

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. IPR2025-00895

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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 3, “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 (i) the Challenged Claims are rendered obvious by U.S. Patent No. 10,779,350 to Xia et al. (APPLE-1004 or “Xia”); (ii) the Challenged Claims are rendered obvious by Xia in view of U.S. Patent Application Publication No. 2015/0141026 to Jover (APPLE-1005 or “Jover”); (iii) Claims 1, 3-4, 6, 8-9 are rendered obvious by TS 36.321 (APPLE-1023), TS 36.133 (APPLE-1024), TS 36.213 (APPLE-1025), TS 36.300 (APPLE-1026), TS 36.331 (APPLE-1027), TS 36.201 (APPLE-1028), TS 36.212 (APPLE-1029), and TS 36.211 (APPLE-1035) (collectively, “3GPP-LTE”); and (iv) Claims 11, 13-14, 16, 18-19 are rendered obvious by 3GPP-LTE in view of U.S. Patent Application Publication. No 2017/0215207 to Yi et al. (APPLE-1031 or “Yi”). Pet. at 1.

The Board should deny the Petition under all of Petitioner’s Grounds for at least the following reasons:

Grounds 1 and 2: First, Xia does not disclose “monitoring a third radio signal in a first time window” because Xia ***stops monitoring*** beyond t3 in Xia if a PUCCH-BFRP is received at t3 (i.e., excludes the time between t3 and t4, which is part of

Petitioner's alleged first time window from t1 to t4). Second, Petitioner's mapping of a third radio signal to Xia's single BFRP and first time window to the time from the PUCCH-BFRQ to the PRACH-BFRP also contradicts subsequent claim language that "the end time of the third time window is the end time of the first time window." In fact, under Petitioner's mapping, the end time of the monitoring of the third radio signal that defines the first time window would end at Xia's t3 if a PUCCH-BFRP were received while the end of the third time window, the end of the waiting period for PRACH-BFRP, would always be t4. The Petition fails to describe how the claimed "triggering the transmission of the first radio signal and the second radio signal," is met. Xia merely states a sequence of events without demonstrating the causality that is implicated by the claimed "triggering." The Petition also does not attempt to connect Jover's "beam sweeping procedure" to the claimed transmission of the first and second radio signals. Moreover, there is no motivation 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.

Grounds 3A and 3B: Under Petitioner's mapping to 3GPP-LTE, the third radio signal is not monitored in a first time window, as required by Claim 1, because Petitioner's cited reference (APPLE-1023) describes that the purported third radio signal or "contention resolution message/msg4" is monitored only "*after* Msg3 is transmitted." Simultaneously, Petitioner alleges the first time window in 3GPP-LTE

only “begins with the start of the RAR window and ends with the expiration of the *mac-ContentionResolutionTimer* or after a contention resolution message is received,” which is well before Msg3 is transmitted. Pet. at 67-68 (citing APPLE-1023, §§5.1.1, 5.1.5). Petitioner’s mapping also directly contradicts the subsequent claim language that “a time resource occupied by the first radio signal is used for determining the start time of the first time window.” Further, the cited portions of 3GPP-LTE and Petitioner’s expert declaration merely describe a sequence of events that occur in CBRAP and that there are ways that a UE can determine link failure without demonstrating the causality that is implicated by the claimed “triggering.” Moreover, Petitioner ignores that, at best, 3GPP-LTE’s initialization of CBRAP only triggers the transmission of what Petitioner alleges to be the first radio signal (*i.e.*, the Random Access Preamble) and not both the first and second radio signal, as recited by Claim 1. If a Random Access Response is not received, the Scheduled Transmission will not be transmitted since it depends on the information received in the Random Access Response (step 2).

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. 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.” APPLE-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 3:48-60.

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 t1, 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#1 (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 13:14-37 (emphases added).

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

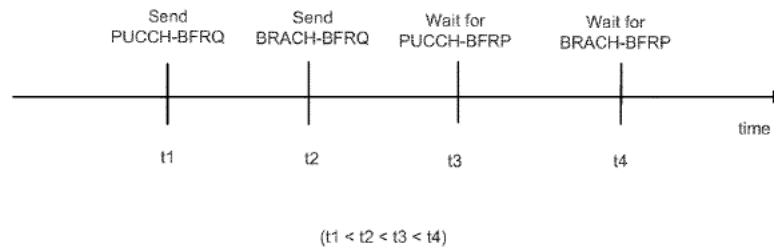


FIG. 6B

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 14:7-12 (emphasis added). Whichever BFRP comes first (PUCCH or PRACH) ends the first and second time window.

