

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC, CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS, T-MOBILE USA, INC., AT&T SERVICES, INC., NOKIA OF AMERICA, CORP.,
AND ERICSSON INC.

Petitioners

v.

KT CORPORATION (Patent Owner) and
PEGASUS WIRELESS INNOVATION LLC (Exclusive Licensee)

Case No. IPR2025-00290

Patent 10,721,118

**PETITION FOR INTER PARTES REVIEW
OF U.S. PATENT NO. 10,721,118**

TABLE OF CONTENTS

	Page
I. INTRODUCTION	1
II. MANDATORY NOTICES PURSUANT TO 37 C.F.R. §42.8(a)(1)	2
A. Real Party-In-Interest	2
B. Identification of Related Matters Under 37 C.F.R. §42.8(b)(2)	3
C. Lead and Backup Counsel.....	4
D. Service Information Under 37 C.F.R. §42.8(b)(4).....	6
III. FEES	6
IV. REQUIREMENTS UNDER 37 C.F.R. §42.104.....	6
A. Grounds for Standing	6
B. Identification of Challenges and Precise Relief Requested	6
C. Prior Art Qualification of Asserted References	7
V. BACKGROUND	10
A. The '118 Patent	10
B. Examination History	11
C. The Prior Art	12
1. Futaki (EX1022, EX1007).....	12
2. 3GPP 36.300 (EX1009)	14
3. 3GPP 36.331 (EX1010)	14
D. Person of Ordinary Skill in the Art (“POSITA”).....	15
VI. CLAIM CONSTRUCTION	15

VII. PETITIONERS HAVE A REASONABLE LIKELIHOOD OF PREVAILING	16
A. Claims 1-15 Are Anticipated by or Obvious in view of Futaki (Ground 1)	17
1. Claim 1 (Preamble): “A method of a user equipment for configuring dual connectivity, the method comprising:”	21
a. [1.1]: “adding and configuring a secondary base station signaling radio bearer (SRB);”	23
b. [1.2]: “receiving from a secondary base station, a radio resource control (RRC) message including radio resource configuration information on the secondary base station or a secondary cell group through the secondary base station SRB; and”	30
c. [1.3]: “transmitting a failure information message to a master base station in case the user equipment is unable to comply with the radio resource configuration information included in the RRC message,”	33
d. [1.4]: “wherein the addition of the secondary base station SRB is determined by the secondary base station.”	35
2. Claim 2: “The method according to claim 1, wherein the master base station and the second base station are base stations using radio access technologies different from each other.”	39
3. Claim 3: “The method according to claim 1, wherein the addition of the secondary base station SRB is configured when the master base station performs a secondary base station addition procedure.”	40

4. Claim 4: “The method according to claim 1, wherein, in case the user equipment is unable to comply with the radio resource configuration information included in the RRC message and therefore fails to a secondary BS radio resource configuration, a radio resource on the secondary base station or the secondary cell group is suspended.” 42
5. Claim 5: “The method according to claim 4, wherein the radio resource on the secondary base station or the secondary cell group includes at least one of a secondary cell group data radio bearer (DRB), a secondary cell group SRB, a part of a secondary cell group of a split DRB, and a part of a secondary cell group of a split SRB.” 43
6. Claim 6: “The method according to claim 1, wherein the failure information message includes cause information on the secondary base station radio resource configuration failure.” 44
7. Claim 7 (Preamble): “A method of a secondary base station for controlling dual connectivity of a user equipment, the method comprising:” 45
 - a. [7.1]: “determining, by the secondary base station, to add a secondary base station signaling radio bearer (SRB) to the user equipment;” 45
 - b. [7.2]: “transmitting a radio resource control (RRC) message including radio resource configuration information on the secondary base station or a secondary cell group to the user equipment through the secondary base station SRB; and” 46
 - c. [7.3]: “receiving a response message for a radio resource configuration from the user equipment through the secondary BS SRB if the UE successfully complies with a radio resource on the secondary base station,” 46

- d. [7.4]: “wherein the user equipment configures dual connectivity by using a master base station and the secondary base station.” 47
- 8. Claim 8: “The method according to claim 7, wherein the master base station and the secondary base station are base stations using radio access technologies different from each other.” 48
- 9. Claim 9: “The method according to claim 7, wherein, in case the user equipment is unable to comply with the radio resource configuration information included in the RRC message, the user equipment is configured to transmit a failure information message to the master base station.” 48
- 10. Claim 10 (Preamble): “A user equipment for configuring dual connectivity, the user equipment comprising:” 48
 - a. [10.1]: “a controller configured to add and configure a secondary base station signaling radio bearer (SRB);” 49
 - b. [10.2]: “a receiver configured to receive from a secondary base station, a radio resource control (RRC) message including radio resource configuration information on the secondary base station or a secondary cell group through the secondary base station SRB; and” 49
 - c. [10.3]: “a transmitter configured to transmit a failure information message to a master base station in case the user equipment is unable to comply with the radio resource configuration information included in the RRC message,” 49
 - d. [10.4]: “wherein the addition of the secondary base station SRB is determined by the secondary base station.” 49

11.	Claim 11: “The user equipment according to claim 10, wherein the master base station and the secondary base station are base stations using radio access technologies different from each other.”	51
12.	Claim 12: “The user equipment according to claim 10, wherein the addition of the secondary base station SRB is configured when the master base station performs a secondary base station addition procedure.”	51
13.	Claim 13: “The user equipment according to claim 10, wherein, in case the user equipment is unable to comply with the radio resource configuration information included in the RRC message and fails to a secondary BS radio resource configuration, a radio resource on the secondary base station or the secondary cell group is suspended.”	51
14.	Claim 14: “The user equipment according to claim 13, wherein the radio resource on the secondary base station or the secondary cell group includes at least one of a secondary cell group data radio bearer (DRB), a secondary cell group SRB, a part of a secondary cell group of a split DRB, and a part of a secondary cell group of a split SRB.”	51
15.	Claim 15: “The user equipment according to claim 10, wherein the failure information message includes cause information on the secondary base station radio resource configuration failure.”	51
B.	Claims 1-15 Would Have Been Obvious Over Futaki in View of 3GPP 36.300 and 3GPP 36.331 (Ground 2)	52
1.	Claim 1 (Preamble)	55
a.	Element [1.1]	55
b.	Element [1.2]	56
c.	Element [1.3]	57

d.	Element [1.4]	59
2.	Claim 2	59
3.	Claim 3	60
4.	Claim 4	60
5.	Claim 5	61
6.	Claim 6	62
7.	Claim 7 (Preamble)	63
a.	Element [7.1]	63
b.	Element [7.2]	64
c.	Element [7.3]	64
d.	Element [7.4]	66
8.	Claim 8	66
9.	Claim 9	66
10.	Claim 10 (Preamble)	66
a.	Element [10.1]	66
b.	Element [10.2]	66
c.	Element [10.3]	66
d.	Element [10.4]	67
11.	Claim 11	67
12.	Claim 12	67
13.	Claim 13	67
14.	Claim 14	67
15.	Claim 15	67

VIII. OTHER CONSIDERATIONS	67
A. Secondary Considerations	67
B. Discretion to Institute	68
1. The Board should not deny this Petition under §314(a)	68
a. Factor 1: Whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted	68
b. Factor 2: Proximity of the court’s trial date to the Panel’s projected statutory deadline for a final written decision.....	68
c. Factor 3: Investment in the parallel proceeding by the court and the parties.....	70
d. Factor 4: Overlap between issues raised in the petition and in the parallel proceeding	70
e. Factor 5: Whether the petitioner and the defendant in the parallel proceeding are the same party	71
f. Factor 6: Other circumstances that impact the Panel’s exercise of discretion, including the merits	71
2. The Board should not deny this Petition under §325(d).....	72
IX. CONCLUSION.....	74

APPENDIX A - LIST OF EXHIBITS

CERTIFICATE OF COMPLIANCE WITH 37 C.F.R. §42.24

CERTIFICATE OF SERVICE

TABLE OF AUTHORITIES

Cases	Page(s)
<i>Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH</i> , IPR2019-01469, Paper 6 (PTAB Feb. 13, 2020).....	72, 73
<i>Apple Inc. v. Fintiv, Inc.</i> , IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020)	70
<i>In re AT&T Intellectual Property II, L.P.</i> , 856 F.3d 991 (Fed. Cir. 2017)	18
<i>Becton, Dickinson & Co. v. B. Braun Melsungen AG</i> , IPR2017-01586, Paper 8 (PTAB Dec. 15, 2017)	72
<i>Biogen Ma Inc. v. EMD Serono, Inc.</i> , 976 F.3d 1326 (Fed. Cir. 2020)	50
<i>Blue Calypso, LLC v. Groupon, Inc.</i> , 815 F.3d 1331 (Fed. Cir. 2016)	17, 18
<i>Comcast Cable Commn’s, LLC v. Rovi Guides, Inc.</i> , IPR2019-00231, Paper 14 (PTAB May 20, 2019)	72
<i>In re Dilnot</i> , 300 F.2d 945 (CCPA 1962)	50
<i>Dish Network v. Broadband iTV</i> , IPR2020-01280, Paper 17 (PTAB Feb. 4, 2021).....	69, 70
<i>Inergy Tech., Inc. v. Force Mos Tech., Co., Ltd.</i> , IPR2024-00094, Paper 9 (PTAB May 21, 2024)	71, 72
<i>Penumbra, Inc. v. Rapidpulse, Inc.</i> , IPR2021-01466, Paper 34 (PTAB Mar. 10, 2023)	8
<i>Phillips v. AWH Corp.</i> , 415 F.3d 1303 (Fed. Cir. 2005) (<i>en banc</i>)	15
<i>Puma N. Am., Inc. v. Nike, Inc.</i> , IPR2019-01058, Paper 10 (PTAB Oct. 31, 2019).....	73

Petition for *Inter Partes* Review of U.S. Patent No. 10,721,118

<i>In re Qapsule Techs., Inc.</i> , 759 F.App’x 975 (Fed. Cir. 2019)	50
<i>Samsung Elecs. Co., Ltd. v. Huawei Techs. Co., Ltd.</i> , IPR2017-01487, Paper 45 (PTAB Dec. 10, 2018)	9, 10
<i>Sand Revolution II, LLC v. Continental Intermodal Group – Trucking LLC</i> , IPR2019-01393, Paper 24 (PTAB Jun. 16, 2020)	71
<i>SRAM, LLC v. FOX Factory, Inc.</i> , IPR2024-00216, Paper 11 (PTAB Jun. 7, 2024)	71
<i>Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.</i> , 200 F.3d 795 (Fed. Cir. 1999)	16

Statutes

35 U.S.C. §102	7, 8, 10
35 U.S.C. §102(a)(1)	9, 10
35 U.S.C. §102(a)(2)	8, 9
35 U.S.C. §102(d)(2)	8
35 U.S.C. §103	7, 8
35 U.S.C. §119	8
35 U.S.C. §120	8
35 U.S.C. §§311-319	1
35 U.S.C. §314(a)	68
35 U.S.C. §315(e)	3
35 U.S.C. §325(d)	72

Rules

37 C.F.R. §42.8(a)(1)	2
37 C.F.R. §42.8(b)(1)	2
37 C.F.R. §42.8(b)(2)	3
37 C.F.R. §42.8(b)(3)	4
37 C.F.R. §42.8(b)(4)	6
37 C.F.R. §42.10(a)	4
37 C.F.R. §42.10(b)	6
37 C.F.R. §42.15(a)	6
37 C.F.R. §42.100 <i>et seq.</i>	1
37 C.F.R. §42.104	6
37 C.F.R. §42.104(a)	6
M.P.E.P. §2113	50
M.P.E.P. §2144.04	50
M.P.E.P. §2154.01(b)	8, 9

I. INTRODUCTION

Google LLC, Cellco Partnership d/b/a Verizon Wireless, T-Mobile USA, Inc., AT&T Services, Inc., Nokia of America Corp., and Ericsson Inc., (collectively, “Petitioners”) respectfully request *inter partes* review of Claims 1-15 (“the Challenged Claims”) of U.S. Patent No. 10,721,118 (“the ’118 Patent”) (EX1001) under 35 U.S.C. §§311-319 and 37 C.F.R. §42.100 *et seq.*

The Challenged Claims encompass configuring dual connectivity (“DC”) for a user equipment (“UE”) in radio access networks by adding and configuring a secondary base station signaling radio bearer (“SRB”). The addition of the secondary base station is determined by the secondary base station. The UE receives a radio resource control (“RRC”) message including radio resource configuration information from the secondary base station through the secondary base station SRB. If the UE is unable to comply with the radio resource configuration information in the RRC message, the UE transmits a failure information message to a master base station. The ’118 Patent purports to enable a UE to have DC with a plurality of base stations using different network technologies. *See* EX1001, 1:55-2:20.

However, the prior art cited in this Petition discloses enabling a UE to have DC with a plurality of base stations using different network technologies, particularly LTE+/LTE-Advanced and 5G technologies, where the secondary base station determines the addition of the secondary base station—the alleged novelty of

the '118 Patent. The prior art also discloses enabling a UE to have DC with a plurality of base stations employing the same radio access technology (e.g., LTE, LTE+), using the same techniques disclosed in the '118 Patent. The Challenged Claims are therefore unpatentable. *See* EX1007, EX1009, and EX1010 in their entirety.

II. MANDATORY NOTICES PURSUANT TO 37 C.F.R. §42.8(a)(1)

A. Real Party-In-Interest

Pursuant to 37 C.F.R. §42.8(b)(1), Petitioners certify that the real parties in interest are Google LLC¹, Cellco Partnership d/b/a Verizon Wireless, Verizon Business Network Services LLC, Verizon Corporate Services Group Inc., TracFone Wireless, Inc., AT&T Corp., AT&T Services, Inc., AT&T Mobility LLC, AT&T Mobility II LLC, New Cingular Wireless PCS, LLC, Cricket Wireless LLC, T-Mobile USA, Inc., Sprint Solutions LLC, Sprint Spectrum LLC, Ericsson Inc., Telefonaktiebolaget LM Ericsson, and Nokia of America Corporation.

Out of an abundance of caution, Petitioners identify all current defendants in the below cases, as well as additional involved parties, as potential real parties in

¹ Google LLC is a subsidiary of XXVI Holdings Inc. which is a subsidiary of Alphabet Inc. XXVI Holdings Inc. and Alphabet Inc. are not real parties-in-interest to this proceeding.

interest only for the purpose of this proceeding and only to the extent that Patent Owner contends that these separate legal entities should be named real parties in interest in this IPR. Petitioners do so to avoid the potential expenditure of resources to resolve such a challenge. Petitioners also acknowledge that each petitioner has a number of affiliates. No unnamed entity is funding, controlling, or otherwise has an opportunity to control or direct this Petition or Petitioners' participation in any resulting IPR. Petitioners are also not aware of any affiliate that would be barred from filing this Petition under 35 U.S.C. §315(e).

B. Identification of Related Matters Under 37 C.F.R. §42.8(b)(2)

The following is a list of any judicial or administrative matters that would affect, or be affected by, a decision in this proceeding:

Related District Court Matters (“Related Litigations”)

1. *Pegasus Wireless Innovation LLC v. AT&T Inc. et al.*, Civ. Action No. 2:23-cv-00638 (EDTX) filed on December 29, 2023 (consolidated with 2:23-cv-00640; *see* EX1021) (“the ’638 Litigation”);

2. *Pegasus Wireless Innovation LLC v. T-Mobile US, Inc. et al.*, Civ. Action No. 2:23-cv-00639 (EDTX) filed on December 29, 2023 (consolidated with 2:23-cv-00640; *see* EX1021) (“the ’639 Litigation”); and

3. *Pegasus Wireless Innovation LLC v. Verizon Communications Inc. et al.*, Civ. Action No. 2:23-cv-00640 (EDTX) filed on December 29, 2023 (pending) (“the ’640 Litigation”).

Related Applications

The ’118 Patent issued from U.S. Patent Application No. 16/300,557, filed on November 10, 2018, which is a U.S. National Stage of PCT International Application No. PCT/KR2017/004873, filed on May 11, 2017 and claims priority to Korean Patent Application No. 10-2017-0057549, filed on May 8, 2017, Korean Patent Application No. 10-2016-0083270, filed on July 1, 2016, and Korean Patent Application No. 10-2016-0058157, filed on May 12, 2016.

C. Lead and Backup Counsel

Pursuant to 37 C.F.R. §42.8(b)(3) and §42.10(a), Petitioners hereby identify its lead and backup counsel as follows:

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Powers of Attorney are being filed concurrently herewith in accordance with 37 C.F.R. §42.10(b).

