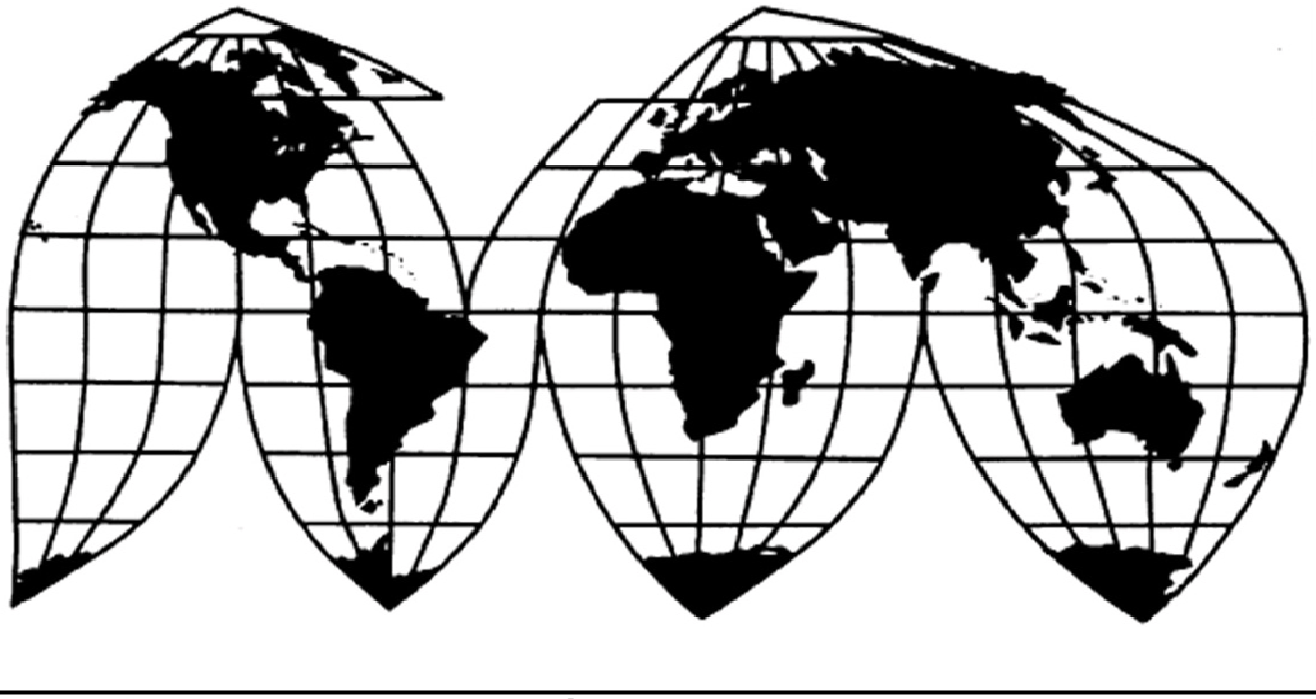
In the Matter of

Certain Light-Emitting Diodes and Products Containing Same

Investigation No. 337-TA-512

Publication 3944 **August 2007**

U.S. International Trade Commission



Washington, DC 20436

U.S. International Trade Commission

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U.S. International Trade Commission

Washington, DC 20436
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In the Matter of

Certain Light-Emitting Diodes and Products Containing Same

Investigation No. 337-TA-512

Publication 3944 **August 2007**

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING SAME	Investigation No. 337-TA-512

NOTICE OF COMMISSION FINAL DETERMINATION OF NO VIOLATION OF SECTION 337 AS TO FIVE PATENTS AND VIOLATION OF SECTION 337 AS TO THREE PATENTS; ISSUANCE OF LIMITED EXCLUSION ORDER; TERMINATION OF INVESTIGATION

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined that there is no violation of 19 U.S.C. § 1337 by Dominant Semiconductors Sdn. Bhd. ("Dominant") with respect to United States Patent Nos. 6,066,861, 6,277,301, 6,613,247, 6,245,259, and 6,592,780 (collectively, the "Particle Size Patents"); that there is a violation by Dominant with respect to United States Patent Nos. 6,376,902, 6,469,321, and 6,573,580 (collectively, the "Lead Frame Patents"); and that the Commission has determined to issue a limited exclusion order.

FOR FURTHER INFORMATION CONTACT: Michelle Walters, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 708-5468. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 205-2000. General information concerning the Commission may also be obtained by accessing its Internet server at *http://www.usitc.gov*. The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at *http://edis.usitc.gov*. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on (202) 205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation based on a complaint filed by Osram GmbH and Osram Opto Semiconductors GmbH, both of Germany (collectively, "Osram"). 69 *Fed. Reg.* 32609 (June 10, 2004). In the complaint, as supplemented and amended, Osram alleged violations of section 337 of the Tariff Act of 1930 in the importation into the United States, the sale for importation, and the sale within the United States after

importation of certain light-emitting diodes and products containing the same by reason of infringement of various claims of the Particle Size Patents, United States Patent No. 6,576,930 (the "'930 patent"), the Lead Frame Patents, and United States Patent No. 6,716,673 (the "'673 patent").

On May 10, 2005, the presiding administrative law judge ("ALJ") issued his final initial determination ("ID") finding the sole remaining respondent, Dominant, in violation of section 337, but only with respect to the '673 patent. The ALJ concluded that the asserted claims of the Particle Size Patents were invalid for indefiniteness, that the '930 patent and the Lead Frame Patents were not infringed by Dominant's accused products, and that Osram did not meet the technical prong of the domestic industry requirement with respect to the '930 patent.

On June 24, 2005, the Commission determined to review the ALJ's findings and conclusions regarding the Particle Size Patents, the '930 patent, and the Lead Frame Patents. 70 *Fed. Reg.* 37431 (June 29, 2005). The Commission declined to review the ALJ's determination of violation of section 337 with respect to the '673 patent.

On review, the Commission determined that the Particle Size Patents were not invalid for indefiniteness and construed the disputed phrase "mean grain diameter d_{50}" to mean average diameter by volume. Inv. No. 337-TA-512, Comm'n Op. at 4-14 (Aug. 12, 2005). The Commission remanded the investigation to the ALJ for a determination on infringement and domestic industry with regard to the Particle Size Patents consistent with the Commission's opinion. In addition, the Commission left open the question whether the asserted claims of the Particle Size Patents are invalid as indefinite for failing to specify the type of instrument that should be used to determine the "mean grain diameter d_{50}." With regard to the '930 patent, the Commission terminated the investigation with a finding of no violation. Finally, the Commission deferred addressing the issue of violation with respect to the Lead Frame Patents, as well as issues relating to remedy, public interest, and bonding. 70 *Fed. Reg.* 48194 (Aug. 16, 2005).

The ALJ issued a remand initial determination ("Remand ID") on October 31, 2005, finding no violation of section 337 with regard to the Particle Size Patents, because Osram failed to show that there was an industry in the United States that practices those patents. The ALJ also concluded that some of Dominant's accused products do not infringe the asserted claims of the Particle Size Patents. Finally, the ALJ declined to revisit the issue of indefiniteness, because Dominant failed to raise it on remand.

In its remand notice, the Commission had invited comments from the parties addressing the ALJ's determination on remand, and on November 10, 2005, Osram filed comments, challenging the Remand ID. 70 *Fed. Reg.* 48194 (Aug. 16, 2005). On November 18, 2005, Dominant and the Commission investigative attorney each filed responses to Osram's comments, asserting that the ALJ's determinations on remand are not erroneous.

Having examined the record of this investigation, including the ALJ's final ID and Remand ID and the submissions of the parties, the Commission has determined (1) that there is no violation of section 337 by Dominant with regard to the Particle Size Patents; (2) that there is a violation of

section 337 by Dominant with regard to the Lead Frame Patents; and (3) to issue a limited exclusion order with respect to the Lead Frame Patents and the '673 patent. The Commission's order was delivered to the President on the day of its issuance.

The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), and in section 210.45 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.45).

By order of the Commission.

Marilyn R. Abbott
Secretary to the Commission

Issued: January 11, 2006

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of	
CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING SAME	Inv. No. 337-TA-512

LIMITED EXCLUSION ORDER

The Commission has determined that there is a violation of section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337), as amended, in the unlawful importation and sale by respondent Dominant Semiconductors Sdn. Bhd. ("Dominant") of certain light-emitting diodes by reason of infringement of one or more of claims 1 and 5-8 of United States Patent No. 6,376,902, claims 1 and 5-8 of United States Patent No. 6,469,321, claims 1, 5-8, and 10-11 of United States Patent No. 6,573,580, and claims 1-3 and 5 of United States Patent No. 6,716,673.

The Commission has also made its determination on the issues of remedy, the public interest, and bonding. The Commission has determined that the appropriate form of relief is a limited exclusion order prohibiting the unlicensed entry of infringing light-emitting diodes that are manufactured abroad by or on behalf of, or imported by or on behalf of, Dominant. The Commission has further determined that the public interest factors enumerated in 19 U.S.C. § 1337(d) do not preclude issuance of the limited exclusion order, and that the bond during the Presidential review period shall be in the amount of 100 percent of the entered value of the light-emitting diodes that are subject to this Order.

Accordingly, the Commission hereby **ORDERS** that:

1. Light-emitting diodes that infringe one or more of claims 1 and 5-8 of United States Patent No. 6,376,902, claims 1 and 5-8 of United States Patent No. 6,469,321, and claims 1, 5-8, and 10-11 of United States Patent No. 6,573,580, and light-emitting diodes that are made by methods that infringe one or more of claims 1-3 and 5 of United States Patent No. 6,716,673, and are manufactured abroad by or on behalf of, or imported by or on behalf of, Dominant Semiconductors Sdn. Bhd., or any of its affiliated companies, parents, subsidiaries, or other related business entities, or any of its successors or assigns, shall be excluded from entry for consumption into the United States, entry for consumption from a foreign trade zone, or withdrawal from a warehouse for consumption, for the remaining term of the patents, except under license of the patent owner or as provided by law.

2. Light-emitting diodes that are excluded by paragraph 1 of this Order are entitled to entry for consumption into the United States, entry for consumption from a foreign trade zone, or withdrawal from a warehouse for consumption, under bond in the amount of 100 percent of the entered value pursuant to subsection (j) of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337(j), from the day after this Order is received by the President until such time as the President notifies the Commission that he approves or disapproves this

action but, in any event, not later than 60 days after the date of receipt of this action.

3. In accordance with 19 U.S.C. § 1337(l), the provisions of this Order shall not apply to light-emitting diodes that are imported by and for the use of the United States, or imported for, and to be used for, the United States with the authorization or consent of the Government.

4. The Commission may modify this Order in accordance with the procedures described in section 210.76 of the Commission's Rules of Practice and Procedure, 19 C.F.R. § 210.76.

5. The Secretary shall serve copies of this Order upon each party of record in this investigation and upon the Department of Health and Human Services, the Department of Justice, the Federal Trade Commission, and the U.S. Bureau of Customs and Border Protection.

6. Notice of this Order shall be published in the *Federal Register*.

By Order of the Commission.

Marilyn R. Abbott
Secretary to the Commission

Issued: January 11, 2006

CERTAIN LIGHT EMITTING DIODES AND PRODUCTS CONTAINAING SAME **337-TA-512**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the **NOTICE OF COMMISSION FINAL DETERMINATION OF NO VIOLATION OF SECTION 337 AS TO FIVE PATENT AND VIOLATION OF SECTION 337 AS TO THREE PATENTS; ISSUANCE OF LIMITED EXCLUSION ORDER; TERMINATION OF INVESTIGATION,** was served upon all parties via first class mail and air mail where necessary on January 11, 2006.

Marilyn R. Abbott, Secretary
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PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING SAME	Investigation No. 337-TA-512

COMMISSION OPINION

On January 11, 2006, the Commission issued notice of its final determination that respondent Dominant Semiconductors Sdn. Bhd. ("Dominant") did not violate section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) ("section 337") with respect to United States Patent Nos. 6,066,861, 6,277,301, 6,613,247, 6,245,259, and 6,592,780 (collectively, the "Particle Size Patents," or respectively, the "'861 patent," the "'301 patent," the "'247 patent," the "'259 patent," and the "'780 patent"). In that same notice, the Commission advised that it had determined that Dominant violated section 337 with respect to United States Patent Nos. 6,376,902, 6,469,321, and 6,573,580 (collectively, the "Lead Frame Patents," or respectively, the "'902 patent," the "'321 patent," and the "'580 patent").[1] This opinion sets forth the reasons for the Commission's determinations.

I. BACKGROUND

A. Procedural History

The Commission instituted the above-captioned investigation on June 10, 2004, based on

[1] Copies of the Particle Size Patents and Lead Frame Patents are attached to this opinion.

a complaint filed by Osram GmbH and Osram Opto Semiconductors GmbH, both of Germany (collectively "Osram"). 69 *Fed. Reg.* 32609 (June 10, 2004). The complaint, as supplemented and amended, alleged violations of section 337 in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain light-emitting diodes ("LEDs") and products containing the same due to infringement of various claims of the Particle Size Patents, the Lead Frame Patents, United States Patent No. 6,576,930 (the "'930 patent"), and United States Patent No. 6,716,673 (the "'673 patent"). Osram originally charged three respondents with infringing its patents: Dominant, American Opto Plus, Inc. ("AOP"), and American Microsemiconductor, Inc. ("AMS"). Respondents AOP and AMS were terminated from the investigation based on settlement agreements, leaving Dominant as the sole respondent.

On May 10, 2005, the presiding administrative law judge ("ALJ") issued his final initial determination ("ID") finding Dominant in violation of section 337 due to infringement of the '673 patent, but finding no violation with regard to the nine other patents. ID at 128-31 & 148-49. He reasoned that Dominant induced infringement of claims 1-3 and 5 of the '673 patent and that Osram met the domestic industry requirement with regard to that patent. *Id.* With respect to the nine other asserted patents, the ALJ found that they were either invalid or not infringed. Specifically, the ALJ concluded that the asserted claims of the Particle Size Patents were invalid as indefinite, because he found the phrase "mean grain diameter d_{50}" insolubly ambiguous. ID at 39. In addition, he concluded that the asserted claims of the Lead Frame Patents and the '930 patent were not infringed by Dominant's accused products and that there was no domestic industry with respect to the '930 patent. ID at 69-70 & 113-17.

The Commission determined not to review the ALJ's determination of violation with respect to the '673 patent, but determined to review the ALJ's determination of no violation with regard to the Particle Size Patents, the '930 patent, and the Lead Frame Patents. 70 *Fed. Reg.* 37431 (June 29, 2005). On review, the Commission determined that the Particle Size Patents were not invalid for indefiniteness and construed the disputed phrase "mean grain diameter d_{50}" to mean average diameter by volume. Inv. No. 337-TA-512, Comm'n Op. at 4-14 (Aug. 12, 2005). The Commission remanded the investigation to the ALJ for a determination on infringement and domestic industry with regard to the Particle Size Patents consistent with the Commission's opinion. *Id.* at 15. In addition, the Commission left open the question of whether the asserted claims of the Particle Size Patents were invalid as indefinite for failing to specify the type of instrument that should be used to determine the "mean grain diameter d_{50}." *Id.* With regard to the '930 patent, the Commission terminated the investigation with a finding of no violation. *Id.* at 26. Finally, the Commission deferred addressing the issue of violation with respect to the Lead Frame Patents, as well as issues relating to remedy, public interest, and bonding. 70 *Fed. Reg.* 48194 (Aug. 16, 2005).

The ALJ issued a remand initial determination ("Remand ID") on October 31, 2005, finding no violation of section 337 with regard to the Particle Size Patents, because Osram failed to show that there was an industry in the United States that practices those patents. Remand ID at 3. The ALJ also concluded that some (but not all) of Dominant's accused products do not infringe the asserted claims of the Particle Size Patents. Remand ID at 4-5. Finally, the ALJ declined to revisit the issue of indefiniteness, because Dominant failed to raise it on remand. Remand ID at 20.

In its remand notice, the Commission had invited comments from the parties addressing the ALJ's determination on remand, and on November 10, 2005, Osram filed comments, challenging the Remand ID. 70 *Fed. Reg.* 48194 (Aug. 16, 2005). On November 18, 2005, Dominant and the Commission investigative attorney each filed responses to Osram's comments, asserting that the ALJ's determinations on remand are not erroneous.

B. Patents and Products at Issue

Only two sets of patents remain under consideration in this investigation with respect to the question of violation, the Particle Size Patents and the Lead Frame Patents. The Particle Size Patents relate to casting compositions that convert light emitted by a semiconductor to light of a different wavelength. Osram alleges that Dominant's white DomiLEDs, Power DomiLEDs, Super Small DomiLEDs, Spice LEDs, and NovaLEDs infringe claims 1, 3, 6-7, and 10-13 of the '861 patent; claims 1-2, 6-7, 11-12, and 14-15 of the '301 patent; claims 1, 3, 6-7, 10-15, 17, and 20-21 of the '247 patent; claims 1, 3, 6-7, 10-13, and 15 of the '259 patent; and claims 2-5, 7, and 10 of the '780 patent. The Lead Frame Patents relate to optoelectrical structural elements having a number of external connections for improved conduction of heat away from a semiconductor chip. Osram asserts that Dominant's white and non-white Power DomiLEDs infringe claims 1 and 5-8 of the '902 patent; claims 1 and 5-8 of the '321 patent; and claims 1, 5-8, and 10-11 of the '580 patent.

II. ANALYSIS

A. The Particle Size Patents

The ALJ concluded that Dominant's accused LEDs containing phosphor [ ] ("F-series phosphor"), which has a mean grain diameter of [ ] micrometers ("μm"), literally

infringe the asserted claims of the Particle Size Patents. Remand ID at 4-5. The ALJ, however, concluded that Dominant's accused LEDs containing phosphors [

] ("N-series phosphors"), which have mean grain diameters of [ ] μm and [ ] μm, respectively, do not infringe the asserted claims of the Particle Size Patents literally or under the doctrine of equivalents. Remand ID at 5. He concluded that they do not literally meet the "mean grain diameter d_{50}" limitation and that finding phosphors that have a mean grain diameter *greater than* 5 μm equivalent to the claim element "mean grain diameter $d_{50} \leq 5$ μm" would entirely vitiate the claim limitation. Remand ID at 5 & 11. The ALJ also concluded that prosecution history estoppel does not apply to preclude application of the doctrine of equivalents and that Osram failed to show that Dominant's N-series phosphors are equivalent to the claimed pigment. Remand ID at 14-15. With respect to the domestic industry requirement, the ALJ concluded that Osram failed to satisfy the technical prong, because Osram did not prove that its phosphors have a mean grain diameter less than or equal to 5 μm. Remand ID at 17-19. Finally, the ALJ concluded that a determination of whether the Particle Size Patents are invalid as indefinite for failing to specify the instrument's type was unnecessary, because Dominant failed to raise the issue on remand. Remand ID at 20. For the reasons discussed below, we agree with the ALJ that Osram has not shown that Dominant's accused products containing the N-series phosphors infringe the asserted claims in the Particle Size Patents either literally or under the doctrine of equivalents, but disagree with the ALJ's analysis of prosecution history estoppel. We also agree with the ALJ that Osram has not shown that there is an industry in the United States that practices those patents and that there is no reason to revisit the issue of indefiniteness.

1. Infringement

Claim construction is the first step in any infringement analysis. *See Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1454 (Fed. Cir. 1998) (*en banc*). The second step entails a comparison between the properly construed claims and the allegedly infringing device. *Id.* Claim 1 of the '861 patent is representative of the independent claims at issue in the Particle Size Patents:

> A wavelength-converting casting composition, for converting a wavelength of ultraviolet, blue or green light emitted by an electroluminescent component, comprising:
>
> a transparent epoxy resin;
>
> an inorganic luminous substance pigment powder dispersed in said transparent epoxy resin, said pigment powder comprising luminous substance pigments from a phosphorus [sic] group having the general formula $A_3B_5X_{12}$:M, where A is an element selected from the group consisting of Y, Ca, Sr; B is an element selected from the group consisting of Al, Ga, Si; X is an element selected from the group consisting of O and S; M is an element selected from the group consisting of Ce and Tb;
>
> said luminous pigments having grain sizes ≤ 20 μm and a **mean grain diameter $d_{50} \leq 5$ μm.**

'861 patent, col. 10, ll. 14-29 (emphasis added). The claim language at issue is identified in bold. In our opinion dated August 12, 2005, we construed the phrase "mean grain diameter d_{50}" to mean average diameter by volume. Comm'n Op. at 4-14. Now, we consider the comparison of the asserted claims with the accused products.

Dominant does not contest the ALJ's conclusion that its accused LEDs containing F-series phosphor infringe the asserted claims of the Particle Size Patents. Similarly, Osram does not contest the ALJ's conclusion that the LEDs containing N-series phosphors do not literally infringe those claims. Hence, we adopt those portions of the ALJ's Remand ID. Osram does, however, challenge the ALJ's determination that Dominant's accused LEDs containing N-series phosphors do not infringe the asserted claims under the doctrine of equivalents. We agree with

the ALJ that a finding of equivalence in this instance would vitiate the mean grain diameter limitation for the reasons discussed in *Moore U.S.A., Inc. v. Standard Register Co.*, 229 F.3d 1091 (Fed. Cir. 2000). In addition, we find *Abbott Laboratories v. Dey L.P.*, 287 F.3d 1097, 1107-08 (Fed. Cir. 2002), to be distinguishable from the present case, not only due to the difference in claim language used, but also because application of the doctrine of equivalents in *Abbott* did not eliminate an upper limit from the range as it would here.

We also agree that, alternatively, Osram has not shown that Dominant's N-series phosphors are insubstantially different from the claimed pigments. Osram had the burden of proving infringement under the doctrine of equivalents by a preponderance of the evidence, but failed to satisfy its burden. *See Cross Med. Prods. Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1310 (Fed. Cir. 2005). Osram points to Dominant's witness, Mr. Low, who is argued to have testified that Dominant's products containing F-series and N-series phosphors perform the same function in the same way to achieve the same result. Complainants' Petition for Review by the Commission at 15-16. Mr. Low's testimony, however, is merely conclusory and does not speak to the issue here, namely, whether the N-series phosphors are equivalent to the claimed pigments. Instead, Mr. Low compares Dominant's LED devices as a whole to each other. This comparison is irrelevant to a determination of infringement. Dr. Zachau's testimony suffers from the same defects. *Id.* at 22-23. Indeed, Osram does not provide any persuasive evidence suggesting that the function, way, and result of the claimed element are insubstantially different from the alleged equivalent.

The specification of the '861 patent indicates that the function of the claimed pigments having a mean grain diameter less than or equal to 5 μm is to convert light from one wavelength

to another, thereby resulting in homogenous light, and, by avoiding clumping, to minimize sedimentation in production and processing. *See* '861 patent, col. 1, ll. 63-67, col. 2, ll. 1-3, col. 3, ll. 16-28, & col. 4, ll. 47-54; CX-1301C at 16-18 (Waitl Direct); CX-1303C at 20-21 (Strauβ Direct); CX-1311C at 10-12 (Zachau Direct); Zachau, Tr. at 690-91. We agree with the ALJ that Osram failed to show that the accused particles perform substantially the same function as the claimed pigments. While the specification indicates that "[e]ssentially no problems of wetting and/or sedimentation occur" in the novel composition having the claimed particles, it is clear that Dominant's phosphor particles sediment during production and processing. *See id.* at col. 3, ll. 27-28; CX-1303C at 7-8 (Strauβ Direct); CDX-191.

Moreover, while there is evidence that the N-series phosphors convert light from one wavelength to another, resulting in homogenous light, *see* CX-1312C at 43 (Zachau Direct), Osram has failed to show that they do so in substantially the same way. The claims require that the pigments have a mean grain diameter less than or equal to 5 μm. Dominant's N-series phosphors, however, have a mean grain diameter of [ ] μm and [ ] μm, both of which are more than [ ] greater than recited mean grain diameter. RX-431C; Nauman, Tr. at 360. A change of this magnitude can hardly be regarded as insubstantial. In addition, Osram expended considerable effort explaining that large particles are inferior to small particles, because they sediment, thereby interfering with the light emission and with the manufacturing processes. Zachau, Tr. at 690-91; CX-1311C at 10-12 (Zachau Direct); CX-1303C at 20-22 (Strauβ Direct). Osram cannot now assert that particles with a mean grain diameter larger than 5 μm are insubstantially different from the claimed particles. Such an assertion is unsupported by the evidence. Accordingly, we adopt the ALJ's determination that Dominant's accused LEDs do not

infringe the asserted claims of the Particle Size Patents under the doctrine of equivalents.

Although we agree with the ALJ's ultimate conclusion of no infringement under the doctrine of equivalents, we disagree with his conclusion that prosecution history estoppel does not apply to the asserted claims as Dominant argued. The ALJ reasoned that "the claimed particle size limitation was included in nearly every set of claims as originally filed and was not added to overcome an obviousness prior art rejection based on [the asserted prior art]." Remand ID at 14-15. Although the particle size limitation was present in nearly every asserted independent claim as originally filed, the single instance where it was not included resulted in prosecution history estoppel.

During prosecution of the application that lead to the '301 patent, Osram amended independent claim 1 by adding the disputed mean grain diameter limitation in an attempt to distinguish the claims from the prior art references relied upon by the examiner. CX-13 at OS 120580. This amendment was a narrowing one substantially related to patentability, thereby invoking a presumption that Osram surrendered all equivalents relating to the amended element. This presumption can only be overcome if "[t]he equivalent [was] unforeseeable at the time of the application; the rationale underlying the amendment [bears] no more than a tangential relation to the equivalent in question; or there [was] some other reason suggesting that the patentee could not reasonably be expected to have described the insubstantial substitute in question." *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, 535 U.S. 722, 740-41 (2002).

That was not the case here. We cannot conclude that particles with larger sizes were unforeseeable at the time of the invention. Indeed, Dr. Zachau testified that Osram experimented

with large particles before reducing the particle size. CX-1311C at 5-12 (Zachau Direct). In addition, we cannot conclude that the addition of a maximum mean size is tangential to the alleged equivalent, which exceeds that maximum. Finally, there appears to be no other reason that the patentee could not reasonably have been expected to describe the substitute in question. Accordingly, the presumption stands that Osram surrendered all equivalents relating to the amended particle size limitation in claim 1 of the '301 patent.

This contraction of scope of equivalents applies with equal force to other claims in the same application and to claims in continuing applications that include the same limitation, even though they were not amended. *See Glaxo Wellcome, Inc. v. Impax Labs., Inc.*, 356 F.3d 1348, 1356 (Fed. Cir. 2004) ("[T]he Festo bar to the doctrine of equivalents applies to all of the [']798 claims containing the 'critical' HPMC limitation."); *see also Biovail Corp. Int'l v. Andrx Pharm., Inc.*, 239 F.3d 1297, 1304 (Fed. Cir. 2001); *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 980 (Fed. Cir. 1999). We note that prosecution history estoppel does not apply to the '861 patent, because it is the parent of the '301 patent. The application of prosecution history estoppel does not change our ultimate conclusion that Dominant's LEDs that contain the N-series phosphor do not infringe the asserted claims of the Particle Size Patents under the doctrine of equivalents.

2. Domestic Industry

We agree with the ALJ that Osram did not satisfy its burden of proof with regard to the technical prong of the domestic industry, because Osram failed to prove that the mean grain diameter of its phosphor is less than or equal to 5 μm. Accordingly, we adopt that portion of the ALJ's Remand ID.

3. Invalidity

We also agree with the ALJ that a determination of whether the Particle Size Patents are invalid as indefinite for failing to specify the type of instrument that should be used to determine the "mean grain diameter d_{50}" is unnecessary, because Dominant failed to raise the issue on remand. Accordingly, we adopt that portion of the ALJ's Remand ID.

B. The Lead Frame Patents

The Lead Frame Patents were not remanded to the ALJ, their consideration being deferred until after the conclusion of the remand. Accordingly, we now address the ALJ's final ID issued on May 10, 2005 with regard to the Lead Frame Patents. In that final ID, the ALJ determined that Dominant's accused device, the Power DomiLED, does not literally infringe the Lead Frame Patents, because it lacks a third external connection that is "thermally conductively connected" to the chip carrier part of the LED and because that connection does not "start[ ] from said chip carrier part [and] run toward the outside in a stellate form." ID at 95-107. Further, he determined that, although the accused device's third ground lead is equivalent to the recited external connection with respect to the requirement that it be "thermally conductively connected" to the chip carrier part, it is not equivalent with respect to the requirement that it "start[ ] from said chip carrier part [and] run toward the outside in a stellate form." ID at 113. Accordingly, he concluded that Dominant's Power DomiLED does not infringe any of the asserted claims of the Lead Frame Patents. For the reasons discussed below, we disagree with the ALJ's conclusion of no infringement and find infringement under the doctrine of equivalents.

1. Claim Construction

Claim 1 of the '902 patent is representative of the independent claims at issue in the Lead Frame Patents. The phrases under consideration are identified in bold below:

> An optoelectronic surface-mountable structural element (SMD), comprising:
>
> a lead frame having a chip carrier part, external connections, and a connection part disposed at a distance from said chip carrier part, at least three of said external connections being heat-conducting connections **thermally conductively connected** to said chip carrier part;
>
> an optoelectronic chip heat-conductively connected to said chip carrier part of said lead frame, said optoelectronic chip having an electrical contact electrically conductively connected to said connection part; and
>
> a casing having a foundation encasing said optoelectronic chip and a part of said lead frame, said foundation having a first main surface and an outward facing second main surface disposed opposite said first main surface, said external connections and said connection part project outside of said casing, said external connections and said connection part being bent outside of said foundation toward said outward-facing second main surface of said foundation and in a further course being further bent one of below said foundation toward a center of said outward-facing second main surface and away from said foundation for forming rocker-shaped connection stumps, said at least three of said external connections projecting from said casing on at least two sides of said casing at different places at a distance from each other, said heat-conducting connections as seen in a top view of said lead frame projecting from said casing on at least two sides and **starting from said chip carrier part run toward the outside in a stellate form within said casing and separately from each other**.

'902 patent, col. 7, ll. 31-62 (emphasis added).

The ALJ construed several claim terms of the Lead Frame Patents, and we adopt his claim construction in its entirety. Further, we add a construction for the phrase "start from," which was not originally construed. The claims and specification of the '902 patent illustrate that the words "start" and "from" are used in their ordinary context and that the inventor did not ascribe any special meaning or add any requirements to the terms. *See* '902 patent, col. 2, l. 67 to col. 3, ll. 1-3; col. 7, ll. 61-63. There are many "ordinary meanings" of the term "start;"

however, in the context of the claims, the appropriate ordinary meaning is "**[6] b** : to range from a specified initial point" and "**[2] d** : a place of beginning : point of departure." WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 2227 (2002); *see also* SHORTER OXFORD ENGLISH DICTIONARY 3006 (5th ed. 2002). Likewise, the term "from" is "**1** – used as a function word to indicate a starting point." WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY at 913; *see also* SHORTER OXFORD ENGLISH DICTIONARY at 1039. Accordingly, we construe the phrase "start from" to mean "to range from a specified starting point."

2. Infringement

As noted above, infringement involves comparison of the properly construed claims with an accused device. *Cybor*, 138 F.3d at 1454. The accused device, Dominant's Power DomiLED, is illustrated below with the added labels:

[

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a. Literal Infringement

The ALJ concluded that Dominant's Power DomiLED literally meets all of the limitations of the asserted independent claims in the Lead Frame Patents, except for the "thermally conductively connected" limitation and the "start[ ] from said chip carrier part [and] run toward the outside in a stellate form" limitation. ID at 95-107. The ALJ concluded that the limitation "thermally conductively connected" is not literally present, because Lead 2 is not "connected" to the chip carrier part. ID at 101. We disagree. The ALJ construed the phrase "thermally conductively connected" to mean "connected to provide thermal conduction away from the chip carrier part." ID at 87. The ALJ applied this construction to require a direct physical connection between Lead 2 and the chip carrier part. We find that the ALJ's claim construction, while correct, does not require a direct physical connection between Lead 2 and the chip carrier part.

Applying the ALJ's claim construction, we find that there is ample evidence suggesting that Lead 2 is connected to provide thermal conduction away from the chip carrier part. First, the evidence illustrates that the [

]. CX-1302C at 29 (Bar-Cohen Direct); CX-194C; CDX-42. Even though the [

], "inefficient infringement is infringement still." *See Shamrock Techs., Inc. v. Med. Sterilization, Inc.*, 903 F.2d 789, 792 (Fed. Cir. 1990). Second, infrared photographs taken of the Power DomiLED during operation illustrate that Lead 2 conducts

thermal energy away from the chip carrier part.[2] CX-1302C at 34-36 (Bar-Cohen Direct); CDX-47; CX-266. The photo below shows that, during operation, Lead 2 increases in temperature as do the two contiguous leads. CX-266; Bar-Cohen, Tr. at 262-66. The fourth lead (*i.e.*, the one connected by a bond wire), however, does not increase in temperature relative to the board at all. Although the temperature at Lead 2 is not as high as leads 3 and 4, the claim does not require that all three external connections dissipate the same amount of heat, rather only that they be "thermally conductively connected" to the chip carrier part.

[

]

Finally, thermocouple measurements of the leads confirm that Lead 2 increases in temperature

[2] Dominant's assertion that Osram's thermal tests are of questionable reliability, because they test Dominant's Power DomiLED, which contains a [ ], and Osram's Power TopLED, which contains a [ ], is unpersuasive. *See* Response of Respondent Dominant Semiconductors Sdn. Bhd. to the Notice of Commission Determination to Review a Final Determination on Violation of Section 337 ("Dom. Sub.") at 89. In assessing infringement, we compare the accused device with the claimed invention, not the patentee's commercial embodiment. *Johnson & Johnston Assoc. Inc. v. R.E. Serv. Co., Inc.*, 285 F.3d 1046, 1052 (Fed. Cir. 2002). Therefore, Osram's Power TopLED is not relevant to this inquiry.

when a current is applied to the chip and that the heat is not merely a backward flow of thermal energy from the circuit board to Lead 2. CX-1302C at 36-41 (Bar-Cohen Direct); CDX-49 & 50; CX-263. Accordingly, the preponderance of the evidence shows that Lead 2 is literally thermally conductively connected to the chip carrier part as required by claim 1. *See Centricut, LLC v. Esab Group, Inc.*, 390 F.3d 1361, 1367 (Fed. Cir. 2004). Nevertheless, we agree with the ALJ that the final limitation, reciting "starting from said chip carrier part run toward the outside in a stellate form within said casing and separately from each other," is not literally present in the accused device, because Lead 2 does not itself "start from" the chip carrier part. *See* CX-397C. Accordingly, there is no literal infringement.

b. Doctrine of Equivalents

Since all of the limitations of claim 1 of the '902 patent, save one, are literally present in the accused device, we only consider whether the Power DomiLED has an equivalent to the limitation "starting from said chip carrier part run toward the outside in a stellate form within said casing and separately from each other."[3] The ALJ concluded that the "Power DomiLED does not have three external connections that start from the chip carrier part; it only has two." ID at 113. Further, he determined that the two external connections run in parallel directions and, therefore, do not satisfy the stellate form limitation. *Id.* As discussed below, we disagree.

In order to establish infringement under the doctrine of equivalents, each limitation in the claim must be met either literally or equivalently. *See Dolly, Inc. v. Spalding & Evenflo Cos.,*

[3] During prosecution, no claims were rejected and no amendments were made to the claims of the '902 patent, the '321 patent, or the '580 patent; thus, the scope of equivalents is not narrowed by prosecution history estoppel as discussed in *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, 535 U.S. 722 (2002).

Inc., 16 F.3d 394, 397 (Fed. Cir. 1994). Determining equivalence generally includes consideration of whether the "function, way, or result" of an accused substitute structure is substantially different from that described by the claimed limitation. *See Odetics, Inc. v. Storage Tech. Corp.*, 185 F.3d 1259, 1267 (Fed. Cir. 1999) (quoting *Warner-Jenkinson Co., Inc. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 39-40 (1997)).

The ALJ improperly excluded the [ ] from his consideration of infringement under the doctrine of equivalents. The Federal Circuit instructs that additional components can be considered during a doctrine of equivalents analysis. *Dolly*, 16 F.3d at 398 ("An accused device may infringe under the doctrine of equivalents even though a combination of its components performs a function performed by a single element in the patented invention."); *see also Intel Corp. v. U.S. Int'l Trade Comm'n*, 946 F.2d 821, 832 (Fed. Cir. 1991). The properly framed issue, therefore, is whether the three ground leads plus the [ ] found in the accused device are equivalent to the three external connections recited in the claims with respect to the "starting from" limitation. Based on the function-way-result test, we conclude that they are.

The function of the external connections, according to the claims, is to conduct heat from the chip carrier part to the external connections. '902 patent, col. 7, ll. 34-39. The specification indicates that they also transfer electricity. *Id.* at col. 4, ll. 63-67. Dominant does not dispute that all of its ground leads, including Lead 2, conduct electricity. *See* Respondent's Reply to the Staff Attorney's and Complainants' Submissions on the Issues under Review and on Remedy, the Public Interest, and Bonding ("Dom. Reply Sub.") at 83. Further, as discussed above with regard to literal infringement, all three ground leads in the Power DomiLED, including the [ ], conduct heat from the chip carrier part to the external connections. *See*

CX-1302C at 34-41 (Bar-Cohen Direct); CX-1313C at 2-4 (Bar-Cohen Direct Rebuttal); Bar-Cohen, Tr. at 262-66; CX-263; CX-266.

Dominant's main argument, therefore, comes down to an assertion that the [ ] is less efficient at conducting thermal energy than external connections that literally start from the chip carrier part. *See* Dom. Sub. at 89. The Federal Circuit, however, has consistently held that differences in efficiency, either decreases or increases, are the types of differences "which fail to avoid infringement because of the doctrine of equivalents." *Yarway Corp. v. Eur-Control USA, Inc.*, 775 F.2d 268, 275 (Fed. Cir. 1985); *see also Laitram Corp. v. Cambridge Wire Cloth Co.*, 863 F.2d 855, 859 (Fed. Cir. 1988); *Insituform Techs., Inc. v. Cat Contracting, Inc.*, 161 F.3d 688, 693 (Fed. Cir. 1998). Accordingly, the difference in efficiency is insubstantial and does not preclude a finding that all three ground leads perform the same function as the claimed limitation.

The claims themselves describe the way in which the claimed external connections transfer heat and electricity; they (a) start from the chip carrier part and (b) run toward the outside in a stellate form within the casing and separately from each other. *See* '902 patent, col. 7, ll. 59-63. The three ground leads perform the function described above in substantially the same way as the claimed external connections. In fact, two of the ground leads start directly from the chip carrier part and perform the function in exactly the same way. The third lead, Lead 2, does not literally range from the chip carrier part as required by the claim; however, the evidence illustrates that Lead 2 starts from the [ ], which in turn starts from the chip carrier part. *See* CX-397C; RX-50. *See also Richardson v. Suzuki Motor Co., Ltd.*, 868 F.2d 1226, 1239 (Fed. Cir. 1989); *Ethicon Endo-Surgery, Inc. v. U.S. Surgical Corp.*, 149 F.3d 1309,

1317 (Fed. Cir. 1998) (stating that the "all-elements" rule should not be applied to reduce the application of infringement under the doctrine of equivalents to "nothing more than a repeated analysis of literal infringement"). As such, [ ] "start from" the chip carrier part, and although the Power DomiLED accomplishes the function in a slightly different way, the difference is insubstantial, especially since claim 1 does not require that the external connections be contiguous with the chip carrier part. *See* CX-1313C at 2-4 (Bar-Cohen Direct Rebuttal). Thus, in our view, the evidence supports the conclusion that the ground leads and the [ ] in the Power DomiLED perform the same function in substantially the same way as the claimed limitation.

This situation differs from *Asyst Techs., Inc. v. Emtrak, Inc.*, 402 F.3d 1188 (Fed. Cir. 2005), where the Federal Circuit concluded that the claimed phrase "mounted on" is binary (*i.e.*, the second microcomputer is either mounted or unmounted), so the fact that the microcomputer in the accused device was unmounted precluded a finding of infringement. In *Asyst*, the accused equivalent did not meet the claim limitation, because it was unmounted. *Asyst*, 402 F.3d at 1195. In the present case, on the other hand, the alleged equivalent [ ] actually meets the recited claim limitation, because the [ ] starts from the chip carrier part. *See Richardson*, 868 F.2d at 1239 (holding that a spring that was pivotally secured to a swing arm that, in turn, was pivotally secured to a frame was equivalent to a "spring means having a first end pivotally secured to said frame"); *see also Riles v. Shell Exploration and Prod. Co.*, 298 F.3d 1302, 1310 (Fed. Cir. 2002) (holding that the record supported a jury's finding that a device that transferred a platform's load from a metal frame through wood timbers to metal support pilings was equivalent to a device that transferred a platform's load through "a

metal-to-metal bearing contact").

Moreover, the ground leads perform the requisite function by running toward the outside in a stellate form within the casing and separately from each other as required by claim 1. Since the ALJ concluded that Lead 2 does not start from the chip carrier part, he did not consider it when he turned to the "stellate form" limitation. Instead, he only considered the two ground leads that he found satisfied the external connections' limitations. ID at 106-07. Because we conclude that the [ ] starts from the chip carrier part, we include it in our analysis of the stellate form and conclude that the three ground leads and [ ] perform the function in this way. CX-397C; CX-1302C at 50 (Bar-Cohen Direct). As the ALJ determined, the term "stellate" means "star shaped." "Stellate form" refers to the external connections' resemblance of a star. Accordingly, after considering the schematic of Dominant's Power DomiLED, it is evident that the three ground leads plus the [ ] run toward the outside of the LED in a shape that resembles a star and are separate from each other.[4] *See* CX-397C; RX-50. Therefore, the ground leads in the Power DomiLED perform the same function in substantially the same way as the claimed limitation.

Finally, we conclude that the claimed limitation and the [ ] achieve the same result. The claimed external connections result in heat being transferred away from the optoelectronic chip, so that it cools down and does not become impaired due to excessive heat. *See* '902 patent, col. 1, ll. 63-67, col. 2, ll. 1-18, & claim 1; *see also* CX-1302C at 6-9 (Bar-Cohen Direct). Likewise, the ground leads of Dominant's Power DomiLED transfer

[4] Dominant did not argue that the three ground leads together fail to make a star shape, but rather only that the two leads it considered to be external connections fail to form a star shape. Dom. Reply Sub. at 83-84.

heat away from the optoelectronic chip. *See* CX-266. We are unaware of any evidence that suggests that Dominant's ground leads do not dissipate enough heat to prevent the chip from becoming impaired. In fact, Mr. Low, a member of Dominant's board of directors and Dominant's head of research and development, attributes the Power DomiLED's ability to function at high current rates to the addition of extra heat-dissipating ground leads. *See* CX-407C ("The Power DomiLED series of devices were designed for high current drive. Its high current drive capability is derived from the package's greater capacity to dissipate heat. Heat dissipation is enhanced by the improved lead-frame design where [

]. These [ ] enable heat to dissipate more rapidly compared to the existing DomiLED devices [ ]."). Accordingly, the result of the accused device's ground leads is the same as the claimed external connections.

Thus, Osram has shown by a preponderance of the evidence that the [

] and the claimed external connection perform the same function in substantially the same way to achieve the same result as the claimed limitation. Therefore, the three ground leads plus the [ ] found in the Power DomiLED are equivalent to the claimed external connections, and the accused LEDs infringe claim 1 of the '902 patent. Since claim 1 of the '321 patent and claim 1 of the '580 patent contain the same disputed terms and the ALJ found that the other limitations of these claims are met, we conclude that they are also infringed by the Power DomiLEDs under the doctrine of equivalents.

c. Dependent Claims

The ALJ concluded that the additional limitations found in dependent claims 5-8 of the '902 patent are literally met. We adopt his findings and determine that these claims are infringed

by the Power DomiLEDs under the doctrine of equivalents. The ALJ, however, did not specifically make any findings of fact with regard to the dependent claims asserted in the '321 patent or the '580 patent. However, we note that the dependent claims are substantially similar to those asserted in the '902 patent and, therefore, the same evidence and findings made by the ALJ with regard to the '902 patent can be relied upon for these claims. ID at 114-16.

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] *See* CX-1302C at 61-62 & 72 (Bar-Cohen Direct); CDX-68 & 69; CX-404C. Claim 10 of the '580 patent recites that, starting from the chip carrier part, the "external connections run apart within said casing first in a stellate form

and then break to perpendicularly penetrate said side surfaces." [

] *See* CX-1302C at 72-73 (Bar-Cohen Direct); CDX-80; CX-397C. Finally, claim 11 of the '580 patent recites that the casing has a foundation and that at least three separate external connections and the connection part are "bent outside of said foundation toward said second main surface and in a further course being bent in a manner selected from a group consisting of being bent below the casing toward a center of said second main surface and being bent away from said casing for forming rocker-shaped connection stumps." [

] *See* CX-1302C at 73-74 (Bar-Cohen Direct); CDX-81; CX-265; CX-407C. [

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3. Domestic Industry

We agree with the ALJ that Osram satisfied the domestic industry requirement with regard to the Lead Frame Patents and adopt the ALJ's determination.

4. Invalidity

We agree with, and adopt, the ALJ's construction of the term "stellate form," which disposes of Dominant's assertion that the claims in the Lead Frame Patents are invalid in light of the asserted prior art. Accordingly, we adopt the ALJ's determination that the claimed invention is not anticipated or rendered obvious by the prior art of record.

C. Remedy, Public Interest, and Bonding

The Commission is authorized to issue a limited exclusion order when the Commission determines that there is a violation of section 337. 19 U.S.C. § 1337(d). In addition to, or in lieu

of, an exclusion order, the Commission is also authorized to issue a cease and desist order directing a person to cease and desist from engaging in the unfair methods or acts involved in the investigation. *Id.* § 1337(f)(1). Osram requests that the Commission enter a permanent, limited exclusion order prohibiting the importation into the United States of Dominant's infringing LED products and a cease and desist order prohibiting Dominant and its distributors, representatives, and customers from selling, advertising, marketing, storing, demonstrating, or testing the infringing LEDs in the United States. Complainant's Submission in Support of Commission's Review of Final Initial Determination at 116. Osram requests that the orders cover not only the accused LEDs themselves, but also downstream products that incorporate LEDs, such as automotive products and cell phones, and requests a certification procedure for the downstream products. *Id.*

We have determined to issue a limited exclusion order directed to Dominant's light-emitting diodes that infringe one or more of the asserted claims of the Lead Frame Patents (claims 1 and 5-8 of the '902 patent, claims 1 and 5-8 of the '321 patent, and claims 1, 5-8, and 10-11 of the '580 patent) and directed to Dominant's light-emitting diodes that are made by methods that infringe one or more of claims 1-3 and 5 of the '673 patent. We agree with the ALJ that the order should not cover downstream products or include Osram's requested certification provision, because to do so would unduly expand the coverage of the exclusion order to include downstream products that are disproportionately priced relative to the LEDs at issue and would unduly interfere with legitimate commerce. *Certain Eraseable Programmable Read-Only Memories*, Inv. No. 337-TA-276, USITC Pub. 2196, Comm'n Op. at 124-26 (May 1989), *aff'd sub nom. Hyundai Elec. Indus. Co. v. U.S. Int'l Trade Comm'n*, 899 F.2d 1024 (Fed. Cir. 1990).

We have declined to issue a cease and desist order, because, although Osram points to evidence suggesting that there are commercially significant domestic inventories of infringing Dominant LEDs, *see, e.g.*, CX-1335, CX-1337, CX-1338C, we agree with the ALJ that Osram has not shown that Dominant maintains those inventories. Instead, it is clear that the inventories identified by Osram are owned by third parties. Accordingly, we decline to issue a cease and desist order against Dominant.

Further, we find that consideration of the public interest factors in 19 U.S.C. § 1337(d)(1) does not preclude issuance of the limited exclusion order. Dominant has not shown that the public health and welfare will be harmed by the exclusion of its LEDs. Further, competitive conditions favor protection of intellectual property over inexpensive copies, and exclusion of the infringing LEDs would not harm competition, because there are sufficient non-infringing and licensed replacements to supply the domestic market.

We have determined to set the temporary importation bond for the Presidential review period at 100 percent of the entered value of the infringing light emitting diodes. The licensing agreements proffered by Dominant contain mixed terms, including lump sum payments and royalty rates. *See* complaint and accompanying licenses. Accordingly, it is difficult to determine what rate the parties would have negotiated had they only selected a royalty rate. Thus, it is not possible to set the bond based on a royalty rate. In addition, there is no information relating to the price of Osram's LEDs in order to determine the price differential between the patented and infringing goods. When a price differential cannot be established, the Commission has found that a 100 percent bond is justified. *See Certain Flash Memory Circuits and Prods. Containing Same*, Inv. No. 337-TA-382, USITC Pub. 3046, Comm'n Op. at 26-27

(July 1997). Accordingly, a 100 percent bond is "sufficient to protect the complainant from any injury." 19 U.S.C. § 1337(e)(1).

III. CONCLUSION

For the reasons discussed herein, the Commission terminates this investigation with a finding of no violation of section 337 with regard to the Particle Size Patents and a finding of violation of section 337 with regard to the Lead Frame Patents.

By Order of the Commission.

/S/

Marilyn R. Abbott
Secretary to the Commission

Issued: January 26, 2006

PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of	
CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING SAME	**Inv. No. 337-TA-512**

INITIAL DETERMINATION ON REMAND REGARDING THE PARTICLE SIZE PATENTS

Administrative Law Judge Charles E. Bullock

(October 31, 2005)

I. Background

The undersigned issued an Initial Determination in this investigation on May 10, 2005. On August 10, 2005, the Commission gave notice of its decision and order to remand part of this investigation to the undersigned for further proceedings and findings in light of certain determinations made by the Commission.[1] On August 12, 2005, the Commission issued its Opinion in this matter.[2]

In its review of the ID, the Commission reversed on the legal issue of indefiniteness of the term "mean grain diameter d_{50}" with respect to the Particle Size Patents and construed the claim

[1] *See* Notice of Commission Final Determination of no Violation of Section 337 as to One Patent and Determination to Remand the Investigation as to Certain Other Patents; and Order (August 10, 2005).

[2] *See* Commission Opinion (August 12, 2005).

limitation as "the average diameter based on the volume of particles."[3] The Commission further ordered the undersigned to make a determination of whether there is a violation of Section 337 with respect to the Particle Size Patents by October 11, 2005.[4] On October 4, 2005, the undersigned issued Order No. 33: Initial Determination Extending Target Date to January 10, 2006, extending the deadline for issuing the recommended determination by one-month to November 10, 2005. On October 12, 2005, the Commission issued a notice of decision not to review the initial determination.

Only issues of law, not fact, were reviewed by the Commission that led to this remand.[5] As an extensive factual record has already been made in this investigation, the undersigned did not reopen the record or order any further discovery or taking of evidence in this investigation. On August 16, 2005, the undersigned issued Order No. 32 regarding the remand. The undersigned permitted the parties[6] to present their cases and affirmative defenses through initial and reply briefs on the remand issues on the basis of the factual record already presented in the investigation. The parties briefs were limited to changes in light of the Commission's claim construction in the ID's determination regarding the Particle Size Patents on the issues of: (i) literal infringement and infringement under the doctrine of equivalents; (ii) practice of patent claims originally at issue that are affected by the Commission Order in connection with the technical prong of the domestic

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[3] *See* Commission Order ¶ 1; Commission Opinion at 4, 14.

[4] *See* Commission Order ¶¶ 1-2; Commission Opinion at 25-26.

[5] *See Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 970-71 (Fed. Cir. 1995) ("the interpretation and construction of patent claims, which define the scope of the patentee's rights under the patent, is a matter of law exclusively for the court"), *aff'd*, 517 U.S. 370 (1996).

[6] The parties include Complainants OSRAM GmbH and OSRAM Opto Semiconductors GmbH (collectively "Osram" or "Complainants"; Respondent Dominant Semiconductors Sdn. Bhd. ("Dominant"); and the Commission Investigative Staff ("Staff").

industry requirement under 19 U.S.C. § 1337(a)(2) on the part of the domestic products that were originally identified at the hearing as practicing those claims; and (iii) indefiniteness based on failure to specify which type of instrument should be used to ascertain the mean. On August 30, 2005, the parties filed their initial remand briefs. On September 9, 2005, the parties filed their reply remand briefs.

The Administrative Law Judge hereby determines that a violation of Section 337 of the Tariff Act of 1930, as amended, has not been found in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain light-emitting diodes and products containing same in connection with claims 1, 3, 6-7, and 10-13 of U.S. Patent No. 6,066,861 ("the '861 patent"); claims 1, 3, 6, 7, 10-13, and 15 of U.S. Patent No. 6,245,259 ("the '259 patent"); claims 1-2, 6-7, 11-12, and 14-15 of U.S. Patent No. 6,277,301 ("the '301 patent"); claims 2-5, 7, and 10 of U.S. Patent No. 6,592,780 ("the '780 patent"); and claims 1, 3, 6-7, 10-15, 17, 20 and 21 of U.S. Patent No. 6,613,247 ("the '247 patent") because a domestic industry in the United States does not exist that practices U.S. Patent Nos. 6,066,861; 6,245,259; 6,277,301; 6,592,780; and 6,613,247.[7]

II. Infringement

The asserted claims of the Particle Size Patents that are at issue in this investigation are claims 1, 3, 6, 7, 10, 11, 12, and 13 of the '861 patent; claims 1, 3, 6, 7, 10, 11, 12 and 13 of the '259 patent; claims 1, 2, 6, 7, 11, 12, 14, and 15 of the '301 patent; claims 2, 3, 4, 5, 7, and 10 of the '780 patent; and claims 1, 3, 6, 7, 10-15, 17, 20 and 21 of the '247 patent. Dominant does not dispute that

[7] *See Certain Removable Electronic Cards and Electronic Card Reader Devices*, Inv. No. 337-TA-396 Commission Opinion (August 13, 1998) ("The failure to satisfy the domestic industry requirement precludes a finding that [the Respondent] violated section 337").

its accused products meets each and every limitation of all the asserted claims of the Particle Size Patents, except for the claim limitation that the phosphor power have a "mean grain diameter $d_{50} \leq 5$ μm." Dominant purchases all its phosphor powder from Phosphor Technology, Inc., which provides phosphor specification sheets.[8] All parties agree that the phosphor specification sheets from Phosphor Technology are reliable and accurate.[9]

A. Literal Infringement

There appears to be no disagreement from the parties that Dominant's accused products that are made with [ ] phosphor literally infringe the asserted claims of the Particle Size Patents under the Commission's claim construction.[10] The only dispute between the parties is whether Dominant has actually stopped making its accused products with the [ ] phosphor.[11] Dominant claims that it stopped using the [ ] phosphor after this investigation was instituted in order to ensure that its product did not infringe the Particle Size Patents.[12] Regardless, as Dominant used the [ ] phosphor when the investigation was instituted and could possibly revert to using the [ ] phosphor, a finding of infringement is appropriate for this investigation. Based on Coulter Counter data from Phosphor Technology, Dr. Nauman testified that Dominant's [ ] phosphor has a volume mean particle size of 4.4

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[8] RIB 3, 5. *See* RX-449C (Low Direct) at 15-17; RX-348C (Phosphor Technology Verbal Quotation); CX-148C (Low Dep.) at 203.

[9] RIB 5, n. 1; SIB 8-9. *See* CX-1304C (Nauman Direct) at 25-26; RX-472C (Holloway Rebuttal) at 5-9.

[10] CIB 12; CRB 5; RIB 4; SIB 9; SRB 1.

[11] CIB 15-21; CRB 6-7; RIB 4; SIB 8; SRB 2.

[12] RIB 4. *See* RX-449C (Low Direct) at 16-17.

μm.[13] Accordingly, Dominant's accused products that are made with [ ] phosphor literally infringe the asserted claims of the Particle Size Patents.

In addition, there is no disagreement between the parties that Dominant's accused products that are made with either [ ] phosphor or [ ] phosphor in combination with [ ] do not literally infringe the asserted claims of the Particle Size Patents under the Commission's claim construction.[14] Based on Coulter Counter data from Phosphor Technology, Dr. Nauman testified that: Dominant's [ ] phosphor has a volume mean particle size of 7.7 μm; Dominant's [ ] phosphor has a volume mean particle size of 8.9 μm; and that Dominant's mixture of [ ] and [ ] phosphor has a volume mean particle size of 7.7-8.9 μm.[15] Accordingly, Dominant's accused products that are made with [ ] or a mixture of the two phosphors do not literally infringe the asserted claims of the Particle Size Patents. Therefore, the only remaining issue is whether Dominant's accused products that are made with [ ] phosphor, or a combination of the two phosphors infringe the asserted claims of the Particle Size Patents under the doctrine of equivalents.

B. Infringement Under the Doctrine of Equivalents

Under the doctrine of equivalents, infringement may be found if the accused product performs substantially the same function in substantially the same way to obtain substantially the

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[13] *See* RX-449C (Low Direct) at 16; RX-431C (Phosphor Technology Order & Calculations) at last page; Nauman, Tr. 359-60, 384-85; CX-878C (Phosphor Technology document); RDX-16.

[14] CIB 21; CRB 7; RIB 3-4; RRB 8; SIB 9-10; SRB 1.

[15] *See* RX-431C (Phosphor Technology Order & Calculations) at last page; Nauman, Tr. 359-60; RDX-16. *See also* RX-399C (Science and Technology Laboratory Particle Analysis Report) at DS150254-55; RX-348C (Phosphor Technology Verbal Quotation).

same result.[16] Osram asserts that any of Dominant's accused products that are made with [ ] infringe the Particle Size Patents under the doctrine of equivalents.[17] Dominant and Staff disagree that Dominant's accused products that are made with either [ ] or [ ] phosphor infringe the Particle Size Patent under the doctrine of equivalents.[18]

Osram concedes that the mean diameter of Dominant's [ ] phosphor powder is 7.7 μm, which falls outside the literal scope of the claims, which requires a volume mean diameter ≤ 5 μm.[19] Osram argues that it is well-established, however, that accused products can infringe under the doctrine of equivalents where they use an ingredient that lies outside a numerical range in the claims.[20] According to Osram, testimony from Mr. Low, a Dominant employee, shows that Dominant's LEDs that are manufactured with the [ ] phosphor powder perform the same function in the same way to obtain the same result as the LEDs that were manufactured with the [ ] phosphor powder.[21]

Osram also cites to the history of the development of the patented invention for support.

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[16] *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 608 (1950). *See also* relevant law discussion in the Initial Determination issued on May 10, 2005.

[17] CIB 21-31; CRB 7-27.

[18] RIB 8-15; RRB 11-31; SIB 10-14; SRB 2-3.

[19] CIB 22; CRB 24.

[20] CIB 22; CRB 14-15, 22-27. *Hilton Davis Chemical Co. v. Warner-Jenkinson Co., Inc.*, 114 F.3d 1161, 1164 (Fed. Cir. 1997) (finding a pH of 5.0 was equivalent to the claimed range of 6.0 to 9.0); *San Huan New Materials High Tech, Inc. v. Int'l Trade Comm'n*, 161 F.3d 1347, 1357 (Fed. Cir. 1998) (affirming Commission's finding that 5,450-5,850 ppm oxygen was equivalent to the claimed range of 6,000-35,000 ppm oxygen); *Laitram Corp. v. Cambridge Wire Cloth Co.*, 863 F.2d 855 (Fed. Cir. 1988).

[21] CIB 24; CRB 8. *See* Low, Tr. 486-87.

According to Osram, when it was developing the patented invention, Osram initially used larger phosphor particles, but Osram found that LEDs made with larger phosphor particles failed to achieve homogeneous light and caused sedimentation problems. When Osram switched to smaller phosphor particles, these problems no longer existed.[22] Therefore, Osram argues that, based on its experience, if Dominant were using a larger particle size than the claimed particle size, one would expect to see substantially less homogeneous light output from those LEDs. Because the evidence shows the opposite, Osram argues that Dominant's products infringe. According to Osram, Dr. Zachau testified that a comparison of the homogeneity of the light emitted by Dominant's LEDs before and after the phosphor switch are insubstantially different.[23]

Dominant asserts that a finding of infringement under the doctrine of equivalents for phosphors with a volume mean grain diameter > 5 μm would impermissibly vitiate the claim limitation " mean grain diameter ≤ 5 μm" and render the claim limitation meaningless.[24] In the alternative, Dominant argues that, even if it would be permissible to vitiate the "≤ 5 μm" claim limitation, Osram cannot prove that Dominant's phosphors are insubstantially different from phosphors that are less than or equal to 5 μm.[25] For example, Dominant argues that Osram has

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[22] CIB 27-29. *See* CX-1301C (Waitl Direct) at 15-17; CX-1303C (Strauss Direct) at 21-25; CX-1 (the '861 patent), col. 1:67-2:1; col. 3: 16-19; col. 5:15-19.

[23] CIB 29-31; CRB 8. *See* CX-1312C (Zachau Direct) at 43; CX-296 (Chromaticity chart).

[24] RIB 9-10; RRB 12-13 *citing Moore U.S.A., Inc. v. Standard Register Co.*, 229 F.3d 1091, 1106 (Fed. Cir. 2000); *Freedman Seating Co. v. American Seating Co.*, 420 F.3d 1350, 1358 (Fed. Cir. 2005).

[25] RIB 11 *citing Warner-Jenkinson Co., Inc. v. Hilton Davis Chemical Co.*, 520 U.S. 17, 24 (1997).

repeatedly noted that the claimed small particle sizes are functionally beneficial because they do not sediment and can be homogeneously distributed in the resin and that Dominant's devices have more sediment and are therefore not homogeneously distributed in the resin.[26] In addition, Osram employee Dr. Zachau testified that large phosphor particles are undesirable because the particles tend to settle, which makes it difficult to control the production process.[27] Dominant also disputes that its phosphors perform in substantially the same way or achieve substantially the same results as the claimed phosphor particles because sedimentation affects conversion efficiency, color variation, and homogeneity of light.[28]

Dominant also argues that Osram is precluded from raising the doctrine of equivalents because of prosecution history estoppel. According to Dominant, Osram specifically amended the claims of the Particle Size Patents to include the language "mean grain diameter ≤ 5 μm" in response to an Office Action rejecting the claims in part on the basis of particle size.[29]

Dominant disputes that any testimony from Mr. Low supports a finding that Dominant copied Osram's patents. While Dominant concedes that "copying may be relevant to obviousness," courts have made clear that copying "is of no import on the question of whether the claims of an issued

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[26] RIB 12; RRB 26-27. *See* CDX-191.

[27] RIB 12; RRB 26. *See* CX-1311C (Zachau Direct) at 10-11; Zachau, Tr. 690-91. *See also* CX-1303C (Strauss Direct) at 20-21.

[28] RIB 13-15; RRB 20-22, 29-31. *See* CDX-191, Complainant's Initial Post-Hearing Brief at 48, 50.

[29] RRB 11-12, 25-26. *See* CX-13 ('301 prosecution history) at OS117904-05.

patent are infringed."[30]

Osram counters Dominant's argument regarding sedimentation because the evidence shows that sedimentation in Dominant's LEDs made with [ ] and [ ] is indistinguishable.[31] Osram also disputes that prosecution history estoppel applies because it argues that even if a claim is written in the form of a numerical range, the test of equivalence focuses on whether the accused device functions equivalently.[32] Osram distinguishes *Moore* because it did not contain a numerical range. Rather, *Moore's* claim limitation was phrased in terms of "majority," which is opposite from "minority," whereas here, the numerical limitations are not opposites of each other.[33]

Staff asserts that Particle Size Patents establish two functions for the "mean grain diameter" limitation, including: 1) the production of LED devices that emit homogenous, color-stable mixed-colored light; and 2) enabling the mass production of such LED devices at a reasonable engineering effort and expense and with maximally replicable component characteristics.[34] Staff argues that, with respect to the first function, Dominant's accused products that are made with phosphor powders having a mean grain diameter < 10 μm perform the function in the same way, to achieve the same

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[30] RRB 17-18 *citing Allen Eng'g Corp. V. Bartell Indus., Inc.*, 299 F.3d 1336, 1351 (Fed. Cir. 2002), *Warner-Jeninson*, 520 U.S. at 36.

[31] CRB 16-20. *Compare* CX-1084C & CX-1085C at OS115252-56 (picture of LED made with [ ]) *with* CDX-191 & RX-352C at 12 (back) & 13 (front) (picture of LED made with [ ]).

[32] CRB 20-22 *citing Hilton Davis*, 114 F.3d at 1164 and *San Huan*, 161 F.3d at 1357.

[33] CRB 21-22. *Moore*, 229 F.3d at 1095, 1106-12.

[34] SIB 11. *See* CX-1 (the '861 patent), col. 1:63-2:7.

result, as the patented invention.[35] Staff argues that, with respect to the second function, there is no evidence that Dominant's accused products, which use phosphors with a mean grain diameter < 10 μm, accomplish the stated function in substantially the same way, and achieves substantially the same result, as phosphors having a mean grain diameter ≤ 5 μm.[36] According to Guenter Waitl, the individual who oversaw the development of the patented technology, the inorganic phosphors used in the patents are extremely hard substances and have a tendency to abrade the system used to dispense the resin/phosphor mix. Mr. Waitl testified that mass production of the patented technology only became possible when Osram began using phosphors with smaller particle size.[37] Staff argues that there is no evidence in the record indicating whether Dominant has had a problem with abrasion after switching to the larger phosphor powders or if Dominant has been able to avoid the problem in another way.[38]

Osram counters Staff's arguments. Osram disagrees that the manufacturing test for equivalence should be part of the inquiry. In the alternative, Osram argues that there is sufficient evidence, *i.e.* Mr. Low's testimony, that proves Dominant did not change its manufacturing approach when it switched to the larger phosphor.[39] Osram also argues that there is no indication that Dominant has any problems with abrasion because none of Dominant's LEDs suffer from the "black

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[35] SIB 12. *See* CX-296 (Chromaticity chart).

