Appeal Nos. 2018-2008, -2009, -2010, -2011 (consolidated)

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

EVOLVED WIRELESS LLC,

Patent Owner-Appellant,

v.

ZTE (USA) INC., HTC CORPORATION, HTC AMERICA, INC., SAMSUNG ELECTRONICS CO., LTD, SAMSUNG ELECTRONICS AMERICA, INC., APPLE INC., MICROSOFT CORPORATION, MICROSOFT MOBILE OY, MICROSOFT MOBILE INC.,

Petitioners-Appellees.

Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. IPR2016-00757, IPR2016-01228, IPR2016-01229, and IPR2016-01345.

APPELLANT EVOLVED WIRELESS LLC'S OPENING BRIEF

<div style="text-align:right">

Christopher K. Larus
Ryan M. Schultz
Brenda L. Joly
Miles A. Finn
ROBINS KAPLAN LLP
800 LaSalle Avenue, Suite 2800
Minneapolis, MN 55402
Tel: (612) 349-8500

</div>

October 4, 2018

<div style="text-align:right">

Attorneys for Patent Owner-Appellant Evolved Wireless LLC

</div>

Certificate of Interest

Counsel for the Appellant Evolved Wireless LLC certifies the following:

1.   The full name of every Party represented by me is:

Evolved Wireless LLC

2.   The name of Real Party in interest (Please only include any real party in interest NOT identified in Question 3) represented by me is:

The party named above in (1) is the real party in interest.

3.   Parent corporations and publicly held companies that own 10% or more of stock in the party:

None.

4.   The names of all law firms and the partners or associates that appeared for the party or amicus now represented by me in the trial court or agency or are expected to appear in this court (and who have not or will not enter an appearance in this case) are:

Cyrus A. Morton, Robins Kaplan LLP

5.   The title and number of any case known to counsel to be pending in this or any other court or agency that will directly affect or be directly affected by this court's decision in the pending appeal. *See* Fed. Cir. R. 47.4(a)(5) and 47.5(b).

In addition to each IPR proceeding and appeal noted in the caption for these consolidated appeals, the following cases will be affected: Evolved Wireless, LLC v. Apple Inc., 15-cv-00542 (D. Del.); Evolved Wireless, LLC v. HTC Corp., 15-cv-00543 (D. Del.); Evolved Wireless, LLC v. Lenovo Grp. Ltd., 15-cv-00544 (D. Del.); Evolved Wireless, LLC v. Samsung Elecs. Co., 15-cv-00545 (D. Del.); Evolved Wireless,

LLC v. ZTE Corp., 15-cv-00546 (D. Del.); Evolved Wireless, LLC v. Microsoft Corp., 15-cv-00547 (D. Del.).

Dated: October 4, 2018   /s/Ryan M. Schultz
                                          Ryan M. Schultz
                                          Attorney for Patent Owner-Appellant

Table of Contents

Table Of Authorities

Page(s)

Cases

Statutes

Other Authorities

Statement of Related Cases

No other appeals from these actions have previously been before this or any other appellate court. In addition to each IPR proceeding underlying these consolidated appeals, the following cases will be directly affected by the Court's decision in these appeals: Evolved Wireless, LLC v. Apple Inc., 15-cv-00542 (D. Del.); Evolved Wireless, LLC v. HTC Corp., 15-cv-00543 (D. Del.); Evolved Wireless, LLC v. Lenovo Grp. Ltd., 15-cv-00544 (D. Del.); Evolved Wireless, LLC v. Samsung Elecs. Co., 15-cv-00545 (D. Del.); Evolved Wireless, LLC v. ZTE Corp., 15-cv-00546 (D. Del.); Evolved Wireless, LLC v. Microsoft Corp., 15-cv-00547 (D. Del.).

Jurisdictional Statement

These consolidated appeals arise from each Final Written Decision ("FWD") and Denial of Rehearing by the Patent Trial and Appeal Board ("Board" or "PTAB") in the following proceedings:

- IPR2016-00757 and IPR2016-01345, which were consolidated below, FWD entered November 30, 2017 (Appx1-41), denial of rehearing entered March 26, 2018 (Appx42-49);

- IPR2016-01228, FWD entered November 30, 2017 (Appx50-91), denial

  of rehearing entered March 26, 2018 (Appx92-99);

- IPR2016-01229, FWD entered November 30, 2017; (Appx100-142),

  denial of rehearing entered March 26, 2018 (Appx143-150).

Appellant Patent Owner Evolved Wireless LLC ("Evolved") filed timely

notices of appeal after each denial of rehearing, pursuant to 35 U.S.C. § 142

and 37 C.F.R. § 90.3. *See* Appx174-180. This Court has jurisdiction over the

consolidated appeals under 28 U.S.C. § 1295(a)(4)(A) and 35 U.S.C. §§ 141,

318-319.

Statement of Issues

1.   Whether the Board erred in concluding the patent claims at issue are unpatentable, by failing to properly apply its own adopted claim construction under which the transmitting limitations of the independent claims require Msg3 buffer data must be transmitted *only when* the two conditions stated in the first limitation are met, and conversely to preclude Msg3 buffer data transmission, and instead require new data transmission, whenever the two conditions are not met, and thus not identifying any evidence, let alone substantial evidence, of prior art teaching of this key aspect of the invention.

2.   Whether the Board erred by refusing to consider the declaration of Evolved's expert on the sole ground that it did not include a statement referring to penalty of perjury, without giving Evolved an opportunity to correct this technical deficiency in contravention of its own regulations.

3.   Whether the proceedings violated Evolved's Fifth Amendment Constitutional rights?

3

Statement of the Case and Facts

These consolidated appeals seek relief from the Board's errors in
related inter partes review ("IPR") proceedings concerning U.S. Patent No.
7,881,236 ("the '236 patent"). The '236 patent is titled, "Data Transmission
Method and User Equipment for the Same" and generally describes user
equipment and its method "for efficiently transmitting data stored in a
message 3 (Msg3) buffer" in a mobile communication system such as a
Long Term Evolution ("LTE") system developed and standardized in the
3rd Generation Partnership Project ("3GPP"). Appx151-171. The '236 patent
improved upon prior art mobile telephone systems, and specifically
addressed certain problems found in systems operating according to prior
art LTE standard specifications, due to Msg3 buffer data being transmitted
in response to any uplink grant ("UL Grant") during a random access
procedure rather than only UL Grants in a random access response
message. *Id.*

ZTE, HTC, and Samsung entities filed two petitions for review of the
'236 patent alleging certain claims were rendered obvious, but not
anticipated by, prior art LTE specifications. *See* Appx2, Appx8-9. Apple and
Microsoft entities then filed another two petitions for review of those same

4

'236 patent claims asserting they were obvious based on combinations of

prior art including prior art LTE standard specifications and patents with

lead named inventor Kitazoe. *See* Appx51, Appx57-58, Appx101, Appx107-

108. Apple and Microsoft's Petitions thus implicitly acknowledged that the

prior art LTE specifications alone were insufficient to anticipate or render

obvious the '236 patent claims. *See id.* In three Final Written Decisions

(FWDs), the Board held in each proceeding that claims 1-10, 12 and 13 of

the '236 patent are unpatentable. Appx1-41, Appx50-91, Appx100-142.[1]

---

[1] IPR2016-01345 was consolidated by the PTAB with IPR2016-00757
because 1345 Petitioner Samsung stated its Petition "is substantially
identical to the petition that ZTE (USA) Inc. et al. filed [earlier] in IPR2016-
00757," Appx431-433, and one FWD was thus issued directed to those
consolidated proceedings. IPR2016-01228 and IPR2016-01229 were not
consolidated but largely proceeded in tandem below. Apple and
Microsoft's 1228 Petition relied on "prior art described in the '236 patent"
in combination with the prior art LTE specification and the Kitazoe patents,
while their 1229 Petition relied on a patent to Niu instead of the "prior art
described in the '236 patent" for teachings regarding a buffer that could
store data that would be transmitted if there was data in the buffer in
making otherwise similar obviousness arguments. *See* Appx57-58, Appx72-
73, Appx76, Appx80 Appx107-108, Appx122, Appx125, Appx127-128,
Appx131. The FWDs in the 1228 and 1229 proceedings made the same
claim construction, findings and conclusions, with the same discussion,
except for the different discussions and reference to Niu in the 1229 FWD
instead of the 1228 FWD's discussion of the '236 patent specification's own
disclosures regarding prior art teaching of a buffer that transmits data
when it has data. *Cf.* Appx50-91; Appx100-142. For simplicity, most

As detailed later herein, the Board's claim construction in its FWDs recognized that the invention required the user equipment to transmit stored Msg3 buffer data *only when* the UL Grant being responded to is a random access response ("RAR") UL Grant. But the Board failed to require evidence regarding this inventive aspect of the claims. Instead, the Board relied on prior art that disclosed a RAR UL Grant is *a* type of UL Grant that a user equipment *may* respond to by transmitting stored Msg3 buffer data in finding the claims taught by the prior art. *See id.* Importantly, the prior art did not disclose transmitting stored Msg3 buffer data *only when* a RAR UL Grant is received. *See id*.

The "Background" section of the '236 patent described that user equipment operating in accordance with the prior art LTE standard would transmit stored Msg3 buffer data in response to RAR UL Grants, *as well as* in response to other UL Grants in a random access procedure. Appx163-164 at 3:60-4:34; *see also* Appx166-169 at 8:38-13:21. The invention was specifically directed to improving upon such systems by requiring the user

---

citations in this brief will be to only the 1228 FWD but such citations should be considered to refer equally to the same content in the 1229 FWD.

equipment to *differentiate* UL Grants by the specific message type in which

they are contained and operate based on that information, so that stored

Msg3 buffer data would *never* be transmitted in response to any UL Grants

not in a RAR message. Appx151-171, *e.g.* at Fig. 9, 4:30-41, 5:9-22, 6:8-26,

6:65-67, 13:22-14:17.

The Board's decisions failed to appreciate that the critical difference

between the prior art and the patented invention can only be discerned by

looking at what happens when a UL Grant *not* in a RAR message is

received during a random access procedure or the specific parameters of

user equipment operation for such situations. The FWDs, like the Petitions,

failed to address such situations, and thus lack evidence showing prior art

teaching of user equipment limiting transmission of stored Msg3 buffer

data to *only* when an UL Grant in the RAR message is received, as the

invention requires. *See generally* Appx1-41, Appx50-91. Evolved requested

rehearing in each proceeding after the FWDs, but the Board declined to

change its decisions. Appx42-49, Appx92-99, Appx143-150.[2]

---

[2] The decisions denying Evolved's requests for rehearing in the 1228 and
1229 proceedings are nearly verbatim to each other. *Cf.* Appx92-99;
Appx143-150. For simplicity, further citations in this brief will be to only

I.   Background State of the Art

At the time of the invention, in 2008, the telecommunications industry was developing the cellular standard now known as LTE or 4G. Appx 17, Appx69, Appx163 at 1:7-9, 1:22-25, Appx196, Appx533. Development of LTE took place in a standard-setting organization called 3GPP, where members from virtually every telecommunications company and organization in the world contributed, including some of the Petitioner entities and LG Electronics Inc., the original assignee of the '236 patent. Appx151, Appx196, Appx334, Appx736. The LTE "standard" comprises many different technical specifications that address different aspects of the standard. Many different versions of the different specifications for the LTE standard were written by the members of the 3GPP over 2004-2009. *See* Appx78, Appx334, Appx1530-1536, Appx1604-1605, Appx1611, Appx1614, Appx1734-1735, Appx2571-2574. Contributions and inventions by different members were incorporated over time into the standard specifications in order to improve the wireless communications systems as contemplated by the previous specifications. *See id.*, Appx1809.

---

the 1228 rehearing denial but such citations should be considered to refer equally to the same content in the 1229 rehearing denial.

The parts of the 3GPP LTE standard that were focused on in these proceedings were found in the "300" and "321" specifications, and the asserted prior art specifications were particular versions of these specifications from prior to the '236 patent's asserted priority date of August 11, 2008. *See* Appx9, Appx17, Appx58, Appx69, Appx1245-1403. Kitazoe, a piece of prior art relied on in the 1228 and 1229 proceedings, is a patent that was filed shortly before the '236 patent's priority date, that describes an encryption scheme for use in a random access procedure. Appx70, Appx1685-1714.

Mobile telephone systems include different parts, including 1) mobile phones, also called "user equipment" ("UE"); 2) base stations, sometimes called "eNode B" or "Node B"; and 3) the core network. Appx163 at 1:33–41, Appx3, Appx52. To communicate through the network, a UE must initiate a "'random access procedure' in a number of instances, including 'when the UE performs initial access' to a base station and 'when there is uplink data transmission in a situation where uplink time synchronization is not aligned or where a specific radio resource used for requesting radio resources is not allocated.'" Appx3-4 (quoting Appx164 at 3:42-57);

9

Appx52-53 (same). In other words, a UE must perform a random access

procedure to create the connection with the base station.

The prior art contemplated, as for example shown in the prior art

LTE 300 specification Figure 10.1.5.1-1 and as disclosed in Figure 5 of the

'236 patent, that at least four transmissions are required in a random access
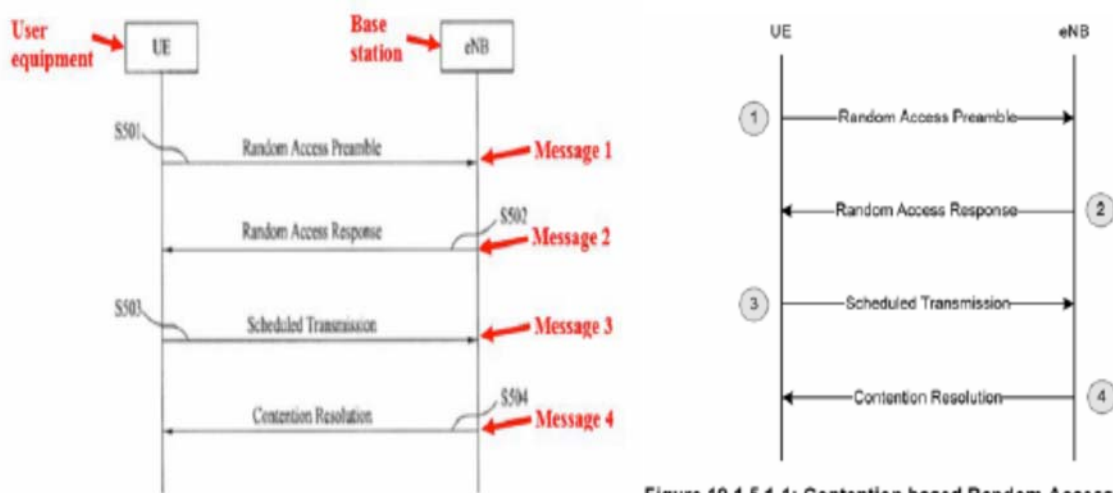
procedure:

Figure 10.1.5.1-1: Contention based Random Access Procedure

Appx4 (FWD showing '236 patent's Figure 5 as annotated by Petitioner);

Appx26 (FWD showing figure from Appx1292); *see also* Appx53, Appx71.

This random access procedure framework contemplated by the prior art:

> begins with transmission of a "random access preamble" from
> the UE to the base station at step 501 (referred to as "Message
> 1" transmitting step). [Appx164] at col. 4, ll. 3-7. The UE
> receives a "random access response" from the base station at
> step 502 "in correspondence with the transmitted random
> access preamble (referred to as a "message 2" receiving step).

10

> *Id.* at col. 4, ll. 7-11. Of particular relevance, the UE then
> transmits an uplink message to the base station at step 503
> (referred to as a "message 3" or "Msg3" transmitting step). *Id.*
> at col. 4, ll. 11-14. The UE receives a corresponding "contention
> resolution" message from the base station at step S504 (referred
> to as a "message 4" receiving step). *Id.* at col. 4, ll. 14-17.

Appx4-5; *see also* Appx53 (same).

Important to this proceeding, different types of UL Grant signals can

be received by a UE during a random access procedure, that can be

distinguished by how they are delivered (or their mode of reception). The

patent differentiates between UL Grants "received on a Physical Downlink

Control Channel (PDCCH)," Appx151-171, *e.g.* at 5:10-11; 6:8-13; claims 3,

6, 10, 13, and UL Grants "received on a random access response message

received on Physical Downlink Shared Channel (PDSCH)." *Id.*, *e.g.* at 5:14-

17; 6:14-17; 8:17-18, claims 6, 11, 13. The Random Access Response message

("RAR message" or "message 2") contemplated in the figures above would

be on PDSCH (aka DL-SCH) and would include a RAR UL Grant. *Id.*, *e.g.* at

5:14-22, Appx5, Appx26 (citing Appx1293), Appx1863-1864; *see also*

Appx2058-2059.[3],[4]

The 3GPP LTE 321 specification discusses MAC (Medium Access

Control) Protocol, and certain sections of it address uplink data transfer

and UL Grant reception. Appx17. The patent explains that in prior art user

equipment, operating in accordance with the prior art LTE standard

specifications relied on by Petitioners, if data is stored in the Msg3 buffer, it

is transmitted in response to any UL Grant, regardless of the reception

message the UL Grant is contained in.

> According to the current LTE system standard, it is defined
> that, if the UL Grant signal is received in a state in which data is
> stored in the Msg3 buffer, the data stored in the Msg3 buffer is
> transmitted regardless of the reception mode of the UL Grant
> signal.

---

[3]For simplicity, this brief thus refers to these two different types of UL
Grants as a) "PDCCH UL Grants" and b) "RAR UL Grants".

[4] The Board acknowledged 1) PDCCH UL Grants and 2) UL Grants on the
PDSCH "received in a random access response message (i.e., message 2)",
and then noted "[t]hus, some UL Grants are received as part of the above
message 1-2-3-4 random access procedure, and some are not." Appx5. It
was undisputed, and indeed the Board's decision even states that the entire
1-2-3-4 procedure is part of the "random access procedure." *Id.*; *see also*
Appx53. The random access *procedure* is not complete until after receipt of
the contention resolution message ("Message 4"). *See id.*; Appx156-167 at
Fig. 5, 4:3:-17, 8:38-40, 9:24-48. Thus the Board was simply incorrect to the
extent it thought PDCCH UL Grants are not received during a random
access *procedure* simply because they are not in the RAR *message* (the
"message 2" of the larger procedure).

Appx164 at 4:26-30; *see also* Appx168 at 12:16-20; Appx17-18 (quoting

Appx1388) ("… if there is an ongoing Random Access procedure and there

is a MAC PDU in the [Message3] buffer: - obtain the MAC PDU to transmit

from the [Message3] buffer …").

II.   The Invention of the '236 Patent

The invention of the '236 patent relates to making sure the proper

data is transmitted in response to received UL Grants. Importantly, it is not

simply about the transmission of "message 3". Rather, the invention is

about what data is transmitted in "message 3", and making sure the

correct, expected data is transmitted in other messages in response to

various UL Grants. Appx151-171, *e.g.* at 4:57-5:22. The inventors realized

that in the real world under the prior art LTE standard relied upon by the

Petitioners there may not just be four messages (including "message 3")

sent and received during a random access procedure. Nor would PDCCH

UL Grants always be received only when the UE's Msg3 buffer is empty.

The inventors recognized, for example, an eNodeB can transmit a PDCCH

containing an UL Grant without being aware that the UE is attempting a

random access procedure.

[S]ince the eNode B does not yet know that the UE is performing the
random access procedure, the eNode B may transmit a UL Grant
signal independent of the random access procedure on a masked
PDCCH (S805).

Appx168 at 12:45-48. Figure 8 of the '236 patent depicts the situation of

where "due to the ignorance of ongoing Random Access Procedure" a

PDCCH UL grant is received by a UE during the random access procedure

(S805), causing the UE to errantly send the stored Msg3 buffer data in

response to the PDCCH UL Grant (S806).

FIG. 8
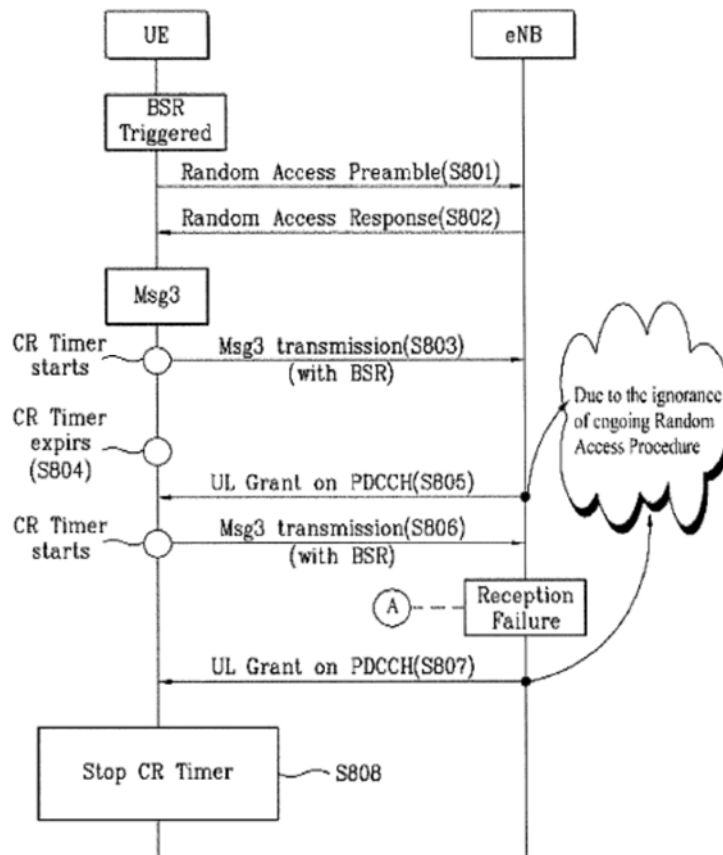
Appx159; *see also* Appx168 at 12:48-51.

The '236 patent describes how this receipt of a PDCCH UL Grant during the random access procedure can result in the loss of data and deadlock can result. Appx168-169 at 12:13-13:21; *see also* Appx2060-2066. The inventors solved this problem by providing for a system where

> the data stored in the Msg3 buffer is restrictively transmitted *only* in the case where the UL Grant signal received from the eNode B is received on the random access response message, but *not* in all cases where the UL Grant Signal is received from the eNode B. If the UL Grant signal is received on the masked PDCCH not by the random access response message but by the UE identifier … in a state in which the data is stored in the Msg3 buffer, a method of acquiring and transmitting new data (MAC PDU) to the eNode B instead of the data stored in the Msg3 buffer is suggested.

Appx169 at 13:23-34 (emphasis added); *see also* Appx164 at 4:26-34; Appx160-161 (Figs. 9-10).

The patent provides a flowchart and explains its invention of a UE that performs a function to differentiate whether or not the UL Grant was received in a RAR message so that, even if there is data in the Msg3 buffer, Msg3 buffer data is *never* transmitted in response to a UL Grant not in the RAR message (*e.g.* a PDCCH UL Grant). Appx160 (Figure 9), Appx169 at 13:35-14:17.

FIG. 9

S901

Identify the HARQ process

S903

S902

Check
Non–Adaptive
Retransmission

NO ← UL Grant indicated?

YES

S904

Adaptive
Retransmission

(B) ← Check
RNTI/NDI/RAR

(A)

S905

S906

NO ← Is there a MAC PDU
in the Msg3 buffer?

YES

S907

NO ← Was UL Grant received
in a RAR?

S909

YES

New Data Transmission

Data in the Msg3
Buffer Transmission —S908
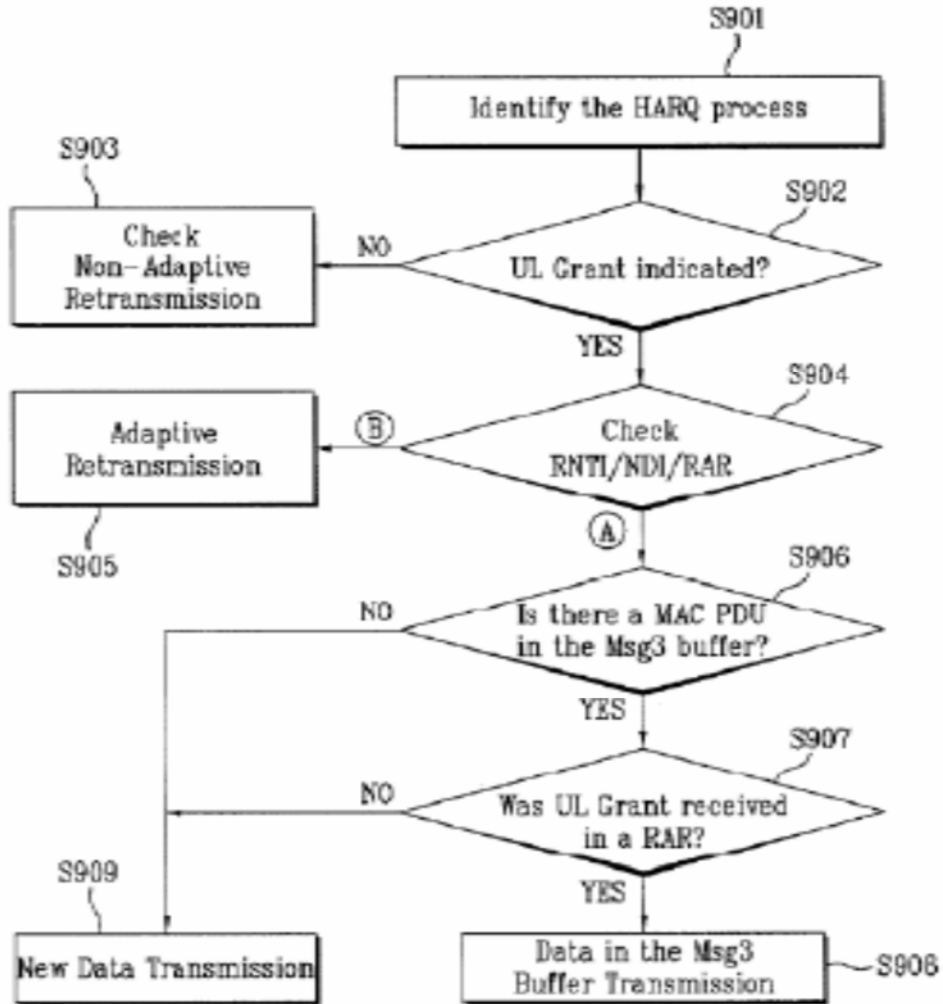
Figure 9 of the patent depicts how a UE operating according to the

invention performs specific operations to ensure that the UE determines if

a particular UL Grant was received in a RAR message or not and *only*

transmits stored Msg3 buffer data if the UL Grant was specifically in a RAR

16

message. Appx160 *e.g.* at S907-909; *see also* Appx169 at 14:3-13 ("[T]he UE

according to the present embodiment transmits the data stored in the Msg3

buffer *only when* there is data in the Msg3 buffer … *and* the UL Grant signal

is received on the random access response message (S908). If … the UL

Grant is not received on the random access response message, the UE …

performs new data transmission (S909).") (emphasis added); Appx5-7,

Appx54-56.

All the '236 patent claims require that the UE analyze the type of

message on which the UL Grant was received and condition what it

transmits on the type of message so that stored Msg3 buffer data is

transmitted in response to *only* a RAR UL Grant (not a PDCCH UL Grant).

Independent claim 1 recites:

> 1. A method of transmitting data by a user equipment through an uplink, the method comprising:
>   receiving an uplink grant (UL Grant) signal from a base station on a specific message;
>   determining whether there is data stored in a message 3 (Msg3) buffer when receiving the UL Grant signal on the specific message;
>   determining whether the specific message is a random access response message;
>   *transmitting the data stored in the Msg3 buffer* to the base station using the UL Grant signal received on the specific message, *if* there is data stored in the Msg3 buffer when receiving

17

the UL Grant signal on the specific message and *the specific message is the random access response message*; and

transmitting new data to the base station in correspondence with the UL Grant signal received on the specific message, *if* there is no data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message or *the specific message is not the random access response message*.

Appx170-171 (emphasis added); *see also* Appx7, Appx56. Independent

claim 7 recites:

7. A user equipment, comprising:

a reception module adapted to receive an uplink grant (UL Grant) signal from a base station on a specific message;

a transmission module adapted to transmit data to the base station using the UL Grant signal received on the specific message;

a message 3 (Msg3) buffer adapted to store UL data to be transmitted in a random access procedure;

a Hybrid Automatic Repeat Request (HARQ) entity adapted to determine whether there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is a random access response message, *acquiring the data stored in the Msg3 buffer* **if** there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and *the specific message is the random access response message*, and controlling the transmission module to transmit the data stored in the Msg3 buffer to the base station using the UL Grant signal received by the reception module on the specific message; and

a multiplexing and assembly entity used for transmission of new data,

wherein the HARQ entity acquires the new data to be transmitted from the multiplexing and assembly entity **if** there is no data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the specific message or *the received message is not the random access response message,* and

18

> controls the transmission module to transmit the new data
> acquired from the multiplexing and assembly entity using the
> UL Grant signal received by the reception module on the
> specific message.

Appx171 (emphasis added); *see also* Appx8, Appx57.

The other claims at issue in the IPRs (claims 2-6, 8-10, 12 and 13) all

depend from the above claims and thus include its limitations. Appx171.

Several of these claims reinforce that the invention is intended to

differentiate between UL Grants received on a PDCCH and UL Grants in a

RAR message, and to only transmit Msg3 buffer data in response to the

latter. *Id.* at claims 3, 6, 10, 13.

III.   The IPR Proceedings

The bulk of the Petitions, and briefing in the IPRs, focused on

Petitioners' claim construction argument and their obviousness arguments

under their construction of the claims. *See generally, e.g.*, Appx498-499,

Appx843-844; *see also* Appx94. Petitioners argued that the claims' "if" terms

should be read as requiring only sufficient conditions, such that Msg3

buffer data transmission "occurs in the presence of the condition, but

possibly also at other times." Appx61 (citing Appx679-680); *see also*

Appx10-12. The claim construction issue raised by Petitioners was thus

whether the "if" terms in the transmitting limitations of the independent claims created *necessary* conditions such that transmission of Msg3 buffer data happens *only when* both conditions stated in the first transmitting limitation—the presence of data stored in the Msg3 buffer *and* the specific message (containing the UL Grant signal that the transmission is to be sent in response to) is the RAR message (*i.e.* is a RAR UL Grant and not a PDCCH UL Grant)—are true. *See* Appx10-12, Appx61-62.

The Board agreed with Evolved on this critical claim construction dispute. Appx12-15, Appx62-66. The Board found that the language and structure of the claims as a whole, as well as the specification's description of the invention, require that the transmission of data stored in the Msg3 buffer happens *only when* both conditions stated in the first transmitting limitation are satisfied, and *exclude* "the optional possibility of transmitting data stored in the Msg3 buffer even when both conditions are not satisfied." Appx13; *see also* Appx12-15, Appx62-66. The Board recognized that the second transmitting limitation "explicitly" requires that "new data" be transmitted whenever one of the conditions stated in the first transmitting limitation is not met. Appx13; Appx63 (same). It noted that Evolved had pointed out that the condition recitations in the two

transmitting limitations are "logical opposites" and "[a]s [Evolved] asserts, 'both limitations cannot, at the same time, be true.'" Appx11; Appx61 (same).

The Board's claim construction opinion thus recognized that Petitioners' position that the claims allow for transmission of Msg3 buffer data in conditions other than stated in the first transmitting limitation, "improperly reaches too broad a construction of the claim[s] as a whole" "[b]y isolating the first 'transmitting' limitation." Appx13; Appx63 (same). The Board agreed that the combination of the two transmitting limitations of the claims at issue was similar in scope as a limitation in a related patent that recited only one transmission limitation but stated that transmission of data stored in a Msg3 buffer occurred "only when" the UL Grant was received on the RAR message. Appx14-15; Appx64-65 (same).

Yet the Board then failed to apply this critical claim construction in analyzing Petitioners' invalidity arguments. Petitioners pointed to—and the Board relied on to find the claims unpatentable—prior art showing Msg3 buffer data *may be* transmitted, if there is data in the Msg3 buffer, in response to a RAR message. Appx17-39, Appx75-89. There was no identification of any prior art that did *not* transmit the stored Msg 3 buffer

data in response to a PDCCH UL Grant that was received during a random

access procedure in addition to or instead of a RAR UL Grant. *See id.* Stated

otherwise, there was no prior art teaching transmission of stored Msg3

buffer data *only when* the UL Grant was in a RAR. The Board identified no

prior art teaching the process depicted in Figure 9 of the '236 patent, which

is captured in the claims. *See id.* Nowhere in the FWDs does the Board even

address what happened in the prior art if a PDCCH UL grant was received

when there was stored Msg3 buffer data and an ongoing random access

procedure. *See id.*

The Board also stated in its FWD in the 757/1345 proceeding that

Petitioners' proffered evidence of "simultaneous development" supported

its conclusions. Appx28-29. But the Board did not address how if the prior

art LTE standard already disclosed the invention, which was its conclusion,

someone else would even need to subsequently agree (after the '236 patent

original assignee proposed to 3GPP a change based on its invention) that

the prior art LTE specification should be changed. *See generally id.*

In all the IPRs, the Board refused to consider the declarations

submitted by Dr. Todor Cooklev on behalf of Evolved. Appx23-25,

Appx59-60. The declarations failed to state the words "under penalty of

perjury" in laying forth his testimony. *See id.* Evolved's counsel

acknowledged during the hearings below this technical failure, but

indicated the testimony was truthful—it was consistent with testimony

given under oath in the related district court litigations with the

Petitioners—but that because Petitioners did not follow the proper IPR

procedure of moving to strike the declarations, the IPR procedures had not

provided opportunity for Evolved to submit corrected declarations.

Appx574-575, Appx908-909. Nonetheless the Board refused to consider the

Cooklev declarations without granting Evolved permission to submit

corrected declarations. Appx23-25, Appx59-60.

Summary of the Argument

Petitioners presented no evidence, and the Board identified no teaching, of prior art precluding stored Msg3 buffer data from being included in the response to a UL Grant not in a RAR message during a random access procedure as required by the Board's construction. Indeed, Petitioners' own experts admitted the prior art did not preclude such. But the Board's own claim construction opinion recognized that the second transmitting limitation explicitly requires "new data," instead of stored Msg3 buffer data, be transmitted in such situations, in accordance with the specification's description of the invention. Given the second transmitting limitation's requirements, the first transmitting limitation and claims as a whole are properly read as requiring Msg3 buffer data be sent *only* when the UL Grant being responded to was in a RAR message, and to preclude such Msg3 buffer data being transmitted in response to any other type of UL Grant. The Board erred because the prior art disclosure regarding an ongoing random access procedure is *not* a teaching to *preclude* transmission of stored Msg3 buffer data (and instead require new data transmission) in response to other UL Grants during a random access procedure.

24

The Board's determinations that the '236 patent claims are obvious are based on adoption of Petitioners' fallback arguments that the prior art taught the transmitting limitations of the independent claims even under the construction of the claims the Board adopted. But those red-herring arguments conflated a "message 3" — the label given in prior art to a message sent by a UE in response to a RAR message — with the content in such a message — either "stored Msg3 buffer data" or "new data" — and avoided addressing the actual claims' requirements about when exactly stored Msg3 buffer data can and *cannot* be the source of data for transmissions. The Board's decisions also confused a random access *procedure* — a procedure requiring four different steps including receipt by the UE of a contention resolution message in order to be completed — with a particular type of message within the larger procedure, a random access response (RAR) *message*.

