

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

Petitioners,

v.

Mitsubishi Electric Corporation,

Patent Owner.

Case IPR2023-00957
U.S. Patent No. 10,200,976

EXHIBIT 2001
DECLARATION OF TODOR COOKLEV, PH.D.

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I. INTRODUCTION

1. My name is Todor V. Cooklev. I am an expert in mobile telecommunications and wireless technology. I have been retained as an expert witness to provide my independent opinion regarding certain matters at issue in *inter partes* review of U.S. Patent No. 10,200,976 (“the ’976 patent”) in IPR2023-00997. I have been retained by Mitsubishi Electric Corporation (“MELCO”), the Patent Owner in the above proceedings. Petitioners are TCL Communication Technology Holdings Limited, TCT Mobile International Limited, TCT Mobile, Inc., TCT Mobile (US) Inc., and TCT Mobile (US) Holdings Inc (collectively “Petitioner”).

2. For my work on this case, I am being compensated at my typical consulting rate of \$700 per hour. I am also being reimbursed for reasonable expenses that I incur during the course of this work. My compensation does not depend on the substance of my opinions or the outcome of any issues in this case.

3. My analysis of the materials produced in this matter is ongoing and I will continue to review any new material as it is provided. This declaration represents only those opinions I have formed to date. I reserve the right to amend or supplement my opinions based on additional documents or evidence I am presented, including without limitation any arguments or expert declarations advanced by Petitioner in this case.

4. I am not a legal expert and offer no opinions on the law. However, I have been informed by counsel of the various legal standards that apply, and I have applied those standards in arriving at my conclusions.

II. QUALIFICATIONS

5. I am currently Professor of Electrical and Computer Engineering at Purdue University in Fort Wayne, Indiana. At the same institution since 2008 I have served in several faculty and administrative positions, including as the Director of the Wireless Technology Center, ITT Associate Professor of Wireless Communication and Applied Research, and subsequently as Harris Professor of Wireless Communication and Applied Research.

6. I graduated from the Technical University of Sofia, Bulgaria in 1988 with a Diploma of Engineering in the field of Electrical Engineering. I graduated from Tokyo Institute of Technology in Tokyo, Japan in 1995 with a Doctor of Philosophy (Ph.D.) degree in Electrical Engineering.

7. I teach several courses related to the hardware and software architectures of wireless systems and wireless devices. My research interests include most aspects of modern wireless systems, including hardware/software architectures. I have given and occasionally continue to give seminars, tutorials, and presentations worldwide.

8. I have received research funding from the National Science Foundation (NSF), the Defense Advanced Research Projects Agency (DARPA), the U.S. Air Force Research Laboratory, the Office of Naval Research, and a number of private companies, including major technology companies.

9. I have authored and co-authored more than 100 peer-reviewed articles. I am also a named inventor on 32 U.S. patents, most of which relate to the hardware or software aspects of communication systems. For part of this work in 2019, I was inducted into the Purdue Inventors Hall of Fame. A list of my publications and patents appears in my *curriculum vitae* attached as Appendix 1.

10. In addition to my academic experience, I have experience in technology and product development in the computer networking and data communications industry. My work has been in the areas of communication protocols, software, digital signal processing, and integrated circuit design for communication systems.

11. I have contributed to the development of several major standards for communication systems and numerous amendments. I have participated in many meetings of standards committees. I have prepared, submitted, and presented documents relating to technical matters considered by these committees. I have chaired some committee meetings and served in other leadership roles.

12. Between 2000-2002 and 2005-2008 I was a Voting Member of the IEEE 802.11 Working Group. Around 2005-2007 I was Chair or a Study Group

within IEEE 802.11. For part of my work I received an award from IEEE Standards Association in 2012.

13. Between 2007-2011 I participated in the work of the Software-Defined Radio Forum (later renamed Wireless Innovation Forum). During 2011-2012 I attended 3GPP standards committee meetings. Around that time, I contributed to and submitted several documents relating to LTE-Advanced.

14. In 2020, I was elected to serve on the Board of Governors of the IEEE Standards Association for one term beginning January 2021. The Board of Governors provides overall leadership of the IEEE Standards Association.

