

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

**PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 9,635,656**

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PETITIONER’S EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 9,635,656 (“the ’656 Patent”)
1002	Excerpts of Prosecution history of U.S. Patent No. 9,635,656 (“Prosecution History”)
1003	Declaration of Mark R. Lanning
1004	C.V. of Mark R. Lanning
1005	MELCO Complaint for Case No.: 8:22-cv-1073-CJC-DFM.
1006	Stipulation Not to Assert the Same Grounds in parallel District Court Litigation
1007	Joint Claim Construction and Prehearing Statement, Case No.: 8:22-cv-1073-CJC-DFM.
1008	Plaintiffs Opening Claim Construction Brief, Case No.: 8:22-cv-1073-CJC-DFM.
1009	Defendants’ Opening Claim Construction Brief, Case No.: 8:22-cv-1073-CJC-DFM.
1010	Certified English Translation of Japanese Patent Application JP 2006-33778 (“UMESH”)
1011	3GPP TS 25.309 V6.6.0 (2006-03). FDD Enhanced Uplink; Overall description; Stage 2 (Release 6).
1012	R1-060583. A 3GPP Standard Contribution to TSG-RAN WG1 #44, Denver, CO, USA, February 13-17, 2006 (“R1-060583”).
1013	About the 3GPP webpages saved on 4/25/2021.
1014	3GPP Working Procedures webpages saved on 4/25/2021.
1015	3GPP Delegates Corner webpages saved on 4/25/2021.
1016	3GPP FAQs webpages saved on 4/25/2021.
1017	3GPP TDoc List showing Ex. 1014 LISTSERV - 3GPP_TSG_RAN_WG1 Archives - LIST.ETSI.ORG.
1018	Directory Listing showing Ex. 1012 /ftp/tsg_ran/WG1_RL1/TSGR1_44/Docs.

Exhibit No.	Description
1019	Exhibit B to Plaintiff’s Preliminary Infringement Contention
1020	3GPP TS 25.214-670 (2005-09). Physical layer procedures (FDD) (Release 6) (“TS 25.214”)
1021	3GPP TS 25.321-660 (2005-09). Medium Access Control (MAC) protocol specification (Release 6) (“TS 25.321”).
1022	Approved Report of 3GPP TSG RAN WG1 #44 meeting (R1-061099)
1023	M. Miyake, “A Survey on Progress and Standardization Trends in Wireless Communications”, <i>Journal of Communications</i> , vol. 4, no. 7, August 2009.
1024	Japanese version - Japanese Patent Application JP 2006-33778 (“UMESH”)

I. INTRODUCTION

Petitioners request *Inter Partes* Review (“IPR”) of claim 3 (the “Challenged Claim”) of U.S. Patent No. 9,635,656 (“the ’656 patent,” Ex. 1001).

The ’656 patent, entitled “Data Communication Method, Communication System and Mobile Terminal” issued on April 25, 2017, from an application filed on December 31, 2014, which claims priority to a Japanese patent application filed on October 27, 2006. Ex. 1001 at (30).

The ’656 patent invention allegedly is for a communication system “which complies with LTE” and includes at least one base station and at least one mobile terminal where the mobile terminal: (1) sends positive or negative (Ack/Nack) signal responses to the base station regarding the data packets it receives; (2) sends a downlink quality notification signal (“QNS”) to the base station; (3) sends a scheduling request (SR) signal to the base station when it has data to send; (4) sends the data to the base station after receiving permission (grant); and (5) when the transmission time of the downlink QNS coincides with the time for sending the SR signal, it stops transmitting the quality notification signal and sends the SR signal. Ex. 1003, at ¶54.

Petitioners submit multiple Grounds and references to demonstrate that the claimed invention would have been obvious to a person of ordinary skill in the art (“POSITA”) at the time of the alleged invention. Accordingly, Petitioners

respectfully request that the Board institute *inter partes* review and cancel the Challenged Claim.

II. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8

A. Real Party-in-Interest Under § 42.8(b)(1)

Petitioners identify TCL Communication Technology Holdings Limited, TCT Mobile International Limited, TCT Mobile, Inc., TCT Mobile (US) Inc., and TCT Mobile (US) Holdings Inc. (herein “Petitioners”) as the real parties-in-interest.

B. Related Matters Under § 42.8(b)(2)

As of the filing date of this petition, the ’656 patent is involved in litigation in the Central District of California, captioned *Mitsubishi Electric Corporation et al. v. TCL Communication Technology Holdings Limited et al.*, Case No. 8:22-cv-01073-GW-DFM (“Related Litigation”). Mitsubishi Electric Corporation is referred to herein as “Patent Owner” or “PO.” Petitioners are not aware of any other judicial or administrative matter involving the ’656 patent.

The Complaint of the aforementioned action was served on TCL Communication Technology Holdings Limited and TCT Mobile International Limited on June 8, 2022, it was served on TCT Mobile, Inc., TCT Mobile (US) Inc., and TCT Mobile (US) Holdings Inc. on June 2, 2022

C. Lead and Back-Up Counsel Under § 42.8(b)(3) & (4)

Petitioners provide the following designation of counsel:

Lead Counsel: Jeremy D. Peterson (Reg. No. 52,115)

Backup Counsel: Bradford A. Cangro (Reg. No. 58,478)

D. Service Information

Pursuant to 37 C.F.R. § 42.8(b)(4), Postal mailings and hand-deliveries should be addressed to:

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III. THE BOARD SHOULD NOT EXERCISE ITS DISCRETION TO DENY INSTITUTION

A. 35 U.S.C. § 314(a)

The Board should institute review of the Challenged Claims because “there is a reasonable likelihood that the petitioner [will] prevail with respect to at least 1 of the claims challenged in the petition,” as set forth in Section VII. 35 U.S.C. § 314(a).

Further, Petitioners have stipulated that if the IPR of the '656 Patent is instituted, it will not assert invalidity in the parallel district court proceedings based on grounds that were raised or reasonably could have been raised in the instituted IPRs. Ex. 1006. Thus, *Fintiv*¹ provides no basis for a discretionary denials in this petition. Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation (June 21, 2022) (stating that the “PTAB will not discretionarily deny institution in view of parallel district court litigation where a petitioner presents” such a stipulation).

Besides, the petition presents compelling evidence of unpatentability, which is another basis against a discretionary denial under *Fintiv* regarding this petition. *Id.* (stating that “the PTAB will not rely on the *Fintiv* factors to discretionarily deny institution in view of parallel district court litigation where a petition presents compelling evidence of unpatentability”)

B. 35 U.S.C. § 325(d)

The Board should not deny institution under 35 U.S.C. § 325(d) because none of JP 2006033778A, 3GPP TS 25.309 version 6.6.0 Release 6 (2006-03), and R1-060583, were cited during prosecution of the Ex. 1001, and there is no evidence that the Examiner considered these references. Discretionary denial under 35 U.S.C.

¹ *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential)

§ 325(d) is therefore not appropriate. *Advanced bionics, LLV v. MED-EL Elektromedizinische Gerate GmbH*, IPR2019-01469, Paper 6 at 8-9 (P.T.A.B. Feb. 13, 2020) (precedential).

IV. THE '656 PATENT

A. Summary of the '656 Patent

The '656 Patent relates to data transmissions within the “Long Term Evolution” (LTE) communication system. Ex.1001 at 1:19-23. Ex. 1003 at ¶ 54. LTE communication was a well-developed technology long before the Oct. 27, 2006 priority date. *See id.*, Ex. 1003 at ¶¶86-118. By that time, the LTE standard was well-along its development by the 3rd Generation Partnership Project (3GPP). Ex. 1003 at ¶¶35-36. Specifically, the 3GPP initiated study on LTE in 2004. Ex. 1023 at p. 513.

In an LTE communication system, a base station which communicates with a mobile terminal UE (User Equipment) is called eNB (E-UTRAN NodeB, eNodeB, or eNode-B), a base station control apparatus (Radio Network Controller) which performs exchange of control data and user data with a plurality of base stations is called an aGW (Access Gateway). Ex. 1001 at 2:5-11.

An LTE communication system provides the following type of communication services, (1) point-to-multipoint, i.e., multicast service, when transmitting data signal(s) from a base station to multiple mobile terminals, (2)

point-to-point, i.e., unicast service, when transmitting data signal(s) from a mobile terminal to a base station. Ex.1001 at 2:12-18.

When receiving data, via a downlink, from a base station, a mobile terminal transmits a signal indicating whether the mobile terminal has received the data perfectly, and 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. Ex.1001 at 2:25-35.

- An Ack/Nack is a signal with which, when the mobile terminal has received downlink data, the mobile terminal notifies information indicating whether the mobile terminal could receive the downlink data correctly to the base station, and the base station uses the Ack/Nack for retransmission control. Ex.1001 at 2:36-41. Ex. 1003 at ¶55.
- A CQI is a signal with which the mobile terminal notifies the downlink channel's state (the communication path's state) which the mobile terminal has measured to the base station, and the base station uses the CQI for downlink scheduling. Ex.1001 at 2:42-46. Ex. 1003 at ¶56.