The Board's obviousness conclusions are thus based on assumptions or mischaracterizations as to the prior art's teachings of the critical transmitting claim limitations that are unsupported by, indeed contradicted by, the record. No substantial evidence supports any finding

25

that the prior art discloses the two transmitting limitations of the claims as construed.

Moreover, the Board's determinations are internally inconsistent. For example, the Board indicated the prior art Kitazoe patent that the Board relied on in the 1228/1229 proceedings teaches the critical transmitting limitations, but also stated that what the UE should do in the critical situation of receiving an UL Grant not in a RAR message (*e.g.* a PDCCH UL Grant) during a random access procedure "does not relate" to what Kitazoe describes. Instead of supporting its determination, such statements are actually a finding that the prior art fails to teach the claimed invention's critical requirement that new data, not stored Msg3 buffer data, be transmitted in such a situation.

The Board's statements in its decision in the 757/1345 proceeding are also inconsistent and confused. For example, in denying rehearing in that proceeding, it stated that it had "implicitly" responded in its FWD to Evolved's contention that the prior art failed to teach the critical claimed requirement that Msg3 buffer data be transmitted only in response to RAR UL Grants, and not in response to any other UL Grants, by finding the prior art LTE "321" and "300" specifications teach this. In doing so it

26

contradicted its own earlier statements it had relied solely on the "321"

reference to find the critical second transmitting limitation that dictates the

proper "only if" interpretation of the first transmitting limitation. And the

Board's discussion of the "321" reference repeatedly mischaracterized the

reference, even misquoting it in stating it taught the transmitting

limitations. Moreover, the Board's statement that it "implicitly" addressed

the critical situation, just shows the Board included no reasoned

explanation that complies with this Court's precedent requiring a clear

explanation supported by evidence that modifying prior art to supply a

missing claim limitation would be obvious. In short, the Board erred in

concluding the claims are unpatentable for obviousness.

The PTO's own regulations require an IPR Petitioner to move to

exclude an exhibit they object to, or they otherwise *waive* such objections.

Under that procedure, a Patent Owner like Evolved then has an

opportunity to submit additional evidence such as corrected declarations.

But the Board did not require Petitioners to follow the proper procedure,

and thus did not give Evolved an opportunity to submit corrected

declarations containing the inadvertently omitted "under penalty of

perjury" language from its expert's declarations. This was improper.

27

However, even exclusion of Dr. Cooklev's declarations does not change the fact that Petitioners failed to meet *their* burden to produce any evidence proving invalidity of the claims as properly construed by the Board. Attorney argument alone can appropriately point out the failure of the Petitioners to produce evidence of the key claim limitations. The Board's determinations of unpatentability should be reversed.

Lastly, the IPR proceedings were conducted pursuant to the AIA which was enacted after the '236 patent was issued. The IPR procedure was unconstitutionally applied retroactively to take Evolved's property without due process or just compensation in violation of the Fifth Amendment of the U.S. Constitution.

Standard of Review

This Court reviews the Board's legal conclusions *de novo* and its factual findings for substantial evidence. *Rambus Inc. v. Rea*, 731 F.3d 1248, 1251 (Fed. Cir. 2013). Obviousness is a question of law based on underlying findings of fact. *In re Kubin*, 561 F.3d 1351, 1355 (Fed. Cir. 2009). The Board's ultimate determination of obviousness is reviewed de novo, and the Board's underlying factual findings are reviewed for substantial evidence. *Merck & Cie v. Gnosis S.P.A.*, 808 F.3d 829, 833 (Fed. Cir. 2015).

"Substantial evidence 'is more than a mere scintilla. It means such relevant evidence as a reasonable mind might accept as adequate to support a conclusion.'" *Microsoft Corp. v. Proxyconn, Inc.*, 789 F.3d 1292, 1297 (Fed. Cir. 2015) (quoting *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938)). Such review "involves examination of the record as a whole, taking into account evidence that both justifies and detracts from an agency's decision." *Microsoft*, 789 F.3d at 1312. This Court has "expressly held that the Board's opinion must explicate its factual conclusions, enabling [it] to verify readily whether those conclusions are indeed supported by 'substantial evidence' contained within the record." *Id.* at 1314; *see also Power Integrations, Inc. v. Lee*, 797 F.3d 1318, 1323 (Fed. Cir. 2015) (The Board

must "fully and particularly set out the bases upon which it reached that decision . . . .").

In addition, this Court may set aside the Board's decision if it is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with the law." *Veritas Techs. LLC v. Veeam Software Corp.*, 835 F.3d 1406, 1413 (Fed. Cir. 2016).

Argument

I.   **The Board erred by failing to apply its own construction and not requiring any evidence regarding operation of the prior art in the key situation where the UL grant being responded to is not a RAR UL grant.**

The Board's decisions improperly assume the prior art discloses the claimed transmitting limitations simply because the prior art contemplated sending stored Msg3 buffer data in response to a RAR UL Grant. But the Board did not address at all what happens in the prior art in the *key* situation where the UL grant during a random access procedure being responded to is *not* a RAR UL Grant. The fact that in the prior art stored Msg3 buffer data was always transmitted in response to a UL Grant received during a random access procedure, regardless of the type of UL Grant, was precisely the problem the invention was intended to address. SOC pp. 12-15, *supra*. The Board thus erred by failing to identify any prior art teaching of the key invention of the claims requiring transmission of stored Msg3 buffer data *only when* the UL Grant being responded to is a RAR UL Grant, and instead requiring new data transmission in response to any other UL Grant.

After agreeing with Evolved that Petitioners' claim construction was improper, the Board nonetheless summarily dismissed Evolved's arguments that the Petitioners (and Board) were failing to consider the situation where a "UL Grant is not in a random access response message but is instead contained in a PDCCH communication" by saying such was a "contrived hypothetical" that "does not relate" to what is described in the prior art. Appx83; *see also* Appx46, Appx95-97.

But such a situation is not contrived, nor hypothetical. It is one of the four possible situations expressly contemplated by the interplay of the two conditions in each transmitting limitation in the claims at issue, and the UE's response in such situation is precisely where the invention differentiated itself from the prior art. The claims require determination of 1) whether there is data stored in the Msg3 buffer, and 2) whether the specific message is a RAR message. Thus, the four situations provided for by the interplay of these conditions, and the responses required by the claims in each situation can be visualized as follows:

Situation 1 Data stored in Msg3 buffer: no UL signal message is RAR message: yes *Response* Transmit new data	*Situation 3* Data stored in Msg3 buffer: yes UL signal message is RAR message: yes *Response* Transmit Msg3 buffer data
Situation 2 Data stored in Msg3 buffer: no UL signal message is RAR message: no *Response* Transmit new data	*Situation 4* Data stored in Msg3 buffer: yes UL signal message is RAR message: no *Response* Transmit new data

In contrast, the prior art would transmit stored Msg3 buffer data in

response to any UL Grant received during an ongoing random access

procedure. *See* SOC pp. 12-13, *supra.* Thus, as the following chart showing

the results of the above four situations during a random access procedure

in the prior art as compared to under the '236 patent claims depicts, the

prior art would result in transmission of stored Msg3 buffer data in

Situations 3 and 4:

Situation 1 *Prior art Result:* Transmit new data *236 Patent Result:* Transmit new data	*Situation 3* *Prior art Result:* Transmit Msg3 buffer data *236 Patent Result:* Transmit Msg3 buffer data
Situation 2 *Prior art Result:* Transmit new data *236 Patent Result:* Transmit new data	*Situation 4* *Prior art Result:* Transmit Msg3 buffer data *236 Patent Result:* Transmit new data

In other words, in the prior art Msg3 buffer data would *not be* transmitted

only when there was data in the Msg3 buffer and there was a RAR UL

Grant, but *also when* there was a different UL Grant (*e.g.* PDCCH UL Grant)

received during an ongoing random access procedure.

The Board's own claim construction recognized that the claims

require the user equipment to transmit the Msg3 buffer data *only when* the

UL Grant being responded to is in a RAR message, and to exclude the

possibility of transmitting Msg3 buffer data (but instead transmit new

data) when the UL Grant is not in the RAR message (but is instead e.g. a

PDCCH UL Grant). Appx13, Appx62-64; *see also* Appx94 ("This

construction [that the Board adopted] is frequently referred to by the

parties as the 'only when' construction."). Petitioners' construction of the

claims, upon which its obviousness arguments revolved, violated the

explicit language of the second transmitting limitation and also how the

first transmitting limitation should be construed in light of the second

transmitting limitation. *See* Appx13-15.

Although Petitioners included short arguments in their Petitions that

the claims should be unpatentable even under Evolved's construction of

the claims (that the Board agreed was correct), those arguments are not

based on any evidence of actual teaching in the asserted prior art of the key

claim limitations. *E.g.,* Appx218, Appx291-292. As detailed below, those

arguments improperly conflated a RAR message ("Message 2") with the

larger random access procedure. Petitioners also conflated the *label*—

"Message 3"— given in the prior art to a UE transmission sent in response

to a RAR message with the *content* of that message—*e.g.* 1) "new data"

versus 2) data from the Msg3 buffer. In the prior art, the Msg3 buffer (when

it has stored data) is the source of the content for a transmission responsive

to a RAR message containing a RAR UL Grant. The invention, however,

was directed to *precluding* that stored Msg3 buffer data from *also* being a

potential source of content for responses to other types of UL Grants. Yet

Petitioners avoided even addressing the *source* of content for transmissions

in response to any other UL Grants during a random access procedure.

Instead they made red-herring arguments about how the prior art

shows a "message 3" is transmitted "only if" the UE "receives a random

access response."Appx218, Appx222, Appx292, Appx296. But the fact the

prior art defined a "message 3" as the transmission responsive to a RAR

message ("message 2" within a larger random access procedure) does *not*

tell you *the source of the content* in the "message 3" transmission, *nor* does it

disclose whether or not that source *could also* be the data source for transmissions responsive to other types of UL Grants. Petitioner thus failed to present evidence regarding the actual "only if" conditions the claims require.

The Board's decisions should not stand because the Board did not require the Petitioners to present any evidence, let alone substantial evidence, that any piece of prior art taught transmitting new data instead of stored Msg3 buffer data when a UL Grant being responded to during a random access procedure is not a RAR UL Grant. Likewise, they thus did not identify evidence that stored Msg3 buffer data is *only* transmitted when a RAR UL Grant is received. The Board merely adopted the Petitioners' red-herring arguments without carefully analyzing those arguments in relation to its own claim construction. In doing so, the Board failed to identify any evidence of the key transmitting claim limitations. The Board did not identify any evidence of the prior art transmitting new data, instead of stored Msg3 buffer data, in response to a PDCCH UL Grant received after a previous "message 3" was sent but before a contention resolution message was received by the UE and thus during an ongoing random access procedure. Petitioners and the Board did not identify any

36

prior art disclosure of user equipment that determined whether the specific

message is a RAR message in order to respond by sending Msg3 buffer

data *only* when the UL Grant is in a RAR message and to *instead* send new

data in response to all UL Grants other than in a RAR message. The Board's

findings as to the teachings of the asserted prior art are thus not supported

by substantial evidence, and its conclusion of obviousness is legal error.

> **A.** **The Board's obviousness conclusion in the 757/1345 proceeding is erroneous because no substantial evidence supports that the prior art LTE specifications teach to preclude transmission of stored Msg3 buffer data in response to PDCCH UL Grants during a random access procedure.**

The Board pointed to section 5.4.2.1 of the prior art LTE 321

specification as allegedly teaching that new data, instead of Msg3 buffer

data, must be transmitted whenever either of the conditions of the '236

patent claims' second transmitting limitation were met (*i.e.* when the two

conditions of the first transmitting limitation were not met). Appx21-22,

Appx28 (citing Appx1388); *see also* Appx45. But the Board's findings as to

this alleged disclosure of the prior art specifications is not supported by

substantial evidence as it is not supported by any evidence. Indeed, the

finding is belied by Petitioners' own admissions.

1.   The prior art LTE 321 specification does not disclose transmitting stored Msg3 Buffer data only in response to a RAR UL Grant.

The Petitioners admit that the prior art LTE 321 specification

does not preclude transmitting "message 3", by which they appear to

have meant "Msg3 buffer data," in response to PDCCH UL Grants.

> [T]he 321 reference was clear that a UE must transmit message 3 *if* it receives a random access response, but the 321 reference was less clear about whether the UE should transmit message 3 *only if* it receives a random access response. For instance, the 321 reference did not expressly state what must happen when a UE receives two uplink grants—one in a random access response, and the other in a PDCCH—during an ongoing random access procedure. The **321 reference** did permit the UE to discard either grant, which, if interpreted improperly, **might result in a UE incorrectly transmitting message 3 in response to the grant in the PDCCH.**

Appx218 (emphasis added); Appx292 (same).

Petitioners' expert likewise admitted during his deposition that

section 5.4.2.1 of the prior art LTE 321 specification, that the Board relied on

to find teaching of the key claim limitations, does *not* teach precluding

transmission of the Msg3 buffer data except in response to an UL grant

received in the RAR message. Appx1968, Appx1967-1968, Appx1979-1980

("… Section … 5.4.2.1 … does not preclude transmission of a Message3

buffer when something else gets triggered. … Q. Okay. So looking at

Exhibit 9, 5.4.2.1, what in here precludes transmitting Message3 buffer data

in something other than the condition that we've talked about before …? A.

That Section 5.4.2.1, by itself, does not."), Appx1982 (Section 5.4.1 and

5.4.2.1 "does not preclude that.").[5] Petitioners' expert further explained that

he was *not* using the prior art LTE specifications for the basis for his

opinion of invalidity under the Board's claim construction. Rather, he was

relying on a *post-invention* of the '236 patent *proposal* submitted to 3GPP to

change the LTE specification, as reflected in a *post-invention version* of the

LTE 321 specification for his opinion that the LTE specifications teach the

claims under the "only if" construction adopted by the Board. Appx1972,

Appx1978-1980, Appx1983-1984; *see also* Appx29 (discussing the

Qualcomm proposal submitted to 3GPP in late August 2008, after the '236

patent's August 11, 2008 priority date). But *post*-invention art is not a

proper basis for invalidation of the claims. *See Duke Univ. v. BioMarin*

Pharm. Inc., 685 Fed. App'x 967, 978 (Fed. Cir. 2017) (expert's testimony

---

[5] Apple and Microsoft's expert in the 1228/1229 proceedings similarly
admitted he had no reason to disagree with the '236 patent's statements
that under the prior art LTE standard stored Msg3 buffer data transmission
would be triggered by any type of UL grant during a random access
procedure. Appx2563-2565.

"falls short" to support Board's unpatentable for obviousness conclusion "because it does not address what an ordinary artisan would have done or understood … *prior to* the priority date of the [patent-at-issue]") (emphasis added) (non-precedential).

The Board tried to justify its conclusion by saying Evolved conceded the prior art LTE 321 specification teaches the critical claim limitations. Appx22-23 (citing Appx460-461). But Evolved made no such concession. The cited portion of Evolved's brief was merely demonstrating that Petitioners' rejected sufficient-not-necessary-conditions construction of the claims was *incorrect* because it was impossible to reconcile the results of that construction with the actual invention of the claims. Appx459-461.

The Board's footnote on Appx23 after its incorrect statement about Evolved's alleged concession also falsely suggests Evolved failed to address the shortcomings of Petitioners' "Scenario 3." First, Evolved does not bear the burden in these proceedings. *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1375, 1377 (Fed. Cir. 2016) (the petitioner in an inter partes review bears the burden of proving unpatentability). Second, Evolved clearly argued that Petitioners failed to ever present a *prima facie* case of invalidity. Appx477-480. Evolved pointed out that instead of addressing

the actual claim limitations of the '236 patent claims, Petitioners instead

engrafted into their Scenario 1 the condition that "the random access

procedure is ongoing." Appx479 (citing Appx228). To their Scenarios 2 and

3, Petitioners conversely only addressed that "the random access procedure

is <u>not</u> ongoing." *Id.* (citing Appx229). But as the '236 patent background

information and prior art LTE specification provide, and was never

disputed, following the transmission of "messages 1-3", a random access

procedure is still ongoing until the contention resolution message

("message 4")[6] has been successfully received. Appx156-167 at Fig. 5, 4:3:-

17, 8:38-40, 9:24-48; *see also* SOC pp. 10-11 & n.4, *supra.*

---

[6] While even the '236 patent referred to the different necessary types of
messages in a basic contention-based random access procedure as
messages 1-4, following the steps shown in the prior art LTE specification,
it specifically noted "if such use will not lead to confusion." Appx164 at
4:3-17. Use of the 1-4 number names can cause confusion because, as the
patent details, other messages can actually occur during a random access
procedure. *See* Appx151-171, *e.g.* at Fig. 8 (Appx159). Even the prior art 321
specification shows that multiple different RAR messages can be received
within a single random access procedure, and there can be multiple
transmissions in response, thus illustrating the framework shown in the
300 reference specification is not intended to indicate there can be only four
transmissions during a random access procedure. *See* Appx1383.

2.   The prior art LTE 321 specification condition of an "ongoing random access procedure" is not the same as the claimed condition of responding to a received RAR UL Grant.

Petitioners thus never even tried to prove the key claim limitations were disclosed by the prior art, as was undisputedly their burden. Requiring there be an "ongoing random access procedure" is *not* the same thing as requiring the specific UL Grant being responded to is a RAR UL Grant. Indeed, the failure of the prior art LTE specification to recognize and address the problems that can occur when a UL Grant other than a RAR UL Grant is received during an ongoing random access procedure was the very problem the patent described and addressed through its claimed invention. SOC section I.B, *supra*.

The prior art LTE 321 specification disclosure the Board's decision relies on says that Msg3 buffer data should be transmitted whenever there is "an ongoing Random Access procedure and there is [data] in the [Message3] buffer." Appx22 (quoting Appx1388). That is *not* a disclosure of *only* transmitting Msg3 buffer data under the situation described by the interplay of the two transmitting limitations of the '236 patent claims and as construed by the Board. The Board falsely equated an "ongoing Random

42

Access procedure" to the patent's condition requiring a RAR UL Grant .

Appx25; *see also* Appx20, App22, Appx23, Appx26, Appx27 (repeatedly

falsely equating an ongoing random access procedure with a Random

Access Response (message 2)). In making its conclusory statement that

section 5.4.2.1 of the LTE 321 prior art specification teaches the second

transmitting limitation of the claims, the Board even *misquotes* the section.

Appx28 (stating the section directs transmission of Msg3 buffer data "if

there is an ongoing Random Access Message …."); *cf.* Appx22, Appx1388

(actual prior art states "if there is an ongoing Random Access procedure

…"). The random access response (RAR) *message* ("message 2") is *not* the

same thing as the larger random access *procedure* that is ongoing until

receipt of the contention resolution message. *See* SOC pp. 10-11 & n.4,

supra.

 After the '236 patent's invention (and after the '236 patent's original

assignee proposed to 3GPP changing the LTE specification to reflect the

invention), this section 5.4.2.1 of the LTE standard specification was

changed to require that "the uplink grant was received in a Random Access

Response" instead of just the previous requirement that there be an

ongoing Random Access *procedure.* Appx199, Appx456-457, Appx2010-

2011. The change reinforces the former language did not mean the exact same thing.

3.   The Board's reliance on alleged simultaneous development does not support the Board's erroneous conclusion.

The Board also noted that Petitioners had argued "that evidence of simultaneous development by others shows that a person of ordinary skill in the art would have interpreted the 3GPP TS 300 and 3GPP TS 321 as teaching transmission of the data in the Msg3 buffer only if conditions (1) and (2) are met." Appx28-29. The Board then noted that Petitioners' first alleged evidence of simultaneous development shows "transmission of the data in the Msg3 buffer if conditions (1) and (2) are met." Appx29. The Board did *not* state it showed transmission *only* if those conditions were met as required by the claimed inventions. The Board then indicated a later, post-invention of the '236 patent submission to 3GPP by Qualcomm indicated the LTE specification should be changed to indicate a "HARQ should obtain the MAC PDU to transmit from the [Message 3] buffer *only* in response to UL grant in a Random Access Response." *Id.* The Board indicated this supported its earlier conclusion that the prior art LTE specification teaches the claimed invention. *Id.*

44

The Board never explained, however, how one other entity—clearly
after the invention of '236 patent and the proposal by LG (the original
assignee of the '236 patent) to 3GPP to change the LTE specification to
reflect the invention—proposing a change that should be made to the LTE
specification, to require certain data transmission only in response to a
Random Access Response, supports the Board's conclusion that the prior
art LTE specification already taught a UE operating as claimed in the '236
patent. If anything, it demonstrates the opposite, namely that the prior art
LTE standard relied upon by Petitioners did not disclose the claims of the
'236 patent.

The Board also provided no reasoning for supplying teachings
entirely missing from the prior art. This Court has indicated common sense
could potentially supply a claim limitation missing from the prior art in an
obviousness analysis, but if so 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, particularly "where the missing limitation goes
to the heart of an invention", this Court must do a "searching" review for a
"reasoned basis to resort to common sense." *Id.* Further the Court indicated
that finding a limitation that is entirely missing from the prior art to be

45

merely obvious to come up with has only been found proper in limited circumstances where "the limitation in question was unusually simple and the technology particularly straightforward" and finding such should be an "exception, rather than the rule." *Id.* at 1362. Indeed, improper "hindsight bias" and "*ex post* reasoning" should be guarded against. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007). UE operation as claimed in the '236 patent and LTE wireless communications technology are not unusually simple nor particularly straightforward technology.

The Board here certainly provided no reasoned explanation that can withstand searching review. Rather, the Board's decision improperly finds, contrary to the actual evidence of record, that the prior art LTE specification already disclosed the invention. Then the Board indicates that maybe someone else, after the invention of the '236 patent, also made the same invention, or at least supported changing the LTE specification to reflect the '236 patent's claimed invention. But this merely shows the prior art LTE specification did not already disclose the claimed invention. It thus undercuts, not supports, the basis of the Court's determination of unpatentability. Moreover, it provides no reasoned explanation as to how the post-invention recognized need for change in the LTE specification

shows the invention was merely obvious. *See DSS Tech. Mgmt, Inc .v Apple Inc.*, 885 F.3d 1367, 1375-77 (Fed. Cir. 2018) (holding a vague reference to ordinary creativity does not satisfy the Board's obligation to explain why modifying a prior art reference to contain a missing claim limitation would be obvious).

In denying Evolved's request for rehearing, the Board stated it "implicitly responded to" Evolved's argument that the prior art fails to teach operation of a UE that requires new data be sent when UL Grants outside a RAR message are received during a random access procedure and conversely limits transmission of stored Msg3 buffer data to *only* when the UL Grant is a RAR UL Grant. Appx47. But saying it "implicitly" responded to this just proves it provided no reasoned analysis that can withstand the required searching review for concluding a limitation entirely missing from the prior art was merely obvious.

> **4. The prior art LTE 300 specification was not relied upon by the Board in its FWD to support its incorrect conclusions, and nonetheless does not disclose the transmitting limitations of the '236 patent.**

In the rehearing denial, the Board then made reference to "the 321 and the 300 reference" teaching the critical *only if* behavior, suggesting

vaguely that perhaps somehow the 300 reference supplied teaching

missing from the 321 reference. *Id.* But earlier in the same rehearing denial,

it stated it relied solely on the 321 reference as teaching the second

transmitting limitation. Appx45 (citing Appx28). Thus, the Board's own

rehearing denial is internally inconsistent in suggesting it somehow

"implicitly" found the 300 reference supplied the second transmitting

limitation's critical requirement that new data must be sent whenever the

UL Grant is not in the RAR message.

Moreover, the Board's own claim construction recognized that the

second transmitting limitation's requirement that new data must be sent in

response to non-RAR UL Grants shows that the first transmitting limitation

is properly read as requiring transmission of stored Msg3 buffer *only if* the

UL Grant is in a RAR message (but not in response to other UL Grants).

Appx11-15. But the 300 reference, like the 321 reference, provides no

teaching of the required *only if* behavior. As discussed above, the Board's

analysis regarding the 321 reference improperly conflated prior art

disclosure regarding sending stored Msg3 buffer data to any UL Grant

during a random access *procedure* with a teaching regarding sending it only

in response to a RAR UL Grant. The prior art disclosure regarding an

48

ongoing random access procedure is *not* a teaching to *preclude* transmission

of stored Msg3 buffer data (and instead require new data transmission) in

response to other UL Grants during a random access *procedure*.

The 300 reference does nothing to correct the flaws in the Board's

analysis. It in fact makes clear that the random access response message is

merely one part in the larger random access procedure. It merely shows the

same basic random access procedure framework discussed in the

background section of the '236 patent—*i.e.* the four types of transmissions

necessary to complete the procedure. SOC, p. 10, *supra*. It, of course, shows

that a random access procedure requires a transmission by the UE

("message 3" transmission) in response to the base station's RAR message

("message 2")—as well as an earlier UE "message 1" transmission and a

later contention resolution "message 4" transmission by the base station.

But this part of the standard specifications does not even address what the

content of the "message 3" UE transmission should be—*e.g.* new data or

stored Msg3 buffer data, or when precisely it should be one versus the

other. Nor does it address what else can happen in real life operation of

UEs during random access procedures, or how the UE would respond to

any other UL Grant not in a RAR message received before receipt of a contention resolution message.

The fact that the 300 reference indicates in order to send a transmission responsive to a RAR message the UE has to have first received a RAR UL Grant, provides absolutely nothing relevant regarding how the UE might respond to a different type of UL Grant received later during the ongoing random access procedure. It does not teach the UE to preclude sending stored Msg3 *buffer* data in response to other non-RAR UL grants received during an ongoing random access procedure. It is important to not conflate a "message 3" with "stored Msg3 buffer data." "Message 3" is just a label for convenience of a transmission sent by the UE in response to a RAR message during a random access procedure (even though it is not necessarily the third transmission during a random access procedure and more than four transmissions can occur during a random access procedure). *See* p. 41 n. 6, *supra*. "Stored Msg3 buffer data" in contrast is data found in a specific buffer in the UE, which, as discussed earlier, even the Petitioners' expert acknowledged could be sent according to the prior art in circumstances other than in a response to the RAR message. *See* pp. 38-39, *supra*.

The 300 reference provides absolutely no evidence relevant to showing the critical limitations of the '236 patent claim. It does not teach new data must be transmitted in response to any UL Grant not in a RAR message during a random access procedure, and thus does not conversely teach transmitting stored Msg3 buffer data *only* if the UL Grant being responded to is in a RAR message.[7]

The Board erred by failing to identify any disclosure in any of the prior art of either the second transmitting limitation of the claims, or the first transmitting limitation *as construed*. Nor did the Petitioners or Board provide a reasoned explanation and evidentiary support that modification of the prior art to supply the missing limitations was merely obvious. Its decision is not supported by substantial evidence and should be reversed. *See In re Lemay*, 660 Fed. App'x 919, 922 (Fed. Cir. 2016) ("When no substantial evidence supports the PTAB's findings, we may reverse its findings without remanding the matter.") (non-precedential) (citing *Arendi*,

---

[7] Not surprisingly, given the 300 specification really adds nothing to the analysis, the 1228/1229 Petitions did not even rely on the 300 specification at all in their arguments. *See* Appx58, Appx108.

832 F.3d at 1366-67; *In re Giannelli*, 739 F.3d 1375, 1380 (Fed. Cir. 2014)); *see also DSS Tech.*, 885 F.3d at 1377.

B.   The Board's conclusions in the 1228/1229 proceedings are similarly flawed as Kitazoe also fails to teach the critical tranmission limitations.

Petitioners Apple and Microsoft apparently recognized the shortcomings of the prior art LTE specifications and, unlike the other Petitioners, did not rely on the prior art LTE specifications alone to argue the invalidity of any claim of the '236 patent. They pointed to the Kitazoe patent in combination with the prior art LTE 321 specification, and other prior art described in the '236 patent (or Liu), as allegedly teaching the independent, and most dependent, claims of the '236 patent. *See* Appx58, Appx108.[8]

But Petitioners Apple and Microsoft, and the Board, still failed to identify in any of the asserted prior art any disclosure of transmission of new data, instead of stored Msg3 buffer data, in response to a PDCCH UL Grant during an ongoing random access procedure. To the contrary, the

---

[8] Apple and Microsoft also relied on a separate Kitazoe patent for a teaching regarding dependent claim 5. *See* Appx87-89. Notably, Apple and Microsoft did not rely on the prior art LTE 300 specification.

Board shirked their responsibility to do so by saying this situation "does

not relate to what is described in Kitazoe." Appx83 (internal quotation

omitted); *see also* Appx97 (indicating the "contrived" situation the '236

patent was intended to address "is not … what a person of ordinary skill in

the art would understand from Kitazoe's teachings"). Rather than

providing support for their unpatentability conclusions, though, this

highlights the failure of the prior art to teach the actual claims. The Board's

own recognition that the prior art "does not relate" to not transmitting

stored Msg3 buffer data in response to a UL Grant *not* in a RAR message, is

thus actually a finding that the prior art does not teach the invention of the

claims.

Evolved never disputed that the prior art teaches transmitting

"message 3" in response to RAR UL Grants. *See* Appx82, Appx96. But that

is not the problem solved by the claims of the '236 patent. Importantly, the

Board's conclusions of unpatentability, however were based on no other

evidence than that. The Board stated that:

> Petitioner identifies Kitazoe's teaching that "the term 'message
> 3' refers to the scheduled transmission sent by the access
> terminal to [the] base station [] <u>as granted by the random access
> response message</u> from [the] base station.' [Appx702] (quoting
> [Appx1703] col. 8, ll. 32-35) (alterations by Petitioner).

> Supported by testimony of Dr. Wells, Petitioner reasons that …
> "[b]ecause the message 3 is sent when this particular uplink
> grant is received and this particular uplink grant is only
> included in the random access response . . . , Kitazoe teaches
> that message 3 is sent only when the random access response is
> received (i.e., only when 'the specific message is the random
> access response message')." *Id.* (citing [Appx1660-1661] ¶ 98).
> This reasoning is persuasive.

Appx81.

Finding this to be persuasive evidence of the actual claim limitations

was error. First, pointing out that the prior art labels something sent in

response to a RAR message as "message 3" does *not* tell you what the

content of that "message 3" is—*e.g.* "new data" or "Msg3 buffer data" or

when the content is one versus the other. Second, even if this were a

teaching to transmit Msg3 buffer data (as opposed to transmitting

something that is labeled as a "message 3" transmission no matter what it

contains), it is a fundamental logic error to assume that because Msg3

buffer data is transmitted under one specific condition (when a RAR UL

Grant is received), that establishes what also happens under all other

conditions. Evidence of something happening under condition X, does not

prove automatically what happens under condition Y or Z. A teaching that

Msg3 buffer data is transmitted in response to a RAR message ("message

2") is *not* a teaching that Msg3 buffer data is sent *only* under that condition, as the Board had construed the limitations. It is *not* a teaching to *preclude* Msg3 buffer data from *also* being sent under the different condition of a PDCCH Grant being received *after* the RAR message (message 2) and "message 3" response to the "message 2" but *before* the contention resolution message during an ongoing random access procedure. Yet that is a problem the invention of the '236 patent specifically addresses. SOC pp. 13-15, *supra*.

The Board also pointed to Kitazoe's teaching that its encrypted data (new data) is transmitted only after the random access procedure is complete, not in response to the RAR message (message 2). Appx82 (citing Petition's references to Kitazoe (Appx1685-1714)). In the rehearing denial, the Board stated that "we cited disclosure by Kitazoe identified by Petitioner that 'teach that the encrypted scheduled transmission message, i.e., the "new data," is transmitted only after the random access procedure is complete.'" Appx96 (citing Appx82). But a teaching that "new data" is transmitted *only after* the random access *procedure* is complete conversely teaches that new data is *not* transmitted *during* the random access *procedure*—*e.g.* in response to UL Grants other than in the RAR (Message 2

of the larger procedure). In other words, Kitazoe, like the prior art LTE 321

specification, merely teaches precisely the flawed prior art method the '236

patent inventors recognized and changed in their claimed invention.

The Board's own claim construction made clear that the claims

require that the transmission of data stored in the Msg3 buffer happens

"only when" both Msg3 buffer data exists *and* the UL Grant being

responded to was in the RAR message, and must *exclude* "the optional

possibility of transmitting data stored in the Msg3 buffer even when both

conditions are not satisfied." Appx63-64; *see also* Appx13, Appx94. The user

equipment of the invention thus must operate to require new data, not

Msg3 buffer data, be sent in response to any UL Grant not in a RAR

message (Message 2), even *during* an ongoing random access procedure.

See SOC pp. 20-21, *supra*.

Nothing in any of Petitioners' prior art showed anyone prior to

the '236 patent's invention had identified the usefulness of such an

invention, let alone disclosed a UE operating according to such. The prior

art LTE specification and Kitazoe at most taught a UE to transmit Msg3

buffer data based on whether or not a random access procedure was

ongoing. That is not the '236 patent's claimed requirement that Msg3 buffer

data be sent *only* when the UL Grant is in the RAR message and does not conversely require new data be sent in response to all PDCCH UL Grants. Like in *In re Facebook, Inc.*, the Board's obviousness conclusion should thus be reversed because there was no showing that the prior art disclosed a system *requiring* the rule recited by the claims but rather left open the possibility of action outside the claims. -- Fed. App'x --, 2018 U.S. App. LEXIS 22808, at *5-6 (Fed. Cir. Aug. 14, 2018) (non-precedential).

The Board erred by failing to identify any disclosure in any of the prior art of the transmitting limitations of the claims under its own claim construction. The requirement that the UE send Msg3 buffer data *only when* the two claim conditions of the first transmitting limitation are satisfied, and new data be otherwise sent (including in response to PDCCH UL Grant during ongoing random access procedure), is part of the explicit second transmitting limitation, as well as the first transmitting limitation of the independent claims as construed.[9] The obviousness determination of all claims is thus unsupported. *See In re Fine*, 837 F.2d 1071, 1076 (Fed. Cir.

---

[9] This requirement that new data must be sent in response to a PDCCH UL Grant is made even more explicit in some of the dependent claims. *See* SOF p. 19, *supra*.

1988) ("Dependent claims are nonobvious under section 103 if the independent claim from which they depend are nonobvious.") (citations omitted); *Ortho-McNeil Pharm., Inc. v. Mylan Labs., Inc.*, 520 F.3d 1358, 1365 (Fed. Cir. 2008) ("[I]f claim 1 is not obvious then claims 6-8 also cannot be obvious because they all depend from a nonobvious claim.") (citation omitted). The Board's determination of unpatentability is based on findings not supported by substantial evidence and should be reversed.

II.   The Board erred by refusing to consider the declaration by Evolved's expert without giving Evolved an opportunity to submit a corrected declaration.

The Board refused to give any weight to the Cooklev Declaration submitted in each proceeding because they failed to include language stating the statements were submitted "under penalty of perjury," saying to give them weight would "thwart the purpose" of rules regarding affidavit or declaration evidence. Appx23-25, Appx59-60. But its refusal to consider the filed exhibits also thwarted the purpose of its rule requiring a timely motion to exclude presenting objections to any submitted evidence so that the "party relying on evidence to which an objection is timely served may respond to the objection by serving supplemental evidence[.]"

