

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Alireza Babaei
U.S. Patent No.: 10,979,128 Attorney Docket No. 50095-0240IP1
Issue Date: April 13, 2021
Appl. Serial No.: 17/113,851
Filing Date: December 7, 2020
Title: BEAM FAILURE AND CONSISTENT LISTEN BEFORE
TALK FAILURE RECOVERY

Mail Stop Patent Board

Patent Trial and Appeal Board
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

**PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT
NO. 10,979,128 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42**

TABLE OF CONTENTS

I.	INTRODUCTION	2
II.	REQUIREMENTS FOR IPR—37 C.F.R. §42.104.....	2
A.	Grounds for Standing—37 C.F.R. §42.104(a)	2
B.	Challenge and Relief Requested—37 C.F.R. §42.104(b)	2
III.	LEVEL OF ORDINARY SKILL	4
IV.	OVERVIEW OF THE '128 PATENT	4
A.	Subject Matter	4
B.	Prosecution History	7
V.	CLAIM CONSTRUCTION—37 C.F.R. §42.104(b)(3)	9
VI.	THE CHALLENGED CLAIMS ARE UNPATENTABLE.....	9
A.	GROUND 1A—Claims 1-19 are Obvious Over Cirik	9
1.	Cirik (EX1004)	9
2.	Element-by-Element Analysis	11
B.	FOUNDATIONS 1B, 1C—Claims 1-19 are Obvious Over Cirik and Wu (Ground 1B) and Obvious Over Cirik and InterDigital (Ground 1C) 63	
1.	Wu (EX1006).....	63
2.	InterDigital (EX1007).....	65
3.	Analysis.....	65
C.	GROUND 2A—Claims 1, 10, and 16-19 are Obvious Over Wu and InterDigital	70
1.	The Wu-InterDigital Combination.....	70
2.	Element-by-Element Analysis	73

D.	GROUND 2B—Claims 2-9 and 11-15 are Obvious Over Wu, InterDigital, and Cirik	85
1.	The Wu-InterDigital-Cirik Combination	85
2.	Element-by-Element Analysis	87
VII.	DISCRETIONARY CONSIDERATIONS FAVOR INSTITUTION	89
VIII.	PAYMENT OF FEES—37 C.F.R. §42.103	89
IX.	MANDATORY NOTICES—37 C.F.R. §42.8(a)(1)	90
A.	Real Party-In-Interest—37 C.F.R. §42.8(b)(1)	90
B.	Related Matters—37 C.F.R. §42.8(b)(2)	90
C.	Lead And Back-Up Counsel—37 C.F.R. §42.8(b)(3)	90
D.	Service Information.....	91

LIST OF EXHIBITS

EX1001	U.S. Patent No. 10,979,128 (“the ’128 Patent”)
EX1002	Excerpts from the File History of U.S. Patent No. 10,979,128
EX1003	Expert Declaration of Dr. Robert Akl, Ph.D.
EX1004	U.S. Publication No. 2021/0100031 to Cirik et al. (“Cirik”)
EX1005	U.S. Prov. App. Serial No. 62/908,473 (“Cirik Provisional”)
EX1006	U.S. Publication No. 2022/0110153 to Wu et al. (“Wu”)
EX1007	R2-1914882, Handling UL LBT Failures in MAC, 3GPP RAN WG2 Meeting #108, InterDigital (“InterDigital”)
EX1008	R2-1915141, Handling of UL LBT Failure, 3GPP RAN WG2 Meeting #108, Huawei & HiSilicon (“Huawei”)
EX1009	R2-1916382, Report of offline-403 - Remaining issues of consistent UL LBT failure, OPPO
EX1010	RESERVED
EX1011	Erik Dahlman et al., 5G NR the Next Generation Wireless Access Technology (2018)
EX1012	Declaration of Mr. Friedhelm Rodermund
EX1013	U.S. Publication No. 2020/0314903 (“Jang”)
EX1014	U.S. Publication No. 2019/0200248 (“Basu Mallick”)
EX1015	Erik Dahlman et al., 4G LTE-Advanced Pro and The Road to 5G (2016)

EX1016	U.S. Publication No. 2020/0367079 (“Chen”)
EX1017	TS 138 300, 3GPP TS 38.300 version 15.5.0 Release 15, ETSI (May, 2019)
EX1018	R2-1912096, Report of TSG-RAN WG2 Meeting #107, OPPO (October, 2019)
EX1019	PCT Pub. WO2021/016910 A1 (“Zheng”)
EX1020	Techplayon, 5G RACH Procedure Overview – CBRA & CFRA, https://www.techplayon.com/5g-nr-rach-procedure-overview-cbra-cfra/#google_vignette (retrieved April 10, 2025)
EX1021	Agostini et al., Evolution of the 5G New Radio Two-Step Random Access Towards 6G Unsourced MAC, Version 1.0 (April 18, 2024)
EX1022	U.S. Publication No. 2020/0373992 (“Wang”)
EX1023-1099	[RESERVED]
EX1100	Complaint, <i>Apex Beam Technologies, LLC v. Apple Inc.</i> , Case No. 6:24-cv-00223 (W.D. Tex.) (April 29, 2024)
EX1101	First Amended Complaint, <i>Apex Beam Technologies, LLC v. Apple Inc.</i> , Case No. 6:24-cv-00223 (W.D. Tex.) (May 2, 2024)

LISTING OF CLAIMS

Claim 1	
[1pre]	A method comprising:
[1a.i]	receiving, by a wireless device, one or more messages comprising:
[1a.ii]	first configuration parameters for beam failure recovery, comprising first random access parameters;
[1a.iii]	second configuration parameters for listen-before-talk (LBT) failure recovery; and
[1a.iv]	second random access parameters;
[1b]	initiating, based on the first configuration parameters and in response to detecting a beam failure on a primary cell, a first random access process on a first bandwidth part (BWP) of the primary cell for beam failure recovery based on the first random access parameters;
[1c]	triggering, based on the second configuration parameters, consistent LBT failure for the primary cell;
[1d]	stopping the first random access process, for the beam failure recovery, based on the triggering the consistent LBT failure;
[1e]	switching from the first BWP of the primary cell to a second BWP of the primary cell as an active BWP of the primary cell; and
[1f]	initiating a second random access process on the second BWP of the primary cell for consistent LBT failure recovery and based on the second random access parameters.

Claim 2	
[2]	The method of claim 1, wherein the second random access process, for consistent LBT failure recovery, is one of a two-step random access process and a four-step random access process.

Claim 3	
[3]	The method of claim 2, further comprising initiating a third random access process, for the beam failure recovery, after the second random access process is successfully completed.

Claim 4	
[4]	The method of claim 2, wherein the second random access process comprises transmitting a transport block comprising an LBT failure medium access control (MAC) control element (CE).

Claim 5	
[5a]	The method of claim 4, wherein: the transmitting the transport block is based on a logical channel prioritization procedure; and
[5b]	a first priority associated with the LBT failure MAC CE is higher than a second priority associated with data from any logical channel except uplink common control channel (UL-CCCH) logical channel.

Claim 6	
[6]	The method of claim 1, wherein the first random access process, for the beam failure recovery, is one of a two-step random access process and a four-step random access process.

Claim 7	
[7]	The method of claim 6, further comprising initiating a third random access process for beam failure recovery after the second random access process is successfully completed.

Claim 8	
[8]	The method of claim 7, wherein the third random access process comprises transmitting a transport block comprising a beam failure recovery medium access control (MAC) control element (CE).

Claim 9	
[9a]	The method of claim 8, wherein: the transmitting the transport block is based on a logical channel prioritization procedure; and
[9b]	a first priority associated with the beam failure recovery MAC CE is higher than a second priority associated with data from any logical channel except uplink common control channel (UL-CCCH) logical channel.

Claim 10	
[10]	The method of claim 1, wherein the first random access parameters indicate random access resources for a beam failure recovery random access process.

Claim 11	
[11pre]	The method of claim 1, wherein the first random access parameters indicate:
[11a]	a random access response window for beam failure recovery;
[11b]	a first number of preamble transmissions before declaring a random access failure for beam failure recovery;
[11c]	a power ramping step for a beam failure recovery random access process; and
[11d]	a configuration index for beam failure recovery.

Claim 12	
[12]	The method of claim 1, wherein the first configuration parameters for beam failure recovery comprise an identifier of a search space for monitoring a control channel in a beam failure recovery random access process.

Claim 13	
[13a]	The method of claim 1, wherein: the first configuration parameters comprise a first parameter indicating a first number of beam failure instances that triggers beam failure recovery; and
[13b]	the detecting the beam failure is based on a beam failure instance indication counter reaching the first number.

Claim 14	
[14]	The method of claim 13, wherein the detecting the beam failure comprises incrementing the beam failure instance indication counter by one based on a beam failure indication.

Claim 15	
[15]	The method of claim 13, wherein the detecting the beam failure comprises setting the beam failure instance indication counter to zero based on a beam failure detection timer expiring.

Claim 16	
[16a]	The method of claim 1, wherein: the second configuration parameters comprise a first parameter indicating a first number of LBT failure instances that triggers LBT failure recovery; and
[16b]	the triggering the consistent LBT failure is based on an LBT failure indication counter reaching the first number.

Claim 17	
[17]	The method of claim 16, wherein the triggering the consistent LBT failure comprises incrementing the LBT failure indication counter by one based on an LBT failure indication.

Claim 18	
[18]	The method of claim 16, wherein the triggering the consistent LBT failure comprises setting the LBT failure indication counter to zero based on an LBT failure detection timer expiring.

Claim 19	
[19a]	The method of claim 1, wherein: the second BWP of the primary cell is configured with random access occasions; and
[19b]	the switching from the first BWP of the primary cell to a second BWP of the primary cell is based on the second BWP of the primary cell being configured with the random access occasions.

I. INTRODUCTION

Apple Inc. (“Apple” or “Petitioner”) petitions for *Inter Partes* Review (“IPR”) of claims 1-19 (“the Challenged Claims”) of U.S. Patent No. 10,979,128 (“the ’128 Patent”). Apple respectfully submits that IPR should be instituted and the Challenged Claims should be canceled as unpatentable.

II. REQUIREMENTS FOR IPR—37 C.F.R. §42.104

A. Grounds for Standing—37 C.F.R. §42.104(a)

Apple certifies that the ’128 Patent is available for IPR and that Apple is not barred or estopped from requesting IPR on the Challenged Claims. This Petition is being filed within one year of service of a complaint of alleged infringement of the ’128 Patent in *Apex Beam Techs. LLC v. Apple Inc.*, No. 6:24-cv-00223 (W.D. Tex. filed Apr. 29, 2024). *See* EX1101.

B. Challenge and Relief Requested—37 C.F.R. §42.104(b)

Apple requests IPR on Grounds 1-2B listed below. Grounds 1-2B are further supported by the additional evidence cited herein, including the expert declaration of Dr. Robert Akl, Ph.D. *See* EX1003.

Ground	Claims	Basis for Rejection
1A	1-19	§103–Cirik (EX1004)
1B	1-19	§103–Cirik in view of Wu (EX1006)
1C	1-19	§103–Cirik in view of InterDigital (EX1007)
2A	1, 10, 16-19	§103–Wu in view of InterDigital

Ground	Claims	Basis for Rejection
2B	2-9, 11-15	§103–Wu in view of InterDigital and Cirik

Apple does not concede that any of the Challenged Claims are entitled to the '128 Patent's earliest claimed priority date of December 7, 2019. Still, every prior art reference that forms the basis of the obviousness challenges in Grounds 1A-2B precedes that date. This Petition therefore treats December 7, 2019 as the Critical Date of the Challenged Claims for purposes of analyzing the prior art.

Reference	Filing Date	Pub. Date	AIA Prior Art Status
Cirik (EX1004)	9/30/2019 ¹	4/1/2021	§102(a)(2)
Wu (EX1006)	2/13/2019	4/7/2022	§102(a)(2)
InterDigital (EX1007)	---	11/7/2019	§102(a)(1)

InterDigital is a document published by the Third Generation Partnership Project (“3GPP”) in connection with the meeting of a 3GPP working group in

¹ September 30, 2019 is the filing date of Cirik's provisional application (“Cirik Provisional”). See EX1005. Cirik Provisional fully supports the disclosures of Cirik relied upon in this Petition. EX1003, ¶¶41-43. Cirik Provisional also readily supports claims of Cirik, and would have qualified under no-longer applicable *Dynamic Drinkware* jurisprudence. *Penumbra, Inc. v. RapidPulse, Inc.*, IPR2021-01466, Paper 34 (March 10, 2023) (precedential as to §II.E.3); EX1003, ¶¶41-43.

November 2019. A detailed analysis of the circumstances of InterDigital's publication in accordance with 3GPP procedures is provided in the declaration of Mr. Fred Rodermund. Mr. Rodermund's declaration confirms that InterDigital was publicly accessible and disseminated before the Critical Date. *See* EX1012, ¶¶2, 20, 52-68.

III. LEVEL OF ORDINARY SKILL

A person of ordinary skill in the art as of the Critical Date (a "POSITA") would have had a bachelor's degree in electrical engineering, computer engineering, computer science, or a similar field, along with two years of experience designing or developing wireless networks, including long-term evolution LTE/4G or 5G new radio (NR) cellular technology. Additional years of experience could substitute for an advanced-level degree (and vice versa). EX1003, ¶¶27-30.

IV. OVERVIEW OF THE '128 PATENT

A. Subject Matter

The '128 Patent describes techniques "relat[ing] to beam failure and consistent listen-before-talk (LBT) failure recovery." EX1001, 3:30-31, FIGs. 29, 34, 43; *see also* EX1003, ¶¶31-34.

When beam failure or consistent LBT failure occurs, the wireless device initiates recovery procedures. The '128 Patent explains that a "wireless device may start a beam failure recovery procedure based on the detecting/determining the beam

failure on a cell” and “[t]he beam failure recovery may be based on performing a random access process, for example on a primary cell.” EX1001, 45:12-16. Likewise, “[t]he wireless device ... may perform a random access process to recover from the consistent LBT failures” *Id.*, 45:14-19. However, “[w]hen the one or more cells have consistent LBT failures and one or more second cells have beam failure, there may be a conflict between the consistent LBT failures recovery process and the beam failure recovery process.” *Id.*, 45:18-22. According to the specification, “[e]xisting solutions for beam failure and consistent LBT failure recovery processes may lead to degraded wireless device and network performance.” *Id.*, 45:23-29. The ’128 Patent thus purports to provide improved methods for resolving the conflict between beam failure and consistent LBT failure recovery processes by stopping the first random access process for beam failure recovery, switching bandwidth parts (BWPs), and initiating a second random access process for consistent LBT failure recovery. *Id.*, 3:25-32, 52:9-30, 63:7-65:45. FIG. 34 illustrates one such method:

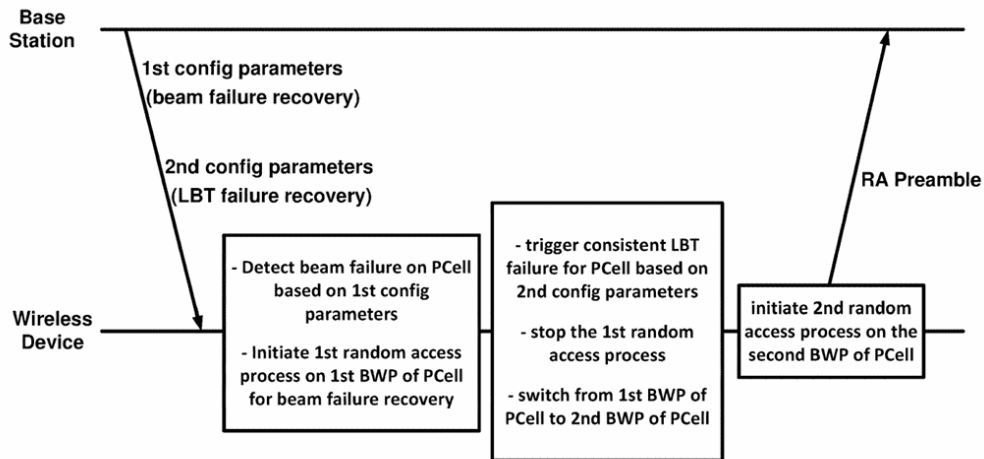


FIG. 34

EX1001, FIG. 34; *see also id.*, 63:7-65:45, 52:9-30, *see also* FIG. 29:

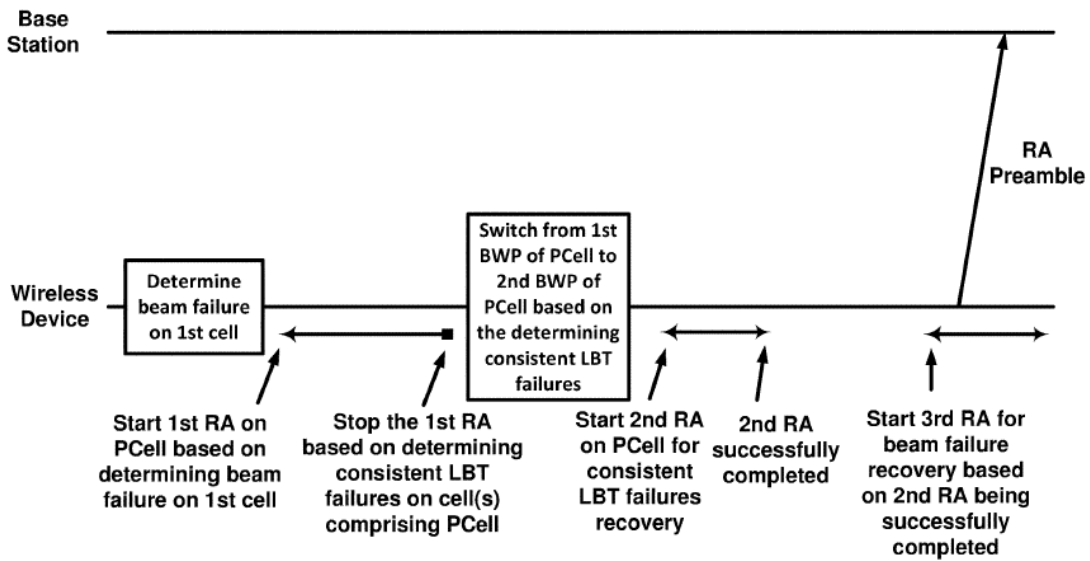


FIG. 29

EX1003, ¶¶33-34.

