

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. 10,568,113
Filing Date: August 9, 2018
Issue Date: February 18, 2020

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

PATENT OWNER'S PRELIMINARY RESPONSE

Case No. IPR2023-00602

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LIST OF EXHIBITS

Exhibit No.	Description of Document
2001	Defendants' Patent L.R. 3-3 Invalidity Contentions and Subject Matter Ineligibility Contentions, <i>Apex Beam Technologies LLC v. Samsung Electronics 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. February 6, 2023)
2003	Order Denying Motion to Stay Pending Inter Partes Review, Dkt. 55, <i>Apex Beam Technologies LLC v. Samsung Electronics Co., Ltd., et al.</i> , Case No. 2:22-cv-00188-JRG (E.D. Tex. June 14, 2023)
2004	Redline Comparison of the Declaration of Harry R. Bim, Jr., Ph.D. (Ex. 1003) to the Petition

I. INTRODUCTION

On February 28, 2023, Samsung Electronics Co., Ltd., and Samsung Electronics America, Inc. (collectively, “Petitioner”) submitted a Petition (Paper 1, “Petition” or “Pet.”) to institute *inter partes* review (“IPR”) of U.S. Patent No. 10,568,113 (Ex. 1001, “the ’113 Patent”), challenging claims 1-20 (the “Challenged Claims”).

The Petition identifies that “[t]he real parties-in-interest are Samsung Electronics Co., Ltd., and Samsung Electronics America, Inc.” Pet. at 67. Petitioner is a party to the district court case captioned *Apex Beam Techs. LLC v. Samsung Elecs. Co., Ltd., et al.*, Case No. 2:22-cv-00188-JRG (E.D. Tex.) (the “District Court Litigation”).

The Petition asserts that the Challenged Claims are obvious (1) over U.S. Patent Publication No. 2018/0367374 to Liu et al., published December 20, 2018 (Exhibit 1007, “Liu”); and (2) over Liu and U.S. Patent Application Publication No. 2015/0141026 to Jover, published May 21, 2015 (Exhibit 1005, “Jover”). Pet. at 3. However, the Board should deny the Petition for at least two reasons: (1) the Petitioner fails to identify how certain elements of the Challenged Claims are obvious over Liu, Jover, or any combination thereof; and (2) the Board should exercise its discretion to deny the Petition under 35 U.S.C. § 314(a).

Based on the reasons set forth regarding § 314(a) below, the Board should exercise its discretion to deny this Petition. The Petition does not establish “a reasonable likelihood that the Petitioner would prevail with respect to at least 1 of the claims challenged in the Petition.” 35 U.S.C. § 314(a). While Patent Owner explicitly reserves the right to present additional arguments, the deficiencies of the Petition noted herein are sufficient for the Board to find that Petitioner has not met its burden to demonstrate a reasonable likelihood that it would prevail in showing unpatentability of any of the Challenged Claims.

Moreover, the Board should not credit the expert testimony of Dr. Bims because his expert Declaration merely repeats the language of the Petition. Ex. 2004, at 74-167.

II. THE ’113 PATENT AND ITS PROSECUTION

The ’113 Patent discloses and claims “transmission schemes of radio signals in wireless communication systems, and in particular to a method and a device for a User Equipment (UE) to autonomously determine transmission of information.” Ex. 1001, at 1:17-21.

The ’113 Patent describes why such schemes are necessary in view of the “low utilization of the time-frequency resource configured for transmitting the beam recovery request,” as in the prior art:

The inventor finds through researches that: if a UE, after using one channel to transmit a beam recovery request, cannot transmit the beam recovery request again during the time window of waiting a response, then a time-frequency resource configured within the time window of waiting the response to transmit a beam recovery request cannot be used by the UE to transmit a beam recovery request, which consequently results in a low utilization of the time-frequency resource configured for transmitting the beam recovery request.

In view of the above problems, the present disclosure provides a solution.

Id. at 1:43-54.

The application that issued as the '113 Patent was filed on August 9, 2018, and claimed priority to a foreign application CN 201710686330.4 filed on August 11, 2017. Ex. 1003, 3, 68.

During prosecution of the '113 Patent, the Examiner rejected the claims, finding that the prior art disclosed the methods and systems recited in original independent claims 1, 6, 11, and 16. Ex. 1003, 122-142. In response, the applicant amended claims 1, 6, 11, and 16 by adding various amendments, including that the target radio signal “obtains a target measurement value” that triggers transmission of the first and second radio signal “when higher than a target threshold” and clarifying various time windows in relation to the transmitted first and second radio signals. Ex. 1003, 153-161. The Examiner subsequently allowed the claims. Ex. 1003, 172-182. Specifically, the Examiner stated:

The instant invention is related to a UE receives a target radio signal, transmits a first radio signal on a first channel, transmits a second radio signal on a second channel, and monitors a third radio signal in a first time window. A measurement for the target radio signal is used for triggering the transmission of the first radio signal and the second radio signal; a time resource occupied by the first radio signal is used for determining the start time of the first time window; and a time resource occupied by the second radio signal is used for determining the end time of the first time window. The application of the present disclosure can make full use of the allocated aerial resources, and improve the utilization of the aerial resources configured to transmit a report request that is determined autonomously by the UE.

Ex. 1003, at 177.

III. THE ALLEGED PRIOR ART

A. Liu U.S. Patent Publication No. 2018/0367374

Liu is directed to “technology for technology for beam failure recovery in user equipment. The user equipment sends a beam failure recovery request to the base station upon detection of a beam failure between the base station and the user equipment, and monitors one or more candidate beams in which to receive the beam failure recovery request response from the base station, based on an association between a beam failure recovery request response and a beam failure recovery request.” Ex. 1007 at Abstract. Liu discloses the problem it tries to solve, as well as an exemplary embodiment of its proposed solution, as follows:

User equipment and base stations establish a connections using downlink and uplink beam pairs. Often times, for

example as a result of blockage or user equipment rotation or displacement, the connection between the user equipment and the base station is disrupted, resulting in a beam failure. To overcome such failure, a beam failure recovery mechanism may help to improve high frequency link performance.

In one embodiment, in order to recover the connection, a beam failure recovery request (BFRR) is sent by the user equipment in an attempt to reestablish the connection with the base station when a beam failure occurs. Using spatially quasi co-located information between a downlink beam pair and an uplink beam pair provided by the base station, the user equipment may monitor candidate beams in which to receive a BFRR response from the base station, where the BFRR response is associated with the BFRR and the downlink beam(s) is in a time slot with a time offset to the BFRR.

Ex. 1007, at [0053]-[0054].

The disclosed advantage of Liu is sending multiple beam pairs (transmitting and receiving beams) on the same channel to determine the best beam pair from all possible beam pairs for maximum beamforming efficiency on that specific channel, as indicated by the patent specification of Liu.

A misalignment between transmitting (Tx) and receiving (Rx) beams may cause a significant loss in the received power, especially for systems with narrow beams, and result in beam failure. To avoid such beam failure, beam alignment in mm-wave communication systems is necessary to *find the best beam pair from all possible beam pairs for maximum beamforming efficiency*.

Id. at [0004].

In the embodiment of FIG. 4A, a single or unidirectional transmission and reception beam pair are illustrated, whereas in FIG. 4B, multiple directions or omnidirectional transmission and *reception beam pairs are illustrated*. In either case, the system may *determine the “best” beam pair(s) (e.g., the beam with the strongest signal, fastest DL/UL speed, etc.) for transmission and reception among the various reception and transmission directions*. In this regard, a signal received from the base station 402 from a particular receive direction can be identified as having a corresponding transmit direction to transmit to the base station 402.