37 C.F.R. § 42.64. Indeed, that regulation provides that a "motion to exclude evidence *must* be filed to preserve any objection." *Id.* (emphasis added).

Petitioners never filed any motion to exclude the Cooklev Declarations. *See generally* Appx172-180. Instead they merely stated untimely objections regarding the technical deficiency of the declarations in their reply briefs, to which, under the regulations and scheduling orders governing the IPR procedures, Evolved was not allowed to further respond. Appx503, Appx508-509, Appx848-849, Appx1179-1180.[10]

As Evolved indicated during the hearings below, had Petitioners followed the regulations and filed a timely motion to exclude, Evolved would have promptly submitted a new exhibit that made clear Dr. Cooklev's declarations were made "under the penalty of perjury." Appx574, Appx908. Furthermore, Evolved stated that Dr. Cooklev had

---

[10] In the 757/1345 IPR proceeding, Petitioners did earlier file a separate "Objections" document that included some specific objections to admissibility of certain *paragraphs* of the Dr. Cooklev declaration exhibit based on the alleged "conclusory" nature of opinions in those paragraphs and alleged "irrelevan[ce]" of certain paragraphs, but made no objection to the overall admissibility or motion to exclude the entire declaration exhibit based on the failure to include an "under penalty of perjury" statement in the declaration. Appx494-496.

submitted an expert report and given testimony under oath in a deposition

in the related district court proceeding against all of the Petitioners

consistent with the statements in the IPR declarations, so it was clear that

Dr. Cooklev believed in the statements and would swear to them.

Appx909; *see also* Appx574-75.

Yet, the Board nonetheless excluded the filed exhibits from the

evidence it would consider without requiring Petitioners to file a motion to

exclude, and thus deprived Evolved of the opportunity to correct the

technical defect pursuant to 37 C.F.R. § 42.64(b). This was improper under

the procedural regulations applicable to IPRs, and/or arbitrary, capricious,

and an abuse of discretion, and should therefore be remedied. *See* 5 U.S.C.

§ 706 ("The reviewing court shall … hold unlawful and set aside agency

action, findings, and conclusions found to be— (A) arbitrary, capricious, an

abuse of discretion, or otherwise not in accordance with law; … (D)

without observance of procedure required by law …"). "[A]gencies are

bound to follow their own rules, even self-imposed procedural rules …."

Hernandez v. Dep't of the Air Force, 498 F.3d 1328, 1332 (Fed. Cir. 2007)

(citation omitted).

Considering the filed declarations because Petitioners failed to file a

motion to exclude and thus waived any objection to the exhibits, or

allowing Evolved an opportunity to submit declarations in a corrected

format before refusing to consider their content, would not only be

consistent with the Patent Office's own regulations in 37 C.F.R. § 42.64, but

also with the statutory direction to the agency.

> Any oral or documentary evidence may be received, but the
> agency as a matter of policy shall provide for the exclusion of
> irrelevant, immaterial, or unduly repetitious evidence. … A
> *party is entitled* to present his case or defense by oral or
> documentary evidence, *to submit rebuttal evidence*, and to
> conduct cross-examination *as may be required for a full and true
> disclosure of the facts*.

5 U.S.C. § 556(d) (emphasis added); *see also Dell Inc. v. Acceleron, LLC*, 818

F.3d 1293, 1301 (Fed. Cir. 2016) (vacating a patent claim cancellation

because the Board denied a patent owner its procedural rights by relying

on assertions made after patent owner could meaningfully respond). The

Board's actions here did not give Evolved a fair opportunity to submit

supplemental/rebuttal evidence (declaration in corrected format), nor did

they promote full and true disclosure of the facts. To the contrary, the

Board's actions were intended to preclude consideration of a full record so

the Board could try to end the proceedings by simply adopting Petitioner's

conclusory, unsupported arguments, without addressing the true facts. *See, e.g.*, Appx45.

As detailed above, section I, *supra*, the Board's determinations of unpatentability should be reversed because they are not supported by substantial evidence and Petitioners failed to meet *their burdens* to produce any evidence proving the invalidity of the claims as construed. The exclusion of the Dr. Cooklev declarations does not excuse Petitioners' failure to meet their burden, as Evolved had no burden to meet and did not have to provide an expert declaration. Attorney argument alone can appropriately point out the shortcomings of the evidence submitted by the party bearing the burden to prove invalidity.

However, should the Court remand for any reason, the Board should be directed to allow Evolved an opportunity to file corrected declarations stating they are made under penalty of perjury and then consider that evidence. The statements in the declarations further demonstrate why the Board's conclusions of obviousness are contrary to the actual teachings of the prior art and not supported by substantial evidence. For example, Dr. Cooklev detailed that the prior art LTE 321 and 300 specifications do not teach the transmitting limitations of the '236 patent claims as the Board

properly construed them. Appx2067-2090. Dr. Cooklev also explained that

Kitazoe likewise does not teach the transmitting limitations as it does not

teach precluding Msg3 buffer data transmission in response to a PDCCH

UL Grant received during an ongoing random access procedure as the '236

patent contemplates. Appx2550-2551.

III. The proceedings violated Evolved's Constitutional rights

The IPR proceedings were conducted pursuant to the AIA which was

enacted after the '236 patent was issued. *See* Appx8, Appx151. The IPR

procedure was thus unconstitutionally retroactively applied to take

Evolved's property without due process or just compensation in violation

of the Fifth Amendment of the U.S. Constitution. The Supreme Court

specifically noted its recent decision in *Oil States* did not address

retroactive application of IPR proceedings or their compliance with the

Due Process Clause or Takings Clause. *Oil States Energy Servs., LLC v.*

Greene's Energy Grp., LLC, 138 S. Ct. 1365, 1379 (2018). A taking by a

Government agency of property such as a patented invention without just

compensation is unconstitutional. *See Horne v. Dept. of Agriculture*, 135 S.Ct.

2419, 2427 (2015). Because the AIA lacks any "just compensation"

provision, the PTO and PTAB's action should be void *ab initio*. *See id.* at

2431 (holding that takings may be raised as a defense against government

action, not requiring a party first to seek compensation under Tucker Act);

Eastern Enters. v. Apfel, 524 U.S. 498, 521 (1998) (noting Court has "granted

equitable relief for Takings Clause violations without discussing the

applicability of the Tucker Act" in cases where there was "lack of a

compensatory remedy"); *see also* Gregory Dolin and Irena D. Manta, *Taking*

Patents, 73 Wash. & Lee L. Rev. 719 (2016). And retroactively applying a

new review scheme to allow invalidation of a patent, after a patentee was

induced to disclose its invention to the public, violates due process as well.

See Welch v. Henry, 305 U.S. 134, 147 (1938) (citing cases holding invalid

under the due process clause "the taxation of gifts made and completely

vested before the enactment of the taxing statute"); *Eastern*, 524 U.S. at 532-

33 ("Retroactive legislation … presents problems of unfairness that are

more serious than those posed by prospective legislations, because it can

deprive citizens of legitimate expectations …"); *id.* at 537-38, 547-49, 556-57.

Conclusion

The Board's decisions should be reversed, or at least vacated and

remanded for further proceedings.

Respectfully submitted,

/s/Ryan M. Schultz

Christopher K. Larus
Ryan M. Schultz
Brenda L. Joly
Miles A. Finn
ROBINS KAPLAN LLP
800 LaSalle Avenue, Suite 2800
Minneapolis, MN 55402
Tel: (612) 349-8500
clarus@robinskaplan.com
rschultz@robinskaplan.com
bjoly@robinskaplan.com
mfinn@robinskaplan.com

Attorneys for Patent Owner-Appellant
Evolved Wireless LLC

Addendum

Appx Start No.	Appx End No.	Description
Appx1	Appx41	Final Written Decision in IPR2016-00757/IPR2016-01345 (Lead Case Paper 42, Filed 11/30/2017)
Appx42	Appx49	Decision Denying Patent Owner's Request for Rehearing in IPR2016-00757/IPR2016-01345 (Lead Case Paper 47, Filed 03/26/2018)
Appx50	Appx91	Final Written Decision in IPR2016-01228 (Paper 27, Filed 11/30/2017)
Appx92	Appx99	Decision Denying Patent Owner's Request for Rehearing in IPR2016-01228 (Paper 32, Filed 03/26/2018)
Appx100	Appx142	Final Written Decision in IPR2016-01229 (Paper 27, Filed 11/30/2017)
Appx143	Appx150	Decision Denying Patent Owner's Request for Rehearing in IPR2016-01229 (Paper 32, Filed 03/26/2018)
Appx151	Appx171	U.S. Patent No. 7,881,236 (Exhibit 1001 in each IPR proceeding)

UNITED STATES PATENT AND TRADEMARK OFFICE
_____

BEFORE THE PATENT TRIAL AND APPEAL BOARD
_____

ZTE (USA) INC., HTC CORPORATION, HTC AMERICA, INC.,
SAMSUNG ELECTRONICS CO., LTD., AND SAMSUNG
ELECTRONICS AMERICA, INC.,
Petitioners,

v.

EVOLVED WIRELESS LLC,
Patent Owner.
_____

Case IPR2016-00757
Case IPR2016-01345[1]
Patent 7,881,236 B2

_____

Before WILLIAM V. SAINDON, PATRICK M. BOUCHER, and
TERRENCE W. McMILLIN, *Administrative Patent Judges*.

McMILLIN, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

---

[1] These cases have been consolidated. Unless otherwise indicated, citations
are to the record of IPR2016-00757.

IPR2016-00757
Patent 7,881,236 B2

In response to a Petition (Paper 3, "Pet.") filed by ZTE (USA) Inc., HTC Corporation, and HTC America, Inc., (collectively, "Petitioner"), we instituted an *inter partes* review of claims 1–10, 12, and 13 of U.S. Patent No. 7,881,236 B2 ("the '236 patent"). Paper 11 ("Dec."), 19. Samsung Electronics Co., Ltd., and Samsung Electronics America, Inc., filed a Petition in IPR2016-01345 that was substantially identical to the Petition in this proceeding, and trial was instituted in IPR2016-01345 on the same grounds as in this proceeding. Paper 12, 2. Therefore, IPR2016-01345 was consolidated with this proceeding. *Id*. During the trial, Evolved Wireless LLC ("Patent Owner") timely filed a Response (Paper 22, "PO Resp."), to which Petitioner timely filed a Reply (Paper 28, "Reply"). An oral hearing was held on August 8, 2017, and a copy of the transcript was entered into the record. Paper 36 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of the claims on which we instituted trial. Based on the record before us, Petitioner has shown, by a preponderance of the evidence, that claims 1–10, 12, and 13 are unpatentable.

I. BACKGROUND

A. *The '236 Patent*

The '236 patent "relates to a mobile communication technology." Ex. 1001, col. 1, ll. 17–18. In particular, the patent describes a random access procedure for user equipment ("UE") and a base station in a telecommunication system. *Id.* at col. 3, ll. 42–59. Figure 1 of the '236 patent illustrates a particular example of such a telecommunication system—

IPR2016-00757
Patent 7,881,236 B2

the Evolved Universal Mobile Telecommunication System ("E-UMTS"),
and is reproduced below.

FIG. 1
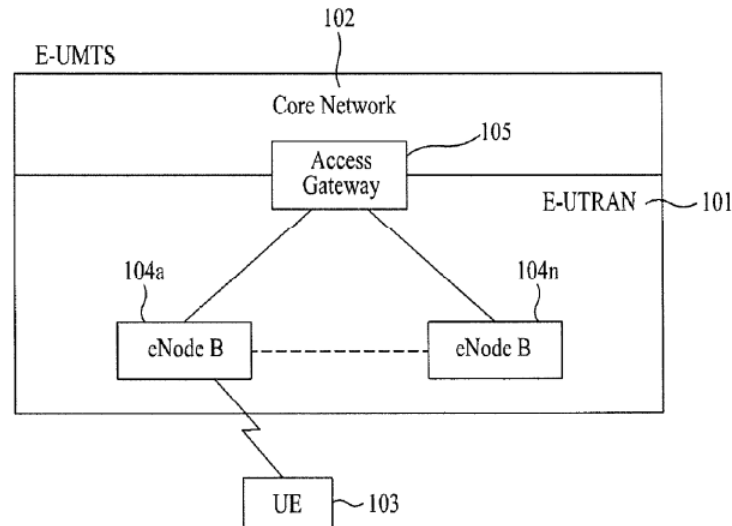
Figure 1 provides a schematic view of a network architecture for the E-
UMTS, which may be conceived in terms of two component networks:
Evolved UMTS Terrestrial Radio Access Network ("E-UTRAN") 101 and
Core Network 102. *Id.* at col. 1, ll. 26–35. The first of these, E-UTRAN
101, may include user equipment ("UE") 103, multiple base stations 104
(referred to in the '236 patent as "eNode B" or "eNB"), and Access Gateway
("AG") 105. *Id.* at col. 1, ll. 35–39. Access Gateway 105 is positioned at
the end of the network and connected to an external network, and can
include a portion for processing user traffic and a portion for processing
control traffic. *Id.* at col. 1, ll. 39–41.

      As the '236 patent describes, "a UE performs the random access
procedure" in a number of instances, including "when the UE performs

IPR2016-00757
Patent 7,881,236 B2

initial access" to a base station and "when there is uplink data transmission
in a situation where uplink time synchronization is not aligned or where a
specific radio resource used for requesting radio resources is not allocated."
Id. at col. 3, ll. 42–57. A version of Figure 5 of the '236 patent annotated by
Petitioner (Ex. 2009, 12) is reproduced below.
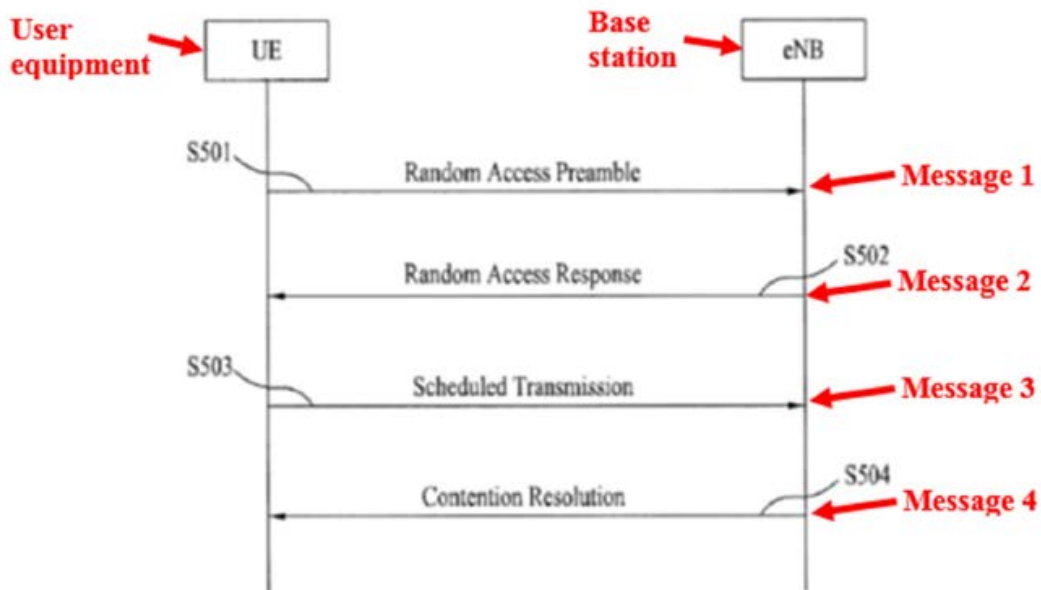
Figure 5 shows an example of a random access procedure performed
between user equipment UE and base station eNB. Ex. 1001, col. 6, ll. 53–
55. The procedure begins with transmission of a "random access preamble"
from the UE to the base station at step S501 (referred to as a "message 1"
transmitting step). *Id.* at col. 4, ll. 3–7. The UE receives a "random access
response" from the base station at step S502 "in correspondence with the
transmitted random access preamble" (referred to as a "message 2" receiving
step). *Id.* at col. 4, ll. 7–11. Of particular relevance, the UE then transmits
an uplink message to the base station at step S503 (referred to as a "message
3" or "Msg3" transmitting step). *Id.* at col. 4, ll. 11–14. The UE receives a

IPR2016-00757
Patent 7,881,236 B2

corresponding "contention resolution" message from the base station at step
S504 (referred to as a "message 4" receiving step). *Id.* at col. 4, ll. 14–17.

In the random access procedure, the UE stores data to be transmitted
via the message 3 in a "Msg 3 buffer" and transmits the stored data "in
correspondence with the reception of an Uplink (UL) Grant signal." *Id.* at
col. 4, ll. 18–21. The UL Grant signal indicates information about uplink
radio resources that may be used when the UE transmits a signal to the base
station. *Id.* at col. 4, ll. 21–26. For example, the UL Grant could be
received on the Physical Downlink Control Channel (PDCCH), indicating
that new data may be transmitted, or the UL Grant could be received on the
Physical Downlink Shared Channel (PDSCH), which indicates that it was
received in a random access response message (i.e., message 2). *Id.* at col.
5, ll. 9–22. Thus, some UL Grants are received as part of the above message
1-2-3-4 random access procedure, and some are not. According to the '236
patent, then-current LTE system standards provided that data stored in the
Msg3 buffer of the UE would be transmitted to the base station "*regardless
of* the reception mode of the UL Grant signal," and that "if the data stored in
the Msg3 buffer is transmitted in correspondence with the reception of *all*
UL Grant signals, problems may occur." *Id.* at col. 4, ll. 26–32 (emphases
added). Thus, the alleged problem is that the UE could send Msg3 buffer
data when it was not supposed to, outside of the proper message 1-2-3-4
random access procedure. The '236 patent purports to solve such problems.
Id. at col. 4, ll. 33–34.

Figure 9 of the '236 patent is reproduced below.

FIG. 9
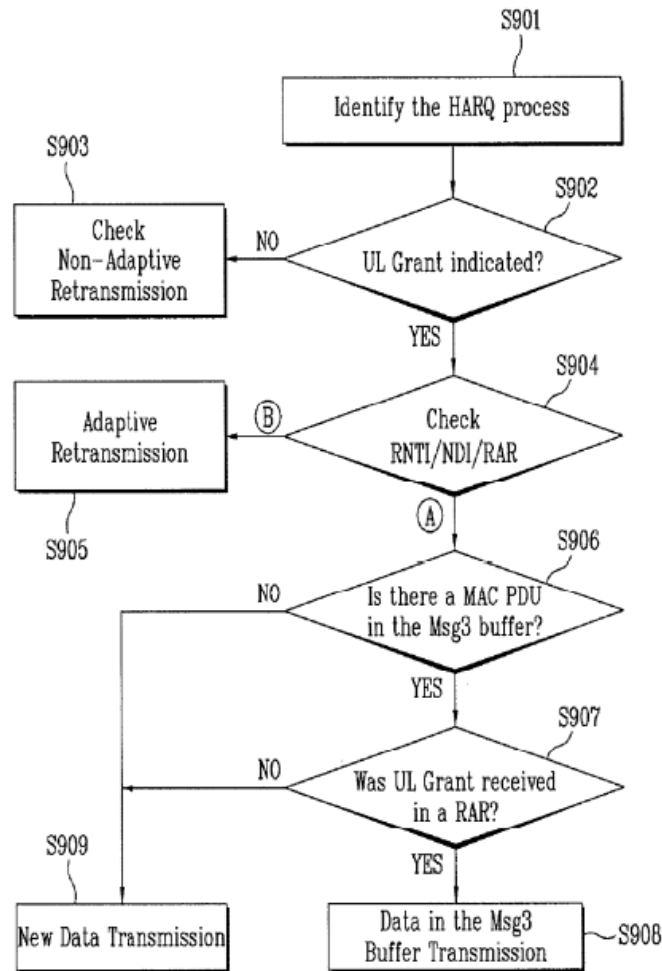
Figure 9 is a flowchart of a method showing the operation of an uplink Hybrid Automatic Repeat Request ("HARQ") entity in a UE. *Id.* at col. 13, ll. 35–39. After a UL grant signal is received from the base station at step 902, the UE determines at step 906 whether there are data in the Msg3 buffer. *Id.* at col. 13, ll. 42–44. If so, a further determination is made at step 907 whether the received UL grant signal is on a random access response ("RAR") message, i.e., that the UL grant was on a message 2 in the above

6

IPR2016-00757
Patent 7,881,236 B2

random access procedure. *Id.* at col. 13, l. 66–col. 14, l. 3. The UE transmits the data in the Msg3 buffer to the base station "only when" both conditions are met, i.e., "only when there is data [stored]in the Msg3 buffer when receiving the UL Grant signal and the UL Grant signal is received on the random access response message (S908)." *Id.* at col. 14, ll. 3–7. Conversely, if either condition is not met, i.e. there are no data in the Msg3 buffer or the UL Grant signal is not on a random access response message, then the UE determines that the base station is making a request for transmission of new data and performs new data transmission at step 909. *Id.* at col. 14, ll. 7–13.

B. Illustrative Claims

Claims 1 and 7 of the '236 patent, reproduced below, are independent claims respectively directed at the above-described method and at user equipment that implements the above-described method.

> 1. A method of transmitting data by a user equipment through an uplink, the method comprising:
>
> receiving an uplink grant (UL Grant) signal from a base station on a specific message;
>
> determining whether there is data stored in a message 3 (Msg3) buffer when receiving the UL Grant signal on the specific message;
>
> determining whether the specific message is a random access response message;
>
> transmitting the data stored in the Msg3 buffer to the base station using the UL Grant signal received on the specific message, if there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message; and
>
> transmitting new data to the base station in correspondence with the UL Grant signal received on the specific message, if there is no data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message or the specific message is not the random access response message.

7

IPR2016-00757
Patent 7,881,236 B2

7. A user equipment, comprising:

      a reception module adapted to receive an uplink grant (UL Grant) signal from a base station on a specific message;

      a transmission module adapted to transmit data to the base station using the UL Grant signal received on the specific message;

      a message 3 (Msg3) buffer adapted to store UL data to be transmitted in a random access procedure;

      a Hybrid Automatic Repeat Request (HARQ) entity adapted to determine whether there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is a random access response message, acquiring the data stored in the Msg3 buffer if there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is the random access response message, and controlling the transmission module to transmit the data stored in the Msg3 buffer to the base station using the UL Grant signal received by the reception module on the specific message; and

      a multiplexing and assembly entity used for transmission of new data,

      wherein the HARQ entity acquires the new data to be transmitted from the multiplexing and assembly entity if there is no data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the specific message or the received message is not the random access response message, and controls the transmission module to transmit the new data acquired from the multiplexing and assembly entity using the UL Grant signal received by the reception module on the specific message.

C. Instituted Grounds of Unpatentability

We instituted trial for challenges under 35 U.S.C. § 103(a)[2] over the following combinations of references. Dec. 19.

---

[2] Because the '236 patent has a filing date before September 16, 2012 (the effective date of the Leahy-Smith America Invents Act (AIA), Pub. L. No. 112-29, § 4(c), 125 Stat. 284 (2011)), we refer herein to the pre-AIA versions of 35 U.S.C. §§ 102 and 103.

IPR2016-00757
Patent 7,881,236 B2

References	Challenged Claims
3GPP TS 300[3] and 3GPP TS 321[4]	1–6
3GPP TS 300, 3GPP TS 321, and Ericsson[5]	7–10, 12, 13

Petitioner asserts that 3GPP TS 300 and 3GPP TS 321 are printed publications published prior to the filing date of the provisional patent application from which the '236 patent claims priority and are thus prior art under 35 U.S.C. § 102(a). Pet. 10–15. Petitioner asserts that Ericsson is prior art under 35 U.S.C. § 102(e) because the application on which it was based was filed prior to the filing date of the provisional patent application from which the '236 patent claims priority. *Id.* at 11. Patent Owner does not challenge any of these assertions of Petitioner or otherwise challenge the prior art status of the cited references. *See generally* PO Resp. Based on this record, Petitioner has established the cited references are prior art under 35 U.S.C. §§ 102 and 103.

D. Real Parties in Interest and Related Proceedings

Petitioner identifies ZTE (USA) Inc., HTC Corporation, and HTC America, Inc. as the real parties in interest. Pet. 2.[6] Patent Owner identifies only itself as a real party in interest. Paper 7, 2.

The parties indicate that the '236 patent is the subject of several district-court litigations: *Evolved Wireless, LLC v. Apple, Inc.*, No. 1:15-cv-542 (D. Del.); *Evolved Wireless, LLC v. HTC Corp.*, No. 1:15-cv-543

---

[3] 3GPP TS 36.300 v8.4.0 (2008) (Ex. 1002, "3GPP TS 300").
[4] 3GPP TS 36.321 v8.2.0 (2008) (Ex. 1003, "3GPP TS 321").
[5] U.S. Patent No. 9,204,468 B2, filed June 9, 2008, issued Dec. 1, 2015 (Ex. 1004, "Ericsson").
[6] Samsung Electronics Co., Ltd., and Samsung Electronics America, Inc., were identified as the real parties in interest in IPR2016-01345 (Paper 1, 3).

IPR2016-00757
Patent 7,881,236 B2

(D. Del.); *Evolved Wireless, LLC v. Lenovo Group Ltd.*, 1:15-cv-544

(D. Del.); *Evolved Wireless, LLC v. Samsung Electronics Co. Ltd.*, 1:15-cv-

545 (D. Del.); *Evolved Wireless, LLC v. ZTE Corp.*, 1:15-cv-546 (D. Del.);

Evolved Wireless LLC v. Microsoft Corp., 1:15-cv-547 (D. Del.). Pet. 2–3;

Paper 7, 2–3. In addition, the '236 patent is the subject of the following

inter partes reviews: IPR2016-01228 and IPR2016-01229.

II. ANALYSIS

A. *Claim Construction*

The Board interprets claims of an unexpired patent using the broadest

reasonable construction in light of the specification of the patent in which

they appear. *See* 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*,

136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest

reasonable interpretation standard); Office Patent Trial Practice Guide, 77

Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). "[T]he claim construction

inquiry . . . begins and ends in all cases with the actual words of the claim."

Renishaw PLC v. Marposs Società per Azioni, 158 F.3d 1243, 1248 (Fed.

Cir. 1998). Under the broadest reasonable construction standard, claim

terms are generally given their ordinary and customary meaning, as would

be understood by one of ordinary skill in the art at the time of the invention.

In re Translogic Tech., Inc., 504 F.3d 1249, 1257 (Fed. Cir. 2007).

A claim-construction disagreement between the parties is grounded in

use of the word "if" in the two "transmitting" limitations of independent

claims 1 and 7. *See* Pet. 16–19; PO Resp. 9–32; Reply 3–9. Those

limitations implicate two conditions, resulting in different data being

transmitted depending on whether both conditions are satisfied or not. The

IPR2016-00757
Patent 7,881,236 B2

first condition is whether "there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message," and the second condition is whether "the specific message is the random access response message." Ex. 1001, col. 16, l. 59 – col. 17, l. 3; col. 17, l. 38 – col. 18, l. 7. "If" both conditions are satisfied, the "data stored in the Msg3 buffer" are transmitted to the base station; and "if" either condition is not satisfied, "new data" are transmitted to the base station. *Id.*

Petitioner presents an argument that addresses the first "transmitting" limitation in isolation, contending that the limitation "requires no construction and should be given its plain and ordinary meaning consistent with the broadest reasonable interpretation standard." Pet. 16. According to Petitioner, "[t]he first 'transmitting' feature is straight-forward," because it requires transmitting the data stored in the Msg3 buffer when the two conditions are met and nothing more. *Id.* That is, Petitioner contends that "if" in the first "transmitting" limitation should be construed as introducing a "*sufficient* condition." *Id.* at 16–17.

Patent Owner presents a counterargument that considers an interplay between the two "transmitting" limitations, correctly observing that the two conditions "are independent of one another" and that the recitations in the two "transmitting" limitations are "logical opposite[s]." PO Resp. 9–12. As Patent Owner asserts, "both limitations cannot, at the same time, be true." *Id.* at 12. In considering this logical interplay, Patent Owner contends that "if" in each "transmitting" limitation should therefore be construed as introducing a *necessary* condition: "The proper claim construction is one that follows the claim's plain language; that is Msg3 data is transmitted if

11

IPR2016-00757
Patent 7,881,236 B2

[both conditions are] met . . . and new data are transmitted if [either condition] is not met." *Id.* at 13.[7]

We have considered the positions of both parties, and conclude that Patent Owner presents the more compelling reading of the claim. In isolation, the plain and ordinary meaning of "if" is amenable to both *sufficient-condition* and *necessary-condition* constructions. Indeed, it is trivial to construct English sentences in which a listener would naturally understand one of those constructions to be implicated. For instance, "If there is smoke, there is fire" is naturally understood not to preclude the possibility of fire if there is no smoke (sufficient if). Conversely, "If you take another step, I'll shoot," is naturally understood to mean that the speaker will not shoot if the listener does not take another step (necessary if).

To resolve the ambiguity, we look, as we must, to the context provided by the claims themselves, as well as to the Specification in whose light they must be considered under the broadest-reasonable-interpretation standard. *See Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996) ("the context of the surrounding words of the claim also must be considered in determining the ordinary and customary meaning of

---

[7] Patent Owner characterizes its position as equivalent to reciting "but not transmitting the new data" as part of the first "transmitting" limitation, i.e., when both conditions are met; and to reciting "but not transmitting any data stored in the Msg3 buffer" as part of the second "transmitting" limitation, i.e., when at least one of the conditions is not met. PO Resp. 10. Although such additional language is logically consistent with Patent Owner's position, we find it unnecessary to incorporate such negative limitations into the claims; the proper construction can be resolved by correctly construing the meaning of "if."

12
Appx12

IPR2016-00757
Patent 7,881,236 B2

those terms"). We agree with Patent Owner's characterization of
Petitioner's position as improperly including the optional possibility of
transmitting data stored in the Msg3 buffer even when both conditions are
not satisfied. *See* PO Resp. 12–13. Such an optional possibility is a logical
consequence of a sufficient-if construction, and we acknowledge that such a
reading would be tenable if the claim included only the first "transmitting"
step.[8] But the claim explicitly answers the question of what occurs when at
least one of the conditions is not satisfied: "new data" are transmitted to the
base station. Ex. 1001, col. 16, l. 16 – col. 17, l. 3; col. 17, l. 52 – col. 18, l.
7. By isolating the first "transmitting" limitation, Petitioner improperly
reaches too broad a construction of the claim as a whole.

Furthermore, Patent Owner's proposed construction is consistent with
the Specification of the '236 patent. For example, in the Background of the
Invention , the Specification observes that, in the prior art, "if the UL Grant
signal is received in a state in which data is stored in the Msg3 buffer, the
data stored in the Msg3 buffer is transmitted *regardless of* the reception
mode of the UL Grant." *Id.* at col. 4, ll. 26–30 (emphasis added). As
explained in the Specification, applicants purport to resolve such a
deficiency because "if the data stored in the Msg3 buffer is transmitting in
correspondence with the reception of *all* UL Grant signals, problems may
occur." *Id.* col. 4, ll. 30–34 (emphasis added). In addition, the description
of Figure 9 of the patent, reproduced above, explicitly explains that data in
the Msg3 buffer are transmitted to the base station "only when" both
conditions recited in the claims are met. *Id*. at col. 14, ll. 3–8.

---

[8] Indeed, this is precisely the case for a child of the '236 patent, as discussed
infra.

IPR2016-00757
Patent 7,881,236 B2

The parties also address the relevance of the prosecution history of a child of the '236 patent. PO Resp. 22–25; Reply 8. During prosecution of U.S. Patent No. 9,532,336 B2 (Ex. 2007, "the '336 patent"), which shares the same written description as the '236 patent, explicit language was included in the independent method claims to require transmission of data stored in the Msg3 buffer "only when" such data are stored in the Msg3 buffer and the UL Grant was received on the random access response message. Ex. 2008, 146. Such "only when" language did not appear in the claims as originally filed, and was added in response to a rejection in which the Examiner made the following remarks:[9]

> Claim 1 recites the limitation "if there is data stored in the Msg3 buffer and if the UL Grant signal was received on the random access response." The limitation is directed to the action to transmit the UL Grant, however, *there is no language to limit the claim to only this scenario* or the claim language *does not provide an alternative for what if the statement is not true*. The Applicant's invention is not being claimed in independent claims 1 and 9.

Id. at 139 (emphases added).

Importantly, the claims in the '336 patent do not include language that corresponds to the second "transmitting" limitation of the claims at issue in this proceeding—the "only when" language was added to a limitation that corresponds to the first "transmitting" limitation. We agree with Patent Owner's characterization of the relevance of these facts and of the Examiner's prior basis for rejection of unamended claims of the '336 patent. That is "the Examiner specifically rejected a claim without the 'only when'

---

[9] Independent method claim 26 of the '336 patent was added by amendment at the same time, including the "only when" language. Ex. 2008, 151.

IPR2016-00757
Patent 7,881,236 B2

language *because there was no alternative recited in the claim . . . if the condition[s were] not met*." PO Resp. 24. The addition of the "only when" language in the '336 patent resolves the ambiguity, recognized by the Examiner, that is otherwise resolved in the claims at issue in this proceeding by the presence of the second "transmitting" limitation. In light of this difference in the claims in the two patents, we are not persuaded by Petitioner's argument that "Patent Owner's decision to narrow the language from 'if' in the '236 patent to 'only when' in the child patent demonstrates the difference in meaning between these two phrases and belies Patent Owner's argument that they mean the same thing." Reply 8.

For these reasons, we agree with Patent Owner that "if" in the "transmitting" limitations of independent claims 1 and 7 is properly construed, under the broadest-reasonable-interpretation standard, as introducing *necessary* conditions, rather than sufficient conditions.[10] We adopt such a construction for purposes of this Decision.

B. Legal Principles Governing Obviousness

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are "such that the

---

[10] This construction is consistent with the reasoning of *Ex Parte Schulhauser*, Appeal No. 2011-002626, slip op. (PTAB Sept. 19, 2012) (precedential). Similar to the claims at issue in this proceeding, *Schulhauser* considered a claim that recited "mutually exclusive" steps. *Schulhauser*, slip op. at 6. The Board held that, under the broadest reasonable interpretation, the claim "covers at least two methods, one in which the prerequisite condition for the [first] step is met and one in which the prerequisite condition for the [second] step is met." *Id.* at 8. The Board did not thereby hold that the language of one of the steps could simply be read out of the claim (as Petitioner's argument would effectively require) nor that that language could not properly inform construction of the other of the steps.

IPR2016-00757
Patent 7,881,236 B2

subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." We resolve the question of obviousness on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations.[11] *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

C. Level of Skill in the Art

Petitioner contends:

> The person of ordinary skill in the art of the subject matter of the 236 patent would have had a master's degree in electrical engineering with 2-3 years of experience in cellular communication system, and would have been aware of the efforts of the Third Generation Partnership Project and its various groups. (Ex. 1016, Min decl., at ¶ 34.) Alternatively, that person would have had a Ph. D. in electrical engineering with the same familiarity with the work of the Third Generation Partnership Project and its various groups. (*Id.*)

Pet. 6. Patent Owner does not present any argument or contentions relating to the level of skill in the art. *See generally* PO Resp. We find Petitioner's proposal reasonable, and accordingly, based on this record, we adopt the level of skill in the art proposed by Petitioner.

