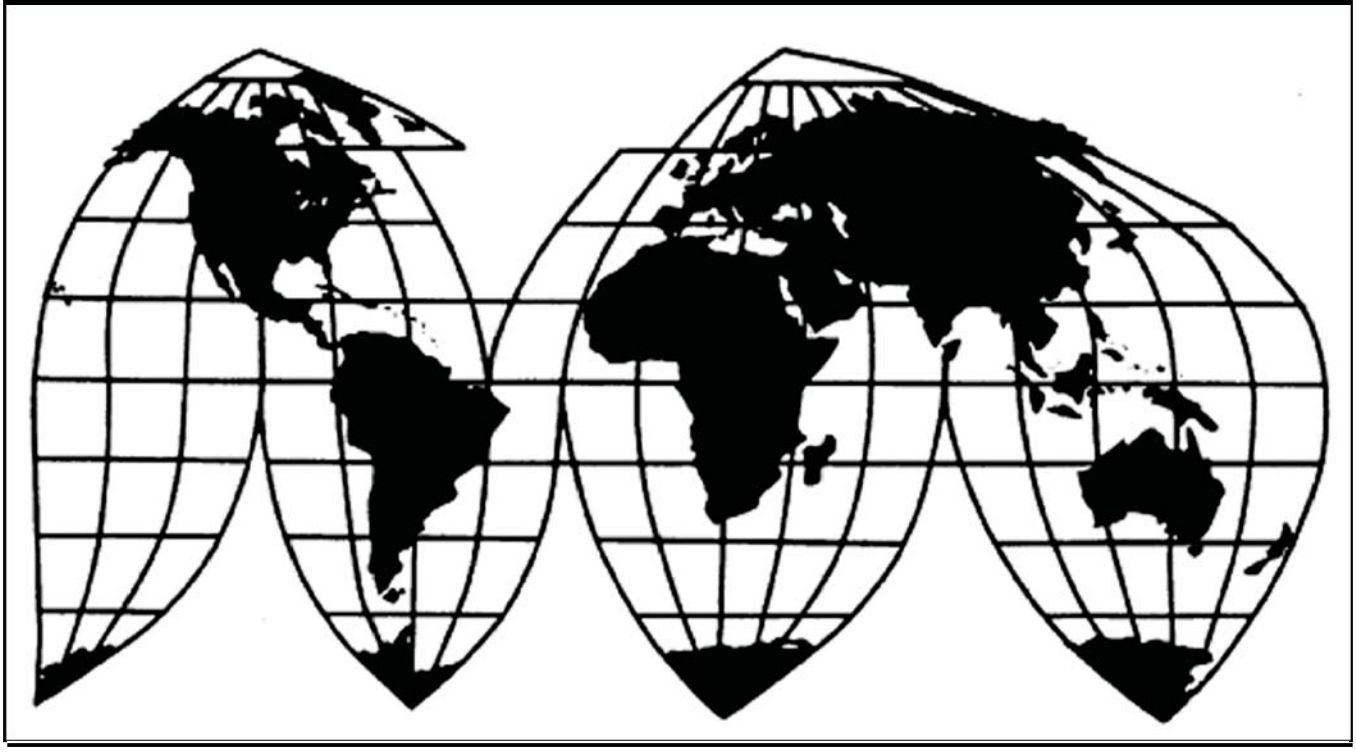
In the Matter of

Certain Mobile Telephone Handsets, Wireless Communication Devices, and Components Thereof

Investigation No. 337-TA-578

Publication 4132 **March 2010**

U.S. International Trade Commission



Washington, DC 20436

U.S. International Trade Commission

COMMISSIONERS

Shara L. Aranoff, Chairman
Daniel R. Pearson, Vice Chairman
Deanna Tanner Okun
Charlotte R. Lane
Irving A. Williamson
Dean A. Pinkert

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

U.S. International Trade Commission

Washington, DC 20436
www.usitc.gov

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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of **CERTAIN MOBILE TELEPHONE HANDSETS, WIRELESS COMMUNICATION DEVICES, AND COMPONENTS THEREOF**	**Investigation No. 337-TA-578**

NOTICE OF COMMISSION DECISION NOT TO REVIEW AN INITIAL DETERMINATION OF THE ADMINISTRATIVE LAW JUDGE FINDING NO VIOLATION OF SECTION 337; TERMINATION OF INVESTIGATION

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined not to review an initial determination ("ID") issued by the presiding administrative law judge ("ALJ") determining that there is no violation of section 337 of the Tariff Act of 1930.

FOR FURTHER INFORMATION CONTACT: Eric Frahm, Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 205-3107. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 205-2000. General information concerning the Commission may also be obtained by accessing its Internet server at *http://www.usitc.gov*. The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at *http://edis.usitc.gov*. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on (202) 205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted this section 337 investigation on July 12, 2006, based on a complaint filed by QUALCOMM Incorporated of San Diego, California ("Qualcomm"). 71 *Fed. Reg.* 39362 (July 12, 2006). The complaint, as amended, alleged violations of section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain mobile telephone handsets, wireless communications devices, and components thereof by reason of infringement of certain claims of six U.S. patents. The

complaint and notice of investigation named Nokia Corporation of Finland and Nokia Inc. of Irving, Texas (collectively, "Nokia"), as respondents. The complaint, as amended, further alleged that an industry in the United States exists as required by subsection 337(a)(2). Only claims 1 and 3 of U.S. Patent No. 5,452,473 ("the '473 patent"), claim 1 of U.S. Patent No. 5,590,408 ("the '408 patent"), and claim 2 of U.S. Patent No. 5,655,220 ("the '220 patent") remain in the investigation.

On December 12, 2007, the ALJ issued his final ID finding no violation of section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337). Specifically, the ALJ determined that there had been an importation of Nokia's accused products, and that none of Nokia's accused products infringe the asserted claims of the '473, '408, or '220 patents. With regard to claims 1 and 3 of the '473 patent, the ALJ determined these asserted claims were not proven to be invalid under the best mode requirement of 35 U.S.C. § 112 or anticipated under 35 U.S.C. § 102. The ALJ also determined that claims 1 and 3 of the '473 patent were proven to be invalid as obvious under 35 U.S.C. § 103. With regard to claim 1 of the '408 patent and claim 2 of the '220 patent, the ALJ determined that these asserted claims were not proven to be invalid. The ALJ determined that a domestic industry exists that practices the '473, '408, and '220 patents. Finally, the ALJ made a recommendation that if the Commission finds a violation under section 337, a limited exclusion and cease and desist orders should issue with a bond set in the amount of 100 percent of entered value during the 60 day period of Presidential review.

On January 9, 2008, Qualcomm and Nokia each filed petitions for review. The Commission Investigative Attorney ("IA") did not file a petition for review.

On January 23, 2008, Qualcomm and Nokia filed responses to each other's petitions for review. The IA filed his response to both petitions on January 24, 2008.

On February 5, 2008, Qualcomm filed a letter requesting that the Commission consider the recent Federal Circuit decision in *Oatey Co. v. IPS, Corp.*, Case No. 07-1214, slip op. (Fed. Cir. Jan. 30, 2008). Nokia filed a responsive letter on February 6, 2008.

Having examined the record of this investigation, including the ALJ's final ID and the submissions of the parties, the Commission has determined not to review the ALJ's determination.

The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), and in section 210.42-45 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.42-45).

By order of the Commission.

Marilyn R. Abbott
Secretary to the Commission

Issued: February 27, 2008

CERTAIN MOBILE TELEPHONE HANDSETS, WIRELESS COMMUNICATION DEVICES AND COMPONENTS THEREOF **337-TA-578**

PUBLIC CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **NOTICE OF COMMISSION DECISION NOT TO REVIEW AN INITIAL DETERMINATION OF THE ADMINISTRATIVE LAW JUDGE FINDING NO VIOLATION OF SECTION 337; TERMINATION OF INVESTIGATION** has been served by hand upon the Commission Investigative Attorneys, David O. Lloyd, Esq., and Paulraj G. Christopher the following parties as indicated, on February 27, 2008.

Marilyn R. Abbott

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

ON BEHALF OF COMPLAINANT QUALCOMM INCORPORATED:

Cecilia H. Gonzalez, Esq.
HOWREY LLP
1299 Pennsylvania Avenue, NW
Washington, DC 20004
P-202-783-0800

( ) Via Hand Delivery
(✓) Via Overnight Mail
( ) Via First Class Mail
( ) Other: _____

Edwin H. Wheeler, Esq.
MCDERMOTT WILL & EMERY
3150 Porter Drive
Palo Alto, CA 94304
P-650-813-5000
F-650-813-5100

( ) Via Hand Delivery
(✓) Via Overnight Mail
( ) Via First Class Mail
( ) Other: _____

Richard J. Stark, Esq.
Roger G. Brooks, Esq.
CRAVATH SWAINE & MOORE LLP
825 Eighth Avenue
New York, NY 10019
P-212-474-1000
F-212-474-3700

( ) Via Hand Delivery
(✓) Via Overnight Mail
( ) Via First Class Mail
( ) Other: _____

Richard S. Taffet, Esq.
BINGHAM MCCUTCHEN LLP
399 Park Avenue
New York, NY 10022
P-212-705-7000
F-212-752-5378

( ) Via Hand Delivery
(✓) Via Overnight Mail
( ) Via First Class Mail
( ) Other: _____

Kathryn B. Riley, Esq.
DLA Piper US LLP
401 B Street, Suite 1700
San Diego, CA 92101-4297
P-619-699-2842
F-619-699-2701

( ) Via Hand Delivery
(✓) Via Overnight Mail
( ) Via First Class Mail
( ) Other: _____

Steven M. Strauss, Esq.
COOLEY GODWARD KRONISH LLP
4401 Eastgate Mall
San Diego, CA 92121
P-858-550-6006
F-858-550-6420

( ) Via Hand Delivery
(✓) Via Overnight Mail
( ) Via First Class Mail
( ) Other: _____

ON BEHALF OF RESPONDENTS NOKIA CORPORATION AND NOKIA INC.:

Louis S. Mastriani, Esq.
ADDUCI MASTRIANI & SCHAUMBERG, LLP
1200 Seventeenth Street, NW – Fifth floor
Washington, DC 20036
P-202-467-6300
F-202-466-2006

( ) Via Hand Delivery
(✓) Via Overnight Mail
( ) Via First Class Mail
( ) Other: _____

Marshall M. Searcy, III, Esq.
William C. Price, Esq.
Eric J. Bakewell, Esq.
QUINN EMANUEL URQUHART OLIVER & HEDGES LLP
865 South Figueroa Street, 10th Floor
Los Angeles, CA 90017-2543
P-213-443-3000
F-213-443-3100

( ) Via Hand Delivery
(✓) Via Overnight Mail
( ) Via First Class Mail
( ) Other: _____

Charles K. Verhoeven, Esq.
QUINN EMANUEL URQUHART OLIVER & HEDGES LLP
50 California Street, 22nd Floor
San Francisco, CA 94111
P-415-875-6600
F-415-875-6700

( ) Via Hand Delivery
(✓) Via Overnight Mail
( ) Via First Class Mail
( ) Other: _____

Paul F. Brinkman, Esq.
ALSTON & BIRD LLP
950 F Street, NW
Washington, DC 20004-1404
P-202-756-3300
F-202-756-3333

( ) Via Hand Delivery
(✓) Via Overnight Mail
( ) Via First Class Mail
( ) Other: _____

Mark A. McCarty, Esq.
Kristen L. Melton, Esq.
Demetrius Tennell Lockett
ALSTON & BIRD LLP
One Atlantic Center
1201 West Peachtree Street
Atlanta, GA 30309
P-404-881-7000
F-404-881-7777

( ) Via Hand Delivery
(✓) Via Overnight Mail
( ) Via First Class Mail
( ) Other: _____

Kenneth R. Adamo, Esq.
Thomas E. Jackson, Esq.
Michael J. Newton, Esq.
JONES DAY
2727 North Harwood Street
Dallas, TX 75201-1515
P-214-220-3939
F-214-969-5100

( ) Via Hand Delivery
(✓) Via Overnight Mail
( ) Via First Class Mail
( ) Other: _____

Steven E. Adkins, Esq.
Alan L. Whitehurst, Esq.
JONES DAY
51 Louisiana Avenue, NW
Washington, DC 20001-2113
P-202-879-3939
F-202-626-1700

( ) Via Hand Delivery
(✓) Via Overnight Mail
( ) Via First Class Mail
( ) Other: _____

PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of	)	
	)	
CERTAIN MOBILE TELEPHONE HANDSETS, WIRELESS COMMUNICATION DEVICES, AND COMPONENTS THEREOF	)	Investigation No. 337-TA-578

Final Initial and Recommended Determinations

This is the administrative law judge's Final Initial Determination under Commission rule 210.42. Said determination includes Appendices A-S. The administrative law judge, after a review of the record developed, finds inter alia that there is jurisdiction and that there is no violation of section 337 of the Tariff Act of 1930, as amended.

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). If the Commission finds a violation, the administrative law judge recommends the issuance of a limited exclusion order barring entry into the United States of infringing mobile telephone handsets, wireless communication devices, and components thereof, the issuance of a cease and desist order, and a bond be set in the amount of 100 percent of entered value during the Presidential review period.

APPEARANCES

FOR COMPLAINANT QUALCOMM, INC.:

Cecilia H. Gonzalez, Esq.
Bert C. Reiser, Esq.
Margaret D. Macdonald, Esq.
HOWREY LLP
1299 Pennsylvania Ave., NW
Washington, DC 20004

Terrance P. McMahon, Esq.
Vera M. Elson, Esq.
MCDERMOTT WILL & EMERY LLP
3150 Porter Dr.
Palo Alto, CA 94304

FOR RESPONDENTS NOKIA CORPORATION AND NOKIA, INC.:

Louis S. Mastriani, Esq.
ADDUCI, MASTRIANI & SCHAUBERG, L.L.P
1200 Seventeenth Street, NW
Washington, DC 20036

A. William Urquhart, Esq.
Frederick Lorig, Esq.
QUINN EMANUEL URQUHART OLIVER & HEDGES, LLP
865 South Figueroa Street, 10th Floor
Los Angeles, CA 90017-2543

Keith E. Broyles, Esq.
ALSTON & BIRD LLP
One Atlantic Center
1201 West Peachtree Street
Atlanta, GA 30309-3424

ITC STAFF:

Christopher G. Paulraj, Esq.
Office of Unfair Import Investigation
U.S. International Trade Commission
500 E Street, SW
Washington, DC 20436

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ABBREVIATIONS

CBr	Complainant's Post-hearing Brief
CDX	Complainant's Demonstrative Exhibit
CFF	Complainant's Proposed Finding
CORFF	Complainant's Objection To Respondents' Proposed Finding
COSFF	Complainant's Objection To Staff's Proposed Finding
CRBr	Complainant's Post-hearing Reply Brief
CRRFF	Complainant's Proposed Rebuttal Finding to RFF
CX	Complainant's Exhibit
JX	Joint Exhibit
RBr	Respondents' Post-hearing Brief
RDX	Respondents' Demonstrative Exhibit
RX	Respondents' Exhibit
RFF	Respondents' Proposed Finding
ROCFF	Respondents' Objection To Complainant's Proposed Finding
RRBr	Respondents' Post-hearing Reply Brief
RRCFF	Respondents' Proposed Rebuttal Finding To CFF
SBr	Staff's Post-hearing Brief
SOCFF	Staff's Objection To Complainant's Proposed Finding
SRBr	Staff's Post-hearing Reply Brief
SRCFF	Staff's Proposed Rebuttal Finding To CFF
SPFF	Staff's Proposed Finding

Tr. Transcript Of Pre-hearing Conference and Hearing

OPINION

I. Procedural History

On June 11, 2007, the Commission issued a notice reassigning this investigation to the undersigned. Order No. 2, which issued on July 12, 2006, had set a fourteen month target date of September 12, 2007, which meant that any final initial determination on violation should have been filed no later than June 12, 2007. However, the record as of June 12, 2007 indicated that there had been no evidentiary hearing.[1] In Order No. 46, which issued on June 12, 2007, the undersigned indicated that an evidentiary hearing should proceed as quickly as possible. Hence, Order No. 45, which also issued on June 12, 2007, set aside July 9, 10, 12, 13, 16, 17, 18, 19 and 20 for the prehearing conference and evidentiary hearing, and further scheduled a one day conference with all parties on June 25, 2007. The undersigned in his Order No. 46 further extended the target date for six months, i.e. from September 12, 2007 to March 12, 2008 (a twenty (20) month target date).[2] This new target date meant that any initial final determination (ID) on violation should have been filed no later than November 12, 2007.[3] The Commission non-reviewed Order No. 46 on June 27.

On June 19, 2007, pursuant to Commission rule 210.15, complainant Qualcomm Incorporated (QUALCOMM) and respondents Nokia Corporation and Nokia, Inc. (Nokia) jointly moved in Motion No. 578-51 to modify the dates set forth by the administrative law judge in his Order No. 45. It was argued that additional time was needed for the following reasons: (1) key

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[1] See Order No. 35 which issued on February 26, 2007 and which postponed the evidentiary hearing and stayed the proceedings.

[2] On June 27, 2007, the Commission determined not to review Order No. 46.

[3] Said target date included a four (4) month period for Commission review. See Commission Rule 210.42(a)(1)(i).

witness unavailability for both parties; and (2) the additional time for the parties to supplement expert witnesses' testimony and, thereby, focus and streamline the issues, including the number of pending prehearing (in limine) motions. Hence, movants requested that the prehearing conference and evidentiary hearing take place on September 10, 11, 12, 13, 14, 17, 18, 19 and 20. The administrative law judge in his Order No. 47, which issued on June 21, 2007, granted Motion No. 578-51, to the extent that, inter alia, the prehearing conference and the evidentiary hearing were to take place on September 10, 11, 12, 13, 14, 19, 20, 21 and 24.

In a telephone conference on September 7, 2007, the administrative law judge denied No. 13 of complainant's Motion No. 578-46 in limine which involved precluding respondents from arguing or offering evidence of either active discouragement of infringement by customers or substantial non-infringing users. (See 9/7/07 Tr. at 101-04). Thereafter, Order No. 51, which issued on October 16, 2007, extended the target date to Monday April 14, 2008 which meant that the ID should be filed no later than December 12, 2007. The Commission non-reviewed Order No. 51 on November 5, 2007.

An evidentiary hearing was conducted on the dates identified supra.[4] In issue at the evidentiary hearing, inter alia, was whether the importation into the United States, the sale for importation, or the sale within the United States after importation by respondents of certain mobile telephone handsets, wireless communication devices, or components thereof involved infringement of claims 1 and 3 of U.S. Patent No. 5,452,473 (the '473 patent) (JX-1), claim 1 of U.S. Patent No. 5,590,408 (the '408 patent) (JX-2) and claim 2 of U.S. Patent No. 5,655,220 (the

[4] Order No. 50, which issued on September 24, 2007, denied respondents' motion to strike certain testimony and further admitted into evidence CX-185C and CX-186C.

'220 patent) (JX-3) and whether an industry in the United States exists as required by subsection (a)(2) of Section 337. Posthearing submissions have been filed.[5] [6]

The matter is now ready for a final decision.

The Final Initial and Recommended Determinations which includes Appendices A-S herein, 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. Jurisdiction Including Parties And Importation

The private parties in this investigation are QUALCOMM which does not manufacture cellular telephone or other mobile communication devices but does provide chips and chipsets for such devices manufactured by others, and Nokia which is a maker of telephone handsets and

---

[5] On October 15, 2007, the staff moved for leave to accept the late filing of its proposed findings of fact and conclusion's of law due to the complexity of the issues and word processing delays. (Motion Docket No. 578-59.) Said motion is granted. On October 11, 2007, QUALCOMM filed an unopposed motion to de-designate and substitute CDX-51and to reopen the record to admit the correct version of CDX-61C into evidence. (Motion Docket No. 578-58.) Said motion is also granted.

[6] Respondents, in their pre-hearing statement at 179 argued that the patents in issue are unenforceable. Respondents, however, did not assert this defense in their posthearing submissions. Hence, the administrative law judge finds that respondents have abandoned said defense.

the infrastructure for mobile telephones. See FF 1-6. The Commission has subject matter jurisdiction over this investigation, because QUALCOMM has alleged violation by Nokia of Section 337 in connection with the importation of certain Nokia products, pursuant to 19 U.S.C. § 1337. Amgen, Inc. v. U.S. Int'l Trade Comm'n, 902 F.2d 1532, 1536 (Fed. Cir. 1990). Moreover, the parties have further stipulated to the importation of certain Nokia products. (JX-7.) In addition, the Commission has personal jurisdiction over Nokia in this investigation because Nokia has participated fully in said investigation, including participation in discovery and motion practice, thereby submitting to the personal jurisdiction of the Commission. Certain Audible Alarm Devices For Divers, Inv. No. 337-TA-365, Initial Determination, 1995 ITC LEXIS 66, *3 (Feb. 2, 1995) ("The Commission has personal jurisdiction over respondent IHK because IHK participated fully in discovery and the hearing.")

III. Patents Including Claims In Issue

As agreed to by all parties in a document titled "Joint General Designation Of Technology," dated September 10, 2007 (DESCRIPTION) each of the '473 patent (JX-1), the '408 patent (JX-2) and the '220 patent (JX-3) shares a common specification, is commonly assigned to QUALCOMM and has a priority date of February 28, 1994. Moreover, during prosecution of the application that issued as the '473 patent, the U.S. Patent and Trademark Office (PTO) issued a restriction requirement pursuant to 35 U.S.C. § 121. (JX-4 at 40-41.) As a result, two divisional applications were filed that ultimately issued as the '408 and '220 patents. (JX-5; JX-6.)

The '473 patent, titled "Reverse Link, Transmit Power Correction and Limitation in a Radiotelephone System," was issued on September 19, 1995, to Ana L. Weiland, Richard K.

Kornfeld, Richard J. Kerr, John E. Maloney and Nathaniel B. Wilson. (Joint Statement of Undisputed Facts, dated January 17, 2007, p. 3 at D.1.) John E. Maloney was later removed as an inventor on the '473 patent by a Certificate of Correction dated November 11, 2003. (Id.)

Claim 1 of the '473 patent in issue reads:

> 1. A method for correcting transmit power of a radio device having a plurality of predetermined calibration values and a reference voltage signal, the radio device transmitting and receiving on a plurality of frequencies, each frequency having a frequency index, the method comprising the steps of:
>
> > receiving a first signal having a first gain, a first frequency of the plurality of frequencies, and the first frequency having a first frequency index;
> >
> > determining a receive power value of the first signal;
> >
> > generating an automatic gain control setpoint in response to the receive power value and the reference voltage signal;
> >
> > selecting a first predetermined calibration value in response to the automatic gain control setpoint and the first frequency index;
> >
> > adjusting the first gain in response to the first calibration value;
> >
> > transmitting a second signal having a second gain and a second frequency of the plurality of frequencies, the second frequency having a second frequency index;
> >
> > determining a transmit power value of the second signal;
> >
> > generating a second calibration value in response to the automatic gain control setpoint, the second frequency index, and the transmit power value; and
> >
> > adjusting the second gain in response to the second calibration value.

(JX-1 at 7:9 -37.)

Claim 3 of the '473 patent in issue reads:

3. A radio performing transmit power calibration, the radio transmitting and receiving signals having a plurality of frequencies, each frequency having a frequency index, the radio transmitting signals through a variable gain, transmit amplifier having a control input and receiving signals through a variable gain, receive amplifier having a control input, the radio comprising:

a power detector, coupled to the receive amplifier, for generating a first power value from a received signal having a first frequency;

an integrator, coupled to the power detector, for generating an automatic gain control setpoint from the first power value;

a receive linearizer, coupled to the integrator and the receive amplifier, for generating a receive calibration value in response to the automatic gain control setpoint and a first frequency index corresponding to the first frequency, the receive calibration value being coupled to the receive amplifier control input for adjusting the gain of the receive amplifier;

a second power detector, coupled to the transmit amplifier, for generating a second power value from a transmitted signal having a second frequency; and

a transmit linearizer for generating a transmit calibration value in response to the automatic gain control setpoint, the second power value, and a frequency index corresponding to the second frequency, the transmit calibration value being coupled to the control input of the transmit amplifier for adjusting the gain of the transmit amplifier.

(JX-1 at 7:43-8:14.)

The '408 patent has the same title as the '473 patent, and was issued on December 31, 1996 to Ana L. Weiland, Richard K. Kornfeld and John E. Maloney. (Joint Statement of Undisputed Facts, dated January 17, 2007, p. 3 at D.2.) Claim 1 of the '408 patent in issue reads:

1. A method for limiting transmit power of a radio operating in a radio communications system, the radio communications system comprising at least one base station that transmits signals including power control commands to the radio,

the radio comprising a variable gain amplifier and a maximum gain setting, the method comprising the steps of:

> determining an open loop power control value in response to a signal received from the at least one base station;
>
> determining a gain adjust signal in response to the transmitted power control commands;
>
> combining the open loop power control value and the gain adjust signal to produce a summation signal;
>
> comparing the summation signal to the maximum gain setting;
>
> if the summation signal is greater than or equal to the maximum gain setting, adjusting the variable gain amplifier in response to the maximum gain setting; and
>
> if the summation signal is less than the maximum gain setting, adjusting the variable gain amplifier in response to the summation signal.

(JX-2 at 6:58-7:11.)

The '220 patent has the same title as the '473 and '408 patents, and was issued on August 5, 1997 to the same inventors as on the '408 patent. (Joint Statement of Undisputed Facts, dated January 17, 2007, at pp. 3-4 at D.3.) Claim 2 of the '220 patent in issue reads:

> 2. A method for limiting transmit power of a radio operating in a radio communications system, the radio communications system comprising a plurality of base stations that transmit power control commands to the radio, the radio comprising a variable gain amplifier and a maximum gain setting, the method comprising the steps of:
>
> receiving a signal from at least one of the plurality of base stations;
>
> generating a received power level signal in response to the received signal;
>
> generating a closed loop power control signal in response to the received signal;

combining the received power level signal and the closed loop power control signal to produce a summation signal;

comparing the summation signal to the maximum gain setting;

adjusting the variable gain amplifier in response to the maximum gain setting if the summation signal is greater than or equal to the maximum gain setting; and

adjusting the variable gain amplifier in response to the summation signal if the summation signal is less than the maximum gain setting.

(JX-3 at 7:12-34.)

IV. Experts

QUALCOMM's expert witness was Dr. Sergio Verdu, who is a professor of electrical engineering at Princeton University. (CX-373.) Verdu was qualified as an expert, in the area of mobile cellular telephonic communications. (Tr. at 1038.)

Nokia's expert witness on issues of claim construction, infringement, and domestic industry was Dr. Herman Helgert, who is a professor of electrical engineering at George Washington University. (Helgert, Tr. at 2285; RX-435.) Helgert was qualified as an expert in the area of mobile cellular telephonic communications. (Tr. at 2307.)

Nokia's expert witness on issues of invalidity was Dr. Steven Kenney, who is an associate professor of electrical engineering at Georgia Institute of Technology. (Kenney, Tr. at 3120; RX-437C.) Kenney was qualified as an expert in the area of mobile cellular telephonic communications. (Tr. at 3123.)

V. The Level of Ordinary Skill in the Art

The level of ordinary skill in the art is a person who has a masters degree in electrical engineering with a specialization in communications engineering, and has at least two years of

experience in the field of wireless communication. (Helgert, Tr. at 2326-9, Verdu, Tr. at 1055-56, Kenney, Tr. at 3129-30.) On the matter of experience, complainant's Verdu testified:

> Q. I believe you said in your opinion that person should have, I think you said, two years of relevant industrial experience.
>
> Correct?
>
> A. Correct.
>
> Q. And when you were asked, well, what industry, you said the industry of cellular telephony or something like that, right?
>
> A. I believe I said wireless.
>
> Q. Wireless, wireless what?
>
> A. Wireless telephony.
>
> Q. Okay. So a person of ordinary skill in your opinion should have two years of relevant industrial experience in wireless telephony, correct?
>
> A. Correct.
>
> Q. All right. You yourself personally do not have two years of industrial experience in wireless telephony, do you, sir?
>
> A. No.
>
> Q. So by your definition, you are not a person of ordinary skill in the art, sir, correct?
>
> A. In '94, I had obtained my Ph.D. ten years before, but I didn't have two years of industrial experience.
>
> Q. So under your definition, what you think is the appropriate definition of a person of ordinary skill in the art, the perspective from which we're supposed to analyze whether something would be obvious or not, you don't fit that definition, correct?
>
> A. Well, in some ways, I would be of extraordinary skill in the

art, but in some other ways, I certainly did not meet the two years of industrial experience.

Q. Right. So you don't have any firsthand personal knowledge of what one of these industrial engineers would have been exposed to during those two years of industrial experience, do you, sir?

A. I wouldn't put it that way. I have certainly been involved with the wireless industry. I have been in the technical advisory board of Flarion Technologies. And as part of my job, I had quite a bit of exposure to what they were doing.

Q. So your exposure to what a person of ordinary skill with this relevant two years of industrial experience, your exposure to that is sort of secondhand, what you pick up, what your graduate students tell you or what you see when you go and consult with people; is that your testimony?

A. I don't think it has to do with what my graduate students tell me. My graduate students work for their Ph.D. and some of them have industrial experience. Some of them do not.

Q. But you don't have any personal first-hand industrial experience, correct?

A. Correct.

(Tr. at 3664-66 (emphasis added).)

VI. Background Technology

The claims in issue made reference to "base station," "frequency," and/or "radio". In the DESCRIPTION the following facts are admitted to:

1. Mobile cellular phone systems, as related to cellular wireless telephone, are divided into geographic areas called "cells." Each cell is serviced by a "base station."

2. The geographic size of a cell may vary. Rural areas generally have large cells, while urban environments may have more cells that are close together.

3. A base station is connected to the regular telephone network and communicates with "mobile stations." Alternative names for mobile stations include:

mobile phone, radiotelephone, user equipment ("UE"), cell phone, handset, and mobile device. Abbreviations for base station include "BS" and "BTS." A common abbreviation for mobile station is "MS."

4. Communications sent from a base station to a mobile station are said to take place in the "forward link," "forward direction," or "downlink."

5. Communications sent from a mobile station to a base station are said to take place in the"reverse link," "reverse direction," or "uplink."

6. Base stations communicate with mobile stations over assigned radio frequencies. The radio frequencies available for use by a particular mobile station depends on the particular cellular system. The Federal Communication Commission ("FCC") and relevant standards organizations specify ranges of frequencies that may be used in a particular system.

7. The GMS specification recognizes a number of frequency bands including: 850, 900, 1800, and 1900 MHz. The 850 and 1900 MHz are the bands primarily used in the United States. The 900 and 1800 MHz bands are used elsewhere, including Europe.

8. Various techniques exist to allow many mobile stations to communicate with one or more base stations within the available frequency bands. The three most relevant for this dispute are Frequency Division Multiple Access ("FDMA"), Time Division Multiple Access (TDMS") and Code Division Multiple Access ("CDMA").

9. The first commercial wireless cellular systems used analog technology and are often referred to as "First Generation" or "IG" systems. These systems focused generally on voice communications. They used analog, as opposed to digital, methods to transmit information between base stations and mobile stations. The principal 1G system used in the United States based

on analog FDMA is sometimes referred to as "AMPS".

10. Beginning in the 1990's, 1G system started being replaced by "Second Generation" or "2G" systems. These systems used digital methods to transmit information between base stations and mobile stations.

11. 2G systems used in the United States based on TDMA include the "GSM system" and a system sometimes called "D-AMPS," "US-TDMA." or "IS-54." The principal 2G system used in the United States based on CDMA is sometimes referred to as "IS-95," "cdmaOne," or sometimes just CDMA. CDMA is sometimes referred to as spread spectrum technology.

12. Currently, T-Mobile and AT&T (formerly Cingular) operate the largest GSM networks in the United States. Version Wireless and Sprint operate the largest CDMA networks in the United States.

13. Earlier 2G systems have been improved subsequently to offer better data transmission capabilities. These systems are often dubbed "2.5F" systems. Two specific 2.5G improvements to the GSM system are called "GPRS" and "EDGE."

14. EDGE stands for Enhanced Data for the GSM Evolution. EDGE improves the data transmission capabilities of GPRS. One feature added in EDGE is the ability to use a different, more efficient form of "modulation" to transmit data at a faster rate. Modulation is the way in which digital data is converted into analog information and transmitted. The type of modulation used in GSM voice and GPRS transmission is called "GMSK." The modulation introduced in EDGE, called 8-PSK, allows for data transmission rates three times higher than possible under GMSK.

15. 2.5G systems are now being supplanted by "Third Generation" or 3G" systems. These systems allow for highly efficient, high-speed data transmissions.

VII. Claim Construction

Claim interpretation 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) (Markman), see Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1455 (Fed. Cir. 1998). In construing claims, a court should 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) (Vitronics); see Bell Atl. Network Servs., Inc. v. Covad Comm. Group, Inc., 262 F.3d 1258, 1267 (Fed. Cir. 2001).

The claims themselves "provide substantial guidance as to the meaning of particular claim terms." Phillips v. AWH Corp., 415 F.3d 1303, 1314 (Fed. Cir. 2005) (Phillips), citing Vitronics, 90 F.3d at 1582. It is essential to consider a claim as a whole when construing each term, because the context in which a term is used in a claim "can be highly instructive." Id. This requirement is consistent with the Federal Circuit's guidance that a claim term can only be understood "with a full understanding of what the inventors actually invented and intended to envelop with the claim." Phillips, 415 F.3d at 1316, citing Renishaw PLC v. Marposs Societá per Azioni,158 F.3d 1243, 1250 (Fed. Cir. 1998). Claim terms "are generally given their ordinary and accustomed meaning." Vitronics, 90 F.3d at 1582.

In Pause Technology, Inc. v. TIVD, Inc., 419 F.3d 1326 (Fed. Cir. 2005) the Court stated:

> . . . in clarifying the meaning of claim terms, courts are free to use words that do not appear in the claim so long as "the resulting claim interpretation . . . accord[s] with the words chosen by the patentee to stake out the boundary of the claimed property." Cf. Renishaw PLC v. Marposs Societá per Azioni, 158 F.3d 1243, 1248 (Fed. Cir. 1998) (noting that "[w]ithout any claim term susceptible to clarification . . . there is no legitimate way to narrow the property right").

Id. at 1333. Also, claim terms are presumed to be used consistently throughout the patent, such that the usage of the term in one claim can often illuminate the meaning of the same term in other claims. Research Plastics, Inc. v. Federal Packaging Corp. 421 F.3d 1290, 1295 (Fed. Cir. 2005) (Research Plastics).

The ordinary 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 use of a dictionary, however, may extend patent protection beyond what should properly be afforded by a patent. Also, there is no guarantee that a term is used in the same way in a treatise as it would be by a patentee. Phillips 415 F.3d at 1322. Moreover, the presumption of ordinary meaning will be "rebutted if the inventor has disavowed or disclaimed scope of coverage, by using words or 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).

The presence of a specific limitation in a dependent claim raises a presumption that the limitation is not present in the independent claim. Phillips, 415 F.3d at 1315. This presumption is especially strong when the only difference between the independent and dependant claims is the limitation in dispute. SunRace Roots Enter. Co., Ltd v. SRAM Corp., 336 F.3d 1298, 1303 (Fed. Cir. 2003). Differences between the claims are helpful in understanding the meaning of claim terms. Phillips, 415 F.3d at 1314.

The preamble of a claim may be significant in interpreting a claim. Thus, "a claim preamble has the import that the claim as a whole suggests for it." Bell Communications

Research, Inc. v. Vitalink Communications Corp., 55 F.3d 615, 620, 34 U.S.P.Q.2nd 1816, 1820 (Fed. Cir. 1995). If said preamble, when read in the context of an entire claim, recites limitations of the claim, or, if the claim preamble is "necessary to give life, meaning, and vitality" to the claim, then the claim preamble should be construed as if in the balance of the claim. Kropa v. Robie, 187 F.2d 150, 152 (CCPA 1951) (Kropa), see also Rowe v. Dror, 112 F.3d 473, 478 (Fed. Cir. 1997) (Rowe), Corning Glass Works v. Sumitomo Elec. U.S.A., Inc., 868 F.2d 1251, 1257 (Fed. Cir. 1989) (Corning Glass). Indeed, when discussing the "claim" in such a circumstance, there is no meaningful distinction to be drawn between the claim preamble and the rest of the claim, for only together do they comprise the "claim." If, however, the body of the claim fully and intrinsically sets forth the complete invention, including all of its limitations, and the preamble offers no distinct definition of any of the claimed invention's limitations, but rather merely states, for example, the purpose or intended use of the invention, then the preamble may have no significance to claim construction because it cannot be said to constitute or explain a claim limitation. See Rowe, 112 F.3d at 478; Corning Glass, 868 F.2d at 1257, Kropa, 187 F.2d at 152. In Pitney Bowes Inc. v. Hewlett-Packard Co., 182 F.2d 1298, 1306 (Fed. Cir. 1999) (Piney Bowes), the preamble statement that the patent claimed a method of or apparatus for "producing on a photoreceptor an image of generated shapes made up of spots" was not merely a statement describing the invention's intended field of use. Instead, the Court found said that statement was intimately meshed with the ensuing language in the claim; and that, for example, both independent claims concluded with the clause "whereby the appearance of smoothed edges are given to the generated shapes." Because this was the first appearance in the claim body of the term "generated shapes," the Court found that the term could only be understood in the context of

the preamble statement "producing on a photoreceptor an image of generated shapes made up of spots." Similarly, the Court found that the term "spots" was initially used in the preamble to refer to the elements that made up the image of generated shapes that were produced on the photoreceptor; that the term "spots" then appeared twice in each of the independent claims; and that the claim term "spots" referred to the components that together made up the images of generated shapes on the photoreceptor and was only discernible from the claim preamble. The Court concluded that in such a case, it was essential that the preamble and the remainder of the claim be construed as one unified and internally consistent recitation of the claimed invention. Id.

The specification of a patent "acts as a dictionary" both "when it expressly defines terms used in the claims" and "when it defines terms by implication." Vitronics, 90 F.3d at 1582. For example, the specification "may define claim terms by implication such that the meaning may be found in or ascertained by a reading of the patent documents." Phillips, 415 F.3d at 1323, quoting Iredto Access, Inc. v. Echostar Satellite Corp., 383 F.3d 1295, 1300 (Fed. Cir. 2004). Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification. Phillips, 415 F.3d at 1314.

A patentee may deviate from the conventional meaning of a particular claim term by making the intended meaning of a particular claim term clear (1) in the specification or (2) during the patent's prosecution history. Lear Siegler, Inc. v. Aeroquip Corp., 733 F.2d 881, 889 (Fed. Cir. 1984). If using a definition that is contrary to the definition given by those of ordinary skill in the art, however, the patentee's specification must communicate a deliberate and clear preference for the alternate definition. Kumar v. Ovonic Battery Co., Inc., 351 F.3d 1364, 1368

(Fed. Cir. 2003), (citing Apple Computers, Inc. v. Articulate Sys., Inc., 234 F.3d 14,21 n.5 (Fed. Cir. 2000)). In ascribing an alternative definition than the ordinary meaning, the intrinsic evidence must "clearly set forth" or "clearly redefine" a claim term so as to put one reasonably skilled in the art on notice that the patentee intended to so redefine the claim term. Bell Atlantic Network Services, Inc. v. Covad Communications Group, Inc., 262 F.3d 1258, 1268 (Fed. Cir. 2001).

The prosecution history, including "the prior art cited," is "part of the 'intrinsic evidence.'" Phillips, 415 F3d at 1317. The prosecution history "provides evidence of how the inventor and the PTO understood the patent." Id. Thus, the prosecution history can often inform the meaning of the claim language by demonstrating how an inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be. Vitronics, 90 F.3d at 1582-83; see also Chimi v. PPG Indus., Inc., 402 F.3d 1371, 1384 (Fed. Cir. 2005) ("The purpose of consulting the prosecution history in construing a claim is to exclude any interpretation that was disclaimed during prosecution"), quoting ZMI Corp. v. Cardiac Resuscitator Corp., 844 F.2d 1576, 1580 (Fed. Cir. 1988); Southwall Techs., Inc. v. Cardinal IG Co., F.3d 1570, 1576 (Fed. Cir. 1995). The prosecution history includes any reexamination of the patent. Intermatic Inc. v. Lamson & Sessions Co., 273 F.3d 1355, 1367 (Fed. Cir. 2001).

In addition to the intrinsic evidence, the administrative law judge may consider extrinsic evidence when interpreting the claims. Extrinsic evidence consists of all evidence external to the patent and the prosecution history, including inventor testimony and expert testimony. This extrinsic evidence may be helpful in explaining scientific principles, the meaning of technical

terms, and terms of art. See Vitronics, 90 F.3d at 1583; Markman, 52 F.3d at 980. However, "[e]xtrinsic evidence is to be used for the court's understanding of the patent, not for the purpose of varying or contradicting the terms of the claims." Markman, 52 F.3d at 981. Also, the Federal Circuit has viewed extrinsic evidence in general as less reliable than the patent and its prosecution history in determining how to read claim terms. Phillips, 415 F.3d at 1318. In addition, while extrinsic evidence may be useful, it is unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence. Phillips, 415 F.3d at 1319.

In Nystrom v. Trex Company 424 F.3d 1136 (Fed. Cir. 2005), the Court stated:

> . . . as explained in Phillips, Nystrom is not entitled to a claim construction divorced from the context of the written description and prosecution history. The written description and prosecution history consistently use the term "board" to refer to wood decking materials cut from a log. Nystrom argues repeatedly that there is no disavowal of scope of the written description or prosecution history. Nystrom's argument is misplaced. Phillips, 415 F.3d at 1321 ("The problem is that if the district court starts with the broad dictionary definition in every case and fails to fully appreciate how the specification implicitly limits that definition, the error will systematically cause the construction of the claim to be unduly expansive."). What Phillips now counsels is that in the absence of something in the written description and/or prosecution history to provide explicit or implicit notice to the public– i.e., those of ordinary skill in the art– that the inventor intended a disputed term to cover more than the ordinary and customary meaning revealed by the context of the intrinsic record, it is improper to read the term to encompass a broader definition simply because it may be found in a dictionary, treatise, or other extrinsic source. Id.

Id. at 1144, 1145. In Free Motion Fitness Inc. v. Cybex International, Inc. 423 F.3d 1343 (Fed. Cir. 2005), the Court concluded that:

> under Phillips, the rule that 'a court will give a claim term the full

> range of its ordinary meaning', Rexnord Corp. v. Laitram Corp., 274 F.3d 1336, 1342 (Fed.Cir. 2001), does not mean that the term will presumptively receive its broadest dictionary definition or the aggregate of multiple dictionary definitions. Phillips, 415 F.3d at 1320- 1322. Rather, in those circumstances, where references to dictionaries is appropriate, the task is to scrutinize the intrinsic evidence in order to determine the most appropriate definition.

Id. at 1348, 49. In Network Commerce, Inc. v. Microsoft Corp. 422 F.3d 1353 (Fed. Cir. 2005), the Court concluded:

> As we recently reaffirmed in Phillips, "conclusory, unsupported assertions by experts as to the definition of a claim term are not useful to a court." Phillips, 415 F.3d at 1318. Here [expert] Coombs does not support his conclusion [the "download component" need not contain the boot program] with any references to industry publications or other independent sources. Moreover, expert testimony at odds with the intrinsic evidence must be disregarded. Id. ("[A] court should discount any expert testimony that is clearly at odds with the claim construction mandated by . . . the written record of the patent." (internal quotations and citation omitted). That is the case here.

Id. at 1361.

Patent claims should be construed so as to maintain their validity. However, that maxim is limited to cases in which a court concludes, after applying all the available tools of claim construction, that the claim is still ambiguous. Phillips, 415 F.3d at 1327. If the only reasonable interpretation renders the claim invalid, then the claim should be found invalid. See, e.g., Rhine v. Casio, Inc., 183 F.3d 1342, 1345 (Fed. Cir. 1999).

A. Prior Claim Constructions

Complainant QUALCOMM argued that Nokia did not offer any justification to depart from prior claim constructions by U.S. District Court Judge Rudi Brewster in Qualcomm Inc. v. Conexant Systems, Inc., Case No. 02CV002-B (Conexant), Qualcomm Inc. v. Maxim Integrated

Products, Inc., Case No. 02CV2429-B (Maxim) and Qualcomm Inc. v. Broadcomm Corp., Case No. 05CV1392-B (Broadcom) and by the prior administrative law judge in his Order Nos. 33 and 37.[7] (CBr at 7.)

Respondents argued that the administrative law judge should not give any deference to claim constructions issued in prior actions to which Nokia was not a party. (RBr at 6.)

The staff argued that the administrative law judge may conduct his own claim construction in a Commission investigation, especially when the parties and issues at hand are not identical to those previously litigated in district court proceedings. (SBr at 9.)

Although the claim constructions in Order Nos. 33 and 37 may be given deference,[8] and Judge Brewster's construction may be given some weight, the administrative law judge is not bound by the claim constructions by Order Nos. 33 and 37 because (1) the portion of Order No. 33 that adopted the '473 claim constructions was not reviewed by the Commission since said adoption stemmed from a denial of summary determination and therefore was not an initial

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[7] Order No. 33 at 9 agreed with Judge Brewster's claims constructions, with respect to the '473 patent, in Conexant and Maxim. Order No. 37 at 8-13 adopted the claim constructions of Judge Brewster, with respect to the '408 and '220 patents, in Coexant and Broadcom.

[8] Despite any deference given to Order Nos. 33 and 37, the prior claim constructions may be reconsidered under the same standards applied to a motion for reconsideration of an administrative law judge's order. See, e.g., 18 James Wm. Moore, Moore's Federal Practice §§ 134.22[1][c], 134.22[3][a] (3d ed. 2006). Moreover, a prior claim construction should be modified if there has been a change of fact, a change of law, or if the prior orders were clearly erroneous or manifestly unjust. See Toro Co. v. White Consolidated Indus., Inc., 383 F.3d 1326, 1336 (Fed. Cir. 2004) ("A departure from law of the case generally requires the discovery of new and material evidence not presented in the prior action or 'an intervening change of controlling legal authority, or [a showing that] the prior decision is clearly incorrect and its preservation would work a manifest injustice.'").) It should further be noted that Judge Brewster issued his claim constructions in the Conexant and Maxim cases prior to the Federal Circuit's decision in Phillips. (RFF II.634-637 (undisputed).)

determination, and (2) Order No. 37 was not an initial determination and therefore similarly was not subject to the Commission's review. Moreover, referring to the prior claim constructions issued by Judge Brewster, they were not final and hence were not reviewed by an appellate court. Also, they involved different accused products than the ones at issue in this investigation, and the constructions were made in litigation to which neither the respondents nor the staff were parties. (RFF II.626-68 (undisputed).) In addition, notwithstanding the rule against tailoring a claim construction to fit the dimensions of the accused products or process, it may be necessary for the administrative law judge in his claim construction to consider the accused device in dispute. See Wilson Sporting Goods Co. v. Hillerich & Bradsby Co., 442 F.3d 1322, 1331 (Fed. Cir. 2006) (Wilson); Pall Corp. v. Hemasure Inc., 181 F.3d 1305, 1308 (Fed. Cir. 1999).) In Wilson, the Federal Circuit stated:

> [I]f the litigants cannot themselves inform a trial court of the specific issues presented by the infringement inquiry – that is, the issues of the breadth of the claim construction analysis and the most useful terms to facilitate that defining process – then a trial court may refer to the accused product or process for that context during the process. For instance in this case, this court is puzzled by the relevance of "rigid" in this claim construction analysis. Without the full infringement context, including some record evidence about the accused devices, this court does not fully understand the necessity of inserting "rigid" into claims without that express language. Moreover, this court cannot assess the meaning of "rigid" in the context of this invention.

Wilson at 1331. The Federal Circuit then held that on remand the trial court may reconsider its previous claim construction "in the context of a detailed examination of the alleged infringement of particular claims by the accused devices." Id. Without knowledge about the accused products or processes, a court may lack a "proper context for an accurate claim construction" and its

construction "takes on the attributes of something akin to an advisory opinion." Lava Trading, Inc. v. Sonic Trading Mgmt., LLC, 445 F.3d 1348, 1350 (Fed. Cir. 2006).)

Said adoption of the prior constructions also did not take into account the differences in the dispute between the parties here and the parties in Conexant, Maxim and Broadcom, including a dispute between QUALCOMM and Nokia regarding the terms "maximum gain setting" and "automatic gain control setpoint." (RFF II.630-633 (undisputed).) In the prior district court cases, the parties stipulated to the constructions of those terms and thus the terms were not a point of contention central to a dispute. (RFF II.630, 632 (undisputed).) In other words, the construction of said terms was not material to resolution of the conflict, so any seemingly erroneous and improper construction would not have been challenged by the injured party because doing so would unnecessarily divert the focus of the dispute. Finally, the administrative law judge would deprive the respondents in this investigation of due process by adopting the prior constructions wholesale without considering the respondents' or the staff's claim construction arguments. It is undisputed that respondents and the staff were not given an opportunity, during the prior litigations, to present their construction arguments because they were not parties to the prior litigations. (RFF II.626, 627 (undisputed).) Moreover, the facts surrounding the investigation here and the facts surrounding the prior cases are divergent. For example, as stated, supra, different products are at issue.

Based on the foregoing, this administrative law judge is not adopting outright the claim constructions of Judge Brewster and those of Order Nos. 33 and 37.

B. '473 Patent

1. Preamble (Claims 1 And 3)

Complainant argued that none of the preambles of the asserted claims of the '473, '408 and '220 patents are limiting. (See CRBr at 3.)

Respondents argued that the preambles of claims 1 and 3 of the '473 patent are limiting, as are the preambles of claim 1 of the '408 patent and claim 2 of the '220 patent. (RBr at 9, 18, 24, 42.)

The staff argued that the preambles of both claims 1 and 3 of the '473 patent as well as the preambles of the asserted claims of the '408 and '220 patents limit the scope of the claims. (SBr at 13-14, 22.)

The administrative law judge finds that the preambles of claim 1 and claim 3 of the '473 patent, as well as the preambles of the asserted claims of the '408 and '220 patents, are limiting because they are essential in understanding the body of the claims. See Pitney Bowes, supra; Corning Glass, supra.

