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 RESPONSE

Case No. IPR2023-00601

APPLE-1036

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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	Docket Control Order, Dkt. 37, *Apex Beam Technologies LLC v. Samsung Electronics Co., Ltd., et al.*, 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, *Apex Beam Technologies LLC v. Samsung Electronics Co., Ltd, et al.*, Case No. 2:22-cv-00188-JRG (E.D. Tex. June 14, 2023)
2004	Redline Comparison of the Declaration of Harry R. Bims, Jr., Ph.D. (Ex. 1003) to the Petition
2005	Declaration of Miguel Gomez ("Gomez Decl."), dated December 26, 2023 and Exhibit A, Curriculum Vitae of Miguel Gomez.
2006	Deposition of Harry Bims, taken in *Samsung Elecs. Co., v. Apex Beam Techs. LLC*, IPR2023-00601 and IPR2023-00602, on December 13, 2023. ("Bims Depo.")

I. INTRODUCTION

The Board should issue a Final Written Decision finding Claims 1-20 (the "Challenged Claims") of the U.S. Patent No. 10,568,113 (Ex. 1001, the "'113 Patent") not unpatentable because Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, "Petitioner" or "Samsung") fail to show that the Challenged Claims are obvious (1) over U.S. Patent Application Publication No. 2019/0053294 Xia *et al.*, published February 14, 2019 (Exhibit 1004, "Xia"); or (2) over Xia in view of U.S. Patent Application Publication No. 2015/0141026 to Jover, published May 21, 2015 (Exhibit 1005, "Jover").

Petitioner does not assert any grounds of anticipation, but asserts two grounds of obviousness. Xia alone or the combination of Xia and Jover do not teach key claim elements of the '113 Patent's Challenged Claims, such as "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," "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," and "the second time window and the third time window have overlapped time domain resource(s)." Notably, Petitioner's second ground of obviousness does not

render obvious any of the Challenged Claims because a person of ordinary skill would not have been motivated to combine Xia with Jover since Jover's disclosure is inapposite to the claims of the '113 Patent.

Petitioner also (i) incorrectly construes "triggering the transmission" to merely mean "transmission" instead of "causing a transmission" and (ii) incorrectly construes "second time window" as the period of time that a first radio signal waits for a responsive signal rather than the period of time from the first radio signal in which to transmit the second radio signal.

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. Harry Bims, demonstrate that the Challenged Claims are patentable. Accordingly, the Board should issue a Final Written Decision finding all the Challenged Claims of the '113 Patent not unpatentable.

II. THE '113 PATENT

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." '113 Patent, 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. *Id.*, 122-142. In response, 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. *Id.* 1003, 153-161. The Examiner subsequently allowed the claims. *Id.*, 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.

Id., at 177.

III. THE ALLEGED PRIOR ART

A. U.S. Patent Application Publication No. 2019/0053294 ("Xia")

Xia is directed to "technology for beam failure recovery in user equipment, comprising detecting a beam failure event between the user equipment and a base station, sending a first beam failure recovery request (BFRQ) to the base station upon detection of the beam failure and searching for a beam failure recovery response (BFRP) within a first response window." Ex. 1004 at Abstract. Xia discloses the problem it tries to solve 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 particular, a beam failure recovery request (BFRQ) and response (BFRQ) method based on a PRACH-like channel and PUCCH is disclosed. The disclosed mechanism determines whether the BFRQ should be sent using the PRACH-like channel or the PUCCH, depending on the expected BFRQ.

Id., at [0035].

Xia is explicit that, in embodiments where the BFRQ is sent by both PUCCH and PRACH, the BFRQ refers to the same event regardless of channel and, at most, the second BFRQ is marked only as being second in time or order.