Id. at [0080].

Liu sends the same BFRR radio signal twice on the same channel. Liu’s patent specification and claims are replete with examples where the BFRR uses PUCCH *or* PRACH, but never both in one system.

In one embodiment, when PRACH is used, the BFRR is a preamble sequence. *In another embodiment*, when PUCCH or PUCCH-like channel is used, the response may include a new beam index/quality and/or failed beam index.

Ex. 1007 at [0085]

With reference to FIG. 6A, when a beam failure is detected by the user equipment 110A-110C, the user equipment 110A-110B sends a beam failure recovery request (BFRR) to the servicing base station 170A-170B. *In one embodiment, the BFRR uses the PUCCH* to report the BFRR to the base station 170A-170B. *In another embodiment, the BFRR uses PRACH* or PRACH-like channel to report the BFRR to the base station 170A-170B.

FIG. 6B illustrates a flow diagram of identifying a downlink beam pair. At 606, the user equipment 110A-110C sends a BFRR using a PUCCH, PRACH *or* PRACH-like channel, such that the user equipment 110A-110C may identify a DL beam pair for the corresponding base station 170A-170B to send the BFRR response in the UL beam pair at 608.

Id. at [0103]-[0104].

That the method of Liu only sends BFRRs on one channel is also indicated by Liu's dependent claims, which are separate according to channel type.

5. The method of claim 1, wherein upon detection of the beam failure, the BFRR is sent using a physical uplink control channel (PUCCH) in the uplink beam pair.

6. The method of claim 5, wherein when the BFRR is sent using the PUCCH, the user equipment identifies a downlink beam pair for the base station to send the BFRR response in the uplink beam pair.

7. The method of claim 1, wherein upon detection of the beam failure, the BFRR is sent using a physical random access channel (PRACH) or a PRACH-like channel in the uplink beam pair.

Id. at Claims 5-7.

As demonstrated by Liu's Fig. 5B, there are only two time windows or time offsets disclosed in Liu.

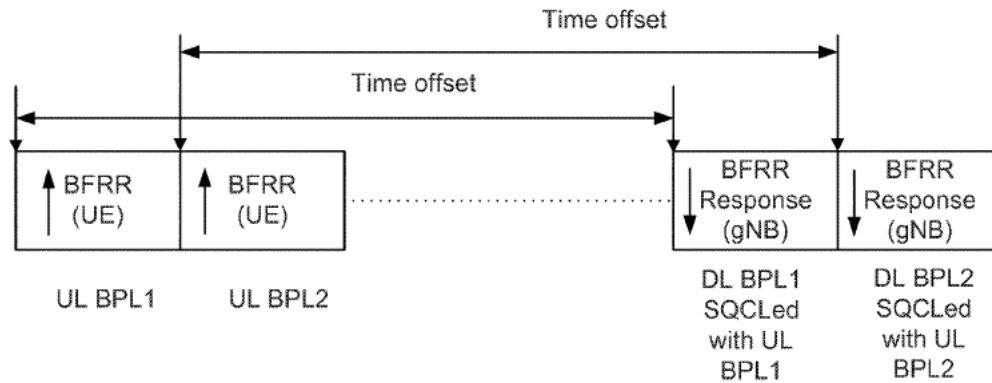


FIG. 5B

Ex. 1007, at Fig. 5B. Fig. 5B of Liu shows (1) a first time window that starts from the first BFRR awaiting a corresponding BFRR response; and (2) a second time window starts from the second BFRR awaiting a corresponding BFRR response. These time windows are noted by the “time offset” labels in Petitioner’s annotated graphic. Such an understanding is confirmed by Liu itself:

Optionally, in any of the preceding aspects, the association between *the BFRR response and received BFRR is represented by a time offset from the BFRR reception to the starting position of a time window within which to transmit the BFRR response.*

Ex. 1007, at [0035].

Optionally, in any of the preceding aspects, the association is represented by *a time offset from the BFRR reception to the ending position of a time window within which to transmit the BFRR response.*

Id. at [0038].

In one embodiment, in order to recover the connection, a beam failure recovery request (BFRR) is sent by the user

equipment in an attempt to reestablish the connection with the base station when a beam failure occurs. Using spatially quasi co-located information between a downlink beam pair and an uplink beam pair provided by the base station, the user equipment may *monitor candidate beams in which to receive a BFRR response from the base station, where the BFRR response is associated with the BFRR and the downlink beam(s) is in a time slot with a time offset to the BFRR.*

Id. at [0054].

As explained in the example of FIGS. 4A and 4B, in the event of a beam failure, the user equipment 404 sends a BFRR in the UL beam pair (UL BPL) to the base station 402. In return, the base station 402 responds with a BFRR response in the DL beam pair (DL BPL) that is SQCL'ed with the UL beam pair used for BFRR transmission by the user equipment 404. In order to implement the BFRR and BFRR response procedure, a transmission occasion association between the BFRR (sent by the user equipment 404) and the BFRR response (sent by the base station 2402) is used to monitor the DL beams. In one embodiment, the transmission occasion association is indicated by a *time offset such that UE should monitor the DL beams for the BFRR response from the base station 402*, which is SQCL'ed with the BFRR from the user equipment 404, in a time slot with a time offset relative to the BFRR, as illustrated. Here *the time slot is a time window for UE monitoring BFRR response and the time offset indicates the starting position of the response monitoring window relative to the BFRR.*

Id. at [0096].

FIG. 6D illustrates a flow diagram in which new candidate beams are received and identified by a base station. At 612, the base station 170A-170B receives a BFRR from user equipment 110A-110C identifying a new candidate beam, and transmits a BFRR response associated with the received BFRR at 614. In one embodiment, *the association between the BFRR response and the received BFRR is represented by a time offset from the BFRR reception to the BFRR response transmission*. In another embodiment, *the association between the BFRR response and the received BFRR is represented by a time offset from the BFRR reception to the starting position of a time window within which to transmit the BFRR response*.

Id. at [0106].

B. Jover U.S. Patent Application Publication No. 2015/0141026

Jover “relate[s] to detecting jamming attacks at an endpoint device and techniques to minimize the effects of such jamming attacks.” Ex. 1005 at [0001].

Jover’s exemplary embodiment includes a method that “detects the communication impairment, performs a sweep to locate a direction of the source of the communication impairment, wherein the sweep is performed in response to the detecting the communication impairment at the endpoint device, and generates a null in the direction of the source of the communication impairment.” *Id.* at [0003].

One way in which Jover decides to initiate its beam sweeping procedure is through monitoring a threshold condition, such as where BER is above a certain threshold or SNR is below a certain threshold.

For example, wireless channel sensing engine 320 may detect a threshold drop in the SNR or SINR (*e.g.*, a 20 percent drop as compared to a preceding time period) an increase in the BER (*e.g.*, when the BER increases beyond one percent), and so forth. In one embodiment, when the wireless channel sensing engine 320 determines that one or more of such threshold conditions are met, the wireless channel sensing engine 320 may signal to the beam-forming engine 310 to begin the beam sweeping procedure.

Ex. 1005, at [0040].

IV. CLAIM CONSTRUCTION

For the purposes of this Preliminary Response only, Patent Owner believes that claim construction is not required to resolve any issues. Pet. at 11-12.

