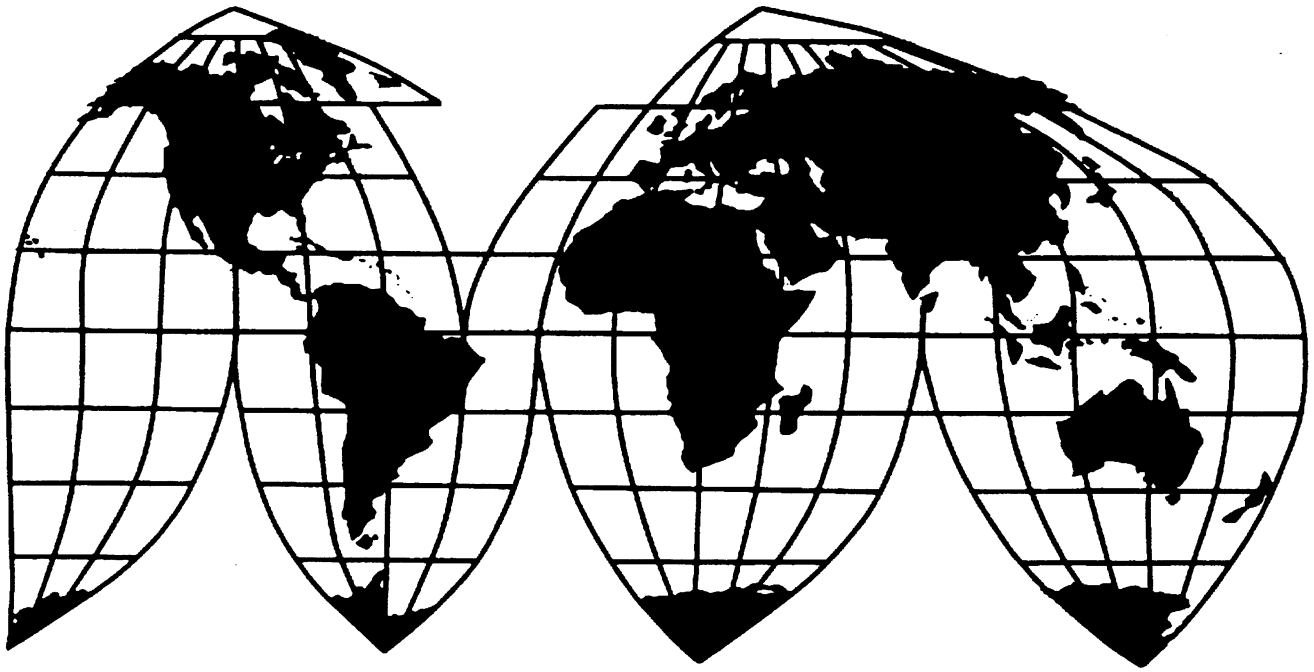
In the Matter of

Certain Automated Mechanical Transmission Systems for Medium-Duty and Heavy Duty Trucks and Components Thereof

Investigation No. 337-TA-503

Publication 3934 **July 2007**

U.S. International Trade Commission



Washington, DC 20436

U.S. International Trade Commission

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Secretary to the Commission
United States International Trade Commission
Washington, DC 20436

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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

In the Matter of	)	
	)	**Inv. No. 337-TA-503**
CERTAIN AUTOMATED MECHANICAL TRANSMISSION SYSTEMS FOR MEDIUM-DUTY AND HEAVY-DUTY TRUCKS AND COMPONENTS THEREOF	)	

TERMINATION OF INVESTIGATION; ISSUANCE OF A LIMITED EXCLUSION ORDER AND A CEASE AND DESIST ORDER

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has terminated the above-captioned investigation in which it has found a violation of section 337 of the Tariff Act of 1930 and has issued a limited exclusion order and a cease and desist order.

FOR FURTHER INFORMATION CONTACT: Rodney Maze, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 205-3065. 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: This patent-based section 337 investigation was instituted by the Commission on January 7, 2004, based on a complaint filed by Eaton Corporation ("Eaton") of Cleveland, Ohio. 69 *Fed. Reg.* 937 (January 7, 2004). The complaint, as supplemented, 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 automated mechanical transmission systems for medium-duty and heavy-

duty trucks, and components thereof, by reason of infringement of claim 15 of U.S. Patent No. 4,899,279 ("the '279 patent"); claims 1-20 of U.S. Patent No. 5,335,566 ("the '566 patent"); claims 2-4 and 6-16 of U.S. Patent No. 5,272,939 ("the '939 patent"); claims 1-13 of U.S. Patent No. 5,624,350 ("the '350 patent"); claims 1, 3, 4, 6-9, 11, 13, 14, 16 and 17 of U.S. Patent No. 6,149,545 ("the '545 patent"); and claims 1-16 of U.S. Patent No. 6,066,071 ("the '071 patent").

The complaint and notice of investigation named three respondents ZF Meritor, LLC of Maxton, North Carolina, ZF Friedrichshafen AG of Freidrichshafen, Germany, and ArvinMeritor, Inc. ("ArvinMeritor") of Troy, Michigan.

On July 21, 2004, the Commission issued a notice that it had determined not to review the ALJ's initial determination ("ID") (Order No. 20) terminating the investigation as to the '071 patent and as to claims 2, 3, and 5-20 of the '566 patent, claims 4, 7, and 12 of the '350 patent, and claims 4, 8-9, and 14 of the '545 patent.

On August 11, 2004, the Commission issued a notice that it had determined not to review the ALJ's ID (Order No. 31) terminating the investigation as to the '939 patent and as to claims 10, 11, and 13 of the '350 patent.

On August 16, 2004, the Commission issued a notice that it had determined not to review the ALJ's ID (Order No. 28) that Eaton has satisfied the economic prong of the domestic industry requirement as to certain articles it alleges practice the patents at issue in this investigation.

On August 23, 2004, the Commission issued a notice that it had determined not to review the ALJ's ID (Order No. 30) that Eaton did not meet the technical prong of the domestic industry requirement as to the remaining claims, claims 1-3, 5, 6, 8, and 9, of the '350 patent, thus terminating the investigation as to that patent.

On September 17, 2004, the Commission issued a notice that it had determined not to review the ALJ's ID (Order No. 38) granting Eaton's partial summary determination that the importation requirement has been met.

On September 23, 2004, the Commission issued a notice that it had determined not to review the ALJ's ID (Order No. 45) granting Eaton's motion for summary determination that it satisfies the economic prong of the domestic industry requirement of section 337 as to its medium-duty automated transmissions. The Commission also issued a notice on September 23, 2004, that it had determined not to review ALJ's ID (Order No. 55) granting Eaton's motion for partial termination of the investigation as to claim 1 of the '566 patent.

On January 7, 2005, the ALJ issued his final ID on violation and his recommended determination on remedy and bonding. The ALJ found a violation of section 337 by reason of infringement of claim 15 of the '279 patent by respondents. He found no violation of section 337 regarding the '566 and the '545 patents. Petitions for review were filed by Eaton, the respondents, and the Commission investigative attorney on January 21, 2005. All parties filed

responses to the petitions on January 28, 2005.

On February 24, 2005, the Commission issued a notice indicating that it had determined not to review the ALJ's final ID on violation, thereby finding a violation of section 337. The Commission also invited the parties to file written submissions regarding the issues of remedy, the public interest and bonding, and provided a schedule for filing such submissions.

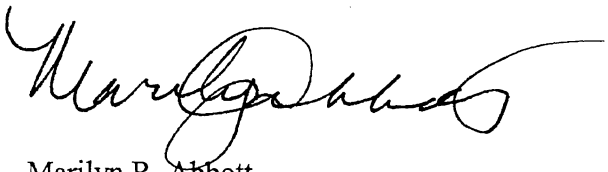
Having reviewed the record in this investigation, including the parties' written submissions and responses thereto, the Commission determined that the appropriate form of relief in this investigation is a limited exclusion order prohibiting the unlicensed entry of automated mechanical transmission systems for medium-duty and heavy-duty trucks, and components thereof covered by claim 15 of the '279 patent. The order covers automated mechanical transmission systems for medium-duty and heavy-duty trucks, and components thereof that are manufactured abroad by or on behalf of, or imported by or on behalf of the respondents, or any of their affiliated companies, parents, subsidiaries, or other related business entities, or their successors or assigns. The limited exclusion order does not cover parts necessary to service infringing automated mechanical transmission systems installed on trucks prior to the issuance of the order.

The Commission also determined to issue a cease and desist order prohibiting ArvinMeritor from importing, selling, marketing, advertising, distributing, offering for sale, transferring (except for exportation), and soliciting U.S. agents or distributors for automated mechanical transmission systems for medium-duty and heavy-duty trucks, and components thereof covered by claim 15 of the '279 patent.

The Commission further determined that the public interest factors enumerated in sections 337(d)(1) and (f)(1), 19 U.S.C. §§ 1337(d)(1) and (f)(1), do not preclude issuance of either the limited exclusion order or the cease and desist order. In addition, the Commission determined that the amount of bond to permit temporary importation during the Presidential review period shall be in the amount of 100 percent of the entered value of the imported articles. Finally, the Commission determined to deny both the complainant's motion to strike and the respondents' motion for leave to file a surreply. The Commission's orders and opinion in support thereof were delivered to the President on the day of their 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 210.50 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.50).

By order of the Commission.



Marilyn R. Abbott
Secretary to the Commission

Issued: April 7, 2005

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of	
CERTAIN AUTOMATED MECHANICAL TRANSMISSION SYSTEMS FOR MEDIUM-DUTY AND HEAVY-DUTY TRUCKS AND COMPONENTS THEREOF	**Inv. No. 337-TA-503**

LIMITED EXCLUSION ORDER

This Commission instituted this investigation on January 7, 2004, based on a complaint filed by Eaton Corporation ("Eaton") of Cleveland, Ohio, naming ZF Meritor, LLC of Maxton, North Carolina, ZF Friedrichshafen AG of Freidrichshafen, Germany, and ArvinMeritor, Inc. of Troy, Michigan as respondents. 69 *Fed. Reg.* 937 (January 7, 2004). The complaint, as supplemented, 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 automated mechanical transmission systems for medium-duty and heavy-duty trucks, and components thereof, by reason of infringement of six U.S. patents. Claim 15 of U.S. Patent No. 4,899,279 ("the '279 patent"), claim 4 of U.S. Patent No. 5,335,566 ("the '566 patent") and claims 1, 3, 6, 7, 11, 13, 16 and 17 of U.S. Patent No. 6,149,545 ("the '545

patent") remained at issue at the time the administrative law judge ("ALJ") issued his final initial determination ("ID").

On January 7, 2005, the ALJ issued his final ID on violation and his recommended determination ("RD") on remedy. The ALJ found a violation of section 337 by reason of infringement of claim 15 of the '279 patent by respondents. He found no violation of section 337 regarding the '566 and the '545 patents.

On February 23, 2005, the Commission determined not to review the ALJ's final ID on violation, thereby finding a violation of section 337 and issued a *Federal Register* notice in which it requested briefing on the issues of remedy, the public interest, and bonding. 70 *Fed. Reg.* 10112 (March 2, 2005).

Having reviewed the record in this investigation, including the written submissions of the parties, the Commission has 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 automated mechanical transmission systems for medium-duty and heavy-duty trucks and components thereof that infringe claim 15 of the '279 patent, and that are manufactured abroad by or on behalf of, or imported by or on behalf of the respondents. The Commission has also determined to issue a cease and desist order to ArvinMeritor, Inc.

The Commission has further determined that the public interest factors enumerated in 19 U.S.C. § 1337(d)(1) do not preclude issuance of its remedial orders, and that the bond during the Presidential review period shall be in the amount of 100 percent of the entered value of articles that are subject to this Order.

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

1. Automated mechanical transmission systems for medium-duty and heavy-duty trucks and components thereof that infringe claim 15 of U.S. Patent No. 4,899,279 that are manufactured abroad by or on behalf of, or imported by or on behalf of, ZF Friedrichshafen AG, Arvin Meritor, Inc., or ZF Meritor, LLC or any of their affiliated companies, parents, subsidiaries, or other related business entities, or their successors or assigns, are 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 that patent, except under license of the patent owner, as provided by law, and except for parts imported for use as a replacement for an identical or substantially equivalent part, subassembly, or component on an automated mechanical transmission system for medium-duty or heavy-duty trucks imported into the United States prior to the effective date of this Order.

2. Automated mechanical transmission systems for medium-duty and heavy-duty trucks and components thereof 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 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. Pursuant to procedures to be specified by the U.S. Bureau of Customs and Border Protection, as the U.S. Bureau of Customs and Border Protection deems necessary, persons seeking to import automated mechanical transmission systems and components thereof that are potentially subject to this Order shall certify that they are familiar with the terms of this Order, that they have made appropriate inquiry, and thereupon state that, to the best of their knowledge and belief, the products being imported are not excluded from entry under paragraph 1 of this Order. At its discretion, the U.S. Bureau of Customs and Border Protection may require persons who have provided the certification described in this paragraph to furnish such records or analyses as are necessary to substantiate the certification.

4. In accordance with 19 U.S.C. § 1337(l), the provisions of this Order shall not apply to automated mechanical transmission systems for medium-duty

and heavy-duty trucks and components thereof 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.

5. 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.

6. 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.

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

By Order of the Commission.

Marilyn R. Abbott
Secretary to the Commission

Issued: April 7, 2005

CERTAIN AUTOMATED MECHANICAL TRANSMISSION SYSTEMS FOR MEDIUM-DUTY AND HEAVY-DURY TRUCKS, AND COMPONENTS THEREOF **337-TA-503**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **TERMINATION OF INVESTIGATION; ISSUANCE OF A LIMITED EXCLUSION ORDER AND A CEASE AND DESIST ORDER**, was served upon all parties via first class mail and air mail where necessary on April 7, 2005.

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

ON BEHALF OF COMPLAINANT EATON CORPORATION:

Strugis M. Sobin, Esq.
Miller & Chevalier Chartered
655 Fifteenth Street, NW Suite 9000
Washington, DC 20005

Michael H. King, P.C.
McGuire Woods LLP
77 West Wacker Drive
Suite 4100
Chicago, IL 60601-1815

William H. Mandir, Esq.
Sughrue Mion PLLC
2100 Pennsylvania Avenue, NW
Suite 800
Washington, DC 20037

ON BEHALF OF ZF FRIEDRICHSHAFEN AG:

Thomas J. Schank, Esq.
Hunter & Schank Co., L.P.A.
One Canton Square
1700 Canton Avenue
Toledo, Ohio 43624-1378

ON BEHALF OF ZF MERITOR, ZF FRIEDRICHSHAFEN AG, AND ARVIN MERITOR, INC.:

Daymon L. Ruttenberg, Esq.
Brinks Hofer Gilson & Lione
455 N. Cityfront Plaza Drive
Suite 3600
Chicago, Illinois 60611

Lyle B. Vander Schaaf, Esq.
White & Case LLP
601 Thirteenth Street, NW
Washington, DC 20005

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of **CERTAIN AUTOMATED MECHANICAL TRANSMISSION SYSTEMS FOR MEDIUM-DUTY AND HEAVY-DUTY TRUCKS, AND COMPONENTS THEREOF**	**Inv. No. 337-TA-503**

ORDER TO CEASE AND DESIST

I.

Definitions

As used in this Order:

(A) "Commission" shall mean the United States International Trade Commission.

(B) "Eaton Corporation," "Eaton" or "Complainant" shall mean Eaton Corporation, Eaton Center, 1111 Superior Avenue Cleveland, OH 44114-2584.

(C) "ArvinMeritor Inc.," "ArvinMeritor" or "Respondent" shall mean ArvinMeritor Inc., 2135 West Maple Road, Troy, Michigan 48084-7196.

(D) "Person" shall mean an individual, or any non-governmental partnership, firm, association, corporation, or other legal or business entity other than ArvinMeritor or its majority owned or controlled subsidiaries, successors, or assigns.

(E) "United States" shall mean the fifty States, the District of Columbia, and Puerto Rico.

(F) The terms "import" and "importation" refer to importation for entry for consumption under the Customs laws of the United States; the terms also refer to the electronic transmission

of software, in whatever form, into the United States.

(G) The term "covered products" shall mean automated mechanical transmission systems for medium-duty and heavy-duty trucks and components thereof that infringe claim 15 of U.S. Patent No. 4,899,279, including Respondent's "FreedomLine" transmission systems, except for parts imported for use as a replacement for an identical or substantially equivalent part, subassembly, or component on an automated mechanical transmission system for medium-duty or heavy-duty trucks imported into the United States prior to the effective date of this Order.

II.

Applicability

The provisions of this Cease and Desist Order shall apply to Respondent and to any of its principals, stockholders, officers, directors, employees, agents, licensees, distributors, controlled (whether by stock ownership or otherwise) and majority-owned business entities, successors, and assigns, and to each of them, insofar as they are engaging in conduct prohibited by Section III, *infra*, for, with, or otherwise on behalf of Respondent.

III.

Conduct Prohibited

The following conduct of Respondent in the United States is prohibited by the Order. For the remaining term of the respective patents, Respondent shall not:

(A) import (including electronically) or sell for importation into the United States covered products;

(B) market, distribute, offer for sale, sell, or otherwise transfer (except for exportation), in the United States imported covered products;

(C) advertise imported covered products;

(D) solicit U.S. agents or distributors for imported covered products;

(E) aid or abet other entities in the importation, sale for importation, sale after importation, transfer, or distribution of covered products; or

(F) furnish services to its customers, including software technical support, relating to covered product.

IV.

Conduct Permitted

Notwithstanding any other provision of this Order, specific conduct otherwise prohibited by the terms of this Order shall be permitted if, in a written instrument, the owner of U.S. Patent No. 4,899,279 licenses or authorizes such specific conduct, or such specific conduct is related to the importation or sale of covered products by or for the United States. Notwithstanding any other provision of this Order, Respondent may furnish services to its customers, including supplying of replacement parts authorized to be imported under paragraph 1 of the limited exclusion order issued herewith that are for use in covered products imported and sold in the United States prior to the effective date of this Order.

V.

Reporting

For purposes of this reporting requirement, the reporting periods shall commence on July 1 of each year and shall end on the subsequent June 30. However, the first report required under this section shall cover the period from the date of issuance of this Order through June 30, 2005. This reporting requirement shall continue in force until such time as Respondent will have

truthfully reported, in two consecutive timely filed reports, that it has no inventory of covered products in the United States.

Within thirty (30) days of the last day of the reporting period, Respondent shall report to the Commission the quantity in units and the value in dollars of covered products that Respondent has imported or sold in the United States after importation (including importations or transfers by electronic transmission) during the reporting period and the quantity in units and value in dollars of reported covered products that remain in inventory in the United States at the end of the reporting period.

Any failure to make the required report or the filing of any false or inaccurate report shall constitute a violation of this Order, and the submission of a false or inaccurate report may be referred to the U.S. Department of Justice as a possible criminal violation of 18 U.S.C. § 1001.

VI.

Record-keeping and Inspection

(A) For the purpose of securing compliance with this Order, Respondent shall retain any and all records relating to the sale, offer for sale, marketing, or distribution in the United States of covered products, made and received in the usual and ordinary course of business, whether in detail or in summary form, for a period of three (3) years from the close of the fiscal year to which they pertain.

(B) For the purpose of determining or securing compliance with this Order and for no other purpose, and subject to any privilege recognized by the federal courts of the United States, duly authorized representatives of the Commission, upon reasonable written notice by the Commission or its staff, shall be permitted access and the right to inspect and copy in

Respondent's principal offices during office hours, and in the presence of counsel or other representatives if Respondent so chooses, all books, ledgers, accounts, correspondence, memoranda, and other records and documents, question, including computer records of electronic transmissions, both in detail and in summary form as are required to be retained by subparagraph VI(A) of this Order.

VII.

Service of Cease and Desist Order

Respondent is ordered and directed to:

(A) Serve, within fifteen (15) days after the effective date of this Order, a copy of this Order upon each of its respective officers, directors, managing agents, agents, and employees who have any responsibility for the importation, marketing, distribution, or sale of imported covered products in the United States;

(B) Serve, within fifteen (15) days after the succession of any persons referred to in subparagraph VII (A) of this Order, a copy of the Order upon each successor; and

(C) Maintain such records as will show the name, title, and address of each person upon whom the Order has been served, as described in subparagraphs VII(A) and VII(B) of this Order, together with the date on which service was made.

The obligations set forth in subparagraphs VII(B) and VII(C) shall remain in effect until the date of expiration of U.S. Patent No. 4,899,279.

VIII.

Confidentiality

Any request for confidential treatment of information obtained by the Commission pursuant to Sections V and VI of this Order should be in accordance with Commission Rule 201.6, 19 C.F.R. § 201.6. For all reports for which confidential treatment is sought, Respondent must provide a public version of such report with confidential information redacted.

IX.

Enforcement

Violation of this Order may result in any of the actions specified in section 210.75 of the Commission's Rules of Practice and Procedure, 19 C.F.R. § 210.75, including an action for civil penalties in accordance with section 337(f) of the Tariff Act of 1930, 19 U.S.C. § 1337(f), and any other action as the Commission may deem appropriate. In determining whether Respondent is in violation of this Order, the Commission may infer facts adverse to Respondent if Respondent fails to provide adequate or timely information.

X.

Modification

The Commission may amend this Order on its own motion or in accordance with the procedure described in section 210.76 of the Commission's Rules of Practice and Procedure, 19 C.F.R. § 210.76.

XI.

Bonding

The conduct prohibited by Section III of this Order may be continued during the sixty (60) day period in which this Order is under review by the President pursuant to section 337(j) of

the Tariff Act of 1930, 19 U.S.C. § 1337(j), subject to Respondent posting a bond of 100% of entered value of the covered products. This bond provision does not apply to conduct that is otherwise permitted by Section IV of this Order. Covered products imported on or after the date of issuance of this order are subject to the entry bond as set forth in the limited exclusion order issued by the Commission, and are not subject to this bond provision.

The bond is to be posted in accordance with the procedures established by the Commission for the posting of bonds by complainants in connection with the issuance of temporary exclusion orders. *See* Commission Rule 210.68, 19 C.F.R. § 210.68. The bond and any accompanying documentation is to be provided to and approved by the Commission prior to the commencement of conduct which is otherwise prohibited by Section III of this Order.

The bond is to be forfeited in the event that the President approves, or does not disapprove within the Presidential review period, this Order, unless the U.S. Court of Appeals for the Federal Circuit, in a final judgment, reverses any Commission final determination and order as to Respondent on appeal, or unless Respondent exports the products subject to this bond or destroys them and provides certification to that effect satisfactory to the Commission.

The bond is to be released in the event the President disapproves this Order and no subsequent order is issued by the Commission and approved, or not disapproved, by the President, upon service on Respondent of an order issued by the Commission based upon application therefor made by Respondent to the Commission.

By Order of the Commission.

Marilyn R. Abbott
Secretary to the Commission

Issued: April 7, 2005

CERTAIN AUTOMATED MECHANICAL TRANSMISSION SYSTEMS FOR MEDIUM-DUTY AND HEAVY-DURY TRUCKS, AND COMPONENTS THEREOF **337-TA-503**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **TERMINATION OF INVESTIGATION; ISSUANCE OF A LIMITED EXCLUSION ORDER AND A CEASE AND DESIST ORDER**, was served upon all parties via first class mail and air mail where necessary on April 7, 2005.

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

ON BEHALF OF COMPLAINANT EATON CORPORATION:

Strugis M. Sobin, Esq.
Miller & Chevalier Chartered
655 Fifteenth Street, NW Suite 9000
Washington, DC 20005

Michael H. King, P.C.
McGuire Woods LLP
77 West Wacker Drive
Suite 4100
Chicago, IL 60601-1815

William H. Mandir, Esq.
Sughrue Mion PLLC
2100 Pennsylvania Avenue, NW
Suite 800
Washington, DC 20037

ON BEHALF OF ZF FRIEDRICHSHAFEN AG:

Thomas J. Schank, Esq.
Hunter & Schank Co., L.P.A.
One Canton Square
1700 Canton Avenue
Toledo, Ohio 43624-1378

ON BEHALF OF ZF MERITOR, ZF FRIEDRICHSHAFEN AG, AND ARVIN MERITOR, INC.:

Daymon L. Ruttenberg, Esq.
Brinks Hofer Gilson & Lione
455 N. Cityfront Plaza Drive
Suite 3600
Chicago, Illinois 60611

Lyle B. Vander Schaaf, Esq.
White & Case LLP
601 Thirteenth Street, NW
Washington, DC 20005

PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

In the Matter of	
CERTAIN AUTOMATED MECHANICAL TRANSMISSION SYSTEMS FOR MEDIUM-DUTY AND HEAVY-DUTY TRUCKS AND COMPONENTS THEREOF	**Inv. No. 337-TA-503**

COMMISSION OPINION

BACKGROUND

This patent-based section 337 investigation was instituted by the Commission on January 7, 2004, based on a complaint filed by Eaton Corporation ("Eaton") of Cleveland, Ohio. 69 *Fed. Reg.* 937 (January 7, 2004). The complaint, as supplemented, 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 automated mechanical transmission ("AMT") systems for medium-duty and heavy-duty trucks, and components thereof, by reason of infringement of claim 15 of U.S. Patent No. 4,899,279 ("the '279 patent"); claims 1-20 of U.S. Patent No. 5,335,566 ("the '566 patent"); claims 2-4 and 6-16 of U.S. Patent No. 5,272,939 ("the '939 patent"); claims 1-13 of U.S. Patent No. 5,624,350 ("the '350 patent"); claims 1, 3, 4, 6-9, 11, 13, 14, 16 and 17 of U.S. Patent No. 6,149,545 ("the '545 patent"); and claims 1-16 of U.S. Patent No. 6,066,071 ("the '071 patent"). The complaint and notice of investigation named three respondents ZF Meritor, LLC ("ZF Meritor") of Maxton, North Carolina, ZF Friedrichshafen AG

("ZFAG") of Freidrichshafen, Germany, and ArvinMeritor, Inc. ("ArvinMeritor") of Troy, Michigan. Claim 15 of the '279 patent, claim 4 of the '566 patent, and claims 1, 3, 6, 7, 11, 13, 16, and 17 of the '545 patent remained at issue at the time that the administrative law judge ("ALJ") issued his final initial determination ("ID").

On January 7, 2005, the ALJ issued his final ID on violation and his recommended determination ("RD") on remedy and bonding. The ALJ found a violation of section 337 by reason of infringement of claim 15 of the '279 patent by respondents. He did not find a violation based on infringement of the asserted claims of the remaining patents. Petitions for review were filed by Eaton, the respondents, and the Commission investigative attorney ("IA") on January 21, 2005. All parties filed responses to the petitions on January 28, 2005.

On February 24, 2005, the Commission issued a notice that it had determined not to review the ALJ's final ID on violation, thereby finding a violation of section 337. 70 *Fed. Reg.* 10112 (March 2, 2005). The Commission also requested briefing on the issues of remedy, the public interest, and bonding. *Id.* Submissions on the issues of remedy, the public interest, and bonding were filed on March 7, 2005 by all parties. On March 9, 2005, Eaton filed a motion to strike a part of the respondents' written submission and requested expedited replies to its motion. All parties filed response submissions on March 14, 2005. On March 18, 2005, the respondents filed a motion for leave to file surreply to Eaton's response submission, which Eaton opposed on March 21, 2005.

PUBLIC VERSION

DISCUSSION

I. Remedy

Having found a violation of section 337, we must consider the issues of remedy, the public interest, and bonding. 19 U.S.C. §§ 1337(d) and (f). The Commission has broad discretion in selecting the form, scope, and extent of the remedy in a section 337 proceeding, and judicial review of its choice of remedy is governed by the abuse of discretion standard. *Fuji Photo Film Co. v. United States Int'l Trade Comm'n*, 386 F.3d 1095, 1106-1107 (Fed. Cir. 2004).

In this investigation, all the parties agree that the appropriate remedy is a limited exclusion order excluding AMT systems, manufactured by or for the respondents, that infringe claim 15 of the '279 patent and a cease and desist order directed to the domestic respondent, ArvinMeritor. Moreover, the parties agree that the orders should include a certification provision and that the cease and desist order should contain a record-keeping requirement. Finally, the parties agree that the issuance of remedial orders directed against the respondents' AMT systems would not be contrary to public interest. The parties disagree, however, as to whether the orders should be limited to AMT systems for medium-duty and heavy-duty trucks, and whether a cease and desist order should be directed to additional respondents. Finally, the parties disagree about the scope of any certification provision or record-keeping requirement.

Eaton argues that the remedial orders should cover all of respondents' AMT systems that infringe claim 15 of the '279 patent and should not be limited to specific models or types of transmissions. The respondents argue that the orders should only cover AMT systems for

medium-duty and heavy-duty trucks that infringe the '279 patent by blocking all gear change command output signals during anti-lock brake system activity in the fully automatic mode of operation. The respondents further argue that any remedial orders should not cover its new FreedomLine transmission system, which they argue does not infringe claim 15 of the '279 patent.

We determine to issue both a limited exclusion order excluding AMT systems for medium-duty and heavy-duty trucks, and components thereof that infringe claim 15 of the '279 patent, and a cease and desist order directed to ArvinMeritor. We agree with the respondents and the IA that the scope of the remedy is dependent upon the scope of the investigation, which is determined by the notice of investigation. *See Certain Insect Traps*, Inv. No. 337-TA-498, Order No. 7 (April 2004). In this case, the notice of investigation identified the infringing products as AMT systems for medium-duty and heavy-duty trucks, and components thereof. 69 *Fed. Reg.* 937 (January 7, 2004). *Certain Hardware Logic Emulations Systems and Components Thereof*, Inv. 337-TA-383, cited by Eaton, does not support Eaton's argument that the scope of the remedial orders should cover AMT systems for other vehicles which are outside the scope of the investigation.

Our limited exclusion order and cease and desist order both include an exception for replacement parts that are necessary to service infringing AMT systems which were installed on trucks prior to the issuance of our remedial orders. We adopt the ALJ's view that the record supports an exception for replacement parts. Moreover, as the IA argues, such an exception would "ensure the safe operation of those transmissions." IA's Brief at 7. Eaton opposes the

inclusion of an exception, arguing that complete relief should encompass all infringing products and that narrowing the scope of the exclusion order would increase the risk of circumvention. We deem Eaton's arguments to be unpersuasive in view of public interest which warrants the continuous safe operation of transmissions that were sold before entry of our remedial orders.

Our limited exclusion order also includes a certification provision that allows importation of AMT systems or components thereof if the importer certifies that these imports do not fall within the scope of the order. We determine to direct the limited exclusion order against the goods of all the respondents, including ZF Meritor. We note that the IA recommends that the limited exclusion order should not extend to ZF Meritor because ZF Meritor ceased operating as of January 1, 2004, and will subsequently be dissolved. *See* IA's Brief at 5 fn.3. We determine, however, that ZF Meritor should be included in the order since, according to the record, ZF Meritor is still in existence.

In addition to a limited exclusion order, we also determine to issue a cease and desist order to domestic respondent ArvinMeritor. The ALJ found that ArvinMeritor maintains a commercially significant inventory in the U.S. and accordingly recommends the issuance of a cease and desist order to ArvinMeritor. The record indicates that ArvinMeritor has a commercially significant inventory of infringing transmissions in the U.S. and, therefore under Commission precedent, a cease and desist order against ArvinMeritor is appropriate. *See Certain Crystalline Cefadroxil Monohydrate*, Inv. No. 337-TA-293, Comm'n Opinion at 6 (January 19, 1990). Our cease and desist order against ArvinMeritor includes an exception for replacement parts to ensure the safe operation of infringing AMT systems installed on trucks prior to the

issuance of the order.

We also determine that there is no basis for issuing a cease and desist order to ZF Meritor because the record indicates that ZF Meritor transferred all of its inventory of components for the FreedomLine transmission to the foreign respondent, ZFAG. *See* ID at 216. Eaton argues that in order to afford complete relief a cease and desist order should be issued to all the respondents including the foreign respondent. In support of its argument, Eaton cites *Certain Abrasive Products*, (Comm'n Opinion on Remedy, the Public Interest, and Bonding) (July 26, 2002) for the proposition that "Commission precedent recognizes that where, as here, infringing foreign respondents maintain control over commercially significant inventories in the United States of infringing products, such respondents are each appropriately subject to cease and desist orders to provide 'complete relief' to Complainant." Eaton's Brief at 18. However, we determine that Eaton's argument is not supported by *Abrasive Products* because the Commission did not issue a cease and desist order to a foreign respondent in that investigation. *See Abrasive Products* at 8. The Commission's practice of declining to issue ceases and desist orders to entities that do not maintain an inventory in the United States was upheld in *Fuji Photo Film Co.*, 386 F.3d at 1106.

Eaton requests that the Commission strike portions of the respondents' brief relating to the respondents' new FreedomLine transmission, as well as the supporting exhibits, because the new FreedomLine transmission was not a part of the investigation.[1] We deny Eaton's motion to

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[1] Respondents do not seek a determination from the Commission regarding whether or not their new transmission system infringes claim 15 of the '279 patent, and we have not made such a determination. We note that respondents may seek an advisory opinion under Commission rule 210.79, 19 C.F.R. § 210.79, as to whether their new FreedomLine transmission

strike because we agree with the IA that the portion of the respondents' submission subject to the motion to strike "falls within the purview of the Commission's request for briefing on the issues of remedy, the public interest, and bonding." IA's Response at 8. We also deny respondents' motion to file a surreply to Eaton's response submission regarding the issues of remedy, the public interest, and bonding because respondents' have not demonstrated good cause for this additional submission.

II. The Public Interest

Section 337(d) and (f) directs the Commission to consider public interest factors before issuing remedial orders, including the effect of any such remedial order on the "public health and welfare, competitive conditions in the United States economy, the production of like or directly competitive articles in the United States, and United States consumers." 19 U.S.C. §§ 1337(d) and (f). In this investigation, we determine that there is no evidence that the entry of permanent relief would adversely affect the public interest factors enumerated in the statute. Moreover, the remedial orders contain an exception that would permit the respondents' service and repair of previously installed FreedomLine transmissions and a certification provision that will facilitate the importation of noninfringing AMT systems and components thereof. Accordingly, we determine that consideration of the statutory public interest factors does not preclude issuance of a limited exclusion order and a cease and desist order covering AMT systems for medium-duty and heavy-duty trucks.

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system falls within the scope of the limited exclusion order.

III. Respondents' Bond

Section 337(j) provides for the entry of infringing articles during the sixty (60) day Presidential review period upon posting of a bond, and states that the bond should be set at a level sufficient to "protect complainant from any injury" during the Presidential review period. 19 U.S.C. § 1337(j); *see* also Commission Rule 210.50(a)(3), 19 C.F.R. § 210.50(a)(3).

The ALJ recommended a bond of 100 percent of the entered value of the imported product due to the lack of adequate pricing information. Eaton argues that the ALJ's recommended bond is appropriate because (1) "[i]n light of the significant number of transmissions that may be imported by [ZFAG] while a bonding requirement is in place, it is imperative that the Commission set a bond that is indeed high enough to protect Eaton from any injury," (2) a price differential analysis is inappropriate and cannot be used, and (3) the importation of respondents' infringing transmission systems is injurious to Eaton but difficult to calculate in terms of actual dollars. *Id.* at 29-34.

The IA also agrees with the ALJ's recommendation concerning the bond. The IA contends that the "record does not permit the use of price comparisons to set the bond amount given Respondents' generally higher prices, the disparate features among the respective transmissions, and the circumstances of sale unique to each transaction. IA's Brief at 13. Moreover, the IA argues that "[f]or reasons stated by the Judge, there does not appear to be sufficient evidence to assess Respondents' average profits on its sales of medium-duty and heavy-duty transmissions." *Id.* Respondents did not address the amount of bond that should be set during the Presidential review period.

Where it is difficult or impossible to calculate a bond based upon price differentials, as it is here, the Commission has traditionally set the bond at 100 percent of entered value of the infringing imported product. *See Certain Oscillating Sprinklers, Sprinkler Components, and Nozzles*, Inv. No. 337-TA-448, Limited Exclusion Order at 4 (March 2002). Accordingly, we determine that the bond during the period of Presidential review in this investigation be set at 100 percent of entered value.

By Order of the Commission.

Marilyn R. Abbott
Secretary to the Commission

Issued: May 9, 2005

CERTAIN AUTOMATED MECHANICAL TRANSMISSION SYSTEMS FOR MEDIUM-DUTY AND HEAVY-DUTY TRUCKS, AND COMPONENTS THEREOF **337-TA-503**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **COMMISSSION OPINION**, was served upon all 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, SW Rm. 112
Washington, DC 20436

ON BEHALF OF COMPLAINANT EATON CORPORATION:

Strugis M. Sobin, Esq.
Miller & Chevalier Chartered
655 Fifteenth Street, NW Suite 9000
Washington, DC 20005

Michael H. King, P.C.
McGuire Woods LLP
77 West Wacker Drive
Suite 4100
Chicago, IL 60601-1815

William H. Mandir, Esq.
Sughrue Mion PLLC
2100 Pennsylvania Avenue, NW
Suite 800
Washington, DC 20037

ON BEHALF OF ZF MERITOR, ZF FRIEDRICHSHAFEN AG, AND ARVIN MERITOR, INC.:

Daymon L. Ruttenberg, Esq.
Brinks Hofer Gilson & Lione
455 N. Cityfront Plaza Drive
Suite 3600
Chicago, Illinois 60611

Lyle B. Vander Schaaf, Esq.
White & Case LLP
601 Thirteenth Street, NW
Washington, DC 20005

ON BEHALF OF ZF FRIEDRICHSHAFEN AG:

Thomas J. Schank, Esq.
Hunter & Schank Co., L.P.A.
One Canton Square
1700 Canton Avenue
Toledo, Ohio 43624-1378

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

In the Matter of	)	
	)	Inv. No. 337-TA-503
CERTAIN AUTOMATED MECHANICAL TRANSMISSION SYSTEMS FOR MEDIUM-DUTY AND HEAVY-DUTY TRUCKS AND COMPONENTS THEREOF	)	

NOTICE OF COMMISSION DECISION NOT TO REVIEW A FINAL INITIAL DETERMINATION FINDING A VIOLATION OF SECTION 337 OF THE TARIFF ACT OF 1930; REQUEST FOR WRITTEN SUBMISSIONS 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 not to review the presiding administrative law judge's (ALJ) initial determination ("ID") in the above-captioned investigation finding a violation of section 337 of the Tariff Act of 1930. Notice is also hereby given that the Commission is requesting briefing on the issues of remedy, the public interest, and bonding.

FOR FURTHER INFORMATION CONTACT: Rodney Maze, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 205-3065. 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: This patent-based section 337 investigation was instituted by the Commission on January 7, 2004, based on a complaint filed by Eaton Corporation ("Eaton") of Cleveland, Ohio. 69 *Fed. Reg.* 937 (January 7, 2004). The complainant, as supplemented, 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 automated mechanical transmission systems for medium-duty and heavy-duty trucks, and components thereof, by reason of infringement of claim 15 of U.S. Patent No. 4,899,279 ("the '279 patent"); claims 1-20 of U.S. Patent No. 5,335,566 ("the '566 patent"); claims 2-4 and 6-16 of U.S. Patent No. 5,272,939 ("the '939 patent"); claims 1-13 of U.S. Patent No. 5,624,350 ("the '350 patent"); claims 1, 3, 4, 6-9, 11, 13, 14, 16 and 17 of U.S. Patent No. 6,149,545 ("the '545 patent"); and claims 1-16 of U.S. Patent No. 6,066,071 ("the '071 patent").

The complaint and notice of investigation named three respondents ZF Meritor, LLC ("ZF Meritor) of Maxton, North Carolina, ZF Friedrichshafen AG ("ZFAG") of Freidrichshafen, Germany, and ArvinMeritor, Inc. of Troy, Michigan.

On July 21, 2004, the Commission issued a notice indicating that it had determined not to review the ALJ's initial determination ("ID") (Order No. 20) terminating the investigation as to the '071 patent and as to claims 2, 3, and 5-20 of the '566 patent, claims 4, 7, and 12 of the '350 patent, and claims 4, 8-9, and 14 of the '545 patent.

On August 11, 2004, the Commission issued a notice (indicating that it had determined not to review the ALJ's ID (Order No. 31) terminating the investigation as to the '939 patent and as to claims 10, 11, and 13 of the '350 patent.

On August 16, 2004, the Commission issued a notice indicating that it had determined not to review the ALJ's ID (Order No. 28) that Eaton has satisfied the economic prong of the domestic industry requirement as to certain articles it alleges practice the patents at issue in this investigation.

On August 23, 2004, the Commission issued a notice indicating that it had determined not to review the ALJ's ID (Order No. 30) that Eaton did not meet the technical prong of the domestic industry requirement as to the remaining claims, claims 1-3, 5, 6, 8, and 9, of the '350 patent, thus terminating the investigation as to that patent.

On September 17, 2004, the Commission issued a notice indicating that it had determined not to review the ALJ's ID (Order No. 38) granting Eaton's partial summary determination that the importation requirement has been met.

On September 23, 2004, the Commission issued a notice indicating that it had determined not to review the ALJ's ID (Order No. 45) granting Eaton's motion for summary determination that it satisfies the economic prong of the domestic industry requirement of section 337 as to its medium-duty automated transmissions. The Commission also issued a notice on September 23, 2004, indicating that it had determined not to review ALJ's ID (Order No. 55) granting Eaton's motion for partial termination of the investigation as to claim 1 of the '566 patent.

On January 7, 2005, the ALJ issued his final ID on violation and his recommended determination on remedy. The ALJ found a violation of section 337 by reason of infringement of

claim 15 of the '279 patent by respondents. He found no violation of section 337 regarding the '566 and the '545 patents. Petitions for review were filed by Eaton, the respondents, and the Commission investigative attorney on January 21, 2005. All parties filed responses to the petitions on January 28, 2005.

Having examined the record in this investigation, including the ALJ's final ID, the petitions for review, and the responses thereto, the Commission has determined not to review the ID, thereby finding a violation of section 337.

In connection with the final disposition of this investigation, the Commission may issue an order that could result in the exclusion of respondents' FreedomLine transmissions from entry into the United States, and/or issue one or more cease and desist orders that could result in the respondents being required to cease and desist from engaging in unfair acts in the importation and sale of FreedomLine transmissions. 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 are 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).

When 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. 19 U.S.C. § 1337(j). 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. *Id.* The Commission is therefore interested in receiving submissions concerning the amount of the bond that should be imposed.

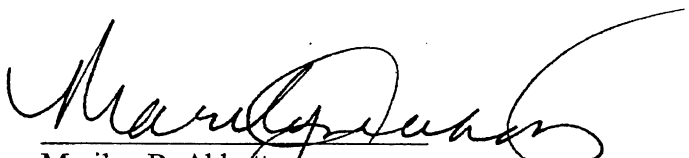
WRITTEN SUBMISSIONS: The parties to the investigation, interested government agencies, and any other interested parties are encouraged to file written submissions on the issues of remedy, the public interest, and bonding. Such submissions should address the January 7, 2005, recommended determinations by the ALJ on the issuance of remedy and bonding. Complainant and the Commission investigative attorney are also requested to submit proposed remedial orders for the Commission's consideration and to state the date on which the '279 patent will expire. The written submissions and proposed remedial orders must be filed no later than close of business on March 7, 2005. Reply submissions must be filed no later than the close of business

on March 14, 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 (or portion thereof) 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* section 201.6 of the Commission's Rules of Practice and Procedure, 19 C.F.R. § 201.6. Documents for which confidential treatment by the Commission is sought will be treated accordingly. All non-confidential 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 sections 210.42, 210.43, and 210.50 of the Commission's Rules of Practice and Procedure (19 C.F.R. §§ 210.42, 210.43, and 210.50).

By order of the Commission.



Marilyn R. Abbott
Secretary to the Commission

Issued: February 24, 2005

CERTAIN AUTOMATED MECHANICAL TRANSMISSION SYSTEMS FOR MEDIUM-DUTY AND HEAVY-DURY TRUCKS, AND COMPONENTS THEREOF **337-TA-503**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **NOTICE OF COMMISISON DECISION NOT TO REVIEW A FINAL INITIAL DETERMINATION FINDING A VIOLATION OF SECTION 337 OF THE TARIFF ACT OF 1930; REQUEST FOR WRITTEN SUBMISSIONS ON REMEDY, THE PUBLIC INTEREST, AND BONDING,** was served upon all parties via first class mail and air mail where necessary on February 24, 2005.

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

ON BEHALF OF COMPLAINANT EATON CORPORATION:

Strugis M. Sobin, Esq.
Miller & Chevalier Chartered
655 Fifteenth Street, NW Suite 9000
Washington, DC 20005

Michael H. King, P.C.
McGuire Woods LLP
77 West Wacker Drive
Suite 4100
Chicago, IL 60601-1815

William H. Mandir, Esq.
Sughrue Mion PLLC
2100 Pennsylvania Avenue, NW
Suite 800
Washington, DC 20037

ON BEHALF OF ZF MERITOR, ZF FRIEDRICHSHAFEN AG, AND ARVIN MERITOR, INC.:

Daymon L. Ruttenberg, Esq.
Brinks Hofer Gilson & Lione
455 N. Cityfront Plaza Drive
Suite 3600
Chicago, Illinois 60611

Lyle B. Vander Schaaf, Esq.
White & Case LLP
601 Thirteenth Street, NW
Washington, DC 20005

ON BEHALF OF ZF FRIEDRICHSHAFEN AG:

Thomas J. Schank, Esq.
Hunter & Schank Co., L.P.A.
One Canton Square
1700 Canton Avenue
Toledo, Ohio 43624-1378

PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of	)	
	)	
CERTAIN AUTOMATED MECHANICAL TRANSMISSION SYSTEMS FOR MEDIUM-DUTY AND HEAVY-DUTY TRUCKS AND COMPONENTS THEREOF	)	Investigation No. 337-TA-503

Final Initial and Recommended Determinations

This is the administrative law judge's Final Initial Determination, under Commission rule 210.42. The administrative law judge, after a review of the record developed, finds that claim 15 of the '279 patent is not invalid; that the '279 patent is enforceable; and that said claim 15 is infringed. Thus, he finds that a violation of section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), has occurred. As for U.S. Patent Nos. 5,335,566 and 6,149,545, while he finds that the asserted claims are not invalid and the '545 patent is enforceable, he finds that the asserted claims of said patents are not infringed.

This is also the administrative law judge's Recommended Determination on remedy and bonding, pursuant to Commission rules 210.36(a) and 210.42(a)(1)(ii). The administrative law judge recommends that the Commission issue a limited exclusion order and a cease and desist order. He further recommends that any bond, during the Presidential review period, be in the amount of 100 percent of the entered value for any importation involving infringing products.

