

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

PATENT OWNER'S RESPONSE

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TABLE OF EXHIBITS

No.	Description
2004	Declaration of Todor Cooklev
2005	Deposition Transcript of Mark Lanning

I. INTRODUCTION

Patent Owner Mitsubishi Electric Corporation (“Patent Owner” or “MELCO”) respectfully submits this Patent Owner Response to the Institution Decision (“ID”) issued on December 4, 2023, based on the Petition seeking *Inter Partes* Review (“IPR”) Petition for *Inter Partes* Review (Paper No. 1) (“the Petition”) of claim 3 (“the Challenged Claim”) of U.S. Patent No. 9,635,656 (“’656 Patent”) submitted by Petitioner TCL Communication Technology Holdings Limited, TCT Mobile International Limited, TCT Mobile, Inc., TCT Mobile (US) Inc., TCT Mobile (US) Holdings Inc. (collectively “Petitioner” or “TCL”).

All Grounds in the Petition, including Ground 3 in which the ID found a reasonable likelihood that Petitioner would prevail, fail to show that the asserted prior art discloses or suggest the “scheduling request signal” as recited in claim 3 of the ’656 Patent. According to claim 3, the “scheduling request signal” transmitted in the first control process when the mobile terminal has not been allocated a data transmission radio resource is the same “scheduling request signal” that stops transmission of the “quality notification signal” in the second control process when its transmission coincides with the “quality notification signal.” None of the asserted prior art in the Grounds, whether considered singly or in combination, discloses or suggests these dual conditions for the “scheduling request signal.” Accordingly,

none of the asserted Grounds can meet the “scheduling request signal” of claim. Claim 3 therefore remains valid over each of the asserted Grounds.

Moreover, the UMESH reference fails to disclose or suggest conditioning the stopping of the transmission of a quality notification signal “when a transmission of said quality notification signal coincides with that of said scheduling request signal in said transmitter” as recited in claim 3 of the ’656 Patent. All three Grounds in the Petition rely exclusively on the UMESH reference to meet this claimed condition. But instead of stopping transmission of the quality notification signal “when a transmission of said quality notification signal coincides with that of said scheduling request signal in said transmitter,” the UMESH reference teaches a controller separate and independent from the mobile terminal either predetermines when the quality notification signal and scheduling request signal are sent such that the transmission of these signals *never* coincides or transmits a notification signal, not a scheduling request signal, in place of the quality notification signal. As such, none of the invalidity grounds can meet the claimed condition.

Finally, Grounds 1 and 2 also fail to disclose or suggest the “first control process” of claim 3 for the reasons set forth in the Patent Owner Preliminary Response (“POPR”) and in the ID as well as the “scheduling request signal” of claim 3, as explained herein.

II. BACKGROUND

A. The '656 Patent Discloses and Claims an Innovative Solution to a Transmission Conflict in LTE Mobile Communications

The '656 Patent describes a new and innovative way to resolve conflicts or collisions between the transmission of certain signals in an LTE communications system. When receiving data from a base station in an LTE communications system, 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. EX1001, 2:25-30. The quality information indicating the quality of the received data or the quality of the downlink communication path is a quality notification signal, such as a CQI (Channel Quality Indicator). *Id.*, 2:30-35. Conversely, when the mobile terminal has data to transmit to the base station, the mobile terminal transmits a signal requesting allocation of uplink radio resources for transmission of data to the base station. *Id.*, 2:46-49. This request signal can be termed a scheduling request, an uplink resource request, or an uplink scheduling request signal. *Id.*, 2:49-52; *see also* EX2004, ¶29.

Since at times the mobile terminal can be tasked with sending the quality notification signal when the scheduling request signal also needs to be sent, it is possible their transmission would coincide. EX1001, 5:28-36; 6:3-24. Because the quality notification and scheduling request signals have no correlation among them,

conventional LTE communication systems transmit the signals with multi-carrier transmission. *Id.*, 7:10-35. But when such uncorrelated signals are transmitted at the same time, the peak to average power ratio (“PAPR”) becomes 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. In addition, the coincidental transmission of the signals creates an interference wave affecting other mobile terminals in the conventional LTE communications system. *Id.*, 7:42-44; *see also* EX2004, ¶30.