B. Prosecution History

Applicant PanPsy Technologies, LLC filed the application that issued as the '128 Patent (U.S. Appl. No. 17/113,851) on December 7, 2020, claiming priority to a provisional application (U.S. Appl. No. 17/113,851) filed a year earlier. EX1001, Cover. In the only substantive action during prosecution, the examiner rejected application claims 1-9 and 13-20 as obvious over Jang (EX1013) in view of Basu Mallick (EX1014). EX1002, 21-32. The examiner further indicated in the action that dependent claims 10-12 recited allowable subject matter. EX1002, 31. In response, the applicant amended independent claim 1 as follows to integrate allowable subject matter from claim 10:

1. (Currently Amended) A method comprising:
 - receiving, by a wireless device, one or more messages comprising:
 - first configuration parameters, for beam failure recovery, comprising first random access parameters;~~and~~
 - second configuration parameters for listen-before-talk (LBT) failure recovery;
 - and
 - second random access parameters;
 - initiating, based on the first configuration parameters and in response to detecting a beam failure on a primary cell, a first random access process on a first bandwidth part (BWP) of the primary cell for beam failure recovery based on the first random access parameters;
 - triggering, based on the second configuration parameters, consistent LBT failure for the primary cell;
 - stopping the first random access process, for the beam failure recovery, based on the triggering the consistent LBT failure;
 - switching from the first BWP of the primary cell to a second BWP of the primary cell as an active BWP of the primary cell; and
 - initiating a second random access process on the second BWP of the primary cell for consistent LBT failure recovery and based on the second random access parameters.

EX1002, 13; *generally id.*, 7-16.

Following this amendment, the examiner issued a notice of allowance on March 4, 2021. EX1002, 10-14. No reasons for allowance were provided. *Id.* As this Petition demonstrates, however, the '128 Patent never should have been allowed. The prior art and combinations addressed in Grounds 1A-2B show that the Challenged Claims were directed to conventional features known in the art before the '128 Patent was filed.

V. CLAIM CONSTRUCTION—37 C.F.R. §42.104(b)(3)

All claim terms should be construed according to the *Phillips* standard. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005); 37 C.F.R. §42.100. Petitioner submits that no formal construction are presently necessary for purposes of demonstrating obviousness of the Challenged Claims based on Grounds 1A-2B. *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“claim terms need only be construed ‘to the extent necessary to resolve the controversy’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed.Cir.1999)). Should any subsequent discussion of claim interpretation arise here or in the parallel district court proceeding, Petitioner reserves all rights to address and respond to any construction advanced by Patent Owner, the Board, and/or the District Court.

VI. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. GROUND 1A—Claims 1-19 are Obvious Over Cirik

1. Cirik (EX1004)

Cirik describes various methods for beam failure detection and recovery and LBT failure detection and recovery. *See, e.g.*, EX1005, [0306]-[0308], FIG. 21;

EX1004, [0001] (incorporating Cirik Provisional (EX1005) by reference)²; EX1003, ¶¶44-48. For example, FIG. 21 of Cirik Provisional illustrates an example “beam failure” and “LBT failure recovery procedure”:

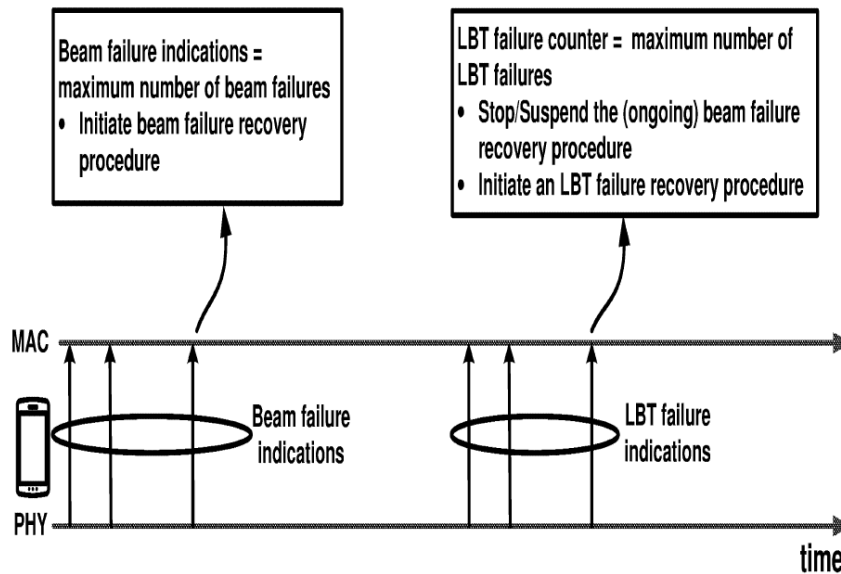


FIG. 21

² The contents of Cirik Provisional are part of Cirik’s disclosure at least because Cirik incorporates Cirik Provisional in its entirety. EX1004, [0001]. This Petition cites to Cirik Provisional both here and in the analysis of the Challenged Claims as confirmation that Cirik’s teachings were properly disclosed before the earliest claimed priority date of the ’128 Patent (December 7, 2019). EX1003, ¶¶41-43, 50.

EX1004, FIG. 21.

As shown in FIG. 21, Cirik addresses the conflict between BFR and consistent LBT failure recovery in the same manner as the '128 Patent, including by stopping the random access process for the ongoing BFR procedure and initiating a new random access process for the LBT failure recovery procedure. EX1005, [0307]-[0310], FIG. 21; *see also id.*, [0077], [0100], [0106], [0237], [0291] [0161]-[0163], [0264], FIGs. 13A-13C, 19, 22; EX1003, ¶¶44-48.

2. Element-by-Element Analysis

(a) Claim 1

Element [1pre]

To the extent the preamble is limiting, Cirik renders it obvious. EX1003, ¶49. Like the '128 Patent, Cirik discloses methods for beam failure detection and recovery and listen-before-talk (LBT) failure detection and recovery. EX1005³,

³ Cirik Provisional (EX1005) is incorporated by reference in Cirik (EX1004) at [0001]. For simplicity, this Petition cites and refers to disclosure from Cirik Provisional as part of Cirik due to its incorporation by reference. The teachings of Cirik Provisional were also carried into the text/figures of Cirik's non-incorporated disclosure. EX1003, ¶50, *see also id.* ¶¶41-43.

FIG. 21, [0307]-[0310]; *see also supra*, §VI.A.1. For example, one method for beam failure detection and recovery is illustrated and described in reference to FIG. 21:

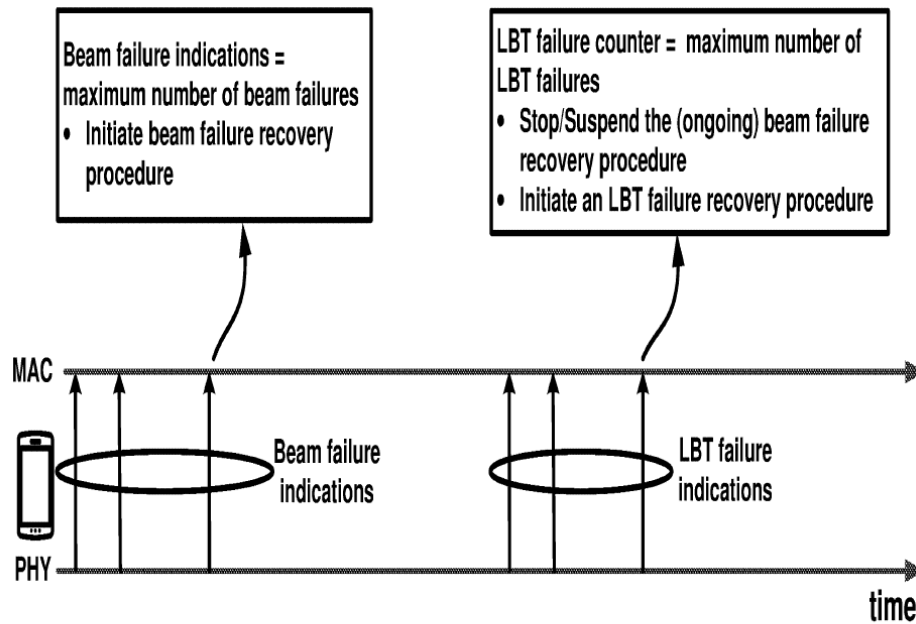


FIG. 21

EX1005, FIG. 21, [0306]-[0310].

Element [1a.i]

Cirik renders obvious [1a.i]. EX1003, ¶51. As discussed, Cirik's wireless device performs random access (RA) procedures for both beam failure recovery and LBT failure recovery. EX1005⁴, [0161]-[0163], [0307]-[0310]; *supra*, Element

⁴ See *supra* Footnote 3.

[1pre], §VI.A.1. In connection with these procedures, Cirik's wireless device receives one or more messages from the base station including first configuration parameters for beam failure recovery including first random access parameters (*see, e.g.,* EX1005, [0161]-[0163], [0307] & *infra* Element [1a.ii]) and second configuration parameters for LBT failure recovery including second random access parameters (*see, e.g.,* EX1005, [0207]-[0209], [0215]-[0218], [0266] & *infra* Element [1a.iii]). EX1003, ¶¶51-59.

Element [1a.ii]

Cirik renders obvious [1a.ii]. EX1003, ¶¶52-56. For example, Cirik's wireless device receives "one or more configuration parameters" that "indicate the maximum number of beam failure[s]":

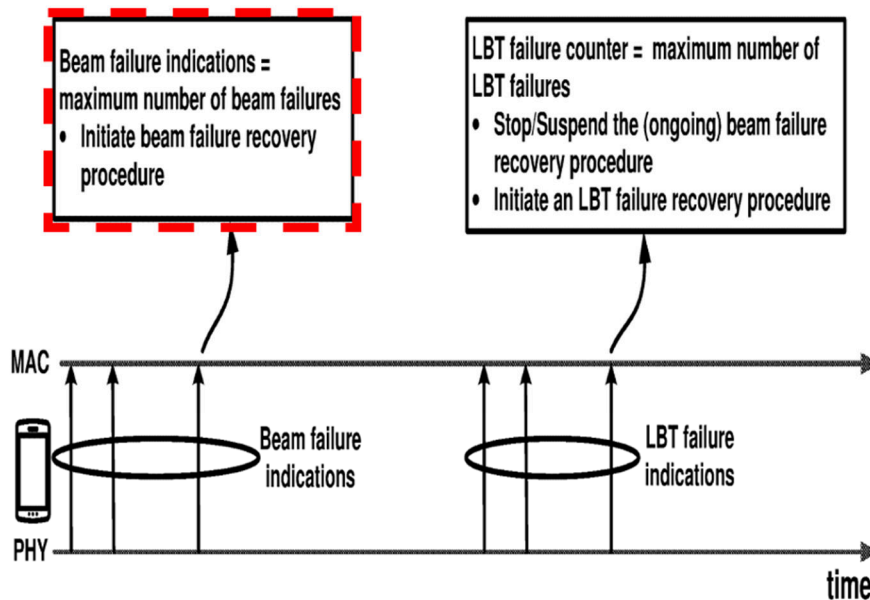


FIG. 21

EX1005⁵, FIG. 21 (annotated), [0307]; EX1003, ¶52.

Cirik explains that “the wireless device may detect the beam failure based on a number of beam failure instance indications (e.g., Beam failure indications in FIG. 21) reaching a maximum number of beam failure counter (e.g., maximum number of beam failures in FIG. 21).” EX1005, [0307]. “The one or more configuration parameters may indicate the maximum number of beam failure counter for the active downlink BWP of the second cell.” *Id*, see also *id*. [0103]. Cirik explains that

⁵ See *supra* Footnote 3.

“second cell” can be the primary cell (e.g., “PCell”). *Id.* Cirik’s first configuration parameters for beam failure recovery thus include parameters substantially the same as those disclosed in the ’128 Patent itself. *See, e.g.*, EX1001, 63:9-12 (“The first configuration for beam failure recovery may comprise a first parameter (e.g., beamFailureInstanceMaxCount) indicating a first number of beam failure instances that triggers beam failure recovery.”), 41:65-67 (“the beamFailureDetectionTimer and beamFailureInstanceMaxCount may be configured cell specifically per [downlink] BWP configured.”); EX1003, ¶53.

Cirik also discloses, in connection with random access (RA) procedures initiated for beam failure recovery, that the base station transmits a configuration message to the wireless device, e.g., as illustrated in each of FIGS. 13A-C. EX1005, [0152], [0161]-[0164], FIGS. 13A-C. The “configuration message” for random access procedures include “one or more random access channel (RACH) parameters.” EX1005, [0151]-[0152], *see also* [0153]-[0154], [0156], [0161] (“configuration message 1320 may be analogous ... to the configuration message 1310”); EX1003, ¶¶54-55 (citing EX1011). The RACH parameters included in a configuration message can include indications of “one or more Physical RACH (PRACH) occasions available for transmission” of a random-access preamble message and information for determining a power level for the transmission. *Id.*, [0153]-[0154]. The configuration parameters for random access processes used in

connection with beam failure recovery, such as the parameters that indicate PRACH resources for beam failure recovery, correspond to “*first random access parameters*” as claimed.

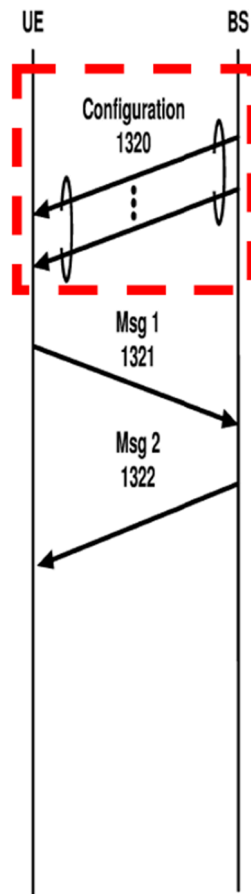


FIG. 13B

EX1005, FIG. 13B (annotated); *see also id.*, [0161], [0162] (“The contention-free random access procedure ... may be initiated for a beam failure recovery.”), [0163] (explaining that the beam failure recovery parameters can include “a separate time window and/or a separate PDCCH in a search space indicated by an RRC message (e.g., recoverySearchSpaceId)”), [0152]-[0154], [0164], [0208], [0304], [0332]

(explaining that the one or more configuration parameters are received at the wireless device); EX1003, ¶¶54-56; *infra*, Elements [1b], [13a].

Element [1a.iii]

Cirik renders obvious [1a.iii]. EX1003, ¶57. For example, Cirik discloses that the wireless device receives “one or more configuration parameters” that “comprise LBT failure detection and recovery configuration parameters.” EX1005⁶, [0207]-[0210], [0215]-[0219], *see also* FIGs. 17, 21. Like the ’128 Patent, Cirik explains that the “LBT failure detection and recovery configuration parameters” can include parameter(s) that define a “maximum number of LBT failures” as shown in FIG. 21:

⁶ *See supra* Footnote 3.

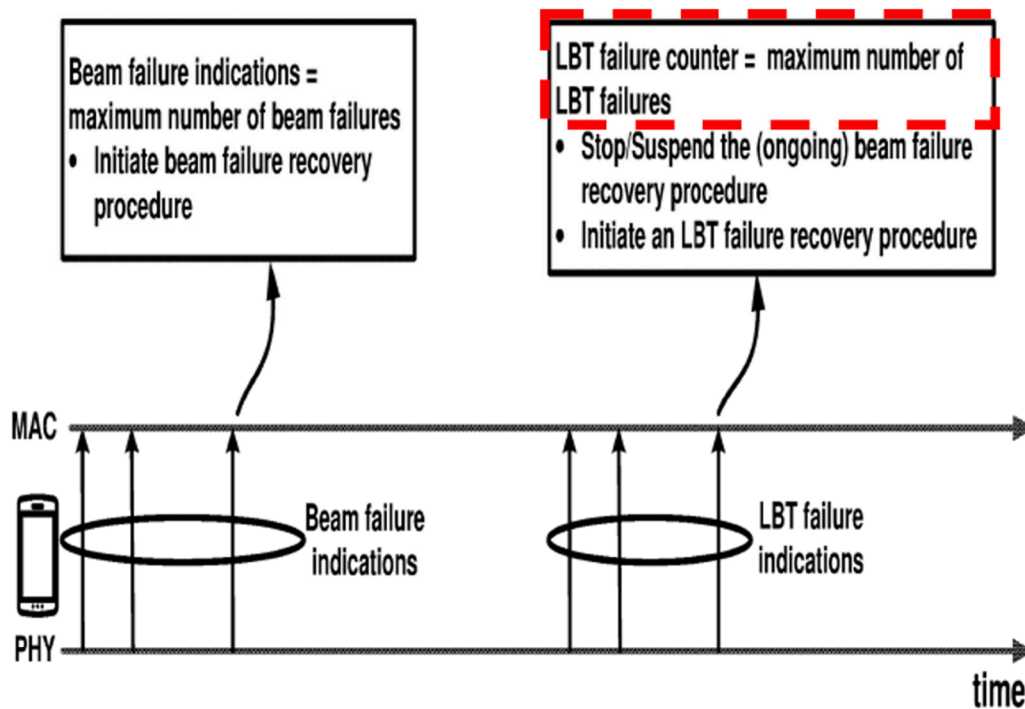


FIG. 21

EX1005, FIG. 21 (annotated), *see also* [0207]-[0209], [0216]-[0217], [0245]-[0246] (“the second LBT failure detection and recovery configuration parameters may indicate a second maximum number of LBT failures”), FIGS. 17-18; *cf.* EX1001, 63:42-46 (“The second configuration for LBT failure recovery may comprise a first parameter (e.g., FailureInstanceMaxCount) indicating a first number of LBT failure instances that triggers LBT failure recovery.”); EX1003, ¶57; *infra*, Elements [1f], [16a].

Element [1a.iv]

Cirik renders obvious [1a.iv]. EX1003, ¶¶58-59. For example, Cirik discloses that the wireless device receives “one or more configuration parameters [that] indicate one or more uplink channel resources” including “PRACH resources” (i.e., physical random access channel resources). EX1005⁷, [0266]. The configuration parameters for random access processes used in connection with consistent LBT failure recovery, such as the parameters that indicate PRACH resources for LBT failure recovery, correspond to “***second random access parameters***” as claimed. EX1005, [0266] (“In an example, the one or more uplink channel resources may be (dedicated) for LBT failure recovery procedures of one or more cells.”), [0207]-[0210], [0264]-[0266], FIGS. 17, 19, 21; *see also* [0151]-[0174] & FIGS. 13A-13C (describing random access procedures involving receipt of configuration messages containing random access parameters)⁸; EX1003, ¶58.

