

Ex. 1025

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. 9,635,656

**DECLARATION OF MARK R. LANNING
IN SUPPORT OF PETITIONERS' REPLY**

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I, Mark R. Lanning, declare as follows:

I. INTRODUCTION

1. I have been retained by the Petitioners to offer technical opinions relating to U.S. Patent No. 9,635,656 (“the ’656 Patent”) and prior art references relating to its subject matter.

2. I previously submitted a declaration in support of the Petition for this matter. That declaration (Ex. 1003) includes a discussion of my profession background and qualifications.

3. I have been asked to offer my opinions on issues that were raised in the Board’s Institution Decisions (Paper 7) and by Patent Owner Mitsubishi Electric Corporation (“Patent Owner”) in its Patent Owner Response (Paper 11). This declaration reflects the opinions I have regarding those issues.

4. I have no financial interest in the parties to this proceeding. I am being compensated for my work as an expert at my customary hourly rate of \$550 per hour, plus reasonable expenses. My compensation is not dependent on the outcome of these proceedings or the content of my opinions.

II. DOCUMENTS CONSIDERED

5. In formulating my opinions, I have considered the documents cited in my Original Declaration as well as the following:

- Institution Decision (Paper 7)
- Patent Owner's Response (Paper 11) and documents cited therein

III. ASSUMPTIONS

A. Date of Invention

6. I have been asked to use the date of the filing of the earliest application to which priority is claimed, October 27, 2006, as the date of invention for purposes of my analysis.

B. Person of Ordinary Skill in the Art

7. For purposes of my analysis, a person of ordinary skill in the art 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 or implementing cellular networks. Additional work or research experience can substitute for less or different education, and vice versa. A person of ordinary skill in the art would also have had familiarity with the 3GPP technical standards. *See* Institution Decision (Paper 7) at 7-8.

IV. RELEVANT PATENT LAW STANDARDS

8. For purposes of this declaration, I apply the same legal standards that are articulated in my Original Declaration (Ex. 1003) at ¶¶ 20-28.

V. CLAIM CONSTRUCTION

9. For purposes of my analysis, I have applied the constructions that the Board rendered for purposes of its Institution Decision, in particular, the following:

Term	Board's Construction
“quality notification signal”	No construction necessary
“when a transmission of said quality notification signal coincides with that of said scheduling request signal in said transmitter”	“when a transmission of said quality notification signal is scheduled to transmit or is transmitting at the same time as 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”	No construction necessary – not limited to stopping an active transmission, but also includes stopping a scheduled transmission

See Institution Decision (Paper 7) at 13-17.

VI. CLAIM 3 OF THE '656 PATENT IS UNPATENTABLE

A. The “scheduling request signal” of the “first control process” Is the Same as That of the “second control process”

10. I understand that Patent Owner argues that the “scheduling request signal” recited in the “first control process” and the “second control process” refer to the same signal. Response at 6. I agree. With that understanding, claim 3 of

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the '656 is unpatentable under the three Grounds at issue in this proceeding, as set forth below.

B. Ground 1: Claim 3 of the '656 Patent Is Unpatentable under 35 U.S.C. § 103 over UMESH Modified in View of the Knowledge of a POSITA

1. *UMESH Discloses the Limitation “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”*

