

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TCL Communication Technology Holdings Limited
TCT Mobile International Limited
TCT Mobile, Inc.
TCT Mobile (US) Inc.
TCT Mobile (US) Holdings Inc.,

Petitioners

v.

Mitsubishi Electric Corporation
Patent Owner

Case No. IPR2023-00997

PETITIONERS' REPLY UNDER 37 C.F.R. §42.23

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PETITIONERS' UPDATED EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 10,200,976 (“the ’976 patent”)
1002	Excerpts of Prosecution history of U.S. Patent No. 10,200,976 (“Prosecution History”)
1003	Declaration of Mark R. Lanning
1004	C.V. of Mark R. Lanning
1005	MELCO Complaint for Case No.: 8:22-cv-1073-CJC-DFM.
1006	Exhibit D of Plaintiffs’ Preliminary Infringement Contentions.
1007	Amended Joint Claim Construction and Prehearing Statement, Case No.: 8:22-cv-1073-CJC-DFM. (Docket 51)
1008	Plaintiffs’ Opening Claim Construction Brief, Case No.: 8:22-cv-1073-CJC-DFM
1009	Defendants’ Opening Claim Construction Brief, Case No.: 8:22-cv-1073-CJC-DFM
1010	Summary of 3GPP Standards Releases for LTE by Alastair Brydon on October 5, 2012.
1011	Reserved
1012	3GPP TS 36.300 V10.0.0 (2010-06). Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2 (Release 10).
1013	R2-104515 3GPP LTE Contribution to TSG-RAN WG2 Meeting #71 in Madrid, Spain, August 23 rd – 27 th , 2010.
1014	3GPP TS 25.308 V9.1.0 (2009-09) Specification. High Speed Downlink Packet Access (HSDPA); Overall description; Stage 2 (Release 9).
1015	3GPP TS 25.319 V9.1.0 (2009-09) Specification. Enhanced uplink; Overall description; Stage 2 (Release 9), aka, High Speed Uplink Packet Access (HSUPA).

Exhibit No.	Description
1016	LTE: Carrier Aggregation Tutorial Tweet4Technology: LTE 5G-NR Wireless Technology Blogs. November 2, 2016. NOT PRIOR ART.
1017	About the 3GPP Webpages saved on 4/25/2021.
1018	3GPP Working Procedures Webpages saved on 4/25/2021.
1019	3GPP Delegates Corner Webpages saved on 4/25/2021.
1020	3GPP FAQs Webpages saved on 4/25/2021.
1021	Overview of 3GPP Release 9 V0.1.1 (2010-09).
1022	3GPP Description of Releases (including Ex. 1021). https://www.3gpp.org/ftp/Information/WORK_PLAN/Description_Releases/Previous_versions
1023	U.S. Patent Publication No. 2006/0274712 A1 to Malladi et al. (“Malladi”)
1024	3GPP TS 36.300 V11.2.0 (2012-06). 3GPP; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2 (Release 11)
1025	3GPP TSGR2-#71 Meeting Docs List. R2-104515 is included.
1026	Report of TSG RAN WG2 #71, Madrid, Spain, August 23 – 27, 2010. https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_71/Report/R2-106031.zip
1027	Fintiv stipulation
1028	Declaration of Mark R. Lanning in Support of Petitioners’ Reply
1029	Patent Owner’s Response
1030	3GPP TSG-RAN WG4 Meeting #65 CR R4-126923.
1031	Carrier Aggregation explained submitted to 3GPP on June 2013

1032	Understanding Carrier Aggregation by Anritsu
1033	3GPP TS 36.101 V8.11.0 (2010-10)
1034	Phone Scoop Band 29. https://www.phonescoop.com/glossary/term.php?gid=561 .
1035	A Guide to Cellular Frequency Bands Used by US Carriers. https://www.kajeet.com/en/blog/a-guide-to-cellular-frequency-bands-used-by-us-carriers
1036	3GPP TS 36.331 V9.4.0 (Non-Patent Document 2)

I. INTRODUCTION

Petitioners filed a Petition for *Inter Partes* Review of U.S. Patent No. 10,200,976 (“the ’976 patent”) on June 2, 2023 (Paper No. 2, “Petition”). The Board instituted review on December 7, 2023 (Paper No. 8, “Institution Decision”). Patent Owner (“PO”), Mitsubishi Electric Corporation, submitted a Response on March 1, 2024 (Paper No. 12, “Response”). Petitioners submit the following Petitioners’ Rely (“Reply”) pursuant to 37 C.F.R. §42.23.

II. ARGUMENT

PO states that “neither TS 36.300 nor R2-104515 discloses or suggests that the base station configures the “non-associated cell’ to have only a downlink resource.” Response, 16. In support of its position, PO presents a scattershot of arguments that can be grouped into three major arguments against Ground 1: 1) neither TS 36.300 V.10.0.0 (“LTE Specification,” Ex. 1012) nor R2-104515 (Ex. 1013) teaches configuration by a base station of a non-associated cell (secondary cell or SCell) allocated with only a downlink resource, 2) prior to the ’976 patent the base station configured an SCell to include both a resource for uplink and a resource for downlink, and 3) there is an inadequate showing of motivation to combine the two references. Each of these arguments will be demonstrated to be

inaccurate, inconsistent with prior positions of PO, or irrelevant to the validity of claim 2.

In making its first argument, PO ignores clear teachings in the applied references. For example, as explained in the LTE Specification the “LTE *base station* controls the assignment of the downlink resources and uplink resources for each UE.” Ex. 1012, p. 13 (3.1 Definitions), p. 15 (3.2 Abbreviations). R2-104515 relates to LTE Carrier Aggregation and states that a secondary cell (SCell) for Carrier Aggregation (CA) can be configured with just a downlink resource. Ex. 1013, p. 1.

PO’s second argument is also incorrect, and PO’s rationale for making that argument based upon Tables showing LTE operating bands is unrelated to the processes of Carrier Aggregation and the limitations of claim 2. Moreover, PO supports its argument with reference to Embodiment 3 disclosed in the ‘976 patent in which both the PCell (associated cell) and its linked SCell are configured without any allocation of resources for uplink, which is contrary to the requirements of claim 2. To avoid invalidity, PO also violates a fundamental tenet of patent law by arguing in its Response an interpretation of the LTE Specification opposite to what it has alleged in Infringement Contentions it served in the companion district court case.

PO's third argument is belied by convincing evidence of motivation to combine presented in the Petition, not the least of which is that R2-104515 is a Change Request (CR) to the then latest version of the LTE Specification, which was TS 36.300 V10.0.0.

For Ground 2, PO's Response provides no basis for its conclusion other than

As acknowledged in the ID, "Petitioner has not shown Malladi to disclose a non-associated cell having no uplink carriers." ID, 21.

Ground 2 of the Petition therefore fails to demonstrate a reasonable likelihood that Malladi would have anticipated the "non-associated cell" of claim 2. Claim 2 therefore remains patentable over Malladi in Ground 2.

Response, p. 43.

For Ground 3, PO's technical argument is also focused on the claimed characteristics of the non-associated cell, stating TS 25.319 has "no teachings of a cell having downlink resources only or that a base station configures a cell with downlink resources only." *Id.*, p. 44. Its only other argument is, despite the Board's finding to the contrary, a POSITA would not be motivated to combine Malladi with TS 25.319. *Id.*, pp.47-50. PO's criticisms of TS 25.319 are based

upon an erroneous and selective reading of its teachings and, as the Board found, there is clear evidence supporting the proposed combination.

PO's arguments against Grounds 1–3 lack both technical and legal merit.