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].

C. 3GPP-LTE

What Petitioner terms "3GPP-LTE" is an amalgamation of various technical specifications belonging to the LTE standard, Release 14. Pet. at 13.

3GPP-LTE describes the sequence of events in a contention-based RA procedure ("CBRAP"):

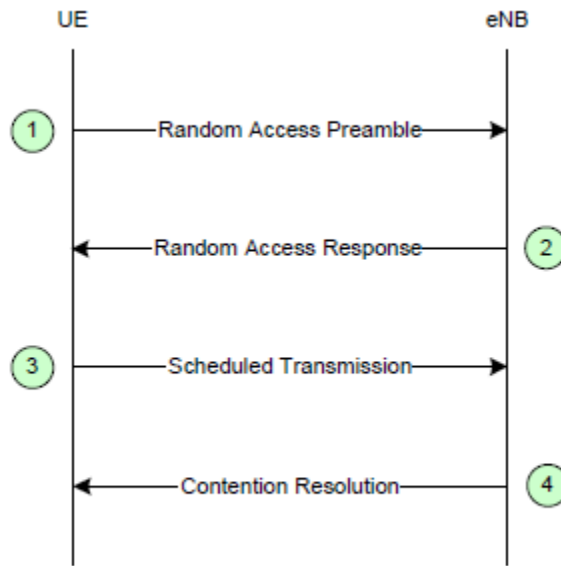


Figure 10.1.5.1-1: Contention based Random Access Procedure

APPLE-1026, §10.1.5.1. 3GPP-LTE explicitly states that the “size of the transport blocks [of the first scheduled UL transmission] *depends on* the UL grant conveyed in step 2”:

The four steps of the contention based random access procedures are:

- 1) Random Access Preamble on RACH in uplink:
 - There are two possible groups defined and one is optional. If both groups are configured the size of message 3 and the pathloss are used to determine which group a preamble is selected from. The group to which a preamble belongs provides an indication of the size of the message 3 and the radio conditions at the UE. The preamble group information along with the necessary thresholds are broadcast on system information.
- 2) Random Access Response generated by MAC on DL-SCH:
 - Semi-synchronous (within a flexible window of which the size is one or more TTI) with message 1;
 - No HARQ;
 - Addressed to RA-RNTI on PDCCH;
 - Conveys at least RA-preamble identifier, Timing Alignment information for the pTAG, initial UL grant and assignment of Temporary C-RNTI (which may or may not be made permanent upon Contention Resolution);
 - Intended for a variable number of UEs in one DL-SCH message.
- 3) First scheduled UL transmission on UL-SCH:
 - Uses HARQ;
 - Size of the transport blocks depends on the UL grant conveyed in step 2;
 - For initial access:
 - Conveys the RRC Connection Request generated by the RRC layer and transmitted via CCCH;
 - Conveys at least NAS UE identifier but no NAS message;
 - RLC TM: no segmentation.
 - For RRC Connection Re-establishment procedure:
 - Conveys the RRC Connection Re-establishment Request generated by the RRC layer and transmitted via CCCH;
 - RLC TM: no segmentation;
 - Does not contain any NAS message.
 - After handover, in the target cell:
 - Conveys the ciphered and integrity protected RRC Handover Confirm generated by the RRC layer and transmitted via DCCH;
 - Conveys the C-RNTI of the UE (which was allocated via the Handover Command);
 - Includes an uplink Buffer Status Report when possible.
 - For other events:
 - Conveys at least the C-RNTI of the UE;
 - In the procedure to resume the RRC connection:
 - Conveys the RRC Connection Resume Request generated by the RRC layer and transmitted via CCCH;
 - Conveys a Resume ID to resume the RRC connection;
 - For NB-IoT:
 - In the procedure to setup the RRC connection:
 - An indication of the amount of data for subsequent transmission(s) on SRB or DRB can be indicated.
- 4) Contention Resolution on DL:
 - Early contention resolution shall be used i.e. eNB does not wait for NAS reply before resolving contention;
 - Not synchronised with message 3;
 - HARQ is supported;
 - Addressed to:
 - The Temporary C-RNTI on PDCCH for initial access and after radio link failure;
 - The C-RNTI on PDCCH for UE in RRC_CONNECTED.
 - HARQ feedback is transmitted only by the UE which detects its own UE identity, as provided in message 3, echoed in the Contention Resolution message;
 - For initial access and RRC Connection Re-establishment procedure, no segmentation is used (RLC-TM).

