

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

PETITION FOR INTER PARTES REVIEW OF
U.S. PATENT NO. 10,200,976

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PETITIONER’S 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

I. INTRODUCTION

Petitioners request Inter Partes Review (“IPR”) of claim 2 (the “Challenged Claim”) of U.S. Patent No. 10,200,976 (“the ’976 patent,” Ex. 1001).

The ’976 patent relates to a radio communication network in which a base station performs radio communication with a plurality of terminal devices. Ex. 1001 at 1:19-22. To increase the capacity of the network the base station utilizes channel aggregation to allocate radio resources (downlink and uplink transmission resources) to communication terminal devices using associated cells and non-associated cells. The base station configures an associated cell with resources for downlink and uplink and a non-associated cell with a resource for downlink but not with a resource for uplink and notifies the communication terminal device of link information indicating that the non-associated cell does not include a resource for uplink. *Id.* at 10:56-11:2.

Petitioners submit multiple references to demonstrate that the claimed invention was both anticipated and would have been obvious to a person of ordinary skill in the art (“POSITA”) at the time of the alleged invention.

Accordingly, Petitioners respectfully request that the Board institute inter partes review and cancel the Challenged Claim.

II. MANDATORY NOTICES

A. Real Party-in-Interest

Petitioners identify TCL Communication Technology Holdings Limited, TCT Mobile International Limited, TCT Mobile, Inc., TCT Mobile (US) Inc., and TCT Mobile (US) Holdings Inc. (herein “Petitioners”) as the real parties-in-interest.

B. Related Matters

As of the filing date of this petition, the ’976 patent is involved in litigation in the Central District of California, captioned Mitsubishi Electric Corporation et al. v. TCL Communication Technology Holdings Limited et al., Case No. 8:22-cv-01073-GW-DFM (“Related Litigation”). Mitsubishi Electric Corporation is referred to herein as “Patent Owner” or “PO”. Petitioners are not aware of any other judicial or administrative matter involving the ’976 patent.

C. Lead and Back-Up Counsel

Petitioners provide the following designation of counsel:

Lead Counsel: Jeremy D. Peterson (Reg. No. 52,115)

Backup Counsel: Bradford A. Cangro (Reg. No. 58,478)

D. Service Information

Pursuant to 37 C.F.R. § 42.8(b)(4), Postal mailings and hand-deliveries should be addressed to:

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III. PAYMENT OF FEES

In accordance with 37 C.F.R. § 42.103(a), the required fees are submitted herewith. If any additional fees are due at any time during this proceeding, the Office is authorized to charge such fees to Deposit Account No. 60-3815.

IV. REQUIREMENTS FOR INTER PARTES REVIEW UNDER 37 C.F.R. § 42.104

A. Grounds for Standing

Pursuant to 37 C.F.R. § 42.104(a), Petitioners certify that the '976 patent is available for IPR and Petitioners are not barred or estopped from requesting IPR challenging the claims of the '976 patent under 37 C.F.R. § 42.101.

B. Claims for Which Review Is Requested

Petitioners request IPR of claim 2 of the '976 patent.

C. Statutory Grounds of Challenge

The statutory grounds for the challenges are as follows:

Ground	Statute	Reference(s)	Claim(s)
1	35 U.S.C. § 103	TS 36.300-V.10.0.0 (Ex. 1012) modified in view of R2-104515 (Ex. 1013)	2
2	35 U.S.C. § 102	Malladi (Ex. 1023)	2
3	35 U.S.C. § 103	Malladi modified in view of TS 25.319 (Ex. 1015)	2

D. Proposed Claim Constructions

In the Related Litigation, Patent Owner and Petitioners filed an Amended Joint Claim Construction and Prehearing Statement (Ex. 1007) on May 3, 2023. Plaintiffs’ Opening Claim Construction Brief (Ex. 1008) and Defendants’ opening Claim Construction Brief (Ex. 1009) were filed on May 4, 2023. In these papers, Petitioners proposed constructions for: (1) “an associated cell configured by the base station to include a resource for uplink and a resource for downlink” (Ex. 1007 at p. 5); (2) “a non-associated cell configured by the base station to include only another resource for downlink” (*Id.* at pp. 5-6); and (3) “the other resource for downlink being allocated to the downlink communication from the base station device” (*Id.* at p. 6), offering intrinsic and extrinsic evidence in support of its proposed constructions. *Phillips v. AWH Corp.*, 415 F3d 1303 (Fed. Cir. 2005) (*en banc*). Petitioners submit that the other claim terms be afforded their plain and

ordinary meanings as understood by POSITA at the time of the purported invention of the '976 patent. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576 (Fed. Cir. 1996).

Patent Owner addressed only these three terms of the '976 patent, urging for each term that "[n]o construction is necessary." *Id.* at pp. 5-6.

1. "an associated cell configured by the base station to include a resource for uplink and a resource for downlink"

In the Related Litigation, Patent Owner and Petitioners dispute the construction of this term. Patent Owner's position is that "[n]o construction is necessary" and Petitioners position is that the term should be construed as "a first type of cell configured by the base station, where the first type of cell is configured with a resource for uplink and a resource for downlink, both assigned to a specific communication terminal device." Ex. 1007 at p. 5.

The claim refers to an "associated" cell but there is no context for what such cell is "associated" with. Rather than use "associated" (and "non-associated," as discussed below) the specification refers to two types of cells: cell1 and ce112. The specification explicitly associates cell1 with an "associated cell." Ex. 1001 at 33:20-21 ("[t]he cell1 corresponds to an associated cell"). In other words, a first type of cell.

The characteristics of cell1 are consistent with the "associated cell" of claim 2. For example, as stated in the claim, the associated cell is configured by the base

station to have a resource for uplink and a resource for download. Ex. 1001 at 54:36-38 (Claim 2) ("an associated cell configured ... to include a resource for uplink and a resource for downlink"). The specification contrasts cell1 with ce112, which does not include a resource for uplink. Ex. 1001 at Abstract ("The ce112 does not include a resource for uplink ... A DL CC1 and a UL CC1 constitute a ce111."); *see also id.* at 33:17-19 ("A cell1 is configured by a DL CC1 and a UL CC1 .. A ce112 is configured by only a DL CC2, where a UL CC is not configured."). Accordingly, there are at least two types of cells described in the specification, one with both uplink and downlink resources and another with just downlink resources. The "associated cell" is a first type, which is later contrasted with a non-associated cell, which is the second type.

Petitioners' proposed construction also provides additional context for this claim term by specifying that the uplink and downlink resources are assigned to the same communication terminal. This specification similarly describes the allocation of uplink and downlink resources:

[T]he base station device configures an asymmetrical cell including a resource for downlink and a resource for uplink, the resource for downlink being allocated to downlink communication to the communication terminal device, the resource for uplink being included in a frequency band different from that of the resource for downlink and being allocated to uplink communication from the communication terminal device.

Id. at 11:5-12.

As described, a single base station device configures resources for downlink and resources for uplink, and those resources are both allocated to "the communication terminal device." In other words, the term "the communication terminal device" appears twice, both times referring to a single communication terminal device. Ex. 1003 at ¶79.

Clarifying the claim term with the phrase "both assigned to a specific communication terminal device" is consistent with the intrinsic evidence and helpful in understanding the meaning of the claim term. *Id.* at ¶80.

2. "a non-associated cell configured by the base station to include only another resource for downlink"

Patent Owner and Petitioners also dispute the construction of this term. Petitioners' position is that the term should be construed as "a second type of cell configured by the same base station that also configures the associated cell, where the second type of cell is configured to communicate only by another resource for downlink." Ex. 1007 at pp. 5-6.

As discussed above, the specification explicitly links "non-associated cell" to "ce112." Ex. 1001 at 33:23-24 ("[t]he ce112 corresponds to a non-associated cell"). In other words, a second type of cell.

The characteristics of "ce112" (second type of cell) are consistent with the characteristics of the claimed "non-associated cell" as both have only downlink

resources. For example, the Abstract provides "[a] ce112 configured by only a DL CC2 being a resource for downlink is configured. The ce112 does not include a resource for uplink, that is, a UL CC to be associated with the DL CC2 by a DL/UL link." See also Ex. 1001 at 33:17-19 ("A ce112 is configured by only a DL CC2, where a UL CC is not configured."). In other words, "ce112" involves a resource for downlink only. This is consistent with the claim element reciting a non-associated cell "configured by the base station to include only another resource for downlink." Thus, construing "a non-associated cell" as "a second type of cell" is consistent with the '976 patent's reference to a "ce112." Ex. 1003 at ¶83.

Petitioners' proposed construction makes clear that the same base station controlling the associated cell (i.e., cell1 or first type of cell) is also controlling the non-associated cell (i.e., ce112 or second type of cell). For example, the specification states that "the eNB or cell1 determines to perform CA on the ce112 for the UE." Ex. 1001 at 33:37-38. The "eNB" is the base station of cell1, and it performs CA or "carrier aggregation," which is the combining of the downlink resources of cell1 and ce112 for the UE or user equipment. This is also consistent with the claim language itself that refers to "the base station." See *X One, Inc. v. Uber Techs., Inc.*, 440 F. Supp. 3d 1019, 1034 (N.D. Cal. 2020) (construing three instances of the term "map" as all referring to the same map where the claim limitation introduced the term with the indefinite article "a" as the antecedent basis and then used the definite article "the" for

the two subsequent references to the map showing the same map was being referred to in the limitation).

3. “the other resource for downlink being allocated to the downlink communication from the base station device”

Patent Owner and Petitioners dispute the construction of this term. Patent Owner’s position is that “[n]o construction is necessary” and Petitioners position is that the term should be construed as “another resource for downlink being allocated to the downlink communication from the base station device.” Ex. 1007 at p. 6.

The term "the other resource. . ." must be construed to mean "the another resource. . ." because otherwise, this term would be indefinite and invalid for lack of antecedent basis. Claim 2 recites "a resource for uplink and a resource for downlink" with respect to "the communication terminal device" performing uplink communication and "only another resource for downlink" and "the other resource for downlink" with respect to the "communication terminal device" performing downlink communication. Ex. 1001, claim 2. It is unclear what "the other resource for downlink" refers to as the claim recites "only another resource." Petitioners’ construction clarifies this apparent antecedent issue. *See Intelligent Water Sols., LLC v. Kohler Co.*, No. 2:16-CV-689, 2017 WL 2444723, at 24 (E.D. Tex. June 5, 2017)

(rejecting plaintiff's proposed construction of plain and ordinary meaning and construing the disputed term to resolve the issue of lack of antecedent basis).

Petitioners' position is that its constructions are proper. However, the Grounds set forth in this Petition apply with equal force under the positions of both Patent Owner and Petitioners such that claim 2 is similarly invalid under the claim constructions offered by Patent Owner and Petitioners. Ex. 1003 at ¶87.

E. How the Construed Claims Are Unpatentable

Pursuant to 37 C.F.R. § 42.104(b)(4), Petitioners provide an explanation of how the construed claims of the '976 patent are unpatentable under the statutory grounds identified above in section VII, *infra*.

F. Supporting Evidence

Pursuant to 37 C.F.R. § 42.104(b)(5), Petitioners identify the exhibit numbers of the supporting evidence relied upon to support the challenges in section VII, *infra* and in Petitioners' Exhibits List, *supra*.

V. THE '976 PATENT AND RELATED TECHNOLOGY

A. Background of Relevant Technology

The '976 patent states that its invention is for 4G LTE cellular networks and identifies eight "Non-Patent Documents" that relate to the 3GPP 4G LTE standard (See *e.g.*, Ex. 1001 at 10:8-16.). The 3GPP 4G LTE standard has been evolving

since it was first released as Release 8 in 2008, approximately three years before the '976 patent priority date. Ex. 1010 at p. 1; Ex. 1003 at ¶35.

1. The 3GPP Standards Organization

The 3GPP is a standards-setting organization. As cellular telecommunications technology developed in the late 1980s, network operators recognized that standardization was necessary to ensure subscriber mobility and compatibility of equipment provided from multiple suppliers. The 3GPP began in 1998 when the European Telecommunications Standards Institute (ETSI) and other standard development organizations as well as several telecommunications companies formed a partnership to develop and standardize various aspects of 2G, 3G, and 4G mobile network operator systems. See Ex. 1017 at pp. 1, 4 and Ex. 1018 at p. 1.

The 3GPP is a group enterprise. Within the larger 3GPP umbrella are four primary plenary Technical Specification Groups (“TSGs”) (*e.g.*, the Systems and Architecture (“SA”) group), under which are several working groups (*e.g.*, Systems and Architecture Working Group 2 (“SA-2” or “S2”)). Meetings of each plenary and working group are numbered sequentially (*e.g.*, TSG RAN WG1, Meeting #40; TSG RAN WG1, Meeting #41).¹ The working groups met roughly

¹ RAN stands for Radio Access Network. Ex. 1003 at p. 19, n. 2.

every month and were responsible for drafting and editing specific standards and change requests. All change requests had to be approved by the plenary group before the change requests were incorporated into a specific release of the standard. *See* Ex. 1017 at pp. 1-2.

Major changes to the 3GPP standard are defined in “Releases,” which comprise many Technical Specifications (TS) and certain groups of releases are informally referred to as a generation. Ex. 1017 at pp. 1-2. As shown by the table below, each generation of a cellular network has multiple releases. Ex. 1003 at ¶¶37-38.