⁷ *See supra* Footnote 3.

⁸ As an example, Cirik discloses use of a “two-step random access procedure” for LBT failure recovery. EX1005, [0264] (“In an example, when the wireless device detects/determines/declares the uplink LBT failure, the wireless device may trigger transmission of an uplink signal (e.g., SR) for an LBT failure recovery procedure

Element [1b]

Cirik renders obvious [1b]. EX1003, ¶¶60-63. For example, in connection with FIG. 21, Cirik discloses that “the wireless device may initiate a beam failure recovery procedure (e.g., PRACH-based, PUCCH-based) based on the detecting the beam failure.” EX1005⁹, [0308]. Cirik’s beam failure recovery procedure, such as the PRACH-based (i.e., physical random-access channel-based) beam failure recovery procedure, provides a “***first random access process***” as claimed. EX1005, [0150] (“The UE may initiate the random access procedure for a beam failure recovery request.”); EX1003, ¶60.

... In an example, the uplink grant may be indicated/obtained by a random-access response. In an example, the uplink grant may be a PUSCH occasion indicated by configuration parameters of a two-step random access procedure.”); [0164]-[0174] & FIGS. 13B, 13C (describing details of two-step random access procedures); EX1003, ¶59.

⁹ See *supra* Footnote 3.

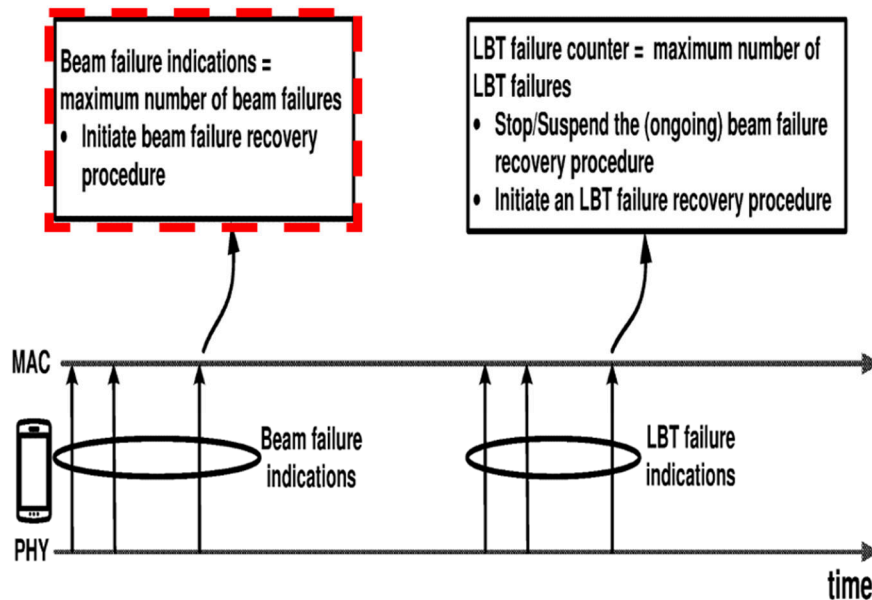


FIG. 21

EX1005, FIG. 21 (annotated); EX1003, ¶60.

Cirik's wireless device performs the beam failure recovery procedure based on the first configuration parameters discussed above (*supra*, [1a.ii]) and in response to detecting a beam failure. EX1003, ¶61. Indeed, Cirik specifically explains that beam failure recovery is initiated “based on the detecting the beam failure” and that the beam failure is detected “based on a number of beam failure instance indications (e.g., Beam failure indications in FIG. 21) reaching a maximum number of beam failure counter (e.g., maximum number of beam failures in FIG. 21).” EX1005, [0307]-[0308]; *see also id.*, [0307] (“The one or more configuration parameters may

indicate the maximum number of beam failure counter ...”); *supra*, Element [1a.ii]. Cirik further discloses detecting the beam failure on a primary cell (PCell) and that the beam failure recovery procedure can be initiated on a first BWP of the same primary cell. EX1005, [0307] (“detect a beam failure for a ... PCell”), [0308] (“initiate the beam failure recovery procedure for the active downlink BWP” of the PCell (i.e., the same second cell referenced in [0307])); *see also id.*, [0112], [0196], [0209], [0321], [0333]; *cf.*]; EX1001, 17:7-22; EX1003, ¶61.

Cirik likewise describes techniques for initiating beam failure recovery using a random access process (e.g., “PRACH-based”) and based on the first random access parameters. EX1005, [0308], [0161]-[0163]; *see also id.*, [0151]-[0160], [0164]-[0174], FIGS. 13A-C. EX1003, ¶62. For instance, Cirik explains that random access procedures are initiated by the wireless device using “one or more random access channel (RACH) parameters” received in configuration messages from the base station (e.g., configuration messages 1310, 1320, 1330). EX1005, [0151]-[0154], [0161]-[0163], FIGS. 13A-13C; *supra*, Element [1a.ii]; EX1003, ¶62. A POSITA also would have understood that a PRACH-based beam failure recovery procedure would be initiated on a first BWP of the primary cell because a BWP configured with random access occasions would be standard, and even necessary, to initiate a PRACH-based BFR procedure. EX1005, [0161]-[0163], [0270], FIG. 13B, *see also id.*, [0151]-[0157], [0212] (explaining that “in the active

state of an uplink BWP of the one or more uplink BWPs, the wireless device may transmit an uplink signal/channel (e.g., PUCCH, preamble, PUSCH, PRACH, SRS, etc) via the uplink BWP.”), FIG. 13A; EX1003, ¶63 (citing EX1006, [0073]-[0074] (describing examples for initiating BFR recovery on a first BWP); EX1016, [0060]-[0061], [0083]-[0088]; EX1011, 248-249).

Element [1c]

Cirik renders obvious [1c]. EX1003, ¶¶64-65. For example, Cirik’s wireless device “may detect/determine/declare the uplink LBT failure for the uplink BWP of the cell.” EX1005¹⁰, [0309], *see also id.*, [0310]-[0315]. Cirik further explains that the “the cell” on which consistent LBT failure is triggered (e.g., detected/determined/declared) is in some cases the same primary cell (PCell) as the cell (e.g., second cell) on which beam failure was detected and on which BFR was initiated. EX1005, [0307] (“detect a beam failure for a second cell (eg., PCell ...) ... the second cell and the cell may be the same”).

¹⁰ *See supra* Footnote 3.

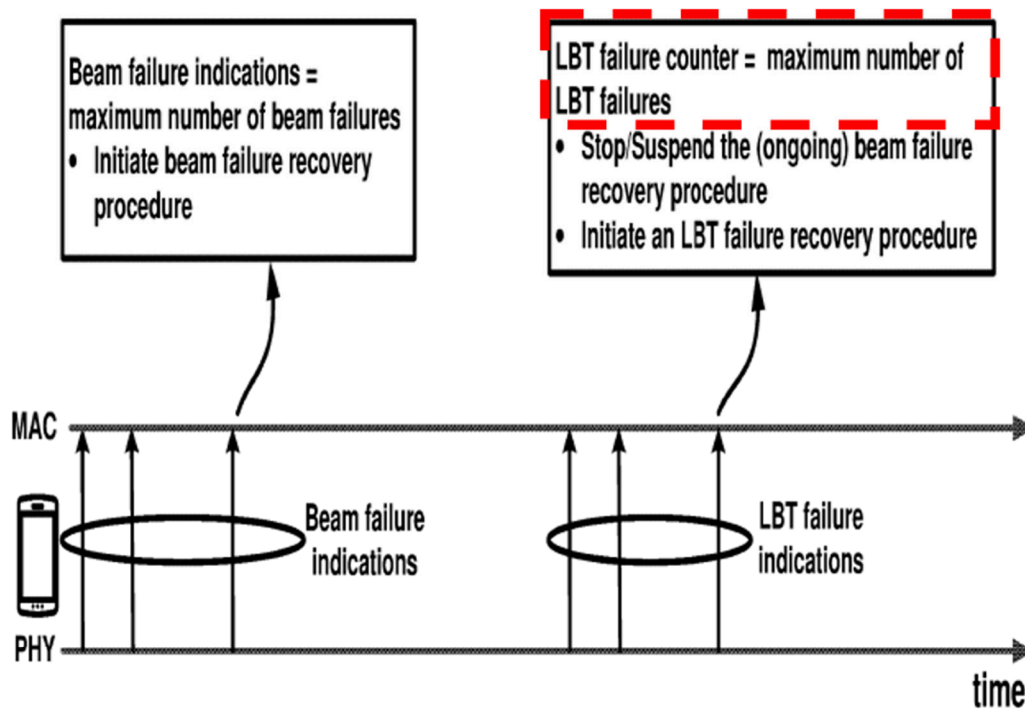


FIG. 21

EX1005, FIG. 21 (annotated); EX1003, ¶64. Cirik explains that the wireless device triggers (e.g., detects/determines/declares)¹¹ LBT failure based on the “LBT failure detection and recovery configuration parameters” included among the “*second configuration parameters*” described above in connection with [1a.iiii]. EX1005,

¹¹ The '128 Patent likewise discloses that “[a] consistent uplink LBT failure event may be triggered based on the uplink LBT failure counter reaching the threshold value.” EX1001, 33:36-38, *see also* 36:31-34; 38:63-67; EX1003, ¶65.

[0215]-[0217], *see also id.*, [0207]-[0209], FIG. 17; *supra*, [1a.iii]. For example, Cirik's "LBT failure detection and recovery configuration parameters" include a "maximum number of LBT failures" and Cirik explains that "the wireless device may detect/determine/declare an uplink LBT failure for the uplink BWP of the cell based on a number of LBT failure indications reaching the maximum number of LBT failures." EX1005, [0216]-[0217], [0231]-[0233]; EX1003, ¶64.

Element [1d]

Cirik renders obvious [1d]. EX1003, ¶¶66-67. For example, regarding the process depicted in FIG. 21, Cirik discloses that "based on the detecting/determining/declaring the uplink LBT failure for the uplink BWP of the cell during the (ongoing) beam failure recovery procedure, the wireless device may suspend the (ongoing) beam failure recovery procedure until the LBT failure recovery procedure is completed (e.g., time T4 in FIG. 19)." EX1005¹², [0310]; *see also id.*, [0309] (explaining that "based on the detecting/determining/declaring the uplink LBT failure for the uplink BWP of the cell during the (ongoing) beam failure recovery procedure, the wireless device may stop/abort the (ongoing) beam failure recovery procedure"), [0312]-[0314], [0318].

¹² *See supra* Footnote 3.

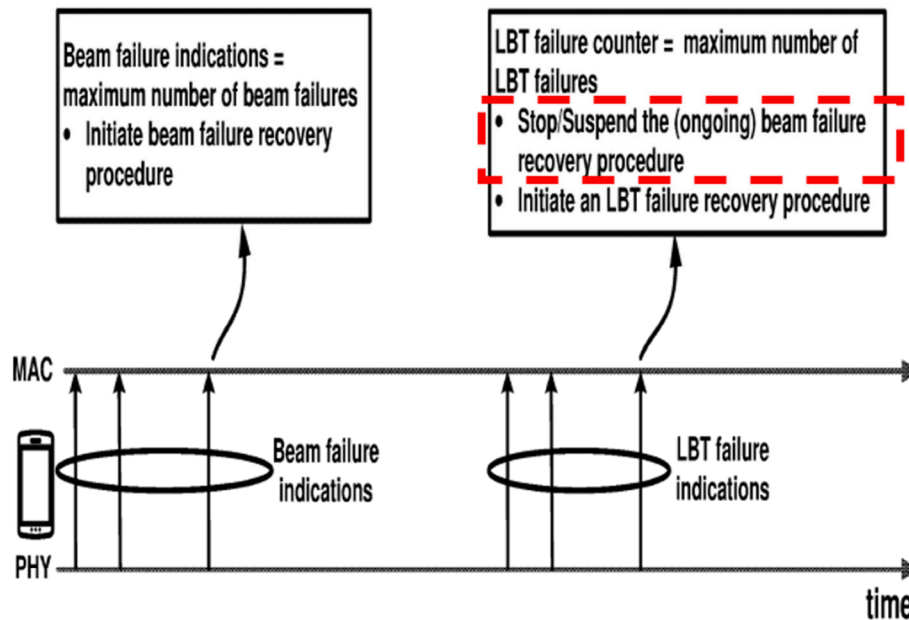


FIG. 21

FIG. 21 (annotated); EX1003, ¶66.

As discussed above (*supra*, Element [1b]) the beam failure recovery procedure involves a first random access process. *Supra*, Element [1b]; EX1005, [0161]-[0163], [0308], FIG. 13B; *see also id.*, [0151]-[0174], FIG. 13A-C. Suspending/stopping/aborting the beam failure recovery procedure to initiate a new random access for consistent LBT failure recovery as taught in Cirik would include stopping the first random access process. EX1003, ¶67. Indeed, a POSITA would have known how to stop an ongoing random access process, such as for beam failure recovery, upon switching BWPs caused by detection of consistent LBT failures.

EX1003, ¶67 (citing EX1007, 1-2). It also would have been obvious to stop the first random access process for beam failure recovery to achieve Cirik's express goal of stopping beam failure recovery, and to facilitate BWP switching and the initiation of a second random access process for consistent LBT failure recovery, particularly in systems where only one random access process can be performed at a time. *Id.*

Element [1e]

Cirik renders obvious [1e]. EX1003, ¶¶68-72. As an initial matter, Cirik explains that the wireless device may switch between bandwidth parts (BWPs) of a cell "for any suitable reason." EX1005¹³, [0107], FIG. 9. For example, "[s]witching between configured BWPs may occur based on RRC [radio resource control] signaling, DCI [downlink control information], expiration of a BWP inactivity timer, and/or an initiation of random access." EX1005, [0106]; *see also id.* ("Downlink and uplink BWP switching (where BWP refers to switching from a currently active BWP to a not currently active BWP) may be performed independently in paired spectra. In unpaired spectra, downlink and uplink BWP switching may be performed simultaneously."), [0235]-[0237] ("based on initiating a random-access procedure"), [0291] ("the wireless device may switch from the uplink BWP to a

¹³ *See supra* Footnote 3.

second uplink BWP ... during the (ongoing) LBT failure recovery procedure”), FIG. 18.

Based on these disclosures, a POSITA would have recognized that Cirik describes the wireless device switching from a first BWP of a cell on which the first random access process for beam failure recovery was initiated (*supra*, Element [1b]) to a second BWP of the cell as an active BWP of the cell. EX1003, ¶¶68-69. The switch may occur “for any suitable reason” according to Cirik (EX1005, [0107]), including based on initiation of a random-access process. EX1005, [0106], [0237]. Cirik thus indicates that the wireless device would switch from a first uplink BWP to a second uplink BWP of a cell to initiate a second random access process for consistent LBT failure recovery (e.g., after suspending/stopping/aborting the first random access process for beam failure recovery) since BWP switching occurs upon “initiation of random access” and “initiat[ing] an LBT failure recovery procedure” involves initiating a random access process.¹⁴ EX1005, [0309] (“[b]ased on the stopping/aborting the (ongoing) beam failure recovery procedure, the wireless device may trigger transmission of an uplink signal (e.g., scheduling request (SR),

¹⁴ A POSITA also would have known that BWP switching in this context had been described in various contexts before the Critical Date. EX1003, ¶70 (citing EX1006, EX1007, and EX1009).

random-access preamble) for an LBT failure recovery procedure of the uplink BWP of the cell”), [0106], [0237], [0155]-[0156], [0306]-[0315], FIGS. 21-22; *infra*, Element [1f]; EX1003, ¶69. At a minimum, switching BWPs would have been obvious to ensure the wireless device uses a suitable BWP appropriately configured with resources for transmission of a new random-access preamble, and because switching would facilitate the wireless device’s ability to recover more efficiently from consistent LBT failure than if a whole re-establishment procedure were performed. EX1003, ¶71 (citing EX1006 (Abstract, [0090]) and EX1007, 1-2). A POSITA would have reasonably expected success since wireless devices commonly switched BWPs when initiating a new random-access procedure, and because switching BWPs in this context is consistent with Cirik’s explanation that BWP switching can occur for any suitable reason. EX1003, ¶71.

As noted above, Cirik further teaches that the wireless device can switch BWPs during an ongoing LBT failure recovery procedure. EX1005, [0291]; *see also id.*, [0288]-[0305], FIG. 20. For example, “the wireless device may switch from the uplink BWP to the second uplink BWP during the (ongoing) LBT failure recovery procedure (e.g., between time T0 and time T4 in FIG. 20)”:

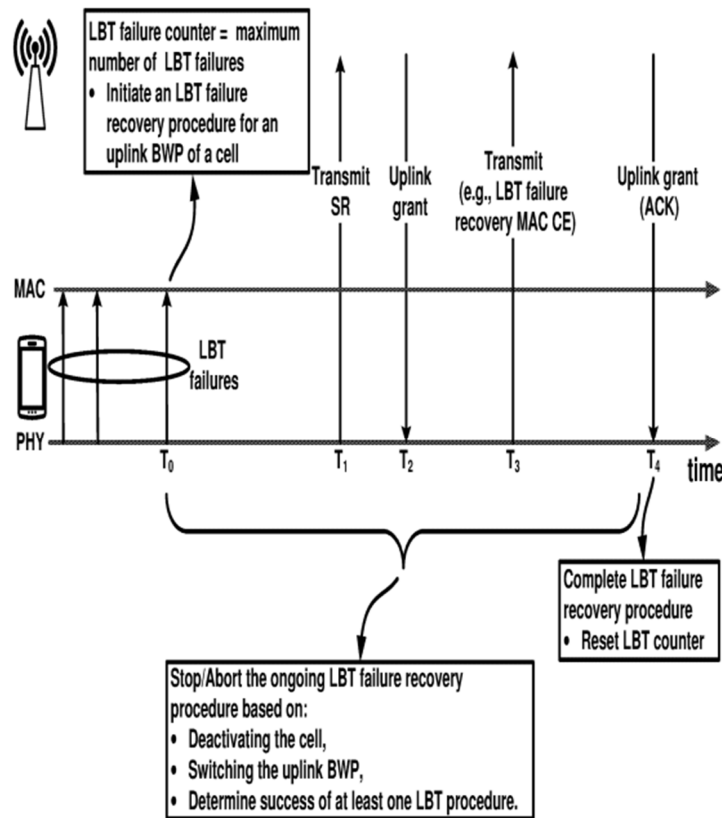


FIG. 20

EX1005, FIG. 20, [0291]; *see also id.*, EX1005, [0210]-[0211] (explaining that each of the BWPs of the cell may be “one of an active state and an inactive state”), [0214], [0237], [0309]-[0310]. Cirik’s disclosure at paragraph [0291] and FIG. 20 provides yet another basis for understanding that the wireless device can switch BWPs when initiating an LBT failure recovery procedure, especially since the switch can occur as early as the start of the procedure at time T_0 . EX1005, [0291] (“between time T_0 and time T_4 ”). These teachings further show how Cirik’s wireless device switches to a different, second BWP to initiate the LBT failure recovery procedure following suspension/stopping/aborting of the beam failure recovery procedure. *Id.*; EX1003,

¶72 (citing EX1006, EX1007). A POSITA also would have understood that the act of switching BWPs occurs on the same cell, which Cirik confirms is the primary cell in some examples. EX1005, [0307]-[0309], [0112], [0108]; *supra*, [1b]-[1c]; EX1003, ¶72 (citing EX1007, 4 (agreed to “UE switch[ing] to another BWP ... on PCell”)).