APPEARANCES

For Complainant Eaton Corporation:

Sturgis M. Sobin, Esq.
Miller & Chevalier Chartered
655 Fifteenth Street, NW Suite 9000
Washington, DC 20005

Michael H. King, P.C.
McGuire Woods LLP
77 West Wacker Drive
Suite 4100
Chicago, IL 60601-1815

William H. Mandir, Esq.
Sughrue Mion PLLC
2100 Pennsylvania Avenue, NW
Suite 800
Washington, DC 20037

Respondents ZF Meritor LLC, ZF Friedrichshafen AG, ArvinMeritor, Inc.:

Gary M. Ropski, Esq.
BRINKS HOFER GILSON & LIONE
455 N. Cityfront Plaza Drive, Suite 3600
Chicago, Illinois 60611

Lyle B. Vander Schaaf, Esq.
WHITE & CASE, LLP
701 Thirteenth Street, N.W.
Washington, DC 20005

Respondent ZF Friedrichshafen AG

Thomas J. Schank, Esq.
HUNTER & SCHANK CO., L.P.A.
One Canton Square
1700 Canton Avenue
Toledo, Ohio 43624-1378

Staff: Jay H. Reiziss, Esq.

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OPINION

ABBREVIATIONS

CBr	Complainant's Post-hearing Brief
CORPFF	Complainant's Objection To Respondents' Proposed Finding
COSPFF	Complainant's Objection To Staff's Proposed Finding
CPFF	Complainant's Proposed Finding
CPHS	Complainant's Pre-hearing Statement
CRBr	Complainant's Post-hearing Reply Brief
CRRPFF	Complainant's Proposed Rebuttal Finding to Respondents' Proposed Finding
CX	Complainant's Exhibit
RBr	Respondents' Post-hearing Brief
RPHS	Respondents' Pre-hearing Statement
RRBr	Respondents' Post-hearing Reply Brief
RRX	Respondents' Rebuttal Exhibit
ROCPFF	Respondents' Objection To Complainant's Proposed Finding
ROSPFF	Respondents' Objection To Staff's Proposed Finding
RPFF	Respondents' Proposed Finding
RRCPFF	Respondents' Proposed Rebuttal Finding To Complainant's Proposed Finding
RRSPFF	Respondents' Proposed Rebuttal Finding To Staff's Proposed Finding
RX	Respondents' Exhibit
SBr	Staff's Post-hearing Brief
SPFF	Staff's Proposed Finding
SRBr	Staff's Post-hearing Reply Brief

SRCPFF	Staff's Proposed Rebuttal Finding To Complainant's Proposed Finding
Tr.	Transcript Of Pre-hearing Conference, Hearing And Closing Arguments

OPINION

I. Procedural History

By notice, which issued on December 31, 2003, the Commission instituted an investigation, pursuant to subsection (b) of section 337 of the Tariff Act of 1930, as amended to determine whether there is a violation of subsection (a)(1)(B) of section 337 in the importation into the United States, the sale for importation into the United States, or the sale within the United States after importation of certain automated medium-duty and heavy-duty trucks, or components thereof by reason of infringement of claim 15 of U.S. Patent No. 4,899,279 (the '279 patent), claims 1-20 of U.S. Patent No. 5,335,566 (the '566 patent), claims 2-4 and 6-16 of U.S. Patent No. 5,272,939 (the '939 patent), claims 1-13 of U.S. Patent No. 5,624,350 (the '350 patent), claims 1, 3, 4, 6-9, 11, 13, 14, 16, or 17 of U.S. Patent No. 6,149,545 (the '545 patent), or claims 1-16 of U.S. Patent No. 6,066,071 (the '071 patent) and whether an industry in the United States exists as required by subsection (a)(2) of section 337.

The complaint was filed on December 1, 2003, under section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, on behalf of Eaton Corporation (Eaton) of Cleveland, Ohio. A supplement to the complaint was filed on December 3, 2003. The complainant requested that the Commission institute an investigation and issue a permanent exclusion order and a permanent cease and desist order. Named in the notice of investigation as respondents and served with the complaint were ZF Meritor LLC (ZFM) of North Carolina, ZF Friedrichshafen AG (ZFF) of Allmannsweilerstrasse 25, 88046 Friedrichshafen Germany, and ArvinMeritor, Inc., of Michigan.

Order No. 3, which issued on February 5, 2004, set a target date of April 7, 2005. Order No. 20, which issued on June 24, 2004, granted complainant's Motion No. 503-17 to the extent that the investigation was terminated as to claims 2, 3, 5-20 of the '566 patent, claims 4, 7, 12 of

the '350 patent, claims 4, 8-9 and 14 of the '545 patent and claims 1-16 of the '071 patent. By notice dated July 21, the Commission determined not to review Order No. 20.

Order No. 25, which issued on July 22, 2004, denied respondents' Motion No. 503-1 for summary determination that the accused FreedomLine transmission system does not infringe claim 15 of the '279 patent. Order No. 26, which issued on July 22, 2004, denied respondents' Motion No. 503-4 for summary determination that the accused FeedomLine transmission system does not infringe claims 1-20 of the '566 patent. Order No. 27, which also issued on July 22, 2004, denied respondents' Motion No. 503-9 for summary determination that the accused FreedomLine transmission system does not infringe claims 1, 3, 4, 6-9, 11-13, 14, 16 or 17 of the '545 patent.

Order No. 28, which issued on July 22, 2004, was an initial determination finding that complainant had satisfied the economic prong of the domestic industry requirement as it relates to heavy-duty transmissions. By notice dated August 16, the Commission determined not to review Order No. 28.

On July 22, 2004, Order No. 30 issued which granted respondents' Motion No. 503-16 thus finding that complainant did not practice claim 1 of the '350 patent and hence had failed to meet the technical prong of the domestic industry requirement as said requirement relates to the '350 patent. By notice dated August 23, the Commission determined not to review Order No. 30.

Order No. 31, which issued on July 28, 2004, granted complainant's Motion No. 503-32 which terminated the investigation as to claims 10, 11 and 13 of the '350 patent and as to the '939 patent in its entirety. By notice dated August 11, the Commission determined not to review Order No. 31.

Order No. 32, which issued on July 28, 2004 and was characterized by the administrative law judge as an educational vehicle required submissions from complainant, respondents and the staff. Order No. 38, which issued on August 12, granted complainant's Motion No. 503-33 for summary determination on the importation issue. By notice dated September 10, the Commission determined not to review Order No. 38.

Order No. 45, which issued on August 24, 2004, granted complainant's Motion No. 503-36 and found that complainant satisfies the economic prong of the domestic industry requirement as it relates to medium-duty transmissions. By notice dated September 23, the Commission determined not to review Order No. 45.

Order No. 54, which issued on August 26, 2004, denied complainant's Motion No. 503-35 for summary determination that respondents' FreedomLine transmission system infringes claim 15 of the '279 patent and that complainant's Lighting Top2 transmission practices claim 15 of the '279 patent.

Order No. 55, which issued on August 27, 2004, granted complainant's Motion No. 503-69 and terminated the investigation as to claim 1 of the '566 patent. By notice dated September 23, the Commission determined not to review Order No. 55. With the termination as to claim 1 of the '566 patent, in issue in the investigation are claim 15 of the '279 patent, claim 4 of the '566 patent and claims 1, 3, 6, 7, 11, 13, 16 and 17 of the '545 patent.

A pre-hearing conference was conducted on September 2, 2004 with the hearing also commencing on that date and continuing on September 3, 4, 7, 8, 9, 10, 11, 14 and 15. All parties participated in the hearing. Post-hearing submissions have been filed and closing arguments were conducted on November 3.

The Final Initial and Recommended Determinations are based on the record compiled at the hearing and the exhibits admitted into evidence. The administrative law judge has also taken into account his observation of the witnesses who appeared before him during the hearing. Proposed findings of fact submitted by the parties not herein adopted, in the form submitted or in substance, are rejected as either not supported by the evidence or as involving immaterial matters and/or as irrelevant. Certain findings of fact included herein have references to supporting evidence in the record. Such references are intended to serve as guides to the testimony and exhibits supporting the finding of fact. They do not necessarily represent complete summaries of the evidence supporting said findings.

II. Parties

See FF 1-15.

III. Jurisdiction

The complaint and notice of investigation state a cause of action under section 337 of the Tariff Act of 1930, as amended. Thus, the Commission has jurisdiction over the subject matter of this investigation. See Amgen, Inc. v. U.S. Int'l Trade Comm'n, 902 F.2d 1531, 1536 (Fed. Cir. 1990). All parties appeared in the investigation. Thus, the Commission has in personam jurisdiction.

IV. Products In Issue

Complainant's three products in issue are the AutoShift, UltraShift and Lighting Top2 transmission systems. With respect to respondents, ZFF sells in the U.S. market an automated mechanical transmission (AMT) called the FreedomLine transmission. ZFF first began importing those transmissions for commercial sale at least as early as 2001. (Collenberg, Tr. at

2464, FF 63.) The customers for FreedomLine transmissions are major original equipment manufacturers (OEMs), including Freightliner, Paccar, Volvo, Mack and International Truck and Engine Corporation. (Collenberg, Tr. at 2465.)

V. The '566 Patent

The '566 patent, titled "Shift Control Method/System," issued on August 9, 1994 to Thomas A. Genise and Ronald K. Markyvech based on Application No. 909,332 filed July 6, 1992. (CX-198.) The '566 patent is assigned to Eaton. (CX-198.) A portion of the term of the '566 patent subsequent to December 28, 2010 has been disclaimed. (Id.) Application No. 909,332 is related to Application No. 909,335, titled "Shift Enable Control Method/System," filed also on July 6, 1992 and now U.S. Patent No. 5,272,939 assigned to Eaton. (CX-198, col. 1, lns. 5-10.) While the '566 patent contains twenty claims (CX-198), only claim 4 of said patent is in issue. Claim 4 reads:

> A control method for controlling at least partially automated implementation of selected shifts of a vehicular mechanical change gear transmission system comprising a controlled fuel throttle controlled engine (E), a multi-speed change gear mechanical transmission (10) having an input shaft (16) and an output shaft (90) adapted to drive vehicular drive wheels, said input shaft having a determinable expected acceleration during a gear ratio change operation, a master friction clutch (C) drivingly interposed between the engine and the transmission, a first sensor (98) for providing a first input signal indicative of transmission input shaft (16) rotational speed, a second sensor (100) for providing a second input signal indicative of vehicle speed, a third sensor (DL) for providing an input signal indicative of engine torque and a transmission actuator (112, 70, 96) for controlling shifting of the transmission, said control method characterized by;
>
> determining selection of a shift from a currently engaged transmission ratio of a target gear ratio,
>
> determining as a function of at least said input signals indicative of (i) current engine torque and (ii) current vehicle acceleration, an expected vehicle acceleration (Ao) under current vehicle operating conditions and at zero engine

torque to the drive wheels;

determining as of function of (i) the expected vehicle acceleration (Ao) under current vehicle operating conditions and at zero engine torque to the drive wheels, (ii) the gear ratio of the selected target gear ratio and (iii) the expected input shaft acceleration during a shift into the target gear ratio, feasibility or infeasibility of achieving substantially synchronous conditions for engagement of the target ratio if the selected shift is implemented, and

causing the initiation of a selected shift only upon a determination of feasibility of achieving substantially synchronous conditions for engagement of the target gear ratio.

(CX-198, col. 12, ln. 51 to col. 13, ln. 21.)

A. Claim Interpretation

Claim interpretation, as to each of the asserted claims of the three patents in issue, is a question of law. Markman v. Westview Instruments, Inc., 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc), aff'd, 517 U.S. 370 (1996); Cybor Corp. v. FAS Techs., Inc.,138 F.3d 1448, 1455 (Fed. Cir. 1998). In construing claims, the court should first look to intrinsic evidence consisting of the language of the claims, the specification and the prosecution history as it "is the most significant source of the legally operative meaning of disputed claim language." Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996); see Bell Atl. Network Servs., Inc. v. Covad Communications Group, Inc., 262 F.3d 1258, 1267 (Fed. Cir. 2001). Claim construction analysis begins with words of the claim. Tex. Digital Sys., Inc. v. Telegenix, Inc., 308 F.3d 1193, 1201 (Fed. Cir. 2002). The ordinary and customary meaning of a claim term may be determined by reviewing a variety of sources, which may include the claims themselves, dictionaries and treatises, and the written description, the drawings and the prosecution history. Ferguson Beauregard/Logic Controls v. Mega Sys., LLC, 350 F.3d 1327, 1338 (Fed. Cir. 2003). The

presumption of ordinary meaning will be "rebutted if the inventor has disavowed or disclaimed scope of coverage, by using words for expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope." ACTV, Inc. v. Walt Disney Co., 346 F.3d 1082, 1091 (Fed. Cir. 2003).

Referring to claim 4 in issue, the meaning of the language in its preamble, i.e. the language up to "characterized by," is not in dispute. (Tr. at 3331-32.) A preamble of a claim has significance because a preamble of a claim not only provides meaning to the claim as a whole but also provides the antecedent basis for any limitations in the body of said claim. (RPFF 100 (undisputed).) Referring to the preamble of claim 4, its initial portion reads:

> A control method for controlling at least partially automated implementation of selected shifts of a vehicular mechanical change gear transmission system comprising a controlled fuel throttle controlled engine (E), a multi-speed change gear mechanical transmission (10) having an input shaft (16) and an output shaft (90) adapted to drive vehicular drive wheels....

(CX-198, col. 12, lns. 51-68.) The "(E)," "(10)," "(16)" and "(90)," inter alia, are referenced under the DESCRIPTION OF THE PREFERRED EMBODIMENT portion of the '566 patent. (CX-198.) For example, the '566 patent states:

> Referring to FIG. 1,[1] a range type compound transmission 10 of the type partially automated by the semiautomatic mechanical transmission system having an automatic preselect mode of operation of the present invention is illustrated. Compound transmission 10 comprises a multiple speed main transmission section 12 connected in series with a range type auxiliary section 14. Transmission 10 is housed within a housing H and includes an input shaft 16 driven by a prime mover such as diesel engine E through a selectively disengaged, normally engaged friction master clutch C having an input or driving portion 18 drivingly connected

[1] In the BRIEF DESCRIPTION OF THE DRAWINGS portion of the '566 patent, FIG. 1 is described as a schematic illustration of the vehicular mechanical transmission system partially automated by the system of the "present invention." (CX-198, col. 3, lns. 66-68.)

to the engine crankshaft 20 and a driven portion 22 rotatably fixed to the transmission input shaft 16.

* * *

For purposes of providing the automatic preselect mode of operation and the semi-automatic shift implementation operation of transmission 10, an input shaft speed (IS) sensor and an output shaft speed (OS) sensor 100 are utilized. Alternatively to output shaft speed sensor 100, a sensor 102 for sensing the rotational speed of auxiliary section countershaft gear 82 may be utilized. The rotational speed of gear 82 is, of course, a known function of the rotational speed of mainshaft 28 and, if clutch 92 is engaged in a known position, a function of the rotational speed of output shaft 90.

(CX-198, col. 5, lns. 4-17, col. 6, ln. 63 to col. 7, ln. 3 (emphasis added).)

The remaining portion of the preamble of claim 4 reads:

[s]aid input shaft having a determinable expected acceleration during a gear ratio change operation, a master friction clutch (C) drivingly interposed between the engine and the transmission, a first senor (98) for providing a first input signal indicative of transmission input shaft (16) rotational speed, a second sensor (100) for providing a second input signal indicative of vehicle speed, a third sensor (DL) for providing an input signal indicative of engine torque and a transmission actuator (112, 70, 96) for controlling shifting of the transmission, said control method characterized by;

(CX-198, col. 12, lns. 57-68.) The "DL" "(98)", "(100)", "(112), "(70)" and "(96)")" are also referenced under said DESCRIPTION OF THE PREFERRED EMBODIMENT portion of the '566 patent. For example, the '566 patent states:

The automatic preselect and semi-automatic shift implementation control system 104 for a mechanical transmission system of the present invention is schematically illustrated in FIG. 2.[2] Control system 104, in addition to the mechanical transmission 10 described above, includes an electronic control unit

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[2] In said BRIEF DESCRIPTION OF THE DRAWINGS portion of the '566 patent, FIG. 2 is described as a schematic illustration of the automatic preselect and semi-automatic shift implementation system for a mechanical transmission system of the "present invention." (CX-198, col. 4, lns. 3-6.)

> 106, preferably microprocessor based, for receiving input signals, from the input shaft speed sensor 98, from the output shaft speed senor 100 (or, alternatively, the mainshaft speed sensor 102) and from the driver control console 108 from a throttle pedal P position sensor 152 and from the engine E through data link DL. The ECU 106 may also receive inputs from an auxiliary section position sensor 110.
>
> The ECU 106 may be of the type illustrated in U.S. Pat. No. 4,595,986, the disclosure of which is incorporated herein by reference. The ECU is effective to process the inputs in accordance with predetermined logic rules to issue command output signals to a transmission operator, such as solenoid manifold 112 which controls the mainsection section actuator 70 and the auxiliary section actuator 96, and to the driver control console 108, and through the data link DL to engine E.

(CX-198, col. 7, lns. 4-25.)

The preamble of claim 4 makes reference to "mechanical . . . transmission system." A transmission provides a series of gears or gear ratios that tailor the engine speed to the wheel speed. (SPFF 173 (undisputed).) Thus, it is a gearbox that has multiple sets of gears that change and manipulate the speed and torque of the engine to the speed and torque at the output shaft to move the vehicle. (SPFF 174 (undisputed).) Inside the transmission, there are several different gears and the transmission selects different combinations of those gears to provide the gear ratio from the input shaft to the output shaft. (SPFF 175 (undisputed).) A gear ratio is the difference in rotational speed from the input shaft of the transmission to the output shaft of the transmission; i.e., the ratio at which those two members are spinning. (SPFF 176 (undisputed).) The transmission transforms engine revolutions per minute (RPM) into a broad range of vehicle motion. (SPFF 177 (undisputed).) Jaw clutches or dog clutches inside the transmission are called positive clutches because they have interlocking teeth to engage the gears. (SPFF 178 (undisputed).) Manual transmissions have shift levers that the driver must manipulate to shift through the different gears in a transmission. (SPFF 160 (undisputed).) Manual transmissions

are different from semi-automatic and automatic transmissions. Semi-automatic and automatic transmissions utilize a processor to perform some or all of the steps involved in the shift process. (Sayman, Tr. at 1823-24; FF 57.) The electric actuator in an AMT (automated mechanical transmission) can be connected to a computer which determines when shifts need to be made so the driver does not have to make that determination. (Morschek, Tr. at 53; FF 56; see Tr. at 1427.) A transmission electronic control unit (ECU) contains a microprocessor with all of the computing power and memory to enact automated algorithms. (Morschek, Tr. at 107; CX-200.) A drivetrain is the mechanical hardware following the clutch, including the transmission gearbox, drive shaft and axles. (SPFF 163 (undisputed).) The powertrain is the drivetrain plus the engine. (SPFF 164 (undisputed).) The basic elements of a vehicle from the front side of a transmission gear box are the input shaft, the clutch and the engine. (Morschek, Tr. at 105-06; CX-200.) The basic elements of a vehicle from the back side of the transmission gear box are an output shaft, a drive shaft and the axles. (Morschek, Tr. at 106; CX-200; Genise, Tr. at 309; RRX-26; RRX-27.)

The preamble of claim 4 makes reference to a master friction clutch. Generally, automated mechanical transmissions have an input shaft at the front of the transmission that is driven by the engine through a master friction clutch and an output shaft at the back of the transmission that is connected to the vehicle driveline. (Morschek, Tr. at 105-06; CX-200; Genise, Tr. at 309, RRX-26; RRX-27). A master friction clutch has two parts – one part connected to the crankshaft or the fly wheel of the engine and another part connected to the input shaft on the transmission. (Davis, Tr. at 2319-21; Genise, Tr. at 312; RRX-26; RRX-27.) Master friction clutches may be designed to synchronize speed differentials between the transmission, in

particular the input shaft and the engine with the two parts of a master friction clutch having relatively smooth faces for engagement to connect the engine and that input shaft when those two members are not initially rotating at substantially the same speed. (RRX-27; SPFF 167 (undisputed).) Thus, as respondents' expert Davis[3] testified:

> As I teach my students, the master friction clutch has two main functions in life, okay. One is to allow you to connect members, two members that are not rotating at substantially the same speed, and you force synchronization, and you do that because, again, it's just a friction element.
>
> So if they're rotating at different rates of speeds, as you push harder and harder, you're going to accomplish synchronization. So you need that, for example, in all of these transmissions, in order to, let's say if you're stopped at a stoplight and your gear is engaged, at that point in time, your vehicle wheels would be not spinning at all.
>
> Your output shaft speed would be zero. If you're engaged, that would mean then that your input shaft speed would be zero, but yet, your engine would still be operating at normal engine speed, and so you need to have that element, and that's vastly different from a jaw clutch.

(Tr. at 2320.) The act of closing the master friction clutch will synchronize the engine and the driveline at the input shaft. (SPFF 172 (undisputed).)

To engage or slide the gear and jaw clutch teeth together for engagement of the target gear inside the transmission, the input shaft and the output shaft have to be synchronized, or

---

[3] Complainant argued that the testimony of Davis should be given no weight because Davis "lacks relevant education and experience in the area relevant to the patents-in-suit." (CBr at 92.) However, Davis was qualified as an expert witness in the area of vehicle power train systems, which includes automated and mechanical transmissions for heavy-duty and medium-duty trucks, as well as in the interaction of those transmissions with the other components of the drive train, such as the braking system. (FF 38-46.) Accordingly the administrative law judge rejects the argument of complainant that no weight whatsoever should be given any of the testimony of Davis.

spinning at approximately the same velocity. (SPFF 181 (undisputed).) Thus, the input shaft and output shaft cannot be engaged during a shift unless the input shaft is rotating at a speed that is substantially equal to the speed of the output shaft multiplied by the target gear ratio because the jaw clutches inside a transmission have teeth that positively engage. (SPFF 181 (undisputed).) If the positively locking jaw clutches and the target gear are not rotating at roughly the same velocity, they will grind, or not engage at all. (SPFF 188 (undisputed).)

As for "synchronization," Sayman testified:

Q. You also referred, in the course of describing those animations, to synchronization.

What does that mean?

A. Because we're using a jaw clutch or a dog clutch inside the transmission, these are two gear looking devices, they have teeth, and to engage them, to actually slide the teeth together, they have to be spinning at approximately the same velocity.

So when we say synchronization, what we mean is we're synchronizing the input shaft speed to the output shaft speed times the target gear ratio. Once those are approximately equal, then the jaw clutch can actually be engaged.

Q. Does every mechanical transmission have to synchronize the gears during a shift?

A. I believe so, yes.

Q. Why is that?

A. Well, if you're using a positively locking device like a jaw clutch, if you don't synchronize the speeds of the two elements that you're trying to connect, then you can either have grinding, or they won't engage at all, or some type of damage to them. All three are possible.

Q. Is that true for manual transmission as well?

A. Oh, yes, absolutely. That's one of the hardest things about learning to drive a manual transmission in a truck.

(Tr. at 1888-89 (emphasis added).) The obtainment of "synchronous conditions" in transmissions systems is not novel with the '566 patent. Thus said patent, under the subheading "Description of the Prior Art," in referring to a partially automated transmission system states:

> An electronic control unit (ECU) is provided for receiving input signals indicative of transmission input and output shaft speeds and for processing same in accordance with predetermined logic rules to determine (i) if synchronous conditions exists, and (ii) in the automatic preselection mode, if an upshift or downshift from the currently engaged ratio is required and to issue command output signals to a transmission actuator for shifting the transmission in accordance with the command output signals.

(CX-198, col. 2, lns. 16-26.)

Complainant and respondents, in their post-hearing filings, have made reference to "closed-clutch" shifting and "open-clutch" shifting. A gear shift may be accomplished using "closed-clutch" shifting or "open-clutch" shifting. (RPFF 72 (undisputed).) Closed-clutch shifting involves keeping the master clutch (which is positioned between and couples the engine to the input shaft of the transmission) closed during the shift. (RPFF 73 (undisputed).) With the engine shaft still coupled to the input shaft to the transmission, the engine is temporarily defueled to cause a torque reversal inside the transmission. (RPFF 74 (undisputed).) This defueling of the engine removes the torque between the gears, allowing the gears and positive clutches within the transmission to separate or disengage. (RPFF 75 (undisputed).) In order to re-engage the gears in the target gear ratio, it is necessary for the rotation of the transmission input shaft to synchronize with the rotation of the output shaft in the target gear ratio. (RPFF 76 (undisputed).) The relative rotational speeds of the two shafts that must be achieved in order to synchronize the gears within

the transmission is a function of the target gear ratio and is reflected by the equation IS = OS*GR(target). (RPFF 77 (undisputed).)

Closed-clutch shifts, especially without an engine brake, may have difficulty synchronizing, and therefore may not be able to engage the target gear. (RPFF 78 (undisputed).) This difficulty stems from the inability to independently control the deceleration rate of the input shaft. (RPFF 79 (undisputed).) Since the input shaft is still coupled to the engine shaft in a closed-clutch shift, the deceleration rate is limited to, and can be predicted to be, the decay rate of the engine. (RPFF 80 (undisputed).) There are instances where the output shaft decelerates too quickly (i.e., the vehicle slows down too rapidly), such as when the vehicle is traveling uphill during the shift. (RPFF 81 (undisputed).) Thus, as respondents' expert Davis testified at the hearing:

> JUDGE LUCKERN: All right. In your opinion, would a person of ordinary skill in the art, looking at this claim, the specification, the language, the file wrapper, understand the feasibility clause to refer to the desirability or suitability of achieving substantially synchronous conditions in order to reconnect the drive train at the completion of a shift to result in an engine and vehicle speed that there are acceptable?
>
> THE WITNESS: No.
>
> JUDGE LUCKERN: Why not?
>
> THE WITNESS: Because the problem that they're trying to achieve here is not being able to complete a shift. And what I mean by that is some of the early AMT systems would start to attempt a shift, disengage to neutral and then, because of the conditions, they could never reach synchronization, so they couldn't engage the target gear ratio, so

they would miss the shift. And I think I could direct you to a part of the patent here --

JUDGE LUCKERN: You know what I'm saying on that basis, Doctor? Yes, I want you to, otherwise you can't testify eight years after the patent issued as to what somebody is saying that this patent. Let's go to the language of the patent.

THE WITNESS: Let me try to find that. Give me a second here. Yes, if we go to column 2.

JUDGE LUCKERN: Okay.

THE WITNESS: Starting around the paragraph, line 49, it begins at line 49, that paragraph, if you could blow that up a little bit?

JUDGE LUCKERN: I have it in front of me.

THE WITNESS: Okay.

* * *

JUDGE LUCKERN: Move on, please, I believe we've left that topic for the time being. Move on.

THE WITNESS: It starts,

"Basically, while the above described automatic and/or partial automatic shift implementation type vehicular mechanical transmission systems are well-suited for their intended applications, they are not totally satisfactory as they will occasionally initial an attempted shift, which, due to the vehicle operating conditions, cannot be completed."

So what they're talking about there is that would be a case where you couldn't, you could disengage the gear, and you could never reach synchronous conditions in the transmission, so the jaw clutches would not be spent at the same rate. You couldn't reengage to get to the next gear.

(Tr. at 2360-62; see RPFF 81 (undisputed).)

Open-clutch shifting involves disengaging or opening the master clutch during the shift. (RPFF 83 (undisputed).) After disengaging the master clutch during an open-clutch shift, the transmission input shaft then spins freely and without any force from the engine (i.e., the torque between the gears is removed), allowing the gears and positive clutches within the transmission to separate or disengage. (RPFF 84 (undisputed).) To reengage the gears in the target gear ratio, the input shaft must be synchronized with the rotation of the output shaft in the target gear ratio. As respondents' Davis testified:

> Q. The transmissions for both types of vehicles, do they need to synchronize inside the gearbox when shifting?
>
> A. Yes, in any mechanical transmission, you have to accomplish synchronization before you can engage the target gear.

(Tr. at 2278; see RPFF 85 (undisputed).)

During the open-clutch shift, the input shaft brake may independently control the speed of the input shaft. (RPFF 87 (undisputed).) The input shaft brake can slow down the input shaft so that the input shaft speed will reach a speed that permits synchronization with the output shaft in the new gear ratio. (RPFF 88 (undisputed).) Unlike closed-clutch systems, the engine speed for an open-clutch system will not be an accurate prediction of the speed of the input shaft during the shift. As respondents' Davis testified:

> THE WITNESS: I'm not sure I've probably been very clear, but what happens in an open clutch system . . ., during the shift transient, the input shaft is not tied to the engine because the master friction clutch is disengaged. Furthermore, you're in neutral, so the jaw clutches are disengaged, and your input shaft then is not tied through to the output shaft.

> So your input shaft is just kind of floating there by itself making a prediction about some natural decay rate or something for that input shaft would be, it would be probably impossible to do.

(Davis, Tr. at 2357-58; see RPFF 90 (undisputed).)

A closed-clutch system can be an automated transmission system in which all the upshifts and downshifts are performed without opening the master clutch during the shifts. (Genise, Tr. at 313-14; RRX-26.) In a closed-clutch system, engine speed and input shaft speed are typically the same during a shift. (SPFF 190 (undisputed).) Inventor Genise testified as to an open clutch system:

> To start, to execute an upshift or downshift in an open clutch system, one would typically ramp down fuel or defuel the engine at the same time you would open the master friction clutch.
>
> Once the master friction clutch is opened, then you would open the jaw clutch for the previous gear ratio and then you would manipulate the input speed via an input shaft brake or some type of device to achieve synchronous for the gear ratio, the target gear ratio for your new gear.

(Genise, Tr. at 315.)

A typical shift in a closed-clutch system can consist of: (1) removing the power or torque from the engine by de-fueling it; (2) disengaging the jaw clutch from the currently engaged gear to assume an open position, also called neutral; (3) either manipulating the engine to a speed that would create synchronous conditions for engagement of the target gear ratio or waiting until such a speed is achieved; (4) commanding the target jaw clutch to engage that new gear ratio; and (5) re-fueling the engine. (SPFF 191 (undisputed).) In an open-clutch system, a shift involves: (1) de-fueling the engine and opening the master friction clutch; (2) disengaging the jaw clutch from the currently engaged gear ratio; (3) manipulating the input shaft speed via an input shaft brake

or some type of device to achieve synchronous conditions for engagement of the target gear ratio; (4) commanding the target jaw clutch to engage the new gear ratio; and (5) closing the master friction clutch and re-fueling the engine. (SPFF 192 (undisputed).)

The parties are in dispute concerning language in each of the determining clauses of claim 4 following the preamble of claim 4 and also in the final "causing" clause of said claim.

1. The determining clause "determining selection of a shift from a currently engaged transmission ratio of a target gear ratio,"

The determining clause of claim 4 following its preamble reads "determining selection of a shift from a currently engaged transmission ratio of a target gear ratio." The staff initially argued, as to its construction, that an electronic control unit (ECU), as instructed by logic instructions (e.g., software or firmware), such as ECU 106, satisfies this "determining" limitation of the clause; that the currently engaged transmission ratio is the gear that the transmission is in at the time it is determining whether to shift; and that the target gear ratio is a gear ratio into which the system plans to shift. (SBr at 25.) Respondents did not object to the staff's construction. (Tr. at 3343-44.) At closing argument complainant argued that the ECU should not be a limitation. As to the rest of the staff's construction, complainant agreed. (Tr. at 3339-40.) The staff then agreed that the ECU is not considered a limitation and that an ECU was indicated only because one representative embodiment of the limitation "determining selection of a shift from a currently engaged transmission ratio to a target gear ratio" includes an ECU 106 which, as instructed by logic instructions (e.g., software), determines selection of a shift from the gear ratio that the transmission is in at the time to the gear ratio into which the system plans to shift. (CX-198 at col. 7, lns. 17-21; Fig. 2; see Tr. at 3341.)

Respondents argued that although the clause in dispute does not use "step for" language, step-plus-function language is implicit or inherent in the patentees' choice of the functional phrase "determining selection of." (RRBr at 26.) Complainant argued that claim 4 does not contain the language "step for" and moreover, the claim recites specific acts to be performed, not merely an underlying function. (CRBr at 19.) At closing argument respondents argued that a specific act is not disclosed in the "determining selection" clause and therefore one would interpret the clause much the same way as one would interpret "means for" language. (Tr. at 3346-37.) The staff agreed with complainant that claim 4 is a method claim that calls for determining. (Tr. at 3338.)

Respondents argued that step-plus-function language is inherent in the claimed phrase "determining selection of." (RBr at 26.) The statute explicitly authorizes expressing claim elements in both means-plus-function and step-plus-function form:

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claims shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

35 U.S.C. § 112, ¶ 6. The statute's format and language suggest a strong correlation between means and step-plus-function claim elements in both their identification and interpretation. Based on § 112, ¶ 6, it is apparent that "structure" and "material" are associated with "means," while "acts" are associated with "step." See O.I. Corp. v. Tekmar Co. Inc., 115 F.3d 1576, 1583 (Fed. Cir. 1997) ("In this paragraph, structure and material go with means, acts go with steps."). Therefore, a claim element deserves means-plus-function treatment when "expressed as a means ... for performing a specified function without the recital of structure [or] material .... in support

thereof." Id. (emphasis added). Similarly, a claim element deserves step-plus-function treatment when "recited as a ... step for performing a specified function without the recital of acts in support of the function." Id.; see Sage Prods., Inc. v. Devon Indus., Inc., 126 F.3d 1420, 1427 (Fed. Cir. 1997); Greenberg v. Ethicon Endo-Surgery, Inc., 91 F.3d 1580, 1583 (Fed. Cir. 1996). The phrase "step for" generally introduces functional language falling under §112, ¶ 6. See Greenberg, 91 F.3d at 1583 ("Claim drafters conventionally use the preface 'means for' (or 'step for') when they intend to invoke [§ 112, ¶ 6]."). Thus, the phrase "step for" in a method claim raises a presumption that § 112, ¶ 6 applies.

Claim 4 in issue has neither the word "means" nor the phrase "step for." Hence, the administrative law judge finds no presumption that 35 U.S.C. § 112, ¶ 6 applies to claim 4, and merely considers claims 4 as a method claim. Respondents, in closing argument, argued "ultimately, it's our position that whether it's a step for claim or simply a method claim, our construction is appropriate." (Tr. at 3336 (emphasis added).)

The word "determine" is defined as "[t]o set bounds or limits to; to limit in extent, scope, etc." See Webster's New Collegiate Dictionary at 226 (1956). Hence, the administrative law judge interprets "determining" in claim 4 as setting bounds or limits. In addition the preamble of claim 4, which no party objected to, states that claim 4 is directed to "[a] control method for controlling ...." (CX-198, col 12, ln. 51. (emphasis added).) Moreover, the plain language of claim 4 following its preamble states that method claim 4 involves a plurality of "determining" limitations, including determining or setting bounds or limits to the selection of a shift from a currently engaged transmission ratio of a target gear ratio. In addition the administrative law judge finds nothing in the intrinsic evidence to limit the clause in dispute to the use of an ECU.

He further construes the "currently engaged transmission ratio" of the clause as the gear that the transmission is in at the time it is determining whether to shift and the "target gear ratio" of said clause as a gear ratio into which the system plans to shift.

2. The claimed clause "determining as a function of at least said input signals indicative of (i) current engine torque and (ii) current vehicle acceleration, an expected vehicle acceleration (A_0) under current vehicle operating conditions and at zero engine torque to the drive wheels;"

Complainant argued that "current vehicle acceleration" refers to the present change in vehicle speed; that "expected vehicle acceleration (A_0)" means the change in speed of the vehicle that is expected over a time in the future; and that "current vehicle operating conditions" refers to operating parameters of the vehicle such as, for example, the acceleration and engine torque. (CBr at 50-51.)

Respondents argued that the claimed clause in issue refers to the act of determining the expected vehicle acceleration (or deceleration) that will occur during the requested shift, using current engine torque, current vehicle acceleration assuming current vehicle operating conditions and requires the use of the formula disclosed at col. 9, ln. 54 to col. 11, ln. 4 of the '566 patent. (RBr at 28-32.)

The staff argued that the proper interpretation of the claim limitation requires a determination of the anticipated change of the vehicle's speed during a shift when no engine torque is applied to the drive wheels, based upon signals indicative of the present operating conditions of the vehicle which signals must include signals indicative of (1) the present amount of torque output by the engine and (2) the present change in vehicle speed (referred to as "acceleration"); that a person of ordinary skill in the art would understand that the function for

"current vehicle acceleration (A_0) under current operating conditions" relates to the output shaft speed because the output shaft of the transmission is always tied (through the rest of the driveline) to the wheels of the vehicle; that for heavy-duty and medium-duty trucks, the '566 patent specification discloses only one embodiment for predicting vehicle acceleration during the shift under current operating conditions, teaching that:

> ... for vehicles having a widely variable gross combined weight ("GCW"), i.e. combined weight of vehicle, fuel, carno [sic, cargo] (if any) passengers (if any) and operator, the following procedure is followed. Upon sensing that an upshift (single or skip) has been selected by the system controller, ECU 106, the ECU will issue commands over the data link DL to momentarily slightly reduce fueling of the engine to cause a known momentary slight reduction of engine torque. By way of example, a ten percent (10%) reduction of engine torque for one second or less should be sufficient and should be transparent to (i.e. not noticed by) the driver. During this time, the change in vehicle (output shaft) acceleration is sensed. From this information, the system can determine what the vehicle acceleration (usually a deceleration) will be at zero driveline torque, i.e. the slope of line 208 or 210.

quoting CX-198, col. 9 ln. 54 to col. 10, ln. 2 (emphasis added by staff); and that thus the specification indicates that the vehicle acceleration at zero engine torque to the drive wheels is measured by sensing the change in output shaft speed. (SBr at 26-27.)

As to whether the claimed expected vehicle acceleration requires use of the disclosed algorithm for vehicles with varying gross weights, at closing argument the staff represented that while there is only a single disclosed method for heavy-duty trucks, i.e. trucks with varying gross weights, it was known to one of ordinary skill in the art that there were other known methods for determining the vehicle weight and whether the vehicle could accelerate after a shift. (Tr. at 3244-45.)

The administrative law judge finds that the plain language of the claimed clause in issue

requires calculating the expected vehicle acceleration under current engine torque and current vehicle acceleration under current operating conditions; and that thus all of those variables have to be taken into account for determining an expected vehicle acceleration. The administrative law judge further finds that the specification of the '566 patent teaches that determining the claimed expected vehicle acceleration may be represented by the equation $A_{0\,Torque} = A_i - (T_i/CW)$, where "[t]he value of gross vehicle weight W and the constant C are determined during the momentary decrease in engine torque by determining the corresponding change on [sic] vehicle acceleration."[4] (CX-198, col. 10, lns. 15-30.) However, he finds nothing in the intrinsic evidence that the claimed expected acceleration is limited to said equation.

In addition he finds that "current vehicle operating conditions" refers to conditions at a time immediately after the system has sensed the need to perform an upshift time and before commencing a shift. Thus, as Davis testified:

> JUDGE LUCKERN: So it's your testimony, is sort of a general concept about this current operating condition, but you don't pin it down to a time, as to what's happening in the shift?
>
> THE WITNESS: Well, it would be a time after the system has sensed the need to perform an upshift, so right at that moment in time. Now, the system has to predict whether that upshift will be feasible or completable. And what I mean by that is the problem that they were really trying to address in this patent was the idea that sometimes these systems would attempt to shift, so they would shift into neutral, and then they couldn't synchronize jaw clutches, so they couldn't engage the target gear ratios. That would be considered missing a shift.

---

[4] Acceleration can refer to the change of speed or velocity over a period of time and is represented by the equation dv/dt. (RX-480; Davis, Tr. at 2328.) Therefore, expected vehicle acceleration claimed in this element would take into account the expected change in vehicle speed or velocity over a period of time. (Davis, Tr. at 2330; Caulfield, Tr. at 1545-46.)

> So what they're doing here is they're saying, upon sensing the upshift point, so now, you're ready to consider an upshift, it then immediately does this reducing of the fueling in order to calculate the current expected vehicle torque at zero torque -- I'm sorry, current expected vehicle acceleration at zero torque conditions.
>
> JUDGE LUCKERN: And without repeating this, I will read this transcript after this record is closed and go into it, but based on what you've already testified to, that's what's disclosed in the specification, you already, don't repeat yourself, please.
>
> THE WITNESS: Yes.

(Tr. at 2343-44.)

3. The claimed clause "determining as of function of (i) the expected vehicle acceleration (A_0) under current vehicle operating conditions and at zero engine torque to the drive wheels, (ii) the gear ratio of the selected target gear ratio and (iii) the expected input shaft acceleration during a shift into the target gear ratio, feasibility or infeasibility of achieving substantially synchronous conditions for engagement of the target ratio if the selected shift is implemented,"

Complainant argued that the phrase "substantially synchronous conditions for engagement of the target ratio" of the claimed clause in dispute "refers to conditions whereby a speed is within a desired range so that the drivetrain can be reconnected, i.e., to complete a shift"; and that the "feasibility or infeasibility of achieving substantially synchronous conditions for engagement of the target ratio if the selected shift is implemented" of the claimed clause in dispute refers to the desirability or suitability of achieving substantially synchronous conditions in order to reconnect the drivetrain[5] at the completion of a shift to result in an engine and vehicle speed that are acceptable. (CBr at 51-52; CPFF 243.) Complainant also argued that the feasibility or infeasibility of achieving substantially synchronous conditions for

[5] A drivetrain consists of the components between the clutch and the wheels, namely the transmission gearbox, drive shaft, axles and other such components. (Morscheck, Tr. at 95-96, 106.)

> engagement of the target ratio is determined as a function of (i) the expected vehicle acceleration (Ao), (ii) the gear ratio of the selected target gear ratio and (iii) the expected input shaft acceleration during a shift into the target gear ratio.

(CBr at 48.) However, complainant further argued that the "feasibility or infeasibility . . ." clause refers to the desirability or suitability of achieving substantially synchronous conditions in order to reconnect the drivetrain at the completion of a shift to result in an engine and vehicle speed that are acceptable. (CPFF 244.)

Respondents argued that the claimed clause in issue sets forth a specific feasibility test for determining whether substantial synchronization of gears in the target ratio can be achieved. It is argued that "determining as of function of" requires use of specifically defined inputs in performing the claimed feasibility test and that determining the feasibility or infeasibility of achieving synchronization conditions means determining whether expected input shaft speed will equal expected output shaft speed at the new gear ratio. Respondents argued that the proper construction of the claimed clause in dispute, when read in whole, is determining, prior to implementing the selected shift, whether it will be possible or impossible for the members of the transmission selected for engagement at the target gear ratio to reach largely the same rotational speed by comparing expected transmission input shaft speed to expected output shaft speed multiplied by the new gear ratio and determining whether they will equal each other (i.e., IS = OS*GR) above a predetermined engine speed, where IS=ES and the predetermined engine speed is engine idle speed. (RBr 32-40.) Respondents also argued that "substantially synchronous conditions for engagement of the target gear ratio" means the condition whereby the members inside the transmission that connect to the transmission input shaft and the transmission output shaft in the new gear ratio are rotating at roughly the same speed. (RRBr at 24-25.) Thus in

respondents' interpretation, the claimed feasibility test requires a determination before disengagement as to whether the transmission output shaft will synchronize with the transmission input shaft such that the new target gear can be engaged inside the transmission gear box.

The staff argued that the proper construction of the feasibility test claimed in the clause in dispute requires that the transmission assess (1) an expected vehicle acceleration (or deceleration) during the shift, (2) the ratio of the selected target gear, and (3) the expected input shaft acceleration (or deceleration) during a shift to determine if it is possible to engage the target gear inside the transmission gear box; that the claimed clause expressly requires that at least three distinct inputs be considered, two of which are the output shaft speed and the input shaft speed, in determining whether substantially synchronous conditions can be achieved for engagement of the target gear ratio; and that the claimed feasibility test involves a determination of whether the transmission can be synchronized through a prediction as to whether IS equals OS times GR, where IS refers to the speed of the input shaft, OS refers to the speed of the output shaft and GR refers to the target gear ratio. (SBr at 27-38.)

As the preamble of claim 4 and the claimed clause in issue indicates, claim 4 is directed to a transmission control method that determines whether proposed shifts are "feasible." The word "feasible" is defined as "capable of being done or carried out." (See RX 347, Webster's Ninth New Collegiate Dictionary (1991).) In addition the administrative law judge finds that the plain language of the claimed clause in issue indicates to a person of ordinary skill in the art that claim 4 is directed to "achieving substantially synchronous conditions" at engagement of the target ratio; and that "engagement of the target ratio" occurs inside the transmission gear box when the jaw clutches within the gear box re-engage at a new target gear ratio. As complainant's

expert Caulfield testified:

> Q. Can we go to (ii)(b).[6]
>
> Dr. Caulfield, can you explain (ii)(b) for us?
>
> A. At the engagement of the target gear ratio, that's when it goes to target gear, the vehicle will be capable of at least a predetermined acceleration, dOS/dt.
>
> That's the predetermined acceleration of the output shaft, which is a way of mathematically representing that statement in parentheses. What it says is after you make your shift, you want to check to see if you have sufficient torque available, under the peak torque to the peak torque, to be able to accelerate the vehicle.
>
> The reason that's done is if you can't accelerate, you may very well come out of that with another downshift after you made an upshift. So make an upshift three and down one, and it would result in inefficient shifting.
>
> * * *
>
> Q. I'm just saying, in an open clutch shift, I'm just speaking about your opinion. Generally, in open clutch shifts, at what point in an open clutch shift is a target gear ratio engaged? In my example, we're going from 4th to 5th gear.
>
> A. Target gear ratio is engaged inside the transmission when the input shaft is sunk and connected with the output shaft.
>
> JUDGE LUCKERN: Nobody has - -
>
> THE WITNESS: - - across the gear ratio.

---

[6] The (ii)(b) is referring to (ii)(b) of claim 1 of the '545 patent. Said claim 1 refers to the engagement of the target ratio as does claim 4 of the '566 patent.

JUDGE LUCKERN: You finished your answer?

THE WITNESS: Yes.

(Caulfield, Tr. at 1451, 3184-85 (emphasis added); see FF 21-28.) Also, as respondents' expert Davis testified, "[e]ngagement of the target ratio is when the jaw clutches of the target gear ratio were engaged." (Davis, Tr. at 2364.) Engagement of the target gear can only occur when the output shaft and input shaft are rotating at roughly the same speed, i.e. they are sufficiently synchronous to engage the new gear. (SPFF 212 (undisputed).)

