

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC., HTC CORPORATION, HTC AMERICA, INC.,
ZTE CORPORATION, and ZTE (USA), INC.,
Petitioner,

v.

CELLULAR COMMUNICATIONS EQUIPMENT LLC,
Patent Owner.

Case IPR2016-01480¹
Patent 8,867,472 B2

Before BRYAN F. MOORE, GREGG I. ANDERSON,
And JOHN A. HUDALLA, *Administrative Patent Judges*.

ANDERSON, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) AND 37 C.F.R. § 42.73

¹ HTC Corporation, HTC America, Inc., ZTE Corporation, and ZTE (USA), Inc. filed a petition in (now terminated) IPR2017-00982 (“’982 IPR”), and have been joined to the instant proceeding. Subsequently, Apple, Inc. was terminated from the proceeding. See *infra* Section I, n.3.

I. INTRODUCTION

Apple Inc. (“Apple”) filed a Petition (Paper 1, “Pet.”) pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of claims 1, 10, 11, 14, 28, 37, 38, and 41 (“the challenged claims”) of U.S. Patent No. 8,867,472 B2 (“the ’472 patent,” Exhibit 1001), filed March 25, 2010. HTC Corporation, HTC America, Inc., ZTE Corporation, and ZTE (USA), Inc. (collectively “HTC et al.” or “Petitioner”) were joined in this proceeding. (See Paper 14, n.1; ’982 IPR, Paper 8).

The Petition is supported by the Declaration of Zygmunt J. Haas, Ph.D. (“Haas Declaration,” Ex. 1003). Dr. Haas was deposed by Patent Owner (“Haas Deposition,” “Haas Dep.,” Ex. 2004). Cellular Communications Equipment LLC (“Patent Owner”) filed a Preliminary Response (Paper 6, “Prelim. Resp.”).²

We instituted an *inter partes* review of the challenged claims (Paper 9, “Institution Decision” or “Inst. Dec.”). Patent Owner filed a Response (“PO Resp.,” Paper 12) and Petitioner filed a Reply (“Pet. Reply,” Paper 16). Patent Owner’s Response is supported by the Declaration of Jay P. Kesan, Ph.D. (“Kesan Declaration,” Ex. 2002). Dr. Kesan was deposed by Petitioner (“Kesan Deposition,” “Kesan Dep.,” Ex. 1013). The Board filed a transcription of a Final Hearing held on August 30, 2017 (“Tr.,” Paper 23). Subsequent to the hearing, Apple was terminated from this proceeding,

² In its Preliminary Response, Patent Owner argued Dr. Haas was not shown to be a “qualified as an expert by knowledge, skill, experience, training or education.” Prelim. Resp. 15–17. We found Dr. Haas was sufficiently qualified to provide testimony. Inst. Dec. 13–14. Patent Owner does not raise that issue again in its Response, so we deem the argument waived. See Scheduling Order, 3 (Paper 8).

reaching a settlement with Patent Owner. Paper 26, 3.³

The Board has jurisdiction under 35 U.S.C. § 6. This Final Written Decision issues pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 10, 11, 14, 28, 37, 38, and 41 are unpatentable.

A. Related Proceedings

Petitioner advises us that the '472 patent has been asserted in *Cellular Communications Equipment LLC v. AT&T Inc., et al.*, 2:15-cv-00576 (E.D. Tex. 2015) (consolidated lead case) (the "District Court" or the "District Court Lawsuit"). Pet. 2. Including the lawsuit identified by Petitioner, Patent Owner advises us that there are four separate lawsuits filed by Patent Owner against various parties in the U.S. District Court for the Eastern District of Texas. Paper 3, 2–3. In addition, there are two *inter partes* review proceedings asserting unpatentability of claims of the '472 patent: *Telefonaktiebolaget LM Ericsson and Ericsson Inc. v. Cellular Communications Equipment LLC*, Case IPR2016-01485 ("'1485 IPR");⁴ and *HTC Corporation and HTC America, Inc. v. Cellular Communications Equipment LLC*, Case IPR2016-01504 ("'1504 IPR").⁵ *Id.*

³ As a result of the termination, from now forward, HTC et al. are authorized to take the active role with respect to this proceeding. See Paper 14, 7 (restricting HTC et al. from an active role pending authorization of the Board).

⁴ Terminated by settlement. '1485 IPR, Paper 13.

⁵ Institution denied. '1504 IPR, Paper 7.

B. Technology and the '472 Patent (Ex. 1001)

The '472 patent describes an apparatus and method for sending and receiving aperiodic channel state information ("CSI") for a selected downlink component carrier of a plurality of component carriers ("CCs"). Ex. 1001, Abstract, 1:15, 1:19.

1. LTE Wireless Communication Systems

The '472 patent relates generally to 3rd Generation Partnership Project (3GPP) LTE ("Long term evolution") wireless communication systems.⁶ Ex. 1001, 1:26, 1:42–47; see Ex. 1003 ¶ 20. A base station sends user equipment ("UE") a request to "force the UE to send an aperiodic CSI [(“Channel State information”)] report." Ex. 1001, 1:19–20, 1:40, 3:4–11. The CSI can include channel quality indicators ("CQI"), precoding matrix indicators ("PMI"), rank indicators, channel frequency, impulse response, and/or channel covariance matrix. *Id.* at 2:1–10. CSI reports may also include identification information concerning the component carrier or sub-band to which the CSI report relates. *Id.*

The UE of the '472 patent provides feedback on CSI using carrier aggregation. Ex. 1001, 1:41–47. Generally, carrier aggregation groups are multiple component carriers used to increase the overall system bandwidth available to a UE. *Id.* at 1:54–61. Figure 3 from the '472 patent is reproduced below.

⁶ Petitioner provides a copy of one of the LTE standard documents as Exhibit 1011: 3GPP TS 36.201 V8.3.0 (2009-03) TECHNICAL SPECIFICATION-3RD GENERATION PARTNERSHIP PROJECT; TECHNICAL SPECIFICATION GROUP RADIO ACCESS NETWORK; EVOLVED UNIVERSAL TERRESTRIAL RADIO ACCESS (E-ULTRA); LTE PHYSICAL LAYER-GENERAL DESCRIPTION (Release 8) (3GPP Organizational Partners 2009).

