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

ACTIVE WIRELESS TECHNOLOGIES LLC, Plaintiff, v. T-MOBILE USA, INC. and T-MOBILE US, INC., Defendants, ERICSSON INC. and NOKIA OF AMERICA CORPORATION, Intervenors.	Case No. 2:23-cv-00261-JRG **JURY TRIAL DEMANDED**

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DEFENDANTS' SUPPLEMENTAL P.R. 3-3 AND 3-4 DISCLOSURES

I. INTRODUCTION

Pursuant to P.R. 3-3 and 3-4, the Docket Control Order (Dkt. 33), and Paragraph 3(a)(ii) of the Discovery Order (Dkt. 35), Defendants T-Mobile USA, Inc. and T-Mobile US, Inc. (collectively, "T-Mobile"), Intervenor Ericsson Inc. ("Ericsson") and Intervenor Nokia of America Corporation ("Nokia") (all defendants and intervenors collectively, "Defendants") hereby disclose their Supplemental P.R. 3-3 and 3-4 disclosures ("Supplemental Invalidity Contentions") in view of Plaintiff Active Wireless Technologies, LLC ("Active Wireless" or "Plaintiff") various P.R. 3-1 Disclosure of Asserted Claims and Infringement Contentions, served September 14, 2023, and Plaintiff's Amended Disclosure of Asserted Claims and Infringement Contentions, served May 29, 2024 (collectively, "Infringement Contentions"). In the event that Active Wireless is granted leave to amend its Infringement Contentions or its infringement theories, these Supplemental Invalidity Contentions may change, and Defendants reserve the right to further amend or supplement these Supplemental Invalidity Contentions.

Defendants contend that each of the Asserted Claims (as defined below) by Active Wireless is invalid under 35 U.S.C. §§ 102, 103, and/or 112 for at least the reasons provided below.[1]

A. Asserted Claims

Active Wireless served Infringement Contentions alleging infringement of the following patents and claims (collectively, the "Asserted Patents" and "Asserted Claims"):

- Claims 3 and 5 of U.S. Patent No. 10,531,443 (the "'443 Patent");
- Claims 9-16 of U.S. Patent No. 11,019,557 (the "'557 Patent");
- Claims 3-4 and 6 of U.S. Patent No. 10,785,764 (the "'764 Patent"); and

[1] All Asserted Patents have priority dates after March 16, 2013. Accordingly, all references to 35 U.S.C. §102 refer to the AIA version of that statute defining prior art.

- Claims 8-14 and 16 of U.S. Patent No. 10,601,566 (the "'566 Patent").

These Supplemental Invalidity Contentions address only the Asserted Claims specifically set forth in Active Wireless' Infringement Contentions. Defendants do not concede that the claims that Active Wireless has not asserted are valid and reserve all rights to amend these contentions if Active Wireless asserts additional claims and/or patents.

B. Ongoing Discovery and Disclosures

Defendants base their Supplemental Invalidity Contentions on their current knowledge and understanding of the Asserted Claims and review of prior art, as of the date of these Supplemental Invalidity Contentions. Defendants' Supplemental Invalidity Contentions are made without the benefit of discovery regarding the parties' claim construction contentions, expert discovery, third-party discovery, and claim construction opinion or order by the Court. Defendants also base their SupplementaInvalidity Contentions on their current understanding of the Asserted Claims in view of Active Wireless' Infringement Contentions. These Supplemental Invalidity Contentions are provided without prejudice to Defendants' right to revise, amend, correct, supplement, modify, or clarify their Supplemental Invalidity Contentions.

Defendants incorporate by reference all other bases for invalidity identified in Defendants' Answers, Initial Disclosures, and interrogatory responses in this matter, and the prosecution or post-grant review (e.g., during *Inter Partes* Review) of the Asserted Patents and all related patents and/or patent applications, including but not limited to statements made by both the patent applicant and patent examiners, and references cited therein. For the avoidance of doubt, Defendants hereby expressly incorporate by reference the invalidity theories and positions set forth in the following IPRs:

- IPR2024-00886, concerning U.S. Patent No. 11,019,557;[2]
- IPR2024-00951, concerning U.S. Patent No. 10,531,443;[3]
- IPR2024-00985, concerning U.S. Patent No. ,10,601,566;[4] and
- IPR2024-00986, concerning U.S. Patent No. 10,785,764.[5]

Defendants further incorporate by reference all admissions regarding the Asserted Patents including, but not limited to, admissions in the specification of the Asserted Patents, and the prosecution or post-grant review of the Asserted Patents and related patents and/or patent applications. Defendants further incorporate any and all invalidity contentions previously served or subsequently served in any related litigation, or served in any prior litigation involving the Asserted Patents and related patents (collectively, the "Other Actions").

C. Claim Construction

The Court has not construed the Asserted Claims. Defendants map the prior art references to the Asserted Claims based on Active Wireless' apparent constructions, to the extent understood, of the Asserted Claims as advanced in Active Wireless' Infringement Contentions. However, nothing stated in this document or accompanying claim charts should be treated as an admission or suggestion that Active Wireless' apparent claim constructions are correct, or that any claim terms of the Asserted Claims are not invalid under 35 U.S.C. § 112 for being indefinite, failing to satisfy the written description requirement, or failing to satisfy the enablement requirement. In fact, Defendants specifically deny that Active Wireless' apparent claim constructions are proper.

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[2] The invalidity theories set forth in IPR2024-00886 are incorporated in Exhibit B09.

[3] The invalidity theories set forth in IPR2024-00951 are incorporated in Exhibits A02, A05, and A06.

[4] The invalidity theories set forth in IPR2024-00985 are incorporated in Exhibit D11.

[5] The invalidity theories set forth in IPR2024-00986 are incorporated in Exhibit C08.

Depending on the Court's construction of the Asserted Claims of the Asserted Patents, and/or positions that Active Wireless or its expert witness(es) may take concerning claim interpretation, infringement, and/or invalidity issues, the asserted prior art references may be of greater or lesser relevance. Given this uncertainty, the charts may reflect alternative applications of the prior art against the Asserted Claims. Thus, no chart or position taken by Defendants should be construed as an admission or a waiver of any particular construction of any claim term. Defendants also reserve the right to challenge any of the claim terms under 35 U.S.C. § 112, including by arguing that they are indefinite, not supported by the written description, and/or not enabled.

D. Effective Dates

Active Wireless asserted under P.R. 3-1(e) that the Asserted Claims of the '443 Patent are entitled to a priority date of June 15, 2017; that the Asserted Claims of the '557 Patent are entitled to a priority date of May 10, 2018; and that the Asserted Claims of the '764 and '566 Patents are each entitled to a priority date of August 10, 2017. Defendants contest Active Wireless' alleged priority dates with respect to the '443, '557 and '566 Patents. The '443 Patent is entitled to a priority date of no earlier than June 13, 2018, the '557 Patent is entitled to a priority date of no earlier than May 10, 2019, and the '566 Patent is entitled to a priority date of no earlier than August 8, 2018.

Defendants contest Active Wireless' claimed priority dates as new matter was added to the specification of the Asserted Patents through later-filed applications disclosing new matter that was incorporated into the Asserted Claims. Defendants reserve the right to rely on prior art dated after Active Wireless' claimed priority date to the extent Active Wireless fails to prove entitlement to the above priority dates for any Asserted Claim. To the extent Active Wireless in the future seeks and is granted leave to amend its disclosures in an attempt to establish an earlier effective

date, Defendants reserve the right to amend these contentions in response, including by disclosing additional prior art or earlier versions or evidence of the prior art disclosed herein.

E. Prior Art Identification and Citation

The accompanying invalidity claim charts (Exhibits A-D) cite to particular teachings and disclosures of the prior art references as applied to features of the Asserted Claims. However, persons having ordinary skill in the art may view an item of prior art generally in the context of other publications, literature, products, and understanding. Accordingly, the cited portions are only exemplary and are intended to put Active Wireless on notice of the basis for Defendants' contentions. Defendants have endeavored to identify the most relevant portions of the references, but the references may contain additional support for particular claim limitations. Defendants reserve the right to rely on uncited portions of the prior art references, other documents, and/or operational systems, as well as fact and expert testimony, to provide context or to aid in understanding the cited portions of the references and interpreting the teachings of the prior art and to establish bases for combinations of certain cited references that render the Asserted Claims obvious.

Defendants reserve the right to rely on any prior art system referenced, embodied, or described in any of the prior art references identified herein, or which embodies any of the prior art references identified herein. Moreover, Defendants reserve the right to rely on inventor admissions concerning the scope of the prior art relevant to the asserted patents found in, *inter alia*, the prosecution histories or post-grant review proceedings of the asserted patents and related patents and/or patent applications, any testimony or declarations of the named inventors concerning the asserted patents or related patents, and any papers or evidence submitted by Active Wireless in connection with this litigation, any other pending or future litigation brought by Active Wireless involving the asserted patents or related patents. Defendants also may establish what was

known to a person having ordinary skill in the art through treatises, published industry standards other publications, products, and/or testimony.

Where the invalidity claim charts (Exhibits A-D) cite to a particular figure in a reference, the citation should be understood to encompass the caption of the figure and other text relating to and/or describing the figure. Similarly, where the invalidity claim charts cite to particular text referring to a figure, the citation should be understood to include the figure and related figures as well.

The prior art references listed herein and in the accompanying claim charts may disclose the elements of the Asserted Claims explicitly and/or inherently. The prior art references are also relevant for their showing of the state of the art and reasons and motivations for making improvements, additions, and combinations. The suggested obviousness combinations are provided in the alternative to Defendants' anticipation contentions and are not to be construed to suggest that any reference is not itself anticipatory.

Further, the combinations of prior art references contained herein demonstrating the obviousness of the Asserted Patents under 35 U.S.C. § 103 are merely exemplary and are not intended to be exhaustive. All such combinations are intended to include and are in view of the knowledge of a person of ordinary skill in the art. Additional obviousness combinations of the identified prior art references are possible, and Defendants reserve the right to use any such combination(s) in this Action. In particular, Defendants are currently unaware of the extent, if any, to which Active Wireless will contend that limitations of any particular claim(s) is/are not disclosed in the art that Defendants have identified as anticipatory. To the extent that Active Wireless does so, Defendants reserve the right to identify other evidence or references that anticipate or render obvious the particular claim(s).

Nothing in these Supplemental Invalidity Contentions should be treated as an admission that any of Defendants' accused instrumentalities meet any limitation of the Asserted Claims. Defendants deny infringing the Asserted Claims. To the extent that any prior art reference identified by Defendants contains a claim element that is the same as or similar to an element in an accused instrumentality, based on a claim construction inferred from Active Wireless' Infringement Contentions, inclusion of that reference in Defendants' Supplemental Invalidity Contentions is not a waiver by Defendants of any claim construction or non-infringement position, nor is it an admission or suggestion by Defendants that any accused instrumentality satisfies the limitations of the Asserted Claims under a proper construction of those claims.

F. Lack of Inventorship and Proper Ownership

Defendants reserve the right to assert that the Asserted Claims are invalid under 35 U.S.C. § 101 in the event that Defendants obtain evidence that the named inventor of the Asserted Patents did not invent (either alone or in conjunction with other parties) the subject matter claimed in the Asserted Patents. Should Defendants obtain such evidence, Defendants will provide the name of the person(s) from whom and the circumstances under which the invention or any part of it was derived, and/or the circumstances surrounding the making of the invention before the patent application.

G. Additional Reservation of Rights

Defendants' identification in the prior art of claim elements recited in the preamble of any claims is not intended to indicate that any such preamble is limiting. All such disclosures are made only to the extent the preamble is determined to be limiting.

As described above, Defendants also intend to diligently seek discovery from third parties to demonstrate the inventions were in public use, on sale, or otherwise available to the public under

35 U.S.C. § 102(a)(1). Defendants may therefore further modify, amend, and/or supplement these Supplemental Invalidity Contentions if and when further information becomes available.

Additionally, Defendants incorporate by reference into these contentions every claim element cross-referenced in Active Wireless' Infringement Contentions. For any element in Active Wireless' Infringement Contentions for which Active Wireless refers to the information from one or more other elements (whether in the same or a different patent), Defendants incorporate by reference the same cross-reference for these contentions.

Subject to the foregoing statements and qualifications, Defendants provide the following disclosures.

II. P.R. 3-3 DISCLOSURES AND CONTENTIONS

The following Exhibits (also referred to as Appendices) include claim charts of prior art references that, alone and/or in combination with other references, render the Asserted Claims of the Asserted Patents invalid under 35 U.S.C. §§ 102 or 103, and further include (directly and/or in combination with the corresponding subparts of Sections II.B. of this document) secondary references that would have been obvious to combine with the charted prior art references and motivations for making such combinations.

Exhibit A	'433 Patent
Exhibit B	'557 Patent
Exhibit C	'764 Patent
Exhibit D	'566 Patent

A. P.R. 3-3(a) Disclosures: Identification of Items of Prior Art that Anticipate

Subject to Defendants' reservation of rights, Defendants contend that the following prior art patents, printed publications, and systems, alone and/or in combination, anticipate and/or render obvious the Asserted Claims of the Asserted Patents.

As noted above, however, discovery is ongoing, and Defendants' prior art investigation and third party discovery are therefore not yet complete. Accordingly, Defendants reserve the right to present additional items of prior art under 35 U.S.C. § 102(a) and/or § 103 located during the course of discovery or further investigation. For example, Defendants expect to issue subpoenas to third parties believed to have knowledge, documentation, and/or corroborating evidence concerning some of the prior art listed in this and the following sections and/or additional prior art. These third parties include, without limitation, the authors, inventors, or assignees of the references listed in these disclosures.

While the categories of art (patents/applications, non-patent publications, and systems) below are organized by asserted patent number, because of the overlapping nature of the asserted patents, Defendants identify each reference in each category as art applicable to each of the asserted patents.

