

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of

CERTAIN MOBILE PHONES, TABLET
COMPUTERS, SMART WATCHES,
SMART SPEAKERS, AND DIGITAL
MEDIA PLAYERS, AND PRODUCTS
CONTAINING SAME

Inv. No. 337-TA-1300

ORDER NO. 20: CONSTRUING CERTAIN TERMS OF THE ASSERTED
CLAIMS (*MARKMAN* CLAIM CONSTRUCTION)

(September 26, 2022)

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Table of Abbreviations

Compl.	Complaint
CMBr.	Complainants' <i>Markman</i> Brief
RMBr.	Respondent's <i>Markman</i> Brief
CXM	Complainants' <i>Markman</i> Exhibit
RXM	Respondent's <i>Markman</i> Exhibit
JXM	Joint <i>Markman</i> Exhibit
MHr'g Tr.	<i>Markman</i> Hearing Transcript

I. BACKGROUND

On February 24, 2022, 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 products identified in paragraph (2) by reason of infringement of one or more of claims 2, 3, 5-8, and 11-18 of the '430 patent; claims 1-3, 7, 12, and 18 of the '273 patent; claims 1, 9, 10, 12-14, 18, and 20 of the '621 patent; claims 1, 2, 4, 7-10, 12, 15, and 16 of the '770 patent; and claims 1, 2, 8, 10, 13, and 15 of the '400 patent, and whether an industry in the United States exists as required by subsection (a)(2) of section 337[.]¹

87 Fed. Reg. 10385 (Feb. 24, 2022).

The Notice of Investigation ("NOI") names as complainants: Ericsson Inc. of Plano, TX; and Telefonaktiebolaget LM Ericsson of Stockholm, Sweden ("Ericsson" or "Complainants").

Id. at 10386. The NOI names as respondent: Apple Inc. at Cupertino, CA ("Apple" or "Respondent," and with Ericsson, the "Private Parties"). *Id.* The Office of Unfair Import Investigations ("Staff," and with the Private Parties, the "Parties") is also a party in this Investigation.² *Id.*

On June 8, 2022, pursuant to Order No. 6 ("Adopted Procedural Schedule"), the Private Parties filed a Joint Claim Construction Chart ("JCCC"). (Doc. ID No. 772606 (June 8, 2022)). The JCCC contains: (i) 8 agreed upon claim terms; and (ii) 10 disputed claim terms that the Private Parties asked to be construed. (*Id.*). On June 22, 2022, the Private Parties filed a

¹ The asserted patents are: U.S. Patent No. 7,151,430 ("the '430 patent"); U.S. Patent No. 9,509,273 ("the '273 patent"); U.S. Patent No. 9,853,621 ("the '621 patent"); U.S. Patent No. 7,957,770 ("the '770 patent"); and U.S. Patent No. 9,705,400 ("the '400 patent"). 87 Fed. Reg. 10385 (Feb. 24, 2022).

² Staff's participation in this Investigation is limited to "issues relating to remedy, the public interest, and bonding." (Doc. ID No. 764657 (Mar. 7, 2022)). Thus, Staff was not involved in the *Markman* proceedings.

Revised Joint Claim Construction Chart (“Revised JCCC”), which contains: (i) the same 8 agreed upon claim terms; and (ii) 9 disputed claims terms. (Doc. ID No. 749539 (Aug. 13, 2021)).

Additionally, each of the Private Parties filed a *Markman* Brief. (Doc. ID No. 773690 (June 22, 2022); Doc. ID No. 773692 (June 22, 2022)). Each of the Private Parties re-filed their respective Briefs to include *Markman* exhibits. (Doc. ID No. 773995 (June 27, 2022) (CMBR.); Doc. ID No. 774033 (June 28, 2022) (RMBR.)).

Pursuant to Order No. 13, a *Markman* hearing was held on July 27, 2022 (“*Markman* Hearing”). (Order No. 13 (July 6, 2022); *see also* MHR’g Tr., Doc. ID No. 776416 (July 28, 2022)). On July 28, 2022, the Private Parties filed a Post-Hearing Joint Claim Construction Chart. (Doc. ID No. 776438 (July 28, 2022)). Subsequently, the Private Parties filed an updated Post-Hearing Joint Claim Construction Chart (“PH JCCC”). (Doc. ID No. 777135 (Aug. 4, 2022)). The PH JCCC contains: (i) 9 agreed upon claim terms; and (ii) 7 disputed claim terms, upon which the proposed constructions referenced in this Order are based.

II. APPLICABLE LAW

A. Claim Construction Generally

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. *Id.* “[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 claims is uncertain, the specification is the “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 (“PTO”), 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. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996).

B. Indefiniteness

Indefiniteness must be proven by clear and convincing evidence. *See Cox Commc’ns, Inc. v. Sprint Commc’ns Co. LP*, 838 F.3d 1224, 1228 (Fed. Cir. 2016). A patent claim is not indefinite if it “inform[s], with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014). The indefiniteness “inquiry turns on the understanding of a skilled artisan at the time of the patent application” and must be conducted in light of the intrinsic evidence. *Id.* at 911, 901.

C. Person of Ordinary Skill in the Art

A hypothetical person is a 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.” *Envtl. 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. *See, e.g., Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 693, 697 (Fed. Cir. 1983).

III. THE ASSERTED PATENTS AND CLAIMS AT ISSUE

A. The ’430 Patent

The ’430 patent, entitled “Method of and Inductor Layout for Reduced VCO Coupling,” was filed on August 16, 2004, as U.S. Patent Application Serial No. 10/919,130 (“the ’130 application”). (JXM-0001 (’430 patent) at (21), (22), (54).). The ’430 patent issued on December 10, 2006, and names Thomas Mattsson as the sole inventor. (*Id.* at (45), (75).). The ’130 application claims its earliest priority to U.S. Provisional Application Serial No. 60/549,611 filed on March 3, 2004. (JXM-0001 at (60).). Ericsson owns by assignment all right, title and interest in and to the ’423 patent. (*See* Compl. at ¶ 19, Ex. 6.).

The ’430 patent relates to inductors implemented within a semiconductor chip. (*Id.* at ¶ 21.). Specifically, the ’430 patent utilizes an inductor design that is symmetrical about at least one axis and contains at least one pair of loops (e.g., a figure-eight-shape) arranged so that the

magnetic fields emanating from each of the loops tend to cancel each other out. (*Id.*; *see also*, *e.g.*, JXM-0001 at Abstract, 1:61-66, 2:3-5). As a result of this configuration, there is a reduced electromagnetic field at a certain distance from the inductor, thereby lowering the electromagnetic coupling between this inductor and other circuit components on the same chip. (Compl. at ¶ 21; *see also*, *e.g.*, JXM-0001 at 1:65-2:2.). The '430 patent is particularly useful when implementing an RF transceiver with voltage-controlled oscillators on a single chip, which typically requires multiple inductors. (Compl. at ¶ 21.). The design of the '430 patent reduces the amount of undesired coupling with the inductor, which may result in spurious receiver responses and unwanted frequencies in the transmit spectrum. (*Id.*).

B. The '273 and '621 Patents

The '273 and '621 patents are entitled “Transformer Filter Arrangement.” (JXM-0002 ('273 patent) at (54); JXM-0003 ('621 patent) at (54).).

The '273 patent, filed as U.S. Patent No. Application Serial No. 14/233,497 (“the 497 application”), is based on PCT Application No. PCT/SE2012/050729, filed on June 28, 2012, and claims priority to European Patent Application No. 11174822, filed on July 21, 2011. (JXM-0002 at (21), (22), (30), (86).). The '273 patent issued on November 29, 2016, and names Stefan Andersson, Fenghao Mu, and Johan Wernehag as the inventors. (*Id.* at (45), (75).).

The '621 patent was filed on February 16, 2016, as U.S. Patent No. Application Serial No. 15/044,466 (“the '466 application”). (JXM-0003 at (21), (22).). The '466 application is a continuation of the '497 application and thus shares the same specification and figures.³ (*Id.* at (63).). The '466 application issued as the '621 patent on December 26, 2017, and names the same inventors as the '273 patent. (*Id.* at (45), (72).).

³ Unless otherwise noted, all citations to the specification of the '273 or '621 patents are to the '273 patent.

Ericsson owns by assignment all right, title and interest in and to the '273 and '621 patents. (*See* Compl. at ¶ 31, Ex. 7, Ex. 8).).

The '273 and '621 patents relate to a transformer filter arrangement that can be integrated into a radio receiver or transmitter circuit. (*Id.* at ¶ 34.). Normally, a balun (balanced/unbalanced) arrangement is used in radio receiver and transmitter circuits to convert between single-ended analog signals and differential (balanced) signals. (*Id.*). The '273 and '621 patents utilize a circuit layout in which filtering is included in this balun arrangement to reduce the need for external, off-chip filters. (*Id.*). The windings (turns) of a planar transformer have an inner border, and in this configuration, a reactive sub-circuit is located inside the border area to save circuit area. (*Id.*). This reactive sub-circuit includes an inductor connected in series with the winding segments to provide filtering. (*Id.*). The resulting transformer filter is able to pass signals around a fundamental frequency and suppress signals at an interfering frequency, such as an odd-order harmonic. (*Id.*).

C. The '770 Patent

The '770 patent, entitled “Mobile Communication Terminal for Providing Tactile Interface,” was filed on December 12, 2007, as U.S. Patent Application Serial No. 11/955,300 (“the '300 application”). (JXM-0005 ('770 patent) at (21), (22), (54).). The '770 patent issued on June 7, 2011, and names Hyunjun An, Ju-Nam Kim, and Min Hak Lee as the inventors. (*Id.* at (45), (75).). Ericsson owns by assignment all right, title and interest in and to the '770 patent. (*See* Compl. at ¶ 41, Ex. 9.).

The '770 patent discloses a mobile terminal with a touch input device that detects an external contact, a vibrator connected to the mobile terminal, and a controller that causes the vibrator to vibrate in response to an external touch of the input device independent of whether the mobile terminal is in a vibrate mode that may cause the vibrator to vibrate in response to

incoming and outgoing telephone calls, incoming and outgoing messages, an alarm, or games. (Compl. at ¶ 45.).

D. The '400 Patent

The '400 patent is entitled “Reconfigurable Output Stage.” (JXM-0004 ('400 patent) at (54).). The '400 patent, filed as U.S. Patent No. Application Serial No. 14/889,892 (“the 892 application”), is based on PCT Application No. PCT/EP2014/061350, filed on June 2, 2014, and claims priority to European Patent Application No. 13305740, filed on June 3, 2013. (*Id.* at (21), (22), (30), (86).). The '400 patent issued on July 11, 2017, and names Philippe Sirito-Olivier, Patrizia Milazzo, and Angelo Nagari as the inventors. (*Id.* at (45), (72).). Ericsson owns by assignment all right, title and interest in and to the '400 patent. (*See* Compl. at ¶ 52, Ex. 10.).

The '400 patent “discloses an output subsystem that is selectively configured by a controller to perform multiple different functions. (*Id.* at ¶ 55.). In one implementation, two sets of terminals are configurable to operate as either input terminals or output terminals in different configurations, making more efficient use of circuitry, such as, for example, bidirectional charging with external devices.” (*Id.*).

IV. ADOPTED DEFINITIONS OF A PERSON OF ORDINARY SKILL IN THE ART

A. The '430 Patent

Ericsson proposed that a person of ordinary skill in the art at the time of the issuance of the '430 patent “would have a bachelor’s degree in electrical engineering, computer science, computer engineering, or a similar discipline, and either a master’s degree in one of these fields of study or a minimum of two years of experience working in the wireless communications industry.” (CMBR. at 14-15 (citing CXM-0035 (Decl. of Paul Prucnal) at ¶ 55).).