15. Currently, I am a Series Editor for Wireless and Radio Communications of the IEEE Communications Standards Magazine (which is the premier journal in the field of communication standards) and have held that position since 2017. As a member of the Editorial Board I coordinate the review of scholarly manuscripts submitted to the wireless and radio communications series.

16. I am qualified by education and experience to testify as an expert with respect to subject matter in the fields of wireless communications, wireless communications protocols, wireless data transmission, wireless device hardware, data and signal processing hardware and software, and wireless device interoperability.

17. I have attached a current copy of my curriculum *vitae* as Exhibit 2003, which includes a list of my publications. My CV also includes a list of cases during at least the last four years in which I have provided testimony as an expert.

III. LEGAL STANDARDS

18. I am not a lawyer, and I do not intend to offer any opinions as to the interpretation of the law. When considering the '976 patent and stating my opinions, I rely on the following legal standards as described to me by the attorneys for the Patent Owner.

A. Priority Date

19. I understand that the analysis of alleged obviousness of the Patent should be performed from the perspective of a person of ordinary skill in the art (POSITA) as of the priority date of the Patent. The '976 Patent claims priority to January 7, 2011. My opinions in this matter are from the perspective of a POSITA as of that date.

B. Level Of Ordinary Skill In The Art.

20. My opinions in this declaration are based on the understandings of a person of ordinary skill in the art, as of the time of the invention. I understand that the person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. By "relevant," I mean relevant to the challenged claim of the '976 patent.

21. I understand that various factors should be considered when determining the person of ordinary skill in the art in connection with a particular patent. I understand that these factors include, without limitation, the type of problems encountered in the art, the prior solutions to those problems found in the prior art references, the rapidity with which innovations are made, the sophistication of the technology, the level of education of active workers in the field, and my own experience working with those of skill in the art at the time of the invention.

22. Mr. Lanning opines that “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.” EX1003 [Lanning-Decl.] ¶33. For the purpose of this declaration, I will apply the same definition of the level of skill of a POSITA.

23. Based on my experience, education, and training, I met the definition of a POSITA as of the priority date of the Patent. My qualifications at that time far exceeded that of a POSITA, and I had worked with, as well as supervised, many

POSITA's throughout my work in the field. My opinions concerning the '976 Patent and the prior art are from the perspective of a POSITA, as set forth above.

24. As further discussed below, my opinions as stated in this declaration are valid even if the Board adopts a slightly different level of ordinary skill in the art.

C. Claim Construction.

25. I understand that claims in a patent-at-issue in an IPR are generally interpreted according to the district court-type claim construction.

26. I further understand that claim terms are interpreted as they would have been interpreted by a person of ordinary skill in the art at the time of the invention, in light of the specification and the patent's prosecution history in the patent office.

D. Anticipation Legal Standard.

27. I understand that a patent claim is anticipated if every element of a claim is disclosed expressly or inherently in a single prior art reference. In addition to every element being disclosed expressly or inherently, I also understand that the single prior art reference must disclose every element being arranged or combined in the same way as the claim. I further understand that it is not proper to combine different embodiments in a single prior art reference to show anticipation.

E. Obviousness Legal Standard.

28. I understand that a patent claim is unpatentable if the claimed invention would have been obvious to a person of ordinary skill in the art at the time of the invention.

29. I understand that an obviousness analysis involves comparing a claim to the prior art to determine whether the claimed invention would have been obvious to a person of ordinary skill in the art at the time of the invention in view of the prior art and in light of the general knowledge in the art as a whole. I also understand that obviousness is ultimately a legal conclusion based on underlying facts of four general types, all of which must be considered: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) any objective indicia of non-obviousness, including any praise of the invention. Objective indicia of non-obviousness may include, for example, commercial success of an embodiment, a long-felt need, skepticism, failure by others to find the solution provided by the claimed invention, copying by others of the subject matter of the claim invention, unexpected results of the claimed invention, acceptance of others and industry praise, and licensing of the patents.

