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. 10,912,081
Filing Date: May 6, 2018
Issue Date: February 2, 2021

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

PATENT OWNER'S RESPONSE

Case No. IPR2023-00599

TABLE OF CONTENTS

Page(s)

I. INTRODUCTION 1

II. THE '081 PATENT 3

III. THE ALLEGED PRIOR ART 6

A. Lee 6

B. Chen 10

IV. LEVEL OF ORDINARY SKILL IN THE ART 12

V. CLAIM CONSTRUCTION 13

A. "radio signal" 13

B. "the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols" 18

VI. REQUIREMENTS UNDER 35 U.S.C. § 103 20

VII. PETITIONER HAS NOT PROVED INVALIDITY OF THE CHALLENGED CLAIMS BY A PREPONDERANCE OF THE EVIDENCE 22

A. Claims 1-12 Are Not Anticipated by Lee 22

1. Lee Does Not Disclose "*receiving a second radio signal*," as Required by Claim 1 22

2. Lee Does Not Disclose "*receiving a first radio signal*," as Required by Claim 1 25

3. Lee Does Not Disclose "*wherein the first radio signal is transmitted within a first time unit" or "the second radio signal is transmitted within the first time unit*," as Required by Claim 1 28

4. Lee Does Not Disclose "*first bit block is used for generating the first radio signal*," as Required by Claim 1 29

5. Lee Does Not Disclose "*the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols*," as Required by Claim 1 30

6. Lee Does Not Disclose "*as for any one given multicarrier symbol of the G multicarrier symbols, the multi-antenna related receiving for the given multicarrier symbol is related to the relative position of a time-domain resource occupied by the given multicarrier symbol with respect to a first time point in time domain*," "*when the time-domain resource occupied by the given multicarrier symbol is behind the first time point, the second radio signal is used for determining the multi-antenna related receiving for the given multicarrier symbol*," and "*when the time-domain resource occupied by the given multicarrier symbol is before the first time point, the multi-antenna related receiving for the given multicarrier symbol is related to the multi-antenna related receiving for the second radio signal*," as Required by Claim 1 31

7. Independent Claims 5, 9, and 11 Are Not Anticipated by Lee 34

8. Dependent Claims 2-4, 6-8, 10, and 12 Are Not Anticipated by Lee 35

B. Claims 1-12 Are Not Obvious Over the Combination of Chen and Lee 35

1. The Combination of Chen and Lee Does Not Disclose "*first bit block is used for generating the first radio signal*," as Required by Claim 1 35

2. The Combination of Chen and Lee Does Not Disclose "*the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols*," as Required by Claim 1 36

3. The Combination of Chen and Lee Does Not Disclose "*as for any one given multicarrier symbol of the G multicarrier symbols, the multi-antenna related receiving for the given multicarrier symbol is related to the relative position of a time-domain resource occupied by the given multicarrier symbol with respect to a first time point in time domain*," "*when the time-domain resource occupied by the given multicarrier symbol is behind the first time point, the second radio signal is used for determining the multi-antenna related receiving for the given multicarrier symbol*," and "*when the time-domain resource occupied by the given multicarrier symbol is before the first time point, the multi-antenna related receiving for the given multicarrier symbol is related to the multi-antenna related receiving for the second radio signal*," as Required by Claim 1 37

4. The Combination of Chen and Lee Does Not Render Obvious Claims 5, 9, and 11 40

5. The Combination of Chen and Lee Does Not Render Obvious Claims 2-4, 6-8, 10, and 12 41

VIII. CONCLUSION.....41

TABLE OF AUTHORITIES

Page(s)

Cases

Apple, Inc. v. Contentguard Holdings, Inc.,
IPR2015-00355, Paper 9 (P.T.A.B. June 26, 2015) 20

Broadcom Corp. v. Emulex Corp.,
732 F.3d 1325 (Fed. Cir. 2013) 21

Graham v. John Deere Co. of Kansas City,
383 U.S. 1 (1966).....20

Innogenetics, N.V. v. Abbott Lab'ys.,
512 F.3d 1363 (Fed. Cir. 2008) 21

Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.,
821 F.3d 1359 (Fed. Cir. 2016) 21

KSR Int'l Co. v. Teleflex Inc.,
550 U.S. 398 (2007).....21

Los Angeles Biomedical Rsch. Inst. at Harbor-UCLA Med. Ctr. v. Eli Lilly Co., 849 F.3d 1049 (Fed. Cir. 2017).....21

Pers. Web Techs., LLC v. Apple, Inc.,
848 F.3d 987 (Fed. Cir. 2017) 21

Richardson v. Suzuki Motor Co.,
868 F.2d 1226 (Fed. Cir. 1989) 20

Verdegaal Bros., Inc. v. Union Oil Co. of Cal.,
814 F.2d 628 (Fed. Cir. 1987) 20

Statutes

35 U.S.C. § 102.....20

35 U.S.C. § 103.....20

35 U.S.C. § 112(f).....13

Other Authorities

37 C.F.R. § 42.104 13

37 C.F.R. § 42.104(b)(3) 13

EXHIBIT LIST

Exhibit No.	Description of Document
2001	Defendants' Patent L.R. 3-3 Invalidity Contentions and Subject Matter Ineligibility Contentions, *Apex Beam Technologies LLC v. Samsung Electronics Co., Ltd. et al.,* Case No. 2:22-cv-00188-JRG, served March 2, 2023
2002	Order Denying Motion to Stay Pending *Inter Partes* Review, Dkt. 55, *Apex Beam Technologies LLC v. Samsung Electronics Co., Ltd., et al.*, Case No. 2:22-cv-00188-JRG (E.D. Tex. June 14, 2023)
2003	Redline Comparison of the Declaration of Apostolos Kakaes, Ph.D. (Ex. 1003) to the Petition
2004	Declaration of Miguel Gomez ("Gomez Decl."), dated January 12, 2024 and Exhibit A, Curriculum Vitae of Miguel Gomez
2005	Deposition of Apostolos Kakaes, taken in *Samsung Elecs. Co., Ltd. and Samsung Elecs. America, Inc. v. Apex Beam Techs. LLC*, IPR2023-00599, on December 22, 2023 ("Kakaes Depo.")

I. INTRODUCTION

The Board should issue a Final Written Decision finding Claims 1-12 (the "Challenged Claims") of the U.S. Patent No. 10,912,081 (Ex. 1001, the "'081 Patent") not unpatentable because Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, "Petitioner" or "Samsung") fails to show that the Challenged Claims are (i) anticipated by International Patent Publication No. WO 2017/083489 to Lee et al. ("Lee"); or (ii) rendered obvious by International Patent Publication No. WO 2018/201861 to Chen et al. ("Chen") in view of Lee.

Lee does not anticipate key claim elements of the '081 Patent's Challenged Claims, such as "receiving a second radio signal," "receiving a first radio signal," "wherein the first radio signal is transmitted within a first time unit," "the second radio signal is transmitted within the first time unit," "first bit block is used for generating the first radio signal," "the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols," "as for any one given multicarrier symbol of the G multicarrier symbols, the multi-antenna related receiving for the given multicarrier symbol is related to the relative position of a time-domain resource occupied by the given multicarrier symbol with respect to a first time point in time domain," "when the time-domain resource occupied by the given multicarrier symbol is behind the first time point, the second radio signal is used for determining the multi-antenna related receiving for the given multicarrier

symbol," and "when the time-domain resource occupied by the given multicarrier symbol is before the first time point, the multi-antenna related receiving for the given multicarrier symbol is related to the multi-antenna related receiving for the second radio signal."

