Exhibit 1003

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 Electronic Corporation

Patent Owner.

Case No. IPR2023-00997

U.S. Patent No. US 10,200,976

DECLARATION OF MARK R. LANNING IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. US 10,200,976

TABLE OF CONTENTS

I. INTRODUCTION 7

II. PROFESSIONAL BACKGROUND AND QUALIFICATIONS 7

III. DOCUMENTS AND OTHER MATERIALS REVIEWED 11

IV. UNDERSTANDING OF THE LAW 11

A. Date of Invention 11

B. Obviousness 11

C. Standard of Proof 14

V. LEVEL OF ORDINARY SKILL 14

VI. RELEVANT TECHNOLOGY BACKGROUND 16

A. The 3GPP Standards Organization 17

a. *3GPP Documentation 19*

B. The 3GPP 4G LTE Network Standard 20

C. LTE Carrier Aggregation (CA) in 3G UMTS and 4G LTE 22

a. *The 3GPP 3G UMTS Standard Defined Carrier Aggregation Before the '976 Patent 22*

b. *The 3GPP 4G LTE Standard Defined Carrier Aggregation Before the '976 Patent 23*

D. High Level Description of Carrier Aggregation (CA) 23

a. *Component Carriers (CCs) 24*

b. *Symmetric and Asymmetric Carrier Aggregation 25*

c. *A Different Base Station Cell Supports Each Component Carrier 26*

VII. OVERVIEW OF The '976 patent 27

A. Summary of the Disclosure of the '976 patent 27

a. *Carrier Aggregation (CA)* *28*

b. *Primary (PCell) and Secondary (SCell) Designations* *31*

c. *PCell, Associated Cell, SCell, and Non-Associated Cell Terminology* *33*

d. *Admitted Prior Art Documents* *36*

B. Challenged Claim 37

VIII. CLAIM CONSTRUCTION 38

A. Legal Standard 38

B. Terms Construed In The Related Litigation 39

a. *"an associated cell configured by the base station to include a resource for uplink and a resource for downlink"* *39*

b. *"a **non**-associated cell configured by the base station to include only another resource for downlink"* *42*

c. *"the other **resource** for downlink being allocated to the downlink communication from the base station device"* *43*

IX. OVERVIEW OF THE PRIOR ART 44

A. 3GPP TS 25.308 V9.1.0 (2009-09) Specification, Ex. 1014 44

B. 3GPP TS 25.319 V9.1.0 (2009-09) Specification, Ex. 1015 49

C. 3GPP TS 36.300 V10.0.0 (2010-06) Specification, Ex. 1012 51

D. The R2-104515 3GPP LTE "Discussion and Decision" Document, Ex. 1013 52

E. US 2006/0274712 Al to Malladi et al. – "Malladi" Ex. 1023 55

X. 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 60

A. Motivation to Combine 60

a. *TS 36.300..... 60*

b. *R2-104515..... 60*

B. Patent Holder's Infringement Contentions Include TS 36.300 v11.2.0..... 61

C. Independent Claim 2 63

a. *Limitation 2[pre]: "A communication terminal device performing radio communication with a base station device, wherein"..... 63*

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..... 66*

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"..... 70*

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."..... 71*

XI. GROUND 2: CLAIM 2 OF THE '976 PATENT IS UNPATENTABLE UNDER 35 U.S.C. §102 OVER MALLADI 77

A. Independent Claim 2 77

a. *Limitation 2[pre]: "A communication terminal device performing radio communication with a base station device, wherein"..... 77*

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..... 82

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"..... 84*

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."..... 85*

XII. GROUND 3: CLAIM 2 OF The '976 patent is UNPATENTABLE UNDER 35 U.S.C. §103 OVER MALLADI MODIFIED IN VIEW OF TS 25.319 88

A. Motivation to Combine 88

a. *Malladi 88*

b. *TS 25.319..... 89*

B. Independent Claim 2 89

a. *Limitation 2[pre]: "A communication terminal device performing radio communication with a base station device, wherein"..... 89*

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..... 89*

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"..... 90*

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."..... 90*

XIII. CONCLUSION 94

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 Lanning
1004	C.V. of Mark R. Lanning
1005	MELCO Complaint for Case No.: 8:22-cv-1073-CJC-DFM.
1006	Exhibit D of MELCO Preliminary Infringement Contentions dated December 16, 2022.
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 23rd – 27th, 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).
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.

Exhibit No.	Description
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, Mark R. Lanning, declare as follows:

I. INTRODUCTION

1. My name is Mark R. Lanning, and I have been retained by the Petitioners to offer technical opinions relating to U.S. Patent No. 9,635,656 ("the '976 patent") and prior art references relating to its subject matter. My extensive experience with 2G, 3G and 4G LTE cellular networks and their standards provides me with an understanding of the subject matter described and claimed in the '976 patent.

2. My opinions, as explained below, are based on my education, experience, and expertise in the fields relating to the '976 patent. Any figures that appear within this document have been prepared with the assistance of Counsel and reflect my understanding of the '976 patent and the prior art discussed below.

3. I have no financial interest in the party or in the outcome of this proceeding. I am being compensated for my work as an expert on an hourly basis. My compensation is not dependent on the outcome of these proceedings or the content of my opinions.

II. PROFESSIONAL BACKGROUND AND QUALIFICATIONS

4. I have extensive experience in the field of telecommunications including circuit-switched networks; multiple generations of cellular networks; and packet-switched networks.

5. Further details on my education, work experience, and the cases in which I have previously given testimony in the past four years are contained in my curriculum vitae (CV). Ex. 1004.

6. I am currently the president of two consulting companies: Telecom Architects, Inc. and Reticle Consulting, LLC. Telecom Architects provides consulting services to fixed and wireless telecom service providers and their equipment suppliers. I have been President of Telecom Architects since 1999.

7. I have over 40 years of experience working in the telecommunications industry that began in the U.S. Army Signal Corp. My experience relevant to this case includes my work as an architect of various telecommunications systems and my work developing equipment used in telecommunications systems. This experience includes extensive design, implementation and testing work on the wireless interface functionality (between the base station and mobile phones) for multiple generations of cellular standards.

8. I received a B.S. in Computer Science from Southern Methodist University (SMU) in 1983.

9. DSC, now a part of Alcatel, hired me in 1983 where I was a software development manager on the team responsible for ting DSC's PSTN telephone switch into a Mobile Switching Center (MSC) for Motorola to sell as a part of their cellular product offering in the U.S. and many other countries.

10. In 1991, I began working as a consultant to Motorola for its "SuperCell" base station product and as a consultant to British Telecom to upgrade its current analog cellular network and I was one of the network architects responsible for the design and rollout of its Global System for Mobile Communications (GSM) network known as Cellnet. Beginning in the early 1990s, I was responsible for implementation of the SMS service, including working with suppliers of the SMS Center (SMSC), Mobile Switching Centers (MSCs) and cellular phones to define and roll out the functionality that was to be provided.

11. I was personally involved with Nokia, Ericsson, Motorola and other equipment suppliers in this effort.

12. Since 1995, I have also provided second generation (2G) and third generation (3G) Code Division Multiple Access ("CDMA") network architecture and equipment design and implementation consulting services to companies such as Sprint, Nextel, Nokia, and Ericsson. While consulting to Nextel, which has since become part of Sprint, as one of the network architects for its iDEN network, one of my responsibilities was to define the network and mobile phone functionality required to support MMS and advanced data communications capability.

13. In addition to my cellular experience listed above, for at least the past ten years, I have kept up to date my knowledge of the present-day 3G, 4G, and 5G cellular network and wireless standards and their associated equipment and protocols.

I have done this through my study of each new release of these standards, technical books and trade publications as well as my expert work in legal cases, which has involved evaluating the functionality of many different types of network equipment, mobile devices, and baseband chipsets. I have also evaluated thousands of cellular technology patents and most of these were for cellular phone and/or base station functionality.

14. I have also been responsible for the procurement, configuration and implementation of multiple types of Wi-Fi networks and have served as a technical expert on multiple cases regarding Wi-Fi standards, technology, chipsets and products.

15. I am a member of the Institute of Electrical and Electronics Engineers (IEEE), including the IEEE Standards Association. I am also a member of the Association for Computing Machinery (ACM). While employed at DSC, I was a member of the ANSI T1 and T1X1 standard groups responsible for the definition and standardization of the Advanced Intelligent Network (AIN) and Signaling System 7 (SS7) protocol.

16. I was retained as a technical expert by TCL Communication Technology Holdings Limited, TCT Mobile International Limited, TCT Mobile, Inc., and TCT Mobile US Inc., ("Petitioners")

III. DOCUMENTS AND OTHER MATERIALS REVIEWED

17. In forming the opinions set forth in this declaration, I have reviewed the documents Identified in the Exhibit List and the prosecution history of the ’976 patent and of the patents and patent applications to which it claims priority.

18. Additionally, I have utilized my own experience and expertise, including that regarding the knowledge and capabilities of a person of ordinary skill in the relevant art in the timeframe of the claimed priority date of the ’976 patent.

IV. UNDERSTANDING OF THE LAW

A. Date of Invention

19. I have been asked to use the date of the filing of the earliest application to which priority is claimed, January 7, 2011, as the date of invention for purposes of my analysis (“analysis date” or “priority date”).

B. Obviousness

20. I am informed and understand that a patent claim is invalid under 35 U.S.C. § 103 if the differences between the invention and the prior art are such that the subject matter as a whole would have been obvious at the time of the invention to a person having ordinary skill in the art to which the subject matter pertains. Obviousness, as has been explained to me, is based on (i) the scope and content of the prior art, (ii) the differences between the prior art and the claim, (iii) the level of ordinary skill in the art, and (iv) any secondary indicia of non-obviousness (e.g.,

"secondary considerations" such as commercial success in the marketplace of the claimed invention), to the extent that they exist.