30. I also understand that obviousness may be established under certain circumstances by combining or modifying the teachings of the prior art. However,

I have been informed that a claim is not proved obvious merely by demonstrating that each of the elements was independently known in the prior art. I have been informed that many, if not all, inventions rely on building blocks already previously known, and claimed discoveries almost of necessity will likely be combinations of what is already known. I have been informed that it is important to identify whether a reason existed at the time of the invention that would have motivated a person of ordinary skill in the art in the relevant field to combine the known elements in the way the claimed invention does. Specific teachings, suggestions, or motivations to combine any first prior art reference with a second prior art reference can be explicit or implicit, but must have existed before the date of purported invention. I understand that prior art references themselves may be one source of a specific teaching or suggestion to combine features of the prior art, but that such suggestions or motivations to combine art may come from the knowledge that a person of ordinary skill in the art would have had.

31. I understand that a reference may be relied upon for all that it teaches, including uses beyond its primary purpose, but also including teachings that lead away from the invention. I understand that a reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, although the mere disclosure of alternative designs does not teach away.

32. I further understand that whether there is a reasonable expectation of success in combining references in a particular way is also relevant to the analysis.

33. I understand that it is improper to use hindsight to combine references or elements of references to reconstruct the invention using the claims as a guide. My analysis of the prior art is made from the perspective of a person of ordinary skill in the art at the time of the invention.

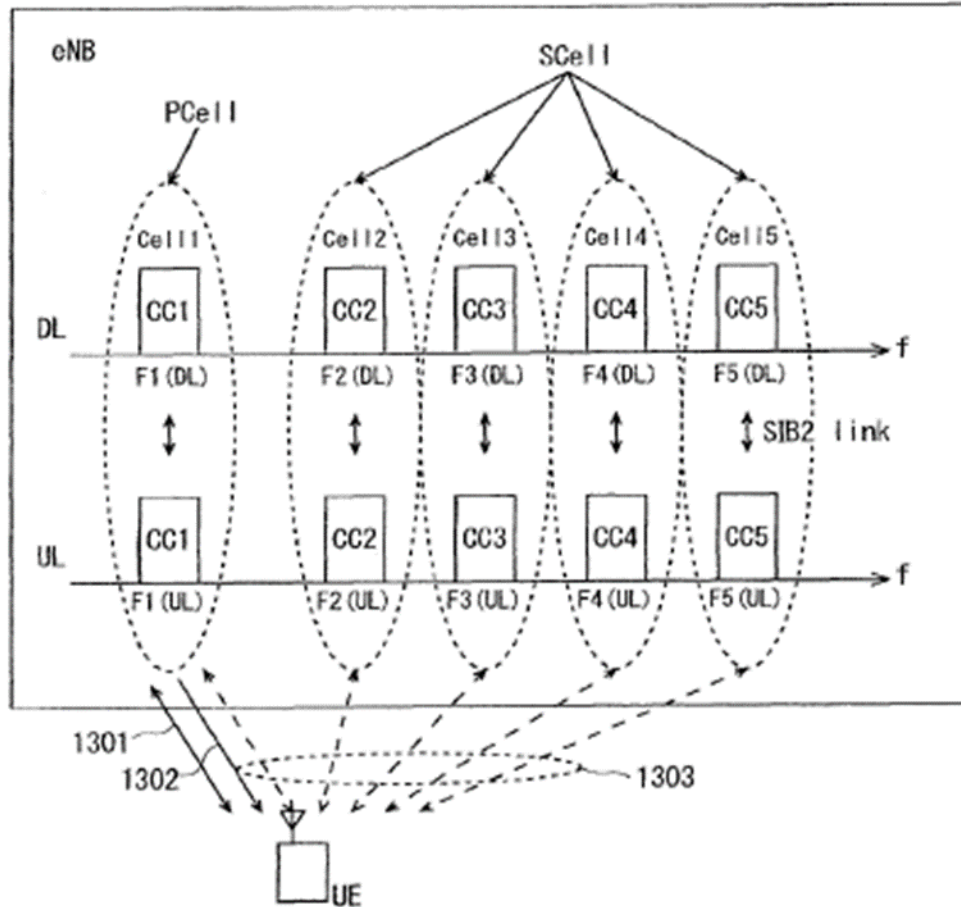
34. I am not offering any legal opinions in this declaration nor am I qualified to do so. I only consider such legal standards in framing my opinions and conclusions as well as placing assertions made by Petitioner in the Petition into the proper context. Additionally, from a subject matter perspective, I understand that the petitioner always has the burden of persuasion regarding a challenge of patentability of an invention under an *inter partes* review.