D. Service Information Under 37 C.F.R. §42.8(b)(4)

Petitioners consent to electronic service at the email addresses listed above.

III. FEES

The undersigned authorizes the Office to charge Deposit Account 02-4800 for fees required by 37 C.F.R. §42.15(a).

IV. REQUIREMENTS UNDER 37 C.F.R. §42.104

A. Grounds for Standing

Petitioners certify that the '118 Patent is available for IPR and Petitioners are not barred or estopped from requesting an IPR of the Challenged Claims on the grounds identified herein. 37 C.F.R. §42.104(a)."

B. Identification of Challenges and Precise Relief Requested

Petitioners challenge Claims 1-15 of the '118 Patent and request that these claims be found unpatentable for the reasons set forth in Petitioners' Grounds as follows:

Ground	Reference(s)	Basis	Claims
1	WO 2017/119247 (“Futaki”) (EX1022, EX1007) ²	§§102/103	1-15
2	Futaki in view of “LTE; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2 (3GPP TS 36.300 version 12.8.0 Release 12)” (“3GPP 36.300”) (EX1009) and “LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification (3GPP TS 36.331 version 12.8.0 Release 12)” (“3GPP 36.331”) (EX1010)	§103	1-15

Petitioners also rely upon the evidence listed in the Exhibit List, including the Declaration and *Curriculum Vitae* of Sumit Roy (EX1013, ¶¶1-278; EX1014) and the Declaration and *Curriculum Vitae* of Craig Bishop (EX1023, ¶¶1-77; EX1024).

C. Prior Art Qualification of Asserted References

For this Petition, Petitioners assume the earliest effective filing date of the ’118 Patent is the May 12, 2016 filing date of the earliest priority Korean Patent

² International Publication No. WO 2017/119247 is EX1022. The Certified English Translation of WO 2017/119247 is EX1007. Unless otherwise indicated, citations to Futaki are to EX1007.

Application No. 10-2016-0058157.³ The '118 Patent is subject to prior art provisions under AIA 35 U.S.C. §§102, 103.

Futaki (EX1022, EX1007), PCT International Application No. PCT/JP2016/087143 filed December 14, 2016 and published July 13, 2017 as WO 2017/119247, claims earliest priority to Japanese Patent Application JP 2016-002879 (“Futaki Priority Application”, EX1008) filed January 8, 2016.

Futaki is prior art at least under AIA §§102(a)(2), 102(d)(2), and 119. “[F]or prior-art determinations under AIA §102, ‘there is no need to evaluate whether any claim of [a reference] patent document is actually entitled to priority or benefit under 35 U.S.C. 119, 120.’” *Penumbra, Inc. v. Rapidpulse, Inc.*, IPR2021-01466, Paper 34 at 32 (PTAB Mar. 10, 2023) (quoting M.P.E.P. §2154.01(b)). All that is required is that the Futaki Priority Application “describe the subject matter” that Petitioner relies upon in Futaki. Here, the disclosures of the Futaki Priority Application and Futaki are nearly identical, with immaterial differences in some phrasing; the table below identifies corresponding disclosures:

Futaki (EX1007)	Futaki Priority Application (EX1008)
[0001]-[0123]	[0001]-[0123]
[0124]-[0142]	[0124]
Figs. 1-13	Figs. 1-13

³ Petitioners do not concede that any Challenged Claim is entitled to an effective filing date of May 12, 2016.

Citations to Futaki (EX1007) in this Petition and Dr. Roy's Declaration (EX1013) bear corresponding disclosure in the Futaki Priority Application (EX1008) describing the same subject matter.

Futaki qualifies as prior art as of January 8, 2016, the filing date of the Futaki Priority Application, and constitutes prior art at least under §102(a)(2). Futaki: (1) contains a priority or benefit claim to the prior-filed application; (2) was filed within the applicable filing period requirement (copending with or within twelve months of the earlier filing, as applicable); and (3) has a common inventor or by the same applicant. *See* M.P.E.P. §2154.01(b).

3GPP 36.300 (EX1009), published at least by January 4, 2016, constitutes prior art at least under §102(a)(1). Craig Bishop's Declaration (EX1016) explains that 3GPP technical specifications and contributions, including 3GPP 36.300 (EX1009), are publicly accessible as of their upload date to the publicly available 3GPP file server. EX1016, ¶52. 3GPP 36.300 was uploaded to the 3GPP server on December 17, 2015. *Id.*, ¶¶64-70. 3GPP 36.300 became a "printed publication" and qualifies as prior art under 35 U.S.C. §102(a)(1) on December 17, 2015. *Id.*, ¶70. *See, e.g., Samsung Elecs. Co., Ltd. v. Huawei Techs. Co., Ltd.*, IPR2017-01487, Paper 45 (Final Written Decision), pp.13-14 (determining that technical reports/specifications uploaded to a standards organization's file server before a

challenged patent's priority date qualify as prior art under 35 U.S.C. §102) (P.T.A.B. Dec. 10, 2018).

3GPP 36.331 (EX1010), published at least by September 25, 2015, constitutes prior art at least under §102(a)(1). Craig Bishop's Declaration (EX1016) explains that 3GPP 36.331 was uploaded to the publicly available 3GPP file server on December 28, 2015. EX1016, ¶¶52, 71-77. 3GPP 36.331 became a "printed publication" and qualifies as prior art under 35 U.S.C. §102(a)(1) on December 28, 2015. *Id.*, ¶77. *See, e.g., Samsung*, IPR2017-01487, Paper 45, pp.13-14.

V. BACKGROUND

A. The '118 Patent

The '118 Patent discloses configuring DC of a UE with a plurality of base stations, particularly with base stations employing radio access network technologies different from each other. EX1001, 3:16-25. The '118 Patent discloses that the prior art method used a master base station to determine to add the secondary base station and to transmit the RRC message to the UE for configuring the secondary base station. EX1001, 7:53-62.

With the introduction of New Radio ("NR", "5G") radio access technologies, "a RAN [*radio access network*] architecture is required to support tight interworking between the NR and the LTE." EX1001, 8:1-2. The '118 Patent describes purported problems associated with using different radio access technologies, stating that an

“LTE BS [*base station*] cannot understand an RRC message generated by the NR BS” and “in the typical dual connectivity technology, [*a secondary base station*] is able to transmit an RRC message through only an MeNB.” *Id.*, 8:16-17; 8:22-23; *see* 7:63-8:48. The ’118 Patent purports to address this problem by providing “LTE-NR dual connection operation supporting ***tight interworking between the LTE and the NR***” and “effectively processing radio connection in a signaling process between an LTE BS and an NR BS and/or between a UE and any of the LTE BS and the NR BS.” *Id.*, 8:36-45 (emphasis added). But the prior art (Futaki, 3GPP 36.300, 3GPP 36.331) had already addressed this problem by providing the exact techniques contemplated in the ’118 Patent. *See* §VII.

The ’118 Patent discloses that “a RAN architecture is required to support tight interworking between the NR and the LTE.” EX1001, 8:1-2; 7:63-9:14. But Futaki had already recognized and solved this problem. *See* EX1007, ¶[0008]; *see also* EX1008, ¶[0008] (“The inventors have studied the 5G radio architecture that provides tight interworking of the LTE RAT [*radio access technology*] and the New 5G RAT and found some problems.”); *see id.*, ¶¶[0002]-[0015]. *See* §VII.

B. Examination History

The Examiner issued a single Office Action on the merits (EX1002, pp.108-116, Office Action dated Nov. 15, 2019), with rejections based on U.S.

2016/0028585 (“Wager”, EX1011) and Wager in view of U.S. 2016/0044743 (“Xu”, EX1012).

In response, Applicant amended the claims to recite “from a secondary base station” and “wherein the addition of the secondary base station SRB is determined by the secondary base station.” EX1002, p.65. Applicant argued that the recitation “from a secondary base station” renders the Challenged Claims allowable because the cited references “teach the MeNB receiving the SeNB radio resource configuration from the SeNB” and that they “do[] not teach the UE receiving the radio resource configuration from the SeNB.” EX1002, p.69. Applicant argued that the recitation “wherein the addition of the secondary base station SRB is determined by the secondary base station” renders the Challenged Claims allowable because the cited references merely teach that “the secondary base station decides the modification” and “do[] not teach the secondary base station deciding the addition of the radio resources.” EX1002, p.70. The Examiner subsequently allowed the application. EX1002, pp.46-50. However, the art cited in this Petition discloses the purported allowable subject matter.

C. The Prior Art

1. Futaki (EX1022, EX1007)

Futaki discloses “an apparatus, a method, and a program that contribute to efficient transmission of control-plane messages through a cell of the subordinate

RAT in a radio architecture that provides *interworking of two different RATs*.” EX1007, ¶[0009]; EX1008, ¶[0009] (emphasis added). Futaki focuses on “specific examples with regard to the 5G radio architecture that provides tight interworking of the LTE RAT and the New 5G RAT.” EX1007, ¶[0019]; EX1008, ¶[0019]. Futaki discloses a UE “connect[ing] to both one or more LTE cells (e.g., cells 21 and 22) and one or more New 5G cells (e.g., cells 23 and 24)” using DC. EX1007, ¶[0020]; EX1008, ¶[0020]. EX1013, ¶46.

Futaki recognizes that “a signalling connection specific to 5G cells (e.g., an RRC connection and a Signaling Radio Bearer (SRB)) may be required.” EX1007, ¶[0008]; EX1008, ¶[0008]. Futaki discloses that “[t]he New RRC layer 511 [*e.g. the 5G RRC layer*] may configure a signalling radio bearer with the 5G UE 1, also configure the lower layers 406-408 of the New 5G CG [*cell group*] (e.g., the New 5G cells 23 and 24) and the New PDCP [*packet data convergence protocol*] layer 512, and then transmit or receive RRC messages to or from the 5G UE 1 through the New 5G CG.” EX1007, ¶[0030]; EX1008, ¶[0030]. Futaki discloses that “the 5G specific eNB 6 (or the New RRC layer 511 thereof) may *transmit an RRC message containing this RRC configuration information to the 5G UE 1 on a New 5G cell*.” EX1007, ¶[0031]; EX1008, ¶[0031] (emphasis added). EX1013, ¶47.

2. 3GPP 36.300 (EX1009)

3GPP 36.300 discloses the overall description of LTE radio interface protocol architecture and refers to detailed specifications “in companion specifications of the 36 series” (e.g., 3GPP 36.331). EX1009, p.15. 3GPP 36.300 discloses techniques for dual connectivity of a UE used in LTE networks. *See* EX1009, pp.45-46, §4.9; pp.66-67, §6.5.; pp.71-72, §7.6; pp.84-92, §10.1.2.8; pp.240-242. Such techniques involved adding and configuring a secondary base station SRB for a UE (*Id.*, pp.84-92, §10.1.2.8), receiving and transmitting, via base stations and UEs, RRC messages including radio resource configuration information (*Id.*, p.84), transmitting, from the UE to a base station, a failure information message to a master base station (*Id.*, p.71), and determining the addition of the secondary base station SRB (*Id.*, p.84). EX1013, ¶¶48-49.

3. 3GPP 36.331 (EX1010)

3GPP 36.331 discloses RRC protocol details for the radio interface between a UE and base stations. EX1010, p.16. 3GPP 36.331 belongs to the same group of standards as 3GPP 36.300, which is cited in 3GPP 36.331. *Id.* 3GPP 36.300 discloses that “[d]etails of the radio interface protocols are specified in companion specifications of the 36 series.” EX1009, p.15. 3GPP 36.331 is a “companion specification” to 3GPP 36.300. Thus, 3GPP 36.300 expressly teaches its applicability, compatibility, and use with 3GPP 36.331. EX1013, ¶50.

3GPP 36.331 discloses details of RRC messaging, including RRC connection establishment (EX1010, pp.45-55), RRC connection re-establishment (*id.*, pp.66-70), RRC connection release (*id.*, pp.71-72), radio resource configuration including SRB addition/modification (*id.*, pp.71-82), and radio link failure information. *Id.*, pp.81-82. RRC message formats and definitions are disclosed. *Id.*, pp.158-561. EX1013, ¶51.

D. Person of Ordinary Skill in the Art (“POSITA”)

A person of ordinary skill in the art (“POSITA”) pertinent to the ’118 Patent would have had a bachelor’s degree in electrical engineering, computer engineering, or a related discipline, knowledge of the relevant 3GPP standards as of this time, and at least 2 years of experience working in a field involving wireless communications. EX1013, ¶¶38-39. A person with a different degree but with additional relevant experience could still qualify if the additional experience compensates for the different educational background. *Id.* A person with less than 2 years of experience working in a field involving wireless communications could still qualify if the person has additional education that compensates for their lesser experience. *Id.*

VI. CLAIM CONSTRUCTION

Claim terms are interpreted according to *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (*en banc*), and its progeny.

The Board only construes the claims when necessary to resolve the underlying controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

In Related Litigation, the parties proposed that certain claim terms should be given their plain and ordinary meaning. *See* EX1015, pp.10-11 (Plaintiff's initial proposed constructions); EX1016, p.26 (Defendants' preliminary claim constructions). Defendants proposed that the plain and ordinary meaning of "configured to" in claim 10 means "actually configured to and not merely capable of performing the claimed function". EX1016, p.26. Defendants also proposed that the preambles are limiting. *See id.*, pp.24-25. Petitioners apply the constructions proposed in the Related Litigation in the Grounds below. While the proper metes and bounds of the claims are disputed in the Related Litigation, the cited prior art falls within these bounds whatever they may be. The Challenged Claims are unpatentable under all potential constructions.

VII. PETITIONERS HAVE A REASONABLE LIKELIHOOD OF PREVAILING

The Challenged Claims are unpatentable over the prior art. EX1013, ¶¶52, 278.

A. Claims 1-15 Are Anticipated by or Obvious in view of Futaki (Ground 1)

The following sections reference where elements of Claims 1-15 are anticipated by or obvious in view of Futaki.

Petitioner relies on the first embodiment of Futaki, described with at least Figures 1-10, 12 and 13.⁴ Futaki's first embodiment contains all elements of the Challenged Claims (*see* EX1007, ¶[0016]; EX1008, ¶[0016]), including the arrangement of claimed elements. Futaki anticipates all Challenged Claims.⁵ EX1013, ¶53.

To the extent it is asserted that the Challenged Claims are not “anticipated” because multiple embodiments are disclosed, such an argument is moot. The Federal Circuit has held that anticipation may be based on multiple embodiments if a POSITA would have envisaged the claimed system. *See also Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015); *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1342–44 (Fed. Cir. 2016). Futaki teaches its

⁴ Futaki's “second embodiment” is described with Figure 11.

⁵ For assertions Futaki anticipates or discloses limitations discussed *infra*, alternative obviousness positions are asserted in §VII.A, which should be understood as asserting that Futaki also renders those limitations obvious.

embodiments are combinable, such that a POSITA reading Futaki would have envisaged the claimed system:

The multiple embodiments described below can be implemented independently or in any suitable combination .

EX1007, ¶¶[0018], [0110] (“The above-described embodiments may be implemented independently, or may be implemented in appropriate combination.”); EX1008, ¶¶[0018], [0110]. EX1013, ¶54. Futaki states: “***two or more of the embodiments may be appropriately combined with one another.***” EX1007, ¶¶[0017]-[0019]; EX1008, ¶¶[0017]-[0019]. (Emphasis added).

Futaki anticipates all elements of the Challenged Claims. EX1013, ¶¶55-57. “Anticipation occurs when a prior art reference discloses each element of the claimed invention, not only where a particular embodiment within a reference discloses each element of the claimed invention.” *In re AT&T Intellectual Property II, L.P.*, 856 F.3d 991, 996 (Fed. Cir. 2017) (citing *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1341 (Fed. Cir. 2016)).

Given that the components and functionalities of Futaki discussed in §VII.A are all clearly compatible and applicable to one another, it would have been apparent to a POSITA that Futaki discloses the combined use of such components and functionalities. Thus, Futaki anticipates even if the disclosures cited herein relate to different embodiments.

Although Futaki’s disclosures cited herein relate to Futaki’s first embodiment (See EX1007, ¶[0016]; EX1008, ¶[0016]), Futaki’s disclosed embodiments share common features, and details described with respect to one embodiment apply to others. Futaki states: “[e]xamples of wireless communication networks and wireless protocol stacks according to [the second embodiment] are similar to FIGS. 1-6” where Figures 1-6 of Futaki describe “some embodiments”. EX1007, ¶¶[0016], [0088]; EX1008, ¶¶[0016], [0088]. Futaki indicates its example configurations of its 5G UE 1, integrated eNB 2, LTE+ eNB 5, and 5G specific eNB 6 are described “according to the plurality of embodiments described above.” EX1007, ¶[0092]; EX1008, ¶[0092]. EX1013, ¶¶58-62.