Chen in combination with Lee does not render obvious key claim elements of the '081 Patent's Challenged Claims, such as "first bit block is used for generating the first radio signal," "the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols," "as for any one given multicarrier symbol of the G multicarrier symbols, the multi-antenna related receiving for the given multicarrier symbol is related to the relative position of a time-domain resource occupied by the given multicarrier symbol with respect to a first time point in time domain," "when the time-domain resource occupied by the given multicarrier symbol is behind the first time point, the second radio signal is used for determining the multi-antenna related receiving for the given multicarrier symbol," and "when the time-domain resource occupied by the given multicarrier symbol is before the first time point, the multi-antenna related receiving for the given multicarrier symbol is related to the multi-antenna related receiving for the second radio signal."

Petitioner also (i) improperly construed both "the first radio signal" and "the second radio signal" to be capable of each comprising two separate radio signals with different content and transmitted at different times; and (ii) Petitioner

improperly construes "the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols" to refer to the time-domain resource occupied by all of the G multicarrier symbols in the first radio signal collectively. A proper construction of these terms, as presented by Patent Owner in Section V, would not allow a person of ordinary skill in the art to anticipate or render obvious the Challenged Claims.

Patent Owner respectfully submits that Petitioner's deficient arguments, Patent Owner's arguments presented herein, and the additional evidence submitted herewith, such as the Declaration of Miguel Gomez, and the deposition testimony of Dr. Apostolos Kakaes, demonstrate that the Challenged Claims are patentable. Accordingly, the Board should issue a Final Written Decision finding all the Challenged Claims of the '081 Patent not unpatentable.

II. THE '081 PATENT

The '081 Patent discloses and claims "transmission schemes of radio signals in wireless communication systems and, in particular, to a method and a device for multi-antenna transmission." '081 Patent, at 1:16-20.

The '081 Patent describes why such schemes are necessary in view of the problems of the prior art:

> [T]he inventor finds through research that cross-slot beam indication would result in reduction of dynamic of beam information, increase of overhead of control signaling,

> reduction of dynamic of scheduling, and other problems. A UE with high processing capacity can decode the PDCCH in a short time to obtain beam information that is used for receiving the PDSCH that is in the time slot of the PDCCH, and adjust a receiving beam to receive a multicarrier symbol in which the PDSCH is located. However, the delay in PDSCH transmission caused by decoding PDCCH would result in underutilization of system resources.
>
> In view of the above problems, the present disclosure provides a solution.

Id. at 1:49-62. Therefore, at least one of the benefits of determining multi-antenna related receiving depending on the "relative position of a time-domain resource occupied by the given multicarrier symbol with respect to a first time point in time domain" in the '081 Patent is to "avoid[] the problem of delay" between the second and first signal due to decoding:

> In one embodiment, the above method is advantageous in that the delay in the receiving of the first radio signal resulted from the delay in the decoding of the second radio signal is avoided.
>
> In one embodiment, the above method is advantageous in that, before the first time point, the PDSCH receives the multicarrier symbol of the PDSCH before the first time point using the same beam used for receiving the PDCCH, thereby avoiding the problem of the delay in PDSCH transmission resulted from the delay in PDCCH decoding.

Id., 4:24-37.

Fig. 7 of the ’081 Patent is representative of how the invention seeks to provide the aforementioned benefit. Fig. 7 and its accompanying description in the ’081 Patent specification shows (i) that the first radio signal can comprise different multi-carrier symbols and (ii) that the multi-carrier symbols can change at a “first time point” between a first receiving beam, which is the same beam that the second radio signal is sent under, and second receiving beam.

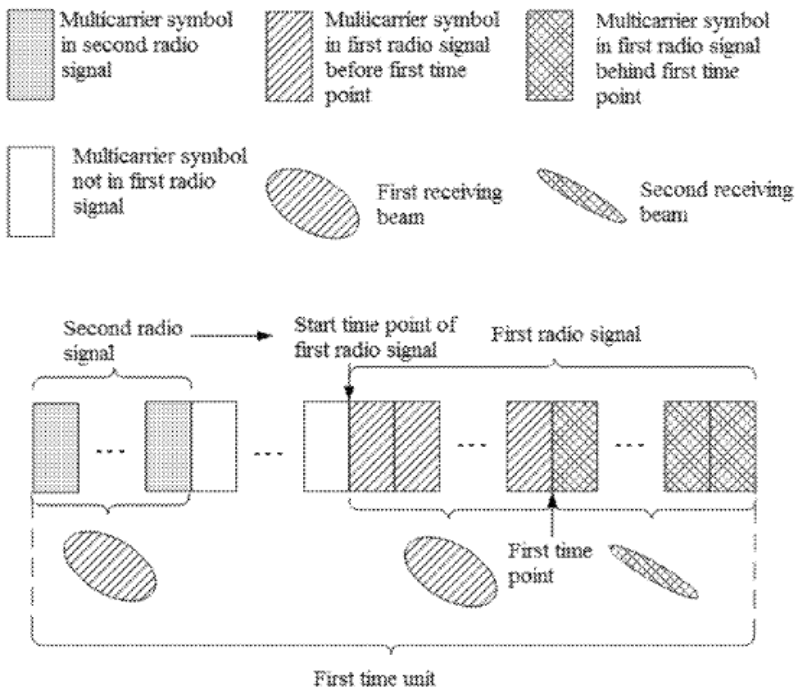


FIG. 7

Id., FIG. 7.

> [B]oth the first radio signal and the second radio signal are transmitted within the first time unit, the multicarrier symbols occupied by the second radio signal are before the multicarrier symbols occupied by the first radio signal in

> time domain, the first receiving beam is used for receiving the second radio signal, the second radio signal indicates the start time point of the first radio signal in the first time unit, and the start time point is used for determining the time domain resource occupied by the first radio signal in the first time unit. . .
>
> [T]he first receiving beam is used for receiving the second radio signal and the multicarrier symbols of the first radio signal before the first time point, and the second receiving beam is used for receiving the multi-carrier symbols of the first radio signal behind the first time point."

Id., 18:1-18.

III. THE ALLEGED PRIOR ART

A. Lee

Lee is directed towards "[a] wireless transmit/receive unit (WTRU) configured to perform wireless communications in higher frequency bands (*e.g.*, above 6 GHz) using a fallback scheme." Ex. 1004 at Abstract.

The Abstract of Lee, and elsewhere in Lee, explicitly describe such a "fallback scheme" is accomplished using at least one control signal and two subsequent data signals, that correspond to the control signals.

> The WTRU includes a receiver configured to receive, in a time transmission interval (TTI), ***at least one control signal*** and a ***first data signal using a first beam associated with a first beam identifier*** (ID) and ***a second data signal, subsequent to the first data signal, using a second beam associated with a second beam ID different from the first beam ID***[1], such that one of the at least one control signal

[1] Emphasis added unless otherwise noted.

> indicates the second beam ID; and a processor configured to switch a receive beam of the receiver from the first beam to the second beam based on the second beam ID to receive the second data signal.

Id., Abstract.

> According to another embodiment, a method implemented by a WTRU includes ***receiving, in a time transmission interval (TTI), at least one control signal, a first transport block and a second transport block***. The at least one control signal and the first transport block are received using a first beam, and the second transport block is received using a second beam that has a beam width that is more narrow than a beam width of the first beam. In addition, the first transport block and the second transport block are multiplexed using time division multiplexing such that the second transport block is received subsequent to the first transport block. The method further includes switching a receive beam of the WTRU from the first beam to the second beam, to receive the second transport block, based on beam information associated with the second beam received in one of the at least one control signal.

Id. at [0259].

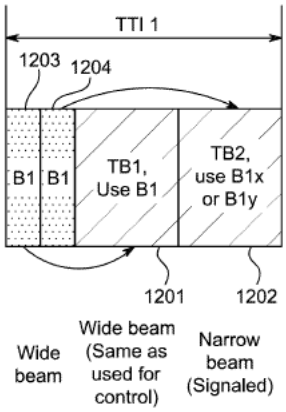


FIG. 12

Id. at FIG. 12.

