IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

WIRELESS ALLIANCE, LLC, Plaintiff, v. AT&T MOBILITY LLC, AT&T SERVICES, INC., AND AT&T CORP., Defendant, NOKIA OF AMERICA CORPORATION, ERICSSON, INC. Intervenors.	§ § § § § § § § § § § § §	CASE NO. 2:23-cv-00095 (Lead Case) JURY TRIAL DEMANDED
WIRELESS ALLIANCE, LLC, Plaintiff, v. T-MOBILE US, INC., AND T-MOBILE USA, INC., Defendants, NOKIA OF AMERICA CORPORATION, ERICSSON, INC. Intervenors.	§ § § § § § § § § § § § §	CASE NO. 2:23-cv-00096 (Member Case) JURY TRIAL DEMANDED
WIRELESS ALLIANCE, LLC, Plaintiff, v. VERIZON COMMUNICATIONS, INC., AND CELLCO PARTNERSHIP D/BA VERIZON WIRELESS, Defendant, NOKIA OF AMERICA CORPORATION, ERICSSON, INC. Intervenors.	§ § § § § § § § § § § § §	CASE NO. 2:23-cv-00097 (Member Case) JURY TRIAL DEMANDED

DEFENDANTS' AND INTERVENORS' PRELIMINARY INVALIDITY CONTENTIONS REGARDING U.S. PATENT NOS. 9,144,106; 9,565,662; 10,045,383

Pursuant to Rules 26 and 33 of the Federal Rules of Civil Procedure, Defendants AT&T Services Inc., AT&T Mobility LLC, and AT&T Corp. ("AT&T"), Cellco Partnership d/b/a Verizon Wireless ("Verizon"), and T-Mobile USA, Inc. ("T-Mobile") (collectively, "Defendants") and Intervenors Nokia of America Corporation ("Nokia" or "Intervenor") and Ericsson Inc. ("Ericsson" or "Intervenor"), hereby provide their Preliminary Invalidity Contentions with respect to the claims identified by Plaintiff Wireless Alliance, LLC ("Plaintiff" or "Wireless Alliance") in its previously served Infringement Contentions in the above captioned matters ("Infringement Contentions").

I. PRELIMINARY STATEMENT AND RESERVATION OF RIGHTS

A. ASSERTED CLAIMS

According to the Infringement Contentions regarding U.S. Patent Nos. 9,144,106; 9,565,662; and 10,045,383, Plaintiff asserts the following claims, and priority dates in its Infringement Contentions.

Asserted Patent	Asserted Claims	Asserted Priority Date
U.S. Patent No. 9,144,106 (the 106 Patent)	1-4	August 12, 2010
U.S. Patent No. 9,565,662 (the 662 Patent)	1-4	August 12, 2010
U.S. Patent No. 10,045,383 (the 383 Patent)	1-2, 4-7	March 28, 2013

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Defendants and Intervenors contend that each of the Asserted Claims is invalid under at least one or more of 35 U.S.C. §§ 102, 103, or 112.[1, 2] Pursuant to the Patent Rules, Defendants and Intervenors do not provide any contentions regarding any claims not asserted by Plaintiff. To the extent that the Court permits Plaintiff to assert additional claims against Defendants and/or Intervenors in the future, Defendants and Intervenors reserve all rights to amend or supplement these Preliminary Invalidity Contentions or to otherwise disclose new or supplemental invalidity contentions regarding such claims. Furthermore, because discovery is ongoing,[3] Defendants and Intervenors reserve the right to revise, amend, and/or supplement the information provided herein, including identifying, charting, and relying on additional references, should discovery yield additional information or references. Defendants and Intervenors further reserve the right to amend these contentions in response to any claim construction rulings, as permitted by the Patent Rules or with permission of the Court.

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[1] Intervenors' contentions are only for those claims of the patents specifically asserted against its equipment.

[2] Defendants' and Intervenors' contentions with respect to the 662 and 106 Patents are based on the pre-AIA versions of these statutes, while Defendants' and Intervenors' contentions with respect to the 383 Patent are based on the AIA versions of these statutes.

[3] Defendants' and Intervenors' ongoing efforts include but are not limited to: serving subpoenas on prior artists and inventors regarding prior art, seeking additional information related to the references and systems disclosed in these Preliminary Invalidity Contentions, and seeking additional information related to available prior art systems, as well as Plaintiff's Infringement Contentions and the products accused of infringing therein. In addition, Defendants and Intervenors have not yet had the benefit of taking the deposition of any of the named inventors or those that worked with the named inventors, or of the named inventors, authors, and entities listed on any references or systems identified in these Preliminary Invalidity Contentions. Further, should Plaintiff or any third party identify or produce any further prior art, Defendants and Intervenors reserve the right to review and supplement these Preliminary Invalidity Contentions with any such art.

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The Infringement Contentions are deficient in multiple respects and do not provide Defendants and Intervenors with sufficient information to understand the specific accused features and components and the alleged factual and evidentiary bases for Plaintiff's infringement allegations. Among other things, the Infringement Contentions lack the specificity required by P. R. 3-1, fail to properly identify accused instrumentalities, and fail to explain adequately Plaintiff's infringement theories for numerous claim elements. Plaintiff has prejudiced Defendants' and Intervenors' ability to understand, for purposes of preparing these Preliminary Invalidity Contentions, what Plaintiff alleges to be the scope of the Asserted Claims. If Plaintiff modifies any assertion or contention in its Infringement Contentions or presents any new assertion or contention relevant to these Preliminary Invalidity Contentions to the extent allowed by the Patent Rules or the Court, Defendants and Intervenors reserve the right to supplement or otherwise amend these initial Invalidity Contentions.

B. PRIORITY DATE OF THE ASSERTED PATENTS

Plaintiff's Infringement Contentions contain allegations regarding the priority date to which Plaintiff alleges it is entitled for each of the Asserted Claims. *See* 7/21/2023 Amended Infringement Contentions at 5. Defendants and Intervenors do not agree that Plaintiff is entitled to the alleged priority dates for each of the Asserted Claims.

Specifically, with respect to the 662 and 106 Patents, Defendants and Intervenors assert that Korean Application No. 10-2010-0077880, filed on Aug. 12, 2010, fails to disclose the subject matter allegedly claimed in the 662 and 106 Patents. For example, Korean Application No. 10-2010-0077880 provides no disclosure of the "changing the secondary carrier to a deactivation state after a predetermined time from the transmission of the deactivation message" limitation of Claim 1 from the 106 Patent, nor of the "changing the secondary carrier to a deactivation state based on a predetermined time from the transmission of the deactivation message" limitation of Claim 1 of

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the 662 Patent. Furthermore, Korean Application No. 10-2010-0077880 provides no disclosure of the "stopping downlink (DL) transmission of the secondary carrier and initializing uplink (UL) and DL retransmission buffers after transmitting the deactivation message" limitation of Claim 1 from the 106 Patent, nor of the "stopping downlink (DL) data transmission of the secondary carrier and initializing uplink (UL) and DL buffers associated with the secondary carrier after transmitting the deactivation message" limitation of Claim 1 of the 662 Patent. In addition, Korean Application No. 10-2010-0077880 provides no disclosure of the "wherein the predetermined time is a value predefined to make state information that is managed by the base station consistent with state information that is managed by the terminal for the secondary carrier" limitation of Claim 2 from the 106 and 662 Patents. Furthermore, Korean Application No. 10-2010-0077880 provides no disclosure of the "wherein the changing of the secondary carrier to the deactivation state includes changing, by the base station, the secondary carrier to the deactivation state after a predetermined time from an arrival time of the reception success message" limitation of Claim 3 from the 106 and 662 Patents. Additionally, Korean Application No. 10-2010-0077880 provides no disclosure of the "immediately stopping, by the base station, data transmission and retransmission using the secondary carrier immediately after transmitting the deactivation message" limitation of Claim 4 from the 106 and 662 Patents. These are merely examples of claim limitations that are not disclosed by the relevant Korean Priority Application and are not meant to be limiting. Defendants and Intervenors intend to rely on these and additional examples in expert reports, motions, or at trial. As such, at best the 662 and 106 Patents are only entitled to a priority date of November 8, 2010. The preceding is intended to be merely exemplary. Defendants and Intervenors are not conceding that the Asserted Patents are entitled to any of their claim priority dates. Defendants and

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Intervenors also reserve the right to rely on other deficiencies with the alleged priority claims for any of the Asserted Patents.

Any reference to an "asserted priority date" in these Preliminary Invalidity Contentions refers to the priority dates identified in Plaintiff's Infringement Contentions. Reference to a "priority date" or an "asserted priority date" should not be construed to mean that Defendants and Intervenors agree that the 106, 662, and 383 Patents is in fact entitled to such priority date, or that Plaintiff has provided proper notice as to its contentions for a priority date. To the extent Plaintiff alleges that any prior art relied on in these Preliminary Invalidity Contentions does not actually qualify as prior art to an Asserted Patent, Defendants and Intervenors reserve the right to rebut those allegations (*e.g.*, by demonstrating an earlier critical date for the challenged prior art and/or a later priority date for a particular Asserted Patent and/or Asserted Claim).[4] Likewise, to the extent Plaintiff successfully establishes an invention date before any of the prior-art references relied on by Defendants and Intervenors, then those references serve as evidence secondary considerations of obviousness, particularly, contemporaneous invention by others.

C. CLAIM CONSTRUCTION

Because the Court has not yet construed any terms of the Asserted Claims, Defendants' and Intervenors' Preliminary Invalidity Contentions are based on (1) Defendants' and Intervenors' present understanding of the Asserted Claims, and (2) the claim constructions Plaintiff appears to be proposing based on the Infringement Contentions, all without regard to whether Defendants and Intervenors agree with Plaintiff's apparent or expressed claim constructions. Defendants and Intervenors reserve the right to supplement or otherwise amend these Preliminary Invalidity

[4] Defendants and Intervenors reserve the right to rely on additional documents and evidence to rebut any efforts by Plaintiff to allege any reference was not publicly available or otherwise available as prior art.

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Contentions in response to any proposed claim constructions or alleged supporting evidence offered by Plaintiff, any report from any expert witness for Plaintiff regarding claim construction issues, any claim construction briefing filed by Plaintiff, and any position taken by Plaintiff concerning claim construction, infringement, or invalidity.

Defendants and Intervenors take no position on any matter of claim construction in these Preliminary Invalidity Contentions. If Defendants' and Intervenors' apparent claim constructions herein are consistent with any explicit, apparent, or implied claim constructions in the Infringement Contentions, no inference is intended and no inference should be drawn that Defendants and Intervenors agree with any of Plaintiff's claim constructions. Any statement herein describing or tending to describe any claim element is provided solely for the purpose of understanding and/or applying the cited prior art. Defendants and Intervenors expressly reserve the right (1) to propose any claim construction Defendants and Intervenors consider appropriate, (2) to contest any claim construction proposed by Plaintiff that Defendants and Intervenors consider inappropriate or inaccurate, and/or (3) to take positions with respect to claim construction issues that are inconsistent with, or even contradictory to, claim construction positions expressed or implied in these Preliminary Invalidity Contentions.

Prior art not included in these Preliminary Invalidity Contentions, whether now known to Defendants and Intervenors, might become relevant depending on the claim constructions proposed by Defendants and Intervenors and/or the Court's claim construction rulings. Defendants and Intervenors reserve all rights to supplement or modify the positions and information in these Preliminary Invalidity Contentions, including without limitation the prior art and grounds of invalidity set forth herein, pursuant to P.R. 3-6 after the Court has construed the asserted claims.

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D. ONGOING DISCOVERY AND SUPPLEMENTATION

Defendants' and Intervenors' investigation, including its investigation of prior art and grounds for invalidity, is ongoing. Furthermore, Defendants' and Intervenors' invalidity positions will be the subject of expert testimony. Defendants and Intervenors base these Preliminary Invalidity Contentions on their current knowledge and understanding of the Asserted Claims, Plaintiff's Infringement Contentions, the prior art, and other facts and information available as of the date of these contentions. Defendants and Intervenors reserve the right to supplement these Preliminary Invalidity Contentions, including, without limitation, by adding additional prior art and grounds of invalidity in accordance with the Federal Rules of Civil Procedure, the Local Rules, the local Patent Rules, the Docket Control Order, any Order issued by this Court, or otherwise.

E. PRIOR ART IDENTIFICATION AND CITATIONS THERETO

In these Preliminary Invalidity Contentions, Defendants and Intervenors identify specific portions of prior art references that disclose the elements of each of the Asserted Claims. While Defendants and Intervenors have identified exemplary prior art references for each element, they do not necessarily identify every disclosure of the same element in each prior art reference. A person of ordinary skill in the art would read a prior art reference as a whole and in the context of other publications, literature, and general knowledge in the field and would rely upon other information including other publications and general scientific or engineering knowledge. Defendants and Intervenors therefore reserve the right to rely upon other unidentified portions of the prior art references and on other publications and prior art products and expert testimony to provide context and to aid understanding and interpretation of the identified portions of the prior art.

Defendants and Intervenors also reserve the right to rely upon (1) other portions of the cited prior art references, other publications, prior art products, and the testimony of experts to establish

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that the alleged inventions would have been obvious to a person of ordinary skill in the art, including on the basis of modifying or combining certain cited references; (2) admissions relating to prior art in the 106, 662, and 383 Patents or related patents, the prosecution history of the 106, 662, and 383 Patents or related patents, or other admissions obtained during discovery; and (3) foreign counterparts of any U.S. patents identified in Defendants' Preliminary Invalidity Contentions.

Where Defendants and Intervenors identify a particular figure in a prior art reference, the identification should be understood to encompass the caption and description of the figure as well as any text relating to the figure in the remainder of the prior art reference (e.g., if a patent reference, in the specification and prosecution history). Similarly, where an identified portion of text refers to a figure or other material, the identification of the text should be understood to include the referenced figure or other material.

F. INVALIDITY, UNENFORCEABILITY AND/OR INELIGIBILITY BASED ON NON-REQUIRED DISCLOSURE(S)

Defendants and Intervenors reserve the right to prove the invalidity, unenforceability and/or ineligibility of one or more of each of the Asserted Claims on bases other than those required by P.R. 3-3 to be disclosed in these disclosures.

G. INVALIDITY UNDER SECTION 102(F) PRIOR ART

Defendants and Intervenors reserve the right to assert that the Asserted Claims of the 106 and 662 Patents are invalid under 35 U.S.C. § 102(f) in the event they obtain evidence that the applicants named on the 106 and 662 Patents or related patents, did not themselves "invent" the subject matter claimed. For example, based on the 3GPP standardization history for the accused sections, it appears that Nokia and Ericsson "invented" the subject matter Wireless Alliance claims

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is covered by the Asserted Claims.[5] Should Defendants and Intervenors obtain such evidence, they will provide the name of the person(s) from whom and the circumstances under which the claimed subject matter or any part of it was derived.

H. INVALIDITY UNDER 102(G)

The 106 and 662 Patents are likewise invalid under 102(g) because the claims of the 106 and 662 Patents were made in this country by another inventor who had not abandoned, suppressed, or concealed it. 35 U.S.C. § 102(g). For example, based on the 3GPP standardization history for the accused sections, it appears that Nokia and Ericsson "invented" the subject matter Wireless Alliance claims is covered by the claims 1-4 of the 106 and 662 Patents.[6] As another example, in light of Wireless Alliance's apparent interpretation of the claims, under 102(g), claims 1-4 are invalid because Nokia made at least the Nokia Flexi Multiradio 10 Base Station before the priority date of the 106 and 662 Patents. Likewise, in light of Wireless Alliance's apparent interpretation of the claims, under 102(g), claims 1-4 are invalid because Ericsson made at least the Ericsson RBS 6000 series before the priority date of the 106 and 662 Patents. As will be shown by the exemplary evidence listed in Exhibits A-10 and B-10, each and every element of those asserted claims is invalid under 102(g).

I. INVALIDITY UNDER § 102(A)(1)

In light of Wireless Alliance's apparent interpretation of the claims, claims 1-2 and 4-7 of the 383 Patent are invalid under 35 U.S.C. § 102(a)(1) because at least the Nokia Flexi Multiradio 10 Base Station and the Ericsson RBS 6000 Series were in public use, on sale, or otherwise available to the public before the effective filing date of the claimed inventions. As will be shown

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[5] See Section II.D.2 and Section III.D.2 for more explanation of the standardization history for the accused sections.

[6] See Section II.D.2 for more explanation of the standardization history for the accused sections.

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by the exemplary evidence listed in Exhibit C-03, each and every element of those asserted claims is invalid under 102(a)(1).

J. NO PATENTABLE WEIGHT

Defendants and Intervenors reserve the right to argue that various portions of each of the Asserted Claims, such as an intended use or result, non-functional descriptive material, and certain preamble language, are entitled to no patentable weight. Mapping of a portion of an Asserted Claim to a prior art reference does not represent that such portion of the claim is entitled to patentable weight when comparing the claimed subject matter to the prior art.

II. INVALIDITY CONTENTIONS RELATED TO 106 AND 662 PATENTS

As explained herein and in Exhibits A-01 through A-10, and Appendix A1, Defendants and Intervenors contend that each of the Asserted Claims of the 106 Patent are invalid under 35 U.S.C. §§ 102, 103, and/or 112.

As explained herein and in Exhibits B-01 through B-10, and Appendix B1, Defendants and Intervenors contend that each of the Asserted Claims of the 662 Patent are invalid under 35 U.S.C. §§ 102, 103, and/or 112.

A. P.R. 3-3(A) – IDENTIFICATION OF PRIOR ART

Pursuant to P. R. 3-3(a), and subject to Defendants' and Intervenors' reservation of rights as stated herein, Defendants and Intervenors identify the prior art that anticipates or renders obvious the Asserted Claims of the of the 106 and 662 Patents in the tables set forth below.[7] On

[7] Defendants and Intervenors also hereby identify any systems or products that embody the technology described in any patent or publication identified in these Preliminary Invalidity Contentions. Defendants and Intervenors reserve the right to rely on any documents or other evidence regarding any such systems.

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information and belief, each listed reference qualifies as prior art to the 106 and 662 Patents, respectively.[8]

To the extent that any of the following are prior art, Defendants and Intervenors reserve the right to rely upon foreign counterparts of the U.S. patents identified herein; U.S. counterparts of foreign patents and foreign patent applications identified herein; and U.S. and foreign patents and patent applications corresponding to articles and publications identified herein. Defendants and Intervenors also reserve the right to rely upon parent or ancestor patents or patent applications from which any of the patents or patent applications identified herein claim priority to as continuation, divisional, or continuation-in-part applications.

1. Identification Of Prior Art Patents related to the 106 and 662 Patents

Patent/Publication No.	Country of Origin	Date of Issue/Publication
U.S. Patent No. 8,917,605 to Pelletier ("Pelletier")	U.S.	December 23, 2014
U.S. Patent Publication No. 2011/0026495 to Lee ("Lee")	U.S.	February 3, 2011
U.S. Patent Publication 2011/0103326 to Kim ("Kim")	U.S.	May 5, 2011
U.S. Patent Publication 2011/0116467 to Jung ("Jung")	U.S.	May 19, 2011
U.S. Patent Publication 2010/0118720 to Gauvreau ("Gauvreau")	U.S.	May 13, 2010
U.S. Patent No. 9,065,650 to Wiemann ("Wiemann")	U.S.	June 23, 2015
U.S. Patent Publication 2011/0243048 to Wang ("Wang")	U.S.	October 6, 2011
U.S. Patent Publication 2014/0328284 ("Jang")	U.S.	November 6, 2014

[8] Defendants and Intervenors may rely on any document produced with the prefix JD-WA to explain the background and/or state of the art to the 106 and 662 Patents.