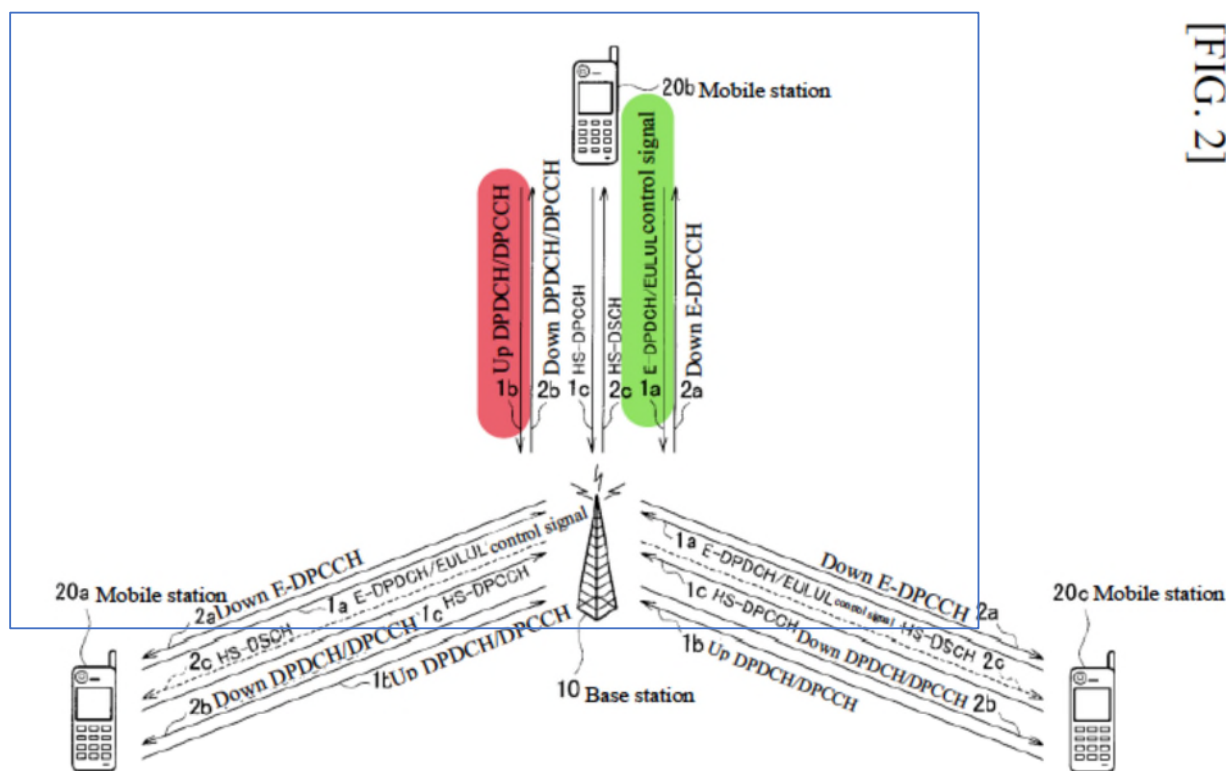
11. I understand that the Board preliminarily found that “user data is independently transmitted in a dedicated physical data channel DPDCH, and therefore the RR/SI signal is sent when the mobile terminal has already been allocated a radio resource (i.e., DPDCH) for transmitting data.” Institution Decisions (Paper 7) at 20. I disagree.

12. The DPDCH and e-DPDCH are uplink data channels that are operated independently from one another in the mobile terminal and the mobile terminal does not need to transmit data on the uplink DPDCH before it receives packet data that needs to be transmitted on e-DPDCH. Before the mobile terminal (UE) can transmit the packet data, it needs to make a resource request and receive a grant from the base station (NodeB). Therefore, the RR/SI signal is NOT sent when the mobile terminal has already been allocated a radio resource as the Patent Owner has argued. A detailed explanation is in the following paragraphs.