21. I further understand that obviousness may be shown by showing that it would have been obvious to combine the teachings of more than one item of prior art. In determining whether a piece of prior art could have been combined with other prior art or with other information within the knowledge of a person having ordinary skill in the art, the following are examples of approaches and rationales that may be considered:

- Combining prior art elements according to known methods to yield predictable results;
- Simple substitution of one known element for another to obtain predictable results;
- Use of a known technique to improve similar devices (methods, or products) in the same way;
- Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- Applying a technique or approach that would have been obvious to try (choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success);
- Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to a person having ordinary skill in the art; and

- Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

22. I further understand that an invention may be obvious if one of ordinary skill in the art, facing a wide range of needs created by developments in the field, would have seen an obvious benefit to the solutions tried by the applicant. When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, it may be obvious to a person of ordinary skill to try the known options. If a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique would have been obvious.

23. I further understand that a person of ordinary skill in the art is a hypothetical person who is presumed to be aware of all of the relevant art at the time of the invention. The person of ordinary skill is not an automaton and may be able to fit together the teachings of multiple patents and/or printed publications employing ordinary creativity and the common sense that familiar items may have uses in another context or beyond their primary purposes.

24. I also understand that when considering the obviousness of a patent claim, one should consider whether a teaching, suggestion, or motivation to combine the references exists so as to avoid impermissibly applying hindsight when

combining or modifying the prior art. I understand this test should not be applied rigidly, but that the test can be important to avoid such hindsight.

25. I also understand that one of ordinary skill in the art must have a reasonable expectation of success in combining or modifying prior art references.

26. I also understand that all elements of a claim must be considered in an obviousness analysis.

C. Standard of Proof

27. I understand that the standard to prove unpatentability in an *inter partes* review proceeding is by a preponderance of the evidence, which means more likely than not.

V. LEVEL OF ORDINARY SKILL

28. I have considered the level of ordinary skill in the art relevant to the '976 patent. I understand that factors such as the education level of those working in the field, the sophistication of the technology, the types of problems encountered in the art, the prior art solutions to those problems, and the speed at which innovations are made may help establish the level of skill in the art.

29. After reviewing the '976 patent, the relevant portions of the prosecution history of the '976 patent, and cited references, it is my opinion that the relevant art of the '976 patent is in the general field of wireless communication systems and more

specifically it is focused on some of the functionality used in Long Term Evolution (LTE) 4G cellular networks. *See e.g.,* Ex. 1001, 10:18-52.[1]

30. Specifically, the ’976 patent relates to techniques for “Communication System and Communication Terminal Device Using Associated And Non-Associated Cells.” *Id.* title.

31. The ’976 patent states that the “Means to Solve the Problem” is:

32. A base station device of the present invention performs radio communication with a communication terminal device, wherein: the base station device configures a non-associated cell that includes a resource for downlink and does not include a resource for uplink, the resource for downlink being allocated to downlink communication to the communication terminal device, the resource for uplink being allocated to uplink communication from the communication terminal device; the base station device notifies the communication terminal device of link information indicating that the non-associated cell does not include the resource for uplink, using the resource for downlink; and the base station device communicates with the communication terminal device using the non-associated cell.

Ex. 1001 at 10:56 – 11:2.

[1] All cites to the exhibits are to the original exhibit page numbers.

33. Based upon my knowledge of this field, I conclude that a POSITA at the time of the alleged invention of the '976 patent, and for that matter, at all subsequent times through the present, would have held 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, planning, 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 LTE technical standards. *See e.g.,* Ex. 1001, 10:8-16.

34. I am and was at the time of the alleged invention, at least a person of skill in the relevant art, of a level at least as high as or more than ordinarily skilled persons, and I can provide insight and opinions into the understandings of such persons at all relevant times by virtue of my education, training, and experience.

VI. RELEVANT TECHNOLOGY BACKGROUND

35. The '976 patent states that its invention is for 4G LTE cellular networks and provides eight "Non-Patent Documents" that are regarding the 3GPP 4G LTE standard (*See e.g.,* Ex. 1001, 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.

A. The 3GPP Standards Organization

36. 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. Thus, 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 joint 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.

37. 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")). The meetings for each plenary and working group are numbered sequentially (*e.g.*, TSG RAN WG1, Meeting #40; TSG RAN WG1, Meeting #41).[2] In my experience, the working groups met roughly every month and were responsible for drafting and editing specific standards and change requests. All change requests had to be approved by

[2] RAN stands for Radio Access Network.

the plenary group before the change requests were incorporated into a specific release of the standard. *See* Ex. 1017 at pp. 1-2.

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

Generation	Release	End Date[3]
"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
. . .	. . .	. . .

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

a. 3GPP Documentation

39. Standardization by the 3GPP at the time of the '976 patent and still is 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. In my experience, the 3GPP has stored and controlled documents electronically, and these documents are retained on the public 3GPP server indefinitely. *See also* Ex. 1019 at pp. 2-3.

40. In my experience 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. Then at the meeting itself, the members publicly discuss those Tdocs and discussion documents. Members also vote on the Tdocs and, if approved, incorporate them into the standard. *See also* Ex. 1019 at p. 1. Sometimes Tdocs are drafted, edited, or combined during the meeting. The new and edited Tdocs are given new Tdoc numbers and uploaded to 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.

41. In my experience, both 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. *See also* Ex. 1019. If so, the file will receive a date and time stamp. In my experience, 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. *See* 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."

42. I provide a specific example of how the public can find and download the 3GPP TSG-RAN WG2 document R2-104515 (Ex. 1013) without a password and how it was distributed to members and other people (guests) that desired it in Section IX.E below.

B. The 3GPP 4G LTE Network Standard

43. The 3GPP LTE (4G) cellular standard was not based on a greenfield model. Instead, the LTE standard adopted many of the proven concepts that were known and used by millions of mobile terminals (UEs) in its 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 very weak or absent.

44. Based on my personal experience, the two most significant changes made to the 3G UMTS standard to create the 4G LTE standard were made to the air

interface and the core network protocol. The air interface is the wireless communication method and communication protocols that used by the base stations and the mobile terminals (UEs) to communicate with each other. As described in the paragraphs directly above, 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. The details of these two types of air interfaces are beyond the scope of this declaration. However, these are used in LTE in order to support the ever-increasing requirement for higher network data capacities and higher connection speeds with mobile terminals. The core network in a cellular system 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 in order to provide mobile terminals with voice and data connections. Prior to 4G LTE, the 3G UMTS cellular core network really consisted of two subnetworks. One of these was used to carry voice calls and is referred to as a circuit-switched network. The other subnetwork 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. *See also* Ex. 1010.

45. Ex. 1010 also describes the list of the most substantial features defined for each of the LTE Releases 8-10, which are relevant to this declaration. 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 for the Challenged Claim and thus, for this declaration. For example, a feature called Carrier Aggregation (CA) was defined in 3GPP Release 10 and some of the detailed technical Specifications for this Release, which the '976 patent refers to as "PRIOR ART DOCUMENTS Non-patent Documents" (*See e.g.,* Ex. 1001 at 10:4-16) and Ex. 1010 at p. 1.

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

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

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

47. Specifically, the 3GPP TS 25.308 V9.1.0 (2009-09) Specification ("TS 25.308"), Ex. 1014, Defines 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. Both of these 3GPP Specifications are described in more detail in Section IX below.

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

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

49. Ex. 1012 is described in more detail in Section IX below.

D. High Level Description of Carrier Aggregation (CA)

50. Aggregation means grouping together and, for the 3GPP 3G UMTS and 4G LTE standards, 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 of these carriers together to expand the total bandwidth that can be used to communicate with a mobile terminal. Each of these 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

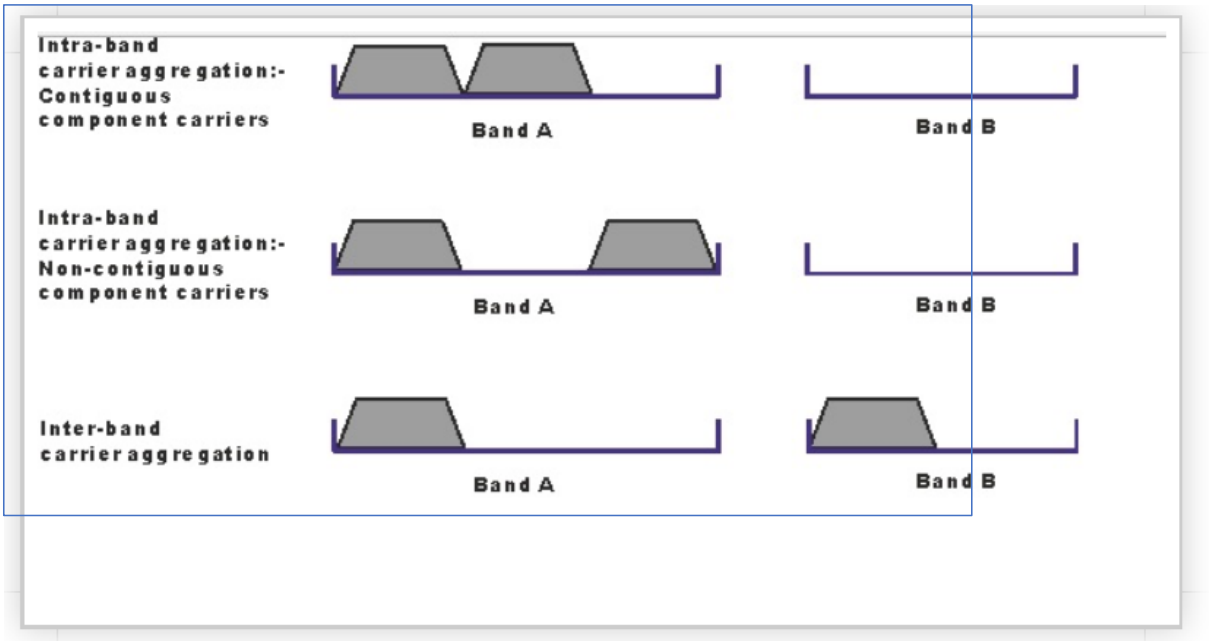
10. (*See also* Section VII.A.a below for the '976 patent's description of CA and Ex. 1016 at p. 1—Not Prior Art).

a. Component Carriers (CCs)

51. Figure 1.4 below shows the different types of configurations that LTE (or a similar type of network) can use to group multiple carriers together. The first row is the simplest form of CA because the different frequencies for the two CCs are next (adjacent) to each other. This is referred to as "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.

