

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

**DECLARATION OF SUMIT ROY IN SUPPORT OF PETITION FOR
INTER PARTES REVIEW OF U.S. PATENT NO. 10,721,118**

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1. Claim 1 (Preamble): “A method of a user equipment for configuring dual connectivity, the method comprising:” 26
 - a. [1.1]: “adding and configuring a secondary base station signaling radio bearer (SRB);” 29
 - 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” 37
 - 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,” 41
 - d. [1.4]: “wherein the addition of the secondary base station SRB is determined by the secondary base station.” 43
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- a. [10.1]: “a controller configured to add and configure a secondary base station signaling radio bearer (SRB);” 58
- 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” 58
- 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,” 58
- d. [10.4]: “wherein the addition of the secondary base station SRB is determined by the secondary base station.” 58
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.” 60
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.” 60

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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.”	60
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APPENDIX 1		

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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”)
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”)

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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.)
1022	PCT International Publication No. WO 2017/119247, published on July 13, 2017

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I, Sumit Roy, hereby state as follows:

1. I have been retained by 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”) as an independent expert consultant in this *inter partes* review (“IPR”) proceeding before the United States Patent and Trademark Office (“PTO”).

2. I have been asked by Counsel for Petitioners (“Counsel”) to consider whether certain references teach or suggest the features recited in Claims 1-15 (“the Challenged Claims”) of U.S. Patent No. 10,721,118 (“the ’118 Patent”) (EX1001). My opinions and the bases for my opinions are set forth below.

3. I understand that the ’118 Patent is assigned to KT Corporation, which has given an exclusive license to Pegasus Wireless Innovation LLC.

4. I have been asked to provide an independent analysis of the ’118 Patent in view of the asserted prior art publications cited in the Petition. This Declaration is limited to those issues.

5. I am not, and never have been, an employee of KT Corporation, Pegasus Wireless Innovation LLC, or Petitioners. I am not receiving compensation for this Declaration beyond my normal hourly fees based on my time actually spent analyzing and documenting my opinions herein on the ’118 Patent, the asserted prior

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art publications cited in this Declaration and in the Petition, and the issues related thereto. My compensation is not related to the outcome of this proceeding, and I will not receive any additional compensation based on the outcome of any IPR or other proceeding involving the '118 Patent.

6. I am being compensated at my ordinary and customary consulting rate for my work, which is \$625 per hour. My compensation is in no way contingent on the nature of my findings, the presentation of my findings in testimony, or the outcome of this or any other proceeding. I have no other financial interest in this proceeding.

7. I have personal knowledge of the facts and opinions stated herein and, if called as a witness, could and would testify competently to them under oath.

I. BACKGROUND AND QUALIFICATIONS

8. All of my opinions stated in this declaration are based on my own personal knowledge and professional judgment. In forming my opinions, I have relied on my knowledge and experience in the field of wireless networks.

9. I am an expert in the field of wireless networks (both commercial licensed cellular and unlicensed technologies) – having studied, taught, practiced, and researched this field for over thirty years. I summarize in this section my educational background, work experience, and other relevant qualifications. I

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understand that my curriculum vitae (CV) is being filed as EX1014 in this proceeding. I certify that EX1014 is a true and correct copy and sets forth the details of my educational history, work history, patents, and other related professional experience.

10. I earned my Bachelor of Technology degree in Electrical Engineering from Indian Institute of Technology in Kanpur, India in 1983. Subsequently, I earned my Master of Science and Doctor of Philosophy degrees in Electrical & Computer Engineering from University of California in Santa Barbara – with my dissertation being on “Estimation Strategies for a Network of Distributed Sensors.” I also simultaneously was awarded a Master of Arts in Statistics & Applied Probability from University of California in Santa Barbara in 1988.

11. While a graduate student (1983 through 1988), I worked on various projects related to wireless communication and radar systems using a mix of analytical modeling and computer simulation. This initial exposure to 3G cellular systems initiated a career pathway that traversed network evolution through 4G and current 5G systems, giving me a working knowledge of 3GPP technology standards governing these systems. In July 1988, I joined the faculty of the University of Pennsylvania as an Assistant Professor in the Department of Electrical Engineering, where I taught an upper level undergraduate course on “Communication Systems”

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and graduate level courses on “Advanced Digital Signal Processing” and “Digital Communications” and conducted research in my specialization.

12. In January 1995, I became a tenured Associate Professor in the Division of Engineering at the University of Texas at San Antonio, in San Antonio, Texas. In April 1998, I transferred to a tenured Associate Professor position in the Department of Electrical Engineering, University of Washington (“UW”) in Seattle, Washington and was promoted to Professor in September 2002. As a faculty member at UW, I have taught courses and directed research in networking and telecommunications, including 802.11 WLAN and cellular technologies. From September 2014 to September 2019, I was awarded Integrated Systems Term Professorship at UW in recognition of my leadership and national stature in this area.

13. I took full-time leave from UW to serve as a Senior Staff Researcher at Intel Labs, Hillsboro, OR from September 2001 to December 2003. In that role, I served as Wireless Systems Architect researching IEEE 802.15.3a Ultra-Wideband PHY layer for Wireless Personal Area Networks and pre-802.11n (MIMO WiFi). I also represented Intel at IEEE Standards meetings and coordinated with other industry partners. My research resulted in several patents relating to the above, including design implementation of MIMO WiFi transceivers. More recently (July 2020 – Aug. 2022), I served as Program Lead for the U.S. Department of Defense,

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Office of the Under Secretary of Defense's Innovate Beyond 5G program for research and experimentation within the 5G-to-xG (now renamed FutureG) initiative, where I had responsibility for monitoring commercial 5G evolution via 3GPP standardization.

14. As a result of my academic teaching, research, industry, and federal government experience, I have significant knowledge of wireless networking technologies. Since 1988, I have served as Principal Investigator for multiple competitively awarded research projects (in excess of \$10 M net funding) from various national organizations (both federal government and private industry sources) to support my research, as listed in my CV. I have authored and co-authored over 200 journal publications, conference proceedings, technical papers, book chapters, and technical presentations in a broad array of communications-related technologies, including networking and wireless communication. My work on Radar-WiFi Spectrum Sharing was recognized as the best paper published in IEEE Trans. Aerosp. Elect. Systems with annual Barry Carlton Award in 2016.

15. My professional affiliation with IEEE include serving in various professional societies as a reviewer for a number of technical publications, journals, and conferences. I have also received multiple awards and recognitions, most notably, elevation to IEEE Fellow in 2007 for "contributions to multi-user

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communications theory and cross-layer design of wireless networking standards.”

By IEEE bylaws, only 0.1% of IEEE membership is elevated to Fellow annually.

See <https://www.ieee.org/membership/fellows/steps.html>. In addition, I was selected as IEEE Communications Society’s Distinguished Lecturer (2014-15, 2017-18), which are listed in my curriculum vitae.

16. In addition to advising and mentoring students at UW, I have served as an external dissertation reviewer for several reputed international universities (e.g., McGill Univ., Montreal, CA; National University of Singapore, and Australia National University). During my career, I have advised and supervised over 35 Ph.D. students and numerous visiting scholars.

17. I have also served as an expert in certain legal proceedings. A list of cases in which I have testified at trial, hearing, or by deposition is provided in Appendix 1. Over the years, I have been retained by both patent owners as well as petitioners.

II. INFORMATION CONSIDERED

18. In preparation for this declaration, I have considered the materials discussed in this declaration, including, for example, the ’118 Patent, the references cited by the ’118 Patent, the prosecution histories of the ’118 Patent and applications from which it derives (including the references cited therein), various background

articles and materials referenced in this declaration, and the prior art references identified in this declaration. In addition, my opinions are further based on my education, training, experience, and knowledge in the relevant field.

III. RELEVANT LEGAL STANDARDS

19. I am not an attorney and offer no legal opinions. For the purposes of this Declaration, I have been informed about certain aspects of the law that are relevant to my analysis, as summarized below.

A. Claim Interpretation

20. I have been informed that during an *inter partes* review proceeding, claims are to be construed in light of the specification as would be read by a person of ordinary skill in the relevant art at the time the application was filed. I have been informed that claim terms are given their ordinary and customary meaning as would be understood by a person of ordinary skill in the relevant art in the context of the entire disclosure. A claim term, however, will not receive its ordinary meaning if the patentee acted as his own lexicographer and clearly set forth a definition of the claim term in the specification. In that case, the claim term will receive the definition set forth in the patent.

21. I have been informed that certain patent claim terms may be interpreted as “means-plus-function” claim terms. I have been informed that terminology is part

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of the U.S. Patent Law in 35 USC §112, paragraph 6 (pre-AIA) / 35 USC §112(f) (post-AIA), which states the following: “An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.”

B. Perspective of One of Ordinary Skill in the Art

22. I have been informed that a patent is to be understood from the perspective of a hypothetical “person of ordinary skill in the art” (“POSITA”). Such an individual is considered to possess normal skills and knowledge in a particular technical field (as opposed to being a genius). I have been informed that in considering what the claims of a patent require, what was known prior to that patent, what a prior art reference discloses, and whether an invention is obvious or not, one must use the perspective of such a POSITA.

C. Anticipation

23. I have been informed that a claim is not patentable if it is anticipated. I have been informed that anticipation of a claim requires that every element of a claim is disclosed expressly or inherently in a prior art reference, arranged as in the claim, when considered from the perspective of a person of ordinary skill in the relevant

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art. I have been informed that when the structure recited in a reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. I have been informed that extrinsic evidence may be used to explain but not expand the meaning of terms and phrases used in the reference relied upon as anticipatory of the claimed subject matter.