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Patent/Publication No.	Country of Origin	Date of Issue/Publication
U.S. Patent Publication 2010/0130219 ("Cave")	U.S.	May 27, 2010
U.S. Patent Publication 2009/0296643A1 to Cave et al.("Cave")	U.S.	December 3, 2009
U.S. Patent Publication 2009/0086657A1 to Alpert et al. ("Alpert")	U.S.	April 2, 2009
U.S. Patent Publication 2009/0300456A1 to Pelletier et al. ("Pelletier 456")	U.S.	December 3, 2009
U.S. Patent Publication 2012/0294213 A1 to Chen et al. ("Chen")	U.S.	November 12, 2012
U.S. Patent Publication 2011/0274057 A1 to Kuo ("Kuo")	U.S.	November 10, 2011
U.S. Patent Publication 2012/0099464 A1 to Chun et al. ("Chun")	U.S.	April 26, 2012
U.S. Patent Publication 2016/0373233 A1 to Pelletier et al. ("Pelletier 233")	U.S.	December 22, 2016
U.S. Provisional Patent Appl. No. 61/314,446 to Pelletier et al. ("Pelletier 446")	U.S.	March 16, 2010
U.S. Provisional Patent Appl. No. 61/307,803 to Pelletier et al. ("Pelletier 803")	U.S.	February 24, 2010
U.S. Provisional Patent Appl. No. 61/304,149 to Pelletier et al. ("Pelletier 149")	U.S.	February 12, 2010
U.S. Provisional Patent Appl. No. 61/293,520 to Pelletier et al. ("Pelletier 520")	U.S.	January 8, 2010
U.S. Provisional Patent Appl. No. 61/317,289 to Kuo et al. ("Kuo 389")	U.S.	March 25, 2010
U.S. Provisional Patent Appl. No. 61/355,756 to Pelletier et al. ("Pelletier 756")	U.S.	June 17, 2010
U.S. Provisional Patent Appl. No. 61/330,150 to Pelletier et al. ("Pelletier 150")	U.S.	April 30, 2010
U.S. Provisional Patent Appl. No. 61/320,021 to Wiemann ("Wiemann 021")	U.S.	April 1, 2010

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Patent/Publication No.	Country of Origin	Date of Issue/Publication
U.S. Provisional Patent Appl. No. 61/373,678 to Pelletier et al. ("Pelletier 678")	U.S.	August 13, 2010
U.S. Provisional Patent Appl. No. 61/320,486 to Wang ("Wang 486")	U.S.	April 2, 2010

2. Identification Of Prior Art Publications related to the 106 and 662 Patents

Title, Author(s), and Publisher	Date of Publication
RP-091440, *Work Item Description: Carrier Aggregation for LTE*, 3GPP TSG RAN#46, Nokia Corporation (December 1-4, 2009)	December 1-4, 2009
R1-106557, *Change Request (36.213) – Introduction of Rel-10 LTE-Advanced features in 36.213*, 3GPP TSG-RAN Meeting #63, Motorola (November 15-19, 2010)	November 15-19, 2010
R2-095277, *Change Request (25.331) – Clarification of H-ARQ Info for DC-HSDPA*, 3GPP TSG RAN WG#2 Meeting #67, Qualcomm Europe (August 24-28, 2010)	August 24-28, 2010
R2-101076, *Explicit Activation and Deactivation*, 3GPP TSG RAN WG#2 Meeting #69, Nokia Siemens Networks, Nokia Corporation (February 22-26, 2010)	February 22-26, 2010
R2-101846, Change Request (36.300) – Stage 2 description of Carrier Aggregation, 3GPP TSG RAN WG#2 Meeting #69, Nokia Siemens Networks (February 22-26, 2010)	February 22-26, 2010
R2-101986, *Timing and HARQ Feedback Errors with Activation/Deactivation*, 3GPP TSG RAN WG#2 Meeting #69bis, Nokia Siemens Networks, Nokia Corporation (April 12-16, 2010)	April 12-16, 2010
R2-102177, *DRX and activation/deactivation*, 3GPP TSG RAN WG#2 Meeting #69bis, ZTE (April 12-16, 2010)	April 12-16, 2010
R2-102757, *Details on MAC Control Element for Component Carrier Management*, 3GPP TSG RAN WG#2 Meeting #70, Panasonic (May 10-14, 2010)	May 10-14, 2010

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Title, Author(s), and Publisher	Date of Publication
R2-103107, *Delay in applying the deactivation command*, 3GPP TSG RAN WG#2 Meeting #70, Ericsson, ST-Ericsson (May 10-14, 2010)	May 10-14, 2010
R2-103108, *Explicit Uplink Activation/Deactivation*, 3GPP TSG RAN WG#2 Meeting #70, Ericsson, ST-Ericsson (May 10-14, 2010)	May 10-14, 2010
R2-103161, *Activation/Deactivation Timing*, 3GPP TSG RAN WG#2 Meeting #70, Ericsson, ST-Ericsson (May 10-14, 2010)	May 10-14, 2010
R2-103880, *Activation/Deactivation Timing*, 3GPP TSG RAN WG#2 Meeting #70bis, Ericsson, ST-Ericsson (June 28-July 2, 2010)	June 28-July 2, 2010
R2-104391, *Handling of DL HARQ processes upon deactivation*, 3GPP TSG RAN WG#2 Meeting #71, ASUSTeK (August 23-27, 2010)	August 23-27, 2010
R2-104503, *Efficient and synchronized deactivation of Scell*, 3GPP TSG RAN WG#2 Meeting #71, Panasonic (August 23-27, 2010)	August 23-27, 2010
R2-104613, *Change Request (36.321) – Introduction of Carrier Aggregation*, 3GPP TSG RAN WG#2 Meeting #71, Ericsson (August 23-27, 2010)	August 23-27, 2010
R2-105063, *Change Request (35.319) – Update of DC-HSUPA stage 2 description reflecting latest 4C-HSDPA agreements*, 3GPP TSG RAN WG#2 Meeting #71, Infineon (August 23-27, 2010)	August 23-27, 2010
R2-105220, *Change Request (36.321) – Introduction of Carrier Aggregation*, 3GPP TSG RAN WG#2 Meeting #71, Ericsson (August 23-27, 2010)	August 23-27, 2010
R2-105703, *Report of e-mail discussion [71#56] Enabling/Disabling of UL functionality*, 3GPP TSG RAN WG#2 Meeting #71bis, InterDigital Communications (October 11-15, 2010)	October 11-15, 2010
R2-105798, *HARQ Buffer and UL Activation/Deactivation*, 3GPP TSG RAN WG#2 Meeting #71bis, Samsung (October 11-15, 2010)	October 11-15, 2010

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Title, Author(s), and Publisher	Date of Publication
R2-105960, *Change Request (36.321) – Introduction of Carrier Aggregation*, 3GPP TSG RAN WG#2 Meeting #71bis, Ericsson (October 11-15, 2010)	October 11-15, 2010
R2-106929, *Report of 3GPP TSG RAN WG2 meeting #71bis, Xian, China, October 11 - 15, 2010*, 3GPP TSG RAN WG#2 Meeting #72, ETSI MCC (November 15-19, 2010)	November 15-19, 2010
R2-110704, *3GPP TSG RAN WG2 compendium v10.0*, 3GPP TSG RAN WG#2 Meeting #72bis, ETSI MCC (January 11-15, 2011)	January 11-15, 2011
R1-075115, *Change Request (36.201) – Alignment of 36.201 with other LTE L1 specifications*, 3GPP TSG RAN WG#1, Meeting #51, Ericsson (November 5-9, 2007)	November 5-9, 2007
R1-075049, *Change Request (36.211) – Introduction of optimized FS2 for TDD*, 3GPP TSG RAN WG, Meeting #51, Ericsson (November 5-9, 2007)	November 5-9, 2007
R1-075112, *Change Request (36.211) Introduction of scrambling sequences, uplink reference signal sequences, secondary synchronization sequences and control channel processing*, 3GPP TSG RAN WG, Meeting #51bis, Ericsson (November 5-9, 2007)	November 5-9, 2007
R1-075116, *Change Request (36.212) – Update of 36.212*, 3GPP TSG RAN WG#1, Meeting #51, Motorola (November 5-9, 2007)	November 5-9, 2007
R1-075111, *Change Request (36.212) – Update of 36.212*, 3GPP TSG RAN WG#1, Meeting #51, Qualcomm Europe (November 5-9, 2007)	November 5-9, 2007
R1-075104, *Change Request (36.214) – RRC state correction for LTE UE measurements*, 3GPP TSG RAN WG1, Meeting #51, Nokia (November 5-9, 2007)	November 5-9, 2007
R2-103427, *Change Request (36.300) – Stage 2 description of Carrier Aggregation*, 3GPP TSG RAN WG2, Meeting #70, Nokia Siemans Networks (November 5-9, 2007)	November 5-9, 2007
R2-105217, *Change Request (36.300) – Corrections and new Agreements on Carrier Aggregation* 3GPP TSG RAN WG2, Meeting #71, Nokia Siemans Networks (November 5-9, 2007)	November 5-9, 2007

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Title, Author(s), and Publisher	Date of Publication
R1-105829, *LS on Timing Requirements for Activation and Deactivation of SCells,* TSG RAN WG1 Meeting #63, Release 10 (October 11-15, 2010)	October 11-15, 2010
R1-106190, *Timing for activation and deactivation of SCells,* TSG RAN WG1 Meeting #63, Nokia, Nokia Siemens Networks (November 15-19, 2010)	November 15-19, 2010
R1-106218, *Implementation of timing Requirements for Activation and Deactivation of SCells in RAN1 specification,* TSG RAN WG1 Meeting #63, Alcatel-Lucent, Alcatel-Lucent Shanghai Bell (November 15-19, 2010)	November 15-19, 2010
R1-106237, *Discussion on "LS on Timing Requirements for Activation and Deactivation of SCells",* TSG RAN WG1 Meeting #63, HTC (November 15-19, 2010)	November 15-19, 2010
R1-106441, *Timing Requirements for Activation and Deactivation of SCells in RAN1 specification,* TSG RAN WG1 Meeting #63, Alcatel-Lucent, Alcatel-Lucent Shanghai Bell (November 15-19, 2010)	November 15-19, 2010
R1-106442, *Draft LS reply on Timing Requirements for Activation and Deactivation of SCells,* TSG RAN WG1 Meeting #63, Alcatel-Lucent (November 15-19, 2010)	November 15-19, 2010
R1-106524, *LS reply on Timing Requirements for Activation and Deactivation of SCells,* TSG RAN WG1 Meeting #63, Alcatel-Lucent (November 15-19, 2010)	November 15-19, 2010
R1-110005, *Response LS on Timing Requirements for Activation and Deactivation of SCells Jacksonville, United States of America, 15-19 November, 2010,* TSG RAN WG1 Meeting #63bis, Dublin, Ireland, (January 17 – 21, 2011)	January 17 – 21, 2011
R2-100003, *3GPP TSG RAN WG2 compendium v6.0 (2010-01)*, TSG-RAN Working Group 2 meeting #68bis, ETSI MCC (January 18 – 22, 2010)	January 18 – 22, 2010
R2-100148, *Explicit carrier activation/deactivation*, 3GPP TSG RAN WG2 Meeting #68bis, ETRI (January 18 - 22, 2010)	January 18 – 22, 2010
R2-101119, *DL carrier activation/deactivation by MAC*, 3GPP TSG RAN WG2 Meeting #69, ETRI (February 22 – 26, 2010)	February 22 – 26, 2010

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Title, Author(s), and Publisher	Date of Publication
R2-101952, *3GPP TSG RAN WG2 compendium v7.0 (2010-03)*, TSG-RAN Working Group 2 Meeting #69bis, ETSI MCC (April 12-16, 2010)	April 12-16, 2010
R2-102247, *Activation/De-activation Details*, 3GPP TSG-RAN2 Meeting #69bis, LG Electronics Inc. (April 12 – 16, 2010)	April 12 – 16, 2010
R2-102251, *Remaining issues on DL CC activation/deactivation*, 3GPP TSG RAN WG2 Meeting #69bis, ETRI (April 12 – 16, 2010)	April 12 – 16, 2010
R2-102353, *Clarifications on CC Activation and Deactivation Terminology and Scope*, 3GPP TSG RAN WG2 Meeting #69bis, Intel Corporation (UK) Ltd. (April 12 – 16, 2010)	April 12 – 16, 2010
R2-102858, *CC management MAC CE handling*, 3GPP TSG RAN WG2 Meeting #70, ETRI (May 10-14, 2010)	May 10-14, 2010
R2-102967, *Serving Cell Selection in a Type 1 Relay Network*, 3GPP TSG RAN WG2 Meeting #70, Research In Motion, UK Limited, (May 10 – 14, 2010)	May 10-14, 2010
R2-103449, *LS on DL timing difference and DL timing reference in Carrier Aggregation*, 3GPP TSG-RAN WG2 Meeting #70, RAN WG2 (May 10 – 14, 2010)	May 10-14, 2010
R2-103604, *Efficient deactivation of Scell*, 3GPP TSG-RAN WG2 Meeting #70bis, Panasonic (June 28 – July 2, 2010)	June 28 – July 2, 2010
R2-103803, *Discussion on DL CC Activation/Deactivation*, 3GPP TSG RAN WG2 Meeting #70bis, ETRI (June 28 – July 2, 2010)	June 28 – July 2, 2010
R2-103878, *[70#14] LTE: Removal of Activation/Deactivation from Rel-10?*, 3GPP TSG-RAN WG2 Meeting #70bis, Ericsson (June 28 – July 2, 2010)	June 28 – July 2, 2010
R2-104027, *Scell activation/deactivation MAC Control Element*, 3GPP TSG RAN WG2 Meeting #70bis, Intel Corporation (UK) Ltd, June 28 – July 2, 2010)	June 28 – July 2, 2010
R2-104181, *LS on SCell activation/deactivation*, 3GPP TSG RAN WG2 Meeting #70bis, RAN WG2, (June 28 – July 2, 2010)	June 28 – July 2, 2010

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Title, Author(s), and Publisher	Date of Publication
R2-104217, *3GPP TSG RAN WG2 compendium v8.0*, TSG-RAN Working Group 2 Meeting #70bis, ETSI MCC (June 28 – July 2, 2010)	June 28 – July 2, 2010
R2-104601, *UL SCell activation/deactivation procedure*, 3GPP TSG RAN WG2 Meeting #71, ETRI (August 23 – 27, 2010)	August 23 – 27, 2010
R2-105636, *Retransmission on SCell deactivation*, 3GPP TSG RAN WG2 Meeting #71bis, ETRI (October 11 – 15, 2010)	October 11 – 15, 2010
R2-105745, *UL SCell deactivation timing*, 3GPP TSG RAN WG2 Meeting #71bis, ETRI (October 11 – 15, 2010)	October 11 – 15, 2010
R2-106016, *LS on Timing Requirements for Activation and Deactivation of SCells*, 3GPP TSG-RAN2 Meeting #71bis, RAN2 (October 11 – 15, 2010)	October 11 – 15, 2010
R2-106491, *SCell deactivation procedure*, 3GPP TSG-RAN WG2 Meeting #72, ETRI (November 15 – 19, 2010)	November 15 – 19, 2010
R2-106496, *Change Request for SCell deactivation procedure*, 3GPP TSG-RAN WG2 Meeting #72, ETRI (November 15 – 19, 2010)	November 15 – 19, 2010
R2-112649, *3GPP TSG RAN WG2 compendium v11.0 (status after RAN #51)*, TSG-RAN Working Group 2 Meeting #73bis, ETSI MCC (April 11 – 15, 2011)	April 11 – 15, 2011
R4-104038, *3GPP TSG-RAN2 Meeting #71bis, Tdoc R2-106016, Xi'an, PR China, 11th – 15th October 2010*, 3GPP TSG RAN WG4 Meeting #57, RAN2 (November 15 – 19, 2010)	November 15 – 19, 2010
R4-104316, *Timing of (de)activation*, 3GPP TSG-RAN WG4 Meeting #57, Nokia, Nokia Siemens Networks, Mediatek (November 15 – 19, 2010)	November 15 – 19, 2010
R4-104579, *Reply LS on Timing Requirements for Activation and Deactivation of SCells*, 3GPP TSG-RAN WG4 Meeting #57, TSG-RAN WG4 (November 15 – 19, 2010)	November 15 – 19, 2010
R4-104930, *[DRAFT] Response LS on Timing Requirements for Activation and Deactivation of SCells*, 3GPP TSG-RAN WG4 Meeting #57, RAN4 (November 15 – 19, 2010)	November 15 – 19, 2010

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Title, Author(s), and Publisher	Date of Publication
R4-110409, *3GPP TSG RAN WG1 Meeting #63 R1-106524 Jacksonville, USA, 15th - 19th November, 2010*, 3GPP TSG RAN WG4 Meeting #57AH, RAN1 (January 17 – 21, 2011)	January 17 – 21, 2011
RP-100056, *Status Report to TSG*, TSG RAN meeting #47, Nokia Corporation (March 16 – 19, 2010)	March 16 – 19, 2010
RP-100465, *Status Report to TSG*, TSG RAN meeting #46, Nokia Corporation (June 1 – 4, 2010)	June 1 – 4, 2010
RP-100775, *Status Report to TSG*, TSG RAN meeting #49, Nokia Corporation (September 14 – 17, 2010)	September 14 – 17, 2010
LISTSERV - 3GPP_TSG_RAN_WG2 Archives - Re: [71b#08]: LTE: CA - Running CR for 36.321 (October 22, 2010)	October 22, 2010
LISTSERV - 3GPP_TSG_RAN_WG2 Archives - Agenda proposal RAN2#72 (October 29, 2010)	October 29, 2010
3GPP TS § 36.213 v10.0.0	December 22, 2010
3GPP TS § 36.213 v10.0.1	December 28, 2010
3GPP TS § 36.213 v10.1.0	March 30, 2011
3GPP TS § 36.213 v10.2.0	June 22, 2011
3GPP TS § 36.213 v10.3.0	September 27, 2011
3GPP TS § 36.213 v10.4.0	December 22, 2011
3GPP TS § 36.213 v10.5.0	March 13, 2012
3GPP TS § 36.213 v10.6.0	June 26, 2012
3GPP TS § 36.321 v10.0.0	December 21, 2010
3GPP TS § 36.321 v10.1.0	April 6, 2011
3GPP TS § 36.321 v10.2.0	June 24, 2011

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Title, Author(s), and Publisher	Date of Publication
3GPP TS § 36.321 v10.3.0	October 3, 2011
3GPP TS § 36.321 v10.4.0	December 21, 2011
3GPP TS § 36.321 v10.5.0	March 16, 2012
3GPP TS § 36.321 v10.6.0	September 21, 2012
3GPP TS § 25.331 v8.10.0	April 2010
Kreher & Gaenger, *LTE Signaling* (2011) ("Kreher & Gaenger")	2011
Sesia et al., LTE: The UMTS Long Term Evolution From Theory to Practice (2011) ("Sesia")	2011
Holma & Toskala, LTE for UMTS (2009) ("Holma & Toskala 1")	2009
Holma & Toskala, LTE for UMTS (2011) ("Holma & Toskala 2")	2011
Dahlman & Parkvall, 4G LTE-Advanced for Mobile Broadband (2011) ("Parkvall")	2011

3. Identification Of Prior Art Sales/Public Uses related to the 106 and 662 Patents

Item Offered for Sale and/or Publicly Used	Date of Offer/Public Use	Person or Entity Who Made and Received Offer, Made Public Use, or Made Information Known
Nokia base station equipment (for example the Nokia Flexi Multiradio 10 Base Station)[9]		Nokia

[9] Defendants' and Intervenors' identification of Nokia base station equipment is based upon Wireless Alliance's proposed interpretation of the claims of the 106 and 662 Patents in light of its infringement contentions.

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Item Offered for Sale and/or Publicly Used	Date of Offer/Public Use	Person or Entity Who Made and Received Offer, Made Public Use, or Made Information Known
Ericsson base station equipment (for example the Ericsson RBS 6000 series)[10]		Ericsson
All systems or products that embody the technology described in any patent or publication identified in these Preliminary Invalidity Contentions.		

B. P.R. 3-3(B) – ANTICIPATION AND OBVIOUSNESS

Pursuant to P.R. 3-3 (b), and subject to Defendants' and Intervenors' reservation of rights, Defendants and Intervenors attach claim charts hereto that are directed to the prior art references that anticipate each of the Asserted Claims under 35 U.S.C. §§ 102(a), (b), (e), and/or (g), either expressly or inherently, and/or the prior art references that, in the alternative, would have rendered the Asserted Claims obvious under 35 U.S.C. § 103. *See* Exs. A-01 through A-10 and Appendix A1; Exs. B-01 through B-10 and Appendix B1. Some claim charts also contain explanations about the motivation to combine the references. Any combinations contained or referenced in Defendants' and Intervenors' claim charts are exemplary. Any prior art reference cited herein may be combined with any other reference to demonstrate the invalidity of any of the Asserted Claims 106 and 662 Patents, as set forth below and in Appendices A1 and B1.