52. 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 next (adjacent) to each other. These carriers are referred to as non-contiguous carriers.

53. 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.

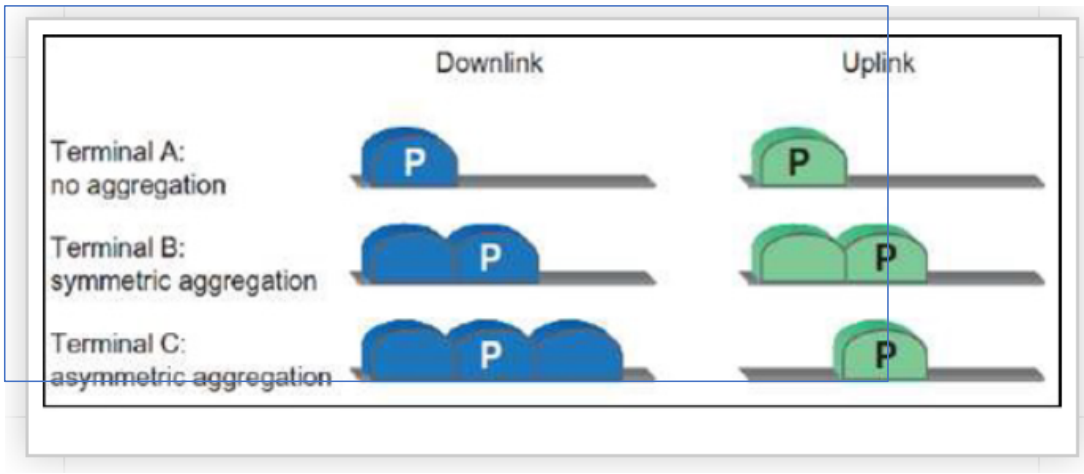


Ex. 1016 at p. 3, Figure 1.4. Carrier Aggregation; Intra-band and inter-band aggregation alternatives.

b. Symmetric and Asymmetric Carrier Aggregation

54. 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 could 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.



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

c. A Different Base Station Cell Supports Each Component Carrier

55. 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.

VII. OVERVIEW OF THE '976 PATENT

A. Summary of the Disclosure of the '976 patent

56. The '976 patent, titled "Communication system and communication terminal device using associated and non-associated cells" issued on February 5, 2019, from an application filed on April 18, 2018. Counsel has informed me that this application claims priority to JP 2011-001684 dated January 7, 2011.

57. The '976 patent invention allegedly is for a wireless communication system that has a base station (eNodeB or eNB in LTE) that can provide at least two cells—an associated cell and a non-associated cell that can provide communication with a communication terminal device, referred to by the LTE standard as User Equipment (UE). (See e.g.,

58. The textual part of the '976 patent specification is 27 pages long and has columns 1-54. There are many columns included in the specification that are not relevant to its two claims. As discussed in more detail in the paragraphs below and in my analysis for Grounds 1-3 below, the two claims are regarding Carrier Aggregation, which requires an associated cell and a non-associated cell that are controlled by the same base station and that are used to communicate with a communication terminal.

59. The most significant irrelevant subject area that takes up many columns in the specification is regarding "closed subscriber groups (CSGs)" and "Home-eNodeBs" starting at Col. 6:37.

60. I note at this point that the concept of a base station (eNodeB) providing multiple cells is different than the terminology that most people are familiar with where a "base station" and a "cell" are used interchangeably. This is not the case for the '976 patent, and this declaration as will be more apparent from the disclosures in the following paragraphs. Therefore, for the remainder of this declaration, an LTE base station (eNodeB/eNB) and a cell are different terms. As described in Section VI.D above, two or more different cells can be controlled by the same base station for Carrier Aggregation (CA). These cells can operate at different frequencies (component carriers) in the same or different frequency bandwidths.

61. One of the main reasons that an LTE base station (eNodeB) has functionality that can support more than one cell is to support an LTE feature called Carrier Aggregation (CA). 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 as described in Sections VI.C and VI.D above.

a. Carrier Aggregation (CA)

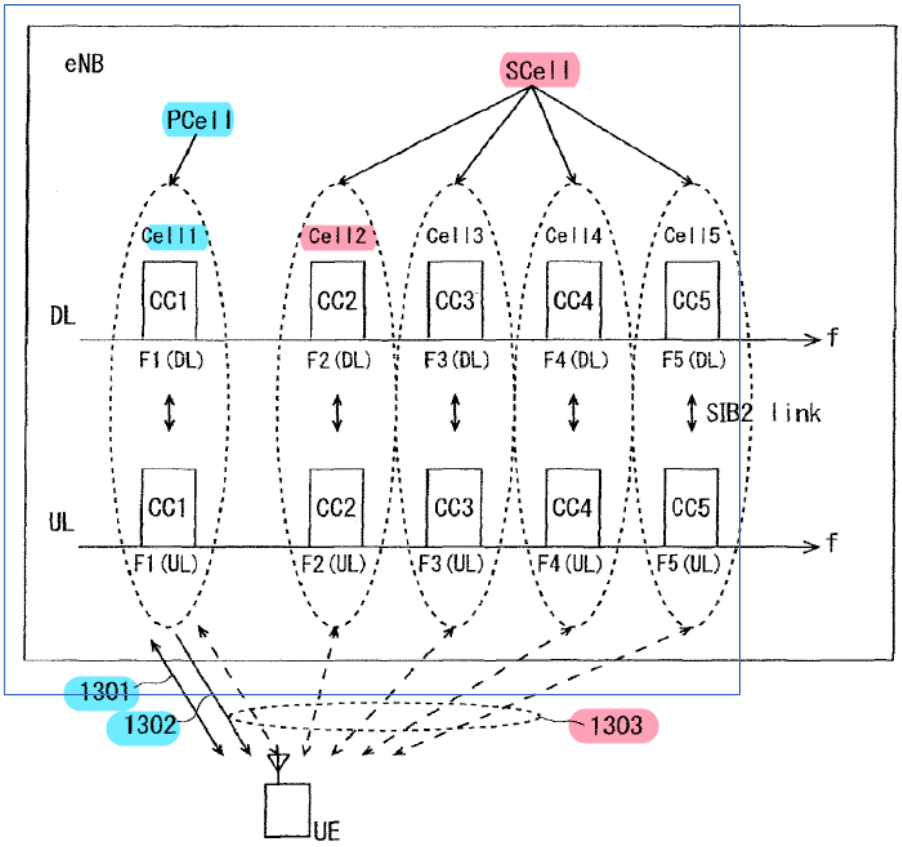
62. The following passages are from the '976 patent regarding carrier aggregation.

> **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.

Id. at 9:10-23 (emphasis added).

63. The 976 patent provides Fig. 13 and its supporting text to show and describe the concept of Carrier Aggregation as shown and described below. The PCell "Cell1," on the far left-hand side, highlighted in blue, and the SCell "Cell2,"

the cell on the left hand side of the group of SCells, highlighted in red, are specifically relevant to the Challenged Claim. I also note that the PCell (Cell1) is using carrier frequency "F1" and the SCell2 (Cell2) is using carrier frequency "F2," which shows that each cell is using a different CC as described directly above.



Ex. 1001 Fig. 13 (Highlighting Added).

FIG. 13 is a **diagram showing the concept of CA**. An eNB shown in FIG. 13 configures a cell n configured by a DL CCn and a UL CCn which is associated with the DL CCn by a DL/UL link via SIB2 [System Information Block No. 2 message from eNB]. The carrier

frequency of the DL CCn is denoted by Fn (DL), and the carrier frequency of the UL CCn is denoted by Fn (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 CCm and a UL CCm, 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.

Id. at 21:3-25 (emphasis added)

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

64. When a base station uses CA for multiple cells to communicate with a mobile terminal (UE), all these cells do not perform the same functions. The ’976 patent describes the cell that performs “mobility information and security” as the

primary cell (PCell). It 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)." It 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)" as described by the following passages:

> 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**.

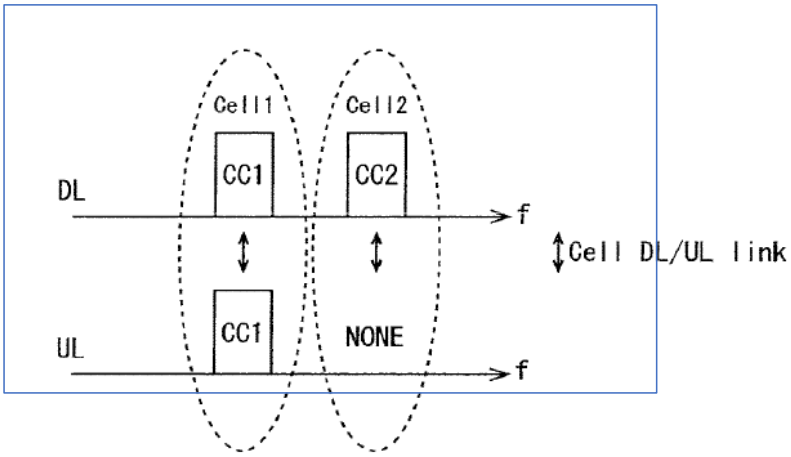
Id. at 9:29-49 (emphasis added).