A POSITA would have appreciated Futaki’s stated suggestion and motivation to combine disclosed features across multiple embodiments. EX1013, ¶63. A POSITA is presumed to have been motivated to combine elements in a single prior art reference. *See General Elec. Co. v. Raytheon Techs. Corp.*, 983 F.3d 1334, 1352 (Fed. Cir. 2020) (“[T]he Board’s approach would require a motivation to combine each element of the claim—even those present together in a reference. This analysis unduly dissects prior art references into collections of individual elements, requiring a party showing obviousness to re-do the work already done in the prior art reference.”).

Futaki teaches to use 5G UE 1, LTE+ eNB 5, and 5G specific eNB 6 from configurations of Figures 12-13 as components for systems of at least Figures 3-6 and operations of Figures 7-10. It would have been obvious to combine components and functionalities of Futaki discussed in §VII.A in the same implementation given Futaki's express teaching and suggestion to combine embodiments. EX1007, ¶¶[0017]-[0019]; EX1008, ¶¶[0017]-[0019]. Such a modification would have been predictable, and a POSITA would have had a reasonable expectation of success, given that: (1) Futaki expressly suggests and teaches such modifications; (2) the components and functionalities are all applicable to the same general LTE+/5G base station systems and DC techniques for transmitting control-plane messages in cells using different radio access technologies; and (3) Futaki's clear disclosure of combining embodiments. A POSITA's would have understood that components of Figures 3-6 will function to perform operations of Figures 7-10, with configurations from Figures 12-13. EX1013, ¶¶64-66.

To the extent there are any minor differences between Futaki and limitations of the Challenged Claims, they would have been obvious. To the extent any expert testimony is interpretive of Futaki, any minor differences would have been obvious to a POSITA to be taught by Futaki. Thus, the Challenged Claims are anticipated or obvious over Futaki. EX1013, ¶67.

1. Claim 1 (Preamble): “A method of a user equipment for configuring dual connectivity, the method comprising:”

To the extent the Preamble is limiting, Futaki discloses the Preamble. Futaki discloses a first embodiment of at least Fig. 1-10, and 12-13 containing the Preamble and all elements of the Challenged Claims. *See* EX1007, ¶[0016]; EX1008, ¶[0016]. Futaki “relates to communication between a radio station and a radio terminal *using a plurality of Radio Access Technologies (RATs).*” EX1007, ¶[0001]; EX1008, ¶[0001] (emphasis added). Futaki discloses that “in order to ensure the stability of New 5G RAT communication in high frequency bands, tight integration or interworking between low and high frequencies (i.e., tight integration or interworking between LTE/LTE-Advanced and New 5G RAT) is required.” EX1007, ¶[0003]; EX1008, ¶[0003]. Futaki discloses a “5G supporting radio terminal (i.e., 5G User Equipment (UE))” that “is connected to both of a low frequency band cell and a high frequency band cell (i.e., a LTE/LTE-Advanced cell and a new 5G cell) by using Carrier Aggregation (CA) or *Dual Connectivity (DC)*, or a modified technique thereof.” *Id.* (emphasis added). Futaki’s UE “connects to both one or more LTE cells (e.g., cells 21 and 22) and one or more New 5G cells (e.g., cells 23 and 24)” using DC. EX1007, ¶[0020]; EX1008, ¶[0020]. Figure 3 shows a system for DC to perform Futaki’s method including LTE+ eNB 5 (primary base station), the 5G specific eNB 6 (secondary base station), and 5G UE 1.

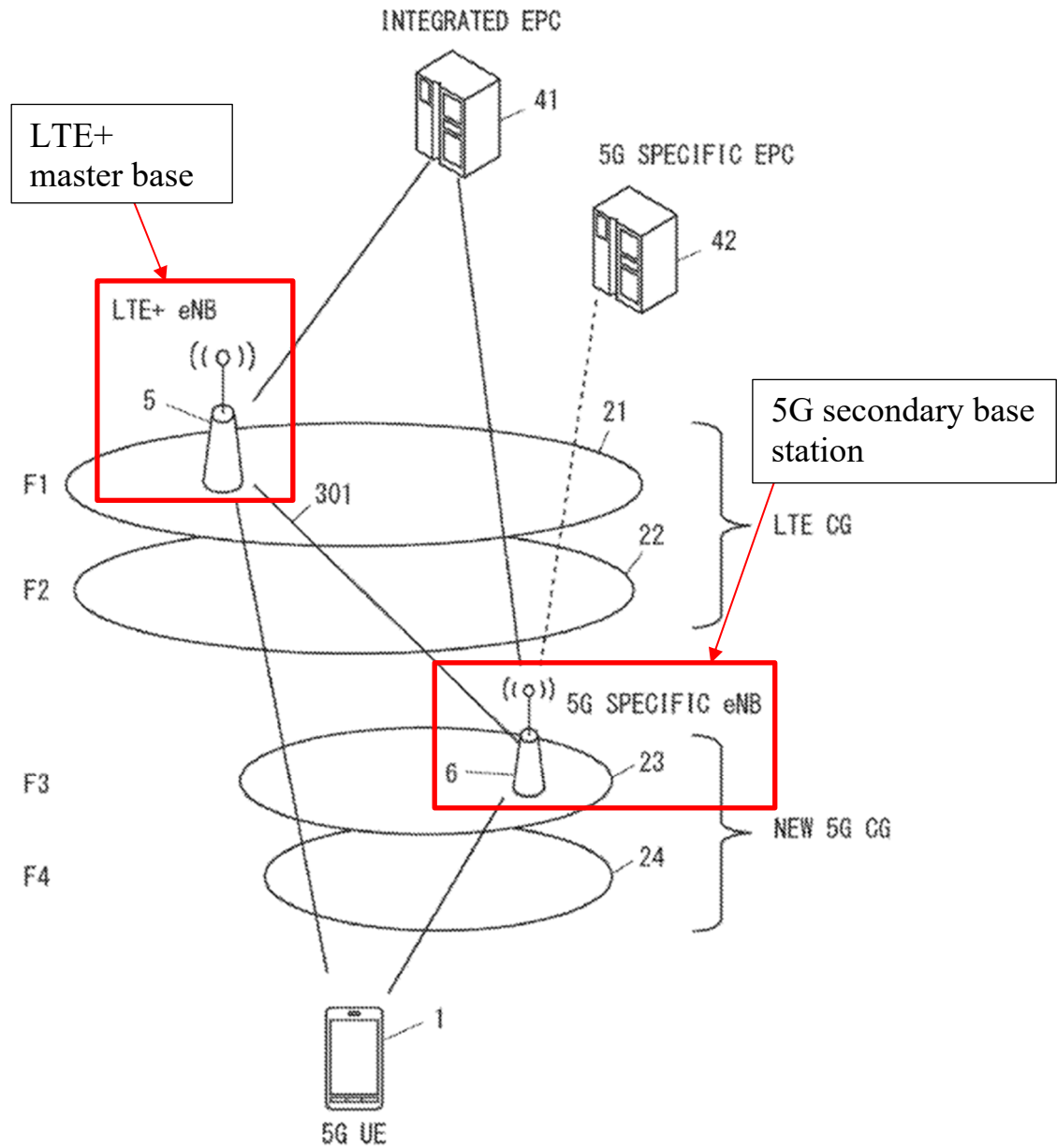


Fig. 3 of Futaki (Annotated)

EX1013, ¶¶68-71.

Futaki expressly discloses methods for configuring the UE for DC such that the UE is connected to an LTE base station (e.g., LTE eNB) and a 5G base station (e.g., 5G specific eNB). *See* EX1007, Fig. 8; EX1008, Fig. 8.

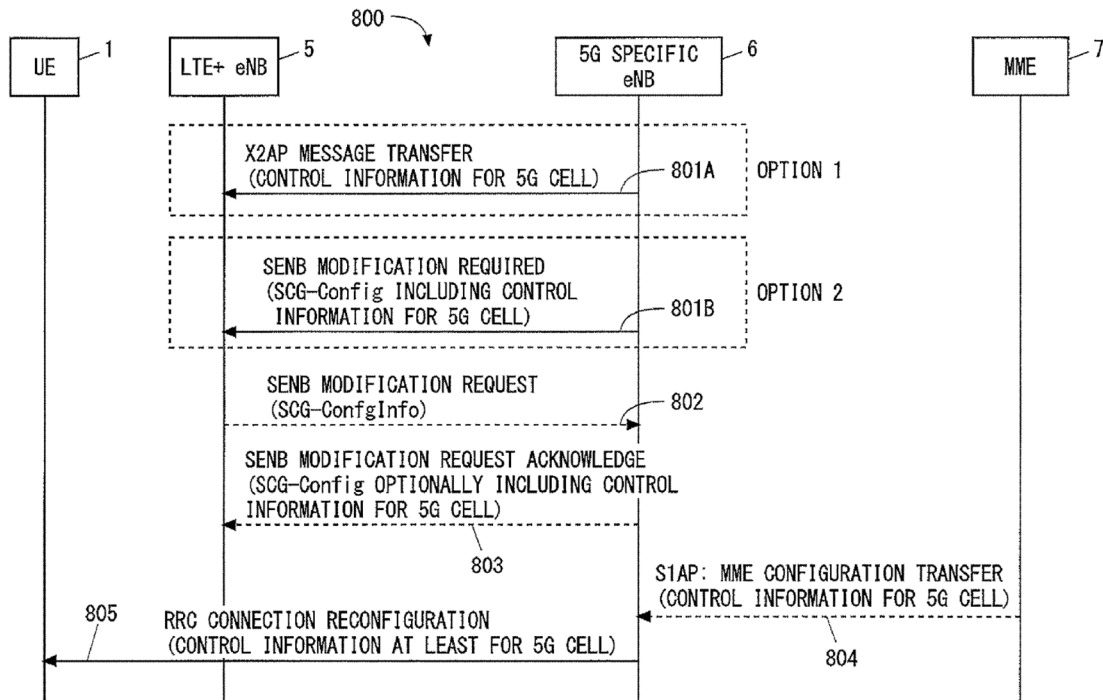


Fig. 8 of Futaki

EX1013, ¶72.

a. [1.1]: “adding and configuring a secondary base station signaling radio bearer (SRB);”⁶

Futaki discloses Element [1.1]. Futaki’s UE includes a baseband processor 1205 that performs “control-plane processing” including “processing of a Non-Access Stratum (NAS) protocol, an RRC protocol, and MAC [*media access control*]

⁶ The ’118 Patent uses “adding” and “configuring” interchangeably. *See* EX1001, 9:50-60, 12:49-53, 14:65-15:3, 17:19-25, 18:15-25, 19:31-36, 20:39-43, 22:25-38, 22:49-51, 24:11-26.

CEs [*control elements*]” and an application processor 1206 to provide functions of the UE. EX1007, ¶¶[0095]-[0097]; EX1008, ¶¶[0095]-[0097]. Figure 12 shows Futaki’s UE.

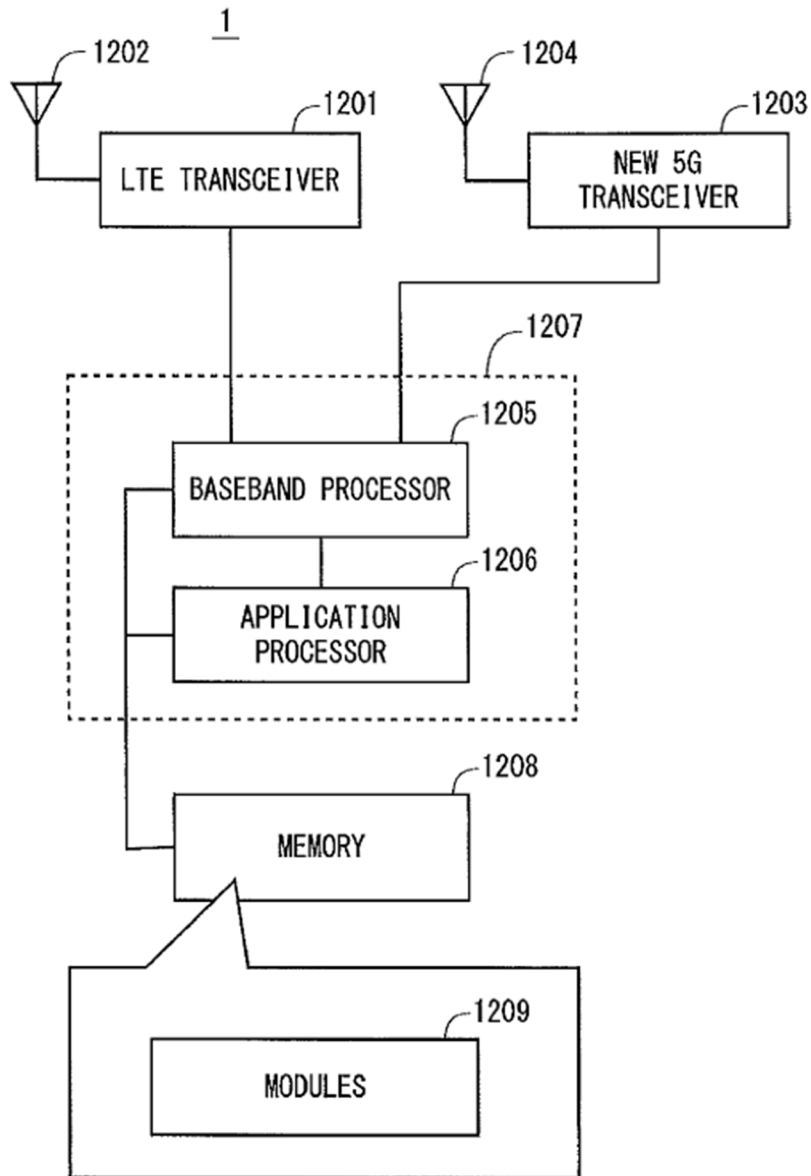


Fig. 12 of Futaki

EX1013, ¶¶73-74.

Futaki discloses a “base station system [that] adds or releases another New 5G cell (e.g., 5G SCell [*secondary cell*]) for the 5G UE 1 after the base station system configures the specific New 5G cell (e.g., PSCell [*primary secondary cell*], Special cell) for the 5G UE 1 (that is, after the specific 5G cell becomes available).” EX1007, ¶[0063]; EX1008, ¶[0063]. *See* EX1013, ¶75. Futaki’s base station transmits “the information related to the *addition* and release *of cells in a New 5G CG* and the change of a specific New 5G cell” to the UE. EX1007, ¶[0063]; EX1008, ¶[0063]. Futaki’s UE adds and configures new 5G base station SRBs (e.g., secondary base station SRBs) and/or 5G cells in a new 5G CG. EX1007, ¶[0032]; EX1008, ¶[0032]. Futaki’s UE receives “an RRC Connection Reconfiguration message containing control plane information (CP message) for the New 5G cell” for adding and configuring the secondary base station SRB. EX1007, ¶[0082], Fig. 8; EX1008, ¶[0082], Fig. 8. As Futaki’s UE receives RRC configuration messages from the 5G specific eNB, the “New 5G transceiver 1203 performs analog RF signal processing for the PHY layer of the New 5G RAT to communicate” with the 5G specific eNB such that the UE configures parameters to establish communication with the 5G specific eNB through the secondary SRB. *See* EX1007, ¶¶[0031]-[0032]; EX1008, ¶¶[0031]-[0032]. EX1013, ¶76. Futaki discloses the UE successfully adding and configuring the secondary base station SRB once the UE has made the New 5G cell available:

The 5G UE 1 and base station systems are configured so that the transmission of CP messages (i.e., RRC signaling) can be performed in the New 5G cell ***after the configuration and activation*** of any of the New 5G cells is complete, ***that is, after the 5G UE 1 has made the New 5G cell available.***

EX1007, ¶[0046]; EX1008, ¶[0046]. *See* EX1007, ¶[0047]; EX1008, ¶[0047]. *See also* EX1001, 9:50-55. EX1013, ¶77.

The '118 Patent indicates that a base station provides a cell, and that “base station” and “cell” are collectively referred to as a “BS”. EX1001, 4:20-21 (“base station (BS, or eNB)”); 4:43-63; *see id.*, 4:43-63; 10:13-18; 11:22-27; 24:35-40; 25:43-48. Futaki’s 5G specific eNB and Futaki’s new 5G CG (or a single cell of the 5G CG) each constitute a secondary base station. Futaki does not merely disclose “modifying” an existing SRB, but discloses adding and configuring a new SRB (*i.e.*, the feature Applicant relied on for allowance, *see* EX1002, p.70). EX1013, ¶¶78-79.