1. Prior Art Patents and Published Patent Applications

Defendants disclose the following patents and patent application publications:

a. <u>The '443 Patent</u>

Exh.	Patent/Publication No.	Country of Origin	Named Inventor	Issue / Publication Date	Short Title
A01	USP 11,206,108	U.S.	Yi Wang, Shichang Zhang, Yingyang Li	Dec. 21, 2021	Wang
A02	USP 11,012,221	U.S.	Suckchel Yang, Kijun Kim, Seonwood Kim, Changhwan Park, Joonkui Ahn, Hanjun Park, Seunggye Hwang	May 18, 2021	Yang

Exh.	Patent/Publication No.	Country of Origin	Named Inventor	Issue / Publication Date	Short Title
A03	USP 10,582,531	U.S.	Daesung Hwang, Yunjung Yi, Jaehyung Kim, Hanjun Park, Inkwon Seo, Suckchel Yang	Mar. 3, 2020	Hwang

b. <u>The ’557 Patent</u>

Exh.	Patent/Publication No.	Country of Origin	Named Inventors	Issue Date / Publication Date	Short Title
B01	USP 11,310,728	U.S.	Ahmad Awada, Ingo Viering	April 19, 2022	Awada
B02	USP 11,297,610	U.S.	Prateek Basu Mallick, Hyejung Jung, Joachim Loehr, Alexander Johann, Maria Golitschek, Edler von Elbwart, Ravi Kuchibhotla, Vijay Nangia	April 5, 2022	Mallick ’610
B03	USP 10,904,910	U.S.	Hung-Chen Chen, Chie-Ming Chou, Yung-Lan Tseng	January 26, 2021	Chen ’910
B04	US Prov. App. 62/668,711	U.S.	Prateek Basu Mallick, Hyejung Jung, Joachim Loehr, Alexander Johann, Maria Golitschek, Edler von Elbwart, Ravi Kuchibhotla, Vijay Nangia	May 8, 2018	Mallick ’711
B05	US Prov. App. 62/656,827	U.S.	Hung-Chen Chen, Chie-Ming Chou, Yung-Lan Tseng	April 12, 2018	Chen ’827
B07	WO 2018/016922	WO	Mangesh Abhimanyu Ingale, Anil Agiwal	January 25, 2018	Ingale
B08	US Pat. App. Pub. No. 2015/0223258	U.S.	Sunghoon Jung, Youngae Lee, Sungjun Park, Seungjune Yi, Jaewook Lee	August 6, 2015	Jung

c. **The ’764 Patent**

Exh.	Patent/Publication No.	Country of Origin	Inventor	Issue Date/ Publication Date	Short Title
C01	USP 10,785,752	U.S.	Hui Xu, Zijiang Ma, Chen Lu, Yaying Wang	Sept. 22, 2020	Xu
C02	USP 11,049,360	U.S.	Seokmin Shin, Hyangsun YouJoonkui Ahn, Yunjung YiSeunggye Huang	June 15, 2021	Shin ’360
C03	USP 11,006,443	U.S	Xiaolei Tie, Tong Ji, Meng Hua	May 11, 2021	Tie
C04	US Pub. 2018/0048985	U.S.	Kyujin Park, Woo-Jin Choi	February 15, 2018	Park
C05	USP 11, 160,094	U.S.	Seokmin Shin, Hyangsun You, Joonkui Ahn, Yunjung Yi, Seunggye Hwang	2021-03-16	Shin ’094
C07	US Pub. 2019/0182632	U.S.	Masata Fujishiro, Henry Chang	June 13, 2019	Fujishiro

d. **The ’566 Patent**

Exh.	Patent/Publication No.	Country of Origin	Inventor	Issue Date/ Publication Date	Short Title
D01	USP 11,057,871 (Huang)	U.S.	Yi Huang, Wanshi Chen, Juan Montojo, Peter Gaal, Tao Luo, Renqiu Wang, Seyong Park	Jul. 6, 2021	Huang
D02	US Pub. 2020/0229177 (Zou)	U.S.	Zhenhua Zou, Kittipong Kittichokechai, Gustav Wikstrom, Marten Sundberg	Jul., 16, 2020	Zou
D03	US Pub. 2019/0159191 (Kim)	U.S.	Seonwook Kim, Suckchel Yang, Kijun Kim, Yunjung Yi, Eunsun Kim, Hyangsun You, Jaehyung Kim	May 23, 2019	Kim

Exh.	Patent/Publication No.	Country of Origin	Inventor	Issue Date/ Publication Date	Short Title
D04	US Pub. 2020/0052835 (Xiong)	U.S.	Gang Xiong, Joonyoung Cho, Lopamudra Kundu, Yongjun Kwak	Feb. 13, 2020	Xiong
D05	USP 10,951,350 (Gao)	U.S.	Xuejuan Gao	Mar. 16, 2021	Gao
D06	USP 11,109,404 (Lee)	U.S	Seungmin Lee, Suckchel Yang, Seonwook Kim	Aug. 31, 2021	Lee

2. Prior Art Non-Patent Publications

In addition to the patents and patent and patent application publications, Defendants disclose the following additional publications:

a. <u>The ’443 Patent</u>

Exh.	Title	Author / Publisher	Date Published	Short Title
A04	3GPP Prior Art Standards (including specifically: 3GPP TS 36.213 V13.5.0 (2017-03); 3GPP TS 36.212 V14.2.0 (2017-03))	3GPP	March 23, 2017	443 3GPP Standards Prior Art

b. <u>The ’557 Patent</u>

Exh.	Title	Author / Publisher	Date Published	Short Title
B06	’577 3GPP RAN2 Working Group Materials	3GPP	(see individual documents in charts	557 3GPP RAN2 Working Group Materials

c. **The ’764 Patent**

Exh.	Title	Author / Publisher	Date Published	Short Title
C06	3GPP Prior Art Standards and RAN1 Working Group Materials (including specifically: references as identified in the associated chart and in the Title column)	3GPP	(dates as identified in the associated chart and in the Title column)	764 3GPP Standards Prior Art

d. **The ’566 Patent**

Exh.	Title	Author / Publisher	Date Published	Short Title
D07	3GPP TSG-RAN WG1 Meeting #88bis, R1-1704208	3GPP / Huawei/HiSilicon	(no later than) April 3, 2017	R1-1704208
D08	3GPP TSG-RAN WG1 NR Ad-Hoc#2, R1-1710555	3GPP / Intel	(no later than) June 27, 2017	R1-1710555
D09	3GPP TSG RAN WG1 Meeting #89, R1-1707396	3GPP / Intel	(no later than) May 15, 2017	R1-1707396
D10	3GPP TSG RAN WG1 Meeting #NR Ad-Hoc#2, R1-1710116	3GPP / ZTE	(no later than) June 27, 2017	R1-1710116

The following references are not separately charted in an exhibit but relied upon to show that each of these references is prior art under section 102(a).

Exh.	Title	Authors	Date Published	Short Title
	3GPP Releases 8, 9, 10, 11 and/or 12 (as cited in the specification of the ‘566 at 4:23-30 and as discussed 4:51-6:36			

3. **Prior Art Systems**

Defendants also contend that the Asserted Claims are invalid in view of public knowledge, uses and/or offers for sale or sales of products and services that are prior art under 35 U.S.C.

§ 102(a) and/or prior inventions made in this country by other inventors, and that anticipate or render obvious the Asserted Claims.

The following lists each system that is now known by Defendants to constitute prior art under 35 U.S.C. § 102(a). Defendants contend that the following descriptions and events are stated on information and belief, and are supported by the information and documents that will be produced by Defendants and/or third parties. As discovery is ongoing, Defendants continue to investigate these events.

Defendants also reserve the right to rely upon any system, public knowledge or use embodying or otherwise incorporating any of the prior art disclosed below, alone or in combination. Defendants further reserve the right to rely upon any other documents or references describing any such system, knowledge or use.

The following systems, and any other systems identified in these contentions, are prior art under 35 U.S.C. § 102(a).

a. <u>'443 Patent</u>

Based on information currently known to Defendants, at least the following products or systems are prior art: 4G LTE systems. Defendants intend to adduce further evidence on the availability and operation of these products during discovery. As noted by the '443 Patent inventors in the Detailed Description section, the patented technology relates to existing technology already deployed (and/or standardized) in prior art LTE systems as well as systems discussed in previous working groups:

> The 3rd Generation Partnership Project, also referred to as "3GPP," is a collaboration agreement that aims to define globally applicable technical specifications and technical reports for third and fourth generation wireless communication systems. The 3GPP may define specifications for next generation mobile networks, systems and devices.

3GPP Long Term Evolution (LTE) is the name given to a project to improve the Universal Mobile Telecommunications System (UMTS) mobile phone or device standard to cope with future requirements. In one aspect, UMTS has been modified to provide support and specification for the Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN).

At least some aspects of the systems and methods disclosed herein may be described in relation to the 3GPP LTE, LTE-Advanced (LTE-A) and other standards (e.g., 3GPP Releases 8, 9, 10, 11 and/or 12). However, the scope of the present disclosure should not be limited in this regard. At least some aspects of the systems and methods disclosed herein may be utilized in other types of wireless communication systems.

A wireless communication device may be an electronic device used to communicate voice and/or data to a base station, which in turn may communicate with a network of devices (e.g., public switched telephone network (PSTN), the Internet, etc.). In describing systems and methods herein, a wireless communication device may alternatively be referred to as a mobile station, a UE, an access terminal, a subscriber station, a mobile terminal, a remote station, a user terminal, a terminal, a subscriber unit, a mobile device, etc. Examples of wireless communication devices include cellular phones, smart phones, personal digital assistants (PDAs), laptop computers, netbooks, e-readers, wireless modems, etc. In 3GPP specifications, a wireless communication device is typically referred to as a UE. However, as the scope of the present disclosure should not be limited to the 3GPP standards, the terms "UE" and "wireless communication device" may be used interchangeably herein to mean the more general term "wireless communication device." A UE may also be more generally referred to as a terminal device.

In 3GPP specifications, a base station is typically referred to as a Node B, an evolved Node B (eNB), a home enhanced or evolved Node B (HeNB) or some other similar terminology. As the scope of the disclosure should not be limited to 3GPP standards, the terms "base station," "Node B," "eNB," and "HeNB" may be used interchangeably herein to mean the more general term "base station." Furthermore, the term "base station" may be used to denote an access point. An access point may be an electronic device that provides access to a network (e.g., Local Area Network (LAN), the Internet, etc.) for wireless communication devices. The term "communication device" may be used to denote both a wireless communication device and/or a base station. An eNB may also be more generally referred to as a base station device.

It should be noted that as used herein, a "cell" may be any communication channel that is specified by standardization or regulatory bodies to be used for International Mobile Telecommunications-Advanced (IMT-Advanced) and all of it or a subset of it may be adopted by 3GPP as licensed bands (e.g., frequency bands) to be used for communication between an eNB and a UE. It should also be noted that in E-

Active Wireless Exhibit No. 2002, IPR2024-00886
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UTRA and E-UTRAN overall description, as used herein, a "cell" may be defined as "combination of downlink and optionally uplink resources." The linking between the carrier frequency of the downlink resources and the carrier frequency of the uplink resources may be indicated in the system information transmitted on the downlink resources.

"Configured cells" are those cells of which the UE is aware and is allowed by an eNB to transmit or receive information. "Configured cell(s)" may be serving cell(s). The UE may receive system information and perform the required measurements on all configured cells. "Configured cell(s)" for a radio connection may consist of a primary cell and/or no, one, or more secondary cell(s). "Activated cells" are those configured cells on which the UE is transmitting and receiving. That is, activated cells are those cells for which the UE monitors the physical downlink control channel (PDCCH) and in the case of a downlink transmission, those cells for which the UE decodes a physical downlink shared channel (PDSCH). "Deactivated cells" are those configured cells that the UE is not monitoring the transmission PDCCH. It should be noted that a "cell" may be described in terms of differing dimensions. For example, a "cell" may have temporal, spatial (e.g., geographical) and frequency characteristics.

Fifth generation (5G) cellular communications (also referred to as "New Radio", "New Radio Access Technology" or "NR" by 3GPP) envisions the use of time/frequency/space resources to allow for enhanced mobile broadband (eMBB) communication and ultra-reliable low latency communication (URLLC) services, as well as massive machine type communication (mMTC) like services. In order for the services to use the time/frequency/space medium efficiently it would be useful to be able to flexibly schedule services on the medium so that the medium may be used as effectively as possible, given the conflicting needs of URLLC, eMBB, and mMTC. A new radio base station may be referred to as a gNB. A gNB may also be more generally referred to as a base station device.

In 5G NR, at least two different types of uplink control channel (PUCCH) formats may be specified: at least one short PUCCH format and one long PUCCH format. The PUCCH channel is designed to carry uplink control information (UCI). In NR, multiple short PUCCH formats and multiple long PUCCH formats may be defined, and the PUCCH formats of a UE may be configured by a base station.

The PUCCH resource allocation and indication are important aspects for NR operations. One of the most important UCI is hybrid-ARQ acknowledgements (HARQ-ACK) feedback for DL transmissions. A PUCCH for HARQ-ACK feedback may be determined explicitly or implicitly. However, the number of HARQ-ACK bits in a NR PUCCH report may vary dramatically based on the scheduling and configurations, and the number of HARQ-ACK bits may be much larger than that of a LTE feedback in some cases.

> To satisfy the performance requirements of HARQ-ACK feedback, the gNB has to configure PUCCH resources to carry HARQ-ACK feedback based on the maximum target payload. This may cause very conservative PUCCH resource reservation, and significantly increase the PUCCH resource overhead.
>
> The systems and methods described herein teach dynamic PUCCH format adaptation based on the HARQ-ACK feedback status and scheduling indications. In an aspect, a switch between a long PUCCH and a short PUCCH is described herein. In another aspect, a switch between different PUCCH formats of the same duration or PUCCH category is described herein.

'443 Patent, 3:22-5:19. Defendants intend to take discovery on the specific implementations of the prior art technology for the dynamic PUCCH format adaptation based on the HARQ-ACK feedback status and scheduling indications to establish that the Asserted Claims are not patentable improvements over the prior art.

Defendants' investigation, including third-party discovery in this matter, is ongoing.

b. <u>'557 Patent</u>

Based on information currently known to Defendants, at least the following products or systems are prior art: 4G LTE systems. Defendants intend to adduce further evidence on the availability and operation of these products during discovery. As noted even by the '557 Patent inventor in the Background section, the patented technology relates to existing technology already deployed (and / or standardized) in prior art LTE systems as well as systems discussed in previous working groups. The inventor acknowledges that largely all of the asserted claim elements are found in the prior art LTE systems:

> In wireless communication systems, a radio access network generally comprises one or more access nodes (such as a base station) which communicate on radio channels over a radio or air interface with plural wireless terminals. In some technologies such a wireless terminal is also called a User Equipment (UE). A group known as the 3rd Generation Partnership Project ("3GPP") has undertaken to define globally applicable technical specifications and technical reports for present and future generation wireless communication systems. The 3GPP Long Term Evolution ("LTE") and 3GPP LTE Advanced (LTE-A) are projects to improve an earlier Universal Mobile Telecommunications System ("UMTS") mobile phone or device standard in a manner to cope with future requirements.

> In typical cellular mobile communication systems, the base station broadcasts on the radio channels certain information which is required for mobile stations to access to the network. In Long-Term Evolution (LTE) and LTE Advanced (LTE-A), such information is called "system information" ("SI"). Each access node, such as an evolved NodeB ("eNB") or a gNB in the 5G New Radio (NR) System, broadcasts such system information to its coverage area via a Master Information Block (MIB) and several System Information Blocks (SIBs) on downlink radio resources allocated to the access node.
>
> A wireless terminal ("UE"), after entering a coverage area of an eNB or gNB, is required to obtain all the MIB/SIBs which are necessary to access to the system. For sake of UEs under coverage, the eNB or gNB periodically broadcasts all MIB/SIBs relevant for offered services, where each type of MIB or SIBs is transmitted in a designated radio resource(s) with its own pre-determined/configurable frequency.
>
> This all-broadcast-based periodic delivery method (e.g., collective broadcast of all SIBs, not just those necessary for system access) is efficient under a condition where many UEs are almost always flowing into the coverage area (such as a macro cell). However, this approach may result in wasting valuable radio resources in case of small cell deployment. Therefore, more efficient methods of SIB transmission are desired.

'557 at 1:25-64. Thus, relevant to the claims, the Background acknowledges that prior art 4G LTE base stations have the claimed transmitting circuitry that will transmit multiple different types of SIB blocks that configure SI windows in which the SI message is periodically transferred. Moreover, prior art LTE systems included the "value tag" field (since the early 2000s) that plaintiff cites as the claimed "parameter" as well as the indication of broadcast status, all while serving as a current serving access node of the user equipment. Thus, plaintiff is essentially accusing functionality that existed in LTE prior to the earliest effective filing date of the '557 patent as detailed in, for example, the '557 3GPP charts (557 3GPP RAN2 Working Group Materials), and in the Answers (Dkt. Nos. 25, 34, 37). Defendants' investigation, including third-party discovery in this matter, is ongoing.

c. **<u>'764 Patent</u>**

Based on information currently known to Defendants, at least the following products or systems are prior art: 4G LTE systems. Defendants intend to adduce further evidence on the availability and operation of these products during discovery. As noted even by the '764 Patent inventors in the Background section, the patented technology relates to existing technology already deployed (and / or standardized) in prior art LTE systems as well as systems discussed in previous working groups:

> For better implementation of the Internet of Everything, at the 3GPP RAN #69 plenary meeting held in September 2015, a new work item was proposed in the Third Generation Partnership Project (3GPP) Long Term Evolution Project (LTE) standard (see non-patent document: RP-151621 New Work Item: NarrowBand IoT (NB-IoT), which may be referred to as narrowband Internet of Things (NB-IoT). In the description of this project, NB IoT is configured to be a narrow band system that operates on 180 KHz uplink and downlink, so that terminals in the Internet of Things would meet the requirements such as low power consumption, long standby, cost reduction, wide coverage, and others. The first phase of the NB-IoT system has completed basic function designs, including broadcast notification of system information, point-to-point unicast uplink data transmission, and downlink data reception. Considering multicast requirements for software download, terminal system upgrade, and packet information delivery in the future Internet of Things, it was determined that a new work item was needed to enhance NB-IoT and achieve multicast at the 3GPP RAN #72 plenary meeting held in June 2016 (see non-patent document: RP-161324 New work item proposal: Enhancements of NB-IoT). It was clearly pointed out that multicast transmission in the NB-IoT system is to be implemented on the basis of the features of the existing version 13 LTE SC-PTM.
>
> In an existing LTE system, SC-PTM (single-cell point-to-multipoint) refers to multicast transmission of a multimedia broadcast service performed within a single cell. The feature introduces two logical channels: an SC-MCCH and an SC-MTCH, which are multiplexed on a DL-SCH transmission layer channel. The SC-MCCH (Single-Cell Multicast Control Channel) is a control channel, and information carried on the channel includes a multicast service type broadcasted in a current cell, and scheduling and receiving configurations of the service channel SC-MTCH on which the multicast service is provided; the SC-MTCH (Single-Cell Multicast Traffic Channel) is a service channel carrying specific service content.