13. UMESH's invention is in regard to the new high speed uplink data packet functionality that was in the process of being finalized for Release 6 of the UMTS 3G cellular standard. At the time of UMESH, this functionality was called "Uplink Enhancements for Dedicated Transport Channels" (Ex. 1027 p. 9, which is the Non-Patent Literature 1 document cited by UMESH [0007]) and was later named High-Speed Uplink Packet Access (HSUPA) by the 3GPP standards group. Ex. 1026 p. 4. This functionality was added to complement the High-Speed Downlink Packet Access (HSDPA) functionality that was added in the previous release of the UMTS standard (Release 5) beginning in 2002. *Id.* pp. 4 and 61. The 3GPP UMTS standards group added additional channels in order to support the high-speed nature of the HSUPA functionality. The new physical uplink data channel is called e-DPDCH (also e-DCH) and the 3GPP ultimately named the new physical uplink control e-DPCCH. Ex. 1027 p. 10. UMESH refers to the e-DPCCH as the EULUL channel. UMESH [0003]. For completeness, UMESH includes the existing downlink and uplink data and control channels that were "already determined" in the initial 3GPP UMTS release (Rel99 in 2000) *Id.* [0002] and Ex. 1026 pp. 61-63 ("From the Release 99 DCH, the dedicated physical control channel (DPCCH) is unchanged and the need for the DPDCH depends on possible uplink services mapped to the DCH."). These uplink data

and control channels are respectively called the DPDCH (also DCH) and the DPCCH. *See e.g.*, UMESH [0002]. These “already determined” DPDCH and DPCCH uplink channels are shown on the left side of Fig. 2 below, labelled as 1b and are highlighted in Red. The new e-DPDCH and EULUL enhanced data and control channels are shown on the right side of the figure, are labelled as 1a and are highlighted in Green. Of specific relevance for this disclosure of UMESH, and described in more detail below, the uplink data and control channels labelled 1b are operated independently of the enhanced uplink data and control channels labelled 1a.

14. For all of the Grounds that use UMESH in my initial declaration, I used the independent e-DPDCH and EULUL enhanced channels labelled 1a for my analysis and continue to use them for this declaration.



[FIG. 2]

Ex. 1010 Fig. 2 (highlighting added).

15. UMESH teaches that for the uplink, the mobile station can use just the uplink E-DPDCH/EULUL control signal 1a. In particular, UMESH discloses as follows:

The mobile stations 20a to 20c and the base station 10 transmit user data by using dedicated physical channels dedicated to each mobile station. In uplink, the mobile stations 20a to 20c can transmit user data by using *at least one* among an uplink DPDCH/DPCCH 1b and an *E-DPDCH / EULUL control signal 1a*. The uplink DPDCH/DPCCH 1b, the E-DPDCH / EULUL control signal 1a, and an HS-DPCCH 1c are uplink physical channels.

Ex. 1010 at ¶ [0033] (emphasis added).

16. Therefore, UMESH teaches that this limitation can be accomplished using a system that employs only EUL enhanced access channels (1a), in which case there would be no existing DPDCH uplink channel (1b) available to the UE before the scheduling request.

17. The fact that a UMTS mobile terminal (UE) would not need to have a DPDCH or, if it was configured with a DPDCH, it would not need to send any data on the DPDCH before it needed to send data on the E-DPDCH and, therefore, the mobile terminal would need to send a scheduling request signal on the EULUL to the base station requesting an allocation of resources so it can transmit uplink data on the E-DPDCH is corroborated by a well-known book that, based on my personal experience, is a very popular reference to those of ordinary skill in the art and is contemporaneous to the '656 Patent as shown in the following passages.

The user data is carried on the enhanced dedicated physical data channel (E-DPDCH) while new control information is on the E-DPCCH, as will be covered in later sections. From the Release 99 DCH, the dedicated physical control channel (DPCCH) is unchanged and *the need for the DPDCH depends on possible uplink services mapped to the DCH.*

Ex. 1026 p. 63 (emphasis added).

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This book continues to explain the relationship between the Release 99 DCH and the E-DCH for HSUPA by describing the optional requirement for a mobile terminal having and using the DPDCH (DCH).

5.5.4 E-DCH coexistence with DCH

As described earlier, transport block processing for the E-DCH and DCH is completely different and is carried over the air interface by completely separate physical channels, too. Apart from one very important fact – that is, the shared power amplifier of the UE – simultaneous transmission of the E-DCH and DCH could be considered to be coming from two different UEs. There is only so much power the UE is capable of transmitting and if the DCH is using some of it there is less for the E-DCH.