Referring to the preambles of the asserted claims of the '473 patent, both preambles recite elements that are referred to in the body of both claims. For example, the preamble of claim 1 recites "plurality of frequencies" and "predetermined calibration values," and both of those terms are recited again in the body of claim 1 of the '473 patent. (JX-1 at 7:10-14, 16-17, 22-24, 28-29, 36-37.) The preamble of claim 3 recites "a radio performing transmit power calibration," and "transmitting signals through a variable gain, transmit amplifier . . . and receiving signals through a variable gain, receive amplifier," and the body of claim 3 references back to the preamble for both transmit and receive amplifiers. (JX-1 at 7:43-49.) In order to give "life, meaning and

vitality" to the claims, the administrative law judge finds that the recitations in the preambles must be accorded weight and construed consistently with the subsequent recitations in the bodies of the claims. See Pitney Bowes, supra.

The administrative law judge finds the context of the preamble of claim 1 provides meaning to certain claimed terms by describing the composition of a radio device and the method by which the radio transmits and receives data. (JX-1 at 7:9-14 ("a radio device having a plurality of predetermined calibration values . . . the radio device transmitting and receiving on a plurality of frequencies, each frequency having a frequency index.") (emphasis added.)) If said preamble were not held to be limiting, then the subsequent recitations of those terms in the body of claim 1 would be deprived of the meaning attributed to them in the preamble. As for the preamble of claim 3 of the '473 patent, the preamble states "a variable gain, transmit/receive amplifier" (JX-1 at 7:46-47, 48) while the first mention of either amplifier in the body of said claim states "the receive amplifier" and "the transmit amplifier." (JX-1 at 7:50, 8:4-5.) Thus, the mentions in the preamble serve as the antecedent bases for the mentions in the claim body.

Based on the foregoing, the administrative law judge finds that the preambles of claim 1 and claim 3 of the '473 patent limit the scope of the body of both claims.

2. The Claimed Term "Frequency Index"

The claim term "frequency index" appears in the preamble and the first, fourth, sixth, and eighth elements of asserted independent method claim 1 of the '473 patent, following "the method comprising the steps of," as well as in the preamble and the third and fifth elements of asserted independent apparatus claim 3 of the '473 patent following "the ratio comprising".

Complainant argued that "frequency index", as to each of claims 1 and 3,[9] should properly be construed as "a value specifying the center frequencies on which receiver or transmitter is operating at a given moment." (CBr at 14, citing CDX-06.) Complainant further argued that during the hearing, Nokia sought to limit the word "frequency" to a specific range of frequencies, corresponding to the small range of frequencies of a channel rather than a band, thus excluding a band; that the "channel" limitation advocated by Nokia is not in any of the parties' constructions; and that Nokia's belated effort during the hearing to re-write the proposed construction to a particular embodiment of the '473 patent is procedurally and substantively improper. (CBr at 14.)

Respondents argued that the term "frequency index," as to each of claims 1 and 3, should be construed as "a number or symbol representing the current center frequency on which the receive or transmit chains are operating." (RFF II.189.) Respondents further argued that complainant is confusing claim construction with the non-infringement analysis; that Nokia's proposed construction of "frequency index" is: "a number or symbol representing the current center frequency on which the receive or transmit chains are operating;" that while Nokia does not contend this construction should contain the word "channel," Nokia contends that this construction can refer only to a particular channel because Nokia's handsets "operate" on only one channel at any given moment.[10] It is also argued that QUALCOMM has altered the language

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[9] None of the parties argued that there should be different interpretations for "frequency index" in claim 1 as contrasted to claim 3.

[10] Nokia noted that QUALCOMM and the staff argued that while the specification does not expressly limit the frequency index to a particular "channel," the "current center frequency on which the receive or transmit chains [of Nokia's handsets] are operating" is necessarily a single channel because the receive and transmit chains can operate on only one channel at a time.

of the specification from an index that represents a single "center frequency" on which the phone is currently operating to include multiple "center frequencies" on which the phone is operating; and that there is no support for QUALCOMM's modification of the express language. (RBr at 14.)

The staff argued that the term "frequency index" should be construed as "a value specifying the current center frequency on which the receive or transmit chains are operating, which is used to address the linearizer and access the proper calibration value." (SBr at 19.)

The asserted claims of the '473 patent associate each of the individual receive and transmit frequencies, with a separate frequency index. (JX-1 at 7:11-13 ("the radio device transmitting and receiving on a plurality of frequencies, each frequency having a frequency index . . .") (emphasis added); JX-1 at 7:15-17 ("receiving a first signal having a first gain, a first frequency of the plurality of frequencies, and the first frequency having a first frequency index . . .") (emphasis added); JX-1 at 7:27-30 ("transmitting a second signal having a second gain and a second frequency of the plurality of frequencies, the second frequency having a second frequency index . . .") (emphasis added).) Moreover the specification of the '473 patent states:

> In order to reduce the error in the receive and transmit chains versus frequency, the receive and transmit linearizers utilize the frequency index that specifies the current center frequency on which the receive and transmit chains are operating.

(JX-1 at 3:59-61 (emphasis added).) As the parties have agreed, one of ordinary skill in the art as of the February 28, 1994 filing date of the '473 patent would have understood that a phone cannot transmit and receive at the same time on the same frequency. (CFF G36 (undisputed).) Moreover, the Background of the Invention section of the '473 patent defines the forward and

reverse links as operating on different bandwidths as follows:

> The 800 MHz cellular telephone system operates its forward link, the cell to radiotelephone transmission, in the bandwidth of 869.01 MHz to 893.97 MHz and the reverse link, the radiotelephone to cell transmission, in the bandwidth of 824.01 MHz to 848.97 MHz.

(JX-1 at 1:24-28 (emphasis added).) Therefore, the administrative law judge finds that the receive and transmit chains operate on their own distinct center frequencies: one center frequency for the receive chain, and one center frequency for the transmit chain. Furthermore, FIG. 2 of the '473 patent shows a different "frequency index" as an input to each of the receive and transmitter linearizers. (JX-1 at Fig. 2.)

Additionally, with respect to the concept of frequencies and channels, the '473 patent explicitly states that the patented invention addresses the issue of power control in FDMA and CDMA systems. (JX-1 at 2:17-19.) FDMA systems operate on only a single channel at a time, while CDMA systems utilize several channels at a time. (JX-1 at 1:41-44.) The specification also discloses that the bandwidths are split into channels:

> The forward and reverse link bandwidths are split up into channels each of which occupies a 30 kHz bandwidth. A particular user of the cellular system may operate on one or several of these channels at a time. All users of the system must ensure that they are compliant with the level of radiated emissions allowable inside and outside of the channel or channels that they have been assigned.

(JX-1 at 1:27-35 (emphasis added).) The parties do not dispute that a person of ordinary skill in the art as of the February 28, 1994 filing date would have understood that both a channel and a band comprise a plurality of frequencies. (CFF G25 (undisputed).) The parties likewise do not dispute that a band is comprised of a range of frequencies including multiple channels, and each channel is a range of frequencies. (CFF G27 (undisputed).) As such, the administrative law

judge finds that the term "frequency index" is not limited to a frequency within a single channel. Thus, he finds that the term encompasses frequencies within different channels because the specification discusses both FDMA and CDMA technologies and the output power level control problems associated with them. (JX-1 at 1:41-47; JX-1 at 2: 17-20.) For example, the specification of the '473 patent describes the power problems associated with CDMA technology: "For maximum system performance, users of the CDMA technique must carefully control the level of radiated power inside the channels in which they are operating." (JX-1 at 1:47-50.) Also, the Background of the Invention concludes by describing the focus of the present invention:

> Also, both the FDMA and CDMA based radios must operate on different channels while maintaining acceptable output power levels. Variation in output power level and input power detection versus frequency can cause an unacceptable amount of error in the amount of return link transmitted energy.
>
> These issues present significant problems to the designer of both FDMA and CDMA based radiotelephones. There is a resulting need for an effective, cost efficient means of correcting these problems.

(JX-1 at 2:9-20 (emphasis added).) Those portions of the specification therefore indicate that the "frequency index" of the '473 invention can span several channels. Moreover, complainant's expert Verdu testified:

> JUDGE LUCKERN: Let me ask you the next question. Am I correct that a person of ordinary skill in the art, again as of the filing date of this patent, would not find any limitation as to band or channel in the claim language?
>
> THE WITNESS: Correct.
>
> JUDGE LUCKERN: All right. Now, am I correct that a person of

ordinary skill in the art as of the filing date of this patent, which of course is February 28th, 1994, would understand that bands are made up of channels?

THE WITNESS: Yes.

JUDGE LUCKERN: All right. Also would I be correct that a person of ordinary skill in the art as of February 28th, 1994 would understand that both bands and channels can be said to be made up of frequencies?

THE WITNESS: Yes.

JUDGE LUCKERN: All right. Let me ask you this question. Would, in your opinion, a person of ordinary skill in the art as of the filing date of this patent conclude that the term "frequency index", as it is used in these claims, applies when the phone operates on any frequency band, not just on the more limited frequency channels?

THE WITNESS: That's correct.

JUDGE LUCKERN: All right. Let me ask you this question. Now, your construction that you like for frequency index is a value specifying the center frequencies on which receiver or transmitter is operating at a given moment. Correct?

THE WITNESS: Correct.

JUDGE LUCKERN: All right. Why -- the way I read it, why are you using this term "frequencies" in the plural in your claim construction? Is it critical to your claim construction as far as how a person of ordinary skill in the art would interpret frequency index as of the filing date of this patent?

You have frequencies, in the plural. Is that sort of critical? Do you understand my question?

THE WITNESS: Right. No, I don't think it is critical. And I think Judge Brewster came up with this language just to make sure --

JUDGE LUCKERN: Well, let's forget about Judge Brewster. I have already said that I would give deference to Judge Brewster, et

cetera, but I am going to look at the intrinsic evidence, and also I can give weight to the extrinsic evidence. I want to hear what you are -- you are testifying. You have been qualified as an expert. I want to hear from you, not Judge Brewster. I can read what Judge Brewster said if he wrote anything.

THE WITNESS: True. I was just responding to your question about why the term construction has the plural rather than the singular.

JUDGE LUCKERN: Correct.

THE WITNESS: And the reason is that when you transmit information, you cannot just transmit information with a signal that occupies just one frequency in the frequency spectrum. You have to have a bandwidth. Okay?

Signals that occupy only one frequency have no information. You have to occupy a certain bandwidth. Okay? And that's why the language is plural.

JUDGE LUCKERN: That's why you like frequencies.

THE WITNESS: Frequencies.

JUDGE LUCKERN: That's how you feel a person of ordinary skill in the art as of the filing date of this patent would consider this phrase?

THE WITNESS: Correct.

(Tr. at 1088-91 (emphasis added).)

Moreover, because the receive and transmit chains cannot operate on the same frequency at the same time, the administrative law judge finds that the values extracted from the "frequency index" must be different for the receive and transmit chains and they also do not have to be within the same channel. Thus, he finds that the term "frequency index" should be understood to consist of a set of frequency values in a table, with one frequency value serving as a reference

point for the receive chain linearizer and another frequency value serving as a reference point for the transmit chain linearizer. In this way, the value of the frequency index for the transmit chains represents the current center frequency on which the transmit chain is operating, while the value of the frequency index for the receive chain represents the current center frequency on which the receive chain is operating.

Based on the foregoing, the administrative law judge construes the term "frequency index" as "a value specifying the current center frequency on which the receive chain is operating, or the current center frequency on which the transmit chain is operating."

The staff argued that "frequency index" should be construed with the additional limitation of "which is used to address the linearizer and access the proper calibration value." (SBr at 19.)[11] The first portion of the staff's added limitation imports into an independent method claim a requirement to use a specific component of an independent apparatus claim. No party, however, contests the fact that the "frequency index" is used to address the linearizer. Hence, the function is inherent in the "frequency index" recitation of claim 1.

As for the second portion of the staff's proposed limitation dealing with the calibration value, the administrative law judge finds that it is redundant in light of the language of claim 1 and claim 3 which explicitly describes how the "calibration values" are generated in response to the first frequency index and the second frequency index. (JX-1 at 7:22-24 ("selecting a first predetermined calibration value in response to the automatic gain control setpoint and the first frequency index") (emphasis added); JX-1 at 7:33-35 ("generating a second calibration value in

[11] The administrative law judge notes that "linearizer" is not claimed in method claim 1 of the '473 patent, while apparatus claim 3 recites both a "receive linearizer" and a "transmit linearizer." (JX-1 at 7:9-37; JX-1 at 7:56; JX-1 at 8:8.)

response to the automatic gain control setpoint, the second frequency index, and the transmit power value") (emphasis added); JX-1 at 7:57-60 ("for generating a receive calibration value in response to the automatic gain control setpoint and a first frequency index corresponding to the first frequency . . .") (emphasis added); JX-1 at 8:8-11 ("generating a transmit calibration value in response to the automatic gain control setpoint, the second power value, and a frequency index corresponding to the second frequency . . .") (emphasis added).) Thus, although the frequency index is used to "access the proper calibration value," the administrative law judge finds that the staff's modifying clause incorporating the calibration value into the definition of "frequency index" is unnecessary because this limitation is explicitly stated in the claim language.

3. The Claimed Term "Automatic Gain Control Setpoint"

Complainant argued that the term "automatic gain control [AGC] setpoint" should be construed to mean "the setpoint generated by a control circuit that is used for automatically changing the gain of a transmitter or receiver." (CBr at 16.) It is further argued that the fundamental claim construction question raised by said term is the meaning of the term, not how it is generated. (CBr at 16, citing CDX-9.)

Respondents put in issue the phrase "generating an automatic gain control setpoint in response to the receive power value and the reference voltage signal" and argued that the phrase should be construed to mean "integrating the receive power value with respect to a reference voltage to generate a gain control value." (RBr at 10.) It is also argued that how the AGC setpoint is generated is a "jugular" issue. (RRBr at 8.)

The staff argued that the term "automatic gain control setpoint" should be construed to mean "the open loop power control signal for the radio." (SBr at 22.) It further argued that to the

extent that additional clarification is needed, Nokia's proposed construction is reasonable. (RBr at 23.)

All parties agree that the term "automatic gain control setpoint" did not have a standard meaning to one of ordinary skill in the art as of the February 28, 1994 filing date of the '473 patent. (RFF II.122 (undisputed).) The parties also agree that the term "setpoint" is loosely used by electrical engineers. (RFF II.124 (undisputed).)

Complainant's expert Verdu testified that because a person of ordinary skill in the art would not understand what an AGC setpoint is, he or she would have to look to the claims and the specification and that Verdu was unable to find a different discussion of AGC setpoint than the one discussed in a preferred embodiment:

> JUDGE LUCKERN: Would it be reasonable to a person of ordinary skill in the art to interpret this phrase "automatic gain control setpoint" as the value generated by integrating the receive power value with respect to a reference voltage to automatically change the gain of a receiver or transmitter?
>
> THE WITNESS: That would be the specific embodiment, the preferred embodiment in the patent talks exactly in that way. That's how -- that's essentially what the preferred embodiment does.
>
> JUDGE LUCKERN: But you feel that a person --
>
> THE WITNESS: <u>But by looking at the patent, the whole patent and the claim language, I don't think that one of ordinary skill in the art would understand that the claim language is meant to limit it in that way</u>.
>
> JUDGE LUCKERN: Well, maybe you can just tell me how this other claim language would broaden it to come out the way you feel that a person of ordinary skill in the art would interpret it.
>
> You have made reference, of course, to certain sections of the specification, for example, what the staff has referred to, the AGC

setpoint, is the open loop power control signal for the radio. I am reading from column 3, around line 66 to 67. I think I can go back to realtime, where it was made reference here, but it is not clear to me what other parts of the specification you are relying on to broaden your definition as to how a person of ordinary skill in the art would interpret it.

I am not prejudging you or anything right now. You are the expert. You are on the stand. I don't have to have lawyers anymore, which I have heard in plenty of telephone conferences. You are under oath and you are an expert. Okay?

THE WITNESS: Right. In the plain language of claim 1, the first time it talks about automatic gain control setpoint says generating an automatic gain control setpoint in response to the receive power value and the reference voltage signal.

So that's very broad language, generating in response to.

Then later on in claim 3, it says, an integrator, coupled to the power detector for generating an automatic gain control setpoint from the first power value. Claim 4, an integrator coupled to the power detector for generating an automatic gain control setpoint from the power value.

So there in those passages, it does include the limitation of including an integrator, but not in claim 1. That language in claim 1 is broader.

* * *

THE WITNESS: Offhand I cannot cite a specific example where they would have a different discussion of AGC setpoint than the one they have when they discuss the preferred embodiment.

JUDGE LUCKERN: Can you point to any literature reference or anything of that sort where, being around February 28, 1994, that would have this larger concept -- February 28th is what it is, 1994.

THE WITNESS: Yes, not a specific one, but in 1994, as well as today, you know, it is common knowledge that you could generate these kind of AGC setpoints, not necessarily as the output of an integrator, but in other ways.

(Tr. at 1099-1101, 1104 (emphasis added).) Verdu further testified that the term AGC setpoint alone, without any context, did not have an ordinary meaning to one of ordinary skill at the time the '473 patent was filed:

> Q. Thank you, Your Honor. Dr. Verdu, you agree that the phrase automatic gain control setpoint is not, would not have had any standard or ordinary meaning to one of skill in the art in 1994, correct?
>
> A. I think that's a fair statement.
>
> Q. And it is your testimony that in order to understand what that phrase means, automatic gain control setpoint, you would have to look at the particular context in which it is used, correct?
>
> A. In the sense that if you say automatic gain control setpoint, and you look at a diagram like this, then one of ordinary skill in the art would not immediately be able to pinpoint, you know, a specific point in the diagram that says that, so --
>
> Q. Go ahead.
>
> A. So you would have to indeed look at the claim language and so on.

(Tr. at 1830-1831 (emphasis added).) Additionally, when one of the inventors, Ann Weiland, was questioned about the definition of AGC setpoint, she was not at all confident that the term in the early nineties was used in a consistent way:

> A. I remember that [AGC setpoint] was a term that was used. I don't have much confidence that throughout our developments, throughout our numerous, numerous discussions regarding this solution, our product development in this patent, I am not at all confident that that term was used in a consistent way.
>
> I believe some people might have a different definition in their mind of what an AGC setpoint is and that is the main reason why I am hesitant to use that term.

(Tr. at 559 (emphasis added).) Respondents' expert Helgert testified as to the indefinite meaning of AGC setpoint prior to the February 28, 1994 filing date:

> Q. Okay. In your opinion, would a person of ordinary skill in the art, prior to February 28th, 1994 in the abstract, not even looking at the patent, would that person know that an automatic gain control setpoint would require a reference value?
>
> A. Well, there is a question of what was meant by the word automatic gain control setpoint in 1994 in the abstract, without reference to one of these patents. And the meaning of setpoint without reference to the patent would really be different. It would simply be a target value that an amplifier gain would be set to, rather than the difference between a target value and an actual output of the amplifier.
>
> So there is this discrepancy here, and when we think of someone of ordinary skill in the art in 1994, we would have to refer that person to this particular patent in order to have an understanding of automatic gain control setpoint in the context of the patent.
>
> Q. As used in the context of the patent, and the specification, this phrase automatic gain control setpoint is used in a way that's different than it would be understood to mean to a person of ordinary skill in 1994 without even seeing the patent?
>
> A. Yes.

(Tr. at 2442-2443 (emphasis added).)

In light of the foregoing, the administrative law judge finds that the claim term "automatic gain control setpoint" did not have an ordinary meaning to a person of ordinary skill in the art as of the filing date of the '473 patent, which is consistent with undisputed proposed finding RFF II.122. Therefore, he finds that the patentees' definition of said term in the '473 patent governs.

The "automatic gain control setpoint" is used in an automatic gain control loop. Unlike an AGC setpoint, an AGC loop does have meaning to a person of ordinary skill in the art, as of the

February 28, 1994 filing date (RFF II.127 (undisputed)) although the parties dispute what that meaning was. The '473 specification, however, under the subheading DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT, directly associates the AGC setpoint with a loop: "The AGC setpoint is the open loop power control signal for the radio" (JX-1 at 3:66-4:5 (emphasis added)), which is the basis for the staff's proposed construction. The '473 specification earlier under the same subheading, describes the automatic gain control section of the receive chain as follows:

> The receive linearization section includes an automatic gain control (AGC) section. The signal input to the AGC section is received on the forward link and amplified by a low noise amplifier (LNA) (211). The output of the LNA (211) is input to a variable gain amplifier (212). The variable gain amplifier (212) produces a signal that is converted to a digital signal using an analog to digital converter (ADC) (213).
>
> The power of the digitized received signal is next computed by a digital power detector (214). The power detector (214) includes an integrator that integrates the detected power with respect to a reference voltage. In the preferred embodiment, this reference voltage is provided by the radio's demodulator to indicate the nominal value at which the demodulator requires the loop to lock in order to hold the power level constant. The demodulator requires this value for optimum performance since a power level too far out of the optimum range will degrade the performance of the demodulator. The power detector (214) performs the integration, thus generating an AGC setpoint. The setpoint and a receive frequency index are input to a receiver linearizing table (216).
>
> The AGC setpoint and the frequency index are used to address the linearizer (216), thus accessing the proper calibration value. This calibration value is then output to a digital to analog converter (215) that generates the analog representation of the receive AGC setting.
>
> The analog value adjusts the biasing of the variable gain amplifier (212). The control of the variable gain amplifier (212)

> forces the receive AGC loop to close such that the input to the receiver linearizing table (216) follows a predetermined straight line with respect to RF input power.

(JX-1 at 3:18-51 (emphasis added).) Significantly, what is disclosed, supra, is the first reference in the '473 patent to AGC setpoint. Thus, the earlier ABSTRACT, BACKGROUND OF THE INVENTION, SUMMARY OF THE INVENTION and BRIEF DESCRIPTION OF THE DRAWINGS sections do not reference AGC setpoint.

Complainant's expert Verdu directly associated the AGC setpoint with an AGC loop. (See Tr. at 1093, 1095-1096, 1833-1834.) For example he testified:

> JUDGE LUCKERN: If I went up to this person in February 24th, 1994, he has never seen the patent, never seen the specification, nothing, and I say: Do you have an understanding of this phrase "automatic gain control setpoint" in your field, would he say yes, it means, this, this, this, this, or not?
>
> And he has no knowledge of this patent, no knowledge of the specification, nothing. But he is a person of ordinary skill in the art, and has some knowledge with respect to electrical -- you defined such a person the other day. Would he be able to give you an answer?
>
> THE WITNESS: They would be able to give you an answer.
>
> JUDGE LUCKERN: You are the expert. What type of answer would such a person give?
>
> THE WITNESS: The answer they would give you, you know, it is a signal that --
>
> JUDGE LUCKERN: Go ahead, go ahead.
>
> THE WITNESS: Yeah, it is a signal that you are using in an automatic gain control loop, and you will be using that signal in order to control the gain of a variable gain amplifier. That's what a person of ordinary skill in the art, not having seen the patent, would understand.

JUDGE LUCKERN: So he would have an understanding of this phrase "automatic gain control setpoint"? The whole phrase, he would have an understanding from something else?

THE WITNESS: Yes.

(Tr. at 1833-1834 (emphasis added).) Respondents' expert Helgert, testified as to the well known meaning of AGC loop:

Q. Let me start by asking you about this person of ordinary skill. So this is the person that you described, it is prior to February 28, 1994, and my question is, would that person have understood that the automatic gain control loop had a well-known meaning at the time?

A. Yes, it would have.

Q. And what would that meaning be?

A. The meaning would be that the relationship through an amplifier would be controlled by a gain control signal, that is to say, the gain of the variable gain amplifier would be controlled by a gain control signal.

And that gain control signal would be derived by comparing the actual output of this amplifier with a particular reference value, or let us say, a target value that the output of the amplifier should reach.

Q. Okay. If you turn to the slide, RDX-61C-11, is that an illustration that you prepared?

* * *

A. Yes. Here we have again an amplifier that has the possibility of adjusting its gain by means of a signal, which is indicated there as coming out of this gain control adjustment box.

Now, the idea here is that you have a certain input level which fluctuates over time, but you would like to have an output level from this amplifier that is equal to a reference level provided

externally. And so at any one time, you make a comparison between what the amplifier actually puts out and this reference level, which is the desired output from the amplifier.

This comparator then is fed back into a gain control adjustment process, and the purpose of the gain adjustment is to change the gain of the amplifier in such a way as to bring the output level in line with the reference level. That's the basic idea of what's called an automated gain control loop.

Q. So the purpose of an AGC loop is to make the difference between the output level and reference level as small as possible?

A. Exactly.

Q. And would a person of ordinary skill at the time have understood that?

A. Yes.

Q. And would they have understood that an AGC loop must have a reference level?

A. Yes.

Q. What would happen to the AGC loop if you removed the reference level?

A. There would be no point to it, because you would have no basis on which to make any kind of gain adjustment.

Q. In your opinion, can you have an AGC loop without a reference level?

A. No.

(Tr. at 2342-2345 (emphasis added).) Thus, the administrative law judge finds that the AGC setpoint is intertwined with the concept of an AGC loop.

Claim 1 states that the automatic gain control setpoint is calculated with respect to two values: the receive power value and the reference voltage signal. (JX-1 at 7:19-21 ("[G]enerating

an automatic gain control setpoint in response to the receive power value and the reference voltage signal;") (emphasis added).) The language of claim 3, however, only requires that the AGC setpoint be generated from a single power value. (JX-1 at 7:53-55 ("[A]n integrator, coupled to the power detector, for generating an automatic gain control setpoint from the first power value.") (emphasis added).)[12] Nonetheless, claim 3 implements an integrator[13] for generating the AGC setpoint. (JX-1 at 7:53-55.) As seen, supra, claim 1 requires a reference voltage with respect to AGC setpoint but does not specifically require an integrator, while claim 3 has a requirement for an integrator with respect to AGC set point but does not specifically require a reference value.

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[12] The phrases "in response to" in claim 1 and "from" in claim 3 indicate that there are reference values considered and factored into the calculation of the AGC setpoint. QUALCOMM's expert testified that the fact that an AGC setpoint shows no functional dependence on the reference voltage does not mean that it is not generated as a function of the reference voltage level. (Verdu, Tr. at 1970.) However, the administrative law judge finds that the claim language as well as the specification's teaching clearly indicate a relationship between the AGC setpoint and the reference voltage. As Nokia's expert testified:

> If the word "in response to" means anything at all, there has to be a relationship between the quantity and the quantity that it is in response to. Otherwise the meaning of the word "in response to" has no meaning. So there has to be some kind of functional relationship between the automatic gain control setpoint and the reference voltage in this particular claim element.

(Helgert, Tr. at 2445.) He further finds that the language "in response to" would have no meaning if there were no functional relationship required. Such an interpretation runs afoul of settled law. See Ethicon Endo-Surgery, Inc. v. United States Surgical Corp., 93 F.3d 1572, 1582 (Fed.Cir.1996) (refusing plaintiffs "invit[ation] [] to read its 'during staple firing' limitation out of the claim" because the court must give meaning to all the words in a claim, noting: "Ethicon need not have included this limitation in its claims. Having done so, it must live with the language it chose.").

[13] The term "integrator" is separately construed. However, analysis of the term AGC setpoint requires mention of "integrator" because the language of claim 3 explicitly states that the integrator generates the AGC setpoint. (See JX-1 at 7:53-55.) By understanding how the integrator generates the AGC setpoint, the term AGC setpoint can be appropriately defined.

The term "integrator" is defined in two locations within the specification of the '473 patent. The first mention of integrator in the specification appears in the context of using an AGC setpoint in both the receive and transmit chains. As for the receive chain, it describes the automatic gain control setpoint as follows:

> The power detector (214) includes an integrator that integrates the detected power with respect to a reference voltage . . . [t]he power detector (214) performs the integration, thus generating an AGC setpoint. The setpoint and a receive frequency index are input to a receiver linearizing table (216). The AGC setpoint and the frequency index are used to address the linearizer (216), thus accessing the proper calibration value. This calibration value is then output to a digital to analog converter (215) that generates the analog representation of the receive AGC setting. The analog value adjusts the biasing of the variable gain amplifier (212).

(JX-1 at 3:27-29, 37-47 (emphasis added).) The third element of claim 1 requires the AGC setpoint to be generated "in response to a receive power value [detected power] and the reference voltage signal. (JX-1 at 7:18-21 (emphasis added).) Said description (JX-1 at 3:27-29, 27-47) is therefore consistent with the third element of claim 1. As for the transmit chain, the specification describes the automatic gain control setpoint as follows:

> As the power of the signal received from the cell increases, the radio decreases its transmit power. This output power control is accomplished by the AGC setpoint that is filtered by a low pass filter (217).
>
> The transmit section includes a digital summer (210) that combines the AGC setpoint and a closed loop power control setting (206). The output of the summer (210) is fed into a power control limiting section (205).
>
> * * *
>
> The output of the power control limiting section (205), along with the transmit frequency index, are used to address values stored

in a transmitter linearizing table (204).

(JX-1 at 4:1-9, 4:14-17.) The third element of claim 1 and the cited portions, supra, of the specification therefore support the finding that AGC setpoint is generated via an integration of the detected, or receive power value, with respect to a reference voltage; and that the setpoint is used in a sequence of steps to ultimately adjust the receive variable gain amplifier in the receive chain or address a transmit linearizing table in the transmit chain. As seen, supra, in the specification at JX-1 at 3:26-40, which is the only description in the specification regarding the generation of an AGC setpoint, the specification recites:

> The power detector (214) includes an integrator that integrates the detected power with respect to a reference voltage. . . . The power detector (214) performs the integration, thus generating an AGC setpoint.

The second mention of "integrator" in the specification of the '473 patent appears in the context of Figure 8 which is "another embodiment." (JX-1 at 6:21.) This portion of the specification describes an integrator (801) being used to generate a gain control signal according to the following equation:

$$1/K * \int(\text{Setpoint} - \text{Detected})dt$$

where "detected" represents the digital measured output power of the power amplifier (808) and where "setpoint" represents a desired reference value. (See JX-1 at Fig. 8; 6:21-42.) Thus, even in this separate embodiment this equation for the integrator (801) requires integrating a detected power value (e.g., "detected") with respect to a reference value (e.g, "setpoint").

Hence, the administrative law judge finds that the language of claim 1, claim 3, and of the specification support the construction that at least a detected power value and one reference value

are required to generate the AGC setpoint. Thus, the administrative law judge construes the term "automatic gain control setpoint," as "the value generated by integrating a detected power value with respect to a reference value to automatically change the gain of a receiver or transmitter."

Complainant relies on dictionary definitions for its claim construction of AGC setpoint. (CBr at 17.) However, complainant's cited definitions are for the phrase "automatic gain control," not for the claim term "automatic gain control setpoint."[14] Also one of those dictionaries is from 1996. In the other dictionary, which did exist at the time of the February 28, 1994 filing of the patent application, that led to the '473 patent, the language immediately below what QUALCOMM quotes in its post-hearing brief clearly does require a reference value. Thus, the IEEE Standard Dictionary of Electrical and Electronics Terms (IEEE) includes two definitions of "automatic gain control":

> (1) A process or means by which gain is automatically adjusted in a specified manner as a function of input or other specified parameters.
>
> (2) A method of automatically obtaining a substantially constant output of some amplitude characteristic of the signal over a range of variation of that characteristics at the input.

(CDX-169.) The first definition of "automatic gain control" in the IEEE allows for the use of a

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[14] Leaving aside the fact that this "automatic gain control" is not the disputed claim term, complainant's dictionary definitions simply indicate in the abstract that automatic gain control is a "process or means by which gain is adjusted in a specified manner as a function of input or other specified parameters." One skilled in the art would have to look at the context in which the automatic gain control is used to determine what "specified manner," "input," or "other specified parameters" are needed. To the extent that one skilled in the art would look beyond the four corners of the patent to determine what this term means, other more relevant prior art references (including those cited in the asserted patents) teach AGC circuits specifically used for power control in cellular communications that integrate a reference level with respect to a received signal. See Wheatley U.S. Patent No. 5,367,262 (CX-40) and Wheatly PCT application. (RX-311.)

reference voltage. (Helgert, Tr. at 2689-2690; CDX-169.) The second definition of "automatic gain control" in the IEEE requires the use of a reference voltage to indicate what the "substantially constant output" should be. (Helgert, Tr. at 2689; CDX-169.) Moreover, the use of a dictionary may extend patent protection beyond what should properly be afforded by a patent. See Phillips, supra.

Complainant also argued that the specification merely describes a preferred embodiment of the invention, and that as such, any excerpts taken from the specification regarding AGC setpoint are not limiting on the invention as a whole. However, as found, supra, it is clear from claim 1 itself that the AGC setpoint is based on the receive power value and the reference voltage signal. As for claim 3, because AGC setpoint has no ordinary meaning, the term cannot be understood in isolation and the description of AGC setpoint in the specification must govern. Moreover, the patentee cannot expand beyond what he has claimed as the AGC setpoint by characterizing the specification as referring to only a "preferred embodiment" of the invention. As discussed supra, the only embodiments in which AGC setpoint is disclosed in the specification require that the setpoint be generated by integrating some detected power with respect to a reference value. Merely using the words "preferred embodiment" in a subheading does not allow a patentee to expand a claim to what is not disclosed in the specification, especially when the language of claim 1 limits the term explicitly in requiring a reference voltage signal[15] and when it is undisputed that the term "automatic gain control setpoint" did not have a standard meaning to one of ordinary skill in the art as of the February 28, 1994 filing date of the '473 patent, thus

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[15] The specification refers to "another embodiment" and "alternate embodiments." (See, e.g., JX-1 at 5:47; 6:4, 21, 52.) The use of those terms signifies that the detailed description of the invention describes alternate embodiments and not just a preferred embodiment.

requiring said person to look to the patent itself to determine its meaning. Complainant focused on the fact that there is no disclaimer of alternate ways of generating the AGC setpoint, but the focus should instead be on the fact that there is not even a mention in the specification of the '473 patent of any such alternate ways. The specific teachings of the '473 patent requires that the AGC setpoint be generated by integrating a detected power with respect to a reference voltage. There is no indication that any other alternative was contemplated. See Snow v. Lake Shore & Mich. S. Ry. Co., 121 U.S. 617, 630 (1887) (embodiment described in the specification was found to be the actual invention because there was "nothing in the context to indicate that the patentee contemplated any alternative" embodiment to the one presented); Phillips, 415 F.3d at 1323 (stating that the context in which a term is used will make it clear whether the patentee "intends for the claims and the embodiments in the specification to be strictly coextensive").

Complainant argued that claim 1 should limit AGC setpoint under a claim differentiation theory. Specifically, complainant argued that the term "integrator" appears in claim 3 and does not appear in claim 1, and therefore that claim 1 should not be limited to requiring an integrator. (CBr at 19.) The claim differentiation doctrine "normally refers to the presumption that an independent claim should not be construed as requiring a limitation added by a dependent claim." Curtiss-Wright Flow Control Corp. v. Velan, Inc., 438 F.3d 1374, 1380 (Fed. Cir. 2006) (Curtiss-Wright. However, when applied to two independent claims: "(1) claim differentiation takes on relevance in the context of a claim construction that would render additional, or different, language in another independent claim superfluous; and (2) claim differentiation 'can not broaden claims beyond their correct scope.'" Id. at 1381. In the context of independent claims, the Federal Circuit has cautioned that "claim differentiation is a guide, not a rigid rule." Id. Moreover, as the

Federal Circuit recently stated: "claim differentiation takes on relevance in the context of a claim construction that would render additional, or different, language in another independent claim superfluous." AllVoice Computing PLC v. Nuance Communications, Inc., 504 F.3d 1236, 2007 U.S. App. LEXIS 23949, at *23 (Fed. Cir. Oct. 12, 2007).

Claims 1 and 3 of the '473 patent are each independent claims and differ from each other, in other ways than just the recitation of "integrator." Thus, unlike apparatus claim 3, claim 1 is a method claim and does not require the recitation of the structural components. It therefore is reasonable that a patentee may have recited the step of generating an AGC value without specifically referencing an integrator even though integration is inherently needed to perform that step. See Hormone Research Found. v. Genentech, Inc., 904 F.2d 1558, 1567 (Fed. Cir. 1990) ("It is not unusual that separate claims may define the invention using different terminology, especially where (as here) independent claims are involved."). Furthermore, it is undisputed that claim 3 describes an apparatus that performs the method described in claim 1. That apparatus claim 3 expressly requires an integrator therefore supports a construction that integration is used to generate the automatic gain control setpoint in method claim 1.

4. The Claimed Term "Calibration Value(s)"

Complainant argued that the term "calibration value(s)," as found in claims 1 and 3 of the '473 patent, means "corrected gain control settings." (CBr at 20.) It is also argued that "predetermined calibration value" as used in the preamble, as well as the fourth element following the preamble, of claim 1 means calibration value "determined beforehand." (CBr at 20.) Complainant further argued that there is no basis to limit "calibration value(s)" to a value generated during production. (CBr at 20, 21.)

Respondents argued that the term "calibration value(s)" means "a value in a correction table, determined during production or manufacturing, indexed by frequency, to linearize gain as a function of a gain control value(s)." (RBr at 14.)

The staff argued that the term "calibration value(s)" means corrected gain control settings loaded into a look-up table during factory calibration or production testing of the radio." (SBr at 14.)

As found supra, the preamble limits the body of claim 1, and more specifically, the administrative law judge finds that the plain language of the preamble, viz. "a plurality of predetermined calibration values" limits the "calibration values" in the body to a plurality of predetermined calibration values. (JX-1 at 7:10-11 (emphasis added).) The administrative law judge further finds that in the body of claim 1 following "comprising the steps of," the fourth element of claim 1 recites "selecting a first predetermined calibration value in response to the automatic gain control setpoint and the first frequency index." (JX-1 at 7:22-24 (emphasis added).) The fifth element of claim 1 then recites "adjusting the first gain in response to the first calibration value." (JX-1 at 7:25-26 (emphasis added).) Thus, he finds that the claim language makes clear that the mention of the first calibration value in the fifth element refers back to the mention of a "predetermined" calibration value in the fourth element.

In addition, the administrative law judge finds that the preamble language "a plurality of predetermined calibration values" (JX-1 at 7:10-11 (emphasis added)) should apply to the second calibration value, as recited in the eighth and ninth elements of claim 1, because "plurality" means more than one value. If only the first calibration value were "predetermined," then there would not be a "plurality" of "predetermined values" as the preamble requires. Thus, to make the

preamble consistent with the body of the claim, the administrative law judge finds that the plain language indicates that the "second calibration value" must be predetermined like the first.

Moreover, with respect to the "second calibration value," the administrative law judge finds that a claim construction requiring the value to be "predetermined" is further supported in light of the relationship between the words "first" and "second." By using those words when referring to the "calibration values," he finds that a person of ordinary skill in the art would conclude that the calibration values are related to one another by being part of a series of values, with each value sharing a common characteristic, and since the "first calibration value" is predetermined, the "second calibration value" must also be predetermined as well.

Referring to the specification, it defines "calibration value(s)" as being predetermined even without the use of the "predetermined" language. The following excerpts from the '473 specification demonstrate this point:

> [The power control correction of the present invention] is accomplished by real-time compensation utilizing a set of correction tables[16] that are generated during the production testing of each radiotelephone. (JX-1 at 3:6-10) (emphasis added);
>
> The control of the variable gain amplifier (212) forces the receive AGC loop to close such that the input to the receiver linearizing table (216) follows a predetermined straight line with respect to RF input power. (JX-1 at 3:47-51) (emphasis added);
>
> During factory calibration of the radiotelephone, the linearizers are loaded with values, in addition to the previously mentioned calibration values, that are indexed by frequency to correct the errors related to the operating center frequency. (JX-1 at 3:61-65) (emphasis added);

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[16] The description of the invention equates "correction tables" with "look-up tables" and with "calibration tables." (JX-1 at 6:68-7:1 ("This power limitation is accomplished by a control loop including a calibration look-up table.") (emphasis added).)

> The transmitter linearizing table (204) contains values determined from production testing of the radiotelephone. (JX-1 at 4:17-20) (emphasis added); and
>
> The biasing of the variable gain amplifier (202) is adjusted by the analog calibration value to a point such that the input to the transmitter linearizing table (204) follows a predetermined straight line with respect to transmitted RF output power. (JX-1 at 4:23-27) (emphasis added).

The last paragraph of the specification, preceding the claims, further reinforces the predetermined nature of the invention by stating: "In summary, the process of the present invention ensures that the transmitted sidebands and synthesizer phase noise of a radio transmitter remains [sic] within a predetermined specification by limiting the maximum output power..." (JX-1 at 6:64-68 (emphasis added).) Moreover, respondents' expert Helgert has opined:

> Q. And a person of ordinary skill in the art prior to February 28th, 1994, looking at element D, would they understand that the calibration value was a value that was in a table that was put in there during manufacture?
>
> A. Yes.
>
> Q. And why is that?
>
> A. Well, the word predetermined means it has to be preestablished, it has to be somehow an integral part of the phone. And the words calibration value indicate -- would indicate to someone of ordinary skill in the art that it is some kind of a table containing some discrete quantities.
>
> And so we would have then the idea that there is a table that's in the phone that has these calibration values in it.

(Tr. at 2472-2473.) Further, complainant's expert Verdu has testified:

> Q. Okay. Let's go back to claim 1, then. Now, the preamble is talking about a method and talks about a radio device that has, it says "having a plurality of predetermined calibration values." Do

you see that?

A. Yes.

Q. And then it goes on, and it talks about steps that occur in the method claim. Do you see that?

A. I do.

Q. But before those method steps occur in the preamble, it says that there is a radio device and it says, "having a plurality of predetermined calibration values." Do you see that?

A. I do.

Q. A person of ordinary skill in 1994 would interpret that language to mean that before these method steps were performed, there has to be a radio device in existence, and that device has to have on it a plurality of predetermined calibration values, right?

A. All right. I don't have any problem with that.

(Tr. at 1891-92.)

Hence, based on the foregoing, the administrative law judge finds that the language of the claims and the specification use the term "calibration value" repeatedly and exclusively to describe predetermined values, viz. values being generated during production or manufacturing and stored onto the radio in correction tables. Thus, the administrative law judge finds that the term "calibration value(s)" means "corrected gain control settings loaded into a look-up table during factory calibration or production testing of the radio."

Complainant argued that although the specification describes a preferred embodiment as having linearizing tables loaded during factory calibration or production testing, the specification also describes calibration values as either the output of a linearizing table, or an analog signal for controlling the gain of the transmit amplifier. (CBr at 22, citing CFF G127; CFF G128.) Hence,

complainant argued that there is no basis to limit "calibration value(s)" to a value generated during production. (CBr at 22.) The administrative law judge finds that complainant's argument confuses the purpose and generation of the calibration values in the '473 patent. Thus, the calibration values recited in the '473 patent are used to affect the strength of the received or transmitted signals (e.g., the gain) and to achieve linearization. For example, the specification of the '473 patent states:

> The AGC setpoint and the frequency index are used to address the linearizer (216), thus accessing the proper calibration value. This calibration value is then output to a digital to analog converter (215) that generates the analog representation of the receive AGC setting. The analog value adjusts the biasing of the variable gain amplifier (212). The control of the variable gain amplifier (212) forces the receive AGC loop to close such that the input to the receiver linearizing table (216) follows a predetermined straight line with respect to RF input power.

(JX-1 at 3:41-51 (emphasis added).) Although the selection or generation of those calibration values may change during operation of the phone, they are all nonetheless stored on the phone during factory production. Thus, complainant's witness Verdu testified:

> JUDGE LUCKERN: How does that change the fact that the phones don't possess calibration values after they leave the manufacturing plant? How does that change that? Or it doesn't change it, does it? I am not argumentative. I am just asking you how a person of ordinary skill in the art would interpret this patent.
>
> THE WITNESS: I don't think there is any -- nobody is claiming here that the phone, when it leaves the factory, does not have calibration values, if I understand your question.
>
> JUDGE LUCKERN: So you would agree that the phone that is described here and is written here would have calibration values when it leaves the factory?
>
> THE WITNESS: Yeah, in this particular -- for that particular part

> of the circuit I am talking about, the digital representation of those calibration values would indeed be stored in that table.

(Tr. at 1115-16.)

The administrative law judge finds that the calibration values could not serve their purpose of adjusting the gain of the amplifier such that the output of the variable gain amplifier "follows a predetermined straight line with respect to RF input/output power" without being stored on the phone beforehand. (JX-1 at 3:47-51; 4:23-27.) In other words, even though the values are selected during operation of the handset, they must be stored on the phone prior to operation in order for them to function as they are intended.

Complainant also argued that limiting "calibration value(s)" to those stored in a look-up table during factory testing or production excludes from the patent's scope the embodiment disclosed in Figure 7 of the '473 patent. (CBr at 23-24.) The embodiment disclosed in Figure 7 utilizes a closed loop power control mechanism in the transmit chain of the handset. (JX-1 at Fig. 7.) The specification for this embodiment reads:

> In another alternate embodiment, illustrated in FIG. 7, a power limiting control system is employed that is based on the closed loop power control accumulator (702). The system operates by first measuring the output power of the power amplifier (705) using a power detector (706). The detected power is digitized (707) and compared to a maximum allowable setting by the comparator (701). If the output power is greater than the maximum setting, the closed loop power control accumulator (702) is modified to turn the amplifier (704) power down by one step each 1.25 ms until the output power is less than the maximum setting. If the output power is less than the maximum setting, the closed loop power control accumulator is not modified. The linearizing compensation tables, similar to the preferred embodiment, are added into the transmit gain control using a summer (703).

(JX-1 at 6:4-20 (emphasis added).) This portion of the specification therefore does not refer to the

'473 claims, but refers to claims of the '220 patent, which employ a closed loop power control system implementing a transmit gain control signal.[17] The summer (703) adds the linearizing compensation tables into the transmit gain control, and does not access or generate any calibration value from a look-up table. (JX-1 at 6:17-20.) In fact, claim 8 of the '220 patent uses the same language that is employed in the specification that describes the embodiment shown in Figure 7. The claim calls for "a summer for combining the received power level signal and the closed loop power control signal to produce a summation signal." (JX-3 at 9:5-7 (emphasis added).) Thus, the output of summer (703) is a "summation signal" as claimed in the '220 patent. The administrative law judge finds that "summation signal" is not a "calibration value" as used in the '473 patent claims because Figure 7 employs a control loop mechanism, and such a mechanism is not claimed in the '473 patent.

Complainant also argued that the calibration values are not predetermined since they are converted from digital to analog form. (See Tr. at 1128-29.) The administrative law judge finds that the patent requires "calibration value(s)" be stored on the phone during testing and manufacturing, and their subsequent conversion from digital to analog or vice versa does not change the fact that the phones possess "calibration values" after the phones leave the manufacturing plant once testing is complete. (JX-1 at 3:7-10; Verdu, Tr. at 1114-1116, 1890; Helgert, Tr. at 2474-2475.) Thus, any subsequent conversion performed by the phone (e.g., from digital to analog form) only manipulates the pre-stored value and does not generate any new non-

[17] During prosecution of the application that led to the '473 patent, the PTO issued a restriction requirement which led to the issuance of the '408 and '220 patents. (JX-4 at 40-41; JX-5; JX-6.) Thus, the Examiner found that the so called "Group III claims (the '220 patent) were based on controlling the transmitter via a close loop, classified in Class 455, subclass 127." (JX-4 at QHITC002561; CFF J10, CFF 15 (undisputed); CFF 16 (undisputed relevant part).)

predetermined value.

5. The Claimed Term, "Integrator"

Complainant argued that an "integrator" is "a device which generates a sum (over time) of an input and that the dispute between the parties about the term is whether the claimed "integrator" must integrate with respect to a "reference voltage." (CBr at 25.)

Respondents argued that "an integrator, coupled to the power detector, for generating an automatic gain control setpoint" is "a device that integrates a power value with respect to a reference voltage to generate an automatic gain control setpoint." (RBr at 19.)

The staff argued that an "integrator" is "a device that generates a sum (over time) of a detected power value with respect to a reference value." (SBr at 26.)

The term "integrator" is recited in the second element of asserted independent claim 3 and in the third element of unasserted independent claim 4 of the '473 patent following the preambles. The second element of claim 3 recites, "an integrator, coupled to the power detector, for generating an automatic gain control setpoint from the first power value." (JX-1 at 7:53-55 (emphasis added).) Thus, said claim 3 requires a specific type of integrator. The third element of claim 4 recites "an integrator, coupled to the power detector, for generating an automatic gain control setpoint from the power value." (JX-1 at 8:29-31 (emphasis added).) Thus, both mentions of "integrator" in the claims of the '473 patent associate "integrator" with the generation of an AGC setpoint. Hence, the administrative law judge finds that the claim language is clear that the integrator component of the invention is intertwined with the generation of an automatic gain control (AGC) setpoint. Moreover, because the AGC setpoint does not have an ordinary meaning, see Section VII.B.3, supra, the integrator's function in the '473 patent must be limited to what is

described in the patent claims and specification. As such, the administrative law judge finds that the same limitations applied to the generation of the AGC setpoint must also apply to the description of "integrator" in order to maintain consistency within the claims and specification. See Research Plastics, supra.

The '473 specification discloses that the "[t]he power detector (214) includes an integrator that integrates the detected power with respect to a reference voltage . . . [t]he power detector (214) performs the integration, thus generating an AGC setpoint." (JX-1 at 3:27-29, 37-38 (emphasis added).) As found, supra, an automatic gain control setpoint is "the value generated by integrating a detected power value with respect to a reference value to automatically change the gain of a receiver or transmitter." Additionally, the specification states the disadvantages that may result if no reference value is used in the integrator:

> In an embodiment, this reference voltage is provided by the radio's demodulator to indicate the nominal value at which the demodulator requires the loop to lock in order to hold the power level constant. The demodulator requires this value for optimum performance since a power level too far out of the optimum range will degrade the performance of the demodulator.

(JX-1 at 3:29-37 (emphasis added).) See Kinik Co. v. ITC, 362 F.3d 1359, 1365 (Fed. Cir. 2004) ("The inventor's discussion of the disadvantages of the low binder prior art sheds light on the scope of the invention."); SciMed Life Sys. v. Advanced Cardiovascular Sys., 242 F.3d 1337, 1342-44 (Fed. Cir. 2001) (claim to "lumen" limited by the single embodiment in the specification to mean coaxial lumen structure and not side-by-side structure because the written description described the disadvantages of using a side-by-side structure).