’764 Patent, 1:25-63. Defendants intend to take discovery on the specific implementations of the prior art technology for the single cell multicast to establish that the Asserted Claims are not patentable improvements over the prior art.

Defendants’ investigation, including third-party discovery in this matter, is ongoing.

d. <u>’566 Patent</u>

Based on information currently known to Defendants, at least the following products or systems are prior art: 4G LTE systems. Defendants intend to adduce further evidence on the availability and operation of these products during discovery. As noted even by the ’566 Patent inventor, the 4G LTE PUCCH was a baseline for the accused technology (and the asserted patent). See, for example, R1-1705474 submitted by inventor Nogami to RAN1 #88bis and was entitled “Structure of NR PUCCH in long duration.” The inventor’s sole “Proposal” was that “**The LTE PUCCH formats should be considered as baseline**.” (R1-1705474) (bolding in original). The asserted patent claims are not patentable over the LTE PUCCH.

B. P.R. 3-3(b) Disclosures: Each Item of Prior Art that Anticipates and/or Renders Obvious the Asserted Claim, and Obviousness Combinations and Motivations to Combine

Based on presently known information and the apparent constructions Active Wireless is asserting in its Infringement Contentions, the prior art references identified above anticipate the Asserted Claims or, alone or in combination with the knowledge in the art, render the Asserted Claims obvious. To the extent Active Wireless asserts that any of the prior art references charted in Exhibits A-01 *et seq.*, B-01 *et seq.*, C-01 *et seq.*, and D-01 *et seq.*, fail to explicitly or inherently disclose any element of the Asserted Claims, Defendants contend that it would have been obvious to modify such reference to include the allegedly missing element, in view of the knowledge of one of ordinary skill in the art, the admitted prior art of the Asserted Patents, and/or in combination with any of the other prior art references identified in the Exhibits for that respective patent. To

the extent Active Wireless contends that any primary reference does not anticipate the Asserted Claims, it would have been obvious to combine or modify the primary references with concepts from other prior art.

In particular, for each limitation of the Asserted Claims that Active Wireless contends is not met by a particular primary reference, Defendants 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 other reference as identified in Exhibits A–D as disclosing that limitation, (3) any admitted prior art, as explained in the background of each patent or discussed in the file history, and/or (4) the knowledge of a person of ordinary skill in the art including 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 contend render the Asserted Claims obvious are readily determinable as described herein and as provided in Exhibits A-D. Defendants' 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 do not yet have the benefit of Active Wireless' positions on the prior art, including what (if any) elements it contends are missing in each prior art reference, whether Active Wireless agrees that a reference is in fact prior art, and whether Active Wireless agrees that a person of ordinary skill in the art would be motivated to combine specific references. Defendants 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.

While the categories of art (patents/applications, non-patent publications, and systems) below are organized by asserted patent number, because of the overlapping nature of the asserted patents, Defendants identify each reference in each category as art applicable to each of the asserted patents.

1. Background and State of the Art

Defendants 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 Asserted Patents for the general subject matter of each of the Asserted 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 the Asserted Patents were 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 expressly reserve the right to rely on each of the prior art references, systems, concepts, and technologies discussed in this Section with respect to each of the Asserted Patents. In addition to the prior art identified in Section II.A, Defendants reserve the right to rely on each of the prior art references in its prior art document production. Further, Defendants identify the following prior art references that provide information concerning the state of the art at or before the priority date of the Asserted Claims.

a. <u>'443 Patent</u>

Patent No. / Publication
Prior art listed in the file history of the '443 Patent, or that of any related foreign or domestic patent applications
Prior art discussed in the background of the '443 Patent
Prior Art LTE Standards (the versions that are prior art to the asserted priority date)

Each of the documents identified in Exhibit A dealing with the 3GPP Working Group Materials and prior art standards including all materiials showing the previous discussions of the Working Group

b. <u>’557 Patent</u>

Patent No. / Publication
Prior art listed in the file history of the ’557 Patent, or that of any related foreign or domestic patent applications
Prior Art LTE Standards (the versions that are prior art to the asserted priority date)
Each of the documents identified in the chart in Exhibit B detailing the 3GPP Working Group materials and prior art standards including all of the materials showing the previous discussions in the Working Group (and at meetings attended by the inventor)
Prior art discussed in the background of the ’557 Patent

c. <u>’764 Patent</u>

Patent No. / Publication
Prior art listed in the file history of the ’764 Patent, or that of any related foreign or domestic patent applications
Prior Art LTE Standards (the versions that are prior art to the asserted priority date)
Prior art discussed in the background of the ’764 Patent
Each of the documents identified in the chart in Exhibit C detailing the 3GPP Working Group materials and prior art standards including all of the materials showing the previous discussions in the Working Group

d. <u>’566 Patent</u>

Patent No. / Publication
Prior art listed in the file history of the ’566 Patent, or that of any related foreign or domestic patent applications
All of the RAN1 WG papers related to the “long PUCCH” from at least the following 3GPP meetings: RAN1 #88 meeting (Athen, Greece, 2017-02-13), the RAN1 NR Ad-Hoc meeting (Spokane, 2017-01-16), the RAN1 #88bis (Spokane, 2017-04-03), the RAN1 #89 (Qingdao, 2017-06-27) and the RAN1 #87 (Reno, USA, 2016-11-14).
The 3GPP email distribution groups and related emails discussing the long PUCCH at least in June 2017 leading up to RAN1 #89 as identified in the ’566 discussion herein
Prior art discussed in the background of the ‘566 Patent including LTE releases 8-12
Prior Art LTE Standards (the versions that are prior art to the asserted priority date)

2. Obviousness

Defendants contend that, to the extent the primary references identified in these Supplemental 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 also reserve the right to rely on the discussions of the state of the art and prior art in each of the Asserted Patent specifications and their file histories including foreign file histories of related patents in explaining the state of the art. Defendants 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 also expressly reserve the right to rely on any admissions by any of the named inventors, institutions with which they were associated, and Active Wireless, regarding the state of the art.

a. <u>'443 Patent</u>

In the following discussion, the claim elements refer to the elements as charted in the charts for Exhibits A (e.g., A-01). In the asserted combinations between two or more references that are charted in the Exhibit A charts, the combination would be to use the citations for one of the elements (as shown in the charts) from the reference(s) to fill in the gaps for the other reference(s). For example, if Active Wireless alleges that element 1[b] is not present in chart A-01, the combination of A-01 and A-02 would include the content of A-02 for element 1[b].

Differentiating HARQ-ACK Transmissions Based Upon PDSCH Search Space Configurations. Elements [3B], [3C], [5B], and [5C] refer to differentiating HARQ-ACK transmissions based upon PDSCH search space configurations. More specifically, elements [3B]

and [5B] refer to a base station receiving a HARQ-ACK bit transmission per transport block when the PDSCH is scheduled in a common search space, while elements [3C] and [5C] refer to a base station receiving a HARQ-ACK bit for each CBG received when the PDSCH is scheduled in a UE-specific search space. Under Active Wireless' apparent application of the claims, differentiating HARQ-ACK transmissions in such a manner according to PDSCH search space configurations were well-known prior to the priority date of the '433 Patent. References that teach these limitations include: Yang (see A-01 chart at element [3B]), Hwang (see A-02 chart at element [3B]), and Wang (see A-03 chart at element [3B]).

The motivation to combine with each of these references (beyond the other motivations identified herein) includes several factors including: (1) express statements regarding the benefits of differentiating HARQ-ACK transmissions based upon PDSCH search space configurations, (2) express statements that PDSCH search space configurations were used to differentiate HARQ-ACK transmissions, and (3) the knowledge of a POSITA recognizing that differentiating HARQ-ACK transmissions based upon PDSCH search space configurations were well-known and in use.

b. <u>'557 Patent</u>

In the following discussion, the claim elements refer to the elements as charted in the charts for Exhibits B (e.g., B-01). In the asserted combinations between two or more references that are charted in the Exhibit B charts, the combination would be to use the citations for one of the elements (as shown in the charts) from the reference(s) to fill in the gaps for the other reference(s). For example, if Active Wireless alleges that element 30[b] is not present in chart B-01, the combination of B-01 and B-02 would include the content of B-02 for element 30[b].

The Amended Answer presented a detailed analysis of the invalidity of the '557 Asserted Claims and that analysis is incorporated herein to these Supplemental Invalidity Contentions. Moreover, as noted in the Amended Answer, the alleged distinction over the prior art cited by the

Examiner was not, in fact a distinction. Thus, the invalidity analysis presented by the Examiner, including the references cited therein, as identified in the Answer, can be combined with any of the charted base references to invalidate the Asserted Claims.

As detailed below, any of the base references (charted in Exhibits B, *et. seq.*) can be combined with any of the other base references. Each of these references detail very specific technology and approaches for a very narrow functionality of transmitting the SI and SIB including parameters and indications of broadcast status such that the UE (acting on its own) can re-acquire an SIB that it might have previously failed to acquire. Indeed, this was expressly contemplated in the prior version of the specification Active Wireless cites in its Infringement Contentions. See TS 38.331 v.15.1.0 (2018-03) §§ 5.2.2.2 and 5.2.2.3. A POSITA would have been motivated to combine these references because they each describe the same specific narrow functionality, propose highly similar solutions, are based upon the same set of 3GPP working group exchanges and standards and relate to an industry effort to harmonize specific exchanges between the UE and base stations to ensure compatibility.

The motivation to combine with each of these references (beyond the other motivations identified herein) includes several factors including: (1) express statements regarding the benefits of multiple types of SIB, (2) the need to ensure that the updated SIB is present in UE, and (3) the knowledge of a POSITA recognizing the benefits of providing updated scheduling information.

c. <u>'764 Patent</u>

In the following discussion, the claim elements refer to the elements as charted in the charts for Exhibits C (e.g., C-01). In the asserted combinations between two or more references that are charted in the Exhibit C charts, the combination would be to use the citations for one of the elements (as shown in the charts) from the reference(s) to fill in the gaps for the other reference(s).

For example, if Active Wireless alleges that element 1[c] is not present in chart C-01, the combination of C-01 and C-02 would include the content of C-02 for element 1[c].

764 3GPP Standards Prior Art. The '764 claims reflect, at most, a minor improvement over the "existing LTE system" referenced in the Background of the '764 patent. At most, the Asserted Claims reflect mere design choices for known tradeoffs such as the number of bits to represent a particular piece of information or the amount of information to convey in known structures. Changing such information is not a patentable improvement.

Defendants have charted the prior art 3GPP standards for each of the standards cited by Plaintiff as allegedly showing infringement of one or more claim elements including the following prior standards which are collectively referenced herein as the "764 3GPP Standards Prior Art":

- 3GPP TS 36.212, V13.2.0, (2016-06), Release 13;
- 3GPP TS 36.212, V14.0.0 (2016-09), Release 14;
- 3GPP TS 36.212, V14.1.1 (2017-01), Release 14;
- 3GPP TS 36.212, V14.2.0 (2017-03), Release 14;
- 3GPP TS 36.213, V13.2.0 (2016-06), Release 13.

A POSITA would have been motivated to combine any of the charted references with any one or more of these 764 3GPP Standards Prior Art with a reasonable expectation of success. A POSITA would have understood that the '764 claims are but a mere minor change over the known and existing technology and would have consulted the standards documents reflecting the known and existing documents. A POSITA woud have been motivated to combine such known technology with any of the charted references because they all pertain to the same technology with similar and complementary solutions to the proposed improvement to 3GPP standards.

d. <u>'566 Patent</u>

In the following discussion, the claim elements refer to the elements as charted in the charts for Exhibits D (e.g., D-01). In the asserted combinations between two or more references that are charted in the Exhibit D charts, the combination would be to use the citations for one of the elements (as shown in the charts) from the reference(s) to fill in the gaps for the other reference(s). For example, if Active Wireless alleges that element 1[c] is not present in chart D-01, the combination of D-01 and D-02 would include the content of D-02 for element 1[c].

The Asserted Claims of the '566 Patent merely reflect the efforts and ideas of *others* in the 3GPP RAN1 Working Group to select from known solutions to arrive at a specific solution for providing a long-PUCCH for 5G. These ideas were developed at others during meetings that included the RAN1 #88 meeting (Athen, Greece, 2017-02-13), the RAN1 NR Ad-Hoc meeting (Spokane, 2017-01-16), the RAN1 #88bis (Spokane, 2017-04-03), the RAN1 #89 (Qingdao, 2017-06-27) and the RAN1 #87 (Reno, USA, 2016-11-14). The provisional for the '566 Patent was filed on August 10, 2017 – shortly prior to the RAN1-90 meetings in Prague on 2017-08-21. Notably, various email chains reflected this Long-PUCCH prior to the RAN1-90 meeting and prior to the filing of the provisional. Each of these groups included minutes and Defendants intend to rely upon those minutes. The minutes are in the 3GPP archives and include:

- 3GPP, "Draft Report of 3GPP TSG RAN WG1 #R1-0-NR#2", Qingdao, 27th – 30th June, 2017
- 3GPP, "Draft Report of 3GPP TSG RAN WG1 #89", Hangzhou, 15th – 19th May, 2017.
- 3GPP, "Draft Report of 3GPP TSG RAN WG1 #88bis", Spokane, USA, 4th – 7th April, 2017.

- 3GPP, “Draft Report of 3GPP TSG RAN WG1 #88”, Athens, Greece, 13th – 17th February, 2017.
- 3GPP, “Draft Minutes report of 3GPP TSG RAN WG1 Meeting NR Ad-Hoc”, Spokane, USA, 16th – 20th January, 2017.
- R1-1705088, “Symbol number of PUCCH in long duration”, Spokane, USA, 3rd - 7th April 2017.
- 3GPP, “Draft Report of 3GPP TSG RAN WG1 #87 v0.2.0”, Reno, USA, 14th – 18th November 2016

The ’566 Patent inventors are listed on the list of attendees at these meetings. Moreover, they also apparently at least received the emails and attached documents participated in the email distribution groups. In June 2017, there were many separate email chains on long PUCCH as reflected by the following screenshot from the 3GPP website which reflect discussions leading up to, and including RAN1 #89 on June 27-30, 2017:

3GPP_TSG_RAN_WG1 Archives
Search the archives of lists on this server

Search:

Sort By: Date/Time (Most Recent First)

☐ Substring

Subject Line Contains: long pucch

Author's Address:

Since: 2017-02-01

Until: 2017-08-10

Search

3GPP_TSG_RAN_WG1@LIST.ETSI.ORG (22 Matches)

Subject	From	Date
Re: [Long PUCCH] Some WFs on Remaining issues	Christian Ibars <[log in to unmask]>	2017-06-30 09:58
Re: [Long PUCCH] Some WFs on Remaining issues	Sorour Falahati <[log in to unmask]>	2017-06-30 09:53
Re: [Long PUCCH] Some WFs on Remaining issues	Sorour Falahati <[log in to unmask]>	2017-06-30 09:40
[Long PUCCH] Some WFs on Remaining issues	Sorour Falahati <[log in to unmask]>	2017-06-30 07:50
[NR PUCCH] WF on Long PUCCH	Sorour Falahati <[log in to unmask]>	2017-06-29 09:14
[NR PUCCH] Two WFs on Long PUCCH	Sorour Falahati <[log in to unmask]>	2017-06-28 12:40
Re: [89-21] Email discussion on Long-PUCCH for NR	Sorour Falahati <[log in to unmask]>	2017-06-28 04:24
Re: [89-21] Email discussion on Long-PUCCH for NR	Satoshi Nagata <[log in to unmask]>	2017-06-27 06:20
Re: [89-21] Email discussion on Long-PUCCH for NR	Seonwook Kim <[log in to unmask]>	2017-06-27 00:52
Re: [89-21] Email discussion on Long-PUCCH for NR	Cho, Joonyoung <[log in to unmask]>	2017-06-26 19:37
Re: [89-21] Email discussion on Long-PUCCH for NR	Sorour Falahati <[log in to unmask]>	2017-06-26 18:13

https://list.etsi.org/scripts/wa.exe 1/2

Subject	From	Date
Re: [89-21] Email discussion on Long-PUCCH for NR	Yi Wang(Eason) <[log in to unmask]>	2017-06-26 17:48
Re: [89-21] Email discussion on Long-PUCCH for NR	Aris Papasakellariou <[log in to unmask]>	2017-06-26 17:02
Re: [89-21] Email discussion on Long-PUCCH for NR	Xianghui Han <[log in to unmask]>	2017-06-26 13:34
Re: [89-21] Email discussion on Long-PUCCH for NR	Farag, Emad (Nokia - US/Murray Hill) <[log in to unmask]>	2017-06-26 13:28
Re: [89-21] Email discussion on Long-PUCCH for NR	hua xu <[log in to unmask]>	2017-06-26 05:38
Re: [89-21] Email discussion on Long-PUCCH for NR	Tony Ekpenyong <[log in to unmask]>	2017-06-26 03:07
Re: [89-21] Email discussion on Long-PUCCH for NR	Fred TAKEDA <[log in to unmask]>	2017-06-25 23:51
Re: [89-21] Email discussion on Long-PUCCH for NR	Yi Huang <[log in to unmask]>	2017-06-24 22:29
Re: [89-21] Email discussion on Long-PUCCH for NR	Christian Ibars <[log in to unmask]>	2017-06-24 01:26
Re: [89-21] Email discussion on Long-PUCCH for NR	Tetsuya Yamamoto <[log in to unmask]>	2017-06-21 09:42
[89-21] Email discussion on Long-PUCCH for NR	Sorour Falahati <[log in to unmask]>	2017-06-12 10:13

The "WF" referenced in the above screenshots are the document R1-1711834 and R1-1711835 which show that the inventors did not contribute anything.