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

65. 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 the "primary cell (PCell)" and "associated cell" terminology interchangeably. It also uses "secondary cell (SCell)" and "non-associated cell" terminology interchangeably. As described directly 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.

66. Additionally, Fig. 28 shown below along with its description text describes Cell1 as being the "PCell" and the "associated cell." It also describes Cell2

as being the "SCell" and the "non-associated cell." It also discloses that the cell in which a UL CC is not configured is prohibited from serving as PCell and that the use thereof is limited to SCell."



Id. 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 for 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, where 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 (emphasis added).

67. Thus, 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.

68. I provide the following table for a cross reference between 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)

d. Admitted Prior Art Documents

69. The ’976 patent states that the following list of documents are what it refers to as “Non-Patent Documents.” As discussed earlier, all these documents are either Specifications or contributions for 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.

B. Challenged Claim

70. I understand that the Petitioners are challenging claim 2 (the "Challenged Claim"). Claim 2 states:

> A communication terminal device performing radio communication with a base station device, wherein
>
> 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 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.

Ex. 1001, Claim 2.

VIII. CLAIM CONSTRUCTION

A. Legal Standard

71. I understand that patent claim terms are given their ordinary and customary meaning as understood by a POSITA. Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576 (Fed. Cir. 1996)). I further understand that if a claim term is to be construed, proper claim construction requires a review of the patent's intrinsic evidence and, when appropriate, extrinsic evidence. Phillips v. AWH Corp., 415 F3d 1303 (Fed. Cir. 2005) (en banc). Intrinsic evidence includes the language of the claims, the specification of the patent, and the prosecution history of the patent. Id. at 1314.

72. It is my understanding that the ’976 patent is involved in litigation in the Central District of California, captioned Mitsubishi Electric Corporation and Sisvel International S.A. v TCL. (f/k/a TCL Communication Technology Holdings Limited) et al., Case No. 8:22-cv-1073-CJC-DFM (“Related Litigation”).

73. I further understand that in the Related Litigation, Patent Owner and Petitioners filed an Amended Joint Claim Construction and Prehearing Statement (Ex. 1007) on May 3, 2023. Patent Owner filed Plaintiffs’ Opening Claim Construction Brief (Ex. 1008) on May 4, 2023, and Petitioners filed Defendants’ opening Claim Construction Brief (Ex. 1009) on May 4, 2023. In these papers, Petitioners propose construction of: (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).

B. Terms Construed In The Related Litigation

74. I understand that Patent Owner addressed only these three terms of the '976 patent, urging for each term that "no construction is necessary." *Id*. at pp. 5-6.

a. <u>"an associated cell configured by the base station to include a resource for uplink and a resource for downlink"</u>

75. I understand that 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.

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

77. The characteristics of celll are also 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 celll 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 celll 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.

78. In my opinion, the 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 is consistent with how the specification 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.

79. 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.

80. In my opinion clarifying the claim term with the phrase "both assigned to a specific communication terminal device" is not only consistent with the intrinsic evidence, but also helpful in understanding the meaning of the claim term.

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

81. It is my understanding that 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.

82. The '976 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.

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

84. In my opinion Petitioners' proposed construction makes clear that the same base station controlling the associated cell (i.e., celll 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 celll determines to perform CA on the ce112 for the UE." Ex. 1001 at 33:37-38. The "eNB" is the base station of celll, and it performs CA or "carrier aggregation," which is the combining of the downlink resources of celll and ce112 for the UE or user equipment. This is also consistent with the claim language itself that refers to "the base station."

c. "the other **resource** for downlink being allocated to the downlink communication from the base station device"

85. I understand that 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 "the another resource for downlink being allocated to the downlink communication from the base station device." Ex. 1007 at p. 6.

86. 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 mentions "only another resource." In my opinion, Petitioners' construction clarifies this apparent antecedent issue.

87. It is my opinion that Petitioners' positions on construction of the above terms are consistent with the teachings of the '976 patent and are not improperly limiting. I consider the Grounds in this Petition under the positions of both Patent Owner and Petitioners with regard to claim construction. In my opinion, the Grounds set forth in this Petition apply with equal force under the constructions proposed by Patent Owner and Petitioners such that claim 2 is invalid under the claim constructions offered by Patent Owner and Petitioners.

IX. OVERVIEW OF THE PRIOR ART

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

88. 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.

89. This Specification was published no later than September 2009 and I understand it is prior art against the ’976 patent under pre-AIA 35 U.S.C. §102 (a) and (b).

90. This Specification defines “Dual Cell HSDPA Operation” for Frequency Division Duplex (FDD) networks. Based on my experience, most, if not all, the UMTS networks in the U.S. operate using FDD. At a high level, FDD uses a separate frequency bandwidth for the downlink channels and the uplink channels.

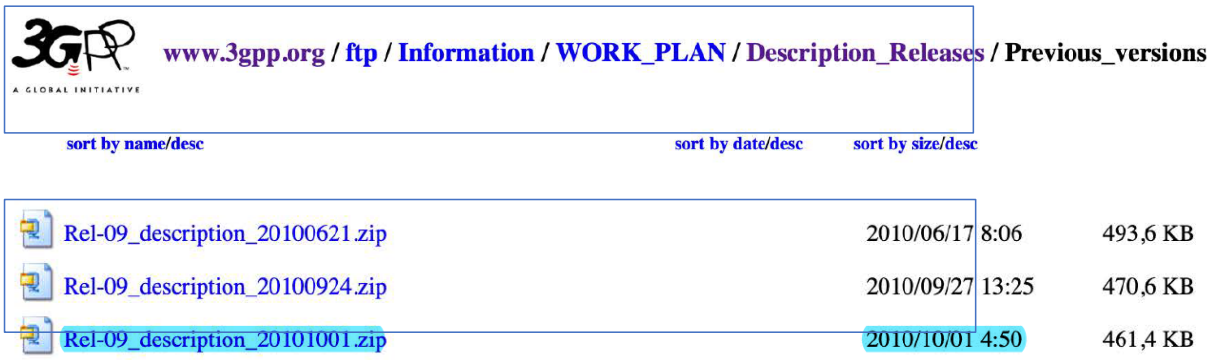
91. The 3GPP has published an “Overview of 3GPP Release 9” (Ex. 1021) in September 2010, which is before the priority date of the ’976 patent. This document (Ex. 1021) provides some context for the purpose of including the “Dual Cell HSDPA” functionality in TS 25.308 Specification and “Dual Cell HSUPA” functionality in TS 25.319 Specification (described in the Section directly below). This document also provides support for what a POSITA would have known and understood regarding this functionality. This document states that Dual Cell HSDPA had been already defined in 3GPP Release 8 and adding Dual Cell HSUPA in Release 9 to address the “imbalance between the uplink and the downlink” was an “obvious solution” with:

> 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 DPCCH.
  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 (emphasis and highlighting added).



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

92. Because Dual Cell HSDPA was already defined for "adjacent carriers" (*See* Section VI.D.a above) in Release 8 of TS 25.308, an additional enhancement of Dual Cell HSDPA supporting Inter-Band Carrier Aggregation (*See* Section VI.D.a above) was added in Release 9. This document also uses the "Dual Cell" and "Carrier Aggregation" terminology interchangeably as demonstrated by the following passages.

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 (emphasis and highlighting added).

93. 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).

94. A POSITA would have understood, and would still understand, 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.* 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. This Specification defines "Dual Cell" operation with and without MIMO and MIMO operation is not relevant for this declaration.
- 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 orders is referring to control signaling received by the UE over the High Speed-Signaling Control Channel. *Id.* at p. 7, Section 3.2.

95. In summary, TS 25.308 Release 9 defines the requirements for 3G UMTS HSDPA (Downlink) Carrier Aggregation (CA) for both Intra-Band and Inter-Band configurations.

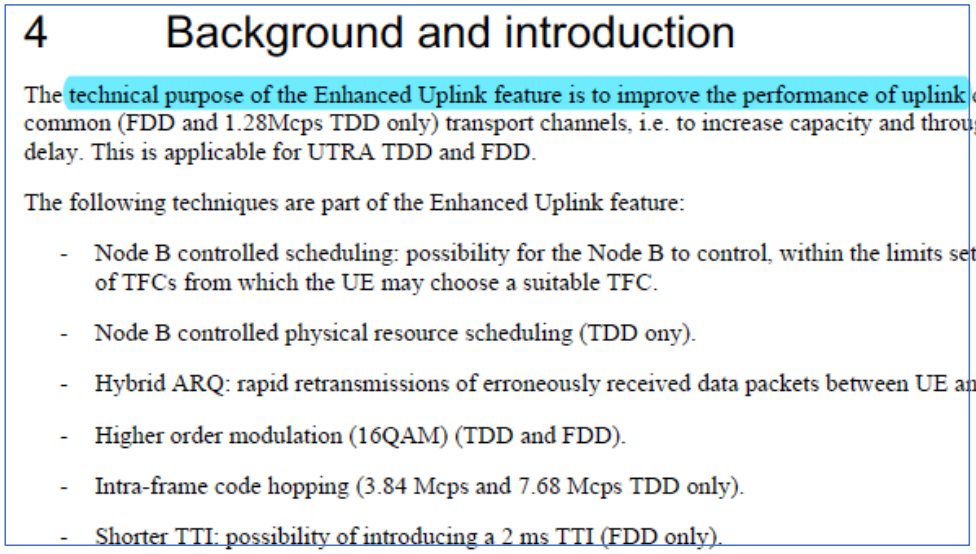
B. 3GPP TS 25.319 V9.1.0 (2009-09) Specification, Ex. 1015

96. 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.

