

PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of

CERTAIN MOBILE ELECTRONIC
DEVICES AND RADIO FREQUENCY
AND PROCESSING COMPONENTS
THEREOF (II)

Inv. No. 337-TA-1093

ORDER NO. 38: CONSTRUING CERTAIN TERMS OF THE ASSERTED
CLAIMS OF THE PATENTS AT ISSUE (*MARKMAN*
CLAIM CONSTRUCTION)

(August 28, 2018)

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I. BACKGROUND

On January 2, 2018, the Commission instituted this Investigation pursuant to subsection (b) of Section 337 of the Tariff Act of 1930, as amended, to determine:

whether there is a violation of subsection (a)(1)(B) of section 337 in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain mobile electronic devices and radio frequency and processing components thereof by reason of infringement of one or more of claims 1, 7, 8, 10, 11, 17, and 18 of the '356 patent; claim 4 of the '336 patent; claims 1, 5–8, 12, 16–18, and 21–22 of the '674 patent; claims 1–4, 7–9, 11, 17, 20–23, 31–33 and 36 of the '002 patent; and claims 1–3, 10–12, 18, and 22–24 of the '633 patent;¹ and whether an industry in the United States exists as required by subsection (a)(2) of section 337[.]

83 Fed. Reg. 834–35 (Jan. 8, 2018).

The Notice of Investigation (“NOI”) names as complainant: Qualcomm Incorporated. of San Diego, California (“Complainant” or “Qualcomm”). *Id.* at 835. The NOI names as respondent: Apple, Inc. of Cupertino, California (“Respondent” or “Apple,” and with Complainant, the “Private Parties”). *Id.* The NOI also names the Office of Unfair Import Investigations (“Staff,” and with Qualcomm and Apple, the “Parties”) as a party. *Id.*

On January 19, 2018, a Proposed Scheduling Order issued to guide the timing and conduct of this Investigation. (Order No. 2 (Jan. 19, 2018)). Also on January 19, 2018, an initial determination (“ID”) issued setting January 21, 2019 as the target date in this Investigation. (Order No. 3 (Jan. 21, 2018)). On February 14, 2018, an initial procedural schedule (“Procedural Schedule”) issued, (Order No. 4 (Feb. 14, 2018)), that “accepted certain changes and adapted others” from the Parties’ Joint Submission Regarding Procedural Schedule, filed on February 2, 2018 (Doc. ID No. 635535 (Feb. 2, 2018)).

¹ The numbers of the asserted utility patents are: U.S. Patent No. 9,154,356 (“the ‘356 patent”); U.S. Patent No. 9,473,336 (“the ‘336 patent”); U.S. Patent No. 8,063,674 (“the ‘674 patent”); U.S. Patent No. 7,693,002 (“the ‘002 patent”); and U.S. Patent No. 9,552,633 (“the ‘633 patent”). *See, e.g.*, 83 Fed. Reg. 834 (Jan. 8, 2018).

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On March 27, 2018, in response to the Parties' Joint Motion to Amend the Procedural Schedule, (Motion Docket No. 1093-003 (Mar. 23, 2018)), a Revised Procedural Schedule issued, (Order No. 7 (Mar. 27, 2018)). The Revised Procedural Schedule "extend[ed] expert discovery and avoid[ed] scheduling conflicts with other investigations without affecting scheduling of the hearing, Initial Determination, or Target Date in this Investigation." (*Id.*). Although it contained a deadline for Initial Briefs by All Parties Explaining Their Initial Claim Constructions, the Revised Procedural Schedule omitted a deadline for reply *Markman* briefs. (*Id.*; see also Order No. 2 at 11 ("compulsory reply *Markman* briefs have been eliminated.")).

On May 7, 2018, Staff filed an Unopposed Motion to Amend the Date for Its Initial Claim Construction Brief. (Motion Docket No. 1093-007 (May 7, 2018)). That motion was granted on May 8, 2018, giving Staff a one-week extension, until May 25, 2018, to file its claim construction brief. (Order No. 10 (May 8, 2018)).

On May 16, 2018, one day late, the Parties filed a Joint Claim Construction Chart ("Joint CC Chart"). (Doc. ID No. 645195 (May 16, 2018)). The Joint CC Chart lays out the claim terms for which a meaning remains in dispute. (*Id.*). With their Joint CC Chart, the Parties filed a Joint Motion for Leave to File Joint Claim Construction Chart Out of Time. (Motion Docket No. 1093-008 (May 16, 2018)). That motion was granted on June 4, 2018. (Order No. 13 (June 4, 2018)).

On May 18, 2018, the Private Parties each filed a claim construction brief. (Respondent Apple Inc.'s Initial Claim Construction Brief ("RMBR."), Doc. ID No. 645527 (May 18, 2018); Complainant Qualcomm's Claim Construction Brief ("CMBR."), Doc. ID No. 645526 (May 18, 2018)). Also on May 18, 2018, the Private Parties filed separate *Markman* Hearing Proposals requesting the scheduling of a one-day *Markman* hearing to occur during the week of June 4,

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2018. (Complainant's *Markman* Hearing Proposal, Doc. ID No. 645497 (May 18, 2018); Respondent Apple Inc.'s *Markman* Hearing Proposal, Doc. ID No. 645499 (May 18, 2018).). Staff filed its claim construction brief on May 25, 2018. (Claim Construction Brief of the Commission Investigative Staff ("SMBr."), Doc. ID No. 646022 (May 25, 2018).).

On May 30, 2018, an order issued setting June 7, 2018, as the date of the *Markman* hearing. (Order No. 12 (May 30, 2018).). Qualcomm filed a Pre-*Markman* Hearing Statement on June 6, 2018. (Doc. ID No. 647012 (June 6, 2018).). Apple filed a *Markman* Pre-Hearing Statement on June 7, 2018. (Doc. ID No. 647034 (June 7, 2018).). Qualcomm and Apple filed amended versions of these Statements on June 7, 2018. (Doc. ID Nos. 647035 and 647036 (June 7, 2018).). The *Markman* hearing took place on June 7, 2018. (*Markman* Hearing Transcript ("Markman Tr."), Doc. ID No. 647253 (June 8, 2018).).

On June 19, 2018, the Parties filed a Statement Regarding *Markman* Meet and Confer. (Doc. ID No. 648172 (June 19, 2018).). The Statement reported on results of the Parties' post-*Markman* Hearing meeting on June 14, 2018 that addressed disputed claim constructions. (*Id.* at 1.). The Statement also referenced another such meeting that was documented in an unfiled Joint Claim Construction Statement provided to Chambers on June 15, 2018. (*Id.*).

On August 7, 2018, Qualcomm filed its first Unopposed Motion for Partial Termination by Withdrawal of Certain Claims. (Doc. ID No. 652282 (Aug. 7, 2018).). On August 22, 2018, Qualcomm filed its second Unopposed Motion for Partial Termination by Withdrawal of Certain Claims. (Doc. ID No. 653609 (Aug. 22, 2018).). An Initial Determination issued on August 27, 2018, granting Qualcomm's motions for partial termination. (Order No. 37 (Aug. 27, 2018).).

II. PATENTS AND CLAIMS AT ISSUE

The complaint (“Complaint”) and NOI identify five (5) asserted patents and approximately forty-six (46) asserted claims: claims 1, 7, 8, 10, 11, 17, and 18 of the ’356 patent; claim 4 of the ’336 patent; claims 1, 5, 6, 7, 8, 12, 16, 17, 18, 21, and 22 of the ’674 patent; claims 1, 2, 3, 4, 7, 8, 9, 11, 17, 20, 21, 22, 23, 31, 32, 33 and 36 of the ’002 patent; and claims 1, 2, 3, 10, 11, 12, 18, and 22, 23, and 24 of the ’633 patent. (*See, e.g.*, Compl. ¶ 5 (Nov. 30, 2017).). Patents and claims that remain after Qualcomm’s motions for partial termination and Order No. 37 are: (1) claim 4 of the ’336 patent; (2) claims 1 and 17 of the ’356 patent; and (3) claims 1, 5, and 8 of the ’674 patent.² (Order No. 37 at 3.). As set forth below in Chart 1, each remaining asserted patent claim has one or more disputed claim terms.