The invention of the ’656 Patent provides a communications system that is capable of solving these problems. EX1001, 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) at a time 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. The prior art cited in the Grounds of the Petition neither recognizes these problems nor

discloses or suggests the inventive solution disclosed in the '656 Patent and recited in claim 3. EX2004, ¶31.

III. LEGAL STANDARDS

Petitioner raises grounds based solely on 35 U.S.C. § 103. To prevail on obviousness under 35 U.S.C. § 103, Petitioner must demonstrate based on “record evidence” that the claimed “structural features . . . were known prior art elements.” *K/S Himpp v. Hear-Wear Techs., LLC*, 751 F.3d 1362, 1365 (Fed. Cir. 2014). “[W]hile ‘common sense’ can be invoked, even potentially to supply a limitation missing from the prior art, it must still be supported by evidence and a reasoned explanation.” *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1363 (Fed. Cir. 2016). Moreover, “[o]bviousness requires more than a mere showing that the prior art includes separate references covering each separate limitation in a claim.” *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). “Rather, obviousness requires the additional showing that a person of ordinary skill at the time of the invention would have selected and combined those prior art elements in the normal courses of research and development to yield the claimed invention.” *Id.* These additional requirements cannot be met by “conclusory statements”—“there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006); *see also KSR Int’l. Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

IV. CLAIM CONSTRUCTION

Patent Owner accepts the Board's adoption of the California case claim constructions.

V. PERSON OF ORDINARY SKILL IN THE ART

Patent Owner accepts the Board's adoption of Petitioner's proposal for the level of a person of ordinary skill in the art.

VI. RESPONSE TO PETITIONERS' ARGUMENTS

A. The "scheduling request signal" in the Context of Claim 3

1. **The "scheduling request signal" of the "first control process" and the "second control process" is the *same* "scheduling request signal"**

Based on the plain language of claim 3 of the '656 Patent and the accepted canons of claim construction, the "scheduling request signal" recited in the "first control process" and the "second control process" refer to the *same* signal. A review of claim 3 confirms this identity.

Claim 3 recites that a mobile terminal is 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**.

(Emphasis Added).

Claim 3 first introduces “a scheduling request signal” in the second “transmit” limitation, specifically that the mobile terminal is configured to “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.” The “scheduling request signal” is therefore a request for allocation of radio resources “before transmitting transmission data to said base station.”

In each subsequent reference to “scheduling request signal,” claim 3 references it as “*said* scheduling request signal,” as noted in the bolded terms in claim 3 above. By using the term “said” for each subsequent reference to “scheduling request signal” after its introduction in the second “transmit” limitation,

claim 3 makes clear that each subsequent reference is for the *same* “scheduling request signal.”

With respect to the first control process, claim 3 recites “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.” Similarly, with respect to the second control process, claim 3 recites “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**.” Accordingly, since each reference in the first and second control processes is to “**said scheduling request signal**,” the “scheduling request signal” in both processes must be the same.

2. **Because it is the same signal in both processes, the “scheduling request signal” transmitted in the “first control process” when the mobile terminal has no data transmission radio resources allocated is the same “scheduling request signal” transmitted in the “second control process” when its transmission coincides with transmission of the quality notification signal**

Because the “scheduling request signal” transmitted in the first and second processes is the same, the condition for transmitting the “scheduling request signal” in the “first control process” applies to the “scheduling request signal” transmitted

in the “second control process.” According to the “first control process” in claim 3, the controller in the mobile terminal is configured to transmit the “scheduling request signal” to the base station “when the mobile terminal has not been allocated a radio resource for transmitting said transmission data.” In other words, the mobile terminal controller in the “first control process” is conditioned to transmit the “scheduling request signal” when the mobile terminal has yet to be allocated any data transmission radio resources. EX2004, ¶¶34, 35.