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

98. The 3GPP explanation of the requirement to include Dual Cell HSUPA (Carrier Aggregation) in 3G UMTS Release 9 is included in the Section above for TS 25.308. Basically, Dual Cell HSUPA was included in Release 9 to address the imbalance in data throughput on the uplink that was created by including Dual Cell HSDPA (downlink) in Release 8 so Dual Cell HSUPA was added in Release 9.

99. 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 ony).
- 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)

100. TS 25.319 also states that a UE operating in "Dual Cell" mode (aka, "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* Section VII.A.b and VII.A.c below). 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* Section VII.A.b and VII.A.c below). The passage below also states that a UE can have zero or one secondary uplink carrier on secondary cell.

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.]

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

101. A POSITA would have understood the "E-DCH" acronym used above 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*, Section 3.1.2. The "DCH" acronym stands for "Dedicated CHannel." In other words, the E-DCH is the HSUPA channel that carries uplink user data. Thus, the passage above is saying that the UE can have either one or zero uplink data channels on the *non-associated*/SCell/secondary E-DCH cell.

102. These statements are relevant to the Challenged Claim because they are stating the requirement that the *non-associated cell* (SCell) does not need to have an uplink (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 carrier and **only** the *associated cell* with have an uplink carrier.

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

103. The 3GPP TS 36.300-a.0.0 (V10.0.0) Specification ("TS 36.300") is titled "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 I understand that it is prior art against the ’976 patent under pre-AIA 35 U.S.C. §102(a). The 3GPP standards group publicly releases versions of each Specification when required as described in Section VI.A above.

104. 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.

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

105. Document R2-104515 (“R2-104515”) was made publicly available to TSG RAN members no later than August 23, 2010 (it was stored on the 3GPP file server no later than August 16, 2010), when it was discussed at the 3GPP TSG RAN WG2 Meeting #71 held in Madrid Spain. Its title is: UL Absence Indicator for Secondary Cells.

106. This document is a contribution to the 3GPP LTE Technical Standards Group (TSG) responsible for defining the LTE Specifications regarding the Radio Access Network (RAN). More specifically, it was submitted to Working Group 2

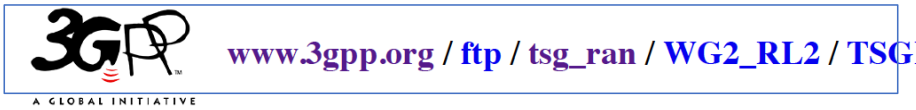
(WG2) of the RAN TSG because this is the Working Group responsible for the subject matter of this contribution (Radio Layer 2 and Radio Layer 3)[4]. It was made public no later than August 23, 2010, when the WG2 Meeting #71 convened in Madrid Spain. As described in Section VI above, the 3GPP meetings are public and many of the industry experts representing many, if not all, the companies involved with suppling network and/or mobile equipment, network providers, logistics and support are represented. This document was contributed by CATT (China Academy of Telecommunications Technology).

107. This document has been stored on the 3GPP document server and can be downloaded by using the following links:

- https://www.3gpp.org/3gpp-groups/radio-access-networks-ran/ran-wg2.
- https://www.3gpp.org/ftp/tsg_ran/WG2_RL2.
- https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_71.
- https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_71/Docs.

[4] Within the 3GPP Technical Specification Group Radio Access Network (TSG RAN), RAN WG2 (RAN2) is in charge of the Radio Interface architecture and protocols (e.g., MAC, RLC, PDCP, SDAP), the specification of the Radio Resource Control protocol and the Radio Resource Management procedures. RAN2 is responsible for the development of specifications dealing with Evolved UTRA, NR radio access (NR) and beyond. https://www.3gpp.org/3gpp-groups/radio-access-networks-ran/ran-wg2.

- This is the header of the page that appeared after clicking the link directly above.



Ex. 1025 at p. 1.

- I clicked on the link shown below (R2-104515.zip) when on the previous webpage and the file downloaded to my computer.



Id. at p. 10.

108. As shown above, the latest date for this file on the 3GPP server is "2010/08/16," which is seven days before the WG2 Meeting #71 convened in Madrid Spain on August 23, 2010.

109. This meeting had 190 participants as stated by the 3GPP report for this meeting. Ex. 1026 at p. 6. This report also shows that R2-104515 document was discussed in this meeting. *Id.* at p. 67.

110. I understand it is prior art against the '976 patent under pre-AIA 35 U.S.C. §102 (a).

111. The subject area of this document is LTE Carrier Aggregation. Specifically, this document is acknowledging 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 (emphasis added).

112. 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.

113. This document is also describing three different options that can be used to specify to the UE that its Secondary Cell (SCell) does not have an uplink. It is describing 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.

E. US 2006/0274712 Al to Malladi et al. – "Malladi" Ex. 1023

114. US 2006/0274712 Al ("Malladi") is a published patent application that was published on December 7, 2006. It was filed on April 5, 2006. I understand it is prior art against the '976 patent under pre-AIA 35 U.S.C. §102 (a) and (b).

115. The title of Malladi is "multi-carrier operation in data transmission systems." The field of invention for Malladi "relates generally to

telecommunications, and, more specifically, to multi-carrier and multi-cell communications in wireless systems." Ex. 1023 at [0003].

116. Malladi also states that a CDMA system like its invention "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 *See* Section VI.C above) and the 3GPP Specification numbers listed (i.e., TS 25.###) above are all for the 3G UMTS standard.

117. Malladi states that backward compatibility is also important when upgrading the current "single-carrier communication systems" to its invention of "multi-carrier capability" with:

> 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**.

Id. at [0011] (emphasis added).

118. Malladi's Fig. 1 is shown below, and it illustrates the components of a multicarrier communication network based on its invention.

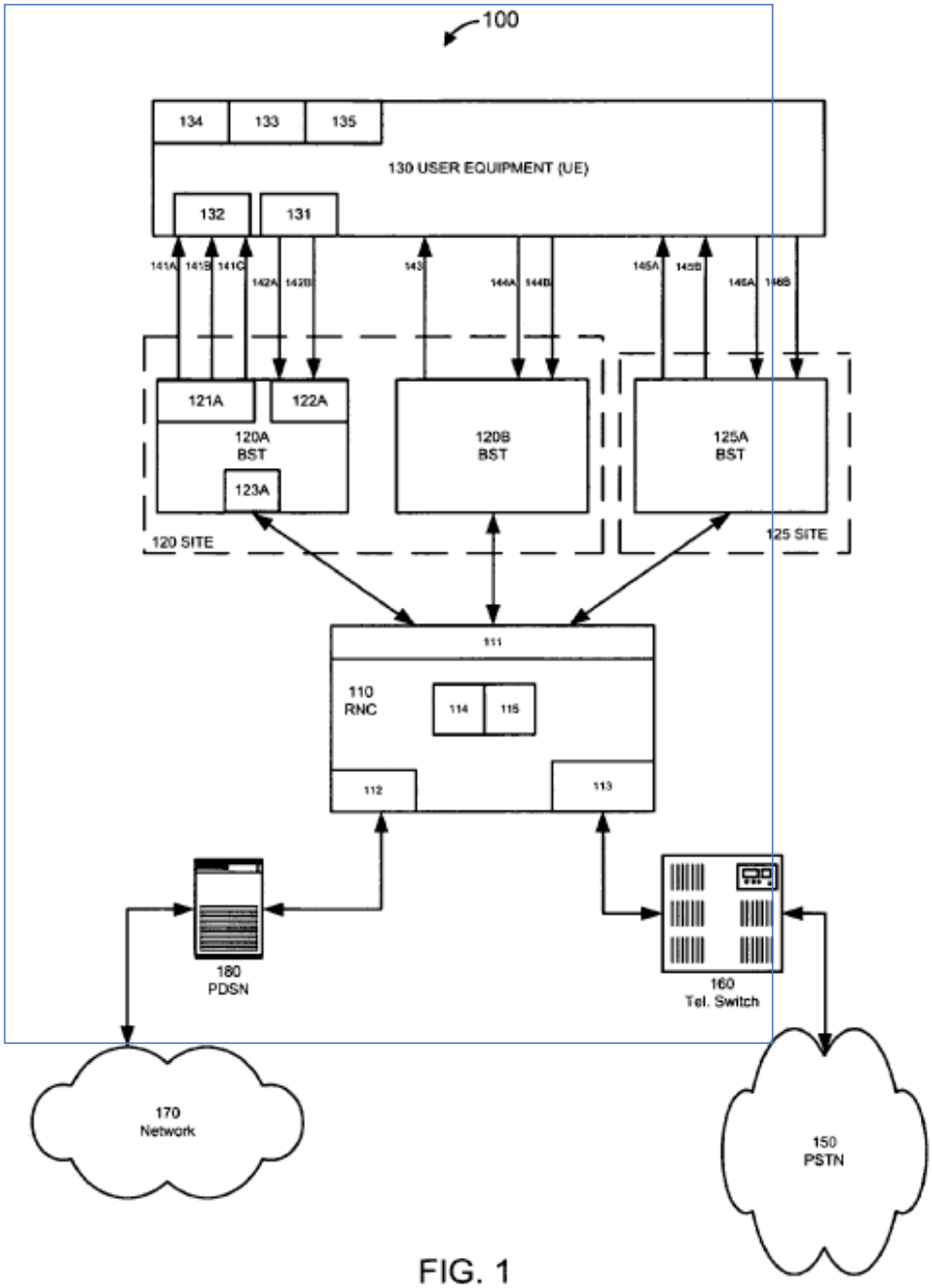


FIG. 1

Ex. 1023 at Fig. 1.

119. Malladi also 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.

120. 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] (emphasis added).

121. The statement above is describing the characteristics for "component carriers" as described in Sections VI.D and VII.A.a above. Additionally, the paragraph below is describing 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 VI.D.b above.