Notably, the inventors are not identified as contributing anything to these discussions. Thus, it is apparent that they were exposed to ideas for the long PUCCH that others had suggested and filed the '566 Patent provisional using those ideas. Notably, the inventors did not apparently contribute *any* ideas to the working group.

Moreover, the documents submitted to the '566 RAN1 WG by the inventors show that the inventors merely had the idea of using the previously used LTE formats. For example, R1-1705474 was submitted by inventor Nogami to RAN1 #88bis and was entitled "Structure of NR PUCCH in long duration." The inventor's sole "Proposal" was that "**The LTE PUCCH formats should be considered as baseline**." (R1-1705474) (bolding in original). Notably, the inventor did not make any long duration PUCCH submissions in RAN1 #89.

The prior art identified herein (both the charted art and the additional documents from the RAN1 WG identified above) all reflect a common effort by the industry to arrive at a solution for an identified problem. A POSITA would have considered and combined (with a reasonable expectation of success) any of the identified prior art because it all reflects common solutions (with a very limited number of proposed solutions) to known problems. This reflects just basic engineering practices and the development of the standard as would be expected by a POSITA. The materials relate to the same effort, by the same limited set of people (participants and companies involved in the working group discussions) addressing the same problem in a joint fashion. Thus, a POSITA would have been motivated to combine any of these materials to arrive at an engineering solution for long PUCCH (including the solution from the prior art LTE systems that was proposed by the inventors as discussed above).

e. **Exemplary Combinations for ’443 Patent**

As explained above, Defendants contend that a person of ordinary skill in the art would have been motivated to combine with a reasonable expectation of success any of the primary references in these Invalidity Contentions with (1) any other primary reference charted in the charts for A-01 *et seq*.; (2) any reference disclosed in in the section above for specific concepts claimed in the patent; (3) any statements made in the intrinsic record of the patent, and/or (4) the knowledge of one of ordinary skill in the art. By way of example only, Defendants provide the following exemplary combinations and some of the reasons a person of ordinary skill in the art would be motivated to combine references.

Each of the charted references in A-01 *et seq*. are a single reference obviousness reference in light of the knowledge of a POSITA.

Each of the charted references in A-01 *et seq.* are obviousness references in light of the knowledge of a POSITA combined with any one or more of the ’443 3GPP Standards Prior Art.

As noted above, each of the primary references in charts A-01 *et seq.* can be combined with one of the other charted references. Additionally, each of the primary references in charts A-01 *eq seq.* can be combined with one of the other charterd references and one or more of the ’443 3GPP Standards Prior Art.

All of the prior art charted and used for combinations herein pertains to the same technology, uses the same terminology, are based on the same prior exsiting technology (the LTE standards) and were developed as part of a joint collective effort by industry to specify standards, out of known existing possibilities, for industry to be able to make compatible products.

As discussed below, the “’443 Prosecution References” are the references cited by the Examiner in the following passage with the identification of the citations related to the prior art refereces including the citations provided by the Examiner during examination:

Prior art Jo et al. (US Publication 2019/0245648 A1) teaches resource sets for control signal transmission that can be configured for a common search space and a user specific search space (see paragraph 49). A transport block may include multiple code block groups and the UE transmits an ACK for each CBG (see paragraph 195). When the network receives the HARQ-ACK information, the network transmits CBG (see paragraph 207). However no specific mention or HARQ-ACK in the search spaces is taught.

Prior art Park et al. (US Publication 2019/0230685 A1) teach, a default PUCCH allocation being implemented when HARQ-ACK corresponding to a Common search space is transmitted (see paragraph 281). Park also teaches, the base station may

configure, through a semi-static higher layer signal (e.g., RRC signaling), a single (UE specific) PUCCH type or a plurality of (UE specific) PUCCH types for a PUCCH carrying HARQ-ACK information for PDSCH(s) scheduled through a specific DL assignment. For a PDSCH transmitted before the (UE specific) PUCCH type is configured for the UE (or before the RRC connection) or a PDSCH (and/or Msg4 transmission) scheduled through the DCI transmitted in the UE (group) common search space, the base station may deliver information about a single default PUCCH type or a plurality of default PUCCH types to be used by the UE (See paragraph 289).

Without prejudice to any other combinations, Defendants identify specifically the following further combinations (all in light of the knowledge of a POSITA) below.

To the extent Wang does not anticipate and/or render obvious on its own any of the ’443 claims, a person of ordinary skill in the art would have been motivated to combine it with one or

more other references, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Wang with any of these references as identified below because each of the references pertains to the same specific subject matter to the same specific subject matter of differentiating HARQ-ACK transmissions based upon search space configurations. The references pertain to the same technology and use the same terminology. Each of the references describes one or more approaches to definining HARQ-ACK transmission formats. Thus, a POSITA would be motivated to take beneficial aspects of Wang and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.

- Wang with one or more of Yang, Hwang
- Wang with one or more of the ’433 3GPP Standards Prior Art references (*see* Exhibit A05)
- Wang with one or more of Yang, Hwang and one or more of the ’443 3GPP Standards Prior Art references
- Wang with the ’443 Prosecution References
- Wang with one or more of Yang, Hwang, and the ’443 Prosecution References
- Wang with one or more of the ’443 3GPP Standards Prior Art references and the ’443 Prosecution References
- Wang with one or more of Yang, Hwang and one or more of the ’443 3GPP Standards Prior Art references and the ’443 Prosecution References

To the extent that Yang does not anticipate and/or render obvious on its own any of the ’443 Patent claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Yang with any of these references identified below because each of the references pertains to the same specific subject matter to the same specific subject matter of differentiating HARQ-ACK transmissions based upon search space configurations. The references pertain to the same technology and use the same terminology. Each of the references describes one or more approaches to definining HARQ-ACK transmission formats. Thus, a POSITA would be motivated to take beneficial aspects of Yang and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.

- Yang with one or more of Wang, Hwang
- Yang with one or more of the ’433 3GPP Standards Prior Art references (*see* Exhibit A06)
- Yang with one or more of Wang, Hwang and one or more of the ’443 3GPP Standards Prior Art references
- Yang with the ’443 Prosecution References
- Yang with one or more of Wang, Hwang, and the ’443 Prosecution References
- Yang with one or more of the ’443 3GPP Standards Prior Art references and the ’443 Prosecution References

- Yang with one or more of Wang, Hwang and one or more of the ’443 3GPP Standards Prior Art references and the ’443 Prosecution References

To the extent that Hwang does not anticipate and/or render obvious on its own any of the ’443 Patent claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Hwang with any of these references identified below because each of the references pertains to the same specific subject matter to the same specific subject matter of differentiating HARQ-ACK transmissions based upon search space configurations. The references pertain to the same technology and use the same terminology. Each of the references describes one or more approaches to definining HARQ-ACK transmission formats. Thus, a POSITA would be motivated to take beneficial aspects of Hwang and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.

- Hwang with one or more of Yang, Wang
- Hwang with one or more of the ’433 3GPP Standards Prior Art references (*see* Exhibit A07)
- Hwang with one or more of Yang, Wang and one or more of the ’443 3GPP Standards Prior Art references
- Hwang with the ’443 Prosecution References
- Hwang with one or more of Yang, Wang, and the ’443 Prosecution References

- Hwang with one or more of the ’443 3GPP Standards Prior Art references and the ’443 Prosecution References
- Hwang with one or more of Yang, Wang and one or more of the ’443 3GPP Standards Prior Art references and the ’443 Prosecution References.

f. Exemplary Combinations For ’557 Patent

As explained above, Defendants contend that a person of ordinary skill in the art would have been motivated to combine with a reasonable expectation of success any of the primary references in these Invalidity Contentions with (1) any other primary reference charted in the charts for B-01 *et seq*.; (2) any reference disclosed in in the section above for specific concepts claimed in the patent; (3) any statements made in the intrinsic record of the patent, and/or (4) the knowledge of one of ordinary skill in the art. By way of example only, Defendants provide the following exemplary combinations and some of the reasons a person of ordinary skill in the art would be motivated to combine references.

Each of the charted references in B-01 *et seq*. are a single reference obviousness reference in light of the knowledge of a POSITA.

As noted above, each of the primary references in charts B-01 *et seq.* can be combined with one of the other charted references. Additionally, each of the primary references in charts D01 *et seq.* can be combined with one of the other charted references and one or more of the 557 3GPP RAN2 Working Group Materials for the reasons including that, for example, the prior art standards were well known proposals to augment existing functionality that pervasively already known to a POSITA with this patent.

Each of the charted references in B01 *et seq*. are obviousness reference in light of the knowledge of a POSITA combined with the prior art LTE standard definition of the various system information and system information blocks. Furthermore, each of the charted references in B01

et seq. are obviousness reference in light of the knowledge of a POSITA combined with the prior art 557 3GPP RAN2 Working Group Materials from the working groups in the months prior to the filing of the provisional application as detailed in the associated charts herein and in the Amended Answer. The inventor himself cited to the 3GPP working group submissions and email exchanges that were distributed in his submission to 3GPP on or around May 10, 2018 that cited to the draft "TP" document that had been exchanged via the email distribution groups as noted in the Amended Answer.

As noted above, each of the primary references in charts B01 *et seq.* can be combined with one of the other charted references. Additionally, each of the primary references in charts B01 *et seq.* can be combined with one of the other charted references and one of the 3GPP working group papers identified above and in the Amended Answer. Without prejudice to any other combinations, Defendants identify specifically the following further combinations (all in light of the knowledge of a POSITA) below.

As noted in the associated chart, the "557 3GPP RAN2 Working Group Materials" include at least the following:

- R2-1805060, 3GPP TSG-RAN WG2 Meeting #101 "TP for email discussion [101#38][NR] SI procedure text" Sanya, China, April 16-20, 2018
- R2-1805217, 3GPP TSG-RAN2 #101bis, "[101#39][NR] Text Proposal on the ASN.1 for SIB content," Sanya, China, April 16-20, 3018
- R2-1808000, 3GPP TSG-WG2 Meeting #102, "Introduction of SA," Busan, South Korea, May 21-25, 2018
- 2018-05-04 14:37 email and attachment (which is the "TP" that the inventor cited in his May 10, 2018 submission to 3GPP as discussed in the Amended Answer

To the extent Awada does not anticipate and/or render obvious on its own any of the ’577 claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Awada with any of these references as identified below because each of the references pertains to the same specific subject matter of developing the system information blocks for the NR standards and technologies. The references pertain to the same technology and use the same terminology. Each of the references describes proposed structures and functionality for the system information blocks in NR. Thus, a POSITA would be motivated to take beneficial aspects of Awada and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.

Furthermore, for the references below that were identified specifically on the face of the Awada and submitted to the PTO during the prosecution of Awada, a POSITA would be motivated to combine such references with Awada for the reason that the inventor thought these references so pertinent as to have submitted them to the PTO. Moreover, these references submitted to the PTO reflect specific technology cited as examples of the type of known proposed solutions that could be used in implementing inventions very similar to that disclosed in Awada. Such references are an explicit motivation to combine (and an explicit teaching of the referenced technology for anticipation purposes) and also provide a reasonable expectation of success in the combination because at least one inventor noted their suitability for the disclosure of technology similar to this reference.

- Awada with one of Mallick[6] or Chen[7]
- Awada combined with one or more of the 557 3GPP RAN2 Working Group Materials
- Awada combined with one or more of 557 3GPP RAN2 Working Group Materials and one of Mallick or Chen
- Awada combined with Mallick and Chen
- Awada combined with Mallick and one or more of the 557 3GPP RAN2 Working Group Materials
- Awada combined with Mallick and one or more of the 557 3GPP RAN2 Working Group Materials and Chen
- Awada combined with Chen and one or more of the 557 3GPPRAN2 Working Group Materials
- Awada combined with Ingale
- Awada combined with Ingale and one or more of the 557 3GPP RAN2 Working Group Materials
- Awada combined Jung
- Awada combined with Jung and Ingale
- Awada combined with Jung and one or more of the 557 3GPP RAN2 Working Group Materials
- Awada combined with Jung, Ingale, and one or more of the 557 3GPP RAN2 Working Group Materials

To the extent Mallick does not anticipate and/or render obvious on its own any of the ’557 Patent’s claims, a person of ordinary skill in the art would have been motivated to combine it with

[6] References to “Mallick” should be understood as referring to Mallick ’610 (Exhibit B02) and Mallick ’711 (Exhibit B04).

[7] References to “Chen” should be understood as referring to Chen ’910 (Exhibit B03) and Chen ’827 (Exhibit B05).

one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Mallick with any of these references identified below because each of the references pertains to the same specific subject matter of developing the system information blocks for the NR standards and technologies. The references pertain to the same technology and use the same terminology. Each of the references describes proposed structures and functionality for the system information blocks in NR. Thus, a POSITA would be motivated to take beneficial aspects of Mallick and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.

Furthermore, for the references below that were identified specifically on the face of the Mallick and submitted to the PTO during the prosecution of Mallick, a POSITA would be motivated to combine such references with Mallick for the reason that the inventor thought these references so pertinent as to have submitted them to the PTO. Moreover, these references submitted to the PTO reflect specific technology cited as examples of the type of known proposed solutions that could be used in implementing inventions very similar to that disclosed in Mallick. Such references are an explicit motivation to combine (and an explicit teaching of the referenced technology for anticipation purposes) and also provide a reasonable expectation of success in the combination because at least one inventor noted their suitability for the disclosure of technology similar to this reference.

- Mallick with one of Awada or Chen
- Mallick combined with one or more of the 557 3GPP RAN2 Working Group Materials
- Mallick combined with one or more of 557 3GPP RAN2 Working Group Materials and one of Awada or Chen

- Mallick combined with Awada and Chen
- Mallick combined with Awada and one or more of the 557 3GPP RAN2 Working Group Materials
- Mallick combined with Awada and one or more of the 557 3GPP RAN2 Working Group Materials and Chen
- Mallick combined with Chen and one or more of the 557 3GPP RAN2 Working Group Materials
- Mallick combined with Ingale
- Mallick combined with Ingale and one or more of the 557 3GPP RAN2 Working Group Materials
- Mallick combined with Jung
- Mallick combined with Jung and Ingale
- Mallick combined with Jung and one or more of the 557 3GPP RAN2 Working Group Materials
- Mallick combined with Jung, Ingale, and one or more of the 557 3GPP RAN2 Working Group Materials

To the extent Chen does not anticipate and/or render obvious on its own any of the '557 Patent's claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Chen with any of these references identified below because each of the references pertains to the same specific subject matter of developing the system information blocks for the NR standards and technologies. The references pertain to the same technology and use the same terminology. Each of the references describes proposed structures and functionality for the system information blocks in NR. Thus, a POSITA would be motivated to take beneficial aspects of Chen and combine them with the other aspects

reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.