D. Obviousness

24. I have been informed that a patent claim is obvious under 35 U.S.C. §103, and therefore invalid, if the claimed subject matter, as a whole, would have been obvious to a POSITA as of the priority date of the patent based on one or more prior art references and/or the knowledge of a POSITA.

25. I have been informed that an obviousness analysis must consider (1) the scope and content of the prior art, (2) the differences between the claims and the prior art, (3) the level of ordinary skill in the pertinent art, and (4) secondary considerations, if any, of non-obviousness (such as unexpected results, commercial success, long- felt but unmet need, failure of others, copying by others, and skepticism of experts).

26. I have been informed that a prior art reference may be combined with other references to disclose each element of the invention under 35 U.S.C. § 103. I have been informed that a reference may also be combined with the knowledge of a

POSITA, and that this knowledge may be used to combine multiple references. I have been informed that a POSITA is presumed to know the relevant prior art. I have been informed that the obviousness analysis may take into account the inferences and creative steps that a POSITA would employ.

27. In determining whether a prior art reference would have been combined with other prior art or other information known to a POSITA, I have been informed that the following principles may be considered:

- whether the references to be combined involve non-analogous art;
- whether the references to be combined are in different fields of endeavor than the alleged invention in the Patent;
- whether the references to be combined are reasonably pertinent to the problems to which the inventions of the Patent are directed;
- whether the combination is of familiar elements according to known methods that yields predictable results;
- whether a combination involves the substitution of one known element for another that yields predictable results;
- whether the combination involves the use of a known technique to improve similar items or methods in the same way that yields predictable results;
- whether the combination involves the application of a known technique to a prior art reference that is ready for improvement, to yield predictable results;
- whether the combination is “obvious to try”;

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- whether the combination involves the known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces, where the variations are predictable to a POSITA;
- whether there is some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill in the art to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention;
- whether the combination requires modifications that render the prior art unsatisfactory for its intended use;
- whether the combination requires modifications that change the principle of operation of the reference;
- whether the combination is reasonably expected to be a success; and
- whether the combination possesses the requisite degree of predictability at the time the invention was made.

28. I have been informed that in determining whether a combination of prior art references renders a claim obvious, it is helpful to consider whether there is some teaching, suggestion, or motivation to combine the references and a reasonable expectation of success in doing so. I have been informed, however, that a teaching, suggestion, or motivation to combine is not required.

IV. SUMMARY OF OPINIONS

29. It is my opinion that Claims 1-15 of the '118 Patent are unpatentable under 35 U.S.C. §§102 and 103 on the following grounds:

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Ground	Reference(s)	Basis	Claims
1	WO 2017/119247 (“Futaki”) (EX1022, 1007) ¹	§§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

V. TECHNOLOGY BACKGROUND

30. The ’118 Patent discloses configuring dual connectivity of a UE with a plurality of base stations, particularly with base stations employing radio access network technologies different from each other. The ’118 Patent discloses that:

¹ 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.

typical dual connectivity of the LTE may be provided based on coordination between two LTE BSs. In such a typical dual connectivity, the MeNB [*master base station*] 110 is able to understand an RRC message of the SeNB 120. Further, ***the MeNB 110 generates a final RRC message in consideration of coordination between the UE capabilities and the SeNB [secondary base station] 120 and transmits it to the UE 100.*** Therefore, it is possible to efficiently utilize the radio resources of the two BSs. ***The RRC message is provided through only radio interfaces of the UE 100 and the MeNB 110.***

EX1001, 7:53-62 (emphasis added). The '118 Patent indicates that according to the prior art, the master base station determines to add the secondary base station and transmits the RRC message to the UE for configuring the secondary base station. *Id.*

31. 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.

32. 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 purported problem by providing the same technique contemplated in the ’118 Patent. *See* §XI.

33. 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* §XI.

VI. THE CHALLENGED ’118 PATENT

34. The ’118 Patent contains 15 claims. I have been asked to opine on the validity of Claims 1-15.

VII. THE '118 PATENT PROSECUTION HISTORY

35. I have reviewed the file history of the '118 Patent.

36. The Examiner issued a single Office Action on the merits. EX1002, pp.108-116 (Office Action dated Nov. 15, 2019). The Examiner made rejections based on U.S. 2016/0028585 (“Wager”, EX1011) and Wager in view of U.S. 2016/0044743 (“Xu”, EX1012).

37. 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 merely “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 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.

VIII. LEVEL OF ORDINARY SKILL IN THE ART

38. 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. 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.*

39. I have been informed that the “priority date” or “earliest effective filing date” of a patent is the date on which it is filed, or the date on which an earlier-filed U.S. or international patent application was filed if the patentee claims the benefit of priority to that earlier-filed U.S. or international patent application. For purposes of this declaration, I have assumed that the ’118 Patent is entitled to a priority date of May 12, 2016, and I have not evaluated or formed an opinion on whether the claims of the ’118 Patent are actually entitled to that date.

IX. CLAIM CONSTRUCTION

40. For purposes of my analysis in this IPR proceeding, I have been informed that terms that appear in the claims of the '118 Patent should be interpreted according to their plain and ordinary meaning under the *Phillips* standard. In determining the ordinary and customary meaning, I have been informed that the words of a claim are first given their plain meaning that those words would have had to a POSITA at the time of the alleged invention. I also have been informed that the claims, specification, and file history may be used to better construe a claim insofar as the plain meaning of the claims cannot be understood. I have been informed that even treatises and dictionaries may be used under limited circumstances to determine the meaning attributed by a POSITA to a claim term at the time of filing.

41. I also understand that, for terms that evoke a means plus function construction, “the construction of the claim must identify the specific portions of the specification that describe the structure, material, or acts corresponding to each claimed function.” 37 C.F.R. §42.104(b)(3). I understand from counsel that construing a means-plus-function claim term is a two-step process that includes (1) identifying the claimed function and (2) then determining what structure, if any, disclosed in the specification corresponds to the claimed function.

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42. I have reviewed the '118 Patent and its prosecution history as well as additional documents to construe the claims for performing my validity analysis. It is my understanding that some terms of the '118 Patent are in dispute in a related litigation. Below is a summary of claim constructions I have made for purposes of evaluating the Challenged Claims of the '118 Patent.

43. I understand that 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. I apply the constructions proposed in Related Litigation for purposes of this Expert Declaration.

44. 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.

45. The Challenged Claims are unpatentable under all potential constructions.

X. OVERVIEW OF THE PRIOR ART REFERENCES

A. Futaki (EX1022, EX1007)

46. 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 [(Radio Access Technology)] 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 dual connectivity (“DC”). EX1007, ¶[0020]; EX1008, ¶[0020].

47. 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).

B. 3GPP 36.300 (EX1009)

48. 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 DC 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).

49. These techniques were well known and conventional in the art, and developed for the purpose of configuring DC of a UE with at least two LTE base

stations (e.g., a primary or master base station (“MeNB”) and a secondary base station (“SeNB”)). *Id.*

C. 3GPP 36.331 (EX1010)

50. 3GPP 36.331 discloses details for the Radio Resource Control (“RRC”) protocol 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.

51. 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 also disclosed. *Id.*, pp.158-561.

XI. DETAILED EXPLANATION OF THE UNPATENTABILITY GROUNDS

52. In my opinion, the Challenged Claims are unpatentable over the prior art.

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

53. The following sections reference where elements of Claims 1-15 are anticipated by or obvious in view of Futaki. Cited herein is a single embodiment disclosed in Futaki. In particular, Futaki discloses a first embodiment that is described in relation to at least Figures 1-10, and is further described in relation to Figures 12 and 13.² This embodiment contains all elements of the Challenged Claims. *See* EX1007, ¶[0016]; EX1008, ¶[0016]. As such, Futaki discloses each and every limitation of claims 1-15 as those limitations are arranged in the claims. Futaki therefore anticipates claims 1-15, as explained below.³

54. To the extent that it is asserted that claims 1-15 are not shown to “anticipate” because, e.g., multiple embodiments are allegedly relied upon, such an

² Futaki also discloses a “second embodiment” that is described in relation to Figure 11.

³ In all cases of anticipation discussed *infra*, an alternative position of obviousness is asserted in §VII.A. In instances where it is indicated that Futaki discloses limitations of the Challenged Claims, it should be understood that Futaki anticipates and/or renders obvious the limitations of the Challenged Claims.

argument is incorrect because this Expert Declaration does not rely on citations to multiple embodiments. But even if it was, Futaki teaches its 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. These multiple embodiments have novel features that are different from each other. Therefore, these multiple embodiments contribute to solving mutually different objectives or problems, and contribute to mutually achieving different effects.

EX1007, ¶¶[0018], [0110] (“The above-described embodiments may be implemented independently, or may be implemented in appropriate combination.”); EX1008, ¶¶[0018], [0110].

55. To the extent there are any minor differences between Futaki and the features of the Challenged Claims, any such minor differences would have been obvious.

56. Further, 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 obvious over Futaki.

57. To the extent it is argued that Futaki does not constitute an anticipation because Futaki does not disclose a single specific embodiment containing all elements of the Challenged Claims, such an assertion is untenable.

58. Here, Futaki expressly discloses that “[e]ach of embodiments described below may be used individually, *or two or more of the embodiments may be appropriately combined with one another.*” EX1007, ¶¶[0017]-[0019]; EX1008, ¶¶[0017]-[0019] (emphasis added).