Generation	Release	End Date ²
“2G”	Release 98	2/12/1999
“3G” or “UMTS”	Release 99	12/17/1999
	Release 4	6/21/2001
	Release 5	9/12/2002
	Release 6	9/28/2005
	Release 7	3/13/2008
“4G” or “LTE”	Release 8	3/12/2009
	Release 9	3/25/2010

² All these end dates are available on the 3GPP website. *See Releases*, 3GPP: The Mobile Broadband Standard, <http://www.3gpp.org/specifications/67-releases>.

2. 3GPP Documentation

Standardization by the 3GPP has been an ongoing, collaborative effort. It involves hundreds of engineers from companies that are interested in developing the technology. Each 3GPP working group typically holds monthly meetings in different locations around the world. The members of the working group submit written contributions (called “temporary documents” or “Tdocs”) and discussion documents. The 3GPP stores and controls documents electronically, and the documents are retained on the public 3GPP server indefinitely. Ex. 1019 at pp. 2-3. Ex. 1003 at ¶39.

The general practice of the 3GPP, both now and at the time of the invention, is to make Tdocs and discussion documents publicly available prior to each meeting. At the meeting itself, members publicly discuss those Tdocs and discussion documents, vote, and, if approved, they are incorporated into the standard. Ex. 1019 at p. 1. Sometimes Tdocs are edited or combined during the meeting and are then given new Tdoc numbers and uploaded on the public 3GPP file server, usually soon after the meeting. Sometimes, the new and edited Tdocs are further circulated for e-mail approval—that is, they can be distributed and voted upon via e-mail. *Id.* at ¶40.

Now and at the time of the ’976 patent, Tdocs and discussion documents are publicly circulated to group members before and after meetings in two ways. First,

they can be uploaded to the public 3GPP file server prior to each meeting. Ex.

1019. If so, the file will receive a date and time stamp. The date and time stamp can be relied upon to indicate when the upload occurred, making the document available to the public on the Internet. Ex. 1019. Second, Tdocs and discussion documents can be distributed to the public using the group's public e-mail exploder. *See, e.g.*, Ex. 1020 at p. 1 "Questions about 3GPP email exploder lists." The public can find and download the 3GPP TSG-RAN WG2 document R2-104515 (Ex. 1013) without a password and distribute it to members and other people. Ex. 1003 at ¶¶41-42.

3. The 3GPP 4G LTE Network Standard

The 3GPP LTE (4G) cellular standard adopted many of the proven concepts known and used by millions of mobile terminals (UEs) in the predecessor 3G UMTS network. UMTS networks are still in operation today in the U.S. and many mobile terminals (UEs) can switch to 3G UMTS cells when they are in areas where LTE coverage is weak or absent. *Id.* at ¶43.

Two significant changes made to the earlier 3G UMTS standard to create the 4G LTE standard affected the air interface and the core network protocol. The air interface is the wireless communication method and communication protocols that are used by the base stations and the mobile terminals (UEs) to communicate with each other. The LTE standard uses an air interface for the downlink referred to as

OFDM and air interface for the uplink referred to as SC-FDMA. These are used in LTE to support the ever-increasing requirement for higher network data capacities and higher connection speeds with mobile terminals. The core network provides connections to each of the base stations in a cellular provider's network and to other communication networks like the Public Switched Telephone Network (PSTN) and Internet to provide mobile terminals with voice and data connections. Before 4G LTE, the 3G UMTS cellular core network essentially consisted of two subnetworks. One was used to carry voice calls and is referred to as a circuit-switched network. The other was used to carry data connections and is referred to as a packet network. The 4G LTE standard only includes a packet-switched network that is used for carrying both voice and data calls. Ex. 1003 at ¶44; *See also*, Ex. 1010.

Ex. 1010 describes the most substantial features defined for each of the LTE Releases 8-10. Specifically, some of the 3GPP LTE Release 10 requirements, which were defined and publicly released before the Priority Date of the '976 patent, disclose the functionality relevant to the Challenged Claim. For example, a feature called Carrier Aggregation (CA) was defined in 3GPP Release 10 and others in the detailed technical Specifications for that Release, which the '976 patent refers to as "PRIOR ART DOCUMENTS Non-patent Documents" (*See e.g.*, Ex. 1001 at 10:4-16); Ex. 1010 at p. 1; Ex. 1003 at ¶45.

4. LTE Carrier Aggregation (CA) in 3G UMTS and 4G LTE

a. High Level Description of Carrier Aggregation (CA)

Aggregation means grouping together and a carrier is the width of the frequency used for each bearer channel. In other words, the carrier is the width of the frequency used to carry one data connection (bearer) between the base station and the mobile terminal (UE). Carrier Aggregation groups two or more carriers together to expand the total bandwidth that can be used to communicate with a mobile terminal. Each of the carriers is referred to as Component Carrier (CC). Therefore, multiple Component Carriers are grouped together between the base station and the mobile terminal to provide a larger overall transmission bandwidth, which has the key benefit of providing a significantly higher data throughput connection in one direction or in both directions. For example, if the size of each CC is an arbitrary value of 5, combining these two CCs together would double the overall bandwidth to a value of 10. Ex. 1003 at ¶50; *see also*, non prior art document Ex. 1016 at p. 1, Ex. 1003 at ¶50.

b. The 3GPP 3G UMTS Standard Defined Carrier Aggregation Before the '976 Patent

Over a year before the priority date of the '976 patent, the 3GPP 3G UMTS standards group defined Carrier Aggregation (CA) for both the high-speed downlink and uplink for UMTS networks and UEs (mobile terminals). *Id.* at ¶46.

Specifically, the 3GPP TS 25.308 V9.1.0 (2009-09) Specification (“TS 25.308”), Ex. 1014, defined the High Speed Downlink Packet Access (HSDPA) requirements for “Dual Cell” operation to support CA on the downlink. The 3GPP TS 25.319 V9.1.0 (2009-09) Specification (“TS 25.319”), Ex. 1015, defines the High Speed Uplink Packet Access (HSUPA), also referred to as the “Enhanced uplink,” requirements for “Dual Cell” operation to support CA on the uplink. Ex. 1003 at ¶¶46-47. These 3GPP Specifications are described in more detail in Section VI, below.

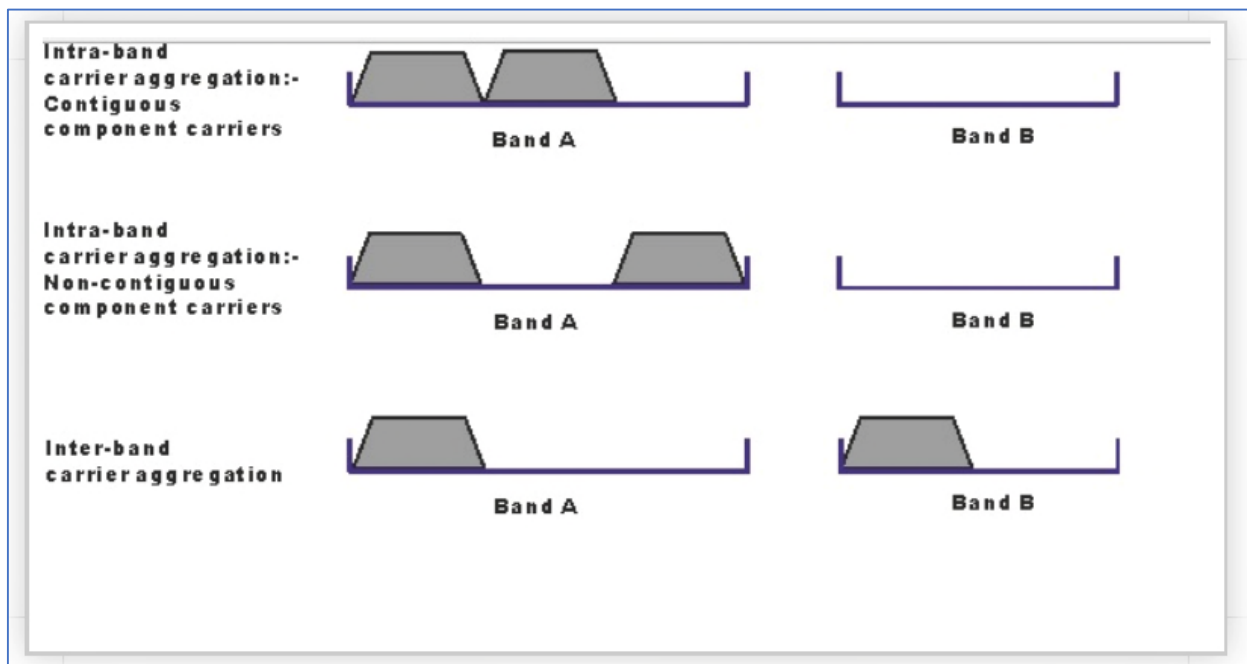
c. The 3GPP 4G LTE Standard Defined Carrier Aggregation Before the '976 Patent

The 3GPP 4G LTE standards group also identified Carrier Aggregation as one of the features that would be included for both the downlink and uplink in LTE networks no later than in LTE Release 10. (*See e.g.*, Ex. 1001 at 9:10-23, Section 7.5 in Ex. 1012.) Ex. 1003 at ¶48.

Ex. 1012 is described in more detail in Section VI below.

d. Component Carriers (CCs)

Figure 1.4 below shows the different types of configurations that LTE uses to group multiple carriers together. Ex. 1003 at ¶51.

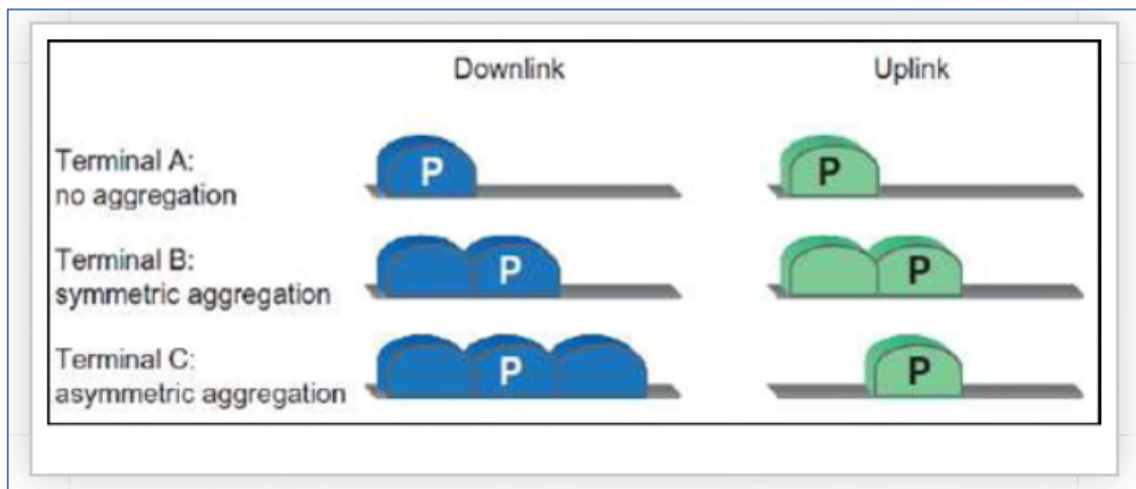


Ex. 1016 at p. 3, Figure 1.4. Carrier Aggregation; Intra-band and inter-band aggregation alternatives.

The first row is the simplest form of CA because the different frequencies for the two CCs are adjacent to each other. These are “contiguous component carriers.” These CCs are in the same frequency Band A and no CCs are being used in frequency Band B, so this is referred to as “intra-band” CA. The second row shows a more complex case of CA where the CCs are in the same frequency Band A (intra-band), but their different frequencies are not adjacent to each other. These carriers are non-contiguous carriers. The third row shows the most complex case of CA where all the CCs are not located in the same frequency Band A. Instead, one CC frequency is in Band A and the other CC frequency is in Band B. This is referred to as Inter-band CA. Ex. 1003 at ¶¶51-53.

e. Symmetric and Asymmetric Carrier Aggregation

The number of Component Carriers (CCs) used for the downlink (DL) and the uplink (UL) can be the same or different. The top row in the figure below for Terminal A shows no CA is being performed because there is only one CC for the Downlink and only one CC for the uplink. The second row shows that symmetric aggregation is configured because there are two CCs for both the downlink and uplink. The third row shows that asymmetric CA is being performed because more CCs (3) are configured for the downlink than the uplink (1). The third row would also show asymmetric CA with two CCs configured for the downlink and one CC configured for the uplink, which is the configuration required by the Challenged Claim. Ex. 1001, Claim 2; Ex. 1003 at ¶54.



Ex. 1016 at p. 4. Symmetric & Asymmetric CA in LTE (P is for Primary Cell).

f. A Different Base Station Cell Supports Each Component Carrier

For Carrier Aggregation, a base station has a cell that is used to support each Component Carrier (CC). Thus, if there are three CCs in a group as shown in the third row for the Downlink connecting to Terminal C above, the base station has three different cells supporting these. Only one of the cells in a CC group can be designated as the Primary Cell (PCell), which performs additional functionality. The other cells in each CC group are referred to as Secondary Cells (SCells). For each group of CCs in the diagram above, only one CC (cell) of each group is labelled with a “P” that stands for the Primary Cell (PCell). The other CCs without the “P” are a Secondary Cell (SCell). See also Section VI.A.b below for more detail regarding Primary and Secondary Cells. Ex. 1003 at ¶55.