Furthermore, for the references below that were identified specifically on the face of the Chen and submitted to the PTO during the prosecution of Chen, a POSITA would be motivated to combine such references with Chen for the reason that the inventor thought these references so pertinent as to have submitted them to the PTO. Moreover, these references submitted to the PTO reflect specific technology cited as examples of the type of known proposed solutions that could be used in implementing inventions very similar to that disclosed in Chen. Such references are an explicit motivation to combine (and an explicit teaching of the referenced technology for anticipation purposes) and also provide a reasonable expectation of success in the combination because at least one inventor noted their suitability for the disclosure of technology similar to this reference.

- Chen with one of Mallick or Awada
- Chen combined with one or more of the 557 3GPP Working Group Materials
- Chen combined with one or more of 557 3GPP RAN2 Working Group Materials and one of Mallick or Awada
- Chen combined with Mallick and Awada
- Chen combined with Mallick and one or more of the 557 3GPP RAN2 Working Group Materials
- Chen combined with Mallick and one or more of the 557 3GPP RAN2 Working Group Materials and Awada
- Chen combined with Awada and one or more of the 557 3GPP RAN2 Working Group Materials
- Chen combined with Ingale
- Chen combined with Ingale and one or more of the 557 3GPP RAN2 Working Group Materials

- Chen combined with Jung
- Chen combined with Jung and Ingale
- Chen combined with Jung and one or more of the 557 3GPP RAN2 Working Group Materials
- Chen combined with Jung, Ingale, and one or more of the 557 3GPP RAN2 Working Group Materials

To the extent 557 3GPP RAN2 Working Group Materials does not anticipate and/or render obvious on its own any of the '557 Patent's claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine 557 3GPP RAN2 Working Group Materials with any of these references as identified below because each of the references pertains to the same specific subject matter of developing the system information blocks for the NR standards and technologies. The references pertain to the same technology and use the same terminology. Each of the references describes proposed structures and functionality for the system information blocks in NR. Thus, a POSITA would be motivated to take beneficial aspects of 557 3GPP RAN2 Working Group Materials and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.

Furthermore, for the references below that were identified specifically on the face of the 557 3GPP RAN2 Working Group Materials and submitted to the PTO during the prosecution of 557 3GPP RAN2 Working Group Materials, a POSITA would be motivated to combine such references with 557 3GPP RAN2 Working Group Materials for the reason that the inventor thought these references so pertinent as to have submitted them to the PTO. Moreover, these references

submitted to the PTO reflect specific technology cited as examples of the type of known proposed solutions that could be used in implementing inventions very similar to that disclosed in 557 3GPP RAN2 Working Group Materials. Such references are an explicit motivation to combine (and an explicit teaching of the referenced technology for anticipation purposes) and also provide a reasonable expectation of success in the combination because at least one inventor noted their suitability for the disclosure of technology similar to this reference.

- 557 3GPP RAN2 Working Group Materials with one of Mallick or Chen
- 557 3GPP RAN2 Working Group Materials combined with one or more of the Awada, Mallick or Chen
- 557 3GPP RAN2 Working Group Materials combined with one or more of Awada, Mallick, or Chen
- 557 3GPP RAN2 Working Group Materials combined with Mallick and Chen
- 557 3GPP RAN2 Working Group Materials combined with Mallick and one or more of the Awada
- 557 3GPP RAN2 Working Group Materials combined with Mallick and one or more of the Awada and Chen
- 557 3GPP RAN2 Working Group Materials combined with Chen and Awada
- 557 3GPP RAN2 Working Group Materials combined with Ingale
- 557 3GPP RAN2 Working Group Materials combined with Ingale and Awada
- 577 3GPP RAN2 Working Group Materials combined with Ingale, Awada, and Mallick
- 577 3GPP RAN2 Working Group Materials combined with Ingale, Awada, and Chen
- 557 3GPP RAN2 Working Group Materials combined with Jung
- 557 3GPP RAN2 Working Group Materials combined with Ingale and Jung
- 557 3GPP RAN2 Working Group Materials combined with Ingale, Jung, and Mallick

- 557 3GPP RAN2 Working Group Materials combined with Ingale, Jung, and Chen

To the extent Ingale does not anticipate and/or render obvious on its own any of the ’557 Patent’s claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Ingale with any of these references identified below because each of the references pertains to the same specific subject matter of developing the system information blocks for the NR standards and technologies. The references pertain to the same technology and use the same terminology. Each of the references describes proposed structures and functionality for the system information blocks in NR. Thus, a POSITA would be motivated to take beneficial aspects of Ingale and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.

Furthermore, for the references below that are referenced by Ingale, a POSITA would be motivated to combine such references with Ingale for the reason that the inventor(s) thought these references so pertinent as to have expressly referenced them. Moreover, these references that are expressly referenced by Ingale reflect specific technology cited as examples of the type of known proposed solutions that could be used in implementing inventions very similar to that disclosed in Ingale. Such references are an explicit motivation to combine (and an explicit teaching of the referenced technology for anticipation purposes) and also provide a reasonable expectation of success in the combination because the inventor(s) noted their suitability for the disclosure of technology similar to this reference.

- Ingale combined with Awada

- Ingale combined with Mallick
- Ingale combined with Awada and Mallick
- Ingale combined with Chen
- Ingale combined with Awada and Chen
- Ingale combined with Awada, Chen, and Mallick
- Ingale combined with 577 3GPP RAN2 Working Group Materials
- Ingale combined with 577 3GPP RAN2 Working Group Materials and Awada
- Ingale combined with 577 3GPP RAN2 Working Group Materials and Mallick
- Ingale combined with 577 3GPP RAN2 Working Group Materials, Awada, and Mallick
- Ingale combined with 577 3GPP RAN2 Working Group Materials, Awada, and Chen
- Ingale combined with 577 3GPP RAN2 Working Group Materials, Mallick, and Chen
- Ingale combined with Jung (*see* Exhibit B09)
- Ingale combined with Jung and Awada
- Ingale combined with Jung and Mallick
- Ingale combined with Jung and Chen
- Ingale combined with Jung and 3GPP RAN2 Working Group Materials
- Ingale combined with Jung, 3GPP RAN2 Working Group Materials, and Awada
- Ingale combined with Jung, 3GPP RAN2 Working Group Materials, and Mallick
- Ingale combined with Jung, 3GPP RAN2 Working Group Materials, and Chen

To the extent Jung does not anticipate and/or render obvious on its own any of the ’557 Patent’s claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Jung with any of these references identified below because each of the references pertains to the same specific subject matter of developing the system information blocks for the NR standards and technologies. The references pertain to the same technology and use the same terminology. Each of the references describes proposed structures and functionality for the system information blocks in NR. Thus, a POSITA would be motivated to take beneficial aspects of Jung and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.

Furthermore, for the references below that are referenced by Jung, a POSITA would be motivated to combine such references with Jung for the reason that the inventor(s) thought these references so pertinent as to have expressly referenced them. Moreover, these references that are expressly referenced by Jung reflect specific technology cited as examples of the type of known proposed solutions that could be used in implementing inventions very similar to that disclosed in Jung. Such references are an explicit motivation to combine (and an explicit teaching of the referenced technology for anticipation purposes) and also provide a reasonable expectation of success in the combination because the inventor(s) noted their suitability for the disclosure of technology similar to this reference.

- Jung combined with Awada
- Jung combined with Mallick
- Jung combined with Awada and Mallick
- Jung combined with Chen
- Jung combined with Awada and Chen
- Jung combined with Awada, Chen, and Mallick
- Jung combined with 557 3GPP RAN2 Working Group Materials

- Jung combined with 557 3GPP RAN2 Working Group Materials and Awada
- Jung combined with 557 3GPP RAN2 Working Group Materials and Mallick
- Jung combined with 557 3GPP RAN2 Working Group Materials and Chen
- Jung combined with 557 3GPP RAN2 Working Group Materials, Awada, and Mallick
- Jung combined with 557 3GPP RAN2 Working Group Materials, Awada, and Chen
- Jung combined with Ingale
- Jung combined with Ingale and Awada
- Jung combined with Ingale and Mallick
- Jung combined with Ingale and Chen
- Jung combined with Awada and Mallick
- Jung combined with Awada, Chen, and Mallick
- Jung combined with 557 3GPP RAN2 Working Group Materials and Ingale

Jung combined with 557 3GPP RAN2 Working Group Materials, Ingale, and Awada

g. <u>Exemplary Combinations For the ’764 Patent</u>

As explained above, Defendants contend that a person of ordinary skill in the art would have been motivated to combine with a reasonable expectation of success any of the primary references in these Invalidity Contentions with (1) any other primary reference charted in the charts for C-01 *et seq*.; (2) any reference disclosed in in the section above for specific concepts claimed in the patent; (3) any statements made in the intrinsic record of the patent, and/or (4) the knowledge of one of ordinary skill in the art. By way of example only, Defendants provide the following exemplary combinations and some of the reasons a person of ordinary skill in the art would be motivated to combine references.

Each of the charted references in C-01 *et seq*. are a single reference obviousness reference in light of the knowledge of a POSITA.

Each of the charted references in C-01 *et seq*. are obviousness references in light of the knowledge of a POSITA combined with any one or more of the 764 3GPP Standards Prior Art.

As noted above, each of the primary references in charts C-01 *et seq.* can be combined with one of the other charted references. Additionally, each of the primary references in charts C-01 *et seq.* can be combined with one of the other charted references and one or more of the 764 3GPP Standards Prior Art.

All of the prior art charted and used for combinations herein pertains to the same technology, uses the same terminology, are based on the same prior existing technology (the LTE standards) and were developed as part of a joint collective effort by industry to specify standards, out of known existing possibilities, for industry to be able to make compatible products.

As discussed below, the "764 Prosecution References" are the combination cited by the Examiner in the following passage with the identification of the citations related to the prior art references including the citations provided by the Examiner during prosecution:

> **2a. Claims 45-48** are rejected under 35 U.S.C. 103(a) as being unpatentable over Shin Provisional Application 62/372,324 filed 8/9/2016 (of Application 16/324,288, hereinafter Shin '372,324) in view of Fijishiro (US 20190182632 A1).

Without prejudice to any other combinations, Defendants identify specifically the following further combinations (all in light of the knowledge of a POSITA) below.

To the extent Shin does not anticipate and/or render obvious on its own any of the '764 Patent claims, a person of ordinary skill in the art would have been motivated to combine it with

one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Shin[8] with any of these references identified below because each of the references pertains to the same specific subject matter of specifying the data structures to provide the single-cell multicast functionality and the meaning of the specific bits within the structure as defined by industry working groups. The references pertain to the same technology and use the same terminology. Each of the references describes one or more approaches to defining the structures for single-cell multicast data and control. Thus, a POSITA would be motivated to take beneficial aspects of Shin and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.

- Shin with one or more of Xu, Tie, and Park
- Shin with one or more of the 764 3GPP Standards Prior Art references
- Shin with one or more of Xu, Tie, Park, and one or more of the 764 3GPP Standards Prior Art references
- Shin with the 764 Prosecution References
- Shin with one or more of Xu, Tie, Park, and the 764 Prosecution References
- Shin with one or more of the 764 3GPP Standards Prior Art references and the 764 Prosecution References

[8] References to "Shin" include Shin '460 (Exhibit C02) and/or Shin '094 (Exhibit C05)

- Shin with one or more of Xu, Tie, Park, and one or more of the 764 3GPP Standards Prior Art references and the 764 Prosecution References

To the extent Xu does not anticipate and/or render obvious on its own any of the ’764 Patent’s claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Xu with any of these references identified below because each of the references pertains to the same specific subject matter of specifying the data structures to provide the single-cell multicast functionality and the meaning of the specific bits within the structure as defined by industry working groups. The references pertain to the same technology and use the same terminology. Each of the references describes one or more approaches to defining the structures for single-cell multicast data and control. Thus, a POSITA would be motivated to take beneficial aspects of Xu and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.

- Xu with one or more of Shin, Tie, and Park
- Xu with one or more of the 764 3GPP Standards Prior Art references
- Xu with one or more of Shin, Tie, Park, and one or more of the 764 3GPP Standards Prior Art references
- Xu with the 764 Prosecution References
- Xu with one or more of Shin, Tie, Park, and the 764 Prosecution References

- Xu with one or more of the 764 3GPP Standards Prior Art references and the 764 Prosecution References
- Xu with one or more of Shin, Tie, Park, and one or more of the 764 3GPP Standards Prior Art references and the 764 Prosecution References
- Xu with Fujishiro and 764 3GPP Standards Prior Art (*see* Exhibit C08)

To the extent Tie does not anticipate and/or render obvious on its own any of the '764 Patent's claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Tie with any of these references identified below because each of the references pertains to the same specific subject matter of specifying the data structures to provide the single-cell multicast functionality and the meaning of the specific bits within the structure as defined by industry working groups. The references pertain to the same technology and use the same terminology. Each of the references describes one or more approaches to defining the structures for single-cell multicast data and control. Thus, a POSITA would be motivated to take beneficial aspects of Tie and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.

- Tie with one or more of Xu, Shin, and Park,
- Tie with one or more of the 764 3GPP Standards Prior Art references
- Tie with one or more of Xu, Shin, Park, and one or more of the 764 3GPP Standards Prior Art references

- Tie with the 764 Prosecution References
- Tie with one or more of Xu, Shin, Park, and the 764 Prosecution References
- Tie with one or more of the 764 3GPP Standards Prior Art references and the 764 Prosecution References
- Tie with one or more of Xu, Shin, Park, and one or more of the 764 3GPP Standards Prior Art references and the 764 Prosecution References

To the extent Park does not anticipate and/or render obvious on its own any of the '764 Patent's claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Park with any of these references identified below because each of the references pertains to the same specific subject matter of specifying the data structures to provide the single-cell multicast functionality and the meaning of the specific bits within the structure as defined by industry working groups. The references pertain to the same technology and use the same terminology. Each of the references describes one or more approaches to defining the structures for single-cell multicast data and control. Thus, a POSITA would be motivated to take beneficial aspects of Park and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.

- Park with one or more of Xu, Tie, and Shin
- Park with one or more of the 764 3GPP Standards Prior Art references

- Park with one or more of Xu, Tie, Shin, and one or more of the 764 3GPP Standards Prior Art references
- Park with the 764 Prosecution References
- Park with one or more of Xu, Tie, Shin, and the the 764 Prosecution References
- Park with one or more of the 764 3GPP Standards Prior Art references and the 764 Prosecution References
- Park with one or more of Xu, Tie, Shin, and one or more of the 764 3GPP Standards Prior Art references and the 764 Prosecution References

To the extent 764 3GPP Standards Prior Art (as charted) does not anticipate and/or render obvious on its own any of the '764 Patent's claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine 764 3GPP Standards Prior Art with any of these references identified below because each of the references pertains to the same specific subject matter of specifying the data structures to provide the single-cell multicast functionality and the meaning of the specific bits within the structure as defined by industry working groups. The references pertain to the same technology and use the same terminology. Each of the references describes one or more approaches to defining the structures for single-cell multicast data and control. Thus, a POSITA would be motivated to take beneficial aspects of 764 3GPP Standards Prior Art and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.