59. Given such express disclosure and the fact that the components and functionalities of Futaki discussed in §XI.A. are all clearly compatible and applicable to one another, it would have been immediately 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. Further, Futaki’s disclosures cited herein relate to a common embodiment (Futaki’s first embodiment). *See* EX1007, ¶[0016]; EX1008, ¶[0016].

60. Moreover, it is clear that the embodiments disclosed by Futaki share common features, and that certain details described with respect to one embodiment also apply to others.

61. For example, Futaki indicates that “[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].

62. Futaki also 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].

63. To the extent the disclosures of Futaki cited herein are somehow found to not anticipate, for example, because Patent Owner alleges that Petitioner is relying on multiple distinct embodiments disclosed in Futaki, a POSITA would have been motivated to employ such disclosures in the same embodiment.

64. Futaki teaches to use Futaki’s 5G UE 1, LTE+ eNB 5, and 5G specific eNB 6 and configurations described thereof in Figures 12-13 as the components to carry out systems described in at least Figures 3-6 and operations described in Figures 7-10.

65. It would have been obvious to employ the components and functionalities of Futaki discussed in §XII.A. together in the same implementation given Futaki’s express suggestion and teaching to combine its embodiments noted above. EX1007, ¶¶[0017]-[0019]; EX1008, ¶¶[0017]-[0019].

66. That is, 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+ and 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, and a POSITA's understanding that the components of Figures 3-6 can each function together to carry out the operations of Figures 7-10.

67. To the extent there are any minor differences between Futaki and the features of the Challenged Claims, any such minor differences would have been obvious. Further, 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 obvious over Futaki.

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

68. To the extent the Preamble is limiting, Futaki discloses the Preamble.

69. Futaki discloses a single embodiment (e.g., a first embodiment, described in relation to at least Fig. 1-10, 12, and 13 disclosed in Futaki) containing 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).

70. 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].

71. Figure 3 shows a system for dual connectivity to perform Futaki’s method including LTE+ eNB 5 (primary base station), the 5G specific eNB 6 (secondary base station), and 5G UE 1.

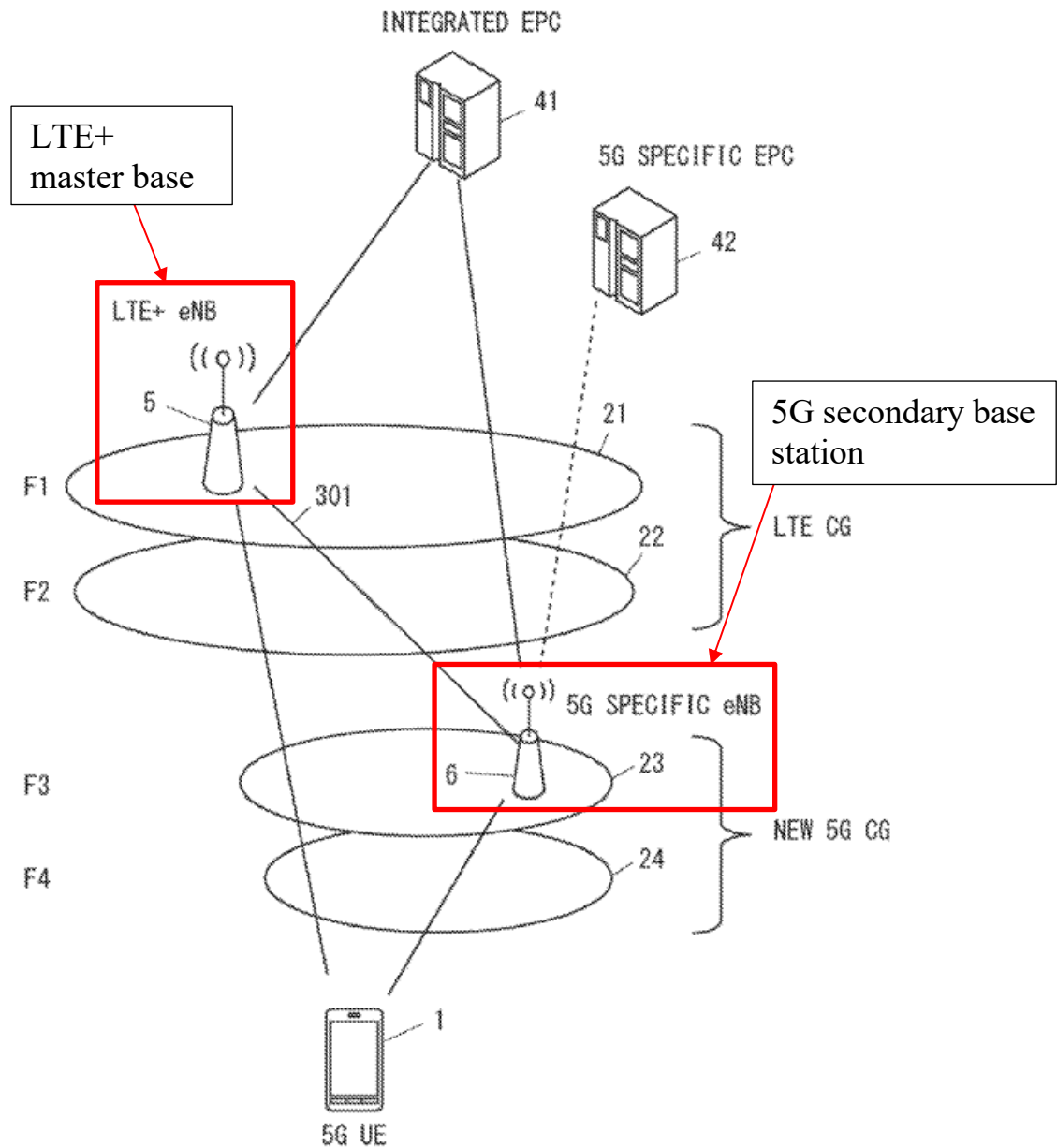


Fig. 3 of Futaki (Annotated)

72. 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.

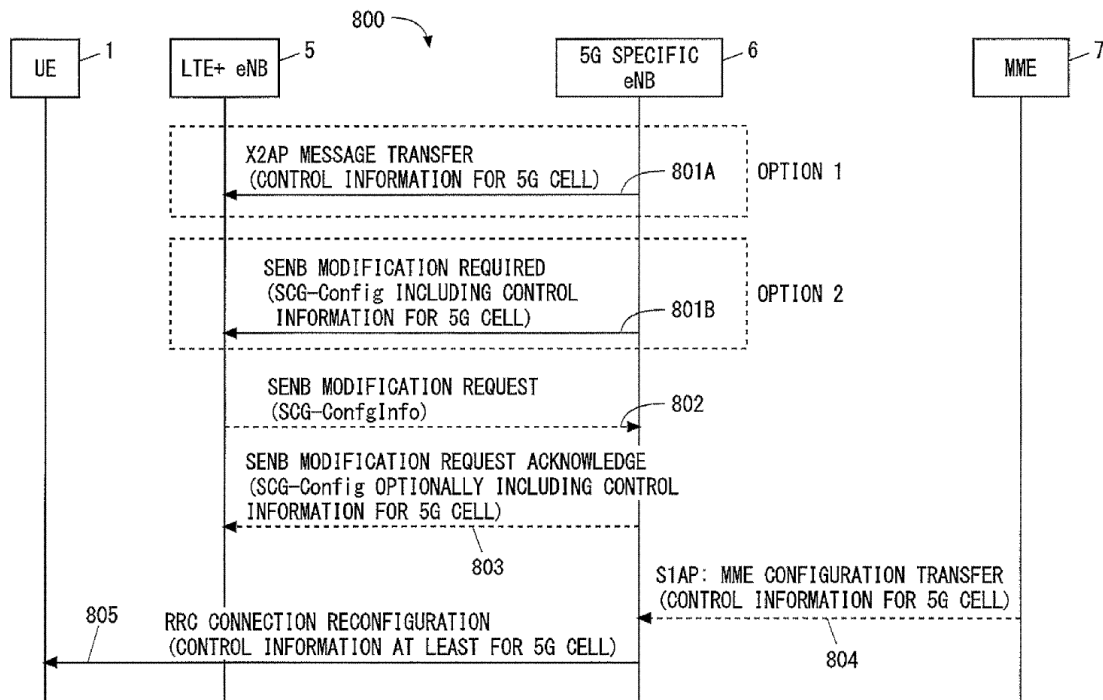


Fig. 8 of Futaki

a. [1.1]: “adding and configuring a secondary base station signaling radio bearer (SRB);”⁴

73. Futaki discloses Element [1.1].

74. Futaki’s UE includes a baseband processor 1205 that performs “control-plane processing” including “processing of a Non-Access Stratum (NAS)

⁴ 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.

protocol, an RRC protocol, and MAC [*media access control*] 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.