The interaction between the DCH and the E-DCH in simultaneous transmission from the same UE is simply so that TFC selection is first done for the DCH and the power used by doing this is, of course, no longer available for the E-TFC selection process. This means that the DCH has an absolute first take right to the UE power resource, or the DCH has absolute priority over the E-DCH. The reason for this is that the E-DCH is designed for uplink packet access and, thus, if there are any circuit-switched services they must be mapped to the DCH. As circuit-switched services are not very tolerant of sudden and frequent data rate changes it makes sense to let, say, a normal AMR voice call to take the power it needs and send it with that on DCH and use whatever is left for packet data transmission on the E-DCH. The power allocation of the TFC and E-TFC selection processes of the UE is illustrated in Figure 5.20. The TFC and E-TFC selection processes are defined in [9]. It should be noted though that the maximum DCH data rate allowed by the specification is 64 kbps when configured parallel to the E-DCH.

All of this has one notable impact on radio bearer mapping. If a DCH is configured parallel to an E-DCH for a single UE, then the signalling radio bearer must also be mapped to the DCH. This is due to the fact that the signalling radio bearer is the most important bearer, and it would not be acceptable to let the power required to transmit a voice frame prevent the transmission of a signalling message – that is, the SRB may only be mapped to the E-DCH if there are no DCHs configured for the UE.

Ex. 1026 p. 84 (highlighting added).

18. I have highlighted the significant passages above but one of the key passages that supports UMESH's disclosure above is the passage highlighted in the middle that states "The reason for this is that the E-DCH is designed for uplink packet access and, thus, if there are any circuit-switched services they must be

mapped to the DCH.” In other words, the DCH is used for voice calls (circuit-switched services) and the E-DCH is used for packet data. Therefore, there are multiple scenarios where a DCH channel is either not configured in a mobile terminal or, if configured, the DCH channel would not be used before the E-DCH channel. At least two of these scenarios are:

- A mobile terminal does not have voice calling capability. This type of mobile terminal could be a computer with a UMTS modem or another similar device; and
- A mobile terminal with voice calling capability is turned on and data packet applications like email or Internet browsing are used before any voice calls are made or received.

19. In the first scenario, a DCH (DPDCH) would not be needed. In fact, three of the passages above use the word “if” when referring to the mobile terminal being configured with a DPDCH (DCH) channel. In the second scenario, the DPDCH would not be used until the user made or received a voice call after using the data packet applications.

20. For at least these reasons and the reasons in my initial declaration, a person of ordinary skill in the art would understand that, in view of the foregoing disclosures, UMESH discloses a scenario where there is no DPDCH uplink (1b) channel established when a scheduling request is sent on the EULUL (1a) to request an allocation of radio resources so the mobile terminal can send data on the E-DPDCH (1a).

21. Figure 20 of UMESH provides another example. In that embodiment, the EULUL control signal and scheduling request are sent on the control channel as the “notification signal” and no data channel is being used before the EUL enhanced data uplink is granted. UMESH describes that embodiment as follows:

For example, as illustrated in FIG. 20, when starting HS-PDCCH 1c transmission, the base station 10 and the mobile station 20a can send and receive signals while assuming that DTX transmission is performed *without transmitting anything in a time slot in which a notification signal or an EULUL control signal is not transmitted*. Accordingly, it is not necessary to develop a system according to differences in operation forms, and cost reduction can be achieved.

Ex. 1010 at ¶ [0108] (emphasis added).