Chart 1: Disputed Claim Terms of Asserted Patent Claims Remaining in This Investigation

Asserted Patents/Claims	Disputed Terms
’336 patent, cl. 4	first stage carrier group
’336 patent, cl. 4	first portion of the carrier signals second portion of the carrier signals
’356 patent, cls. 1 and 17	carrier aggregation
’356 patent, cls. 1 and 17	a second carrier of the multiple carriers
’674 patent, cls. 1, 5 ³ and 8	up/down detector

² On August 20, 2018, the Private Parties filed pre-hearing briefs. (Complainant’s Pre-Hearing Brief (“CPBr.”), Doc. ID No. 653441 (Aug. 20, 2018); Respondent Apple Inc.’s Pre-Hearing Brief (“RPBr.”), Doc. ID No. 653442 (Aug. 20, 2018).). On the same date, the Private Parties filed a Joint Chart of Substantive Legal Issues Being Litigated (“Joint Chart”). (Doc. ID No. 653442 (Aug. 20, 2018).). On August 22, 2018, in response to Order No. 33, the Parties filed a Joint Statement of Terminated Claims and Prior Art Statements (“Joint Statement”). (Doc. ID No. 653669 (Aug. 22, 2018).). With respect to asserted patents and patent claims remaining in the Investigation, the Joint Chart, Pre-Hearing Briefs, and Joint Statement are consistent with Qualcomm’s motions to terminate. (*See, e.g.*, CPBr. at 9-69.).

³ Claim 5 of the ’674 patent is the only remaining asserted dependent claim, as it depends from claim 1. The term “up/down detector” appears only in claim 1 and is inherited by dependent claim 5.

	power on/off detector
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A. U.S. Patent No. 9,473,336

The '336 patent, entitled "Radio Frequency (RF) Front End Having Multiple Low Noise Amplifier Modules," was filed on March 27, 2015 as U.S. Patent Application No. 14/671,939 ("the '939 application"). (JXM-0002 at 1.). The '939 application claims priority to U.S. Provisional Application No. 61/994,158, filed on May 16, 2014. (*Id.*). The '939 application issued as the '336 patent on October 18, 2016, and names as inventors Dongling Pan, Aleksandar Miodrag Tasic, Rajagopalan Rangarajan, Lai Kan Leung, Chiewcharn Narathong, and Yiwu Tang. (*Id.*). Complainant Qualcomm is the assignee of the '336 patent. (*Id.*).

The '336 patent relates generally to radio frequency transceivers capable of accommodating "carrier aggregation," defined by the '336 patent as the "concurrent operation of two or more receive paths" to "simultaneously receive two or more receive signals"⁴ (*Id.* at 1:28-30.). Yet, "carrier aggregation" poses a problem occasioned by "RF transceivers that are becoming more and more complex as they are designed to handle an ever-increasing number of different frequencies in multiple communication bands." (*Id.* at 1:45-48.). The problem is that a "receiver includes multiple signal paths that give rise to stringent path-to-path isolation requirements because each receiver signal path could generate aggressor signals to other receiver signal paths," which make "recovery of the information on the victim receiver path difficult or impossible." (*Id.* at 1:51-59.).

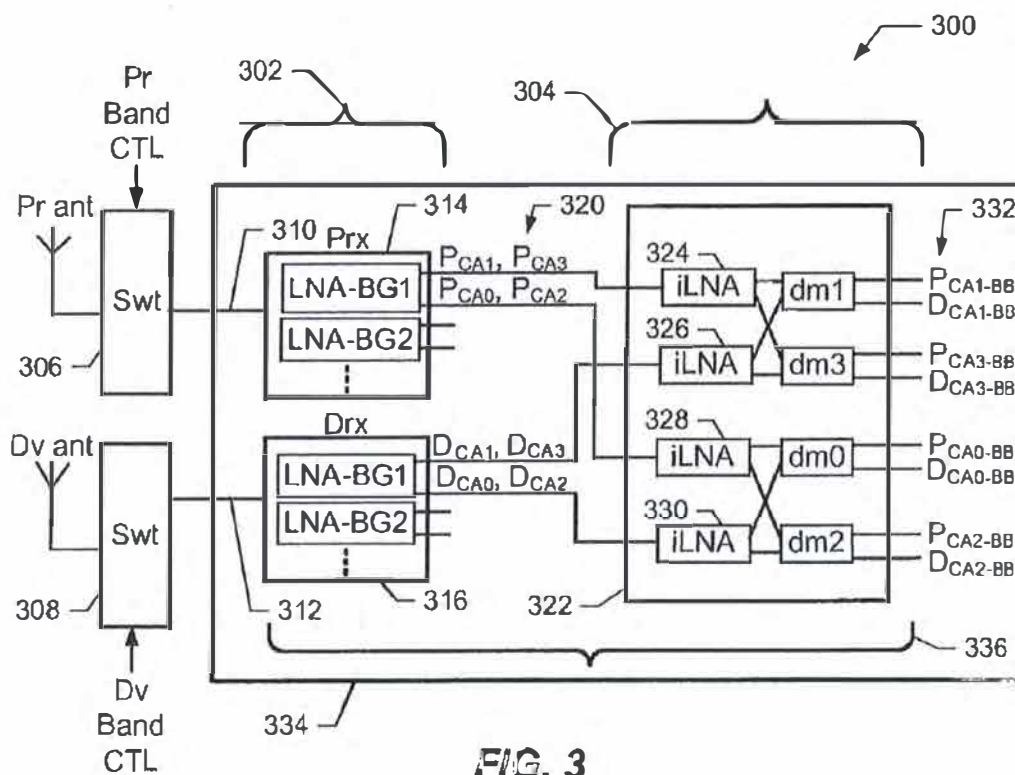
⁴ According to Apple, a "carrier" is a signal that contains or "carries" useful information (e.g., voice data, a text message, or an email). (RMBR. at 2.). As explained by Qualcomm, "[i]n an uplink operation, an RF frequency sine wave, also referred to as a 'carrier wave' is first modulated with [configured to carry] the information to be communicated by the baseband processor [e.g., voice data, a text message, or an email]. Then, this modulated carrier signal is transmitted by the cellular device" (CMBR. at 8.).

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The solution taught by the '336 patent is “improved receiver path isolation” using a “two stage low noise amplifier (‘LNA’) that efficiently routes received RF carrier signals in multiple communication bands to demodulators in a wireless device”⁵ (*Id.* at 1:60-62, 2:40-44.). In one embodiment, the first stage comprises “first stage amplification integrated circuits (IC),” and the second stage comprises a “second stage amplification and demodulation integrated circuit” (*Id.* at 4:31-35.). The first stage outputs “signals having selected carrier signals in selected bands and/or band groups.” (*Id.* at 3:64-66.). The second stage demodulates “carrier signals associated with a particular carrier frequency” (*Id.* at 5:18-21.).

In layman’s terms, it appears that the '336 patent teaches a housekeeping approach to “handle an ever-increasing number of different frequencies in multiple communication bands,” so as to minimize signal conflict. (*Id.* at 1:45-59.). In at least one embodiment, the first stage of a two-stage LNA, bearing number 302 in Figure 1 below, facilitates the grouping of signals (by carrier frequency) so as to minimize interference among them. (*See, e.g., id.* at 3:64-66.). The signals are then delivered in their interference-minimizing groups to the second stage of the two-stage LNA, bearing number 304 in Figure 1 below, where the signals are individually separated from their groups by carrier frequency and demodulated. (*See, e.g., id.* at 5:18-21.).

⁵ According to Apple, demodulation converts “the received frequency into a different (typically lower) frequency that other components in the mobile device (such as a baseband processor) can process.” (RMBR. at 28.). The function of the demodulator is typically referred to as “demodulation” or “downconversion.” (*Id.* (citing RXM-0001 (Fay Decl.) ¶ 49 and JXM-0002 ('336 patent) at 1:20-23, 5:18-21, and 9:9-13.). While modulation combines useful information with a carrier wave for transmission, demodulation does the opposite by extracting the useful information from a carrier wave. (*See, e.g., JXM-0002* at 9:9-54 (“The demodulated signals, which are baseband signals are input to baseband filters 610(a) and 610(b) of baseband filters 610(a-h).”).).

Figure 1: Figure 3 of the '336 Patent**FIG. 3**

(*Id.* at Fig. 3.).

B. U.S. Patent No. 9,154,356

The '356 patent, entitled "Low Noise Amplifiers for Carrier Aggregation," was filed on August 21, 2012, as U.S. Patent Application No. 13/590,423 ("the '423 application"). (JXM-0001 at Cover.). The '423 application claims priority to U.S. Provisional Application No. 61/652,064, filed May 25, 2012. (*Id.*). The '423 application issued as the '356 patent on October 6, 2015 and names as inventors Aleksandar Miodrag Tasic and Anosh Bomi Davierwalla. (*Id.*). Qualcomm is the assignee of the '356 patent. (*Id.*).