IV. OVERVIEW OF THE '976 PATENT

35. Having reviewed the '976 Patent, I understand that it describes a new and innovative way to implement carrier aggregation in a communication system such as LTE that improves and maximizes efficient use of system resources. Carrier aggregation (CA) involves aggregating two or more component carriers (CCs) to support wider transmission bandwidths of up to 100 MHz. EX1001, 9:6-9. CA supports contiguous CCs, non-contiguous CCs, and CCs in different frequency bandwidths. *Id.*, 9:17-19.

36. In a communication system in which CA is configured, the UE originally has a single radio resource connection (RRC) with a primary cell (PCell) that provides both uplink and downlink carriers. *Id.*, 9:29-35. A secondary cell (SCell), which is configured to form a pair of a PCell and a serving cell, can also provide both uplink and downlink carriers. *Id.*, 9:36-41. In each SCell, a UE is capable of using resources for uplink (UL) and resources for downlink (DL). *Id.*, 9:44-45. The number of DL resources is equal to or more than the number of UL resources, and no SCell is used for UL resources only. *Id.*, 9:46-47. SCells can be reconfigured, added, or removed through RRC. *Id.*, 9:59-60.

37. Fig. 13 shows an exemplary embodiment for implementing CA.



As shown in Fig. 13 (above), a user equipment UE can communicate with base station eNB via various cells. UE camps on cell1 and performs RRC connection, which makes cell1 a PCell. *Id.*, 21:10-12. The eNB then notifies the UE of the information regarding CCs to be aggregated, whereby cell2 to cell5 become SCCells. *Id.*, 21:13-21.

38. In addition to CA as shown in Fig. 13, it is recognized that there is no SCell configuration that includes only a UL CC without a DL CC associated with the UL CC, and there is also no SCell configuration in which a plurality of DL CCs are associated with one UL CC. *Id.*, 23:14-22. One of the particularly innovative

features of the '976 Patent is its recognition that frequency bands can be flexibly allocated, thereby resulting in more effective use of frequency resources in a communication system. *Id.*, 23:23-25. Part of that flexibility and more effective use of frequency resources is the further recognition that services may require different frequency bandwidths between DL and UL. *Id.*, 23:25-28. In other words, if a service has different demands and requirements for bandwidth between UL and DL, then efficient implementation of that service would flexibly allocate UL and DL resources to meet those demands in a more efficient matter. Accordingly, to satisfy those demands, the '976 Patent proposes implementing carrier aggregation CA in which the number of DL CCs differs from the number of UL CCs. *Id.*, 23:28-30.

39. Applying this recognition in an innovative way, the '976 Patent discloses a system and method in which an eNB and a UE communicate with each other using a cell that includes a DL resource but not a UL resource. *Id.*, 32:40-44. This configuration eliminates the need to always reserve a UL resource in the same frequency band as the DL resource. *Id.*, 32:44-46. As a result, that UL resource can be allocated to another cell, another operation, or another system, thereby improving the use efficiency of frequency resources. *Id.*, 32:46-50; 34:12-15; 44:47-51; 45:61:64, 46:7-11; 48:64-49:2. Having reviewed the prior art cited in the Grounds of the Petition, as well as the Petition itself explaining the basis of the Grounds, it is my opinion that the cited prior art fails to recognize this improved and innovative

use of frequency allocation and likewise fails to disclose or suggest the inventive solution disclosed in the '976 Patent and recited in claim 2.

V. CLAIM-AT-ISSUE

40. The only claim being challenged by the Petition is claim 2 of the '976 Patent, which recites the following:

2. 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.