Apple proposed that a person of ordinary skill in the art at the time of the issuance of the '430 patent “would have had: (1) a Master of Science degree in electrical engineering and at least

2 years of experience in the design and development of integrated circuits or antennas; or (2) a Bachelor of Science degree in electrical engineering and at least 4 years of experience in the design and development of integrated circuits or antennas. Additional education might compensate for less experience, and vice versa.” (RMBr. at 14 (citing RXM-0010 (Decl. of David Choi) at ¶ 27) (internal citation omitted).).

The Private Parties’ definitions are similar. Any differences between the definitions will have little, if any, effect on the claim construction analysis. Thus, both proposals are appropriate for a person of ordinary skill in the art for the ’430 patent.

B. The ’273 and ’621 Patents

As with the ’430 patent, Ericsson proposed that a person of ordinary skill in the art relative to the ’273 and ’621 patents “would have a bachelor’s degree in electrical engineering, computer science, computer engineering, or a similar discipline, and either a master’s degree in one of these fields of study or a minimum of two years of experience working in the wireless communications industry.” (CMBr. at 56 (citing CXM-0035 (Prucnal Decl.) at ¶ 108).).

Apple proposed that a person of ordinary skill in the art at the time of the issuance of the ’273 and ’621 patents “would have had: (1) a Master of Science degree in electrical engineering and at least 2 years of experience in the design and development of integrated circuits or cellular/mobile communication technologies; or (2) a Bachelor of Science degree in electrical engineering and at least 4 years of experience in the design and development of integrated circuits or cellular/mobile technologies. Additional education might compensate for less experience, and vice versa.” (RMBr. at 15 (citing RXM-0010 (Choi Decl.) at ¶ 28) (internal citation omitted).).

Again, the Private Parties’ definitions are very similar. Any differences between the definitions will have little, if any, effect on the claim construction analysis. Accordingly, both

proposals are proper for a person of ordinary skill in the art for the '273 and '621 patents.

C. The '770 Patent

Ericsson proposed that a person of ordinary skill in the art at the time of the issuance of the '770 patent “would have had at least a Bachelor of Science degree in electrical engineering, computer engineering, computer science, or a related field, and two to three years of experience related to the design or development of user interfaces. Additional education might compensate for less experience, and vice versa.” (CMBR. at 73 (citing CXM-0036 (Decl. of Mark Horestein) at ¶ 23)).

Apple proposed that a person of ordinary skill in the art at the time of the issuance of the '770 patent “would have had a Bachelor’s degree in electrical engineering, computer engineering, computer science, or a related field, and 2-3 years of experience related to the design or development of user interfaces. Additional education might compensate for less experience, and vice versa.” (RMBR. at 15 (citing JXM-0005 at 1:16-44) (internal citation omitted)).

The Private Parties’ definitions are nearly identical. Any differences between the definitions will have little, if any, effect on the claim construction analysis. Therefore, both proposals are appropriate for a person of ordinary skill in the art for the '770 patent.

D. The '400 Patent

Ericsson proposed that a person of ordinary skill in the art at the time of the issuance of the '400 patent “would have had at least a Bachelor of Science degree in electrical engineering or a related field, and two to three years of experience in the design and development of power management electronics. Additional education might compensate for less experience, and vice versa.” (CMBR. at 81 (citing CXM-0036 (Horenstein Decl.) at ¶ 24)).

Apple proposed that a person of ordinary skill in the art at the time of the issuance of

the '400 patent “would have had: (1) at least a Master of Science degree in electrical engineering and at least two years of experience in the design and development of power management electronics; or (2) at least a Bachelor of Science degree in electrical engineering and at least four years of experience in the design and development of power management electronics. Additional education might compensate for less experience, and vice versa.” (RMBr. at 16 (citing RXM-0010 (Choi Decl.) at ¶ 29) (internal citation omitted)).

Once again, the Private Parties’ definitions are similar. Any differences between the definitions will have little, if any, effect on the claim construction analysis. Thus, both proposals are suitable for a person of ordinary skill in the art for the '400 patent.

V. ADOPTED CLAIM TERMS

A. Agreed Upon Claim Terms

1. The '430 Patent

Claim Term(s)	Adopted Construction
Preamble (claims 1 and 11)	Limiting

2. The '273 and '621 Patents

Claim Term(s)	Adopted Construction
Preamble (claims 1, 7, 12, and 13 of the '273 patent; claims 1 and 18 of the '621 patent)	Limiting

3. The '770 Patent

Claim Term(s)	Adopted Construction
Preamble (claim 1)	Limiting
Preamble (claim 9)	Limiting

4. The '400 Patent

Claim Term(s)	Adopted Construction
Preamble (claim 1)	Limiting
Preamble (claim 8)	Not limiting
Preamble (claim 13)	Not limiting
Preamble (claim 15)	Not limiting
“electronically disconnected” (claims 13 and 15)	“not in electrical contact with”

B. Disputed Claim Terms

1. The '430 Patent

a. “two closely spaced terminals” (claims 1 and 11)

Ericsson’s Proposed Construction	Apple’s Proposed Construction	Adopted Construction
This term does not need to be construed. Plain and ordinary meaning applies, which is “two terminals in proximity to each other (such that the electromagnetic field at a certain distance from the first inductor (where the second inductor is positioned) is reduced)”	“two terminals spaced as close to each other as possible” Alternatively: Indefinite	Plain and ordinary meaning applies, which is “two terminals in proximity to each other (such that the electromagnetic field at a certain distance from the first inductor (where the second inductor is positioned) is reduced)”

Claims 1 and 11 recite “two closely spaced terminals” for supplying electric current to the first and second loops of the first inductor, “while minimizing magnetic field contributions from the terminals.” (JXM-0001 at cls. 1, 11.). These claims also recite that “mutual electromagnetic coupling” between the first and second inductors is “reduced.” (*Id.*). The context provided by the intrinsic and extrinsic evidence indicates that two terminals connected to

the first inductor are “closely spaced” if they are in proximity to each other such that the electromagnetic field at a certain distance from the first inductor (where the second inductor is positioned) is reduced, as Ericsson proposes.

Ericsson’s expert, Dr. Prucnal, explained that:

[W]hen there are multiple conductive coils on a chip, the resulting magnetic field at a particular location is the combination of the magnetic field contributions from each of these conductors. And if current is flowing in opposite directions in two different conductors, the magnetic fields from the conductors will also be in opposite directions and tend to cancel each other out at locations away from those two conductors.

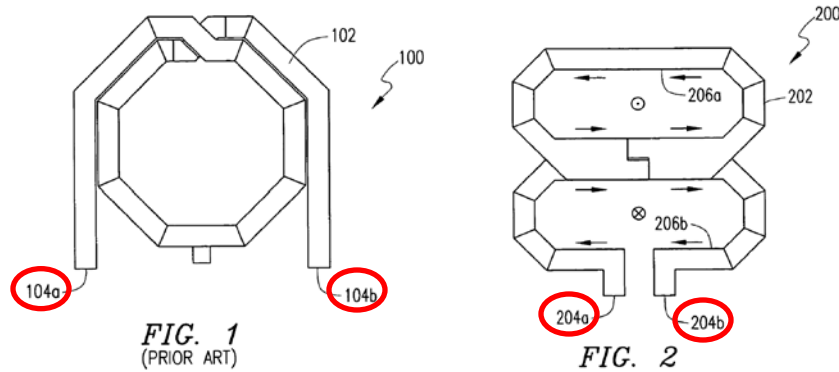
(CXM-0035 (Prucnal Decl.) at ¶ 63.).

Based on this understanding, Dr. Prucnal concluded that:

These features of conductors and electromagnetism inform a person of ordinary skill that the ‘closely spaced’ limitations in the claims are related to the functional limitations. Magnetic field contributions from these two terminals are minimized and mutual electromagnetic coupling between the two inductors is reduced as long as the spacing between the terminals is close enough that magnetic field contributions from each of the two terminals tend to cancel each other out in the vicinity of the second inductor.

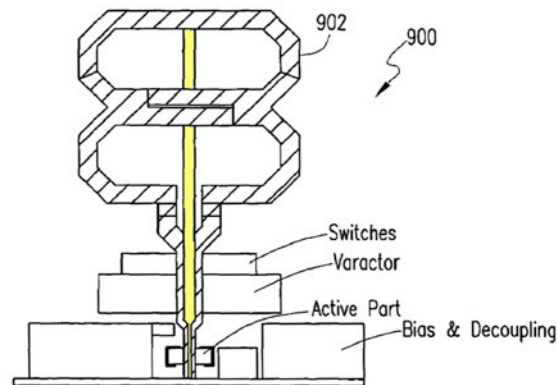
(*Id.* at ¶ 64.).

Ericsson’s construction is supported by the figures of the ’430 patent, which provide examples and show that the spacing is relative to the proportions and locations of other claim elements. *See Guangdong Alison Hi-Tech Co. v. Int’l Trade Comm’n*, 936 F.3d 1353, 1363 (Fed. Cir. 2019); *Exmark Mfg. Co. Inc. v. Briggs & Stratton Power Prod. Grp., LLC*, 879 F.3d 1332, 1345-46 (Fed. Cir. 2018). Figure 1 of the ’430 patent depicts a prior art inductor 100 with terminals 104a and 104b that are clearly not spaced close to one another. By contrast, Figure 2 depicts an 8-shaped inductor 200 with terminals 204a and 204b that are closely spaced. Figures 1 and 2 are replicated below.



(JXM-0001 at Figs. 1 and 2 (annotated); *see also id.* at 3:60-4:4, 4:5-42.).

Furthermore, the embodiment of an 8-shaped inductor 902 shown below in Figure 9 of the '430 patent has two terminals for supplying current that are closely spaced but are not “as close together to each other as possible.” (*Id.* at Fig. 9.). The terminals are separated from each other along the vertical axis. The specification indicates that the layout for the other parts is symmetrical about that axis with “wires routed on top of each other so that they will not create an additional loop.” (*Id.* at 8:37-46.).



(*Id.* at Fig. 9 (annotated copy from CMBR. at 9); *see also* CXM-0035 (Prucnal Decl.) at ¶ 67.).

Apple relies on a disclosure in the specification of the '430 patent that “positioning the two terminals 204a and 204b [of Figure 2] as close to each other as possible helps make the field

contributions from the two parts of the inductor 200 identical.” (RMBR. at 22 (citing JXM-0001 at 4:28-32)). However, as Ericsson correctly points out, the specification refers to inductor 200 and its terminals as an example. (JXM-0001 at 4:28-32 (“***For example***, positioning the two terminals 204a and 204b as close to each other as possible helps make the field contributions from the two parts of the inductor 200 identical.”) (emphasis added)). See, e.g., *Imaginal Systematic, LLC v. Leggett & Platt, Inc.*, 805 F.3d 1102, 1109-10 (Fed. Cir. 2015) (“This court has repeatedly cautioned against limiting the claimed invention to preferred embodiments or specific examples in the specification.”). The specification discloses this option as an example that would help make field contributions from the two parts of inductor 200 identical, which the claim language defining the terminals and inductors does not require. (JXM-0001 at 4:28-32, cls. 1, 11; see also CXM-0035 (Prucnal Decl.) at ¶ 68.). The narrower example of terminals being “as close to each other as possible” as recited in the specification is not required to achieve the claimed function of “minimizing magnetic field contributions from the terminals.” (JXM-0001 at 4:28-32, cl. 1.).