Complainant's expert Verdu, in his definition of "integrator," relied on extrinsic evidence

to define how a person of ordinary skill would understand the term:

> Q. What would one of ordinary skill in 1994 have understood the term integrator to be?
>
> A. Just what I said, device that integrates or sums a signal over time.
>
> Q. Is there any extrinsic support that supports your construction, Doctor?
>
> A. Yes. I have selected some supporting --
>
> Q. Could you please, could we please bring up Q-58. Next page. What is this, Doctor, what are we looking at?
>
> A. This is a dictionary of the IEEE. That's Institute for Electrical and Electronics Engineers. And the entry in the dictionary for integrator is a device producing an input -- excuse me, producing an output proportional to the integral of one variable or of a sum of variables, with respect to another variable, usually time.
>
> Q. So can an integrator only have one variable as an input?
>
> A. It may.

(Tr. at 1152 (emphasis added).) When asked about the description in the specification referring to the embodiment depicted in FIG. 2, e.g., JX-1 at 3:26-40, respondents' expert Helgert however testified:

> A. Because I think a person of ordinary skill in the art in 1994 would have had to consult the specifications in order to understand what was meant by the term integrator in the context of the patent. Without that, as I mentioned, he would have been able to come up with a mathematical definition of that term, but that would have not helped that person very far.
>
> So I look at this phrasing here, and I first of all see that there is a digitized received signal, in other words, we're not talking about an analog signal here anymore, but, rather, a digital signal.

> And then we see that the power of this digital signal is computed by a digital power detector. Therefore, the digital power detector is going to put out digital power values, not an analog power signal, but digital power values.
>
> And this power detector then says here, "includes an integrator that integrates the detected power with respect to a reference voltage." And that tells me two things. The first thing it tells me is that this integrator has to deal with discrete quantities, not continuous quantities.
>
> And the word integrator in the usual definition of that term would be looking for an analog quantity, not a discrete quantity.
>
> That would lead me then to believe that the word integration here really has a different meaning from its mathematical meaning. And that would mean that it has to sum these power detector -- these digital power detector outputs over time. It has to sum these things, and it has to sum them over indefinite time.
>
> Now, the second part of that highlighted section talks about with respect to a reference voltage. And that means to me that the values produced by the power detector have to be compared with a reference voltage. And it is a result of this comparison that is actually integrated, or in this case, summed because we're dealing with digital quantities.
>
> So that would be my reason for highlighting this particular section, because it would teach me what is meant by that particular claim.

(Tr. at 2495-2497 (emphasis added).) Moreover, Ann Weiland, one of the named inventors of the '473 patent, testified as to how an integrator in the embodiment in FIG. 2 would act:

> Q. Let's go to slide, or the next slide in RDX-7. Now, I have highlighted, the only difference is I have highlighted the word integrator in that box. I have asked you about what a power detector did. Now I want to ask you just about the integrator . . . Is it true that the integrator in this box takes the difference between the detected power and a reference voltage and integrates that difference over time?

A. That is what an integrator would do.

(Tr. at 550-51 (emphasis added).) Weiland also testified that at least with respect to the embodiment in FIG. 2, the function of the claimed integrator was distinct from the power detector to which it is coupled:

> Q. This element we're looking at that's up on the screen, "an integrator, coupled to the power detector, for generating an automatic gain control setpoint from the first power value," do you see that?
>
> A. Yes.
>
> Q. The function of the integrator in that phrase is to subtract the reference voltage, correct?
>
> A. That is, yes, that's part of what it does.
>
> Q. That's what it does, right?
>
> A. It does do that.
>
> Q. Okay. And the power detector alone just calculates power over some period of time, doesn't it?
>
> A. Yes.
>
> Q. And the integrator that gets added to the power detector, adds the function of subtracting out the reference voltage, correct?
>
> A. Repeat the question?
>
> JUDGE LUCKERN: And the integrator that gets added to the power detector, adds the function of subtracting out the reference voltage, correct?
>
> THE WITNESS: Yes.

(Tr. at 696-7 (emphasis added).) Therefore, in order to generate an automatic gain control setpoint, the integrator disclosed with respect to FIG. 2 must integrate the receive power value

with respect to a reference value.

Besides the portions of the '473 specification cited supra that associates an integrator with the generation of an AGC setpoint, the only other description of the process an "integrator" uses to integrate is given in the context of FIG. 8 of the '473 patent. The "integrator" described therein generates "a gain control signal," a signal that is analogous to an AGC setpoint because both a reference value (e.g., setpoint) and a receive power value (e.g., detected) are similarly used to calculate the gain control signal. (See JX-1 at 6:25-42.) The relevant portion of the '473 specification is as follows:

> The detected power is digitized (810) and input to an integrator (801) that follows the equation:
>
> $$1/K * \int(\text{Setpoint} - \text{Detected})dt.$$
>
> The integrator (801), generating a gain control signal, saturates at 0 dB and -63 dB of correction. The gain control signal is thus limited within a range. If the output power is greater than the setpoint, the integrator turns down the output power of the amplifier (807) at a rate based on the integration constant K until the setpoint is reached. The integrator is allowed to turn power down by as much as 63 dB. If the output power is less than the setpoint, the output of the integrator (801) will be forced to zero, thus not adjusting output power
>
> In this embodiment, a closed loop power control limiting function (803 and 804), similar to the preferred embodiment, is employed. The trigger for the closed loop power control limiting function, however, is a comparator (802) that detects when the power limiting integrator (801) is limiting the output power . . .

(JX-1 at 6:25-48 (emphasis added); see also JX-1 at Fig. 8.) The equation used by the integrator of this embodiment utilizes both a setpoint, or reference value, and a detected value, or receive power value. Thus, both mentions of "integrator" in the specification require a reference value and a receive power value.

In light of the foregoing, the administrative law judge finds that the claim term "integrator" should be construed as "a device that generates a sum (over time) of a detected power value with respect to a reference value." This construction is consistent with the construction of AGC setpoint, and the administrative law judge finds is further supported by the claims and the specification of the '473 patent.

Furthermore, the unasserted claims from the '408 and '220 reciting "integrator" or "integrating" support the construction herein. As for the '408 patent, the sixth element of claim 7 recites, "integrating the difference [between the digitized, detected power value and the maximum gain setting] to generate a gain control signal, the gain control signal being limited to a predetermined range . . ." (JX-2 at 8:51-53 (emphasis added).) As for the '220 patent, the sixth element of claim 6 recites, "integrating the difference [between the digitized received power level signal and the maximum gain setting] to generate a gain control signal, the gain control signal being limited to a predetermined range . . ." (JX-3 at 8:35-37 (emphasis added).) The second element of claim 9 recites, "an integrator, coupled to the analog to digital converter, for integrating a difference between the received power level signal and a maximum gain setting to generate the limiting gain control setting." (JX-3 at 10:5-8 (emphasis added).) Thus, all of those claim recitations require integrating a detected, or receive power value, with respect to a reference value (e.g., a maximum gain setting).

The administrative law judge finds that complainant's construction of "integrator" attempts to broaden the claim term beyond what is specified in the claims. (CRBr at 12.) Thus, both claims 3 and 4 of the '473 patent associate the integrator with an AGC setpoint. (See JX-1 at 7:53-55; 8:29-31.) Upon reading the claims, the administrative law judge finds that the reader

immediately understands that the integrator is being used to generate an AGC setpoint or another similarly calculated value. Hence, any construction of integrator must take into account the limitations of an AGC setpoint, which include the use of a reference value. Furthermore, as found supra, the only descriptions of integrator in the '473 specification support this construction. (See JX-1 at 3:26-40; 6:21-42.) The specification describes the integrator as performing its calculation with at least two values: the detected or receive power value, and a reference value. (See id.)

Complainant also argued that the doctrine of claim differentiation supports its construction. (CBr at 26.) Specifically, complainant argued that the term "reference voltage" appears in claim 1, but not in claim 3, and that there is nothing in the term "integrator" which requires a reference voltage or reference value. (CFF G144.) However, claim 1 and claim 3 are independent claims. As found in Section VII.B.3 supra, where two independent claims are involved, "claim differentiation is a guide, not a rigid rule." Curtiss-Wright supra. Here, the administrative law judge finds that the claim differentiation doctrine does not aid in construing claim 3 because this claim would not be rendered superfluous to claim 1 merely because claim 3 is interpreted to require a reference value. The claims remain distinct from each other because, at a minimum, claim 1 claims a method while claim 3 claims an apparatus. See Anderson Corp. v. Fiber Composites, LLC, 474 F.3d 1361, 1370 (Fed. Cir. 2007) (declining to apply the doctrine of claim differentiation because "there are numerous other differences varying the scope of the claimed subject matter").

6. The Claimed Term "Linearizer"

Complainant argued that "linearizer", which only appears in claim 3 of the '473 patent is "a device that supplies correction values used for making outputs approximately linear functions

of inputs." (CBr at 26.) It is argued that the claim language does not support a limitation that the linearizer corrects for non-linearities in only the vauable gain amplifier, as opposed to other elements of the receive or transmit chain. (CBr at 28.)

Respondents do not separately construe "linearizer," but argued that the claim term "a receive linearizer . . . for generating a receive calibration value in response to the automatic gain control setpoint and a first frequency index" should be construed as "[a] device that supplies calibration values to account for known non-linearities of the receive variable gain amplifier using the automatic gain control setpoint and a frequency index of the received signal." (RBr at 21.) Respondents further construed the claim term "a transmit linearizer for generating a transmit calibration value in response to the automatic gain control setpoint, the second power value, and a frequency index corresponding to the second frequency" as "[a] device that supplies calibration values to account for known non-linearities of the transmit variable gain amplifier using the automatic gain control setpoint, a frequency index of the transmit signal, and the power value of the transmit signal." (RBr at 23.)

The staff argued that the claim term "linearizer" should be construed as "a device that generates calibration values to account for non-linearities of the receive or transmit variable gain amplifier. (SBr at 30.) While the staff does not believe that the claimed linearizer only corrects for non-linearities of only the variable gain amplifier, the staff argued that the specification makes it clear that the receive and transmit linearizers "reduce the error in the receive and transmit chains versus frequency" (JX-1 at 3:57-59) and that at a minimum, the linearizers must account for non-linearities in the receive and transmit variable gain amplifiers that are part of those chains. (SRBr at 17.)

The claim term "linearizer" appears in the third and fifth element, after the preamble, of asserted claim 3 of the '473 patent. The claim term "linearizer" or the related term "linearizing" is disclosed in the specification of the '473 patent in various locations. (See, e.g., JX-1 at 3:39-40, 3:49, 3:54, 4:16-17, 4:26, 5:68, 6:17-18, 6:48-49.) The specification provides that:

> The control of the variable gain amplifier (212) forces the receive AGC loop to close such that the input to the receiver linearizing table (216) follows a predetermined straight line with respect to the RF input power. This linearization removes the undesired linear and non-linear errors in addition to variations versus frequency that would otherwise be apparent at the input to the receiver linearizing table (216) in the receiver.

(JX-1 at 3: 47-55 (emphasis added).) On the transmit side, the specification provides that:

> The biasing of the variable gain amplifier (202) is adjusted by the analog calibration value to a point such that the input to the transmitter linearizing table (204) follows a predetermined straight line with respect to transmitted RF output power. This linearization removes the undesired linear and non-linear errors along with variations versus frequency in the transmitter.

(JX-1 at 4:23-29 (emphasis added).) The specification therefore identifies the variable gain amplifier as one of the components affected by the linearizer whose output must follow a predetermined straight line with respect to its input. Also, the parties agree that the specification discloses that "[t]he AGC setpoint and the frequency index are used to address the [receive] linearizer (216), thus accessing the proper calibration value." (JX- 1 at 3:41-43; RFF II.321(undisputed).) The parties have likewise agreed that "[a]ddress the linearizer" means that the frequency index and AGC setpoint are used to look up in the table the calibration value for the frequency index and the AGC setpoint. (CFF G182 (undisputed).) The language of asserted claim 3, regarding a receive linearizer, requires that:

> a receive linearizer, coupled to the integrator and the receive amplifier, for generating a receive calibration value in response to the automatic gain control setpoint and a first frequency index corresponding to the first frequency, the receive calibration value being coupled to the receive amplifier control input for adjusting the gain of the receive amplifier;

(JX-1 at 7:56 to 8:3 (emphasis added).) Regarding the transmit linearizer, claim 3 states:

> a transmit linearizer for generating a transmit calibration value in response to the automatic gain control setpoint, the second power value, and a frequency index corresponding to the second frequency, the transmit calibration value being coupled to the control input of the transmit amplifier for adjusting the gain of the transmit amplifier.

(JX-1 at 8:8-14 (emphasis added).) The term "amplifier" in said language of claim 3 refers to the "variable gain amplifier" disclosed in the specification. Therefore, the administrative law judge finds that the term "linearizer," in the context of the asserted claims, is construed to mean "a device that generates calibration values to account for non-linearities of the receive or transmit variable gain amplifier." Further, the administrative law judge has found, in Section VII.B.4, supra, that the term "calibration value(s)" is a "corrected gain control settings loaded into a look-up table during factory calibration or production testing of the radio." Therefore, he finds that a "linearizer" necessarily comprises the lookup tables in which said calibration values are loaded.

Regarding respondents' addition of the limitation "known," the parties agree that the background of the invention discusses both "linear and nonlinear errors," not just "known non-linearities," as a problem of the prior art, as shown in FIG. 1 of the '473 patent. (CFF G170 (undisputed).) The background of the invention also states:

> Variation in output power level and input power detection versus frequency can cause an unacceptable amount of error in the amount of return link transmitted energy.

(JX-1 at 2:13-16.) The Summary of the Invention section of the '473 describes the invention as addressing various linear and non-linear errors. (CFF G172 (undisputed in relevant part).) The specification further discloses "linearization [that] removes the undesired linear and non-linear errors along with variations versus frequency . . ." for both the receiver and the transmitter. (CFF G172-73 (undisputed).) In fact, the word "known" does not appear in the specification or claims of the '473 patent. Further, respondents, despite their proposed construction, apparently reject the use of the term "known" as a limitation. (See ROCFF G172 ("The proposed finding mischaracterizes Nokia's proposed construction of the claimed linearizers as being limited to accounting for 'just' known non-linearities of the variable gain amplifiers.").) Respondents also argued that "Nokia's construction does not preclude addressing other errors; it requires only that the claimed linearizers address at least known non-linearities, as set forth in the Common Specification." (RRBr at 16.) Therefore, the administrative law judge finds that respondents essentially argued that the claimed linearizers must address at least the errors disclosed in the specification and the claims, but may address other errors, thereby rendering the word "known" inconsistent with respondents' proposed construction and also superfluous to the construction of the claim phrase "linearizer."

C. '408 Patent And '220 Patent

1. Preamble (Claim 1 Of '408 Patent) "A method for limiting transmit power of a radio operating in a radio communications system, the radio communications system comprising at least one base station that transmits signals including power control commands to the radio, the radio comprising a variable gain amplifier and a maximum gain setting, the method comprising the steps of:" (JX-2 at 6:58-63.)

Asserted claim 1 of the '408 patent is a method claim, and the preamble of said claim recites the structure required by said method claim. (See JX-2 at 6:58-60 ("a radio operating in a

radio communications system, the radio communications system comprising..."). Each of the disputed claim phrases "variable gain amplifier" and "maximum gain setting" are first referred to in the preamble. (See JX-2 at 6:62-63.) The claim elements that mention said claimed phrases do so by stating "the variable gain amplifier" and "the maximum gain setting," meaning that the claim elements refer back to the claim phrases mentioned in the preamble, i.e. the claim phrases have antecedent basis in the preamble. (JX-2 at 7:3-4; JX-2 at 7:6-7 (emphasis added).) Likewise, the claim phrase "the at least one base station" also has antecedent basis in the preamble. (JX-2, 6:60-61; JX-2 at 6:65.) Therefore, the claim is incomplete without the preamble. Based on the foregoing, the administrative law judge finds that the preamble of asserted claim 1 of the '408 patent is limiting.

2. Preamble (Claim 2 Of '220 Patent) "A method for limiting transmit power of a radio operating in a radio communications system, the radio communications system comprising a plurality of base stations that transmit power control commands to the radio, the radio comprising a variable gain amplifier and a maximum gain setting, the method comprising the steps of." (JX-4 at 7: 12-17.)

Asserted claim 2 of the '220 patent is a method claim, and the preamble of said claim recites the structure required by a method claim. (JX-3 at 7:12-17 ("a radio operating in a radio communications system, the radio communications system comprising a plurality of base stations that transmit power control commands to the radio, the radio comprising...").) The disputed claim phrase "maximum gain setting" is first referred to in the preamble. (See JX-3 at 7:16-17.) Likewise, the claim phrase "variable gain amplifier" in the body of claim 2 is first referenced in the preamble. (JX-3 at 7:16.) The claim elements that mention said claimed phrases do so by stating "the variable gain amplifier" and "the maximum gain setting," meaning that the claim elements have antecedent basis in the preamble. (JX-3 at 7:27-28; JX-3 at 7:29-34 (emphasis

added).) Therefore, the administrative law judge finds that the claim is incomplete without the preamble. Hence, the administrative law judge finds that the preamble of asserted method claim 2 of the '220 patent is limiting.

3. The Claimed Term "Maximum Gain Setting"

The claimed term "maximum gain setting" appears in the preamble and the fourth, fifth, and sixth elements of claim 1 of the '408 patent following "the method comprising the steps of." Said term also appears in the preamble and the fifth, sixth, and seventh elements of claim 2 of the '220 patent following "the method comprising the steps of". The parties agree that the said term should be construed in the same way for both patents. (RFF II.370, RFF II.404 (undisputed).)

Complainant argued that the "maximum gain setting" should be construed as the "upper limit on the gain setting." (CBr at 34.)

Respondents argued that said claim term should be construed as "a nominal gain value hard coded into the radio during assembly or input during manufacturing and testing of the radio that sets the upper limit of the transmit variable gain amplifier." (RBr at 25.)

The staff argued that said claim term should be construed as "[a]n upper limit on the transmitter gain setting hard coded into the radio during assembly or input during manufacturing and testing of the radio. (SBr at 35.)

A person of ordinary skill in the art as of February 28, 1994 would understand that gain is the ratio of output signal power to input signal power, and the parties have so stipulated. (RFF II.391, RFF II.396, RFF II.397 (undisputed).) "Maximum gain setting," however, is not a standard term of art. (RFF II.368 (undisputed).) A "maximum gain setting" is different than a maximum output power. (RFF II.394, RFF II.395 (undisputed in relevant part); CRRFF II.395A.)

The parties agree that the following excerpt from the abstract describes a maximum gain setting:

> The process and apparatus of the present invention limits the output power of a radiotelephone, operating in a cellular system in the preferred embodiment ... This is accomplished by power detection and a correction accumulator that together generate a gain control signal by limiting the gain adjustment to a maximum value, even when the cell site communicating with the radiotelephone is sending power turn-up commands to the radiotelephone.

(CFF G246 (undisputed)); JX-2 at Abstract; JX-3 at Abstract (emphasis added).) The parties agree that the following excerpt from the Summary of the Invention section describes the maximum gain setting:

> The radiotelephone also determines if the transmitter is operating above a maximum set point. The transmit gain and power amplifier biasing of the radiotelephone are adjusted to correct the undesired error and maintain the desired output power.

(CFF G247 (undisputed); JX-2 at 2:34-39; JX-3 at 2:35-40 (emphasis added).) Thus the administrative law judge finds that the transmit gain adjustment has a maximum value. The parties further agree that a maximum gain setting is a limit on the gain. Complainant's expert Verdu has testified.

> Q. I would like to move on the '048 patent, claim 1, the term maximum gain setting, which first appears in element D of claim 1 of the '408. Could we have CDX-28, please.
>
> What is your consideration, Doctor, of maximum gain setting?
>
> A. Upper limit of the gain setting.

(Tr. at 1196.) Likewise, respondents' expert Helgert has opined:

> Q. Have you reviewed the parties' proposed constructions of

maximum gain setting?

A. I have.

Q. Would you agree that all -- that the two private parties and the staff have proposed constructions of maximum gain setting that require it to be an upper limit on the gain?

A. Yes, I believe that's true.

(Tr. at 2506-07.)

In addition, as found in Sections VII.C.1 and VII.C.2, supra, the preambles of claim 1 of the '408 patent and claim 2 of the '220 patent are limiting. The preamble of claim 1 of the '408 patent reads, "the radio comprising . . . a maximum gain setting..." (JX-2 at 6:62-63.) The preamble of claim 2 of the '220 patent reads, "the radio communications system comprising. . . a maximum gain setting..." (JX-3 at 7:13-17.) Therefore, the administrative law judge finds that a "maximum gain setting" is a required part of the radio. (See JX-2 at 6:62-63; JX-3 at 7:16-17.) Because the maximum gain setting must be part of the radio, the administrative law judge finds that said maximum gain setting must be incorporated into the radio during the assembly of the radio, or input during the manufacturing and testing of the radio, as per the specification. (See, e.g., JX-2 at 4:58-60.) Based on the foregoing, the administrative law judge finds that the claim phrase "maximum gain setting" should be construed as "an upper limit on the transmit gain setting that is hard coded into the radio or during assembly or input during manufacturing and testing of the radio."

Complainant argued that "hard coded" never appears in claim 1 of the '408 patent or claim 2 of the '220 patent; and that respondents' construction "would result in independent claim 1 in the '408 patent being too narrow to cover dependent claim 2, directed to a variable maximum gain

setting." (CBr at 35.) Said claim 2 states "[t]he method of claim 1 and further including the step of adjusting the maximum gain setting in response to a temperature of the variable gain amplifier." Said dependent claim's use of "maximum gain setting" has antecedent basis to the "maximum gain setting" used in the independent claim. The administrative law judge finds that the requirement of claim 1 for a "maximum gain setting" is strengthened, not weakened, by a dependent claim purporting to modify an already-existing "maximum gain setting," as the dependent claims require the prior existence of a "maximum gain setting."[18] The specification states that the "maximum gain setting can be hard coded into the radio during assembly or input during manufacturing and testing of the radio." (JX-2 at 58-60.) Operation of the radio required by the claims requires that a "maximum gain setting" exist, and the specification discloses no alternate way for said "maximum gain setting" to suddenly find itself in the radio. Therefore, the administrative law judge rejects complainant's arguments.

Complainant further argued that "the asserted claims of the '408 and '220 patents are directed to methods of operating a radio (CFF G252) so there is no basis to limit the claim to what the phone comprises as a result of 'assembly,' 'manufacturing' or 'testing' as Nokia proposes." (CBr at 35 (emphasis in original).) Although said claims are method claims, both claims require the method disclosed be preformed on "the radio comprising . . . a maximum gain setting..." (JX-2 at 6:62-63; JX-3 at 7:15-17.) As the preamble is limiting, as found, supra, the administrative law judge finds that both claim 1 of the '408 patent and claim 2 of the '220 patent therefore require

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[18] Complainant also made the same argument regarding independent claim 2 and dependent claim 3 of the '220 patent. (CBr at 35, n.23.) The administrative law judge finds that the same logic as regards independent claim 1 and dependent claim 2 of the '408 patent, supra, applies.

that the method disclosed be performed on a radio, and that that radio must have a "maximum gain setting." Regardless of whether said claim is a method or apparatus claim, the requirement for a radio remains the same.

Respondents argued that the "maximum gain setting" should be the "upper limit of the transmit variable gain amplifier." (RBr at 25.) In fact, taken in their entirety, each of asserted claim 1 of the '408 patent and claim 2 of the '220 patent do require that the maximum gain setting be an upper limit on the gain setting of the transmit variable gain amplifier. (RFF II.375 (undisputed); RFF II.379 (undisputed in relevant part).) However, when the elements of said claims in which "maximum gain setting" are found are reviewed individually, the administrative law judge finds that the term "valuable gain amplifier" does not appear in each element. Thus, the claim term "maximum gain setting" appears in one element in each claim that does not mention "variable gain amplifier. (See JX-2 at 7:3-4 ("comparing the summation signal to the maximum gain setting..."); JX-3 at 7:27-28 ("comparing the summation signal to the maximum gain setting...").) Those elements, in fact, do not involve a variable gain amplifier at all, and the administrative law judge finds that importing "variable gain amplifier" into said elements would be confusing at best, and, at worst, could change the expected operation of the invention. Therefore, the administrative law judge rejects this portion of respondents' construction.

Respondents also argued that "[b]ecause the operating characteristics of the transmit variable gain amplifier [for each phone] will depend on the specific hardware components, a maximum gain setting must be specific to each phone." (RFF II.379.) Respondents, however, do not use this language in their proposed construction. Moreover, respondents do not cite to, and the administrative law judge has not found, any reference in the specification or claims that

requires that the maximum gain setting be "specific to each phone." Instead, unasserted claim 2 of the '408 patent describes adjusting the maximum gain setting during real-time operation of the phone to account for temperature variations. (JX-2 at 7:11-13 ("adjusting the maximum gain setting in response to a temperature of the variable gain amplifier.").) Thus, rather than requiring that a unique value for each phone be hard coded into the radio during assembly or input during manufacturing and testing of the radio, unasserted claim 2 discloses a means by which each phone may customize an existing "maximum gain setting." Hence, the administrative law judge finds no requirement that the "maximum gain setting" be unique to each phone.

4. The Claimed Term "Open Loop Power Control Value"

The claim term "an open loop power control value" appears in the first and third elements of claim 1 of the '408 patent following the preamble.

Complainant argued that "open loop power control value" should be construed as "the value of the automatic gain control setpoint." (CBr at 29.)

Respondents argued that "[t]he parties all agree that the "open loop power control value" is the automatic gain control setpoint. (RBr at 43.)

The staff argued that the claim term in issue should be construed as, "[t]he automatic gain control setpoint generated in response to the receive power value and the reference voltage signal. (SBr at 38.)

The parties do not dispute that the open loop power control signal is the AGC setpoint. (RFF II.615 (undisputed).) The meaning of open loop power control to one of ordinary skill in the art as of the February 28, 1994 filing date is "controlling the transmit output power based on a measurement of the received signal strength of the signal received from the base station." (CFF

G186 (emphasis added) (undisputed).) The '408 patent states that "[t]he AGC setpoint is the open loop power control signal for the radio. (JX-2 at 3:64-65 (emphasis added).) In an embodiment:

> this is the power control performed by the radio by itself without control input from the cells. As the power of the signal received from the cell increases, the radio decreases its transmit power. This output power control is accomplished by the AGC setpoint that is filtered by a low pass filter (217).

(JX-2 at 3:65-4:3 (emphasis added).) Therefore, based on the intrinsic evidence and the admissions of the parties, the administrative law judge finds that the claim term "the open loop power control value" is the value of the automatic gain control setpoint, as construed, supra, in Section VII.B.3.

5. The Claimed Term "Gain Adjust Signal"

The claim term "gain adjust signal" appears in the second and third elements of claim 1 of the '408 patent following the preamble.

Complainant argued that one of ordinary skill in the art as of the February 28, 1994 filing date of the '408 patent would have understood the "gain adjust signal" in claim 1 of the '408 patent to mean "a signal that can be used to change the gain of the variable gain amplifier," and thus "is not just any gain signal." (CBr at 30, CRBr at 21.)

Respondents argued that the "gain adjust signal" is "[a] signal based on accumulated power control commands that is used to adjust the gain of the radio's variable gain amplifier." (RBr at 43.) It is also argued that said signal is a closed loop power control signal. (RBr at 43-45.)

The staff argued that the "gain adjust signal" is "[a] signal based on multiple power control commands used to change the gain of the variable gain amplifier." (SBr at 37.)

All parties agree that the claim term refers to a signal used to change the gain of the

variable gain amplifier. (CBr at 30; RBr at 43; SBr at 37.) The parties also agree that the "gain adjust signal" must be based on "power control commands." (RFF II.592 (undisputed).) The issue is whether said power control commands need to be accumulated.

Claim 1 of the '408 patent states "determining a gain adjust signal in response to the transmitted power control commands" (JX-2 at 6:66-67 (emphasis added)) which requires said signal to be determined in response to more than one power control command. The specification states:

> The closed loop power control section (206), illustrated in FIG. 4, accumulates the power control commands sent on the forward link by the controlling radiotelephone cell site and outputs a gain adjust signal.

(JX-2 at 5:15-18.) Further, each of unasserted claims that requires a "gain adjust signal," i.e., claims 4, 5 6, and 7 of the '408 patent, requires that a "gain adjust signal" be based on power control commands. (See JX-2 at 7:33-34, 7:61-62, 8:18-19, 8:22-23, 8:44-45.) Based on the foregoing, the administrative law judge finds that the claim term "gain adjust signal" in claim 1 of the '408 patent means "a signal that can be used to change the gain of the variable gain amplifier." Moreover, in view of the plain meaning of the claim language, the specification, and the agreement of the parties, the administrative law judge finds that the gain adjust signal must be based on the power control commands. Hence, the claim term, "determining a gain adjust signal in response to the transmitted power control commands" is construed as "determining a signal based on the power control commands that can be used to change the gain of the variable gain amplifier."

Regarding respondents' argument that the power control commands must be

"accumulated" (see RBr at 44-45), the use of the term "power control commands" in the plural indicates that more than one power control command may used to change the gain of the variable gain amplifier, and the parties agree. (See JX-2 at 6:66-67; RFF II.594 (undisputed).) Claim 1 of the '408 patent, however, does not disclose the requirement of an accumulator. (JX-2 at 6:58-7:11.) Likewise, unasserted independent claim 4 of the '408 patent does not require an accumulator. (JX-2 at 7:23-52.) Unasserted claim 6 of the '408 patent, however, recites "a power control command accumulator that generates a gain adjust signal" in its preamble (JX-2 at 8:18-19) thus indicating that when the inventors wanted to claim a gain adjust signal that is generated from a "power control command accumulator," they explicitly did so. Each of said claims, supra, moreover, are method claims, and require the same element of "determining the gain adjust signal in response to the transmitted power control commands." (JX-2 at 6:66-67, JX-2 at 8:22-23.) Further, U.S. Patent No. 5,056,109 (the Gilhousen patent or the '109 patent)[19] states in its Summary of the Invention section:

> A power adjustment command is generated and sent to the mobile unit in the outbound link data, or voice channel, addressed to that mobile unit. In response to the cell-site power adjustment command, the mobile unit increases or decreases the mobile unit transmitter power by a predetermined amount, nominally 1 dB.

(JX-88 at 6:68-7:6.) In fact, said excerpt from the Gilhousen patent discloses that the transmit

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[19] Although not incorporated by reference, the Gilhousen patent is referenced in the Background of the Invention section of the specification of the asserted patents as further explanation of the prior art:

> Closed loop and open loop power control together determine the return link transmit energy, as disclosed in U.S. Pat. No. 5,056,109 to Gilhousen et al. and assigned to Qualcomm, Incorporated.

(JX-2 at 2:4-7.)

power of the mobile unit is changed based directly on the power adjustment command, with no mention of an accumulator. Further, independent claim 22 of the Gilhousen patent contains the element, "varying transmitter signal power in correspondence to received power adjustment commands," (JX-88 at 22:10-11) while claim 27, which depends from claim 22, contains the claim element "accumulating said processed power adjustment commands with a predetermined gain control level setting..." (JX-88 at 22:66-67). Thus, said claim 22 does not require an accumulator, while said claim 27 does. Therefore, the administrative law judge finds that the claims of the '408 patent and the specification, through reference to the Gilhousen patent, does not support reading the requirement of "accumulated" into asserted claim 1 of the '408 patent. Respondents, in support of their argument that the "power control commands" must be accumulated, also rely on their argument, infra, that "power control commands" are "incremental." (RRBr at 31.) However, the administrative law judge has found, in Section VII.C.6, infra, that "power control commands" are not incremental.

Referring to respondents' argument that the "gain adjust signal" of the '408 patent is a closed loop power control signal, the plain language of claim 1 of the '408 patent specifically requires the use of an "open loop power control value." (JX-2 at 6:64-65, 7:1-2.) Also, the language of claim 1 and of other claims of the '408 patent does not refer to a closed loop. In addition, to so limit the "power control commands" in claim 1 of the '408 patent, as respondents argued, the administrative law judge finds would be inconsistent with the restriction requirement during prosecution that resulted in the '408 and '220 patents. (See JX-4 at QHITC002561-652.)

Also, while a "gain adjust signal" has been found, supra, to depend on "power control commands," "power control commands," as found in Section VII.C.6, infra, need not be based on

the radio's power level as received by the base station. As found in Section VII.C.8, infra, a closed loop power control signal would need to be based on said power level as received by the base station. Therefore, the administrative law judge finds that claim 1 of the '408 patent neither directly nor indirectly supports the assertion that the "gain adjust signal" is a closed loop power control signal.

6. The Claimed Term "Power Control Commands"

The claim term, "power control commands" appears in the preamble and the second element of claim 1 of the '408 patent following the preamble, and in the preamble of claim 2 of the '220 patent. The parties agree that the said claim term should be interpreted consistently between said patents. (RFF II.404 (undisputed).)

Complainant argued that the claim term "power control commands" should be construed as "commands from the base station instructing the radio to turn up or turn down power." (CBr at 32.)

Respondents argued that said claim term should be construed as "[p]ower-up or power down commands sent from the base station to the radio, based on the radio's power level as received by the base station." (RBr at 29.)

The staff argued that said claim term should be construed as "[c]ommands from the base station instructing the radio to turn up or turn down power." (SBr at 32.)

All parties agree that the claim term "power control commands" should be construed, at least in part, as "commands from the base station instructing the radio to turn up or turn down power." (CBr at 32; RBr at 29; SBr at 32; see also CFF G230, CFF G231, CFF G232, RFF II.413 (undisputed).) However, the issue is whether the term should be based on the radio's power level

as received by the base station.

The preamble of claim 1 of the '408 patent states in part only "the radio communications system comprising at least one base station that transmits signals including power control commands to the radio..." (JX-2 at 6:59-62.) Such is consistent with the specification of the '408 patent, which discloses that the input labeled "Up/Down From Cell" to 206 in FIG. 2 as well as the input labeled "UP,Down,0," to 702 in FIG. 7 refers to the "power control commands." (JX-2 at 5:15-18; JX-2 at 5:59-61.) Likewise, the specification of the '408 patent discloses that the input labeled "Adjustment from Cell" to 405 and 401 in FIG. 4 of the '408 patent also refers to the "power control commands." (JX-2 at 5:26-32.) While the specification shows that the power control commands must come from the base station, none of the asserted patents control the content of any signals sent from the base station. Thus, complainant's expert Verdu testified:

> Q. Dr. Verdu, does the specification of the patents at issue teach or disclose anything about what's going on inside the base station?
>
> A. No, Ms. Elson. These three patents are about technology in the handset, all the claims here relate to procedures at the handset, not at the base station.
>
> Q. Okay. So is there anything to you or to one of ordinary skill in '94 that would have taught in the patent any measurements going on inside the base station?
>
> A. No.

(Tr. at 1193-94.) Also, the specification states that "[t]he radiotelephone limits the power output even when the cell erroneously decides the radiotelephone power should be increased." (JX-2 at 6:54-55.) In other words, the administrative law judge finds that the specification contemplates a situation in which the "UP/Down From Cell" is ignored, accommodating for several variants of a

power control command rather than restricting the base station to sending only one kind of power command.

Also, the '408 patent, under a restriction requirement issued by the PTO during the prosecution of the '473 patent, claims only those aspects utilizing open loop power control. (JX-4 at QHITC0025651-652; JX-2 at 6:64-65 ("determining an open loop power control value in response to a signal received from the at least one base station ... determining a gain adjust signal in response to the transmitted power control commands...").) The '220 patent, on the other hand, contains claims drawn to "controlling the transmitter via closed loop." (JX-4 at QHITC0025651-652; JX-3 at 7:22-23 ("generating a closed loop power control signal in response to the received signal...").) In fact, the Examiner issued said restriction based on exactly that distinction. Thus the Examiner believed that so-called "Group II" claims, which later issued in the '408 patent, were based on "controlling the transmitter gain based on transmitted commands, classified in Class 455, subclass 69." (JX4 at QHITC0025651; CFF J10, CFF J13 (undisputed in relevant part).) The Examiner found that so-called "Group III" claims, which later issued in the '220 patent, were based on "controlling the transmitter via a closed loop, classified in Class 455, subclass 127." (JX-4 at QHITC0025651; CFF J10, CFF J15 (undisputed); CFF J16 (undisputed in relevant part).)

Further, the Gilhousen patent, or the '109 patent, discloses both power control commands based on the radio's power level as received by the base station and power control commands not based on the radio's power level as received by the base station. (JX-88 (Gilhousen) at Abstract, 5:9-20.) As a specific example, independent claim 22 of the Gilhousen patent has no such requirement, stating only "varying transmitter signal power in correspondence to received power

adjustment commands." (JX-88 at 22:10-11.) Claim 25, however, which depends from claim 22, specifically requires:

> The method of claim 22 wherein said cell-site station measures signal power of said cellular mobile telephone transmitted CDMA communication signals and generates for transmission said power adjustment commands indicative of one of an increase and a decrease in said cellular mobile telephone signal power so as to maintain a predetermined power level for cell-site station received CDMA communication signals from said cellular mobile telephone.

(JX-88 at 22:24-32.)

Based on the foregoing, the administrative law judge finds that "power control commands" are "commands from the base station instructing the radio to turn up or turn down power." Also based on the foregoing, the administrative law judge rejects respondents' proposed construction that said the "power control commands" must be "based on the radio's power level as received by the base station." (RBr at 29.)

Respondents argued that "power control commands" are "incremental closed loop commands." (RBr at 33.) As found, supra, said "power control commands" need not be based on the radio's power level as received by the base station. Therefore, said commands cannot be "incremental closed loop commands," as a "closed loop" would depend at least in part on the radio's power level as received by the base station. (See Section VII.C.8, infra.) Further, the word "increment" or any derivative thereof does not appear in the specification or claims of the '408 patent. (See, generally, JX-2.) The word "increment" or derivatives thereof does not appear in the Gilhousen patent specification or claims. (See, generally, JX-88.) Moreover, as found, supra, the claims of the asserted patents do not control the contents of a particular signal from the base station. Although each of FIGS. 4, 6, 7, 8, and 9 show a summation symbol representing that the

power command from the base station will cause the sum to increase or decrease by 1 dB, the written specification and the claims do not purport to limit the base station to only power commands that increase or decrease by that amount. (JX-2 at FIGS. 4, 6, 7, 8, 9; see generally, JX-2.) Also, complainant's expert Verdu has testified:

> Q. And what kind of power control commands would one of ordinary skill in 1994, what different kinds would the person have understood were applicable to the term power control commands in the claim?
>
> A. Well, the information that flows from the base station to the handset could come in the form of absolute commands, for example, 5 dB. By the way, when I say dB, first is lower case, d is lower case, and upper case is B.
>
> Q. What do you mean by absolute power control commands?
>
> A. As opposed to incremental power control commands, where the information could be given as increments. So, in other words, the information would take the previous value you have computed, and add one dB to it, or take the previous value you have computed and decrease it by one dB. That's the kind of incremental power control command.
>
> Q. So in your opinion, Doctor, would the term power control commands encompass a command from the base station just saying go to this transmit power level?
>
> A. Well, the command would say make the gain adjust signal equal to 5 dB, for example, an absolute command.
>
> Q. Versus --
>
> A. That would be encompassed.
>
> Q. Versus an incremental command, which might be just go up one or down one?
>
> A. Yes.

(Tr. at 1194-95 (emphasis added).) Therefore, the administrative law judge rejects respondents' argument that "power control commands" are "incremental closed loop commands."

7. The Claimed Term "Generating A Received Power Level Signal In Response To The Received Signal"

This claim term appears in the second and fourth elements of claim 2 of the '220 patent, following the preamble.

Complainant argued that the "received power level signal" should be construed as "a value indicating a power level." (CBr at 37.)

Respondents argued that said claim term should be construed as "[t]he automatic gain control setpoint." (RBr at 40.)

The staff argued that term claim phrase should be construed as "[a] value indicating a power level of the received signal." (SBr at 44.)

The claim term in issue does not appear in the specification of the '220 patent. (See, generally, JX-3.) The "received signal" however is the signal received from a base station. (JX-3 at 7:18-19; CFF G271 (undisputed).) With reference to FIG. 2 of the '220 patent, the specification states:

> The signal input to the AGC section is received on the forward link and amplified by a low noise amplifier (LNA) (211). The output of the LNA (211) is input to a variable gain amplifier (212). The variable gain amplifier (212) produces a signal that is converted to a digital signal using an analog to digital converter (ADC) (213).
>
> The power of the digitized received signal is next computed by a digital power detector (214).

(JX-3 at 3:18-26 (emphasis added).) The "signal input to the AGC section" is the signal received from a base station, as a "forward link" is the base station to radiotelephone transmission. (JX-3 at

1:28; CFF C4 (undisputed).) Also, the SUMMARY OF THE INVENTION section of the '220 patent states:

> The forward and return link power are measured by power detectors and input to an analog to digital converter accessible by both control hardware and/or software.

(JX-3 at 2:27-30 (emphasis added).) The excerpts of the specification cited, supra, state that once the received signal is digitized, then the power is computed. Therefore, the administrative law judge finds that the specification discloses that a power detector is used to measure the power of the received signal. The result of a measurement is a value. The specification also states, "[a]s the power of the signal received from the cell increases, the radio decreases its transmit power." (JX-3 at 3:67-4:2.) The parties agree that the "received power level signal" is used to adjust the gain of the transmit variable gain amplifier. (JX-3 at 7:24-34; CFF G272 (undisputed).) Therefore, the administrative law judge finds that the construction of the claim term in issue is "a value indicating a power level of the received signal."

Respondents argued that said claim term should be construed as "the automatic gain setpoint." The term "the automatic gain setpoint" does not appear in any claim of the '220 patent. Said term does appear in the specification of each of the asserted patents, and in the claims of the '473 patent, from which the '220 patent is derived. (See, e.g., JX-3 at 3:36; JX-3 at 3:39; JX-1 at 7:19; JX-1 at 7:23; JX-1 at 7:34.) Therefore, the inventors on the '220 patent had an understanding of an automatic gain control setpoint, but chose not to use it for the claims of the '220 patent. Further, the specification of the '220 patent states:

> The power of the digitized received signal is next computed by a digital power detector (214). The power detector (214) includes an integrator that integrates the detected power with respect to a

> reference voltage. In the preferred embodiment, this reference voltage is provided by the radio's demodulator to indicate the nominal value at which the demodulator requires the loop to lock in order to hold the power level constant. The demodulator requires this value for optimum performance since a power level too far out of the optimum range will degrade the performance of the demodulator. The power detector (214) performs the integration, thus generating an AGC setpoint. The setpoint and a receive frequency index are input to a receiver linearizing table (216).

(JX-3 at 3:25-38 (emphasis added).) The received power level signal is the digitized received signal in this excerpt. The excerpt goes on to describe an integrator integrating the received power level signal with a reference voltage to generate the automatic gain control setpoint. Because the value of the received power level is combined with a reference voltage to create the automatic gain control setpoint, the administrative law judge finds that the value of the received power level cannot itself be the automatic gain control setpoint.

8. The Claimed Term "Closed Loop Power Control Signal"

Complainant argued that the claim term should be construed as, "a signal representing one or more power control commands." (CBr at 38.)[20] It is argued that said term should not be based on the radio's power level as received by the base station. (CBr at 38-41.)

Respondents argued that said claim term should be construed as, "[a] signal based on accumulated power control commands that is used to adjust the gain of the radio's variable gain amplifier." (RBr at 35.) It is also argued that said claim term requires a measurement by the base station of the signal received from the handset. (RRBr at 23.)

The staff argued that the claim term in issue should be construed as "[a] value representing

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[20] As found, supra, "power control commands" are "commands from the base station instructing the radio to turn up or turn down power."

power control commands sent from the base station to the handset, and based at least in part on a measurement of the handset's transmitted power." (SBr at 39.)

The claim terms "close loop power control" and/or "closed loop" are found throughout the specification of the '220 patent. (See, e.g., JX-3 at 2:30-35; 2:50-51, 4:4-10, 4:38-45, 5:16-35, 7:22, 7:24, 7:48, 7:56, 8:3; 8:9, Figs. 2, 3, 4.) Claim 2 of the '220 patent requires the step of "generating a closed loop power control signal in response to the received signal..." (JX-3 at 7:22-23.) The parties agree that the "received signal" is the signal received from the base station. (CFF G287 (undisputed).) Likewise, the parties agree that the base station transmits "power control commands to the radio." (JX-3 at 7:14-15; CFF G288 (undisputed).) The SUMMARY OF THE INVENTION section states:

> The closed loop power control setting is also monitored. The radiotelephone uses the detected power levels and closed loop power control setting to index a set of correction tables that indicate the reverse link transmit power error and desired power amplifier biasing for the particular operating point.

(JX-3 at 2:30-35 (emphasis added).) In FIG. 2, box 206, which is labeled "Closed Loop Power Control," has as one input: the "Up/Down From Cell." The output of box 206, which is not separately labeled, is used as an input box 205, which is labeled "Power Limiting Control." (JX-3 at FIG. 2.) FIG. 4, which is a block diagram of the closed loop power control section in FIG. 2 (JX-3 at 50-51), shows the same input as "Adjustment From Cell." (JX-2 at FIG. 4.) FIG. 4 also shows the output of the closed loop power control section to be "TX_GAIN_ADJUST," which adjusts the gain. The specification of the '220 patent further states:

> The closed loop power control section (206), illustrated in FIG. 4, accumulates the power control commands sent on the forward link by the controlling radiotelephone cell site and outputs a

gain adjust signal.

* * *

In this embodiment, a closed loop power control limiting function (604 and 605), similar to the preferred embodiment, is employed. However, the trigger for the closed loop power control limiting function is a comparator (603) that detects when the power limiting accumulator (602) is limiting the output power by comparing the accumulator (602) output to 0 dB with the comparator (603). The linearizing compensation tables, similar to the tables in the preferred embodiment, are added into the transmit gain control using a summer (606).

* * *

In another alternate embodiment, illustrated in FIG. 7, a power limiting control system is employed that is based on the closed loop power control accumulator (702). The system operates by first measuring the output power of the power amplifier (705) using a power detector (706). The detected power is digitized (707) and compared to a maximum allowable setting by the comparator (701). If the output power is greater than the maximum setting, the closed loop power control accumulator (702) is modified to turn the amplifier (704) power down by one step each 1.25 ms until the output power is less than the maximum setting. If the output power is less than the maximum setting, the closed loop power control accumulator is not modified. The linearizing compensation tables, similar to the preferred embodiment, are added into the transmit gain control using a summer (703).

(JX-3 at 5:15-18, 5:50-59, 5:60-6:8 (emphasis added).) Based on the foregoing, the administrative law judge finds that the "closed loop power control signal" is based on one or more "power control commands." Moreover, all parties apparently agree, as each proposed construction has such a limitation. (See CBr at 38; RBr at 35; SBr at 39.) The '220 patent, however, does not itself fully define the "closed loop power control signal," but refers to the Gilhousen patent or the '109 patent (JX-88). (JX-3 at 2:5-8 ("Closed loop and open loop power control together determine the return link transmit energy, as disclosed in U.S. Pat. No. 5,056,109

to Gilhousen et al. and assigned to Qualcomm, Incorporated").) The '220 patent does not incorporate the Gilhousen patent by reference, but does cite the Gilhousen patent in the BACKGROUND OF THE INVENTION section of the '220 patent specifically for the purpose of explaining the use of closed loop and open loop power control in combination. Significantly, Ann Weiland, a named inventor of the asserted patents, testified at the hearing:

> Q. Well, isn't it true that the Gilhousen patent served as the base line for the work that you did on power control?
>
> A. I would say that's a fair statement. We took -- we built upon ideas in that patent. And I would say we further refined those ideas so that they would be more suitable to a commercially viable handset.

(Weiland, Tr. at 629:10-17.) The Gilhousen patent states:

> Furthermore, the present invention also utilizes closed loop power adjustment feedback from the cell-site to adjust mobile unit transmitter power.

(JX-88 at 11:17-20 (emphasis added).) Also, the abstract of the Gilhousen patent states:

> A power control feedback scheme may also be utilized. At the cell-site communicating with the mobile unit, the mobile unit transmitted power is measured as received at the cell-site. A command signal is generated at the cell-site and transmitted to the mobile unit for further adjusting mobile unit transmitter power corresponding to deviations in the cell site received signal power. The feedback scheme is used to further adjust the mobile unit transmitter power so as to arrive at the cell-site at a desired power level.

(JX-88 at abstract (emphasis added).) Thus, the administrative law judge finds that a person of ordinary skill in the art, as of the February 28, 1994 filing date, would have understood "closed loop" to refer to a signal sent from a radiophone based at least in part on the power of the signal received from that radiophone by the base station.

Based on the foregoing, the administrative law judge finds that the claim term "closed loop power control signal" should be construed as "a value representing one or more power control commands sent from the base station to the handset and based at least in part on a measurement of the handset's transmitting power as received by the base station." The administrative law judge finds that if the "closed loop power control signal" were not based at least in part on a measurement of the handset's transmitting power, said signal would simply be one or more power control commands received from a base station by the handset. However, power control commands must be different than a closed loop power control signal as each of "power control commands" and "closed loop power control signal" is recited in claim 2 of the '220 patent. If the claimed "closed loop power control signal" were interpreted as not requiring that it be based in part on the measurement of the power level of the radio as received by the base station, as complainant argued, then the administrative law judge finds the language "closed loop power control signal" superfluous. (See Power Mosfet Techs., L.L.C. v. Siemens AG, 378 F.3d 1396, 1410 (Fed. Cir. 2004).) ("Interpretations that render some portion of the claim language superfluous are disfavored").

Respondents argued that the "closed loop power control signal" must be based on "accumulated power control commands." (RBr at 35.) However as found, in Section VII.C.6, supra, regarding claim 1 of the '408 patent, "power control commands" need not be accumulated. The parties have agreed that claim terms should be interpreted consistently between the asserted patents. (RFF II.404 (undisputed).)

Complainant argued that a closed loop would not necessarily be based at least in part on a measurement of the handset's transmitted power. (CBr at 39-41; CRBr at 17-18.) The citations to

the record that complainant makes to support said argument are found not supportive. For example, complainant points to claim 22 of the Gilhousen patent as claiming a method "which includes 'power control commands' which need not be based on the phone's power level as received by the base station, and to dependent claim 25 of said patent which specifies that the commands are based on the phone's power level as received by the base station." (CBr at 40.) The administrative law judge has found, in Section VII.C.6, supra, that "power control commands" need not be based on the phone's power level as received by the base station and thus he finds that "power control commands" need not be used in a closed loop. Hence, the bare fact that said claims 25 requires that power control commands be based on the received power level of the radio, and said claim 22 does not so require, does not support the conclusion that closed loop power control need be based on the received power level of the radio. Thus, the administrative law judge finds that the distinction between said claims 22 and 25 of the Gilhousen patent does not aid in defining a closed loop.