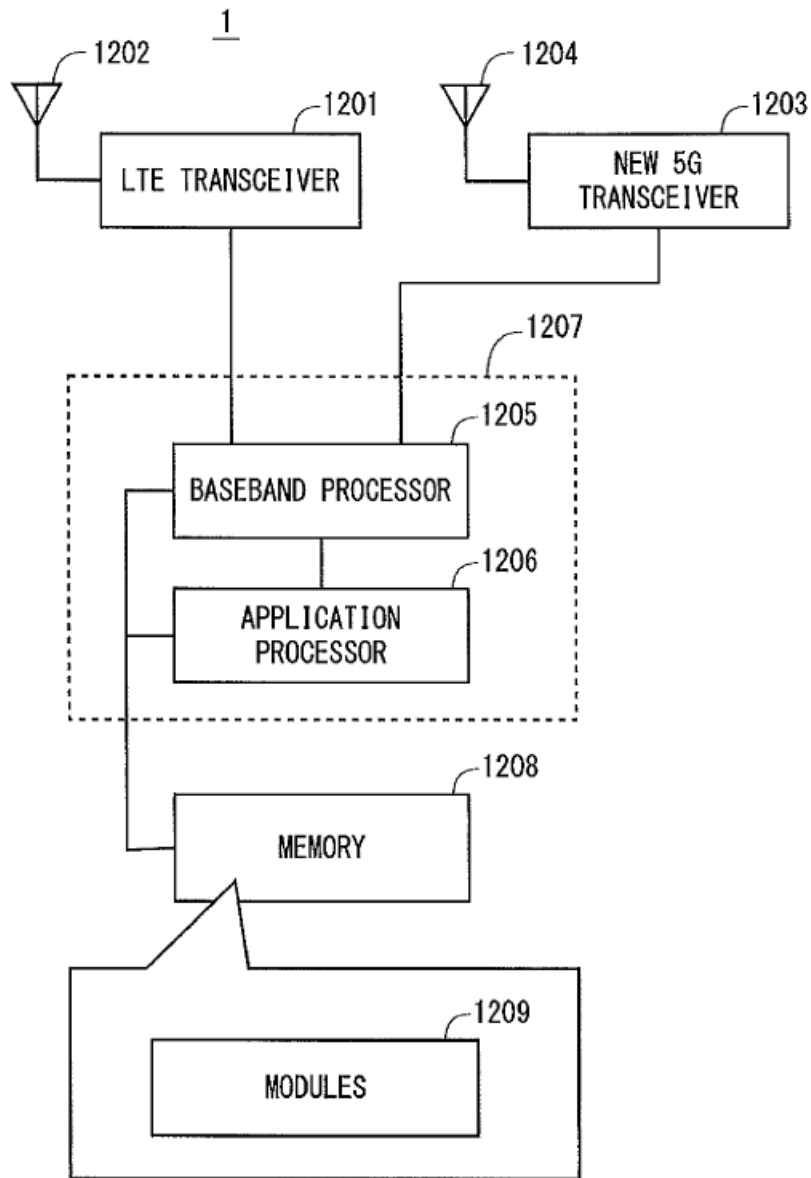


Fig. 12 of Futaki

75. 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]. In LTE, a “PCell” (Primary Cell) refers to the primary serving cell that a UE connects to (e.g., MeNB or MCG), while a “PSCell” (Primary Secondary Cell) is the primary cell within a SCG (e.g., SeNB). 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 discloses a UE that 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].

76. 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].

77. 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.

78. 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.

79. 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).

80. 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).

81. 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].

82. 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.

83. 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].

84. Here, Futaki specifically notes that that the 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.

85. Futaki specifies that "[e]ach of the radio bearers #1, #2, and #3 may be an SRB or a DRB." EX1007, ¶[0035]; EX1008, ¶[0035].

86. Futaki's radio bearer #2 shows that a New 5G bearer is a secondary base station SRB.

87. In Figure 5, Futaki's 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].

88. 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.).

89. Futaki's radio bearer #2 of the 5G specific eNB 6 constitutes the added and configured secondary base station SRB.

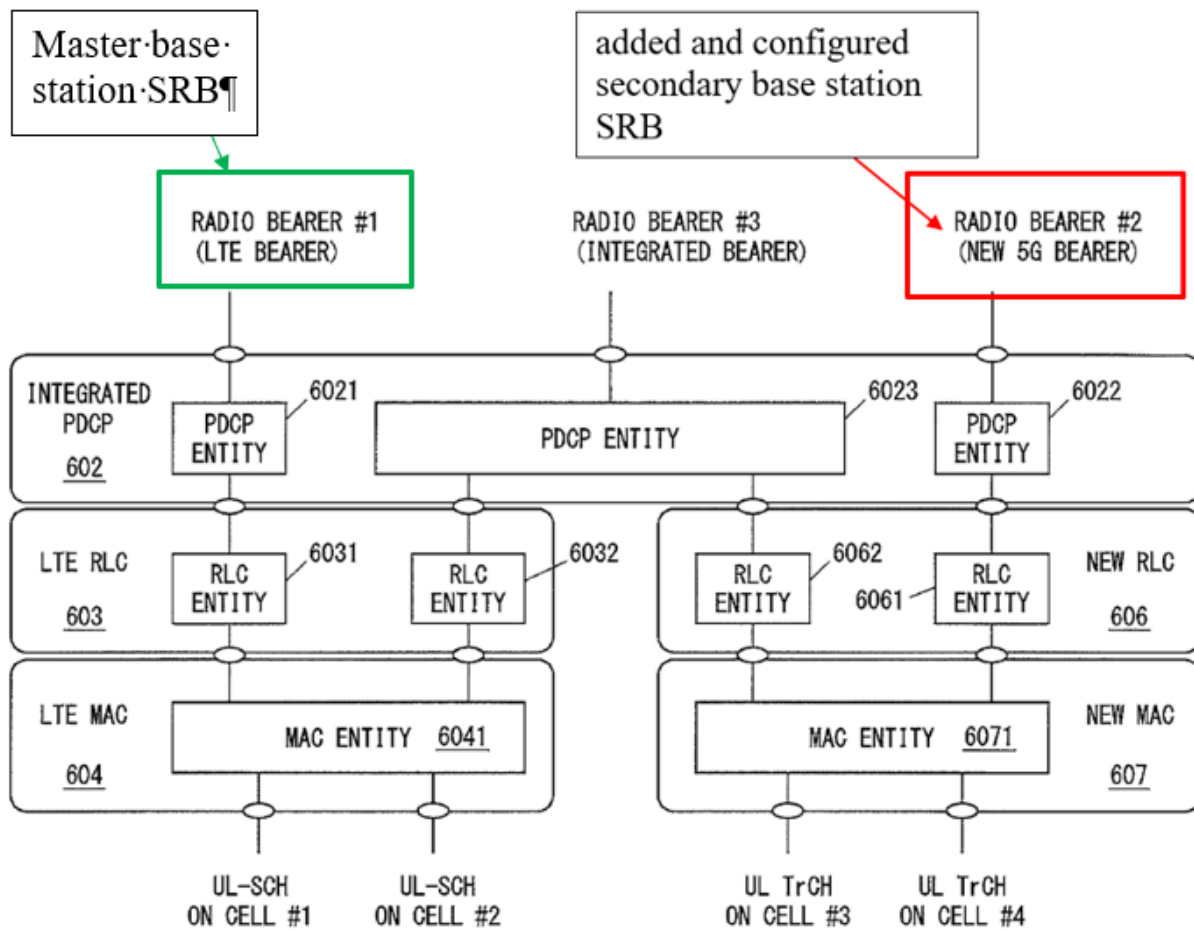


Fig. 6 of Futaki (Annotated)

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.

90. Futaki does not merely disclose “modifying” an existing SRB, but discloses adding and configuring a new SRB as explained in §XI.A.1.a.

91. Further, it would have been obvious to perform both addition and modification of radio resources given Futaki’s teachings.

92. For example, 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.

93. Futaki expressly contemplates addition of radio resources. EX1007, ¶¶[0061]-[0063], [0071]-[0080]; EX1008, ¶¶[0061]-[0063], [0071]-[0080].

94. A POSITA would understand that SeNB Addition and SeNB Modification are well-known techniques in LTE DC in the 3GPP standards.

95. 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.

96. 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.

- 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”**

97. Futaki discloses Element [1.2].

98. 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.

99. The UE’s “baseband processor 1205 performs digital baseband signal processing” including “control-plane processing”. EX1007, ¶¶[0093]-[0094]; EX1008, ¶¶[0093]-[0094].

100. 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.

101. The 5G UE 1 may *receive this RRC message* on any cell within the New 5G CG.” EX1007, ¶[0065]; EX1008, ¶[0065].

102. 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).

103. 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).

104. 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].

105. Fig. 8 of Futaki 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].

106. The 5G specific eNB 6 is the New 5G specific base station that constitutes the secondary base station. *See* §XI.A.1.a., *supra*; EX1007, ¶¶[0079]-[0083], Fig. 8; EX1008, ¶¶[0079]-[0083], Fig. 8.