According to the “second control process” in claim 3, the controller in the mobile terminal is configured to, “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.” The “second control process” therefore requires, in the event that transmission of the “quality notification signal” and “scheduling request signal” coincides, stopping transmission of the “quality notification signal” during transmission of the “scheduling request signal.” EX2004, ¶36.

But since that “scheduling request signal” is only transmitted when the mobile terminal has yet to be allocated any data transmission radio resources according to the “first control process,” the “quality notification signal” is stopped in the “second control process” when its transmission coincides with transmission of the

“scheduling request signal,” which is transmitted when the mobile terminal has yet to be allocated any data transmission radio resources. *Id.* Petitioner’s expert Mr. Lanning confirmed that the “scheduling request signal” transmitted in the “first control process” when the mobile terminal has yet to be allocated any data transmission radio resources is the same “scheduling request signal” transmitted in the “second control process” when coinciding with the “quality notification signal.” *See* EX2005, 19:22-20:7.

As explained herein, these conditions of the transmission of the “scheduling request signal” are not taught or suggested by UMESH and R1-060583, whether considered singly or in combination.

B. Even if Combinable, 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

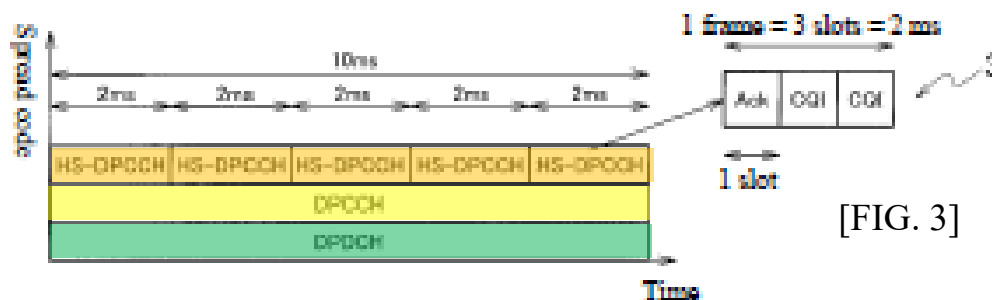
As explained in the POPR and accepted by the Board in the ID, UMESH does not disclose or suggest a “scheduling request signal” transmitted to the base station “when the mobile terminal has not been allocated a radio resource for transmitting said transmission data” as recited in the “first control process.” *See* POPR at 22-24; ID at 19-20. Moreover, because UMESH does not teach such a “scheduling request signal,” and that “scheduling request signal” is the *same one* recited in the “second

control process,” UMESH also fails to disclose or suggest the “scheduling request signal” in the “second control process.” EX2004, ¶37.

To reiterate, UMESH’s RR/SI signal, which Petitioner exclusively relies on in UMESH as being the claimed “scheduling request signal,” cannot be the “scheduling request signal” in the first and second control processes of claim 3. UMESH’s mentions the RR/SI signal solely in ¶0075, which 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 (emphasis added). Consistent with this definition, UMESH discloses 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. UMESH thus makes clear that the RR/SI signal is for establishing “enhanced access” between mobile station 20a and base station 10. EX2004, ¶38.

UMESH teaches that “enhanced access” is configured to avoid affecting *existing* physical channels, which includes the dedicated physical data channel (DPDCH) that *already* provides transmission of transmission data from mobile station 20a to base station 10. *See* EX1010, ¶0010; POPR, 23-24; EX2004, ¶39. The POPR, as acknowledged in the ID, explained that “enhanced access” is for configuring the enhanced transmission of user data using an enhanced dedicated physical data channel (E-DPDCH). *See* POPR, 23; ID at 20; EX1010, ¶¶0003, 0035.