> In the example of FIG. 6A, the PUCCH-BFRQ is sent followed by the PRACH-BFRQ. In particular, after a PUCCH-BFRQ is sent at tl, and before a PUCCH-BFRP arrives at the UE 404 from the gNB 402, the UE 404 has a PRACH-BFRQ OPPORTUNITY and sends a second BFRQ using a PRACH-BFRQ#l (unlike the example in FIG. 5B in which only one of the BFRQs are sent, both BFRQs are sent in this example). Under these circumstances, the ***UE 404 notifies (as explained below) the gNB 402 that the second BFRQ (PRACH-BFRQ) shares the same BFR event as the first BFRQ*** (PUCCH-BFRQ), notifying the gNB 402 that ***both BFRQs relate to the same event*** prevents the gNB 402 from misinterpreting the two BFRQs as being separate events for the same UE 404.

> In one embodiment, the UE 404 may notify the gNB 402 by marking the second BFR event, when sending the BFRQ, ***as being second in time or order*** such the gNB 402 identifies the second BFRQ (PRACH-BFRQ) as not being a first request.
>
> In another embodiment, the UE 404 may notify the gNB 402 by placing a pointer to the first BFRQ (PUCCHBFRQ) in the second BFRQ (PRACH-BFRQ), which indicates that ***the PUCCH-BFRQ and the PRACH-BFRQ correspond to the same BFR event***.
>
> In still another embodiment, the UE 404 may notify the gNB 402 by placing a BFR event ID in both the first and second BFRQs (PUCCH-BFRQ and PRACH BFRQ), such that ***all BFRQs with the same BFR event ID correspond to the same BFR event***.

Id., at [0093]-[0096] (emphases added).

Xia also discloses two time windows, as indicated in its FIG. 6B:

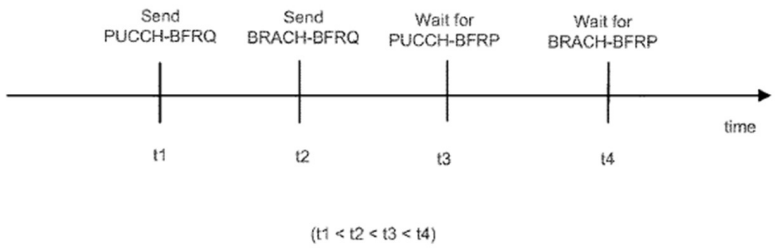


FIG. 6B

Id,, at FIG. 6B. Therefore, in Xia there is (1) a first time window that starts from the PUCCH-BFRQ awaiting a PUCCH-BFRP (from t1 to t3); and (2) a second time window that starts from the BRACH-BFRQ awaiting a BRACH-BFRP (from t2 to t4). Such an understanding is confirmed by Xia itself:

> As illustrated in the example of FIG. 6B, a single BFRP is sent in response to two BFRQs. In the example, the UE 404 sends two BFRQs – a PUCCH-BFRQ at time t1 and a PRACH-BFRQ at time t2. The UE 404 then ***waits for a single BFRP*** – a PUCCH-BFRP at time t3 or a PRACH-BFRP at t4, from the gNB 402.

Id., at [0102] (emphasis added). Whichever BFRP comes first (PUCCH or PRACH) ends the first and second time window.

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

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.

Id., at [0040].

IV. 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. "triggering the transmission"

Despite the Parties not proposing any claim constructions during the Institution phase, Petitioner has apparently improperly construed "triggering the transmission" in the same way as "transmission". *See infra* Section VII.A.1; Ex. 2005, ¶ 34. Patent Owner proposes the following claim construction: "triggering the transmission" should be construed to mean "cause the transmission." *Id.*

Petitioner's construction of this term to read out the word "triggering" runs contrary to the general assumption that different terms have different meanings, and therefore should be rejected. *CAE Screenplates Inc. v. Heinrich Fiedler GmbH &*

Co. KG, 224 F.3d 1308, 1317 (Fed. Cir. 2000) ("In the absence of any evidence to the contrary, we must presume that the use of these different terms in the claims connotes different meanings."); *Neville v. Found. Constructors, Inc.*, 972 F.3d 1350, 1357 (Fed. Cir. 2020) (rejecting argument that "end plate" can be an indistinguishable part of the "protrusion" where claimed protrusion extends outwardly from an end plate; "While the 'protrusion' and 'end plate' structures must be connected in some fashion, the use of these 'two terms in a claim requires that they connote different meanings.'"); *Apple Inc. v. Firstface Co.*, No. 2021-1001, 2021 WL 4156323, at *1–*2 (Fed. Cir. Sept. 13, 2021) (aff'g PTAB non-obviousness; that one claim uses both "perform" and "initiate" reinforces that "performing" (without additional user input) means full performance of the function (without additional user input) not just initiating it).