A. Ground 1: Patent Owner's Arguments That Claim 2 of the '976 Patent Is Not Unpatentable Over TS 36.300 V10.0.0 Modified in View of R2-104515 Lack Merit and Are Irrelevant to the Claim

PO is incorrect in stating "TS 36.300, as of the priority date of the '976 Patent, did not disclose or suggest a 'non-associated cell' configured by the base station to have only a downlink resource allocated." Response, 16. To support its position, PO makes the false argument based upon a table of predetermined Operating Frequency Band pairs present in the TS 36.101 Specification. Response, 17-28. In fact, these predetermined Operating Frequency Band pairs are not relevant to claim 2 because this pairing is unrelated to configuring a UE with allocations of uplink and downlink resources. That configuration and allocation is done by the base station. Nothing in or related to the Table prohibits the base station from configuring a UE by allocating only a downlink resource when only a downlink resource is needed. Ex. 1028, ¶¶14-15, 19-20.

PO's position that the frequency bands are always assigned for both the downlink and uplink (EX2005, ¶57, Response, 21-23) is also untrue. Section 7.5 of TS 36.300 of the LTE Standard, quoted in the Response and in Dr. Cooklev's

declaration, directly contradicts this position. The highlighted portion below defines the number of downlink and uplink resources, referred to as component carriers (CCs), which the base station can configure to be allocated for the PCell (associated cell) and the SCell (non-associated cell). The phrase “the number of DL [downlink] SCCs [Secondary Component Carriers] configured is therefore always larger or equal to the number of UL [uplink] SCCs” means that when the number of downlink SCCs is one, as covered by claim 2, the number of UL SCCs can either be one or zero. Zero UL SCCs meets the claim 2 limitation of a non-associated cell configured by the base station to include only another resource for downlink. Ex. 1028, ¶¶21-22.

7.5 Carrier Aggregation

When CA is configured, the UE only has one RRC connection with the network. At RRC connection establishment/re-establishment, one serving cell provides the security input (one ECGI, one PCI and one ARFCN) and the NAS mobility information (e.g. TAI) similarly as in Rel-8/9. This cell is referred to as the Primary Serving Cell (PCell). In the downlink, the carrier corresponding to the PCell is the Downlink Primary Component Carrier (DL PCC) while in the uplink it is the Uplink Primary Component Carrier (UL PCC).

Depending on UE capabilities, Secondary Serving Cells (SCells) can be configured to form together with the PCell a set of serving cells. In the downlink, the carrier corresponding to an SCell is a Downlink Secondary Component Carrier (DL SCC) while in the uplink it is an Uplink Secondary Component Carrier (UL SCC).

The configured set of serving cells for a UE therefore always consists of one PCell and one or more SCells:

- For each SCell the usage of uplink resources by the UE in addition to the downlink ones is configurable (the number of DL SCCs configured is therefore always larger or equal to the number of UL SCCs and no SCell can be configured for usage of uplink resources only);
- The number of serving cells that can be configured depends on the aggregation capability of the UE (see subclause 5.5);
- PCell can only be changed with handover procedure (i.e. with security key change and RACH procedure);

NOTE: PCell change optimisations (e.g. not involving a handover procedure) are FFS.

- PCell is used for transmission of PUCCH;
- Unlike SCells, PCell cannot be de-activated (see subclause 12.1);
- Re-establishment is triggered when PCell experiences RLF, not when SCells experience RLF;
- NAS information is taken from PCell.

The reconfiguration, addition and removal of SCells can be performed by RRC. At intra-LTE handover, RRC can also add, remove, or reconfigure SCells for usage with the target PCell. When adding a new SCell, dedicated RRC signalling is used for sending the system information of the SCell required for transmission/reception (similarly as in Rel-8/9 for handover).

Ex. 1012, p. 49 (Section 7.5 of TS 36.300 V10.0.0, highlighting added); *see also*,

Ex. 1028, ¶¶21-22.

Further support in the LTE Standard, as documented by at least the TS 36.300 V10.0.0 Specification, requires that the base station (eNB) configure and allocate the downlink and uplink resources that are to be used by a communication terminal device (“UE”). This functionality is described with

reference to the Radio Bearer Control (RBC) functionality that is located in the eNB. Radio Bearer channels are used for multiple purposes in an LTE network. The main use for RBs is to transfer user data in both directions between a UE and an eNB. In an LTE network, the user data includes voice conversations in addition to the many different applications contained in a UE that are used to send and receive data, e.g., Internet browsing, email, and multi-media messaging. The RBC functions are described by TS 36.300 V10.0.0 are:

16.1 RRM functions

16.1.1 **Radio Bearer Control (RBC)**

The **establishment**, maintenance and release of **Radio Bearers** involves the configuration of **radio resources associated with them**. When **setting up a radio bearer for a service**, radio bearer control (RBC) takes into account the **overall resource situation in E-UTRAN [Evolved Universal Terrestrial Radio Access Network, aka the LTE Radio Access Network]**, the QoS requirements of in-progress sessions and the QoS requirement for the new service. RBC is also concerned with the maintenance of radio bearers of in-progress sessions at the change of the radio resource situation due to mobility or other reasons. RBC is involved in the

release of radio resources associated with radio bearers at session termination, handover or at other occasions.

RBC is located in the eNB.

Id. at pp. 107-108 (emphasis added).

TS 36.300 V10.0.0 also states the following rules for the LTE CA configuration:

- The configured set of serving cells for a UE therefore always consists of **one PCell and one or more SCells**; and
- For each SCell the usage of uplink resources by the UE in addition to the downlink ones **is configurable** (the number of DL SCCs configured is therefore **always larger or equal to the number of UL SCCs and no SCell can be configured for usage of uplink resources only**).

Id. at p. 49, Section 7.5.

Thus, a POSITA would consider that TS 36.300 V10.0.0 clearly teaches that the eNB (base station) configures uplink and/or downlink resources for non-associated cells. Further, a POSITA would have understood that in LTE Carrier Aggregation if only one non-associated cell (SCell) is configured and that SCell is allocated only one downlink resource (DL SCC=1) the SCell may be configured to have no uplink resource (UL SCC=0) because the non-associated cell (SCell) is

configured by the eNB such that the number of DL SCCs is “always larger or equal to the number of UL SCCs.” In this case, for the non-associated cell, the number of DL SCCs = 1 would be larger than the number of the UL SCCs = 0. Ex. 1028, ¶22.

Section 5.5 of TS 36.300 provides additional support that more downlink resources (DL CCs) can be configured than the aggregate uplink resources (UL CCs). The text below clearly states at least two key facts: (1) the base station (eNB) can configure a different number of CCs in the UL and DL; and (2) it is not possible to configure a UE with more UL CCs than DL CCs. A POSITA would understand if the aggregate number of DL CCs is two (one for the associated cell and one for the non-associated cell), then the number of UL CCs can be only one. *Id.*, ¶23.

It is possible to configure a UE to aggregate a different number of CCs originating from the same eNB and of possibly different bandwidths in the UL and the DL.

- The number of DL CCs that can be configured depends on the DL aggregation capability of the UE;
- The number of UL CCs that can be configured depends on the UL aggregation capability of the UE;
- It is not possible to configure a UE with more UL CCs than DL CCs;
- In typical TDD deployments, the number of CCs and the bandwidth of each CC in UL and DL is the same.

Ex. 1012, p. 39 (highlighting added).¹

1. The '976 Patent Recognizes That Prior Art LTE Standards Defined a CA Configuration with Fewer Total Uplinks Than Downlinks as Stated by Petitioner

The '976 Patent concedes a relevant fact currently in dispute regarding the disclosure of the prior art LTE TS 36.300 Specification and other earlier LTE prior art specifications. The patent states that for Carrier Aggregation (CA) configurations, a Release 8 or 9-compliant UE can be configured with the number of uplink resources allocated by the base station being less than the number of downlink resources. Specifically, the UE cannot be configured with “the number of uplink CCs (UL CCs) equal to or more than the number of downlink CCs (DL CCs).” Ex. 1001, 9:6-21. “CC” in the foregoing stands for “Component Carriers” where each CC is a separate resource for either downlink or uplink. Thus, the '976 patent is fully consistent with the foregoing disclosure of the LTE Specifications such that if the number of downlink resources is two (one for the associated cell and one for the non-associated cell), then the number of uplink

¹ Additional support for a base station configuring an SCell by allocating only a downlink resource is found in Section 11 of TS 36.300 and TS 36.300 Specification, Annex J.1, see Ex. 1028, ¶¶24-25.

resources (UL CCs) would be at most one which would be present in the associated cell. This meets the requirements of claim 2. Ex. 1028, ¶¶26-27.