V. LEVEL OF ORDINARY SKILL IN THE ART

For the purposes of this Preliminary Response only, Patent Owner utilizes Petitioner's proposed level of skill in the art: "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. Additional relevant work experience can compensate for less education, and *vice versa*." Pet. at 13 (citations omitted).

**VI. PETITIONER HAS NOT DEMONSTRATED A REASONABLE
LIKELIHOOD OF SUCCESS FOR THE GROUNDS
ADVANCED IN THE PETITION, AND THE PETITION
SHOULD BE DENIED**

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) so-called secondary considerations where in evidence. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966); *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1537 (Fed. Cir. 1983).

The Board has held that a 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, Decision Denying Institution of *Inter Partes* Review, Paper 9 at 9-10 (P.T.A.B. June 26, 2015) (denying institution for failure to identify the differences between the claimed subject matter and the prior art).

In arriving at an obviousness determination, 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 and reasonably expected success. *Pers. Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 994 (Fed. Cir. 2017). That is, even if all the claim elements are found across a number of references, an obviousness determination must consider whether a person of ordinary skill in the art would have the motivation to combine those references. *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) (vacating and remanding an obviousness determination, in part, because the Board did not make factual finding as to whether there was an apparent reason to combine all three prior art references to achieve the claimed invention and whether a person of skill in the art would have had a reasonable expectation of success from such a combination). This combinability determination, as supported by an articulated motivation to combine, requires a plausible rationale as to why those prior art references would have worked together. *Broadcom Corp. v. Emulex Corp.*, 732 F.3d 1325, 1335 (Fed. Cir. 2013). Absent some articulated rationale, a “common sense” finding is no different than the conclusory statement “would have been obvious.” *In re Van Os*, 844 F.3d 1359, 1361 (Fed. Cir. 2017). Of additional importance, “knowledge of a problem and motivation to solve it are entirely different

from motivation to combine particular references. . . .” *Innogenetics, N.V. v. Abbott Lab’ys.*, 512 F.3d 1363, 1373 (Fed. Cir. 2008).

A. Claims 1-20 are Not Obvious Over Liu, Alone or in Combination with Jover

1. Independent Claim 1

(a) Liu Does Not Disclose “transmitting a second radio signal on a second channel,” as Required by Claim 1

Claim 1 of the ’113 Patent recites “transmitting a second radio signal on a second channel.” Petitioner only relies on Liu for this claim limitation but Liu does not render this claim limitation obvious, as Petitioner asserts. Pet. at 19-20.¹

Petitioner cannot show that Liu teaches “transmitting a second radio signal on a second channel” because Petitioner relies on the same signal sent twice over the same channel to meet the first signal and second signal limitations.

Liu sends the same BFRR radio signal on the same channel. Liu’s patent specification and claims are replete with examples where the BFRR uses PUCCH *or* PRACH, but never both in one system.

In one embodiment, when PRACH is used, the BFRR is a preamble sequence. *In another embodiment*, when PUCCH or PUCCH-like channel is used, the response may include a new beam index/quality and/or failed beam index.

¹ The Petition cites the expert Declaration of Dr. Bims (Ex. 1002, ¶¶ 87-90) for its assertion that this disclosure in Liu meets the limitation, but the Bims Declaration merely repeats the Petition word-for-word and does not provide any analysis and should, therefore, be given no weight. *See infra* Sec. VIII.

Ex. 1007 at [0085]

With reference to FIG. 6A, when a beam failure is detected by the user equipment 110A-110C, the user equipment 110A-110B sends a beam failure recovery request (BFRR) to the servicing base station 170A-170B. ***In one embodiment, the BFRR uses the PUCCH*** to report the BFRR to the base station 170A-170B. ***In another embodiment, the BFRR uses PRACH*** or PRACH-like channel to report the BFRR to the base station 170A-170B.

FIG. 6B illustrates a flow diagram of identifying a downlink beam pair. At 606, the user equipment 110A-110C sends a BFRR using a PUCCH, PRACH ***or*** PRACH-like channel, such that the user equipment 110A-110C may identify a DL beam pair for the corresponding base station 170A-170B to send the BFRR response in the UL beam pair at 608.

Id. at [0103]-[0104].

That the method of Liu only sends BFRRs on one channel is also indicated by Liu's dependent claims, which are separate according to channel type.

5. The method of claim 1, wherein upon detection of the beam failure, the BFRR is sent using a physical uplink control channel (PUCCH) in the uplink beam pair.

6. The method of claim 5, wherein when the BFRR is sent using the PUCCH, the user equipment identifies a downlink beam pair for the base station to send the BFRR response in the uplink beam pair.

7. The method of claim 1, wherein upon detection of the beam failure, the BFRR is sent using a physical random

access channel (PRACH) or a PRACH-like channel in the uplink beam pair.

Id. at Claims 5-7.

It would not be obvious at all to modify the system of Liu to have one BFRR sent by PUCCH and one sent by PRACH because the disclosed advantage of Liu is sending multiple beam pairs (transmitting and receiving beams) on the same channel to determine the best beam pair from all possible beam pairs for maximum beamforming efficiency on that specific channel, as indicated by the patent specification of Liu.

A misalignment between transmitting (Tx) and receiving (Rx) beams may cause a significant loss in the received power, especially for systems with narrow beams, and result in beam failure. To avoid such beam failure, beam alignment in mm-wave communication systems is necessary to *find the best beam pair from all possible beam pairs for maximum beamforming efficiency*.

Id. at [0004].

In the embodiment of FIG. 4A, a single or unidirectional transmission and reception beam pair are illustrated, whereas in FIG. 4B, multiple directions or omnidirectional transmission and *reception beam pairs are illustrated*. In either case, the system may *determine the “best” beam pair(s) (e.g., the beam with the strongest signal, fastest DL/UL speed, etc.) for transmission and reception among the various reception and transmission directions*. In this regard, a signal received from the base station 402 from a particular receive direction can be identified as having a corresponding transmit direction to transmit to the base station 402.

Id. at [0080].

Therefore, Liu fails to render obvious this claim limitation.

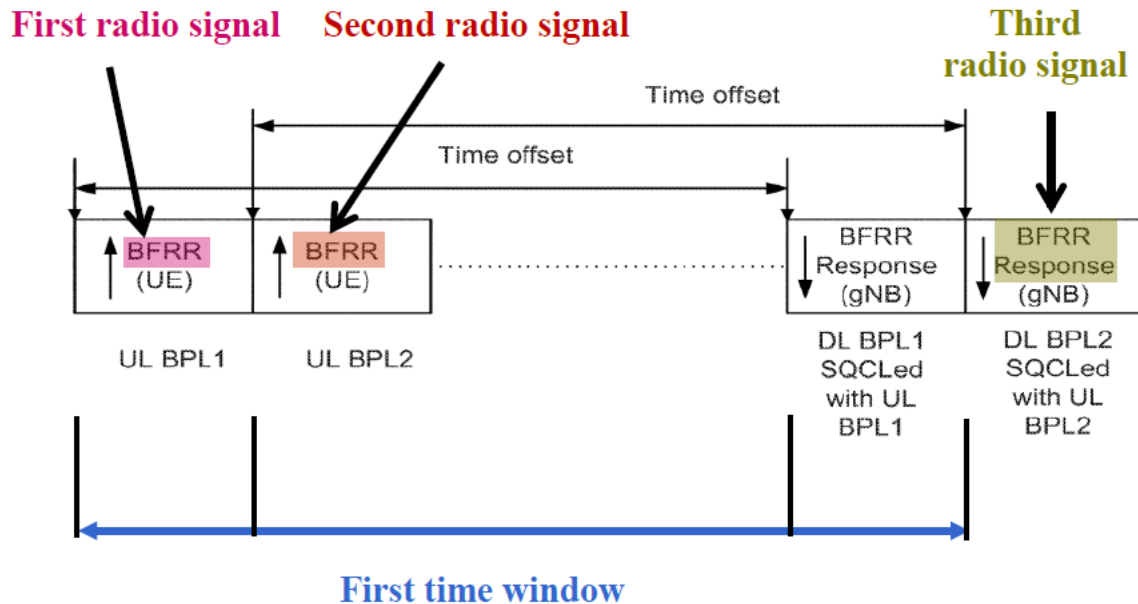
(b) Liu Does Not Disclose “monitoring a third radio signal in a first time window,” as Required by Claim 1

