

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.

Petitioner,

v.

Mitsubishi Electric Corporation,

Patent Owner.

Case IPR2023-00957
U.S. Patent No. 9,635,656

EXHIBIT 2004
DECLARATION OF TODOR COOKLEV, PH.D.

TABLE OF CONTENTS

I.	INTRODUCTION	4
II.	QUALIFICATIONS	5
III.	LEGAL STANDARDS	8
	A. Priority Date	8
	B. Level Of Ordinary Skill In The Art.....	8
	C. Claim Construction.....	9
	D. Obviousness Legal Standard.	9
IV.	OVERVIEW OF THE ‘656 PATENT	12
V.	CLAIM-AT-ISSUE	14
VI.	OPINIONS.....	15
	A. The “Scheduling Request Signal” of Claim 3 is Subject to Two Conditions from the “First Control Process” and the “Second Control Process”	15
	B. Claim 3 is Not Rendered Obvious by UMESH in View of R1-060583 as Asserted in Ground 3	16
	1. UMESH does not teach a “scheduling request signal” according to claim 1 that is transmitted before the allocation of data transmission radio resources	16
	2. R1-060583 teaches an entirely different scheduling request signal used in an entirely different way than the RR/SI signal in UMESH.....	21
	3. Given the entirely different context and use, a POSITA has no basis and would have found it impossible to use the scheduling request of R1-060583 for the RR/SI signal of UMESH	23
	4. Neither R1-060583 nor UMESH disclose or suggest stopping transmission of the “quality notification signal” if it coincides with the “scheduling request signal” transmitted when no data transmission radio resources have been allocated	25
	5. Even if combinable, R1-060583 at best teaches the process for establishing initial data transmission radio resources in UMESH	26
	C. Grounds 1 and 2: Neither UMESH in View of the Knowledge of a POSITA nor UMESH in View of TS 25.309 Renders Obvious Claim	

3 Because Neither Ground Discloses nor Suggests the “First Control Process” or the “Scheduling Request Signal” of Claim 3.....	27
D. Grounds 1-3: UMESH Fails to Disclose or Suggest the “Second Control Process” of Claim 3.....	28
1. UMESH never schedules the transmission of the RR/SI signal at the same time as the CQI signal.....	29
2. Knowledge of a POSITA in Ground 1 Cannot Cure UMESH’s Deficiencies.....	33
3. TS 25.309 in Ground 2 Cannot Cure UMESH’s Deficiencies.....	33
4. R1-060538 in Ground 3 Cannot Cure UMESH’s Deficiencies.....	33
VII. CONCLUSION.....	34

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. 9,635,656 (“the ’656 patent”) in IPR2023-00957. 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.

II. QUALIFICATIONS

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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.

11. 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.

12. 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.

13. 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.

14. 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.

15. 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.

16. 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

17. I am not a lawyer, and I do not intend to offer any opinions as to the interpretation of the law. When considering the '656 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

18. 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 '656 Patent claims priority to October 27, 2006. My opinions in this matter are from the perspective of a POSITA as of that date.

B. Level Of Ordinary Skill In The Art.

19. I understand that the Board has adopted Petitioner's proposal for the level of a person of ordinary skill in the art. As this level is consistent with my own view of the appropriate level of a person of ordinary skill in the art, I have no further opinion on it. As further discussed below, my opinions as stated in this declaration are valid and in accordance with level of ordinary skill in the art adopted by the Board.

C. Claim Construction.

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

21. 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. Obviousness Legal Standard.

22. 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.

23. 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.

24. 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.

25. 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.

26. 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.

27. 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.

28. 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 '656 PATENT

29. Having reviewed the '656 Patent, I understand that it describes a new and innovative way to resolve conflicts or collisions between the transmission of certain signals in an LTE communications system. According to the '656 Patent, a mobile terminal transmits a signal indicating either the quality of the received data or the quality of the downlink communication path to the base station via an uplink transmission when receiving data from a base station in an LTE communications system. EX1001, 2:25-30. An example of a signal providing the quality information indicating the quality of the received data or the quality of the downlink communication path, which generically can be referred to as a quality notification signal, is a Channel Quality Indicator or CQI. *Id.*, 2:30-35. Separate from sending a CQI, a mobile terminal can be configured to transmit a signal requesting allocation of uplink radio resources to the base station when the mobile terminal has data to transmit to the base station. *Id.*, 2:46-49. This type of request sent to the base station can be termed, for example, a scheduling request, an uplink resource request, or an uplink scheduling request signal. *Id.*, 2:49-52.