[36] SIB 12-13. *See Zenith Labs., Inc. v. Bristol-Meyers Squibb Co.*, 19 F.3d 1418, 1419, 1424-25 (Fed. Cir. 1994) (accused product did not infringe asserted patent under doctrine of equivalents because it did not have the manufacturing-related benefits of the patented invention).

[37] *See* CX-1301C (Waitl Direct) at 14-17.

[38] SIB 12-13.

[39] CRB 9-10. *See* Low, Tr. 483-84.

LED" problem where the LEDs produce nearly no light.[40] According to Osram, it requested discovery from Dominant as to any manufacturing changes and that Dominant provided no such discovery, so it can only be assumed that no manufacturing changes were made.[41] Osram also disputes that *Zenith Laboratories* is on point because in that case there was evidence that the accused product was not functionally equivalent to the patented invention.[42]

The undersigned finds the arguments of Dominant and Staff persuasive. The undersigned finds that a finding of infringement under the doctrine of equivalence for LEDs made with Dominant's [ ] phosphor powder would entirely vitiate the claim limitation "mean grain diameter ≤ 5 μm" and that Dominant's use of [ ] phosphor powder is not an insubstantial change from the claimed phosphor powder.[43] The Particle Size Patents specifically state that the advantages of using phosphor powder with a mean grain diameter ≤ 5 μm includes, among other things, the production of homogeneous light and being able to mass produce LEDs at reasonable engineering effort and expense.[44] The Particle Size Patents also go on to state that it is even more desirable to have an even smaller phosphor size than five microns, preferably, one to two microns.[45]

A product that falls outside a numerical range claimed in the patent can still infringe under

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[40] CRB 11. *See* CX-1301C (Waitl Direct) at 16; CX-1311(Zachau Direct) at 9.

[41] CRB 12-13. *See* Order No. 22 at 2 (November 12, 2004).

[42] CRB 13-14.

[43] *Moore*, 229 F.3d at 1106; *Freedman*, 420 F.3d at 1358-59.

[44] CX-1 (the '861 patent), col. 1:63-2:7.

[45] CX-1 (the '861 patent), col. 2:22-24, Claim 4.

the doctrine of equivalents if it is functionally equivalent. Osram has not, however, proved that Dominant's LEDs made with [ ] phosphor powder are functionally equivalent. Dominant and Staff have pointed to several substantial differences between Dominant's [ ] phosphor powder and the claimed phosphors having a mean grain diameter ≤ 5 μm. For example, there is evidence that Dominant's LEDs made with [ ] have more sedimentation and may not be as easily mass produced when compared with phosphors having a mean grain diameter ≤ 5 μm.[46]

The Particle Size Patents themselves discuss how sedimentation from larger particles is undesirable.[47] While Osram acknowledges that all white LEDs have some sedimentation, Osram concludes that Dominant's white LEDs before and after the phosphor switch do not have severe sedimentation, unlike what was experienced by the inventors.[48] But the fact that Dominant's LEDs that are made with [ ] phosphor powder do not experience as much sedimentation as Osram's phosphors did when using phosphor powder with larger volume grain diameters during the development of the invention has no bearing on infringement. Although Osram cites to a comparison of CX-1084C and CX-1085C at OS115252-56 with CDX-191 and RX-352C at 12-13,[49] Osram does not cite to any testimony from any witness comparing these exhibits.[50] Based on a review of the

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[46] CX-1311C (Zachau Direct) at 10-11; Zachau, Tr. 690-91; CX-1303C (Strauss Direct) at 20-21; CX-1301C (Waitl Direct) at 14-17; CDX-191.

[47] CX-1 (the '861 patent), col. 2:45-47; 3:16-28.

[48] CRB 19.

[49] The undersigned notes that there is no page within RX-352C that is labeled 12 or 13. Counting 12 and 13 pages in from the first page of the exhibit brings one to DS149759-60.

[50] *See* CRB 16-17 and Complainant's Rebuttal Finding of Fact (CRFF) R306.

exhibits themselves, the undersigned does not find that such a comparison supports a finding that that there is no difference in sedimentation between Dominants LEDs made with [ ] versus [ ]

As to Osram's arguments that its history of developing the patented invention supports a finding in equivalence, the undersigned does not find these arguments persuasive. Osram makes the assumption that, because it was not able to come up with a way to use larger phosphor particles to produce homogeneous light, that Dominant could not have done so. And while Osram concedes that Dominant could have invented a new way of using lager particles while still achieving homogeneous light, Osram argues that Dominant has not offered any evidence of any experimentation. But the burden is not on Dominant to disprove infringement; it is Osram's burden to prove infringement. The lack of evidence regarding Dominant's manufacturing experience using the larger phosphor does not support Osram's position.

While Osram asserts that Mr. Low's testimony shows that Dominant did not change its manufacturing at all, the evidence does not support such a conclusion. Mr. Low testified that Dominant received a shipment of the larger phosphor on July 13th and that Dominant was able to immediately start using the phosphor.[51] No specific questions were asked about the manufacturing process, and no such assumption will be inferred. In addition, no assumptions will be made regarding the undersigned's order regarding the motion to compel. In Order No. 22, Osram requested that Dominant produce "information regarding what is done to the phosphors after they are purchased by Dominant, including which phosphors are used in the allegedly infringing products," which the undersigned found to be discoverable under 19 C.F.R. § 210.27(b), and ordered that such documents

[51] Low, Tr. 483-84.

be produced. The order was in regard to what was done to the phosphor, not the entire manufacturing process of the LED. Therefore, no broad sweeping conclusions about Dominant's manufacturing process can be inferred from this portion of Mr. Low's testimony.

The undersigned also finds *Hilton-Davis/Warner-Jenkinson* to be distinguishable. In *Hilton-Davis/Warner-Jenkinson* the claim term at issue involved "a pH from *approximately* 6.0 to 9.0," where the Federal Circuit held that a pH of 5 was equivalent.[52] Here, the claims do not cite an approximate mean grain diameter ≤ 5 μm. Rather, cases cited by Dominant are more on point, such as *Moore*, where the Federal Circuit held that, "to allow what is undisputedly a minority (i.e., 47.8%) to be equivalent to a majority would vitiate the requirement . . ." and that "it would defy logic to conclude that a minority–the very antithesis of a majority–could be insubstantially different from a claim limitation requiring a majority."[53] Although here, the claim term does not recite a majority or minority, the claim limitation is similar because it is phrased in terms of being less than or equal to, which is opposite to being greater than.

While it does not affect the determination of the question of infringement under the doctrine of equivalents, as to Dominant's prosecution history estoppel argument, the undersigned does not find that prosecution history estoppel is applicable here because the claimed particle size limitation was included in nearly every set of claims as originally filed and was not added to overcome an obviousness prior art rejection based on Shimizu and Matsukiyo in combination with WO

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[52] *Hilton-Davis*, 114 F.3d at 1164; *Warner-Jenkinson*, 520 U.S. at 22 (emphasis added).

[53] *Moore*, 229 F.3d at 1106.

98/12757.[54]

Accordingly, based on the foregoing, Osram has failed to prove, by a preponderance of evidence, that Dominant's products infringe the Particle Size Patents under the doctrine of equivalents.

III. Domestic Industry - Technical Prong

The parties dispute whether Osram's products meet the technical prong of domestic industry. Osram asserts that there is no dispute that its white LEDs satisfy the technical prong because Dominant conceded the issue, so it is now hereby waived.[55] In the alternative, Osram argues that, if the undersigned finds that the technical prong issue has not been waived, that Osram should be allowed to supplement the record with additional evidence.[56] While Staff agrees that Osram has satisfied the domestic industry requirement, Staff does not agree that Staff has waived any right to challenge Osram's domestic industry arguments.[57] Dominant disputes that there has been any waiver and asserts that the Commission lacks subject matter jurisdiction because Osram has failed to meet the technical prong of the domestic industry requirement because there is no evidence whatsoever regarding whether Osram's products have a volume mean particle size ≤ 5 μm.[58]

Staff concedes that there is no specific evidence in the record as to the volume mean particle

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[54] *See* Respondent's Initial Post-Hearing Brief at 81; CX-13 ('301 prosecution history) at OS117904-05, 118729-31.

[55] CIB 32; CRB 28.

[56] CRB 29-30.

[57] SRB 4-5, n. 1.

[58] RIB 2-3; RRB 3-8.

size of the powders used in Osram's products.[59] Staff, however, asserts that because there is some evidence that the "number mean" grain diameter of the powder used in Osram's products is ≤ 5 μm, one can reasonably infer that at least some of Osram's products use a phosphor powder having a volume mean that is ≤ 5 μm.[60] Staff bases this inference based on the volume mean being generally larger than the number mean by 1.2 and 4 times, based on the calculations performed by Dr. Nauman on the phosphor powder used in Dominant's accused products.[61]

Osram agrees with Staff's analysis. Osram further asserts that the number mean diameter of particles in Osram's powder is smaller than the number mean diameter of particles in Dominant's [ ] powder, which has been found to infringe. Therefore, according to Osram, "[s]ince OSRAM's phosphor is even smaller than the [ ] phosphor that literally satisfies the claims, OSRAM's phosphor must also literally satisfy the claims."[62] Osram also argues that, because its products have less sedimentation than Dominant's products, there are fewer larger particles, which heavily affects the mean particle size by volume.[63] In the alternative, Osram argues that, even is its phosphors do not fall within the literal scope of the claims, it satisfies the claims under the doctrine of equivalents.[64]

Dominant asserts that all of the evidence introduced by Osram with respect to the grain

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[59] SIB 15; SRB 4.

[60] SIB 15-16; SRB 4.

[61] SIB 16; SRB 4. *See* RX-431C (Phosphor Technology Order & Calculations) at last page.

[62] CRB 28.

[63] CRB 31-32.

[64] CRB 30, n. 5.

diameter of the phosphors used in its products are based on the number of particles, not the volume of particles.[65] Dominant dismisses Staff's speculations as to the volume mean particle size of the powder used in Osram's products based on comparison of ratios between volume mean and number mean, especially for phosphors made by different manufacturers. For example, the volume mean to number mean ratio for Phosphor Technology's [ ] phosphor equals 4.0 (4.4/1.1), while the volume mean to number mean ratio for Phosphor Technology's [ ] phosphor equals 1.2 (8.9/7.6).[66] According to Dominant, the ratios are different between the F and N series phosphors for phosphors made by the same manufacturer, *i.e.* Phosphor Technology, so it would be not be reasonable to infer any such ratios to phosphor made by a different manufacturer, *i.e.* Osram's phosphor manufacturer.

Osram and Staff point to various exhibits to support an *assumption* that Osram's white LEDs have a volume mean particle size ≤ 5 μm. But there is no *direct* evidence in the record regarding what the volume mean particle size of the phosphor used in Osram's white LEDs. While Osram urges the undersigned to admit an additional exhibit into the record,[67] the undersigned denies this request, not only based on untimeliness, but also because there is no supporting testimony regarding this exhibit.[68] Osram had the burden to prove that it met the technical prong of domestic industry. Absent a stipulation from the parties that the technical prong of the domestic industry requirement

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[65] RIB 2-3; RRB 6. *See* CX-1304C (Nauman Direct) at 35-37; CX-1315C (Nauman Rebuttal) at 4.

[66] RRB 7-8; RX-431 (Phosphor Technology Order & Calculations).

[67] RX-218C (E-mail from Dr. Klaus Höhn to Herbert Brunner with attachments).

[68] *See* Ground Rule 9.4.13, Order No. 2 (June 14, 2004).

was met, Osram took a risk by not having certain evidence admitted into the record. There is no excuse for Osram failing to submit any direct evidence for inclusion in the record that shows the volume mean particle size of the phosphor used in *Osram's* white LEDs when Osram submitted direct evidence for inclusion in the record that shows the volume mean particle size of the phosphor used in *Dominant's* accused products. Osram was fully aware of the possibility that the undersigned, or the Commission, could adopt the claim construction that "mean grain diameter d_{50}" means "average diameter based on the volume of particles." Failure to introduce any evidence or testimony as to this possibility falls on Osram.

While it is true that, at the beginning of the hearing, Dominant stated that it did not intend to cross-examine any of Osram's witnesses as to domestic industry, this was limited to the *economic prong* of domestic industry.[69] In addition, Dominant specifically stated that, while it did not intend to cross-examine four economic prong domestic industry witnesses, Dominant still had a number of objections to their witness statements and corresponding exhibits, and that Dominant was not waiving its right to challenge Osram's assertion of domestic industry.[70] No such similar agreement was made regarding the *technical prong* of domestic industry, so Osram cannot claim that it has been taken advantage of. And even though Dominant, in its post-hearing brief, which was filed *after the hearing,* agreed that it would not challenge Osram's assertion that the technical prong of domestic industry for the Particle Size Patents was met, this does not explain why Osram failed to introduce any evidence regarding the volume mean particle size of phosphor used in its products *during the hearing* when it had more than ample opportunity to do so.

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[69] Wright, Tr. 7-8 (Prehearing Conference 12/6/04).

[70] Wright, Tr. 7-8; Bullock, Tr. 8 (Prehearing Conference 12/6/04).

As to the various extrapolations and assumptions urged by Osram and Staff to be adopted, the undersigned does not find such arguments persuasive when there is no indication why such assumptions should be adopted when direct evidence could have, but was not, presented. In addition, even if the undersigned were inclined to analyze such arguments, there is simply no basis in the record from which one can infer the relationship between volume mean and number mean. In addition, while Osram compares the number mean grain diameters of its own phosphor powder with that of Dominant's [ ] phosphor powder, case law makes it clear that it is improper to compare the patentee's commercial embodiment with an accused product because the analysis should be centered around the claims.[71] In addition, the undersigned finds that there is no basis with which to conclude that Osram's products meet the technical prong under the doctrine of equivalence, as there has been no testimony or argument, other than a summary statement in a footnote in Osram's reply remand brief.

Accordingly, the undersigned finds that Osram has failed to prove that its white LEDs practice the Particle Size Patents because there is no direct evidence that the phosphor used in the white LEDs have a volume mean particle size ≤ 5 μm. Therefore, Osram has failed to meet the technical prong of the domestic industry requirement.

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[71] *Zenith Labs*, 19 F.3d at 1423; *SRI Int'l v. Matsushita Elec. Corp.*, 775 F.2d 1107, 1121 (Fed. Cir. 1985) (infringement is determined by comparing an accused product not with a preferred embodiment described in the specification, or with a commercialized embodiment of the patentee, but with the claims). While the case law specifically refers to infringement, rather than the technical prong of domestic industry, the undersigned finds its equally applicable.

IV. Indefiniteness

Dominant no longer raises the argument that the Particle Size Patents are indefinite based on a failure to specify which type of instrument should be used to determined the "mean grain diameter d_{50}."[72] Accordingly, no determination as to indefiniteness is necessary in this Recommended Determination.

V. Conclusions of Law

1. Dominant's accused products that are made with [ ] phosphor literally infringe the asserted claims of the Particle Size Patents in violation of 35 U.S.C. § 271(a).

2. Dominant's accused products that are made with [ ] or [ ] phosphor do not infringe the asserted claims of the Particle Size Patents, either literally or under the doctrine of equivalents, under 35 U.S.C. § 271(a).

3. An industry in the United States does not exist with respect to Osram's light-emitting diodes that are protected by the Particle Size Patents, as required by 19 U.S.C. § 1337(a)(2) and (3).

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[72] RIB 15-16; RRB 31. It should be noted that Dominant takes this position based on the Commission's claim construction of the term "mean grain diameter d_{50}," and that it reserves the right to raise this argument if the Commission's claim construction is challenged or reversed.

Within seven days of the date of this document, each party shall submit to the office of the Administrative Law Judge a statement as to whether or not it seeks to have any portion of this document deleted from the public version. The parties' submissions must be made by hard copy by the aforementioned date.

Any party seeking to have any portion of this document deleted from the public version thereof must submit to this office a copy of this document with red brackets indicating any portion asserted to contain confidential business information. The parties' submission concerning the public version of this document need not be filed with the Commission Secretary.

SO ORDERED.

Charles E. Bullock
Administrative Law Judge

IN THE MATTER OF CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING THE SAME **337-TA-512**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **ORDER** was served upon, Benjamin D.M. Wood, Esq., Commission Investigative Attorney, and the following parties via first class mail and air mail where necessary on November 22, 2005.

Marilyn R. Abbott, Secretary
U.S. International Trade Commission
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Washington, D.C. 20436

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IN THE MATTER OF CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING THE SAME **337-TA-512**

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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of	
CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING SAME	**Inv. No. 337-TA-512**

NOTICE OF COMMISSION FINAL DETERMINATION OF NO VIOLATION OF SECTION 337 AS TO ONE PATENT AND DETERMINATION TO REMAND THE INVESTIGATION AS TO CERTAIN OTHER PATENTS

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined that there is no violation of 19 U.S.C. § 1337 by Dominant Semiconductors Sdn. Bhd. ("Dominant") with regard to United States Patent No. 6,576,930 and that the Commission has determined to remand the investigation with respect to certain other patents to the presiding administrative law judge.

FOR FURTHER INFORMATION CONTACT: Wayne Herrington, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 205-3090, or Michelle Walters, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 708-5468. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 205-2000. General information concerning the Commission may also be obtained by accessing its Internet server (*http://www.usitc.gov*). The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at *http://edis.usitc.gov*. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on (202) 205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation based on a complaint filed by Osram GmbH and Osram Opto Semiconductors GmbH, both of Germany (collectively, "Osram"). 69 *Fed. Reg.* 32609 (June 10, 2004). In the complaint, as supplemented and amended, Osram alleged violations of section 337 of the Tariff Act of 1930 in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain light-emitting diodes and products containing the same by reason of infringement of various claims of United States Patent Nos. 6,066,861, 6,277,301, 6,613,247,

6,245,259, 6,592,780 (collectively, the "Particle Size Patents"), United States Patent No. 6,576,930 (the "'930 patent"), United States Patent Nos. 6,376,902, 6,469,321, 6,573,580 (collectively, the "Lead Frame Patents"), and United States Patent No. 6,716,673 (the "'673 patent").

On May 10, 2005, the presiding administrative law judge ("ALJ") issued his final initial determination ("ID") finding the sole remaining respondent Dominant in violation of section 337, but only with respect to the '673 patent. The ALJ concluded that the asserted claims of the Particle Size Patents are invalid for indefiniteness, that the '930 patent and the Lead Frame Patents are not infringed by Dominant's accused products, and that Osram does not meet the technical prong of the domestic industry requirement with respect to the '930 patent.

On June 24, 2005, the Commission determined to review the ALJ's findings and conclusions regarding the Particle Size Patents, the '930 patent, and the Lead Frame Patents. 70 *Fed. Reg.* 37431 (June 29, 2005). The Commission declined to review the ALJ's determination of violation of section 337 with respect to the '673 patent.

Having examined the record of this investigation, including the ALJ's final ID and the submissions of the parties, the Commission has (1) determined that the Particle Size Patents are not invalid for indefiniteness with respect to the phrase "mean grain diameter d_{50}" or the failure to specify the basis for calculating the "mean grain diameter d_{50}" and particle size distribution as number or volume, construed the asserted claims, and remanded this part of the investigation to the ALJ for the purpose of determining whether there is a violation of section 337; and (2) determined that there is no violation of section 337 with regard to the '930 patent. The Commission has extended the target date of the above-captioned investigation to December 12, 2005 and instructed the ALJ to make his determination on remand by October 11, 2005. The parties are invited to file comments on the ALJ's remand determination within five business days after service of the ALJ's determination and to file responses to the comments within five business days after service of the comments. The Commission has decided to defer addressing the issue of violation of the Lead Frame Patents, as well as issues relating to remedy, public interest, and bonding, until after the ALJ issues his initial determination on remand regarding the Particle Size Patents.

Further, the Commission has determined to deny Osram's motion to admit the prosecution history of United States Application No. 10/616,783 into the record. The Commission, however, has determined to grant Dominant's motion for extension of time to submit its Response of Respondent Dominant Semiconductors Sdn. Bhd. to the Notice of Commission Determination to Review a Final Determination on Violation of Section 337.

The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), and in section 210.45 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.45).

By order of the Commission.

Marilyn R. Abbott
Secretary to the Commission

Issued: August 10, 2005

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of	
CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING SAME	**Inv. No. 337-TA-512**

ORDER

The Commission instituted this investigation on June 10, 2004, based on a complaint filed by Osram GmbH and Osram Opto Semiconductors GmbH, both of Germany (collectively "Osram"). 69 *Fed. Reg.* 32609 (June 10, 2004). The complaint, as supplemented and amended, alleged violations of section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain light-emitting diodes and products containing same by reason of infringement of various claims of United States Patent Nos. 6,066,861, 6,277,301, 6,613,247, 6,245,259, and 6,592,780 (collectively, the "Particle Size Patents"), United States Patent No. 6,576,930 (the "'930 patent"), United States Patent Nos. 6,376,902, 6,469,321, and 6,573,580 (collectively, the "Lead Frame Patents"), and United States Patent No. 6,716,673 (the "'673 patent").

On May 10, 2005, the presiding administrative law judge ("ALJ") issued his final initial determination ("ID") finding the sole remaining respondent, Dominant Semiconductors Sdn. Bhd. ("Dominant"), in violation of section 337. Specifically, he determined that Dominant infringes claims 1-3 and 5 of the '673 patent and that there is a domestic industry with respect to that patent. On the other hand, he determined that there is no violation of section 337 with regard to Osram's nine other patents, finding that the Particle Size Patents are invalid for indefiniteness, that the '930

patent and the Lead Frame Patents are not infringed by Dominant's accused products, and that Osram does not meet the technical prong of the domestic industry requirement with respect to the '930 patent.

On June 24, 2005, the Commission determined to review the ALJ's findings and conclusions regarding the Particle Size Patents, the '930 patent, and the Lead Frame Patents. 70 *Fed. Reg.* 37431 (June 29, 2005). The Commission declined to review the ALJ's determination of violation of section 337 with respect to the '673 patent.

Having examined the record of this investigation, including the ALJ's final ID and the submissions of the parties, the Commission has (1) determined that the Particle Size Patents are not invalid for indefiniteness with respect to the phrase "mean grain diameter d_{50}" or the failure to specify the basis for calculating the "mean grain diameter d_{50}" and particle size distribution as number or volume, construed the asserted claims, and determined to remand this part of the investigation to the ALJ for the purpose of determining whether there is a violation of section 337; and (2) determined that there is no violation of section 337 with regard to the '930 patent, because Dominant's accused light-emitting diodes do not infringe the asserted claims. The Commission will issue an opinion giving the reasons for its determinations. The Commission has decided to defer addressing the issue of violation of the Lead Frame Patents, as well as issues relating to remedy, public interest, and bonding, until after the ALJ issues his initial determination on remand regarding the Particle Size Patents.

Accordingly, the Commission hereby **ORDERS** that:

1. The question of violation of section 337 with respect to the Particle Size Patents is remanded to the ALJ for an initial determination consistent with the Commission's opinion in support of this Order.

2. The ALJ shall make his determination of whether there is a violation of section 337 with regard to the Particle Size Patents by October 11, 2005.

3. The parties are invited to file comments on the ALJ's remand determination within five business days after service of the ALJ's determination and to file responses to the comments within five business days after service of the comments.

4. The target date for termination of the investigation is hereby extended to December 12, 2005.

5. Osram's motion to admit the prosecution history of United States Application No. 10/616,783 into the record is denied due to the belated nature of the disclosure.

6. Dominant's motion for extension of time to submit its Response of Respondent Dominant Semiconductors Sdn. Bhd. to the Notice of Commission Determination to Review a Final Determination on Violation of Section 337 is granted.

7. The Secretary shall serve copies of this Order upon each party of record in this investigation.

8. Notice of this Order shall be published in the *Federal Register*.

By Order of the Commission.

Marilyn R. Abbott
Secretary to the Commission

Issued: August 10, 2005

CERTAIN LIGHT EMITTING DIODES AND PRODUCTS CONTAINAING SAME **337-TA-512**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the**NOTICE OF COMMISSION FINAL DETERMINATION OF NO VIOLATION OF SECTION 337 AS TO ONE PATENT AND DETERMINATION TO REMAND THE INVESTIGATION AS TO CERTAIN OTHER PATENTS**, was served upon all parties via first class mail on August 11, 2005.

Marilyn R. Abbott, Secretary
U.S. International Trade Commission
500 E Street, SW Rm 112
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PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of **CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING SAME**	**Investigation No. 337-TA-512**

COMMISSION OPINION

On August 10, 2005, the Commission issued a notice that it had determined that United States Patent Nos. 6,066,861, 6,277,301, 6,613,247, 6,245,259, and 6,592,780 (collectively, the "Particle Size Patents," or respectively, the "'861 patent," the "'301 patent," the "'247 patent," the "'259 patent," and the "'780 patent") are not invalid for indefiniteness with respect to the phrase "mean grain diameter d_{50}" or the failure to specify the basis of the grain diameter determinations, and that it was remanding this portion of the investigation to the ALJ for an initial determination on violation under section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) ("section 337") consistent with this opinion. In addition, the Commission determined that Respondent Dominant Semiconductors Sdn. Bhd. ("Dominant") did not violate section 337 with respect to United States Patent No. 6,576,930 (the "'930 patent"). The opinion set forth herein provides the reasons for the Commission's determinations.

I. BACKGROUND

A. Procedural History

The Commission instituted this investigation on June 10, 2004, based on a complaint filed

by Osram GmbH and Osram Opto Semiconductors GmbH, both of Germany (collectively "Osram"). 69 *Fed. Reg.* 32609 (June 10, 2004). The complaint, as supplemented and amended, alleged violations of section 337 in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain light-emitting diodes and products containing same by reason of infringement of various claims of the Particle Size Patents, the '930 patent, United States Patent Nos. 6,376,902, 6,469,321, and 6,573,580 (collectively, the "Lead Frame Patents"), and United States Patent No. 6,716,673 (the "'673 patent"). Osram charged three respondents with infringing its patents: Dominant, American Opto Plus, Inc. ("AOP"), and American Microsemiconductor, Inc. ("AMS"). Respondents AOP and AMS were terminated from the investigation based on settlement agreements, leaving Dominant as the sole respondent.

On May 10, 2005, after a hearing on the merits, the presiding administrative law judge ("ALJ") issued his final initial determination ("ID") holding Dominant in violation of section 337 with regard to one of Osram's ten patents, the '673 patent, but finding no violation with regard to the other nine patents. ID 128-31 & 148-49. Specifically, the ALJ concluded that the asserted claims of the Particle Size Patents are invalid and that the Lead Frame Patents and the '930 patent are not infringed. ID 39, 69-70 & 113-17. He also found that Osram does not meet the technical prong of the domestic industry requirement with respect to the '930 patent. ID 70.

Osram petitioned for review of the final ID challenging the ALJ's conclusions with respect to the Particle Size Patents, the '930 patent, and the Lead Frame Patents.[1] The Commission agreed

[1] The Commission investigative attorney ("IA") also petitioned for review of the final ID with regard to the Particle Size Patents.

to review the ALJ's findings and conclusions with respect to those patents and received briefing on the pertinent issues. 70 *Fed. Reg.* 37431 (June 29, 2005).

B. Patents at Issue

The Particle Size Patents relate to casting compositions that convert light emitted by a semiconductor to light of a different wavelength.[2] The patents all descend from the '861 patent and share a common specification. Moreover, all five Particle Size Patents are based on a German-origin PCT application, PCT/DE97/02139. Osram alleges that Dominant's products infringe claims 1, 3, 6-7, and 10-13 of the '861 patent; claims 1-2, 6-7, 11-12, and 14-15 of the '301 patent; claims 1, 3, 6-7, 10-15, 17, and 20-21 of the '247 patent; claims 1, 3, 6-7, 10-13, and 15 of the '259 patent; and claims 2-5, 7, and 10 of the '780 patent.

The '930 patent is directed to a component that converts radiation of a first wavelength to radiation of a different wavelength. The '930 patent is a divisional of United States Application No. 09/221,789 and is based on PCT/DE97/01337. Osram asserts that Dominant's products infringe claims 2-4 of the '930 patent.

C. Products at Issue

The products at issue in this investigation include various light-emitting diodes ("LEDs"). Specifically, Osram alleges that Dominant's white DomiLEDs, Power DomiLEDs, Super Small DomiLEDs, and NovaLEDs infringe the Particle Size Patents and the '930 patent and further that

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[2] The Lead Frame Patents and the '673 patent are not addressed in this opinion. The Commission has decided to defer addressing the issue of violation of the Lead Frame Patents, as well as issues relating to remedy, public interest, and bonding, until after the ALJ issues his initial determination on remand regarding the Particle Size Patents. With respect to the '673 patent, the Commission determined not to review the ALJ's determination that Dominant violated section 337. 70 *Fed. Reg.* 37431 (June 29, 2005).

Dominant's Spice LEDs infringe the Particle Size Patents. The products are discussed in more detail, as necessary, below.

II. ANALYSIS

A. The Particle Size Patents

The ALJ found all of the asserted claims in the Particle Size Patents invalid for indefiniteness due to ambiguity in the claim phrase "mean grain diameter d_{50}," a phrase that is common to all of the asserted claims. ID 39 & 40. According to the ALJ, the parties generally agreed that the ordinary meaning of the term "mean" is an arithmetic average and that the ordinary meaning of the term "d_{50}" is the median diameter, *i.e.*, "the diameter where 50% of the particles are smaller and 50% of the particles are larger." ID 29. He thus found the phrase "mean grain diameter d_{50}" insolubly ambiguous and indefinite because that phrase "leaves a person of ordinary skill in the art to speculate as to whether the claims cover *mean* grain diameters ≤ 5 μm or *median* grain diameters ≤ 5 μm" and that to choose one term over the other would constitute impermissible rewriting of the claims. ID 36-37 (emphasis added). We decline to adopt the ALJ's determination for the following reasons.

1. Definiteness and Claim Construction

Definiteness is a question of law derived from 35 U.S.C. § 112, ¶ 2, which states: "The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." *See Credle v. Bond*, 25 F.3d 1566, 1576 (Fed. Cir. 1994). In practice, definiteness requires consideration of whether "one skilled in the art would understand the bounds of the claim when read in light of the specification . . . ." *Exxon Research & Eng'g Co. v. United States*, 265 F.3d 1371, 1375 (Fed. Cir. 2001).

The definiteness requirement is closely related to the issue of claim construction - the process of determining the legal boundaries of a patent claim. *See Oakley, Inc. v. Sunglass Hut Int'l*, 316 F.3d 1331, 1340 (Fed. Cir. 2003) (The principal purpose of the definiteness requirement is to make certain that the claims are drafted such that "they give notice to the public of the extent of the legal protection afforded by the patent, so that interested members of the public, *e.g.*, competitors of the patent owner, can determine whether or not they infringe. That determination requires a construction of the claims according to the familiar canons of claim construction." (quoting *All Dental Prodx, LLC v. Advantage Dental Prods.*, 309 F.3d 774, 779-80 (Fed. Cir. 2002)). Only where a claim is so unclear that it does not give notice of the extent of legal protection, *i.e.*, it cannot be construed, will a tribunal hold it invalid as indefinite. *Exxon*, 265 F.3d at 1375 ("If the meaning of the claim is discernible, even though the task may be formidable and the conclusion may be one over which reasonable persons will disagree, we have held the claim sufficiently clear to avoid invalidity on indefiniteness grounds.").

Claim construction, a question of law, involves consideration of the claims themselves, the specification, and the prosecution history of the patent (if in evidence). *See Phillips v. AWH Corp.*, No. 03-1269, 03-1286, -- F.3d --, 2005 WL 1620331, slip op. at *6 (Fed. Cir. 2005) (*en banc*); *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979-80 (Fed. Cir. 1995) (*en banc*). The claim language selected by the patentee defines the scope of the claim. *SRI Int'l v. Matsushita Elec. Corp.*, 775 F.2d 1107, 1121 (Fed. Cir. 1985) (*en banc*). In addition to carefully considering the language of the claims, the written description must be considered to inform the proper construction of the claims and to determine, in particular, if the inventor acted as his own lexicographer and ascribed

a certain meaning to the claim terms. *Phillips*, 2005 WL 1620331, slip op. at *8; *Digital Biometrics, Inc. v. Identix, Inc.*, 149 F.3d 1335, 1344 (Fed. Cir. 1998). If he did not, the ordinary meaning of the claim language to one skilled in the art controls. *Digital*, 149 F.3d at 1344; *Elekta Instrument S.A. v. O.U.R. Scientific Int'l*, 214 F.3d 1302, 1307 (Fed. Cir. 2000) ("Absent an express intent to impart a novel meaning, claim terms take their ordinary meaning."). The prosecution history of the patent, if in evidence, must likewise be considered to determine whether the inventor surrendered coverage of material that would otherwise be covered by the claim. *See Bayer AG v. Elan Pharm. Research Corp.*, 212 F.3d 1241, 1252 (Fed. Cir. 2000) ("In determining whether there has been a clear and unmistakable surrender of subject matter, the prosecution history must be examined as a whole.").

Turning to the asserted claims in the Particle Size Patents, claim 1 of the '861 patent is representative and reads:

> A wavelength-converting casting composition, for converting a wavelength of ultraviolet, blue or green light emitted by an electroluminescent component, comprising:
>
> a transparent epoxy resin;
>
> an inorganic luminous substance pigment powder dispersed in said transparent epoxy resin, said pigment powder comprising luminous substance pigments from a phosphorus [sic] group having the general formula $A_3B_5X_{12}$:M, where A is an element selected from the group consisting of Y, Ca, Sr; B is an element selected from the group consisting of Al, Ga, Si; X is an element selected from the group consisting of O and S; M is an element selected from the group consisting of Ce and Tb;
>
> said luminous pigments having grain sizes ≤ 20 μm and a **mean grain diameter $d_{50} \leq$** 5 μm.

'861 patent (CX-1), col. 10, ll. 14-29 (emphasis added). The only claim term at issue is the phrase shown in bold above.

Osram argues that the term "mean" broadly refers to"halfway between extremes" and that

it "embraces, among other things, a median diameter." Complainant's Submission in Support of Commission's Review of Final Initial Determination ("Osram Sub.") at 6. Osram asserts that "d_{50}," on the other hand, is a narrow term universally understood to mean "median diameter." Osram Sub. at 3. As such, Osram concludes that the claims are not indefinite and that "the inventors clearly intended the claim limitation 'mean grain diameter d_{50}' to refer to the median diameter based on their use of the universally accepted symbol for the median, 'd_{50}.'" Osram Sub. at 14.

Contrarily, Dominant argues that the term "mean" should be given its mathematical definition of average. *See* Response of Respondent Dominant Semiconductors Sdn. Bhd. to the Notice of Commission Determination to Review a Final Determination on Violation of Section 337 ("Dom. Sub.") at 17-20. The only term about which Osram and Dominant agree is "d_{50}." However, Dominant concludes, as the ALJ did, that the terms "mean" and "d_{50}" are hopelessly inconsistent, rendering the claims indefinite. Dom. Sub. at 7-14 & 30-36.

The IA agrees that the term "mean" should be construed as arithmetic mean. *See* Submission of the Office of Unfair Import Investigations on the Issues Under Review and on Remedy, the Public Interest, and Bonding ("IA Sub.") at 7-9. However, he disagrees that "d_{50}" meant "median diameter" to a person of ordinary skill in the art at the time the invention was made. IA Sub. at 9. Instead, he argues that, through the use of the phrase "mean grain diameter d_{50}," the inventors defined "d_{50}" to mean "mean grain diameter" and, as such, the inventors acted as their own lexicographers. IA Sub. at 15. Accordingly, the IA submits that, since the claims can be reasonably construed, they are not indefinite. *Id.*

Although claim construction in this instance presents a close issue, there is one claim

construction that comports with the intrinsic evidence. Under that claim construction, the disputed phrase means the mathematical average of the grain diameters. Thus, the phrase "mean grain diameter d_{50}" does not render the claims of the Particle Size Patents indefinite.

The term "mean" is consistently used throughout the Particle Size Patents in the phrase "mean grain diameter d_{50}," but otherwise it is used without further clarification by either the claims or the specification. Thus, they alone do not provide the ordinary meaning of the term. General purpose and technical dictionaries give ample definitions of the term "mean," including the "middle point between two extremes," "arithmetic mean," and "average." THE AMERICAN HERITAGE DICTIONARY 775 (2nd ed. 1985); *Phillips*, 2005 WL 1620331, slip op. at *10. The Federal Circuit recently reiterated that extrinsic evidence, such as dictionaries, may be relied upon to assist in the claim construction process; however, they cautioned that dictionaries should not be allowed to extend patent protection beyond what is properly afforded by the patent. *Phillips*, 2005 WL 1620331, slip op. at *10-11. Accordingly, we rely on the claims themselves to aid us in assessing the definitions.

The phrase "mean grain diameter d_{50}" is not used in a vacuum in the asserted claims, but rather, the phrase is equated with a numerical value ("≤ 5 μm"), suggesting that the terms are used in their mathematical, not general, sense. Moreover, the term "mean" is employed in the context of phosphor particle science, thus technical treatises, such as the PHOSPHOR HANDBOOK, are more relevant than general dictionaries. The PHOSPHOR HANDBOOK defines "mean" as a mathematical average that can be based on number, length, area, or weight. PHOSPHOR HANDBOOK 736-37 (Shigeo Shionoya & William M. Yen eds., 1999) (CX-1159). Accordingly, we conclude that the

term "mean" means mathematical average.

Next, we turn to "d_{50}." While it appears from the expert testimony on the record that this term has a general usage as "median diameter," nothing suggests that one skilled in the relevant art would have attributed that meaning to the term at the time of the invention. *See* CX-1304C at 7 (Nauman Direct); Holloway Tr. at 788:21-789:14. All of the references cited by Osram and Dominant for this proposition are either not in the relevant art, are dated after the earliest identified invention date, September 20, 1996, or do not mention "d_{50}." *See* CLIVE WASHINGTON, PARTICLE SIZE ANALYSIS IN PHARMACEUTICALS AND OTHER INDUSTRIES: THEORY AND PRACTICE (1992) (RX-404) (relating to the pharmaceutical industry); U.S. Patent No. 6,140,04 (RX-470) (relating to filtration field, issued 2000); U.S. Patent No. 6,455,213 (RX-471) (relating to cathode ray tube displays, issued 2002); A.S. Murphy *et al.*, *Breaking the Boundaries of Jameson Cell Capacity* (CX-1319) (relating to coal technology, published after 1997); PHOSPHOR HANDBOOK (CX-1159) (does not mention "d_{50}"); and PERRY'S CHEMICAL ENGINEERS' HANDBOOK (Don W. Green ed., 7th ed. 1997) (RX-400) (does not mention "d_{50}"). Thus, this definition does not appear to have been universally accepted in the relevant art at the time of the invention.

Terms such as "d_{50}" are customarily defined by the words directly preceding them and, therefore, they have an ordinary meaning as a mathematical variable. *See* RX-447C at 2 (Holloway Supplemental Direct); RX-472C at 2 (Holloway Direct Rebuttal). A variable is a symbol that represents a quantity capable of assuming any of a set of values. *See* THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE (4th ed. 2000). That "d_{50}" is a variable in the context of the Particle Size Patents is indicated by the fact that, in the claim itself, "d_{50}" can be any value less

than or equal to five microns.[3] Thus, "d_{50}" is a variable defined by the words "mean grain diameter" directly preceding it.

This interpretation is consistent with the intrinsic evidence. Indeed, the patentees' own actions indicate that those skilled in the art are not entirely familiar with the meaning of "d_{50}." The patentees chose to use the phrase "mean grain diameter d_{50}," rather than "d_{50}" alone. But, if those skilled in the relevant art at the time of the invention so clearly understood "d_{50}" to mean "median diameter," "d_{50}" alone would have been sufficient. The patentees' choice indicates that "d_{50}" was not clear.

Even if the Commission assumes, *arguendo*, the truth of the assertion that "d_{50}" means "median diameter," this does not preclude the Commission from adopting d_{50}'s ordinary meaning as a variable. Indeed, it is precisely because "d_{50}" has a potentially contrary meaning to the words that directly precede it that one skilled in the art, reading the claim limitation as a whole, would turn to its alternate meaning as a variable. The context of the term governs its meaning. For example, consider a claim phrase "mean grain diameter π." In this situation, one skilled in the art would substitute π's universally accepted meaning of 3.14159 with its alternate meaning as a variable, precisely because there is a conflict between "mean" and "π." Thus, π, as defined by the words that precede it, means "mean grain diameter" in this context.

Likewise, the conflict between "mean" and "d_{50}" would lead one skilled in the art to conclude

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[3] The fact that the PHOSPHOR HANDBOOK identifies $\bar{D}$ as the traditional symbol for mean diameter is irrelevant. We must construe the terms that are actually used in the claims, and the PHOSPHOR HANDBOOK is not enlightening with regard to the meaning of "d_{50}." Moreover, it discloses several other expressions for mean diameter, including D_1, D_2, D_3, D_4, D_5, D_v, D_{vl}, D_n, and D_g, suggesting that there is flexibility as to which subscript to use. *See* Osram Reply Sub. at 21 & PHOSPHOR HANDBOOK 736-37 (CX-1159C).

that d_{50} is a variable defined by the words preceding it. Thus, regardless of whether "d_{50}" is interpreted as median diameter or not, one skilled in the art, considering the context of the Particle Size Patents, would understand the phrase "mean grain diameter d_{50}" to refer to the mathematical average of the grain diameters. To the contrary, if we adopted "median diameter" as the sole meaning of "d_{50}," the claims would be rendered indefinite due to the use of incongruous terms. The Federal Circuit, however, instructs tribunals to endeavor to construe a claim rather than hold it indefinite, even if it is a difficult task. *See Exxon*, 265 F.3d at 1375.

Finally, this is not the only instance where the patentees defined a variable by the words directly preceding it in the Particle Size Patents. They also defined the term "λ" in the same way. In column 4, line 59, of the '861 patent, the patentees state "wavelength lambda $\lambda \leq 520$nm" and, again in column 9, line 33, the patentees refer to "wavelength λ." They thus defined λ as "wavelength." The patentees later use the symbol λ on its own, but only after it had been defined. Similarly, the patentees use the phrase "mean grain diameter d_{50}" to define "d_{50}" as mean grain diameter.[4] In addition, although the patentees use "d_{50}" alone in the specification, they only do so after the term has already been defined. *See* '861 patent, col. 3, ll. 19-21 ("Especially luminous substance pigment powders with $d_{50} \leq 5$ µm have a strong tendency to clump[ ]."") & col. 2, ll. 21 & 23. Thus, the phrase "mean grain diameter d_{50}," read as a whole in light of the specification, means the mathematical average of the grain diameters. Finally, we note that by adopting this claim construction, we are not rewriting the claim as Dominant suggests, but rather giving "d_{50}" its ordinary meaning as a variable.

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[4] When we state that "d_{50}" is defined by the words directly preceding it, we mean that "d_{50}" is defined in the mathematical sense (*i.e.*, d_{50} = mean grain diameter).

Having concluded that "mean grain diameter d_{50}" means average diameter, we turn to the parties' dispute of whether the particle distribution and the mean should be calculated based upon the number of particles or the volume of the particles. We note at the outset that the claim is not invalid for indefiniteness merely because the patentee did not express which basis the distribution and the mean rely upon. Rather, the question remains "whether one of ordinary skill in the art would understand what is claimed when the claim is read in light of the specification." *BJ Serv. Co. v. Halliburton Energy Serv., Inc.*, 338 F.3d 1368, 1372 (Fed. Cir. 2003). This inquiry is especially important where, as here, the general understanding of the basis differs from the art-specific understanding. Nevertheless, one of ordinary skill in the art would understand what is claimed.

Generally, means are calculated by tallying the digits in a given set and dividing the sum by the number of digits. *See* WEBSTER'S NEW WORLD DICTIONARY OF AMERICAN ENGLISH 74 (3rd ed. 1994). Indeed, both Osram's expert and Dominant's expert testified as much. Nauman Tr. at 1033:5-11; *see also* Holloway Tr. at 777:19-22. Osram and the IA, therefore, argue for application of the number basis. *See* Osram Sub. at 24; IA Sub. at 4-5. Dominant, on the other hand, submits that the average should be calculated based on the volume of the particles. *See* Dom. Sub. at 40.

The art-specific evidence and testimony consistently indicate that skilled artisans use the volume (or, equivalently, the mass) method. For example, during prosecution of two of the Particle Size Patents, the '247 and '780 patents, Osram cited two references to the examiner that illustrate that one skilled in the art would determine the particle size distribution, and hence, the mean, based on volume or mass.[5] *See* Information Disclosure Statements (Jan. 10, 2002 & Jul. 9, 2002). The

[5] Osram argues that these references are irrelevant because the authors were entitled to use the terms outside of their ordinary meaning. Osram Reply Sub. at 36. Nothing, however,

first reference is a product specification sheet for lamp phosphors created by Nichia Kagaku Kogyo K.K. of Japan, a LED manufacturer, and it shows a particle size distribution based on the volume of the particles. *See* Lamp Phosphor Data Sheet, CX-19 ('247 patent) at OS 120832 & CX-18 ('780 patent) at OS 121640. The second reference is a product specification sheet for Phosphor L175 created by Osram, which shows a particle size distribution based on the mass of the particles. *See* Phosphor and Emitter, CX-19 ('247 patent) at OS 120756 & CX-18 ('780 patent) at OS 121663. These references suggest that the volume method and the mass method, which are undisputedly identical, are used by manufacturers of LEDs, who use phosphor particles.

Moreover, Osram's own expert, Dr. Zachau testified that it is common for manufacturers of phosphors to report phosphor sizes to customers by volume. *See* Zachau Tr. 638:18-22 ("Q: Okay. And it's true, is it not, that it is common for manufacturers of phosphors to report phosphor sizes to customers by particle volume? That's true right? A: Yeah. That's true."). In fact, Dr. Zachau, an Osram employee, acknowledged that Osram itself reports phosphor particle size by volume. *See* Zachau Tr. 641:11-15 ("Q: Okay. And you -- you're aware also that Phosphor Technologies reports their phosphor sizes by volume, correct? A: Yes, they do. The same way we do it. But I bet they also have an SEM."). Finally, technical treatises in the art indicate that the weight basis is more often used to describe real powders than other bases. For example, the PHOSPHOR HANDBOOK states that area-based and weight-based distributions "are frequently adopted to express [the] characteristics of actual powders," while PERRY'S CHEMICAL ENGINEERS' HANDBOOK states that "[i]t is common

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indicates that they used anything but the ordinary meaning. Osram also argues that these are marketing materials and not evidence of what a researcher developing LEDs would ordinarily use. Osram Reply Sub. at 37. Again, nothing supports Osram's assertion.

to use a weight basis for percentage but surface or number may, in some cases, be more relevant." PHOSPHOR HANDBOOK 736 (CX-1159C); PERRY'S CHEMICAL ENGINEERS' HANDBOOK 20-5 (DS150264) (RX-400).

Osram argues that the volume method places too much emphasis on large particles, which clump at the bottom of the resin and trap light internally. Osram Reply Sub. at 41-42. This does not suggest, however, that one skilled in the art would understand the mean grain diameter to refer to the number basis contrary to all of the art-specific evidence suggesting otherwise. Osram also argues that the only way to measure the particle diameters in the finished product is by SEM, which is based on the number of the particles. Osram Reply Sub. at 43. However, Osram's own expert, Dr. Zachau testified that SEM's can be used to measure phosphor sizes by volume. *See* Zachau Tr. 641:11-15. Accordingly, these arguments do not overcome the evidence cited to the examiner during prosecution of the '247 and '780 patents or the art-specific evidence indicating that those making and using phosphors in the LED field use volume and mass bases. Thus, one skilled in the art would understand the term "mean grain diameter d_{50}" to refer to the average diameter based on the volume of the particles.

We do not address Dominant's argument - raised before the ALJ, but which was not before the Commission - that the claims are indefinite because the patent does not specify which type of instrument should be used to ascertain the mean.[6] We leave this argument for the parties to raise,

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[6] We note that Dominant relied on *Honeywell v. Int'l Trade Comm'n*, 341 F.3d 1332 (Fed. Cir. 2003), to make its argument in this regard. In *Honeywell*, the respondent challenged the asserted method claims as indefinite, because they did not identify which sample preparation method was used to measure the melting point elevation. In determining that the claims were indefinite, however, the Federal Circuit relied on the Commission's factual determination that the choice of sample preparation method was crucial to deciding whether a particular product was

and the ALJ to decide, on remand.

2. Infringement

Once claims have been construed, the Commission compares them to the allegedly infringing device. *See Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1454 (Fed. Cir. 1998) (*en banc*). Comparison of the claim to the accused device is a question of fact that requires the patent holder to establish that the accused device includes every claim limitation or its equivalent. *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 29 (1997). Given our claim construction, we remand the issue of infringement to the ALJ for consideration in the first instance.

3. Domestic Industry

The ALJ should likewise revisit the issue of domestic industry in light of our claim construction.

B. The '930 Patent

The ALJ determined that Dominant's accused products do not infringe claims 2-4 of the '930 patent, because they lack "said luminescence conversion element being formed such that ... the plurality of paths hav[e] a substantially equal path length inside said luminescence conversion element" as required by each of the claims. ID 69. The ALJ characterized the difference of opinion between the parties as whether "the disputed claim term has a requirement that the luminescence conversion element that is deposited on the semiconductor body has a *uniform thickness*." ID 63 (emphasis added). After failing to find the term "uniform thickness" in the claims and determining that the specification "does not impose the uniform thickness limitation on all embodiments

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made by an infringing process. *Id.* at 1339.

discussed in the patent," the ALJ turned to the prosecution history. ID 63. Looking at a May 16, 2002 response to a prior art rejection, he found that Osram treated application claim 1, which contained the limitation "plurality of paths having a substantial equal path length," as if it recited or was limited to a luminescence conversion element with uniform thickness. ID 64-66. Thus, the ALJ concluded that Osram had disclaimed elements without uniform thickness and that Dominant's products, which have a non-uniform luminescence conversion element, do not literally infringe the asserted claims of the '930 patent. ID 64-66 & 69. For the following reasons, we agree with the ALJ that Dominant's products do not infringe the asserted claims of the '930 patent.

1. Claim Construction

The '930 patent presents a single question of claim construction - what is the meaning of "substantially equal path length." Claim 2 below is representative of the asserted claims and the limitation at issue is in bold:

> A light-radiating semiconductor component, comprising:
>
> a semiconductor body emitting electromagnetic radiation during an operation of the semiconductor component, said semiconductor body having a semiconductor layer sequence suitable for emitting electromagnetic radiation of a first wavelength range selected from a spectral region consisting of ultraviolet, blue, and green;
>
> a first electrical terminal and a second electrical terminal each electrically conductively connected to said semiconductor body;
>
> a luminescence conversion element with at least one luminescent material, said luminescence conversion element being deposited on said semiconductor body, said luminescence conversion element converting a radiation originating in the first wavelength range into a radiation of a second wavelength range different from the first wavelength range, such that the semiconductor component emits polychromatic visible light comprising radiation of the first wavelength range and radiation of the second wavelength range; and
>
> said luminescence conversion element being formed such that the radiation of the first

> wavelength range passes through said luminescence conversion element along a plurality of paths, the plurality of paths having a **substantially equal path length** inside said luminescence conversion element, and said luminescence conversion element emitting a substantial portion of the radiation of the first wavelength range and the radiation of the second wavelength range,
>
> wherein said luminescence conversion element includes light-diffusing particles.

'930 patent (CX-7), col. 16, ll. 30-67 (emphasis added).

The ALJ, the IA, and Dominant essentially agree that the term "path length" means the distance light travels through the luminescence conversion element. Moreover, they agree that the phrase "substantially equal path length" requires that the luminescence conversion element have uniform thickness and that, since Dominant's accused LEDs do not have a luminescence conversion element of uniform thickness, they do not infringe. ID 63 & 69; IA Sub. 23; Dom. Sub. at 52; Response of Respondent Dominant Semiconductors Sdn. Bhd. to the Staff Attorney's and Complainants' Petition for Review in the Initial Determination ("Dom. Pet. Resp.") at 67.

Osram argues that the term "path length" means the "distance of the route" and that, in the context of the claim, it means the distance of the route traveled by the blue light within the luminescence conversion element. Osram Sub. at 49 & 56. Unlike the ALJ, the IA, and Dominant, Osram argues that the distance traveled by the blue light is the sum of the particle-to-particle path lengths traced out by each individual photon of blue light emitted by the LED as it passes through the luminescence conversion element and that, if these path lengths are substantially equal, the LED will emit homogenous white light. Osram Sub. at 53-54.

The intrinsic evidence illustrates that in order to satisfy the "substantially equal path length" limitation, the luminescence conversion element must have uniform thickness. As described above,

claim construction "must begin with and remain centered on the language of the claims themselves." *Storage Tech. Corp. v. Cisco Sys., Inc.*, 329 F.3d 823, 830 (Fed. Cir. 2003). In this case, the claims indicate that the term "path" refers to the route by which light of the first wavelength (blue light) emitted by the LED chip travels from the chip through the luminescence conversion element. *See* '930 patent (CX-7), col. 16, ll. 52-59. The path length therefore is the length of that route.

Unlike Osram's claim construction, which would have us sum up the individual distances each photon travels between phosphor particles, the claims make clear that the path length is simply meant to refer to the form or shape of the luminescence conversion element as it affects the distance traveled by the blue light. For instance, the claims state that "said luminescence conversion element [is] **formed**" such that the blue light passes through the luminescence conversion element along a plurality of paths of substantially equal path length. *See* '930 patent (CX-7), col. 16, l. 52 (emphasis added). The claims do not refer to particle-to-particle distances or even to homogenous light.

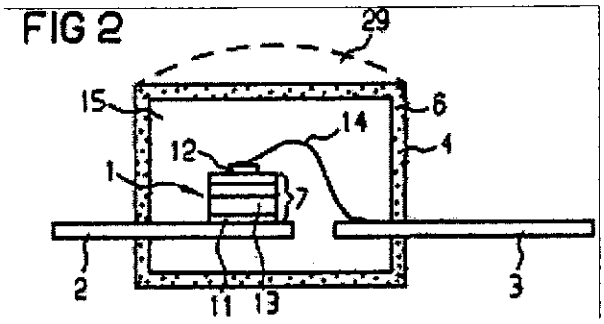
The specification likewise associates the path length with the shape, or more particularly the thickness, of the luminescence conversion layer:

> In accordance with another feature of the invention, the luminescence conversion element is at least one luminescence conversion layer disposed in a vicinity of the semiconductor body. In this particularly preferred embodiment of the invention, a partially transparent luminescence conversion layer, that is to say one which is partially transparent to the radiation emitted by the radiation-emitting semiconductor body, is provided as the luminescence conversion element above or on the semiconductor body. ***In order to ensure a uniform color of the radiated light, the luminescence conversion layer is advantageously designed in such a way that it has a constant thickness throughout. This has the particular advantage that the path length of the light radiated by the semiconductor body through the luminescence conversion layer is virtually constant for all radiation directions.***

'930 patent (CX-7), col. 3, ll. 34-48. Osram argues that this statement in the '930 patent does not

limit the entire invention and all of the claims. Osram Reply Sub. at 98. Although this passage does refer to a particular embodiment of the invention, it generally describes that a luminescence conversion element that has a constant thickness throughout also has a light path length that is virtually constant in all directions and suggests that luminescence conversion layers that do not have a constant thickness throughout would not have virtually constant path lengths.

Moreover, the specification points to Figure 2 of the '861 patent as one example of an embodiment that has a constant path length throughout the luminescence conversion layer. Figure 2 is reproduced below.



At col. 12, lines 16-23, the specification of the '861 patent describes Figure 2 by stating:

> This exemplary embodiment has the particular advantage that the ***path length*** through the luminescence conversion element ***is approximately the same size*** for all of the radiation emitted by the semiconductor body. This is important particularly when, as is often the case, the exact hue of the light radiated by the semiconductor component depends on this path length.

(Emphasis added). Although no scale is provided to show relative lengths, Figure 2 illustrates that the shape of the luminescence conversion element has a virtually constant thickness throughout. Accordingly, the claims and the specification illustrate that the patentees employed the phrase

"substantially equal path length" to refer to path lengths through luminescence conversion elements of constant thickness.

The prosecution history is consistent with this interpretation. *Phillips*, 2005 WL 1620331, slip op. at *9 (Prosecution history "can often inform the meaning of the claim language by demonstrating how the inventor understood the invention...."). It also indicates that the patentees used the phrase "substantially equal path length" to refer to luminescence conversion elements of constant or uniform thickness. CX-17. In fact, there are at least five instances in the prosecution history of the '930 patent that show that the patentees understood the disputed phrase to refer to luminescence conversion elements of uniform thickness.

For example, on May 16, 2002, in response to a rejection of all 51 original claims of the application leading to the '930 patent, the applicants amended claim 1 to add the phrase "substantially equal path length," and added a new claim 54 drawn to a semiconductor device with a "transparent encapsulating resin" having "substantially uniform thickness." CX-17 at OS 119909. In the "Remarks" section of the amendment, the applicants stated several times that a distinguishing feature of claim 1 was that it covered luminescence conversion elements having substantially uniform thickness:

- "As amended, *claim 1 also recites a substantially uniform thickness*" (CX-17 at OS 119910 (emphasis added));
- The Stevenson reference is distinguishable because it does not teach "*a layer of uniform thickness as required by claims 1 and 54.*" (*Id.* (emphasis added));
- The Tadatsu reference is distinguishable because in Tadatsu "[t]he resin mold is taller than it is wide, such that there is a longer path for the light through the resin upward than to the sides. *Tadatsu thus does not teach substantially equal thickness, as required by claims 1 and 54.*" (*Id.* at OS 119910-11 (emphasis added));

- The Abe and Thornton references differ from claims 1 and 54 because "[t]hese references describe devices that are radically different than the much more compact device claimed, which has *a uniform thickness deposited on the semiconductor body.*" (*Id.* at OS 119911 (emphasis added));

- "The references, taken alone or in combination, do not disclose or suggest . . . a luminescence conversion element that is deposited on the semiconductor body and *has a substantially constant thickness . . . as required by independent claim 1.*" (*Id.* at OS 119912 (emphasis added)).

Again, these statements suggest that the patentees used the term "substantially equal path length" to refer to the shape of the luminescence conversion element as uniformly thick.

Osram argues that these statements would be seen as clearly erroneous by a person of ordinary skill the art. Osram Sub. at 66 & Osram Pet. at 87. Specifically, Osram argues that the remarks were meant to refer only to application claim 54, which claimed a luminescence conversion element having uniform thickness, and not to application claim 1, which contained the phrase "substantially equal path length." *Id.* This is unpersuasive. All of the prior art rejections for claim 1 were based on the Stevenson reference, either alone or in combination with other references. CX-17 at OS119904-05. In response to these rejections, Osram characterized Stevenson as follows: "Stevenson in particular does not teach depositing the phosphors on the semiconductor element or a layer of uniform thickness as required by claims 1 and 54." CX-17 at OS 119910. If, as Osram now contends, it did not mean to apply this comment to claim 1, Osram would have left the rejections relating to Stevenson unrebutted with respect to claim 1, and would have had no basis to assert to the examiner – as it did – that claim 1 was allowable over Stevenson. CX-17 at OS 119910-11. Thus, it is unlikely that a person of ordinary skill in the art would read the prosecution history the way Osram urges us to read it. Moreover, even if these statements were erroneous as

Osram suggests, it would not preclude our claim construction, because "the inquiry into the meaning of claim terms is an objective one, a patentee who notifies the public that claim terms are to be limited beyond their ordinary meaning to one of skill in the art will be bound by that notification, even where it may have been unintended." *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1117 (Fed. Cir. 2004).

Osram also argues that an interpretation requiring uniform thickness improperly excludes the preferred embodiment illustrated in Figure 10. To show that the applicants' intended to cover Figure 10, Osram points to the following statement made by the applicants early in the prosecution of the '930 patent's parent application, U.S. Application Serial No. 09/221,789 (the "'789 application"):

> There are two basic embodiments of the present invention, each of the two basic embodiments having variations. The first embodiment is shown in Figs. 1-3, 5, and 10 [Fig. 10 having the same "well shape" as Dominant's accused products and Osram's products]. . . . Both embodiments have in common that radiation emitted by the body **1** travels a substantially uniform or equal path length.

Osram Pet. at 83 (quoting CX-1238 at 4-5). Osram interprets this as an explicit statement that the non-uniformly thick luminescence conversion element disclosed in Figure 10 produces light that "travels a substantially uniform or equal path length," and thus is in conflict with a claim interpretation that requires uniform thickness and excludes Figure 10. *Id.*

Understood in the context of the entire prosecution history of the parent '789 application, it is apparent that, even if this statement indicates that the applicants originally intended Figure 10 to fall within the scope of the claims, it does not reflect the express representations they subsequently made in the '789 application and that they made to get the claims of the '930 patent allowed. When the applicants added the phrase "substantially equal path length" to the pending claims in the '789

application, they stated, in an attempt to distinguish Tadatsu, that:

> Tadatsu discloses a resin dome shaped LED 4 encapsulating a light emitting body 11 disposes in a cavity positioned atop of a first terminal and electrically connected to the first and a second terminal via bonding wires. The encapsulation is filled with a fluorescent dye 5. The dye is excited by emissions from the emitter 11 to produce light. The dye is dispersed throughout the dome having a *non-uniform thickness and thus the path lengths of the radiation through the dome have different lengths.*

CX-1238 at OS 115876 & OS 115881 (emphasis added). This remark indicates that the applicants believed that the non-uniformity of the path lengths through the resin dome *is caused by* the fact that the resin dome is not uniformly thick. In subsequent responses, the applicants made similar statements. *See* CX-1240 at 115860 ("The dye [in the Tadatsu device] is dispersed throughout the dome having a non-uniform thickness and thus the path lengths of the radiation through the dome have <u>different</u> lengths." (emphasis original)); CX-17 at OS 115588. Osram argues that these statements are correct, because the dye in Tadatsu automatically disperses to a constant concentration and, thus, the shape of the dome affects the path length of the light. Osram Sub. at 65-66. This argument, however, is not supported by the applicants' remarks in the prosecution history and does not overcome applicants' statement in the '930 patent's prosecution history that "Tadatsu thus does not teach substantially equal thickness, as required by claims 1 and 54." CX-17 at OS 119910-11.

Thus, in the course of prosecuting the '789 application and the '930 patent, the applicants expressed multiple times that having a "substantially constant thickness" is equivalent to "a substantially equal path length." Even if the applicants did not believe this at an earlier time in the prosecution, they long since abandoned that view in the course of the subsequent prosecution of the '789 application and the application that lead to the '930 patent. Thus, the embodiment in Figure 10 does not fall within the scope of the claims.

Although it is true that the Federal Circuit has stated that an interpretation excluding a preferred embodiment "is rarely, if ever, correct and would require highly persuasive evidentiary support," this canon of claim construction is normally saved for those situations where the specification discloses only a single preferred embodiment. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583-84 (Fed. Cir. 1996) ("Indeed, if 'solder reflow temperature' were defined to mean liquidus temperature, a preferred (and indeed only) embodiment in the specification would not fall within the scope of the patent claim. Such an interpretation is rarely, if ever, correct...."). Moreover, the Federal Circuit has also recognized that where, as here, the intrinsic evidence illustrates that the claim does not cover an embodiment, the claim need not be arbitrarily construed to do so. *See Elekta*, 214 F.3d at 1308. Osram does not argue, nor can it argue in light of the intrinsic evidence, that our interpretation excludes all of the disclosed embodiments. *See* '930 patent (CX-7), Fig. 6. Thus, our construction is permissible, even mandated, despite the fact that it does not cover the embodiment of Figure 10.

Finally, Osram argues that this interpretation must be wrong because it is contrary to the purpose of the invention, which is to produce homogenous white light. Osram Sub. at 58 & Osram Pet. at 98-102. Along these lines, Osram argues that the concentration can be varied to make luminescence conversion elements of non-uniform thickness that emit homogenous white light. However, the '930 patent itself teaches that construing the phrase "substantially equal path length" to require a uniformly thick luminescence conversion element is fully compatible with this purpose. In explaining a particular embodiment, the patent teaches that a luminescence conversion element that has "constant thickness throughout" *ensures* homogenous light output. *See* '930 patent (CX-7),

col. 3, lines 42-45 ("In order to ***ensure*** a uniform color of the radiated light, the luminescence conversion layer is advantageously designed in such a way that it has a constant thickness throughout.") (emphasis added). Thus, at least with respect to particular embodiments, the stated purpose of the invention is fully compatible with our interpretation. Thus, the Commission construes the phrase "substantially equal path length" to mean the distance the radiation of a first wavelength travels from a semiconductor body through a luminescence conversion element of uniform thickness.

2. Infringement

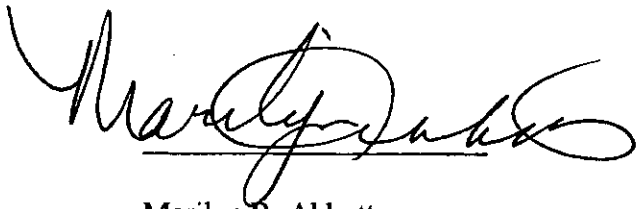
Dominant's accused device is structured in the same manner as Figure 10 of the '930 patent with a luminescence conversion layer that is not uniform in thickness. *See* Holloway Tr. at 918 & 926. Given our claim construction, we affirm the ALJ's conclusion that Dominant does not infringe the asserted claims of the '930 patent. We do not reach the issues of invalidity or domestic industry with regard to the '930 patent.

III. CONCLUSION

For the reasons discussed herein, the Commission remands this investigation to the ALJ for a determination of violation of section 337 with regard to the Particle Size Patents consistent with this opinion, including (1) a determination on infringement and (2) a determination on domestic industry. In addition, the Commission terminates the investigation with a finding of no violation with regard to the '930 patent.

PUBLIC VERSION

By Order of the Commission.