Claim 1 recites “monitoring a third radio signal in a first time window.” Petitioner only relies on Liu for this claim limitation but Liu does not render this claim limitation obvious, as Petitioner asserts. Pet. at 21-23.²

Since Petitioner fails to show how Liu discloses, teaches, or suggests “a second radio signal,” it cannot now disclose, teach, or suggest “a third radio signal.” *See supra* Section VII.A.1(a).

Liu also does not disclose, teach, or suggest the claimed “first time window.” Even assuming that the second BFRR is the claimed “second radio signal” (it is not), Petitioner’s identified time window is merely a fabrication because it attempts to correlate the second BFRR response (intended to be a response to the second BFRR) with the first BFRR instead as a time window. Therefore, the time windows discussed in Liu are not the time windows that Petitioner is identifying in its annotated graphic, displayed below.

² The Petition cites the expert Declaration of Dr. Bims (Ex. 1002, ¶¶ 91-95) for its assertion that this disclosure in Liu meets the limitation, but this portion of the Bims Declaration merely repeats the Petition word-for-word and does not provide any analysis and should, therefore, be given no weight. *See infra* Sec. VIII.



Pet. at 21.

There are only two time windows disclosed in Liu: (1) one time window starts from the first BFRR awaiting a corresponding BFRR response; and (2) a second time window starts from the second BFRR awaiting a corresponding BFRR response. These time windows are noted by the “time offset” labels in Petitioner’s annotated graphic. Such an understanding is confirmed by Liu itself:

Optionally, in any of the preceding aspects, the association between *the BFRR response and received BFRR is represented by a time offset from the BFRR reception to the starting position of a time window within which to transmit the BFRR response.*

Ex. 1007, at [0035].

Optionally, in any of the preceding aspects, the association is represented by *a time offset from the BFRR reception*

to the ending position of a time window within which to transmit the BFRR response.

Id. at [0038].

In one embodiment, in order to recover the connection, a beam failure recovery request (BFRR) is sent by the user equipment in an attempt to reestablish the connection with the base station when a beam failure occurs. Using spatially quasi co-located information between a downlink beam pair and an uplink beam pair provided by the base station, the user equipment may *monitor candidate beams in which to receive a BFRR response from the base station, where the BFRR response is associated with the BFRR and the downlink beam(s) is in a time slot with a time offset to the BFRR.*

Id. at [0054].

As explained in the example of FIGS. 4A and 4B, in the event of a beam failure, the user equipment 404 sends a BFRR in the UL beam pair (UL BPL) to the base station 402. In return, the base station 402 responds with a BFRR response in the DL beam pair (DL BPL) that is SQCL'ed with the UL beam pair used for BFRR transmission by the user equipment 404. In order to implement the BFRR and BFRR response procedure, a transmission occasion association between the BFRR (sent by the user equipment 404) and the BFRR response (sent by the base station 402) is used to monitor the DL beams. In one embodiment, the transmission occasion association is indicated by a *time offset such that UE should monitor the DL beams for the BFRR response from the base station* 402, which is SQCL'ed with the BFRR from the user equipment 404, in a time slot with a time offset relative to the BFRR, as illustrated. Here *the time slot is a time window for UE monitoring BFRR response and the time offset indicates the starting position of the response monitoring window relative to the BFRR.*

Id. at [0096].

FIG. 6D illustrates a flow diagram in which new candidate beams are received and identified by a base station. At 612, the base station 170A-170B receives a BFRR from user equipment 110A-110C identifying a new candidate beam, and transmits a BFRR response associated with the received BFRR at 614. In one embodiment, *the association between the BFRR response and the received BFRR is represented by a time offset from the BFRR reception to the BFRR response transmission*. In another embodiment, *the association between the BFRR response and the received BFRR is represented by a time offset from the BFRR reception to the starting position of a time window within which to transmit the BFRR response*.

Id. at [0106].

Moreover, as Liu's own graphic (FIG. 5B) discloses, assuming Petitioner correctly alleged "the second signal," the third signal shown in the non-annotated Figure is the first BFRP, not the second BFRP as Petitioner incorrectly asserts. Even if the claimed third radio signal was Petitioner's incorrectly alleged second BFRR response, this radio signal falls outside the first time window that extends from the first BFRR to the first BFRR response, in contravention of this claim limitation ("monitoring a third radio signal *in* a first time window").

Therefore, Liu fails to render this claim limitation obvious.

(c) Liu Alone, or in Combination with Jover, Does Not Disclose “wherein a measurement for the target radio signal obtains a target measurement value, the target measurement value, when higher than a target threshold is used for triggering the transmission of the first radio signal and the second radio signal,” as Required by Claim 1

Claim 1 recites “wherein a measurement for the target radio signal obtains a target measurement value, the target measurement value, when higher than a target threshold is used for triggering the transmission of the first radio signal and the second radio signal.” Liu alone, or in combination with Jover, does not render this claim limitation obvious, as Petitioner asserts. Pet. at 23-27.³

Additionally, under either Ground 1 or Ground 2, since Petitioner fails to show how Liu discloses, teaches, or suggests “a second radio signal,” it cannot now disclose, teach, or suggest “triggering the transmission of the first radio signal and the second radio signal,” as required by this claim limitation. *See supra* Section VII.A.1(a).

Petitioner relies on Jover for showing that BER could be used as a target measurement value. Pet. at 24-27. Petitioner proceeds to cite to its expert declaration which, in turn, cites to various other alleged prior art references that it used in the

³ The Petition cites the expert Declaration of Dr. Bims (Ex. 1002, ¶¶ 98-104) for its assertion that this disclosure in Liu and Jover meets the limitation, but this portion of the Bims Declaration merely repeats the Petition word-for-word and does not provide any analysis and should, therefore, be given no weight. *See infra* Sec. VIII.

District Court Litigation, including “Pandey” and “Vembu” to show the use of BER in determining whether beam failure occurred. *Id.*; Ex. 2001, at 55-56.

However, the context in which Jover’s threshold condition for an increase in BER is only used to “begin the beam-sweeping procedure,” and not on triggering a transmission of the first and second radio signal, as required by this claim limitation.

For example, wireless channel sensing engine 320 may detect a threshold drop in the SNR or SINR (*e.g.*, a 20 percent drop as compared to a preceding time period) an increase in the BER (*e.g.*, when the BER increases beyond one percent), and so forth. In one embodiment, when the wireless channel sensing engine 320 determines that one or more of such threshold conditions are met, the wireless channel sensing engine 320 may signal to the beam-forming engine 310 to begin the beam sweeping procedure.