Id.

3GPP-LTE also describes that the “contention resolution message/msg4” in CBRAP is monitored only “after Msg3 is transmitted.”

mac-ContentionResolutionTimer: Specifies the number of consecutive subframe(s) during which the MAC entity shall monitor the PDCCH *after Msg3 is transmitted*.

APPLE-1023, § 3.1 (emphasis added).

Once Msg3 is transmitted, the MAC entity shall:

...

- regardless of the possible occurrence of a measurement gap or Sidelink Discovery Gap for Reception, monitor the PDCCH until *mac-ContentionResolutionTimer* expires or is stopped

APPLE-1023, § 5.1.5 (emphasis added).

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 3-8.

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

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 21-22. Patent Owner assumes, for the purposes of this Preliminary Response that Petitioner intended the degree to be a Bachelor's degree.

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 21-22 (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 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 Render Obvious Claim 1 in View of Xia or Xia in view of Jover

1. Xia Alone or in Combination with Jover Does Not Render Obvious “*monitoring a third radio signal in a first time window*” and “*the end time of the third time window is the end time of the first time window,*” as Required by Claim [1d] and [1i]

Claim 1 recites “monitoring a third radio signal in a first time window” and “the end time of the third time window is the end time of the first time window.”

Petitioner only relies on Xia to render obvious these claim limitations.

Petitioner recognizes that the '113 Patent describes embodiments where the third radio signal can either be “a response to the second radio signal” (which is transmitted in a time domain resource after the first radio signal) ('113 Patent, 10:47-49) or “a response to the first radio signal and the second radio signal” (*id.*, 10:61-64).

The Petition claims that Xia discloses that a “single BFRP is sent in response to two BFRQs” purportedly akin to the '113 Patent's embodiment of a “response to both the first and the second radio signal”:

As shown, Xia's UE waits for the BFRP (i.e., PRACH-BFRP) from the base station from t1 to t4 (“**first time window**”) because a single BFRP is sent in response to two BFRQs. APPLE-1004, 14:7-12; APPLE-1012, [0083]-[0085]. Specifically, the UE sends two BFRQs, a PUCCH-BFRQ at t1 and a PRACH-BFRQ at t2, and the UE waits for a single BFRP from the base station, a PUCCH-BFRP at t3 or a PRACH-BFRP at t4. APPLE-1004, 14:7-12; APPLE-1012, [0083]-[0085]. The UE also receives the BFRPs from the base station, implying that the base station sends the BFRPs. APPLE-1004, 2:37-45, 11:10-12, 14:7-24 (describing the base station sending BFRPs); APPLE-1003, ¶¶111-114.

Pet. at 30. However, Petitioner ignores a key distinction. Xia's “single BFRP” is not “*a response* to both the first and the second radio signal” as in the '113 Patent, but is only sent *in response* to two BFRQs. Specifically, Xia describes that “[t]he UE 404 then wa[i]ts *for a single BFRP* – a PUCCH-BFRP at time t3 *or* a PRACH-

BFRP at t4.” APPLE-1004, 14:10-12 (emphasis added). In other words, Xia’s “single BFRP” is a response to only one of the first and second radio signals, which would give the first time window a variable length (*i.e.*, the waiting period for either the PUCCH-BFRP or PRACH-BFRP). This means that, if a PUCCH-BFRP is received at t3, t3 would end the UE’s waiting (*i.e.*, monitoring) period for the single BFRP (Petitioner’s purported third radio signal) and thus end the first time window. Xia does not disclose “monitoring a third radio signal in a first time window” because Xia stops monitoring beyond t3 if a PUCCH-BFRP is received at t3 (*i.e.*, excludes the time between t3 and t4, which is part of Petitioner’s alleged first time window from t1 to t4).

Petitioner’s mapping of a third radio signal to Xia’s single BFRP and first time window to the time from the PUCCH-BFRQ to the PRACH-BFRP also contradicts subsequent claim language that “the end time of the third time window is the end time of the first time window.” In fact, as noted above, under Petitioner’s mapping, the end time of the monitoring of the third radio signal that defines the first time window would end at Xia’s t3 if a PUCCH-BFRP were received while the end of the third time window, the end of the waiting period for PRACH-BFRP, would always be t4. This discrepancy between the end of the purported first and third time windows under the scenario where a PUCCH-BFRP is received in Xia, is shown below using an annotated version of FIG. 6B of Xia:

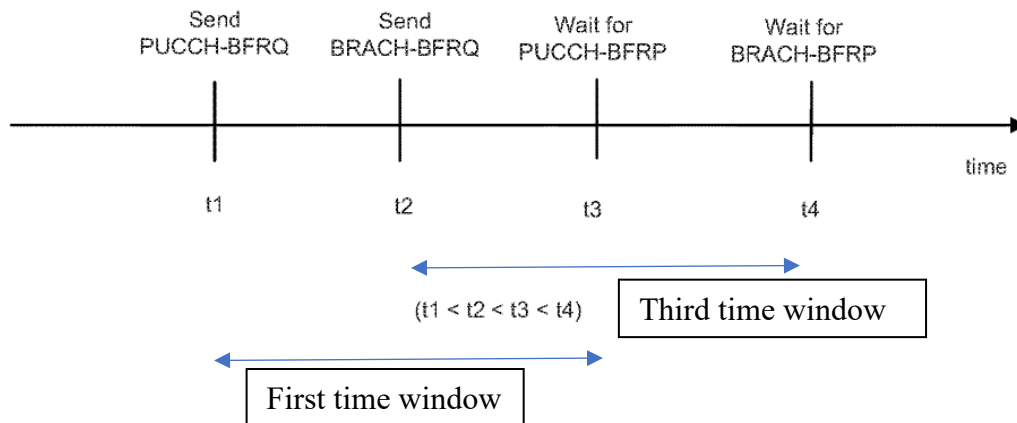


FIG. 6B

APPLE-1004, FIG. 6B (annotated). The Petition does not address Xia's contradictions to the claim language of Claim 1 of the '113 Patent.

Therefore, the Petition is deficient because it fails to show that Claims [1d] and [1i] are rendered obvious by the combination of Xia alone or in view of Jover.

2. 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 [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.” (emphasis added.)

(1) Ground 1: Xia

Petitioner relies generally on beam failure detection for the claimed “target measurement value” and claims that “many well-known indicators of beam quality were known,” including bit error rate (BER). Pet. at 31-32. Notably Xia does not disclose BER specifically, despite being allegedly “well-known,” as Petitioner asserts. Xia only describes one example of “whether a beam failure trigger condition has been met (e.g., beam signal strength has dropped below a threshold).” APPLE-1004, 10:27-34.

However, even if BER or another beam quality indicator were implied in Xia’s disclosure of “beam signal strength,” the Petition fails to describe how the claimed “triggering the transmission of the first radio signal and the second radio signal,” is met. Xia merely states a sequence of events, namely that “[a]fter the UE 404 detects the beam failure; a beam failure recovery request (BFRQ) transmission is performed.” *Id.*, 10:42-43. 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. The only “trigger” disclosed by Xia is a “beam failure trigger condition.” *Id.*, 10:27-60. While the Petition incorrectly latches on to those words as describing the claimed trigger (Pet. at 31-38), Xia’s trigger only corresponds to a condition that triggers an assessment of beam

failure, rather than triggering signal transmission for the first and second radio signals.

Faced with the dearth of disclosure in Xia, Petitioner improperly utilizes the '113 Patent's disclosure itself to piecemeal together the disparate sequential transmission of signals after beam failure in Xia and a POSITA's knowledge of BER or BLER. Pet. at 35. Specifically, the Petition openly cites the '113 Patent for the disclosure that "these sets of values may be used interchangeably for triggering the transmission of the first and second radio signals." *Id.*

Because Xia is silent on establishing causality between any threshold being exceeded and transmitting the first and second radio signal, Xia does not disclose "the target measurement value . . . is used for triggering the transmission of the first radio signal and the second radio signal."

(2) Ground 2: Xia and Jover

Jover does not cure the deficiencies of Xia above because 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).

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 Xia, "triggering the transmission" requires causality between the threshold being exceeded and transmitting the first and second radio signal, and this required link of causality is missing from Jover. Therefore, the Petition's reliance on Jover does not remedy the deficiencies of its reliance on Xia. Moreover, even if it did, 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 Xia's method such that Xia's beam failure triggering condition uses BER as the target measurement value." Pet. at 36.

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 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.

Where Xia looks to resolve a beam failure due to attenuation, misalignment and other channel deficiencies (*see* APPLE-1004, at 1:16-47), 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.*

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

B. The Petition Fails to Render Obvious Claim 1 in View of 3GPP-LTE or 3GPP-LTE in view of Yi

1. 3GPP-LTE Alone or in Combination with Yi Does Not Render Obvious “*monitoring a third radio signal in a first time window*” and “*a time resource occupied by the first radio signal is used for determining the start time of the first time window,*” as Required by Claims [1d], [1f], [11d], and [11f]

Claims 1 and 11 recite “monitoring a third radio signal in a first time window” and “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 3GPP to render obvious these claim limitations.