According to Qualcomm, the '356 patent teaches "a receiver design that offers the flexibility of activating circuitry to receive a signal employing carrier aggregation when needed and deactivating that circuitry when it is not needed." (CMBR. at 9; *see also* JXM-0001 at

Abstract, 2:23-25.). This purportedly saves precious device power. (CMBR. at 9.). In reference to Figure 6A below, the '356 patent describes an input RF signal split at the input of a dual-stage amplifier. (JXM-0001 at 8:21-24, Fig. 6A.). "CA [carrier aggregation] LNA 640a may operate in a non-CA mode or a CA mode at any given moment. In the non-CA mode, CA LNA 640a receives transmissions on one set of carriers and provides one output RF signal to one load circuit. In the CA mode, CA LNA 640a receives transmissions on two sets of carriers and provides two output RF signals to two load circuits, one output RF signal for each set of carriers." (*Id.* at 8:28-35.). In other words, "In the non-CA mode, only one amplifier stage is enabled, and the other amplifier stage is disabled." (*Id.* at 8:46-47.).

Figure 2: Figure 6A of the '356 Patent

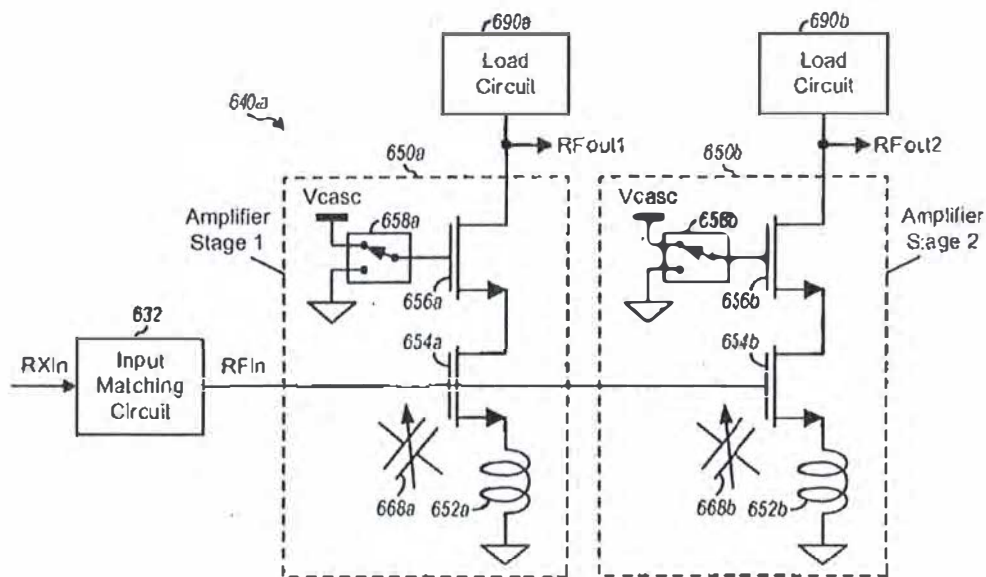


FIG. 6A

(*Id.* at Fig. 6A.).

C. U.S. Patent No. 8,063,674

The '674 patent, entitled "Multiple Supply-Voltage Power-Up/Down Detectors," was filed on February 4, 2009, as U.S. Patent Application No. 12/365,559 ("the '559 application"). (JXM-0003 at Cover.). The '559 application issued as the '674 patent on November 22, 2011 and names Chang Ki Kwon and Vivek Mohan as inventors. (*Id.*). Qualcomm is the assignee of the '674 patent. (*Id.*).

The '674 patent pertains to power management in integrated devices having multiple supply voltages. (*Id.* at 3:15-22.). "[M]any newer integrated circuit devices include dual power supplies: one lower-voltage power supply for the internally operating or core applications, and a second higher-voltage power supply for the I/O circuits and devices." (*Id.* at 1:22-25.). "It has been found useful to have the I/O devices in a known [i.e., controlled] state when the core networks are powered down." (*Id.* at 1:41-48.).

"One hardware solution currently in use provides power-up/down detectors to generate a power-on/off-control (POC) signal internally. The POC signal instructs the I/O devices when the core devices are shut down." (*Id.* at 1:55-58.). "However, when I/O power supply 104 is powered-up before core power supply 103 powers-up, substantial current leakage may occur in the power up/down detector 100 or in the POC 10." (*Id.* at 2:17-20.). In addition to leakage, "conventional solutions still have problems with ... [slow] switching [i.e., detecting] times" during supply voltage transitions. (*Id.* at 3:1-11.).

As shown in Figure 3B below, the '674 patent teaches solving these problems using a power-up/down detector with feedback signals. (*Id.* at 5:1-23, Fig. 3B.). Specifically, "[t]he control network further includes one or more feedback circuits coupled to the up/down detector. The one or more feedback circuits are configured to provide feedback signals to adjust a current

capacity of said up/down detector.” (*Id.* at 3:31-34.). According to the ’674 patent, these feedback circuits allow the power-up/down detector to detect supply voltage transitions faster and more efficiently in terms of power usage, as compared to conventional techniques. (*Id.* at 7:1-7.).

Figure 3: Figure 3B of the ’356 Patent

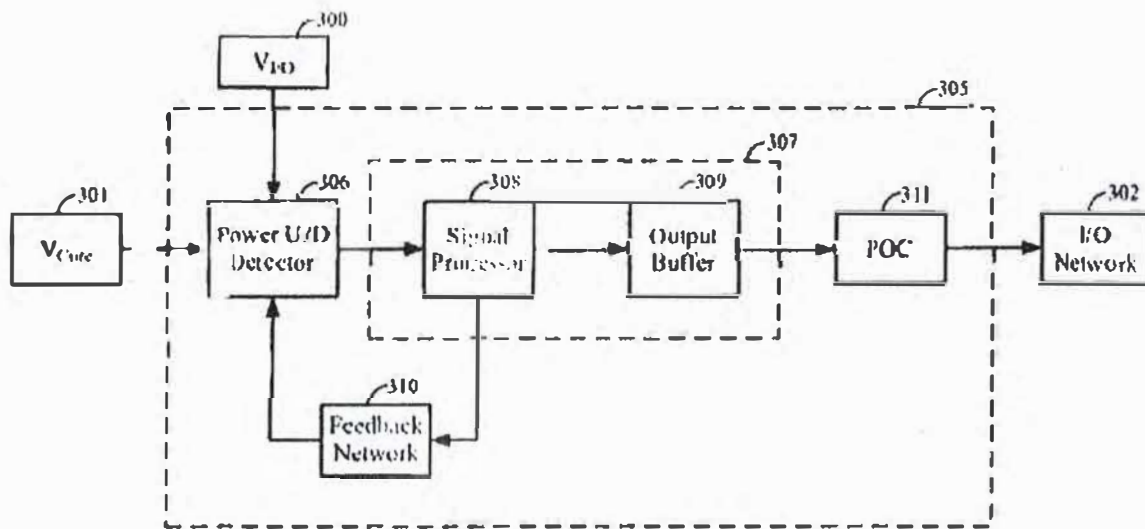


FIG. 3B

(*Id.* at Fig. 3B.).

III. TERMS ADOPTED AND CONSTRUED IN THIS ORDER

A. Claim Construction and Ground Rules

Claim terms are construed in this Order solely for the purposes of this Section 337

Investigation. Only claim terms in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *Vanderlande Indus. Nederland BV v. Int'l Trade Comm.*, 366 F.3d 1311, 1323 (Fed. Cir. 2004); *Vivid Tech., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

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Going forward, including during the evidentiary hearing (“Hearing”) scheduled from September 17 to September 22, 2018, the Parties are limited to the claim-term constructions adopted in this Order. Ground Rule 1.14 states that “[t]he parties will be bound by their claim construction positions set forth on the date they are required to submit a joint list showing each party’s final proposed construction of the disputed claim terms and will not be permitted to alter these absent a timely showing of good cause.” Modified or new claim-term constructions set forth for the first time in post-hearing briefs will be considered to be waived.

Similarly, it will not be appropriate for any party to seek additional claim construction during the evidentiary hearing or merely to state that a claim term that may be implicated in an expert report or expert testimony has either a “plain or ordinary” meaning, or that a claim term is “indefinite.” (See Proposed Scheduling Order and Notice of Ground Rules (Order No. 2 at 6-7; Attachment B, G.R. 1.14 at 9 (Jan. 19, 2018)). If any party posits a “plain and ordinary meaning,” it must be explained.