D. Obviousness of Claims 1–6 Over 3GPP TS 300 and 3GPP TS 321

Independent claim 1 and dependent claims 2–6 are challenged as obvious over 3GPP TS 300 (Ex. 1002) and 3GPP TS 321 (Ex. 1003) (Pet.

---

[11] The record does not include allegations or evidence of objective indicia of nonobviousness.

IPR2016-00757
Patent 7,881,236 B2

20–48), and the Board instituted an *inter partes* review on this challenge
(Dec. 19).

1. 3GPP TS 300 (Ex. 1002)

Technical Specification 300 is published by the 3GPP[12] and "provides
an overview and overall description of the E-UTRAN (Evolved Universal
Terrestrial Radio Access Network) radio interface protocol architecture" in
an LTE system. Ex. 1002, 11. Section 10.1.5 describes a Random Access
Procedure, and section 10.1.5.1 outlines a contention-based random access
procedure. *Id*. at 48–49.

2. 3GPP TS 321(Ex. 1003)

Technical Specification 321 is published by the 3GPP and "specifies
the E-UTRA [Evolved Universal Terrestrial Radio Access] MAC [Medium
Access Control] Protocol" in an LTE system. Ex. 1003, 6. Section 5.4 of
3GPP TS 321 describes uplink data transfer, section 5.4.1 describes UL
Grant reception, and section 5.4.2.1 states:

> At the given TTI [transmission time interval], the HARQ entity
> shall:
>
> - if an uplink grant indicating that the NDI has been incremented
> compared to the value in the previous transmission of this HARQ
> process is indicated for this TTI or if this is the very first
> transmission for this HARQ process (i.e. a new transmission
> takes place for this HARQ process):
>
>> - if there is an ongoing Random Access procedure and
>> there is a MAC PDU in the [Message3] buffer:

---

[12] The Third Generation Partnership Project is a standards-setting
organization for mobile communications and was developing a cellular
communication system known as the Long Term Evolution (LTE). Pet. 6;
PO Resp. 2. *See also* Ex. 1001, col. 1, ll. 22–25.

IPR2016-00757
Patent 7,881,236 B2

> - obtain the MAC PDU to transmit from the [Message3] buffer.

> - else, if the "uplink prioritisation" entity indicates the need for a new transmission:

>> - obtain the MAC PDU to transmit from the "Multiplexing and assembly" entity;

>> - instruct the HARQ process corresponding to this TTI to trigger a new transmission using the identified parameters.

Id. at 18 (brackets in original).

3. Obviousness Analysis

Petitioner asserts that claims 1–6 would have been obvious over the combination of 3GPP TS 300 and 3GPP TS 321. Pet. 20–48. Petitioner advances several reasons why persons of ordinary skill in the art would have been motivated to combine the teachings of 3GPP TS 300 and 3GPP TS 321. *Id*. at 46–48 (citing Ex. 1016 (Min Decl. ¶¶ 116–119)). Petitioner asserts skilled artisans "would have consulted the two complementary references together because both specifications were part of the then-current LTE standard" and such artisans "considered the LTE standard as one collective reference set." *Id*. at 46. The '236 patent repeatedly refers to the "LTE system standard" as a whole. Ex. 1001, col. 4, l. 26, col. 12, l. 17, col. 12, l. 49, col. 13, l. 6. Petitioner also asserts "[s]killed artisans also would have consulted the 300 and 321 references together because both specifications described LTE's random access procedure" and "[t]o understand and implement the random access procedure, the skilled artisan would have needed to consult both specifications together, rather than

IPR2016-00757
Patent 7,881,236 B2

treating each specification in isolation." Pet. 46. And, 3GPP TS 300 references "3GPP TS 321." Ex. 1002, 11. Patent Owner does not contest Petitioner's assertions related to the reason for combining the teachings of the cited references. *See generally* PO Resp. Based on this record, we conclude Petitioner has established that a person of ordinary skilled in the art would have had a reason to combine the teachings of 3GPP TS 300 and 3GPP TS 321.

a. Independent Claim 1

Claim 1 is a method claim. The preamble of claim 1 recites, "[a] method of transmitting data by a user equipment through an uplink." Petitioner cites section 5.4 of 3GPP TS 321, which is titled "UL-SCH data transfer" (Ex. 1003, 18), and section 10.1.5.1 of 3GPP TS 300, which describes a "contention based random access procedure" in which step 3 is the "[f]irst scheduled UL transmission on UL-SCH" by the "UE" (Ex. 1002, 48–49). Pet. 22–23. "SCH" is an abbreviation for synchronization channel. Ex. 1002, 14. We find the cited art teaches, "[a] method of transmitting data by a user equipment through an uplink."

The first method step of claim 1 recites, "receiving an uplink grant (UL Grant) signal from a base station on a specific message." Petitioner cites both 3GPP TS 321 and 3GPP TS 300 as teaching this step. Pet. 23–24. 3GPP TS 321 states, "the UE shall for each TTI [Transmission Time Interval]: - if [(1)] an uplink grant for the TTI has been received on the PDCCH [Physical Downlink Control Channel] for the UE's C-RNTI [Cell-Radio Network Temporary Identifier] or Temporary C-RNTI; or – [(2)] if an uplink grant for this TTI has been received in a Random Access Response; - [then] indicate a valid uplink grant." Ex. 1003, 18. Petitioner cites Figure

19
Appx19

IPR2016-00757
Patent 7,881,236 B2

10.1.5.1 of 3GPP TS 300 as showing eNodeB, a base station, would transmit the random access response to the UE in step 2. Ex. 1002, 48. We find the cited art teaches, "receiving an uplink grant (UL Grant) signal from a base station on a specific message."

The second method step of claim 1 recites, "determining whether there is data stored in a message 3 (Msg3) buffer when receiving the UL Grant signal on the specific message." Petitioner cites 3GPP TS 321 as teaching this step. Pet. 24–25. Section 5.4.2.1 of 3GPP TS 321 states, "[a]t the given TTI [Transmission Time Interval], the HARQ [Hybrid Automatic Repeat Request] entity shall: . . . if there is an ongoing Random Access procedure and there is a MAC PDU [Medium Access Control Packet Data Unit] in the [Message3][13] buffer." Ex. 1003, 18. With regard to when the determination of whether there is data stored in the Msg3 buffer occurs, 3GPP TS 321 teaches making this determination during the same TTI (Time Transmission Interval). *Id.* Thus, Section 5.4.2.1 describes determining whether there is data in the Msg3 buffer ("if . . . there is a . . . [Data Unit] in the [Message3] buffer") when the UL Grant signal is received on the specific message ("if there is an ongoing Random Access procedure"). *Id.*

Patent Owner argues that Petitioner's declarant, Dr. Min, testified that 3GPP TS 321 does not teach making this determination in the same TTI. PO Resp. 34. But this is incorrect. We credit the testimony of Dr. Min, who repeatedly testified that 3GPP TS 321 teaches making this determination in the same TTI. *See, e.g.*, Ex. 2004, 96:20–21 ("What the 321 reference says is to determine for that TTI, and that's what the claim language is."). We

---

[13] This bracketed material in original.

IPR2016-00757
Patent 7,881,236 B2

find 3GPP TS 321 teaches, "determining whether there is data stored in a message 3 (Msg3) buffer when receiving the UL Grant signal on the specific message."

The third method step of claim 1 recites, "determining whether the specific message is a random access response message." Petitioner cites 3GPP TS 321 for this element. Pet. 25–26. Section 5.4.1 of 3GPP TS 321 states, "if an uplink grant for this TTI has been received in a Random Access Response." Ex. 1003, 18. We find 3GPP TS 321 teaches, "determining whether the specific message is a random access response message."

The fourth method step of claim 1 recites:

> transmitting the data stored in the Msg3 buffer to the base station using the UL Grant signal received on the specific message, if there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message.

Petitioner cites 3GPP TS 300 and 3GPP TS 321 as teaching this element. Pet. 29–31; Reply 10–13. Petitioner argues that condition (1), "if there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message" was shown to be taught in relation to the second step of claim 1, and condition (2), "if . . . the specific message is the random access response message" was shown to be taught in relation to the third step of claim 1. And, section 5.4.2.1 of 3GPP TS 321 states, "if there is an ongoing Random Access procedure and there is a MAC PDU in the [Message3] buffer": - obtain the MAC PDU to transmit from the [Message3] buffer." Ex. 1003, 18 (brackets in original).

The fifth and final method step of claim 1 recites:

IPR2016-00757
Patent 7,881,236 B2

> transmitting new data to the base station in correspondence with the UL Grant signal received on the specific message, if there is no data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message or the specific message is not the random access response message.

Petitioner cites 3GPP TS 321 as teaching this element. Pet. 37–40. Section 5.4.2.1 of 3GPP TS 321 states:

> - if there is an ongoing Random Access procedure and there is a MAC PDU in the [Message3] buffer:
>
>> - obtain the MAC PDU to transmit from the [Message3] buffer.
>
> - *else*, if the "uplink prioritisation" entity indicates the need for a new transmission:
>
>> - obtain the MAC PDU to transmit from the "Multiplexing and assembly" entity;
>>
>> - instruct the HARQ process corresponding to this TTI to trigger a new transmission using the identified parameters.

Ex. 1003, 18 (emphasis added) (brackets in original). This element provides that "new data" should be transmitted if either conditions (1) or (2) are not met. The cited passage in 3GPP TS 321 teaches triggering a "new transmission" if there is not a MAC PDU (i.e., no data) in the Msg3 buffer. With regard to this element, Patent Owner acknowledges, "the 321 reference (Exhibit 1003)—which purportedly invalidates the claims of the '236 patent, teaches transmitting new data for a = true [condition (1) met] and b = false

22

IPR2016-00757
Patent 7,881,236 B2

[condition (2) not met]." PO Resp. 18–19 (citing Pet. at 39 (Scenario 3)).[14]
Thus, Patent Owner acknowledges that 3GPP TS 321 teaches transmitting
new data if one of conditions (1) or (2) fails.

Although Petitioner advocates for a construction in which "if"
introduces sufficient conditions, Petitioner alternatively presents arguments
that account for the construction we adopt, namely that "if" introduces
necessary conditions. In these alternative arguments, Petitioner asserts that
both 3GPP TS 321 and 3GPP TS 300 would be interpreted by one of
ordinary skill in the art to teach or suggest transmission of the data in the
Msg3 buffer only if both conditions (1) and (2) are met and transmission of
new data if either condition (1) or (2) is not met. Pet. 29–31; *see also* Reply
10–13. Petitioner's showing in this regard is supported by the Declaration of
Paul S. Min, Ph. D. (Ex. 1016). Patent Owner proffers a Declaration by
Todor Cooklev, Ph. D. (Ex. 2006), which it contends supports its position.
See, e.g., PO Resp. 42, 46.

Petitioner argues that the Cooklev Declaration should be given no
weight because the declarant did not acknowledge "that (i) willful false
statements are punishable by fine, imprisonment, or both; or (ii) the
statements are true under penalty of perjury." Reply 6–7 (citations
omitted).[15] In an IPR proceeding, evidence includes affidavits. 37 C.F.R.

---

[14] In Petitioner's Scenario 3, there is data in the Msg3 buffer (condition (1) is
met) but the random access procedure is not ongoing (condition (2) is not
met). Pet. 39–40. At pages 38–42 of the Response, Patent Owner argues
that Petitioner's evidence fails with regard to the second transmitting step of
claim 1, but Patent Owner only addresses Petitioner's Scenario 1 (condition
(1) is not met and condition (2) is met (Pet. 38–39)) and Scenario 2 (neither
condition (1) nor (2) is met (Pet. 39)).

[15] Petitioner also argues the Cooklev Declaration should be given no weight

IPR2016-00757
Patent 7,881,236 B2

§ 42.63(a) ("[e]vidence consists of affidavits"). 37 C.F.R. § 42.2 defines

affidavit as "affidavit or declaration under § 1.68 of this chapter. A

transcript of an *ex parte* deposition or a declaration under 28 U.S.C. 1746

may be used as an affidavit." 37 C.F.R. § 1.68 requires that the declarant be

warned, on the same document, that "willful false statements and the like are

punishable by fine or imprisonment, or both." 28 U.S.C. § 1746 provides

that unsworn declarations under penalty of perjury may be used where a

matter is required or permitted to be supported by sworn declaration or

affidavit. To give weight to Dr. Cooklev's statements would thwart the

purpose of these rules. *See Intel Corp. v. Alacritech, Inc.*, IPR 2017-01402,

Paper 8, 6 (PTAB Nov. 6, 2017) (citation omitted).

Patent Owner had notice of the defect in the Cooklev Declaration at

least as early as the filing of Petitioner's Reply on June 14, 2017. Reply 1,

6–7, 11, 25.[16] In addition, the defect in the Cooklev Declaration was

discussed at the oral hearing on August 8, 2017. Tr. 22:9–23:5, 45:1–46:3.

At the oral hearing, Patent Owner acknowledged that the Cooklev

Declaration was defective. Tr. 45:1–46:3. Nevertheless, Patent Owner took

no affirmative steps to cure the defect. Although we recognize that

Petitioner may well have capitalized tactically on the defect by forgoing

cross-examination in which Dr. Cooklev may have provided sworn

testimony consistent with his Declaration, we cannot simply ignore the

---

because Dr. Cooklev applies the clear and convincing evidence standard to
the invalidity evidence (Ex. 2006 ¶ 16) rather than the preponderance of
evidence standard applicable in this proceeding (35 U.S.C. § 316(e); 37
C.F.R. § 42.1(d)). Reply 1, 25.
[16] We also note that Petitioner noticed the deposition of Dr. Cooklev (Paper
26) but withdrew the notice (Paper 27).

IPR2016-00757
Patent 7,881,236 B2

regulatory and statutory requirements that render that Declaration defective. To give weight to the Declaration would require us to surmise that Dr. Cooklev would swear to the statements in his Declaration, and we are in no position to do so.   Accordingly, we do not consider Ex. 2006 and give no weight to Patent Owner's reliance on the Cooklev Declaration.

3GPP TS 321 states, "[i]f the UE receives a[n uplink] grant for its RA-RNTI and a grant for its C-RNTI, the UE may choose to continue with either the grant for its RA-RNTI or the grant for its C-RNTI." Ex. 1003, 18. The RA-RNTI refers to the Random Access Radio Network Temporary Identifier and is used "when Random Access Response messages are transmitted." *Id*. at 7. *See also* Ex. 1003 at 10 ("RA-RNTI for Random Access Response on DL-SCH"). Section 5.1.4 of 3GPP TS 321 states, "[o]nce the Random Access Preamble is transmitted [Message 1], the UE shall . . . monitor for Random Access Response(s) identified by the RA-RNTI . . . if the Random Access Response [Message 2] contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble (see subclause 5.1.3), the UE shall: . . . process the received UL grant value." *Id*. at 13. Taking these passages into consideration with the process in Section 5.4.2.1 discussed above (*see* Ex. 1003, 18 ("if there is an ongoing Random Access procedure and there is a MAC PDU in the [Message3] buffer": - obtain the MAC-PDU to transmit from the [Message3] buffer, else . . . trigger a new transmission" (brackets in original)), 3GPP TS 321 teaches to transmit the data in the Msg3 buffer only in response to an uplink grant in the random access message and there is data in the Msg3 buffer (conditions (1) and (2) are met) and to transmit new data only if conditions 1 or 2 are not met.

25
Appx25

IPR2016-00757
Patent 7,881,236 B2

3GPP TS 300 in Figure 10.1.5.1-1, reproduced below, shows a random access procedure. Ex. 1002, 48.
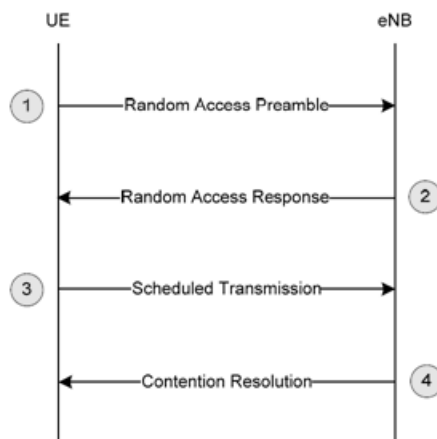
Figure 10.1.5.1-1: Contention based Random Access Procedure

Figure 10.1.5.1-1 depicts a random access method in which the UE transmits a Random Access Preamble in message 1 and eNB, a base station, transmits a Random Access Response in message 2. The "Random Access Response generated by MAC on DL-SCH . . . Addressed to RA-RNTI . . . Conveys at least . . . [an] initial UL grant." Ex. 1002, 49. In response, the UE transmits Scheduled Transmission, message 3, described as "First Scheduled UL transmission on UL-SCH" which "depends on the UL grant conveyed in step 2." *Id.*

With regard to these passages in 3GPP TS 300 and 3GPP TS 321, Petitioner argues:

> Reading these complementary standards documents together, as skilled artisans would do, they would understand that the 300 and 321 references taught two facts. First, message 3 transmission should occur only if "there is an ongoing random access procedure and there is a MAC PDU in the [Message3] buffer." (*Id.*[Min Decl.] at ¶ 76 (citing Ex. 1003, 321 reference, at § 5.4.2.1 (brackets in original)).) Second, message 3 transmission requires a prior random access response grant. (*Id.* (citing Ex. 1002, 300 reference, at § 10.1.5.1).) These two facts

26
Appx26

IPR2016-00757
Patent 7,881,236 B2

> established that a UE should transmit message 3 *only if* it
> receives a random access response grant while data is in the
> message 3 buffer. (*Id.*) Therefore, the 300 and 321 references
> collectively taught the "only if" feature. (*Id.*)

Pet. 32.

Petitioner's arguments are persuasive. With respect to the first

transmitting step, 3GPP TS 321 describes transmitting the contents of the

Msg3 buffer when both conditions are met: "if there is an ongoing Random

Access procedure [(condition 2)] and there is a MAC PDU in the

[Message3] buffer [(condition 1)]." Ex. 1003, 18. The language "if there is

an ongoing Random Access procedure" in section 5.4.2.1 requires verifying

whether the current process *is* a random access procedure, which means that

it must know that the uplink grant was the "specific message," i.e., a proper

message 2, or otherwise the current process would not be a random access

procedure.[17] As shown in sections 3.1 and 5.1.4, a Random Access

Response may be identified by the RA-RNTI. *Id.* at 7, 13. Thus, when

discussing the "ongoing Random Access procedure," the reference is

implicating the uplink grant "received in a Random Access Response." *Id.*

at 18. If the reference intended the "ongoing Random Access procedure" to

include both the uplink grants received in section 5.4.1, as Patent Owner

appears to contend, then it would have merely referenced the more generic

"valid uplink grant." With regard to 3GPP TS 300, based on the passages

cited above, Petitioner's declarant, Dr. Min, states, "the eNodeB sends the

---

[17] That is, the UL grant was something else, such as "an uplink grant . . .
received on the PDCCH for the UE's C-RNTI or Temporary C-RNTI," as
expressed in Section 5.4.1 as the alternative to a Random Access Response.
Ex. 1003, 18.

IPR2016-00757
Patent 7,881,236 B2

UE a random access response grant, and the UE responds with a message 3

transmission that depends on the random access response grant. This taught

that the message 3 transmission requires a prior random access response

grant." Ex. 1016 ¶ 75. Accordingly, upon consideration of the cited

passages in 3GPP TS 300 and 3GPP TS 321, the Min Declaration, and

Petitioner's arguments, we find 3GPP TS 300 and 3GPP TS 321 teach the

first "transmitting" limitation recited in claim 1 under the construction we

have adopted.

Similarly, with respect to the second transmitting step, section 5.4.2.1

of 3GPP TS 321 indicates that after determining "if there is an ongoing

Random Access Message and there is a MAC PDU in the [Message3]

buffer" "obtain the MAC PDU to transmit from the Message3] buffer" or

"else" make a "new transmission." [18] Ex. 1003, 18 (brackets in original).

Accordingly, 3GPP TS 321 teaches the second "transmitting" limitation

under the construction we adopted.

Petitioner also argues that evidence of simultaneous development by

others shows that a person of ordinary skill in the art would have interpreted

the 3GPP TS 300 and 3GPP TS 321 as teaching transmission of the data in

---

[18] Patent Owner attempts to distinguish the procedure of section 5.4.2.1 of
3GPP TS 321 under Petitioner's Scenarios 1 and 2 (*see* fn. 14 above) on the
basis that this passage refers to an "'uplink prioritisation' entity." *See* PO
Resp. 38. Dr. Min testified that the "'uplink prioritisation' entity" refers to
the "Scheduling/Priority Handling" entity shown in Figures 6-1 and 6-2 of
3GPPP TS 300 (Ex. 1002, 28). Ex. 2004, 117, l. 18 – 127, l. 2. Dr. Min also
testified the function of the "'uplink prioritisation' entity" is to receive the
new data and transmit it to the "'Multiplexing and assembly' entity" and the
"HARQ entity" referred to in section 5.4.2.1 of 3GPP TS 321 and shown in
Figures 6-1 and 6-2 of 3GPP TS 300. *Id*. at 123, l. 16 – 124, l. 3.

IPR2016-00757
Patent 7,881,236 B2

the Msg3 buffer only if conditions (1) and (2) are met. Pet. 35–37.

Petitioner contends Ex. 1005 titled, "3GPP TSG-RAN WG2#61bis" which

was submitted to the 3GPP by Philips and NXP Semiconductors for a

meeting held on March 31 through April 4, 2008, in Shenzden, China,

teaches the fourth step of claim 1, the first "transmitting"' limitation. *Id*. at

34–35. Figure 2 and the related description in the Philips submission to

3GPPG shows transmission of the data in the Msg3 buffer if conditions (1)

and (2) are met. Ex. 1005, 1–2. Petitioner makes a similar contention with

Ex. 1008 titled, "3GPP TSG-RAN WG2 #63" which was submitted to the

3GPP by Qualcomm Europe for a meeting held on August 18 through 22,

2008, in Jeju Island, Korea. Pet. 37. In this document, Qualcomm proposed

the "HARQ should obtain the MAC PDU to transmit from the [Message3]

buffer *only* in response to UL grant in a Random Access Response." Ex.

1008, 2 (emphasis added). Patent Owner argues that the Petitioner's

simultaneous development argument is wrong because Petitioner did not

otherwise show invalidity under the proper construction of the claims. PO

Resp. 47. However, as indicated above, we find 3GPP TS 321 and 3GPP TS

300 have been shown to teach the method recited in claim 1 under the proper

construction. In addition, we agree with Petitioner that Ex. 1005 and Ex.

1008 are evidence of simultaneous invention by others working within 3GPP

on the LTE standard and provide further support for concluding claim 1

would have been obvious. *See Geo M. Martin Co. v. Alliance Machine Sys*

Int'l LLC, 618 F.3d 1294, 1306 (Fed. Cir. 2010) ("Independently made,

simultaneous inventions, made 'within a comparatively short space of time,'

are persuasive evidence that the claimed apparatus 'was the product only of

ordinary mechanical or engineering skill.'")

IPR2016-00757
Patent 7,881,236 B2

We conclude that Petitioner demonstrates, by a preponderance of the evidence, that claim 1 is unpatentable under 35 U.S.C. § 103(a) over 3GPP TS 300 and 3GPP TS 321.

> b. *Dependent Claims 2–6*

Dependent claim 2 recites, "wherein the transmitting the new data to the base station includes: acquiring a Medium Access Control Protocol Data Unit (MAC PDU) from a multiplexing and assembly entity; and transmitting the MAC PDU to the base station." Petitioner cites 3GPP TS 321 as teaching this element. Pet. 40–41. As noted above, section 5.4.2.1 of 3GPP TS 321 states:

> - if there is an ongoing Random Access procedure and there is a MAC PDU in the [Message3] buffer:
>
> > - obtain the MAC PDU to transmit from the [Message3] buffer.
>
> - else, if the "uplink prioritisation" entity indicates the need for a new transmission:
>
> > **- obtain the MAC PDU to transmit from the "Multiplexing and assembly" entity;**
> >
> > **- instruct the HARQ process corresponding to this TTI to trigger a new transmission using the identified parameters.**

Ex. 1003, 18 (emphasis added). We find 3GPP TS 321 teaches the limitations of claim 2.

Dependent claim 3 recites, "wherein the UL Grant signal received on the specific message is a UL Grant signal received on a Physical Downlink Control Channel (PDCCH), and wherein the user equipment transmits new

IPR2016-00757
Patent 7,881,236 B2

data in correspondence with the UL Grant signal received on the PDCCH."

Petitioner cites 3GPP TS 321. Pet. 41–42. As shown above, section 5.4.1.

of 3GPP TS 321 states, "if an uplink grant for this TTI has been received on

the PDCCH" and section 5.4.2.1 states, "if the 'uplink prioritisation' entity

indicates the need for a new transmission: - obtain the MAC PDU to

transmit from the 'Multiplexing and assembly' entity; - instruct the HARQ

process corresponding to this TTI to trigger a new transmission using the

identified parameters." Ex. 1003, 18. We find 3GPP TS 321 teaches the

limitations of claim 3.

Dependent claim 4 recites, "wherein the data stored in the Msg3

buffer is a Medium access Control Protocol Data Unit (MAC PDU)

including a user equipment identifier." Petitioner cites 3GPP TS 300 and

3GPP TS 321. Pet. 42–44. As shown above, section 5.4.2.1 of 3GPP TS

321 states, "if . . . there is a MAC PDU in the [Message3] buffer." Ex. 1003,

18 (brackets in original). Section 6.1.2 of 3GPP TS 321 teaches, "[a] MAC

PDU consists of . . . zero, or more MAC control elements." *Id*. at 24. One

of the "MAC Control Elements" is the "C-RNTI MAC Control Element"

that "contains the C-RNTI of the UE." *Id*. at 26. The "C-RNTI" is the

"Cell-Radio Network Temporary Identifier." *Id*. at 7. Section 10.1.5.1 of

3GPP TS 300 teaches message 3 (Scheduled Transmission) "[c]onveys at

least the C-RNTI of the UE." Ex. 1002, 48–49. We find the cited art teaches

the limitations of claim 4.

Dependent claim 5 recites, "wherein the data stored in the Msg3

buffer further includes information about a buffer status report (BSR) if the

user equipment starts a random access procedure for the BSR." Petitioner

cites 3GPP TS 300 and 3GPP TS 321. Pet. 44–46. Section 5.4.5 of 3GPP

IPR2016-00757
Patent 7,881,236 B2

TS 321 is directed to "Buffer Status Reporting" and states, "[t]he Buffer Status reporting procedure is used to provide the serving eNB with information about the amount of data in the UL buffers of the UE." Ex. 1003, 21. As noted above, section 5.4.2.1 of 3GPP TS 321 states, "if . . . there is a MAC-PDU in the [Message3] buffer." *Id*. at 18 (brackets in original). Also, as shown above, section 6.1.2 of 3GPP TS 321 teaches, "[a] MAC PDU consists of . . . zero, or more MAC control elements." *Id*. at 24. One of the "MAC Control Elements" is a "Buffer Status Report (BSR)." *Id*. at 26. Section 10.1.5.1 of 3GPP TS 300 teaches message 3 (Scheduled Transmission) "[i]ncludes an uplink Buffer Status Report when possible." Ex. 1002, 48–49. We find the cited art teaches the limitations of claim 5.

Dependent claim 6 recites, "wherein the UL Grant signal received on the specific message is either a UL Grant signal received on a Physical Downlink Control Channel (PDCCH) or a UL Grant signal on the random access response message." Petitioner cites 3GPP TS 321. Pet. 45–46. As noted above, section 5.4.1 of 3GPP TS 321 states, "the UE shall for each TTI [Transmission Time Interval]: - if an uplink grant for this TTI has been received on the PDCCH [Physical Downlink Control Channel] for the UE's C-RNTI [Cell-Radio Network Temporary Identifier] or Temporary C-RNTI; or – if an uplink grant for this TTI has been received in a Random Access Response." Ex. 1003, 18. We find 3GPP TS 321 teaches the limitations of claim 6.

Patent Owner fails to contest any part of Petitioner's showing with regard to dependent claims 2–6. *See generally* PO Resp. We conclude that Petitioner demonstrates, by a preponderance of the evidence, that claims 2–6

32
Appx32

IPR2016-00757
Patent 7,881,236 B2

are unpatentable under 35 U.S.C. § 103(a) over 3GPP TS 300 and 3GPP TS 321.

E. Obviousness of Claims 7–10, 12, and 13 Over 3GPP TS 300, 3GPP TS 321, and Ericsson

Independent claim 7 and dependent claims 8–10, 12, and 13 were challenged as obvious over 3GPP TS 300 (Ex. 1002), 3GPP TS 321 (Ex. 1003), and Ericsson (Ex. 1004) (Pet. 48–59) and the Board instituted an *inter partes* review on this challenge (Dec. 19).

1. Ericsson (Ex. 1004)

Ericsson is titled "Timing Alignment in an LTE System" and generally describes the use of a timing advance value for transmissions from user equipment to a controlling node of a cell in a cellular communications system, such as an LTE system. Ex. 1004, Abstract, col. 1, ll. 5–8, col. 7, ll. 15–18. When the Ericsson method is "applied in an LTE system, the procedure in which it is employed is preferably an LTE Random Access procedure." *Id*. at col. 7, ll. 21– 23. Figure 6 of Ericsson is reproduced below.
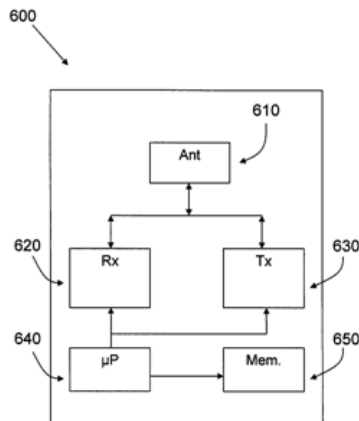
Fig 6

IPR2016-00757
Patent 7,881,236 B2

Figure 6 is a schematic block diagram of a transceiver for use as a user terminal or user equipment. Ex. 1004, col. 7, ll. 24–26. Transceiver 600 comprises antenna 610, transmit part 630, receive part 620, memory 650, and microprocessor 640. *Id.* at col. 7, ll. 26–30. Memory 640, transmit part 630, and antenna 610 can transmit access requests to a controlling node, and antenna 610 and receiver 620 can receive messages from a controlling node. *Id.* at col. 7, ll. 33–40.

2. *Obviousness Analysis*

Petitioner asserts that claims 7–10, 12, and 13 would have been obvious over the combination of 3GPP TS 300, 3GPP TS 321, and Ericsson. Pet. 48–59. With regard to combining the teachings of 3GPP TS 300, 3GPP TS 321, and Ericsson, the Petition asserts:

> The skilled artisan would have combined the teachings of the 300 and 321 references with the specific hardware implementation details provided in the Ericsson patent. (Ex. 1016, Min decl., at ¶ 157.) The 300 and 321 references described a UE, an eNodeB, and their components at a high level from a functional point of view, but by their very nature, did not provide all of the specific structural details. (*Id.* at ¶ 157 (citing Ex. 1003, 321 reference, at 4.1 ("The objective is to describe the MAC architecture and the MAC entity from a functional point of view.").) Many structural features such as a transmission module and reception module would have been routine, common-sense design choices for the skilled artisan, who would have recognized that those features are necessary to implement working LTE devices. (*Id.* at ¶ 157.) But to the extent the skilled artisan had wanted more information about a UE's structure, the skilled artisan would have logically and predictably consulted a reference such as the Ericsson patent, which provided a block diagram of the components included in a UE, such as transmission and reception modules. (*Id.* at ¶ 157.) The skilled artisan would have also turned to the Ericsson patent because it is in the same field of endeavor as the prior art specifications

34
Appx34

IPR2016-00757
Patent 7,881,236 B2

>concerning LTE's random access process and was created by a
>well-known manufacturer of cellular devices. (*Id.* at ¶ 157.)
>Like the prior art specifications, the Ericsson patent specifically
>focused on the LTE random access procedure. (*Id.* (citing Ex.
>1004, Ericsson patent, at 4:42-54, 7:16-23).)

Pet. 58–59. Patent Owner fails to contest Petitioner's presentation with regard to the motivation to combine 3GPP TS 300, 3GPP TS 321, and Ericsson. *See generally* PO Resp. Based on this record, we conclude Petitioner has established that a person of ordinary skilled in the art would have had a reason to combine the teachings of 3GPP TS 300, 3GPP TS 321, and Ericsson.

a. Independent Claim 7

Claim 7 is an apparatus claim directed to a user equipment (UE). It recites modules, a buffer, and entities which perform the same functions as recited in claim 1. Patent Owner states, "[t]he similarities between claim 1 (a method claim) and claim 7 (an apparatus claim), are notable," "[t]he structure of claim 7 resembles the structure of claim 1" that "is written as an apparatus claim, with entities 'adapted to' perform steps." PO Resp. 30–31.

The preamble of claim 7 recites "user equipment." Section 5.4 of 3GPP TS 321 teaches a UE. Ex. 1003, 18–22. Section 10.1.5.1 of 3GPP TS 300 teaches a UE. Ex. 1002, 48–50. Ericsson teaches a UE. Ex. 1004, Figure 1. We find the cited art teaches, "user equipment."

The first element of claim 7 recites, "a reception module adapted to receive an uplink grant (UL Grant) signal from a base station on a specific message." Figure 6 of Ericsson, shown above, is a block diagram of a UE and the detailed description teaches, "[t]he transceiver 600 also uses the antenna 610 and ***the receiver 620 for receiving an initiation message such***

IPR2016-00757
Patent 7,881,236 B2

as MSG 2 in response from the controlling node along with a second

timing advance value." Ex. 1004, col. 7, ll. 24–26, 38–41 (emphasis added).

The controlling node is an eNodeB, a base station. *Id*. at col. 3, l. 66. The

functions of this element were shown to be taught by the cited art in the

discussion above relating to the first step of claim 1. *See also* Pet. 49–50.

We find the cited art teaches, "a reception module adapted to receive an

uplink grant (UL Grant) signal from a base station on a specific message."

The second element of claim 7 recites, "a transmission module

adapted to transmit data to the base station using the UL Grant signal

received on the specific message." The description of Figure 6 of Ericsson

teaches, "the transmit part 630 and the antenna 610 for requesting

communication with the controlling node in a contention based procedure by

transmitting an access request such as MSG 1." Ex. 1004, col. 7, ll. 34–37.

The functions of this element were shown to be taught by the cited art in the

discussion above relating to claim 1. *See also* Pet. 50–51. We find the cited

art teaches, "a transmission module adapted to transmit data to the base

station using the UL Grant signal received on the specific message."

The remaining four elements of claim 7 recite:

> a message 3 (Msg3) buffer adapted to store UL data to be
> transmitted in a random access procedure;
> a Hybrid Automatic Repeat Request (HARQ) entity
> adapted to determine whether there is data stored in the Msg3
> buffer when the reception module receives the UL Grant signal
> and the specific message is a random access response message,
> acquiring the data stored in the Msg3 buffer if there is data stored
> in the Msg3 buffer when the reception module receives the UL
> Grant signal and the specific message is the random access
> response message, and controlling the transmission module to
> transmit the data stored in the Msg3 buffer to the base station

36

Appx36

IPR2016-00757
Patent 7,881,236 B2

> using the UL Grant signal received by the reception module on the specific message; and
>
> > a multiplexing and assembly entity used for transmission of new data,
> >
> > wherein the HARQ entity acquires the new data to be transmitted from the multiplexing and assembly entity if there is no data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the specific message or the received message is not the random access response message, and controls the transmission module to transmit the new data acquired from the multiplexing and assembly entity using the UL Grant signal received by the reception module on the specific message.