30. Whether sending over the same channel or over separate channels, the mobile terminal may from time to time have both a quality notification signal and a scheduling request signal to send in which their transmission would coincide, conflict, or collide. *Id.*, 5:28-36; 6:3-24. The quality notification and scheduling

request signals have no correlation among them; accordingly, conventional LTE communication systems may be configured to transmit them with multi-carrier transmission. *Id.*, 7:10-35. When transmitted at the same time, the peak to average power ratio (“PAPR”) can become high due to the high peak of the transmission signals time waveforms. *Id.*, 7:36-39. The high PAPR increases the power consumption of the mobile terminal and correspondingly narrows the cell coverage. *Id.*, 7:39-42. Moreover, when transmission of these signals coincides, it can create an interference wave that affects other mobile terminals in the conventional LTE communications system. *Id.*, 7:42-44.

31. According to the ’656 Patent, the inventive system can provide a communications system that is capable of solving these problems. *Id.*, 7:45-51. For example, in the event that the transmission of the quality notification signal (e.g., CQI) coincides with the transmission of the scheduling request signal (e.g., SR), which is sent when the mobile terminal has no data transmission radio resources, the transmission of the quality notification is stopped while transmitting the scheduling request signal. *Id.*, 16:7-21; 18:37-43. By stopping transmission of the quality notification signal while transmitting the scheduling request signal, the mobile terminal can prevent an increase in the radio resources load on the communication system and implement transmission with a correspondingly lower PAPR. *Id.*, 15:9-33; 18:44-54.

32. 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 these problems and likewise fails to disclose or suggest the inventive solution disclosed in the '656 Patent and recited in claim 3.

V. CLAIM-AT-ISSUE

33. The only claim being challenged by the Petition is claim 3 of the '656 Patent, which recites the following:

3. A mobile terminal configured to:

transmit a quality notification signal for notifying downlink communication quality to a base station, and

transmit a scheduling request signal with which to make a request for allocation of radio resources to said base station before transmitting transmission data to said base station, wherein said mobile terminal includes:

a transmitter configured to transmit said quality notification signal to said base station, and to transmit said scheduling request signal to said base station; and

a controller configured to perform a first control process that includes, when the mobile terminal has not been allocated a radio resource for transmitting said transmission data, transmitting said scheduling request signal to said base station, and a second control process that includes, when a

transmission of said quality notification signal coincides with that of said scheduling request signal in said transmitter, stopping transmitting said quality notification signal during a time interval during which said transmitter transmits said scheduling request signal.

VI. OPINIONS

A. The “Scheduling Request Signal” of Claim 3 is Subject to Two Conditions from the “First Control Process” and the “Second Control Process”

34. Based on my review of claim 3 and my understanding of claim construction as has been explained to me, the “scheduling request signal” recited at various points in claim 3 is the same “scheduling request signal” throughout the claim. Accordingly, since the “first control process” and the “second control process” both impose conditions on the transmission of the “scheduling request signal,” both of those conditions are applicable to the “scheduling request signal.”

35. The condition imposed on the “scheduling request signal” in the “first control process” is that it is transmitted when the mobile terminal has yet to be allocated any data transmission radio resources. When the mobile terminal has not been allocated data transmission radio resources, the mobile terminal is not able to send transmission data to the base station.

36. The condition imposed on the “scheduling request signal” in the “second control process” is that, when its transmission coincides with transmission

of the “quality notification signal,” transmission of the “quality notification signal” is stopped during transmission of the “scheduling request signal.” In combination, these conditions require stopping transmission of the “quality notification signal” when its transmission coincides with transmission of the “scheduling request signal” that is being transmitted when the mobile terminal has yet to be allocated any data transmission radio resources.

B. Claim 3 is Not Rendered Obvious by UMESH in View of R1-060583 as Asserted in Ground 3

1. UMESH does not teach a “scheduling request signal” according to claim 1 that is transmitted before the allocation of data transmission radio resources

37. As I explained in my original Declaration (EX2001) and as accepted by the Board in its Institution Decision, UMESH does not disclose or suggest a “scheduling request signal” transmitted to the base station “when the mobile terminal has not been allocated a radio resource for transmitting said transmission data” as recited in the “first control process.” ID at 19-20. Since the “scheduling request signal” in the “first control process” is the same one recited in the “second control process,” it necessarily follows that UMESH also fails to disclose or suggest the “scheduling request signal” in the “second control process.” In other words, even if it is accepted that UMESH stops transmission of the CQI signal when its transmission coincides with the RR/SI signal, that RR/SI signal is not the