Complainant, to support its argument that there are multiple forms of closed loop, i.e. one that requires power control command be based on a measurement of the received power level from measurement the radio and one that does not, argued that:

> A power adjustment command in a CDMA network being sent by a base station to a phone where the command is based on a measurement of the phone's signal strength is just one form of "closed loop" power control in the counterpart Wheatley PCT application. (RX-311 at p. 10; Wheatley, Tr. at 312:3-313:7, 314:4-8; JX-302C (Wheatley Dep.) at 74:12-76:1.)

(CFF G314.) Yet, the Wheatley PCT application (RX-311) at 10 cited by complainant states:

> Each cell-site receiver measures that strength of the signal, as received at the cell-site, from each mobile unit to which the cell-site

> is in communication with. The measured signal strength is compared to a desired signal strength level for that particular mobile unit. A power adjustment command is generated and sent to the mobile unit in the outbound link data, or voice channel, addressed to that mobile unit. In response to the cell-site power adjustment command, the mobile unit increases or decreases the mobile unit transmitter power by a predetermined amount...

(RX-311 at 10:4-12 (emphasis added).) This excerpt from the Wheatley PCT application, pointed out by complainant, shows a closed loop which is based on a measurement of received signal strength. Complainant does not point to any reference for an alternate form of closed loop in RX-311 in the other citations listed in CFF G314, and the administrative law judge has found none.

VIII. Validity Prior Art

A. Claims 1 And 3 Of The '473 Patent

1. Anticipation

Respondents argued that under complainant's proposed claim construction, McGirr U.S. Patent No. 5,129,098 (McGirr) (JX-333) anticipates each of claims 1 and 3 of the '473 patent. (RRBr at 69.)

Complainant argued that certain elements of claims 1 and 3 of the '473 patent are missing from McGirr. Hence, it argued that Nokia has not shown by clear and convincing evidence that McGirr anticipates the asserted claims of the '473 patent. (CBr at 96-100.)

The staff, in its post hearing filings, did not take a position on the issue of alleged anticipation of the asserted claims of the '473 patent.

Although a patent is presumed valid upon issue, see 35 U.S.C. § 282, it is invalid as anticipated if it "was known or used by others in this country, or patented or described in a printed publication" before the claimed invention, id. § 102(a), or if it was "patented or described in a

printed publication . . . more than one year prior" to the filing date. Id. § 102(b). However, for anticipation, "all of the elements and limitations of the claim must be shown in a single prior reference, arranged as in the claim." Karsten Mfg. Corp. v. Cleveland Golf Co., 242 F.3d 1376, 1383 (Fed. Cir. 2001) (emphasis added).

Respondents, in support of their argument that McGirr anticipates each of claims 1 and 3 of the '473 patent, included the following rebuttal findings:

> RRCFF J259b. Although a receive AGC is not expressly disclosed in Fig. 1 of McGirr, one skilled in the art would have understood that a receive AGC loop was inherent in the disclosure and would have known how to implement a receive AGC loop to control the gain of the receive chain and achieve the RSSI signal that is calibrated in table 88a. (Kenney Tr. 3197:8-3198:25, 3199:12-3201:24, 3412:22-3413:2, 3432:22-3433:19, 3499:2-21; RDX-32:2; RDX-63:36; RDX-069).
>
> RRCFF J262c. One skilled in the art at the time of the purported invention would have known how to select a first predetermined calibration value in response to the automatic gain control setpoint and the first frequency index in light of the teachings of McGirr. (Kenney Tr. 3197:8-3198:25, 3199:12-3201:24, 3432:22-3433:11; RDX-63:36; RDX-069)
>
> RRCFF J268a. Dr. Kenney testified that the line of questioning during his deposition cited by Qualcomm in CFF J267 was confusing, but that his testimony has been consistent that an AGC circuit is inherent in generation of the RSSI voltage disclosed in McGirr. (Kenney Tr. 3498:4-18).
>
> CFF J272. When asked if McGirr shows any adjustment of the received signal gain in response to the first calibration value, as recited in claim 1 element 5 (RDX-32), Professor Kenney testified, "I believe that it is inherent as part of the invention, and therefore, one of ordinary skill in the art would say that it does have such a receive gain that's controlled by this calibration value." (RDX-32; JX-333 (McGirr); JX-1, claim 1; Kenney, Tr. 3499:12-21.)
>
> CFF J275. When asked to confirm that Figure 2 of McGirr

does not show a variable gain amplifier whose gain could be adjusted, Professor Kenney disagreed, replying that "one of ordinary skill in the art would know that since AGC circuits were discussed at length in the transmitter, one could apply that same concept to the receiver." (JX-333 (McGirr), Fig. 2; Kenney, Tr. 3501:15-25.)

RRCFF J277a. Dr. Kenney testified that one skilled in the art prior to the time of the purported invention of the '473 patent would understand that a receive variable gain amplifier is inherent in the teachings of McGirr and is inherent in the conventional AGC circuits disclosed in McGirr. (3499:12-3413:2).

RRCFF J282a. Dr. Kenney testified that one skilled in the art prior to the time of the purported invention of the '473 patent would know that the receive AGC loop inherent and expressly disclosed in McGirr would necessarily include an integrator and a reference voltage. (Kenney Tr. 3150:14-24, 3231:20-3232:1, 3499:12-3413:2, 3432:22-3433:19, 3499:2-21; 3501:15-25, 3502:4-23; JX-333 at 1:8-55, 7:35-68; RDX-32:2).

RRCFF J283b. Although a receive AGC is not expressly disclosed in Fig. 1 of McGirr, one skilled in the art would have understood that a receive AGC loop was inherent in the disclosure and would have known how to implement the conventional AGC loops disclosed in McGirr to control the gain of the receive chain and achieve the RSSI signal that is calibrated in table 88a. (Kenney Tr. 3197:8-3198:25, 3199:12-3201:24, 3412:22-3413:2, 3432:22-3433:19, 3499:2-21; RDX-32:2; RDX-63:36; RDX-069).

RRCFF J284i. One skilled in the art at the time of the invention would recognize that the transmit calibration tables disclosed in McGirr (JX-333) would calibrate the radiotelephone's control signal to account for frequency variations. (Kenney Tr. 3224:4-22, 3204:14-25; JX-333 at 8:15-18).

RRCFF J284j. One skilled in the art at the time of the invention would recognize that the transmit calibration tables disclosed in McGirr (JX-333) would use indices corresponding to the operating frequency of the radiotelephone, an RSSI value, and the transmit power of the radiotelephone. (Kenney Tr. 3224:4-22, 3204:14-25; JX-333 at 8:15-18).

RRCFF J284k. One skilled in the art at the time of the invention

would have known how to generate a second calibration value in response to the automatic gain control setpoint, the second frequency index, and the transmit power value in light of McGirr. (Kenney Tr. 3224:4-22, 3204:14-25; JX-333 at 8:15-18).

RRCFF J290a. Dr. Kenney testified that "anyone of ordinary skill in the art would know that [McGirr's power control] algorithms could run faster, a lot faster," particularly in light of McGirr's teaching to modify its power control method according to design choice. (Kenney Tr. 3477:23-3478:7; JX-333 7:45-56).

(emphasis added).

Based on said rebuttal findings with their repeated references to what is not expressly disclosed in McGirr, the administrative law judge finds that respondents have not established, by clear and convincing evidence, that all of the elements and limitations of claims 1 and 3 of the '473 patent are shown in McGirr, as arranged in said claims in issue. Hence, he finds that respondents have not established that McGirr anticipates claims 1 and 3 of the '473 patent.

2. Obviousness

Respondents argued that claims 1 and 3 of the '473 patent are obvious because they did nothing more than combine well-known elements as they had been used. Thus, it is argued that the '473 patent itself in its FIG. 1 acknowledges an existing and complete prior art circuit including "nearly every element" of claims 1 and 3; that the asserted claims are obvious in light of the Wheatley PCT application W093/07702 (combined Wheatley) (RX-311) and the documents it incorporates by reference; that to the extent a "claim of validity" is able to survive the combined Wheatley, claims 1 and 3 are "definitively" made obvious by McGirr (JX-333); that in addition to the complete systems of the combined Wheatley and McGirr, prior art as European Patent Application 0416613 A2 (Fujitsu) (JX-329), U.S. Patent No. 5,230,091 (Vaisanen) (RX-309), and

European Patent Application 0412392A2 (Motorola I) (RX-313) are replete with digital lookup tables used in handset power control applications and such art combined with the combined Wheatley render claims 1 and 3 of the '473 patent obvious. (RBr at 100-201.)[21]

The staff argued that the collective teachings of the combined Wheatley, in view of McGirr and Vaisanen, render the asserted claims 1 and 3 of the '473 patent obvious. (SBr at 69-76.)

Complainant argued that it has not been shown, by clear and convincing evidence, that one of ordinary skill in the art would have combined the combined Wheatley and the "other" cited patents; and that even if the combined Wheatley "references" were "properly combinable" with McGirr or with the other digital linearizer patents, the combination would not work for its intended purpose, and therefore could not render asserted claims 1 and 3 of the '473 patent obvious. (CBr at 104-11.) Complainant further argued that "unrebutted" evidence of secondary considerations demonstrate that the "asserted patents" are not obvious. (CBr 96-131.)

All parties make reference to KSR Int'l v. Teleflex, 127 S.Ct. 1727 (2007) (KSR). In KSR, the Supreme Court reaffirmed its long-standing obviousness test:

> Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc.,

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[21] As indicated in an exhibit dated 8/3/07 (RX-404) the PTO has granted Nokia's request for reexamination of claims 1-4 of the '473 patent, the PTO stating that Nokia considers claims 1-4 of the '473 patent unpatentable over "the combination of the Wheatley Patents (Wheatley I [RX-311], Wheatley II [RX-306] and Wheatley III [RX-307]) in view of McGirr et al [JX-333]." and also "over McGirr in view of the combined Wheatley Patent." (RX-404 at NITC-N1059280.)

> might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

Id. at 1734 (quoting Graham v. John Deere Co., 383 U.S. 1, 17-18, (1966)).

However, the Supreme Court found that the Federal Circuit in the case below had addressed the question of obviousness in a manner contrary to 35 U.S.C. § 103 and Supreme Court precedents. Thus it stated:

> Seeking to resolve the question of obviousness with more uniformity and consistency, the Court of Appeals for the Federal Circuit has employed an approach re-ferred to by the parties as the "teaching, suggestion, or motivation" test (TSM test), under which a patent claim is only proved obvious if "some motivation or suggestion to combine the prior art teachings" can be found in the prior art, the nature of the problem, or the knowledge of a person having ordinary skill in the art. See, e.g., Al-Site Corp. v. VSI Int'l, Inc., 174 F.3d 1308, 1323-1324 (CA Fed. 1999). KSR challenges that test, or at least its application in this case. See 119 Fed. Appx. 282, 286-290 (CA Fed. 2005). Because the Court of Appeals addressed the question of obviousness in a manner contrary to § 103 and our precedents, we granted certio-rari, 547 U.S. , 126 S. Ct. 2965, 165 L. Ed. 2d 949 (2006). We now reverse.

127 S.Ct. at 1734-35, (emphasis added).

Referring to the cited prior art and claimed invention at issue in KSR, the Supreme Court indicated that the case concerned adjustable automotive pedals, which were intended to allow "drivers of smaller stature" to avoid needless repositioning of the driver's seat. KSR, 127 S. Ct. at 1735. One prior art reference, U.S. Patent No. 5,010,782 (Asano), taught an adjustable pedal designed so that "one of the pedal's pivot points stays fixed," with the result that "the force necessary to push the pedal down is the same regardless of adjustments to its location." Id. Also during this time, "it became more common to install computers in cars to control engine

operation." KSR, 127 S. Ct. at 1735. Once a computer controlled a car's engine, "an electronic sensor is necessary to translate the mechanical operation into digital data the computer can understand." Id. The industry developed various electronic pedal sensors for this purpose. See id. at 1735-36. One such advance was a prior art reference U.S. Patent No. 5,819,593 (Rixon), which taught "an adjustable pedal assembly with an electronic sensor for detecting the pedal's position." 127 S. Ct. at 1736. Rixon however had a flaw in that its sensor was "located in the pedal footpad" and, as a result, became "known to suffer from wire chafmg when the pedal was depressed and released." Id.

A third prior art reference, U.S. Patent No. 5,063,811 (Smith), according to KSR, taught that "to prevent the wires connecting the sensor to the computer from chafing and wearing out, and to avoid grime and damage from the driver's foot, the sensor should be put on a fixed part of the pedal assembly rather than in or on the pedal's footpad." KSR, 127 S. Ct. at 1735-36. Finally, the Supreme Court pointed out that in 1994, Chevrolet built a line of trucks with computerized engines, using "modular" electronic sensors on their pedals (id. at 1736) and modular sensors could, as their name implied, "be taken off the shelf and attached to mechanical pedals of various sorts, enabling the pedals to be used" with computer engine control with Chevrolet attaching its modular sensors to the pedal support bracket. Id.

According to KSR against the backdrop of said prior art, General Motors engaged petitioner KSR "to supply adjustable pedal systems for Chevrolet and GMC light trucks that used engines with computer-controlled throttles." 127 S. Ct. at 1736. Petitioner KSR added a modular electronic sensor to an existing pedal used in non-computerized cars. Id. Upon learning of petitioner KSR's design for GM, Teleflex Inc. sent a warning letter informing the petitioner that

its proposal would violate its U.S. Patent No. 6,237,565 to Engelgau (Enelgau patent). Petitioner then refused to enter a royalty arrangement with Teleflex so in the district court Teleflex accused KSR's design of infringing claim 4 of the Engelgau patent. See KSR, 127 S. Ct. at 1737. The Engelgau patent was said to teach

> "'a position-adjustable pedal assembly with an electronic pedal position sensor attached to the support member of the pedal assembly. Attaching the sensor to the support member allows the sensor to remain in a fixed position while the driver adjusts the pedal."

Id. (quoting Teleflex Inc. v. KSR Int'l, 298 F. Supp. 2d 581, 586-587 (ED. Mich. 2003).

Petitioner KSR then sought summary judgment in the district court asserting that "it would have been obvious to someone with ordinary skill in the art of designing pedal systems to combine an adjustable pedal system with an electronic pedal position sensor to work with electronically controlled engines increasingly being used in motor vehicles." Teleflex Inc. v. KSR Int'l, 298 F. Supp. 2d 581, 585 (E.D. Mich. 2003). The district court agreed, finding "little difference between the teachings of the prior art and claims of the patent-in-suit." Id. at 592. The district court noted that Asano taught "the structure and function of each of the claim 4 limitations, except those relating to an electronic pedal position sensor," which itself was "fully disclosed by other prior art references." Id.

Having found all claim elements in the prior art, the district court proceeded to apply the then-governing test, which required "some motivation or suggestion to combine the prior art teachings." 298 F. Supp. 2d at 593. The district court found that "it was inevitable that adjustable pedal assemblies would be joined with an electronic device to work in conjunction with modem electronically controlled engines," noting that the prior art reference Rixon had already done so.

Id. Although the prior art reference Rixon suffered from wire chafing due to its placement of the sensor, the district court concluded that a person of ordinary skill in the art would have been motivated to combine prior art reference Asano with Chevrolet's 1994 sensors precisely "to avoid the problems with Rixon." Id. at 594. Finally, the express teaching of the prior art reference Smith to avoid wire chafing by fixing electronic sensors to a stationary point was said by the district court to support a skilled artisan's motivation to combine the prior art, further rendering Engelgau obvious. See id.

On appeal by Teleflex, the Federal Circuit vacated and remanded. Teleflex, Inc. v. KSR Int'l, 119 Fed. App'x 282 (Fed. Cir. 2005). The Federal Circuit found that the district court had erred by failing to find a specific motivation to combine the prior art exactly as performed in the patent:

> Under our case law, whether based on the nature of the problem to be solved, the express teachings of the prior art, or the knowledge of one of ordinary skill in the art, the district court was required to make specific findings as to whether there was a suggestion or motivation to combine the teachings of Asano with an electronic control in the particular manner claimed by [Engelgau].

Id. at 288 (emphasis added).

The Federal Circuit also rejected the district court's conclusion that the "nature of the problem to be solved" could provide the required motivation to combine the prior art. KSR, 119 Fed. App'x at 288. The Federal Circuit, noting that it had endorsed this possibility only when "two prior art references address the precise problem that the patentee was trying to solve," rejected the cited prior art as too far afield. Id. (emphasis added). Similarly, the Federal Circuit found that the district court improperly considered the prior art Smith's teaching that "the pedal assemblies must not precipitate

any motion in the connecting wires" because Smith did not specifically advise attachment in the particular manner claimed by Engelgau. Id. at 288-89. Hence, the Federal Circuit vacated summary judgment. See id. at 289.

In KSR the Supreme Court rejected the Federal Circuit's "narrow conception of the obviousness inquiry," noting that the Supreme Court's test was both objective and flexible:

> In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim. If the claim extends to what is obvious, it is invalid under § 103. One of the ways in which a patent's subject matter can be proved obvious is by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims.

127 S. Ct. at 1741-42 (emphasis added). It concluded that the Federal Circuit erred by failing to "recognize that the problem motivating the patentee may be only one of many addressed by the patent's subject matter." Id. at 1742. Instead, the Supreme Court emphasized that courts must consider all potential motivations:

> The question is not whether the combination was obvious to the patentee but whether the combination was obvious to a person with ordinary skill in the art. Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.

Id. (emphasis added).

The Supreme Court further found that the Federal Circuit erred by assuming that a skilled artisan "attempting to solve a problem will be led only to those elements of prior art designed to solve the same problem." 127 S. Ct. at 1742. Thus, it stated that the Federal Circuit erred in dismissing the prior art reference Asano on the grounds that it addressed a problem different from Engelgau. See id.

It further noted:

> Common sense teaches, however, that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle. Regardless of Asano's primary purpose, the design provided an obvious example of an adjustable pedal with a fixed pivot point; and the prior art was replete with patents indicating that a fixed pivot point was an ideal mount for a sensor. The idea that a designer hoping to make an adjustable electronic pedal would ignore Asano because Asano was designed to solve the constant ratio problem makes little sense. A person of ordinary skill is also a person of ordinary creativity, not an automaton.

Id. (emphasis added) [quoted in part also in the later Translogic, see infra]. The Supreme Court also found that the Federal Circuit erred by concluding "that a patent claim cannot be proved obvious merely by showing that the combination of elements was 'obvious to try.'" Id. Instead, the Supreme Court stated:

> When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under § 103.

Id. (emphasis added). Finally, the Supreme Court ruled that the Federal Circuit erred in its consideration of hindsight bias by imposing "[r]igid preventative rules that deny factfinders recourse to common sense." Id.

The "rigid approach" of the Federal Circuit, the Supreme Court explained in KSR, ran afoul of §103 by granting patent protection to obvious, predictable combinations of prior art elements:

> Neither the enactment of § 103 nor the analysis in Graham disturbed this Court's earlier instructions concerning the need for caution in granting a patent based on a combination of elements found in the prior

> art. For over a half century, the Court has held that a "patent for combination which only unites old elements with no change to their respective functions . . . obviously withdraws what is already known into the field of its monopoly and greatly diminishes the resources available to skillful men."

Id. at 1739 (quoting Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp., 340 U.S. 147, 152 (1950)) (emphasis added).

In correcting the Federal Circuit's error, KSR reaffirmed prior cases holding that a "combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." 127 S. Ct. at 1739. The Supreme Court cited three case exemplifying this principle. Thus it was said that in United States v. Adams, 383 U.S. 39 (1966), the Court "recognized that when a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result." KSR, 127 S. Ct. at 1739-40 (emphasis added). In Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57 (1979), it was said that the Court struck a patent "combining two pre-existing elements" because, "while the combination of old elements performed a useful function, it added nothing new to the nature and quality" of the prior art. KSR, 127 S. Ct. at 1740. Finally, it was said that in Sakraida v. AG Pro, Inc., 425 U.S. 273 (1976), the Supreme Court held a patent must be invalid if it "simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement." KSR, 127 S. Ct. at 1740. Following "the principles underlying these cases," KSR noted that a patent must be obvious if it discloses only a foreseeable variation from art in the same or a related field:

> When a work is available in one field of endeavor, design incentives

> and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

Id. at 1740 (emphasis added). Thus, under the correct test, the Supreme Court stated that courts must "ask whether the improvement is more than the predictable use of prior art elements according to their established functions." Id. KSR, however, did indicate that a patent composed of several elements is not obvious merely because each of said elements was independently known in the prior art:

> Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit. See In re Kahn, 441 F.3d 977, 988 (CA Fed. 2006) "Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness"). As our precedents make clear, however, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.
>
> When it first established the requirement of demonstrating a teaching, suggestion, or motivation to combine known elements in order to show that the combination is obvious, the Court of Customs and Patent Appeals captured a helpful insight. See Application of Bergel, 292 F.2d 955, 956-957, 48 C.C.P.A. 1102, 1961 Dec. Com-m'r Pat. 504 (1961). As is clear from cases such as Adams, a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Although common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, it can be

> important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.

Id. at 1739-40 (emphasis added).

After explaining the correct obviousness standard and analysis, the Supreme Court in KSR held that claim 4 of the Engelgau patent was obvious as a matter of law, agreeing with the district court that one of ordinary skill in the art would have seen the benefits of combining the prior art references Asano with the prior art reference Smith:

> As did the District Court, we see little difference between the teachings of Asano and Smith and the adjustable electronic pedal disclosed in claim 4 of the Engelgau patent. A person having ordinary skill could have in the art could have combined Asano with a pedal position sensor in a fashion encompassed by claim 4, and would have seen the benefits of doing so. [quoted in the later Translogic, see infra]

127 S. Ct. at 1743 (emphasis added). For this reason, the Supreme Court ruled that the district court was correct to:

> conclude that, as of the time Engelgau designed the subject matter in claim 4, it was obvious to a person of ordinary skill to combine Asano with a pivot-mounted pedal position sensor. There then existed a marketplace that created a strong incentive to convert mechanical pedals to electronic pedals, and the prior art taught a number of methods for achieving this advance.

Id. at 1744. These "design incentives and other market concerns," the Supreme Court concluded, provided sufficient impetus to apply Asano to an electronic pedal, rendering the Engelgau patent obvious. Id. In contrast, the Supreme Court found that the Federal Circuit had "considered the issue too narrowly" by asking "whether a pedal designer writing on a blank slate would have chosen both

Asano and a modular sensor" in response to the "strong incentive to convert mechanical pedals to electronic pedals." 127 S. Ct. at 1744. (emphasis added). Instead, the Supreme Court stated that the Federal Circuit should have asked "whether a pedal designer of ordinary skill starting with Asano would have found it obvious to put the sensor on a fixed pivot point." Id. (emphasis added). Among other reasons, "from the known wire-chafing problems of Rixon, and Smith's teaching that 'the pedal assemblies must not precipitate any motion in the connecting wires,' the designer would know to place the sensor on a nonmoving point of the pedal structure." Id. Because it was the "most obvious nonmoving point on the structure," the Supreme Court held that "attaching the sensor where both KSR and Engelgau put it would have been obvious to a person of ordinary skill," further confirming the obviousness of Engelgau. See id. at 1744-45. Thus the judgement of the Federal Circuit was reversed, and the case remanded for further proceedings consistent with "this opinion" 127 S.Ct, at 1746.[22]

In a later case, the Federal Circuit in In re Translogic Tech. Inc., 504 F.3d 1249 (Fed. Cir. 2007) (Translogic), in affirming the PTO Board's final rejection of claims 16, 17, 39-45, 47 and 48 of U.S. Patent No. 5,162,666 (the '666 patent) as obvious, made frequent reference to KSR. In Translogic, the Federal Circuit found that the '666 patent deals with multiplexers; that a multiplexer is a type of electrical circuit; that a multiplexer has multiple inputs, one or more control lines, and one output; that signals on the control lines select one of the various inputs to be passed to the output; that in a 2:1 multiplexer, a single output value is selected from two inputs; that similarly, in 4:1 and 8:1 multiplexers, a single output is selected from among four or eight inputs, respectively; and that thus the invention selected one of the multiple inputs to pass to the output. Id. at 1251. The Court further found

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[22] On remand, the Federal Circuit affirmed the district court's grant of summary judgment which was the same grant it had previously vacated. Teleflex, Inc. v. KSR Int'l, 228 Fed. App's 988, (Fed. Cir. 2007).

that the '666 patent describes a multiplexer that couples together multiple stages of 2:1 multiplexers in series; that the '666 patent specifically uses a transmission gate multiplexer (TGM) as each 2:1 multiplexer; that Figure 3 of the '666 patent illustrates a 4:1 series multiplexer that connects three TGMs (i.e., A, B and C) in series; that the inputs are I0, I1, I2 and I3, the output is Z and the control lines are S1, S2 and S3; that while a conventional 4:1 multiplexer would have two control lines, the 4:1 series multiplexer, according to the '666 patent configuration, has three control lines. Id. at 1252-3. It also found that the claims on appeal specify multiplexers with multiple 2:1 TGMs connected in series; that in the series configuration, the output of one TGM connects to one input of the next TGM; and that each TGM is known as a stage; that a multiplexer built from a series of TGMs has p control inputs and (p+1) data inputs for a total of (2p+1) overall inputs; and that for example, a 4:1 series multiplexer has p=3 control inputs and 4 data inputs thereby resulting in 7 ((2*3) + 1 = 7) overall inputs whereas a conventional 4:1 multiplexer has 4 inputs and 2 control inputs, resulting in 6 overall inputs. Id. at 1253-54. In affirming the Board, the Federal Circuit found that a person of ordinary skill in the art would have a thorough understanding of electrical switching systems and knowledge of actual electrical implementations of multiplexers such as the TGMs in a Weste reference; and that a Gorai reference uses serial connectivity of 2:1 multiplexers, each described as M(1), to realize logic functions; and that the subject matter of the Gorai reference explains an approach (i.e., algorithm) to analyze mathematical dependencies among desired inputs and then selects appropriate input connections as well as series connectivity between M(1) multiplexers to realize the specified logic function. For example, the Gorai algorithm was said to result in the circuit in FIG. 6 defined by logic function: $f_2(x_1, x_2, x_3, x_4) = \Sigma (0, 5, 7, 8, 9, 12, 13)$. Id. at 1260.

In Translogic, the Court in commenting on KSR, stated:

> When Teleflex sued KSR for infringement, the district court invalidated the '565 patent on summary judgment. This court reversed because the trial court had not made specific findings to show a teaching, suggestion, or motivation to combine ("TSM test"). The Supreme Court, in turn, reversed: "A person having ordinary skill in the art could have combined Asano with a pedal position sensor in a fashion encompassed by claim 4, and would have seen the benefits of doing so." KSR Int'l Co., 550 U.S. at , 127 S. Ct. at 1743. [quoted also supra]

On one level, KSR corrected a rather straightforward error. The error appears right before footnote 3 in this court's opinion:

> In this case, the Asano patent does not address the same problem as the [Engelgau] '565 patent. The objective of the '565 patent was to design a smaller, less complex, and less expensive electronic pedal assembly. The Asano patent, on the other hand, was directed at solving the "constant ratio problem."
>
> Teleflex, Inc. v. KSR Int'l, Co., 119 Fed. Appx. 282, 288 (Fed. Cir. 2005). This passage overlooks the fundamental proposition that obvious variants of prior art references are themselves part of the public domain. See KSR Int'l Co., 550 U.S. at , 127 S. Ct. at 1743; Dystar Tex-tilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co., 464 F.3d 1356, 1361 (Fed. Cir. 2006); In re Dembiczak, 175 F.3d 994, 999 (Fed. Cir. 1999) ("We have noted that evidence of a suggestion, teaching, or motivation to combine may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved . . . ."). In the context of KSR, the Asano teachings and its obvious variants were relevant prior art, even if that patent did address a different problem (the constant ratio problem). The Supreme Court highlighted that error in its opinion:
>
> The primary purpose of [prior art reference] Asano was solving the constant ratio problem; so, the court concluded, an inventor considering how to put a sensor on an adjustable pedal would have no reason to consider putting it on the Asano pedal. Common sense teaches, however, that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle. Regardless of Asano's primary purpose, the design

> provided an obvious example of an adjustable pedal with a fixed pivot point; and the prior art was replete with patents indicating that a fixed pivot point was an ideal mount for a sensor. The idea that a designer hoping to make an adjustable electronic pedal would ignore Asano because Asano was designed to solve the constant ratio problem makes little sense. KSR Int'l Co., 550 U.S. at , 127 S. Ct. at 1742.

Id. at 1254 (emphasis added).

The Federal Circuit in Translogic continued:

> The Supreme Court [in KSR] also criticized this court's "rigid and mandatory" application of the motivation to combine test: "The obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and the explicit content of issued patents." Id. at 1741. Instead, the Supreme Court advised that "common sense" would extend the use of customary knowledge in the obviousness equation: "A person of ordinary skill is also a person of ordinary creativity, not an automaton." Id. at 1742. Thus, the Supreme Court set aside any "rigid" application of the TSM test and ensured use of customary knowledge as an ingredient in that equation.
>
> The Supreme Court observed that this court had also "elaborated a broader conception of the TSM test than was applied in [KSR]." Id. at 1743. Specifically the Court referred to Dystar Textilfarben GmbH & Co. v. C.H. Patrick Co., wherein this court noted: "Our suggestion test is in actuality quite flexible and not only permits, but requires, consideration of common knowledge and common sense." 464 F.3d 1356, 1367 (Fed. Cir. 2006) (emphasis original). The Court suggested that this formulation would be more consistent with the Supreme Court's restatement of the TSM test. KSR Int'l Co., 127 S. Ct. at 1739. In any event, as the Supreme Court suggests, a flexible approach to the TSM test prevents hindsight and focuses on evidence before the time of invention, see, e.g., In re Rouffet, 149 F.3d 1350, 1357 (Fed. Cir. 1998), without unduly constraining the breadth of knowledge available to one of ordinary skill in the art during the obviousness analysis.

Id. at 1260 (emphasis added.)

Of particular relevance is the Federal Circuit's rejection of the argument of Translog Tech Inc.:

> In this appeal, Translogic proffers two arguments to attempt to show

that the Gorai reference is not prior art with respect to the '666 patent. Initially, Translogic contends that neither the Gorai algorithm nor its circuit realizations provide a multiplexer function. In fact, since the entire point of Gorai's article revolves around logic, not multiplexing, with series connectivity among M(1) circuits, Translogic contends that Gorai teaches away from multiplexers. Next, Translogic contends that the Gorai reference discloses an algorithm capable of providing designs for a large number of circuits, while the inventor of the '666 patent was modifying one circuit, a multiplexer, with utmost regard for its performance. In other words, while Gorai discloses an algorithm to design logic circuits based on functional parameters, the '666 patent improves a known circuit. In sum, Translogic's argument tries to state that the Gorai reference is not relevant prior art because the reference does not spe-cifically disclose a N:1 series multiplexer but only discloses an algorithm to realize logic functions by using 2:1 multiplexers connected in series.

In its prior art argument, Translogic is making the same error corrected by the Supreme Court in KSR. Translogic mistakenly argues that variants of a circuit connecting 2:1 multiplexers in series are not relevant prior art with respect to the '666 patent because these variants do not address the same problem, namely an improved multiplexer circuit. However, this argument overlooks the fundamental proposition that the series circuits in Gorai are prior art within the public domain and the common knowledge of a person of ordinary skill in the art. Thus, the Gorai reference is a relevant prior art reference with respect to the '666 patent and clearly discloses a series 2:1 multiplexer circuit.

Translogic also puts forth a prior art argument based on the circuit inputs. Translogic contends that Fig. 3 in Gorai (see below) is a half-bare, incomplete circuit because all h and g inputs are undefined (variables or constants) and therefore the Fig. 3 circuit only shows three control inputs (x_1, x_{p-1} and x_p).

* * *

Therefore, Translogic states that the Gorai Fig. 3 circuit cannot be a multiplexer because the inputs are not specifically defined to realize a N:1 series multiplexer circuit (4:1 in this example).

Translogic's input argument is without merit. Claims 47 and 48 of the '666 patent define a series multiplexer circuit. Gorai Fig. 3 discloses the same serial multiplexer circuit. As any person of ordinary

skill in the art would understand, the inputs to a circuit do not change the circuit itself. Therefore, this court finds that Gorai discloses a series multiplexer circuit as claimed in the '666 patent. Thus, the Board was correct in concluding that the Gorai reference discloses a series multiplexer circuit.

Lastly, Translogic contends that Gorai does not teach or suggest the use of TGMs for each M(1) stage (i.e., 2:1 multiplexer). Translogic admits that the Weste reference does disclose a TGM circuit; however, Translogic argues that Weste provides no specific teaching, suggestion or motivation to use TGMs in a series circuit such as shown in Gorai Fig. 3. Furthermore, Translogic notes that Weste discloses a TGM used for a single multiplexer but does not include any reference to coupled TGMs in series. Thus, according to Translogic, the Weste reference does not provide the necessary teaching, suggestion or motivation [*26] to combine the use of TGMs with the Gorai reference.

As articulated by the Supreme Court in KSR, an obviousness analysis "need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." 550 U.S. at , 127 S. Ct. at 1741. In this case, a person of ordinary skill in the art at the time of the invention would have recognized the value of using a known element, a 2:1 TGM, as taught by Weste, for the 2:1 multiplexers in the series arrangement of multiplexers in Gorai. A person of ordinary skill in the art would have appreciated that any conventional multiplexer circuit could be utilized to implement the 2:1 multiplexer circuits in Gorai. After all, TGMs were well-known multiplexer circuits as evidenced by the Weste 1985 textbook. In other words, in looking for a multiplexer circuit for the individual 2:1 multiplexers disclosed in Gorai, a person of ordinary skill in the art would have solved this design need by "pursu[ing] known options within his or her technical grasp." Id. at 1742. Thus, this court agrees with the Board's determination. The Board based its decision on sound reasoning that a person of ordinary skill in the art would select a specific circuit based on the need for a 2:1 multiplexer circuit for the individual multiplexers shown in Gorai. Specifically, a person of ordinary skill in the art at the time of the invention would have been able to choose TGMs as an option. While other circuits could have been used to implement the 2:1 multiplexers, TGMs were a well-known circuit as shown by the explanation of TGM circuits in the 1985 textbook by Weste. This court finds that substantial evidence in the record supports the Board's finding that a person of ordinary skill in

> the art would have used TGMs in the N:1 circuit configuration shown in Gorai. In sum, this court agrees with the Board's conclusion that the '666 patent is unpatentable under 35 U.S.C. § 103(a) over Gorai in view of Weste.

Id. at 1260-62 (emphasis added).

The Commission, in its opinion dated November 7, 2007 in Certain Ink Cartridges And Components Thereof, Inv. No. 337-TA-565 (Ink Cartridges), stated that the Supreme Court in KSR, while reaffirming that the Graham factors still control the analysis of an obviousness inquiry, reexamined how the obviousness inquiry should be conducted and rejected what it referred to as the overly rigid application of the so-called "teaching, suggestion, motivation" test.[23] Id. at 40. Thereafter the Commission, referring to this administrative law judge's ID in Ink Cartridges, observed:

> While the ALJ did refer to a lack of "suggestion" for combining prior art in his analysis of obviousness of claims 1, 2, 3 and 9 of the '917 patent, he also found that not all the features of the asserted claims of the '917 and '422 patents were disclosed in the prior art. ID 151, 153. Thus, the prior art could not simply be combined to yield the inventions of the two patents and it cannot be argued that the claimed inventions would have resulted simply from the combination of old elements to yield a predictable result, which appears to have been a primary concern of the KSR decision. KSR, 127 S.Ct. at 1740 ("The principles underlying these cases are instructive when the question is whether a patent claiming the combination of elements of prior art is obvious.") We find that ALJ's conclusions with respect to the non-obviousness of the asserted claims the of the '917 and'422 patents are well-reasoned and well-supported in the record and that the active respondents have not demonstrated the obviousness of the patents by clear and convincing evidence.

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[23] The Commission noted that, prior to KSR, the Federal Circuit indicated consideration of two factors which was required to determine if the invention was obvious: "(1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process," and "(2) whether the prior art would also have revealed that in so making or carrying out, those of ordinary skill would have a reasonable expectation of success." Noelle v. Lederman, 355 F.3d 1343, 1351-52 (Fed. Cir. 2004).

> As to claim 1 of the '053 patent, the ID discusses a combination of prior art elements and one additional element relied on by respondents, the repositioning of the ink port to avoid contamination of the circuit board. ID 156-157. The ALJ found that the '422 patent teaches away from the repositioning of the ink port and the specification of the '422 patent suggests the ink port should be near the circuit board, we do not find that the repositioning of the ink port would have been obvious to one skilled in the art. See '422 Patent 3:66:67. Moreover, the application for the '422 patent was disclosed to the examiner and found not to be a bar to patentability. ID 156 citing (CFF VIII.73). Accordingly, we find that the active respondents have not demonstrated the obviousness of claim 1 of the '053 patent by clear and convincing evidence.

(Id. at 47-8) (emphasis added).

Referring to the combined Wheatley titled "Transmitter Power Control System" (RX-311), under the subheading "Field of the Invention" at 1 it states that the invention relates to a novel and improved method and apparatus for controlling transmitter power in a code division multiple access (CDMA) cellular mobile telephone system. (RX-311 at 3.)

RX-311 is an international patent application published under the patent cooperation treaty (PCT). (RX-311.) RX-311 bears International Publication Number WO 93/07702 and International Application Number PCT/US92/08613. (RX-311.) The named inventor of RX-311 is Charles E. Wheatley, III, an inventor on the '473 patent. (RX-311.) The named applicant of RX-311 is QUALCOMM. (RX-311.) The International Filing Date for RX-311 is October 8, 1992. (RX-311.) RX-311 bears a priority date of October 8, 1991 and claims priority to U.S. Patent Application No. 773,067 (RX-311.)[24] RX-311 bears an International Publication Date of April 15, 1993 (RX-311.) The subject of RX- 311 was described in a printed publication by at least as early as April 15, 1993 within the meaning of 35 U.S.C. §102 (a). (RX-311.) It was so described before the purported invention

[24] Wheatley U.S. Patent No. 5,267,262 (CX-42) is based on said application No. 773,067.

claimed in the '473 patent. (RX-311; RFF VI.233 (undisputed).) RX-311 constitutes prior art to each of the '473 patent, '408 patent and '220 patent under 35 U.S.C. §102 (a). (RX-311; RFF VI.237-9 (undisputed).) Because RX-311 explicitly incorporates RX-306 (U.S. Patent No. 5,049,204) and RX-307 (U.S. Patent No. 5,107,225) by reference, the administrative law judge finds that one of ordinary skill in the art would view the disclosures of RX-311, RX-306, and RX-307 as a single combined reference. (RFF VI.224 (undisputed).) [25]

FIG. 1 of RX-311[26] is a schematic overview of an exemplary mobile cellular telephone system. (RFF VI.240 (undisputed).) In FIG. 1 of RX-311, mobile stations 16 and 18 communicate with base stations 12 and 14 over uplink communication paths 20b, 22b, and 24b, and downlink communication paths 20a, 22a, and 24a. (RX-311 at 13:29-30.) FIGS. 2A-2C of RX-311 illustrate, in a series of graphs, mobile unit received signal power, mobile unit transmit power and cell-site received signal power as a function of distance. (RX-311 at 13:31-33; RFF VI.242 (undisputed).) FIG. 7 of RX-311 is a block diagram of a cell-site/system controller configuration for cell-site transmitter power control. (RX-311 at FIG. 7; RFF VI.246 (undisputed).) FIG. 4 of RX-311, is a block diagram of the mobile unit with particular reference to the power control features. (RX-311 at 13:36-14:1; RFF VI.247

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[25] There is a typographical error that appears on page 26 of RX-311, lines 3-7, which error in the specification reverses the label number assigned to boxes "AGC Detector Circuit" and "Conversion Subsystem" in FIG. 5 of RX-311. (RFF VI.271 (undisputed).)

[26] See Appendix A. Included with this ID are a number of figures. Some of the figures have been color highlighted which meant that said figures had to be reproduced by the publishing office at the ITC which took time. Thus the administrative law judge has included said figures as appendices to this ID which appendices follow the signature page of the ID. The copy of the ID that is filed as well as the seven copies of the ID that will be distributed inside the ITC will have the appendices which will be color highlighted as indicated in the ID. Any other copy of the ID with appendices, eg. the EDIS copy, will be in black and white and thus will not have said color highlight." However, the private parties and the staff should have any color highlighted figures since they are in evidence.

(undisputed).)

It is undisputed that RX-311 discloses a power control system for a cellular mobile telephone system in which system users communicate information signals between one another via at least one cell site (RX-311 at Abstract; RFF VI.248 (undisputed)); that RX-311 discloses the use of radio frequency (RF) signals to communicate information (RX-311 at 14:29-31; RFF VI.249 (undisputed)); and that RX-311 discloses a radiotelephone using code division multiple access spread spectrum communication signals. (RX-311 at Abstract; (RFF VI.250 (undisputed).)

RX-311 discloses that the radiotelephone receives RF signals through an antenna (RX-311 at Abstract, 19:27-30, 21:29-31; RFF VI.252 (undisputed)); that the radiotelephone's antenna is coupled to a duplexer (RX-311 at 21:31-33; RFF VI.253 (undisputed)); that the transmit and receiver sections of the radiotelephone disclosed by RX-311 operate on different frequencies (RX-311 at 4:19-29; JX-1 at 1:24-32; RFF VI.254 (undisputed)); that accounting for the outbound channel path loss (base station to mobile) is insufficient to account for inbound channel path loss (mobile to base station) (RX-311 at 4:30-35; RFF VI.256 (undisputed)); and that a radiotelephone that measures the power level of communication signals received by the radiotelephone. (RX-311 at Abstract, 2:1-3, 8:1-4, 26:3-4; Fig. 5; (RFF VI.257 (undisputed).)

FIG. 5 of RX-311[27] is a block diagram illustrating in further detail the power control features of the mobile unit of FIG. 4 which is said to be a block diagram of the mobile unit with particular reference to the power control features. (RX-311 at 14:2-3; RFF VI.259 (undisputed)). RX-311 at 28 specifically states:

> In a preferred embodiment [Fig. 5] amplifiers 94 and 102 are

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[27] See Appendix B.

> each configured as series coupled dual gate FET transistors with a surface acoustic wave bandpass disposed therebetween. In order to correct for inherent nonlinearities of the transistors so as to provide linear gain operation over an extended dynamic range, a gain compensation circuit is used to modify the gain control signal as input to the transistors. Further details on the specific implementation of this circuitry are provided in copending U.S. Patent Application Serial No. 07/598,845 filed October 15, 1990, entitled "LINEAR GAIN CONTROL AMPLIFIER", now U.S. Patent No. 5,099,204 [RX-306] issued March 24, 1992, also assigned to the assignee hereof and incorporated by reference. Further details on an implementation of the feedback loop comprised of amplifier 94, AGC detector circuit 98 and comparator 100 which provide the gain control are provided in copending U.S, Patent Application Serial No. 07/620,092, filed November 30, 1990, entitled "HIGH DYNAMIC RANGE CLOSED LOOP AUTOMATION GAIN CONTROL CIRCUIT", now U.S. Patent No. 5,107,225 [RX-307] issued April 21, 1992, also assigned to the assignee hereof and incorporated by reference.

(RX-311 at 28 (emphasis added).)

It is undisputed that RX-311 discloses that the RF signals arrive from the antenna system (RFF VI.260 (undisputed)); that the RF signals from the antenna system are down-converted into IF signals by element 90 of FIG. 5 (RFF VI.260 (undisputed)); that the RF signals from the antenna system are processed by the band-pass filter 92 of FIG. 5 to remove any out-of-band signals (RFF VI.262 (undisputed)); that a radiotelephone measures the power level of communication signals received by the radiotelephone using a power detector (RFF VI.266 (undisputed)); that the output of variable gain amplifier 94 of FIG. 5 was split, and transmitted to two subsystems: the automatic gain control detector 98 of FIG. 5 and the conversion subsystem 96 of FIG. 5 (RFF VI.267 (undisputed)); that the radiotelephone's receiver contains an AGC detector circuit 98 of FIG. 5 that is used to generate a signal indicative of the signal strength of the received signal (RDX-63:7; RFF VI.268 (undisputed)); that RX-311 discloses that the signal strength signal (output of AGC detector 98 of FIG. 5) is provided

as one input to integrator 100 of FIG. 5 (RFF VI.272 (undisputed)); that RX-311 discloses that the other input to said integrator 100 is an input level control signal from a conversion subsystem 96 of FIG. 5 also called an open loop power level set signal (RFF VI.273) (undisputed)); that the open loop power level set signal (output of said conversion subsystem 96) disclosed by RX-311 is a reference signal that represents the desired power level at the output of IF AMP 94 of FIG. 5 (RFF VI.274 (undisputed)); that RX-311 discloses that the open loop power level set signal and the signal strength signal are differentially integrated by ssaid integrator 100 to generate a resultant gain control signal that is provided as a gain control input to both (1) receive said variable gain amplifier 94 and (2) transmit variable gain amplifier 102 of FIG. 5 (RFF VI.275 (undisputed).)

RDX-63:10[28] depicts FIG. 5 of RX-11 along with text from page 27 lines 6 through 9 of RX-311. (RFF VI.276 (undisputed).) The administrative law judge finds that one skilled in the art would understand the highlighted text of RDX-63:10 to teach that a gain control signal is output from element 100 and is sent to receive variable gain amplifier 94 and transmit variable gain amplifier 102. (Kenney, Tr. at 3144 - 45.)

RX-311 discloses the use of open loop power control in a radio communications system. (RFF VI.280 (undisputed).) RX-311, referring to FIG. 5, also discloses that AGC detector circuit 98, conversion subsystem 96 and integrator 100 estimate the received mobile unit signal power to determine the open loop power correction necessary for the mobile unit transmitter. (RFF VI.281 (undisputed).) One skilled in the art at the time of the purported invention of the asserted patents would recognize that AGC detector circuit 98, integrator 100 and amplifier 94 of FIG. 5 form an automatic gain control loop. (RFF VI.282 (undisputed).) The administrative law judge further finds

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[28] See Appendix C.

that one of ordinary skill in the art at the time of the invention of the asserted patents would recognize that the highlighted elements of RDX-63:5[29] constitute a receive AGC loop. (Kenney, Tr. at 3142-3150.) He also finds that a person of ordinary skill in the art at the time of the purported invention of the asserted patents would have understood an automatic gain control loop to be:

> a control loop that adjusts gain in a signal path such that it is forced to meet a reference point that's provided to it and, thus, reducing the error that the integrator processes, the differential integrator processes to zero. So it forces the gain in the received path to be a value such that the detected power value is equal to the reference value.

(Kenney, Tr. at 3149.) The administrative law judge further finds that a person of ordinary skill in the art at the time of the purported invention of the asserted patents would have understood that the signal leaving element 96 and entering element 100 of said FIG. 5 is a reference voltage that represents the desired power in the received signal path. (Kenney, Tr. at 3150.)

It is also undisputed that RX-311 discloses using an automatic gain control circuit in the radiotelephone's receiver to generate an open loop power control signal used to control variable gain amplifier 102 (RFF VI.287 (undisputed)); that RX-311 discloses that its open loop power control circuit allows the transmitter power to track the received signal power (RFF VI.288 (undisputed)); that the open loop power control disclosed in RX-311 adjusts the mobile unit transmitter power in an inverse relationship to the mobile unit's received signal, so that the stronger the received signal, the lower the mobile transmitter power and the weaker the received signal, the higher the mobile transmitter power (RFF VI.289 (undisputed)); that RX-311 discloses that details regarding a specific implementation of the feedback loop comprised of amplifier 94, AGC detector circuit 98 and comparator 100 of RX-311 FIG. 5 are disclosed in RX-307 ('225 patent) (RFF VI.291 (undisputed));

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[29] See Appendix D.

that RX-311 discloses that details regarding a specific implementation of an automatic gain control circuit are disclosed in RX-307 (RFF VI.282 (undisputed)); that RX-311 discloses the use of closed loop power control (RFF VI.295 (undisputed)); that RX-311 disclosed that the closed loop power control signal, derived from the closed loop power adjustment command signal transmitted by the cell-site, is used to control amplifier 104 (RFF VI.298 (undisputed)); that RX-311 discloses that the open loop power control and closed loop power control for the radiotelephone are combined to control the radiotelephone's transmission power (RFF VI.302 (undisputed)); and that RX-311 disclosed that, although illustrated as two separate units for controlling the transmit power, the power level could be adjusted by a single variable gain amplifier with two input control signals combined before being applied to the variable gain amplifier. (RFF VI.302 (undisputed).)

The '204 patent (RX-306), which is incorporated by reference in the combined Wheatley, bears the title LINEAR GAIN CONTROL AMPLIFIER and has as its named inventor Charles E. Wheatley, III (RX-306). The Assignee of RX-306 is QUALCOMM. (RX-306). The Patent Application for RX-306, filed on October 15, 1990, is 598,845. (RX-306). The subject of RX-306 was described in a printed publication more than one year prior to the application date for the '473 patent, 408 patent and '220 patent. (RX-306). (RFF VI.332-334 (undisputed).)

It is undisputed that RX-306 acknowledged that "[t]he use of automatic gain control (AGC) circuits to control amplifier gain in communications terminals has been accomplished by many various designs" (RX-306 at 1:13-15; (RFF VI.346 (undisputed)); that RX-306 acknowledged that because typically the range in gain for such amplifiers is somewhat limited, they are not directly useful in applications where a very large dynamic range of signals are to be accommodated (RFF VI.347 (undisputed)); that RX-306 taught that:

> "[i]n many systems, again such as in CDMA cellular telephone transceivers, it is essential that in response to a received signal, the AGC loop should provide a signal indicative of measured signal strength which is linear, in terms of output indication as a function of dB of input. Conventional AGC circuits normally exhibit such a characteristic over only a portion of the full control range, due to non-linearities in the gain control function of the amplifier."