Futaki acknowledges that “a signalling connection specific to 5G cells (e.g., an RRC connection and ***a Signaling Radio Bearer (SRB)***) may be required” because it is “efficient for the New-5G-cell-specific control plane (CP) messages and the 5G-cell-specific signalling connections to be transmitted via New 5G cells, not via LTE cells.” EX1007, ¶[0008]; EX1008, ¶[0008] (emphasis added). Futaki discloses adding a New 5G specific base station having a New RRC layer where “[t]he New

RRC layer 511 may configure a signalling radio bearer with the 5G UE 1”. EX1007, ¶[0030]; EX1008, ¶[0030]. EX1013, ¶¶80-81.

Futaki’s SRB of a New 5G base station is a secondary base station SRB. As shown in Fig. 6 of Futaki, “data of the radio bearer #2 is transmitted from the 5G UE 1 to the integrated eNB 2 (or the 5G specific eNB 6) via the New 5G RAT on the New 5G CG (e.g., the New 5G cells 23 and 24). Accordingly, the radio bearer #2 may be hereinafter referred to as a New 5G bearer. When the data is transmitted on the New 5G CG managed by the 5G specific eNB 6, *the radio bearer #2 is similar to an SCG [secondary cell group] bearer in LTE Release 12 DC.*” EX1007, ¶[0037]; EX1008, ¶[0037]. Futaki’s radio bearer #2 for the New 5G CG is similar to a secondary SRB described in LTE Release 12 for DC. Thus, Futaki acknowledges that its secondary SRB is not identical to LTE Release 12 secondary SRBs because Futaki’s secondary SRB is for the New 5G CG and 5G specific base station, however Futaki’s secondary SRB functions similarly to the LTE Release 12 DC secondary SRBs. Futaki specifies that “[e]ach of the radio bearers #1, #2, and #3 may be an SRB or a DRB.” EX1007, ¶[0035]; EX1008, ¶[0035]. EX1013, ¶¶82-85.

Futaki’s radio bearer #2 shows that a New 5G bearer is a secondary base station SRB. Futaki’s Figure 5 5G specific eNB 6 includes New RRC layer 511 which “configure[s] a signalling radio bearer with the 5G UE 1” such as radio bearer

#2 that is associated with the 5G specific eNB 6. EX1007, ¶¶[0030]-[0037]; EX1008, ¶¶[0030]-[0037]. “[T]he 5G specific eNB 6 is arranged in another site 502 and provides the New RLC [*radio link control*] layer 406, the New MAC layer 407, and the New PHY [*physical*] layer 408.” EX1007, ¶[0029]; EX1008, ¶[0029]. The 5G specific eNB 6 is the same 5G specific eNB 6 that is shown in Figure 8 of Futaki. EX1007, ¶[0079]; EX1008, ¶[0079], Fig. 8 (“FIG. 8 shows an example in which the 5G specific eNB 6” performs various functions.”). Futaki’s radio bearer #2 of the 5G specific eNB 6 constitutes the added and configured secondary base station SRB.

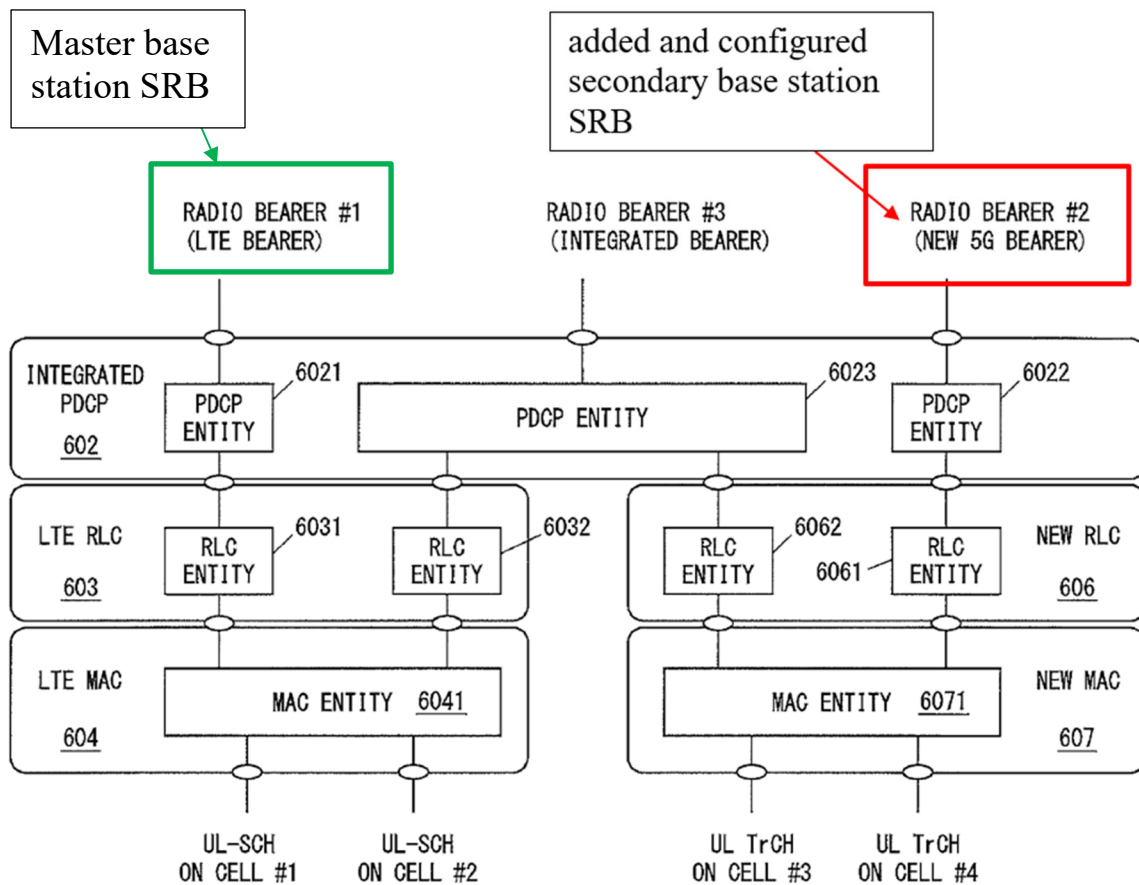


Fig. 6 of Futaki (Annotated)

Futaki discloses that configuration information to/from the 5G specific eNB 6 is “transmitted in a signalling radio bearer (e.g., SRBx) that will be newly defined.” EX1007, ¶[0067]; EX1008, ¶[0067]. “[I]nformation required to *configure* this SRBx may be transmitted on a New 5G cell or on a LTE cell.” *Id.* Futaki discloses adding and configuring a secondary base station SRB. EX1013, ¶¶86-89.

Futaki does not merely disclose “modifying” an existing SRB, but discloses adding and configuring a new SRB as explained in §VII.A.1.a. Further, it would have been obvious to perform both addition and modification of radio resources given Futaki’s teachings. In instances where Futaki’s disclosures relate to modification of existing radio resources, a POSITA would have understood that such disclosures also relate to adding and configuring a new radio resource, given Futaki’s disclosure of configuring a UE, a LTE+ eNB, and a 5G specific eNB to perform addition of a radio resource for DC. Futaki expressly contemplates addition of radio resources. EX1007, ¶¶[0061]-[0063], [0071]-[0080]; EX1008, ¶¶[0061]-[0063], [0071]-[0080]. A POSITA would understand that SeNB Addition and SeNB Modification are well-known techniques in LTE DC in the 3GPP standards. A POSITA with knowledge of 3GPP would understand that addition of a radio resource involves adding a new radio resource, while modification of radio resources involves changing a configuration of an existing radio resource, and Futaki contemplates both techniques. A POSITA would have a reasonable expectation of

success in view of the well-known SeNB addition procedures described in 3GPP standards and Futaki's express disclosure of addition. Applying addition to 5G base stations would have been an obvious variant of the existing addition procedure for LTE DC. EX1013, ¶¶90-96.

- b. [1.2]: “receiving from a secondary base station, a radio resource control (RRC) message including radio resource configuration information on the secondary base station or a secondary cell group through the secondary base station SRB; and”**

Futaki discloses Element [1.2]. Futaki's Fig. 12 shows the UE including a new 5G transceiver 1203 which “performs analog RF signal processing” to communicate with the 5G specific base station. The UE's “baseband processor 1205 performs digital baseband signal processing” including “control-plane processing”. EX1007, ¶¶[0093]-[0094]; EX1008, ¶¶[0093]-[0094]. EX1013, ¶¶97-99.

Futaki discloses that the secondary base station, e.g., the New 5G specific eNB 6, which is distinct from the master base station LTE+ eNB 5 (*see* EX1007, ¶¶[0006], [0029], Fig. 3; EX1008, ¶¶[0006], [0029], Fig. 3) “transmit[s] an RRC message on any cell within the New 5G CG when this RRC message *includes control information* newly defined for New 5G cells. The 5G UE 1 may *receive this RRC message* on any cell within the New 5G CG.” EX1007, ¶[0065]; EX1008, ¶[0065]. According to Futaki, “*the 5G UE 1 ... receive[s] the RRC configuration information regarding a New 5G cell(s) (i.e., New 5G CG) through a New 5G cell.*”

EX1007, ¶[0032]; EX1008, ¶[0032] (emphasis added). RRC messages are received by the UE “from a secondary base station” as Futaki discloses that “the 5G UE 1 and the base station system are able to *transmit or receive RRC messages relating to the New 5G RAT (or a New 5G cell(s)) through any cell within a New 5G CG*. This, for example, contributes to transmission of RRC messages regarding the New 5G RAT (or a New 5G cell(s)) with low latency.” EX1007, ¶[0068]; EX1008, ¶[0068] (emphasis added). Futaki discloses that “the base station system may transmit an RRC message on any cell within the New 5G CG when this *RRC message includes the configuration information specific to the New 5G RAT*. The 5G UE 1 may receive this RRC message on any cell within the New 5G CG.” EX1007, ¶[0060]; EX1008, ¶[0060] (emphasis added). Futaki’s New 5G RAT is distinct from the LTE RAT (primary/master base station) and constitutes a secondary base station or secondary cell group. *Id.* (“New 5G RAT (e.g., SCG configuration for 5G, Secondary RAT (sRAT) configuration).”). *See* EX1007, ¶[0006]; EX1008, ¶[0006]. EX1013, ¶¶100-104.

Futaki’s Fig.8 discloses that “the 5G specific eNB 6 transmits an RRC Connection Reconfiguration message containing the control-plane information (the CP message) regarding a New 5G cell(s) to the 5G UE 1 on a New 5G cell.” EX1007, ¶[0082]; EX1008, ¶[0082]. The 5G specific eNB 6 is the New 5G specific base station that constitutes the secondary base station. *See* §VII.A.1.a., *supra*; EX1007,

¶¶[0079]-[0083], Fig. 8; EX1008, ¶¶[0079]-[0083], Fig. 8. Figure 8 shows the UE receiving the RRC message from the secondary base station.

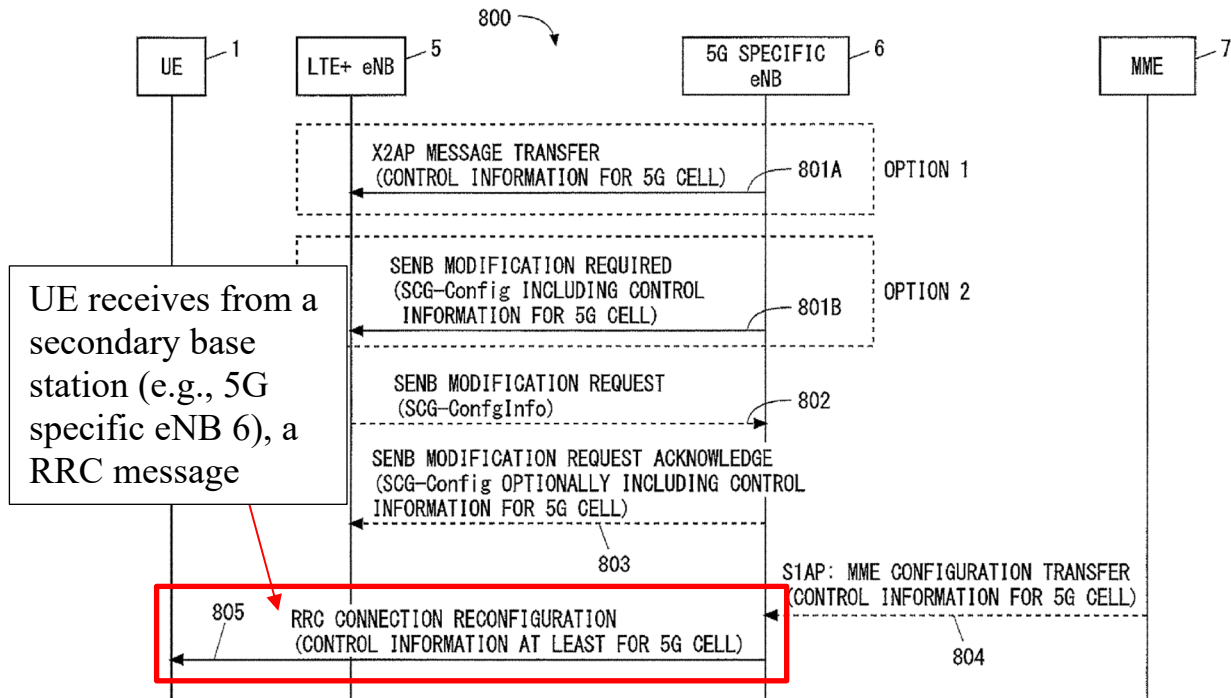


Fig. 8 of Futaki (Annotated)

EX1013, ¶¶105-107.

Futaki’s RRC message (received from the secondary base station) includes “configuration information specific to the New 5G RAT.” EX1007, ¶[0060]; EX1008, ¶[0060]. Futaki’s configuration information includes “any one or any combination of: Terminal capability-related information; Service-related information; and 5G CG management-related information.” *Id.* Futaki’s “base

station system may transmit *radio resource configuration information* about this other New 5G cell (e.g., sCellToAddModListSRAT, sCellToReleaseListSRAT, RadioResourceConfigDedicatedSCellSRAT) as the 5G CG management-related information.” EX1007, ¶[0063]; EX1008, ¶[0063] (emphasis added). EX1013, ¶¶108-110.

Futaki’s RRC message including radio resource configuration information on the secondary base station (e.g., 5G specific eNB 6, New 5G base station) or a secondary cell group (e.g., New 5G cell group associated with the 5G specific eNB 6) is transmitted through the secondary base station SRB. EX1007, ¶[0070]; EX1008, ¶[0070] (“the base station system may determine which one of the New 5G CG and the LTE CG is to be used to transmit a CP message (i.e., an RRC message or a NAS message) depending on whether to transmit this CP message *via a specific signalling radio bearer associated with the New 5G RAT*.”); *see id.*, ¶¶[0067]-[0076]. EX1013, ¶111.

c. [1.3]: “transmitting a failure information message to a master base station in case the user equipment is unable to comply with the radio resource configuration information included in the RRC message,”

Futaki discloses Element [1.3]. Futaki’s UE includes a new 5G transceiver 1203 which “performs analog RF signal processing” to communicate with the 5G specific base station and the LTE base station (e.g., using the integrated eNB 2). EX1007, ¶[0093]; EX1008, ¶[0093]. EX1013, ¶¶112-113.