3GPP TS 300 and 3GPP TS 321 teach these elements as shown above with regard to claim 1. *See also* Pet. 50–53.

We conclude that Petitioner demonstrates, by a preponderance of the evidence, that claim 7 is unpatentable under 35 U.S.C. § 103(a) over 3GPP TS 300, 3GPP TS 321 and Ericsson.

   b.   *Dependent Claims 8–10, 12, and 13*

Claim 8 recites,

> > one or more HARQ processes; and
> > HARQ buffers respectively corresponding to the one or more HARQ processes,
> >
> > wherein the HARQ entity transfers the data acquired from the multiplexing and assembly entity or the Msg3 buffer to a specific HARQ process of the one or more HARQ processes and controls the specific HARQ process to transmit the data acquired from the multiplexing and assembly entity or the Msg3 buffer through the transmission module.

Petitioner cites 3GPP TS 321. Pet. 53–55. Section 5.4.2.1 of 3GPP TS 321 teaches, "[a] number of parallel HARQ processes are used in the UE to support the HARQ entity." Ex. 1003, 18. Section 5.4.2.2 of 3GPP TS 321

IPR2016-00757
Patent 7,881,236 B2

teaches, "[e]ach HARQ process is associated with a HARQ buffer." *Id.* at

19. As shown above with regard to claim 1, 3GPP TS 321 teaches the

functions of claim 8. *See also* Pet. 54–55. We find the cited art teaches the

limitations of claim 8.

> Claim 9 recites,

> > wherein, when the specific HARQ process transmits the data stored in the Msg3 buffer through the transmission module, the data stored in the Msg3 buffer is controlled to be copied into a specific HARQ buffer corresponding to the specific HARQ process, and the data copied into the specific HARQ buffer is controlled to be transmitted through the transmission module.

Section 5.4.2.2 of 3GPP TS 321 teaches, "the HARQ process shall . . . -

store the MAC PDU in the associated HARQ buffer; - generate a

transmission." Ex. 1003, 19. As shown above with regard to claim 1, 3GPP

TS 321 teaches storing the MAC PDU in the Msg3 buffer and transmitting

the MAC PDU. *See also* Pet. 56–57. We find the cited art teaches the

limitations of claim 9.

> Claim 10 recites the same element as claim 3, claim 12 recites the

same element as claim 4, and claim 13 recites the same element as claim 6.

As shown above with regard to claims 3, 4, and 6, respectively, the cited art

teaches the elements recited in claims 10, 12 and 13.

> Patent Owner fails to contest any part of Petitioner's showing with

regard to dependent claims 8–10, 12, and 13. *See generally* PO Resp. Based

on this record, we conclude that Petitioner demonstrates, by a preponderance

of the evidence, that claims 8–10, 12, and 13 are unpatentable under 35

U.S.C. § 103(a) over 3GPP TS 300, 3GPP TS 321 and Ericsson.

IPR2016-00757
Patent 7,881,236 B2

III. CONCLUSION

For the foregoing reasons, we conclude that Petitioner demonstrates, by a preponderance of the evidence, that claims 1–6 are unpatentable under 35 U.S.C. § 103(a) over 3GPP TS 300 and 3GPP TS 321 and claims 7–10, 12, and 13 are unpatentable under 35 U.S.C. § 103(a) over 3GPP TS 300, 3GPP TS 321, and Ericsson.

IV. ORDER

It is

ORDERED that, based on a preponderance of the evidence, claims 1–10, 12, and 13 are held to be unpatentable;

FURTHER ORDERED that, because this is final written decision, parties to this proceeding seeking judicial review of our decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2016-00757
Patent 7,881,236 B2

PETITIONER:

For ZTE petitioners:
Charles M. McMahon
cmcmahon@mwe.com

Hersh H. Mehta
hmehta@mwe.com

For HTC petitioners:
Stephen S. Korniczky
skorniczky@sheppardmullin.com

Martin Bader
mbader@sheppardmullin.com

Ericka J. Schulz
eschulz@sheppardmullin.com

For Samsung petitioners:
James M. Glass
jimglass@quinnemanuel.com

Kevin P.B. Johnson,
kevinjohnson@quinnemanuel.com

Todd M. Briggs
toddbriggs@quinnemanuel.com

John T. McKee
johnmckee@quinnemanuel.com

IPR2016-00757
Patent 7,881,236 B2

PATENT OWNER:

Cyrus Morton
Ryan Schultz
Miles A. Finn
cmorton@robinskaplan.com
rschultz@robinskaplan.com
mfinn@robinskaplan.com
Evolved_RK_Team@robinskaplan.com

41
Appx41

UNITED STATES PATENT AND TRADEMARK OFFICE
_____

BEFORE THE PATENT TRIAL AND APPEAL BOARD
_____

ZTE (USA) INC., HTC CORPORATION, HTC AMERICA, INC.,
SAMSUNG ELECTRONICS CO., LTD., and
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioners,

v.

EVOLVED WIRELESS LLC,
Patent Owner.

_____

Case IPR2016-00757[1]
Patent 7,881,236 B2
_____

Before WILLIAM V. SAINDON, PATRICK M. BOUCHER, and
TERRENCE W. McMILLIN, *Administrative Patent Judges*

McMILLIN, *Administrative Patent Judge*

DECISION
Denying Patent Owner's Request for Rehearing
37 C.F.R. § 42.71(d)

_____

[1] IPR2016-01345 has been consolidated with this proceeding.

IPR2016-00757
Patent 7,881,236 B2

I. INTRODUCTION

Pursuant to 37 C.F.R. § 42.71(d), Evolved Wireless, LLC ("Patent Owner") requests rehearing of our Final Written Decision (Paper 42, "Dec."). Paper 43 ("Req. Reh'g"). As authorized by the Board (Paper 44, 2–3), Petitioners filed an opposition to Patent Owner's rehearing request (Paper 45) and Patent Owner filed a reply in support of its request for rehearing (Paper 46).

For the reasons set forth below, Patent Owner's Request for Rehearing is *denied*.

II. STANDARD OF REVIEW

A party requesting rehearing bears the burden of showing that the decision should be modified. 37 C.F.R. § 42.71(d). The party must identify specifically all matters we misapprehended or overlooked, and the place where each matter was addressed previously in a motion, an opposition, or a reply. *Id.* With this in mind, we address the arguments presented by Patent Owner.

III.   ANALYSIS

Patent Owner submits that we (1) "overlooked the Patent Owner's argument that Petitioner has made a general conclusion that its prior art behaves according to the Board's narrow *only if* construction for the first transmitting limitation, even though that prior art does not create the conditions that test the *only if* behavior;" (2) "overlooked the Patent Owner's argument that the 321 reference taught the only if behavior only in hindsight;" and (3) "misapprehended" and "improperly modified the Patent Owner's argument that the 321 reference made the *only if* behavior obvious into one that the 321 reference disclosed that behavior." Req. Reh'g 1–2.

2

IPR2016-00757
Patent 7,881,236 B2

We have fully reviewed and considered all of Patent Owner's arguments in the rehearing request and are not persuaded that any changes to our Final Written Decision are necessary or appropriate.

In the Final Written Decision, with regard to claim construction, the Board concluded, "we agree with Patent Owner that 'if' in the 'transmitting' limitations of independent claims 1 and 7 is properly construed, under the broadest reasonable interpretation standard, as introducing necessary conditions, rather than sufficient conditions." Dec. 15. The transmitting limitations of claim 1 recite:

> transmitting the data stored in the Msg3 buffer to the base station using the UL Grant signal received on the specific message, *if* there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message; and
> transmitting new data to the base station in correspondence with the UL Grant signal received on the specific message, *if* there is no data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message or the specific message is not the random access response message.

Ex. 1001, 16:59–17:3 (emphasis added). Independent claim 7 contains commensurate limitations. *Id.* at 17:30–18:7. The operation of these two transmitting limitations can be described as follows:

> Those limitations implicate two conditions, resulting in different data being transmitted depending on whether both conditions are satisfied or not. The first condition is whether "there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message," and the second condition is whether "the specific message is the random access response message." Ex. 1001, col. 16, l. 59 – col. 17, l. 3; col. 17, l. 38 – col. 18, l. 7. "If" both conditions are satisfied, the "data stored in the Msg3 buffer"

IPR2016-00757
Patent 7,881,236 B2

> are transmitted to the base station; and "if" either condition is not
> satisfied, "new data" are transmitted to the base station. *Id.*

Dec. 10–11. The Patent Owner refers to these operations, in light of the
claim construction adopted by the Board, as the "'only if' behavior" in the
rehearing request. Req. Reh'g *passim*. In the Final Written Decision, the
Board found that the 321 reference[2] and the 300 reference[3] taught the first
"transmitting" limitation and the 321 reference taught the second
"transmitting" limitation under a proper claim construction. Dec. 28.

Pursuant to 35 U.S.C. §316(e), the Petitioner had "the burden of
proving a proposition of unpatentability by a preponderance of the
evidence." In support of its arguments in the Response, Patent Owner relied
on the Declaration of Todor Cooklev, Ph. D. (Ex. 2006) which was unsigned
and to which we gave no evidentiary weight.[4] *See* Dec. 23–25. In contrast,
Petitioner's case was supported by the Declaration of Paul S. Min, Ph. D.
(Ex. 1006) to which we gave appropriate evidentiary weight. Dec. *passim*.
Petitioner's evidence cannot be rebutted by Patent Owner's unsworn
attorney argument. *See Gemtron Corp. v. Saint-Gobain Corp.*, 572 F.3d
1371, 1380 (Fed. Cir. 2009) ("[U]nsworn attorney argument . . . is not
evidence and cannot rebut . . . evidence."). Thus, the weight of the
evidence greatly favored Petitioner.

---

[2] 3GPP TS 36.321 v8.2.0 (2008) (Ex. 1003, "3GPP TS 321").
[3] 3GPP TS 36.300 v8.4.0 (2008) (Ex. 1002, "3GPP TS 300").
[4] In our Final Written Decision, we noted that, despite having notice of the
defect with the Cooklev Declaration, Patent Owner took no affirmative steps
to cure the defect. Dec. 23–25. Patent Owner did not request leave to cure
the defect in the Cooklev Delcaration in connection with the rehearing
request or otherwise.

IPR2016-00757
Patent 7,881,236 B2

Patent Owner first argues that the Board failed to consider a "more complex case of UL Grant reception" based on an annotated Figure 7 of the 300 reference to which Patent Owner added a second UL Grant. Req. Reh'g. 9. Patent Owner argued that this "more complex case" showed that the data in the Msg3 buffer could be transmitted based on a UL Grant not in a random access response. *Id.* at 10. The fact that Patent Owner can hypothesize a system that is more complex than the cited references teach does not negate the teachings of the cited references.[5]

Patent Owner next argues, "[t]he Board overlooked . . . the Patent Owner's argument concerning the 321 reference relied on hindsight." Req. Reh'g. 11. Specifically, Patent Owner argues:

> The Petitioner argued that the 321 reference rendered the *only if* behavior obvious. (Pet. at 29-31.) The Patent Owner argued that the 321 reference rendered the *only if* feature of the claim obvious only in hindsight. (Response at 42-43.) The Patent Owner pointed out that the Petitioner's argument hinges on the recognition that "erroneous grants" were known at the time of the invention. (*Id.* at 42.) The Patent Owner pointed out that recognition of any grant as being problematic only first appeared in the '236 patent. (*Id.*) Accordingly, the Patent Owner argued that the Petitioner's argument with respect to the 321 reference relies on improper hindsight. (*Id. at 42-43.*)

Req. Reh'g. 11–12. In the Response, Patent Owner's hindsight argument was presented as part of its argument that "[n]one of the prior art teaches the

---

[5] Patent Owner's hypothetical case was discussed and found not to be persuasive in the Final Written Decisions in IPR2016-01228 (Paper 27, 33–34) and IPR2016-01229 (Paper 27, 35) in which independent claims 1 and 7 of the '236 patent were held to be unpatentable in view of combinations of references not asserted in this proceeding. IPR2016-01228 Paper 27, 40–41; IPR2016-01229 Paper 27, 41–42.

IPR2016-00757
Patent 7,881,236 B2

'only if' behavior or renders it obvious." PO Resp. 42–43. We implicitly responded to this argument by finding the 321 reference and the 300 reference teach this feature. Dec. 28. We also noted the evidence of simultaneous invention, which indicates that others recognized the problem recognized by the inventors of the '236 patent and offered the same solution as claimed in the '236 patent. Dec. 28–29.

Patent Owner finally argues that the Board misapprehended an argument made by Petitioner. Req. Reh'g 2, 13–14. Patent Owner argues, "[n]otably the Board understood that Petitioner argued that the 321 and 300 references . . . each separately teach the 'only if' behavior." *Id*. at 13 (citing Dec. 23). There was no misapprehension by the Board of Petitioner's argument. On pages 29–31 of the Petition, there was a section titled, "[t]he 321 reference by itself renders the 'only if' feature obvious" and, on pages 31-32 of the Petition, there was a section titled, "[t]he 300 reference taught the 'only if' feature."

Patent Owner also suggests "[t]he Board improperly analyzed arguments about the 321 reference as if that reference supported an anticipation argument, and accordingly misapprehended the Petitioner's Ground for invalidity." Req. Reh'g 13. In support of this argument, Patent Owner quotes the following sentence from page 23 of the Final Written Decision: "Petitioner asserts that both 3GPP TS 321 and 3GPP TS 300 would be interpreted by one of ordinary skill in the art to teach or suggest transmission of the data in the Msg3 buffer only if both conditions (1) and (2) are met and transmission of new data if either condition (1) or (2) is not met." *Id*. This statement was made in the context of the Board's "Obviousness Analysis" of claim 1 and relates to the Board's analysis of

IPR2016-00757
Patent 7,881,236 B2

whether the cited combination of references teaches or suggests all the limitations of claim 1. *See* Pet. 18–30. As shown in the Final Written Decision, the Board reviewed and considered the teachings and suggestions of the cited combination of references and concluded claim 1 would have been obvious. *Id.* Patent Owner has not shown that this conclusion was in error.

IV.   ORDER

Accordingly, it is ORDERED that Patent Owner's Request for Rehearing is *denied*.

IPR2016-00757
Patent 7,881,236 B2

PETITIONERS:

For ZTE petitioners:
Charles M. McMahon
cmcmahon@mwe.com
Hersh H. Mehta
hmehta@mwe.com

For HTC petitioners:
Stephen S. Korniczky
skorniczky@sheppardmullin.com
Martin Bader
mbader@sheppardmullin.com
Ericka J. Schulz
eschulz@sheppardmullin.com

For Samsung petitioners:
James M. Glass
jimglass@quinnemanuel.com
Kevin P.B. Johnson,
kevinjohnson@quinnemanuel.com
Todd M. Briggs
toddbriggs@quinnemanuel.com
John T. McKee
johnmckee@quinnemanuel.com

PATENT OWNER:

Cyrus Morton
Ryan Schultz
cmorton@robinskaplan.com
rschultz@robinskaplan.com

8

Trials@uspto.gov   Paper 27
571-272-7822   Entered: November 30, 2017

UNITED STATES PATENT AND TRADEMARK OFFICE
_____

BEFORE THE PATENT TRIAL AND APPEAL BOARD
_____

APPLE INC., MICROSOFT CORPORATION,
MICROSOFT MOBILE OY, and
MICROSOFT MOBILE INC. (F/K/A/ NOKIA INC.),
Petitioner,

v.

EVOLVED WIRELESS LLC,
Patent Owner.

_____

Case IPR2016-01228
Patent 7,881,236 B2

_____

Before WILLAM V. SAINDON, PATRICK M. BOUCHER, and
TERRENCE W. McMILLIN, *Administrative Patent Judges*.

BOUCHER, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

IPR2016-01228
Patent 7,881,236 B2

In response to a Petition (Paper 2, "Pet.") filed by Apple Inc., Microsoft Corporation, Microsoft Mobile Oy, and Microsoft Mobile Inc. (f/k/a Nokia Inc.) (collectively, "Petitioner"), we instituted an *inter partes* review of claims 1–10, 12, and 13 of U.S. Patent No. 7,881,236 B2 ("the '236 patent"). Paper 8 ("Dec."), 21. During the trial, Evolved Wireless LLC ("Patent Owner") timely filed a Response (Paper 14, "PO Resp."), to which Petitioner timely filed a Reply (Paper 16, "Reply"). An oral hearing was held on September 15, 2017, and a copy of the transcript was entered into the record. Paper 22 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of the claims on which we instituted trial. Based on the record before us, Petitioner has shown, by a preponderance of the evidence, that claims 1–10, 12, and 13 are unpatentable.

I. BACKGROUND

A. *The '236 Patent*

The '236 patent "relates to a mobile communication technology." Ex. 1001, col. 1, ll. 17–18. In particular, the patent describes a random access procedure for user equipment ("UE") and a base station in a telecommunication system. *Id.* at col. 3, ll. 42–59. Figure 1 of the '236 patent illustrates a particular example of such a telecommunication system— the Evolved Universal Mobile Telecommunication System ("E-UMTS"), and is reproduced below.

IPR2016-01228
Patent 7,881,236 B2

FIG. 1

Figure 1 provides a schematic view of a network architecture for the E-UMTS, which may be conceived in terms of two component networks: Evolved UMTS Terrestrial Radio Access Network ("E-UTRAN") 101 and Core Network 102. *Id.* at col. 1, ll. 26–35. The first of these, E-UTRAN 101, may include user equipment ("UE") 103, multiple base stations 104 (referred to in the '236 patent as "eNode B" or "eNB"), and Access Gateway ("AG") 105. *Id.* at col. 1, ll. 35–39. Access Gateway 105 is positioned at the end of the network and connected to an external network, and can include a portion for processing user traffic and a portion for processing control traffic. *Id.* at col. 1, ll. 38–41.

As the '236 patent describes, "a UE performs the random access procedure" in a number of instances, including "when the UE performs initial access" to a base station and "when there is uplink data transmission in a situation where uplink time synchronization is not aligned or where a

3

IPR2016-01228
Patent 7,881,236 B2

specific radio resource used for requesting radio resources is not allocated."
Id. at col. 3, ll. 42–57. A version of Figure 5 of the '236 patent annotated by
Petitioner is reproduced below.

Figure 5 shows an example of a random access procedure performed
between user equipment UE and base station eNB. *Id.* at col. 6, ll. 53–55.
The procedure begins with transmission of a "random access preamble"
from the UE to the base station at step S501 (referred to as a "message 1"
transmitting step). *Id.* at col. 4, ll. 3–7. The UE receives a "random access
response" from the base station at step S502 "in correspondence with the
transmitted random access preamble" (referred to as a "message 2" receiving
step). *Id.* at col. 4, ll. 7–11. Of particular relevance, the UE then transmits
an uplink message to the base station at step S503 (referred to as a "message
3" or "Msg3" transmitting step). *Id.* at col. 4, ll. 11–14. The UE receives a
corresponding "contention resolution" message from the base station at step
S504 (referred to as a "message 4" receiving step). *Id.* at col. 4, ll. 14–17.

IPR2016-01228
Patent 7,881,236 B2

In the random access procedure, the UE stores data to be transmitted via the message 3 in a "Msg3 buffer" and transmits the stored data "in correspondence with the reception of an Uplink (UL) Grant signal." *Id.* at col. 4, ll. 18–21. The UL Grant signal indicates information about uplink radio resources that may be used when the UE transmits a signal to the base station. *Id.* at col. 4, ll. 21–26. According to the '236 patent, then-current Long-Term Evolution ("LTE") system standards provided that data stored in the Msg3 buffer of the UE would be transmitted to the base station "*regardless of* the reception mode of the UL Grant signal," and that "if the data stored in the Msg3 buffer is transmitted in correspondence with the reception of *all* UL Grant signals, problems may occur." *Id.* at col. 4, ll. 26–32 (emphases added). The '236 patent purports to solve such problems. *Id.* at col. 4, ll. 33–34.

Figure 9 of the '236 patent is reproduced below.

5

Appx54

IPR2016-01228
Patent 7,881,236 B2

FIG. 9

Figure 9 is a flowchart of the method described by the '236 patent, showing the operation of an uplink Hybrid Automatic Repeat Request ("HARQ") entity in a UE. *Id.* at col. 13, ll. 35–39. After a UL grant signal is received from the base station at step 902, the UE determines at step 906 whether there are data in the Msg3 buffer. *Id.* at col. 13, ll. 42–44, 66–67. If so, a further determination is made at step 907 whether the received UL grant signal is on a random access response ("RAR") message. *Id.* at col. 13, l.

6

IPR2016-01228
Patent 7,881,236 B2

66–col. 14, l. 3. The UE transmits the data in the Msg3 buffer to the base station "only when" both conditions are met, i.e., "only when there is data in the Msg3 buffer when receiving the UL Grant signal and the UL Grant signal is received on the random access response message (S908)." *Id.* at col. 14, ll. 3–7. Conversely, if either condition is not met, i.e. there are no data in the Msg3 buffer or the UL Grant signal is not on a random access response message, then the UE determines that the base station is making a request for transmission of new data and performs new-data transmission at step 909. *Id.* at col. 14, ll. 7–13.

B. Illustrative Claims

Claims 1 and 7 of the '236 patent, reproduced below, are independent claims respectively directed at the above-described method and at user equipment that implements the above-described method.

1. A method of transmitting data by a user equipment through an uplink, the method comprising:
   receiving an uplink grant (UL Grant) signal from a base station on a specific message;
   determining whether there is data stored in a message 3 (Msg3) buffer when receiving the UL Grant signal on the specific message;
   determining whether the specific message is a random access response message;
   transmitting the data stored in the Msg3 buffer to the base station using the UL Grant signal received on the specific message, if there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message; and
   transmitting new data to the base station in correspondence with the UL Grant signal received on the specific message, if there is no data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message or the specific message is not the random access response message.

7

Appx56

IPR2016-01228
Patent 7,881,236 B2

7. A user equipment, comprising:

a reception module adapted to receive an uplink grant (UL Grant) signal from a base station on a specific message;

a transmission module adapted to transmit data to the base station using the UL Grant signal received on the specific message;

a message 3 (Msg3) buffer adapted to store UL data to be transmitted in a random access procedure;

a Hybrid Automatic Repeat Request (HARQ) entity adapted to determine whether there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is a random access response message, acquiring the data stored in the Msg3 buffer if there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is the random access response message, and controlling the transmission module to transmit the data stored in the Msg3 buffer to the base station using the UL Grant signal received by the reception module on the specific message; and

a multiplexing and assembly entity used for transmission of new data,

wherein the HARQ entity acquires the new data to be transmitted from the multiplexing and assembly entity if there is no data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the specific message or the received message is not the random access response message, and controls the transmission module to transmit the new data acquired from the multiplexing and assembly entity using the UL Grant signal received by the reception module on the specific message.

C. Instituted Grounds of Unpatentability

We instituted trial for challenges under 35 U.S.C. § 103(a) over the following combinations of references. Dec. 21.

IPR2016-01228
Patent 7,881,236 B2

References	Challenged Claim(s)
Kitazoe,[1] Prior art described in the '236 patent,[2] and Specification 321[3]	1–4, 6–10, 12, and 13
Kitazoe, Prior art described in the '236 patent, Specification 321, and Kitazoe II[4]	5

D. Real Parties in Interest and Related Proceedings

Petitioner identifies Apple Inc., Microsoft Corporation, Microsoft Mobile Oy, Microsoft Mobile Inc. (f/k/a Nokia Inc.), Microsoft Luxembourg International Mobile SARL, and Microsoft Luxembourg USA Mobile SARL as real parties in interest. Pet. 1. Petitioner asserts that "[t]he Microsoft entities have numerous affiliated and/or related entities," but that "no unnamed Microsoft entity is funding or controlling this Petition or any resulting IPR." *Id.* Patent Owner identifies only itself as a real party in interest. Paper 5, 2.

The parties indicate that the '236 patent is the subject of several district-court litigations: *Evolved Wireless, LLC v. Apple, Inc.*, No. 1:15-cv-542 (D. Del.); *Evolved Wireless, LLC v. HTC Corp.*, No. 1:15-cv-543 (D. Del.); *Evolved Wireless, LLC v. Lenovo Group Ltd.*, 1:15-cv-544 (D. Del.); *Evolved Wireless, LLC v. Samsung Electronics Co. Ltd.*, 1:15-cv-545 (D. Del.); *Evolved Wireless, LLC v. ZTE Corp.*, 1:15-cv-546 (D. Del.); *Evolved Wireless LLC v. Microsoft Corp.*, 1:15-cv-547 (D. Del.). Pet. 1–2;

---

[1] U.S. Patent No. 8,180,058 B2, filed June 10, 2008, issued May 15, 2012 (Ex. 1005, "Kitazoe").

[2] *See* "Discussion of the Related Art," U.S. Patent No. 7,881,236 (Ex. 1001).

[3] 3GPP Technical Specification 36.321 V8.1.0 (March 2008) (Ex. 1007, "Specification 321").

[4] U.S. Patent Publication No. 2009/0163211 A1, filed Dec. 17, 2008, published June 25, 2009 (Ex. 1009, "Kitazoe II").

9
Appx58

IPR2016-01228
Patent 7,881,236 B2

Paper 5, 2–3. In addition, the '236 patent is the subject of the following *inter partes* reviews: IPR2016-00757, which has been consolidated with IPR2016-01345 (both of which involve a different petitioner); and IPR2016-01229 (which involves this Petitioner on different grounds).

E. Cooklev Declaration

Patent Owner proffers a Declaration by Todor Cooklev, Ph.D., as evidentiary support of its claim-construction and substantive arguments. Ex. 2009. Petitioner argues that the Declaration "is entitled to no weight" because "[n]otoriously absent from Exhibit 2009 is any indication that the declarant was 'warned that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. 1001),' or a statement by the declarant that 'all statements made of the declarant's own knowledge are true and that all statements made on information and belief are believed to be true.' *See* 37 CFR 1.68." Reply 2–3. We agree with Petitioner that Dr. Cooklev's Declaration is defective and can be accorded no weight.

In an *inter partes* review proceeding, evidence includes "affidavits," which are defined in our regulations by reference to the provisions of 37 C.F.R. § 1.68 and 28 U.S.C. § 1746. *See* 37 C.F.R. § 42.2. The former of these, i.e., 37 C.F.R. § 1.68, requires that a declarant be warned, on the same document, that "willful false statements and the like are punishable by fine or imprisonment, or both." The latter, i.e., 28 U.S.C. § 1746, provides that unsworn declarations may substitute for sworn declarations if accompanied by a statement in substantially the form, "I declare . . . under penalty of perjury under the laws of the United States of America that the foregoing is

IPR2016-01228
Patent 7,881,236 B2

true and correct." To give weight to Dr. Cooklev's statements would thwart the purpose of these provisions. *See Intel Corp. v. Alacritech, Inc.*, Case IPR2017-01402, slip op. at 6 (PTAB Nov. 6, 2017) (Paper 8).

At the oral hearing, Patent Owner conceded that Dr. Cooklev's Declaration is defective. Tr. 36:16–17 ("Well, yes, he did not swear under the penalty of perjury"). Indeed, Patent Owner had notice of the defect in Dr. Cooklev's Declaration at least as early as the filing of Petitioner's Reply on July 26, 2017. Reply 2–3. Nevertheless, Patent Owner took no affirmative steps to cure the defect. Although we recognize that Petitioner may well have capitalized tactically on the defect by forgoing cross-examination in which Dr. Cooklev may have provided sworn testimony consistent with his Declaration, we cannot simply ignore the regulatory and statutory requirements that render that Declaration defective. To give weight to the Declaration would require us to surmise that Dr. Cooklev would swear to the statements in his Declaration, and we are in no position to do so.

Accordingly, we give no weight to Dr. Cooklev's Declaration.

II. ANALYSIS

A. Claim Construction

The Board interprets claims of an unexpired patent using the broadest reasonable construction in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard); Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012).

IPR2016-01228
Patent 7,881,236 B2

1. *"transmitting . . . if"*

A claim-construction disagreement between the parties is grounded in use of the word "if" in the two "transmitting" limitations of independent claims 1 and 7. *See* Pet. 17–21; PO Resp. 10–32; Reply 3–21. Those limitations implicate two conditions, resulting in different data being transmitted depending on whether both conditions are satisfied or not. The first condition is whether "there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message," and the second condition is whether "the specific message is the random access response message." Ex. 1001, col. 16, l. 59–col. 17, l. 3; col. 17, l. 38–col. 18, l. 7. "If" both conditions are satisfied, the "data stored in the Msg3 buffer" are transmitted to the base station; and "if" either condition is not satisfied, "new data" are transmitted to the base station. *Id.*

Petitioner presents an argument that effectively addresses each "transmitting" limitation in isolation, contending that "the claim language . . . speaks for itself," and that "the term 'if' is used to indicate that the action occurs in the presence of the condition, but possibly also at other times." Pet. 20–21. That is, Petitioner contends that "if" in each "transmitting" limitation should be construed as introducing a *sufficient* condition.

Patent Owner presents a counterargument that considers an interplay between the two "transmitting" limitations, correctly observing that the two conditions "are independent of one another" and that the recitations in the two "transmitting" limitations are "logical opposite[s]." PO Resp. 10–15. As Patent Owner asserts, "both limitations cannot, at the same time, be true." *Id.* at 14. In considering this logical interplay, Patent Owner contends

12
Appx61

IPR2016-01228
Patent 7,881,236 B2

that "if" in each "transmitting" limitation should therefore be construed as introducing a *necessary* condition: "The proper claim construction is one that follows the claim's plain language . . . ; that is Msg3 data is transmitted if [both conditions are] met . . . and new data are transmitted if [either condition] is not met." *Id.* at 15.[5]

We have considered the positions of both parties and conclude that Patent Owner presents the more compelling reading of the claim. In isolation, the plain and ordinary meaning of "if" is amenable to both *sufficient-condition* and *necessary-condition* constructions. Indeed, it is trivial to construct English sentences in which a listener would naturally understand one of those constructions to be implicated. For instance, "If there is smoke, there is fire" is naturally understood not to preclude the possibility of fire if there is no smoke (sufficient if). Conversely, "If you take another step, I'll shoot," is naturally understood to mean that the speaker will not shoot if the listener does not take another step (necessary if).

To resolve the ambiguity, we look, as we must, to the context provided by the claims themselves, as well as to the Specification in whose light they must be considered under the broadest-reasonable-interpretation

---

[5] Patent Owner characterizes its position as equivalent to reciting "but not transmitting the new data" as part of the first "transmitting" limitation, i.e., when both conditions are met; and to reciting "but not transmitting any data stored in the Msg3 buffer" as part of the second "transmitting" limitation, i.e., when at least one of the conditions is not met. PO Resp. 12–13. Although such additional language is logically consistent with Patent Owner's position, we find it unnecessary to incorporate such negative limitations into the claims; the proper construction can be resolved by correctly construing the meaning of "if."

IPR2016-01228
Patent 7,881,236 B2

standard. *See Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996) ("the context of the surrounding words of the claim also must be considered in determining the ordinary and customary meaning of those terms"). We agree with Patent Owner's characterization of Petitioner's position as improperly including the optional possibility of transmitting data stored in the Msg3 buffer even when both conditions are not satisfied. *See* PO Resp. 14–15. Such an optional possibility is a logical consequence of a sufficient-if construction, and we acknowledge that such a reading would be tenable if the claim included only the first "transmitting" step.[6] But the claim explicitly answers the question of what occurs when at least one of the conditions is not satisfied: "new data" are transmitted to the base station. Ex. 1001, col. 16, l. 16–col. 17, l. 3; col. 17, l. 52–col. 18, l. 7. By isolating the "transmitting" limitations, Petitioner improperly reaches too broad a construction of the claim as a whole.

Furthermore, Patent Owner's proposed construction is consistent with the Specification of the '236 patent. For example, in motivating its disclosure, the Specification observes that, in the prior art, "if the UL Grant signal is received in a state in which data is stored in the Msg3 buffer, the data stored in the Msg3 buffer is transmitted *regardless of* the reception mode of the UL Grant signal." *Id.* at col. 4, ll. 26–30 (emphasis added). The Specification purports to resolve such a deficiency because "if the data stored in the Msg3 buffer is transmitted in correspondence with the reception of *all* UL Grant signals, problems may occur." *Id.* col. 4, ll. 30–34 (emphasis added). In addition, the description of Figure 9 of the patent,

---

[6] Indeed, this is precisely the case for a child of the '236 patent, as discussed *infra*.

IPR2016-01228
Patent 7,881,236 B2

reproduced above, explicitly explains that data in the Msg3 buffer are transmitted to the base station "only when" both conditions recited in the claims are met, i.e., they are necessary conditions. *Id*. at col. 14, ll. 3–8.

The parties also address the relevance of the prosecution history of a child of the '236 patent. PO Resp. 25–27; Reply 20–21. During prosecution of U.S. Patent No. 9,532,336 B2 (Ex. 2011, "the '336 patent"), which shares the same written description as the '236 patent, explicit language was included in the independent method claims to require transmission of data stored in the Msg3 buffer "only when" such data are stored in the Msg3 buffer and the UL Grant was received on the random access response message. Ex. 2012, 146. Such "only when" language did not appear in the claims as originally filed, and was added in response to a rejection in which the Examiner made the following remarks:[7]

> Claim 1 recites the limitation "if there is data stored in the Msg3 buffer and if the UL Grant signal was received on the random access response." The limitation is directed to the action to transmit the UL Grant, however, *there is no language to limit the claim to only this scenario* or the claim language *does not provide an alternative for what if the statement is not true*. The Applicant's invention is not being claimed in independent claims 1 and 9.

Id. at 139 (emphases added).

Importantly, the claims in the '336 patent do not include language that corresponds to the second "transmitting" limitation of the claims at issue in this proceeding—the "only when" language was added to a limitation that corresponds to the first "transmitting" limitation. We agree with Patent

---

[7] Independent method claim 26 of the '336 patent was added by amendment at the same time, including the "only when" language. Ex. 2012, 151.

IPR2016-01228
Patent 7,881,236 B2

Owner's characterization of the relevance of these facts and of the
Examiner's prior basis for rejection of unamended claims of the '336 patent.
That is "the Examiner specifically rejected a claim without the 'only when'
language *because there was no alternative recited in the claim . . . if the
condition[s were] not met.*" PO Resp. 27. The addition of the "only when"
language in the '336 patent resolves the ambiguity, recognized by the
Examiner, that is otherwise resolved in the claims at issue in this proceeding
by the presence of the second "transmitting" limitation.

We disagree with Petitioner's contention that "the Examiner's
reasoning is flawed because . . . a comprising claim is open-ended and may
cover additional, unrecited actions (such as actions performed when a
condition is not met)." Reply 20. In making his remarks, the Examiner had
rejected the claim for indefiniteness, and nothing in the amendment that
resolved the indefiniteness to the Examiner's satisfaction, i.e., reciting "only
when," precludes additional, unrecited actions when the conditions are not
met. In light of the difference in the claims in the two patents, we are also
not persuaded by Petitioner's contention that "the cited portions of the child
patent's file history reinforce Petitioner's argument that the term 'if' in the
claims of the '236 patent means 'if.'" *Id.* As indicated above, the word "if,"
in isolation and without more, is ambiguous whether it introduces a
sufficient or necessary condition. That ambiguity was resolved by additional
language in the claims of the '336 patent and is resolved in the claims of the
'236 patent through the logical interplay of express limitations.