[10] Defendants' and Intervenors' identification of Ericsson base station equipment is based upon Wireless Alliance's proposed interpretation of the claims of the 106 and 662 Patents in light of its infringement contentions.

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To the extent any claim limitation is construed to have a similar meaning, or to encompass similar feature(s) and/or function(s), as any other claim limitation, the citations to prior art references for each of those claim limitations in Defendants' and Intervenors' claim charts are incorporated by reference with respect to each other.

Defendants' and Intervenors' claim charts provide exemplary citations to the prior art references that teach or suggest every element of the Asserted Claims. To the extent that an element of an Asserted Claim is not shown in a chart, the Asserted Claims would have been obvious based on a combination of one or more other prior art references, as set forth below and in Appendices A1 and B1.

Much of the art cited in these Preliminary Invalidity Contentions reflects common knowledge and the state of the art at the time of the earliest filing date of the 106 and 662 Patents. Defendants and Intervenors may rely on additional citations, references, expert testimony, and other material to provide context or to aid in understanding the cited portions of the references and/or cited features of the systems. Defendants and Intervenors also may rely on expert testimony explaining relevant portions of references, relevant hardware or software products or systems, and other discovery regarding these subject matters. Additionally, Defendants and Intervenors may rely on other portions of any prior art reference for purposes of explaining the background and general technical subject area of the reference.

Where an individual reference is cited with respect to all elements of an Asserted Claim, Defendants contend that the reference anticipates the claim under 35 U.S.C. §§ 102(a), (b), (e), and/or (g) and also renders obvious the claim under 35 U.S.C. § 103, both by itself in view of the knowledge of a person of ordinary skill in the art and in combination with the other cited references to the extent the reference is not found to disclose one or more claim elements. A single prior art

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reference, for example, can establish obviousness where the differences between the disclosures within the reference and the claimed invention would have been obvious to one of ordinary skill in the art. For example, "[c]ombining two embodiments disclosed adjacent to each other in a prior art patent does not require a leap of inventiveness." *Bos. Sci. Scimed, Inc. v. Cordis Corp.*, 554 F.3d 982, 991 (Fed. Cir. 2009). To the extent Plaintiff contends that an embodiment within a particular item of prior art does not fully disclose all limitations of a claim, Defendants and Intervenors accordingly reserve their rights to rely on other embodiments in that prior art reference, or other information, to show single reference obviousness under 35 U.S.C. § 103(a).

Where an individual reference is cited with respect to fewer than all elements of an Asserted Claim, Defendants and Intervenors contend that the reference renders obvious the claim under 35 U.S.C. § 103(a) in view of each other reference and combination of references that discloses the remaining claim element(s), as indicated in the claim charts submitted herewith. "Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (quoting *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17 (1966)).

Exemplary motivations to combine references are discussed below and in some instances within the accompanying charts. Defendants and Intervenors reserve the right to rely upon any references or assertions identified herein in connection with Defendants' and Intervenors' contentions that each Asserted Claim is invalid under 35 U.S.C. § 103 and to rely upon expert testimony addressing such references and assertions. The fact that prior art is identified to anticipate the Asserted Claims presents no obstacle in also relying on that reference as a basis for

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invalidity based on obviousness. It is established that "a rejection for obviousness under § 103 can be based on a reference which happens to anticipate the claimed subject matter." *In re Meyer*, 599 F.2d 1026, 1031 (C.C.P.A. 1979). To the extent any cited prior art item may not fully disclose a limitation of an Asserted Claim or is alleged by Plaintiff to lack disclosure of the limitation, such limitation is present and identified in another prior art item as shown in the attached claim charts.

Many of the cited references cite or relate to additional references and/or products, services, or projects. Many of the cited references also cite software, hardware, or systems. Defendants and Intervenors might rely upon such cited additional references and/or products and copies or exemplars of such software, hardware, or systems. Defendants and Intervenors will produce or make available for inspection any such cited references, products, software, hardware, or systems that it intends to rely upon. Defendants and Intervenors may also rely upon the disclosures of the references cited and/or discussed during the prosecution of the 106 and 662 Patents, and/or the assertions presented regarding those references.

Defendants and Intervenors reserve the right to further streamline and reduce the number of anticipation or obviousness references relied upon with respect to a given Asserted Claim and to exchange or otherwise modify the specific references relied upon for anticipation and within each obviousness combination for each Asserted Claim.

C. P.R. 3-3(C) – CLAIM CHARTS

Defendants and Intervenors attach the following claim charts pursuant to P.R. 3-3(c):

- Ex. A-01: 106 Patent over the prior art 3GPP standards ("3GPP Standards")
- Ex. A-02: 106 Patent over U.S. Patent Publication 2010/0118720 to Gauvreau et al. ("Gauvreau")
- Ex. A-03: 106 Patent over U.S. Patent Publication 2011/0116467 to Jung et al. ("Jung")
- Ex. A-04: 106 Patent over U.S. Patent Publication 2011/0103326 to Kim et al. ("Kim")

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- Ex. A-05: 106 Patent over U.S. Patent Publication 2011/0026495 to Lee et al. ("Lee")
- Ex. A-06: 106 Patent over U.S. Patent No. 8,917,605 to Pelletier et al. ("Pelletier")
- Ex. A-07: 106 Patent over 3GPP standardization documents ("3GPP Standardization Documents")
- Ex. A-08: 106 Patent over U.S. Patent Publication 2011/0243048 to Wang et al. ("Wang")
- Ex. A-09: 106 Patent over U.S. Patent No. 9,065,650 to Wiemann et al. ("Wiemann")
- Ex. A-10: 106 Patent over Nokia and Ericsson base station equipment and UE's complying with one or more sections of the 3GPP Standards cited in Exhibit A1.
- Ex. B-01: 662 Patent over the prior art 3GPP standards ("3GPP Standards")
- Ex. B-02: 662 Patent over U.S. Patent Publication 2010/0118720 to Gauvreau et al. ("Gauvreau")
- Ex. B-03: 662 Patent over U.S. Patent Publication 2011/0116467 to Jung et al. ("Jung")
- Ex. B-04: 662 Patent over U.S. Patent Publication 2011/0103326 to Kim et al. ("Kim")
- Ex. B-05: 662 Patent over U.S. Patent Publication 2011/0026495 to Lee et al. ("Lee")
- Ex. B-06: 662 Patent over U.S. Patent No. 8,917,605 to Pelletier et al. ("Pelletier")
- Ex. B-07: 662 Patent over 3GPP standardization documents ("3GPP Standardization Documents")
- Ex. B-08: 662 Patent over U.S. Patent Publication 2011/0243048 to Wang et al. ("Wang")
- Ex. B-09: 662 Patent over U.S. Patent No. 9,065,650 to Wiemann et al. ("Wiemann")
- Ex. B-10: 662 Patent over Nokia and Ericsson base station equipment and UE's complying with one or more sections of the 3GPP Standards cited in Exhibit B1.

The attached claim charts are based, in whole or in part, on Plaintiff's asserted theories of infringement in this case, to the extent discernible from Plaintiff's Infringement Contentions. As an initial matter, all portions of each prior art reference cited in each of the attached claim charts are relied upon to support the disclosure of each patent claim limitation, as all portions provide general support. Representative descriptions and supporting citations are nevertheless provided, but are merely exemplary; they do not necessarily reflect every instance where a particular claim

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term or claim limitation may be disclosed in or taught by the prior art reference. References to figures or drawings refer to the figures/drawings themselves, as well as to any accompanying text or text necessary to understand the figures or drawings. References to text refers to the text itself, as well as the accompanying figures or drawings that accompany the text. Defendants and Intervenors reserve the right to rely on additional, or different, portions of the prior art references, other publications and expert testimony to establish what these references would have taught one of ordinary skill in the art, or in what manner they would have motivated a particular combination of references. Moreover, in certain instances, representative documents for certain prior art systems are cited, but, again, are merely exemplary; they do not necessarily reflect or include every document relating to the prior art system that exists and that discloses or teaches a particular claim term or claim limitation. Defendants and Intervenors reserve the right to rely on any and all documents that describe or relate to prior art systems, including relying on the system itself. Defendants and Intervenors also reserve the right to rely on the testimony of the authors, named inventors, or anyone else with knowledge of the prior art references and systems identified herein, as well as expert testimony regarding any such references or systems.

D. OBVIOUSNESS AND MOTIVATION TO COMBINE

The primary references identified above, and as further described in Exhibits A-01 through A-10 and Exhibits B-01 through B-10, each discloses, either expressly or inherently, every element of each of the Asserted Claims, thereby anticipating those claims. To the extent Plaintiff contends that any primary reference does not anticipate each of the Asserted Claims, it would have been obvious to combine or modify the primary references with concepts from other prior art, as explained herein and in the following Appendix. Each of these combinations is exemplary and representative, and the below does not constitute an exhaustive list of the possible combinations of the primary references, nor the primary references in combination with any additional references

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noted in the Appendix. Defendants and Intervenors reserve the right to rely on combinations outside of the below listed.

- 3GPP TS § 36.213 v10.0.0 in combination with any of 3GPP TS § 36.213 v10.1.0, 3GPP TS § 36.213 v10.2.0, 3GPP TS § 36.321 v10.0.0, 3GPP TS § 36.321 v10.1.0, 3GPP TS § 36.321 v10.2.0, 3GPP TS § 25.331 v8.10.0 (the "3GPP Standards").

- Any combination of RP-091440, R1-106557, R2-095277, R2-101076, R2-101846, R2-101986, R2-102177, R2-102757, R2-103107, R2-103108, R2-103161, R2-103880, R2-104391, R2-104503, R2-104613, R2-105063, R2-105220, R2-105703, R2-105798, R2-105960, R2-106929, R2-110704, LISTSERV - 3GPP_TSG_RAN_WG2 Archives - Re: [71b#08]: LTE: CA - Running CR for 36.321, LISTSERV - 3GPP_TSG_RAN_WG2 Archives - Agenda proposal RAN2#72 (the "3GPP Standardization Documents").

- 3GPP standards ("3GPP Standards") in combination with any of the 3GPP Standardization Documents.

- 3GPP standards ("3GPP Standards") in combination with any of the 3GPP Standardization Documents, in further view of Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall.

- Gauvreau in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Lee, Pelletier, Wang, or Wiemann.

- 3GPP Standards in combination with any of the Gauvreau, 3GPP Standardization Documents, Jung, Kim, Lee, Pelletier, Wang, or Wiemann.

- 3GPP Standardization Documents in combination with any of the 3GPP Standards, Gauvreau, Jung, Kim, Lee, Pelletier, Wang, or Wiemann.

- Jung in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Gauvreau, Kim, Lee, Pelletier, Wang, or Wiemann.

- Kim in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Gauvreau, Lee, Pelletier, Wang, or Wiemann.

- Lee in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Gauvreau, Pelletier, Wang, or Wiemann.

- Pelletier in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Lee, Gauvreau, Wang, or Wiemann.

- Wang in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Lee, Pelletier, Gauvreau, or Wiemann.

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- Wiemann in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Lee, Pelletier, Wang, or Gauvreau.

- Gauvreau in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Lee, Pelletier, Wang, or Wiemann, in further view of Cave, Alpert, Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall.

- 3GPP Standards in combination with any of the Gauvreau, 3GPP Standardization Documents, Jung, Kim, Lee, Pelletier, Wang, or Wiemann, in further view of Cave, Alpert, Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall.

- 3GPP Standardization Documents in combination with any of the 3GPP Standards, Gauvreau, Jung, Kim, Lee, Pelletier, Wang, or Wiemann, in further view of Cave, Alpert, Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall.

- Jung in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Gauvreau, Kim, Lee, Pelletier, Wang, or Wiemann, in further view of Cave, Alpert, Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall.

- Kim in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Gauvreau, Lee, Pelletier, Wang, or Wiemann, in further view of Cave, Alpert, Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall.

- Lee in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Gauvreau, Pelletier, Wang, or Wiemann, in further view of Cave, Alpert, Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall.

- Pelletier in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Lee, Gauvreau, Wang, or Wiemann, in further view of Cave, Alpert, Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall.

- Wang in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Lee, Pelletier, Gauvreau, or Wiemann, in further view of Cave, Alpert, Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall.

- Wiemann in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Lee, Pelletier, Wang, or Gauvreau, in further view of Cave, Alpert, Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall.

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- Any of the above, in combination with any reference noted in Appendices A1 and B1.

In particular, for each limitation of each of the Asserted Claims that Plaintiff contends is not met by a particular primary reference, Defendants and Intervenors contend that the limitation (and claim as a whole) is obvious based on a combination of that particular primary reference with (1) any other primary reference disclosing that limitation, (2) any reference identified in Appendices A1 and B1 as disclosing that limitation, and/or (3) the knowledge of a person of ordinary skill in the art and/or any of the references and concepts discussed herein regarding the relevant background and state of the art. The specific combinations of prior art that Defendants and Intervenors contend render the Asserted Claims obvious are readily determinable as described herein. Defendants' and Intervenors' obviousness grounds for each dependent claim incorporate the obviousness grounds for the claim(s) from which the dependent claim depends in addition to any obviousness grounds identified in the charts for the dependent claim.

Defendants and Intervenors do not yet have the benefit of Plaintiff's positions on the prior art, including what (if any) elements it contends are missing in each prior art reference, whether Plaintiff agrees that a reference is in fact prior art, and whether Plaintiff agrees that a person of ordinary skill in the art would be motivated to combine specific references. Defendants and Intervenors reserve the right to supplement these obviousness positions (including identifying additional prior art combinations and the associated reasons to combine) as discovery in the case progresses, including expert discovery.

1. Motivation To Combine

Each prior art reference may be combined with one or more other prior art references to render obvious each of the Asserted Claims of the 106 and 662 Patents in combination, as explained in more detail below. The disclosures of these references also may be combined with

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information known to persons skilled in the art at the time of the alleged invention, and understood and supplemented in view of the common sense of persons skilled in the art at the time of the alleged invention, including any statements in the intrinsic record of the 106 and 662 Patents and related applications.

A person of ordinary skill would have been motivated to combine the prior art cited in the attached claim charts based on the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. The identified prior art references, including portions cited in the claim charts, address the same or similar technical issues and suggest the same or similar solutions to those issues as the Asserted Claims of the 106 and 662 Patents. On such bases, on an element-by-element basis, Defendants and Intervenors intend to combine one or more prior art references identified in the claim charts attached as Exhibits A-01 through A-10 and Exhibits B-01 through B-10, and/or Appendices A1-B1 with each other to address any contention from Plaintiff that a particular prior art item supposedly lacks one or more elements of an Asserted Claim of the 106 and 662 Patents. In other words, Defendants and Intervenors contend that each charted prior art reference can be combined with other charted prior art references when a particular prior art item lacks or does not explicitly disclose an element or feature of an Asserted Claim of the 106 and 662 Patents. A person of ordinary skill in the art would have been motivated to make such combinations based on, for example, the below. The below list of motivations to combine is exemplary and representative, and is not an exhaustive list of motivations to combine, nor potential combinations.

- A person of ordinary skill in the art would have been motivated to combine 3GPP TS § 36.213 v10.0.0 in combination with any of 3GPP TS § 36.213 v10.1.0, 3GPP TS § 36.213 v10.2.0, 3GPP TS § 36.321 v10.0.0, 3GPP TS § 36.321 v10.1.0, 3GPP TS § 36.321 v10.2.0, 3GPP TS § 25.331 v8.10.0 (the "3GPP Standards"), as the 3GPP Standards are technical specifications defining different aspects of the same

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standard and a person of ordinary skill in the art would understand that the 3GPP Standards were therefore meant to be read together.

- A person of ordinary skill in the art would have been motivated to combine any of RP-091440, R1-106557, R2-095277, R2-101076, R2-101846, R2-101986, R2-102177, R2-102757, R2-103107, R2-103108, R2-103161, R2-103880, R2-104391, R2-104503, R2-104613, R2-105063, R2-105220, R2-105703, R2-105798, R2-105960, R2-106929, R2-110704, LISTSERV - 3GPP_TSG_RAN_WG2 Archives - Re: [71b#08]: LTE: CA - Running CR for 36.321, LISTSERV - 3GPP_TSG_RAN_WG2 Archives - Agenda proposal RAN2#72 (the "3GPP Standardization Documents"), as the 3GPP Standardization Documents are all technical documents and reports submitted during the 3GPP standardization process. A person of ordinary skill in the art would look to these documents to understand that the 3GPP Standards and standardization process. Furthermore, many of the same participants at these 3GPP meetings are the same and would have attended many of the meetings and heard the documents discussed and presented. As such, a person of ordinary skill in the art would have been motivated to read the 3GPP Standardization Documents together and combine them together.

- A person of ordinary skill in the art would have been motivated to combine the 3GPP standards ("3GPP Standards") in combination with any of the 3GPP Standardization Documents, as the 3GPP Standards and 3GPP Standardization Documents are all technical documents and reports submitted and developed during the 3GPP standardization process. The 3GPP Standards would have resulted from discussions by 3GPP participants of the 3GPP Standardization Documents. Furthermore, each 3GPP standard comes from Release 10 and each 3GPP Standardization contribution was being discussed for LTE Release 10. In addition, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation. As such, a person of ordinary skill in the art would have been motivated to read the 3GPP Standardization Documents together and combine them together.

- A person of ordinary skill in the art would have been motivated to combine the 3GPP standards ("3GPP Standards") in combination with any of the 3GPP Standardization Documents, in further view of Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall because each of these references teach fundamental building blocks of wireless data communication. Moreover, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall all describe well-known features that were long described in the art of wireless communication. A POSITA would have been motivated to look to basic textbooks on LTE and LTE-Advanced as well as specific standards contributions made to LTE and LTE-Advanced because each of those references deal with the same subject matter. Each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation.