VI. OPINIONS

A. Ground 2: Petitioner's Anticipation Arguments Based On Malladi Lack Merit

41. I have reviewed Malladi and Petitioner's explanation in the Petition asserting that Malladi anticipates claim 2 of the '976 Patent. In my opinion, Malladi does not anticipate claim 2 because Malladi does not teach a non-associated cell with downlink resources only. In addition, based on the law of anticipation as has been explained to me, the Petition does not provide an explanation nor any reasoning for how or why a disclosure in its background can or should be applied to any embodiments disclosed in Malladi. Accordingly, that lack of explanation provides an additional basis for why Malladi does not anticipate claim 2.

a. Claim 2 Requires an Associated Cell With Uplink and Downlink Resources and a Non-Associated Cell with Downlink Resources Only

42. Claim 2 of the '976 Patent recites in part that in a communication terminal device performing radio communication with a base station device, wherein:

an associated cell [is] configured by the base station to include a resource for uplink and a resource for downlink ..., and

a non-associated cell [is] configured by the base station to include only another resource for downlink.

Based on claim construction principles as has been explained to me, a plain and ordinary meaning of these limitations of claim 2 means that the base station configures the associated cell to include resources for both uplink and downlink but configures the non-associated cell to include downlink resources only.

b. Petitioner Fails to Explain With Particularity Why BST 120B of Malladi Corresponds to the Claimed Non-Associated Cell

43. In contrast to the assertion of the Petitioner, there is no basis for asserting that BST 120B in Fig. 1 of Malladi (Pet. 63) purportedly corresponds to the claimed non-associated cell. Pet. 64 (“120B BST’ box is the claimed *non-associated cell*.”), 67 (“120B BST’ box is the claimed *non-associated cell* (non-serving cell.)”) (emphasis in originals); EX1023, Fig. 1, ¶¶0061-0066.

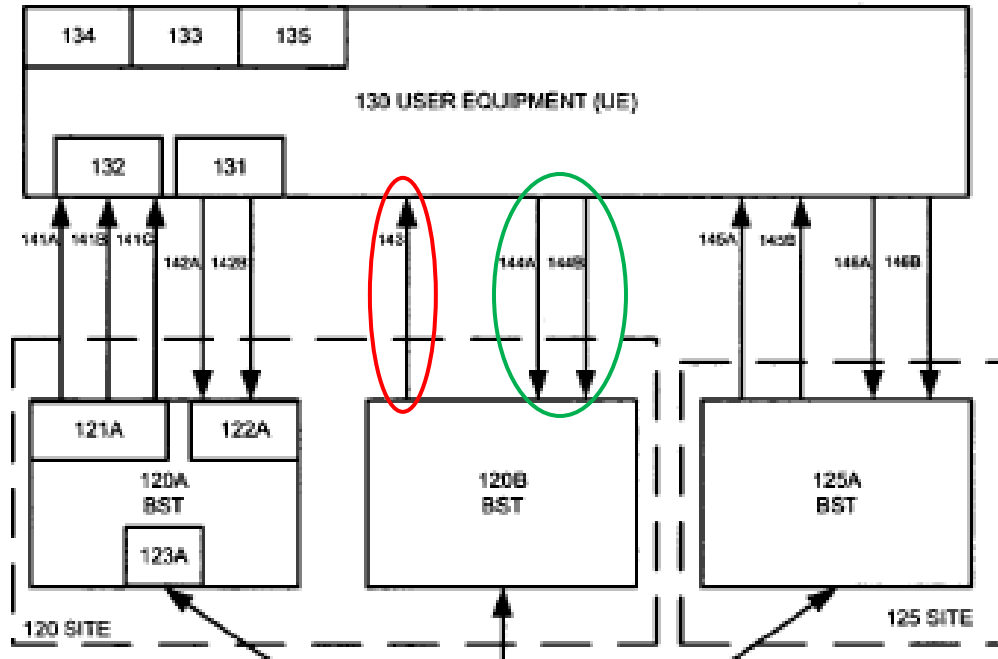
44. Petitioner also makes a false equivalence between Malladi’s “non-serving cell” and the “non-associated cell of claim 2. Petitioner asserts that Malladi’s “non-serving cell” provides the same functionality of the claimed non-associated cell and that these terms are interchangeable. Pet. 68. But at no point does Petitioner ever explain why Malladi’s non-serving cell provides the same functionality as the claimed non-associated cell. Indeed, Mr. Lanning’s declaration makes the exact same assertion as the Petitioner while likewise failing to explain why the terms are interchangeable. EX1003, ¶0163. Neither the Petition nor Mr. Lanning’s declaration provides any citation at all for the assertion that the terms are interchangeable. Accordingly, in my opinion, Petitioner has not provided sufficient

evidence why a POSITA would have considered BST 120 to be claimed non-associated cell. Moreover, as explained herein, Malladi's BST 120 is not a non-associated cell as recited in claim 2 of the '976 Patent.