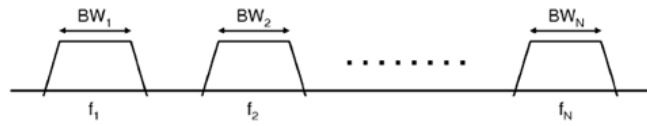


Fig. 3

Figure 3 shows an example of carrier aggregation. *Id.* at 2:57. Figure 3 illustrates “component carrier aggregation (or channel bonding), where the total system bandwidth consists of [a] set of component carriers.” *Id.* at 1:55–57. In the example of Figure 3, carrier aggregation occurs with non-contiguous bands, in which “the total system bandwidth contains a set of component carriers $BW_1, BW_2, \dots, BW_N$, having carrier frequencies $f_1, f_2, \dots, f_N$.” *Id.* at 1:58–61.

2. The '472 Patent

The “ongoing standardization of LTE-Advanced in 3GPP” uses carrier aggregation to form bandwidths of up to 100MHz by aggregating up to five component carriers of 20 MHz each. Ex. 1001, 1:62–65. The problem with using multiple component carriers is the creation of large CSI reports, resulting in high overhead, which in turn limits uplink capacity. *Id.* at 2:20–22, 3:20–29.

The '472 patent describes a solution to the problem where a request is made for an aperiodic channel information (e.g., CSI) report for a specific downlink (“DL”) component carrier, which may include “some coarse wideband CSI for other CCs.” *Id.* at 3:35–40. The UE sends CSI reports to the eNode-B (“base station”) upon a request from the base station (“BS”) for a particular channel, thus, greatly reducing the costs of reporting within the UE and BS system. *Id.* at 1:24, 2:66–3:3, 3:30–40, Fig. 1.

C. Illustrative Claims

Of the challenged claims, claims 1 and 28 recite very similar subject matter in independent apparatus and method claims, respectively.

Claims 10, 11, and 14 depend directly or indirectly from claim 1.

Claims 37, 38, and 41 depend directly or indirectly from claim 28. The parties' arguments focus on method claim 28 and its dependent claim 37 (*see, e.g.*, Tr. 5:19–6:7, 22:6–18), which are reproduced below:

28. A method comprising:

- receiving a request for providing aperiodic channel information with respect to a selected downlink component carrier of a plurality of component carriers;

- determining the selected downlink component carrier based on which component carrier of the plurality of component carriers carried the request for providing the aperiodic channel information;

- establishing channel information with respect to the selected downlink component carrier; and

- sending the channel information with respect to the selected downlink component carrier.

Ex. 1001, 15:1–12.

37. The method according to claim 28, further comprising:

- providing channel information for at least one of the other component carriers of the plurality of component carriers other than the selected component carrier of the plurality of component carriers; and

- sending the channel information for the at least one of the other component carriers.

Id. at 15:50–56.

D. Asserted Ground of Unpatentability

Petitioner challenges claims 1, 10, 11, 14, 28, 37, 38, and 41 of the '472 patent as obvious over Seo⁷ under 35 U.S.C. § 103(a). Pet. 8, 21–49. The '472 patent has an effective filing date of March 25, 2010, prior to the effective date of the Leahy-Smith America Invents Act (“AIA”). Thus, the grounds asserted are under the pre-AIA version of §§ 103 and 112 referenced below.

II. ANALYSIS

A. Principal Issue Presented

The papers filed by the parties show that the construction of the “other than” limitation recited in dependent claims 10 and 37 is the principal issue in this proceeding.⁸ Patent Owner’s Summary of Argument argues only the “other than” limitation.⁹ PO Resp. 1–2. At the oral hearing, Patent Owner argued “what I want to get to today is particularly what Patent Owner means by saying exclusive of with respect to the ‘other than’ language.” Tr. 22:10–12. Petitioner’s Reply also asserts that that “this proceeding primarily revolves around a single issue: claim construction of the ‘other than’

⁷ U.S. Patent No. 8,625,513 B2, to Dong Youn Seo, et al., PCT application filed Dec. 29, 2009 (“Seo,” Ex. 1005).

⁸ Petitioner has the burden of showing unpatentability. 35 U.S.C. § 316(e). Accordingly, other aspects of the required showing are also addressed in this Decision.

⁹ Patent Owner’s only other argument in the Patent Owner’s Response is that Petitioner’s expert admits that Seo does not disclose the “determining” step of independent claims 1 and 28. We address that argument below.

limitation in dependent claims 10 and 37.” Pet. Reply 1. The “other than” limitation is construed in Section II.B.3 below.

B. Claim Construction

In *inter partes* review, claim terms are given their broadest reasonable interpretation in light of the specification in which they appear. *See* 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142 (2016). We presume that claim terms have their ordinary and customary meaning. *See Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1061–62 (Fed. Cir. 2016) (“Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification and prosecution history.”); *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definition for a claim term must be set forth in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). In the absence of such a special definition or other consideration, “limitations are not to be read into the claims from the specification.” *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993). “[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.” *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

1. “channel information” (claims 1, 10, 11, 14, 28, 37, 38, 41)

In the Institution Decision, we found that Petitioner and Patent Owner both agreed that “channel information” was not disputed. Inst. Dec. 7 (citing Pet. 14 (citing Ex. 1003 ¶¶ 30–32; *Vivid Techs. Inc.*, 200 F.3d at 80)). Patent

Owner agreed the term did not require construction because at this stage of the proceeding it is not disputed. Prelim. Resp. 12–13. Neither party’s arguments after institution request construction of the term. We, therefore, maintain our determination from the Institution Decision that “channel information” is not disputed and construction is not required. Inst. Dec. 7.

2. “*processor [is] configured to*” (claims 1 and 10)

The question raised regarding the various “processor [is] configured to” terms (“processor terms”) is whether or not they require construction as means-plus-function terms under 35 U.S.C. § 112 ¶ 6. In the Institution Decision, we determined that the processor terms do not contain the word “means” and are not presumptively subject to section 112, paragraph 6. *See Williamson v. Citrix Online, LLC*, 792 F.3d 1339 (Fed. Cir. 2015) (en banc in relevant part). Inst. Dec. 8–9. The presumption against means-plus-function construction was not overcome and no further construction was required. *Id.* at 10.

Patent Owner and Petitioner agree with the Institution Decision’s determination that construction of the “processor terms” is not required. PO Resp. 24; Pet. Reply 16. We, therefore, maintain our determination from the Institution Decision that the “processor terms” are not means-plus-function terms and construction is not required. Furthermore, the “processor terms” are not disputed and for that additional reason construction is not required.