122. The last sentence in the paragraph below is also key for the Challenged Claim 3 because it is stating 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 3, 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. Using basic mathematics and following the rules listed below, if N (DL carriers) is a value of 2, then M (uplink carriers) can be 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] (emphasis added).

X. 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

A. Motivation to Combine

a. TS 36.300

123. As described above in Section IX.C above. This is one of the Specifications used to define Release 10 of the 3GPP LTE Standard. As its title states, 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 VI above, the E-UTRAN is the portion of the LTE network that includes its basestations referred to as eNodeB or eNB. This specification also states the overall description and requirements for Carrier Aggregation for each of the relevant protocol layers.

b. R2-104515

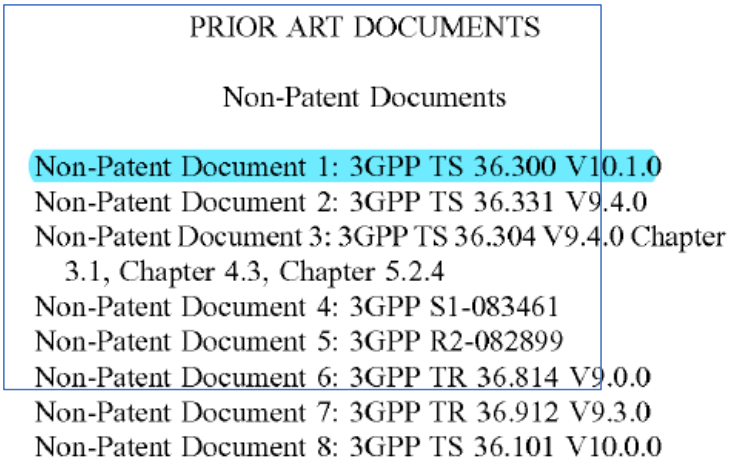
124. As described in Section IX.D above the title of this contribution is "UL Absence Indicator for Secondary cells" (*non-associated cell*/SCell). It describes the various methods that can be used to notify a UE (communication terminal device) that its Secondary Cell (non-associated cell) is not going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

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

B. Patent Holder's Infringement Contentions Include TS 36.300 v11.2.0

126. The Patent Holder has asserted infringement contentions for the '976 Patent against the Petitioner in the District Court litigation described in Section VIII above. In this litigation, the Patent Holder is claiming infringement based on the "'Accused Instrumentalities' as used herein refers to mobile devices and data terminals made, used, sold and offered for sale, provided, and/or caused to be used, now and within the past six years, **which are capable of communicating over LTE** (Long Term Evolution) **wireless communication networks within the United States**." Ex. 1006 at p. 2 (emphasis added). In these Infringement Contentions, the Patent Holder is using the 3GPP 36.300 v11.2.0 Specifications to show infringement. However, as described in Section VII.A.d above, an earlier version of this same Specification number "TS 36.300" is declared to be part of the "PRIOR ART DOCUMENTS" as highlighted below.



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).

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

- the '976 Patent declares V10.1.0 a "Prior Art Document;"
- I am using an earlier version V10.0.0 for this declaration; and
- The Patent Holder is using a more recent version 11.2.0 as one of the 3GPP LTE Specifications to show infringement.

128. The most relevant part of TS 36.300, Section 7.5, is essentially the same in V10.0.0, that I am using to show invalidity for Limitations 2[2] and 2[3] as V11.2.0, used by the Patent Holder to show infringement. I provide a comparison of the relevant text from both versions below.

C. Independent Claim 2

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

129. To the extent the preamble is limiting, the TS 36.300 Specification (Ex. 1012) discloses a communication terminal device performing radio communication.

130. As described in Section IX.C above the 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* (UE) performs radio communication with the *base station* (eNodeB/eNB).

131. The portion of the LTE network that includes the 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. The acronym UTRAN is used to refer to the similar part of the 3G UMTS network and the "E" has been added to the acronym for the "evolved" LTE network. A diagram showing the E-UTRAN is included below showing how the eNBs are connected to each other and how they connect to some of the LTE core network devices (MME/S-GW), which are outside the scope of this declaration.

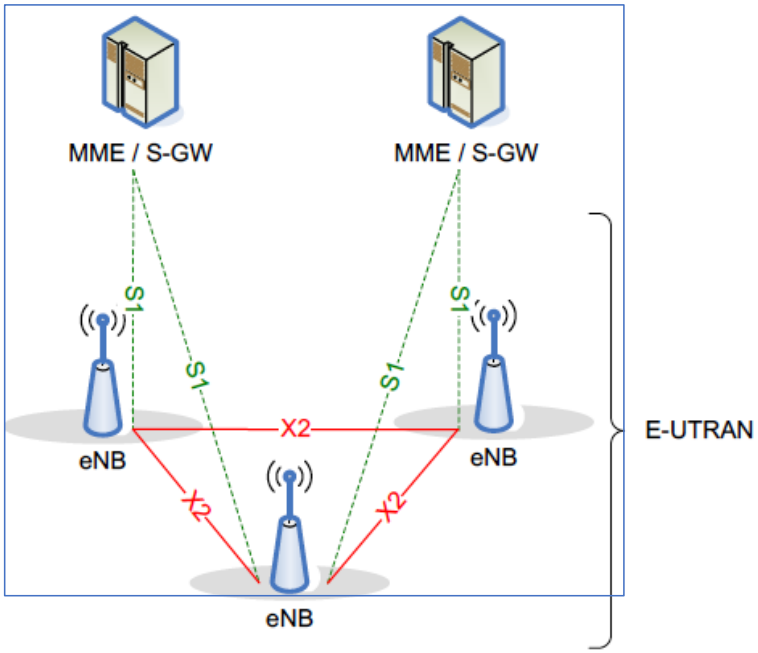


Figure 4-1: Overall Architecture

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

132. The LTE *base station* also controls the assignment of the *downlink resources* and *uplink resources* for each UE. These wireless channels are referred to generally 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. As shown by the control flow diagram below, the eNB performs Radio Bearer Setup with the UE using the Radio Resource Control (RRC) protocol (*Id.* at p. 16).

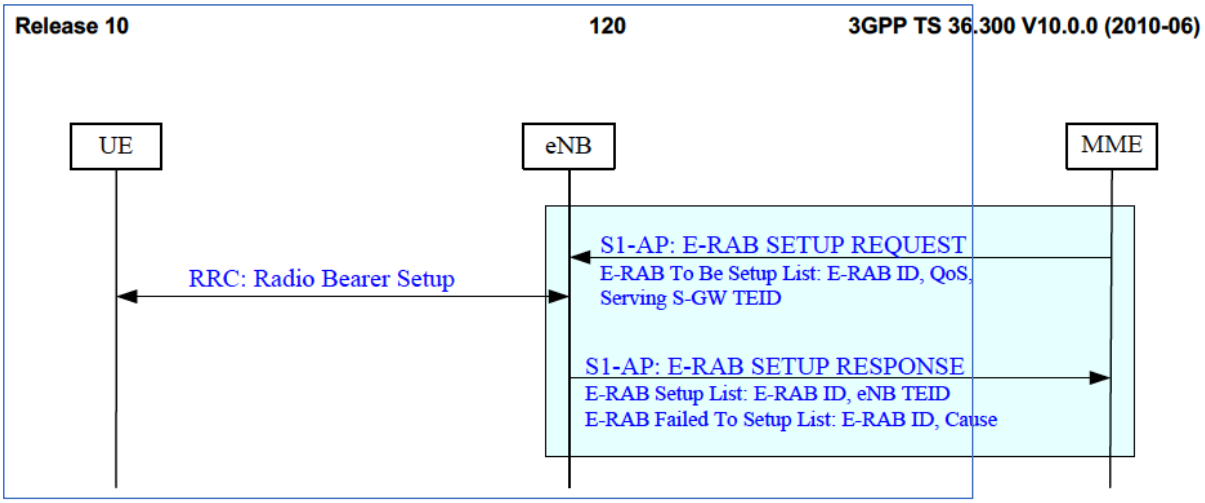


Figure 19.2.2.4.1-1: E-RAB Setup procedure

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

133. 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 located 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 in located in the eNB.

Id. at pp. 107-8 (emphasis added).

134. Therefore, TS 36.300 discloses this limitation regardless of if it is limiting.

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

135. In my opinion, the TS 25.300 Specification discloses this limitation under the claim construction set forth in Section VIII, B,1, above. TS 36.300 also discloses this limitation if it is construed under its plain and ordinary meaning.

136. As described above in Sections VI.C, VI.D and VII.A, the *associated cell* requirement is referring to the "Primary/PCell" cell for a Carrier Aggregation (CA) configuration between the *communication terminal device* and the *base station device.*

137. The following table shows three of the CA deployment scenarios defined by TS 36.300 that are applicable when CA is used on both the downlink and uplink. It shows and the text below it describes that the eNB (*base station)* is controlling the 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 can be implemented for the first three deployment scenarios if intra-band carrier CA used. Intra-band CA is described in Section VI.D 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)* are being controlled by the same *base station* (eNB). As described in the text in 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).

Annex J (informative): Carrier Aggregation

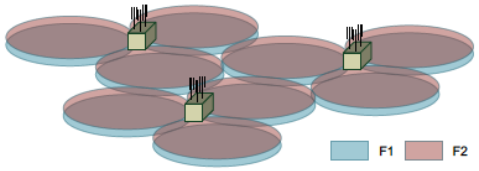
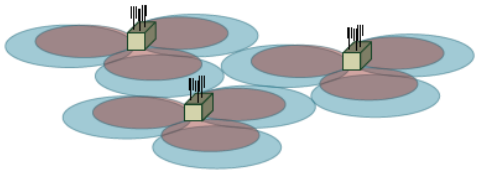
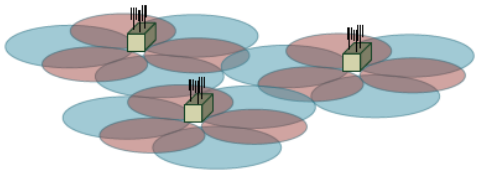
This Annex reflects the agreements reached on carrier aggregation that may not necessarily fit in the core of the specification but which needs to be captured in the absence of corresponding details in Stage 3 specifications.