With respect to B1 1203 and B2 1204 in Fig. 12 displayed above, Lee describes that each different control beam (*e.g.*, control Tx beam 1203 and control Tx beam 1204) would indicate scheduling information for their respective transport blocks (*e.g.*, transport block 1201 and transport block 1202):

> In an example which the two transport blocks may be transmitted in a TDM fashion, the control channel and the DL data assignment may be in the same TTI. For example, ***transport block 1201 may be associated with control Tx beam 1203 and transport block 1202 may be associated with control Tx beam 1204***. The ***first transport block may be mapped on to a first codeword provided in the control Tx beam 1203 and the second transport block may be mapped on to a second codeword provided in control Tx beam 1204***. The codeword may be associated with: a specific beam or beam ID, a BRS, and/or a time/frequency location. As used herein, a codeword represents user data before it is formatted for transmission.

Id. at [0169].

With respect to TB1 and TB2, Lee's MAC PDU generates these two different signals (*i.e.*, TB1 and TB2) from two different code blocks and two different code words (CW) emphasized below.

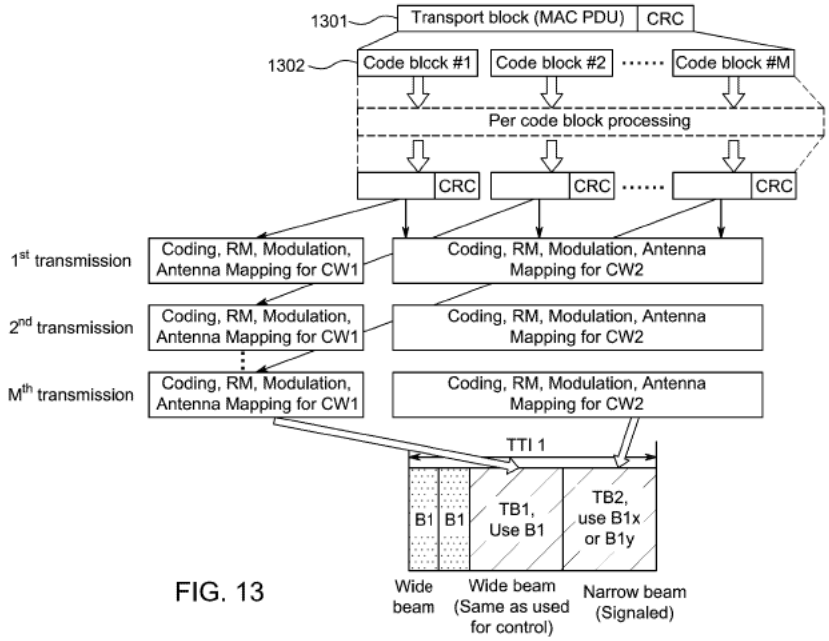


FIG. 13

Id. at FIG. 13. The specification of Lee confirms that there are a number of sub-blocks (or code blocks) that the MAC PDU is partitioned in to reach the two different TB signals:

> In one example, for the data fallback transmission, the DCI may include the following: a field indicating that ***a single MAC PDU is transmitted using the 2 CW scheme, a field indicating the number M of sub-blocks (or code blocks) the MAC PDU is partitioned in for mapping to codeword #1*** (*see e.g.*, FIG. 13 and FIG. 14), and the index (in the range 1 to M) of the sub-block (or code block) transmitted in the current TTI. The maximum value of M may be predefined. The choice for the maximum value of M may be a trade-off between the maximum transport block size to be transmitted with the fallback scheme, and the maximum number of TTIs ***the MAC PDU may be transmitted due to sub-block or code-block partitioning for transmission on codeword #1***.

Id. at [0228].

B. Chen

Chen "relate[s] to the field of communications technology and in particular relates to a message-decoding method, a transmitting end device, and a receiving end device." Ex. 1012, at 1. Chen seeks to solve the technical problem of "how a receiving end device selects an appropriate receiver parameter to decode a message transmitted by a transmitting end device. *Id.*

Chen's Fig. 4 is representative of its disclosed embodiments and illustrates a first message split into two "parts" (*e.g.*, "first part content of first message" and "second part content of first message"). Both the first and second part content of the first message are transmitted twice, first after a second message with beam indication information present, and second after a second message with beam indication information not present.

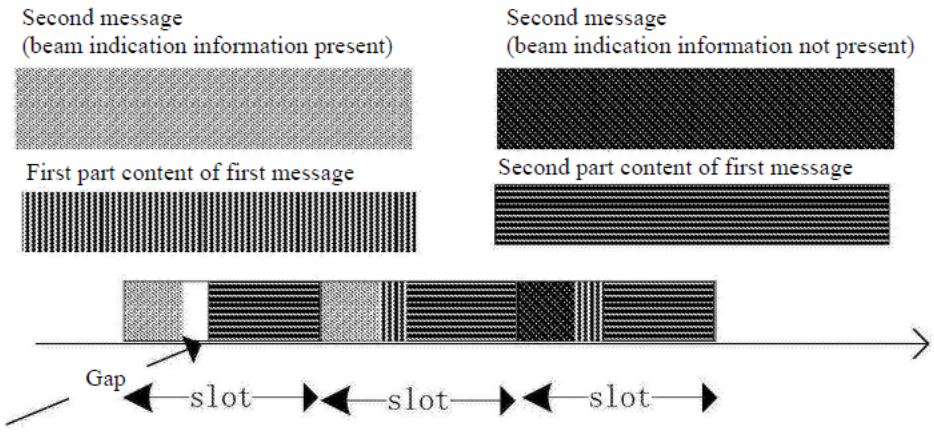


FIG. 4

Id., FIG. 4. Chen describes Fig. 4 in the context of determining whether to decode the second part content or discard the first part content of the first message in order

to "improve the accuracy of receiving end device decoding":

> In this implementation, because said second message includes parameter indication information, said receiving end device uses said ***target receiver parameter indicated by said parameter indication information to decode said second part content***, wherein said transmitting end device has not yet transmitted said first part content. For example, the first slot shown in FIG. 4. It is possible in this way to ***improve the accuracy of receiving end device decoding***.
>
> In addition, when the second message includes parameter indication information, ***it is possible to discard said first part content and use said target receiver parameter indicated by said parameter indication information to decode said second part content***. That is, it is possible to discard the first part content of the second slot shown in FIG. 4, while also being able ***to ensure performance between the transmitting end device and the receiving end device because the transmitting end device in this situation may transmit non-important information in the first part content and important information in the second part content***. Of course, the embodiments of the present disclosure are not limited to the above; when the first message includes parameter indication information, the transmitting end device may also transmit important information in the first part content and transmit non-important information in the second part content.
>
> In addition, when the second message includes parameter indication information, ***the default receiver parameter may be used to decode said first part content, and said target receiver parameter indicated by said parameter indication information may be used to decode said second part content***. Thus, it is possible for the receiving end to precisely decode first part and second part content.
>
> In addition, when the second message does not include parameter indication information, the default receiver

> parameter may be used to decode said first part content and said second part content. That is, the third slot shown in FIG. 4.

Id., 17-18.

IV. LEVEL OF ORDINARY SKILL IN THE ART

In its Preliminary Response, Patent Owner utilized Petitioner's proposed level of skill in the art— a person of ordinary skill in the art ("POSITA") would have had "at least a master's degree in electrical engineering or a similar field and at least two years of experience working with telecommunications systems, including multiple-input multiple-output (MIMO) technology" and that "[a]dditional relevant work experience can compensate for less education, and *vice versa*." Pet. at 13; Ex. 2004, ¶ 20. The Board noted that "Petitioner's last sentence regarding additional relevant work experience compensating for less education and *vice versa*, [] is vague" Inst. at 11-12; Ex. 2004, ¶ 20. In view of the Board's guidance, Patent Owner proposes that a POSITA would have had either (i) at least a master's degree in electrical engineering or a similar field and at least two years of experience working with telecommunications systems; or (ii) at least a bachelor's degree in electrical engineering or a similar field and at least five years of experience working with telecommunications systems. Ex. 2004, ¶ 20.