A person of ordinary skill in the art would understand that the patent specification points to no specific meaning of the word "triggering" other than the plain and ordinary meaning of the term, which can be ascertained from any dictionary:

> "cause to happen"

Ex. 2005, ¶ 34 (citing https://www.thesaurus.com/browse/triggering).

> "to cause something to start"

Id. (citing https://dictionary.cambridge.org/us/dictionary/english/trigger).

As a result of Petitioner's improper construction of "triggering the transmission," as noted below (*see infra* Section VII.A.1), Patent Owner requests that the Board provide an express claim construction that "triggering the transmission" is different than mere "transmission" and that "triggering the transmission" means "causing the transmission." *Id.* at ¶ 35.

B. "first time window"; "second time window"; and "third time window"

In order to more fully establish the non-obviousness of the challenged claims, Patent Owner believes that the Board would benefit from an express construction of the terms, "first time window," "second time window," and "third time window" to make clear its bounds in the context of Petitioner's arguments. *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (alteration in original) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)) ("The Board is required to construe 'only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.'").

Therefore, Patent Owner proposes the following claim constructions:

> "first time window": a period of time from the first radio signal in which to receive a third radio signal (*i.e.*, a response to either the first or second radio signals)
>
> "second time window": "a period of time from the first radio signal in which to transmit the second radio signal"
>
> "third time window": "a period of time from the second radio signal in which to receive a third radio signal (*i.e.*, a

> response to either the first or second radio signals)"

Ex. 2005, ¶ 36.

A person of ordinary skill in the art would understand that each of the claimed time windows are "a period time," as Petitioner's own expert admits:

> Q. Right, and Figure 6 shows time windows; my question is what is a time window?
>
> A. A time window as shown in Figure 6 is ***a period of time*** on the time axis.

Ex. 2006, 75:6-11 (emphases added); Ex. 2005, ¶ 37.

Petitioner's expert's definition of "time windows" comports with the plain and ordinary meaning identified by Wiley Electrical and Electronics Engineering Dictionary:

> **window**:
>
> **1.** A time interval during which an activity may take place. Also, a time interval during which an activity must take place.

Steven M. Kaplan, Wiley Electrical and Electronics Engineering Dictionary, 2006; *Id.* ¶ 38. The Petition does not engage with "which [] activity [may]/[must] take place" in the first, second, and third "periods of time," rendering the time window terms arbitrary without further construction. Ex. 2005, ¶ 38.

Embodiment 6 "illustrates an example of a first time window, a second time window and a third time window, as shown in FIG. 6." '113 Patent, 22:44-46; Ex.

2005, ¶ 39.

