

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. AND
SAMSUNG ELECTRONICS AMERICA, INC.,

Petitioners,

v.

APEX BEAM TECHNOLOGIES LLC,

Patent Owner.

Patent No. 10,462,767
Filing Date: April 18, 2018
Issue Date: October 29, 2019

Inventor: Xiaobo Zhang
Title: METHOD AND DEVICE IN UE AND BASE STATION
USED FOR PAGING

PATENT OWNER'S SUR-REPLY

Case No. IPR2023-00598

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EXHIBIT LIST

Exhibit No.	Description of Document
2001	Samsung's Invalidity Contentions for U.S. Patent No. 10,462,767, <i>Apex Beam Techs. LLC v. Samsung Elecs. Co., Ltd., et al.</i> , Case No. 2:22-cv-00188-JRG, served March 2, 2023
2002	Docket Control Order, Dkt. 37, <i>Apex Beam Technologies LLC v. Samsung Electronics Co., Ltd., et al.</i> , Case No. 2:22-cv-00188-JRG (E.D. Tex. Feb. 6, 2023)
2003	Order, Dkt. 55, <i>Apex Beam Techs. LLC v. ZTE Corp.</i> , Case No. 2:22-cv-00031-JRG (E.D. Tex. June 14, 2023)
2004	Declaration of Miguel Gomez ("Gomez Decl."), dated December 7, 2023 and Exhibit A, Curriculum Vitae of Miguel Gomez
2005	Deposition of Harry Bims, taken in <i>Samsung Elecs. Co., v. Apex Beam Techs. LLC</i> , IPR2023-00598 on November 21, 2023 ("Bims Depo.")
2006	Defendants' Patent Local Rule 4-2 Disclosure of Preliminary Claim Constructions and Extrinsic Evidence, <i>Apex Beam Techs. LLC v. Samsung Elecs. Co.</i> , Case No. 2:22-cv-00188-JRG (E.D. Tex. Sept. 1, 2023)

I. INTRODUCTION

Petitioner's Reply (Paper No. 15, "Reply") confirms patentability for at least three reasons. First, Petitioner fails to construe "time intervals" properly as "variable" in view of the claim language and embodiments of the specification. For example, Petitioner intentionally ignore the claim limitation that "at least one of {location of the first subband in frequency domain, subcarrier spacing of subcarriers included in the first subband} is used for *determining the X time intervals*," which shows that the time intervals are "determin[ed]," (*i.e.*, are variables that need to be determined rather than fixed quantities, which do not need to be determined) (emphasis added). By ignoring this claim language, Petitioner enables itself to argue (1) that any monitoring of a first signaling, which takes place over time, renders obvious the claimed X time intervals; and (2) that any automatic or fixed (*i.e.*, not determined) quantity of time, such as subframes or slots, can render obvious the claimed X time intervals. Similarly, Patent Owner's arguments relying on this proper construction of "time intervals" prove that the Challenged Claims of the '767 Patent are not unpatentable because neither Liu nor You disclose monitoring a first signaling over variable ranges of time that are determined by the User Equipment (UE), as required by Claim 1.

Second, Petitioner side steps Patent Owner's arguments against a proper motivation to combine because Petitioner ignores that any reference to the 5G/NR

standard already included or “combined” relevant and compatible portions of the 4G/LTE standard. As the proposed claim construction for “time intervals” demonstrates, one of the features that distinguished 5G from 4G was the use of different scheduling units. Therefore, a person of ordinary skill in the art (“POSITA”) would not have been motivated to combine a 4G reference with such a clearly distinguished feature with a 5G reference.

Third, Petitioner cannot exclude the testimony of Patent Owner’s expert, Mr. Miguel Gomez, by simply questioning his ability to testify on the patentability issues presented in this proceeding. Mr. Gomez is qualified to offer testimony on issues from the perspective of an ordinarily skilled artisan and has presented opinions based on specialized knowledge, training, and experience. In relevant part, Mr. Gomez graduated with a Bachelor of Science Degree from Yale University in Electrical Engineering and has over thirty five years in the design and development of hardware and software technology used in telecommunications, data communications, wireless transmission and related protocols. Recognizing his vast experience, Mr. Gomez has been retained as an expert, including in several cases involving the investigation of VHDL, Verilog, C, and C++ source code that implemented OFDM (i.e., the symbol methodology described in the ’767 Patent). During his deposition, Mr. Gomez properly addressed all questions and demonstrated his qualifications to testify from the perspective of an ordinary skilled

artisan. *See generally* Ex. 1041. Petitioner’s attempt to call into question Mr. Gomez’s qualifications, while foregoing the opportunity to secure contradictory reply expert testimony, demonstrates the weakness of the Petition’s (“Pet.”) grounds for unpatentability. Patent Owner recognizes the Board’s broad discretion to assign weight to expert testimony and submits that Mr. Gomez’s expert testimony should be accorded substantial weight.