V. CLAIM CONSTRUCTION

37 C.F.R. § 42.104 governs the required content of the petition. 37 C.F.R. § 42.104(b)(3) specifically requires the Petitioner to point out "[h]ow the challenged claim is to be construed" and also "[w]here the claim to be construed contains a means-plus-function or step-plus-function limitation as permitted under 35 U.S.C. § 112(f), the construction of the claim must identify the specific portions of the specification that describe the structure, material, or acts corresponding to each claimed function." 37 C.F.R. § 42.104(b)(3).

A. "radio signal"

Patent Owner proposes that the Board construe "radio signal" to be a "signal that transmits particular radio information." Ex. 2004, ¶ 27. Despite the parties not proposing any claim constructions during the Institution phase, Petitioner improperly construed both "the first radio signal" and "the second radio signal" to be capable of each comprising two separate radio signals with different content and transmitted at different times. *Id.* At the institution stage, the Board accepted this erroneous construction but noted that "[t]o the extent that a dispute remains concerning the scope of "second radio signal," the parties during trial should fully develop the record for claim construction purposes, in accordance with our Rules." Inst. at 18. For the same reason, the Board also noted that "[t]o the extent that a dispute remains concerning the scope of 'first radio signal,' the parties during trial

should fully develop the record for claim construction purposes, in accordance with our Rules." Inst. at 20. Patent Owner's proposed claim construction remedies this error.

Based on the disclosure in the '081 Patent, a person of ordinary skill in the art would understand that the meaning of a signal is tied to the particular information transmitted. Ex. 2004, ¶ 28. For example, Figure 5 of the '081 Patent discloses five ***different*** signals: second information (from UE to Base Station), first information (from Base Station to UE), third information (from Base Station to UE), second radio signal (from Base Station to UE), and first radio signal (from Base Station to UE):

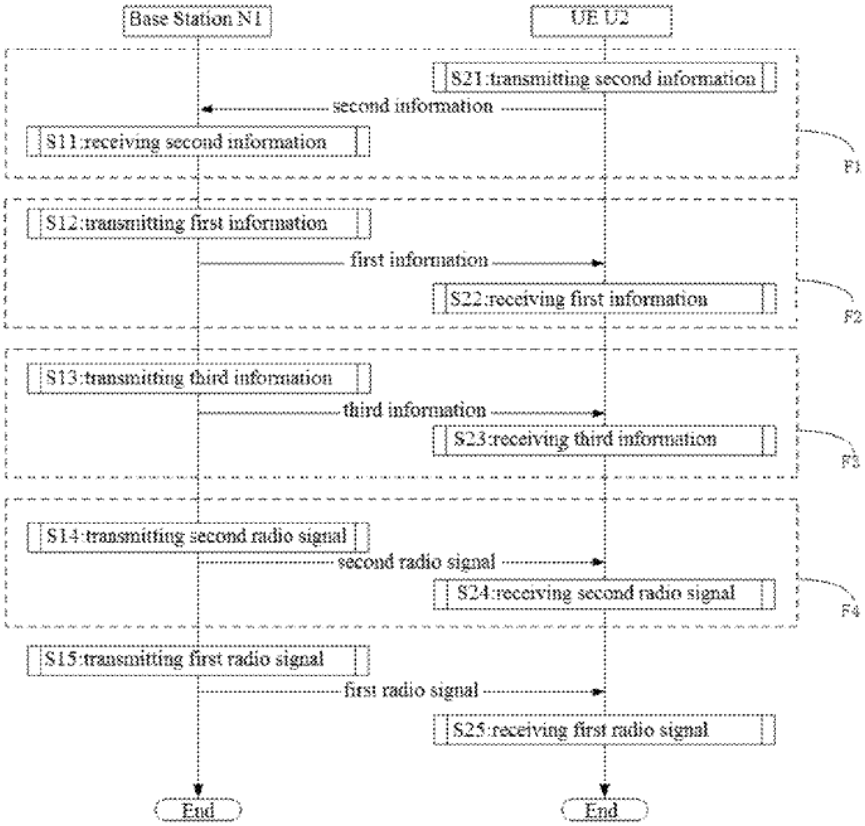
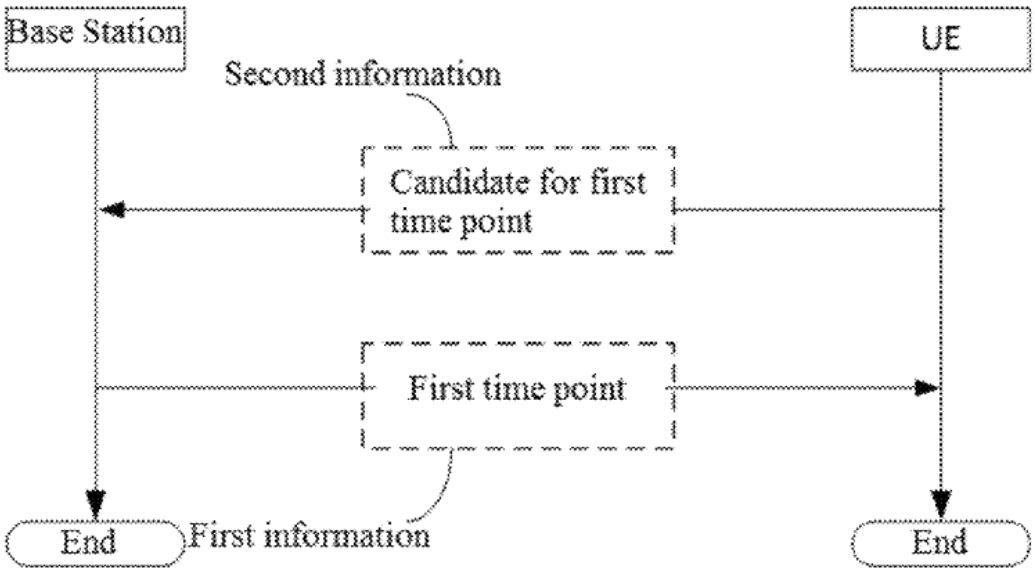


FIG. 5

Id. (citing ’081 Patent, FIG. 5). A person of ordinary skill would understand that each of the five signals correspond to different pieces of particular information and that the ’081 Patent describes the information or content is particular to each signal. *Id.* For example, the content for the first information signal is a “first time point,” the content for the second information is the “candidate [scheme] for the first time point,” and the content for the third information signal is “candidate scheme for the multi-antenna related receiving corresponding to the G multicarrier symbols [of the first radio signal]”:



Id. (citing ’081 Patent, Fig. 8).

> The third information is used for determining a candidate scheme for the multi-antenna related receiving corresponding to the G multicarrier symbols.

’081 Patent, at 6:4-6. Because each of the content of the first, second, and third information signals is different, a person of ordinary skill in the art would not consider the first, second, and third information to be part or portions of the same signal. Ex. 2004, ¶ 28.

Similarly, and for further example, the ’081 Patent is clear that each of the first and second radio signals correspond to particular content:

> In one subembodiment, the second radio signal is a DCI that is used for indicating downlink assignment, and the first radio signal is a PDSCH transmitted on the downlink resource indicated by the second radio signal.

Id., ¶ 29 (citing ’081 Patent, at 6:4-6). Because each of the content of the first and

second signals is different, a person of ordinary skill in the art would not consider the first and second radio signals to be part, or portions of, the same signal despite the fact that they may be transmitted back to back. *Id.* In fact, Petitioner's expert admits that, when signals are sent at different times (*e.g.*, each of the signals is sent on a physical downlink shared channel but five hours apart), a person of ordinary skill in the art would also understand that those are two separate signals with different information:

> Q. So using any of those signals that you just described, if two of those types of signals have different content, would a person of ordinary skill in the art consider the signals to be different signals?
> …
> A. If one of those signals is a physical downlink shared channel that takes place now and the other radio signal is a physical downlink shared channel that takes place five hours from now, the person would consider them to be different.