Moreover, according to the plain language of the claimed clause, to determine whether substantially synchronous conditions exist, any feasibility test should utilize at least three distinct elements to determine if it will be possible to engage the target gear inside the transmission gear box, said three elements being: (i) an expected vehicle acceleration (or deceleration) during the shift, (ii) the ratio of the selected target gear, and (iii) the expected input shaft acceleration (or deceleration) during a shift into the target gear ratio. Significantly, the specification of the '566 patent discloses under a subheading "Description of the Prior Art" that "while automatic and/or partial automatic shift implementation vehicular mechanical transmission systems" are disclosed in prior art patents:

> they are not totally satisfactory as they will occasionally initiate an attempted shift, which, due to vehicle operating conditions, cannot be completed. This is especially a concern for upshifts of these mechanical transmission systems not provided with an automated clutch actuator and/or an input shaft brake and thus have input shaft deceleration limited to the normal decay rate of the engine without the benefit of an input shaft brake or the like.

(CX-198, col. 2, lns. 44-66 (emphasis added).) Thereafter under the heading SUMMARY OF THE INVENTION the '566 patent states:

> In accordance with the present invention, the drawbacks of the prior art are minimized or overcome by the provision of a shift control method/system for a vehicular at least partially automated mechanical transmission system which, upon sensing an automatic or manual selection of an upshift from a currently engaged gear ratio to a target gear ratio will, based upon currently sensed vehicle operating conditions, determine if the selected shift is feasible (i.e. probably completable) and only initiate feasible shifts.
>
> A criticism of certain less than fully automated mechanical transmission systems (such as transmission systems without automatic master clutch control) and/or input shaft brakes) is that under certain conditions they may not be able to complete some shifts that they start (i.e., on a grade, low gear shifts, etc.).
>
> However, a transmission system does not have to be able to make all shifts under all conditions. It just needs to be smart enough to know not to start a shift it cannot finish. In accordance with the present invention, the transmission control, prior to initiation of a shift, will make a simple passive test for shiftability. The test involves momentarily slightly changing the throttle amount which should be transparent to the driver, and observing the response. Based upon the response, shift feasibility is determined and requests for nonfeasible upshifts are either modified or cancelled.
>
> The above is accomplished in vehicles having a large variation in CVW (combined vehicle weight) by providing a shift control system which, upon selection of an upshift from a currently engaged ratio to a target ratio (usually as a function of engine fueling, throttle position, engine speed, vehicle speed and/or currently engaged ratio) will automatically cause a slight decrease in engine fueling (about 10%) for a short interval of time, sense the change in vehicle acceleration, predict the vehicle reaction to a torque break shift transient, determine an estimated vehicle speed during the shift transient into the target ratio and compare this value to expected engine speed (equals input shaft speed) during the proposed shift transient to determine if the proposed shift is feasible, i.e. can substantial synchronous be achieved.

(CX-198, col. 2, ln. 63 - col. 3, ln. 37 (emphasis added).) Thus, the administrative law judge finds that the invention, as disclosed in the '566 patent, is, inter alia, directed to overcoming deficiencies in prior art transmissions that attempted shifts which, due to vehicle operating conditions, cannot be completed, and which "is especially a concern" for closed-clutch shifts. He further finds that the SUMMARY OF THE INVENTION portion of the '566 patent discloses,

inter alia, that the invention of the '566 patent overcomes the drawbacks in the prior art by becoming "smart enough" to avoid starting shifts that, due to vehicle operating conditions, are not "completable," and in fact describes a shift control system that will "determine if the proposed shift is feasible, i.e. can substantial synchronous [conditions] be achieved." In addition, the administrative law judge finds that all these disclosures are directed to a transmission that determines before the shift is attempted whether substantial synchronization can be achieved for engagement of a target gear.

Also, the '566 patent under the hearing DESCRIPTION OF THE PREFERRED EMBODIMENT discloses:

> Under certain operating conditions of the vehicle, an automatically or manually selected shift may not be completable. These conditions usually involve upshifts when the vehicle is heavy loaded and/or is traveling against a great resistance, such as in mud, up a steep grade and/or into a strong headwind. To achieve substantial synchronous conditions to complete an upshift, the speed of the input shift 16 (which substantially equals the speed of the engine E with the master clutch engaged) must be lowered to substantially equal the speed of the output shaft 90 (directly proportional to vehicle speed) multiplied by the target gear ratio. As an automated clutch actuator and input shaft brake are not provided, the speed of the input shaft will decrease with the rate of decay of engine speed. Thus, to achieve substantially synchronous conditions for engagement of the target ratio, IS should substantially equal OS*GRTARGET and, with the master clutch fully engaged, IS will substantially equal ES.
>
> The sequence of an upshift of the illustrated automated mechanical transmission system is graphically illustrated in FIG. 5. Line 200 represents the input shaft speed (IS) at vehicle conditions prior to the upshift point 202 wherein the current gear ratio (GR) is fully engaged, the master clutch C is fully engaged and ES =IS=OS*GR. As the engine is defueled (i.e. fueling of the engine is reduced to a minimum value), the input shaft speed and engine speed will decay at the constant (but not necessarily linear) rate (dIS/dt) represented by line 204 until idle speed 206 is reached. The expected speed of the output shaft 90 during the shift transient when zero engine torque is applied to the vehicle drive wheels ($OS_{EXPECTED}$) multiplied by the target gear ratio, which product is the required synchronous speed of the input shaft/engine, is represented by lines 208 and 210

> illustrating, respectively, that product at a lesser or greater, respectively, resistance to motion of the vehicle. As may be seen, under conditions of lower resistance (line 208), synchronous will occur at point 212 and the selected upshift is feasible while, under conditions of greater resistance (line 210), substantial synchronous will not occur and the selected upshift is not feasible.

(CX-198, col. 8, ln. 43 to col. 9, ln. 18 (emphasis added).) Thus, the '566 patent discloses a test to determine if a proposed shift is feasible, which test indicates that to achieve substantially synchronous conditions for engagement of the target gear ratio, IS should approximately equal OS*GR and with the master clutch fully engaged, IS will equal ES. Significantly this is the only way set forth in the specification in which the transmission determines whether the target gear can be synchronized.

Figure 5 of the '566 patent graphically demonstrates how the claimed feasibility test would determine whether a predicted OS*GR will intersect a predicted IS to achieve synchronous gear engagement. In referring to Figure 5, the specification states:

> As may be seen by reference to FIG. 5, if the input shaft speed (IS) as determined by initial shaft speed at point 202 and the acceleration of the input shaft (dIS/dt), will be equal to the product of expected output shaft speed at zero torque to the vehicle drive wheels ($OS_{EXPECTED}$), which is determined by initial OS (-IS/GR) and the vehicle acceleration (dOS/dt) at current resistance to vehicle motion, multiplied by the numerical value of the target gear ratio (GR_{TARGET}) at a value greater than a reference (such as engine idle speed 206), then achieving a synchronous shift into the selected target gear ratio is feasible, if not, achieving a substantially synchronous shift into the selected target gear ratio is infeasible. The OS and dOS/dt signals are, of course, equivalent of vehicle speed and vehicle acceleration signals, respectively. The reference value is illustrated as engine idle speed 206 but can be a lower positive value if the master clutch is manually or automatically disengaged.

(CX-198, col. 9, lns. 35-53 (emphasis added); see SPFF 213 (undisputed).)

Figure 5 of the '566 patent depicts the claimed synchronicity test for closed-clutch shifts. (Genise, Tr. at 389-96.) However, complainant argued that "Fig. 5 is not limited to depicting closed-clutch shifts" and further argued that "Genise did not testify that Fig. 5 of the '566 patent is limited to depicting closed-clutch shifts" relying on the following testimony:

> A. Well, it is not totally correct because line 204 can represent the input speed or the engine speed depending on the system that you are talking about. Figure 5 is used in an embodiment that we described in the patent but the patent itself does not limit it to input speed only. It can be used for input speed or input [sic: engine] speed depending on your system.
>
> A. Figure 5 is a generic diagram to depict the algorithm for many different types of systems.
>
> A. I don't know if I can conclude that figure 5 represents a closed clutch system. Figure 5 is part of the preferred embodiment described in the patent, which I believe is describing a closed clutch system.

(Genise, Tr. at 391, 394, 396; see COSPFF 214; CRSPFF 214.) As seen from the transcript references complainant cited, complainant relies on "pieces" of Genise's testimony taken from the hearing transcript at pages 389-96. For the record, the administrative law judge is setting forth below the complete portion of Genise's testimony:

> Q. Would you please read beginning with the word feasibility to the end of that paragraph [claim 4 at col. 13, ln. 14-18]?
>
> JUDGE LUCKERN: To himself or on the record?
>
> BY MR. McMAHON:
>
> Q. On the record.

A. "Feasibility or infeasibility of achieving substantially synchronous conditions for engagement of the target ratio if the selected shift is implemented."

Q. Thank you. The feasibility test required by the '566 patent is performed before a shift is initiated, correct?

A. That's correct.

Q. In an upshift to achieve substantially synchronous conditions, the speed of the input shaft must be reduced, correct?

A. Yes.

Q. And in particular it must be reduced to substantially equal the speed of the output shaft multiplied by the target gear ratio, correct?

A. Yes, that's correct.

Q. Returning to the '566 patent exhibit, CX-198, would you please look at figure 5.

A. Yes.

Q. In figure 5, line 204 represents the expected rate of change of the input shaft, correct?

A. That's not correct.

Q. Would you please turn to column 9 of the '566 patent.

A. I should say when I say that's not correct, that's not totally correct.

Q. In column 9 on line 4 there is a reference to DISDT. Do you see that?

A. Yes.

Q. What does DISDT [dIS/dt] stand for?

A. That's a rate of change of the input shaft.

Q. And the text at lines 4 and 5 reads that the DIS/DT is represented by line 204. Is that correct?

A. That's correct.

Q. Returning to figure 5, please, line 208. I'm sorry. Do you have figure 5 in front of you?

A. Yes, I do.

Q. Thank you. Line 208 represents one expected output shaft speed multiplied by the target gear ratio, correct?

A. Yes.

Q. And because line 208 intersects line 204, that particular shift is feasible, correct?

A. Yes.

Q. It is feasible because the expected input shaft speed equals the expected output shaft speed multiplied by the target gear ratio, correct?

A. Well, it is not totally correct because line 204 can represent the input speed or the engine speed depending on the system that you are talking about. Figure 5 is used in an embodiment that we described in the patent but the patent itself does not limit it to input speed only. It can be used for input speed or engine speed depending on your system.

Q. In figure 5 the input shaft speed represented by line 204 is equal to the engine speed, correct?

A. That's what it indicates, yes.

Q. And it is decaying at the natural decay rate of the engine speed, correct?

A. Yes.

Q. And that's because the master clutch is closed as illustrated in figure 5, correct?

A. In the embodiment described using figure 5, yes, we have, we described a closed master clutch system, yes.

Q. So, again, in figure 5, where line 208 intersects line 204, and the shift is feasible, that's because the input shaft speed substantially equals the output shaft speed multiplied by the target gear ratio at that point, correct?

A. In this embodiment, yes.

Q. By contrast, line 210 represents a different expected output shaft speed multiplied by the target gear ratio, correct?

A. That's correct.

Q. And line 210 does not intersect line 204, correct?

A. That's correct.

Q. Because line 210 does not intersect line 204, that particular shift is not feasible, correct?

A. That's correct.

Q. In fact, it would be impossible to complete that shift, correct?

A. That's not correct.

Q. As shown in figure 5, it would be impossible for line 210 to intersect line 204 above reference line 206, correct?

A. That's correct.

Q. And as we said before, because the input shaft speed substantially equals the engine speed, we know that the master clutch is closed, correct?

A That's correct. Well, in the embodiment described, yes, master clutch is closed, you are right.

Q. With the master clutch closed, the engine speed -- excuse me, the engine speed cannot go below engine idle speed, correct?

A. That's correct.

Q. Is engine idle speed represented by line 206?

A. That's correct.

Q. With the master clutch closed, the input shaft speed also can not go below line 206, correct?

A. That's correct.

Q. And we know that line 210 cannot intersect line 204 above line 206, correct?

A. That's correct.

Q. Which means that the expected output shaft speed multiplied by the target gear ratio cannot equal the expected input shaft speed above engine idle speed, correct?

A. That's only true for a closed clutch system, yes.

Q. As shown in figure 5, that's true, correct?

A. Figure 5 is a generic diagram to depict the algorithm for many different types of systems.

Q. So as shown in figure 5, that's correct, right?

A. Could you repeat your question you were trying to ask me?

JUDGE LUCKERN: Why don't you ask. It is sort of a combination there, Mr. McMahon. Why don't you go ahead and ask a complete question.

MR. McMAHON: Thank you, Your Honor.

BY MR. McMAHON:

Q. We established that the line 210 will not cross line 204 above line 206, correct?

A. Yes.

Q. And we know that from looking at figure 5, correct?

A. Yes.

Q. So as shown in figure 5, what that means is that the expected output shaft speed multiplied by the target gear ratio will not substantially equal the expected input shaft speed above engine idle speed, correct?

A. That's correct.

Q. And we also know that the expected input shaft speed cannot go below the engine idle speed because the master clutch is closed as shown in figure 5, correct?

A. That's correct.

Q. We also know that the expected output shaft speed multiplied by -- let me take that back.

Because of the things that we just established, we know that the expected output shaft speed multiplied by the target gear ratio will not intersect the expected input shaft speed as shown in figure 5?

A. It will not intersect above 206.

Q. And they intersect below 206?

A. We don't know.

Q. If the master clutch is closed, can they intersect below 206?

A. No.

Q. So the shift represented by line 210 is actually impossible, correct?

A. It is only impossible in a closed clutch system.

Q. Which is what figure 5 represents, correct?

A. I don't know if I can conclude that figure 5 represents a closed clutch system. Figure 5 is part of the preferred embodiment described in the patent, which I believe is describing a closed clutch system.

JUDGE LUCKERN: Do I understand what your testimony is, Mr. Genise, is that the preferred embodiment described in the '566 patent describes a closed clutch system?

THE WITNESS: I believe it does.

MR. McMAHON: Do you have further questions, Your Honor?

JUDGE LUCKERN: No.

(Genise, Tr. at 389-96 (emphasis added).)

The administrative law judge finds, in the foregoing testimony, that Genise, an inventor on the '566 patent, did admit that "[i]n the embodiment described using figure 5, . . . we described a closed master clutch system" and that in answer to a question from the administrative law judge, he admitted that the Figure 5 embodiment of the '566 patent describes a closed clutch system.

As for Figure 5 of the '566 patent, which the administrative law judge has found relates to a closed-clutch shift, Figure 5 discloses a sloping line 204 and it is indicated in said Figure and at

col. 9, ln. 63 to col. 4, ln. 5 that line 204 represents an input shaft speed that equals the engine speed, i.e. IS = ES. (See Genise, Tr. at 390-91.) Thus, Figure 5 does not disclose an input shaft speed synchronizing with an engine speed since the two are shown to be equal. The '566 patent further discloses:

> The expected speed of the output shaft 90 during the shift transient when zero engine torque is applied to the vehicle drive wheels ($OS_{EXPECTED}$) multiplied by the target gear ratio, which product is the required synchronous speed of the input shaft/engine, is represented by lines 208 [which represents an output shaft speed in the new gear] and 210 [of Figure 5] illustrating, respectively, that product at a lesser or greater, respectively, resistance to motion of the vehicle. As may be seen, under conditions of lower resistance (line 208), synchronous will occur at point 212 [of Figure 5] and the selected upshift is feasible while, under conditions of greater resistance (line 210), substantial synchronous will not occur and the selected upshift is not feasible.

(CX-198, col. 9, lns. 5-18.)

Referring to Figure 5 of the '566 patent, since line 208, which represents one expected output shaft speed multiplied by the target gear ratio, intersects line 204, that particular shift is feasible because the input shaft speed substantially equals the output shaft speed multiplied by the target gear ratio at that point. In contrast, line 210 of Figure 5 represents a different expected output shaft speed multiplied by the target gear ratio. (Genise, Tr. at 392.) Line 210 of Figure 5 does not intersect line 204 and hence that particular shift is not feasible. (Id.) Moreover, Figure 5 shows that it would be impossible for line 210 to intersect line 204 above reference line 206 of Figure 5. (Tr. at 393.) Also when the master clutch is closed, the input shaft speed can not go below line 206 and further line 210 cannot intersect line 204 above line 206 which means in Figure 5 the expected output shaft speed multiplied by the target gear ratio cannot equal the

expected input shaft speed above engine idle speed. (Tr. at 394.) Figure 5 does disclose that line 208 should intersect line 204 and that the output shaft speed in the new gear should meet the input shaft/engine speed above the engine's stall speed. Thus the administrative law judge finds that Figure 5 of the '566 patent discloses to one of ordinary skill in the art that, at the new gear ratio, the output shaft speed at the target gear ratio should synchronize with the input shaft speed (which equals the engine speed) above the engine stall speed. Hence, he finds that Figure 5 discloses to one of ordinary skill in the art that the claimed clause in issue is directed to the feasibility of synchronizing the output shaft and input shaft and teaches that such synchronization should not occur below engine idle speed in a closed-clutch shift.

Respondents argued that a person of ordinary skill in the art would understand that claim 4 is not directed to open clutch systems having an input shaft brake. (RPFF 258.) While the administrative law judge has found that FIG. 5 of the '566 patent depicts a closed-clutch embodiment, the '566 specification, in its description of said FIG. 5, teaches that "[t]he reference value is illustrated as engine idle speed 206 but can be a lower positive value if the master clutch is manually or automatically disengaged. (CX-198, col. 9, lns. 50-63 (emphasis added).) As seen in the administrative law judge's comparison of open-clutch and closed-clutch shifts, supra, an open clutch system would include a disengaged master clutch as described by the foregoing. (See RPFF 83 (undisputed).) With respect to open-clutch shifting, the '566 specification further discloses that:

> Although the control method/system of the present invention is particularly useful for those mechanical transmission systems not having clutch actuators or input shaft brakes, the present invention is not limited to such use.

(CX-198, col. 5, lns. 35-39 (emphasis added).) Thus, the '566 specification indicates that the control method could include the use of an input shaft brake, which is used in an open-clutch system to slow the input shaft speed to permit synchronization with the output shaft in the new gear ratio. (See RPFF 88 (undisputed).) Moreover, the '566 specification incorporates by reference the disclosures of U.S. Patent Nos. 4,361,060 and 4,648,290, which both describe open clutch systems. (CX-198, col. 1, ln. 40, 60; see Stein, Tr. at 2898.) Hence, the administrative law judge finds that claim 4 is not limited to closed-clutch systems only, but also includes open-clutch embodiments.

Referring to the prosecution of the '566 patent, applicants distinguished the claimed invention from the prior art on the basis of a specific feasibility test which used three distinct inputs, viz. expected vehicle acceleration, target gear ratio and expected input shaft acceleration, in determining whether the target gear can be synchronized. Thus, in an amendment sent March 8, 1993, in response to a December 8, 1992 Office Action, the applicant amended the first element of claim 4 as follows:

> . . . determining [the desirability] selection of a shift from a currently engaged transmission ratio to a target [transmission] gear ratio . . . .

(SPFF 227 (undisputed).) It was then argued that:

> None of the prior art utilizes current engine torque and vehicle acceleration (dOS/dt) to calculate an expected shift transient vehicle acceleration under current resistance to vehicle motion and zero engine torque to drive wheels conditions, and then determines if a selected shift is feasible/not feasible as a function of expected vehicle acceleration, target gear ratio and expected acceleration (decay) of IS.

(SPFF 228 (undisputed) (emphasis in original).) There was no mention of engine speed in connection with the feasibility test. Therefore in the prosecution, the Examiner's Statement of Reasons for Allowance provided:

> The prior art of record does not disclose or render obvious a motivation to provide for a control system and a method therefor as defined by the limitations of claims 1, 4, 7 and 14, including means for determining as a function of current engine torque, current vehicle acceleration, expected vehicle acceleration under current vehicle operating conditions and at zero engine torque to the drive wheel and means for determining the feasibility or infeasibility of achieving synchronous engagement of the target gear ratio based on a function of the expected vehicle acceleration, the gear ratio of the target ratio and the expected input shaft acceleration during the shift and the steps for performing the same (claims 4 and 1 respectively) . . . .

(SPFF 229 (undisputed) (emphasis added).) Thus, the Examiner allowed claim 4 on the basis of the feasibility test that included the expressly claimed three distinct inputs for determining whether synchronous engagement of the target gear ratio can be achieved.

Based on the foregoing, the administrative law judge finds that the proper interpretation of claim 4 of the '566 patent requires consideration of at least three distinct inputs in determining whether it is possible to synchronize the input shaft and the output shaft at the target gear ratio.

Complainant argued that the claimed clause "feasibility or infeasibility of achieving substantially synchronous conditions for engagement of the target ratio if the selected shift is implemented" should not be limited to making the "input shaft speed of the transmission to equal the output shaft speed times the target gear ratio," or to synchronizing the input and output shafts, citing Liebel-Flarsheim v. Medrad, 358 F.3d 898, 906 (Fed. Cir. 2004). (CBr at 52.) However, the administrative law judge finds that the clear teaching in the specification including the

embodiments shown in FIG. 5, which are described as a "graphical representation of an upshift event illustrating both feasible and not feasible attempted shifts" and are the only embodiments of the '566 patent relating to feasible and not feasible attempted shifts, fully support the claim construction found by the administrative law judge. (CX-198, col. 4, lns.19-21.)

Complainant, relying on the doctrine of claim differentiation, argued that the '566 patent contains claims, e.g., claims 7 and 14, that are particularly directed to closed clutch shifting systems; that specifically, claims 7 and 14 both recite "substantially synchronous conditions for jaw clutch engagement," whereas claim 4 recites "substantially synchronous conditions for engagement of the target ratio"; that claims 7 and 14 both recite an "engine with the master clutch engaged" during a shift, whereas claim 4 does not recite whether the master clutch is engaged or disengaged; and that based on at least those noted differences, a fair and correct implication is that claim 4 is applicable to open clutch shifting, and moreover, the "substantially synchronous conditions" are not limited to any particular clutch. (CRBr at 25-26.)

The doctrine of claim differentiation, however, does not apply unless a narrower proposed construction of an independent claim would render the dependent claim in question "superfluous." See, e.g., Athletic Alternatives, Inc. v. Prince Mfg., Inc., 73 F.3d 1573 (Fed. Cir. 1996). Claims 7 and 14, however, contain a substantial additional limitation beyond the recitation of jaw clutch engagement. Said claims 7 and 14 are directed to upshifts, as opposed to claim 4 which is directed to all shifts. Moreover, the doctrine of claim differentiation is not a rule that can broaden a claim beyond its correct scope determined in light of the specification, the prosecution history and any other relevant intrinsic evidence. Multiform Desicants, Inc. v. Medzam, Ltd., 133 F.3d at 1473, 1477 (Fed. Cir. 1998). Rather, the doctrine of claim

differentiation is only a guide to claim construction and cannot supplant an interpretation of a claim that is mandated by the specification and the prosecution history. Fantasy Sports Properties, Inc. v. Sportsline.com, Inc., 287 F.3d 1108, 1114-16 (Fed. Cir. 2002); Laitram Corp. v. Morehouse Industries, Inc., 143 F.3d 1456, 1463 (Fed. Cir. 1998); see also SRI Int'l. v. Matsushita Elec. Corp., 775 F.2d 1107, 1118 (Fed. Cir. 1985).

4. The claimed clause "causing the initiation of a selected shift only upon a determination of feasibility of achieving substantially synchronous conditions for engagement of the target gear ratio."

The administrative law judge interprets that said clause "causing the initiation of a selected shift only upon a determination of feasibility of achieving substantially synchronous conditions for engagement of the target gear ratio" requires a prediction as to whether a proposed shift can actually be accomplished before initiating the shift. (Davis, Tr. at 2314-15.) The administrative law judge rejects complainant's argument that the interpretation is "misdescriptive of the feasibility test as properly construed according to the intrinsic evidence." (COSPFF 232.) Rather, the administrative law judge finds that his interpretation of the last claimed clause is consistent with his interpretation of the preceding claimed clauses.

Complainant argued that respondents improperly limit claim 4 to closed-clutch shifting. (CRBr at 19.) However as seen from the foregoing, the administrative law judge has not limited claim 4 to closed-clutch shifting.

Complainant, ignoring specific language of claim 4, argued that "substantially synchronous conditions for engagement of the target ratio" recited in claim 4 "refers to conditions whereby a speed is within a desired range so that the drivetrain can be reconnected i.e. to complete a shift." (CPFF 243; CRSPFF 183.) Hence, complainant disregards three expressly

claimed inputs. Moreover, complainant has not denied that the claimed feasibility test includes a predicted acceleration and an expected input shaft acceleration. In addition, the administrative law judge can find nothing in the specification of the '566 patent, including any embodiment of said patent, that indicates that the claimed feasibility test that would involve only "conditions whereby a speed is within a desired range so that the drivetrain can be reconnected, i.e. to complete a shift."

B. Validity

1. Anticipation And Obviousness

A patent claim is invalid, as anticipated, if a single reference teaches all of the claim elements. Glaverbe Societe Anonyme v. Northlake Marketing, 45 F.3d 1550, 1554 (Fed. Cir. 1995); Continental Can Co. USA, Inc. v. Monsanto Co., 948 F.2d 1264, 1267 (Fed. Cir. 1991). Anticipation is a question of fact and references must be accepted for what they actually teach, not what they could have taught in hindsight. See Glaverbe, 45 F.3d at 1554; Panduit Corp. v. Dennison Mfg., Co., 774 F.2d at 1095 (Fed. Cir. 1985).

Obviousness is a question of law based on a series of factual determinations, including: (1) the scope and content of the prior art; (2) the differences between the art and the claims at issue; (3) the level of ordinary skill in the art; and (4) any other objective evidence. Texas Instruments Inc. v. U.S. Int'l Trade Comm'n, 988 F.3d 1165, 1178 (Fed. Cir. 1993), citing Graham v. John Deere Co., 383 U.S. 1 (1966). A single prior art reference can invalidate a claim based on obviousness. Sibia Neurosciences, Inc. v. Cadus Pharmaceutical Corp., 225 F.3d 1349,1356 (Fed. Cir. 2000); see In re Kotzab, 217 F.3d 1365, 1370 (Fed. Cir. 2000). However, where a party contends that a single prior art reference renders a claim obvious:

> [T]here must be a showing of a suggestion or motivation to modify the teachings of that reference to the claimed invention in order to support the obviousness conclusion. This suggestion or motivation may be derived from the prior art reference itself, from the knowledge of one of ordinary skill in the art, or from the nature of the problem to be solved. Determining whether there is a suggestion or motivation to modify a prior art reference is one aspect of determining the scope and content of the prior art, a fact question subsidiary to the ultimate conclusion of obviousness.

Sibia Neurosciences, Inc., 225 F.3d at 1356 (citations omitted) (emphasis added).

Respondents argued that under complainant's claim construction, claim 4 of the '566 patent is anticipated by the reference entitled "Powertrain Electronics-Progress on the Use and Development of the Computer Aided Gearshift Systems" (Powertrain reference) (RX-309); that even if the Powertrain reference does not anticipate said claim 4, the '566 patent is rendered obvious when the Powertrain reference is combined with Klatt, U.S. Patent No. 4, 630,508 (the '508 patent) (RX-105) and Smyth, U.S. Patent No. 4,361,060 (the '060 patent) (RX-308) and/or Dunkley, U.S. Patent No. 4,648,290 (the '290 patent) (RX-310). (RBr at 85-90.)

Respondents argued that the Powertrain reference teaches that gear selection or presetting must account for the loss in vehicle speed that occurs due to the interruption in power during a shift; that according to the Powertrain reference, "the relevant criterion is the expected loss in speed which is calculated in the gear selection system prior to gear presetting which loss in speed depends on the current driving resistances and is basically proportional to the road gradient with aerodynamic drag being neglected," and if the loss in vehicle speed will result in an engine speed that is too low, then the shift is not executed. It is further argued that the Powertrain reference teaches measuring a vehicle acceleration during a power-off condition to obtain a temporarily valid driving resistance coefficient and that once the driving resistance coefficient is calculated,

the vehicle mass is obtained through repeated application of the equations for vehicle dynamics at different times. It is argued that the calculation of vehicle mass is significant because it allows the Powertrain reference to then indirectly determine the driving resistances and the expected loss in speed prior to future gear selections and therefore, the Powertrain reference clearly teaches predicting prior to a shift the ability to synchronize power train utilizing the expected vehicle acceleration at zero engine torque. (RRBr at 74-75.)

It is further argued that one of ordinary skill in the art would understand that Klatt teaches predicting the expected vehicle acceleration at zero torque to the drive wheels using the equation disclosed for calculating the vehicle weight; that since the Klatt patent and the Powertrain reference are directed to similar subject matter of determining whether to select a gear for upshift based on current operating conditions, one of ordinary skill in the art would also be motivated to combine these references to render the '566 patent obvious. (RRBr at 74-77.) Respondents also argued that the Powertrain reference in the abstract states that "shifting strategies can be implemented which allow fuel savings in steady-state operation, while under dynamic driving conditions, the emphasis is rather placed on gear presettings which can be used to fully exploit propulsion power"; that Smyth relates "to such a system wherein gear selection and shift decisions are made and executed based upon measured parameters such as vehicle and engine speed, rate of change of vehicle and engine speed, etc."; that Dunkley "relates to a control system for the semi-automatic control of a mechanical change gear transmission "including means for automatically executing automatically determined and displayed allowable driver selected transmission ratio shifts, including automatic control of the vehicle master clutch in all but start from stop situations; and that the nature of the problem to be solved, the knowledge available to

those in the industry, and the teachings of the prior art, provide motivation to combine the Klatt, Powertrain, Smyth and Dunkley references with one another to render the '566 patent obvious. (RBr at 89-90.)

Complainant argued that the Powertrain reference does not anticipate the '566 patent because the reference states that the driving resistance coefficient be calculated by measuring the vehicle acceleration during the power-off condition when the clutch is disengaged, which is in direct contrast to the teaching of the '566 patent that predicts the expected value of the vehicle acceleration during the zero torque interval before commencing with the shift. Also it is argued that respondents concede in their post-hearing statement, that said reference lacks at least one limitation of claim 4 ("[E]ven if the Powertrain reference does not teach how to predict the expected vehicle deceleration at zero torque to the drive wheels prior to a shift, the '566 patent is rendered obvious when. . . ."). (CRBr at 111; see RBr at 87.) It is also argued that none of the references which respondents cite in their obviousness analysis disclose a pre-shift feasibility test based on an estimate of the vehicle acceleration during the shift, as recited in claim 4 of the '566 patent; that the Klatt '508 patent makes the assumption that the vehicle speed does not change during a shift and by assuming that the vehicle does not change speed during the power-off condition, said patent teaches away from the '566 patent's prediction of how much the vehicle slows down during a shift; that the Smyth '060 patent and Dunkley '290 patent are similarly deficient, in that neither reference teaches or suggests the pre-shift feasibility determination based on an estimation of the vehicle acceleration during the shift; and that while respondents assert that the Powertrain reference can be combined with the Klatt, Smyth and/or Dunkley references to render the '566 patent obvious, respondents do not explain how the teachings of those

references can be combined to include all of the limitations of the '566 patent. (CRBr at 111-12.)

The staff argued that respondents have not established, by clear and convincing evidence, that claim 4 of the '566 patent is not valid. It is argued that respondents' expert Davis agreed with complainant's expert Stein that predicting vehicle acceleration at zero torque to the driveline as called for in claim 4 is a unique feature of the '566 patent; and that Davis considers that feature to be "kind of a new approach." It is further argued that the '566 patent teaches predicting, prior to a shift, the expected vehicle acceleration with no engine torque applied to the drivewheels and using that prediction as one of three variables in determining whether it will be feasible to synchronize the transmission; that none of the references cited by respondents disclose predicting prior to a shift the ability to synchronize the output shaft in the new gear ratio with the input shaft using, inter alia, the expected vehicle acceleration at zero engine torque and that to the extent that those references teach utilizing vehicle acceleration, that acceleration value is based on conditions sensed during a shift (the '508 patent), or conditions in the current gear ratio (the '060 patent), or by assuming no change in vehicle acceleration (the '290 patent).[7] The staff further argued that the evidence also fails to establish that there existed a motivation to combine the references to derive the invention of claim 4 of the '566 patent. (SBr at 91-92.)

Respondents' Davis was qualified as an expert at the hearing. (FF 46.) Respondents have not denied his expertise. At the hearing, when Davis was interrogated by his counsel about claim 4, Davis testified:

> Q. When one of ordinary skill in the art reads this passage, what would they understand Claim 4 to be teaching, or Claim 4 to be requiring?

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[7] The staff noted that the '060 and '290 patents are referenced in the '566 patent.

A. What you have to understand is what is difficult in these trucks is trying to determine, with some degree of accuracy, the gross combined vehicle weight. And once you know that, then you can reapply the method again, the same equations that are disclosed in column 10, in order to then predict what the zero driveline torque acceleration would be.

And so this was kind of a novel approach because what they did is they did it just prior to considering an upshift, they would vary the fuel to cause what I would call kind of a torque blip in order to accomplish two different accelerations, and they could use that approach then to come up with a relatively accurate prediction on what the zero driveline torque would be.

In fact, if I remember correctly, it seemed to me one of the expert reports, I think Dr. Stein, I believe, even said that that was kind of a unique feature of, in his opinion, of this patent. And I agree.

(Davis, Tr. at 2333 (emphasis added).) Also at the hearing, this administrative law judge specifically directed Davis to complainant's expert Caulfield's hearing testimony (Tr. at 1566, line 24 to 1569, line 18), which testimony involved the claimed invention of the '566 patent. Davis, while denying the breath of Caulfield's testimony, testified:

JUDGE LUCKERN: We're on the public record, so I don't want to get into anything that you feel is confidential, but would you agree with that testimony as to this portion of the patent? And if not, why not?

THE WITNESS: No, I wouldn't because I think, as I mentioned, that was a challenge at that time, was to try and determine the gross combined vehicle weight, because it varies a lot from these heavy-duty trucks. Sometimes they're driving without even having the trailer attached. You know, I suppose it's always tough. I mean, once you read the algorithm, then you can always think of other ways that maybe you could do it, but at the time, I don't think people were able to do that very well, so I think this was kind of a new idea.

* * *

> THE WITNESS: . . .. I think perhaps, maybe after having read this patent, you could think of modifications you could make, but at the time, this was kind of a new idea.
>
> JUDGE LUCKERN: And when you say this was what was --
>
> THE WITNESS: I mean, starting that whole column that I read, that whole process of, immediately prior to considering an upshift, changing the fueling while you keep the master clutch engaged in order to estimate the weight of the vehicle and then applying that same algorithm again in order to determine the acceleration of the vehicle, that would occur under zero torque conditions.

(Davis, Tr. at 2335-37 (emphasis added).)

Based on the foregoing, the administrative law judge finds that even respondents' expert Davis agreed that predicting the acceleration at zero torque to the driveline as claimed in claim 4 was a novel approach. Moreover, the administrative law judge finds that none of the prior art relied on by respondents in the combinations alleged suggest to a person of ordinary skill in the art predicting, prior to a shift, the ability to synchronize the output shaft in the new gear ratio with the input shaft using, inter alia, the expected vehicle acceleration at zero engine torque.

Based on the foregoing, the administrative law judge finds that respondents have not established that claim 4 of the '566 patent is not valid in view of any of the cited prior art.

2. Written Description

Respondents argued that the written description requirement of 35 U.S.C. § 112, ¶ 1, requires that the patent specification "must clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed," and that therefore, if the patent is read more broadly than the specification teaches and is construed to cover "a situation where the expected input shaft speed is not dictated by and equal to rate of acceleration (deceleration) of the

engine during a shift," then the claim lacks a sufficient written description and is not enabling due to its failure to teach how to calculate the claimed expected input shaft acceleration during a shift. Gentry Gallery, Inc. v. Berkline Corp., 134 F.3d 1473, 1479 (Fed. Cir. 1998) (Gentry). It is argued that the '566 patent has a "§ 112 Insufficient Written Description" in that the '566 patent does not support the claimed feasibility test for open-clutch shifting because it does not include any disclosure regarding the claimed feasibility test for open-clutch shifting. It is argued that while complainant's Stein testified that the claims of the '566 patent can be construed to apply to open-clutch shifting because the original application for the '566 patent and the '060 and '290 patents, which are incorporated by reference in the '566 patent, describe an open-clutch shifting system, the evidence does not support the claimed feasibility for open-clutch shifting. (RBr at 90-92.)

Complainant argued that there is ample disclosure of "the patent's application" to open clutch shifting to satisfy the written description requirement of § 112, ¶ 1, citing Vas-Cath Inc. v. Mahurkar, 935 F.2d 1555 (Fed. Cir. 1991); that there is no requirement that an applicant disclose more than one embodiment of his invention and indeed, an applicant can be allowed claims broader than the preferred embodiment of his invention, citing Ethicon Endo-Surgery, Inc. v. U.S. Surgical Corp., 93 F.3d 1572, 1582, n.7 (Fed. Cir. 1996); and that while in Gentry, the patent at issue made it clear that there was only one possible way to implement a particular claimed feature, the '566 patent as originally filed made it clear that the invention applied to open as well as closed clutch systems. (CRBr at 113.)

The staff argued that respondents have not established by clear and convincing evidence that the '566 patent is invalid for insufficient written description. In support it was argued that

claim 4 of the '566 patent covers only a feasibility test that determines whether the output shaft in the new gear will synchronize with the input shaft, regardless of the type of shift; and that the patent adequately discloses to a person of ordinary skill in the art that, to practice the invention of claim 4 of the '566 patent, the transmission must predict an input shaft speed acceleration during the shift and determine whether the input shaft speed will be substantially synchronous with the output shaft speed such that the target gear can be engaged. (SRBr at 17.)

To satisfy the enablement requirement, a patentee must set forth in the specification "a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise and exact terms as to enable any person skilled in the art to which it contains, or with which it is most nearly connected, to make and use the same...." 35 U.S.C. § 112, ¶ 1. To prove invalidity due to lack of an enabling disclosure, a party must demonstrate, by clear and convincing evidence, that a person of ordinary skill in the art would be unable to practice the claimed invention without undue experimentation. Koito Mfg. Co. v. Turn-Key-Tech, LLC, 381 F.3d 1142 (Fed. Cir. 2004); Nat'l Recovery Techs. v. Magnetic Separation Sys., Inc., 166 F.3d 1190, 1195 (Fed. Cir. 1999).

The administrative law judge has found that claim 4 of the '566 patent covers a feasibility test that determines whether the output shaft in the new gear will synchronize with the input shaft, irrespective of the type of shift. He further finds that the '566 patent adequately discloses to a person of ordinary skill in the art that to practice the invention of claim 4 of the '566 patent the transmission must predict an input shaft speed acceleration during the shift and determine whether the input shaft speed will be substantially synchronous with the output shaft speed such that the target gear can be engaged. Hence, he finds that respondents have not established, by

clear and convincing evidence, that the '566 patent has an insufficient written description, under 35 U.S.C. § 112.

C. Infringement

Complainant argued that respondents FreedomLine transmissions directly and indirectly infringe claim 4 of the '566 patent; that at least the test and marketing trucks used by respondents in the United States directly infringe claim 4; that in addition, since asserted claim 4 is directed to a transmission control method that is contained or performed completely inside the FreedomLine transmission system as sold, respondents' sale of the transmission constitutes direct infringement as well. (CBr at 74.) It is also argued that respondents FreedomLine infringes under the doctrine of equivalents. (CBr at 79-80.) In addition, complainant argued that respondents actively induce infringement. (CBr 80-81.) Complainant further argued that respondents contributorily infringe claim 4 of the '566 patent. (CBr at 81-83.)

Respondents argued that complainant failed to prove that the FreedomLine system infringes the '566 patent. (RBr at 62-70.)

The staff argued that the evidence establishes that respondents' FreedomLine transmissions do not infringe claim 4 of the '566 patent. (SBr at 56.)

Under the provisions of 35 U.S.C. § 271, liability for infringement arises if "whoever without authority makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent therefor." 35 U.S.C. § 271(a). This infringement of a patented invention is the usual meaning of the expression "direct infringement." See Joy Techs., Inc. v. Flakt, Inc., 6 F.3d 770, 773 (Fed. Cir. 1993). However, even though an alleged infringer is not making, using, selling or importing

a patented invention, a party's acts in connection with selling a product may, however, constitute active inducement of infringement or contributory infringement of a patented invention under either 35 U.S.C. § 271(b) and/or 35 U.S.C. § 271(c). Liability for either active inducement of infringement (under 35 U.S.C. § 271(b)) or for contributory infringement (under 35 U.S.C. § 271(c)) is dependent upon the existence of direct infringement. See Joy Techs., Inc., 6 F.3d at 773.

A determination of infringement requires a two-step analysis. First, the patent claim must be properly construed to determine its scope and meaning. Second, the claim as properly construed must be compared to the accused device or process. Zelinski v. Brunswick Corp., 185 F.3d 1311, 1315 (Fed. Cir. 1999), citing Markman v. Westview Instruments, Inc., 52 F.3d 967, 976 (Fed. Cir. 1995). Whereas, claim construction is a matter of law and, therefore, the exclusive province of the court, "whether a claim encompasses an accused device, either literally or under the doctrine of equivalents, is a question of fact." Id., citing N. Am. Vaccine, Inc. v. Am. Cyanamid Co., 7 F.3d 1571, 1574 (Fed. Cir. 1993).

To prove literal infringement, the patentee must show that the accused device contains every limitation in the asserted claims. WMS Gaming Inc. v. Int'l Game Tech., 184 F.3d 1339, 1350 (Fed. Cir. 1999), citing Mas-Hamilton Group v. LaGard, Inc., 156 F.3d 1206, 1211 (Fed. Cir. 1998). An accused device that does not literally infringe a claim may nonetheless infringe under the doctrine of equivalents if differences between the accused device and the claimed invention are "insubstantial." Desper Prods. Inc. v. QSound Labs, Inc., 48 U.S.P.Q.2d 1088, 1097 (Fed. Cir. 1998). Equivalency of a claimed element to an element of an accused device is determined on an element-by-element basis at the time of infringement. Warner-Jenkinson Co.

v. Hilton Davis Chem. Co., 41 U.S.P.Q.2d 1865, 1874 (1997).

With respect to the accused FreedomLine transmissions, the first function relevant to claim 4 of the '566 patent in the FreedomLine software algorithm relates to

(SPFF 303-05 (undisputed).)

(Sayman, Tr. at 1915; RX-395.)

(Sayman, Tr. at 1916; RX- 305.)

(Id.)

SPFF 310 (undisputed).)

(Sayman, Tr. at 1926; RX-395; Locke,[8] Tr. at 2130-32.)

[8] Locke was qualified as an expert for respondents. (FF 47-55.)

(SPFF 313 (undisputed).)

The administrative law judge has found that the proper construction of claim 4 of the '566 patent calls for a feasibility test based on three distinct inputs, viz. predicted output shaft speed during the shift, the gear ratio and predicted input shaft speed and further calls for a comparison of the expected output shaft speed in the new gear ratio to an expected input shaft speed.

(SPFF 315 (undisputed).)

(Sayman, Tr. at 1932.) The FreedomLine system does not predict an expected output shaft speed in the target gear ratio prior to a shift. (SPFF 318 (undisputed).) At no time does the FreedomLine system predict the intersection of an output shaft speed in the new gear ratio with an input shaft speed to determine if the target gear can be engaged. (Sayman, Tr. at 1937; RX-428; SPFF 318, 319 (undisputed).)

(Sayman, Tr. at 1890; Davis, Tr. at 2403-04.)

Based on the foregoing, the administrative law judge finds that complainant has not established that the FreedomLine system performs the claimed feasibility test and also that it does not infringe under the doctrine of equivalents. If a claim element is completely absent from the accused device or process, the accused device or process cannot infringe the claim either

literally or under the doctrine of equivalents. See Zygo Corp. v. Wyko Corp., 79 F.3d 1563, 1568 (Fed. Cir. 1996); Dolly, Inc. v. Spalding & Evenflo Cos., 16 F.3d 394, 398 (Fed. Cir. 1994). Thus, the Freedomline system synchronizes the gears in a different way than called for in claim 4, viz.

Also, since there is no direct infringement, the administrative law judge finds that complainant has not established either active inducement of infringement or contributory infringement.

VI. The '545 Patent

The '545 patent, titled "Automated Transmission Upshift Control," issued on November 21, 2000 to Thomas A. Genise, Daniel P. Janecke and Marcel Amsallen on Application No. 09/232,252 filed January 14, 1999 and is assigned to complainant. (CX-200.) The '545 patent contains seventeen claims of which claims 1, 3, 6, 7, 11, 13, 16 and 17 are in issue. The '545 patent incorporates by reference the '566 patent. (CX-200, col. 4, lns. 23-26.)

The '545 patent relates to logic for automated mechanical transmission upshifts. Specifically, independent claims 1 and 11 cover automatic transmission upshift logic that includes: (1) a two-part test for assessing the feasibility of upshifting, (2) a maximum time for a skip upshift, and (3) a sequence for assessing skip upshifts.[9] The first part of the two-part

[9] There are a few minor differences between claims 1 and 11. For example claim 11 is a system claim that includes the structure of "logic rules." (See CX-200, col. 7, lns. 23-24.) Other minor differences are apparent from a verbatim comparison of the two claims. However, other than the fact that claim 1 covers a method for controlling an automated mechanical transmission and apparatus claim 11 covers an automated mechanical transmission system, the claims are identical in all pertinent respects.

As for the term "logic rules" in claim 11, the term is a common way of describing how software running in a processor functions. The word "algorithm" is equivalent to logic rules.

feasibility test is a synchronicity test, with the further requirement that synchronization must occur above an engine speed that is substantially equal to the maximum torque rotational speed of the engine. The second part of the feasibility test relates to vehicle acceleration and requires an assessment of whether the vehicle will be able to maintain an acceptable rate of acceleration following the shift. The timing element associated with claims 1 and 11 requires an assessment of whether a skip upshift of two gear ratios is feasible within a maximum acceptable time. Finally, the specified sequence for analyzing skip upshifts requires that the algorithm first assess the feasibility of skip upshifts of two ratios before assessing the feasibility of single skip upshifts (without using engine brakes). There is no dispute with said specified sequence. (See Tr. at 3483-90.[10])

Moreover, an engineer in the relevant field would understand what is meant by logic rules. (Locke, Tr. at 2152.)