Furthermore, when the mobile terminal desires to transmit data to the base station, prior to transmitting the data, the mobile terminal transmits a signal with which to make a request for allocation of uplink radio resources to the base station. Such a request signal is called a scheduling request, an uplink resource request, or

an uplink scheduling request signal (SR: Scheduling Request). Ex.1001 at 2:46-52.
Ex. 1003 at ¶57.

The '656 patent admits that the vast majority of the asserted claim limitations were already known in the art. For example, the '656 patent describes the prior art data transmission between mobile terminal and base station, where (1) the Ack/Nack signal, (2) the CQI and (3) the scheduling request, are control signals for data transmission between mobile terminal and base station. *See e.g.*, Ex.1001 at 4:37-50; 6:34-37; 43:4-8. Ex.1003 at ¶¶60, 124, 132.

The '656 patent further admits that prior art discloses a mobile terminal transmitting an uplink Ack/Nack and an uplink CQI by using an Ack/Nack exclusive channel, and the same mobile terminal transmitting an uplink scheduling request signal (SR) by using an S-RACH (Synchronous Random Access Channel) or a scheduled channel, or a CQICH (Channel Quality Indicator Channel) and an ACHCH. *See e.g.*, Ex.1001 at 4:37-50; 7:25-32; 43:4-8. Ex. 1003 at ¶¶ 124, 132.

The '656 Patent's object is to prevent increasing in the radio resources load due to temporary increase in the physical channel caused by transmitting simultaneously, an Ack/Nack and a CQI, and a scheduling request signal (SR). *See e.g.*, Ex.1001 at 7:32-38.

The '656 patent describes that the invention achieves its object by avoiding transmitting the scheduling request signal at the same time as the CQI. *See e.g.*,

Ex.1001 at 7:45-51. The '656 Patent incorrectly claims that the Applicant was the first to devise such an apparatus. As explained below, the claimed invention was obvious in view of the prior art.

B. Summary of the Prosecution History of the '656 Patent

Applicant filed a preliminary amendment on January 2, 2015, canceling existing claim 1 and adding new claims 2-4. Ex. 1002 at pp. 6-7. (January 2, 2015, Claims). Ex. 1003 at ¶72.

The Examiner rejected claims 2-4 under §102(e) by Ihm et al. (US 7,873,023), rejected claims 2-4 under §103(a) over Ihm in view of R2-061464, and rejected claims 2-4 under §103(a) over Ihm in view of R1-060111. *Id.* at pp. 9-26. (November 4, 2015, Non-Final Rejection). In response, the applicant argued that Ihm is silent regarding any control processor or controller that **stops** a quality notification process that transmits the quality notification signal when the mobile terminal transmits the scheduling request signal. *Id.* at pp. 32-33. In addition, R2-061464, like Ihm, merely suggests that a “bit indicator” may be provided as a signal from the mobile device to the base station device, and thus fails to disclose that the transmission of a “bit indicator” should cause a process that transmits a quality notification signal to be *stopped*. *Id.* at pp. 33-34. Further, R1-060111 describes that the scheduling request process of the mobile station may wait until a concurrent transmission is completed before sending the scheduling request but fails to teach or suggest **stopping** a process

that transmits a quality notification signal to a base station. *Id.* at p. 35. Ex. 1003 at ¶73.

The Examiner issued a Final Rejection under §103(a) over Ihm in view of Baker et al. (US 2007/0054689 A1). *Id.* at pp. 37-48. (March 31, 2016, Final Rejection). In response, the Applicant asserted that the cited references do not disclose the claimed feature of “scheduling request signal,” because Baker’s “another signal” means the signal “to enable the mobile station to make measurements on other channels in preparation for handover to another system,” but not “TPC commands” evidently. *Id.* at 49-53. Ex. 1003 at ¶74.

The Examiner disagreed with the applicant regarding Baker reference, and in an Advisory Action dated July 12, 2016, maintained the position that the Baker reference was cited as teaching certain features that related to stopping a quality notification process when it coincides with another signal transmission process, not the specific term of “scheduling request signal.” *Id.* at pp. 54-56. (July 12, 2016, Advisory Action). In response, the Applicant amended claim 4 to recite “a controller configured to perform a first control process that includes, when there is no radio resource available for transmitting said transmission data, enabling said transmitter to transmit 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,” and amended claims 2-3 similarly, and argued that the cited references do not disclose this feature. *Id.* at pp. 60-62. (July 28, 2016, Claims). Ex. 1003 at ¶75.

The Examiner again rejected the claims, this time adding a new reference Varma (US 2014/0177444 A1). That is, claim 2-4 are rejected under §103(a) over Ihm in view of Baker, and Varma. *Id.* at pp. 68-85. (August 31, 2016, Non-Final Rejection). In response, the applicant amended claim 4 to recite “a controller configured to perform a first control process that includes, when there is no the mobile terminal has not been allocated a radio resource available for transmitting said transmission data, enabling said transmitter to transmit 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,” and amended claims 2-3 similarly. *Id.* at pp. 87-89. (November 30, 2016, Claims). On December 16, 2016, the Examiner issued a Notice of Allowance. *Id.* at pp. 96-100. (December 16, 2016 Notice of Allowance and Fees Due). Ex. 1003 at ¶76.

C. Level of Ordinary Skill in the Art

A POSITA at the time of the alleged invention of the '656 Patent would have had 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. Ex. 1003 at ¶¶29-34.

V. REQUIREMENTS FOR *INTER PARTES* REVIEW UNDER 37 C.F.R. § 42.104 AND § 42.108

A. Grounds for Standing

Pursuant to 37 C.F.R. § 42.104(a), Petitioners certify that the '656 patent is available for IPR and Petitioners are not barred or estopped from requesting IPR challenging the claims of the '656 patent under 37 C.F.R. § 42.101.

B. Claims for Which Review Is Requested

Petitioners request IPR of claim 3 of the '656 patent.

C. Overview of Challenge and Relief Requested

Pursuant to Rules 42.22(a)(1) and 42.104(b)(1)-(2), Petitioners request cancellation of claim 3 of the '656 Patent under 35 U.S.C. §103 on the following grounds:

Ground	Claim	Basis for Ground	Exhibit
1	3	Rendered obvious under § 103 by JP 2006033778A (UMESH)	Ex. 1010,
2	3	Rendered obvious under § 103 by UMESH in view of 3GPP TS 25.309 version 6.6.0 Release 6 (2006-03)	Ex. 1010 Ex. 1011
3	3	Rendered obvious under § 103 by R1-060583 in view of UMESH	Ex. 1010 Ex. 1012

This Petition, supported by the Declaration of Mr. Lanning (Ex. 1003), demonstrates a reasonable likelihood that Petitioners will prevail in obtaining cancellation of at least one challenged claim. 35 U.S.C. §314(a).

D. Claim Construction Under 37 C.F.R. § 42.104(b)(3)

A claim challenged in an IPR is construed “in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. §42.100(b).

Patent owner asserts claim 3 in litigation, and the parties submitted Joint Claim Construction and Prehearing Statement on March 23 2023. On May 4, 2023, the parties filed opening claim construction briefs. On June 1, 2023, the parties filed responsive claim construction briefs. The District Court is yet to issue a ruling on the parties’ claim constructions.

For claim terms expressly construed below, as the patentee is free to provide any definition for a claim term, regardless of its plain and ordinary meaning, the terms thus should be understood as most naturally aligns with the patent's description of the invention in the specification. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (the specification is dispositive as the patentee may act as his own lexicographer).

For all claim terms not expressly construed below, Petitioners applies the ordinary and customary meaning of the claim term as understood by a person of ordinary skill in the art ("POSITA"). *See Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576 (Fed. Cir. 1996).

1. **"Quality notification signal"**

In the Related Litigation, Patent Owner and Petitioners disputed construction of the term "quality notification signal." Patent Owner's position was that "no construction is necessary" whereas Petitioner's position was that the term should be construed as the "Channel Quality Indication (CQI) signal."

Petitioners' position in this Petition, which the PTAB should adopt, is consistent with its position in the Related Litigation, i.e., "Quality notification signal" should be construed as "Channel Quality Indication (CQI) signal."

On the contrary, Patent owner's position that "no construction is necessary", is problematic, at least because in the district court action, the parties' interpretations

of the term “quality notification signal” differ. *See Eon Corp. IP Holdings LLC v. Silver Spring Network, Inc.* 815 F.3d 1314, 1320 (Fed.Cir.2016) (a determination that a particular term needs no construction may be inadequate when a term has more than one meaning). Here, the petitioners’ position is that the term “quality notification signal” means “Channel Quality Indication (CQI) signal”, whereas the patent owner, in their infringement contentions, appeared to assert that this term means either one of “channel quality indication (CQI),” “precoding matrix indicator (PMI),” or “rank indication (RI).” *See, e.g.,* Ex. 1019 at 3 (“A UE shall transmit periodic CQI/PMI, or RI reporting”).