- A person of ordinary skill in the art would have been motivated to combine Gauvreau in combination with any of the 3GPP Standards, 3GPP Standardization

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Documents, Jung, Kim, Lee, Pelletier, Wang, or Wiemann. Gauvreau discusses methods and systems which perform bandwidth aggregation/carrier aggregation as do the other references, 3GPP Standards, and 3GPP Standardization Documents. Each reference contains similar subject matter (e.g., carrier aggregation). Furthermore, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

- A person of ordinary skill in the art would have been motivated to combine 3GPP Standards in combination with any of the Gauvreau, 3GPP Standardization Documents, Jung, Kim, Lee, Pelletier, Wang, or Wiemann. The 3GPP Standards discuss carrier aggregation and secondary cell deactivation (among other things) as do the other references and 3GPP Standardization Documents. Each reference contains similar subject matter (e.g., carrier aggregation). Furthermore, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

- A person of ordinary skill in the art would have been motivated to combine 3GPP Standardization Documents in combination with any of the 3GPP Standards, Gauvreau, Jung, Kim, Lee, Pelletier, Wang, or Wiemann. The 3GPP Standardization Documents discuss carrier aggregation and secondary cell deactivation (among other things) as do the other references and 3GPP Standards. Each reference contains similar subject matter (e.g., carrier aggregation). Furthermore, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

- A person of ordinary skill in the art would have been motivated to combine Jung in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Gauvreau, Kim, Lee, Pelletier, Wang, or Wiemann. Jung discusses multi-carrier resource utilization including carrier aggregation and secondary cell deactivation as do the other references, 3GPP Standards, and 3GPP Standardization Documents. Each reference contains similar subject matter (e.g., carrier aggregation). Furthermore, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

- A person of ordinary skill in the art would have been motivated to combine Kim in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Gauvreau, Lee, Pelletier, Wang, or Wiemann. Kim discusses carrier aggregation and, more particularly, secondary cell deactivation as do the other references, 3GPP Standards, and 3GPP Standardization Documents. Each reference contains similar subject matter (e.g., carrier aggregation). In addition, some of the references are assigned to the same Assignee. For example, Lee and Kim are both assigned to LG Electronics. Furthermore, each document is analogous art because

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they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

- A person of ordinary skill in the art would have been motivated to combine Lee in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Gauvreau, Pelletier, Wang, or Wiemann. Lee discusses carrier aggregation/management and, more particularly, secondary cell deactivation as do the other references, 3GPP Standards, and 3GPP Standardization Documents. Each reference contains similar subject matter (e.g., carrier aggregation). In addition, some of the references are assigned to the same Assignee. For example, Lee and Kim are both assigned to LG Electronics. Furthermore, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

- A person of ordinary skill in the art would have been motivated to combine Pelletier in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Lee, Gauvreau, Wang, or Wiemann. Pelletier discusses carrier aggregation and, more particularly, secondary cell activation/deactivation as do the other references, 3GPP Standards, and 3GPP Standardization Documents. Each reference contains similar subject matter (e.g., carrier aggregation). Furthermore, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

- A person of ordinary skill in the art would have been motivated to combine Wang in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Lee, Pelletier, Gauvreau, or Wiemann. Wang discusses carrier aggregation and, more particularly, secondary cell activation/deactivation as do the other references, 3GPP Standards, and 3GPP Standardization Documents. Each reference contains similar subject matter (e.g., carrier aggregation). Furthermore, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

- A person of ordinary skill in the art would have been motivated to combine Wiemann in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Lee, Pelletier, Wang, or Gauvreau. Wiemann discusses deactivation of component carriers as do the other references, 3GPP Standards, and 3GPP Standardization Documents. Each reference contains similar subject matter (e.g., carrier aggregation). Furthermore, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

- A person of ordinary skill in the art would have been motivated to combine Gauvreau in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Lee, Pelletier, Wang, or Wiemann, in further view of Cave, Alpert, Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia,

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Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall for the same reason above. Furthermore, Gauvreau discusses methods and systems which perform bandwidth aggregation/carrier aggregation, and the textbooks and other references describe further development of the same systems. A POSITA would have been motivated to look to basic textbooks on UMTS, LTE and LTE-Advanced. For example, the Holma & Toskala books contains similar subject matter because they describe base UMTS systems and the advancement of those systems through LTE and LTE-Advanced. Each reference contains similar subject matter (e.g., carrier aggregation). Furthermore, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

- A person of ordinary skill in the art would have been motivated to combine 3GPP Standards in combination with any of the Gauvreau, 3GPP Standardization Documents, Jung, Kim, Lee, Pelletier, Wang, or Wiemann, in further view of Cave, Alpert, Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall for the same reason above. Furthermore, the 3GPP Standards discuss carrier aggregation and secondary cell deactivation (among other things) and the textbooks and other references describe further development of the same systems. A POSITA would have been motivated to look to basic textbooks on UMTS, LTE and LTE-Advanced. For example, the Holma & Toskala books contains similar subject matter because they describe base UMTS systems and the advancement of those systems through LTE and LTE-Advanced. Each reference contains similar subject matter (e.g., carrier aggregation). Furthermore, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

- A person of ordinary skill in the art would have been motivated to combine 3GPP Standardization Documents in combination with any of the 3GPP Standards, Gauvreau, Jung, Kim, Lee, Pelletier, Wang, or Wiemann, in further view of Cave, Alpert, Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall for the same reason above. Furthermore, the 3GPP Standardization Documents discuss carrier aggregation and secondary cell deactivation (among other things) and the textbooks and other references describe further development of the same systems. A POSITA would have been motivated to look to basic textbooks on UMTS, LTE and LTE-Advanced. For example, the Holma & Toskala books contains similar subject matter because they describe base UMTS systems and the advancement of those systems through LTE and LTE-Advanced. Each reference contains similar subject matter (e.g., carrier aggregation). Furthermore, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

- A person of ordinary skill in the art would have been motivated to combine Jung in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Gauvreau, Kim, Lee, Pelletier, Wang, or Wiemann, in further view of Cave, Alpert,

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Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall for the same reason above. Furthermore, Jung discusses multi-carrier resource utilization including carrier aggregation and secondary cell deactivation and the textbooks and other references describe further development of the same systems. A POSITA would have been motivated to look to basic textbooks on UMTS, LTE and LTE-Advanced. For example, the Holma & Toskala books contains similar subject matter because they describe base UMTS systems and the advancement of those systems through LTE and LTE-Advanced. Each reference contains similar subject matter (e.g., carrier aggregation). Furthermore, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

- A person of ordinary skill in the art would have been motivated to combine Kim in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Gauvreau, Lee, Pelletier, Wang, or Wiemann, in further view of Cave, Alpert, Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall for the same reason above. Furthermore, Kim discusses carrier aggregation and, more particularly, secondary cell deactivation and the textbooks and other references describe further development of the same systems. A POSITA would have been motivated to look to basic textbooks on UMTS, LTE and LTE-Advanced. For example, the Holma & Toskala books contains similar subject matter because they describe base UMTS systems and the advancement of those systems through LTE and LTE-Advanced. Each reference contains similar subject matter (e.g., carrier aggregation). In addition, some of the references are assigned to the same Assignee. For example, Lee and Kim are both assigned to LG Electronics. Furthermore, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

- A person of ordinary skill in the art would have been motivated to combine Lee in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Gauvreau, Pelletier, Wang, or Wiemann, in further view of Cave, Alpert, Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall for the same reason above. Furthermore, Lee discusses carrier aggregation/management and, more particularly, secondary cell deactivation and the textbooks and other references describe further development of the same systems. A POSITA would have been motivated to look to basic textbooks on UMTS, LTE and LTE-Advanced. For example, the Holma & Toskala books contains similar subject matter because they describe base UMTS systems and the advancement of those systems through LTE and LTE-Advanced. Each reference contains similar subject matter (e.g., carrier aggregation). In addition, some of the references are assigned to the same Assignee. For example, Lee and Kim are both assigned to LG Electronics. Furthermore, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

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- A person of ordinary skill in the art would have been motivated to combine Pelletier in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Lee, Gauvreau, Wang, or Wiemann, in further view of Cave, Alpert, Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall for the same reason above. Furthermore, Pelletier discusses carrier aggregation and, more particularly, secondary cell activation/deactivation and the textbooks and other references describe further development of the same systems. A POSITA would have been motivated to look to basic textbooks on UMTS, LTE and LTE-Advanced. For example, the Holma & Toskala books contains similar subject matter because they describe base UMTS systems and the advancement of those systems through LTE and LTE-Advanced. Each reference contains similar subject matter (e.g., carrier aggregation). Furthermore, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

- A person of ordinary skill in the art would have been motivated to combine Wang in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Lee, Pelletier, Gauvreau, or Wiemann, in further view of Cave, Alpert, Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall for the same reason above. Furthermore, Wang discusses carrier aggregation and, more particularly, secondary cell activation/deactivation and the textbooks and other references describe further development of the same systems. A POSITA would have been motivated to look to basic textbooks on UMTS, LTE and LTE-Advanced. For example, the Holma & Toskala books contains similar subject matter because they describe base UMTS systems and the advancement of those systems through LTE and LTE-Advanced. Each reference contains similar subject matter (e.g., carrier aggregation). Furthermore, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

- A person of ordinary skill in the art would have been motivated to combine Wiemann in combination with any of the 3GPP Standards, 3GPP Standardization Documents, Jung, Kim, Lee, Pelletier, Wang, or Gauvreau, in further view of Cave, Alpert, Pelletier 456, Chen, Kuo, Chun, Pelletier 233, Kreher & Gaenger, Sesia, Holma & Toskala 1, Holma & Toskala 2, and/or Parkvall for the same reason above. Furthermore, Wiemann discusses deactivation of component carriers and the textbooks and other references describe further development of the same systems. A POSITA would have been motivated to look to basic textbooks on UMTS, LTE and LTE-Advanced. For example, the Holma & Toskala books contains similar subject matter because they describe base UMTS systems and the advancement of those systems through LTE and LTE-Advanced. Each reference contains similar subject matter (e.g., carrier aggregation). Furthermore, each document is analogous art because they all relate to 3GPP based wireless communication and/or carrier aggregation or more specifically secondary cell deactivation.

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The suggested obviousness combinations discussed herein are not to be construed to suggest that any reference included in the combinations is not anticipatory. Further, to the extent that Plaintiff contends that any of the anticipatory prior art fails to disclose one or more limitations of the Asserted Claims of the 106 and 662 Patents, Defendants and Intervenors reserve the right to identify other prior art references that, when combined with the anticipatory prior art, would render the claims obvious despite an allegedly missing limitation. Defendants and Intervenors will further specify the motivations to combine the prior art, including through reliance on expert testimony, at the appropriate later stage of this lawsuit.

The decision in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007), held that patents that are based on new combinations of elements or components already known in a technical field may be found to have been obvious. The Supreme Court rejected a rigid application of the "teaching, suggestion, or motivation [to combine]" test. *Id*. at 407, 418. "In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim." *Id*. at 419. "Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id*. at 420. The Supreme Court emphasized the principle that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Id*. at 416. A key inquiry is whether the "improvement is more than the predictable use of prior art elements according to their established function." *Id*. at 417.

The Court further held that "in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id.* at 420. It is sufficient that a combination of elements was "obvious to try" – "When there is a design need or market pressure

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to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense." *Id.* at 421. "In that instance the fact that a combination was obvious to try might show that it was obvious under § 103." *Id*. Finally, the Supreme Court recognized that "[g]ranting patent protection to advances that would occur in the ordinary course without real innovation retards progress and may, in the case of patents combining previously known elements, deprive prior inventions of their value or utility." *Id*. at 419.

The rationale to combine or modify prior art references is significantly stronger when the references seek to solve the same problem, come from the same field, and correspond well together. *See In re Inland Steel Co.*, 265 F.3d 1354, 1362 (Fed. Cir. 2001) (allowing two references to be combined as invalidating art under similar circumstances where the art "focus[ed] on the same problem ... c[a]me from the same field of art [and] ... the identified problem found in the two references correspond[ed] well").

All of the following rationales recognized in *KSR* support a finding of obviousness with respect to each of the obviousness combinations disclosed herein: (1) combining prior art elements according to known methods to yield predictable results; (2) simple substitution of one known element for another to obtain predictable results; (3) use of a known technique to improve similar devices, methods, or products in the same way; (4) applying a known technique to a known device, method, or product ready for improvement to yield predictable results; (5) "obvious to try," that is, choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; (6) known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations

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would have been predictable to one of ordinary skill in the art; and (7) some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention. Certain of these rationales are discussed more specifically below. The fact that other rationales are not discussed more specifically should not be interpreted as an admission or concession that the other rationales do not apply.

Multiple teachings, suggestions, motivations, and/or reasons to modify any of the references and/or to combine two or more of the prior art references set forth herein come from many sources, including the prior art itself (individual references and as a whole), common knowledge, common sense, predictability, expectations, industry trends, design incentives or need, market demand or pressure, market forces, obviousness to try, the nature of the problem faced, and/or knowledge possessed by a person of ordinary skill. Defendants and Intervenors reserve the right to present expert testimony on, among other things, the teachings, suggestions, motivations, and/or reasons to modify any of the references and/or to combine any two or more of the prior art references presented in Exhibits A-01 through A-10 and Exhibits B-01 through B-10, and/or Appendices A1-B1.

Defendants and Intervenors further contend that the prior art identified in these Preliminary Invalidity Contentions is evidence of simultaneous or near-simultaneous independent invention by others of the alleged invention as recited in one or more of the Asserted Claims of the 106 and 662 Patents. Defendants and Intervenors reserve their rights to rely on the simultaneous or near-simultaneous independent invention by others as further evidence of the obviousness of the Asserted Claims of the 106 and 662 Patents.

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Each limitation of each of the Asserted Claims of the 106 and 662 Patents was well-known to those of ordinary skill in the art at the time. At best, the elements recited in the Asserted Claims of the 106 and 662 Patents are a mere combinations and modifications of these well-known elements. A person of ordinary skill in the art would be able, and motivated, to improve the existing technology in the same or similar manner by combining or modifying the individual elements that were already known in the art to yield predictable results.

2. Background And State Of The Art

Defendants and Intervenors set forth below a summary of their current understanding of the state of the art as understood as of the asserted priority dates of the 106 and 662 Patents for the general subject matter of the 106 and 662 Patents. The information discussed in this section may have formed the background knowledge of a person of ordinary skill in the art at the time of the 106 and 662 Patents was filed and may have been used in determining whether and how to combine references to achieve the claimed inventions. *See Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013) (stating that "the knowledge [of a person of ordinary skill in the art] is part of the store of public knowledge that must be consulted when considering whether a claimed invention would have been obvious"). Defendants and Intervenors expressly reserve the right to rely on each of the prior art references, systems, concepts, and technologies discussed in this Section with respect to the 106 and 662 Patents.

Defendants and Intervenors contend that, to the extent the primary references identified in these Preliminary Invalidity Contentions do not anticipate the Asserted Claims, it would have been obvious to combine any of the references, systems, concepts, or technologies discussed in this Section with those primary references. Defendants and Intervenors also reserve the right to rely on the discussions of the state of the art and prior art in the 106 and 662 Patents specifications and their file histories including file histories of related patents and foreign file histories of related

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patents in explaining the state of the art. Defendants and Intervenors further expressly reserve the right to supplement their summary of the background and state of the art, including, for example, with information from any of the authors or named inventors on any of the prior art references, by personnel familiar with systems based on any of the prior art references, or any prior art systems related to prior art references, or by technical experts retained on behalf of any party. Defendants and Intervenors also expressly reserve the right to rely on any admissions by any of the named inventors, institutions with which they were associated, and Plaintiff, regarding the state of the art.

In wireless communication, carrier aggregation is a technique used to increase the data rate per user, whereby multiple frequency blocks (called component carriers) are assigned to the same user. Carrier aggregation has been around in one form or another since Release 8 with HSDPA. Holma and Toskala 1 at 13.6. This original implementation of carrier aggregation was referred to as Dual Carrier HSDPA, in which two adjacent carriers are used for transmissions. *Id.*; *see also* 3GPP TS 25.331 v8.10.0 (April 2010). Release 10 LTE carrier aggregation "is designed to be fundamentally similar to an LTE Release 8 carrier so that they can be configured in a backward-compatible way and used by legacy UEs if desired." Sesia at pg. 618.

LTE Release 10 Carrier Aggregation was first listed as a identified as a Work Item Description during RAN 46 (Dec. 1-4, 2009). RP-091440. The first draft of the specification describing the secondary cell deactivation process and timing was released in December 2010. *See* 3GPP TS § 36.321 v10.0.0 (Dec. 21, 2010); 3GPP TS § 36.213 v10.0.0 (Dec. 22, 2010). In the early stages of the development of the Carrier Aggregation specification, the working group decided that Secondary Component Carriers (SCC) could be deactivated both explicitly (the eNB sending a deactivation message) and implicitly (an inactivity timer expiring). R2-101846 - Stage

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2 Description of Carrier Aggregation - 3GPP TSG-RAN WG2 Meeting #69 (February 22-26, 2010).

The specific timing aspect of § 36.213 and § 36.321 appears to have first been mentioned in R2-101076 during RAN2 69. R2-101076 - Explicit Activation and Deactivation – 3GPP TSG-RAN WG2 Meeting #69 (February 22-26, 2010). During RAN2 69 in February 2010, Nokia explained that scheduling gaps may occur during SCC deactivation due to the need for RF retuning in the UE when SCCs. *Id*. Nokia observed that "both L1 and MAC signalling require the eNB to consider an activation/deactivation gap during which activated CCs are not available for transmission." *Id*. To do so, Nokia proposed that the eNB would need to perform some level of bookkeeping "to remember that at time instant *t – Delay* it had commanded a CC activation/deactivation and that therefore the corresponding UE cannot be scheduled for transmission in the current TTI. *Id*. The value of *Delay* depends on the type of signalling." *Id*.

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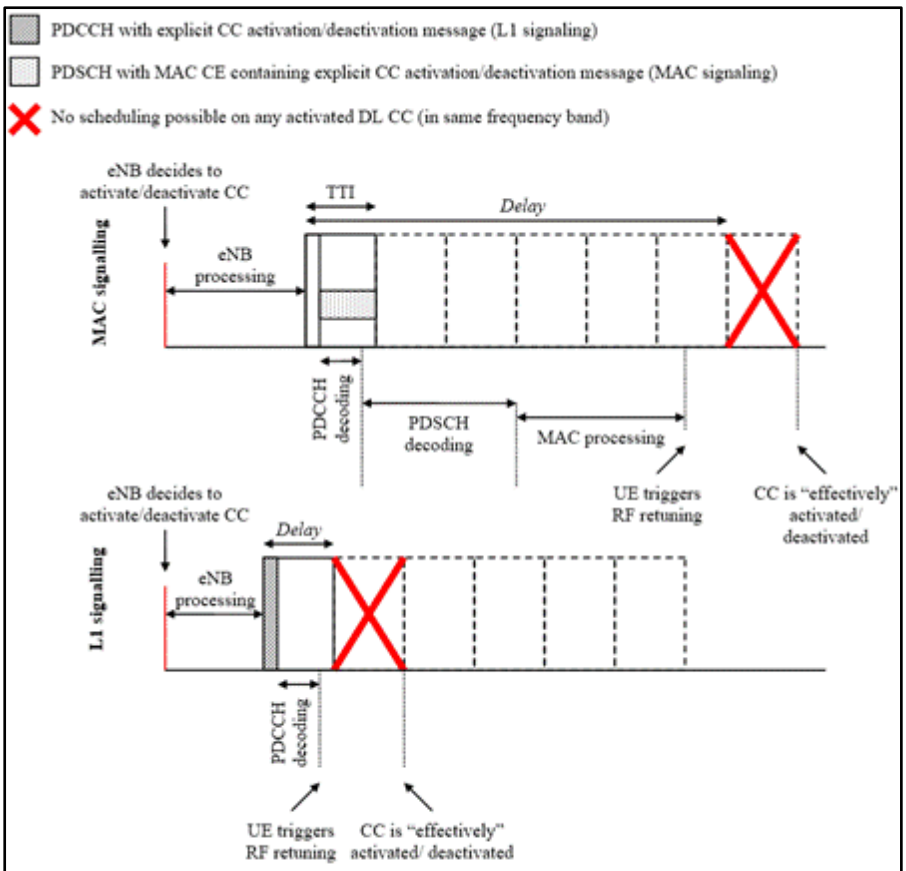

Figure 1: Fast CC activation/deactivation via L1 and MAC signalling

R2-101076 at Fig. 1.

During RAN2 69bis in April 2010, Nokia submitted another T-Doc discussing these timing issues. R2-101986 - Timing and HARQ Feedback Errors with Activation/Deactivation - 3GPP TSG-RAN WG2 Meeting #69bis (April 12–16, 2010). In the same, Nokia proposed that "the subframe when the UE starts performing RF retuning is relative to the subframe when the positive HARQ acknowledgement to a MAC activation/deactivation message is transmitted." *Id*. More specifically, Nokia proposed that a specific timing should be used for this purpose and proposed that it should occur in subframe i + R + T, where R related to the RF retuning time and T relates to the MAC processing time. *Id*.

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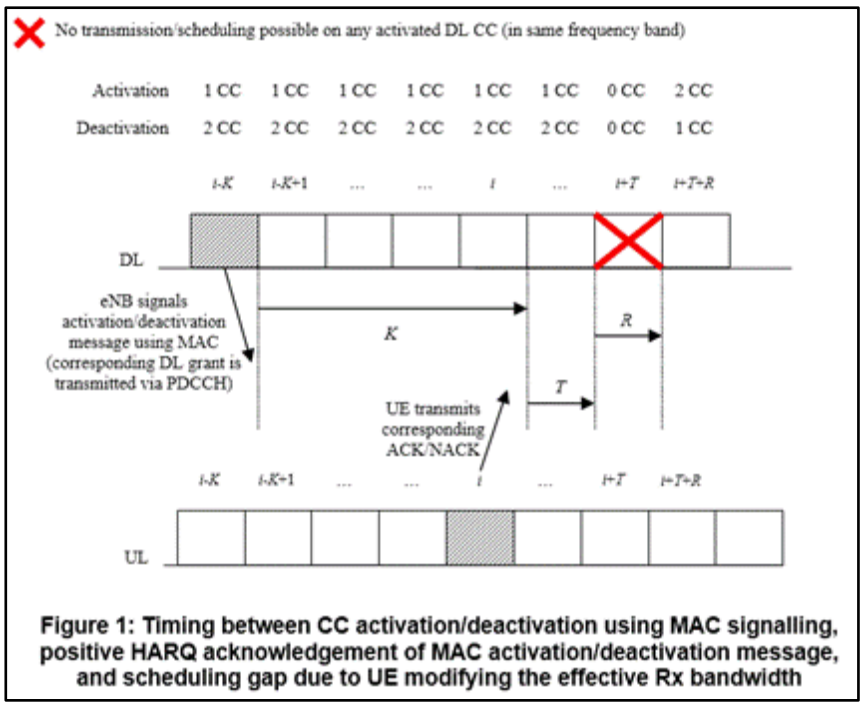

Figure 1: Timing between CC activation/deactivation using MAC signalling, positive HARQ acknowledgement of MAC activation/deactivation message, and scheduling gap due to UE modifying the effective Rx bandwidth

R2-101986 at Fig. 1.