Futaki describes “an operation of transmitting a control-plane (CP) message performed by the 5G UE 1 and the integrated eNB 2 (or the LTE+ eNB 5 and the 5G specific eNB 6)”. EX1007, ¶[0046]; EX1008, ¶[0046]. “The 5G UE 1 and the base station system are configured to transmit CP messages (i.e., RRC signalling) on a New 5G cell after completion of configuration and activation of this New 5G cell (i.e., after the New 5G cell becomes available for the 5G UE 1).” *Id.* Futaki specifies that the UE may transmit a CP based on a cause including “a *failure* of a radio link establishment in the LTE cell or the New 5G cell”. EX1007, ¶[0050]; EX1008, ¶[0050] (emphasis added). The UE transmits a “report message carrying the terminal (holding) information” where terminal information is “[r]adio link-related information” including “information regarding *degradation of a radio quality (e.g., Radio Link Failure: RLF)* in the LTE CG (e.g., PCell [*primary cell*]) or the New 5G CG (e.g., PSCell, Special cell) or *information regarding a failure of radio link establishment* (e.g., RRC Connection Establishment Failure: CEF, RRC Connection Re-establishment failure).” EX1007, ¶¶[0053]-[0054]; EX1008, ¶¶[0053]-[0054] (emphasis added). Futaki’s failure information message is transmitted to a master base station or a secondary base station. EX1007, ¶[0054]; EX1008, ¶[0054] (“information regarding a failure of radio link establishment may be always requested or reported on the LTE CG (or the New 5G CG) [*secondary base station/cell group*].”). *See id.*, ¶¶[0047]-[0054]. EX1013, ¶¶114-118. Futaki’s

failure information message is transmitted in response to a failure of radio link establishment “e.g., RRC Connection Establishment Failure: CEF”. EX1007, ¶[0054]; EX1008, ¶[0054]; *see id.* ¶¶[0047]-[0054]. Thus, Futaki’s failure information message is transmitted in a case the UE is unable to comply with the radio resource configuration information included in the RRC message. EX1013, ¶¶119-120.

d. [1.4]: “wherein the addition of the secondary base station SRB is determined by the secondary base station.”

Futaki discloses Element [1.4]. Futaki’s 5G specific base station (e.g., the 5G specific eNB) constitutes the secondary base station. *See* §VII.A.1.b., *supra*. Futaki’s 5G specific base station includes “a New RRC layer 511” which adds the secondary base station SRB by “configur[ing] a signalling radio bearer with the 5G UE 1” and “configur[ing] the lower layers 406-408 of the New 5G CG (e.g., the New 5G cells 23 and 24) and the New PDCP layer 512, and then transmit[ing] or receiv[ing] RRC messages to or from the 5G UE 1 through the New 5G CG.” EX1007, ¶[0030]; EX1008, ¶[0030]. Futaki discloses that the “New RRC layer 511” of the “New 5G CG” corresponding to the 5G specific eNB configures the addition of the New 5G SRB, and not only a modification of the New 5G SRB. *Id.* Thus, Futaki discloses the secondary base station determining the addition of the secondary base station SRB by newly configuring the New 5G specific SRB. EX1013, ¶¶121-123.

To obtain allowance, Patent Owner argued that disclosure of a “SeNB decid[ing] to **modify** radio resources for a specific E-RAB [*E-UTRA radio access bearer*] ... does not teach the secondary base station deciding the addition of the radio resources.” EX1002, p.70. Patent Owner argued that the prior art taught the master base station “decid[ing] to request the SeNB to add or modify radio resources for a specific E-RAB.” *Id.* The ’118 Patent also discloses that the master base station “decides to request the SeNB 120 to allocate radio resources for a specific E-RAB”. EX1001, 6:63-64; 6:60-66. Futaki discloses the secondary base station (the 5G specific eNB 6) deciding to add radio resources for a specific (e.g., 5G) radio access bearer by having “[t]he New RRC layer 511 [] configure a signalling radio bearer with the 5G UE 1” without a request or instruction from the master (e.g., LTE+) base station. EX1007, ¶[0030]; EX1008, ¶[0030]. Futaki’s 5G specific eNB 6 is shown in Figure 8 deciding to request the primary base station (LTE+ eNB 5) to allocate radio resources by deciding to initiate the secondary base station addition by first transmitting a message (e.g., X2AP Message Transfer step 801A, SeNB Modification Required message step 801B) including control information for the secondary base station to the master base station, without an initial request from the master base station. *See* EX1007, 1008, Fig. 8. EX1013, ¶¶124-128. Thus, Futaki expressly discloses the limitation found to be missing from the art during prosecution. *See* §V.B. EX1013, ¶129.

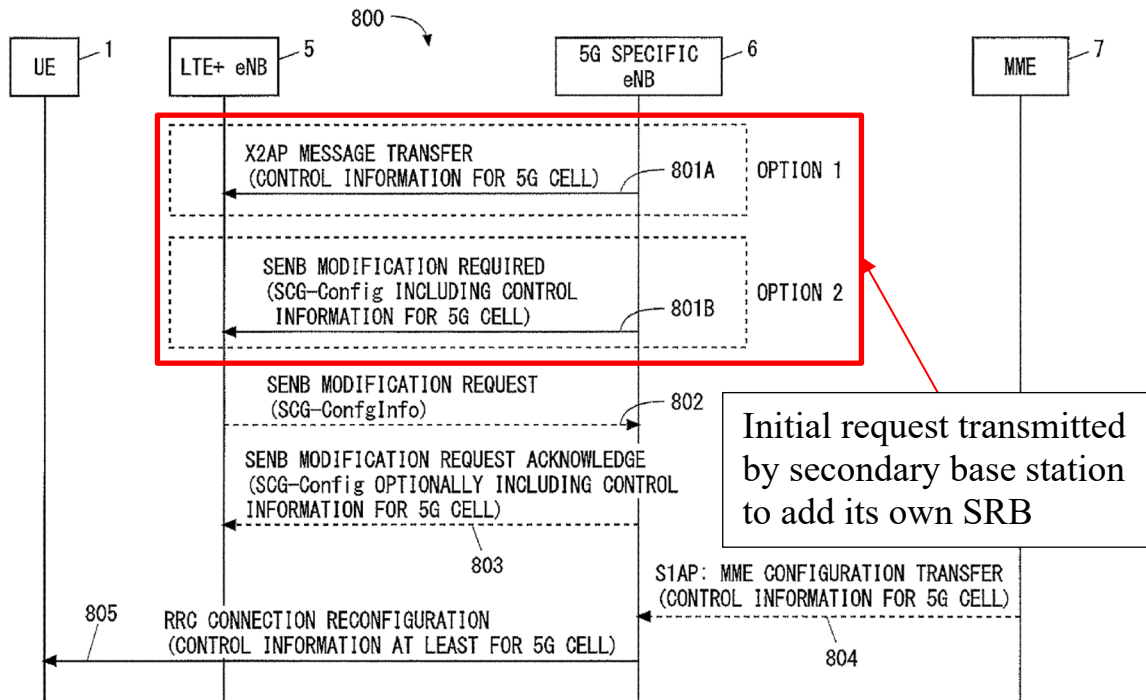


Fig. 8 of Futaki (Annotated)

Futaki’s secondary base station “deciding” the addition of the secondary base station SRB satisfies the claimed “determining”. Additionally, Futaki’s secondary base station “configuring” the secondary base station SRB satisfies the claimed “determining” as explained below. EX1013, ¶130.

The ’118 Patent discloses that the secondary base station “determines” the addition of the secondary base station SRB by “configuring” the SRB, and Futaki discloses the same technique. An “NR BS [*e.g.*, 5G specific base station] may *configure an SRB* (e.g., SRB1) between the UE and the NR BS. ***This denotes that the NR BS determines to add an SRB*** (e.g., SRB1) between the UE and the NR BS to a corresponding UE, and generates configuration information for this.” EX1001,

14:58-62; 14:54-15:3. In the same way, Futaki's secondary base station (e.g., the 5G specific eNB 6) "determines" the addition of the secondary base station SRB (e.g., radio bearer #2 in Figure 6 of Futaki) by configuring the SRB with the 5G UE. EX1007, ¶¶[0030]-[0032], [0046], [0060], [0063], Fig. 8; EX1008, ¶¶[0030]-[0032], [0046], [0060], [0063], Fig. 8; EX1013, ¶¶131-133.

Futaki discloses the 5G specific eNB configuring the SRB between the UE and the 5G specific eNB:

Alternatively, the 5G specific eNB6 (New RRC layer 511) may send an RRC message including the RRC configuration information to the 5G UE 1 in the New 5G cell.

EX1007, ¶[0031]; EX1008, ¶[0031]. *See* EX1001, 10:61-64. Futaki's 5G specific eNB 6 transmits an RRC message through the New RRC layer to configure a SRB with the UE. EX1007, ¶[0030]; EX1008, ¶[0030]. *See also id.*, [0030]-[0032]; ¶[0046]; ¶[0060]; ¶[0063]. EX1013, ¶¶134-135.

Futaki discloses wherein the addition of the secondary base station SRB is determined by the secondary base station by each of deciding to request the addition of the secondary base station SRB and configuring the secondary base station SRB. EX1013, ¶136.

- 2. Claim 2: “The method according to claim 1, wherein the master base station and the second base station are base stations using radio access technologies different from each other.”**

Futaki discloses claim 2. *See, e.g.*, EX1007, Title (“Methods and Apparatuses for Transmitting Control-Plane Messages in ***Cells Using Different Radio Access Technologies***”) (emphasis added). *See id.*, ¶[0023] (“the LTE radio protocol and the New 5G radio protocol are provided by two nodes (eNBs) different from each other.”). *See also id.*, Fig. 3 (showing LTE+ master base station and 5G secondary base station).

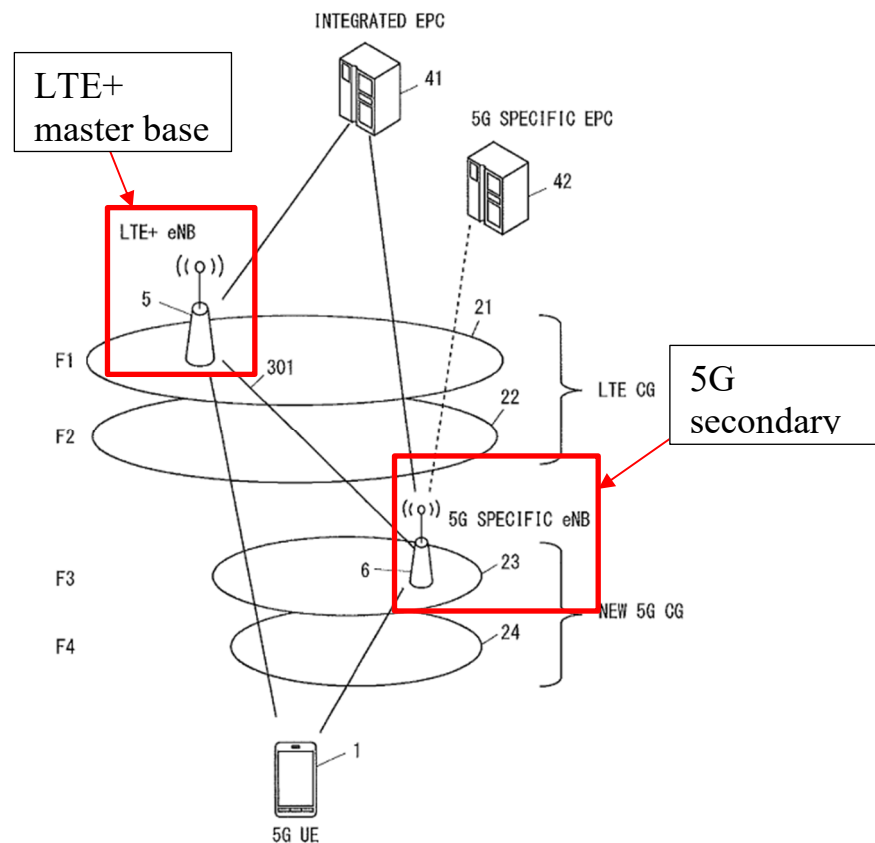


Fig. 3 of Futaki (Annotated)

EX1013, ¶137.

3. **Claim 3: “The method according to claim 1, wherein the addition of the secondary base station SRB is configured when the master base station performs a secondary base station addition procedure.”**

Futaki discloses claim 3. Figure 7 of Futaki shows the master base station (e.g., LTE+ eNB) performing a secondary base station addition procedure by “send[ing] control-plane information (i.e., CP message) regarding a New 5G cell(s) to the 5G specific eNB 6.” EX1007, ¶¶0077]; EX1008, ¶¶0077]. “In Step 701A or 701B, the 5G specific eNB 6 receives an X2 message containing at least control-plane information (i.e., CP message) regarding a New 5G cell(s) from the LTE+ eNB 5.” *Id. See id.*, Fig. 7. EX1013, ¶¶138-139.

Futaki discloses the master base station requesting and reporting terminal capability information, service-related information, and 5G CG management-related information as part of the secondary base station addition procedure. EX1007, ¶¶0060]-[0064]; EX1008, ¶¶0060]-[0064].

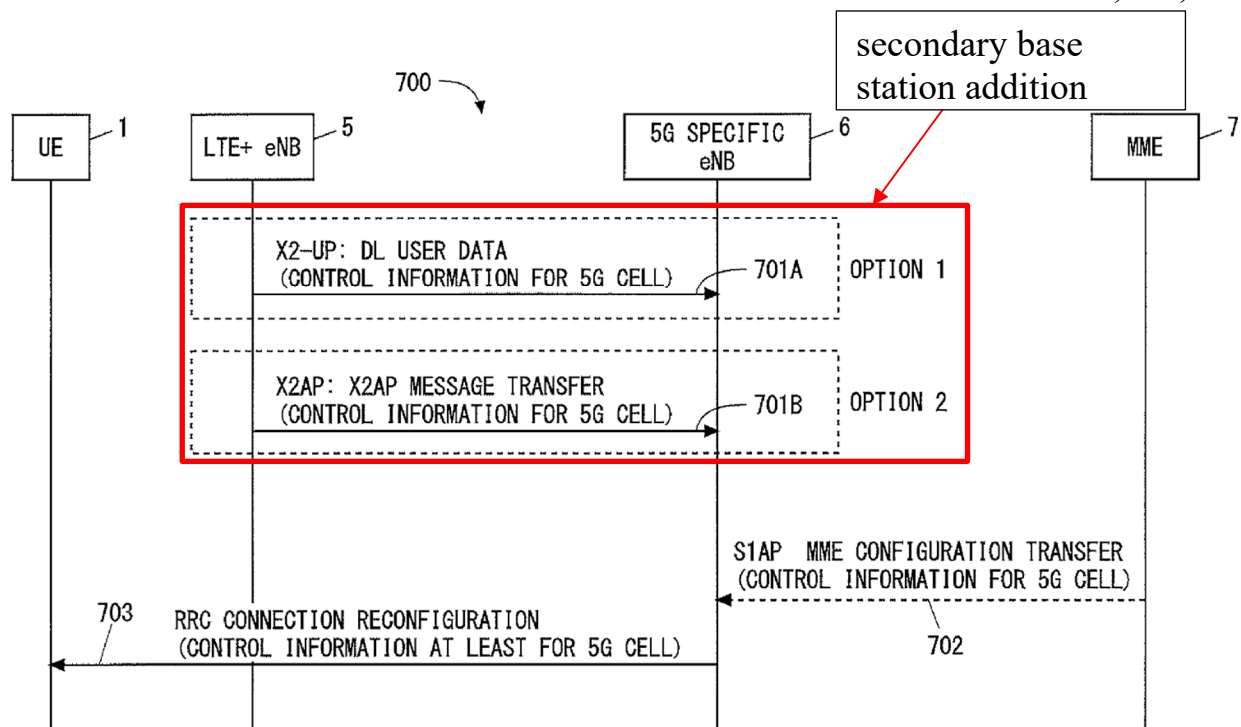


Fig. 7 of Futaki (Annotated)

“In Step 701A or 701B, the 5G specific eNB 6 receives an X2 message containing at least control-plane information (i.e., CP message) *regarding a New 5G cell(s)* from the LTE+ eNB 5. This X2 message ... may be a DL CONTROL DATA message that will be newly defined.” EX1007, ¶[0077]; EX1008, ¶[0077]. Futaki discloses the “X2 message (e.g., *SeNB Configuration Request message*)” *Id.* See *id.*, ¶¶[0077]-[0078]. EX1013, ¶140.

Futaki also discloses addition of a secondary base station SRB where the 5G specific eNB transmits RRC configuration information to the master base station (e.g., LTE+ eNB) in response to an instruction or a request from the LTE+ eNB 5. See EX1007, ¶[0031]; EX1008, ¶[0031]. Thus, Futaki’s master base station (LTE+ eNB) performs a secondary base station addition procedure. EX1013, ¶141.

4. **Claim 4: “The method according to claim 1, wherein, in case the user equipment is unable to comply with the radio resource configuration information included in the RRC message and therefore fails to a secondary BS radio resource configuration, a radio resource on the secondary base station or the secondary cell group is suspended.”**

Futaki discloses claim 4. Futaki’s failure information message includes “information regarding a failure of radio link establishment (e.g., *RRC Connection Establishment Failure: CEF, RRC Connection Re-establishment failure*).” EX1007, ¶[0054]; EX1008, ¶[0054]. See §VII.A.1.c., *supra*. In the case of both RRC Connection Establishment Failures and RRC Connection Re-establishment failures, the UE suspends the radio resource where the connection establishment or re-establishment has failed. See EX1007, ¶[0026]; EX1008, ¶[0026] (“Establishment, maintenance, and release of RRC connections ... Configuration, maintenance, and release of radio bearers”). EX1013, ¶¶142-143.