c. Petitioner Fails to Explain With Particularity Why an Embodiment of Malladi Would Include an Associated Cell With Uplink and Downlink Resources and a Non-Associated Cell with Downlink Resources Only

i. Malladi Has No Embodiments Having a Cell with Only Downlink Resources Nor Does Petitioner Explain Why Malladi Would Have Such a Cell

45. Malladi has no embodiments in which a cell has downlink resources only. Despite having no such embodiment, Petitioner relies on a disclosure in Malladi's background prior art to assert that a Malladi embodiment would include a non-associated cell with downlink resources. But Petitioner provides no explanation or reasoning for why any cell of Malladi would be configured with downlink resources only. BST 120B, which Petitioner asserts is the claimed non-associated cell, cannot be the claimed non-associated cell. Fig. 1 of Malladi (excerpted and annotated below) shows that BST 120B provides UE 130 with *both* downlink resources 143 (outlined in red) *and* uplink resources 144A, 144B (outlined in green). *See also* EX1023, ¶0062.



46. To support its assertion that BST 120B provides only downlink resources to UE 130, Petitioner first contends that “[n]o *uplink resource* is allocated between the UE and the *non-associated cell*” and cites to the expert declaration at ¶¶0172-0173. Pet. 71 (emphasis in original). The cited expert declaration paragraphs are reproduced below:

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*.

EX1003, ¶¶0172-0173. Just like the Petition, Mr. Lanning’s declaration simply makes the same conclusory statement that no uplink resource is allocated between the UE and the non-associated cell without any citation to Malladi nor any reason why no uplink resource is allocated. That conclusory statement is flatly contradicted by Fig. 1 and the associated description in Malladi. As shown in Fig. 1 and described in its specification, Malladi explicitly describes ***uplink*** resources 144A, 144B between UE 130 and BST 120B. EX1023, ¶0062. Neither the Petition nor Mr. Lanning’s declaration cites any evidence to support the contention that no uplink resource is allocated between UE 130 and the BST 120B.

47. Petitioner also cites to ¶0008 in the Background of Malladi, which notes that “the number of forward link carriers may differ from the number of reverse link carriers in a multi-carrier system.” EX1023, ¶0008. That paragraph also indicates

that the number of downlink carriers N may exceed the number of uplink carriers M , the number of uplink carriers M may exceed the number of downlink carriers, or the numbers of the uplink M and downlink N carriers may be the same in a multi-carrier system. *Id.* In addition, N or M may equal 1. *Id.* Notably, ¶0008 never indicates that N or M can ever be 0.

48. Relying on this paragraph from Malladi's background, Petitioner further contends that:

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

Pet. 71. Based on this Background disclosure, Petitioner asserts that the total uplink carriers can be 1 when the total downlink carriers is 2. First of all, no such embodiment is actually disclosed by Malladi across a pair of cells or even in an

individual cell. In fact, Fig. 1 shows BST 120B has the opposite, 2 uplink carriers and only one downlink carrier. But across any pair of cells, there at least 2 uplink carriers and at least 2 downlink carriers.

49. Except for the fact that claim 2 of the '976 Patent requires 1 uplink carrier and 2 downlink carriers across the combination of associated and non-associated cells, Petitioner provides no explanation nor any evidence as to why any communication system in Malladi would have this speculative arrangement of carriers (2 DL, 1 UL) across a combination of associated and non-associated cells. What Malladi actually discloses confirms this point. Malladi has no embodiment in which any pair of cells have this speculative arrangement. Petitioner does not cite to any example in Malladi of such an arrangement, and in fact cannot because it does not exist. And not only does not such arrangement exist, but Petitioner does not provide any reason why a POSITA would configure a communication system with such an arrangement of carriers.