Marilyn R. Abbott
Secretary

Issued: 8/29/05

CERTAIN LIGHT EMITTING DIODES AND PRODUCTS CONTAINAING SAME

337-TA-512

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that **COMMISSION OPINION (PUBLIC)**, was served upon all parties via first class mail and air mail where necessary on August 29, 2005.

Marilyn R. Abbott

Marilyn R. Abbott, Secretary
U.S. International Trade Commission
500 E Street, SW Rm 112
Washington, DC 20436

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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of	)	
	)	Inv. No. 337-TA-512
CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING SAME	)	

NOTICE OF COMMISSION DETERMINATION TO REVIEW A FINAL DETERMINATION ON VIOLATION OF SECTION 337; SCHEDULE FOR FILING WRITTEN SUBMISSIONS ON THE ISSUES UNDER REVIEW AND ON REMEDY, THE PUBLIC INTEREST, AND BONDING

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined to review a portion of the final initial determination ("ID") issued by the presiding administrative law judge ("ALJ") on May 10, 2005, regarding whether there is a violation of section 337 of the Tariff Act of 1930, 19 U.S.C. § 1337, in the above-captioned investigation.

FOR FURTHER INFORMATION CONTACT: Wayne Herrington, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 205-3090, or Michelle Walters, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 708-5468. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 205-2000. General information concerning the Commission may also be obtained by accessing its Internet server (*http://www.usitc.gov*). The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at *http://edis.usitc.gov*. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on (202) 205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted this patent-based section 337 investigation based on a complaint filed by Osram GmbH and Osram Opto Semiconductors GmbH, both of Germany (collectively, "Osram"). 69 *Fed. Reg.* 32609 (June 10, 2004). In the complaint, as supplemented and amended, Osram alleged violations of section 337 of the Tariff Act of 1930 in the importation into the United States, the sale for importation, and the sale within the United

States after importation of certain light-emitting diodes and products containing the same by reason of infringement of United States Patent Nos. 6,066,861, 6,277,301, 6,613,247, 6,245,259, 6,592,780 (collectively, the "Particle Size Patents"), 6,576,930 (the "'930 patent"), 6,376,902, 6,469,321, 6,573,580 (collectively, the "Lead Frame Patents"), and 6,716,673 (the "'673 patent"). The complaint, as subsequently amended, named three respondents: Dominant Semiconductors Sdn. Bhd. ("Dominant"), American Opto Plus, Inc. ("AOP"), and American Microsemiconductor, Inc. ("AMS"). The Commission has terminated the investigation as to AOP and AMS based on settlement agreements.

On May 10, 2005, the ALJ issued his final ID finding a violation of section 337 with regard to the '673 patent and containing his recommended determination on remedy and bonding. He found no violation of section 337 with respect to the nine other patents asserted by Osram. Specifically, he found that the asserted claims of the Particle Size Patents are invalid for indefiniteness, that the asserted claims of the '930 patent and the Lead Frame Patents are not infringed, and that the domestic industry requirement was not met for the '930 patent. Osram and the Commission investigative attorney ("IA") filed petitions for review of the ALJ's final ID. Dominant filed a response in opposition to the petitions from Osram and the IA. The IA filed a response to Osram's petition. Osram filed a motion for leave to file a reply to Dominant's response to its petition for review.

Having examined the record of this investigation, including the ALJ's final ID, the petitions for review, and the responses thereto, the Commission has determined (1) not to grant Osram's motion for leave to file a reply; (2) not to review the ALJ's determination of violation with respect to the '673 patent; and (3) to review the ALJ's findings and conclusions regarding the Particle Size Patents, the '930 patent, and the Lead Frame Patents.

In connection with its review, the Commission is particularly interested in responses to the following questions:

1. With respect to the Particle Size Patents, state your position with regard to whether the disputed limitation, "mean grain diameter d_{50}," can be construed and, if so, what the appropriate construction is. Identify the intrinsic evidence (and, if appropriate, extrinsic evidence) upon which you rely. Your response should separately discuss the meaning of the words "mean" and "d_{50}."

2. With respect to the '930 patent, provide your claim construction of the phrase "path length," including an analysis of any intrinsic and/or extrinsic evidence upon which you rely.

3. With respect to the Lead Frame Patents, provide your claim construction of the phrase "starting from," including an analysis of any intrinsic and/or extrinsic evidence upon which you rely.

4. With respect to the Lead Frame Patents, given that the ALJ construed the term "lead frame" to exclude glue dots, can the glue dot at issue in the accused device be considered part of the alleged equivalent in assessing infringement under the doctrine of equivalents?

5. Assuming the answer to the previous question is "yes," are the three ground leads plus the glue dot at issue in the accused device equivalent to the claimed external connections, especially with respect to the limitation "starting from said chip carrier part run toward the outside in a stellate form?" (You should discuss the "function, way, result" test in your analysis.)

In connection with the final disposition of this investigation, the Commission may (1) issue an order that could result in the exclusion of the subject articles from entry into the United States, and/or (2) issue one or more cease and desist orders that could result in the respondent being required to cease and desist from engaging in unfair acts in the importation and sale of such articles. Accordingly, the Commission is interested in receiving written submissions that address the form of remedy, if any, that should be ordered. If a party seeks exclusion of an article from entry into the United States for purposes other than entry for consumption, the party should so indicate and provide information establishing that activities involving other types of entry either are adversely affecting it or likely to do so. For background, *see In the Matter of Certain Devices for Connecting Computers via Telephone Lines*, Inv. No. 337-TA-360, USITC Pub. No. 2843 (December 1994) (Commission Opinion).

If the Commission contemplates some form of remedy, it must consider the effects of that remedy upon the public interest. The factors the Commission will consider include the effect that an exclusion order and/or cease and desist orders would have on (1) the public health and welfare, (2) competitive conditions in the U.S. economy, (3) U.S. production of articles that are like or directly competitive with those that are subject to investigation, and (4) U.S. consumers. The Commission is therefore interested in receiving written submissions that address the aforementioned public interest factors in the context of this investigation.

If the Commission orders some form of remedy, the President has 60 days to approve or disapprove the Commission's action. During this period, the subject articles would be entitled to enter the United States under bond, in an amount determined by the Commission and prescribed by the Secretary of the Treasury. The Commission is therefore interested in receiving submissions concerning the amount of the bond that should be imposed.

WRITTEN SUBMISSIONS: The parties to the investigation are requested to file written submissions on the issues identified in this notice. The written submissions should be concise and should thoroughly reference the record. Parties to the investigation, interested government agencies, and any other interested parties are encouraged to file written submissions on the issues of remedy, the public interest, and bonding. Such submissions should address the May 10, 2005, recommended determination by the ALJ on remedy and bonding. Complainants and the Commission investigative attorney are also requested to submit proposed remedial orders for the Commission's consideration.

Complainants are also requested to state the dates that the patents expire and the HTSUS numbers under which the accused products are imported. The written submissions and proposed remedial orders must be filed no later than close of business on July 8, 2005. Reply submissions must be filed no later than the close of business on July 15, 2005. No further submissions on these issues will be permitted unless otherwise ordered by the Commission.

Persons filing written submissions must file the original document and 12 true copies thereof on or before the deadlines stated above with the Office of the Secretary. Any person desiring to submit a document to the Commission in confidence must request confidential treatment unless the information has already been granted such treatment during the proceedings. All such requests should be directed to the Secretary of the Commission and must include a full statement of the reasons why the Commission should grant such treatment. *See* 19 C.F.R. § 210.6. Documents for which confidential treatment by the Commission is sought will be treated accordingly. All nonconfidential written submissions will be available for public inspection at the Office of the Secretary.

The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), and in section 210.42-46 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.42-46).

By order of the Commission.

/s/
Marilyn R. Abbott
Secretary to the Commission

Issued: June 24, 2005

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of	
CERTAIN LIGHT EMITTING DIODES AND PRODUCTS CONTAINING SAME	**Inv. No. 337-TA-512**

NOTICE REGARDING ISSUANCE OF INITIAL DETERMINATION

(May 10, 2005)

On May 10, 2005, the administrative law judge filed his Initial Determination. Attached are pages 150 through 153 from said filing, which are a matter of public record.

Charles E. Bullock
Administrative Law Judge

CONCLUSIONS OF LAW

1. The Commission has subject matter jurisdiction in this investigation.

2. The Commission has personal jurisdiction over Respondent Dominant Semiconductors Sdn. Bhd.

3. Dominant's DomiLEDs, Power DomiLEDs, Super Small DomiLEDs, and NovaLEDs do not infringe claims 2-4 of U.S. Patent No. 6,469,930 in violation of 35 U.S.C. § 271(a).

4. Dominant's Power DomiLEDs do not infringe claims 1 and 5-8 of U.S. Patent No. 6,376,902; claims 1 and 5-8 of U.S. Patent No. 6,469,321 ("the '321 patent"); and claims 1, 5-8, and 10-11 of U.S. Patent No. 6,573,580 in violation of 35 U.S.C. § 271(a).

5. Dominant's Super SmallDomiLEDs infringe claims 1-3 and 5 of U.S. Patent No. 6,716,673 in violation of 35 U.S.C. § 271(a).

6. An industry in the United States does not exist with respect to Osram's light-emitting diodes that is protected by U.S. Patent No. 6,066,861; U.S. Patent No. 6,245,259; U.S. Patent No. 6,277,301; U.S. Patent No. 6,592,780; and U.S. Patent No. 6,613,247, as required by 19 U.S.C. § 1337(a)(2) and (3).

7. An industry in the United States does not exist with respect to Osram's light-emitting diodes that is protected by U.S. Patent No. 6,469,930, as required by 19 U.S.C. § 1337(a)(2) and (3).

8. An industry in the United States exists with respect to Osram's light-emitting diodes that is protected by U.S. Patent No. 6,376,902; U.S. Patent No. 6,469,321; and U.S. Patent No. 6,573,580, as required by 19 U.S.C. § 1337(a)(2) and (3).

9. An industry in the United States exists with respect to Osram's light-emitting diodes that is protected by U.S. Patent No. 6,716,673, as required by 19 U.S.C. § 1337(a)(2) and (3).

10. U.S. Patent No. 6,066,861; U.S. Patent No. 6,245,259; U.S. Patent No. 6,277,301; U.S. Patent No. 6,592,780; and U.S. Patent No. 6,613,247 are invalid under 35 U.S.C. § 112, ¶ 2 for indefiniteness.

11. No showing of invalidity due to lack of enablement under 35 U.S.C. § 112, ¶ 1 has been made for U.S. Patent No. 6,469,930.

12. U.S. Patent No. 6,376,902; U.S. Patent No. 6,469,321; and U.S. Patent No. 6,573,580 are not invalid under 35 U.S.C. § 102(b) based on U.S. Patent No. 5,035,483.

13. U.S. Patent No. 6,376,902; U.S. Patent No. 6,469,321; and U.S. Patent No. 6,573,580 are not invalid under 35 U.S.C. § 103 based on a combination of U.S. Patent No. 5,035,483, U.S. Patent No. 4,843,280, and/or U.S. Patent No. RE. 34,254.

INITIAL DETERMINATION

Based on the foregoing opinion, findings of fact, conclusions of law, the evidence, and the record as a whole, and having considered all pleadings and arguments, including the proposed findings of fact and conclusions of law, it is the Administrative Law Judge's INITIAL DETERMINATION that a violation of Section 337 of the Tariff Act of 1930, as amended, has been found in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain light-emitting diodes and products containing same in connection with claims 1-3 and 5 of U.S. Patent No. 6,716,673. In addition, the Administrative Law Judge hereby determines that a violation of Section 337 of the Tariff Act of 1930, as amended, has not been found in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain light-emitting diodes and products containing same in connection with claims 1, 3, 6-7, and 10-13 of U.S. Patent No. 6,066,861; claims 1, 3, 6, 7, 10-13, and 15 of U.S. Patent No. 6,245,259; claims 1-2, 6-7, 11-12, and 14-15 of U.S. Patent No. 6,277,301; claims 2-5, 7, and 10 of U.S. Patent No. 6,592,780; claims 1, 3, 6-7, 10-15, 17, 20 and 21 of U.S. Patent No. 6,613,247; claims 1 and 5-8 of U.S. Patent No. 6,376,902; claims 1 and 5-8 of U.S. Patent No. 6,469,321; claims 1, 5-8, and 10-11 of U.S. Patent No. 6,573,580; and claims 2-4 of U.S. Patent No. 6,469,930.

Furthermore, the Administrative Law Judge hereby determines that a domestic industry in the United States exists that practices U.S. Patent No.6,376,902; U.S. Patent No. 6,469,321, U.S. Patent No. 6,573,580, and U.S. Patent No. 6,716,673 and that a domestic industry in the United States does not exist that practices U.S. Patents No. 6,066,861; U.S. Patent No. 6,245,259; U.S. Patent No. 6,277,301; U.S. Patent No. 6,592,780;U.S. Patent No. 6,613,247; and U.S. Patent No. 6,469,930.

The Administrative Law Judge hereby CERTIFIES to the Commission this Initial Determination, together with the record of the hearing in this investigation consisting of the following:

- The transcript of the trial, with appropriate corrections as may hereafter be ordered by the Administrative Law Judge; and further,
- The exhibits accepted into evidence in this investigation as listed in the attached exhibit lists.

Pursuant to 19 C.F.R. § 210.42(h), this Initial Determination shall become the determination of the Commission unless a party files a petition for review pursuant to 19 C.F.R. § 210.43(a) or the Commission, pursuant to 19 C.F.R. § 210.44, orders on its own motion a review of the Initial Determination or certain issues therein.

IN THE MATTER OF CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING THE SAME

337-TA-512

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **ORDER** was served upon, Benjamin D.M. Wood, Esq., Commission Investigative Attorney, and the following parties via first class mail and air mail where necessary on May 10, 2005.

Marilyn R. Abbott, Secretary
U.S. International Trade Commission
500 E Street, S.W., Room 112A
Washington, D.C. 20436

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IN THE MATTER OF CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING THE SAME **337-TA-512**

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PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of	
CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING SAME	**Inv. No. 337-TA-512**

INITIAL DETERMINATION ON VIOLATION OF SECTION 337 AND RECOMMENDED DETERMINATION ON REMEDY AND BOND

Administrative Law Judge Charles E. Bullock

(May 10, 2005)

Appearances:

For the Complainants OSRAM GmbH and OSRAM Opto Semiconductors GmbH:
Alan D. Smith, Esq.; Charles H. Sanders, Esq.; of Fish & Richardson, P.C., of Boston Massachusetts

Evelyn G. Heilbrunn, Esq.; Malan D. Rampton, Esq.; Peter J. Sawert, Esq.; Ahmed J. Davis, Esq.; of Fish & Richardson, P.C., of Washington, D.C.

Edmond R. Bannon, Esq.; of Fish & Richardson, P.C., of New York, N.Y.

For the Respondent Dominant Semiconductors Sdn. Bhd.:
Raymond A. Kurz; Esq.; Celine Jimenez Crowson, Esq.; Ajit J. Vaidya, Esq.; Anna Kurian Shaw, Esq.; of Hogan & Hartson, LLP, of Washington, D.C.

For the Commission Investigative Staff:
Lynn I. Levine, Esq., Director; T. Spence Chubb, Esq., Supervising Attorney; Benjamin Wood, Esq., Investigative Attorney; of the Office of Unfair Import Investigations, U.S. International Trade Commission, of Washington, D.C.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

CDX	Complainants' demonstrative exhibit
CFF	Complainants' proposed findings of fact
CIB	Complainants' initial post-hearing brief
CORFF	Complainants' objections to Respondent's proposed findings of fact
COSFF	Complainants' objections to Staff's proposed findings of fact
CPX	Complainants' physical exhibit
CRB	Complainants' reply post-hearing brief
CX	Complainants' exhibit
Dep.	Deposition
JX	Joint Exhibit
RDX	Respondent's demonstrative exhibit
RFF	Respondent's proposed findings of fact
RIB	Respondent's initial post-hearing brief
ROCFF	Respondent's objections to Complainants' proposed findings of fact
ROSFF	Respondent's objections to Staff's proposed findings of fact
RPX	Respondent's physical exhibit
RRB	Respondent's reply post-hearing brief
RX	Respondent's exhibit
SFF	Staff's proposed findings of fact
SIB	Staff's initial post-hearing brief
SOCFF	Staff's objections to Complainants' proposed findings of fact
SORFF	Staff's objections to Respondent's proposed findings of fact
SRB	Staff's reply post-hearing brief
SX	Staff's exhibit
Tr.	Transcript

PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of	
CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING SAME	**Inv. No. 337-TA-512**

INITIAL DETERMINATION ON VIOLATION OF SECTION 337 AND RECOMMENDED DETERMINATION ON REMEDY AND BOND

Administrative Law Judge Charles E. Bullock

(May 10, 2005)

Pursuant to the Notice of Investigation[1] and Rule 210.42(a) of the Rules of Practice and Procedure of the United States International Trade Commission,[2] this is the Administrative Law Judge's Initial Determination in the matter of certain light-emitting diodes and products containing same, Investigation No. 337-TA-512.

The Administrative Law Judge hereby determines that a violation of Section 337 of the Tariff Act of 1930, as amended, has been found in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain light-emitting diodes and products containing same in connection with claims 1-3 and 5 of U.S. Patent No. 6,716,673 ("the '673 patent"). In addition, the Administrative Law Judge hereby determines that a violation of Section 337 of the Tariff Act of 1930, as amended, has not been found in the importation into the

[1] *See* 69 Fed. Reg. 32,609 (June 10, 2004).
[2] *See* 19 C.F.R. § 210.42(a)

United States, the sale for importation, or the sale within the United States after importation of certain light-emitting diodes and products containing same in connection with claims 1, 3, 6-7, and 10-13 of U.S. Patent No. 6,066,861 ("the '861 patent"); claims 1, 3, 6, 7, 10-13, and 15 of U.S. Patent No. 6,245,259 ("the '259 patent"); claims 1-2, 6-7, 11-12, and 14-15 of U.S. Patent No. 6,277,301 ("the '301 patent"); claims 2-5, 7, and 10 of U.S. Patent No. 6,592,780 ("the '780 patent"); claims 1, 3, 6-7, 10-15, 17, 20 and 21 of U.S. Patent No. 6,613,247 ("the '247 patent"); claims 1 and 5-8 of U.S. Patent No. 6,376,902 ("the '902 patent"); claims 1 and 5-8 of U.S. Patent No. 6,469,321 ("the '321 patent"); claims 1, 5-8, and 10-11 of U.S. Patent No. 6,573,580 ("the '580 patent"); and claims 2-4 of U.S. Patent No. 6,469,930 ("the '930 patent").

Furthermore, the Administrative Law Judge hereby determines that a domestic industry in the United States exists that practices U.S. Patent No. 6,376,902; U.S. Patent No. 6,469,321, U.S. Patent No. 6,573,580, and U.S. Patent No. 6,716,673 and that a domestic industry in the United States does not exist that practices U.S. Patent No. 6,066,861; U.S. Patent No. 6,245,259; U.S. Patent No. 6,277,301; U.S. Patent No. 6,592,780; U.S. Patent No. 6,613,247; and U.S. Patent No. 6,469,930.

DISCUSSION

I. Introduction

A. Procedural History

On April 5, 2004, Complainants OSRAM GmbH and OSRAM Opto Semiconductors GmbH (collectively "Osram" or "Complainants") filed a complaint with the Commission pursuant to Section 337 of the Tariff Act of 1930, as amended.[3] The complaint was supplemented by letter on May 27, 2004. The complaint, as amended, asserts unfair methods of competition and unfair acts in violation of Section 337 by the following Respondents in connection with the importation, sale for importation, and sale within the United States after importation of certain light-emitting diodes and products containing same: American Microsemiconductor Inc. ("AMS"); American Opto Plus, Inc. ("AOP"); and Dominant Semiconductors Sdn. Bhd. ("Dominant").

The amended complaint accuses the Respondents' products of infringing various claims of the following ten U.S. Patents owned by Osram: claims 1, 3, 6-7, and 10-13 of the '861 patent; claims 1, 3, 6, 7, 10-13, and 15 of the '259 patent; claims 1-2, 6-7, 11-12, and 14-15 of the '301 patent; claims 1 and 5-8 of the '902 patent; claims 1 and 5-8 of the '321 patent; claims 1, 5-8, and 10-11 of the '580 patent; claims 2-4 of the '930 patent; claims 2-5, 7, and 10 of the '780 patent; claims 1, 3, 6-7, 10-15, 17, 20 and 21 of the '247 patent; and claims 1-3 and 5 of the '673 patent. The complaint further alleges that there exists a domestic industry with respect to the patents-at-issue. Osram seeks, among other things, a limited exclusion order on the accused products and on downstream products that include the accused products.

On June 7, 2004, the Commission issued a notice of investigation that was subsequently

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[3] 19 U.S.C. § 1337.

published in the Federal Register on June 10, 2004.[4] The undersigned set a fourteen-month target date for the investigation.[5] Respondent Dominant filed a response to the amended complaint and notice of investigation on August 2, 2004.

On June 8, 2004, Osram and Respondent AOP filed a joint motion [512-001], pursuant to Commission Rule 210.21(a) and (b), to terminate the investigation with respect to Respondent AOP on the basis of a settlement agreement. Order No. 3, an initial determination, was issued on June 21, 2004, granting the motion to terminate as to Respondent AOP. On July 14, 2004, the Commission issued a Notice Not to Review an Initial Determination Terminating the Investigation as to One Respondent on the Basis of a Settlement Agreement, which was published in the Federal Register on July 19, 2004.[6]

On July 2, 2004, Osram filed a motion [512-003] to amend the complaint and notice of investigation to add an additional patent–the '673 patent–against Respondent Dominant. Order No. 6, an initial determination, was issued on July 21, 2004, granting the motion to amend the complaint and notice of investigation. On August 11, 2004, the Commission issued a Notice Not to Review an Initial Determination Amending the Complaint and Notice of Investigation, which was published in the Federal Register on August 17, 2004.[7]

On July 8, 2004, Osram and Respondent AMS filed a joint motion [512-004], pursuant to Commission Rule 210.21(a) and (b), to terminate the investigation with respect to Respondent AMS on the basis of a settlement agreement. Order No. 7, an initial determination, was issued on July 21,

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[4] *See* Notice of Investigation, 69 Fed. Reg. 32609 (June 10, 2004).
[5] *See* Order No. 2 (June 14, 2004).
[6] *See* 69 Fed. Reg. 43,014 (July 19, 2004).
[7] *See* 69 Fed. Reg. 51,103 (August 17, 2004).

2004, granting the motion to terminate as to Respondent AMS. On August 11, 2004, the Commission issued a Notice Not to Review an Initial Determination Terminating the Investigation as to One Respondent on the Basis of a Settlement Agreement.

On October 5, 2004, Osram filed a motion [512-009] to amend the complaint and notice of investigation to add additional claims from the patents-at-issue against Respondent Dominant. Order No. 13, an initial determination, was issued on October 19, 2004, granting the motion to amend the complaint and notice of investigation. On November 12, 2004, the Commission issued a Notice Not to Review an Initial Determination Amending the Complaint and Notice of Investigation, which was published in the Federal Register on November 17, 2004.[8]

A tutorial was conducted before the Administrative Law Judge on December 2, 2004. The evidentiary hearing before the Administrative Law Judge was conducted in this investigation from December 6, 2004 through December 17, 2004. In support of its case-in-chief, Osram called the following witnesses who appeared live at the hearing:

1) Guenter Waitl (Osram Senior Director for Backend Technology);[9]

2) Dr. Avram Bar-Cohen (Expert in Packaging and Thermal Systems of Microelectronic Components; Professor of Mechanical Engineering);[10]

3) Dr. Jörg Strauss (Osram Materials Specialist and Scientist);[11]

4) Dr. E. Bruce Nauman (Expert in Chemical Engineering and Particle Size Analysis; Professor of Chemical Engineering);[12] and

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[8] *See* 69 Fed. Reg. 67,364 (November 17, 2004).
[9] *See* CX-1301C (Waitl Direct).
[10] *See* CX-1302C (Bar-Cohen Direct).
[11] *See* CX-1303C (Strauss Direct).
[12] *See* CX-1304C (Nauman Direct).

5) Dr. Martin Zachau (Expert in Phosphors and Osram Scientist).[13]

In addition, Osram called two Dominant employees as adverse witnesses, one of which testified live at the hearing:

6) Low Tek Beng (Director of Research & Development for Dominant Semiconductors); and

7) Ko Su Piow (Senior Sales and Marketing Manager for Dominant Semiconductors).[14]

Osram also relied on the written testimony of the following domestic industry witnesses who did not appear live:

8) Fredrick Arnold Peterson, III (Manager of the LED Bulb Group for OSRAM Sylvania Inc.);[15]

9) Dr. Makarand Chipalkatti (Former Director of the Lamp Module Business Unit for OSRAM Opto Semiconductors, Inc.);[16]

10) Michelle Huang (Manager of the LED AE Group for OSRAM Opto Semiconductors, Inc.);[17] and

11) Michael Schmitt (Senior Quality Engineer for OSRAM Opto Semiconductors, Inc.).[18]

Dominant called three live to rebut Osrams' case and in support of its own case-in-chief:

1) Low Tek Beng (see above);[19]

2) Joseph C. McAlexander (Professional Expert; Owner of McAlexander Sound, Inc.);[20] and

3) Dr. Paul H. Holloway (Expert; Professor of Materials Science and Engineering).[21]

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[13] *See* CX-1311C & CX-1312C (Zachau Direct).
[14] *See* CX-1338C (Ko *de bene esse* deposition).
[15] *See* CX-1309C (Peterson Direct).
[16] *See* CX-1308C (Chipalkatti Direct).
[17] *See* CX-1307C (Huang Direct).
[18] *See* CX-1310C (Schmitt Direct).
[19] *See* RX-449C (Low Direct).
[20] *See* RX-448C (McAlexander Direct); RX-461C (McAlexander Supplemental Direct).
[21] *See* RX-415C (Holloway Direct); RX-447C (Holloway Supplemental Direct).

Osram re-called Dr. Bar-Cohen,[22] Dr. Nauman[23] and Dr. Zachau[24] on their rebuttal case, while Dominant re-called Dr. Holloway,[25] Dr. McAlexander[26] and Mr. Low[27] on their rebuttal case. In addition, deposition designations of several unavailable witnesses were admitted by the Court on December 17, 2004.[28]

After the hearing, post-hearing briefs and reply briefs, together with proposed findings of fact, conclusions of law and rebuttals to the same, were filed on January 18, 2005 and January 25, 2005, respectively.

On the first day of the trial, December 6, 2004, Dominant stated that it would not contest Osram's allegations of infringement of the '673 patent.[29] Dominant also stated that it would not put on any evidence regarding Osram meeting the economic prong of domestic industry requirement but would challenge the evidence presented by Osram in meeting its burden of proving domestic industry.[30] In addition, Dominant withdrew its patent misuse affirmative defense by letter dated October 12, 2004.

B. The Parties

1. Complainants

Complainant OSRAM GmbH is a German corporation with its headquarters located at

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[22] *See* CX-1313C (Bar-Cohen Rebuttal).
[23] *See* CX-1315C (Nauman Rebuttal).
[24] *See* CX-1314C (Zachau Rebuttal).
[25] *See* RX-472C (Holloway Rebuttal).
[26] *See* RX-462C (McAlexander Rebuttal).
[27] *See* RX-463C (Low Rebuttal).
[28] *See* RX-473C (Joanna McKittrick); RX-475C (Herbert Brunner); RX-476C (Klaus Hoehn); RX-477C (Uwe Kronen); RX-478C (Ronald Terry); RX-479C (Karlheinz Arndt); RX-480C (Martin Zachau).
[29] Kurz, Tr. (12/02/04 Tutorial) 111:16-112:1; Crowson, Tr.22:6-15.
[30] Smith, Tr. 6:23-25, 7:1-8; Wright, Tr. 7:20-8:13.

Hellabrunner Strasse 1, 81543, Munich, Germany. OSRAM GmbH is the owner of the asserted patents.[31]

Complainant OSRAM Opto Semiconductors GmbH is a German corporation with its principal place of business located at Wernerwerkstrasse 2, 93049, Regensburg, Germany. OSRAM Opto Semiconductors GmbH is a subsidiary of OSRAM GmbH and is the exclusive licensee of the asserted patents.[32]

OSRAM GmbH also has a wholly owned subsidiary in the United States named OSRAM Opto Semiconductors Inc. ("Osram Opto") and an affiliated company in the United States named OSRAM Sylvania Inc. ("Osram Sylvania").

2. Respondent

Respondent Dominant Semiconductor Sdn. Bhd. is a Malaysian corporation with its principal place of business located at Lot 6, Batu Berendam, FTZ Phase III, 75350, Melaka, Malaysia.[33]

C. Overview of the Technology

At issue in this investigation are light-emitting diodes ("LEDs"). LEDs are small light-emitters that contain semiconductor chips that emit light by applying electricity. It should be noted that the term "light-emitting diode" or "LED" is commonly used to describe both the complete device and the semiconductor chip inside it that emits the light. When the term "light-emitting diode" or "LED" is used in this initial determination, it is being used to describe the complete device, unless otherwise noted.

LEDs can be made in various colors. They are compact, robust, last up to ten times longer

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[31] *See* Second Amended Complaint ¶ 2.1.
[32] *See* Second Amended Complaint ¶ 2.2.
[33] *See* Second Amended Complaint ¶ 3.1.

than fluorescent lamps and use less energy than fluorescent lamps. LEDs are used in all sorts of lighting applications, including: automobile dashboards and taillights; electronic goods, such as mobile telephones, personal digital assistants and liquid crystal displays; household items, such as refrigerators; indoor lighting, and outdoor lighting, such as traffic lights.

This investigation involves three types of LEDs: white LEDs, "power" LEDs that use relatively high electrical currents, and very small LEDs, which are sometimes referred to as "bikini" or "micro" LEDs. White LEDs are important because, in the future, they may replace traditional lighting sources such as fluorescent and incandescent lamps.

The white LEDs at issue in this investigation contain a semiconductor chip that emits blue light and a yellow phosphor. The yellow phosphor is a yttrium aluminum garnet activated with the element cerium (the formula is $Y_3Al_5O_{12}$:Ce and is abbreviated as "YAG:Ce"). When the blue light and yellow light are combined, the result is a LED that emits white light.

Before the development of white LEDs that use a semiconductor chip that emits blue light and a yellow phosphor, white light was produced by using three separately colored semiconductor chips–one blue, one red, and one green. LEDs that use a semiconductor chip that emits blue light and a yellow phosphor are easier and cheaper to make than the ones that use three different colored semiconductor chips. In addition, LEDs that use three different colored semiconductor chips show significant changes of color with ambient temperature or with dimming level.

D. The Patents at Issue

1. The Particle Size Patents

The '861, '259, '301, '780 and '247 patents will collectively be referred to as "the Particle Size Patents" because the patents all contain a limitation that is directed to the size of the phosphor

particles used in the manufacture of white-light-emitting LED devices.

The '861 patent is entitled "Wavelength-Converting Casting Composition and its Use" which was issued on May 23, 2000, based on Application Serial No. 09/082,205, filed on May 20, 1998, that was a continuation of Application Serial No. PCT/DE97/02139, filed on September 22, 1997. The named inventors are Klaus Höhn, Alexandra Debray, Peter Schlotter, Ralf Schmidt, and Jürgen Schneider. OSRAM GmbH is the owner of the '861 patent by assignment. The '861 patent has a total of 14 claims.[34] Two independent claims, claims 1 and 10, are at issue here. Also at issue are dependent claims 3, 6-7, and 11 through 13.

The '259 patent is entitled "Wavelength-Converting Casting Composition and Light-Emitting Semiconductor Component" which was issued on June 12, 2001, based on Application Serial No. 09/650,932, filed on August 29, 2000, that was a division of Application Serial No. 09/536,564, filed on March 28, 2000, which was a division of Application Serial No. 09/082,205, filed on May 20, 1998, which issued as U.S. Patent No. 6,066,861, which was a continuation of Application Serial No. PCT/DE97/02139, filed on September 22, 1997. The named inventors are Klaus Höhn, Alexandra Debray, Peter Schlotter, Ralf Schmidt, and Jürgen Schneider. OSRAM GmbH is the owner of the '259 patent by assignment. The '259 patent has a total of 16 claims.[35] Two independent claims, claims 1 and 10, are at issue here. Also at issue are dependent claims 3, 6-7, 11-13, and 15.

The '301 patent is entitled "Method of Producing a Wavelength-Converting Casting Composition" which was issued on August 21, 2001, based on an Application Serial No. 09/536,564, filed on March 28, 2000, that was a division of Application Serial No. 09/082,205, filed on May 20,

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[34] *See* CX-1.
[35] *See* CX-2.

1998, which issued as U.S. Patent No. 6,066,861, which was a continuation of Application Serial No. PCT/DE97/02139, filed on September 22, 1997. The named inventors are Klaus Höhn, Alexandra Debray, Peter Schlotter, Ralf Schmidt, and Jürgen Schneider. OSRAM GmbH is the owner of the '301 patent by assignment. The '301 patent has a total of 19 claims.[36] Three independent claims, claims 1, 6, and 11, are at issue here. Also at issue are dependent claims 2, 7, 12, 14, and 15.

The '780 patent is entitled "Wavelength-Converting Casting Composition and White Light-Emitting Semiconductor Component" which was issued on July 15, 2003, based on Application Serial No. 09/843,080, filed on April 25, 2001, that was a continuation of Application Serial No. 09/650,932, filed on August 29, 2000, which issued as U.S. Patent No. 6,245,259, which was a division of Application Serial No. 09/536,564, filed on March 28, 2000, which issued as U.S. Patent No. 6,277,301, which was a division of Application Serial No. 09/082,205, filed on May 20, 1998, which issued as U.S. Patent No. 6,066,861, which was a continuation of Application Serial No. PCT/DE97/02139, filed on September 22, 1997. The named inventors are Klaus Höhn, Alexandra Debray, Peter Schlotter, Ralf Schmidt, and Jürgen Schneider. OSRAM GmbH is the owner of the '780 patent by assignment. The '780 patent has a total of 10 claims.[37] One independent claim, claim 2, is at issue here. Also at issue are dependent claims 3-5, 7 and 10.

The '247 patent is entitled "Wavelength-Converting Casting Composition and White Light-Emitting Semiconductor Component" which was issued on September 2, 2003, based on Application Serial No. 09/654,368, filed on September 1, 2000, which was a division of Application Serial No.

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[36] *See* CX-3.
[37] *See* CX-8.

09/536,564, filed on March 28, 2000, which issued as U.S. Patent No. 6,277,301, which was a division of Application Serial No. 09/082,205, filed on May 20, 1998, which issued as U.S. Patent No. 6,066,861, which was a continuation of Application Serial No. PCT/DE97/02139, filed on September 22, 1997. The named inventors are Klaus Höhn, Alexandra Debray, Peter Schlotter, Ralf Schmidt, and Jürgen Schneider. OSRAM GmbH is the owner of the '247 patent by assignment. The '247 patent has a total of 21 claims.[38] Two independent claims, claims 1 and 12, are at issue here. Also at issue are dependent claims 3, 6-7, 10-11, 13-15, 17, and 20-21.

2. The '930 Patent

The '930 patent is entitled "Light-Radiating Semiconductor Component with a Luminescence Conversion Element" which was issued on June 10, 2003, based on Application Serial No. 09/731,452, filed on December 7, 2000, that was a division of Application Serial No. 09/221,789 filed on December 28, 1998, which was a continuation of Application Serial No. PCT/DE97/01337, filed on June 26, 1997. The named inventors are Ulrike Reeh, Klaus Höhn, Norberto Stath, Günter Waitl, Peter Schlotter, Jürgen Schneider, Ralf Schmidt. OSRAM GmbH is the owner of the '930 patent by assignment. The '930 patent has a total of 4 claims.[39] Three independent claims, claims 2, 3 and 4, are at issue here.

3. The Lead Frame Patents

The '902, '321, and '580 patents will collectively be referred to as "the Lead Frame Patents" because there are directed to a particular lead frame configuration suitable for high-power LED devices.

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[38] *See* CX-9.
[39] *See* CX-7.

The '902 patent is entitled "Optoelectronic Structural Element" which was issued on April 23, 2002, based on Application Serial No. 09/494,771 filed on January 31, 2000, that was a continuation of Application Serial No. PCT/DE98/02125, filed on July 27, 1998. The named inventor is Karlheinz Arndt. OSRAM GmbH is the owner of the '902 patent by assignment. The '902 patent has a total of 24 claims.[40] One independent claim, claim 1, is at issue here. Also at issue are dependent claims 5 through 8.

The '321 patent is entitled "Surface-Mountable Light-Emitting Diode Structural Element" which was issued on October 22, 2002, based on Application Serial No. 10/072,836, filed on February 5, 2002, that was a division of Application Serial No. 09/494,771, filed on January 31, 2000, which is a continuation of Application Serial No. PCT/DC98/02125, filed on July 27, 1998. The named inventor is Karlheinz Arndt. OSRAM GmbH is the owner of the '321 patent by assignment. The '321 patent has a total of 8 claims.[41] One independent claim, claim 1, is at issue here. Also at issue are dependent claims 5 through 8.

The '580 patent is entitled "Surface-Mountable Light-Emitting Diode Structural Element" which was issued on June 3, 2003, based on Application Serial No. 10/259,556, filed on September 27, 2002, that was a division of Application Serial No. 10/072,836, filed on February 5, 2002, which issued as U.S. Patent No. 6,469,321, which was a division of Application Serial No. 09/494,771, filed on January 31, 2000, which issued as U.S. Patent No. 6,376,902. The named inventor is Karlheinz Arndt. OSRAM GmbH is the owner of the '580 patent by assignment. The '580 patent

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[40] *See* CX-4.
[41] *See* CX-5.

has a total of 27 claims.[42] One independent claim, claim 1, is at issue here. Also at issue are dependent claims 5-8 and 10-11.

4. The '673 Patent

The '673 patent is entitled "Two-pole SMT miniature housing for semiconductor components and method for the manufacture thereof" which was issued on April 6, 2004, based on an Application Serial No. 147672, filed on May 15, 2002, that was a division of Application Serial No. 08/866,064, filed May 30, 1997, which issued as U.S. Patent No. 6,432,745. The named inventors are Guenther Waitl, Franz Schellhorn and Herbert Brunner. OSRAM GmbH is the owner of the '673 patent by assignment. The '673 patent has a total of 5 claims.[43] One independent claim, claim 1, is at issue here. Also at issue are dependent claims 2, 3 and 5.

E. The Products at Issue

1. Osram's LEDs

Osram's white-light LEDs include: Mini TOPLEDs, PointLEDs, CHIPLEDs, TOPLEDs, MicroSIDELEDs, Power TOPLEDs, Advanced Power TOPLEDs, Smart LEDs, and SIDELEDs, which they assert practice the following patents:

	Particle Size	'930 Patent	Lead Frame	'673 Method
Mini TOPLEDs	✓	✓		
PointLEDs	✓	✓		
CHIPLEDs	✓	✓		
TOPLEDs	✓	✓		
MicroSIDELEDs	✓	✓		✓

[42] *See* CX-6.
[43] *See* CX-10.

	Particle Size	'930 Patent	Lead Frame	'673 Method
Power TOPLEDs	✓	✓	✓	
Advanced Power TOPLEDs			✓	
Smart LEDs	✓	✓		
SIDELEDs	✓	✓		

2. Dominant's LEDs

The accused products at issue include of all Dominant's white LEDs, which include DomiLEDs, Power DomiLEDs, Super Small DomiLEDs, Spice LEDs, and NovaLEDs for the following asserted patents:

	Particle Size	'930 Patent	Lead Frame	'673 Method
DomiLEDs	✓	✓		
Power DomiLEDs	✓	✓	✓	
Super Small DomiLEDs	✓	✓		✓
Spice LEDs	✓			
NovaLEDs	✓	✓		

3. Downstream Products

Many products are imported or sold with LEDs included. These LEDs are often incorporated directly into products made by original equipment manufacturers ("OEMs"). Examples of these products, which may contain LEDs include: automobile dashboards and taillights; electronic goods, such as mobile telephones, personal digital assistants and liquid crystal displays; and household items, such as refrigerators.

II. Jurisdiction and Importation

Section 337 confers subject matter jurisdiction on the International Trade Commission to investigate, and if appropriate, to provide a remedy for, unfair acts and unfair methods of competition in the importation of articles into the United States.[44] In order to have the power to decide a case, a court or agency must have both subject matter jurisdiction, and jurisdiction over either the parties or the property involved.[45]

A. Subject Matter Jurisdiction

The complaint alleges that the Dominant has violated Subsection 337(a)(1)(A) and (B) in the importation and sale of products that infringe the patents at issue. Dominant has stipulated that the importation requirement has been met. *See* Stipulation Regarding Importation of Accused Products by Dominant, filed on September 17, 2004. Accordingly, the Commission has subject matter jurisdiction over Dominant in this investigation.[46]

B. Personal Jurisdiction

Dominant has responded to the complaint and notice of investigation, participated in the investigation, including participating in discovery, made an appearance at the hearing, and submitted post-hearing briefs, thereby submitting to the personal jurisdiction of the Commission.[47]

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[44] 19 U.S.C. § 1337; *also see Certain Steel Rod Treating Apparatus and Components Thereof*, Inv. No. 337-TA-97, Commission Memorandum Opinion, 215 U.S.P.Q. 229, 231 (1981) ("*Steel Rod*").

[45] *Id.*

[46] *See Amgen, Inc. v. U.S. Int'l Trade Comm.*, 902 F.2d 1532, 1536 (Fed. Cir. 1990) ("*Amgen*").

[47] *See Certain Miniature Hacksaws*, Inv. No. 337-TA-237, U.S.I.T.C. Pub. No. 1948, Initial Determination (unreviewed by Commission in relevant part) at 4, 1986 WL 379287 (U.S.I.T.C., October 15, 1986) ("*Miniature Hacksaws*").

III. The Particle Size Patents

A. Claim Construction

1. Relevant Law

Analyzing whether a patent is infringed "entails two steps. The first step is determining the meaning and scope of the patent claims asserted to be infringed. The second step is comparing the properly construed claims to the device or process accused of infringing."[48] The first step is a question of law, whereas the second step is a factual determination.[49] To prevail, the patentee must establish by a preponderance of the evidence that the accused device infringes one or more claims of the patent either literally or under the doctrine of equivalents.[50]

Concerning the first step of claim construction, "[i]t is well-settled that, in interpreting an asserted claim, the court should look first to the intrinsic evidence of record, *i.e.*, the patent itself, including the claims, the specification and, if in evidence, the prosecution history .... Such intrinsic evidence is the most significant source of the legally operative meaning of disputed claim language."[51]

"In construing claims, the analytical focus must begin and remain centered on the language of the claims themselves, for it is that language that the patentee chose to use to 'particularly point

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[48] *Dow Chem. Co. v. United States*, 226 F.3d 1334, 1338 (Fed. Cir. 2000) ("*Dow Chemical*"), *citing Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (*en banc*), *aff'd*, 517 U.S. 370 (1996) ("*Markman*").

[49] *Markman, supra.*

[50] *Bayer AG v. Elan Pharm. Research Corp.*, 212 F.3d 1241, 1247 (Fed. Cir.), *cert. denied*, 531 U.S. 993 (2000) ("*Bayer*").

[51] *Bell Atlantic Network Serv., Inc. v. Covad Communications Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001) ("*Bell Atlantic*").

[] out and distinctly claim [] the subject matter which the patentee regards as his invention.'"[52] Thereafter, if the claim language is not clear on its face, "[t]hen we look to the rest of the intrinsic evidence, beginning with the specification and concluding with the prosecution history, if in evidence" for the purpose of "resolving, if possible, the lack of clarity."[53]

The specification is considered "always highly relevant" to claim construction and "[u]sually, it is dispositive; it is the single best guide to the meaning of a disputed term."[54] The prosecution history is also examined for a claim's scope and meaning "to determine whether the patentee has relinquished a potential claim construction in an amendment to the claim or in an argument to overcome or distinguish a reference."[55]

There is a "heavy presumption" that claim terms are to be given "their ordinary and accustomed meaning as understood by one of ordinary skill in the art," and in aid of this interpretation, "[d]ictionaries and technical treatises, which are extrinsic evidence, hold a 'special place' and may sometimes be considered along with the intrinsic evidence when determining the ordinary meaning of claim terms."[56] Caution must be used, however, when referring to non-scientific dictionaries "lest dictionary definitions . . . be converted into technical terms of art having legal, not linguistic significance."[57]

The presumption in favor of according a claim term its ordinary meaning is overcome "(1) where the patentee has chosen to be his own lexicographer, or (2) where a claim term deprives the

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[52] *Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001) ("*Interactive Gift Express*"), *citing* 35 U.S.C. § 112, ¶ 2.

[53] *Id.*

[54] *Bell Atlantic,* 262 F.3d at 1268.

[55] *Id.*

[56] *Id.* at 1267-68.

[57] *Id.* at 1267 (internal quotation marks omitted).

claim of clarity such that there is 'no means by which the scope of the claim may be ascertained from the language used.'"[58] In this regard, "[t]he specification acts as a dictionary 'when it expressly defines terms used in the claims or when it defines terms by implication.'"[59]

"[I]f the meaning of the claim limitation is apparent from the intrinsic evidence alone, it is improper to rely on extrinsic evidence other than that used to ascertain the ordinary meaning of the claim limitation. [citation omitted] However, in the rare circumstance that the court is unable to determine the meaning of the asserted claims after assessing the intrinsic evidence, it may look to additional evidence that is extrinsic to the complete document record to help resolve any lack of clarity."[60] "Extrinsic evidence consists of all evidence external to the patent and prosecution history ...."[61] It includes "such evidence as expert testimony, articles, and inventor testimony."[62] But, "[i]f the intrinsic evidence resolves any ambiguity in a disputed claim, extrinsic evidence cannot be used to contradict the established meaning of the claim language."[63] "What is disapproved of is an attempt to use extrinsic evidence to arrive at a claim construction that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent."[64]

In interpreting particular limitations within each claim, "adding limitations to claims not required by the claim terms themselves, or unambiguously required by the specification or

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[58] *Id.* at 1268.

[59] *Id.*

[60] *Id.* at 1268-69.

[61] *Markman,* 52 F.3d at 980.

[62] *Bell Atlantic,* 262 F.3d at 1269.

[63] *DeMarini Sports, Inc. v. Worth, Inc.*, 239 F.3d 1314, 1322-23 (Fed. Cir. 2001) ("*DeMarini*").

[64] *Markman,* 52 F.3d at 979.

prosecution history, is impermissible."[65] Further, a patent is not limited to its preferred embodiments in the face of evidence of broader coverage by the claims.[66] "[T]here is sometimes 'a fine line between reading a claim in light of the specification, and reading a limitation into the claim from the specification.'"[67] On the other hand, a claim construction that excludes the preferred embodiment in the specification of a patent is "rarely, if ever, correct."[68]

Claims amenable to more than one construction should, when it is reasonably possible to do so, be construed to preserve their validity.[69] A claim cannot, however, be construed contrary to its plain language.[70] Claims cannot be judicially rewritten in order to fulfill the axiom of preserving their validity; "if the only claim construction that is consistent with the claim's language and the written description renders the claim invalid, then the axiom does not apply and the claim is simply invalid."[71]

2. The Disputed Claim Terms of the Particle Size Patents and Their Interpretation

The asserted claims of the Particle Size Patents that are at issue in this investigation are claims 1, 3, 6, 7, 10, 11, 12, and 13 of the '861 patent; claims 1, 3, 6, 7, 10, 11, 12 and 13 of the '259

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[65] *Dayco Prod., Inc. v. Total Containment, Inc.*, 258 F.3d 1317, 1327 (Fed. Cir. 2001) ("*Dayco Products*"), *citing Laitram Corp. v. NEC Corp.*, 163 F.3d 1342, 1347 (Fed. Cir. 1998) ("*Laitram*") ("a court may not import limitations from the written description into the claims").

[66] *Acromed Corp. v. Sofamor Danek Group, Inc.*, 253 F.3d 1371, 1382-83 (Fed. Cir. 2001) ("*Acromed*"); *Electro Med. Sys. S.A. v. Cooper Life Sci., Inc.*, 34 F.3d 1048, 1054 (Fed. Cir. 1994) ("*Electro Med.*")("[P]articular embodiments appearing in a specification will not be read into the claims when the claim language is broader than such embodiments.").

[67] *Bell Atlantic*, 262 F.3d at 1270.

[68] *See Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583-34 (Fed. Cir. 1996) ("*Vitronics*").

[69] *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1384 (Fed. Cir. 2001) ("*Karsten*").

[70] *See Rhine v. Casio, Inc.*, 183 F.3d 1342, 1345 (Fed. Cir. 1999) ("*Rhine*").

[71] *Id.*

patent; claims 1, 2, 6, 7, 11, 12, 14, and 15 of the '301 patent; claims 2, 3, 4, 5, 7, and 10 of the '780 patent; and claims 1, 3, 6, 7, 10-15, 17, 20 and 21 of the '247 patent.

Independent claims 1 and 10 of the '861 patent are asserted, which read as follows [with disputed claim terms in **bold** and *italics*]:

Claim 1: A wavelength-converting casting composition, for converting a wavelength of ultraviolet, blue or green light emitted by an electroluminescent component, comprising:

a transparent epoxy casting resin;

an inorganic luminous substance pigment powder dispersed in said transparent epoxy resin, said pigment powder comprising luminous substance pigments from a phosphorus group having the general formula $A_3B_5X_{12}$:M, where A is an element selected from the group consisting of Y, Ca, Sr; B is an element selected from the group consisting of Al, Ga, Si; X is an element selected from the group consisting of O and S; M is an element selected from the group consisting of Ce and Tb;

said luminous substance pigments having grain sizes ≤20 μm and a ***mean grain diameter*** $d_{50} \leq 5$ μm.

Claim 10: A light-emitting semiconductor component, comprising:

a semiconductor body formed of a semiconductor layer sequence and being capable, during an operation of the semiconductor component, of emitting electromagnetic radiation in at least one of an ultraviolet, blue, and green spectral range;

a wavelength-converting casting composition disposed in a vicinity of said semiconductor body, said casting composition being formed of a transparent epoxy casting resin and an inorganic luminous substance pigment powder dispersed in said transparent epoxy resin, said pigment powder comprising luminous substance pigments from a phosphorus group having the general formula $A_3B_5X_{12}$:M, where A is an element selected from the group consisting of Y, Ca, Sr; B is an element selected from the group consisting of Al, Ga, Si; X is an element selected from the group consisting of O and S; M is an element selected from the group consisting of Ce and Tb, and having grain sizes ≤20 μm and a ***mean grain diameter*** $d_{50} \leq 5$ μm;

said luminous substance pigments converting a portion of the radiation originating from the ultraviolet, blue and green spectral range into radiation of a higher wavelength, such that the semiconductor component emits mixed radiation including the higher-wavelength radiation and radiation from at least one of the ultraviolet, blue and green spectral range.

Also at issue are dependent claims 3, 6, 7, 11, 12, and 13 of the '861 patent, which read as follows:

Claim 3: The casting composition according to claim 1, wherein said luminous substance pigments are flakelike particles.

Claim 6: The casting composition according to claim 1, wherein said luminous substance pigments are particles of Ce-doped garnets.

Claim 7: The casting composition according to claim 6, wherein said luminous substance pigments are YAG:Ce particles.

Claim 11: The light-emitting semiconductor component according to claim 10, wherein said casting composition encloses at least a part of said semiconductor body.

Claim 12: The light-emitting semiconductor component according to claim 10, wherein said semiconductor body is adapted to emit radiation in a blue spectral range having a maximum luminescence intensity at $\lambda = 430$ nm or at $\lambda = 450$ nm.

Claim 13: The light-emitting semiconductor component according to claim 10, which further comprises an opaque base housing having a recess formed therein, said semiconductor body being disposed in said recess and said recess being at least partially filled with said casting composition.

Independent claims 1 and 10 of the '259 patent are asserted, which read as follows [with disputed claim terms in **bold** and *italics*]:

Claim 1: A wavelength-converting casting composition, for converting a wavelength of ultraviolet, blue or green light emitted by an electroluminescent component, comprising:

a transparent epoxy casting resin;

an inorganic luminous substance pigment powder dispersed in said transparent resin, said pigment powder comprising luminous substance pigments from Ce-doped phosphors; and

said luminous substance pigments having grain sizes ≤20 μm and a mean grain diameter ≤20 μm and a ***mean grain diameter*** d_{50} ≤ 5 μm.

Claim 10: A light-emitting semiconductor component, comprising:

a semiconductor body formed of a semiconductor layer sequence and being capable, during an operation of the semiconductor component, of emitting electromagnetic radiation in at least one of an ultraviolet, blue, and green spectral range;

a wavelength-converting casting composition disposed in a vicinity of said semiconductor body, said casting composition being formed of a transparent epoxy casting resin and an inorganic luminous substance pigment powder dispersed in said transparent resin, said pigment powder comprising first luminous substance pigments from Ce-doped phosphors and having grain sizes ≤20 μm and a ***mean grain diameter*** d_{50} ≤ 5 μm;

said luminous substance pigments converting a portion of the radiation originating from the at least one of the ultraviolet, blue and green spectral range into radiation of a higher wavelength, such that the semiconductor component emits mixed radiation including the higher-wavelength radiation and radiation from the at least one of the ultraviolet, blue and green spectral range.

Also at issue are dependent claims 3, 6, 7, 11, 12, 13, and 15 of the '259 patent, which read as follows:

Claim 3: The casting composition according to claim 1, wherein said luminous substance pigments are flakelike particles.

Claim 6: The casting composition according to claim 1, wherein said Ce-doped phosphors are garnets.

Claim 7: The casting composition according to claim 1, wherein said Ce-doped phosphors are YAG:Ce based particles.

Claim 11: The light-emitting semiconductor component according to claim 10, wherein said casting composition encloses at least a part of said semiconductor body.

Claim 12: The light-emitting semiconductor component according to claim 10, wherein said semiconductor body is adapted to emit radiation in a blue spectral range having a maximum luminescence intensity at a wavelength between 420 nm and 460 nm.

Claim 13: The light-emitting semiconductor component according to claim 10, which further

comprises an opaque base housing having a recess formed therein, said semiconductor body being disposed in said recess and said recess being at least partially filled with said casting composition.

Claim 15: The light-emitting semiconductor component according to claim 10, wherein said semiconductor body is a blue light emitting semiconductor body, and said Ce-doped phosphor comprises types of garnet adapted to shift some of the blue light emitted by said semiconductor body into a yellow spectral range, whereby the semiconductor component emits white light.

Independent claims 1, 6 and 11 of the '301 patent are asserted, which read as follows [with disputed claim terms in **bold** and *italics*]:

Claim 1: A method of producing a wavelength-converting casting composition, for converting a wavelength of ultraviolet, blue or green light emitted by an electroluminescent component, the method comprising:

providing a base of transparent epoxy casting resin;

providing a luminous substance pigment powder containing luminous substance pigments having grain sizes ≤20 μm and a ***mean grain diameter*** $d_{50} \leq 5$ μm and being selected from the group consisting of Ce-doped phosphors; garnets doped with rare earths; thiogallates doped with rare earths; aluminates doped with rare earths; and orthosilicates doped with rare earths;

tempering the luminous substance pigment powder at a temperature of ≥200° C. and subsequently mixing the tempered pigment powder with the epoxy casting resin.

Claim 6: A method of producing a wavelength-converting casting composition, the method comprising:

providing a base of transparent epoxy casting resin;

providing a luminous substance pigment powder containing luminous substance pigments having grain sizes ≤20 μm and a ***mean grain diameter*** $d_{50} \leq 5$ μm and being selected from the group consisting of Ce-doped phosphors; garnets doped with rare earths; thiogallates doped with rare earths; aluminates doped with rare earths; and orthosilicates doped with rare earths; and

mixing the pigment powder with the epoxy casting resin.

Claim 11: A method of producing a wavelength-converting casting composition for a white light emitting semiconductor component having an electroluminescing semiconductor body emitting blue light, the method comprising:

providing a base of transparent epoxy casting resin;

providing a luminous substance pigment powder of luminous substance pigments having grain sized ≤ 20 µm and a ***mean grain diameter*** $d_{50} \leq 5$ µm, the pigment powder comprising luminous substance pigments from Ce-doped phosphors which shift some of the blue light emitted by the semiconductor body into the yellow spectral range; and

mixing the pigment powder with epoxy casting resin.

Also at issue are dependent claims 2, 7, 12, 14 and 15 of the '301 patent, which read as follows:

Claim 2: The method according to claim 1, wherein the step of providing a luminous substance pigment powder comprises providing an inorganic luminous substance pigment powder comprising luminous substance pigments of agents doped with rare earths and having grain sizes ≤ 20 µm and a mean grain diameter $d_{50} \leq 5$ µm.

Claim 7: The method according to claim 6, which comprises, prior to the mixing step, tempering the luminous substance pigment powder at a temperature of $\geq 200°$ C.

Claim 12: The method according to claim 11, wherein the pigment powder comprises luminous pigments from a phosphorous group having the general formula $A_3B_5O_{12}$:M, where A is at least one element selected from the group consisting of Y, Gd and Lu; B is at least one element selected from the group consisting of Al and Ga; and M is at least one element selected from the group consisting of Ce, Eu and Cr.

Claim 14: The method according to claim 12, which comprises adding light-scattering particles to the casting composition.

Claim 15: The method according to claim 11, which comprises, prior to the mixing step, tempering the luminous substance pigment powder at a temperature of $\geq 200°$ C.

Independent claim 2 of the '780 patent is asserted, which reads as follows [with disputed claim terms in **bold** and *italics*]:

Claim 2: A light-emitting semiconductor component, comprising:

a semiconductor body formed of a semiconductor layer sequence and being capable, during an operation of the semiconductor component, of emitting electromagnetic radiation in at least one of an ultraviolet, blue, and green spectral range;

a wavelength-converting casting composition disposed in a vicinity of said semiconductor body, said casting composition being formed of a transparent epoxy casting resin and an inorganic luminous substance pigment powder dispersed in said transparent resin, said pigment powder comprising luminous substance pigments from Ce-doped phosphors and having grain sizes $\leq 20\ \mu m$ and a ***mean grain diameter*** $d_{50} \leq 5\ \mu m$;

said luminous substance pigments converting at least a portion of the radiation originating from the at least one of the ultraviolet, blue and green spectral range into radiation of a higher wavelength.

Also at issue are dependent claims 3, 4, 5, 7, and 10 of the '780 patent, which read as follows:

Claim 3: The light-emitting semiconductor component according to claim 2, wherein said casting composition encloses at least a part of said semiconductor body.

Claim 4: The light-emitting semiconductor component according to claim 2, wherein said semiconductor body is adapted to emit radiation in a blue spectral range having a maximum luminescence intensity at $\lambda = 430$ nm or at $\lambda = 450$ nm.

Claim 5: The light-emitting semiconductor component according to claim 2, which further comprises an opaque base housing having a recess formed therein, said semiconductor body being disposed in said recess and said recess being at least partially filled with said casting composition.

Claim 7: The light-emitting semiconductor component according to claim 2, wherein said semiconductor body is a blue light emitting semiconductor body, and said Ce-doped phosphor comprises types of garnet adapted to shift some of the blue light emitted by said semiconductor body into a yellow spectral range, whereby the semiconductor component emits white light.

Claim 10: The light emitting semiconductor component according to claim 2, wherein said semiconductor body is adapted to emit radiation in a blue spectral range having a maximum luminescence intensity at a wavelength between 420 nm and 460 nm.

Independent claims 1 and 12 of the '247 patent are asserted, which read as follows [with

disputed claim terms in **bold** and *italics*]:

Claim 1: A wavelength-converting casting composition, comprising:

a transparent epoxy casting resin:

an inorganic luminous substance pigment powder dispersed in said transparent casting resin, said pigment powder comprising luminous substance pigments selected from the group consisting of garnets doped with rare earths; thiogallates doped with rare earths; aluminates doped with rare earths; and orthosilicates doped with rare earths; and

said luminous substance pigments having grain sizes ≤20 μm and a ***mean grain diameter*** $d_{50} \leq 5$ μm.

Claim 12: A light emitting semiconductor component, comprising;

a semiconductor body formed of a semiconductor layer sequence and being capable, during an operation of the semiconductor component, of emitting electromagnetic radiation in a first spectral range selected from ultraviolet, blue, and green;

wavelength-converting casting composition disposed in a vicinity of said semiconductor body and formed of a transparent epoxy casting resin in an inorganic luminous substance pigment powder dispersed in said transparent casting resin;

said pigment powder comprising luminous substance pigments selected from the group consisting of garnets dopes with rare earths; thiogallates doped with rare earths; aluminates doped with rare earths; and orthosilicates doped with rare earths; and

said luminous substance pigments having grain sizes ≤20 μm and a ***mean grain diameter*** $d_{50} \leq 5$ μm and converting a portion of the radiation originating from said semiconductor component into radiation of a higher wavelength, such that the semiconductor component emits mixed radiation including the higher-wavelength radiation and radiation from the first spectral range.

Also at issue are dependent claims 3, 6, 7, 10, 11, 13, 14, 15, 17, 20 and 21 of the '247 patent, which read as follows:

Claim 3: The casting composition according to claim 1, wherein said luminous substance pigments are flakelike particles.

Claim 6: The casting composition according to claim 1, wherein said luminous substance pigments are Ce-doped garnets.

Claim 7: The casting composition according to claim 1, wherein said luminous substance pigments are YAG:Ce based particles.

Claim 10: The casting composition according to claim 1, wherein said luminous substances pigment powder converts a wavelenght (sic) of ultraviolet, blue, or green light into a relatively longer wavelenght (sic).

Claim 11: The casting composition according to claim 1, which comprises light-scattering particles added to said casting resin.

Claim 13: The light-emitting semiconductor component according to claim 12, wherein said casting composition encloses at least a part of said semiconductor body.

Claim 14: The light-emitting semiconductor component according to claim 12, wherein said semiconductor body is adapted to emit radiation in a blue spectral range having a maximum luminescence intensity at $\lambda = 430$ nm or at $\lambda = 450$ nm.

Claim 15: The light-emitting semiconductor component according to claim 12, which further comprises an opaque base housing having a recess formed therein, said semiconductor body being disposed in said recess and said recess being at least partially filled with said casting composition.

Claim 17: The light-emitting semiconductor component according to claim 12, wherein said semiconductor body is a blue light emitting semiconductor body, and said luminous substance pigments are Ce-doped phosphors adapted to shift some of the blue light emitted by said semiconductor body into a yellow spectral range, whereby the semiconductor component emits white light.

Claim 20: The light-emitting semiconductor component according to claim 12, which comprises light-scattering particles added to said casting resin.

Claim 21: The light-emitting semiconductor according to claim 12, wherein said luminous substances pigment powder is a tempered pigment powder.

The analysis will generally focus on the '861 patent as representative of the Particle Size Patents because the other four Particle Size Patents claim priority to the '861 patent and all five

patents share a common specification.

a. Mean Grain Diameter d_{50}

The parties agree that the only claim term at issue for the Particle Size Patents is the term "mean grain diameter d_{50}."[72] There are two disputes at issue: first, whether the term "mean" or "d_{50}" should govern the interpretation of the claim term; second, whether the claim term is based on the number or volume of phosphor particles.[73] Osram's position is that d_{50} and the number of phosphor particles governs;[74] Respondent's position is that mean and the volume of phosphor particles governs;[75] and Staff's position is that mean and the number of phosphor particles governs.[76]

The parties generally agree that the ordinary meaning of the term "mean" represents a traditional arithmetic average.[77] The parties also generally agree that the ordinary meaning of the technical term "d_{50}" represents the median diameter, which means the diameter where 50% of the particles are smaller and 50% of the particles are larger.[78] The parties also agree that the calculation or the statistical definition of mean and median are different and cannot be used interchangeably.[79] Therefore the issue is not one that requires an interpretation of the terms "mean" or "d_{50}," as all parties generally agree what these terms mean, but, it is argued by the parties, to simply choose which term governs.

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[72] CIB 24; RIB 29; SIB 11.

[73] The claim term "luminous substance pigments" has regularly been called "phosphor particles" through this case. In addition, the parties agree that the Particle Size Patents use the terms "grains" and "particles" interchangeably. CFF 229; ROCFF 229.

[74] CIB 24; CX-1304C (Nauman Direct) at 7; CX-1312 (Zachau Direct) at 14; CX-1303C (Strauss Direct) at 1.

[75] RIB 30; RX-447C (Holloway Supplemental Direct) at 2-3.

[76] SIB 11.

[77] CIB 25; RFF 3.29; SIB 11.

[78] CIB 25, 28-29; CFF 173-76; RRB 9; ROCFF 173-76; SFF 51.

[79] CX-1312C (Zachau Direct) at 13; RRB 8-9; SIB 12-13.

The statute requires that the *inventor* particularly point out and distinctly claim the subject matter of his invention.[80] And the *inventor* is responsible for drafting claims to precisely define what his invention is.[81] The asserted claims of the Particle Size Patents leave a person of ordinary skill in the art to speculate as to whether the claims cover mean grain diameters ≤ 5 μm or median grain diameters ≤ 5 μm. Such ambiguity does not adequately inform the public of what the claims particularly point and distinctly claim, as required by Section 112. Accordingly, the undersigned finds that the asserted claims of the Particle Size Patents are indefinite. A detailed discussion is below.

Osram argues that "d_{50}" is a specific term, which controls over the more general term "mean."[82] Osram also argues that the universally recognized symbol for mean is a "¯"over a letter[83] and that the inventors would have used a dash if they intended the claim term to represent the mean, rather than the median.[84] Dominant counters that the dash was not used because that symbol typically refers to a mean by number, which it argues, further supports its argument that the mean should be based on volume.[85]

Osram also argues that the specification uses the term "$d_{50} \leq 5$ μm" alone without the term

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[80] 35 U.S.C. § 112 (emphasis added).

[81] *White v. Dunbar*, 119 U.S. 47, 52 (1886) ("The claim is a statutory requirement, prescribed for the very purpose of making the patentee define precisely what his invention is; and it is unjust to the public, as well as an evasion of law, to construe it in a manner different from the plain import of its terms").