Accordingly, the Board should issue a Final Written Decision finding all the Challenged Claims of the ’767 Patent not unpatentable.

II. PETITIONER’S FAILURE TO PROPERLY CONSTRUE “TIME INTERVALS” IS FATAL TO ITS OBVIOUSNESS ARGUMENTS

The words of the claim must be given their plain meaning unless the plain meaning is inconsistent with the specification. *In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989); *Chef Am., Inc. v. Lamb-Weston, Inc.*, 358 F.3d 1371, 1372 (Fed. Cir. 2004). As Patent Owner’s Response (Paper No. 13, “POR,” at 9-12) explained, and for the following reasons, the plain meaning alone of “time intervals” as merely “ranges of time” is inconsistent with the patent specification and the claim language because Petitioner’s apparent “plain and ordinary” construction renders the term “time intervals” meaningless and reads out claim requirements.

A. Petitioner’s Construction of “Time Intervals” Renders the Term Meaningless

Petitioner’s proposal to construe the claim term “time intervals” as plain and ordinary meaning is deficient because Petitioner’s understanding of the plain meaning of “time intervals” as “ranges of time” reads out claim requirements and renders the term meaningless.

For example, Claim 1 recites “monitoring a first signaling in X time intervals.” ’767 Patent, Claim 1. If “time intervals” meant any arbitrary ranges of time, as Petitioner argues (Reply at 2), then simply disclosing the monitoring of a first signaling would meet the claim limitation since any activity (*e.g.*, monitoring) takes place during some “time” and time can be split into ranges of time (*i.e.*, seconds, minutes, etc.). Since Petitioner’s apparent construction of the claimed “time intervals” renders the term meaningless, it should therefore be rejected. *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 801, 810 (Fed. Cir. 2021) (citing *Wasica Fin. GmbH v. Cont’l Auto. Sys., Inc.*, 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.”) (emphasis added).

B. Patent Owner’s Correct Construction Stems from Lexicography

Both embodiments from the ’767 Patent specification and the explicit claim language indicate that the recited “time intervals” should be construed as “**variable**

ranges of time.”¹ Petitioner’s numerous cites to embodiments (including embodiments also cited by Patent Owner) indicate variously that the recited time intervals can either include intervals of equal length or different length, can be made up of various amounts of OFDM symbols, or can be the same length as slot lengths. *See generally* Reply at 3-6. However, such embodiments neither disprove that the claimed “time intervals” are variable just because it is possible to have equal time intervals nor show that the “‘variable’ in Apex’s construction is optional.” *Id.* at 3-8.

Petitioner ignores these embodiments *in the context of the claim language*. For example, Claim 1 recites that “at least one of {location of the first subband in frequency domain, subcarrier spacing of subcarriers included in the first subband} is ***used for determining*** the X time intervals.” ’767 Patent, Claim 1 (emphasis added); *see also id.*, 2:29-32, 3:43-46, 4:5-7, 4:36-38, 4:53-55, 6:59-62, 7:4-6, 7:46-49, 8:32-35, 8:44-46, 10:10-12, 14:55-58, 15:6-9, 15:26-29, 15:46-49, 16:41-44, 16:61-63, 18:63-64, 21:11-14, 21:22-24, 22:5-8, 22:17-19. Put another way, the UE uses numerologies such as the “location of the first subband in the frequency

¹ Despite arguing that “Apex identifies nothing warranting” a “depart[ure] from [the plain and ordinary] meaning,” Petitioner later admits that “Apex appears to assert lexicography.” Reply at 2.

domain” and/or “subcarrier spacing of subcarriers included in the first subband” **to determine** X time intervals because those intervals are not fixed quantities (i.e., are variables). If the time intervals were fixed quantities, they would not need to be determined. This is what Patent Owner’s expert explains when he says that “variable . . . means that it [could] change[] over time.” Ex. 1041, 69:19-24. The ranges of time can change because they are determined by the UE based on at least one of the factors mentioned in the claim. They are not a given and are not fixed quantities. Petitioner’s misguided argument that the word “variable” is not used in the specification completely ignores that the background of the specification expressly explains the distinction that the claimed invention makes over the prior art’s **fixed** time lengths:

The **radio frame in LTE has a fixed time length** of 10 milliseconds, and **the subframe has a fixed time length of 1 millisecond**. Since an LTE network generally employs a single numerology or the numerology basically does not change in a long time in the network, the definition of the possible time of paging using the PF and PO **having a fixed time length can simplify the design of system**, under the premise of guaranteeing the paging capacity and not increasing the power consumption of UE. Under the 5G NR, a network supports different numerologies, thus, a **given time length**, for example, 1 millisecond, probably includes multiple basic scheduling units (for example, slot). If the legacy design of the current paging opportunity is employed, **the UE would detect the paging message different times for different numerologies within the 1 millisecond**. Therefore, power consumption in some numerology would be greatly increased. Meanwhile, the

paging capacity varies greatly due to the adoption of different numerologies.

In order to solve the above design problem of paging when multiple numerologies are employed in the 5G NR, the present disclosure provides a solution.

'767 Patent, 1:50-2:3 (emphasis added). This is consistent with the remainder of the above-identified portions of the specification distinguishing prior art fixed time lengths from claimed invention's variable ranges of time. Therefore, in view of the apparent distinction between the fixed ranges of time in prior art systems and the claimed invention, it follows that the recited "time intervals" are "variable ranges of time."

C. Petitioner's New Arguments Based on Patent Owner's Proposed Construction Should Be Ignored and Are Incorrect

Petitioner blatantly circumvents the Board's Trial Practice Guide that states that a reply "may only respond to arguments raised in the preceding brief," which means that it does not "proceed in a new direction with a new approach as compared to the positions taken in a prior filing" "in the context of 37 C.F.R. § 42.23(b)." Patent Trial and Appeal Board Consolidated Trial Practice Guide ("Trial Practice Guide") (Nov. 2019), at 74, available at <https://www.uspto.gov/sites/default/files/documents/tpgnov.pdf>. However, that is exactly what Petitioner does in its Reply. Reply at 8 ("Even Under a Restrictive

Version of ‘Variable,’ the Combinations Satisfy Apex’s Construction.”). Instead of merely arguing against Patent Owner’s proposed claim construction, Petitioner improperly applies Patent Owner’s proposed construction to formulate a new approach and rationale for obviousness. *Id.* at 8-14; Trial Practice Guide, at 74 (“While replies and sur-replies can help crystalize issues for decision, a reply or sur-reply that raises a new issue or belatedly presents evidence may not be considered.”).

Since Petitioner relies upon the combination of Liu and You with respect to Ground 1 of its Petition, mapping Liu to Patent Owner’s proposed construction of “time intervals” rises to the level of a “newly raised rationale to combine the prior art references that was not expressed in the petition” that is barred by the Board. *See id.* (citing *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369–70 (Fed. Cir. 2016)). As a result, Petitioner’s new argument applying Patent Owner’s claim construction should not be considered by the Board.

Further, Petitioner’s mapping to Liu is incorrect and inconsistent with the specification of Liu, as described below. *See infra* Section IV.A.

D. Petitioner Admits that its Expert Erred Under Oath and that its District Court Claim Construction Is Incorrect

While it now appears from Petitioner’s Reply that X can be “one and more than one” (Reply at 14-15), Patent Owner notes again that this was not clear from Petitioner’s expert testimony and Petitioner’s claim construction position in the

related District Court Litigation. Specifically, Mr. Bims testified under oath that “in the context of Claim 1, the number one is not a positive integer.” Ex. 2005, 28:2-5, 29:5-10, 34:19-24. Additionally, in the related District Court Litigation, Petitioner construed “X time intervals . . . wherein X is a positive integer” as “plural, positive integer number of time intervals.” *See* Ex. 2006, at 3.