Ex. 1005, at [0040].

Petitioner completely avoids addressing whether Liu, Jover, or any of the other references cited would use BER as a threshold for “triggering the transmission of [*two radio signals*,] the first radio signal *and* the second radio signal.”

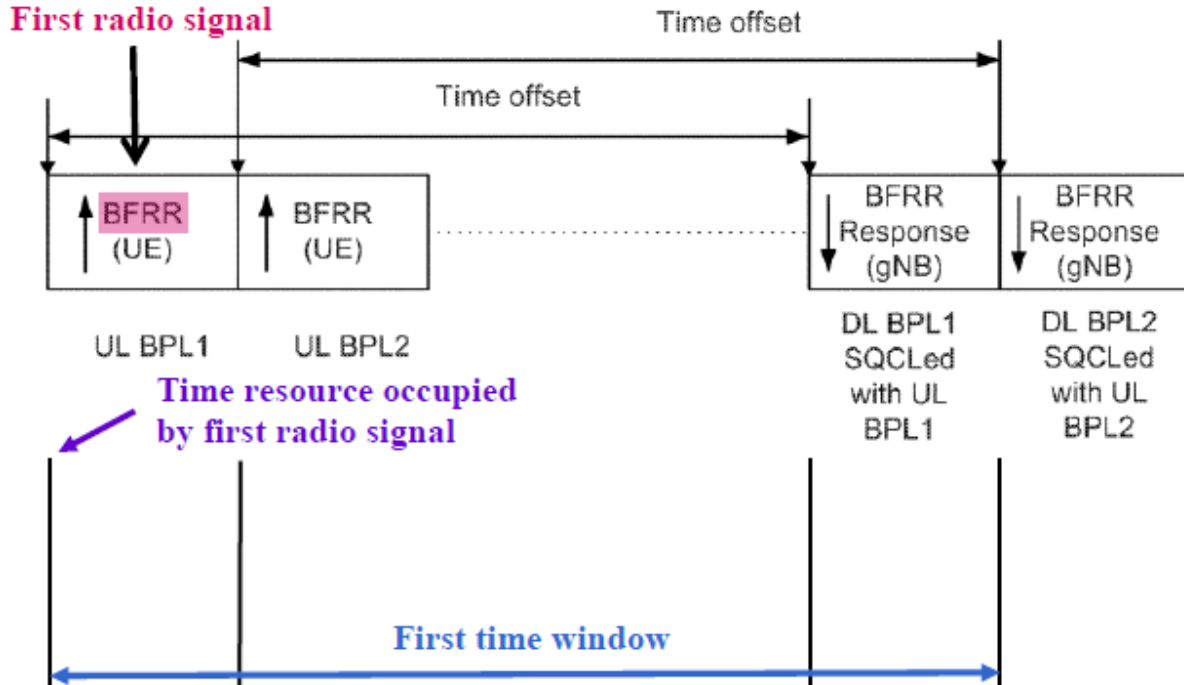
For at least these reasons, Liu alone, or in combination with Jover, fails to render obvious this claimed limitation.

(d) Liu Does Not Disclose “a time resource occupied by the first radio signal is used for determining the start time of the first time window,” as Required by Claim 1

Claim 1 of the '113 Patent recites “a time resource occupied by the first radio signal is used for determining the start time of the first time window.” Petitioner only relies on Liu for this claim limitation but Liu does not render this claim limitation obvious, as Petitioner asserts. Pet. at 27-29.⁴

Since Petitioner fails to show how Liu discloses, teaches, or suggests “a first time window,” it cannot now disclose, teach, or suggest “a time resource occupied by the first radio signal is used for determining the start time of the first time window.” *See supra* Section VII.A.1(b). Specifically, the only two time windows in Liu are between the first BFRR and first BFRR response and between the second BFRR and the second BFRR response in Petitioner’s annotated Figure below, but because Petitioner’s incorrectly identified third radio signal does not fall within the period between the first BFRR and first BFRR response, the de facto first window of Liu, Petitioner fails to show how Liu discloses the claimed “first time window limitation.”

⁴ The Petition cites the expert Declaration of Dr. Bims (Ex. 1002, ¶¶ 105-107) for its assertion that this disclosure in Liu meets the limitation, but this portion of the Bims Declaration merely repeats the Petition word-for-word and does not provide any analysis and should, therefore, be given no weight. *See infra* Sec. VIII.



Pet. at 28.

- (e) **Liu Does Not Disclose “a time domain resource occupied by the first radio signal is used for determining a second time window, a time domain resource occupied by the second radio signal is within the second time window, and the second time window is within the first time window,” as Required by Claim 1**

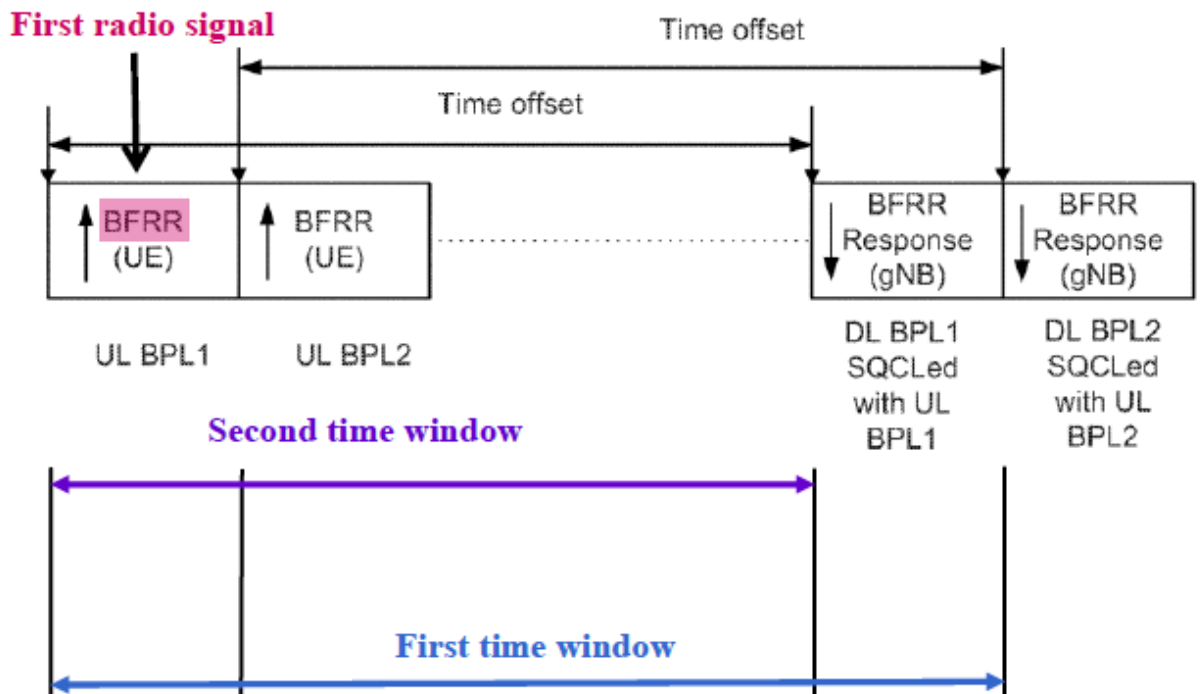
Claim 1 of the '113 Patent recites “a time domain resource occupied by the first radio signal is used for determining a second time window, a time domain resource occupied by the second radio signal is within the second time window, and the second time window is within the first time window.” Petitioner only relies on

Liu for this claim limitation but Liu does not render this claim limitation obvious, as Petitioner asserts. Pet. at 29-31.⁵

Since Petitioner fails to show how Liu discloses, teaches, or suggests “a second radio signal,” it cannot now disclose, teach, or suggest “a time domain resource occupied by the second radio signal.” *See supra* Section VII.A.1(a).