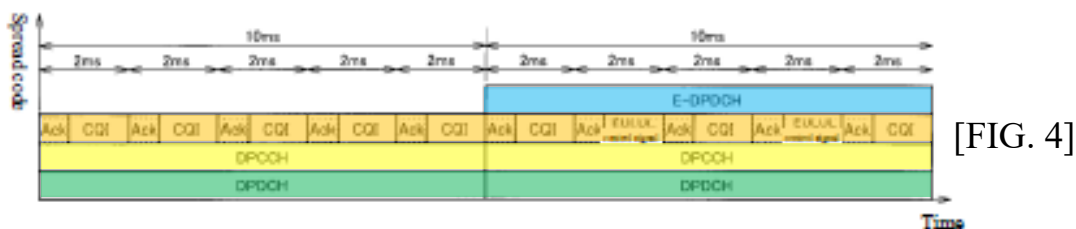
In its description and figures, UMESH further makes it clear that the E-DPDCH is established only when the DPDCH has already been established and remains present. EX2004, ¶40. In Fig. 3 of UMESH as annotated below, the signal channels present between the mobile station and the base station include the DPDCH (in green), dedicated physical control channel (DPCCH) (in yellow), and high speed DPCCH (HS-DPCCH) (in orange).



[FIG. 3]

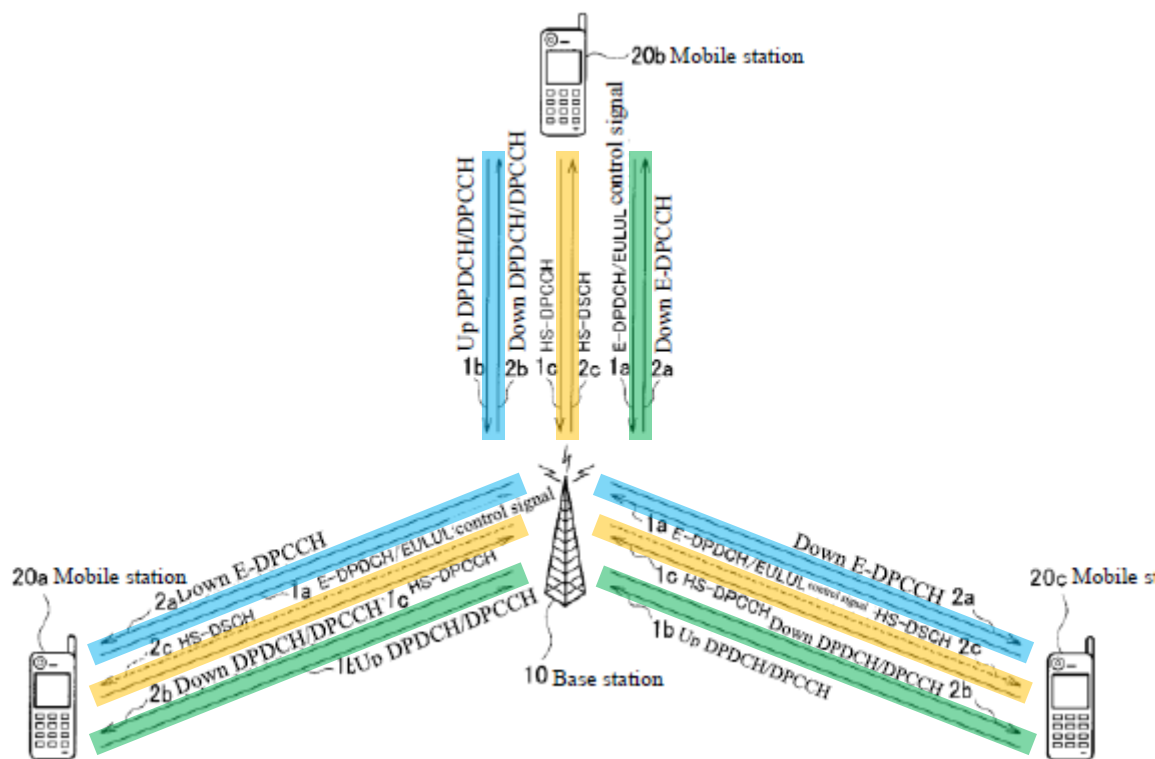
As described by UMESH, “FIG. 3 illustrates a frame format and code-division multiplexing configuration of the uplink physical channels of when no E-DPDCH / EULUL control signal conforming to enhanced uplink (enhanced uplink) is transmitted.” EX1010, ¶0040. UMESH thus makes clear that the DPDCH is present when there is no E-DPDCH. EX2004, ¶40.