3. “*other than*” (claims 37 and 10)

With respect to claim 37, the “other than” limitation in its entirety recites “providing channel information for at least one of the other component carriers of the plurality of component carriers *other than* the

selected component carrier of the plurality of component carriers.”¹⁰ In the Institution Decision, we determined that “[t]he plain and ordinary meaning of the claim language does not preclude inclusion of channel information for the selected component carrier; rather, it requires channel information about another component carrier, but does not limit the claim to providing only that information.” Inst. Dec. 11. We rejected Patent Owner’s proposed construction that the “other than” limitation means “*excluding* the selected component carrier.” *Id.* (citing Prelim. Resp. at 18–19) (emphasis added).

In its Response, Patent Owner again contends that we “should construe ‘other than’ as ‘exclusive of,’ which is the plain, ordinary, and reasonable meaning of this phrase.” PO Resp. 15–16 (citing Exhibit 2002 ¶ 29). Petitioner argues our preliminary construction is correct and is both supported by the plain and ordinary meaning of “other than” and consistent with the specification. Pet. Reply 3.

Patent Owner argues that it “did not imply or assert that claims 37 and 10, as a whole, would exclude any channel information concerning the selected downlink component carrier.” PO Resp. 16. Rather, it argues that the independent claims, 28 and 1, recite a first form of channel information directed to the “selected downlink component carrier,” and the dependent claims, 37 and 10, relate to “channel information with respect to one or more other component carriers, exclusive of the selected downlink component carrier.” *Id.* Patent Owner supports its position with the Kesan Declaration and a dictionary definition of “other than” as meaning “exclusive of.” *Id.* at

¹⁰ Method claim 37’s language is reproduced here. Claim 10’s language is similar but written in the context of an apparatus claim. *See supra* Section I.C.

17 (citing *Merriam-Webster's Collegiate Dictionary*, 821 (“other than”) (10th ed. 2000) (Ex. 2003); Ex. 2002 ¶¶ 30–31). Patent Owner contends that the “second channel information” of the dependent claims “cannot include channel information about the selected component carrier because it is for ‘at least one component carrier other than the selected component carrier.’” *Id.* at 18 (citing Ex. 2002 ¶ 34).

Patent Owner argues its “exclusive of” construction for “other than” is supported by the ’472 patent Specification, which states the “‘common nominator for all the alternative [embodiments] is that they provide a way to indicate for which DL CC the detailed frequency selective CSI report is derived’ and in addition ‘wideband reports for *other* DL CC in the DL CC monitoring set can be reported simultaneously.’” PO Resp. 19 (citing Ex. 1001, 4:62–67; Ex. 2002 ¶ 35). Relying on the Kesan Declaration and Figure 3 of the ’472 patent, Patent Owner describes the method of independent claim 28 as including “a plurality of component carriers BW1, BW2, BW3, BW4, and BW5.” *Id.* at 19–20 (citing Ex. 1001, Fig. 3; Ex. 2002 ¶ 36). Patent Owner summarizes the claim 28 steps as “receiving, determining, establishing and sending channel information with respect to the selected downlink component carrier BW1.” *Id.* at 20 (citing Ex. 2002 ¶ 36). Patent Owner concludes that dependent claim 37 includes the steps of its independent claim but requires the “other than” limitation “in addition.” *Id.* at 20–22 (citing Ex. 2002 ¶¶ 39–40; Ex. 2004, 76:9–18). Patent Owner concludes that the “other than” limitation of dependent claims 37 and 10 should be construed as “providing channel information for at least one of the other component carriers of the plurality of component carriers *exclusive of*

the selected component carrier of the plurality of component carriers.” *Id.* at 23–24 (citing Ex. 2002 ¶ 41).

We are not persuaded by Patent Owner’s arguments and maintain our preliminary construction of the “other than” limitation. Patent Owner’s proposed construction does not address our preliminary determination that the “other than” limitation in dependent claims 37 and 10 “requires channel information about another component carrier, *but does not limit the claim to providing only that information.*” Inst. Dec. 11 (emphasis added). In other words, dependent claims 37 and 10 can include the channel information about *both* the selected downlink component carrier *and* the other component carriers.

The specification supports our construction. Patent Owner cites to the specification as supporting that dependent claim 37 includes the steps of its independent claim 28 but requires the “other than” limitation “in addition.” Prelim. Resp. 20–22; *see also* Pet. Reply 3–4 (arguing claim 37’s recited channel about the other component carriers is “***in addition***” to channel information about the selected component carrier). That channel information of the other component carriers is “in addition” to the channel information of the selected downlink component carrier does not exclude the latter and is contrary to Patent Owner’s “exclusive of” construction. For example, the specification states that

The common nominator for all the alternatives is that they provide a way to indicate for which DL CC the detailed frequency selective CSI report is derived. ***Additionally wideband reports for other DL CC in the DL CC monitoring set can be reported simultaneously.***

Ex. 1001, 4:63–67 (emphasis added); *see also* Pet. Reply 6 (citing Ex. 1001, 3:35–39 (“aperiodic channel information (e.g., CSI) report for some specific

DL CC (*plus* potentially some coarse wideband CSI for other CCs) (emphasis added)). We agree with Petitioner that “claims 10 and 37 encompass providing channel information about all component carriers ‘simultaneously’ or ‘together’ without excluding the selected component carrier.” See Pet. Reply 7–10.

We find Patent Owner’s arguments to be circular. On the one hand, Patent Owner argues that its construction “*would not exclude* any channel information concerning the selected downlink component carrier” of claim 28. PO Resp. 16 (emphasis added); see also Tr. 22:1–5 (Patent Owner’s construction does not “exclude the selected component carrier”). On the other hand, Patent Owner’s construction states that the “other than” limitation means “*exclusive of* the selected component carrier of the plurality of component carriers.” PO Resp. 23–24 (emphasis added).

Patent Owner tries to reconcile the inconsistency by arguing the channel information for the other component carriers of claim 37 is “distinct” from the selected downlink channel component carrier of claim 28. This argument merely restates the difference between claim 28 and claim 37. That claims 28 and 37 recite distinct channel information does not mean that the claim 28 channel information is “excluded.” Nor does the argument explain why our preliminary construction of the “other than” limitation should change.

At the Final Hearing, Patent Owner understood that the dependent claims 10 and 37 include all the limitations of claims 1 and 28 from which they depend. Tr. 29:9–25. Patent Owner contended the dependent claims recite “a subset of the plurality of component carriers ‘other than’ the selected component carrier.” *Id.* at 29:13–25. The contention does not

explain how Patent Owner's construction "excludes" what is recited in independent claim 28. None of Patent Owner's arguments establish that our preliminary construction is wrong or why the "other than" limitation requires us to exclude the selected downlink component carrier.