- 764 3GPP Standards Prior Art with one or more of Shin, Xu, Tie, and Park
- 764 3GPP Standards Prior Art with the 764 Prosecution References
- 764 3GPP Standards Prior Art with one or more of Shin Xu, Tie, Park, and the 764 Prosecution References

To the extent Fujishiro does not anticipate and/or render obvious on its own any of the '764 Patent's claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Fujishiro with any of these references identified below because each of the references pertains to the same specific subject matter of specifying the data structures to provide the single-cell multicast functionality and the meaning of the specific bits within the structure as defined by industry working groups. The references pertain to the same technology and use the same terminology. Each of the references describes one or more approaches to defining the structures for single-cell multicast data and control. Thus, a POSITA would be motivated to take beneficial aspects of Fujishiro and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.Fujishiro with one or more of Xu, Tie, Shin, Park

- Fujishiro with one or more of the 764 3GPP Standards Prior Art references
- Fujishiro with one or more of Xu, Tie, Shin, Park, and one or more of the 764 3GPP Standards Prior Art references
- Fujishiro with the 764 Prosecution References

- Fujishiro with one or more of Xu, Tie, Shin, Park, and the 764 Prosecution References
- Fujishiro with one or more of the 764 3GPP Standards Prior Art references and the 764 Prosecution References
- Fujishiro with one or more of Xu, Tie, Shin, Park, and one or more of the 764 3GPP Standards Prior Art references and the the 764 Prosecution References

h. Exemplary Combinations For '566 Patent

As explained above, Defendants contend that a person of ordinary skill in the art would have been motivated to combine with a reasonable expectation of success any of the primary references in these Invalidity Contentions with (1) any other primary reference charted in the charts for D01 *et seq*.; (2) any reference disclosed in in the section above for specific concepts claimed in the patent; (3) any statements made in the intrinsic record of the patent, and/or (4) the knowledge of one of ordinary skill in the art. By way of example only, Defendants provide the following exemplary combinations and some of the reasons a person of ordinary skill in the art would be motivated to combine references.

Each of the charted references in D01 *et seq*. are a single reference obviousness reference in light of the knowledge of a POSITA.

Each of the charted references in D01 *et seq*. are obviousness references in light of the knowledge of a POSITA combined with the prior art LTE standard definition of the LTE PUCCH. The inventor himself proposed that the subsequently developed NR long PUCCH used the prior art LTE formats as a baseline. For example, R1-1705474 was submitted by inventor Nogami to RAN1 #88bis and was entitled "Structure of NR PUCCH in long duration." The inventor's sole "Proposal" was that "**The LTE PUCCH formats should be considered as baseline**." (R1-1705474) (bolding in original).

As noted above, each of the primary references in charts D01 *et seq.* can be combined with one of the other charted references. Additionally, each of the primary references in charts D01 *et seq.* can be combined with one of the other charted references and one of the 3GPP working group papers identified above relevant to the long PUCCH development in the working group for the reasons cited above. Without prejudice to any other combinations, Defendants identify specifically the following further combinations (all in light of the knowledge of a POSITA) below.

To the extent Huang does not anticipate and/or render obvious on its own any of the '566 Patent claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Huang with any of these references identified below because each of the references pertains to the same specific subject matter of developing the long PUCCH structure for the NR standards and technologies. The references pertain to the same technology and use the same terminology. Each of the references describes proposed structures and functionality for the long PUCCH in NR. Thus, a POSITA would have been motivated to take beneficial aspects of Huang and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.

Furthermore, for the references below that were identified specifically on the face of the Huang and submitted to the PTO during the prosecution of Huang, a POSITA would have been motivated to combine such references with Huang for the reason that the inventor thought these references so pertinent as to have submitted them to the PTO. Moreover, these references submitted to the PTO reflect specific technology cited as examples of the type of known proposed

solutions that could be used in implementing inventions very similar to that disclosed in Huang. Such references are an explicit motivation to combine (and an explicit teaching of the referenced technology for anticipation purposes) and also provide a reasonable expectation of success in the combination because at least one inventor noted their suitability for the disclosure of technology similar to this reference.

- Huang with one or more of Zou, Kim, Xiong, Li, Lo, Gao and Lee
- Huang combined with one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Huang combined with one or more of R1-1704208, R1-171055, R1-1707396 and one of Zou, Kim, Xiong, Li, Lo, Gao or Lee
- Huang with Kim and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Huang with Zou and of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Huang with Xiong and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Huang with Lo and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Huang with Adams and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Huang combined with Lee and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Huang combined with Zou and one of Xiong or Gao
- Huang combined with Zou and one of Li or Lo
- Huang combined with Zou and one of Xiong or Kim
- Huang combined with Zou and Lee
- Huang combined with Kim and one of Xiong or Zou
- Huang combined with Kim and one of Li or Lo

- Huang combined with Kim and one of Xiong or Lee
- Huang combined with Xiong and one of Kim, Xiong, Li, Lo, Gao or Lee
- Huang combined with Xiong and one of Kim or Zou
- Huang combined with Xiong and Lee
- Huang combined with Lee and one of Xiong or Zou
- Huang combined with Lee and one of Kim or Zou
- Huang combined with Lo and one of Xiong or Zou
- Huang combined with Lo and Lee
- Huang combined with Lo and one of Kim or Zou
- Huang combined with the prosecution references(s) cited by the Examiner
- Huang combined with the prior art LTE PUCCH
- Huang combined with the prior art LTE PUCCH and one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396

To the extent Zou does not anticipate and/or render obvious on its own any of the '566 Patent claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Zou with any of these references identified below because each of the references pertains to the same specific subject matter of developing the long PUCCH structure for the NR standards and technologies. The references pertain to the same technology and use the same terminology. Each of the references describes proposed structures and functionality for the long PUCCH in NR. Thus, a POSITA would have been motivated to take beneficial aspects of Zou and combine them with the other aspects reflected

in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have had a reasonable expectation of success in such combinations.

Furthermore, for the references below that were identified specifically on the face of the Zou and submitted to the PTO during the prosecution of Zou, a POSITA would have been motivated to combine such references with Zou for the reason that the inventor thought these references so pertinent as to have submitted them to the PTO. Moreover, these references submitted to the PTO reflect specific technology cited as examples of the type of known proposed solutions that could be used in implementing inventions very similar to that disclosed in Zou. Such references are an explicit motivation to combine (and an explicit teaching of the referenced technology for anticipation purposes) and also provide a reasonable expectation of success in the combination because at least one inventor noted their suitability for the disclosure of technology similar to this reference.

- Zou with one of Huang, Kim, Xiong, Li, Lo, Gao or Lee
- Zou combined with one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Zou combined with one or more of R1-1704208, R1-171055, R1-1707396 and one of Huang, Kim, Xiong, Li, Lo, Gao or Lee
- Zou with Kim and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Zou with Huang and of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Zou with Xiong and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Zou with Lo and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Zou with Adams and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396

- Zou combined with Lee and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Zou combined with Huang and one of Xiong or Gao
- Zou combined with Huang and one of Li or Lo
- Zou combined with Huang and one of Xiong or Kim
- Zou combined with Huang and Lee
- Zou combined with Kim and one of Xiong or Huang
- Zou combined with Kim and one of Li or Lo
- Zou combined with Kim and one of Xiong or Lee
- Zou combined with Xiong and one of Kim, Xiong, Li, Lo, Gao or Lee
- Zou combined with Xiong and one of Kim or Huang
- Zou combined with Xiong and Lee
- Zou combined with Lee and one of Xiong or Huang
- Zou combined with Lee and one of Kim or Huang
- Zou combined with Lo and one of Xiong or Huang
- Zou combined with Lo and Lee
- Zou combined with Lo and one of Kim or Huang
- Zou combined with the prosecution references(s) cited by the Examiner
- Zou combined with the prior art LTE PUCCH
- Zou combined with the prior art LTE PUCCH and one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396

To the extent Kim does not anticipate and/or render obvious on its own any of the ’566 Patent claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Kim with any of these references identified below because each of the references pertains to the same specific subject matter of developing the long PUCCH structure for the NR standards and technologies. The references pertain to the same technology and use the same terminology. Each of the references describes proposed structures and functionality for the long PUCCH in NR. Thus, a POSITA would be motivated to take beneficial aspects of Kim and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have had a reasonable expectation of success in such combinations.

Furthermore, for the references below that were identified specifically on the face of the Kim and submitted to the PTO during the prosecution of Kim, a POSITA would have been motivated to combine such references with Kim for the reason that the inventor thought these references so pertinent as to have submitted them to the PTO. Moreover, these references submitted to the PTO reflect specific technology cited as examples of the type of known proposed solutions that could be used in implementing inventions very similar to that disclosed in Kim. Such references are an explicit motivation to combine (and an explicit teaching of the referenced technology for anticipation purposes) and also provide a reasonable expectation of success in the combination because at least one inventor noted their suitability for the disclosure of technology similar to this reference.

- Kim with one of Zou, Huang, Xiong, Li, Lo, Gao or Lee
- Kim combined with one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Kim combined with one or more of R1-1704208, R1-171055, R1-1707396 and one of Zou, Huang, Xiong, Li, Lo, Gao or Lee
- Kim with Huang and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396

- Kim with Zou and of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Kim with Xiong and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Kim with Lo and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Kim with Adams and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Kim combined with Lee and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Kim combined with Zou and one of Xiong or Gao
- Kim combined with Zou and one of Li or Lo
- Kim combined with Zou and one of Xiong or Huang
- Kim combined with Zou and Lee
- Kim combined with Huang and one of Xiong or Zou
- Kim combined with Huang and one of Li or Lo
- Kim combined with Huang and one of Xiong or Lee
- Kim combined with Xiong and one of Huang, Xiong, Li, Lo, Gao or Lee
- Kim combined with Xiong and one of Huang or Zou
- Kim combined with Xiong and Lee
- Kim combined with Lee and one of Xiong or Zou
- Kim combined with Lee and one of Huang or Zou
- Kim combined with Lo and one of Xiong or Zou
- Kim combined with Lo and Lee
- Kim combined with Lo and one of Huang or Zou
- Kim combined with the prosecution references(s) cited by the Examiner
- Kim combined with the prior art LTE PUCCH

- Kim combined with the prior art LTE PUCCH and one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Kim combined with U.S. Patent No. 10,951,350 ("Gao"), R1-1710555 and/or U.S. Patent No. 10,873,435 ("Huang") (*see* Exhibit D11)

To the extent Xiong does not anticipate and/or render obvious on its own any of the '566 Patent's claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Xiong with any of these references identified below because each of the references pertains to the same specific subject matter of developing the long PUCCH structure for the NR standards and technologies. The references pertain to the same technology and use the same terminology. Each of the references describes proposed structures and functionality for the long PUCCH in NR. Thus, a POSITA would have been motivated to take beneficial aspects of Xiong and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.

Furthermore, for the references below that were identified specifically on the face of the Xiong and submitted to the PTO during the prosecution of Xiong, a POSITA would be motivated to combine such references with Xiong for the reason that the inventor thought these references so pertinent as to have submitted them to the PTO. Moreover, these references submitted to the PTO reflect specific technology cited as examples of the type of known proposed solutions that could be used in implementing inventions very similar to that disclosed in Xiong. Such references are an explicit motivation to combine (and an explicit teaching of the referenced technology for anticipation purposes) and also provide a reasonable expectation of success in the combination

because at least one inventor noted their suitability for the disclosure of technology similar to this reference.

- Xiong with one of Zou, Kim, Huang, Li, Lo, Gao or Lee
- Xiong combined with one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Xiong combined with one or more of R1-1704208, R1-171055, R1-1707396 and one of Zou, Kim, Huang, Li, Lo, Gao or Lee
- Xiong with Kim and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Xiong with Zou and of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Xiong with Huang and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Xiong with Lo and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Xiong with Adams and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Xiong combined with Lee and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Xiong combined with Zou and one of Huang or Gao
- Xiong combined with Zou and one of Li or Lo
- Xiong combined with Zou and one of Huang or Kim
- Xiong combined with Zou and Lee
- Xiong combined with Kim and one of Huang or Zou
- Xiong combined with Kim and one of Li or Lo
- Xiong combined with Kim and one of Huang or Lee
- Xiong combined with Huang and one of Kim, Huang, Li, Lo, Gao or Lee
- Xiong combined with Huang and one of Kim or Zou

- Xiong combined with Huang and Lee
- Xiong combined with Lee and one of Huang or Zou
- Xiong combined with Lee and one of Kim or Zou
- Xiong combined with Lo and one of Huang or Zou
- Xiong combined with Lo and Lee
- Xiong combined with Lo and one of Kim or Zou
- Xiong combined with the prosecution references(s) cited by the Examiner
- Xiong combined with the prior art LTE PUCCH
- Xiong combined with the prior art LTE PUCCH and one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396

To the extent Gao does not anticipate and/or render obvious on its own any of the '566 Patent claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Gao with any of these references identified below because each of the references pertains to the same specific subject matter of developing the long PUCCH structure for the NR standards and technologies. The references pertain to the same technology and use the same terminology. Each of the references describes proposed structures and functionality for the long PUCCH in NR. Thus, a POSITA would have been motivated to take beneficial aspects of Gao and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have a reasonable expectation of success in such combinations.

Furthermore, for the references below that were identified specifically on the face of Gao and submitted to the PTO during the prosecution of Gao, a POSITA would have been motivated

to combine such references with Gao for the reason that the inventor thought these references so pertinent as to have submitted them to the PTO. Moreover, these references submitted to the PTO reflect specific technology cited as examples of the type of known proposed solutions that could be used in implementing inventions very similar to that disclosed in Gao. Such references are an explicit motivation to combine (and an explicit teaching of the referenced technology for anticipation purposes) and also provide a reasonable expectation of success in the combination because at least one inventor noted their suitability for the disclosure of technology similar to this reference.

- Gao with one of Zou, Kim, Xiong, Li, Lo, Huang or Lee
- Gao combined with one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Gao combined with one or more of R1-1704208, R1-171055, R1-1707396 and one of Zou, Kim, Xiong, Li, Lo, Huang or Lee
- Gao with Kim and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Gao with Zou and of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Gao with Xiong and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Gao with Lo and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Gao with Adams and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Gao combined with Lee and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Gao combined with Zou and one of Xiong or Huang
- Gao combined with Zou and one of Li or Lo
- Gao combined with Zou and one of Xiong or Kim

- Gao combined with Zou and Lee
- Gao combined with Kim and one of Xiong or Zou
- Gao combined with Kim and one of Li or Lo
- Gao combined with Kim and one of Xiong or Lee
- Gao combined with Xiong and one of Kim, Xiong, Li, Lo, Huang or Lee
- Gao combined with Xiong and one of Kim or Zou
- Gao combined with Xiong and Lee
- Gao combined with Lee and one of Xiong or Zou
- Gao combined with Lee and one of Kim or Zou
- Gao combined with Lo and one of Xiong or Zou
- Gao combined with Lo and Lee
- Gao combined with Lo and one of Kim or Zou
- Gao combined with the prosecution references(s) cited by the Examiner
- Gao combined with the prior art LTE PUCCH
- Gao combined with the prior art LTE PUCCH and one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396

To the extent Lee does not anticipate and/or render obvious on its own any of the '566 Patent's claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine Lee with any of these references identified below because each of the references pertains to the same specific subject matter of developing the long PUCCH structure for the NR standards and technologies. The references pertain to the same technology and use the same terminology. Each of the references describes

proposed structures and functionality for the long PUCCH in NR. Thus, a POSITA would have been motivated to take beneficial aspects of Lee and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have had a reasonable expectation of success in such combinations.

Furthermore, for the references below that were identified specifically on the face of the Lee and submitted to the PTO during the prosecution of Lee, a POSITA would have been motivated to combine such references with Lee for the reason that the inventor thought these references so pertinent as to have submitted them to the PTO. Moreover, these references submitted to the PTO reflect specific technology cited as examples of the type of known proposed solutions that could be used in implementing inventions very similar to that disclosed in Lee. Such references are an explicit motivation to combine (and an explicit teaching of the referenced technology for anticipation purposes) and also provide a reasonable expectation of success in the combination because at least one inventor noted their suitability for the disclosure of technology similar to this reference.