During RAN2 70 in May 2010, Panasonic and Ericsson reiterated the same timing issues raised by Nokia. For example, Panasonic proposed that potential data loss issues could be "avoided if eNB sends the MAC CE with the deactivation for all DL SCCs but eNB only performs the actual deactivation of a DL SCC when the last transmission on that DL SCC is successfully completed." R2-102757 - Details on MAC Control Element for Component Carrier Management - 3GPP TSG-RAN WG2 Meeting #70 (May 10-14, 2010). As another example, Ericsson agreed with Nokia that the "timing relation between the transmission of the Activation/Deactivation MAC CE (in subframe n) and the subframe(s) in which the corresponding action is performed (n+x)" should be specified. R2-103161 - Activation/Deactivation Timing - 3GPP TSG-RAN WG2 #70 (May 10-14, 2010). More specifically, Ericsson proposed that "[t]he UE performs the activation/deactivation requested in a MAC CE transmitted in subframe n during a predefined subframe n+x, where the value of x if FFS." *Id*. Ericsson proposed something similar for uplink SCCs as well. *See* R2-

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103108 - Explicit Uplink Activation/Deactivation – 3GPP TSG RAN WG2 #70 (May 10-14, 2010); *see also* R2-103108 at Fig. 1 (below).

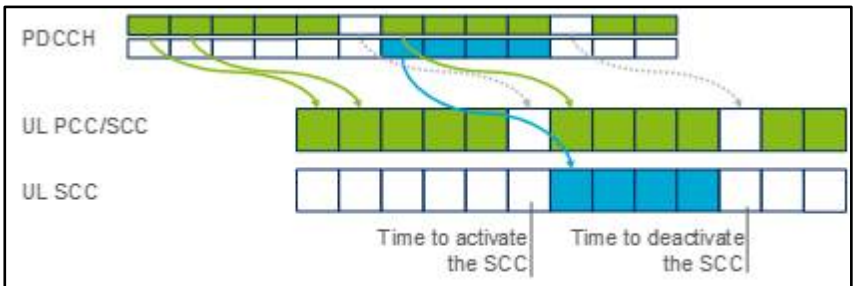

Figure 1: Preventing data loss due to a glitch.

During RAN2 70bis in July 2010, Ericsson reported that in RAN2 70 "many companies agreed that it would be desirable to perform the RF re-tuning at a particular known subframe so that the scheduler can e.g. account for glitches." R2-103880 - Activation/Deactivation Timing - 3GPP TSG-RAN WG2 #70bis (June 28–July 2, 2010). Ericsson again proposed that "[t]he UE performs the activation/deactivation requested in a MAC CE transmitted in subframe n during a predefined subframe n+x, where the value of x if FFS." *Id*.

During RAN2 71 in August 2010, Ericsson submitted the first change request for the specification describing the secondary cell deactivation process. R2-104613 - Change Request (36.321) - 3GPP TSG-RAN WG2 #71 (August 23–27, 2010); s*ee also* R2-105220 - Change Request (36.321) - 3GPP TSG-RAN WG2 #71 (August 23–27, 2010). In the Change Request, Ericsson indicated that these changes reflected "functionality which has already been agreed in RAN2 up to and including RAN2#70bis," thus indicating that everything within the Change Request was agreed up as of July 2, 2010.

Leading up to RAN2 71bis in October 2010, the participants working on the secondary cell deactivation specifications discussed "non-adaptive retransmissions" and proposed that the UE should clear its HARQ buffers upon deactivation to prohibit non-adaptive retransmissions. R2-

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105703 - Report of e-mail discussion [71#56] Enabling/Disabling of UL functionality - 3GPP TSG-RAN WG2 #71bis (October 11–15, 2010); *see also* R2-105798 - HARQ Buffer and UL Activation/Deactivation - 3GPP TSG RAN WG2 #71bis (October 11-15, 2010) ("Proposal: When the UE receives an Activation/Deactivation MAC CE deactivating the Scell it should stop non adaptive re-transmissions and clear the HARQ buffer.").

The above standardization history shows that there was a robust and comprehensive discussion of carrier aggregation and secondary cell deactivation processes and timing for LTE Release 10 before the filing date of the 106 and 662 Patents.

3. Secondary Considerations

A patentee bears the burden of production with respect to evidence of secondary considerations of non-obviousness. *ZUP, LLC v. Nash Mfg., Inc.*, 896 F.3d 1365, 1373 (Fed. Cir. 2018). As of the date of these Preliminary Invalidity Contentions, Plaintiff has not identified any evidence of secondary considerations. As shown in these Preliminary Invalidity Contentions, other companies and individuals described, built, and/or patented the exact same concepts in the 106 and 662 Patents before Plaintiff ever did—often many years before. Even where others' invention occurred around the same time as the 106 and 662 Patents, such simultaneous invention demonstrates the obviousness of the 106 and 662 Patents.

Additionally, potentially relevant evidence includes any prior art reference cited herein that occurred before or around the alleged inventions claimed in the 106 and 662 Patents. This also includes any prior art asserted in these Preliminary Invalidity Contentions that Plaintiff is able to pre-date based on its asserted priority dates by proving, *inter alia*, corroborated conception and diligent reduction to practice.

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Defendants and Intervenors reserve all rights to further respond to any secondary considerations of non-obviousness raised by Plaintiff, including by updating, modifying, and/or adding to these Preliminary Invalidity Contentions. Defendants and Intervenors are not aware of any unexpected results (none is mentioned in the 106 and 662 Patents or their file histories), long felt need, commercial success (or any nexus to any allegedly successful commercial embodiment), or awards for the alleged inventions of the 106 and 662 Patents.

E. P.R. 3-3(D): INVALIDITY UNDER 35 U.S.C. § 112

As set forth below, Defendants and Intervenors contend that the Asserted Claims are invalid under 35 U.S.C. §112 because the claims (1) are indefinite; (2) fail to satisfy the enablement requirement; and/or (3) fail to satisfy the written description requirement.

Defendants' and Intervenors' contentions that the Asserted Claims identified in this section are made in the alternative and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the Asserted Claims identified herein or that the Asserted Claims identified herein would not have been anticipated and/or obvious in light of the prior art.

Plaintiff has not yet provided a claim construction for any of the terms or phrases that Defendants and Intervenors anticipate will be in dispute. Defendants and Intervenors, therefore, cannot provide a complete list of § 112 defenses because Defendants and Intervenors do not know whether Plaintiff will proffer a construction for certain terms and phrases that is broader than, or inconsistent with, the construction that would be supportable by the disclosure set forth in the specification. Defendants and Intervenors offer these contentions without prejudice to any position they may ultimately take as to any claim construction issues.

Accordingly, Defendants and Intervenors reserve the right to supplement, amend, and/or modify these § 112 invalidity contentions as discovery progresses.

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1. Invalidity Under 35 U.S.C. § 112, ¶ 1

35 U.S.C. § 112, ¶ 1 requires that the specification contain a written description of the invention. "[T]he hallmark of written description is disclosure." *Bos. Sci. Corp. v. Johnson & Johnson*, 647 F.3d 1353, 1361-62 (Fed. Cir. 2011) (citation omitted). The test for whether a specification adequately describes an invention is "whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date .... [T]he test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art .... [It] is a question of fact." *Ariad Pharms., Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (*en banc*); *Bos. Sci.*, 647 F.3d at 1362.

The enablement requirement of Section 112 demands that the patent specification enable "those skilled in the art to make and use the full scope of the claimed invention without 'undue experimentation.'" *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (quoting *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993)). "[T]he scope of the claims must be less than or equal to the scope of the enablement." *Nat'l Recovery Tech., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1196 (Fed. Cir. 1999).

Defendants and Intervenors contend that the following Asserted Claims are invalid under 35 U.S.C. § 112, ¶ 1. Each Asserted Claim identified below is invalid under ¶ 1 because the specification of the Asserted Patent fails to provide a sufficient written description, enabling disclosure and/or fails to inform, with reasonable certainty, those skilled in the art about the scope of the invention the meaning of the term(s) and/or phrase(s):

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Asserted Patent	Asserted Claim(s)	Term(s) and/or Phrase(s) Lacking Written Description and/or Enablement
106 Patent	1	"changing the secondary carrier to a deactivation state after a predetermined time from the transmission of the deactivation message""
106 Patent	2	"wherein the predetermined time is a value predefined to make state information that is managed by the base station consistent with state information that is managed by the terminal for the secondary carrier"
106 Patent	3	"wherein the changing of the secondary carrier to the deactivation state includes changing, by the base station, the secondary carrier to the deactivation state after a predetermined time from an arrival time of the reception success message."
106 Patent	1	"stopping downlink (DL) transmission of the secondary carrier and initializing uplink (UL) and DL retransmission buffers after transmitting the deactivation message"
662 Patent	1	"changing the secondary carrier to a deactivation state based on a predetermined time from the transmission of the deactivation message"
662 Patent	2	"wherein the predetermined time is a value predefined to make state information that is managed by the base station consistent with state information that is managed by the terminal for the secondary carrier"

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Asserted Patent	Asserted Claim(s)	Term(s) and/or Phrase(s) Lacking Written Description and/or Enablement
662 Patent	3	"wherein the changing of the secondary carrier to the deactivation state includes changing, by the base station, the secondary carrier to the deactivation state after a predetermined time from an arrival time of the reception success message."
662 Patent	1	"stopping downlink (DL) data transmission of the secondary carrier and initializing uplink (UL) and DL buffers associated with the secondary carrier after transmitting the deactivation message."

2. Invalidity Under 35 U.S.C. § 112, ¶ 2

Claims are indefinite under 35 U.S.C. § 112, ¶ 2 when they "fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014).

In addition to Defendants and Intervenors' reservation of rights stated above, Defendants and Intervenors note that the Court's Docket Control Order contemplates that all indefiniteness issues be brought to the Court's attention through the *Markman* briefing process. Defendants' and Intervenors' detailed arguments as to indefiniteness will be presented at that time, *i.e.*, through the *Markman* meet and confer and briefing process.

Defendants and Intervenors contend that the Asserted Claim is invalid under 35 U.S.C. § 112, ¶ 2. The Asserted Claim(s) identified below is invalid under ¶ 2 because they fail to inform, with reasonable certainty, those skilled in the art about the scope of the claimed invention:

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Asserted Patent	Asserted Claim(s)	Indefinite Term(s) and/or Phrase(s)
106 Patent	1	"changing the secondary carrier to a deactivation state after a predetermined time from the transmission of the deactivation message"
106 Patent	1	"after a predetermined time"
106 Patent	1	"changing the secondary carrier to a deactivation state"
106 Patent	1	"stopping downlink (DL) transmission of the secondary carrier and initializing uplink (UL) and DL retransmission buffers after transmitting the deactivation message."
106 Patent	1	"initializing uplink (UL) and DL retransmission buffers"
106 Patent	2	"wherein the predetermined time is a value predefined to make state information that is managed by the base station consistent with state information that is managed by the terminal for the secondary carrier."
106 Patent	3	"wherein the changing of the secondary carrier to the deactivation state includes changing, by the base station, the secondary carrier to the deactivation state after a predetermined time from an arrival time of the reception success message."
106 Patent	4	"immediately stopping, by the base station, data transmission and retransmission using the secondary carrier immediately after transmitting the deactivation message."

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Asserted Patent	Asserted Claim(s)	Indefinite Term(s) and/or Phrase(s)
662 Patent	1	"changing the secondary carrier to a deactivation state based on a predetermined time from the transmission of the deactivation message"
662 Patent	1	"based on a predetermined time"
662 Patent	1	"changing the secondary carrier to a deactivation state"
662 Patent	1	"stopping downlink (DL) data transmission of the secondary carrier and initializing uplink (UL) and DL buffers associated with the secondary carrier after transmitting the deactivation message"
662 Patent	1	"initializing uplink (UL) and DL buffers associated with the secondary carrier"
662 Patent	2	"wherein the predetermined time is a value predefined to make state information that is managed by the base station consistent with state information that is managed by the terminal for the secondary carrier."
662 Patent	3	"wherein the changing of the secondary carrier to the deactivation state includes changing, by the base station, the secondary carrier to the deactivation state after a predetermined time from an arrival time of the reception success message."
662 Patent	4	"immediately stopping, by the base station, data transmission and retransmission using the secondary carrier immediately after transmitting the deactivation message."

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III. INVALIDITY CONTENTIONS RELATED TO 383 PATENT

As explained herein and in Exhibits C-01 through C-07, and Appendix C1, Defendants and Intervenors contend that each of the Asserted Claims of the 383 Patent are invalid under 35 U.S.C. §§ 102, 103, and/or 112.

A. P.R. 3-3(A) – IDENTIFICATION OF PRIOR ART

Pursuant to P. R. 3-3(a), and subject to Defendants' and Intervenors' reservation of rights as stated herein, Defendants and Intervenors identify the prior art that anticipates or renders obvious the Asserted Claims of the of the 383 Patent in the tables set forth below.[11] On information and belief, each listed reference qualifies as prior art to the 383 Patent, respectively.[12]

To the extent that any of the following are prior art, Defendants and Intervenors reserve the right to rely upon foreign counterparts of the U.S. patents identified herein; U.S. counterparts of foreign patents and foreign patent applications identified herein; and U.S. and foreign patents and patent applications corresponding to articles and publications identified herein. Defendants and Intervenors also reserve the right to rely upon parent or ancestor patents or patent applications from which any of the patents or patent applications identified herein claim priority to as continuation, divisional, or continuation-in-part applications.

1. Identification Of Prior Art Patents related to the 383 Patent

[11] Defendants and Intervenors also hereby identify any systems or products that embody the technology described in any patent or publication identified in these Preliminary Invalidity Contentions. Defendants and Intervenors reserve the right to rely on any documents or other evidence regarding any such systems.

[12] Defendants and Intervenors may rely on any document produced with the prefix JD-WA to explain the background and/or state of the art to the 383 Patent.

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Patent/Publication No.	Country of Origin	Date of Issue/Publication
European Patent Application No. EP2563073 to Rong ("Rong-073")	Europe	February 27, 2013
U.S. Patent Pub. No. 2013/0083759 to Rong ("Rong")	United States	April 4, 2013
U.S. Patent No. 9,215,651 to Rong ("Rong-651")	United States	December 15, 2015
U.S. Patent Pub. No. 2002/0058511 to Mohebbi ("Mohebbi")	United States	May 16, 2002
U.S. Patent Pub. No. 2011/0223900 to Yu ("Yu")	United States	September 15, 2011
U.S. Patent No. 8,204,507 to Yu ("Yu-507")	United States	June 19, 2012
U.S. Patent Pub. No. 2013/0089034 to Acharaya ("Acharaya")	United States	April 11, 2013
U.S. Patent Pub. No. 2013/0163441 to Verma ("Verma")	United States	June 27, 2013
U.S. Patent No. 9,060,351 to Verma ("Verma-441")	United States	June 16, 2015
U.S. Patent No. 9,479,973 to Centonza ("Centonza")	United States	October 25, 2016
U.S. Patent No. 9,769,842 to Song ("Song")	United States	September 19, 2017
U.S. Patent Pub. No. 2015/0351119 to Song ("Song-119")	United States	December 3, 2015

2. Identification Of Prior Art Publications related to the 383 Patent

Title, Author(s), and Publisher	Date of Publication
3GPP TS 36.211 v11.1.0	December 20, 2012
3GPP TS 36.211 v11.2.0	March 15, 2013
3GPP TS 36.213 v11.1.0	December 20, 2012
3GPP TS 36.213 v11.2.0	March 15, 2013
3GPP TS 36.331 v11.2.0	January 3, 2013

Title, Author(s), and Publisher	Date of Publication
3GPP TS 36.331 v11.3.0	March 18, 2013
3GPP TR 36.932 v12.1.0	March 18, 2013
3GPP TR 36.932 v12.0.0	December 13, 2012
3GPP TS 36.214 v11.1.0	December 20, 2012
3GPP TR 36.814 v9.0.0	March 30, 2010
3GPP TR 36.819 v11.1.0	December 22, 2011
3GPP TS 36.814 v9.0.0	March 30, 2010
3GPP TS § 36.839 v11.1.0	January 7, 2013
R1-130566, *Physical layer aspects of dual connectivity*, 3GPP TSG-RAN WG#1 Meeting #72, Ericsson, ST-Ericsson (January 28-Febraury 1, 2013)	January 18, 2013
RP-122032, *New Study Item Proposal for Small Cell Enhancements for E-UTRA and E-UTRAN Physical Layer Aspects*, 3GPP TSG RAN Meeting #58, Huawei, HiSilicon, CATR (December 4-7, 2012)	December 9, 2012
RP-122033, *New Study Item Proposal for Small Cell Enhancements for E-UTRA and E-UTRAN Higher Layer Aspects*, 3GPP TSG RAN Meeting #58, NTT DOCOMO, Inc. (December 4-7, 2012)	December 9, 2012
R1-094113, *Performance Analysis of UE Association in a Type-II relay network*, 3GPP TSG RAN WG#1 Meeting #58bis, Research in Motion, UK Limited (October 12-16, 2009)	October 6, 2009
R1-094462, *Performance Analysis of UE Association in a Type-II relay network*, 3GPP TSG RAN WG#1 Meeting #59, Research in Motion, UK Limited (November 9-13, 2009)	November 3, 2009
R1-103072, *Serving Cell Selection in a Heterogeneous network with Type 1 Relay*, 3GPP TSG RAN WG#1 Meeting #61, Research in Motion, UK Limited (May 10-14, 2010)	May 4, 2010

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Title, Author(s), and Publisher	Date of Publication
R1-113149, *Rel-10 DM RS Limitations for UL CoMP*, 3GPP TSG RAN WG#1 Meeting #66bis, Nokia Siemens Networks, Nokia (October 10-14, 2011)	October 4, 2011
R1-093290, *UE Association in a Type-II relay network*, 3GPP TSG RAN WG#1 Meeting #58, Research in Motion, UK Limited (August 24-28, 2009)	August 18, 2009
R2-130453, Discussion on small cells dual connectivity, 3GPP TSG RAN WG2 Meeting #81, Nokia Corporation, Nokia Siemens Networks (January 28-February 1, 2013)	January 19, 2013
R1-130743, *Scenario and Candidate Technologies for Small Cell Enhancement*, 3GPP TSG RAN WG#1 Meeting #72, NTT DoCoMo (January 28-February 1, 2013)	February 1, 2013
R1-130446, *Proposed work plan for small cell enhancement SI*, 3GPP TSG RAN WG1 Meeting #72, Huawei, HiSilicon (January 28-February 3, 2013)	January 19, 2013
R1-130019, *TR skeleton of small cell enhancement*, 3GPP TSG RAN WG1 Meeting #72, Huawei, HiSilicon (January 28-February 3, 2013)	January 19, 2013
R1-130740, *Scenario and Migration for Small Cell Enhancement*, 3GPP TSG RAN WG1 Meeting #72, NTT DOCOMO, AT&T, China Telecom, CMCC, Deutsche Telekom, KDDI, KT Corp., Orange, Telecom Italia, Telefonica, Teliasonera, Verizon (January 28-February 3, 2013)	February 1, 2013
R1-130741, *WF for SCE PHY scenarios*, 3GPP TSG RAN WG1 Meeting #72, NTT DOCOMO, AT&T, CMCC, Deutsche Telekom, KDDI, KT Corp., Orange, Telecom Italia, Telefonica (January 28-February 3, 2013)	February 1, 2013
R1-130748, *Text Proposal for TR36.923 on Small Cell Enhancement Scenarios*, 3GPP TSG RAN WG1 Meeting #72, NTT DOCOMO (January 28-February 3, 2013)	February 1, 2013
R1-130744, *WF on evaluation assumptions for SCE physical layer*, 3GPP TSG RAN WG1 Meeting #72, Huawei, HiSilicon, CATR, CMCC (January 28-February 3, 2013)	February 1, 2013