Patent Owner's dictionary evidence is neither relevant nor persuasive because, as here, "the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005). Further, unlike here, the usefulness of dictionaries, and especially technical dictionaries, is most beneficial where we "endeavor to collect the accepted meanings of terms used in various fields of science and technology." *Phillips*, 415 F.3d at 1318. Similarly, Patent Owner's proffered expert testimony is of no assistance in discerning how to construe the "other than" limitation. None of the testimony from the expert declarations of either party is relevant to the construction issue because we rely on the plain and ordinary meaning of "other than."

We agree with Petitioner that claim 37, a claim that includes the transitional word "comprising," is open ended. Pet. Reply 5 (citing *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501 (Fed. Cir. 1997)). As Petitioner argues, "providing information for at least one component carrier 'other than' the selected component carrier is essential, but a method that additionally provides other channel information still falls within the scope of the claim." *Id.* We agree with Petitioner's arguments and supporting evidence that the channel information provided for the "other" component

carriers compared to the selected downlink component carrier: (i) need not be a different type; (ii) does not require a different request; and (iii) does not have to be provided at a different time. *Id.* at 14; *see also id.* at 10–16 (detailing the arguments and evidence).

C. Obviousness Analysis

Petitioner alleges claims 1, 10, 11, 14, 28, 37, 38, and 41 would have been obvious to a person of ordinary skill in the art over Seo. Pet. 15–46. Petitioner cites the Haas Declaration in support of its positions. *See* Ex. 1003 ¶¶ 34–46 (including claim chart).

1. Law of Obviousness

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness.¹¹ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

2. Level of Ordinary Skill

In the Institution Decision, we found that

a person of ordinary skill in the art would include someone who had, at the priority date of the ’472 patent, a B.S. degree in

¹¹ Patent Owner has not presented any objective evidence of nonobviousness.

Electrical Engineering, Computer Engineering, or Computer Science, or equivalent training as well as at least three years of technical experience in the field of wireless cellular communication systems and networks.

Inst. Dec. 11–12 (citing Ex. 1003 ¶ 14). Patent Owner does not contest this finding in its Response. We maintain our finding on the level of ordinary skill for purposes of this Decision.

2. *Seo (Exhibit 1005)*

Seo describes a “method for transmitting control information to request a Channel Quality Indicator (CQI) in a wireless communication system supporting a plurality of transmission bands.” Ex. 1005, Abstract. Seo describes “[h]ow to report . . . CQI in the multi-carrier system” without unnecessarily “increas[ing] overhead.” *Id.* at 5:36–37, 14:28–29.

A Component Carrier (“CC”) is an element of the multi-carrier in that “a plurality of CCs form the multi-carrier by carrier aggregation.” Ex. 1005, 5:18–20, 5:24–25. A “multi-carrier is called a whole band, a CC may be referred to as a subband.” *Id.* at 5:26–28.

Figure 9, depicting Seo’s Embodiment 2, is reproduced below.

Fig. 9

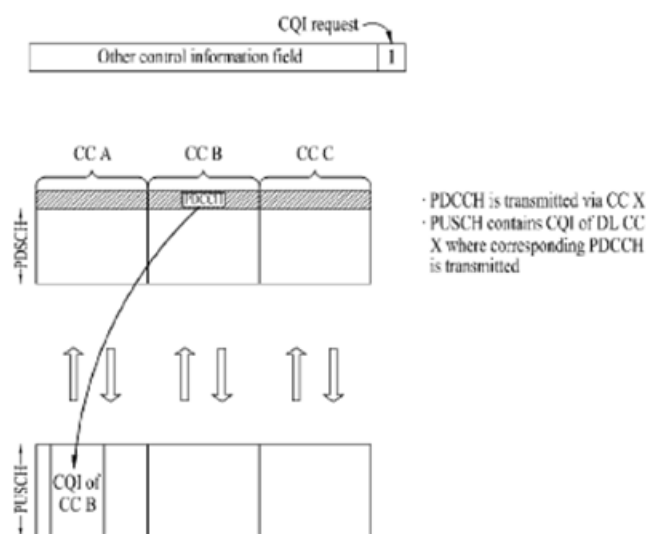


Figure 9 shows the “structure of control information fields including a CQI request field and a CQI transmission method.” *Id.* at 15:14–17. When the control information fields’ 1-bit CQI request field is set to 1, a CQI report is requested. *Id.* at 15:17–19. When the control information is received, “the UE transmits a CQI for a downlink CC, CC B in which it has received a PDCCH¹² carrying the uplink grant in an uplink CC scheduled by the uplink grant.” *Id.* at 15:19–23. “This exemplary embodiment offers the benefits of still using a conventional signal format and reducing signaling overhead” *Id.* at 15:23–25.

Figure 12 of Seo is reproduced below.

Fig. 12

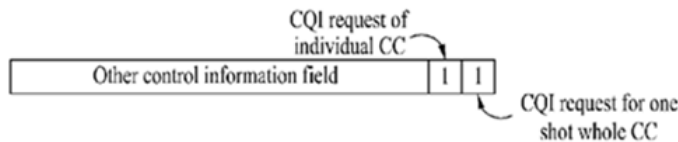


Figure 12 illustrates Embodiment 5 where “control information fields may include [a] 1 bit field for indicating [a] CQI request of [an] individual CC which is indicated implicitly by the method of Embodiment 2” and a “1 bit field for requesting CQIs for whole CCs (i.e., CQI request for one shot whole CC in FIG. 12), respectively.” Ex. 1005, 16:33–38. Seo explains that a “one shot whole” is for the “whole CCs,” i.e., all of the component carriers. *Id.* at 16:6–14, Fig. 11.

In Embodiment 2, the control information field 1-bit request field is set to 1 to request a CQI report for a downlink CC. Ex. 1005, 15:14–23, Fig. 9. Embodiment 2, therefore, implicitly represents a state where the 1-bit request is for an individual CC. *Id.* at 16:39–44. A state for “no CQI

¹² This is an abbreviation for “Physical Downlink Control Channel.” See Ex. 1001, 1:32; Ex. 1011 ¶ 3.3.

request” and for “one-shot whole CC” also may be indicated. *Id.* The one shot whole configuration is shown in Figure 12 and Embodiment 5 where Embodiment 2 is “modified so that CQIs for entire CCs are requested on one PDCCH.” *Id.* at 16:25–27. In Embodiment 5, a separate 1-bit field is used for “requesting CQIs for whole CCs (i.e., CQI request for one shot whole CC in Fig. 12).” *Id.* at 16:36–38.