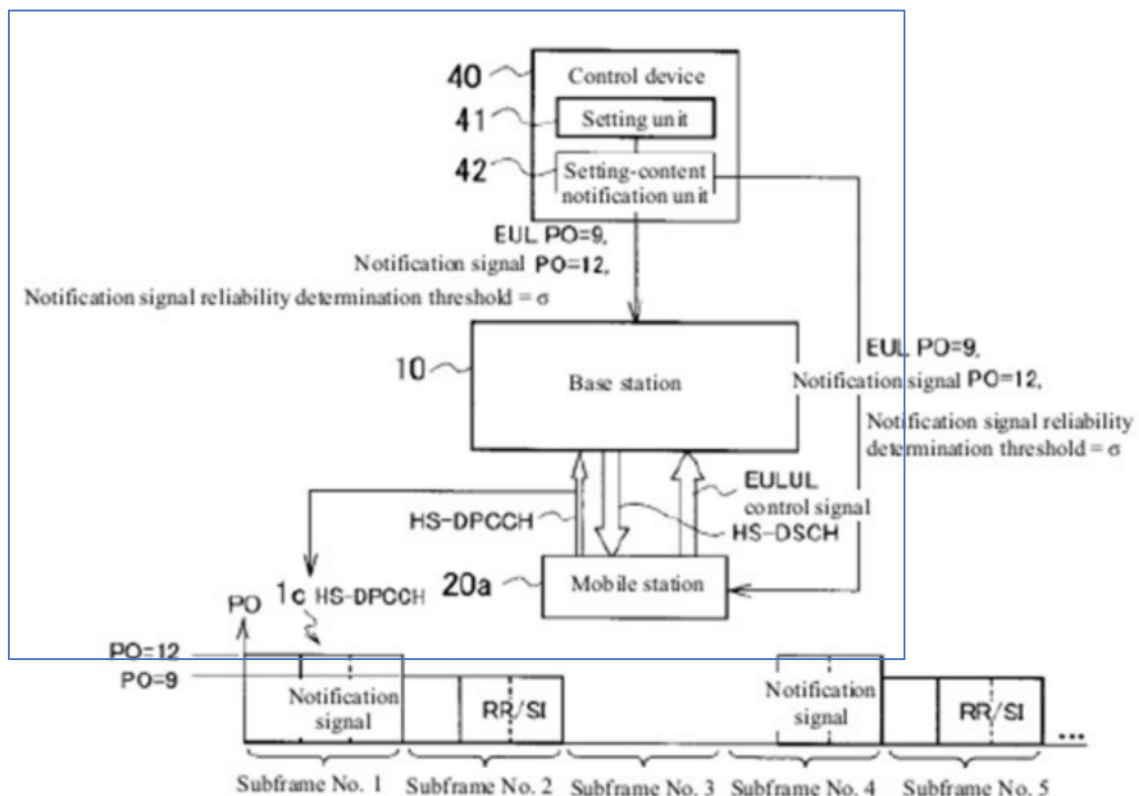
22. A person of ordinary skill in the art would have understood, that in this scenario, there is no DPDCH uplink channel established when the “notification signal” (scheduling request) is sent. In particular, a person of ordinary skill in the art would understand that UMESH is disclosing that the HS-PDCCH of the Fig. 20 embodiment is a control channel that is used to send control information; it does not carry user data. UMESH makes this explicit:

The HS-DPCCH 1c is a *dedicated physical control channel* conforming to high-speed downlink packet access (HSDPA: high-

speed downlink packet access) (high speed DPCCH). That is, HS-DPCCH is a ***high-speed uplink physical control channel*** conforming to high-speed packet access. Moreover, a high-speed uplink physical control signal is transmitted on the high-speed uplink physical control channel.

Ex. 1010 at ¶ [0036] (emphasis added).

23. Figure 20 also shows that the scheduling request “SI” is sent on the HS-PPCCH (control channel) to the base station without there being a DPDCH (data channel).



Ex. 1010, Fig. 20.

24. For the reasons set forth above and in my initial declaration, a person of ordinary skill in the art would understand that UMESH alone teaches the first control process limitation “[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.”