[10] The staff had argued that the first part of the two-part feasibility is a synchronicity test, including the type of synchronicity test disclosed in the '566 patent. (SBr at 39). In closing argument complainant objected to the reference to the '566 patent and argued that it believes the staff is referring to col. 4, lns. 23-25 which state that "[t]his logic may be appreciated by reference by U.S. Pat. Nos. 5,335,566 and 5,425,689, the disclosures of which are incorporated herein by reference"; that complainant believes that both the '566 and 545 patents cover both open and closed clutch shifts; that complainant knows "that the Staff believes and the Respondents believe that the '566 patent is limited to a specific jaw clutch arrangement, which we would not agree with that"; and that even if for some reason the administrative law judge were to find that "'566 is so limited, the '545 clearly is not . . . [b]ecause the '545 only discloses -- the only clutch talked about is the master clutch." (Tr. at 3484-85.) The staff stood by its language in its brief and argued that when the '545 patent "says 'this logic' - - and the '566 patent is clearly a synchronicity test patent. So when the '545 references - - includes the '566 and says, this logic may be appreciated, I read that to be the entire first part of the synchronicity test." (Tr. at 3485.) The staff argued that the "'545 synchronicity test, it is a broader test. It's not limited to the engagement of the target gear ratio. It is synchronizing the engine. It includes [an] engine speed component. We don't dispute that. . . . We're not saying it's limited to such a test [the '566 test]. We're saying, does it include such a test? I stand by my position that it does include such a test." (Tr. at 3486.) The staff further argued that in the '545 patent there is reference to synchronizing at a specific engine speed or above a predetermined engine speed and

The asserted claims of the '545 patent recite:

1. A method for controlling automatic upshifting in a vehicular automated mechanical transmission system (10) for a vehicle comprising a fuel-controlled engine (12) having a maximum torque rotational speed, a multiple-speed mechanical transmission (14), and a controller (28) for receiving input signals (30) including one or more of signals indicative of engine speed (ES), engaged gear ratio (GR) and vehicle speed (OS), and to process said input signals in accordance with logic rules to issue command output signals (32) to transmission system actuators including a transmission actuator (52) effective to shift said transmission, said method characterized by:

(i) establishing a maximum acceptable time (TMAX) for completion of skip upshifts;

(ii) establishing an upshift feasibility criteria whereby upshifts into a target gear ratio are considered feasible only if, under sensed vehicle operating conditions,

(a) substantial synchronization can be obtained above a predetermined engine speed substantially equal to maximum torque rotational speed and

(b) at engagement of the target ratio, the vehicle will be capable of at least a predetermined acceleration (dOS/dt);

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that it is not limited to engagement of the target gear ratio the way the '566 patent is limited. (Tr. at 3488-89.)

The respondents, regarding the staff's position, argued that they agree that in the '545 patent, there is a two-part feasibility test that there is a maximum time for skip upshifts; and that thus there is a sequencing for assessing skip upshifts. They also agreed that the two-part feasibility test is a synchronicity test. However, it was argued that respondents would go farther than the position of the staff and maintain that the feasibility test required by the '545 patent is, in fact, the feasibility test synchronizing within the transmission, the transmission members that are disclosed "in the '566 and the '689 patent." (Tr. at 3488.) The respondents also argued that the statements in the '545 patent about the '566 patent are referring to the logic generally for determining a synchronous value above or a synchronous condition preselected of engine speed; that it is not referring of engine braking, as complainant's counsel would suggest; and that engine braking is not really a concept of the '566 patent. (Tr. at 3489.) Respondents argued that the claim language of the '545 patent talks about synchronizing in the target gear ratios and the test looks at what the gear ratio one is skipping to and so it is clear that the "synchronicity tests are looking at what's happening in the transmission." (Tr. at 3490.)

(iii) upon sensing a requirement (ES>ES/U/S) for an upshift from an engaged gear ratio (GR), in sequence:

(a) determining if a skip upshift of two ratios from the currently engaged ratio (GRTARGET=GR+2) is feasible within a time no greater than said maximum acceptable time and, if so, commanding a skip upshift of two ratios from the currently engaged ratio; if not,

(b) then determining if a single upshift (GRTARGET=GR+1) without using engine brakes is feasible and, if feasible, commanding a single upshift from the currently engaged ratio without using engine brakes.

3. The method of claim 1 comprising the further step, prior to step (iii)(a), of:

(e) determining if a skip upshift of three ratios from the currently engaged ratio (GRTARGET=GR+3) is feasible within a time no greater than said maximum acceptable time and, if so, commanding a skip upshift of three ratios from said currently engaged ratio and, if not, then proceeding to step (iii)(a).

6. The method of claim 1 wherein said maximum acceptable time is about 1.0 to 2.0 seconds.

7. The method of claim 1 wherein said engine is a diesel engine and said predetermined engine speed is about 1100 to 1300 rpm.

11. A control system for controlling automatic upshifting in a vehicular automated mechanical transmission system (10) for a vehicle comprising a fuel-controlled engine (12) having a maximum torque rotational speed, a multiple-speed mechanical transmission (14), and a controller (28) for receiving input signals (30) including one or more of signals indicative of engine speed (ES), engaged gear ratio (GR) and vehicle speed (OS), and to process said input signals in accordance with logic rules to issue command output signals (32) to transmission system actuators including a transmission actuator (52) effective to shift said transmission, said control system including logic rules for:

(i) establishing a maximum acceptable time (TMAX) for completion of skip upshifts;

(ii) establishing an upshift feasibility criteria whereby upshifts into a target gear ratio are considered feasible only if, under sensed vehicle operating conditions,

(a) substantial synchronization can be obtained above a predetermined engine speed substantially equal to said maximum torque rotational speed and

(b) at engagement of the target ratio, the vehicle will be capable of at least a predetermined acceleration (dOS/dt);

(iii) upon sensing a requirement (ES>ES/U/S) for an upshift from an engaged gear ratio (GR), in sequence:

(a) determining if a skip upshift of two ratios from the currently engaged ratio (GR_{TARGET}=GR+2) is feasible within a time no greater than said maximum acceptable time and, if so, commanding a skip upshift of two ratios from the currently engaged ratio; if not,

(b) then determining if a single upshift (GR_{TARGET}=GR+1) without using engine brakes is feasible and, if feasible, commanding a single upshift from the currently engaged ratio without using engine brakes.

13. The control system of claim 11 further comprising logic rules, prior to step (iii)(a), for:

(e) determining if a skip upshift of three ratios from the currently engaged ratio (GR_{TARGET}=GR+3) is feasible within a time no greater than said maximum acceptable time and, if so, commanding a skip upshift of three ratios from said currently engaged ratio and, if not, then proceeding to step (iii)(a).

16. The control system of claim 11 wherein said maximum acceptable time is about 1.0 to 2.0 seconds.

17. The control system of claim 11 wherein said engine is a diesel engine and said predetermined engine speed is about 1100 to 1300 rpm.

(CX-200, col. 5, ln. 24 to col. 8, ln. 42.)

A. Claim Interpretation

Other than a few terms that appear in both the preamble and the body of independent claims 1 and 11, the terms used in the preamble of claim 1, which conclude with "characterized by" in claim 1 and with "logic rules for" in claim 11 are not disputed.[11] Hence, the administrative law judge limits his claim interpretation to the body of the claims in issue.

1. The claimed clause "(i) establishing a maximum acceptable time (TMAX) for completion of skip upshifts" (Claims 1, 11)"

Complainant argued that the claimed clause refers to setting an upper limit for what is an "acceptable" time estimate for completing a skip upshift and that it does not refer to any comparison between TMAX and the actual time to complete a skip shift. (CRBr at 16.) It is further argued that the clause sets forth no requirement "of any consequences" for exceeding the maximum and only that a maximum be established. (CORPFF 319.)

Respondents argued that the clause "(i) establishing a maximum acceptable time (TMAX) for completion of skip upshifts" should be construed as setting a limit to the amount of time in which a skip upshift must be completed. (RBr at 43.)

The staff argued that the clause in dispute requires that the transmission shift logic set an upper limit to the amount of time that a skip upshift can take to complete. (SBr at 40.)

The administrative law judge finds that the plain language of the clause in dispute in its recitation of "establishing a maximum . . . time" refers to establishing an upper limit to the amount of time (TMAX) in which a skip upshift must be completed. He further finds that the specification of the '545 patent is consistent with the plain language. (See CX-200, col. 1, lns. 52-

[11] For applicable law, see V.A., supra.

56, FIG 3A (schematic illustration in flow-chart format of the "present invention"); see also CX-200, col. 4, lns. 10-14 (specification discloses that "[a] maximum time for completion of an upshift is established based upon consideration for shift quality, vehicle performance, etc. For heavy-duty trucks, by way of example, this time value may have a value of about 1.0 to 2.0 seconds").) The administrative law judge finds that a person of ordinary skill in the art would understand that TMAX is a maximum amount of time the transmission will allow for a shift to take place. Thus, complainant's expert Caulfield testified:

> JUDGE LUCKERN: If you look, for example, at column 4, lines 10 to 14 of the patent, the '545 patent, there it states a maximum time for completion of an upshift is established based upon considerations for shift quality, vehicle performance, et cetera. For heavy-duty trucks, by way of example, this time value may have a value of about 1.0 to 2.0 seconds.
>
> My question is does this portion of the patent have anything to do with this claim phrase (i), establishing a maximum acceptable time, TMAX, for completion of skip upshifts?
>
> A. For the most part, it's a dependent claim where it puts the TMAX between 1 and 2. So we're dealing with a dependent claim hanging on this independent claim 1. But for the rest of that, I would say that we're looking at a maximum time for completion of the upshift is established, and I'd hold by the same answer based upon the considerations of the shift quality vehicle performance. They're getting into a prediction of when the shift will occur rather than a guarantee of when it will happen to occur over across the time.
>
> * * *
>
> Q Dr. Caulfield, the feasibility criteria that's indicated in claim 1 of the '545 patent, is that directed to shifts that are going to occur or that -- or is it directed to shifts that have occurred?

A You can only direct a feasibility test to shifts that are proposed to occur. You can't really direct one to shifts that have occurred unless you're doing an evaluation of the system. They are shifts that are going to occur or that are proposed or that are being suggested.

* * *

JUDGE LUCKERN: Yeah. Let me just ask this question. Doctor, if you look at claim 1 and the phrase at (iii)(a), and that is -- starts at determining if a skip upshift, et cetera. And then it ends up with currently engaged ratio.

I believe you just had testimony about that, correct?

THE WITNESS: Correct.

JUDGE LUCKERN: All right. I don't want to take the time reading your previous testimony. You may have already answered it. But in your interpretation, would one of ordinary skill in the art understand how the feasibility criteria are met and how the shift is commanded?

THE WITNESS: In my interpretation, I could do that given these claim elements and this particular patent.

JUDGE LUCKERN: And you're saying one of ordinary skill in the art also would be able to do it?

THE WITNESS: I would assume so.

JUDGE LUCKERN: And briefly how would he be able to do it from the specification?

THE WITNESS: Well, what you have to do, and we've read it from the specification, is you want to get to a shift point to do an upshift -- we're always looking at upshifts in this particular claim -- such that when I come off the upshift point, I'm going to land and get synchability across the transmission, number one, at or above or essentially equal to the maximum torque rotational speed. And that I'm going to have enough acceleration basically left in the position point at the target so I can still accelerate the vehicle.

> Once I'm at that shift speed to make that and come into synch, the whole thing is to go from current gear to target gear and get the whole system put back together again, then you command the skip upshift.
>
> What it's also telling us, we haven't gotten to (b) yet. But if the shift is not reasonable, if it can't get that done within the TMAX time frame, then command another shift. That's basically what it says.
>
> In other words, what it's really trying to do is really a pretty simple claim. It's try to get as high of a number of skip in the minimum time. And if the skips are going to take too long, they're going to degrade them. They're always going to be shifting at the maximum reasonable shift within the 1.5 second time frame. Or the time frame between 1 and 2, if you look at the subpoint.
>
> The claim is broad enough so it says just establish a maximum time. Realistically, they're going to come out to be pretty close to a second and a half.
>
> The dependent claims calls it for -- the maximum acceptable time is in a range between 1 and 2. That's claim 6. So we really haven't established a maximum time.
>
> However, I don't know when you know too much. I know when it's going to be. I know when the times of shifts are.

(Tr. at 1438, 1454-57 (emphasis added).) Consistent with the testimony of Caulfield complainant in its CPFF 179 proposed that the claimed clause in dispute refers "to setting an upper limit to the time for completing a skip upshift."

2. The claimed clause "(ii) establishing an upshift feasibility criteria whereby upshifts into a target gear ratio are considered feasible only if, under sensed vehicle operating conditions, (a) substantial synchronization can be obtained above a predetermined engine speed substantially equal to maximum torque rotational speed and (b) at engagement of the target ratio, the vehicle will be capable of at least a predetermined acceleration (dOS/dt);" (Claims 1, 11)

Complainant argued that the clause in dispute refers to the "checks" set forth in the

claims that are used to determine the desirability of a potential shift. (CPFF182.)

Respondents argued that the first part of the feasibility test requires that substantial synchronization must occur above a predetermined speed substantially equal to maximum torque rotational speed; that an upshift is considered feasible, under this first part of the two-part test, if the members of the transmission selected for engagement at the target gear ratio will reach largely the same rotational speed above a predetermined engine speed that is largely the same as the speed at which an engine outputs its maximum amount of torque; and that the term "substantial synchronization" refers to the feasibility test for determining whether synchronization of the gears in the target gear ratio will occur, which was described in the '566 patent, with the term "maximum torque rotational speed" referring to the speed at which the maximum available torque of the engine is achieved. (RRCPFF 182B.) It is argued that the second part of the feasibility criteria requires a determination of whether the vehicle, at the point when the members within the transmission reach substantial synchronization, will be capable of a predetermined acceleration sufficient to maintain present vehicle speed after completion of the upshift. (RRCPFF 182C.)

The staff argued that the first part of the two-part feasibility test in the clause in dispute requires the shift logic to determine whether substantial synchronization can be achieved at a predetermined engine speed that is largely the same as the engine's maximum rotational speed, i.e. achieving substantially synchronous conditions for re-engagement of the entire drivetrain, including the engine, following a shift. (SBr at 40-45.) It is argued by the staff that the second part of the feasibility test in the claimed clause in dispute requires a determination that available torque at the drivewheels "at completion of the shift" will be sufficient to maintain at least a

minimal forward velocity. (SPFF 251.)

At the outset the administrative law judge finds that, pursuant to the plain language of elements (ii) and (iii) of claims 1 and 11, said claims set forth a feasibility criteria for evaluating upshifts that will be used in element (iii) of said claims which are concerned with determining whether upshifts into a target gear ratio[12] are feasible.

The '545 patent, under the heading SUMMARY OF THE INVENTION, discloses as to the feasibility test:

> The control of the present invention provides a control for a vehicular automated mechanical transmission system which will sense conditions indicative of upshifting from a currently engaged gear ratio, and will evaluate, in sequence, the desirability of large skip upshifts, then single skip upshifts, and will command an upshift to the first target ratio deemed to be desirable under current vehicle operating conditions.
>
> The foregoing is accomplished, in a preferred embodiment of the present

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[12] The phrase "target gear ratio," pursuant to its ordinary meaning, means the ratio formed by the gears within the transmission upon completion of the shift. Thus complainant's expert Caulfield testified:

> JUDGE LUCKERN: Yes, my question was, let me make reference, wait a minute, let me get the right portion of Realtime here. All right. Would I be correct to conclude that, I said what about this term "target gear ratio," and that's in this clause, there's been testimony about, okay?
>
> THE WITNESS: Okay.
>
> JUDGE LUCKERN: Then my question was, would I be correct to conclude that one of ordinary skill in the art, looking at this patent, would interpret that phrase as a gear ratio to be achieved by the transmission members after a preselected shift is executed?
>
> THE WITNESS: I'd say that would be correct. That would be the target gear ratio. It's the target gear.

(Caulfield, Tr. at 1547-48.)

> invention, by setting (i) a maximum acceptable shift time for completing upshifts and (ii) upshift feasibility rules to determine if a proposed upshift is feasible under current vehicle operating conditions. The upshift feasibility rules comprise a two-part test, (a) can the upshift be completed above a minimum engine speed? and (b) when completed, will the engine, in the target ratio, provide sufficient torque at the drive wheels to allow at least a minimum vehicle acceleration?

(CX-200, col. 1, lns. 44-61) (emphasis added).) Thereafter, under the heading DESCRIPTION OF THE PREFERRED EMBODIMENT, the '545 patent's two-part feasibility test is initially disclosed:

> A two-part feasibility test is established:
>
> (1) Will the engine speed be at a synchronous value above a preselected minimum engine speed ESMIN, given current/assumed engine and vehicle deceleration rates? The ESMIN, by way of example, is selected at about 1100 to 1300 rpm, which for a typical heavy-duty diesel engine is at or near a peak torque rpm. The engine deceleration rate may be evaluated with or without the use of engine braking. This logic may be appreciated by reference by U.S. Pat. Nos. 5,335,566 and 5,425,689, the disclosures of which are incorporated herein by reference. Use of engine brakes (also called exhaust and Jake brakes) to enhance upshifting is known, as may be seen by reference to U.S. Pat. No. 5,409,432; and
>
> (2) At completion of a proposed upshift, will torque at the drive wheels provide sufficient torque for at least minimal vehicle acceleration? (See U.S. Pat. Nos. 5,272,939 and 5,479,345, the disclosures of which are incorporated herein by reference).

(CX-200, col. 4, lns. 15-34) (emphasis added).)

As seen from the foregoing, the invention of the '545 patent is found to be directed to the completion of proposed shifts, which extends to synchronizing the entire driveline and further indicates that the feasibility test determines whether the engine will be synchronized after the shift, given current engine and vehicle deceleration rates. Moreover, as seen from the quoted portion of the '545 patent, supra, although the specification of the '545 patent incorporates the feasibility test of the '566 patent, it states that the logic may be appreciated by reference to the

'566 patent. Hence, the administrative law judge finds that the specification indicates that the '545 patent is not limited to the feasibility test of the '566 patent. Thus, the driveline members to be synchronized may be either an output shaft and an input shaft, in the case of closed-clutch shifts, or an input shaft and an engine, in the case of open-clutch shifts.

As for the engine speed limitation, the disputed clause states that upshifts are feasible "only if, under sensed vehicle operating conditions, (a) substantial synchronization can be obtained above a predetermined engine speed substantially equal to maximum torque rotational speed."[13] Thus, for this limitation the administrative law judge finds that the shift logic must know a value for the speed at which the engine produces its maximum torque, i.e. know what the predetermined engine speed is for maximum torque, and further must make a comparison of the predicted engine speed after synchronization to that value. (Davis, Tr. at 2403-04.) In addition, as the plain language of the disputed clause indicates, an upshift is commanded only if it is determined that the predicted engine speed following the shift will be above a speed substantially equal to the engine's maximum torque rotational speed.

As for the recitation "substantial synchronization can be obtained above a predetermined engine speed substantially equal to maximum torque rotational speed," in an amendment mailed January 12, 2000, the applicants added dependent claims 20-25 "to indicate that the minimum engine speed at completion of an upshift is determined as a function of (or is substantially equal to) peak torque engine speed (see page 7, lines 4-13)." (SPFF 245 (undisputed).) The applicants then distinguished each of the cited references as follows:

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[13] Inventor Genise defined peak torque as "the maximum available torque of the engine. The speed at which the maximum available torque of the engine is achieved." (Tr. at 372.)

> In Speranza '331, expected engine speed after a single upshift is compared to the upshift speed in the next higher ratio (not to a peak torque engine speed).
>
> Genise '689 teaches that upshifts must be completable at above engine idle speed (206), see column 10, lines 50-53. There is no teaching or suggestion of a reference to engine speed based on (or equal to) peak torque engine speed.

(SPFF 246 (undisputed) (emphasis added).) Thus, the applicants argued that the prior art Speranza '331 and Genise '689 patents failed to teach a feasibility test that specifically compared a predicted engine speed following the shift to an engine's maximum torque rotational speed. The applicants also stated that the expected engine speed after the shift could either be based on (i.e., a function of) the engine's maximum torque rotational speed or equal to (i.e., substantially equal to) the engine's maximum torque rotational speed. (See SPFF 245.) The Examiner replied to this argument by stating:

> Note: it is believed that the prior art of record fails to show said predetermined engine speed being substantially equal to a maximum torque rotational speed; but all predetermined speeds in the prior art can be justified as being a function of the maximum torque speed as long as they are not substantially equal.

(SPFF 247 (undisputed) (emphasis added).)

The applicants subsequently amended the claims that issued as claims 1 and 11 to add to the feasibility test the limitation that "substantial synchronization can be obtained above a predetermined engine speed substantially equal to maximum torque rotational speed." (SPFF 248 (undisputed) (emphasis in original).)[14] The Examiner then allowed claims 1 and 11, stating:

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[14] The applicants also added to the preambles of claims 1 and 11 "a fuel controlled engine (12) having a maximum torque rotational speed." (SPFF 249 (undisputed) (emphasis in original).)

> [T]he prior art of record fails to show or render obvious the automated transmission upshift control as claimed, and particularly including an engine having a maximum torque rotational speed, and an upshift feasibility criteria, which concludes that synchronization can be obtained above a speed substantially equal to said maximum torque rotational speed, that the vehicle can reach a predetermined acceleration, and upon sensing a requirement for an upshift, determining if a skip upshift of two ratios is feasible, if not, then seeing if a single upshift if is feasible without using engine brakes.

(SPFF 250) (undisputed) (emphasis added).

The administrative law judge thus finds that the file history indicates that the Examiner determined that the patentable subject matter in claims 1 and 11 relates to a specific feasibility test that concludes that synchronization can be obtained above a speed substantially equal to the engine's maximum torque rotational speed; that the feasibility test is not merely a function of the engine's maximum torque output, but rather is a test of whether the shift can be completed above a speed substantially equal to the engine's maximum torque, based on a comparison of the expected engine speed following the shift to the engine's maximum rotational speed and that under such a test, only shifts that are predicted to complete above a speed substantially equal to an engine's maximum torque rotational speed are commanded.

The specification indicates that this feasibility test requires a determination that available torque at the drivewheels "at completion of the shift" will be sufficient to maintain at least a minimal vehicle acceleration. (CX-200, col. 4, lns. 15-34.) Thus, the administrative law judge also finds that the second part of the feasibility test called for in the claimed clause in dispute requires determining, prior to initiating a shift, whether the vehicle will have sufficient torque at the drivewheels to maintain an established minimal vehicle acceleration after completion of an upshift.

3. The claimed clause "(iii) upon sensing a requirement (ES>ES/U/S) for an upshift from an engaged gear ratio (GR), in sequence" (Claims 1, 11)

Complainant argued that the parties "appear to agree that the meaning of this term [in sequence] is 'events occurring in a specified order.'" (CBr at 42.) However, it is argued that the use of reference characters in parenthesis should have no effect on the scope of claims 1 and 11. (CBr at 46-47.)

The staff argued that the clause in issue means "that the system, upon determining that the engine speed is greater than a predetermined threshold engine speed, assesses upshifts in the specified order (i.e., upshifts of two gear ratios, followed by single gear upshifts)." (SPFF 252.)

The respondents argued that the staff's interpretation (SPFF 252) is incomplete; that the element first requires performing the function of sensing the requirement of an upshift; that the function of sensing the requirement of an upshift is performed by comparing the current engine speed to a predetermined threshold speed; and that if the predetermined threshold engine speed is exceeded, the claim requires a specific sequence of events of first evaluating skip upshifts (element (iii)(a)) and then evaluating single upshifts (element (iii)(b)). (RRSPFF 252.)

The administrative law judge finds that the plain language of the claimed clause in issue, when considered with the remaining language of independent claims 1 and 11, is unambiguous in first requiring performing the function of sensing the requirement of an upshift by comparing the current engine speed to a predetermined engine threshold speed and then, if the predetermined, threshold speed is exceeded, requiring a specific sequence of events for first evaluating skip upshifts and then evaluating single upshifts.

4. The claimed clause "(a) determining if a skip upshift of two ratios from the currently engaged ratio (GRTARGET=GR+2) is feasible within the time

no greater than said maximum acceptable time, and, if so, commanding a skip upshift of two ratios from the currently engaged ratio;" (Claims 1, 11)

Complainant argued that the claimed clause in dispute requires determining if the recited feasibility criteria are met for a proposed shift of GR+2, and if so, commanding that shift, and that the term "feasible" means "desirable" based on the criteria set forth in the claims. (CPFF 187.)

Respondents argued that the word "feasible" is entitled to its ordinary meaning of possible or capable of being done; that the clause in dispute requires determining (a) whether a skip upshift is feasible using the two part feasibility test set forth in element (ii)[15] of claims 1 and 11 and (b) whether the skip upshift can be completed within the maximum established time for skip upshifts set forth in element (i)[16] of claims 1 and 11; that if, and only if, the program logic determines that both feasibility criteria and the maximum established time criteria will be met, will a skip upshift be commanded; and that if the skip upshift being evaluated does not meet both of the maximum time and feasibility tests, only then a single upshift is evaluated. (RRCPFF 187B.)

The staff argued that a person of ordinary skill in the art would understand that the claimed clause in issue calls for an assessment as to whether the proposed skip upshift can be completed within a maximum period of time. (SBr at 46.)[17]

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[15] See VIA.2. supra.

[16] See VIA.1. supra.

[17] At closing argument respondents argued that the real dispute is in the clause (iii) of claims 1 and 11, although in order to perform (iii), one has to use the test of claimed element (i), and the feasibility test of claimed element (ii); that clause (iii) requires a comparative test; that one must look for example, at predictive time and compare it to the maximal acceptable time;

The administrative law judge finds that the use of the terms "within" and "no greater than" in the claimed clause in dispute would indicate to a person of ordinary skill in the art that the skip upshift must be completed in a time equal to or less than the predetermined maximum acceptable time to complete a shift. Moreover, the specification of the '545 patent discloses that:

> Large skip upshifts (i.e., upshifts from GR to GR+3) and then single skip upshifts (i.e., upshifts to GR+2) are evaluated to determine if (i) they can be completed within the maximum acceptable shift time and (ii) if they are feasible. If the evaluated skip upshift meets both tests, it is desirable and is commanded.

(SPFF 253 (undisputed) (emphasis added).) Subsequently, the specification states:

> According to the logic of the present invention, upon sensing that an upshift is indicated ($ES>ES_{U/S}$), in sequence:
>
> > (1) A big skip upshift from the currently engaged ratio GR to GR+3 (without using engine brakes) is evaluated and if an upshift to GR+3 (i) is feasible and (ii) can be accomplished within the maximum time, it is desirable and an upshift to GR+3 will be initiated . . . .

(SPFF 254 (undisputed) (emphasis added).) Complainant's Caulfield further testified that the specification teaches predicting whether the proposed shift will happen within the TMAX time frame. (Tr. at 1438.) Moreover, as respondents' expert Davis testified:

> A. Well, first of all, it seems pretty plain when you just read it. You want to check to see currently engaged -- well, let me just start here at line 50, 'is feasible within a time no greater than said maximum acceptable time.' That right there implies that you'd have to perform a test to see if the shift is going to take too long, and so you'd compare the time of the shift with the -- predicted time of the shift with the maximum time.

---

and that one has to look at the target speed and compare it to the predetermined engine speed which is equal to or substantially equal to maximum torque. (Tr at 3495, 3499). The staff argued that it is really the limitations of clauses (ii)(a) and (iii) of claims 1 and 11 that are in dispute. (Tr at 3496.) Complainant argued that the dispute is in the interpretation of claimed elements (i), (ii)(a) and (iii)(a). (Tr. at 3500-3501.)

Q. And what is your understanding of the use of the term 'feasible' in (iii)(a)?

A. Feasible in that case, it's kind of an extension, I believe, of the '566 patent, so first, you have to try and achieve substantial synchronization. That means get the jaw clutches synchronized for engagement. Then based on that, then you go a little bit further. Let me just pull up the claim, so I don't --

* * *

THE WITNESS: And then if you would start maybe up (ii) there, 'Establishing an upshift feasibility criteria, whereby upshifts into a target gear ratio are considered feasible only if under sensed vehicle operating conditions, (a) substantial synchronization can be obtained.' That's the synchronization test. Can IS substantially equal OS times the target gear ratio?

And then if that's met, then you check the speed, the input shaft speed, or the resulting engine speed that would occur at the end of the shift due to that speed, and you see if that's substantially above a value rather, that's substantially equal to the maximum torque rotational speed, so that would be part of the feasibility test.

And then you would also do part (b), and you would predict that, at engagement of the target ratio, the vehicle would be capable of at least a predetermined acceleration, dos/dt, that would be the change in output speed with respect to time.

* * *

THE WITNESS: To me, it's clear that you would predict how long a shift would take using all the feasibility calculations I mentioned before, synchronization, and then above a certain engine speed, you would figure out how long that process was going to take, and then you would compare that with this TMAX to see if it exceeds that time. If it exceeds that time, then you would modify or cancel the shift. So to me, it's clear --

JUDGE LUCKERN: Is it your testimony --

THE WITNESS: -- that you need a time comparison there.

JUDGE LUCKERN: Is it your testimony that one of ordinary skill

> in the art, looking at this patent specification, anything else connected with the patent, the claims, prior art, et cetera, would come to that conclusion?
>
> THE WITNESS: Yes.
>
> JUDGE LUCKERN: And, again, what portion of this specification are you relying on? Maybe it's already in there, and you can say, Judge, I've already said that, and I'll move.
>
> THE WITNESS: Again, I'm looking at that figure 3a, 'Upshift to GR plus 2 feasible in time less than,' the less than symbol, 'TMAX,' and so they're performing a mathematical test right there, so that would be one spot.

(Tr. at 2382-84, 2386-87 (emphasis added).)

Based on the foregoing, the administrative law judge construes element (iii)(a) as predicting whether the proposed shift will happen within the TMAX time frame and involving a comparison of the predetermined maximum acceptable time (TMAX) to complete a shift to the estimated length of time of the skip upshift.

The administrative law judge finds that the prosecution history supports this construction. Thus, in an amendment sent January 12, 2000, in response to an Office Action mailed November 9, 1999 (Paper No. 5), the applicants stated:

> All pending claims include the limitation that skip upshifts will be commanded only if feasible within an established maximum time. This feature is not, in the sense of 35 U.S.C. § 103, seen in or suggested by the cited prior art.
>
> In Speranza '331, the time (REF_T) is used simply to calculate expected engine speed. There is no criteria that a shift *must be completed within* REF_T (see column 7, lines 36-59) . . . .
>
> Genise '689 has no requirement that upshifting *be completed within a given time*. . . . There is no teaching or suggestion that a shift *must be completed within a given time*.

> Markyvech '939 has no teaching or suggestion that allowable shifts *must be completed within a given time*. . . . There is no teaching or suggestion of an upshift *must be completable within a particular time*.

(SPFF 258) (undisputed) (underline in original, italics added).) Thus, in distinguishing over the prior art, the applicants made it clear that the claims relate to a criteria or requirement that allowable shifts must be completed within a given time. Accordingly, to meet this limitation, the transmission control system or method must preclude skip upshifts that are predicted to take longer than a set maximum time period.

5. The claimed clause "if not, (b) then determining if a single upshift (GRTARGET = GR+1) without using engine brakes is feasible and, if feasible, commanding a single upshift from the currently engaged ratio without using engine brakes." (Claims 1, 11)

Complainant argued that the claimed clause in dispute means determining if the recited feasibility criteria are met for GR+1, and if so, issuing a software or other command in the control algorithm indicating a request or instruction for a shift upwards of one gear, without employing engine brakes. (CPFF 191.) It is argued that the claim requires a determination of whether the single upshift is feasible; that the feasibility criteria are defined in elements (ii)(a) and (b); and that element (ii)(a) does not require a determination of whether it is possible to synchronize the gear, but rather whether the synch speed is in the bounds of the claim (i.e., above a reference speed that is substantially equal to maximum torque rotational speed). (COSPFF 268.)

Respondents argued that complainant's proposed interpretation is incomplete in that additional facts are needed and that the feasibility criteria referred to in the limitation is the feasibility test set forth in element (ii) of claims 1 and 11. (ROCPFF 191; RRCPFF 191.) It is

argued that the intrinsic evidence teaches the use of the equation IS=OS*GR to satisfy the feasibility prediction test of the third element of claim 4. (RRSPFF 268.) Respondents further argued that the '545 patent distinguishes between the terms "feasible" and "desirable"; and that for example, a skip shift is deemed feasible it meets the two part test of element (ii), but it is not desirable if it is not predicted to occur within the maximum acceptable time established in element (i). (RRCPFF 192.)

The staff argued that the claimed clause in dispute requires the shift logic to determine, if a skip upshift cannot be commanded, (1) whether a single upshift from the currently engaged ratio can be synchronized without the use of the engine brake (i.e., a device to retard the rotational speed of the engine), and (2) whether a minimum acceptable acceleration can be maintained in the new gear; and that if such a single gear upshift is feasible (i.e., can be synchronized and will permit a minimum acceleration), the claim calls for the software to issue a command requesting or instructing a shift upwards of one gear ratio. (SBr at 49-50.)

The parties do not dispute and the administrative law judge agrees that element (iii)(b) of claims 1 and 11 is a separate and required step in the process of evaluating shifts and requires decrementing the skip upshift to a single upshift and determining whether a single upshift without using engine brakes is feasible using the criteria set forth in element (ii), and if so, commanding a single upshift from the current engaged gear without using engine brakes. (RPFF 355 (undisputed).) Hence, he finds only if said criteria are met without using engine brakes, is a single upshift from the current engaged gear commanded.

6. The claimed clause "determining if a skip upshift of three ratios from the currently engaged ratio (GR_{TARGET}=GR+3) is feasible within a time no greater than said maximum acceptable time and, if so, commanding a skip

upshift of three ratios from said currently engaged ratio and, if not, then proceeding to step (iii)(a)." (Claims 3, 13)

Complainant argued that the claimed clause in issue of dependent claims 3 and 13 requires determining if the recited feasibility criteria are met for a proposed shift of GR+3, and if so, commanding that shift and that the term "feasible" means "desirable" or "suitable" based on the criteria set forth in the claims. (CPFF 193.) It is also argued that the skip upshift must be feasible within a certain time and that said time must be no greater than the maximum time as established (TMAX). (CPFF 194.)

Respondents argued that the feasibility criteria referred to in this claim limitation is the feasibility test set forth in element (ii) of independent claims 1 and 11. (RRCPFF 193.) It is further argued the '545 patent distinguishes between the terms "feasible" and "desirable," e.g., a skip shift is deemed feasible if it meets the two-part test of element (ii), but it is not desirable if it is not predicted to occur within the maximum acceptable time established in element (i); and that feasible is entitled to its ordinary meaning of possible or capable of being done. (RRCPFF 193A; RRCPFF 193B.)

The staff argued that claims 3 and 13 depend from claims 1 and 11 respectively; that although those dependent claims pertain to skip upshifts of three gear ratios rather than skip upshifts of two gear ratios (as required by claims 1 and 11), the claimed timing comparison is the same as that for the independent claims from which they depend and should be construed consistently.[18] (SBr at 50.)

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[18] Dependent claims 6 and 16 in issue, which also depend directly from claims 1 and 11, respectively, establish the maximum acceptable shift time at between 1.0 and 2.0 seconds. Dependent claims 7 and 17, which also depend directly from claims 1 and 11, respectively, establish a predetermined engine reference speed of between 1,100 rpm and 1,300 rpm for the

The administrative law judge finds that the claimed timing comparison is the same for dependent claims 3 and 13 as already found for independent claims 1 and 11 from which claims 3 and 13 depend. Hence, he finds that his construction for claims 1 and 11 governs the interpretation of claims 3 and 13. He also finds that the '545 patent distinguishes between the terms "feasible" and "desirable." For example, a skip shift is deemed feasible if it meets the two-part test of element (ii) of claims 1 and 11, but it is not desirable if it is not predicted to occur within the maximum acceptable time established in element (i) of said claims. Thus, consistent with the ordinary meaning of "feasible," i.e. capable of being done (RX-346; RX-347), the specification states:

> According to the logic of the present invention, upon sensing that an upshift is indicated (ES>ESU/S), in sequence:
> (1) A big skip upshift from the currently engaged ratio GR to GR+3 (without using engine brakes) is evaluated and if an upshift to GR+3 (i) feasible and (ii) can be accomplished within the maximum time, it is desirable and an upshift to GR+3 will be initiated. If not,
> (2) Then a single skip upshift to GR+2 (without using engine brakes) is evaluated and if an upshift to GR+2 is (i) feasible and (ii) can be accomplished within the maximum time, it is desirable and an upshift to GR+2 will be initiated. If not,
> (3) Then a single upshift to GR+1 (without using engine bakes) is evaluated and if an upshift to GR+1 (without using engine brakes) is feasible, an upshift to GR+1 (without using engine brakes) will be commanded. If not,
> (4) Then a single up upshift to GR+1 using the engine brake is evaluated and if an upshift to GR+1 using the engine brake is feasible, an upshift to GR+1 using the engine brakes will be commanded. If not,
> (5) No upshift will be initiated.

(CX-200, col. 4, lns. 38-60 (emphasis added).) Thus the administrative law judge rejects

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synchronicity test. (See CX-200.)

complainant's CPFF 183 that the "term 'feasible' means 'desirable' or 'suitable' based on the criteria set forth in the claims" thus equating "feasible" with "desirable."

Complainant argued that the claim construction should not involve any comparison between two values (CRBr at 15.) However, contrary to complainant's argument, the administrative law judge finds that claim language, the specification of the '545 patent and the file history of said patent show that the claimed subject matter in issue requires making comparisons. For example, the language of element (iii)(a) indicates that a skip upshift will be commanded only if it is determined to be feasible "within a time no greater than said maximum acceptable time." In addition, the specification teaches that element (iii)(a) requires determining whether the proposed skip upshift can be completed within a time no greater than TMAX. (SPFF 253-254 (undisputed).) Similarly, FIG. 3A discloses the specific algorithm: "UPSHIFT TO GR + 3 FEASIBLE IN TIME < TMAX?" which indicates comparing the predicted time for completion of the proposed skip upshift with the maximum acceptable time established in element (i). (CX-200, FIG. 3A.)

The prosecution history also is consistent with the interpretation. For example, in the Amendment and Remarks mailed on January 12, 2000, applicants wrote:

> All pending claims include the limitation that skip upshifts will be commanded only if feasible within an established maximum time. This feature is not, in the sense of 35 U.S.C. § 103, seen or suggested by the prior art.

(CX-201, EA 101032 (emphasis in original).) Applicants continued their remarks by arguing that in Speranza "[t]here is no criteria that a shift must be completed within [a referenced time]." (Id.) Similarly, applicants argued that Genise "has no requirement that upshifting be completed within a given time. . . . There is no teaching or suggestion that a shift must be completed within

a given time." (Id.)

B. Validity

Respondents argued that the asserted claims of the '545 patent are invalid under 35 U.S.C. §103 in light of the combination of complainant's AutoShift Gen I transmission and U.S. Patent No. 4,947,331 (the '331 patent) to Speranza (RX-314), U.S. Patent No. 5,425,689 (the '689 patent) to Genise (RX-313) and U.S. Patent No. 5,272,939 (the '939 patent) to Markyvech. (RX-72.)[19] In support it was argued that each of the AutoShift Gen I,

and the Speranza, Genise, and Markyvech patents are directed to similar subject matter of vehicular automatic/semi-automatic transmission control systems that seek to improve shifting by canceling or modifying undesirable shifts which would result in unsatisfactory vehicle performance. (RBr at 93-102.)

Respondents argued that Speranza relates to automatic/semi-automatic transmission control systems "having at least one mode of operation in which upshifting by more than a single ratio step will be commanded if conditions indicative of vehicle acceleration sufficient to indicate that single upshifting will result in a rapid requirement for further upshifting are sensed," and that "Speranza describes known automatic transmission control systems for selecting a desired gear ratio in view of sensed parameters 'were not totally acceptable as the predetermined programs utilized to generate shift decision data . . . did not optimize vehicle performance when vehicle acceleration . . . sufficient to cause undesirably frequent single upshifting is sensed.'" (RBr at 100-101.)

Markyvech, it is argued by respondents, relates to "to shift control methods/systems for

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[19] For applicable law, see V.B.1., supra.

automated mechanical transmissions wherein the likelihood of acceptably completing a selected upshift is evaluated in view of existing vehicle operating conditions and only acceptably completable shifts are initiated," and describes that known automatic, semi-automatic and/or partial automatic shift implementation type vehicular mechanical transmission systems "are not totally satisfactory as they will occasionally initiate an attempted shift, which, due to vehicle operating conditions, [may result in undesirable 'hunting' as the transmission undergoes cycles of upshifts followed by almost immediate downshifts, and] should not be completed." (RBr at 101.)

Respondents argued that Genise relates to "shift control methods/systems for automated mechanical transmission wherein the probabilities of successfully completing a selected upshift are evaluated in view of existing vehicle operating conditions and only feasible shifts are initiated" and describes that known automatic, semi-automatic and/or partial automatic shift implementation type vehicular mechanical transmission systems "are not totally satisfactory as they will occasionally initiate an attempted shift, which, due to vehicle operating conditions, cannot be completed." (RBr at 101.) Hence, based on the nature of the problem to be solved and the teachings of the prior art, respondents argued that there is motivation to combine the AutoShift Gen I, Speranza, Genise and Markyvech references with one another and that even the Examiner on the application for the '545 patent combined the Speranza, Genise and Markyvech references with one another to render the '566 patent obvious, except for the limitation relating to "a predetermined engine speed substantially equal to maximum torque rotational speed." (RBr at 101-102.)

Complainant argued that respondents have failed to show any prior art that teaches or

suggests the claimed combinations of the asserted claims. It is argued that the AutoShift Gen I system

that every witness except respondents' Davis agreed that no engines in the time frame of the '545 patent had a maximum torque rotational speed of 1,000 RPM; and that none of the cited references teaches or suggests using a maximum time to complete a skip upshift as part of a pre-shift feasibility test. Complainant further argued that it chose to accept the Examiner's determination in the prosecution of the '545 patent that the combination of the elements which the Examiner found in the prior art and the addition of the maximum torque rotational speed was patentably novel. (CRBr at 103-04.)

The staff argued that the evidence does not show "clearly and convincingly" that the asserted claims of the '545 patent are invalid in light of the prior art of record. It was argued that while Eaton has stated that "1,000 r.p.m. is substantially equal to maximum torque rotational speed," the evidence shows that 1,000 RPM was not above a speed substantially equal to peak engine torque during the period in time when the AutoShift was commercially available; that while respondents put forward a diesel engine reference book with a copyright of 1999 that states that a maximum engine speed of 1,200 RPM "was very popular in 1994," this reference indicates that 1,200 RPM was the prevailing peak torque engine speed in 1994, when the AutoShift GEN I was introduced; that in addition, a website for Cummins Engines contained advertising showing a peak torque engine value at 1,200 RPM for engines sold in the middle 1990s; and that,

the prior art AutoShift GEN I did not perform the synchronicity test claimed in the '545 patent and the Examiner clearly considered this claim element to be novel when allowing claims 1 and 11 of the '545 patent. The staff

further argued that the prior art AutoShift transmission did not practice the elements in subparagraph (iii) of independent claims 1 and 11 relating to the sequence for assessing upshifts and the maximum time to complete skip upshifts.

The staff, referring to the '331 patent to Speranza, argued that it teaches a person of ordinary skill in the art, when evaluating upshifts, to measure the time it will take to shift from the new gear ratio (i.e., GR+1) to a higher gear ratio (GR+N), which time difference is referred to as (REF_T); that the '331 patent teaches that when it is predicted that shifts from the next higher ratio (GR+1) to a higher ratio (GR+N) will occur in less than a reference time (REF_T), the system should increment the skip upshift (i.e., skip to the higher gear (GR+N)); and that the '331 patent therefore teaches one of ordinary skill in the art to increment, or increase by one gear ratio, all skip upshifts where an upshift following the skip upshift is predicted to happen in rapid succession. It is argued that the '545 patent, in contrast, discloses decrementing, or stepping down, skip upshifts that will take too long.

It is argued by the staff that although the '689 patent to Genise discloses a potential shift occurring in less than two seconds, it does not contain any teaching about predicting a shift time for skip upshifts and then commanding only those skip upshifts predicted to take less than a maximum acceptable time and that while the '939 patent to Markyveck is referenced in the '545 patent for its teaching of a feasibility test for sufficient drivewheel torque in the new gear ratio, it does not even suggest the claimed timing test of the '545 patent. (SBr at 95-97.)

The administrative law judge finds that respondents have not established, by clear and convincing evidence, that the asserted claims of the '545 patent are not valid. Respondents' basis for invalidating the asserted claims is a "combination of AutoShift Gen I and Speranza,

Genise, and Markyvech patents," whereby respondents at least admit that "perhaps" the AutoShift Gen I does not have the elements in limitation (iii) relating to the sequence for evaluating upshifts and the time to complete skip upshifts of independent claims 1 and 11. (RBr at 94.) The administrative law judge rejects respondents' argument that the evaluation of skip upshifts and then single upshifts is, at most, an "obvious variation" of the sequence embodied in the prior art AutoShift Gen I transmission for the reason that in the prosecution of the '545 patent, after the applicants subsequently amended claims 1 and 11, only to add the subparagraph (ii) limitation pertaining to achieving substantially synchronous conditions "above a predetermined engine speed substantially equal to said maximum torque rotational speed," a Notice of Allowance issued. (CX-201 at EA 0010152 (emphasis in original).) (CX-201, Notice of Allowability dated 5/30/00). Moreover, the administrative law judge finds in none of the references relied on at least the TMAX feasibility criterion or the sequencing as claimed in the asserted claims. (See Stein, Tr. at 2985-86.)[20]

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[20] During prosecution of the '545 patent Eaton's in-house patent counsel Gordon argued for applicants that the prior art failed to show a synchronization test requiring a minimum engine speed as either a function of or substantially equal to maximum torque rotational speed. (CX-201 at EA101030-33). In a response dated January 18, 2000 to an office action mailed November 9, 1999, Gordon stated:

> Added dependent claims 20-25 are added to indicate that the minimum engine speed at completion of an upshift is determined as a function of (or is substantially equal to) peak torque engine speed (see page 7, lines 4-13). This feature is not seen in or suggested by the cited prior art.
>
> In Speranza '331, expected engine speed after a single upshift is compared to the upshift speed in the next higher ratio (not to a peak torque engine speed).
>
> Genise '689 teaches that upshifts must be completable at

C. Infringement

Complainant argued that the FreedomLine transmissions literally infringe each of the asserted claims of the '545 patent. (CBr at 65-71.)[21] It is also argued that FreedomLine algorithm infringes under the doctrine of equivalents. (CBr at 73-74.) Like complainants' allegation of infringement of the '566 patent, it is further argued that respondents actively induce infringement of the asserted claims of the '545 patent as well as contributorily infringe said claims. (CBr at 80-83.)

Respondents argued that complainant failed to prove infringement of the '545 patent. (RBr at 51-59.)

The staff argued that the evidence demonstrates that respondents' FreedomLine transmissions do not infringe independent claims 1 or 11 of the '545 patent. (SBr at 59-63.) It is also argued that dependent claims 3, 6, 7, 13, 16 and 17 of the '545 patent have not been shown to be infringed. (SBr at 63-64.)

In issue at least is whether the FreedomLine system practices element (ii)(a) of claims 1

> above engine idle speed (2061, see column 10, lines 50-53. There is no teaching or suggestion of a reference engine speed based on (or equal to) peak torque engine speed.
>
> Markyvech '939 has no teaching that upshifts must be completed at above a reference engine speed.
>
> In view of the foregoing, Examiner is respectfully requested to reconsider his position and to allow all claims at issue.