3. Claims 1 and 28

Petitioner’s arguments and evidence that the challenged claims are unpatentable over Seo are discussed below. Petitioner begins with method claim 28 and apparatus claim 1, which “recites additional structural elements not found in claim 28.” Pet. 21.¹³ Unless otherwise indicated, Patent Owner does not dispute Petitioner’s showing.

Petitioner begins its analysis with method claim 28. Pet. 21–33. Limitation 28.0 states the claim is “[a] method comprising.” We do not find the preamble is limiting; nonetheless, Petitioner asserts it is disclosed by Seo’s teaching of a wireless communication system including a UE and a BS where CQI information is generated for one downlink control channel of a plurality of downlink transmission bands. *Id.* at 21 (citing Ex. 1005, Abstract, 6:38–49). Figure 9 is cited by Petitioner as showing “a **CQI transmission method** in the multi-carrier system.” *Id.* at 21–22 (citing Ex. 1005, 7:34–37, Fig. 9; Ex. 1003, 52–53¹⁴).

¹³ The Petition’s format uses the claim number followed by a decimal, followed by a number indicating a claim limitation. For example, “28.0” is the preamble of claim 28, and “28.1” is the first claim limitation of claim 28. See Pet. 21–22. We follow Petitioner’s convention.

¹⁴ Petitioner cites pages 52–53 of the Haas Declaration, which are portions of the claim charts that follow paragraph 46. Page citations to the Haas

Limitation 28.1 recites “receiving a request for providing aperiodic channel information with respect to a selected downlink component carrier of a plurality of component carriers.” Petitioner argues that limitation 28.1 is disclosed by Seo. Pet. 25 (citing Ex. 1003, 53–57). First, Seo describes a “wireless communication system supporting a plurality of transmission bands,” which Petitioner argues constitute a “plurality of component carriers.” *Id.* at 22 (citing Ex. 1005, 6:38–40); *see also id.* at 23 (citing an annotation of Fig. 9 (“Plurality of downlink component carriers (CC)”).

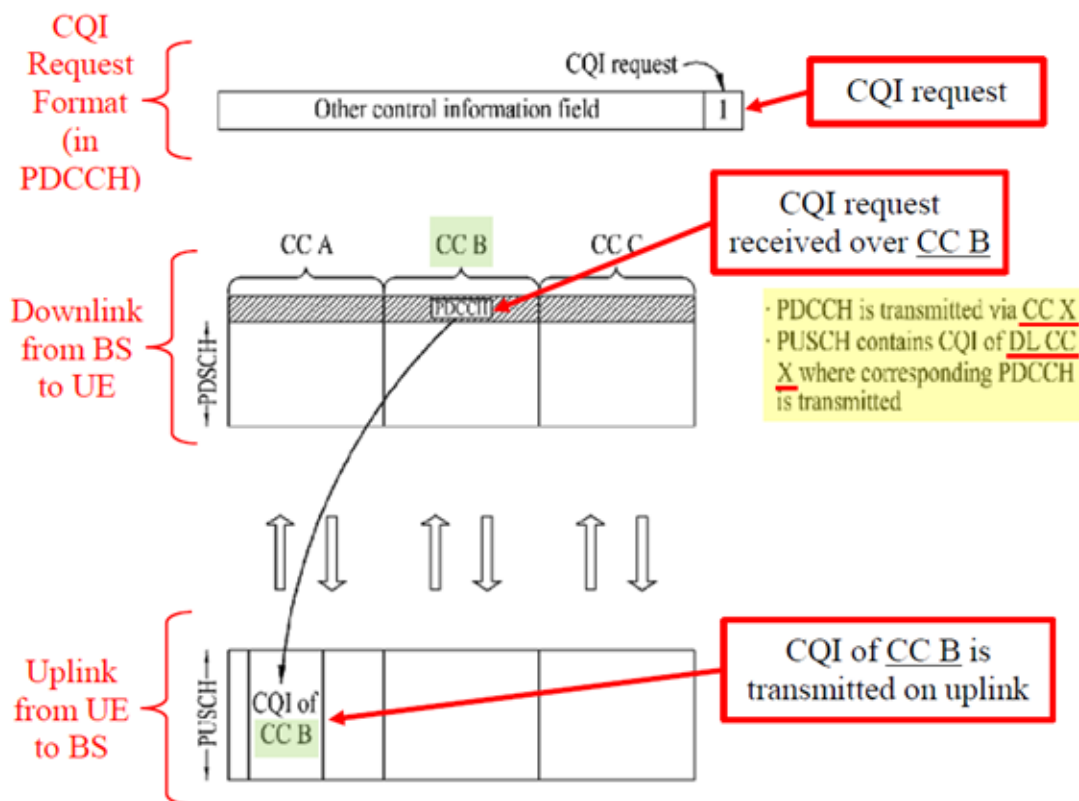
As to “receiving a request,” Petitioner argues Seo’s UE “includes a receiver for receiving from a BS [base station] control information, which includes **CQI request information requesting CQI reporting.**” Pet. 23 (citing Ex. 1005, 6:39–44). Petitioner argues “[t]he CQI request received by the UE is for a ‘specific downlink CC’ within the plurality of component carriers.” *Id.* (citing Ex. 1005, 15:25–28, 14:30–32). Relying on its annotation of Figure 9 at page 24 of the Petition, Petitioner concludes a person of ordinary skill in the art would understand that a CQI request for channel information about one component carrier is illustrated. *Id.* at 23–24 (citing Ex. 1005, second annotated Fig. 9; Ex. 1003, 54).

Petitioner argues Seo teaches the recited “aperiodic” or non-periodic reporting because the channel information is sent “at the *request* of the base station (*i.e.*, the transmission of CQI is triggered by the base station)” and is therefore “aperiodic.” Pet. 24 (citing Ex. 1005, 14:22–27; Ex. 1003, 56–57). Petitioner cites to the ’472 patent for its disclosure that “in contrast to a periodic CSI report, an aperiodic CSI report is sent by the UE when it is

Declaration are only for claim chart citations. Paragraphs of the Haas Declaration are cited by paragraph number.

triggered to do so.” *Id.* (citing Ex. 1001, 3:7–9). We agree with Petitioner’s factual assertions and determine that Petitioner has established that Seo teaches limitation 28.1.

Limitation 28.2 recites “determining the selected downlink component carrier based on which component carrier of the plurality of component carriers carried the request for providing the aperiodic channel information.” Referencing an annotation of Figure 9 at page 27 of the Petition, Petitioner notes that “when the UE receives a CQI request in a PDCCH on CC B, the UE generates CQI of CC B and transmits it on the uplink to the base station.” Pet. 27 (emphasis omitted) (citing Ex. 1003 ¶ 39). The annotation at page 27 of the Petition is reproduced below.