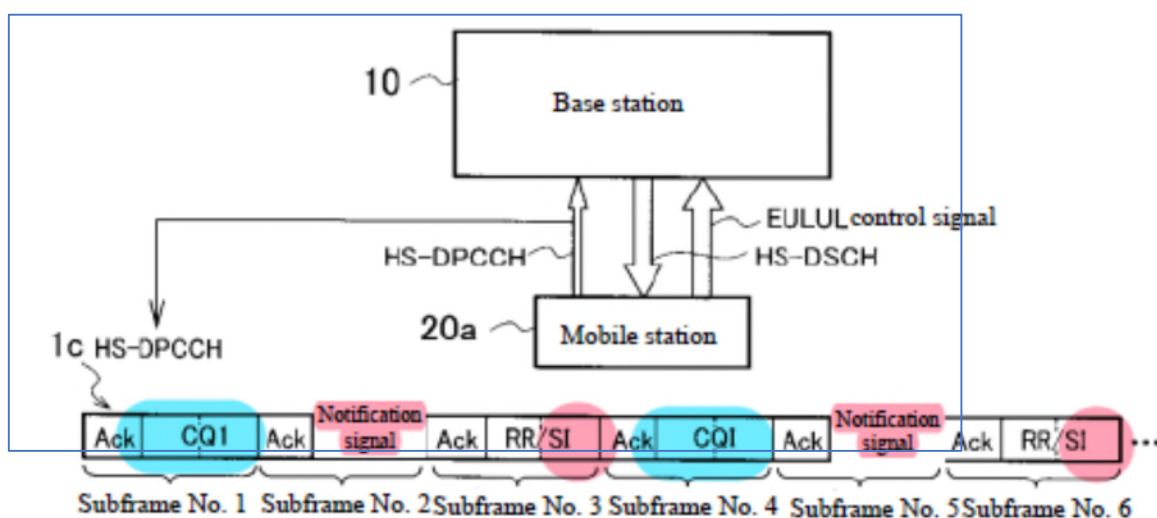
2. *UMESH Discloses the Limitation “a second control process that includes, when a transmission of said quality notification signal coincides with that of said scheduling request signal in said transmitter, stopping transmitting said quality notification signal during a time interval during which said transmitter transmits said scheduling request signal.”*

25. I described how UMESH discloses this limitation in my Original Declaration (Ex. 1003) at ¶¶ 95-101, 143.

26. I understand that Patent Owner has argued that UMESH never schedules transmission of the RR/SI signal at the same time as the CQI signal. Response at 23. I disagree.

27. With reference to Fig. 11, UMESH teaches the mobile station “**stops** CQI transmission and transmits the EULUL control signal” (consisting of an RR/SI signal). Ex. 1010, ¶ [0077] (emphasis added). I have included the same highlighted version of Fig. 11 that is in my initial declaration below. A person of ordinary skill in the art would understand that, because the CQI transmission is

stopped and the SI signal is sent, the CQI signal was scheduled to be transmitted when the scheduling request was sent. Stated differently, UMESH describes a system in which a CQI is set to be sent in a slot, the system determines that the scheduling request should be sent in its place; thus, the CQI is not sent, and the scheduling request is sent in its place.