Element [1f]

Cirik renders obvious [1f]. EX1003, ¶¶73-76. For example, Cirik discloses that “[b]ased on the stopping/aborting the (ongoing) beam failure recovery procedure, the wireless device may initiate an LBT failure recovery procedure for the uplink BWP of the cell.” EX1005¹⁵, [0309], FIG. 21; *see also id.*, [0312], [0317]-[0318].

¹⁵ *See supra* Footnote 3.

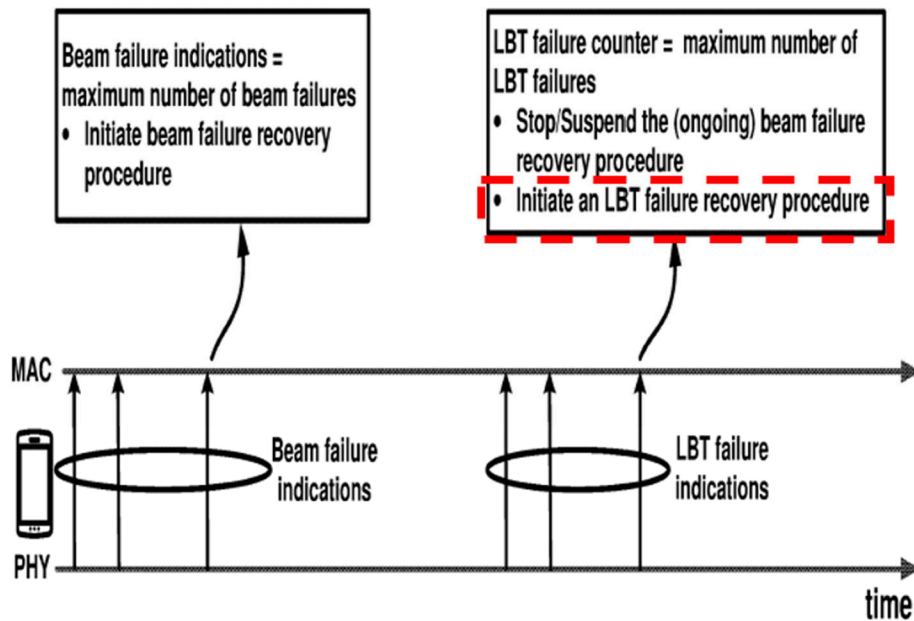


FIG. 21

EX1005, FIG. 21 (annotated); EX1003, ¶73.

Cirik also explains that initiating an LBT failure recovery procedure includes initiating a second random access process. EX1003, ¶74. For example, “[b]ased on the stopping/aborting the (ongoing) beam failure recovery procedure, the wireless device may trigger transmission of an uplink signal (e.g., scheduling request (SR), *random-access preamble*) for an LBT failure recovery procedure of the uplink BWP of the cell.” EX1005, [0309]. A POSITA would have known that the wireless device transmits a random-access preamble to initiate a random-access process. EX1005, [0155]-[0156] (“The Msg 1 1311 may include one or more preamble

transmissions ...”), [0161]-[0163] (“transmitting a preamble”), [0165] (“one or more transmissions of a preamble”), FIGS. 13A-13C; EX1003, ¶74.

Cirik further discloses that the second random access process for LBT failure recovery can be initiated based on the second random access parameters discussed above with respect to Element [1a.iv]. *Supra*, [1a.iv]; EX1003, ¶75. For example, Cirik describes determining a random access preamble “based on the one or more RACH parameters provided in the configuration message.” EX1005, [0156]; *see also id.*, [0150]-[0174]. The wireless device also uses “PRACH resources” identified in a configuration message to initiate a random access process for LBT failure recovery. EX1005, [0253], [0266] (“the one or more configuration parameters may indicate one or more uplink channel resources (e.g., ... PRACH resources[]) ...). In an example, the one or more uplink channel resources may be (dedicated) for LBT failure recovery procedures of one or more cells.”), [0264] (“[W]hen the wireless device detects/determines/declares the uplink LBT failure, the wireless device may trigger transmission of an uplink signal (e.g., SR) for an LBT failure recovery procedure ... In an example, the uplink grant may be indicated/obtained by a random-access response. In an example, the uplink grant may be a PUSCH occasion indicated by configuration parameters of a two-step random access procedure.”), [0153] (“transmitted to the base station via one or more PRACH occasions”) [0164]-[0174] & FIGS. 13A-C (describing details of

conventional random access procedures); EX1003, ¶75(citing EX1007, EX1008, EX1011).

As discussed in further detail above (*supra*, [1e]), Cirik discloses, and it would have been obvious, to initiate the second random access process for consistent LBT failure recovery on a second BWP of the primary cell different than the first BWP. EX1003, ¶76. For example, Cirik describes techniques for switching uplink BWPs on a primary cell for “any suitable reason,” including for “initiation of random access,” which occurs when initiating consistent LBT failure recovery. EX1005, [0106]-[0107], [0237], [0309]; *supra*, Element [1e]. Cirik also expressly discloses switching BWPs at initiation of an LBT failure recovery procedure (e.g., time T0). EX1005, [0291], FIGS. 20-21; *see also id.*, [0161]-[0163], [0209], [0264].

Claim [2]

Cirik renders obvious Claim 2. EX1003, ¶77. As discussed with respect to Claim 1, Cirik discloses a second random access process, for consistent LBT failure recovery. *See supra* Element [1a.iii]-[1a.iv], [1f]. Cirik discloses that the LBT failure recovery procedure can be a “two-step random access procedure.” EX1005¹⁶, [0264], *see also* [0150]-[0174] (describing details of random-access processes including two-step random access processes of FIGS. 13B-13C and a four-step

¹⁶ *See supra* Footnote 3.

random access process of FIG. 13A) & FIGS. 13A-13C, [0256], [0309] (transmitting “random-access preamble”), [0310]; EX1003, ¶77.

Claim [3]

Cirik renders obvious Claim 3. EX1003, ¶¶78-80. For example, Cirik discloses that “the wireless device may suspend the (ongoing) beam failure recovery procedure until the LBT failure recovery procedure is completed” and then “the wireless device may *resume the (ongoing) beam failure recovery procedure based on (e.g., after) the LBT failure recovery procedure being completed.*” EX1005¹⁷, [0310], *see also id.*, [0312], [0314].

A POSITA would have understood that resuming the beam failure recovery procedure as taught in Cirik involves initiating a third random access process since performing beam failure recovery itself involves initiating a random access process. EX1005, [0162] (“The contention-free random access procedure ... may be initiated for a beam failure recovery”), [0308] (“wireless device may initiate a beam failure recovery procedure (e.g., PRACH-based[] ...)”), *supra*, Element [1b]; EX1003, ¶79. Further, to the extent the claim requires, a POSITA also would have appreciated that resuming the beam failure recovery procedure after switching from the first BWP to the second BWP would involve initiating a new (third) random access process for

¹⁷ *See supra* Footnote 3.

beam failure recovery distinct from the first random access process that was earlier used to initiate the beam failure recovery procedure before it was stopped/suspended. EX1003, ¶79; *supra*, [1e]-[1f]. For example, Cirik teaches that switching BWPs causes the BWP from which the device switched (e.g., the first BWP) to be deactivated, which would thus require the wireless device to resume beam failure recovery on an active BWP other than the deactivated BWP (e.g., other than the deactivated first BWP), and thus requiring initiation of a new random access process for beam failure recovery on the active BWP after consistent LBT failure recovery is completed. EX1005, [0237], [0106]-[0107], [0318]. Resuming beam failure recovery would also require the BWP to initiate a new random access procedure by transmitting a new random access preamble (e.g., Msg 1 1311, 1321, or 1331) as Cirik describes with respect to FIGS. 13A-13C. EX1005, [0150]-[0174], FIGS. 13A-C. At the very least, it would have been obvious to a POSITA to initiate a new (third) random access process when resuming beam failure recovery to ensure the beam failure recovery is performed on an active BWP and that the preamble counter and the power ramping power counter are reset. EX1003, ¶79 (citing EX1007, 1-2).

Based on the infringement theories identified in Patent Owner's district court complaint, Patent Owner may argue that the claim encompasses a third random access process for beam failure recovery prompted by a beam failure that is *separate* from the beam failure that prompted the first random access process for the earlier-

suspended beam failure recovery procedure (e.g., an independent/separate beam failure event that occurs later in time). EX1101, p. 207, ¶364. Cirik would render [3] obvious under this interpretation as well. EX1003, ¶80. For example, Cirik discloses that a random-access process can be initiated for beam failure recovery upon detecting any beam failure event, including later beam failures. EX1005, [0150], [0308], FIGS. 13A-13C, 21; *supra*, Element [1b].

Claim [4]

Cirik renders obvious Claim 4. EX1003, ¶81. As discussed, Cirik discloses a random access process for consistent LBT failure recovery. *Supra*, Elements [1a.iii], [1f], [2]; EX1005¹⁸, [0309] (“trigger transmission of an uplink signal (e.g., ... random-access preamble) for an LBT failure recovery procedure”), [0264] (“random access procedure”). Cirik describes details of a two-step random-access procedure, for example, that includes transmitting a “transport block 1342”:

¹⁸ See *supra* Footnote 3.

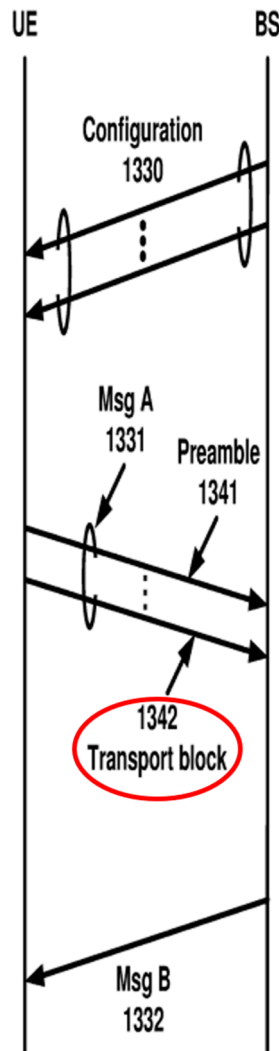


FIG. 13C

EX1005, FIG. 13C (annotated), [0164]-[0165], *see also* [0167-0168]. Cirik explains that the transport block comprises a MAC CE. EX1005, FIGs. 4A-B, [0073], [0159], [0165]-[0168]. The wireless device transmits an “LBT failure recovery MAC CE” in a “transport block” in response to detecting consistent LBT failure as part of a random-access procedure for LBT failure recovery, for example.

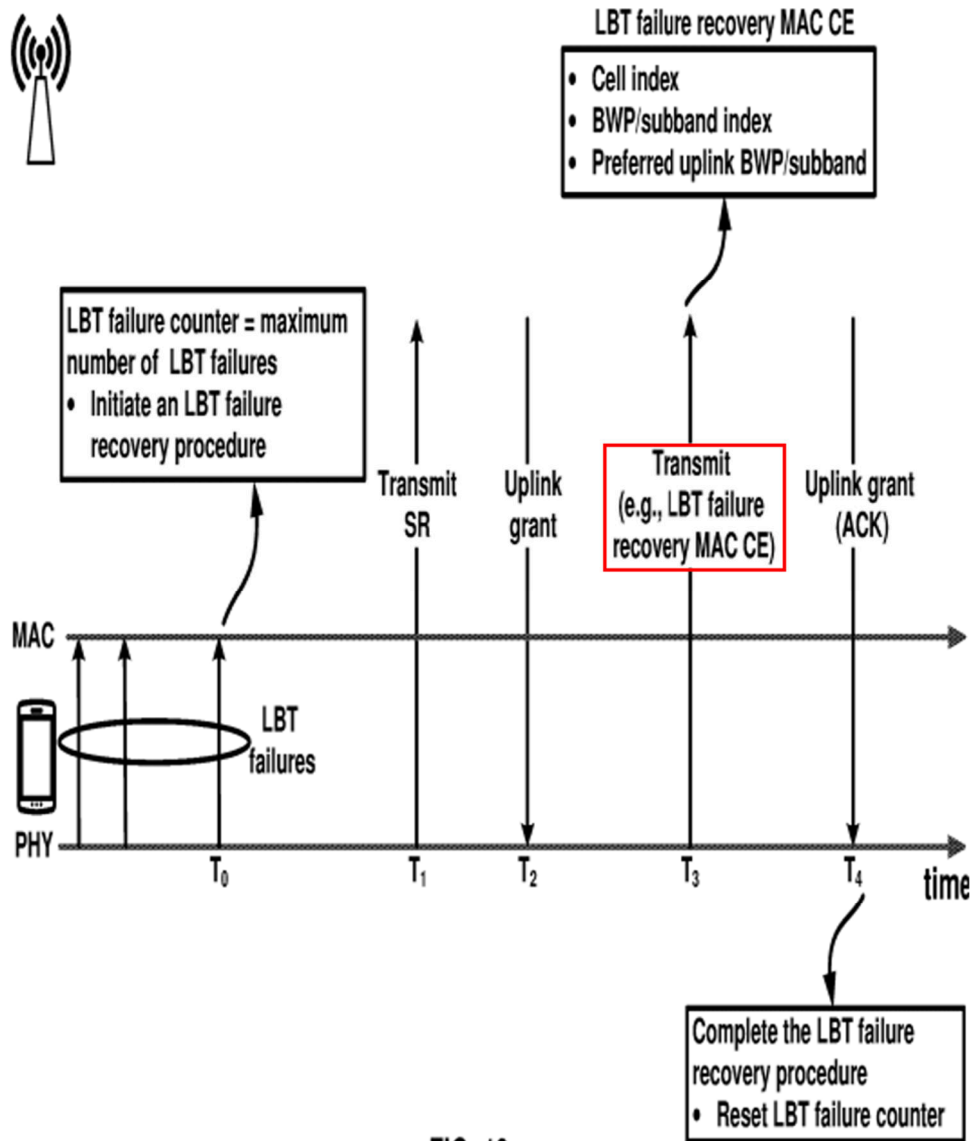


FIG. 19

EX1005, FIG. 19 (annotated), [0264], *see also* [0265], [0277], [0281-0285], FIG. 20; EX1003, ¶81. The MAC CE included in the transport block comprises an LBT failure recovery MAC CE when initiating a random access process for consistent LBT failure recovery. *Id.*; EX1003, ¶81.

Element [5a]

Cirik renders obvious [5a]. EX1003, ¶82. For example, Cirik explains that the “logical channels (LCHs) may be prioritized” including for the “LBT failure recovery MAC CE.” EX1005¹⁹, [0281]-[0283]. As discussed, the “LBT failure recovery MAC CE” is included in a transport block. *See supra*, Claim [4]. The transmitting of the transport block is therefore based on a logical channel prioritization procedure. Indeed, Cirik’s LBT failure recovery MAC CE is included in the transport block and is transmitted based on a logical channel prioritization scheme. EX1005, [0281]-[0283]; EX1003, ¶82.

Element [5b]

Cirik renders obvious [5b]. EX1003, ¶¶83-84. For example, Cirik explains that the LBT failure recovery MAC CE has a higher priority than data from other logical channels including “a BFR MAC CE” and a “Configured Grant Confirmation MAC CE.” EX1005²⁰, [0281]. Cirik also explains that “the LBT failure recovery MAC CE has a lower priority than ... data from UL-CCCH.” EX1005, [0282]. Cirik also explains that the LBT failure recovery MAC CE may have the same priority as “data from UL-CCCH.” EX1005, [0284]. Accordingly, Cirik teaches that the

¹⁹ *See supra* Footnote 3.

²⁰ *See supra* Footnote 3.

priority associated with the LBT failure MAC CE is higher than a second priority associated with data from any logical channel (e.g., data from the logical channel for BFR MAC CE) except the UL-CCCH, which can have either a higher priority or the same priority as the BFR MAC CE.²¹ EX1005, [0281-0283]; EX1003, ¶83.

Claim [6]

Cirik renders obvious Claim 6. EX1003, ¶85. For example, Cirik describes a two-step random access process for “beam failure recovery” like that illustrated in

²¹ Element [5b] does not require that the first priority associated with the LBT failure MAC CE be higher than the priority of data from *every* logical channel except UL-CCCH. The language of [5b] instead refers to a single “second priority” associated with data from *any* logical channel except UL-CCCH. The BFR MAC CE is data from one such logical channel. , ¶84. Moreover, given the wide range of prioritization options provided in Cirik, and the various examples in which the priority associated with the LBT failure MAC CE is higher than a priority associated with data from other logical channels, Cirik’s teachings would have plainly suggested to a POSITA that the priority associated with the LBT failure MAC CE can be higher than a priority associated with data from all other logical channels except the UL-CCCH, and at a minimum, this would have been an obvious option so as to prioritize LBT failure recovery. EX1003, ¶84.

FIG. 13B. EX1005²², [0161]-[0163], FIG. 13B; *supra*, Element [1b]. Cirik also discloses options for at least three contention-free and contention-based random access processes that would be suitable for initiating beam failure recovery. EX1005, FIGS. [0151]-[0174], 13A-13C.