Fig. 4 of UMESH, as annotated below, illustrates a time of transitioning from no E-DPDCH to a state with E-DPDCH (in blue). EX1010, ¶0045.



UMESH discloses that the mobile stations transmit signals on the DPDCH, DPCCH, HS-DPCCH, and E-DPDCH using code-division multiplexing with four different spread codes and transmit these “*simultaneously.*” EX1010, ¶0046. As shown by Figs. 3 and 4, UMESH teaches that the DPDCH is present regardless of whether the E-DPDCH is present. EX2004, ¶41.

Indeed, there is nothing in UMESH that discloses or suggests that the E-DPDCH can be established or present without the DPDCH already present. Rather, each figure and the corresponding description teaches that the DPDCH is present *without* E-DPDCH or that the E-DPDCH is established *with* DPDCH already present. EX2004, ¶42. For example, in Fig. 2 below, every 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).



And like Figs. 2-4, Figs. 5, 21, and 22 also show that while the DPDCH can be present without the E-DPDCH, the E-DPDCH is *never* established *unless* DPDCH is already present. EX2004, ¶42.

Accordingly, since the RR/SI signal is for configuring “enhanced access” to establish the E-DPDCH, and 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 cannot be a “scheduling request signal” that is transmitted *before* the allocation of data transmission radio resources as required by the first and second control processes of claim 3. EX2004, ¶43.

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

In contrast to the RR/SI signal in UMESH, the scheduling request disclosed in R1-060583 is transmitted by the UE to request resources for uplink data transmission *only* when the UE does not yet have such resources. EX1012, 1. R1-060583 thus makes clear 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 *does not yet* have such resources. EX2004, ¶44. Unsurprisingly, given the express condition R1-060583 prescribes for sending the scheduling request, R1-060583 has no disclosure or suggestion of transmitting the scheduling request when uplink data transmission resources have already been assigned. *Id.*, ¶45. UMESH, on the other hand, 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.” *Id.*

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 teaches the opposite of UMESH. EX2004, ¶46. Conversely, there is nothing in R1-060583 that discloses or suggests that the scheduling request and CQI should not be transmitted simultaneously or that the CQI should be stopped if its transmission coincides with transmission of the scheduling request. *Id.*

Moreover, Petitioner's expert Mr. Lanning expressly agrees that there is nothing in R1-060583 suggesting that the scheduling request and CQI should not be transmitted simultaneously. See EX2005, 74:10-15. Accordingly, whereas R1-060583 teaches simultaneous transmission of scheduling request and CQI signals, UMESH teaches the opposite in which the RR/SI signal and CQI signal are never simultaneously transmitted. Accordingly, both in context (the absence or presence of data transmission radio resources) and use (simultaneous with versus separate

transmission from the CQI), the scheduling request of R1-060583 and the RR/SI signal of UMESH are entirely different from each other. EX2004, ¶47.

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

The entirely different context and use of the scheduling request of R1-060583 in comparison to the RR/SI signal of UMESH contradicts Petitioner's contention that "R1-060583 clarifies that the Scheduling Information described in UMESH is the 'Scheduling Request' as in '656 Claim 3.'" Petition at 44; EX2004, ¶48. R1-060583 teaches the scheduling request is exclusively used to request data transmission radio resources when no such resources exist. In contrast, UMESH teaches the RR/SI signal is exclusively used to configure "enhanced access" that requests additional data transmission radio resources (i.e., the E-DPDCH) when such resources already exist (i.e., the DPDCH). Rather than clarifying the scheduling information in UMESH as contended by Petitioner, the different context with concomitant different purpose of the scheduling request in R1-060583 does nothing to clarify anything about the scheduling information in UMESH. EX2004, ¶48.