B. Summary of the '976 Patent

The '976 patent is entitled “Communication System and Communication Terminal Device Using Associated and Non-associated Cells” and issued on February 5, 2019, from an application filed on April 18, 2018. The patent claims priority to JP 2011-001684 filed January 7, 2011. Ex. 1001 at (30).

As discussed below, including in Grounds 1-3, the Challenged Claim relates to Carrier Aggregation, which requires an *associated cell* and a *non-associated cell* which are controlled by the same *base station* and are used to communicate with a

communication terminal. The specification of the '976 patent specification spans columns 1-54 and much of the specification is unrelated to subject matter of the Challenged Claim. For example, extensive irrelevant subject matter begins at Col. 6, line 37 and relates to “closed subscriber groups (CSGs)” and “Home-eNodeBs,” neither of which is relevant to the Challenged Claim. Ex. 1003 at ¶¶58-59.

The '976 patent explains that the LTE standard specification was developed under the auspices of the 3GPP. Ex. 1001 at 1:42-47. In predecessor communication systems, resources for uplink (UL) meaning resources granted to individual user equipment (UE) for transmission from the UE to a base station were necessarily reserved in the same frequency band as that of the resources for communications from a base station to UE, *i.e.*, downlink (DL) resources. This constraint used frequency resources inefficiently and it was also necessary to reserve, in the frequency band for downlink, the frequency band for uplink which is paired therewith. It was difficult to use a large number of free discrete and narrow frequency bands. This decreased efficiency in the use of available frequency resources. *Id.* at 10:37-47. LTE addressed this inefficiency by adopting the known technology of Carrier Aggregation (CA) by which two or more component carriers (CCs) are aggregated to support wide transmission bandwidths such as up to 100 MHz. *Id.* at 9:6-9.

According to the '976 patent, LTE is a wireless communication system using a base station (referred to as an “eNodeB” or “eNB” in LTE) which can provide at least two cells—an associated cell and a non-associated cell which provide communication with UE. *Id.* at 2:1-7, Claim 2.

The LTE concept of a base station (eNodeB) providing multiple cells meant that a “base station” and a “cell” were no longer interchangeable terms. Ex. 1003 at ¶60. In LTE technology, a base station (eNodeB/eNB) and a cell have different meanings and two or more different cells can be controlled by the same base station for Carrier Aggregation (CA). The cells operate at different frequencies (component carriers) in the same or different frequency bandwidths. *Id.*

Each LTE base station (eNodeB) has functionality, Carrier Aggregation (CA), that supports more than one cell as discussed above. Carrier Aggregation is used to increase the channel bandwidth of a connection between the base station and a terminal device to achieve higher data rates. *Id.* at ¶61. This is discussed in Sections V.A.4.a -V.A.4.f, above.

a. Carrier Aggregation (CA)

The '976 patent discusses Carrier Aggregation.

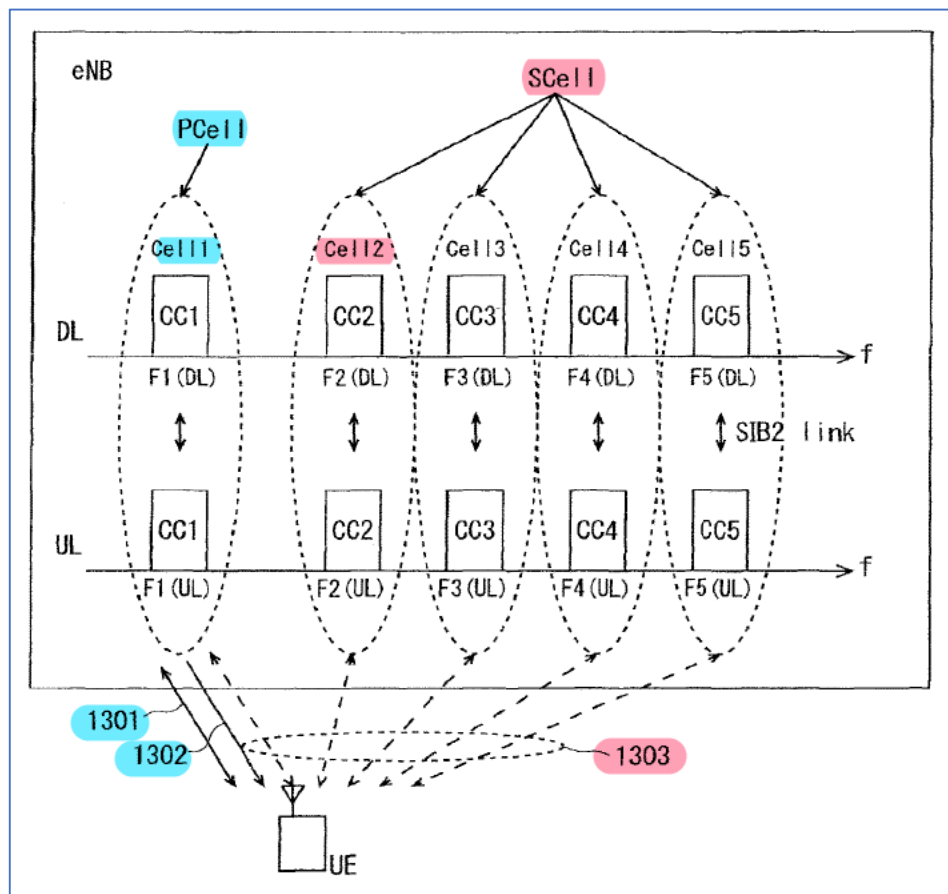
Carrier aggregation (CA) is studied in the LTE-A system, in which two or more component carriers (CCs) are aggregated to support wider transmission bandwidths up to 100 MHz.

A Release 8 or 9-compliant UE, which supports LTE, is capable of transmission and reception on only the CC corresponding to one serving cell. On the other hand, it is conceivable that a Release 10-compliant UE may have the capability of transmission and reception, only reception, or only transmission on the CCs corresponding to a plurality of serving cells at the same time.

Each CC employs the configuration of Release 8 or 9, and the CA supports contiguous CCs, non-contiguous CCs, and CCs in different frequency bandwidths. The UE cannot configure the number of uplink CCs (UL CCs) equal to or more than the number of downlink CCs (DL CCs). The CCs configured by the same eNBs do not need to provide the same [geographic] coverage. The CC is compatible with Release 8 or 9.

Ex. 1001 at 9:10-23.

In the '976 patent, FIG. 13 and its supporting text explain the concept of Carrier Aggregation.



Ex. 1001 at FIG. 13 (highlighting added).

Reference is made to the PCell, “Cell1,” on the far left-hand side of FIG. 13 (highlighted in blue) and the SCell “Cell2,” (the cell on the left hand side of the group of SCells, highlighted in red). The PCell (Cell1) is using carrier frequency “F1” and the SCell1 (Cell2) is using carrier frequency “F2,” which shows that each cell is using a different CC. Ex. 1003 at ¶63.

As stated in the ‘976 patent:

FIG. 13 is a diagram showing the concept of CA. An eNB shown in FIG. 13 configures a cell n configured by a DL [downlink] CC n and a UL [uplink] CC n which is associated with the DL CC n by a DL/UL link via SIB2 [System Information Block No. 2 message from eNB]. The carrier frequency of the DL CC n is denoted by F_n (DL), and the carrier frequency of the UL CC n is denoted by F_n (UL). Here, n is an integer of one to five.

A UE camps on the cell1 and performs RRC connection indicated by an arrow 1301. As a result, the cell1 becomes a PCell.

After that, the eNB notifies the UE of the information regarding the CCs to be aggregated through dedicated RRC signaling indicated by an arrow 1302. The information regarding a cell m configured by a DL CC m and a UL CC m , for example, system information is notified as the information regarding the CCs. Here, m is an integer of two to five. The eNB notifies the UE of the information regarding the CCs in this manner, whereby the cell2 to the cell5 become SCells.

As described above, the eNB performs CA for the UE with the cell1 to the cell5. Then, the UE performs communication with the cell1 to the cell5 based on CA, as indicated by an arrow 1303.

Ex. 1001at 21:3-25.

b. Primary (PCell) and Secondary (SCell) Designations

When a base station uses CA for multiple cells to communicate with a mobile terminal (UE), all of the cells do not perform the same functions. The '976 patent describes the cell that performs “mobility information and security” as the primary cell (PCell). The passage below refers to the uplink and downlink carriers supported by the PCell as the “uplink primary component carrier (UL PCC)” and the “downlink primary component carrier (DL PCC).” The '976 patent refers to the other cells as the Secondary Cells (SCells) and the downlink carrier corresponding to SCell as a “downlink secondary component carrier (DL SCC).” In uplink it refers to a carrier corresponding to SCell is an “uplink secondary component carrier (UL SCC).” Ex. 1003 at ¶64.

In a case where CA is configured, a UE has single RRC connection with a NW [network]. In RRC connection, one serving cell provides NAS [network access stratum] mobility information and security input. This cell is referred to as primary cell (PCell). In downlink, a carrier corresponding to PCell is a downlink primary component carrier (DL PCC). In uplink, a carrier corresponding to PCell is an uplink primary component carrier (UL PCC). A secondary cell (SCell) is configured to form a pair of a PCell and a serving cell, in accordance with the UE

capability. In downlink, a carrier corresponding to SCell is a downlink secondary component carrier (DL SCC). In uplink, a carrier corresponding to SCell is an uplink secondary component carrier (UL SCC).

A pair of one PCell and a serving cell configured by one or more SCells is configured for one UE.

In each SCell, a UE is capable of using resources for uplink (UL) in addition to resources for downlink (DL). The number of DL SCCs is equal to or more than the number of UL SCCs. No SCell is used for only resources for UL. Each resource for UL belongs to only one serving cell for one UE. The number of serving cells depends on the UE capability.

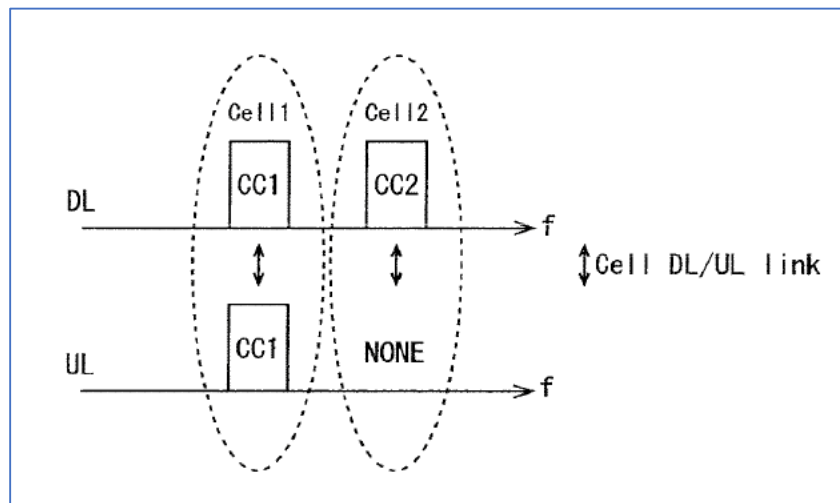
Ex. 1001 at 9:29-49.

c. PCell, Associated Cell, SCell, and Non-Associated Cell Terminology

The Challenged Claim uses the “associated cell” and “non-associated cell” terminology in its limitations. A POSITA would have understood that the ’976 patent uses “primary cell (PCell)” and “associated cell” terminology interchangeably. The patent further uses “secondary cell (SCell)” and “non-associated cell” terminology interchangeably. As described above, FIG. 13 and

its associated text describes the PCell as Cell1 and it is the PCell that performs additional functionality over what the SCells (Cell2 – Cell5) can perform. Ex. 1003 at ¶65.

Additionally, FIG. 28, shown below, and its descriptive text describes Cell1 as being the “PCell” and the “associated cell.” Cell2 is the “SCell” and the “non-associated cell.” It also discloses that a cell in which a UL CC is not configured is prohibited from serving as a PCell and that the use thereof is limited to SCell. *Id.* at ¶66.



Ex. 1001 at FIG. 28.

It suffices that in this case, a cell in which a UL CC is not configured is prohibited from serving as PCell and that the use thereof is limited to SCell. Although the cell for which the UE performs RRC connection serves as PCell, in a cell in which a UL CC is not configured, the UE

cannot perform uplink access for RRC connection. Therefore, if the cell in which a UL CC is not configured is prohibited from serving as PCell, the UE allows a cell in which a UL CC is configured to serve as PCell and is allowed CA. In addition, it is possible to prevent a UE from unnecessarily performing the RRC connection process in a cell in which a UL CC is not configured.

FIG. 28 is a diagram describing cells for use in CA in the first embodiment of the present invention. A cell1 is configured by a DL CC1 and a UL CC1. The carrier frequency of the UL CC1 to be associated with the DL CC1 is shown in the DL/UL link (link) information of the cell. A cell2 is configured by only a DL CC2, whereas a UL CC is not configured. Therefore, it is indicated that a UL CC is not configured as the DL/UL link information of a cell. The cell1 corresponds to an associated cell, the DL CC1 corresponds to another resource for downlink, and the UL CC1 corresponds to a resource for uplink. The cell2 corresponds to a non-associated cell, and the DL CC2 corresponds to a resource for downlink.