2. The Patent Owner's Infringement Contentions Conflict With its Response.

PO used Section 7.5 of TS 36.300 (V11.2.0) in its Infringement Contentions in the companion district court litigation regarding infringement of claim 2 by Petitioners' products.

US 10,200,976 – Claim 2	Illustrative Sections of relevant 3GPP Specification to which the Accused Instrumentalities are compliant
the communication terminal device performs downlink communication using the associated cell and a non-associated cell configured by the base station to include only another resource for downlink, the other resource for downlink being allocated to the downlink communication from the base station device.	The Accused Instrumentalities are communication terminal devices configured to perform downlink communication using the associated cell and a non-associated cell configured by the base station to include only another resource for downlink, the other resource for downlink being allocated to the downlink communication from the base station device. Specifically, the Accused Instrumentalities satisfy these elements because they must be compliant with the following Specifications: As noted in TS 36.300, Section 7.5, for carrier aggregation (CA), a UE may be configured with one PCell and one or more SCells, and the number of downlink SCCs (secondary component channels) is always greater than or equal to the number of uplink SCCs (therefore, there may be one uplink band ("resource") and two downlink bands ("resources"), of which one may be configured from a SCell). TS 36.331, Section 4.2.1 establishes that the function of allocating these resources is performed by the network and, therefore, via the eNB. Relevant Sections of the Standard: The sections of the standard cited in conjunction with elements (a) and (b) are also relevant to element (c). The following further sections of the standard are also relevant to element (c).

	Relevant Sections of TS 36.300 v11.2.0: 7 RRC ⋮ 7.5 Carrier Aggregation When CA is configured, the UE only has one RRC connection with the network. At RRC connection establishment/re-establishment/handover, one serving cell provides the NAS mobility information (e.g. TAI), and at RRC connection re-establishment/handover, one serving cell provides the security input. This cell is referred to as the Primary Cell (PCell). In the downlink, the carrier corresponding to the PCell is the Downlink Primary Component
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Ex. 1006, pp. 22-24 (only first page of support included) (Highlighting added).

However, as shown below by the respective Section 7.5 of TS 36.300 V10.0.0 and Section 7.5 of TS 36.300 V11.2.0, and as found in the Institution Decision at 30-31, the language of Section 7.5 of prior art version V10.0.0 is identical in all relevant respects to the language of version V11.2.0.

7.5 Carrier Aggregation

When CA is configured, the UE only has one RRC connection with the network. At RRC connection establishment/re-establishment, one serving cell provides the security input (one ECGL, one PCI and one ARFCN) and the NAS mobility information (e.g. TAI) similarly as in Rel-8/9. This cell is referred to as the Primary Serving Cell (PCell). In the downlink, the carrier corresponding to the PCell is the Downlink Primary Component Carrier (DL PCC) while in the uplink it is the Uplink Primary Component Carrier (UL PCC).

Depending on UE capabilities, Secondary Serving Cells (SCells) can be configured to form together with the PCell a set of serving cells. In the downlink, the carrier corresponding to an SCell is a Downlink Secondary Component Carrier (DL SCC) while in the uplink it is an Uplink Secondary Component Carrier (UL SCC).

The configured set of serving cells for a UE therefore always consists of one PCell and one or more SCells:

- For each SCell the usage of uplink resources by the UE in addition to the downlink ones is configurable (the number of DL SCCs configured is therefore always larger or equal to the number of UL SCCs and no SCell can be configured for usage of uplink resources only);
- The number of serving cells that can be configured depends on the aggregation capability of the UE (see subclause 5.5);
- PCell can only be changed with handover procedure (i.e. with security key change and RACH procedure);

NOTE: PCell change optimisations (e.g. not involving a handover procedure) are FFS.

- PCell is used for transmission of PUCCH;
- Unlike SCells, PCell cannot be de-activated (see subclause 12.1);
- Re-establishment is triggered when PCell experiences RLF, not when SCells experience RLF;
- NAS information is taken from PCell.

The reconfiguration, addition and removal of SCells can be performed by RRC. At intra-LTE handover, RRC can also add, remove, or reconfigure SCells for usage with the target PCell. When adding a new SCell, dedicated RRC signalling is used for sending the system information of the SCell required for transmission/reception (similarly as in Rel-8/9 for handover).

Ex. 1012, p. 49 (Section 7.5 of TS 36.300 V10.0.0, highlighting added).

7.5 Carrier Aggregation

When CA is configured, the UE only has one RRC connection with the network. At RRC connection establishment/re-establishment/handover, one serving cell provides the NAS mobility information (e.g. TAI), and at RRC connection re-establishment/handover, one serving cell provides the security input. This cell is referred to as the Primary Cell (PCell). In the downlink, the carrier corresponding to the PCell is the Downlink Primary Component Carrier (DL PCC) while in the uplink it is the Uplink Primary Component Carrier (UL PCC).

Depending on UE capabilities, Secondary Cells (SCells) can be configured to form together with the PCell a set of serving cells. In the downlink, the carrier corresponding to an SCell is a Downlink Secondary Component Carrier (DL SCC) while in the uplink it is an Uplink Secondary Component Carrier (UL SCC).

The configured set of serving cells for a UE therefore always consists of one PCell and one or more SCells:

- For each SCell the usage of uplink resources by the UE in addition to the downlink ones is configurable (the number of DL SCCs configured is therefore always larger than or equal to the number of UL SCCs and no SCell can be configured for usage of uplink resources only);
- From a UE viewpoint, each uplink resource only belongs to one serving cell;
- The number of serving cells that can be configured depends on the aggregation capability of the UE (see subclause 5.5);
- PCell can only be changed with handover procedure (i.e. with security key change and RACH procedure);
- PCell is used for transmission of PUCCH;
- Unlike SCells, PCell cannot be de-activated (see subclause 11.2);
- Re-establishment is triggered when PCell experiences RLF, not when SCells experience RLF;
- NAS information is taken from PCell.

The reconfiguration, addition and removal of SCells can be performed by RRC. At intra-LTE handover, RRC can also add, remove, or reconfigure SCells for usage with the target PCell. When adding a new SCell, dedicated RRC signalling is used for sending all required system information of the SCell i.e. while in connected mode, UEs need not acquire broadcasted system information directly from the SCells.

Ex. 1024, p. 56 (Section 7.5 of TS 36.300 V11.2.0, highlighting added).

PO's Response does not point to any difference in language that could be relevant to the effectiveness of V10.0.0 as prior art. PO merely stated, without support, that "[a]ccordingly, that the language in later versions of § 7.5 in TS 36.300 is the same as or similar to § 7.5 in TS 36.300 V10.0.0 (EX1012) does nothing to prove or support Petitioner's contention that TS 36.300 V10.0.0 teaches

a 'non-associated cell' configured by a base station to have downlink resources only, particularly when considering the context provided by TS 36.101."

Response, 28.

Simply put, PO's facile position is that disclosure can satisfy a claim limitation for purposes of infringement but when that same disclosure is in a prior art document, "[it] does nothing to prove or support Petitioner's contention" that the disclosure meets the claim limitation. Ex. 1028, ¶¶28-32. The Board was spot on in its Institution Decision in noting the critical importance of the same disclosure in PO's infringement contentions because "that which infringes if later, anticipates if earlier." *See, e.g., Los Angeles Biomed. Research Inst. at Harbor-UCLA Med. Ctr. v. Eli Lilly & Co.*, 849 F.3d 1049, 1069 (Fed. Cir. 2017).

Institution Decision, 30.