Intrinsic evidence support the petitioners’ construction. Claim 3 recites that “a quality notification signal” is “for notifying downlink communication quality to the base station.” Furthermore, the Specification’s references to the term are consistent with the Petitioners’ proposed construction. *See e.g.,* Ex. 1001, 2:25-35 (“the quality information indicating the quality of the received data or the quality of the downlink communication path is referred to as a CQI (Channel Quality Indicator)”); and 2:42-46 (“A CQI is a signal with which the mobile terminal notifies the downlink channel’s state (the communication path’s state) which the mobile terminal has measured to the base station, and the base station uses the CQI for downlink scheduling.”).

By contrast, the ‘656 patent does not disclose or even mention any “precoding matrix indicator (PMI)” or “rank indication (RI)”, nor does it associate any signal other than the CQI with notifying the quality of downlink communication. Thus, to the extent the Patent Owner argue the term “quality notification signal” would encompass any signal other than the CQI signal, such argument must be rejected as unsupported by the specification and as improperly broadening the scope of the term.

2. “When a transmission of said quality notification signal coincides with that of said scheduling request signal in said transmitter”

The Petitioners’ position here is consistent with that taken in the related litigation, i.e., “When a transmission of said quality notification signal coincides with that of said scheduling request signal in said transmitter” should be construed as “when said [quality notification signal] is transmitted by the transmitter simultaneously with the transmission of the scheduling request signal.” The Patent Owner, in the Related Litigation, proposed construction of such term to be “No construction necessary”.

The PTAB should adopt the Petitioners’ construction for the following reasons.

The Specification supports construing the term “coincides with” as “simultaneously with”. *See e.g.*, Ex. 1001, 16:7-21 (“at the same time when the mobile terminal UE1 transmits the uplink scheduling request signal SR by using the

S-RACH, the mobile terminal, in ST605, stops the transmission of a predetermined Ack/Nack symbol (or LB) of the uplink Ack/Nack exclusive channel or a CQI symbol (or LB), which the mobile terminal was originally scheduled to transmit at the same timing”) (emphasis added).

In fact, the specification uses the term “simultaneously” to describe the transmission of the CQI and scheduling request signals: “[T]here can be considered a case in which the transmission of the CQI using an Ack/Nack exclusive channel and an uplink scheduling request signal SR occur *simultaneously*.” See *e.g.*, Ex. 1001, 18:23-26 (emphasis added).

3. “stopping transmitting said quality notification signal during a time interval during which said transmitter transmits said scheduling request signal”

The Petitioners’ position, as in the Related Litigation, is that “Stopping transmitting said quality notification signal during a time interval during which said transmitter transmits said scheduling request signal” should be construed as “stopping the transmission of said [quality notification signal] during a time interval when the transmitter is also transmitting said scheduling request signal.” Whereas the Patent Owner, in the Related Litigation, proposed construction of such term to be “No construction necessary”.

The PTAB should adopt the petitioners’ position.

The Specification's references to the term are consistent with Petitioner's proposed construction. *See e.g.*, Ex. 1001, 16:7-21("at the same time when the mobile terminal UE1 transmits the uplink scheduling request signal SR by using the S-RACH, the mobile terminal, in ST605, stops the transmission of a predetermined Ack/Nack symbol (or LB) of the uplink Ack/Nack exclusive channel or a CQI symbol (or LB), which the mobile terminal was originally scheduled to transmit at the same timing, and suspends the transmission while the mobile terminal transmits the uplink scheduling request signal SR (symbol DTX or DTX of LB)."); 18:37-54 ("in a case in which a mobile terminal transmits an uplink scheduling request signal SR by using an S-RACH while transmitting an Ack/Nack signal and/or a CQI signal by using an Ack/Nack exclusive channel, the mobile terminal stops the transmission of the Ack/Nack signal and/or the CQI signal while transmitting the uplink scheduling request signal SR."); 21:43-53 ("the transmission stop time interval during which transmission of an Ack/Nack symbol and/or a CQI symbol in the Ack/Nack exclusive channel is stopped during the transmission of the uplink scheduling request signal SR also becomes short.")

E. How the Construed Claims Are Unpatentable

Pursuant to 37 C.F.R. § 42.104(b)(4), Petitioners provide an explanation of how the construed claims of the '656 patent are unpatentable under the statutory grounds identified above in Section VII, *infra*.

F. Supporting Evidence

Pursuant to 37 C.F.R. § 42.104(b)(5), Petitioners identify the exhibit numbers of the supporting evidence relied upon to support the challenges in Section VII, *infra*, and in Petitioners' Exhibits List, *supra*.

VI. THE PRIOR ART

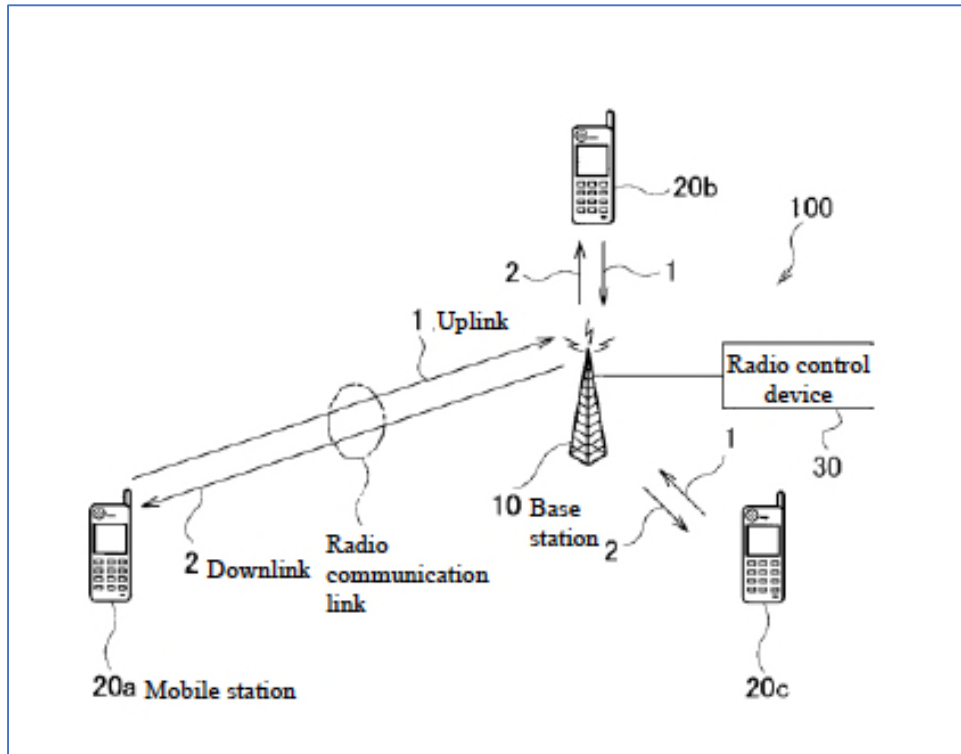
The earliest application to which the '656 patent purports to claim priority is JP2006-292641, filed on Oct. 27, 2006. The critical date of the '656 patent is therefore, at the earliest, Oct. 27, 2006. Each of the references relied on in this Petition, are prior art under at least pre-AIA 35 U.S.C. §102(a).

A. Published Japanese Patent Application JP 2006-33778 – UMESH et al. (Ex. 1010)

UMESH et al. ("UMESH") is a Japanese patent application that was published on February 2, 2006. It claims a priority to JP P2004-180238 filed in Japan on June 17, 2004. Ex. 1024 is an original version of this published application. Ex. 1010 is a certified English translation of this published application, which is prior art against the '656 patent under pre-AIA 35 U.S.C. §102(a). Ex. 1003 at ¶86.

UMESH is entitled "Mobile Station, Base Station, Control Device, Mobile Communication System, and Mobile Communication Method." Ex. 1010 at 1. UMESH states that "[t]he present invention relates to a mobile station, a base station, a control device, a mobile communication system, and a mobile communication method." *Id.* at [0001]. UMESH discloses a mobile station (*mobile terminal*) 20a in

a mobile communication system 100 that includes a *base station* 10 and a radio control device 30, a downlink 2, and an uplink 1. Id. at [0032] and FIG. 1. Ex. 1003 at ¶87.