In addition to the different context regarding the absence or existence of data transmission radio resources when sending these signals, the differences between the scheduling request in R1-060583 and the RR/SI signal in UMESH are further

demonstrated by their different scheduling in the presence of a CQI signal. Whereas R1-060583 suggests transmitting the scheduling request at the same time as the CQI signal, UMESH teaches the opposite with the RR/SI signal being transmitted at disparate times from the CQI signal. This additional difference also fails to support Petitioner's contention that the scheduling signal somehow clarifies the RR/SI signal as meeting the "scheduling request signal" of claim 3. These differences would in fact suggest to a POSITA that the scheduling request of R1-060583 is completely unrelated to the RR/SI signal of UMESH. EX2004, ¶49.

Indeed, due to these differences, a POSITA would have found it impossible to use the scheduling request signal of R1-060538 for the RR/SI signal of UMESH. UMESH describes that 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), *see also, id.*, ¶¶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; EX2004, ¶50.

R1-060583 thus transmits the scheduling request in a manner that specifically contravenes what UMESH identifies as its invention. In particular, R1-060583's

scheduling request transmission schemes either affect (i.e., interfere with) transmission on existing physical channels or increase the peak-to-average power ratio, whereas UMESH's invention specifically purports that 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; EX2004, ¶51. With these specifically opposite physical effects, a POSITA would have found it impossible to substitute the scheduling request of R1-060583 for the RR/SS signal of UMESH. EX2004, ¶51.

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

As already explained and accepted in the ID, UMESH has no teaching of transmitting the "scheduling request signal" when no data transmission radio resources have been allocated, as required by claim 3. Accordingly, even if UMESH stops transmission of the "quality notification signal," it does so for transmission of the RR/SI signal, which is transmitted when data transmission radio resources have *already* been allocated, not when *no* data transmission radio resources have been allocated as required by claim 3. EX2004, ¶52.

While R1-060583 teaches transmitting a scheduling request when no data transmission radio resources have been allocated, it also expressly teaches

simultaneous transmission of the scheduling request and the CQI. So, instead of stopping the transmission of the CQI when there is coincident transmission scheduled, as required by claim 3, R1-060583 teaches transmitting the CQI and the scheduling request at the same time. EX2004, ¶53.

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. EX2004, ¶54.

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

Even if a POSITA were to combine the teachings of R1-060583 with UMESH, the different context and use of the scheduling request of R1-060583 as compared to the RR/SI signal of UMESH would simply suggest the manner in which a POSITA could establish data transmission radio resources in UMESH when none yet exist. R1-060583 discloses a system for sending a scheduling request to request resources for uplink data transmission, i.e., data transmission radio resources, when no such resources exist. In contrast, UMESH discloses a system for requesting “enhanced access” providing supplemental data transmission radio resources (i.e., the E-DPDCH) when data transmission radio resources (i.e., the DPDCH) already

exist. But UMESH has no teaching regarding the process for establishing data transmission radio resources for the DPDCH. EX2004, ¶55.

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, at best it may have been obvious to a POSITA to use the process taught by R1-060583 to establish data transmission radio resources for the DPDCH in UMESH. That combination, however, still fails to 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. EX2004, ¶56. As already explained, rather than stopping transmission of the CQI signal, R1-060583 expressly teaches transmitting the scheduling request and the CQI signals at the same time, as shown in Table 2. Accordingly, even if combinable, claim 3 is not rendered obvious by the combination of UMESH and R1-060583. EX2004, ¶56.