Id. at 33:1-25.

A POSITA would have understood that a “primary cell (PCell)” is synonymous with an “associated cell” and a “secondary cell (SCell)” is

synonymous with a “non-associated cell” in the Challenged Claim. Ex. 1003 at ¶67.

The following table cross references terms in the ’976 Patent and terms in the 3GPP Specifications.

’976 Patent Terms	3GPP LTE Terms
Associated Cell	Primary Cell or PCell
Non-associated Cell	Secondary Cell or SCell
Base station Device	eNodeB/eNB
Communication Terminal Device	UE
Resource for downlink from Associated Cell	Downlink Primary Component Carrier (DL PCC)
Resource for downlink from Non-associated Cell	Downlink Secondary Component Carrier (DL SCC)
Resource for Uplink from Associated Cell	Uplink Primary Component Carrier (UL PCC)
Resource for Uplink from Non-associated Cell	Uplink Secondary Component Carrier (UL SCC)

Ex. 1003 at ¶68.

d. Admitted Prior Art Documents

The ’976 patent specification identifies the following “PRIOR ART DOCUMENTS” that are “Non-Patent Documents.” These documents are either Specifications or contributions/changes to the 3GPP 4G LTE standard:

PRIOR ART DOCUMENTS

Non-Patent Documents

Non-Patent Document 1: 3GPP TS 36.300 V10.1.0
Non-Patent Document 2: 3GPP TS 36.331 V9.4.0
Non-Patent Document 3: 3GPP TS 36.304 V9.4.0 Chapter
3.1, Chapter 4.3, Chapter 5.2.4
Non-Patent Document 4: 3GPP S1-083461
Non-Patent Document 5: 3GPP R2-082899
Non-Patent Document 6: 3GPP TR 36.814 V9.0.0
Non-Patent Document 7: 3GPP TR 36.912 V9.3.0
Non-Patent Document 8: 3GPP TS 36.101 V10.0.0

Ex. 1001 at 10:3-17.

C. Summary of the Prosecution History of the '976 Patent

Applicant filed a preliminary amendment on April 19, 2018, canceling claim 1 and adding claims 2-3. Ex. 1002 at pp. 2-3. (April 19, 2018, Claims).

A non-final rejection issued on June 1, 2018, rejected claim 3 under §112(b) as being indefinite, rejected claim 3 under §102(e) based on Ishida et al. (US 2010/0216454 A1), and rejected claims 2-3 under the judicially created doctrine of obviousness-type double patenting. The examiner indicated that claim 2 contains allowable subject matter. *Id.* at pp. 5-14. (June 1, 2018, Non-Final Rejection).

In response to the initial Office Action, the applicant amended claim 3 (ultimately the Challenged Claim) to recite “the communication terminal device performs uplink communication using an associated cell configured by the base station to include a resource for uplink and a resource for downlink,” and argued

that Ishida failed to disclose that a base station configures both MBMS dedicated cell and the unicast/MBMS mixed cell. Applicant submitted a Terminal Disclaimer. A Notice of Allowance issued on September 28, 2018. *Id.* at pp. 23-29. (September 28, 2018, Notice of Allowance and Fees Due).

D. Level of Ordinary Skill in the Art

A POSITA at the time of the alleged invention of the '976 patent would have had at least a degree in electrical engineering, computer engineering, computer science or a similar discipline, with at least two years of relevant industry or research experience, including experience designing or implementing cellular networks. Additional work or research experience can substitute for less or different education, and *vice versa*. A person of ordinary skill in the art would also have had familiarity with the 3GPP technical standards. Ex. 1003 at ¶¶28-34.

VI. OVERVIEW OF THE PRIOR ART

A. 3GPP TS 25.308 V9.1.0 (2009-09) Specification, Ex. 1014

The 3GPP TS 25.308 V9.1.0 (2009-09) Specification (“TS 25.308”), Ex. 1014, provides the “overall description” for the 3G UMTS High Speed Downlink Packet Access (HSDPA) functionality for the 3G UMTS Release 9. It includes, *inter alia*, the functionality for “Dual Cell” operation to support Carrier Aggregation (CA) on the HSDPA channels. Ex. 1003 at ¶88. This Specification

was published no later than September 2009 and is prior art against the '976 patent under pre-AIA 35 U.S.C. §102 (a) and (b).

TS 25.308 defines “Dual Cell HSDPA Operation” for Frequency Division Duplex (FDD) networks, which is widely used in UMTS networks in the U.S. At a high level, FDD uses separate frequency bandwidths for the downlink channels and the uplink channels. Ex. 1003 at ¶90.

The 3GPP published an “Overview of 3GPP Release 9” (Ex. 1021) in September 2010, which is before the priority date of the '976 patent. This document (Ex. 1021) provides context for the purpose of including the “Dual Cell HSDPA” functionality in TS 25.308 Specification and “Dual Cell HSUPA” functionality in TS 25.319 Specification (described in Section VI.B, below). Ex. 1021. Also it would have informed a POSITA regarding this functionality. Ex. 1003 at ¶91. This document states that Dual Cell HSDPA had been defined even earlier in 3GPP Release 8 and included Dual Cell HSUPA in Release 9 to address the “imbalance between the uplink and the downlink” was an “obvious solution:”

With the increased use of packet data services, increased data rates introduced for HSDPA evolution as well as the supportable bandwidth imbalance between uplink and downlink after the introduction of Dual Cell HSDPA to Rel-8 the aggregation of two carriers in the uplink can

be seen as an obvious solution complementing the work already completed for the downlink operation. This work:

- specified Dual Cell HSUPA operation for the following scenarios:
 - a. The dual carrier transmission only applies to HSUPA UL physical channels and DPCH.
 - b. The carriers belong to the same Node-B and are on adjacent carriers
 - c. Operation with at least 2 carriers configured simultaneously in downlink. In this case the duplex distance between uplink carrier n and downlink carrier n will respect single carrier rules.
- introduced Stage 2 level definition of the Dual Cell HSUPA in TS 25.319

Ex. 1021 at p. 98 (highlighting added).

 www.3gpp.org / ftp / Information / WORK_PLAN / Description_Releases / Previous_versions			
sort by name/desc sort by date/desc sort by size/desc			
	Rel-09_description_20100621.zip	2010/06/17 8:06	493,6 KB
	Rel-09_description_20100924.zip	2010/09/27 13:25	470,6 KB
	Rel-09_description_20101001.zip	2010/10/01 4:50	461,4 KB

Ex. 1022 at pp. 1 and 5 (highlighting added).

Dual Cell HSDPA was already defined for “adjacent carriers” in Release 8 of TS 25.308, an additional enhancement of Dual Cell HSDPA supporting Inter-Band Carrier Aggregation was added in Release 9. This document also uses the “Dual Cell” and “Carrier Aggregation” terminology interchangeably as demonstrated by the following passages. Ex. 1003 at ¶92.

17.2 Support for different bands for Dual-Cell HSDPA.

* * *

Rel-8 study on multi-carrier HSDPA resulted with a work item under which Dual-Cell HSDPA operation was defined for two adjacent carrier cells operating in the same frequency band. Given the fragmentation of frequency resources across different bands, it is also foreseen that enabling carrier aggregation across frequency bands would allow a larger portion of network deployments to take the Dual-Cell HSDPA in use. This work:

- specified Dual-Cell HSDPA operation for limited set of band combinations:
 - a. physical layer operation is unchanged from Rel-8 DC-HSDPA operation
 - b. paired cells can operate on two different bands in addition to Rel-8 adjacent carrier-only operation
 - c. two cells belong to the same Node-B and mobility is based on one of the carriers only (anchor carrier)
 - d. focus on limited set of band combinations allowed in order to keep the UE RF implementation feasible.
Target was to have only one band combination per Region.
For Region 1 combining a 900 MHz band cell with a cell operating in 2100 MHz.
For Region 2, PCS and AWS bands can be considered when RAN4 identifies suitable band combination.
For Region 3 band combinations to be considered separately and could result in more than one combination due to different allocations within the region.

Ex. 1021 at p. 99 (highlighting added).

The TS 25.308 Specification describes Dual Cell HSDPA (DC-HSDPA) operation as:

Dual Cell operation is characterized as simultaneous reception of more than one HS-DSCH transport channel. Certain categories of UEs may be configured into Dual Cell operation with or without MIMO in CELL_DCH state. Dual Cell operation may be activated and deactivated using HS-SCCH orders.

Ex. 1014 at p. 59, Section 18 (emphasis added).

A POSITA would have understood, the acronyms used in the passage above to mean the following.

- The HS-DSCH transport channel is High Speed Downlink Shared Channel that is used to transfer data traffic from the base station (NodeB) to one or more mobile terminals (UEs). *Id.* at p. 7, Section 3.2. HSDPA relies on a new type of transport channel, the HS-DSCH, which is terminated in the Node B. *Id.* Section 4.
- The MIMO acronym stands for “Multiple In Multiple Out” and is referring to multiple antennas at the base station and/or the mobile terminal.
- The UE in the CELL_DCH state means that the UE is connected to a base station and has a physical channel allocated in the uplink and downlink directions.
- The HS-SCCH order refers to control signaling received by the UE over the High Speed-Signaling Control Channel. *Id.* at p. 7, Section 3.2.

Ex. 1003 at ¶¶93-94.

In summary, TS 25.308 defines the requirements for 3G UMTS HSDPA (Downlink) Carrier Aggregation (CA) for both Intra-Band and Inter-Band configurations. *Id.* at ¶95.

B. 3GPP TS 25.319 V9.1.0 (2009-09) Specification, Ex. 1015

The 3GPP TS 25.319 V9.1.0 (2009-09) Specification (“TS 25.319”), Ex. 1015, provides the “overall description” for the “Enhanced Uplink” functionality

for 3G UMTS Release 9. The “Enhanced Uplink” is also referred to as the High Speed Uplink Packet Access (HSUPA). It includes, *inter alia*, the functionality for “Dual Cell” operation to support Carrier Aggregation (CA) on the HSUPA (uplink) channels. Ex. 1003 at ¶96. This Specification was published no later than September 2009 and is prior art against the ’976 patent under pre-AIA 35 U.S.C. §102(a) and (b).

The TS 25.319 Specification defines the requirements for “Dual Cell” HSUPA operation to support Carrier Aggregation on the uplink as shown by the following passages.

4 Background and introduction

The technical purpose of the Enhanced Uplink feature is to improve the performance of uplink dedicated and common (FDD and 1.28Mcps TDD only) transport channels, i.e. to increase capacity and throughput and reduce delay. This is applicable for UTRA TDD and FDD.

The following techniques are part of the Enhanced Uplink feature:

- Node B controlled scheduling: possibility for the Node B to control, within the limits set by the RNC, the set of TFCs from which the UE may choose a suitable TFC.
- Node B controlled physical resource scheduling (TDD only).
- Hybrid ARQ: rapid retransmissions of erroneously received data packets between UE and Node B.
- Higher order modulation (16QAM) (TDD and FDD).
- Intra-frame code hopping (3.84 Mcps and 7.68 Mcps TDD only).
- Shorter TTI: possibility of introducing a 2 ms TTI (FDD only).
- Enhanced Uplink in CELL_FACH state and Idle mode (FDD and 1.28Mcps TDD only).
- Dual Cell E-DCH (FDD).

Ex. 1015 at p. 9 (highlighting added).

TS 25.319 also states that the UE can have “zero or one ... secondary uplink carrier.” *Id.* at p. 7, Section 3.1.1. It additionally states “A UE can have zero or one Secondary Serving E-DCH RLS.” *Id.* at p. 8, Section 3.1.2. These statements are relevant to the Challenged Claim because they inform that the Secondary Cell (SCell) does not need to have an uplink (zero uplink carriers). Therefore, under the condition of zero uplink carriers both the PCell and SCell will have a downlink carrier and only the PCell will have an uplink carrier. Ex. 1003 at ¶¶100-102.

C. 3GPP TS 36.300V10.0.0 (2010-06) Specification, Ex. 1012

The 3GPP TS 36.300V10.0.0 Specification (“TS 36.300 V10.0.0”) is entitled “Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2 (Release 10).” It was publicly released no later than June 2010, as shown by the header on each page of the document and is prior art against the ’976 patent under pre-AIA 35 U.S.C. §102(a).

This Specification discloses, *inter alia*, the LTE Carrier Aggregation (CA) requirements for the Physical (PHY) layer, layer 2, layer 3 (RRC) and examples of CA deployment scenarios in an LTE network. See *e.g.*, Ex. 1012 pp. 39, 45, 49 and 176, respectively. Ex. 1003 at ¶¶103-104.

D. The R2-104515 3GPP LTE “Discussion and Decision” Document, Ex. 1013

Document R2-104515 (“R2-104515”) was publicly available to TSG RAN members since at least August 23, 2010, (Ex. 1003 at ¶¶105-109) and is prior art against the ’976 patent under pre-AIA 35 U.S.C. §102 (a).

This document relates to LTE Carrier Aggregation and acknowledges that a secondary cell (SCell) for Carrier Aggregation (CA) can be configured with just a downlink resource as stated by:

According to current agreements, when configuring a secondary cell, the UL and DL resources of this cell should obey the relationship indicated in SIB2. Meanwhile, it is permitted that only DL resources are configured to secondary cells.”