(RFF VII.349 (undisputed)); that RX-306 taught that:

> "[i]t is therefor an object of the present invention to provide a novel and improved amplification circuit which, in response to a gain control signal, is capable of substantially linear gain control operation over a relatively large range."

(RX-306 at 1:59-63; RFF VI.350 (undisputed)); that the face of RX-306 depicts compensation circuit 10 compensating amplifiers that amplify RF signals (RX-306; RFF VI.351 (undisputed)); that the face of RX-306 depicts a compensation circuit 10 used in connection with an RF input signal. (RFF VI.334 (undisputed)); that FIG. 1 of RX-306 is a block diagram of an exemplary embodiment of the linearized automatic gain control amplifier of the present invention (RX-306 at 3:1-3; RFF VI.353 (undisputed)); that FIG. 1 of RX-306 also depicts compensation circuit 10 compensating amplifiers that are amplifying RF signals (RFF VI.355 (undisputed)); that FIG. 1 of RX-306 also depicts compensation circuit 10 used in connection with an RF circuit (RFF VI.356 (undisputed)); that the compensation circuit 10 of RX-306 provided "compensation in the control signal for inherent non-linearities in the amplification circuitry used to amplify the input RF signal," shown in FIG. 1 as RF IN entering amplifier 12 (RFF VI.358 (undisputed)); that the compensation circuit 10 of RX-306 was designed for application in AGC circuits (RFF VI.359 (undisputed)); that the compensation circuit 10 of RX-306 compensates gain control signals (RFF VI.360 (undisputed)); that the compensation circuit 10 of RX-306 compensates gain control signals generated in AGC loops (RFF VI.361 (undisputed)); that the

compensation circuit 10 of RX-306 compensates gain control signals generated in AGC loops to compensate for inherent non-linearities in the amplification circuitry used to amplify input RF signals (RFF VI.362 (undisputed)); that the result of the compensation circuit of RX-306 is a "region of operation of about 85dB, [where] which gain in dB is a linear function of the input voltage applied to the gain control input of the amplifiers" (RFF VI.364 (undisputed)); that FIG. 3 of RX-306 is a graph illustrating the inherent gain characteristic of the uncompensated amplifier circuit used in the embodiment of FIG. 2 (RFF VI.364 (undisputed)); that FIG. 3 illustrates in graphical form the gain characteristics of the amplifier circuit without compensation of the AGC signal (RFF VI.365 (undisputed)); that FIG. 4 of RX-306 is a graph illustrating the linearized gain characteristic of the compensated amplifier circuit used in the embodiment of FIG. 2 (RFF VI.366 (undisputed)); that FIG. 4 illustrates in graphical form the gain characteristics of the amplifier circuit with compensation of the AGC signal (RFF VI.367 (undisputed)); that RX-306 discloses that it can "readily be seen that by providing a compensated AGC signal in the amplifier circuit of the present invention that an extended range of gain control in dB, which is linear function of the input AGC signal, is possible" (RFF VI.368 (undisputed)); and that the compensation circuit 10 of RX-306 modifies gain control signals according to predetermined compensation characteristics. (RFFF VII.369 (undisputed).)

The '225 patent (RX-307) bears the title HIGH DYNAMIC RANGE CLOSED LOOP AUTOMATIC GAIN CONTROL CIRCUIT and has as its named inventors Charles E. Wheatley, III and Derek N. Punch. (RX-307.) The Assignee of RX-307 is QUALCOMM. (RX-307.) The patent application for RX-307 was filed on November 30, 1990. (RX-307.) RX-307 constitutes prior art to each of the '473 patent, the '408 patent and the '220 patent under 35 U.S.C. §§102 (a) and (b). (RFF VI.394-96 (undisputed).)

It is undisputed that RX-307 discloses that it was known in the art that automatic gain control circuits are implemented in both analog and digital receivers using different techniques (RFF VI.398 (undisputed)); that RX-307 discloses that in analog receivers, analog automatic gain control techniques are commonly used while in digital receivers, digital automatic gain control techniques are applied (RX-307 at 1:13-19; RFF VI.399 (undisputed)); that FIG. 1 of RX-307 is a block diagram illustrating in an exemplary application the elements of an automatic gain control circuit (RFF VI.405 (undisputed)); that RX-307 discloses that radiotelephone includes the capability of measuring the strength of the signal received by the radiotelephone (RFF VI.406 (undisputed)); that RX-307 discloses that the radiotelephone uses the received signal strength measurement to generate a received signal strength indicator (RSSI) (RFF VI.407 (undisputed)); that RX-307 discloses that the RSSI and an RSSI reference signal are provided to an integrator 22 (RFF VI.408 (undisputed)); that RX-307 discloses that the RSSI reference signal corresponds to a desired signal strength level for the output of receive amplifier 18 (RFF VI.409 (undisputed)); that RX-307 discloses that an integrator integrates the RSSI signal (indicative of the measured receive power level) and the RSSI reference signal (indicative of the desired power level) to eliminate any error between the two signals (RFF VI.410 (undisputed)); that RX-307 discloses that said integrator generates an AGC signal that is used to control the gain of a receive amplifier (RFF VI.411 (undisputed)); that RX-307 discloses that the RSSI measurements of RX-307 could be made at various points in the processing of the received signal (RFF VI.412 (undisputed)); that RX-307 discloses that the RSSI measurement described in RX-307 could be made at an RF or IF frequency (RFF VI.413 (undisputed)); that RX-307 discloses that the transmitter gain tracks the receiver gain (RX-307 at 4:28-36, 4:58-68; RFF VI.416 (undisputed)); that RX-307 discloses that the receive AGC signal controls the gain of IF amplifier 24 (RFF VI.417 (undisputed));

and that RX-307 discloses an open loop power control system. (RRF VI.419 (undisputed).)

RDX-63:33[30] is a slide created by Kenney in which he replaced, as the combined Wheatley discloses, amplifier from FIG. 5 of the combined Wheatley with the analog compensation circuit that is depicted in FIG. 1 of the '204 patent (RX-306) which is incorporated by reference in the combined Wheatley and which the administrative law judge finds how a person of ordinary skill in the art would have understood how to combine the '204 patent into FIG. 5 of the combined Wheatley. (Kenney, Tr. at 3191, 3247, 3254.) The administrative law judge finds that said compensation circuit from the '204 patent (RX-306) and described in a preferred embodiment as an analog circuit would lineraize the gain control signal that is fed from the integrator into the receive and transmit amplifiers. (Kenney, Tr. at 3247-48.) In other words, RDX-63:33 shows that the linerazied variable gain amplifier of the '204 patent (RX-306) has replaced, on both the receive side and transmit side, the ordinary variable gain amplifies of the FIG. 5 of the combined Wheatley (RX-311), thus linearizing both the receive AGC loop and making more accurate the measurement of the receive power for use with an open loop power control circuit. (Kenney, Tr. at 3191-92.)[31] With this change, the gain control signal coming from integrator 100 in RDX-63:33 goes through a compensation circuit 10 which compensates for the predetermined nonlinerities in that gain control signal and then that compensated signal is applied to the transmit VGA which the administrative law judge finds how a person of ordinary skill would understand how the '204 patent (RX-306) would be incorporated into the combined Wheatley (RX-311). (Kenney, Tr. at 3194.)

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[30] See Appendix E.

[31] The blue boxes in RDX-63:33 which replace the VGAs, that are in FIG. 5 of the combined Wheatley, come from FIG. 1 of Wheatley II. (Kenney, Tr. at 3192.)

The administrative law judge finds that one skilled in the art at the time of the invention of the '473 patent would understand from the teachings of the combined Wheatley (RX-311) that the block diagram shown in RDX-63:33 (Appendix E) represents the result of replacing the receive and transmit variable gain amplifiers of FIG. 5 of RX-311 with the compensation circuit disclosed in the '204 patent (RX-306) (Kenney, Tr. at 3190-92; Kenney, Tr. at 3247-48; RDX-63:33; RDX-3:5.) He also finds that one skilled in the art at the time of the invention of the '473 patent would understand from the teachings of RX-311 that RDX-63:33 could be achieved by replacing the receive and transmit variable gain amplifiers of FIG. 5 of RX-311 with the compensation circuit disclosed in RX-306. (Kenney, Tr. at 3190-92; Kenney, Tr. at 3247-48; RDX-63:33; RDX-3:5; RFF VI.313 (undisputed).)

As to why a person of ordinary skill in the art would want to so incorporate the '204 patent which is part of the combined Wheatley into FIG. 5 of the combined Wheatley:

> THE WITNESS: Sure, Your Honor. From a technical point of view, one would want to achieve very accurate measurement of received signal power and use that to control transmit signal power over a very wide dynamic range in order to implement open loop power control for a CDMA system.
>
> And the invention of Wheatley II [the '204 patent (RX-306)] allows that greater linearity and, hence, greater dynamic range of control for this to take place in the invention originally described [as shown in FIG. 5] in the PCT application.

(Kenney, Tr. at 3195-96.)

Referring to McGirr (JX-333), the named inventors of McGirr are Andrew E. McGirr and Barry J. Cassidy. (JX-333). The assignee of JX-333 is NovAtel Communications Ltd. (JX-333.) The patent application Number for JX-333 is 587,004, which application was filed on September 24, 1990. (JX-333.) McGirr bears the title RADIO TELEPHONE USING RECEIVED SIGNAL STRENGTH

IN CONTROLLING TRANSMISSION POWER and issued on July 7, 1992. (JX-333.) JX-333 constitutes prior art to each of the '473 patent, '408 patent and '220 patent under 35 U.S.C. §§102 (a) and (b). (RFF VI.443-45 (undisputed).)

It is undisputed that McGirr (JX-333) discloses a radiotelephone containing circuitry for dynamically controlling the amplification of communication signals to be transmitted in response to a measure of prevailing signal propagation conditions (RFF VI.446 (undisputed)); that JX-333 discloses the use of conventional AGC circuits (RFF VI.451 (undisputed)); that JX-333 discloses a radio telephone that receives a radio frequency RF signal through its antenna (RFF VI.454 (undisputed)); that JX-333 further discloses a radiotelephone with a receiver that has a conventional front-end converter and mixer for converting the RF signal from the duplex into an IF signal (RFF VI.455 (undisputed)); that JX-333 also discloses that said receiver has an FM receiver/RSSI detector that produces an RSSI (a signal indicating the strength of the received communication signal) signal having a voltage amplitude that varies in response to the strength of the IF signal, and, thus, of the in-coming RF signal (RFF VI.456 (undisputed)); and that FIG. 1 of JX-333[32] is a block diagram of a radio telephone in accordance with a preferred embodiment of the invention. (RFF VI.453 (undisputed).)

McGirr discloses that the RSSI signal output from FM receiver/RSSI detector is converted into a digital signal using analog-to-digital-converter 82 of FIG. 1. (Appendix F) (RFF VI.461 (undisputed).) JX-333 also discloses that the output of analog-to-digital-converter 82 is input into central processing unit (CPU) 30 of FIG. 1 (RFF VI.462 (undisputed)); that to eliminate any false or short term fluctuations in the RSSI measurement, the CPU samples the digital RSSI values and calculates an average, called RSSI AVERAGE (RFF VI.463 (undisputed)); that sampling and

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[32] See Appendix F.

averaging of the digital RSSI values are corrected for momentary fluctuations in the RSSI (RFF VI.464 (undisputed)); and that as a result of the errors arising from non-linearities in the frequency characteristics of the duplexer 40 of FIG. 1 and other components of the radiotelephone 10, the measured RSSIs can vary from one channel to the next despite identical strengths of the received signals on the various channels. (RFF VI.466 (undisputed).)

FIG. 5 of JX-333 is an algorithm in flow chart form suitable for execution by the CPU 30 of FIG. 3[33] (a block diagram of the CPU of FIG. 1, (RFF VI.470(undisputed)) in deriving RSSI-based digital control signals. (RFF VI.467 (undisputed).) It is undisputed that central processing unit (CPU) 30 stores various data concerning the RSSI, and computes a digitized power control signal using the digitized RSSI from A/D converter of FIG. 1 (RFF VI.468 (undisputed)); that the calibration of the measured RSSI is required because the RSSI value provided to the CPU 30 can have a transient component due to non-linearities in the frequency characteristics of the duplexer 40 of FIG. 1 and other components of the radio telephone 10 (RFF VI.475 (undisputed)); that the measured RSSIs can vary from one channel to the next, despite identical strengths of the received signals on the various channels (RFF VI 476 (undisputed)); that JX-333 discloses that calibration of the measured RSSI is required because the measured RSSI will depend on the normally-otherwise-acceptable manufacturing tolerances of those components that cause their characteristics to vary from unit to unit (RFF VI.477 (undisputed)); that JX-333 (McGirr) discloses that calibration of the measured RSSI is required because the measured RSSI will depend on the selection of the output level of the IF and limiter amplifiers 54, 58 which are shown in FIG. 2, since that level dictates the level of currents drawn by amplifiers 54, 58 of FIG. 2, which currents are detected in deriving the RSSI (RFF VI.479

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[33] See Appendix G.

(undisputed)); that JX-333 discloses that the calibration value stored in RSSI Calibration Look-up Table 88a of FIG. 3 (Appendix G) is selected by using the average RSSI value as one pointer into the calibration lookup table, and the frequency of the received signal is used as the other pointer into calibration lookup table 88a (RFF VII.483 (undisputed)); that the absolute RSSI value output from calibration table 88a is input into lookup table 88b of FIG 3 (RFF VI.484 (undisputed)); that FIG. 6 of JX-333, is a graph of the relationship between the power amplifier output power (dB relative to nominal) and RSSI (dBm) for an illustrative application of the invention (RFF VI.487 (undisputed)); that JX-333 discloses that the output power levels disclosed in FIG. 6 of JX-333 are exemplary and that the rates of increase in output power can be any desired amount (RFF VI.489 (undisputed)); that the target transmit power level output from lookup table 88b of FIG. 3 (Appendix G) is input into lookup table 88c of FIG. 3 (RFF VI.491 (undisputed)); that lookup table 88c of said FIG. 3 contains stored values that represent the precise control signal needed to produce a specified output power in power amplifier 36 (RFF VI.492 (undisputed)); that the values stored in said lookup table 88c account for non-linearities by frequency and signal strength in the radiotelephone's transmit chain (RFF VI.493 (undisputed)); that the values stored in said lookup table 88c are empirically derived to account for, and substantially eliminate, unit-to-unit variations in the responses of power amplifiers to control signals (RFF VI.494 (undisputed)); and that Kenney's illustration reflected in RDX-70[34] depicts calibration lookup tables 88a, 88b and 88c of JX-333, with lookup table 88a indexed by RSSI and frequencies, and lookup table 88c indexed by transmit power and frequency. (RDX-70; RFF VI.496 (undisputed).) As to the creation of RDX-70, the administrative law judge finds the following testimony of Kenney relevant:

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[34] See Appendix H.

Q. Okay. Let's go to the next slide, RDX-63:40, which is the exact same pull-out of JX-333, McGirr, specifically figure 3 and column 7, lines 10 through 26 with the next sentence highlighted.

I will read it into the record. "Third, the measured RSSI will depend on the selection of the output level of the IF and limiter amplifiers 54, 58 (figure 2) since that level dictates the level of currents drawn by amplifiers 54, 58 (figure 2), which currents are detected in deriving the RSSI."

Do you see that?

A. Yes.

Q. From the standpoint of the person of ordinary skill in the art at the time, what is that sentence teaching?

A. I believe one would have understood that that sentence is teaching that there might be variations in the, deviations from the ideal linear response of an RSSI detector, and those would also need to be corrected in element 88A.

Q. Dr. Kenney, what I would like to ask you to do now, if you would, is to draw for us what the look-up table here that's been described looks like in terms of the matrix with the inputs.[35]

* * *

THE WITNESS: We're discussing the look-up table 88A.

* * *

THE WITNESS: 88A describes a digital look-up table. And one of ordinary skill in the art could think of that look-up table as being a matrix of sorts, and so it has rows and columns that are indexed by certain values.

JUDGE LUCKERN: The good doctor is making some marks on RDX-70. And also 88a, as I understand it, is from the McGirr patent,

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[35] Complainant moved to strike the subsequent testimony. (Tr. at 3211.) Said motion was denied, and complainant was given the opportunity to cross examine Kenney on said testimony. (Tr. at 3217.)

correct?

THE WITNESS: Correct.

JUDGE LUCKERN: Go ahead.

THE WITNESS: And one thing that indexes these values is a set of RSSI values received from the RSSI detector. So down the rows of the matrix I have labeled four values, for example, RSSI 1 through 4.

Now, along the columns of the matrix the received frequency channel is noted, and I will denote also for frequency channels that are also used to index the table and, I'm sorry, and extract a particular value based on an RSSI signal and a frequency index.

And let's suppose, for example, that an RSSI value corresponding to RSSI 2 is sent to the look-up table, and that the processor has knowledge of the received signal because it has to tune the receiver to get the channel from a particular frequency. And that might be frequency 3.

So to highlight frequency 3 --

JUDGE LUCKERN: You are doing that with green now, that's fine. You are doing a great job, as all witnesses do. That's fine.

THE WITNESS: Thank you, Your Honor. Frequency 3 is used as the index, as is RSSI 2. And effectively then I have a corrected RSSI value, and I will label it generically CRSSI.

JUDGE LUCKERN: That's all done in green. Thank you, Doctor.

THE WITNESS: Yes. And that's the action of element 88a of the McGirr patent.

JUDGE LUCKERN: All right.

BY MR. VERHOEVEN:

Q. While you are down here drawing, could you show how the table 88a, using the same sort of illustration, interacts with -- I think there is two other tables here in figure 3, control value look-up table 88C and RSSI PA relationship look-up table 88B? Could you show the

relationship of those two, what those tables look like and the relationship --

A. Sure.

Q. -- of those tables?

A. So those are two additional tables, and I will try to make good use of the page here. 88b is another digital look-up table stored in nonvolatile RAM. And 88b can be thought of as a one-dimensional array.

And just for the sake of illustration, I will draw a matrix that has only one column and four rows. And each of these four rows would have corresponding with it some corrected RSSI value, which I will label CRSSI 1 through 4, and that would be the sole index of 88b.

So what is happening is the value selected by table 88a is then used to index a particular corrected RSSI value in 88b. And that gives another value here (indicating).

Now, 88b is what determines the relationship between the corrected RSSI, meaning the true received signal strength received by the radio and the desired transmitted signal. And so I will just label that as PTX. In this case, I will put an index 2 there, indicating it is some desired transmit signal that corresponds to this corrected RSSI.

JUDGE LUCKERN: Thank you.

BY MR. VERHOEVEN:

Q. And then show how that relates to the third table, 88c?

* * *

A. If I may continue. As I was describing, the desired transmit power level PTX 2 is what the receiver intends to transmit. However, there is a third correction required and that's illustrated by table 88c. Again, I will be consistent and draw four columns and four rows here.

Each of the rows is indexed by some desired transmit power value. And I will label these PTX 1 through 3 -- I'm sorry, 1 through 4. And across the top, there will be a frequency index corresponding to the

frequency channel that the transmitter is intending to transmit on at that given instant.

And to distinguish them between the receiver channels, I will label them FA, FB, FC, and FD. They are different from the receiver channel frequencies.

So the value that is desired to transmit PTX 2, comes around -- I'm sorry, I have to draw a long arrow here, it comes around and indexes the table. The processor then decides what frequency it is desired to transmit on. And for purposes of illustration, I will just pick frequency B.

And frequency B has in it a value that is the corrected transmit power value, PTX to CPTX2, as I have labeled it. And it is this power value which eventually goes back to the transmitter and tells it accurately what value to transmit on channel B.

JUDGE LUCKERN: Now, the earlier arrow you drew, you drew this arrow from PTX2 in 88b down to -- do you want to label that? Whatever you want to do. Is that 88c or something?

THE WITNESS: Yes, thank you, Your Honor.

JUDGE LUCKERN: And down to PTX2 in 88c. That was earlier on. Then you put a little green on 88c where you have the C PTX and then an arrow going out. I want to make sure the record is clear. Correct?

THE WITNESS: I believe that's correct.

JUDGE LUCKERN: All right. You correct me, please. You are doing the talking. Go ahead.

THE WITNESS: And the last step, which I believe we will cover in some detail in some slides I prepared, is to send the value to the transmitter, in particular, the transmit AGC circuit. So this value eventually goes to Tx AGC.

JUDGE LUCKERN: That's what you just put on -- what does AGC stand for?

THE WITNESS: Automatic gain control.

BY MR. VERHOEVEN:

Q. Just a couple of follow-ups on this. Box 88a, the RSSI columns, those are from the received signal?
A. Yes.

Q. Okay. And this is calibrating based on frequency of the received signal in 88a?

A. Yes. It is calibrating both for the receive index and unit to unit variations in the RSSI.

Q. And that gets a corrected RSSI that goes to 88b?

A. Correct.

Q. And the PTX2 represents what?

A. That represents the desired transmit power based on the true indication of RSSI, what might be illustrated from figure 6 in McGirr.

Q. So that's the desired transmit value?

A. Yes.

Q. And that value itself hasn't been calibrated yet for the transmit, through the transmit chain, right?

A. No. It is not. There is frequency variations in the transmit chain as well.

Q. So then that goes into a calibration table for the transmit chain, right?

A. 88c, correct.

Q. Okay. And so the 88c table, if I understand what you are saying, is taking the desired transmit power and calibrating it based on the frequency channel; is that right?

A. Correct.

Q. And then it comes out of there and goes back out into the diagram?

A. That is correct.

(Tr. at 3205-22.)

The administrative law judge also finds that one of ordinary skill in the art would understand that the three digital lookup tables in McGirr (88a, 88b, and 88c[36] of FIG. 3) (Appendix G) could be

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[36] Complainant argued that Nokia's repeated assertions that table 88c of McGirr (JX-333) corrects for frequency is demonstrably false. (CRBr at 6.) There is reference in McGirr (RX-333) however, to the use of frequency as an input to the various LUTs it describes:

> The RSSI calibration factor is preferably stored in a calibration look-up table ("LUT") 88a in the NVM 88 of the CPU 30. The LUT 88a is a database in which calibration factors are stored in locations corresponding to measured RSSI values, and the channels or frequencies to which the receiver 28 (FIG. 1) can be tuned. Thus, the calibration factor is the entry corresponding to the particular measured RSSI value, and to the particular channel over which the communication signal that produced that value was received.
>
> Calibration of the measured RSSI is required for various reasons. First, the RSSI value provided to the CPU 30 can have a transient component due to non-linearities in the frequency characteristics of the duplexer 40 (FIG. 1) and other components of the radio telephone 10. Thus, the measured RSSI's can vary from one channel to the next, despite identical strengths of the received signals on the various channels. Second, the measured RSSI will depend on the normally-otherwise-acceptable manufacturing tolerances of these components that cause their characteristics to vary from unit to unit. Third, the measured RSSI will depend on the selection of the output level of the IF and limiter amplifiers 54, 58 (FIG. 2), since that level dictates the level of currents drawn by amplifiers 54, 58 (FIG. 2), which currents are detected in deriving the RSSI. For all these reasons, RSSI calibration is appropriate.

(RX-333 at 7:2-26 (emphasis added).) Thus, not only is the LUT 88a described in RX-333 as being referenced by a frequency, RX-333 also discloses that RSSI can vary per channel. Therefore, because each entry in 88c is described as "the precise control signal needed to produce

combined in a single lookup table or partition differently into two lookup tables in light of the following disclosure in McGirr:

> It will be apparent, however, that variations and modifications may be made to the invention, with the attainment of some or all of the advantages of the invention. For example, for many applications, the look-up tables can be consolidated into a single table, which, when referenced by the average RSSI, will yield the digital power control signal for use by the AGC circuit 100. Therefore, it is the object of the appended claims to cover all such variations and modifications as come within the true spirit and scope of the invention.

(JX-333 at 9:23-33 (emphasis added); Kenney, Tr. at 3258.)

It is also undisputed that the power control voltage derived from the calibrated value output from FIG. 3 (Appendix G) lookup table 88c of JX-333 leaves the triangle labeled D/A 102 of FIG. 1 (Appendix F) of JX-333 as one input to power control circuit 104 of FIG. 1 (RFF VI.499 (undisputed)); that FIG. 4 of JX-333, is a block diagram of the power control circuit 104 of FIG. 1 (JX-333 at 3:34-35, RFF VI.501 (undisputed)); that JX-333 discloses that the power amplifier feedback signal and the power control voltage input to differential amplifier 108 of FIG. 4 are integrated to produce an AGC signal (RFF VI.505 (undisputed)); that JX-333 discloses that the AGC signal output of said differential amplifier 108 is provided as an input to amplifier 36 in order to control the gain of amplifier 36 of FIG. 1 and drive the output power level of said amplifier 36 toward the target level computed by CPU 30 (RFF VI.506 (undisputed)); that a preferred embodiment of JX-333 contains a transmit automatic gain control loop (RFF VI.507 (undisputed)); and that said

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a specified output power in the power amplifier ..." (RX-333 at 8:16-18), the administrative law judge finds that 88c would also have to take frequency into account to perform its disclosed function. Moreover, as found, supra, RX-333 also discloses that the individual LUTs it describes could be combined into one LUT, which would also take frequency into account.

amplifier 36, RF power detector 106 of FIG. 4 the differential integrator contained in power control circuit 104 of FIG. 4, the power amplifier feedback signal, the power control signal and the AGC signal of JX-333 comprise a transmit automatic gain control loop. (RFF VI.508 (undisputed).)

The Vaisanen '091 patent (RX-309) bears the title METHOD AND APPARATUS FOR TUNING AND COMPENSATING POWER LEVELS IN A RADIO TELEPHONE and issued on July 20, 1993. (RX-309.) Its named inventor is Risto Vaisanen of Salo, Finland. (RX-309.) The assignee of RX-309 is Nokia Mobile Phones Ltd. (RX-309.) The patent application Number for RX-309 is 583,942 which application was filed on September 17, 1990. (RX-309.) Vaisamen constitutes prior art to each of the '473 patent, the '408 patent and the '220 patent under 35 U.S.C. §102 (a). (RFF VI.525-27 (undisputed).)

FIG. 1[37] of Vaisanen (RX-309) is a simplified block diagram illustrating the tuning arrangement according to the invention. (RFF VI.528 (undisputed).) Vaisanen discloses a radiotelephone having a logic section and a computer that stores tuning and compensation information in memory. (RX-309 at Abstract, 1:8-14.) It is undisputed that the power of a radiotelephone's transmitter may vary with the radiotelephone's operating conditions (RFF VI.531 (undisputed)); that that the operating conditions of a radiotelephone are influenced by the selected channel frequency (RFF VI.532 (undisputed)); that individual compensation values for each radiotelephone are determined during testing of the radiotelephone for chosen operating conditions (RFF VI.533 (undisputed)); that the compensation values that are determined during testing are stored in the radiotelephone's memory and used during operation of the radiotelephone to control the radiotelephone's transmit power level (RFF VI.535 (undisputed)); that radiotelephone gain

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[37] See Appendix I.

compensation or calibration could be performed using digital and analog techniques (RFF VI.537 (undisputed)); that Vaisanen (RX-309) discloses that a number of problems and drawbacks persist with using analog technologies to compensate for power variations in radiotelephones, including: 1) analog components are less reliable than electronic components; 2) analog technologies take up substantial area on a radiotelephone's circuit board (the need for large space is a particular problem concerning handsets); 3) analog tuning requires a skilled person manually performing the tuning, which is a slow process and introduces the risk for human errors; and 4) compensation based on analog technologies are limited by the tolerances of the analog components, which prevents a fully individual compensation in series production (RX-309 at 1:38-55; RFF VI.538 (undisputed)); that the operating conditions of the radio telephone are defined to include the operating channel (or channel range), the temperature (or temperature range) measured with the sensor 14 of FIG. 1 (Appendix I) and the operating voltage (or the operating voltage range) measured with the D/A-converter (RFF VI.540 (undisputed)); that during tuning, the system of Vaisanen sets temperature, voltage and frequency channel to known values, then measures the output from the radiotelephone transmitter (RFF VI.541 (undisputed)); that the tuning process disclosed in RX-309 continued until the lookup table was filled with values indexed by voltage and frequency as well as by temperature (RFF VI.543 (undisputed)); and that following the tuning called for in RX-309, the handset would use the completed lookup table in operation in accordance with the operating conditions, namely, temperature, frequency, and voltage, where the microprocessor 10 of FIG. 1 selects from its non-volatile memory a compensating constant or value tuned for the respective operating conditions, and the transmitter power level is set according to this value. (RFF VI.544 (undisputed).)

Fujitsu (JX-256), a European Patent Application, bears the title TRANSMISSION POWER

CONTROL CIRCUIT and an application publication date of March 13, 1991 with European Patent Publication Number 0 416 613 A2. (JX-256.) The named inventor of JX-256 is Yoshifumi Toda. (JX-256.) The named applicant of JX-256 is Fujitsu Limited. JX-256 constitutes prior art to each of the '473 patent, the '408 patent and the '220 patent under 35 U.S.C. §§102 (a) and (b). (RFF VI.561-63 (undisputed).) JX-256 discloses a transmission power control circuit which controls the power amplifier of a radiotelephone. (RFF VI.564 (undisputed).) FIG. 4 of JX-256 is a block diagram showing a mobile terminal provided with a conventional transmission power control circuit which is a first embodiment of the invention recited in JX-256. (RFF VI.564 (undisputed).)

It is undisputed that Fujitsu discloses:

> A transmission power control circuit comprises a control data table (56) in which digital data of monitor voltage depending on a transmission power level for a plurality of values of transmission frequency and a plurality of values of transmission power are stored, and a D/A converter (62) for converting selected values of the digital data to an analog signal as a reference voltage. The transmission power is controlled so that the monitor voltage becomes equal to the reference voltage.

(JX-256 at abstract, RFF VI.566 (undisputed)); that it also discloses:

> a transmission power control circuit comprising control data table means [(56)] for storing digital values of monitor voltage [(MON)] which are output from a power amplifier [(28)] depending on a transmission power level of the power amplifier for a plurality of values of transmission frequency, control means for selecting one of the digital values stored in the control data table means in accordance with a specified value of the transmission frequency, and for outputting a selected digital value, D/A conversion means for converting the digital value to an analog signal as a reference voltage, and power control means for controlling an amplification factor of the power amplifier so that the monitor voltage which is output from the power amplifier becomes equal to the reference voltage.

(JX-256 at 2:49-3:1; RFF VI.567 (undisputed)); that Fujitsu (JX-256) contains a control part which

comprises a central processing unit, a random access memory, and a read only memory (RFF VI.568 (undisputed)); that radiotelephone of JX-256 receives a signal from a base station along with instructions from the base stations to control the radiotelephone's output power (RFF VI.569 (undisputed)); and that JX-256 discloses an automatic power control (APC) circuit that outputs a control voltage that controls the amount of amplification of the radiotelephone's PA (RFF VI.572 (undisputed)); JX-256 further discloses that the APC controls the amount of amplification of the radiotelephone's amplifier so that a monitor voltage (MON) corresponding to the transmission power of the power amplifier becomes equal to a reference voltage corresponding to a required transmission power. (JX-256 at 2:18-21.) Thus, the APC generates a control signal that controls the transmission power to achieve a required value. (RFF VI.573 (undisputed).)

It is further undisputed that JX-256 discloses that "another problem to be solved arises in the mobile communication system where a carrier frequency of the transmission wave is frequently changed in accordance with an assigned frequency channel." (RFF VI.575 (undisputed).) FIG. 5[38] of JX-256, is a schematic circuit diagram showing a more detailed implementation of the PA (28) and the APC (40) shown in FIG. 4. (RFF VI.580 (undisputed).)

The output of differential amplifier 46 of FIG. 5 is used to produce a signal that adjusts the gain applied to the transmit chain to control the output power of the radiotelephone. (JX-256 at 3:50-4:9, 3:47-48.) It is further undisputed that JX-256 teaches re-lookup and re-calibration whenever the handset changes the power or frequency of its transmission:

> "When the control part 10' receives an instruction to alter the transmission power or the carrier frequency, the CPU 12 reads out an applicable digital value from the control data table 56 in accordance

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[38] See Appendix J.

> with the values of carrier frequency and the transmission power, and output to the APC 40' in the form of serial data as shown in FIG. 6."

(RFF VI.583 (undisputed).)

Motorola (RX-313) is European Patent Application Number 90114596 which bears the title AMPLIFIER FOR RADIO TRANSMITTER HAVING CONTROLLABLE OUTPUT POWER, has an application publication date of February 13, 1991 and has the named inventors Peter William Dale Bishop and Neil Grant. (RX-313.) The named applicant of RX-313 is Motorola Ltd. (RX-313.) RX-313 constitutes prior art to each of the '473, '408 and '220 patents under 35 U.S.C. §§102 (a) and (b). (RFF VI.600-02 (undisputed).)

It is undisputed that Motorola (RX-313) acknowledges as prior art a power amplifier for a radio frequency signal utilizing a microprocessor to address a read-only memory (ROM) to look-up a power control value for setting the output power of an RF power amplifier (RFF VI.604 (undisputed)); and that it teaches a control loop for adjusting the output power, the control loop comprising measuring means for measuring the output power and comparison means for comparing the power measured with the power set and adjusting the output power in response thereto, as implemented in FIG. 2.[39] (RFF VI.605 (undisputed).)

It is also undisputed that Motorola further discloses a transmission power control circuit which controls the power amplifier of a radio transmitter (RFF VI.606 (undisputed)); that it also details a transmit section of a transmitter incorporating an RF power control implementation that is based on attenuating the output power of the power amplifier with a control value generated with respect to a reference voltage and corrected by values from a correction look-up table and a calibration look-up

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[39] See Appendix K.

table (RFF VI.607 (undisputed)); that it also discloses that the power control circuit uses digital look-up tables and stored calibration values to correct for the radio transmitter's transmit power based on frequency (RFF VI.608 (undisputed)); that the correction look-up table disclosed in Motorola stores power correction values with respect to frequency and control voltage values and corrects for temperature, drift and frequency variations that occur in the transmit section of the transceiver during operation of the radio transmitter (RFF VI.609 (undisputed)); that the calibration look-up table disclosed in Motorola stores power correction values with respect to power detection and control voltage values and corrects for power characteristics of components in the transmit section of a radio transmitter (RFF VI.610 (undisputed)); and that FIG. 1[40] of RX-313 illustrates two methods of power control in accordance with the invention of RX-313. (RFF VI.611 (undisputed).)

In Motorola, the output power is attenuated using attenuator 13 of FIG. 1 (Appendix L) to a lower power level and detected using transmit power detector 14 of FIG. 1 and stored in memory 15 of FIG. 1 on the radio transmitter as a maximum transmission level that is lower than the radiotelephone's "high" level. (RFF VI.613 (undisputed).) The stored maximum transmission value is recalled and the radiotelephone's control functionality 16 ramps up the control voltage to the power amplifier from zero volts until the output power level measured by the transmit power detector is equal to the maximum value stored on the transmitter. (RX-313 at 3:42-4:12; FIG. 1A, step III.) The amount of voltage required to achieve the maximum output power is stored in setting means 12. (RX-313 at 5:7-14; RFF VI.614 (undisputed).)

FIG. 2 (Appendix K) of RX-313, shows a block diagram representing a more detailed implementation for implementing the method of FIG. 1A. (RFF VI.615 (undisputed).) In FIG. 2, of

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[40] See Appendix L.

Motorola (RX-313) the attenuator means 13 is shown to comprise a 20dB laser trimmed resistor pad 21 and a 2dB pad 22, each having a bypass switch, 23 and 24 respectively, that enables the pads to be connected in series to provide their combined attenuation. (RX-313 at 4:33-49.) The storage means 15 is comprised of an analog-to-digital converter that provides digital power values to the memory of a microprocessor, represented as element 15. (RX-313 at 4:33-49.) The control means 16 is shown as comprising a comparator 25, a divider 26, frequency correction means 27 and a subtracter 28. An analog representation of the output of subtracter 28 controls the power amplifier 10. (RFF VI.615 (undisputed).) Motorola further teaches a system that is both pre-calibrated and self-correcting, the latter through transmit power feedback:

> During operation, a required power level is selected by calling up the appropriate calibrated power value from setting means 12. With each time slot of transmission output, the output power detected by detector 14 and sampled by the A/D converter in sample and storage means 15. . . . The resultant value is stored in correction table 27, for use when the same power level and frequency combination is next selected.
>
> Correction table 27 has space for 12 x 21 values - i.e. twenty-one power levels at twelve different frequencies.

(RX-313 at 7:6-23; RFF VI.607 (undisputed).) It is undisputed that RX-313 includes a frequency correction value to allow compensation for the fact that a given control voltage will not necessarily give rise to the same output power over the whole frequency range of the amplifier (RFF VI.618 (undisputed)); and that Motorola discloses further details regarding the operation of its power control system, stating that "the maximum output power value is set manually by adjusting the control voltage to the power amplifier 10, until the output power is measured to be the desired maximum level (e.g. 80 watts) using highly accurate calibration equipment." (RFF VI.619 (undisputed).)

Respondents' expert Kenney has testified:

Q. Now, we have looked at several references now that disclose the use of digital look-up tables to perform calibration, correct?

A. Yes, four different references.

JUDGE LUCKERN: What are they, for the record? Just name the names. McGirr is one?

THE WITNESS: Yes.

JUDGE LUCKERN: Vaisanen is another?

THE WITNESS: Vaisanen, Motorola, and Fujitsu.

(Kenney, Tr. at 3248.) Thus, based on the analysis, supra, and the cited testimony, the administrative law judge finds that each of McGirr, Vaisanen, Motorola and Fujitsu discloses the use of digital look-up tables to perform calibration. (Kenney, Tr. at 3248.)

The administrative law judge further finds that a person of ordinary skill in the art, as of the February 28, 1994 filing date of the '473 patent, would be motivated to replace the analog compensation circuits of the combined Wheatley (through its incorporation by reference of RX-306 (the '204 patent)) and as shown in RDX-63:33 (Appendix E) with the digital compensation circuits disclosed in McGirr (JX-333), Vaisanen (RX-309), Motorola (JX0313) or Fujitsu (JX-256) to take advantage of numerous efficiencies offered by digital circuits based on design choice. Even named inventors on the '473 patent testified that the use of digital lookup tables in digital electronics and ASIC development was well known and was in fact "standard practice." Thus inventor Weiland testified:

Q. And you consulted Mr. Kerr regarding the look-up tables you were developing and the work you were doing that resulted in this patent, the '473 patent, correct?

A. Yes. Rich and I would, you know, we would discuss the ideas

and bounce ideas off of each other and he was, he was part of that group, yes.

Q. Yeah. And you consulted him about the look-up tables because he had more expertise in digital electronics than you did, correct?

A. Yes, and also ASIC development as well.

Q. And if you look at this e-mail, it says subject: Look-up table patent. Do you see that?

A. Yes.

Q. That refers to the '473 patent, does it not?

A. I believe so, yes.

Q. Now, Ms. Weiland, you admit that you didn't invent the idea of using look-up tables, don't you?

A. Well, I think that somewhere there have been uses of look-up tables. I do not believe there had been uses in a system such as this.

Q. You didn't invent the idea of using look-up tables, did you?

A. In isolation, no.

Q. Look-up tables already existed in the prior art, didn't they?

A. Yes.

Q. Okay. And you admit that when I said you -- strike that. Once again, when I said "you" in those last series of questions, I meant to refer to you and your team.

A. That's correct.

Q. And if I asked the same questions by saying "you and your team," your answers would be the same, correct?

A. That's absolutely right.

Q. What I would like to do, Ms. Weiland, is play you a clip from a

deposition excerpt from Mr. Kerr, your coinventor, about the look-up table, a question he was asked about it, and then ask you a question.

A. Okay.

Q. And that clip is from the deposition of Richard Kerr dated November 28th, 2006. It is page 54, lines 9 through page 55, line 7.

* * *

(Videotape clip played and transcribed as follows:)

"Question: Sure. What was the debate?

"Answer: The debate was, should we go make our own power amp that has that linearity characteristics?

"Question: And how did you resolve that debate?

"Answer: I just said, I think it would be easier just to relinearize it in a look-up table and make it perform how you want by redoing the gain bias.

"Question: And did you have to actually implement that strategy before you could understand whether it would actually be the right choice rather than redesigning the amplifier?

"Answer: No.

"Question: You knew just from the concept that it could work --

"Answer: Right.

"Question: Is that correct?

"Answer: Right.

"Question: How did you know that, if you hadn't done it?

"Answer: It's -- I don't know.

"Question: It's pretty obvious?

"Answer: Yes.

"Mr. Bright: Objection to form.

"The Witness: Standard practice. I mean, it's something that I had used previously as an audio distortion and also a frequency synthesizer patent I worked on."

(End of video clip.)

(Tr. at 666-70 (emphasis added).)

RDX-63:62 [41] an in illustration of replacing the analog compensation circuits of RDX-63:33 with digital compensation circuits. As Kenney stated in his supplemented expert report of July 7, 2007, para. 151:

> "As recognized by QUALCOMM's engineers, it was apparent to those skilled in the art that analog circuits, such as Wheatley's analog compensation circuit, could easily be replaced with corollary digital circuits such as McGirr's or Vaisanen's digital look-up tables."

(Tr. at 3250.)[42] As Kenney further explained in said replacement, the circuit would respond in a "quite similar manner. It would only use a set of digital look-up tables to do the lineranization rather than an analog compensation circuit." (Kenney, Tr. at 3255.) [43]

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[41] See Appendix M.

[42] Complainant, relying on January 2006 deposition testimony of Kenney, argued that Kenney, after reviewing the '473 patent, stated that he had no reason to believe that the asserted claims of the '473 patent were not novel. See CFF J58. However, Kenney also testified that his deposition testimony was given before he had "reviewed the prior art." See Tr. at 3338. Moreover, Kenney's deposition testimony was before KSR, supra, was decided by the Supreme Court.

[43] At the hearing complainant had objected to RDX-63:62 stating:

> What they say is that Wheatley's analog compensation circuit could easily be replaced with corollary digital circuits such as McGirr's or Vaisanen's digital look-up tables. He doesn't say

As found supra, each of McGirr, Vaisanen, Motorola and Fujitsu have digital look-up tables calibrated based on frequency. (Kenney, Tr. at 3254-55.) The administrative law judge finds that a person of ordinary skill in the art would have known that one could substitute a digital look-up table for an analog compensation circuit. As Kenney testified:

> Q. And what happens to this diagram that you created, if we were to replace the analog compensation circuit in Wheatley II with the digital look-up table, RDX-63:62, can you explain?
>
> A. Yes. In effect the circuit would respond in a quite similar manner. It would only use a set of digital look-up tables to do the linearization rather than an analog compensation circuit.
>
> JUDGE LUCKERN: Why would a person of ordinary skill in the -- did you finish your answer?
>
> THE WITNESS: Yes, Your Honor.
>
> JUDGE LUCKERN: Why would a person of ordinary skill in the art, say, in '94, want to make any such combination?
>
> THE WITNESS: I think it was widely known that digital circuits are -- can be made more accurate than analog circuits, and they also can be made in such a manner that they will, they are easily calibrated because you can store those values in a factory test.
>
> JUDGE LUCKERN: That's a reason you think a person of ordinary skill would make this combination?
>
> THE WITNESS: Yes. Digital calibration tables were widely used about that time. I had used them around and before that period of time

---

> anything [in Kenney's expert reports] here about how to do it. He doesn't say anything where they would affix it to that.
>
> And, frankly, Your Honor, the Wheatley patents literally teach away from digital.

Complainant's objection was overruled on the ground that complainant had its expert available and further had the opportunity to cross Kenney. (Tr. at 3249-52.)

myself.

JUDGE LUCKERN: What is the advantage of using digital rather than analog? Why mix them up? I'm a chemist talking that way, but what's the advantage of the digital? Why would anybody want to go to digital?

THE WITNESS: Well, a few good reasons.

JUDGE LUCKERN: I am talking about 1994.

THE WITNESS: Sure. At that time, digital technology was well-established. The computer, personal computer revolution was well under way. And high-level integration of digital circuits was commonplace at that time.

And so digital circuits are more easily formed into integrated circuits, and, moreover, because they have things like memory, you can do these calibration steps and store values in memory rather than adjusting circuits, as you might have to do in analog.

(Tr. at 3255-57.)

The administrative law judge finds Vaisanen (RX-309) is relevant in establishing the problems a person of ordinary skill in the art would recognize using analog technologies to compensate for power variation as radiotelephones. The invention of the Vaisanen patent relates to a method of tuning and compensating power levels in a radio telephone having a logic section which controls the operation, and to the use of this method in series production and maintenance. The invention also relates to a radio telephone, which is tuned with a method according to the invention. (RX-309 at 1:7-13.) Under the subheading "Background Of The Invention" it states:

> Generally the power levels in a radio telephone are tuned by adjusting built-in trimmer potentiometers and monitoring the output power of the radio telephone. The tuning is generally made manually, although in some cases a tuning with the aid of robots could be possible. It is however common to these prior art methods to adjust electromechanical components, such as trimmer potentiometers, with

the aid of tools.

> The power of the transmitter may vary with the operating conditions of the radio telephone. The operating conditions are influenced by the selected channel frequency, the radio telephone's internal temperature and the supply voltage (accumulator or battery voltage). In prior art it is generally tried to compensate for the power variations with means of analog technology. Diodes or NTC resistors are used to compensate for power variations due to temperature changes, for example. The transmitter output power of individual radio telephone units can behave in very different ways at various temperatures and with various voltages, and thus the compensating circuitry designed for a radio telephone type does not necessarily function in a desired manner for every unit in series production.
>
> The known methods entail many problems and drawbacks. The trimmer potentiometers, being electromechanical components, are less reliable than the electronic components used in the radio telephone and they take up a substantial area on the device's circuit board. The need for a large space is a problem, particularly concerning handsets. In addition, tuning of the trimmers is slow and requires a skilled person performing the tuning. The tuning precision depends on the person, and thus human errors are possible. The radio telephone casing has to be opened for the tuning in order to get access to the various components.
>
> The power levels are usually compensated for temperature and battery voltage variations by analog techniques, so that the accuracy of the compensation depends on component tolerances, and a fully individual compensation will not be possible in series production.

(RX-309 at 1:15-55.) Thus, a person of ordinary skill on the art, knowing about Vaisanen, would recognize a number of problems and drawbacks that persist with using analog technologies to compensate for power variations in radiotelephones, as was found supra.

At the hearing, Kenney testified as to a series of slides he prepared, in which the left hand side of the slide corresponded to RDX-1 63:62 (Appendix M) i.e. the Wheatley and digital linearizes combination without the blue shading but containing portions highlighted in yellow which Kenney testified that a person of ordinary skill in the art would equate to the yellow highlighted portions of

FIG. 2 of the '473 patent on the right side of the respective slide. Said slides have been identified as RDX-63:64,[44] RDX-63:65,[45] RDX-63-66,[46] RDX-63:67,[47] RDX-63:68[48] and RDX-63:69.[49] The administrative law judge finds the following testimony of Kenney pertinent as to how a person of ordinary skill in the art would perceive in combining the combined Wheatley with McGirr, Vaisanen, Motorola or Fujitsu:

> Q. Okay. Now let's go to RDX-63:64. You have highlighted certain boxes on both of these illustrations, correct?
>
> A. Correct.
>
> Q. Let's start on the left with the Wheatley and digital linearizers. What have you highlighted?
>
> * * *
>
> "I have started on the left-hand side, it says from antenna system, and that is receiving a signal on a particular frequency channel that" --
>
> THE WITNESS: Okay, that is subsequently converted to an IF frequency by element 90, down-converter, and filtered in a band pass filter 92, and then further amplified through amplifiers 12 and 16 and further filtered through element 14. And that's showing the received signal path of the combined inventions.
>
> BY MR. VERHOEVEN:
>
> Q. That's the received signal chain up to the variable -- to the

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[44] See Appendix N.

[45] See Appendix O.

[46] See Appendix P.

[47] See Appendix Q.

[48] See Appendix R.

[49] See Appendix S.

amplifier 16?

A. Yes.

Q. And then what's on the right-hand side from figure 2 of the patents in suit?

A. On the right-hand side on the lower portion of that diagram, it as showing RX-UHF as the input signal. And one would have understood that to be the received signal from the antenna. That enters element 211, LNA, low noise amplifier, and is further amplified by element 212 which is simply labeled Rx gain.

Q. That is the received chain on the patents in suit up to the variable gain amplifier receive side?

A. Yes, I should say the output of 212 implies that the signal has also been converted as it is labeled RX-IF coming out.

Q. Okay. Let's go to the next slide.

This is RDX-63:65. This is a demonstrative you prepared, correct?

A. Correct.

Q. Let's start on the left-hand side. It says Wheatley and digital linearizers. What have you highlighted there?

A. What I have highlighted essentially is the linearized receive side AGC loop.

Q. Can you walk us through it?

A. Sure. We ended up on the receive path on element 16, which is the amplified received signal, and that output is provided to elements 98 and 96 AGC detector and conversion subsystem respectively.

The AGC detector 98 produces a value responsive to the level of the input signal.

And the conversion subsystem, among other things, produces a reference voltage that represents the desired output power of the receive chain that subsequently subtracted and integrates in element

100, differential integrator, and that AGC control voltage is then fed to the digital linearizer that controls the amplifiers 12 and 16.

Q. Okay. And then turning to figure 2 on the right-hand side, can you walk us through what you are illustrating there?

A. Sure. We ended up there with element 212, which outputs a signal RX-IF. That signal is subsequently digitized by an analog-to-digital converter and it is processed by element 214, power detector with integrator.

And that power detector with integrator would have in it a reference voltage that is subtracted and applied to the integration function producing a gain control signal.

The AGC control signal is then fed into 216, Rx linearizer, converted back into analog form by 215, digital to analog converter, and subsequently controlling the gain, a variable gain amplifier of 212, thus closing the AGC loop.

Q. So in figure 2, box 214 is where the power detection and the integration occurs in figure 2?

A. Correct.

Q. And the integration described in the specification of the patents in suit is what?

A. The integrator is described as an integration with respect to a reference voltage.

Q. And where do we see that on the Wheatley diagram on the left?

A. On the Wheatley diagram, the reference voltage is provided by box 96, conversion subsystem.

Q. And the integration happens where?

A. In element 100.

Q. So in Wheatley, those three, the three boxes, basically 100, 98, 96, the corresponding functionality in those boxes is in 214 of figure 2; is that right?

A. Correct.

Q. And then on Wheatley, the digital linearizer in your demonstrative of Wheatley's digital linearizers is in the box marked 10?