Petitioner’s statement that “whether ‘X’ can be one is irrelevant to the outcome” is only true given the apparent (although not explicit) admission in Petitioner’s Reply which clarifies that Mr. Bims made an error under oath and that Petitioner’s position in the related District Court Litigation is incorrect. Otherwise, it is highly relevant in view of Claim 1’s limitation that “the frequency domain resource used for transmitting the first signaling belongs to a first subband.” For example, Claim 1 recites that a user equipment (UE) performs “monitoring a first signaling in X time intervals.” Coupled with the limitation that a “frequency domain resource is used for transmitting the first signaling,” the time domain resource of the X time intervals corresponds to the frequency domain resource that belongs to a first subband. Petitioner explicitly maps time intervals to subframes in its Petition. Pet. at 37 (tagging “X time intervals,” “multiple subframes,” “one or more downlink subframes,” and “one subframe” in bright green). If in fact, You’s subframes are the claimed time intervals (they are not), then the X time intervals or X subframes need to correspond to a first subband. Further, if X needs to be greater than one, as

Petitioner's expert testifies, and as Petitioner's District Court Litigation construction states, then Petitioner's combination should disclose multiple subframes that correspond to a first subband.

Petitioner's argument for the irrelevance of this matter is undercut by the fact that its Reply dedicates an entire section to describing how "Samsung's proposed combination does *not* require the 'subband' to exist in more than one subframe." Reply at 21-23.

Therefore, in view of Petitioner's admission, the Board should reject any testimony from Petitioner or Petitioner's expert that requires X to be more than one.

III. THERE IS NO MOTIVATION TO COMBINE THE 4G / LTE SYSTEMS OF YOU OR MALLICK WITH THE 5G / NR SYSTEM OF LIU

Petitioner fails to present any evidence that would prove that a POSITA at the time of the claimed invention of the '767 Patent would have combined the teachings of a 5G/NR reference (whether complete or in development) with the incompatible teachings of a 4G/LTE reference. Petitioner's attempts to obfuscate its failure should be rejected. Specifically, whether Petitioner "propose[d] bodily incorporation of *Liu's* 5G/NR system into *You/Mallick's* 4G/LTE systems (or vice versa)" (Reply at 16), whether 5G is a progression of 4G (*id.* at 17), or whether 4G and 5G have many

similarities (*id.*) are all red herrings.² Notably, Petitioner does not dispute that the '767 Patent and Liu are directed toward 5G/NR systems, You and Mallick are directed toward 4G/LTE systems, and that 4G and 5G systems utilize different scheduling units. Reply at 15-21 (“Samsung’s petition demonstrated a motivation to apply *Liu*’s 5G/NR solutions to upgrade *You/Mallick*’s 4G/LTE system to 5G/NR”; “*Liu*’s solution enables *You*’s UE to perform monitoring under 5G/NR’s flexible scheduling unit size”).

² In another effort to obfuscate Petitioner’s failure to prove a motivation to combine a 4G reference with a 5G reference, Petitioner introduced Exhibit 1039 in the deposition of Mr. Gomez. To the extent this exhibit does not reflect Patent Owner’s arguments or Mr. Gomez’s testimony, Patent Owner objects to this exhibit as misleading, confusing, irrelevant, incomplete, and prejudicial. It is evident from Dr. Bims’ testimony, which is properly cited (POR at 17) that Dr. Bims stated that “a search space that is only a portion of a subframe, which is not something expressly disclosed in *You* but is possible if *You* were to be combined with other art such as *Liu*.” The insertion of “[improperly]” in both Patent Owner’s Response (POR at 17) and Mr. Gomez’s declaration (Ex. 2004, ¶ 43) indicates that a POSITA would rely upon the combination of *You* and *Liu* to disclose a search space that is only a portion of a subframe is an improper conclusion by Dr. Bims.

The proper inquiry is whether there is a motivation to combine where developers of 5G at the time of the invention had the ability to incorporate certain elements of 4G/LTE standard in the 5G/NR standard and made the decision not to do so because incorporating such elements from the 4G/LTE prior art (You and Mallick) to achieve Petitioner's proposed combination would change the principle of operation of the 5G/NR prior art (Liu). *In re Ratti*, 270 F.2d 810, 813 (C.C.P.A. 1959) (reversing a rejection of obviousness where the seal construction taught in the primary reference required rigidity for operation, whereas the seal in the claimed invention required resiliency such that the "suggested combination of references would require a . . . change in the basic principles under which the [primary reference] construction was designed to operate."); POR at 14-17 ("those differences were already considered by standard setting organizations, such as 3GPP, at the time of transitioning to 5G"). Ex. 1041, 36:5-37:4 ("I wouldn't say that [5G] was a natural progression [from 4G]. 5G has a number of additional inventive concepts that weren't part of LTE, and so ***there are a number of new objectives in 5G that weren't part of LTE***. So in terms of a natural progression, I think there's backwards compatibility that's built in, but not necessarily a natural progression forward. These are new -- new ideas."; "5G . . . includes not just the capabilities that LTE had, but also ***additional objectives like ultra reliable low latency communication as well as millimeter bandwidth communication. Those things weren't found in LTE, so***