107. Figure 8 shows the UE receiving the RRC message from the secondary base station.

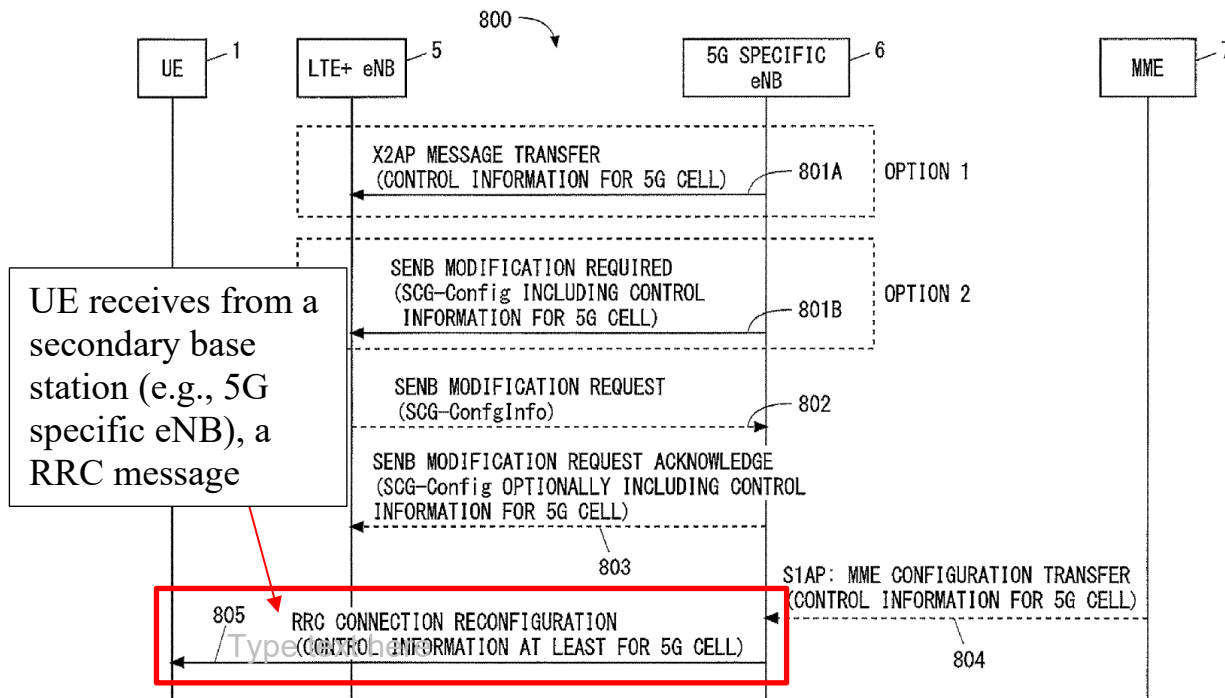


Fig. 8 of Futaki (Annotated)

108. Futaki's RRC message (received from the secondary base station) includes "configuration information specific to the New 5G RAT." EX1007, ¶[0060]; EX1008, ¶[0060].

109. 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.*

110. 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).

111. 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].

- 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,”

112. Futaki discloses Element [1.3].

113. 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].

114. 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.*

115. Futaki specifies that the UE may transmit a CP based on a cause including “¹*a failure* of a radio link establishment in the LTE cell or the New 5G cell”. EX1007, ¶[0050]; EX1008, ¶[0050] (emphasis added).

116. 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).

117. 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 [*master base station/cell group*] (or the New 5G CG) [*secondary base station/cell group*].”).

118. Thus, Futaki’s failure information messages are transmitted either to the master base station or the secondary base station. *See id.*, ¶¶[0047]-[0054].

119. 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].

120. 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.

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

121. Futaki discloses Element [1.4].

122. Futaki's 5G specific base station (e.g., the 5G specific eNB) constitutes the secondary base station. *See* §XI.A.1.b., *supra*.

123. 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[ting] 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.

124. To obtain allowance of the Challenged Claims, 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.

125. 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.” EX1002, p.70.

126. 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.

127. 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].

128. 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.

129. Thus, Futaki expressly discloses the limitation found to be missing from the art during prosecution. *See* § V.II.

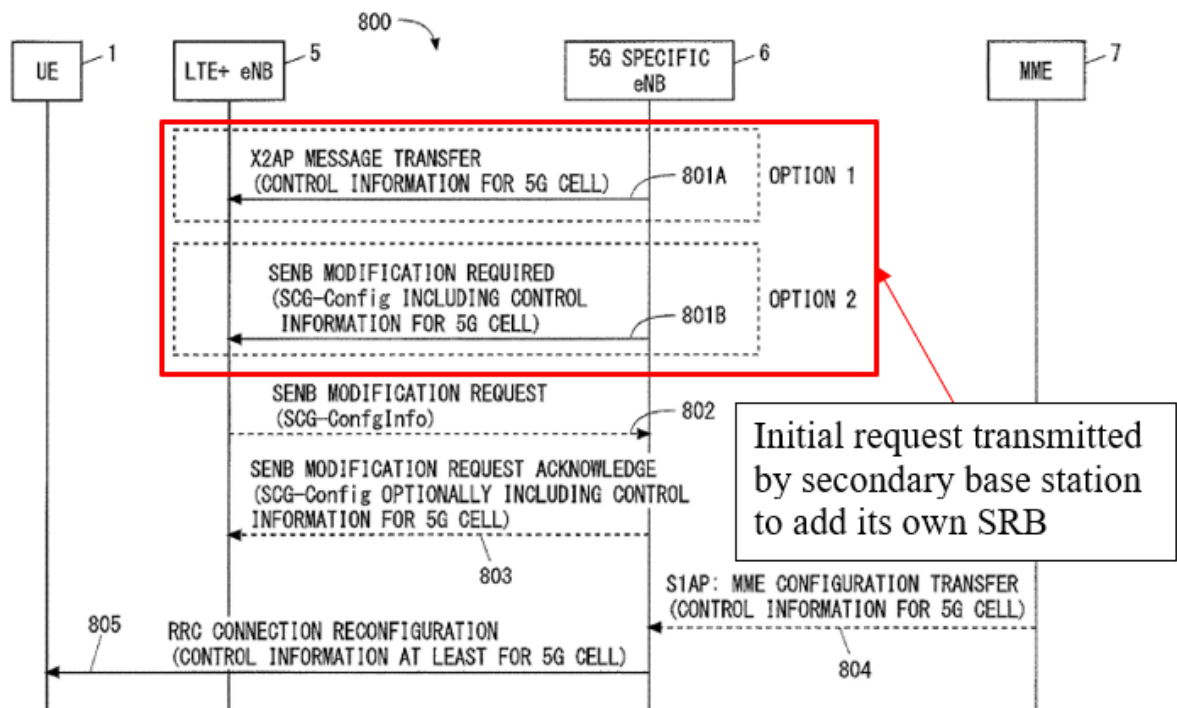


Fig. 8 of Futaki (Annotated)

130. 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.

131. The '118 Patent expressly 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.

132. According to the '118 Patent, “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.

133. 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.

134. 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.

135. 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].

136. As explained above, 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.

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.”

137. 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).

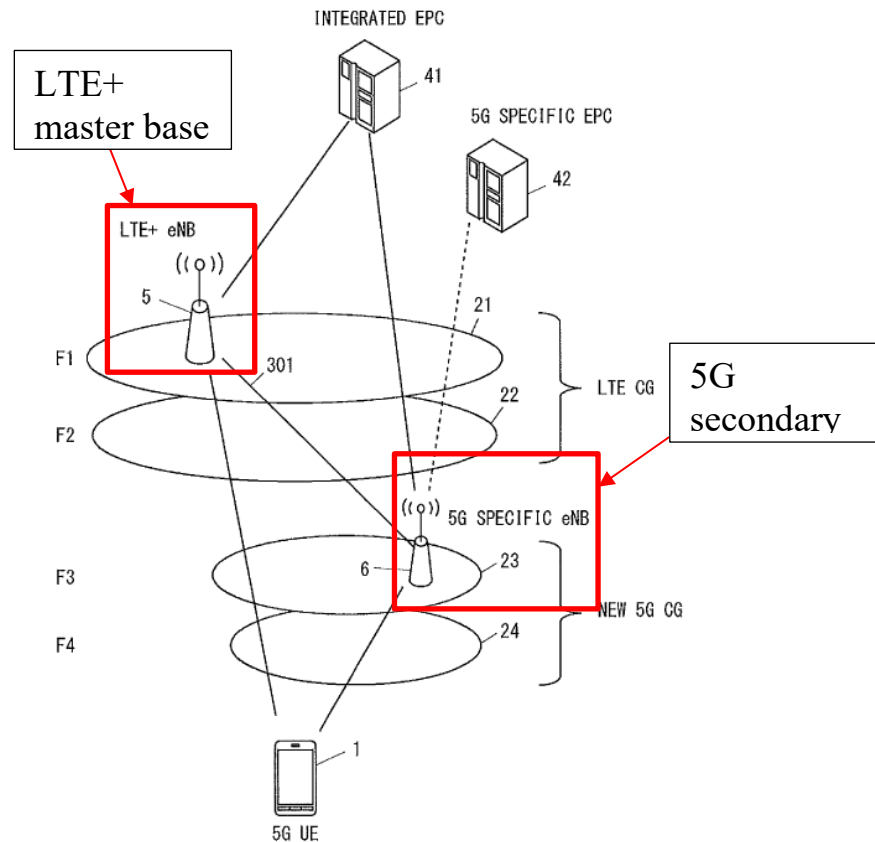


Fig. 3 of Futaki (Annotated)

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.”**

138. Futaki discloses claim 3.

139. 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.