What is that number, I can't read it. Is that a 10?

A. Yes, it is 10, digital linearizer.

Q. And the digital linearizer figure 2 is in the box marked 216?

A. Correct.

Q. Okay. Let's go to the next slide. [RDX-63:66] This just has the digital linearizers highlighted. What was your intent there?

A. Just to show the correspondence between the combined invention of Wheatley with the other references and the element in the '473 patent.

* * *

Q. All right. So we're at RDX-63:67.

And before we go to each side, what generally are you attempting to show by correspondence up here?

A. I believe one would understand that this shows that the AGC control signal that is used on the receive AGC loop is also used to control the transmitter gain that's shown also on the right-hand side, highlighted in figure 2 of the '473 patent.

Q. So both show open loop power control?

A. Both show open loop power control being implemented.

Q. Let's go to the next slide, RDX-63:68.

And can you start on the left side and walk us through your comparison on this slide?

A. Yes. On the left side, I have shown that the control AGC control

value produced by element 100 is coupled to element 10 digital linearizer which linearizes the response of the variable gain amplifiers used in the transmit chain. And those would be, again, labeled 12 and 16.

The other portion of the transmitter consists of a closed loop power control as element 104.

Q. Okay. If we can go to the next slide of your demonstrative, RDX-63:69, and start on the left and then go to the right and explain what you are illustrating, please.

A. On the left-hand side, shown on the combined Wheatley with digital linearizers, I am showing a power level control from a processor being applied to variable gain amplifier 104, thus implementing closed loop power control.

And on the right-hand side, I am showing that closed loop power control is implemented from an up/down from cell command applied to element 106, which is processed through box 206 -- I'm sorry, I may have misspoke. I meant element 206, closed loop power control, and that closed loop power control signal is combined with the open loop power control signal.

Q. Okay. And so there is also a combination of -- withdraw the question.

Both sides show closed loop power control, correct?

A. Correct.

Q. And both of these, both sides, figure 2 and the Wheatley with digital linearizers also both show combined open loop and closed loop power control, correct?

A. That is correct.

(Tr. at 3259-68.)

The administrative law judge finds that the functionality of the individual components which form the left hand side of the slides (the Wheatley and digital linearizes combination) supra did not

change in the combination, i.e. the elements were assembled in a predictable manner using the functions that they were supposed to implement as set forth in the cited references. (Kenney, Tr. at 3271-72.) Moreover in a 2/2/07 witness statement of complainant's Verdu, Verdu stated:

> Well, you see these claims talk about components that at that time were very well-known in the state-of-the-art. We're talking about power detectors, integrators, linearizers, variable gain amplifiers and so on. So none of those particular components was in any way novel.
>
> What was novel of these claims were the particular combination. That's what the innovation of those claims was. So these inventions really are at the level of putting together components. Not in the sense that they would invent a new way to implement any of those components.

(RDX-63:70 (emphasis added).)

Responding to respondents' proposed finding which relied on testimony of its Kenney that the combined Wheatley alone or in combination with one or more references invalidates claims 1 and 3 of the '473 patent (RFF VI.103), complainant represented (CRFF VII.103A) that its Verdu opined that the combined Wheatley (RX-311, RX-306 and RX-307) do not disclose the following elements of claim 1 of the '473 patent:

1. [a] "receiving a first signal having a first gain, a first frequency of the plurality of frequencies, and the first frequency having a first frequency index;"

2. [d] "selecting a first predetermined calibration value in response to the automatic gain control setpoint and the first frequency index;

3. [e] "adjusting the first gain in response to the first calibration value;"

4. [f] "transmitting a second signal having a second gain and a second frequency of the plurality of frequencies, the second frequency having a second frequency

index;"

5. [g] "determining a transmit power value of the second signal;"

6. [h] "generating a second calibration value in response to the automatic gain control setpoint, the second frequency index, and the transmit power value; and"

7. [i] "adjusting the second gain in response to the second calibration value."

(CRRF VII.103A.) Complainant further represented that its Verdu opined that the following elements of claim 3 of the '473 patent are not disclosed in the combined Wheatley

8. "a receive linearizer, coupled to the integrator and the receive amplifier, for generating a receive calibration value in response to the automatic gain control setpoint and a first frequency index corresponding to the first frequency, the receive calibration value being coupled to the receive amplifier control input for adjusting the gain of the receive amplifier;"

9. a second power detector, coupled to the transmit amplifier, for generating a second power value from a transmitted signal having a second frequency; and

10. a transmit linearizer for generating a transmit calibration value in response to the automatic gain control setpoint, the second power value, and a frequency index corresponding to the second frequency, the transmit calibration value being coupled to the control input of the transmit amplifier for adjusting the gain of the transmit amplifier.

(CRRFF VII.103E.)

The administrative law judge finds that a person of ordinary skill in the art would find said elements 1 to 7 of claim 1 of the '473 patent in the combined Wheatley taken with McGirr, Vaisnen, Motorola or Fujitsu. Referring to said first element all handsets operating in a cellular environment

inherently perform this step because each signal received by the handset will have a gain and a frequency associated with it. Moreover, the '473 patent itself teaches that it was known that "[a] particular user of the [800 Mhz] cellular system may operate on one or several [frequency] channels at a time." (JX-1 at 1:31-32.) McGirr teaches calibration look-up tables ("LUTs") that have locations corresponding to the channels or frequencies to which the receiver can be tuned. (JX-333 at 7:2-6.) Such locations correspond to a "frequency index." (Kenney, Tr. at 3207-08; RDX-70.)

Referring to the second element, supra, Wheatley (RX-306) teaches a linear gain control amplifier (amplification circuit) "having a compensation circuit for receiving a control signal and generating a corresponding compensation signal according to predetermined compensation characteristics." (RX-306, Abstract). It further discloses that the

> "[c]ompensation circuit 10 provides compensation in the control signal for inherent nonlinearities in the amplification circuitry used to amplify the input RF signal, corresponding to the received RF signal. Compensation circuit 10 thus generates a compensated control signal which is output therefrom as a nonlinear control signal or compensation signal."

(Id. at 3:46-52.) Said signal produced by the compensation circuit of Wheatley (RX-306) can be used to correct for nonlinearities in the AGC amplifiers disclosed in the combined Wheatley and Wheatley. (RX-307.) While Wheatley (RX-306) does not specifically disclose whether the "compensation characteristics" used in its circuit can be based on frequency, McGirr teaches the use of frequency-dependent calibration values for look-up tables:

> The LUT is a database in which calibration factors are stored in locations corresponding to measured RSSI values, and the channels or frequencies to which the receiver 28 (FIG. 1) can be tuned. Thus, the calibration factor is the entry corresponding to the particular measured RSSI value, and to the particular channel over which the communication signal that produced that value was received.

(JX-333 at 7:2-9.) McGirr further teaches:

> First, the RSSI value provided to the CPU 30 can have a transient component due to non-linearities in the frequency characteristics of the duplexer 40 (FIG. 1) and other components of the radio telephone 10. Thus, the measured RSSI's can vary from one channel to the next, despite identical strengths of the received signals on the various channels.

(Id. at 7:11-15.) Vaisanen similarly teaches that "[t]he operating conditions [of a radio telephone] are influenced by the selected channel frequency." (RX-309 at 1:24-26.)

Because it was known that a measured signal could vary from one channel to the next (i.e., depending upon frequency), the administrative law judge finds that one skilled in the art at the Feb. 28, 1994 filing date would have recognized that the AGC setpoint generated in the Wheatley system could also suffer from non-linearities depending on the frequency of the received signal. Accordingly, he finds that the evidence demonstrates that the skilled practitioner would have been motivated to account for frequency-dependent variations, as taught by McGirr and Vaisanen, using the compensation circuit disclosed in Wheatley. (RX-306.) Thus, Nokia's expert Kenney credibly testified that one skilled in the art would have found it obvious to incorporate the digital linearizers taught by McGirr and other references into the circuitry described by the Wheatley references. (Kenney, Tr. at 3267-68.)

Referring to the third element supra, Wheatley (RX-306) discloses that the "[a]mplification circuit 12 receives the RF signal at an input and amplifies the signal at a gain level as determined by the compensation circuit" (CDX-374 at 4:17-20, 58-60) which teaching can be applied to the variable gain amplifier circuit disclosed in the combined Wheatley and Wheatley (RX-306) in order to perform this claim step.

As for the fourth element supra, Wheatley (RX-307) discloses the transmission of a CDMA

communications signal, where the transmitter portion of the telephone is provided with "user baseband signals." (RX-307 at 4:37-41.) These signals are converted to higher frequency "IF signals," which in turn are provided to an IF amplifier that is amplified at a level determined by the AGC signal. (Id. at 4:42-49.) As already found for the first element, supra, any signal transmitted and received by a radio will inherently have a gain, and may operate on one of several frequencies in CDMA systems. In view of the teachings of McGirr and Vaisanen, the administrative law judge finds that it would have been obvious to associate a frequency index to each of those frequencies.

Referring to the fifth element supra, while this claim step is not taught by Wheatley, Vaisanen teaches that "the transmitter output power . . . will be measured with measuring devices . . . which may, for example, comprise a power level meter." (RX-309 at 4:46-49.) McGirr further teaches the use of an "RF power detector" that detects the power level of the power amplifier's output. (JX-333 at 6:7-15, Fig. 4.) In addition Nokia's expert, Kenney testified that one skilled in the art would have been motivated to calibrate the transmit power over a range of frequency channels. (Kenney, Tr. at 3241.) Thus, the prior art teaches the need to detect the transmitted power. (JX-133; RX-313; RX-309.)

As for the sixth element supra, for the reasons stated with regard to the second element, supra, the administrative law judge find that one skilled in the art would have a reason to generate a compensation signal (i.e., calibration value) as taught by Wheatley (RX-306) in response to both an AGC setpoint as well as a frequency index, as taught and suggested by McGirr and Vaisanen. Additionally, as Kenney testified, this calibration value can be made more accurate if it is generated partly in response to the transmit power value. (Kenney, Tr. at 3241-42.) Hence the administrative law judge finds that it would therefore have been obvious to generate a calibration value in accordance with these claim requirements.

Referring to the seventh element, supra the administrative law judge finds that once a calibration value is generated according to the sixth element, the next logical, and obvious, step is to adjust the gain of an amplifier in the transmit section of the radio using this value. As stated for the third element, the teachings of Wheatley (RX-306) to "amplify the signal at a gain level as determined by the compensation signal" can also be applied to the variable gain amplifier in the transmit paths of the systems disclosed by the combined Wheatley and Wheatley. (RX-307, FIG. 1; RX-311, FIG. 5.)

Referring to claim 3 of the '473 patent as respondents' expert Kenney testified, the apparatus recited in claim 3 can be used to perform the method recited in claim 1, and many of the same claim elements are recited in both claims. (Kenney, Tr. at 3287-88.) The administrative law judge finds that any additional structural components recited in claim 3 can also be found in the asserted prior art. For example, Wheatley (RX-307) discloses receive and transmit variable gain amplifiers (labeled "IF Amplifier (AGC)" 18 and 28) (RX-307, FIG. 1.) A power detector is used to measure the received power level. (Id. at 3:29-30, 54-55.) An integrator is also used to generate the AGC setpoint. (Id. at 3:30-32, 51-63.) As stated with regard to the "calibration value" element in claim 1 of the '473 patent, the administrative law judge finds that it would have been obvious to one skilled in the art to utilize calibration look-up tables (LUTs) (i.e., receive and transmit linearizers) where calibration values are stored in locations corresponding to the channels or frequencies of the signal (i.e., frequency index). (JX-333 at 7:2-15.) While the Wheatley prior art does not specifically disclose a power detector coupled to a transmit amplifier within the handset, the administrative law judge finds that one of ordinary skill in the art would have found it obvious to detect the handset's transmitted power in order to generate a more accurate calibration value, among other reasons. Thus, Vaisanen (RX-309 at 2:48-49) discloses that the transmitter output power can be measured with measuring devices which may for

example comprise a power level meter. The combined Wheatley (RX-311 at 2:12-19) discloses:

> The signals transmitted by the mobile unit to the satellite are relayed by the satellite to a Hub control system earth station. The Hub measures the received signal power from signals transmitted by each active mobile unit transceiver. The Hub then determines the deviation in the received power level from that which is necessary to maintain the desired communications. Preferably the desired power level is a minimum power level necessary to maintain quality communications so as to result in a reduction in system interference.

McGirr (JX-333 at 6:7-15) discloses:

> FIG. 4 is a schematic representation of the power control circuit 104. An RF power detector 106, e.g., a diode detector, receives a portion of the output of the power amplifier 36 as a power amplifier's feedback signal, and provides a feedback voltage that is proportional to the power control amplifier 108 at its first input 108*a*.

There is also testimony that "[p]ower detectors were very well-known in the state of the art." (Verdu, Tr. at 3669.) Moreover the inventors of the asserted claims did not invent power detectors. Thus inventor Weiland testified:

> [QUESTION]: And you and your team didn't invent a power detector, those were around before, right?
>
> [ANSWER]: Yes, that's correct.
>
> . . .
>
> [QUESTION]: And then next slide, power detector box over there on 207. Again, you didn't invent a power detector, right?
>
> [ANSWER]: No, we did not.

(Weiland, Tr. at 641:13-16, 643:8-11.) In addition at the time of the February 28, 1994 filing date of the asserted patents (1) the use of receive and transmit power detectors was well known in the field of wireless telephony, (2) one skilled in the art would have known how to implement a receive or transmit power detector in a radiotelephone, (3) one skilled in the art would have known that a transmit

power detector in a radiotelephone could be used to determine the power level of a transmit signal, one of ordinary skill in the art would have known how to implement a power detector in a transmitter to determine a transmit power value of a transmit signal. (Weiland, Tr. at 641:13-16, 643:8-11; Verdu, Tr. at 3667:20-3670:10; RDX-73:4.)[50]

Complainant argued that Nokia has not shown that claims 1 and 3 of the '473 patent merely combine well-known elements in predictable ways. (CRBr at 59.) It is argued that there is no evidence to explain why one of ordinary skill in the art would think to try to combine the teachings of McGirr or the other lookup table references with the combined Wheatley. (CRBr at 66.) Complainant, relying on testimony of Verdu, argued that it would not have been reasomable for one of ordinary skill in the art in February 1994 to combine the Wheatley patents with either McGirr, Vaisanen, Motorola or Fujitsu. (CFF J358.)

At the outset it has been found that a person of ordinary skill in the art in this investigation is not merely a person who holds a bachelor degree in electrical engineering. Rather, it is a person who not only has a master's degree in electrical engineering but also with a specialization in communications engineering and significantly has at least two years of experience in the field of wireless communications.[51] See Section IV, supra. Hence, the administrative law judge finds that a

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[50] Complainant argued that Kenney's illustration in RDX-63:62 does not include a power detector on the transmit side. See CFF J378. Complainant presumably would want the administrative law judge to find that a person with a master's degree in electrical engineering with a specialization in communication engineering and with at least two years experience in the field of wireless communications would not be aware that a power detector on the transmit side could be employed for measurement purposes. Even in the absence of Vaisanen, McGirr and the combined Wheatley, the administrative law judge rejects complainant's argument. See Translogic, supra, which indicates the weight be given to a person of ordinary skill in the art.

[51] Complainant's Verdu does not have two years of industrial experience in wireless telephony. See Section IV, supra

person of ordinary skill in this investigation is a person of ordinary creativity, and not an "automaton." See KSR 127 S. Ct. at 1742, supra. Moreover it is expected that such a person, when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, has good reason to pursue the known options with the person's technical grasp. Id. In addition if a technique has been used to improve one device, the administrative law judge finds that a person of ordinary skill in the art in this investigation would recognize that the technique would improve similar devices in the same way, using the same technique unless its actual application is beyond the skill of a such a person who has a master's degree in electrical engineering with a specialization in communications engineering, and two years of experience in the field of wireless communication. KSR 127 S. Ct. at 1740, supra.

The Commission stated in its opinion in Ink Cartridges that this administrative law judge in his ID in that investigation did not find all the features of the asserted claims disclosed in the prior art. See supra. In contrast to Ink Cartridges, the administrative law judge finds all the features of the asserted claims disclosed in the prior art and further finds that a person of ordinary skill in the art would be motivated to combine the features of the prior art such that the asserted claims of the '473 patent are obvious.

Complainant argued that it would not have been obvious to one of ordinary skill in the art in February 1994 to combine the frequency dependent digital look-up table of Fujitsu with the combined Wheatley, which is operating at a fixed frequency. (CFF J405.) Specifically, complainant relies on testimony of its expert Verdu:

> Q. Okay. And can we have figure on the front of the page of Fujitsu? There you go. Let me ask you this, Dr. Verdu. In your opinion, would one of ordinary skill in the art in February 1994 have

found it reasonable to combine Fujitsu with the Wheatley patents?

A. No.

Q. And what's the basis for your opinion?

A. Well, again, the same basis I outlined before when I talked about McGirr. These references disclose tables that are indexed by frequency and these tables are used to compensate an output power amplifier. And that output power amplifier, block 28, that works at one of a plurality of frequencies. So that's why you have the frequency dependent compensation in those tables.

Whereas the one in Wheatley that you were asking me about, that one is just operating at a fixed frequency.

(Tr. at 3626-27.) At the outset RX-306 discloses that "RF signal" and IF signal" may be input into the disclosed compensation circuit in RX-306. (RX-306 at 3:36-59; RX-306 at FIG. 1.) An RF signal is a radio-frequency signal. (RFF VI.454 (undisputed).) The following two excerpts show that the combined Wheatley discloses the use of an RF signal:

> In an AGC application, such a control signal is generated by a signal strength measurement circuit (not shown) in linear correspondence with the log of the measured signal strength of the received RF signal, or corresponding IF signal if frequency downconverted before measurement.

(RX-306 at 3:40-45.)

> It should be understood that the RSSI measurement can be made at various points in the processing of the received signal. Although illustrates in FIG. 1 that the measurement is made in downconverter 20, and at an IF frequency, the measurement can be made in downconverter 16 or at any other point in the signal processing at either an RF or IF frequency.

(RX-307 at 3:66-4:2 (emphasis added).) In fact, it is undisputed that RX-311 discloses that the RF signals from the antenna system are down-converted into IF signals by element 90. (RFF VI.261

(undisputed).) RF signals could be any of a number of frequencies, as the combined Wheatley refer to an "RF channel" and an "RF frequency band". (See RX-306 at 3:21-23; RX-307 at 8:22-28.) RX-307 discloses that the RSSI measurement described in RX-307 could be made at an RF or IF frequency. (RX-307 at 3:66-4:2 ("Although illustrates [sic.] in FIG. 1 that the measurement is made in downconverter 20, and at an IF frequency, the measurement can be made in downconverter 16 or at any other point in the signal processing at either an RF or IF frequency.").) Further, Wheatley has testified:

> Q. Do you have any particular techniques in mind when you said that they were using digital techniques to augment features?
>
> A. Yes. The AGC circuits that we mentioned are not inherently linear. And we were able to get linearity achieved to meet the requirement by working. And my whole history of circuit design has been in analog circuits, so I was able to make it work. But it was, if you want, fairly complicated and not widely reproducible at that time. So they went for other ways which would be, in essence, accomplish the same effect by using perhaps digital techniques to control the – to compensate out the nonlinearities. And there's a wide variety of ways it could have been doing that. And then the point there would be, we could use less accurate AGC circuits, compensate them using, you know, replacing this compensation circuit with digital technique – it doesn't say what goes in there – to achieve a linear function. And if that turned out to be more economic and more commercial and more reproducible, then that would be the proper choice for commercial equipment.

(JX-302C at 64:24-65:20 (emphasis added).) Thus, the administrative law judge finds that Wheatley chose to use analog circuits because his "whole history of circuit design has been in analog circuits," and that he himself contemplated that portions of said analog circuits could be replaced by using digital circuits. Thus, the administrative law judge finds that a person of ordinary skill in the art would have found it obvious to combine Fujitsu with the combined Wheatley.

Complainant argued that digital components were extremely slow in 1994 and did not offer the same performance abilities as analog components. (CFF J365.)[52] However, the administrative law judge finds that a person of ordinary skill in the art as of the February 28, 1994 filing date would know from the teachings of McGirr that McGirr's power control system could be modified, and an algorithm could be designed to operate faster or slower depending on design choice and project requirements. (Kenney, Tr. at 3477-3478; JX-333 at 7:45-56.) Specifically, Kenney testified that "anyone of ordinary skill in the art would know that [McGirr's power control] algorithms could run faster, a lot faster," (Tr. at 3477-3478) particularly in light of McGirr's teaching to modify its power control method according to design choice. (JX-333 at 7:45-56.) Further, Wheatley has testified that he chose to use analog circuits because his "whole history of circuit design has been in analog circuits," and that he himself contemplated that portions of said analog circuits could conceivably be replaced by using digital circuits, if someone else could design one that was "more economic and more commercial and more reproducible." See supra. The administrative law judge finds that a person of ordinary skill in the art as of the February 28, 1994 filing date of the '473 patent would know that there are advantages and disadvantages to weigh when determining whether to use a digital or analog design. See Vaisanen (RX-309) at 1:38-55; RFF VI.538 (undisputed), both referenced at 135, supra. Also, in referring to RX-307 of the combined Wheately, Verdu testified:

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[52] CFF J365 relies on testimony of inventor Wheatley and complainant's expert Verdu. Regarding testimony of Wheatley, the question before the administrative law judge is not whether the combination of the asserted claims of the '473 patent was obvious to the patentee Wheatley but rather whether the combination was obvious to a person with ordinary skill in the art. Moreover, any need known in the field of endeavor at the time of the invention can provide a reason for combining the elements in the manner claimed. See KSR, supra. As for testimony of Verdu, Verdu does not meet criteria found for a person of ordinary skill in the art. See Section V, supra.

Q. And a person looking at this paragraph and seeing that it is talking about how typically in digital receivers, a digital VGA -- excuse me, a digital AGC loop is created, that person at the time of this patent, they would have understood that you could also accomplish this with analog circuitry, wouldn't they?

A. By when you say accomplish this, you mean accomplish an AGC loop?

Q. Yes.

A. Yes, indeed.

Q. And the opposite is also true, if a person was looking at an analog AGC loop at this time, they would have understood that you could accomplish this functionality digitally, correct?

A. Yeah, you could have a digital AGC loop indeed.

(Tr. at 3729.) Thus, the administrative law judge finds that, in light of the cited testimony, it would be obvious to combine the combined Wheatley with McGirr.

Complainant argued, based on testimony of its Verdu, that although the '225 patent (RX-307, Wheatley III) recognizes the use of AGC techniques that were known, for the purposes that Wheatley was trying to address, (i.e., fast, high dynamic range, accurate power control) Wheatley is unequivocal in teaching away from digital AGC techniques. (CFF J361.) Specifically, Verdu testified that:

Q. Okay. And then immediately preceding that paragraph, Dr. Wheatley goes on to say in his patent, "digital AGC techniques, however, are relatively slow in controlling signal power due to saturation of the error signals involved in actually controlling the power." In your opinion, Dr. Verdu, does the Wheatley III reference teach away from the use of digital AGC techniques, whether they were well-known or not at the time, does Wheatley III teach away from using those techniques?

A. Indeed, for the purposes that Wheatley was trying to address, in other words, fast, high dynamic range, accurate power control, he was unequivocal in teaching away from digital AGC techniques.

(Tr. at 3784-3785.) RX-307 discloses that it was known in the art that automatic gain control circuits are implemented in both analog and digital receivers. (See RX-307 at 1:13-19 ("In both analog and digital signal receivers AGC circuits are implemented using different techniques.").) In fact, JX-307 describes typical functionality of a digital receiver (JX-307 at 1:27-40) and explicitly discloses "a closed loop automatic gain control circuit for a digital receiver...". (RX-307 at 2:40-44.) As found, supra, complainant's expert Verdu testified that a person of ordinary skill in the art at the February 28, 1994 date of the '473 patent would know that AGC loops could be designed with either analog or digital circuits. Also, McGirr teaches that the power control approach described in its preferred embodiment could be modified to fit other power control approaches. (JX-333 at 7:45-56 ("Of course, the rates of increase in output power per drop in RSSI values below the first threshold and of decrease in output power per rise in RSSI values above the second threshold can be any desired amounts, and certainly need not be equal.").) The administrative law judge finds that a person of ordinary skill in the art would know that choosing a digital or analog design is a matter of balancing the drawbacks and benefits of each. RX-307 discloses an analog circuit means but inventor Wheatley admitted his "whole history of circuit designs has been in analog circuits." See supra. There are only two choices for circuit design, digital or analog, and RX-307 explicitly discusses and uses both. Based on the foregoing, the administrative law judge finds that RX-307 does not teach away from the use of digital techniques.

Complainant argued that the combined Wheatley and the digital lookup table references as illustrated in RDX-63:62 would not work, relying on testimony of Verdu which was said to opine that the linearizers disclosed and claimed in the '473 patent could linearize the non-linear signals illustrated in CDX-209 which shows linearizing frequency 1 and frequency 2 (CFF J149); and on testimony of

Wheatley which was said to indicate that Wheatley, an inventor on the '204 patent, did not consider putting a linearizer in the '204 patent (CFF J151);[53] that there is a distinction between linearizers and compensation circuits, such as in RX-306 (CFF J152); and that the compensation circuit of RX-306 cannot linearize an arbitrary nonlinear transfer function. (CFF J153.) Complainant also relies on testimony of Verdu stating that controlling the gain of an amplifier with both an uncompensated signal and a compensated signal would not work. (CFF J387.)

Respondents' expert Kenney, however, did testify that modifications would have to be made to the digital linearizers of McGirr when combining them with Wheatley:

> Q. Okay. But when you put that digital circuit -- if we go back to 63:62, RDX-63:62, please. So when you drop the digital linearizer circuit from McGirr into Wheatley, that circuit will take, according to the example as you described it, we looked at, 2.5 seconds to provide a value, correct?
>
> A. Well, I disagree that I was implying that I am dropping the exact embodiment discussed in the specification of McGirr into this figure to form a digital linearizer.
>
> Q. All right.
>
> A. It is showing an invention that uses digital look-up tables that runs, that run tens of thousands of times faster that might be described by an algorithm that's used for a different purpose.

(Tr. at 3479 (emphasis added).) However, as found, supra, a person of ordinary skill in the art at the time of the February 28, 1994 filing date of the '473 patent would known from the teachings of McGirr that its power control system could be modified according to design choice. (Kenney Tr. 3477-3478; JX-333.) Also, as found, supra, Wheatley's entire experience was with analog circuits, and thus it is unsurprising that he chose an analog design, rather than implementing a fully digital

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[53] However, see immediately preceding footnote.

design. Moreover, Kenney has testified:

> Q. Now, you also -- it is also your opinion that a person of ordinary skill in the art would have known that you could substitute out an analog compensation circuit for a digital look-up table, correct?
>
> A. I think one of ordinary skill in the art at the time would know both techniques are available to solve these kinds of problems.
>
> Q. The four references you went through were available at the time, right?
>
> A. Yes, they were all prior art.
>
> Q. And what happens to this diagram that you created, if we were to replace the analog compensation circuit in Wheatley II with the digital look-up table, RDX-63:62, can you explain?
>
> A. Yes. In effect the circuit would respond in a quite similar manner. It would only use a set of digital look-up tables to do the linearization rather than an analog compensation circuit.
>
> JUDGE LUCKERN: Why would a person of ordinary skill in the -- did you finish your answer?
>
> THE WITNESS: Yes, Your Honor.
>
> JUDGE LUCKERN: Why would a person of ordinary skill in the art, say, in '94, want to make any such combination?
>
> THE WITNESS: I think it was widely known that digital circuits are -- can be made more accurate than analog circuits, and they also can be made in such a manner that they will, they are easily calibrated because you can store those values in a factory test.
>
> JUDGE LUCKERN: That's a reason you think a person of ordinary skill would make this combination?
>
> THE WITNESS: Yes. Digital calibration tables were widely used about that time. I had used them around and before that period of time myself.
>
> JUDGE LUCKERN: What is the advantage of using digital rather

than analog? Why mix them up? I'm a chemist talking that way, but what's the advantage of the digital? Why would anybody want to go to digital?

THE WITNESS: Well, a few good reasons.

JUDGE LUCKERN: I am talking about 1994.

THE WITNESS: Sure. At that time, digital technology was well-established. The computer, personal computer revolution was well under way. And high-level integration of digital circuits was commonplace at that time.

And so digital circuits are more easily formed into integrated circuits, and, moreover, because they have things like memory, you can do these calibration steps and store values in memory rather than adjusting circuits, as you might have to do in analog.

(Tr. at 3255-3257 (emphasis added).) Thus, while linearizers and compensation circuits may have different implementations, they are functionally interchangeable. In fact, complainant's expert Verdu has testified:

Q. A person of ordinary skill in the looking at this patent at the time, the relevant time frame, would understand that if you used this technique with amplifiers that are analog, that you are going to have a problem with linearities, aren't you?

A. Well, by this technique, you mean Wheatley III's technique or which technique.

Q. A digital AGC loop with an analog VGA.

A. They would not understand -- they would understand that you may have nonlinearities or that you may not have nonlinearities, the fact that you have digital AGC loop does not negate the possibility that you may have nonlinearities.

Q. A person of ordinary skill looking at Wheatley III would have understood there may be nonlinearities and that compensation tables were one way to correct for nonlinearities, correct?

A. There would be nonlinearities in the VGA, you mean?

Q. Sure.

A. Yes.

Q. And that one way to correct for those would be to use compensation tables, correct?

A. Correct.

Q. And a person looking at this paragraph and seeing that it is talking about how typically in digital receivers, a digital VGA -- excuse me, a digital AGC loop is created, that person at the time of this patent, they would have understood that you could also accomplish this with analog circuitry, wouldn't they?

A. By when you say accomplish this, you mean accomplish an AGC loop?

Q. Yes.

A. Yes, indeed.

Q. And the opposite is also true, if a person was looking at an analog AGC loop at this time, they would have understood that you could accomplish this functionality digitally, correct?

A. Yeah, you could have a digital AGC loop indeed.

(Tr. at 3728-3729 (emphasis added).) Also, the administrative law judge's construction of linearizer does not require it to be able to "linearize an arbitrary nonlinear transfer function." Nor does RX-306 disclose that it cannot do so. (See, generally, RX-306.) Instead, RX-306 discloses:

> It is another object of the present invention to provide an amplifier circuit in which gain in dB is controlled as a linear function of an input control signal.

(RX-306 at 1:64-66 (emphasis added).) RX-306 also discloses:

> Compensation circuit 10 provides compensation in the control signal for inherent nonlinearities in the amplification circuitry used to amplify the input RF signal, corresponding to the received RF signal.

> Compensation circuit 10 thus generates a compensated control signal which is output therefrom as a nonlinear control signal or compensation signal.

(RX-306 at 3:49-55.) Thus, the compensation circuit of RX-306 is able to linearize signals. Based on the foregoing, the administrative law judge finds complainant's arguments unavailing.

B. Claim 1 Of The '408 Patent And Claim 2 Of The '220 Patent

1. Anticipation

Respondents argued that a EIA/TIA standard (RX-147) alone invalidates the asserted claims of '408 and '220 patents. (RFF VIII.1.)[54] They later argued that RX-147 anticipates the asserted claims of the '408 and '220 claims under the claim construction proposed by QUALCOMM. (RFF VIII.14.) Respondents further argued that U.S. Patent Number 5,241,690 (the Larsson patent RX-142)) anticipates the asserted claims of the '408 patent and the '220 patent under the claim construction proposed by QUALCOMM. (RFF VIII.50 (undisputed).)

Complainant argued that respondents have not shown, by clear and convincing evidence, that any reference anticipates the asserted claims of the '408 and '220 patents. (CBr at 112-116.)

The staff argued that the '408 and '220 patents are not anticipated by any art. (SBr at 81.)

The parties agree that the only novel elements of the '408 and '220 patents are those elements regarding "maximum gain setting." (Tr. at 3643; RFF VIII.4, RFF VIII.5, RFF VIII.6, RFF VIII.8, RFF VIII.9, RFF VIII.10, RFF VIII.11 (undisputed); CRRFF VIII.13A-C.) Therefore, the anticipation

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[54] As indicated in an exhibit dated 2/15/07 (RX-403), the PTO has granted Nokia's request for reexamination of claim 1 of the '408 patent, inter alia, over a combination of Vilmur et al U.S. Patent No. 5,107,487 and Larsson et al U.S. Patent No. 5,241,690. The PTO, as stated in RX-405 which has a 3/1/07 date, has also has granted Nokia's request for reexamination of claim 2 of the '220 patent, inter alia, over a combination of Vilmur, et al, in view of Larsson and McGirr et al. U.S. Patent No. 5,129,098.

analysis focuses on whether or not a "maximum gain setting" is disclosed by the prior art as argued by respondents.

Regarding the EIA/TIA Standard, the administrative law judge has found in Section VII.C.3, supra, that the claim term "maximum gain setting" is "an upper limit on the transmit gain setting that is hard coded into the radio during assembly or input during manufacturing and testing of the radio. The parties agree that the EIA/TIA standard expressly disclosed that radiotelephone operating in accordance with the standard must comply with the standard's power control algorithm as limited by the standard's maximum power setting. (RFF VIII.30 (undisputed).) The parties also agreed that the EIA/TIA Standard discloses an upper limit on the allowed transmit power of a handset. (RFF VIII.17 (undisputed).) The administrative law judge finds that an "upper limit" is the same as a "maximum," and that therefore said EIA/TIA Standard discloses a maximum on the transmit power. The parties further agree that a maximum gain setting is different from a maximum output power; that a maximum gain setting limits the amount of amplification that can be applied by the amplifier; that a maximum gain setting does not limit the output power of an amplifier because the input power could increase; and that a maximum power setting limits the overall output power of the phone, regardless of the amount of gain applied in an amplifier. (RFF V.81, RFF V.82, RFF V.83, RFF V.84 (undisputed).) The parties also agree that the objective of the maximum gain setting is to limit the transmit gain. (CFF G262 (undisputed).) As the administrative law judge has found in Section VII.C.3, supra, a limit on a gain is distinct from a limit on power. No party has cited any portion of RX-147 that suggests a limit on a gain. Based on the foregoing, the administrative law judge finds that the EIA/TIA Standard does not anticipate either the '408 or the '220 patents.

Regarding Larsson, the parties agree that RX-142 expressly teaches that the transmitter

transmit at the lower of the power control signal or a maximum transmission power setting. (RFF VIII.77 (undisputed).) As found, supra, limiting the power of a transmission is different than limiting a gain. Further, the administrative law judge did not follow complainant's proposed claim construction, which was the premise of at least some of respondents arguments regarding Larsson. (RFF VIII.50 (undisputed).) Thus, the administrative law judge finds that RX-142 does not anticipate either of the asserted claims of the '408 or the '220 patents.

2. Obviousness

Respondents argued that the asserted claims of the '408 and '220 patents are obvious in light of prior art FIG. 1 of said patents and Larsson U.S. Patent No. 5,241,690 (RX-142) or the ETA/TIA Interim Standard. (RBr at 121-41; RRBr at 76-8.) It is argued that the asserted claims add nothing to the prior art beyond a well-known element, viz. a maximum gain setting on a variable gain amplifier, that behaved exactly as expected, and that the only issue is whether it would be obvious to add a maximum gain setting to the prior art disclosed in common Figure 1. (RBr at 120-25.) Respondents further argued that the combination of the EAI/TIA standard and one or more of the combined Wheatleys, Fujitsu[55], Motorola and Larsson invalidates the asserted claims of the '408 and '220 patents. See Respondents' Proposed Findings, Sections VIII.D, E and F.

Complainant argued that the combined Wheatley, in combination with either Larsson or the ETA/TIA Standard, do not render the asserted claims of the '408 and '220 patents obvious because the evidence is clear that neither the EIA/TIA Standard nor Larsson discloses comparing a summation signal to a maximum gain setting to adjust the gain of a variable gain amplifier up or down. It is also

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[55] Respondents do not argue that Fujitsu discloses a maximum gain setting. (See RFF II.209.) Therefore, the administrative law judge is not considering this reference.

argued that the evidence is clear that the asserted claims of the '408 and '220 patents would not have been obvious to one of ordinary skill in the art based on the disclosure of a "maximum power" in the EIA/TIA Standard and Larsson. (CBr at 119-21.) Complainant's position, as to claim 1 of the '408 patent and claim 2 of the '220 patent, is that their novelty was the combination of "all those elements that have to do with maximum gain setting", citing Verdu (Tr. at 3643) and that the use of maximum gain setting and how it is compared is what is new and that would be "elements D, E and F" of claim 1 of the '408 patent and "elements E, F and G of claim 2 of the '220 patent," citing Verdu, Tr. at 3740-41. See CRRFF VIII.13A, 13B.

The staff argued that it would not have been obvious to substitute a maximum gain setting for the previously known "maximum power level" in the prior art and hence, under the staff's proposed construction of "maximum gain setting," the prior art does not render the asserted claims of the '408 and '220 patents obvious. (SBr at 81-2.) It is argued by the staff that the only prior art reference relied upon by respondents to meet the claimed "maximum gain setting" of the asserted claims impose an upper limit on the power level rather than a gain setting and that it would not have been obvious to substitute a maximum gain setting or the previously known maximum power level which can still result in an increase in transmitted power levels. (Id.)

The parties agree that the only novel elements of the '408 and '220 patents are those elements regarding "maximum gain setting." (RFF VIII.13; Tr. at 3643:3-8; CRRFF VIII.13A-C.) All other elements of the '408 and '220 patent are admitted to be in the prior art. (RFF VIII.4, RFF VIII.5, RFF VIII.6, RFF VIII.8, RFF VIII.9, RFF VIII.10, RFF VIII.11 (undisputed); Tr. at 3643:3-13.) Therefore, the key question for the obviousness analysis is whether or not any of the prior art discloses a "maximum gain setting."

Regarding Larsson and the EIA/TIA Standard, the administrative law judge has found in Section VIII.B.1, supra, that neither the Larsson patent nor the EIA/TIA Standard anticipates either of the '408 or '220 patents, as neither reference discloses a "maximum gain setting."

Regarding the combined Wheatley, the fourth, fifth, and sixth elements of claim 1 of the '408 patent, which relate to "maximum gain setting," are the same elements that the Examiner said were not taught or suggested in the prior art during prosecution of the '220 Patent. (CDX-186; JX-6 at QHITC0025564; Verdu, Tr. at 3643:24-3644:3.) Respondents argued that Wheatley, a named inventor on the combined Wheatley, admitted that a maximum gain setting was inherent in the operation of the radiotelephone that was the subject of the combined Wheatley, specifically citing to Wheatley Tr. at 385:6-15. (RFF VIII.101.) Thus, the transcript excerpt reads:

> "Question: And the limit on the gain, is that what determined the maximum transmit power?
> "Answer: Yes.
> "Question: And how was the limit on the gain achieved again?
> "Answer: Um, it was just inherent in the amplifiers. At the maximum control voltage, they would go to the maximum gain and that's it."

(Tr. at 385:6-15 (emphasis added).) Wheatley's testimony, therefore, was that the amplifiers would go to the maximum gain and no further. As he had explained eariler in his testimony:

> Q. Okay. And in the demonstration unit that you talked about doing earlier today, is it correct that that demonstration unit had a maximum power?
>
> A. Actually, no.
>
> Q. It didn't have maximum power?
>
> A. We had maximum power, but there was – the maximum power would be determined by how much power it could put out. It could put out a certain amount of power because that's the way it was built. It couldn't do any more.

Q. So in your system, the maximum power was effectively controlled when the amplifier couldn't put any more power out?

A. That's right.

Q. And that's when the amplifier reached its maximum gain; isn't that right?

A. No, that's exactly when the power amp saturated.

Q. That's when the power amp reached its maximum gain, right?

A. No. The power amp is the final stage in the system. It could be driven beyond its range, but it won't put out any more power than the power it's capable of putting out. Simply saturated.

(Tr. at 380-381(emphasis added).) In other words, the "maximum gain" was the maximum gain allowed by the hardware. Therefore, the administrative law judge finds that Wheatley's testimony does not support the conclusion reached by respondents.

Respondents further argued that Weiland testified that she did not invent the use of a maximum gain setting to adjust a variable gain amplifier and cited the following testimony:

Q. And it's true, isn't it, that it was well known in 1990 [sic 1994] to adjust a variable gain amplifier in response to a maximum gain setting, correct?

A. Yes.

(RFF VIII.44; JX-299C at 88:13-16.) However, Weiland also testified:

Q. Ms. Weiland, are you aware of anyone who used a maximum gain setting before your implementation of the maximum gain setting in a QCP line of phones?

A. I believe that somebody had probably used a maximum gain setting somewhere for some applications, but I don't specifically recall any solution.

(Tr. at 524:7-14.) Weiland further testified:

> Q. Now, isn't it true, referring to this maximum gain setting, isn't it true that it was well-known in the art that you could adjust a variable gain amplifier in response to a maximum gain setting?
>
> A. It was probably true. I don't recall a specific example, but it was probably, it was likely.

(Tr. at 644:10-17.) Thus, while Weiland testified that a variable gain amplifier could be adjusted by using a maximum gain setting, the administrative law judge finds that nowhere in Weiland's hearing testimony is there a mention of using the maximum gain setting to set a limit on maximum power. Rather, Weiland testified that the variable gain amplifier itself had an upper limit on how much it could be adjusted.

Respondents also argued that complainant's Verdu testified that maximum gain setting was known in the art, pointing to the following portion of the transcript:

> JUDGE LUCKERN: All right. Well, I will repeat the question. We're not talking about the patent right now. Hold on a minute. Let me get it. The question is this: "What I am asking you is about if you have a variable gain amplifier prior to 1994, a person of ordinary skill in the art would understand that you could set a limit on that gain of that variable gain amplifier. That concept is not new, right, sir?" Yes, no, I don't know. And I am talking about a person of ordinary skill in the art, which you testified has a certain knowledge, degree, whatever it is. I hope he is not an ignoramus.
>
> THE WITNESS: Right.
>
> JUDGE LUCKERN: Answer the question yes, no or however you want to answer.
>
> THE WITNESS: The answer is yes.

(Tr. at 3748-49 (emphasis added).) Thus, Verdu testified that, outside the context of radiophones, the prior art references, and the asserted patents, it was known to a person of ordinary skill in the art that one could set a limit on the gain of a variable gain amplifier. Again, there is no mention in said

testimony of using said "limit on the gain of a variable gain amplifier" to control maximum output power. Rather, Verdu is describing the normal function of variable gain amplifiers, which all parties admit was commonly known before the February 28, 1994 filing date of the asserted patents.

Respondents further argued that Motorola (RX-313) included implementation of a maximum power level by setting an amplifier's maximum gain. (RFF VI.618, 621-23.) Specifically, respondents point to the following excerpt from RX-313:

> The maximum output power value is set manually, by adjusting the control voltage to the power amplifier 10, until the output power is measured to be the desired maximum level (e.g. 80 watts) using highly accurate calibration equipment. The voltage V_{22} applied to the control input of the amplifier to provide this measured power is recorded in setting means 12.

(RX-313 at 5:11-14.) That reference goes on to explain:

> (b) The power amplifier is set to maximum power (80 watts), by recalling the calibrated power value V_{22} from setting means 12.

(RX-313 at 5:22-24.) Thus, the administrative law judge finds that, rather than limiting the output power by limiting a gain, the cited reference discloses a calibration routine that automatically finds a specific gain that will cause the output power to reach a desired level; in the excerpt cited above, maximum output power. Likewise, FIG. 3 of RX-313 shows only that V_{22} is used to achieve maximum power; not that V_{22} is used to limit maximum power. Respondents also cite to RX-313 at 9:7-14; but that citation is not relevant to the conclusions drawn by respondents. (See RFF VI.621; RFF VI.622.)

Based on the foregoing, the administrative law judge finds that "maximum gain setting, as

disclosed in the asserted products, is not found in the prior art.[56] Thus, the administrative law judge finds that respondents have not shown, by clear and convincing evidence, that the asserted claims of the '408 and '220 patents are invalid.[57]

C. Secondary Considerations

Complainant argued that unrebutted evidence of secondary considerations demonstrates that the asserted patents are not obvious. (CBr at 122-31.)

Respondents argued that QUALCOMM's purported secondary considerations of nonobviousness cannot save the patents-in-issue. (RBr at 126-30.)

The staff argued that QUALCOMM did not present sufficient evidence at the hearing to demonstrate a nexus between factors, such as the commercial success of its initial QCP-800 phone and its current MSM 6550 chipset, industry praise and skepticism, and the particular claimed features of the asserted patents. (SBr at 76-7.)

"Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented." KSR, 127 S.Ct. at 1734 (quoting Graham v. John Deere Co., 383 U.S. 1, 17-18, (1966). Secondary consideration of commercial success, or other secondary considerations, however, are only significant if there is a nexus between the claimed invention and the commercial

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[56] Even assuming arguendo that "maximum gain setting" was in the prior art, such would not establish that the asserted claims are obvious. See KSR 127 S. Ct. at 1739-40, supra.

[57] In Section VIII.A.2, supra, the administrative law judge found that respondents have established, by clear and convincing evidence, that claims 1 and 3 of the '473 patent are obvious in view of the combined Wheatley taken with McGirr, Vaisanen, Motorola or Fujitsu. Significantly McGirr, Vaisanen, Motorola and Fujitsu were not cited by the Examiner in the prosecution of the '473 patent. See JX-4. Also the administrative law judge finds it significant that the '473 patent issued before KSR was handed down by the Supreme Court.

success. See Ormco Corp. v. Align Tech., Inc. 463 F.3d 1299, 1312 (Fed. Cir. 2006).

Complainant argued that the "unrebutted evidence is clear that many in the cellular phone industry were hightly skeptical that a CDMA system could be commercially viable, in large part due to the difficulty in controlling mobile telephone handset power as it moves closer or further from the base station, commonly known at the "near-far" problem; and that by implementing the claimed power control solutions of the asserted patents in the QCP-800 handset, QUALCOMM was able to overcome the near-far problem and provide fast, accurate power control in a handset that was capable of being produced in high volumes and in cost effective manner. (CBr at 123-4.) However, Wheately, an inventor on the '473 patent, testified:

> Q. Let me ask you a question. Was there also a counterpart, was there a counterpart filed in Europe that related to CX-40, the '262 patent?[58]
>
> A. Yes, there was.
>
> Q. And if you could turn to RX-311 [the combined Wheatley PCT application], could you identify this document as to whether or not it was the PCT or European counterpart of the '262?
>
> A. Yes, it is.
>
> Q. And were there any material differences that you are aware of between Exhibit 311 and CX-40?
>
> A. So the two figures in CX-40 and RX-311 are both shown right here, figure 5, the first one and figure 5 from the second. I believe that there is no material difference.
>
> Q. All right. Thank you. Looking at CX-40, please, Doctor, CX-40,

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[58] CX-40 is U.S. Patent No. 5,267,262 with named inventor Charles E. Wheatley, III and assigned to QUALCOMM. (CX-40.) It is titled "Transmitter Power Control System" and is based on application Ser. No. 773,047 filed October 8, 1991.

that's the '262 patent. Is there any power control disclosed in CX-40?

A. The answer is yes.

Q. Okay. Can you describe it, please?

A. This describes an open and a closed loop, combination of power control, which is best and most simply shown in figure 5.

* * *

Q. Was there any other power control techniques utilized in the, in CX-40, besides what you have described as closed loop and open loop?

A. This is all about closed loop and open loop in an analog fashion.

JUDGE LUCKERN: So your answer is no, that there is nothing else disclosed?

THE WITNESS: Not that I know of, no.

BY MR. McMAHON:

* * *

Q. Looking at figure 5 of CX-40, did you consider any other -- any power control techniques besides what's disclosed?

JUDGE LUCKERN: Well, in figure 5, only the closed loop and open loop is disclosed in figure 5, isn't there, and that's all there is?

THE WITNESS: That's what it is all about is closed loop and open loop.

* * *

JUDGE LUCKERN: There wasn't any objection, but looking at figure 5, did you consider any other power control techniques -- well, that's the question.

MR. VERHOEVEN: I don't even -- I don't believe I objected to that question, did I?

JUDGE LUCKERN: I don't see any objection there. I just made that comment here. We have got an answer. All right. However you want

to proceed.

BY MR. McMAHON:

Q. Can you answer the question, Doctor? Do you need it back?

A. Did I consider others?

Q. Power control techniques?

A. Other than open and closed loop?

Q. That's correct.

A. No.

Q. Why not?

A. Because that combination as we had worked out in the tests and everything, it worked. It solved the near-far problem.

(Tr. at 265-70 (emphasis added).) Later in the hearing when QUALCOMM's expert Verdu was cross-examined on Wheatley's testimony, supra, Verdu testified:

Q. So Dr. Wheatley testified that his technology that he developed, which is the primary prior art in this case, was the technology that solved the near-far problem, right?

A. Well, Dr. Wheatley said what he said there, but one thing is to solve a problem in the abstract and come up with a circuit that may not be a simple circuit to implement, that may not be suitable for small handsets that have to be produced in very, very large quantities.

So one thing is solving a problem and another one, another issue is solving a problem in a way that can be produced cost effectively.

Dr. Wheatley testified that his technology solved the near-far problem, correct?

A. That's what it says here.

Q. Now, you showed us a number of articles on your direct

examination [to support commercial issues of the patents in issue]. Did any of those articles specifically refer to look-up tables?

A. No.

Q. None of them did, did they?

A. No.

Q. Did any of those articles refer to a maximum gain setting?

A. No.

Q. None of them did, did they?

A. No.

* * *

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(Tr. at 3756-62.)

Verdu later testified that he{

}" (Tr. at 3765.) However, there is no testimony from Verdu that he made an analysis of said patents and said other patents pending[59] to determine whether they were responsible for the commercial success of QCP-800 versus the other patents that were listed. Moreover, it is a fact that inventor Wheatley testified that it was the combination of the open and closed loop that solved the "near-far" problem.

Based on the foregoing, the administrative law judge rejects complainant's argument that there is evidence of secondary considerations that indicate that the asserted patents are not obvious.[60]

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[59] The '408 patent was filed on March 20, 1995 and the '220 patent was filed on September 23, 1995, which dates were before the 1996 copyright date of the user manual (CX-187C) that had referenced the '473 patent, which did not issue until September 19, 1995. Hence, said filing dates of the '408 patent and '220 patent and the copyright date of CX-187C indicate that the pendings of the applications for the '408 and '220 patents could have been on the list.