Ex. 1013 at p. 1; Ex. 1003 at ¶111.

The “SIB2” acronym in the passage above stands for System Information Block number 2. Multiple SIBs are transmitted from the LTE base station (eNodeB) to inform each UE of many configuration parameters, including its configuration for Carrier Aggregation in SIB2. *See also*, Ex. 1001 at 8:57-9:2.

R2-104515 also describes three different options used to specify to the UE that its Secondary Cell (SCell) does not have an uplink. It describes these three

options so the RAN Working Group 2 can decide on the option they prefer to be added to Release 10 of the LTE standard. Ex. 1003 at ¶¶112-113.

E. US 2006/0274712 A1 to Malladi et al. – “Malladi” Ex. 1023

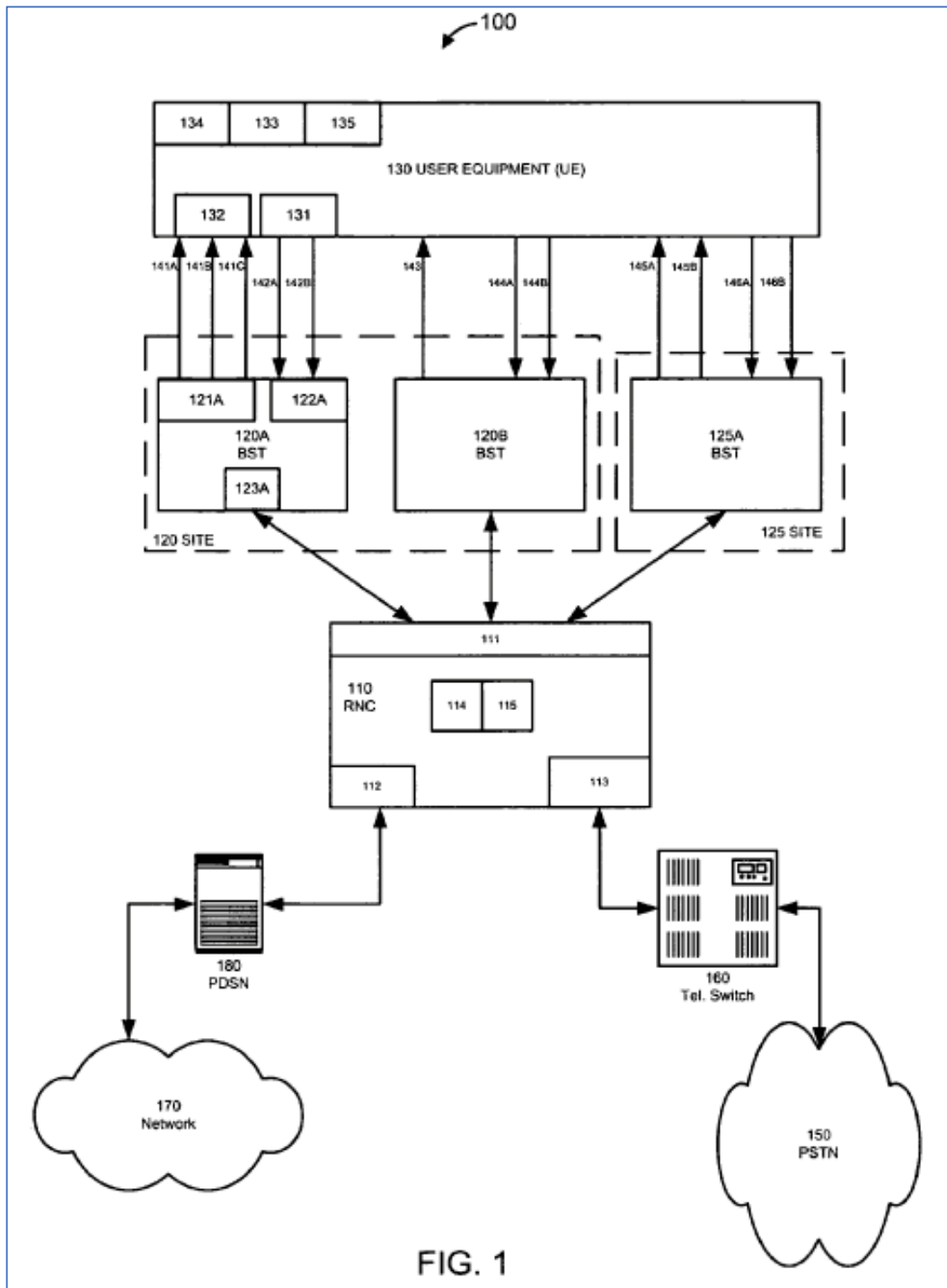
US 2006/0274712 A1 (“Malladi”) is a published patent application that was published on December 7, 2006. It was filed on April 5, 2006. It is prior art against the ’976 patent under pre-AIA 35 U.S.C. §102(a) and (b).

Malladi is entitled “Multi-carrier Operation in Data Transmission Systems” and “relates generally to telecommunications, and, more specifically, to multi-carrier and multi-cell communications in wireless systems.” Ex. 1023 at [0003]. Malladi also states that a CDMA system “may be designed to support one or more CDMA standards.... [including] (3) the standard sponsored by a consortium named “3rd Generation Partnership Project” (3GPP) and embodied in a set of documents including Document Nos. 3G TS 25.211, 3G TS 25.212, 3G TS 25.213, and 3G TS 25.214 (the “W-CDMA standard”).” *Id.* at [0006]. The W-CDMA standard is also known as the 3G UMTS standard and the 3GPP Specification numbers listed (i.e., TS 25.###) above are all for the 3G UMTS standard. Ex. 1003 at ¶¶115-116. Malladi states that backward compatibility is important when upgrading the current “single-carrier communication systems” to its invention of “multi-carrier capability”:

There is therefore a need in the art for methods and apparatus that preserve backward compatibility of user equipment and reduce the necessity for hardware changes when adding multi-carrier capability to single-carrier communication systems.

Ex. 1023 at [0011].

FIG. 1 illustrates the components of a multicarrier communication network.



Ex. 1023 at FIG. 1.

Malladi teaches that “[c]hannel reuse is employed to minimize changes in asymmetric systems with different numbers of uplink and downlink carriers” and

“[j]oint and separate scheduling schemes are shown for concurrent scheduling of a data stream transmission to a UE via multiple downlink carriers.” *Id.* at Abstract.

Malladi describes “multi-carrier communication systems” as:

Multi-carrier communication systems are being developed to satisfy the constantly increasing demand for wireless services, and in particular for data services. A multi-carrier communication system is a system with the capability to transmit information on two or more carrier frequencies. It should be noted that multi-carrier system capability may exist in both downlink and uplink connections; alternatively, a multi-carrier system may have multi-carrier capability only on uplink or only on downlink.

Id. at [0007].

The statement above is describing the characteristics for “component carriers” as described in Sections V.A.4.a, V.A.4.d and V.B.a above, and the paragraph below describes that the number of component carriers for the downlink and the uplink can be the same (symmetric) or they can be different in either the downlink or the uplink (asymmetric) direction as described in Section V.A.4.e above. Ex. 1003 at ¶121.

The last sentence in the paragraph below is also key for the Challenged Claim 2 because it states that the number of uplink carriers defined as “M” can be

equal to one. Thus, for an asymmetric multi-carrier system, as required by the Challenged Claim 2, the number of downlink carriers defined as “N” is greater than the number of uplink carriers defined as “M,” which is the condition of “ $N > M$ ” described below. Thus, if N (DL carriers) has a value of 2, then M (uplink carriers) can have a value of 1.

Importantly, the number of forward link carriers may differ from the number of reverse link carriers in a multi-carrier system. For example, the number of downlink carriers (N) may exceed the number of uplink carriers (M), i.e., $N > M$. The opposite relationship is also possible, albeit less likely, with the number of uplink carriers exceeding the number of downlink carriers, i.e., $M > N$. Of course, the numbers of the uplink and downlink carriers may be the same in a multi-carrier system, i.e., $N = M$. As noted in the immediately preceding paragraph, either N or M may equal 1 in a multi-carrier system.

Id. at [0008]; Ex. 1003 at ¶122.

VII. DETAILED GROUNDS OF UNPATENTABILITY

Below is an explanation of each proposed Ground of unpatentability in accordance with 37 C.F.R. § 42.104(b) as well as an identification of the specific portions of the evidence that support each Ground in accordance with 37 C.F.R. § 42.104(c).

A. Ground 1: Claim 2 of the '976 Patent is Unpatentable Under 35 U.S.C. §103 Over TS 36.300 V10.0.0 Modified in View of R2-104515

1. Motivation to Combine

a. TS 36.300

TS 36.300 is a Specification used to define Release 10 of the 3GPP LTE Standard. It is the Specification that provides the “Overall description” of the Evolved Universal Terrestrial Radio Access Network (E-UTRAN), Stage 2 (Release 10). As described in Section V, above, the E-UTRAN is the portion of the LTE network that includes its base stations referred to as eNodeBs or eNBs. This specification also states the overall description and requirements for Carrier Aggregation for each of the relevant protocol layers. Ex. 1003 at ¶123.

b. R2-104515

As described in Section VI.D, above, the title of this contribution is "UL Absence Indicator for Secondary Cells" (non-associated cell/SCell). It describes various methods that can be used to notify a UE (communication terminal device) that its Secondary Cell (*non-associated cell*) will not have an uplink resource configured. Ex. 1013 at p. 1.

It would have been obvious for a POSITA to consider the R2-104515 contribution because this contribution was published shortly after TS 36.300 and is requesting that a decision be made on how to modify the Carrier Aggregation (CA)

functionality for the same release of the LTE standard as TS 36.300 (Release 10).

Ex. 1003 at ¶125.

2. Patent Owner’s Infringement Contentions Include TS 36.300 v11.2.0

Patent Owner filed Infringement Contentions (Ex. 1006) for the ’976 Patent in the Related Litigation. In these Contentions, Patent Owner claims infringement by “‘Accused Instrumentalities’ as ... mobile devices and data terminals ... which are capable of communicating over LTE (Long Term Evolution) wireless communication networks within the United States.” Ex. 1006 at p. 2. In the Infringement Contentions Patent Owner relies upon the 3GPP 36.300 v11.2.0 Specifications to show infringement. However, as described in Section V.B.d, above, an earlier version of this same Specification number, i.e., “TS 36.300,” is identified in Patent Owner’s specification to be one of the “PRIOR ART DOCUMENTS.”

PRIOR ART DOCUMENTS	
Non-Patent Documents	
Non-Patent Document 1:	3GPP TS 36.300 V10.1.0
Non-Patent Document 2:	3GPP TS 36.331 V9.4.0
Non-Patent Document 3:	3GPP TS 36.304 V9.4.0 Chapter 3.1, Chapter 4.3, Chapter 5.2.4
Non-Patent Document 4:	3GPP S1-083461
Non-Patent Document 5:	3GPP R2-082899
Non-Patent Document 6:	3GPP TR 36.814 V9.0.0
Non-Patent Document 7:	3GPP TR 36.912 V9.3.0
Non-Patent Document 8:	3GPP TS 36.101 V10.0.0

Ex. 1001 at 10:3-18 (highlighting added).

In summary, the following 3GPP LTE TS 36.300 Specification Versions are relevant for this Petition:

- o the '976 Patent declares V10.1.0 as a “Prior Art Document;”
- o an earlier version V10.0.0 is used for this Petition;
- o Patent Owner is using a later version, V11.2.0 to allegedly show infringement; and
- o Patent Owner’s Infringement Contentions rely on Section 7.5 of TS 36.300 V11.2.0 to map language of Challenged Claim 2 to the Accused Instrumentalities (Ex. 1006 at pp. 22-24). Importantly, essentially the same language relied upon by Patent Owner to show the presence of the claim element for purposes of infringement appeared much earlier in TS 36.300 V10.0.0, which is prior art used herein to show invalidity for Limitations 2[2] and 2[3].

Ex. 1003 at ¶¶126-128.

3. Independent Claim 2

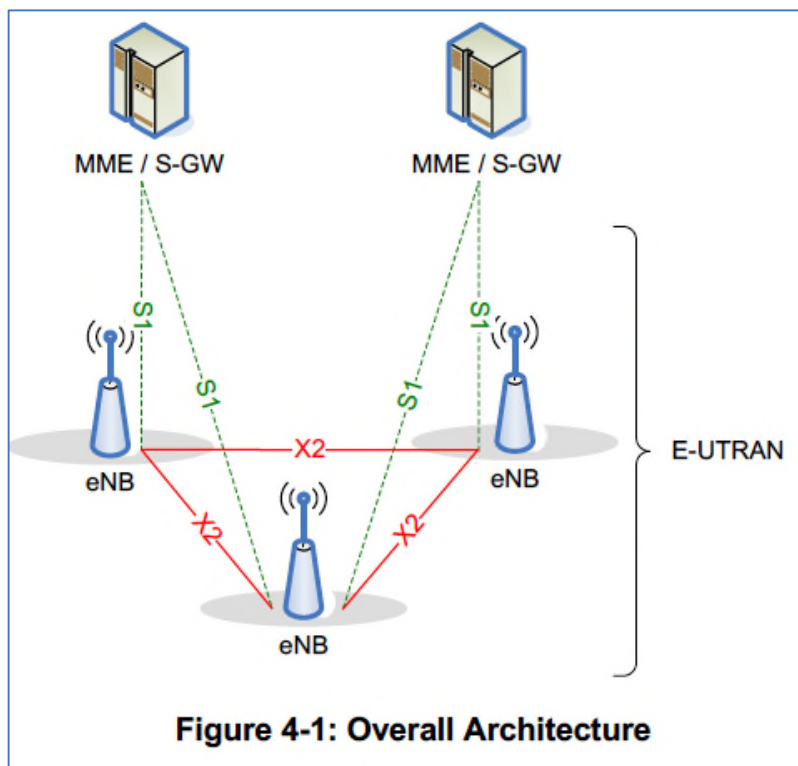
- a. **Limitation 2[pre]: “A communication terminal device performing radio communication with a base station device, wherein”**

If the preamble is limiting, the TS 36.300 Specification (Ex. 1012) discloses a communication terminal device performing radio communication. Ex. 1003 at ¶¶129-134.