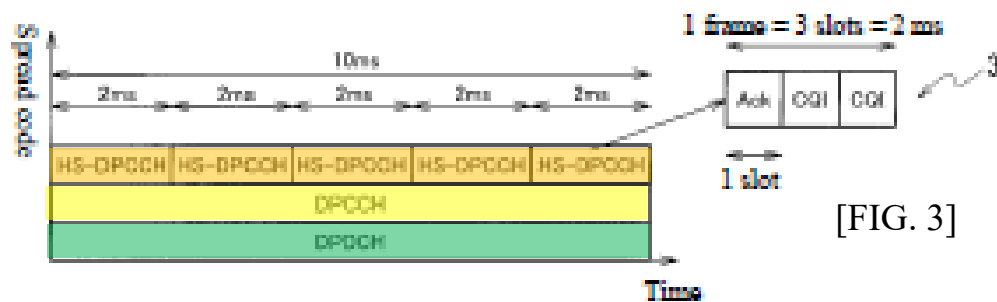
“scheduling request signal” because it is not sent when the mobile terminal has not been allocated a radio resource for transmitting transmission data.

38. As also explained in my original Declaration (EX2001), UMESH’s does not mention the RR/SI signal except in ¶0075. In that paragraph, UMESH identifies the RR/SI signal as an EULUL control signal. UMESH defines an “EULUL control signal” as “an enhanced uplink physical control signal conforming to enhanced access.” EX1010, ¶0003. UMESH confirms that the RR/SI signal is also for enhanced access, indicating that “RR and SI are information necessary in enhanced access for the base station 10 to calculate uplink radio resources to assign to the mobile station 20a.” *Id.*, ¶0075. Accordingly, in my opinion, the RR/SI signal in UMESH is necessary for establishing “enhanced access” between mobile station 20a and base station 10. The Institution Decision also agreed with my opinion that “enhanced access” is for configuring the enhanced transmission of user data using an enhanced dedicated physical data channel (E-DPDCH). ID at 20 EX1010, ¶¶0003, 0035.

39. In addition to being primarily directed to explaining how to provide “enhanced access” between a mobile terminal and a base station, UMESH points out that a primary purpose of its system for providing “enhanced access” is to avoid affecting existing physical channels. EX1010, ¶0010. UMESH also makes clear that the existing physical channels include the dedicated physical data channel

(DPDCH), such as shown in Figs. 2-5 of UMESH. And importantly, the DPDCH already provides radio resources for the transmission of transmission data from mobile station 20a to base station 10. EX1010, ¶¶0002, 0034.

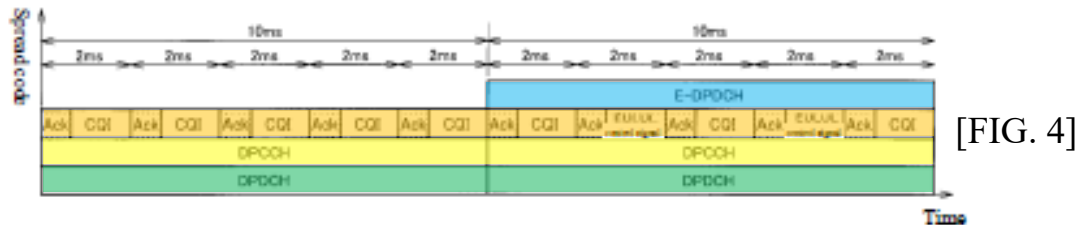
40. Based on my review of UMESH, it is clear that the E-DPDCH is established only when the DPDCH has already been established and remains present. I have annotated Fig. 3 below to show the signal channels present between the mobile station and the base station. Those channels include the DPDCH (in green), dedicated physical control channel (DPCCH) (in yellow), and high speed DPCCH (HS-DPCCH) (in orange).