For these reasons, we agree with Patent Owner that "if" in the
"transmitting" limitations of independent claims 1 and 7 is properly
construed, under the broadest-reasonable-interpretation standard, as

16

IPR2016-01228
Patent 7,881,236 B2

introducing *necessary* conditions, rather than sufficient conditions.[8] We

adopt such a construction for purposes of this Decision.

2. Other Terms

The Petition addresses the construction of certain other terms recited

in independent claim 7, taking the position that such terms should not be

construed as means-plus-function limitations—a position different than that

taken by Petitioner in related litigation where a different claim-construction

standard is applied. Pet. 21. Patent Owner does not respond to Petitioner's

position and does not proffer its own construction of those terms.

Given that the identified terms do not recite the word "means," and

given that Patent Owner does not challenge Petitioner's position, we find it

unnecessary to construe the terms expressly. *Williamson v. Citrix Online,*

LLC, 792 F.3d 1339, 1348 (Fed. Cir. 2015) (en banc) ("the failure to use the

word 'means' also creates a rebuttable presumption—this time that § 112,

para. 6 does not apply"); *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200

F.3d 795, 803 (Fed. Cir. 1999) ("[O]nly those terms need be construed that

are in controversy, and only to the extent necessary to resolve the

---

[8] This construction is consistent with the reasoning of *Ex Parte Schulhauser*,
Appeal No. 2013-007847, slip op. (PTAB Apr. 28, 2016) (precedential).
Similar to the claims at issue in this proceeding, *Schulhauser* considered a
claim that recited "mutually exclusive" steps. *Schulhauser*, slip op. at 6.
The Board held that, under the broadest reasonable interpretation, the claim
"covers at least two methods, one in which the prerequisite condition for the
[first] step is met and one in which the prerequisite condition for the
[second] step is met." *Id.* at 8. The Board did not thereby hold that the
language of one of the steps could simply be read out of the claim (as
Petitioner's argument would effectively require) nor that that language could
not properly inform construction of the other of the steps.

IPR2016-01228
Patent 7,881,236 B2

controversy."). We accord the terms their ordinary and customary meaning, without resort to the provisions of 35 U.S.C. § 112, ¶ 6.

B. Legal Principles

A claim is unpatentable for obviousness under 35 U.S.C. § 103 if the differences between the claimed subject matter and the prior art are "such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) objective evidence of non-obviousness, i.e., secondary considerations.[9] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

Additionally, the obviousness inquiry typically requires an analysis of "whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (requiring "articulated reasoning with some rational underpinning to support the legal conclusion of obviousness")); *see In re Warsaw Orthopedic, Inc.*, 832 F.3d 1327, 1333 (Fed. Cir. 2016) (citing *DyStar Textilfarben GmbH & Co. Deutschland KG v. C. H. Patrick Co.*, 464 F.3d 1356, 1360 (Fed. Cir. 2006)).

---

[9] The parties do not address secondary considerations, which, accordingly, do not form part of our analysis.

18
Appx67

IPR2016-01228
Patent 7,881,236 B2

To prevail on its challenges, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). "In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.* 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")). The burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware, LLC. v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (citing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)) (discussing the burden of proof in *inter partes* review). Furthermore, Petitioner does not satisfy its burden of proving obviousness by employing "mere conclusory statements." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

C. Level of Skill in the Art

Petitioner contends that a person of ordinary skill in the art "would have had a Master's of Science Degree in an academic area emphasizing electrical engineering, physics, computer engineering, or an equivalent field (or a similar technical Master's Degree, or higher degree) with a concentration in wireless communication and networking systems." Pet. 22–23. Alternatively, according to Petitioner, a person of ordinary skill "would have had a Bachelor's Degree (or higher degree) in an academic area emphasizing electrical engineering, physics, or computer engineering and having two or more years of experience in wireless communication and

IPR2016-01228
Patent 7,881,236 B2

networking systems." *Id.* at 23. Petitioner asserts that "[a]dditional education in a relevant field, such as computer engineering, physics, or electrical engineering, or industry experience may compensate for a deficit in one of the other aspects of the requirements stated above." *Id.* In addition, Petitioner contends that a person of ordinary skill "would also have had experience with the wireless Standard Setting Organizations such as ETSI, IEEE, and 3GPP[10], and would have been familiar with relevant standards and draft standards directed to wireless communications." *Id.* Petitioner's declarant, Jonathan Wells, Ph.D., makes substantially the same statements as appear in the Petition. Ex. 1003 ¶ 39.

Patent Owner does not directly address the level of skill possessed by a person of ordinary skill in the art in its Response.

For purposes of this Decision, we agree with and adopt the level of skill proposed by Petitioner.

D. Scope and Content of the Prior Art

1. Kitazoe

a. Availability as Prior Art

The '236 patent was filed on August 10, 2009, claiming the benefit of the August 11, 2008, filing date of U.S. Prov. Appl. No. 61/087,988 under 35 U.S.C. § 119(e), and claiming priority under 35 U.S.C. § 119(a) to Korean patent application 10-2009-0057128, filed June 25, 2009. Ex. 1001

---

[10] The Third Generation Partnership Project ("3GPP"), which published Specification 321, is a standards-setting organization for mobile communications and was developing the LTE cellular communication system. *See* Pet. 33; PO Resp. 2; Ex. 1001, col. 1, ll. 22–25.

IPR2016-01228
Patent 7,881,236 B2

at [60], [30]. Petitioner "does not acknowledge that the '236 patent is entitled to its proclaimed priority date." Pet. 4, n.1. Patent Owner does not address this issue in its Response.

Kitazoe was filed on June 10, 2008, claiming the benefit of the August 14, 2007, filing date of U.S. Prov. Appl. No. 60/955,867 under 35 U.S.C. § 119(e). Ex. 1005 at [60]. Petitioner contends that "at least one claim of the Kitazoe patent is supported by disclosure in the Kitazoe Provisional," and that Kitazoe is therefore "entitled to the earlier priority date of the Kitazoe Provisional" application. Pet. 4–8. Patent Owner does not dispute this contention in its Response.

Petitioner presents arguments that Kitazoe's claims are supported by the disclosure of U.S. Prov. Appl. No. 60/955,867 so that its teachings are available as prior art as of August 14, 2007. *Id.* We do not reach these arguments. Patent Owner has not presented antedating evidence that might bear on the availability of Kitazoe as prior art to the '236 patent. Even if Petitioner's arguments fail, Kitazoe still qualifies as prior art under 35 U.S.C. § 102(e) by virtue of its June 10, 2008, filing date, which precedes the August 11, 2008, earliest potential effective filing date for the challenged claims.

b. Disclosure of Kitazoe

Kitazoe is titled "Encryption of the Scheduled Uplink Message in Random Access Procedure," and generally discloses a system and method for selectively encrypting uplink messages from access terminals to base stations in random-access procedures to gain access to wireless communications systems, such as LTE systems. Ex. 1005, [54], abst., col. 1,

IPR2016-01228
Patent 7,881,236 B2

ll. 23–26, col. 1, ll. 45–46, col. 2, ll. 13–15, col. 6, ll. 27–48. Kitazoe
describes a "random access procedure that leverages encrypted and/or
unencrypted data in a scheduled uplink message." *Id.* at abst. The
scheduled uplink message can be referred to as a "message 3," and access
terminals include "cellular phones, smart phones . . . and/or any other
suitable device" for communicating over wireless systems. *Id.* at col. 8, ll.
31–34, col. 7, ll. 46–50. Figure 4 of Kitazoe is reproduced below.

In Figure 4, signaling diagram 400 illustrates uplink message transmission
by an access terminal ("AT"). *Id.* at col. 5, ll. 25–28, col. 12, ll. 58–60. At
step 402, the access terminal transmits a random-access preamble to a
serving base station ("Serving BS"). *Id.* at col. 12, ll. 63–64. At step 404, a
random-access response is sent by the serving base station to the access
terminal, which, at step 406, can use the uplink grant to transmit
unencrypted message 3 to the base station. *Id.* at col. 13, ll. 1–8. In

22

Appx71

IPR2016-01228
Patent 7,881,236 B2

response to message 3, at step 408, the base station can send a contention-resolution message to the access terminal, which, at step 410, transmits a "normal scheduled" encrypted message to the base station. *Id.* at col. 13, ll. 12–14, col. 13, ll. 21–24. The access terminal can include memory that can store data to be transmitted.

2. *Prior Art Described in the '236 Patent*

Petitioner contends that statements in the "Discussion of the Related Art" section of the '236 patent "include[] a detailed description of a random access procedure in an LTE system" that constitutes admissions of the scope and content of the prior art. Pet. 13–15; *see* Ex. 1001, col. 1, l. 21–col. 4, l. 34. In particular, Petitioner asserts that, although the '236 patent does not use the term "prior art" to describe the disclosures, the section title, "Discussion of the Related Art," alone indicates a description of "prior art related to the disclosure of the '236 patent." *Id.* at 15; *see Ex parte Ji-Young Lee*, 2006 WL 4075454 at *20 (BPAI Feb. 23, 2007) ("where terms such as 'background art, or 'related art,' or 'conventional'" appear in a patent's specification, they should be "presume[d]" to denote admissions of prior art even if the specification does not specifically use the term "prior art"). Petitioner further asserts that the section describes the current state of LTE systems as of the filing of the '236 patent. *Id.*; *see* Ex. 1001, col. 1, ll. 30–32 ("The E-UMTS is evolved from the existing UMTS and has been currently standardized in the 3GPP"), col. 4, ll. 26–30 ("According to the current LTE system standard . . .").

Patent Owner does not contest that prior art described in the '236 patent can be properly considered in this *inter partes* review proceeding, and

IPR2016-01228
Patent 7,881,236 B2

several panels of the Board have held admissions of the scope and content of

the prior art in a patent's specification are available as prior art for the

purposes of *inter partes* review proceedings. *E.g., Ericsson v. Intellectual*

Ventures, Case IPR2014-01330, slip op. at 2, n.3 (PTAB Feb. 19, 2016)

(Paper 29); *Apple v. Yosmot 33*, Case IPR2015-00761, slip op. at 11 (PTAB

July 29, 2015) (Paper 5); *Intri-Plex Tech. v. Saint-Gobain Performance*

Plastics, Case IPR2014-00309, slip op. at 19–21 (PTAB Mar. 23, 2014)

(Paper 83).

　　　　The prior art described in the '236 patent includes disclosure of a

random-access procedure in an LTE system where the UE stores data to be

transmitted in a Msg3 buffer, and transmits the data "in correspondence

with" receipt from the base station of a UL grant signal that contains

information about radio resources. Ex. 1001, col. 4, ll. 18–26. "According

to the current LTE system standard, it is defined that, if the UL Grant signal

is received in a state in which data is stored in the Msg3 buffer, the data

stored in the Msg3 buffer is transmitted." *Id.* at col. 4, ll. 26–29.

3. Specification 321

　　　　Specification 321 is a technical specification published by the 3GPP

and describes the "Medium Access Control" ("MAC") architecture in an

LTE system, used for "[d]ata transfer" and for "[r]adio resource allocation."

Ex. 1007, 8. Detailed procedures involving the MAC architecture are

described in Section 5 of the reference, *id.* at 11–22, and several specific

aspects of these procedures are relevant to Petitioner's challenges.

　　　　For example, Sections 5.1.4 and 5.1.5 describe procedures in which

user equipment monitors a Physical Downlink Control Channel ("PDCCH")

IPR2016-01228
Patent 7,881,236 B2

for certain messages. *Id.* at 12–14. As described in Section 5.1.4, once the random-access preamble is transmitted, the user equipment monitors the PDCCH in a time window (referred to as a "TTI" or "transmission time interval") for random-access responses. *Id.* at 12. The user equipment may stop such monitoring after successfully receiving a random-access response that corresponds to the random-access preamble transmission. *Id.* As part of a contention-resolution procedure described in Section 5.1.5, the user equipment also monitors the PDCCH for a contention-resolution message after an uplink message, such as message 3, is transmitted. *Id.* at 13 ("Once the uplink message . . . is transmitted, the UE shall . . . monitor the PDCCH until the Contention Resolution Timer expires.") (bracketing in original omitted). As set forth in Section 5.4.1, the user equipment includes a "HARQ entity" that controls transmission and reception of messages by the user equipment, including the random-access response message, and dictates which transmissions use which uplink grants. *Id.* at 16; *see* Ex. 1003 ¶ 79.

The HARQ entity is described in detail in Section 5.4.2.1, which explains that "[t]here is one HARQ entity at the [user equipment]," and that "[a] number of parallel HARQ processes are used in the [user equipment] to support the HARQ entity, allowing transmissions to take place continuously while waiting for the feedback on the successful or unsuccessful reception of previous transmissions." *Id.* at 17. Each such HARQ process "is associated with a HARQ buffer." *Id.* (Section 5.4.2.2).

Of particular relevance is Section 5.4.2.1's enumeration of the conditions under which, at a given transmission time interval, the HARQ entity transmits a new payload, generates a retransmission, or has its associated buffer flushed. First, if an uplink grant indicates a "new

25
Appx74

IPR2016-01228
Patent 7,881,236 B2

transmission" for the transmission time interval *and* an "uplink prioritisation" entity indicates the need for a new transmission, the protocol data unit ("PDU") to be transmitted is obtained from a "Multiplexing and assembly" entity *and* the HARQ process is instructed to trigger transmission of the new payload using identified parameters. *Id.* Second, if an uplink grant indicates a "new transmission" but the uplink prioritization entity does *not* indicate the need for a new transmission, the HARQ buffer is flushed. *Id.* Third, if an uplink grant does *not* indicate a new transmission, the HARQ entity is instructed to generate a retransmission under two circumstances: (a) the uplink grant indicates a retransmission, *or* (b) the HARQ buffer of the corresponding HARQ process is not empty. *Id.*

E. Analysis

Petitioner relies on Dr. Wells's testimony in explaining how the combination of Kitazoe, the prior art described in the '236 patent, and Specification 321 teach the limitations of claims 1–4, 6–10, 12, and 13. Pet. 30–62 (citing Ex. 1003). Petitioner additionally relies on Kitazoe II, discussed below, in addressing the further limitation of claim 5. *Id.* at 62–65.

1. Combination of Kitazoe, Prior Art Described in the '236 Patent, and Specification 321

Petitioner proposes to combine the teachings of Kitazoe, the prior art described in the '236 patent, and Specification 321 into a system that has the following characteristics and which Petitioner contends meets all limitations of the relevant claims. Pet. 30–34. First, Petitioner observes that Kitazoe

IPR2016-01228
Patent 7,881,236 B2

describes transmitting an unencrypted Msg3 to the target base station during a random access procedure "in response to [a] received random access response." *Id.* at 30 (citing Ex. 1005, col. 13, ll. 60–66). Petitioner also observes that the prior art described in the '236 patent includes storing data to be transmitted via the Msg3 in a Msg3 buffer and includes transmitting the data stored in the Msg3 buffer "in correspondence with" reception of an uplink grant signal. *Id.* at 30–31 (citing Ex. 1001, col. 4, ll. 18–21. Based on these observations, Petitioner reaches two conclusions regarding the combination of Kitazoe and the prior art described in the '236 patent: (1) the Msg3 data transmitted by the user equipment, as described in Kitazoe, is stored in a Msg3 buffer, described as prior art in the '236 patent; and (2) to transmit the data stored in the Msg3 buffer, "the user equipment makes a determination that there is data stored in the Msg3 buffer when the UL grant signal is received," described as prior art in the '236 patent. *Id.* at 31 (citing Ex. 1001, col. 4, ll. 18–29; Ex. 1003 ¶ 88).

Second, Petitioner observes that Specification 321 teaches that the user equipment receives the contention-resolution message on a PDCCH. *Id.* at 31 (citing Ex. 1007 § 5.1.5). Coupled with Kitazoe's teaching of user equipment receiving a contention-resolution message, Petitioner reasons that, in the combined system, the contention-resolution message of Kitazoe is received on a PDCCH. *Id.* at 31 (citing Ex. 1005, col. 13, ll. 24–26, Fig. 4; Ex. 1007 § 5.1.5; Ex. 1003 ¶ 106).

Third, Petitioner observes that Specification 321 teaches that the user equipment in an LTE system like that taught by Kitazoe includes a HARQ entity that controls transmission and reception of messages by the user equipment. *Id.* at 31–32 (citing Ex. 1007, § 5.4.1; Ex. 1003 ¶¶ 114–115).

IPR2016-01228
Patent 7,881,236 B2

Petitioner reasons that the HARQ entity taught by Specification 321, and its

functionality, would be included in the user equipment of Kitazoe:

> In the combination, the reception of messages from the base
> station (such as the random access response), the transmission of
> messages to the base station (such as the [Msg3] and new data),
> and the processing of uplink grants received by the user
> equipment are performed by the HARQ entity and the HARQ
> processes taught by [Specification 321]. The user equipment of
> the combination also monitors the downlink for random access
> responses sent by the base station, and ceases monitoring "after
> successful reception of a Random Access Response
> corresponding to the Random Access Preamble transmission."
> . . . Also in the combination, new data to be transmitted by the
> user equipment to the base station is acquired from a
> "Multiplexing and assembly entity" by the HARQ entity.

Id. (citing Ex. 1007 §§ 5.4.1, 5.4.2.1). Petitioner supports this reasoning

with testimony by Dr. Wells, which we credit. Ex. 1003 ¶¶ 83–116.

Petitioner's analysis reasonably identifies corresponding elements among the

references in proposing the combination.

Petitioner also provides explicit reasoning why a person of skill in the

art would have combined the references' teachings in the proposed manner.

Pet. 32–34. As Petitioner recognizes, Kitazoe, the prior art described in the

'236 patent, and Specification 321 "all describe wireless network systems

implementing the 'LTE' protocol." *Id.* at 32–33 (citing Ex. 1005, col. 6, l.

46; Ex. 1001, col. 1, ll. 20–32; Ex. 1007 §§ 3.2, 4.3.1). This commonality,

according to Petitioner, makes the result of its proposed modifications

predictable because "the common technology of all three disclosures

indicates that the proposed modification would be straightforward for a

[person of ordinary skill in the art] to implement." *Id.* at 33 (citing Ex. 1005,

IPR2016-01228
Patent 7,881,236 B2

col. 6, l. 46; Ex. 1001, col. 1, ll. 20–32; Ex. 1007 §§ 3.2, 4.3.1; Ex. 1003

¶ 118). As Petitioner asserts, a person of ordinary skill in the art

> would have modified the user equipment described in Kitazoe
> to store [Msg3] data to be transmitted in the [Msg3] buffer
> described by the [prior art described in the '236 patent], to
> determine that data is store[d] in the [Msg3] buffer when an
> uplink grant is received, and to include a HARQ entity and its
> associated components to handle message processing as taught
> by [Specification 321], in order to conform the user equipment
> to the current LTE system standard.

Pet. 32. These assertions provide rational underpinning to Petitioner's
reasoning, which we find persuasive.

Patent Owner disputes this reasoning, referring to the art described in
the '236 patent that is relied on by Petitioner as "cited in the '236 patent as
3GPP TS 36.321 *V8.2.0*" and asserting that "the current LTE system
standard" referred to in the '236 patent "encompasses V8.2.0, not V8.1.0
(which is Petitioners' Exhibit 1007)." PO Resp. 43. Although Patent Owner
is correct that the references cited on the face of the '236 patent include the
V8.2.0 version of the standard (and do not include the V8.1.0 version
applied in Petitioner's challenges), the argument is unpersuasive.[11] The
mere identification of one version of the standard in the list of references
made of record during prosecution does not impute the degree of meaning to
the phrase "the current LTE system standard" that Patent Owner attempts to
impose. Rather, we agree with Petitioner that "Patent Owner provides no
evidence or explanation to support its conclusion that 'the "current LTE

---

[11] We note that the V8.2.0 version of the standard is applied in challenges by
other petitioners in IPR2016-00757 and IPR2016-01345 (consolidated).

IPR2016-01228
Patent 7,881,236 B2

system standard" . . . encompasses V8.2.0, not V8.1.0." Reply 23 (quoting
PO Resp. 43).

Accordingly, we conclude that Petitioner articulates sufficient
reasoning for combining the references' teachings, in accordance with the
principles set forth in *KSR*.

2. Independent Claim 1

For independent claim 1, Petitioner relies on the structure of its
proposed combination in contending that all limitations are met, and
identifies specific references that disclose individual teachings. Pet. 34–48.
Specifically, Petitioner contends that Kitazoe teaches "receiving an uplink
grant (UL Grant) signal from a base station on a specific message." *Id.* at
35–37 (citing Ex. 1005, col. 17, ll. 27–28, col. 13, ll. 1–8, col. 16, ll. 41–43,
col. 13, ll. 11–16).

For the limitation of "determining whether there is data stored in a
message 3 (Msg3) buffer when receiving the UL Grant signal on the specific
message," Petitioner observes that, in its proposed combination, "the user
equipment 'utilize[s] the uplink grant' received in the random access
response 'to transmit message 3' to the base station," and that "[t]he ['data
to be transmitted via the message 3 [is stored] in a message 3 (Msg3)
buffer.'" *Id.* at 37–38 (quoting Ex. 1005, col. 13, ll. 6–8; Ex. 1001, col. 4, ll.
18–21) (alterations by Petitioner except for addition of omitted quotation
mark). Petitioner's reasoning that the limitation is met relies on the
inference that "in order to transmit the data stored in the Msg3 buffer 'if the
UL Grant signal is received in a state in which data is stored in the Msg3
buffer,' the user equipment must determine whether there is data stored in

IPR2016-01228
Patent 7,881,236 B2

the Msg3 buffer when the UL grant signal is received." *Id.* (quoting Ex. 1001, col. 4, ll. 26–29).

Patent Owner disputes this inference, characterizing it as "just an assumption" "that data cannot be transmitted unless some entity has determined that there is data to send." PO Resp. 37. Although we agree that the art cited by Petitioner is not explicit on the point, an obviousness analysis "need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR*, 550 U.S. at 418. In this instance, Dr. Wells testifies in support of Petitioner's position that a person of skill in the art "would have understood that, in order to transmit the data stored in the Msg3 buffer 'if the UL Grant signal is received in a state in which data is stored in the Msg3 buffer,' the user equipment must necessarily determine whether there is data stored in the Msg3 buffer when the UL grant signal is received." Ex. 1003 ¶ 75 (citing Ex. 1001, col. 4, ll. 18–29). We credit this testimony, which we find reasonable, and conclude that Petitioner adequately demonstrates that the limitation is met by the combination of art.

With respect to the limitation of "determining whether the specific message is a random access response message," Petitioner makes a sufficient showing through its observation that Kitazoe "teaches that the user equipment determines 'non-security-critical' information 'that can be transmitted as part of the . . . unencrypted message 3,' and determines 'security-critical information' that can be transmitted as part of the later encrypted message." Pet. 40 (quoting Ex. 1005, col. 11, ll. 20–27) (alteration by Petitioner). Supported by testimony of Dr. Wells, Petitioner

31
Appx80

IPR2016-01228
Patent 7,881,236 B2

reasons that "[i]n order to determine whether to send 'non-security-critical' or 'security-critical' information in response to a specific message, the user equipment determines whether the specific message including the uplink grant is a random access response message." *Id*. at 40 (citing Ex. 1003 ¶ 93). Patent Owner does not dispute this argument.

For the two "transmitting" limitations, in addition to addressing the claim construction that Petitioner advocates, Petitioner alternatively addresses the claim construction we adopt for this Decision. *Id.* at 42–44. Specifically, Petitioner identifies Kitazoe's teaching that "the term 'message 3' refers to the scheduled transmission sent by the access terminal to [the] base station [] as granted by the random access response message from [the] base station." *Id.* at 43 (quoting Ex. 1005, col. 8, ll. 32–35) (alterations by Petitioner). Supported by testimony of Dr. Wells, Petitioner reasons that "[t]his indicates that message 3 is only sent using the uplink grant included in the random access response," and that "[b]ecause the message 3 is sent when this particular uplink grant is received and this particular uplink grant is only included in the random access response . . . , Kitazoe teaches that message 3 is sent only when the random access response is received (i.e., only when 'the specific message is the random access response message')." *Id.* (citing Ex. 1003 ¶ 98). This reasoning is persuasive.

Furthermore, also supported by testimony of Dr. Wells, Petitioner contends that a person of ordinary skill in the art "would have understood that the data in the Msg3 buffer can be transmitted 'only when' there is data stored in the Msg3 buffer." *Id.* at 43–44 (citing Ex. 1003 ¶ 99). We agree with Petitioner's and Dr. Well's reasonable inference that a person of skill in

32

IPR2016-01228
Patent 7,881,236 B2

the art would have understood that "if there is no data stored in the Msg3 buffer, . . . there would have been nothing to transmit." *Id.* at 44 (citing Ex. 1003 ¶ 99). Petitioner thus shows that the combination of art meets the first "transmitting" limitation, with both recited conditions satisfied.

For the converse case, when at least one of the recited conditions is not met, Petitioner makes two relevant observations. First, "Kitazoe teaches that the user equipment 'transmits a normal scheduled transmission message, which is encrypted, to the base station' after the random access procedure is completed." *Id.* at 47 (quoting Ex. 1005, col. 13, ll. 21–26) (alteration by Petitioner). Second, "Kitazoe further teaches that encrypted messages (such as this) cannot be sent in response to the random access response message (i.e., before message 3 is received by the base station), because the base station determines a 'security configuration' for the UE based on the information included in message 3." *Id.* (citing Ex. 1005, col. 10, ll. 65–67). That is, Kitazoe teaches that encrypted messages cannot be sent to the base station before determining the security configuration, "because the base station 'would not know which security configuration to apply in order to decrypt such encrypted message[s]' and thus 'would be unable to decipher the encrypted' messages." *Id.* (citing Ex. 1005, col. 10, l. 65–col. 11, l. 1). We agree with Petitioner's reasoning that these disclosures teach that the encrypted scheduled transmission message, i.e., the "new data," is transmitted only after the random access procedure is complete. *See id.* at 47–48.

Patent Owner "does not dispute" that Kitazoe "shows transmission of the Msg3 buffer data (the Scheduled Transmission) taking place after receipt of a random access response." PO Resp. 39. Nevertheless, Patent Owner

IPR2016-01228
Patent 7,881,236 B2

contends that "Kitazoe takes a narrow view of what can occur during a random access procedure" and "does not consider the more complex case" in which a "UL Grant is not in a random access response message but is instead contained in a PDCCH communication." *Id.* at 40–41. In such a "more complex case," Patent Owner argues, "the Msg3 buffer data is sent responsive to a [different message], an UL Grant *not* in a random access response." *Id.* at 42. Patent Owner contends that such a "more complex case" illustrates an example in which Msg3 buffer data are transmitted even when the (necessary) conditions recited in the first "transmitting" step are not satisfied. *Id.*

Patent Owner's argument is not persuasive. Patent Owner's reliance on its "more complex case" is unavailing. As Dr. Wells testifies, this complex case is a "contrived hypothetical" that does not "relate[] to what is described in Kitazoe," Ex. 2010, 60:21–22, 61:6–8. The fact that Patent Owner can hypothesize a system that is more complex than Kitazoe that does not teach or suggest the claim limitation does not negate the fact that the system described in Kitazoe does.

We conclude that Petitioner demonstrates, by a preponderance of the evidence, that independent claim 1 is unpatentable under 35 U.S.C. § 103(a) over Kitazoe, prior art described in the '236 patent, and Specification 321.

3. Dependent Claims 2–4 and 6

Each of claims 2–4 and 6 depends directly from independent claim 1. Patent Owner does not contest any aspect of Petitioner's challenge to these claims apart from its arguments directed at underlying claim 1. For each of

34

IPR2016-01228
Patent 7,881,236 B2

these claims, we agree with Petitioner's reasoning, which is summarized below.

Claim 2 recites that the second "transmitting" limitation of claim 1 includes "acquiring a Medium Access Control Protocol Data Unit (MAC PDU) from a multiplexing and assembly entity" and "transmitting the MAC PDU to the base station." Ex. 1001, col. 17, ll. 4–9. For these additional limitations, Petitioner identifies Specification 321's disclosure of user equipment that "obtain[s] the MAC PDU to transmit from the 'Multiplexing and assembly' entity" and for "instruct[ing] the HARQ process . . . to trigger the transmission of this new payload." Pet. 48; Ex. 1007, 17 (§ 5.4.2.1).

Claim 3 recites that the UL Grant signal received on the specific message "is a UL Grant signal received on a Physical Downlink Control Channel (PDCCH)" and that "the user equipment transmits new data in correspondence with the UL Grant signal received on the PDCCH." Ex. 1001, col. 17, ll. 10–16. For these limitations, Petitioner relies on its identification of new data transmitted to the base station in correspondence with the UL grant signal received in the contention resolution message from the base station, as taught by Specification 321. Pet. 48–49; Ex. 1007, 13–14 (§ 5.1.5).

Claim 4 recites that the data stored in the Msg3 buffer "is a Medium Access Control Protocol Data Unit (MAC PDU) including a user equipment identifier." Ex. 1001, col. 17, ll. 17–20. For this limitation, Petitioner identifies Kitazoe's disclosure that "a MAC layer PDU can be used for the . . . message 3" and that the message 3 can include an "access terminal identifier," which "can also be called a . . . user equipment (UE)." Pet. 49; Ex. 1005, col. 16, ll. 30–32, col. 6, ll. 62–66, col. 9, ll. 22–23.

IPR2016-01228
Patent 7,881,236 B2

Claim 6 recites that the UL Grant signal received on the specific message "is either a UL Grant signal received on a Physical Downlink Control Channel (PDCCH) or a UL Grant signal received on the random access response message." Ex. 1001, col. 17, ll. 25–29. By again pointing to Specification 321's disclosure related to a contention-resolution message, Petitioner identifies a teaching of the second of these recitations, i.e., "a UL Grant signal received on the random access response message." Pet. 49–50.

Based on these identifications, which are not contested by Patent Owner, we conclude that Petitioner demonstrates, by a preponderance of the evidence, that claims 2–4 and 6 are unpatentable under 35 U.S.C. § 103(a) over Kitazoe, prior art described in the '236 patent, and Specification 321.

4. Independent Claim 7

Independent claim 7 recites "user equipment" with limitations that generally parallel those of independent method claim 1, but specifying that functions are performed by "a reception module," "a transmission module," "a message 3 (Msg3) buffer," a "Hybrid Automatic Repeat Request (HARQ) entity," and "a multiplexing and assembly entity used for transmission of new data." Ex. 1001, col. 17, l. 30–col. 18, l. 7. As Patent Owner acknowledges, "[i]n large part, claim 7 claims an apparatus that performs the method claimed in claim 1" by "includ[ing] entities adapted to carry out the steps like those of claim 1." PO Resp. 9–10, 30.

We have referred to each of these structural elements above in the context of Petitioner's proposed combination of art, and therefore agree with Petitioner that such structural elements are met by the combination. *See* Pet. 50–59. For the functionality performed by such structural elements,

IPR2016-01228
Patent 7,881,236 B2

Petitioner advances arguments that parallel those made for independent claim 1. *See id.* For the same reasons discussed above, we conclude that Petitioner makes a sufficient showing of such functionality. Patent Owner does not contest Petitioner's arguments apart from its arguments directed at claim 1.

We conclude that Petitioner demonstrates, by a preponderance of the evidence, that claim 7 is unpatentable under 35 U.S.C. § 103(a) over Kitazoe, prior art described in the '236 patent, and Specification 321.

5. *Dependent Claims 8–10, 12, and 13*

Each of claims 8–10, 12, and 13 depends, directly or indirectly, from independent claim 7. Patent Owner does not contest any aspect of Petitioner's challenge to these claims apart from its arguments directed at corresponding independent method claim 1. For each of these claims, we agree with Petitioner's reasoning, which is summarized below.

Claim 8 recites "one or more HARQ processes" and "HARQ buffers respectively corresponding to the one or more HARQ processes," with specific limitations on data transmission by "the HARQ entity" recited in claim 7. Ex. 1001, col. 18, ll. 8–19. Claim 9 depends from claim 8 and further recites additional data-transmission limitations by the HARQ processes of claim 8. For both of these claims, Petitioner relies on the description of HARQ entities described in Specification 321, discussed above, and its related description of data transmission by such HARQ entities. Pet. 60–61; Ex. 1007, 17 (§ 5.4.2.1). We agree with Petitioner that the limitations are met by that disclosure.

IPR2016-01228
Patent 7,881,236 B2

Claims 10, 12, and 13 respectively parallel claims 3, 4, and 6, but include structural limitations consistent with their status as apparatus claims directed to "user equipment." Ex. 1001, col. 18, ll. 27–33. For each of these claims, Petitioner relies on the same disclosure, discussed above, as it does for the corresponding method claims. Pet. 61–62.

Based on Petitioner's identifications, which are not contested by Patent Owner, we conclude that Petitioner demonstrates, by a preponderance of the evidence, that claims 8–10, 12, and 13 are unpatentable under 35 U.S.C. § 103(a) over Kitazoe, prior art described in the '236 patent, and Specification 321.

6. Claim 5:
Combination of Kitazoe, Prior Art Described in the '236 Patent, Specification 321, and Kitazoe II

Claim 5 depends from claim 4 and recites that "the data stored in the Msg3 buffer further includes information about a buffer status report (BSR) if the user equipment starts a random access procedure for the BSR." Ex. 1001, col. 17, ll. 21–24. Petitioner challenges claim 5 as unpatentable under 35 U.S.C. § 103(a) over Kitazoe, prior art described in the '236 patent, Specification 321, and Kitazoe II. Pet. 62–65.

a. Availability of Kitazoe II as Prior Art

Kitazoe II was filed on December 17, 2008, claiming the benefit of the December 19, 2007, filing date of U.S. Prov. Appl. No. 61/015,159 under 35 U.S.C. § 119(e). Ex. 1009 at [22], [60]. Petitioner contends that "at least one claim of the Kitazoe-II patent is supported by disclosure in the

38
Appx87

IPR2016-01228
Patent 7,881,236 B2

Kitazoe-II Provisional," and that Kitazoe-II is therefore "entitled to the earlier priority date of the Kitazoe-II Provisional" application. Pet. 8–11.

Petitioner presents arguments that Kitazoe II's claims are supported by the disclosure of U.S. Prov. Appl. No. 61/015,159, so that Kitazoe II's teachings are available as prior art as of December 19, 2017. *Id.* For example, Petitioner asserts the limitations recited in claim 1 and in thirty-eight other claims of Kitazoe II are described in the Kitazoe II provisional application. *Id.* Patent Owner does not respond to these contentions and does not present any antedating evidence that might bear on the availability of Kitazoe II as prior art to the '236 patent. On the record before us, we are persuaded for purposes of this Decision that Kitazoe II is entitled to the earlier effective filing date of the Kitazoe II provisional application, and is prior art to the '236 patent under 35 U.S.C. § 102(e).

b. Disclosure of Kitazoe II

Kitazoe II is titled, "Method and Apparatus for Transfer of a Message on a Common Control Channel for Random Access in a Wireless Communication Network," and describes "[t]echniques for sending a message for random access by a user equipment." Ex. 1009 at [54], abst. Kitazoe II discloses that the user equipment may send a message for random access that includes a buffer status report. *Id.* at abst., ¶ 72.

c. Analysis

Petitioner contends that the limitation of dependent claim 5 is met by Kitazoe II, which describes that the user equipment may send a buffer-status-report message in Msg3. Pet. 63–64 (citing Ex. 1009, abst., ¶ 72). In

IPR2016-01228
Patent 7,881,236 B2

addition, Petitioner contends that one of ordinary skill would have combined this teaching with those of the other references. Pet. 63–64. Petitioner contends that the combination would "increase the data efficiency of the random access procedure, as taught by Kitazoe-II," which "would have been predictable because" the references "describe techniques related to wireless networks using the 'LTE' protocol." *Id.* at 64 (citing Ex. 1003 ¶¶ 122–123). Patent Owner does not respond to these contentions. *See* PO Resp. 45 (relying on arguments directed at claim 1).