As described in Section VI.C, above, TS 36.300 is one of many Specifications created by the 3GPP to define the 4G LTE network standard. For

LTE networks, the *communication terminal device*³ (UE) performs *radio* communication with the *base station* (eNodeB/eNB). *Id.* at ¶130.

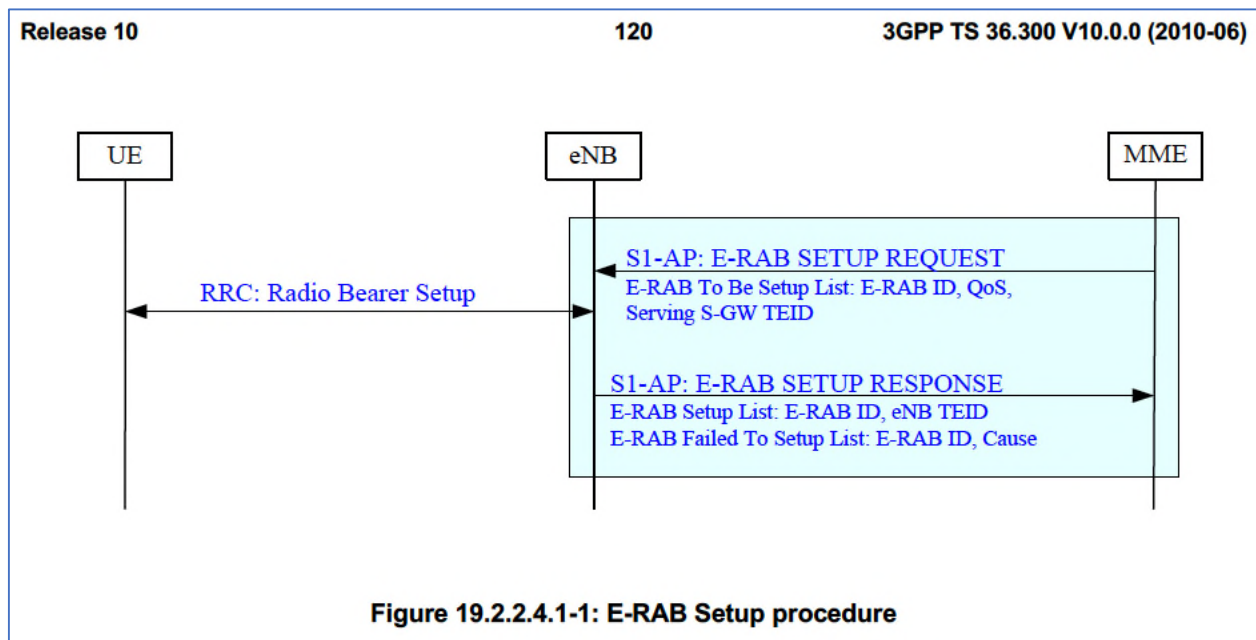
The portion of the LTE network that includes eNBs (*base stations*) is referred to as the “E-UTRAN,” which stands for the “Evolved Universal Terrestrial Radio Access Network.” Ex. 1012 at pp. 15-17. UTRAN is used to refer to similar parts of the 3G UMTS network and the “E” has been added to refer to the “evolved” LTE network. A diagram showing the E-UTRAN is included below showing how the eNBs are connected and how they connect to LTE core network devices (MME/S-GW).



³ Claim terms are shown in italics.

Ex. 1012 at p. 17, Fig. 4-1.

The LTE *base station* controls the assignment of the *downlink resources* and *uplink resources* for each UE. The wireless channels are referred to as “E-UTRAN Radio Access Bearer (E-RAB)” channels (Ex. 1012 at p. 13, 3.1 Definitions and p. 15, 3.2 Abbreviations). Some of these channels are for transferring user data on both the uplink and the downlink. The control flow diagram below shows that the eNB performs Radio Bearer Setup with the UE using the Radio Resource Control (RRC) protocol. *Id.* at p. 16.



Id. at p. 120, Fig. 19.2.2.4.1-1.

Additional support that the LTE *base station device* (eNB) controls the *downlink resources* and the *uplink resources* for a *communication terminal device* is described below for the Radio Bearer Control (RBC) function that is in the eNB.

16.1 RRM functions

16.1.1 **Radio Bearer Control (RBC)**

The **establishment**, maintenance and release **of Radio Bearers** involve 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**, 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).

If this limitation is limiting, TS 36.300 fully discloses it. Ex. 1003 at ¶¶129-134.

- b. **Limitation 2[1], “the communication terminal device performs uplink communication using an associated cell configured by the base station to include a resource for uplink and a resource for downlink, the resource for uplink being allocated to the uplink communication to the base station device, the resource for downlink being allocated to the downlink communication from the base station device, and**

The TS 36.300 Specification discloses this limitation under the claim construction set forth in Section IV, D,1, above. TS 36.300 further discloses this limitation if it is construed under its plain and ordinary meaning. Ex. 1003 at ¶¶135-141.

As described above in Sections V.A.4, V.A.4.a - V.A.4.f and V.B, the *associated cell* requirement refers to the “Primary/PCell” cell for a Carrier Aggregation (CA) configuration between the *communication terminal device* and the *base station device*.

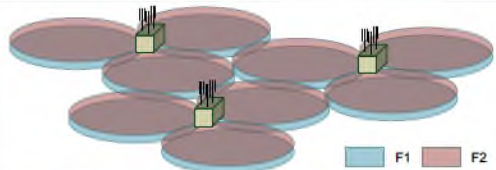
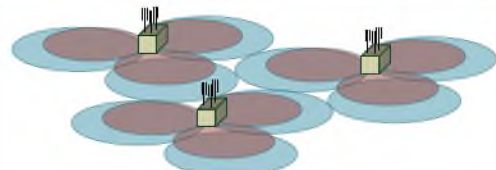
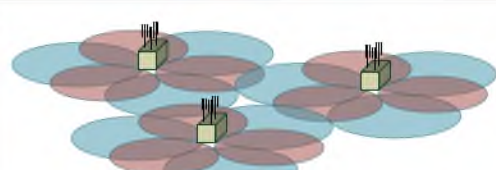
The following table shows three of the CA deployment scenarios defined by TS 36.300 which are applicable when CA is used on both the downlink and uplink. It shows, and the related text describes, that the eNB (*base station*) controls two CA F1 and F2 cells for the three shown deployments that have both downlink and uplink CA. As stated in the passage below, uplink CA is implemented for the first three deployment scenarios if intra-band carrier CA is used. Intra-band CA is described in Section V.A.4.c, above. The F1 (Frequency 1) component carrier

represents the *associated*/Primary/Pcell and the F2 (Frequency 2) represents the *non-associated*/Secondary/Scell. In each configuration below, both the F1 and F2 (*associated* and *non-associated cells*) are controlled by the same *base station* (eNB). Per the table below, both a *downlink* and an *uplink* are connected to the *associated cell* (F1). As additionally described in the table below, both a *downlink* and an *uplink* are also connected to the *non-associated cell* (F2) where both the *associated cell* and the *non-associated cell* are being controlled and used by the same *base station*. However, as described further below for Limitation 2[3], TS 36.300 also states that an uplink is not required on the *non-associated cell* (F2).

Release 10	176	3GPP TS 36.300 V10.0.0 (2010-06)
Annex J (informative): Carrier Aggregation		
This Annex reflects the agreements reached on carrier aggregation that may not necessarily fit in the core of the specification but which needs to be captured in the absence of corresponding details in Stage 3 specifications.		
J.1 Deployment Scenarios		
Table J.1-1 shows some of the potential deployment scenarios for CA. In Rel-10, for the uplink, the focus is laid on the support of intra-band carrier aggregations (e.g. scenarios #1, as well as scenarios #2 and #3 when F1 and F2 are in the same band). For the downlink, all scenarios should be supported in Rel-10.		

Ex. 1012 at p. 176, Annex J (highlighting added).

Table J.1-1: CA Deployment Scenarios (F2 > F1).

#	Description	Example
1	F1 and F2 cells are co-located and overlaid, providing nearly the same coverage. Both layers provide sufficient coverage and mobility can be supported on both layers. Likely scenario when F1 and F2 are of the same band, e.g., 2 GHz, 800 MHz, etc. It is expected that aggregation is possible between overlaid F1 and F2 cells.	
2	F1 and F2 cells are co-located and overlaid, but F2 has smaller coverage due to larger path loss. Only F1 provides sufficient coverage and F2 is used to provide throughput. Mobility is performed based on F1 coverage. Likely scenario when F1 and F2 are of different bands, e.g., F1 = {800 MHz, 2 GHz} and F2 = {3.5 GHz}, etc. It is expected that aggregation is possible between overlaid F1 and F2 cells.	
3	F1 and F2 cells are co-located but F2 antennas are directed to the cell boundaries of F1 so that cell edge throughput is increased. F1 provides sufficient coverage but F2 potentially has holes, e.g., due to larger path loss. Mobility is based on F1 coverage. Likely scenario when F1 and F2 are of different bands, e.g., F1 = {800 MHz, 2 GHz} and F2 = {3.5 GHz}, etc. It is expected that F1 and F2 cells of the same eNB can be aggregated where coverage overlap.	

Id., Only Top Part of Table J.1-1.

The following paragraphs also support CA in an LTE network that is required by TS 36.300.

Regarding the Physical layer (PHY) protocol for Carrier Aggregation, TS 36.300 states below, *inter alia*, that the same *base station* can configure a different number of Component Carriers (CCs) for the *downlink* and *uplink* and the number of uplink CCs cannot be more than the number of downlink CCs.

Release 10

39

3GPP TS 36.300 V10.0.0 (2010-06)

5.5 Carrier Aggregation

In *Carrier Aggregation* (CA), two or more *component carriers* (CCs) are aggregated in order to support wider transmission bandwidths up to 100MHz. A UE may simultaneously receive or transmit one or multiple CCs depending on its capabilities:

- A Rel-10 UE with reception and/or transmission capabilities for CA can simultaneously receive and/or transmit on multiple CCs corresponding to multiple serving cells;
- A Rel-8/9 UE can receive on a single CC and transmit on a single CC corresponding to one serving cell only.

CA is supported for both contiguous and non-contiguous CCs with each CC limited to a maximum of 110 Resource Blocks in the frequency domain using the Rel-8/9 numerology.

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.

Id. at p. 39 (highlighting added).

Regarding the Radio Resource Control (RRC) protocol layer that is located in both the LTE *base station device* (eNB) and the *communications terminal device* (UE), TS 36.300 defines the acronyms of PCell, DL PCC, SCell, UP PCC, DL SCC, UP SCC that are described in more detail in Sections V.A.4, V.A.4.a - V.A.4.f and V.B above. It also states at least the following rules for the LTE CA configurations:

- 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 (emphasis added).

Therefore, TS 36.300 discloses this limitation.

- c. **Limitation 2[2], “the communication terminal device performs downlink communication using the associated cell and a non-associated cell configured by the base station”**

The TS 36.300 Specification discloses this limitation as described in Limitation 2[1], above, and incorporated herein. Ex. 1003 at ¶¶142-144.

The technical basis for establishing that this limitation is fully met by the TS 36.300 Specification is provided above in the discussion of the relevance of this reference to limitation 2[1] and will not be repeated here. That earlier discussion demonstrates that the 36.300 Specification teaches that in an LTE network the *communication terminal device* (UE) can perform *downlink communication using the associated cell* (Primary or PCell) and *a non-associated cell* (Secondary or SCell) *configured by the base station* because the eNB can allocate downlink component carriers (CCs) on both the PCell and the SCell. Ex. 1003 at ¶¶142-143.

Therefore, TS 36.300 discloses this limitation.

- d. **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.”**

As noted in Section IV.D.3, above, a POSITA would have interpreted the text “*only another resource for downlink*,” in this limitation to be requiring that *only a downlink resource is allocated on the non-associated cell*. Therefore, when including the requirements for the previous limitations and this limitation, the total number of *downlink resources to communicate* over between the *communication terminal device* and the *base station device* are two and the total number of *uplink resources to communicate* over is one. More specifically, the *associated cell* has one *downlink resource* and one *uplink resource*. The *non-associated cell only* has one *downlink resource*. Ex. 1003 at ¶145.

As described at the beginning of this Ground, the Patent Owner has used Section 7.5 from a recent version of TS 36.300 (V11.2.0) to allege infringement in its Infringement Contentions.