[FIG. 3]

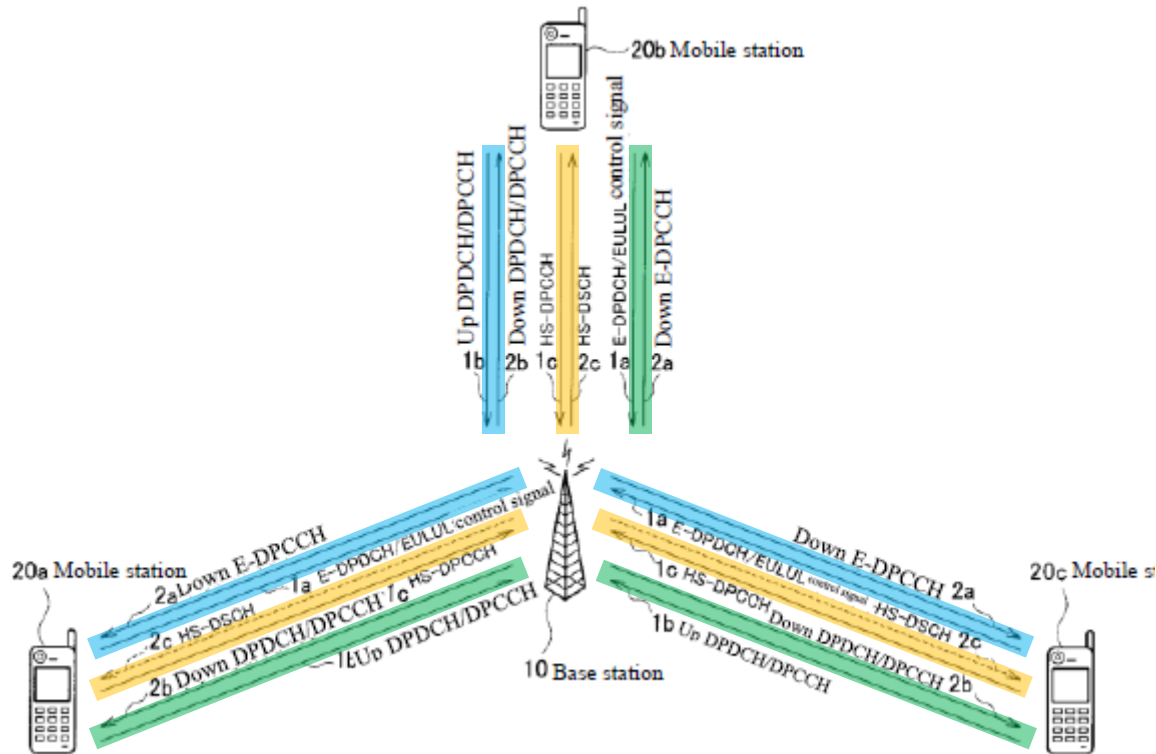
According to UMESH, “FIG. 3 illustrates a frame format and code-division multiplexing configuration of the uplink physical channels of when no E-DPDCH / EULUL control signal conforming to enhanced uplink (enhanced uplink) is transmitted.” EX1010, ¶0040. UMESH thus makes clear that the DPDCH is present when there is no E-DPDCH.

41. I have similarly annotated Fig. 4 of UMESH below. According to UMESH, Fig. 4 illustrates a transition from having no E-DPDCH to a state in which E-DPDCH is present (in blue). EX1010, ¶0045.



Importantly, not only does UMESH disclose that the mobile stations transmit signals on the DPDCH, DPCCH, HS-DPCCH, and E-DPDCH using code-division multiplexing with four different spread codes, but UMESH also discloses transmitting signals on these channels “simultaneously.” EX1010, ¶0046. Figs. 3 and 4 plainly show that UMESH teaches having the DPDCH be present regardless of whether the E-DPDCH is present.

42. In addition, based on my analysis of the entire disclosure of UMESH including its figures, I find nothing in UMESH to disclose or suggest establishing or using the E-DPDCH without the DPDCH already present. Instead, all description and figures in UMESH teach that the DPDCH is always present when the E-DPDCH is also present. I have annotated Fig. 2 below with the same color scheme. In annotated Fig. 2, each mobile station 20a, 20b, 20c includes three channels communicating on both the uplink and downlink: DPDCH 1b/2b (in green); HS-DPCCH/DSCH 1c/2c (in orange); and E-DPDCH 1a/1b (in blue).



I also note that Figs. 5, 21, and 22 show that while the DPDCH can be present without the E-DPDCH, the E-DPDCH is never established or present unless DPDCH is already present.

43. As I previously noted, the RR/SI signal is for configuring “enhanced access” to establish the E-DPDCH. But since UMESH teaches that the mobile station already has DPDCH as a radio resource for transmitting transmission data when configuring “enhanced access,” the RR/SI signal is sent when the mobile station already has data transmission radio resources. It therefore follows that the RR/SI signal cannot be the “scheduling request signal” of claim 2 because the RR/SI signal is sent when data transmission radio resources have already been allocated,

not before any data transmission resources have been allocated as required by the first and second control processes of claim 3.