B. Claim Charts in Appendix A

Chart No. 1 in Appendix A is labeled “Court’s Constructions of Disputed Claim Terms That Remain Relevant in this Investigation” and is self-explanatory. There are seven (7) columns in Chart No. 1: (1) Patent/Claim(s); (2) Term(s) to be Construed; (3) Complainants’ Proposed Construction; (4) Respondent’s Proposed Construction; (5) Staff’s Proposed Construction; (6) the Adopted Construction; and (7) the Rationale/Support for the Adopted Construction.

Chart No 2 in Appendix A, labeled “Adopted Claim Constructions Based Upon the Parties’ Agreed Upon Constructions That Remain Relevant in this Investigation,” contains the

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one remaining claim term for which the Parties have agreed to a construction. The Parties' agreed-upon claim construction was adopted without providing a rationale or explanation.

IV. APPLICABLE LAW⁶

Claim construction begins with the language of the claims themselves. Claims should be given their ordinary and customary meaning as understood by a person of ordinary skill in the art, viewing the claim terms in the context of the entire patent. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005). In some cases, the plain and ordinary meaning of claim language is readily apparent and claim construction will involve little more than "the application of the widely-accepted meaning of commonly understood words." *Id.* at 1314. In other cases, claim terms have a specialized meaning and it is necessary to determine what a person of ordinary skill in the art would have understood disputed claim language to mean by analyzing "the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, as well as the meaning of technical terms, and the state of the art." *Id.* (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004)).

The claims themselves provide substantial guidance with regard to the meaning of disputed claim language. *Phillips*, 415 F.3d at 1314. "[T]he context in which a term is used in the asserted claim can be highly instructive." *Id.* Similarly, other claims of the patent at issue, regardless of whether they have been asserted against respondents, may show the scope and meaning of disputed claim language. *Id.*

In cases in which the meaning of a disputed claim term in the context of the patent's

⁶ The constructions of the disputed claim terms in Chart 1 of Appendix A generally follow and apply the law cited in this Order. To the extent possible, the case law that applies to a construction is either identified explicitly or implicitly in adopting a party's argument or construction.

claims is uncertain, the specification is “single best guide to the meaning of a disputed term.” *Id.* at 1321. Moreover, “[t]he construction that stays true to the claim language and most naturally aligns with the patent’s description of the invention will be, in the end, the correct construction.” *Id.* at 1316. As a general rule, however, the particular examples or embodiments discussed in the specification are not to be read into the claims as limitations. *Id.* at 1323.

The prosecution history may also explain the meaning of claim language, although “it often lacks the clarity of the specification and thus is less useful for claim construction purposes.” *Id.* at 1317. The prosecution history consists of the complete record of the patent examination proceedings before the U.S. Patent and Trademark Office, including cited prior art. *Id.* The prosecution history may reveal “how the 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.” *Id.*

If the intrinsic evidence is insufficient to establish the clear meaning of a claim, a court may resort to an examination of the extrinsic evidence. *Zodiac Pool Care, Inc. v. Hoffinger Indus., Inc.*, 206 F.3d 1408, 1414 (Fed. Cir. 2000). Extrinsic evidence may shed light on the relevant art, and “consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises.” *Phillips*, 415 F.3d at 1317. In evaluating expert testimony, a court should disregard any expert testimony that is conclusory or “clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent.” (*Id.* at 1318.) Moreover, expert testimony is only of assistance if, with respect to the disputed claim language, it identifies what the accepted meaning in the field would be to one skilled in the art. *Symantec Corp. v. Comput. Assocs. Int’l, Inc.*, 522 F.3d 1279, 1289 n.3., 1290-

91 (Fed. Cir. 2008). Testimony that recites how each expert would construe the term should be accorded little or no weight. *Id.* Extrinsic evidence is inherently “less reliable” than intrinsic evidence, and “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 1318-19.

Extrinsic evidence is a last resort: “[i]n those cases where the public record unambiguously describes the scope of the patented invention, reliance on any extrinsic evidence is improper.” *Vitronics Corp. v. Conception, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996).

V. PERSON OF ORDINARY SKILL IN THE ART

This is a hypothetical person of ordinary skill and “ordinary creativity.” *KSB Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 420 (2007). “Factors that may be considered in determining [the] level of ordinary skill in the art include: (1) the educational level of the inventor[s]; (2) type of problems encountered in the art; (3) prior art solutions to the problems; (4) rapidity with which inventions are made; (5) sophistication of the technology; and (6) educational level of active workers in the field.” *Envil. Designs Ltd. v. Union Oil Co. of California*, 713 F.2d 693, 696-97 (Fed. Cir. 1983) (citations omitted). “These factors are not exhaustive but merely a guide to determining the level of ordinary skill in the art.” *Daiichi Sankyo Co. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007). The hypothetical person of skill is also separately presumed to have knowledge of all the relevant prior art in the field. *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 693, 697 (Fed. Cir. 1983).

The Parties disagreed over the qualifications of a person of ordinary skill in the art for the asserted patents. According to Qualcomm, for the ’336 and ’356 patents, a person of ordinary skill in the art “at the time of the invention would have had at least a bachelor’s degree in computer science or engineering, electrical engineering, or a comparable degree, with about two

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years of graduate coursework or work experience in wireless communications.” (CMBr. at 11, 25.). Staff agrees with Qualcomm. (SMBr. at 10, 28.). Apple contends that “[a] person of ordinary skill in the art at the time of the alleged invention would have had at least a Master of Science degree in electrical engineering (or equivalent experience) and would have had at least two years of experience with the structure and operation of RF transceivers and related structures (or the equivalent).” (RMBr. at 6, 25.). The Parties have not explained the reasons for their disagreement.

For the '674 patent, Qualcomm asserts that a person of ordinary skill in the art “at the time of its invention would have had a Bachelor’s degree in Electrical Engineering with at least three years of experience as an integrated circuit designer focusing on on-chip power control and multiple supply voltage VLSI circuit and system design. Alternatively, he/she would have had a higher degree (M.S. or Ph.D.) with fewer years of design experience.” (*Id.* at 39.). According to Apple and Staff, “[a] person of ordinary skill in the art ...pertaining to the '674 patent at the time of filing would have a Bachelor of Science degree in electrical engineering and two years of experience designing CMOS circuits or equivalent training and experience. Additional education can compensate for less work experience, and vice versa.” (RMBr. at 49; SMBr. at 41.). The Parties have not explained the reasons for their disagreement.

This Order does not resolve the person of ordinary skill in the art issue because it is not germane to the claim construction requested by the Parties. In arguing for their proposed constructions of disputed terms, the Parties have appropriately focused on other matters, such as the intrinsic evidence. None of the Parties has indicated in any of their filed documents that the person of ordinary skill in the art definition is necessary or dispositive for construction of the disputed claim terms. (*See, e.g.*, SMBr. at 10, 28, 41 (“Staff, however, is of the view that the

difference between the private parties' proposals with respect to the level of ordinary skill in the art does not appear to be dispositive as to the construction that should be adopted for the disputed term."").

To the extent this issue could be necessary for testimony during the upcoming evidentiary Hearing, the Parties should attempt to agree on a person of ordinary skill in the art definition for each of the '336, '356, and '674 patents. If the Parties instead reserve their person of ordinary skill in the art positions for the evidentiary Hearing, their explanations at the Hearing must address each of the factors set forth in *Envtl. Designs, supra*.

VI. SUMMARY OF CONSTRUCTIONS OF DISPUTED CLAIM TERMS

With respect to the '336 patent, the Parties dispute the construction of "first stage carrier group" and "first portion of the carrier signals | second portion of the carrier signals." (SMBr. at 28-32.). With respect to the '356 patent, the Parties dispute the construction of "carrier aggregation" and "a second carrier of the multiple carriers." (*Id.* at 10-15.). With respect to the '674 patent, the Parties dispute the construction of "up/down detector | power on/off detector." (*Id.* at 41.). Constructions of these disputed terms are set forth below in Chart No. 2.

Chart No. 2: Constructions of Disputed Terms

Asserted Patents/Claims	Disputed Terms	Construction
'336 patent, cl. 4	first stage carrier group	a grouping of carrier signals output from a first stage amplifier
'336 patent, cl. 4	first portion of the carrier signals	a first subset of carrier signals of the received carrier signals
	second portion of the carrier signals	a second subset of carrier signals of the received carrier

		signals, the second subset of carrier signals being different in composition than the first subset of carrier signals
'356 patent, cls. 1 and 17	carrier aggregation	simultaneous operation on multiple carriers
'356 patent, cls. 1 and 17	a second carrier of the multiple carriers	at least one carrier of the multiple carriers included in the input RF signal that is different from the first carrier
'674 patent, cls. 1, 5 ⁷ and 8	up/down detector power on/off detector	circuitry configured to detect a power state of a supply voltage

VII. PROCEEDINGS GOING FORWARD

A. Supplementation in Response to This Order

The Parties may not file supplemental expert reports in response to this Order. No additional discovery will be permitted because of this Order. No re-argument of the claims construed in this Order may occur.