[82] CIB 29; WEBSTER'S NEW WORLD DICTIONARY OF AMERICAN ENGLISH, 839 (3rd College Edition 1994) (first and second definitions).

[83] Or "$\bar{d}$."

[84] CIB 30; CX-1312C (Zachau Direct) at 14.

[85] RRB 28.

"mean grain diameter"; therefore, that these terms are interchangeable.[86] Dominant counters that the use of the term "d_{50}" used once by itself in the specification is insufficient to overcome the other evidence.[87] Staff also counters that the use of "d_{50}" without "mean grain diameter" in the specification does not necessarily support Osram's position because it was used in a different context than in the claim.[88]

Osram also argues that the use of the word "mittleren" in the German PCT application, PCT/DE97/01239, from which the Particle Size Patents claim priority, supports its position because the term "mittleren" can be defined as either "mean" or "median," depending on the context.[89] Osram asserts that the German counterpart to the U.S. patent, DE 297 24 382 U1, which also uses the word "mittleren" has been translated as "median."[90] Dominant agrees that the German word "mittleren" can be defined as either "mean" or "median," but argues that the German PCT application supports its position because Osram chose to translate the term as "mean" when they submitted the U.S. counterpart.[91]

Osram points to Webster's Dictionary's definition of "mean," which is "halfway between extremes," "a middle or intermediate position," or "a number between the smallest values of a set of quantities, obtained by some prescribed method; unless otherwise specified, the arithmetic

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[86] CIB 31. *See* CX-1 at col. 2:20-21; 3:19-20.

[87] RIB 31.

[88] SIB 14.

[89] CX-1243 (DICTIONARY OF ENGINEERING AND TECHNOLOGY, GERMAN-ENGLISH) at OS139591; CX-1303C (Strauss Direct) at 19.

[90] CIB 32. *See* CX-1004 at 17.

[91] RIB 31; CX-1243 (DICTIONARY OF ENGINEERING AND TECHNOLOGY, GERMAN-ENGLISH) at OS139591); CX-1303C (Strauss Direct) at 19.

mean."[92] While Osram cites to the third definition of mean in their brief regarding whether the mean should be calculated by number or volume, they cite to the first and second definitions of mean in their brief regarding whether the claim term should be mean or median. Osram specifically states that,

> [c]ontrary to the Staff's argument, OSRAM does not seek to re-write the claims. *See* Staff Initial Br. at 13. The Staff is presuming that "mean" has a definition that is incompatible with "d_{50}," but this is only true if one skips to the third definition of "mean" in the dictionary, which is its mathematical definition. The first and second definitions of "mean" quoted above show that, according to its primary definitions, "mean" is just a broader term than "d_{50}." Interpreting the claim term "mean grain diameter d_{50}" gives full credit to, and is consistent with, the primary definitions of "mean."[93]

Osram asserts that the issue of whether to construe "mean grain diameter d_{50}" as a median or a mean is simply an issue of claim construction, not indefiniteness. In Osram's opinion,

> This Court need merely decide whether "mean grain diameter d_{50}" is governed by the specific technical term "d_{50}" since the word "mean" is more general, as OSRAM argues, or whether the phrase "mean grain diameter" defines the "d_{50}" term that follows it. This is the type of decision that courts make everyday in construing patent claims. OSRAM does not consider this a difficult issue of claim construction, but, even if it is, the Federal Circuit has made clear that [they have not held that] (sic) "a claim is indefinite merely because it poses a difficult issue of claim construction."
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> . . .
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> The meaning of "mean grain diameter d_{50}" is discernable – it is either governed by "d_{50}" and therefore a median, or governed by the word "mean" and therefore a mean, *i.e.*, an arithmetic average. Any ambiguity in the claim phrase is eminently capable of being resolved.[94]

Osram asserts that there is nothing indefinite about 5 microns or 20 microns because the numerical limitations are definite.[95] Staff agrees that, in view of the prosecution history, the term "mean grain

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[92] WEBSTER'S NEW WORLD DICTIONARY OF AMERICAN ENGLISH 74, 839 (3rd College Edition 1994).

[93] CRB 30.

[94] CRB 58 (citations omitted).

[95] CIB 122.

diameter d_{50}" is sufficiently discernable to avoid a finding of invalidity.[96]

Dominant argues that the Examiner's Reasons for Allowance supports its argument that one of ordinary skill in the art is most likely to interpret the term "mean grain diameter d_{50}" as a mean grain diameter rather than a median grain diameter. In the Reasons for Allowance, the Examiner uses the term "mean grain diameter" without using the term "d_{50}" in stating that the prior art does not disclose a mean grain diameter ≤ 5 μm.[97] Dominant argues that, because Osram did not respond to the Examiner's Reasons for Allowance, any competitor that is seeking to avoid infringement would reasonably rely upon the Examiner's Reasons for Allowance.[98] Staff agrees with Dominant that the Examiner's Reasons for Allowance support an interpretation of "mean grain diameter d_{50} ≤ 5 μm" as mean, rather than median.[99]

Osram counters that the Examiner's Reasons for Allowance should not be considered because the rules of the Patent Office specifically state that the fact that an Applicant does not respond to the Reasons for Allowance is of no significance because the rules in effect at the Patent Office until November 2000 stated that "The applicant or patent owner may file a statement commenting on the reasons for allowance within such time as may be specified by the examiner. Failure to file such a statement does not give rise to any implication that the applicant or patent owner agrees with or acquiesces in the reasoning of the examiner."[100]

Dominant also argues that it is a common and accepted practice in technical fields to define

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[96] SIB 24.

[97] CX-11 at OS116742-43.

[98] RIB 30.

[99] SIB 15. *See ACCO Brands, Inc. v. Micro Sec. Devices, Inc.*, 346 F.3d 1075, 1078-79 (Fed. Cir. 2003) (relying on Examiner's Reasons for Allowance in construing claim term).

[100] CIB 33; Manual of Patent Examining Procedure (MPEP) 6th ed. (rev. 3) § 1302.14; MPEP 7th ed (rev. 1) § 1302.14.

a variable in a sentence by preceding the variable with a definition.[101] Staff agrees with Dominant that it is a common practice in the scientific and technical communities to define a symbol or variable by preceding the symbol with its definition and that it would be reasonable to expect a person of ordinary skill in the art to understand that the term "mean grain diameter" is defining "d_{50}."[102]

Dominant asserts that, if a person of ordinary skill in the art saw the term "mean grain diameter $d_{50} \leq 5$ μm," they would probably find the term to be incongruous and could either follow the standard technical convention of defining the variable "d_{50}" by the express definition preceding it, or could follow the convention of having the more specific term "d_{50}" control over the more general term "mean."[103] Given such divergent avenues of interpretation, Dominant asserts that one of ordinary skill in the art cannot ascertain which interpretation governs the claim limitation, and that the claim term is therefore, indefinite.

Dominant asserts that the Particle Size Patents are indefinite for the following four reasons: (1) "mean grain diameter d_{50}" refers to a mean or a median; (2) "mean grain diameter d_{50}" is based on number or volume; (3) the methodology for measuring particle size is not specified; and (4) the phrase "grain diameter" is unclear.[104] Dominant asserts that if one were to choose between two terms with admittedly different meanings would be to improperly rewrite the claim term.[105] Dominant cites to *Certain Zero-Mercury-Added Alkaline Batteries* in support:

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[101] RIB 31. *See* RX-447C (Holloway Supplemental Direct) at 2.

[102] SIB 12; RX-447C (Holloway Supplemental Direct) at 2; RX-472C (Holloway Rebuttal) at 2.

[103] RIB 89.

[104] RIB 88-108.

[105] RRB 3.

> To arrive at the result found by the ALJ and sought by complainants would require that we read "anode" out of "said zinc anode." As noted above, claim construction does not include rewriting the claims. The portion of the prosecution history relied on by the ALJ is of little help to complainants. If anything, it further indicates that complainants erred in drafting claim 1. Indeed, the inventor testified that [* * *]. However, the Commission is not in a position to correct claim drafting errors, as noted above.[106]

Specifically, Dominant asserts that Osram is advocating that the Commission write out a portion of the claim language so that "mean grain diameter d_{50}" is construed as "~~mean grain diameter~~ d_{50}," while the Staff is advocating that the Commission write-out a portion of the claim language so that "mean grain diameter d_{50}" is construed as "mean grain diameter ~~d_{50}~~."[107]

Staff argues that there is much contemporaneous evidence that the term "mean grain diameter" was well understood by a person of ordinary skill in the art at the time of the invention to refer to the arithmetic mean of a particle size distribution and that there is little contemporaneous evidence demonstrating that a person of ordinary skill in the art would be familiar with the term "d_{50}."[108] Osram counters that the term "d_{50}" is used in the Phosphor Handbook, so that the Staff's argument is misplaced.[109]

Staff argues that, if "d_{50}" refers to median, then the term "mean grain diameter d_{50}" would read "mean median grain diameter," which is nonsensical and should not be adopted.[110] Dominant agrees that "mean median grain diameter" is a nonsensical result.[111] Staff also argues that the '930 patent is applicable, as it is also a descendant of the PCT application. The '930 patent discloses the

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[106] RRB 3-4, fn. 2. *Certain Zero-Mercury-Added Alkaline Batteries*, Inv. No. 337-TA-493, Commission Opinion (November 10, 2004).

[107] RRB 8.

[108] SIB 11-12.

[109] CRB 31.

[110] SIB 12-13.

[111] RRB 9.

use of a luminescent power having a mean particle size of ~ 10 μm.[112]

Patent law does not allow the meaning of a particular word in a claim to be ignored. "[E]ach element of a claim is considered *material and essential*."[113] "While not an absolute rule, *all* claim terms are presumed to have meaning in a claim."[114] "In construing claims, the analytical focus must begin and remain centered *on the language of the claims themselves*, for it is that language that the patentee chose to use to 'particularly point [ ] out and distinctly claim [ ] the subject matter which the patentee regards as his invention.'"[115] Patentees may alter the meaning of words that they use in claims, but they must put the public on notice that they are doing so. Thus, a patent applicant may give new or old terms a different meaning than they would otherwise have to a person of ordinary skill in the art; but if that is done, then the patent applicant must "set out the different meaning in the specification in a manner sufficient to give one of ordinary skill in the art notice of the change from ordinary meaning."[116]

Where the specification is silent about the meaning of a claim term such that "the claim is not 'amenable to construction,' then the claim is invalid as indefinite under 35 U.S.C. § 112, ¶ 2."[117] A claim is ruled indefinite if it is "insolubly ambiguous, and no narrowing construction can properly be adopted."[118] In this case, the term "mean grain diameter d_{50}" is just such a claim term. The

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[112] SIB 15; CX-7 (emphasis added).

[113] *See London v. Carson Pirie Scott & Co.*, 946 F.2d 1534, 1538 (Fed. Cir. 1991) (emphasis added).

[114] *Innova/Pure Water, Inc. v. Safari Water Filtration Systems, Inc.*, 381 F.3d 1111, 1119 (Fed. Cir. 2004) (emphasis added).

[115] *Interactive Gift Express, supra*, 256 F.3d at 1331 (emphasis added).

[116] *Innova, supra*, 381 F.3d at 1116-17.

[117] *See Honeywell Int'l, Inc. v. U.S. Int'l Trade Comm.*, 341 F.3d 1332, 1338 (Fed. Cir. 2003).

[118] *Id.* at 1338-39.

asserted claims in the Particle Size Patents leaves a person of ordinary skill in the art to speculate as to whether the claims cover mean grain diameters ≤ 5 μm or median grain diameters ≤ 5 μm. This anomaly does not adequately inform the public of what the claims "particularly point[ ] out and distinctly claim[ ]," as Section 112, paragraph 2 requires.[119] In construing claims and in assessing whether those claims are indefinite, tribunals may not rewrite them.[120] The Federal Circuit has repeatedly and consistently stated that "courts may not redraft claims, whether to make them operable or to sustain their validity."[121]

As detailed above, the issue before the undersigned is not one that requires an interpretation of the terms "mean" or "d_{50}," but to simply choose one term over the other. Adopting either claim construction would impermissibly be rewriting the claim term "mean grain diameter d_{50}" to either be **"mean grain diameter d_{50}"** or **"~~mean grain diameter~~ d_{50}."** Choosing either claim construction would be improper because patent law does not allow the meaning of a particular word in a claim to be ignored as "each element of a claim is considered *material and essential*."[122]

A reading of the PCT application, from which the Particle Size Patents claim priority, supports this finding of indefiniteness.[123] The cover page of the PCT application has an abstract, which is written in both English and German. The relevant German phrase is "*einen mittleren Korndurchmesser $d_{50} \leq 5$ μm auf*" while the relevant English phrase is "a grain diameter $d_{50} \leq 5$ μm." There is **no** mention of the word "mean" in the English language abstract. With the exception

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[119] *See* 35 U.S.C. § 112 ¶ 2.

[120] *Certain Zero-Mercury-Added Alkaline Batteries*, Inv. No. 337-TA-493, Commission Opinion (November 10, 2004).

[121] *Chef America, Inc. v. Lamb-Weston, Inc.*, 358 F.3d at 1371, 1372 (Fed. Cir. 2004).

[122] *London*, 946 F.2d at 1538 (emphasis added).

[123] *See* RX-372C.

of the final word "*auf/aufweisen*," the German phrase that is used in the abstract is identical to the phrase used within the application.[124]

When applicants prosecute the U.S. counterpart to a PCT application, the Manual of Patent Examining Procedure requires applicants to file an English translation of the international application if the application was filed in another language and was not published under PCT Article 21(2) in English.[125] The original application to the '861 patent, which was a continuation of the PCT application, was the translation that was submitted to the Patent Office. The application used the term "mean grain diameter d_{50}" throughout.[126] Another English translation of the PCT application was filed as RX-372C; however, this is not the translation that was submitted to the Patent Office when the Particle Size Patents applications were submitted. This translation translates the term as "average particle diameter d_{50} not greater than 5 μm."[127] An English translation of related German patent DE 297 24 382 U1 translates the same term "*einen mittleren Korndurchmesser* $d_{50} \leq 5$ *μm aufweisen*" as "median grain diameter $d_{50} \leq 5$ μm."[128]

There is no dispute that the German word "mittleren" can either be defined as "mean" or "median" depending on the context. What the English translation of the abstract on the PCT application seems to tell us is that the translator found it unnecessary to translate the term "mittleren" because it was clear that the inventor was indicating a "median" because of the use of the symbol "d_{50}." There is no indication within the patent's claims, specification or prosecution history that the inventors intended to be their own lexicographer and give the term "d_{50}" anything other than its

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[124] *See* RX-372C at 3, 18.
[125] *See* Manual of Patent Examining Procedure (MPEP) § 1893.01(d).
[126] CX-11 at OS116625-55.
[127] *See* RX-372C.
[128] *See* CX-1004C.

ordinary meaning of "median."

The first time the word "mean grain diameter d_{50}" is used in the prosecution history is when the '861 patent application was filed on May 20, 1998.[129] It is clear that the inventors intended the claim limitation to be a "median" based on their use of the universally accepted symbol for median, d_{50}. Therefore, the use of the term "mean grain diameter d_{50}" is inconsistent with the intent of the inventors. A logical conclusion is that, somewhere along the way, there was an error in translation which has somehow been carried throughout the prosecution history. Although Osram acknowledges that the German PCT application contains the word "mittleren" whereas the U.S. patent counterpart has the word "mean," they refuse to admit that an error has been made. Their position is most likely based on the Federal Circuit's repeated admonition that "courts may not redraft claims."[130] In any event, it is not appropriate for the undersigned to redraft the claim to ignore either "mean" or "d_{50}." As the claim "mean grain diameter d_{50}" is currently written, it is inherently inconsistent, insolubly ambiguous, and therefore indefinite. In light of its indefiniteness, it is not amenable to claim construction or any infringement or domestic industry analysis.

Accordingly, the term "mean grain diameter d_{50} " in claims 1 and 10 of the '861 patent; claims 1 and 10 of the '259 patent; claims 1, 6, and 11 of the '301 patent; claim 2 of the '780 patent; and claims 1 and 12 of the '247 patent must be viewed as insolubly ambiguous and, hence, indefinite under 35 U.S.C. § 112, ¶ 2.[131]

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[129] *See* CX-11 at OS116624, 116628.

[130] *Chef America*, 358 F.3d at 1372.

[131] *See Honeywell, supra*, 341 F.3d at 1340 (where patent claims are missing an element and "the claims, the written description, and the prosecution history fail to give us, as the interpreter of the claim term, any guidance as to what one of ordinary skill in the art would interpret the claim to require," and where the missing element is "necessary to practice the

(continued...)

Because the undersigned has found that the term "mean grain diameter d_{50}" in claims 1 and 10 of the '861 patent; claims 1 and 10 of the '259 patent; claims 1, 6, and 11 of the '301 patent; claim 2 of the '780 patent; and claims 1 and 12 of the '247 patent is insolubly ambiguous and, hence, indefinite under 35 U.S.C. § 112, ¶ 2, the undersigned does not reach a conclusion regarding the remaining indefiniteness arguments of failure to specify the distribution from which "mean grain diameter d_{50}" should be calculated, failure to specify the appropriate instrument and/or methodology that is to be used to ascertain "mean grain diameter d_{50}" and failure to specify the basis of the grain diameter in "mean grain diameter d_{50}."

B. Infringement

1. Relevant Law

a. Literal Infringement

Literal infringement is a question of fact.[132] Literal infringement requires the patentee to prove that the accused device contains each limitation of the asserted claim(s). Each element of a claim is considered material and essential, and in order to show literal infringement, every element must be found to be present in the accused device.[133] If any claim limitation is absent from the accused device, there is no literal infringement of that claim as a matter of law.[134]

b. Infringement Under the Doctrine of Equivalents

Where literal infringement is not found, infringement nevertheless can be found under the

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[131](...continued)
invention," the claims are insolubly ambiguous and, therefore, legally indefinite under 35 U.S.C. § 112, ¶ 2).

[132] *Tegal Corp. v. Tokyo Electron America, Inc.*, 257 F.3d 1331, 1350 (Fed. Cir. 2001) ("*Tegal Corp.*"), *cert. denied*, 535 U.S. 927 (2002).

[133] *London*, 946 F.2d at 1538.

[134] *Bayer*, 212 F.3d at 1247.

doctrine of equivalents based on "the substantiality of the differences between the claimed and accused products or processes, assessed according to an objective standard" judged from "the vantage point of one of ordinary skill in the relevant art."[135] Determining infringement under the doctrine of equivalents "requires an intensely factual inquiry."[136]

In *Warner-Jenkinson*, the Supreme Court noted that the doctrine of equivalents is subject to several limitations, including applying the doctrine to individual elements of a claim and not to the invention as a whole.[137] The court acknowledged that the commonly used "function-way-result" test is suitable in some instances, including analyzing mechanical devices.[138]

c. Prosecution History Estoppel

Although infringement can be demonstrated under the doctrine of equivalents in the absence of literal infringement, the doctrine of prosecution history estoppel "can prevent a patentee from relying on the doctrine of equivalents when the patentee relinquishes subject matter during the prosecution of the patent, either by amendment or argument."[139] Prosecution history estoppel is a legal question for the court.[140]

According to the rule of "amendment-based estoppel," "when an applicant narrows a claim

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[135] *Hilton Davis Chem. Co. v. Warner-Jenkinson Co., Inc.*, 62 F.3d 1512, 1518-1519 (Fed. Cir. 1995) ("*Hilton Davis*"), *rev'd*, 520 U.S. 17 (1997) ("*Warner-Jenkinson*").

[136] *Vehicular Tech. Corp. v. Titan Wheel Int'l, Inc.*, 212 F.3d 1377, 1381 (Fed. Cir. 2000) ("*Vehicular Technologies*").

[137] *Warner-Jenkinson*, 520 U.S. at 29.

[138] *See Hilton Davis*, 62 F.3d at 1518 ("In applying the doctrine of equivalents, it is often enough to assess whether the claimed and accused products or processes include substantially the same function, way, and result").

[139] *Pharmacia & Upjohn Co. v. Mylan Pharm., Inc.*, 170 F.3d 1373, 1376-77 (Fed. Cir. 1999) ("*Pharmacia*").

[140] *Bayer*, 212 F.3d at 1251-54; *Insituform Tech. v. Cat Contracting*, 99 F.3d 1098, 1107 (Fed. Cir. 1996) ("*Insituform*"), *cert. denied*, 520 U.S. 1198 (1997).

element in the face of an examiner's rejection based on the prior art, the doctrine estops the applicant from later asserting that the claim covers, through the doctrine of equivalents, features that the applicant amended his claim to avoid. A patentee is also estopped to assert equivalence to 'trivial' variations of such prior art features."[141] Under the rule of "argument-based estoppel," "[c]lear assertions made during prosecution in support of patentability, whether or not actually required to secure allowance of the claim, may also create an estoppel."[142] In determining whether estoppel exists, "[t]he legal standard for determining what subject matter was relinquished is an objective one, measured from the vantage point of what a competitor was reasonably entitled to conclude, from the prosecution history, that the applicant gave up to procure issuance of the patent."[143]

In *Warner-Jenkinson, supra*, the Supreme Court ruled that the reason for an amendment is relevant to prosecution history estoppel, particularly when it is "tied to amendments made to avoid the prior art, or otherwise to address a specific concern -- such as obviousness -- that arguably would have rendered the claimed subject matter unpatentable."[144] The Supreme Court further held that where the reason for an amendment is unclear, there is a presumption that prosecution history estoppel applies but is rebuttable "if an appropriate reason for a required amendment is established."[145]

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[141] *Litton Sys., Inc. v. Honeywell, Inc.*, 140 F.3d 1449, 1462 (Fed. Cir. 1998) ("*Litton Systems*"), *cert. dismissed*, 122 S. Ct. 914 (2002).

[142] *Southwall Tech., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1583 (Fed. Cir.), *cert. denied*, 516 U.S. 987 (1995) ("*Southwall Technologies*"); *see also Canton Bio-Med., Inc. v. Integrated Liner Tech., Inc.*, 216 F.3d 1367, 1371 (Fed. Cir. 2000) ("*Canton Bio-Medical*").

[143] *Hoganas AB v. Dresser Indus., Inc.*, 9 F.3d 948, 952 (Fed. Cir. 1993) ("*Hoganas*").

[144] *Warner-Jenkinson*, 520 U.S. at 30-31.

[145] *Id.* at 33.

In *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*,[146] the Supreme Court elaborated on its prosecution history estoppel ruling in *Warner-Jenkinson*. Concerning the kinds of amendments that may give rise to estoppel, the Supreme Court decided that "a narrowing amendment made to satisfy any requirement of the Patent Act may give rise to an estoppel."[147] Thus, estoppel may arise not only from narrowing amendments to avoid prior art, but also from narrowing amendments to satisfy the statutory requirements of usefulness, novelty and non-obviousness (35 U.S.C. §§ 101-103) as well as the statutory requirements of adequate descriptiveness in the specification and claims, enablement, and setting forth the best mode of carrying out the invention (35 U.S.C. § 112).[148] While some Section 112 amendments may, according to the Supreme Court, be "truly cosmetic" and therefore would not narrow the patent's scope or raise an estoppel, nevertheless "if a § 112 amendment is necessary and narrows the patent's scope – even if only for the purpose of better description – estoppel may apply."[149]

The Supreme Court in *Festo* also addressed whether prosecution history estoppel bars the inventor from asserting infringement against any equivalent to the narrowed element, or whether some equivalents might still infringe.[150] In reversing the Federal Circuit's ruling below that a complete bar applies, the Supreme Court instead ruled in favor of a "flexible bar" that "requires an examination of the subject matter surrendered by the narrowing amendment."[151] Recognizing the inherent limitation of words to describe an invention, the Supreme Court held:

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[146] *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, 535 U.S. 722 (2002) ("*Festo*").

[147] *Id.* at 736.

[148] *Id.*

[149] *Id.* at 736-737.

[150] *Id.* at 737-738.

[151] *Id.*

> The narrowing amendment may demonstrate what the claim is not; but it may still fail to capture precisely what the claim is. There is no reason why a narrowing amendment should be deemed to relinquish equivalents unforeseeable at the time of the amendment and beyond a fair interpretation of what was surrendered. Nor is there any call to foreclose claims of equivalence for aspects of the invention that have only a peripheral relation to the reason the amendment was submitted. The amendment does not show that the inventor suddenly had more foresight in the drafting of claims than an inventor whose application was granted without amendments having been submitted. It shows only that he was familiar with the broader text and with the difference between the two. As a result, there is no more reason for holding the patentee to the literal terms of an amended claim than there is for abolishing the doctrine of equivalents altogether and holding every patentee to the literal terms of the patent.[152]

The Supreme Court in *Festo* went on to hold that there is a rebuttable presumption that a narrowing amendment creates an estoppel, and that the patentee bears the burden of rebutting the presumption by proving that the amendment does not surrender the particular equivalent in question.[153] "The equivalent may have been unforeseeable at the time of the application; the rationale underlying the amendment may bear no more than a tangential relation to the equivalent in question; or there may be some other reason suggesting that the patentee could not reasonably be expected to have described the insubstantial substitute in question."[154] To rebut the presumption, "[t]he patentee must show that at the time of the amendment one skilled in the art could not reasonably be expected to have drafted a claim that would have literally encompassed the alleged equivalent."[155]

2. Infringement

As indicated earlier herein in connection with claim construction, independent claims 1 and

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[152] *Id.* at 738.
[153] *Id.* at 740-741.
[154] *Id.*
[155] *Id.* at 741.

10 of the '861 patent are invalid under 35 U.S.C. § 112, ¶ 2 as indefinite.[156] Therefore, those claims cannot be analyzed for infringement.[157] In turn, claims 3, 6, 7, 11, 12, and 13 that depend from those claims are also indefinite and cannot be analyzed for infringement.

As indicated earlier herein in connection with claim construction, independent claims 1 and 10 of the '259 patent are invalid under 35 U.S.C. § 112, ¶ 2 as indefinite.[158] Therefore, those claims cannot be analyzed for infringement.[159] In turn, claims 3, 6, 7, 11, 12, 13, and 15 that depend from those claims are also indefinite and cannot be analyzed for infringement.

As indicated earlier herein in connection with claim construction, independent claims 1, 6 and 11 of the '301 patent are invalid under 35 U.S.C. § 112, ¶ 2 as indefinite.[160] Therefore, those claims cannot be analyzed for infringement.[161] In turn, claims 2, 7, 12, 14 and 15 that depend from those claims are also indefinite and cannot be analyzed for infringement.

As indicated earlier herein in connection with claim construction, independent claim 2 of the '780 patent is invalid under 35 U.S.C. § 112, ¶ 2 as indefinite.[162] Therefore, that claim cannot be analyzed for infringement.[163] In turn, claims 3, 4, 5, 7, and 10 that depend from that claims is also indefinite and cannot be analyzed for infringement.

As indicated earlier herein in connection with claim construction, independent claims 1 and

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[156] *See* Section III(A)(2)(a).
[157] *See Honeywell, supra*, 341 F.3d at 1342.
[158] *See* Section III(A)(2)(a).
[159] *See Honeywell, supra*, 341 F.3d at 1342.
[160] *See* Section III(A)(2)(a).
[161] *See Honeywell, supra*, 341 F.3d at 1342.
[162] *See* Section III(A)(2)(a).
[163] *See Honeywell, supra*, 341 F.3d at 1342.

12 of the '247 patent are invalid under 35 U.S.C. § 112, ¶ 2 as indefinite.[164] Therefore, those claims cannot be analyzed for infringement.[165] In turn, claims 3, 6, 7, 10, 11, 13, 14, 15, 17, 20 and 21 that depend from those claims are also indefinite and cannot be analyzed for infringement.

C. Domestic Industry - Technical Prong

In a patent-based complaint, a violation of Section 337 can be found "only if an industry in the United States, relating to the articles protected by the patent . . . concerned, exists or is in the process of being established."[166] This "domestic industry requirement" has an "economic" prong and a "technical" prong. The "technical" prong will be discussed here, within each relevant patent section. The "economic" prong for all patents will be discussed later, in Section VII.

1. Relevant Law

A complainant in a patent-based Section 337 investigation must demonstrate that it is practicing or exploiting the patents at issue.[167] In order to find the existence of a domestic industry exploiting a patent at issue, it is sufficient to show that the domestic industry practices any claim of that patent, not necessarily an asserted claim of that patent.[168] Fulfillment of this so-called "technical prong" of the domestic industry requirement is not determined by a rigid formula, but rather by the

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[164] *See* Section III(A)(2)(a).

[165] *See Honeywell, supra*, 341 F.3d at 1342.

[166] 19 U.S.C. § 1337(a)(2).

[167] *See* 19 U.S.C. § 1337(a)(2) and (3); *also see Certain Microsphere Adhesives, Process for Making Same, and Products Containing Same, Including Self-Stick Repositionable Notes*, Inv. No. 337-TA-366, Commission Opinion at 8, 1996 WL 1056095 (U.S.I.T.C., January 16, 1996) ("*Microsphere Adhesives*"), *aff'd sub nom. Minnesota Mining & Mfg. Co. v. U.S. Int'l Trade Comm'n*, 91 F.3d 171 (Fed. Cir. 1996) (Table); *Certain Plastic Encapsulated Integrated Circuits*, Inv. No. 337-TA-315, U.S.I.T.C. Pub. No. 2574 (November 1992), Commission Opinion at 16, 1992 WL 813959 ("*Encapsulated Circuits*").

[168] *Microsphere Adhesives*, Commission Opinion at 7-16.

articles of commerce and the realities of the marketplace.[169]

The test for claim coverage for the purposes of the technical prong of the domestic industry requirement is the same as that for infringement.[170] "First, the claims of the patent are construed. Second, the complainant's article or process is examined to determine whether it falls within the scope of the claims."[171] As with infringement, the first step of claim construction is a question of law, whereas the second step of comparing the article to the claims is a factual determination.[172] To prevail, the patentee must establish by a preponderance of the evidence that the domestic product practices one or more claims of the patent either literally or under the doctrine of equivalents.[173]

2. Technical Prong

As explained earlier herein in connection with the claim construction, claims 1, 3, 6-7, and 10-13 of the '861 patent are invalid as indefinite under 35 U.S.C. § 112, ¶ 2.[174] Therefore, claim 1, the only claim of the '861 patent that Osram alleges is practiced by its domestic products,[175] cannot be analyzed under the technical prong.[176] Accordingly, the technical prong of the domestic industry requirement has not been met in connection with the '861 patent.

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[169] *Certain Diltiazem Hydrochloride and Diltiazem Preparations*, Inv. No. 337-TA-349, U.S.I.T.C. Pub. No. 2902, Initial Determination at 138, 1995 WL 945191 (U.S.I.T.C., February 1, 1995) (unreviewed in relevant part) ("*Diltiazem*"); *Certain Double-Sided Floppy Disk Drives and Components Thereof*, Inv. No. 337-TA-215, 227 U.S.P.Q. 982, 989 (Commission Opinion 1985) ("*Floppy Disk Drives*").

[170] *Certain Doxorubicin and Preparations Containing Same*, Inv. No. 337-TA-300, Initial Determination at 109, 1990 WL 710463 (U.S.I.T.C., May 21, 1990) ("*Doxorubicin*"), *aff'd*, Views of the Commission at 22 (October 31, 1990).

[171] *Id.*

[172] *Markman*, 52 F.3d at 976.

[173] *See Bayer*, 212 F.3d at 1247.

[174] *See* Section III(A)(2)(a).

[175] CIB 218.

[176] *See Honeywell, supra*, 341 F.3d at 1342.

As explained earlier herein in connection with the claim construction, claims 1, 3, 6, 7, 10-13, and 15 of the '259 patent are invalid as indefinite under 35 U.S.C. § 112, ¶2.[177] Therefore, claim 1, the only claim of the '259 patent that Osram alleges is practiced by its domestic products,[178] cannot be analyzed under the technical prong.[179] Accordingly, the technical prong of the domestic industry requirement has not been met in connection with the '259 patent.

As explained earlier herein in connection with the claim construction, claims 1-2, 6-7, 11-12, and 14-15 of the '301 patent are invalid as indefinite under 35 U.S.C. § 112, ¶2.[180] Therefore, claim 6, the only claim of the '301 patent that Osram alleges is practiced by its domestic products,[181] cannot be analyzed under the technical prong.[182] Accordingly, the technical prong of the domestic industry requirement has not been met in connection with the '301 patent.

As explained earlier herein in connection with the claim construction, claims 2-5, 7, and 10 of the '780 patent are invalid as indefinite under 35 U.S.C. § 112, ¶2.[183] Therefore, claim 2, the only claim of the '780 patent that Osram alleges is practiced by its domestic products,[184] cannot be analyzed under the technical prong.[185] Accordingly, the technical prong of the domestic industry requirement has not been met in connection with the '780 patent.

As explained earlier herein in connection with the claim construction, claims 1, 3, 6-7, 10-15,

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[177] *See* Section III(A)(2)(a).
[178] CIB 218.
[179] *See Honeywell, supra*, 341 F.3d at 1342.
[180] *See* Section III(A)(2)(a).
[181] CIB 219.
[182] *See Honeywell, supra*, 341 F.3d at 1342.
[183] *See* Section III(A)(2)(a).
[184] CIB 219.
[185] *See Honeywell, supra*, 341 F.3d at 1342.

17, 20 and 21 of the '247 patent are invalid as indefinite under 35 U.S.C. § 112, ¶ 2.[186] Therefore, claim 1, the only claim of the '247 patent that Osram alleges is practiced by its domestic products,[187] cannot be analyzed under the technical prong.[188] Accordingly, the technical prong of the domestic industry requirement has not been met in connection with the '247 patent.

D. Validity

1. Relevant Law

A patent is presumed valid.[189] The party challenging a patent's validity has the burden of overcoming this presumption by clear and convincing evidence.[190] Since the claims of a patent measure the invention at issue, the claims must be interpreted and given the same meaning for purposes of both validity and infringement analyses. As with an infringement analysis, an analysis of invalidity involves two steps: the claim scope is first determined, and then the properly construed claim is compared with the prior art to determine whether the claimed invention is anticipated and/or rendered obvious.[191]

a. Anticipation, 35 U.S.C. §§ 102 (a), (b) and (e)

A patent may be found invalid as anticipated under 35 U.S.C. § 102(b) if "the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United

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[186] *See* Section III(A)(2)(a).

[187] CIB 220.

[188] *See Honeywell, supra*, 341 F.3d at 1342.

[189] 35 U.S.C. § 282; *Richardson-Vicks Inc. v. Upjohn Co.*, 122 F.3d 1476, 1480 (Fed. Cir. 1997) ("*Richardson-Vicks*").

[190] *Richardson-Vicks Inc., supra; Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044 (Fed. Cir.) ("*Uniroyal*"), *cert. denied*, 488 U.S. 825 (1988).

[191] *Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d 1343, 1351 (Fed. Cir. 2001) ("*Amazon.com*").

States."[192] Anticipation is a question of fact.[193]

Under the foregoing statutory provision, a claim is anticipated and therefore invalid when "the four corners of a single, prior art document describe[s] every element of the claimed invention, either expressly or inherently, such that a person of ordinary skill in the art could practice the invention without undue experimentation."[194] To be considered anticipatory, the prior art reference must be enabling and describe the applicant's claimed invention sufficiently to have placed it in possession of a person of ordinary skill in the field of the invention.[195] But, the degree of enabling detail contained in the reference does not have to exceed that contained in the patent at issue.[196]

Further, the disclosure in the prior art reference does not have to be express, but may anticipate by inherency where the inherency would be appreciated by one of ordinary skill in the art.[197] To be inherent, the feature must necessarily be present in the prior art.[198] Inherency may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. If, however, the disclosure is sufficient to show that the natural result flowing from the operation as taught would result in the performance of the questioned function, it seems to be well settled that the disclosure should be regarded as sufficient.

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[192] 35 U.S.C. § 102(b).

[193] *Texas Instruments, Inc. v. U.S. Int'l Trade Comm'n*, 988 F.2d 1165, 1177 (Fed. Cir. 1993) ("*Texas Instruments II*").

[194] *Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000), *cert. denied*, 532 U.S. 904 (2001) ("*Advanced Display Systems*").

[195] *Helifix Ltd. v. Blok-Lok, Ltd.*, 208 F.3d 1339, 1346 (Fed. Cir. 2000) ("*Helifix*"); *In re Paulsen*, 30 F.3d 1475, 1478 (Fed. Cir. 1994) ("*Paulsen*").

[196] *Paulsen*, 30 F.3d at 1481 n.9.

[197] *Glaxo Inc. v. Novopharm Ltd.*, 52 F.3d 1043, 1047 (Fed. Cir.), *cert. denied*, 516 U.S. 988 (1995) ("*Glaxo*").

[198] *See Finnigan Corp. v. U.S. Int'l Trade Comm'n*, 180 F.3d 1354, 1365-66 (Fed. Cir. 1999).

This modest flexibility in the rule that "anticipation" requires that every element of the claims appear in a single reference accommodates situations where the common knowledge of technologists is not recorded in the reference; that is, where technological facts are known to those in the field of the invention, albeit not known to judges.[199]

b. Obviousness, 35 U.S.C. § 103 (a)

Under 35 U.S.C. § 103(a), a patent is valid unless "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains."[200] The ultimate question of obviousness is a question of law, but "it is well understood that there are factual issues underlying the ultimate obviousness decision."[201]

Once claims have been properly construed, "[t]he second step in an obviousness inquiry is to determine whether the claimed invention would have been obvious as a legal matter, based on underlying factual inquiries including : (1) the scope and content of the prior art, (2) the level of ordinary skill in the art, (3) the differences between the claimed invention and the prior art ; and (4) secondary considerations of non-obviousness" (also known as "objective evidence").[202] In order to prove obviousness, the patent challenger must demonstrate, by clear and convincing evidence, that "there is a reason, suggestion, or motivation in the prior art that would lead one of ordinary skill in

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[199] *See Continental Can Co. v. Monsanto Co.*, 948 F,2d 1264, 1268-69 (Fed. Cir. 1991); *Finnigan*, 180 F.2d at 1365.

[200] 35 U.S.C. § 103(a).

[201] *Richardson-Vicks Inc.*, 122 F.3d at 1479; *Wang Laboratories, Inc. v. Toshiba Corp.*, 993 F.2d 858, 863 (Fed. Cir. 1993) ("*Wang Laboratories*").

[202] *Smiths Industries Medical Systems, Inc. v. Vital Signs, Inc.*, 183 F.3d 1347, 1354 (Fed. Cir. 1999) ("*Smiths Industries*"), *citing Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966) ("*Graham*").

the art to combine the references, and that would also suggest a reasonable likelihood of success."[203] When an obviousness determination relies on the combination of two or more references, "[t]he suggestion to combine may be found in explicit or implicit teachings within the references themselves, from the ordinary knowledge of those skilled in the art, or from the nature of the problem to be solved . . . the question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination."[204]

"Secondary considerations,"also referred to as "objective evidence of non-obviousness," such as "commercial success, long felt but unsolved needs, failure of others, etc." may be used to understand the origin of the subject matter at issue, and may be relevant as indicia of obviousness or non-obviousness.[205] Secondary considerations may also include copying by others, prior art teaching away, and professional acclaim.[206]

Evidence of "objective indicia of non-obviousness," also known as "secondary considerations," must be considered in evaluating the obviousness of a claimed invention, but the existence of such evidence does not control the obviousness determination. A court must consider

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[203] *Smiths Industries*, 183 F.3d at 1356; *also see United States Surgical Corporation v. Ethicon, Inc.*, 103 F.3d 1554, 1564 (Fed. Cir. 1997) ("*U.S. Surgical*"), *cert. denied*, 522 U.S. 950 (1997); *Certain Integrated Circuit Telecommunication Chips and Products Containing Same, Including Dialing Apparatus*, Inv. No. 337-TA-337, Commission Opinion at 18 (August 3, 1993) ("*Integrated Circuit Telecommunication Chips*").

[204] *WMS Gaming, Inc. v. International Game Technology*, 184 F.3d 1339, 1355 (Fed. Cir. 1999) ("*WMS Gaming*").

[205] *Graham v. John Deere Co., supra*, 383 U.S. at 17-18.

[206] *See Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 894 (Fed. Cir. 1984) ("*Perkin-Elmer*"), *cert. denied*, 469 U.S. 857 (1984); *Avia Group Int'l, Inc. v. L.A. Gear California*, 853 F.2d 1557, 1564 (Fed. Cir. 1988) ("*Avia*") (copying by others); *In re Hedges*, 783 F.2d 1038, 1041 (Fed. Cir. 1986) ("*Hedges*") (prior art teaching away; invention contrary to accepted wisdom); *Kloster Speedsteel AB v. Crucible Inc.*, 793 F.2d 1565 (Fed. ir. 1986) ("*Kloster*"), *cert. denied*, 479 U.S. 1034 (1987) (wide acceptance and recognition of the invention).

all of the evidence under the *Graham* factors before reaching a decision on obviousness.[207] In order to accord objective evidence substantial weight, its proponent must establish a nexus between the evidence and the merits of the claimed invention, and a *prima facie* case is generally made out "when the patentee shows both that there is commercial success, and that the thing (product or method) that is commercially successful is the invention disclosed and claimed in the patent."[208] Once the patentee has made a *prima facie* case of nexus, the burden shifts to the challenger to show that the commercial success was caused by "extraneous factors other than the patented invention, such as advertising, superior workmanship, etc."[209]

c. Enablement, 35 U.S.C. § 112, ¶ 1

Section 112, ¶ 1 of Title 35 requires that the specification describe the manner and process of making and using the invention "in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same."

The issue of whether a disclosure is enabling is a matter of law.[210] "To be enabling, the specification of a patent must teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation.'"[211] "Patent protection is granted in return for

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[207] *Richardson-Vicks Inc.*, 122 F.3d at 1483-84.

[208] *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995) ("*GPAC*"); *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988), *cert. denied*, 488 U.S. 956 (1988) ("*Demaco*"); *Certain Crystalline Cefadroxil Monohydrate*, Inv. No. 337-TA-293, Commission Opinion (March 15, 1990),15 U.S.P.Q.2d 1263, 1270 ("*Crystalline Cefadroxil Monohydrate*").

[209] *Id.* at 1393.

[210] *Applied Materials, Inc. v. Advanced Semiconductor Materials America, Inc.*, 98 F.3d 1563, 1575 (Fed. Cir. 1996) ("*Applied Materials*").

[211] *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997)

(continued...)

an enabling disclosure of an invention, not for vague, intimations of general ideas that may or may not be workable."[212] Although a specification need not disclose minor details that are well known in the art, "[i]t is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement," and in so doing the specification cannot merely provide "only a starting point, a direction for further research."[213] On the other hand, "[i]t is not fatal if some experimentation is needed, for the patent document is not intended to be a production specification."[214] "Undue experimentation" is "a matter of degree" and "not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed ...."[215]

It is well-settled that in order to be enabling under Section 112, "the patent must contain a description sufficient to enable one skilled in the art to make and use the full scope of the claimed invention."[216] Section 112 requires that the scope of the claims must bear a reasonable correlation to the scope of enablement provided by the specification to such persons.[217]

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[211](...continued)
("*Genentech*").

[212] *Id.* at 1366.

[213] *Id.*

[214] *Northern Telecom, Inc. v. Datapoint Corp.*, 908 F.2d 931, 941 (Fed. Cir. 1990) ("*Northern Telecom*").

[215] *PPG Industries, Inc. v. Guardian Industries Corp.*, 75 F.3d 1558, 1564 (Fed. Cir. 1996) ("*PPG Industries*").

[216] *United States v. Teletronics, Inc.*, 857 F.2d 778, 785 (Fed. Cir. 1988) ("*Teletronics*"); *see also Amgen, Inc. v. Chugai Pharmaceutical Co., Ltd.*, 927 F.2d 1200, 1213 (Fed. Cir. 1991) ("*Chugai*") (inventor's disclosure must be "sufficient to enable on skilled in the art to carry out the invention commensurate with the scope of his claims").

[217] *Application of Fischer*, 427 F.2d 833, 839 (C.C.P.A. 1970) ("*Fischer*").

d. Indefiniteness, 35 U.S.C. § 112, ¶ 2

Claims must ". . . particularly point[ ] out and distinctly claim[ ] the subject matter which the applicant regards as his invention." 35 U.S.C. § 112, ¶ 2. When "means plus function" language is used in the claims, the specification must set forth "adequate disclosure showing what is meant by that language."[218] Claim indefiniteness under Section 112, ¶ 2 is a question of law.[219]

"[I]f the claims, read in light of the specification, reasonably apprise those skilled in the art both of the utilization and scope of the invention, and if the language is as precise as the subject matter permits, the courts can demand no more."[220] Further in this connection, the Federal Circuit has observed:

> We have not insisted that claims be plain on their face in order to avoid condemnation for indefiniteness; rather, what we have asked is that the claims be amenable to construction, however difficult that task may be. If a claim is insolubly ambiguous, and no narrowing construction can properly be adopted, we have held the claim indefinite. If the meaning of the claim is discernible, even though the task may be formidable and the conclusion may be one over which reasonable persons will disagree, we have held the claim sufficiently clear to avoid invalidity on indefiniteness grounds.[221]

"By finding claims indefinite only if reasonable efforts at claim construction prove futile," the Federal Circuit continued in *Exxon Research*, "we accord respect to the statutory presumption of

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[218] *In re Donaldson*, 16 F.3d 1189, 1195 (Fed. Cir. 1994) ("*Donaldson*").

[219] *Exxon Research and Engineering Co. v. U.S.*, 265 F.3d 1371, 1376 (Fed. Cir. 2001) ("*Exxon Research*"); *Union Pacific Resources Co. v. Chesapeake Energy Corp.*, 236 F.3d 684, 692 (Fed. Cir. 2001) ("*Union Pacific*").

[220] *Shatterproof Glass Corp. v. Libby-Owens-Ford Co.*, 758 F.2d 613, 624 (Fed. Cir. 1985), *cert. dismissed*, 474 U.S. 976 (1985) ("*Shatterproof Glass*"); *accord, Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1385 (Fed. Cir. 1986), *cert. denied*, 480 U.S. 947 (1987) ("*Hybritech*").

[221] *Exxon Research, supra*, 265 F.3d at 1375.

patent validity."[222] In this regard, where claims on their face cover various methods that produce widely varying and non-overlapping results such that they "fail to put competitors on notice of the limits of the claimed invention, so that they may fairly know the point at which their activities may begin to pose a serious risk of infringement," those claims are indefinite under Section 112, ¶ 2.[223]

2. Obviousness

Although Dominant asserted an obviousness argument in its pre-trial brief, it did not present any obviousness argument in its post-trial brief and specifically stated in its post-trial reply brief that it was focusing its invalidity argument on indefiniteness.[224] Accordingly, obviousness as to the Particle Size Patents will not be addressed.

3. Indefiniteness

As explained in the claim construction section of this Initial Determination, the term "mean grain diameter d_{50}" in the claims of the Particle Size Patents must be taken at face value for what it literally means.[225] One is not free to ignore the term "mean" or the term "d_{50}," as the experts for both parties improperly recommend.[226] Nothing in the specification of the Particle Size Patents suggests that the word "mean" or "d_{50}"means anything less than its ordinary meaning. The prosecution history of the Particle Size Patents suggests no less.

As a result, claims 1 and 10 of the '861 patent have been found in this Initial Determination

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[222] *Id.*

[223] *Certain Polyethylene Terephthalate Yarn and Products Containing Same*, Inv. No. 337-TA-457, Commission Opinion at 18, 2002 WL 1349938 (U.S.I.T.C., June 18, 2002).

[224] RRB 36.

[225] *See* Section III(A)(2)(a).

[226] *Chef America*, 358 F.3d at 1374 ("courts may not redraft claims, whether to make them operable or to sustain their validity;" "in accord with our settled practice we construe the claim as written, not as the patentees wish they had written it").

to be invalid as indefinite under 35 U.S.C. § 112, ¶ 2.[227] Moreover, claims 3, 6, 7, 11, 12, and 13, depending from claims 1 and 10 are also invalid as indefinite for the same reason.

Claims 1 and 10 of the '259 patent have also been found in this Initial Determination to be invalid as indefinite under 35 U.S.C. § 112, ¶ 2.[228] Moreover, claims 3, 6, 7, 11, 12, 13, and 15, depending from claims 1 and 10 are also invalid as indefinite for the same reason.

Claims 1, 6 and 11 of the '301 patent have also been found in this Initial Determination to be invalid as indefinite under 35 U.S.C. § 112, ¶ 2.[229] Moreover, claims 2, 7, 12, 14 and 15, depending from claims 1, 6, and 11 are also invalid as indefinite for the same reason.

Claim 2 of the '780 patent has also been found in this Initial Determination to be invalid as indefinite under 35 U.S.C. § 112, ¶ 2.[230] Moreover, claims 3, 4, 5, 7, and 10, depending from claim 2, are also invalid as indefinite for the same reason.

Claims 1 and 12 of the '247 patent have also been found in this Initial Determination to be invalid as indefinite under 35 U.S.C. § 112, ¶ 2.[231] Moreover, claims 3, 6, 7, 10, 11, 13, 14, 15, 17, 20 and 21, depending from claims 1 and 12 are also invalid as indefinite for the same reason.

IV. The '930 Patent

The '930 patent, entitled "Light-Radiating Semiconductor Component with a Luminescence Conversion Element," issued June 10, 2003, from an application filed on December 7, 2000.[232] It

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[227] *See* Section III(A)(2)(a).
[228] *See* Section III(A)(2)(a).
[229] *See* Section III(A)(2)(a).
[230] *See* Section III(A)(2)(a).
[231] *See* Section III(A)(2)(a).
[232] CX-7 ('930 patent). This application was a division of Application No. 09/221,789,
(continued...)

is directed to an LED device in which the luminescence layer is formed such that the radiation (*i.e.* light) emitted by an LED chip passes through the luminescence conversion layer along a "plurality of paths" and each path of light emitted from the chip has "substantially equal path lengths inside the luminescence conversion element."[233]

A. Claim Construction

1. The Disputed Claim Terms of the '930 Patent and Their Interpretation

The claims that are at issue in the '930 patent include independent claims 2 through 4. Claim 2, which is representative of the other claims as to the disputed claim term, reads as follows (with the principal terms in dispute noted in **bold** print and *italics* for emphasis):

> A light-radiating semiconductor component, comprising:
>
> > a semiconductor body emitting electromagnetic radiation during an operation of the semiconductor component, said semiconductor body having a semiconductor layer sequence suitable for emitting electromagnetic radiation of a first wavelength range selected from a spectral region consisting of ultraviolet, blue, and green;
> >
> > a first electrical terminal and a second electrical terminal each electrically conductively connected to said semiconductor body;
> >
> > a luminescence conversion element with at least one luminescent material, said luminescence conversion element being deposited on said semiconductor body, said luminescence conversion element converting a radiation originating in the first wavelength range into radiation of a second wavelength range different from the first wavelength range, such that the semiconductor component emits polychromatic visible light comprising radiation of the first wavelength range and radiation of the second wavelength range; and

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[232](...continued)
filed in December 1998. This patent claims priority to PCT application filed in June 1997, Application No. PCT/DE97/01337.

[233] CX-7, col.16:30-18:30.

said luminescence conversion element being formed such that the radiation of the first wavelength range passes through said luminescence conversion element along a plurality of paths, the plurality of paths having a substantially equal path length inside said luminescence conversion element, and said luminescence conversion element emitting a substantial portion of the radiation of the first wavelength range and the radiation of the second wavelength range,

wherein said luminescence conversion element includes light-diffusing particles.[234]

2. Disputed Claim Term: "said luminescence conversion element being formed such that . . . the plurality of paths hav[e] a substantially equal path length inside said luminescence conversion element"

The only claim term that is at issue is whether the "said luminescence conversion element being formed such that . . . the plurality of paths hav[e] a substantially equal path length inside said luminescence conversion element."[235] Dominant and Staff argue that the term "substantially equal path length" includes the limitation that the luminescence conversion layer has a substantially uniform thickness.[236] As support for this argument they cite the patent specification[237] and several references to statements made by Osram in the prosecution history of the '930 patent as well as that of the parent '789 patent.[238] They reject Osram's argument that the statements that Osram made in the prosecution history constitute error or create conflicting bases for interpreting the claim term, and, according to Osram, should result in the prosecution history being ignored.[239] They also reject

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[234] CX-7, col.16:30-62 (emphasis added).

[235] CIB 125, SIB 25.

[236] RIB 109; SIB 25.

[237] CX-7, col.3:42-48.

[238] See examples cited in Respondent's Reply Brief at pages 120 through 121. In addition, they cite to the Examiner's rejection on July 26, 2004 of certain claims in the '789 prosecution history based upon "the judicially created doctrine of obviousness double patenting" as further support for their position. CX-1240 at DS 115319.

[239] RIB 118-19.

Osram's argument that the claims must be read to cover all LED devices in the various figures and preferred embodiments in the patent because they all emit homogeneous light.[240]

Dominant and Staff oppose Osram's argument that their claim construction improperly excludes one of the several preferred embodiments in the patent, Figure 10, because that embodiment does not have a luminescence conversion layer with a substantially uniform thickness. They argue that coverage of a preferred embodiment cannot be maintained in the face of express language in the specification and the prosecution history effectively excluding such embodiment. In conjunction with these arguments, they assert that the claim construction testimony of Osram's expert witness Dr. Zachau presented in support of Osram's claim construction arguments is not persuasive.[241]

Osram argues that the requirement of the luminescence element having uniform thickness applies, at most, to one of several "particularly preferred embodiment[s] of the invention" described in the specification of the patent[242] but not to other preferred embodiments. Osram states that the disputed claim language must be interpreted in light of what the object of the invention was and what the problem with the prior art was. More specifically, Osram quotes language from the "BACKGROUND OF THE INVENTION" section of the patent to illustrate that the problem with the prior art was the difficulty in achieving homogeneous white light.[243] Osram also quotes the following language from the "SUMMARY OF THE INVENTION:"

> It is accordingly an object of the invention to provide a light-radiating semiconductor component, which overcomes the above-mentioned disadvantages of the heretofore-unknown devices and methods of this general type and which **radiates homogeneous polychromatic light** and ensures technically simple mass production with component characteristics that are

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[240] RIB 112; SIB 26.
[241] RIB 115; Zachau, Tr. 624, 628-29.
[242] CX-7, col. 3:33-58.
[243] CIB 127; CX-7, col. 1:61- 2:11.

reproducible to the greatest possible extent.[244]

These quotes are said to support Osram's assertion that the claim language "substantially equal path length" means that light travels substantially the same distance to produce substantially homogeneous polychromatic white light.

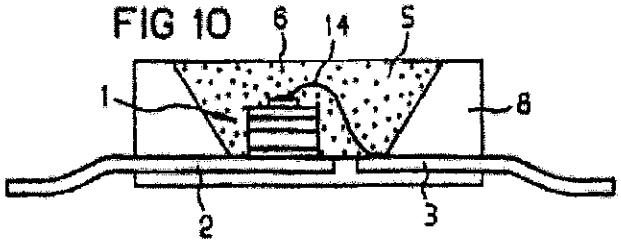
Osram goes on to discuss the novel approach set forth in the '930 patent. Rather than coating a transparent plate with a phosphor, the

> '930 patent teaches putting phosphor particles (called a luminescent material in the patent) into a luminescence conversion element and using this luminescence conversion element to convert light from, *e.g.* a blue light-emitting semiconductor, into polychromatic light, *e.g.* white light. CPFF 830. The specification contains several figures illustrating different embodiments of this inventive approach to achieving homogeneous light. CPFF 831.[245]

Osram then discusses the embodiments represented by Figures 1, 2, 3, 4, 5 ,6, 7, 10, 13 and 14.[246]

However, Osram notes that

> Figure 10 of the '930 Patent is most pertinent here because OSRAM's white light products and Dominant's white light products accused of infringing the '930 patent all use the basic configuration shown in Figure 10. CPFF 841. Figure 10 shows the luminescence conversion element 5 containing the luminescent material 6 surrounding the semiconductor body 1 in a well of a housing 8.[247]



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[244] CIB 128; CX-7, col. 2:14-20 (emphasis added by Complainant).
[245] CIB 128.
[246] CIB 129.
[247] CIB 129-130.

After discussing its contention that both Osram's products and Dominant's accused products use the configuration of Figure 10, Osram goes on to refute the assertion by Dominant and Staff that the specification requires that all embodiments require that their respective luminescence layers have a "constant thickness."[248] Osram notes that the discussion in the specification only applies to "this particularly preferred embodiment" and not the other preferred embodiments.[249]

Osram also refutes the allegations by Dominant and Staff as to the import of their prosecution history arguments. Osram argues that the "double patenting" rejection by the Examiner of certain claims in the related '789 patent does not support the contention that "substantially equal path length" equals "substantially equal thickness."[250] With respect to the May 16, 2002 "Remarks" submitted to the Examiner in the '930 patent prosecution history, Osram argues that these statements create a conflict in the prosecution history, and "[t]herefore, the prosecution history is unhelpful and cannot be used to support Dominant's claim construction." Osram goes on to attack Dominant's witness Dr. Holloway's testimony as erroneous and not in conformity with relevant scientific principles or proper claim construction principles.[251]

Upon review of the record, it is determined that the claim language in question can be interpreted using only intrinsic evidence. Therefore, there is no need to resort to extrinsic evidence such as the testimony of the private parties' respective expert witnesses.

It is clear that "an object of the invention [which is the subject of what the '930 patent is] to provide a light-radiating semiconductor component, which ... radiates homogeneous polychromatic

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[248] CIB 130-33.
[249] RIB 132.
[250] CIB 134-35.
[251] CIB 137.

light..."[252] It is also clear that all 3 of the claims [2, 3, and 4] asserted by Osram contain the claim limitation "the plurality of paths having a substantially equal path length inside said luminescence conversion element." In essence, the dispute among the parties is whether, as Staff and Dominant argue, the definition of the disputed claim term has a requirement that the luminescent conversion element that is deposited on the semiconductor body has a uniform thickness, or, as Osram argues, does not have such a requirement for all devices covered by the claims. It is true that the term "uniform thickness" does not appear in the claims asserted by Osram (2, 3 and 4) nor in claim 1, which is not asserted by Osram in this proceeding.[253] It is also true, as argued by Osram, that the language in the specification cited by Staff and Dominant does not impose the uniform thickness limitation on all embodiments discussed in the patent. While the term "constant thickness throughout" appears as a modifier of the claim element "luminescence conversion layer" in the specification on lines 43 through 45 of column 3 of the '930 patent, the earlier part of the same paragraph at lines 37 and 38 of column 3 makes clear that these limitations apply only to "this particularly preferred embodiment."

The question then becomes, did certain remarks made by Osram in the prosecution history limit the term "plurality of paths having a substantial equal path length" to those devices in which the luminescence conversion layer is of a uniform thickness. An appropriate place to begin this inquiry is the divisional application from the '789 patent.[254] The '452 application which ultimately

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[252] CX-7, col. 2:14-20.

[253] CX-7, col. 15:63 - 18:30.

[254] There is much argument by the parties as to the relevance of the prosecution history of the '789 patent for periods both before and after December 7, 2000. There is no need to discuss this because the claim language in dispute did not appear in the original December 7, 2000 '452 application that led to the '930 patent. Also, actions taken by the PTO Examiner with respect to (continued...)

issued as the '930 patent was filed on December 7, 2000. Along with the application was a preliminary amendment. The '452 application and the preliminary amendment contained 51 draft claims, none of which contained the "substantial equal path length" claim term.[255] On November 29, 2001, the Patent Examiner rejected all 51 claims as being anticipated under 35 U.S.C. ¶ 102(b) or, in the alternative, as obvious under Stevenson, the '974 patent, per 35 U.S.C. ¶ 103(a).[256]

In response thereto, Osram, on May 16, 2002, among other things, amended claim 1 to add the term "the plurality of paths having a substantially equal path length inside said luminescence conversion element."[257] Osram also added a new claim 54 covering a semiconductor device with a transparent encapsulating resin having a "substantially uniform thickness."[258] In the "Remarks" section of its filing, Osram discussed "substantially uniform thickness" or a variant thereof (*i.e.* "uniform thickness," "equal thickness," or "constant thickness") **five** times. The first time Osram discussed "substantially uniform thickness" was with regard to amended claim 1:

> Claim 1 is directed to a light radiating semiconductor component including a ... luminescence conversion element ... As amended, claim 1 also recites a ***substantially uniform thickness***

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[254](...continued)
the '789 patent after the separate '452 application was submitted cannot properly be considered part of the prosecution history of the '930 patent. *See Certain Microlithographic Machines and Components Thereof*, Inv. No. 337-TA-468, Initial Determination (January 29, 2003) ("When the meaning of a claim term is not raised during the patent prosecution of the patents at issue, the prosecution histories of those related patents do not provide any intrinsic evidence for claim construction purposes. *Georgia-Pacific Corp. v. U.S. Gypsum Co.*, 195 F.3d 1322 (Fed Cir. 1999) ("*Georgia-Pacific*"). Specifically, the Federal Circuit stated that in order for a patentee to be bound by a statement made to the PTO in connection with a later prosecution of a different patent, the statement would have to be one that the examiner relied upon in allowing the claims in the patent at issue. *Georgia-Pacific*, 195 F.3d at 1333.")

[255] CX-17 at OS 119762 - OS119769 and OS 119816 - OS119819.

[256] CX-17 at OS 119902-119906.

[257] CX-17 at 119909.

[258] CX-17 at 119909.

and that the luminescence conversion element is deposited on the semiconductor body...[259]

The second time Osram discussed "substantially uniform thickness" was with regard to claim 54 ("Claim 54 is directed to semiconductor device including a light emitting diode, a transparent encapsulating resin over the diode, and a ***substantially uniform thickness*** resin layer containing fluorescent material thereover").[260] The third time Osram discussed "uniform thickness" was with regards to one item of prior art ("Stevenson, in particular does not teach depositing the phosphors on the semiconductor element or a layer of ***uniform thickness*** as required by claims 1 and 54").[261] The fourth time Osram discussed "substantially equal thickness" was with regards to distinguishing another prior art reference, specifically Tadatsu JP 5152609 ("The resin mold is taller than it is wide, such that there is a longer path for the light through the resin upward than to the sides. Tadatsu thus does not teach ***substantially equal thickness*** as required by claims 1 and 54").[262] In distinguishing the "Abe U.S. Patent No. 5,535,230" and the "Thornton U.S. Patent No. 3,602,758 ... describe devices that are radically different than the much more compact device claimed, which has a uniform thickness deposited on the semiconductor body."[263] The fifth time Osram discussed "substantially constant thickness" was in Osram's concluding remarks:

> The references, taken alone or in combination, do not disclose or suggest a light emitting component including a semiconductor that emits ultraviolet, blue or green light and a luminous conversion element that is deposited on the semiconductor body and has a ***substantially constant thickness***, such that some of the light is converted to a different wavelength, and polychromatic light is emitted from the device, **as required by claim 1**. The references, taken alone or in combination, also do not disclose or suggest the subject

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[259] CX-17 at OS119910 (emphasis added).
[260] CX-17 at OS119910 (emphasis added).
[261] CX-17 at OS119910.
[262] CX-17 at OS119911.
[263] CX-17 at OS119911.

matter of claim 54.[264]

Based on the above remarks made by Osram to the Examiner, Osram used the term "substantially uniform thickness" interchangeably to apply to both claims 1 and 54.

On June 4, 2002, the Examiner issued an Office Action which, among other things, rejected claims 1 and 54 (as well as claims 2-12, 14-24, 27-33, and 53) "under 35 U.S.C. 102(e) as anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over Lowery '316." He continued that "Lowery teaches a led with a uniform coating of fluorescent material." However, he noted that "[c]laims 13, 25, 26, 52 are objected to as being dependent upon a rejected claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims."[265]

Subsequently, claims 13, 25, 26 and 52 were amended to become the current claims 1, 2, 3, and 4 respectively. A comparison of the rejected claim 1 indicates that it is identical in significant respect to current claims 2, 3 and 4.

The fourth limitation of claims 12, 25, 26, and 52 (which were renumbered respectively as claims 1, 2, 3 and 4 of the '930 patent), is exactly the same as the fourth limitation of claim 1, which was amended on May 16, 2002[266] in response to the Patent Examiner's Office Action on November 29, 2001. The November 29, 2001 Office Action rejected Claim 1 on the basis of anticipation or obviousness based on the Stevenson, Tadatsu, Abe, Thornton, Tokailin, Mita, Chao, Robbins and Sato references.[267] Claim 1 was rejected again on July 15, 2002 on the basis of anticipation or

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[264] CX-17 at OS119912 (emphasis added).
[265] CX-17 at OS 119915 - 119917.
[266] CX-17 at OS 119908-09.
[267] CX-17 at OS 119903-06.

obviousness based on the Lowery reference.[268] Claim 1 was canceled on December 16, 2002.[269] On the same day that Claim 1 was cancelled, Claims 12, 25, 26 and 52 were amended as follows,[270] and accepted on February 27, 2003 without further amendment:[271]

Fourth Limitation of Claim 1 (amended on May 16, 2002, rejected on November 29, 2001 and July 15, 2002, cancelled on December 16, 2002)	Fourth Limitation of Claims 12, 25, 25 and 52 (amended on December 16, 2002; accepted on February 27, 2003; renumbered as Claims 1-4 of the '930 patent)
said luminescence conversion element being formed such that the radiation of the first wavelength range passes through said luminescence conversion element along a plurality of paths, the plurality of paths having a substantially equal path length inside said luminescence conversion element, and said luminescence conversion element emitting a substantial portion of the radiation of the first wavelength range and the radiation of the second wavelength range	said luminescence conversion element being formed such that the radiation of the first wavelength range passes through said luminescence conversion element along a plurality of paths, the plurality of paths having a substantially equal path length inside said luminescence conversion element, and said luminescence conversion element emitting a substantial portion of the radiation of the first wavelength range and the radiation of the second wavelength range

So the legal effect of Osram's remarks in the May 16, 2002 filing cited above are applicable to current claims 2, 3, and 4. That is, Osram, in order to get approval of the rewritten claims in the May 16, 2002 filing, represented to the Examiner in 5 separate instances that claim 1 required that the luminescence conversion element be uniformly thick around the LED. It is clear that in this instance, therefore, that Osram has relinquished a particular claim construction such that LEDs that are otherwise covered by the claims at issue are not covered by the claims if they do not have a

[268] CX-17 at OS 119915-17.
[269] CX-17 at OS 119919.
[270] CX-17 at OS 119919-22.
[271] CX-17 at OS120036.

luminescence conversion layer that is uniformly thick around the LED.[272]

Osram's argument that this interpretation is incorrect because it would exclude one of the "particularly preferred embodiments," Figure 10, is not persuasive. While case law holds that a claim construction that excludes the preferred embodiment in the patent is "rarely, if ever, correct,[273] this patent contains several preferred embodiments.[274] The Federal Circuit has held that a claim construction excluding a preferred embodiment is proper when, as here, the claim language interpreted in light of the prosecution history necessarily excludes such embodiment.[275]

Osram's argument that the prosecution history is contradictory and therefore should be ignored is not persuasive. As noted above, throughout the prosecution history of the '930 patent, once the term "substantially equal path length" was first introduced in the May 16, 2002 filing in the '452 application that led to the '930 patent, Osram has consistently asserted that the claim language required that the luminescence conversion element surrounding the LED be of a uniform thickness. Accordingly, Osram's argument is rejected.