140. Futaki also 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].

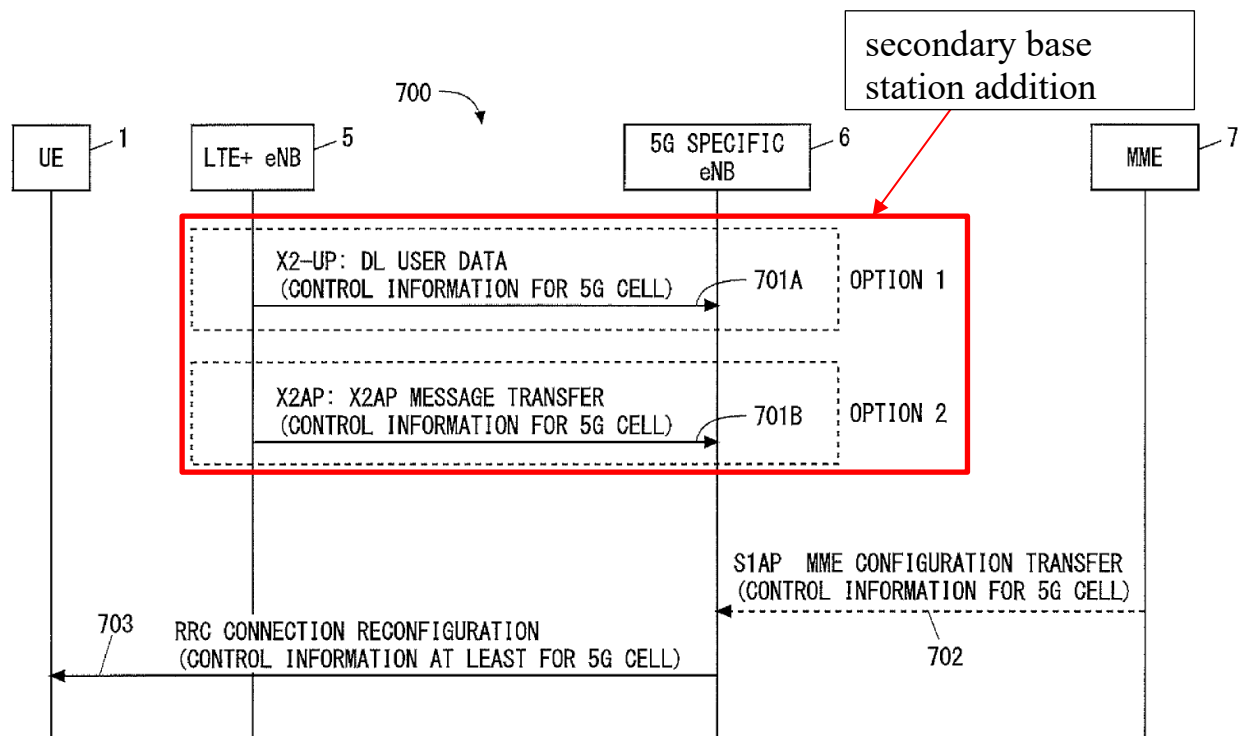


Fig. 7 of Futaki (Annotated)

“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].

141. 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.

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.”

142. Futaki discloses claim 4.

143. 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 §XI.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”).

144. According to 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*.”). Thus, 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).

145. 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.

146. 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].

- 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.”**

147. Futaki discloses claim 5.

148. 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]; EX1008, ¶¶[0035]-[0038], Fig. 6.

- 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.”**

149. Futaki discloses claim 6.

150. 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].

151. 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].

152. 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].

153. 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).

154. 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.*

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

155. To the extent the Preamble is limiting, Futaki discloses the Preamble.

156. Futaki discloses the method for DC from the point of view of the UE (claim 1) and base station (claim 7). *See* EX1007, ¶[0047]; EX1008, ¶[0047], claims 3-10 (reciting both terminal and radio station claims).

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

157. Futaki discloses Element [7/1]. *See* §XI.A.1.d., *supra*.

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”

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

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,”

159. Futaki discloses Element [7.3]. *See* §XI.A.1.c., *supra*.

160. 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.

161. The base station system may receive this RRC message on any cell within the New 5G CG.” EX1007, ¶[0059]; EX1008, ¶[0059].

162. 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.

163. 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.

164. 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.*

165. 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.").

166. 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.

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

167. Futaki discloses Element [7.4].

168. 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* §XI.A.1.a., *supra*. EX1007, ¶[0012]; *see also* EX1008, ¶[0012].

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.”**

169. Futaki discloses claim 8. *See* §XI.A.2., *supra*.

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.”**

170. Futaki discloses claim 9. *See* §XI.A.3., *supra*.

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

171. To the extent the Preamble is limiting, Futaki discloses the Preamble. *See* §XI.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].

172. 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* §IX.

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

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

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”

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

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,”

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

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

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

177. In addition, Element [10.4] is non-limiting. Claim 10 is directed to “a *user equipment*” for configuring DC. However, 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 in any way.

178. Claim 10 does not limit the UE to any specific configuration to perform the (secondary base station's) function recited in Element [10.4]. The claimed UE does not have any specific role in determining the addition of the secondary base station SRB.

179. 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.

180. Element [10.4] does not impart distinctive structural characteristics of the claimed user equipment, and should not be accorded patentable weight.

181. 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].

182. 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.

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

- 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.”**

184. Futaki discloses claim 11. *See* §XI.A.2., *supra*.

- 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.”**

185. Futaki discloses claim 12. *See* §XI.A.3., *supra*.

- 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.”**

186. Futaki discloses claim 13. *See* §XI.A.4., *supra*.

- 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.”**

187. Futaki discloses claim 14. *See* §XI.A.5., *supra*.

- 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.”**

188. Futaki discloses claim 15. *See* §XI.A.6., *supra*.

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

189. The Challenged Claims would have been obvious over Futaki in view of 3GPP 36.300 and 3GPP 36.331.

190. Futaki discloses and suggests the claimed subject matter as explained in Grounds 1 and 2 (*see* §XI.A-§XI.B.).

191. Further, to the extent any minor differences are alleged between the Challenged Claims and Futaki, such minor differences would have been obvious in view of the details expressly provided in 3GPP 36.300 and 3GPP 36.331.

192. Futaki expressly 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.*

193. 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].

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194. 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.

195. 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.

196. 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.

197. 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.

198. 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.

199. 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.

200. 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).

201. 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).

202. The '118 Patent even acknowledges that its systems and methods "may be applied to DC 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.

203. The '118 Patent contemplates that its systems and methods are applicable to existing 4G/LTE technologies. *Id.*

204. 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.

205. 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.

206. 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.

207. 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].

1. Claim 1 (Preamble)

208. To the extent the Preamble is limiting, Futaki discloses and suggests the Preamble. *See* §XI.A.1., *supra*.

a. Element [1.1]

209. Futaki, 3GPP 36.300, and 3GPP 36.331 in combination disclose and suggest Element [1.1]. *See* §XI.A.1.a., *supra*.

210. 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.

211. 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”).

212. 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.

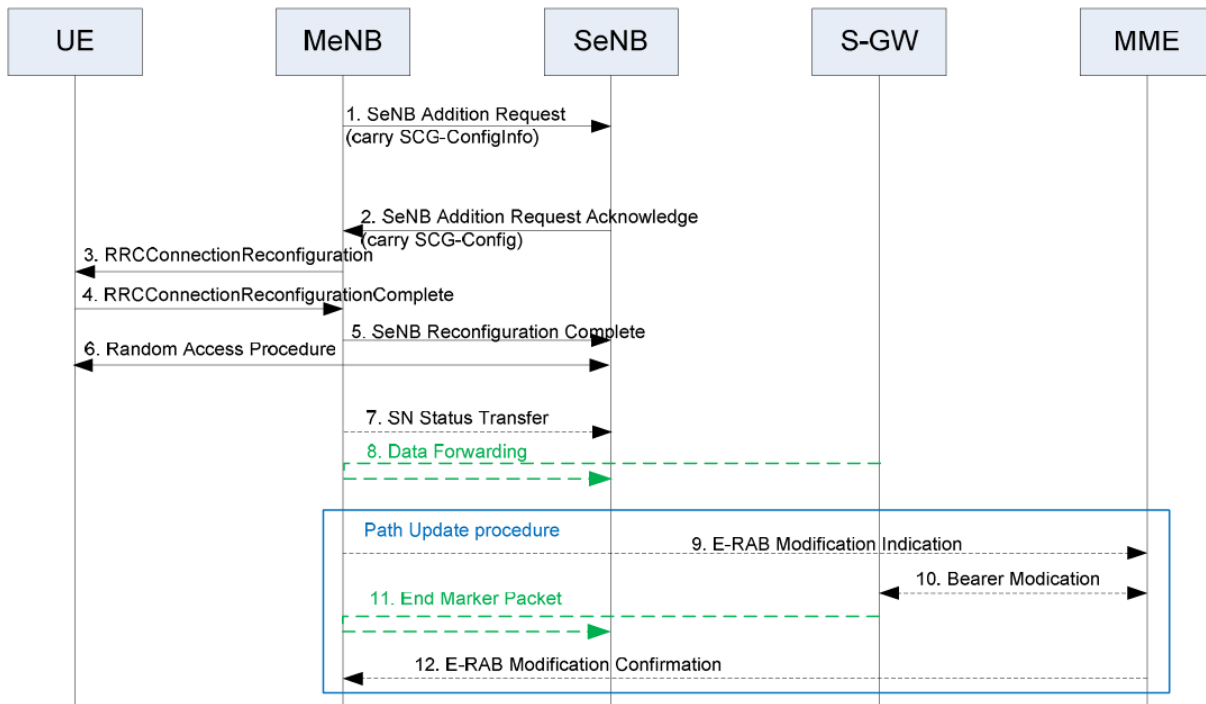


Fig. 10.1.2.8.1-1 of 3GPP 36.300

213. 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.

b. Element [1.2]

214. Futaki discloses Element [1.2]. *See* §XI.A.1.b., *supra*. *See also* EX1005, pp.1-3.

c. Element [1.3]

215. Futaki, 3GPP 36.300, and 3GPP 36.331 in combination disclose and suggest Element [1.3].

216. 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.

217. The '118 Patent recognizes that a “re-establishment procedure ... results in service interruption.” EX1001, 16:49-50.

218. 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.

219. 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).

220. 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).

221. 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* EX1006, pp.1-3.

222. 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.”).

223. 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”).

224. 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* §XI.B., *supra*.