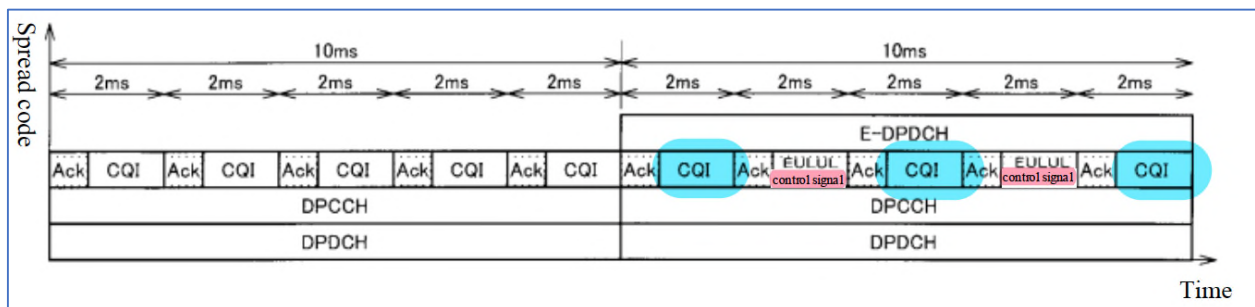
Ex. 1010 at Fig. 1

As shown in FIG. 1, the mobile communication system 100 includes a **base station 10, mobile stations 20a to 20c**, and a radio control device 30. The radio control device 30 controls radio communication between the base station 10 and the mobile stations 20a to 20c. **A radio link is established between the base station 10 and the mobile stations 20a-20c.** The radio link includes an **uplink 1 transmitted from the mobile stations 20a to 20c to the base station 10** and a **downlink 2**

transmitted from the base station 10 to the mobile stations 20a to 20c.

Ex. 1010 at [0032] (emphasis added). Ex. 1003 at ¶89.

Fig. 4 from UMESH is shown below with two different colors of highlighting that I added. A CQI control signal is transmitted by the mobile terminal to the base station in three different time slots highlighted in Blue during the 10ms (millisecond) time called a frame. The “EULUL control signal”² is being transmitted by the mobile terminal in two different time slots highlighted in Red during the same 10ms timeframe. The EULUL control signal is defined by UMESH as the “enhanced uplink physical control signal (UL control signal) conforming to enhanced uplink (EUL: enhanced uplink)” Ex. 1010 at [0003]. In other words, the EULUL is an uplink control signal that is transmitted on the enhanced uplink channel. Therefore, the two different control signals are time-division multiplexed in different time slots. Ex. 1003 at ¶¶94-95. Ex. 1003 at ¶90.



Id. at Fig. 4 (highlighting added)

² The “control signal” text was included with the translated document.

UMESH describes the CQI signal as radio quality information. Ex. 1010 at [0044]. Ex. 1003 at ¶92. One of “EULUL control signals,” shown transmitted by the mobile terminal, the “Scheduling Information (SI) Signal” or RR/SI is a request to the base station when it has data to send but it does not have any uplink resources available. The base station needs the information in the RR/SI signal so it can calculate the uplink resources it should assign to the mobile terminal. Ex. 1010 at [0075]; Ex. 1003 at ¶¶93-95.

UMESH discloses that a scheduling information signal (scheduling request signal) can be transmitted in place of a CQI (quality notification signal) when a scheduling request signal needs to be transmitted to the base station. UMesh specifically states that the mobile terminal “stops CQI transmission and transmits the EULUL control signal.” Ex. 1010 at [0077]; Ex. 1003 at ¶96.

UMESH discloses a mobile terminal transmitting a scheduling request signal (RR/SI signal) and a quality notification signal (CQI) to a base station and when the timing of the transmission of scheduling request signal coincides with the transmission of a quality notification signal, the mobile terminal stops the transmission of the quality notification signal and sends the scheduling request signal in its place. Ex. 1010 at [0048]; Ex. 1003 at ¶100.

B. 3GPP TS 25.309 V6.6.0 (2006-03) FDD Enhanced Uplink; Overall description; Stage 2 (Release 6) (EX. 1011)

The 3GPP TS 25.309 Specification (“TS 25.309”) is titled “Technical Specification Group Radio Access Network; FDD Enhanced Uplink; Overall description; Stage 2 (Release 6)” and was publicly released no later than March of 2006, as it states on the header of each page of the document. Ex. 1003 at ¶101, 104. TS 25.309 is prior art against the ‘656 patent under pre-AIA 35 U.S.C. §102(a).

This document is a technical specification that has been produced by the 3rd Generation Partnership Project (3GPP), with objective to improve the performance of uplink dedicated transport channels, i.e., to increase capacity and throughput and reduce delay. Ex. 1003 at ¶¶101-105.

This document describes controlled scheduling of signal transmissions between mobile terminals and base stations. *See e.g.*, ETSI TS 125 309 V6.6.0 (2006-03) pages 21-22. Specifically, this document discloses CQI & Ack/Nack. *See e.g.*, ETSI TS 125 309 V6.6.0 (2006-03) Figure 6.3.1-1: Model of the UE’s Uplink physical Layer. Furthermore, this document describes Scheduling Requests which will be transmitted in the form of “Scheduling Information and Happy Bit.” *See e.g.*, ETSI TS 125 309 V6.6.0 (2006-03) page 25.

C. R1-060583. 3GPP LTE Contribution to TSG-RAN WG1 (EX. 1012)

This document (“R1-060583”) is a contribution to the 3GPP LTE working group responsible for defining the LTE Specifications regarding the Radio Access Network (RAN). It was made public no later than February 13-17, 2006, in the Working Group1 (WG1) meeting located in Denver, CO and is prior art under 35 U.S.C. §102(a). Ex. 1003 at ¶106.

R1-060583 is focused on providing the overhead for the uplink signaling messages in an LTE network. Signaling messages are essentially the same as the “control signals” disclosed and claimed by the ‘656 patent. The “overhead” is the information that is added to each signaling message (control signal) so the receiver, *inter alia*, can determine the type of message being received and its format. One of the key considerations is the overall length of each signaling message because many of these are sent on the uplink and downlink control channels and it is important that they do not overload them or require additional capacity, which would reduce the data throughput of the cell. The relevant signaling messages/control signals analyzed by this document include “Scheduling requests” and the “CQI.” Ex. 1003 at ¶113.

R1-060583 describes “Scheduling requests” as “control signaling transmitted by the UE [mobile terminal] to request resources for uplink data transmission. Scheduling requests are only transmitted when the UE does not have a valid

scheduling grant as inband signaling can be used otherwise.” Ex. 1012 at p. 1 (1. Introduction section). The scheduling request is “used to request uplink resources from the NodeB [base station] scheduler. Outband scheduling requests are only required when the UE does not have a valid scheduling grant *Id.* at (2. Scheduling Request section,); Ex. 1003 at ¶115.

Additionally, information on priority, buffer status, etc. might be useful to the scheduler although it is far from obvious whether it is required. The scheduler could request, issue a grant and once the transmission has started to obtain more information about the UE status through inband signaling. Ex. 1012 at 2. Scheduling Request section.

In other words, when the mobile terminal (UE) has data that it needs to transmit to the base station (NodeB) and does not currently have any uplink resources assigned (no valid scheduling grant), it needs to send a “Scheduling request” (SR) signal to the base station. Ex. 1003 at ¶116.

R1-060583 also describes the “CQI” as “transmitted by the UE [mobile terminal] for the purpose of downlink scheduling and link adaptation. CQI transmission is independent of uplink data transmissions.” Ex. 1012 at p. 1 (1. Introduction section).

Transmission of CQI is independent of uplink data transmissions, i.e., the user may or may not transmit data simultaneously with the CQI. The CQI consists of

several bits. Coverage for CQI reporting can be solved in similar ways as for the data-associated control signaling. A simple approach, present already in HSDPA, is to repeat the same CQI information in several subsequent subframes. *Id.* at pp. 2-3 (4. CQI section, emphasis added). Ex. 1003 at ¶117. The foregoing describes the purpose of the mobile terminal sending a CQI signal and certain methods used to send it to the base station. *Id.* at ¶118.

VII. DETAILED GROUNDS OF UNPATENTABILITY

Below is an explanation of each proposed ground of unpatentability in accordance with 37 C.F.R. § 42.104(b) as well as an identification of specific portions of the evidence that support each ground in accordance with 37 C.F.R. § 42.104(c).