In the ’118 Patent, suspending a radio resource includes stopping, holding, and/or releasing a radio resource. EX1001, 17:41-43 (“[I]n case a UE (RRC) is unable to comply with an NR configuration, the using of the NR radio resource is *suspended/stopped/held/released*.”). Futaki suspends a radio resource on the secondary base station or the secondary cell group at least by releasing the radio resource (e.g., RRC connection). Detection of failure on a SRB due to any reason such as poor signal strength or interference or network congestion triggers RRC

reconfiguration. That is, the network sends a release message via RRC to the UE to release and/or suspend the SRB. EX1013, ¶¶144-145.

Futaki's failure information message relates to a secondary BS radio resource configuration and/or a radio resource on the secondary BS or secondary CG (e.g., the 5G specific eNB 6). Futaki's failure information message is based on the UE's failure to comply with radio resource configuration information in an RRC message received from the secondary base station for the secondary base station and/or the secondary base station SRB. The failure information can be transmitted to either the LTE+ base station (e.g., master base station) or the 5G specific base station (e.g., secondary base station). EX1007, ¶[0054]; EX1008, ¶[0054]. EX1013, ¶146.

- 5. Claim 5: “The method according to claim 4, wherein the radio resource on the secondary base station or the secondary cell group includes at least one of a secondary cell group data radio bearer (DRB), a secondary cell group SRB, a part of a secondary cell group of a split DRB, and a part of a secondary cell group of a split SRB.”**

Futaki discloses claim 5. Futaki discloses a secondary CG radio bearer (both DRB and SRB) for the secondary base station or secondary CG (e.g., the New 5G specific eNB or CG) and a part of a secondary CG of a split SRB. *See* EX1007, ¶¶[0035]-[0038], Fig. 6; EX1008, ¶¶[0035]-[0038], Fig. 6. EX1013, ¶¶147-148.

6. Claim 6: “The method according to claim 1, wherein the failure information message includes cause information on the secondary base station radio resource configuration failure.”

Futaki discloses claim 6. Futaki discloses a “predetermined condition, which is used to determine which one of the LTE CG and the New 5G CG is used to transmit a CP message” where the predetermined condition includes “the transmission cause of the CP message”. EX1007, ¶¶0047]; EX1008, ¶¶0047]. The transmission cause includes “degradation of a radio quality of the New 5G cell” and “a failure of a radio link establishment in the LTE cell or the New 5G cell”. EX1007, ¶¶0050]; EX1008, ¶¶0050]. EX1013, ¶¶149-150.

Futaki’s UE transmits a failure information message including cause information on the secondary base station (e.g., 5G specific eNB) RRC failure. Futaki’s UE transmits a “report message carrying the terminal (holding) information” where terminal information is “[r]adio link-related information” including “information regarding *degradation of a radio quality (e.g., Radio Link Failure: RLF)* in the LTE CG (e.g., PCell) or *the New 5G CG* (e.g., PSCell, Special cell) or *information regarding a failure of radio link establishment (e.g., RRC Connection Establishment Failure: CEF, RRC Connection Re-establishment failure)*.” EX1007, ¶¶0054]; EX1008, ¶¶0054]. EX1013, ¶151.

Futaki discloses an example where the UE “determine[s] which one of the New 5G CG and the LTE CG is to be used to transmit a CP message (i.e., an RRC

message or a NAS message) depending on whether the transmission cause of this CP message indicates degradation of a radio quality of any New 5G cell.” EX1007, ¶[0072]; EX1008, ¶[0072]. Futaki’s UE uses the “transmission cause” information in the CP message, such as failure information, to determine which of the primary or secondary base station should send the CP message (e.g., depending on which base station failed the radio resource configuration). Similarly, the UE also determines which CG is used to transmit a CP message depending on whether the transmission cause of the failure information message indicates a failure of radio resource configuration using the radio link-related information. *Id.* EX1013, ¶¶152-154.

7. Claim 7 (Preamble): “A method of a secondary base station for controlling dual connectivity of a user equipment, the method comprising:”

To the extent the Preamble is limiting, Futaki discloses the Preamble. *See* §VII.A.1., *supra*. Futaki discloses the method for DC from the point of view of the UE (claim 1) and base station (claim 7). *See* EX1007, ¶[0047], claims 3-10; EX1008, ¶[0047], claims 3-10 (reciting both terminal and radio station claims). EX1013, ¶¶155-156.

a. [7.1]: “determining, by the secondary base station, to add a secondary base station signaling radio bearer (SRB) to the user equipment;”

Futaki discloses Element [7.1]. *See* §VII.A.1.d., *supra*. EX1013, ¶157.

- b. [7.2]: “transmitting a radio resource control (RRC) message including radio resource configuration information on the secondary base station or a secondary cell group to the user equipment through the secondary base station SRB; and”**

Futaki discloses Element [7.2]. *See* §VII.A.1.b., *supra*. EX1013, ¶158.

- c. [7.3]: “receiving a response message for a radio resource configuration from the user equipment through the secondary BS SRB if the UE successfully complies with a radio resource on the secondary base station,”**

Futaki discloses Element [7.3]. *See* §VII.A.1.c., *supra*. Futaki discloses that the UE “transmit[s] an RRC message on any cell within the New 5G CG when this RRC message includes the response to the AS-security-activation request for one or more New 5G cells. The base station system may receive this RRC message on any cell within the New 5G CG.” EX1007, ¶[0059]; EX1008, ¶[0059]. Futaki also discloses that “the 5G specific eNB 6 receives control-plane information from the 5G UE 1 on a 5G cell.” EX1007, ¶[0083]; EX1008, ¶[0083]. Thus, Futaki’s base station receives a response message for radio resource configuration from the UE if the UE complies with a radio resource on the secondary base station. EX1013, ¶¶159-162.

Because Futaki’s disclosure applies to at least LTE Release 12 (*see* EX1007, ¶¶[0002], [0036]-[0038]; EX1008, ¶¶[0002], [0036]-[0038]), contents of LTE Release 12 describing RRC messaging details are instructive and serve as further evidence detailing Futaki’s disclosure. EX1013, ¶163.

3GPP 36.331 (e.g., Release 12) describes details of known RRC messaging. Futaki's systems and methods apply aspects of Release 12 using similar RRC implementations. *Id.* As evidenced by 3GPP 36.331, upon successful RRC connection establishment, the UE transmits a RRCConnectionSetupComplete message to the base station. EX1010, pp.45-50, pp.195-196 ("The RRCConnectionSetupComplete message is used to confirm the successful completion of an RRC connection establishment."). Thus, Futaki's secondary base station (e.g., 5G specific eNB 6) receives a response message (e.g., at least a RRCConnectionSetupComplete message) for a radio resource configuration from the user equipment through the secondary base station SRB if the UE successfully complies with a radio resource on the secondary base station. EX1013, ¶¶164-166.

d. [7.4]: "wherein the user equipment configures dual connectivity by using a master base station and the secondary base station."

Futaki discloses Element [7.4]. The UE configures DC by "connect[ing] to both one or more LTE cells (e.g., cells 21 and 22) and one or more New 5G cells (e.g., cells 23 and 24) using CA, DC, or an enhancement thereof." *See also* §VII.A.1.a., *supra*. EX1007, ¶[0012]; *see also* EX1008, ¶[0012]. EX1013, ¶¶167-168.

8. **Claim 8: “The method according to claim 7, wherein the master base station and the secondary base station are base stations using radio access technologies different from each other.”**

Futaki discloses claim 8. *See* §VII.A.2., *supra*. EX1013, ¶169.

9. **Claim 9: “The method according to claim 7, wherein, in case the user equipment is unable to comply with the radio resource configuration information included in the RRC message, the user equipment is configured to transmit a failure information message to the master base station.”**

Futaki discloses claim 9. *See* §VII.A.3., *supra*. EX1013, ¶170.

10. **Claim 10 (Preamble): “A user equipment for configuring dual connectivity, the user equipment comprising:”**

To the extent the Preamble is limiting, Futaki discloses the Preamble. *See* §VII.A.1., *supra*. Futaki discloses that “UE 1 is a 5G UE and connects to both one or more LTE cells (e.g., cells 21 and 22) and one or more New 5G cells (e.g., cells 23 and 24) using CA, DC, or an enhancement thereof.” EX1007, ¶[0012]; *see also* EX1008, ¶[0012]. For the reasons discussed herein, Futaki discloses that the controller, receiver, and transmitter are actually configured to (and not merely capable of) performing the claimed functions at least because the prior art expressly discloses that the controller, receiver, and transmitter perform the claimed functions. Futaki discloses “configured to” under any construction. *See* §VI. EX1013, ¶¶171-172.

- a. [10.1]: “a controller configured to add and configure a secondary base station signaling radio bearer (SRB);”

Futaki discloses Element [10.1]. *See* §VII.A.1.a., *supra*. EX1013, ¶173.

- b. [10.2]: “a receiver configured to receive from a secondary base station, a radio resource control (RRC) message including radio resource configuration information on the secondary base station or a secondary cell group through the secondary base station SRB; and”

Futaki discloses Element [10.2]. *See* §VII.A.1.b., *supra*. EX1013, ¶174.

- c. [10.3]: “a transmitter configured to transmit a failure information message to a master base station in case the user equipment is unable to comply with the radio resource configuration information included in the RRC message,”

Futaki discloses Element [10.3]. *See* §VII.A.1.c., *supra*. EX1013, ¶175.

- d. [10.4]: “wherein the addition of the secondary base station SRB is determined by the secondary base station.”

Futaki discloses Element [10.4]. *See* §VII.A.1.d., *supra*. EX1013, ¶176.

In addition, Element [10.4] is non-limiting. Claim 10 is directed to “a *user equipment*” for configuring DC. Element [10.4] recites “wherein the addition of the secondary base station SRB is determined *by the secondary base station*.” That is, Element [10.4] relates to a process step performed by “the secondary base station”, and does not limit the UE to any specific configuration to perform the (secondary base station’s) function recited in Element [10.4]. EX1013, ¶¶177-178.

Even if Element [10.4] implies structure of *the secondary base station*, doing so does not impart patentable weight with regard to the UE as claimed. *See* M.P.E.P. §2113. EX1013, ¶179.

Element [10.4] does not impart distinctive structural characteristics of the claimed user equipment, and should not be accorded patentable weight. *See Biogen Ma Inc. v. EMD Serono, Inc.*, 976 F.3d 1326 (Fed. Cir. 2020); M.P.E.P. §2144.04. *See also In re Qapsule Techs., Inc.*, 759 F.App'x 975, 978 (Fed. Cir. 2019); *In re Dilnot*, 300 F.2d 945, 950 (CCPA 1962) (“The addition of a method step in a product claim, which product is not patentably distinguishable from the prior art, cannot impart patentability to the old product.”). The claimed UE has no structural or functional difference from prior art UE where the master base station determined the addition of the secondary base station SRB. *See* EX1002, p.70; EX1007, ¶¶[0064], [0067]; EX1008, ¶¶[0064], [0067]. The '118 Patent itself does not describe any specific structure or function of the UE to accommodate secondary base station functionality, particularly for determining the addition of the secondary base station SRB. EX1013, ¶¶180-182.

Even if found limiting, Element [10.4] is disclosed by Futaki. *See* §VII.A.1.d., *supra*. EX1013, ¶183.

- 11. Claim 11: “The user equipment according to claim 10, wherein the master base station and the secondary base station are base stations using radio access technologies different from each other.”**

Futaki discloses claim 11. *See* §VII.A.2., *supra*. EX1013, ¶184.

- 12. Claim 12: “The user equipment according to claim 10, wherein the addition of the secondary base station SRB is configured when the master base station performs a secondary base station addition procedure.”**

Futaki discloses claim 12. *See* §VII.A.3., *supra*. EX1013, ¶185.

- 13. Claim 13: “The user equipment according to claim 10, wherein, in case the user equipment is unable to comply with the radio resource configuration information included in the RRC message and fails to a secondary BS radio resource configuration, a radio resource on the secondary base station or the secondary cell group is suspended.”**

Futaki discloses claim 13. *See* §VII.A.4., *supra*. EX1013, ¶186.

- 14. Claim 14: “The user equipment according to claim 13, wherein the radio resource on the secondary base station or the secondary cell group includes at least one of a secondary cell group data radio bearer (DRB), a secondary cell group SRB, a part of a secondary cell group of a split DRB, and a part of a secondary cell group of a split SRB.”**

Futaki discloses claim 14. *See* §VII.A.5., *supra*. EX1013, ¶187.

- 15. Claim 15: “The user equipment according to claim 10, wherein the failure information message includes cause information on the secondary base station radio resource configuration failure.”**

Futaki discloses claim 15. *See* §VII.A.6., *supra*. EX1013, ¶188.

B. Claims 1-15 Would Have Been Obvious Over Futaki in View of 3GPP 36.300 and 3GPP 36.331 (Ground 2)

The Challenged Claims would have been obvious over Futaki in view of 3GPP 36.300 and 3GPP 36.331. Futaki discloses and suggests the claimed subject matter as explained in Ground 1 (*see* §VII.A.). To the extent any minor differences are alleged between the Challenged Claims and Futaki, they would have been obvious in view of the details expressly provided in 3GPP 36.300 and 3GPP 36.331. EX1013, ¶¶189-191.

Futaki teaches and suggests the applicability of 3GPP specifications (e.g., Release 12) to its techniques and expressly adopts many of its implementations. *See* EX1007, ¶¶[0002], [0022], [0036-0038], [0048], [0060]; EX1008, ¶¶[0002], [0022], [0036-0038], [0048], [0060]. 3GPP 36.300 and 3GPP 36.331 are related documents as part of the same 3GPP standard (e.g., Release 12, which is expressly used in Futaki). *Id.* Futaki indicates that its disclosed SRBs are “similar to an MCG bearer in LTE Release 12 DC”, “similar to an SCG bearer in LTE Release 12 DC”, and “similar to a bearer on the SCG side of a split bearer in LTE Release 12 DC.” *Id.*, ¶¶[0034]-[0038]. EX1013, ¶¶192-193. 3GPP 36.300 discloses methods and implementations for DC. *See* EX1009, at least §§4.9, 6.5, 7.6, 10.1.2.8; Annex M, p.240. 3GPP 36.331 discloses methods and implementations for RRC messaging. *See* EX1010, at least §§5.3.3, 5.3.7, 5.3.8, 5.3.10, 5.3.11, 6.2, 7.1. EX1013, ¶194.

It would have been obvious to apply existing implementations and techniques of 3GPP, including details disclosed in 3GPP 36.331, to Futaki given its express suggestions and teachings to do so. A POSITA would have been motivated to combine teachings of 3GPP 36.300 and 3GPP 36.331 (e.g., Release 12) with Futaki because of Futaki's express recognition of 3GPP standards, particularly Release 12. A POSITA would have been motivated to provide systems and methods for configuring DC, at least for a UE using different radio access technologies, such as LTE+ and 5G, as disclosed in Futaki. A POSITA would have looked to the disclosure of detailed messaging sequences and techniques disclosed in 3GPP 36.300 and details of message formats and fields disclosed in 3GPP 36.331 as applied to existing 4G/LTE technologies. These details would have been similarly applied to Futaki's methods and systems for interworking of a 5G RAT with an LTE+ RAT. A POSITA would have also been motivated to combine 3GPP 36.300 and 3GPP 36.331 with Futaki to ensure Futaki's systems and methods comply with established 3GPP standards. EX1013, ¶¶195-199.

A POSITA would have had a reasonable expectation of success given that Futaki applies similar implementations for LTE+ and 5G base station DC. Those similar implementations are disclosed in 3GPP 36.300 and 3GPP 36.331 and have proven successful for 4G/LTE DC (e.g., using LTE MeNB and LTE SeNB). Throughout development of 5G standards, the 3GPP intended for New 5G

specifications to be backward-compatible with existing 4G/LTE/LTE+ specifications (e.g., 3GPP 36.300 and 3GPP 36.331). EX1013, ¶¶200-201.

The '118 Patent even acknowledges that its systems and methods “may be applied to dual connectivity between LTE BSs. Accordingly, the same may be applied to a case where the secondary BS is an LTE BS.” EX1001, 8:62-9:3. The '118 Patent contemplates that its systems and methods are applicable to existing 4G/LTE technologies. *Id.* EX1013, ¶¶202-203.