This explanation is consistent with the prosecution history, which includes a preliminary amendment made prior to any substantive examination that added the “two closely spaced terminals” limitations to the claims. For example, application claim 21 was amended as follows:

21. (Currently Amended) An inductor having a reduced far field, comprising:

a first loop having a shape that is substantially symmetrical about a first predefined axis; ~~and~~

a second loop having a size and shape substantially identical to ~~a size and shape of said the~~ first loop, said second loop arranged such that a magnetic field emanating therefrom tends to cancel a magnetic field emanating from said first loop;

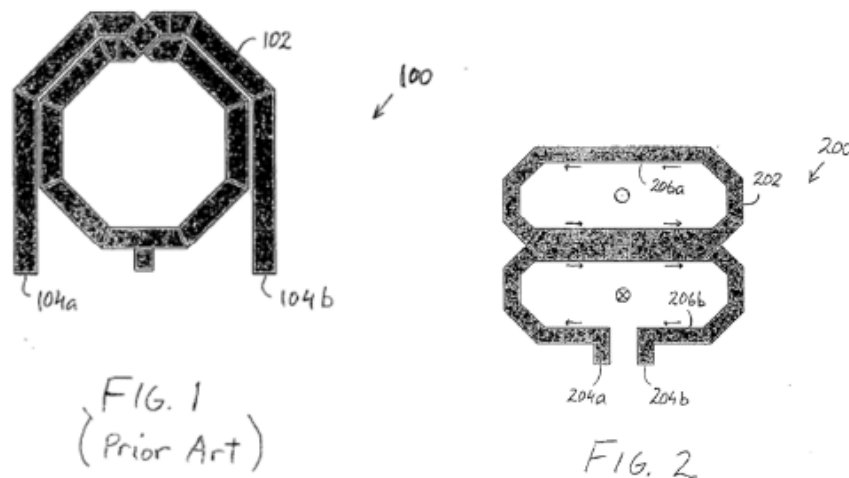
and two closely spaced terminals connected to the first loop for supplying electrical current to the first and second loops while minimizing magnetic field

contributions from the terminals.⁴

(JXM-0007.0104.).

As Ericsson notes, there is no indication that this amendment or the accompanying remarks require the two (2) terminals to be “as close to each other as possible.” (CMBR. at 25.).

Additionally, the references cited during prosecution teach the placement of the two terminals on opposite sides of the inductor. For instance, as shown below, terminals 104a and 104b in a prior art inductor are depicted in Figure 1 of the original application. In contrast, terminals 204a and 204b for an embodiment of the claimed invention are depicted in Figure 2 of the original application.



(JXM-0007.0029.).

Another prior art reference cited during prosecution also teaches the placement of terminals 4 and 5 on opposite sides of the inductor.

⁴ Stricken through language represents claim language that was deleted by the amendment. Underlined language represents claim language that was added by the amendment.

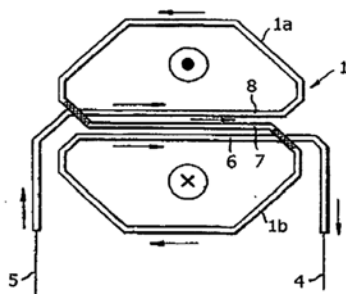


FIG. 2

(JXM-0007.0115; *see also id.* at JXM-0007.0110, JXM-0007.0249.).

Nothing in the claim language, the figures in the patent, the prosecution history, or cited art indicates that the disputed claim limitation can only be met if the terminals are “as close to each other as possible.” (CXM-0035 (Prucnal Decl.) at ¶ 66.).

Apple’s alternative construction, that the disputed claim term is indefinite unless construed to require “two terminals spaced as close to each other as possible,” is contrary to controlling case law.

Disagreements about the scope of a claim term are not proof of indefiniteness:

The test for indefiniteness is whether the claims, viewed in light of the specification and prosecution history, “inform those skilled in the art about the scope of the invention with reasonable certainty.” The test is not merely whether a claim is susceptible to differing interpretations. Such a test would render nearly every claim term indefinite so long as a party could manufacture a plausible construction.

Nevro Corp. v. Bos. Sci. Corp., 955 F.3d 35, 41 (Fed. Cir. 2020) (citing *Nautilus*, 572 U.S. at 910).

Moreover, this Court and the Federal Circuit have rejected the reasoning that a claim term must be limited either to the narrowest example described in the specification or held to be indefinite. As the Federal Circuit noted in *Guangdong Alison Hi-Tech Co. v. Int’l Trade Comm’n*, the Court “declined to limit ‘lofty . . . batting’ to [a] specific example of ‘resilience’ in the specification: a material that is compressible by 50% and will return to 70% of its original

thickness after a few seconds [where Alison argued] that if the 70% example does not limit the scope of the claim, then it must be ‘irrelevant to indefiniteness.’” *Guangdong Alison Hi-Tech Co. v. Int’l Trade Comm’n*, 936 F.3d 1353, 1363 (Fed. Cir. 2019)(“*Guangdong Alison*”) (citing *Certain Composite Aerogel Insulation Materials & Methods for Mfg. the Same*, Inv. No. 337-TA-1003, Order No. 35, App. A at 4-6 (Jan. 31, 2017)). Additionally, the Federal Circuit held that:

[The ITC respondent’s] argument finds no support in our case law. Nor should it because there is no fundamental incompatibility here. Under our case law, examples in the specification may be used to inform those skilled in the art of the scope of the invention with reasonable certainty—thus demonstrating that the term is not indefinite—without being directly construed into the claim.

Id. (internal quotations and citation omitted); *see also Sonix Tech. Co. v. Publ’ns Int’l, Ltd.*, 844 F.3d 1370, 1379 (Fed. Cir. 2017); *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1334-35 (Fed. Cir. 2010).

Here, the claim language, prosecution history, cited references, drawings, specification, and relevant extrinsic evidence provided enough information for persons of ordinary skill to understand what this term means in the context of the intrinsic and extrinsic evidence. The purpose of the “closely spaced” limitation is related to functional limitations for minimizing magnetic field contributions and reducing mutual electromagnetic coupling. (CXM-0035 (Prucnal Decl.) at ¶ 76.). Therefore, spacing between two terminals supplying electric current to the first inductor is close enough when their magnetic field contributions tend to cancel each other out in the vicinity of the second inductor. (*Id.*).

For the reasons discussed above, Ericsson’s proposed construction is adopted. The term “two closely spaced terminals” is given its plain and ordinary meaning, which is “two terminals in proximity to each other (such that the electromagnetic field at a certain distance from the first inductor (where the second inductor is positioned) is reduced).”

**b. “a first inductor having a reduced far field” / “forming the first inductor to reduce a far field” (claims 1 and 11)
(addressed below with “reduced electromagnetic field”)**

Ericsson’s Proposed Construction	Apple’s Proposed Construction	Adopted Construction
“(reduced/reduce) the electromagnetic field at a certain distance from the first inductor (where the second inductor is positioned)”	Indefinite	“(reduced/reduce) the electromagnetic field at a certain distance from the first inductor (where the second inductor is positioned)”

c. “reduced electromagnetic field” (claims 1 and 11)

Ericsson’s Proposed Construction	Apple’s Proposed Construction	Adopted Construction
This term does not need to be construed. Plain and ordinary meaning applies, which is “the electromagnetic field emanating from the first inductor is reduced (at a certain distance from the first inductor where the second inductor is positioned)”	Indefinite	Plain and ordinary meaning applies, which is “the electromagnetic field emanating from the first inductor is reduced (at a certain distance from the first inductor where the second inductor is positioned)”

These two terms are addressed together because they share the same issue: whether a person of ordinary skill would understand the claims and whether these phrases are directed at reducing the electromagnetic field that emanates from a first inductor at a certain distance where a second inductor is positioned. For the reasons discussed below, the claim language, specification, prosecution history, and relevant extrinsic evidence indicate that these limitations would be understood to cover a layout in which mutual electromagnetic coupling between two inductors is reduced because the electromagnetic field emanating at a certain distance from the

first inductor (where the second inductor is positioned) is reduced, which is encompassed in Ericsson’s proposed construction.

Claims 1 and 11 recite a first inductor and a second inductor (in the inductor layout or on a semiconductor die). (JXM-0001 at cls 1, 11.). The claims describe the first inductor as having “a reduced far field” or as being formed to “reduce a far field.” (*Id.*). The patentee provided a particular definition for the term “far field” in the ’430 patent specification, which controls. (JXM-0001 at 3:6-10 (“The inductor design and method serve to reduce the EM field at a certain distance from the inductor (i.e., the far field)”).). *Cont’l Circuits LLC v. Intel Corp.*, 915 F.3d 788, 796 (Fed. Cir. 2019) (“When the patentee acts as its own lexicographer, that definition governs.”).

The general rule is that the “use of ‘i.e.’ signals an intent to define the word to which it refers[.]” *Edwards Lifesciences LLC v. Cook Inc.*, 582 F.3d 1322, 1334 (Fed. Cir. 2009); *see also Abbott Labs. v. Novopharm Ltd.*, 323 F.3d 1324, 1327-30 (Fed. Cir. 2003) (court found patentee “explicitly defined” a claim term because of following statement in specification: “co-micronization of fenofibrate and a solid surfactant (i.e., the micronization of an intimate mixture of fenofibrate and a solid surfactant)”). Ericsson’s proposed construction for “far field” is consistent with the definition the patentee used.

The ’430 patent explicitly defines what it means to reduce the “far field” of an inductor.

As mentioned above, various embodiments of the invention provide an inductor design and method of implementing the same where mutual EM coupling is reduced. The inductor design and method serve to ***reduce the EM field at a certain distance from the inductor (i.e., the far field)***, at least in some directions, by using inductor shapes that are substantially symmetrical.

(JXM-0001 at 3:4-10 (emphasis added).).

As Ericsson explains and demonstrates through a highlighted version of claim 1, the scope of the claim language is set forth with reasonable certainty because the claim recites: (i)

what field is reduced; (ii) how it is reduced; (iii) where it is reduced; (iv) and why it is reduced.

1. An inductor layout having reduced mutual electromagnetic coupling, comprising:

a first inductor having a reduced far field, said first inductor comprising:

a first loop having a shape that is substantially symmetrical about a first predefined axis;

a second loop connected to the first loop, said second loop having a size and shape substantially identical to the first loop, said second loop arranged such that a magnetic field emanating therefrom tends to cancel a magnetic field emanating from the first loop; and

two closely spaced terminals connected to the first loop for supplying electrical current to the first and second loops while minimizing magnetic field contributions from the terminals; and

a second inductor positioned at a predetermined distance from the first inductor, wherein a mutual electromagnetic coupling between the first inductor and the second inductor is reduced as a result of the first inductor having a reduced electromagnetic field.

(CMBR. at 36 (citing JXM-0001 at cl. 1 (annotated))).

As recited in claims 1 and 11, the electromagnetic field emanating from a first inductor (with two loops) is reduced [highlighted in green]. (JXM-0001 at cls. 1, 11.). This magnetic field from the first inductor is reduced by arranging the size and shape of its two loops “such that a magnetic field emanating” from the second loop “tends to cancel a magnetic field emanating from the first loop” [highlighted in blue]. (*Id.*). The place where the electromagnetic field from the first inductor is reduced (as a result of this cancellation of magnetic fields) is in the “far field,” which is at a certain distance from the first inductor where there is a “second inductor positioned at a predetermined distance from the first inductor” [highlighted in yellow]. (*Id.*). As recited in the claims, the reason for forming an inductor with a reduced electromagnetic field in the far field is to reduce “mutual electromagnetic coupling between the first inductor and the second inductor” [highlighted in red]. (*Id.*).

The prosecution history confirms that the phrase, “a first inductor having a reduced far field,” corresponds to a first inductor having a “reduced electromagnetic field at a certain distance from the first inductor.” As shown below, in the original application, the patentee used both of these phrases in different independent claims to define the same electromagnetic field emanating from the same first inductor.

Original application claim 1 for an inductor layout did not use the term “far field” to describe the first inductor. Rather, this claim used the definition for “far field” that is disclosed in the specification: “the electromagnetic (EM) field at a certain distance from the inductor.”