Id. (citing Ex. 2005, 22:11-17).

Wiley Electrical and Electronics Engineering Dictionary confirms that the content of a signal defines the signal. For example, a signal that transmits control information is a control signal:

> **control signal:**
>
> 2. In telecommunications, a signal that transmits control information.

Ex. 2004, ¶ 30 (citing Steven M. Kaplan, Wiley Electrical and Electronics

Engineering Dictionary, p. 145 (2006)) (emphasis added).[2]

As a result of Petitioner's improper understanding of what constitutes a single signal, and its subsequent incorrect construction of "first radio signal" and "second radio signal," Patent Owner requests that the Board construe "radio signal" to be a "signal that transmits particular radio information." *Id.*, ¶ 31.

B. "the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols"

Petitioner's implied construction of Claim 1's limitation that "the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols" is that the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols collectively. *See* Sections VII.A.5. and VII.B.2.; Ex. 2004, ¶ 32. However, a person of ordinary skill in the art would understand, based on the claim limitations that follow, that "the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols" should be construed as "the second radio signal is used for determining a time-domain resource occupied by ***each of*** the G multicarrier symbols." *Id.*

In particular, the claim limitations that follow describe:

[2] This is particularly relevant, where, as described in Section VII.A., where both Petitioner and Patent Owner understand the claimed "second radio signal" of the '081 Patent to comprise control information. Yet, Petitioner argues that two different control signals somehow comprise one control signal (the claimed second radio signal).

> ***as for any one given multicarrier symbol of the G multicarrier symbols***, the multi-antenna related receiving for the given multicarrier symbol is related to ***the relative position of a time-domain resource occupied by the given multicarrier symbol with respect to a first time point*** in time domain;
>
> ***when the time-domain resource occupied by the given multicarrier symbol is behind the first time point***, the second radio signal is used for determining the multi-antenna related receiving for the given multicarrier symbol; and
>
> ***when the time-domain resource occupied by the given multicarrier symbol is before the first time point***, the multi-antenna related receiving for the given multicarrier symbol is related to the multi-antenna related receiving for the second radio signal; the first time point is one time point within the first time unit; and G is a positive integer.

Ex. 2004, ¶ 33 (citing '081 Patent, Claim 1). A person of ordinary skill in the art would readily understand that the time domain resource occupied by ***each one*** of the G multicarrier symbols must be determined by the second radio signal. *Id.* Otherwise, it would not be possible to determine, in the subsequent limitations, whether the time domain resource occupied by each one of the multicarrier symbols is before or behind the first time point. *Id.*

Therefore, a person of ordinary skill in the art would understand that "the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols" should be construed as "the second radio signal is used for determining a time-domain resource occupied by ***each of*** the G multicarrier

symbols" in order that the subsequent claim limitations logically follow. Ex. 2004, ¶ 34.

VI. REQUIREMENTS UNDER 35 U.S.C. § 103

Anticipation under 35 U.S.C. § 102 is a high bar to meet. A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989).

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 skill in the art, and (4) where in evidence, so called secondary considerations. *See Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966). Failure to identify the differences between the claimed subject matter and the prior art is fatal to an obviousness challenge. *See Apple, Inc. v. Contentguard Holdings, Inc.*, IPR2015-00355, Paper 9 at 9-10 (P.T.A.B. June 26, 2015).

To arrive at obviousness, the Board must sufficiently explain and support the conclusions that the prior art references disclose all the elements recited in the Challenged Claims and a relevant skilled artisan not only could have made but would

have been motivated to combine all the prior art references in the way the patent claims. *See Pers. Web Techs., LLC v. Apple, Inc*., 848 F.3d 987, 994 (Fed. Cir. 2017).

Even if all the claim elements are found across a number of references, an obviousness determination must consider whether a POSITA would have been motivated to combine those references. *See Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd*., 821 F.3d 1359, 1368 (Fed. Cir. 2016); *Los Angeles Biomedical Rsch. Inst. at Harbor-UCLA Med. Ctr. v. Eli Lilly Co*., 849 F.3d 1049, 1067 (Fed. Cir. 2017).

The Supreme Court explained in *KSR Int'l Co. v. Teleflex Inc.* that "[o]ften, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit." 550 U.S. 398, 418 (2007). This combination determination, as supported by an articulated motivation to combine, requires a plausible rationale as to why those prior art references would have worked together. *See Broadcom Corp. v. Emulex Corp*., 732 F.3d 1325, 1335 (Fed. Cir. 2013). Additionally, "knowledge of a problem and motivation to solve it are entirely different from motivation to combine particular references." *See Innogenetics, N.V.*

v. Abbott Lab'ys., 512 F.3d 1363, 1373 (Fed. Cir. 2008).

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

As set forth below, and in view of both the Petition ("Paper No. 1" or "Pet.") and the Board's Institution Decision ("Paper No. 9" or "Inst."), Petitioner has failed to demonstrate by a preponderance of the evidence that the Challenged Claims are obvious in view of the asserted prior art.

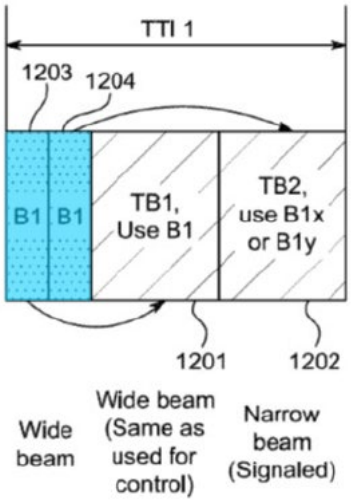
A. Claims 1-12 Are Not Anticipated by Lee

1. Lee Does Not Disclose "*receiving a second radio signal*," as Required by Claim 1

Claim 1 recites "receiving a second radio signal."

As noted above, a person of ordinary skill in the art would have understood that a "radio signal" should be construed as a "signal that transmits particular radio information." *See supra* Section V.A.; Ex. 2004, ¶ 35.

The Petition fails to disclose this element because Petitioner does not identify a single radio signal with particular information as the one incoming "second radio signal." Ex. 2004, ¶ 36. Petitioner argues that two different control signals (B1 1203 and B1 1204) are collectively the claimed second radio signal:



Lee, FIG. 12 (annotated).

Id. (citing Pet. at 16).

Petitioner's argument fails to disclose "receiving a second radio signal" because B1 1203 and B1 1204 are two separate control signals (i.e., each contain different particular information). Ex. 2004, ¶ 37. The part of the specification of Lee that discusses Fig. 12 confirms that B1 1203 and B1 1204 each contain different particular information. Referring to B1 1203 and B1 1204, Lee describes that:

> For example, ***transport block 1201 may be associated with control Tx beam 1203 and transport block 1202 may be associated with control Tx beam 1204.*** The first transport block may be mapped on to a first codeword provided in the control Tx beam 1203 and the second transport block may be mapped on to a second codeword provided in control Tx beam 1204. The codeword may be associated with: a specific beam or beam ID, a BRS, and/or a time/frequency location. As used herein, a codeword represents user data before it is formatted for transmission.

Id. (citing Ex. 1004, [0169]). A person of ordinary skill in the art would understand that each codeword in separate control Tx beams is separate particular information that each of two different transport blocks may be mapped on to. *Id.* Petitioner's expert confirms the understanding that each of Lee's B1 1203 and B1 1204 contains a different particular information, namely different code words that correspond to downlink control information for respective (i.e., separate) data:

> Q. So each of 1203 and 1204 contains a code word, correct?
> A. Provide a code word that could respond to the DCI that provides the downlink control information for the respective data.

Id. (citing Ex. 2005, 22:17-22).

> Q. So 1203 provides a first code word, right?
> A. Yes, it does.
>
> Q. And control transmission being 1204 provides a second code word, right?
> A. Yes, I think that's correct as well.

Id. (citing Ex. 2005, 23:16-22).