2. R1-060583 teaches an entirely different scheduling request signal used in an entirely different way than the RR/SI signal in UMESH

44. Based on my review of R1-060583, it is clear that the disclosed scheduling request signal is completely different from the RR/SI signal in UMESH. R1-060583 conditions transmission of the scheduling request to request resources for uplink data transmission only when the UE does not yet have such resources. EX1012, 1. Based on this description, it is my opinion that R1-060583 is teaching that the scheduling request's only function is to obtain uplink data transmission resources for a UE (e.g., a mobile terminal) when the UE has no uplink data transmission resources.

45. By limiting the UE to transmit scheduling requests only when the UE has no uplink data transmission resources, R1-060583 consequently does not teach transmitting the scheduling request when the UE already has uplink data transmission resources. R1-060583 is thus teaching the opposite of UMESH. UMESH expressly discloses transmitting the RR/SI signal only when a UE (e.g., mobile station 20a) already has uplink data transmission resources in order to configure "enhanced access."

46. In further contrast to UMESH, R1-060583 suggests transmitting the scheduling request and the CQI (an exemplary “quality notification signal”) simultaneously without stopping one for the other.

Information	Approx. size	Simultaneous transmission										Comment
Scheduling request	1-2											
Data-associated control signaling	2-3 or 10-14											Once per TTI. See Table 1 for assumptions.
CQI	10											Transmission of one CQI may span multiple subframes.
ACK/NAK	1											Once per transmitted downlink data block.

EX1012 at 4. As shown in Table 2 above, R1-060583 explicitly teaches simultaneously transmitting the scheduling request with the CQI in two different subframes, as shown by the pair of red rectangles annotated to the table. R1-060583 thus again teaches the opposite of UMESH. At the same time, R1-060583 has no teaching that the scheduling request and CQI should not be transmitted simultaneously. It also has no teaching that the CQI should be stopped if its transmission coincides with transmission of the scheduling request.

47. The scheduling request in R1-060583 is therefore substantially different from the RR/SI signal in UMESH. R1-060583 teaches simultaneous transmission of scheduling request and CQI signals. In contrast, UMESH teaches the opposite in which the RR/SI signal and CQI signal are never simultaneously transmitted. Since the two signals are therefore transmitted in entirely different

contexts (the absence or presence of data transmission radio resources) and entirely different uses (simultaneous with versus separate transmission from the CQI), it is my opinion that the scheduling request of R1-060583 and the RR/SI signal of UMESH are entirely different from each other.

3. Given the entirely different context and use, a POSITA has no basis and would have found it impossible to use the scheduling request of R1-060583 for the RR/SI signal of UMESH

48. Given the entirely different context and use of the scheduling request of R1-060583 in comparison to the RR/SI signal of UMESH, it is my opinion that there is nothing about the scheduling request of R1-060583 that in any way clarifies how the RR/SI signal could meet the “scheduling request signal” of claim 3. This lack of clarification is illustrated by the different uses of each signal. In R1-060583, the scheduling request is exclusively used to request data transmission radio resources when the mobile terminal has no data transmission resources. In UMESH, the RR/SI signal is exclusively used to configure “enhanced access” to provide data transmission radio resources with the E-DPDCH to supplement the already existing data transmission radio resources provided by the DPDCH. Accordingly, in my opinion, a POSITA would not have found the scheduling request of R1-060583 to clarify anything about the RR/SI signal of UMESH.

49. That there is nothing clarifying is also shown by the different scheduling limitations in R1-060583 and in UMESH when transmitting scheduling

signals in the presence of a CQI signal. R1-060583 explicitly teaches the scheduling request can be transmitted at the same time as the CQI signal. In contrast, UMESH teaches the RR/SI signal cannot be transmitted at the same time as the CQI signal. This difference in scheduling also fails to support Petitioner's contention that the scheduling signal clarifies the RR/SI signal as meeting the "scheduling request signal" of claim 3. In fact, in my opinion, these differences in the signal would suggest to a POSITA that the scheduling request of R1-060583 is completely unrelated to the RR/SI signal of UMESH.