those were new things that 5G incorporates.") (emphasis added), 37:18-38:18 ("Q. Does 5G include the concept of a paging frame? A. Some of those things in terms of the communication are similar, but *because of the additional new goals for the different communication band wavelengths, they had to be modified. They had to be adopted and changed*, and those were some of the new inventive qualities that I was referring to. Q. Did the 5G technical specifications use the term 'paging frame'? A. Yes, it does, but again, there's all sorts of *new things that had to be accommodated in order to make that work in 5G.*") (emphasis added).

The patent specification of the '767 Patent describes that 4G/LTE and 5G/NR, even during development, had different principles of operation. Specifically, 4G/LTE radio frames had fixed time lengths in order to "simplify the design of [the] system" and "not increasing the power consumption of UE" while the operating principle of 5G/NR was supporting a diversity of numerologies, which means the "power consumption in some numerology would be greatly increased":

The radio frame in LTE has a fixed time length of 10 milliseconds, and the subframe has a fixed time length of 1 millisecond. Since an LTE network generally employs a single numerology or the numerology basically does not change in a long time in the network, the definition of the possible time of paging using the PF and PO having a fixed time length can *simplify the design of system, under the premise of guaranteeing the paging capacity and not increasing the power consumption of UE. Under the 5G NR, a network supports different numerologies*, thus, a given time length, for example, 1 millisecond, probably

includes multiple basic scheduling units (for example, slot). If the legacy design of the current paging opportunity is employed, the UE would detect the paging message different times for different numerologies within the 1 millisecond. Therefore, ***power consumption in some numerology would be greatly increased. Meanwhile, the paging capacity varies greatly due to the adoption of different numerologies.***

'767 Patent, 1:50-67 (emphasis added).

Petitioner's Reply actually admits that "the only difference that Apex identified between 4G/LTE and 5G/NR is the very thing that Samsung's combination modifies based on *Liu*." Reply at 16. But that is the point. Despite the development of 5G/NR occurring with foreknowledge of the 4G/LTE, there was an active effort to make ***that difference*** at the time of the claimed invention. Petitioner then asks this Board to apply impermissible hindsight in making the very combination of disparate scheduling units (Ex. 2004, ¶ 39) that the developers of 5G/NR rejected in reaching the "knowledge gleaned only from applicant's disclosure." *In re McLaughlin*, 443 F.2d 1392, 1395 (C.C.P.A. 1971) ("Any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill [in the art] at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, such a reconstruction is proper.").

Petitioner’s argument that Patent Owner is “assess[ing] obviousness at the wrong time” also fails because it is not Patent Owner’s burden to show that, at the time of the invention while 5G was still under development, a POSITA would have been motivated to combine references with two different scheduling units. Reply at 19; 35 U.S.C. § 316(e) (In an Inter Partes Review (IPR), the burden of proof and persuasion lies with the petitioner to demonstrate “unpatentability by a preponderance of the evidence”); *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378-79 (Fed. Cir. 2015) (“[T]hat burden [of proof to demonstrate unpatentability] never shifts to the patentee.”); *Endo Pharms., Inc. v. Actavis LLC*, 922 F.3d 1365, 1373 (Fed. Cir. 2019) (“An obviousness determination requires finding that a POSITA [Person Of Ordinary Skill In The Art] would have been motivated to combine or modify the teachings in the prior art and would have had a reasonable expectation of success in doing so.”).

Patent Owner has pointed to evidence and expert testimony that it likely is not true that such a motivation to combine or modify the teachings in the prior art existed during the development of 5G/NR standard, but Petitioner has failed to address the timing of the development of the 5G/NR standard in relation to the 4G/LTE teaching of fixed scheduling units at all for its motivation to combine and only now raises this issue to meet its burden for the first time in its Reply. Reply at 19-21. Additionally, Petitioner’s attempts to meet its requisite burden relies on unsupported attorney

argument, which should be rejected. *Enzo Biochem v. Gen-Probe, Inc.*, 424 F.3d 1276, 1284, (Fed. Circ. 2005) (“Attorney argument is no substitute for evidence.”); *Wasica Fin. GmbH v. Cont'l Auto. Sys.*, 853 F.3d 1272, 1284-85 (Fed. Cir. 2017) (holding that “a party’s ‘unsworn attorney argument . . . is not evidence’ and thus cannot rebut record evidence.”).