1. An inductor layout having reduced mutual electromagnetic coupling, comprising:

a first inductor having a shape that is substantially symmetrical about a first predefined axis, said shape causing said first inductor to have a ***reduced electromagnetic field at a certain distance from said first inductor***, at least in some directions; and

a second inductor positioned at a predetermined distance from said first inductor, wherein a mutual electromagnetic coupling between said first inductor and said second inductor is reduced as a result of said first inductor having a reduced electromagnetic field.

(JXM-0007.0023 (original '430 application at 19) (emphasis added).).

In contrast, original application claim 11, which was directed to forming a first inductor and a second inductor on a semiconductor die, used the term “far field” to describe the first inductor.

11. A method of reducing mutual electromagnetic coupling between two inductors on a semiconductor die, comprising:

forming a first inductor on said semiconductor die having a shape that is substantially symmetrical about a first predefined axis, said shape causing said first inductor to have a ***reduced far field***, at least in some directions; and

forming a second inductor on said semiconductor die at a predetermined distance from said first inductor, wherein a mutual electromagnetic coupling between said first inductor and said second inductor is reduced as a result of said first inductor having a reduced far field.

(JXM-0007.0024 (original '430 application at 20) (emphasis added).),

Before any substantive examination of the patent application, the patentee filed a preliminary amendment that replaced original application claims 1 and 11 with new application claims 25 and 26, which ultimately issued as claims 1 and 11 of the '430 patent. (JXM-0007.0101–JXM-0007.0103, JXM-0007.0105–JXM-0007.0106 ('430 Preliminary Amendment No. 2 at 1-3, 5-6).). According to the patentee, the original claims were amended “to place them in better form” and to recite the “two closely spaced terminals” limitation. (JXM-0007.0107 ('430 Preliminary Amendment No. 2 at 7).).

As a result of this preliminary amendment, instead of having independent claim 1 recite a “reduced electromagnetic field at a certain distance from said first inductor” and independent claim 11 recite the first inductor has a “reduced far field,” issued claims 1 and 11 both recite the first inductor has a reduced “far field.” (JXM-0001 at cls. 1, 11.). The claim language used in the original application strongly suggests that the “far field” term has the same meaning as “the electromagnetic field at a certain distance from the first inductor.”

The Summary of the Invention confirms that the term “far field” means an “electromagnetic field at a certain distance from the first inductor” (where the second inductor is positioned.

In general, in another aspect, a method of reducing mutual electromagnetic coupling between two inductors on a semiconductor die comprises the step of forming a first inductor on the semiconductor die having a shape that is substantially symmetrical about a first predefined axis, the shape causing the first inductor to *have a reduced far field*, at least in some directions.

(*Id.* at 2:13-19 (emphasis added).).

In the next paragraph, the term “far field” is replaced with the definition that is set forth in the Description, which corresponds to Ericsson’s proposed construction.

In general, in another aspect, an inductor layout having reduced mutual

electromagnetic coupling comprises a first inductor having a shape that is substantially symmetrical about a first predefined axis, the shape causing the first inductor to *have a reduced electromagnetic field at a certain distance from the first inductor*, at least in some directions.

(*Id.* at 2:25-30 (emphasis added)).

Moreover, the Summary indicates that the “certain distance” at which the electromagnetic field from the first inductor is reduced is at a second inductor located on the same chip: “two such inductors may be placed near each other and oriented in a way so that the induced current in the second inductor due to the magnetic field originating from first inductor is significantly reduced.” (*Id.* at 1:66-2:2.).

In the examples provided in the specification, the distance between the first and second inductors varies between 0.50 mm and 2.00 mm. (*See id.* at Figs. 6, 12.). The specification also indicates that the electromagnetic field and the far field is reduced “at a certain distance” from the first inductor and that unwanted mutual coupling between the pair of inductors is very low as a result.

As a result, the *EM field* components *emanating at a certain distance* from the two substantially symmetrical loops 206a and 206b also have opposite directions and tend to counteract each other. . . . Consequently, the inductor 200 has been found to have a significantly *reduced far field at a certain distance from the inductor coil 202*.

(JXM-0001 at 4:14-21 (emphases added); *see also id.* at 7:25-30 (“mutual coupling is very low at a certain distance”); CXM-0035 (Prucnal Decl.) at ¶ 82.).

With respect to definiteness, *Guangdong Alison* is instructive here because the ’430 patent, like the patent considered in *Guangdong Alison*, contains a written description that is “replete with examples and metrics that further inform the meaning of” the disputed terms. *Guangdong Alison*, 936 F.3d at 1361.

In sum, the written description of the ’359 patent provides sufficient detail to inform a person of ordinary skill in the art about the meaning of “lofty . . . batting.” That puts this case in the same class as cases like *Sonix* and *Enzo*, where we held that

examples and procedures in the written description provided sufficient guidance and points of comparison to render claim terms not indefinite. *See Sonix*, 844 F.3d at 1376-81; *Enzo*, 599 F.3d at 1332-36. We therefore conclude that claims 1, 7, and 9 are not indefinite because the '359 patent informs a person of ordinary skill in the art about the scope of “lofty . . . batting” with “reasonable certainty.” *Nautilus*, 572 U.S. at 901, 134 S.Ct. 2120.

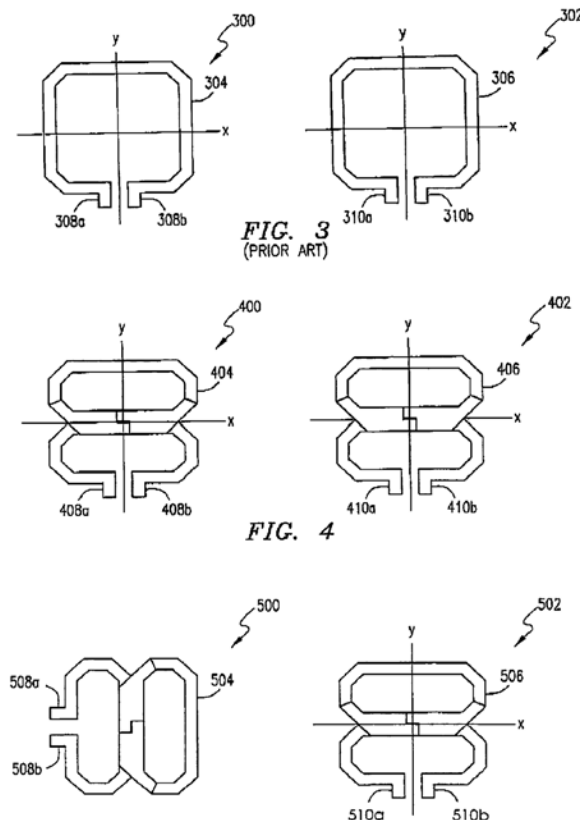
Id. at 1362.

The examples and metrics in the written description of the '430 patent that provide guidance concerning a first inductor having a “reduced far field” and a “reduced electromagnetic field” at a certain distance from the first inductor (where the second inductor is positioned) include: (i) the layouts of four different embodiments of the invention with two inductors in Figures 4, 5, 7, and 11; (ii) data showing the amounts of attenuation and electromagnetic coupling between two inductors with different coil shapes, orientations, and offsets in Table 1, Table 2, and Table 3; and (iii) plots showing the drop in voltage gain between the ports of the first and second inductors for different coil shapes (as the distance between the first and second inductor is varied between 0.50 mm and 2.00 mm) in Figures 6 and 12. (CXM-0035 (Prucnal Decl.) at ¶ 83.).

Specifically, the specification expressly describes how a person of ordinary skill can determine the effectiveness of the reduced electromagnetic field from a first inductor in reducing mutual electromagnetic coupling with a second inductor at a certain distance from the first inductor. Data and plots were provided using several commercially available tools, such as the Momentum 2D EM Simulator™ from Agilent Technologies and FastHenry™ from the Computational Prototyping Group. (JXM-0001 at 5:40-6:51, 7:64-8:27.). The patentee also provided a plot in Figure 8 that compares the results obtained using different tools. (*Id.* at Fig. 8.). The tools identified in the specification were well-known in 2004, when the '130 application that issued as the '430 patent was filed, and permitted persons of ordinary skill to independently

calculate the electromagnetic fields from and electromagnetic coupling between two inductors for any of the disclosed embodiments. (See, e.g., CXM-0018 (document entitled “Co-stimulation of Microwave Networks”); CXM-0021 (article entitled “Accurate Modeling of Spiral Inductors on Silicon for Wireless RFIC Designs”); CXM-0019 (article entitled “FASTHENRY: A Multipole-Accelerated 3-D Inductance Extraction Program”); CXM-0020 (FastHenry User’s Guide); CXM-0035 (Prucnal Decl.) at ¶ 84.).

For example, the ’430 patent discloses the use of the Momentum 2D EM Simulator™ to show that the reduced far field from an 8-shaped first inductor greatly reduces mutual electromagnetic coupling with an 8-shaped second inductor located 1.00 mm away. (JXM-0001 at 4:63-5:13, 5:23-31.). As shown below, a comparison is made of inductor layouts with two 8-shaped inductors in the orientations in Figures 4 or 5 to a prior art layout with two O-shaped inductors in Figure 3.



(*Id.* at Figs. 3-5.).

Data provided below in Table 1 shows the coupling coefficient “K” and amount of attenuation “Att” in decibels that results when using the inductor layouts in the embodiments of Figures 4 or 5 compared to the “reference” prior art layout of Figure 3.

TABLE 1

Inductor 1	Inductor 2	L1 [nH]	Q1	Gvdd [dB]	Att [dB]	K
O-shape	O-shape	0.841	16.93	-54.0	reference	0.002077
8-shape	O-shape	1.216	15.20	-75.6	21.6	0.000173
8-shape_90	O-shape	1.218	15.63	-74.9	20.9	0.000187
8-shape	8-shape	1.216	15.84	-86.5	32.5	0.000049
8-shape_90	8-shape	1.216	15.19	-89.7	35.7	0.000034
8-shape_90	8-shape_-90	1.217	15.69	-92.8	38.8	0.000024

(*Id.* at col. 1, Table 1.).

In describing the data presented in Table 1, the specification discloses that:

As can be seen, making one of the inductors 8-shaped was shown to reduce the mutual coupling by up to 20 dB. Making both of them 8-shaped was shown to improve the isolation by up to 30 dB. Making both connectors 8-shaped and rotating them by 90 degrees in opposite directions was shown to improve the isolation nearly 40 dB.

(*Id.* at 7-12-17.).

As Ericsson points out, this data demonstrates that replacing O-shaped inductors with the claimed 8-shaped inductors reduces the amount of mutual electromagnetic coupling by at least 30 decibels. (CMBR. at 44 (citing CXM-0035 (Prucnal Decl.) at ¶ 86).).

The specification provides additional examples of suitable structures. In particular, the Momentum 2D EM Simulator™ is used to show how the reduced far field from an 8-shaped first inductor reduces the mutual electromagnetic coupling with an 8-shaped second inductor located 1.00 mm away that is also offset on the vertical axis by a varying amount. (JXM-0001 at 7:35-45.). A comparison is made of inductor layouts with two 8-shaped inductors that are offset, as shown in the Figure 7 embodiment below, to the prior art layout with two O-shaped inductors.

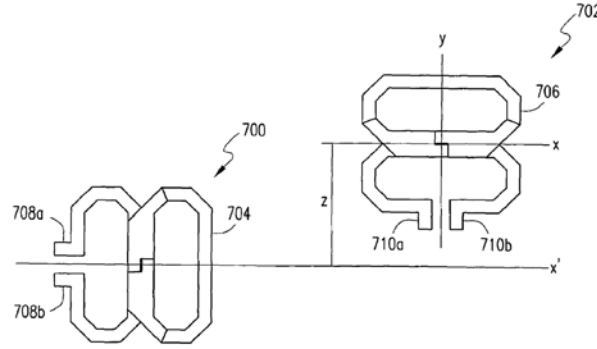


FIG. 7

(*Id.* at Fig. 7.).