As the Parties proceed in this Investigation, they will be expected to notify Chambers of any issues that have become moot, or have been eliminated for any reason. The Parties' required outlines that must identify any issues, claims, defenses, prior art, theories, or any other content that was originally asserted or argued, should identify all issues or contentions and patents that have been dropped or become moot for any reason.

The Parties should redact from expert reports and from any other documents upon which they intend to rely any issues, claims, defenses, prior art, theories, or any other content that has been rendered moot or disallowed as a result of this or other Orders, or termination from this

⁷ Claim 5 of the '674 patent is the only remaining asserted dependent claim, as it depends from claim 1. The term "up/down detector" appears only in claim 1 and is inherited by dependent claim 5.

Investigation of patent claims or allegations. The Parties must file on EDIS any expert reports or other documents upon which they intend to rely that have been redacted for the reasons stated above, and provide two (2) copies to Chambers.

B. Streamlining the Investigation

To the extent that this *Markman* Order will enable the Parties to streamline the Investigation, the Parties are encouraged to drop issues now in advance of the Hearing scheduled for September 17 to September 22, 2018. Moreover, the Private Parties are encouraged promptly to resolve each issue in this Investigation for which there is no reasonable dispute or little, or weak, evidentiary support.

C. Settlement

It is strongly recommended that the Parties take informal opportunities to engage in settlement.

VIII. CONCLUSION

Constructions of the disputed claim terms are adopted by this Order for the reasons discussed in Chart 1 in Appendix A. The construction of the agreed-upon claim term listed in Chart 2 in Appendix A is also adopted by this Order.

Within seven (7) business days of the date of this document, each party shall submit to the Office of the Administrative Law Judges a statement as to whether or not⁸ it seeks to have any confidential portion of this document (including Charts 1 and 2) deleted from the public version. Any party seeking redactions to the public version must submit to this office two (2) copies of a proposed public version of this document pursuant to Ground Rule 1.10 with yellow highlighting clearly indicating any portion asserted to contain confidential business information.

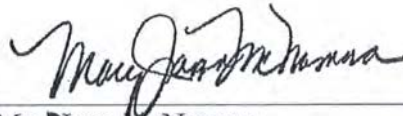
⁸ This means that parties that do not seek to have any portion of this Order redacted are still required to submit a statement to this effect.

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The Parties' submissions may be made by facsimile and/or hard copy by the
aforementioned date. In addition, an electronic courtesy copy is required pursuant to Ground
Rule 1.3.2.

The Parties' submissions concerning the public version of this document need not be
filed with the Commission Secretary.

SO ORDERED.



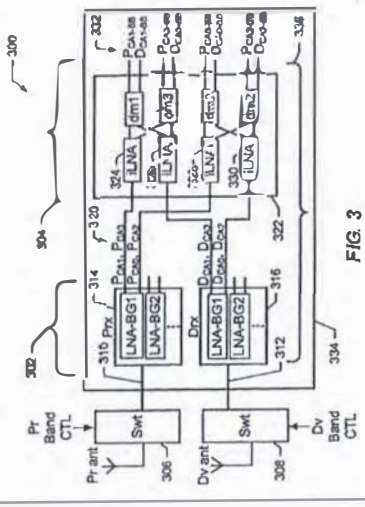
Mary Joan McNamara
Administrative Law Judge

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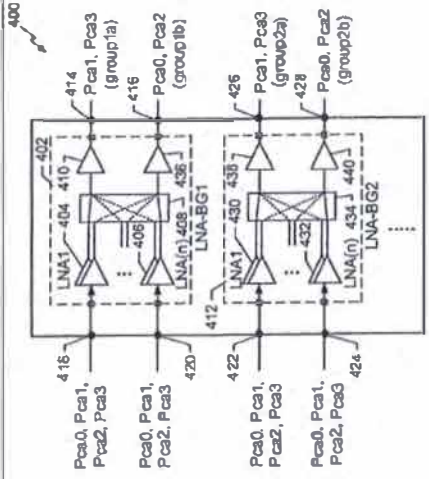
Chart 1: Court's Constructions of Disputed Claim Terms That Remain in this Investigation

Patent/ Claim(s)	Term(s) to be Construed	C's Proposed Construction	R's Proposed Construction	Staff's Proposed Construction	Adopted Construction	Rationale/Support for the Adopted Construction
'336 Patent						
'336: 4	first stage carrier group	carriers output from one of the at least one first stage amplifiers	plurality of carriers including the outputs of the at least one first LNA and the at least one second LNA	carrier signals output from one of the at least one first stage amplifiers	a grouping of carrier signals output from a first stage amplifier	The '336 patent relates generally to radio frequency transceivers capable of accommodating "carrier aggregation," described by the '336 patent as "concurrent operation of two or more receive paths" to "simultaneously receive two or more receive signals" (JXM-0002 at 1:28-30). The problem identified by the '336 patent is that a "receiver includes multiple signal paths that give rise to stringent path-to-path isolation requirements because each receiver signal path could generate aggressor signals to other receiver signal paths," which make "recovery of the information on the victim receiver path difficult or impossible." (<i>Id.</i> at 1:51-59.). The solution taught by the '336

Patent/ Claim(s)	Term(s) to be Construed	C's Proposed Construction	R's Proposed Construction	Staff's Proposed Construction	Adopted Construction	Rationale/Support for the Adopted Construction
						21.). In Figure 3 of the '336 patent below, the first and second stages bear labels 302 and 304, respectively. Figure 3 of the '336 Patent  (<i>Id.</i> at Fig. 3.). In the First Stage, Band Group LNAs Generate Carrier Groups Within this receiver "front end," a "first stage amplifier" generates a "first stage carrier group." (<i>Id.</i> at Abstract, 11:65-12:3, Fig. 9). "Each first stage carrier group includes a respective portion of

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Patent/ Claim(s)	Term(s) to be Construed	C's Proposed Construction	R's Proposed Construction	Staff's Proposed Construction	Adopted Construction	Rationale/Support for the Adopted Construction
						the carrier signals.” (<i>Id.</i>). The specification provides examples of “carrier groups,” explaining that “each band group LNA comprises two outputs to output amplified signals (shown generally at 320 and referred to as <i>carrier groups</i>)” (<i>Id.</i> at 4:58-60.). “For example, the LNA-BG1 ... has a first output that outputs amplified primary carrier signals Pca1 and Pca3 [group 1a, output at 414 in Fig. 4] and a second output that outputs amplified primary carrier signals Pca0 and Pca2 [group 1b, output at 416 in Fig. 4].” (<i>Id.</i> at 4:62-65, Fig. 4.). <u>Figure 4 of the '336 Patent</u>

Patent/ Claim(s)	Term(s) to be Construed	C's Proposed Construction	R's Proposed Construction	Staff's Proposed Construction	Adopted Construction	Rationale/Support for the Adopted Construction
						 (Id. at Fig. 4.). Band Group LNAs Have Individual LNAs and Routing Modules Inside a band group LNA that generates “first-stage carrier groups” are individual LNAs for signal amplification and a routing module for directing amplified carrier signals to a first or second output of the first-stage amplifier. (Id. at 5:30-6:34, Figs. 4-5). Before carrier signals are output in

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						"first stage carrier groups," they pass through these components. (<i>Id.</i>). Individual LNAs Amplify As shown in the two-LNA configuration depicted above in Figure 4, a first LNA receives one or more of the four primary carrier signals, amplifies the received carrier signals, and outputs amplified carrier signals to a routing module. (<i>Id.</i> at 5:42-46.). Likewise, a second LNA also receives one or more of the four primary carrier signals, amplifies the received carrier signals, and outputs amplified carrier signals to the routing module. (<i>Id.</i> at 5:46-51.). Routing Modules Direct "The routing module 408 routes the received amplified carrier signals such that carrier signals in a first band group are routed to a first output terminal 414. Carriers in a second band group are routed to a second output terminal

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						416.” (<i>Id.</i> at 5:52-56.). Thus, within a first stage amplifier, LNAs are controllable in terms of how carrier signals present at input ports and are amplified and routed to output ports. (<i>Id.</i> at 8:24-27.). The ’336 patent teaches a flexible approach in which “an input carrier, band or band group can be routed to either output [of the first stage amplifier] by the operation of the routing modules 408, 434.” (<i>Id.</i> at 6:32-34.). “In an exemplary embodiment, the switches are controlled by a routing control (RC) signal 558 that controls each of the switches to be in either an open or closed state. By controlling the state of the switches, the routing module 408 operates to route any of the amplified input signals to one or both of the output buffers 410 and 436.” (<i>Id.</i> at 7:36-42.). Apple’s Construction Reads