Accordingly, the disputed claim term "said luminescence conversion element being formed such that ... the plurality of paths hav[e] a substantially equal path length inside said luminescence conversion element" includes a luminescence conversion element with a uniform thickness around the semiconductor body (the LED chip).

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[272] *Bell Atlantic*, 262 F.3d at 1268.

[273] *Vitronics*, 90 F.3d at 1583-84.

[274] CX-7, col. 11:11-15:61.

[275] *Elekta Instrument S.A. v. O.U.R. Scientific Intern.*, 214 F.3d 1302, 1308 (Fed. Cir. 2000); *Ultra-Temp Corp. v. Advanced Vacuum Sys., Inc.*, 11 F. Supp. 2d 141, 146-47 (D.Mass 1998).

B. Infringement

1. Literal Infringement

As will be shown below, the issue of infringement has been determined by the decision above with respect to claim construction. A review of the briefs and record confirms this. Dominant and Staff argue that Dominant's products do not infringe, while Osram argues that certain of them do infringe.[276] However, Osram's entire argument is base upon its own claim construction, which has already been rejected.

Dominant's products resemble Figure 10 of the '930 patent.[277] Figure 10 clearly does not have a luminescence conversion element of uniform thickness around the semiconductor body (LED chip). Since claims 2, 3, and 4 require that an infringing product must have a luminescence conversion element must have a uniform thickness around the semiconductor body (the LED chip), Dominant's products do not infringe Claims 2, 3, and 4 of the '930 patent.

2. Infringement Under the Doctrine of Equivalents

Osram does not argue that any of Dominant's products infringe under the doctrine of equivalents. Accordingly, there is no infringement of the '930 patent under the doctrine of

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[276] CIB 147-56; RIB 122-26; SIB 28.

[277] Holloway, Tr. 918:

Q. Well, you know that – let's turn to Figure 10 of the patent. Figure 10 is a representation of the shape of the device used both by Osram and Dominant; isn't that correct?
A. That's correct.

Holloway, Tr. 926:

Q. Okay. And Figure 10 is the embodiment that both Dominant and Osram utilize in their commercial devices; isn't that correct?
A. I believe that is correct, yes.
Q. Okay.
A. That's the well-shaped device.
Q. That's right. Figure 10 is the well-shaped device.

equivalents.

C. Domestic Industry - Technical Prong

Like the issue of infringement, the question of whether or not Osram practices the '930 patent is determined by the proper claim construction. Dominant and Staff argue that Osram's product resembles Figure 10 in the '930 patent and therefore does not have a luminescence conversion element with a uniform thickness around the semiconductor body (the LED chip), as required by claims 2, 3, and 4 of the '930 patent.[278] Osram, using its own claim construction (already rejected herein) asserts that its products meet the technical prong of the domestic industry requirement.[279]

Osram's argument is rejected. The record clearly shows that Osram's TopLED device, which is represented by Figure 10 of the '930 patent, does not have a luminescence conversion element that has a uniform thickness.[280] Osram does not contest this assertion by Dominant and Staff. Therefore, it does not practice a domestic industry under claim 2, 3 or 4 of the '930 patent. Accordingly, Osram has not met the technical prong of the domestic industry requirement for the '930 patent.

D. Validity

1. Lack of Enablement

Dominant and Staff make an argument that if Osram's claim construction is adopted, claims 2,3, and 4 of the '930 patent would be invalid for lack of enablement under 35 U.S.C. § 112 ¶ 1.[281] Osram urges rejection of this argument.[282] Since the argument raised by Dominant and Staff is based upon a claim construction that was not adopted, there is no need to address this assertion.

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[278] RIB 166-67; SIB 42.
[279] CIB 220-21.
[280] Holloway, Tr. 918-919, 926.
[281] RIB 129-35; SIB 29-30.
[282] CIB 156-57.

Accordingly, the argument of Dominant and Staff is rejected.

V. The Lead Frame Patents

A. Claim Construction

1. The Disputed Claim Terms of the Lead Frame Patents and Their Interpretation

The asserted claims of the Lead Frame Patents that are at issue in this investigation are claims 1 and 5-8 of the '902 patent; claims 1 and 5-8 of the '321 patent; and claims 1, 5-8, and 10-11 of the '580 patent.

Independent claim 1 of the '902 patent is asserted, which reads as follows [with disputed claim terms in **bold** and *italics*]:

Claim 1: An optoelectronic surface-mountable structural element (SMD), comprising:

> a ***lead frame*** having a chip carrier part, external connections, and a ***connection part*** disposed at a distance from said chip carrier part, at least three of said external connections being heat-conducting connections ***thermally conductively connected*** to said chip carrier part;
>
> an optoelectronic chip ***heat-conductively connected*** to said chip carrier part of said ***lead frame***, said optoelectronic chip having an electrical contact ***electrically conductively connected*** to said ***connection part***; and
>
> a casing having a foundation encasing said optoelectronic chip and a part of said ***lead frame***, said foundation having a first main surface and an outward facing second main surface disposed opposite said first main surface, said external connections and said ***connection part*** project outside of said casing, said external connections and said ***connection part*** being bent outside of said foundation toward said outward-facing second main surface of said foundation and in a further course being further bent one of below said foundation toward a center of said outward-facing second main surface and away from said foundation for forming rocker-shaped connection stumps, said at least three of said external connections projecting from said casing on at least two sides of said casing at different places at a distance from each

other, said heat-conducting connections as seen in a top view of said ***lead frame*** projecting from said casing on at least two sides and starting from said chip carrier part run toward the outside in a ***stellate form*** within said casing and separately from each other.[283]

Also at issue are dependent claims 5, 6, 7, and 8 of the '902 patent, which read as follows:

Claim 5: The optoelectronic structural element according to claim 1, wherein said casing has a recess formed therein and an emission-permeable window part disposed in said recess.

Claim 6: The optoelectronic structural element according to claim 5, wherein said foundation is formed of an emission-impermeable material, said chip carrier part is partially encased by said foundation, and said optoelectronic chip is disposed in said recess.

Claim 7: The optoelectronic structural element according to claim 5, wherein said recess has a cross-section widening in its course from inside said casing toward an outside of said casing.

Claim 8: The optoelectronic structural element according to claim 7, wherein said foundation has inner surfaces defining said recess and said inner surfaces are reflectors for an emission transmitted by said optoelectronic chip and an emission to be received by said optoelectronic chip.[284]

Independent claim 1 of the '321 patent is asserted, which reads as follows [with disputed claim terms in **bold** and *italics*]:

Claim 1: A surface-mountable light-emitting diode structural element comprising:

a ***lead frame*** having a chip carrier part, three separate external connections, and a ***connection part*** disposed at a distance from said chip carrier part, said three separate external connections extending outward in three different directions, starting from said chip carrier part;

a light-emitting semiconductor chip ***heat-conductively connected*** to said chip carrier part of said ***lead frame***, said light-emitting semiconductor chip having an electrical contact ***electrically conductively connected*** to said ***connection part***; and

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[283] CX-4, col. 7:32-63.
[284] CX-4, col. 8:9-25.

a casing having a foundation encasing said chip carrier part, said ***connection part*** and partial areas of said three separate external connections, said foundation having a first main surface, a recess formed therein, and an outward facing second main surface disposed opposite said first main surface, said three separate external connections and said ***connection part*** project outside of said casing, said three separate external connections and said ***connection part*** being bent outside of said foundation toward said outward-facing second main surface of said foundation and in a further course being further bent one of below said foundation toward a center of said outward-facing second main surface and away from said foundation for forming rocker-shaped connection stumps, said three separate external connections projecting from said casing on at least two sides of said casing at different places at a distance from each other, said heat-conducting connections as seen in a top view of said ***lead frame*** projecting from said casing on at least two sides and starting from said chip carrier part run toward the outside in a ***stellate form*** within said casing and separately from each other, and said light-emitting semiconductor chip disposed in said recess.[285]

Also at issue are dependent claims 5, 6, 7, and 8 of the '321 patent, which read as follows:

Claim 5: The light-emitting diode structural element according to claim 1, including an emission-permeable window part disposed in said recess.

Claim 6: The light-emitting diode structural element according to claim 5, wherein said foundation is formed of an emission-impermeable material.

Claim 7: The light-emitting diode structural element according to claim 5, wherein said recess has a cross-section widening in its course from inside said casing toward an outside of said casing.

Claim 8: The light-emitting diode structural element according to claim 7, wherein said foundation has inner surfaces defining said recess and said inner surfaces are reflectors for an emission transmitted by said light-emitting semiconductor chip and an emission to be received by said light-emitting semiconductor chip.[286]

Independent claim 1 of the '580 patent is asserted, which reads as follows [with disputed claim terms in **bold** and *italics*]:

Claim 1: A surface-mountable light-emitting diode structural element, comprising:

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[285] CX-5, col. 7:31-8:17.
[286] CX-5, col. 8:31-46.

a ***lead frame*** having a chip carrier part, at least three separate external connections, and a ***connection part*** disposed at a distance from said chip carrier part, said at least three separate external connections extending outward in three different directions, starting from said chip carrier part;

a light-emitting semiconductor chip being ***heat-conductively connected*** to said chip carrier part of said ***lead frame***, said light-emitting semiconductor chip having an electrical contact being ***electrically conductively connected*** to said ***connection part***; and

a casing encasing said chip carrier part, said ***connection part***, and portions of said at least three separate external connections, said casing having a first main surface, a second main surface disposed opposite said first main surface and side surfaces;

said at least three separate external connections and said ***connection part*** projecting outside of said casing;

said at least three separate external connections projecting from said casing on at least two of said side surfaces of said casing at different places at a distance from each other;

said at least three separate external connections configured for simultaneously lying on and being mounted on a connection or a plate; and

said at least three separate external connections, as seen in a top view of said ***lead frame*** starting from said chip carrier part, running separately outward in a ***stellate form*** within said casing.[287]

Also at issue are dependent claims 5, 6, 7, 8, 10, and 11 of the '580 patent, which reads as follows:

Claim 5: The light-emitting diode structural element according to claim 1, wherein: said casing has a recess formed therein and an emission-permeable window part disposed in said recess.

Claim 6: The light-emitting diode structural element according to claim 5, wherein said casing has a foundation formed of an emission-impermeable material.

Claim 7: The light-emitting diode structural element according to claim 5, wherein: said casing has an inside and an outside; and said recess defines a cross-section widening from

[287] CX-6, col. 7:32-63.

said inside of said casing toward said outside of said casing.

Claim 8: The light-emitting diode structural element according to claim 7, wherein: said casing has a foundation formed with inner surfaces defining said recess; said inner surfaces serve as reflectors for an emission that will be transmitted by said light-emitting semiconductor chip and for an emission that will be received by said light-emitting semiconductor chip.

Claim 10: The light-emitting diode structural element according to claim 1, wherein: starting from said chip carrier part, said at least three separate external connections run apart within said casing first in a stellate form and then break to perpendicularly penetrate said side surfaces.

Claim 11: The light-emitting diode structural element according to claim 1, wherein: said casing has a foundation; said at least three separate external connections and said connection part being bent outside of said foundation toward said second main surface and in a further course being bent in a manner selected from a group consisting of being bent below said casing toward a center of said second main surface and being bent away from said casing for forming rocker-shaped connection stumps.[288]

The analysis will generally focus on the '902 patent as representative of the Lead Frame Patents because they all claim priority from the same underlying application and all three patents share a common specification.

a. "Lead Frame"

Osram construes the claim term "lead frame" as "a structure that is capable of providing electrical and thermal functions."[289] Dominant construes "lead frame" as "the metallic skeleton or skeletal metal structure of a semiconductor device."[290] The Staff also construes "lead frame" as "the skeletal metal structure of a semiconductor component."[291]

Both Dominant and Staff base their claim construction on the testimony from Osram's

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[288] CX-6, col. 8:10-47.

[289] CIB 158; Bar-Cohen, Tr. 721, 724-25.

[290] RRB 82.

[291] SIB 31; CX-1302C (Bar-Cohen Direct) at 4; Bar-Cohen, Tr. 6-11; McAlexander, Tr. 577; CX-1301C (Waitl Direct) at 2-3.

expert, Dr. Bar-Cohen, who stated the following in his written direct testimony:

Q. What are lead frames?

A. The skeletal metal structure of a semiconductor component.[292]

Osram asserts that Dominant and Staff's reliance on Dr. Bar-Cohen's direct testimony regarding the lead frame is misguided because the question that was posed to Dr. Bar-Cohen in his direct testimony was merely directed towards the identification of the lead frame and that Dr. Bar-Cohen's more detailed rebuttal testimony describes the function of the lead frame which should govern claim construction.[293] Osram further asserts that Dr. Bar-Cohen's rebuttal testimony clarifies this point because he stated that the testimony he gave during his direct statement was true only in a narrow sense.[294]

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[292] CX-1302C (Bar-Cohen Direct), at 4-5.

[293] CRB 105; CX-1302C (Bar-Cohen Direct) at 3; Bar-Cohen, Tr. 715-17.

[294] At trial, Dr. Bar-Cohen testified as follows, when referring to the definition of lead frames given in his direct witness testimony:

Q. There towards the middle you define lead frames. The question says: What are lead frames? And you answer: The skeletal metal structure of a semiconductor component. Do you see where I'm reading?

A. Yes.

Q. Is that a true statement?

A. That is a true statement in the narrow sense. And in dealing with the terminology used in packaging, we often encounter a situation where a term is used progressively to mean different things. So when one purchases a lead frame, that is precisely the definition that I used here. It is a metal skeleton around which a package is formed.

Those of ordinary skill in the art very often will refer to a lead frame in the completed package to -- in a way that includes the wire bond, that includes any other connections that might be made internally, so as to provide the structure that

(continued...)

Osram asserts that its claim construction incorporates the primary function of the lead frame, which is to provide power and ground functions as well as heat flow.[295] In other words, the function of the lead frame is to conduct electricity to the chip and to conduct heat away from the chip.[296] Osram asserts that Dominant and Staff's claim constructions are too narrow and ignores the plain language and intent of the Lead Frame Patents.[297] Osram cites to the first limitation of claim 1 of the '902 patent in support, which requires:

> a lead frame having a chip carrier part, external connections, and a connection part disposed at a distance from said chip carrier part, at least three of said external connections being heat-conducting connections thermally conductively connected to said chip carrier part.[298]

Osram also cites to the specification, which states that

> the chip carrier part **2** with the external connections **4, 5, 6** serves in this case as both a cathode connection and as a thermal connection for heat conduction away from the LED chip **1**.[299]

Osram argues that if a "lead frame" only refers to a skeletal metal structure that does not include a chip or any other components, such as a wire bond, then no external connections would conduct heat or be thermally conductively connected to the chip carrier part.[300]

Staff is opposed to Dr. Bar-Cohen's broader rebuttal testimony definition of lead frame

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[294](...continued)
delivers power to the package, provides the ground planes, and brings signals in and out as would occur in a VLSI chip, although not in a particular package. VLSI chip, very large scale integration.

Bar-Cohen, Tr. 276-77.

[295] CIB 158-59; Bar-Cohen, Tr. 715, 719-20; SX-1 at § 8.3.

[296] CRB 107.

[297] CRB 107.

[298] CX-4, col.7:34-39.

[299] CX-4, col. 4:63-67.

[300] CRB 106.

because it is inconsistent with his previous testimony and contradicts the direct testimony of Dr. Waitl, who is Osram's Senior Director for Backend Technology.[301] Dr. Waitl testified that:

> Q. What do you mean by lead frame?
>
> A. Basically, the lead frame is the internal metal structure of the device. The LED chip is mounted on the lead frame.[302]

In addition, Staff argues that Osram's broader construction, as set forth by Dr. Bar-Cohen, of "lead frame" is contradicted by certain prior art references cites, such as the Electronic Materials Handbook, which graphically depicts the lead frame as separate from the wire bond and die attach portions of an electronic package.[303] In addition, the Staff cites to the specification in support:

> The lead frame consists of a chip carrier part with external connections and a connection part disposed at a distance from the latter, thus electrically insulated from it.[304]

Similarly, Dominant opposes Dr. Bar-Cohen's broader rebuttal testimony definition of lead frame because it is contrary to: (1) his own prior written direct testimony, (2) his own prior live trial testimony on cross-examination and re-direct examination,[305] (3) the written direct testimony of Dr. Waitl, (4) the Microelectronics Packaging Handbook, and (5) the express language of the Lead Frame Patents.[306]

Osram criticizes Staff's arguments, including its reliance on the Electronic Materials Handbook, arguing that another prior art reference, the Microelectronics Packaging Handbook, supports its own arguments because it explicitly states that the functional requirements of a lead

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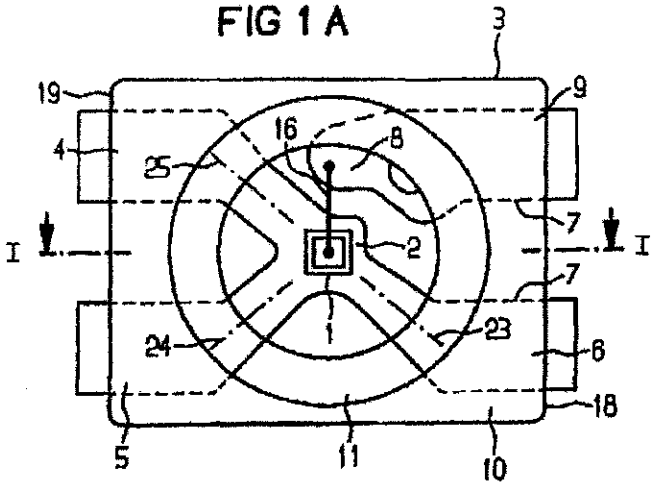
[301] SIB 32.
[302] CX-1301C (Waitl Direct) at 3.
[303] SIB 33; SX-2 at Fig 1 on page 483 and Fig. 7 on page 487.
[304] CX-4, col. 1:39-42.
[305] Bar-Cohen, Tr. 206, 233, 277.
[306] RRB 78.

frame include an electrical and thermal conductor from chip to board.[307]

The underlying dispute between the parties is whether the term "lead frame" should include the glue dot and wire bond on Dominant's Power DomiLED device. Under Osram's claim construction, the "lead frame" would include both the glue dot and the wire bond. Under Dominant's and Staff's claim construction, the "lead frame" would not include either the glue dot or the wire bond.

Although the parties cite to various extrinsic evidence, such as prior art references, the undersigned finds that it is not necessary to look at the extrinsic evidence because the meaning of the claim term "lead frame" can be determined by looking at intrinsic evidence only, specifically the claim language and the specification. The undersigned does not find Osram's arguments to be persuasive. The claim language itself, along with the specification, supports Dominant's and Staff's claim construction of the term "lead frame." Figure 1A of the '902 patent is depicted below:

FIG 1 A



The written description of Figure 1A states that

[307] CRB 106, SX-1 at § 8.3.

> The structural element has a light emitting semiconductor chip **1** (LED chip) attached to a chip carrier part **2** of a lead frame **7** by a good heat-conducting material, for example by metal soldering. Three separate external connections **4, 5, 6** extend outwards in three different directions, starting from the chip carrier part **2**. At a distance from the chip carrier part **2** with the external connections **4, 5, 6**, a connection part **8** with an external connection **9** is disposed, which is connected with an electrical contact of the LED chip **1**, e.g., with anode contacting, by use of a bond wire **16**.[308]

The first limitation of claim 1 of the '902 patent claims a "lead frame having a chip carrier part, external connections, and a connection part disposed at a distance from said chip carrier part."[309] The specification similarly defines a lead frame as consisting of "a chip carrier part with external connections and a connection part disposed at a distance from the latter."[310] There is nothing in the claims or the specification that supports Osram's broader definition of the term "lead frame" to include a glue dot or a wire bond. Accordingly, the term "lead frame" is construed as "the skeletal metal structure of a semiconductor component."

b. "Connection Part"

Osram construes the term "connection part" as "a lead not connected to the chip carrier part."[311] Dominant construes the term "connection part" as a "lead frame lead having an external connection disposed at a distance from the part of the lead frame to which the chip is attached."[312] Staff construes the term "connection part" as "a portion of the lead frame that is disposed at a distance from, and thus is not physically connected to, the chip carrier part of the lead frame."[313]

Accordingly to the Osram, there does not appear to be much dispute between Osram and

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[308] CX-4, col. 4:49-59.
[309] CX-4, col.7:34-39.
[310] CX-4, col. 1:39-42.
[311] CIB 159; CX-1302C (Bar-Cohen Direct), at 9-11.
[312] RIB 137; CX-4, col. 4:44-5:30, 7:34-36, Figure 1A; RDX-4; RX-447C (McAlexander Supplemental Direct) at 1.
[313] SIB 33; CX-4, col. 1:17-19, Figure 1A.

Dominant regarding how to construe the term "connection part" because both parties cite to the same part of the specification in support:

> [a]t a distance from the chip carrier part **2** with the external connections **4, 5, 6**, a connection part **8** with an external connection **9** is disposed, which is connected with an electrical contact of the LED chip1, e.g., with anode contacting, by use of a bond wire **16**.[314]

The Staff cites to the claim language itself (a connection part disposed at a distance from said chip carrier part),[315] along with a different part of the specification, which states "the lead frame has a connecting part disposed at a distance from the chip carrier part which is connected with an electrically conducting electrical contact of the optoelectronic chip."[316]

According to Dominant, there does not appear to be much dispute between Dominant and Staff regarding how to construe the term "connection part" because both parties construe "connection part" as a portion of a lead frame that is disposed at a distance away from the chip carrier part. Dominant disagrees with Osram's claim construction as being contrary to the express language of the Lead Frame patents.[317]

As both parties agree with the Staff's construction and because the Staff's construction of the term "connection part" best conforms with the actual language of the claim, it is hereby adopted. Accordingly, the term "connection part" is construed as "a portion of the lead frame that is disposed at a distance away from the chip carrier part."

c. "Heat-Conductively Connected"

Osram construes the term "heat-conductively connected" as "connected to provide a path of

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[314] CX-4, col. 4:54-59.
[315] CX-4, col.7:34-39.
[316] SIB 33-34; CX-4, co. 1:17-19.
[317] RRB 82.

low thermal resistance."[318] Dominant construes the term "heat-conductively connected" as "connected by a good heat-conducting material for heat conduction."[319] Staff construes the term "heat-conductively connected" as "the connection of the LED chip to the chip carrier part of the lead frame in such a way that the conduction of heat away from the chip is facilitated, not hindered."[320]

Osram asserts that the term "heat-conductively connected" is used to described the connection between the chip and the chip carrier part. Osram asserts the object of the invention is to transfer heat from one point to another and that in order to effectively transfer heat from the chip to the chip carrier part there should be as little resistance as possible between the heat source and the ambient (the surroundings of the LED package to which the heat is transferred).[321]

Osram uses an example to demonstrate its point. Assume there is a gold door. Gold is generally known as a good heat conducting material. But if the door is really thick, then the thickness of the door will prevent an effective flow of heat from one side of the door to the other, resulting in a path of high thermal resistance, even though gold is usually a good heat conducting material. If the door is thin, then heat will effectively flow from one side to the other, which is path of low thermal resistance. Osram asserts that only focusing on the property of the connective material would be inaccurate and that both the material and the geometry of the path must be considered.[322]

Osram further asserts that its claim construction is supported by the Lead Frame Patents. For example, the Lead Frame Patents do not discuss the use of the wire bond, which is usually made of

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[318] CIB 160; CX-1302C (Bar-Cohen Direct) at 12-14.

[319] RRB 83; RX-448C (McAlexander Direct) at 12; RX-461C (McAlexander Rebuttal) at 4.

[320] SIB 34.

[321] CIB 160;CX-1302C (Bar-Cohen Direct) at 12-14.

[322] CIB 160; Bar-Cohen, Tr. 250;CX-1302C (Bar-Cohen Direct) at 13-14.

gold, to thermally connect the connection part to the chip because the wire bond's small cross-section and long-length provides poor thermal conductivity.[323]

The Staff is generally in agreement with Osram's claim construction.[324] The Staff acknowledges that there is no express definition of the term "heat-conductively connected" in the specification, but asserts that the term is evident from the object of the invention, which is to provide an optoelectronic structural element with improved heat conduction from the chip to avoid the problems of high heating. According to the Staff, to a person of ordinary skill in the art, the thermal conductivity of a connection is a function of both the thermal properties of the materials used and the dimensions, such as area and thickness, of the material used. For example, the use of a good thermal conductor to bond the chip is not sufficient to ensure a good thermal conduction. And the use of a bond material that is not a good thermal conductor may result in a good thermal connection depending on the dimensions of the connection.[325]

Dominant asserts that the Lead Frame Patents define the term "heat-conductively connected" as being a "good heat-conducting material, for example by metal soldering."[326] Dominant does not dispute that the object of the invention is to successfully and effectively remove heat from the LED source.[327] According to Dominant, in order to successfully transfer heat from a concentrated heat source, it is important to use materials that are good heat conductors.[328] Therefore, Dominant asserts that one of ordinary skill in the art would understand "heat-conductively connected" to mean

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[323] CIB 161; CX-1302C (Bar-Cohen Direct) at 14.
[324] CRB 108.
[325] SIB 34; CX-1302C (Bar-Cohen Direct) at 13-14.
[326] RIB 137; CX-4, col. 4:50-52, 7:40-43, Figure 1A.
[327] RIB 137-38; CX-4, col. 2:11-15; CX-1302C (Bar-Cohen Direct) at 13.
[328] RIB 138; Low, Tr. 489-90.

"connected by a good heat-conducting material for heat conduction."[329]

The underlying dispute between the parties is whether the term "heat-conductively connected" should be focused on the material that is being used to provide the thermal resistance, *i.e.* such as the glue dot on Dominant's Power DomiLED device, or whether the focus should be on the way the material is being used, *i.e.* that the layer of glue dot is relatively thin. Under Osram's claim construction, although glue normally does not provide a path of low thermal resistance, because the glue dot layer is thin, it provides a path of low thermal resistance. Under Dominant's claim construction, glue would not meet the claim limitation because it is considered to have a lower thermal conductivity than gold, silver, copper or other pure metals.[330]

The undersigned finds that, although the specification describes the structural element as having "a light-emitting semiconductor chip **1** (LED chip) attached to a chip carrier part **2** of a lead frame **7** by a good heat-conducting material," the claim language itself does not describe "heat-conductively connected" in terms of any particular material.[331] In interpreting particular limitations within each claim, it is improper to add "limitations to claims not required by the claim terms themselves."[332] Requiring the claim term "heat-conductively connected" to be made from a good heat-conducting material would be improperly adding a limitation to the claim.

Accordingly, the term "heat-conductively connected" is construed as "connected to provide heat conduction away from the chip."

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[329] RIB 138.

[330] CIB 161; Bar-Cohen, Tr. 257; CX-1302C (Bar-Cohen Direct) at 14-15; CX-1313C (Bar-Cohen Rebuttal) at 2; Low, Tr. 490; McAlexander, Tr. 547-48; CX-194C; CDX-42.

[331] CX-4, col. 4:50-52, 7:40-43.

[332] *Dayco Prod.*, 258 F.3d at 1327, *citing Laitram*, 163 F.3d at 1347 ("a court may not import limitations from the written description into the claims").

d. "Thermally Conductively Connected"

The claim term "thermally conductively connected" only appears in the '902 patent. Osram construes the term "thermally conductively connected" as "connected to provide a path of low thermal resistance."[333] This is the same construction Osram's proposed for the claim term "heat-conductively connected," as Osram maintains that, for the purposes of achieving an object of the invention (namely, the transfer of heat from one point to another), that there is no difference between the two terms.[334] Dominant construes the term "thermally conductively connected" as "three connections that are good thermal or heat conductors."[335] The Staff does not take a position on this claim term.[336]

Osram asserts that the term "thermally conductively connected" is used to described the connection between the chip carrier part and the external connections. Osram asserts that the object of the invention is to transfer heat from one point to another and than in order to effectively transfer heat from the chip carrier part to the external connections, there should be as little resistance as possible between the heat source and the ambient (the surroundings of the LED package to which the heat is transferred).[337] Osram's argument regarding "thermally conductively connected" is the same for its argument regarding "heat-conductively connected"; namely, that one cannot consider only the material being used, but must consider the material, along with the material's dimensions,

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[333] CIB 160; CX-1302C (Bar-Cohen Direct) at 12-14.

[334] CIB 160.

[335] RIB 138; RX-448C (McAlexander Direct) at 12; RX-447C (McAlexander Supplemental Direct) at 3; RDX-11; RX-479C (Arndt depo) at 51.

[336] Staff does, however, construe the term "heat-conducting connections" as "external connections of the lead frame." SIB 35.

[337] CIB 160;CX-1302C (Bar-Cohen Direct) at 12-14.

in determining whether it is thermally conductive.[338]

Dominant agrees with Osram that the "heat-conducting connections thermally conductively connected to said chip carrier part" facilitates the conduction of heat away from the LED chip.[339] Dominant opposes Osram's claim construction because it includes any connection that enables any heat conduction whatsoever.[340] Dominant's position is that the claim term is described as a part of the lead frame and specifically modifies the manner in which the metal leads are connected to the chip carrier part; namely, that the connections assure that heat conduction from the chip is improved.[341] Dominant states that the testimony of Mr. Ardnt, the inventor of the Lead Frame Patents, supports its position because Mr. Ardnt testified that the improved heat conduction of the invention is provided because the three external connections are "one piece" with the chip carrier part.[342]

The undersigned finds that, for the same reason "heat-conductively connected" should not be construed as requiring any particular material, "thermally conductively connected" should not be construed as requiring any particular material because to do so would improperly add a limitation to the claim. The undersigned also finds that there is no limitation in the claim that requires the three external connections to be "one piece" of metal and no such limitation will be read into the claim. It is entirely possible to have a lead frame with at least three external connections being heat-conducting connections thermally conductively connected the chip carrier part without being made out of one piece of metal. In addition, the undersigned finds that it is not necessary, as Dominant

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[338] CRB 108-09; Bar-Cohen, Tr. 250.
[339] RIB 138-39; CX-4, col. 2:11-18, 53-65; 4:52-67, Figure 1A.
[340] RIB 139.
[341] RRB 84; CX-4, col. 2:11-16.
[342] RX-479C (Ardnt depo) at 51.

proposes, to include the term "three connections" when construing "thermally conductively connected" because it is apparent from the express language of the claims that the "heat-conducting connections thermally conductively connected" to the chip carrier part is referring to the at least three external connections because the term "at least three" directly precedes "thermally conductively connected" (***at least three*** of said external connections being heat-conducting connections ***thermally conductively connected*** to said chip carrier part).

Accordingly, the term "thermally conductively connected" is construed as "connected to provide thermal conduction away from the chip carrier part."

e. "Electrically Conductively Connected"

Osram construes the term "electrically conductively connected" as "connected to provide a path of low electrical resistance."[343] Dominant construes the term "electrically conductively connected" as "connected by an electrical conductor for electrical conduction."[344] Staff does not take a position on this claim term.

Osram asserts that the term "electrically conductively connected" is used to described how the chip is connected to the connection part. Osram asserts the object of the invention is to conduct electricity from the connection part to the chip.[345] Osram states that, while the material used for conduction is important, without a path of low electrical resistance, the object of the invention cannot be achieved. Therefore, Osram asserts that the actual electrical connection is less important

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[343] CIB 161; CX-1302C (Bar-Cohen Direct) at 11.

[344] RIB 140; RX-448C (McAlexander Direct) at 12-13; RX-447C (McAlexander Supplemental Direct) at 1; RX-461C (McAlexander Rebuttal) at 3; RDX-9.

[345] CIB 161; CX-1302C (Bar-Cohen Direct) at 11; CX-4, col. 34:55-59.

than the effectiveness of the flow of electricity.[346] Osram's argument regarding "electrically conductively connected" is similar to its argument regarding "heat-conductively connected" and "thermally conductively connect"; namely, that one cannot only consider the material being used, but must consider the path of the material in determining whether it is electrically conductive.

Dominant describes "electrically conductively connected" not as an attribute of the chip, but as an attribute of the type of material between the chip and the connection part, with the chip deriving a benefit from the material used.[347] Dominant asserts that their claim construction is consistent with the specification which discloses that "[a]t a distance from the chip carrier part **2** with the external connections **4, 5, 6,** a connection part **8** with an external connection **9** is disposed, which is connected with an electrical contact of the LED chip **1,** e.g., with anode contacting, by use of a bond wire **16**."[348] Dominant opposes Osram's claim construction because it does not describe any particular connection and only describes a path of low electrical resistance. According to Dominant, the claims expressly discuss the electrical connection, not the electrical resistance.[349]

The undersigned finds that, for the same reason "heat-conductively connected" and "thermally conductively connected" should not be construed as requiring any particular material, "electrically conductively connected" should not be construed as requiring any particular material because to do so would improperly add a limitation to the claim.

Accordingly, the claim term "electrically conductively connected" is construed as "connected to provide electrical conduction away from the connection part."

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[346] CIB 161-62; CX-1302C (Bar-Cohen Direct) at 12.
[347] RIB 140; RX-448C (McAlexander Direct) at 12-13.
[348] CX-4, col. 4:54-59.
[349] RIB 140; RX-448C (McAlexander Direct) at 12-13; CX-1302C (Bar-Cohen) at 12.

f. "Stellate Form"

Claims 1 of the '902 and '321 patents use the claim term "stellate form" in the context of "said heat-conducting connections as seen in a top view of said lead frame projecting from said casing on at least two sides and starting from said chip carrier part run toward the outside in a ***stellate form***," while claim 1 of the '580 patent uses it in the context of "said at least three separate external connections, as seen in a top view of said lead frame starting from said chip carrier part, running separately outward in a ***stellate form***."

There are three main disputes between the parties regarding the claim construction of this claim limitation. The first is the actual meaning of the term "stellate form." The second is whether stellate form describes the lead frame or the entire LED package. The third is whether the at least three heat-conducting or external connections must start at the chip carrier part.

Osram construes the term "stellate form" as "widely distributed relative to the central point consisting of the chip carrier part."[350] Osram concedes that the term "stellate" by itself, in the abstract, means "star-shaped."[351] Osram argues, however, that construing "stellate form" as "star-shaped" is inaccurate when considering the purpose of the Lead Frame Patents and in view of the specification.[352] Osram asserts that the primary purpose of the Lead Frame Patents is to provide a package that would be able to successfully handle a high-powered optoelectronic device and successfully carry the heat away from the device to the printed circuit board.[353] Osram cites to the following three portions of the specification in support regarding the purpose of the invention:

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[350] CIB 162.
[351] CRB 111.
[352] CRB 111.
[353] CIB 162;Bar-Cohen, Tr. 242-43.

A) It is accordingly an object of the invention to provide an optoelectronic structural element that overcomes the above-mentioned disadvantages of the prior art devices of this general type, in which improved heat conduction from the chip is assured, without at the same time substantially altering the housing dimensions and without at the same time substantially increasing delamination danger.[354]

B) In the structural element according to the invention, it is provided for the chip carrier part to have at least three separate thermally conducting external connections connected with the chip carrier part which project from the casing at different places at a distance from each other and are configured so that they all simultaneously lie on the connection or lead plate in the assembled state of the structural element provided for mounting the structural element. The heat resulting in the chip in the operation of the structural elements is consequently fed into the lead plate at three different points and is distributed on a broad surface of the latter. A distinctly improved heat conduction from the optoelectronic chip is thereby obtained.[355]

C) Especially large soldering pads are provided on the lead plate provided for the assembly of the structural element in order to attain a further improvement in heat transfer from the LED chip 1. They are also disposed in the stellate form and can thus distribute the heat conducted from the LED chip 1 over a large surface. The lead frames 7 of the structural elements according to the invention conduct the heat from the LED chip 1 in the stellate form to the outside of the casing 3. The heat is thereby fed to points in the plate lying far from each other.[356]

Osram asserts that reference (B) teaches that there be at least three separate thermally, or heat conducting external connections, connected with the chip carrier part, and that they project from the casing at different places at a distance from each other.[357] Osram also asserts that reference (C) clearly addresses the dissipation of heat from the chip the printed circuit board at widely distributed points.[358]

Dominant construes the term "stellate form" as "star-shaped."[359] Dominant asserts that

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[354] CX-4, col. 2:12-18.
[355] CX-4, col. 2:53-65.
[356] CX-44, col. 7: 6-15.
[357] CIB 164; Bar-Cohen, Tr. 245-46.
[358] CIB 163; Bar-Cohen, Tr. 243-44; CX-1302C (Bar-Cohen Direct) at 15-16.
[359] RIB 143; RX-448C (McAlexander Direct) at 13-14; RX-447C (McAlexander Supplemental Direct) at 2; Bar-Cohen, Tr. 201; RDX-38.

Osram's expert, Dr. Bar-Cohen, admitted that the term "stellate" means "star-shaped":

> Q. [Y]ou agree with me, do you not, that the word itself stellate means star shaped, right?
>
> A. I would agree.[360]

According to Dominant, "stellate form" describes the lead frame, not the entire LED package, and the at least three external connections must start from the said chip carrier part, and therefore cannot be disposed at a distance from the chip carrier part.[361] Dominant argues that Osram's claim construction avoids an essential requirement recited in the Lead Frame Patents; namely that the "stellate form" specifically refers to the shape of the lead frame itself where at least three external connections each start at or originate from the chip carrier part and run outward.[362] Dominant asserts that Osram's claim construction avoids any construction of the term "starting from said chip carrier part."[363] Osram counters that it does not believe the term needs to be construed because it should be given its ordinary meaning, which is that the "heat conducting connections start from the chip carrier part."[364] Dominant cites to the following portions of the specification in support:

> In a particularly preferred form of the structural element according to the invention, the external connections of the chip carrier part, in a top view of the lead frame, run separately from each other in an essentially stellate form, starting from the chip carrier part. The heat conduction points from the structural element to the lead plate thereby present large distances from each other, whereby a very large-surface distribution of the thermal energy derived from the chip in the operation of the structural element is conducted away by way of the chip carrier part and its external connections.
>
> The external connections in the area in which they run outward in a star shape advantageously present longitudinal central axes, wherein two adjacent connections always

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[360] Bar-Cohen, Tr. 201.
[361] RIB 141; RRB 84; RX-448C (McAlexander Direct) at 13.
[362] RIB 144; RX-448C (McAlexander Direct) at 13-14.
[363] RIB 142; CX-1302C (Bar-Cohen Direct) at 9-17.
[364] CRB 109.

present an angle of about 90° to each other. In this configuration, the plastic area between the connections is maximum, whereby the delamination danger is reduced, for example in the case of temperature fluctuations.[365]

According to Osram, Dominant, by its claim construction, is implying that the lead frame must be one contiguous piece of metal, which is improperly reading a limitation from the specification into the claims.[366] Osram also alleges that Dominant's claim construction is essentially limiting the shape of the lead frame as depicted in Figure 1A, which is contrary to established case law.[367] Dominant does not dispute that Figure 1A is the only embodiment of the asserted claims.[368]

Osram also argues that Dominant's reliance on the above passage ignores the doctrine of claim differentiation. Specifically, Osram argues that the language from the specification that is cited above does not appear in any of the asserted claims of the Lead Frame Patents, but that the language is found in claim 9 (an unasserted claim) of the '580 patent. Osram argues that, because claim 10 in the '580 patent contains the word "stellate," and that because claim 9 in the '580 patent does not contain the word "stellate," the claims are presumed to be different in scope.[369]

Staff construes the term "stellate form" as "arranged or shaped like a star."[370] According to the Staff, the term "stellate" is not a term of art; therefore, it should be given its ordinary meaning.

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[365] CX-4, col. 2:66-3:16.

[366] CRB 110.

[367] CRB 110. *See Kinik Co. v. U.S. Int'l Trade Comm'n*, 362 F.3d 1359, 1364-65 (Fed. Cir.2004) ("When the specification describes the invention in broad terms, accompanied by specific embodiments, the claims are generally not restricted to the specific examples or the preferred embodiments unless that scope was limited during prosecution), *Prima Tek II, L.L.C. v. Polypap S.A.R.L.*, 318 F.3d 1143, 1149 (Fed. Cir. 2003) (the mere fact that the patent drawings depict a particular embodiment of the patent does not operate to limit the claims to that specific configuration).

[368] CRB 84. RFF 5.2; Bar-Cohen, Tr. 200.

[369] CRB 112-13.

[370] SIB 35.

The Staff cites to Webster's Dictionary, which defines "stellate" as "arranged or shaped like a star."[371] In addition, the Staff argues that the claim specifically requires that the stellate form of the heat-conducting connections be visible from the top of the lead frame, not from the top of the entire package, which supports Staff's position that "stellate form" refers to the lead frame, not the entire LED package.[372]

While it is true that Osram's claim construction of "widely-distributed points" can describe something in a "stellate form," Osram's claim construction is too broad. Case law clearly establishes that it is improper to read an express limitation out of the claims.[373] Although Osram asserts that the purpose of the invention is to successfully carry the heat away from the device, Osram does not provide any explanation why a lead frame that is in a stellate form, which is precisely what is claimed, does not fulfil the purpose of the invention.

As to Osram's claim differentiation argument, while there is presumed to be a difference in meaning and scope when different words or phrases are used in separate claims, "[t]he doctrine of claim differentiation is not a hard and fast rule of claim construction"[374] and "that the claims are presumed to differ in scope does not mean that every limitation must be distinguished from its counterpart in another claim, but only that at least one limitation must differ."[375] Something that is "star-shaped" may not necessarily have two points of at least three points that "define an angle of

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[371] WEBSTER'S II NEW RIVERSIDE UNIVERSITY DICTIONARY, 1136 (1994).

[372] SIB 35.

[373] *See Warner-Jenkinson*, 520 U.S. at 29; *see also Texas Instruments*, 988 F.2d at 1171 (claim construction rejected that would "render the disputed claim language mere surplusage" and "read an express limitation out of the claims").

[374] *Comark Communications, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998); *Tandon Corp. v. U.S. Int'l Trade Comm'n*, 831 F.2d 1017, 1023 (Fed. Cir. 1987).

[375] *Kraft Foods, Inc. v. International Trading Co.*, 203 F.3d 1362, 1368 (Fed. Cir. 2000).

about 90° with respect to each other," so the claims are different enough to satisfy the doctrine of claim differentiation.

The undersigned also agrees that the term "stellate" is not a term of art and that the patent does not indicate that the inventor intended stellate to mean anything other than its ordinary meaning. In addition, the specification specifically uses the term "star shape" to describe the external connections for one of the preferred embodiments. Even though the specification is referring to a different preferred embodiment than referenced for the asserted claims, there is no indication that the inventor intended the term "stellate form" to be construed differently among the different preferred embodiments. Therefore, the use of the term "star-shaped" in the specification is consistent with the ordinary meaning of "stellate" and further supports the undersigned's claim construction.[376]

The undersigned finds the arguments of Dominant and Staff regarding the other two issues persuasive as well. The claim limitation specifically states that the "heat-conducting connections" or "external connections" "of said lead frame" "start[ ] from said chip carrier part" "in a stellate form." The claim limitation is clear on its face that, when the claim limitation is describing the "stellate form" it is referring to the shape of the "lead frame." The claim limitation is also clear on its face that, the at least three "heat-conducting connections" or "external connection" must start from the chip carrier part. Osram's arguments regarding these other two issues are equally untenable as their arguments regarding "stellate form."

Accordingly, the term "stellate form" is construed as "star-shaped." Within in the context

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[376] "The external connections in the area in which they run outward in a **star shape** advantageously present longitudinal central axes, wherein two adjacent connections always present an angle of about 90° to each other." CX-4, col. 3:10-13 (emphasis added).

of the asserted claims, "stellate form" describes the shape of the lead frame, which has at least three external connections which must start at, rather than be disposed from, the chip carrier part.

B. Infringement

Osram asserts that Dominant's Power DomiLED ("PDL") family of products infringes the Lead Frame Patents, either literally, or by equivalence.[377] Dominant and Staff disagree that the Power DomiLEDs infringes, either literally or by equivalence.[378] Osram examines how each claim limitation asserted in the Lead Frame Patents is literally infringed by Dominant's Power DomiLEDs.[379] According to Osram, with the exception of three claim terms (namely "thermally conductively connected," "starting at the chip carrier part," and "stellate form"), Dominant's Power DomiLED infringes all other limitations and elements of claim 1 of the Lead Frame Patents under either Osram's or Dominant's claim constructions.[380]

Dominant asserts that its Power DomiLEDs do not literally infringe the Lead Frame Patents because they do not have (1) a lead frame having a chip carrier part, external connections, and a connection part disposed at a distance from said chip carrier part, at least three of said external connections being heat-conducting connections thermally conductively connected to said chip carrier part or (2) said three heat-conducting connections as seen in a top view of the lead frame starting from said chip carrier part and run toward the outside in a stellate form within said casing and separately from each other.[381] Dominant does not dispute that its Power DomiLEDs literally infringe

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[377] CIB 165.
[378] RIB 146-59; SIB 36-38.
[379] CIB 165-80.
[380] CIB 182.
[381] RIB 146.

other claim limitations.[382]

An x-ray picture and a schematic of Dominant's Power DomiLED is depicted below in RX-50C at 8 and CX-397C:

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[ ]

The main dispute between the parties concerns one of the leads in the Power DomiLED that is bonded to the chip carrier part with silver epoxy glue, shown in the top right hand corner.

1. Infringement of the '902 Patent

a. Claim 1

(1) An optoelectronic surface-mountable structural element (SMD), comprising

Osram asserts that it is undisputed that the Power DomiLED is an optoelectronic surface mountable structural element.[383] Therefore the Power DomiLED contains all the limitations contained in the preamble to claim 1 and literally infringes this portion of claim 1.

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[382] RIB 147-54.

[383] CIB 165; CFF 1072; ROCFF 1072 (no response); SOCFF 102 (no objection); CX-198C;CDX-32; CX-1302C (Bar-Cohen Direct) at 18-19.

(2) A lead frame having a chip carrier part, external connections, and a connection part disposed at a distance from said chip carrier part

Osram asserts that it is undisputed that the Power DomiLED literally infringes the first limitation of claim 1 under both Osram's and Dominant's claim construction.[384] Specifically, Osram asserts that the Power DomiLED has a lead frame;[385] a chip carrier part (which is the portion of the lead frame to which the chip is attached); external connections or leads that extend from the chip carrier part; and a connection part, or a lead that supplies power to the chip, disposed at a distance from the chip carrier part.[386] Therefore the Power DomiLED contains all the limitations contained in this part of the first limitation to claim 1 and literally infringes this portion of claim 1.

(3) At least three of said external connections being heat-conducting connections thermally conductively connected to said chip carrier part

As previously discussed in the claim construction section, the term "thermally conductively connected" only appears in the '902 patent, so the discussion as to infringement regarding this claim limitation only covers the '902 patent. Osram asserts that Dominant's Power DomiLED infringes the claim element "at least three of said external connections being heat-conducting connections thermally conductively connected to said chip carrier part."[387] Dominant disagrees.[388] The Staff does not appear to take a specific position on this issue.[389]

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[384] CIB 165.

[385] CX-198C.

[386] CX-196C; CX-264; CX-265; CX-397C; CX-177C; McAlexander, Tr. 540:8-23; RX-449C (Low Direct) at 6, 10; CX-1302C (Bar-Cohen Direct) at 21, 26-27, 42.

[387] CIB 166.

[388] RIB 147.

[389] SIB 36.

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]390 Osram asserts that this glue dot is part of the fabricated lead frame 391 [ ]392

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Osram relies on two sets of tests performed on Dominant's Power DomiLED. The first set involved infrared photography taken by Osram employee, Karlheinz Arndt, and relied upon by Dr. Bar-Cohen.[396] The second set involved thermal characterization testing performed by Drs. Peter Rogers and Michael Pecht at the University of Maryland, which Dr. Bar-Cohen also relied on in formulating his infringement opinion.[397]

For the first set of tests, lead 2 is the lead that is bonded to the chip carrier part with silver epoxy glue, lead 4 is the connection part, and leads 3 and 5 are the other external connections. The

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[390] McAlexander, Tr. 547:16-548:5; CX-1302C (Bar-Cohen Direct) at 29-31; CX-397C; CX-264; CX-194C; CDX-42; CX-1313C (Bar-Cohen Rebuttal) at 2.

[391] Bar-Cohen, Tr. 241:16-20.

[392] CX-194C; CDX-42; CX-1302C (Bar-Cohen Direct) at 29; CX-1313C (Bar-Cohen Rebuttal) at 2.

[393] Low, Tr. 490:2-6; McAlexander, Tr. 547:4-548:2.

[394] CX-1313C (Bar-Cohen Direct) at 2.

[395] CIB 167.

[396] CX-266; CX-1302C (Bar-Cohen Direct) at 34.

[397] CX-263; CX-1302C (Bar-Cohen Direct) at 36; Bar-Cohen Tr., 255.

test results show that there was significant heating on leads 3 and 5 (24.4-24.5°C), practically no heating at lead 4 (23.1°C), with lead 2 having heating in between these two temperatures (23.7°C).[398]

For the second set of tests, two specific tests were performed: one involved all four leads of Dominant's Power DomiLED being soldered onto a standard printed circuit board, the other involved lead 2 not being soldered onto the printed circuit board to ensure that the heating of lead 2 during the first test was not affected by the heating of leads 1 and 3, by heating of the encapsulant or any heat that was conducted by leads 1 and 3 to the circuit board.[399] For these tests, lead 2 is the lead that is bonded to the chip carrier part with silver epoxy glue, lead 4 is the connection part, and leads 1 and 3 are the other external connections. For the first test, leads 1 and 3 had the highest temperature, lead 4 had the lowest, and lead 2 was somewhere in between.[400] For the second test, lead 2 had the highest temperature of all the other leads. Osram argues that the test results prove that lead 2 could not have been warmed by the surrounding encapsulant, the other leads or the printed circuit board.[401]

Although Osram readily acknowledges that lead 2, the lead with the glue dot, does not heat up as much as the other two leads, Osram argues that there is no requirement in the Lead Frame Patents that the heat-conducing leads must conduct heat at the same temperature.[402] Osram also argues that there is no requirement in the Lead Frame Patents that the heat-conducting leads be part of one piece of lead frame.[403] Therefore, according to Osram, lead 2 in Dominant's Power DomiLED

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[398] *See* CX-266, slide 3; Bar-Cohen, Tr. 263-65.
[399] CX-263; CX-1302C (Bar-Cohen Direct) at 38-39; CDX-49; Bar-Cohen, Tr. 222.
[400] CX-263; CX-1302C (Bar-Cohen Direct) at 38-39; CDX-49; Bar-Cohen, Tr. 222.
[401] CIB 172; CX-263; CDX-50; CX-1302C (Bar-Cohen Direct) at 39-40; Bar-Cohen, Tr. 223.
[402] CIB 169-170; CRB 124; CX-1302C (Bar-Cohen Direct) at 40; Bar-Cohen, Tr. 258-59.
[403] CIB 173.

conducts heat away from the chip carrier part and the claim limitation is met.[404]

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][405]

Dominant asserts that its Power DomiLED only has two leads that are "heat-conducting connections thermally conductively connected to said chip carrier part" and that the other two leads are disposed at a distance away from the portion of the lead frame to which the chip is attached.[406] Dominant asserts that lead 2, the lead with the glue dot, is there to provide an electrical connection, not a thermal connection.[407] In addition, Dominant argues that the glue dot is not part of the lead frame, nor does it dissipate heat. [

][408] As for Osram's tests, Dominant argues that the test results show that lead 2 functions differently than the other two leads which are connected to the chip carrier part, because lead 2 does not perform as well as a thermal conductor than the other two leads that are connected to the chip carrier part.[409]

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[404] CIB 173.

[405] CX-407C; Low, Tr. 495-96.

[406] RIB 147; Low, Tr. 494-95; RX-449C (Low Direct) at 7-11; RX-448C (McAlexander Direct) at 17-20; RX-461C (McAlexander Rebuttal) at 2-6; RX-447C (McAlexander Supplemental Direct) at 2; RDX-6.

[407] RIB 147; RX-448C (McAlexander Direct) at 17-18.

[408] RIB 149; Low, Tr. 494-95.

[409] RIB 150; CX-263; Bar-Cohen, Tr. 212-25; RX-448C (McAlexander Direct) at 18-22;

(continued...)

The undersigned has construed that the term "lead frame" as "the skeletal metal structure of a semiconductor component." Based on this claim construction, the [ ] glue is not considered as part of the lead frame. Because the glue dot is not part of the lead frame and [

] Therefore Osram's argument that lead 2 is [

] and therefore "connected" is unpersuasive and rejected. The claim limitation requires that the at least three external connections be heat-conducting connections thermally conductively connected to said chip carrier part. [

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Therefore the Power DomiLED does not contains all the limitations contained in this part of the first limitation to claim 1. Even if only one claim limitation is not met, there can be no literal infringement.[410] Accordingly, the Power DomiLED does not literally infringe claim 1 of the '902 patent. As all the other asserted claims of the '902 patent depend on claim 1 and it has been found that the Power DomiLED does not literally infringe claim 1 of the '902 patent, the Power DomiLED does not literally infringe the remaining asserted claims of the '902 patent.

(4) An optoelectronic chip heat-conductively connected to said chip carrier part of said lead frame, said optoelectronic chip having an electrical contact electrically conductively connected to said connection part

Osram asserts that it is undisputed that the Power DomiLED literally infringes the second

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[409](...continued)
RX-461C (McAlexander Rebuttal) at 4-6.

[410] *Mas-Hamilton Group v. LaGard, Inc.*, 156 F.3d 1206, 1211 (Fed. Cir. 1998).

limitation of claim 1 under its claim construction.[411] Specifically, Osram asserts that the Power DomiLED contains an optoelectronic chip;[412] that the chip is connected to the chip carrier part by a thermally conductive silver epoxy glue, through which heat is transferred from the chip to the chip carrier part;[413] that the chip is "electrically conductively connected" to the connection part, in that not only is there a bond wire that supplies power to the chip, but there is also a path of low electrical resistance between the LED chip and the connection part.[414] According to Osram, electricity must be effectively transferred to the chip in the Power DomiLED or the device would not function properly. In the alternative, Osram asserts that the Power DomiLED infringes the second limitation of claim 1 under Dominant's construction of the term "electrically conductively connected" because there is no dispute that the connection part is connected to the chip by an electrically conductive wire bond.[415] Based on the undersigned's claim construction of the term "electrically conductively connected," the Power DomiLED contains all the limitations contained in the second limitation to claim 1 and literally infringes this portion of claim 1.

> (5) **A casing having a foundation encasing said optoelectronic chip and a part of said lead frame, said foundation having a first main surface and an outward facing second main surface disposed opposite said first main surface, said external connections and said connection part project outside of said casing**

Osram asserts that it is undisputed that the Power DomiLED literally infringes this portion of

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[411] CIB 174.

[412] CFF 1194; ROCFF 1194 (no response); SOCFF 1194 (no objection); CX-198C.

[413] Low, Tr. 490:2-6; McAlexander, Tr. 547:4-548:2; Bar-Cohen, Tr. 257:6-9; CX-194C; CDX-42; CX-1302C (Bar-Cohen Direct) at 29; CX-1313C (Bar-Cohen Rebuttal) at 2.

[414] CX-1302C (Bar-Cohen Direct) at 42.

[415] CFF 1138; CX-397C; CX-264; CX-265; McAlexander, Tr. 540:8-17; CX-1302C at 26-27, 42.

the third limitation of claim 1.[416] [

]417 [

]418 [

]419 Therefore the Power DomiLED contains all the limitations contained in this part of the third limitation to claim 1 and literally infringes this portion of claim 1.

(6) Said external connections and said connection part being bent outside of said foundation toward said outward-facing second main surface of said foundation and in a further course being further bent one of below said foundation toward a center of said outward-facing second main surface and away from said foundation for forming rocker-shaped connection stumps

Osram asserts that it is undisputed that the Power DomiLED literally infringes this portion of the third limitation of claim 1.[420] [

]421 Therefore the Power DomiLED contains all the limitations contained in this part of the third limitation to claim 1 and literally infringes this portion of claim 1.

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[416] CIB 174.

[417] CFF 1139; ROCFF 1139 (no response); SOCFF 1139 (no objection); CX-397C; CX-407C; McAlexander, Tr. 540:24-541:4; CX-1302C (Bar-Cohen Direct) at 43.

[418] CFF 1140; ROCFF 1140 (no response); SOCFF 1140 (no objection); CX-407C; CX-265; CDX-56; CX-1302C (Bar-Cohen Direct) at 46-47.

[419] CFF 1142; ROCFF 1142 (no response); SOCFF 1142 (no objection); CX-407C; CX-397C; CX-396C; CX-265; CDX-57; CDX-41; CX-1302C (Bar-Cohen) at 49-50.

[420] CIB 175.

[421] CFF 1143; ROCFF 1143 (no response); SOCFF 1143 (no objection); CX-407C; CX-397C; CX-265; McAlexander Tr., 541:14-21; CX-265; CX-1302C at 49.

(7) Said at least three of said external connections projecting from said casing on at least two sides of said casing at different places at a distance from each other

Osram asserts that it is undisputed that the Power DomiLED literally infringes this portion of the third limitation of claim 1.[422] [

]. [423] Therefore the Power DomiLED contains all the limitations contained in this part of the third limitation to claim 1 and literally infringes this portion of claim 1.

(8) Said heat-conducting connections as seen in a top view of said lead frame projecting from said casing on at least two sides and starting from said chip carrier part run toward the outside in a stellate form within said casing and separately from each other

The majority of Osrams' discussion on infringement regarding this claim limitation is based on its claim construction of the term "stellate form" which was not adopted, so it will not be addressed here.[424] Osram also discusses, in the alternative, infringement based on Dominant's claim construction of the term "stellate form." Osram argues that, even under Dominant's claim construction, Dominant's Power DomiLED infringes because infringement is not limited by a preferred embodiment.[425] Osram argues that when you compare CX-397C with Figure 1A of the '902 patent, leads 1, 2, and 3 extend from the chip carrier part in virtually the same directions, as shown by drawing three distinct lines in three separate directions on CX-397C:

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[422] CIB 175.

[423] CFF 1144; ROCFF 1144 (no response); SOCFF 1144 (no objection); CX-407C; CX-397C; CX-396C; CX-265; CDX-57; CDX-41; CX-1302C at 49-50.

[424] CIB 175-78.

[425] CIB 178.

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CX-397C (as modified by lines)

CIB 180.[426]

[

][427] Osram also argues again that there is no requirement in the specification or the claims that the heat-conducting leads be one piece of contiguous metal.[428]

Dominant argues that its Power DomiLED contains four leads: two that start at the chip carrier part and two that do not because they are disposed at a distance away from the chip carrier part–in other words, not touching and not contiguous to the chip carrier part.[429] Dominant argues that the two leads that are disposed at a distance are only electrically, but not thermally connected to the chip carrier part.[430] In addition, the glue dot is not part of the lead frame.[431] In support, Dominant points

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[426] Bar-Cohen, Tr. 272-75; McAlexander, Tr. 547-48; CX-1302C (Bar-Cohen Direct) at 31; CX-397; CX-264.

[427] CIB 180.

[428] CIB 180.

[429] RIB 151; Low, Tr. 494-95; RX-449C (Low Direct) at 7-11; RX-448C (McAlexander Direct) at 17-20; RX-461C (McAlexander Rebuttal) at 2; RX-447C (McAlexander Supplemental Direct) at 2; RDX-6.

[430] RIB 151-52; Low, Tr. 494-95; RX-449C (Low Direct) at 7-11; RX-448C

(continued...)

to RX-50, which is an x-ray of the Power DomiLED lead frame.[432] Osram objects to the use of this x-ray because it does not show a finished LED, which is what the claim is directed towards.[433] Dominant also argues that, not only does the Power DomiLED not have at least three external connections that start from the chip carrier part, but that the external connections do not run outwards in a stellate form.[434]

The Staff's position is that Dominant's Power DomiLED does not infringe the Lead Frame Patents because it does not meet the "stellate form" limitation. Specifically, the lead frame portion of Dominant's Power DomiLED does not have at least three external connections that start from the chip carrier part and run separately outward in a star-shaped pattern. Dominant's Power DomiLED only has two external connections that run outward from the chip carrier part and the other two external connections are disposed at a distance from the chip carrier part. One of the external connection is attached to the chip carrier part by a glue dot.[435]

While it is true that there is no requirement in the specification or the claim that the heat-conducting leads be one piece of contiguous metal, the claim limitation specifically states that at least three heat-conducting leads or external connections must start from the chip carrier part and run separately outward in a stellate form. Lead 2 does not start from the chip carrier part because it is

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[430](...continued)
(McAlexander Direct) at 17-20; RX-461C (McAlexander Rebuttal) at 2-6; RX-447C (McAlexander Supplemental Direct) at 2; RDX-6.

[431] RIB 154; McAlexander, Tr. 577-79; CX-1302C (Bar-Cohen Direct) at 4; SX-1.

[432] RIB 152.

[433] CRB 117-20.

[434] RIB 153; Low, Tr. 494-95; McAlexander, Tr. 536-37; RX-449C (Low Direct) at 7-11; RX-448C (McAlexander Direct) at 17-20; RX-461C (McAlexander Rebuttal) at 2-6; RX-447C (McAlexander Supplemental Direct) at 2; RX-50; RDX-6.

[435] SIB 36; Bar-Cohen, Tr. 208-09; CX-265, CX-397C, CX-407C, CX-1302C (Bar-Cohen Direct) at 31.

connected to the chip carrier part with the glue dot. Osram's argument that lead 2 "starts at the chip carrier part" as a result of the "bond" between the lead and the chip carrier part created with the glue dot is unpersuasive and rejected because "bond" is not synonymous with the term "start." Therefore, the Power DomiLED does not have at least three external connections that start from the chip carrier part; it only has two external connections that start from the chip carrier part. And these two external connections do not run separately outward in a star-shaped pattern as they run separately outward as a line.

Therefore the Power DomiLED does not contain all the limitations contained in this part of the third limitation to claim 1. Even if only one claim limitation is not met, there can be no literal infringement.[436] Accordingly, the Power DomiLED does not literally infringe claim 1 of the '902 patent, claim 1 of the '321 patent, and claim 1 of the '580 patent. As all the other asserted claims of the Lead Frame Patents depend on claims 1 of the Lead Frame Patents and it has been found that the Power DomiLED does not literally infringe claims 1 of the Lead Frame Patents, the Power DomiLED does not literally infringe the remaining asserted claims of the Lead Frame Patents as well.

b. Infringement of Claim 1 Under the Doctrine of Equivalents

Osram asserts that, in the event that the undersigned does not find literal infringement and adopts Dominant's claim construction, that Dominant's product infringe under the doctrine of equivalents. The specific claim elements that Osram asserts are infringed by the doctrine of equivalents include three heat-conducting connections "thermally conductively connected to the chip carrier part," "starting at the chip carrier part," and "run toward the outside in a stellate form." Osram argues that only insubstantial differences exist between the lead structure of Dominant's Power

[436] *Mas-Hamilton,* 156 F.3d at 1211.

DomiLED and the preferred embodiment of the Lead Frame Patents, Figure 1A.[437] Osram asserts that the lead frame structure of the Power DomiLED and the preferred embodiment perform substantially the same function, in substantially the same way, to obtain substantially the same result.[438] Dominant and the Staff assert that the Power DomiLEDs do not infringe under the doctrine of equivalents, contributorily or by inducement.[439] A side by side comparison of the Power DomiLED and Figure 1A is provided below:

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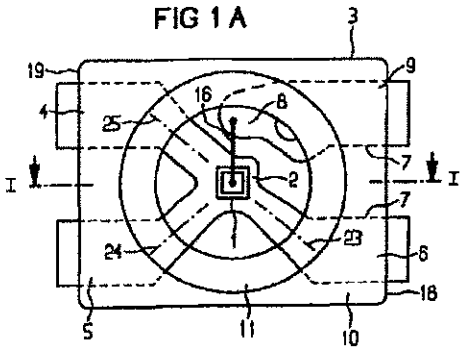

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CX-4, Figure 1A CX-397C

Osram argues that the function of the lead frame in the Power DomiLED and Figure 1A are substantially the same, which is to conduct heat away from the LED chip to the far corners of the device so that the heat can be dissipate more effectively.[440] Osram also argues that the functions of the lead frame in the Power DomiLED and Figure 1A are obtained in substantially the same way–specifically, that the lead frame provides three external connections with paths of low thermal and electrical resistance from the chip carrier part by spreading separately to three separate corners

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[437] CRB 129.
[438] CRB 130.
[439] RIB 155-58; SIB 37.
[440] CRB 130; CX-1313C (Bar-Cohen Rebuttal) at 3.

of the device.[441] Osram further argues that the end result of the lead frame in the Power DomiLED and Figure 1A are the same, which is to cool the LED chip and to improve the device's overall reliability and performance.[442]

Osram repeats many of its previously asserted arguments. [

][443] Osram argues that the Dominant has merely divided a single component, as shown in the preferred embodiment, into two components, which is a recognized paradigm of an insubstantial difference.[444] Osram also repeats its previously asserted arguments that its testing on infrared photography and thermal characterization to show that the function of Dominant's Power DomiLED is substantially same as the preferred embodiment.[445]

Dominant argues that based on Osram's own testing, lead 2, the lead with the glue dot, conducts heat in a different manner than the asserted claims because it conducts substantially less heat.[446] Dominant argues that, even if lead 2 performs a similar function, it does not perform the function in substantially the same way or achieve substantially the same result because lead 2 is only electrically connected, not thermally conductively connected to the chip carrier part.[447]

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[441] CRB 132-33; CX-1313C (Bar-Cohen Rebuttal) at 3-4.