A POSITA would have recognized that the benefits of DC in 4G/LTE/LTE+ of having “the UE configured with two cell groups (CGs)” such that “frame timing and SFN [*system frame number*] are aligned among the component carriers”. EX1009, p.240. Such advantages of DC allow for a UE to remain connected to a base station while moving around within the network to areas at an edge of a cell and/or coverage area. EX1013, ¶¶204-205. DC provides for enhanced connectivity and decreased service interruption for a UE by configuring the UE to connect to a master base station and a secondary base station at the same time. *See id.*, pp.46-48. A POSITA would have been motivated by DC techniques for 4G/LTE/LTE+ disclosed in 3GPP 36.300 to apply DC to 4G and developing 5G technologies. Futaki confirms that, before the filing date of the '118 Patent, the 3GPP was already “starting to work on the standardization for 5G, i.e., 3GPP Release 14, in 2016 to

make 5G a commercial reality in 2020.” EX1007, ¶[0002]; *see also* EX1008, ¶[0002]. EX1013, ¶¶206-207.

1. Claim 1 (Preamble)

To the extent the Preamble is limiting, Futaki discloses and suggests the Preamble. *See* VII.A.1., *supra*. EX1013, ¶208.

a. Element [1.1]

Futaki, 3GPP 36.300, and 3GPP 36.331 in combination disclose and suggest Element [1.1]. *See* §VII.A.1.a., *supra*. 3GPP 36.300 also discloses both adding and configuring a secondary base station SRB. 3GPP 36.300 discloses a “SeNB Addition procedure” (EX1009, p.84; Figure 10.1.2.8.1-1) and “SeNB radio resource configuration”. EX1009, p.85. Like Futaki, 3GPP 36.300 discloses a method for a UE for configuring DC including adding and configuring a secondary base station SRB. *See, e.g.*, EX1009, pp.84-85 (“SeNB Addition procedure”; Figure 10.1.2.8.1-1; “SeNB radio resource configuration”). 3GPP 36.331 discloses details of the SeNB addition/configuration. *See, e.g.*, EX1010, pp.72-82. Thus, a POSITA would understand from Futaki, 3GPP 36.300, and 3GPP 36.331 that adding and configuring a secondary base station SRB can be performed with both LTE+ and 5G base stations. EX1013, ¶¶209-212.

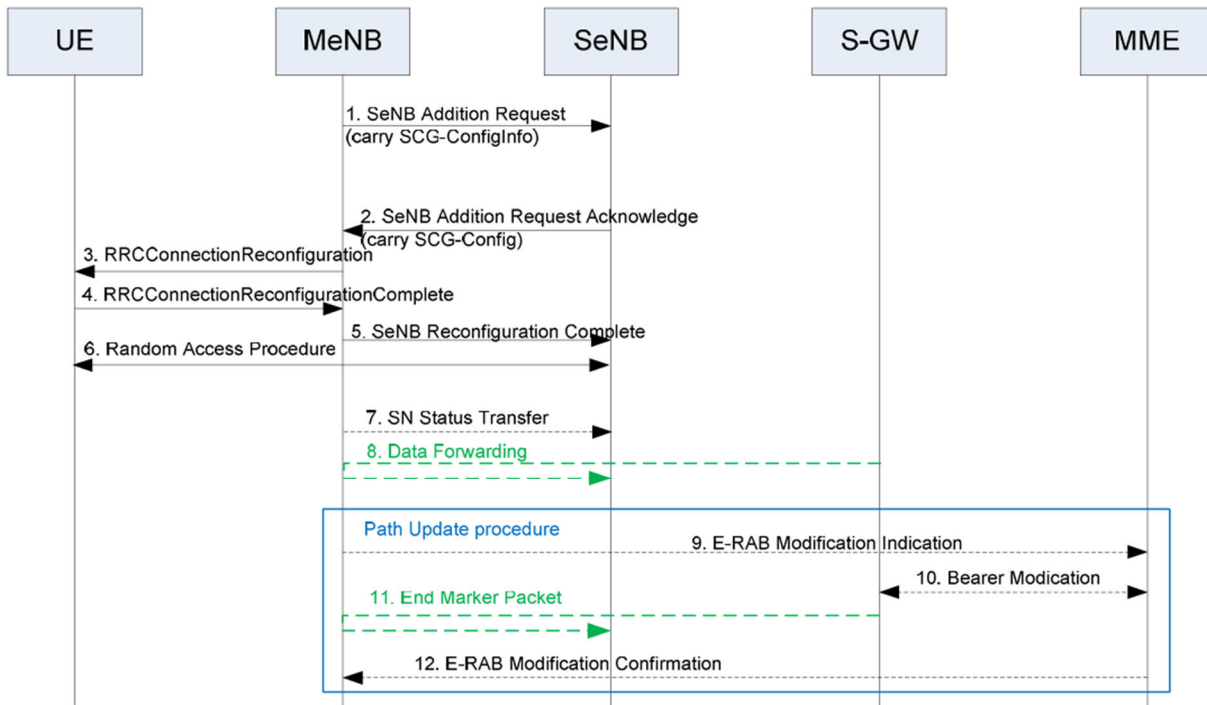


Fig. 10.1.2.8.1-1 of 3GPP 36.300

EX1013, ¶212.

To the extent Futaki somehow lacks “adding and configuring a secondary base station SRB”, 3GPP 36.300 discloses details of adding and configuring a secondary base station SRB which a POSITA would be motivated to apply to the framework of Futaki’s UE, LTE+ base station, and 5G base station. EX1013, ¶213.

b. Element [1.2]

Futaki discloses and suggests Element [1.2]. *See* §VII.A.1.b., *supra*. EX1013, ¶214. *See also* EX1023, ¶¶54-58; EX1005, pp.1-3.

c. Element [1.3]

Futaki, 3GPP 36.300, and 3GPP 36.331 in combination disclose and suggest Element [1.3]. To the extent Futaki somehow lacks Element [1.3], 3GPP 36.300 discloses the UE transmitting a failure information message to a master base station when the UE is unable to comply with the radio resource configuration information included in the RRC message for the secondary base station. EX1009, pp.71-72. EX1013, ¶¶215-216.

The '118 Patent recognizes that a “re-establishment procedure ... results in service interruption.” EX1001, 16:49-50. The '118 Patent suggests that “it may be not efficient for a UE to transit into an idle mode or perform an RRC connection re-establishment procedure.” *Id.*, 16:55-56. “In order to solve this, ... a reconfiguration failure procedure should not be triggered.” *Id.*, 16:57-61. Instead, “a UE may transmit an RRC message (e.g., a SCG failure information message[])” such that “if a UE fails in a radio resource configuration of a secondary BS by using an RRC message received through an SRB of a secondary BS, the UE may transmit corresponding failure information to a master BS.” *Id.*, 17:6-9. *See id.*, 16:29-17:9. 3GPP 36.300 also recognizes that the re-establishment procedure should not be performed when a failure is detected on the secondary base station, and that the UE should transmit a failure information message to a master base station (MeNB). EX1013, ¶¶217-219.

3GPP 36.300 discloses, for DC, “[u]pon detection of a physical layer problem or a random access problem on PSCell ... RRC connection Re-establishment procedure is not triggered; All UL transmissions towards all cells of the SCG are stopped; ***MeNB is informed by the UE of SCG failure type;***”. EX1009, p.71 (emphasis added). According to 3GPP 36.300, in DC, “upon detecting RLF [*radio link failure*] on the PSCell [*secondary base station*], the re-establishment procedure is not triggered at the end of the first phase. Instead, ***UE shall inform the radio link failure of PSCell to the MeNB.***” EX1009, p.100 (emphasis added). *See also* EX1009, pp.71-100. *See also* EX1023, ¶¶59-63; EX1006, pp.1-3. EX1013, ¶¶220-221.

3GPP 36.331 provides details and data fields for the failure information messages disclosed in 3GPP 36.300. *See* EX1010, pp.136-137 (“*SCGFailureInformation* message”); pp.196-197 (“The *SCGFailureInformation* message is used to provide information regarding failures detected by the UE.”). 3GPP 36.331 discloses that “SCG failure information messages” (as disclosed in the ’118 Patent) are used “to inform E-UTRAN [*e.g., a network*] about an SCG failure the UE has experienced i.e. SCG radio link failure, SCG change failure.” EX1010, pp.136-137 (the UE “initiates transmission of *SCGFailureInformation* message”). EX1013, ¶¶222-223.

A POSITA would have been motivated to look to 3GPP 36.300 and 3GPP 36.331 to ensure Futaki’s systems and methods comply with the established

standards. *See* §VII.B., *supra*. Upon review of the 3GPP standards (e.g., 3GPP 36.300 and 3GPP 36.331), a POSITA would have understood to use the failure information procedure of 3GPP 36.300 with Futaki's system and method for DC of a UE between an LTE+ base station and a new 5G base station because 3GPP 36.300 informs a POSITA that the re-establishment procedure should not be triggered and instead, a failure information message should be transmitted to the master base station. EX1009, pp.71-72, 100. EX1013, ¶¶224-225.

A POSITA would have been motivated to apply existing procedures of transmitting failure information messages to a master base station when the UE's configuration with a secondary base station (e.g., Futaki's New 5G specific eNB) has failed. A POSITA would have had a reasonable expectation of success at least because the failure procedure described in 3GPP 36.300 was applicable to DC with at least two LTE base stations. Such an application would have been successful for DC of a UE being connected to one LTE+ base station and one new 5G base station. EX1013, ¶¶226-227.

d. Element [1.4]

Futaki discloses and suggests Element [1.4]. *See* §VII.A.1.d., *supra*. EX1013, ¶228. *See also* EX1023, ¶¶54-58; EX1005, pp.1-3.

2. Claim 2

Futaki discloses and suggests claim 2. *See* §VII.A.2., *supra*. EX1013, ¶229.

3. Claim 3

Futaki discloses and suggests claim 3. *See* §VII.A.3., *supra*. EX1013, ¶230.

4. Claim 4

Futaki, 3GPP 36.300, and 3GPP 36.331 in combination disclose and suggest claim 4. *See* §VII.A.4., *supra*. To the extent Futaki does not expressly disclose claim 4, 3GPP 36.300 discloses this claimed subject matter. 3GPP 36.300 discloses that, for DC, upon a failure to comply with radio resource configuration, “[a]ll UL transmissions towards all cells of the SCG [*secondary cell group*] are stopped”. EX1009, p.71. *See also* EX1009, pp.89-90, 195. 3GPP 36.331 discloses that when the UE transmits an *SCGFailureInformation* message to the master base station (e.g., when the UE is unable to comply with the radio resource configuration information included in the RRC message and therefore fails to a secondary BS radio resource configuration), a radio resource on the secondary base station or the secondary cell group is suspended. EX1010, p.136 (the UE shall “suspend all SCG DRBs and suspend SCG transmission for split DRBs”). A secondary cell group data radio bearer (SCG DRB), that is suspended upon SCG failure, constitutes a radio resource on the secondary base station or the secondary cell group. EX1013, ¶¶231-235.

A POSITA would have been motivated to look to 3GPP 36.300 and 3GPP 36.331 to ensure Futaki’s systems and methods comply with established 3GPP standards. *See* VII.B., *supra*. A POSITA would understand from 3GPP 36.300 that

an allocated radio resource of a 5G secondary base station in Futaki's DC system could be suspended upon failure of configuration. *See* EX1009, pp.71, 89-90. A POSITA would also understand from 3GPP 36.331 that allocated radio resources are suspended during RRC re-establishment, (EX1010, pp.66), SCG reconfiguration (*id.*, p.79), and SCG failure information reporting when a radio link failure occurs with the SCG (*id.*, pp.133-136). EX1013, ¶¶236-238.

A POSITA would have been motivated to combine the existing procedure for suspending a radio resource of a secondary base station or secondary cell group described in 3GPP 36.300 and 3GPP 36.331 to provide details of failure procedures and to ensure Futaki's system complied with 3GPP standards. A POSITA would have had a reasonable expectation of success at least because the procedure for suspending an allocated radio resource of a secondary base station was applicable to DC with LTE base stations, and would have been successful for DC of a UE where the UE is connected to one LTE+ base station and one new 5G base station. In this way, the 3GPP "principles" (*see* EX1009, pp.71-72) for SCG in DC would have successfully been applied for both LTE and 5G secondary base stations in DC. *See also* EX1001, 8:62-9:3. EX1013, ¶¶239-240.

5. Claim 5

Futaki discloses and suggests claim 5. *See* §VII.A.5., *supra*. EX1013, ¶241.

6. Claim 6

Futaki, 3GPP 36.300, and 3GPP 36.331 in combination disclose and suggest claim 6. *See* §VII.A.6., *supra*. To the extent that Futaki does not expressly disclose claim 6, 3GPP 36.300 and 3GPP 36.331 disclose this claimed subject matter. As disclosed by 3GPP 36.331, Futaki’s failure information message for radio resource configuration (e.g., *SCGFailureInformation* message) includes at least cause information in variables including “FailureReportSCG” and failureType (including failure types of timer expiration, random access failure, radio link control failure, and SCG change failure). EX1010, pp.196-197. EX1013, ¶¶242-244.

3GPP 36.300 discloses other failure information messages with cause information (e.g., RLF INDICATION message) including an “RLF Report received from the UE and forwarded in the RLF INDICATION message.” EX1009, pp.212-213. “The radio measurements contained in the RLF Report may be used e.g. to identify coverage issues *as the potential cause of the failure.*” EX1009, p.213. EX1013, ¶245.

A POSITA would have been motivated to look to 3GPP 36.300 and 3GPP 36.331 *See* VII.B., *supra*. A POSITA would recognize that the RLF INDICATION message and RLF report disclosed in 3GPP 36.300 as applicable to Futaki to include cause information on the radio resource configuration failure for the secondary base station. A POSITA would also recognize the RRC messaging details, including

variables “VarConnEstFailReport” and/or “VarRLF-Report” transmitted by the UE to the base station using fields including “rlf-Cause” to constitute failure information messages including cause information on the secondary base station radio resource configuration failure. These failure information messages apply directly to the systems and methods of Futaki. *See* §VII.A.6., *supra*. EX1013, ¶¶246-249.

3GPP 36.300 discloses an *SCGFailureInformation* message including an SCG failure type, which is transmitted to the master base station. *See* EX1009, pp.71-72. 3GPP 36.331 details the *SCGFailureInformation* message, disclosing specific data fields that store cause information which are transmitted by the UE to the master base station via the RRC layer. *See* EX1010, pp. 136-137, 164-165, 196-197. Thus, a POSITA would have been motivated to configure a UE to transmit the same failure information messages, including the data fields detailed in 3GPP 36.331, in Futaki’s LTE+/5G DC as described in 3GPP 36.300 for LTE DC. EX1013, ¶¶250-252.

7. Claim 7 (Preamble)

To the extent the Preamble is limiting, Futaki discloses and suggests the Preamble. *See* §VII.A.1., *supra*. EX1013, ¶253.

a. Element [7.1]

Futaki discloses and suggests Element [7.1]. *See* §VII.A.1.d., *supra*. EX1013, ¶254.

b. Element [7.2]

Futaki discloses and suggests Element [7.2]. *See* §VII.A.1.b., *supra*. EX1013, ¶255.

c. Element [7.3]

Futaki, 3GPP 36.300, and 3GPP 36.331 in combination disclose and suggest Element [7.3]. *See* §§VII.A.1.c., VII.A.7.c., *supra*. EX1013, ¶256. As disclosed by 3GPP 36.331, once RRC connection is established, the UE transmits an *RRCConnectionSetupComplete* message to the base station. EX1010, pp.45-55. The *RRCConnectionSetupComplete* message is shown in Figure 5.3.3.1-2 of 3GPP 36.331, highlighted below.