Data provided below in Table 2 shows the coupling coefficient K and amount of attenuation Att in decibels that results when the claimed 8-shaped inductors are used with different offset spacing.

TABLE 2

Offset [mm]	L1 [nH]	Q1	Gvdd [dB]	Att [dB]	Deg [dB]	k estim
0.0	1.216	15.19	-89.7	35.7	reference	0.000034
0.1	1.216	15.19	-85.3	31.3	4.4	0.000057
0.2	1.216	15.19	-82.5	28.5	7.2	0.000078
0.3	1.216	15.19	-81.0	27.0	8.7	0.000093
0.5	1.216	15.19	-81.8	27.8	7.9	0.000085
0.7	1.216	15.19	-85.8	31.8	3.9	0.000053
1.0	1.216	15.19	-103.4	49.4	-13.7	0.000007

(*Id.* at col. 7, Table 2.).

As Ericsson again points out, the data indicate that replacing the prior art inductors with the claimed 8-shaped inductors reduces mutual electromagnetic coupling by about 30 decibels, which is described in the specification.

With this arrangement, some degradation of the inductor isolation was observed, but even at a 1 mm offset, which corresponds to an orientation of 45 degrees, an improvement of about 30 dB in mutual coupling reduction is achieved for the 8-shaped inductor.

(*Id.* at 7:46-51; *see also* CXM-0035 (Prucnal Decl.) at ¶ 89.).

Additional examples show that replacing prior art inductors with four-leaf-clover-shaped inductors also greatly reduces mutual electromagnetic coupling because these claimed inductors have a reduced electromagnetic field at a certain distance from the inductor. (See JXM-0001 at 3:19-27.). One inductor layout of a pair of four-leaf-clover-shaped inductors is shown in Figure 11, and the data in Table 3 indicates that the use of four-leaf-clover-shaped inductors reduces mutual electromagnetic coupling by about 40 decibels. (*Id.* at col. 9, Table 3; CXM-0035 (Prucnal Decl.) at ¶ 90.).

The examples in the '430 patent include specific parameters for coil size, geometry, orientation, spacing, offset, inductance value (L1), and RF frequency that provide sufficient guidelines to enable a person of ordinary skill to determine the scope of the claims. (CXM-0035 (Prucnal Decl.) at 91.). In Figures 6 and 12 below, the FastHenry™ tool was used to show the drop in voltage gain between the ports of the first and second inductors as the distance between the first and second inductor is varied between 0.50 mm and 2.00 mm.

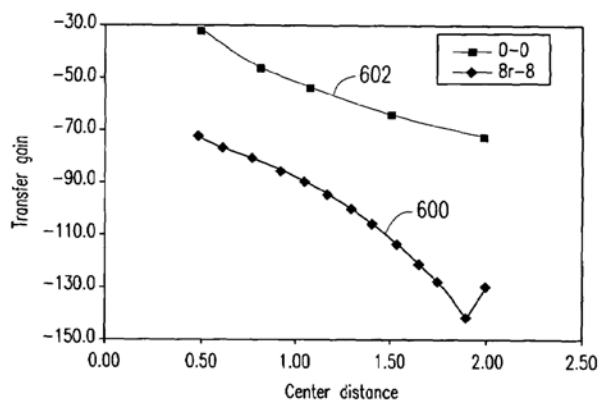


FIG. 6

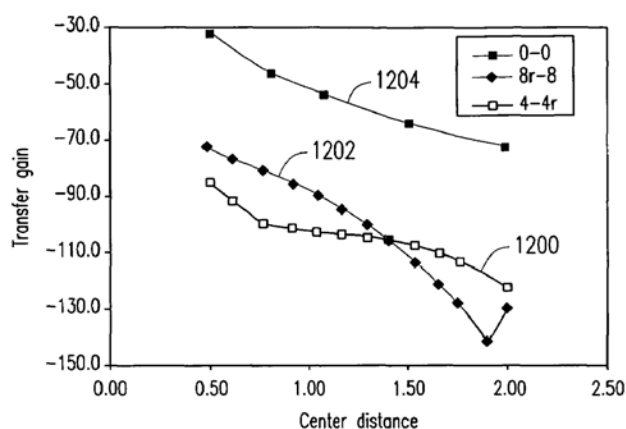


FIG. 12

(JXM-0001 at Fig. 6, 12.).

As shown above in Figures 6 and 12, the pair of 8-shaped inductors (plots 600 and 1202) have between 30 and 40 dB more isolation than the pair of prior art O-shaped inductors (plots

602 and 1204) over these same distances, while the pair of four-leaf-clover-shaped inductors (plot 1200) provides 10 dB more of isolation than the 8-shaped inductors for distances below 1.00 mm. (See JXM-0001 at 7:25-33, 9:13-17; CXM-0035 (Prucnal Decl.) at 92.).

Under these circumstances, the disputed claim terms have a definite meaning and provide sufficient guidance in view of, *inter alia*, the '430 patent's disclosures, examples, and associated data.

Because the intrinsic evidence here provides “a general guideline and examples sufficient to enable a person of ordinary skill in the art to determine [the scope of the claims],” *In re Marosi*, 710 F.2d 799, 803 (Fed.Cir.1983), the claims are not indefinite even though the construction of the term “not interfering substantially” defines the term without reference to a precise numerical measurement, *see Young*, 492 F.3d at 1346 (holding that a word of degree was definite, even without a numerical claim construction); *Exxon*, 265 F.3d at 1381 (same); *Marosi*, 710 F.2d at 803 (same); *In re Mattison*, 509 F.2d 563, 565 (CCPA 1975) (same).

Enzo, 599 F.3d at 1335; *see also Guangdong*, 936 F.3d at 1360-61.

For the foregoing reasons, Ericsson's proposed construction is adopted. The terms “a first inductor having a reduced far field” / “forming the first inductor to reduce a far field” are construed to mean “(reduced/reduce) the electromagnetic field at a certain distance from the first inductor (where the second inductor is positioned).” Additionally, the term “reduced electromagnetic field” is given its plain and ordinary meaning, which is “the electromagnetic field emanating from the first inductor is reduced (at a certain distance from the first inductor where the second inductor is positioned).”

2. The '273 and '621 Patents

- a. **“winding loops of both the first and the second windings, when considered in a plane of the first winding and the second winding of the transformer, enclose an area” (claims 1, 7, 12, and 13 of the '273 patent; claims 1 and 18 of the '621 patent)**

Ericsson's Proposed Construction	Apple's Proposed Construction	Adopted Construction
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This term does not need to be construed. Plain and ordinary meaning applies, which is “an area of the chip or PCB is contained within winding loops of both the first and second winding of the transformer”	“winding loops of the first winding when considered in a first plane of the first winding enclose an area, and winding loops of a second winding when considered in a second plane of the second winding, enclose the same area when viewed from above” Alternatively: Indefinite	Plain and ordinary meaning applies, i.e., “an area of the chip or PCB is contained within winding loops of both the first winding and second winding of the transformer”
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The plain and ordinary meaning is adopted. The winding loops enclose, i.e., contain therein, an area, as reflected in an area of the chip or printed circuit board. As explained more fully below, the context of the claim, specification and prosecution history support the adopted claim construction.

Apple argues that Ericsson ignores the following claim language: “when considered in a plane of the first winding and the second winding of the transformer.” (RMBR. at 36.). Apple contends that the two windings are each in their own “plane.” (*Id.*). To support its argument, Apple relies on the definitional words “[t]hat is” in the specification:

The ***second winding*** is located between an outer border 300 and an inner border 310, which is inside the outer border 300, wherein the inner border 310 defines an area 350. ***That is, the winding loops of the second winding 120, considered in a plane*** of the chip or printed circuit board, encloses the area 350.

* * *

As can be seen in FIG. 10, also the ***first winding*** is located between the same outer border 300 and the same inner border 310 as the second winding 120. ***That is, also the winding loops of the first winding 110, considered in a plane*** of the chip or printed circuit board, encloses the area 350.

(RMBR. at 37 (quoting JXM-0002 (’273 patent) at 8:46-51, 9:7-12) (emphases in original).).

However, the sentences Apple emphasized also specifically reference “a plane of the chip

or printed circuit board.” (JXM-0002 at 8:46-51, 9:7-12.). The passages do not describe two planes. Rather, the passages discuss two different figures showing two different windings. The passages do not describe the two windings together in the same figure. Therefore, Apple’s reliance on the different passages as disclosing two different planes is misplaced because both passages refer to the same plane “of the chip or printed circuit board.”

Moreover, claim 1 does not cite particular loops: “a plane of the first winding [loop] and the second winding [loop] of the transformer.” Rather, claim 1 refers to the transformer as a whole, and recites that the transformer has a first winding and a second winding. Claim 1 recites that the first winding and second winding are formed by conducting and isolation layers. (JXM-0002 at cl. 1.). These many conducting and isolation layers necessarily together generally form a plane. The transformer itself is a “planar transformer.” (JXM-0002 at 6:15-28; *see also id.* at Fig. 4.). Both the printed circuit board (“PCB”) and the planar transformer are generally flat. They generally form “a plane” as opposed to surfaces than may be normal or at some other angle to the substrate.

This interpretation is consistent with the claims as originally filed. Claim 1 as originally filed sheds light on how to interpret the phrase: ⁵

Claim 1 [(original)]. A transformer filter arrangement (30), comprising
a transformer (100) having a first winding (110) and a second winding (120)
formed by conducting and isolation layers of a chip or printed circuit board,
wherein winding loops of *both* the first and the second winding are arranged *such
that they together, considered in a plane of the windings of the transformer,*
enclose an area (350) of said chip or printed circuit board; ...

(Compl., App. B (Prosecution History of the ’273 patent) at ERICSSON01ITC000000284 (emphases added).).

⁵ The pre-amendment in the application leading to the ’273 patent stated: “Applicant notes that the amendments are based on the originally filed PCT claims. No new matter has been added.” (Compl., App. B (Prosecution History of the ’273 patent) at ERICSSON01ITC000000290.).

The invention, in original claim 1, describes that the first and second windings “such that they together” are “considered in a plane of the windings of the transformer.” (*Id.*). There is only one plane described. The words “they together” is consistent with the word “both” in the disputed claim term. The windings are to be considered together, i.e., both windings are considered to be in a plane of the transformer. Thus, the intrinsic record, including the claims, specification and prosecution history, support the interpretation that the plane is that of the chip or printed circuit board.

Apple argues about the winding loops enclosing a “same area” 350 in a stacked topology when viewed from above. (RMBR. at 38.). However, even when winding loops enclose the same area, this is not on a different plane “of the printed circuit board.” At the very least, the area is a two-dimensional area, and that area defines the plane. The plane of the PCB can also be understood to define the plane of the “same area” 350. However, no matter which way the area/PCB is interpreted, there is only one plane of the PCB.

Apple’s strongest argument is that the following language from claims 1 and 18 of the ’621 patent provide for a first plane for the first winding and a second plane for the second winding: “a loop in the *corresponding plane* of one of the first winding and the second winding.” (RMBR. at 39 (citing JXM-0003 (’621 patent) at cls. 1, 18).).