(CX-201 at EA101030-33 (doubled underlined emphasis added).)

[21] For applicable law, see V.C., supra.

and 11, which requires a determination as to whether synchronous conditions can be achieved above a predetermined engine speed substantially equal to the engine's maximum torque rotational speed; and whether the FreedomLine system practices claim element (iii)(a) of claims 1 and 11, which requires a test as to whether a skip upshift can be completed within a predetermined maximum amount of time.

As found in the infringement section relating to the '566 patent,

(SPFF 304-05 (undisputed).)

(Locke, Tr. at 2125.)

processor. (Locke, Tr. at 2126.)

(Sayman, Tr. at 1924-26.)

(RX-427R; Sayman, Tr. at 1939-40; Locke, Tr. at 2134-35; Davis, Tr. at 2391.) (Caulfield, Tr. at 1653.)

(RX-427R; Sayman, Tr. at 1948-49.)

(RX-427R; Sayman, Tr. at 1948– 49.)

(RX-409 at ZFF016850; Sayman, Tr. at 1945-46.)

(Sayman, Tr. at 1949.)

(Sayman, Tr. at 1950; RX-427; Locke, Tr. at 2132-37.)

(Davis, Tr. at 2391-92, 2406.)

(Caulfield, Tr. at 1468-70, 1656-59; RX-427.) Caulfield testified that the FeedomLine system would have to be changed in order to perform the claimed timing test. (Caulfield, Tr. at 1468-69) (emphasis added) ("In other words, I can take their software, make one change in it . . . . [then] I would be decrementing the shift and be doing exactly the same thing").

Based on the foregoing, the administrative law judge finds that complainant has not established that the FeedomLine system has the claimed upshift feasibility criteria nor does it use the claimed upshift feasibility criteria to determine if skip upshifts are feasible within a time no greater than the maximum acceptable time. Hence, complainant has not satisfied its burden in establishing literal infringement of independent claims 1 and 11 of the '545 patent.

Referring to dependent claims 3, 6, 7, 13, 16 and 17, a dependent claim incorporates all of the limitations of the independent claim from which it depends. Thus, dependent claims 3, 6 and 7 have all the limitations of independent claim 1 and dependent claims 13, 16 and 17 have all the limitations of independent claim 11. Hence, for the same reasons that the administrative law

judge finds that complainant has not met its burden in establishing that respondents' FeedomLine transmissions literally infringe claims 1 and 11, the administrative law judge finds that complainant has not met its burden in establishing that respondents' FeedomLine transmissions literally infringe claims 3, 6, 7, 13, 16 and 17. Likewise, he finds that complainant has not established that the FeedomLine transmissions infringe any of the asserted claims under the doctrine of equivalents since claim elements are completely absent from the FeedomLine transmissions. Also since there is no direct infringement, the administrative law judge finds that complainant has not established either active inducement of infringement or contributory infringement.

D. Inequitable Conduct

Respondents argued that complainant's Howard Gordon, Eaton's in-house patent counsel, committed inequitable conduct when he failed to disclose the commercialization of the AutoShift product and its use in MCI coach buses and 10-speed, heavy-duty trucks during the prosecution of the '545 patent. (RBr at 108-15.)

Complainant argued that respondents have not proven, by clear and convincing evidence, that Gordon committed any inequitable conduct during the prosecution of the application for the '545 patent. In support it is argued that all of the elements of the "undisclosed" AutoShift reference were disclosed and the product itself was at most cumulative of, and probably less material than, other art which the Examiner considered in allowing the application for the '545 patent; and that there is no evidence of Gordon's recognition of such reference as material prior art or of Gordon's intent to withhold such reference to obtain the '545 patent. (CRBr at 104-05.)

The staff argued that while it is undisputed that complainant did not disclose the

AutoShift GEN I product to the PTO, the evidence establishes that the AutoShift GEN I was not material to the patentability of any claim of the '545 patent and was, at most, cumulative of other prior art complainant placed before the PTO. (SBr at 97.)

To establish unenforceability due to inequitable conduct, a respondent must prove, by clear and convincing evidence, that a patentee failed to disclose material information during prosecution of the patent with an intent to mislead the PTO. Bristol-Myers Squibb Co. v. Rhone-Poulenc Rorer, Inc., 326 F.3d 1226, 1233 (Fed. Cir. 2003).[22] In an inequitable conduct analysis, the administrative law judge must determine whether the withheld reference(s) meet a threshold level of materiality and whether the evidence demonstrates a threshold level of intent to mislead the PTO. Purdue Pharma L.P. v. Boehringer Ingelheim, 237 F.3d 1359, 1366 (Fed. Cir. 2001); Baxter Int'l, Inc. v. McGaw, Inc., 149 F.3d 1321, 1327 (Fed. Cir. 1998). Direct evidence of an intent to mislead is not required and is usually inferred from the facts. Bristol-Myers Squibb Co., 326 F.3d at 1239. In fact, Federal Circuit precedent establishes an inverse relationship between the levels of materiality and intent within the inequitable conduct standard, viz. the more material the omission, the lower the level of intent required to establish inequitable conduct. See, e.g., Bristol-Myers Squibb Co., 326 F.3d at 1234; Critikon, Inc. v. Becton Dickinson Vascular Access, Inc., 120 F.3d 1253, 1256 (Fed. Cir. 1997). Once the materiality of the withheld information and the patentee's intent to mislead have been established, the administrative law judge "must weigh them to determine whether the equities warrant a conclusion that inequitable conduct occurred." Bristol-Myers Squibb Co., 326 F.3d at 1234, quoting Molins PLC v. Textron,

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[22] Affirmative misrepresentations of material fact or submissions of false material information to the PTO can also form the basis of an inequitable conduct defense. Bristol-Myers Squibb Co., 326 F.3d at 1233.

Inc., 48 F.3d 1172, 1178 (Fed. Cir. 1995).

1. Materiality

Patent applicants and their attorneys have a duty of candor and good faith in dealing with the PTO, which includes a duty to disclose information known to each individual to be material to patentability.[23] 37 C.F.R. § 1.56(a). Within the context of an inequitable conduct analysis, "[i]nformation is deemed material if there is a substantial likelihood that a reasonable examiner would consider it important in deciding whether to allow the application to issue as a patent." Brasseler, U.S.A. I, L.P. v. Stryker Sales Corp., 267 F.3d 1370, 1380 (Fed. Cir. 2001); accord Baxter Int'l, Inc., 149 F.3d at 1327. A withheld reference may be "highly material" and "[g]enerally, when withheld information is highly material, a lower showing of deceptive intent will be sufficient to establish inequitable conduct." Certain Ammonium Octamolybdate Isomers, Inv. No. 337-TA-477, U.S.I.T.C. Pub. No. 3668, Comm'n Op. at 48 (January 2004) (Ammonium), citing GFI, Inc. v. Franklin Corp., 265 F.3d 1268, 1273 (Fed. Cir. 2001); Critikon, Inc. v. Becton Dickinson Vascular Access, Inc., 120 F.3d 1253, 1256 (Fed. Cir. 1997). However, there is no duty to disclose information that is merely cumulative of other information already before the examiner. Baxter Int'l, Inc., 149 F.3d at 1328; see 37 C.F.R. 1.56(b).

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[23] Under 37 C.F.R. § 1.56(b), information is "material to patentability":

> [W]hen it is not cumulative to information not already of record or not being made of record in the application, and (1) [i]t establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or (2) [i]t refutes, or in inconsistent with, a position the applicant takes in: (i) [o]pposing an argument of unpatentability relied on by the [Patent] Office, or (ii) [a]sserting an argument of unpatentability.

37 C.F.R. § 1.56(b)(1)-(2).

A preliminary question is whether Gordon knew or should have known about certain prior art. Gordon prosecuted the '545 patent in the PTO on behalf of complainant. (SPFF549 (undisputed).) He did conduct prior art patent searches in connection with prosecuting the '545 patent. (SPFF 550 (undisputed).) Gordon, when shown an Eaton document indicating " AutoShift for bus and coach" testified:

> Q. Does the appearance of this entry on this document refresh your recollection as to when you knew that AutoShift was first used in the buses or coaches?
>
> A. I have no doubt that that's correct. I suspect I should have known at that time, yes.
>
> Q. Independent of this document, Mr. Gordon, does this document refresh your recollection as to when you knew this use occurred?
>
> A. Independent of this document?
>
> Q. Yes, sir.
>
> A. Based on this document, that tells me that.
>
> Q. And independent of this document, what is your personal recollection today as you sit here?
>
> A. As of -- what I knew in
>
> Q. Does this document refresh your recollection as to when you first knew that AutoShift Generation I was commercially used in buses?
>
> A. Does this tell me that I knew that in
> Is that what you're asking me?
>
> MR. FILARSKI: Can I have the question read back, Your Honor, please.
>
> JUDGE LUCKERN: Sure. The question is as follows, Mr. Gordon: Does this document, which is CRDX-1, page 6, refresh

your recollection as to when you first knew that AutoShift Generation I was commercially used in buses?

THE WITNESS: It tells me that that information was certainly available to me, yes.

BY MR. FILARSKI:

Q. I direct your attention down to the final entry, AutoShift for heavy truck. The entries there indicate -- state: 1998 winner, Truck Writers of North America's 1997 Technical Achievement Award.

Does that entry refresh your recollection as to when Eaton commercially sold and used AutoShift in heavy trucks?

A. That tells me that information was available to me and I certainly could have known it at that time.

Q. Does this help you recall that you knew that AutoShift was used for heavy trucks in the year 1997?

A. Once again, it tells me that the information was available to me. And I expect that that information is very true, and I could have known it very easily.

(Gordon, Tr. at 994-99.) Gordon also testified that he "certainly should have been aware of it [an award provided because the AutoShift Generation I was used publicly in heavy-duty trucks] at the time [he filed the '545 patent application in 1999]." (Tr. at 996.)

Based on the foregoing, the administrative law judge finds that Gordon, who prosecuted the '545 patent for complainant, knew or should have known that the AutoShift GEN I was first used in the buses or coaches and in heavy-duty trucks when he filed the application in the PTO for the '545 patent. The administrative law judge further finds that Gordon, prior to the filing of the application which matured into the '545 patent, at least had information available to him that the algorithm in the AutoShift GEN I software likely was set at and was

aware that the threshold speed for shifting was higher then engine idle speed (600 RPM). (Gordon, Tr. at 887-88; CRSPFF 557.)

Respondents argued that complainant's prior use of its AutoShift Generation I transmission in buses and 10-speed, heavy-duty truck transmissions is material to the '545 patent claims because it discloses a synchronization test with a threshold engine speed above [24]; that the closest art of record, the Genise '689 patent, disclosed a synchronization test with a threshold engine speed of engine idle speed, which was about 600 RPM; and that no other reference in the record disclosed a synchronization test with a predetermined engine speed greater than engine idle speed.[25] (RBr at 109.) However, the file history of the '545 patent, sheet 2 of 2 of Form PTO 1449 filed by applicants as a part of an Information Disclosure Statement, lists at "AA" U.S. Patent No. 5,479,345 to Amsallen (the '345 patent). (CX-201 at EA100579.) The '345 patent to Amsallen is also listed as a cited reference on the cover page of the '545 patent. (Gordon, Tr. at 1029; CX-200.) Moreover, the '345 patent is incorporated by reference into the '545 patent as prior art relating specifically to "single and/or skip shift feasibility" evaluation. (CX-201 at EA100806, col. 1, lns. 32-40.) Significantly, the '345 patent discloses an upshift feasibility logic that utilizes a 1,000 RPM engine speed as a minimum reference value.

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[24] While respondents argued that RPM, as is present in the Autoshift Bus and 10-speed heavy duty truck Autoshift transmissions, is substantially equal to maximum torque rotational speed, the AutoShift Gen I set the threshold engine speed to a value of RPM because typically for heavy-duty diesel engines, the torque drops off radically below RPM and the torsional vibrations become excessive. (Genise, Tr. at 337, 339, 408, 437; Amsallen, Tr. at 475-76; Janecke, Tr. at 531-32; Dedow, Tr. at 696.)

[25] In the preceding section "VI. B", the administrative law judge rejected respondents' argument that the combination of the AutoShift Gen I transmission and the Genise '689 patent rendered the asserted claims obvious under 35 U.S.C. § 103.

(CX-201 at EA100553, EA100578, EA100807.) In addition the '345 patent teaches a pre-shift test to ensure that the engine speed after the shift will be above a reference speed of 1,000 RPM: [t]o maintain driveability, the vehicle should not be forced to operate at an engine speed below 1,000 RPM for any gear except first gear. This is the minimum engine speed (MIN_VALUE) required at completion of the shift. Otherwise a shift should not be initiated." (CX-201 at EA 100806, col. 6, lns. 35-39; see Gordon, Tr. at 1027-30, 1035-36.) Thus, Eaton disclosed to the Examiner at least one prior art reference that taught 1,000 RPM as the lowest engine speed for engagement of the driveline following a shift.

Based on the foregoing, in view of the disclosure to the PTO of the '345 patent and the fact that AutoShift Gen I transmission is lacking critical elements of the claimed subject matter in issue, the administrative law judge finds that a reasonable Examiner would not consider the AutoShift Gen I reference important in deciding whether to allow the application to issue as the '545 patent. Hence, he finds that respondents have not established the materiality of the prior use of the AutoShift Gen I transmission and thus respondents' inequitable conduct defense fails.

2. Intent

Assuming arguendo respondents had established the materiality element, after establishing that the withheld information was material to patentability, a respondent alleging inequitable conduct must establish that the patentee withheld said information with an intent to deceive the PTO. Purdue Pharma L.P., 237 F.3d at 1366; Baxter Int'l, Inc., 149 F.3d at 1327. "In a case involving an omission of a material reference to the PTO, there must be clear and convincing evidence that the applicant made a deliberate decision to withhold a known material reference." Baxter Int'l, Inc., 149 F.3d at 1329 citing Molins, 48 F.3d at 1181. Direct evidence of

intent is not required and intent may be inferred from the surrounding circumstances, "[f]or example, ... where a patent applicant knew, or should have known, that withheld information would be material to the PTO's consideration of the patent application." Critikon, Inc. v. Becton Dickinson Vascular Access, Inc., 120 F.3d 1253, 1256 (Fed. Cir. 1997); see Bristol-Myers Squibb Co., 326 F.3d at 1239. Moreover, the Federal Circuit has stated that:

> [W]here withheld information is material and the patentee knew or should have known of that materiality, he or she can expect to have great difficulty in establishing subjective good faith sufficient to overcome an inference of intent to mislead.

Bristol-Myers Squibb Co., 326 F.3d at 1239. "Generally, when withheld information is highly material, a lower showing of deceptive intent will be sufficient to establish inequitable conduct." Ammonium, Comm'n Op. at 48 (emphasis added).

In this investigation, at the hearing, inventor Janecke testified that in 1999 he did not consider 1,000 RPM to be a peak torque speed for a truck engine and that he was unaware of any truck engines at that time that had peak torque ratings of 1,000 RPM. (Janecke, Tr. at 523.) Inventor Amsallen testified that when the application that matured into the '545 patent was filed in 1999, he did not consider 1,000 RPM to be a peak torque speed for a truck engine "[b]ecause 1,000 RPM is in the area where the torque curve where the torque begins to fall off pretty rapidly as you approach idle." (Amsallen, Tr. at 467.) He also testified that he was not aware of any truck engines that had peak torque ratings of 1,000 RPM in 1999. (Amsallen, Tr. at 467-68.) Gordon testified that when he prosecuted the '545 patent, he did not believe that when used in AutoShift GEN I, represented maximum torque rotational speed. (Gordon, Tr. at 1022.) The administrative law judge finds nothing in the record that impeaches the testimony of

the inventors and Gordon. Hence, assuming arguendo, respondents had established the materiality of the AutoShift Gen I prior use, the administrative law judge finds that respondents have not established Gordon's required intent to deceive the PTO.

VII. The '279 Patent

The '279 patent, entitled "Method For Controlling AMT System Including Wheel Lock-Up Detection And Tolerance" issued on February 6, 1990 to William F. Cote and Robert R. Smyth based on Application No. 848,610 filed on April 7, 1986. (CX-196.) The '279 patent is assigned to Eaton. (Id.) While the '279 patent contains 15 claims, claim 15 is the only claim of the '279 patent in issue. Said claim 15 reads:

> 15. A control system for controlling a vehicular automatic mechanical transmission system[26] utilized in connection with a vehicle equipped with vehicle wheel brakes for retarding the rotation of at least one of the vehicle drive wheels, said automatic mechanical transmission system comprising a throttle-controlled engine, a change gear transmission having a plurality of gear ratio combinations selectably engagable between a transmission input shaft and the transmission output shaft, said transmission output shaft drivingly coupled to said vehicle drive wheels, and a disengagable coupling drivingly interposed said engine and said transmission input shaft, said automatic mechanical transmission system additionally comprising an information processing unit having means for receiving a plurality of input signals including (1) an input signal indicative of the rotational speed of said transmission output shaft, said processing unit including means for processing said input signals in accordance with a program to provide a predetermined gear ratio for a given combination of input signals and for generating command output signals whereby said transmission system is operated in accordance with said program, and means associated with said transmission system effective to actuate said transmission system to effect engagement of one of said gear ratio combinations in response to said output signals from said processing unit, the system characterized by:
>
> > means for sensing the presence of wheel lock-up condition, and, if and as long as the presence of a wheel lock-up condition is sensed,

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[26] The '279 patent specification refers to automatic mechanical transmissions as "AMT's." (See CX-196, col. 1, lns. 10-11.)

prohibiting said processing unit from generating all transmission gear change command output signals.

(CX-195, '279 patent at col. 10, lns. 19-51.) (emphasis added)

The final "means" clause of asserted claim 15 recites "wheel lock-up condition." A wheel lock-up condition is also known as a skid and refers to the condition in which the vehicle is moving, but the wheels are not rotating at a speed representative of the vehicle speed.[27] (Caulfield, Tr. at 1308-09; see Tr. at 3251; SRCPFF 137.) With respect to the prior art, the '279 patent discloses that:

> A wheel lock-up condition presents several problems related to control of a vehicle AMT [automatic mechanical transmission] system, these include the inertia of the engine and clutch on the wheels which may delay the wheels' ability to roll-up to vehicle speed, the circumstance that the value of the [transmission] output shaft speed signal may not be indicative of vehicle speed during a skid which may cause the transmission system to undesirably attempt one or more rapid downshift and the requirement of providing the system with the ability to revalidate the output shaft speed signal as a true indication of vehicle speed at expected termination of a wheel lock-up condition.

(CX-196, col. 2, lns. 7-18.) The specification further provides:

> Accordingly, it is an object of the present invention to provide a new and improved method for controlling a vehicle AMT system including sensing of wheel lock-up conditions and modifying of the system control algorithm in tolerance of such sensed lock-up conditions.

(CX-196, col. 2, ln. 66 to col. 3, ln. 2.)

A. Claim Interpretation

It is undisputed that the preamble of claim 15 should be treated as a limitation of the claimed invention because it provides meaning to the claim as a whole and provides the

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[27] The output shaft speed is an accurate representation of vehicle speed in the absence of a wheel lock-up condition, but is not an accurate representation of vehicle speed during a wheel lock-up condition. (See CPFF 135-36 (undisputed).)

antecedent basis for limitations in the body of claim 15. (RPFF 100 (undisputed).)[28] Referring to claim 15 supra, the parties dispute the proper interpretation of the three means elements emphasized in the preamble of claim 15. (See RPFF 101, 115; CBr at 37.) The parties however are in agreement that each of said means elements should be construed in accordance with 35 U.S.C. § 112, ¶ 6. In addition, the parties disagree on the correct interpretation of the means and prohibiting clauses of the body of claim 15 emphasized supra.

1. The claimed clause "means for receiving a plurality of input signals including (1) an input signal indicative of the rotational speed of said transmission output shaft"

The parties dispute the function as well as the corresponding structure of the aforementioned means limitation. Complainant argued that the function "of this receiving means is to receive a plurality of input signals including an input signal indicative of the transmission output shaft rotational speed"; and that the '279 specification indicates that it was known in the art for a processing unit to receive such input signals. (CPFF 117, 118.) As to the structure disclosed in the '279 patent specification, complainant argued that "Fig. 1 of the '279 patent shows that the corresponding structure is the input connections or interface of the CPU (central processing unit) 56 since that structure performs the function of receiving the input signals." (CBr at 36, citing CPFF 117.)

Respondents argued that CPFF 117 is "[i]ncomplete in that additional facts are needed and misleading." (ROCPFF 117.) It is argued that "the recited function is receiving a plurality of input signals, and that the function must include receiving at least a signal indicative of the rotational speed of the transmission output shaft." (RBr at 12.) Respondents further argued that

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[28] For applicable law, see V.A., supra.

the term "input signals" should not be construed to ignore signals generated by driver-initiated activities and instead should be construed broadly to cover any "sign or indication that provides information or messages to the processing unit for processing, including input signals sending information or messages of driver initiated activities." (RBr at 12; see RPFF 103-08.) As to the corresponding structure for receiving said input signals, respondents argued that the structure includes a processor 56 programmed with an algorithm to receive input signals and "sensors for sending input signals to the processor." (RRSPFF 96; see RBr at 13; RPFF 109.)

The staff made no objection to CPFF 117. It did argue that the function of the claimed means is to receive multiple input signals, one of which must be an input signal relating to the transmission output shaft, and that the central processing unit 56 in Figure 1, which receives multiple input signals from sensors 22, 28, 32, 36, 38, 54 and/or 58, is the structure disclosed in the specification for performing the claimed function. (SBr at 7; see SPFF 91, 92, 94, 95.)

The parties do not dispute that the claimed function is to receive multiple input signals, one of which must be an input signal relating to the speed of the transmission output shaft. With respect to the receiving function, the '279 specification states that the method for "sensing a wheel lock-up condition and modifying the control algorithms in response thereto ... is accomplished by providing the electronic control unit with input means for receiving a signal indicative of a wheel lock-up...." (CX-196, col. 2, lns. 36-38, 48-50 (emphasis added).) The specification further discloses that the AMT control system performs gear selection and shift decisions:

> based upon measured and/or calculated parameters including input signals indicative of engine speed, transmission input shaft speed and transmission output shaft speed. Other inputs/parameters, such as signals indicative of throttle

> position and/or rate of change of throttle position, condition of the master clutch, currently engaged gear ratio, operation of the vehicle brakes, etc. are also utilized to make decisions for control of the AMT system.

(CX-196, col. 2, lns. 26-35 (emphasis added).) FIG. 1[29] of the '279 patent displays the CPU 56 receiving the following inputs: throttle position 22, engine speed 28, clutch/clutch operator 30, transmission input speed 32, transmission output speed 36, anti-lock system 42 and brake applied 38, as well as "information from a shift control assembly 58." (CX-196, FIG.1; see id. at col. 3, lns. 65-68 (describing interaction between CPU 56 and shift control assembly 58).) Therefore, the administrative law judge finds that the function is to receive multiple input signals, one of which must be an input signal relating to the speed of the transmission output shaft.

As for the structure corresponding to the claimed receiving function, the specification discloses that the devices for detecting said inputs "supply information to or accept commands from a central processing unit or control 56." (CX-196 at col. 3, lns. 60-62 (emphasis added).) The '279 patent further teaches that this feature of receiving input signals by the CPU is known in the art, and incorporates patents by reference which show this feature. (See CX-196, col. 1, lns. 44-49.) For example, U.S. Patent No. 4,551,802 indicates that it is known in the art to receive as inputs, signals from a "sensor indicating the present transmission output shaft speed." (CPFF 118 (undisputed).) The specification also states that the method for "sensing a wheel lock-up condition and modifying the control algorithms in response thereto ... is accomplished by providing the electronic control unit with input means for receiving a signal indicative of a wheel lock-up...." (CX-196, col. 2, lns. 36-38, 48-50 (emphasis added).) Moreover, neither the staff

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[29] The '279 patent describes FIG. 1 as "a schematic illustration of the components and interconnections of the automatic mechanical transmission control system of the present invention." (CX-196, col. 3, lns. 9-11.)

nor respondents objected to complainant's proposed construction of the corresponding structure, which includes input connections or an interface of the CPU 56 as being part of the structure disclosed for the claimed receiving means. (See Staff and Respondents' Responses to CPFF 117.) Hence, the administrative law judge finds that the '279 patent teaches that the structure corresponding to the receiving function is the central processing unit 56 with input means for receiving said input signals.

While respondents argued that "the '279 patent discloses a processor 56 programmed with an algorithm to receive input signals and sensors for sending input signals to the processor as the structure corresponding to the function of receiving plurality of input signals...," the portion of the specification respondents cited states:

> The above mentioned AMT system devices supply information to or accept commands from a central processing unit or control 56. The central processing unit 56 may include analogue and/or digital electronic logic hardware or, preferably is microprocessor based and utilizes logic in a software mode.

(CX-196, col. 3, lns. 60-65 (emphasis added); see RRSPFF 96 (emphasis added), citing CX-196, FIG. 1; col. 3, lns. 60-65; col. 4, lns. 10-13.) Moreover, the '279 specification also provides that the CPU 56 "receives input signals ... in accordance with a program of predetermined logic rules." (CX-196, col. 16-18 (emphasis added).) The administrative law judge rejects respondents' argument that "sensors for sending input signals" are part of the corresponding structure relative to the receiving means element. The function is to receive input signals. Said sensors (e.g., 22, 28, 32, 36, 38, 54, 58) "supply information to or accept commands from" the CPU 56, but do not receive input signals as said signals have been described in the '279 specification. (CX-196, col. 3, lns. 60-61 (emphasis added); see id. at col. 3, lns. 65-67.)

2. The claimed clause "means for processing said input signals in accordance with a program to provide a predetermined gear ratio for a given combination of input signals and for generating command output signals whereby said transmission system is operated in accordance with said program"

In issue are the proper interpretation of the function and structure corresponding to the preamble "means for processing..." limitation. Complainant argued that the claimed function is "'processing said input signals...' and the corresponding structure described in the '279 patent is a microprocessor." (CPFF 120.)

Respondents argued that complainant's CPFF 120 is "[i]ncomplete and misleading" (ROCPFF 120; ROCPFF 120A.) It is argued that the specification confirms that the means element recites two functions, processing said input signals and generating command output signals; and that according to the plain and ordinary meaning of the "generating command output signals..." limitation, said "generating..." limitation should be construed as "signals produced by and emanating from the processing unit that direct a change in the gear ratio of the transmission." (RBr at 14-15; see RPFF 118-30; RRCPFF 120.) Respondents further argued that the structure necessary to perform the processing and generating functions is the processing unit and the algorithms or logic rules that generate said output signals "to be sent to the transmission operators that change the gear ratio combination selectably engagable between the transmission input shaft and the transmission output shaft." (RBr at 16; see RPFF 116, 142-46.)

The staff did not object to CPFF 120. It argued that the recited function includes selecting predetermined gear ratios and providing output signals to select said predetermined gear ratios. (SBr at 8-9.) As for the corresponding structure, the staff argued that the central processing unit 56, using computer software logic or algorithms, senses input signals and uses

the logic rules of the software to provide output signals to select a predetermined gear ratio. (Id; see SPFF 97-102.)

As to the claimed function, the '279 specification discloses that "[t]he purpose of the central processing unit 56 is to select in accordance with the program, i.e., predetermined logic rules and current or stored parameters, the optimum gear ratio in which transmission 11 should be operating and, if necessary, to command a gear change or shift in the selected optimal gear ratio based upon the current and/or stored information." (CX-196 at col. 4, lns. 23-37 (emphasis added).) Moreover, the parties agree that the limitation directed to "a program to provide a predetermined gear ratio for a given combination of input signals" refers to software operating inside the central processing unit to provide output signals to select a predetermined gear ratio based on the logic or algorithm in the software program. (See ROSPFF 101; Tr. at 3609; COSPFF 101 (no objection).) Hence, the administrative law judge finds that the function of the aforementioned preamble means element is to select a predetermined gear ratio based on the received input signals and use the logic rules of the software to issue command output signals based on said selected predetermined gear ratio.

With respect to the corresponding structure associated with the processing and generating functions, it is undisputed that the CPU receives input signals and uses the logic rules of the software to then provide a predetermined gear ratio. (See SPFF 98 (undisputed).) The parties also agree that the "program to provide a predetermined gear ratio for a given combination of input signals" limitation refers to software operating inside the central processing unit to provide output signals to select a predetermined gear ratio based on the logic or algorithm in the software program. (See ROSPFF 101; Tr. at 3609; COSPFF 101 (no objection).) Such

software, generally including calibration tables or some other algorithm for selecting actual gear ratios, is located in the CPU to provide a predetermined gear ratio for a given combination of input signals and for generating command output signals, whereby the transmission is operated in accordance with the embedded software program. (See SPFF 102 (undisputed), citing Davis, Tr. at 2695-96.) Moreover, the '279 specification discloses that "[t]he purpose of the central processing unit 56 is to select in accordance with the program, i.e., predetermined logic rules and current or stored parameters, the optimum gear ratio in which transmission 11 should be operating and, if necessary, to command a gear change or shift in the selected optimal gear ratio based upon the current and/or stored information." (CX-196 at col. 4, lns. 23-37 (emphasis added).) Therefore, the administrative law judge finds that the central processing unit 56, including the logic or algorithm of the software operating inside the central processing unit, is the structure disclosed in the '279 specification for performing the recited processing and generating functions.

While complainant argued that the corresponding structure for the processing means limitation is described in the '279 patent as a microprocessor, the administrative law judge finds that the portions of the specification complainant relies upon for this assertion disclose features and functions of the preferred embodiment for the central processing unit 56. (See CPFF 120, citing CX-196, col. 1, lns. 26-48; col. 3, lns. 60-65; col. 4, lns. 29-36.) The first portion of the '279 specification complainant cites describes the prior art and states that "[e]lectronic control systems utilizing discrete logic circuits and/or software controlled microprocessors for automatic transmissions ... are known in the prior art." Said portion also states that the '279 patent incorporates by reference examples of automatic transmission control systems including said

software controlled microprocessors. (CX-196, col. 1, lns. 26-48 (emphasis added); see ROCPFF 121 ("Respondents do not object with respect to using a microprocessor for automatic shifts being well known in the art.").) The following portion of the '279 specification complainant relies on describes the preferred embodiment of the CPU: "[t]he central processing unit may include analogue and/or digital electronic logic hardware or, preferably, is microprocessor based and utilizes logic in a software mode." (CX-196, col. 3, lns. 62-65 (emphasis added).) As to the portion of column 4 of the '279 specification complainant cited, said portion is directed to "[t]he various functions to be performed by CPU 56, and a preferred manner of performing same..." and not the structure corresponding to the means limitation in issue. (CX-196, col. 4, lns. 29-30.) Hence, the administrative law judge rejects complainant's argument that the corresponding structure for the preamble limitation "means for processing said input signals ... and for generating command output signals..." is limited to a microprocessor.

3. The claimed clause "means associated with said transmission system effective to actuate said transmission system to effect engagement of one of said gear ratio combinations in response to said output signals from said processing unit"

The parties dispute the function as well as the structure of the aforementioned means limitation. Complainant argued that the claimed function is "actuating the transmission to effect a gear ratio combination" and that the structure of transmission operator or actuator 34 shown in Figure 1 corresponds directly to said actuating function. (CPFF 123; see CBr at 37-38.)

Respondents argued that CPFF 123 is "[i]naccurate and vague" (ROCPFF 123.) It is argued that the claimed function is "to cause the transmission operators or actuators to move the gears from the currently engaged ratio to the selected gear ratio." (RPFF 144.) As for the

structure corresponding to said claimed function, respondents argued that the means limitation "is referring to the transmission operator 34, which according to the '279 specification, executes the operations in response to command output signals from the processing unit and which causes the transmission gears to move into the selected gear ratio." (RPFF 141 (citations omitted).) Respondents also argued that the structure necessary to accomplish the function of generating transmission gear change command output signals is the processing unit and the algorithms or logic rules that generate command output signals to be sent to the transmission operators that change the gear ratio combination selectably engageable between the transmission input shaft and the transmission output shaft. (RRCPFF 123B.)

The staff argued that the claimed function is to "actuate" the system to effect gear changes in response to output signals from the processing unit; and that the Figure 1 "'operators 26, 30, 34, 50 and 52, which may be of any known electrical, pneumatic or electropneumatic type executing operations in response to command signals from processing unit 56' are the structures corresponding to the claimed function." (SBr at 9, citing SPFF 103.)

Claim 15 does not define "actuate" or "effect" and the '279 patent specification also fails to define those words as they are used in the preamble means limitation. The dictionary definition of "actuate" is "1: to put into mechanical action or motion 2: to move to action." WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY 54 (1984). "Effect" is defined as "1: To cause to come into being 2 a: to bring about often by surmounting obstacles: ACCOMPLISH ... b: to put into effect...." Id. at 397. Moreover, the specification teaches that the purpose of the central processing unit 56 is "to command a gear change or shift into the selected optimal gear ratio based upon the current and/or stored information." (CX-196, col. 4, lns. 26-28;

see also Davis, Tr. at 2695-96.) Hence, the administrative law judge finds the function of the means limitation is to put the transmission system into mechanical action to cause engagement of a gear ratio combination in response to command output signals from the CPU.

As for the structure corresponding to the actuating function, the '279 specification states that transmission operator 34 "accept[s] commands from a central processing unit or control 56." (CX-196, col. 3, lns. 61-62.) While the '279 specification teaches that operators 26, 30, 34, 50 and 52 also respond to commands from CPU 56, as the staff has argued, the specification specifically describes transmission operator 34 as "being effective to shift the transmission 11 into a selected gear ratio...," and thus accomplishes the function of putting the transmission system into mechanical action to cause engagement of a gear ratio combination in response to command output signals from the CPU. (CX-196, col. 3, lns. 39-40.) Thus, the administrative law judge finds that the transmission operator 34 is the structure disclosed in the '279 patent specification corresponding to the aforementioned actuating function.

4. The claimed clause "means for sensing the presence of wheel lock-up condition, and, if and as long as the presence of a wheel lock-up condition is sensed"

In issue is the function as well as the corresponding structure of the aforementioned means limitation. While it is undisputed that the "means for sensing the presence of a wheel lock-up condition" limitation should be construed in accordance with 35 U.S.C. § 112, ¶ 6, the parties dispute whether "and, if and as long as the presence of a wheel lock-up condition is sensed" is a separate means element from the "means for sensing the presence of a wheel lock-up condition" limitation. (See RPFF 148 (undisputed); CORPFF 150 (disputing interpretation of "and, if and as long as the presence of a wheel lock-up condition is sensed").) Complainant

argued that the recited function in the body of claim 15 is to sense the presence of a wheel lock-up condition; that the use of the indefinite article "a"when used in patent claims means one or more in claims containing open-ended transitional phrases such as "comprises" or "characterized by"; that "the claim limitation 'a,' without more, requires at least one"; and that the proper meaning of the claimed function is sensing a wheel lock-up condition and not all wheel lock-up conditions.[30] (CBr at 38-39.)

As to the structure corresponding to the claimed function, complainant argued that the specification discloses alterative embodiments for sensing the presence of wheel lock-up condition; that said embodiments include an ABS system and/or logic for determining the presence and absence of a wheel lock-up condition; and that the sensing function is completely unrelated to engaging or disengaging the master clutch. (CBr at 39; CRBr at 6, 8; see CPFF 154, 157.) While complainant did not address the "and, if and as long as the presence of a wheel lock-up condition is sensed" element separately in its post-hearing briefing, at closing arguments, complainant argued that said element is a portion of the "means for sensing the presence..." limitation and that no additional corresponding structure, aside from that necessary to sense the presence of a wheel lock-up condition, is necessary to detect the termination of a wheel lock-up

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[30] In their post-hearing reply brief, respondents stated that:

> Complainant similarly misconstrues Respondent's position when it argues that Respondents read the claim as requiring sensing 'each,' 'every' or 'all' wheel lock up conditions. It is not Respondents' position that claim 15 requires the control system to detect 'each' and 'every' wheel lock up condition that 'exists,' nor is it Respondents' position that the control system must react to 'all' wheel lock up conditions that 'exist.'

(RRBr at 14 (citations omitted).)

condition.[31] (Tr. at 3617; see CRRPFF 151.)

Respondents argued that the claimed function is sensing the presence of a wheel lock-up condition; that the claim language and specification indicate that the limitation requires more than the original means for sensing the presence of a wheel lock-up condition; and that said limitation necessarily requires the function of sensing the point at which the wheel lock-up condition terminates. (RBr at 18-19.) It is argued that the logic rules illustrated in Figures 2a and 2b of the '279 patent include "a multi-step process that first looks for an indication that the wheel lock up event may have ended then verifies that termination"; that the patent teaches away from simply relying upon the absence of the signal that was used to originally detect the presence of a wheel lock-up condition (RPFF 152, 154); and that in an Amendment After Allowance, the applicant's attorney argued that the remaining claims, including asserted claim 15, were patentable over the prior art because the prior art "'does not disclose the concepts of Applicant's method for sensing (wheel lock) termination and/or prohibiting shift commands during a skid.'" (RBr at 19-20, citing RPFF 155.)

As to the corresponding structure, respondents argued that the specification recites two alternative structures for performing the sensing function; and that said structures include the vehicle anti-lock braking system (ABS) if the vehicle is provided with such an ABS or alternatively "differentiating the signal from the transmission output sensor 36 and comparing that signal to a reference signal corresponding or related to a reference signal corresponding or

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[31] Complainant further argued that the '279 patent's skid logic is based on the assumption that the vehicle is actually in a wheel lock-up condition caused by the operator stepping hard on the brake pedal; and that the '279 patent teaches that a wheel lock-up condition is sensed when excessive brake force is being applied on a slippery surface and the throttle pedal 24 is not being applied.

related to the maximum possible rate of deceleration of the output shaft when the tires are maintaining a rolling friction with the road." (RBr at 18; see RPFF 149.) Respondents further argued that the structure corresponding to the detecting the termination of the wheel lock-up condition function is not the same structure used to detect the presence of the wheel lock-up condition; and that inventor Cote testified that only one multi-step algorithm was developed to detect the termination of the wheel lock-up condition, which was described in detail in the patent specification and complainant's internal document concerning the invention. (RBr at 19-20; RPFF 150-54, 156-59; see CX-196 col. 5, ln. 32 to col. 6, ln. 9; RRCPFF 126-126D.)

The staff argued that the claimed function is sensing the presence of a wheel lock-up condition. (SBr at 11.) As to the "and, if and as long as the presence of a wheel lock-up condition is sensed" element of the means limitation, the staff argued that the claim uses the same terminology directed to initially sensing a wheel lock-up as is used for later determining the cessation or continued existence of wheel lock-up; that the specification teaches two methods for sensing a wheel lock-up and its continued presence, viz. an ABS system and the other based on a formula for output shaft speed as shown in Figure 2A and 2B; that the '279 prosecution history, specifically an office action issued on or about January 14, 1988, confirms that the PTO clearly believed that the claim term "presence" alone sufficed to cover both the existence and termination of wheel lock-up. (SBr at 10-11; see SRBr at 1-2.)

With respect to the corresponding structure, the staff argued that the antecedent for "said processing unit" is the preamble automated control system, the structure of which is the central processing unit 56 of Figure 1; that "[t]hus, this claim is directed to automated control systems and does not relate to semi-automated mechanical transmission control systems or manual

transmission control systems"; and that an ABS system that senses the existence of wheel lock-up is one corresponding structure in the specification for the claimed function. (SBr at 9.)

The parties do not dispute the claimed function includes at least sensing the presence of a wheel lock-up condition and that a wheel lock-up condition is also known as a skid.[32] (Tr. at 3251; SRCPFF 137.) With respect to the sensing function, the '279 patent specification teaches that "the present invention relates to a method for controlling a vehicle AMT system including sensing or detecting of a skid or wheel lock-up condition...." (CX-196, col. 1, lns. 20-23 (emphasis added).) The '279 specification also states that:

> In the event of a wheel lock-up or skid condition, it is important that the AMT system control logic be provided with a method to detect such conditions.... Sensing of an actual or impending wheel lock-up condition by the AMT central processing unit 56 is relatively simple and may comprise....

(CX-196, col. 4, lns. 37-51 (emphasis added).) Further describing the sensing function of claim 15, the '279 patent specification states:

> [T]he central processing unit 56 receives various input signals and processes these and/or stored information in accordance with a program of predetermined logic rules to issue command output signals for operation of the AMT system 10. Periodically, preferably at least once during each period of time in which the various mechanical actuators can react to a command output signal, the logic will verify the existence or non-existence of a wheel lock-up condition and, if necessary, adopt a set of logic rules or method of operation tolerant to said sensed condition.

(CX-196, col. 6, lns. 16-26.) Thus, the administrative law judge finds that the '279 patent specification discloses that the claimed function is sensing the presence of a wheel lock-up condition.

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[32] The output shaft speed is an accurate representation of vehicle speed in the absence of a wheel lock-up condition, but is not an accurate representation of vehicle speed during a wheel lock-up condition. (See CPFF 135-36 (undisputed).)

While respondents argued that the "and if and as long as the presence of a wheel lock-up condition is sensed" portion of the claim is a separate means element that requires the function of sensing the point at which the wheel lock-up condition terminates, said claim 15 does not refer to sensing the termination of a wheel lock-up condition. (See CX-196, col. 10, lns. 19-51.) Rather, the claimed function includes sensing the presence of a wheel lock-up condition and is consistent with the prosecution history of the '279 patent. With respect to the prosecution history, on or about January 14, 1988, the PTO Examiner issued an office action rejecting the pending claims of the '279 patent application:

> The breadth, and meaning of the following claim language is vague and indefinite 'presence or absence' (claim 1). The term absence appears redundant in view of the claims which follow. The claims taken as a whole react, modify in the presence of a wheel lock signal. On the other hand in the absence of anti-lock signal there is no modification needed, it would then appear that the system is operating to specification. Therefore, the term absence appears to be redundant.

(CX-197 at EA 99640 (emphasis added).) In light of said rejection the administrative law judge finds that the PTO believed that the claim term "presence" alone sufficed to cover both situations where a wheel lock-up condition was or was not present. (CX-197 at EA 99413-14.) Thus, the Examiner considered the function of sensing the presence of a wheel lock-up condition separate from other claim limitations in the application directed to the function of sensing the termination of a wheel lock-up condition. Thereafter, in an amendment mailed April 12, 1988, complainant removed the term "or absence" from the pending claims and stated that "the present invention involves an AMT control method or system which, independently or in cooperation with an ABS system, senses an impending wheel lock condition and responds in a specific manner." (CX-197 at EA 99650-51 (emphasis added).)

As support for respondents' position that the claimed function of claim 15 includes sensing the termination of a wheel lock-up condition, respondents further relied on "an Amendment After Allowance, in which the applicant sought to cancel certain claims as unpatentable over the prior art...." (RPFF 115.) In said amendment, it is undisputed that the applicant's attorney argued that the remaining claims, which included presently asserted claim 15, were patentable over the prior art because the prior art "does not disclose the concepts of Applicant's methods for sensing (wheel lock) termination and/or prohibiting shift commands during a skid." (CX-197 at EA 99707-08 (emphasis added).) However, said amendment added method claim 24 that ultimately issued as claim 1 of the '279 patent, which contains the limitation "sensing the presence of a wheel lock up condition; and if the presence of a wheel lock-up condition is sensed, ... processing said input signals to determine if previously sensed existing or impending wheel lock conditions have terminated...." (CX-197 at 99705-06 (emphasis added); accord CX-196, col. 7, lns. 18-24.) The application also included original method claim 12[33] that, at the time of the amendment, depended from the newly-added claim 24 and contained additional limitations directed to sensing the termination of a wheel lock-up condition:

> said determining if the presence of a wheel lock-up condition has terminated additionally comprising: comparing the current value of the input signal indicative of output shaft speed to a predetermined percentage of the initial value of said, input signal indicative of the rotational speed of the output shaft; and returning to the non-wheel lock condition control algorithms if said current input signal value exceeds said percentage of said initial input signal value.

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[33] Originally filed claim 12 ultimately issued as claim 13 of the '279 patent, which depends from claim 1of the '279 patent. (See CX-197 at EA 99413; CX-196, col. 9, ln. 51 - col. 10, ln. 16.)

(CX-197 at EA 99413-14 (emphasis added); accord CX-196, col. 10, lns. 6-16.) Thus, the administrative law judge finds that the fact that applicants' attorney argued that the '279 claims were patentable over the prior art because the prior art did not disclose, inter alia, "the concepts of Applicants' methods for sensing (wheel lock) termination" does not support respondents construction of the "if and as long as the presence of a wheel lock-up condition is sensed...," given that the pending claims, at the time the Amendment After Allowance was submitted, contained limitations directed to determining if a previously-sensed wheel lock-up condition had terminated and given the fact that in the amendment it was argued that the prior art did not disclose either sensing (wheel lock) termination or prohibiting shift commands during a skid.

As for the structure corresponding to the claimed sensing function, the parties also agree that the '279 patent specification teaches two methods for sensing the presence of a wheel lock-up condition, one based on the anti-lock braking system (ABS system)[34], if the vehicle is equipped with an ABS system, and the other based on an algorithm or formula for sensing the speed of the transmission output shaft. (See COSPFF 108; ROSPFF 108; see also SPFF 105 (undisputed).) In addition, neither complainant nor the staff objected to respondents' proposed finding of fact 149, which states that:

> The ['279 patent] specification identifies two, and only two, alternative structures for performing the sensing function: receiving an input signal from the vehicle anti-lock braking system if the vehicle is provided with such an ABS system, or alternatively, differentiating the signal from the transmission output sensor 36 and comparing that signal to a reference signal corresponding or related to the maximum possible rate of deceleration of the output shaft when the tires are maintaining a rolling friction with the road.

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[34] An anti-lock braking system commonly is referred to as an ABS system. (SPFF 112 (undisputed).)

(RPFF 149 (undisputed) (emphasis added); see CX-196, col. 4, lns. 50-60.) The first portion of the '279 patent specification respondents' rely on for said proposed finding clearly states that "[s]ensing of an actual or impending wheel lock-up condition by the AMT central processing unit 56 is relatively simple and may comprise, in the alternative...." (CX-196, col. 4, lns. 50-53 (emphasis added).) The '279 specification further provides that "the electronic control unit [includes] input means for receiving a signal indicative of wheel lock-up, such as from a vehicle anti-lock system, and/or includes logic to process the input signals to determine the presence or absence of a wheel lock-up condition." (CX-196, col. 2, lns. 48-53 (emphasis added).) Thus, the administrative law judge finds that the structure disclosed in the specification for performing the sensing function is the central processing unit 56 and either (1) an ABS system or (2) an algorithm dependent on the speed of the transmission output shaft.