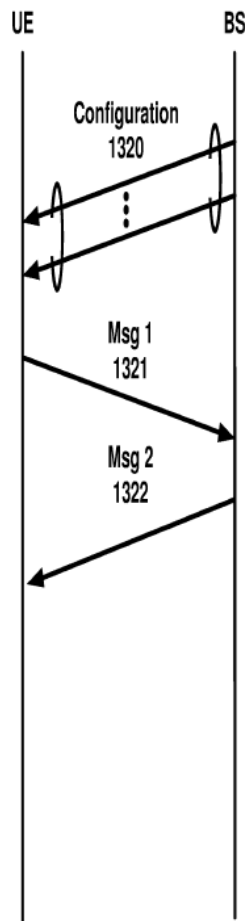


FIG. 13B

EX1005, FIG. 13B.

²² See *supra* Footnote 3.

Claim [7]

Supra, Claim [3]; EX1003, ¶86.

Claim [8]

Cirik renders obvious Claim 8. EX1003, ¶¶87-88. As discussed, Cirik discloses that the wireless device initiates a random access process for beam failure recovery. *See supra* Element [1a.ii], [1b], [3], [7]. The wireless device “may initiate a beam failure recovery (BFR) procedure” by “transmit[ting] a BFR request (e.g., *a preamble, ... a MAC CE*, and/or the like) based on the initiating of the BFR procedure.” EX1005, [0148]. Cirik further teaches that MAC CEs are transmitted in transport blocks and that transport blocks can be included in a message sent from the wireless device to the base station in a random-access process. EX1005, [0067], [0069]-[0074], [0159], [0169], [0164]-[0169], FIGS. 4A-B, 21, 13A-13C; *see also* [0281]-[0283], [0311], [0313], [0315], [0319]. A POSITA therefore would have understood that the third random access process for beam failure recovery can include transmitting a transport block comprising a BFR MAC CE. EX1003, ¶¶87-88 (citing EX1019, [0031] and EX1011, 89, 247-249).

Element [9a]

Cirik renders obvious [9a]. EX1003, ¶89. For example, Cirik explains that the “logical channels (LCHs) may be prioritized” including for the “BFR MAC CE.”

EX1005²³, [0281]-[0283]. As discussed, the “BFR MAC CE” is included in the transmitting of a transport block. *See supra* Claim [8]. A POSITA thus would have understood from Cirik’s teachings that the transmitting of the transport block is based on a logical channel prioritization procedure since Cirik’s BFR MAC CE is included in the transport block and is transmitted based on a logical channel prioritization scheme. EX1005, [0281]-[0283]; EX1003, ¶89.

Element [9b]

Cirik renders obvious [9b]. EX1003, ¶¶90-92. For example, Cirik explains that “a LBT failure recovery MAC CE” may have a lower priority than a beam failure recovery (BFR) MAC CE. EX1005²⁴, [0282]. Cirik also discloses that “the LBT failure recovery MAC CE may have a lower priority than ... data from UL-CCCH.” EX1005, [0282]. Accordingly, a first priority associated with the BFR MAC CE can be higher than a second priority associated with a logical channel for the LBT failure recovery MAC CE. Because the logical channel for the LBT failure recovery MAC CE is distinct from the UL-CCCH logical channel, Element [9b] is met by Cirik’s disclosure that the BFR MAC CE priority is higher than the priority of the logical channel for the LBT failure recovery MAC CE (i.e., higher than a

²³ *See supra* Footnote 3.

²⁴ *See supra* Footnote 3.

second priority associated with data from any logical channel except the UL-CCCH logical channel).²⁵ EX1003, ¶90.

Additionally, it would have been obvious to a POSITA to assign a first priority for BFR MAC CE that is higher than a second priority associated with data from any logical channel except the UL-CCCH in view of Cirik's teachings. EX1003, ¶92. First, Cirik indicates that the BFR MAC CE can have a higher priority than the LBT failure recovery MAC CE. EX1005, [0282]. Second, Cirik provides several

²⁵ Element [9b] does not require that the first priority associated with the BFR MAC CE be higher than the priority of data from *every* logical channel except UL-CCCH. The language of [9b] instead refers to a single "second priority" associated with data from *any* logical channel except UL-CCCH. The LBT failure MAC CE is data from one such logical channel. EX1003, ¶91. Moreover, given the wide range of prioritization options provided in Cirik, and the various examples in which the priority associated with the BFR MAC CE is higher than a priority associated with data from other logical channels, Cirik's teachings would have plainly suggested to a POSITA that the priority associated with the BFR MAC CE can be higher than a priority associated with data from all other logical channels except the UL-CCCH, and at a minimum, this would have been an obvious option so as to prioritize beam failure recovery. EX1003, ¶91.

examples of various logical channels that have a lower priority than the LBT failure recovery MAC CE. EX1005, [0281]. Third, Cirik indicates that the LBT failure recovery MAC CE can have a lower priority the UL-CCCH. EX1005, [0282]. Accordingly, Cirik teaches that the BFR MAC CE and UL-CCCH can have a higher priority than various logical channels including the LBT failure recovery MAC CE. EX1003, ¶92. Cirik's prioritization scheme thus leaves three options for prioritizing the BFR MAC CE relative to UL-CCCH: (1) the UL-CCCH having a higher priority than the BFR MAC CE; (2) the UL-CCCH having the same priority as the BFR MAC CE (as suggested in EX1005, [0283]); or (3) the UL-CCCH having a lower priority than the BFR MAC CE. EX1003, ¶92. The first two of these options satisfy [9b], and a POSITA would have found it obvious to try making a priority associated with the BFR MAC CE lower than or equal to a priority of UL-CCCH given the limited number of options available. EX1003, ¶92. It likewise would have been obvious and a POSITA would have been motivated to make a priority associated with the BFR MAC CE lower than or equal to a priority of UL-CCCH to ensure BFR MAC CE does not interfere with UL-CCCH functions and to improve system performance. EX1003, ¶92. This also would have been the natural result when the LBT failure recovery MAC CE has a lower priority than UL-CCCH and the BFR MAC CE has the same priority as the LBT failure recovery MAC CE. *Supra*, [5b]; EX1004, [0283]; EX1003, ¶92.

Claim [10]

Cirik renders obvious Claim 10. EX1003, ¶93. As discussed, Cirik discloses “one or more random access channel (RACH) parameters” for beam failure recovery as an example of “first random access parameters.” *Supra*, Elements [1a.ii], [1b]; EX1005²⁶, [0152], *see also* [0153-0154], [0156], [0161]. “The UE may determine, based on the one or more RACH parameters, a time-frequency resource” for transmission of messages in the random access procedure. EX1005, [0152]. For example, “[t]he one or more RACH parameters provided in the configuration message 1310 may indicate one or more Physical RACH (PRACH) occasions available for transmission of the Msg 1 1311.” *Id.*, [0153]; *see also id.*, [0161] (analogizing Msg 1 1321 (FIG. 13B) to Msg 1311 (FIG. 13A) and configuration message 1320 (FIG. 13B) to 1310 (FIG. 13A), [0167] (“The UE may determine, based on two-step RACH parameters included in the configuration message 1330, a radio resource ... for the preamble 1341 and/or the transport block 1342 included in the Msg A 1331.”), [0167] (“time-frequency resource”), [0168], [0170]; EX1003, ¶93.

²⁶ *See supra* Footnote 3.

Element [11pre]

Cirik renders obvious [11pre]. EX1003, ¶94. As discussed, Cirik discloses first random access parameters for beam failure recovery, including “one or more random access channel (RACH) parameters.” *Supra*, Elements [1a.ii], [1b], [10]; EX1005²⁷, [0152], *see also* [0153]-[0154], [0156], [0161]. Cirik’s random access parameters indicate the information recited in Elements [11a]-[11d]. *Infra* Elements [11a]-[11d]. EX1003, ¶94.

Element [11a]

Cirik renders obvious [11a]. EX1003, ¶95. As discussed, Cirik discloses configuring a wireless device using “one or more random access channel (RACH) parameters” in the “configuration messages” for beam failure recovery. *Supra*, Elements [1a.ii], [1b], [10], [11pre]. Cirik explains that “[i]n the event of a beam failure recovery request, the base station may configure the UE with a separate time window” for example a “ra-ResponseWindow.” EX1005²⁸, [0162]-[0163]. Cirik’s random access parameters indicate a “ra-ResponseWindow” or other separate time window for a random access response for beam failure recovery. *See* EX1005, [0161-0163]; EX1003, ¶95.

²⁷ *See supra* Footnote 3.

²⁸ *See supra* Footnote 3.

Element [11b]

Cirik renders obvious [11b]. EX1003, ¶96. As discussed, Cirik discloses configuring a wireless device using “one or more random access channel (RACH) parameters” in the “configuration messages” for beam failure recovery. *Supra*, Elements [1a.ii], [1b], [10], [11pre]. Cirik explains that the “[wireless device] may determine that a random access procedure completed unsuccessfully, for example, if the number of preamble transmissions exceeds a threshold configured by the one or more RACH parameters.” EX1005²⁹, [0157], *see also* [0156] (explaining that the “RACH parameters may indicate...a maximum quantity/number of preamble transmissions”), [0148]-[0149], FIGS. 13A-13C, 21; EX1003, ¶96.

Element [11c]

Cirik renders obvious [11c]. EX1003, ¶97. As discussed, Cirik discloses configuring a wireless device using “one or more random access channel (RACH) parameters” in the “configuration messages” for beam failure recovery. *Supra*, Elements [1a.ii], [1b], [10], [11pre]. Cirik explains that the “RACH parameters may indicate: a power ramping step.” EX1005³⁰, [0154]; EX1003, ¶97.

²⁹ *See supra* Footnote 3.

³⁰ *See supra* Footnote 3.

Element [11d]

Cirik renders obvious [11d]. EX1003, ¶98. As discussed, Cirik discloses configuring a wireless device using “one or more random access channel (RACH) parameters” in the “configuration messages” for beam failure recovery. *Supra*, Elements [1a.ii], [1b], [10], [11pre]. Cirik explains that the “RACH parameters” may indicate a “prach-ConfigIndex” as the claimed “*configuration index*.” EX1005³¹, [0153], *see also* [0152] (describing various general configuration parameters), [0158] (describing various indices including an “OFDM symbol index; a slot index; a frequency domain index; and/or a UL carrier indicator of the PRACH occasions”); EX1003, ¶98.

Claim [12]

Cirik renders obvious Claim 12. EX1003, ¶99. As discussed, Cirik’s wireless device receives “one or more configuration parameters” that provide the claimed “*first configuration parameters*” for the beam failure recovery. *Supra*, Elements [1a.ii], [1b]. Cirik explains that “the base station may configure the [wireless device] with ... a separate PDCCH in a search space indicated by an RRC message (e.g., recoverySearchSpaceid).” EX1005³², [0163]; *see also* [0152] (explain that the

³¹ *See supra* Footnote 3.

³² *See supra* Footnote 3.

configuration messages are transmitted “using one or more RRC messages”), [0158], [0162].

Element [13a]

Cirik renders obvious [13a]. EX1003, ¶100. As discussed, Cirik’s wireless device receives “one or more configuration parameters” that provide the claimed “*first configuration parameters*” for the beam failure recovery, and the configuration parameters may include a first parameter indicating a first number of beam failure instances that triggers beam failure recovery. EX1005³³, [0307] (“[T]he wireless device may detect the beam failure based on a number of beam failure instance indications (e.g., Beam failure indications in FIG. 21) reaching a maximum number of beam failure counter (e.g., maximum number of beam failures in FIG. 21)”; “The one or more configuration parameters may indicate the maximum number of beam failure counter for the active downlink BWP of the second cell.”).

³³ See *supra* Footnote 3.

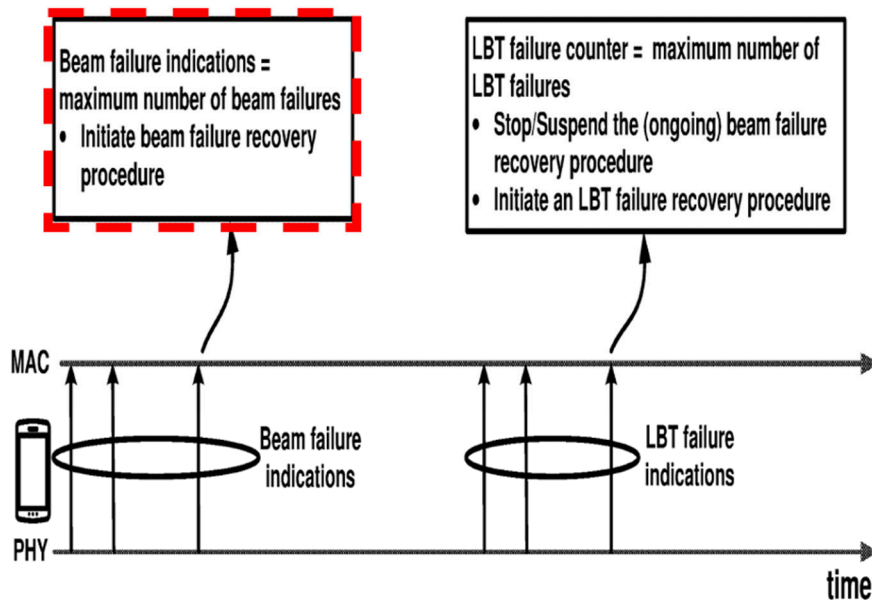


FIG. 21

EX1005, FIG. 21 (annotated), [0307]; EX1003, ¶100, *see also* EX1005, [0208], [0304], [0332]; *supra*, Elements [1a.ii], [1b]; *infra*, Element [13b].

Element [13b]

Cirik renders obvious [13b]. EX1003, ¶101. For example, Cirik discloses that “the wireless device may detect the beam failure based on a number of beam failure instance indications (e.g., Beam failure indications in FIG. 21) reaching a maximum number of beam failure counter (e.g., maximum number of beam failures in FIG. 21).” EX1005³⁴, [0307]; *see also id.*, [0148].

³⁴ *See supra* Footnote 3.

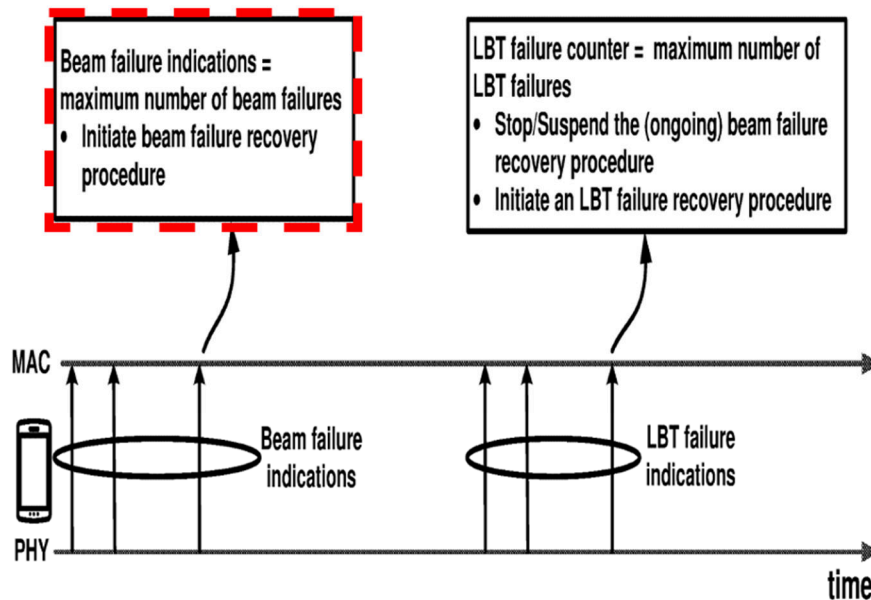


FIG. 21

EX1005, FIG. 21 (annotated); EX1003, ¶101.

Claim [14]

Cirik renders obvious Claim 14. EX1003, ¶102. As discussed, Cirik’s wireless device detects beam failure “based on a number of beam failure instance indications (e.g., Beam failure indications in FIG. 21) reaching a maximum number of beam failure counter (e.g., maximum number of beam failures in FIG. 21).” EX1005³⁵, [0307], FIG. 21; *see also id.*, [0148]; *supra*, Elements [13a]-[13b]. A POSITA would have understood and found obvious that the determination of beam

³⁵ *See supra* Footnote 3.

failure based on a number of beam failure instance indications reaching a maximum number of beam failure counter to include incrementing the counter by one. EX1003, ¶102. Cirik's disclosure expressly indicates that the counter represents a number of beam failure indications that have occurred since the counter was reset, and the standard method of counting would involve incrementing the counter by one each time a beam failure indication is detected. In fact, Cirik expressly suggests incrementing a counter by one with an analogous counter used for LBT failure detection. EX1005, [0228] ("increment the LBT failure counter by one"), FIGs. 17-18. A POSITA would have implemented the same conventional mechanism taught for LBT failure detection for beam failure detection to simplify the design of the counter and to ensure the counter represents the actual number of beam failure indications detected. EX1003, ¶102; *see also id.*, [0148] (explaining that beam failure is detected based on determining that the beam pair links have "an error rate higher than an error rate threshold"), FIG. 21, EX1003, ¶102. A POSITA would have reasonably expected success given the conventional nature of counting by one. *Id.*

Claim [15]

Cirik renders obvious Claim 15. EX1003, ¶103. For example, as discussed, Cirik's wireless device detects beam failure "based on a number of beam failure instance indications (e.g., Beam failure indications in FIG. 21) reaching a maximum

number of beam failure counter (e.g., maximum number of beam failures in FIG. 21).” EX1005³⁶, [0307], FIG. 21; *supra*, Element [13b]. In an analogous mechanism for LBT failure detection, Cirik teaches resetting an LBT failure counter when any of a variety of conditions occur such as an LBT detection timer expiring, switching uplink BWPs, deactivating the cell, resetting the MAC layer, expiry of an alignment timer, reaching a maximum number of SR transmissions, clearing uplink channels/signals, or reaching the maximum number of LBT failure indications. EX1005, [0230], [0236]-[0250], FIG. 17. It would have been obvious to implement many of the same conventional mechanisms that Cirik describes for resetting the LBT failure counter to similarly reset the beam failure counter. EX1003, ¶103. A POSITA would have been motivated to reset the beam failure instance indication counter to zero based on a beam failure detection timer expiring to ensure that beam failure is determined/triggered/declared only when the beam failure instance indications occur sufficiently close in time to reflect a persistent beam failure incident, thereby avoiding false positives where beam failure is wrongly declared as a result of the counter continuing to increment from unrelated beam failure instance indications that accumulate over a long period of time. EX1003, ¶103. Indeed, the use of such timers for resetting beam failure counters was well known before the

³⁶ See *supra* Footnote 3.