50. Given how these signals are completely different from each other, it is my opinion that a POSITA would have found it impossible to use the scheduling request signal of R1-060538 for the RR/SI signal of UMESH or vice versa. As I noted previously, UMESH says its invention "can transmit an enhanced uplink physical control signal conforming to enhanced access without affecting existing physical channels or increasing a peak-to-average ratio in transmission power of a mobile station." EX1010, ¶0031 (emphasis added), 0010, 0013, 0021, 0089, 0091, 0105. In contrast, R1-060583 describes transmitting the scheduling request in a manner that minimizes delays even "at the cost of some interference" with other uplink data transmissions or that uses orthogonal signal spreading, which increases the peak-to-average power ratio. EX1012, 2-3.

51. R1-060583's emphasis on minimizing delay at the cost of some interference when transmitting the scheduling request stands in direct opposition to what UMESH identifies as its invention. R1-060583's scheduling request transmission schemes have two impacts: affecting or interfering with transmission on existing physical channels or increasing the peak-to-average power ratio. In contrast UMESH's invention says its invention transmits the RR/SI signal "without affecting existing physical channels or increasing a peak-to-average ratio in transmission power of a mobile station." EX1012, 2-3; EX1010, ¶0010. Since the transmission schemes for the two signal have effects in direct opposition to each other, in my opinion, a POSITA would have found it impossible to substitute the scheduling request of R1-060583 for the RR/SS signal of UMESH.

4. Neither R1-060583 nor UMESH disclose or suggest stopping transmission of the "quality notification signal" if it coincides with the "scheduling request signal" transmitted when no data transmission radio resources have been allocated

52. As I explained in my original Declaration (EX2001) and explained in the Institution Decision, UMESH has no teaching of transmitting the "scheduling request signal" when no data transmission radio resources have been allocated, as required by claim 3. Even if it is accepted that UMESH stops transmission of the "quality notification signal," which I do not agree, that signal is stopped for transmission of the RR/SI signal. But the RR/SI signal is transmitted when data transmission radio resources have already been allocated, and thus cannot be the

“scheduling request signal” of claim 3, which is transmitted when *no* data transmission radio resources have been allocated.

53. The opposite situation applies to the scheduling request in R1-060583. R1-060583 teaches transmitting a scheduling request when no data transmission radio resources have been allocated. But in contrast to UMESH, R1-060583 teaches simultaneous transmission of the scheduling request and the CQI, a “quality notification signal.” R1-060583 does not stop transmission of the CQI when its transmission coincides with transmission of the scheduling request.

54. It is therefore my opinion that neither UMESH nor R1-060683 stop transmission of the CQI when there is coincident transmission of the “scheduling request signal” that is transmitted when the mobile terminal has no data transmission radio resources, as required by claim 3.

5. Even if combinable, R1-060583 at best teaches the process for establishing initial data transmission radio resources in UMESH

55. As I just explained, given their substantial difference, it is my opinion that there is no basis for using the scheduling request of R1-060583 for the RR/SI signal of UMESH. On the other hand, if a POSITA were to combine the teachings of R1-060583 with UMESH, it is my opinion that the scheduling request in R1-060583 could be used in UMESH in a manner that is consistent with the teachings of R1-060583 but that still fails to meet in claim 3. In particular, given the different

context and use of the scheduling request of R1-060583 as compared to the RR/SI signal of UMESH, at best it could suggest to a POSITA to use the scheduling request of R1-060583 to establish data transmission radio resources in UMESH when none yet exist, i.e., to establish the DPDCH.

56. Given the absence of any teaching in UMESH for establishing data transmission radio resources when none exist, and R1-0606583's express teaching of establishing such resources in that context, it is possible that a POSITA could use the process taught by R1-060583 to establish data transmission radio resources for the DPDCH in UMESH. But even in that scenario, the combination does not teach stopping transmission of the "quality notification signal" if it coincides with the "scheduling request signal" transmitted when no data transmission radio resources have been allocated. This is so because R1-060583 expressly teaches transmitting the scheduling request and the CQI signals at the same time, as shown in Table 2. Thus, in my opinion, even if combined in this manner, the combination of UMESH and R1-060583 would not meet the "scheduling request signal" of claim 3.