3. PO is Incorrect Regarding the Timely Disclosure of at Least the LTE Specifications TS 36.100 and TS 36.101.

PO states, "That the 3GPP standard did not contemplate, disclose, or suggest a base station configuring a cell with downlink resources only is confirmed by TS 36.101 V11.3.0 (EX2009), published in December 2012, nearly two years after the '976 Patent priority date." Response, 24. This argument is based upon the incorrect interpretation that configuration by a base station of a

non-associated cell having only a resource for downlink was not adopted until Frequency Table 5.5-1 in TS 36.101 V11.3.0. Apparently, PO makes this argument because of the same erroneous understanding of the import of Frequency Table 5.5-1 in TS 36.101 V10.0.0. This was shown to be incorrect in Section II.A.1, *supra*, and it is incorrect here. Again, Claim 2 does not require a frequency band comprising a predetermined list of Operating Bands as PO now contends. Thus, the date this table of Operating Bands was published in the LTE Specification is irrelevant to the validity of claim 2. Ex. 1028, ¶33.

4. PO's "Band 29" Argument Is Unavailing

It is a false argument that Operating Band 29 added after the filing date of the '976 patent when considered with a portion of the disclosure in the '976 Patent supports validity because "[n]otably operating band 29 in TS 36.101 V11.3.0 mirrors the operating band configuration shown in Fig. 41 of the '976 Patent." Response, 26.

This is wrong for several reasons. As background, PO overlooks that Band 29 is owned by AT&T and cannot be used by the other LTE carriers, and it may not even be used by all the base stations in AT&T's LTE network. Band 29 was not added to the Frequency Table in the Standard to support special downlink-only cases of CA as PO and its expert contend. If it was added for that reason, it

would have been added to the LTE requirements such that it pertained to all base stations and UEs in all the LTE networks and not just to AT&T's LTE network. Actually, in the Table, Band 29 was not paired with an uplink frequency band because to do so would have interfered with the previously defined uplink frequency for Band 12. Furthermore, if a base station requires configuring an uplink resource for CA when using Band 29 as the downlink resource, the base station can also allocate (pair) at least Band 12 for the uplink resource. Thus, Band 29 is not restrictive to downlink only CA resources as PO contends. Ex 1028, ¶¶34-35.

It is also false when PO links the addition of Band 29 with the Third Embodiment (Fig. 41 and accompanying text) of the '976 Patent. *See* Response, 17-30; EX2005, ¶¶54-64, *see also* Ex. 1028, ¶36. PO's and Dr. Cooklev's characterization of both Band 29 and the Third Embodiment simply do not withstand scrutiny.

Band 29 is a band that AT&T owns, and it has not been allocated an uplink frequency in the Table due to an overlapping frequency conflict with Band 12 and not, as PO claims, created to support CA configurations that do not require a secondary uplink resource. This verified in Change Request (CR) below, which is one of many change requests that were submitted by AT&T and base station

suppliers, Ericsson and Nokia. The CRs all proposed to modify TS 36.101 for the introduction of the new Band 29. The Change Request states that an uplink frequency range was not allocated for Band 29 “due to BS-BS coexistence with Band 12.” There is no mention that Band 29 was established to support DL only CA configurations as the PO and Dr. Cooklev contend.

3GPP TSG-RAN WG4 Meeting #65		R4-126923									
New Orleans, USA, 12-16 November 2012											
CR-Form-v10											
CHANGE REQUEST											
⌘ 36.101 CR		⌘ 1490 rev 1									
		⌘ Current version: 11.2.0 ⌘									
<i>For HELP on using this form look at the pop-up text over the ⌘ symbols. Comprehensive instructions on how to use this form can be found at http://www.3gpp.org/Change-Requests.</i>											
Proposed change affects: ⌘ UICC apps ⌘ ☐ ME ☒ Radio Access Network ☐ Core Network ☐											
Title: ⌘ Introduction of Band 29											
Source to WG: ⌘ Ericsson, ST-Ericsson, AT&T, Nokia Corporation											
Source to TSG: ⌘ R4											
Work item code: ⌘ LTE_DL_FDD700-Core		Date: ⌘ 2012-11-12									
Category: ⌘ B		Release: ⌘ Rel-11									
Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:									
F (correction)		Rel-4 (Release 4)									
A (mirror corresponding to a change in an earlier release)		Rel-5 (Release 5)									
B (addition of feature).		Rel-6 (Release 6)									
C (functional modification of feature)		Rel-7 (Release 7)									
D (editorial modification)		Rel-8 (Release 8)									
Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Rel-9 (Release 9)									
		Rel-10 (Release 10)									
		Rel-11 (Release 11)									
		Rel-12 (Release 12)									
Reason for change: ⌘ Introduce Band 29 (DL700) as a down-link only band in a part of the frequency range 716-728 MHz for E-UTRA operation and include CA_2-29, CA_4-29 to the specifications.											
Summary of change: ⌘ The DL700 band is introduced as a down-link only band in a part of the frequency range 716-728 MHz, specifically 717-728 MHz, due to BS-BS co-existence with Band 12. The band is defined for carrier-aggregation operation only and is restricted to carry SCell(s) without configured uplinks. The duplex mode is still defined as FDD but with the downlink paired with the (external) uplink band supporting the Pcell. Minimum requirements for Band 29 are only specified for the UE receiver configured with carrier aggregation (CA_2-29, CA_4-29). Spurious emissions requirements for protection of Band 29 are also specified.											
Consequences if not approved: ⌘ The range 716-728 MHz cannot be used for E-UTRA operation and the inter-band CA between Band 2 and DL700 as well as Band 4 and DL700 is not specified											
Clauses affected: ⌘ 5.5, 5.5A, 5.6A.1, 5.7.3, 6.6.3.2, 7.3.1A, 7.5.1A, 7.6.3.1A, 7.7.1A, 7.8.1A											
<table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 5px;">Y</td><td style="padding: 2px 5px;">N</td></tr><tr><td style="padding: 2px 5px;">X</td><td style="padding: 2px 5px;"></td></tr><tr><td style="padding: 2px 5px;">X</td><td style="padding: 2px 5px;"></td></tr><tr><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;">X</td></tr></table>				Y	N	X		X			X
Y	N										
X											
X											
	X										
Other specs affected: ⌘		Other core specifications ⌘ TS 36.307, TS 36.133									
(show related CRs)		Test specifications ⌘ TS 36.521-1									
		O&M Specifications ⌘									
Other comments: ⌘											

Ex. 1030 (green highlighting added) See Ex. 1028, ¶¶36-38.

The following Table is from TS 36.101 v11.3.0, which includes Band 29 as specified in CR R4-126923 (Ex. 1034). The highlighting for Operating Band 12 shows the uplink (UL) operating band to be 699 MHz – 716 MHz. If an UL operating band had been allocated for (paired with) Band 29 it would have overlapped or otherwise interfered with Band 12 “due to BS-BS coexistence with Band 12.” Again, there is nothing in CR R4-126923 suggesting that Band 29 was created to provide a special downlink for CA configuration. Ex. 1028, ¶¶37-39.