A. Ground 1: Claim 3 of the '656 Patent is Unpatentable Under 35 U.S.C. §103 Over UMESH in View Of The Knowledge of a POSITA

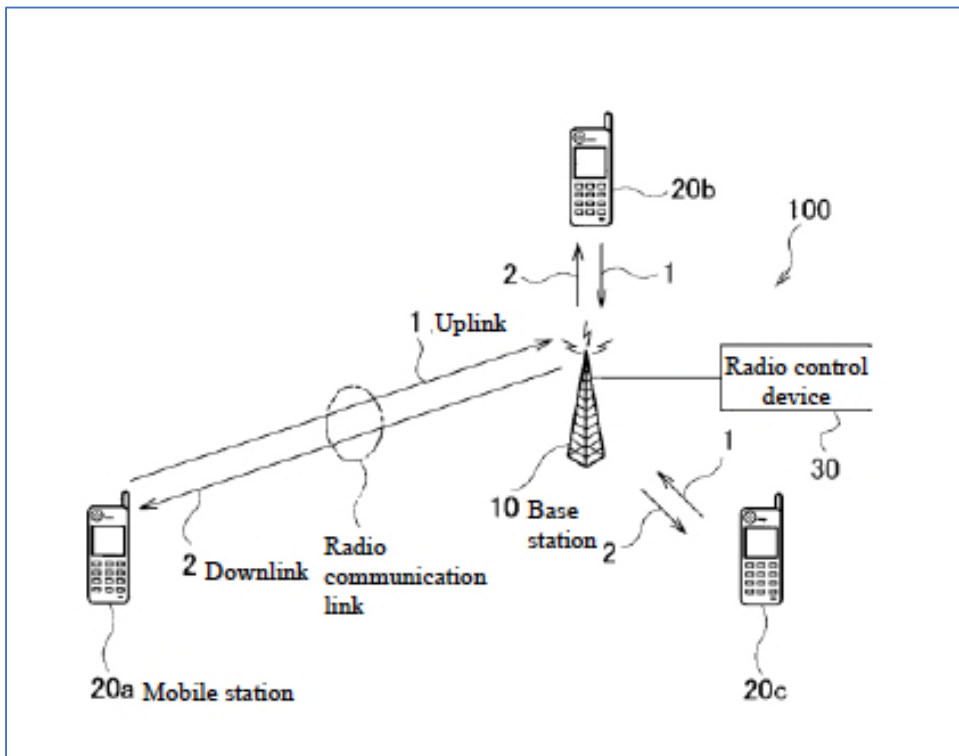
A POSITA would have found Claim 3 to have been obvious in view of UMESH and the knowledge of one skilled in the art.

1. Limitation 3[pre]: “A mobile terminal configured to:”

To the extent the preamble is limiting, UMESH discloses a mobile terminal communicating with a base station on a downlink and uplink in a mobile communication system. Ex. 1003 at ¶¶120, 121.

More specifically, UMESH discloses a mobile station (mobile terminal) 20a in a mobile communication system 100 that includes a base station 10 and a radio

control device 30, a downlink 2, and an uplink 1. Ex. 1010 at [0032], [0055] and FIG. 1; Ex. 1003 at ¶¶ 90, 120.



Ex. 1010 at Fig. 1.

2. **Limitation 3[1]: “transmit a quality notification signal for notifying downlink communication quality to a base station, and”**

As discussed in Section V.D. above a “quality notification signal” should be construed as a “Channel Quality Indication (CQI) signal.” As explained below, claim limitation 3[1] is disclosed by UMESH, regardless the PTAB adopts the petitioners’ proposed claim construction or any other reasonable construction(s) as understood by a POSITA.

UMESH teaches “a quality notification signal”, i.e. a CQI signal. As described in para [0044], “the channel quality indicator (CQI) is information regarding a downlink radio quality”. *See e.g.*, Ex. 1010 at [0044]. Ex. 1003 at ¶¶91, 92, 93, 122.

UMESH further teaches that the quality notification signal is transmitted for notifying downlink communication quality to a base station. For example, UMESH explains that “the channel quality indicator (CQI) is a downlink radio quality between each **mobile station** 20a to 20c and the base station 10 and is determined in each mobile station 20a to 20c. . . **based on the channel quality indicator (CQI), the base station 10 determines** a mobile station whereto HS-DSCH is assigned, a transmission rate of data transmission in HS-DSCH, and the like.” *See e.g.*, Ex. 1010 at [0044] (emphasis added). Ex. 1003 at ¶¶91, 92, 93, 122.

Thus, UMESH discloses this limitation by disclosing a mobile terminal transmitting a quality notification signal on the uplink to the base station, which notifies the base station of the quality of the downlink. The quality notification signal is referred to specifically as a CQI (channel quality indicator) signal, which is the same as the quality notification signal/CQI described by the ‘656 patent. Ex. 1003 at ¶¶94-96, 123-124. Ex. 1003 at ¶¶91, 92, 93, 122.

The ‘656 Patent admits that “transmit a quality notification signal for notifying downlink communication quality to a base station” is known in the prior

art. Ex. 1001, 43:4-8 (“The nonpatent reference 1 discloses that in a case in which a mobile terminal is receiving **downlink data** without performing transmission of uplink data, an Ack/Nack or/and a **CQI are transmitted** by using an Ack/Nack exclusive channel having a broad band as shown in FIG. 23.”) (emphasis added). Ex. 1003 at ¶124.

3. Limitation 3[2]: “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:”

UMESH teaches the “transmit a scheduling request signal with which to make a request for allocation of radio resources to said base station” claim element. For example, in [0075], UMESH discloses transmission of such a signal by stating that a mobile station 20 can transmit a rate request signal and scheduling information to the base station 10. *See e.g.*, Ex. 1010 at [0075]. UMESH further teaches that transmitting the scheduling request signal is to request for allocation of radio resources, by explaining that “RR (Rate Request) and SI (scheduling information) are information necessary in enhanced access for the base station 10 to **calculate uplink radio resources to assign** to the mobile station 20a.” *See e.g.*, Ex. 1010 at [0075] (emphasis added). Ex. 1003 at ¶¶125, 126, 127.

A POSITA would understand from his/her knowledge of 3GPP standard and cellular networks that the Rate Request and/or Scheduling Information taught by

UMESH is the scheduling request described in the '656 Patent claim 3 as they serve the purpose of assigning uplink radio resource to the mobile station to access the base station. Ex. 1003 at ¶129.

Besides, UMESH discloses transmitting a scheduling request before transmitting transmission data to base station. As explained in UMESH, a rate request is a necessity for assigning uplink radio resources for the mobile terminal's access of the base station, a POSITA would thus understand that transmission of the scheduling request signal is prior to data transmission to the base station. *See e.g.*, Ex. 1010 at [0075] ("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") (emphasis added). Ex. 1003 at ¶130.

Therefore, UMESH in view of POSITA knowledge, discloses this claim limitation. Ex. 1003 at ¶131.

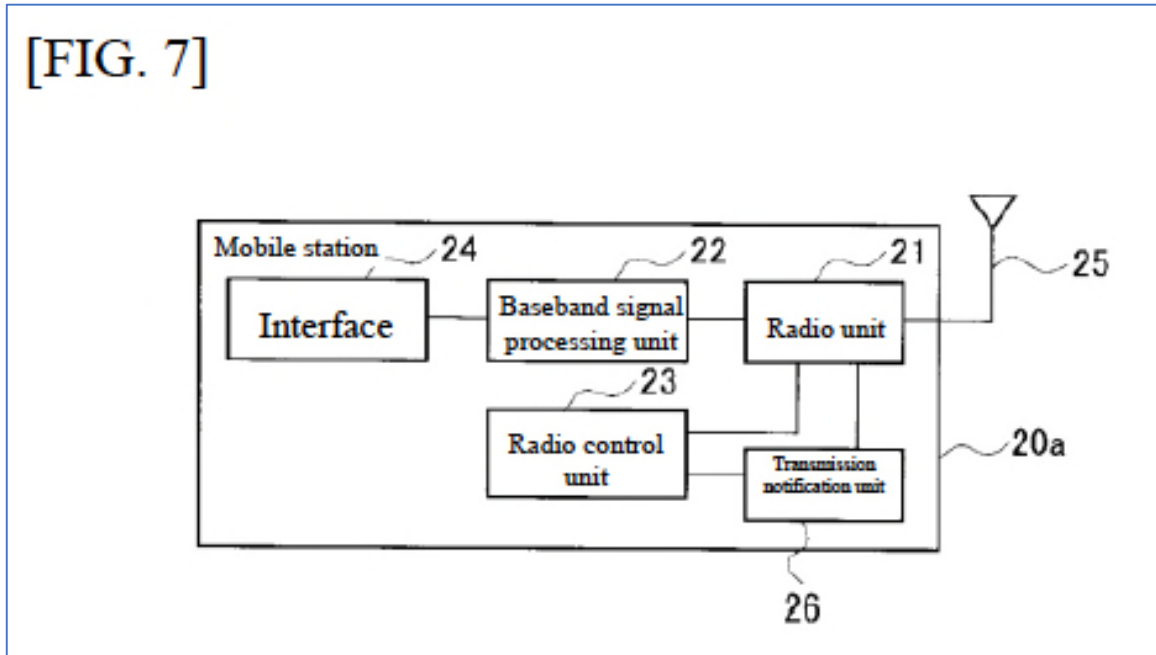
Further, the '656 patent admits that the claim term - "transmit a scheduling request signal with which to make a request for allocation of radio resources to said base station before transmitting transmission data to base station" is known in the prior art. *See e.g.*, Ex. 1001 at 4:37-50 ("A synchronous random access (Synchronous Random Access SRA) is a signal used for a scheduling request (SR) which a mobile terminal transmits before starting uplink data transmission. . .As a method of allocating an SRA to physical resources, there is provided a method of

monopolistically allocating one certain time-frequency region (Nonpatent reference 3: TR25.814V7.0.0).”) Therefore, UMESH alone or UMESH combined with the knowledge of a POSITA discloses this limitation. Ex. 1003 at ¶132.