IV. PETITIONER HAS NOT PROVED INVALIDITY OF THE CHALLENGED CLAIMS BY A PREPONDERANCE OF THE EVIDENCE

A. The Combination of You and Liu Does Not Render Obvious “*monitoring a first signaling in X time intervals*” and “*at least one of {location of the first subband in frequency domain, subcarrier spacing of subcarriers included in the first subband}* is used for determining the X time intervals,” as Required by Claim 1

Claim 1 recites the limitations of “monitoring a first signaling in X time intervals” and “at least one of {location of the first subband in frequency domain, subcarrier spacing of subcarriers included in the first subband} is used for determining the X time intervals.”

As noted above, Petitioner’s Reply presents a new argument that “even under a restrictive version of ‘variable,’ the combinations satisfy Apex’s construction,” which should be rejected as not complying with the Trial Practice Guide. *See* Section II.C.

However, even if not rejected by the Board, Petitioner’s new argument is also incorrect because Petitioner merely equates “variable” with the fact “that switching

the numerology (i.e., subcarrier spacing) will change the DCI monitoring occasions” (internal quotations omitted). Reply at 9-12. However, this point is not salient because no “determination” is performed as required by Claim 1, and therefore, the time intervals are not variables (*i.e.*, are not variable ranges of time). As Petitioner admits, there is a fixed range of time associated with each numerology. For example, Petitioner cites to *Liu*’s Figure 2, reproduced below, to “depict[] how the slot length and corresponding DCI monitoring occasions (the shaded portions) vary depending on the subcarrier spacing”:

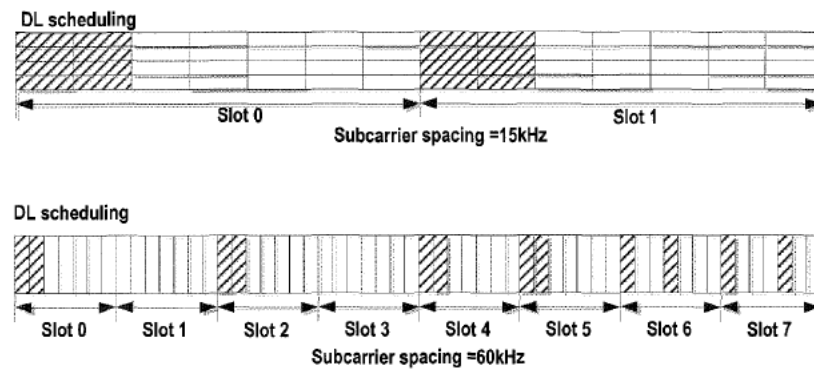


Fig. 2

Reply at 12-13 (citing Ex. 1006, FIG. 2). In other words, the slot length and corresponding DCI monitoring occasions of *Liu* are directly proportional (*i.e.*, fixed) to the subcarrier spacing, such that the claimed “determining” is not necessary in contravention of Claim 1.

Additionally, Petitioner’s new arguments ignore that Claim 1 requires that *the user equipment (UE)* determines the time intervals, as Patent Owner’s expert points

out:

I agree that that's [Liu is] transmitting DCI configuration parameter to the terminal. It contains information about where these DL scheduling should be located. I guess what I was looking for -- and haven't really seen it here -- is that this information is determined by the node -- the node B, whereas that's different than what's in the '767 patent where the subcarrier spacings are determined by the -- or the X time intervals are determined by reference to the subcarrier spacings in the UE. It's -- a fundamental difference between the Liu patent and the '767 patent is that in the Liu patent, the node B is making the determination about where all the scheduling is occurring. But in the '767 patent, the claim clearly says that, "In at least one location of first sub band in frequency domain, subcarrier spacing or subcarriers included in the first sub band is used for determining the X time intervals, and that's in a method of a UE, user equipment, for paging."

Ex. 1041, 77:14-78:14.

The way I read Liu is that the node transmits the information about what to do, and the UE just simply accepts that and enacts that. So it's -- the UE just simply takes instructions from the node B, whereas the key fundamental difference is in that '767 patent it is the UE that's making the determination, and that's the terminology used here in the claim. It's -- subcarrier's location on first sub band -- I'll start over. "Location of the first sub band in frequency domain, subcarrier spacing or subcarriers included in the first sub band is used for determining the X time intervals." So the determination is made in the UE. That's different than what Liu teaches, which is that it's -- that a determination is made in the node B. That's the way I read Liu.