[442] CRB 135; CX-1313C (Bar-Cohen Rebuttal) at 4.

[443] CIB 183; McAlexander, Tr. 547-48; CX-194C; CX-263; CX-266; CX-1302C (Bar-Cohen Direct) at 30-31; CX-.97C; CX-264; CX-1313C (Bar-Cohen Rebuttal) at 2-3.

[444] CRB 130; *see Toro Co. v. White Consol. Indus., Inc.*, 266 F.3d 1367, 1370 (Fed. Cir. 2001) (if an accused infringer has simply separated into two components what the patentee has claimed as one component, a fact finder might indeed find such a change "insubstantial").

[445] CIB 185; CX-263; CX-266; CX-1302C (Bar-Cohen Direct) at 6, 35-36, 38-40.

[446] RIB 157; CX-263C; Bar-Cohen, Tr. 212-25.

[447] RIB 157; CX-263C, Bar-Cohen, Tr. 212-251; RX-448C (McAlexander Direct) at 21-

Dominant asserts that Osram has specifically excluded from the scope of its patents, any products having less than three external connections that start at the chip carrier part and run outward in a stellate form because to do so would be to use the doctrine of equivalents to read out an express limitation of the claim.[448] Dominant asserts that the Power DomiLED only has two external connections that start at the chip carrier part which, by itself, is substantially different than having three external connections. Furthermore, Dominant asserts that the two external connections extend in parallel directions to one another, not in a stellate form, which is another substantial difference.[449]

Staff asserts that the Power DomiLED does not infringe under the doctrine of equivalents because it has not been shown that the lead frame in Dominant's Power DomiLED performs in substantially the same way and achieves substantially the same result as the lead frame claimed in the Lead Frame Patents. Staff asserts that the heat-dissipation in the Power DomiLED lead frame is primarily due to [ ][450] Osram counters this argument by arguing that it is improper to consider the thickness of the lead frame because the thickness of the lead frame is not described anywhere, nor claimed anywhere in the Lead Frame Patents. Specifically, Osram asserts that it is improper to compare Dominant's Power DomiLED with Osram's Power TopLED, [ ], because infringement is measured from comparison with the claims, not by comparing against other commercial devices.[451]

Staff also asserts that the thermal characterization analysis testing performed by Dr. Bar-

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[447](...continued)
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[448] RIB 155; *Warner-Jenkinson*, 520 U.S. at 29.

[449] RIB 156; Bar-Cohen, Tr. 230; RX-448C (McAlexander Direct) at 21-22.

[450] SIB 37; Low, Tr. 494, 503.

[451] CRB 135; *see Zenith Labs., Inc. v. Bristol-Myers Squibb Co.*, 19 F.3d 1418, 1423 (Fed. Cir. 1994).

Cohen on Dominant's Power DomiLED and Osram's Power TopLED product is not reliable because the two products tested were not comparable: the Power DomiLED contained a red LED chip, while the Power TopLED contained a blue chip which can greatly differ in terms of composition, efficiency and thermal characteristics.[452] Staff also asserts that even looking at Dr. Bar-Cohen's thermal characterization analysis, the testing does not support the conclusion that the Power DomiLED achieves substantially the same result as that disclosed in the Lead Frame Patents because the testing shows that the noncontiguous lead of the Power DomiLED does not dissipate heat as well as the external leads of the Power TopLED.[453] The Staff argues that the temperature of lead 2 (with the glue dot) is closer to lead 4 (the connection part), than the other two leads that start from the chip carrier part.[454] Osram counters Staff's argument by arguing that the bare temperatures do not tell the whole story and that to get the most accurate understanding of lead 2's structure is from the thermal testing where lead 2 is not soldered onto the printed circuit board.[455]

The undersigned finds that Osram's argument regarding whether the Power DomiLED infringes, under the doctrine of equivalents, the claim limitation that at least three external connections are "thermally conductively connected to the chip carrier part," to be persuasive. The test results show that lead 2, the lead in the Power DomiLED with the glue dot, dissipates heat. Although it doesn't dissipate as much heat as the two leads that start directly from the chip carrier part, it dissipates more heat than lead 4, the connection part.

The function of the external connections (except the connection part) is to dissipate heat away

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[452] SIB 37; CX-263 at 1, 3; CX-12 at OS117386, OS117610; CX-19 at OS120914; CX-1301 (Waitl Direct) at 25.

[453] SIB 37; Bar-Coyhen, Tr. 221.

[454] SIB 37-38.

[455] CRB 134.

from the chip. The way that function is achieved is by transferring the heat from the chip carrier to the external connections, which leads to the result of cooling the chip down. Although the Power DomiLED achieves this function in a slightly different way than the preferred embodiment because two of the leads start directly from the chip carrier part, while the other lead is connected to the chip carrier part with a glue dot, the difference appears to be insubstantial in the context of the patent. While Dominant and Staff argue that the reason that the Power DomiLED does not malfunction even though lead 2 does not dissipate any heat is because of [ ], they have not provided any test data to back up such a theory. The undersigned agrees with Osram that comparison of respondent's device to complainant's device is improper for infringement purposes, *i.e.* comparing the thickness of the Power DomiLED to the Power TopLED.

The undersigned is not in agreement with Dominant's argument that the three external connections must be one piece of contiguous metal in order to meet the claim limitation, as previously stated in construing the claim limitation "thermally conductively connected."[456] As stated above, Osram's argument that dividing a claimed component into two components can be considered an insubstantial difference is persuasive. But there is a huge difference between the language of the claims. Although the undersigned finds that there is infringement under the doctrine of equivalents for the claim limitation "at least three of ***said external connections being heat-conducting connections thermally conductively connected to said chip carrier part,***" the undersigned cannot find that there is infringement under the doctrine of equivalents for the claim limitation ***"said heat-conducting connections*** as seen in a top view of said lead frame projecting from said casing on at least two sides and ***starting from said chip carrier part*** run toward the outside in a stellate form

[456] *See* section V(A)(1)(d).

within said casing and separately from each other."

Osram cannot avoid its own claim language that requires that at least three external connections must start from the chip carrier part and run outward in a star-shaped pattern. The undersigned finds that it doesn't matter whether the three external connections are made out of one piece, two pieces, three pieces, etc., as long as they start from the chip carrier part. But the Power DomiLED does not have three external connections that start from the chip carrier part; it only has two. And the use of a third lead that is bonded to the chip carrier part with a glue dot constitutes a substantial difference for the purposes of meeting this claim limitation. Not only are there not three external connections, but the connections do not run outward in a star-shaped pattern; they run out in parallel directions. Looking at the schematic of Dominant's PowerDomiLED and Figure 1A in the Lead Frame Patents confirms that the two lead frames are not substantially the same: Figure 1A is star-shaped, while the Power DomiLED is not.

(1) Conclusion

Based on the foregoing, the Power DomiLED does not infringe claim 1 of the '902 patent, claim 1 of the '321 patent and claim 1 of the '580 patent under the doctrine of equivalents. As all the other asserted claims of the Lead Frame Patents depend on claims 1 of the Lead Frame Patents, and it has been found that the Power DomiLED does not infringe claims 1 of the Lead Frame Patents under the doctrine of equivalents, the Power DomiLED does not infringe the remaining asserted claims of the Lead Frame Patents under the doctrine of equivalents as well.

c. Claim 5 - The optoelectronic structural element according to claim 1, wherein said casing has a recess formed therein and an emission-permeable window part disposed in said recess.

Osram asserts that it is undisputed that the Power DomiLED literally infringes claim 5.[457] The Power DomiLED casing has a recess that is filled with an epoxy resin[458] which is clear enough for light from the LED chip to go through.[459] Therefore the Power DomiLED contains all the limitations in claim 5. Claim 5, however, depends from claim 1, and it has been found that the Power DomiLED does not literally infringe, or infringe under the doctrine of equivalents, claim 1 of the '902 patent. Therefore, the Power DomiLED does not literally infringe, or infringe under the doctrine of equivalents, claim 5 of the '902 patent as well.

d. Claim 6 - The optoelectronic structural element according to claim 5, wherein said foundation is formed of an emission-impermeable material, said chip carrier part is partially encased by said foundation, and said optoelectronic chip is disposed in said recess.

Osram asserts that it is undisputed that the Power DomiLED literally infringes claim 6.[460] The Power DomiLED foundation is made of a high reflectivity white color plastic through which light does not pass.[461] The casing of the Power DomiLED is the foundation, plus the filled recess.[462] The

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[457] CIB 191.

[458] CFF 1203; ROCFF 1203 (no response); SOCFF 1203 (no objection); CX-397C; CX-407C; McAlexander, Tr. 541:5-7; CFF 1204; ROCFF 1204 (no response); SOCFF 1204 (no objection); McAlexander, Tr. 541:8-10.

[459] CFF 1205; ROCFF 1205 (no response); SOCFF 1205 (no objection); McAlexander, Tr. 541:11-13; CX-1302C (Bar-Cohen Direct) at 59.

[460] CIB 191.

[461] CFF 1209; ROCFF 1209 (no response); SOCFF 1209 (no objection); CX-404C; RX-449C (Low Direct) at 7-8; CFF 1210; ROCFF 1210 (no response); SOCFF 1210 (no objection); CX-404C; CX-1302C (Bar-Cohen Direct) at 60.

[462] CFF 1211; ROCFF 1211 (no response); SOCFF 1211 (no objection); CX-407C; CX-265; CDX-53; CX-1302C (Bar-Cohen Direct) at 45.

Power DomiLED foundation encases the LED chip.[463] Osram also asserts that the Power DomiLED foundation encases part of the lead frame; Dominant objects based on Osram's construction of the term "lead frame."[464] Therefore the Power DomiLED contains all the limitations in claim 6. Claim 6, however, depends from claim 5, which depends from claim 1, and it has been found that the Power DomiLED does not literally infringe, or infringe under the doctrine of equivalents, claim 1 of the '902 patent. Therefore, the Power DomiLED does not literally infringe, or infringe under the doctrine of equivalents, claim 6 of the '902 patent as well.

e. Claim 7 - The optoelectronic structural element according to claim 5, wherein said recess has a cross-section widening in its course from inside said casing toward an outside of said casing.

Osram asserts that it is undisputed that the Power DomiLED literally infringes claim 5.[465] It is undisputed that the recess in the Power DomiLED foundation widens from the inside to the outside.[466] Therefore the Power DomiLED contains all the limitations in claim 7. Claim 7, however, depends from claim 5, which depends from claim 1, and it has been found that the Power DomiLED does not literally infringe, or infringe under the doctrine of equivalents, claim 1 of the '902 patent. Therefore, the Power DomiLED does not literally infringe, or infringe under the doctrine of equivalents, claim 7 of the '902 patent as well.

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[463] CFF 1212; ROCFF 1212 (no response); SOCFF 1212 (no objection); CX-407C; CX-397C; CX-265; CDX-55; CX-1302C (Bar-Cohen Direct) at 46.

[464] CFF 1213; CX-407C; CX-397C; CX-265; CDX-55; CX-1302C (Bar-Cohen Direct) at 46.

[465] CIB 191.

[466] CFF 1217; ROCFF 1217 (no response); SOCFF 1217 (no objection); CX-407C.

f. Claim 8 - The optoelectronic structural element according to claim 7, wherein said foundation has inner surfaces defining said recess and said inner surfaces are reflectors for an emission transmitted by said optoelectronic chip and an emission to be received by said optoelectronic chip.

It is undisputed that the Power DomiLED foundation is made of a high reflectivity white color plastic, and therefore reflects the light emitted by the chip.[467] Therefore the Power DomiLED contains all the limitations in claim 8. Claim 8, however, depends from claim 7, which depends from claim 5, which depends from claim 1, and it has been found that the Power DomiLED does not literally infringe, or infringe under the doctrine of equivalents, claim 1 of the '902 patent. Therefore, the Power DomiLED does not literally infringe, or infringe under the doctrine of equivalents, claim 8 of the '902 patent as well.

2. Infringement of The '321 Patent

All the elements of infringement of the '321 patent have previously been discussed with regard to the '902 patent and will not be repeated here. The Power DomiLED, therefore, does not literally infringe or infringe under the doctrine of equivalence claim 1 of the '321 patent. As all the other asserted claims of the '321 patent depend on claim 1 and it has been found that the Power DomiLED does not literally infringe or infringe under the doctrine of equivalence claim 1 of the '321 patent, the Power DomiLED does not literally infringe or infringe under the doctrine of equivalence the remaining asserted claims of the '321 patent as well.

3. Infringement of The '580 Patent

All the elements of infringement of the '580 patent have previously been discussed with regard to the '902 patent and will not be repeated here. The Power DomiLED, therefore, does not

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[467] CFF 1221; ROCFF 1221 (no response); SOCFF 1221 (no objection); CX-407C.

literally infringe or infringe under the doctrine of equivalence claim 1 of the '580 patent. As all the other asserted claims of the '580 patent depend on claim 1 and it has been found that the Power DomiLED does not literally infringe or infringe under the doctrine of equivalence claim 1 of the '580 patent, the Power DomiLED does not literally infringe or infringe under the doctrine of equivalence the remaining asserted claims of the '580 patent as well.

C. Domestic Industry - Technical Prong

Osram asserts that its Power TopLED and Advanced Power TopLED products practice at least one claim of each of the three Lead Frame Patents. Specifically, Osram asserts that its Power TopLED and Advanced Power TopLED practice claims 1, 5, 6, 7, and 8 of the '902 patent, claims 1, 5, 6, 7, and 8 of the '321 patent, and claims 1, 5, 6, 7, 8, 10, and 11 of the '580 patent. Pictures and schematics of Osram's Power TopLED are depicted in CX-264, CDX-109, CX-862C, and CDX-112, while pictures and schematics of Osrams' Advanced Power TopLED are depicted in CX-264, CDX-110, CX-828C, CDX-114. Osram analyzes the two LEDs on a claim by claim basis for each asserted claim in the Lead Frame Patents, which is detailed below.

1. The '902 Patent

a. Claim 1

The Power TopLED and Advanced Power TopLED have an optoelectronic chip and are surface mountable.[468] As can be seen in CX-264, both products have lead frames that contain a chip carrier part, external connections, and a connection part.[469] According to [

] which were relied upon by Dr. Bar-Cohen,[

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[468] CX-827C; CX-860C; CX-1302C (Bar-Cohen Direct) at 103.

[469] CX-264; CX-265; CX-828C; CX-862C; CX-1302C (Bar-Cohen Direct) at 105-107; CDX-109, CDX-110, CDX-112 and CDX-114.

][470]

The chip in both the Power TopLED and the Advanced Power TopLED is attached to the chip carrier part [ ][471] In both the Power TopLED and the Advanced Power TopLED the LED chip is electrically connected to the connection part with a wire bond.[472]

The Power TopLED and the Advanced Power TopLED have a casing with a foundation that encases the chip and part of the lead frame.[473] The foundation has a first main surface and a second main surface at the bottom.[474] In both the Power TopLED and the Advanced Power TopLED the leads, or external connections, are bent outside the casing to the bottom of the device.[475] The external connections project from the casing on at least two sides of the casing at different places at a distance from each other.[476] The heat conducting external connections in the Power TopLED and Advanced Power TopLED are widely distributed relative to the chip carrier part.[477]

b. Claim 5

Both the Power TopLED and the Advanced Power TopLED have a recess that is filled with

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[470] CX-266; *see also* CX-263; CDX-115; CDX-116; CX-1302C (Bar-Cohen Direct) at 110-116; RX-479C ([ ] Dep.) at 42:6-9.

[471] CX-1302C (Bar-Cohen Direct) at 116-117; CX-1204C.

[472] CX-851C; CX-830C.

[473] CX-1302C (Bar-Cohen Direct) at 119-120; CX-831C; CX-860C.

[474] CX-1302C (Bar-Cohen Direct) at 120-121; CX-831C; CX-860C.

[475] CX-1302C (Bar-Cohen Direct) at 121; CX-831C; CX-860C.

[476] CX-831C; CX-860C.

[477] *See* CX-862C and CX-828C. *See also* CX-1302C (Bar-Cohen Direct) at 121; CX-264; CDX-113; CDX-114; RX-479C ([ ] Dep.) at 42:21-43:11.

[ ] through which light is emitted.[478]

c. Claim 6

The housings for both the Power TopLED and the Advanced Power TopLED are made from [ ][479]

d. Claim 7

The recesses in both the Power TopLED and the Advanced Power TopLED widen from the inside to the outside.[480]

e. Claim 8

The inner surfaces of the recesses in the Power TopLED and the Advanced Power TopLED are reflective.[481]

2. The '321 Patent

a. Claim 1

The Power TopLED and Advanced Power TopLED have light emitting diodes.[482] Both products have lead frames that contain a chip carrier part, external connections, and a connection part.[483] The leads in the Power TopLED and Advanced Power TopLED extend outward in different directions from the chip carrier part.[484] The chip in the Power TopLED and the Advanced Power TopLED is attached to the chip carrier part [ ], and is

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[478] CX-831C; CX-860C; CX-1302C (Bar-Cohen Direct) at 121.
[479] CX-1202C; CX-1203C; CX-1302C (Bar-Cohen Direct) at 121-122.
[480] CX-831C; CX-860C; CX-1302C (Bar-Cohen Direct) at 124.
[481] CX-831C; CX-860C; CX-1302C (Bar-Cohen Direct) at 124.
[482] CX-860C; CX-1302C (Bar-Cohen Direct) at 124.
[483] CX-264; CX-265; CX-862C; CX-828C; CX-1302C (Bar-Cohen Direct) at 105-107.
[484] CX-831C; CX-860C; CX-1302C (Bar-Cohen Direct) at 124.

electrically connected to the connection part with a wire bond.[485]

The Power TopLED and the Advanced Power TopLED have a casing with a foundation that encases the chip and part of the lead frame.[486] The foundation has a first main surface and a second main surface at the bottom.[487] The leads, or external connections, are bent outside the casing to the bottom of the device.[488] The heat conducting external connections in the Power TopLED and Advanced Power TopLED are widely distributed relative to the chip carrier part.[489]

b. Claim 5

Both the Power TopLED and the Advanced Power TopLED have a recess that is filled with [ ] through which light is emitted.[490]

c. Claim 6

The housings for both the Power TopLED and the Advanced Power TopLED are made from [ ][491]

d. Claim 7

The recesses in both the Power TopLED and the Advanced Power TopLED widen from the inside to the outside.[492]

e. Claim 8

The Power TopLED and the Advanced Power TopLED both have a casing with a foundation

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[485] CX-1302C (Bar-Cohen Direct) at 116-117; CX-1204C;CX-851C; CX-830C.
[486] CX-1302C (Bar-Cohen Direct) at 119-120; CX-831C; CX-860C.
[487] CX-1302C (Bar-Cohen Direct) at 120-121; CX-831C; CX-860C.
[488] CX-1302C (Bar-Cohen Direct) at 121; CX-831C; CX-860C.
[489] CX-1302C (Bar-Cohen Direct) at 121; CX-264; RX-479C ([ ]Dep.) at 42:21-43:11.
[490] CX-831C; CX-860C; CX-1302C (Bar-Cohen Direct) at 121.
[491] CX-1202C; CX-1203C; CX-1302C (Bar-Cohen Direct) at 121-122.
[492] CX-831C; CX-860C; CX-1302C (Bar-Cohen Direct) at 124.

that encases the chip and part of the lead frame.[493] The inner surfaces of the recesses in the Power TopLED and the Advanced Power TopLED are reflective.[494]

3. The '580 Patent

a. Claim 1

The Power TopLED and Advanced Power TopLED have light emitting diodes that are attached to the chip carrier part[ ][495] Both products have at least three separate external connections that extend outward in different directions from the chip carrier part.[496] In both the Power TopLED and the Advanced Power TopLED the LED chip is electrically connected to the connection part with a wire bond.[497]

The Power TopLED and the Advanced Power TopLED both have a casing with a foundation that encases the chip and part of the lead frame.[498] The foundation has a first main surface and a second main surface at the bottom, as well as side surfaces.[499] The external connections in the Power TopLED and the Advanced Power TopLED project from the casing on at least two sides of the casing at different places at a distance from each other, and are [ ][500] The heat conducting external connections in the Power TopLED and Advanced Power TopLED are widely distributed relative to the chip carrier part.[501]

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[493] CX-1302C (Bar-Cohen Direct) at 119-120; CX-831C; CX-860C.
[494] CX-831C; CX-860C; CX-1302C (Bar-Cohen Direct) at 124.
[495] CX-860C; CX-1302C (Bar-Cohen Direct) at 116-17, 124; CX-1204C.
[496] CX-265, CX-862C, CX-828C; CX-831C; CX-860C; CX-1302C (Bar-Cohen Direct) at 107, 124.
[497] CX-851C; CX-830C.
[498] CX-1302C (Bar-Cohen Direct) at 119-120; CX-831C; CX-860C.
[499] CX-1302C (Bar-Cohen Direct) at 120-121; CX-831C; CX-860C.
[500] CX-831C; CX-860C.
[501] CX-1302C (Bar-Cohen Direct) at 121; CX-264; RX-479C ([ ] Dep.) at 42:21-
(continued...)

b. Claim 5

Both the Power TopLED and the Advanced Power TopLED have a recess that is filled with [ ] through which light is emitted.[502]

c. Claim 6

The housings for both the Power TopLED and the Advanced Power TopLED are made from [ ][503]

d. Claim 7

The casing in both the Power TopLED and the Advanced Power TopLED has both an inside and an outside, and the recesses in both products widen from the inside to the outside.[504]

e. Claim 8

The Power TopLED and the Advanced Power TopLED both have a casing with a foundation that encases the chip and part of the lead frame.[505] The inner surfaces of the recesses in the Power TopLED and the Advanced Power TopLED are reflective.[506]

f. Claim 10

The heat conducting external connections in the Power TopLED and Advanced Power TopLED are widely distributed relative to the chip carrier part.[507]

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[501](...continued)
43:11.

[502] CX-831C; CX-860C; CX-1302C (Bar-Cohen Direct) at 121.

[503] CX-1202C; CX-1203C; CX-1302C (Bar-Cohen Direct) at 121-122.

[504] CX-831C; CX-860C; CX-1302C (Bar-Cohen Direct) at 124.

[505] CX-1302C (Bar-Cohen Direct) at 121; CX-264; CX-862C; CX-828C; CDX-113; CDX-114; RX-479C (Arndt Dep.) at 42:21-43:11.

[506] CX-1302C (Bar-Cohen Direct) at 119-120, 124; CX-831C; CX-860C.

[507] CX-1302C (Bar-Cohen Direct) at 121; CX-264; RX-479C ([ ] Dep.) at 42:21-43:11.

g. Claim 11

In both the Power TopLED and the Advanced Power TopLED the leads are bent outside the casing to the bottom of the device.[508]

4. Conclusion as to Technical Prong of Domestic Industry

Dominant and Staff do not contest that Osram's products sold in the United States are covered by the Lead Frame Patents.[509] As Osram's evidence regarding how its Power TopLED and Advanced Power TopLED practice claims 1, 5, 6, 7, and 8 of the '902 patent, claims 1, 5, 6, 7, and 8 of the '321 patent, and claims 1, 5, 6, 7, 8, 10, and 11 of the '580 patent is uncontested, the undersigned hereby finds that Osram has met the technical prong of the domestic industry requirement for the Lead Frame Patents.

D. Validity

There is no dispute among the parties that a person of ordinary skill in the art of the Lead Frame Patents is a person with a bachelors degree in engineering and at least three years of experience in LED packaging, including at least one year of exposure to designing lead frames.[510]

1. Anticipation

a. U.S. Patent No. 5,035,483

Dominant alleges that, if the claims of the Lead Frame Patents are interpreted as broadly as proposed by Osram, then, and only then, is claim 1 of the '902 patent invalid as anticipated based upon the '483 patent.[511] Osram and the Staff disagree that the '483 patent anticipates the Lead Frame

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[508] CX-1302C (Bar-Cohen Direct) at 121; CX-831C; CX-860C.
[509] RIB 167; SIB 42.
[510] CX-1302C (Bar-Cohen Direct) at 9; SFF 126; COSFF 126; ROSFF 126.
[511] RIB 161.

Patents.[512]

Dominant asserts that the '483 patent is prior art under 35 U.S.C. § 102.[513] The '483 patent, entitled "Surface-Mountable Opto-Component" was issued on July 30, 1991 by Guenter Waitl and Franz Schellhorn of Siemens Aktiengesellschaft.[514] As required by 35 U.S.C § 102(b) for anticipation purposes, the '483 patent was published more than one year prior to the date of the application for the Lead Frame Patents.

Specifically, Dominant asserts that if the undersigned adopts Osram's broad claim construction that the term "stellate form" means "widely distributed relative to the central point consisting of the chip carrier part," then the '483 patent anticipates the Lead Frame Patents. The undersigned did not, however, adopt Osram's claim construction for the term "stellate form." Instead, the undersigned adopted Dominant and Staff's claim construction of the term "stellate form" to mean "star-shaped." Because Dominant's argument that the '483 patent anticipates the Lead Frame Patents is based on Osram's claim construction of the term "stellate form," which was not adopted, Dominant's anticipation argument must fail.

Each and every element of a claimed invention must be disclosed in a single prior art reference in order to be anticipatory. Not every element of at least claim 1 of the '902 patent, claim 1 of the '321 patent, and claim 1 of the '580 patent are anticipated by the '483 patent. Accordingly, Dominant has failed to demonstrate, by clear and convincing evidence, that the Lead Frame Patents are invalid as anticipated under 35 U.S.C. § 102(b) by the '483 patent.

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[512] CIB 201-05; SIB 39.
[513] RIB 161.
[514] CX-340.

2. Obviousness

a. U.S. Patent No. 5,035,483

(1) By Itself

Dominant alleges that, if the claims of the Lead Frame Patents are interpreted as broadly as proposed by Osram, then, and only then, is claim 1 of the '902 patent invalid as obvious based upon the '483 patent.[515] Osram and the Staff disagree that the '493 patent, either by itself or in combination with any other references, renders the Lead Frame Patents invalid as obvious.[516] Again, Dominant's argument regarding obviousness is based on the assumption that the undersigned adopts Osram's broad claim construction of the term "stellate form." The undersigned did not, however, adopt Osram's claim construction for the term "stellate form;" therefore Dominant's obviousness argument must fail. In addition, Dominant has presented no evidence of a motivation to combine.

(2) In Combination with U.S. Patent No. 4,843,280

Dominant asserts that the '280 patent to Lumbard and Wiese is prior art.[517] The '280 patent, entitled "A Module Surface Mount Component for an Electrical Device or LEDs" was issued on June 27, 1989 by Marvin Lumbard and Lynn Wiese of Siemens Corporate Research and Support, Inc.[518] As required by 35 U.S.C § 102 for prior art purposes, the '280 patent was published more than one year prior to the date of the application for the Lead Frame Patents.

Osram and the Staff disagree that the '483 patent, in combination with the '280 patent, renders

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[515] RIB 161.
[516] CIB 205-08; SIB 39-40.
[517] RIB 163.
[518] CX-344.

the Lead Frame Patents invalid as obvious.[519] Again, Dominant's argument regarding obviousness is based on the assumption that the undersigned adopts Osram's broad claim construction of the term "stellate form." The undersigned did not, however, adopt Osram's claim construction for the term "stellate form;" therefore Dominant's obviousness argument must fail. In addition, Dominant has presented no evidence of a motivation to combine the '483 patent with the '280 patent.

(3) In Combination with U.S. Patent No. RE. 34,254

Dominant asserts that the RE '254 patent to Dragoon is prior art under 35 U.S.C. § 102(b).[520] The RE '254 patent, entitled "Surface Mounted LED Package" was issued on May 18, 1993 by Daniel Dragoon of Dialight Corporation.[521] As required by 35 U.S.C § 102 for prior art purposes, the RE '254 patent was published more than one year prior to the date of the application for the Lead Frame Patents.

Osram and the Staff disagree that the '483 patent, in combination with the RE '242 patent, renders the Lead Frame Patents invalid as obvious.[522] Again, Dominant's argument regarding obviousness is based on the assumption that the undersigned adopts Osram's broad claim construction of the term "stellate form." The undersigned did not, however, adopt Osram's claim construction for the term "stellate form;" therefore Dominant's obviousness argument must fail. In addition, Dominant has presented no evidence of a motivation to combine the '483 patent with the RE '254 patent.

(4) Conclusion as to Obviousness

Accordingly, Dominant has failed to show, by clear and convincing evidence, that the Lead

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[519] CIB 206-08; SIB 39-40.
[520] RIB 164.
[521] CX-345.
[522] CIB 206-08; SIB 39-40.

Frame Patents are invalid as obvious based on any combinations of the above references.

VI. The '673 Method Patent

A. Claim Construction

Four of the claims of the '673 patent are at issue in this investigation, including independent claim 1, which reads as follows:

Claim 1: A method for manufacturing and mounting onto a printed circuit board a two-pole surface mount technology (SMT) miniature housing in lead frame technique for a semiconductor component, comprising the steps of:

> punching out first and second lead frame parts each having a portion extending into the housing and a leg portion serving as a respective solder terminal running at a right angle to the portion extending into the housing;
>
> mounting a semiconductor chip on the first lead frame part at a flat mounting surface of the chip and contacting the semiconductor chip to the second lead frame part;
>
> encapsulating the semiconductor chip in a housing such that said right-angle leg portions of the lead frame parts forming solder terminals are positioned at two opposite sides of the housing and extend to and terminate at a bottom of the housing serving as a mounting surface, a right angle being provided between said chip flat mounting surface and said housing mounting surface, and wherein during the entire method the lead frame parts and their respective solder terminals are never metallically bent so that no bending stresses are present in the lead frame parts and solder terminals and no stresses resulting from metallic bending are exerted on the housing; and
>
> mounting the housing onto the printed circuit board with the housing mounting surface on a top surface of the printed circuit board, and ends of the solder terminals being soldered at and terminating at the top surface of the printed circuit board.[523]

---

[523] CX-10, col. 3:16 - 4:16.

Also at issue are dependent claims 2, 3, and 5, which read as follows:

Claim 2: The method according to claim 1 wherein the solder terminals have a thickness of approximately 0.2 mm - 0.5 mm.[524]

Claim 3: The method according to claim 1 wherein the semiconductor component comprises and opto-electronic component.[525]

Claim 5: The method according to claim 1 wherein the semiconductor component is a laterally transmitting opto-electronic component, and wherein light is transmitted sideways as opposed to from the above component.[526]

As Dominant has not put forth a defense as to this patent, there are no claim terms in dispute.

B. Infringement

The only accused product that Osram asserts infringes the '673 patent is the Super SmallDomiLED ("SSDL").[527]

1. Claim 1

The SSDL is surface mountable and has two "poles," or solder terminals.[528] The SSDL has first and second lead frame parts and the solder terminals of the SSDL are at right angles to the rest of the respective lead frame parts.[529] A portion of the first and second lead frame parts of the SSDL extends into the housing.[530] The SSDL is singulated, or punched out, from metal strips of lead frames.[531] The punching process requires that pressure be applied by a mechanical process to the

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[524] CX-10, col. 4:17-19.
[525] CX-10, col. 4:20-22.
[526] CX-10, col. 4:27-30.
[527] CIB 213-216.
[528] *See* CX-1302C (Bar-Cohen Direct) at 84-85; CX-373C;CX-203C; CDX-92.
[529] *See* CX-1302C (Bar-Cohen Direct) at 86-88; CX-203C; CX-265; CX-374C; CDX-93; CDX-94.
[530] *See* CX-1302C (Bar-Cohen Direct) at 87-88; CX-374C; CDX-94.
[531] *See* CX-1302C (Bar-Cohen Direct) at 88-91; CX-1137C.

metal strips of lead frames.[532] The SSDL singulation step is performed under pressure by a mechanical process.[533] The chip in the SSDL is mounted on a first lead frame part and is connected to the second lead frame part by a wire bond.[534] The chip in the SSDL is encapsulated in a housing.[535] The solder terminals are on opposite sides of the housing and they terminate at the bottom of the housing, which serves as a mounting surface for the device.[536] At no time during the manufacture of stamping of the lead frame by the outside vendor, or during the assembly of the SSDL by Dominant, are the lead frame parts and their solder terminals bent.[537] Based on the above, Dominant's SSDL literally infringes the first three claim elements of claim 1 of the '673 patent.

As to the fourth and final claim element of claim 1, Osram asserts that Dominant infringes contributorily and/or by inducement because Dominant instructs its customers and distributors, via data sheets and direct communications, how to mount the SSDL onto printed circuit boards.[538] Dominant does not dispute this. Accordingly, Dominant's SSML meets all of the criteria that it infringes contributorily and/or by inducement the fourth element of claim1.

2. Claim 2

The thickness of Dominant's SSDL is approximately 0.2 mm.[539]

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[532] *See* CX-1302C (Bar-Cohen Direct) at 91.
[533] *See* CX-1302C (Bar-Cohen Direct) at 91-92; CX-1289C.
[534] *See* CX-1302C (Bar-Cohen Direct) at 93; CX-374C.
[535] *See* CX-1302C (Bar-Cohen Direct) at 93-94; CX-374C.
[536] *See* CX-1302C (Bar-Cohen Direct) at 94-96; CX-374C.
[537] *See* CX-1302C (Bar-Cohen Direct) at 96.
[538] CIB 215.
[539] *See* CX-1302C (Bar-Cohen Direct) at 100-01; CX-897.

3. Claim 3

The SSDL contains an opto-electronic chip, or and LED.[540]

4. Claim 5

The SSDL is a side looker because it transmits light sideways instead of straight up.[541]

5. Conclusion

Accordingly, based on the foregoing, Dominant's SSDL infringes, either literally, contributorily, and/or by inducement, all elements of claims 1, 2, 3 and 5 of the '673 patent.

C. Domestic Industry - Technical Prong

Osram asserts that its Micro SideLED ("MSL") product satisfies the technical prong of the domestic industry requirement for the '673 patent.[542]

1. Claim 1

The MSL is surface mountable and has two "poles," or solder terminals that are mounted onto, *inter alia*, a printed circuit board.[543] [

][544] The MSL has two lead frame portions, both of which extend outside the housing.[545] The solder terminals in the MSL run at right angles to the portions of the lead frame parts that extend into the housing.[546] The chip in the MSL is mounted onto one of the lead frame parts at a flat mounting surface of the chip and the chip is contacted to the second lead frame part.[547] The chip in the MSL is

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[540] *See* CX-1302C (Bar-Cohen Direct) at 101-02; CX-204C.
[541] *See* CX-1302C (Bar-Cohen Direct) at 102; CX-449C at 3.
[542] CIB 229-231.
[543] *See* CX-1302C (Bar-Cohen Direct) at 125; CX-265.
[544] *See* CX-1302C (Bar-Cohen Direct) at 126-27.
[545] *See* CX-1302C (Bar-Cohen Direct) at 127-28; CX-264; CX-824C.
[546] *See* CX-1302C (Bar-Cohen Direct) at 128; CX-374C; CDX-131; CDX-132.
[547] *See* CX-1302C (Bar-Cohen Direct) at 129-30; CX-824C; CDX-133.

encapsulated in a housing so that the right angle portions of the lead frame parts are at two opposite sides of the housing, which extend outside the housing and terminate at the bottom of the housing.[548]

[

]550

2. Claim 2

The solder terminals of the MSL have a thickness of [ ]551

3. Claim 3

The MSL is an optoelectronic component.[552]

4. Claim 5

The MSL transmits light sideways.[553]

5. Conclusion

Accordingly, based on the foregoing, Osram's MSL practices claims 1, 2, 3 and 5 of the '673 patent. Therefore, the technical prong of the domestic industry of Section 337 is satisfied for the '673 patent.

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[548] *See* CX-1302C (Bar-Cohen Direct) at 130-31; CX-824C; CDX-134.
[549] *See* CX-1302C (Bar-Cohen Direct) at 132; CX-264; CX-265; CX-374C; CX-821C.
[550] *See* CX-1302C (Bar-Cohen Direct) at 132-33; CX-821C; CDX-136.
[551] *See* CX-1302C (Bar-Cohen Direct) at 133.
[552] *See* CX-1302C (Bar-Cohen Direct) at 133; CX-821C.
[553] *See* CX-1302C (Bar-Cohen Direct) at 134.

VII. Domestic Industry - Economic Prong

A. Relevant Law

The term "domestic industry" in Section 337 is not defined by the statute, but the Commission has interpreted the intent of Section 337 to be "the protection of domestic manufacture of goods."[554] The Commission has further stated that "[t]he scope of the domestic industry in patent-based investigations has been determined on a case by case basis in light of the realities of the marketplace and encompasses not only the manufacturing operations but may include, in addition, distribution, research and development and sales."[555]

In making this determination, Section 337(a)(2) provides that for investigations based on patent infringement, a violation can be found "only if an industry in the United States, relating to the articles protected by the patent . . . concerned, exists or is in the process of being established."[556] Section 337(a)(3) sets forth the following economic criteria for determining the existence of a domestic industry in such investigations:

> an industry in the United States shall be considered to exist if there is in the United States, with respect to the articles protected by the . . . patent . . . concerned –
>
> (A) significant investment in plant and equipment;
>
> (B) significant employment of labor or capital; or
>
> (C) substantial investment in its exploitation, including engineering, research and development, or licensing.[557]

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[554] *Certain Dynamic Random Access Memories, Components Thereof and Products Containing Same*, Inv. No. 337-TA-242, U.S.I.T.C. Pub. No. 2034 (November 1987), Commission Opinion at 61, 1987 WL 450856 (U.S.I.T.C., September 21, 1987).

[555] *Id.* at 62 (footnotes omitted).

[556] 19 U.S.C. § 1337(a)(2).

[557] 19 U.S.C. § 1337(a)(3).

As the statute uses the disjunctive term "or," a complainant can demonstrate this so-called "economic prong" of the domestic industry requirement by satisfying any one of the three tests set forth in Section 337(a)(3).[558] The complainant bears the burden of establishing that the domestic industry requirement is satisfied.[559]

Osram is only asserting that it satisfies criterion (C) of Section 337(a)(3). Criterion (C) and the legislative history accompanying its enactment have been held to establish a "simpler test" for domestic industry than those for criteria (A) and (B).[560] In *Microlithographic Machines*, it was held that the economic analyses under criterion C in recent cases involving products produced entirely abroad, or partly in the U.S. and partly abroad, have taken the form of requiring only a sufficient nexus between Osram's domestic activities and investments and the patents at issue.[561] *Microlithographic Machines* makes clear that where a complainant relies on criterion (C) expenditures that are associated with specific products of the complainant, the nexus analysis of its economic prong argument requires a determination that the products at issue are at least sometimes

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[558] *See Certain Plastic Encapsulated Integrated Circuits*, Inv. No. 337-TA-315, U.S.I.T.C. Pub. No. 2574 (November 1992), Initial Determination at 83, 1992 WL 813952 (U.S.I.T.C., October 16, 1991) (unreviewed by Commission in relevant part).

[559] *See Certain Set-top Boxes and Components Thereof*, Inv. No. 337-TA-454, U.S.I.T.C. Pub. No. 3564 (November 2002), Initial Determination at 294, 2002 WL 31556392 (U.S.I.T.C., June 21, 2002), *unreviewed by Commission in relevant part*, Commission Opinion at 2 (August 29, 2002).

[560] *See Certain Microlithographic Machines and Components Thereof*, Inv. No. 337-TA-468, Final Initial Determination at 346 (January 29, 2003), adopted in Notice of Commission Determination Not to Review a Final Initial Determination Finding No Violation of Section 337 and Termination of the Investigation (March 17, 2003); *Certain Home Vacuum Packaging Machines*, Inv. No. 334-TA-496, Initial Determination on Temporary Relief at 141 (December 15, 2003), adopted by the Commission in Notice of Commission Determination Denying a Motion for Temporary Relief (January 15, 2004).

[561] *Microlithographic Machines,* Initial Determination at 347.

covered by the patents at issue.[562] Under these circumstances, the domestic industry analysis under criterion (C) subsumes within it a technical-prong aspect.

B. Economic Prong

Osram asserts that it has made substantial investments in the engineering, research and development of products, such as Osram's white light LEDs (including the Mini TOPLEDs, PointLED, CHIPLED, TOPLEDs, MicroSIDELEDs, Power TOPLEDs, Smart LEDs, and SIDELEDs), that are covered by the Particle Size Patents and the '930 patent.[563] Osram also asserts that it has made substantial investments in its Power TOPLEDs and Advanced Power TOPLEDs that are covered by the Lead Frame Patents.[564] Osram also asserts that it has made substantial investments in its MicroSIDELEDs that are covered by the '673 patent.[565]

The Staff agrees with Osram that the economic prong of domestic industry has been met. As noted by the Staff, the substantiality of Osram's domestic investments relating to the products at issue is evidenced by uncontested witness statements identifying and quantifying Osram's domestic investments relating to the relevant Osram products.[566] The Staff also asserts that the evidence adduced at trial demonstrates that Osram's devices practice the asserted patents, and thus confirms that there is a "sufficient nexus" between the domestic activities and the asserted patents.[567]

Dominant contests Osram's establishment of a domestic industry under criterion (C) as to all of the asserted patents and asserts that the testimony presented is speculative, lacks foundation, is

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[562] *Microlithographic Machines*, Initial Determination at 365-66.
[563] CIB 233.
[564] CIB 241.
[565] CIB 248.
[566] SIB 45.
[567] SIB 45.

largely hearsay (triple hearsay, in fact), not based on personal knowledge of the proffered witness, not supported by the requisite documentary underpinnings, and is therefore unreliable and should be given no weight. Specifically, Dominant argues that [ ] Osram Opto's CFO, did not provide a direct witness statement and was the one who gave the four witnesses providing direct witness statements [ ] expense allocations. Dominant asserts that the expense allocations are double hearsay to [ ] because the expense allocations are based on what unidentified others told him, and that they are triple hearsay to the direct witnesses because the expense allocations were given to the direct witnesses by [ ][568] Osram counters that [ ]swore under oath to the accuracy of the numbers reflected in the expense allocations and that based on his personal knowledge, the expense allocations in CX-135C reflects true and correct compilations of the financial records for Osram Opto Inc and that domestic industry witnesses, who are all managers of the groups, are in the best position to assess whether the expenses incurred by the group is accurate as reflected in CX-135C.[569]

Dominant asserts that a number of the witnesses "double-dipped" expense results.[570] Osram counters that Dominant misunderstands the domestic industry requirement. Osram explains that the domestic industry requirement must be satisfied independently for each of the ten asserted patents. Due to the similarity of some of the patents, Osram divided the patents up into three groups of related patents and then submitted evidence to establish that Osram independently satisfies the domestic

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[568] RIB 172.

[569] CRB 142; Declaration of [ ] in Support of Complainant's Motion for Summary Determination that it has Satisfied the Domestic Industry Requirement; RX-478C at 70-71, 79-803

[570] RIB 178, 182, 186.

industry requirement for each of these three groups of patents.[571] While Dominant combines these investments together, Osram asserts that it is improper to do so, and is not advocating that the undersigned do so, because it would result in double-counting of expenses.[572]

Dominant also asserts that, even if the evidence presented was reliable and substantiated, the expenditures are not substantial given the enormous market opportunity in this field of technology. Specifically, Dominant states that Osram's investment in engineering, research and development are really for sales engineers that perform sales and marketing functions which should not be included when establishing a domestic industry.[573] Osram counters that application engineering work, such as helping customers with thermal design and electrical design, is the type of work that has been considered sufficient in establishing a domestic industry.[574]

Although Dominant argues that Osram's summary documents are unreliable because the underlying reports supporting those documents were not admitted into evidence, Dominant does not point to any specific discovery request for such documents. Even if such a discovery request was made and not provided by Osram, Dominant does not point to any motion to compel for such

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[571] CRB 144.

[572] CRB 145.

[573] RIB 168-69. *See Certain Doxorubicin and Preparations Containing Same*, Inv. No. 337-TA-300, Initial Determination (May 21, 1990) ("The definition of section 337(a)(3) applies to both product and process patents. The legislative history states that '[t]his definition does not require actual production of the article in the United States if it can be demonstrated that substantial investment activities of the type enumerated are taking place in the United States.' H.R.Rep. No. 40, 100th Cong., 1st Sess. 157 (1987); S.Rep. No. 71, 100th Cong., 1st Sess. 129 (1987). It was further stated that '[m]arketing and sales in the United States alone would not, however, be sufficient to meet this test.'" *Id.*) (footnote omitted).

[574] CRB 146; *Certain Integrated Circuits, Processes for Making Same, and Products Containing Same*, Inv. No. 337-TA-450, Initial Determination (May 6, 2002) ("Section 337(a)(3)(C) may include 'application engineering, design work or other such activities.'" *citing* H.R. Rep. 40, 100th Cong., 1st sess., at 157 (1987), and S. Rep. No. 71, 100th Cong., 1st Sess., at 130 (1987)).

documents. In addition, Dominant chose not to cross-examine any of Osram's domestic industry witnesses. In any event, the testimonies are unchallenged, except by attorney argument. And although [ ] was not called as a direct witness, [ ] deposition designations were admitted into evidence, by agreement of the parties.[575] Therefore, without the underlying documents and without any cross-examination of the witnesses, Dominant's challenge to the reliability of these documents and witness statements by attorney argument only is unpersuasive, inadequate, and is rejected.[576]

1. Particle Size Patents and the '930 Patent

Osram asserts that it has made substantial investments in the engineering, research and development of products, such as Osram's white light LEDs, that are covered by the Particle Size Patents and the '930 patent. Specifically, Osram asserts that its United States affiliates, OSRAM Opto Inc. ("Osram Opto") and OSRAM Sylvania Inc. ("Osram Sylvania"), have made substantial investments in engineering, research, and/or development activities related to its white light LEDs. In support, Osram points to three specific business units: [

].[577]

a. [ ]

[ ] is a part of Osram Opto. [ ] is the manager of the [ ] and provided testimony regarding the work that the [ ] performs. [

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[575] *See* RX-478C; Bullock, Tr. 1140.

[576] With respect to Dominant's hearsay objection, hearsay evidence is not *per se* excludable in administrative proceedings but is an argument affecting the weight to be given certain evidence. *Richardson v. Perales*, 402 U.S. 389, 402 (1972); *Peters v. United States*, 408 F.2d 719 (1969).

[577] CIB 233.

] One of the application engineers left in July 2004 [

]578

[

]579

Customers typically purchase LEDs with the intention of replacing a traditional light bulb source in their lighting product. This process requires special know-how because LEDs are not like traditional light bulbs, which have standardized plug-in parts. Therefore, developing an application includes two aspects: first, is the development of the general optical, electrical, and thermal system solutions for LED products; second, is providing customers with support to "design in" or incorporate LEDs into their products, which requires meeting the customer's optical, electrical, thermal and mechanical technical requirements. [

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578 CX-1307C ([ ] Direct) at 2-3.
579 CX-1307C ([ ]Direct) at 4.

]580

Some examples of work that [

]581 [

]582 [

]583 [

]584

Dominant challenges [ ] allocations of time and expenses as speculative because the underlying documents to support the allocations were not introduced as evidence.585 Dominant also challenges [ ] testimony because she does not explain the salary and benefit structures of the persons in the Group whose time she estimates was spent working on the asserted products, [

] among other things.586 The undersigned has already stated above that Dominant's challenges are unpersuasive and are therefore rejected.

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580 CX-1307C ([ ] Direct) at 4-5, 7.
581 CX-1307C ([ ]Direct) at 9; CX-1299C.
582 CX-1307C ([ ] Direct) at 23.
583 CX-1307C ([ ]Direct) at 13, 16, 18.
584 CX-1307C ([ ]Direct) at 20.
585 RIB 179-82.
586 RIB 182.

b. [ ]

[

] [ ] was [

] [ ] is [

] As of May 2004, [

] The [ ] headquarters [

]587

The [ ] performs a similar role as the [ ] [

] group's principal function is [

] An LED lamp module is an array of visible LEDs that are electrically, optically, mechanically and thermally grouped together in a package, which can be configured in many different shapes and sizes.588

587 CX-1308C ([ ] Direct) at 2-3.
588 CX-1308C ([ ]Direct) at 4.

The LED lamp module was originally designed [

]

Specifically, [

]589

[

]590

Dominant challenges [ ] allocations of time and expenses as speculative because the underlying documents to support the allocations were not introduced as evidence and accuses him of "double-dipping."591 Osram counters that the monthly reports for [ ] were submitted as CX-1231C at OS137638-54.592 Dominant also challenges [ ] reliance on certain record of invention forms because they are incomplete and unsigned.593 Osram counters that [ ] testified that he had personal knowledge regarding the forms and that they are complete and accurate copies of the originals.594 Dominant also criticizes [ ] "double-dipping" time allocations. Osram's arguments are persuasive for the reasons state by Osram. Therefore, Dominant's challenges are rejected.

c. [ ]

The [ ] [ ] is currently the acting manager of the [ ]and provided testimony regarding the [ ] The current manager of the [ ] [ ] [

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589 CX-1308C ([ ] direct) at 5-7.
590 CX-1308C ([ ] direct) at 7, 21.
591 RIB 177-79.
592 CRB 146.
593 RIB 177; CX-1231C.
594 CRB 146.

] including [

] [ ] is located in San Jose, California. The salaries of the engineers range from [ ] while the salary of the manager is approximately [ ][595]

The responsibilities of [

]

Specifically, Osram asserts that [ ] worked on the following number of projects that were related to Osrams' white light LEDs, compared with the total number of projects:

Osram asserts that, over the past three years, it has invested approximately [

]related to Osrams' white light LEDs.[596]

Dominant challenges [ ] allocations of time and expenses as speculative because the underlying documents to support the allocations were not introduced as evidence.[597] Dominant also challenges the substance of [ ] as merely being compilations of test data and the allocations used for the[ ] for FY02 and FY03 because they are based on estimates, as data for

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[595] CX-1310C ([ ]Direct) at 2-3.
[596] CX-1310C ([ ] Direct) at 4, 8, 11, 13; CX-1227 at OS137440-08.
[597] RIB 182-86.

these years was either not tracked for all or part of those fiscal years.[598] Osram counters that, investments related to quality engineering work has been accepted by the Commission in establishing the existence of a domestic industry.[599] The undersigned has already stated above that Dominant's challenges are unpersuasive and are therefore rejected.

2. Lead Frame Patents

Osram asserts that it has made substantial investments in its Power TOPLEDs and Advanced Power TOPLEDs that are covered by the Lead Frame Patents. Specifically, Osram asserts that its United States affiliates, Osram Opto and Osram Sylvania, have made substantial investments in engineering, research, and/or development activities related to its white light LEDs. In support, Osram points to four specific business units: [

][600]

a. [ ]

The functions of [ ] Group have already been discussed above. Regarding the Lead Frame Patents, Osram asserts that, during the last three years, [ ] that involve Osrams' Power TOPLEDs. Two such projects included [

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[598] RIB 184.

[599] CRB 148; *Certain Display Controllers and Products Containing Same*, Inv. No. 337-TA-491, Initial Determination (April 14, 2004) (In *Cube Puzzles*, the Commission found a domestic industry based on, inter alia, the employment of up to 200 people tasked with conducting quality control, repairs, and packaging of products imported from overseas. The Commission noted that the initially inspected lots with 1-3% defect rates underwent "extensive quality control inspection before packaging" *citing Certain Cube Puzzles*, Inv. No. 337-TA-112, Commission Action and Order (December 30, 1982)).

[600] CIB 242.

][601] Osram asserts that, over the last three years, it has invested approximately [ ] in the aggregate, in engineering support activities related to Osrams' Power TOPLEDs.[602]

Osram asserts that, during the last three years, [ ] worked on various engineering support activities that involve Osrams' Power TOPLEDs, including inventions such as [

] Osram asserts that, over the last three years, it has invested approximately [ ] in the aggregate, in engineering support activities related to Osrams' Power TOPLEDs.[603]

Osram asserts that, during the last three years, [ ] worked on the following number of projects that were related to Osrams' Power TOPLEDs, compared with the total number of projects:

Osram asserts that, in the aggregate, it has invested approximately [ ] in engineering support activities related to Osrams' Power TOPLEDs over the last three years.[604]

b. [ ]

[ ] was created in [

---

[601] CX-1307C ([ ] Direct) at 10, 25-30; CX-1296C; CX-1297C.
[602] CX-1307C ([ ] Direct) at 31.
[603] CX-1307C ([ ] Direct) at 21-23, 33; CX-1308C (Chipalkatti Direct) at 14-15; CX-1231C at OS137671-88, 137749-51.
[604] CX-1310C ([ ] Direct) at 16-20; CX-1227C at OS137440-08.

] [ ] is the manager of [ ] and provided testimony regarding the work that [ ] performs. As of May 2004, [ ] Currently, the members of [ ] include [ ] [ ] As of May 2004, the salaries of the engineers range from [ ] while the salary of the manager was approximately [ ][605]

The LED systems developed by [ ] are launched under the product line name [ ] Currently, [ ] A group of six engineers,[ ] developed the concept [ ] When [ ]was officially formed, four of the six engineers joined, while the other two engineers provided engineering support. [ ] along with three application engineers from [ ] and one electronics engineer from [ ][606] Currently, [

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[605] CX-1309C ([ ]Direct) at 2-4.

[606] The salaries of the three application engineers supporting the LED Bulb Group ranges (continued...)

] is in the process of preparing [

]607

[ ] is also working on [

] by using Osrams'

[

] is also working on an

[ ]

respectively. Osram expects to sell approximately [

] Osram expects that, over

the next ten years, [

] 608

Osram asserts that it has invested approximately [ ] in research and development activities performed by [ ] the three application engineers and the electronics engineer, that related to Osrams' Advanced Power TOPLEDs.[609]

Dominant challenges [ ] assumptions regarding the success of the second generation of LED Bulbs because they are speculative and based on hope for the future, rather than any concrete customer commitments.[610] The undersigned agrees that Osram's future projections are

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[606](...continued)
from[ ] while the salary of the electronics engineer supporting [ ] is approximately[ ] The three application engineers are located in [ ] while the electronics engineer is located in [ ]

[607] CX-1309C ([ ]Direct) at 4-8, 11-12; CPX-70.

[608] CX-1309C ([ ] Direct) at 12, 19-24; CX-106C at OS082152 & OS082160.

[609] CX-1309C ([ ] Direct) at 18-19.

[610] RIB 186-89.

too speculative to rely upon. The expenses incurred to date, however, support a finding of the economic prong of domestic industry.

3. '673 Patent

Osram asserts that it has made substantial investments in its MicroSIDELEDs that are covered by the '673 patent. Specifically, Osram asserts that its United States affiliates, Osram Opto and Osram Sylvania, have made substantial investments in engineering, research, and/or development activities related to its MicroSIDELEDs. In support, Osram points to two specific business units: [ ] both of which have been discussed above.[611] Regarding the '673 patent, Osram asserts that, during the last three years, [ ] worked on three major application projects that involve Osrams' MicroSIDELEDs. Osram asserts that, over the last three years, it has invested approximately [ ] in engineering support activities related to Osrams' Micro SIDELEDs.[612]

Osram also asserts that, during the last three years, [ ] worked on the following number of projects that were related to Osrams' Power TOPLEDs, compared with the total number of projects:

Osram asserts that, over the last three years, it has invested approximately [ ] in engineering

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[611] CIB 248.

[612] CX-1307C ([ ]Direct) at 32-33, 35.

support activities related to Osrams' Micro SIDELEDs.[613] Dominant does not contest that the Micro SIDELED meets the economic prong.[614]

4. Conclusion

Accordingly, based on the foregoing, Osram has satisfied criterion (C) of the economic prong of the domestic industry requirement for all of the asserted patents.

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[613] CX-1310C ([ ]Direct) at 21-23; CX-1227C at OS137400-48.
[614] RIB 194.

CONCLUSIONS OF LAW

1. The Commission has subject matter jurisdiction in this investigation.

2. The Commission has personal jurisdiction over Respondent Dominant Semiconductors Sdn. Bhd.

3. Dominant's DomiLEDs, Power DomiLEDs, Super Small DomiLEDs, and NovaLEDs do not infringe claims 2-4 of U.S. Patent No. 6,469,930 in violation of 35 U.S.C. § 271(a).

4. Dominant's Power DomiLEDs do not infringe claims 1 and 5-8 of U.S. Patent No. 6,376,902; claims 1 and 5-8 of U.S. Patent No. 6,469,321 ("the '321 patent"); and claims 1, 5-8, and 10-11 of U.S. Patent No. 6,573,580 in violation of 35 U.S.C. § 271(a).

5. Dominant's Super SmallDomiLEDs infringe claims 1-3 and 5 of U.S. Patent No. 6,716,673 in violation of 35 U.S.C. § 271(a).

6. An industry in the United States does not exist with respect to Osram's light-emitting diodes that is protected by U.S. Patent No. 6,066,861; U.S. Patent No. 6,245,259; U.S. Patent No. 6,277,301; U.S. Patent No. 6,592,780; and U.S. Patent No. 6,613,247, as required by 19 U.S.C. § 1337(a)(2) and (3).

7. An industry in the United States does not exist with respect to Osram's light-emitting diodes that is protected by U.S. Patent No. 6,469,930, as required by 19 U.S.C. § 1337(a)(2) and (3).

8. An industry in the United States exists with respect to Osram's light-emitting diodes that is protected by U.S. Patent No. 6,376,902; U.S. Patent No. 6,469,321; and U.S. Patent No. 6,573,580, as required by 19 U.S.C. § 1337(a)(2) and (3).

9. An industry in the United States exists with respect to Osram's light-emitting diodes that is protected by U.S. Patent No. 6,716,673, as required by 19 U.S.C. § 1337(a)(2) and (3).

10. U.S. Patent No. 6,066,861; U.S. Patent No. 6,245,259; U.S. Patent No. 6,277,301; U.S. Patent No. 6,592,780; and U.S. Patent No. 6,613,247 are invalid under 35 U.S.C. § 112, ¶ 2 for indefiniteness.

11. No showing of invalidity due to lack of enablement under 35 U.S.C. § 112, ¶ 1 has been made for U.S. Patent No. 6,469,930.

12. U.S. Patent No. 6,376,902; U.S. Patent No. 6,469,321; and U.S. Patent No. 6,573,580 are not invalid under 35 U.S.C. § 102(b) based on U.S. Patent No. 5,035,483.

13. U.S. Patent No. 6,376,902; U.S. Patent No. 6,469,321; and U.S. Patent No. 6,573,580 are not invalid under 35 U.S.C. § 103 based on a combination of U.S. Patent No. 5,035,483, U.S. Patent No. 4,843,280, and/or U.S. Patent No. RE. 34,254.

INITIAL DETERMINATION

Based on the foregoing opinion, findings of fact, conclusions of law, the evidence, and the record as a whole, and having considered all pleadings and arguments, including the proposed findings of fact and conclusions of law, it is the Administrative Law Judge's INITIAL DETERMINATION that a violation of Section 337 of the Tariff Act of 1930, as amended, has been found in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain light-emitting diodes and products containing same in connection with claims 1-3 and 5 of U.S. Patent No. 6,716,673. In addition, the Administrative Law Judge hereby determines that a violation of Section 337 of the Tariff Act of 1930, as amended, has not been found in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain light-emitting diodes and products containing same in connection with claims 1, 3, 6-7, and 10-13 of U.S. Patent No. 6,066,861; claims 1, 3, 6, 7, 10-13, and 15 of U.S. Patent No. 6,245,259; claims 1-2, 6-7, 11-12, and 14-15 of U.S. Patent No. 6,277,301; claims 2-5, 7, and 10 of U.S. Patent No. 6,592,780; claims 1, 3, 6-7, 10-15, 17, 20 and 21 of U.S. Patent No. 6,613,247; claims 1 and 5-8 of U.S. Patent No. 6,376,902; claims 1 and 5-8 of U.S. Patent No. 6,469,321; claims 1, 5-8, and 10-11 of U.S. Patent No. 6,573,580; and claims 2-4 of U.S. Patent No. 6,469,930.

Furthermore, the Administrative Law Judge hereby determines that a domestic industry in the United States exists that practices U.S. Patent No.6,376,902; U.S. Patent No. 6,469,321, U.S. Patent No. 6,573,580, and U.S. Patent No. 6,716,673 and that a domestic industry in the United States does not exist that practices U.S. Patents No. 6,066,861; U.S. Patent No. 6,245,259; U.S. Patent No. 6,277,301; U.S. Patent No. 6,592,780;U.S. Patent No. 6,613,247; and U.S. Patent No. 6,469,930.

The Administrative Law Judge hereby CERTIFIES to the Commission this Initial Determination, together with the record of the hearing in this investigation consisting of the following:

- The transcript of the trial, with appropriate corrections as may hereafter be ordered by the Administrative Law Judge; and further,

- The exhibits accepted into evidence in this investigation as listed in the attached exhibit lists.

Pursuant to 19 C.F.R. § 210.42(h), this Initial Determination shall become the determination of the Commission unless a party files a petition for review pursuant to 19 C.F.R. § 210.43(a) or the Commission, pursuant to 19 C.F.R. § 210.44, orders on its own motion a review of the Initial Determination or certain issues therein.

RECOMMENDED DETERMINATION ON REMEDY AND BOND

Pursuant to Commission Rules 210.36 (a) and 210.42 (a)(1)(ii), the Administrative Law Judge is to consider evidence and argument on the issues of remedy and bonding and issue a recommended determination thereon.

VIII. Remedy and Bonding

A. Limited Exclusion Order

Under section 337(d), the Commission may issue either a limited or a general exclusion order. A limited exclusion order instructs the U.S. Customs Service to exclude from entry all articles that are covered by the patent at issue and that originate from a named respondent in the investigation. A general exclusion order instructs the U.S. Customs Service to exclude from entry all articles that are covered by the patent at issue, without regard to source. Osram seeks the entry of a permanent, limited exclusion order.[615]

B. Scope of Exclusion from Entry

Osram requests that the exclusion order not only cover light-emitting diodes that are found to infringe, but also cover certain "downstream products" that incorporate the infringing light-emitting diodes as components. The specific types of "downstream products" that Osram wishes to exclude are automotive products and cell phones. Osram contends that in order to have complete and effective relief, an exclusion order for downstream products is necessary.[616] Both Dominant and Staff oppose any exclusion of downstream products.[617]

The Commission has identified relevant factors to be considered in deciding whether to

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[615] CIB 250, 252-53.
[616] CIB 250, 253-59.
[617] RIB 195; SIB 46.

include downstream products in an exclusion order, including: (1) the value of the infringing articles compared to the value of the downstream products in which they are incorporated; (2) the identity of the manufacturer of the downstream products, *i.e.*, whether it can be determined that the downstream products are manufactured by the respondent or by a third party; (3) the incremental value to the complainant of the exclusion of downstream products; (4) the incremental detriment to respondents of exclusion of such products; (5) the burdens imposed on third parties resulting from exclusion of downstream products; (6) the availability of alternative downstream products that do not contain the infringing articles; (7) the likelihood that the downstream products actually contain the infringing articles and are thereby subject to exclusion; (8) the opportunity for evasion of an exclusion order that does not include downstream products; (9) the enforceability of an order by Customs; and any other factors the Commission determines to be relevant.[618]

Including downstream products in the exclusion order has the potential to greatly expand the coverage of the exclusion order, which increases the risk of interfering with legitimate commerce. The evidence does not show that it is necessary for the exclusion order to cover downstream products because the risk that an exclusion order covering downstream products would interfere with legitimate commerce far outweighs the incremental benefit to Osram in excluding downstream products. Therefore, the undersigned does not recommend that the exclusion order include downstream products.

C. Certification Provision

Limited exclusion orders may contain a "certification" provision whereby a respondent may

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[618] *See Certain Erasable Programmable Read-Only Memories*, Inv. No. 337-TA-276, USITC Pub. 2196, Commission Opinion at 124-126, 136 (May 1989) *aff'd sub nom. Hyundai Elec. Indus. Co. v. U.S. Int'l Trade Comm'n*, 899 F.2d 1024 (Fed. Cir. 1990).

import goods by providing to the U.S. Customs Service a written certification that the imported products in question are not covered by the asserted claims of the patents at issue. Such provisions facilitate Customs' administration of the order by eliminating the often difficult task of determining how a product was made by examining its contents or appearance. Similar certification provisions have been included in previous exclusion orders, particularly when respondents imported both infringing and non-infringing products.[619]

Osram proposes a certification provision that is similar to the one adopted by the Commission in *Certain Integrated Circuit Telecommunication Chips and Products Containing Same, Including Dialing Apparatus*.[620] In that case, the Commission specified that a certification process specified by the U.S. Customs Service was to be employed allowing entry of telephones described in the order "if the importer provides a certification to accompany the invoice (whether filed electronically or otherwise) stating that the manufacturer of the telephones . . . certifies that . . . the telephones . . . do not contain integrated circuit telecommunication chips excluded under [the order]."[621] Dominant opposes the certification requirement because it would force a downstream manufacturer to certify that its products do not contain any infringing LEDs, which would require a tracking mechanism between manufacturers of downstream product and the exact model and manufacturer of the LED

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[619] *See Certain Condensers, Parts Thereof, and Products Containing Same*, Inv. No. 337-TA-334 (Remand Proceeding), Commission Opinion at 39, 1997 WL 599891 (U.S.I.T.C., September 10, 1997); *Certain Minoxidil Powders, Salts, and Compositions for Use in Hair Treatment*, Inv. No. 337-TA-267 (1988); *Certain Curable Fluoroelastomer Compositions and Precursors Thereof*, Inv. No. 337-TA-364, U.S.I.T.C. Pub. No. 2890 (May 8, 1995).