50. This speculative arrangement fails for additional reasons as well. Petitioner provides no explanation or evidence that connects this speculative arrangement to any embodiment of Malladi. Petitioner also does not explain or cite any evidence as to why the non-associated cell (as opposed to the associated cell) would be the cell with no uplink carrier in this speculative arrangement. Even if a communication system could have 2 downlink carriers and 1 uplink carrier as

asserted by Petitioner, neither the Petition nor Mr. Lanning's Declaration explains why the communication system would have such an arrangement of carriers. Tellingly, both the Petition and Mr. Lanning's declaration never explain why such an arrangement could or would exist across a pair of cells, as opposed to within one cell. Accordingly, for all of these reasons, it is my opinion that Petitioner has no evidence to support its contention that BST 120B corresponds to the claimed non-associated cell.

ii. Petitioner Improperly Equates Malladi's Carriers With the Claimed Resources

51. In its Petition and in Mr. Lanning's Declaration, Petitioner incorrectly equates Malladi's "carriers" with the "resources" recited in claim 2. As shown in Malladi's Fig. 1 shows that each cell (BST 120A, 120B, 125A) includes at least one uplink carrier and at least one downlink carrier. EX1023, ¶0062. In addition, each carrier 141-146 corresponds to a different frequency. *Id.* A cell includes uplink resources when it includes one or more uplink carriers, and a cell includes downlink resources when it includes one or more downlink carriers. Accordingly, as long as a cell has at least one uplink carrier and at least one downlink carrier, the cell has both uplink resources and downlink resources.

52. Having at least one uplink carrier and at least one downlink carrier in each cell as shown in Fig. 1 of Malladi, and thus each cell has both uplink and downlink resources, is also completely consistent with Malladi's ¶0008. That

paragraph indicates that a cell can include the same or different number of uplink (M) and downlink (N) carriers and that M and N can each be one. *Id.*, ¶0008. Fig. 1 shows BST 120A having three (3) downlink carriers 141A-141C and two (2) uplink carriers 142A-142B, BST 120B having one (1) downlink carrier 143 and two (2) uplink carriers 144A-144B, and BST 125A having two (2) downlink carriers 145A-145B and two (2) uplink carriers 146A-146B. Fig. 1 thus illustrates each example of carrier distribution in a cell described in Malladi's ¶0008: $N > M$ (BST 120A); $M > N$ (BST 120B); $M = N$ (BST 125A); and $M = 1$ or $N = 1$ (BST 120B).

53. While Malladi teaches that a cell can have one uplink or one downlink carrier, Malladi does not teach or suggest having a cell with no uplink carriers. Petitioner appears to suggest that its speculative arrangement of two downlink carriers and one uplink carrier applies across two cells, but that is not supported by any embodiment of Malladi or by Background ¶0008. Rather, as shown in Malladi's Fig. 1 and as described by Malladi's ¶0008, the varying arrangements of uplink and downlink carriers are in each cell, each cell has at least one uplink carrier and at least one downlink carrier, and thus each cell has both uplink and downlink resources.

iii. Petitioner Fails to Show Malladi Must be Arranged as Claimed

54. As I noted previously, one of the ways Petitioner attempts to show the claimed arrangement of uplink and downlink resources in the associated and non-associated cells is by citing to ¶0008 in Malladi's Background section. But in citing

solely to the Background in regards to differing numbers of downlink and uplink carriers, Petitioner never provided any explanation or cited any evidence why the teachings of ¶0008 as applied to any embodiment of Malladi would necessarily result in the arrangement of claim 2. That ¶0008 never teaches a cell could have 0 uplink carriers or 0 downlink carriers confirms that, even if ¶0008's teachings were applied to an embodiment of Malladi, such teachings would *not* necessarily result in an arrangement of a cell having 0 downlink resources.

55. For all of these reasons, Petitioner has failed to show sufficient evidence that Malladi anticipates claim 2 of the '976 Patent. Accordingly, Ground 2 must fail.