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Title, Author(s), and Publisher	Date of Publication
R1-130749, *Proposal on backhaul assumptions for SCE physical layer*, 3GPP TSG RAN WG1 Meeting #72, Huawei, HiSilicon (January 28-February 3, 2013)	February 1, 2013
R1-130750, *Evaluation of assumptions for small cell enhancements-physical layer*, 3GPP TSG RAN WG1 Meeting #72, Huawei, HiSilicon, CATR, Hitachi (January 28-February 3, 2013)	February 1, 2013
R1-130020, Performance metrics and requirements for small cell enhancement, 3GPP TSG RAN WG1 Meeting #72, Huawei, HiSilicon (January 28-February 3, 2013)	January 19, 2013
R1-130055, On Rel-12 small cell deployment scenarios, 3GPP TSG RAN WG1 Meeting #72, CATT (January 28-February 3, 2013)	January 18, 2013
R1-130086, *Views on small cell evaluation and methodology*, 3GPP TSG RAN WG1 Meeting #72, Intel Corporation (January 28-February 3, 2013)	January 19, 2013
R1-130109, *Evaluation assumptions and methodology for small cell enhancement*, 3GPP TSG RAN WG1 Meeting #72, Fujitsu (January 28-February 3, 2013)	January 18, 2013
R1-130134, *Considerations on evaluation assumptions and methodology for small cell enhancements*, 3GPP TSG RAN WG1 Meeting #72, ZTE (January 28-February 3, 2013)	January 19, 2013
R1-130146, *Evaluation assumptions and metrics on small cell enhancements*, 3GPP TSG RAN WG1 Meeting #72, ITRI (January 28-February 3, 2013)	January 18, 2013
R1-130162, *Discussion on the evaluation methodology for small cell enhancements*, 3GPP TSG RAN WG1 Meeting #72, New Postcom (January 28-February 3, 2013)	January 19, 2013
R1-130175, *Evaluation assumptions for inter-site CA*, 3GPP TSG RAN WG1 Meeting #72, ETRI (January 28-February 3, 2013)	January 19, 2013
R1-130206, *Initial Evaluation Results for Uplink Small Cell Enhancements with Dedicated Channel*, 3GPP TSG RAN WG1 Meeting #72, KDDI (January 28-February 3, 2013)	January 18, 2013

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Title, Author(s), and Publisher	Date of Publication
R1-130222, *Evaluation methodology for small cell enhancements*, 3GPP TSG RAN WG1 Meeting #72, MediaTek Inc. (January 28-February 3, 2013)	January 19, 2013
R1-130233, *Recommendations for Small Cell evaluation methodology and assumptions*, 3GPP TSG RAN WG1 Meeting #72, InterDigital (January 28-February 3, 2013)	January 19, 2013
R1-130295, *Evaluation scenarios and assumptions for small cell enhancement*, 3GPP TSG RAN WG1 Meeting #72, Samsung (January 28-February 3, 2013)	January 19, 2013
R1-130296, *Evaluation methodologies for small cell enhancement*, 3GPP TSG RAN WG1 Meeting #72, Samsung (January 28-February 3, 2013)	January 19, 2013
R1-130297, *Evaluation-related Small Cell Enhancements SID Clarifications*, 3GPP TSG RAN WG1 Meeting #72, Samsung (January 28-February 3, 2013)	January 19, 2013
R1-130322, *Small Cell Evaluation Assumptions*, 3GPP TSG RAN WG1 Meeting #72, Panasonic (January 28-February 3, 2013)	January 18, 2013
R1-130326, *Proposal of realistic traffic assumptions and adequate metrics*, 3GPP TSG RAN WG1 Meeting #72, IAESI, CEA, DAC-UPC, SEQUANS (January 28-February 3, 2013)	January 19, 2013
R1-130350, *Discussion on simulation assumptions for small cell scenario*, 3GPP TSG RAN WG1 Meeting #72, China Unicom (January 28-February 3, 2013)	January 18, 2013
R1-130383, *Discussion on scenarios and evaluation assumptions for small cell*, 3GPP TSG RAN WG1 Meeting #72, Research in Motion UK Limited (January 28-February 3, 2013)	January 19, 2013
R1-130390, *Indoor channel models for small cell evaluation*, 3GPP TSG RAN WG1 Meeting #72, Research in Motion UK Limited (January 28-February 3, 2013)	January 19, 2013
R1-130391, *On uplink robustness at medium mobility and 3.5 GHz for small cell*, 3GPP TSG RAN WG1 Meeting #72, Research in Motion UK Limited (January 28-February 3, 2013)	January 19, 2013
R1-130743, *Scenario and Candidate Technologies for Small Cell Enhancement*, 3GPP TSG RAN WG1 Meeting #72, NTT DOCOMO (January 28-February 3, 2013)	February 1, 2013

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Title, Author(s), and Publisher	Date of Publication
R1-130403, *Evaluation Assumptions for Small Cell Enhancement*, 3GPP TSG RAN WG1 Meeting #72, NTT DOCOMO (January 28-February 3, 2013)	January 19, 2013
R1-130424, *Scenarios for small cell studies in Rel-12*, 3GPP TSG RAN WG1 Meeting #72, Renesas Mobile Europe Ltd (January 28-February 3, 2013)	January 19, 2013
R1-130464, *Evaluation methodology for Small Cell Enhancement - Physical Layer Aspects*, 3GPP TSG RAN WG1 Meeting #72, Alcatel-Lucent, Alcatel-Lucent Shanghai Bell (January 28-February 3, 2013)	January 19, 2013
R1-130490, *Simulation assumptions for Rel-12 small cell studies*, 3GPP TSG RAN WG1 Meeting #72, Nokia Siemens Networks, Nokia (January 28-February 3, 2013)	January 19, 2013
R1-130536, *Inclusion of indoor scenario for small cell evaluation*, 3GPP TSG RAN WG1 Meeting #72, CMCC (January 28-February 3, 2013)	January 19, 2013
R1-130563, *Scenarios and Simulation Assumptions*, 3GPP TSG RAN WG1 Meeting #72, Ericsson, ST-Ericsson (January 28-February 3, 2013)	January 19, 2013
R1-130591, *Channel models for indoor small cells*, 3GPP TSG RAN WG1 Meeting #72, Qualcomm Inc. (January 28-February 3, 2013)	January 19, 2013
R1-130592, *Evaluation methodology for indoor small cell deployments*, 3GPP TSG RAN WG1 Meeting #72, Qualcomm Inc. (January 28-February 3, 2013)	January 19, 2013
R1-130603, *Considerations on simulation assumptions and methodology for small cell enhancements*, 3GPP TSG RAN WG1 Meeting #72, CATR (January 28-February 3, 2013)	January 19, 2013
R1-130655, *Discussion on small cell simulation scenarios and assuptions*, 3GPP TSG RAN WG1 Meeting #72, Coolpad (January 28-February 3, 2013)	January 19, 2013
R1-130679, *Initial Evaluation Results for Downlink Small Cell Enhancements with Dedicated Channel*, 3GPP TSG RAN WG1 Meeting #72, KDDI (January 28-February 3, 2013)	January 23, 2013
R1-130689, *General Evaluation Assumptions and Methodology for Small Cell Enhancements*, 3GPP TSG RAN WG1 Meeting #72, Texas Instruments (January 28-February 3, 2013)	January 29, 2013

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Title, Author(s), and Publisher	Date of Publication
R1-130707, *General evaluation assumptions for small cell enhancement*, 3GPP TSG RAN WG1 Meeting #72, LG Electronics (January 28-February 3, 2013)	January 29, 2013
R1-130746, *WF on Small Cell Scenarios and Evaluation Methodology*, 3GPP TSG RAN WG1 Meeting #72, CMCC, Nokia Siemens Networks, Qualcomm, Renesas, ZTE (January 28-February 3, 2013)	February 1, 2013
R1-130564, *Overview of Candidate Spectrum Efficiency Improvements*, 3GPP TSG RAN WG1 Meeting #72, Ericsson, ST-Ericsson (January 28-February 3, 2013)	January 19, 2013
R1-130101, *Evaluation Assumptions for Enhancements for Improved Spectral Efficiency*, 3GPP TSG RAN WG1 Meeting #72, Texas Instruments (January 28-February 3, 2013)	January 19, 2013
R1-130172, *Evaluation assumptions for introduction of DL higher order modulation to small cell*, 3GPP TSG RAN WG1 Meeting #72, Fujitsu (January 28-February 3, 2013)	January 18, 2013
R1-130234, *Evaluation methodology for 256QAM in Small Cell deployments*, 3GPP TSG RAN WG1 Meeting #72, InterDigital (January 28-February 3, 2013)	January 19, 2013
R1-130465, *Evaluation of DL Higher Order Modulation for Small Cells*, 3GPP TSG RAN WG1 Meeting #72, Alcatel-Lucent Shanghai Bell, Alcatel-Lucent (January 28-February 3, 2013)	January 19, 2013
R1-130491, *Evaluation Assumptions on Schemes to Enhance Small Cell Spectral Efficiency*, 3GPP TSG RAN WG1 Meeting #72, Nokia, Nokia Siemens Networks (January 28-February 3, 2013)	January 18, 2013
R1-130752, *[DRAFT] LS on Higher Order Modulation Evaluation Assumptions*, 3GPP TSG RAN WG1 Meeting #72, Fujitsu (January 28-February 3, 2013)	February 1, 2013
R1-130022, *Analysis and initial evaluation results for overhead reduction and control signaling enhancements*, 3GPP TSG RAN WG1 Meeting #72, Huawei, HiSilicon (January 28-February 3, 2013)	January 19, 2013
R1-130057, *Overhead reduction for spectrum efficiency improvement*, 3GPP TSG RAN WG1 Meeting #72, CATT (January 28-February 3, 2013)	January 18, 2013
R1-130087, *Evaluation of specific enhancements for improved spectral efficiency*, 3GPP TSG RAN WG1 Meeting #72, Intel Corporation (January 28-February 3, 2013)	January 19, 2013

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Title, Author(s), and Publisher	Date of Publication
R1-130174, *Considerations on UE-Specific RS for small cell enhancement*, 3GPP TSG RAN WG1 Meeting #72, Fujitsu (January 28-February 3, 2013)	January 18, 2013
R1-130223, *On overhead reudction in small cell enhancements*, 3GPP TSG RAN WG1 Meeting #72, MediaTek Inc. (January 28-February 3, 2013)	January 19, 2013
R1-130691, *Initial evaluation of DM-RS reduction for small cell*, 3GPP TSG RAN WG1 Meeting #72, LG Electronics (January 28-February 3, 2013)	January 27, 2013
R1-130594, *Overhead reduction*, 3GPP TSG RAN WG1 Meeting #72, Qualcomm Inc. (January 28-February 3, 2013)	January 19, 2013
R1-130663, *UL considerations for Small Cell Enhancements*, 3GPP TSG RAN WG1 Meeting #72, Texas Instruments (January 28-February 3, 2013)	January 19, 2013
R1-130137, *Consideration in downlink control overhead reduction for small cell*, 3GPP TSG RAN WG1 Meeting #72, ZTE (January 28-February 3, 2013)	January 19, 2013
R1-130138, *Downlink DMRS reduction for Small Cell*, 3GPP TSG RAN WG1 Meeting #72, ZTE (January 28-February 3, 2013)	January 19, 2013
R1-130021, *Evaluation of higher order modulation*, 3GPP TSG RAN WG1 Meeting #72, Huawei, HiSilicon (January 28-February 3, 2013)	January 19, 2013
R1-130056, *Support of 256QAM for small cells*, 3GPP TSG RAN WG1 Meeting #72, CATT (January 28-February 3, 2013)	January 18, 2013
R1-130136, *Consideration on high order modulation for Small cell*, 3GPP TSG RAN WG1 Meeting #72, ZTE (January 28-February 3, 2013)	January 19, 2013
R1-130139, *Evaluation on the Uplink DMRS Overhead Reduction of Small Cells, 3GPP TSG RAN WG1 Meeting #72, ZTE (January 28-February 3,* 2013)	January 19, 2013
R1-130187, *Modulation scheme selection of DL for small cells*, 3GPP TSG RAN WG1 Meeting #72, New Postcom (January 28-February 3, 2013)	January 18, 2013
R1-130197*, Downlink control signalling enhancement for DL_RS in small cell*, 3GPP TSG RAN WG1 Meeting #72, ZTE (January 28-February 3, 2013)	January 19, 2013

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R1-130207, *Views on the Physical Layer Enhancements for Small Cells to Improve Spectral Efficiency*, 3GPP TSG RAN WG1 Meeting #72, KDDI (January 28-February 3, 2013)	January 18, 2013
R1-130298, *Discussion on higher-order modulation and UE-specific RS for small cells*, 3GPP TSG RAN WG1 Meeting #72, Samsung (January 28-February 3, 2013)	January 19, 2013
R1-130299, *Control Signaling Enhancements for Small Cells*, 3GPP TSG RAN WG1 Meeting #72, Samsung (January 28-February 3, 2013)	January 19, 2013
R1-130311, *On Small Cell Enhancement for Improved Spectral Efficiency*, 3GPP TSG RAN WG1 Meeting #72, HTC (January 28-February 3, 2013)	January 18, 2013
R1-130341, *Views on 256QAM for small cell enhancement*, 3GPP TSG RAN WG1 Meeting #72, Hitachi Ltd. (January 28-February 3, 2013)	January 18, 2013
R1-130354, *Discussion on spectral efficiency improvement for small cell enhancements*, 3GPP TSG RAN WG1 Meeting #72, China Telecom (January 28-February 3, 2013)	January 18, 2013
R1-130384, *On improved spectral efficiency for small cells*, 3GPP TSG RAN WG1 Meeting #72, Research in Motion UK Limited (January 28-February 3, 2013)	January 19, 2013
R1-130404, *Enhanced transmission scheme for SCE*, 3GPP TSG RAN WG1 Meeting #72, NTT DOCOMO (January 28-February 3, 2013)	January 19, 2013
R1-130425, *Performance Evaluation for 256-QAM*, 3GPP TSG RAN WG1 Meeting #72, Renesas Mobile Europe Ltd (January 28-February 3, 2013)	January 19, 2013
R1-130593, *Higher order modulation for small cells*, 3GPP TSG RAN WG1 Meeting #72, Qualcomm Inc. (January 28-February 3, 2013)	January 19, 2013
R1-130604, *Simulations for small cell spectrum efficiency improvements-256QAM*, 3GPP TSG RAN WG1 Meeting #72, CATR (January 28-February 3, 2013)	January 19, 2013
R1-130023, *Potential technologies for small cell enhancement - operation efficiency improvement*, 3GPP TSG RAN WG1 Meeting #72, Huawei, HiSilicon (January 28-February 3, 2013)	January 19, 2013

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Title, Author(s), and Publisher	Date of Publication
R1-130058, *Mechanisms for efficient small cell operations*, 3GPP TSG RAN WG1 Meeting #72, CATT (January 28-February 3, 2013)	January 18, 2013
R1-130135, *Mechanisms for interference avoidance and coordination in small cell scenarios*, 3GPP TSG RAN WG1 Meeting #72, ZTE (January 28-February 3, 2013)	January 19, 2013
R1-130690, *Techniques for efficient small cell operations*, 3GPP TSG RAN WG1 Meeting #72, Panasonic (January 28-February 3, 2013)	January 27, 2013
R1-130342, *Efficient Small Cell Operations*, 3GPP TSG RAN WG1 Meeting #72, Hitachi Ltd. (January 28-February 3, 2013)	January 18, 2013
R1-130408, *Enhanced Coordination Aspects for Small Cell Enhancement*, 3GPP TSG RAN WG1 Meeting #72, NTT DOCOMO (January 28-February 3, 2013)	January 19, 2013
R1-130024, *Feasibility and benefits of radio-interface based synchronization mechanisms for operation efficiency improvement*, 3GPP TSG RAN WG1 Meeting #72, Huawei, HiSilicon (January 28-February 3, 2013)	January 19, 2013
R1-130088, *Discussion on small cell discovery operation*, 3GPP TSG RAN WG1 Meeting #72, Huawei, HiSilicon (January 28-February 3, 2013)	January 19, 2013
R1-130861, Final Report of 3GPP TSG RAN WG1 #72 v1.0.0 (St. Julian's, Malta, January 28-February 1, 2013)	January 28-February 1, 2013
R1-093746, *Final Report of 3GPP TSG RAN WG1 #58 v1.0.0*, TSG RAN WG1 Meeting #58, MCC Support (August 24-28, 2009)	August 24-28, 2009
R1-094421, *Final Report of 3GPP TSG RAN WG1 #58bis v1.0.0*, TSG RAN WG1 Meeting #59, MCC Support (October 12-16, 2009)	October 12-16, 2009
R1-092419, *Type-II Relay Reference Signal Transmission and UE Association ,* TSG RAN WG1 Meeting #57bis, Research In Motion, UK Limited (June 29-July 3, 2009)	June 29-July 3, 2009
R1-125061, *Discussion on scenarios for small cell enhancement in Rel-12*, 3GPP TSG-RAN WG1 Meeting #71, CMCC (November 12 – 16, 2012)	November 12 – 16, 2012

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Title, Author(s), and Publisher	Date of Publication
R1-130409, *Physical Layer Design for Dual Connectivity*, 3GPP TSG RAN WG1 Meeting #72, NTT DOCOMO (January 28 – February 1, 2013)	January 19, 2013
R2-130420, *Protocol architecture alternatives for dual connectivity*, 3GPP TSG-RAN WG2 Meeting #81, Ericsson (January 28 – February 1, 2013)	January 28 – February 1, 2013
R2-130520, Discussion on dual connectivity and requirements, 3GPP TSG RAN WG2 Meeting #81, Alcatel-Lucent Shanghai Bell (January 28 – February 1, 2013)	January 28 – February 1, 2013
Sesia et al., LTE: The UMTS Long Term Evolution From Theory to Practice (2011) ("Sesia")	2011
Holma & Toskala, LTE for UMTS (2009) ("Holma & Toskala 1")	2009
Holma & Toskala, LTE for UMTS (2011) ("Holma & Toskala 2")	2011
Lee, J. et al., *Coordinated multipoint transmission and reception in LTE-advanced systems*, IEEE Communications Magazine, vol. 50, iss. 11 (November 2012) ("Lee IEEE Article")	November 15, 2012

3. Identification Of Prior Art Sales/Public Uses related to the 383 Patent

Item Offered for Sale and/or Publicly Used	Date of Offer/Public Use	Person or Entity Who Made and Received Offer, Made Public Use, or Made Information Known
Nokia base station equipment (for example the Nokia Flexi Multiradio 10 Base Station)[13]		Nokia

[13] Defendants' and Intervenors' identification of Nokia base station equipment is based upon Wireless Alliance's proposed interpretation of the claims of the 383 Patent in light of its infringement contentions.

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Item Offered for Sale and/or Publicly Used	Date of Offer/Public Use	Person or Entity Who Made and Received Offer, Made Public Use, or Made Information Known
Ericsson base station equipment(for example the Ericsson RBS 6000 series)[14]		Ericsson
All systems or products that embody the technology described in any patent or publication identified in these Preliminary Invalidity Contentions.		

B. P.R. 3-3(B) – ANTICIPATION AND OBVIOUSNESS

Pursuant to P.R. 3-3 (b), and subject to Defendants' and Intervenors' reservation of rights, Defendants and Intervenors attach claim charts hereto that are directed to the prior art references that anticipate each of the Asserted Claims of the Asserted Patent under 35 U.S.C. § 102 either expressly or inherently, and/or the prior art references that, in the alternative, would have rendered the Asserted Claims obvious under 35 U.S.C. § 103. See Exs. C-01 through C-07 and Appendix C1. Any combinations contained or referenced in Defendants' and Intervenors' claim charts are exemplary. Any prior art reference cited herein may be combined with any other reference to demonstrate the invalidity of any of the Asserted Claims, as set forth below and in Appendix C1.