- Lee with one of Zou, Kim, Xiong, Li, Lo, Gao or Huang
- Lee combined with one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Lee combined with one or more of R1-1704208, R1-171055, R1-1707396 and one of Zou, Kim, Xiong, Li, Lo, Gao or Huang
- Lee with Kim and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Lee with Zou and of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Lee with Xiong and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Lee with Lo and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396

- Lee with Adams and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Lee combined with Huang and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396
- Lee combined with Zou and one of Xiong or Gao
- Lee combined with Zou and one of Li or Lo
- Lee combined with Zou and one of Xiong or Kim
- Lee combined with Zou and Huang
- Lee combined with Kim and one of Xiong or Zou
- Lee combined with Kim and one of Li or Lo
- Lee combined with Kim and one of Xiong or Huang
- Lee combined with Xiong and one of Kim, Xiong, Li, Lo, Gao or Huang
- Lee combined with Xiong and one of Kim or Zou
- Lee combined with Xiong and Huang
- Lee combined with Huang and one of Xiong or Zou
- Lee combined with Huang and one of Kim or Zou
- Lee combined with Lo and one of Xiong or Zou
- Lee combined with Lo and Huang
- Lee combined with Lo and one of Kim or Zou
- Lee combined with the prosecution references(s) cited by the Examiner
- Lee combined with the prior art LTE PUCCH
- Lee combined with the prior art LTE PUCCH and one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396

To the extent R1-1704208 does not anticipate and/or render obvious on its own any of the ’566 Patent claims, a person of ordinary skill in the art would have been motivated to combine it

with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine R1-1704208 with any of these references as identified below because each of the references pertains to the same specific subject matter of developing the long PUCCH structure for the NR standards and technologies. The references pertain to the same technology and use the same terminology. Each of the references describes proposed structures and functionality for the long PUCCH in NR. Thus, a POSITA would be motivated to take beneficial aspects of R1-1704208 and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have had a reasonable expectation of success in such combinations.

Furthermore, for the references below that are referenced by R1-1704208, a POSITA would have been motivated to combine such references with R1-1704208 for the reason that the author(s) thought these references so pertinent as to have expressly referenced them. Moreover, these references that are referenced expressly by R1-1704208 reflect specific technology cited as examples of the type of known proposed solutions that could be used in implementing inventions very similar to that disclosed in R1-1704208. Such references are an explicit motivation to combine (and an explicit teaching of the referenced technology for anticipation purposes) and also provide a reasonable expectation of success in the combination because at least one author noted their suitability for the disclosure of technology similar to this reference.

- R1-1704208 with one of Zou, Kim, Xiong, Li, Lo, Gao or Lee
- R1-1704208 combined with one or more of the 3GPP chart prior art references R1-1710116, Huang, or R1-171055, or R1-1707396
- R1-1704208 combined with one or more of Huang, R1-171055, R1-1707396 and one of Zou, Kim, Xiong, Li, Lo, Gao or Lee

- R1-1704208 with Kim and one of the 3GPP chart prior art references R1-1710116, Huang, or R1-171055, or R1-1707396
- R1-1704208 with Zou and of the 3GPP chart prior art references R1-1710116, Huang, or R1-171055, or R1-1707396
- R1-1704208 with Xiong and one of the 3GPP chart prior art references R1-1710116, Huang, or R1-171055, or R1-1707396
- R1-1704208 with Lo and one of the 3GPP chart prior art references R1-1710116, Huang, or R1-171055, or R1-1707396
- R1-1704208 with Adams and one of the 3GPP chart prior art references R1-1710116, Huang, or R1-171055, or R1-1707396
- R1-1704208 combined with Lee and one of the 3GPP chart prior art references R1-1710116, Huang, or R1-171055, or R1-1707396
- R1-1704208 combined with Zou and one of Xiong or Gao
- R1-1704208 combined with Zou and one of Li or Lo
- R1-1704208 combined with Zou and one of Xiong or Kim
- R1-1704208 combined with Zou and Lee
- R1-1704208 combined with Kim and one of Xiong or Zou
- R1-1704208 combined with Kim and one of Li or Lo
- R1-1704208 combined with Kim and one of Xiong or Lee
- R1-1704208 combined with Xiong and one of Kim, Xiong, Li, Lo, Gao or Lee
- R1-1704208 combined with Xiong and one of Kim or Zou
- R1-1704208 combined with Xiong and Lee
- R1-1704208 combined with Lee and one of Xiong or Zou
- R1-1704208 combined with Lee and one of Kim or Zou
- R1-1704208 combined with Lo and one of Xiong or Zou
- R1-1704208 combined with Lo and Lee
- R1-1704208 combined with Lo and one of Kim or Zou

- R1-1704208 combined with the prosecution references(s) cited by the Examiner
- R1-1704208 combined with the prior art LTE PUCCH
- R1-1704208 combined with the prior art LTE PUCCH and one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396

To the extent R1-1710555 does not anticipate and/or render obvious on its own any of the '566 Patent claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine R1-1710555 with any of these references identified below because each of the references pertains to the same specific subject matter of developing the long PUCCH structure for the NR standards and technologies. The references pertain to the same technology and use the same terminology. Each of the references describes proposed structures and functionality for the long PUCCH in NR. Thus, a POSITA would have been motivated to take beneficial aspects of R1-1710555 and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have had a reasonable expectation of success in such combinations.

Furthermore, for the references below that are referenced by R1-1710555, a POSITA would have been motivated to combine such references with R1-1710555 for the reason that the author(s) thought these references so pertinent as to have referenced them expressly. Moreover, these references reflect specific technology cited as examples of the type of known proposed solutions that could be used in implementing inventions very similar to that disclosed in R1-1710555. Such references are an explicit motivation to combine (and an explicit teaching of the referenced technology for anticipation purposes) and also provide a reasonable expectation of

success in the combination because at least one author noted their suitability for the disclosure of technology similar to this reference.

- R1-1710555 with one of Zou, Kim, Xiong, Li, Lo, Gao or Lee
- R1-1710555 combined with one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or Huang, or R1-1707396
- R1-1710555 combined with one or more of R1-1704208, Huang, R1-1707396 and one of Zou, Kim, Xiong, Li, Lo, Gao or Lee
- R1-1710555 with Kim and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or Huang, or R1-1707396
- R1-1710555 with Zou and of the 3GPP chart prior art references R1-1710116, R1-1704208, or Huang, or R1-1707396
- R1-1710555 with Xiong and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or Huang, or R1-1707396
- R1-1710555 with Lo and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or Huang, or R1-1707396
- R1-1710555 with Adams and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or Huang, or R1-1707396
- R1-1710555 combined with Lee and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or Huang, or R1-1707396
- R1-1710555 combined with Zou and one of Xiong or Gao
- R1-1710555 combined with Zou and one of Li or Lo
- R1-1710555 combined with Zou and one of Xiong or Kim
- R1-1710555 combined with Zou and Lee
- R1-1710555 combined with Kim and one of Xiong or Zou
- R1-1710555 combined with Kim and one of Li or Lo
- R1-1710555 combined with Kim and one of Xiong or Lee
- R1-1710555 combined with Xiong and one of Kim, Xiong, Li, Lo, Gao or Lee
- R1-1710555 combined with Xiong and one of Kim or Zou

- R1-1710555 combined with Xiong and Lee
- R1-1710555 combined with Lee and one of Xiong or Zou
- R1-1710555 combined with Lee and one of Kim or Zou
- R1-1710555 combined with Lo and one of Xiong or Zou
- R1-1710555 combined with Lo and Lee
- R1-1710555 combined with Lo and one of Kim or Zou
- R1-1710555 combined with the prosecution references(s) cited by the Examiner
- R1-1710555 combined with the prior art LTE PUCCH
- R1-1710555 combined with the prior art LTE PUCCH and one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396

To the extent R1-1707396 does not anticipate and/or render obvious on its own any of the ’566 Patent claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine R1-1707396 with any of these references identified below because each of the references pertains to the same specific subject matter of developing the long PUCCH structure for the NR standards and technologies. The references pertain to the same technology and use the same terminology. Each of the references describes proposed structures and functionality for the long PUCCH in NR. Thus, a POSITA would have been motivated to take beneficial aspects of R1-1707396 and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have had a reasonable expectation of success in such combinations.

Furthermore, for the references below that are referenced by R1-1707396, a POSITA would have been motivated to combine such references with R1-1707396 for the reason that the author(s) thought these references so pertinent as to have referenced them expressly. Moreover, these references reflect specific technology cited as examples of the type of known proposed solutions that could be used in implementing inventions very similar to that disclosed in R1-1707396. Such references are an explicit motivation to combine (and an explicit teaching of the referenced technology for anticipation purposes) and also provide a reasonable expectation of success in the combination because at least one author noted their suitability for the disclosure of technology similar to this reference.

- R1-1707396 with one of Zou, Kim, Xiong, Li, Lo, Gao or Lee
- R1-1707396 combined with one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or Huang
- R1-1707396 combined with one or more of R1-1704208, R1-171055, Huang and one of Zou, Kim, Xiong, Li, Lo, Gao or Lee
- R1-1707396 with Kim and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or Huang
- R1-1707396 with Zou and of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or Huang
- R1-1707396 with Xiong and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or Huang
- R1-1707396 with Lo and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or Huang
- R1-1707396 with Adams and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or Huang
- R1-1707396 combined with Lee and one of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or Huang
- R1-1707396 combined with Zou and one of Xiong or Gao
- R1-1707396 combined with Zou and one of Li or Lo

- R1-1707396 combined with Zou and one of Xiong or Kim
- R1-1707396 combined with Zou and Lee
- R1-1707396 combined with Kim and one of Xiong or Zou
- R1-1707396 combined with Kim and one of Li or Lo
- R1-1707396 combined with Kim and one of Xiong or Lee
- R1-1707396 combined with Xiong and one of Kim, Xiong, Li, Lo, Gao or Lee
- R1-1707396 combined with Xiong and one of Kim or Zou
- R1-1707396 combined with Xiong and Lee
- R1-1707396 combined with Lee and one of Xiong or Zou
- R1-1707396 combined with Lee and one of Kim or Zou
- R1-1707396 combined with Lo and one of Xiong or Zou
- R1-1707396 combined with Lo and Lee
- R1-1707396 combined with Lo and one of Kim or Zou
- R1-1707396 combined with the prosecution references(s) cited by the Examiner
- R1-1707396 combined with the prior art LTE PUCCH
- R1-1707396 combined with the prior art LTE PUCCH and one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396

To the extent R1-1710116 does not anticipate and/or render obvious on its own any of the ’566 Patent claims, a person of ordinary skill in the art would have been motivated to combine it with one or more other references as identified below, for the reasons noted below, as well as for the reasons described throughout this Section with a reasonable expectation of success.

A POSITA would have been motivated to combine R1-1710116 with any of these references identified below because each of the references pertains to the same specific subject matter of developing the long PUCCH structure for the NR standards and technologies. The

references pertain to the same technology and use the same terminology. Each of the references describes proposed structures and functionality for the long PUCCH in NR. Thus, a POSITA would have been motivated to take beneficial aspects of R1-1710116 and combine them with the other aspects reflected in the references. Furthermore, because the references are so similar and use such similar technologies, a POSITA would have had a reasonable expectation of success in such combinations.

Furthermore, for the references below that are referenced by R1-1710116, a POSITA would have been motivated to combine such references with R1-1710116 for the reason that the author(s) thought these references so pertinent as to have referenced them expressly. Moreover, these references reflect specific technology cited as examples of the type of known proposed solutions that could be used in implementing inventions very similar to that disclosed in R1-1710116. Such references are an explicit motivation to combine (and an explicit teaching of the referenced technology for anticipation purposes) and also provide a reasonable expectation of success in the combination because at least one author noted their suitability for the disclosure of technology similar to this reference.

- R1-1710116 with one of Zou, Kim, Xiong, Li, Lo, Gao or Lee
- R1-1710116 combined with one or more of the 3GPP chart prior art references Huang, R1-1704208, or R1-171055, or R1-1707396
- R1-1710116 combined with one or more of R1-1704208, R1-171055, R1-1707396 and one of Zou, Kim, Xiong, Li, Lo, Gao or Lee
- R1-1710116 with Kim and one of the 3GPP chart prior art references Huang, R1-1704208, or R1-171055, or R1-1707396
- R1-1710116 with Zou and of the 3GPP chart prior art references Huang, R1-1704208, or R1-171055, or R1-1707396
- R1-1710116 with Xiong and one of the 3GPP chart prior art references Huang, R1-1704208, or R1-171055, or R1-1707396

- R1-1710116 with Lo and one of the 3GPP chart prior art references Huang, R1-1704208, or R1-171055, or R1-1707396
- R1-1710116 with Adams and one of the 3GPP chart prior art references Huang, R1-1704208, or R1-171055, or R1-1707396
- R1-1710116 combined with Lee and one of the 3GPP chart prior art references Huang, R1-1704208, or R1-171055, or R1-1707396
- R1-1710116 combined with Zou and one of Xiong or Gao
- R1-1710116 combined with Zou and one of Li or Lo
- R1-1710116 combined with Zou and one of Xiong or Kim
- R1-1710116 combined with Zou and Lee
- R1-1710116 combined with Kim and one of Xiong or Zou
- R1-1710116 combined with Kim and one of Li or Lo
- R1-1710116 combined with Kim and one of Xiong or Lee
- R1-1710116 combined with Xiong and one of Kim, Xiong, Li, Lo, Gao or Lee
- R1-1710116 combined with Xiong and one of Kim or Zou
- R1-1710116 combined with Xiong and Lee
- R1-1710116 combined with Lee and one of Xiong or Zou
- R1-1710116 combined with Lee and one of Kim or Zou
- R1-1710116 combined with Lo and one of Xiong or Zou
- R1-1710116 combined with Lo and Lee
- R1-1710116 combined with Lo and one of Kim or Zou
- R1-1710116 combined with the prosecution references(s) cited by the Examiner
- R1-1710116 combined with the prior art LTE PUCCH
- R1-1710116 combined with the prior art LTE PUCCH and one or more of the 3GPP chart prior art references R1-1710116, R1-1704208, or R1-171055, or R1-1707396

C. P.R. 3-3(c) Disclosures: Charts Identifying Where in Each Item of Prior Art Each Element of the Asserted Claim Is Found

Exhibits A-01 *et seq.*, B-01 *et seq.*, C-01 *et seq.*, and D-01 *et seq.*, of these contentions are charts that specifically identify where each element of each Asserted Claim is found in the prior art. The claim charts in these contentions (Exhibits A-01 *et seq.*, B-01 *et seq.*, C-01 *et seq.*, and D-01 *et seq.*) provide example sections within the prior art references that teach or suggest each and every element of the Asserted Claims either expressly or inherently. The contentions set forth obviousness arguments based on the disclosures in each of the references, teachings well known at the time of filing, admitted prior art, and the knowledge of a person of ordinary skill in the art at the time the respective patent application was filed. If needed, all of the exhibited art can be used in combination for an obvious determination.

For Asserted Claims governed by 35 U.S.C. §112(f), the exhibits include identity of structure(s), act(s), or materials in each prior art reference that performs the claimed function. To the extent any limitation of any of the Asserted Claims is construed to have a similar meaning, or to encompass similar feature(s) and function(s), as apparently contended by Active Wireless in its Infringement Contentions, or later determined by the Court, and to the extent at least one claim chart in Exhibits A-01 *et seq.*, B-01 *et seq.*, C-01 *et seq.*, and D-01 *et seq.*, identifies any prior art reference, or a portion thereof, as disclosing or teaching such similarly construed claim limitation, such identified prior art reference, or the portion thereof, and Defendants' contentions with respect to such claim limitation and such prior art reference as found in such claim chart, are incorporated by reference, and are part of, Defendants' invalidity contentions with respect to each of the Asserted Claims that includes such similarly construed claim limitation.

D. P.R. 3-4(d) Disclosures: Invalidity Under 35 U.S.C. § 112

Pursuant to Local Rule 3-3(d), Defendants contend that certain claims of the Asserted Patents are invalid under 35 U.S.C. § 112 because: (1) the claims are indefinite; (2) the claims are not enabled; and/or (3) the claims lack adequate written description. Defendants' contentions that the following claims are invalid under 35 U.S.C. § 112 are made in the alternative, and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the claims of the Asserted Patents, or that any of the claims of the Asserted Patents are not anticipated or rendered obvious by any prior art.