Release 11

21

3GPP TS 36.101 V11.3.0 (2012-12)

Table 5.5-1 E-UTRA operating bands

E-UTRA Operating Band	Uplink (UL) operating band BS receive UE transmit		Downlink (DL) operating band BS transmit UE receive		Duplex Mode
	F _{UL, low}	F _{UL, high}	F _{DL, low}	F _{DL, high}	
1	1920 MHz	1980 MHz	2110 MHz	2170 MHz	FDD
2	1850 MHz	1910 MHz	1930 MHz	1990 MHz	FDD
3	1710 MHz	1785 MHz	1805 MHz	1880 MHz	FDD
4	1710 MHz	1755 MHz	2110 MHz	2155 MHz	FDD
5	824 MHz	849 MHz	869 MHz	894 MHz	FDD
6 ¹	830 MHz	840 MHz	875 MHz	885 MHz	FDD
7	2500 MHz	2570 MHz	2620 MHz	2690 MHz	FDD
8	880 MHz	915 MHz	925 MHz	960 MHz	FDD
9	1749.9 MHz	1784.9 MHz	1844.9 MHz	1879.9 MHz	FDD
10	1710 MHz	1770 MHz	2110 MHz	2170 MHz	FDD
11	1427.9 MHz	1447.9 MHz	1475.9 MHz	1495.9 MHz	FDD
12	699 MHz	716 MHz	729 MHz	746 MHz	FDD
13	777 MHz	787 MHz	746 MHz	756 MHz	FDD
14	788 MHz	798 MHz	758 MHz	768 MHz	FDD
15	Reserved		Reserved		FDD
16	Reserved		Reserved		FDD
17	704 MHz	716 MHz	734 MHz	746 MHz	FDD
18	815 MHz	830 MHz	860 MHz	875 MHz	FDD
19	830 MHz	845 MHz	875 MHz	890 MHz	FDD
20	832 MHz	862 MHz	791 MHz	821 MHz	FDD
21	1447.9 MHz	1462.9 MHz	1495.9 MHz	1510.9 MHz	FDD
22	3410 MHz	3490 MHz	3510 MHz	3590 MHz	FDD
23	2000 MHz	2020 MHz	2180 MHz	2200 MHz	FDD
24	1626.5 MHz	1660.5 MHz	1525 MHz	1559 MHz	FDD
25	1850 MHz	1915 MHz	1930 MHz	1995 MHz	FDD
26	814 MHz	849 MHz	859 MHz	894 MHz	FDD
27	807 MHz	824 MHz	852 MHz	869 MHz	FDD
28	703 MHz	748 MHz	758 MHz	803 MHz	FDD
29	N/A		717 MHz	728 MHz	FDD ²
...					
33	1900 MHz	1920 MHz	1900 MHz	1920 MHz	TDD
34	2010 MHz	2025 MHz	2010 MHz	2025 MHz	TDD
35	1850 MHz	1910 MHz	1850 MHz	1910 MHz	TDD
36	1930 MHz	1990 MHz	1930 MHz	1990 MHz	TDD
37	1910 MHz	1930 MHz	1910 MHz	1930 MHz	TDD
38	2570 MHz	2620 MHz	2570 MHz	2620 MHz	TDD
39	1880 MHz	1920 MHz	1880 MHz	1920 MHz	TDD
40	2300 MHz	2400 MHz	2300 MHz	2400 MHz	TDD
41	2496 MHz	2690 MHz	2496 MHz	2690 MHz	TDD
42	3400 MHz	3600 MHz	3400 MHz	3600 MHz	TDD
43	3600 MHz	3800 MHz	3600 MHz	3800 MHz	TDD
44	703 MHz	803 MHz	703 MHz	803 MHz	TDD

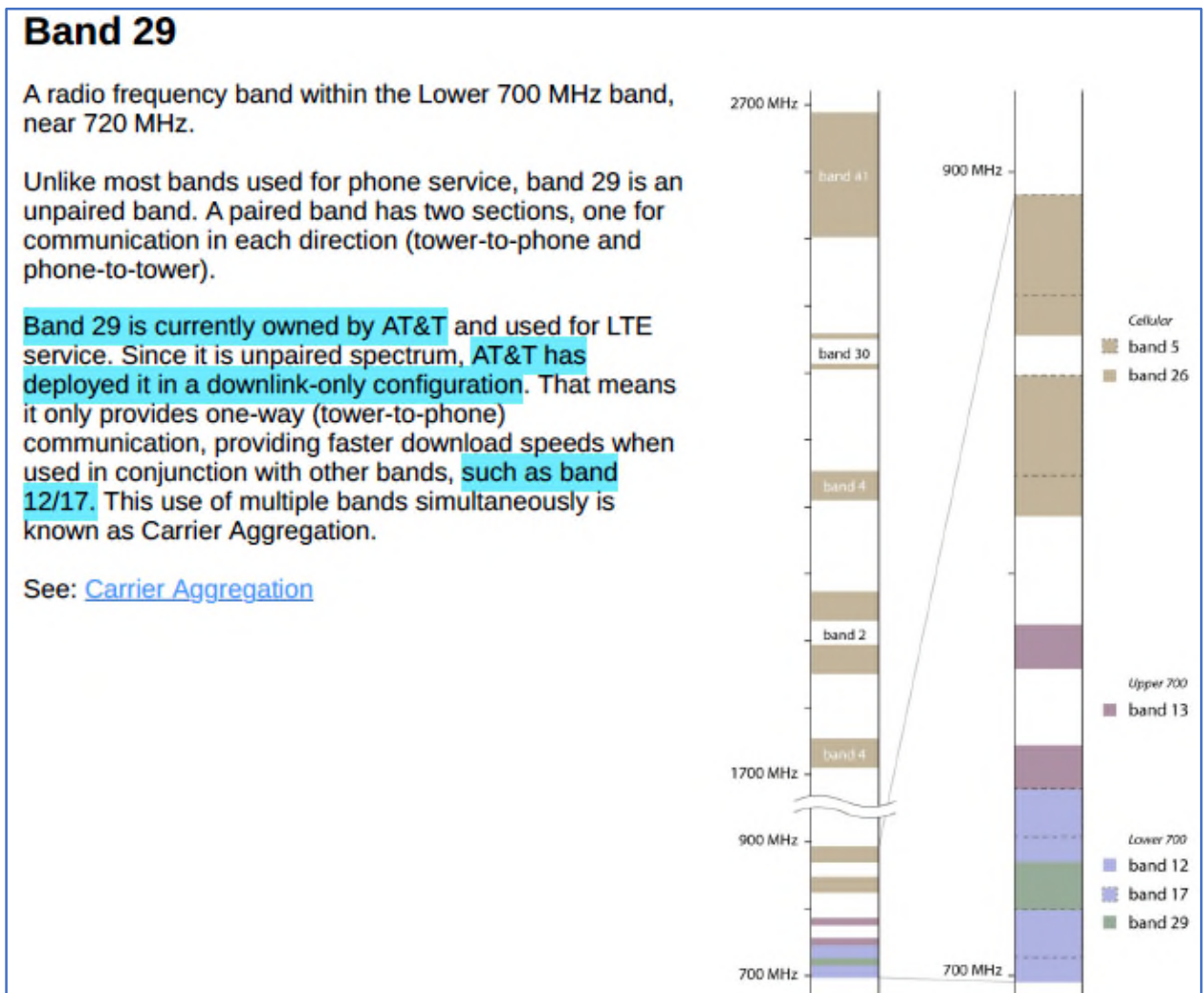
NOTE 1: Band 6 is not applicable

NOTE 2: Restricted to E-UTRA operation when carrier aggregation is configured. The downlink operating band is paired with the uplink operating band (external) of the carrier aggregation configuration that is supporting the configured Pcell.

EX2009, 21 (highlighting added).

Apparently PO and Dr. Cooklev were unaware that Band 29 is owned only by AT&T and that its “downlink-only configuration” provides “faster download

speeds when used in conjunction with other bands, such as band 12/17.” This was publicly reported in an industry publication (Ex. 1035) quoted below. Band 29 can have a UL and DL resource pair—the listed DL frequency for Band 29 with either the listed UL frequency and the downlink frequency for Band 12 or Band 17. The evidence regarding the origin of Band 29, the reason for its existence, and that Band 29 attains faster download speeds when paired with an uplink resource fully refutes PO’s “Band 29” argument. Ex. 1028, ¶¶40-41.