[60] While the administrative law judge has found the absence of secondary considerations as they relate to the '220 and '408 patents, he has found in Section VIII.B, supra, that respondents have not established, by clear and convincing evidence, that said patents are invalid based on any prior art.

IX. Validity Best Mode

Respondents argued that the '473 patent is invalid because QUALCOMM failed to disclose the best mode for carrying out the claimed invention in issue; that the evidence shows that the inventors subjectively considered a two RAM Table embodiment using linear interpretation to be the best mode for the linearizer; and that QUALCOMM's identification of a linearizer in the '473 patent without more, was insufficient to satisfy its obligations to disclose its best mode in detail. (RBr at 130-5.)

Complainant argued that respondents have not shown, by clear and convincing evidence, that the inventors or their attorneys failed to disclose the best mode for practicing the '473 patent. (CBr at 131-6.)

The staff argued that respondents' evidence as a whole fails to show that the inventors considered an undisclosed linearizer to constitute the best mode for practicing the '473 patent. (SBr at 77-81.)

Title 35 U.S.C. § 112, ¶ 1 requires, in relevant part, that the patent specification "set forth the best mode contemplated by the inventor of carrying out his invention." The Federal Circuit has articulated a "two-prong" inquiry for determining best mode disclosure compliance:

> Our case law explicating the best mode requirement focuses on a two-prong inquiry. . . . First, the factfinder must determine whether, at the time of filing the application, the inventor possessed a best mode for practicing the invention. . . . Second, if the inventor possessed a best mode, the factfinder must determine whether the written description disclosed the best mode such that one reasonably skilled in the art could practice it. . . . The first prong involves a subjective inquiry, focusing on the inventor's state of mind at the time of filing. . . . The second prong involves an objective inquiry, focusing on the scope of the claimed invention and the level of skill in the art.

Eli Lilly & Co. v. Barr Laboratories, Inc., 251 F.3d 955, 963 (Fed. Cir. 2001) (emphasis added).

The Federal Circuit has explained the subjective nature of the best mode inquiry:

> Unlike enablement, the existence of a best mode is a purely subjective matter depending upon what the inventor actually believed at the time the application was filed. Because of the subjective nature of the best mode inquiry, the best mode disclosure requirement – unlike enablement – cannot be met by mute reference to the knowledge of one of skill in the art.

Bayer AG v. Schein Pharms., Inc., 301 F.3d 1306, 1314 (Fed. Cir. 2002) (emphasis added).

Compliance with the best mode requirement is a question of fact. Northern Telecom Ltd. v. Samsung Electronics Co., Ltd., 215 F.3d 1281, 1286 (Fed. Cir. 2000). Moreover

> "the first task in any best mode analysis is to define the invention at hand. The definition of the invention, like the interpretation of the patent claims, is a legal exercise, wherein the ordinary principles of claim construction apply."

Id. at 1286-87. A finding of patent invalidity based on best mode "requires clear and convincing evidence that the inventor both knew of and concealed a better mode of carrying out the claimed invention than that set forth in the specification." Liquid Dynamics Corp. v. Vaughan Co., 449 F.3d 1209, 1223 (Fed. Cir. 2006) (citations omitted). See also Panduit Corp. v. Dennison Mfg., Co., 810 F.2d 1561, 1570 (Fed. Cir. 1987).

The QCP-800 was the first QUALCOMM product to practice the patents in issue. (RFF XI.1 (undisputed).) The QCP line of phones used linearizers comprised of{ } (RFF XI.2 (undisputed).) The QCP-800 used a mobile station modem chip called the MSM2P which was the brains of the phone. (RFF XI.3 (undisputed).) MSM2P chip implemented the power control, in the QCP-800. (RFF XI. 4 (undisputed).) The MSM2P chip used linearizers containing{ } (RFF XI. 5(undisputed).)

Respondents argued that the design for the linearizers of the MSM2P was disclosed in a number of Qualcomm documents prior to the application for the '473 patent on February 28, 1994. See RFF XI.6. Hence, it is argued that said design should have been disclosed in the '473 patent.

The administrative law judge finds unrefuted testimony from inventor Weiland that at the time that the application for the QUALCOMM patents at issue in this investigation was filed on February 28, 1994,{ }(Weiland, Tr. 527-528) and also specifics regarding the{ }(JX-299C (Weiland Dep.) at 96-98; Weiland, Tr. at 537-38.) Respondents rely on JX-45C which is a document titled { }dated January 10, 1994. (RFF XI.11 (undisputed).){ }(Weiland, Tr. at 529, 532-36; JX-124C (MSM2 HLD) at QNITC23339 (also JX-45 at QNITC23339).)

Respondents refer to JX-257C which is a document titled{ }dated January 26, 1994. (RFF XI.18 (undisputed).) JX-257C contains a figure, Figure 3.2.2.1, showing{ } However it states that{ }(JX-257C at QNITC0012748-49.) Moreover JX-257C is a proposed design for an{ } (JX-257C at QNITC0012732.) In addition in late January 1994, QUALCOMM engineers created a preliminary draft (denoted{ } to emphasize its very preliminary nature) for what they called the{ } that would be used to test and verify the early stage proposed design elements. Said draft states: { } (JX-257C at QNITC 0012732.)

Respondents rely on JX-150 which is U.S. Patent No. 5,627,857 (the '857 patent). The named inventor of the '857 patent is Nathaniel Wilson,[61] and the patent's assignee is QUALCOMM. (JX-150.) The patent application for JX-150 was filed on September 15, 1995 and the patent bears the title LINEARIZED DIGITAL AUTOMATIC GAIN CONTROL. (JX-150.) The subject of the '857 patent was patented on May 6, 1997. (JX-150.) The '857 patent does disclose "a linearized digital control apparatus for automatic gain control (AGC) in a radio." (RFF XI.36 (undisputed).) Figure 6 of JX-150 discloses the preferred embodiment of the linearizer "us[ing] two small lookup tables and linear interpolation" which "simplifies the circuitry and reduces the amount of calibration data the radiotelephone must store. The linearizer . . . is comprised of two random access memory (RAM) look-up tables. One stores slope 610 and the other stores offset 605." (RFF XI.37 (undisputed).)

It is a fact that the '857 patent was filed on September 15, 1995 some seventeen months after the February 28, 1994 filing of the application that led to the '473 patent. Respondents argued that inventor Wilson worked out a linerization table using{

} no later than September 13, 1993 and refers to RX-236 which states:

{

}

(RX-23C at QNITC1519862).[62] (See RFF XI.46.) Wilson's three-sentence notation in RX-23C however includes no diagrams or details. Moreover inventor Wilson testified:

---

[61] Wilson is also a named inventor on the '473 patent. (JX-1.)

[62] Incorrectly cited by respondents as QNITC15198862.

> And then the 857 specifies that the tables contained slope and offset values, which implies that there's linear interpolation happening in the linearizers, which is not described at all in the 473 patent. It's not described in the 473 patent because we believe that the claims of 473 was a high level invention including linearizers. The claim of 857 is different and includes, for example, a detailed recitation of a "receive linearizer having a plurality of receive slope values and a plurality of receive offset values" whereas the more general claim of the 473 recites merely a "receive linearizer". By "optimize" I mean that for the 857 claim, I was focused on the specific design of the linearizer to conserve memory as a cost and production consideration whereas, for the 473, we were more focused on control.

(JX-361 at 164 including Errata (emphasis added).)

Based on the foregoing the administrative law judge finds that respondents have not established, by clear and convincing evidence, that the inventors of the '473 patent subjectively considered a particular AGC linearizer to be the best mode of practicing the claimed invention of the '473 patent before the February 28, 1994 filing date of said patent.

X. Infringement

The unfair acts covered under Section 337 include "all forms of infringement, including direct, contributory, and induced infringement." Certain Home Vacuum Packaging Machines, Inv. No. 337-TA-496, Order No. 44, 2004 ITC LEXIS 202 * 2 n.2 (March 3, 2004). To establish infringement, there must be a preponderance of evidence. See Kao Corp. v. Unilever United States, Inc, 441 F.3rd 963 (Fed. Cir. 2006). A determination of patent infringement encompasses a two-step analysis. Advanced Cardiovascular Systems, Inc. v. Scimed Life Systems, Inc., 261 F.3d 1329, 1336 (Fed. Cir. 2001) (Scimed). First, the court determines the scope and meaning of the patent claims asserted, and then properly construed claims are compared to the allegedly infringing device. Id. "Literal infringement of a claim exists when each of the claim limitations reads on, or in other words is found

in, the accused device." Allen Engineering Corp. v. Bartell Indus., 299 F.3d 1336, 1345 (Fed. Cir. 2002).

Under the doctrine of equivalents, "a product or process that does not literally infringe upon the express terms of a patent claim may nonetheless be found to infringe if there is equivalence between the elements of the accused product or process and the claimed elements of the patented invention." Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 21 (1997). Equivalency may be determined using the "triple identity test" and thus "focusing on the function served by a particular claim element, the way that element serves that function, and the result . . . obtained by that element . . . ." Id. at 39. Regardless of the linguistic framework of the test used, the "essentially inquiry" is: "[d]oes the accused product or process contain elements identical or equivalent to each claimed element of the patented invention?" Id. at 40.

Direct infringement includes the making, using, selling, offering for sale and importing into the United States an infringing product, without authority. 35 U.S.C. § 271(a). To prove direct infringement, the plaintiff must establish by a preponderance of the evidence that one or more claims of the patent read on the accused device either literally or under the doctrine of equivalents. Scimed, 261 F.3d at 1336.

A person may also infringe a patent claim indirectly. Section 271 (b) of the Patent Act provides that "[w]hoever actively induces infringement of a patent shall be liable as an infringer." To establish liability for induced infringement, "a patent holder must prove that once the defendants knew of the patent, they actively and knowingly aided and abetted another's direct infringement." DSU Med. Corp. v. JMS Co., 471 F.3d 1293, 1305 (Fed. Cir. 2006) (DSU Med. Corp.) (citations omitted). However, "[t]he mere knowledge of possible infringement by others does not amount to inducement;

specific intent and action to induce infringement must be proven." Id.

Additionally, 35 U.S.C. § 271(c) provides that:

> [w]hoever offers to sell or sells within the United States . . . a component of a patented machine, manufacture, combination or composition . . . constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of such patent, and not a staple article of commodity of commerce suitable for substantial noninfringing use, shall be liable as a contributory infringer.

Thus, "[i]n order to succeed on a claim of contributory infringement, in addition to proving an act of direct infringement, plaintiff must show that defendant knew that the combination for which its components were especially made was both patented and infringing, and that defendant's components have no substantial non-infringing uses." Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc., 424 F.3d 1293, 1312 (Fed. Cir. 2005).

Direct infringement is a necessary element of induced and contributory infringement. DSU Med. Corp., 471 F.3d at 1303.

A. The Accused Products

Complainant's infringement analysis refers to{ } (CBr at 44.) Complainant argued that CDX-45C illustrates its expert Verdu's opinion which sets forth how the hardware and software components and signals interact in the accused Nokia handsets and that all of the accused products infringed. (CFF H3.)

Respondents argued that complainant has not established infringement. They admitted that CDX-45C represents complainant's expert Verdu's opinions regarding the{ }accused products, which incorporate the{ } but argued that CDX-45C is inaccurate because it fails to identify certain power control -related components contained in the accused Nokia handsets

with{ } Respondents further argued that CDX-45C is inaccurate because Nokia's accused handsets with the{ } have certain hardware-based structural and functional differences from the{ }

The staff argued that none of the accused products have been proven to directly infringe any of the asserted claims of the '473, '408 and '220 patents and further because of no direct infringement, induced and contributory infringement "will not be discussed." (SBr at 47.) It is further argued that for purposes of this investigation, all the accused products are similar. (SPFF 23.)

The accused handsets have been grouped into three categories based on the Radio Frequency (RF) engine: { } (CDX-52C; SPFF 21 (undisputed).). These RF engines constitute the relevant hardware components within the handset. (Verdu, Tr. at 1047-48; SPFF 21 (undisputed).) The accused Nokia handsets operate on Global System for Mobile Communications (GSM) cellular systems, and comply with the General Packet Radio Services (GPRS) and Enhanced GPRS (EGPRS or EDGE) standards. (Petterson, Tr. at 2949; SPFF 25 (undisputed).) Qualcomm relies upon one of its baseband processors, the MSM6550, used in conjunction with a receiver, the RFR6500, and a transmitter, the RFT6150, to satisfy the domestic industry requirement. (Verdu, Tr. at 1628; SPFF 26 (undisputed).)

Regarding respondents' arguments that CDX-45C is inaccurate as to the accused products, respondents do not argue that said "power control-related components" in the{ }affect the infringement analysis. (See, generally, RBr; RRBr.) Although respondents have argued in their post-hearing submissions that the differences of the{ } do affect the infringement analysis, said arguments were not made during the trial, and are unsupported by expert trial testimony. (See Section X.B.7, infra.) Therefore, the administrative law judge finds that the{ } accused

products are representative of all 117 accused products. (SBr at 47.)

B. Claim 1 Of The '473 Patent

Preamble

The preamble of claim 1 of the '473 patent reads:

> "A method for correcting transmit power of a radio device having a plurality of predetermined calibration values and a reference voltage signal, the radio device transmitting and receiving on a plurality of frequencies, each frequency having a frequency index, the method comprising the steps of:" (JX-1 at 7:9-14.)

The administrative law judge has found in Section VII.B.1, supra, that the preamble of claim 1 of the '473 patent is a limitation on the claim. In Sections X.B.4, X.B.5, X.B.8, and X.B.9, infra, the administrative law judge finds that the accused products have no calibration values as required by the elements of claim 1 of the '473 patent. As the administrative law judge has found, supra calibration values have antecedent basis in the preamble. See Section VII.B.1, supra. Therefore, the administrative law judge finds that the accused products do not have all the elements required by the preamble of claim 1 of the '473 patent.

1. The first element of claim 1 "receiving a first signal having a first gain, a first frequency of the plurality of frequencies, and the first frequency having a first frequency index"

Complainant argued that the Nokia accused handsets practice this first element of claim 1 of the '473 patent, and that the only disputed issue is whether the accused products have a "frequency index." (CBr at 45.) Specifically, complainant argued that:

{

}

(CBr at 36 (emphasis in original).)

Respondents argued that:

{

}

(RRSPFF 99c.)

The staff argued that Nokia does not contest QUALCOMM's allegation that its accused devices practice "elements [a], [b], [f], and [g] of claim 1 of the '473 patent," citing CX-243C; RDX-62C:16; Helgert, Tr. at 2504-05; that Nokia also does not contest QUALCOMM's allegation that its accused devices practice "elements [a] and [d] of claim 3 of the '473 patent," citing CX-243C; RDX-62C:17; Helgert, Tr. at 2505-06 and that in any event, QUALCOMM has met its burden of proof with respect to those uncontested claim elements, citing Verdu, Tr. at 1299-1311, 1402-08, 1439-40, 1452. With respect to the remaining elements, the staff argued that Nokia challenges the assertion that its handsets satisfy the following claim limitations: (1) integrator, (2) the automatic gain control setpoint, (3) the frequency index, and (4) the first [receive] and second [transmit] calibration values, citing RDX-62C:16-17; Helgert, Tr. at 2504-06; that in the staff's view, the evidence presented at the hearing supports a finding that Nokia's handsets do not "generat[e] a second [transmit] calibration value," and therefore do not meet "elements [h] and [i] of claim 1 or element [e] of claim 3 of the '473 patent," either literally or under the doctrine of equivalents. The staff, however, believes that the evidence supports a finding that Nokia's handsets meet the other claim elements of said claims 1 and 3. (SBr at 47-8.)

The private parties agree that respondents' accused products practice this first element of claim 1 of the '473 patent, except for disputing the claim term "frequency index." (CFF H23 (undisputed).)

The administrative law judge has construed the term "frequency index" as "a value specifying the current center frequency on which the receive chain is operating, or the current center frequency on which the transmit chain is operating." (See Section VII.B.2, supra.) The parties admit that in CDX-45C, Rx UHF is the first signal recited in this claim element. (CFF H24 (undisputed).) The received signal is received within one of four different bands: GSM-850, GSM-900, GSM-1800 and GSM-1900. (Pettersson, Tr. at 2904, 2907-08.) {

} (Verdu, Tr. at 1946-47; Frederiksen, Tr. at 2826-27; Helgert, Tr. at 2457-58, 2466-67.) As found in Section VII.B.2, supra, a "frequency index" is not limited to only a channel, but may be an index to a band. Therefore, the administrative law judge finds that{ } is a "first frequency index" as recited in this claim element. Based on the foregoing, the administrative law judge finds that respondents' accused products practice the first element of claim 1 of the '473 patent.

2. The second element of claim 1 "determining a receive power value of the first signal"

Complainant argued that the Nokia accused handsets practice this second element of claim 1 of the '473 patent, and that there is no dispute regarding this element. (CBr at 46.)

Respondents do not dispute that their products perform this second element. (CFF H37, CFF H38 (undisputed).) Also the staff argued that respondents did not dispute that their accused products practice said second element. See supra. Hence, the administrative law judge finds that the Nokia accused products practice the second element of claim 1 of the '473 patent.

3. The third element of claim 1 "generating an automatic gain control setpoint in response to the receive power value and the reference voltage signal"

Complainant argued that the Nokia accused handsets practice this third element of claim 1 of the '473 patent both literally and under the doctrine of equivalents. (CBr at 46.) Specifically, complainant argued that the AGC setpoint is{ } and is computed as{

} (CBr at 47.)

{

}

The administrative law judge has found, supra, that the term "automatic gain control setpoint," is construed as "the value generated by integrating a detected power value with respect to a reference value to automatically change the gain of a receiver or transmitter." (See Section VII.B.3.) Considering literal infringement, complainant argued with regard to the{ }

{

}

{

}

(CBr at 46-47.) {

}

{

} Based on the foregoing, the administrative law judge finds that Nokia's accused products do not literally practice the third element of claim 1 of the '473 patent.

Regarding the doctrine of equivalents, complainant argued:

{

}

(CBr at 52-53.) As noted, supra, the signal labeled{

} Because the claim language is specific about the requirement for an integration of a received power and a reference voltage, the administrative law judge finds that the reference signal as represented in CDX-45C does not perform substantially the same function as required by the claim element. Moreover, in regard to the transmit amplifier, the

{

} (RFF V.28 (undisputed).) Furthermore,

complainant's expert Verdu stated that{ } has no dependance on the reference voltage level:

{

}

(Verdu, Tr. at 1433-1434 (emphasis added).) Therefore, as the accused products attempt to remove

from{

} the administrative law judge finds that the accused products cannot be said to use{ } in substantially the same way as disclosed in this third claim element. Therefore, the administrative law judge finds that complainant has not established that the accused products practice said third element by the doctrine of equivalents.

While the staff argued that the output of{ } is an automatic gain control setpoint (SBr at 48-49), the administrative law judge finds that said output cannot literally be the claimed automatic gain control setpoint because said signal is not the result of a direct integration of a reference voltage level and a detected power level. Also he finds that said output does not satisfy this third claim element under the doctrine of equivalents for the same reasoning as regarding{

} and hence it cannot be used in substantially the same way as the claimed automatic gain control setpoint.

4. The fourth element of claim 1 "selecting a first predetermined calibration value in response to the automatic gain control setpoint and the first frequency index"

Complainant argued that the Nokia accused handsets practice this fourth element of claim 1 of the '473 patent both literally and under the doctrine of equivalents. (CBr at 53.) Specifically, complainant argued that the signal labeled { } in CDX-45C is the first predetermined calibration value and is computed in response to the{

} in selecting said the first calibration value. (CBr at 53-54.)

Respondents argued that the accused products do not use a frequency index, that{ } is not an AGC setpoint, and that{ } is not an input to the{ } block and hence that the accused products cannot practice said fourth element. (RBr at 55.)

The staff argued that the{

} hence that the accused products practice said fourth element. (SBr at 51.)

The administrative law judge has found in Section X.B.1 supra, that{ } is a frequency index. However the administrative law judge has found in Section X.B.3 supra, that { } is not an automatic gain control setpoint. Therefore, the administrative law judge finds that said fourth element is not literally practiced by the accused products.

Regarding the doctrine of equivalents, the administrative law judge has found in Section X.B.3, supra, that the signal{ } is also not an automatic gain control setpoint under the doctrine of equivalents. As this fourth element of the claim requires an automatic gain control setpoint, and no such signal, either literally or under the doctrine of equivalents is used, the administrative law judge finds that the accused products cannot perform substantially the same function in substantially the same way as required by the claim element. Therefore, the administrative law judge also finds that said fourth element is not practiced by the accused products under the doctrine of equivalents.

5. The fifth element of claim 1 "adjusting the first gain in response to the first calibration value"

Complainant argued that the Nokia accused handsets practice this fifth element of claim 1 of the '473 patent both literally and under the doctrine of equivalents. (CBr at 55.) Specifically, complainant argued that{

} (CBr at 55.)

Respondents argued that Nokia's accused handsets do not include a first predetermined

calibration value because the{

} Hence it is

argued that the accused products do not practice this fifth element. (RRCFF H136a.)

The staff argued that the{ } parameter in Nokia's handsets meets the requirement of a "first predetermined calibration value" in this element of claim 1 because it is selected in response to both the AGC setpoint and the first frequency index and hence that the accused products practice said fifth element. (SPFF 117.)

The administrative law judge found in Section X.B.4, supra, that the accused products do not have a first calibration value. Therefore, the administrative law judge finds that said fifth element of claim 1 of the '473 patent is not practiced by the accused products.

6. The sixth element of claim 1 "transmitting a second signal having a second gain and a second frequency of the plurality of frequencies, the second frequency having a second frequency index"

Complainant argued that the Nokia accused handsets practice this sixth element of claim 1 of the '473 patent both literally and under the doctrine of equivalents. (CBr at 56.) Specifically, complainant argued that the only dispute is whether a frequency index that identifies a frequency band satisfies the claim, and that the variable labeled{ } in CDX-45C is the frequency index that specifies on which transmitter frequency or transmitter band the transmitter is operating. (CBr at 56-57.)

Respondents argued that the { } value identifies only the band on which the handset is transmitting because different hardware is used for each band, and that the{ } value does not identify the specific frequency channel, within that band, on which the transmitter is operating.

Hence, it is argued that the accused products do not practice this sixth element. (RBr at 54.)

The staff argued that respondents do not contest QUALCOMM's allegation that their accused devices practice this sixth element of claim 1 of the '473 patent. (SPFF 99.)

Respondents do not appear to dispute any portion of this claim, except regarding the "frequency index" limitation. (See generally, RBr at 54-66; RRBr at 41-42.) The{ } variable specifies on which transmitter band the handset is transmitting. (Verdu, Tr. at 1406:2-12, 1416:1-1417:12; Helgert, Tr. at 2468:13-2469:5; Frederiksen, Tr. at 2873:15-2875:2; JX-132C at 0000099:16520, 16534-35, 16540-41; JX-63C:43.) By the same reasoning for{

}

is a frequency index. Based on the foregoing, the administrative law judge finds that the accused products meet this sixth element claim limitation.

7. The seventh element of claim 1 "determining a transmit power value of the second signal"

Complainant argued that the Nokia accused handsets literally practice this seventh element of claim 1 of the '473 patent. (CBr at 57.) Complainant further argued that all of respondents' accused products practice said claim element, including those using the{ } (CRBr at 43.)

Respondents argued that the accused handsets{

} as required by this element of the claim 1 of the '473 patent and hence do not practice said seventh element. (RBr at 62.) Respondents do not appear to dispute that the other accused products meet said seventh element claim limitation. (SPFF 99 (undisputed in relevant part).)

The staff did not provide an argument regarding this seventh claim element, but did not object to respondents' argument regarding non-infringement of the{ } (See Staff Reply to Nokia's Proposed Findings at RFF V.71.)

Respondents disclaimed any argument regarding this claim element in their interrogatory responses. (See CX-243C at Exhibit F, p. 3.) During a telephone conference on September 7, 2007, counsel for respondents also disclaimed any argument regarding infringement of the seventh element of claim 1 of the '473 patent:

> JUDGE LUCKERN: All right, let's go to the infringement argument that's been made that I see here. And let's go to claim one of the 473 patent.
>
> I'm now talking about infringement or claim construction, but as far as what is construed to be infringing and I'll ask the Respondents and the staff, but I didn't find any arguments of the Respondent or the staff. Of course to infringe you've got to look at the whole claim in itself. But I have in the past sometimes broken it down into elements of the claim and of course I come out with no infringement if it hasn't met one of the elements.
>
> So with that comment that I've just made on the record I didn't see where the Respondent or the staff offered any argument with respect to infringement of claim one of the 473 patent with respect to the, one, the preamble of claim one, two, the first element of claim one. And I'm talking about the 473 patent. That, of course, "element receiving the first signal, having a first gain, a first frequency of the plurality of frequencies, first frequency having the first frequency index."
>
> Also I didn't see where the Respondent or the staff offered any argument with respect to infringement as it relates to the second element of claim one of the 473 patent which reads, "Determining a received power value of the first signal."
>
> Also, I didn't find any arguments of the Respondent and the staff with respect to the fifth element of claim one of the 473 patent, again with respect to infringement. And that, of course, element reads, "adjusting the first gain in response to the first calibration value."
>
> Same, I didn't see any arguments with respect to non-infringement -- of course you've got to infringe the whole claim but looking at these particular elements made anything about the sixth element of claim one of the 473 patent which reads, "transmitting a

second signal having a second gain and a second frequency of the plurality of frequencies, second frequency having the second frequency index."

The same thing with respect to the seventh element, I didn't see any arguments from the staff and Respondent, this is with respect to claim one of the 473 patent. That element reads, "determining a transmit power value of the second signal."

And also with respect to the ninth element of claim one as to any infringement with respect to that particular element. That reads, "adjusting the second gain in response to the second calibration value."

Now, I've gone through a lot of the clauses of claim one of the 473 patent but you people, the staff and Respondent, have lived with this for over a year so you should know precisely where you stand with respect to non-infringement. Am I correct, Mr. Verhoeven, with respect to offering no arguments as far as these particular elements as to why these do not infringe?

* * *

MR. VERHOEVEN: The seventh element we don't dispute. So you're correct on that one.

(Tr. at 91-94, 96 (emphasis added).) Moreover respondents did not raise any argument regarding this seventh claim element at the hearing. In fact, the only citation to the hearing transcript that respondents made in their proposed findings is the following:

Q. The next slide, RDX-61C, page 24, do you see that?

A. I do.

Q. Did you prepare this slide?

A. I did.

Q. Did you prepare the diagram disclosed in this slide?

A. Yes, I did.

Q. What does this slide represent?

A. This slide now focuses on the transmit side of the Nokia handsets.

Q. And this is intended to represent, with the exception of the{ } this is intended to represent the functionality of all of the accused Nokia handsets, correct?

A. With the possible exception of some of the{ } handsets.

Q. Yes.

A. Yes.

(Helgert, Tr. at 2371-72 (emphasis added).) The answer emphasized in this excerpt was in response to a leading question by counsel, and said answer was not definitive. No other mention of{ } is cited, and no reason is given, either in this excerpt or in the post-hearing submissions, for respondents' change of position. Respondents even argued in their post hearing reply submission that "Qualcomm's post-hearing brief does not contain any evidence or argument concerning Nokia's{ } handsets." (RRBr at 45.) Such omission by QUALCOMM is not unexpected, given that respondents had led each of the other parties and the administrative law judge to believe that there was no dispute regarding { } handsets. Complainant did make reference to this element in its rebuttal to Nokia's proposed findings of fact. (CRRFF III.203-205 CRRFF V.55-56.) However, the administrative law judge finds that respondents have waived their right to so argue non-infringement in view of their discovery responses, testimony at the hearing and, with no explanation or warning, after the hearing has concluded, especially where, as here, no expert trial testimony exists exploring the issue. Based on the foregoing, the administrative law judge finds that all of the accused products practice this seventh element of claim 1 of the '473 patent.

8. The eighth element of claim 1 "generating a second calibration value in response to the automatic gain control setpoint, the second frequency index, and the transmit power value; and"

Complainant argued that the Nokia accused handsets practice this eighth element of claim 1 of the '473 patent both literally and under the doctrine of equivalents. (CBr at 58.) Specifically, complainant argued that the{

} (CBr at 58-59.)

Respondents argued that no "second calibration value" exists in the accused products because said value must be predetermined, and in the accused products it is{

} (RBr at 57-59.)

The staff argued that the accused products do not generate a second calibration value because {

} and hence that the accused products do not practice said eighth element. (SBr at 52-54.)

Complainant, in support of its argument, argued that the linear combination of{

} block in the middle of CDX-45C. (CBr at 58-59.) Complainant further argued that the box labeled{

} The administrative law judge has

found in Section X.B.3, supra, that{ } is not an automatic gain control setpoint, and also that said signal is not even{ } Moreover, the administrative law judge has found in Section VII.B.4 that the claim term "calibration value(s)" means "corrected gain control settings loaded into a look-up table during factory calibration or production testing of the radio." Although{

} Therefore, the administrative law judge finds that this element is not literally practiced by the accused products.

Regarding the doctrine of equivalents, the claims require that an automatic gain control setpoint, a frequency index, and a transmit power value be used to generate the second calibration value. As found, in Section X.B.3 supra,{

} Therefore, the administrative law judge finds that the accused products do not perform substantially the same function in substantially the same way, and cannot achieve substantially the same result. Based on the foregoing, the administrative law judge finds that the accused products do not practice this eighth element of claim 1 of the '473 patent.

9. The ninth element of claim 1 "adjusting the second gain in response to the second calibration value"

Complainant argued that the Nokia accused handsets practice this ninth element of claim 1 of

the '473 patent both literally and under the doctrine of equivalents. (CBr at 61.) Specifically, complainant argued that the second calibration value, which is the{

} (CBr at 61.)

Respondents argued that Nokia's handsets do not generate a second calibration value in response to the AGC setpoint, the second frequency index and the transmit power value to adjust the second gain under any party's proposed constructions and thus that the accused products do not practice said ninth element. (RRCFF H221a.)

The staff argued that the Nokia accused handsets do not practice said ninth element. (SBr at 48.)

The administrative law judge has found, supra, that the accused products do not have a "second calibration value." Therefore, the administrative law judge likewise finds that the accused products do not practice this ninth element of claim 1 of the '473 patent.

Based on the foregoing, the administrative law judge finds that complainant has not established, by a preponderance of the evidence, that the accused products literally or under the doctrine of equivalents infringe claim 1 of the '473 patent.

C. Claim 3 Of The '473 Patent

Preamble

The preamble of claim 3 of the '473 patent reads:

> "A radio performing transmit power calibration, the radio transmitting and receiving signals having a plurality of frequencies, each frequency having a frequency index, the radio transmitting signals through a variable gain, transmit amplifier having a control input and receiving signals through a variable gain, receive amplifier having a control input, the radio comprising..."

(JX-1 at 7:43-49.)

The administrative law judge has found in Section VII.B.1, supra, that the preamble of claim 3 of the '473 patent is a limitation on the claim. Respondents have admitted that the accused products are radios. (RFF III.8 (undisputed); ROCFF E27; RRCFF E27a-d.) The administrative law judge has also found in Section X.B.1, supra, that the accused products have a frequency index. Respondents further have admitted that their accused products also contain a transmit amplifier and a receive amplifier. (CFF E34 (undisputed); RRCFF H1s; RRCFF H49b.) Therefore, the administrative law judge finds that the accused products contain all the elements required by the preamble of claim 3 of the '473 patent.

1. The first element of claim 3 "a power detector, coupled to the receive amplifier, for generating a first power value from a received signal having a first frequency"

Complainant argued that the Nokia accused handsets literally practice this first element of claim 3 of the '473 patent, and that Nokia does not dispute this. (CBr at 62.)

Respondents do not provide a counter argument regarding said first claim element. (RBr at 63.)

The staff argued that respondents did not contest that their accused products practice the first element of claim 3 of the '473 patent. (SBr at 47.)

The parties agree that the accused products practice the first claim element. (CFF H232-233 (undisputed).) Also, respondents, at the teleconference on September 7, 2007, disclaimed any non-infringement argument regarding said first claim element:

> JUDGE LUCKERN: All right. Well, let's go to claim three of the 473 patent. Again I didn't see any arguments by Respondents and the staff as to why the accused doesn't infringe. Zeroing in on maybe perhaps what you said with respect to claim one, Mr. Verhoeven, but with respect to the preamble on the second thing with respect to the first element that reads "a power detector coupled to the receiver amplifier

for generating a first power value from a received signal having a first frequency." Or the fourth element, and that reads, "A second power detector coupled to the transmit amplifier for generating a second power value from a transmitted signal having a second frequency."

I'm reading in these elements because some people may have a different view as to what the first, second, third and fourth elements. But in any event as to the preamble the first element which I read into the record and also the fourth element am I correct, Mr. Verhoeven, that you haven't zeroed in on non-infringement as it deals with those elements?

MR. VERHOEVEN: Your Honor, you're correct. I just want to have one caveat for the record though is that we do dispute that the accused devices have a frequency index. And the word "frequency" appears in those claims but they're not talking, as I read them, about a frequency index. Well, I guess the preamble does say the frequency index. So we would dispute that we have that frequency index. So that one word, Your Honor, should be aware of.

As to the elements one and four you're correct, we aren't raising arguments on those.

(Tr. at 99-100 (emphasis added).)

Based on the foregoing, the administrative law judge finds that the accused products practice the first element of claim 3 of the '473 patent.

2. The second element of claim 3 "an integrator, coupled to the power detector, for generating an automatic gain control setpoint from the first power value"

Complainant argued that the Nokia accused handsets practice the second element of claim 3 of the '473 patent both literally and under the doctrine of equivalents. (CBr at 62.) Specifically, complainant argued:

{

}

{

}

(CBr at 62-63.)

Respondents argued that the accused products do not include an integrator as defined in the '473 patent; that{ } is not an AGC setpoint;{

} Hence, it is argued that the accused handsets do not have said second element. (RBr at 63-64.)

The staff argued that the accused products do contain an integrator, and that the received power value is adjusted in Nokia's handsets with respect to a reference value. (SBr at 50-51.)

This second claim element requires an automatic gain control setpoint. The administrative law judge has found in Section X.B.3, supra, that the accused products do not use an automatic gain control setpoint, either literally or under the doctrine of equivalents. Therefore, the administrative law judge finds that the accused products do not practice the second element of claim 3 of the '473 patent.

3. The third element of claim 3 "a receive linearizer, coupled to the integrator and the receive amplifier, for generating a receive calibration value in response to the automatic gain control setpoint and a first frequency index corresponding to the first frequency, the receive calibration value being coupled to the receive amplifier control input for adjusting the gain of the receive amplifier"

Complainant argued that the Nokia accused handsets practice this third element of claim 3 of the '473 patent both literally and under the doctrine of equivalents. (CBr at 63.) Specifically,

complainant argued:

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}

(CBr at 63-64.)

Respondents argued that{

} is the receive linearizer, and the table does not generate a calibration value. Hence, it is argued that the accused products do not have said third element. (RBr at 65-66.)

The staff provided no argument regarding this third claim element.

This third claim element requires an automatic gain control setpoint. The administrative law judge has found, supra, that the accused products do not use an automatic gain control setpoint, either literally or under the doctrine of equivalents. Therefore, the administrative law judge finds that the accused products do not practice the third element of claim 3 of the '473 patent.

4. The fourth element of claim 3 "a second power detector, coupled to the transmit amplifier, for

generating a second power value from a transmitted signal having a second frequency; and"

Complainant argued that the Nokia accused handsets literally practice this fourth element of claim 3 of the '473 patent, and that respondents do not dispute this. (CBr at 65.)

Respondents argued that this fourth element of claim 3 requires a power detector, and

{

} (RBr at 71.)

Respondents do not dispute that the{ } handsets practice this fourth element. (RRCFF H265a.)

The staff argued that respondents do not dispute that the accused products practice this fourth claim element. (SBr at 47.)

Respondents do not provide an argument regarding said claim element in their interrogatory responses. (See CX-243C at Exhibit F, p. 6.) Respondents, at the teleconference on September 7, 2007, disclaimed any non-infringement argument regarding this claim element. See transcript quoted, supra, as to the first claim element of said claim 3. Based on the foregoing, the administrative law judge finds that the accused products practice the fourth element of claim 3 of the '473 patent.[63]

5. The fifth element of claim 3 "a transmit linearizer for generating a transmit calibration value in response to the automatic gain control setpoint, the second power value, and a frequency index corresponding to the second frequency, the transmit calibration value being coupled to the control input of the transmit amplifier for adjusting the gain of the transmit amplifier."

Complainant argued that the Nokia accused handsets practice this fifth element of claim 3 of the '473 patent both literally and under the doctrine of equivalents. (CBr at 66.) Specifically, complainant argued that "[t]he transmit linearizer in the Nokia handsets is comprised of at least the

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[63] For further reasoning rejecting respondents'{ } non-infringement argument, see also Section X.B.7, supra.

{

} (CBr at 66.)

Respondents argued that complainant cannot point to any functionality in the accused handsets that generate a calibration value based on the inputs of a frequency index, an automatic gain control setpoint, and the power value of the transmit signal. (RBr at 68.) Respondents further argued that the patent requires that the linearizer be a "look-up table." Hence, it is argued that the accused handsets do not practic said fifth element. (RRBr at 15.)

The staff argued that the{ }vlaue that QUALCOMM argued is an automatic gain control setpoint cannot be an AGC setpoint because{

} (SBr at 52.)

This fifth claim element requires an automatic gain control setpoint. The administrative law judge has found in Section X.B.3, supra, that the accused products do not use an automatic gain control setpoint, either literally or under the doctrine of equivalents. Therefore, the administrative law judge finds that the accused products do not have the fifth element of claim 3 of the '473 patent.

Based on the foregoing, the administrative law judge finds that complainant has not established, by a preponderance of the evidence, that the accused products literally or under the doctrine of equivalents infringe claims 3 of the '473 patent.

D. Claim 1 Of The '408 Patent

Preamble

The preamble of claim 1 of the '408 patent reads:

> "A method for limiting transmit power of a radio operating in a radio communications system, the radio communications system comprising at least one base station that transmits signals including power control

commands to the radio, the radio comprising a variable gain amplifier and a maximum gain setting, the method comprising the steps of:"

(JX-2 at 6:58-63.)

The administrative law judge has found in Section VII.C.1, supra, that the preamble of claim 1 of the '408 patent is a limitation on the claim. Respondents have admitted that the accused products are radios. (RFF III.8 (undisputed); ROCFF E27; RRCFF E27a-d.) Respondents also have admitted that the accused products operate in a network with at least one base station. (CFF C3, CFF H293, CFF H561 (undisputed).) The administrative law judge has found in Section X.D.2, infra, that power control commands are transmitted to the radio by the base station. Respondents have admitted that the accused products comprise a variable gain amplifier. (See, inter alia, CFF H12, CFF H50, CFF H76 (undisputed); CFF H589 (undisputed in relevant part).) The administrative law judge has found, however, in Section X.D.4, infra, that the accused products do not comprise a maximum gain setting. Therefore, the administrative law judge finds that the accused products do not practice the preamble of claim 1 of the '408 patent.

1. The first element of claim 1 "determining an open loop power control value in response to a signal received from the at least one base station"

Complainant argued that the Nokia accused handsets practice this first element of claim 1 of the '408 patent both literally and under the doctrine of equivalents. (CBr at 70.) Specifically, complainant argued that the open loop power control value is{ }, which is the AGC setpoint in Nokia's handsets, as complainant described for the second and third elements of claim 1 of the '473 patent. (CBr at 70.) Complainant further argued that the AGC setpoint,{ } is indicative of the received power level. (CBr at 70.)

Respondents argued that all parties agree that the term "open loop power control value" refers

to the automatic gain control setpoint, and referred to their prior argument regarding non-infringement of the '473 patent. Hence, it is argued that the accused products do not practice this first element. (RBr at 87-88.)

The staff argued that the{ } signal is not an automatic gain control setpoint, but that the accused products do generate an open loop power control value. (SBr at 57.)

This first claim element requires an "open loop power control value." The parties agree that the open loop power control value is the same as the automatic gain control setpoint. (RFF V.132 (undisputed).) The administrative law judge has found in Section X.B.3, supra, that the accused products do not contain an automatic gain control setpoint either literally or under the doctrine of equivalents. Therefore, the administrative law judge finds that the accused products do not practice the first element of claim 1 of the '408 patent.

2. The second element of claim 1 "determining a gain adjust signal in response to the transmitted power control commands"

Complainant argued that the Nokia accused handsets practice this second element of claim 1 of the '408 patent both literally and under the doctrine of equivalents. (CBr at 72.) Specifically, complainant argued that power control commands are extracted from the base station signal gamma_ch and used by the accused Nokia handsets to determine a gain adjust signal. (CBr at 75.)

Respondents argued that, based on the same arguments presented regarding "power control commands" as for the '220 patent, their accused products do not receive power control commands either literally or under the doctrine of equivalents. (RBr at 88.) Specifically, respondents argued that gamma_ch (or Γ_{CH}) is not a power control command because said signal is not based on any measurement by the base station of the signal from the handset, and that said signal cannot turn up or

turn down power without that measurement. (RBr at 77-78.) Respondents also argued that said signal cannot cause a change in the power level of the handset because said signal is a constant that never changes. (RBr at 78.)

The staff argued that the Γ_{CH} value broadcast by the base station satisfies the claim requirement for multiple power control commands. (SBr at 59.)

The administrative law judge has found that "power control commands" are "commands from the base station instructing the radio to turn up or turn down power." (See Section VII.C.6, supra.) The parties agree that Γ_{CH} is a static parameter that is sent to every handset within a particular cell during GPRS or EDGE communications. (CFF H312, H320, H458 (undisputed).) The parties also agree that the accused Nokia handsets extract gamma_ch from the signal received from the base station. (CFF H315 (undisputed).) The parties further agree that the ccused Nokia handsets store the value of gamma_ch{ } corresponds to the gamma_ch sent by the base station. (CFF H318 (undisputed).) The gamma_ch parameter value is set by network operators. (CFF H453 (undisputed).) The parties agree that 3GPP TS 45.008 is a GPRS/EDGE Standard. (CFF C31 (undisputed).) Respondents admit that uplink transmit power for GPRS/EDGE transmissions is defined in 3GPP TS 45.008, specifically in § 10.2.1. (RRCFF E45b; see also Paul Tr. at 3071:20-3072:24; JX-118 at 65.) Respondents further admit that the GPRS/EDGE uplink power control algorithm operates according to the equation $P_{CH} = \min (T_0 - \Gamma_{CH} - \alpha * (C + 48), PMAX)$. (RRCFF E45c; see also Paul Tr. at 3072:19-24; JX-118:65.) Respondents also admit that Nokia's accused handsets comply with 3GPP TS 45.008. (RRCFF E45a; see also Helgert, Tr. at 2657:6-10, Verdu, Tr. at 1818:13-19; Frederiksen, Tr. at 2851:15-2853:16; Pettersson, Tr. at 2948:14-2949:5.) The 3GPP Standard states that, "When the [mobile station] receives new gamma_ch or alpha values,

the [mobile station] shall use the new value to update P_{CH} according to the equation (1) . . . [.]" (JX-118 at QHITC0021715 (equation (1) is the power control formula of §10.2.1 as can be seen by the (1) to the right of the power control formula on page QHITC0021714).) (CFF H329 (undisputed).) CX-123 shows that for the first day two entry, the test mobile moved from a cell that had alpha equal to eight and gamma_ch equal to 18 to a new cell that had alpha equal to one and gamma_ch equal to zero. (CFF H486 (undisputed).) Moreover, Γ_{CH} is defined by the 3GPP standard as "an MS and channel specific power control parameter, sent to the MS in an RLC control message (see 3GPP TP 44.060). (JX-118 at 65.) It is the only variable of this formula described specifically as a "power control parameter." (JX-118 at 65.) The administrative law judge has rejected respondents' proposed construction that said "power control commands" must be "based on the radio's power level as received by the base station." (See Section VII.C.6, supra.) Based on the foregoing, the administrative law judge finds that Γ_{CH} is a power control command, and that the accused products use Γ_{CH} to determinate a gain adjust signal. Therefore, the administrative law judge finds that the accused products literally practice this second element of claim 1 of the '408 patent.

3. The third element of claim 1 "combining the open loop power control value and the gain adjust signal to produce a summation signal"

Complainant argued that the Nokia accused handsets literally practice this third element of claim 1 of the '408 patent. (CBr at 79.) Specifically, complainant argued that the "accused Nokia handsets sum[] the open loop component, 'alpha * (c_value + 48)' with closed loop component, 'gamma_ch', to generate the summation signal, which is calls the 'preliminary value'." (CBr at 80.)

Respondents argued that "[b]ecause Nokia's handsets neither generate an open loop power control value ... nor generate a gain adjust signal ... Nokia's handsets cannot satisfy element [C]." (RBr

at 90.) Respondents further argued that the accused products never{

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(RBr at 90.)

The staff argued that "[b]ecause the open loop power control value is not sent to the transmit section of the handset, it is not combined with the gain adjust signal to produce a summation signal." (SBr at 60.)

This third claim element requires an "open loop power control value." The administrative law judge has found that the accused products do not have, either literally or under the doctrine of equivalents, an open loop power control value. (See Section X.D.1, supra.) Thus, the administrative law judge finds that the accused products do not practice this third element of claim 1 of the '408 patent, and do not have a summation signal.

4. The fourth element of claim 1 "comparing the summation signal to the maximum gain setting"

Complainant argued that the Nokia accused handsets practice this fourth element of claim 1 of the '408 patent both literally and under the doctrine of equivalents. (CBr at 80.) Specifically, it is argued that the{

} (CBr at 80.)

Respondents argued that "[b]ecause Nokia's handsets neither produce a summation signal ... nor comprise a maximum gain setting ... Nokia's handsets cannot satisfy this element." (RBr at 91.) Regarding "maximum gain setting," respondents argued that neither the PMAX nor the{ } values infringe, because they are limits on power, not gain. (RBr at 74.) Moreover, respondents argued that{

} (RBr at 72-73.)

The staff argued that this fourth element is not met, because the open loop power control value is not sent to the transmit section of the handset, and cannot therefore be combined with the gain adjust signal to produce a summation signal. (SBr at 60.) The staff also argued that the accused products do not comprise a "maximum gain setting." (SBr at 60-61.)

This fourth element requires a "summation signal." The administrative law judge has found in Section X.D.3, supra, that the accused products do not produce a summation signal as defined by the specification of the '408 patent.

The administrative law judge has found in Section VII.C.3, supra, that the claim phrase "maximum gain setting" is "an upper limit on the transmit gain setting that is hard coded into the radio during assembly or input during manufacturing and testing of the radio." It is undisputed that the accused products comply with Section 10.2.1. of the 3GPP Standard. (CFF E25 (undisputed).) Complainant argued that either PMAX{ } is the maximum gain setting the accused products. (CBr at 50; CRBr at 82; CRRFF V.85.) The MS output power formula in said Section 10.2.1 of the 3GPP standard is $P_{CH} = \min (T_0 - \Gamma_{CH} - \alpha * (C + 48), PMAX)$, and, as found in Section X.D.2, supra, respondents admit that the GPRS/EDGE uplink power control algorithm operates according to that formula. (RRCFF E45c; see also Paul Tr. 3072:19-24; JX-118 at 65.) In the description of that formula, PMAX is described as "the maximum allowed output power in the cell." (JX-118 at 65 (emphasis added).) The parties agree that PMAX is transmitted from the base station. (RFF III.185 (undisputed).) Therefore, PMAX is not hard coded into the radio during assembly or input during manufacturing and testing of the radio, as required by the claim. Further, complainant admits that PMAX specifies a limit to the value of Pch. (CRRFF V.88.G; see also RDX-61C:28.) Pch

is described in the description of the formula in 10.2.1 of the 3GPP standard as the "RF output power ... to be employed by the MS on each individual uplink PDCH..." (JX-118 at 65.) Also, the parties admit that Pch is the desired transmit power level, i.e. Pch is a power level, not an amount to change a gain. (RFF III.189 (undisputed).) The parties further agree that{

} (RFF III.187 (emphasis added) (undisputed).) Again, said maximum allowed transmission power of the mobile station is a power level, not an amount to change a gain. Complainant has admitted that a maximum gain setting is different from a maximum output power; that a maximum gain setting limits the amount of amplification that can be applied by the amplifier; that a maximum gain setting does not limit the output power of an amplifier because the input power could increase; and that a maximum power setting limits the overall output power of the phone, regardless of the amount of gain applied in an amplifier. (RFF V.81, RFF V.82, RFF V.83, RFF V.84 (undisputed).) Based on the foregoing, the administrative law judge finds{

} are limits on power, not gain, as is required by the claim. Therefore, the administrative law judge finds that the accused products do not practice a maximum gain setting.

Based on the foregoing, the administrative law judge finds that the accused products do not practice this fourth element of claim 1 of the '473 patent, because the accused products do not meet the requirement of a summation signal, and do not practice a maximum gain setting.

5. The fifth element of claim 1 "if the summation signal is greater than or equal to the maximum gain setting, adjusting the variable gain amplifier in response to the maximum gain setting; and"

Complainant argued that the Nokia accused handsets practice this fifth element of claim 1 of

the '408 patent both literally and under the doctrine of equivalents. (CBr at 83.) Specifically, complainant argued that the maximum gain setting, i.e.{ } is comparted to the{

} (CBr at 83.)

Respondents argued that "[b]ecause Nokia's handsets neither produce a summation signal ... nor comprise a maximum gain setting...," Nokia's handsets cannot satisfy said fifth element. (RBr at 91.)

The staff argued that said fifth element is not met because the open loop power control value is not sent to the transmit section of the handset, and cannot therefore be combined with the gain adjust signal to produce a summation signal. (SBr at 60.)

This fifth element requires a summation signal. The administrative law judge has found in Section X.D.3, supra, that the accused products do not have a summation signal. Thus, the administrative law judge finds that the accused products do not practice this fifth element of claim 1 of the '408 patent.

6. The sixth element of claim 1 "if the summation signal is less than the maximum gain setting, adjusting the variable gain amplifier in response to the summation signal."

Complainant argued that the Nokia accused handsets practice this sixth element of claim 1 of the '408 patent both literally and under the doctrine of equivalents. (CBr at 84.) Specifically, complainant argued that{

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(CBr at 84.)