We are persuaded that Petitioner both identifies relevant disclosure in Kitazoe II that meets the limitation of claim 5 and provides sufficient articulated reasoning with rational underpinning for combining the teachings of Kitazoe, prior art described in the '236 patent, and Specification 321 with that of Kitazoe II. That is, Petitioner's analysis for claims 1 and 4 sufficiently establishes that those claims are unpatentable for the reasons discussed above, and that one of skill in the art would additionally store information about a buffer status report in the data stored in the Msg3 buffer in accordance with the teachings of Kitazoe II. Accordingly, we conclude that Petitioner demonstrates, by a preponderance of the evidence, that claim 5 is unpatentable under 35 U.S.C. § 103(a) over Kitazoe, prior art described in the '236 patent, Specification 321, and Kitazoe II.

III. CONCLUSION

We conclude that Petitioner demonstrates, by a preponderance of the evidence, that claims 1–4, 6–10, 12, and 13 are unpatentable under 35 U.S.C. § 103(a) over Kitazoe, prior art described in the '236 patent, and Specification 321; and that claim 5 is unpatentable under 35 U.S.C. § 103(a)

IPR2016-01228
Patent 7,881,236 B2

over Kitazoe, prior art described in the '236 patent, Specification 321, and

Kitazoe II.

IV. ORDER

It is

ORDERED that, based on a preponderance of the evidence, claims 1–

10, 12, and 13 of U.S. Patent No. 7,881,236 B2 are held to be unpatentable;

and

FURTHER ORDERED that, because this is a final written decision,

parties to this proceeding seeking judicial review of our decision must

comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2016-01228
Patent 7,881,236 B2

PETITIONER

Walter Renner
IPR00035-0009IP1@fr.com

Roberto Devoto
Daniel Smith
PTABInbound@fr.com

PATENT OWNER

Cyrus Morton
Ryan Schultz
ROBINS KAPLAN LLP
cmorton@robinskaplan.com
rschultz@robinskaplan.com

Trials@uspto.gov   Paper 32
571-272-7822   Entered: March 26, 2018

UNITED STATES PATENT AND TRADEMARK OFFICE
_____

BEFORE THE PATENT TRIAL AND APPEAL BOARD
_____

APPLE INC., MICROSOFT CORPORATION,
MICROSOFT MOBILE OY, and
MICROSOFT MOBILE INC. (F/K/A/ NOKIA INC.),
Petitioner,

v.

EVOLVED WIRELESS LLC,
Patent Owner.

_____

Case IPR2016-01228
Patent 7,881,236 B2

_____

Before WILLAM V. SAINDON, PATRICK M. BOUCHER, and
TERRENCE W. McMILLIN, *Administrative Patent Judges*.

BOUCHER, *Administrative Patent Judge*.

DECISION
Denying Patent Owner's Request for Rehearing
37 C.F.R. § 42.71(d)

Appx92

IPR2016-01228
Patent 7,881,236 B2

Patent Owner requests rehearing of our Final Written Decision holding claims 1–10, 12, and 13 of U.S. Patent No. 7,881,236 ("the '236 patent") unpatentable. Paper 28 ("Req. Reh'g"). Pursuant to our authorization, Petitioner filed an Opposition (Paper 30) and Patent Owner filed a Reply (Paper 31). By email correspondence, we denied Petitioner's requests either to expunge Patent Owner's Reply from the record as advancing new arguments or to authorize Petitioner to file a sur-reply.

For the reasons set forth below, Patent Owner's Request for Rehearing is denied.

I. BACKGROUND

"The burden of showing a decision should be modified lies with the party challenging the decision." 37 C.F.R. § 42.71(d). When requesting rehearing of a decision, the party must identify specifically all matters the party believes the Board misapprehended or overlooked, and the place where each matter was previously addressed in the record. *Id.*

Patent Owner's Request for Rehearing focuses on the "transmitting" limitations of independent method claim 1 and the corresponding limitations of independent apparatus claim 7. The "transmitting" limitations of claim 1 recite:

> transmitting the data stored in the Msg3 buffer to the base station using the UL Grant signal received on the specific message, *if* there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message; and
> transmitting new data to the base station in correspondenc with the UL Grant signal received on the specific message, *if* there is no data stored in the Msg3 buffer when receiving the UL

IPR2016-01228
Patent 7,881,236 B2

> Grant signal on the specific message or the specific message is
> not the random access response message.

Ex. 1001, col. 16, l. 59–col. 17, l. 3 (emphases added). In the Final Written
Decision, we agreed with Patent Owner that, under the broadest reasonable
interpretation, the recitation of "if" in these limitations introduces necessary
conditions rather than sufficient conditions. Paper 27 ("Dec."), 12–17. That
is, the operation of the two "transmitting" limitations can be described as
follows:

> Those limitations implicate two conditions, resulting in different
> data being transmitted depending on whether both conditions are
> satisfied or not. The first condition is whether "there is data
> stored in the Msg3 buffer when receiving the UL Grant signal on
> the specific message," and the second condition is whether "the
> specific message is the random access response message." . . .
> "If" both conditions are satisfied, the "data stored in the Msg3
> buffer" are transmitted to the base station; and "if" either
> condition is not satisfied, "new data" are transmitted to the base
> station.

Id. at 12 (citations omitted). This construction is frequently referred to by
the parties as the "only when" construction.

   Although Petitioner advocated for a broader construction in which the
recitation of "if" more broadly introduces *sufficient* conditions, the Petition
also addressed the construction we adopted. Paper 2, 42–44; *see* Dec. 32
(noting Petitioner's alternative argument). In addition to the documentary
prior art cited by the Petition, Petitioner also relied on a Declaration by
Jonathan Wells, Ph.D., which we accorded evidentiary weight. Ex. 1003;
see Dec. 32–34. In contrast, we did not accord weight to a Declaration by
Todor Cooklev, Ph.D., proffered by Patent Owner, because that declaration

IPR2016-01228
Patent 7,881,236 B2

was unsworn and therefore defective.[1] Ex. 2009; Dec. 10–11. Petitioner's

evidence cannot be rebutted by Patent Owner's unsworn attorney argument.

See Gemtron Corp. v. Saint-Gobain Corp., 572 F.3d 1371, 1380 (Fed. Cir.

2009) ("[U]nsworn attorney argument . . . is not evidence and cannot rebut

. . . evidence.").   Thus, the weight of the evidence greatly favored Petitioner.

Weighing that evidence—even adopting the construction of the

"transmitting" limitations advocated by Patent Owner—we concluded that

Petitioner demonstrated sufficiently that both "transmitting" limitations are

disclosed by Kitazoe. Dec. 32–34. Ultimately, we concluded that Petitioner

demonstrated, by a preponderance of the evidence, that both independent

claims 1 and 7 are unpatentable over the combination of art considered, and

that the claims that depend therefrom are also unpatentable. *Id.* at 41.

In its Request for Rehearing, Patent Owner contends that "[t]he Board

should reconsider its Final Written Decision . . . for two independent

reasons." Req. Reh'g 1. First, Patent Owner contends that we "overlooked

the Patent Owner's argument about why the additional UL Grant it discussed

in the Response is not a 'contrived hypothetical' but is instead grounded in

the '236 patent's specification." *Id.* Second, "and more importantly," Patent

Owner contends that we overlooked an argument advanced by Patent Owner

in its response that the prior art relied on by Petitioner "does not create the

conditions that test" the adopted construction. *Id.*

---

[1] In the Final Written Decision, we noted that, despite having notice of the
defect with the Cooklev Declaration, Patent Owner took no affirmative steps
to cure the defect. Dec. 11. Patent Owner did not request leave to cure the
defect in the Cooklev Declaration with its Request for Rehearing or
otherwise.

IPR2016-01228
Patent 7,881,236 B2

II. ANALYSIS

Both of Patent Owner's contentions are grounded in its position that that Kitazoe did not consider conditions that could test whether the Msg3 buffer data are transmitted if the conditions recited in the claims are not met.[2] Req. Reh'g 6. That is, Patent Owner does not dispute in its Request for Rehearing that transmission occurs when the conditions *are* met. *Id.*; *see also* Paper 14, 39 ("Patent Owner does not dispute that [Kitazoe] shows transmission of the Msg3 buffer data . . . taking place after receipt of a random access response."). Instead, Patent Owner bases its request on an argument that Kitazoe insufficiently addresses the circumstance of what behavior results when the conditions are *not* met.

In addressing the "transmitting" limitations, the Final Written Decision considered and addressed this circumstance, i.e. "when at least one of the recited conditions is not met." Dec. 33. In addressing that circumstance, we cited disclosure by Kitazoe identified by Petitioner that "teach that the encrypted scheduled transmission message, i.e., the 'new data,' is transmitted only after the random access procedure is complete." *Id.*

In its Request for Rehearing, Patent Owner reiterates its argument that "Kitazoe 'takes a narrow view of what can occur during a random access procedure.'" Req. Reh'g 9 (quoting Paper 14, 40). Instead, as it did in its Response, Patent Owner "illustrate[s] a more complex case of UL Grant

---

[2] There appears to be an important omission of the word "not" in the following sentence of the Request for Rehearing: "And fatal to Petitioner's argument, the one place they looked—Kitazoe—admittedly did not consider conditions that could test the [*sic*] whether the Msg3 buffer data is transmitted if Condition X is [***not***] met." Req. Reh'g 6.

5
Appx96

IPR2016-01228
Patent 7,881,236 B2

reception." *Id.* But we expressly considered this "more complex case"—for which Patent Owner relies on unsworn attorney argument and the unsworn Cooklev Declaration—in light of the cross-examined testimony of Dr. Wells. Dec. 33–34. As summarized in the Final Written Decision, Dr. Wells testified that Patent Owner's "more complex case" is a "contrived hypothetical" that does not "relate[] to what is described in Kitazoe." *Id.* at 34 (quoting Ex. 2010, 60:21–22, 61:6–8). That such a case may have been discussed in the Specification of the '236 patent is not relevant to what a person of ordinary skill in the art would understand from Kitazoe's teachings. *See* Req. Reh'g 11–12.

Although we have reconsidered Patent Owner's reiterated argument, we do not now reach a different conclusion. Patent Owner effectively attempts to intensify Petitioner's burden by casting the already narrower construction of "if" adopted by the Final Written Decision as encompassing a negative limitation. Req. Reh'g 5–6. That is, Patent Owner contends that Petitioner could only make a sufficient showing by exhaustively demonstrating that no prior art performs the respective "transmitting" steps when the conditions are not met. *Id.* at 6 ("Petitioners didn't look everywhere."). This argument demands too much by relying on hypothetical scenarios not addressed by the reference itself, with the attorney argument by Patent Owner supported only by the defective Declaration of its witness. As in the Final Written Decision, we continue to accord weight to the contrary testimony of Dr. Wells, while not according weight to the testimony of Dr. Cooklev.

IPR2016-01228
Patent 7,881,236 B2

For these reasons, we are not persuaded that the Final Written Decision misapprehended or overlooked any argument by Patent Owner that would justify a change in that Decision.

III. ORDER

Accordingly, it is

ORDERED that Patent Owner's Request for Rehearing is *denied*.

IPR2016-01228
Patent 7,881,236 B2

PETITIONER

Walter Renner
Roberto Devoto
Daniel Smith
FISH & RICHARDSON P.C.
IPR00035-0009IP1@fr.com
PTABInbound@fr.com

PATENT OWNER

Cyrus Morton
Ryan Schultz
ROBINS KAPLAN LLP
cmorton@robinskaplan.com
rschultz@robinskaplan.com

8

Appx99

UNITED STATES PATENT AND TRADEMARK OFFICE
_____

BEFORE THE PATENT TRIAL AND APPEAL BOARD
_____

APPLE INC., MICROSOFT CORPORATION,
MICROSOFT MOBILE OY, and
MICROSOFT MOBILE INC. (F/K/A/ NOKIA INC.),
Petitioner,

v.

EVOLVED WIRELESS LLC,
Patent Owner.

_____

Case IPR2016-01229
Patent 7,881,236 B2

_____

Before WILLAM V. SAINDON, PATRICK M. BOUCHER, and
TERRENCE W. McMILLIN, *Administrative Patent Judges*.

BOUCHER, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

IPR2016-01229
Patent 7,881,236 B2

In response to a Petition (Paper 2, "Pet.") filed by Apple Inc., Microsoft Corporation, Microsoft Mobile Oy, and Microsoft Mobile Inc. (f/k/a Nokia Inc.) (collectively, "Petitioner"), we instituted an *inter partes* review of claims 1–10, 12, and 13 of U.S. Patent No. 7,881,236 B2 ("the '236 patent"). Paper 8 ("Dec."), 21. During the trial, Evolved Wireless LLC ("Patent Owner") timely filed a Response (Paper 14, "PO Resp."), to which Petitioner timely filed a Reply (Paper 16, "Reply"). An oral hearing was held on September 15, 2017, and a copy of the transcript was entered into the record. Paper 22 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of the claims on which we instituted trial. Based on the record before us, Petitioner has shown, by a preponderance of the evidence, that claims 1–10, 12, and 13 are unpatentable.

I. BACKGROUND

A. The '236 Patent

The '236 patent "relates to a mobile communication technology." Ex. 1001, col. 1, ll. 17–18. In particular, the patent describes a random access procedure for user equipment ("UE") and a base station in a telecommunication system. *Id.* at col. 3, ll. 42–59. Figure 1 of the '236 patent illustrates a particular example of such a telecommunication system—the Evolved Universal Mobile Telecommunication System ("E-UMTS"), and is reproduced below.

IPR2016-01229
Patent 7,881,236 B2

FIG. 1

Figure 1 provides a schematic view of a network architecture for the E-UMTS, which may be conceived in terms of two component networks: Evolved UMTS Terrestrial Radio Access Network ("E-UTRAN") 101 and Core Network 102. *Id.* at col. 1, ll. 26–35. The first of these, E-UTRAN 101, may include user equipment ("UE") 103, multiple base stations 104 (referred to in the '236 patent as "eNode B" or "eNB"), and Access Gateway ("AG") 105. *Id.* at col. 1, ll. 35–39. Access Gateway 105 is positioned at the end of the network and connected to an external network, and can include a portion for processing user traffic and a portion for processing control traffic. *Id.* at col. 1, ll. 38–41.

As the '236 patent describes, "a UE performs the random access procedure" in a number of instances, including "when the UE performs initial access" to a base station and "when there is uplink data transmission in a situation where uplink time synchronization is not aligned or where a

IPR2016-01229
Patent 7,881,236 B2

specific radio resource used for requesting radio resources is not allocated."
Id. at col. 3, ll. 42–57. A version of Figure 5 of the '236 patent annotated by
Petitioner is reproduced below.

Figure 5 shows an example of a random access procedure performed
between user equipment UE and base station eNB. *Id.* at col. 6, ll. 53–55.
The procedure begins with transmission of a "random access preamble"
from the UE to the base station at step S501 (referred to as a "message 1"
transmitting step). *Id.* at col. 4, ll. 3–7. The UE receives a "random access
response" from the base station at step S502 "in correspondence with the
transmitted random access preamble" (referred to as a "message 2" receiving
step). *Id.* at col. 4, ll. 7–11. Of particular relevance, the UE then transmits
an uplink message to the base station at step S503 (referred to as a "message
3" or "Msg3" transmitting step). *Id.* at col. 4, ll. 11–14. The UE receives a
corresponding "contention resolution" message from the base station at step
S504 (referred to as a "message 4" receiving step). *Id.* at col. 4, ll. 14–17.

IPR2016-01229
Patent 7,881,236 B2

In the random access procedure, the UE stores data to be transmitted via the message 3 in a "Msg3 buffer" and transmits the stored data "in correspondence with the reception of an Uplink (UL) Grant signal." *Id.* at col. 4, ll. 18–21. The UL Grant signal indicates information about uplink radio resources that may be used when the UE transmits a signal to the base station. *Id.* at col. 4, ll. 21–26. According to the '236 patent, then-current Long-Term Evolution ("LTE") system standards provided that data stored in the Msg3 buffer of the UE would be transmitted to the base station "*regardless of* the reception mode of the UL Grant signal," and that "if the data stored in the Msg3 buffer is transmitted in correspondence with the reception of *all* UL Grant signals, problems may occur." *Id.* at col. 4, ll. 26–32 (emphases added). The '236 patent purports to solve such problems. *Id.* at col. 4, ll. 33–34.

Figure 9 of the '236 patent is reproduced below.

5

Appx104

IPR2016-01229
Patent 7,881,236 B2

FIG. 9

Figure 9 is a flowchart of the method described by the '236 patent, showing the operation of an uplink Hybrid Automatic Repeat Request ("HARQ") entity in a UE. *Id.* at col. 13, ll. 35–39. After a UL grant signal is received from the base station at step 902, the UE determines at step 906 whether there are data in the Msg3 buffer. *Id.* at col. 13, ll. 42–44, 66–67. If so, a further determination is made at step 907 whether the received UL grant signal is on a random access response ("RAR") message. *Id.* at col. 13, l.

Appx105

IPR2016-01229
Patent 7,881,236 B2

66–col. 14, l. 3. The UE transmits the data in the Msg3 buffer to the base station "only when" both conditions are met, i.e., "only when there is data in the Msg3 buffer when receiving the UL Grant signal and the UL Grant signal is received on the random access response message (S908)." *Id.* at col. 14, ll. 3–7. Conversely, if either condition is not met, i.e. there are no data in the Msg3 buffer or the UL Grant signal is not on a random access response message, then the UE determines that the base station is making a request for transmission of new data and performs new-data transmission at step 909. *Id.* at col. 14, ll. 7–13.

B. *Illustrative Claims*

Claims 1 and 7 of the '236 patent, reproduced below, are independent claims respectively directed at the above-described method and at user equipment that implements the above-described method.

> 1. A method of transmitting data by a user equipment through an uplink, the method comprising:
>
>   receiving an uplink grant (UL Grant) signal from a base station on a specific message;
>
>   determining whether there is data stored in a message 3 (Msg3) buffer when receiving the UL Grant signal on the specific message;
>
>   determining whether the specific message is a random access response message;
>
>   transmitting the data stored in the Msg3 buffer to the base station using the UL Grant signal received on the specific message, if there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message; and
>
>   transmitting new data to the base station in correspondence with the UL Grant signal received on the specific message, if there is no data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message or the specific message is not the random access response message.

7

IPR2016-01229
Patent 7,881,236 B2

7. A user equipment, comprising:

a reception module adapted to receive an uplink grant (UL Grant) signal from a base station on a specific message;

a transmission module adapted to transmit data to the base station using the UL Grant signal received on the specific message;

a message 3 (Msg3) buffer adapted to store UL data to be transmitted in a random access procedure;

a Hybrid Automatic Repeat Request (HARQ) entity adapted to determine whether there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is a random access response message, acquiring the data stored in the Msg3 buffer if there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is the random access response message, and controlling the transmission module to transmit the data stored in the Msg3 buffer to the base station using the UL Grant signal received by the reception module on the specific message; and

a multiplexing and assembly entity used for transmission of new data,

wherein the HARQ entity acquires the new data to be transmitted from the multiplexing and assembly entity if there is no data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the specific message or the received message is not the random access response message, and controls the transmission module to transmit the new data acquired from the multiplexing and assembly entity using the UL Grant signal received by the reception module on the specific message.

C. Instituted Grounds of Unpatentability

We instituted trial for challenges under 35 U.S.C. § 103(a) over the following combinations of references. Dec. 21.

IPR2016-01229
Patent 7,881,236 B2

References	Challenged Claim(s)
Kitazoe,[1] Niu,[2] and Specification 321[3]	1–4, 6–10, 12, and 13
Kitazoe, Niu, Specification 321, and Kitazoe II[4]	5

D. Real Parties in Interest and Related Proceedings

Petitioner identifies Apple Inc., Microsoft Corporation, Microsoft Mobile Oy, Microsoft Mobile Inc. (f/k/a Nokia Inc.), Microsoft Luxembourg International Mobile SARL, and Microsoft Luxembourg USA Mobile SARL as real parties in interest. Pet. 1. Petitioner asserts that "[t]he Microsoft entities have numerous affiliated and/or related entities," but that "no unnamed Microsoft entity is funding or controlling this Petition or any resulting IPR." *Id.* Patent Owner identifies only itself as a real party in interest. Paper 5, 2.

The parties indicate that the '236 patent is the subject of several district-court litigations: *Evolved Wireless, LLC v. Apple, Inc.*, No. 1:15-cv-542 (D. Del.); *Evolved Wireless, LLC v. HTC Corp.*, No. 1:15-cv-543 (D. Del.); *Evolved Wireless, LLC v. Lenovo Group Ltd.*, 1:15-cv-544 (D. Del.); *Evolved Wireless, LLC v. Samsung Electronics Co. Ltd.*, 1:15-cv-545 (D. Del.); *Evolved Wireless, LLC v. ZTE Corp.*, 1:15-cv-546 (D. Del.); *Evolved Wireless LLC v. Microsoft Corp.*, 1:15-cv-547 (D. Del.). Pet. 1–2; Paper 5, 2–3. In addition, the '236 patent is the subject of the following

---

[1] U.S. Patent No. 8,180,058 B2, filed June 10, 2008, issued May 15, 2012 (Ex. 1005, "Kitazoe").
[2] U.S. Patent No. 6,161,160, filed Sept. 3, 1998, issued Dec. 12, 2000 (Ex. 1012, "Niu").
[3] 3GPP Technical Specification 36.321 V8.1.0 (March 2008) (Ex. 1007, "Specification 321").
[4] U.S. Patent Publication No. 2009/0163211 A1, filed Dec. 17, 2008, published June 25, 2009 (Ex. 1009, "Kitazoe II").

9

IPR2016-01229
Patent 7,881,236 B2

inter partes reviews: IPR2016-00757, which has been consolidated with IPR2016-01345 (both of which involve a different petitioner); and IPR2016-01228 (which involves this Petitioner on different grounds).

E. *Cooklev Declaration*

Patent Owner proffers a Declaration by Todor Cooklev, Ph.D., as evidentiary support of its claim-construction and substantive arguments. Ex. 2011. Petitioner argues that the Declaration "is entitled to no weight" because "[n]otoriously absent from Exhibit [2011[5]] is any indication that the declarant was 'warned that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. 1001),' or a statement by the declarant that 'all statements made of the declarant's own knowledge are true and that all statements made on information and belief are believed to be true.' *See* 37 CFR 1.68." Reply 2–3. We agree with Petitioner that Dr. Cooklev's Declaration is defective and can be accorded no weight.

In an *inter partes* review proceeding, evidence includes "affidavits," which are defined in our regulations by reference to the provisions of 37 C.F.R. § 1.68 and 28 U.S.C. § 1746. *See* 37 C.F.R. § 42.2. The former of these, i.e., 37 C.F.R. § 1.68, requires that a declarant be warned, on the same document, that "willful false statements and the like are punishable by fine or imprisonment, or both." The latter, i.e., 28 U.S.C. § 1746, provides that unsworn declarations may substitute for sworn declarations if accompanied by a statement in substantially the form, "I declare . . . under penalty of

---

[5] Petitioner incorrectly refers to Dr. Cooklev's Declaration as "Exhibit 2009" in its Reply.

IPR2016-01229
Patent 7,881,236 B2

perjury under the laws of the United States of America that the foregoing is true and correct." To give weight to Dr. Cooklev's statements would thwart the purpose of these provisions. *See Intel Corp. v. Alacritech, Inc.*, Case IPR2017-01402, slip op. at 6 (PTAB Nov. 6, 2017) (Paper 8).

At the oral hearing, Patent Owner conceded that Dr. Cooklev's Declaration is defective. Tr. 36:16–17 ("Well, yes, he did not swear under the penalty of perjury"). Indeed, Patent Owner had notice of the defect in Dr. Cooklev's Declaration at least as early as the filing of Petitioner's Reply on July 26, 2017. Reply 2–3. Nevertheless, Patent Owner took no affirmative steps to cure the defect. Although we recognize that Petitioner may well have capitalized tactically on the defect by forgoing cross-examination in which Dr. Cooklev may have provided sworn testimony consistent with his Declaration, we cannot simply ignore the regulatory and statutory requirements that render that Declaration defective. To give weight to the Declaration would require us to surmise that Dr. Cooklev would swear to the statements in his Declaration, and we are in no position to do so.

Accordingly, we give no weight to Dr. Cooklev's Declaration.

II. ANALYSIS

A. Claim Construction

The Board interprets claims of an unexpired patent using the broadest reasonable construction in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest

IPR2016-01229
Patent 7,881,236 B2

reasonable interpretation standard); Office Patent Trial Practice Guide, 77
Fed. Reg. 48,756, 48,766 (Aug. 14, 2012).

1. *"transmitting . . . if"*

A claim-construction disagreement between the parties is grounded in
use of the word "if" in the two "transmitting" limitations of independent
claims 1 and 7. *See* Pet. 15–18; PO Resp. 10–32; Reply 3–21. Those
limitations implicate two conditions, resulting in different data being
transmitted depending on whether both conditions are satisfied or not. The
first condition is whether "there is data stored in the Msg3 buffer when
receiving the UL Grant signal on the specific message," and the second
condition is whether "the specific message is the random access response
message." Ex. 1001, col. 16, l. 59–col. 17, l. 3; col. 17, l. 38–col. 18, l. 7.
"If" both conditions are satisfied, the "data stored in the Msg3 buffer" are
transmitted to the base station; and "if" either condition is not satisfied, "new
data" are transmitted to the base station. *Id.*

Petitioner presents an argument that effectively addresses each
"transmitting" limitation in isolation, contending that "the claim language
. . . speaks for itself," and that "the term 'if' is used to indicate that the action
occurs in the presence of the condition, but possibly also at other times."
Pet. 18. That is, Petitioner contends that "if" in each "transmitting"
limitation should be construed as introducing a *sufficient* condition.

Patent Owner presents a counterargument that considers an interplay
between the two "transmitting" limitations, correctly observing that the two
conditions "are independent of one another" and that the recitations in the
two "transmitting" limitations are "logical opposite[s]." PO Resp. 10–15.

IPR2016-01229
Patent 7,881,236 B2

As Patent Owner asserts, "both limitations cannot, at the same time, be true." *Id.* at 14. In considering this logical interplay, Patent Owner contends that "if" in each "transmitting" limitation should therefore be construed as introducing a *necessary* condition: "The proper claim construction is one that follows the claim's plain language . . . ; that is Msg3 data is transmitted if [both conditions are] met . . . and new data are transmitted if [either condition] is not met." *Id.* at 15.[6]

We have considered the positions of both parties and conclude that Patent Owner presents the more compelling reading of the claim. In isolation, the plain and ordinary meaning of "if" is amenable to both *sufficient-condition* and *necessary-condition* constructions. Indeed, it is trivial to construct English sentences in which a listener would naturally understand one of those constructions to be implicated. For instance, "If there is smoke, there is fire" is naturally understood not to preclude the possibility of fire if there is no smoke (sufficient if). Conversely, "If you take another step, I'll shoot," is naturally understood to mean that the speaker will not shoot if the listener does not take another step (necessary if).

---

[6] Patent Owner characterizes its position as equivalent to reciting "but not transmitting the new data" as part of the first "transmitting" limitation, i.e., when both conditions are met; and to reciting "but not transmitting any data stored in the Msg3 buffer" as part of the second "transmitting" limitation, i.e., when at least one of the conditions is not met. PO Resp. 12–13. Although such additional language is logically consistent with Patent Owner's position, we find it unnecessary to incorporate such negative limitations into the claims; the proper construction can be resolved by correctly construing the meaning of "if."

IPR2016-01229
Patent 7,881,236 B2

To resolve the ambiguity, we look, as we must, to the context provided by the claims themselves, as well as to the Specification in whose light they must be considered under the broadest-reasonable-interpretation standard. *See Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996) ("the context of the surrounding words of the claim also must be considered in determining the ordinary and customary meaning of those terms"). We agree with Patent Owner's characterization of Petitioner's position as improperly including the optional possibility of transmitting data stored in the Msg3 buffer even when both conditions are not satisfied. *See* PO Resp. 14–15. Such an optional possibility is a logical consequence of a sufficient-if construction, and we acknowledge that such a reading would be tenable if the claim included only the first "transmitting" step.[7] But the claim explicitly answers the question of what occurs when at least one of the conditions is not satisfied: "new data" are transmitted to the base station. Ex. 1001, col. 16, l. 16–col. 17, l. 3; col. 17, l. 52–col. 18, l. 7. By isolating the "transmitting" limitations, Petitioner improperly reaches too broad a construction of the claim as a whole.

Furthermore, Patent Owner's proposed construction is consistent with the Specification of the '236 patent. For example, in motivating its disclosure, the Specification observes that, in the prior art, "if the UL Grant signal is received in a state in which data is stored in the Msg3 buffer, the data stored in the Msg3 buffer is transmitted *regardless of* the reception mode of the UL Grant signal." *Id.* at col. 4, ll. 26–30 (emphasis added). The Specification purports to resolve such a deficiency because "if the data

---

[7] Indeed, this is precisely the case for a child of the '236 patent, as discussed *infra*.

Appx113

IPR2016-01229
Patent 7,881,236 B2

stored in the Msg3 buffer is transmitted in correspondence with the reception of *all* UL Grant signals, problems may occur." *Id.* col. 4, ll. 30–34 (emphasis added). In addition, the description of Figure 9 of the patent, reproduced above, explicitly explains that data in the Msg3 buffer are transmitted to the base station "only when" both conditions recited in the claims are met, i.e. they are necessary conditions. *Id.* at col. 14, ll. 3–8.

The parties also address the relevance of the prosecution history of a child of the '236 patent. PO Resp. 25–27; Reply 20–21. During prosecution of U.S. Patent No. 9,532,336 B2 (Ex. 2013, "the '336 patent"), which shares the same written description as the '236 patent, explicit language was included in the independent method claims to require transmission of data stored in the Msg3 buffer "only when" such data are stored in the Msg3 buffer and the UL Grant was received on the random access response message. Ex. 2014, 146. Such "only when" language did not appear in the claims as originally filed, and was added in response to a rejection in which the Examiner made the following remarks:[8]

> Claim 1 recites the limitation "if there is data stored in the Msg3 buffer and if the UL Grant signal was received on the random access response." The limitation is directed to the action to transmit the UL Grant, however, *there is no language to limit the claim to only this scenario* or the claim language *does not provide an alternative for what if the statement is not true*. The Applicant's invention is not being claimed in independent claims 1 and 9.

Id. at 139 (emphases added).

---

[8] Independent method claim 26 of the '336 patent was added by amendment at the same time, including the "only when" language. Ex. 2014, 151.

IPR2016-01229
Patent 7,881,236 B2

Importantly, the claims in the '336 patent do not include language that corresponds to the second "transmitting" limitation of the claims at issue in this proceeding—the "only when" language was added to a limitation that corresponds to the first "transmitting" limitation. We agree with Patent Owner's characterization of the relevance of these facts and of the Examiner's prior basis for rejection of unamended claims of the '336 patent. That is "the Examiner specifically rejected a claim without the 'only when' language *because there was no alternative recited in the claim . . . if the condition[s were] not met*." PO Resp. 27. The addition of the "only when" language in the '336 patent resolves the ambiguity, recognized by the Examiner, that is otherwise resolved in the claims at issue in this proceeding by the presence of the second "transmitting" limitation.

We disagree with Petitioner's contention that "the Examiner's reasoning is flawed because . . . a comprising claim is open-ended and may cover additional, unrecited actions (such as actions performed when a condition is not met)." Reply 20. In making his remarks, the Examiner had rejected the claim for indefiniteness, and nothing in the amendment that resolved the indefiniteness to the Examiner's satisfaction, i.e., reciting "only when," precludes additional, unrecited actions when the conditions are not met. In light of the difference in the claims in the two patents, we are also not persuaded by Petitioner's contention that "the cited portions of the child patent's file history reinforce Petitioner's argument that the term 'if' in the claims of the '236 patent means 'if.'" *Id.* As indicated above, the word "if," in isolation and without more, is ambiguous whether it introduces a sufficient or necessary condition. That ambiguity was resolved by additional

16
Appx115

IPR2016-01229
Patent 7,881,236 B2

language in the claims of the '336 patent and is resolved in the claims of the
'236 patent through the logical interplay of express limitations.

For these reasons, we agree with Patent Owner that "if" in the
"transmitting" limitations of independent claims 1 and 7 is properly
construed, under the broadest-reasonable-interpretation standard, as
introducing *necessary* conditions, rather than sufficient conditions.[9] We
adopt such a construction for purposes of this Decision.

2. Other Terms

The Petition addresses the construction of certain other terms recited
in independent claim 7, taking the position that such terms should not be
construed as means-plus-function limitations—a position different than that
taken by Petitioner in related litigation where a different claim-construction
standard is applied. Pet. 19. Patent Owner does not respond to Petitioner's
position and does not proffer its own construction of those terms.

Given that the identified terms do not recite the word "means," and
given that Patent Owner does not challenge Petitioner's position, we find it
unnecessary to construe the terms expressly. *Williamson v. Citrix Online,*

---

[9] This construction is consistent with the reasoning of *Ex Parte Schulhauser*,
Appeal No. 2013-007847, slip op. (PTAB Apr. 28, 2016) (precedential).
Similar to the claims at issue in this proceeding, *Schulhauser* considered a
claim that recited "mutually exclusive" steps. *Schulhauser*, slip op. at 6.
The Board held that, under the broadest reasonable interpretation, the claim
"covers at least two methods, one in which the prerequisite condition for the
[first] step is met and one in which the prerequisite condition for the
[second] step is met." *Id.* at 8. The Board did not thereby hold that the
language of one of the steps could simply be read out of the claim (as
Petitioner's argument would effectively require) nor that that language could
not properly inform construction of the other of the steps.

IPR2016-01229
Patent 7,881,236 B2

LLC, 792 F.3d 1339, 1348 (Fed. Cir. 2015) (en banc) ("the failure to use the word 'means' also creates a rebuttable presumption—this time that § 112, para. 6 does not apply"); *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) ("[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy."). We accord the terms their ordinary and customary meaning, without resort to the provisions of 35 U.S.C. § 112, ¶ 6.

B. Legal Principles

A claim is unpatentable for obviousness under 35 U.S.C. § 103 if the differences between the claimed subject matter and the prior art are "such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) objective evidence of non-obviousness, i.e., secondary considerations.[10] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

Additionally, the obviousness inquiry typically requires an analysis of "whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (requiring "articulated

---

[10] The parties do not address secondary considerations, which, accordingly, do not form part of our analysis.