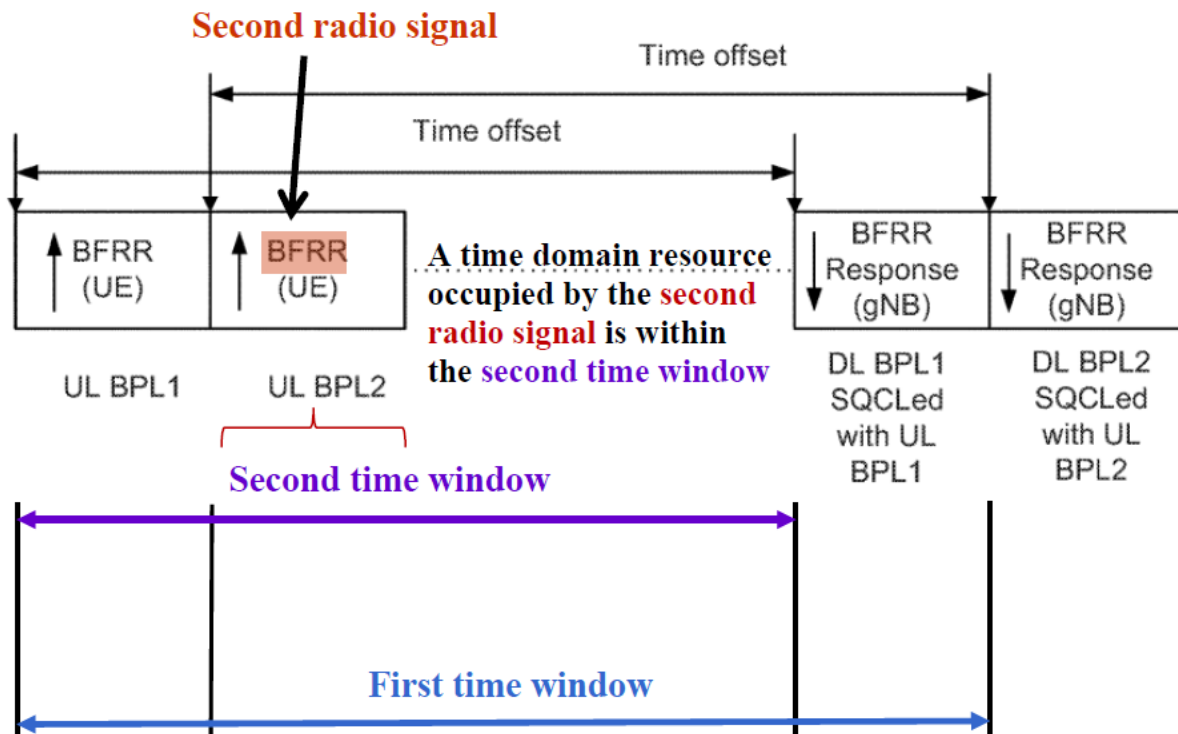
Additionally, since Petitioner fails to show how Liu discloses, teaches, or suggests “the first time window” of the claimed invention, it cannot now disclose, teach, or suggest “a second time window.” *See supra* Section VII.A.1(b). Specifically, the only second time window of Liu is between the second BFRR and second BFRR response, as indicated by Petitioner’s annotated Figure, replicated below.

⁵ The Petition cites the expert Declaration of Dr. Bims (Ex. 1002, ¶¶ 108-111) for its assertion that this disclosure in Liu meets the limitation, but this portion of the Bims Declaration merely repeats the Petition word-for-word and does not provide any analysis and should, therefore, be given no weight. *See infra* Sec. VIII.



Pet. at 29.

Petitioner again fancifully annotates Liu’s FIG. 5B to meet this claim limitation of “a time domain resource occupied by the second radio signal is within the second time window, and the second time window is within the first time window,” as demonstrated below:



Pet. at 31.

As demonstrated in Section VII.A.1(b), there are only two time windows. Petitioner's annotated graphic of Liu's FIG. 5B clearly demonstrates the second time window or offset extends beyond the first time window or offset. Therefore, Liu cannot show "the second time window is within the first time window," as required by the claimed limitation.

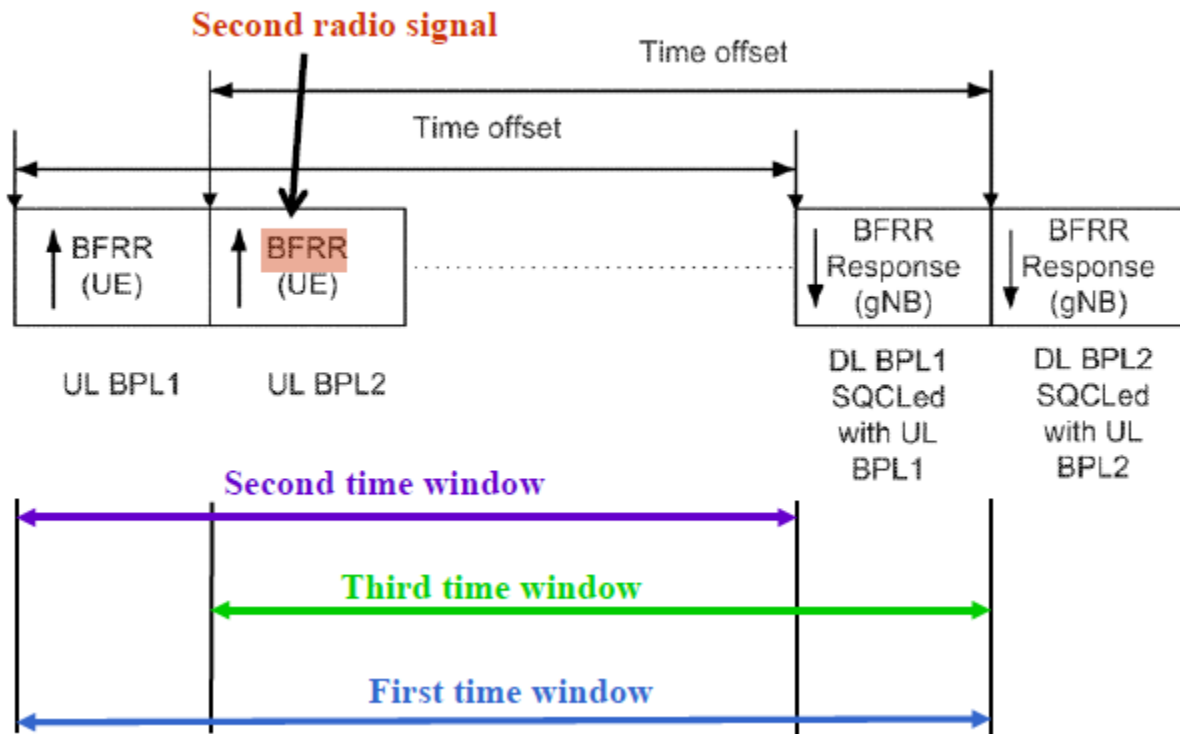
(f) Liu Does Not Disclose “a time domain resource occupied by the second radio signal is used for determining a third time window, and the end time of the third time window is the end time of the first time window,” as Required by Claim 1

Claim 1 of the '113 Patent recites “a time domain resource occupied by the second radio signal is used for determining a third time window, and the end time of the third time window is the end time of the first time window.” Petitioner only relies on Liu for this claim limitation but Liu does not render this claim limitation obvious, as Petitioner asserts. Pet. at 31-33.⁶

Since Petitioner fails to show how Liu discloses, teaches, or suggests “a second radio signal,” it cannot now disclose, teach, or suggest “a time domain resource occupied by the second radio signal.” *See supra* Section VII.A.1(a).