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

As acknowledged in the ID, "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). Patent Owner agrees with this finding. In addition, as explained in Section B *supra*, Patent Owner has also explained in further detail in conjunction with the testimony of Dr. Cooklev 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. In that same explanation, Patent Owner has explained in conjunction with the testimony of Dr. Cooklev that UMESH does not disclose or suggest the “scheduling request signal” of claim 3. Ground 1 of the Petition therefore fails to demonstrate a reasonable likelihood that UMESH would have taught or suggest the “first control process” or the “scheduling request signal” of claim 3. Claim 3 therefore remains patentable over UMESH in Ground 1. EX2004, ¶57.

As further acknowledged in the ID, in regard to the “first control process” of claim 3 in Ground 2, “Petitioner relies only on the disclosure of UMESH, which, as discussed above, we determine is inadequate.” ID, 25. Accordingly, Ground 2 of the Petition likewise fails to demonstrate a reasonable likelihood that UMESH and TS 25.309 would have taught or suggest the first control process or the “scheduling request signal” of claim 3. Claim 3 therefore remains patentable over UMESH and TS 25.309 in Ground 2. EX2004, ¶58.

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

Each of Grounds 1-3 fails to disclose or suggest the second control process of claim 3. In each Ground, Petitioner relies exclusively on UMESH as allegedly meeting the second control process. But as explained herein, UMESH in fact fails to disclose or suggest to a POSITA 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.”

(a) UMESH never schedules the transmission of the RR/SI signal at the same time as the CQI signal

Even adopting the Board’s construction for the second control process, UMESH still fails to meet this limitation of claim 3 because at no point is an RR/SI signal scheduled to transmit at the same time as a CQI signal. While the examples cited in the ID show an EULUL control signal (which can be an RR/SI signal) can be sent in a slot where a CQI signal is normally sent, UMESH never suggests that the EULUL control and CQI signals are ever in fact *scheduled* at the same time. Rather, UMESH simply discloses a binary system. If no EULUL control signal needs to be sent, a CQI signal is sent in the designated slot. If a EULUL control signal is to be sent, then the EULUL control signal is sent in that designated slot. But regardless of whether a EULUL control signal is to be sent, UMESH never

suggests that the EULUL control signal and CQI signal could ever have been scheduled at the same time. EX2004, ¶60.

- (i) **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**

In UMESH's first transmission method, the predetermined transmission schedule used by mobile station 20a to send EULUL control and CQI signals is set by control device 40. EX1010, ¶¶0070-0072. Control device 40 can be provided in base station 10 or radio control device 30, but not in mobile station 20a. *Id.*, ¶0072. Regardless of where it is provided, a setting-content notification unit 42 notifies mobile station 10 of the predetermined transmission schedule (i.e., the "set timing"). *Id.*; EX2004, ¶61. Thus, as shown in Figs. 1 and 10 of UMESH, control device 40 is separate and independent from mobile unit 10. EX2004, ¶61.