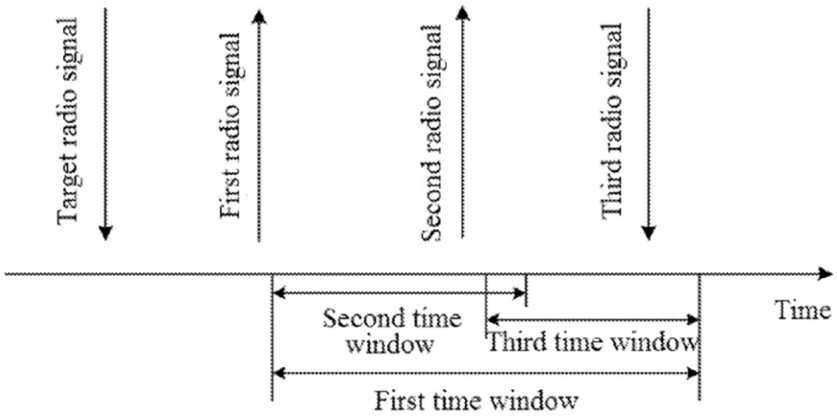


FIG.6

'113 Patent, Fig. 6. In combination with the claim language, which recites "monitoring a third radio signal in a first time window," the first time window (which includes both the second and third time window) is a period of time allocated in order to receive a response to the signal requests of the first and second radio signals, where the response is indicated by the monitored third radio signal, as shown in Fig. 6 above. Ex. 2005, ¶ 39.

The "first time window" is also described by the patentee as below:

> 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.

'113 Patent, 1:43-52 (emphasis added); Ex. 2005, ¶ 40. The "third time window" is related to the "first time window" because it is a portion of the first time window starting from the second radio signal in which to receive a third radio signal. *See, e.g.,* Claim 1 ("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"); *Id.*

The "second time window" of Claims 1, 6, 11, and 16 is described with respect to Embodiment 6. It has a different function than the first and third time windows, as the '113 patent specifies:

> The UE conducts monitoring of the third radio signal in a ***time interval between the start time of the first time window and the time domain resource occupied by the second radio signal***, but does not detect the third radio signal. The third radio signal is transmitted after the second radio signal.

'113 Patent, 22:56-60 (emphasis added); Ex. 2005, ¶ 41. Namely, the '113 Patent describes the second time window as a time interval or period of time between the start of the first time window and the time domain resource occupied by the second radio signal (the same time domain resource that is used to determine a third time window, as indicated in Claim 1). *Id.* While it is possible that a "third radio signal" (*e.g.*, a signal responsive to the request of the first radio signal) is received during

this second time window (part of the first time window) and before the third time window, Fig. 6 shows the scenario where the third radio signal is received in the third time window. *Id.* The '113 Patent specification further confirms that the second time window is defined as the period of time from the first radio signal in which to receive the second radio signal because it explicitly states that "[the]/[a] time domain resource occupied by the second radio signal is within the second time window." '113 Patent, 22:53-54, Claim 1; *id.* A person of ordinary skill in the art would understand that, if the second time window was merely a period of time from the first radio signal in which to receive a responsive signal (*i.e.*, a third radio signal), it would be possible to reach a scenario that a second radio signal falls outside the second time window, which defies the limitations of the claim. Ex. 2005, ¶ 41.

V. 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 . . ." and that "[a]dditional relevant work experience can compensate for less education, and *vice versa*." Pet. At 14; Ex. 2005, ¶ 27. The Board noted that "Petitioner's last sentence regarding additional relevant work experience compensating for less education and *vice versa*, [] is vague." Inst. At 10-11; Ex. 2005, ¶ 27. 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. 2005, ¶ 27.

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

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. *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); and *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. 10" 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. Xia Alone or in Combination with Jover Does Not Render Claims 1-5 Obvious

1. Xia Alone or in Combination with Jover Does Not Render Obvious "*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 the limitation "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."

(1) Ground 1: Xia

Even if BER were disclosed in Xia, Petitioner does not describe the claimed limitation which is "triggering the transmission of the first radio signal and the second radio signal" under the proper construction of "triggering the transmission," as described above in Section IV.A. Ex. 2005, ¶ 42. Xia merely states that "[a]fter the UE 404 detects the beam failure; a beam failure recovery request (BFRQ)

transmission is performed." Ex. 1004 at [0078]; *id.* Xia's disclosure of transmission that occurs after detection of beam failure is not the same as and does not render obvious the claimed system where the exceeding of a target threshold itself causes the transmission of the first and second radio signals, as the claim requires. Ex. 2005, ¶ 42. A person of ordinary skill in the art would understand that the claim limitation requires more than just transmission that sequentially occurs after a target threshold is exceeded, but rather that exceeding a target threshold "triggers" or "causes" the transmission of two radio signals. *Id.* Xia is silent on establishing causality between the threshold being exceeded and transmitting the first and second radio signal. *Id.*