Id. at 79:4-24.

I see that the DCI configuration parameters are transmitted [in Liu], and there's nothing in Liu that teaches that the UE does the determining. It's just that in Liu, the UE accommodates the subcarrier spacing by – by conforming to these DCI configuration parameters. In the '767 patent, the UE determines the X time intervals according to the sub band frequency subcarrier spacing of subcarriers. There's a fundamental difference in that Liu seems to just accommodate them, whereas the '767 actually does the determining according to the subcarrier's spacing.

Id. at 80:10-25.

Liu says that it will send the DCI configuration about how it should be structured so that the UE can accommodate the -- the numerology, but it doesn't say that the UE will determine according to the subcarrier spacings. So that's a fundamental difference that there's additional information in that the '767 patent teaches that would – that will allow the UE to determine, to do the determining. This simply shows that the UE in Liu was accommodating the – their numerology, but it's getting instructions from the node.

Id. at 81:12-25. Petitioner's failure to understand Patent Owner's proposed construction of "time intervals" as "variable ranges of time" is underscored by Petitioner's accompanying failure to interpret the claim language properly, namely, that *the UE determines* X time intervals, which renders the time intervals as determined quantities (i.e., variables).

For these reasons, Claim 1 is not rendered obvious by the combination of You and Liu.

B. The Combination of You and Liu Does Not Render Obvious “receiving a second radio signal wherein the second radio signal is used for determining at least one of {location of the first subband in frequency domain, subcarrier spacing of subcarriers included in the first subband},” as Required by Claim 4

Petitioner mischaracterizes Patent Owner’s argument as not addressing “Samsung’s combination of You and Liu.” Petitioner is clear that the portion of the combination used to disclose the claimed “second radio signal” is from You. Pet. at 51-54. And Patent Owner correctly addressed this disclosure in You and the cites relied upon by Petitioner. POR at 29.

In its Reply, Petitioner only addresses Patent Owner’s argument against motivation to combine and reasonable expectation of success (Reply at 23-24) and ignores Patent Owner’s other argument that “You’s SIB merely ‘includes parameters needed to determine if a specific cell is suitable for cell selection, as well as information about time-domain scheduling of the other SIBs.’” POR at 29 (citing Ex. 1005, [70]-[71]).

For these reasons, Claim 4 is not rendered obvious by the combination of You and Liu.

C. Any Combination of You, Liu, and Mallick Does Not Render Claims 2-20 Obvious

As noted in its Response, Claims 2-5 depend upon Claim 1, and for at least the same reasons as Claim 1, any combination of You, Liu, and Mallick fails to obviate Claims 2-5. POR, at 35-36; Ex. 2004, ¶ 69. Specifically, Claims 2-5 are not

obvious because Petitioner's combinations fail to disclose or suggest the claimed "time intervals" according to the term's proper construction of "variable ranges of time."

As Petitioner notes, Patent Owner's arguments for Claims 6-20 "mirror its arguments for claims 1-5" and, for at least the same reasons as Claims 1-5, any combination of You, Liu, and Mallick fails to obviate Claims 6-20. *Id.*; Reply at 25.

V. MR. GOMEZ IS QUALIFIED TO OFFER EXPERT TESTIMONY FROM THE PERSPECTIVE OF AN ORDINARILY SKILLED ARTISAN

The parties agree on the definition of a POSITA in this proceeding, including that "more than five years of relevant work and/or research experience can compensate for a lesser level of education." Pet. at 22. In addition to a Bachelor of Science Degree from Yale University in Electrical Engineering, Mr. Gomez has over "thirty five years in the design and development of hardware and software technology used in telecommunications, data communications, wireless transmission and related protocols." *See* Ex. 2004, Exhibit A, at 1, 3. Mr. Gomez has considerable experience designing products that utilize the underlining technologies of Spread Spectrum (802.11a,b,g,n), LTE, OFDM, RF Transmission and reception, which are in turn utilized by LTE and by 5G NR. *Id.* at 2. Specifically, the following work experiences listed in Mr. Gomez's CV are highly pertinent to the field of "wireless networking," which Petitioner agrees is the relevant field. Pet. at 22.