4. Limitation 3[3], “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”

UMESH discloses this limitation because it discloses that the transmitter for the mobile terminal is configured to transmit the quality notification signal (CQI) to the base station. UMESH also discloses the mobile terminal is also configured to transmit a scheduling request signal to the base station when it is required. Ex. 1003 at ¶133.

UMESH discloses that the mobile terminal includes a transmitter. For example, UMESH teaches “the **mobile terminal 20a** is provided with. . . **a radio unit 21**. . . a radio control unit 23. . . the radio unit 21 performs radio transmission and reception. . . **The radio unit 21 transmits and receives the physical channels to and from the base station 10** via the antenna 25 as controlled by the radio control unit 23.” *See e.g.*, Ex. 1010 at [0055]-[0056] (emphasis added), Fig. 7. Ex. 1003 at ¶¶134, 135.



Ex. 1010 at Fig. 7.

UMESH teaches that the transmitter, i.e. the radio unit 21, transmit quality notification signal to the base station. For example, UMesh teaches “the CQI slot that normally sets the channel quality indicator (CQI) and instructs the radio unit 21 to transmit. . .” See *e.g.*, Ex. 1010 at [0058]. Ex. 1003 at ¶135.

UMESH further teaches that the transmitter, i.e., the radio unit 21, transmit scheduling request signal to the base station. For example, UMesh teaches “when a need to transmit the EULUL control signal arises, the radio control units sets the EULUL control signal. . .and instructs the radio unit 21 to transmit the EULUL control signal. . .” See *e.g.*, Ex. 1010 at [0058]. UMesh further teaches RR (rate request)/SI (scheduling information) as the EULUL control signal which is transmitted from the mobile station to the base station. See *e.g.*, Ex. 1010 at [0075].

As previously discussed with respect to claim element [3.2], a POSITA would understand from her knowledge of 3GPP standard and cellular networks that the Rate Request and/or Scheduling Information taught by UMESH is the scheduling request described in ‘656 Claim 3. *See e.g.*, Supra at VII.A.3. Therefore, UMESH discloses this limitation. Ex. 1003 at ¶¶136.

5. Limitation 3[4] “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”

UMESH discloses that the controller that is configured to perform a first control process that includes transmitting a scheduling request when it has data to send to the base station and does not have any uplink resources assigned for doing so. Ex. 1003 at ¶139.

As described for limitation 3[3], UMESH discloses a mobile terminal has a transmitter for transmitting multiple control signals, including a scheduling request signal. Ex. 1003 at ¶139.

The box numbered 23 and labelled “radio control unit” is the required controller for this limitation. *See e.g.*, Ex. 1010 at [0055] (“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”) (emphasis added); [0057] (“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”) (emphasis added). Ex. 1003 at ¶139.

Such control process taught by UMESH includes transmitting a scheduling request signal to the base station. As described in para [0075], a scheduling request signal, i.e., the RR (rate request) /SI (scheduling information) is transmitted to the base station. *See e.g.*, Ex. 1010 at [0075] (“the mobile station 20a can transmit, for example, RR (rate request) / SI (scheduling information) as the EULUL control signal to the base station 10. RR/SI is one of the EULUL control signals being discussed by 3GPP.”). As previously discussed with respect to claim element [3.2], a POSITA would understand from her knowledge of 3GPP standard and cellular networks that the Rate Request and/or Scheduling Information taught by UMESH is the scheduling request described in ‘656 Claim 3. *See e.g.*, Supra at Section VII.A.3. Ex. 1003 at ¶¶ 96, 140.

UMESH further teaches that the scheduling request signal is transmitted to the base station when the mobile terminal has not been allocated a radio resource for data transmission. In para [0075], UMESH discloses that RR (rate request) /SI (scheduling information) is transmitted for purpose of the base station deciding uplink resources to assign to the mobile terminal. *See e.g.*, Ex. 1010 at [0075] (“the mobile station 20a can transmit, for example, RR (rate request) / SI (scheduling information) as the EULUL control signal to the base station 10. RR/SI is one of the

EULUL control signals being discussed by 3GPP. RR and SI i.e., the EULUL control signal, are **information necessary** in enhanced access **for the base station 10 to calculate uplink radio resources to assign** to the mobile station 20a”) (emphasis added). Ex. 1003 at ¶¶ 96, 141.

A POSITA when reading UMESH para [0075], would understand based on her knowledge of 3GPP standard and cellular networks that, calculation of uplink resource to assign to the mobile station necessitates the scheduling request being transmitted to the base station when the mobile terminal has not been allocated a radio resource for data transmission. Ex. 1003 at ¶ 130.

Therefore, UMESH discloses this claim limitation. Ex. 1003 at ¶ 142.

6. **Limitation 3[5], “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.”**

UMESH teaches a second control process, that when transmission of CQI coincides with the scheduling request signal, i.e., the RR (rate request) /SI (scheduling information), stop transmitting the CQI during a time interval during which the scheduling request signal is transmitted. For example, para [0073] discloses the second control process that “the radio control unit 23 of the mobile station 20a **controls** the radio unit 21 so CQI transmission on the HS-DPCCH 1c is

stopped every three subframes and the EULUL control signal is transmitted in the CQI slot.” *See e.g.*, Ex. 1010 at [0073] (emphasis added). Ex. 1003 at ¶ 95.

UMESH discloses “a transmission of said quality notification signal coincides with that of said scheduling request signal in said transmitter.” As discussed in Section V.D. this term should be construed as “when said [quality notification signal] is transmitted by the transmitter simultaneously with the transmission of the scheduling request signal.” As explained below, this term is disclosed by UMESH, no matter the PTAB adopts the petitioners’ proposed claim construction or any other reasonable construction(s) as understood by a POSITA.

For example, para [0058] describes that the scheduling request signal, i.e., the EULUL control signal, is transmitted simultaneously with the CQI signal. *See e.g.*, Ex. 1010 at [0058] (“when 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. 1003 at ¶ 97.

UMESH discloses “stopping transmitting said quality notification signal during a time interval during which said transmitter transmits said scheduling

request signal”. As discussed in Section V.D., this term should be construed as “stopping the transmission of said [quality notification signal] during a time interval when the transmitter is also transmitting a scheduling request signal.” As explained below, this term is disclosed by UMESH, no matter the PTAB adopts the petitioners’ proposed claim construction or any other reasonable construction(s) as understood by a POSITA.

For example, “The radio control unit 23 of the mobile station 20a controls the radio unit 21 so **CQI transmission on the HS-DPCCH 1c is stopped every three subframes and the EULUL control signal is transmitted in the CQI slot.**” See *e.g.*, Ex. 1010 at [0073] (emphasis added); *see also.*, Ex. 1010 at [0048] (“when **there is a need to transmit the EULUL control signal**, the mobile stations 20a-20c transmit the radio quality information (CQI) by replacing the radio quality information (CQI) with the EULUL control signal **without transmitting the radio quality information (CQI)** on the HS-DPCCH”) (emphasis added). Ex. 1003 at ¶ 97, 98, 99.

Therefore, UMESH discloses this limitation. Ex. 1003 at ¶ 144.

Thus, Claim 3 is rendered obvious over the teachings of UMESH combined with knowledge of a POSITA.

B. Ground 2: Claim 3 of the ‘656 Patent is Unpatentable Under 35 U.S.C. §103 over UMESH in View of TS 25.309

UMESH teaches every element of ‘656 Patent Claim 3, and 3GPP TS 25.309 V6.6.0 Release 6 (2006-03) clarifies that the Scheduling Information described in UMESH is the “Scheduling Request” as in ‘656 Claim 3. Ex. 1003 at ¶ 177.

1. Motivation to Combine

A POSITA would be motivated to combine UMESH with the TS 25.309 Specification as UMESH expressly referred to 3GPP, when explaining Rate Request/Scheduling Information recited in UMESH. *See e.g.*, Ex. 1010 at [0075] (“The mobile station 20a can transmit RR (Rate Request) / SI (Scheduling Information) to the base station 10 as an EUUL control signal. RR/SI is one of the EUUL control signals discussed in 3GPP.”). Ex. 1003 at ¶ 178.

A POSITA is further motivated to combine the two references for at least the following reasons. First, both are addressing control signals for cellular wireless networks. Exemplary relevant sections of TS 25.309 are at least Section 9 regarding “Node B controlled scheduling” and Section 9.3 regarding “Signaling” for the “Uplink.” Second, both are focused on providing efficient control signals (signaling messages, aka signals) for at least the mobile terminal (UE) functionality of sending downlink channel quality (CQI), scheduling requests/scheduling information, and data to the base station (NodeB). Third, both are focused on the “Enhanced Uplink” functionality being added to the 3G UMTS standard. This functionality is also

referred to as High-Speed Uplink Packet Access (HSUPA). Therefore, a POSITA looking to modify the UMTS signaling to support this new HSUPA functionality regarding downlink quality notification signals and scheduling requests would first look to the existing 3GPP requirements for this functionality (TS 25.309) and methods for modifying it to make it more efficient, like what is disclosed by UMESH. Ex. 1003 at ¶162. Ex. 1003 at ¶¶ 179, 180.

