

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,

Petitioner,

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. IPR2025-00921

TABLE OF CONTENTS

	<u>Page(s)</u>
I. INTRODUCTION	1
II. THE '113 PATENT	2
III. THE ALLEGED PRIOR ART	4
A. Liu.....	4
B. Jover	10
IV. CLAIM CONSTRUCTION	11
V. LEVEL OF ORDINARY SKILL IN THE ART	11
VI. PETITIONER HAS NOT DEMONSTRATED A REASONABLE LIKELIHOOD OF SUCCESS FOR THE GROUNDS ADVANCED IN THE PETITION, AND THE PETITION SHOULD BE DENIED	11
A. The Petition Fails to Show how Liu in View of Jover Renders Obvious Claim 1	14
1. Liu in Combination with Jover Does Not Render Obvious “ <i>transmitting a second radio signal on a second channel,</i> ” as Required by Claim [1c].....	14
2. Liu in Combination with Jover Does Not Render Obvious “ <i>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,</i> ” as Required by Claim [1e]	17
3. There is No Motivation to Combine Liu with Jover.....	19
B. Claims 2-20 Are Not Rendered Obvious by Grounds 1, 2, 3A, and 3B.....	21

1.	Independent Claims 6, 11, and 16 Are Not Rendered Obvious by Grounds 1, 2, 3A, and 3B.....	21
2.	Dependent Claims 2-5, 7-10, 12-15, and 17-20 Are Not Rendered Obvious by Grounds 1, 2, 3A, and 3B	22
VII.	CONCLUSION.....	22

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>Apple, Inc. v. Contentguard Holdings, Inc.</i> , IPR2015-00355, Paper 9 at 9-10 (P.T.A.B. June 26, 2015)	12
<i>Broadcom Corp. v. Emulex Corp.</i> , 732 F.3d 1325 (Fed. Cir. 2013)	13
<i>Graham v. John Deere Co. of Kansas City</i> , 383 U.S. 1 (1966)	12
<i>Innogenetics, N.V. v. Abbott Lab'ys</i> , 512 F.3d 1363 (Fed. Cir. 2008)	14
<i>Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.</i> , 821 F.3d 1359 (Fed. Cir. 2016)	13
<i>KSR Int'l Co. v. Teleflex Inc.</i> , 550 U.S. 398 (2007)	12
<i>Pers. Web Techs., LLC v. Apple, Inc.</i> , 848 F.3d 987 (Fed. Cir. 2017)	13
<i>Richardson v. Suzuki Motor Co.</i> , 868 F.2d 1226 (Fed. Cir. 1989)	12
<i>Stratoflex, Inc. v. Aeroquip Corp.</i> , 713 F.2d 1530 (Fed. Cir. 1983)	12
<i>In re Van Os</i> , 844 F.3d 1359 (Fed. Cir. 2017)	14
<i>Verdegaal Bros., Inc. v. Union Oil Co. of Cal.</i> , 814 F.2d 628 (Fed. Cir. 1987)	12
Statutes	
35 U.S.C. § 102	11

LIST OF EXHIBITS

Exhibit No.	Description of Document
2001	Scheduling Order, Dkt. 40, <i>Apex Beam Techs. LLC v. Apple Inc.</i> , Case No. 6:24-cv-00223-ADA (W.D. Tex. June 18, 2025)
2002	Apex Beam Technologies LLC's Infringement Contentions and P.R. 3-1 and 3-2 Disclosures in <i>Apex Beam Techs. LLC v. Apple Inc.</i> , Case No. 6:24-cv-00223-ADA (W.D. Tex.), dated May 27, 2025
2003	Complaint, Dkt. 1, <i>Apex Beam Techs. LLC v. Apple Inc.</i> , Case No. 6:24-cv-00223-ADA (W.D. Tex. April 29, 2024)

I. INTRODUCTION

On May 2, 2025, Apple, Inc. (“Petitioner”) submitted a petition (Paper 2, “Petition” or “Pet.”) to institute *inter partes* review (“IPR”) of U.S. Patent No. 10,568,113 (APPLE-1001, the “’113 Patent”), challenging Claims 1-20 (the “Challenged Claims”). The Petition asserts that the Challenged Claims are rendered obvious by U.S. Patent No. 10,461,994 to Liu et al. (APPLE-1007 or “Liu”); in view of U.S. Patent Application Publication No. 2015/0141026 to Jover (APPLE-1005 or “Jover”). Pet. at 1.