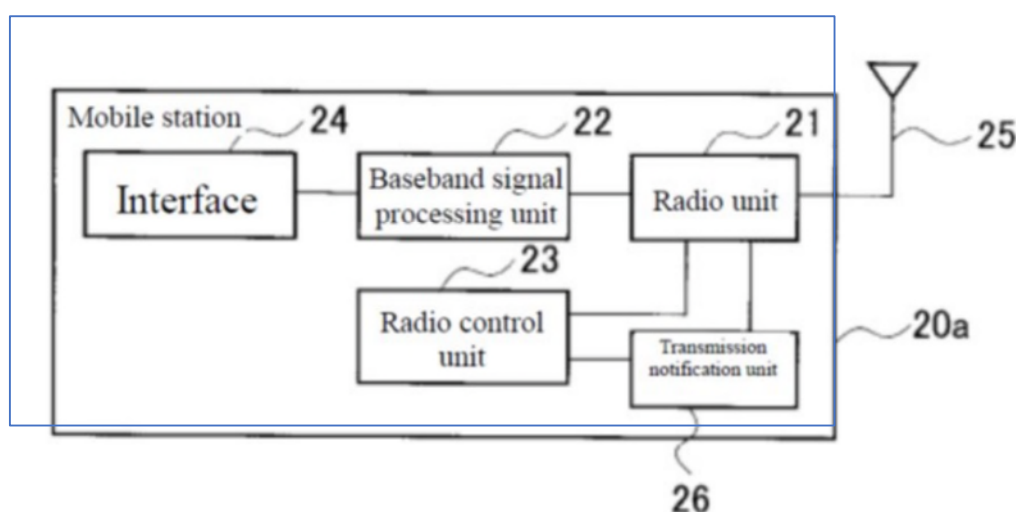


UMESH Fig. 11 (highlighting added).

28. I understand that Patent Owner argues that “the predetermined transmission schedule used by mobile station 20a to send EULUL control and CQI signals is set by control device 40” and that “[c]ontrol device 40 can be provided in base station 10 or radio control device 30, but not in mobile station 20a.” Response at 24. I disagree.

29. The claim requires only a controller that sends a scheduling request when a radio resource has not been allocated. UMESH discloses a mobile

terminal that has a transmitter for transmitting multiple control signals, including a scheduling request signal. As depicted in Figure 7, UMESH discloses a mobile station that includes a “radio control unit” 23, which is the required controller for this limitation.



Ex. 1010, Fig. 7.

30. UMESH describes this figure as follows: “As illustrated in FIG. 7, the mobile station 20a is provided with an antenna 25, a radio unit 21, a baseband signal processing unit 22, *a radio control unit 23*, an interface 24, and a transmission notification unit 26.” Ex. 1010, ¶ [0055] (emphasis added).

UMESH proceeds: “[T]he radio control unit 23 *instructs and controls* the radio unit 21 so the EULUL control signal is transmitted in the CQI slot of HS-DPCCH.” *Id.*, ¶ [0058] (emphasis added). The radio control unit 23 is a controller that sends a scheduling request when such resource has not been

provided to it and sends a scheduling request in place of the CQI. A person of ordinary skill in the art would have understood that a scheduling request is sent only when the mobile terminal does not have the required radio resources.

31. Patent Owner appears to confuse a base station that sets a schedule for when the CQI and scheduling requests are to be sent by the mobile terminal, with the actual claim limitation which requires a mobile terminal's controller to "transmit said scheduling request signal to said base station, and 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." Ex. 1001, 72:30-40. The claim is silent regarding what sets the original schedule for when the CQI should be sent, so it does not matter if this is done by the base station. UMESH discloses what the claim recites, *i.e.*, the mobile station controller determines it needs UL resources, configures a scheduling request, and sends that in place of the CQI.

32. I understand that Patent Owner argues that a notification signal—as opposed to the EULUL control signal—is sent in place of the CQI. Response at 26. I disagree.

33. UMESH teaches that a scheduling request signal coincides with a CQI and that the scheduling request is sent in place of the CQI. Specifically, UMESH discloses as follows:

[W]hen a need to transmit the EULUL control signal arises, the radio control unit 23 *sets the EULUL control signal in the CQI slot that normally sets the channel quality indicator (CQI)* and instructs the radio unit 21 to transmit a high-speed uplink physical control signal on HS-DPCCH and the EULUL control signal by time division multiplexing. That is, the radio control unit 23 instructs and controls the radio unit 21 so *the EULUL control signal is transmitted in the CQI slot* of HS-DPCCH.

Ex. 1010, ¶ [0058] (emphasis added).