C. Grounds 1 and 2: Neither UMESH in View of the Knowledge of a POSITA nor UMESH in View of TS 25.309 Renders Obvious Claim 3 Because Neither Ground Discloses nor Suggests the "First Control Process" or the "Scheduling Request Signal" of Claim 3

57. I agree with the holding in the Institution Decision that "UMESH would not have taught or suggested the first control process of claim 3 **that, 'when the mobile terminal has not been allocated a radio resource for transmitting said**

transmission data, transmitting said scheduling request signal to said base station.” ID at 19-20 (emphasis in original). I have also explained in further detail above that UMESH does not teach the first control process of claim 3 because the RR/SI signal is transmitted only after data transmission radio resources have already been allocated. I also explained that UMESH does not disclose or suggest the “scheduling request signal” of claim 3. It is therefore my opinion that Ground 1 of the Petition must fail because UMESH does not teach the first control process or the “scheduling request signal” of claim 3.

58. In Ground 2, the Petition relies exclusively on UMESH to teach the first control process. Accordingly, for the same reasons, it is my opinion that Ground 2 of the Petition must fail because neither UMESH nor TS 25.309 teaches the first control process or the “scheduling request signal” of claim 3.

D. Grounds 1-3: UMESH Fails to Disclose or Suggest the “Second Control Process” of Claim 3

59. It remains my opinion that UMESH does not teach the “second control process” of claim 3. Since each Ground relies exclusively on UMESH for the “second control process,” it is therefore my opinion that each Ground does not meet the “second control process” because UMESH does not teach stopping transmission of the “quality notification signal” when its transmission is scheduled to transmit or is transmitting at the same time as the “scheduling request signal.”

1. UMESH never schedules the transmission of the RR/SI signal at the same time as the CQI signal

60. In my opinion, at no point is the RR/SI signal in UMESH scheduled to transmit at the same time as a CQI signal. Sending an EULUL control signal like the RR/SI signal in a slot where a CQI signal is normally sent does not mean that the signals were ever scheduled at the same time by a controller of the mobile terminal. UMESH's transmission process is binary: send a CQI signal in the designated slot when there is no EULUL control signal; send the EULUL control signal in the designated slot when there is a EULUL control signal. In either case, the EULUL control signal and the CQI signal are never scheduled at the same time by the controller of the mobile terminal.

(a) Since the first transmission method uses a control device independent of the mobile station to inform the mobile station and base station of a predetermined transmission schedule, no controller in the mobile station schedules transmission of the EULUL control and CQI signals at the same time

61. UMESH discloses two different transmission methods. The first transmission method relies on a predetermined transmission schedule used by mobile station 20a to send EULUL control and CQI signals is set by control device 40. EX1010, ¶¶0070-0072. Whether provided in base station 10 or radio control device 30, a setting-content notification unit 42 in control device 40 notifies mobile station 10 of the predetermined transmission schedule. *Id.*, ¶0072. The

predetermined transmission schedule is the “set timing.” *Id.* Thus, as shown in Figs. 1 and 10 of UMESH, control device 40 is separate and independent from mobile unit 10.

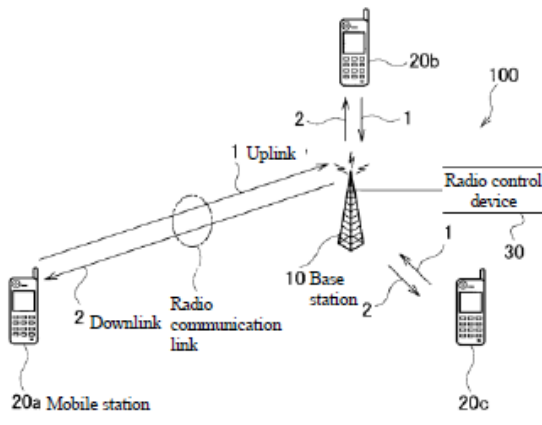


FIG. 1

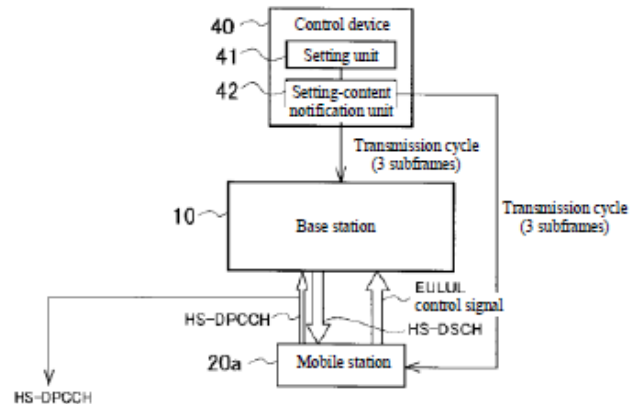


FIG. 10

62. The control device 40, which is separate and independent from the mobile station 20, sets the predetermined transmission schedule. A POSITA therefore would have understood that the mobile station 20 transmits the EULUL control and CQI signals according to the predetermined transmission schedule, but the mobile station 20 does not have a controller configured to perform the “second control process” of claim 3 because that scheduling is performed by the control device 40.