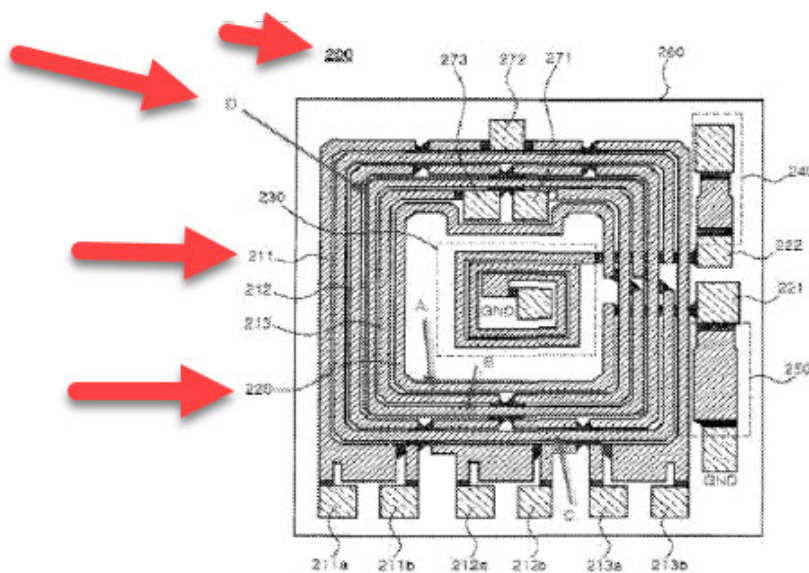
The prosecution history can inform how the inventor understood the meaning of a term and whether the inventor intends a different claim scope. *Phillips*, 415 F.3d at 1317. The word “corresponding” was added by the applicant in response to an office action in which the claims were “objected to because of the following informalities.” (Compl., App. C (’621 patent prosecution history) at ERICSSON01ITC000000700.). The examiner explained the reason for the suggested change as “to improve claim language clarity: On line 8 of claim 1 and line 9 of

claim 17, insert - - corresponding - - before each occurrence of ‘plane’” without further explanation of the informality. (*Id.*). The examiner failed to further comment on the word “corresponding.” However, overall the examiner characterized the word “corresponding” as an informality without explaining where antecedent basis for the word appeared in the specification.

The examiner in the same office action also rejected the claims over Kim et al. (“Kim”). (*Id.* at ERICSSON01ITC000000701.). In rejecting the claim language of “winding loops of both the first and the second windings, when considered in a plane of the first winding and the second winding of the transformer, enclose an area of the printed circuit board,” the examiner explained how Figure 2 of Kim anticipated the claim language at issue:

Output conductive line or “first winding” 220 and input conductive line or “second winding” 211 are both disposed in a plane of transformer 200, and each of the “first and second windings” encircles a middle area portion annotated as D within the plane in which the windings are disposed in.

(Complaint., App. C at ERICSSON01ITC000000702.).



ERICSSON01ITC000000703

(*Id.* at ERICSSON01ITC000000703 (ann.)).

Shown above is Figure 2 of Kim, as annotated by the examiner in rejecting claims 1-3 and 7-20 as being anticipated by Kim. The figure is further annotated with large arrows to show where transformer 200, windings 211, 220 appear and where the examiner's annotation of area "D" appears. By the words used to reject the claim, the examiner interpreted the plane as "a plane of transformer 200" not as individual planes. The plane of the transformer 200 is equivalent to the plane of a "planar transformer" as described in the specification.

In response to the office action, the applicant inserted the word "corresponding" without any explanation about claim scope. (*Id.* at ERICSSON01ITC000000674.). Because the amendment did not add new matter, the claim must be read to be consistent with the specification. This requires that the windings are in a plane of the transformer, which is also how the examiner interpreted and rejected the claim over Kim et al.

Apple argues that Ericsson's proposed construction deletes the phrase "when considered in a plane of the first winding and the second winding of the transformer." (RMBR. at 39-40.). However, the words have meaning because the plane of the transformer is also the plane of the chip or the plane of the printed circuit board. These all describe the same plane, and are necessarily present because the conducting and isolation layers that form the windings are also on that same plane. The windings enclose an area, as explained above, and the area is also on that same plane. Whether the windings are interleaved or stacked, they are nonetheless formed by conducting and isolation layers, and these layers form the windings of the transformer, within that same plane and on the chip or PCB.

Ericsson argues that "there is an 'area' (as denoted by reference numeral 350) that is 'enclosed' by both windings in a stacked topology that consists of the intersection of the first metal layer space enclosed by the first winding and the second metal layer space enclosed by the

second winding.” (CMBr. at 59.). Apple’s claim construction describes that both the first winding loop and the second winding loop “enclose the same area when viewed from above.” [CITE] Apple’s proposed construction is another way of stating that the areas encompass an “intersection” as in Ericsson’s proposed construction. Therefore, aside from the presence of two planes, Ericsson and Apple appear to agree that the area is one of intersection. Thus, the adopted claim construction simply requires “an area ... contained within winding loops of both the first winding and second winding of the transformer.” If the windings are stacked and in perfect overlap, the area is that of either the first winding or the second winding. However, where “both” windings enclose an area, that area is defined.

Apple’s construction of describing a second plane is not supported by the specification, which nowhere describes a “second” plane. Ericsson argues that for an interleaved structure of the windings, Apple’s construction of the “same area” would require the windings to enclose the same physical space. (CMBr. at 62.). However, the claim construction merely defines an area resulting from the placement of the windings. In other words, the area “enclosed” or “contained within” the windings is simply the area contained within the first and second windings, and does not require or limit a specific placement of the windings.

Apple asserts that if its claim construction is not adopted, then the claim is indefinite. (RMBR. at 42.). First, Apple argues that a plane of the first winding and second winding cannot exist. (*Id.* at 42-43). However, the plane does exist – it is the plane of the transformer, chip or PCB, as explained above. Second, Apple contends that a person of ordinary skill would not understand the scope of the “area” of the claims. (*Id.* at 43.). Apple asserts that for an interleaved topology, the “area” is not ascertainable, and the “area” is only described for a stacked topology in the specification. (*Id.* (citing RXM-0010 (Choi Decl.) at ¶¶ 96, 103).).

Apple's expert, Dr. Choi, opines that "[t]ransformer windings are three-dimensional objects that are not typically described as being in a (single) 'plane.'" (RXM-0010 at ¶ 97.). However, Dr. Choi does not state that the transformer is not planar. Although different layers may individually provide different planes, the chip or PCB as a whole is planar, and the chip or PCB defines the plane. Dr. Choi's interpretation of a plane is given little weight because a plane can describe the chip or printed circuit board. Thus, Dr. Choi's interpretation about the area, based on his interpretation of a plane, is also given little weight.

Apple attempts to rely on the stacked topology as the "sole teaching" in the specification to define the area. (RMBR. at 43.). However, as Ericsson correctly points out, the specification discloses either a stacked topology or an interleaved topology of the windings. (CMBR. at 61 (citing JXM-0002 at 5:36-46).). A well-settled canon of claim construction limits interpreting the claims according to a preferred embodiment. *Phillips*, 415 F.3d at 1323-1324 (cautioning against "confining the claims to [disclosed] embodiments"); *see also Kara Tech. Inc. v. Stamps.com Inc.*, 582 F.3d 1341, 1348 (Fed. Cir. 2009) ("The claims, not specification embodiments, define the scope of patent protection. The patentee is entitled to the full scope of his claims, and we will not limit him to his preferred embodiment or import a limitation from the specification into the claims.") (citation omitted).

While the stacked topology is a preferred embodiment, the claimed invention is not limited to the preferred embodiment. For the special case of a stacked topology with perfect overlap, the areas are the same. For other cases with imperfect overlap or interleaved topology, the area is the area enclosed by both the first winding and the second winding.

The adopted construction is also consistent with the purpose and intent of defining the area. *Renishaw*, 158 F.3d at 1250 (explaining that a term is interpreted "with a full

understanding of what the inventors actually invented and intended to envelop with the claim”) (citations omitted). The ’273 patent is directed to a transformer filter arrangement that includes at least one reactive sub circuit, each comprising at least one inductor. (JXM-0002 at 1:54-56.). At least one inductor is located inside the area at issue in this claim construction. (*Id.* at 1:61-63, cl.1.). The advantage of having the inductor located inside the area (“an area saving layout”) is that it saves real estate on the chip and reduces manufacturing cost of the final product. (*Id.* at 9:40-43, 9:51-60, 1:30-31.). Thus, interpreting the area to be inside the first winding and the second winding is consistent with providing an area in which the at least one inductor may be located.

For the foregoing reasons, the disputed term “winding loops of both the first and the second windings, when considered in a plane of the first winding and the second winding of the transformer, enclose an area” is given its plain and ordinary meaning, which is “an area of the chip or PCB is contained within winding loops of both the first winding and second winding of the transformer.”

b. “interfering frequency” (claims 1, 7, 12, and 13 of the ’273 patent; claims 1 and 18 of the ’621 patent”)

Ericsson’s Proposed Construction	Apple’s Proposed Construction	Adopted Construction
This term does not need to be construed. Plain and ordinary meaning applies, which is “frequency, such as an odd order harmonic of the fundamental frequency, that results in unwanted signal content within the bandwidth of the wanted signal content”	frequency, including at least an odd order harmonic of the fundamental frequency, that results in unwanted signal content within the wanted signal content	Plain and ordinary meaning, i.e., “frequency, such as an odd order harmonic of the fundamental frequency, that results in unwanted signal content within the bandwidth of the wanted signal content”

Ericsson's construction is adopted. For the reasons described below, the plain and ordinary meaning is supported by the specification and the doctrine of claim differentiation.

At issue is whether the term “interfering frequency” requires an odd order harmonic or not. The term is construed to optionally include an odd order harmonic of the fundamental frequency. Ericsson correctly points out that this result is supported by the specification. (CMBR. at 68-71.). The specification explains that the “transformer filter arrangement 30 is configured to pass signals at a fundamental frequency and to suppress signals at one or more interfering frequencies.” (JXM--0002 at 6:51-53.). In some embodiments, the harmonics of the fundamental frequency may “include one or more odd order harmonics.” (*Id.* at 7:19-22.). Thus, the plain and ordinary meaning of an “interfering frequency” is a “frequency, such as an odd order harmonic of the fundamental frequency, that results in unwanted signal content within the bandwidth of the wanted signal content.”

Ericsson also correctly points out that the adopted claim construction is supported by the doctrine of claim differentiation. The context of a term within the claim can provide “substantial guidance as to the meaning of particular claims terms.” *Phillips*, 415 F.3d at 1314. The usage of a claim term should be consistent from one claim to another. *Id.* Moreover, a limitation from a dependent claim is presumably not in the independent claim. *Id.* at 1315 (“the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim.”) (citation omitted).

Here, independent claim 8 recites “said at least one interfering frequency includes at least one harmonic of the fundamental frequency.” (JXM-0002 at cl.8.). The term “interfering frequency” is used consistently throughout the patent and the other claims, including claim 1.

Claim 8 does not specify whether the interfering frequency is an even- or odd-order harmonic.⁶

Claim 9, dependent from claim 8, recites “wherein the at least one harmonic includes at least one odd order harmonic.” (*Id.* at cl. 9.). Accordingly, based on the doctrine of claim differentiation, the limitation of claim 9, that of an odd order harmonic, is presumably not included in claim 8. *Phillips*, 415 F.3d at 1315.

Apple argues that the specification refers to a prior art circuit that “suppress[es] other frequencies, but does not ‘filter’ the ‘interfering frequencies,’” “i.e. it does not remove or suppress any content of the differential signal at the resonance frequency” when describing the prior art. (RMBR. at 45 (citing JXM-0002 at 11:66-12:6).). Apple asserts that the definitional term “i.e.” means that the specification defines “filtering to require suppression of the ‘differential signal at the resonance frequency,’ namely the ‘interfering’ frequency.” (RMBR. at 45.). However, this passage merely explains the prior art, and ends by stating that embodiments of the present invention may be combined with the prior art circuit. (JXM-0002 at 12:31-34 (“embodiments of the present invention may be combined with the circuit disclosed in US 2009/0195324 A1 to achieve both filtering and common-mode stabilization.”).). The ’273 patent’s recognition that filtering and common-mode stabilization may be combined, together with the claim construction based on claim differentiation together show that there is insufficient evidence to support Apple’s argument about filtering interfering frequencies.