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

Ex. 1006 at pp. 22-24 (only first page of support included) (Highlighting added).

The following captions are the complete Section 7.5 from the two versions of the TS 36.300 Specification. The first caption is from V10.0.0, used as prior art in this Petition, and the second caption is from V11.2.0, used in the Patent Owner’s Infringement Contentions. The highlighted text for both captions below is substantively identical. The non-highlighted text of the whole Section 7.5 is also essentially the same. Ex. 1003 at ¶147.

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

At least for the reasons described above, this limitation is disclosed by TS 36.300 and further finds support in the discussion of limitation 2[1], above, which is incorporated herein.

In addition to the paragraphs above regarding the Patent Owner's Infringement Contentions, the following paragraphs provide additional analysis that the TS 36.300 V10.0.0 discloses the requirements that an LTE *base station*

(eNB) can allocate and use at least one *downlink* and one *uplink* connected between a UE and the *associated cell* (Primary/PCell) of an eNB and the same LTE *base station* (eNB) can also allocate and use at least one *downlink* and one *uplink* connected between a UE and its *non-associated cell* (Secondary/SCell). Ex. 1003 at ¶149.

However, while the LTE *base station* can configure an uplink resource on the *non-associated cell* (Secondary/SCell), TS 36.300 states that it is not required to do so. An example of when an uplink resource on the *non-associated cell* (Secondary/SCell) is not needed, and will not be allocated, is when there is more downlink traffic to be sent to the UE from the eNB than the uplink traffic to be received from the UE. Ex. 1003 at ¶150.

Specifically, the statement below includes two key requirements for this limitation. First, the number of Downlink and Uplink Component Carriers (*resources*) do not need to be the same. Second, the number of *non-associated downlink resources* (DL SCCs) is “always larger or equal to the number of UL SCCs,” which means that, if the number of *downlink resources allocated for the non-associated cell* is one, as required by this claim, then the number of *uplink resources for the non-associated cell* can be less than one or equal to zero. Thus, the *non-associated cell* would *ONLY* have a *downlink resource* and no *uplink resource*. *Id.*

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**).

Ex. 1012 at p. 49, Section 7.5 (emphasis added).

Further, R2-104515 discloses this limitation as described below. Ex. 1003 at ¶¶151-154. The R2-104515 contribution provides additional support that an SCell (Secondary or *non-associated cell*) can be configured with *only* a “*downlink resource*” (no *uplink resource*). R2-104515 states:

1 Introduction

According to current agreements, when configuring a secondary cell, the UL and DL resources of this cell should obey the relationship indicated in SIB2. **Meanwhile, it is permitted that only DL resources are configured to secondary 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 at p. 1 (emphasis added).

As described in more detail in Section VI.D, above, this contribution describes three different options for “how to indicate UL absence of secondary cells” to the UE. Ex. 1003 at ¶153.

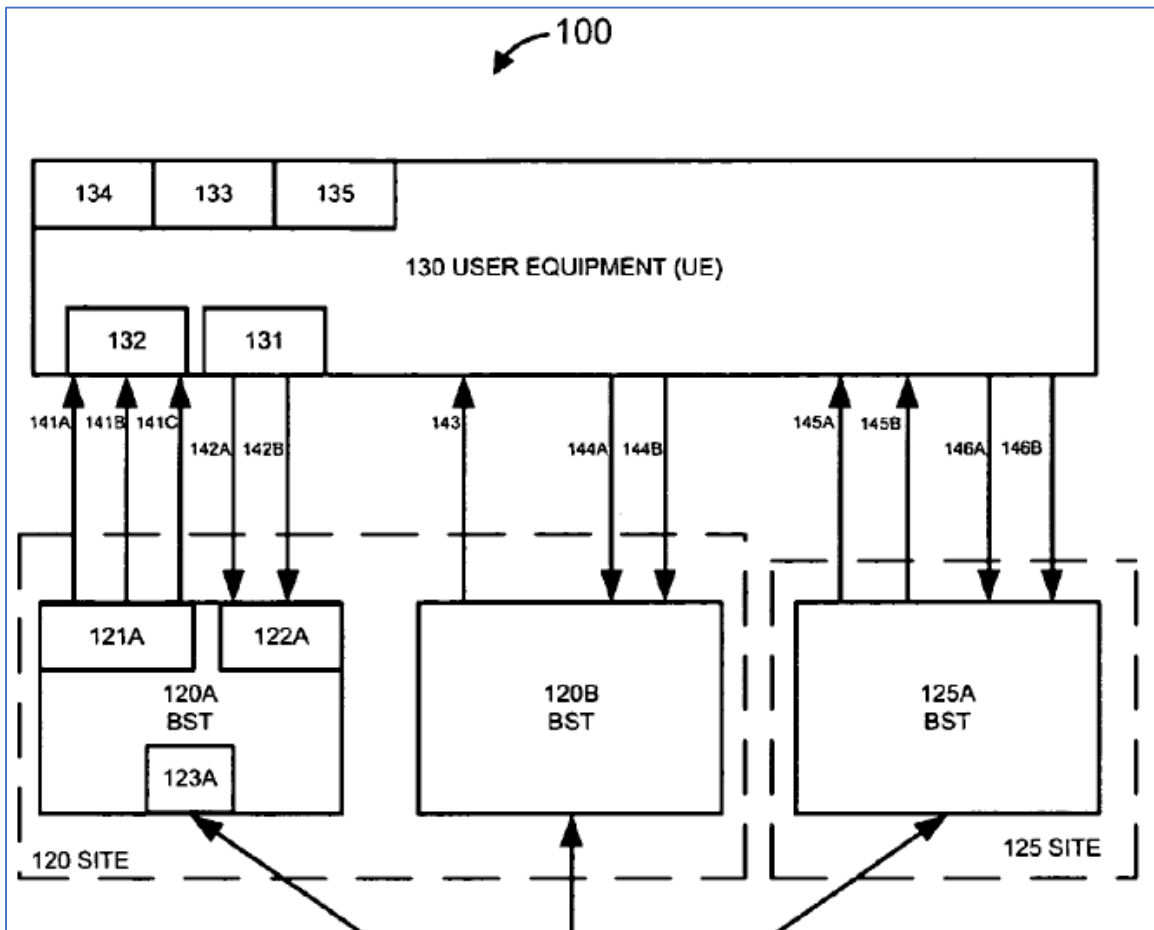
Therefore, TS 36.300 combined with R2-104515 discloses this limitation under the claim constructions set forth in Section IV.D. 2-3, above, and the combination also discloses this limitation if they are construed under their plain and ordinary meaning. Ex. 1003 at ¶154. Moreover, for at least the reasons listed above, the Challenged Claim 2 is obvious over the teachings of TS 36.300 combined with R2-104515. *Id.* at ¶¶154-155.

B. Ground 2: Claim 2 of the '976 Patent Is Invalid Under 35 U.S.C. §102 As Anticipated By Malladi

1. Independent Claim 2

a. Limitation 2[pre]: “A communication terminal device performing radio communication with a base station device, wherein”

Malladi (Ex. 1023) discloses a communication terminal device performing radio communication with a base station device. More specifically, Malladi discloses a communication terminal device (User Equipment—UE) that performs radio communication with at least one base station (Site) as described by at least FIG. 1 and its associated text included below. Ex. 1003 at ¶¶156-157.



Ex. 1023 Top Part of FIG. 1 only.

FIG. 1 shows the claimed *communication terminal device* as box 130 labelled "USER EQUIPMENT (UE)". The text below gives many examples of what a "UE" device can be, including a wireless telephone. FIG. 1 also shows two base stations labeled "120 SITE" and "125 SITE." (Also see [0139]-[0140] that equates a Node-B (a UMTS base station) to SITE 125). The "120 SITE/Node-B" is the claimed *base station device*. The dashed lines for each SITE show the number of base transceiver stations (BST [BTS]) devices that are supported by each base station. The base station labelled "120 SITE" includes the BSTs labelled

120A and 120B where the base station labelled “125 SITE” only includes one BST labelled 125A. The text below also discloses that the “base transceiver stations” correspond to “different sectors (cells).” The “120A BST” box is the claimed *associated cell* and the “120B BST” box is the claimed *non-associated cell*. The line labelled “142A” is the claimed *uplink resource* connected to the *associated cell*. The line labelled “141A” is the claimed *downlink resource* connected to the *associated cell*. The line labelled “143” is the claimed *downlink resource* connected to the *non-associated cell*. Ex. 1003 at ¶¶158-159.

The following passages describe the components in FIG. 1.

[0061] FIG. 1 illustrates selected components of a communication network 100, ... base station wireless transceivers 120A, 120B, and 125A. The base transceiver stations 120A and 120B are part of a [base station] site 120A and correspond to different sectors (cells) of this site. The base transceiver station 125A is part of a different [base station] site 125.

[0062] The base transceiver station 120A is configured to send data to a user equipment device 130 through one or more downlink wireless carriers 141A, 141B, and 141C; the transceiver 120A is further configured to receive data from the UE 130 through one or more uplink wireless carriers 142A and 142B. The base transceiver station

120B is configured to send data to the UE 130 through downlink wireless carrier 143, and to receive data from the UE 130 through one or more uplink wireless carriers 144A and 144B. The base transceiver station 125A is configured to send data to and receive data from the UE 130 using, respectively, downlink wireless carriers 145A/B and uplink wireless carriers 146A/B. Each of the carriers 141-146 corresponds to a different frequency. The downlink data streams from different transceivers (cells) to the UE 130 may be different, but there may also be periods when several transceivers transmit the same data to the UE concurrently.

[0064] The communication network 100 provides both data communication services and telephone (voice) services to the UE 130. In alternative embodiments, the communication network 100 may provide only data or only telephone services. In yet other alternative embodiments, the communication network 100 may provide services such as video transmission services, either alone or in combination with telephone services, and other services.

[0065] The UE 130 may be or include a wireless telephone, wireless modem, personal digital assistant, wireless local loop apparatus, and other communication devices. The UE 130 is configured to

communicate data in the forward and reverse directions using at least one transmission protocol, such as a protocol consistent with the wireless packet transmission protocols described above. The UE 130 may include a wireless transmitter 131, wireless receiver 132, a controller 133 (e.g., a microcontroller) executing program code.... In some variants, a user equipment device may include multiple instances of these components, for example, multiple receivers and/or multiple transmitters.

[0066] Each of the base transceiver stations 120A/B and 125 includes one or more wireless receivers (such as a receiver 122A of the transceiver 120A), one or more wireless transmitters (such as a transmitter 121A of the transceiver 120A), and a base station controller interface (such as an interface 123A). A receiver/transmitter pair of each base station is configured by a processor operating under control of program code to establish forward and reverse links with the UE 130 in order to send data packets to and receive data packets from the UE 130.

Ex. 1023 at [0061]-[0066].

Malladi discloses limitation 2[pre].

- b. Limitation 2[1]: “the communication terminal device performs uplink communication using an associated cell configured by the base station to include a resource for uplink and a resource for downlink, the resource for uplink being allocated to the uplink communication to the base station device, the resource for downlink being allocated to the downlink communication from the base station device, and”**

As described in the discussion of Limitation 2[pre], FIG. 1 and its associated text disclose data being transmitted from the *base station device* to the *communication terminal device* on multiple *downlink resources* (e.g., 141A and 143). These downlinks are being transmitted by two base transceiver stations (cells) (120A and 120B) on different carrier frequencies to the *communication terminal device* (UE 130). Box 120A is the claimed *associated cell* (serving cell) and Box 120B is the claimed *non-associated cell* (non-serving cell). Both the 120A and 120B cells are controlled by the same *base station device* (SITE 120). FIG. 1 shows data being received from the *communication terminal device* (UE 130) over the *uplink resource* labelled 142A, which is connected to the *associated cell* (serving cell) labelled 120A BST. Ex. 1003 at ¶162. Malladi discloses a dual cell configuration controlled by the *base station device* labelled “120 SITE.” Each of the base transceiver stations labelled “120A BST” and “120B BST” is controlled by the base station corresponding to different sectors, which are also referred to as cells, which communicate with the *communication terminal device*. These types of

cells are referred to as a “serving cell” and “non-serving cell.” Ex. 1023 at FIG. 2, [0095], [0104], [0137], [0150] and [0151].

Malladi’s “serving cell” provides the same functionality as the claimed *associated cell* and Malladi’s “non-serving cell” provides the same functionality as the claimed *non-associated cell*. Ex. 1003 at ¶163. A POSITA would have understood that these terms are interchangeable.

[0062] The base transceiver station 120A [serving cell] is configured to send data to a user equipment device 130 through one or more downlink wireless carriers 141A, 141B, and 141C; the transceiver 120A is further configured to receive data from the UE 130 through one or more uplink wireless carriers 142A and 142B.

[0052] A subscriber station, referred to herein as “user equipment,” “UE,” or “user equipment device,” may be mobile or stationary, and may communicate with one or more base transceiver stations.... User equipment transmits and receives data packets to or from a radio network (base station) controller through one or more base transceiver stations.

Ex. 1023 at [0062], [0052].

Therefore, Malladi discloses this limitation under the claim construction set forth in Section IV, D,1, above. Malladi further discloses this limitation if it is construed under its plain and ordinary meaning. Ex. 1003 at ¶¶162-164.

c. Limitation 2[2]: “the communication terminal device performs downlink communication using the associated cell and a non-associated cell configured by the base station”

Malladi discloses this limitation for reasons described for Limitation 2[1].