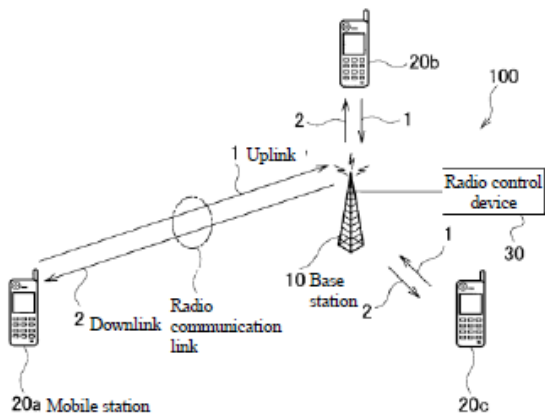


FIG. 1

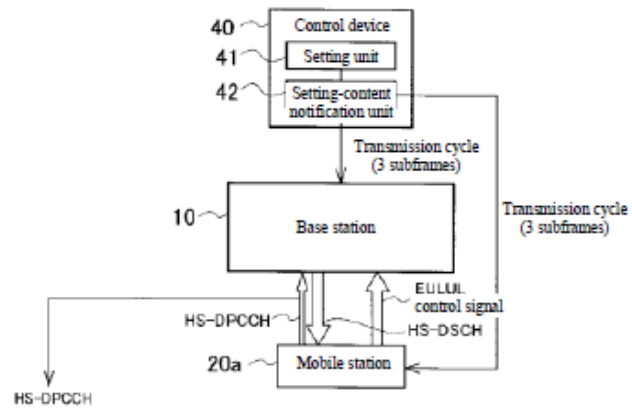


FIG. 10

Since mobile station 20 transmits the EULUL control and CQI signals according to the predetermined transmission schedule set by the separate and independent control device 40, mobile station 20 does not have a controller configured to perform the “second control process” as required by claim 3. Rather, regardless of whether 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, it is control device 40, *not* mobile station 20, that perform this process. Since claim 3 requires the “second control process” to be performed by the controller of the mobile station, UMESH’s first transmission process cannot meet the “second control process” of claim 3. EX2004, ¶62.

(ii) 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

In the second transmission method, UMESH discloses that a transmission notification unit 26 of mobile station 20a first notifies 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.*; EX2004, ¶64.

At no time in UMESH's second transmission method can the EULUL control signal be scheduled for transmission at the same time as the CQI signal. A POSITA would understand that the signals being scheduled at the same time is satisfied only when the two signals are actually "scheduled" for transmission in a specific timeslot of a specific subframe. But UMESH does not teach any instance where the CQI and

EULUL control signals are actually scheduled for transmission at the same time. EX2004, ¶65.

Before sending any EULUL control signal, UMESH teaches that mobile station 20a must first send a notification signal in place of a CQI signal. Without sending the notification signal, the base station has no indication of the timing for the transmission of the EULUL control signal, which makes the notification signal a required transmission prior to the transmission of the EULUL control signal. EX2004, ¶66.

There is no scheduled transmission of the EULUL control signal until after the notification signal is sent. And since the CQI signal can never be sent in the slot subsequent to the notification signal, it is not possible for the EULUL control signal and the CQI signal to be scheduled to be transmitted at the same time. Instead, UMESH teaches, at best, that the EULUL control signal is transmitted in a future timeslot that has not yet been determined. Because UMESH does not identify the specific timeslot when the EULUL control signal is scheduled, there is no indication that it would actually be scheduled at the same time as the CQI signal. UMESH's second transmission method therefore also fails to disclose or suggest the "second control process" of claim 3. EX2004, ¶67.

(b) Knowledge of a POSITA in Ground 1 Cannot Cure UMESH's Deficiencies

To the extent Ground 1 relies on the knowledge of a POSITA, Petitioner's evidence for meeting the "second control process" in claim 3 relies solely on UMESH and makes no reference or citation to the knowledge of a POSITA. *See* Pet. 34-36. Accordingly, even if combinable, Petitioner has failed to meet its burden of demonstrating that each and every limitation of claim 3 of the '656 Patent is disclosed by UMESH in view of the knowledge of a POSITA.

(c) TS 25.309 in Ground 2 Cannot Cure UMESH's Deficiencies

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. *See* Pet. 43. 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.

(d) R1-060538 in Ground 3 Cannot Cure UMESH's Deficiencies

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. *See* Pet. 50. 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

In view of the foregoing, Patent Owner respectfully submits that the Board should deny institution of all Grounds of the Petition.

Dated: February 28, 2024

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CERTIFICATE OF LENGTH (37 C.F.R. §§ 42.24(D))

The undersigned hereby certifies that, according to the word-processing system used to prepare the foregoing document, this document has 5837 words and thus complies with the applicable word limit.

Dated: February 28, 2024

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CERTIFICATE OF SERVICE (37 C.F.R. §§ 42.6(E), 42.105(A))

The undersigned hereby certifies that the foregoing document was served in its entirety on February 28, 2024, upon the following parties via Electronic Mail addresses jeremy.peterson@pvuslaw.com, bradford.cangro@pvuslaw.com, jacob.snodgrass@pvuslaw.com, and TCLMELCOIPRService@pvuslaw.com:

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