Apple contends that “a POSITA readily understands that when the specification describes filtering out an ‘interfering’ frequency, the patentee is describing the suppression of an odd order harmonic.” (RMBR. at 46.). However, this understanding is not inconsistent with the adopted

⁶ Apple explains that “[b]ecause harmonics are multiples of the fundamental frequency, there are only even-order harmonics (e.g., two times the fundamental frequency) and odd-order harmonics (e.g., three times the fundamental frequency). (RMBR. at 46 n.1 (citing RXM-0010 (Choi Decl.) at ¶ 109).).

claim construction, which includes the interfering frequency of an odd order harmonic. The plain language of the claim is not limited to an odd order harmonic through the doctrine of claim differentiation.

Apple also argues that the patentee “disparag[es] the prior art that suppressed only even-order harmonics.” (*Id.*). However, the patentee explicitly disclosed that the prior art and the invention of the ’273 patent may be combined. (JXM-0002 at 12:31-34.). Thus, while the prior art is not a preferred embodiment, the claims when interpreted in light of the specification are open to even- and odd-order harmonics.

For the foregoing reasons, the disputed term “interfering frequency” is given its plain and ordinary meaning, which is a “frequency, such as an odd order harmonic of the fundamental frequency, that results in unwanted signal content within the bandwidth of the wanted signal content.”

3. The ’770 Patent

a. “vibrator” (claims 1, 2, 4, 7, 9, 10, 12, and 15)

Ericsson’s Proposed Construction	Apple’s Proposed Construction	Adopted Construction
This term does not need to be construed. Plain and ordinary meaning applies, which is “a module that provides tactile information in response to a control signal”	“vibration motor and vibration element”	“vibration motor and vibration element”

The term “vibrator” appears in every asserted claim of the ’770 patent, except for claims 8 and 16, which incorporate the term as a result of their dependency on independent claims 1 and 9, respectively. (*See* JXM-0005 at cls. 1-16.). The ’770 patent expressly defines the term with

reference to the “present invention:” “The vibrator 16 *is* a module comprising a *vibration motor* and a *vibration element* configured to generate vibration to make the mobile terminal 100 vibrate according to a control signal from the controller.” (*Id.* at 3:41-46 (emphases added); *see also id.* at 6:10-14 (“As described above, the vibrator 16 *is* a module comprising a *vibration motor* and a *vibration element* configured to generate vibration to make the terminal 100 vibrate according to a control signal from the controller 10.”) (emphases added).).

“When a patentee explicitly defines a claim term in the patent specification, the patentee’s definition controls.” *Martek Biosciences Corp. v. Nutrinova, Inc.*, 579 F.3d 1363, 1380 (Fed. Cir. 2009); *see also Plastic Omnium Advanced Innovation & Research v. Donghee America, Inc.*, 943 F.3d 929, 936-937 (Fed. Cir. 2019) (noting that “the district court correctly determined in its claim construction—accepting Plastic Omnium’s arguments—that the patentee gave the term ‘parison’ a special definition, and the patents ‘do not use the term ‘parison’ [in] its conventional, plain and ordinary meaning’”); *Phillips*, 415 F.3d at 1316 (“[O]ur cases recognize that the specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor’s lexicography governs.”).

Here, the specification expressly defines the term “vibrator.” Thus, the term does not get its plain and ordinary meaning, as Ericsson proposes, but rather, is limited to the specific configuration defined in the specification.

The mobile terminal 100 in accordance with the present invention includes . . . the vibrator 16 is a module comprising a vibration motor and a vibration element configured to generate vibration to make the mobile terminal 100 vibrate according to a control signal from the controller.

(JXM-0005 at 3:11-12; 41-46.).

As described above, the vibrator 16 is a module comprising a vibration motor and a vibration element configured to generate vibration to make the terminal 100 vibrate according to a control signal from the controller.

(*Id.* at 6:10-14.).

As Apple points out, no other definition of “vibrator” is disclosed in the ’770 patent, nor does the ’770 patent define or describe the term as “a module that provides tactile information in response to a control signal,” as Ericsson proposes. (RMBR. at 51.).

In addition to explicitly defining the claim term in two separate passages, and failing to provide any other description or definition, the specification also states that the “mobile terminal 100 *in accordance with the present invention* includes” the “vibrator,” which is a “module comprising a vibration motor and a vibration element.” (*Id.* at 3:11-12; 3:41-46.). The Federal Circuit has found disavowal or disclaimer based on clear and unmistakable statements by the patentee that limit the claims, such as “the present invention includes . . .” or “the present invention is . . .” or “all embodiments of the present invention are . . .” *Luminara Worldwide, LLC v. Liown Elecs. Co. Ltd.*, 814 F.3d 1343, 1353 (Fed. Cir. 2016) (collecting cases). Where a patentee “describes the features of the ‘present invention’ as a whole,” he implicitly alerts the reader that “this description limits the scope of the invention.” *Id.* (citing *Regents of the Univ. of Minn. v. AGA Med. Corp.*, 717 F.3d 929, 936 (Fed. Cir. 2013)). Accordingly, the term “vibrator,” the definition of which is modified by the phrase “the present invention includes . . .”, is limited to “a module comprising a vibration motor and a vibration element.”

Ericsson proposes giving this claim term its plain and ordinary meaning, which it defines as “a module that provides tactile information in response to a control signal.” However, as discussed above, nowhere in the ’770 patent is the term “vibrator” described as such. Moreover, construing the term as Ericsson proposes, which is not supported by the intrinsic evidence, would inappropriately strip the term of the patentee’s specific meaning. *See Martek Biosciences Corp.*,

579 F.3d at 1380; *Plastic Omnium*, 943 F.3d 929; *Phillips*, 415 F.3d at 1316; *General Elec. Co. v. U.S.*, 572 F.2d 745, 753 (1978) (“[W]ords used in a patent cannot be given their ordinary and accustomed meaning where it appears from the patent that the inventor attached some different and/or specific meaning to them.”).

For these reasons, Apple’s proposed construction is adopted. The term “vibrator” is construed to mean a “vibration motor and vibration element.”

4. The ’400 Patent

- a. **“wherein, in the first operating state, the output stage is arranged in a first electrical configuration; and in the second operating state wherein the output stage is arranged in a second electrical configuration different from the first configuration” (claims 1, 8, 13, and 15)**

Ericsson’s Proposed Construction	Apple’s Proposed Construction	Adopted Construction
This term does not need to be construed. Plain and ordinary meaning applies, which is “wherein, in the first operating state, the output stage is electrically connected in a first electrical arrangement; and in the second operating state wherein the output stage is electrically connected in a second electrical arrangement different from the first electrical arrangement.”	Plain and ordinary meaning applies, which is “wherein, in the first operating state, the output stage is electrically connected in a first arrangement; and in the second operating state wherein the output stage is electrically connected in a second arrangement different from the first arrangement.”	Plain and ordinary meaning applies, which is “wherein, in the first operating state, the output stage is electrically connected in a first arrangement; and in the second operating state wherein the output stage is electrically connected in a second arrangement different from the first arrangement.”

The crux of the Private Parties’ dispute is what the claim means when it refers to an “output stage [that] is arranged in second electrical configuration different from the first configuration.” Apple’s position is that the claimed “electrical configuration[s]” of an output stage are “different” when the components of the output stage (e.g., its switches) are “arranged”

in a different way than in the first configuration. (RMBR. at 56-57.). Ericsson’s position is that the different arrangements of the output stage in the first operating state and the second operating state are different “electrical arrangements.” (CMBR. at 83.). For the following reasons, Apple’s proposed construction is adopted.

As Apple notes, the ’400 patent discloses an output stage that is comprised of four switches and four terminals. (RMBR. at 57 (citing JXM-0004 (’400 patent) at 1:57-67, 6:12-21, Fig. 2; *see also id.* at cl. 1 (requiring an “output stage . . . comprising” four switches and four terminals))). The claims include requirements with respect to how the “output stage” is “arranged”: “in the first operating state, the output stage is arranged in a first electrical configuration,” whereas “in the second operating state[,] . . . the output stage is arranged in a second electrical configuration different from the first configuration.” (*Id.* at cls. 1, 8, 13, 15.). Apple’s proposed construction mirrors this claim language by requiring that in the second electrical configuration, the “output stage is electrically connected in a second arrangement different from the first arrangement.”

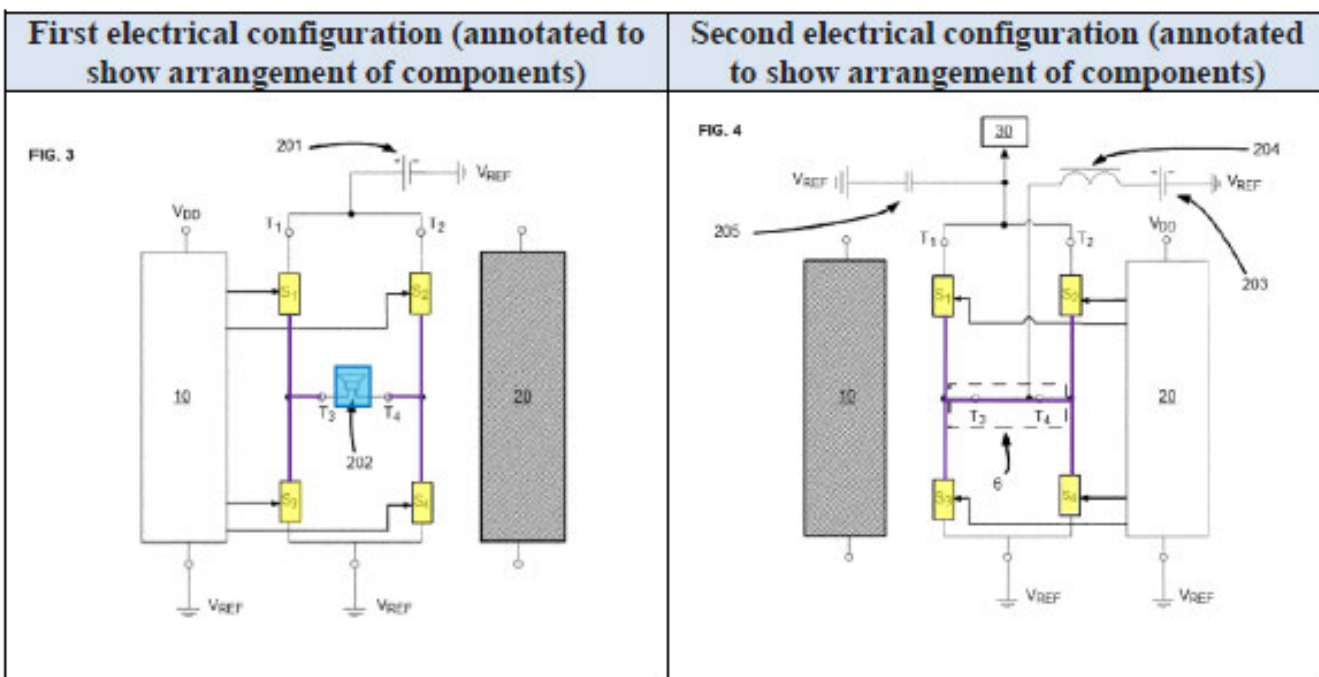
Apple’s construction applies the plain and ordinary meaning of “arranged,” which pertains to how electrical components are connected to one another. (*See* RXM-0010 (Choi Decl.) at ¶¶ 119, 120, 124, 129, 130.). Apple’s interpretation of the word “arranged” is consistent with how this word is used in the ’400 patent itself. (*See, e.g.,* JXM-0004 at 7:46-48 (“Rather, the structure of the output stage 200 in the example of FIG. 4 may be seen as two branches 4, 5 which are **arranged** in parallel.”) (emphasis added); *see also id.* at 6:58-62; RXM-0010 (Choi Decl.) at ¶¶ 124-127, 130.). “Arranged in parallel” refers to the way the “two branches 4, 5” are connected to one another. (JXM-0004 at 7:46-48; RXM-0010 (Choi Decl.) at ¶¶ 124-127, 130.). “Arranged” does not have a different meaning in the claims; it refers to how

the circuit components of the output stage (its switches) are interconnected.