'128 Patent. *Id.* (citing EX1008, 1-3, 5 and EX1017, 58 (“the UE declares beam failure when the number of beam failure instance indications from the physical layer reaches a configured threshold before a configured timer expires.”)).

Element [16a]

Cirik renders obvious [16a]. EX1003, ¶104. For example, Cirik discloses that the “one or more configuration parameters” for LBT failure recovery that provide the claimed “*second configuration parameters*” include parameter(s) that define a “maximum number of LBT failures” as shown in FIG. 21. *Supra*, Elements [1a.iii], [1c]. Cirik’s wireless device determines LBT failure when the LBT failure counter meets the maximum number of LBT failure instances and initiates an LBT failure recovery procedure:

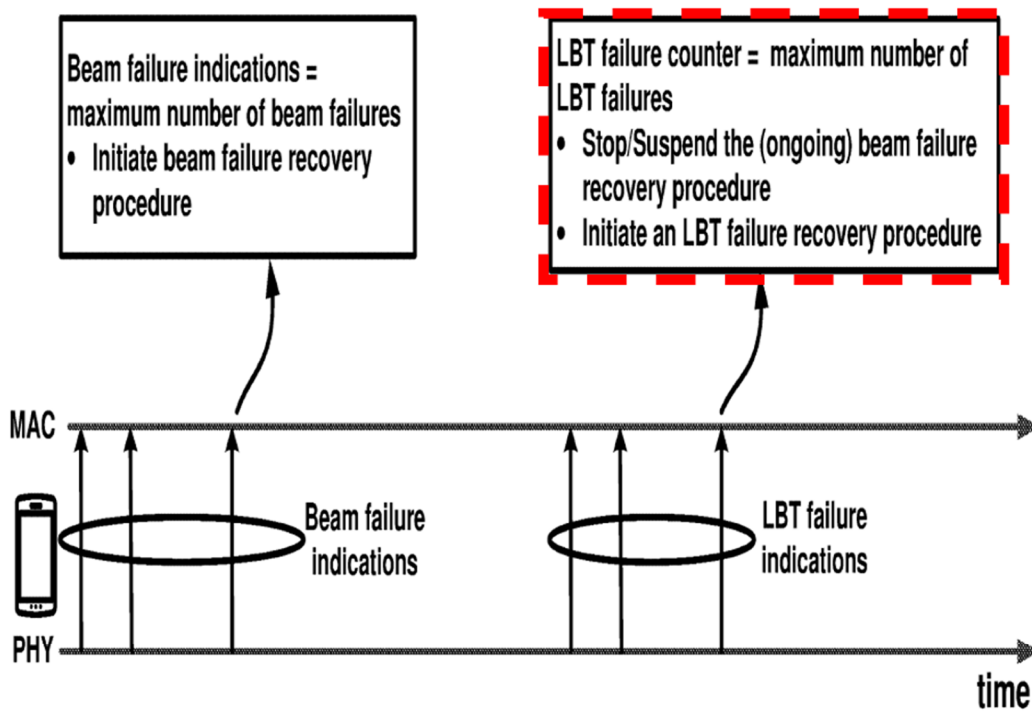


FIG. 21

EX1005³⁷, FIG. 21 (annotated); EX1003, ¶104; *see also* EX1005, [0207]-[0209], [0216]-[0217], [0245]-[0246] (“the second LBT failure detection and recovery configuration parameters may indicate a second maximum number of LBT failures”), [0226]-[0231], [0232] (explaining that the LBT failure “may comprise consistent uplink LBT failures”), [0247]-[0250], [0262], FIGs. 17-19; *supra*, Elements [1a.iii]-[1a.iv], [1f].

³⁷ *See supra* Footnote 3.

Element [16b]

Cirik renders obvious [16b]. EX1003, ¶105. For example, Cirik's wireless device triggers consistent LBT failure and then initiates an LBT failure recovery procedure when the LBT failure instance indication counter reaches the maximum number of LBT failure instances:

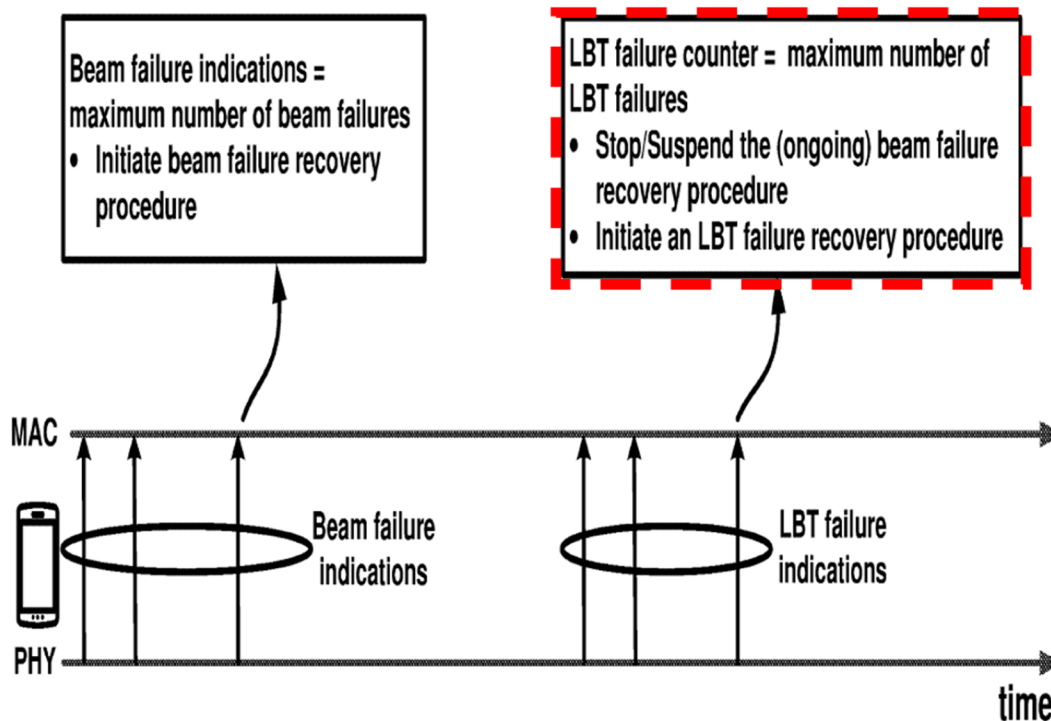


FIG. 21

EX1005³⁸, FIG. 21 (annotated); *see also id.*, [0232], [0233] (“[T]he wireless device may detect/determine/declare an uplink LBT failure ... based on a number of LBT failure indications reaching the maximum number of LBT failures.”), [0234], [0252], FIGs. 17-19; *supra*, [1a.iii], [1c], [16a]; EX1003, ¶105.

Claim [17]

Cirik renders obvious Claim 17. EX1003, ¶106. For example, Cirik discloses that “[b]ased on the receiving the LBT failure indication, the wireless device may increment the LBT failure counter In an example, the wireless device may increment the LBT failure counter by one.” EX1005³⁹, [0228]; *generally id.*, [0227]-[0234].

³⁸ *See supra* Footnote 3.

³⁹ *See supra* Footnote 3.

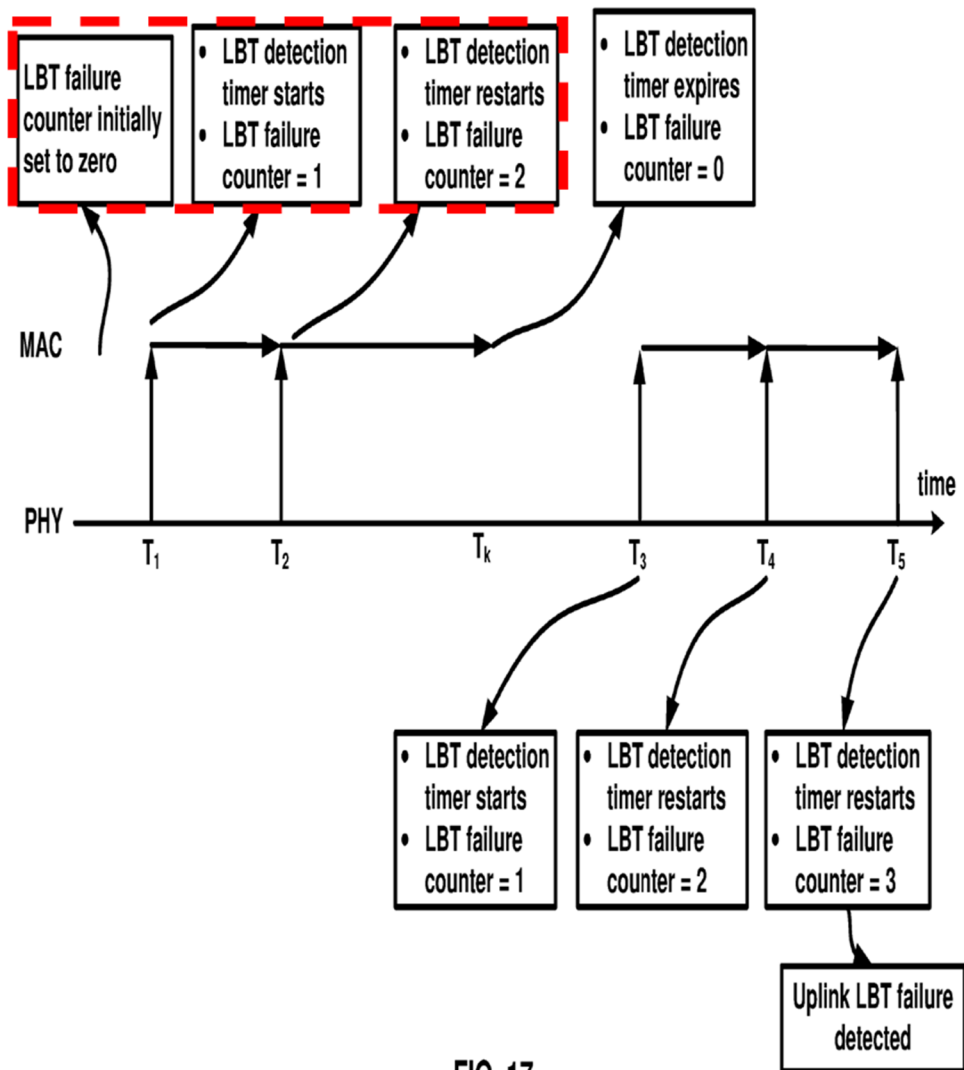
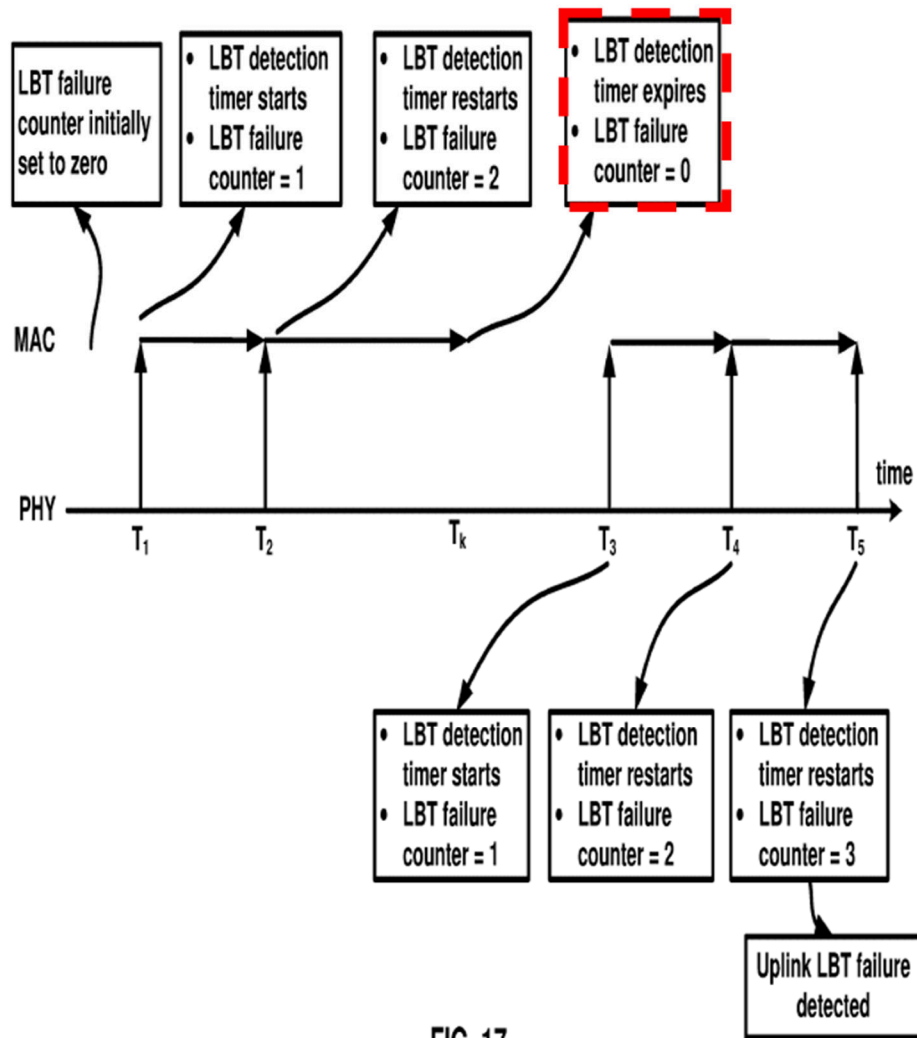


FIG. 17

EX1005, FIG. 17 (annotated), [0233]; *see also id.*, FIG. 18; EX1003, ¶106.

Claim [18]

Cirik renders obvious Claim 18. EX1003, ¶107. For example, Cirik discloses that “[b]ased on the LBT detection timer expiring, the wireless device may reset the LBT failure counter” and “resetting the LBT failure counter may comprise setting a value of the LBT failure counter to zero”:



EX1005⁴⁰, FIG. 17 (annotated), [0230]; EX1003, ¶107.

Element [19a]

Cirik renders obvious Element [19a]. EX1003, ¶108. As discussed, Cirik's wireless device switches from a first BWP to a second BWP of the primary cell as the active BWP, e.g., to initiate a random access process for LBT failure recovery.

⁴⁰ See *supra* Footnote 3.

Supra, Elements [1e]-[1f]. Cirik further discloses that the random-access configuration messages sent to the wireless device include indications of one or more “Physical RACH (PRACH) occasions” and that the wireless device may initiate a random access process by transmitting a preamble or other message “via one or more PRACH occasions.” EX1005⁴¹, [0153], [0156], [0158]. The wireless device switches from a first uplink BWP to a second uplink BWP based on “initiating a random access procedure” (e.g., the random access procedure for the LBT failure recovery). EX1005, [0237], FIG. 19; EX1003, ¶108. Accordingly, Cirik’s second BWP is configured with random access occasions (e.g., PRACH occasions) that allow the wireless device to initiate the random-access procedure for LBT failure recovery including transmitting a random-access preamble or related message “via one or more PRACH occasions.” *Id.*, [0153]; EX1003, ¶108.

Element [19b]

Cirik renders obvious Element [19b]. EX1003, ¶109. As discussed, Cirik’s wireless device switches from a first BWP to a second BWP of the primary cell as the active BWP, e.g., to initiate the random-access procedure for LBT failure recovery. *Supra*, Elements [1e]-[1f], [19a]. The wireless device switches to the

⁴¹ *See supra* Footnote 3.

second BWP based on initiating the random-access process. EX1005⁴², [0153], [0237], FIG. 19. Initiating the random-access process includes transmitting a random-access preamble or related message “via one or more PRACH occasions.” *Id.* A POSITA thus would have understood that switching from the first BWP to the second BWP is based on the second BWP being configured with the random-access occasions. EX1003, ¶109. Indeed, it would not be possible to initiate a random-access procedure for consistent LBT failure recovery on the second BWP if the second BWP were not configured with random-access occasions, and it thus would have been obvious to a POSITA to make the switch to the second BWP based on the second BWP being configured with random-access occasions to ensure consistent LBT failure recovery could be performed upon switching BWPs. EX003, ¶109 (citing EX1006).

B. GROUND 1B, 1C—Claims 1-19 are Obvious Over Cirik and Wu (Ground 1B) and Obvious Over Cirik and InterDigital (Ground 1C)

1. Wu (EX1006)

Like the '128 Patent, Wu discloses methods for beam failure recovery (BFR) and LBT failure recovery. EX1006, [0070], see also *id.* [0065], [0074], [0078], [0086], FIGs. 2-3; EX1003, ¶110. Wu explains that a terminal device determines “a

⁴² See *supra* Footnote 3.

plurality of BWPs each configured with at least one of the following: a resource for performing a scheduling request (SR) procedure (also referred to as “SR resource”), and a RACH resource.” *Id.*, [0076]. The terminal device selects a second BWP to switch to from a first BWP, for example, in response to detecting beam failure or LBT failure. *Id.*, [0072]-[0074], [0076], [0078], [0080].

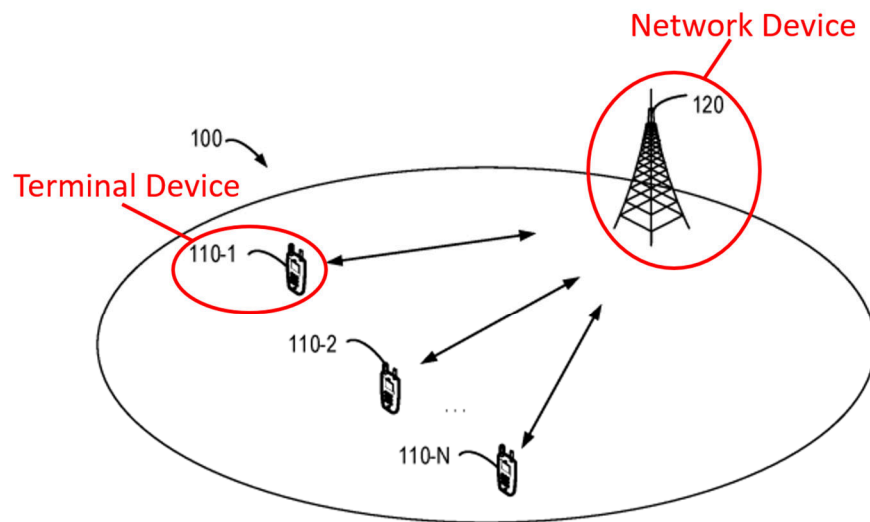


FIG. 1

EX1006, FIG. 1 (annotated), [0079]; EX1003, ¶110.