> Q. Would a person of ordinary skill in the art expect the code words associated with each of TB1 and TB2 to be different?
> A. One would expect them to be the same structure, but ***would provide different information. . .those specific values will be different in 1203 and 1204*** because TB1 and TB2 are located at ***different places on the time frequency resources and they're using different beams and that information would have -- would be conveyed in***

> ***1203 and in 1204*** for the respective portions of the signal representing the data in TB1 and TB2.

Id. (citing Ex. 2005, 25:2-25).

In an attempt to misrepresent the claimed requirements, Petitioner contends that "[t]he '081 patent does not preclude the 'second radio signal' from having multiple portions." Pet. at 16 (citations omitted); Ex. 2004, ¶ 38. As noted in Section V.A., having different particular information corresponds to different signals in the context of the '081 Patent, not portions of the same signal. *Id.*

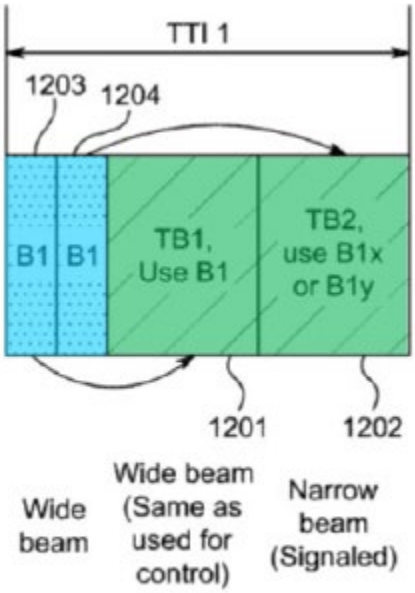
Therefore, Petitioner fails to show that Lee anticipates this claim limitation. *Id.*, ¶ 39.

2. Lee Does Not Disclose "*receiving a first radio signal*," as Required by Claim 1

Claim 1 recites "receiving a first radio signal."

As noted above, a person of ordinary skill in the art would have understood that a "radio signal" should be construed as a "signal that transmits particular radio information." *See supra* Section V.A.; *Id.*, ¶ 40.

The Petition fails to disclose this element because Petitioner does not identify a single radio signal with particular information as the one incoming "first radio signal." *Id.*, ¶ 41. Petitioner argues that two different transport block signals (TB1 1201 and TB1 1202) are collectively the claimed first radio signal:



Lee, FIG. 12 (annotated).

Id. (citing Pet. at 17).

But, as with Petitioner's argument with respect to the "second radio signal," TB1 and TB2 are separate signals (i.e., each contain different particular information). *Id.*, ¶ 42. With respect to Fig. 12 of Lee, which Petitioner relies upon (Pet. at 17), the disclosure of Lee is clear that TB1 and TB2 are "individual" signals in a "dual TB transmission" with different particular information carried, and different modulation and coding schemes:

> FIG. 12 shows a diagram for a ***dual TB transmission scheme***. ***Two or more transport blocks*** may be transmitted with a same beam as the control channel, or may be transmitted with different beams. For example, FIG. 12 illustrates two transport blocks 1201 and 1202 transmitted (multiplexed) in a TDM fashion within a single TTI (*e.g.*,

> TTI1). The transmission of the ***individual transport blocks*** may use the same beam as the control channel (*e.g.*, transport block 1201 which uses a wide beam), or may use a different beam (*e.g.*, transport block 1202 which uses a narrow beam).

Id. (citing Ex. 1004, [0167]). Each transport block is also respectively associated with each of the different control Tx beams described in Section VII.A.1.:

> For example, ***transport block 1201 may be associated with control Tx beam 1203 and transport block 1202 may be associated with control Tx beam 1204.*** The first transport block may be mapped on to a first codeword provided in the control Tx beam 1203 and the second transport block may be mapped on to a second codeword provided in control Tx beam 1204. The codeword may be associated with: a specific beam or beam ID, a BRS, and/or a time/frequency location. As used herein, a codeword represents user data before it is formatted for transmission.

Id. (citing Ex. 1004, [0169]). A person of ordinary skill in the art would understand that each transport block in a dual TB transmission scheme is associated with separate codewords in separate control Tx beams and therefore, each transport block comprises separate particular information. *Id.* Petitioner's expert confirms the understanding that each of Lee's TB 1201 and TB 1202 contains different particular information, for example, "different places on the time frequency resources" and "using different beams":

> Q. Would a person of ordinary skill in the art expect the code words associated with each of TB1 and TB2 to be different?

> A. TB1 is being transmitted using a wide beam, as he explains in the figure 12, and TB2 is transmitted using a narrow beam and the specific aspects needed to receive those respective portions of the data block, for example, beam IDs time and frequency resource locations used for each of them, those specific values will be different in 1203 and 1204 because ***TB1 and TB2 are located at different places on the time frequency resources and they're using different beams*** and that information would have -- would be conveyed in 1203 and in 1204 for the respective portions of the signal representing the data in TB1 and TB2.

Ex. 2004, ¶ 42 (citing Ex. 2005, 25:2-24).

In an attempt to misrepresent the claimed requirements, as for the claimed "second radio signal," Petitioner contends that "[t]he '081 patent does not preclude the 'first radio signal' from having multiple portions." Pet. at 18; Ex. 2004, ¶ 43. As noted in Section V.A, having different particular information corresponds to different signals in the context of the '081 Patent, not portions of the same signal. *Id.*

Therefore, Petitioner fails to show that Lee anticipates this claim limitation. *Id.*, ¶ 44.

3. Lee Does Not Disclose "*wherein the first radio signal is transmitted within a first time unit" or "the second radio signal is transmitted within the first time unit*," as Required by Claim 1

Claim 1 recites "wherein the first radio signal is transmitted within a first time

unit" and "the second radio signal is transmitted within the first time unit."

Since Petitioner fails to show how Lee discloses "the first radio signal" or "the second radio signal," it cannot now disclose "wherein the first radio signal is transmitted within a first time unit" or "the second radio signal is transmitted within the first time unit," as required by this claim limitation. *See supra* Sections VII.A.1. and VII.A.2.; Ex. 2004, ¶ 45.

Therefore, Lee does not anticipate these claim limitations. Ex. 2004, ¶ 46.

4. Lee Does Not Disclose "*first bit block is used for generating the first radio signal*," as Required by Claim 1

Claim 1 recites "first bit block is used for generating the first radio signal."

Since Petitioner fails to show how Lee discloses, teaches, or suggests "the first radio signal," it cannot now disclose, teach, or suggest "first bit block is used for generating the first radio signal," as required by this claim limitation. *See supra* Section VII.A.1.; Ex. 2004, ¶ 47.

Specifically, Lee's MAC PDU (which Petitioner alleges corresponds to the first bit block) does not generate a first radio signal. *Id.*, ¶ 48. As described in Section VII.A.2., Lee describes that two different signals are generated (*i.e.*, TB1 and TB2) from two different code words (CW) (i.e., different particular information) instead of one radio signal. *Id.*

Therefore, Lee does not anticipate this claim limitation. *Id.*, ¶ 49.

5. Lee Does Not Disclose "*the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols*," as Required by Claim 1

Claim 1 recites "the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols."

Since Petitioner fails to show how Lee discloses, teaches, or suggests "a second radio signal," it cannot now disclose, teach, or suggest "the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols." *See supra* Section VII.A.1.; Ex. 2004, ¶ 50.

Moreover, as noted above, a person of ordinary skill in the art would have understood that "the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols" should be construed as "the second radio signal is used for determining a time-domain resource occupied by ***each of*** the G multicarrier symbols." *See supra* Section V.B.; Ex. 2004, ¶ 51.