Malladi states that “[j]oint and separate scheduling schemes are shown for concurrent scheduling of a data stream transmission to a UE via multiple downlink carriers,” which supports that multiple downlink resources are provided by at least the base station labelled “120 SITE.” *Id.* at Abstract. Malladi discloses that the *base station device* transmits data on a first and second downlink carrier to the *communications terminal device* (wireless user equipment/UE) and the UE responds back to the *base station device* on the *associated cell’s uplink resource* (142A) regarding the received quality for each downlink carrier. Ex. 1003 at ¶¶166-167.

The *communications terminal device* measures the quality of each of the two *downlinks resources* and sends a quality indication in the form of a Channel Quality Indicator (CQI) signal back to the base station on the *associated cell’s uplink resource*:

In an embodiment, **a wireless user equipment** device for communicating with a base transceiver station of a radio network includes a receiver, a transmitter, and a processing circuit. The receiver is configured to **receive from the base transceiver station data on a first downlink carrier and on a second downlink carrier**, to determine values of a first channel quality indicator for the first downlink carrier, and to determine values of a second channel quality indicator for the second downlink carrier. There is one value of the first channel quality indicator per time slot, and one value of the second channel quality indicator per time slot. The transmitter is configured to **transmit on a first uplink carrier** to the base transceiver station channel quality indicator values in a CQI field, one CQI field per time slot.

Ex. 1023 at [0013] (emphasis added).

Malladi discloses this limitation. Ex. 1003 at ¶¶168-169.

- d. **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.”**

Malladi discloses this limitation as described above for Limitations 2[pre], 2[1] and 2[2]. Additionally, Malladi discloses that its multi-carrier system

allocates two downlink carrier *resources*—one from the serving (*associated*) cell and one from the non-serving (*non-associated*) cell, and only one uplink carrier *resource* is connected to the serving (*associated*) cell, which means that the *only another resource* is the *downlink resource* allocated to the non-serving (*non-associated*) cell. No *uplink resource* is allocated between the UE and the *non-associated cell*. Ex. 1003 at ¶¶172-173.

The last sentence in the paragraph below discloses this limitation because it states that the number of uplink carriers defined as the variable “M” can be equal to one. Thus, for an asymmetric multi-carrier system, as required by this limitation (See Section V.A.4.e, above, for asymmetric definition), the number of downlink carriers defined by the variable “N.” If N (total DL carriers) is 2, as required by this limitation, then M (total uplink carriers) can be 1. Here, “M” could also be a value of zero following this rule, but a POSITA would have understood that having no uplinks between a base station and a UE would not be a feasible configuration and as explained below with the “albeit less likely” phrase. *Id.* at ¶174.

Importantly, **the number of forward link carriers may differ from the number of reverse link carriers in a multi-carrier system.** For example, **the number of downlink carriers (N) may exceed the number of uplink carriers (M), i.e., $N > M$.** The **opposite relationship is also possible, albeit less likely**, with the number of

uplink carriers exceeding the number of downlink carriers, i.e., $M > N$.

Of course, **the numbers of the uplink and downlink carriers may be the same in a multi-carrier system, i.e., $N=M$.** As noted in the immediately preceding paragraph, **either N or M may equal 1 in a multi-carrier system.**

Ex. 1023 at [0008] (emphasis added).

A POSITA would have understood that the configuration required by this limitation of providing two *downlink resources* (one on the *associated cell* and one on the *non-associated cell*) and only one *uplink resource* on the *associated cell* is disclosed by Malladi. Malladi discloses this limitation under the claim constructions set forth in Section IV,D. 2-3, above, and discloses these limitations if they are construed under their plain and ordinary meaning. Moreover, for at least the reasons discussed above, Challenged Claim 2 is invalid as anticipated by Malladi. Ex. 1003 at ¶¶175-177.

C. Ground 3: Claim 2 of the '976 Patent Is Unpatentable Because It Would Have Been Obvious Under 35 U.S.C. §103 Over Malladi Modified In View Of TS 25.319

A POSITA would have found Claim 2 to have been obvious in view of Malladi modified in view of TS 25.319.

1. Motivation to Combine

a. Malladi

As described in Section VI.E above, Malladi’s invention is for “dual cell” operation in a 3G UMTS network. Because Malladi occurred before the 3GPP standards group defined the same functionality disclosed by Malladi, instead of using “Carrier Aggregation,” “Primary Cell,” and “Secondary Cell, Malladi uses the terminology of “Dual Cell,” “Serving Cell,” and “Non-serving Cell,” respectively. Ex. 1003 at ¶178.

b. TS 25.319

As described in Section VI.B above, the 3GPP TS 25.319 Specification (Ex. 1015) is for Release 9 of the 3G UMTS standard and it defines, *inter alia*, the UMTS network Carrier Aggregation (CA) requirements.

A POSITA would have been motivated to modify Malladi based on the teachings of TS 25.319 to comply with the required functionality for 3G UMTS Release 9. Ex. 1003 at ¶¶179-180.

2. Independent Claim 2

a. Limitation 2[pre]: “A communication terminal device performing radio communication with a base station device, wherein”

If the preamble is limiting, Malladi meets Limitation 2[pre] as described for Limitation 2[pre] in Ground 2. Ex. 1003 at ¶¶181-182.

- b. Limitation 2[1], “the communication terminal device performs uplink communication using an associated cell configured by the base station to include a resource for uplink and a resource for downlink, the resource for uplink being allocated to the uplink communication to the base station device, the resource for downlink being allocated to the downlink communication from the base station device, and**

This limitation is disclosed by Malladi as described for Limitation 2[1] in Ground 2. Ex. 1003 at ¶¶183-184.

- c. Limitation 2[2], “the communication terminal device performs downlink communication using the associated cell and a non-associated cell configured by the base station”**

This limitation is disclosed by Malladi as described for Limitation 2[2] in Ground 2. Ex. 1003 at ¶¶185-186.

- d. 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.”**

The effect of Limitations 2[2] and 2[3] is the requirement that the base station allocates two downlink resources (one each for the associated cell and the non-associated cell) and a single resource for uplink to the associated cell (no uplink resource allocated to the non-associated cell). TS 25.319 discloses this limitation. Ex. 1003 at ¶¶187-189.

The below excerpt from the TS 25.319 Specification teaches that the total number of uplink component carriers (*uplink resources*) can be one when the total number of downlink component carriers (*downlink resources*) is two. This disclosure is described in more detail in the Sections VI.A and VI.B, above. The reason that the maximum number of *downlink resources* is defined as two is because, as the name “Dual Cell” implies, the maximum number of downlink component carriers that could be supported in Release 9 is a maximum of two cells. *Id.* at ¶190.

The TS 25.319 Specification defines the requirements for “Dual Cell” HSUPA operation to support Carrier Aggregation on the uplink as shown by the following section.

4 Background and introduction

The technical purpose of the Enhanced Uplink feature is to improve the performance of uplink dedicated and common (FDD and 1.28Mcps TDD only) transport channels, i.e. to increase capacity and throughput and reduce delay. This is applicable for UTRA TDD and FDD.

The following techniques are part of the Enhanced Uplink feature:

- Node B controlled scheduling: possibility for the Node B to control, within the limits set by the RNC, the set of TFCs from which the UE may choose a suitable TFC.
- Node B controlled physical resource scheduling (TDD only).
- Hybrid ARQ: rapid retransmissions of erroneously received data packets between UE and Node B.
- Higher order modulation (16QAM) (TDD and FDD).
- Intra-frame code hopping (3.84 Mcps and 7.68 Mcps TDD only).
- Shorter TTI: possibility of introducing a 2 ms TTI (FDD only).
- Enhanced Uplink in CELL_FACH state and Idle mode (FDD and 1.28Mcps TDD only).
- Dual Cell E-DCH (FDD).

Ex. 1015 at p. 9 (highlighting added)

TS 25.319 also states that a UE operating in “Dual Cell” mode (i.e., “Carrier Aggregation” mode—CA) has one “Serving E-DCH cell,” also referred to as an “*associated cell*” or “primary cell (PCell)” by the ’976 patent (See Sections V.B.b and V. B.c above). TS 25.319 also states that a UE operating in Dual Cell mode (CA) also has one “Secondary Serving E-DCH cell,” also referred to as a “*non-associated cell*” or a “secondary cell (SCell)” by the ’976 patent (See Sections V.B.b and V.B.c above).

The passage below states that a *communication terminal device* (UE) can have “zero or one” when referring to the number of secondary uplink carriers (*uplink resource*) on the secondary cell. Thus, for this limitation, the Serving E-DCH cell (*associated cell*) and the Secondary Serving E-DCH cell (*non-associated cell*) would both have a *downlink resource* and only the Serving E-DCH cell (*associated cell*) would have an *uplink resource*. Ex. 1003 at ¶192.

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 at p. 7, Section 3.1.1 (highlighting added).

A POSITA would have understood the “E-DCH” acronym used above is defined to mean an “Enhanced DCH, a new dedicated and common (FDD only) transport channel type or enhancements to an existing dedicated and common (FDD only) transport channel type” *Id.* at p. 7, Section 3.1.2, and the “DCH” acronym to stand for a “Dedicated Channel.” In other words, the E-DCH is the HSUPA channel that carries uplink user data. Thus, the passage above says that the *non-associated*/SCell/Secondary Serving E-DCH cell can have either one or zero uplink resources (data channel) connected to the *communication terminal device* (UE). Ex. 1003 at ¶193.

These statements are relevant to the Challenged Claim 2 because they are stating the requirement that the *non-associated cell* (SCell) does not need to have an uplink *resource* (zero uplink carriers). Therefore, both the *associated cell* (serving E-DCH cell) and the *non-associated cell* (secondary serving E-DCH cell) will have a *downlink resource* assigned and only the *associated cell* will have an *uplink resource* assigned for a total of two downlink carriers and one uplink carrier as required by this Claim. *Id.* at ¶194.

Therefore, Malladi combined with TS 25.319 discloses this limitation under the claim constructions set forth in Section IV,D. 2-3, above, and discloses these limitations if they are construed under its plain and ordinary meaning. Ex. 1003 at ¶154. *Id.* at ¶195.

For at least the reasons stated above, the Challenged Claim 2 would have been obvious over the teachings of Malladi combined with TS 25.319. *Id.* at ¶196.

VIII. THE BOARD SHOULD NOT EXERCISE ITS DISCRETION TO DENY INSTITUTION

A. 35 U.S.C. § 314(a)

The Board should institute review of the Challenged Claims because “there is a reasonable likelihood that the petitioner [will] prevail with respect to at least 1 of the claims challenged in the petition,” as set forth in Section VII. 35 U.S.C. § 314(a).

Further, Petitioners have stipulated that if the IPR of the ’976 Patent is instituted, it will not assert invalidity in the parallel district court proceedings based on grounds that were raised or reasonably could have been raised in the instituted IPRs. Ex. 1027. Thus, *Fintiv* provides no basis for a discretionary denial in this petition. Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation (June 21, 2022) (stating that the “PTAB will not discretionarily deny institution in view of parallel district court litigation where a petitioner presents” such a stipulation).

Besides, the petition presents compelling evidence of unpatentability, which is another basis against a discretionary denial under *Fintiv* regarding this petition. *Id.* (stating that “the PTAB will not rely on the *Fintiv* factors to discretionarily deny

institution in view of parallel district court litigation where a petition presents compelling evidence of unpatentability”)

B. 35 U.S.C. § 325(d)

The Board should not deny institution under 35 U.S.C. § 325(d) because none of 3GPP TS 36.300 V10.0.0 (2010-06) (Ex. 1012), R2-104515 (Ex. 1013), 3GPP TS 25.308 V9.1.0 (2009-09) (Ex. 1014), 3GPP TS 25.319 V9.1.0 (2009-09) (Ex. 1015), Overview of 3GPP Release 9 V0.1.1 (2010-09) (Ex. 1021), US 2006/0274712 (“Malladi”) (ex. 1023), and 3GPP TS 36.300 V11.2.0 (2012-06) (Ex. 1024) was cited during prosecution of the ‘976 patent (Ex. 1001), and there is no evidence that the Examiner considered these references. Discretionary denial under 35 U.S.C. § 325(d) is therefore not appropriate. *Advanced bionics, LLV v. MED-EL Elektromedizinische Gerate GmbH*, IPR2019-01469, Paper 6 at 8-9 (P.T.A.B. Feb. 13, 2020) (precedential).

IX. CONCLUSION

Petitioner respectfully requests institution of IPR.

Dated: June 2, 2023

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), Petitioner hereby 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 Petition is 13,883. Pursuant to 37 C.F.R. § 42.24(a), words in the table of contents, table of authorities, mandatory notices under § 42.8, certificate of service, certificate of word count, appendix of exhibits, and claim listing were excluded.

Dated: June 2, 2023

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing Petition and all exhibits and other documents filed together with the Petition were served on June 2, 2023, via Federal Express on the attorney of record for Patent Owner at the following address:

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A copy of the foregoing Petition and all exhibits and other documents filed together with the Petition were also served on June 2, 2023 via electronic mail to counsel for Mitsubishi Electric Corporation and Sisvel International S.A., in the Central District of California litigation at the email address below:

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