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						Limitations Into Claim 4 Apple contends that the Court must construe “first stage carrier group” to require that carriers in a given group come from amplified signals output from a first LNA <i>and</i> a second LNA. (RMBr. at 32-33.). In other words, according to Apple, a carrier group composed of signals amplified by only one LNA within a first stage amplifier would not satisfy claim 4. <u>Apple's Depiction of First Stage Carrier Group Formation</u> FIG. 4 (Apple's Markman Slides, '356 and

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						'336 patents, at 49.). Apple argues that its construction is consistent with the specification of the '336 patent and the language of claim 4, which requires "at least one first [LNA]" and "at least one second [LNA]." (<i>Id.</i> at 33 (citing JXM-0002 at 12:65-13:8)). Apple is mistaken for several reasons, each of which makes apparent that Apple's construction of "first stage carrier group" is an improper attempt to read limitations from the specification into claim 4. <i>See Phillips v. AWH Corp.</i>, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005) (as a general rule, particular examples or embodiments discussed in the specification are not to be read into the claims as limitations). The first reason is that the routing module required by claim 4 belies Apple's construction. The '336 patent teaches that individual LNAs have at least two outputs for amplified signals,

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						group,” namely claims 1, 13, and 16. While claim 4 and Apple’s proposed construction recite first and second LNAs, claims 1, 13, and 16 do not. Applying Apple’s proposed construction in claims 1, 13, and 16, which are not asserted, would result in the inappropriate importation of limitations from the specification. Further, the intrinsic record provides no indication that “first stage carrier group” should mean one thing in claim 4 and something different in claims 1, 13, and 16. See <i>Fin Control Sys. Pty, Ltd v. OAM, Inc.</i>, 265 F.3d 1311, 1318 (Fed. Cir. 2001) (identical terms in different claims are strongly presumed to have the same meaning, absent a clear showing to the contrary from the specification and the prosecution history). Apple also asserts that its construction should prevail because for each “first stage carrier group” disclosed in the specification of the ’336 patent, carriers

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						in a given group come from amplified signals outputted from a first LNA and a second LNA. (RMBR. at 36 (“There is no embodiment in the ’336 patent specification in which the entirety of the ‘first stage carrier group’ is generated by a single LNA.”)). Yet, this position conflicts with the ’336 patent’s flexible approach toward routing signals amplified by a LNA. In particular, the ’336 patent teaches “switches [in the routing module] to be in either an open or closed state,” such that “the routing module 408 operates to route any of the amplified input signals to one or both of the output buffers 410 and 436.” (<i>Id.</i> at 6:32-34, 7:36-42.). The use of separate switches for each of the two LNA outputs, as depicted in Fig. 5, in conjunction with the disclosure (highlighted on page 35 in Apple’s claim construction brief) that each LNA “amplifies all four carrier signals,” reinforces the understanding of a person of ordinary

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			being different than carrier signals in the first subset	being different than carrier signals in the first subset	signals being different in composition than the first subset of carrier signals	13:3-7.). The Parties respective constructions reflect two disputes. The first dispute is the best way to indicate that "portion" refers to less than a whole, in this scenario less than all of the carrier signals. (CMBR. at 29; RMBR. at 39.). The second dispute is whether the first and second portions are mutually exclusive in terms of included carrier signals or, alternatively, that a signal in one portion can also exist in another portion. (CMBR. at 29-30; SMBR. at 33-34.). Each of these disputes is addressed in turn. Each Private Party agrees that "portion" refers to less than a whole of something. (CMBR. at 29 ("The plain meaning of 'portion' requires that a portion of the carrier signals be a quantity of carrier signals that is fewer than all of the carrier signals. ... Moreover, this construction is consistent with how the terms 'portion'

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						and 'all' are used throughout the specification as different quantities."); RMBR. at 39 ("in the context of the '336 patent the plain meaning of a 'portion' of received carrier signals is a 'subset' of the whole").). However, the Parties disagree over whether to characterize "portion" as a "quantity" or "subset." Qualcomm argues for the former, while Apple and Staff advocate for the latter. (CMBR. at 29; RMBR. at 38-39.). Apple and Staff's construction appears to be correct. The specification of the '336 patent treats "portion" as a subset of a whole. (JXM-0002 at 5:35-41 ("In this exemplary embodiment, two LNAs (e.g., 404 and 406) are shown and each receives as input all or any portion of the four primary carrier signals (Pca0, Pca1, Pca2 and Pca2) 310 selected for output from the switch 306 shown in FIG. 3."), 11:65-12:3 ("The apparatus 900 includes a first means (902) for

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						2004)). Yet, Federal District Court cases are not intrinsic evidence. Consistent with the specification of the '336 patent, "subset" as used in this <i>Markman</i> Order does not encompass an entire set. Moreover, Apple and Staff are correct that it is unclear whether "quantity," in Qualcomm's construction, "refers to a number of carrier frequencies or to the identity of the carrier frequencies." (RMBr. at 40; SMBr. at 34.) Clarity here is important because the '336 patent discloses first and second "portions" of carrier signals that are different in terms of the identity of the carrier signals included in each portion but not necessarily the number of carrier signals included per portion. (See, e.g., JXM-0002 at Figs. 3-4.). "Subset" in the constructions of Apple and Staff clarifies, consistent with the '336 patent, that the relevant focus is the identity of the carrier signals in

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						each “portion” of carrier signals. Qualcomm, and Staff and Apple also dispute whether the claimed first and second portions are mutually exclusive in terms of included carrier signals or, alternatively, that a signal in one portion can also exist in another portion. According to Qualcomm, “the claim language only requires that the ‘first portion’ be different than ‘the second portion;’ nothing in the claim language precludes the ‘first portion’ and the ‘second portion’ from overlapping in part, that is, sharing some of the same constituent carriers so long as the overall composition of the respective portions is different.” (CMBR. at 30.). Staff and Apple, by contrast, focus on the carrier signals themselves, asserting that such signals in the first portion must be different from such signals in the second portion. (RMBR. at 38; SMBR. at 33 (“with each signal in the second portion being different than the signals in the first

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						portion"). On this dispute, Qualcomm prevails. Apple and Staff have pointed to nothing in the intrinsic evidence that requires the claimed first and second portions of carrier signals to be mutually exclusive in terms of constituent signals. Instead, the '336 patent teaches flexibly in how carrier signals are amplified and routed within the first stage amplifier to generate first stage carrier groups. For example, the '336 patent teaches that first stage amplifiers can possess not only two, but many LNAs for amplifying incoming carrier signals. (JXM-0002 at 5:33-35 ("[t]he band group LNA 402 comprises up to 'n' LNAs to receive bands and/or carrier signals for amplification").). As mentioned above, the '336 patent also teaches a flexible approach toward routing signals amplified by a LNA. (<i>Id.</i> at 6:32-34, 7:36-42.). Together, these disclosures present myriad opportunities to a person of ordinary

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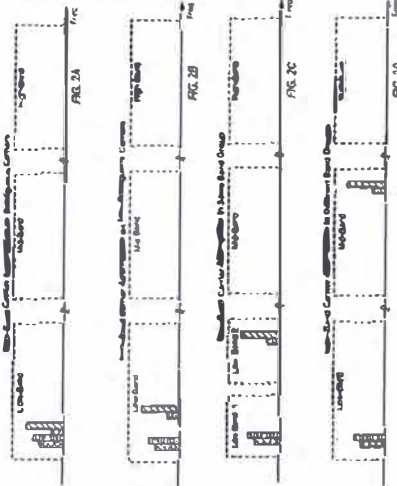
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						skill in the art for mixing and matching carrier signals into first stage carrier groups, some of which might overlap in terms of carrier signal members.
'356 Patent						
'356: 1, 17	carrier aggregation	simultaneous operation on multiple carriers to increase the bandwidth for a user	simultaneous operation on multiple carriers having different frequency ranges	simultaneous operation on multiple carriers to increase the bandwidth for a user	simultaneous operation on multiple carriers	The '356 patent discloses a specific LNA configuration for supporting "carrier aggregation" that purportedly improves performance of a wireless device. (See JXM-0001 ('356 patent) at Abstract, 2:23-25.). Strangely, the '356 patent does not clearly identify the problem it is trying to solve. According to Qualcomm, the '356 patent teaches "a receiver design that offers the flexibility of activating circuitry to receive a signal employing carrier aggregation when needed and deactivating that circuitry when it is not needed." (CMBR. at 9.). This purportedly saves precious device power. (<i>Id.</i>). Qualcomm's observation is consistent