To the extent any claim limitation is construed to have a similar meaning, or to encompass similar feature(s) and/or function(s), as any other claim limitation, the citations to prior art

[14] Defendants' and Intervenors' identification of Ericsson base station equipment is based upon Wireless Alliance's proposed interpretation of the claims of the 383 Patent in light of its infringement contentions.

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references for each of those claim limitations in Defendants' and Intervenors' claim charts are incorporated by reference with respect to each other.

Defendants' and Intervenors' claim charts provide exemplary citations to the prior art references that teach or suggest every element of each of the Asserted Claims of the Asserted Patent. To the extent that an element of an Asserted Claim is not shown in a chart, the Asserted Claims would have been obvious based on a combination of one or more other prior art references, as set forth below and in Appendix C1.

Much of the art cited in these Preliminary Invalidity Contentions reflects common knowledge and the state of the art at the time of the earliest filing date of the Asserted Patent. Defendants and Intervenors may rely on additional citations, references, expert testimony, and other material to provide context or to aid in understanding the cited portions of the references and/or cited features of the systems. Defendants and Intervenors also may rely on expert testimony explaining relevant portions of references, relevant hardware or software products or systems, and other discovery regarding these subject matters. Additionally, Defendants and Intervenors may rely on other portions of any prior art reference for purposes of explaining the background and general technical subject area of the reference.

Where an individual reference is cited with respect to all elements of an Asserted Claim, Defendants contend that the reference anticipates the claim under 35 U.S.C. § 102 and also renders obvious the claim under 35 U.S.C. § 103, both by itself in view of the knowledge of a person of ordinary skill in the art and in combination with the other cited references to the extent the reference is not found to disclose one or more claim elements. A single prior art reference, for example, can establish obviousness where the differences between the disclosures within the reference and the claimed invention would have been obvious to one of ordinary skill in the art.

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For example, "[c]ombining two embodiments disclosed adjacent to each other in a prior art patent does not require a leap of inventiveness." *Bos. Sci. Scimed, Inc. v. Cordis Corp.*, 554 F.3d 982, 991 (Fed. Cir. 2009). To the extent Plaintiff contends that an embodiment within a particular item of prior art does not fully disclose all limitations of a claim, Defendants and Intervenors accordingly reserve their rights to rely on other embodiments in that prior art reference, or other information, to show single reference obviousness under 35 U.S.C. § 103.

Where an individual reference is cited with respect to fewer than all elements of an Asserted Claim, Defendants and Intervenors contend that the reference renders obvious the claim under 35 U.S.C. § 103 in view of each other reference and combination of references that discloses the remaining claim element(s), as indicated in the claim charts submitted herewith. "Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (quoting *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17 (1966)).

Exemplary motivations to combine references are discussed below and in some instances within the accompanying charts. Defendants and Intervenors reserve the right to rely upon any references or assertions identified herein in connection with Defendants' and Intervenors' contentions that each Asserted Claim is invalid under 35 U.S.C. § 103 and to rely upon expert testimony addressing such references and assertions. The fact that prior art is identified to anticipate the Asserted Claims presents no obstacle in also relying on that reference as a basis for invalidity based on obviousness. It is established that "a rejection for obviousness under § 103 can be based on a reference which happens to anticipate the claimed subject matter." In re *Meyer*,

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599 F.2d 1026, 1031 (C.C.P.A. 1979). To the extent any cited prior art item may not fully disclose a limitation of an Asserted Claim or is alleged by Plaintiff to lack disclosure of the limitation, such limitation is present and identified in another prior art item as shown in the attached claim charts.

Many of the cited references cite or relate to additional references and/or products, services, or projects. Many of the cited references also cite software, hardware, or systems. Defendants and Intervenors might rely upon such cited additional references and/or products and copies or exemplars of such software, hardware, or systems. Defendants and Intervenors will produce or make available for inspection any such cited references, products, software, hardware, or systems that it intends to rely upon. Defendants and Intervenors may also rely upon the disclosures of the references cited and/or discussed during the prosecution of the Asserted Patent and/or the assertions presented regarding those references.

Defendants and Intervenors reserve the right to further streamline and reduce the number of anticipation or obviousness references relied upon with respect to a given Asserted Claim and to exchange or otherwise modify the specific references relied upon for anticipation and within each obviousness combination for each Asserted Claim.

C. P.R. 3-3(C) – CLAIM CHARTS

Defendants and Intervenors attach the following claim charts pursuant to P.R. 3-3(c):

- Ex. C-01: 383 Patent over 3GPP Standards
- Ex. C-02: 383 Patent over 3GPP Standardization Documents
- Ex. C-03: 383 Patent over Nokia and Ericsson base station equipment and UE's complying with one or more sections of the 3GPP Standards cited in Exhibit C-01
- Ex. C-04: 383 Patent over Acharaya
- Ex. C-05: 383 Patent over Verma
- Ex. C-06: 383 Patent over Rong

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- Ex. C-07: 383 Patent over Yu

The attached claim charts are based, in whole or in part, on Plaintiff's asserted theories of infringement in this case, to the extent discernible from Plaintiff's Infringement Contentions. As an initial matter, all portions of each prior art reference cited in each of the attached claim charts are relied upon to support the disclosure of each patent claim limitation, as all portions provide general support. Representative descriptions and supporting citations are nevertheless provided, but are merely exemplary; they do not necessarily reflect every instance where a particular claim term or claim limitation may be disclosed in or taught by the prior art reference. References to figures or drawings refer to the figures/drawings themselves, as well as to any accompanying text or text necessary to understand the figures or drawings. References to text refers to the text itself, as well as the accompanying figures or drawings that accompany the text. Defendants and Intervenors reserve the right to rely on additional, or different, portions of the prior art references, other publications and expert testimony to establish what these references would have taught one of ordinary skill in the art, or in what manner they would have motivated a particular combination of references. Moreover, in certain instances, representative documents for certain prior art systems are cited, but, again, are merely exemplary; they do not necessarily reflect or include every document relating to the prior art system that exists and that discloses or teaches a particular claim term or claim limitation. Defendants and Intervenors reserve the right to rely on any and all documents that describe or relate to prior art systems, including relying on the system itself. Defendants and Intervenors also reserve the right to rely on the testimony of the authors, named inventors, or anyone else with knowledge of the prior art references and systems identified herein, as well as expert testimony regarding any such references or systems.

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D. OBVIOUSNESS AND MOTIVATION TO COMBINE

The primary references identified above, and as further described in Exhibits C-01 through C-07, each discloses, either expressly or inherently, every element of each of the Asserted Claims, thereby anticipating those claims. To the extent Plaintiff contends that any primary reference does not anticipate each of the Asserted Claims of the 383 Patent, it would have been obvious to combine or modify the primary references with concepts from other prior art, as explained herein and in the following Appendix. Each of these combinations is exemplary and representative, and the below does not constitute an exhaustive list of the possible combinations of the primary references, nor the primary references in combination with any additional references noted in the Appendix. Defendants and Intervenors reserve the right to rely on combinations outside of the below listed.

- Any one of the 3GPP Standards in combination with any of 3GPP TS 36.331 v11.3.0; 3GPP TR 36.932 v12.1.0; 3GPP TR 36.932 v12.0.0; 3GPP TS 36.214 v11.1.0; 3GPP TS 36.331 v11.2.0; 3GPP TS 36.211 v11.2.0; 3GPP TS 36.211 v11.1.0 (collectively, the "3GPP Standards")

- The 3GPP Standards in combination with R1-130566; RP-122032; RP-122033; R1-092419; R1-093290; R1-094113; R1-094462; R1-103072 in further view of R1-113149 (the "3GPP Standardization Documents")

- 3GPP Standards in combination with U.S. Patent Publication No. 2011/0223900 ("Yu")

- 3GPP Standards in combination with U.S. Patent Publication No. 2013/0089034 ("Acharaya")

- 3GPP Standards in combination with U.S. Patent Publication No. 2013/013441 ("Verma")

- 3GPP Standards in combination with U.S. Patent Publication No. 2013/003759 ("Rong")

- Any one of the 3GPP Standardization Documents combination with any other one of the 3GPP Standardization Documents R1-130566; RP-122032; RP-122033; R1-092419; R1-093290; R1-094113; R1-094462; R1-103072 in further view of R1-113149

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- 3GPP Standardization Documents R1-130566; RP-122032; RP-122033; R1-092419; R1-093290; R1-094113; R1-094462; R1-103072; and R1-113149, in combination with U.S. Patent Publication No. 2011/0223900 ("Yu")

- 3GPP Standardization Documents R1-130566; RP-122032; RP-122033; R1-092419; R1-093290; R1-094113; R1-094462; R1-103072; and R1-113149, in combination with U.S. Patent Publication No. 2013/0089034 ("Acharaya")

- 3GPP Standardization Documents R1-130566; RP-122032; RP-122033; R1-092419; R1-093290; R1-094113; R1-094462; R1-103072; and R1-113149, in combination with U.S. Patent Publication No. 2013/003759 ("Rong")

- 3GPP Standardization Documents R1-130566; RP-122032; RP-122033; R1-092419; R1-093290; R1-094113; R1-094462; R1-103072; and R1-113149, in combination with U.S. Patent Publication No. 2013/013441 ("Verma")

- U.S. Patent Application No. 2011/0223900 ("Yu") in combination with U.S. Patent Application No. 2013/0089034 ("Acharaya")

- U.S. Patent Application No. 2011/0223900 ("Yu") in combination with U.S. Patent Application No. 2013/003759 ("Rong")

- U.S. Patent Application No. 2011/0223900 ("Yu") in combination with U.S. Patent Application No. 2013/013441 ("Verma")

- combine U.S. Patent Application No. 2013/0089034 ("Acharaya") in combination with U.S. Patent Application No. 2013/003759 ("Rong")

- U.S. Patent Application No. 2013/0089034 ("Acharaya") in combination with U.S. Patent Application No. 2013/013441 ("Verma")

- U.S. Patent Application No. 2013/013441 ("Verma") in combination with U.S. Patent Application No. 2013/003759 ("Rong")

- Any of the above, in combination with any reference noted in Appendix C1.

In particular, for each limitation of each of the Asserted Claims that Plaintiff contends is not met by a particular primary reference, Defendants and Intervenors contend that the limitation (and claim as a whole) is obvious based on a combination of that particular primary reference with (1) any other primary reference disclosing that limitation, (2) any reference identified in Appendix C1 as disclosing that limitation, and/or (3) the knowledge of a person of ordinary skill in the art and/or any of the references and concepts discussed herein regarding the relevant background and

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state of the art. The specific combinations of prior art that Defendants and Intervenors contend render the Asserted Claims of the 383 Patent obvious are readily determinable as described herein. Defendants' and Intervenors' obviousness grounds for each dependent claim incorporate the obviousness grounds for the claim(s) from which the dependent claim depends in addition to any obviousness grounds identified in the charts for the dependent claim.

Defendants and Intervenors do not yet have the benefit of Plaintiff's positions on the prior art, including what (if any) elements it contends are missing in each prior art reference, whether Plaintiff agrees that a reference is in fact prior art, and whether Plaintiff agrees that a person of ordinary skill in the art would be motivated to combine specific references. Defendants and Intervenors reserve the right to supplement these obviousness positions (including identifying additional prior art combinations and the associated reasons to combine) as discovery in the case progresses, including expert discovery.

1. Motivation To Combine

Each prior art reference may be combined with one or more other prior art references to render obvious each of the Asserted Claims of the 383 Patent in combination, as explained in more detail below. The disclosures of these references also may be combined with information known to persons skilled in the art at the time of the alleged invention, and understood and supplemented in view of the common sense of persons skilled in the art at the time of the alleged invention, including any statements in the intrinsic record of the 383 Patent and related applications.

A person of ordinary skill would have been motivated to combine the prior art cited in the attached claim charts based on the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. The identified prior art references, including portions cited in the claim charts, address the same or similar technical issues and suggest the same or similar solutions to those issues as the Asserted Claims of the 383 Patent. On such

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bases, on an element-by-element basis, Defendants and Intervenors intend to combine one or more prior art references identified in the claim charts attached as Exhibits C-01 to C-07 and/or Appendices C1 with each other to address any contention from Plaintiff that a particular prior art item supposedly lacks one or more elements of an Asserted Claim of the 383 Patent. In other words, Defendants and Intervenors contend that each charted prior art reference can be combined with other charted prior art references when a particular prior art item lacks or does not explicitly disclose an element or feature of an Asserted Claim of the 383 Patent. A person of ordinary skill in the art would have been motivated to make such combinations based on, for example, the below. The below list of motivations to combine is exemplary and representative, and is not an exhaustive list of motivations to combine, nor potential combinations.

- A person of ordinary skill in the art would have been motivated to combine 3GPP TS 36.331 v11.3.0 in combination with any of 3GPP TR 36.932 v12.1.0; 3GPP TR 36.932 v12.0.0; 3GPP TS 36.214 v11.1.0; 3GPP TS 36.331 v11.2.0; 3GPP TS 36.211 v11.2.0; 3GPP TS 36.211 v11.1.0 (collectively, the "3GPP Standards"), as the 3GPP Standards are technical specifications defining different aspects of the same standard and a person of ordinary skill in the art would understand that the 3GPP Standards were therefore meant to be read together.

- A person of ordinary skill in the art would have been motivated to combine the 3GPP standards in combination with any of the 3GPP contributions R1-130566; RP-122032; RP-122033; R1-092419; R1-093290; R1-094113; R1-094462; R1-103072 in further view of R1-113149, because those contributions were being discussed and provided to propose specific changes to the 3GPP standards. Moreover, each 3GPP standard and each contribution were released and/or discussed around during similar time periods.

- A person of ordinary skill in the art would have been motivated to combine the 3GPP standards in combination with U.S. Patent Publication No. 2011/0223900 ("Yu") because the 3GPP standards show the standardization of the methods and systems disclosed in Yu. Moreover, both references discuss heterogeneous networks and methods for improving the coverage and capacity of heterogeneous networks.

- A person of ordinary skill in the art would have been motivated to combine the 3GPP standards in combination with U.S. Patent Publication No. 2013/0089034 ("Acharaya") because the 3GPP standards show the standardization of the methods

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and systems disclosed in Acharaya. Moreover, both references discuss heterogeneous networks and methods for improving the coverage and capacity of heterogeneous networks.

- A person of ordinary skill in the art would have been motivated to combine the 3GPP standards in combination with U.S. Patent Publication No. 2013/013441 ("Verma") because the 3GPP standards show the standardization of the methods and systems disclosed in Verma. Moreover, both references discuss heterogeneous networks and methods for improving the coverage and capacity of heterogeneous networks.

- A person of ordinary skill in the art would have been motivated to combine the 3GPP standards in combination with U.S. Patent Publication No. 2013/003759 ("Rong") because the 3GPP standards show the standardization of the methods and systems disclosed in Rong. Moreover, both references discuss heterogeneous networks and methods for improving the coverage and capacity of heterogeneous networks.

- A person of ordinary skill in the art would have been motivated to combine the any one of the 3GPP Standardization Documents combination with any other one of the 3GPP standardization documents R1-130566; RP-122032; RP-122033; R1-092419; R1-093290; R1-094113; R1-094462; R1-103072 in further view of R1-113149, because those contributions were being discussed and provided to propose specific changes to the same 3GPP standards and a person of ordinary skill in the art would understand that the 3GPP Standardization Documents were therefore meant to be read together.

- A person of ordinary skill in the art would have been motivated to combine the 3GPP standardization documents R1-130566; RP-122032; RP-122033; R1-092419; R1-093290; R1-094113; R1-094462; R1-103072; and R1-113149, in combination with U.S. Patent Publication No. 2011/0223900 ("Yu") because those contributions were directed to proposals and changes to the 3GPP Standards which show the standardization of the methods and systems disclosed in Yu. Moreover, the original assignee of Yu is Research in Motion, and several of the 3GPP standardization documents are Research in Motion Standards contributions describing the same methods and systems for improved coverage and capacity in heterogeneous networks.

- A person of ordinary skill in the art would have been motivated to combine the 3GPP standardization documents R1-130566; RP-122032; RP-122033; R1-092419; R1-093290; R1-094113; R1-094462; R1-103072; and R1-113149, in combination with U.S. Patent Publication No. 2013/0089034 ("Acharaya") because those contributions were directed to proposals and changes to the 3GPP Standards which show the standardization of the methods and systems disclosed in Acharaya.

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- A person of ordinary skill in the art would have been motivated to combine the 3GPP standardization documents R1-130566; RP-122032; RP-122033; R1-092419; R1-093290; R1-094113; R1-094462; R1-103072; and R1-113149, in combination with U.S. Patent Publication No. 2013/003759 ("Rong") because those contributions were directed to proposals and changes to the 3GPP Standards which show the standardization of the methods and systems disclosed in Rong.

- A person of ordinary skill in the art would have been motivated to combine the 3GPP standardization documents R1-130566; RP-122032; RP-122033; R1-092419; R1-093290; R1-094113; R1-094462; R1-103072; and R1-113149, in combination with U.S. Patent Publication No. 2013/013441 ("Verma") because those contributions were directed to proposals and changes to the 3GPP Standards which show the standardization of the methods and systems disclosed in Verma. In particular, Verma discloses methods and systems related to CoMP, and several of the 3GPP Standardization documents are directed to changes to aspects of the 3GPP standard related to CoMP.

- A person of ordinary skill in the art would have been motivated to combine U.S. Patent Application No. 2011/0223900 ("Yu") with U.S. Patent Application No. 2013/0089034 ("Acharaya") because both references disclose improvements to heterogeneous networks and are related to UL and DL cell association of a UE. Further, Yu and Acharaya are parallel references because each reference discloses RSRP-based cell association.

- A person of ordinary skill in the art would have been motivated to combine U.S. Patent Application No. 2011/0223900 ("Yu") with U.S. Patent Application No. 2013/003759 ("Rong") because both references discloses improvements to heterogeneous networks, and are related to UL and DL cell association of a UE. Further, Yu and Rong are parallel references because reference discloses RSRP-based cell association.

- A person of ordinary skill in the art would have been motivated to combine U.S. Patent Application No. 2011/0223900 ("Yu") with U.S. Patent Application No. 2013/013441 ("Verma") because both references are related to UL and DL cell association of a UE based on signal strength A POSITA would therefore understand these are parallel references.

- A person of ordinary skill in the art would have been motivated to combine U.S. Patent Application No. 2013/0089034 ("Acharaya") with U.S. Patent Application No. 2013/003759 ("Rong") because both references disclose improvements to heterogeneous networks and are related to UL and DL cell association of a UE. Further, Rong and Acharaya are parallel references because each reference discloses RSRP-based cell association.

- A person of ordinary skill in the art would have been motivated to combine U.S. Patent Application No. 2013/0089034 ("Acharaya") with U.S. Patent Application No. 2013/013441 ("Verma") because both references disclose improvements to

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heterogeneous networks and are related to UL and DL cell association of a UE. Further, a POSITA would understand that these are parallel references because they both disclose cell association based on signal strength.

- A person of ordinary skill in the art would have been motivated to combine U.S. Patent Application No. 2013/013441 ("Verma") with U.S. Patent Application No. 2013/003759 ("Rong") because both references disclose improvements to heterogeneous networks and are related to UL and DL cell association of a UE. Further, a POSITA would understand that these are parallel references because they both disclose cell association based on signal strength.

The suggested obviousness combinations discussed herein are not to be construed to suggest that any reference included in the combinations is not anticipatory. Further, to the extent that Plaintiff contends that any of the anticipatory prior art fails to disclose one or more limitations of the Asserted Claims of the 383 Patent, Defendants and Intervenors reserve the right to identify other prior art references that, when combined with the anticipatory prior art, would render the claims obvious despite an allegedly missing limitation. Defendants and Intervenors will further specify the motivations to combine the prior art, including through reliance on expert testimony, at the appropriate later stage of this lawsuit.

The decision in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007), held that patents that are based on new combinations of elements or components already known in a technical field may be found to have been obvious. The Supreme Court rejected a rigid application of the "teaching, suggestion, or motivation [to combine]" test. *Id*. at 407, 418. "In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim." *Id*. at 419. "Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id*. at 420. The Supreme Court emphasized the principle that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield

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predictable results." *Id*. at 416. A key inquiry is whether the "improvement is more than the predictable use of prior art elements according to their established function." *Id*. at 417.