[620] Inv. No. 337-TA-337, Comm'n Op. On the Issue Under Review and on Remedy, the Public Interest, and Bonding (August 3, 1993).

[621] *Id.* at 10.

within the downstream product.[622] Staff does not take a position on this issue.

Such a certification requirement appears unreasonable. Accordingly, no certification requirement is recommended here.

D. Cease and Desist Order

Under Section 337(f)(1), the Commission may issue a cease and desist order in addition to, or instead of, an exclusion order. Cease and desist orders are warranted primarily when the respondent maintains a commercially significant inventory of the accused products in the United States.[623] Osram requests a cease and desist order against Dominant.[624] Osram asserts that Dominant has very close business relationships with various representatives and distributors, including Agilent and Fairchild, and that circumstantial evidence supports Osram's assertion that there are significant domestic inventories of infringing LEDs in the United States.[625] Dominant has not taken a position on this issue. Staff asserts that a cease and desist order is not warranted because Osram has not provided sufficient evidence that Dominant owns a commercially significant domestic inventory of infringing products.[626] The undersigned agrees that Osram has not shown that Dominant maintains a commercially significant domestic industry of infringing products. Accordingly, a cease and desist order is not appropriate here.

E. Bond During Presidential Review Period

If the Commission enters an exclusion order or cease and desist order, parties may continue to import and sell their products during the pendency of the Presidential review under a bond in an

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[622] RRB 110.
[623] *Crystalline Cefadroxil Monohydrate*, 15 U.S.P.Q.2d at 1277-79.
[624] CIB 250, 260-62.
[625] CX-1338C (Ko *de bene esse* Deposition) at 45-53; CX-1334; CX-212C; CX-629C.
[626] SIB 49.

amount determined by the Commission to be "sufficient to protect the Complainants from any injury."[627]

The Commission frequently sets the bond by attempting to eliminate the difference in sales prices between the patented domestic product and the infringing product.[628] In the absence of reliable price information, the Commission has used other methods to determine an appropriate bond. For example, where a price comparison is unworkable, the Commission has determined that a bond of 100 percent is appropriate.[629] In other instances where a direct comparison between a patentee's product and the accused product was not possible, the Commission has set the bond at a reasonable royalty rate.[630]

Osram requests a bond in the amount of 100 percent of entered value.[631] Dominant contends that the effective royalty rates of licenses granted under the patents-at-issue would be appropriate, which they approximate at 6%.[632] The Staff contends that a reasonable royalty rate cannot be determined and therefore recommends a bond of 100% of entered value to be appropriate because

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[627] 19 U.S.C. § 1337(e); 19 C.F.R. § 210.50(a)(3).

[628] *See Certain Microsphere Adhesives, Process for Making Same, and Products Containing Same, Including Self-Stick Repositionable Notes*, Inv. No. 337-TA-366, Commission Opinion at 24, 1996 WL 1056095 (U.S.I.T.C., January 16, 1996) ("*Microsphere Adhesives*"), *aff'd sub nom. Minnesota Mining & Manufacturing Co. v. U.S. Int'l. Trade Comm.*, 91 F.3d 171 (Fed.Cir. 1996) (Table).

[629] *See, e.g., Certain Variable Speed Wind Turbines and Components Thereof*, Inv. No. 337-TA-376, U.S.I.T.C. Pub. No. 3003, Commission Opinion at 27-28 and 40, 1996 WL 1056330 (U.S.I.T.C., September 23, 1996) ("*Wind Turbines*").

[630] *See, e.g., Certain Digital Satellite System (DSS) Receivers and Components Thereof*, Inv. No. 337-TA-392, U.S.I.T.C. Pub. No. 3418, Initial and Recommended Determinations at 245, *vacated on other grounds*, Commission Determination (May 13, 1999), 2001 WL 535427 (U.S.I.T.C., October 20, 1997) ("*DSS Receivers*").

[631] CIB 250, 262-63.

[632] RIB 196.

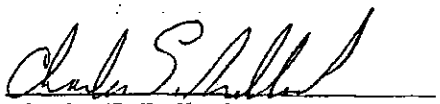
there is insufficient evidence with which to set a price differential or royalty rate.[633]

In this case, a bond of 100% is appropriate and recommended here.

Within seven days of the date of this document, each party shall submit to the office of the Administrative Law Judge a statement as to whether or not it seeks to have any portion of this document deleted from the public version. The parties' submissions must be made by hard copy by the aforementioned date.

Any party seeking to have any portion of this document deleted from the public version thereof must submit to this office a copy of this document with red brackets indicating any portion asserted to contain confidential business information. The parties' submission concerning the public version of this document need not be filed with the Commission Secretary.

SO ORDERED.



Charles E. Bullock
Administrative Law Judge

[633] SIB 50-51.

APPENDIX OF EXHIBIT LISTS

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

Before the Honorable Charles E. Bullock
Administrative Law Judge

In the Matter of	)	
	)	Investigation No. 337-TA-512
Certain Light-Emitting Diodes and Products Containing Same	)	

COMPLAINANTS OSRAM GMBH AND OSRAM OPTO SEMICONDUCTORS GMBH'S FINAL EXHIBIT LIST

Legend: C=Corporate & Background, I=Infringement, V=Validity, DIT=Domestic Industry Technical, DIE=Domestic Industry Economic, R=Remedy

Exhibit Number	Date	Exhibit Description	Bates Number	Statement of the Purpose for Which the Exhibit is Being Offered Into Evidence	Sponsoring Witness	Received
CX-1	5/23/2000	U.S. Patent No. 6,066,861	OS 116513-116524	I, V, DIT	Waitl, Strauss, McKittrick, Nauman	Admitted 12/7/04; 12/9/04
CX-2	5/12/2001	U.S. Patent No. 6,245,259	OS 116525-116538	I, V, DIT	Waitl, Strauss, McKittrick, Nauman	Admitted 12/7/04; 12/9/04
CX-3	8/21/2001	U.S. Patent No. 6,277,301	OS 116539-116550	I, V, DIT	Waitl, Strauss, McKittrick, Nauman	Admitted 12/7/04; 12/9/04
CX-4	4/23/2002	U.S. Patent No. 6,376,902	OS 116551-116558	I, V, DIT	Waitl, Bar-Cohen	Admitted 12/7/04; 12/9/04
CX-5	10/22/2002	U.S. Patent No. 6,469,321	OS 116559-116565	I, V, DIT	Waitl, Bar-Cohen	Admitted 12/7/04; 12/9/04
CX-6	6/3/2003	U.S. Patent No. 6,573,580	OS 116566-116574	I, V, DIT	Waitl, Bar-Cohen	Admitted 12/7/04; 12/9/04
CX-7	6/10/2003	U.S. Patent No. 6,576,930	OS 116575-116591	I, V, DIT	Waitl, Strauss, McKittrick, Nauman	Admitted 12/7/04; 12/9/04
CX-8	7/15/2003	U.S. Patent No. 6,592,780	OS 116592-116603	I, V, DIT	Waitl, Strauss, McKittrick, Nauman	Admitted 12/7/04; 12/9/04
CX-9	9/2/2003	U.S. Patent No. 6,613,247	OS 116604-116615	I, V, DIT	Waitl, Strauss, McKittrick, Nauman	Admitted 12/7/04; 12/9/04
CX-10	4/6/2004	U.S. Patent No. 6,716,673	OS 116616-116619	I, V, DIT	Waitl, Bar-Cohen	Admitted 12/7/04; 12/9/04
CX-11	3/26/2004	Copy of the Certified File History of U.S. Patent No. 6,066,861	OS 116620-116813	I, V, DIT	McKittrick, Nauman	Admitted 12/9/04
CX-12	3/26/2004	Copy of the Certified File History of U.S. Patent No. 6,245,259	OS 116814-117848	I, V, DIT	McKittrick, Nauman	Admitted 12/9/04
CX-13	4/2/2004	Copy of the Certified File History of U.S. Patent No. 6,277,301	OS 117849-118850	I, V, DIT	McKittrick, Nauman	Admitted 12/9/04
CX-14	3/24/2004	Copy of the Certified File History of U.S. Patent No. 6,376,902	OS 118851-119046	I, V, DIT	Waitl, Bar-Cohen	Admitted 12/9/04
CX-15	6/10/2004	Copy of the Certified File History of U.S. Patent No. 6,469,321	OS 119047-119195	I, V, DIT	Waitl, Bar-Cohen	Admitted 12/9/04
CX-16	3/25/2004	Copy of the Certified File History of U.S. Patent No. 6,573,580	OS 119196-119366	I, V, DIT	Waitl, Bar-Cohen	Admitted 12/9/04
CX-17	3/29/2004	Copy of the Certified File History of U.S. Patent No. 6,576,930	OS 119367-120233	I, V, DIT	McKittrick, Nauman	Admitted 12/9/04
CX-18	3/26/2004	Copy of the Certified File History of U.S. Patent No. 6,592,780	OS 121237-121715	I, V, DIT	McKittrick, Nauman	Admitted 12/9/04

CX-19	3/26/2004	Copy of the Certified File History of U.S. Patent No. 6,613,247	OS 120234-121236	I, V, DIT	McKittrick, Nauman	Admitted 12/9/04
CX-20		Copy of the Certified File History of U.S. Patent No. 6,716,673	OS 121716-121837	I, V, DIT	Waitl, Bar-Cohen	Admitted 12/7/04; 12/9/04
CX-21		Withdrawn				
CX-22		Withdrawn				
CX-23		Withdrawn				
CX-24		Withdrawn				
CX-25C		Withdrawn				
CX-26C		Withdrawn				
CX-27		Withdrawn				
CX-28		Withdrawn				
CX-29		Withdrawn				
CX-30C		Withdrawn				
CX-31		Withdrawn				
CX-32		Withdrawn				
CX-33		Withdrawn				
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CX-80		Withdrawn				
CX-81		Withdrawn				
CX-82		Withdrawn				
CX-83		Withdrawn				
CX-84C		Withdrawn				
CX-85C		Withdrawn				
CX-86C		Withdrawn				
CX-87		Withdrawn				

CX-88		Withdrawn				
CX-89C		Withdrawn				
CX-90C		Withdrawn				
CX-91C		Withdrawn				
CX-92		Withdrawn				
CX-93		Withdrawn				
CX-94		"OSRAM Opto Semiconductors Unveils LED Lighting Solutions on Key Ford Motor Company 2004 and 2005 Performance Vehicle Rollouts at Chicago Auto Show" from Business Wire (Amended Complaint Exhibit 84)	OS 122568-122569	DIE	Schmitt, Chipalkatti, Huang, Peterson	Admitted 12/7/04
CX-95		"Osram Opto Provides First White LED Lighting for the 2002 Lincoln Navigator; Technology Promotes Vehicle Harmony" from PR Newswire (Amended Complaint Exhibit 85)	OS 122570-122571	DIE	Schmitt, Chipalkatti, Huang, Peterson	Admitted 12/7/04
CX-96		Withdrawn				
CX-97		Withdrawn				
CX-98C		Withdrawn				
CX-99C		Withdrawn				
CX-100C		Documents regarding phosphors and cerium (Amended Complaint Exhibit 90)	OS 122590-122592	I, V	McKittrick, Nauman, Zachau, Strauss	Admitted 12/9/04
CX-101C		Withdrawn				
CX-102C		Withdrawn				
CX-103C		Withdrawn				
CX-104C		Withdrawn				
CX-105C		Withdrawn				
CX-106C	7/29/2004	OSRAM Global Automotive Lighting LED Bulb Schedule Summary (Peterson Deposition Exhibit 4)	OS 082151-082160	DIE, DIT	Fredrick Peterson	Admitted 12/15/04
CX-107C	8/27/2004	Schedule Summaries used to generate Peterson Deposition Exhibit 4 (Peterson Deposition Exhibit 5)	OS 094632-094660	DIE, DIT	Fredrick Peterson	Admitted 12/15/04
CX-108C		Withdrawn				
CX-109C		Withdrawn				
CX-110C	Sep-04	OSRAM New Possibilities with Signal Lighting Innovation, 09/04 (Presentation) (Peterson Deposition Exhibit 8)	OS 114074-114134	DIE, DIT	Fredrick Peterson	Admitted 12/15/04
CX-111C		Withdrawn				
CX-112C		Withdrawn				
CX-113C		Withdrawn				
CX-114C		Withdrawn				
CX-115C		Withdrawn				
CX-116C		Withdrawn				
CX-117C		Withdrawn				
CX-118C		Withdrawn				
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CX-124C		Withdrawn				
CX-125C		Withdrawn				
CX-126C		Withdrawn				
CX-127C		Withdrawn				
CX-128C		Withdrawn				
CX-129C		Withdrawn				
CX-130C		Withdrawn				
CX-131C		Withdrawn				
CX-132C		Withdrawn				
CX-133C		Withdrawn				
CX-134C		OSRAM Payroll Information (Terry Deposition Exhibit 14)	OS 022733-022735	C, DIE	Schmitt, Chipalkatti, Huang	Rejected 12/15/04
CX-135C		LED Sales Summary, Osram and IFX (Terry Deposition Exhibit 15)	OS 094625-094631	C, DIE	Schmitt, Chipalkatti, Huang	Admitted 12/15/04

CX-136C		Withdrawn				
CX-137C		Withdrawn				
CX-138C		Withdrawn				
CX-139C		Withdrawn				
CX-140C		Withdrawn				
CX-141C		Withdrawn				
CX-142C		Withdrawn				
CX-143C		Withdrawn				
CX-144C		Withdrawn				
CX-145C		Withdrawn				
CX-146C		Withdrawn				
CX-147C		Withdrawn				
CX-148C	9/8/2004	Deposition of Low Tek Beng, Volume 1		I, R	Low Tek Beng	Admitted 12/7/04
CX-149C		Withdrawn				
CX-150C		Withdrawn				
CX-151C		Withdrawn				
CX-152C		Withdrawn				
CX-153C		Withdrawn				
CX-154C		Withdrawn				
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CX-165C		Withdrawn				
CX-166C		Withdrawn				
CX-167C		Withdrawn				
CX-168C		Withdrawn				
CX-169C		Withdrawn				
CX-170C		Withdrawn				
CX-171C		Withdrawn				
CX-172C		Withdrawn				
CX-173C		Withdrawn				
CX-174C		Withdrawn				
CX-175C		Specifications for CREE Chips (Beng Deposition Exhibit 28)	DS 000232-000250	I	Bar-Cohen, McKittrick, Nauman, Low Tek Beng, Ko SP	Admitted 12/10/04
CX-176C		Withdrawn				
CX-177C	8/25/2004	Respondent Dominant's Responses to Complainants' First Set of Requests for Admission (Nos. 1-67) (Beng Deposition Exhibit 30)		I, V, R	Bar-Cohen, McKittrick, Nauman, Low Tek Beng, Ko SP	Admitted 12/7/04
CX-178C		Withdrawn				
CX-179C		Withdrawn				
CX-180C	6/18/2004	Bill of Material for LED (Beng Deposition Exhibit 33)	DS 003308-003350	I	Bar-Cohen, McKittrick, Nauman, Low Tek Beng, Ko SP	Admitted 12/10/04
CX-181C	12/4/2003	Direct and Indirect Material List (Beng Deposition Exhibit 34)	DS 003351-003358	I	Bar-Cohen, McKittrick, Nauman, Low Tek Beng, Ko SP	Admitted 12/10/04
CX-182C		Withdrawn				
CX-183C		Withdrawn				
CX-184C		Withdrawn				
CX-185C		Withdrawn				
CX-186C		Withdrawn				
CX-187C		Withdrawn				
CX-188C		Withdrawn				
CX-189C		Withdrawn				
CX-190C		Withdrawn				
CX-191C		Withdrawn				
CX-192C		Withdrawn				

CX-193C	7/9/2002	Power DomiLED Dawb Drawing (Beng Deposition Exhibit 45)	DS 005578	I	Bar-Cohen, Low Tek Beng, Ko SP	Admitted 12/16/04
CX-194C		Datasheet for Sumiresin Excel CRM 1084 (Beng Deposition Exhibit 46)	DS 007916	I	Bar-Cohen, Low Tek Beng, Ko SP	Admitted 12/7/04; 12/10/04 12/16/04
CX-195C	5/16/2002	Power DomiLED Leadframe Drawing (Beng Deposition Exhibit 47)	DS 004950	I	Bar-Cohen, Low Tek Beng, Ko SP	Admitted 12/7/04; 12/16/04
CX-196C	5/30/2002	Power DomiLED Molding Drawing; Power DomiLED IQA Drawing (Beng Deposition Exhibit 48)	DS 004952 and DS 004974	I	Bar-Cohen, Low Tek Beng, Ko SP	Admitted 12/7/04; 12/10/04
CX-197C		Withdrawn				
CX-198	Mar-04	Dominant Catalogue Summary (Beng Deposition Exhibit 50)	DS 002242-002270	I, R	Bar-Cohen, McKittrick, Nauman, Low Tek Beng, Ko SP	Admitted 12/7/04; 12/10/04
CX-199C		Withdrawn				
CX-200C	2/12/2002	Power DomiLED Process Flow Chart (Beng Deposition Exhibit 52)	DS 005524-005528	I	Bar-Cohen, McKittrick, Nauman, Low Tek Beng, Ko SP	Admitted 12/10/04
CX-201C		Withdrawn				
CX-202C		Withdrawn				
CX-203C	5/13/2002	Engineering Design Change Notice (Beng Deposition Exhibit 55)	DS 006398-006404	I	Bar-Cohen, McKittrick, Nauman, Low Tek Beng, Ko SP	Admitted 12/7/04
CX-204C	1/6/2004	DomiLED Bikini InGaN DSx-xSx-Catalogue-v4 (Beng Deposition Exhibit 56)	DS 001943-001953	I, R	Bar-Cohen, McKittrick, Nauman, Low Tek Beng, Ko SP	Admitted 12/7/04
CX-205C		Withdrawn				
CX-206C		Withdrawn				
CX-207C		Withdrawn				
CX-208C		Withdrawn				
CX-209C		Withdrawn				
CX-210C		Withdrawn				
CX-211C		Withdrawn				
CX-212C		Dominant Sales Invoices Tracking (Beng Deposition Exhibit 65)	DS 001869-001932	I, R	Bar-Cohen, McKittrick, Nauman, Low Tek Beng, Ko SP	Admitted 12/10/04
CX-213C		Withdrawn				
CX-214C		Withdrawn				
CX-215C		Withdrawn				
CX-216C		Withdrawn				
CX-217C		Withdrawn				
CX-218C		Withdrawn				
CX-219C		Withdrawn				
CX-220C		Withdrawn				
CX-221C		Withdrawn				
CX-222C		Withdrawn				
CX-223C		Withdrawn				
CX-224C		Withdrawn				
CX-225C		Withdrawn				
CX-226C		Withdrawn				
CX-227C		Withdrawn				
CX-228C		Withdrawn				
CX-229C	10/1/2004	Deposition Designations for Thomas Shottes		C, DIE, DIT	Huang, Chipalkatti, Schmitt	Admitted 12/17/04
CX-230C		Withdrawn				
CX-231C		Withdrawn				
CX-232C		Withdrawn				
CX-233C	6/8/2004	OSRAM Opto Semiconductors Overview (Shottes Deposition Exhibit 13)	OS 025199-25232	DIE, DIT	Waitl, Schmitt, Chipalkatti, Huang	Admitted 12/17/04
CX-234C		Withdrawn				

CX-235C	2/12/2004	OSRAM Opto Semiconductors: Automotive Update (Powerpoint Presentation) (Shottes Deposition Exhibit 15)	OS 025037-025086	DIE, DIT	Schmitt, Chipalkatti, Huang	Rejected 12/15/04
CX-236C		Withdrawn				
CX-237C		Withdrawn				
CX-238C		Withdrawn				
CX-239C		Withdrawn				
CX-240C		Withdrawn				
CX-241C		Withdrawn				
CX-242C		Withdrawn				
CX-243C		Withdrawn				
CX-244C		Withdrawn				
CX-245C		Withdrawn				
CX-246C		Withdrawn				
CX-247C		Withdrawn				
CX-248C		Withdrawn				
CX-249C		Withdrawn				
CX-250C		Withdrawn				
CX-251C		Withdrawn				
CX-252C		Withdrawn				
CX-253C		Withdrawn				
CX-254C		Withdrawn				
CX-255C		Withdrawn				
CX-256C		Withdrawn				
CX-257C		Withdrawn				
CX-258C		Withdrawn				
CX-259C		Withdrawn				
CX-260C		Withdrawn				
CX-261		Curriculum Vitae of Avram Bar-Cohen (Exhibit A to the Expert Report of Dr. Avram Bar-Cohen)		I, V, DIT, R	Avram Bar-Cohen	Admitted 12/7/04
CX-262		Withdrawn				
CX-263	10/7/2004	Experimental Characterization of LED Thermal Performance (Exhibit C to the Expert Report of Dr. Avram Bar-Cohen)		I, DIT	Avram Bar-Cohen	Admitted 12/7/04
CX-264		X-rays of the Dominant Power DomiLED, Dominant Super Small DomiLED, OSRAM Power TOPLED, OSRAM Advanced Power TOPLED, and OSRAM Micro SIDELED products (Exhibit D to the Expert Report of Dr. Avram Bar-Cohen)		I, DIT	Avram Bar-Cohen	Admitted 12/7/04; 12/16/04
CX-265		Enlarged photographs of the Dominant Power DomiLED, Dominant Super Small DomiLED, OSRAM Power TOPLED, OSRAM Advanced Power TOPLED, and OSRAM Micro SIDELED products (Exhibit E to the Expert Report of Dr. Avram Bar-Cohen)		I, DIT	Avram Bar-Cohen	Admitted 12/7/04
CX-266		Infra-red photographs of the Dominant Power DomiLED, OSRAM Power TOPLED and OSRAM Advanced Power TOPLED products (Exhibit F to the Expert Report of Dr. Avram Bar-Cohen)		I, DIT	Avram Bar-Cohen	Admitted 12/7/04
CX-267		Withdrawn				
CX-268		Withdrawn				
CX-269C		Withdrawn				
CX-270		Curriculum Vitae of Paul H. Halloway (Exhibit A to the Expert Witness Report of Professor Paul H. Holloway)		I, V, DIT	McKittrick, Nauman, Paul H. Holloway	Admitted 12/16/04
CX-271C		Claim Chart for the '861 Patent (Exhibit G to the Expert Report of Professor Paul H. Holloway)		I, V, DIT	McKittrick, Nauman, Paul H. Holloway	Admitted 12/16/04

CX-272C		Withdrawn				
CX-273C		Withdrawn				
CX-274C		Withdrawn				
CX-275C		Withdrawn				
CX-276C		English translation of DE19638667 (Exhibit L to the Expert Report of Professor Paul H. Holloway)	DS 122375-122386.1	I, V, DIT	McKittrick, Nauman, Paul H. Holloway	Admitted 12/16/04
CX-277C		Withdrawn				
CX-278C		Withdrawn				
CX-279C		Withdrawn				
CX-280C		Withdrawn				
CX-281C		Withdrawn				
CX-282C		Withdrawn				
CX-283		Curriculum Vitae of Joseph C. McAlexander (Exhibit F to the Expert Report of Joseph C. McAlexander)		I, V, DIT	Bar-Cohen, Joseph C. McAlexander	Admitted 12/16/04
CX-284		Withdrawn				
CX-285		Withdrawn				
CX-286C		Withdrawn				
CX-287		Withdrawn				
CX-288		Withdrawn				
CX-289		Withdrawn				
CX-290C		Withdrawn				
CX-291		Withdrawn				
CX-292	10/15/2004	Graphs on Chromaticity Point, Spectral Curve, Radiation Characteristic and Electrical Characteristic for DDW-UJD-TU2-1-VX (Exhibit 2A to the Expert Report of Dr. Joanna McKittrick)		I, V, DIT	Joanna McKittrick, Strauss	Admitted 12/9/04
CX-293	10/15/2004	Graphs on Chromaticity Point, Spectral Curve, Radiation Characteristic and Electrical Characteristic for DDW-SJD-TU2-1 (Exhibit 2B to the Expert Report of Dr. Joanna McKittrick)		I, V, DIT	Joanna McKittrick, Strauss	Admitted 12/9/04
CX-294	10/15/2004	Graphs on Chromaticity Point, Spectral Curve, Radiation Characteristic and Electrical Characteristic for DSW-USD-ST2-1 (Exhibit 2C to the Expert Report of Dr. Joanna McKittrick)		I, V, DIT	Joanna McKittrick, Strauss	Admitted 12/9/04
CX-295	10/15/2004	Graphs on Chromaticity Point, Spectral Curve, Radiation Characteristic and Electrical Characteristic for NPW-CED-VW2-1 (Exhibit 2D to the Expert Report of Dr. Joanna McKittrick)		I, V, DIT	Joanna McKittrick, Strauss	Admitted 12/9/04
CX-296	10/15/2004	Graphs of Products (Exhibit 3 to the Expert Report of Dr. Joanna McKittrick)		I, V, DIT	Joanna McKittrick, Strauss	Admitted 12/7/04; 12/9/04
CX-297		Withdrawn				
CX-298C		Withdrawn				
CX-299		Withdrawn				
CX-300		Withdrawn				
CX-301C		Withdrawn				
CX-302C		Withdrawn				
CX-303C		Withdrawn				
CX-304C		Withdrawn				
CX-305C		Withdrawn				
CX-306		Withdrawn				
CX-307		Withdrawn				
CX-308		Withdrawn				
CX-309C		Withdrawn				
CX-310		Withdrawn				
CX-311		Withdrawn				
CX-312		Withdrawn				
CX-313		Withdrawn				
CX-314C		Withdrawn				
CX-315C		Withdrawn				

CX-316C		Withdrawn				
CX-317C		Withdrawn				
CX-318C		Withdrawn				
CX-319C		Withdrawn				
CX-320C		Withdrawn				
CX-321C		Withdrawn				
CX-322C		Withdrawn				
CX-323	10/15/2004	Resume of E. Bruce Nauman (Exhibit A to the Expert Report of E. Bruce Nauman)		I, V, DIT	E. Bruce Nauman	Admitted 12/9/04
CX-324		Withdrawn				
CX-325C	10/15/2004	Analysis of Powder Samples (Exhibit C to the Expert Report of E. Bruce Nauman)		I, DIT	E. Bruce Nauman	Admitted 12/9/04
CX-326	10/15/2004	Analysis of the LED Devices (Exhibit D to the Expert Report of E. Bruce Nauman)		I, DIT	E. Bruce Nauman	Admitted 12/9/04
CX-327	6/15/1998	Various References (Exhibits E1 & E2 to the Expert Report of E. Bruce Nauman)		I, V, DIT	E. Bruce Nauman	Admitted 12/9/04
CX-328C		Withdrawn				
CX-329		Withdrawn				
CX-330		Withdrawn				
CX-331C		Engineering of Phosphor Particles (Zachau Deposition Exhibit 15)	OS 022332	C, V, I, DIT	McKittrick, Nauman, Martin Zachau	Admitted 12/16/04
CX-332C		Withdrawn				
CX-333C		Withdrawn				
CX-334C		Withdrawn				
CX-335		Withdrawn				
CX-336		Withdrawn				
CX-337		Withdrawn				
CX-338		Withdrawn				
CX-339C		Withdrawn				
CX-340	6/30/1991	U.S. Patent No. 5,035,483 (Exhibit A to the Rebuttal Expert Report of Dr. Avram Bar-Cohen)		V, I, DIT	Avram Bar-Cohen	Admitted 12/16/04
CX-341		Withdrawn				
CX-342		Withdrawn				
CX-343		Withdrawn				
CX-344	6/27/1989	U.S. Patent No. 4,843,280 (Exhibit E to the Rebuttal Expert Report of Dr. Avram Bar-Cohen)		V, I, DIT	Avram Bar-Cohen	Admitted 12/16/04
CX-345	5/18/1993	U.S. Patent No. Re. 34,254 (Exhibit F to the Rebuttal Expert Report of Dr. Avram Bar-Cohen)		V, I, DIT	Avram Bar-Cohen	Admitted 12/16/04
CX-346		Withdrawn				
CX-347C		Withdrawn				
CX-348		Withdrawn				
CX-349C		Phosphor Data Sheets (Appendix B to the Rebuttal Expert Witness Report of Professor Paul H. Holloway, Ph.D.)	DS 007917-007918	I, V, DIT	McKittrick, Nauman, Paul H. Holloway	Admitted 12/9/04
CX-350		IMR Test Results (Appendix C to the Rebuttal Expert Witness Report of Professor Paul H. Holloway, Ph.D.)		I, V, DIT	McKittrick, Nauman, Paul H. Holloway	Admitted 12/9/04
CX-351		Withdrawn				
CX-352		Withdrawn				
CX-353		Withdrawn				
CX-354C		Withdrawn				
CX-355		Radiographs and Microscope images of Dominant Products (Attachment 1 to the Rebuttal Expert Report of Joseph C. McAlexander)		I, V, DIT	Bar-Cohen, Joseph C. McAlexander	Admitted 12/7/04
CX-356C		Withdrawn				
CX-357		Withdrawn				
CX-358		Withdrawn				
CX-359C		Withdrawn				
CX-360C		Withdrawn				
CX-361C		Withdrawn				

CX-362C		Withdrawn				
CX-363C		Withdrawn				
CX-364C		Withdrawn				
CX-365C		Withdrawn				
CX-366C		Withdrawn				
CX-367C		Withdrawn				
CX-368C		Withdrawn				
CX-369C		Withdrawn				
CX-370C		Withdrawn				
CX-371C		Withdrawn				
CX-372C		Withdrawn				
CX-373C	6/30/2004	Email fr Ko SP to sales re Latest Catalogue summary with attachments - Catalogue Summary REV	DS 028202-028237	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 12/7/04
CX-374C	3/15/2004	DomiLED Bikini AlInGaP DSx-xSS - Catalogue-v4	DS 062166-062175	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 12/7/04
CX-375C		Withdrawn				
CX-376C		Withdrawn				
CX-377C		Withdrawn				
CX-378C	5/12/2004	Email to Massimo and Low TB fr Ko SP re Mspice/Tecnovision	DS 106315-106316	I, V, R	Bar-Cohen, Ko Su Piow, Low TB	Admitted 1/13/05
CX-379C	8/3/2004	Email to Lai fr Goh re application notes on the bikini LEDs	DS 090177-090179	I, V, R	Bar-Cohen, Ko Su Piow, Low TB	Admitted 12/7/04
CX-380C		Withdrawn				
CX-381C		Withdrawn				
CX-382C		Withdrawn				
CX-383C		Withdrawn				
CX-384C		Withdrawn				
CX-385C		Withdrawn				
CX-386C		Withdrawn				
CX-387C		Withdrawn				
CX-388C		Withdrawn				
CX-389C		Withdrawn				
CX-390C		Withdrawn				
CX-391C		Withdrawn				
CX-392C		Withdrawn				
CX-393C		Withdrawn				
CX-394C		Withdrawn				
CX-395C		Withdrawn				
CX-396C	10/23/2002	Dominant - power domiled DAWB Drawing D DW DD 0251	DS 005908	I, V	Bar-Cohen, Ko Su Piow, Low TB	Admitted 12/7/04
CX-397C	3/24/2002	Dominant - power domiled Package Drawing D DW DO 0232	DS 005909	I, V	Bar-Cohen, Ko Su Piow, Low TB	Admitted 12/7/04; 12/16/04
CX-398C		Withdrawn				
CX-399C		Withdrawn				
CX-400C		Withdrawn				
CX-401C		Withdrawn				
CX-402C		Withdrawn				
CX-403C	1/8/2003	Email fr Sales to infod-power re question	DS 031418-031422	I, V, R	Bar-Cohen, Ko Su Piow, Low TB	Admitted 1/13/05
CX-404C		Product Data for A-1133 NL WH 505	DS 013624-013625	I, V	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 12/7/04; 12/10/04
CX-405C		Withdrawn				
CX-406C		Withdrawn				
CX-407C	5/11/2004	Email to Massimo fr Low TB re attached solder-pad design for Power DomiLED packages	DS 109039-109042	I, V, R	Bar-Cohen, Ko Su Piow, Low TB	Admitted 12/7/04; 12/10/04
CX-408C		Withdrawn				
CX-409C		Withdrawn				
CX-410C		Withdrawn				
CX-411C	10/8/2004	Deposition Designations for James M. Belcher		C, I, V, R	James Belcher	Admitted 12/17/04
CX-412C		Withdrawn				
CX-413C		Withdrawn				
CX-414C		Withdrawn				
CX-415C		Withdrawn				

CX-416C		Withdrawn				
CX-417C		Withdrawn				
CX-418C		Withdrawn				
CX-419C	8/12/2004	Certificate of Formation of E&O Semiconductors, LLC (Belcher Deposition Exhibit 8)	E 0001-0002	R	Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-420C	7/28/2000	OES Holdings, Inc. Organizational Consent of the Sole Director to Action in Lieu of Meeting (Belcher Deposition Exhibit 9)	E 0014-0012	R	Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-421C	Aug-02	E&O Semiconductors Catalogue Summary (Belcher Deposition Exhibit 10)	E 0007-0003	I, R	Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-422C	4/18/2003	E&O Semiconductor Price List (Belcher Deposition Exhibit 11)	E 0009-0008	R	Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-423C		Email to Tay KC fr Belcher re source of the product (Belcher Deposition Exhibit 12)	E 0046	I, R	Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-424C		Dominant Invoices to Ennar Latex Inc. Attn: Mr. James Belcher (Belcher Deposition Exhibit 13)	DS 006870, 007008, 007009 and 007435	I, R	Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-425C	2/6/2004	Dominant Debtor Transaction (Belcher Deposition Exhibit 14)	DS 002313 and 000593	I, R	Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-426C	10/22/2001	Email to Low TB fr Belcher re LED samples (Belcher Deposition Exhibit 15)	E 0041-0040	I, R	Bar-Cohen, Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-427C	10/29/2001	Email to Foley fr Belcher re new LED products (Belcher Deposition Exhibit 16)	E 0045-044	I, R	Bar-Cohen, Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-428C		Email to Belcher re AMS Update - Light Pipe LEDs (Belcher Deposition Exhibit 17)	E 0049	I, R	Bar-Cohen, Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-429C		Email to Tay KC fr Belcher re latest mailer sent out (Belcher Deposition Exhibit 18)	E 0048-0047	I, R	Bar-Cohen, Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-430C		Email to Ko SP fr Belcher re initial order (Belcher Deposition Exhibit 19)	E 0060-0059	I, R	Bar-Cohen, Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-431C		Email to Michaels fr Belcher re tricolor LED (Belcher Deposition Exhibit 20)	E 0065-0063	R	Bar-Cohen, Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-432C		Email to KW fr Belcher re Query on Tr-Color LED (Belcher Deposition Exhibit 21)	E 0069-0068	R	Bar-Cohen, Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-433C		Email fr Belcher re prices for units requested (Belcher Deposition Exhibit 22)	E 0076-0075	I, R	Bar-Cohen, Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-434C		Email to Shah fr Belcher re part number for Hyper Red (Belcher Deposition Exhibit 23)	E 0081	I, R	Bar-Cohen, Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-435C		Email to Sean fr Belcher re LED order (Belcher Deposition Exhibit 24)	E 0026-0025	I, R	Bar-Cohen, Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-436C		Email to Rosemarie fr Belcher re shipment details (Belcher Deposition Exhibit 25)	E 0028	I, R	Bar-Cohen, Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-437C		Email to Sean fr Belcher re LED pricing (Belcher Deposition Exhibit 26)	E 0019-0015	I, R	Bar-Cohen, Ko Su Piow, James Belcher, Low TB	Admitted 12/17/04
CX-438C		Withdrawn				
CX-439C		Withdrawn				
CX-440C		Withdrawn				
CX-441C		Withdrawn				
CX-442C		Withdrawn				
CX-443C		Withdrawn				
CX-444C		Withdrawn				
CX-445C		Withdrawn				
CX-446C		Withdrawn				

CX-447C	10/28/2004	Deposition Designations for Ernst Nirschl, Ph.D.		C, V, I, DIT	Ernst Nirschl	Admitted 12/17/04
CX-448C		Withdrawn				
CX-449C		Withdrawn				
CX-450C		Withdrawn				
CX-451C	12/7/1999	U.S. Patent No. 5,998,925 (Nirschl Deposition Exhibit 12)		C, V	Ernst Nirschl	Admitted 12/16/04
CX-452C		Withdrawn				
CX-453C		Withdrawn				
CX-454C		Withdrawn				
CX-455C		Withdrawn				
CX-456C		Withdrawn				
CX-457C		Withdrawn				
CX-458C		Withdrawn				
CX-459C		Withdrawn				
CX-460C		Withdrawn				
CX-461C		Withdrawn				
CX-462C		Withdrawn				
CX-463C		Withdrawn				
CX-464C		Withdrawn				
CX-465C		Withdrawn				
CX-466C		Withdrawn				
CX-467C		Withdrawn				
CX-468C		Withdrawn				
CX-469C		Report: Influence of the converter grain size on the light conversion efficiency in white LEDs (Strauss Deposition Exhibit 6)	OS 010584-010589	V, I, DIT	McKittrick, Nauman, Zachau, Strauss	Admitted 12/9/04
CX-470C		Withdrawn				
CX-471C		Withdrawn				
CX-472C		Withdrawn				
CX-473C		Withdrawn				
CX-474C	10/21/2004	Deposition Designations for Lim Thian Soo		C, V, I, R	Lim Thian Soo	Admitted 12/17/04
CX-475C	Sep-02	Dominant Semiconductors Sdn. Bhd. Company Overview (Lim T.S Deposition Exhibit 1)	DS 119473-119509	C, V, I, R	Bar-Cohen, McKittrick, Nauman, Ko SP, Ko SP, Lim Thian Soo, Low TB	Admitted 1/13/05
CX-476C		Withdrawn				
CX-477C		Withdrawn				
CX-478C		Withdrawn				
CX-479C		Withdrawn				
CX-480C		Withdrawn				
CX-481C		Withdrawn				
CX-482C		Withdrawn				
CX-483C		Withdrawn				
CX-484C		Withdrawn				
CX-485C		Withdrawn				
CX-486C		Withdrawn				
CX-487C		Withdrawn				
CX-488C		Withdrawn				
CX-489C		Withdrawn				
CX-490C	8/12/2004	Email to Tan & Gregory from Ko SP re Application of LEDs (Piow Deposition Exhibit 4)	DS 120947-120965	Remedy	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-491C	8/26/2004	Email to Justine (DNS) from Ko SP re technical reading - Lumination to Illumination (Piow Deposition Exhibit 5)	DS 121705-121726	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-492C	7/25/2024	Email to Chang YY from Ko SP re Data Match w/ attached Power Top LED (Piow Deposition Exhibit 17)	DS 121092-121107	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-493C		Withdrawn				
CX-494C	9/8/2003	Email to Sunny & Ko SP fr Goh re Dominant samples for cross p/n OSRAM (Piow Deposition Exhibit 23)	DS 114754-114755	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05

CX-495C	10/7/2003	Email to Yang from Ko SP re cross-reference list (Piow Deposition Exhibit 24)	DS 120509-120511	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-496C		Withdrawn				
CX-497C		Withdrawn				
CX-498C		Withdrawn				
CX-499C		Withdrawn				
CX-500C		Withdrawn				
CX-501C		Withdrawn				
CX-502C		Advanced Power TopLED Diagrams (Arndt Deposition Exhibit 8)	OS 082743-082754	V, I, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-503C		Withdrawn				
CX-504C		Withdrawn				
CX-505C		Withdrawn				
CX-506C		Withdrawn				
CX-507C		Withdrawn				
CX-508C		Withdrawn				
CX-509C		Withdrawn				
CX-510C		Withdrawn				
CX-511		DE 196 38 667.5 (In German) (Hoehn Deposition Exhibit 3)		C, V, DIT	Waitl	Admitted 12/7/04; 12/9/04
CX-512C		Withdrawn				
CX-513C		Withdrawn				
CX-514C		Withdrawn				
CX-515C		Withdrawn				
CX-516C		Withdrawn				
CX-517C		Withdrawn				
CX-518C		Withdrawn				
CX-519C		Withdrawn				
CX-520C		Withdrawn				
CX-521C		Withdrawn				
CX-522C		Withdrawn				
CX-523C		Withdrawn				
CX-524C	3/30/2004	Email to Ko SP fr Massimo re OSRAM LW-T673Q2R2	DS 098104	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko SP	Admitted 1/13/05
CX-525C		Withdrawn				
CX-526C		Withdrawn				
CX-527C		Withdrawn				
CX-528C		Withdrawn				
CX-529C		Withdrawn				
CX-530C		Withdrawn				
CX-531C		OSRAM: Pacific Insight-License Plate Design Proposal	OS 097788-097792	V, I, DIT, DIE	Bar-Cohen, McKittrick, Nauman, Waitl, Schmitt, Chipalkatti, Huang, Peterson	Rejected 12/15/04
CX-532C		Withdrawn				
CX-533C		Withdrawn				
CX-534C	6/17/2003	OSRAM: OEM LED Bulb Presentation Cross Divisional Manufacturing Concept Team (Powerpoint Presentation)	OS 086880-086898	V, I, DIT, DIE	Bar-Cohen, McKittrick, Nauman, Waitl, Schmitt, Chipalkatti, Huang, Peterson	Admitted 12/15/04
CX-535C		Withdrawn				
CX-536C		Withdrawn				
CX-537C		Withdrawn				
CX-538C		Withdrawn				
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CX-541C		Withdrawn				
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CX-546C		Withdrawn				
CX-547C		Withdrawn				

CX-548C		Withdrawn				
CX-549C		Withdrawn				
CX-550C	8/20/2003	Email to Ko SP fr Klinksiek re equivalent to Osram Hyper Micro SIDELEDs	DS 121986	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko SP, Low TB	Admitted 1/13/05
CX-551C	2/10/2003	Email to Ko SP fr Klinksiek re LWT67C-T2U2-3C5D	DS 122027	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko SP, Low TB	Admitted 1/13/05
CX-552C	7/3/2003	Email to Ko SP fr Klinksiek re alternative Dominant device for Osram LA E67F and LA E65F	DS 122029	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko SP, Low TB	Admitted 1/13/05
CX-553C	8/15/2003	Email to Ko SP fr Klinksiek re latest update of project sheet	DS 122087-122103	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko SP, Low TB	Admitted 1/13/05
CX-554C	10/3/2003	Email to Chang YY fr Klinksiek re updated project list	DS 122104-122132	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko SP, Low TB	Admitted 1/13/05
CX-555C	9/3/2003	Email to Ko SP fr Klinksiek re updated project list	DS 122133-122176	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko SP, Low TB	Admitted 1/13/05
CX-556C	4/22/2003	Email to Ko SP fr Klinksiek re activity report	DS 122193-122205	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko SP, Low TB	Admitted 1/13/05
CX-557C		Withdrawn				
CX-558C		Withdrawn				
CX-559C	6/5/2001	Agilent and Dominant manufacturing agreement	DS 000314-000349	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko SP, Low TB	Admitted 12/10/04
CX-560C		Withdrawn				
CX-561C		Withdrawn				
CX-562C		Withdrawn				
CX-563C		Withdrawn				
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CX-566C		Withdrawn				
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CX-569C		Withdrawn				
CX-570C		Withdrawn				
CX-571C		Withdrawn				
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CX-575C		Withdrawn				
CX-576C		Withdrawn				
CX-577C		Withdrawn				
CX-578C		Withdrawn				
CX-579C	3/4/2004	Email fr Dirk Ohlrogge to Su Piow Ko re DO/SEC/ENDRICH/031 Delphi	DS 018931	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-580C	4/20/2004	Email fr Dirk Ohlrogge to Yik Yuan Change re Business Analysis Dominant with attachment - patent Projecte Dominant; Analysis Spice + Nova; potential value dominant	DS 018824-018847	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-581C		Withdrawn				
CX-582C		Withdrawn				
CX-583C		Withdrawn				
CX-584C		Withdrawn				
CX-585C		Withdrawn				
CX-586C		Withdrawn				

CX-587C	7/9/2004	Email fr Massimo re Request of quotation from Bitron (LED)	DS 062250-062251	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-588C		Withdrawn				
CX-589C		Withdrawn				
CX-590C		Withdrawn				
CX-591C		Withdrawn				
CX-592C	2/12/2004	Email to Ko Sp fr Chang YY re price for SSW-JLD-LM2-1	DS 063642	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-593C	8/3/2004	Email to Chang YY fr Wachno re possible business	DS 063631-063633	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-594C		Withdrawn				
CX-595C	2/5/2004	Email to Chang YY fr Ohlrogge re enclosed inquiry from Bally	DS 063965-063967	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-596C		Withdrawn				
CX-597C	5/25/2004	Email to Kim & Ko SP fr Tan re 36K SDW for Fujitsuden	DS 053679-053680	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-598C		Withdrawn				
CX-599C		Withdrawn				
CX-600C		Withdrawn				
CX-601C	7/14/2004	Email to Ko Sp fr Janice re enquiry on top LED for Sharp	DS 108111-108112	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-602C	7/21/2004	Email to Massimo fr Chang YY re Ible pharmacy crosses	DS 108336-108337	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-603C		Withdrawn				
CX-604C		Withdrawn				
CX-605C		Withdrawn				
CX-606C		Withdrawn				
CX-607C		Withdrawn				
CX-608C	1/25/2002	Email to Low TB fr Tan re Osram - White for Ford	DS 132061-132064	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 12/10/04
CX-609C		Withdrawn				
CX-610C		Withdrawn				
CX-611C		Withdrawn				
CX-612C		Withdrawn				
CX-613C		Withdrawn				
CX-614C		Withdrawn				
CX-615C		Withdrawn				
CX-616C	8/10/2004	Email to Ko SP fr Klinksiek re Dominant Sales	DS 106509-106514	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 12/10/04
CX-617C		Withdrawn				
CX-618C		Withdrawn				
CX-619C	4/13/2004	Email to Low TB & Mel Kuan fr Ko SP re DDS-SJS with 30mA	DS 080069	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 12/10/04
CX-620C	4/19/2004	Email to Kuan fr Ko Sp re samples for Delco	DS 080355	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 12/10/04
CX-621C		Withdrawn				
CX-622C		Withdrawn				
CX-623C		Withdrawn				
CX-624C		Withdrawn				
CX-625C		Withdrawn				

CX-626C		Withdrawn				
CX-627C		Distributors Report - Taiwan ROC Trip from 24/6/2002 to 28/6/2002	DS 099260-099262	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 12/10/04
CX-628C	6/3/2002	Email to Tay KC fr Ko SP Re attached World Wide Marketing Strategy slide	DS 099294-099296	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-629C	10/3/2002	Email from Tay KC re SooGhee's update	DS 099496	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-630C		Withdrawn				
CX-631C		Withdrawn				
CX-632C		Withdrawn				
CX-633C	7/20/2004	Price List for Dominant Products	DS 100217-100226	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-634C		Withdrawn				
CX-635C	7/2/2004	Email to Messeri fr Chang YY re attached pricing information	DS 100758-100764	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-636C	7/21/2004	Email to Chang YY and Ko SP re Massimo re Marelli	DS 100913-100915	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko Su Piow, Low TB	Admitted 1/13/05
CX-637C		Withdrawn				
CX-638C		Withdrawn				
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CX-796C		Withdrawn				
CX-797C		Withdrawn				
CX-798C	8/3/1993	Mini SIDELED Diagram	OS 034219	V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-799C		Withdrawn				
CX-800C		Withdrawn				
CX-801C	Apr-94	SMT MINI-SIDELED	OS 034243	V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-802C		Withdrawn				
CX-803C		Withdrawn				
CX-804C		Withdrawn				
CX-805C		Withdrawn				
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CX-812C		Withdrawn				
CX-813C		Withdrawn				
CX-814C		Withdrawn				
CX-815C		Withdrawn				
CX-816C		Withdrawn				
CX-817C		Withdrawn				
CX-818C		Withdrawn				
CX-819C	10/29/1999	Diagram - Micro SIDELED - Leadframe pre molded	OS 039006	V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04

CX-820C	10/29/1999	Diagram - Micro SIDELED	OS 039003	V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-821C		Osram - Hyper Micro SIDELED Hyper-Bright LED LB Y87S Preliminary Data	OS 006313-006325	V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-822C	1/22/2003	trim and form/singulation - Micro SIDELED Diagram	OS 039023	V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-823C		Withdrawn				
CX-824C	8/19/2003	Die and Wire Bonding Micro SIDELED Diagram	OS 039022	V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-825C		Withdrawn				
CX-826C		Withdrawn				
CX-827C	1/25/2002	OSRAM: Advanced Power TopLED Powerpoint Presentation	OS 086650-086658	V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-828C	2/5/2002	Leadframe pre molded diagram	OS 091201	V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-829C	4/29/2002	Attachment to Project Review: M1 - Development Proposal Advanced Power TOPLED	OS 082735	V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-830C	8/5/2003	Die and Wire Bonding Diagram	OS 082747	V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-831C	9/8/2004	OSRAM: Advanced Power TopLED packet (Powerpoint Presentation)	OS 086600-086604	V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-832C		Withdrawn				
CX-833C	11/8/1995	Leadframe (rough) Power TOPLED Diagram	OS 002060	V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-834C		Withdrawn				
CX-835C		Withdrawn				
CX-836C	4/22/1996	SIEMENS - Target Specification for Power TOPLED	OS 001896	V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-837C	10/31/1996	SIEMENS OPTO Semiconductor - TSK - Test mit Power TOPLED	OS 000208-000241	V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-838C		Withdrawn				
CX-839C		Withdrawn				
CX-840C		Withdrawn				
CX-841C		Withdrawn				
CX-842C		Withdrawn				
CX-843C		Withdrawn				
CX-844C		Withdrawn				
CX-845C		Withdrawn				
CX-846C		Withdrawn				
CX-847C		Withdrawn				
CX-848C		Withdrawn				
CX-849C		Withdrawn				
CX-850C		Withdrawn				
CX-851C	10/6/1997	Diagram - die and wire bonding - Power TOPLED	OS 036787	V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-852C		Withdrawn				
CX-853C		Withdrawn				
CX-854C		Withdrawn				
CX-855C		Withdrawn				
CX-856C		Withdrawn				
CX-857C		Withdrawn				
CX-858C		Withdrawn				
CX-859C		Withdrawn				
CX-860C	7/17/2002	Dominant - Power TOPLED preliminary data	DS 005498-005512	I	Bar-Cohen,	Admitted 12/7/04
CX-861C		Withdrawn				
CX-862C	9/12/2003	Leadframe pre molded Power TOPLED Diagram	OS 036748	V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-863		Withdrawn				
CX-864C		Withdrawn				
CX-865		Withdrawn				
CX-866		Withdrawn				
CX-867C		Withdrawn				
CX-868		Withdrawn				
CX-869		Withdrawn				
CX-870		Withdrawn				

CX-871	10/12/2004	Letter to Heilbrunn fr Shaw re supplement to prior discovery responses		I, V, R	Bar-Cohen, McKittrick, Nauman, Ko SP, Low TB	Admitted 12/9/04
CX-872		Withdrawn				
CX-873		Withdrawn				
CX-874		Withdrawn				
CX-875		Withdrawn				
CX-876		Withdrawn				
CX-877		Various invoices from Dominant Semiconductors Sdn Bhd to Phosphor Technology Ltd	DS 122330-122341	I, V	McKittrick, Nauman, Ko SP, Low TB	Admitted 12/10/04
CX-878C		Blue LED Phosphor Type QMK58/F-U1	DS 122370	I, V	McKittrick, Nauman, Ko SP, Low TB	Admitted 12/9/04; 12/10/04
CX-879C		Withdrawn				
CX-880C		Withdrawn				
CX-881C		Withdrawn				
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CX-893C		Withdrawn				
CX-894C		Withdrawn				
CX-895C		Withdrawn				
CX-896C		Withdrawn				
CX-897C	4/11/2003	Email fr Ko SP to John Lin re Data request for Super Nova with attachments	DS 025806-025815	I, V, R	McKittrick, Nauman, Ko SP, Low TB	Admitted 12/7/04
CX-898C		Withdrawn				
CX-899C		Withdrawn				
CX-900C		Withdrawn				
CX-901C		Withdrawn				
CX-902C		Withdrawn				
CX-903C		Withdrawn				
CX-904C		Withdrawn				
CX-905C	4/21/2004	Email fr Ko SP to John Lin re our problem with attachments	DS 026026-026035	I, V, R	McKittrick, Nauman, Ko SP, Low TB	Admitted 1/13/05
CX-906C		Withdrawn				
CX-907C		Withdrawn				
CX-908C		Withdrawn				
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CX-934C		Withdrawn				
CX-935C		Withdrawn				
CX-936C		Withdrawn				
CX-937C	6/21/2004'	Email to Cheng fr Tay KC re Osram Complaint	DS 096150-096153	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko SP, Low TB	Admitted 12/10/04
CX-938C		Withdrawn				
CX-939C		Withdrawn				
CX-940C	7/2/2004	Email to Ko SP fr Sunny (Jannock) re attached new OSRAM Hyper TOPLED preliminary data sheet	DS 079369-079383	I, V, R	Bar-Cohen, McKittrick, Nauman, Ko SP, Low TB	Admitted 1/13/05
CX-941C		Withdrawn				
CX-942C		Withdrawn				
CX-943C		Withdrawn				
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CX-972C		Withdrawn				
CX-973C		Withdrawn				
CX-974C		Withdrawn				
CX-975C		Withdrawn				
CX-976C	1/5/2004	Email fr Low TB to Jason re High Power Nova LED with attachments SP NovaLED 350 InGaN White-Catalogue	DS 028714-028731	I, V, R	McKittrick, Nauman, Ko SP, Low TB	Admitted 12/10/04
CX-977C		Withdrawn				
CX-978C		Withdrawn				
CX-979C		Withdrawn				
CX-980C		Withdrawn				
CX-981C		Withdrawn				
CX-982C		Withdrawn				
CX-983C		Withdrawn				
CX-984C		Withdrawn				
CX-985C	4/30/2003	Email fr Ko SP to Dirk Ohlrogge re DO/SEC/GIRA/001	DS 020300-020309	I, V, R	McKittrick, Nauman, Ko SP, Low TB	Admitted 1/13/05
CX-986C		Withdrawn				
CX-987C		Withdrawn				
CX-988C		Withdrawn				
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CX-993C		Withdrawn				
CX-994C		Withdrawn				
CX-995C		Withdrawn				
CX-996C		Withdrawn				
CX-997C	6/18/2003	JP 5-152609 (Japanese with English Translation)	OS 043379-043386	C, V	McKittrick, Nauman, Zachau, Strauss	Admitted 12/16/04
CX-998C		Withdrawn				
CX-999C		Withdrawn				
CX-1000C		Withdrawn				
CX-1001C		Withdrawn				
CX-1002C		Withdrawn				
CX-1003C		Withdrawn				
CX-1004	12/21/2000	DE 297 24 382 (German with English translation)	OS 017133-017156	V, I, DIT	McKittrick, Nauman, Zachau, Strauss	Admitted 12/9/04
CX-1005C		Withdrawn				
CX-1006C	9/13/1999	SEM Micrograph of Mix of Phosphors from Dominant	OS 137428	V, I, DIT	McKittrick, Nauman, Waitl, Zachau, Strauss	Admitted 12/9/04
CX-1007C		Withdrawn				
CX-1008C		Withdrawn				
CX-1009C		Withdrawn				
CX-1010C		Withdrawn				
CX-1011C		Withdrawn				
CX-1012C		Withdrawn				
CX-1013C		Withdrawn				
CX-1014C		Withdrawn				
CX-1015C		Withdrawn				
CX-1016C		Withdrawn				
CX-1017C		Withdrawn				
CX-1018C		Withdrawn				
CX-1019C		Withdrawn				
CX-1020C		Withdrawn				
CX-1021C		Withdrawn				
CX-1022C		Withdrawn				
CX-1023C		Withdrawn				
CX-1024C		Withdrawn				
CX-1025C		Withdrawn				
CX-1026C		Withdrawn				
CX-1027C		LUCO Project timeline (German with English translation)	OS 031069	V, I, DIT	McKittrick, Nauman, Zachau, Waitl	Admitted 12/7/04
CX-1028C		Withdrawn				
CX-1029C		LUCO Project timeline (German with English translation)	OS 010576	V, I, DIT	McKittrick, Nauman, Zachau, Waitl	Admitted 12/7/04
CX-1030C		Light-Emitting Diodes with Luminescence Converters (LUCOLED) (German with English translation)	OS 031150-031154	V, I, DIT	McKittrick, Nauman, Zachau, Waitl	Admitted 12/7/04
CX-1031C		Withdrawn				
CX-1032C		Withdrawn				
CX-1033C		Luminescence Conversion of Blue Emitting Diodes (German with English translation)	OS 006546-006550	V, I, DIT	McKittrick, Nauman, Zachau, Waitl	Admitted 12/7/04
CX-1034C		Withdrawn				
CX-1035C		Withdrawn				
CX-1036C		Withdrawn				
CX-1037C		Withdrawn				
CX-1038C		Withdrawn				
CX-1039C		Withdrawn				
CX-1040C		Withdrawn				
CX-1041C		Withdrawn				
CX-1042C		Withdrawn				
CX-1043C	1/29/1997	Meeting Notes re Plan visit and meeting at OSRAM GmbH in Schwarnunchen and Augsburg (German with English translation)	OS 008236	V, I, DIT	McKittrick, Nauman, Zachau, Waitl	Admitted 12/7/04
CX-1044C		Withdrawn				

CX-1045C	2/20/1997	Letter to Waitl fr Kummer re tests to produce a fine grain yellow fluorescent L 175 (German with English translation)	OS 008232	V, I, DIT	McKittrick, Nauman, Zachau, Waitl	Admitted 12/7/04
CX-1046C		Withdrawn				
CX-1047C		Withdrawn				
CX-1048C		Withdrawn				
CX-1049C		Withdrawn				
CX-1050C		Withdrawn				
CX-1051C		Withdrawn				
CX-1052C		Withdrawn				
CX-1053C		Withdrawn				
CX-1054C		Withdrawn				
CX-1055C		Withdrawn				
CX-1056C		Withdrawn				
CX-1057C		Withdrawn				
CX-1058C		Withdrawn				
CX-1059C		Withdrawn				
CX-1060C		Withdrawn				
CX-1061C		Withdrawn				
CX-1062C		Withdrawn				
CX-1063C		Withdrawn				
CX-1064C		Withdrawn				
CX-1065C		Withdrawn				
CX-1066C		Withdrawn				
CX-1067C		Withdrawn				
CX-1068C		Withdrawn				
CX-1069C		Withdrawn				
CX-1070C		Withdrawn				
CX-1071C		Withdrawn				
CX-1072C		Withdrawn				
CX-1073C		Withdrawn				
CX-1074C		Withdrawn				
CX-1075C		Withdrawn				
CX-1076C		Withdrawn				
CX-1077C		Withdrawn				
CX-1078C		Withdrawn				
CX-1079C		Withdrawn				
CX-1080C		Withdrawn				
CX-1081C		Withdrawn				
CX-1082C	3/22/2004	Report: Radiation pattern	OS 010658-010659	V, I, DIT	McKittrick, Nauman, Zachau, Waitl, Strauss	Admitted 12/9/04
CX-1083C	7/16/2003	Meeting LED fluorescent substances Schwabmunchen DP-M F. Zwaschka (German with English translation)	OS 008076-008082	V, I, DIT	McKittrick, Nauman, Zachau, Waitl	Admitted 12/16/04
CX-1084C	10/14/2004	SEM: Dominant novaLED (NPW-CED-VW2-1)	OS 115189-115190	C, V, I	McKittrick, Nauman, Strauss	Admitted 12/9/04
CX-1085C		Product Tests	OS 115191-115270	C, V, I	McKittrick, Nauman, Strauss	Admitted 12/9/04
CX-1086C	9/7/2004	REM: Dominant DSW-USD-ST2-1	OS 115271-115273	C, V, I	McKittrick, Nauman, Strauss	Admitted 12/9/04
CX-1087C	3/8/2004	Analysis Report: Dominant DDW-UJD-TU2-1-VX	OS 115274-115275	C, V, I	McKittrick, Nauman, Strauss	Admitted 12/9/04
CX-1088C	3/8/2004	Analysis Report: Dominant LED DSW-USD-ST2-1	OS 115276-115277	C, V, I	McKittrick, Nauman, Strauss	Admitted 12/9/04
CX-1089C	3/8/2004	Analysis Report: Dominant LED DWW-SJD-TU2-1	OS 115278-115279	C, V, I	McKittrick, Nauman, Strauss	Admitted 12/9/04
CX-1090C	2/18/2004	Analysis Report: TOPLED LW T673	OS 115280-115281	V, I, DIT	McKittrick, Nauman, Strauss	Admitted 12/9/04
CX-1091C	2/18/2004	Analysis Report: TOPLED LW T67C	OS 115282-115283	V, I, DIT	McKittrick, Nauman, Strauss	Admitted 12/9/04
CX-1092C		Withdrawn				
CX-1093C	4/13/2004	SEM Micrograph of QMK-N from Dominant	OS 137431	V, I, DIT	McKittrick, Nauman, Zachau	Admitted 12/9/04
CX-1094C	4/8/2004	SEM Micrograph of QMK-F From Phosphor Technology	OS 137432	V, I, DIT	McKittrick, Nauman, Zachau	Admitted 12/9/04
CX-1095C	3/5/2004	SEM Micrograph of QMK-N from Phosphor Technology	OS 137433	V, I, DIT	McKittrick, Nauman, Zachau	Admitted 12/9/04

CX-1096C	9/9/2004	Physikalische Fehleranalyse	OS 132257-132275	V, I, DIT	McKittrick, Nauman, Zachau, Strauss	Admitted 12/9/04
CX-1097C		Withdrawn				
CX-1098C		Withdrawn				
CX-1099C		Withdrawn				
CX-1100C		Withdrawn				
CX-1101C		Withdrawn				
CX-1102C		Withdrawn				
CX-1103C		Withdrawn				
CX-1104C		Withdrawn				
CX-1105C		Withdrawn				
CX-1106C		Withdrawn				
CX-1107C		Withdrawn				
CX-1108C		Withdrawn				
CX-1109C		Withdrawn				
CX-1110C		Withdrawn				
CX-1111C		Withdrawn				
CX-1112C		Withdrawn				
CX-1113C		Withdrawn				
CX-1114C		Withdrawn				
CX-1115C		Withdrawn				
CX-1116C		Withdrawn				
CX-1117C		Withdrawn				
CX-1118C		Withdrawn				
CX-1119C		Withdrawn				
CX-1120C		Withdrawn				
CX-1121C		Withdrawn				
CX-1122C		Withdrawn				
CX-1123C		Withdrawn				
CX-1124C		Withdrawn				
CX-1125C		Withdrawn				
CX-1126C	5/12/1992	Japanese Patent No. 4-137570	DS 149513-149519	C, V	McKittrick, Nauman, Zachau, Strauss	Admitted 12/16/04
CX-1127C	2/23/1995	Concept 241 - Leadframe Diagram	OS 033880	C, V, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-1128C		Withdrawn				
CX-1129		Excerpt from the "Phosphor Handbook"	OS 137334-137335	I, V, DIT	McKittrick, Nauman, Zachau, Strauss	Admitted 12/16/04
CX-1130	12/7/1999	U.S. Patent No. 5,998,925	OS 137336-137375	C, V	Nauman, McKittrick, Holloway	Admitted 12/16/04
CX-1131		Withdrawn				
CX-1132C		Withdrawn				
CX-1133C	11/26/2001	OSRAM Opto Semiconductors PACE Site Review Ford Motor Company Presentation	OS 116424-116467	C, V, DIT, DIE	Bar-Cohen, McKittrick, Nauman, Schmitt, Chipalkatti, Huang	Rejected 12/15/04
CX-1134C	9/21/2001	Harmonized White LED Lighting to Achieve OEM Brand Signature Theme	OS 116468-116483	C, V, DIT, DIE	Bar-Cohen, McKittrick, Nauman, Schmitt, Chipalkatti, Huang	Rejected 12/15/04
CX-1135C		Withdrawn				
CX-1136C		Withdrawn				
CX-1137C	7/22/2002	Process Instruction For Trim and Form Machine	DS 003177-003182	I	Bar-Cohen, Ko SP, Low TB	Admitted 12/7/04; 12/10/04
CX-1138C		Withdrawn				
CX-1139C	6/26/1997	Mini SIDELED Diagram	OS 032783	V, I, DIT	Bar-Cohen, Waitl, Ko SP, Low TB	Admitted 12/7/04
CX-1140C		Withdrawn				
CX-1141C		Withdrawn				
CX-1142C		Withdrawn				
CX-1143C		Withdrawn				
CX-1144C		Withdrawn				
CX-1145C		Withdrawn				
CX-1146C		Withdrawn				