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						multi-carrier operation.”)). The specification of the '356 patent also addresses the meaning of “carrier.” “A carrier may refer to a range of frequencies used for communication and may be associated with certain characteristics. For example, a carrier may be associated with system information describing operation on the carrier. A carrier may also be referred to as a component carrier (CC), a frequency channel, a cell, etc.” (<i>Id.</i> at 1:33-35.). In addition to these uses, the '356 patent repeatedly refers to “carrier” sets of at least one carrier. (<i>See, e.g.,</i> 5:11-23, 17:60-64.). According to the '356 patent, Figures 2A through 2D (displayed below) show four examples of “carrier aggregation,” including intra-band carrier aggregation on contiguous carriers, intra-band carrier aggregation on non-contiguous carriers, inter-band carrier aggregation in same band group, and inter-band

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						carrier aggregation in different band groups. (<i>Id.</i> at 3:1-38.) Figures 2A-2D of the '356 Patent  (<i>Id.</i> at 1:46-47, Figs. 2A-2D.). In spite of this explanation with examples, Qualcomm and Staff make an unusual argument that the construction of “carrier aggregation” should incorporate language not used to describe “carrier aggregation” in the '356 patent specification. (SMBr. at 12

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						("Increasing the bandwidth to a user" (as proposed by Staff and Qualcomm), although not stated that way in the specification"). The specific language at issue, absent from the specification and yet advanced by Staff and Qualcomm, ties "carrier aggregation" to accomplishing a specific purpose: "increase the bandwidth for a user." (<i>Id.</i>). In support of their position, Staff and Qualcomm reference the prosecution history of the '356 patent, in which the applicant distinguishes the Hirose prior art reference. In the patent prosecution history, the applicant for the '356 patent stated that the "claimed invention recites 'carrier aggregation' which results in an <i>increased aggregated</i> data rate. In contrast, Hirose transmits the same signals over different paths which results in <i>redundant</i> data at a <i>common</i> data rate." (JXM-0006 part 26 at QUALCOMMAppeITC2-00002378

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						patent appear consistent with an interpretation that "carrier aggregation" increases data rates by more efficiently using available bandwidth to convey information. The applicant appears to interpret Hirose as practicing frequency diversity without necessarily increasing the data rate. (JXM-0006 part 26 at QUALCOMMAppleITC2-00002378-79.). In other words, in the applicant's view, Hirose appears to disclose the use of increased bandwidth without an increase in the amount of information transmitted (e.g., "three waves containing the same contents"). (<i>Id.</i>). A bandwidth limitation like the one proposed by Staff and Qualcomm would steer "carrier aggregation" away from how the applicant characterized the invention and toward prior art the applicant distinguished from the invention. Moreover, as mentioned above, Staff and Qualcomm did not remain true to the intrinsic record and suggest a limitation reflecting that

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'356: 1, 17	a second carrier of the multiple carriers	Plain and ordinary meaning, which is at least one carrier of the multiple carriers included in the input RF signal that is	a second carrier of the multiple carriers different from each carrier in the first output RF signal	a second carrier of the multiple carriers included in the input RF signal that is different from the first carrier	at least one carrier of the multiple carriers included in the input RF signal that is different from the first carrier	aggregation comprising transmissions sent on multiple carriers at different frequencies to a wireless device").). For at least the reasons set forth above, Apple's "different frequency ranges" limitation is rejected. In sum, free from artificial limitations, the proper construction of "carrier aggregation" comes straight from the specification of the '356 patent: "simultaneous operation on multiple carriers." Claims 1 and 17 of the '356 patent recite "a first carrier of the multiple carriers" and "a second carrier of the multiple carriers." (<i>Id.</i> at cls. 1, 17.). The Parties appear to agree that the terms "first" and "second" distinguish two different carriers. (CMBR. at 16; RMBR. at 13; SMBR. at 15.); <i>see also</i> 3M <i>Innovative Properties Co. v. Avery Dennison Corp.</i>, 350 F.3d 1365, 1371 (Fed. Cir. 2002) ("The use of the terms

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		different from the first carrier				'first' and 'second' is a common patent law-convention to distinguish between repeated instances of an element or limitation."). This understanding is confirmed by surrounding claim language that requires that "at least a second carrier of the multiple carriers [be] different than the first carrier." (JXM-0001 at 20:59-61, 22:25-27.). In the context of intra-band "carrier aggregation," as depicted in Figures 4A and 4B, the '356 patent teaches the reception by a mobile device of "one input RF signal comprising multiple transmissions on M sets of carriers." (<i>Id.</i> at 5:17-23.). The '356 patent also teaches a "carrier aggregation" LNA receiving that input RF signal and "provid[ing] M output RF signals to M load circuits, one output RF signal for each set of carriers, where $M > 1$. Each set of carriers may include one or more carriers in one band." (<i>Id.</i>). It appears from the words and figures

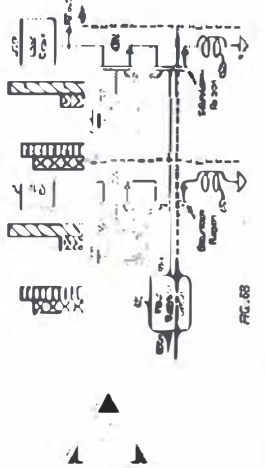
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						included by the applicant in the '356 patent specification that the above-mentioned M output RF signals provided by the "carrier aggregation" LNA can be identical. (<i>See, e.g.</i>, 5:17-23, Figs. 4A-6C.). "[P]rovid[ing] M output RF signals to M load circuits, one output RF signal for each set of carriers, where $M > 1$" could be read to suggest the opposite, that each output RF signal is different. However, as demonstrated by Qualcomm, the figures of the '356 patent belie that interpretation. (CMBR. at 16.). The figures show "carrier aggregation" LNAs splitting and amplifying the input RF signal, not separating the signal into its constituent parts. (JXM-0001 at 5:17-23, Figs. 4A-6C.). <u>Qualcomm's Depiction of a "Carrier Aggregation" LNA Outputting Copies of the Input RF Signal</u>

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						 (See <i>id.</i> at Fig. 6B; Qualcomm's <i>Markman</i> Slides, '356 patent at 52.). The '356 patent also teaches downconversion and filtering of the input RF signals occurring not in "carrier aggregation" LNAs, but in load circuits. (JXM-0001 at 5:24-62.). Load circuits, endowed with mixers and filters, can accept identical output RF signals and proceed to downconvert and filter the signals to isolate specific baseband signals (e.g., constituent parts) for information retrieval. (<i>Id.</i> ("Filters 494a and 494b receive and filter the I and Q downconverted signals from mixers 492a and 492b,

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						respectively, and provide I and Q baseband signals, Vout1, for the first set of carriers. ... Filters 494c and 494d receive and filter the I and Q downconverted signals from mixers 492c and 492d, respectively, and provide I and Q baseband signals, Vout2, for the second set of carriers.”). This context exemplifies the claim construction dispute between Qualcomm, on one side, and Apple and Staff, on the other side. The dispute is whether, in claims 1 and 17, the claimed “second carrier” in the second output RF signal must be different from each of the carriers in the first output RF signal. Based on the discussion above, the answer is no. The ’356 patent teaches that, in all disclosed embodiments, the first and second output RF signals are identical, which would violate Apple and Staff’s construction which requires at least one

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						difference in carrier composition between the two. See <i>Vitronics Corp. v. Conceptor, Inc.</i>, 90 F.3d 1576, 1583 (Fed. Cir. 1996) (holding that construction that excludes the preferred embodiment “is rarely, if ever, correct and would require highly persuasive evidentiary support”); <i>Hoeschst Celanese Corp. v. BP Chemicals Ltd.</i>, 78 F.3d 1575, 1581 (Fed. Cir. 1996) (“it is unlikely that an inventor would define the invention in a way that excluded the preferred embodiment, or that persons of skill in this field would read the specification in such a way.”) Simply put, Staff and Apple’s interpretation of “a second carrier of the multiple carriers” to require heterogeneity across output RF signals is unduly narrow. A less restrictive interpretation of the term, consistent with the claim language and specification, is that a input RF signal having a second carrier that is different from a first carrier is a baseline