The Board should deny the Petition for at least the following reasons: First, Petitioner improperly relies on Liu’s transmission of the same BFRR signal sent twice over the same channel to meet the first signal and second signal limitations. Petitioner ignores that Liu is replete with examples where the BFRR uses PUCCH or PRACH, but never both in one system. Second, Liu only describes determining a beam failure for each respective channel rather than determining beam failure based on the one recited target threshold and then, at best, transmitting separate signals corresponding to each of the separate determinations instead of the recited triggering a transmission of both first and second signals. The Petition also does not attempt to connect Jover’s “beam sweeping procedure” to the claimed triggered transmission of the first and second radio signals. Moreover, there is no motivation to combine Liu with Jover or look to Jover at all since Jover is directed to the opposite objective

of the '113 Patent or Liu.

The Petition is deficient with respect to the '113 Patent's dependent claims and analogues to Claim 1 for the same reasons.

Accordingly, the Board should deny institution of the Petition.

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 2017 1 0686330.4 filed on August 11, 2017. APPLE-1002, 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.*, 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. Liu

Liu is directed to “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.” APPLE-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.

Id., at 4:40-56.

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 1:31-37 (emphasis added).

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 8:62-9:6 (emphasis added).

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.

Id. at 9:62-65 (emphasis added).

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 12:65-13:14 (emphasis added).

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 an 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 an 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.

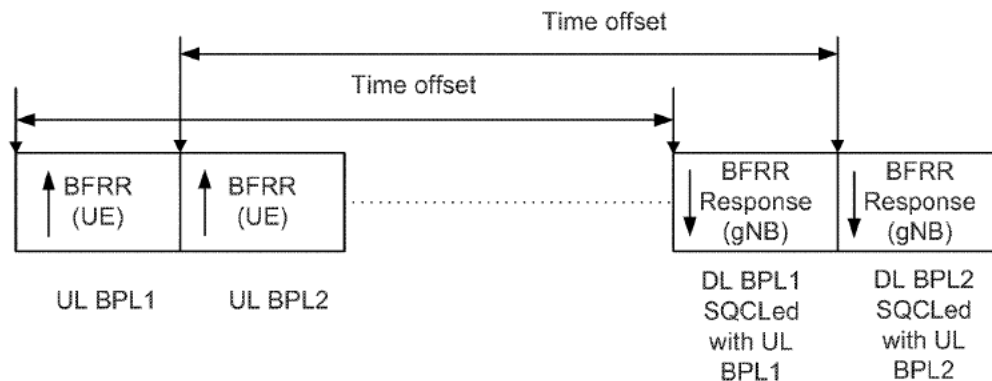


FIG. 5B

Id., 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.*

Id., at 3:50-54 (emphasis added).

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 3:61-64 (emphasis added).

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 4:47-56 (emphasis added).

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 11:32-50 (emphasis added).

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 13:22-34 (emphasis added).

B. Jover

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

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

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: "[bachelor's degree in]¹ electrical engineering, computer engineering, computer science, or a similar field, along with two years of experience designing or developing wireless networks. Additional education might substitute for some of the experience, and additional substantial experience might substitute for some of the educational background." Pet. at 19 (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

Anticipation under 35 U.S.C. § 102 is a high bar to meet. A claim is

¹ There seems to be an error in Petitioner's statement of the level of ordinary skill as no degree is listed: "would have had at least a [sic] electrical engineering, computer engineering, computer science, or a similar field." Pet. at 19. Patent Owner assumes, for the purposes of this Preliminary Response that Petitioner intended the degree to be a Bachelor's degree.

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) 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. The Petition Fails to Show how Liu in View of Jover Renders Obvious Claim 1

1. Liu in Combination with Jover Does Not Render Obvious “transmitting a second radio signal on a second channel,” as Required by Claim [1c]

Claim 1 recites “transmitting a second radio signal on a second channel.”

Petitioner only relies on Liu to render obvious this claim limitation.

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

Liu is replete with examples where the BFRR uses PUCCH or PRACH, but never both in one system:

Optionally, in any of the preceding aspects, upon detection of the beam failure, the BFRR is sent using a physical uplink control channel (PUCCH) in the uplink beam pair.

...

Optionally, in any of the preceding aspects, 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.

Ex. 1007 at 2:5-11.

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.

Id. at 9:62-65.

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 12:65-13:14 (emphasis added).

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 an 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 an uplink beam pair.