CX-1147C		Claims of U.S. Patent No. 6,613,247 vs. White Dominant DomiLEDs, Power DomiLEDs, Super Small DomiLEDs, and NovaLEDs	OS 082474	V, I	Bar-Cohen, McKittrick, Nauman, Adelman, Strauss	Admitted 12/7/04
CX-1148C		Withdrawn				
CX-1149C		Withdrawn				
CX-1150C	11/3/2004	Deposition Designations for Lim CS		C, V, I, R	Lim CS, Low TB	Admitted 12/17/04
CX-1151C		Withdrawn				
CX-1152C		Withdrawn				
CX-1153C		Withdrawn				
CX-1154C		Withdrawn				
CX-1155C		Withdrawn				
CX-1156C		Excerpt from the "Phosphor Handbook" (Holloway Deposition Exhibit 1)		V, I, DIT	McKittrick, Nauman, Zachau, Strauss, Holloway	Admitted 12/16/04
CX-1157C		Withdrawn				
CX-1158C		Withdrawn				
CX-1159C		Excerpt from the "Phosphor Handbook" (Holloway Deposition Exhibit 4)		V, I, DIT	McKittrick, Nauman, Zachau, Strauss, Holloway	Admitted 12/16/04
CX-1160C		Withdrawn				
CX-1161C		Withdrawn				
CX-1162C		Withdrawn				
CX-1163C		Measurement and Data Representation (Holloway Deposition Exhibit 10)		V, I, DIT	McKittrick, Nauman, Zachau, Strauss, Holloway	Admitted 12/9/04
CX-1164C	11/3/2004	Deposition of Kin Shin Lai		C, V, I, DIT	Low TB, Lim CS	Admitted 12/7/04
CX-1165C		Withdrawn				
CX-1166C		Withdrawn				
CX-1167C		Withdrawn				
CX-1168C		Withdrawn				
CX-1169C		Withdrawn				
CX-1170C		Withdrawn				
CX-1171C		Withdrawn				
CX-1172C		Withdrawn				
CX-1173C		Withdrawn				
CX-1174C	6/30/2003	Advanced Power TOPLED LL Diagram	OS 082771	V, I, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-1175C	10/14/2004	LED Bulb Engineering and AE Support - R&D Costs Oct-May FY 03/04	OS 132276	DIT, DIE	Schmitt, Chipalkatti, Huang, Peterson	Admitted 12/15/04
CX-1176C		LED Application Engineering Group FY 01/02	OS 132277	DIT, DIE	Schmitt, Chipalkatti, Huang, Peterson	Admitted 12/15/04
CX-1177C		LED Application Engineering Group FY 02/03	OS 132278	DIT, DIE	Schmitt, Chipalkatti, Huang, Peterson	Admitted 12/15/04
CX-1178C		LED Application Engineering Group Oct-May GY 03/04	OS 132279	DIT, DIE	Schmitt, Chipalkatti, Huang, Peterson	Admitted 12/15/04
CX-1179C		Withdrawn				
CX-1180C		QA Group FY 01/02	OS 132281	DIT, DIE	Schmitt, Chipalkatti, Huang, Peterson	Admitted 12/15/04
CX-1181C		QA Group FY 02/03	OS 132282	DIT, DIE	Schmitt, Chipalkatti, Huang, Peterson	Admitted 12/15/04
CX-1182C		QA Group Oct-May FY 03/04	OS 132283	DIT, DIE	Schmitt, Chipalkatti, Huang, Peterson	Admitted 12/15/04
CX-1183C		Withdrawn				
CX-1184C		LM Business Unit FY 01/02	OS 132285	DIT, DIE	Schmitt, Chipalkatti, Huang, Peterson	Admitted 12/15/04

CX-1185C		LM Business Unit FY 02/03	OS 132286	DIT, DIE	Schmitt, Chipalkatti, Huang, Peterson	Admitted 12/15/04
CX-1186C		LM Business Unit Oct-May FY 03/04	OS 132287	DIT, DIE	Schmitt, Chipalkatti, Huang, Peterson	Admitted 12/15/04
CX-1187C		Withdrawn				
CX-1188C		Withdrawn				
CX-1189C		Withdrawn				
CX-1190C		Withdrawn				
CX-1191C		Withdrawn				
CX-1192C		Withdrawn				
CX-1193C		Withdrawn				
CX-1194C		Withdrawn				
CX-1195C		Withdrawn				
CX-1196C		Withdrawn				
CX-1197C		Withdrawn				
CX-1198C		Withdrawn				
CX-1199C		Withdrawn				
CX-1200C		Withdrawn				
CX-1201C		Withdrawn				
CX-1202C		AMODEL A-1133 NL WH 505 Engineering Resin	OS 137325-137326	V, I, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-1203C		Provisional Data Sheet Grivory HT - Grivory XE 3825 White 6861 Product Description	OS 137327-137331	V, I, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-1204C	Oct-97	"Sumeresin Excel" CRM-1084	OS 137332	V, I, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-1205C		Withdrawn				
CX-1206C		Withdrawn				
CX-1207C		Withdrawn				
CX-1208C	10/10/2003	Leadframe raw Diagram	OS 039169	V, I, DIT	Bar-Cohen, Waitl	Admitted 12/7/04
CX-1209C		Withdrawn				
CX-1210C		SEM Micrograph of QUMK from Dominant	OS 137434	I	Low TB, Nauman, McKittrick, Holloway	Admitted 12/9/04
CX-1211C		SEM Micrograph of QUMK from Phosphor Technology	OS 137435	I	Low TB, Nauman, McKittrick, Holloway	Admitted 12/9/04
CX-1212C		Datasheet for QMK58 from Phosphor Technology	OS 115180-115182	I	Low TB, Nauman, McKittrick, Holloway	Admitted 12/9/04
CX-1213C		Yitrium Aluminate Phosphor Datasheet from Phosphor Technology	OS 115183-115185	I	Low TB, Nauman, McKittrick, Holloway	Admitted 12/9/04
CX-1214C		(Yitrium, Gadolinium) Aluminate Phosphor Datasheet from Phosphor Technology	OS 115186-115188	I	Low TB, Nauman, McKittrick, Holloway	Admitted 12/9/04
CX-1215C		Claims of U.S. Patent Nos. 6,066,861; 6,245,259; 6,277,301; 6,592,780; and 6,613,247 vs. White Dominant DomiLEDs, Power DomiLEDs, Super Small DomiLEDs, NovaLEDs, and D-Spice LEDs	OS 139537-139553	I	McKittrick, Adelman	Admitted 12/16/04
CX-1216C		Claims of U.S. Patent No. 6,576,903 vs. White DomiLEDs, Power DomiLEDs, and Super Small DomiLEDs	OS 139554-139557	I	McKittrick, Adelman	Admitted 12/16/04
CX-1217C		Claims of U.S. Patent Nos. 6,066,861; 6,245,259; 6,277,301; 6,592,780; and 6,613,247 for OSRAM Products	OS 139558-139574	DIT	McKittrick, Adelman	Admitted 12/16/04
CX-1218C		Claim of U.S. Patent No. 6,576,930 for OSRAM Products	OS 139575-139576	DIT	McKittrick, Adelman	Admitted 12/16/04
CX-1219		Red LED and inside view of the diode (Figure 1 from the Expert Report of Dr. Joanna McKittrick)		C, I, V, DIT	McKittrick	Admitted 12/16/04
CX-1220		Layered structure of the LED (Figure 2 from the Expert Report of Dr. Joanna McKittrick)		C, I, V, DIT	McKittrick	Admitted 12/16/04

CX-1221		Cross-section of a blue-emitting LED (Figure 3 from the Expert Report of Dr. Joanna McKittrick)		C, I, V, DIT	McKittrick	Admitted 12/16/04
CX-1222		Withdrawn				
CX-1223		Withdrawn				
CX-1224		Different ways that white light can be produced based on blue-emitting LED technology (Figure 6 from the Expert Report of Dr. Joanna McKittrick)		C, I, V, DIT	McKittrick	Admitted 12/16/04
CX-1225		CIE chromaticity diagram (Figure 7 from the Expert Report of Dr. Joanna McKittrick)		C, I, V, DIT	Strauss, Zachau, McKittrick	Admitted 12/16/04
CX-1226		Withdrawn				
CX-1227C		PPAP and FAR for the QA Group by Fiscal Year	OS 137440-137448	C, V, DIT, DIE	Schottes, Schmitt, Huang, Chipalkatti, Peterson	Admitted 12/15/04
CX-1228C		LED Bulb L1224R Production Components	OS 137554	C, DIT, DIE	Peterson	Admitted 12/15/04
CX-1229C		Withdrawn				
CX-1230C	11/3/2004	Lumileds Lighting and Philips Announce New Partnership	OS 138556-138557	DIE, DIT, R	Waitl, Huang, Schmitt, Chipalkatti, Peterson, Shottes	Admitted 12/15/04
CX-1231C		Lamp Module Group Documents	OS 137590-137751	C, V, DIT, DIE	Schottes, Schmitt, Huang, Chipalkatti, Peterson	Admitted 12/15/04
CX-1232C		LED AE Group Monthly Reports	OS 137752-138219	C, V, DIT, DIE	Schottes, Schmitt, Huang, Chipalkatti, Peterson	Rejected 12/15/04
CX-1233		Withdrawn				
CX-1234		Withdrawn				
CX-1235		Withdrawn				
CX-1236		Withdrawn				
CX-1237		Withdrawn				
CX-1238	1/24/2000	Amendment from the File History of 09/221,789	OS 115875-115888	I, V, DIT	McKittrick	Admitted 12/16/04
CX-1239	9/12/2000	Preliminary Amendment from the File History of 09/221,789	OS 115856-115868	I, V, DIT	McKittrick	Admitted 12/16/04
CX-1240		File History of 09/221,789	OS 115317-116376	I, V, DIT	McKittrick	Admitted 12/9/04
CX-1241	1/2/1998	DE 196 25 622 A1 (German with English Translation)	OS 139577-139588 and OS 116499-116512	I, V, DIT	Strauss, Zachau, McKittrick, Nauman, Waitl	Admitted 12/7/04
CX-1242		Withdrawn				
CX-1243		Excerpt of Dictionary of Engineering and Technology, Volume 1, German English	OS 139590-139592	I, V, DIT	Strauss, Zachau, McKittrick, Nauman, Waitl	Admitted 12/9/04
CX-1244C		Test Particle	OS 139593	I, V, DIT	Nauman	Admitted 12/9/04
CX-1245C		SEM Calibration	OS 139589	I, V, DIT	Nauman	Admitted 12/9/04
CX-1246C		Microtrac S3000 Data Description	DS 149711-149725	I, V, DIT	Nauman, McKittrick	Admitted 12/9/04
CX-1247C		Withdrawn				
CX-1248C		Withdrawn				
CX-1249C		Withdrawn				
CX-1250C		Withdrawn				
CX-1251C		Withdrawn				
CX-1252C		Withdrawn				
CX-1253C		Phosphor Technology Services Offered - Particle Size Analysis web pages	DS 149742-149744	I, V	Nauman, McKittrick	Admitted 12/16/04
CX-1254		Withdrawn				
CX-1255C		Withdrawn				
CX-1256C		Withdrawn				
CX-1257C		Withdrawn				
CX-1258C		Withdrawn				
CX-1259C		Withdrawn				

CX-1260C		Withdrawn				
CX-1261C		Withdrawn				
CX-1262C		Withdrawn				
CX-1263C		Withdrawn				
CX-1264C		Withdrawn				
CX-1265C		Withdrawn				
CX-1266C		Withdrawn				
CX-1267C		Withdrawn				
CX-1268C		Withdrawn				
CX-1269C		Withdrawn				
CX-1270C	10/7/2004	OSRAM Global Automotive Lighting LED Bulb Variants Costed BOM Summary	OS 138685-138696	C, DIE, DIT	Schottes, Peterson	Admitted 12/17/04
CX-1271C		Withdrawn				
CX-1272C		Withdrawn				
CX-1273		English translation of Application No. DE 196 38 667.5 (Adelman Deposition Exhibit 12)		I, V	Waitl, McKittrick, Nauman	Admitted 12/7/04; 12/9/04
CX-1274C		Withdrawn				
CX-1275C		Withdrawn				
CX-1276C		Withdrawn				
CX-1277		Withdrawn				
CX-1278C		Withdrawn				
CX-1279		Withdrawn				
CX-1280C		Withdrawn				
CX-1281		Withdrawn				
CX-1282		Withdrawn				
CX-1283C		Withdrawn				
CX-1284C		Withdrawn				
CX-1285C		Withdrawn				
CX-1286C		Withdrawn				
CX-1287C		Withdrawn				
CX-1288C		Withdrawn				
CX-1289C	11/5/2004	Visualization of LED devices outer lead surfaces (Exhibit M To the Supplemental Expert Report of Dr. Avram Bar-Cohen)		I, V, DIT	Bar-Cohen	Admitted 12/7/04
CX-1290C		Withdrawn				
CX-1291C		Withdrawn				
CX-1292C		Withdrawn				
CX-1293C		Withdrawn				
CX-1294		WO 98/12757	OS 139603-139633	I, V	Waitl, McKittrick, Nauman	Admitted 12/9/04
CX-1295C		Withdrawn				
CX-1296C		GMT305 CHMSL LED Module	OS 139634	DIT, DIE	Schottes, Schmitt, Huang, Chipalkatti, Peterson	Admitted 12/15/04
CX-1297C		AM803RCL LED Module	OS 139635-139637	DIT, DIE	Schottes, Schmitt, Huang, Chipalkatti, Peterson	Admitted 12/15/04
CX-1298C		LED with Stretched Reflector	OS 139641	I, V	Strauss, McKittrick	Admitted 12/9/04
CX-1299C		PCB Layout Design for Dacoma Auto Systems - White Light LED	OS 139638	I, DIT	Waitl, Bar-Cohen, Huang, Schmitt, Chipalkatti, Peterson, Shottes	Admitted 12/15/04
CX-1300C		Laser Light Scattering With Multiple Scattering Suppression Used to Measure Particle Sizes	OS 139639-139640	I, V	Nauman, McKittrick, Strauss, Zachau	Admitted 12/9/04
CX-1301C	11/19/2004	Direct Testimony of Guenter Waitl		C, I, V, DIT	Waitl	Admitted 12/6/04
CX-1302C	11/19/2004	Direct Testimony of Dr. Avram Bar-Cohen		I, V, DIT	Bar-Cohen	Admitted 12/6/04
CX-1303C	11/19/2004	Corrected Direct Testimony of Dr. Joerg Strauss		I, V, DIT	Strauss	Admitted 12/7/04
CX-1304C	11/21/2004	Testimony of Dr. E. Bruce Nauman		I, V, DIT	Nauman	Admitted 12/7/04
CX-1305C		Withdrawn				

CX-1306C		Withdrawn				
CX-1307C	11/19/2004	Direct Testimony of Michelle Huang		DIE	Huang	Admitted 12/15/04
CX-1308C	11/19/2004	Direct Testimony of Dr. Makarand Chipalkatti		DIE	Chipalkatti	Admitted 12/15/04
CX-1309C	11/19/2004	Direct Testimony of Fredrick Arnold Peterson, III		DIE	Peterson	Admitted 12/15/04
CX-1310C	11/20/2004	Direct Testimony of Michael Schmitt		DIE	Schmitt	Admitted 12/15/04
CX-1311C	11/19/2004	Direct Testimony of Dr. Martin Zachau		I, DIT	Zachau	Admitted 12/10/04
CX-1312C	12/5/2004	Direct Testimony of Martin Zachau, Ph.D.		I, DIT	Zachau	Admitted 12/10/04
CX-1313C	11/24/2004	Rebuttal Testimony of Dr. Avram Bar-Cohen		I, V	Bar-Cohen	Admitted 12/10/04
CX-1314C	12/5/2004	Rebuttal Examination of Martin Zachau, Ph.D		I, V	Zachau	Admitted 12/14/04
CX-1315C	11/24/2004	Rebuttal Testimony of Dr. E. Bruce Nauman		I, V	Nauman	Admitted 12/14/04
CX-1316C		Withdrawn				
CX-1317	3/21/2003	"Synergistic Temperature and Electron Irradiation Effects on the Degradation of Cathodoluminescent ZnS:Ag,Cl Powder Phosphors," by B. L. Abrams, et al.		I, V	Holloway	Admitted 12/16/04
CX-1318	11/14/2000	"Effect of Drug Substance Particle Size on the Characteristics of Granulation Manufactured in a High-Shear Mixer," by Sherif I. Farag Badawy, et al.		I, V	Holloway	Admitted 12/16/04
CX-1319		"Breaking the Boundaries of Jameson Cell Capacity," by A.S. Murphy, et al.		I, V	Holloway	Admitted 12/16/04
CX-1320	11/13/2003	U.S. Patent Application Publication No. 2003/0209694 A1		V	Holloway	Admitted 12/16/04
CX-1321C		SEM Image	DS 149771	I	Holloway	Admitted 12/16/04
CX-1322		Excerpt from the Phosphor Handbook, by Shigeo Shionoya, et al.		V	Holloway	Admitted 12/16/04
CX-1323C		SEM Image	DS 149758	I	Holloway	Admitted 12/16/04
CX-1324		D&O Ventures Berhad Prospectus		R	Ko SP	Admitted 1/13/05
CX-1325		Withdrawn				
CX-1326C		LED Device Data	OS 137436	I, V, DIT	Nauman, Holloway	Admitted 12/16/04
CX-1327C		Smartech 1607 CS Devices	OS 137437	I, V, DIT	Nauman, Holloway	Admitted 12/16/04
CX-1328C		OSRAM Powder Analyses	OS 137438	DIT	Nauman, Holloway	Admitted 12/16/04
CX-1329C		OSRAM Data	OS 137439	DIT	Nauman, Holloway	Admitted 12/16/04
CX-1330		Dominant website		R	Ko SP	Admitted 1/13/05
CX-1331C	8/2/2004	Email fr Goh to Ian Lai re application notes on the bikini LEDs (Piow Deposition Exhibit 12)	DS 067663-067664	R	Ko SP	Admitted 1/13/05
CX-1332C	8/3/2004	Email fr Ko SP to Kuan re ADP guarantee letter (Piow Deposition Exhibit 14)	DS 121852-121853	R	Ko SP	Admitted 1/13/05
CX-1333C		Withdrawn				
CX-1334	2/20/2002	Agilent Technologies introduces series of LEDs for automotive interiors, industrial instruments and electrical appliances		R	Ko SP	Admitted 1/13/05
CX-1335		Excellence Opto, Inc. Website		R	Ko SP	Admitted 1/13/05

CX-1336		Toyolite Technologies Corp. Website		R	Ko SP	Admitted 1/13/05
CX-1337		Dominant Distribution Channel Web printout		R	Ko SP	Admitted 1/13/05
CX-1338C	1/5/2005	*De Bene Esse* Deposition of Ko Su Piow		I, R	Ko SP	Admitted 1/13/05

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

Before the Honorable Charles E. Bullock
Administrative Law Judge

In the Matter of

Certain Light-Emitting Diodes and Products Containing Same

Investigation No. 337-TA-512

COMPLAINANTS OSRAM GMBH AND OSRAM OPTO SEMICONDUCTORS GMBH'S FINAL PHYSICAL EXHIBIT LIST

Exhibit Number	Date	Exhibit Description	Bates Number	Statement of the Purpose for Which the Exhibit is Being Offered Into Evidence	Sponsoring Witness	Received
CPX-1		QUMK58/N-D1 From Phosphor Technology		Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-2C		QUMK58/N-D1 from Dominant	DS 007932	Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-3		QMK58/N-U1 from Phosphor Technology		Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-4C		QMK58/N-U1 from Dominant	DS 007931	Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-5		QMK58/F-C1 from Phosphor Technology		Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-6C		QMK58/F-U1 from Dominant	DS 149539	Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-7C		Mix of Phosphors from Dominant	DS 007933	Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-8		Withdrawn				
CPX-9		Dominant DDW-UJD	DS 004926	Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-10		Withdrawn				
CPX-11		Dominant DWW-UJD	DS 004930	Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-12		Withdrawn				
CPX-13		Withdrawn				
CPX-14		Withdrawn				
CPX-15		Dominant NPW-CED-VW2-1	DS 007927	Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-16		Dominant SDW-DLD	DS 007929	Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-17		White DomiLED from AMS, DDW-CJD-RS2-1		Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-18		White Power DomiLED from AMS, DWW-SJD-TU2-1		Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-19		Withdrawn				
CPX-20C		Withdrawn				
CPX-21C		Withdrawn				
CPX-22		White NovaLED from AOP Model L995LWC		Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-23		Withdrawn				
CPX-24		Withdrawn				
CPX-25		Withdrawn				
CPX-26		Withdrawn				
CPX-27		Withdrawn				
CPX-28		Withdrawn				
CPX-29		Withdrawn				
CPX-30		Withdrawn				
CPX-31		Withdrawn				
CPX-32		Withdrawn				
CPX-33		AOP L955LWC		Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-34		Dominant DSW-USD-ST2-1 obtained by OSRAM		Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-35		Dominant DWW-SJD-TU2-1 obtained by OSRAM		Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-36		Dominant DDW-UJD-TU2-1-VX obtained by OSRAM		Infringement	Low TB, Nauman, McKittrick, Waitl	Admitted 12/9/04
CPX-37		Withdrawn				
CPX-38		Withdrawn				
CPX-39		Withdrawn				
CPX-40		Withdrawn				
CPX-41		Withdrawn				

CPX-42		Withdrawn				
CPX-43		Withdrawn				
CPX-44		Withdrawn				
CPX-45		Withdrawn				
CPX-46		Withdrawn				
CPX-47		OSRAM LW E67C		DIT/DIE	Huang, Chipalkatti, Schmitt, Peterson	Admitted 12/9/04
CPX-48		Withdrawn				
CPX-49		OSRAM LW T67C		DIT/DIE	Huang, Chipalkatti, Schmitt, Peterson	Admitted 12/9/04
CPX-50		Withdrawn				
CPX-51		Withdrawn				
CPX-52		Withdrawn				
CPX-53		Withdrawn				
CPX-54		OSRAM LW T673		DIT/DIE	Huang, Chipalkatti, Schmitt, Peterson	Admitted 12/9/04
CPX-55		Withdrawn				
CPX-56		Withdrawn				
CPX-57		Withdrawn				
CPX-58		Withdrawn				
CPX-59		Withdrawn				
CPX-60		Withdrawn				
CPX-61		Withdrawn				
CPX-62		Withdrawn				
CPX-63		Withdrawn				
CPX-64		OSRAM Phosphor 1		DIT/DIE	Huang, Chipalkatti, Schmitt, Peterson	Admitted 12/9/04
CPX-65		OSRAM Phosphor 2		DIT/DIE	Huang, Chipalkatti, Schmitt, Peterson	Admitted 12/9/04
CPX-66		OSRAM Power TOPLED		DIT/DIE	Huang, Chipalkatti, Schmitt, Peterson	Rejected 12/15/04
CPX-67		OSRAM LED Colour Palette		DIT/DIE	Huang, Chipalkatti, Schmitt, Peterson	Rejected 12/15/04
CPX-68		OSRAM SMT Demoboard		DIT/DIE	Huang, Chipalkatti, Schmitt, Peterson	Rejected 12/15/04
CPX-69		OSRAM LED Bulb L2224R		DIT/DIE	Huang, Chipalkatti, Schmitt, Peterson	Admitted 12/15/04
CPX-70		OSRAM LED Bulb L1224R		DIT/DIE	Huang, Chipalkatti, Schmitt, Peterson	Admitted 12/15/04
CPX-71		Rear Combination Lamp from Lincoln Navigator		DIT/DIE	Huang, Chipalkatti, Schmitt, Peterson	Admitted 12/15/04
CPX-72		Withdrawn				
CPX-73		Withdrawn				
CPX-74		Withdrawn				
CPX-75		Withdrawn				

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

Before the Honorable Charles E. Bullock
Administrative Law Judge

In the Matter of Certain Light-Emitting Diodes and Products Containing Same	)	Investigation No. 337-TA-512

COMPLAINANTS OSRAM GMBH AND OSRAM OPTO SEMICONDUCTORS GMBH'S DEMONSTRATIVE EXHIBIT LIST

Exhibit Number	Date	Exhibit Description	Bates Number	Statement of the Purpose for Which the Exhibit is Being Offered Into Evidence	Sponsoring Witness	Received
CDX-1		Withdrawn				
CDX-2		Slide re: device		Infringement	McKittrick, Nauman, Holloway	Admitted 12/16/04
CDX-3		The general structure of the operation of the White Light Emitting LEDS		Infringement	McKittrick, Nauman, Holloway	Admitted 12/16/04
CDX-4		Slide re: particles		Infringement	McKittrick, Nauman, Holloway	Admitted 12/9/04
CDX-5		Slide re: particles		Infringement	McKittrick, Nauman, Holloway	Admitted 12/9/04
CDX-6		Slide re: particles		Infringement	McKittrick, Nauman, Holloway	Admitted 12/9/04
CDX-7		Slide re: agglomeration		Infringement	McKittrick, Nauman, Holloway	Admitted 12/9/04
CDX-8		Interpretation of OSRAM White Light Patents		Infringement	McKittrick, Nauman, Holloway	Admitted 12/16/04
CDX-9		Slide re: particles		Infringement	McKittrick, Nauman, Holloway	Admitted 12/9/04
CDX-10		Difficulties Associated with Coulter Measurements		Infringement	McKittrick, Nauman, Holloway	Admitted 12/9/04
CDX-11		Withdrawn				
CDX-12		Slide Shows the Homogenous light and inhomogeneous light		Infringement	McKittrick, Nauman, Holloway	Admitted 12/16/04
CDX-13		Slide illustrating the homogenous plots are flat and not flat when it is not homogenous		Infringement	McKittrick, Nauman, Holloway	Admitted 12/16/04
CDX-14		The inside of the device showing that you cannot predict the path any single photon will take		Infringement	McKittrick, Nauman, Holloway	Admitted 12/16/04
CDX-15		Shows the longer path length, the less blue light is emitted		Infringement	McKittrick, Nauman, Holloway	Admitted 12/16/04
CDX-16		Slide of RGB		Infringement	McKittrick, Nauman, Holloway	Admitted 12/16/04
CDX-17		Slide of Device		Infringement	McKittrick, Nauman, Holloway	Admitted 12/16/04
CDX-18		CIE diagram		Infringement	McKittrick, Nauman, Holloway	Admitted 12/7/04; 12/9/04
CDX-19		Slide of Device		Infringement	McKittrick, Nauman, Holloway	Admitted 12/16/04
CDX-20		Withdrawn				
CDX-21		SEM photographs		Infringement/Domestic Industry/Technical	McKittrick, Nauman, Holloway	Admitted 12/16/04
CDX-22		The overall structure of the lead frame technology taught in patents '902, '321 and '580		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-23		The external connection		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-24		Slide re: external connections		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-25		The specification at column 4, lines 54-59		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-26		X-rays of OSRAM and Dominant products		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-27		Electrically conductively connected		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-28		Thermally conductively connected		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-29		902 specification		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-30		902 specification		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04; 12/16/04

CDX-31		902 specification		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-32		Surface Mount LED		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-33		Slide re: Power DomiLED		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-34		Dominant's response to Request for Admission number 37		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-35		Slide re: parts of device		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-36		Slide re: chip carrier part		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-37		The Power DomiLED lead frame which has a chip attached to it		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-38		Slide illustrating that the Powe DomiLED has four leads		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-39		Slide showing the external connections		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-40		Connection part		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-41		Slide re: die attach		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-42		Showing the silver epoxy glue used by Dominant is thermally conductive		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-43		Heat conducting connections		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04; 12/16/04
CDX-44		Heat conducting connections		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-45		Solder pad design		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-46		Slide re: heat dissipation		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-47		Power DomiLED IR Photography		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-48		Power DomiLED X-Ray		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-49		Power DomiLED - All Four Leads Soldered		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04; 12/16/04
CDX-50		Power DomiLED - Lead 2 Not Soldered		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04; 12/16/04
CDX-51		Power DomiLED		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-52		Slide re: electrical connection		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-53		Power DomiLED showing a clear, epoxy filled recess		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-54		Specification Sheet		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-55		Power DomiLED Casing		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-56		Power DomiLED "first main surface"		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-57		The external connections		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-58		Slide re: leads		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-59		Slide showing the emission permeable window		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-60		A model material		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-61		Side drawing of the Power DomiLED		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-62		Slide shows the inner surfaces of the foundation define the recess		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-63		Shows three separate external connections and connection part disposed at a distance from the chip carrier part		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-64		The electrically conductively connected to the connection part through a wire bond		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-65		Shows the three separate external connections		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-66		Shows the window in the recess		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-67		Amodel, a plastic material through which light does not pass		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-68		Shows the recess in Power DomiLED widens from inside the casing to outside the casing		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04

CDX-69		The inner surfaces reflect light		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-70		The Power DomiLED is a surface-mountable light-emitting diode structural element		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-71		Slide shows the external connections extend outward in three different directions, starting from the chip carrier part		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-72		Slide showing LED in the Power DomiLED is heat conductively connected to the chip carrier part with a silver epoxy glue		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-73		The external connection, connection part and chip carrier part		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-74		External connections and connection part project outside the casing		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-75		External connections project from casing at different places		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-76		External connections configured for simultaneous lying on		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-77		Top view - external connections start from chip carrier part and run outward		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-78		"Emission Permeable Window"		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-79		Optoelectronic chip - "disposed in said recess" - plastic "emission-impermeable" foundation		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-80		External connections and connection part are bent outside the foundation toward the bottom center of the device		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-81		Component mounted on printed circuit board at two "poles" of the lead frame		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-82		Two "poles" w/ semiconductor chip attached to left part of lead frame		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-83		Lead frames stamped into strip of metal		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-84		Withdrawn				
CDX-85		Lead frames separated from individual devices		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-86		"Punched" as used in the first limitation of claim 1		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-87		Withdrawn				
CDX-88		Withdrawn				
CDX-89		Withdrawn				
CDX-90		Language re Super Small DomiLED is surface mountable		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-91		Super Small DomiLED has two "poles"		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-92		Two "poles" or solder terminals		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-93		Super Small DomiLED has a first and second lead frame part		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-94		Method used to singulate the Super Small DomiLED devices		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-95		Procedure re trim and form		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-96		Components are singulated one row at a time from the metal strips		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-97		Summary of findings of the cut edge of the Super Small DomiLED		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-98		Super Small DomiLED is mounted on a first lead frame part		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-99		Solder terminals positioned at two opposite sides of the housing		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-100		Two small portions of the housing that extend slightly beyond the main portion of the housing		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-101		Solder pad design for the Super Small DomiLED		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-102		Communication b/w Dominant and its distributor		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04

CDX-103		Dominant provides its distributors and customers w/ information and recommendations re solder the Super Small DomiLED to a printed circuit board		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-104		Super Small DomiLED has a thickness of 0.2mm		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-105		Method wherein the solder terminals have a thickness of 0.2mm-0.5mm		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-106		The Super Small DomiLED contains an optoelectronic chip		Infringement	Bar-Cohen, McAlexander, Low	Admitted 12/7/04
CDX-107		An optoelectronic surface-mountable structural element		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-108		An optoelectronic surface-mountable structural element		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-109		Lead frames containing a chip carrier part, external connections, and a connection part		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-110		Symmetry of lead frame		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-111		Led frame containing carrier part		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-112		Led frame containing carrier part		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-113		Led frame containing carrier part		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-114		Led frame containing carrier part		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-115		Power TopLED Chip heats up - external connections		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-116		Power TopLED Chip heats up - external connections		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-117		Thermally conducted connections		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-118		Two tests - one w/ all four leads soldered onto the circuit board and one w/ three		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-119		Test - all four leads soldered to the board showed three of the leads become hotter than the fourth		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04; 12/16/04
CDX-120		Test - leads 1,2, and 3 conducted heat much better than lead 4		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04; 12/16/04
CDX-121		Thermal conductivity information		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-122		Wire bonds diagram		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-123		Advanced Power TopLED is electrically connected to the chip carrier part		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-124		Foundation in both Power TopLED and Advanced TopLED have a first main surface and second main surface		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-125		Foundation in both Power TopLED and Advanced TopLED have a first main surface and second main surface		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-126		X-ray showing heat conducting external connections		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-127		X-ray (larger picture) showing heat conducting external connections		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-128		Specification sheet		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-129		Specification sheet		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-130		Two solder terminals mounted onto printed circuit board		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-131		Micro SideLED two lead frame portions		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-132		Solder terminals run at right angles to the portions of the lead frame parts		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-133		Flat mounting suface of Micro SideLED		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-134		Micro SideLED encapsulated in a housing		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-135		Wire bonding w/ small extensions		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-136		Solder pad design		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04

CDX-137		Micro SideLED semiconductor component		Domestic Industry/Technical	Bar-Cohen, McAlexander	Admitted 12/7/04
CDX-138		Lead frame of one product and the Power TopLED - demolding angle		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-139		Withdrawn				
CDX-140		TopLED lead frame (chip)		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-141		two lead Power TopLED		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-142		TSK - Test mit Power TOPLED		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-143		Siemens Target Specification Power TOPLED		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-144		Siemens Target Specification Power TOPLED		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-145		die and wire bonding Power TOPLED		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-146		Advanced Power TOPLED		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-147		Advanced Power TOPLED LL		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-148		Lead Frame - (Advanced Power TopLED)		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-149		Lead (four at corner of device)		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-150		solder pad design (Advanced Power TopLED)		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-151		leads - Section B-B		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-152		Advanced Power TopLED - Recess		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-153		Conception and Development of Mini Sideled and Micro Sideled		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-154		Siemens SMT MINI-SIDELED		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-155		Mini Sideled		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-156		Mini Sideled		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-157		Mini Sideled		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-158		Micro Sideled		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-159		small lead frames on strips of metal		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-160		Plastic part of device (Housing)		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-161		Mini Sideled Stand for device		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-162		trim and form / singulation Micro SIDELED		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-163		Recommended Solder Pad		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-164		Micro SideLED (1993 Drawing)		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04
CDX-165		die and wire bonding		Invention Story/Domestic Industry/Technical	Waitl	Admitted 12/7/04

CDX-166		Difficulties in measuring particles or agglomerates based on their orientation using laser diffraction		Infringement	Zachau	Admitted 12/16/04
CDX-167		Withdrawn				
CDX-168		Withdrawn				
CDX-169		Withdrawn				
CDX-170		Withdrawn				
CDX-171		Withdrawn				
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CDX-186		Withdrawn				
CDX-187		Withdrawn				
CDX-188		Withdrawn				
CDX-189		Withdrawn				
CDX-190		Withdrawn				
CDX-191		Micrographs of Field and Bottom Corner of a Device				Admitted 12/16/04
CDX-192		Withdrawn				
CDX-193		Withdrawn				
CDX-194		Withdrawn				
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CDX-272		Withdrawn				
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CDX-276		Holloway Testimony				Admitted 12/16/04
CDX-277		Withdrawn				
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CDX-348		Withdrawn				
CDX-349		Withdrawn				
CDX-350		Withdrawn				
CDX-351		Handwritten Demonstrative by Dr. Martin Zachau				Admitted 12/16/04
CDX-352		Holloway Testimony				Admitted 12/16/04

CERTIFICATE OF SERVICE

It is hereby certified that copies of the foregoing document: **COMPLAINANTS OSRAM GMBH AND OSRAM OPTO SEMICONDUCTORS GMBH'S FINAL EXHIBIT LIST** were served on this 18th day of January, 2005 as follows:

The Hon. Marilyn R. Abbott Secretary U.S. International Trade Commission 500 E Street, S.W., Room 112-A Washington, D.C. 20436	(By Hand Delivery) (Original and Six Copies)
The Honorable Charles E. Bullock Administrative Law Judge U.S. International Trade Commission 500 E Street, S.W., Suite 317 Washington, D.C. 20436	(By Hand Delivery) (Two copies)
Benjamin D. M. Wood, Esq. Office of Unfair Import Investigations U.S. International Trade Commission 500 E Street, S.W., Room 401 Washington, D.C. 20436	(By Hand Delivery)
Raymond A. Kurz Celine Jiminez Crowson Mark S. McConnell Ajit J. Vaidya Anna Kurian Shaw David D. Nelson William T. Slaven Hogan & Hartson L.L.P. 555 13th Street, N.W. Washington, D.C. 20004	Counsel for Respondent Dominant Semiconductors Sdn. Bhd. (By Hand Delivery)

Sarah K. Tyson

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

Before the Honorable Charles E. Bullock
Administrative Law Judge

In the Matter of Certain Light Emitting Diodes and Products Containing Same	Inv. No. 337-TA-512

RESPONDENT'S FINAL EXHIBIT LIST

Respondent Dominant Semiconductors Sdn. Bhd. ("Dominant")

hereby respectfully submits its Final Exhibit List:

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-1				Withdrawn
RX-2				Withdrawn
RX-3				Withdrawn
RX-4				Withdrawn
RX-5				Withdrawn
RX-6				Withdrawn
RX-7				Withdrawn
RX-8				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-9				Withdrawn
RX-10				Withdrawn
RX-11				Withdrawn
RX-12				Withdrawn
RX-13				Withdrawn
RX-14				Withdrawn
RX-15				Withdrawn
RX-16				Withdrawn
RX-17				Withdrawn
RX-18				Withdrawn
RX-19				Withdrawn
RX-20				Withdrawn
RX-21				Withdrawn
RX-22				Withdrawn
RX-23				Withdrawn
RX-24				Withdrawn
RX-25				Withdrawn
RX-26				Withdrawn
RX-27				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-28				Withdrawn
RX-29				Withdrawn
RX-30				Withdrawn
RX-32				Withdrawn
RX-33				Withdrawn
RX-34				Withdrawn
RX-35				Withdrawn
RX-36				Withdrawn
RX-37				Withdrawn
RX-46C				Withdrawn
RX-47				Withdrawn
RX-48C				Withdrawn
RX-49C				Withdrawn
RX-50	Exhibit 1 to the Rebuttal Expert Report of Joseph C. McAlexander, III	Noninfringement, invalidity of patent(s)-in-suit	McAlexander	Admitted 12/16/04
RX-51				Withdrawn
RX-52C				Withdrawn
RX-53C				Withdrawn
RX-54C				Withdrawn
RX-55C	Exhibit B to the Rebuttal Expert Report of Paul H. Holloway, Ph.D.	Noninfringement, invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-56C	Exhibit C to the Rebuttal Expert Report of Paul H. Holloway, Ph.D.	Noninfringement, invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RX-57C				Withdrawn
RX-58				Withdrawn
RX-59C				Withdrawn
RX-60				Withdrawn
RX-61C				Withdrawn
RX-62C				Withdrawn
RX-63C				Withdrawn
RX-64C				Withdrawn
RX-65C				Withdrawn
RX-66C				Withdrawn
RX-67C				Withdrawn
RX-68				Withdrawn
RX-69				Withdrawn
RX-70				Withdrawn
RX-71C				Withdrawn
RX-72C				Withdrawn
RX-73C				Withdrawn
RX-74C				Withdrawn
RX-75C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-76C	Quotation List of Dominant Products DS 4897	Noninfringement of patent(s)-in-suit	Low	Admitted 12/10/04
RX-77C				Withdrawn
RX-78C				Withdrawn
RX-79C				Withdrawn
RX-80C				Withdrawn
RX-81C				Withdrawn
RX-82C	Blue LED Phosphor QMK 58/N-U1 Specification Sheet DS 7917	Noninfringement of patent(s)-in-suit	Low	Admitted 12/10/04
RX-83C	Blue LED Phosphor QUMK 58/N-D1 Specification Sheet DS 7918	Noninfringement of patent(s)-in-suit	Low	Admitted 12/10/04
RX-84C				Withdrawn
RX-85C				Withdrawn
RX-86C				Withdrawn
RX-87C				Withdrawn
RX-88C				Withdrawn
RX-89C				Withdrawn
RX-90C				Withdrawn
RX-91C				Withdrawn
RX-92C				Withdrawn
RX-93C				Withdrawn
RX-94C				Withdrawn
RX-95C				Withdrawn
RX-96C				Withdrawn
RX-97C				Withdrawn
RX-98C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-99C				Withdrawn
RX-100C				Withdrawn
RX-101C				Withdrawn
RX-102C				Withdrawn
RX-103C				Withdrawn
RX-104C				Withdrawn
RX-105C				Withdrawn
RX-106C				Withdrawn
RX-107C				Withdrawn
RX-108C				Withdrawn
RX-109 C				Withdrawn
RX-110C				Withdrawn
RX-111C				Withdrawn
RX-112C				Withdrawn
RX-113C				Withdrawn
RX-114C				Withdrawn
RX-115C				Withdrawn
RX-116C				Withdrawn
RX-117C				Withdrawn
RX-118C				Withdrawn
RX-119C				Withdrawn
RX-120				Withdrawn
RX-121				Withdrawn
RX-122C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-123C				Withdrawn
RX-124C				Withdrawn
RX-125C				Withdrawn
RX-126C				Withdrawn
RX-127C				Withdrawn
RX-128C				Withdrawn
RX-129C				Withdrawn
RX-130C				Withdrawn
RX-131C				Withdrawn
RX-132C				Withdrawn
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RX-136C				Withdrawn
RX-137C				Withdrawn
RX-138C				Withdrawn
RX-139C				Withdrawn
RX-140C				Withdrawn
RX-141C				Withdrawn
RX-142C				Withdrawn
RX-143C				Withdrawn
RX-144C				Withdrawn
RX-145C				Withdrawn
RX-146C				Withdrawn
RX-147C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-148C				Withdrawn
RX-149C				Withdrawn
RX-150C				Withdrawn
RX-151C				Withdrawn
RX-152C				Withdrawn
RX-153C				Withdrawn
RX-154C				Withdrawn
RX-155C				Withdrawn
RX-156C				Withdrawn
RX-157C				Withdrawn
RX-158C				Withdrawn
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RX-160C				Withdrawn
RX-161C				Withdrawn
RX-162C				Withdrawn
RX-163C				Withdrawn
RX-164C				Withdrawn
RX-165				Withdrawn
RX-166				Withdrawn
RX-167C				Withdrawn
RX-168C				Withdrawn
RX-169C				Withdrawn
RX-170C				Withdrawn
RX-171C				Withdrawn
RX-172C				Withdrawn
RX-173C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-174C				Withdrawn
RX-175C				Withdrawn
RX-176C				Withdrawn
RX-177C				Withdrawn
RX-178C	German documents about specifications and emails to Zachau OS 17394-17400	Noninfringement, invalidity of patent(s)-in-suit	Zachau	Admitted 12/17/04
RX-179C				Withdrawn
RX-180C				Withdrawn
RX-181C				Withdrawn
RX-182C				Withdrawn
RX-183C				Withdrawn
RX-184C				Withdrawn
RX-185C				Withdrawn
RX-186C				Withdrawn
RX-187C				Withdrawn
RX-188C				Withdrawn
RX-189C				Withdrawn
RX-190C				Withdrawn
RX-191C				Withdrawn
RX-192C				Withdrawn
RX-193C				Withdrawn
RX-194C				Withdrawn
RX-195C				Withdrawn
RX-196C				Withdrawn
RX-197C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-198C				Withdrawn
RX-199C				Withdrawn
RX-200C				Withdrawn
RX-201C				Withdrawn
RX-202C				Withdrawn
RX-203C				Withdrawn
RX-204C				Withdrawn
RX-205C				Withdrawn
RX-206C				Withdrawn
RX-207C				Withdrawn
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RX-211C				Withdrawn
RX-212C				Withdrawn
RX-213C				Withdrawn
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RX-215C				Withdrawn
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RX-219C				Withdrawn
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RX-221C				Withdrawn
RX-222C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-224C				Withdrawn
RX-225C				Withdrawn
RX-227C				Withdrawn
RX-228C				Withdrawn
RX-229C				Withdrawn
RX-230C				Withdrawn
RX-231C				Withdrawn
RX-232C				Withdrawn
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RX-239C				Withdrawn
RX-240C				Withdrawn
RX-241C				Withdrawn
RX-242C				Withdrawn
RX-243C				Withdrawn
RX-244C				Withdrawn
RX245C				Withdrawn
RX-246C				Withdrawn
RX-247C				Withdrawn
RX-248C				Withdrawn
RX-249C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-250	The Phosphor Handbook excerpt pgs. DS 149450-149550	Noninfringement, invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RX-251				Withdrawn
RX-252				Withdrawn
RX-253				Withdrawn
RX-254				Withdrawn
RX-255				Withdrawn
RX-256				Withdrawn
RX-257				Withdrawn
RX-258				Withdrawn
RX-259C				Withdrawn
RX-260C				Withdrawn
RX-261C				Withdrawn
RX-262C				Withdrawn
RX-263C				Withdrawn
RX-264C				Withdrawn
RX-265C				Withdrawn
RX-266C				Withdrawn
RX-267	Wieland Rolled Products DS 7012-7013	Noninfringement, invalidity of patent(s)-in-suit	Bar-Cohen/ McAlexander/ Low	Admitted 12/7/04 & 12/10/04 & 12/16/04
RX-268C				Withdrawn
RX-269C				Withdrawn
RX-270C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-271C				Withdrawn
RX-272C	Phosphor Technology Website pages DS 149742 - DS 149744	Noninfringement, invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RX-273C				Withdrawn
RX-274C				Withdrawn
RX-275C				Withdrawn
RX-276C				Withdrawn
RX-277C				Withdrawn
RX-278C				Withdrawn
RX-279C				Withdrawn
RX-280C				Withdrawn
RX-281C				Withdrawn
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RX-286C				Withdrawn
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RX-288C				Withdrawn
RX-289C				Withdrawn
RX-290C				Withdrawn
RX-291C				Withdrawn
RX-292C				Withdrawn
RX-293C				Withdrawn
RX-294C				Withdrawn
RX-295C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-296C				Withdrawn
RX-297C				Withdrawn
RX-298C				Withdrawn
RX-299C				Withdrawn
RX-300C				Withdrawn
RX-301C				Withdrawn
RX-302C				Withdrawn
RX-303C				Withdrawn
RX-304C				Withdrawn
RX-305C				Withdrawn
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RX-320C				Withdrawn
RX-321C				Withdrawn
RX-322C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-323C				Withdrawn
RX-324C				Withdrawn
RX-325C				Withdrawn
RX-326C				Withdrawn
RX-326C-1				Withdrawn
RX-327C				Withdrawn
RX-328C				Withdrawn
RX-329C				Withdrawn
RX-330C				Withdrawn
RX-331				Withdrawn
RX-332				Withdrawn
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RX-334C				Withdrawn
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RX-337C				Withdrawn
RX-338C				Withdrawn
RX-339C				Withdrawn
RX-340C				Withdrawn
RX-341C				Withdrawn
RX-342C				Withdrawn
RX-343C				Withdrawn
RX-344C				Withdrawn
RX-345C				Withdrawn
RX-346C				Withdrawn
RX-347C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-348C	Phosphor Technology Specification and MSDS sheets DS 149735 - 149741	Noninfringement, invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RX-349C	Illustrated Power Domiled Leadframe Drawing DS 149745	Noninfringement, invalidity of patent(s)-in-suit	Low	Admitted 12/10/04
RX-350C				Withdrawn
RX-351C	Illustrated Power Domiled DAWB Drawing DS 149747	Noninfringement, invalidity of patent(s)-in-suit	Low	Admitted 12/10/04
RX-352C	SEM Images DS 149748-149792	Noninfringement, invalidity of patent(s)-in-suit	Nauman/ Holloway	Admitted 12/16/04
RX-353				Withdrawn
RX-354				Withdrawn
RX-355				Withdrawn
RX-356				Withdrawn
RX-357				Withdrawn
RX-358C	LED Bulb Voice of the Customer Surveys OS 137556-137568	Lack of Domestic Industry	Shottes	Admitted 12/17/04
RX-359C				Withdrawn
RX-360C	Power Domiled Leadframe Drawing D-DW-DS-0198 DS 004950	Noninfringement, invalidity of patent(s)-in-suit	Low	Admitted 12/10/04
RX-361C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-362C	Power Domiled DAWB Drawing DS 005578	Noninfringement, invalidity of patent(s)-in-suit	Low	Admitted 12/10/04
RX-363C				Withdrawn
RX-364C				Withdrawn
RX-365C				Withdrawn
RX-366				Withdrawn
RX-367				Withdrawn
RX-368				Withdrawn
RX-369				Withdrawn
RX-370				Withdrawn
RX-371				Withdrawn
RX-372	PCT Application PCT/DE 97/02139 WO 98/12757 (Hohn et al.) September 22, 1996 with Translation DS 149009-149036.1	Noninfringement, invalidity of patent(s)-in-suit	Nauman/ Holloway	Admitted 12/16/04
RX-373				Withdrawn
RX-374				Withdrawn
RX-375				Withdrawn
RX-376				Withdrawn
RX-377				Withdrawn
RX-378C				Withdrawn
RX-379C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-380C	Microtrac-S3000 test results for QUMK58N-D1and QMK58N-U1 from Phosphor Technology DS 149803-149810	Noninfringement, invalidity of patent(s)-in-suit	Nauman/ Holloway	Admitted 12/16/04
RX-381C	Microtrac-S3000 test results for mixture of phosphors (DS 007933) DS 149811-149814	Noninfringement, invalidity of patent(s)-in-suit	Nauman/ Holloway	Admitted 12/16/04
RX-382C	Microtrac-S3000 test results for QUMK58N-D1 (DS 7932) DS 149815-149818	Noninfringement, invalidity of patent(s)-in-suit	Nauman/ Holloway	Admitted 12/16/04
RX-383C	Microtrac-S3000 test results for QMK58N-U1 (DS 7931) DS 149819-149822	Noninfringement, invalidity of patent(s)-in-suit	Nauman/ Holloway	Admitted 12/16/04
RX-384				Withdrawn
RX-385C				Withdrawn
RX-386C				Withdrawn
RX-387C				Withdrawn
RX-388C				Withdrawn
RX-389C				Withdrawn
RX-390C				Withdrawn
RX-391C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-392				Withdrawn
RX-393C				Withdrawn
RX-394C				Withdrawn
RX-395C				Withdrawn
RX-396C				Withdrawn
RX-397C				Withdrawn
RX-398C				Withdrawn
RX-399C	Particle Analysis Report (Coulter Analysis of DS 007931-007932) DS 150251-150256	Noninfringement, invalidity of patent(s)-in-suit	Nauman/ Holloway	Admitted 12/16/04
RX-400	Perry's Chemical Engineers' Handbook-Excerpt pp. 20-5 through 20-6 DS 150262-150265	Noninfringement, invalidity of patent(s)-in-suit	Nauman/ Holloway	Admitted 12/16/04
RX-401	Particle Size Analysis by Jelinek-Excerpt pp. 9-17 DS 150266-150276	Noninfringement, invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RX-402	Particle Size Analysis 1985-Excerpt pp. 211-221 DS 150277-150289	Noninfringement, invalidity of patent(s)-in-suit	Zachau/ Nauman/ Holloway	Admitted 12/16/04
RX-403C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-404	Particle Size Analysis in Pharmaceutics and other Industries Theory and Practice-Excerpt pp. 18-23 DS 150293-150300	Noninfringement, invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RX-405C				Withdrawn
RX-406				Withdrawn
RX-407				Withdrawn
RX-408				Withdrawn
RX-409				Withdrawn
RX-410				Withdrawn
RX-411				Withdrawn
RX-412				Withdrawn
RX-413				Withdrawn
RX-414C				Withdrawn
RX-415C	Direct Witness Statement of Paul H. Holloway, Ph.D.	Noninfringement, invalidity of patent(s)-in-suit	Holloway	Admitted 12/14/04
RX-416C				Withdrawn
RX-417C				Withdrawn
RX-418C				Withdrawn
RX-419C				Withdrawn
RX-420C	Quarzwerke Silbond Product Data DS 150444-150446	Noninfringement	Low	Admitted 12/10/04
RX-421C				Withdrawn
RX-422C				Withdrawn
RX-423C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-424C				Withdrawn
RX-425C				Withdrawn
RX-426C				Withdrawn
RX-427C				Withdrawn
RX-428C				Withdrawn
RX-429C				Withdrawn
RX-430	Laser Diffraction for Particle Size Analysis (EMA 5008 Introduction to Particle Technology DS 150378-150407	Noninfringemement/ invalidity	Nauman/ Holloway	Admitted 12/16/04
RX-431	Phosphor Technology Invoices obtained by E. B. Nauman	Noninfringement/ invalidity	Nauman	Admitted 12/09/04
RX-432				Withdrawn
RX-433	Particle Size Analysis: AAPS Workshop Report, Cosponsored by the Food and Drug Administration and the Untied States Pharmacopeia DS 150408-150419	Noninfringement/ invalidity	Holloway	Admitted 12/16/04
RX-434				Withdrawn
RX-435				Withdrawn
RX-436C				Withdrawn
RX-437C				Withdrawn
RX-438C				Withdrawn
RX-439C				Withdrawn
RX-440C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-441C				Withdrawn
RX-442C				Withdrawn
RX-443C				Withdrawn
RX-444C				Withdrawn
RX-445				Withdrawn
RX-446C				Withdrawn
RX-447C	Supplemental Direct Witness Statement of Paul H. Holloway, Ph.D.	Noninfringement, invalidity of patent(s)-in-suit	Holloway	Admitted 12/14/04
RX-448C	Redacted Direct Witness Statement of Joseph C. McAlexander	Noninfringement, invalidity of patent(s)-in-suit	McAlexander	Admitted 12/09/04
RX-449C	Redacted Direct Witness Statement of Low Tek Beng	Noninfringement, invalidity of patent(s)-in-suit	Low	Admitted 12/09/04 & 12/10/04
RX-450C				Withdrawn
RX-451C				Withdrawn
RX-452C				Withdrawn
RX-453C				Withdrawn
RX-454C				Withdrawn
RX-455C				Withdrawn
RX-456C				Withdrawn
RX-457C				Withdrawn
RX-458C				Withdrawn
RX-459C				Withdrawn
RX-460C				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-461C	Supplemental Direct Statement of Joseph C. McAlexander in view of Demonstrative Exhibits	Noninfringement, invalidity of patent(s)-in-suit	McAlexander	Admitted 12/09/04
RX-462C	Rebuttal Witness Statement of Joseph C. McAlexander, III	Noninfringement, invalidity of patent(s)-in-suit	McAlexander	Admitted 12/09/04
RX-463C	Rebuttal Witness Statement of Low Tek Beng	Noninfringement, invalidity of patent(s)-in-suit	Low	Admitted 12/09/04 & 12/10/04
RX-464C				Withdrawn
RX-465	Osram Sylvania Electroluminescent Phosphor DS 150450-150452	Noninfringement, invalidity of patent(s)-in-suit	Zachau	Admitted 12/16/04
RX-466	Response to Office Action for U.S. Application No. 09/731,452 OS 11908-119913	Noninfringement, invalidity of patent(s)-in-suit	Zachau	Admitted 12/16/04
RX-467	Cabot Corporation Article DS 150453-150459	Noninfringement, invalidity of patent(s)-in-suit	Zachau	Admitted 12/16/04
RX-468	Preliminary Amendment to U.S. Application No. 09/221,789 DS 150180-150191	Noninfringement, invalidity of patent(s)-in-suit	Zachau	Admitted 12/16/04
RX-469	An Introduction to Microhene Polyolefin Powders for Specialty Applications by Equistar DS 150460-150470	Noninfringement, invalidity of patent(s)-in-suit	Zachau	Admitted 12/16/04
RX-470	U.S. Patent No. 6,140,040	Noninfringement, invalidity of patent(s)-in-suit	Zachau	Admitted 12/16/04

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-471	U.S. Patent No. 6,455,213	Noninfringement, invalidity of patent(s)-in-suit	Zachau	Admitted 12/16/04
RX-472C	Rebuttal Witness Statement of Paul H. Holloway, Ph.D.	Noninfringement, invalidity of patent(s)-in-suit	Holloway	Admitted 12/14/04
RX-473C	Deposition Designations for Joanna McKittrick	Noninfringement, invalidity of patent(s)-in-suit	McKittrick	Admitted 12/17/04
RX-474C	Deposition Designations and Counter-Designations for Lai K.S.	Noninfringement, invalidity of patent(s)-in-suit	KS Lai	Admitted 12/17/04
RX-475C	Deposition Designations and Counter-Designations for Herbert Brunner	Noninfringement, invalidity of patent(s)-in-suit	Brunner	Admitted 12/17/04
RX-476C	Deposition Designations and Counter-Designations for Klaus Hohen	Noninfringement, invalidity of patent(s)-in-suit	Hoehn	Admitted 12/17/04
RX-477C	Deposition Designations and Counter-Designations for Uwe Kronen	Noninfringement, invalidity of patent(s)-in-suit	Kronen	Admitted 12/17/04
RX-478C	Deposition Designations and Counter-Designations for Ronald Terry	Lack of Domestic Industry	Terry	Admitted 12/17/04
RX-479C	Deposition Designations and Counter-Designations for Karlheinz Arndt	Noninfringement, invalidity of patent(s)-in-suit	Arndt	Admitted 12/17/04
RX-480C	Deposition Designations for Martin Zachau	Noninfringement, invalidity of patent(s)-in-suit	Zachau	Admitted 12/17/04

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RX-500C	Documents from CD's produced by E. Bruce Nauman OS	Noninfringement, invalidity of patent(s)-in-suit	Nauman	Admitted 12/09/04
RX-501C	Documents from CD's produced by E. Bruce Nauman OS and Chart	Noninfringement, invalidity of patent(s)-in-suit	Nauman	Admitted 12/09/04

DEMONSTRATIVE EXHIBITS

Hearing Exhibit	Description	Purpose	Witness	Status
RDX-1	Invalidity of the Phosphor Patents- '861, '259, '301, '780 and '247 Patents	Noninfringement, invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-2	Invalidity of the Lead Frame Patents- '580, '902 and '321 Patents	Noninfringement, invalidity of patent(s)-in-suit	McAlexander	Admitted 12/16/04
RDX-3	The Lead Frame Patents - '902, '580, '321 "...A Chip Carrier Part...."	Noninfringement, invalidity of patent(s)-in-suit	McAlexander	Admitted 12/16/04
RDX-4	The Lead Frame Patents - '902, '580, '321 "...A Connection Part...."	Noninfringement, invalidity of patent(s)-in-suit	McAlexander	Admitted 12/16/04
RDX-5	The Lead Frame Patents - '902, '580,'321, Three External Connections "Starting From Said Chip Carrier Part"	Noninfringement, invalidity of patent(s)-in-suit	McAlexander	Admitted 12/16/04

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RDX-6	"External Connections' Starting from the Chip Carrier Part	Noninfringement, invalidity of patent(s)-in-suit	McAlexander	Admitted 12/16/04
RDX-7	A 'Stellate Form'	Noninfringement, invalidity of patent(s)-in-suit	McAlexander	Admitted 12/16/04
RDX-8	The Lead Frame Patents - '902, '580,' 321 "...A Light-Emitting Semiconductor Chip...."	Noninfringement, invalidity of patent(s)-in-suit	McAlexander	Admitted 12/16/04
RDX-9	The Lead Frame Patents - '902, '580, '321 "Electrically Conductively Connected to...."	Noninfringement, invalidity of patent(s)-in-suit	McAlexander	Admitted 12/16/04
RDX-10	The Lead Frame Patents - '902, '580, '321 "...Casing...."	Noninfringement, invalidity of patent(s)-in-suit	McAlexander	Admitted 12/16/04
RDX-11	Thermal Conductivity for Some Common Materials	Infringement, Invalidity of patent(s)-in-suit	McAlexander	Admitted 12/16/04
RDX-12	Dominant Power DomiLED Lead Frame	Noninfringement of patent(s)-in-suit	Bar-Cohen/ McAlexander	Admitted 12/07/04 & 12/16/04
RDX-13				Withdrawn
RDX-14	Dominant's White LEDs - Luminescence Conversion Layer of Non-Constant Thickness	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-15				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RDX-16	All Show Mean Grain Diameter d_{50} > μm for QUMK58/N-D1 and QMK58/N-U1	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-17	QMK58/N-U1-Osram Testing Methodology	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-18	Comparison of '930 Patent to Dominant Product	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-19	Comparison of Lead Frames	Noninfringement/Invalidity of patent(s)-in-suit	Bar-Cohen	Admitted 12/07/04
RDX-20				Withdrawn
RDX-21	'930 Patent	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-22	Phosphors	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-23	Dependence of Luminescence on Weight/Volume	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-24	Describing a Particle's Size	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-25	Single Particle Description	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-26	Spherical Volume Equivalent	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-27	Spherical Volume Equivalent	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-28	Measurement Methods	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-29	Volume/Weight/Mass Percentage Distributions	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-30	Volume/Weight/Mass Distributions	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-31	Number Distributions	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-32	QMK58/N-U1 Particle Distributions	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RDX-33	Example Volume vs. Number and Mean vs. Median	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-34	Example Volume vs. Number and Mean vs. Median	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-35	What Happens if 1 of the 100 5 μm Particles Breaks Apart into 1 μm Particles?	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-36	What Happens if 50 of the 100 5 μm Particles Breaks Apart into 1 μm Particles?	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-37	Summary Volume v. Number and Mean vs. Median	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-38	The Lead Frame Patents- '902, '580, '321 Three External Connections '...Running Separately Outward in a Stellate Form...'	Noninfringement/Invalidity of patent(s)-in-suit	McAlexander	Admitted 12/16/04
RDX-39	Summary Volume v. Number and Mean vs. Median	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-40				Withdrawn
RDX-41				Withdrawn
RDX-42				Withdrawn
RDX-43				Withdrawn
RDX-44				Withdrawn
RDX-45				Withdrawn
RDX-46				Withdrawn

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RDX-47				Withdrawn
RDX-48				Withdrawn
RDX-49				Withdrawn
RDX-50	Tutorial Presentation of Dr. Paul H. Holloway	Noninfringement/Invalidity of patent(s)-in-suit	Holloway	Admitted 12/16/04
RDX-51				Withdrawn
RDX-52				Withdrawn
RDX-53				Withdrawn
RDX-54				Withdrawn
RDX-55				Withdrawn

PHYSICAL EXHIBITS

Hearing Exhibit	Description	Purpose	Sponsoring Witness	Status
RPX-1				Withdrawn
RPX-2				Withdrawn
RPX-2				Withdrawn
RPX-3				Withdrawn
RPX-3				Withdrawn
RPX-4				Withdrawn
RPX-5				Withdrawn
RPX-6				Withdrawn
RPX-7	Lead Frame Pieces Mounted	Noninfringement and invalidity of the patent(s)-in-suit	Low	Admitted 12/10/04
RPX-8				Withdrawn

Respectfully submitted,

HOGAN & HARTSON, L.L.P.

By: _____

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Dated: January 18, 2005

CERTIFICATE OF SERVICE

I CERTIFY THAT on January 18, 2005, true copies of the foregoing, **RESPONDENT'S FINAL EXHIBIT LIST** was served upon the following parties as indicated below:

Marilyn R. Abbott, Secretary U.S. International Trade Commission 500 E Street, S.W. Room 112-A Washington, D.C. 20436	Original & Six Copies by Hand Delivery
The Honorable Charles E. Bullock Administrative Law Judge U.S. International Trade Commission 500 E Street, S.W., Room 317 Washington, D.C. 20436	Two Copies by Hand Delivery
Benjamin D. M. Wood, Esquire U.S. International Trade Commission Office of Unfair Import Investigations 500 E Street, S.W., Room 401-I Washington, D.C. 20436	One Copy by Hand Delivery & Electronic Mail
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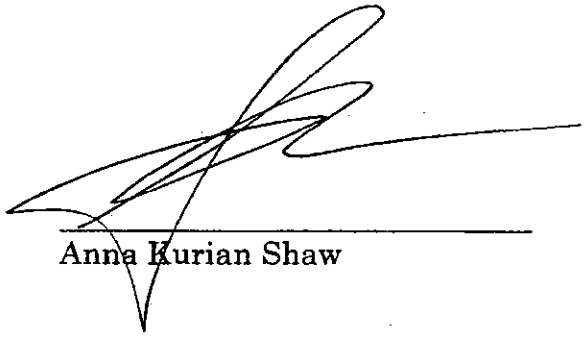
Alan D. Smith, Esquire Charles H. Sanders, Esquire Fish & Richardson, P.C. 225 Franklin Street Boston, MA 02110	One Copy by First-Class Mail



Anna Kurian Shaw

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

Before the Hon. Charles E. Bullock
Administrative Law Judge

In the Matter of	
CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING SAME	Inv. No. 337-TA-512

COMMISSION INVESTIGATIVE STAFF'S FINAL EXHIBIT LIST

Pursuant to Order No. 30 (amended procedural schedule) and Ground Rule 11, the Commission Investigative Staff respectfully submits the following final exhibit list, :

Exhibit No.	Description	Issue for Which Exhibit Offered	Sponsoring Witness	Status
SX-1	R. Tummala, MICROELECTRONICS PACKAGING HANDBOOK (1989) (excerpts)	Claim Construction; Infringement Analysis	Bar-Cohen; McAlexander	Admitted
SX-2	ELECTRONIC MATERIALS HANDBOOK: VOLUME I (PACKAGING) (1989) (excerpts)	Claim Construction; Infringement Analysis	Bar-Cohen; McAlexander	Admitted
SX-3	Kevin Powers, "Laser Diffraction for Particle Size Analysis" (handout)	Claim Construction; Infringement Analysis	McKittrick; Holloway	With-drawn
SX-4	Rudiger Werner, "Steep Particle Size Distribution Curves as a Determining Factor in the Use of Fine Extenders in Various Coating Systems" (1998)	Claim Construction; Infringement Analysis	McKittrick; Holloway	With-drawn

Respectfully submitted,

/s/ Benjamin D. M. Wood

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January 18, 2005

CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING SAME
Inv. No. 337-TA-512

CERTIFICATE OF SERVICE

I hereby certify that on January 18, 2004, the foregoing **COMMISSION INVESTIGATIVE STAFF'S FINAL EXHIBIT LIST** was delivered by hand to the Hon. Charles E. Bullock (2 copies) and was served upon the following parties **BY ELECTRONIC MAIL**:

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/s/ Benjamin D. M. Wood
Benjamin D. M. Wood
Commission Investigative Attorney

IN THE MATTER OF CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING SAME **337-TA-512**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **CONFIDENTIAL ORDER** was served upon, Benjamin D. M. Wood, Esq., Commission Investigative Attorney, and the following parties via first class mail and air mail where necessary on MAY 10 2005

Marilyn R. Abbott, Secretary
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IN THE MATTER OF CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING SAME

337-TA-512

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IN THE MATTER OF CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING THE SAME **337-TA-512**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **ORDER** was served upon, Benjamin D.M. Wood, Esq., Commission Investigative Attorney, and the following parties via first class mail and air mail where necessary on August 25, 2005.

Marilyn R. Abbott, Secretary
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IN THE MATTER OF CERTAIN LIGHT-EMITTING DIODES AND PRODUCTS CONTAINING THE SAME **337-TA-512**

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