APPL-1005, Fig. 9 (annotated); APPL-1003, p. 60

Petitioner argues annotated Figure 9 above shows that the UE receives, on the “Downlink from BS to UE,” a 1-bit CQI request on CC B (green highlighting). *Id.* The UE then “selects one of CC A, CC B, and CC C for CQI reporting and does so with only the knowledge of which CC carried the request.” *Id.* (citing Ex. 1003 ¶ 39). Petitioner concludes that “[i]n this case, the UE selects CC B because CC B carried the request.” *Id.* at 27–28.

Seo teaches that “[o]nly a 1-bit CQI request per CC is used and a CQI is supposed to be reported for a downlink CC in which a PDCCH carrying an uplink grant is transmitted.” Ex. 1005, 15:11–13. Based on the preceding, Petitioner argues “a person of ordinary skill in the art would find it obvious that, when Seo’s UE receives a CQI request, it makes a determination about which component carrier it is supposed to report on based on which component carrier carried the request.” Pet. 27–28 (citing Ex. 1003 ¶ 39).

In addition, Petitioner argues the background knowledge of a person of ordinary skill in the art supports its assertion. *Id.* at 28 (citing *KSR*, 550 U.S. at 420). Specifically, Petitioner asserts that “at the time of the ’472 Patent, persons of ordinary skill in the art were aware of other carrier aggregation systems that also implicitly informed a UE of the selected component carrier for which action was desired by transmitting a request over the selected carrier.” *Id.* at 28–29 (citing Ex. 1003 ¶¶ 41–43 (citing Ex. 1006 ¶¶ 5, 30, 31, 56 (“the carrier or group of carriers for which a deactivation is targeted **may be determined based on which carrier the [deactivation] order was transmitted on**” (emphasis added))))). Petitioner concludes knowledge of systems similar to Seo “would have led a person of ordinary skill in the art to find it obvious that Seo’s UE determines the

component carrier for which CQI is to be reported based on which component carrier carried the CQI request.” *Id.* at 29 (citing Ex. 1003 ¶ 44).

Petitioner notes that a person of ordinary skill in the art would have found “determin[ing] the selected downlink component carrier based on the carrier that carried the request” advantageous. *Id.* Petitioner argues the efficiency of such an approach would have led a person of ordinary skill to the limitation because it aligns with Seo’s goal of “reduc[ing] the overhead of uplink CQI reporting.” *Id.* (citing Ex. 1005, 15:53–54; Ex. 1003 ¶ 45, 57–61 (claim chart)). We agree with Petitioner’s factual assertions and determine that Petitioner has established that Seo teaches limitation 28.2.

Patent Owner argues the “determining” step, limitation 28.2, is not disclosed by Seo because Dr. Haas admitted at his deposition that “I could not find the explicit [] disclosure of this element in Seo.” PO Resp. 26 (citing Ex. 2004, 41:14–42:3). Further, Patent Owner cites to the Haas Deposition testimony that

the step of determination of – determination that the CQI – CQI is requested for a particular downlink [component] carrier is based on the [component] carrier on which the request was transmitted. *I believed that this element is not – may not be explicitly stated in the Seo prior art reference . . .*

Id. (quoting Ex. 2004, 39:23–40:8) (emphasis by Patent Owner). Patent Owner contends this admission is sufficient to deny the Petition because the “determining” step is absent from Seo. *Id.* at 26–27 (citing *CFMT, Inc. v. YieldUp Int’l Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003)).

Patent Owner’s argument is not persuasive because it does not consider the totality of Dr. Haas’ testimony. Dr. Haas affirmatively testified that the “determining” step would have been obvious to a person of ordinary skill in the art. Ex. 2004, 40:9–25. In doing so, he unequivocally stated that

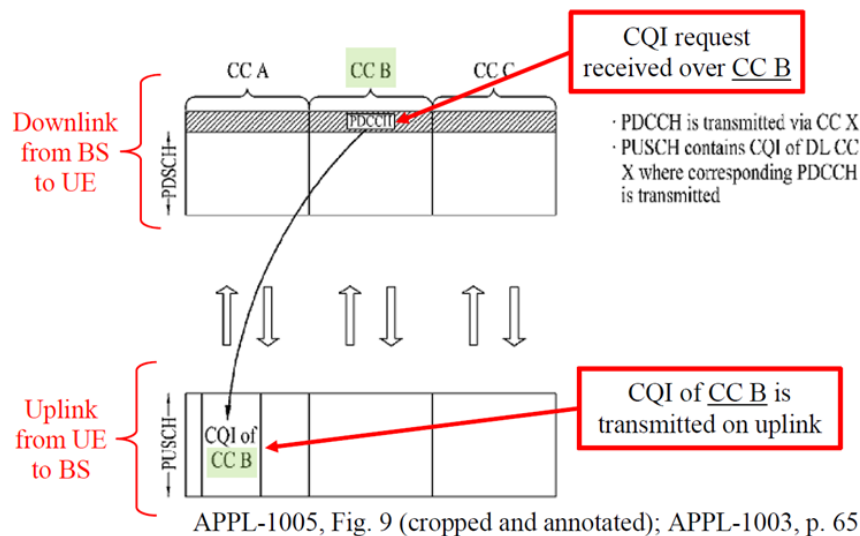
because “Seo does not expressly, explicitly disclose this determining step” it is not anticipated by Seo, and “rather than relying on anticipation, I went through obviousness.” *Id.*

Further, Patent Owner’s expert, Dr. Kesan does not express an opinion on the “determining” step. Patent Owner presents no other argument or evidence to rebut Petitioner’s showing. *See also* Tr. 42:17–43:7 (regarding the “determining” step, “Patent Owner simply submits the argument on the briefs, Your Honors, and we don’t appear – need to address that today.”). We agree with Petitioner’s factual assertions and determine that Petitioner has established that Seo teaches the “determining” step, limitation 28.2.

Limitation 28.3 recites “establishing channel information with respect to the selected downlink component carrier.” Seo teaches that after the UE receives a CQI request for CQI reporting on one of a plurality of downlink transmission bands, the UE “generat[es] CQI information for the downlink transmission band.” Ex. 1005, 6:38–46. Seo teaches that “generating CQI information” includes “measur[ing] a downlink channel quality.” *Id.* at 4:55–58, 6:38–46. Petitioner argues “Seo’s teaching of ‘measure[ing]’ a downlink channel quality parallels the explanation in the ’472 Patent about what it means to ‘establish’ channel information.” Pet 30. The ’472 patent discloses using a processor to determine the component carrier to be monitored and detect the channel quality of the component carriers. *Id.* at 30–31 (citing Ex. 1001, 3:54–60). Petitioner concludes the limitation is met because Seo “generates CQI information for the downlink component carrier that carried the request.” *Id.* at 31 (citing Ex. 1003, 61–63 (claim chart)).