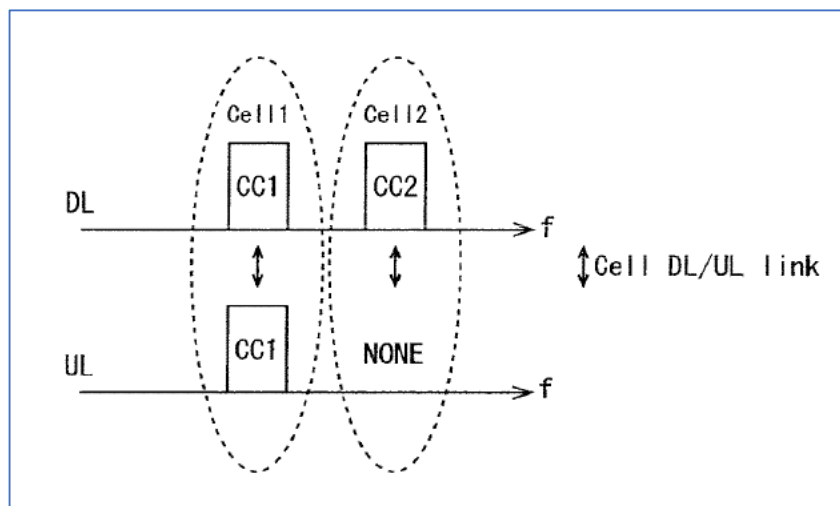


Ex. 1034 (highlighting added).

5. The '976 Patent's Third Embodiment is Irrelevant

PO directs the Board to consider the “Third Embodiment” of the '976 Patent in order to provide support for its erroneous statements regarding the allocation of CA frequency bands. Response, 27-30. This argument has no merit.

While the focus of the discussion so far has been on the base station configuring a UE by allocating only a non-associated downlink resource, claim 2 also requires an associated cell be configured to include resources for uplink and downlink. These requirements are shown by Fig. 28 of the '976 Patent along with its description text. Ex. 1001, 33:13-25. Cell1 in Fig. 28 is a PCell (claim 2, “associated cell”). Cell2 is an SCell (claim 2, “non-associated cell”). Cell1 has a “DL” and an “UL” as required of an associated cell in claim 2. Cell2 has only a “DL” as required of a non-associated cell in claim 2 because the word “NONE” is listed for the uplink (UL). Ex. 1028, ¶¶42-46.

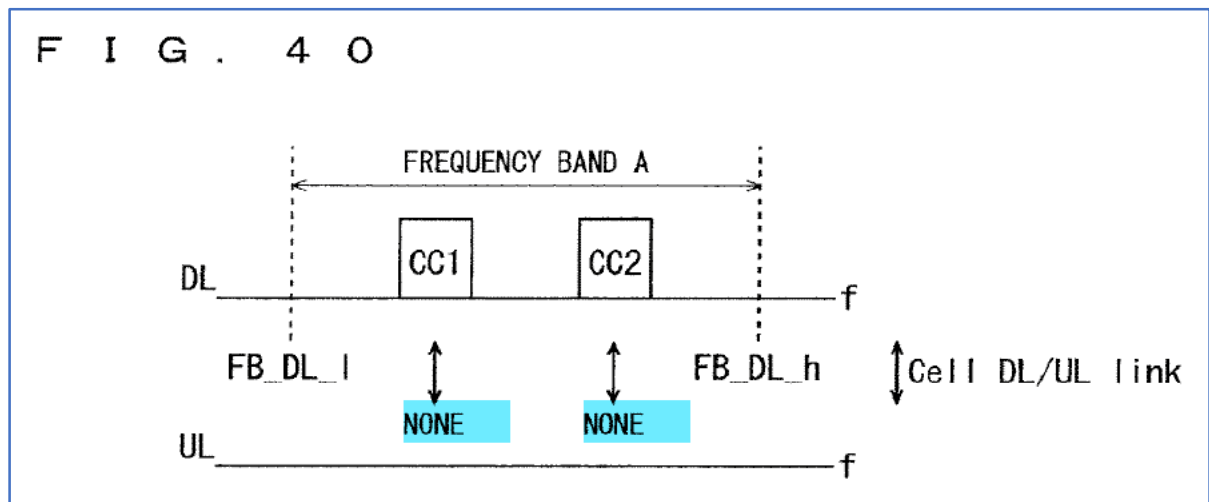


Id. at Fig. 28.

However, instead of citing to Fig. 28 to support its arguments in its Response, PO erroneously cites to passages relating to Fig. 41 and the “Third

Embodiment.” Response, 10, 11, and 20. However, the Third Embodiment is not relevant to claim 2 because it does not have any uplinks. The Third Embodiment discloses only two downlinks, which does not meet the limitation of the associated cell having a downlink resource **and** an uplink resource. Ex. 1028, ¶47.

Fig. 40 and its associated text (Ex. 1001, 49:9-50:19) also describes the Third Embodiment and verifies that no uplinks exist with the “NONE” under both CC1 and CC2 along the horizontal “UL” line. Ex. 1028, ¶¶48-50.



Ex. 1001, Fig. 40 (highlighting added).

Both Fig. 40 and Fig. 41 relate to the Third Embodiment and teach that no uplinks are being allocated. All arguments supported by Fig. 40 and Fig. 41 and their associated texts should be rejected as irrelevant to claim 2. PO’s reference to the Third Embodiment is demonstrably mistaken. Ex. 1028, ¶48.

PO compounds its mistake by stating that the “Innovation of the ’976 Patent [was] to Enable Base Station to Configure Cell with DL Resources Only” (Response, 9-10) and “[j]ust like operating band 29 in TS 36.101 V11.3.0, the operating band in Fig. 41 of the ’976 Patent has no uplink resources assigned.” Response, 26. Like for Fig. 40 above, this support using Fig. 41 from the Third Embodiment is also a false argument because Fig. 41 shows a configuration with no uplinks. Fig. 41 and its description text are included below.

F I G . 4 1

Band	Uplink (UL) operating Band	Downlink (DL) operating Band	Duplex Mode
	F _{UL_low} — F _{UL_high}	F _{DL_low} — F _{DL_high}	
A	—	F _{B_DL_l} — F _{B_DL_h}	FDD

Ex. 1001, Fig. 41 (highlighting added).

FIG. 41 is a diagram showing a setting example of a frequency band configured by one or more resources for DL **without a resource for UL to be associated therewith. There is no frequency band for uplink (UL operating band)** as the frequency band (band) A.

Ex. 1001, 49:46-50 (emphasis added). See Ex. 1028, ¶¶49-53.

6. R2-104515 Discloses a Base Station that Allocates a Downlink Only Resource on the Non-Associated Cell

PO argues that “R2-104515 makes clear that the base station configures the secondary cell to have both uplink and downlink resources while communicating to the UE whether to be configured to include or ignore the uplink resources.”

Response, 30; *see also* EX2005, ¶65. It makes another false argument based upon a misinterpretation of this passage in R2-104515. Response, 31-33.

ul-PresenceIndicator

Indicates whether or not the UL resources are configured. When this parameter is set to 'false', the UE ignores any UL resource configurations of the secondary cell.

Ex. 1013, p. 5.

There are multiple reasons that PO is wrong again.

First, PO ignores the reason stated for this contribution which is “[m]eanwhile, it is permitted that only DL resources are configured to secondary cells [non-associated cells]. Then, there comes a question on how to indicate UL absence of secondary cells. This contribution mainly focuses on the detailed schemes of UL absence indication for secondary cells.” Ex. 1013, p. 2 (emphasis added). This statement refers to the resources that are configured by the base station. More specifically, it says that only downlink resources can be configured for secondary cells. Ex. 1028, ¶¶56-58.

Second, based on its stated premise that the base station can configure “only DL resources” to “secondary cells,” this document “focuses on the detailed schemes of UL absence indication for secondary cells.” Ex. 1013, p. 2

Third, Section 2.2 titled “Options for indicating UL Absence/Deletion/Addition” for “Opt 1” clearly states that one of the configurations is “UL absence,” which it defines as “the UL resource configurations are all absent when initially configuring a secondary cell.” *Id.*, p. 3 (emphasis added). Additionally, “Opt 2” states “[t]he IEs² which are only necessary to primary cells and unrelated to secondary cells are all capable to be re-used as the UL absence indicator for secondary cells.” *Id.* (emphasis added). Furthermore, “Opt 3” states “it is feasible to define a new IE to indicate UL absence/deletion/addition.” *Id.* p. 3. Therefore, all three listed options assume that a secondary cell (*non-associated cell*) can be configured by the base station with only downlink resources. Ex. 1028, ¶¶59-61.