The Petition contends that 3GPP-LTE's Msg3 is the recited second radio signal and that “the UE monitors for the contention resolution message/msg4 (third radio signal) during the first time window.” Pet. at 67. However, under Petitioner's mapping, the third radio signal is not monitored in a first time window, which Petitioner alleges “begins with the start of the RAR window and ends with the expiration of the *mac-ContentionResolutionTimer* or after a contention resolution message is received.” Pet. at 67-68 (citing APPLE-1023, §§ 5.1.1, 5.1.5).

Petitioner's cited reference (APPLE-1023) describes that the purported third radio signal or "contention resolution message/msg4" is monitored only "after Msg3 is transmitted."

mac-ContentionResolutionTimer: Specifies the number of consecutive subframe(s) during which the MAC entity shall monitor the PDCCH ***after Msg3 is transmitted***.

APPLE-1023, § 3.1 (emphasis added).

Once Msg3 is transmitted, the MAC entity shall:

...

- regardless of the possible occurrence of a measurement gap or Sidelink Discovery Gap for Reception, monitor the PDCCH until *mac-ContentionResolutionTimer* expires or is stopped

Id., § 5.1.5 (emphasis added).

In other words, 3GPP-LTE describes that monitoring of the third radio signal only occurs after what Petitioner describes as the second radio signal, not the first radio signal. This directly contradicts the subsequent claim language that "a time resource occupied by the first radio signal is used for determining the start time of the first time window."

Therefore, the Petition is deficient because it fails to show that Claims [1d], [1f], [11d], and [11f] are rendered obvious by 3GPP-LTE alone or in view of Yi.

2. 3GPP-LTE Alone or in Combination with Yi 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 Claims [1e] and [11e]

Claims [1e] and [11e] recite “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.”

First, the Petition fails to describe how the claimed “*triggering the transmission* of the first radio signal and the second radio signal,” is met. The Petition, without any support, merely states that “[g]enerally, the UE’s determination of radio link failure triggers CBRAP.” Pet. at 69-70 (citing APPLE-1026, § 10.1.5.1, §10.1.6 and APPLE-1003, ¶¶ 220-223). However, the cited portions of 3GPP-LTE and Petitioner’s expert declaration merely describe a sequence of events that occur in CBRAP and that there are ways that a UE can determine link failure. Nothing in the cited portions or in the Petition discloses or suggests that the CBRAP initialization is caused by radio link failure outside of the Petition’s ipse dixit that “[t]he UE starts CBRAP after determining radio link failure.” Pet. at 70. 3GPP-LTE’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. Because 3GPP-LTE is silent on establishing causality between any threshold being exceeded and transmitting the first and second radio signal, 3GPP-LTE does not disclose “the target measurement value . . . is used for triggering the transmission of the first radio signal and the second radio signal.”

Second, the Petition fails to describe how the claimed “triggering the transmission of *the first radio signal and the second radio signal*” is met. Specifically, the Petition presents no evidence for its statements that “[i]nitialization of CBRAP causes the UE to send the RA preamble (**first radio signal**) and scheduled UL transmission/Msg3 (**second radio signal**)” or that “[b]ecause CBRAP is initialized based on link failure, . . . the CRS exceeding the BLER triggers the transmission of both the RA preamble (**first radio signal**) and the UL-SCH/Msg3 (**second radio signal**).” Pet. at 70-71. Even if there was a trigger for CBRAP initialization (there is not), 3GPP-LTE only describes a sequence of events in CBRAP:

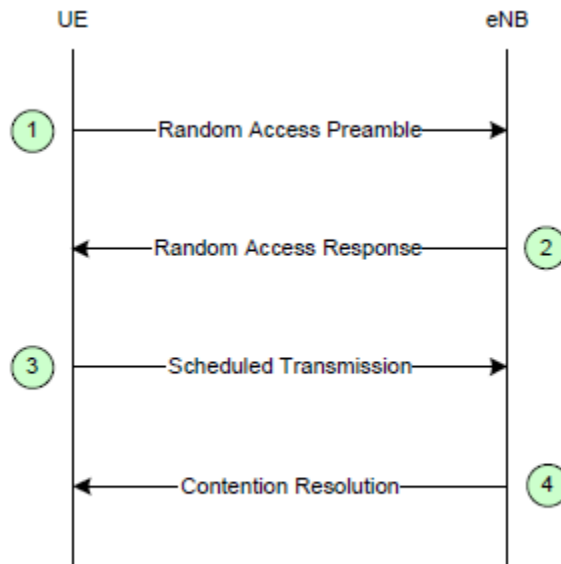


Figure 10.1.5.1-1: Contention based Random Access Procedure

APPLE-1026, §10.1.5.1. Nowhere does 3GPP-LTE describe a beam failure causing both the Random Access Preamble and the Scheduled Transmission (msg3). The Petition ignores whether the Scheduled Transmission is contingent upon the Random Access Preamble and the Random Access Response. In fact, 3GPP-LTE explicitly states that the “size of the transport blocks [of the first scheduled UL transmission] *depends on* the UL grant conveyed in step 2”:

The four steps of the contention based random access procedures are:

- 1) Random Access Preamble on RACH in uplink:
 - There are two possible groups defined and one is optional. If both groups are configured the size of message 3 and the pathloss are used to determine which group a preamble is selected from. The group to which a preamble belongs provides an indication of the size of the message 3 and the radio conditions at the UE. The preamble group information along with the necessary thresholds are broadcast on system information.
- 2) Random Access Response generated by MAC on DL-SCH:
 - Semi-synchronous (within a flexible window of which the size is one or more TTI) with message 1;
 - No HARQ;
 - Addressed to RA-RNTI on PDCCH;
 - Conveys at least RA-preamble identifier, Timing Alignment information for the pTAG, initial UL grant and assignment of Temporary C-RNTI (which may or may not be made permanent upon Contention Resolution);
 - Intended for a variable number of UEs in one DL-SCH message.
- 3) First scheduled UL transmission on UL-SCH:
 - Uses HARQ;
 - Size of the transport blocks depends on the UL grant conveyed in step 2;
 - For initial access:
 - Conveys the RRC Connection Request generated by the RRC layer and transmitted via CCCH;
 - Conveys at least NAS UE identifier but no NAS message;
 - RLC TM: no segmentation.
 - For RRC Connection Re-establishment procedure:
 - Conveys the RRC Connection Re-establishment Request generated by the RRC layer and transmitted via CCCH;
 - RLC TM: no segmentation;
 - Does not contain any NAS message.
 - After handover, in the target cell:
 - Conveys the ciphered and integrity protected RRC Handover Confirm generated by the RRC layer and transmitted via DCCH;
 - Conveys the C-RNTI of the UE (which was allocated via the Handover Command);
 - Includes an uplink Buffer Status Report when possible.
 - For other events:
 - Conveys at least the C-RNTI of the UE;
 - In the procedure to resume the RRC connection:
 - Conveys the RRC Connection Resume Request generated by the RRC layer and transmitted via CCCH;
 - Conveys a Resume ID to resume the RRC connection;
 - For NB-IoT:
 - In the procedure to setup the RRC connection:
 - An indication of the amount of data for subsequent transmission(s) on SRB or DRB can be indicated.
- 4) Contention Resolution on DL:
 - Early contention resolution shall be used i.e. eNB does not wait for NAS reply before resolving contention;
 - Not synchronised with message 3;
 - HARQ is supported;
 - Addressed to:
 - The Temporary C-RNTI on PDCCH for initial access and after radio link failure;
 - The C-RNTI on PDCCH for UE in RRC_CONNECTED.
 - HARQ feedback is transmitted only by the UE which detects its own UE identity, as provided in message 3, echoed in the Contention Resolution message;
 - For initial access and RRC Connection Re-establishment procedure, no segmentation is used (RLC-TM).

Id. In other words, at best, the initialization of CBRAP only triggers the transmission of what Petitioner alleges to be the first radio signal (*i.e.*, the Random Access Preamble). If a Random Access Response is not received, the Scheduled

Transmission will be not be transmitted since it depends on the information received in the Random Access Response (step 2).

Therefore, the Petition is deficient because it fails to show that Claim [1e] is disclosed or rendered obvious by 3GPP-LTE alone or in view of Yi.

C. 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 Grounds 1, 2, and 3A render 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 Grounds 1, 2, and 3B render 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 Grounds 1, 2, and 3B render 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

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CERTIFICATE OF WORD COUNT

The undersigned hereby certifies that the portions of the above-captioned PATENT OWNER'S PRELIMINARY RESPONSE has 5,761 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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