These contentions are based on Defendants' current understanding of Active Wireless' Infringement Contentions. To the extent Active Wireless contends that the prior art references identified above would not enable a person of ordinary skill to make or use the elements of the Asserted Claims against which they are cited, or to the extent Active Wireless contends that the Asserted Claims cover something different from what Defendants understands them to cover, the Asserted Claims do not comply with the enablement, written description, and/or definiteness requirements of 35 U.S.C. §§ 112(a), (b). Because compliance with the requirements of 35 U.S.C. §§ 112(a) and (b) depends on the construction of those phrases—and no claim construction positions have been exchanged, no claim construction order issued in this case, and no expert discovery undertaken—Defendants' positions on written description, enablement, and/or indefiniteness are necessarily preliminary at this early stage of the case. A more detailed basis for Defendants' indefiniteness, enablement, and/or written description defenses will be set forth in Defendants' claim construction briefing and/or expert reports on invalidity and/or in Motion[s] for Summary Judgment of Invalidity, to be served in accordance with the Court's Docket Control Order. Defendants have not taken any depositions related to these issues and discovery is on-going. Defendants specifically reserve the right to amend and/or supplement these contentions based on

further developments in the case in accordance with the Court's Rules or as otherwise authorized by the Court.

The written description and enablement requirements are analyzed by comparing the claims with the disclosure in the specification. If the claimed invention does not appear in the specification, the claim fails regardless of whether one of skill in the art could make or use the claimed invention. *See, e.g., Ariad Pharms., Inc. v. Eli Lilly & Co*., 598 F.3d 1336, 1348 (Fed. Cir. 2010). To satisfy the enablement requirement, a patentee must "describe the manner and process of making and using the invention so as to enable a person of skill in the art to make and use the full scope of the invention without undue experimentation." *See, e.g., LizardTech, Inc. v. Earth Res. Mapping, Inc.*, 424 F.3d 1336, 1344-45 (Fed. Cir. 2005). To satisfy the written description requirement, the patentee must convey to those skilled in the art that, as of the filing date, the applicant was in possession of the invention, and demonstrate that possession by disclosing the invention in the specification. *See, e.g., Ariad*, 598 F.3d at 1352. A patent must also be precise enough to afford clear notice to what is claimed. *Nautilus, Inc. v. Biosig Instruments, Inc*., 134 S. Ct. 2120, 2124 (2014). A patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention. *Id*. The standard for assessing if a patent claim is sufficiently definite to satisfy the statutory requirement is whether "one skilled in the art would understand the bounds of the claim when read in light of the specification." *See Novo Indus., L.P. v. Micro Molds Corp*., 350 F.3d 1348, 1358 (Fed. Cir. 2003). Claims that depend from claims that are invalid for lack of enablement or written description support inherit the deficiencies of the claims from which they depend and are also invalid.

A claim term can be indefinite based on multiple grounds ranging from the substantive concerns to unresolvable drafting errors, each of which can be fatal to the validity of the claims as a matter of law. For example, the Federal Circuit has repeatedly held that apparatus claims that contain method claim limitations are indefinite because it is impossible to determine when direct infringement occurs. *See, e.g., Rembrandt Data Techs., LP v. AOL, LLC*, 641 F.3d 1331, 1339-40 (Fed. Cir. 2011) (an independent claim that recited both an apparatus and a method of using that apparatus was indefinite, as was its dependent claims); *IPXL Holdings v. Amazon.com*, 430 F.3d 1377, 1384 (Fed. Cir. 2005); *In re Katz Interactive Call Processing Patent Litigation*, 639 F.3d 1303, 1318 (Fed. Cir. 2011) (mixed claims "create confusion as to when direct infringement occurs because they are directed both to systems and to actions performed by" users). Claim terms that lack antecedent basis are indefinite. *See, e.g., Allen Eng'g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1348-49 (Fed. Cir. 2002) (claim ending in the middle of a claim limitation was indefinite because it was "impossible to discern the scope of such a truncated limitation"). Furthermore, means-plus-function claims, which invoke 35 U.S.C. § 112(f), may be invalid as indefinite where a patent owner has failed to disclose adequate corresponding structure linked to the recited claim functionality. *Noah Sys., Inc. v. Intuit Inc.*, 675 F.3d 1302, 1311-12 (Fed. Cir. 2012).

In the Supreme Court's decision in *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014), the Court clarified that a patent is invalid "for indefiniteness if its claims read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *See id.* "[I]t cannot be sufficient that a court can ascribe some meaning to a patent's claim; the definiteness inquiry trains on the understanding of a skilled artisan at the time of the patent application, not that of a court viewing matters post hoc." *Id.* at 2130. The definiteness inquiry necessarily demands that

the "patent and prosecution history disclose a single known approach or establish that, where multiple known approaches exist, a person of ordinary skill in the art would know which approach to select." *Id*. Claims that depend from claims that are indefinite inherit the indefiniteness of the claims from which they depend and are also indefinite.

The Asserted Claims of the Asserted Patents are invalid because the Asserted Patents do not include sufficient written description of the purported inventions claimed therein, and of the manner and process of making and using said inventions, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which the inventions pertain, or which they are most nearly connected, to make and use any of the claimed inventions. 35 U.S.C. § 112(a).

Defendants contend that the specifications to which priority is sought fail to describe the full scope of the claimed inventions in sufficient detail such that one skilled in the art could reasonably conclude that the inventor had possession of the claimed invention as of the filing dates to which the Asserted Patents claim priority. The specifications of the Asserted Patents fail to describe the claimed inventions in a manner understandable to one of ordinary skill in the art and fail to show that the listed inventors actually invented the claimed inventions. Accordingly, each of the Asserted Claims is invalid for lack of adequate written description under 35 U.S.C. § 112(a).

In addition, Defendants contend that, at the time of Active Wireless' claimed priority date, the patent applications to which Active Wireless claims priority did not enable one of ordinary skill in the art to make and use the full scope of the claimed inventions without undue experimentation. Accordingly, each of the Asserted Claims is invalid for lack of enablement under 35 U.S.C. § 112(a).

Defendants also contend that the Asserted Claims fail to particularly point out and distinctly claim the subject matter that the listed inventor regarded as his invention. Defendants

contend that one of ordinary skill in the art would not understand the scope of each of the Asserted Claims when the claim is read in light of the specification. Accordingly, each of the Asserted Claims is invalid for indefiniteness under 35 U.S.C. § 112(a).

As discussed above, the following claims are invalid pursuant to 35 U.S.C. § 112(a) as indefinite.

Asserted Claim(s)	Claim Term
’443 Patent: Claim 3	“sending circuitry configured to send a physical downlink shared channel (PDSCH)”
’443 Patent: Claim 3	“receiving circuitry configured to receive CBG based HARQ-ACK”
’443 Patent: Claim 3	“for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a common search space (CSS), the receiving circuitry is configured to receive one HARQ-ACK bit for the transport block”
’443 Patent: Claim 3	“for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a UE-specific search space (USS), the receiving circuitry is configured to receive HARQ-ACK bits of all CBGs.”
’443 Patent: Claim 5	“for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a common search space (CSS), one HARQ-ACK bit for the transport block is received”
’443 Patent: Claim 5	“for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a UE-specific search space (USS), HARQ-ACK bits of all CBGs are received.”
’557 Patent: Claims 9, 13	a parameter associated with a condition for determination of a failure of an SI message acquisition process;
’557 Patent: Claims 9, 13	an indication of broadcast status for the SI message, the indication indicating broadcasting
’557 Patent: Claims 9, 13	[processor circuitry configured to cause the transmitting circuitry to broadcast the SI message; wherein:] (claim 9) wherein: the first type SIB is re-acquired by the user equipment upon the user equipment failing on the SI message acquisition process in at least one of the SI windows to receive the SI message,
’557 Patent: Claims 10, 14	wherein the first type SIB re-acquired by the user equipment is used by the user equipment to re-initiate the SI message acquisition process.
’557 Patent: Claims 11, 15	wherein a master information block (MIB) is re-acquired by the user equipment from the base station apparatus prior to the re-acquisition of the first type SIB.
’557 Patent: Claims	wherein the condition for the determination of the failure of the SI

Asserted Claim(s)	Claim Term
12, 16	message acquisition process includes that a stored version of one of the at least one second type SIB is not valid.
’764 Patent: Claim 3	a period of the more than one first subframe is different from a period of the more than one second subframe
’764 Patent: Claim 3	configured to transmit the another SC-MCCH information with use of the resource indicated by the first DCI format and in accordance with the second DCI format.
’764 Patent: Claim 3	the transmitting circuitry is configured to transmit, in more than one second subframe, the second DCI format carried on a second narrowband physical downlink control channel (NPDCCH),
’566 Patent: Claims 8, 16	transmit, to a user equipment (UE), a signaling, an uplink control channel (PUCCH) spans over multiple slots being determined based on the signaling; and
’566 Patent: Claims 8, 16	receive uplink control information (UCI) with the frequency hopping for the configured multiple slots PUCCH, wherein
’566 Patent: Claims 8, 16	the frequency hopping
’566 Patent: Claims 8, 16	the configured multiple slots PUCCH
’566 Patent: Claims 8, 16	the number of symobls of the PUCCH is the same in each slot of the multiple slots, and
’566 Patent: Claims 8, 16	the location of the symbols for the PUCCH is the same in the each slot of the multiple slots.
’566 Patent: Claim 9	a reference symbol (RS) pattern in each slot is determined on a per slots basis by a long PUCCH format of a given the number of PUCCH symbols
’566 Patent: Claim 10	wherein the same PUCCH symbol location may be allocated in each slot.
’566 Patent: Claim 11	wherein UCI encoded bits are rate matched and loaded to all to PUCCH UCI carrying symbols of each slot of the long PUCCH separately, and if the number of symbols of the PUCCH in each slot is the same, the PUCCH format and encoded UCI in each slot is repeated in the multiple slots.

Defendants contend that Active Wireless’ apparent claim constructions render the Asserted Claims overly broad in scope and well beyond the purported inventions described in the Asserted Patents. Active Wireless is attempting to construe the Asserted Claims in an idiosyncratic manner that is entirely inconsistent with the written specification and prosecution history of the Asserted

Patents as well as with the understanding of one of ordinary skill in the art at the time the applications that issued as the Asserted Patents were filed. These allegations are inconsistent with the plain language of the claims, the supporting description, and the prosecution history.

Defendant provides below an identification of terms in Asserted Claims that render the Asserted Claims, at least as apparently construed by Active Wireless in its Infringement Contentions as discussed above, invalid pursuant to 35 U.S.C. § 112 as not enabled or lacking sufficient written description.

Asserted Claim(s)	Claim Term	Invalidity Under 35 U.S.C. § 112
'443 Patent: Claim 3	"for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a common search space (CSS), the receiving circuitry is configured to receive one HARQ-ACK bit for the transport block"	The claim is invalid under 35 U.S.C. § 112(a) because the specification fails to describe or enable the full breadth of the claims.
'443 Patent: Claim 3	"for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a UE-specific search space (USS), the receiving circuitry is configured to receive HARQ-ACK bits of all CBGs."	The claim is invalid under 35 U.S.C. § 112(a) because the specification fails to describe or enable the full breadth of the claims.
'443 Patent: Claim 5	"for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a common search space (CSS), one HARQ-ACK bit for the transport block is received"	The claim is invalid under 35 U.S.C. § 112(a) because the specification fails to describe or enable the full breadth of the claims.
'443 Patent: Claim 5	"for the CBG based HARQ-ACK	The claim is invalid under 35 U.S.C. § 112(a) because the specification fails to describe or

Asserted Claim(s)	Claim Term	Invalidity Under 35 U.S.C. § 112
	corresponding to the PDSCH which is scheduled in a UE-specific search space (USS), HARQ-ACK bits of all CBGs are received."	enable the full breadth of the claims.
'557 Patent: Claims 9, 13	a parameter associated with a condition for determination of a failure of an SI message acquisition process;	The claim is invalid under 35 U.S.C. § 112(a) because the specification fails to describe or enable the full breadth of the claims.
'557 Patent: Claims 9, 13	an indication of broadcast status for the SI message, the indication indicating broadcasting	The claim is invalid under 35 U.S.C. § 112(a) because the specification fails to describe or enable the full breadth of the claims.
'557 Patent: Claims 9, 13	the first type SIB is re-acquired by the user equipment upon the user equipment failing on the SI message acquisition process in at least one of the SI windows to receive the SI message,	The claim is invalid under 35 U.S.C. § 112(a) because the specification fails to describe or enable the full breadth of the claims.
'764 Patent: Claim 3	configured to transmit the another SC-MCCH information with use of the resource indicated by the first DCI format and in accordance with the second DCI format.	The claim is invalid under 35 U.S.C. § 112(a) because the specification fails to describe or enable the full breadth of the claims.
'764 Patent: Claim 3	the transmitting circuitry is configured to transmit, in more than one second subframe, the second DCI format carried on a second narrowband physical downlink control channel (NPDCCH),	The claim is invalid under 35 U.S.C. § 112(a) because the specification fails to describe or enable the full breadth of the claims.
'566 Patent: Claims 8, 16	transmit, to a user equipment (UE), a signaling, an uplink control channel (PUCCH) spans over	The claim is invalid under 35 U.S.C. § 112(a) because the specification fails to describe or enable the full breadth of the claims.

Asserted Claim(s)	Claim Term	Invalidity Under 35 U.S.C. § 112
	multiple slots being determined based on the signaling; and	
’566 Patent: Claims 8, 16	the location of the symbols for the PUCCH is the same in the each slot of the multiple slots.	The claim is invalid under 35 U.S.C. § 112(a) because the specification fails to describe or enable the full breadth of the claims.
’566 Patent: Claim 10	wherein the same PUCCH symbol location may be allocated in each slot.	The claim is invalid under 35 U.S.C. § 112(a) because the specification fails to describe or enable the full breadth of the claims.
’566 Patent: Claim 11	wherein UCI encoded bits are rate matched and loaded to all to PUCCH UCI carrying symbols of each slot of the long PUCCH separately, and if the number of symbols of the PUCCH in each slot is the same, the PUCCH format and encoded UCI in each slot is repeated in the multiple slots.	The claim is invalid under 35 U.S.C. § 112(a) because the specification fails to describe or enable the full breadth of the claims.

These are merely examples and are not intended to be limiting. Defendants reserve all rights to amend their Invalidity Contentions under 35 U.S.C. § 112, including after an Asserted Claim is ultimately construed by the Court, in response to any interpretation of an Asserted Claim embodied in Active Wireless’ infringement positions, and/or to account for any changes in the law concerning invalidity under 35 U.S.C. §112. Defendants additionally reserve the right to provide additional explanation and/or argument for their Invalidity Contentions under § 112, including, for example, based on expert testimony.

III. P.R. 3-4 DISCLOSURES AND CONTENTIONS

A. P.R. 3-4(a) Disclosures

Pursuant to P.R. 3-4(a), Defendants are separately producing representative technical documentation within their possession, custody, and control that show the operation of aspects or elements of the Accused Instrumentality identified by Active Wireless in its Infringement Contentions for each Defendant. Defendants reserve the right to supplement these disclosures with additional documentation.

B. P.R. 3-4(b) Disclosures

In accordance with P.R. 3-4(b), Defendants produced a single set of prior art references identified in these Invalidity Contentions for prior art related to patents asserted against more than one Defendant. Defendants also produced prior art references concerning prior art systems and methods. Such documents can be found at the following Bates range: Defendants_PA 0000001–Defendants_PA 0019988. Any prior art references not in English are produced with an English translation of the portion(s) relied upon. These prior art references are cited herein and support the contentions presented. Defendants' search for prior art references, additional documentation, and/or corroborating evidence concerning prior art apparatuses and methods is ongoing. Accordingly, Defendants reserve the right to supplement their production, as provided by the local rules, as additional prior art references, additional documentation, and/or corroborating evidence concerning prior art documents/apparatuses, and methods are obtained during the course of discovery. Defendants also produced its core technical documents. Such documents can be found at the following Bates ranges: NOKIA-AWT-00000001 – NOKIA-AWT-00218503; Ericsson-AWT-00000001 – Ericsson-AWT-00337662; and TMoAWT_0000000001 – TMoAWT_0000001167. Defendants' investigation is ongoing and it specifically reserves the right to supplement its production should additional information become available.

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Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that on June 28, 2024, the foregoing document was served via e-mail upon all counsel of record in this case.

/s/ John Gibson