Wu discloses that the terminal device can detect beam failure and trigger a BFR procedure that includes performing a random access (RA) process on one of the configured BWPs. EX1006, [0073]-[0074], see also *id.* [0070], [0078]. Wu also explains that the beam failures may be “caused by continuous LBT failures.” *Id.*, [0070]. The terminal device can detect continuous LBT failure by using, for

example, “a counter or a timer.” *Id.*, [0066]-[0067], FIG. 2. In response to detecting continuous LBT failure, the terminal device “switches to a second BWP.” EX1006, [0072]. Wu discloses triggering a RA procedure “on the second BWP due to the continuous LBT failures.” *Id.*, [0072], [0078], [0080]; EX1003, ¶111.

2. InterDigital (EX1007)

InterDigital is a standards proposal submitted to the 3rd Generation Partnership Project (3GPP) Radio Access Network (RAN) Working Group #2’s Meeting #108 in November 2019 related to “Handling UL [Uplink] LBT [Listen-Before-Talk] Failures in MAC” in a 5G New Radio communications network. EX1007, 1; EX1003, ¶112. InterDigital describes techniques for recovering from a “consistent UL LBT Failure.” EX1007, 1-2. Like the ’128 Patent, InterDigital teaches that the UE (*i.e.*, a wireless/terminal device) should “initiate a new RA procedure upon switching to another BWP, i.e. to ensure the preamble counter and the power ramping counter are reset.” EX1007, 1-2. InterDigital proposes that in response to “BWP switching caused by detection of consistent uplink LBT failures on SpCell, MAC shall stop any ongoing RA procedure and initiate a new RA procedure.” EX1007, 1-3.

3. Analysis

As discussed above in Ground 1A, Cirik describes techniques for switching between BWPs of a cell “for any suitable reason” including “based on initiating a

random-access procedure.” EX1005⁴³, [0107], [0235]-[0237], FIG. 9; *supra*, Ground 1A, [1e]. To the extent it is argued that Cirik does not expressly disclose switching BWPs to initiate a second random access process for consistent LBT failure recovery (e.g., upon stopping a first random access process), these features were nonetheless known before the Critical Date of the ’128 Patent as evidenced by both Wu and InterDigital. EX1003, ¶¶113. For example, Wu teaches that “in response to the continuous LBT failures occurring on the first BWP, switching to a second BWP different from the first BWP.” EX1006, Abstract; *see also id.*, [0073]-[0074], [0069]-[0079], FIGS. 2-3. InterDigital likewise teaches that “[u]pon declaring a consistent UL LBT failure ..., the UE switches to another configured BWP with PRACH configured and initiates RACH”). EX1007, 1; *see also id.*, (“UE will switch to another BWP with PRACH configured after detection”).

Multiple reasons would have motivated a POSITA to apply the respective teachings of Wu and InterDigital to Cirik such that Cirik’s wireless device would switch from a first BWP to a second BWP of a primary cell upon stopping the ongoing RA procedure for beam failure recovery and initiating a new random access process for consistent LBT failure recovery. EX1003, ¶¶114-120.

⁴³ *See supra* Footnote 3.

First, Cirik, Wu, and InterDigital are all analogous art in the same field of endeavor as the '128 Patent and similarly describe techniques for handling recovery from consistent LBT failures in wireless systems such as 5G New Radio (NR) systems. EX1003, ¶115; EX1006, [0054]-[0055]; EX1007, 1; *supra* §VI.B.1-2.

Second, a POSITA would have implemented the combinations to achieve benefits like those expressly described in Wu, including that “switching to another BWP on different LBT sub-channels can be much more efficient than going through the whole re-establishment and configuration procedures.” EX1006, Abstract; *see also id.*, [0090]; EX1003, ¶116.

Third, a POSITA would have been motivated to implement the combinations to achieve benefits like those expressly described in InterDigital, including that “initiat[ing] a new RA procedure upon switching to another BWP” will “ensure the preamble counter and the power ramping counter are reset.” EX1007, 1-2; EX1003, ¶117.

Fourth, a POSITA would have been motivated to implement the combinations because, before the Critical Date of the '128 Patent, it had already been agreed to by the relevant 3GPP standard working group that the wireless device should “switch to another BWP and initiate[] RACH upon declaration of consistent LBT failure on PCell or PSCell if there is another BWP with configured RACH resources.”

EX1007, 4; EX1003, ¶118. A POSITA would have implemented these features in view of these developments of the 3GPP standard. *Id.*

Fifth, switching BWPs in this context would have been obvious to provide the wireless device with a better opportunity to successfully perform consistent LBT failure recovery since the new BWP is likely to perform better than the prior BWP on which failure had been determined. EX1003, ¶119.

Sixth, the combinations involve a straightforward application of a known technique as taught by each of Wu and InterDigital to a known system as taught by Cirik to achieve predictable results. EX1003, ¶120. In this context, the law is clear that the combination would have been obvious to a POSITA. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007) (a supposed invention that “simply arranges old elements with each performing the same function it had been known to perform” is obvious). A POSITA would have reasonably expected success implementing the combination since it merely entails the application of known techniques for switching BWPs when initiating a new random-access process (e.g., for consistent LBT failure recovery) that had been evaluated and approved by the 3GPP working group before the Critical Date. EX1003, ¶120.

The Cirik-Wu and Cirik-InterDigital combinations render each element of the Challenged Claims obvious for the same reasons described above in connection with Ground 1A, except that Elements [1e]-[1f] are further rendered obvious based on

Wu's and InterDigital's respective teachings for the wireless device to switch BWPs of the primary cell upon initiating a new random access process for consistent LBT failure recovery, as discussed in the preceding paragraphs in this section. EX1003, ¶121.

The Cirik-Wu combination further would have rendered obvious the additional features recited in claim 19 based on Wu's explanation that switching BWPs involves selecting a second BWP based on the second BWP being configured with "a resource for performing a random access procedure" (e.g., random access occasions). EX1006, [0008]-[0009], *see also id.*, [0076] ("select one of the plurality of BWPs" "configured with ... a RACH resource"), [0077] ("prioritize a BWP configured with a resource for performing a Contention Free Random Access (CFRA)"), [0078]-[0079], Cls. 8-9; *infra*, Ground 2A at [19a]-[19b]; EX1003, ¶122.

The Cirik-InterDigital combination also reinforces the obviousness of stopping an ongoing random access procedure in response to triggering consistent LBT failure (Element [1d]) based on InterDigital's express teachings to do exactly this. EX1007, 1-2 ("After BWP switching caused by detection of consistent uplink LBT failures on SpCell, MAC shall stop any ongoing RA procedure and initiate a new RA procedure"); EX1003, ¶123.

C. GROUND 2A—Claims 1, 10, and 16-19 are Obvious Over Wu and InterDigital

1. The Wu-InterDigital Combination

Wu describes the same scenario as the '128 Patent in which consistent/continuous LBT failure is detected during an ongoing random access process for beam failure recovery (BFR):

At block 220, in response to the continuous LBT failures occurring on the first BWP, the terminal device 110 switches to a second BWP different from the first BWP. ... In some embodiments, in response to a beam failure being detected on the first BWP and a BFR procedure being triggered, the terminal device 110 may select a BWP configured with a resource for performing a RA procedure (also referred to as 'RACH resource') as the second BWP to be switched to. The terminal device 110 may switch to the second BWP and initiate a RA procedure there[] ...

EX1006, [0071]-[0074], FIG. 2; EX1003, ¶124.

While Wu explains that the terminal device 110 may switch from a first BWP to a second BWP to initiate a RA procedure for consistent/continuous LBT failure recovery, Wu nonetheless leaves various implementation details around these processes to a POSITA. EX1003, ¶125. For example, Wu does not expressly address whether to immediately initiate the RA procedure for consistent/continuous

LBT failure recovery by preempting the ongoing RA procedure for BFR or wait until the ongoing RA procedure for BFR is completed. *Id.* A POSITA would have looked to references such as InterDigital to inform this choice. *Id.* Along these lines, InterDigital teaches that the preferred option is to stop the ongoing RA procedure and immediately initiate a new RA procedure for consistent/continuous LBT failure recovery:

It's worthwhile to clarify that the UE should initiate a new RA procedure upon switching to another BWP, i.e. to ensure the preamble counter and the power ramping counter are reset. Upon BWP switching caused by detection of consistent uplink LBT failures on SpCell, the MAC entity shall therefore stop the ongoing RA procedure -if any- and initiate a new RA procedure on the active BWP.

Proposal 2: After BWP switching caused by detection of consistent uplink LBT failures on SpCell, MAC shall stop any ongoing RA procedure and initiate a new RA procedure.

EX1007, 1-2.

It would have been obvious to a POSITA to apply InterDigital's suggestion to stop an ongoing RA procedure (e.g., an ongoing RA procedure for BFR) and initiate a new RA procedure for consistent/continuous LBT failure recovery in Wu.

Multiple reasons would have prompted a POSITA to make this combination before the Critical Date of the '128 Patent. EX1003, ¶¶126.

First, Wu and InterDigital are both analogous art in the same field of endeavor as the '128 Patent and similarly describe techniques for handling recovery from consistent LBT failures in wireless systems such as 5G New Radio (NR) systems. EX1003, ¶127; EX1006, [0054]-[0055]; EX1007, 1; *supra* §VI.B.1-2.

Second, a POSITA would have been prompted to modify Wu in view of InterDigital to realize the benefits expressly identified in InterDigital, including to “ensure the preamble counter and the power ramping counter are reset.” EX1006, 1-2; EX1003, ¶128. InterDigital’s technique also ensures that a new RA procedure is initiated (e.g., for LBT failure recovery) when “consistent UL LBT failure [is] detected as part of a given random access procedure,” thereby ensuring the UE behaves predictably and continues efforts to communicate with the network even when confronted by BWP switching after consistent LBT failure is detected during an ongoing RA procedure (e.g., for BFR). EX1007, 1-2; EX1003, ¶128.

Third, InterDigital’s solution would have been obvious to try. EX1003, ¶129. A POSITA would have recognized that the only two practical options for initiating a RA procedure for consistent/continuous LBT failure during an ongoing RA procedure for BFR as described in Wu would be to continue the ongoing RA procedure and initiate the RA procedure for consistent/continuous LBT failure once

the ongoing RA procedure completes or stop the ongoing RA procedure and initiate the RA procedure for consistent/continuous LBT failure recovery sooner. EX1003, ¶129. A POSITA would have had reason to pursue the latter option based on the known advantages attendant to this option as described in InterDigital. *Id.*

Fourth, the combination also amounts to straightforward application of a known technique as taught by InterDigital to a known system as taught by Wu to achieve predictable results. EX1003, ¶130. In this context, the law is clear that the combination would have been obvious to a POSITA. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007) (a supposed invention that “simply arranges old elements with each performing the same function it had been known to perform” is obvious). A POSITA would have reasonably expected success implementing the combination since it merely entails the application of known techniques for initiating RA process to a known situation in similar radio systems as described in Wu and InterDigital. EX1003, ¶130.

2. Element-by-Element Analysis

Element [1pre]

To the extent the preamble is limiting, Wu-InterDigital renders it obvious. EX1003, ¶131. For example, Wu discloses methods for beam failure recovery (BFR) and LBT failure recovery. EX1006, [0070], *see also id.* [0065], [0074], [0078], [0086], FIGs. 2-3.

Element [1a.i]

Wu-InterDigital renders obvious [1a.i]. EX1003, ¶¶132-133. For example, Wu discloses a terminal device, e.g., terminal device 110, (***wireless device***) that receives “configuration” messages from a network device, e.g., network device 120:

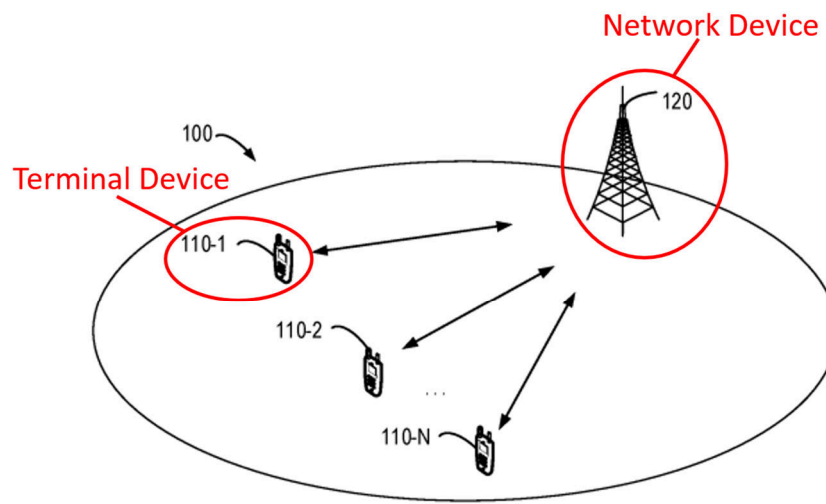


FIG. 1

EX1006, FIG. 1 (annotated), [0010], [0024], [0073-0074], [0076], [0078]-[0079], [0098]; EX1003, ¶¶132-133. Wu explains that the terminal device has “means for receiving ... a configuration” from the network device. *See* EX1006, [0098]. Wu also explains that the terminal device receives messages indicating a configuration of each BWP, which would include a BWP that a first RA process is initiated on for BFR and a second BWP that a second RA process is initiated on for LBT failure recovery. EX1006, [0008] (“cause the device to determine a plurality of BWPs each

configured with ... a resource for performing a random access procedure”), [0068] (“configured by the network device 120”), [0022], [0070]-[0077], [0096], cls. 4, 17; EX1003, ¶¶132-133 (citing EX1005); *see also infra* [1a.ii]-[1a.iv]; EX1006, [0010], [0024], [0073-0074], [0076], [0078-0079], [0085], Cl. 6.

Element [1a.ii]

Wu-InterDigital renders obvious [1a.ii]. EX1003, ¶134. As discussed in connection with [1a.i], Wu’s terminal device receives messages that define a “configuration” of BWPs from the network device. EX1006, [0076], [0079], [0098], *supra*, Element [1a.i]. Wu also explains that the network device can configure the terminal device with parameters for beam failure recovery, such as parameters that indicate “whether to initiate the RA procedure on the first or second BWP for BFR.” EX1006, [0073]-[0074]. Wu also discloses that each BWP can be configured with “a resource for performing a RA procedure (also referred to as “RACH resource”).” *Id.*; *see also id.*, [0078]-[0079]. “If a plurality of BWPs are available ..., the terminal device 110 may prioritize a BWP configured with a resource for performing a Contention Free Random Access (CFRA) procedure (also referred to as “CFRA resource”)” or “may prioritize a BWP configured with a SR [scheduling request] resource.” *Id.*, [0077].

Element [1a.iii]

Wu-InterDigital renders obvious [1a.iii]. EX1003, ¶¶135-136. As discussed in connection with [1a.i]-[1a.ii], Wu's terminal device receives messages that define a "configuration" of BWPs from the network device. EX1006, [0079]; *supra*, Elements [1a.i]-[1a.ii]. Wu also explains that the terminal device is configured by the network device with a "threshold number" of LBT failures for declaring continuous/consistent LBT failure (an example of the claimed "*second configuration parameters*"). EX1006, [0068]-[0069]; *see also id.*, [0076] (explaining that the BWPs can be configured with an "SR resource") [0079], [0085]-[0087], [0098], FIGS. 2-3. Accordingly, the one or more messages received by the terminal device includes second configuration parameters for LBT failure recovery, such as a "threshold number" of LBT failures and indications of an "SR resource" for LBT failure recovery. *Id.*, [0068], [0076]; *cf.* EX1001, 63:42-46 ("The second configuration for LBT failure recovery may comprise a first parameter (e.g., FailureInstanceMaxCount) indicating a first number of LBT failure instances that triggers LBT failure recovery."); EX1003, ¶¶135-136.

Element [1a.iv]

Wu-InterDigital renders obvious [1a.iv]. EX1003, ¶¶137-138. As discussed in connection with [1a.i]-[1a.iii], Wu's terminal device receives messages that define a "configuration" of BWPs from the network device. EX1006, [0079], *supra*,

Elements [1a.i]-[1a.iii]. Wu explains that the terminal device can include “a plurality of BWPs each configured with ... a RACH resource” and/or a “CFRA resource.” EX1006, [0076]-[0078]. “If a plurality of BWPs are available ..., the terminal device 110 may prioritize a BWP configured with a resource for performing a Contention Free Random Access (CFRA) procedure (also referred to as “CFRA resource”)” or “may prioritize a BWP configured with a SR [scheduling request] resource.” *Id.*, [0077]. Based on Wu’s teachings that the terminal device prioritizes BWPs based on whether the BWPs are configured with a resource for performing a random access procedure or a particular type of random access procedure (e.g., contention-free or contention-based), the configuration parameters received by the terminal device include “*second random access parameters*” used for initiating a random access process for consistent/continuous LBT failure recovery. EX1006, [0011]-[0012], [0060]-[0061], [0070]-[0078], Abstract, FIGS. 2-3; EX1003, ¶¶137-138 (citing EX1005).

Element [1b]

Wu-InterDigital renders obvious [1b]. EX1003, ¶139-140. For example, Wu discloses initiating a “RA procedure” on a first BWP “in response to a beam failure being detected ... and a BFR [beam failure recovery] procedure being triggered.” EX1006, [0073]-[0074]. As discussed, Wu teaches first configuration parameters that indicate, among other things, “whether to initiate the RA procedure on the first

or second BWP for BFR” and “a resource for performing a RA procedure.” *Id.*; *supra*, Element [1a.ii]. Accordingly, Wu’s first RA procedure is initiated based on the first configuration including first random access parameters, such as parameters indicating “whether to initiate the RA procedure on the first or second BWP for BFR” and the “resource for performing a RA procedure.” EX1006, [0073]-[0074]; *see also id.*, [0070], [0078]; EX1003, ¶139. Wu also explains that the beam failure is detected on a first BWP and that the RA procedure can be performed on the same first BWP or another (second) BWP of the same cell, and it would have been obvious to a POSITA that this cell would be a primary cell when it is the first cell to which the terminal device connected. EX1006, [0070], [0074]; EX1001, 17:7-22; EX1003, ¶¶139-140. A POSITA also would have appreciated that initiating random access procedures in 3GPP system like that described in Wu ordinarily and commonly involve doing so in accordance with random access parameters received in configuration messages from the network. EX1003, ¶¶139-140 (citing EX1005 and EX1017).