(2) Ground 2: Xia and Jover

Jover does not cure the deficiencies of Xia above. Ex. 2005, ¶ 43. Petitioner relies on showing that BER could be used as a target measurement value and proceeds to cite to its expert declaration which, in turn, cites to various other alleged prior art references that it used in the District Court Litigation, including "Pandey" and "Vembu," to show the use of BER in determining whether beam failure occurred. Pet. at 26-29; *see* Ex. 2001, at 55-56.

However, the context in which Jover's threshold condition for an increase in BER is not used for 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] (emphasis added); Ex. 2005, ¶ 43.

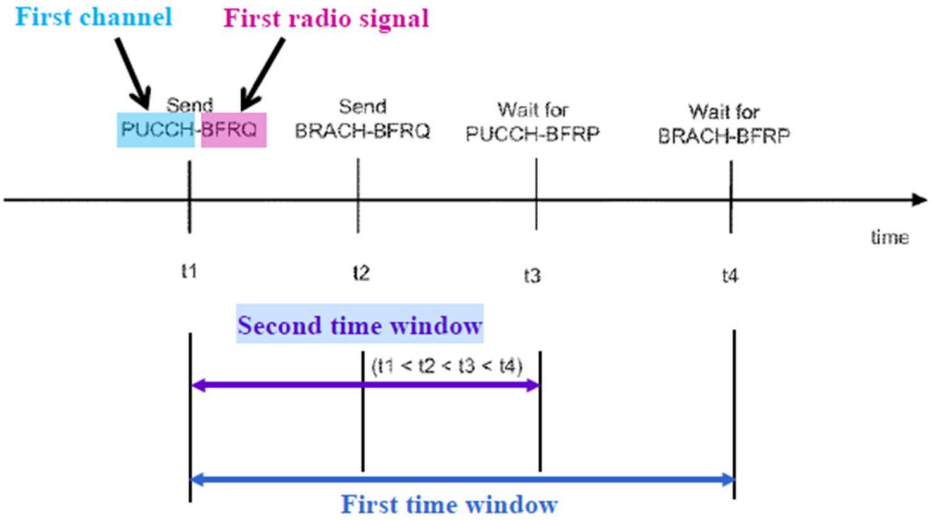
A person of ordinary skill in the art would not understand "the beam sweeping procedure" to be the transmission of the first and second radio signals. Ex. 2005, ¶ 44. Petitioner avoids addressing whether Xia, Jover, or any of the other references cited would use BER as a threshold for "causing" or "triggering the transmission of the first radio signal and the second radio signal." *Id.* As noted above, a person of ordinary skill in the art would understand that "causing the transmission" requires causality between the threshold being exceeded and transmitting the first and second radio signal. The required link of causality is missing from Jover. *Id.*

In view of Petitioner's incorrect construction of this claim limitation that reads out the term "triggering" in the claim language, Petitioner cannot prove that this claim limitation is rendered obvious by Xia alone or in combination with Jover by a preponderance of the evidence. *Id.* ¶ 45.

2. Xia Alone or in Combination with Jover Does Not Render Obvious "*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,*" and *"the second time window and the third time window have overlapped time domain resource(s),*" as Required by Claim 1

Claim 1 recites the limitations "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," and "the second time window and the third time window have overlapped time domain resource(s)." Petitioner only relies on Xia to render obvious these claim limitations. Ex. 2005, ¶ 46.

Petitioner relies on an annotated version of Xia's Fig. 6B to render obvious the claimed "second time window," as shown below:



Pet. at 32 (citing Ex. 1004, FIG. 6B); *id.* In particular, Petitioner argues that the second time window is the designated wait period from t1, when the PUCCH-BFRQ is transmitted, to t3 in order to receive PUCCH-BFRP. *Id.* Petitioner's argument contradicts the proper construction of the "second time window" as "a period of time from the first radio signal in which to transmit the second radio signal," as described in Section IV.B because Petitioner's proposed second time window from Xia completely ignores when the second radio signal is transmitted. Ex. 2005, ¶ 46.