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).

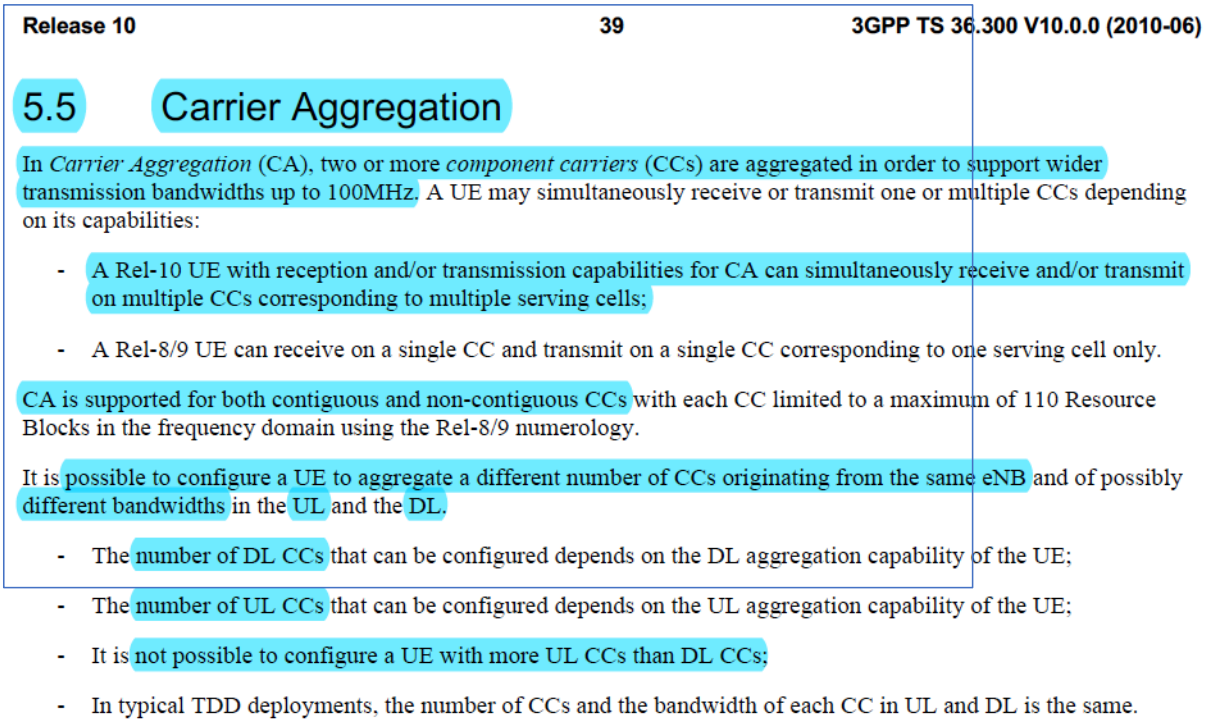
Table J.1-1: CA Deployment Scenarios (F2 > F1).

#	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.

138. The following paragraphs include other support for CA in an LTE network that are required by TS 36.300.

139. Regarding the Physical layer (PHY) protocol for Carrier Aggregation, TS 36.300 states, 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).

140. 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 VI.C, VI.D and VII.A 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).

141. 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"

142. In my opinion, the TS 36.300 Specification discloses this limitation as described in Limitation 2[1] directly above and incorporated herein.

143. Summarizing the disclosures listed in the limitation above, but not being exhaustive, the TS 36.300 Specification states 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 and uplink component carriers (CCs) on both the PCell and the SCell.

144. 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."

145. 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* on that are between the *communication terminal device* and the *base station device* are two and the total number of *uplink resources* to *communicate* on is one. More specifically, the *associated cell* has one *downlink resource* and one *uplink resource.* The *non-associated cell only* has one *downlink resource.*

146. As described at the beginning of this Ground, the Patent Holder has used Section 7.5 from a more recent version of TS 36.300 (V11.2.0) to show infringement as shown below by a part of 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).

147. The following two 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 declaration, and the second caption is from V11.2.0, used in the Patent Holder's Infringement Contentions. I have highlighted the text that I believe the Patent Holder is referring to in both captions. The highlighted text for both captions below is essentially the same, if not identical. The non-highlighted text of the whole Section 7.5 is also essentially the same.

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).

148. At least for the reasons described above, this limitation is disclosed by TS 36.300 and the support listed for limitation 2[1] above that is incorporated herein.

149. In addition to the paragraphs above regarding the Patent Holder's Infringement Contentions, the following paragraphs provide my additional analysis that the TS 36.300 V10.0.0 states 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).

150. However, while the LTE *base station* is capable of configuring an uplink resource on the *non-associated cell* (Secondary/SCell), TS 36.300 states that it is not required to do so. For example, if an unlink resource on the *non-associated cell* (Secondary/SCell) is not needed because there is more downlink traffic to be sent to the UE from the eNB than the uplink traffic to be received from the UE. 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.*

> 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).

151. If it is determined by the board that this limitation is not disclosed by TS 36.300, then R2-104515 discloses this limitation as described below.

152. 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)*. The introduction paragraph for 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).

153. As described in more detail in Section IX.D above, this contribution describes three different options for "how to indicate UL absence of secondary cells" to the UE.

154. It is my opinion that TS 36.300 combined with R2-104515 discloses this limitation under the claim construction set forth in Section VIII, B,2 and 3,

above, and that TS 36.300 combined with R2-104515 further discloses this limitation if it is construed under its plain and ordinary meaning..

155. For at least the reasons discussed above, the Challenged Claim 2 is obvious over the teachings of TS 36.300 combined with R2-104515.

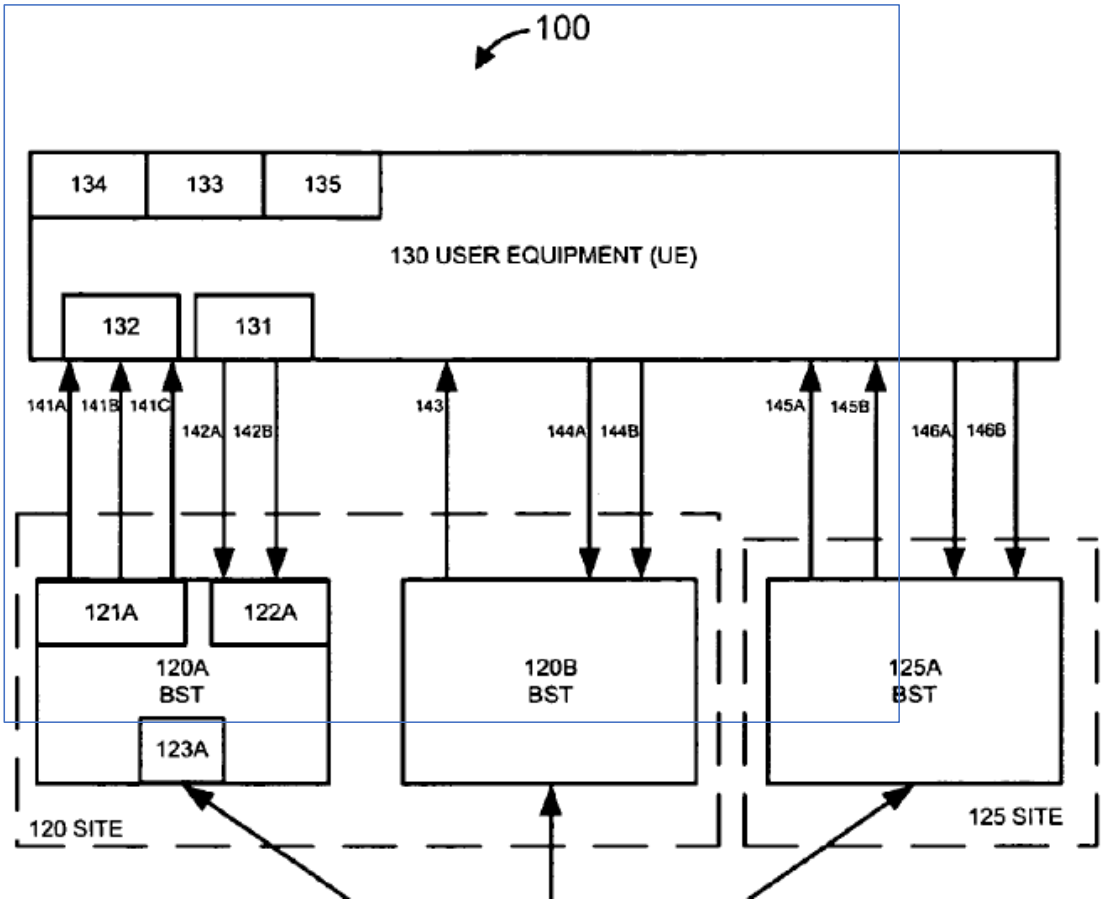
XI. GROUND 2: CLAIM 2 OF THE '976 PATENT IS UNPATENTABLE UNDER 35 U.S.C. §102 OVER MALLADI

A. Independent Claim 2

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

156. To the extent the preamble is limiting, Malladi discloses a communication terminal device performing radio communication with a base station device. Section IX.E above also describes other aspects of Malladi.

157. Malladi discloses that 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. 1023 Top Part of Fig. 1 only.

158. The following paragraph provides an overview of Fig. 1 and how each relevant component in Fig. 1 is being applied to the Challenged Claim.