B. Petitioner's Obviousness Ground 3 is Also Deficient

56. Even if combinable, TS 25.319 cannot cure the deficiencies of Malladi as I have explained above. Like Malladi, TS 25.319 also fails to disclose or suggest a non-associated cell having downlink resources only as required by claim 2.

a. Malladi Fails to Disclose or Suggest a Cell With Downlink Resources Only

57. As I just explained, Malladi has no embodiment and no teaching in which a cell is configured to have downlink resources only. Every embodiment of Malladi has as at least one uplink carrier and at least one downlink carrier in each cell. *See* Malladi, ¶0008, ¶0062, Fig. 1. Malladi thus teaches that each cell has *both* uplink and downlink resources and not downlink resources only as required by claim

2 because each cell in Malladi has at least one uplink carrier and at least one downlink carrier.

b. TS 25.319 Likewise Fails to Disclose or Suggest a Cell With Downlink Resources Only

58. Just like Malladi, TS 25.319 does not include any teachings of a cell having downlink resources only. To make the assertion that TS 25.319 does provide such a teaching, it is my opinion that Petitioner plainly misinterprets the portion of TS 25.319 cited in the Petition. relies on a mistaken interpretation and understanding of a passage in TS 25.319. As properly interpreted, TS 25.319 simply teaches that each cell includes both uplink and downlink resources, just like Malladi does.

59. The only evidence Petitioner relies on in TS 25.319 focuses on the language “zero or one.” Pet. 76. But the “zero or one” language has nothing to do with the number of carriers in a cell. The relevant excerpt is as follows:

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

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

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

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

Ex. 1015 at p. 7, Section 3.1.1 (highlighting added).

Petitioner’s statement highlighted in yellow mistakenly asserts that “zero or one” refers to the number of secondary uplink carriers on the secondary cell. That assertion contradicts the language highlighted in blue regarding the definition of “Secondary Service E-DCH cell.” That language highlighted in blue clearly indicates that “zero or one” applies to the number of Serving E-DCH cells that are on the secondary uplink carrier, not to the number of secondary uplink carriers. With the proper interpretation, this excerpt of TS 25.319 teaches that the Secondary Serving E-DCH cell alone can be on the secondary uplink carrier or both the Secondary Serving E-DCH cell and the Serving E-DCH can be on the secondary uplink carrier.

60. TS 25.319's technical purpose further confirms that every cell has at least one uplink carrier and thus every cell has uplink resources. Petitioner in fact highlights that the "technical purpose of the Enhanced Uplink is to improve the performance of uplink dedicated and common (FDD and 1.28Mcps TDD only) transport channels." Pet. 75 (excerpting TS 25.319 at 9). Other portions also support that the focus of TS 25.319 is improvement of uplink performance. For example, Section 5 Requirements in TS 25.319 lists a number of enhancements and improvements in "uplink performance" provided by the "Enhanced Uplink" feature. EX1015, 10. A POSITA would thus understand that TS 25.319's focus on improving uplink performance further contradicts Petitioner's assertion of TS 25.319 teaching a cell having no uplink resources.

c. Since both Malladi and TS 25.319 Fail to Disclose or Suggest a Cell With Downlink Resources Only, the Combination Cannot Render Claim 2 Obvious

61. As I have explained above, neither Malladi nor TS 25.319 teaches a cell having downlink resources only. Since both fail to teach a cell having downlink resources only, a POSITA would have understood that the combination necessarily fails to teach it either. Accordingly, for all of the above reasons, Petitioner's Ground 3 cannot show claim 2 is unpatentable as obvious over Malladi in view of TS 25.319.

VII. CONCLUSION

62. For the foregoing reasons, based on my expertise and experience and the record of this case that I have reviewed, it is my opinion that the challenged claim is not shown to be disclosed or obvious.

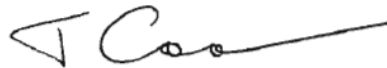
63. I understand that my opinions discussed above support a legal conclusion that the challenged claim is not anticipated and is nonobvious.

In signing this declaration, I recognize 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 also recognize that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required, I will appear for cross-examination within the United States during the time allotted.

I hereby declare that all statements made herein of my own knowledge are true and all statements made herein on information and belief were and are believed by me to be true, and that all statements herein were and are 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 and that any such willful false statements may jeopardize the validity of the application or any patents issued thereon.

Respectfully Submitted,

September 14, 2023

A handwritten signature in black ink, appearing to read 'T Cooklev', with a long horizontal stroke extending to the right.

Todor V. Cooklev, Ph.D.