3. Conclusion for UMESH Alone

34. For the reasons set forth above, a person of ordinary skill in the art would understand that, in UMESH, when the DPDCH is either not configured or it is not used before the E-DPDCH is used, the first scheduling request is transmitted on the EULUL (1a) before data can be sent on the E-DPDCH (1a). Therefore, the scheduling request is the same scheduling request in the first and second control process claim limitations of claim 1.

C. Ground 2: Claim 3 of the '656 Patent Is Unpatentable under 35 U.S.C. § 103 over UMESH Modified in View of TS 25.309

35. Ground 2 relies on the disclosure of UMESH for the first and second process requirements of claim 3 of the '656 patent. TS 25.309 is relied upon for other aspects of claim 3. Patent Owner does not advance any further arguments with respect to Ground 2 other than those that it advances for Ground 1. Response at 28. For the reasons set forth in the preceding section, Patent Owner's arguments are unavailing, and UMESH discloses the first and second process requirements. Accordingly, UMESH in view of TS 25.309 satisfies all limitations of claim 3 of the '656 patent.

D. Ground 3: Claim 3 of the '656 Patent Is Unpatentable under 35 U.S.C. § 103 over UMESH Modified in View of R1-060583

36. R1-060583 clearly teaches the first control process limitation. For example, R1-060583 teaches a control process for "E-UTRA uplink control signaling," and transmitting "scheduling requests" when the mobile terminal has not been allocated a radio resource for transmitting transmission data. I discuss this in my Original Declaration (Ex. 1003) at ¶ 172. Patent Owner has not argued that R1-060583 does not teach this limitation.

37. With respect to the second control process, as described above, UMESH teaches the second control process, as the Board correctly found. Institution Decision at 26-27.

38. Patent Owner argues that the scheduling request taught by both references is somehow different. Importantly, Patent Owner does not argue that both scheduling requests are not typical scheduling requests and that they do not request UL resources. The scheduling request from UMESH is sent in replacement of the CQI, and the scheduling request from R1-060583 is configured when there is no active UL data resources available to the UE.

39. It would have been obvious to a person of ordinary skill in the art to combine UMESH and R1-060583 in a manner that obviates claim 3 of the '656 patent. UMESH and R1-060583 both address control signals for cellular wireless networks. Further, both are focused on providing efficient control signals (signaling messages) for at least the mobile terminal functionality of sending downlink channel quality (CQI), scheduling request, and data to the base station (NodeB). Petition at 44. Both references teach alteration of transmitting the CQI for purpose of reducing overload. *Id.* UMESH also teaches the advantage that transmitting the RR/SI signal “without affecting existing physical channels or increasing a peak-to-average ratio in transmission power of a mobile station.” Ex. 1010, ¶ [0051]. Further, a person of ordinary skill in the art would readily be able to integrate UMESH’s teaching of stop transmitting CQI while scheduling request signal is transmitted into R1-060583’s alteration of CQI transmission given that

both references aim to reduce the overload. I discussed this in detail in my Original Declaration (Ex. 1003) at ¶ 180.

40. Accordingly, in addition to UMESH alone teaching the first and second control processes, the combination of UMESH and R1-060583 satisfy both limitations as well.

41. I understand that Patent Owner stated, “Both UMESH and R1-060683, therefore fail to disclose or suggest stopping transmission of the CQI when there is coincident transmission of the “scheduling request signal” in the context of no existing data transmission radio resources, as required by claim 3.” Response at 20. However, Ground 3 is based on the combination of UMESH and R1-060583, *i.e.*, the combination of the scheduling request from R1-060583 (first control process) and the scheduling request from UMESH (second control process). Accordingly, UMESH in view of R1-060583 satisfies all limitations of claim 3 of the ’656 patent.

VII. CONCLUSION

42. For the foregoing reasons, I continue to believe that claim 3 of the '656 is unpatentable in view of the prior art.

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

Executed on May 28, 2024, in Greenville, TX.


Mark R. Lanning