² IE stands for Information Element. IEs are the names of the fields in a message that is sent from the base station to the UE. Ex. 1028 at fn. 1, p. 41..

A POSITA would have clearly understood from R2-104515 that a secondary (non-associated) cell could be configured with only downlink resources (no uplink resources).

PO seems to overlook relevant disclosure in the specifications because it focuses on sections devoted to UEs, but the relevant functionality is in sections devoted to eNB (i.e., base stations). Specifically, PO focuses on TS 36.101 V10.0.0 (EXV2006) as “the specification for User Equipment (UE) radio transmission and reception” and “establishes the minimum RF characteristics and minimum performance requirements for E-UTRA User Equipment (UE).” Response, 16.) This is in contrast to TS 36.300 V10.0.0, which PO admits provides “an overview and overall description of the E-UTRAN radio interface protocol architecture...” *Id.* at 16. In simple terms, TS 36.300 V10.0.0 relates to the functionality of the eNB (base station), which allocates, controls, and monitors resources within the network, and TS 36.101 relates to the UE, which for CA is configured by the eNB to have specific resources. It is both of no surprise and no merit that TS 36.101 is silent with respect to the functionality for configuring an SCell to have only a resource for downlink (as in claim 2) or other configurations of uplink and downlink resources because such tasks are performed by the eNB not the UE. Ex. 1028, ¶61.

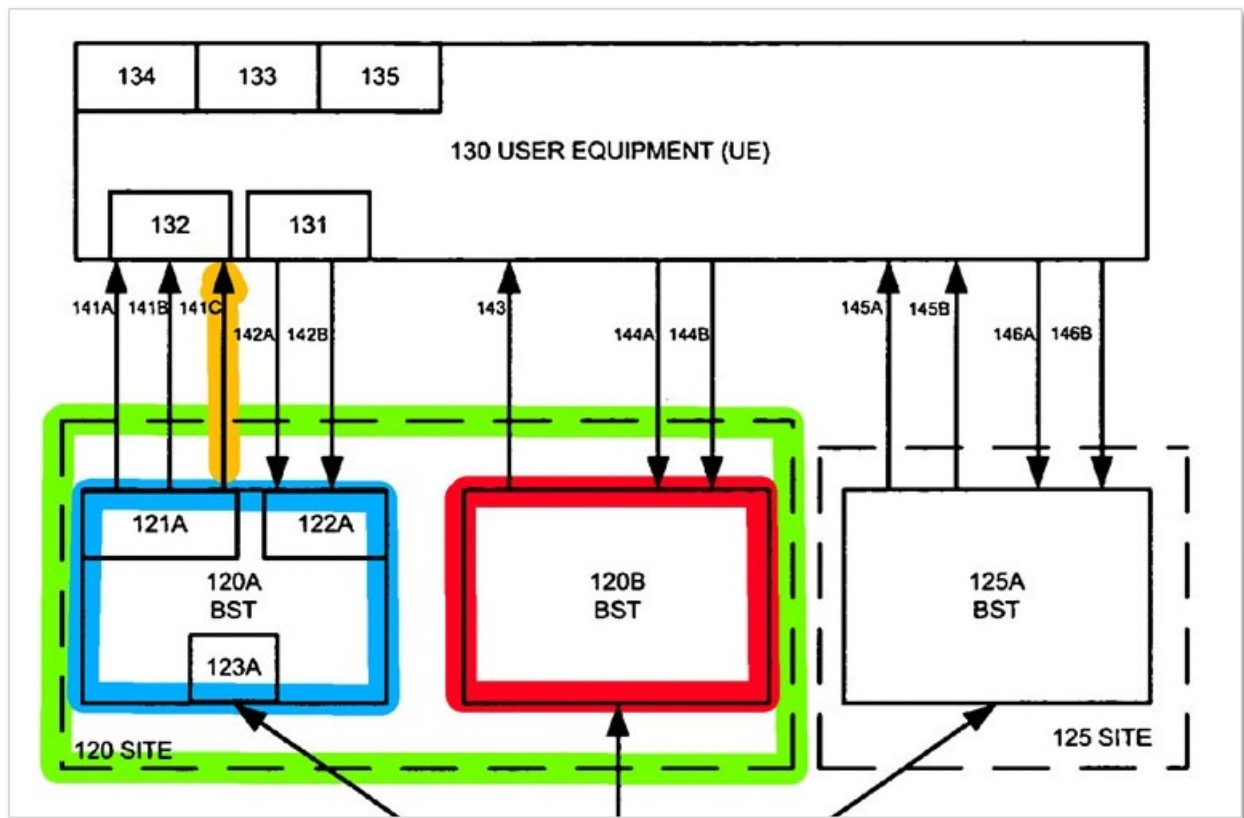
B. Grounds 2 and 3: Claim 2 Is Invalid As Anticipated By Malladi and/or Obvious Over Malladi Combined with TS 25.319

The Board's evaluation of Malladi and PO's Response focuses on the claim 2 limitation that the non-associated cell is configured to have only a resource for the downlink and no resource for the uplink. See Institution Decision, p.21; Response, p. 3. PO makes the same argument regarding TS 25.319. *Id.* As demonstrated below, this feature of claim 2 is disclosed in each reference.

1. Malladi Teaches the Base Station Configuring the Associated Cell and Non-associated Cell as Required by Claim 2.

Malladi teaches the original claim limitation 2[3], "to include only another resource for downlink, the other resource for downlink being allocated to the downlink communication from the base station device." Petition, 70-72; Ex. 1028, ¶¶64-75. At the institution stage, the Board indicated that the Petition did not make a sufficient showing in this regard.

However, Malladi teaches that at the cell level there can be more downlink carriers than uplink carriers ($N > M$). Ex. 1028, ¶¶68 (citing Ex. 1023 [0090 – 0093]). The annotated version of Figure 1 of Malladi below, which was prepared by Petitioners' expert, Mark Lanning, illustrates the preceding statement.



Ex. 1023, Fig. 1 (partial, highlighting added).

In this illustration, highlighting colors mean the following: Green (120 SITE) is for the base station; Blue (120A) is for a first cell of the base station 120; Red (120B) is for the second cell of the base station 120; and Orange (141C) is for the downlink carrier frequency allocated to cell 120 which does not have an uplink of the frequency pair allocated. Ex. 1028, ¶¶63-65. Malladi discloses that 120 SITE and 125 SITE are base stations, 120A, 120B, and 125A are cells within their respective base stations, and 141A-C, 142 A-B, 143, 144A-B, 145A-B, and

146A-B are carriers within their respective cells. *Id.*, ¶¶68-73 (citing Ex. 1023, [0090 – 0093]). A POSITA would have understood from Malladi that following its teachings encompasses a base station configuring one cell (associated cell) with uplink and downlink resources and a second cell (non-associated cell) with only a resource for download. *Id.* Malladi teaches an asymmetric system; the number of downlink carriers (N) can be one and the number of uplink carriers (M) can be 0. Therefore, for non-associated cell 120A, Malladi teaches the claim element “to include only another resource for downlink, the other resource for downlink being allocated to the downlink communication from the base station device.” Ex. 1028, ¶¶75-78. Consequently, claim 2 is anticipated by Malladi.

2. Motivation to Combine Malladi with TS 25.319

The Board found that the Petition provided sufficient evidence for motivation to combine Malladi with TS 25.319. Institution Decision, 22. PO disputes the finding stating: “Petitioner does not explain why TS 25.319’s alleged teaching of a cell with only downlink resources is a requirement of the 3G UMTS network.” Response, 47-50. The Board’s finding is correct.