159. Fig. 1 shows the claimed *communication terminal device*[5] 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

[5] Claim terms are shown in italics.

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 station (BST [BTS]) devices that are supported by each base station. For example, 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.*

160. 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.

Id. at [0061-0066] (bold emphasis added but parenthetical statements are in original text).

161. Therefore, Malladi discloses this limitation regardless of if it is limiting.

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

162. As described in Limitation 2[pre] above, Fig. 1 and its associated text describes data being transmitted from the *base station device* to the *communication terminal device* on multiple *downlink resources* (e.g., 141A and 143). These two 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 also 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.

163. Additionally, Malladi discloses a dual cell configuration that is controlled by the *base station device* labelled "120 SITE." Each of the base

transceiver stations labelled "120A BST" and "120B BST" are controlled by the base station correspond to different sectors, that are also referred to as cells, that communicate with the *communication terminal device*. These types of cells are referred to by Malladi as a "serving cell" and "non-serving cell." *Id*. at [Fig. 2, 0095, 0104, 0137, 0150 and 0151]. As described by at least the following passages, Malladi's "serving cell" performs the same functionality as the claimed *associated cell* and Malladi's "non-serving cell" performs the same functionality as the claimed *non-associated cell.* Thus, a POSITA would have understood that these terms are interchangeable. *See also* Section VII.A.c regarding this terminology.

> [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**.

Id. at [0052] (emphasis added).

164. Therefore, in my opinion Malladi discloses this limitation under the claim construction set forth in Section VIII, B,1, above. Malladi also discloses this limitation if it is construed under its plain and ordinary meaning.

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"

165. Malladi discloses this limitation as described for Limitation 2[2] above.

166. Additionally, 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.

167. Malladi also 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.

168. The *communications terminal device* measures the quality of each of these two *downlink 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* as disclosed with:

> 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.

Id. at [0013] (emphasis added).

169. Therefore, Malladi 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."

170. A POSITA would have interpreted the text "*only another resource for downlink,"* in this limitation is requiring that *only* a *downlink resource* is being *allocated* on the *non-associated cell.* Thus, when including the previous limitations

with this limitation, the total number of *downlink resources* to *communicate* on that are between the *communication terminal device* and the *base station device* is two and the total number of *uplink resources* to *communicate* on is one. More specifically, the *associated cell* has one *downlink resource* and one *uplink resource.* The *non-associated cell only* has one *downlink resource.*

171. I also note that the Patent Holder has interpreted Limitations 2[2] and 2[3] consistent with this understanding as detailed for these limitations in Ground 1 above.

172. Malladi discloses this limitation as described above for Limitations 2[pre], 2[1] and 2[2].

173. Additionally, Malladi discloses that its multi-carrier system can allocate 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. In other words, no *uplink resource* is allocated between the UE and the *non-associated cell.*

174. The last sentence in the paragraph below is also additional support for this limitation because it is stating 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 VI.D.b for asymmetric definition), the number of downlink carriers defined by the variable "N" is required to be greater than the number of uplink carriers defined as "M," which is the condition of "N>M" described below. Using basic mathematics and following the rules defined by Malladi below, if N (total DL carriers) has a value of 2, as required by this limitation, then M (total uplink carriers) can be a value of 1. I note that "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.

> 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] (emphasis added).

175. Therefore, 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.

176. Therefore, it is my opinion that Malladi discloses this limitation under the claim construction set forth in Section VIII, B,2 and 3, above, and that TS 36.300 combined with R2-104515 further discloses this limitation if it is construed under its plain and ordinary meaning..

177. For at least the reasons listed above, the Challenged Claim 2 is invalid over Malladi.

XII. GROUND 3: CLAIM 2 OF THE '976 PATENT IS UNPATENTABLE UNDER 35 U.S.C. §103 OVER MALLADI MODIFIED IN VIEW OF TS 25.319

A. Motivation to Combine

a. Malladi

178. As described in Section IX.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.

b. TS 25.319

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

180. A POSITA would have been motivated to modify Malladi based on the teachings of TS 25.319, which was made publicly available after Malladi, in order to comply with the required functionality for 3G UMTS Release 9.

B. Independent Claim 2

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

181. To the extent the preamble is limiting, Malladi discloses a communication terminal device performing radio communication with a base station device as described for Limitation 2[pre] in Ground 2 above (Section XI).

182. Therefore, Malladi discloses this limitation regardless of if it is limiting.

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

183. This limitation is disclosed by Malladi as described for Limitation 2[1] in Ground 2 above (Section XI).

184. Therefore, Malladi 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"

185. This limitation is disclosed by Malladi as described for Limitation 2[2] in Ground 2 above (Section XI).

186. Therefore, Malladi 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."

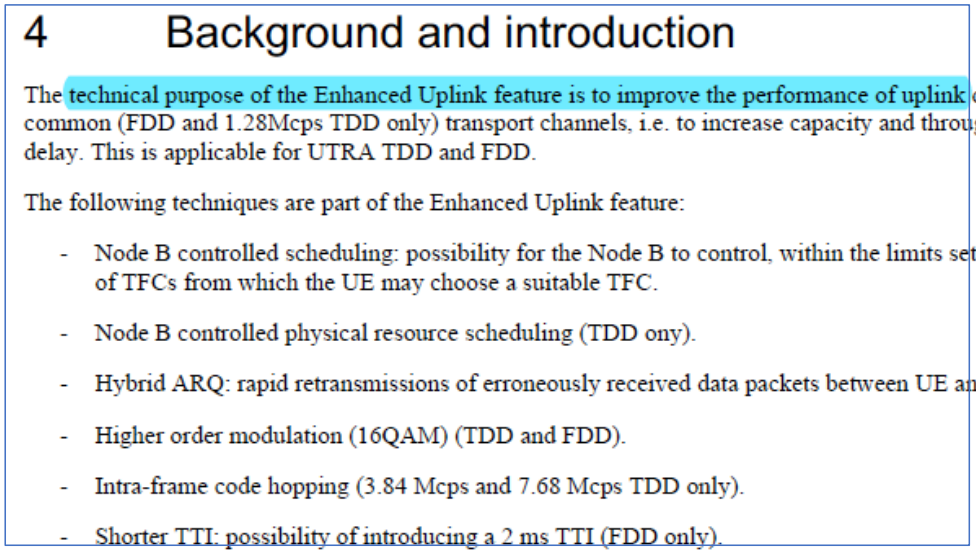
187. A POSITA would have interpreted the text "*only another resource for downlink,"* in this limitation is requiring that *non-associated cell* is allocated *only* a *downlink resource.* Thus, when including the previous limitations with this limitation, the total number of *downlink resources* to *communicate* on between the *communication terminal device* and the *base station device* is two and the total number of *uplink resources* to *communicate* on is one. More specifically, the *associated cell* has one *downlink resource* and one *uplink resource.* The *non-associated cell only* has one *downlink resource.*

188. I also note that the Patent Holder has interpreted Limitations 2[2] and 2[3] consistent with this understanding as detailed for these limitations in Ground 1 above.

189. TS 25.319 discloses this limitation.

190. The background and rationale for the 3GPP standards group adding "Dual Cell/Carrier Aggregation" to the HSUPA (high-speed uplink) functionality in release 9 of the 3G UMTS standard is described in Sections IX.A and IX.B above. At least the following paragraphs from the TS 25.319 Specification shown below require that the total number of uplink component carriers (*uplink resources*) can be one when the total number of downlink component carriers (*downlink resources)* are two, this disclosure is also described in more detail in the Sections IX.A and IX.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.

191. The TS 25.319 Specification defines the requirements for "Dual Cell" HSUPA operation in order 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.

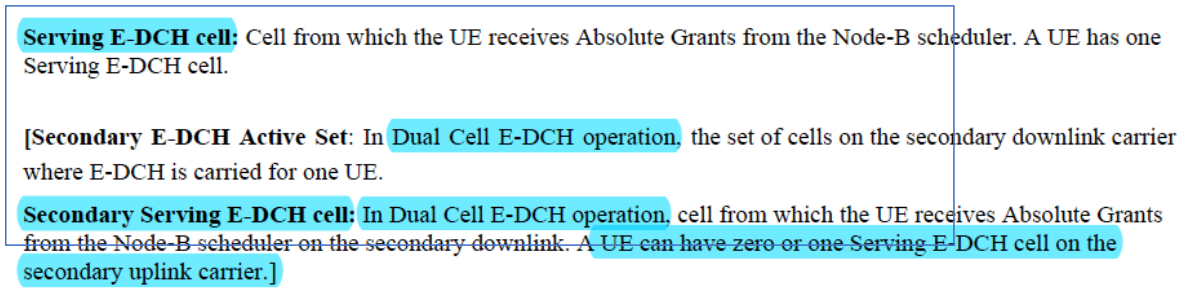
The following techniques are part of the Enhanced Uplink feature:

- 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 ony).
- 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)

192. TS 25.319 also states that a UE operating in "Dual Cell" mode (aka, "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 VII.A.b and VII.A.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 VII.A.b and VII.A.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 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.*



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.]

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

193. 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*, 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).

194. These statements are relevant to the Challenged Claim 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* with have an *uplink*

resource assigned for a total of two downlink carriers and one uplink carrier as required by this Claim.

195. Therefore, in my opinion, Malladi combined with TS 25.319 discloses this limitation under the claim construction set forth in Section VIII, B, 2 and 3, above, and that Malladi combined with TS 25.319 further discloses this limitation if it is construed under its plain and ordinary meaning..

196. 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.

XIII. CONCLUSION

197. For at least the reasons addressed above, it is my opinion that every claim of the ’976 patent is invalid as obvious.

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

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

200. I declare under penalty of perjury that the foregoing is true and correct.

Executed on: JUNE 1, 2023

Mark R. Lanning