5. The claimed clause "prohibiting said processing unit from generating all transmission gear change command output signals"

The parties dispute the function as well as the corresponding structure of the prohibiting function. With respect to the claimed "prohibiting," complainant argued that the limitation requires prohibiting gear change command output signals whereby, in response to a detected skid condition, "the central processing unit [is prohibited] from making any shift decisions and attempting a transmission gear change." (CBr at 39-40; CPFF 141, 147-48, 150-52.) As to the structure corresponding to the claimed "prohibiting," complainant argued that the '279 specification describes operational logic; and that said operational logic, in response to a detected skid condition, inhibits the central processing unit "from making any shift decisions and attempting a transmission gear change." (CBr at 39-40; see CPFF 141, 147-48, 150-52.)

Complainant further argued that said "prohibiting" and its corresponding structure "has nothing to do with engaging or disengaging the master clutch." (CBr at 39-40; CRBr at 7-8.)

Respondents argued that the "prohibiting said processing unit..." limitation should be construed in accordance with its ordinary meaning as "preventing any signals whatsoever from being produced by and emanating from the processing unit that command or direct the transmission operators to effect a change in the gear ratio of the transmission"; and that regardless of whether the administrative law judge construes neutral as a gear[35], that said claim limitation "as properly construed prohibits all command output signals generated during each step of [the] gear change process, including command output signals to change from one gear to neutral, from neutral to another gear, or from one gear ratio through neutral to another gear ratio." (RBr at 21; see RRBr at 15 (arguing claim 15 requires that "any time a wheel lock up condition is sensed, the control system must prohibit the processing unit from generating all gear change command output signals..."); RRSPFF 119; CX-196, col. 2, lns. 53-57 and col. 6, lns. 16-34.)[36] As to the corresponding structure for the claimed function, respondents argued that the

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[35] Respondents argued that a shift to neutral requires generation of gear change command output signals, which issue from the processing unit and command the transmission operators to move from an engaged gear to neutral (RRSPFF 117, 117A); and that "regardless of whether neutral itself is a 'gear,' a state of operation (as the staff argued), or an intermediate phase between one engaged gear and another engaged gear, a proper interpretation must recognize that a shift to neutral requires the processing unit to send gear change command output signals to the transmission operators." (RRBr at 21-22; see RPFF 121-30.)

[36] Respondents further argued that complainant, in its post-hearing brief, implicitly acknowledged that respondents' construction of the claimed term "gear change command output signals" is correct, "namely that the term refers to the output signals sent from the processor to the transmission operators that execute the gear change" (RRBr at 19; see RRCPFF 121, 123); that claim 15 covers only prohibiting the processing unit from generating the transmission gear change command output signals and is not "directed to prohibiting shift decisions, prohibiting selection of a gear ratio combination, or prohibiting generation of any other signal that is internal

specification describes logic rules for performing the "prohibiting"; and that the structure for prohibiting also includes "necessarily a processor and clutch or other completely disengagable [coupling] in a disengaged condition (a completely disengagable coupling is another element of the preamble at CX 196 col. 10, lns. 29-30)." (RBr at 22-23; see RPFF 180-82.)

The staff argued that "the open-ended claim language simply states that if the system senses 'a' wheel lock-up condition," then the claimed "prohibiting" is to "block all transmission gear change command output signals, language that is broad enough to allow for the system to sense some wheel lock-up conditions without also blocking gear change command signals"; that a "gear change" is the conversion inside the transmission from one engaged gear into another engaged gear; that the '279 specification confirms that the patentees equate a gear change with a shift into a new gear ratio; and that neutral is a mode of operation for a transmission as opposed to a gear. (SRBr at 12-14.) The staff further argued that complainant should be estopped from now asserting that moving the transmission to neutral is a gear change requiring a gear change command output signal, a position contrary to the position complainant relied on in successfully refuting respondents' motion for partial summary determination of non-infringement of the '279 patent. (See SBr at 14-22.) As to the structure corresponding to the "prohibiting," the staff argued that "the disclosed structure for modifying gear change decisions in light of a skid is inhibiting 'the central processing unit 56 from attempting a transmission gear change.'" (SBr at 13.) The staff further argued that claim 15 is not directed to decoupling the driveline in response to a wheel lock-up condition and thus the structure corresponding to the "prohibiting" does not

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to the processing unit" (RRBr at 21); and that the staff's construction of gear change command output signals "ignores the distinction made in the patent specification between gear change command output signals and other signals generated during the shift process." (RRBr at 21.)

include a released or disengaged clutch or coupling. (SRBr at 3.)

The parties do not dispute that the claim term "prohibiting" should be accorded its plain and ordinary meaning, namely prevent or precluding. (RPFF 160 (undisputed).) Claim 15 also includes the term "generating all transmission gear change command output signals," which term is not expressly defined in the '279 specification. Consistent with its ordinary meaning, the word "generate" means to bring into existence or produce. WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY at 510 (1984). "Command" means to direct or order. Id. at 264. "Change" means to make different in some particular and in claim 15 is modified by the claim term "gear." WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY at 225. Hence, the administrative law judge finds that the limitation "prohibiting said processing unit from generating all transmission gear change command output signals" means preventing all signals from being produced by the processing unit that direct the transmission operators to cause a change in the gear ratio of the transmission. Said construction is consistent with the disclosure of the '279 specification, which states, inter alia, that "[u]pon sensing of a wheel lock-up, the control method ... ceases all gear changing operations thus ... preventing undesirable downshifting of the transmission" and that "[t]he operational logic, or method of controlling the AMT system 10 in response to the detecting of a skid condition is ... to inhibit the central processing unit from attempting a transmission gear change." (CX-196, col. 2, lns. 53-58; col. 5, lns. 3-8 (emphasis added).)

While the staff argued that the '279 specification confirms that the patentees equate a gear change with a shift into a new gear ratio, that a shift to neutral is not a "gear change" and that therefore, a shift to neutral would not require a gear change command output signal, the

portion of the '279 specification the staff relies upon states:

> The central processing unit 56 also receives information from a shift control assembly 58 by which the vehicle operator may select a reverse ®), neutral (N) or forward drive (D) mode of operation of the vehicle.

(CX-196, col. 3, ln. 65 to col. 4, ln. 1.) The administrative law judge finds that this portion of the '279 specification, which generically describes "mode[s] of operation" does not support the staff's construction of a "gear change" or "gear change command output signal." The '279 specification also teaches that "[t]he purpose of the central processing unit 56 is ... to command a gear change or shift into the selected optimal gear ratio...." (CX-196, col. 4, lns. 22-27.) In addition, the '279 patent incorporates by reference, inter alia, the U.S. Patent No. 4,527,447, which discloses a central processing unit that commands gear changes:

> in the sequence comprising shifting the main transmission section to neutral, then commanding a shift in the auxiliary transmission section to engage the desired auxiliary transmission gear ratio and thereafter commanding a shift in the main transmission section to engage the desired main transmission ratio. The central processing unit thus commands transmission shifts in a sequence....

(SPFF 147 (undisputed).) Moreover, "[t]he Staff does not deny that moving the transmission into neutral, thereby disengaging it, is a necessary part of commanding a gear change." (SBr at 21.) As indicated above, the ordinary meaning of "change" is to make different in some particular. Thus, based on the ordinary meaning of the word "change," a shift from one engaged gear ratio to neutral would constitute a "gear change." Consistent with this construction of gear change, complainant's expert Caulfield testified:

> Q. Is a shift into neutral a shift decision by the processor?
>
> A. A shift into neutral is a shift decision. In order to get to neutral, you have to come from something to something. So a shift into neutral requires a shift decision from the processor.

Q. Does it also include a gear changing operation?

A. A shift into neutral constitutes a gear changing operation because you came from something to neutral. So it does make up a neutral gear changing operation.

Q. A shift into neutral, does that require the transmission control unit in the FeedomLine system to generate command output signals?

A. A shift into neutral will require gear change command output signals.

Q. Have you always taken that position in this investigation, Dr. Caulfield?

A. Initially, when I first wrote my report, I didn't consider neutral as a gear change because I couldn't consider or even start to see neutral as being, in fact, a gear. It's got not gear teeth. It's got no gear ratios. So I could never consider neutral as a gear. I still can't. Now, shifting from something to something where my thought process was – is neutral a gear change? Well, certainly if you shift, let's say from 3 to 6, triple upshift, you shift from 3 to neutral, and then from neutral to 6. And certainly everybody will agree from 3 to 6 is a gear change. If 3 to neutral is not a gear change, and neutral to 6 is not a gear change, then you went through two not a gear changes to get to a gear change, which gets very confusing. So I think it's best, for purposes of analysis, to adopt the position neutral is a gear change. It's at least part of a gear change. But sorting through all that, I don't think all that matters much. Neutral does require, in other words, to make a shift, requires a gear change command output signal. To make a shift, you have to go through neutral. So neutral will at lease require a gear change command output signal.

Q. Based on - -

A. Whether or not you consider it a gear, a full shift or not, you still, to get from a gear into neutral will require a gear change command output signal.

Q. Based on your review of Dr. Davis's expert report and his deposition testimony, do you know if Dr. Davis agrees with you regarding whether neutral, a shift to neutral requires a gear change?

* * *

A. I think everybody agrees at this point that a shift into neutral is a gear change or will at least require a gear change command output signal.

(Tr. at 1399-1402 (emphasis added).) Respondents' expert Davis also testified that a shift to

neutral is a gear change or at least part of a gear changing operation. (Tr. at 2835.) Caulfield further testified that "[i]f you don't believe neutral requires a gear change command output signal, you basically can never make a shift." (Tr. at 1706; see Caulfield, Tr. at 1707 ("shifting to neutral requires a gear change output command").) Accordingly, the administrative law judge finds that a shift to neutral requires a "gear change command output signal," a signal from the processing unit that directs the transmission operators to cause a change in the gear ratio of the transmission.

As to the structure corresponding to the claimed "prohibiting," it is undisputed that the antecedent for "said processing unit" in the body of claim 15 is the preamble control system, the structure of which is the disclosed central processing unit 56 in FIG. 1. (SPFF 104 (undisputed).) The '279 specification states that "[t]he operational logic, or method of controlling the AMT system 10 in response to the detecting of a skid condition is ... to inhibit the central processing unit from attempting a transmission gear change." (CX-196, col. 5, lns. 3-8 (emphasis added).) The specification further provides that "[t]he central processing unit 56 may include analogue and/or digital electronic logic hardware or, preferably, is microprocessor based and utilizes logic in a software mode." (Id. at col. 3, lns. 62-65.) Therefore, the administrative law judge finds that the structure disclosed for performing the claimed prohibiting function is the logic of the central processing unit.

Respondents argued that the corresponding structure for the claimed "prohibiting" also includes a clutch or other completely disengagable coupling in a disengaged condition. It is a fact that the preamble of claim 15 describes a vehicular automatic mechanical transmission system comprising, inter alia, "a disengagable coupling drivingly interposed said engine and said

transmission output shaft...." (CX-196, col. 10, lns. 29-31.) The Summary of the Invention teaches that "[u]pon sensing of a wheel lock-up, the control method causes the vehicle clutch, or other completely disengagable coupling to be and remain disengaged and ceases all gear changing operations thus allowing the wheels to roll up to vehicle speed and preventing undesirable downshifting of the transmission." (CX-196, col. 2, lns. 53-59.) Other portions of the '279 patent specification teach releasing the clutch or coupling in response to a wheel lock-up condition. (See, e.g., CX-196 at col. 4, lns. 45-49; col. 5, lns. 3-8; col. 5, lns. 12-19.) However, claim 15 requires prohibiting, which the administrative law judge has found requires preventing all signals from being produced by the processing unit that direct the transmission operators to cause a change in the gear ratio of the transmission. Said "prohibiting" does not include releasing or disengaging the clutch or other disengagable coupling. Moreover, the '279 patent contains claim limitations, independent of the presently asserted claim 15, which require "said coupling to be immediately disengaged...." (See, e.g., CX-196, col. 7, lns 21-22 (claim 1).) Thus the administrative law judge finds that the corresponding structure for the claimed "prohibiting" of claim 15 does not include a clutch or other completely disengagable coupling in a disengaged condition.

B. Validity

1. Anticipation

Respondents argued that U.S. Patent No. 4,467,427 to Magnusson (the '427 patent) (RX-175) anticipates claim 15 of the '279 patent provided that a shift to neutral is not considered a gear change, but that if the administrative law judge construes a shift to neutral as a gear change,

then the '427 patent renders claim 15 of the '279 patent obvious. (RBr at 81-82.)[37] It is argued that U.S. Patent No. 4,039,061 to Pruvot et al (the '061 patent) (RX-306) anticipates said claim 15 under "[c]omplainant's claim instruction because it teaches sensing a wheel slipping using the signal from a pickup element of a device for preventing the wheels from being locked during a brake application," and also teaches "cancelling automatic shifts in two instances or modes when downshifting would otherwise occur if wheel slipping is detected." It is further argued that claim 15 is obvious in light of the combination of Magnusson and Pruvot et al. (RBr at 83; see RRBr at 67-68; RPFF 628-34.)

With respect to the '061 patent, complainant argued that the reference does not teach prohibiting all gear change command output signals in response to a wheel lock-up condition; that the '061 patent teaches prohibiting only certain shifts while others are permitted even if wheel slipping is detected; and that the '061 patent further fails to teach or suggest a "disengagable coupling drivingly interposed said engine and said transmission input shaft" as recited in the preamble of claim 15.[38] (CBr at 99; CRBr at 74.) As to anticipation it is argued that respondents and the staff misrepresented and misinterpreted the teachings of the '427 patent. (CRBr at 71-78.) Complainants also argued that respondents and the staff failed to show that the '279 patent is invalid under 35 U.S.C. § 103. (CRBr at 79.)

The staff argued that the '427 patent anticipates claim 15 of the '279 patent provided the

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[37] For applicable law, see V.B.1., supra.

[38] As to the '061 patent, complainant also contended that respondents failed to put any evidence into the record regarding the '061 patent, offered only an exhibit containing respondents' attorneys' work and that, accordingly, the Commission should not consider the '061 patent in any invalidity analysis. (CBr at 98-99.)

administrative law judge finds that a shift to neutral is not a gear change requiring a gear change command output signal, but that, in the alternative, if a shift to neutral is construed as a gear change, then the '427 patent renders claim 15 obvious. (See SBr at 74-77, 80.) The staff opposed respondents' argument that the '061 patent anticipates claim 15 because the '061 does not teach cancelling all transmission gear changes would be advantageous or necessary but rather teaches cancelling only two types of shifts during a wheel lock-up condition. (See SRRPFF 628, 631.)

With respect to respondents' and the staff's arguments that the '427 patent anticipates claim 15 of the '279 patent, said arguments are dependent on a claim construction for the terms "gear change" and "gear change command output signals," which the administrative law judge has rejected.[39] Thus, based on the proper construction of said claim terms, the administrative law judge finds that the '427 patent does not anticipate claim 15. Moreover, the administrative law judge finds that the '427 patent teaches away from claim 15 of the '279 patent because the '427 patent teaches, inter alia, generating a gear change command output signal to shift to neutral and thus does not prohibit the generation of all gear change command output signals as required in asserted claim 15.

Referring to respondents' argument that claim 15 of the '279 patent is anticipated by the '061 patent, the '061 patent, entitled "Automatically Controlling The Transmission Ratios Of An Automotive Vehicle Engine For Decreasing The Vehicle Speed," issued on August 2, 1977 based

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[39] In VII.A., supra, the administrative law judge has found that a shift from one engaged gear ratio to neutral would constitute a "gear change." He also found that a shift from one gear to neutral would require a gear change command output signal.

on application No. 267,208 filed on June 28, 1972.[40] (RX-306.) The disclosure of the '061 patent is incorporated by reference into the '279 specification as one of several exemplary automatic transmission control systems. (CX-196, col. 1, lns. 47-48.) Respondents' expert Davis testified regarding the teachings of the '061 patent:

> Q. And what does the '061 patent teach?
>
> A. What they're teaching here is a method of limiting the selection of gear ratios if a wheel lockup condition is sensed. And so what they do is at least some functions are disabled. And I am referring to the functions on column 4 of the '061 patent, pretty much the, most of the whole column there, it lists a series of functions.... And they at function 7, when it determines it has hit this wheel lock condition, the system will cancel automatically the functions 2 and 5, so it'll stop at least those shifts from occurring.
>
> * * *
>
> Q. So what does the '061 patent add to your invalidity analysis, if anything?
>
> A. Well, it adds the idea of cancelling the shifts in response to, in at least some shifts cancelling those gear selections in response to a wheel lockup event.

(Tr. at 2633-34 (emphasis added).)

Complainant's expert Caulfield also testified as to the teachings of the '061 patent:

> Q. Can you just briefly describe this '061 patent, CRX-81?
>
> A. Yes. '061 will basically, I'm sorry, 4,039,061 basically is a reference that will suspend on a brake condition, plus a number of other conditions, some gear change operations, but not all, so it will allow certain ones, it will reject others, particularly where I'm referring in Claim 4, lines 5 through 56.
>
> Q. How does the '061 patent relate to claim 15 of the '279 patent?
>
> A. Well, clearly, claim 15 doesn't allow any gear change command output signals. '061 is selective on which ones it doesn't want to allow and which

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[40] The '061 patent claims priority to application No. 71.28168 filed in France on July 30, 1971. (RX-306.)

ones it will allow.

* * *

Q. Do you have an opinion as to whether or not the '061 patent invalidates claim 15 of the '279 patent?

A. It would be my opinion that it does not.

Q. And this is because of why?

A. Well, number one, it's been referenced and cited by the prosecuting attorney, and the patent examiner has reviewed it. '061 teaches something completely different. It suspends some shifts from automatically happening in anti-lock condition and will allow others to happen in the anti-lock condition.

(Tr. at 3127-28 (emphasis added).)

Both Davis's and Caulfield's testimony is consistent with the '061 patent specification which teaches that the invention cancels certain shifts, but not all shifts in response to a wheel lock-up event. (See RX-306, col. 4, lns. 51-56.) However, asserted claim 15 contains the limitation "prohibiting said processing unit from generating all transmission gear change command output signals," which the administrative law judge construed as preventing all signals from being produced by the processing unit that direct the transmission operators to cause a change in the gear ratio of the transmission. Thus, the administrative law judge finds that the '061 patent does not anticipate asserted claim 15 because it teaches only prohibiting certain shifts and therefore, does not satisfy the limitation of claim 15 "prohibiting said processing unit from generating all transmission gear change command output signals."

2. Obviousness

Respondents argued that if a shift to neutral is considered a gear change, then the '427 patent renders claim 15 obvious; that the '427 patent teaches that, upon sensing wheel lock during braking, "the gear selection program of a control unit selects a shift to neutral, then

immediately terminates without making any further automatic gear selection"; that the shift to neutral in response to a sensed wheel lock-up condition taught in the '427 patent is the equivalent of the master clutch disengagement taught in the '279 patent; that the disadvantage of shifting to neutral is that it results in "freewheeling," which may be undesired; that the obvious alternative to freewheeling in neutral is to disengage the master clutch, which avoids freewheeling, but still removes the engine torque from the drive wheels; and that it would have been obvious to one ordinary skill in the art at the time of the '279 invention to replace the shift to neutral taught in the '427 patent with a disengaged the master clutch. (RBr at 81-83.) Respondents further argued that claim 15 is obvious in light of the combination of the '427 and '061 patents as both references are directed to controlling shifting of the transmission during a skid condition; and that either of said '427 and '061 patents "could be, but need not be, combined with" U.S. Patent No. 4,044,634 (the '634 patent) (RX-307) or U.S. Patent No. 4,361,060 (the '060 patent) (RX-308) to invalidate claim 15. (RBr at 84-85.) Respondents argued that the '634 patent relates to an automatic shift system for an AMT and "teaches calculating the acceleration of the transmission output shaft and compares this acceleration with upper and lower limits"; that the '060 patent "generally discloses the drive train components of a system for automating the control of a mechanical transmission"; and that Caulfield admitted that the prior art "teaches all of the elements of a system for automatic the control of a mechanical transmission required by the preamble of claim 15." (RBr at 85; see RRBr at 68-69; RPFF 600, 637-40.)

The staff argued that if the administrative law judge finds that a shift to neutral is a gear change then claim 15 would have been obvious in view of the '427 patent; that it is undisputed that selecting neutral and disengaging the master clutch are equivalent means to remove the

inertia of the engine from the rest of the drive train in order to allow the vehicle wheels to roll up to speed without interference from the engine; that prior to the invention of the '279 patent, it was widely known that a shift to neutral or "free wheeling" was dangerous because it was possible that the driver would not be able to reengage the transmission gear from neutral; that as an alternative, it is easier to reengage the master clutch as compared to reengaging gears inside the transmission; that a person of ordinary skill would have been motivated to substitute opening the clutch for selecting neutral in response to a wheel lock-up; and that [a]t a minimum, a person of ordinary skill would have been motivated to prohibit all shifts in response to a wheel lock-up condition without moving the transmission to neutral, thereby avoiding dangerous free wheeling." (SBr at 80-81.)

Complainant argued that respondents' obviousness position is based on an "erroneous assumption" that a person of skill in the art would have considered the '427 patent's teaching, viz. a shift to neutral when a wheel lock-up condition is sensed, an inappropriate response to a wheel lock-up condition because it would result in an illegal and unsafe "freewheeling" condition. Complainant also argued that respondents' and the staff's obviousness argument that a shift to neutral is equivalent to disengaging the master clutch to remove engine inertia from the drive wheels similarly fails because: (1) a shift to neutral is not equivalent to disengaging the master clutch; (2) even if a shift to neutral were equivalent to disengaging the master clutch, that fact does not mean there is any teaching, suggestion or motivation in the '427 patent to modify its teachings; and (3) the '427 patent teaches disengaging the master clutch and thus choosing to disengage the master clutch is not an alternative to shifting to neutral. (CRBr at 79, 83.) Complainant further argued that the '427 patent does not teach responding to a wheel lock-up

condition in an unsafe freewheeling state because a freewheeling state requires that the vehicle brakes are not applied; that instead, the '427 patent teaches shifting to neutral until the vehicle wheel speed reaches a stable condition following braking, the initial cause of the wheel lock-up condition; and that even if a shift to neutral during wheel lock-up resulted in freewheeling, a person of skill in the art would not have been motivated to substitute the shift to neutral with a disengaged master clutch. (CRBr at 81-82.) In addition, complainant argued that respondents offered no evidence to prove that the '427 patent teaches prohibiting all "shift decisions and gear changing operations" as required by claim 15 of the '279 patent; that respondents and the staff have failed to explain how disengaging the master clutch is an obvious alternative to shifting to neutral where the '427 patent already teaches disengaging the master clutch; and that "[b]y arguing that a person of ordinary skill in the art would have modified the '427 when the '427 taught an acceptable way to respond to a wheel lock-up condition, both Respondents and the Staff have engaged in prohibited hindsight analysis because they have failed to prove with clear and convincing evidence that there would be any motivation or suggestion to modify the '427 reference." (CRBr at 84-85.)

With respect to the '061 patent, complainant argued that the reference does not teach prohibiting all gear change command output signals in response to a wheel lock-up condition, which teaching complainant contended Davis admitted; that the '061 patent teaches prohibiting only certain shifts while others are permitted even if wheel slipping is detected; that the '061 patent further fails to teach or suggest a "disengagable coupling drivingly interposed said engine

and said transmission input shaft" as recited in the preamble of claim 15[41]; and that therefore, the '061 patent does not render claim 15 obvious. (CBr at 99; CRBr at 74.) Complainant further argued that the '060 patent does not teach or suggest the claim 15 means for sensing limitation; that the record contains no evidence as to what the '060 patent teaches about an AMT responding to a wheel lock-up as Davis offered no testimony regarding said reference; and that the '279 specification merely cites the '060 patent for an exemplary AMT control system, as well as conventional drive train components and controls therefor. (CBr at 100.) As to the '634 patent, complainant argued that the reference fails to suggest sensing a wheel lock-up condition; that respondents' expert Davis offered no testimony about the '634 patent; and that therefore, the '634 patent does not invalidate claim 15. (CBr at 101.)

In issue is whether U.S. Patent No. 4,467,427 (the '427 patent) renders claim 15 of the '279 patent obvious, as respondents and the staff have argued based on the administrative law judge's construction of said claim 15. The '427 patent, entitled "Method Of Preventing Erroneous Gear Selection In An Automatic Gear Selection System In Vehicles," issued on August 21, 1984 to Karl G. Magnusson on application No. 322,852 filed November 19, 1981.[42] (RX-175, the '427 patent.) The abstract of the '427 patent discloses that:

> The invention relates to a method for preventing, in a vehicle transmission coacting with a system for automatic gear selection, the selection of an operationally incorrect gear in the case where the [sic] a signal

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[41] As to the '061 patent, complainant contended that respondents failed to put any evidence into the record regarding the '061 patent, offered only an exhibit containing respondents' attorneys' work and that, accordingly, the Commission should not consider the '061 patent in any invalidity analysis. (CBr at 98-99.)

[42] The '427 patent claims priority to application No. 8008400 filed in Sweden on November 28, 1980. (RX-175.)

> representing a vehicle wheel rotational speed, e.g., during braking of the vehicle, does not constitute a correct representation of the vehicle speed. There is thus calculated in the system the wheel rotational speed change, which is compared with a predetermined retardation value. If the retardation limiting value is exceeded, an operative circuit or the like is activated for ensuring that an incorrect gear selection is prevented, e.g. by selecting neutral gear. For providing, particularly during pulsing braking of long duration a correct determination of when the wheel has returned to a stable state relative the substructure, the invention is distinguished in that the return to normal gear selection occurs only when the wheel speed has reached a given limiting value and the wheel speed change is less than a predetermined limiting value.

(RX-175, Abstract (emphasis added).) The Brief Description of the Invention states:

> The present invention has the task of providing, in accordance with the introduction to the description, a method which eliminates the risks of erroneous gear selection. With the said objective, the invention is distinguished in that energizing of the operative circuit is interrupted when the wheel speed represents a certain vehicle speed and the wheel speed variation calculated in the system is less than a predetermined value. By means of the inventive method, it is ensured that the system returns to normal gear selection function when a wheel, the speed of which is sensed and which is entirely or partially locked during braking, once again returns to a stabilized condition relative the substructure.

(RX-175, col. 1, lns. 36-50 (emphasis added).) The '427 patent further discloses that said "operative circuit or the like ... caters for the selection of a neutral gear position and/or triggers fault indication in an alarm means." (RX-175, col. 1, lns. 17-20.) Thus, the administrative law judge finds that the '427 patent teaches sensing a wheel lock-up condition. (See SPFF 398 (Figure 3 of the '427 patent discloses sensing a wheel lock-up condition in block 33.) (undisputed).) Moreover, the parties agree that sensing the presence and duration of a wheel lock-up was known before the invention claimed in the '279 patent. (SPFF 392 (undisputed) citing CX-196, col. 3, lns. 56-59; RX-175, '427 patent, col. 3, lns. 29-36, 50-58; Fig. 3 (the automatic gear selection process senses a wheel lock-up event); RX-306, U.S. Patent No.

4,039,061 (the '061 patent), Figure 4, col. 4, lns. 65-68 (depicting a governor receiving signals "emitted by the normal driving automatism device 8 and also by a wheel-slip signal via a switch 9 associated with the anti-lock brake device."); Caulfield, Tr. at 3084.)

Referring specifically to FIG. 3 of the '427 patent, Caulfield testified that the claimed method of the '427 patent reacts to a sensed wheel lock-up condition in the following manner:

Q. Dr. Caulfield, can you explain Figure 3 of the '427 patent, Exhibit RX-175?

A. Yes. Coming in through the top box - - I think it's 31. It looks like 31 because it's between 31 and 32 - - read the acceleration value. That means it's going to read the differential output shaft speed. It the acceleration value is greater than a predetermined retardation value, 33, you're going to get a yes/no condition. If you get a yes, it means that your shaft is slowing down too quickly. It's greater than a certain value. That means you're in an anti-lock condition. You get 35, which basically will store a signal indicating great retardation. And - - or store it in the speed retardation register. Here is what I was referring to earlier. Select neutral gear. And then as long as the neutral gear is selected, it will basically come down that line till it sees commands that it's over with to restore neutral. And then it will erase the values. It will look for the retardation. Unless the retardation is ended, it will basically resume the activity and then in 47 it will activate 'indicate selected gear.'

Q. Dr. Caulfield, is step 33 of Figure 3, is that a test to determine whether or not there's a wheel lock-up condition?

A. Thirty-three is a test to determine whether there is a wheel lock-up condition. You have to read the patent to get that. It's just looking for high retardation value. But if you read further into the specification, you can determine that they're talking, at least in one embodiment, of wheel lock-up condition because they're talking about pulsing.

Q. And in response to a wheel lock-up condition in step 33, does the system in the '427 patent do anything other than select neutral gear?

A. That's all it does.

Q. Is there more than one embodiment in the '427 patent regarding what it does, what the system does in response to a wheel lock-up condition?

A. No. I believe that's the only embodiment.

Q. Does the '427 patent prohibit shift decisions in response to a wheel lock-up condition?

A. The '427 patent doesn't really say prohibit shift decisions. You have to read it into select neutral gear. It's going to select and hold neutral. It's going to also have to prohibit shift decisions.

Q. Does it - - is - - in response to the wheel lock-up condition in step 33, is a shift decision prohibited at that point? In other words, the yes coming out of step 33.

A. It's not prohibited until it selected neutral gears. So I would say it's not prohibited until 36. It's going to make a gear change command output signal to select neutral gear. So it's not prohibited here. It's prohibited after you select neutral gear and hold neutral gear.

Q. Is the '427 patented system as we see in Figure 3, is that different from Claim 15 of the '279 patent?

A. Yes.

Q. And how is it different?

A. After the box 33 is sensed, the '279 system wouldn't allow the selection of neutral gear because it would have to generate a gear change command output signal. This system here basically senses anti-lock feature, if you read that in. And then generates a gear change command output signal to select neutral gear.

(Caulfield, Tr. at 1411-13 (emphasis added).) Consistent with this testimony that the claimed method, in response to a detected wheel lock-up condition, shifts to neutral and thereafter, prohibits further gear changes, the '427 specification states that "[a]fter step 35 there is an

operation step denoted 36, where selection of neutral gear is made, the gear change program thereafter being terminated by an operation step denoted 47...." (CX-175, col. 3, lns. 64-67 (emphasis added).) Respondents' expert Davis also testified that the '427 patent teaches shifting to neutral and thereafter preventing gear changes in response to a detected wheel lock-up condition. (Tr. at 2631; see Davis, Tr. at 2833.) Specifically, Davis testified:

> Q. Can you identify, in the '427 patent, where the means for prohibiting all gear change command output signals is?
>
> * * *
>
> A. Yes, I can. If you follow along in that Figure 3 in the flowchart, once it senses the wheel lock event at box or diamond 33, proceeds along the yes path, stops along 35 and stores the value of the signal for the retardation of the acceleration, and then it selects the neutral gear in box 36, and then it continues on down and bypasses all the rest of the flow diagrams down to the spot above, just above 47, box 47. And the stuff in the middle there is part of the kind of what I would call the termination routine, except for if you notice box 46 is the subroutine for the actual gear selection. And so this bypasses that, that's how it prohibits that. And then the 'if and as long as' part of it would be, let's suppose now you've sensed the wheel lock condition and bypasses the automatic program, and I think, in the patent, it says terminates that until the condition is assessed to be over. Then if you come back up into the flowchart at box, or I'm sorry, diamond 33, and your acceleration was not now greater than the predetermined value, you would go along the no path, and then it has a series of additional steps there fore detecting if the wheel lock condition has actually terminated before it goes back into the automatic program.

(Tr. at 2629-30.) Based on the foregoing, the administrative law judge finds that the '427 patent teaches, in response to a detected wheel lock-up condition, shifting to neutral and thereafter prohibiting further gear changes. In addition, given that the administrative law judge has construed asserted claim 15 as requiring, inter alia, upon sensing a wheel lock-up condition, preventing all signals from being produced by the processing unit that direct the transmission

operators to cause a change in the gear ratio of the transmission, the administrative law judge finds that the '427 patent teaches away from claim 15 of the '279 patent because the '427 patent teaches generating a gear change command output signal to shift to neutral and thus does not prohibit the generation of all gear change command output signals as recited in claim 15.

The '427 patent further teaches that the system will remain in neutral beyond the termination of a wheel lock-up condition, while claim 15 of the '279 patent prohibits gear changes only during the presence of a wheel lock-up condition. (Caulfield, Tr. at 3080-81, 3100-01; RX-175, col. 4, lns. 21-39.) Thus Caulfield testified:

> Q. And how does the '427 patent compare to Claim 15 of the '279 patent?
>
> A. Claim 15 of the '279 patent basically says, upon sensing an anti-lock condition, prohibit all gear change command output signals. The difference in that and the '427 patent, the '427 patent says if you sense an anti-lock condition, make a gear change command output signal and shift to neutral.
>
> So there's a distinct difference. One is prohibit the shift decision, and one is make the shift decision, so they're teaching two opposites on the same condition that's checked. The --
>
> JUDGE LUCKERN: Go ahead. Did you finish your answer?
>
> THE WITNESS: I can put a comma there.
>
> JUDGE LUCKERN: No, no, go ahead. Go ahead.
>
> THE WITNESS: <u>If you look at '427, '427 will hold neutral throughout the anti-lock event, and beyond the patent at hand, the '279 patent will only hold suspending gear change command operations through the existence of an anti-lock, so to speak,</u>

the '427 has a longer tail than the '279 patent does.

(Tr. at 3080-81 (emphasis added).) As indicated in VII.A. supra, the claim 15 limitation "means for sensing the presence of wheel lock-up condition, and, if and as long as the presence of a wheel lock-up condition is sensed" does not include the function of sensing the termination of wheel lock-up.

The staff argued that the '427 patent as a whole "teaches precisely what claim 15 covers, viz. prohibiting ('interrupting') gear change command output signals ('energizing of the operative circuit') in response to a sensed wheel lock-up ('signal representing a vehicle wheel rotational speed, e.g., during braking of the vehicle, does not constitute a correct representation of the vehicle speed')." (SBr at 76.) However, in the '427 patent, the Brief Description Of The Invention states:

> The present invention has the task of providing, in accordance with the introduction to the description, a method which eliminates the risks of erroneous gear selection. With the said objective, the invention is distinguished in that energizing of the operative circuit is interrupted when the wheel speed represents a certain vehicle speed and the wheel speed variation calculated in the system is less than a predetermined value.
>
> By means of the inventive method, it is ensured that the system returns to normal gear selection function when a wheel, the speed of which is sensed and which is entirely or partially locked during braking, once again returns to a stabilized condition relative the substructure.

(RX-175 at col. 1, lns. 36-50.) Interrupting the "energizing of the operative circuit," relates to resuming normal gear selection functions after a wheel lockup condition is over and upon the vehicle reaching a particular acceleration because the selection of gear neutral is caused by "activating an operative circuit." (Caulfield, Tr. at 3091-93, 3095-98; RX-175, col. 1, lns. 12-20,

col. 4, lns. 1-48; CX-197 at EA00099804 at lns. 15-19.) Hence, the administrative law judge finds that the '427 patent does not teach "prohibiting ('interrupting') gear change command output signals ('energizing of the operative circuit') in response to a sensed wheel-lock up" condition.

Each of respondents and the staff makes reference to "freewheeling." Thus respondents, in connection with their obviousness position, argued, inter alia, that "the disadvantage of shifting to neutral, as taught by Magnusson [the '427 patent], is that it results in freewheeling, which may be undesired." [43] (RBr at 82.) The staff argued that a person of ordinary skill in the art at the time of the '279 invention, would have been motivated to substitute disengaging the clutch, which respondents argued is involved in the disputed claim clause,[44] for the "selection of neutral [shift to neutral] taught in the '427 patent because selecting neutral results in a dangerous condition known as freewheeling." (SPFF 426.) The abstract of the '427 patent however discloses that the invention relates to a method employed "during braking of the vehicle." (RX-175.) Putting a transmission into neutral or disengaging the master clutch during an ABS event removes the engine inertia and allows the wheels to roll up to vehicle speed, but the vehicle is still decelerating because the brakes are fully applied by the anti-lock system. (Caulfield, Tr. at 3170-71.) In contrast, freewheeling is a condition in which a vehicle travels downhill, free from

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[43] Respondents are in error when they argue that Magnusson discloses that shifting to neutral is a disadvantage or is undesired. The administrative law judge can find no such disclosure in Magnusson.

[44] The administrative law judge has found VII.A., supra, that the structure corresponding to the function of prohibiting gear change command output signals corresponds to the logic, e.g., that sets a flag in the processing unit for preventing shift decisions, which has nothing to do with disengaging the master clutch. (See Caulfield, Tr. at 1236-37, 1325-26.)

retardation, which can be accomplished by a driver placing the truck into neutral and letting it coast downhill without applying the brakes, or by opening the master clutch and allowing the truck to coast downhill without applying the brakes. (Caulfield, Tr. at 3103-04, 3118.) Also, freewheeling is dangerous due to the excessive speeds truck drivers achieve as a result of shifting the transmission to neutral on a hill, in the absence of braking, and not solely by virtue of the fact that the transmission is in neutral. (See Caulfield, Tr. at 3121.) Hence, the administrative law judge finds that the '427 patent does not teach the practice of freewheeling because the '427 patent teaches shifting to neutral when the RPM of the vehicle wheel is not a correct representation of vehicle speed, e.g. during braking of the vehicle. (Caulfield, Tr. at 3121-22; RX-175 at col. 1, lns. 7-13.) As Caulfield testified:

> Q. We saw in the '427 patent a shift to neutral. Is the '427 patent practicing freewheeling?
>
> A. No.
>
> Q. And why not?
>
> A. Well, clearly, the '427 patent is brake application, sensing an anti-lock condition, shifting to neutral and hold, same thing with the Great Britain patent. That is not freewheeling. You cannot freewheel with brakes applied. In other words, you can't accelerate the vehicle because you have your brakes applied.

(Tr. at 3121-22 (emphasis added).) Thus, freewheeling is distinguishable from the method claimed in the '427 patent on the basis that freewheeling requires no brakes while the '427 patent claims a method of responding to a wheel lock-up condition, "e.g., during braking of the vehicle." (RX-175, '427 patent, col. 1, lns. 12-13; see Caulfield, Tr. at 3121-22.)

Based on the foregoing, the administrative law judge finds that respondents and the staff have not established, by clear and convincing evidence, that a person of ordinary skill in the art at

the time of the '279 invention would equate freewheeling with the '427 patent's claimed method of responding to a wheel lock-up event, "e.g., during braking of the vehicle."

In addition to relying on "freewheeling," respondents, in support of their obviousness contentions, have focused on the '279 specification's teaching that it is beneficial to isolate the brake wheels from the rest of the drive train during a wheel lock-up condition to allow the brake wheels to roll up to vehicle speed unimpeded by the inertia of the engine. (See, e.g., CX-196, col. 5, lns. 13-15 ("releasing the coupling 14 allows the braked wheels 60 to roll-up to vehicle speed unimpeded by the inertia of the engine..."); Caulfield, Tr. at 3165-66; Cote, Tr. at 197.) In further support, respondents rely on Caulfield's testimony where he stated that re-engaging a master clutch is easier as compared to re-engaging from neutral under certain vehicle conditions. (See Caulfield, Tr. at 3167-68.) Asserted claim 15 however does not contain a limitation requiring a decoupling of the driveline (e.g., a disengaged master clutch or a shift to neutral). (See SPFF 416 (undisputed).) Moreover, it is undisputed that the '427 patent teaches that it is necessary to "break torque" in order to shift to neutral and that the only means disclosed in the '427 patent for breaking torque is a master clutch. (See CPFF 978.) Considering that the '427 patent teaches both shifting to neutral and using a master clutch to break torque to effect the shift to neutral, the administrative law judge finds that respondents have not established, by clear and convincing evidence, that a person of ordinary skill in the art at the time of the '279 invention would have been motivated to substitute the '427 patent's teaching of a shift to neutral for a disengaged master clutch in response to a sensed wheel lock-up condition. The administrative law judge finds that respondents and the staff, using the '279 patent specification as a template, have attempted to piece together claim 15 based on the alleged teachings of the '427 patent

which issued on August 21, 1984 (RX-175) and oral testimony in 2004, some fourteen years after the '279 patent issued and some twenty years after the '427 patent issued. As the Federal Circuit stated:

> A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of the invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field.... Close adherence is especially important in cases where the very easy with which the invention can be understood may prompt one 'to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher.'

In re Kotzab, 217 F.3d at 1369 (citations omitted) (emphasis added), see also Texas Instruments, 988 F.2d at 1178 ("Absent such suggestion to combine the references, respondents can do no more than piece the invention together using the patented invention as a template. Such hindsight reasoning is impermissible.") Accordingly, the administrative law judge finds that neither respondents nor the staff has established, by clear and convincing evidence, that the '427 patent renders claim 15 obvious.

As to the combination of the '427 patent and the '061 patent,[45] respondents relied on the following proposed finding of fact:

> Based on the nature of the problem to be solved, the knowledge available to one of ordinary skill in the art, and the teachings of the prior art, one of ordinary skill in the art would have been motivated to combine the Magnusson [the '427 patent] and Pruvot [the '061 patent] references. (Davis, Tr. at 2635:3-17; RX-302.)

(RPFF 646.) The portion of Davis's hearing testimony respondents cite to support RPFF 646 states:

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[45] The only prior art relied on by the staff in connection with 35 U.S.C. § 103 was the '427 patent.

Q. No, it's not, is it? Is that RX-302?

A. Yes, it is.

Q. And did you have input in the preparation of RX-302?

A. Yes, I did.

Q. Did you actually type it?

A. No, I did not.

Q. Did you review it after it was finished?

A. Yes, I did.

Q. And did you contribute to it as it was being created?

A. Yes, I did.

Q. And does it accurately reflect your opinions?

A. Yes, it does.

(Tr. at 2635.) RX-302 is a four-page chart entitled "U.S. Patent No. 4,899,279 to Cote, et al.," which appears to compare claim 15 of the '279 patent to the teachings of the '427, the '634, the '061 and the '060 patents. (RX-302.) Aside from the portion of Davis's conclusory testimony quoted above and Davis's statement that RX-302 reflects his invalidity opinions, the record does not contain any further explanation of RX-302 to support respondents' obviousness contentions. (See Davis, Tr. at 2633-35.) Moreover, both Caulfield and Davis agreed that the '061 patent teaches prohibiting some shifts in response to a wheel lock-up condition, while allowing certain other shifts to proceed, which directly contradicts the teachings of the '427 patent, viz. shift to neutral and thereafter prevent further gear changes. (Caulfield, Tr. at 3127-28; Davis, Tr. at 2633-35.) Thus, the administrative law judge finds that respondents have not established, by

clear and convincing evidence, that based on the nature of the problem to be solved, the knowledge available to one of ordinary skill in the art, and the teachings of the prior art, one of ordinary skill in the art would have been motivated to combine the '427 patent and the '061 patent, such that claim 15 is rendered obvious.

Respondents further argued, in support of their argument that either of the aforementioned '427 and '061 patents "could be, but need not be, combined with" either the '634 patent or the '060 patent to invalidate claim 15, that one of ordinary skill in the art would have been motivated to combine either the Magnusson '427 patent or Pruvot '061 patent with the Florus '634 patent or Smyth '060 patent. (Davis, Tr. at 2635; RX-302.) (RPFF 647.) While RX-302 is a four-page chart that appears to compare claim 15 of the '279 patent to the teachings of the '427, the '634, the '061 and the '060 patents, aside from of Davis's conclusory testimony quoted above and his statement that RX-302 reflects his invalidity opinions, the record does not contain any further explanation or support for respondents' contentions that either the '427 patent or the '061 patent could be combined with the '634 patent or the '060 patent to render claim 15 obvious. (See Davis, Tr. at 2633-35.) Moreover, Caulfield testified that the '634 patent is irrelevant to claim 15 of the '279 patent because it does not contain any teachings relating to wheel lock-up conditions. (Tr. at 3128-29.) As to the '060 patent, the disclosure of which is incorporated by reference into the '279 patent, Caulfield testified:

Q. Do you believe the '060 patent invalidates Claim 15 of the '279 patent?

A. I believe it does not invalidate it.

* * *

Q. What relationship does '060 have to Claim 15 of the '279 patent?

> A. Patent 4,361,060 is a patent for an automatic mechanical transmission. We call it now AMTs. They had MATs then, mechanical automatic transmission. It's basically a patent looking at a processing unit, controlling this shift. I'd look at it as almost a pioneer patent for what we've been talking about in this case. However, it makes no reference to anti-lock condition, it makes no reference in what to do in anti-lock condition throughout the body of the patent. It's just a patent for an AMT.

(Tr. at 3130.) Hence, the administrative law judge finds that respondents have not established, by clear and convincing evidence, that based on the nature of the problem to be solved, the knowledge available to one of ordinary skill in the art, and the teachings of the prior art, one of ordinary skill in the art would have been motivated to combine either the '427 patent or the '061 patent with the '634 patent or the '060 patent to render claim 15 of the '279 patent obvious.

C. Infringement

Complainant argued that the respondents' FeedomLine transmission directly infringes claim 15 of the '279 patent. (CBr at 58-62.)[46] It is further argued that respondents actively induce infringement and contributorily infringe said patent. (CBr at 80-83.)

Respondents argued that the FeedomLine system does not infringe the '279 patent. (RBr at 50-60.)

The staff argued that the evidence demonstrates "both direct infringement and indirect infringement under 35 U.S.C. §§271(b) (induced) and (c) (contributory)." (SBr at 51.)

Davis admitted that the royal blue Volvo truck equipped with the FeedomLine transmission that he drove included all of the elements in the preamble of claim 15 of the '279 patent. (CPFF 634 (undisputed).) As to the remaining portion of claim 15, respondents'

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[46] For applicable law, see V.C., supra.

FeedomLine transmission, which receives signals from the vehicle's ABS system, can operate in two distinct modes, viz. a fully automatic mode and a semi-automatic mode. (SPFF 272, 281 (undisputed).) The FeedomLine transmission allows the vehicle operator to select between the two modes. To switch between the two modes, the operator manually engages a function button on the shift lever. Thus respondents' Robert A. Sayman, who is senior product engineer for ZF Industries testified:

> Q. From the driver's perspective, does the FeedomLine system operate like a traditional automatic transmission?
>
> A. It can. In our system, if the driver turns on the key, starts the engine, puts the transmission into forward, and all they have to do at that point is step on the throttle to launch the vehicle similar to the way an automatic launches, it's a little different, and then the gear shift selection is done for the driver. At that point, the automatic shift algorithm is running. So the shifts feel a little bit different than an automatic, but in general, if you didn't know that it wasn't an automatic, you might not realize that's the case, as the driver.
>
> Q. Can the driver control shifting?
>
> A. Yes, the system has a shift lever. It looks a bit like a joystick, and they're able to select an upshift or downshift by tipping the lever or actually skip upshifts or skip downshifts by pushing the button and tipping the lever.
>
> * * *
>
> Q. Can the driver request a shift request when the system is operating in automatic mode?
>
> A. Yes, they can.
>
> Q. How would the driver do that?