Mr. Gomez's work experience began in 1983 at ROLM Corporation where he designed *transmission protocols for business telephone equipment*. Ex. 2004, Exhibit A, at 6. Later, in 1985, Mr. Gomez was a founding member of Stratacom Inc. where he designed long haul voice and *data routing equipment*, and developed compression algorithms for *voice communications*. *Id.* Mr. Gomez's work at Stratacom also included designing methods to include data on the *voice transmission paths that later became known as Frame Relay*. *Id.* In 1990, as a consultant, Mr. Gomez worked on circuit design in "*computing, telephony and data systems*," which include paging devices.³ *Id.* (emphasis added). At ActSolar, from August 2006 to March 2009, Mr. Gomez was Vice President and tasked with implementing both power conversion circuitry, as well as *a radio system*, to convey the health status of the solar array to a web server. *Id.* at 3. Petitioner's allegations that Mr. Gomez is not a POSITA are therefore meritless and should be rejected.

Moreover, Petitioner's arguments attacking Mr. Gomez's qualifications are based on an incorrect heightened standard that "[t]he Board should give no weight to the testimony of Mr. Gomez because he does not qualify as a POSA." Reply at 25. In fact, the Board explicitly states that "[a] person *may not need to be a person*

³ Notably, the '767 Patent, Claim 1 recites "[a] method in a User Equipment (UE) *for paging*" (emphasis added).

of ordinary skill in the art in order to testify as an expert under Rule 702, but rather must be ‘qualified in the pertinent art’” and that there is “no requirement of a perfect match between the expert’s experience and the relevant field.” Trial Practice Guide, 34 (citing *Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1363–64 (Fed. Cir. 2008) and *SEB S.A. v. Montgomery Ward & Co.*, 594 F.3d 1360, 1373 (Fed. Cir. 2010)).

As described above, Mr. Gomez not only provides sufficient qualification in the field of wireless networking but also meets the parties’ agreed upon definition of a POSITA. And Mr. Gomez has previously been recognized as having sufficient qualification in the field of wireless networking. For example, as an expert, Mr. Gomez has been engaged in several cases relating to OFDM. Between September 2012 and August 2013, in the case of *WiLAN Inc. v. HTC Corp.* (2:11-CV-68-JRG), Mr. Gomez supported WiLAN investigating VHDL, Verilog, C, and C++ source code that implemented **OFDM and SC-OFDMA**. Ex. 2004, Ex. A at 13-14 (emphasis added). Between May 2009 and March 2011, Mr. Gomez also investigated OFDM implementations used in 802.11a,b,g,n in the case of *WiLAN v. Acer* (2:07-CV-473). *Id.* at 18-19. In this case, Mr. Gomez also supported WiLAN investigating Verilog, C, and C++ source code that implemented **OFDM**. *Id.* (emphasis added).

Therefore Mr. Gomez easily meets the level of requisite experience for a POSITA. Mr. Gomez also responded to every question posed by Petitioner's counsel at his deposition, including those questions that were self-serving and misleading. For example, none of Petitioner's counsel's questions clarified a date or specification release when asking questions about LTE's support for a given subcarrier spacing of 7.5kHz. *See, e.g.*, Ex. 1041, 23:22-26:5. Notwithstanding this dearth of relevant information, Mr. Gomez still responded with respect to LTE's support of one subcarrier spacing at 15kHz and continued to respond in spite of Petitioner's counsel's switch to questioning Mr. Gomez about a 7.5kHz subcarrier spacing. *See generally id.*

The Board has broad discretion to assign weight to be accorded expert testimony. Trial Practice Guide at 35 (citing *Yorkey v. Diab*, 601 F.3d 1279, 1284 (Fed. Cir. 2010)). Such broad discretion certainly extends here, where an expert, like Mr. Gomez, provides "testimony that is helpful to the Board" and is qualified in the pertinent art of wireless networking. *Id.* at 34 ("[T]he absence of an advanced degree in a particular field may not preclude an expert from providing testimony that is helpful to the Board, so long as the expert's experience provides sufficient qualification in the pertinent art.").

VI. CONCLUSION

For at least the foregoing reasons, Petitioner's combinations fail to render obvious any Challenged Claim. The Board should issue a Final Written Decision finding the Challenged Claims not unpatentable.

Respectfully submitted,

Dated: April 11, 2024

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CERTIFICATE OF WORD COUNT

The undersigned hereby certifies that the portions of the above-captioned PATENT OWNER'S SUR-REPLY specified in 37 C.F.R. § 42.24 has 5,474 words in compliance with the 14,000 word limit set forth in 37 C.F.R. § 42.24. This word count was prepared using Microsoft Word for Office 365.

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