However, Petitioner and Lee are silent regarding the determination of occupied time domain resources for each of the G multicarrier symbols in the first radio signal. Instead, Petitioner only describes that "*Lee* discloses that the control channel may carry scheduling information for the data channel." Ex. 2004, ¶ 52; Pet. at 25 (citing Ex. 1004, [0110]). But a person of ordinary skill in the art would understand that Lee is limited to disclosing a codeword that "may be associated with: . . . a time/frequency location" of the respective entire transport block mapped to that

codeword. Ex. 2004, ¶ 52 (citing Ex. 1004, [0169]). Therefore, a person of ordinary skill in the art would understand that nowhere does Lee (or Petitioner) describe how a determination of occupied time domain resources is made for each of G multicarrier symbols, but only on a transport block basis. *Id.*

Therefore, Lee does not anticipate this claim limitation. *Id.*, ¶ 53.

6. Lee Does Not Disclose "*as for any one given multicarrier symbol of the G multicarrier symbols, the multi-antenna related receiving for the given multicarrier symbol is related to the relative position of a time-domain resource occupied by the given multicarrier symbol with respect to a first time point in time domain*," "*when the time-domain resource occupied by the given multicarrier symbol is behind the first time point, the second radio signal is used for determining the multi-antenna related receiving for the given multicarrier symbol*," and "*when the time-domain resource occupied by the given multicarrier symbol is before the first time point, the multi-antenna related receiving for the given multicarrier symbol is related to the multi-antenna related receiving for the second radio signal*," as Required by Claim 1

Claim 1 recites "as for any one given multicarrier symbol of the G multicarrier symbols, the multi-antenna related receiving for the given multicarrier symbol is related to the relative position of a time-domain resource occupied by the given multicarrier symbol with respect to a first time point in time domain," "when the time-domain resource occupied by the given multicarrier symbol is behind the first time point, the second radio signal is used for determining the multi-antenna related

receiving for the given multicarrier symbol," and "when the time-domain resource occupied by the given multicarrier symbol is before the first time point, the multi-antenna related receiving for the given multicarrier symbol is related to the multi-antenna related receiving for the second radio signal."

Since Petitioner fails to show how Lee discloses, teaches, or suggests "the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols," it cannot now disclose, teach, or suggest "when the time-domain resource occupied by the given multicarrier symbol is behind the first time point, the second radio signal is used for determining the multi-antenna related receiving for the given multicarrier symbol," and "when the time-domain resource occupied by the given multicarrier symbol is before the first time point, the multi-antenna related receiving for the given multicarrier symbol is related to the multi-antenna related receiving for the second radio signal." *See supra* Section VII.A.1.; Ex. 2004, ¶ 54.

Moreover, since Petitioner fails to show how Lee discloses, teaches, or suggests "a second radio signal," it cannot now disclose, teach, or suggest "as for any one given multicarrier symbol of the G multicarrier symbols, the multi-antenna related receiving for the given multicarrier symbol is related to the relative position of a time-domain resource occupied by the given multicarrier symbol with respect to a first time point in time domain," "when the time-domain resource occupied by

the given multicarrier symbol is behind the first time point, the second radio signal is used for determining the multi-antenna related receiving for the given multicarrier symbol," and "when the time-domain resource occupied by the given multicarrier symbol is before the first time point, the multi-antenna related receiving for the given multicarrier symbol is related to the multi-antenna related receiving for the second radio signal." *See supra* Section VII.A.5.; Ex. 2004, ¶ 55.

Specifically, Lee does not describe a determination, on a multicarrier symbol basis, as these claim limitations contemplate, and as a person of ordinary skill in the art would understand them. Ex. 2004, ¶ 56. Merely disclosing that "Lee's transport blocks TB1 and TB2 include a positive number G multicarrier symbols" and that "*Lee* discloses switching from a wide beam to a narrow beam at the first time point," would not enable a person of ordinary skill in the art to ascertain whether each multicarrier symbol occupies a time domain resource before or after the first time point. *Id.* (citing Pet. at 28-29). Similarly, Petitioner mentions that "*Lee* discloses that 'the narrow beam ID may need to be signaled in the control region of the TTI'" (citing *Lee*, [0167]; *see also* [0006]-[0008], [0150], [0156], [0168], [0172], [0258], FIGS. 10, 19) and that "*Lee* discloses that 'a first TB (TB1) may use the same wide beam or the same beam ID as the control channel'" (citing *Lee*, [0168]; *see also* [0156], [0258], FIGS. 10, 19.). Ex. 2004, ¶ 56 (Pet. at 30-31). A person of ordinary skill in the art would find such a disclosure insufficient to show the claimed

limitations because the mere facts of a wide beam and narrow beam and associated IDs is inapposite to determining an occupied time domain resource for a specific multicarrier symbol and its relation to a first time point. *Id.* To the extent the control signals of Lee disclose time domain resources and relation to a first time point, a person of ordinary skill in the art would understand the disclosure to be pertaining to the occupied time domain resource of each transport block as a whole, not on a multi-carrier symbol basis, as required by these claim limitations. *Id.*

Therefore, Lee does not anticipate these claim limitations. Ex. 2004, ¶ 57.

7. Independent Claims 5, 9, and 11 Are Not Anticipated by Lee

Claim 5 recites "[a] method in a base station device for wireless communication" that mirrors the claim limitations of Claim 1, which recites "[a] method in a User Equipment (UE) for wireless communication." Ex. 2004, ¶ 58. In other words, Claim 5 discloses a method from the perspective of the base station that is in communication with the UE in Claim 1. *Id.* For at least the same reasons as Claim 1, Lee fails to anticipate Claim 5. *Id.*

Claim 9 recites "[a] UE for wireless communication," which is the apparatus claim of Claim 1. *Id.*, ¶ 59. For at least the same reasons as Claim 1, Lee fails to anticipate Claim 1. *Id.*

Independent Claim 11 recites "[a] base station device for wireless communication" that mirrors the claim limitations of Claim 9, which recites "[a] UE for wireless communication." *Id.*, ¶ 60. In other words, Claim 11 discloses the base station device that is in communication with the UE in Claim 9. *Id.* For at least the same reasons as Claim 9, Lee fails to anticipate Claim 11. *Id.*

8. Dependent Claims 2-4, 6-8, 10, and 12 Are Not Anticipated by Lee

Claims 2-4 are dependent on Claim 1, Claims 6-8 are dependent on Claim 5, Claim 10 is dependent on Claim 9, and Claim 12 is dependent on Claim 11. *Id.*, ¶ 61. Therefore, Claims 2-4, 6-8, 10, and 12 are not anticipated by Lee for at least the same reasons as Claims 1, 5, 9, and 11, respectively. *Id.*

B. Claims 1-12 Are Not Obvious Over the Combination of Chen and Lee

1. The Combination of Chen and Lee Does Not Disclose "*first bit block is used for generating the first radio signal*," as Required by Claim 1

Claim 1 of the '081 Patent recites "first bit block is used for generating the first radio signal."

Petitioner cannot and does not rely on Chen to disclose "a first bit block [] used for generating the first radio signal" and, instead, only relies on "*Lee*'s teachings of a data message generated by a bit block (*e.g.*, MAC PDU)" that Petitioner alleges could be implemented into Chen's method. Pet. at 55-58; Ex. 2004,

¶ 62.

However, Lee's MAC PDU does not generate a first radio signal. *Id.*, ¶ 63. As described in Section VII.A.4., Lee's alleged first bit block (MAC PDU) generates two different signals (*i.e.*, TB1 and TB2) associated with two different code words (CW), instead of generating one radio signal. *Id.*

Therefore, Chen in combination with Lee does not render obvious this claim limitation. *Id.*, ¶ 64.

2. The Combination of Chen and Lee Does Not Disclose "*the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols*," as Required by Claim 1

Claim 1 recites "the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols."

As noted above, a person of ordinary skill in the art would have understood that "the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols" should be construed as "the second radio signal is used for determining a time-domain resource occupied by ***each of*** the G multicarrier symbols." *See supra* Section V.B.; Ex. 2004, ¶ 65.