We agree with Petitioner’s factual assertions and determine that Petitioner has established that Seo teaches limitation 28.3.

Limitation 28.4 recites “sending the channel information with respect to the selected downlink component carrier.” Petitioner refers to its showing on limitation 28.3 that Seo teaches the UE establishing CQI information for the selected component carrier. *Id.* Petitioner’s argument includes another annotation of Figure 9 of Seo at page 32 of the Petition, which is reproduced below.



The annotation of Figure 9 of Seo at page 32 of the Petition illustrates a “Downlink from BS to UE” and “Uplink from UE to BS”¹⁵ with CC B highlighted in green. Petitioner argues “after the UE generates CQI for CC B (the CC that carried the CQI request), the ‘UE transmits a CQI for a downlink CC, CC B . . . in an uplink CC.’” *Id.* (emphasis omitted) (citing Ex. 1005, 15:14–23). Petitioner concludes that “transmitting CQI

¹⁵ PDSCH, Physical Downlink Shared CHannel. *See* Ex. 1005, 14:13–14. PUSCH, Physical Uplink Shared CHannel. *Id.* at 14:14–15.

information about the specific downlink component carrier over which the CQI request was received, as taught by Seo, discloses ‘sending the channel information with respect to the selected downlink component carrier.’” *Id.* at 32–33. We agree with Petitioner’s factual assertions and determine that Petitioner has established that Seo teaches limitation 28.4.

For these reasons, and in light of Petitioner’s obviousness rationale, Petitioner establishes that Seo teaches or suggests every limitation in claim 28, and explains why one of ordinary skill in the art would have had a reason to modify Seo in a way that results in the invention as recited in claim 28. Based on the entire trial record, we conclude Petitioner has shown by a preponderance of the evidence that claim 28 would have been obvious over Seo.

4. Claim 1

As noted above, claim 1 is an apparatus claim and is of similar scope to claim 28. The preamble, limitation 1.0, recites “[a]n apparatus comprising.” Ex. 1001, 13:2. Petitioner relies on the preceding and the apparatus shown in Figure 13 of Seo. Pet. 39–40 (citing Ex. 1005, 15:63–67, Fig. 13; Ex. 1003, 24–25).

Limitation 1.1 recites “a receiver.” Petitioner argues a “receiver” is shown in Figure 13, specifically

Seo teaches that its “apparatus” illustrated in Fig. 13 “includes a processor unit 131, a memory unit 132, **a Radio Frequency (RF) unit 133**, a display unit 134, and a User Interface (UI) unit 135. . . . ***The RF unit 133 is electrically connected to the processor unit 131, for transmitting and receiving RF signals.***”

Id. at 40–41 (citing Ex. 1005, 17:1–15). Petitioner also cites to Seo’s disclosure that the UE includes “a receiver for receiving from a BS control

information.” *Id.* at 41 (emphasis omitted) (citing Ex. 1005, 6:39–42). We agree with Petitioner’s factual assertions and determine that Petitioner has established that Seo teaches limitation 1.1.

Limitation 1.1.1 recites the receiver is configured to “receive a request for providing aperiodic channel information with respect to a selected downlink component carrier of a plurality of component carriers.” Petitioner relies on its arguments in connection with limitation 28.1 and Figure 13 as an apparatus for implementing the methods of the invention. *Id.* at 41–42. We agree with Petitioner’s factual assertions and determine that Petitioner has established that Seo teaches limitation 1.1.1.

Limitation 1.2 recites “a processor.” Petitioner again references Figure 13, which shows processor unit 131, among other components. *Id.* at 42 (citing Ex. 1005, 17:1–3, 6:44–45). We agree with Petitioner’s factual assertions and determine that Petitioner has established that Seo teaches limitation 1.2.

Limitation 1.2.1 recites that the processor is configured to “determine the selected downlink component carrier based on which component carrier of the plurality of component carriers carried the request for providing the aperiodic channel information.” Petitioner contends this limitation is substantially similar to limitation 28.2. *Id.* at 43. Petitioner adds that Seo teaches that its apparatus in Figure 13 may be “a UE, for implementing the methods according to the exemplary embodiments of the present invention.” *Id.* (emphasis omitted) (citing Ex. 1005, 16:63–67, 17:1–15; Ex. 1003, 32–38). We agree with Petitioner’s factual assertions and determine that Petitioner has established that Seo teaches limitation 1.2.1.

The next “processor” limitation is 1.2.2, which recites that the processor is configured to “establish channel information with respect to the selected downlink component carrier.” Petitioner contends this limitation is substantially similar to limitation 28.3. *Id.* at 44–45. Petitioner adds that Seo teaches that its apparatus in Figure 13 may be “a UE, for implementing the methods according to the exemplary embodiments of the present invention.” *Id.* (emphasis omitted) (citing Ex. 1005, 16:63–67; Ex. 1003, 39–40). We agree with Petitioner’s factual assertions and determine that Petitioner has established that Seo teaches limitation 1.2.2.

Patent Owner argues “[f]or the same reason Dr. Haas’ admission that Seo . . . does not disclose the ‘determining’ element defeats Petitioner’s challenge to claim 28, it also defeats Petitioner’s challenge with respect to claim 1.” PO Resp. 27. We are not persuaded by this argument for reasons already stated above with respect to limitation 28.2.

Limitation 1.3 recites “a sender.” Petitioner again cites to Seo, Figure 13 which shows, among other things, “a Radio Frequency (RF) unit 133 . . . electrically connected to the processor unit 131, for transmitting and receiving RF signals.” *Id.* at 45 (emphasis omitted) (citing Ex. 1005, 17:1–15). Seo also teaches the UE includes “a transmitter electrically connected to the processor, for transmitting the CQI information on an uplink shared channel.” *Id.* (emphasis omitted) (citing Ex. 1005, 6:39–49; Ex. 1003, 40–41). We agree with Petitioner’s factual assertions and determine that Petitioner has established that Seo teaches limitation 1.3.

The sender recited in limitation 1.3 is configured in limitation 1.3.1 to “send the channel information with respect to the selected downlink component carrier.” Petitioner contends this limitation is substantially

similar to limitation 28.4. Pet. 46. Petitioner again cites to Figure 13 and Seo's description that the apparatus may be "a UE, for implementing the methods according to the exemplary embodiments of the present invention." *Id.* (emphasis omitted) (citing Ex. 1005, 16:63–67; Ex. 1003, 41–43). We agree with Petitioner's factual assertions and determine that Petitioner has established that Seo teaches limitation 1.3.1.