Element [1c]

Wu-InterDigital renders obvious [1c]. EX1003, ¶¶141-142. As discussed, Wu discloses that the terminal device is configured by the network with a “threshold number” of LBT failures for declaring continuous/consistent LBT failure (an example of the claimed “*second configuration parameters*”). EX1006, [0068]-

[0069]; *see also id.*, [0076] (explaining that the BWPs can be configured with an “SR resource”), [0079], [0085]-[0087], [0098]. Accordingly, Wu discloses that the terminal device triggers consistent LBT failure based on second configuration parameters as claimed. EX1006, [0068], *see also id.* [0066-0067], [0069], [0070-72], [0084]-[0085]. Wu further explains that the continuous/consistent LBT failure can occur on the same cell as the cell on which beam failure occurred, which would be a primary cell, for example, when it is the first cell to which the terminal device connects. EX1006, [0070]-[0074]; EX1001, 17:7-22; EX1003, (citing exhibit EX1018, 3).

Element [1d]

Wu-InterDigital renders obvious [1d]. EX1003, ¶143. As an initial matter, Wu discloses that “in response to a beam failure being detected on the first BWP and a beam failure recovery (BFR) procedure being triggered, the terminal device 110 may determine that continuous beam failures occur on the first BWP, since the beam failure on the first BWP may be probably caused by continuous LBT failures as well.” EX1006, [0070]; *see also id.*, [0071]-[0074], FIG. 2. “[I]n response to the continuous LBT failures occurring on the first BWP, the terminal device 110 switches to a second BWP different from the first BWP.” *Id.*, [0071]-[00072]. InterDigital additionally teaches that “[u]pon BWP switching caused by detection of consistent uplink LBT failures on SpCell, the MAC entity shall therefore stop the

ongoing RA procedure-if any-and initiate a new RA procedure on the active BWP.” EX1007, 1-2; *see supra* §VI.B.2-3. Wu confirms that an “ongoing RA procedure” like that referenced in InterDigital can be a RA procedure for beam failure recovery in response to detecting beam failure (*see* EX1006, [0073]-[0074]; *supra*, Element [1b]), and as described above, it would have been obvious in this context to stop the ongoing RA procedure for beam failure recovery and initiate a new RA procedure for consistent/continuous LBT failure recovery on the active BWP. *Supra*, §VI.B.3; EX1003, ¶143.

Element [1e]

Wu-InterDigital renders obvious [1e]. EX1003, ¶¶144-146. As discussed, Wu discloses initiating a first random access process for BFR on a first BWP. *Supra* Element [1b]; EX1006, [0073]-[0074]. Wu discloses switching to a second BWP based on a determination of consistent/continuous LBT failure:

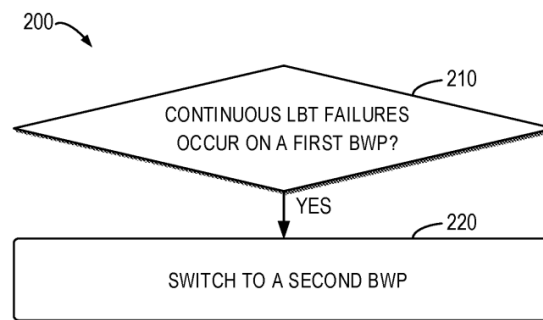


FIG. 2

EX1006, FIG. 2, [0070]-[0072], *see also id.* [0078] (“The terminal device 110 may use the CFRA resource allocated for BFR to perform the RA procedure on the second BWP.”), [0080], [0082]-[0083], [0088]. Further, as discussed in the combination overview and with respect to Element [1d], it would have been obvious to apply InterDigital’s teachings to Wu such that upon BWP switching caused by detection of consistent uplink LBT failures, the MAC entity of the terminal device will stop the ongoing RA procedure for beam failure recovery and initiate a new RA procedure for LBT failure recovery on the active BWP on the primary cell. EX1007, 1-2, 4 (agreed to “UE switch[ing] to another BWP ... on PCell or PSCell”); *supra*, Elements [1c]-[1d], §VI.B.3; EX1007, 1-2; EX1003, ¶¶145-146 (citing EX1005 and EX1018).

Element [1f]

Wu-InterDigital renders obvious [1f]. EX1003, ¶¶147-148. For example, Wu discloses triggering a RA procedure “on the second BWP due to the continuous LBT failures.” EX1006, [0078], [0070]-[0072], [0080]-[0083], FIGS. 2-3. Wu explains that the RA procedure may be based on the second random access parameters indicated in the configuration received by the wireless device as described above in connection with [1a.iv]. *Supra*, Element [1a.iv]; EX1006, [0079] (“The terminal device 110 may determine, based on the received configuration, the second BWP to be switch to.”), [0076] (“select one of the plurality of BWPs as the second BWP to

be switched to”), [0078] (“the CFRA resource can be used for performing the RA procedure”); *see also id.*, [0082]-[0083], [0088].

Further, as discussed in the combination overview and with respect to Elements [1d]-[1e], it would have been obvious to apply InterDigital’s teachings to Wu such that upon BWP switching caused by detection of consistent uplink LBT failures, the MAC entity of the terminal device will stop the ongoing RA procedure for beam failure recovery and initiate a new RA procedure for continuous/consistent LBT failure recovery on the active BWP of the primary cell. EX1007, 1-2; *supra*, Elements [1d]-[1e], §VI.B.3; EX1003, ¶148; *see also* EX1007, 1 (“Upon declaring a consistent UL LBT failure on the SpCell, the UE switches to another configured BWP with PRACH configured and initiates RACH.”).

Claim [10]

Wu-InterDigital renders obvious Claim 10. EX1003, ¶149. As discussed, Wu discloses first random access parameters that indicate random access resources for a beam failure recovery random access process. *Supra*, Elements [1a.ii], [1b]; *generally id.*, EX1006, [0070]-[0079].

Element [16a]

Wu-InterDigital renders obvious [16a]. EX1003, ¶150. As discussed, the second configuration parameters include a parameter for a “threshold number.” *Supra* Element [1a.iii]; EX1006, [0068]. Wu explains that “the terminal device 110

may determine that continuous LBT failures occur” when “the number of LBT failures occurring continuously exceeds [the] threshold number.” EX1006, [0068]. Accordingly, the “threshold number” indicates a number of LBT failure instances that triggers LBT failure recovery. EX1003, ¶150.

Element [16b]

Wu-InterDigital renders obvious [16b]. EX1003, ¶151. For example, Wu discloses that “the terminal device 110 may determine that continuous LBT failures occur” when “the number of LBT failures occurring continuously exceeds [the] threshold number.” EX1006, [0068], *see also* [0067]-[0069], [0087]; *supra*, Element [1a.iii]; EX1003, ¶151.

Claim [17]

Wu-InterDigital renders obvious Claim 17. EX1003, ¶152. For example, Wu teaches that “the terminal device 110 may use a counter to count the number of LBT failures occurring continuously.” EX1006, [0067], *See also id.* [0068]. A POSITA would have understood Wu’s teaching to include incrementing the LBT failure indication counter by one based on an LBT failure indication, especially since incrementing a counter by one was the ordinary and standard technique for counting events in digital systems like Wu’s before the ’128 Patent. EX1003, ¶152(citing EX1005, [0227]-[0234], FIGs. 17-18); EX1006, [0067]-[0068], [0078]. Incrementing by one is also a simple and obvious design choice that a POSITA

would have pursued to obtain an accurate count of LBT failures in a straightforward manner. EX1003, ¶152.

Claim [18]

Wu-InterDigital renders obvious Claim 18. EX1003, ¶153. For example, InterDigital teaches that “the UE maintains a counter and timer to detect a consistent UL LBT failure.” EX1007, 1. “The UE resets the counter upon timer expiry.” EX1007, 1. It would be obvious to incorporate this teaching from InterDigital into Wu because this was the agreed upon implementation for the 5G NR standard and the reset would ensure that consistent LBT failure is not falsely declared if a prolonged period has passed between detection of consecutive UL LBT failures. EX1007, 1 (“As agreed in RAN2#107 as a baseline ...”), 3; EX1003, ¶153, *see also* EX1008, 1.

Element [19a]

Wu-InterDigital renders obvious [19a]. EX1003, ¶154. For example, Wu discloses “a plurality of BWPs each configured with ... a resource for performing a random access procedure; and select one of the plurality of BWPs as the second BWP.” EX1006, [0008], *see also id.*, [0002], [0009], [0012]-[0013], [0022]-[0023], [0026]-[0028], [0077], [0080], [0096]-[0097], [0100]-[0101], Cls. 4-5, 8-9, 17. A BWP configured with resources for performing a RA procedure is configured with

random access occasions with which the terminal device may transmit a message in accordance with a RA procedure. EX1003, ¶154.

Element [19b]

Wu-InterDigital renders obvious [19b]. EX1003, ¶155. As discussed, Wu teaches that the second BWP of the primary cell is configured with random access occasions. *Supra*, Element [19a]. Wu and InterDigital also disclose switching to a second BWP of the primary cell. *Supra*, Element [1e]. Wu teaches that the second BWP can be selected, for example, based on the second BWP being configured with “a resource for performing a random access procedure” (e.g., random access occasions). EX1006, [0008]-[0009], *see also id.*, [0077]-[0079], Cls. 8-9.

D. GROUND 2B—Claims 2-9 and 11-15 are Obvious Over Wu, InterDigital, and Cirik

1. The Wu-InterDigital-Cirik Combination

Wu discloses substantially the same scenario described in the '128 Patent in which consistent/continuous LBT failure is detected during an ongoing random access process for beam failure recovery (BFR). EX1006, [0071]-[0074], FIG. 2. While Wu explains that the terminal device 110 may switch from a first BWP to a second BWP to initiate a RA procedure for consistent/continuous LBT failure recovery, Wu nonetheless leaves various implementation details to a POSITA. EX1003, ¶156. For example, Wu does not expressly describe the protocols used to perform a contention-free or contention-based RA procedure, details of the

configuration parameters for determining/declaring BFR and continuous/consistent LBT failure, how data in logical channels would be prioritized for BFR and continuous/consistent LBT failure recovery, or additional options for handling a suspended BFR procedure after completing consistent/continuous LBT failure recovery. *Id.* A POSITA would have looked to other references that address these topics, such as Cirik, to inform the implementation of the system. *Id.* It would have been obvious to a POSITA to further modify the Wu-InterDigital system by integrating the teachings of Cirik in this regard. *Id.* A POSITA would have been motivated to make the combination because Wu, InterDigital, and Cirik are all analogous art to the '128 Patent and address similar problems for performing BFR and continuous/consistent LBT failure recovery in similar wireless systems (e.g., 5G NR). *Id.* Additionally, a POSITA would have turned to Cirik to provide a more complete solution and to facilitate implementation of a complete and operable system using known techniques for random access, BF detection, BFR, LBT failure detection, and LBT failure recovery. *Id.* The combination also involves a merely straightforward application of a known technique as taught by InterDigital to a known system as taught by Wu to achieve predictable results. *KSR*, 550 U.S. at 417. A POSITA would have reasonably expected success in light of the similar wireless systems and similar solutions for BFR and consistent/continuous LBT failure recovery described in each of Wu, InterDigital, and Cirik. EX1003, ¶156.

2. Element-by-Element Analysis

Claim [2]

Supra, Ground 1A at Claim 2. EX1003, ¶157.

Claim [3]

Supra, Ground 1A at Claim 3. EX1003, ¶158.

Claim [4]

The Wu-InterDigital-Cirik combination provides Claim 4. EX1003, ¶159. For example, Wu discloses that for a RA procedure triggered on the second BWP for continuous LBT failures, “the terminal device 110 may transmit an indication on the RA procedure triggered by the continuous LBT failures.” EX1006, [0082]. Wu explains that “the indication may be transmitted via a Media Access Control (MAC) control element (CE).” *Id.* [0082], *see also id.* [0016], [0030], [0102], Cl. 11. A POSITA would have understood that a transport block would comprise the MAC CE to transmit the indication. EX1003, ¶159; *see also* EX1007, 2 (describing “multiplexing the LBT failure MAC CE into the TB.”); EX1006,[0082]-[0084]. In the combination, Cirik also discloses these features. *Supra*, Ground 1A at Claim 3. EX1003, ¶159.

Claim [5]

Supra, Ground 1A at Claim 5. EX1003, ¶160.

Claim [6]

Supra, Ground 1A at Claim 6. EX1003, ¶161.

Claim [7]

Supra, Ground 1A at Claims 3, 7. EX1003, ¶162.

Claim [8]

The Wu-InterDigital-Cirik combination satisfies Element [8]. EX1003, ¶163. As discussed, Wu discloses transmitting a transport block comprising an LBT failure MAC CE as part of the random access process for LBT failure recovery. See Element [4]. InterDigital explains that the design for LBT failure recovery MAC CE “can generally be similar to the MAC CE used to report a beam failure.” EX1007, 2. Based on these teachings a POSITA would have understood that a RA process for BFR (e.g., a ***third random access process***) would include transmitting a transport block comprising a BFR MAC CE in the same manner the random access process for LBT failure recovery includes transmitting a transport block comprising LBT failure mac CE. EX1003, ¶163; EX1007, 2; *supra* Claim [4]. In the combination, Cirik also discloses these features. *Supra*, Ground 1A at Claim 8. EX1003, ¶163.

Claim [9]

Supra, Ground 1A at Claim 9. EX1003, ¶164.

Claim [11]

Supra, Ground 1A at Claim 11. EX1003, ¶165.

Claim [12]

Supra, Ground 1A at Claim 12. EX1003, ¶166.

Element [13]

Supra, Ground 1A at Claim 13. EX1003, ¶167.

Claim [14]

Supra, Ground 1A at Claim 14. EX1003, ¶168.

Claim [15]

Supra, Ground 1A at Claim 15. EX1003, ¶169.

**VII. DISCRETIONARY CONSIDERATIONS FAVOR
INSTITUTION**

Petitioner believes that discretionary denial is unwarranted, and yet, Petitioner intends to utilize the bifurcated briefing process contemplated by the March 26, 2025, Stewart Memorandum to rebut contentions if offered by Patent Owner to the contrary. See <https://www.uspto.gov/about-us/events/learn-about-new-interim-processes-relating-institution-aia-proceedings> (April 24, 2025); <https://uspto.cosocloud.com/p9xpz6s4jn75/> (Video).

VIII. PAYMENT OF FEES—37 C.F.R. §42.103

Petitioner authorizes the Patent and Trademark Office to charge any fees to Deposit Account No. 06-1050.

IX. MANDATORY NOTICES—37 C.F.R. §42.8(a)(1)

A. Real Party-In-Interest—37 C.F.R. §42.8(b)(1)

Apple Inc. is the petitioner and the real party-in-interest.

B. Related Matters—37 C.F.R. §42.8(b)(2)

Petitioner is not aware of any disclaimers, reexamination certificates, or petitions for *inter partes* review for the '128 Patent. The '128 Patent is the subject of a number of civil actions including: *Apex Beam Technologies LLC v. Apple Inc.*, 6-24-cv-00223 (WDTX), April 29, 2024 and *Apex Beam Technologies LLC v. Samsung Electronics Co., Ltd. et al.*, 2-24-cv-00203 (EDTX), March 20, 2024.

Petitioner is concurrently filing a petition for *inter partes* review of U.S. Patent No. 11,637,615, which is a continuation of the '128 Patent. *See* IPR2025-00911.

C. Lead And Back-Up Counsel—37 C.F.R. §42.8(b)(3)

Petitioner provides the following designation of counsel:

Lead Counsel	Backup counsel
W. Karl Renner, Reg. No. 41,265 Fish & Richardson P.C. 60 South Sixth Street, Suite 3200 Minneapolis, MN 55402 Tel: 202-783-5070 Fax: 877-769-7945 Email: IPR50095-0240IP1@fr.com	Thomas A. Rozylowicz, Reg. No. 50,620 Nicholas W. Stephens, Reg. No. 74,320 Joseph W. Bauer, Reg. No. 81,218 Fish & Richardson P.C. 60 South Sixth Street, Suite 3200 Minneapolis, MN 55402 Tel: 202-783-5070 Fax: 877-769-7945 Email: IPR50095-0240IP1@fr.com

D. Service Information

Please address all correspondence and service to the address listed above.

Petitioner consents to electronic service by email at IPR50095-0240IP1@fr.com.

Respectfully submitted,

Dated: April 25, 2025

/W. Karl Renner/

Karl W. Renner, Reg. No. 41,265
Thomas A. Rozylowicz, Reg. No. 50,620
Nicholas W. Stephens, Reg. No. 74,320
Joseph Bauer, Reg. No. 81,218
Fish & Richardson P.C.
60 South Sixth Street, Suite 3200
Minneapolis, MN 55402
T: 202-783-5070
F: 877-769-7945

(Control No. IPR2025-00910)

Attorneys for Petitioner

CERTIFICATION UNDER 37 CFR § 42.24

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter Partes* Review totals 13,963 words, which is less than the 14,000 allowed under 37 CFR § 42.24.

Dated: April 25, 2025

/W. Karl Renner/

Karl W. Renner, Reg. No. 41,265
Nicholas W. Stephens, Reg. No. 74,320
Joseph W. Bauer, Reg. No. 81,218
Fish & Richardson P.C.
60 South Sixth Street
Minneapolis, MN 55402
T: 202-783-5070
F: 877-769-7945

(Control No. IPR2025-00910)

Attorneys for Petitioner

CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4)(i) *et seq.* and 42.105(b), the undersigned certifies that on April 25, 2025, a complete and entire copy of this Petition for *Inter Partes* Review and all supporting exhibits were provided via Federal Express, to the Patent Owner by serving the correspondence address of record as follows:

ALIREZA BABAEI
4525 Gilbertson Road
Fairfax, VA 22032
(703) 798-0675

/Crena Pacheco/

Crena Pacheco
Fish & Richardson P.C.
60 South Sixth Street
Minneapolis, MN 55402
pacheco@fr.com