As noted in Section IV.B, the purpose of a second time window is ensuring that the second radio signal is transmitted within a certain period of time from the first radio signal which overlaps with the period of time from the second radio signal to receive a responsive third radio signal. In that way, the other elements of the claim can be met: "A time domain resource occupied by the second radio signal is within the second time window" and "and the second time window and the third time window have overlapped time domain resource(s)." *Id,*, ¶ 47.

Therefore, Claim 1 is not rendered obvious by Xia alone or in combination with Jover. *Id.*, ¶ 48.

B. Xia Alone or in Combination with Jover Does Not Render Claims 2-20 Obvious

Claims 2-5 depend upon Claim 1, and for at least the same reasons as Claim 1, any combination of Xia and Jover fails to obviate Claims 2-5. *Id.*, ¶ 49.

Claims 6-10 recites "[a] method in a base station for wireless communication"

that mirrors the claim limitations of Claims 1-5, which recites "[a] method in a User Equipment (UE) for wireless communication." *Id.*, ¶ 50. In other words, Claims 6-10 disclose a method from the perspective of the base station that is in communication with the UE in Claims 1-5. *Id.* For at least the same reasons as Claims 1-5, Xia alone or Xia in combination with Jover fails to obviate Claims 6-10. *Id.*

Claims 11-15 recite "[a] UE for wireless communication," which are the apparatus claims of Claims 1-5. *Id.*, ¶ 51. For at least the same reasons as Claims 1-5, any combination of Xia and Jover fails to obviate Claims 11-15. *Id.*

Claims 16-20 recite "[a] base station device for wireless communication" that mirrors the claim limitations of Claims 11-15, which recites "[a] UE for wireless communication." *Id.*, ¶ 52. In other words, Claims 16-20 discloses the base station device that is in communication with the UE in Claims 11-15. *Id.* For at least the same reasons as Claim 11, any combination of Xia and Jover fails to obviate Claims 16-20. *Id.*

C. There is No Motivation to Combine Xia with Jover

A person of ordinary skill in the art would not have looked to combine Xia with Jover or look to Jover at all since Jover is directed to the opposite objective of the '113 Patent or Xia. *Id.*, ¶ 53.

Where Xia looks to resolve a beam failure due to attenuation, misalignment

and other channel deficiencies (*see* Ex. 1004, at [0003]-[0004]), Jover looks to solve a channel impairment specific to a region in space, such as jamming, by steering beams to ignore signals from a certain area (*i.e.*, "beam steering and null generation"):

> In particular, the present disclosure relates to any cellular network suitable for use with endpoint devices having multiple antennas/directional antennas for beam steering and null generation.

See, e.g., Ex. 1005, at [0033]; Ex. 2005, ¶ 54. As another example, 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." Ex. 1005, [0003]; Ex. 2005, ¶ 54.

A person of ordinary skill in the art would not understand Jover to describe, or be related to, the beam recovery request methodology of the '113 Patent. Ex. 2005, ¶ 55. Instead, Jover teaches away from the methods related to Beam Recovery Requests disclosed in the '113 Patent that seek to maximize aerial resources by transmitting multiple beam recovery requests within the same time window to increase signal strength. '113 Patent, 1:25-59; *id.* Jover provides no attempt to improve the beam strength, but rather ignores it through beam sweeping or nullify

it, in contrast to the purpose of the ’113 Patent. *Id.*

Because Petitioner’s Ground 2 is dependent upon the combination of Xia and Jover, Petitioner cannot prove that Challenged Claims are rendered obvious by Petitioner’s Ground 2. *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,

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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 5,447 words in compliance with the 14,000 word limit set forth in 37 C.F.R. § 42.24. This word count was prepared using Microsoft Word for Office 365.

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