2. Independent Claim 3

a. Limitation 3[pre]: “A mobile terminal configured to:”

To the extent that the preamble is limiting, UMESH teaches a mobile terminal for the reasons stated for Ground 1, claim 3, limitation 3[pre]; Ex. 1003 at ¶¶181-183.

3GPP TS 25.309 V6.6.0 Release 6 also teaches a mobile terminal. For example, section 9.2 of the document describes scheduling operations of a User Equipment, i.e., a mobile terminal. *See e.g.*, 3GPP TS 25.309 V6.6.0 Release 6 at 9.2.1. Ex. 1003 at ¶ 183.

b. Limitation 3[1], “transmit a quality notification signal for notifying downlink communication quality to a base station, and”

As discussed in Section V.D. above a “quality notification signal” should be construed as a “Channel Quality Indication (CQI) signal.” As explained below, claim limitation 3[1] is disclosed by UMESH in view of 3GPP TS 25.309 V6.6.0 Release

6, regardless the PTAB adopts the petitioners' proposed claim construction or any other reasonable construction(s) as understood by a POSITA.

As discussed in Ground 1, claim 3, limitation 3[1] above, UMESH discloses claim element 3[1]. Ex. 1003 at ¶ 184.

3GPP TS 25.309 V6.6.0 Release 6 also teaches a quality notification signal. See *e.g.*, Ex.1011 at Fig. 6.3.1-1 (indicating a CQI). Ex. 1003 at ¶ 186.

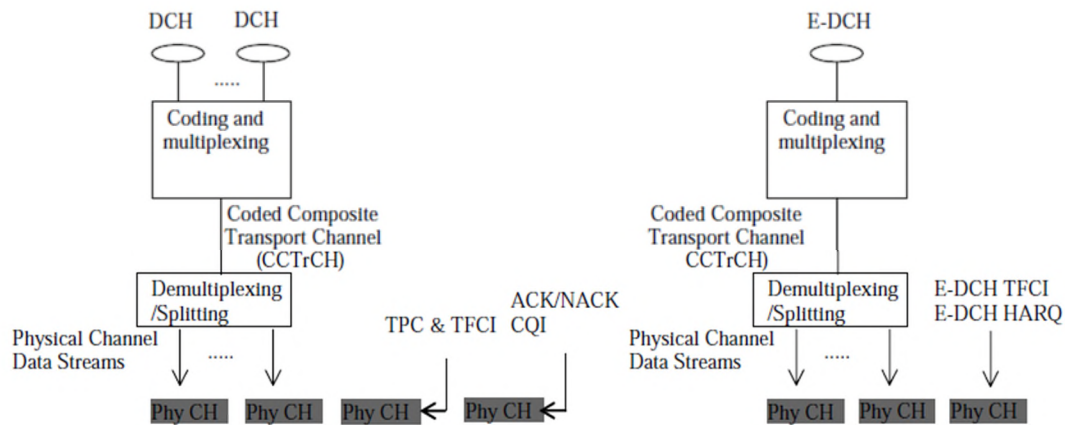


Figure 6.3.1-1: Model of the UE's Uplink physical layer

Ex.1011 at Fig. 6.3.1-1.

- c. **Limitation 3[2], “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:”**

As discussed in Ground 1, claim 3, limitation 3[2], UMESH discloses this limitation. Alternatively, UMESH in view of TS 25.309 meets this limitation. Ex. 1003 at ¶ 187.

UMESH teaches “transmit a scheduling request signal with which to make a request for allocation of radio resources to said base station”. For example, in [0075], UMesh discloses transmission of such a signal by stating that a mobile station 20 can transmit a rate request signal and scheduling information to the base station 10. *See e.g.*, Ex. 1010 at [0075]. UMesh further teaches that the scheduling request signal is a request for allocation of radio resources, by explaining 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.” *See e.g.*, Ex. 1010 at [0075]. Ex. 1003 at ¶¶ 188-191.

3GPP TS 25.309 V6.6.0 Release 6 clarifies that the rate request/scheduling information discussed in UMesh is a scheduling request. UMesh describes “RR (Rate Request) /SI (Scheduling Information) is one of the EULUL control signals being discussed by 3GPP”, wherein TS 25.309 supplements that “for the UE to request resources from the Node B(s), Scheduling Requests will be transmitted in the uplink in the form of Scheduling Information and Happy Bit.” *See e.g.*, Ex. 1010 at [0075]; Ex.1011 at Section 9.3.1. Ex. 1003 at ¶ 192.

Release 6	25	3GPP TS 25.309 V6.6.0 (2006-03)
For the UE to request resources from the Node B(s), Scheduling Requests will be transmitted in the uplink in the form of Scheduling Information and Happy Bit. The Scheduling information will be transmitted for the logical channels for which RRC configured that reporting needed to be made, while the Happy Bit shall always be included in the E-DPCCH, whenever the E-DPCCH is transmitted.		

Ex. 1011 at p. 25:

Besides, as discussed in connection with Ground I, UMESH discloses transmitting a scheduling request before transmitting transmission data to base station. *See Supra* at Section VII.A.3.

3GPP TS 25.309 V6.6.0 Release 6 also disclosed a scheduling request for allocation of radio resources to base station before transmitting transmission data. *See e.g.*, Ex.1011 section 7.3.6. (“Based on scheduling requests, Scheduling Grants” are determined and transmitted”). TS 25.309 explained in latter section(s) that a Scheduling Grant is a resource indication required to indicate to the UE (mobile terminal) “the maximum amount of uplink resources it may use” before initiation of uplink transmission. *See Id.* At Section 9.1. Ex. 1003 at ¶ 194.

Therefore, UMESH combined with TS 25.309 discloses this limitation. Ex. 1003 at ¶ 196.

d. Limitation 3[3], “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”

As discussed in connection with Ground I, limitation 3[3], UMESH discloses that the mobile terminal includes a transmitter. *See Supra* at Section VII.A.4.

Further as discussed in connection with Ground I, UMESH teaches that the transmitter transmit quality notification signal to the base station. *See Supra* at Section VII.A.4.

UMESH further teaches that the transmitter, i.e., the radio unit 21, transmit scheduling request signal to the base station. For example, UMESh teaches “when a need to transmit the EULUL control signal arises, the radio control units sets the EULUL control signal. . .and instructs the radio unit 21 to transmit the EULUL control signal. . .” *See e.g.*, Ex. 1010 at [0058]. UMESh further teaches RR (rate request)/SI (scheduling information) as the EULUL control signal which is transmitted from the mobile station to the base station. *See e.g.*, Ex. 1010 at [0075]. As previously discussed with respect to claim element [3.2], 3GPP TS 25.309 V6.6.0 Release 6 clarifies that the rate request/scheduling information discussed in UMESh is a scheduling request. *See e.g.*, *See Supra* at Section VII.B.2.c. Ex. 1011 at Section 9.3.1. Ex. 1003 at ¶ 198.

Therefore, UMESh combined with TS 25.309 discloses this limitation. Ex. 1003 at ¶ 201.

- e. **Limitation 3[4] “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”**

As discussed in connection with Ground I, UMESh teaches a controller which performs a control process. *See Supra* at Section VII.A.5. Ex. 1003 at ¶ 202.

Further as discussed in connection with Ground I, limitation 3[4], such control process taught by UMESH includes transmitting a scheduling request signal to the base station. *See Supra* at Section VII.A.5. Ex. 1003 at ¶ 203.

As discussed above re Claim term [3.2], 3GPP TS 25.309 V6.6.0 Release 6 at Section 9.3.1 clarified that the rate request/scheduling information discussed in UMESH is a scheduling request. *See Supra* at Section VII.B.2.c. Ex. 1003 at ¶ 204.

As discussed in connection with Ground I, limitation 3[4], UMESH further teaches that the scheduling request signal is transmitted to the base station when the mobile terminal has not been allocated a radio resource for data transmission. *See Supra* at Section VII.A.5. Ex. 1003 at ¶ 205.

Therefore, UMESH in view of TS 25.309 discloses this limitation. Ex. 1003 at ¶ 206.

- f. Limitation 3[5], “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.”**

UMESH discloses this limitation for the reasons discussed regarding Ground 1, claim 3, imitation 3[5]. Ex. 1003 at ¶¶207-209.

Claim 3 is rendered obvious over the teachings of UMESH combined with TS 25.309.

C. Ground 3: Claim 3 of the ‘656 Patent is Unpatentable under 35 U.S.C. §103 Over UMESH in View of R1-060583

R1-060583 in view of UMESH discloses or renders obvious all elements of claim 3 of the ‘656 patent. R1-060583 discloses each and every element of claim 3, except for “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” which was disclosed by UMESH.