The Court further held that "in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id.* at 420. It is sufficient that a combination of elements was "obvious to try" – "When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense." *Id.* at 421. "In that instance the fact that a combination was obvious to try might show that it was obvious under § 103." *Id*. Finally, the Supreme Court recognized that "[g]ranting patent protection to advances that would occur in the ordinary course without real innovation retards progress and may, in the case of patents combining previously known elements, deprive prior inventions of their value or utility." *Id*. at 419.

The rationale to combine or modify prior art references is significantly stronger when the references seek to solve the same problem, come from the same field, and correspond well together. *See In re Inland Steel Co.*, 265 F.3d 1354, 1362 (Fed. Cir. 2001) (allowing two references to be combined as invalidating art under similar circumstances where the art "focus[ed] on the same problem ... c[a]me from the same field of art [and] ... the identified problem found in the two references correspond[ed] well").

All of the following rationales recognized in *KSR* support a finding of obviousness with respect to each of the obviousness combinations disclosed herein: (1) combining prior art elements according to known methods to yield predictable results; (2) simple substitution of one known element for another to obtain predictable results; (3) use of a known technique to improve similar

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devices, methods, or products in the same way; (4) applying a known technique to a known device, method, or product ready for improvement to yield predictable results; (5) "obvious to try," that is, choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; (6) known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art; and (7) some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention. Certain of these rationales are discussed more specifically below. The fact that other rationales are not discussed more specifically should not be interpreted as an admission or concession that the other rationales do not apply.

Multiple teachings, suggestions, motivations, and/or reasons to modify any of the references and/or to combine two or more of the prior art references set forth herein come from many sources, including the prior art itself (individual references and as a whole), common knowledge, common sense, predictability, expectations, industry trends, design incentives or need, market demand or pressure, market forces, obviousness to try, the nature of the problem faced, and/or knowledge possessed by a person of ordinary skill. Defendants and Intervenors reserve the right to present expert testimony on, among other things, the teachings, suggestions, motivations, and/or reasons to modify any of the references and/or to combine any two or more of the prior art references presented in Exhibits C-01 through C-07 and/or Appendix C1.

Defendants and Intervenors further contend that the prior art identified in these Preliminary Invalidity Contentions is evidence of simultaneous or near-simultaneous independent invention by others of the alleged invention as recited in one or more of the Asserted Claims of the 383 Patent.

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Defendants and Intervenors reserve their rights to rely on the simultaneous or near-simultaneous independent invention by others as further evidence of the obviousness of the Asserted Claims of the 383 Patent.

Each limitation of each of the Asserted Claims of the 383 Patent was well-known to those of ordinary skill in the art at the time. At best, the elements recited in the Asserted Claims of the 383 Patent are a mere combinations and modifications of these well-known elements. A person of ordinary skill in the art would be able, and motivated, to improve the existing technology in the same or similar manner by combining or modifying the individual elements that were already known in the art to yield predictable results.

2. Background And State Of The Art

Defendants and Intervenors set forth below a summary of their current understanding of the state of the art as understood as of the asserted priority dates of the 383 Patent for the general subject matter of the 383 Patent. The information discussed in this section may have formed the background knowledge of a person of ordinary skill in the art at the time the 383 Patent was filed and may have been used in determining whether and how to combine references to achieve the claimed inventions. *See Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013) (stating that "the knowledge [of a person of ordinary skill in the art] is part of the store of public knowledge that must be consulted when considering whether a claimed invention would have been obvious"). Defendants and Intervenors expressly reserve the right to rely on each of the prior art references, systems, concepts, and technologies discussed in this Section with respect to the 383 Patent.

Defendants and Intervenors contend that, to the extent the primary references identified in these Preliminary Invalidity Contentions do not anticipate the Asserted Claims, it would have been obvious to combine any of the references, systems, concepts, or technologies discussed in this Section with those primary references. Defendants and Intervenors also reserve the right to rely

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on the discussions of the state of the art and prior art in the 383 Patent specification and its file history including file histories of related patents and foreign file histories of related patents in explaining the state of the art. Defendants and Intervenors further expressly reserve the right to supplement their summary of the background and state of the art, including, for example, with information from any of the authors or named inventors on any of the prior art references, by personnel familiar with systems based on any of the prior art references, or any prior art systems related to prior art references, or by technical experts retained on behalf of any party. Defendants and Intervenors also expressly reserve the right to rely on any admissions by any of the named inventors, institutions with which they were associated, and Plaintiff, regarding the state of the art.

In wireless communication, heterogeneous networks refer to a system of radio cells with varying coverage ranges or access technologies that interoperate to deliver improved network capacity and coverage. Heterogeneous networks and the resulting densification of the networks led to the emergence of dual connectivity or multi-connectivity. This functionality aims to enable User Equipment (UE) to be simultaneously connected to a macro-cell base station, usually called a master node, and to one—dual connectivity—or more—multi-connectivity—lower-tier node(s), such as pico-cells, femto-cells, small-cells, and/or heterogeneous node(s), such as nodes with different radio access technology, such as LTE, 3G, or 2G. Sylla, T. et al., *Multi-Connectivity for 5G Networks and Beyond: A Survey*, Sensors (Basel) (October 2022). Dual connectivity and multi-connectivity has been around in certain forms at least as early as 2009 with the discussion of UL/DL coverage imbalances in relay networks. R1-094113 at 1.

Prior to the introduction of dual connectivity in Release 12, similar functionality existed in Relay Networks. Relays, or Relay Nodes (RN) are additional network nodes designed to complement a macro-cellular network of regular eNodeBs by expanding coverage or increasing

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capacity and were introduced in Release 10. Sesia at 673. A RN is a network node connected wireless to a source eNodeB, and the RNs are under full control of the radio access network. It was agreed at 3GPP RAN1 Meeting #56bis in March 2009 that Type II relay should be studied. R1-094462. To further this study, Research in Motion UK Limited ("RIM") analyzed the UL/DL imbalance issue in a relay network and proposed a UE association scheme for an UL/DL imbalanced Type-II relay network at 3GPP RAN1 Meeting #59 (November 9-13, 2009). In particular, RIM explained that there can be a big difference between and eNB transmission power and a relay node transmission power, which leads to different coverage areas for the relay node and the eNB and ultimately imbalanced UL/DL coverage. As a result, RIM proposed several UE associations types for a relay network that splits UL and DL coverage for the UE between the eNB and the RN. R1-094462.

An approach for dual-connectivity and multi-connectivity in heterogeneous networks was also standardized in 3GPP Release 11 with Coordinated Multiple Point Transmission and reception (CoMP), which became a core feature of Release 11 and LTE-advanced systems. Lee, J. et al., *Coordinated multipoint transmission and reception in LTE-advanced systems*, IEEE Communications Magazine, vol. 50, iss. 11 (November 2012); *see also* Sylla, T. et al., *Multi-Connectivity for 5G Networks and Beyond: A Survey*, Sensors (Basel) (October 2022). At the 3GPP TSG RAN #50 meeting in 2010, the Study Item description on Coordinated Multi-Point Operation for LTE was agreed for Release 11. 3GPP TR 36.819 V11.1.0 (2011-12) at § 4; *see also* 3GPP TR 36.814 v9.0.0 (2010-03) at § 8. CoMP deployment scenarios included heterogeneous networks wherein there is coordinated multipoint uplink (UL) and downlink (DL) transmission between a macro cell and multiple low transmission power remote radio heads. 3GPP TR 36.819 V11.1.0 (2011-12) at §§ 5, 6, 7.3. The transmission/reception points created by the remote radio

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head can have the same or different cell ID as the macro cell's ID. *Id*. Uplink and downlink signal transmission between multiple transmission points improve the received strength of the desired signal at the UE, and help ensure that the uplink signal from the UE is reliably received by the network. Lee, J. et al., *Coordinated multipoint transmission and reception in LTE-advanced systems*, IEEE Communications Magazine, vol. 50, iss. 11 (November 2012) at 44.

LTE-A Release 12 dual connectivity was first identified as two study items for the physical and higher layer design of small cell enhancements for E-UTRA and E-UTRAN at 3GPP Plenary meeting #58 (December 4-7, 2012). During early discussions of defining dual connectivity and aligning working group views on the benefits of dual connectivity at WG#2 Meeting #81 between January 28-Febraury 1, 2013, Nokia presented a comparison of different dual and single radio alternatives for uplink (UL) and downlink (DL) transmission, including Dual radio/Simultaneous DL/UL; Dual radio, TDM between eNBs DL/UL; Dual radio, simultaneous DL, time division connection for UL; Dual radio DL, single radio UL (small cell); and Single radio DL/UL (small cell) as shown in the figure below.

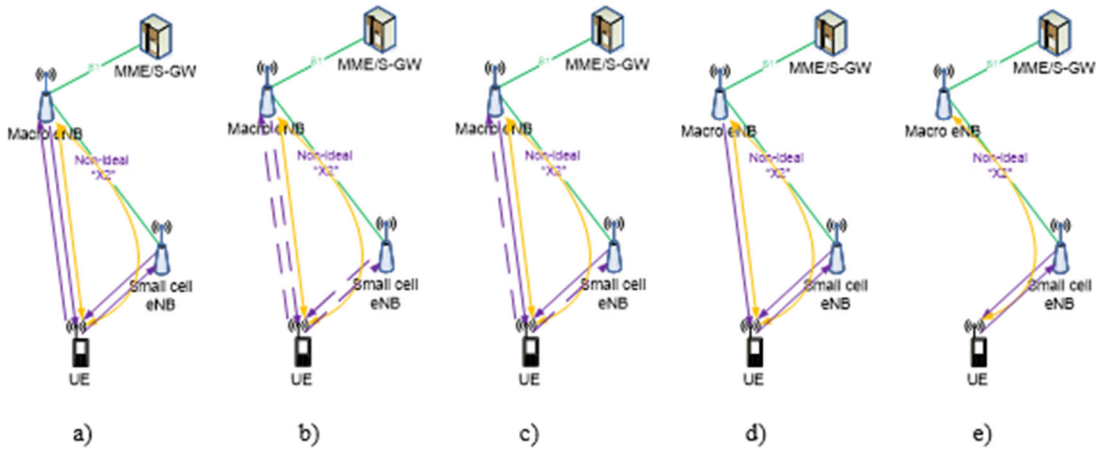

Figure 1 Dual connectivity alternatives: a) dual radio simultaneous DL/UL, b) dual radio, TDM between eNBs DL/UL, c) dual radio, simultaneous DL, TDM for UL, d) dual radio DL, single radio UL, e) single radio DL/UL

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R2-130453. With respect to the specific UL/DL aspect of dual connectivity, Ericsson further proposed dual connectivity as a solution for UL/DL imbalance at WG#1 Meeting #72 between January 28-Febraury 1, 2013. R1-130566. In particular, Ericsson explained that in heterogeneous networks, the base stations have different downlink output power, e.g., macro base stations with high output power and pico base stations with low output power. *Id*. Due to the power imbalance, the best cell to connect with may differ depending on if one considers downlink or uplink performance. *Id*. Ericsson further explained that, in LTE, Reference Signal Received Power-based (RSRP-based) cell selection is often used. *Id*. In this scheme, terminals are associated with the cell from which the strongest downlink power is received, which may result in UEs connecting to the macro cell even though the path loss to the pico is lower. *Id*. Ericsson proposed dual connectivity as a solution to this problem. That is, Ericsson proposed to maintain connectivity to both nodes simultaneously and split the uplink and downlink between different nodes. *Id*. Specifically, Ericsson's UL/DL split allows a terminal to be connected in downlink to the cell which offers highest downlink throughput, which is typically the cell from which the highest RSRP is received, while being connected in uplink to the cell which offers highest uplink throughput. *Id*.

The above standardization history shows that there was a robust and comprehensive discussion of dual connectivity and simultaneous UL/DL cell association before the filing date of the 383 Patent.

3. Secondary Considerations

A patentee bears the burden of production with respect to evidence of secondary considerations of non-obviousness. *ZUP, LLC v. Nash Mfg., Inc.*, 896 F.3d 1365, 1373 (Fed. Cir. 2018). As of the date of these Preliminary Invalidity Contentions, Plaintiff has not identified any evidence of secondary considerations. As shown in these Preliminary Invalidity Contentions,

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other companies and individuals described, built, and/or patented the exact same concepts in the 383 Patent before Plaintiff ever did—often many years before. Even where others' invention occurred around the same time as the 383 Patent, such simultaneous invention demonstrates the obviousness of the 383 Patent.

Additionally, potentially relevant evidence includes any prior art reference cited herein that occurred before or around the alleged inventions claimed in the 383 Patent. This also includes any prior art asserted in these Preliminary Invalidity Contentions that Plaintiff is able to pre-date based on its asserted priority dates by proving, *inter alia*, corroborated conception and diligent reduction to practice.

Defendants and Intervenors reserve all rights to further respond to any secondary considerations of non-obviousness raised by Plaintiff, including by updating, modifying, and/or adding to these Preliminary Invalidity Contentions. Defendants and Intervenors are not aware of any unexpected results (none is mentioned in the 383 Patent or its file histories), long felt need, commercial success (or any nexus to any allegedly successful commercial embodiment), or awards for the alleged inventions of the 383 Patent.

E. P.R. 3-3(D): INVALIDITY UNDER 35 U.S.C. § 112

As set forth below, Defendants and Intervenors contend that the Asserted Claims are invalid due to failure to comply with 35 U.S.C. § 112, including as Wireless Alliance has applied the Asserted Claims for purposes of its infringement contentions, due to the lack of enablement, written description, and/or presence of indefinite terms in the asserted claims.

Defendants' and Intervenors' contentions that the Asserted Claims identified in this section are made in the alternative and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the Asserted Claims identified herein or that the Asserted Claims identified herein would not have been anticipated and/or obvious in light of the prior art.

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Plaintiff has not yet provided a claim construction for any of the terms or phrases that Defendants and Intervenors anticipate will be in dispute. Defendants and Intervenors, therefore, cannot provide a complete list of § 112 defenses because Defendants and Intervenors do not know whether Plaintiff will proffer a construction for certain terms and phrases that is broader than, or inconsistent with, the construction that would be supportable by the disclosure set forth in the specification. Defendants and Intervenors offer these contentions without prejudice to any position they may ultimately take as to any claim construction issues.

Accordingly, Defendants and Intervenors reserve the right to supplement, amend, and/or modify these § 112 invalidity contentions as discovery progresses.

1. Invalidity Under 35 U.S.C. § 112(a)

35 U.S.C. § 112(a) requires that the specification contain a written description of the invention. "[T]he hallmark of written description is disclosure." *Bos. Sci. Corp. v. Johnson & Johnson*, 647 F.3d 1353, 1361-62 (Fed. Cir. 2011) (citation omitted). The test for whether a specification adequately describes an invention is "whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date .... [T]he test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art .... [It] is a question of fact." *Ariad Pharms., Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc); *Bos. Sci.*, 647 F.3d at 1362.

The enablement requirement of Section 112 demands that the patent specification enable "those skilled in the art to make and use the full scope of the claimed invention without 'undue experimentation.'" *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (quoting In re *Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993)). "[T]he scope of the claims must be

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less than or equal to the scope of the enablement." *Nat'l Recovery Tech., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1196 (Fed. Cir. 1999).

Defendants and Intervenors contend that the following Asserted Claims are invalid under 35 U.S.C. § 112(a). Each Asserted Claim identified below is invalid under 35 U.S.C. § 112(a) because the specification of the Asserted Patent fails to provide a sufficient written description, enabling disclosure and/or fails to inform, with reasonable certainty, those skilled in the art about the scope of the invention the meaning of the term(s) and/or phrase(s):

Asserted Patent	**Asserted Claim(s)**	**Term(s) and/or Phrase(s) Lacking Written Description and/or Enablement**
383 Patent	1, 6	"identifier of a second base station providing an uplink control channel"
383 Patent	1, 6	"identifier of the second base station"
383 Patent	6	"networking unit"
383 Patent	4	"receiving, performed by the second base station, an uplink reference signal"
383 Patent	1, 6	"transmitting, performed by the first base station, the identifier of a second base station through the downlink cell association" / "transmit the identifier of the second base station through the downlink cell association"

2. Invalidity Under 35 U.S.C. § 112(b)

Claims are indefinite under 35 U.S.C. § 112(b) when they "fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014).

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In addition to Defendants' and Intervenors' reservation of rights stated above, Defendants and Intervenors note that the Court's Docket Control Order contemplates that all indefiniteness issues be brought to the Court's attention through the Markman briefing process. Defendants' and Intervenors' detailed arguments as to indefiniteness will be presented at that time, i.e., through the Markman meet and confer and briefing process.

Defendants and Intervenors contend that the Asserted Claim is invalid under 35 U.S.C. § 112(b). The Asserted Claim(s) identified below is invalid under § 112(b) because they fail to inform, with reasonable certainty, those skilled in the art about the scope of the claimed invention:

Asserted Patent	Asserted Claim(s)	Indefinite Term(s) and/or Phrase(s)
383 Patent	1, 6	"determining, performed by the first base station, an identifier of a second base station providing an uplink control channel" / determine an identifier of a second base station providing an uplink control channel"
383 Patent	1, 6	"identifier of the second base station"
383 Patent	1, 6	"receiving, performed by a first base station, a strength of the downlink reference signal from the terminal" / "receive a strength of the downlink reference signal form the terminal"
383 Patent	1	"establishing, performed by the first base station, a downlink cell association with the terminal"
383 Patent	1, 6	"transmitting, performed by the first base station, the identifier of a second base station through the downlink cell association" / "transmit the identifier of the second base station through the downlink cell association"

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Asserted Patent	Asserted Claim(s)	Indefinite Term(s) and/or Phrase(s)
383 Patent	1	"establishing, performed by the second base station, an uplink cell association with the terminal"
383 Patent	6	"a processor configured to establish a downlink cell association with the terminal"

3. Invalidity Under 35 U.S.C. § 112(f)

At least asserted claims 1-2, 4-7 of the 383 Patent are invalid under 35 U.S.C. § 112(f) because they are written in means-plus-function language. Claim 6, for instance, includes a limitation of "networking unit configured to transmit a downlink reference signal to a terminal." Each and every limitation of independent claim 6 is written in purely functional language. *Williamson v. Citrix Online, LLC*, 792 F.3d 1339 (Fed. Cir. 2014). Accordingly, each limitation is a means-plus-function limitation and is governed by 35 U.S.C. § 112(f). The 383 patent specification, however, fails to set forth any algorithm or any corresponding structure for these means-plus-function clauses. Accordingly, at least asserted claim 1-2, 4-7 of the 383 patent is invalid for failure to particularly point out and distinctly claim the subject matter that the inventor regards as the invention and is therefore indefinite and invalid under § 112(b), and also violates § 112(f). Because there is no corresponding structure in the 383 patent specification for these means-plus-function clauses and because Wireless Alliance did not recite structure in its Infringement Contentions for the 383 patent, Defendants and Intervenors reserve the right to add citations to their invalidity contentions and claim charts to address the structure for these means-plus-function clauses; as the invalidity claim charts stand, however, there is at least as much structure set forth for the prior art for each limitation as there is in the 383 specification.

IV. ACCOMPANYING DOCUMENT PRODUCTION

Pursuant to P.R. 3-4(a), Defendants and Intervenors are producing documentation sufficient to show the operation of any aspects or elements of each Accused Instrumentality identified by Plaintiff in its P.R. 3-1(c) charts.

Additionally, Pursuant to P.R. 3-4(b), Defendants and Intervenors are producing herewith a copy of each prior art reference identified above pursuant to P.R. 3-3(a) which does not appear in the file histories of the 106, 662, or 383 Patents as well as additional prior art references. To the extent any such prior art reference is not in English, Defendants and Intervenors have produced to Plaintiff or will produce to Plaintiff an English translation of the portion(s) of the non-English prior art reference (s) relied upon by Defendants and Intervenors.

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DATED: September 8, 2023.

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CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the above and foregoing document has been served on September 8, 2023, on the counsel of record via electronic mail.

/s/ David S. Frist
David S. Frist

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