As demonstrated in Section VII.A.1(b), there are only two time windows in Liu. Therefore, Liu cannot show “the third time window,” as required by the claimed limitation. Specifically, the only second time window of Liu is between the second BFRR and the second BFRR response, as indicated by Petitioner’s annotated Figure, replicated below.

⁶ The Petition cites the expert Declaration of Dr. Bims (Ex. 1002, ¶¶ 112-114) for its assertion that this disclosure in Liu meets the limitation, but this portion of the Bims Declaration merely repeats the Petition word-for-word and does not provide any analysis and should, therefore, be given no weight. *See infra* Sec. VIII.



Pet. at 32. But Petitioner mistakenly identifies the actual second time window of Liu from the second BFRR to the second BFRR response as the claimed “third time window” in view of also incorrectly identifying the actual first time window of Xia from the first BFRR to the first BFRR response as the “second time window.” Since the end of the first time window (the time window to receive a response from the first BFRR) is always less than the end of the second time window (the time window to receive a response from the second BFRR) in Liu, it is impossible for any time window to have the same end time, as required by the first and third time window in this claim limitation.

(g) Liu Does Not Disclose “the second time window and the third time window have overlapped time domain resource(s),” as Required by Claim 1

Claim 1 of the ’113 Patent recites “the second time window and the third time window have overlapped time domain resource(s).” Petitioner only relies on Liu for this claim limitation but Liu does not render this claim limitation obvious, as Petitioner asserts. Pet. at 33-34.⁷

As demonstrated in Section VII.A.1(b), there are only two time windows in Liu. Therefore, Liu cannot show “the second time window and the third time window have overlapped time domain resource(s),” as required by the claimed limitation.

2. Independent Claims 6, 11, and 16

Claim 6 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.” In other words, Claim 6 discloses a method from the perspective of the base station that is in communication with the UE in Claim 1. For at least the same reasons as Claim 1, Liu alone, or in combination with Jover, fails to obviate Claim 6.

⁷ The Petition cites the expert Declaration of Dr. Bims (Ex. 1002, ¶¶ 115-116) for its assertion that this disclosure in Xia meets the limitation, but this portion of the Bims Declaration merely repeats the Petition word-for-word and does not provide any analysis and should, therefore, be given no weight. *See infra* Sec. VIII.

Claim 11 recites “[a] UE for wireless communication,” which is the apparatus claim of Claim 1. For at least the same reasons as Claim 1, Liu alone, or in combination with Jover, fails to obviate Claim 11.

Independent Claim 16 recites “[a] base station device for wireless communication” that mirrors the claim limitations of Claim 11, which recites “[a] UE for wireless communication.” In other words, Claim 16 discloses the base station device that is in communication with the UE in Claim 11. For at least the same reasons as Claim 11, Liu alone, or in combination with Jover, fails to obviate Claim 16.

3. Dependent Claims 2-5, 7-10, 12-15, and 17-20

Claims 2-5 are dependent on Claim 1, Claims 7-10 are dependent on Claim 6, Claims 12-15 are dependent on Claim 11, and Claims 17-20 are dependent on Claim 20. Therefore, Claims 2-5, 7-10, 12-15, and 17-20 are not obvious over Liu, or Liu combined with Jover, for at least the same reasons as Claims 1, 6, 11, and 16, respectively.

VII. THE PETITION SHOULD BE DENIED IN THE DISCRETION OF THE DIRECTOR UNDER 35 U.S.C. § 314(A)

Based on Petitioner’s reasons regarding § 314(a), the Board should exercise its discretion to deny this Petition.

The circumstances of the parallel District Court Litigation necessitate denial of the Petition under the Board’s precedent, as every factor considered in relation to

efficiency, fairness, and the merits supports denial. *See Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11, at 6 (P.T.A.B. Mar. 20, 2020) (precedential) (considering (a) “whether the petitioner and the defendant in the parallel proceeding are the same party”; (b) “overlap between issues raised in the petition and in the parallel proceeding” (c) “proximity of the court’s trial date to the Board’s projected statutory deadline for a final written decision”; (d) “investment in the parallel proceeding by the court and the parties”; (e) “whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted”; and (f) “other circumstances that impact the Board’s exercise of discretion, including the merits.”).

As set forth below, these factors collectively demonstrate that efficiency and integrity of the AIA are best served by denying review. First, the Petitioner is the Defendant in the parallel proceeding. *See infra* Section VII.A. Second, the Challenged Claims are all at issue in the District Court Litigation, and Petitioner has raised identical arguments for invalidity there. *See infra* Section VII.B. Third, trial in the District Court Litigation is set for June 24, 2024, four months earlier than the projected statutory deadline for a Final Written Decision of this Petition in October 9, 2024. *See infra* Section VII.C. Fourth, the parties (and Patent Owner in particular) have invested significant resources on developing legal and factual issues of validity and infringement in the District Court Litigation and will have invested substantially more resources before any decision on this Petition. *See infra* Section VII.D. Fifth,

the Court has already denied a stay pending this Petition. *See infra* Section VII.E. Finally, no other factors favor institution. *See infra* Section VII.F.

Accordingly, the Board should exercise its discretion under § 314(a) and deny the Petition because institution of this proceeding would not be consistent with the objective of the AIA to “provide an effective and efficient alternative to District Court litigation.” *NHK Spring Co. v. Intri-Plex Techs., Inc.*, IPR2018-00752, Paper 8, at 20 (P.T.A.B. Sept. 12, 2018) (quoting *Gen. Plastic Indus. Co. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19, at 16–17 (P.T.A.B. Sept. 6, 2017) (precedential)).

**A. The Parallel District Court Litigation and the Petition
Involve the Same Parties**

As noted in Patent Owner’s Mandatory Notice, there exists a parallel District Court Litigation between the same parties regarding the same subject patent (the ’113 Patent). *Samsung Elecs. Co., Ltd. et al., v. Apex Beam Techs. LLC*, IPR2023-00601, Paper 6 at 3 (P.T.A.B. Jan. 23, 2023); Pet. at 67-68. Accordingly, this factor weighs in favor of discretionary denial.

B. The District Court Litigation Involves Substantially the Same Claims, Grounds, Arguments, and Evidence

This Petition is co-extensive with invalidity arguments that Petitioner has already raised in the District Court Litigation. Ex. 2001, at 55-56. “In at least these ways, the parallel proceedings would duplicate effort. This is an inefficient use of Board, party, and judicial resources and raises the possibility of conflicting decisions.” *Cisco Sys., Inc. v. Ramot at Tel Aviv Univ. Ltd.*, IPR2020-00122, Paper 15 at 10 (P.T.A.B. May 15, 2020). Accordingly, this fact weighs strongly in favor of discretionary denial.