225. 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.

226. 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.

227. 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.

d. Element [1.4]

228. Futaki discloses and suggests Element [1.4]. *See* §XI.A.1.d., *supra*. *See also* EX1005, pp.1-3.

2. Claim 2

229. Futaki discloses and suggests claim 2. *See* §XI.B.1., *supra*.

3. Claim 3

230. Futaki discloses and suggests claim 3. *See* §XI.A.3., *supra*.

4. Claim 4

231. Futaki, 3GPP 36.300, and 3GPP 36.331 in combination disclose and suggest claim 4. *See* §XI.A.4., *supra*.

232. To the extent Futaki does not expressly disclose claim 4, 3GPP 36.300 discloses this claimed subject matter.

233. 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.

234. 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”).

235. 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.

236. 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* XI.B., *supra*.

237. 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.

238. 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).

239. 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.

240. 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.

5. Claim 5

241. Futaki discloses and suggests claim 5. *See* §XI.A.5., *supra*.

6. Claim 6

242. Futaki, 3GPP 36.300, and 3GPP 36.331 in combination disclose and suggest claim 6. *See* §XI.A.6., *supra*.

243. To the extent that Futaki does not expressly disclose claim 6, 3GPP 36.300 and 3GPP 36.331 disclose this claimed subject matter.

244. 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.

245. 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.

246. A POSITA would have been motivated to look to 3GPP 36.300 and 3GPP 36.331 *See* XI.B., *supra*.

247. 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.

248. 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.

249. These failure information messages apply directly to the systems and methods of Futaki. *See* §XI.A.6., *supra*.

250. 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.

251. 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.

252. 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.

7. Claim 7 (Preamble)

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

a. Element [7.1]

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

b. Element [7.2]

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

c. Element [7.3]

256. Futaki, 3GPP 36.300, and 3GPP 36.331 in combination disclose and suggest Element [7.3]. *See* §§XI.A.1.c., XI.A.7.c., *supra*.

257. 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.

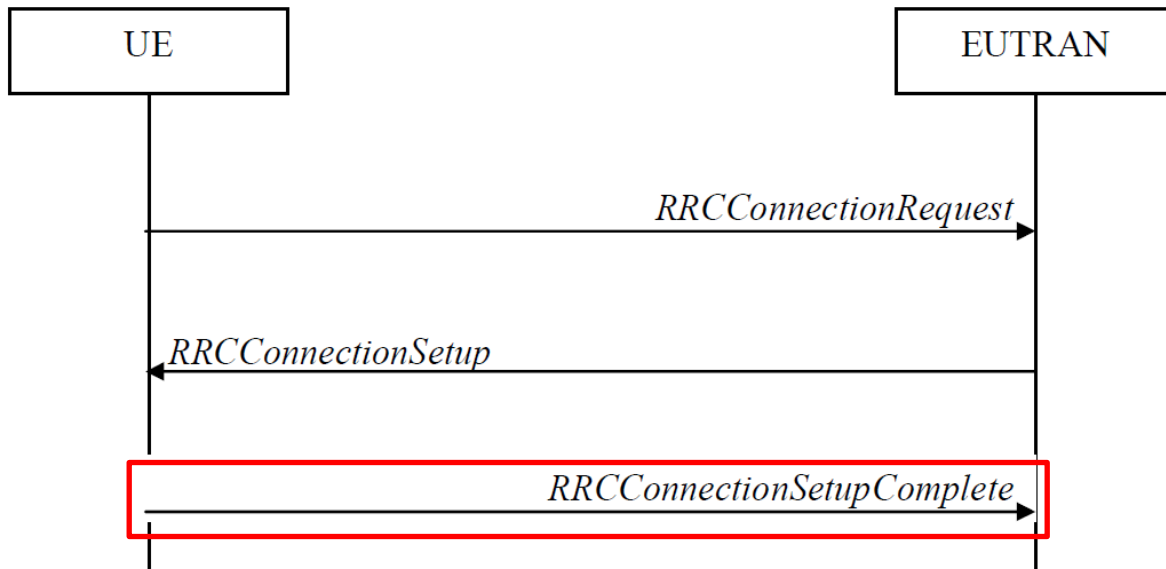


Figure 5.3.3.1-1: RRC connection establishment, successful

258. The response message (e.g., *RRCConnectionSetupComplete* 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 *RRCConnectionSetupComplete* message that the “*RRCConnectionSetupComplete* message is used to confirm the successful

completion of an RRC connection establishment” (*id.*, p.195) using “SRB1” and “DCCH”. *Id.*

259. Thus, it would have been obvious for a POSITA to include this simple *RRCConnectionSetupComplete* confirmation message in Futaki’s implementation, whether configuring an RRC connection on an LTE+ base station or a 5G specific base station.

260. A POSITA would have been motivated to look to 3GPP 36.300 and 3GPP 36.331. *See* XI.B., *supra*.

261. 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.

d. Element [7.4]

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

8. Claim 8

263. Futaki discloses and suggests claim 8. *See* §XI.A.2., *supra*.

9. Claim 9

264. Futaki discloses and suggests claim 9. *See* §XI.A.3., *supra*.

10. Claim 10 (Preamble)

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

a. Element [10.1]

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

b. Element [10.2]

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

c. Element [10.3]

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

d. Element [10.4]

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

11. Claim 11

270. Futaki discloses and suggests claim 11. *See* §XI.B.2., *supra*.

12. Claim 12

271. Futaki discloses and suggests claim 12. *See* §XI.A.3., *supra*.

13. Claim 13

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

14. Claim 14

273. Futaki discloses and suggests claim 14. *See* §XI.A.5., *supra*.

15. Claim 15

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

XII. SECONDARY CONSIDERATIONS

275. As discussed herein, all elements of the Challenged Claims were known in the art, and any differences would have been obvious to a POSITA based on the disclosures of the applied references and the knowledge in the art.

276. I am not aware of any secondary considerations that would alter my opinion. For instance, there was no long felt need as multiple different databases and calibration data used for determining locations of wireless device were known and used before the effective filing date of the '118 Patent.

277. Any secondary considerations evidence Owner may offer in this proceeding would be insufficient to overcome the strong evidence that the Challenged Claims are obvious.

XIII. CONCLUSION

278. For the reasons set forth above, it is my opinion that all elements of the Challenged Claims of the '118 Patent are disclosed or suggested by the prior art. In my opinion, the Challenged Claims of the '118 Patent would have been obvious over the prior art.

279. In signing this Declaration, I understand that the Declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

280. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date: 12-23-2024

Sumit Roy

Sumit Roy

APPENDIX 1

SUMIT ROY, Ph.D.

RESUME ADDENDUM

LITIGATION RELATED EXPERIENCE

Dr. Roy has served as an expert witness on the matters disclosed below (underlined denotes party represented).

Case:	<u>Marvell Semiconductor</u> et al. vs. Commonwealth Scientific and Industrial Research Organization
Jurisdiction:	United States District Court Eastern District of Texas Civil Action No. 6:2007-CV-00204
Nature of Case/Notes:	Patent infringement US Patent 5487069
Work Product:	On Behalf of plaintiff Marvell Semiconductor. Wrote expert Report on Non-Infringement, deposed before opposing attorney.
Counsel:	Retained by White & Case LLP (lead: Warren Heit wheit@paloalto.whitecase.com)
Date:	2009. <u>Status -closed.</u>
Case:	<u>X10</u> vs. Guardian Technologies
Jurisdiction:	United States District Court Northern District of Texas Civil Action No. 3:2009-CV-00649
Nature of Case/Notes:	Patent infringement US Patent 5657076
Work Product:	Wrote expert report on behalf of X10
Counsel:	Retained by Black Lowe & Graham (lead: Larry Graham; graham@blacklaw.com)
Date:	2010. <u>Status - closed.</u>
Case:	Commonwealth Scientific and Industrial Research Organization vs. <u>Sony Corporation</u> et al.
Jurisdiction:	United States District Court Eastern District of Texas Civil Action No. 6:2009-CV-00400-LED
Nature of Case/Notes:	Patent infringement US Patent 5487069.
Work Product:	On behalf of defendant Sony Corporation. Conducted independent technical analysis of claims, wrote rebuttal expert report against motion for infringement, deposed before opposing attorney.
Counsel:	Retained by White & Case LLP (lead: Warren Heit wheit@paloalto.whitecase.com)
Date:	2011. <u>Status -closed.</u>

Case: **Certain Electronic Devices, Including Mobile Phones and Tablet Computers, and Components Thereof**
Complainant- Nokia Corporation and Intellisync vs. HTC (Respondent) & Google (Intervenor)

Jurisdiction: United States International Trade Commission
Investigation No. 337-TA-847

Nature of Case/Notes Expert on behalf of Google (Intervenor) & HTC (Respondent)
Counsel: Retained by White & Case LLP on behalf of Google
(Lead: Shamita D. Etienne-Cummings
setienne@paloalto.whitecase.com)
Coordinated with
Counsel Barrington Dyer, McDermott, Will & Emery for HTC

Work Product Wrote Expert Witness report for Invalidity on behalf of Google. Deposed before opposing counsel.
Testified @ trial before ITC Judge Hon. Robert Pender (Jun. 2013)

Date: Aug. 2012 – July 2013. **Status- completed.**

Case: **In the Matter of Certain Wireless Communications Equipment and Articles Therein**
Complainant: Samsung Electronics Co. vs LM Ericsson

Jurisdiction: United States International Trade Commission
Investigation No. 337-TA-2126

Nature of Case/Notes Expert on behalf of respondents LM Ericsson
Counsel: McKool Smith LLP (Counsel:
Geoffrey Smith; gsmith@mckoolsmith.com)

Date: Feb. 2013 – July 2013

Work Product: Assisted Counsel for discovery of relevant prior art as part of non-infringement. **Status- closed.**

Case: **Intellectual Ventures LLC vs Motorola Mobility/Google**

Jurisdiction: US District Court – Southern District Florida
Case No. 13-CV-61358

Nature of Case/Notes Expert on behalf of respondents Motorola Mobility/Google
Counsel: Kilpatrick Townsend LLP (Counsels: Theodore Brown, Jonathan Olinger, Rob Curylo, Akarsh Belagodu;
tbrown@kilpatricktownsend.com)

Date: Aug. 2013 – Sep. 2015.