The 3GPP TS 25.319 V9.1.0 Specification (Ex. 1015) was published for Release 9 of the 3G UMTS network. Specifically, TS 25.319 defines the requirements for the “Enhanced Uplink” functionality. The “Enhanced Uplink” is

also referred to as the High Speed Uplink Packet Access (HSUPA). The initial HSUPA functionality was defined in 3GPP Release 6 for the UMTS network so Release 9 was released to address the new network functionality introduced in Release 9 that the HSUPA needed to support. One of these new functions was the functionality for “Dual Cell” operation to support Carrier Aggregation (CA) on the HSUPA (uplink) channels. Ex. 1003, ¶¶47, 179-180. One configuration that the HSUPA functionality needed to support was having either one or zero secondary uplink carriers. Ex. 1003, ¶¶96-102. In other words, TS 25.319 was to inform suppliers of base stations and UEs that, if the Carrier Aggregation functionality is supported, they needed to support either one or zero HSUPA data channels on the secondary cell (SCell) referred to as a E-DCH (Enhanced-Data Channel) on a secondary uplink carrier. Ex. 1028, ¶¶80-81.

Like TS 25.319, Malladi states that one of the systems that the invention supports is the “W-CDMA standard.” Ex. 1023, [0006]. The W-CDMA standard is also known as the 3G UMTS standard. EX, 1028, ¶82. Malladi also lists multiple 3GPP Specification numbers that are specifically for UMTS. Ex. 1023, [0006]. Also, like part of TS 25.319, Malladi’s invention is for “adding multi-carrier capability to single-carrier communication systems.” *Id.*, [0011], which is also referred to as Carrier Aggregation. Ex. 1028, ¶83. As discussed in the

section above, the disclosure of Malladi supports a base station configuring a cell with no uplink carriers. Malladi, like TS 25.319, also describes using the HSUPA (E-DCH) for carrying uplink data in its invention. *See e.g.*, Ex. 1023, [0079] (“multi-carrier transmissions may be limited to the Enhanced Dedicated Channel or "E-DCH"), and *id.*, [0094], (“are related to E-DCH transmissions on the uplink.”).

A POSITA would have looked to Malladi for UE implementation details when implementing the new CA functionality required in TS 25.319 for Release 9 of the UMTS network. In addition to defining possible configurations for the uplink and downlink carriers, Malladi also provides a POSITA with valuable information regarding the timing signals and secondary channels and methods that can be used when the number of uplink carriers and downlink carriers is asymmetric (different), which is a significant departure from the UMTS Release 8 functionality. For example, in paragraphs [0072 – 0107] Malladi provides useful tables and different combinations of timing and secondary signals for each M and N configuration. Ex. 1028, ¶¶81-83. The Board is correct in finding adequate motivation to combine Malladi and TS 25.319.

3. TS 25.319 Discloses a Secondary Cell that Includes Only a Downlink Carrier

PO's allegation that TS 25.319 does not disclose limitation 2[3] (Response, 44-47) is based on its misunderstanding of the reference. In his declaration that accompanies this Reply, Mr. Lanning deconstructs the passage of TS 25.319 that was cited in the Petition (reproduced below), explains the relevant terms (with citations to the definitions provided in TS 25.319), and describes how under the proper technical understanding of the relevant terms the passage discloses what Petitioners urged in the Petition. Ex. 1028, ¶¶88-103. The specific passage is as follows:

Serving E-DCH cell: Cell from which the UE receives Absolute Grants from the Node-B scheduler. A UE has one Serving E-DCH cell.

[Secondary E-DCH Active Set: In Dual Cell E-DCH operation, the set of cells on the secondary downlink carrier where E-DCH is carried for one UE.

Secondary Serving E-DCH cell: In Dual Cell E-DCH operation, cell from which the UE receives Absolute Grants from the Node-B scheduler on the secondary downlink. A UE can have zero or one Serving E-DCH cell on the secondary uplink carrier.]

Ex. 1015 (TS 25.319), p. 8, § 3.1.1 (highlighting added).

Mr. Lanning, citing the definitions provided by TS 25.319, explains the relevant terms as follows:

E-DCH: This is an acronym for **E**nhanced **D**edicated **C**hannel. It is a High Speed Uplink Packet Access (HSUPA) that carries uplink user data. Ex. 1028, ¶89.

Node-B and Cells: A Node-B is a base station. For carrier aggregation, a base station (Node-B) provides a cell that is used to support each Component Carrier (CC). One cell in a CC group can be designated as the Primary Cell (PCell), while each other cell in the CC group is a Secondary Cell (SCell). Ex. 1028, ¶¶90-91.

Serving E-DCH Cell: This is defined as “Cell from which the UE receives Absolute Grants from the Node-B scheduler. A UE has one Serving E-DCH cell.” Ex. 1015, p. 9. A POSITA would have understood that for non-carrier aggregation operation a Node-B (base station) would provide a UE with “Absolute Grants” to enable the UE to send user data over the uplink E-DCH. Ex. 1028, ¶92.

Dual Cell E-DECH Operation: “Dual Cell” and “Carrier Aggregation” are used interchangeably in the technology. Thus, the term “Dual Cell E-DCH Operation” means Carrier Aggregation using the **E**nhanced **D**ata **C**hannel for uplink. Ex. 1028, ¶93.

Secondary Serving E-DCH Cell: This is defined as “In Dual Cell E-DCH operation, cell from which the UE receives Absolute Grants from the Node-B scheduler on the secondary downlink. A UE can have zero or one Serving E-DCH cell on the secondary uplink carrier.” Ex. 1015, p. 8. The first sentence of the definition means the secondary cell provides the UE with “Absolute Grants” via the secondary downlink CC, thereby permitting the UE to send user data on the secondary E-DCH uplink (if configured). The second sentence of the definition means that for the secondary uplink carrier, a UE can have zero or one Serving E-DCH cells, i.e., a UE can have either one or no HSUPA uplinks. Ex. 1028, ¶¶94-96.

In view of the foregoing explanations, Mr. Lanning explains how there is a one-to-one relationship between (i) a Serving Cell and (ii) a Component Carrier. Thus, the “Secondary Serving E-DCH Cell” referenced in the passage of TS 25.319 reproduced above can have a maximum of one downlink carrier and a maximum of one uplink carrier. For Frequency Division Duplex (FDD) operation, when both a downlink carrier and uplink carrier are configured for the Secondary Serving Cell, they would be on a pair of frequencies for an operating band chosen by the base station. However, if the base station configures the

Secondary Serving Cell with one downlink carrier and no uplink carriers, there would be no frequency assignment for the uplink. Ex. 1028, ¶97.

Mr. Lanning further explains how his explanation of TS 25.319 is consistent with the '976 patent. Specifically, the '976 patent states, in connection with 3GPP Release 9 (the same release as TS 25.319 used in Ground 3), the base station cannot configure the UE with “a number of uplink CCs (UL CCs) equal to or more than the number of downlink CCs (DL CCs).” Ex. 1001, 9:19-21. Thus, if the base station configures an associated cell with a DL CC and a non-associated cell with a DL CC (total number of DL CCs = 2), the total number of UL CCs for the base station must be one. Ex. 1028, ¶¶98-99.

For the foregoing reasons, TS 25.319 discloses limitation 2[3], and thus the combination of Malladi and TS 25.319 renders claim 2 obvious. *Id.*, ¶100.

III. CONCLUSION

The Board should find claim 2 of the '976 patent unpatentable.

IPR2023-00997
U.S. Patent No. 10,200,976

Dated: May 30, 2024

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies, in reliance on the word count feature provided by the word-processing system used to prepare this Petition, that the number of words in this Petitioners' Reply is 5,729.

Pursuant to 37 C.F.R. § 42.24(a), words in the table of contents, table of authorities, certificate of service, certificate of word count, and appendix of exhibits.

Dated: May 30, 2024

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CERTIFICATE OF SERVICE

I hereby certify that the foregoing Petitioners' Reply and exhibits 1028-1036 were served by electronic mail to the following:

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Zachary S. Stern (Zach.Stern@xsensus.com)
Aldo Martinez (Aldo.Martinez@XSensus.com)
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Date: May 30, 2024

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Jeremy D. Peterson (Reg. No. 52,115)

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