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						requirement for practicing carrier aggregation. Stated another way, if a input RF signal contains only one "carrier," no "aggregation" occurs. This interpretation is supported by the prosecution history of the '356 patent. There, the applicant amended claims 1 and 17, adding the "first carrier" and "second carrier" terms. (JXM-0006 part 22 (Office Action Dated Nov. 14, 2013) at QCAppeITC2-00002053.). In so doing, the applicant distinguished the Eisenhut prior art reference and argued that "the output signals . . . in Eisenhut are identical in carrier selection." (<i>Id.</i>). Apple and Staff interpret this statement as an acknowledgement by the applicant that "the two output RF signals in Eisenhut include the same carrier signals," such that the term "second carrier" cannot be construed in a way that allows it to overlap with any of the carriers already included in the

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						'first output RF signal' (which includes the 'first carrier')." (RMBR. at 19; SMBR. at 19.). Apple and Staff's interpretation is unpersuasive. This is because a better, alternate interpretation exists. That interpretation is that Eisenhut disclosed a single carrier signal, not multiple carrier signals. (RXM-4 (U.S. Patent No. 7,751,513 (Eisenhut)) at Fig. 1; see also id. at 5:16-48.). This appears to be what the applicant meant by "the output signals . . . in Eisenhut are identical in carrier selection." The alternate, compelling interpretation, unlike Staff and Apple's interpretation, is consistent with the Office Action that spurred the applicant to make the amendment at issue. In that Office Action, the examiner conceded that "Eisenhut ... <i>does not disclose the input RF signal comprising transmissions sent on multiple carriers</i> at different

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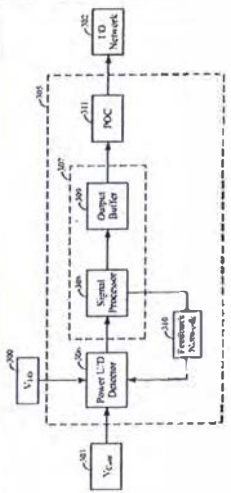
Patent/ Claim(s)	Term(s) to be Construed	C's Proposed Construction	R's Proposed Construction	Staff's Proposed Construction	Adopted Construction	Rationale/Support for the Adopted Construction
						frequencies” (<i>Id.</i>). In other words, the examiner observed that Eisenhut does not teach “carrier aggregation.” The applicant appears to have amended claims 1 and 17, adding first and second carrier signals, to clarify that those claims do practice “carrier aggregation.” Notably, the words “carrier aggregation” were missing from these claims at the time of the amendment (“carrier aggregation” now appears in the claims). Thus, for the term “a second carrier of the multiple carriers,” Staff and Apple’s claim construction arguments are unavailing, and Qualcomm’s construction prevails.
'674: 1, 5 and 8	up/down detector power on/off detector	Plain and ordinary meaning, which is circuitry that detects a power state of	a circuit that is configured to detect the on/off state of a supply voltage	Plain and ordinary meaning, for example: circuitry that detects the power state of	circuitry configured to detect a power state of a supply voltage	The Parties agree that “up/down detector” and “power on/off detector” warrant the same construction. (CMBR. at 42; RMBR. at 52; SMBR. at 42.). The '674 patent pertains to power management in integrated devices

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		a supply voltage		a supply voltage		having multiple supply voltages. (JXM-0003 ('674 patent) at 3:15-22.). “[M]any newer integrated circuit devices include dual power supplies: one lower-voltage power supply for the internally operating or core applications, and a second higher- voltage power supply for the I/O circuits and devices.” (<i>Id.</i> at 1:22-25.). “It has been found useful to have the I/O devices in a known [i.e., controlled] state when the core networks are powered down.” (<i>Id.</i> at 1:41-48.). “One hardware solution currently in use provides power-up/down detectors to generate a power-on/off-control (POC) signal internally. The POC signal instructs the I/O devices when the core devices are shut down.” (<i>Id.</i> at 1:55- 58.). “However, when I/O power supply 104 is powered-up before core power supply 103 powers-up, substantial current leakage may occur in the power up/down detector 100 or in the POC 10.” (<i>Id.</i> at 2:17-20.). In

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						addition to leakage, "conventional solutions still have problems with ... [slow] switching [i.e., detecting] times" during supply voltage transitions. (<i>Id.</i> at 3:1-11.). As shown in Figure 3B below, the '674 patent teaches solving these problems using a power-up/down detector with feedback signals. (<i>Id.</i> at 5:1-23, Fig. 3B.). Specifically, "[t]he control network further includes one or more feedback circuits coupled to the up/down detector. The one or more feedback circuits are configured to provide feedback signals to adjust a current capacity of said up/down detector." (<i>Id.</i> at 3:1-34.). According to the '674 patent, these feedback circuits allow the power-up/down detector to detect supply voltage transitions faster and more efficiently in terms of power usage, as compared to conventional techniques. (<i>Id.</i> at 7:1-7.). <u>Figure 3B from the '674 Patent</u>

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						 (JXM-0003 at Fig. 3B.). Against this background, the Parties propose similar but distinct constructions for “up/down detector” and “power on/off detector.” In its construction, Apple emphasizes that an “up/down detector” or a “power on/off detector” is binary in nature and “detect[s] the on/off state of a supply voltage.” (RMBR. at 50.). In so doing, Apple relates “up/down” and “power-on/off” detectors to the POC (power-on/off-control) signal 311, another component shown in Figure 3B. (<i>Id.</i> at 50-51.). The specification of the ’674 patent describes the POC signal as

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						provides a detection signal to the signal processor 308, which processes the detection signal and transmits the processed signal to the output buffer 309. The output buffer 309 then conditions the processed signal into a POC signal 311, which is then transmitted to an I/O network 302.”). Indeed, the detection signal generated by the “up/down detector” or “power on/off detector” must proceed through a “signal processing” circuit and an inverting buffer before emerging as a binary POC signal. (<i>Id.</i>). This physical and technical separation between a detection signal on the one hand, and “POC signal,” on the other, undermines Apple’s attempts to link the two signals for claim construction purposes. Qualcomm and Staff characterize Apple’s construction as unduly narrow insofar as it precludes an “up/down detector” or a “power on/off detector” from performing a detection during the time it takes for a supply voltage to

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						transition from low to high or high to low. (SMBr. at 42-43; CMBr. at 42-43.). Qualcomm notes that “the power state of a power supply does not change from on to off or off to on instantaneously.” (CMBr. at 42-43.). Thus, Qualcomm and Staff advocate for a construction that is broad enough to cover the detection of “power state,” including during supply voltage transitions, not just detections occurring after a supply voltage has reached a stable “on/off state.” (SMBr. at 41-43; CMBr. at 42-43.). Staff and Qualcomm’s argument prevails. The ’674 patent explicitly discloses “an adjustable current power up/down detector configured to detect a power state of the core network.” (JXM-0003 at Abstract, 3:26-28.). Although the ’674 patent appears to treat states as binary (e.g., high v. low state), lending support to Apple’s construction, the ’674 patent makes clear that conventional and purportedly

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						inventive power up/down detection circuitry detects changes in the power state of a supply voltage while that voltage transitions between states. (<i>See, e.g., id.</i> at 2:40-62, 7:1-4.). In other words, in the context of an “up/down detector” or a “power on/off detector,” Apple’s construction appears to seize upon <i>what</i> is detected at the expense of <i>when</i> it is detected. For these reasons, Apple’s construction fails. With one exception, the adopted construction tracks the definition of “power up/down detector” provided by the ‘674 patent specification: “configured to detect a power state of the core network.” (<i>Id.</i> at Abstract, 3:26-28.). That exception is the substitution of “a supply voltage” for “a core network.” Each of the Parties made this substitution in its proposed construction. (CMBR. at 42.). The substitution is appropriate given the ‘674 patent’s repeated use of first and

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						second supply voltage in place of I/O supply voltage and core supply voltage, respectively. (See, e.g., Abstract ("a core network coupled to the I/O network and operative at a second supply voltage").).

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**Chart 2: Adopted Claim Constructions Based Upon the Parties' Agreed Upon
Constructions That Remain Relevant in this Investigation**

Patent/Claim(s)	Term	Construction
'336 Patent		
none		
'356 Patent		
'356: 1, 17	a first carrier of the multiple carriers	Plain and ordinary meaning, which is at least one carrier of the multiple carriers included in the input RF signal
'674 Patent		
none		

**CERTAIN MOBILE ELECTRONIC DEVICES AND RADIO
FREQUENCY AND PROCESSING COMPONENTS
THEREOF**

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PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **ORDER** has been served by hand upon the Commission Investigative Attorney, **Paul Gennari, Esq.** and the following parties as indicated, on **October 4, 2018**.



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