Patent Owner does not argue separately the patentability of claim 1. Based on Petitioner's showing for claim 1, and for the same reasons discussed above with respect to claim 28, we determine that the methods shown in Seo as implemented by the apparatus shown in Figure 13 of Seo establish sufficiently that those limitations of claim 1 are taught or suggested by Seo. Based on the entire trial record, we conclude Petitioner has shown by a preponderance of the evidence that claim 1 would have been obvious over Seo.

5. Dependent Claims 14 and 41

Claim 14 depends from claim 1, and claim 41 depends from claim 28. Both claims recite "wherein the request for providing the aperiodic channel information is included in an uplink grant." We have reviewed Petitioner's argument and evidence regarding claims 14 and 41. Pet. 38–39, 49; Ex. 1003, 51–52, 73–74. Patent Owner does not argue separately the patentability of claims 14 and 41.

Petitioner's evidence with respect to claim 41 is that Seo teaches "**a CQI request used for non-periodic CQI reporting, included in an uplink grant.**" Pet. 39 (quoting Ex. 1005, 14:22–27). We agree with Petitioner that Seo's teaching of "non-periodic" is the same as the claimed "aperiodic." *Id.* Having considered this evidence in conjunction with Petitioner's showing

and Patent Owner's arguments for the independent claims, we determine Petitioner has shown by a preponderance of the evidence that claims 14 and 41 would have been obvious over Seo.

6. *Dependent Claims 10, 11, 37, 38*

Claim 10 depends from claim 1, and claim 37 depends from claim 28. Both claims recite two limitations (10.1, 10.2, 37.1, and 37.2 in Petitioner's format), which are substantially the same, differing in the fact that claim 10 is an apparatus claim and claim 37 is a method claim. The limitations for method claim 37 are illustrative and are set out below:

[37.1] providing channel information for at least one of the other component carriers of the plurality of component carriers other than the selected component carrier of the plurality of component carriers; and

[37.2] sending the channel information for the at least one of the other component carriers.

We have reviewed Petitioner's argument and evidence as to both claims 10 and 37. Pet. 33–37, 46–48; Ex. 1003, 43–49, 65–71.

Patent Owner's specific arguments are made with respect to claim 37. PO Resp. 27–30. Patent Owner contends that “providing channel information for at least one of the other component carriers of the plurality of component carriers other than the selected component carrier of the plurality of component carriers” means “*excluding the selected component carrier.*” *Id.* at 28 (citing Ex. 2002 ¶¶ 53–54). This argument is based on Patent Owner's proposed construction of the “other than” limitation we rejected in Section II.B.3.

Patent Owner argues that Petitioner agrees that Seo “reports on all component carriers, which necessarily includes the ‘selected component

carrier.’” PO Resp. 28 (citing Pet. 33–34; Ex. 1005, 16:25–62; Ex. 2002 ¶¶ 49–54; Ex. 2004, 91:6–13, 90:15–17). Patent Owner makes additional arguments in the same vein, i.e., Seo obtains channel information for *all* component carriers, including and not excluding the “selected downlink component carrier” recited in independent claim 28. *Id.* at 29–30 (citing Ex. 2002 ¶¶ 48–50, 54–55; Ex. 1005, 15:8–28, 16:25–62). Thus, Patent Owner concludes “Seo . . . does not disclose, teach or suggest a UE that would provide a channel information for a selected downlink component carrier and a channel information for one or more other component carriers, excluding the selected component carrier as required by claim 37.” *Id.* at 30 (citing Ex. 2002 ¶ 55). Patent Owner makes these same arguments for claim 10. *Id.* at 31 (citing Ex. 2002 ¶¶ 45, 51–54).

As we determined in Section II.B.3 above, the plain and ordinary meaning of the claim language does not preclude inclusion of channel information for the selected component carrier; rather, it requires channel information about *another* component carrier, but does not limit the claim to providing only that information. Petitioner has shown sufficiently that another component carrier’s channel information is provided and that claims 10 and 37 would have been obvious over Seo. Specifically, Petitioner cites Embodiment 5 of Seo as providing channel information for *all* component carriers. Pet. 33 (claim 37) (citing Ex. 1005, 16:25–62), *see id.* at 47 (claim 10 (citing Ex. 1003, 43–48 (citing Ex. 1005, 16:25–49, Fig. 12))).

Claims 11 and 38 depend from claims 10 and 37, respectively. Method claim 37 recites “wherein the channel information for the at least

one of the other component carriers is a wide band channel information.”

Claim 11 is identical other than its dependency from claim 10.

Seo teaches that “[a] UE generates a wideband CQI for a total system frequency band or a frequency band set by the higher layer based on the selected precoding matrix. The UE transmits the wideband CQI and PMIs for the respective subbands.” Ex. 1005, 11:48–52, *see also id.* Table 2 (“Wideband (wideband CQI)”). Petitioner refers to its argument and evidence regarding claim 37 and asserts that “Seo teaches sending channel information (CQI) about not only the component carrier that carried the request but also every component carrier.” Pet. 37. Petitioner also relies on the above teachings from Seo to show the recited “wide band channel information.” *Id.* at 37–38.

Patent Owner argues claim 38 is patentable for the same reasons claim 37 should be patentable. PO Resp. 30 (citing Ex. 2002 ¶ 56). With respect to claim 11, Patent Owner argues only that Petitioner made no argument specific to claim 11 other than that it is “identical to” claim 38’s limitations. *Id.* at 31–32. Other than different dependency relationships, claims 11 and 38 are identical. Patent Owner makes no separate arguments with respect to claims 10 and 37.

Based on its showing for claims 10, 11, 37, and 38, and for the same reasons discussed above with respect to the independent claims, we determine that Petitioner has sufficiently shown that Seo teaches or suggests the limitations of claims 10, 11, 37, and 38. Having considered the entire trial record, we conclude Petitioner has shown by a preponderance of the evidence that claims 10, 11, 37, and 38 would have been obvious over Seo.

III. ORDER

Accordingly, it is

ORDERED claims 1, 10, 11, 14, 28, 37, 38, and 41 of the '472 patent are held unpatentable;

FURTHER ORDERED that, HTC et al. are authorized to take the active role with respect to this proceeding; and

FURTHER ORDERED that because this is a final written decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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Patent 8,867,472 B2

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