Respondents argued that "[b]ecause Nokia's handsets neither produce a summation signal ... nor comprise a maximum gain setting...," Nokia's handsets cannot satisfy this sixth claim element. (RBr at 91.)

The staff argued that this sixth element is not met because the open loop power control value is not sent to the transmit section of the handset, and cannot therefore be combined with the gain adjust signal to produce a summation signal. (SBr at 60.)

This sixth claim element requires a summation signal. The administrative law judge has found in Section X.D.3, supra, that the accused products do not have a summation signal. Thus, the administrative law judge finds that the accused products do not practice this sixth element of claim 1 of the '408 patent.

Based on the foregoing, the administrative law judge finds that complainant has not established, by a preponderance of the evidence, that the accused products literally or under the doctrine of equivalents, infringe claim 1 of the '408 patent.

E. Claim 2 Of The '220 Patent

Testing

Respondents argued regarding method claim 2 of the '220 patent, generally, that QUALCOMM cannot prove infringement by Nokia because it never tested a Nokia phone, despite testimony at the hearing indicating that such testing could have been performed. (RBr at 71-72.)

Complainant argued, with respect to method claims that QUALCOMM is entitled to rely on circumstantial evidence to prove that the claimed methods are performed when the accused phones are used as intended in the United States. (CRBr at 29.)

The staff does not appear to answer said argument of respondents directly, but argued that none of the asserted claims are infringed. (SBr at 47, 55, 63.)

Respondents admitted that the accused products practice several elements of the claims in issue. Further, the administrative law judge rejects Nokia's assertion that proof of infringement of method claims must come through direct testing of the accused products. To the contrary, any evidence, including circumstantial evidence, can be relied upon by a patentee to demonstrate infringement of either method or apparatus claims. See, e.g., Moleculon Research Corp. v. CBS, Inc., 793 F.2d 1261, 1272 (Fed. Cir. 1986) ("If CBS is arguing proof of inducing infringement or direct infringement [of the method claims] requires direct, as opposed to circumstantial evidence, we must disagree. It is hornbook law that direct evidence of a fact is not necessary. 'Circumstantial evidence is not only sufficient, but may also be more certain, satisfying and persuasive than direct evidence.'") (quoting Michalic v. Cleveland Tankers, Inc., 364 U.S. 325, 330 (1960)) (emphasis in original); Alco Standard Corp. v. Tennessee Valley Authority, 808 F.2d 1490, 1503 (Fed. Cir. 1986) (addressing method claims and stating that, "[a]lthough the evidence of infringement is circumstantial, that does not make it any less credible or persuasive.") (citing Moleculon, 793 F.2d 1261); see also, Liquid Dynamics Corp. v. Vaughan Co., Inc., 449 F.3d 1209, 1219 (Fed. Cir. 2006) ("[a] patentee may prove direct infringement or inducement of infringement by either direct or circumstantial evidence.") (citing Moleculon, 793 F.2d at 1272). A finding of infringement of a method claim does not require direct evidence, such as the results of tests. Thus, circumstantial evidence is more than sufficient for the task. See also Fuji Photo Film Co. v. Jazz Photo Corp., 394 F.3d 1368, 1374 (Fed. Cir. 2005).

The administrative law judge finds that the authorities cited by Nokia do not stand for the proposition for which they are cited. The outcome of each case was the result of a no proof being

presented; not because of a blanket ruling that direct evidence was required. See Yoon Ja Kim v. ConAgra Foods, Inc., 465 F.3d 1312, 1320 (Fed. Cir. 2006) ("While Kim, who was qualified as an expert, offered conclusory testimony that the additional ingredients would not have materially affected the pertinent characteristics of the bread, Kim did not support this determination with any examinations or tests of the actual accused products. Under the circumstances of this case, we agree with the district court that Kim did not prove infringement because she presented no testimony based on the accused products themselves that supported a finding of infringement. "); Centricut LLC v. ESAB Group, Inc., 390 F.3d 1361, 1370 (Fed. Cir. 2004) ("We do not state a per se rule that expert testimony is required to prove infringement when the art is complex. Suffice it to say that in a case involving complex technology, where the accused infringer offers expert testimony negating infringement, the patentee cannot satisfy its burden of proof by relying only on testimony from those who are admittedly not expert in the field. That is what happened here, and the patentee thus failed to satisfy its burden of proof. "); Eltech Sys. Corp. v. PPG Indus., Inc., 903 F.2d 805, 809-10 (Fed. Cir. 1990) ("Noting that flowing, adhesion and dimensional stability cannot be inferred from OxyTech's DSC curves alone, and that there was no evidence demonstrating adhesion or dimensional stability, and no evidence of reliable tests on PPG's diaphragms or on any diaphragms prepared by PPG's method, the district court was struck, as are we, by the plain and total absence of evidence of infringement. OxyTech's attack on the noninfringement finding is as frivolous as its attack on the court's claim interpretation."). Respondents also relied on In re Certain Molded Golf Balls, Inv. No. 337-TA-35, 1978 WL 50670 (Feb. 10, 1978). As this administrative law judge noted in Certain Curable Fluoroelastomer Compositions and Precursors Thereof, Inv. No. 337-TA-364, Molded Golf

Balls does not require that, absent testing, any other evidence relied on to establish infringement must be disregarded:

> The administrative law judge finds that neither Molded Golf Balls, Genentech nor Perkin-Elmer requires that there must be testing of the accused composition in order to establish infringement under the doctrine of equivalents and that any other evidence relied on to establish infringement under the doctrine of equivalents must, in effect, be disregarded. Thus in Molded Golf Balls in issue was whether certain golf balls were found to infringe "directly and literally" claim 1 of the patent in issue, and whether the failure of respondents to reveal the formulation used by them in their manufacture of the golf balls had precluded any direct evidence. The record in Molded Golf Balls had no evidence, other than the spectra from spectrographic tests performed by an independent lab, to determine whether there was a direct or literal infringement of the claimed subject matter. In Genentech "all the evidence of record" indicated that two methods for obtaining certain measurements to demonstrate infringement were not "comparable." In Perkin Elmer the district court failed to detect the relevance of a modified version of the accused devices, even if the patentee had pointed, as it did not, to evidence that the modified version would operate substantially the same as the claimed invention.

(1995 ITC LEXIS 563, 115-116 (ITC 1995) (emphasis added).) Thus, where testing does not occur, such a fact does not preclude the patentee from relying on other evidence to establish infringement.

Preamble

The preamble of claim 2 of the '220 patent reads: "A method for limiting transmit power of a radio operating in a radio communications system, the radio communications system comprising a plurality of base stations that transmit power control commands to the radio, the radio comprising a variable gain amplifier and a maximum gain setting, the method comprising the steps of:" (JX-3 at 7: 12-17.)

The administrative law judge has found in Section VII.C.2, supra, that the preamble of claim 2 of the '220 patent is a limitation on the claim. Respondents have admitted that the accused products

are radios. (RFF III.8 (undisputed); ROCFF E27; RRCFF E27a-d.) Respondents have admitted that the accused products operate in a network with at least one base station. (CFF C3, CFF H293, CFF H561 (undisputed).) The administrative law judge has found in Section X.D.2, supra, that power control commands are transmitted to the radio by the base station. Respondents further have admitted that the accused products comprise a variable gain amplifier. (See, inter alia, CFF H12, CFF H50, CFF H76 (undisputed); CFF H589 (undisputed in relevant part).) The administrative law judge has found, however, in Section X.D.4, supra, that the accused products do not comprise a maximum gain setting. Therefore, the administrative law judge finds that the accused products do not practice the preamble of claim 2 of the '220 patent.

1. The first element of claim 2 "receiving a signal from at least one of the plurality of base stations"

Complainant argued that the Nokia accused handsets literally practice this first element of claim 2 of the '220 patent, which is not disputed by respondents. (CBr at 85.)

Respondents do not provide an argument regarding said first element in their post hearing briefs.

The staff argued that "Qualcomm has met its burden of proof with respect to this undisputed claim element." (SBr at 64.)

Respondents do not dispute that the accused products practice this first claim element. (CFF H562, H563 (undisputed).) Therefore, the administrative law judge finds that the accused products practice this first element of claim 2 of the '220 patent.

2. The second element of claim 2, "generating a received power level signal in response to the received signal"

Complainant argued that the Nokia accused handsets literally practice this second element of claim 2 of the ' 220 patent. (CBr 85.) Specifically, complainant argued that the generation of the { } signal in the accused products meets this limitation. (CBr at 85.)

Respondents argued that the term "received power level signal" is the automatic gain control setpoint, and thus that Nokia's handsets do not satisfy this second element of claim 2 of the '220 patent for the same reasons that Nokia's handsets do not have an automatic gain control setpoint. (RBr at 83.)

The staff argued that the received power level signal corresponds to the detected power, and there is no dispute that Nokia's accused handsets determines this received power value. (SBr at 64-65.)

The administrative law judge has found in Section VII.C.7, supra, that the "received power level signal" is "a value indicating a power level of the received signal." The administrative law judge has also found that the received power level cannot itself be the automatic gain control setpoint. It is undisputed that the value stored in the{ }variable represents the power of the signal sent by the base station as seen at the mobile station antenna. (RFF III.74, RFF III.75 (undisputed).) Therefore, even though the administrative law judge has found that{ } is not an automatic gain control setpoint (see Section X.B.3, supra), the administrative law judge finds that{ } indicates the power level of the received signal. Therefore, the administrative law judge finds that the accused products practice this second element of claim 2 of the '220 patent.

3. The third element of claim 2 "generating a closed loop power control signal in response to the received signal"

Complainant argued that the Nokia accused handsets literally practice this third element of claim 2 of the '220 patent. (CBr at 86.) Specifically, complainant argued that the "closed loop power

control signal"{

} (CBr at 86.)

Respondents argued that Nokia handsets do not receive instructions from the base station to turn up or turn down power; that GPRS and EDGE base stations do not send power control commands; and that any such power control commands are not accumulated as required by the claim. (RBr at 82-83.)

The staff argued that QUALCOMM has presented no evidence that the base stations in the networks on which Nokia's handsets operate measure the handset's transmitted power. (SBr at 65.)

The administrative law judge has found that "closed loop" refers to a signal sent from a radiophone based at least in part on the power of the signal received from that radiophone by the base station. (See VII.C.8, supra.) The parties agree that Γ_{CH} is a static parameter that is sent to every handset within a particular cell during GPRS or EDGE communications. (CFF H312, H320, H458 (emphasis added) (undisputed).) The parties agree that the accused Nokia handsets store the value of gamma_ch in a variable called{ }and that stored value corresponds to the gamma_ch sent by the base station. (CFF H318 (undisputed).) The gamma_ch parameter value is set by network operators. (CFF H453 (undisputed).) The parties agreed that, based on the evidence of record, within a cell for any individual handset, Γ_{CH} is a constant within that cell. (RFF V.119 (undisputed).) The parties further agreed that based on the evidence of record, within any given cell the value of Γ_{CH} received by each handset is the same. (RFF V.120 (undisputed).) Based on the foregoing, the administrative law judge finds that a static value that is constant within a cell and is the same for each handset within that cell cannot be based at least in part on the power of the signal received from that

radiophone by the base station, as required by the claim element. Therefore, the administrative law judge finds that the accused products do not practice this third element of claim 2 of the '220 patent.

Complainant has argued that, in the accused Nokia handsets, Γ_{CH} is continuously used to adjust the gain of the transmit VGA, so minus Γ_{CH} is the adjustment that the base station is telling the handset to perform, and that if Gamma ch changes form cell to cell, the gain adjust signal varies. (CRRFF V.118A; CRRFF V.118B.) The administrative law judge finds, however, that whether a different cell has a different value of Γ_{CH} is irrelevant. Even in the case where a radiophone moves from one cell to another cell, the Γ_{CH} value is based on the cell, not the power of the signal received from any individual radiophone.

Complainant has further argued that this third element is satisfied under the doctrine of equivalents because Γ_{CH} values are not arbitrary, and "are determined on the basis of field measurements that stimulate the user experience, and are selected as 'optimal' values for the base station." (CRBr at 54 (emphasis added).) As can be seen from complainant's argument, said optimal value is based on the dynamic of the cell, not any individual radiophone. Here again, the Γ_{CH} value is based on the cell, not the power of the signal received from any individual radiophone. Even assuming, arguendo, that the Γ_{CH} value is based on{

} adjusting transmit power based on dynamic measurements received from an individual handset is not, in this context, the same as adjusting a handset using a static constant that is based on prior testing. Therefore, the administrative law judge finds that such a process cannot be performing substantially the same function in substantially the same way to arrive at substantially the same result. Therefore, he finds that this third claim element is not satisfied under the doctrine of equivalents.

4. The fourth element of claim 2 "combining the received power level signal and the closed loop power control signal to produce a summation signal"

Complainant argued that the Nokia accused handsets literally practice this fourth element of claim 2 of the '220 patent in the same way that the third element of claim 1 of the '408 patent, supra, practices this claim element. (CBr at 87.)

Respondents argued that the accused products neither generate a received power level signal nor generate a closed loop power control signal, and therefore cannot produce a summation signal. (RBr at 83-84.) Respondents further argued that, even under QUALCOMM's construction, the accused products do not combine{ } and Γ_{CH}, and therefore likewise cannot produce a summation signal. (RBr at 84.)

The staff argued that a summation signal is not produced in the manner required by said claim 2, because the accused products do not generate a closed loop power control signal. (SBr at 64.)

A closed loop power control signal is required by this claim element. The administrative law judge has found in Section X.E.3, supra, that the accused products do not generate a closed loop power control signal. Therefore, the administrative law judge finds that the accused products do not practice this fourth element of claim 2 of the '220 patent.

5. The fifth element of claim 2 "comparing the summation signal to the maximum gain setting"

Complainant argued that the Nokia accused handsets practice this fifth element of claim 2 of the '220 patent both literally and under the doctrine of equivalents for the same reasoning as that for the fourth element of claim 1 of the '408 patent. (CBr at 87.)

Respondents argued that the accused handsets neither produce a summation signal nor comprise a maximum gain setting, and therefore do not practice this element of the claim. (RBr at 85.)

The staff argued that a summation signal is not produced in the manner required by the claim, because the accused products do not generate a closed loop power control signal. (SBr at 64.) The staff further argued that the accused handsets do not comprise a maximum gain setting under any party's proposed construction of that term. (SBr at 64.)

A summation signal is a requirement of this claim element. The administrative law judge has found in Section X.E.4, supra, that the accused products do not produce a summation signal. Therefore, the administrative law judge finds that this fifth element of claim 2 of the '220 patent is not satisfied in the accused products.

6. The sixth element of claim 2 "adjusting the variable gain amplifier in response to the maximum gain setting if the summation signal is greater than or equal to the maximum gain setting; and"

Complainant argued that the Nokia accused handsets practice this sixth element of claim 2 of the '220 patent both literally and under the doctrine of equivalents for the same reasoning as that for the fifth element of claim 1 of the '408 patent. (CBr at 87.)

Respondents argued that the accused handsets neither produce a summation signal nor comprise a maximum gain setting, and therefore cannot satisfy this element. (RBr at 85.)

The staff argued that a summation signal is not produced in the manner required by said claim 2, because the accused products do not generate a closed loop power control signal. (SBr at 64.) The staff further argued that the accused handsets do not comprise a maximum gain setting under any party's proposed construction of that term. (SBr at 64.)

A summation signal is a requirement of this claim element. The administrative law judge has found in Section X.E.4, supra, that the accused products do not produce a summation signal.

Therefore, the administrative law judge finds that this sixth element of claim 2 of the '220 patent is not satisfied in the accused products.

7. The seventh element of claim 2 "adjusting the variable gain amplifier in response to the summation signal if the summation signal is less than the maximum gain setting."

Complainant argued that the Nokia accused handsets practice this seventh element of claim 2 of the '220 patent both literally and under the doctrine of equivalents for the same reasoning as that for the sixth element of claim 1 of the '408 patent. (CBr at 88.)

Respondents argued that the accused handsets neither produce a summation signal nor comprise a maximum gain setting, and therefore cannot satisfy this seventh element. (RBr at 85.)

The staff argued that a summation signal is not produced in the manner required by the claim, because the accused products do not generate a closed loop power control signal. (SBr at 64.) The staff further argued that the accused handsets do not comprise a maximum gain setting under any party's proposed construction of that term. (SBr at 64.)

A summation signal is a requirement of this claim element. The administrative law judge has found in Section X.E.4, supra, that the accused products do not produce a summation signal. Therefore, the administrative law judge finds that this seventh element of claim 2 of the '220 patent is not satisfied.

Based on the foregoing, the administrative law judge finds that complainant has not established, by a preponderance of the evidence, that the accused products, literally or under the doctrine of equivalents, infringe claim 2 of the '220 patent.

F. Indirect Infringement

Complainant argued that "[t]he record contains substantial circumstantial evidence that the accused handsets as used by them in an infringing manner and Nokia, with knowledge of QUALCOMM's patents, induced handset owners to use the handsets in that manner." (CBr at 88.)

Respondents argued that QUALCOMM has failed to offer evidence of any instance in which anyone has ever operated an accused handset in an infringing manner, and therefore cannot meet its burden of proving contributory or induced infringement. (RBr at 85.) Respondents also argued that the accused products have substantial non-infringing uses, and therefore there cannot be contributory infringement. (RBr at 85-86.) Respondents further argued that there can be no inducement to infringe, as there is no evidence that Nokia actively encouraged any party to use the accused handsets in an infringing manner. (RBr at 87.)

The staff argued that because none of the accused products have been proven to infringe directly any of the asserted claims, induced and contributory infringement have been mooted. (SBr at 47.)

Both contributory and induced infringement require that the accused products directly infringe the claims of the asserted patents. See DSU Med. Corp., supra. The administrative law judge has found, supra, that the accused products do not directly infringe the asserted claims of the '473, '408, and '220 patents. (See, generally, Section X.) Therefore, the administrative law judge finds no contributory or induced infringement in this investigation.

XI. Domestic Industry

To invoke the protection afforded by Section 337, a complainant must show by a preponderance of the evidence that a domestic industry exists or is in the process of being established

within the United States. The domestic industry requirement has two prongs: an "economic" prong and a "technical" prong.

On February 16, 2007, the administrative law judge issued Order No. 33, granting complainant's motion for summary determination that it satisfied the economic prong of the domestic industry requirement with respect to the '473, '408, and '220 patents. (Order 33.) On March 22, 2007, the Commission determined not to review Order No. 33. (3/22/07 "Notice Of Commission Not To Review Initial Determination Granting Complainant's Motion For Summary Determination That It Satisfied The Domestic Industry Requirement As to Two Asserted Patents."[64]

The "technical" prong requires that the activities alleged to constitute a domestic industry actually utilize the intellectual property at issue. In the context of a patent-based investigation, the technical prong is satisfied if the complainant demonstrates that it is practicing at least one claim of each of the patents-in-issue. The test for claim coverage for purposes of the domestic industry requirement is the same as that for infringement. The technical prong of the domestic industry can be satisfied either literally or under the doctrine of equivalents. Certain Excimer Laser Systems for Vision Correction Surgery and Components Thereof and Methods for Performing Such Surgery, Inv. No. 337-TA-419, Order No. 43, 1999 ITC LEXIS 245, *7 (July 30, 1999). The complainant, however, is not

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[64] While the title of the 3/22/07 Commission Notice referred only to two asserted patents which were the '408 and '220 patents, Order No. 33 also found that complainant had satisfied the economic prong of the domestic industry for the '473 patent. Neither respondents nor the staff refutes CFF 271 which asserted:

> On February 16, 2007, The Administrative Law Judge issued Order No. 33, granting QUALCOMM's motion for summary determination that QUALCOMM satisfies the economic prong of the domestic industry requirement with respect to the '473, '408 and '220 patents. (Order 33).

required to show that it practices any of the claims asserted to be infringed, as long as it can establish that it practices at least one claim of the asserted patent. Certain Point of Sale Terminals and Components Thereof, Inv. No. 337-TA-524, Order No. 40, 2005 ITC LEXIS 374, *26 (Apr. 11, 2005).

The only issue that remains in dispute, with regards to domestic industry requirement, is whether complainant satisfies the technical prong with respect to claim 3 of the '473 patent. Claim 3 is the only claim of the '473 patent that QUALCOMM relies on to meet the technical prong of the domestic industry requirement. (RFF XII.2 (undisputed).)

A. Claim 3 Of The '473 Patent

1. Preamble, First, Second, Fourth And Fifth Elements

Complainant argued that Nokia has conceded that QUALCOMM practices the first, second, fourth and fifth elements[65] of claim 3 of the '473 patent. (CBr at 138.) Complainant further argued that Nokia represented to the administrative law judge before, during, and after the hearing that only the third element of claim 3 was in dispute. (CRBr at 88.) Nonetheless, complainant argued that it adduced witness testimony and technical documentation that indisputably establish that QUALCOMM practices said elements. (CRBr at 88, citing CBr at 136-144; CFF I1-I247; CRFF XII 1-81.)

Respondents argued that despite complainant's burden to come forward with evidence supporting its practice of claim 3 of the '473 patent, QUALCOMM failed to introduce any evidence that the MSM6550 chipset met said elements. (RBr at 136-37.) Respondents further argued that although they indicated that they would not contest those elements were the evidence at the hearing consistent with what QUALCOMM claimed it was, respondents affirmatively told QUALCOMM, in

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[65] Said elements are identified in Section X. C., supra.

writing, that they were not relieving QUALCOMM of its burden of presenting said evidence at the hearing. (RBr at 136-37, citing RFF XII.81; RRBr at 88.)

The staff argued that the record is clear that Nokia did not contest QUALCOMM's practice of said first, second, fourth and fifth elements. (SRBr at 38, citing RFF XII.81.) The staff further argued that although the focus of Verdu's testimony was on the contested third element, he did summarily testify as to his belief that QUALCOMM's MSM 6550 chipset satisfies said elements. (SRBr at 39, citing CFF I53-54; CFF I59-60; CFF I230-21; CFF I233-34.) The staff also argued that QUALCOMM presented additional documentary evidence showing how it practices said elements. (SRBr at 39, citing CFF I52-66; CFF I229-270.) Finally, the staff argued that Nokia did not present any evidence to rebut QUALCOMM's case, and has stated on the record that it was not contesting said elements. (SRBr at 39, citing CFF I.12.)

During the pre-hearing telephone conference on 9/7/07, respondents asserted the following:

> JUDGE LUCKERN: All right, let's go to the domestic industry. As far as the domestic industry goes as I understand it the only issue with respect, well the big issue is respect to the technical prong as far as the 473 patent the Complainant relied on claim three. And as I understand it Respondent has disputed whether Complainant had satisfied the received linearizer limitation which is the third element of claim three of the 473 patent. Is that a correct understanding, Mr. Verhoeven, with respect to why you feel they haven't met the technical prong with respect to the 473 patent?
>
> MR. VERHOEVEN: Correct, Your Honor.
>
> JUDGE LUCKERN: And there's nothing else?
>
> MR. VERHOEVEN: Correct, Your Honor.

(Tr. at 105:2-16; (emphasis added).) To support complainant's assertion that it satisfies the technical prong of the domestic industry requirement, Verdu testified regarding claim 3 of the '473 patent:

Q. Doctor, could you please -- let's make sure we got an answer to the overarching question. In your opinion, do -- does the QUALCOMM radio, which includes the chips I just identified, practice claim 3 of the '473 patent?

A. Yes, it does.

Q. Can you please describe how you reached your opinions on domestic industry?

A. Yes. I reviewed QUALCOMM documents. I reviewed their software and I also relied on testimony by their engineers.

Q. Did you rely on the testimony of Taher Nabulsi?

A. Yes.

Q. The QUALCOMM engineer. Did you also rely on the deposition testimony of Mr. Brian Butler and Steve Ciccarelli?

A. Yes.

Q. Now, that documentation you just referred to, would that include QUALCOMM documents and testimony regarding the MSM-6550, the RFR-6500, and the RFT-6150?

A. Correct.

Q. Okay. Let's take claim 3 of the '473 patent. How does the QUALCOMM radio practice that claim?

A. Claim 3 starting at -- you want me to just give a general description?

JUDGE LUCKERN: Rephrase the question. However you want to proceed, but apparently the witness is not sure of just what he is supposed to answer to, Ms. Elson.

MS. ELSON: Sure, Your Honor.

BY MS. ELSON:

Q. Does the QUALCOMM radio literally satisfy each and every element of claim 3?

A. Yes, it does.

Q. Okay. Now, let's just run through the elements. Element A of claim 3 reads, "a power detector, coupled to the receive amplifier, for generating a first power value from a received signal having a first frequency."

In your opinion, Doctor, does the QUALCOMM radio practice this element?

A. Yes.

Q. And are you basing your opinion on the documents and testimony that you identified?

A. Yes.

Q. Element B of claim 3 reads, "an integrator coupled to the power detector for generating an automatic gain control setpoint from the first power value."

In your opinion, Doctor, does the QUALCOMM radio practice element B?

A. Yes.

Q. And is the basis of your opinion the same documentation and witness statement you identified earlier?

A. Yes.

Q. I am going to skip for the present to element D, the fourth element, which reads, "a second power detector, coupled to the transmit amplifier, for generating a second power value from a transmitted signal having a second frequency." In your opinion, Doctor, does the QUALCOMM radio practice element D of claim 3?

A. Yes.

Q. And is the basis of your opinion the same QUALCOMM documentation and testimony you identified earlier?

A. Yes.

Q. Okay. Let's go to element E, which reads, "a transmit linearizer for generating a transmit calibration value in response to the automatic gain control setpoint, the second power value, and a frequency index corresponding to the second frequency, the transmit calibration value being coupled to the control input of the transmit amplifier for adjusting the gain of the transmit amplifier."

In your opinion, Doctor, does the QUALCOMM radio practice element E of the claim 3?

A. Yes.

Q. And is the basis of your opinion the same QUALCOMM document -- excuse me, QUALCOMM documentation and testimony you identified earlier?

A. Yes.

Q. What is your understanding of the only element that's in dispute regarding QUALCOMM, the QUALCOMM radio's practice of claim 3 of the '473 patent?

A. Element C starting in line 56 of column 7.

(Tr. at 1627-31 (emphasis added).) The administrative law judge finds that Verdu's testimony, based on QUALCOMM documents and chipsets, is sufficient to establish the technical prong with respect to the preamble as well as the first, second, fourth and fifth elements of claim 3 of the '473 patent. See Symbol Tech., Inc. v. Opticon, Inc., 935 F.2d 1569, 1574-76 (Fed. Cir. 1991). Respondents provided no arguments disputing Verdu's testimony that QUALCOMM's handset satisfies said elements. (See RBr at 136-37; RRBr at 88.)

2. The Third Element

Complainant argued that its handset practices the third element[66] because the{

} (CRBr at 88-89.) Complainant also argued that the{

}(CRBr at 88-89.) Complainant further argued that other components, such as the variable gain LNA, diplexer, duplexer, and filters, contribute to non-linearities, which need to be corrected for by the receive linearizer. (CRBr at 89.)

Complainant argued that the{

}(CRBr at 91.) It is argued that the{ } (CRBr at 91-92.) Complainant also argued that the{

} (CBr at 143.) Complainant further argued that during a phone call,{

} (CBr at 143; CFF I111-162; CFF I207.) Complainant therefore argued that{ }

---

[66] Said third element is identified in Section X.C, supra. Also there are two circuits at issue regarding the technical prong for this claim element: {

}

{ } (CBr at 143-44; CFF I73; CFF I76-79; CFF I130-131.)

Complainant similarly argued that{

} (CRBr at 93.) It is argued that like the{

} (CBr at 142; CFF I51.) Thus, complainant argued that the {

} (CRRFF XII.25H; CBr at 142.)

Respondents argued that complainant removed the receive linearizer from the MSM6550, such {

} (RBr at 138.)

Respondents also argued that the{ } Figures 20-5 and 20-6 of JX-13C{

}(RBr at 139-141, 143.)

Respondents argued that the{

} (RBr at 143-44.)

Thus, it is argued that the{

}

Respondents further argued that the{

} (RBr at 144.)

The staff argued that QUALCOMM's{ } practices the third element, while its { } does not. (SBr at 87-89.) It is argued that QUALCOMM concedes that the { } (SRBr 39, citing CFF I.93; CFF I224; RFF XII.6, 8, 20-23); and that therefore it is{

} (SRBr at 39, citing RFF XII.76.) The staff also argued that the{

} (SRBr at 40, citing RFF XII.65; RFF XII.74.) Accordingly, the staff argued that {

} (SRBr at 40.)

The staff however argued that the circuitry in the{

} satisfies the third element for the technical prong of domestic industry. (SBr at 87-88.) The staff specifically argued that the {

} satisfies the third element. (SBr at 87, citing Tr. at 941-42, 947.) In light of the staff's construction, the staff argued that the term { }

{ } (SBr at 88.) It is argued that it is undisputed that{

} (SBr at 88, citing Tr. at 944.)

As a preliminary matter, the parties agree that QUALCOMM relies upon the MSM6550 chip, used in conjunction with a receiver, the RFR6500, and a transmitter, the RFT6150, to satisfy the technical prong of the domestic industry requirement. (CFF I6 (undisputed); CFF I7 (undisputed); SPFF 26 (undisputed).) The parties also agree that the MSM6550 chip in QUALCOMM's handsets is a baseband processor that handles the signal processing of the QUALCOMM radio. (CFF I2 (undisputed).)

With respect to the{ } the parties agree that a{ } (RFF XII.23 (undisputed).) Moreover, the parties agree that{

} (CFF I92 (undisputed).) The parties agree that during operation of the MSM6550,{

} (RFF XII.71 (undisputed).)

Nonetheless, the parties dispute whether QUALCOMM{

} The administrative law judge finds that in the MSM6050, a predecessor chip to the MSM6550, QUALCOMM{

} (JX-294C (Butler Dep.) at 115:17:24, 145:21-146:7; JX-295C (Ciccarelli Dep.) at 54:17-25.) { }

{

} (JX-295C (Ciccarelli Dep.) at 55:11-17.) In{

}

(JX-295C (Ciccarelli Dep.) at 54:17-25.) As a result of this change, QUALCOMM replaced{

} (Nabulsi, Tr. at 932:6-933:15; JX-294C (Butler Dep.) at 115:17-24.) Thus, the administrative law judge finds that the QUALCOMM radio used for the domestic industry requirement has{ } (Nabulsi, Tr. at 872:1-2, 871:15-21, 872:8-10, 986:21-23; JX-294C (Butler Dep.) at 103:12-16.) The administrative law judge further finds that said evidence supports the conclusion that the{

} Since the parties agree that the{

} the administrative law judge further finds that the{ } in QUALCOMM's chipset and therefore it cannot serve as a receive linearizer for generating a calibration value in response to an AGC setpoint as the third element recites.[67]

With respect to the{ } the parties agree the{

} (CFF I73 (undisputed).) The parties also agree that the MSM6550 RF software manages the blocks labeled{

} in Figure 20-6 of QNITC0122670. (CFF I111 (undisputed).) The parties further agree that in the{ }

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[67] Complainant's product contains both Digital VGA and LNA circuitry. However the administrative law judge finds that if one of said circuits meets the requirement of said third element, the presence of a circuit that does not meet said requirement is irrelevant.

{ } (CFF I114 (undisputed); CFF I115 (undisputed).) The parties also agree that the{ } (CFF I119 (undisputed); CFFI120 (undisputed).) As found, infra, the { }

The parties agree that the{ } (CFF I123 (undisputed); CFF I124 (undisputed).) The parties also agree that the{ } (CFF I126 (undisputed).) They further agree that{ } (CFF I128 (undisputed).)

The parties agree that the{ } (CFF I160 (undisputed); CFF I161 (undisputed).) The parties also agree that{ } (CFF I132 (undisputed); CFF I137 (undisputed).) The parties further agree that the{ } (CFF I80 (undisputed); CFF I40 (undisputed).) Moreover, the parties agree that the{

} (CFF I145 (undisputed); CFF I148 (undisputed); CFF I149 (undisputed).) Furthermore, the parties agree that the{

} (CFF I151 (undisputed); CFF I153 (undisputed).)

However, the parties dispute whether the{

} Respondents argued that the {

} (RRCFF I118p; RRCFF I118q.) Respondents argued that the {

} (RRCFF I118h.) Respondents further argued that the{

} (RRCFF I118i; RRCFF I118d.) Furthermore, Taker Nabulsi[68] was cross-examined on the LNA_RISE and{ } as follows:

{

}

[68] Nabulsi, a QUALCOMM employee since 1996, is director of engineering. (Tr. at 854-5.)

{

}

{

}

{

}

(Tr. at 941-946 (emphasis added).) Thus, the administrative law judge finds that said testimony shows that the{ } Moreover, the{

} (Nabulsi, Tr. at 940:9-18, 941:11-25, 943:1-13, 947:1-5; JX-13C at QNITC0122660, 122669-122670; JX-19C at QNITC1476015-1476022; JX-28C at QNITC014312-143417; JX-297C Nabulsi Dep. 75:21-77:11) which is not disputed by respondents.

See RRCFF I112a. Finally, the administrative law judge finds that the{

} (Nabulsi, Tr. at 943:19-22, 998:2-999:4), which is not disputed by respondents. See RRCFF I112d.

In view of the foregoing and the construction of "frequency index," which has no channel limitation,[69] the administrative law judge finds by a preponderance of the evidence that QUALCOMM's handset practices the third element because the (1){

}

Based on the foregoing, the administrative law judge finds that complainant has established that it practices claim 3 of the '473 patent, and therefore satisfies the technical prong of the domestic industry requirement as to said patent.

XII. Remedy

Pursuant to the Commission rules 210.36(a) and 210.42(a)(1)(ii), the administrative law judge shall consider evidence on the issue of the appropriate remedy in the event that a violation of Section 337 is found, and issue a recommended determination on that issue. The Commission, with respect to remedy, has wide latitude to craft an exclusion order including selecting the form, scope, and extent of the order. See Hyundai Elecs. Indus. Co., Ltd. v. United States Int'l Trade Comm'n, 899 F.2d 1204,

[69] The administrative law judge has construed "frequency index" as "a value specifying the current center frequency on which the receive chain is operating, or the current center frequency on which the transmit chain is operating."

1209 (Fed. Cir. 1990); Viscofan v. United States Int'l Trade Comm'n, 787 F.2d 544, 548 (Fed. Cir. 1986).

Under Section 337(f)(1), the Commission can also issue cease and desist orders. 19 U.S.C. § 1337(f)(1). A cease and desist order is appropriate when the evidence demonstrates the presence of commercially significant inventory of infringing products in the United States. See Certain Crystalline Cefadroxil Monohydrate, Inv. No. 337-TA-293, Comm'n Opinion on Remedy, the Public Interest and Bonding, [USITC Pub. 2391,] 1991 ITC LEXIS 736, *85 n.117 (June 1991) (cease and desist order does not require evidence of "stockpiling"), see also, Certain Integrated Circuit Telecommunication Chips and Products Containing Same Including Dialing Apparatus, Inv. No. 337-TA-337, Comm'n Op., USITC Pub. 2760, 1993 ITC LEXIS 854, *26 n.45 (Aug. 1993) (cease and desist order appropriate where respondents held 120 days worth of infringing inventory). The Commission issues cease and desist orders to prevent a respondent from selling such commercially significant inventories thus undercutting the effect of any exclusion order. See Certain Microsphere Adhesives, Process for Making Same, and Products Containing Same, Including Self-Stick Repositionable Notes, Inv. No. 337-TA-366, Comm'n Opinion, [USITC Pub. No. 2949,] 1996 ITC LEXIS 5, *31-32 (Jan. 1996).

Complainant argued that if the Commission determines that there has been a violation of Section 337, the appropriate remedy is a limited exclusion order directed to all Nokia products that infringe the asserted claims of the patents-in-issue thus prohibiting the importation of any mobile telephone handset that infringes the asserted claims of the patents at issue. 19 U.S.C. § 1337(d)(1) ("If the Commission determines...that there is a violation of [Section 337], it shall direct that the articles concerned...be excluded from entry into the United States..."). Complainant further argued that given that it would not be afforded complete relief if Nokia were allowed to dispose of its inventories of

accused products in the United States, a cease and desist order barring the marketing, sale, distribution and transfer (other than for exportation) of such inventory is both necessary and appropriate, citing Certain Ink Markers & Packaging Thereof, Inv. No. 337-TA-522, Order No. 30, 2005 ITC LEXIS 750, *98-99 (July 2005) (recommending such a remedy due to respondent's "significant domestic inventory of infringing markers.") (CBr at 145-8.)

Respondents argued that should a violation of Section 337 be found to exist, the appropriate remedy is a limited exclusion order directed only to those specific models of Nokia handsets that have been found to infringe the asserted patents. (RBr at 147.) Respondents, as to any cease and desist order, argued that complainant has failed to establish Nokia's existence of commerically significant inventories of post-importation goods and hence any cease and desist order would not be appropriate. (RBr at 147-48.)

The staff, should a Section 337 violation be found, recommended a limited exclusion to exclude infringing Nokia handsets as well as a cease and desist order to prohibit the sales of Nokia's commercially significant inventories within the United States. (SBr at 90.)

Commission practice is to direct remedial orders to all products "covered by" the asserted claims as to which a violation has been found, not to limit the orders to only those specific models selected for the infringement analysis. See Hardware Logic Emulation Systems and Components Thereof, Inv. No. 337-TA-383, Comm'n Op., 1998 ITC LEXIS 138, *31-32 (March 1998); Certain Optical Disk Controller Chips and Chipsets and Products Containing Same, Including DVD Players and PC Optical Storage Devices, Inv. No. 337-TA-506, Comm'n Op., 2005 ITC LEXIS 881, *90 (Sept. 2005). Thus, while individual models of the accused product may be evaluated in determining 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." Hardware Logic, 1998 ITC LEXIS 138 at *32. Hence if the Commission finds that there is a violation of section 337, the administrative law judge recommends that the Commission issue a limited exclusion order directed to all Nokia infringing products and prohibiting the importation of any infringing mobile telephone handsets, wireless communication devices and components thereof that infringes the asserted claims of the patents at issue.

As to any cease and desist order respondents admit that supplemental Exhibit A to Nokia's Response to Interrogatory No. 7 is a table indicating the inventory held by Nokia at its Alliance facility in the Dallas/Ft. Worth area of Texas as of October 31, 2006, for each non-Vertu handset. (RRCFFL1a, CX-233C, Exhibit A.) {

} (CFF L22, CX-233C at Exhibit A.) However it was argued that:

{

}

(RRCFFL21a-21g (emphasis added).) As seen from the foregoing respondents qualified their responses with "are likely", "may be", "only", "expected to dramatically decrease" "would be", "expected to". In view of the absence of a definitive showing that said Alliance Facility or an equivalent thereof is no longer in existence, should the Commission find a violation, the administrative law judge recommends the issuance of a cease and desist order against respondents.

XIII. Bond

Complainant argued that the administrative law judge should recommend that the Commission set the bond of 100 percent of entered value during the sixty day Presidential review period because a plain price comparison is not practicable and there is no reasonable royalty rate. (CBr at 150.)

Nokia proposed a bond amount not to exceed{ }of the entered value of the accused handsets, which was said to represent{

} However should the administrative law judge conclude that the proposed{

} Nokia proposed that the bond amount should not exceed 5% which it argued was the bond amount applied in Certain Baseband Processor Chips and Chipsets, Inv. No. 337-TA-543, Comm'n Op. on remedy, public interest and bonding at 159-60 (public version, June 19, 2007) (Baseband Processor Chips) to handsets incorporating infringing technology. (RBr at 149.)

The staff argued a 5% royalty rate is the appropriate bond on the ground that it perceives no reason to distinguish the bond amount applied for handsets in this investigation from the 5% that the Commission applied to infringing handsets in Baseband Processor Chips. (SBr at 91.)

If a violation of Section 337 is found and an exclusion order is issued, Section 337(j)(3) provides for the entry of infringing articles upon the payment of a bond during the sixty (60)-day Presidential review period. 19 C.F.R. § 1337(j)(3). The bond is established at a level deemed sufficient to protect the complainant from injury. See id. Thus, the bond is generally set at a level "sufficient to offset any competitive advantage resulting from the unfair method of competition or unfair act enjoyed by persons benefiting from the importation." See Certain Integrated Circuit Telecommunications Chips and Products Containing Same Including Dialing Apparatus, Inv. No 337-TA-2670, Comm'n Op., USITC Pub. 2670, 1993 ITC LEXIS 854, *28 (August 1993).

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 Certain Microsphere Adhesives, Process for Making Same, and Products Containing Same, Including Self-Stick Repositionable Notes, Inv. No. 337-TA-366, Comm'n Op., 1996 ITC LEXIS 5, *35-36 (January 1996), aff'd sub nom. Minnesota Mining & Manufacturing Co. v. U.S. Int'l. Trade Comm., 91 F.3d 171 (Fed. Cir. 1996). The Commission, however, has found that a plain price comparison is not practical when the parties sell their products at different levels of commerce. Certain Flash Memory Circuits and Products Containing Same, Inv. No. 337-TA-382, Comm'n Op., USITC Pub. No. 3046, 1997 ITC LEXIS 166 *6 (July 1997) (a 100 percent bond imposed when price comparison was not practical because the parties sold products at different levels of commerce, and the proposed royalty rate appeared to be de minimis and without adequate support in

the record). The Commission may also rely on royalty rates established on the basis of license agreements or other reliable evidence of an appropriate royalty rate for the patents at issue. See, e.g., Certain Integrated Circuit Telecommunication Chips, Inv. No. 337-TA-337, 19933 ITC LEXIS 854, *27-28.

Nokia has admitted that there is insufficient evidence in the record to perform a price-differential analysis. (RBr at 148.) The staff further noted that QUALCOMM no longer manufactures or sells cellular handsets so there is no evidence in the record as to the prices of handsets for comparison prices. (SBr at 91.) With respect to the{

} (JX-289C (Rahnasto Dep.) at 266.)

Nokia and the staff rely on the amount of bond applied in Baseband Processors Chips. In that case the Commission stated:

> We agree with the ALJ and the IA that a bond equal to 100 percent of entered value should be set on programmed infringing chips during the Presidential review period. We note that, consistent with the ALJ's and the IA's position, where, as in the present investigation, the record lacks any evidence of current sales or pricing information that would permit determination of a price differential or a reasonable royalty rate, a 100 percent bond per accused infringing imported chip is appropriate.
>
> As for the downstream products subject to exclusion under the proposed limited exclusion order, we agree with the IA's analysis and her conclusion that the bond amount on the handsets should be set at five percent of their entered value. n562 [TEXT REDACTED BY THE COURT]. n563 Consistent with the IA's position, we believe that such a bond is excessive. In any event, we expect relatively few imports to be subject to bonding during the Presidential review period because models already being imported for sale to the general public are exempt from exclusion.

2007 ITC LEXIS 621, *255-6 (emphasis added). As seen from the foregoing, the Commission set a 100 percent bond per accused infringing imported chip and, as for downstream products, a bond of five percent of the entered value of the handsets, which was somewhat qualified. Moreover, in Certain Cellular Radiotelephones and Subassemblies and Component Parts Thereof, Inv. No. 337-TA-297, 1991 ITC LEXIS 117, *8-10 (Feb. 1991) the Commission imposed a 25% bond on cellular radiotelephones, subassemblies thereof and components thereof. Hence, a determination of an appropriate bond has been done on a case-by-case basis. Thus because a plain price comparison is not practical and there is no reasonable royalty rate,[70] should a violation be found, the administrative law judge recommends that the Commission set the bond of 100 percent of entered value during the sixty day Presidential review period.

XIV. Additional Findings Of Fact

A. Parties

1. Complainant QUALCOMM is a Delaware corporation with its principal place of business in San Diego, California. It does not manufacture cellular telephones or other mobile communication devices but does provide chips and chipsets for such devices. (SPFF 1, 2 (undisputed).)

2. Respondent Nokia Corp. is a Finland corporation.and a maker of telephone handsets and the infrastructure for mobile telephones. (SPFF 3, 4 (undisputed).)

3. Respondent Nokia, Inc. is a Delaware corporation located in Irving, Texas and distributes phones in the United States manufactured by Nokia Corp. (SPFF 5, 6 (undisputed).)

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[70] Nokia relies on this administrative law judge's recommendation in Certain Rubber Antidegradients, Components Thereof, and Products Containing Same, Inv. No. 337-TA-533, Initial Determination (Feb. 17, 2006). In contrast to the record in that investigation, it is undisputed that QUALCOMM does not manufacture or sell cellular handsets. Moreover, there is evidence that QUALCOMM has not entered into any license involving the subject matter.

CONCLUSIONS OF LAW

1. The Commission has in rem jurisdiction and subject matter jurisdiction.

2. There has been an importation of accused products which are the subject of the unfair trade allegation.

3. None of the accused products infringe the asserted claims of the '473 patent.

4. None of the accused products infringe the asserted claim of the '408 patent.

5. None of the accused products infringe the asserted claim of the '220 patent.

6. A domestic industry exists as to articles protected by the '473, '408, and '220 patents.

7. The asserted claims of the '473 patent have not been proven to be invalid based on anticipation.

8. The asserted claims of the '473 patent have been proven to be invalid under 35 U.S.C. § 103.

9. The asserted claims of the '473 patent have not been proven to be invalid under 35 U.S.C. § 112 for failure to disclose a best mode.

10. The asserted claims of the '408 and '220 patents have not been proven to be invalid.

11. There has been no violation of Section 337.

12. If a violation is found the record supports issuance of a limited exclusion order, a cease and desist order and a bond set in the amount of 100 percent of entered value during the sixty day 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 no 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 mobile telephone handsets, wireless communication devices and components thereof. It is also the administrative law judge's recommendation, if the Commission finds a violation, that a limited exclusion order should issue barring entry into the United States of infringing mobile telephone handsets, wireless communication devices, and components thereof as well as a cease and desist order; and that a bond of 100 percent oft entered value, during the Presidential review period, be set.

The administrative law judge hereby CERTIFIES to the Commission his Final Initial and Recommended Determinations which includes Appendices A-S 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, 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

December 28, 2007. Any such bracketed version shall not be served via facsimile 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: December 12, 2007

IN THE MATTER OF CERTAIN MOBILE TELEPHONE HANDSETS, WIRELESS COMMUNICATION DEVICES AND COMPONENTS THEREOF

Inv. No. 337-TA-578

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **Public Version Final Initial and Recommended Determinations** was served upon Christopher G. Paulraj, Esq., Commission Investigative Attorney, and the following parties via Federal Express overnight delivery on February 1, 2008.

Marilyn R. Abbott

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

FOR COMPLAINANT QUALCOMM, INC.:

Cecilia H. Gonzalez, Esq.
HOWREY LLP
1299 Pennsylvania Ave., NW
Washington, DC 20004

Terrance P. McMahon, Esq.
Vera M. Elson, Esq.
Peter P. Chen, Esq.
MCDERMOTT WILL & EMERY LLP
3150 Porter Dr.
Palo Alto, CA 94304

Philip L. Blum, Esq.
BINGHAM MCCUTCHEN LLP
399 Park Avenue
New York, NY 10022

Richard J. Stark, Esq.
Roger G. Brooks, Esq.
CRAVATH SWAINE & MOORE LLP
825 Eighth Ave.
New York, NY 10019

IN THE MATTER OF CERTAIN MOBILE TELEPHONE HANDSETS, WIRELESS COMMUNICATION DEVICES AND COMPONENTS THEREOF

Inv. No. 337-TA-578

Richard S. Taffet, Esq.
BINGHAM MCCUTCHEN, LLP
399 Park Avenue
New York, NY 10022

Kathryn B. Riley, Esq.
DLA PIPER US LLP
401 B St., Suite 1700
San Diego, CA 92101-4297

Steven M. Strauss, Esq.
COOLEY GODWARD KRONISH LLP
4401 Eastgate Mall
San Diego, CA 92121

FOR RESPONDENTS NOKIA CORPORATION AND NOKIA, INC.:

Louis S. Mastriani, Esq.
Tali L. Alban, Esq.
Andrea B. Miller, Esq.
ADDUCI, MASTRIANI & SCHAUBERG, L.L.P
1200 Seventeenth Street, NW
Washington, DC 20036

Paul F. Brinkman, Esq.
ALSTON & BIRD, LLP
950 F Street, NW
Washington, DC 20004

IN THE MATTER OF CERTAIN MOBILE TELEPHONE HANDSETS, WIRELESS COMMUNICATION DEVICES AND COMPONENTS THEREOF

Inv. No. 337-TA-578

A. William Urquhart, Esq.
Frederick Lorig, Esq.
Marshall M. Searcy, III, Esq.
William C. Price, Esq.
Eric J. Bakewell, Esq.
Matthew Warren, Esq.
David Kleiman, Esq.
Mateo Z. Fowler, Esq.
QUINN EMANUEL URQUHART OLIVER & HEDGES, LLP
865 South Figueroa Street, 10th Floor
Los Angeles, CA 90017

Charles K. Verhoeven, Esq.
Rachel H. Smith, Esq.
Paul A. Alsdorf, Esq.
QUINN EMANUEL URQUHART OLIVER & HEDGES, LLP
50 California St., 22nd Floor
San Francisco, CA 9411

Sanford I. Weisburst, Esq.
Emily Costello, Esq.
QUINN EMANUEL URQUHART OLIVER & HEDGES, LLP
51 Madison Ave., 22nd Floor
New York, NY 10010

Keith E. Broyles, Esq.
Matthew J. Urbanawiz, Esq.
John Haynes, Esq.
Mark A. McCarty, Esq.
Kristen L. Melton, Esq.
Demetrius Tennell Lockett, Esq.
ALSTON & BIRD LLP
One Atlantic Center
1201 West Peachtree Street
Atlanta, GA 30309-3424

IN THE MATTER OF CERTAIN MOBILE TELEPHONE HANDSETS, WIRELESS COMMUNICATION DEVICES AND COMPONENTS THEREOF

Inv. No. 337-TA-578

Kenneth R. Adamo, Esq.
Thomas E. Jackson, Esq.
Michael J. Newton, Esq.
Kajeer Yar, Esq.
JONES DAY
2727 North Harwood Street
Dallas, TX 75201-1515

Jacques Buhart, Esq.
HERBERT SMITH LLP
20 Quentin Bauchart Street
75008 Paris
France

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PUBLIC MAILING LIST

Sherry Robinson
LEXIS - NEXIS
8891 Gander Creek Drive
Miamisburg, OH 45342

Ronnita Green
Thomson West
1100 Thirteen Street, NW, Suite 200
Washington, DC 20005