Id. , 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 1:31-37.

The '113 Patent explains that it teaches a different mechanism than Liu because the '113 Patent is trying to solve a resource utilization problem in a different way (*i.e.*, transmitting a beam recovery request on a different channel than another beam recovery request within a common time window) than envisioned by the

conventional systems, such as Liu:

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.

'113 Patent, at 1:43-54.

Therefore, the Petition is deficient because it fails to show that Claim [1c] is disclosed or rendered obvious by Liu in view of Jover.

2. Liu 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 [1e]

Claim [1e] 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.”

There is absolutely no citation for Petitioner’s statement that “Liu establishes causality between detecting a beam failure and transmitting the first *and* second

radio signals (e.g., the first and second BFRRs). Pet. at 30-31 (emphasis added). The only disclosures of Liu, including the claims of Liu, cited by Petitioner indicate, at best, triggering the transmission of “*a* beam failure recovery request (BFRR)” (i.e., only one radio signal) “upon detection of the beam failure.” Pet. at 30-31 (citing APPLE-1007, [0069], [0076]-[0077], [0087], [0091], [0005], [0114], [0084], FIG. 6A, Claims 1, 5, 7). Such disclosures indicate that Liu describes determining a beam failure for each respective channel rather than determining beam failure based on the one recited target threshold and then, at best, transmitting separate signals corresponding to each of the separate determinations instead of the recited triggering a transmission of both first and second signals. *Id.*

Jover does not remedy the defect of Liu because it also does not disclose the “triggering” limitation. Specifically, 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.*

APPLE-1005, at [0040] (emphasis added). Specifically, the Petition does not attempt to connect Jover's "beam sweeping procedure" to the claimed transmission of the first and second radio signals. As with Liu, "triggering the transmission" requires causality between the threshold being exceeded and transmitting both the first and second radio signal, and this required link of causality is missing from Jover. Moreover, the Petition does not rely on Jover for the recited triggering, but rather that Jover "specifically discloses using a target measurement value (BER) higher than a target threshold (1%) as a triggering condition" and that "[i]t would have been obvious to implement Jover's teachings in Liu's method to use a beam failure triggering condition with BER as the target measurement value." Pet. at 32.

Therefore, the Petition is deficient because it fails to show that Claim [1e] is disclosed or rendered obvious by Xia alone or in view of Jover.

3. There is No Motivation to Combine Liu with Jover

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

Where Liu looks to employ a beam failure reporting and recovery mechanism that entails finding the best beam pair from all possible beam pairs (*see* APPLE-1007, at 1:19-58), 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., APPLE-1005, at [0033]. 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.” *Id.* at Abstract.

Jover does not describe, and is not related to, the beam recovery request methodology of the ’113 Patent. 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. 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.*

Therefore, Petitioner cannot prove that the Challenged Claims are rendered obvious by Liu in view of Jover.

B. Claims 2-20 Are Not Rendered Obvious by Grounds 1, 2, 3A, and 3B

1. Independent Claims 6, 11, and 16 Are Not Rendered Obvious by Grounds 1, 2, 3A, and 3B

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, the Petition fails to show that Liu in view of Jover renders obvious Claim 6.

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, the Petition fails to show that Liu in view of Jover renders obvious 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, the Petition fails to show that that Liu in view of Jover renders obvious Claim 16.

**2. Dependent Claims 2-5, 7-10, 12-15, and 17-20 Are Not
Rendered Obvious by Grounds 1, 2, 3A, and 3B**

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 16. Therefore, the Petition fails to render obvious Claims 2-5, 7-10, 12-15, and 17-20 for at least the same reasons as Claims 1, 6, 11, and 16, respectively.

VII. CONCLUSION

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

Respectfully submitted,

Dated: September 4, 2025

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

CERTIFICATE OF WORD COUNT

The undersigned hereby certifies that the portions of the above-captioned PATENT OWNER'S PRELIMINARY RESPONSE has 4,979 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,

September 4, 2025

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

CERTIFICATE OF SERVICE

A copy of the foregoing PATENT OWNER'S PRELIMINARY RESPONSE
has been served on Petitioner's counsel of record as follows:

Email: IPR50095-0226IP1@fr.com

W. Karl Renner

Jennifer J. Huang

Rishi Gupta

FISH & RICHARDSON P.C.

60 South Sixth Street, Suite 3200

Minneapolis, MN 55402

Attorneys for Apple Inc.

September 4, 2025

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