Work Product: Assisting Counsel for Inter-Partes Review (IPR) for 3 patents.

Status IPR Declaration Filed, **Status – completed.**

Case: **C-Cation vs. Cisco**
Jurisdiction: Patent Trial & Appeals Board IPR 2014-00454
Nature of Case/Notes: Expert on behalf of respondents Cisco
Counsel: Kilpatrick Townsend LLP (Counsels: Patrick Njeim, Mike Pavento; pjneim@kilpatricktownsend.com)
Date: Jan 2014 – present
Work Product: Assisted Counsel for IPR
Status: IPR Declaration filed; **Status - Closed.**

Case: **DirectTV vs. ViXS**
Jurisdiction:
Nature of Case/Notes: Expert on behalf of respondents DirectTV
Counsel: Quinn Emanuel LLP (Counsels: Alan Whitehurst alanwhitehurst@quinnemanuel.com)
Date: Apr- Aug. 2014
Work Product: Assisted in discovery of prior art
Status: **Status: Closed (case settled)**

Case: **Commonwealth Scientific and Industrial Research Organization vs. Mediatek, Amazon et al.**
Jurisdiction: United States District Court Eastern District of Texas
Civil Action No. 6:2012-CV-578-LED
Nature of Case/Notes: Patent infringement US Patent 5487069.
Work Product: On behalf of defendant Amazon Corporation. Wrote expert report on non-infringement, deposed before opposing attorney.
Counsel: Retained by White & Case LLP (lead: Warren Heit wheit@paloalto.whitecase.com)
Date: Jan- Aug. 2015. **Status – Completed (case settled)**

Case: **NFC Tech. vs. Samsung Electronics Ltd. & Samsung Electronics America Inc.**
Jurisdiction: United States District Court Eastern District of Texas
Civil Action No. 2:15-cv-283-JRG-RSP
Nature of Case/Notes: Patent infringement US Patent 7905419.
Work Product: On behalf of defendant Samsung Electronics. Assisted with Claim Construction, wrote Invalidity Expert report.
Counsel: Retained by O'Melveny & Myers LLP (lead: Brian Cook, John Kappos, [bkook](mailto:bkook@omm.com), jkappos@omm.com)
Date: Oct. 2015- May 2016. **Status – Completed (case settled)**

Case:	<u>TCL Commn. Tech.</u> v. Ericsson
Jurisdiction:	U.S. Central District Court, CA Southern District Case 8:14-CV-00341-JVS-AN
Nature of Case/Notes:	Expert consultant for TCL on a set of 4G LTE patents for a FRAND case
Work Product:	Read Claim Charts and evaluated for potential infringement
Counsel:	Retained by Sheppard, Mullin, Richter & Hampton (lead: Nam Kim, nkim@sheppardmullin.com)
Date:	Sep. 2015- Dec. 2015.
Case:	<u>Barco NV</u> vs. Display Ten Tech. (via IMS Expert Services)
Nature of Case/Notes:	Potential US patent infringement
Work Product:	Visited Barco, examined product and wrote report exploring possible patent infringement strategy
Counsel:	Retained by Barnes & Thornburg LLP on behalf of Barco NV (lead: Jeffrey Morgan, jeff.morgan@btlaw.com)
Date:	Dec. 2015- Mar. 2016.
Nature of Work	Expert Consultant - Review of Wireless Patent Porfolio
Work Product:	Reviewed lapsing patents, provided expert opinion
Counsel:	Retained by Perkins Coie (Chris J. Daley-Watson, CDaleyWatson@perkinscoie.com)
Date:	Feb. 2017- Apr. 2017.
Case	<u>SIPCO</u> v Emerson 337-TA-1131
Jurisdiction	ITC
Nature of Case/Notes	Infringement of SIPCO patents re IEEE 802.15.4, Wireless HART, Zigbee standards
Work Product:	Assisted with review of products, patents, assisted with claim construction; Testified at ITC Trial (Judge Lord)
Counsel:	Retained by Finnegan, Henderson, Farabow, Garrett & Dunner (Greg Gramenopoulos, c.gregory.gramenopoulos@finnegan.com ; Karthik Kumar, Karthik.kumar@finnegan.com)
Date:	May 2018 – Sep. 2019 (completed)
Case	Sol IP LLC vs AT&T Mobility 2:18-cv-00526
Jurisdiction	Eastern District TX
Nature of Case/Notes	Retained on behalf of Ericsson NA
Work Product:	Assisted with review of patents, assisted with claim construction;

Counsel:	Retained by Winston & Strawn (M. Ruckheim, MRuckheim@winston.com; J. C. Masullo, JMasullo@winston.com)
Date:	May 2019 – Mar. 2020 <u>(completed)</u>
Case	UNM Rainforest Innovations vs Dell/ZyXEL Comm.
Jurisdiction	IPR2021-00375 before PTAB
Nature of Case/Notes	Retained on behalf of defendants (Dell/ZyXel)
Work Product:	Contributed to multiple expert declarations (3 patents)
Counsel:	Reed Smith (Peter Chassman, Jonathan Detrixhe@reedsmith.com)
Date:	Oct. 2021 – May 2022 <u>(completed)</u>
Case	NXP USA vs <u>MediaTek</u>
Jurisdiction	IPR2022-00911/00912 before PTAB
Nature of Work	Retained on behalf of plaintiff (MediaTek)
Work Product:	Contributed to expert declarations (2 patents)
Counsel:	Finnegan Henderson Farabow Garrett & Dunner (Houtan.Esfahani, Jason.Stach, Christopher.Johns@finnegan.com)
Date:	Mar. 2022 – Jun 2022 <u>(completed)</u>
Case:	Apple v <u>Ericsson</u> (Certain Mobile Phones and Tablet Computers, All With Switchable Connectivity)
Jurisdiction:	United States International Trade Commission 337-TA-1301
Nature of Work	Retained on behalf of Ericsson (plaintiff)
Counsel	Winston and Strawn, Fisher Broyles Louis Campbell (llcampbell@winston.com), Michael Murray (mike.murray@fisherbroyles.com)
Work Description:	multiple declarations (claim construction, expert report) deposition, Trial Testimony @ ITC before ALJ Hon. Cameron Elliott
Date	May – Nov 2022 <u>(completed)</u>
Case	Atlas Global vs <u>Sercomm/Asustek Inc</u>
Jurisdiction	6:21-cv-818 (WDTX) & IPR 2022-01519/01520
Work on Case	Retained on behalf of defendants (Sercomm/Asustek)
Counsel:	Steptoe & Johnson Christopher Suarez (csuarez@steptoe.com), Matthew Bathon (matthew.bathon@steptoe.com)
Work Description:	Assisted with multiple declarations (claim construction brief, expert declaration) for 2 patents
Date:	Mar 2022 – Mar 2023 <u>(completed)</u>

Case:	Panasonic v <u>Broadcomm</u> (6:22-cv-00755, 6:22-cv-00756)
Jurisdiction:	WDTX
Nature of Work	Retained on behalf of Broadcomm (defendant)
Counsel/Firm	Kilpatrick Townsend Ted Mayle (TMayle@kilpatricktownsend.com)
Work Description:	Assisted with Claim Construction, review infringement contentions
Date	Sep. 2022- Nov. 2023 (<u>completed</u>)
Case:	XR Communications v <u>Samsung</u> (6:21-cv-626)
Jurisdiction:	WDTX
Nature of Work	Retained on behalf of Samsung (defendant)
Counsel/Firm	Arnold Porter Ruifeng Pu(Ruifeng.Pu@arnoldporter.com), Atanas Baitchev (Atanas.Baitchev@arnoldporter.com), Michael Shamouilian (Michael.Shamouilian@arnoldporter.com)
Work Description:	Review Infringement contentions, help with Invalidity charts Invalidity Prior art review, Draft Invalidity Report
Date	Aug. 2022 – Feb. 2023 (<u>completed</u>)
Case:	AX Wireless v <u>Lenovo</u> (6:22-cv-280)
Jurisdiction:	EDTX
Nature of Work	Retained on behalf of Lenovo (defendant)
Counsel/Firm	Kilpatrick Townsend Ted Mayle (TMayle@kilpatricktownsend.com)
Work Description:	Review infringement contentions
Date	Mar. 2023- Jul 2023 (<u>completed</u>)
Case:	Neo Wireless v <u>VW Group America</u> (2:22-cv-11404)
Jurisdiction:	EDTN
Nature of Work	Retained on behalf of VW Group (defendant)
Counsel/Firm	Sterne, Kessler, Goldstein & Fox Timothy Tang (TTang@sternekessler.com) Ryan Richardson (RRichardson@sternekessler.com)
Work Description:	Assisted with Non-infringement Contentions
Date	Apr-May 2023 (<u>completed</u>)