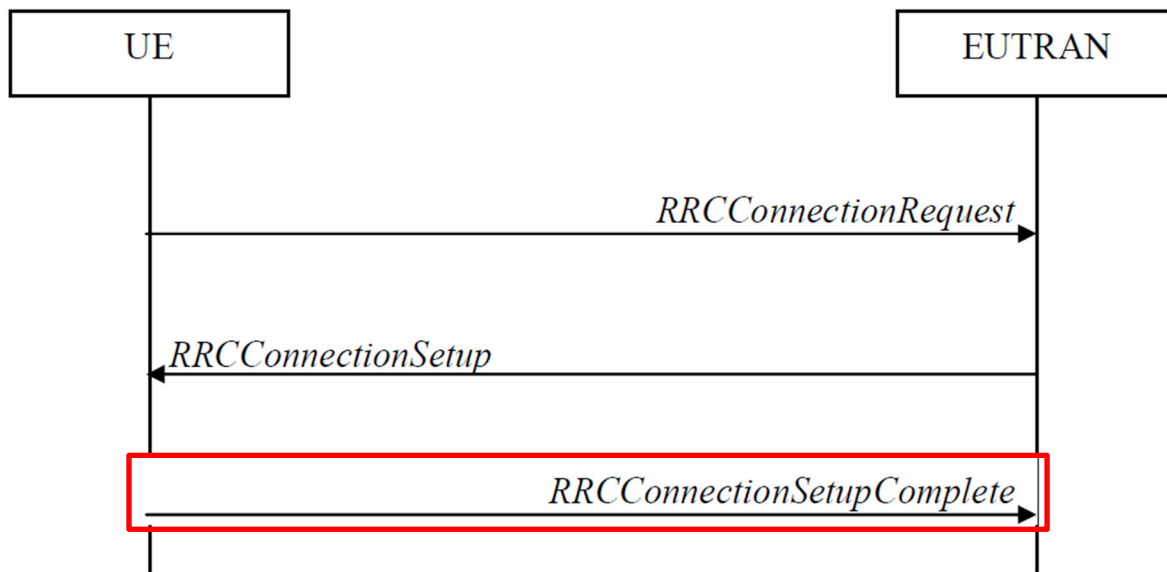


Figure 5.3.3.1-1: RRC connection establishment, successful

EX1013, ¶257.

The response message (e.g., *RRConnectionSetupComplete* message) is transmitted by the UE through the secondary BS SRB (e.g., the newly established SRB), as evidenced by 3GPP 36.331. EX1010, pp.40, (“RRC connection establishment involves the establishment of SRB1.”), 46. 3GPP 36.331 confirms in its detailed description of the *RRConnectionSetupComplete* message that the “*RRConnectionSetupComplete* message is used to confirm the successful completion of an RRC connection establishment” (*id.*, p.195) using “SRB1” and “DCCH”. *Id.* It would have been obvious for a POSITA to include this simple *RRConnectionSetupComplete* confirmation message in Futaki’s implementation, whether configuring an RRC connection on an LTE+ base station or a 5G specific base station. EX1013, ¶¶258-259.

A POSITA would have been motivated to look to 3GPP 36.300 and 3GPP 36.331 *See* VII.B., *supra*. A POSITA would have been motivated to apply similar connection setup complete messages (e.g., success messages) to new 5G base station SRB configuration, as was used for LTE base station SRB configuration. Such an implementation would have a reasonable expectation of success given the application of a response message indicating success is predictable and well-known. EX1013, ¶¶260-261.

d. Element [7.4]

Futaki discloses and suggests Element [7.4]. *See* §VII.A.7.d., *supra*. EX1013, ¶262.

8. Claim 8

Futaki discloses and suggests claim 8. *See* §VII.A.2., *supra*. EX1013, ¶263.

9. Claim 9

Futaki discloses and suggests claim 9. *See* §VII.A.3., *supra*. EX1013, ¶264.

10. Claim 10 (Preamble)

To the extent the Preamble is limiting, Futaki discloses and suggests the Preamble. *See* §§VII.A.1., VII.A.10., VII.B.1., *supra*. EX1013, ¶265.

a. Element [10.1]

Futaki, 3GPP 36.300, and 3GPP 36.331 in combination disclose and suggest Element [10.1]. *See* §§VII.A.1.a., VII.A.10.a., VII.B.1.a., *supra*. EX1013, ¶266.

b. Element [10.2]

Futaki discloses and suggests Element [10.2]. *See* §§VII.A.1.b., VII.A.10.b., VII.B.1.b., *supra*. EX1013, ¶267.

c. Element [10.3]

Futaki, 3GPP 36.300, and 3GPP 36.331 in combination disclose and suggest Element [10.3]. *See* §§VII.A.1.c., VII.A.10.c., VII.B.1.c., *supra*. EX1013, ¶268.

d. Element [10.4]

Futaki discloses and suggests Element [10.4]. *See* §VII.A.1.d., *supra*. EX1013, ¶269.

11. Claim 11

Futaki discloses and suggests claim 11. *See* §VII.B.2., *supra*. EX1013, ¶270.

12. Claim 12

Futaki discloses and suggests claim 12. *See* §VII.A.3., *supra*. EX1013, ¶271.

13. Claim 13

Futaki, 3GPP 36.300, and 3GPP 36.331 in combination disclose and suggest claim 13. *See* §§VII.A.4., VII.B.4., *supra*. EX1013, ¶272.

14. Claim 14

Futaki discloses and suggests claim 14. *See* §VII.A.5., *supra*. EX1013, ¶273.

15. Claim 15

Futaki, 3GPP 36.300, and 3GPP 36.331 in combination disclose and suggest claim 15. *See* §§VII.A.6., VII.B.6., *supra*. EX1013, ¶274.

VIII. OTHER CONSIDERATIONS

A. Secondary Considerations

Petitioners are not aware of any secondary considerations evidence bearing any nexus to the purported claimed invention. Any purported evidence of secondary considerations that Owner may present in this proceeding would be insufficient to

overcome the strong evidence of obviousness of the Challenged Claims. EX1013, ¶¶275-277.

B. Discretion to Institute

1. The Board should not deny this Petition under §314(a)

The '118 Patent has not been challenged in any prior AIA trial proceeding, and this Petition is not a “follow-on” petition. Application of the *Fintiv* factors weighs against discretionary denial as explained below.

a. Factor 1: Whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted

Factor 1 weighs against discretionary denial. In the district court litigation, third party defendant and patent owner KT Corporation (“KT”) has disputed jurisdiction. The parties are engaged in jurisdictional discovery, and the Court has granted KT a protective order from non-jurisdictional discovery during the jurisdictional discovery period. EX1018, EX1017. This could extend the district court trial date, which “allays concerns about inefficiency and duplication of efforts” in the PTAB. *Fintiv* at 8.

b. Factor 2: Proximity of the court’s trial date to the Panel’s projected statutory deadline for a final written decision

Factor 2 should be considered at least neutral because jury selection is far in the future and is not set to begin until at least September 8, 2025. Even if jury selection were to proceed on September 8, 2025, jury selection would proceed with respect to only one of the three cases (*e.g.*, the '638 Litigation, the '639 Litigation,

or the '640 Litigation). Each of the defendant Petitioners are entitled to separate trials, which will necessarily proceed on separate dates. As such, there are explicit and inherent uncertainties for this case given the number of parties involved and the number of trials regarding this patent. In addition, and because much can change in ten months, the current trial date does not support denial. *See Dish Network v. Broadband iTV*, IPR2020-01280, Paper 17 at 16 (PTAB Feb. 4, 2021) (“We cannot ignore the fact that the currently scheduled trial date is more than nine months away and much can change during this time”).⁷

Moreover, given the existence of three cases each with multiple parties, to include multiple intervenors, the likelihood that any trials will be scheduled serially, the potential length of the trials given the number of patents at issue (11) and claims at issue, and post-trial motions, it is likely that the district court proceedings will not be complete before the final written decision in this matter. Indeed, these cases additionally will likely be delayed (as explained earlier) because third party defendant and patent owner KT has disputed jurisdiction, has yet to file an Answer,

⁷ For these reasons, the “statistics on median time-to-trial for civil actions in the district court in which the parallel litigation resides” are not illuminating, given the number of cases and number of defendants.

and the Court has granted KT a protective order from non-jurisdictional discovery. EX1017.

Altogether, this factor weighs against discretionary denial.

c. Factor 3: Investment in the parallel proceeding by the court and the parties

Factor 3 weighs against discretionary denial. The district court cases are in their early stages and the district court has not issued any substantive rulings in either case with respect to the '118 Patent. Specifically, infringement contentions were served on March 18, 2024, invalidity contentions were served on May 17, 2024, and the claim construction hearing is not scheduled until March 11, 2025. EX1019, EX1020. In addition, third party defendant and patent owner, KT Corporation has not yet filed an answer, which will likely further delay progress on the merits.

Altogether, there is much work to be done in the district court and most, if not all, of the work will be well in the future. Accordingly, the district court will not invest significant resources related to the challenged patent prior to the issuance of an institution decision. *See Fintiv*, IPR2020-00019, Paper 11 at 9-12; *Dish Network*, IPR2020-01280, Paper 17 at 18-21.

d. Factor 4: Overlap between issues raised in the petition and in the parallel proceeding

Factor 4 favors institution. Indeed, there will not be complete overlap between this IPR and the district court cases because there are 15 claims asserted in this case

and a total of 113 asserted in the related district court cases. The district court will likely reduce the asserted claims prior to trial including some of the 15 claims at issue here. This factor thus weighs against the Board exercising its discretion to deny.

e. Factor 5: Whether the petitioner and the defendant in the parallel proceeding are the same party

Factor 5 is neutral as it is “far from an unusual circumstance that a petitioner in inter partes review and a defendant in a parallel district court proceeding are the same.” *Sand Revolution*, IPR2019-01393, Paper 24 at 12-13.

f. Factor 6: Other circumstances that impact the Panel’s exercise of discretion, including the merits

Factor 6 weighs strongly against discretionary denial. As detailed herein, this is a compelling case, and the merits of the Petition are strong. The challenges presented in this Petition are particularly compelling given that Ground 1 is anticipatory, *i.e.*, Futaki discloses all of the elements of all Challenged Claims, and alternatively is a straightforward obviousness challenge based on Futaki’s express teachings. Ground 2 is a straightforward obviousness challenge based on Futaki’s express teachings of its compatibility with 3GPP 36.300. Grounds 1-2 are straightforward and very strong as demonstrated above in §VII and thus constitute compelling merits. *See, e.g., SRAM, LLC v. FOX Factory, Inc.*, IPR2024-00216, Paper 11 (PTAB Jun. 7, 2024) at p. 55 (finding compelling merits where the anticipation ground is “seemingly straightforward”), *Inergy Tech., Inc. v. Force Mos*

Petition for *Inter Partes* Review of U.S. Patent No. 10,721,118 *Tech., Co., Ltd.*, IPR2024-00094, Paper 9 (PTAB May 21, 2024) at p. 36 (finding compelling merits where the obviousness ground is “seemingly straightforward” and “Petitioner’s motivation for this modification comes from an express teaching in [the cited reference]”). None of the grounds asserted herein were previously considered by either the Office or the district courts, also favoring institution. *See Comcast Cable Comm’n’s, LLC v. Rovi Guides, Inc.*, IPR2019-00231, Paper 14 at 11 (PTAB May 20, 2019) (obviousness challenges not “previously considered by the Office or any court” weigh in favor of not denying institution). Moreover, the ’118 Patent is currently asserted in three district court cases. Institution of this IPR would simplify the litigations for the district court.

2. The Board should not deny this Petition under §325(d)

Futaki, 3GPP 36.300, and 3GPP 36.331 were neither considered nor substantively discussed by the Patent Office during prosecution of the ’118 Patent. Accordingly, the Board should not exercise its discretion to deny this petition under §325(d).

The factors recited in *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 at 17 (PTAB Dec. 15, 2017) (precedential) weigh in favor of institution. *Id.* at 4. In the present Petition, aspects of the prior art and arguments not considered by the USPTO due to material error during prosecution warrant institution. *See Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte*

GmbH, IPR2019-01469, Paper 6 at 8-9 (PTAB Feb. 13, 2020) (precedential).

Furthermore, the Patent Office's lack of consideration of Futaki, 3GPP 36.300, and 3GPP 36.331 is "material error" because the Patent Office never considered the disclosures of such references that impact patentability of the Challenged Claims as explained in §VII. *Advanced Bionics* at 8 n.9 ("material error may include misapprehending or overlooking specific teachings of the relevant prior art where those teachings impact patentability of the challenged claims"). As explained above, Futaki, 3GPP 36.300, and 3GPP 36.331 disclose and suggest the claim features deemed missing from the prior art considered during prosecution, and are non-cumulative for at least this reason.

With respect to factor (f), the Petition is supported by an expert declaration by Dr. Roy explaining how a POSITA would have understood Futaki, 3GPP 36.300, and 3GPP 36.331. *See, e.g.*, EX1013, ¶¶52-274. This new evidence also weighs against discretionary denial. *See, e.g., Puma N. Am., Inc. v. Nike, Inc.*, IPR2019-01058, Paper 10, 19 (PTAB Oct. 31, 2019).

IX. CONCLUSION

Petitioners have shown a reasonable likelihood of success. Therefore, this Petition should be granted and the Board should institute trial.

Date: December 26, 2024

Respectfully submitted,

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APPENDIX A - LIST OF EXHIBITS

Exhibit No.	Description
1001	U.S. Patent No. 10,721,118, issued on July 21, 2020 (“the ’118 Patent”)
1002	File History of U.S. Patent Application No. 16/300,557, filed on November 10, 2018 (“the ’557 Application”)
1003	<i>Not assigned</i>
1004	<i>Not assigned</i>
1005	3GPP R2-133392 “Discussion on SRB via SeNB for dual connectivity” 3GPP TSG-RAN WG2 Meeting #83b, Ljubljana, Slovenia, 7th-11th October 2013
1006	3GPP R2-141109 “Re-configuration failure in dual connectivity” 3GPP TSG-RAN WG2 Meeting #85bis, Valencia, Spain, March 31st- April 4th, 2014
1007	Certified English Translation of PCT International Publication No. WO 2017/119247 to Futaki <i>et al.</i> , published on July 13, 2017 (“Futaki”)
1008	Certified English Translation of JP 2016-002879
1009	3GPP TS 36.300 v12.8.0 (2015-12) 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Overall description; Stage 2 (Release 12) (“3GPP 36.300”)
1010	3GPP TS 36.331 v12.8.0 (2015-12) 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC) Protocol specification (Release 12) (“3GPP 36.331”)
1011	U.S. Patent Publication No. 2016/0028585, published January 28, 2016 (“Wager”)

1012	U.S. Patent Publication No. 2016/0044743, published February 11, 2016 (“Xu”)
1013	Declaration of Sumit Roy
1014	<i>Curriculum Vitae</i> of Sumit Roy
1015	Plaintiff and Counterclaim-Defendant Pegasus Wireless Innovation LLC’s Initial Proposed Constructions dated December 4, 2024, <i>Pegasus Wireless Innovation LLC v. Verizon Communications Inc., et al.</i> , Civ. Action No. 2:23-cv-00640 (E.D. Tex.)
1016	Defendants and Intervenor’s P.R. 4-2 Preliminary Claim Constructions and Extrinsic Evidence dated December 4, 2024, <i>Pegasus Wireless Innovation LLC v. Verizon Communications Inc., et al.</i> , Civ. Action No. 2:23-cv-00640 (E.D. Tex.)
1017	Memorandum Opinion and Order, filed on December 12, 2024 in <i>Pegasus Wireless Innovation LLC v. Verizon Communications Inc., et al.</i> , Civ. Action No. 2:23-cv-00640 (E.D. Tex.)
1018	Counterclaim-Defendant KT Corporation’s Motion for Protective Order from Non-Jurisdictional Discovery, filed October 4, 2024 in <i>Pegasus Wireless Innovation LLC v. Verizon Communications Inc., et al.</i> , Civ. Action No. 2:23-cv-00640 (E.D. Tex.)
1019	Order granting Joint Motion to Modify Case Deadlines filed March 8, 2024 in <i>Pegasus Wireless Innovation LLC v. Verizon Communications Inc., et al.</i> , Civ. Action No. 2:23-cv-00640 (E.D. Tex.)
1020	First Amended Docket Control Order filed May 9, 2024 in <i>Pegasus Wireless Innovation LLC v. Verizon Communications Inc., et al.</i> , Civ. Action No. 2:23-cv-00640 (E.D. Tex.)
1021	Order Consolidating District Court Case Nos. 2:23-cv-00638, 2:23-cv-00639, 2:23-cv-00640

Petition for *Inter Partes* Review of U.S. Patent No. 10,721,118

1022	PCT International Publication No. WO 2017/119247, published on July 13, 2017
1023	Declaration of Craig Bishop
1024	<i>Curriculum Vitae</i> of Craig Bishop

CERTIFICATE OF COMPLIANCE WITH 37 C.F.R. §42.24

The undersigned hereby certifies that the foregoing Petition totals 13,969 words, excluding the parts which are exempted by 37 C.F.R. §42.24(a)(1).

Date: December 26, 2024

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that on this 26th day of December, 2024, a true and correct copy of the foregoing **PETITION FOR *INTER PARTES* REVIEW FOR U.S. PATENT NO. 10,721,118, EXHIBITS 1001, 1002, 1005-1024, and Petitioners' Powers of Attorney** are being served upon the Patent Owner at the following correspondence address of record via USPS Priority Mail:

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