63. Since the mobile station 20 does not have the controller, it does not even matter if control device 40’s setting of the predetermined transmission schedule involves stopping transmission of the CQI signal when its transmission is scheduled at the same time as the EULUL control signal because control device 40 performs

the process, not mobile station 20. Claim 3 requires the “second control process” to be performed by the controller of the mobile station. As a results, UMESH’s first transmission process cannot meet the “second control process” of claim 3.

(b) The second transmission method in UMESH stops transmission of the quality control signal to send a notification signal before scheduling transmission of the EULUL control signal

64. UMESH’s second transmission method has a transmission notification unit 26 of mobile station 20a first notify base station 10 of an upcoming transmission of the EULUL control signal. EX1010, ¶0076. The notification enables base station 10 to identify and distinguish the EULUL control signal from among time-division multiplexed signals received by base station 10 by providing base station 10 with advanced notice of the upcoming transmission of the EULUL control signal. *Id.* To send the notification signal, mobile station 20a transmits the notification signal to base station 10 in the CQI slot in place of the CQI signal. *Id.*, ¶0077. Then, subsequent to the transmission of the notification signal, mobile station 20a schedules transmission of the EULUL control signal to base station 10 in the next subframe. *Id.*

65. UMESH’s second transmission never schedules transmission of the EULUL control signal at the same time as the CQI signal. According to the claim construction provided by the Board, in my opinion a POSITA would understand that the transmission of the two signals coincides when the two signals are actually

“scheduled” for transmission in a specific timeslot of a specific subframe. UMESH therefore does not teach this because there is no instance where the CQI and EULUL control signals are actually scheduled for transmission at the same time.

66. According to the second transmission method, UMESH teaches that mobile station 20a must first send a notification signal in place of a CQI signal before sending any EULUL control signal. The notification signal is necessary because the base station has no indication of the timing for the transmission of the EULUL control signal until receiving the notification signal. And because the base station must know this timing, it makes the notification signal a required transmission prior to the transmission of the EULUL control signal.

67. In addition, since the notification signal is a prerequisite, the EULUL control signal is not scheduled until after the notification signal is sent. The second transmission method also precludes the CQI signal from ever being sent in the slot subsequent to the notification signal. As a result, it is not possible for the EULUL control signal and the CQI signal to be scheduled to be transmitted at the same time. Instead, the EULUL control signal is transmitted in a future timeslot that has not yet been determined. Because it is not yet determined, UMESH provides no teaching that it would or could actually be scheduled at the same time as the CQI signal. UMESH’s second transmission method therefore cannot meet the “second control process” of claim 3.

2. Knowledge of a POSITA in Ground 1 Cannot Cure UMESH's Deficiencies

68. The Petition for Ground 1 does not rely on the knowledge of a POSITA in regard to the second control process in claim 3. Instead, it relies solely on UMESH. Accordingly, even if combinable, Petitioner has failed to meet its burden of demonstrating that each and every limitation of the '656 Patent claim 3 is disclosed by UMESH in view of the knowledge of a POSITA.

3. TS 25.309 in Ground 2 Cannot Cure UMESH's Deficiencies

69. To the extent Ground 2 relies on TS 25.309, Petitioner's evidence for meeting the second control process in claim 3 relies solely on UMESH and makes no reference or citation to TS 25.309. Accordingly, even if combinable, Petitioner has failed to meet its burden of demonstrating that each and every limitation of the '656 Patent claim 3 is disclosed by UMESH in view of TS 25.309.

4. R1-060538 in Ground 3 Cannot Cure UMESH's Deficiencies

70. To the extent Ground 3 relies on R1-060538, Petitioner's evidence for meeting the second control process in claim 3 relies solely on UMESH and makes no reference or citation to R1-060538. Accordingly, even if combinable, Petitioner has failed to meet its burden of demonstrating that each and every limitation of the '656 Patent claim 3 is disclosed by UMESH in view of R1-060538.

VII. CONCLUSION

71. 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.

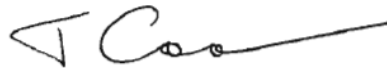
72. I understand that my opinions discussed above support a legal conclusion that the challenged claim is nonobvious.

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,

February 28, 2024

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.