A. Well, there are two different ways. One way would be to press the function button and then tip the lever, excuse me, to press and release the function button, and then to tip the lever either forward for an upshift or backward for a downshift. Or they could push the neutral button to select neutral, I believe, either one of those, they can do.

Q. Why would they need to press the function button?

A. The function button toggles the system from automatic to semiautomatic mode.

Q. Is there any limitation on when the driver can do that?

A. Toggle the function button? No, they can do that at any time.

Q. So is there any limitation on when the driver can request a shift?

A. No.

* * *

Q. Turning back to driver initiated shifts, when can a driver request a shift?

A. They can request a shift any time they want.

Q. You mentioned this briefly before, but how would the driver request, for instance, an upshift?

A. By tipping the lever forward. It's like a joystick. You would just tip it.

Q. And what if a system were in semiautomatic mode at that time -- excuse me, I misspoke, what if the system were in automatic mode at that time?

A. If you're in automatic mode and the driver tips, then the system ignores the shift request.

Q. What does the driver need to do to request that shift?

A. They have to push the function button to change to semiautomatic mode and then tip or request a gear change.

Q. Is that a difficult procedure?

A. No, it's just click, click, and it's done.

(Tr. at 1827-28; 1871-72; 1886-87.) Moreover, in order to move the vehicle in either mode, the operator selects the driving range (Drive, Neutral or Reverse). (SPFF 273 (undisputed).) In the semi-automatic mode, the vehicle operator, rather than the transmission control unit, makes shift decisions, issuing gear change requests by physically moving a shift lever. (SPFF 288 undisputed).) In the fully automatic mode, the driver merely depresses the accelerator pedal and the transmission processor automatically selects the appropriate gears as the vehicle travels. As Sayman testified:

Q. Can you tell us, please, what is the FeedomLine transmission system?

A. The FeedomLine transmission system is a two-pedal automated mechanical transmission.

Q. What exactly is an automated mechanical transmission?

A. It's a transmission that in some cases is a manual transmission that's been converted, or a purpose-built transmission that has the elements of a manual transmission, but the shifting is either partially or fully automated.

Q. In the case of the FeedomLine system, to what extent is it automated?

A. In the case of the FeedomLine system, it can be

fully automated. There's a clutch controller that replaces the clutch pedal and has the ability to actuate the clutch. There is a transmission control unit that replaces the stick, say, from a manual transmission that actuates the gear elements to engage the gears.

In fact, there is no stick, per se, on the transmission. There's a shift lever that looks more like a joystick than what you would think of as a manual transmission shift lever. It also has the ability, it has an algorithm that runs, that calculates upshifts and downshifts for the driver.

Q. You may have just answered this in part, but how is the FeedomLine system different from a traditional manual transmission?

A. It automates the actuation of the clutch, and it automates the actuation of the gear elements in the sense that it moves the gears to the proper position where the driver does not have direct control over the gear elements. A driver cannot take the stick and put it into third gear, for example. The driver has only got a joystick device where they can select, for example, upshifts or downshifts.

Q. Is there any mechanical link between the driver and the transmission?

A. No, they're all electric.

Q. How is the FeedomLine system different from a traditional automatic transmission system?

A. The main difference is the FeedomLine has a dry master friction clutch, a clutch, whereas an automatic transmission has a torque converter, which is a fluid coupling. The master friction clutch can be completely disconnected so that no torque is passed through it, whereas a torque converter normally has some amount of torque that's always going through it.

Q. What's the purpose of the transmission in a heavy-duty truck?

A. The purpose of a transmission is to tailor the engine speed or the engine speed range to the vehicle speed range, meaning that the engine has a certain operating range that it can operate in, for example, from say 600 to 2,000 rpm, whereas the vehicle, the wheels operate anywhere from zero up to several hundred and thousand rpm.

So what the transmission does is it provides a series of gears or gear ratios that tailor that engine speed to the wheel speed or the desired needed wheel speed for whatever speed the driver wants to go.

(Tr. at 1823-25 (emphasis added).)

Respondents refer to the FeedomLine processor as the transmission control unit, or "TCU." (SPFF 275 (undisputed).). The FreedomLine's TCU can receive signals from the vehicle's anti-lock braking system indicating that the ABS is active, and if the ABS is active, the TCU prevents automatic shifts from occurring. Thus, Sayman submitted a sworn declaration, which stated:

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[47]

* * *

11.

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[47] Sayman in his declaration (¶ 2) states that Ex. A is a true and accurate copy of a portion of the technical manual for the ZF-AS Tronic transmissions utilized in the FeedomLine transmission systems, which generally describes the relevant components and functions of the transmission.

(CX-2 (emphasis added).)

(CX-2 at ¶ 11.)

(SPFF 286 (undisputed).)

Claim 15 is practiced when an automated transmission control system senses an active signal from an anti-lock brake system and thereafter prohibits the transmission's processor from generating any gear change command output signals.

Hence, the administrative law judge finds that complainant, has established, by a preponderance of the evidence, that respondents FeedomLine transmission practices the system of claim 15.

Respondents argued that

(RBr at 52.) However, the FeedomLine systems' semi-automatic mode of operation is found to be irrelevant to claim 15

because said claim is directed to preventing an automated transmission system from erroneously downshifting during a skid. It is not disputed that, when in automatic mode, the FeedomLine system will not issue a gear change command if the driver pushes the shift lever.

Respondents also argued that

(RBr at 56.)

Respondents further argued that the FeedomLine system does not infringe claim 15 because it does not "disengage the master clutch or any other disengagable coupling in response to ABS activity." (RBr at 59-60.) However, as found in the claim interpretation section, although claim 15 does not preclude disengaging the clutch in response to a wheel lock-up, it does not require such a response. Thus, the fact that the FeedomLine system does not open the master clutch in response to a wheel lock-up is found by the administrative law judge to be irrelevant to the fact that the FeedomLine system practices claim 15 whenever it prohibits automated shifts in response to a wheel lock-up condition.

Referring to complainant's allegation of indirect infringement, the evidence establishes that respondents knowingly induced and encouraged others to use the infringing FeedomLine transmissions in heavy-duty trucks and that respondents' FeedomLine transmissions are specifically made for use on heavy-duty trucks and do not have a substantial non-infringing use. See Water Technologies Corp. v. Calco, Ltd., 850 F.2d 660 (Fed. Cir. 1988); Hewlett-Packard v. Bausch & Lomb, Inc., 909 F.2d 1464 (Fed. Cir. 1990). Convincing respondents' U.S. truck

Original Equipment Manufacturer (OEM) customers to buy the FeedomLine transmissions was "a very long process," involving technical discussions with the engineering groups of the various truck OEMs, commercial discussions with the OEMs' purchasing groups, and technical releases, which were given to the technical departments of the potential customers. (SPFF 291 (undisputed).) Prototypes had to be built and application engineering work had to be performed in order to demonstrate that the product could perform in a specific truck. (SPFF 292 (undisputed).) Those activities were engaged in from the time the joint venture, ZF Meritor, was founded at the end of 1999 to the time the first production sale of a FeedomLine transmission in the United States was concluded in 2001. (SPFF 293 (undisputed).) Respondent ArvinMeritor acted as a sales agent in the commercial discussions with the U.S. truck OEMs. (SPFF 294 (undisputed).) The technical releases, including the prototypes, were the responsibility of respondent ZF Meritor. (SPFF 295 (undisputed).) Thus, the administrative law judge finds that complainant has established that respondents induced infringement of claim 15 of the '279 patent. Respondents' FeedomLine transmissions are used with heavy-duty trucks. (SPFF 297 (undisputed).) Thus, the administrative law judge finds that complainant also has established that respondents contributorily infringe claim 15.

D. Inequitable Conduct

Respondents, as the basis for their inequitable conduct allegation as to the '279 patent, argued that complainant's in-house patent counsel Howard Gordon twice misled the Examiner away from rejecting original claim 23, which ultimately issued as presently asserted claim 15 of the '279 patent, in view of a German-language prior art reference DE A1 3 146 512 (the DE '512 patent) and its corresponding United States patent, viz. the '427 patent which was referenced in

VII.B., supra. (RBr at 104.) In support respondents argued that Gordon failed to submit an English translation and accurate summary of the DE '512 patent; that Gordon was aware of the DE '512 patent's materiality because it was cited in a search report in complainant's European counterpart application corresponding to the '279 patent, which contained claims identical or very similar to those in the '279 application; that Gordon obtained and read the '427 patent, which compared to its German counterpart, contains additional descriptions in FIG. 3 that explain the disclosed control system for preventing shifting when impending wheel lock-up is sensed; that rather than submitting the '427 patent to the PTO, Gordon submitted the untranslated DE '512 patent to the PTO along with a misleading summary of the '427 patent in which Gordon asserted that the '427 patent did not disclose a control system for responding to an impending wheel lock-up condition; and that Gordon's '427 patent summary also failed to disclose that descriptive comments in FIG. 3 of the '427 patent described how the control system prevented the generation of transmission gear change command output signals. (RBr at 105-06.)

Respondents also argued that Gordon misled the PTO when he learned that dependent claim 2 and independent claim 23 of complainant's corresponding European Patent Office (EPO) patent application were rejected in view of the DE '512 patent; that Gordon failed to disclose to the PTO that the EPO rejection was based on the DE '512 patent and failed to explain that the rejected EPO claims and the allowed U.S. claim 23 of the '279 patent application were identical in scope[48]; that in a petition to withdraw all of the allowed claims of the '279 patent application,

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[48] Respondents argued that complainant was unable to obtain allowance of claim 23 over the DE '512 patent in the corresponding EPO application, acquiesced in the EPO's rejection of said claim 23 and ultimately withdrew claim 23 from consideration by the EPO examiner. (RRBr at 71.)

Gordon directed the Examiner's attention to the German DE A2 2 251 548 reference (the DE '548 patent) and its corresponding British reference, thereby implying that the DE '548 patent was the basis for the petition to withdraw, misleading the examiner away from the DE '512 patent; that Gordon again withheld the '427 patent from the PTO and instead gave the Examiner another patent corresponding to the DE '512 patent, the British patent No. 2,090,927 (the '927 patent), which, like the DE '512 patent, failed to contain descriptive comments that explain the control system for responding to an impending wheel lock-up condition; that Gordon's choice to submit the UK '927 patent instead of the '427 patent indicates that Gordon knew that a more complete translation containing the descriptive FIG. 3 would have decreased, if not eliminated, the chance of obtaining an allowance of the '279 claims[49]; and that Gordon could not point to any evidence that he had submitted the '427 patent to the PTO or explain why there was no record of any alleged disclosure. (RBr at 106-08; see RRBr at 69-71.)

Complainant argued that the fact that Gordon submitted the European search report corresponding to the European counterpart application for the '279 patent to the PTO in a Supplemental Disclosure Statement, including a copy of the DE '512 patent, evidences Gordon's good faith and compliance with the duty of candor; that Gordon thereafter received an Office Action from the PTO rejecting all claims and requesting additional information about the references of record; that Gordon then obtained copies of the U.S. equivalents to the two German-language references disclosed in said Supplemental Disclosure Statement; and that by

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[49] Respondents argued that when Gordon submitted the UK '927 patent to the PTO, he had already "left the examiner with the impression the [sic] he did not need to conduct further investigation or translation of the DE '512 patent [and thus] [a]ny consideration that the examiner did give to the UK '927 patent was tainted by Gordon's conduct." (RRBr at 73.)

virtue of explaining the two U.S. equivalent patents in an amendment received by the PTO on April 15, 1988, Gordon fully disclosed the teachings of the DE '512 patent in disclosing the teachings of its equivalent U.S. '427 patent.[50] (CBr at 102-03.) In response to respondents' argument that Gordon committed inequitable conduct by not submitting an English language copy of the DE '512 patent, complainant argued that Gordon informed the Examiner that the DE '512 patent was equivalent to the '427 patent, thereby evidencing his good faith and compliance with the duty of candor; that Gordon testified that he provided the Examiner with a copy of the '427 patent[51]; and that regardless of whether Gordon submitted an English-language version of the DE '512 patent, the DE '512 patent has an equivalent British patent, the '927 patent, which not only appears in the certified '279 file wrapper, but was also cited by the examiner on the face of the '279 patent and discloses in nearly identical language the same teachings as the '427

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[50] As to Gordon's disclosure of the '427 patent teachings, complainant argued that:

> Mr. Gordon's remarks in the [April 12, 1988] Amendment clearly disclose the distinction between the '427 patent and claim 15 of Eaton's '279 patent. Specifically, while the '427 patent requires the selection of gear neutral, claim 15 of the '279 patent prohibits all gear change command output signals and requires the AMT to remain in the currently engaged gear ratio.

(CBr at 104, citing CPFF 970-985; see CRBr at 95-96 (arguing that the '427 patent is not material to the '279 patent because it teaches away from the claimed invention).)

[51] Complainant argued that the absence of the '427 patent from the '279 file wrapper should not be considered as evidence of Gordon's failure to submit a copy of said reference to the PTO; that there are several prior art references in the '279 file wrapper despite the fact that there is no Form 892 in the file acknowledging their receipt; that the sequence of the documents in the '279 file wrapper does not appear to be accurate; that the parties negotiated a stipulation about the '279 file wrapper, "which specifically recites some confusion surrounding it"; and that given the uncertainty of the '279 file wrapper, the fact that a document is missing from the file cannot be considered clear and convincing evidence of an intent to defraud the PTO. (CRBr at 92; see CX-197b, Joint Stipulations relating to '279 file history.)

patent. (CBr at 105; CRBr at 93.)

Complainant further argued that after Gordon submitted the April 15, 1988 amendment and after receiving a Notice of Allowability for claims 1-23 of the '279 patent application, Gordon received an Office Action from the EPO in connection with the '279 patent's corresponding European counterpart patent application; that said EPO Office Action identified four references, D1 - D4, where the D4 reference is the DE '512 patent that Gordon had previously disclosed to the PTO a year earlier in the Supplemental Disclosure Statement; that Gordon then filed a Petition to Withdraw from Issue the '279 application due to the apparent unpatentability of certain claims over the D1 reference; that said Petition to Withdraw included the entire EPO Office Action and English language equivalents of the D1, D3 and D4 references, as well as a partial translation of the D2 reference; and that said "filing of the Petition to Withdraw from Issue and the disclosure of the entire European office action, including English language equivalents of D1, D3 and D4 references and a partial translation of the D2 reference is evidence of good faith and compliance with the duty of candor." (CBr at 106; see CBr at 105.)

The staff argued that it is undisputed that the '427 patent was material to the patentability of the '279 patent and that said '427 patent is the single most relevant prior art reference; that despite complainant's attempts to distinguish the '427 patent during prosecution, the '427 patent "does disclose preventing erroneous gear shifts by interrupting the 'energizing of the operative circuit' in response to a wheel lock-up, much as the '279 patent discloses preventing gear changes in response to wheel lock-up by 'inhibit[ing] the central processing unit 56 from attempting a transmission gear change'"; that regardless of any misrepresentations, complainant disclosed the '427 patent to the examiner; that Gordon believes he submitted a copy of the '427

patent to the PTO along with the April 15, 1988 amendment and accurately represented the '427 patent to the PTO; and that the record does not contain clear and convincing evidence that complainant intentionally misinformed the examiner of the relevance and teachings of the '427 patent during the prosecution of the '279 patent. (SBr at 90-91.)

1. Materiality

Respondents' unenforceability arguments focus on: (1) Gordon's alleged failure to submit an English language version of the '427 patent to the Examiner during prosecution of the '279 patent; (2) Gordon's allegedly misleading description of the '427 patent submitted to the PTO; and (3) Gordon's alleged failure to disclose the EPO rejection in the corresponding '279 application. Thus, the administrative law judge must determine whether the '427 patent and the EPO rejection in the corresponding '279 application were material, viz. whether there is a substantial likelihood that a reasonable examiner would have considered such information important in deciding whether to allow the '279 application to issue as a patent. See Brasseler, 267 F.3d at 1380 (Fed. Cir. 2001). In addition, the administrative law judge must determine whether Gordon materially misrepresented the teachings of the '427 patent in his submission to the PTO. See Intirtool, Ltd. v. Texar Corp., 369 F.3d 1289, 1297 (Fed. Cir. 2004) (affirming no inequitable conduct holding where patentee's statements were not false and thus did not rise to required threshold level of materiality).[52]

a. The '427 Patent

In VII.B., supra which addressed the validity of claim 15 of the '279 patent, based on the

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[52] See VI.D., supra, for a recitation of the law on unenforceability due to inequitable conduct.

proper construction of the language of claim 15, the administrative law judge found that the '427 patent does not anticipate claim 15, but rather, teaches away from claim 15 because the '427 patent teaches, inter alia, generating a gear change command output signal to shift to neutral and thus does not prohibit the generation of all gear change command output signals as required in asserted claim 15. He also rejected respondents' and the staff's allegations that asserted claim 15 is obvious in view of the teachings of the '427 patent and oral testimony some fourteen years after the issuance of the '279 patent.

In addition, the parties do not dispute that Gordon submitted an English language equivalent of the '427 patent, viz. the '927 patent, to the Examiner during prosecution of the '279 application and that the '279 file history contains a copy of said '927 patent. (See RPFF 845 (undisputed); SPFF 462, 466 (undisputed).) However, respondents, in arguing that the '427 patent was material to the prosecution of the '279 patent application, argued that the '427 patent contains additional descriptions in its FIG. 3 that explain the claimed system for responding to a wheel lock-up condition, which do not appear in the German-language '512 patent or its English-language equivalent, the '927 patent. (See RPFF 828, 830-31.) Accordingly, respondents argued that the Examiner "did not have before him any corresponding copy of Figure 3 with text in the figure or an English language specification." (RPFF 831.)

It is a fact that FIG. 3 of the '427 patent contains descriptive comments that do not appear in FIG. 3 of the '927 or '512 patents. (Compare RX-175, FIG. 3, with CX-197 at EA 99796 ('927 patent, FIG. 3) and CX-197 at EA 99623 ('512 patent FIG. 3).) However, the specifications of the '427 patent and the '927 patent contain identical descriptions of Figure 3: "FIG. 3 is a flow

diagram for gear selection, and illustrates the sensing of a stable wheel condition."[53] (RX-175, col. 1, lns. 61-62; CX-197 at EA 99798, lns. 23-24.) Also, the specifications of the '427 and '927 patents are nearly identical in their teachings regarding said FIG. 3. (Compare RX-175 with CX-197 at EA 99797-803.) Both specifications refer to the same numbered steps in FIG. 3. (Id.) A comparison of the disclosures of a portion of each patent specification with respect to FIG. 3 reveals the striking similarities:

British '927 Patent	**U.S. '427 Patent**
"A program is stored in the PROM 28 for automatic gear selection,	"A program is stored in the PROM 28 for automatic gear selection.
and when the program is being executed, a flow diagram illustrated in Fig. 3 is followed."	The program is illustrated in flow diagram form in Fig. 3 is followed."

[53] Other similarities between the '427 and '927 patent are apparent from a comparison of said references. The '427 patent, entitled "Method Of Preventing Erroneous Gear Selection In An Automatic Gear Selection System In Vehicles," issued on August 21, 1984 to Karl G. Magnusson on application No. 322,852 filed November 19, 1981. (RX-175.) With the exception of the article "A", the title of the '927 patent, "A method of preventing erroneous gear selection in an automatic gear selection system in vehicles," is identical to the '427 patent title, "Method Of Preventing Erroneous Gear Selection In An Automatic Gear Selection System In Vehicles." (Compare CX-197 at EA 99794 with RX-175.) Magnusson is listed as the inventor for the '427 patent and the '927 patent, both of which also list Saab-Scania Aktiebolag as the assignee. (Id.) The applications for the '427 and '927 patents were filed within five days of each other and both claim priority to Application No. 8008400 filed in Sweden on November 28, 1980. (Id.) Aside from minor differences in wording, the specifications of the '427 and the'927 patents are nearly identical. For example, column 1 of the '427 patent is identical to the disclosure of the '927 patent with one exception: the '427 specification teaches an "output signal activating an operative circuit or the like which thereby caters for the selection of a neutral gear position...," while the corresponding portion of the '927 specification states "output signal activating an operative circuit which thereby caters for the selection of a neutral gear position...." (Compare RX-175, col. 1, lns. 17-19 with CX-197 at EA 99797 (col. 1, lns. 11-13).)

"Said gear selection program constitutes a part of a more extensive gear change program, which has gone through a plurality of control routines before a flow path 30 follows the diagram according to Fig. 3."	"The gear selection program constitutes a part of a more extensive gear change program, which has gone through a plurality of control routines before reaching a point 30 in Fig. 3."
"With the availability of manual operation of the automatic gear change system, there is required a routine to decide to what extent the operating means for manual gear selection is actuated or not."	"With the availability of manual operation of the automatic gear change system, a routine is required to decide to what extent the operating means for manual gear selection is actuated."
"Said routine is represented by a block 31 illustrated in the figure."	"The routine is represented by a block 31 illustrated in the figure."
"If said operating means is activated, the block 31 begins a count-down of a time register, e.g. 10 seconds."	"If the operating means is activated, the block 31 begins a count-down of a time register, e.g. 10 seconds."
"Within this time, the driver has the possibility to utilize the manual gear selection."	"During this time, the driver may utilize the manual gear selection."
"If he does not avail himself of this, the system returns to automatic gear selection which, according to the flow diagram, begins at a signal processing operation step denoted BS 32, at which an acceleration value stored in an acceleration register by means of the interrupt program is read."	"If he does not, the system returns to automatic gear selection process which, according to the flow diagram, begins at a signal processing operation step 32, at which an acceleration value stored in an acceleration register by means of the interrupt program is read."
"In a subsequent comparing operation step denoted JS 33, it is determined whether the speed change value constitutes a retardation value which exceeds a given predetermined retardation value, e.g. 5 m/s^2."	"In a subsequent comparing operation step 33, a determination is made as to whether the acceleration value exceeds a predetermined retardation (acceleration) value, e.g. 5 m/s^2."

"If this is the case, e.g. as a result of wheel locking during braking, the program chooses to flow a flow path to an operation step denoted BS 35, at which a signal value representing great retardation is noted in a retardation notation register in the RAM 29."	"If it does, e.g. as a result of wheel locking during braking, the program follows a flow path to an operation step 35, at which a signal value representing the fact that the actual retardation value is greater than the predetermined value is noted in a retardation notation register in the RAM 29."
"After BS 35 there is an operation step denoted BS 36, where selection of neutral gear is made, the gear change program thereafter being terminated by an operation step denoted BS 47, where indication of the selected gear on the display unit is catered for."	"After step 35 there is an operation step denoted 36, where selection of neutral gear is made, the gear change program thereafter being terminated by an operation step denoted 47, where the selected gear is indicated on the display unit."

(CX-197 at EA99801, ln. 16 to EA 99802, ln. 12; RX-175, col. 3, lns. 36-68.) Further comparison of the remaining portions of the '427 and '927 patent specifications' descriptions of FIG. 3 reveals the same teachings as to the FIG. 3 "flow diagram for gear selection, and illustrat[ion of] the sensing of a stable wheel condition." (Compare CX-197 at EA 99802, ln. 13 to EA 99803, ln. 34 with RX-175, col. 4, lns. 1-48.) Moreover, Caulfield distinguished the asserted '279 patent from the '427 and '927 patents as follows:

> In simplicity, the '427, upon sensing anti-lock, teaches shifting, particularly shifting to neutral.... [T]he '279, on the other hand, teaches no shifting, so they're distinctly on the opposite sides of the spectrum. The '427 basically - - in the European, whatever I say for the '427 will also apply for the Great Britain patent [the '927 patent], will teach go to neutral and stay there, not only through the anti-lock event, but thereafter, while your acceleration is at a certain value and your speed change is below a certain value. There's only one way to get out of that. So life after anti-lock is exhibited and taught in the '427, as well as the British ['927] patent, holding it in neutral until your speed is above a certain speed and your acceleration is less than a predetermined value of one meter per second squared.

(Caulfield, Tr. at 3100-01.) Based on the foregoing, the administrative law judge finds that a reasonable Examiner would have understood, from the '927 patent, the teachings of the '427

patent, including the FIG. 3 "flow diagram for gear selection,[] [which] illustrates the sensing of a stable wheel condition," by referring to the disclosure of its equivalent '927 patent, despite the fact that FIG. 3 of the '927 patent does not contain the descriptive comments of the '427 patent's FIG. 3. See In re Sang-Su Lee, 277 F.3d 1338, 1345 (Fed. Cir. 2002) (noting presumption that Examiner assesses prior art and makes obviousness determination from the viewpoint of a person of ordinary skill in the art). Moreover, at the hearing, Gordon testified repeatedly that he submitted a copy of said '427 patent to the Examiner. (Gordon, Tr. at 800, 1055, 1061, 1107.)

Based on the foregoing, the administrative law judge finds that the '427 patent is not material to the prosecution of the '279 patent.

b. Gordon's Description Of The '427 Patent Submitted To The PTO

In issue is whether Gordon misrepresented the teachings of the '427 patent during the prosecution of the '279 application. At some point prior to the first Office Action from the PTO in the '279 prosecution, Gordon received a copy of an EPO search report dated December 10, 1987 corresponding to the '279 EPO application from John Douglas, a European patent attorney employed by Eaton in London who was handling the EPO '279 application. (Gordon, Tr. at 788-89, 1052-54, 1072-73; see CX-197 at EA 99610-11.) Thereafter, Gordon filed a Supplemental Disclosure Statement with the PTO that included the EPO search report and copies of the two German-language references cited in said EPO search report. (See CX-197 at EA 99609-38.) When Gordon submitted the EPO search report to the PTO he commented:

> The below identified patents and/or applications have been cited by the European Patent Office on the European Application which corresponds to the present U.S. case. These patents have not been reviewed but the European Patent Office considers them relevant. A copy of the search report is attached.
>
> DE A1 3 146 516 SAAB

(CX-197 at EA 99609 (emphasis added).) It is undisputed that the DE '512 patent, that Gordon referenced above and attached a copy of to the Supplemental Disclosure Statement submitted to the PTO, is a German-language reference that corresponds to the '427 patent. (RPFF 813 (undisputed).) The EPO search report lists both patents as category "A" references, which Gordon described as "technological background" references. (CX-197 at EA 99611; Gordon, Tr. at 1055.) Gordon testified that he submitted the German-language DE '512 patent to the PTO because "we just immediately forwarded the [EPO] search report with the contents that came in to the [United States] patent office." (Tr. at 1055.)

The next correspondence between Gordon and the PTO in the '279 file history is an Office Action mailed January 14, 1988 (January 14 Office Action) in which the Examiner indicated that he had examined the application and rejected claims 1-21, all claims pending in the application at that time. (CX-197 at EA 99639.) The Office Action contains, inter alia, the following remarks:

> 3. The applicant has filed numerous prior art references, it is noted that the record is not complete unless there is a statement which includes a listing of the patents, publications or other information. Further, the applicant should include an explanation of how those patents, publications are related to the claimed invention, and show the improvement of the claimed invention to each reference cited to satisfy the requirements of 37 CFR 1.97 to CFR 1.99.
>
> 4. Claims 1-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The breadth, and meaning of the following claim language is vague and indefinite 'presence or absence' (claim 1). The term absence appears redundant in view of the claims which follow. The claims taken as a whole react, modify in the presence of a wheel lock signal. On the other hand in the absence of anti-lock signal there is no modification needed, it would then appear that the

system is operating to specification. Therefore, the term absence appears to be redundant....

5. Remark: References made of record contain information which is of interest to the claimed invention. Applicant is con [sic] to provide the appropriate feedback, in accordance to US 37 CFR 1.56, as to the relevancy of the art of record and the claimed invention....

(CX-197 at EA 99640-41.) Gordon testified that after he received the January 14, 1988 Office Action, he acquired copies of the U.S. patents equivalent to the two German patents listed in the Supplemental Disclosure Statement, including the '427 patent. (Tr. at 795.) Thereafter, on or about April 12, 1988, Gordon submitted an amendment (April 12 Amendment) responsive to the January 14 Office Action. (See CX-197 at EA 99647.) He further testified that he submitted a copy of the '427 patent to the PTO along with the April 12 Amendment. (Gordon, Tr. at 1055.)

With respect to said April 12, 1988 amendment, respondents focused on Gordon's remarks to the Examiner and argued that:

> Gordon falsely described the '427 patent as disclosing 'an automatic transmission control method for preventing erroneous gear selection by requiring a gear neutral selection if wheel acceleration exceeds a reference value.' (Gordon, Tr. at 796-98; CX-197 at EA 99651-52; CRX-74.[54])

(RPFF 817 (first emphasis in original submitted to PTO) (second emphasis added).) In said April 12 Amendment, Gordon made the following remarks to the Examiner:

> REMARKS
>
> The cited prior art illustrates (i) AMT type automatic transmission systems or (ii) Anti-Lock Brake Systems (ABS). The present invention involves an AMT control method or system which, independently or in cooperation with an ABS system, senses an impending wheel lock condition and responds in a specific

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[54] In support of RPFF 817 and RPFF818, respondents cite CRX-74. CRX-74, however, is a copy of U.S. Patent No. 4,463,427 to inventors Bonnetain and Sibeud and thus is not the '427 patent at issue, U.S. Patent No. 4,467,427, in the enforceability analysis of the asserted '279 patent. (Compare CRX-74 with RX-175.)

manner. None of the cited art teaches or suggests an AMT control system or method for interfacing with/being tolerant of an ABS/wheel lock signal.

References cited by the EPO in a corresponding European patent application correspond to U.S. Patent Nos. 4,467,427 and 4,459,457. These patents disclose, respectively, an automatic transmission control method for preventing erroneous gear selection by requiring a gear neutral selection if wheel acceleration exceeds a reference value, or if a fault is sensed, respectively.

Neither of the references cited by the EPO teaches or suggests a method for controlling an AMT including sensing a wheel lock signal and responding in a particular manner thereto.

(CX-197 at EA 99651-51 (emphasis in original).)

With respect to the teachings of the '427 patent, FIG. 3 of the '427 patent at step 33 states "IS ACCELERATION VALUE GREATER THAN PREDETERMINED RETARDATION VALUE?" (RX-175, FIG. 3.) Referring to said FIG. 3, the '427 specification discloses:

> In a subsequent comparing operation step 33, a determination is made as to whether the acceleration value exceeds a predetermined retardation (acceleration) value, e.g. 5 m/s^2. If it does, e.g. as a result of wheel locking during braking, the program follows a flow path to an operation step 35, at which a signal value representing the fact that the actual retardation value is greater than the predetermined value is noted in a retardation register in the RAM 29. After step 35 there is an operation step 36 denoted, wherein selection of neutral gear is made, the gear change program thereafter being terminated by an operation step denoted 47, where the selected gear is indicated on the display unit.

(RX-175, col, 3, lns. 55-68 (emphasis added).) Caulfield testified, as to Gordon's description of the teachings in the '427 patent submitted to the Examiner under "REMARKS," supra, as follows:

Q. And do you see the reference there of the '427 patent, U.S. Patent No. 4,467,427?

A. Yes.

Q. Do you agree or disagree with those comments about the '427 patent?

A. I totally agree. These, as he says, these patents disclose respectively an automatic transmission control method for preventing erroneous gear

selection by requiring a gear neutral. So he's saying exactly what the patents say, that when it senses the anti-lock condition, they disclose an automatic transmission control method by requiring it to go to gear neutral. In other words, make one gear change command and get the machine into neutral gear, so that is an accurate statement.

Q. Let me just follow you on to the next paragraph, I think the sentence continues, and ask your comment about that as well. It says, "Selection" - -

A. Oh, I'm sorry, "Selection if wheel acceleration exceeds a referenced value or a fault is sensed, respectively." That's accurate. Throughout the '427 patent, they talk about acceleration being exceeded. Even though it's a negative value, the value is exceeded. It makes no reference to positive acceleration, as taken in context with the '427....

(Tr. at 3101-02 (emphasis added).)

The phrases "predetermined retardation (acceleration) value," "predetermined retardation value" and "predetermined value" are all phrases in the '427 patent that refer to a negative acceleration indicative of a wheel lock-up condition and that are used as a reference value. (See Caulfield, Tr. at 3102; Davis, Tr. at 2626-27.) Thus, Davis testified:

JUDGE LUCKERN: Absolutely. I want to make sure I repeat it from the Realtime however. "Does the '427 patent perform the function of the 'means for sensing' in claim 15?" And I have another, had another question. "Does the '427 patent perform the corresponding structure for performing this function?"

The WITNESS: Yes, it does.

JUDGE LUCKERN: And where is that? I had a double question there, so I should probably split it, what it is. So your yes is to both? And if so, can you tell me where that all is in the '427 patent?

THE WITNESS: Yes, I can. I think it's probably easiest to see in Figure 3 - -

JUDGE LUCKERN: All right, go ahead.

THE WITNESS: - - of the '427 patent. That's a flowchart showing what is occurring here, and if you look in box 32, it's labeled read acceleration value, so the system's going to get an input value then of acceleration, and then it's going to

> move on to, I guess we'd say diamond 33, the decision box, and it's going to compare that acceleration value with a predetermined retardation value. Now, retardation, of course, would be a negative acceleration indicative of wheel lock.
>
> And if that value is greater than the predetermined value, then it would move to the right there, the yes path, and that would be the sensing step where it's actually sensing the wheel lock condition.

(Davis, Tr. at 2626-27 (emphasis added).) Moreover, the '427 specification uses the terms "acceleration" and "retardation" interchangeably. (See RX-175 at col. 3, lns. 55-58 (emphasis added) ("In a subsequent comparing operation step 33, a determination is made as to whether the acceleration value exceeds a predetermined retardation (acceleration) value, e.g. 5 m/s^2.) Hence, the administrative law judge finds that respondents have not established, by clear and convincing evidence, that Gordon materially misrepresented the teachings of the '427 patent, viz. "an automatic transmission control method for preventing erroneous gear selection by requiring a gear neutral selection if wheel acceleration exceeds a reference value," in his submission to the PTO.

In connection with the April 12 Amendment, respondents argued:

> Gordon further falsely represented to the USPTO that the '427 reference did not 'teach or suggest a method for controlling an AMT, including sensing a wheel lock signal and responding in a manner thereto.' (Gordon, Tr. at 798; CX-197 at EA 99652; CRX-74).

(RPFF 818.) The description that Gordon included in the remarks to the April 12 Amendment, which appears in the '279 file history, states that "[n]either of these references cited by the EPO teaches or suggests a method for controlling an AMT including sensing a wheel lock signal and responding in a particular manner thereto." (CX-197 at EA 99652 (emphasis added).) Thus, respondents omitted the word "particular" from Gordon's description of the '427 patent submitted to the PTO. At the hearing, Caulfield testified regarding Gordon's remarks "[n]either

of these references cited by the EPO teaches or suggests a method for controlling an AMT including sensing a wheel lock signal and responding in a particular manner thereto" submitted to the PTO in connection with the April 12 Amendment. Thus, Caulfield testified on cross-examination:

> Q. So I know you've moved ahead of me a little bit, but neither of the references, Mr. Gordon says, cited by the EPO teaches or suggests a method for controlling an AMT, including sensing a wheel lock signal and responding in a particular manner thereto?
>
> A. That's what he says.
>
> Q. That statement is false?
>
> A. No, it's not because, if you look at either patent, see the word 'particular'? If you look at his '279 patent, neither of the references cited by the EPO suggest a method for controlling an AMT, including sensing a wheel lock and responding in a particular manner. In other words, the '427 shifts to neutral. I would interpret that, and I'm not trained in reading these. I can read a patent examiner's file, I just read it as an engineer. They don't refer to shifting to neutral as he's referring to it here. In other words, the '279, each of these that the EPO has looked at, does not do in the particular manner that the '279 does, and it's my understanding the particular manner would be to get on the patent.
>
> Q. The '427 does respond to a wheel lock signal or condition, correct?
>
> A. '427 does respond to a wheel lock condition, and it responds in a different manner, it's not the particular manner that I think Mr. Gordon is reciting, but I can't tell you what's in his head.

(Tr. at 3182-83; see CX-197 at EA 99652.)

At best, by focusing narrowly on a specific portion of Gordon's remarks submitted to the PTO, respondents have attempted to create an issue of fact as to whether Gordon was referring to the '279 patent claims or the method claimed in the '427 patent when he stated "including

sensing a wheel lock signal and responding in a particular manner thereto."[55] The administrative law judge finds that the weight of the evidence indicates that Gordon, in the aforementioned remarks submitted to the PTO, attempted to distinguish the invention claimed in the '279 patent from the references cited in the EPO search report, including the method claimed in the '427 patent. Accordingly, the administrative law judge finds that respondents have failed to establish, by clear and convincing evidence, that Gordon materially misrepresented the teachings of the '427 patent in his remarks in the April 12 Amendment.

c. The EPO Office Action

The next portion of the '279 file history respondents' focus on for their inequitable conduct argument includes a Petition To Withdraw From Issue and an Amendment After Allowance mailed on or about June 5, 1989. (See CX-197 at EA 99671, 99705.) The Petition To Withdraw states:

> Applicants' reason for petitioning for withdrawal from issue is that prior art discovered in prosecution of the corresponding European Patent Application 87302859.1, English language translations/equivalents of which were obtained only after payment of the Issue Fee, appear to render at least one claim of the subject application unpatentable under 35 USC 103.
>
> In particular, at least claims 1, 3, 5 and 22, as allowed, appear to be unpatentable over British 1,405,787 (see page 1, lines 54-64) which is the equivalent of the D1 reference, DE-A-2 251 548, cited by the European Patent Office.
>
> A copy of the EPO First Action and English Language translations/equivalents of cited prior art is enclosed.
>
> An Amendment After Allowance complying with 37 CFR 1.312 is enclosed.

---

[55] The parties do not dispute that sensing a wheel lock condition was known in the art before the time of the '279 invention. (See SPFF 392 (undisputed).)

(CX-197 at EA 99671-72.[56]) Gordon received the EPO Office Action from John Douglas, a European patent attorney employed by Eaton in London who was handling the EPO '279 application.[57] (Gordon, Tr. at 1072-74.) Gordon testified that Douglas did not report to him, either directly or indirectly, that Gordon did not oversee the prosecution of the corresponding EPO application and that he was only responsible for the corresponding application "on a peripheral basis."[58] (Tr. at 1073.)

The EPO Office Action cites four references, D1 - D4. (CX-197 at EA 99676.) Said EPO Office Action lists the D4 reference as "D4 = DE-A-3 146 512," which is the same German-language DE '512 patent that Gordon submitted to the PTO in the Supplemental Disclosure Statement supra. (Id.; see RPFF 813 (undisputed).) It is undisputed that the British patent to Magnusson, the '927 patent, which corresponds to the U.S. '427 patent to Magnusson, is the English-language equivalent to the D4 reference. (SPFF 466 (undisputed).) The '279 file history contains the British '927 patent with a "D4" in handwriting in the upper right-hand corner, which

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[56] It is not disputed that Gordon submitted the EPO Office Action to the PTO. (RPFF 843 (undisputed).)

[57] The '279 file history contains correspondence, which predates the Petition To Withdraw/Amendment After Allowance, between Gordon and Douglas. (See, e.g., CX-197 at EA 99673.) An internal Eaton memo dated February 21, 1989 from Douglas to Gordon references the "First Action" or EPO Office Action at issue. (CX-197 at EA 99680.) The file history also includes a fax request, which was handwritten by Gordon on the February 21st memo on April 3, 1989, where Gordon asked Douglas "to provide translations of D1, D2, D3 and D4 ASAP!!" (CX-197 at EA 99680; Gordon, Tr. at 1074.) An April 19, 1989 memo from Douglas to Gordon indicates that Gordon received "English language versions of [the] D1, D3 and D4" references. (CX-197 at EA 99681; Gordon, Tr. at 1074.) With respect to the D2 reference, the '279 file history contains a fax memo from Douglas to Gordon that includes a description of the D2 reference, which Douglas characterized as "a fairly literal translation of Page 2, lines 12-28" of said D2 reference. (CX-197 at EA 99674.)

[58] The EPO Office Action is addressed to Douglas. (CX-197 at EA 99675.)

Gordon submitted to the PTO in connection with the Petition To Withdraw From Issue. (SPFF 462 (undisputed); RPFF 845 (undisputed).) The file history also includes a copy of British patent 1,405,787 with a handwritten D1 in the upper right-hand corner, the English language equivalent to the German DE A 2 251 548 (the DE '548 patent) patent cited in the EPO Office Action. (CX-197 at EA 99805 (D1); EA 99676.) In addition, a copy of U.S. Patent No. 4,491,919 with a handwritten D3 appears in the '279 file history, which is the English language equivalent to the "D3 = EP-A-106 112" reference cited in the EPO Office Action. (CX-197 at EA 99643.)

The EPO Office action references, inter alia, claim 23 from the EPO '279 application. (CX-197 at EA 99677.) Claim 23 from the EPO application is identical to claim 23 of the U.S. '279 application, which ultimately issued as the presently asserted claim 15. (RPFF 835-36 (undisputed).) With respect to claim 23 in the EPO application, the EPO Office Action states:

> From D3 [English-language equivalent U.S. Patent No. 4,491,919](see claims 3 to 6) it is known to influence the gear change command so that undesirable downshifting is prevented. See in this connection also D4 [the DE '512 patent] (e.g. the abstract).
>
> Thus, the features of the second part of independent claim 23 and all features of dependent claim 2 are in principle known. Therefore claim 23 does not involve an inventive step and claim 2 adds nothing inventive to claim 1.

(CX-197 at EA 99677 (emphasis added).) The EPO Office Action also addresses the D1 reference and states:

> Documents in D1 [English-language equivalent British patent 1,405,787] (see claim 1 and the control means 46, 48 and 50, D2 (see p.2, para 3) and D3 (see claims 1, 2 and 50, D2 (see p. 2, para 3) and D3 (see claims 1, 2 and p. 2 , para 4, last line) show that it is generally known in drive systems to cause a clutch or a coupling of a transmission to be dis engaged, if a wheel lock-up condition is sensed. Thus the features of the characterising part of independent claims 1 and 22 are generally known. The skilled man would regard the inclusion of these features (the method and the apparatus described in D1-D3) in the known transmission systems described in the preamble of the description of the present

> application (see also the first part of the independent claims) as a normal design possibility. The present application does not meet the requirements of Articles 52 (1) and 56, because the subject matter of claim 1 and 22 do not involve an inventive step.

(CX-197 at EA 99676-77.) In the Amendment After Allowance that Gordon submitted to the PTO along with the Petition To Withdraw, Gordon made the following remarks relating to the pending claims 1, 3, 5 and 22 in the U.S. '279 application:

> As set forth in the Petition [To Withdraw From Issue], claims 1, 3, 5 and 22, as allowed, are believed to be unpatentable over prior art, English language versions of which have been obtained only after payment of the Issue Fee. The prior art was cited by the European Patent Office during prosecution of corresponding EP Application No. 87302589.1. Briefly, British 1,405,787 (equivalent of D1 reference DE-A-2, 251,548) at page 1, lines 54-64, discloses the general concept of automatically releasing the master clutch upon sensing a skid. British 1,405,787, nor the other prior art, does not disclose the concepts of Applicant's methods for sensing skid (wheel lock) termination and/or prohibiting shift commands during a skid....

(CX-197 at EA 99707-08.)

It is not disputed that claim 23 from the EPO application is identical to claim 23 of the U.S. '279 application, which ultimately issued as the presently asserted claim 15. (RPFF 835-36 (undisputed).) Hence, the administrative law judge finds that the EPO rejection of claim 23 in the corresponding EPO '279 application was material to the prosecution of the U.S. '279 application. However, Gordon did disclose the entire EPO Office Action to the PTO, which contained the findings of non-patentability made by the EPO. (Gordon, Tr. at 1084-85; CX-197 at EA 99675-79.) Moreover, as of the time Gordon submitted the Petition To Withdraw From Issue, he had already disclosed and distinguished the D4 reference (the DE '512 patent) by virtue of the Remarks section of in the April 12 Amendment in which he addressed the equivalent U.S. '427 patent. (Gordon, Tr. at 1094-95; CX-197 at EA 99651-52, 99671, 99677.)

2. Intent

a. The '427 Patent

Respondents argued that Gordon acted with the requisite intent to defraud the PTO necessary to render the '279 patent unenforceable because Gordon failed to put an English language version of the '427 patent before the Examiner. As indicated above, it is undisputed that Gordon provided the PTO with an English language equivalent to the '427 patent, viz. the British '927 patent, and that the '279 file history contains a copy of said '927 patent. (See RPFF 845 (undisputed); SPFF 462, 466 (undisputed).) While the '279 file history does not contain a copy of the '427 patent or any indication that the Examiner ever considered said '427 patent, the parties have stipulated as to certain inaccuracies in the '279 file history. (See CX-197b.) Moreover, Gordon testified repeatedly that he submitted a copy of the '427 patent to the PTO Examiner.[59] (See, e.g., Gordon, Tr. at 800, 1055, 1061, 1107.) Thus, the administrative law judge finds that respondents have not established, by clear and convincing evidence, that Gordon failed to disclose an English language version of the '427 patent to the Examiner with an intent to deceive the PTO.

b. Gordon's Description Of The '427 Patent Submitted To The PTO

Assuming arguendo that Gordon misrepresented the teachings of the '427 patent, respondents must also establish the Gordon made such misrepresentations with an intent to deceive the PTO. When asked about the aforementioned description of the '427 patent on cross-examination at the hearing, viz. "an automatic transmission control method for preventing

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[59] Gordon testified that he submitted a copy of the '427 patent to the PTO when he filed an amendment dated April 12, 1988, in response to an Office Action dated January 14, 1988. See infra.

erroneous gear selection by requiring a gear neutral selection if wheel acceleration exceeds a reference value," Gordon testified:

> If you turn back to figure 3 [of the '427 patent], I think that's exactly what it shows. Can we put fig. 3 back up. Acceleration greater than a predetermined reference value and requires you to select a neutral gear. That's precisely what figure 3 says.

(Tr. at 1068 (emphasis added).) As to his understanding of the teachings of the '427 patent at the time he prosecuted the '279 application, Gordon testified:

> The '427 patent teaches that, upon sensing a wheel lock condition by excessive, they say acceleration, it is actually deceleration of, I think it is the wheels, that you must shift the transmission to neutral. You are not allowed to stay in your currently engaged gear. You are forced to make a shift to neutral.