UMESH teaches every element of ‘656 Patent Claim 3, and R1-060583 clarifies that the Scheduling Information described in UMESH is the “Scheduling Request” as in ‘656 Claim 3. Ex. 1003 at ¶ 177.

1. Motivation to Combine

A POSITA would be motivated to combine UMESH with R1-060583 for at least the following reasons. First, both are addressing control signals for cellular wireless networks. R1-060583 entitles “E-UTRA Uplink Control Signaling – Overhead Assessment”. Ex. 1012. UMESH resolves the problem of “to 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 solution”, by means of “A high-speed uplink physical control signal on an uplink physical control channel conforming to high-

speed packet access (HS-DPCCH) and an EPLUL control signal conforming to enhanced access are transmitted from a mobile station to a base station by time-division multiplexing.” Ex. 1010 at Abstract. Ex. 1003 at ¶ 180.

Second, both are focused on providing efficient control signals (signaling messages) for at least the mobile terminal functionality of sending downlink channel quality (CQI), scheduling requests, and data to the base station (NodeB). Both arts teach alteration of transmitting the CQI for purpose of reducing overload. R1-060583 teaches that “depending on the CQI reporting scheme used, a single CQI report may span multiple subframes (‘progressive update’) to reduce the overhead.” Ex.1012 at page 2. UMESH discloses “CQI transmission on the HS-DPCCH 1c is stopped every three subframes and the EULUL control signal is transmitted in the CQI slot.” Ex. 1010 at [0073]. A POSITA would thus 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 are to reduce the overload. Ex. 1003 at ¶ 180.

Third, the 4G LTE signaling methods and functionality are based on the existing and proven 3G UMTS functionality. Ex. 1003 at ¶¶43-45. Therefore, a POSITA looking to modify the LTE signaling (R1-060583) for downlink quality notification signals and scheduling requests would first look to how this

functionality was implemented in 3G UMTS and variations to 3G UMTS, like what is disclosed by UMESH. Ex. 1003 at ¶140. Ex. 1003 at ¶ 180.

2. Independent Claim 3

a. Limitation 3[pre]: “A mobile terminal configured to:”

To the extent that the preamble is limiting, for reasons elaborated in Ground 1, Limitation 3[pre] above, UMESH discloses “a mobile terminal.” *See*, Ground 1, claim 3, limitation 3[pre], Ex. 1003 at ¶ 151.

To the extent that the preamble is limiting, R1-060583 discloses a mobile terminal as it describes a “UE”, i.e., user equipment in a communication system, which transmits (1) a quality notification signal, (2) a scheduling request signal. For example, R1-060583 elaborates that “CQI, transmitted by the UE for the purpose of downlink scheduling and link adaption” and “Scheduling requests, i.e., control signaling transmitted by the UE to request resources for uplink data transmission” *See e.g.*, Ex.1012 at 1. Ex. 1003 at ¶ 152.

b. Limitation 3[1], “transmit a quality notification signal for notifying downlink communication quality to a base station, and”

As explained in the Claim Construction section above, “a quality notification signal” should be construed as “Channel Quality Indication (CQI) signal” which is supported by intrinsic and extrinsic evidence. As explained below, claim limitation 3[1] is disclosed by UMESH in view of R1-060583, regardless the PTAB adopts the

petitioners' proposed claim construction or any other reasonable construction(s) as understood by a POSITA.

R1-060583 discloses the mobile terminal transmitting a CQI signal to a base station, as it states “the uplink control signaling can be grouped into the following categories. . . **CQI, transmitted by the UE** for the purpose of downlink scheduling and link adaption. CQI transmission is independent of uplink data transmissions.” See *e.g.*, Ex.1012 at 1 (emphasis added). Ex. 1003 at ¶ 153.

UMESH discloses this limitation for the reasons discussed for Ground 1, claim 3, limitation 3[1]. See *Supra* at Section VII.A.2.

- c. **Limitation 3[2], “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:”**

As discussed in Ground 1, claim 3, limitation 3[2], UMESH discloses this limitation. Ex. 1003 at ¶¶145-148. Alternatively, UMESH in view of R1-060583 meets this limitation. Ex. 1003 at ¶ 155.

R1-060583 discloses that the UE, i.e., the mobile terminal, transmits a scheduling request signal to base station. An “uplink control signal” is a signal transmitted from the mobile terminal to the base station, while “a scheduling request” is an “uplink control signal”. See *e.g.*, Ex.1012 at 1; Ex. 1003 at ¶ 156.

R1-060583 discloses that the scheduling request signal with which, the mobile terminal makes a request for allocation of radio resources. “Scheduling requests, i.e., control signaling transmitted by the UE to **request resources for uplink data transmission.**” *See e.g.*, Ex.1012 at 1; Ex. 1003. at ¶¶ 156, 161.

R1-060583 further explained that the scheduling request signal is sent before transmitting transmission data to the base station. “Scheduling requests are only transmitted when the UE does not have a valid scheduling grant” which is prior to transmitting transmission data. *See e.g.*, Ex.1012 at 1; Ex. 1003. at ¶ 161.

Therefore, UMESH in view of R1-060583 discloses this limitation. Ex. 1003. at ¶ 163.

d. Limitation 3[3], “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”

UMESH discloses this limitation for the reasons set forth for Ground 1, claim 3, limitation 3[3]. *See*, Ex. 1003 at ¶¶164-167.

R1-060583 discloses that the UE, i.e., a mobile terminal, includes a transmitter configured to transmit said quality notification signal. As described by R1-060583 that “CQI, transmitted by the UE for the purpose of downlink scheduling and link adaption,” indicates that the UE, i.e., mobile terminal, comprises a transmitter which transmits the CQI. *See e.g.*, Ex.1012 at 1. The transmitter disclosed

by R1-060583 also transmits scheduling request signal, “Scheduling requests, i.e., control signaling transmitted by the UE”. *See e.g.*, Ex.1012 at 1. Ex. 1003 at ¶167.

R1-060583 further discloses that the CQI and scheduling request signal are transmitted to the base station because they are “uplink control signaling.” *See e.g.*, Ex.1012 at 1. Ex. 1003 at ¶91.

Therefore, UMESH in view of R1-060583 discloses this limitation. Ex. 1003. at ¶ 168.

- e. **Limitation 3[4] “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”**

UMESH discloses this limitation for the reasons set forth for Ground 1, claim 3, limitation 3[4]. *See Supra* at Section VII.A.5. *See also*, Ex. 1003 at ¶169.

R1-060583 teaches a controller configured to perform a control process. For example, “this contribution addresses the required E-UTRA uplink control signaling”, and “Scheduling requests, i.e., control signaling transmitted by the UE”, both indicate a controller configured to perform a control process. *See e.g.*, Ex.1012 at 1. *See also*, Ex. 1003 at ¶171.

R1-060583 further teaches that such a control process 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, as

it explains that “scheduling requests are only transmitted when the UE does not have a valid scheduling grant”. *See e.g.*, Ex.1012 at 1. *See also*, Ex. 1003 at ¶172.

Therefore, R1-060583 discloses this limitation. Ex. 1003 at ¶173.

- f. **Limitation 3[5], “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.”**

UMESH discloses this limitation for the reasons set forth for Ground 1, claim 3, limitation 3[5]. *See Supra* at VII.A.6. *See also*, Ex. 1003 at ¶¶ 174-175.

Claim 3 is therefore rendered obvious over the teachings of UMESH combined with R1-060583. Ex. 1003 at ¶176.

VIII. PAYMENT OF FEES

In accordance with 37 C.F.R. § 42.103(a), the required fees are submitted herewith. If any additional fees are due at any time during this proceeding, the Office is authorized to charge such fees to Deposit Account No. 60-3815.

IX. CONCLUSION

Petitioner respectfully requests institution of IPR.

Dated: June 2, 2023

Respectfully submitted,

/Jeremy D. Peterson/

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IPR2023-00957, Petition for *Inter Partes* Review
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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), Petitioner hereby certifies, in reliance on the word count feature provided by the word-processing system used to prepare this Petition, that the number of words in this Petition is 10,249. Pursuant to 37 C.F.R. § 42.24(a), words in the table of contents, table of authorities, mandatory notices under § 42.8, certificate of service, certificate of word count, appendix of exhibits, and claim listing were excluded.

Dated: June 2, 2023

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing Petition and all exhibits and other documents filed together with the Petition were served on June 2, 2023, via Federal Express on the attorney of record for Patent Owner at the following address:

Oblon, McClelland, Maier & Neustadt, L.L.P
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A copy of the foregoing Petition and all exhibits and other documents filed together with the Petition were also served on June 2, 2023, via electronic mail to counsel for Mitsubishi Electric Corporation and Sisvel International S.A., in the Central District of California litigation at the email address below:

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