Apple's proposal comports with the distinction between two main aspects of the output stage: "operating state" and "electrical configuration." According to the '400 patent, an "output stage" is comprised of four switches and terminals. (*See, e.g.*, JXM-0004 at cl. 1, 1:57-67 ("a first, a second, a third and a fourth switches, each having a first main terminal, a second main terminal and a control terminal").). "Operating state" relates to the *functional mode* in which the output stage operates based on how the switches of the output stage are turned on and off. (*See, e.g., id.* at 7:18-22 ("the switches S1, S2, S3, S4 of the output stage 200 may be controlled by the H-bridge control stage 10"), 7:50-56 ("the control stage 20 may use the same signal to control two switches S1, S2, S3, S4 which are situated on parallel branches of the output stage 200 of the FIG. 4"); RXM-0010 (Choi Decl.) at ¶ 120.). In contrast, "electrical configuration" refers to the manner in which the *components* of the output stage (i.e., switches and terminals) are "*arranged*." (JXM-0004 at 6:58-62, 7:29-60; RXM-0010 (Choi Decl.) at ¶¶ 120, 124, 130.). Ericsson's proposal conflates these two concepts by ignoring that in addition to "first" and "second" "operating states," the claim also requires "first" and "second" "electrical configurations" that must be "arranged" in a "different" way.

This distinction is clear in the context of the '400 patent's disclosure with respect to "operating states" and "electrical configurations" of the output stage of Fig. 2. (*See* JXM-0004 at 6:58-63 ("Referring to FIG. 2, when in the first operating state, the output stage is arranged in a first electrical configuration, and when in the second operating state wherein the output stage is arranged in a second electrical configuration different from the first configuration.")). The '400 patent depicts this output stage operating in a "first operating state" in a "first electrical configuration" (Fig. 3), and operating in a "second operating state" in a "second electrical

configuration” (Fig. 4, also Figs. 5-8). (*See id.* at 6:58-65, 7:25-28.). These figures, and the corresponding specification text, underscore the difference between “operating state” (the way the output stage switches are **controlled**) and “electrical configuration” (the way the output stage switches are **arranged**).



(JXM-0004 at Figs. 3, 4) (annotated copy from RMBR. at 59).).

With respect to “operating state,” the left image (Fig. 3) depicts the output stage operating in a first operating state, with a first control stage (10) controlling the switches (i.e., turning them on and off) accordingly (as a Class-D amplifier). (*Id.* at 6:63-65, 7:15-24.). The right image (Fig. 4) depicts the output stage operating in a second operating state, with a second control stage (20) controlling the switches accordingly (as a DC-DC converter). (*Id.* at 7:25-28, 7:53-60.). Turning the switches on and off with a “Class-D amplifier control stage” implements a first operating state, and turning the switches on and off with a “DC-DC control stage” implements a second operating state. (*Id.* at 6:63-65, 7:15-28, 7:53-60.).

With respect to “electrical configuration,” the left image (Fig. 3) depicts the “first configuration.” (*Id.* at 6:58-65.). Switches S1 and S3 are connected to each other via a branch (purple) that connects to the left terminal of a load element (blue speaker, 202). (*Id.* at 6:40-57 (“Structurally, the output stage 200 is organised [sic] as follows. . . .”), 7:6-8.). Switches S2 and S4 are connected to each other via a separate branch (purple) that connects to the right terminal of the load element. (*Id.*). The right image (Fig. 4) depicts the “second configuration.” (*Id.* at 6:40-57, 7:25-28.). Switches S1 and S3 remain connected by a branch, as do switches S2 and S4. (*Id.* at 6:40-57, 7:37-39, 7:46-48.). However, in this second configuration, the branches are shorted together, i.e., they do not each connect to the opposite terminals of a load element. (*Id.* at 7:37-39.). Thus, in this second configuration, the main terminals of switches S1, S2, S3, and S4 are connected together. (*Id.* at 7:37-39, 7:46-48, Fig. 4.). They are “arranged” in a “different” “electrical configuration” with respect to the first configuration, in which these terminals are not connected together.⁷ (RXM-0010 (Choi Decl.) at ¶¶ 124-126, 129, 130, 131.).

Thus, Apple’s claim construction proposal reflects that the claims require not only first and second operating states of the output stage, but first and second electrical configurations in which the output stage is arranged in a different way. This is reflected in all claims of the ’400 patent: (i) “in the first operating state, the *output stage is arranged in a first electrical configuration*”; and (ii) “in the second operating state wherein the *output stage is arranged in a second electrical configuration different from the first configuration*.” (JXM-0004 at cls. 1, 8, 13, 15 (emphases added).). As Apple notes, “operating state” is implemented in conjunction

⁷ The same is true of Figs. 5-8: all of these reflect variations of the “second electrical configuration” when the output stage is “in the second operating state,” and all depict an electrical configuration in which the components of the output stage are arranged in a different manner than in the “first operating state.” (RXM-0010 (Choi Decl.) at ¶¶ 126-128 (discussing the differences between the second electrical configuration variations depicted in Figs. 4-8 and the first electrical configuration depicted in Fig. 3).).

with the control of the switches; “electrical configuration” is implemented in conjunction with the manner in which switches are “arranged,” i.e., the way they are connected to one another. Ericsson’s proposal seeks to do away with this distinction by suggesting that “electrical configuration” turns on the switching state of the output stage switches.

Ericsson’s proposed construction is not supported by the intrinsic evidence. The patent does not use the terminology introduced in Ericsson’s proposed construction: “electrically arranged.” Rather, the claims refer to the manner in which the output stage is “arranged,” not “electrically arranged.” (*See id.*). Moreover, the patent never defines an “electrical configuration” in terms of the manner in which the switches of the output stage are operated or are controlled. (*See* RXM-0010 (Choi Decl.) at ¶¶ 130, 131). Instead, controlling the on and off states of the output stage switches is how the patent describes the implementation of “operating states.” (JXM-0004 at 6:58-65, 7:15-28, 7:50-64, 8:25-28, 9:1-4, 9:40-45, 10:16-19, 10:49-.11:6.). To the contrary, based on the plain and ordinary meaning of the word “arranged” and its usage in the ’400 patent specification, “electrical configuration” refers to the manner in which circuit components are connected. (*Id.* at 7:46-48 (“Rather, the structure of the output stage 200 in the example of FIG. 4 may be seen as two branches 4, 5 which are arranged in parallel.”); RXM-0010 (Choi Decl.) at ¶¶ 124, 129, 130, 132, 133.).

The figures of the ’400 patent make clear that the on or off state of an output stage switch is not relevant to the “electrical configuration” of the output stage. Specifically, Figures 3-8, which explicitly depict the output stage in its “different” “first” and “second” electrical configurations, do not show a difference in the switching state of any transistor. (RXM-0010 (Choi Decl.) at ¶ 131; JXM-0004 at Figs. 3-8.). As Apple points out, the switches are never depicted as either on or off in these figures. (*Id.*). Instead, electrical configurations differ in only

one way: the manner in which the components of the output stage are interconnected. (RXM-0010 (Choi Decl.) at ¶¶ 124, 132.) Thus, a person of ordinary skill would not understand an “arrangement” of switches to refer to the manner in which those switches are controlled (i.e., as “on” or “off”). (*Id.* at ¶¶ 120, 121, 130.). The figures depict the switches of the output stage identically, despite describing those switches as being “arranged” in “different” configurations. (*See* JXM-0004 at 6:58-66, 7:25-28; Figs. 3, 4; RXM-0010 (Choi Decl.) at ¶ 131.). One of ordinary skill would understand that the difference in arrangement relates to differences in how the switches are connected, and not to differences in their on/off state. (*Id.*).

Ericsson’s proposal renders claim language superfluous by conflating the separate concepts of “operating state” and “electrical configuration.” If the output stage is considered to be “arranged” in a “different” “electrical configuration” based solely upon the switching behavior of the output stage’s switches, “electrical configuration” is indistinguishable from “operating state.” (RXM-0010 (Choi Decl.) at ¶ 133.). *See Wasica Fin. GMBH v. Cont’l Auto. Sys.*, 853 F.3d 1272, 1288 n.10 (Fed. Cir. 2017) (“It is highly disfavored to construe terms in a way that renders them void, meaningless, or superfluous.”).

In its *Markman* Brief, Ericsson states that “Apple will need to clarify the scope of its construction.” (CMBR. at 86.). According to Ericsson, “it appears that Apple is taking the position that 1) its construction reads on physical changes to the components, although 2) its construction is not limited to physical changes, and 3) its construction does not read on changes to the switching states. These three points logically imply that there must be some other way of changing the configuration that Apple intends its construction to read on, but it is a mystery what that would be. . . . *[W]hat else* does Apple’s construction cover?” (*Id.* at 89 (emphasis in original)).

However, as Respondents explain in their *Markman* Brief, “[a]lthough the ’400 patent is clear that the connections between the output stage switches changes from one configuration to another, *compare* Fig. 3 *with* Figs. 4-8, it does not prescribe the mechanism by which a circuit designer implements the ability to change connections, whether physical or non-physical.” (RMBR. at 63 (citing RXM-0010 (Choi Decl.) at ¶ 135.). Additionally, one of ordinary skill would understand that the connections between the switches of the output stage could be implemented by a number of different mechanisms, including non-physical mechanisms such as bypass components between the terminals of the output stage switches. (*Id.*). Thus, there is no need for further clarification, as Ericsson seeks.

For the foregoing reasons, the term “wherein, in the first operating state, the output stage is arranged in a first electrical configuration; and in the second operating state wherein the output stage is arranged in a second electrical configuration different from the first configuration” is given its plain and ordinary meaning, which is “wherein, in the first operating state, the output stage is electrically connected in a first arrangement; and in the second operating state wherein the output stage is electrically connected in a second arrangement different from the first arrangement.”⁸

VI. TERMS CONSTRUED IN THIS ORDER

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,

⁸ In compliance with Order No. 17, the Private Parties filed responses to questions raised in that Order with respect to this claim term. (*See* Doc. ID No. 780430 (Sept. 16, 2022) (Apple); Doc. ID No. 780809 (Sept. 22, 2022) (Ericsson).). All arguments and points made in those responses were carefully reviewed. Ultimately, they did not alter the analysis discussed above or the adopted construction herein.

803 (Fed. Cir. 1999).

As the Investigation proceeds, including during the evidentiary hearing (“Hearing”) scheduled to be held **January 5-6, 9-12, 2023**, the Private Parties will be limited to the 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 constructions set forth for the first time in post-hearing briefs will be considered waived unless a party agrees with the other on a construction, thereby conceding its position.

Similarly, it will not be appropriate for any party to seek additional claim construction during the Hearing (with rare exception) 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. (*See* G.R. 1.14.). If any party posits a “plain and ordinary meaning,” it must be explained with a detailed rationale. (Order No. 9 at 2.). More to the point, there should not be any new, let alone previously disclosed claim terms that have an alleged “plain and ordinary” meaning without clear explanations. *Ipse dixit* arguments are not sufficient.

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 through a filing on EDIS. 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 claims 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 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 send copies to Chambers via McNamara337@usitc.gov.

B. Streamlining the Investigation

To the extent that this *Markman* Order will enable the Parties to streamline the Investigation, the Parties are encouraged to resolve promptly each issue in this Investigation for which there is no reasonable dispute or little, or weak, evidentiary support.

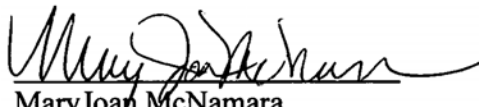
C. Settlement

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

VIII. CONCLUSION

Constructions of the disputed claim terms are hereby adopted by this Order.

SO ORDERED.


MaryJoan McNamara
Administrative Law Judge