(Tr. at 806.) At the hearing, Gordon described the remark "[n]either of these references cited by the EPO teaches or suggests a method for controlling an AMT including sensing a wheel lock signal and responding in a particular manner thereto" submitted to the Examiner as follows:

> A. ... I went on to tell them [the PTO] neither of the references cited by the EPO teaches or suggests a method for controlling an AMT, including sensing a wheel lock signal and responding in a particular manner thereto. So I told them what the references did, then I told them what those references didn't do.
>
> Q. Now, directing your attention to the phrase in a particular manner thereto, at the time that you submitted that, what were you referring to?
>
> A. I was referring to the manner of disengaging the master clutch and preventing gear change operations [in the '279 patent].
>
> Q. And where had you set that out?
>
> A. It goes back to the remarks where the claimed prior art illustrates an AMT - - back on tab 8, Your Honor. The very first paragraph in remarks [CX-197 at EA 99651]. As the cited prior art illustrates, excuse me. The present invention involves an AMT control method or system which, independently or in connection with an ABS system, senses an impending wheel lock condition and responds in a specific manner. And that's the

specific manner as set forth in the claims [of the '279 patent].

* * *

Q. All right. At the time that you submitted that [April 12 Amendment], did you believe the things you said to the Patent Office to be true and correct?

A. Yes, I did.

Q. You still believe them to be true and correct?

A. Absolutely.

(Tr. at 798-99.) Based on the foregoing, the administrative law judge finds that respondents have not established, by clear and convincing evidence, that Gordon intended to deceive the PTO when he described the teachings of the '427 patent and distinguished the invention claim in the '279 application from said '427 patent.

c. The EPO Office Action

As to Gordon's intent to deceive the PTO in failing to disclose to PTO the EPO's rejection of corresponding claim 23, respondents argued that Gordon directed the Examiner to the D1 reference, the German-language DE '548 patent and its English-language equivalent British patent No. 1,405,787, thereby misleading the Examiner away from: (1) the DE '512 patent and its English language equivalent, the U.S. '427 patent and (2) the EPO rejection of claim 23 in the corresponding EPO '279 application, which was identical to the allowed claim 23 in the U.S. '279 application, based on the DE '512 reference.[60] (See RBr at 106-08.) Gordon, however, did submit the entire EPO Office Action to the Examiner at the PTO, which Office Action cited said D4 reference. Gordon had submitted the German-language D4 reference to the

[60] Respondents do not challenge the accuracy of Gordon's comments with respect to the D1 reference.

Examiner in the Supplemental Disclosure Statement filed in March 1988 and thereafter distinguished the '279 invention from the '427 patent teachings in the remarks to the April 12, 1988 Amendment. (See CX-197 at EA 99609, 99647.) Moreover, Gordon testified that he submitted the U.S. '427 patent, the English language equivalent to the D4 reference, to the Examiner with the April 12 Amendment, nearly 14 months before he submitted the Petition To Withdraw and Amendment After Allowance to the PTO. (Tr. at 1055; compare CX-197 at EA 99609 with CX-197 at EA 99671.) In addition, Gordon provided the Examiner with another English-language equivalent to the D4 reference, viz. the British '927 patent, when he submitted the Petition To Withdraw and Amendment After Allowance. Based on the foregoing, the administrative law judge finds that respondents have not established, by clear and convincing evidence, that Gordon intended to deceive the PTO with respect to the EPO Office Action.

VIII. Domestic Industry

Complainants bear the burden of demonstrating the existence of an industry in the United States that practices the patents-at-issue and meets the requirements of section 337(a)(3). Certain Microsphere Adhesives, Process for making Same, and Products Containing Same, Including Self-Stick Repositionable Notes, Inv. No. 337-TA-366, USITC Pub 2049, Comm'n Op. at 8 (January 1996).

In proving the existence of a domestic industry under subparts (A) and (B) of 19 U.S.C. § 1337(a)(3), a complainant must establish that its activities in the United States meet the threshold set forth in the statute (economic prong) and that those activities are devoted to a product or process which is covered by the patent(s) in issue (technical prong). In re Certain Removable Elec. Cards and Elec. Card Reader Devices and Prods. Containing Same, Inv. No. 337-TA-396,

1998 WL 479084, Comm'n Op. (Aug. 13, 1998). The Commission has found that the economic prong of the domestic industry requirement has been satisfied with respect to heavy-duty and medium-duty transmissions. See Procedural History, supra, and its reference to Order Nos. 28 and 45.

The technical prong of the domestic industry requirement requires a complainant to demonstrate that they practice the patents at issue. Although there must be a domestic industry with respect to each asserted patent, there is no requirement that the claims asserted against a respondent must correspond with those practiced by the domestic industry. Certain Microsphere Adhesives, Process for Making Same and Products Containing Same Including Self-Stick Repositionable Notes, Inv. No. 337-TA-366, USITC Pub. 2949 (1996). Thus, a complainant need only show that their products meet one claim of every patent at issue. Certain Lens Fitted Film Packages, Inv. No. 337-TA-406, Final Initial Determination at 203 (Feb. 24, 1999), reviewed-in-part on other grounds (April 9, 1999); Certain Toothbrushes and Packages Thereof, Inv. No. 337-TA-391, Order 8, Initial Determination (July 7, 1997) (unreviewed).

A. Technical Prong ('566 Patent)

Complainant argued that claim 4 of the '566 patent is practiced by the AutoShift/UltraShift products; and that those products

(CBr at 124.)

Respondents argued that complainant's AutoShift and UltraShift transmissions do not practice claim 4 of the '566 patent; that said

(RPFF 1029); that the predicted value of the input shaft speed is then (RPFF 1030); that (RPFF 1031); and that the as shown in the following table:

Model	Without Engine Brake	With Engine Brake

It is further argued by respondents that claim 4 recites "determining . . . feasibility or infeasibility of achieving substantially synchronous conditions for engagement of the target ratio if the selected shift is implemented"; that the AutoShift and UltraShift transmissions do not meet that limitation since the transmissions do not (RPFF 1035); that determining "feasibility or infeasibility" of achieving substantially synchronous conditions is interpreted as determining whether it is possible or impossible to synchronize the input shaft to the output shaft of the transmission; and that the AutoShift and

UltraShift transmissions

(RBr at 21.)

The staff argued that claim 1 of the '566 patent[61] calls only for a comparison of an expected output shaft speed at the new target gear ratio (OS*GR) to an expected input shaft speed (IS) to determine if the two will achieve substantially the same rotational speed such that the target gear can be engaged; that claim 1 makes no reference to engine speed; that while Eaton's transmissions such is not relevant to the practice of claim 1; that, even if such a minimum engine speed element were to be grafted onto claim 1, the '566 patent specification makes it clear that the acceptable engine speed at which the target gear is engaged can be any value above engine idle speed; that Figure 5 of the '566 patent teaches an output shaft speed (208) and input shaft speed (204) intersecting Eaton's transmissions; and that it is undisputed that Eaton's AutoShift transmissions

Hence, it is argued that the evidence shows that the Eaton AutoShift transmissions "practice claim 1 of the '566 patent" and that the technical prong of the domestic industry exists. (SBr at 69.)

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[61] The staff argued that like asserted claim 4 of the '566 patent the central limitation in said claim 1 of the '566 patent is a "means for determining as of [sic] function of (i) expected vehicle acceleration (A_0) under current vehicle operating conditions and zero engine torque to the drive wheel, (ii) the gear ratio of the selected target gear ratio and (iii) the expected input shaft acceleration during a shift into the target gear ratio, feasibility or infeasibility of achieving substantially synchronous conditions for engagement of the target ratio if the selected shift is implemented. . . ." (SBr at 67.)

Eaton's AutoShift transmission is used in (SPFF 360 (undisputed).) Also, Eaton's AutoShift and UltraShift transmissions (SPFF 361 (undisputed).) Eaton's AutoShift transmission (SPFF 362 (undisputed).) (SPFF 363 (undisputed).) When vehicle speed (SPFF 364 (undisputed).) To determine whether to initiate a shift, (SPFF 365 (undisputed).) Moreover, the AutoShift (SPFF 366 (undisputed).) Thus, prior to initiating a shift Accordingly, the administrative law judge finds that at least Eaton's AutoShift transmission practices claim 1 of the '566 patent and Eaton satisfies the technical prong requirement with respect to the '566 patent.

B. Technical Prong ('545 Patent)

Complainant argued that the Eaton AutoShift and the UltraShift transmissions include logic that controls the automatic shifting of the transmission, in the manner recited by claim 1 of the '545 patent. (CBr at 121-24.)

Respondents argued that the AutoShift and UltraShift transmissions do not practice claim

1 of the '545 patent. (RBr at 123-25.)

The staff argued that Eaton's AutoShift transmissions practice claim 1 of the '545 patent. (SBr at 69-72.)

Eaton's AutoShift (SPFF 368 (undisputed).) The AutoShift

(CX-205; CX-227b; CDX-27, see SPFF 369 (undisputed).) It determines if at the completion of a shift

(SPFF 370 (undisputed).) If the transmission determines that

(SPFF 371 (undisputed).) However, if the transmission determines that

(SPFF 372 (undisputed).)

Eaton sells the AutoShift transmission which in the default configuration has a reference speed in the range of (Dedow Tr. at 567.) Eaton selected based on information about the peak torque ratings of available truck engines. (Dedow, Tr. at 568-69.)

(SPFF 375 (undisputed).) Eaton sells AutoShift 18 transmissions to OEM truck manufacturers that have an engine peak torque of (SPFF 378 (undisputed).)

Based on the foregoing, the administrative law judge finds that complainant has established that the Eaton AutoShift transmission practices the first part of the two-part

feasibility test called for in claim 1 of the '545 patent.

As for the second part of the claimed two-part feasibility test, in the AutoShift transmissions, if the transmission determines that

the transmission

(SPFF 379 (undisputed).) To calculate

(SPFF 380 (undisputed).) The AutoShift transmission then

As for said comparison, Dedow testified:

Q. Okay. Can we go back to CDX-27.
synchable block of that diagram.

(Tr. at 572-86 (emphasis added); FF 61.)

In the AutoShift transmission

(SPFF 382 (undisputed).) If the algorithm determines that

(SPFF 383 (undisputed).) The algorithm requires

(SPFF 384 (undisputed).)

Based on the foregoing, the administrative law judge finds that complainant has established that the AutoShift transmission practices the second part of the two-part feasibility test called for in claim 1 of the '545 patent, i.e. ensuring that the synchronization can be achieved above an engine speed, substantially equal to maximum engine torque. Moreover, with the AutoShift transmission if the transmission determines

(SPFF 385 (undisputed).) Also, the AutoShift predicts

(SPFF 386 (undisputed).)

(SPFF 387 (undisputed).)

(SPFF 388 (undisputed).)

Based on the foregoing, the administrative law judge finds that complainant has established that the AutoShift transmission practices each element of claim 1 of the '545 patent.

C. Technical Prong ('279 Patent)

Complainant argued that a truck equipped with Eaton's Lightning Top2 transmission system includes all of the elements in claim 15 of the '279 patent, citing CPFF 442, CPFF 469-470. (CBr at 120-121.)

Respondents argued that complainant's Lightning Top2 transmission does not practice claim 15 of the '279 patent. (RBr at 118-121.)

The staff argued that complainant's Lightning Top2 transmission practices claim 15 of the '279 patent. (SBr at 65-67.)

The Lightning Top2 transmission, which is installed on various heavy-duty trucks, includes, inter alia, a transmission control unit or "ECU" that receives input signals from a transmission output speed sensor and from a network device called the "J1939 datalink." (SPFF 351 (undisputed).) In addition there is the following testimony of complainant's expert Caulfield:

Caulfield, Tr. at 1384-86.) Accordingly, the administrative law judge finds that the Lightning Top2 transmission system contains all the elements in the preamble of claim 15.

The Lightning Top2 transmission has three modes of operation:

(SPFF 352 (undisputed).) In the

(SPFF 352 (undisputed).) Specifically, when active, the

(SPFF 352 (undisputed).)

(See SPFF 356.) The Lightning Top2 determines that

(SPFF 354 (undisputed), 355 (undisputed).)

Thus, the Lightning Top2 system contains

Thus, the administrative law judge finds that Eaton's Lightning Top2 transmission contains a "means for sensing the presence of wheel lock-up condition."

Referring further to claim 15 of the '279 patent, once the ECU senses

Thus, James Walker, who has worked on Lightning Top2 at Eaton (Tr. at 233; CX-248), testified that

(Tr. at 233-34.) Walker, when asked what the Lightning Top2 does once a tire skid event has been detected, testified that

In addition respondents' expert C. Douglas Locke, a full-time consultant and who has a Ph.D. in computer science from Carnegie Melon University, as to the Top 2 system testified that

(Tr. at 2055-57, 2171; RX-338)

Based on the foregoing, because the Lightning Top2 transmission system includes an ECU that

the administrative law judge finds that complainant has established that its Lightning Top2

transmission system practices claim 15 of the '279 patent.

IX. Remedy

The Commission has broad discretion in selecting the form, scope and extent of the remedy in section 337 proceedings. Integrated Circuit Telecommunication Chips, Inv. No. 337-TA-337, Comm'n Op. (August 3, 1993), citing Viscofan, S.A. v. U.S. Int'l Trade Comm'n, 787 F.2d 544, 548 (Fed. Cir. 1986). An exclusion order can exclude from importation goods and products that directly or contributorily infringe the patented technology. In the Matter of Certain Hardware Logic Emulation Systems & Compnents Thereof, Inv. No. 337-TA-383, USITC Pub. 3089, Comm'n Op. at 27 (March 1998) (Hardware Logic). Direct infringement does not have to precede importation for an exclusion order to reach components that contribute to the infringement of the patents-in-issue. Hardware Logic, Comm'n Op. at 19-20. In Certain Personal Computers & Components Thereof, Inv. No. 337-TA-140, USITC Pub. No. 1504 (March 1984), the Commission excluded from entry into the United States personal computers and components thereof "which are less than complete when imported but [which] are designed and intended to be employed by their owner, importer, consignee or agent of either to make a personal computer which directly infringes any of the [patents-in-suit]."

The Commission also has the authority to issue cease and desist orders where a respondent has a sufficient inventory of infringing goods in the United States. See Certain Plastic Encapsulated Integrated Circuits, Inv. No. 337-TA-315, USITC Pub. 2574, Comm'n Op. at 37 (November 1992). A "sufficient inventory" may consist of one infringing product. See, e.g., Hardware Logic, Comm'n Op. at 26.

A cease and desist order can issue in lieu of or in addition to an exclusion order to prevent

the sale, distribution or other use of infringing imported products in the United States. The scope of section 337 is broad enough to prevent every type and form of unfair practice, including the transmission of infringing software by electronic means, electronic transmission of software and/or data that induces an infringing use of an imported product and the servicing of imported products that induce infringement. Hardware Logic, Comm'n Op. at 25-29; Certain Digital Satellite Systems Receivers, Inv. No. 337-TA-392, USITC Pub. 3418, Initial Determination at 239-44 (Oct. 1997); Certain Digital Satellite Systems Receivers, Order No. 53 at 7-11 (June 9, 1997).

Complainant argued that the evidentiary record and applicable law make clear that the administrative law judge should recommend that the Commission issue (1) a permanent limited exclusion order that prohibits the entry or withdrawal from customs warehouses for consumption in the United States of infringing FeedomLine transmissions (assembled or unassembled) and parts, components (whether spare parts or parts for repair, maintenance, modification, upgrading, retrofitting, or otherwise, as well as software of infringing automated mechanical transmissions) and subassemblies thereof manufactured abroad by or for, or imported by or on behalf of respondents and any of their affiliated companies, parents, subsidiaries, suppliers, contractors, or other related business entities or their successors or assignees, and (2) a cease and desist order prohibiting respondents and any of their U.S.-affiliated companies, parents, subsidiaries, contractors, or other related business entities or their successors or assigns, expressly including ZF Holding Inc., ZF Group NAO, Meritor Heavy Vehicle Systems Inc., and Meritor Transmission Corporation, from importing, assembling, manufacturing, selling, offering for sale, leasing, loaning, marketing, distributing, advertising, installing, assisting with the installation of,

modifying, calibrating, upgrading, testing, refurbishing, or training in the use of imported infringing FeedomLine transmissions, or otherwise engaging in activities with respect to imported infringing FeedomLine transmissions and parts, components, and subassemblies thereof in the United States. In order to afford Eaton with complete relief, it was also argued that both the permanent limited exclusion order and the cease and desist order should apply to respondents' principals, stockholders, officers, directors, employees, agents, licensees and distributors insofar as they are engaging in conduct prohibited by either order, for, with, or otherwise on behalf of a respondent. (CBr at 126-27.)

Specifically Eaton requests the entry of a permanent limited exclusion order that prohibits:

> importation of respondents' automated mechanical transmissions (assembled or unassembled) for medium-duty and heavy-duty trucks that infringe the patented technology; and
>
> importation of parts, components and subassemblies of such automated mechanical transmissions, including gears, gearboxes, clutches, clutch actuators, electronic transmission controls, imported yokes and any other tangible products imported for use as a part of or with the FeedomLine system and that are not staple articles of commerce suitable for substantial noninfringing use.

It was argued that this would include, but not be limited to all 12-speed and 16-speed FreedomLine transmissions for medium-duty and heavy-duty trucks and parts, components, and subassemblies thereof, and would cover at minimum model numbers M-13Z12A-A13; M-14Z12A-A14; MO-13Z12A-13; MO-14Z12A-A14; MO-15Z12A-A15; MO-16Z12A-A16; MO-13Z16A-A13; MO-14Z16A-A14; MO-15Z16A-A15; MO-16Z16A-A16; MO-13Z16A-A13; MO-14Z16A-A14; MO-15Z16A-A15; and MO-16Z16A-16. (CBr at 129-30.)

Complainant argued that

It is also argued by complainant that

Complainant argued that

(CBr at 129-31, citing 19 U.S.C. § 1337(d).)

Complainant further requested that any limited exclusion order include a record-keeping and inspection requirement; and that respondents should be required to retain any and all records relating to the importation, sale, offer for sale, marketing, distribution, or other transfer in the

United States of imported covered products, made and received in the ordinary course of business, whether in detail or in summary form, for a period of two years from the close of the fiscal year to which they pertain. (CBr at 134.)

Complainant, as for any cease and desist order specifically requested that respondents their affiliates, subsidiaries, divisions, licensees, agents, contractors, and other related entities, and their successors and assigns, expressly including ZF Holding, Inc., ZF Group NAO, Meritor Heavy Vehicle Systems, Inc., and Meritor Transmission Corporation, from:

> importing and selling for importation into the United States any covered product or component thereof;
>
> offering for sale, selling, leasing, loaning, distributing, assembling, and otherwise transferring any covered product or component thereof, including liquidation of any assembled or unassembled imported inventory held in the United States;
>
> advertising, demonstrating, and marketing any covered product, including soliciting United States OEM manufacturers or other agents and distributorships for any covered product;
>
> engaging in the importation (including through electronic transmissions), sale, transfer or installation of software upgrades or modules for use in, or to be adapted for use in, any component of an infringing FeedomLine transmission system, either in the form of source code, object code, or any other form; and
>
> assisting OEM manufacturers with or otherwise participating in the installation of infringing transmission systems or their components, including the installation of infringing software upgrades (with the exception of participation in necessary servicing or maintenance of infringing transmission systems already sold to and in use by consumers).

(CBr at 136-37.)

Respondents argued that the only products accused of infringement are FeedomLine

transmission systems for use in medium-duty and heavy-duty trucks; that respondents have proven that they do not import FeedomLine transmissions for use in medium-duty trucks and Complainant failed to show otherwise; and that therefore the only use of the accused product at issue is for FeedomLine transmissions in heavy-duty trucks. It is also argued that respondents have additionally established that

(RRBr at 101.)

Respondents also argued that a remedy should not unduly burden the ability of third parties to engage in legitimate commerce; that third parties have purchased transmissions at issue from respondents in order to pursue their legitimate business interests; that respondents assumed warranty obligations pertaining to those transmissions and a remedy should not interfere with the expectations of third parties that respondents will honor their obligations; that complainant has even indicated that, "[i]n the interest of protecting third party customers of respondents from unnecessary harm," it "does not seek a cease-and-desist order prohibiting Respondents from servicing or repairing FeedomLine transmissions currently installed in trucks in the United States." citing CBr at 143; that complainant's admission that such a remedy would unduly burden third parties is equally applicable to complete replacement of FeedomLine transmission systems or units, where needed; that respondents' warranty requires respondents to replace components or a complete transmission system or unit

that complainant's proposed remedy unjustifiably burdens legitimate

commerce because it prevents third parties from reasonably relying on respondents' warranty obligations; that the Commission should fashion a remedy that permits third parties to obtain maintenance, repair or replacement parts or components and transmissions to avoid harm to the third parties who have purchased heavy-duty trucks with FeedomLine transmissions already installed; and that other heavy-duty transmissions simply cannot replace the FeedomLine transmission once the truck is retrofitted with the FeedomLine. (RRBr at 103-4.)

Respondents further argued that any exclusion order should not cover individuals or any non-named respondents; that any such order should not contain a record-keeping requirement; and that it should not cover components or parts. Thus, it is argued that any exclusion order should be limited to the following covered products and the following importation:

> [I]mportation of respondents' accused automated mechanical transmissions (assembled or unassembled) for heavy-duty trucks that are found to infringe the patented technology, which shall be limited to transmissions used in respondents' FeedomLine of transmissions for heavy-duty trucks and comprise gear boxes with the following series model numbers: 1338 031 001, 1338 031 002, 1338 031 003, 1338 031 004, 1338 031 005 and 1338 031 006.

Respondents in addition argued that any exclusion order should also contain the following limitation to ensure that parts and components for maintenance, repair or replacement are freely allowed and not covered by any exclusion order:

> This limited exclusion order shall not apply to any parts, components, gear boxes or transmission systems or units that are intended for maintenance, servicing, repairing or replacing FeedomLine transmissions or parts or components thereof that are currently installed in heavy-duty trucks in the United States.

Respondents also argued that any cease and desist order should be limited to prohibit only the following:

> Importing and selling for importation into the United States any covered product, which shall be limited to transmissions used in Respondents' FeedomLine transmissions for heavy-duty trucks and comprise gear boxes with the following series model numbers: 1338 031 001, 1338 031 002, 1338 031 003, 1338 031 004, 1338 031 005 and 1338 031 006 and FeedomLine transmission systems with the following model numbers: M-13Z12A-A13; M-14Z12A-A14; MO-13Z12A-13; MO-14Z12A-A14; MO-15Z12A-A15; MO-16Z12A-A16; MO-13Z16A-A13; MO-14Z16A-A14; MO-15Z16A-A15; MO-16Z16A-A16;

Also, it was argued that any cease and desist order also should contain a limitation to ensure that parts and components for maintenance, repair or replacement are freely allowed and not covered by any cease and desist order:

> This cease and desist order shall not apply to any parts, components, gear boxes or transmission systems or units that are intended for maintenance, servicing, repairing or replacing FeedomLine transmissions or parts or components thereof that are currently installed in heavy-duty trucks in the United States.

Respondents further argued that, to the extent deemed necessary, a certification procedure can be imposed if concerns arise relating to imported or sold parts, components, gear boxes or transmission systems being dedicated to actual maintenance, repair or replacement applications. (RRBr at 109-10.)

The staff argued that a limited exclusion order, as to respondents' accused automated mechanical transmissions for medium-duty and heavy-duty trucks is appropriate, and that said order should cover components for the transmissions; that the evidence establishes that respondents' imported components and software are (1) essential to the proper functioning of the FeedomLine transmissions sold in the United States, (2) especially adapted for use in these FeedomLine transmissions, and (3) not staple articles of commerce suitable for non-infringing use.

It was argued by the staff that it is clear that respondents' FeedomLine transmission systems also contributorily infringe the patent claims at issue and that respondents induce infringement of those patent claims;

and that accordingly, a limited exclusion order directed to respondents' infringing automated mechanical transmission systems for medium-duty and heavy-duty trucks, and components thereof, would be appropriate. The staff, however, argued that any such exclusion order should contain an exception for parts necessary to service FeedomLine transmissions installed on trucks prior to the issuance of any exclusion order and that such an exception is necessary to ensure the safe operation of those transmissions and could be administered by way of a certification process. (SBr at 102-03.)

Referring to the issuance of any cease and desist order, the staff argued that the evidence shows that

and that accordingly, the issuance of a cease and desist order to the sole remaining domestic respondent would be appropriate to ensure complete relief to complainant. The staff, however, is of the view that any such cease and desist order should contain an exception for parts necessary to service FeedomLine transmissions installed on trucks prior to the issuance of the order and that such an exception is necessary to ensure the safe operation of these transmissions. (SBr at 101-04.)

A. Exclusion Order

Based on the record the administrative law judge recommends that a limited exclusion order issue which prohibits entry of accused automated mechanical transmission for medium-duty and heavy-duty trucks of the respondents and their affiliates which the Commission determines infringe any of the asserted claims in issue.

The administrative law judge rejects respondents' arguments that any exclusion order should be limited to certain model numbers. The Commission's long-standing practice is to direct its remedial orders to all products covered by the patent claims as to which a violation has been found, rather than limiting its orders to only those specific models selected for the infringement analysis. See, e.g., Certain Curable Fluoroelastomer Compositions And Precusrsors Thereof, Inv. No. 337-TA-364, Exclusion Order at 2, Pub. No. 2890 (May 1995); Certain Neodymium-Iron-Boron Magnets, Magnet Alloys, And Articles Containing Same, Inv. No. 337-TA-372, Exclusion Order at 2, Pub. No. 2964 (May 1996) (Magnets); Certain Variable Speed Wind Turbines And Components Thereof, Inv. No. 337-TA-376, Exclusion Order at 3, Pub No. 3003 (Nov. 1996); Certain Toothbrushes And The Packaging Thereof, Inv. No. 337-TA-391,

Limited Exclusion Order at 1-2, Pub. No. 3068 (Oct. 1997). While individual models may be evaluated to determine importation and infringement, the Commission's jurisdiction extends to all models of infringing products that are imported at the time of the Commission's determination and to all such products that will be imported during the life of the remedial orders. The central purpose of remedial orders is to ensure complete relief to the domestic industry. An exclusion order covering only specific models of an accused device could easily be circumvented, thereby denying complete relief to the domestic industry.

The administrative law judge further rejects respondents' arguments that any exclusion order should be "limited to transmissions used in respondent's FeedomLine of transmission ... and comprise gear boxes." Rather, the record supports a recommendation that any exclusion order with a certification process should also cover software and components imported by respondents and used to operate the transmission systems found to infringe any of the asserted claims in issue. Thus the record establishes

(Collenberg, Tr. at 2465);

(Sayman, Tr. at 2021);

(Sayman, Tr. at 2021);

(Sayman, Tr. at 2021);

(Sayman, Tr. at 2021.) While the administrative law judge is recommending that any exclusion order cover software and components, he further recommends that the order

contain an exception for parts necessary to service an accused transmission installed on trucks prior to the issuance of any exclusion order.

B. Cease And Desist Order

(SPFF 572 (undisputed).)

(SPFF 573 (undisputed).)

(SPFF 574 (undisputed).)

(SPFF 575 (undisputed).)

Based on the foregoing, the administrative law judge recommends issuance of a cease and a desist order against the domestic respondent. As with the finding of the administrative law judge relating to any exclusion order, he recommends that any cease and desist order not recite specific model numbers. He also recommends that the order relate to any components of the transmission that would be affected, consistent with what the administrative law judge recommended relating to a limited exclusion order.

X. Bond

Pursuant to Commission rules 210.36(a) and 210.42(a)(1)(ii), the administrative law judge is to issue a recommended determination on bonding since the accused products are entitled to entry under bond during the Presidential 60-day review period. See 19 U.S.C. § 1337(j)(3). To the extent possible, the bond should be an amount that would be sufficient to protect a complainant from an injury. See Commission rule 210.50(a)(3). In setting a bond

amount, "the Commission typically has considered the differential in sales price between the patented product made by the domestic industry and the lower price of the infringing imported product." See, e.g., Microsphere Adhesives, Process for Making Same, and Products Containing Same, Including Self-Stick Repositionable Notes, Inv. No. 337-TA-366, Comm. Op. at 24, Pub. No. 2949 (Jan. 1996). However, where the available pricing information is inadequate, the bond may be set at 100 percent of the entered value. See, e.g., Magnets, Comm. Op. at 15.

Complainant argued that a bond amount of 100 percent of the entered value for any importation of infringing products during the 60-day Presidential review period should be required; and that a bond amount of 100 percent is appropriate when the respondents' accused products are not readily comparable to the complainant's products and a price differential analysis is inappropriate.

It is argued by complainant that although respondents do not dispute that Eaton's products are in direct competition with FeedomLine for the Class 7 and Class 8 truck market (citing CPFF 135 (undisputed)), an "apples-to-apples" comparison of pricing is difficult due to the variety of models and product features and other circumstances of sale; that for example, the

It was further argued by complainant that even if lost sales could be compared to a specific Eaton model, until recently respondents offered a significant rebate on the sales price of their transmissions, and may have been selling their transmissions at or near a loss, making it difficult if not impossible to compute the true sales price of Respondents' products, the profit derived by respondents (if any), or the amount of underselling, if any, confronted by Eaton; and that this uncertainty undercuts traditional methods for computing a respondent's bond. (Id.)

Respondents argued that complainant has not provided any legal support for their assertion that the Commission should impose a bond of 100 percent of the entered value for any importation of infringing products. It was further argued by that respondents have demonstrated that the record contains sufficient price information to determine an effective bond; that respondents' products are priced higher than complainant's products, thereby eliminating the necessity for a bond; and that if necessary, a bond should be set at

(RRBr at 110-11.)

The staff argued that the record does not permit the use of price comparisons to set the bond amount given respondents' generally higher prices, the disparate features among the respective transmissions and the circumstances of sale unique to each transaction; that the record is lacking evidence regarding a reasonable royalty rate; and that there does not appear to be sufficient evidence to assess complainant's average profits on its sales of medium-duty and heavy-duty transmissions. Accordingly, the staff argued that a bond in the amount of 100 percent of the entered value for any importation of infringing products would be appropriate. (SBr at 105.)

It is undisputed that the FeedomLine transmission competes mainly in the class 7 and 8 heavy-duty truck market in North America and in this market, it competes directly with Eaton's UltraShift. (CPFF 1357 (undisputed).) It is also undisputed that

(CPFF 1358 (undisputed));

(CPFF 1358 (undisputed));

(CPFF 1360 (undisputed));

(CPFF 1361 (undisputed)); and that the ZFM FeedomLine transmission has been the primary competitor that Eaton has to its AutoShift and UltraShift products. (CPFF 1367 (undisputed).)

(CX-89, Schedule 4.8 at ARM016173; see CPFF 1324).[62]

[62] The sole objection raised by respondents to this CPFF 1324 was "[i]rrelevant."

The administrative law judge finds no evidence in the record of actual royalties charged by complainant or even of reasonable royalties in the industry generally. Respondents argued that one way to determine a reasonably royalty is to award a 25 to 35 percent share of profits to the patentee, reserving a 65 to 75 percent share for the licensee, citing Fonar Corp. v. General Electric, Co., 107 F.3d 1543, 1552-53 (Fed. Cir. 1997); that while a 100 percent bond is sometimes required, this is in "rare circumstances";

(citing RX-412),

(RBr at 130-31.) However, as indicated in exhibit RX-412,

Hence the administrative law judge rejects the cost and profit data offered by respondents as any basis for a profit and royalty calculation. Thus he finds that a bond during the Presidential review period in the amount of 100 percent of the entered value for any importation of infringing products would be

appropriate.

XI. Additional Findings

A. Parties

1. Complainant Eaton Corporation of Cleveland (Eaton) Ohio owns the '279 patent, the '566 patent and the '545 patent. (SX-2.)

2.

3. Eaton sells transmissions for medium-duty and heavy-duty trucks and related components under the "Eaton Fuller" brand name. (SX-2; CX-224.)

4. Respondent ZF Friedrichshafen AG (ZFF) is a German company having a principal place of business at Graf-von-Soden-Platz 1, 88046 Friedrichshafen, Germany. ZFF is 93.8 percent owned by the Zeppelin Foundation of Friedrichshafen, Germany, and 6.2 percent owned by the Dr. Jürgen Ulderup Foundation of Lemförde, Germany. (Response to Complaint at 19-20, ZFF Answer to ¶ 15; SX-2 at ¶ 5.)

5. ZFF is a worldwide automotive supplier for driveline and chassis technology. (SX-2 at ¶ 5.)

6. Respondent ArvinMeritor Inc. (ArvinMeritor) is a corporation organized and existing under the laws of Indiana, having its principal place of business at 2135 West Maple Road, Troy, Michigan 48084-7196. (Response to Complaint at 19-20, ARM Answer to ¶ 16; SX-2 at ¶ 6.)

7. On June 4, 1999, Meritor Transmission Corporation (MTC) and its parent, Meritor Heavy Vehicle Systems, caused to be formed a Delaware LLC known as Meritor Transmission and Clutch LLC. Pursuant to a purchase agreement dated June 8, 1999 and amended as of August 6, 1999 and August 18, 1999, ZFF, acting through its subsidiary ZF AG Holding, Inc. (ZF AG), purchased a 50 percent membership interest in Meritor Transmission and Clutch LLC which company was subsequently renamed ZF Meritor LLC. (SX-2 at ¶ 9.)

8. Respondent ZF Meritor LLC (ZFM) was a limited liability company organized and existing under the laws of Delaware having its principal place of business at 22021 Skyway Church Road, Maxton, NC 28364. ZFM was a 50/50 joint venture formed in 1999 between ArvinMeritor and ZFF. (SX-2 at ¶ 7; CX102.)

9. ZFM ceased operating as a joint venture effective January 1, 2004 and will be dissolved as soon as the wind up is completed and dissolution documents are filed with the Delaware Secretary of State's Office. (SX-2 at ¶ 7.)

10.

(SX-2 at ¶ 49; CX-96.)

11.

(SX-2 at ¶ 50; CX-95.)

12.

(SX-2 at ¶ 51; CX-99.)

13. ZFM transferred to ZFF all of ZFM's rights in tooling used by vendors of

(SX-2 at ¶ 52; CX-97.)

14.

(SX-2 at ¶ 53; CX-100.)

15. ArvinMeritor's wholly-owned subsidiary, Meritor Heavy Vehicle Systems, LLC, wholly owns Meritor Transmission Company (MTC), which owned a 50 percent share in ZFM. (SX-2 at ¶ 6.)

B. Person Of Ordinary Skill In The Art

16. With respect to complainant's patents in issue, one of ordinary skill in the art would have a Bachelor's degree in at least mechanical engineering and three to five years experience in power train systems and automated mechanical transmissions (AMTs). (See Davis Tr. at 2293; Caulfield, Tr. at 1281; Stein, Tr. at 2891-92.)

C. Witnesses

17. Complainant's expert witness, Dr. Shmuel Rotenstreich, is a professor in the computer science department in the School of Engineering at George Washington University. (Rotenstreich, Tr. at 1126; CX-250.)

18. Rotenstreich has written software code. (Rotenstreich, Tr. at 1126; CX-250.)

19. Rotenstreich is familiar with Java, C++, and C software code languages. (Rotenstreich, Tr. at 1127; CX-250.)

20. Rotenstreich was qualified at trial as an expert in software code. (Rotenstreich, Tr. at 1128; CX-250.)

21. Complainant's expert witness, Dr. Edward Caulfield, has a B.S. in Mechanical Engineering, and an M.S. and Ph.D. in Theoretical and Applied Mechanics. (Caulfield, Tr. at 1193; CX-159a.)

22. Caulfield has taken courses related to truck transmission technology. (Caulfield, Tr. at 1194.)

23. Caulfield was an assistant professor in the Machine Design Department at the University of Illinois, Urbana-Champaign. (Caulfield, Tr. at 1195; CX-159a.)

24. Caulfield has taught classes on truck driveline technology, including gears, gearing systems and gearing ratios. (Caulfield, Tr. at 1195.)

25. Caulfield is the President and Chief Technical Officer of Packer Engineering. (Caulfield, Tr. at 1191.)

26. Caulfield has the responsibility to make sure that all the engineering divisions of Packer Engineering are operating in the proper fashion. (Caulfield, Tr. at 1197.)

27. Caulfield has tested truck transmissions to test the strength of gears, velocity of gears, and stress on the gears. (Caulfield, Tr. at 1200.)

28. Caulfield was qualified at trial as an expert in the field of machine design and dynamics, including expertise in medium-duty and heavy-duty truck driveline technology. (Tr. at 1204-05.)

29. Complainant's expert, Dr. Jeffrey L. Stein, has undergraduate and graduate degrees in engineering from MIT. (Stein, Tr. at 2877-78; CX-252.)

30. Stein has been a professor for more than twenty years and is the Associate Director of the Automotive Research Center at the University of Michigan. (Stein, Tr. at 2878-79; CX-252.)

31. Stein has done some consulting work in connection with power train controls in light trucks. (Stein, Tr. at 2879-80; CX-252.)

32. Stein considers himself to be competent in modeling analysis and design of control systems and control of mechanical systems. (Stein, Tr. at 2880; CX-252.)

33. Stein also considers himself a specialist in automatic control systems, in particular, in the control of electromechanical, electrohydraulic, and pneumatic servo systems. (Stein, Tr. at 2880; CX-252.)

34. Stein considers himself an expert in vehicle dynamics, and instrumentation and simulation of vehicle dynamics. (Stein, Tr. at 2880; CX-252.)

35. Stein has been a registered professional engineer since 1990. (Stein, Tr. at 2880; CX-252.)

36. Stein has published about ten papers on power train control and automatic transmissions of heavy-duty and medium-duty trucks. (Stein, Tr. at 2882; CX-252.)

37. Stein was qualified at trial as an expert in the area of power train controls, including AMTs, for medium-duty and heavy-duty trucks. (Tr. at 2889-90.)

38. Respondent's expert, Dr. Gregory Davis, has a B.S., M.S. and Ph.D. in Mechanical Engineering. (Davis, Tr. at 2203.)

39. Davis is a full professor with tenure at Kettering University. (Davis, Tr. at 2855.)

40. Davis teaches a wide variety of courses in Kettering's automotive programs and also a professional development course for the Society of Automotive Engineers which focuses on AMTs for trucks. (Davis, Tr. at 2206-09.)

41. In his courses, Davis teaches about drive trains, evaluations of heavy-duty and medium-duty trucks, components of the power train and automated mechanical transmissions, the factors influencing automated shift decisions and shift logic in AMTs, and the evaluations of the algorithms that evolve from shift decisions. (Davis, Tr. at 2207-10.)

42. Davis has experienced in programming. (Davis, Tr. at 2211-14.)

43. Davis is a registered professional engineer. (Davis, Tr. at 2214.)

44. Davis has published numerous papers on control systems for power train components. (Davis, Tr. at 2216.)

45. Davis was qualified as an expert witness in the area of vehicle power train systems, which includes automated and mechanical transmissions for heavy-duty and medium-duty trucks, as well as the interaction of those transmissions with the other components of the drive train. (Davis, Tr. at 2283.)

46. Davis was also qualified as an expert in evaluating the factors that are relevant to automated mechanical transmission shift decisions and in constructing the algorithms related to those shift decisions. (Tr. at 2283-84.)

47. Respondents' expert witness, Carey Douglass Locke, has an undergraduate degree in physics and a Ph.D. in computer science from Carnegie Mellon University. (Locke, Tr. at 2056-57.)

48. Locke has been a member of a number of professional organizations. (RX-338.)

49. Locke has been the chair or vice chair of the technical committee on realtime computer systems for the Computer Society of the Institute of Electronics and Electrical Engineers. (Locke, Tr. at 2057; RX-338.)

50. Locke has been involved in planning, speaking, giving lectures and writing papers for numerous symposia and conferences. (Locke, Tr. at 2057-58; RX-338.)

51. Locke worked on computer systems for IBM, Loral, Lockheed Martin and Timesys for the thirty-seven years before he began his independent consulting business. (Locke, Tr. at 2060; RX-338.)

52. Locke currently owns his own business where he does computer system consulting principally for defense and aerospace companies. (Locke, Tr. at 2060; RX-338.)

53. Locke has worked with virtually all of the computer languages that have been used in the last 20 to 30 years, including C++, Pascal, Ada, Java and languages used primarily by NASA, the Navy and the Air Force. (Locke, Tr. at 2061.)

54. Locke has been using the C language system since 1985, used the C language for his dissertation and taught classes in how to use the C language in embedded systems. (Locke, Tr. at 2061.)

55. Locke was qualified at trial as an expert in computer software, including the C programming language, and in particular, software for embedded systems, that is software designed primarily for specialized computer systems that are part of machines or devices other than computers. (Tr. at 2066.)

56. Morschek is Eaton's vice president of technology for the truck components group which manufacturers and sells heavy-duty truck transmissions, medium-duty and light-duty truck

transmissions and clutches. Morschek's responsibility is to work on technologies for new products on the horizon, typically things that are more than three years away from market presence. He has been with Eaton for 33 years. (Morschek, Tr. at 49.)

57. Robert Anthony Sayman has been employed by ZF Industries in Georgia since 2004. He is senior product engineer. Before working for ZF Industries, he worked for ZF Meritor which work started in October 1999. In both positions, he worked in software and application development. (Tr. at 1817, 1819.)

58. William Cote, a named inventor on the '279 patent, testified on September 2, 2004. (Tr. at 169; CX-2465.)

59. James Walker worked on the Lightning Top2, a semi-automated transmission. (Tr. at 233; CX-248.)

60. Thomas A. Genise, Marcel Amsallen and Daniel P. Janecke, inventors on the '545 patent, testified on September 3, 2004. (Tr. at 305, 463 and 520.)

61. Warren Raymond Dedow is a current product engineer for Eaton. (Tr. at 557; CX-249.)

62. Howard Gordon has been employed at Eaton for some 25 to 30 years. (Tr. at 754-55; CX-247.)

63. John Michael Huber is employed as an electronics consultant to ZFF. (Tr. at 1766.)

64. Hans Collenberg is president, in North America, of ZFF's commercial vehicle and special driveline technology division. (Tr. at 2441-42.)

CONCLUSIONS OF LAW

1. The Commission has in rem jurisdiction and in personam jurisdiction.

2. There has been an importation of certain accused automated mechanical transmission systems for medium-duty and heavy-duty trucks which are the subject of the alleged unfair trade allegations.

3. An industry exists in the United States, as required by subsection (a)(2) of section 337, that exploits the transmissions that are covered by the '566 patent, '545 patent and '279 patent.

4. Respondents' accused products infringe the asserted claim 15 of the '279 patent.

5. Respondents' accused products do not infringe the asserted claims of the '545 patent.

6. Respondents' accused products do not infringe the asserted claim 4 of the '566 patent.

7. The asserted claims of the '545, '566 and '279 patents are not invalid.

8. The '545 patent and '279 patent are enforceable.

9. There is a violation of section 337.

10. The record supports issuance of a limited exclusion order, cease and desist order, and a bond in the amount of 100 percent of the entered value for any importation involving infringing products during the Presidential review period.

ORDER

Based on the foregoing, and the record as a whole, it is the administrative law judge's Final Initial Determination that there is a violation of section 337 in the importation into the United States, sale for importation, and the sale within the United States after importation of certain automated mechanical transmission systems for medium-duty and heavy-duty trucks. It is also the administrative law judge's recommendation that a limited exclusion order and a cease and desist order should issue. The administrative law judge further recommends that a bond be imposed during the Presidential review period in the amount of 100 percent of the entered value for any importation involving infringing products.

The administrative law judge hereby CERTIFIES to the Commission his Final Initial and Recommended Determinations together with the record consisting of the exhibits admitted into evidence. The pleadings of the parties filed with the Secretary and the transcript of the pre-hearing conference, and the hearing, including closing arguments, are not certified, since they are already in the Commission's possession in accordance with Commission rules.

Further it is ORDERED that:

1. In accordance with Commission rule 210.39, all material heretofore marked in camera because of business, financial and marketing data found by the administrative law judge to be cognizable as confidential business information under Commission rule 201.6(a) is to be given in camera treatment continuing after the date this investigation is terminated.

2. Counsel for the parties shall have in the hands of the administrative law judge those portions of the final initial and recommended determinations which contain bracketed confidential business information to be deleted from any public version of said determinations,

no later than January 28, 2005. Any such bracketed version shall not be served by telecopy on the administrative law judge. If no such bracketed version is received from a party it will mean that the party has no objection to removing the confidential status, in its entirety, from these initial and recommended determinations.

3. The initial determination portion of the Final Initial and Recommended Determinations, issued pursuant to Commission rule 210.42(h)(2), shall become the determination of the Commission forty-five (45) days after the service thereof, unless the Commission, within that period shall have ordered its review or certain issues therein or by order has changed the effective date of the initial determination portion. The recommended determination portion, issued pursuant to Commission rule 210.42(a)(1)(ii), will be considered by the Commission in reaching a determination on remedy and bonding pursuant to Commission rule 210.50(a).

Paul J. Luckern
Administrative Law Judge

Issued: January 7, 2005

CERTAIN AUTOMATED MECHANICAL TRANSMISSION SYSTEMS FOR MEDIUM-DUTY AND HEAVY-DUTY TRUCKS, AND COMPONENTS THEREOF

Investigation No. 337-TA-503

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **Public Version Final Initial and Recommended Determinations** was served by hand upon Commission Investigative Attorney Jay H. Reiziss, Esq. and upon the following parties via first class mail, and air mail where necessary, on March 17, 2005

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

For Complainant Eaton Corporation:

Sturgis M. Sobin, Esq.
Miller & Chevalier Chartered
655 Fifteenth Street, NW Suite 9000
Washington, DC 20005

Michael H. King, P.C.
McGuire Woods LLP
77 West Wacker Drive
Suite 4100
Chicago, IL 60601-1815

William H. Mandir, Esq.
Sughrue Mion PLLC
2100 Pennsylvania Avenue, NW
Suite 800
Washington, DC 20037

CERTAIN AUTOMATED MECHANICAL TRANSMISSION SYSTEMS FOR MEDIUM-DUTY AND HEAVY-DUTY TRUCKS, AND COMPONENTS THEREOF

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CERTIFICATE OF SERVICE page 2

Respondents ZF Meritor LLC, ZF Friedrichshafen AG, ArvinMeritor, Inc.:

Gary M. Ropski
BRINKS HOFER GILSON & LIONE
455 N. Cityfront Plaza Drive
Suite 3600
Chicago, Illinois 60611

Lyle B. Vander Schaaf
Jonathan Seiger
WHITE & CASE, LLP
701 Thirteenth Street, N.W.
Washington, DC 20005

Respondent ZF Friedrichshafen AG

Thomas J. Schank
HUNTER & SCHANK CO., L.P.A.
One Canton Square
1700 Canton Avenue
Toledo, Ohio 43624-1378

CERTAIN AUTOMATED MECHANICAL TRANSMISSION SYSTEMS FOR MEDIUM-DUTY AND HEAVY-DUTY TRUCKS, AND COMPONENTS THEREOF

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PUBLIC MAILING LIST

Sherry Robinson
LEXIS-NEXIS
8891 Gander Creek Drive
Miamisburg, OH 45342

Ronnita Green
West Group
Suite 230
901 Fifteenth Street, N.W.
Washington, D.C. 20005

(PARTIES NEED NOT SERVE COPIES ON LEXIS OR WEST PUBLISHING)