For this reason, denial of institution under § 314(a) is appropriate because the Petition “includes the same or substantially the same claims, grounds, arguments, and evidence as presented in the parallel [District Court] proceeding.” *Fintiv*, IPR2020-00019, Paper 11, at 12.

C. Proximity of the District Court’s Trial Date

The proximity of the District Court Litigation’s trial date to the Board’s projected statutory deadline for a Final Written Decision strongly weighs in favor of discretionary denial.

The parties’ trial is scheduled for June 24, 2024. Exhibit 2002 (Docket Control Order, Dkt. 37, *Apex Beam Techs. LLC v. Samsung Elecs. Co., Ltd., et al.*, Case No. 2:22-cv-00188-JRG (E.D. Tex. Feb. 6, 2023). Pursuant to 35 U.S.C. §§ 314(b)(1) and 316(a)(11), the projected statutory deadline for a Final Written Decision of this

Petition is October 9, 2024.⁸ As the District Court’s trial will be almost four months before the projected statutory deadline, this factor weighs strongly in favor of denying institution. *See Supercell Oy v. Gree, Inc.*, IPR2020-00513, Paper 11 at 10-12 (P.T.A.B. June 24, 2020) (denying institution where the jury trial was scheduled to conclude approximately ten months before the statutory deadline); *Edward LifeSciences Corp. v. Evalve, Inc.*, IPR2019-01479, Paper 7, at 6-13 (P.T.A.B. Feb. 26, 2020) (denying institution where jury trial would conclude more than nine months before a final decision would be due); *Samsung Elecs. Am., Inc. v. Uniloc 2017 LLC*, IPR2019-01218, Paper 7, at 7-10 (P.T.A.B. Jan. 7, 2020) (denying institution where jury selection was scheduled for approximately six months before trial in the Board proceeding would conclude); *Next Caller Inc. v. TrustID, Inc.*, IPR2019-00961, -00962, Paper 10, at 8-16 (P.T.A.B. Oct. 16, 2019) (denying institution where trial was scheduled to conclude “several months,” before a final decision would be due); *Cisco Sys., Inc.*, IPR2020-00122, Paper 15 at 8 (“Because the trial date is substantially earlier than the projected statutory deadline for the Board’s final decision, this factor weighs in favor of discretionary denial.”).

⁸ Petitioner incorrectly states that “[a] FWD is anticipated in August 2024, about one month after trial ends.” Pet. at 68. Pursuant to U.S.C. § 314(b)(1), an Institution Decision is due, three months after this Preliminary Response, on October 9, 2023 (since October 7, 2023 falls on a Saturday). Pursuant to 35 U.S.C. § 316(a)(11), a Final Written Decision is due one year after an Institution Decision, on October 9, 2024.

Petitioner does not contest that the proximity of the trial favors denial of institution. Thus, this factor also weighs in favor of discretionary denial.

D. Significant Investment and Petitioner's Delay in Filing the Petition

The parties' investment in the parallel proceeding weighs in favor of discretionary denial.

In the District Court Litigation, the Court has already filed a Docket Control Order (Dkt. 37), Discovery Order (Dkt. 38), and Protective Order (Dkt. 44). Discovery is also well under way. The parties have already exchanged initial disclosures, infringement contentions pursuant to P.R. 3-1 and invalidity contentions pursuant to P.R. 3-3, and a trial date is set for June 24, 2024, which is less than a year away. Ex. 2002.

As noted above, the two references used in the Petition (Liu and Jover) and Petitioner's corresponding arguments significantly overlap with the claims, references, arguments, and evidence in the District Court Litigation. Petitioner further fails to offer any explanation why the Board should review the same claims on the same grounds which will already have been adjudicated by the District Court based on the parties' investment. Thus, the parties' and Court's substantial investment in this proceeding weighs in favor of denial of institution under this factor.

E. No Stay of the Parallel District Court Litigation

There is no stay of the parallel District Court Litigation, and Petitioner's previous motion to stay the case pending *inter partes* reviews, including this *inter partes* review, was denied. Ex. 2003, Order Denying Motion to Stay Pending Inter Partes Review, Dkt. 55, *Apex Beam Techs. LLC v. Samsung Elecs. Co., Ltd., et al.*, Case No. 2:22-cv-00188-JRG (E.D. Tex. June 14, 2023). Even if the Petition was instituted and Petitioner filed a motion to stay the District Court Litigation again, prejudice, tactical disadvantage to Patent Owner, the stage of the litigation and the lack of potential simplification would weigh strongly against such a motion. *See Lennon Image Techs., LLC v. Macy's Retail Holdings, Inc.*, 2:13-CV-00235-JRG, 2014 WL 4652117, at *1 (E.D. Tex. Sept. 18, 2014); *see Intell. Ventures II LLC v. FedEx Corp.*, No. 2:16-cv-00980-JRG, Dkt. 141 at 4-5 (E.D. Tex. Oct. 24, 2017) ("The Court agrees that the Parties have already invested substantial effort and resources during discovery and in preparing claim construction briefing. . . . These circumstances weigh against staying this case").

Moreover, a stay would not decrease the burden on the Court and the parties since the instituted IPRs cover only two out of at least 16 references that Petitioner raised in the District Court Litigation for both anticipation and obviousness, and challenges under § 112 and § 101. Ex. 2001, at 48-49, 55-57, 66-68. *Intell. Ventures*, No. 2:16-cv-00980-JRG, Dkt. 141 at 3-4 ("[T]he instituted IPRs only cover a narrow

slice of the invalidity arguments Defendants have raised in this case. For example, Defendants have argued that the '715 Patent is invalid under § 102 with respect to at least eight references . . . under § 103 with respect to at least twenty-six combinations . . . under § 112 [], and under § 101.”).

Accordingly, it would be unlikely for the Court to hold that a stay would streamline the litigation and this factor supports denial of institution.

F. Other Factors Favor Discretionary Denial

Petitioner does not present a strong case on the merits, further supporting denial of institution. *See supra* Section VI. Petitioner also does not identify any other factors which weigh against discretionary denial. Pet. at 67-69.

Thus, when viewing the factors together, the Petition should be denied in the Director’s discretion under 35 U.S.C. § 314(a).

VIII. PETITIONER’S EXPERT DECLARATION SHOULD NOT BE CONSIDERED

“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.” 37 C.F.R. § 42.65(a). Here, the Declaration of Dr. Bims is almost entirely a word-for-word recitation of the Petition, except for the Introduction, Qualifications Background, Materials Considered, and Legal Standards sections. *See* Ex. 2004, at 74-167. Because Dr. Bims does not provide any independent analysis aside from copying the attorney arguments in the Petition and does not disclose the underlying facts or data upon which his opinions

are based, his opinion should be entitled to no weight. *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper No. 9 (P.T.A.B. Aug 24, 2022) (designated precedential Feb. 10, 2023, Paper 12) (denying institution and rejecting a conclusory and unsupported expert declaration that repeated portions of the Petition verbatim.).

IX. CONCLUSION

For the foregoing reasons, Patent Owner respectfully requests that the Board deny institution of the Petition in its entirety.

Respectfully submitted,

Dated: July 7, 2023

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CERTIFICATE OF WORD COUNT

The undersigned hereby certifies that the portions of the above-captioned PATENT OWNER'S PRELIMINARY RESPONSE specified in 37 C.F.R. § 42.24 has 7,843 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,

July 7, 2023

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