As a preliminary matter, the specification of Chen does not even mention multicarrier symbols. *See generally* Ex. 1012; Ex. 2004, ¶ 66. Additionally, similar to Lee (*see* Section VII.A.5.), and as Petitioner admits, Chen only discusses

indicating time-domain resource occupation for the full data message, not on an individual multicarrier symbol basis, as the claim requires. Ex. 2004, ¶ 66 (citing Pet. at 60 ("[A] POSITA would have understood that *Chen*'s control message and/or scheduling message includes information indicating a time-domain resource occupied by *Chen*'s data message ("first message")."). *Id.*

Therefore, Chen in combination with Lee does not render obvious this claim limitation. *Id.*, ¶ 67.

3. The Combination of Chen and Lee Does Not Disclose "*as for any one given multicarrier symbol of the G multicarrier symbols, the multi-antenna related receiving for the given multicarrier symbol is related to the relative position of a time-domain resource occupied by the given multicarrier symbol with respect to a first time point in time domain*," "*when the time-domain resource occupied by the given multicarrier symbol is behind the first time point, the second radio signal is used for determining the multi-antenna related receiving for the given multicarrier symbol*," and "*when the time-domain resource occupied by the given multicarrier symbol is before the first time point, the multi-antenna related receiving for the given multicarrier symbol is related to the multi-antenna related receiving for the second radio signal*," as Required by Claim 1

Claim 1 recites "as for any one given multicarrier symbol of the G multicarrier symbols, the multi-antenna related receiving for the given multicarrier symbol is related to the relative position of a time-domain resource occupied by the given

multicarrier symbol with respect to a first time point in time domain," "when the time-domain resource occupied by the given multicarrier symbol is behind the first time point, the second radio signal is used for determining the multi-antenna related receiving for the given multicarrier symbol," and "when the time-domain resource occupied by the given multicarrier symbol is before the first time point, the multi-antenna related receiving for the given multicarrier symbol is related to the multi-antenna related receiving for the second radio signal."

As noted above in Section VI.B.2., Chen does not mention multicarrier symbols at all in its specification, and therefore cannot disclose, teach, or suggest any of these claim limitations. *See generally* Ex. 1012; Ex. 2004, ¶ 68. At least for this reason, Chen cannot disclose the relational nature of receiving ***any given multicarrier symbol*** to the relative position of the time-domain resource occupied by that multicarrier symbol with respect to Petitioner's alleged first time point. *Id*.

Relatedly, since Petitioner fails to show how Chen in combination with Lee discloses, teaches, or suggests "the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols," it cannot now disclose, teach, or suggest "as for any one given multicarrier symbol of the G multicarrier symbols, the multi-antenna related receiving for the given multicarrier symbol is related to the relative position of a time-domain resource occupied by the given multicarrier symbol with respect to a first time point in time domain," "when

the time-domain resource occupied by the given multicarrier symbol is behind the first time point, the second radio signal is used for determining the multi-antenna related receiving for the given multicarrier symbol," and "when the time-domain resource occupied by the given multicarrier symbol is before the first time point, the multi-antenna related receiving for the given multicarrier symbol is related to the multi-antenna related receiving for the second radio signal." *See supra* Section VII.B.2.; Ex. 2004, ¶ 69.

Moreover, a person of ordinary skill in the art would understand Petitioner's citations to Chen to be inapposite because, while they describe switching beams based on parameters at a given point in time (i.e., what Petitioner alleges is the claimed first time point), Chen does not describe any determination of the time domain resource occupied by each multicarrier symbol in order to further determine whether each time domain resource is before or behind a first time point. *See, e.g.,* Pet. at 63 *(Chen* further discloses that "a reception beam indicated by the parameter indication information may be a receiver parameter different from the receiver parameter currently used by the receiving end device; at this time, the receiving end device needs to switch the receiver parameter."); *see also, e.g.*, Pet. at 65 *(Chen* discloses that 'the default receiver parameter may be the receiver parameter currently used by the receiving end device for rapid decoding of the message transmitted by the transmitting end device.'"); Ex. 2004, ¶ 70.

Therefore, Chen in combination with Lee does not render obvious this claim limitation. Ex. 2004, ¶ 71.

4. The Combination of Chen and Lee Does Not Render Obvious Claims 5, 9, and 11

Claim 5 recites "[a] method in a base station device for wireless communication" that mirrors the claim limitations of Claim 1, which recites "[a] method in a User Equipment (UE) for wireless communication." Ex. 2004, ¶ 72. In other words, Claim 5 discloses a method from the perspective of the base station that is in communication with the UE in Claim 1. *Id.* For at least the same reasons as Claim 1, Chen in combination with Lee does not render obvious Claim 5. *Id.*

Claim 9 recites "[a] UE for wireless communication," which is the apparatus claim of Claim 1. *Id.*, ¶ 73. For at least the same reasons as Claim 1, Chen in combination with Lee does not render obvious Claim 9. *Id.*

Independent Claim 11 recites "[a] base station device for wireless communication" that mirrors the claim limitations of Claim 9, which recites "[a] UE for wireless communication." *Id.*, ¶ 74. In other words, Claim 11 discloses the base station device that is in communication with the UE in Claim 9. *Id.* For at least the same reasons as Claim 9, Chen in combination with Lee does not render obvious Claim 11. *Id.*

5. The Combination of Chen and Lee Does Not Render Obvious Claims 2-4, 6-8, 10, and 12

Claims 2-4 are dependent on Claim 1, Claims 6-8 are dependent on Claim 5, Claim 10 is dependent on Claim 9, and Claim 12 is dependent on Claim 11. *Id.*, ¶ 75. Therefore, Claims 2-4, 6-8, 10, and 12 are not rendered obvious by the combination of Chen and Lee for at least the same reasons as Claims 1, 5, 9, and 11, respectively. *Id.*

VIII. CONCLUSION

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: January 12, 2024 By: */Vincent J. Rubino, III /*

Vincent J. Rubino, III (Reg. No. 68,594)
Lead Counsel for Patent Owner
FABRICANT LLP
411 Theodore Fremd Avenue
Suite 206 South
Rye, New York 10580
Tel. 212-257-5797
Fax. 212-257-5796
Email: vrubino@fabricantllp.com

CERTIFICATE OF WORD COUNT

The undersigned hereby certifies that the portions of the above-captioned PATENT OWNER'S RESPONSE specified in 37 C.F.R. § 42.24 has 8.765 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.

Respectfully submitted,

January 12, 2024 By: */Vincent J. Rubino, III /*

Vincent J. Rubino, III (Reg. No. 68,594)
Lead Counsel for Patent Owner
FABRICANT LLP
411 Theodore Fremd Avenue
Suite 206 South
Rye, New York 10580
Tel. 212-257-5797
Fax. 212-257-5796
Email: vrubino@fabricantllp.com

CERTIFICATE OF SERVICE

A copy of the foregoing Patent Owner's Response and Exhibit 2004 to 2005 have been served on Petitioner's counsel of record as follows:

Joshua L. Goldberg
Email: joshua.goldberg@finnegan.com
Nicholas A. Cerulli
Email: nicholas.cerulli@finnegan.com
Mingji Jin
Email: mingji.jin@finnegan.com
Chen Zang
Email: chen.zang@finnegan.com
FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, LLP
901 New York Avenue, NW
Washington, DC 20001-4413

Kevin D. Rodkey
Email: kevin.rodkey@finnegan.com
FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, LLP
271 17th Street NW, Suite 1400
Atlanta, GA 30363-6209

Yi Yu
Email: yi.yu@finnegan.com
FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, LLP
1875 Explorer Street
Reston, VA 20190-6023

Attorneys for Samsung Electronics Co., Ltd. and
Samsung Electronics America, Inc.

January 12, 2024

By: */Vincent J. Rubino, III /*

Vincent J. Rubino, III (Reg. No. 68,594)
Lead Counsel for Patent Owner
FABRICANT LLP
411 Theodore Fremd Avenue,
Suite 206 South
Rye, New York 10580
Tel. 212-257-5797
Fax. 212-257-5796
Email: vrubino@fabricantllp.com