IPR2016-01229
Patent 7,881,236 B2

reasoning with some rational underpinning to support the legal conclusion of obviousness")); *see In re Warsaw Orthopedic, Inc.*, 832 F.3d 1327, 1333 (Fed. Cir. 2016) (citing *DyStar Textilfarben GmbH & Co. Deutschland KG v. C. H. Patrick Co.*, 464 F.3d 1356, 1360 (Fed. Cir. 2006)).

To prevail on its challenges, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). "In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.* 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")). The burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware, LLC. v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (citing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)) (discussing the burden of proof in *inter partes* review). Furthermore, Petitioner does not satisfy its burden of proving obviousness by employing "mere conclusory statements." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

C. *Level of Skill in the Art*

Petitioner contends that a person of ordinary skill in the art "would have had a Master's of Science Degree in an academic area emphasizing electrical engineering, physics, computer engineering, or an equivalent field (or a similar technical Master's Degree, or higher degree) with a concentration in wireless communication and networking systems." Pet. 20.

19

IPR2016-01229
Patent 7,881,236 B2

Alternatively, according to Petitioner, a person of ordinary skill "would have had a Bachelor's Degree (or higher degree) in an academic area emphasizing electrical engineering, physics, or computer engineering and having two or more years of experience in wireless communication and networking systems." *Id.* Petitioner asserts that "[a]dditional education in a relevant field, such as computer engineering, physics, or electrical engineering, or industry experience may compensate for a deficit in one of the other aspects of the requirements stated above." *Id.* at 20–21. In addition, Petitioner contends that a person of ordinary skill "would also have had experience with the wireless Standard Setting Organizations such as ETSI, IEEE, and 3GPP[11], and would have been familiar with relevant standards and draft standards directed to wireless communications." *Id.* Petitioner's declarant, Jonathan Wells, Ph.D., makes substantially the same statements as appear in the Petition. Ex. 1003 ¶ 39.

Patent Owner does not directly address the level of skill possessed by a person of ordinary skill in the art in its Response.

For purposes of this Decision, we agree with and adopt the level of skill proposed by Petitioner.

---

[11] The Third Generation Partnership Project ("3GPP"), which published Specification 321, is a standards-setting organization for mobile communications and was developing the LTE cellular communication system. *See* Pet. 33; PO Resp. 2; Ex. 1001, col. 1, ll. 22–25.

IPR2016-01229
Patent 7,881,236 B2

D. Scope and Content of the Prior Art

1. Kitazoe

a. Availability as Prior Art

The '236 patent was filed on August 10, 2009, claiming the benefit of the August 11, 2008, filing date of U.S. Prov. Appl. No. 61/087,988 under 35 U.S.C. § 119(e), and claiming priority under 35 U.S.C. § 119(a) to Korean patent application 10-2009-0057128, filed June 25, 2009. Ex. 1001 at [60], [30]. Petitioner "does not acknowledge that the '236 patent is entitled to its proclaimed priority date." Pet. 4, n.1. Patent Owner does not address this issue in its Response.

Kitazoe was filed on June 10, 2008, claiming the benefit of the August 14, 2007, filing date of U.S. Prov. Appl. No. 60/955,867 under 35 U.S.C. § 119(e). Ex. 1005 at [60]. Petitioner contends that "at least one claim of the Kitazoe patent is supported by disclosure in the Kitazoe Provisional," and that Kitazoe is therefore "entitled to the earlier priority date of the Kitazoe Provisional" application. Pet. 4–8. Patent Owner does not dispute this contention in its Response.

Petitioner presents arguments that Kitazoe's claims are supported by the disclosure of U.S. Prov. Appl. No. 60/955,867 so that its teachings are available as prior art as of August 14, 2007. *Id.* We do not reach these arguments. Patent Owner has not presented antedating evidence that might bear on the availability of Kitazoe as prior art to the '236 patent. Even if Petitioner's arguments fail, Kitazoe still qualifies as prior art under 35 U.S.C. § 102(e) by virtue of its June 10, 2008, filing date, which precedes the August 11, 2008, earliest potential effective filing date for the challenged claims.

IPR2016-01229
Patent 7,881,236 B2

b. *Disclosure of Kitazoe*

Kitazoe is titled "Encryption of the Scheduled Uplink Message in Random Access Procedure," and generally discloses a system and method for selectively encrypting uplink messages from access terminals to base stations in random-access procedures to gain access to wireless communications systems, such as LTE systems. Ex. 1005, [54], abst., col. 1, ll. 23–26, col. 1, ll. 45–46, col. 2, ll. 13–15, col. 6, ll. 27–48. Kitazoe describes a "random access procedure that leverages encrypted and/or unencrypted data in a scheduled uplink message." *Id.* at abst. The scheduled uplink message can be referred to as a "message 3," and access terminals include "cellular phones, smart phones . . . and/or any other suitable device" for communicating over wireless systems. *Id.* at col. 8, ll. 31–34, col. 7, ll. 46–50. Figure 4 of Kitazoe is reproduced below.

22
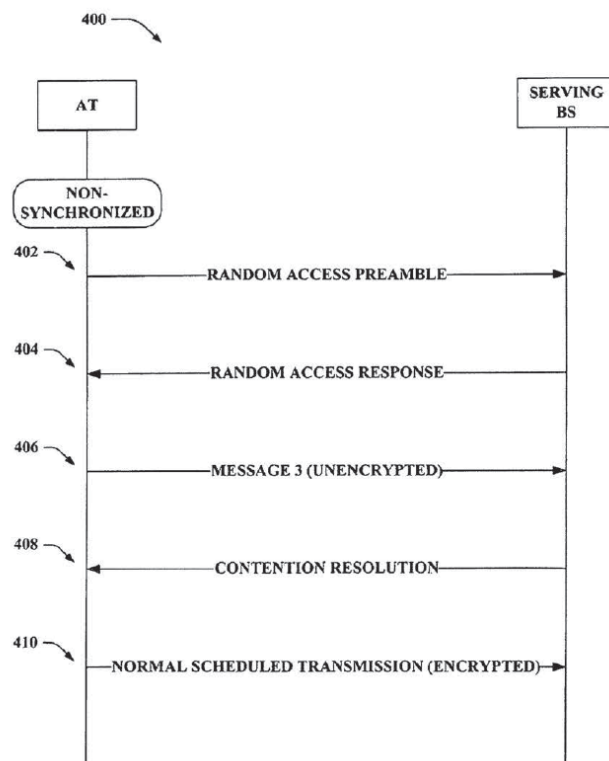
IPR2016-01229
Patent 7,881,236 B2

In Figure 4, signaling diagram 400 illustrates uplink message transmission by an access terminal ("AT"). *Id.* at col. 5, ll. 25–28, col. 12, ll. 58–60. At step 402, the access terminal transmits a random-access preamble to a serving base station ("Serving BS"). *Id.* at col. 12, ll. 63–64. At step 404, a random-access response is sent by the serving base station to the access terminal, which, at step 406, can use the uplink grant to transmit unencrypted message 3 to the base station. *Id.* at col. 13, ll. 1–8. In response to message 3, at step 408, the base station can send a contention-resolution message to the access terminal, which, at step 410, transmits a "normal scheduled" encrypted message to the base station. *Id.* at col. 13, ll. 12–14, col. 13, ll. 21–24. The access terminal can include memory that can store data to be transmitted.

2. *Niu*

Niu is titled "Network Interface Device Architecture for Storing Transmit and Receive Data in a Random Access Buffer Memory Across Independent Clock Domains," and generally describes methods and systems for buffering data in random-access memory in a network interface device. Ex. 1012, [54], col. 1, ll. 9–12, col. 2, l. 66–col. 3, l. 5. The buffer can store data "to be output onto the network" and receive data for storage. *Id.* at abst., col. 7, l. 64–col. 8, l. 9. A circuit in Niu's network interface device "can asynchronously determine the presence of at least one stored data frame" in the transmit buffer. *Id.* at col. 11, ll. 23–27.

IPR2016-01229
Patent 7,881,236 B2

3. Specification 321

Specification 321 is a technical specification published by the 3GPP and describes the "Medium Access Control" ("MAC") architecture in an LTE system, used for "[d]ata transfer" and for "[r]adio resource allocation." Ex. 1007, 8. Detailed procedures involving the MAC architecture are described in Section 5 of the reference, *id.* at 11–22, and several specific aspects of these procedures are relevant to Petitioner's challenges.

For example, Sections 5.1.4 and 5.1.5 describe procedures in which user equipment monitors a Physical Downlink Control Channel ("PDCCH") for certain messages. *Id.* at 12–14. As described in Section 5.1.4, once the random-access preamble is transmitted, the user equipment monitors the PDCCH in a time window (referred to as a "TTI" or "transmission time interval") for random-access responses. *Id.* at 12. The user equipment may stop such monitoring after successfully receiving a random-access response that corresponds to the random-access preamble transmission. *Id.* As part of a contention-resolution procedure described in Section 5.1.5, the user equipment also monitors the PDCCH for a contention-resolution message after an uplink message, such as message 3, is transmitted. *Id.* at 13 ("Once the uplink message . . . is transmitted, the UE shall . . . monitor the PDCCH until the Contention Resolution Timer expires.") (bracketing in original omitted). As set forth in Section 5.4.1, the user equipment includes a "HARQ entity" that controls transmission and reception of messages by the user equipment, including the random-access response message, and dictates which transmissions use which uplink grants. *Id.* at 16; *see* Ex. 1003 ¶ 79.

The HARQ entity is described in detail in Section 5.4.2.1, which explains that "[t]here is one HARQ entity at the [user equipment]," and that

24

IPR2016-01229
Patent 7,881,236 B2

"[a] number of parallel HARQ processes are used in the [user equipment] to support the HARQ entity, allowing transmissions to take place continuously while waiting for the feedback on the successful or unsuccessful reception of previous transmissions." *Id.* at 17. Each such HARQ process "is associated with a HARQ buffer." *Id.* (Section 5.4.2.2).

Of particular relevance is Section 5.4.2.1's enumeration of the conditions under which, at a given transmission time interval, the HARQ entity transmits a new payload, generates a retransmission, or has its associated buffer flushed. First, if an uplink grant indicates a "new transmission" for the transmission time interval *and* an "uplink prioritisation" entity indicates the need for a new transmission, the protocol data unit ("PDU") to be transmitted is obtained from a "Multiplexing and assembly" entity *and* the HARQ process is instructed to trigger transmission of the new payload using identified parameters. *Id.* Second, if an uplink grant indicates a "new transmission" but the uplink prioritization entity does *not* indicate the need for a new transmission, the HARQ buffer is flushed. *Id.* Third, if an uplink grant does *not* indicate a new transmission, the HARQ entity is instructed to generate a retransmission under two circumstances: (a) the uplink grant indicates a retransmission, *or* (b) the HARQ buffer of the corresponding HARQ process is not empty. *Id.*

E. Analysis

Petitioner relies on Dr. Wells's testimony in explaining how the combination of Kitazoe, Niu, and Specification 321 teach the limitations of claims 1–4, 6–10, 12, and 13. Pet. 27–61 (citing Ex. 1003). Petitioner

IPR2016-01229
Patent 7,881,236 B2

additionally relies on Kitazoe II, discussed below, in addressing the further limitation of claim 5. *Id.* at 61–64.

1. Combination of Kitazoe, Niu, and Specification 321

Petitioner proposes to combine the teachings of Kitazoe, Niu, and Specification 321 into a system that has the following characteristics and which Petitioner contends meets all limitations of the relevant claims. Pet. 27–31. First, Petitioner observes that Kitazoe describes transmitting an unencrypted Msg3 to the target base station during a random access procedure "in response to [a] received random access response." *Id.* at 27 (citing Ex. 1005, col. 13, ll. 60–66). Petitioner also observes that, in Kitazoe, the user equipment includes memory for storing "data to be transmitted," which Petitioner equates with a "buffer." *Id.* (citing Ex. 1005, col. 19, l. 64–col. 20, l. 1). "Similarly, Niu teaches a 'transmit buffer' located within a 'random access memory' for storing 'transmit data to be output onto the network.'" *Id.* at 27–28 (quoting Ex. 1012, abst., col. 2, l. 66–col. 3, l. 1, col. 8, l. 5). In addition, Petitioner observes that Niu further teaches "asynchronously determin[ing] the presence of at least one stored data frame" in the transmit buffer in response to the occurrence of an event. *Id.* at 28 (quoting Ex. 1012 col. 3, ll. 58–61, col. 11, ll. 23–24).

Based on these observations, Petitioner reaches two conclusions regarding the combination of Kitazoe and Niu: (1) the Msg3 data transmitted by the user equipment, as described in Kitazoe, is stored in the "transmit buffer" described by Niu prior to transmission; and (2) to transmit the data stored in the Msg3 buffer, "the user equipment 'determines the presence of at least one stored data frame' in the transmit buffer when the

IPR2016-01229
Patent 7,881,236 B2

random access response including the UL grant signal is received," as described in Niu. *Id.* (citing Ex. 1012, col. 3, ll. 58–61, col. 11, ll. 23–24; Ex. 1005, col. 13, ll. 60–66; Ex. 1003 ¶ 131).

Second, Petitioner observes that Specification 321 teaches that the user equipment receives the contention-resolution message on a PDCCH. *Id.* at 28 (citing Ex. 1007 § 5.1.5). Coupled with Kitazoe's teaching of user equipment receiving a contention-resolution message, Petitioner reasons that, in the combined system, the contention-resolution message of Kitazoe is received on a PDCCH. *Id.* at 28 (citing Ex. 1005, col. 13, ll. 24–26, Fig. 4; Ex. 1007 § 5.1.5; Ex. 1003 ¶ 106).

Third, Petitioner observes that Specification 321 teaches that the user equipment in an LTE system like that taught by Kitazoe includes a HARQ entity that controls transmission and reception of messages by the user equipment. *Id.* at 28–29 (citing Ex. 1007, § 5.4.1; Ex. 1003 ¶¶ 132). Petitioner reasons that the HARQ entity taught by Specification 321, and its functionality, would be included in the user equipment of Kitazoe:

> In the combination, the reception of messages from the base station (such as the random access response), the transmission of messages to the base station (such as the [Msg3] and new data), and the processing of uplink grants received by the user equipment are performed by the HARQ entity and the HARQ processes taught by [Specification 321]. The user equipment of the combination also monitors the downlink for random access responses sent by the base station, and ceases monitoring "after successful reception of a Random Access Response corresponding to the Random Access Preamble transmission." . . . Also in the combination, new data to be transmitted by the user equipment to the base station is acquired from a "Multiplexing and assembly entity" by the HARQ entity.

IPR2016-01229
Patent 7,881,236 B2

Id. (citing Ex. 1007 §§ 5.4.1, 5.4.2.1). Petitioner supports this reasoning with testimony by Dr. Wells, which we credit. Ex. 1003 ¶¶ 125–132. Petitioner identifies corresponding elements among the references in proposing the combination.

Petitioner also provides explicit reasoning why a person of skill in the art would have combined the references' teachings in the proposed manner. Pet. 29–31. This reasoning is grounded in Petitioner's contention that the modifications would "enable 'efficient transfer of' the [Msg3] data." *Id.* at 29 (citing Ex. 1012, col. 4, ll. 52–53). In particular, Petitioner contends that a person of ordinary skill in the art "would have modified the user equipment described in Kitazoe to store [Msg3] data to be transmitted in a transmit buffer, as taught by Niu, and to determine that data is stored in the transmit buffer, as also taught by Niu, when the random access response including the uplink grant is received." *Id.* at 29.

In explaining the rationale for combining the references, Petitioner focuses on Niu's disclosure of a "synchronization circuit" that "enabl[es] the use of a random access memory as a buffer in a network interface device." *See* Ex. 1012, col. 2. l. 66–col. 3, l. 1, col. 3, ll. 58–61. Petitioner reasons that one of skill in the art would have understood that Niu's synchronization circuit allows a device, such as the user equipment of Kitazoe, to asynchronously determine the presence of data in a transmit buffer. Pet. 30 (citing Ex. 1012, col. 3, ll. 58–61). "This allows the operation of the device to be 'optimized' by enabling it to determine whether there is data in a buffer in response to an event, such as the reception of an uplink grant from the network." *Id.* (citing Ex. 1012, col. 12, ll. 12–15; Ex. 1015, col. 13, ll. 60–66; Ex. 1003 ¶ 134). Because Niu teaches that such an arrangement

IPR2016-01229
Patent 7,881,236 B2

"enables faster, more reliable design implementation," Petitioner argues that a person of skill in the art would have been motivated to perform the described modification to achieve this benefit, and that the results of the modification "would have been predictable because Kitazoe describes storing data to be transferred in memory (i.e., a buffer), and Niu describes one known way of implementing such functionality." *Id.* (citing Ex. 1012, col. 13, ll. 50–53; Ex. 1005, col. 19, l. 64–col. 20, l. 1; Ex. 1003 ¶ 134).

In addressing the further combination with Specification 321, Petitioner recognizes that both Kitazoe and Specification 321 "describe wireless network systems implementing the 'LTE' protocol." *Id.* (citing Ex. 1005, col. 6, l. 46; Ex. 1007 §§ 3.2, 4.3.1). This commonality, according to Petitioner, makes the result of its proposed modifications predictable, particularly to modify the operations of the user equipment of Kitazoe to conform to the LTE system standard described by Specification 321. *Id.* at 31 (citing Ex. 1003 ¶ 135). These assertions provide rational underpinning to Petitioner's reasoning, which we find persuasive.

Patent Owner disputes this reasoning, contending that "Niu is not analogous art, or at a minimum Petitioners have not shown that it is." PO Resp. 32. A prior-art reference is considered to be analogous to a claimed invention if it is either: (1) from the same field of endeavor, regardless of the problem addressed; or (2) reasonably pertinent to the particular problem with which the inventor is concerned, regardless of the field of endeavor. *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004). In that regard, "[w]hen a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one." *KSR*, 550 U.S. at 417.

IPR2016-01229
Patent 7,881,236 B2

Patent Owner contends that the '236 patent and Niu "are in different fields of endeavor" because "[t]he '236 patent is directed to wireless systems" and "Niu, on the other hand, is directed to wired systems." PO Resp. 34. Patent Owner also contends that "the Petition does not suggest how Niu is pertinent to the entire problem or the *particular problem* the inventors were trying to solve," characterizing the "problem" as "the loss of data and the deadlock that could result[] from indiscriminately transmitting messages independent of the type of UL Grant received." *Id.* (citing *Circuit Check, Inc. v. QXQ Inc.*, 795 F.3d 1331, 1335 (Fed. Cir. 2015); Ex. 1001, col. 12, ll. 13–24, col. 13, ll. 14–18; Ex. 1003 ¶¶ 84–85).

Although we agree with Petitioner that Patent Owner characterizes the relevant fields of endeavor too narrowly by drawing an artificial distinction between wired and wireless systems—a distinction that is tenuously related to the relevance of Niu's teachings, Reply 21–23— it is sufficient that we find Niu reasonably pertinent to the particular problem with which the '236 patent is concerned, namely the handling of data stored in the Msg3 buffer. *See id.* at 23. Although Niu checks a buffer before sending a wired transmission, and Petitioner proposes to use that check before sending a wireless transmission as required by the challenged claims, the problem addressed is the same—checking a buffer before transmission. We find no evidence of a distinction as to what happens after the check. That is, the '236 patent is explicit that "problems may occur" "if the data stored in the Msg3 buffer is transmitted in correspondence with the reception of all UL Grant signals." Ex. 1001, col. 4, ll. 30–33. In the context of this relatively broad characterization of the problem addressed by the '236 patent, the

IPR2016-01229
Patent 7,881,236 B2

teachings related to Niu's "transmit buffer" are reasonably pertinent. *See* Ex. 1003 ¶ 133.

Accordingly, we conclude that Petitioner articulates sufficient reasoning for combining the references' teachings, in accordance with the principles set forth in *KSR*.

2. *Independent Claim 1*

For independent claim 1, Petitioner relies on the structure of its proposed combination in contending that all limitations are met, and identifies specific references that disclose individual teachings. Pet. 31–46. Specifically, Petitioner contends that Kitazoe teaches "receiving an uplink grant (UL Grant) signal from a base station on a specific message." *Id.* at 33–34 (citing Ex. 1005, col. 17, ll. 27–28, col. 13, ll. 1–8, col. 16, ll. 41–43, col. 13, ll. 11–16).

For the limitation of "determining whether there is data stored in a message 3 (Msg3) buffer when receiving the UL Grant signal on the specific message," Petitioner observes that, in its proposed combination, "the user equipment 'utilize[s] the uplink grant' received in the random access response 'to transmit message 3' to the base station," and that "[t]he data to be transmitted via the message 3 is stored in a 'transmit buffer.'" *Id.* at 35 (quoting Ex. 1005, col. 13, ll. 6–8; citing Ex. 1012, abst., col. 2, l. 66–col. 3, l. 1, col. 8, l. 5). Petitioner's reasoning that the limitation is met relies on Niu's explicit disclosure that its synchronization circuit "determine[s] the presence of at least one stored data frame." Ex. 1012, col. 11, ll. 23–24. Incorporating this disclosure into its proposed combination of teachings, Petitioner reasons that the combination includes "user equipment [that]

31
Appx130

IPR2016-01229
Patent 7,881,236 B2

'determines the presence of at least one stored data frame' in the transmit buffer when the random access response including the UL grant signal is received in order to transmit the message 3 data." Pet. 35 (citing Ex. 1012, col. 3, ll. 58–61, col. 11, ll. 23–24; Ex. 1005, col. 13, ll. 60–66; Ex. 1003 ¶ 127).

Patent Owner disputes this reasoning, characterizing it as "misleading" and embracing an "unexplained discrepancy . . . between 'determining whether there is data stored' (as required by the '236 patent) and measuring the amount of data stored (as Niu teaches)." PO Resp. 37. But in making this argument, Patent Owner places unreasonable weight on Petitioner's citation of Niu's disclosure at column 3, lines 58 to 59, that "the amount of data stored in the random access transmit buffer is monitored asynchronously," while evading Petitioner's additional citation to Niu's disclosure at column 11, lines 23 to 24, that "the synchronization circuit can asynchronously determine the presence of at least one stored data frame." *See* Reply 25. Patent Owner's additional hypothetical involving the presence of a partial data frame stored in the buffer does not diminish the reasonable understandings that one of skill in the art would draw from Niu. *See* PO Resp. 37. That is, we agree with Petitioner that Niu's teaching of asynchronous determination of the presence of at least one stored data frame would reasonably teach one of skill in the art to determine whether there are data stored in the buffer. *See* Ex. 1003 ¶ 134.

With respect to the limitation of "determining whether the specific message is a random access response message," Petitioner makes a sufficient showing through its observation that Kitazoe "teaches that the user equipment determines 'non-security-critical' information 'that can be

32

Appx131

IPR2016-01229
Patent 7,881,236 B2

transmitted as part of the . . . unencrypted message 3,' and determines 'security-critical information' that can be transmitted as part of the later encrypted message." Pet. 38 (quoting Ex. 1005, col. 11, ll. 20–27) (alteration by Petitioner). Supported by testimony of Dr. Wells, Petitioner reasons that "[i]n order to determine whether to send 'non-security-critical' or 'security-critical' information in response to a specific message, the user equipment determines whether the specific message including the uplink grant is a random access response message." *Id*. at 38 (citing Ex. 1003 ¶ 93). Patent Owner does not dispute this argument.

For the two "transmitting" limitations, in addition to addressing the claim construction that Petitioner advocates, Petitioner alternatively addresses the claim construction we adopt for this Decision. *Id.* at 40–41. Specifically, Petitioner identifies Kitazoe's teaching that "the term 'message 3' refers to the scheduled transmission sent by the access terminal to [the] base station [] as granted by the random access response message from [the] base station." *Id.* at 40 (quoting Ex. 1005, col. 8, ll. 32–35) (alterations by Petitioner). Supported by testimony of Dr. Wells, Petitioner reasons that "[t]his indicates that message 3 is only sent using the uplink grant included in the random access response," and that "[b]ecause the message 3 is sent when this particular uplink grant is received and this particular uplink grant is only included in the random access response . . . , Kitazoe teaches that message 3 is sent only when the random access response is received (i.e., only when 'the specific message is the random access response message')." *Id.* (citing Ex. 1003 ¶ 128). This reasoning is persuasive.

IPR2016-01229
Patent 7,881,236 B2

Furthermore, also supported by testimony of Dr. Wells, Petitioner contends that a person of ordinary skill in the art "would have understood that the data in the Msg3 buffer can be transmitted 'only when' there is data stored in the Msg3 buffer." *Id.* at 41(citing Ex. 1003 ¶ 129). We agree with Petitioner's and Dr. Well's reasonable inference that a person of skill in the art would have understood that "if there is no data stored in the Msg3 buffer, . . . there would have been nothing to transmit." *Id.* (citing Ex. 1003 ¶ 129). Petitioner thus shows that the combination of art meets the first "transmitting" limitation when both recited conditions are satisfied.

For the converse case, when at least one of the recited conditions is not met, Petitioner makes two relevant observations. First, "Kitazoe teaches that the user equipment 'transmits a normal scheduled transmission message, which is encrypted, to the base station' after the random access procedure is completed." *Id.* at 45 (quoting Ex. 1005, col. 13, ll. 21–26) (alteration by Petitioner). Second, "Kitazoe further teaches that encrypted messages (such as this) cannot be sent in response to the random access response message (i.e., before message 3 is received by the base station), because the base station determines a 'security configuration' for the UE based on the information included in message 3." *Id.* (citing Ex. 1005, col. 10, ll. 65–67). That is, Kitazoe teaches that encrypted messages cannot be sent to the base station before determining the security configuration, "because the base station 'would not know which security configuration to apply in order to decrypt such encrypted message[s]' and thus 'would be unable to decipher the encrypted' messages." *Id.* (citing Ex. 1005, col. 10, l. 65–col. 11, l. 1). We agree with Petitioner's reasoning that these disclosures teach that the encrypted scheduled transmission message, i.e., the "new data," is

IPR2016-01229
Patent 7,881,236 B2

transmitted only after the random access procedure is complete. *See id.* at 45–46.

Patent Owner "does not dispute" that Kitazoe "shows transmission of the Msg3 buffer data (the Scheduled Transmission) taking place after receipt of a random access response." PO Resp. 40. Nevertheless, Patent Owner contends that "Kitazoe takes a narrow view of what can occur during a random access procedure" and "does not consider the more complex case" in which a "UL Grant is not in a random access response message but is instead contained in a PDCCH communication." *Id.* at 41–42. In such a "more complex case," Patent Owner argues, "the Msg3 buffer data is sent responsive to a [different message], an UL Grant *not* in a random access response." *Id.* at 44. Patent Owner contends that such a "more complex case" illustrates an example in which Msg3 buffer data are transmitted even when the (necessary) conditions recited in the first "transmitting" step are not satisfied. *Id.*

Patent Owner's argument is not persuasive. Patent Owner's reliance on its "more complex case" is unavailing. As Dr. Wells testifies, this complex case is a "contrived hypothetical" that does not "relate[] to what is described in Kitazoe," Ex. 2010, 60:21–22, 61:6–8. The fact that Patent Owner can hypothesize a system that is more complex than Kitazoe that does not teach or suggest the claim limitation does not negate the fact that the system described in Kitazoe does.

We conclude that Petitioner demonstrates, by a preponderance of the evidence, that independent claim 1 is unpatentable under 35 U.S.C. § 103(a) over Kitazoe, Niu, and Specification 321.

IPR2016-01229
Patent 7,881,236 B2

3. Dependent Claims 2–4 and 6

Each of claims 2–4 and 6 depends directly from independent claim 1. Patent Owner does not contest any aspect of Petitioner's challenge to these claims apart from its arguments directed at underlying claim 1. For each of these claims, we agree with Petitioner's reasoning, which is summarized below.

Claim 2 recites that the second "transmitting" limitation of claim 1 includes "acquiring a Medium Access Control Protocol Data Unit (MAC PDU) from a multiplexing and assembly entity" and "transmitting the MAC PDU to the base station." Ex. 1001, col. 17, ll. 4–9. For these additional limitations, Petitioner identifies Specification 321's disclosure of user equipment that "obtain[s] the MAC PDU to transmit from the 'Multiplexing and assembly' entity" and for "instruct[ing] the HARQ process . . . to trigger the transmission of this new payload." Pet. 46; Ex. 1007, 17 (§ 5.4.2.1).

Claim 3 recites that the UL Grant signal received on the specific message "is a UL Grant signal received on a Physical Downlink Control Channel (PDCCH)" and that "the user equipment transmits new data in correspondence with the UL Grant signal received on the PDCCH." Ex. 1001, col. 17, ll. 10–16. For these limitations, Petitioner relies on its identification of new data transmitted to the base station in correspondence with the UL grant signal received in the contention resolution message from the base station, as taught by Specification 321. Pet. 47; Ex. 1007, 13–14 (§ 5.1.5).

Claim 4 recites that the data stored in the Msg3 buffer "is a Medium Access Control Protocol Data Unit (MAC PDU) including a user equipment identifier." Ex. 1001, col. 17, ll. 17–20. For this limitation, Petitioner

IPR2016-01229
Patent 7,881,236 B2

identifies Kitazoe's disclosure that "a MAC layer PDU can be used for the

. . . message 3" and that the message 3 can include an "access terminal

identifier," which "can also be called a . . . user equipment (UE)." Pet. 47–

48; Ex. 1005, col. 16, ll. 30–32, col. 6, ll. 62–66, col. 9, ll. 22–23.

Claim 6 recites that the UL Grant signal received on the specific

message "is either a UL Grant signal received on a Physical Downlink

Control Channel (PDCCH) or a UL Grant signal received on the random

access response message." Ex. 1001, col. 17, ll. 25–29. By again pointing

to Specification 321's disclosure related to a contention-resolution message,

Petitioner identifies a teaching of the second of these recitations, i.e., "a UL

Grant signal received on the random access response message." Pet. 48.

Based on these identifications, which are not contested by Patent

Owner, we conclude that Petitioner demonstrates, by a preponderance of the

evidence, that claims 2–4 and 6 are unpatentable under 35 U.S.C. § 103(a)

over Kitazoe, Niu, and Specification 321.

4. Independent Claim 7

Independent claim 7 recites "user equipment" with limitations that

generally parallel those of independent method claim 1, but specifying that

functions are performed by "a reception module," "a transmission module,"

"a message 3 (Msg3) buffer," a "Hybrid Automatic Repeat Request (HARQ)

entity," and "a multiplexing and assembly entity used for transmission of

new data." Ex. 1001, col. 17, l. 30–col. 18, l. 7. As Patent Owner

acknowledges, "[i]n large part, claim 7 claims an apparatus that performs the

method claimed in claim 1" by "includ[ing] entities adapted to carry out the

steps like those of claim 1." PO Resp. 9–10, 30.

IPR2016-01229
Patent 7,881,236 B2

We have referred to each of these structural elements above in the context of Petitioner's proposed combination of art, and therefore agree with Petitioner that such structural elements are met by the combination. *See* Pet. 48–58. For the functionality performed by such structural elements, Petitioner advances arguments that parallel those made for independent claim 1. *See id.* For the same reasons discussed above, we conclude that Petitioner makes a sufficient showing of such functionality. Patent Owner does not contest Petitioner's arguments apart from its arguments directed at claim 1.

We conclude that Petitioner demonstrates, by a preponderance of the evidence, that claim 7 is unpatentable under 35 U.S.C. § 103(a) over Kitazoe, Niu, and Specification 321.

5. *Dependent Claims 8–10, 12, and 13*

Each of claims 8–10, 12, and 13 depends, directly or indirectly, from independent claim 7. Patent Owner does not contest any aspect of Petitioner's challenge to these claims apart from its arguments directed at corresponding independent method claim 1. For each of these claims, we agree with Petitioner's reasoning, which is summarized below.

Claim 8 recites "one or more HARQ processes" and "HARQ buffers respectively corresponding to the one or more HARQ processes," with specific limitations on data transmission by "the HARQ entity" recited in claim 7. Ex. 1001, col. 18, ll. 8–19. Claim 9 depends from claim 8 and further recites additional data-transmission limitations by the HARQ processes of claim 8. For both of these claims, Petitioner relies on the description of HARQ entities described in Specification 321, discussed

IPR2016-01229
Patent 7,881,236 B2

above, and its related description of data transmission by such HARQ entities. Pet. 59–60; Ex. 1007, 17 (§ 5.4.2.1). We agree with Petitioner that the limitations are met by that disclosure.

Claims 10, 12, and 13 respectively parallel claims 3, 4, and 6, but include structural limitations consistent with their status as apparatus claims directed to "user equipment." Ex. 1001, col. 18, ll. 27–33. For each of these claims, Petitioner relies on the same disclosure, discussed above, as it does for the corresponding method claims. Pet. 60–61.

Based on Petitioner's identifications, which are not contested by Patent Owner, we conclude that Petitioner demonstrates, by a preponderance of the evidence, that claims 8–10, 12, and 13 are unpatentable under 35 U.S.C. § 103(a) over Kitazoe, Niu, and Specification 321.

6. Claim 5:
Combination of Kitazoe, Niu, Specification 321, and Kitazoe II

Claim 5 depends from claim 4 and recites that "the data stored in the Msg3 buffer further includes information about a buffer status report (BSR) if the user equipment starts a random access procedure for the BSR." Ex. 1001, col. 17, ll. 21–24. Petitioner challenges claim 5 as unpatentable under 35 U.S.C. § 103(a) over Kitazoe, Niu, Specification 321, and Kitazoe II. Pet. 61–64.

a. Availability of Kitazoe II as Prior Art

Kitazoe II was filed on December 17, 2008, claiming the benefit of the December 19, 2007, filing date of U.S. Prov. Appl. No. 61/015,159 under 35 U.S.C. § 119(e). Ex. 1009 at [22], [60]. Petitioner contends that

IPR2016-01229
Patent 7,881,236 B2

"at least one claim of the Kitazoe-II patent is supported by disclosure in the Kitazoe-II Provisional," and that Kitazoe-II is therefore "entitled to the earlier priority date of the Kitazoe-II Provisional" application. Pet. 9–11.

Petitioner presents arguments that Kitazoe II's claims are supported by the disclosure of U.S. Prov. Appl. No. 61/015,159, so that Kitazoe II's teachings are available as prior art as of December 19, 2017. *Id.* For example, Petitioner asserts the limitations recited in claim 1 and in thirty-eight other claims of Kitazoe II are described in the Kitazoe II provisional application. *Id.* Patent Owner does not respond to these contentions and does not present any antedating evidence that might bear on the availability of Kitazoe II as prior art to the '236 patent. On the record before us, we are persuaded for purposes of this Decision that Kitazoe II is entitled to the earlier effective filing date of the Kitazoe II provisional application, and is prior art to the '236 patent under 35 U.S.C. § 102(e).

b. *Disclosure of Kitazoe II*

Kitazoe II is titled, "Method and Apparatus for Transfer of a Message on a Common Control Channel for Random Access in a Wireless Communication Network," and describes "[t]echniques for sending a message for random access by a user equipment." Ex. 1009 at [54], abst. Kitazoe II discloses that the user equipment may send a message for random access that includes a buffer status report. *Id.* at abst., ¶ 72.

c. *Analysis*

Petitioner contends that the limitation of dependent claim 5 is met by Kitazoe II, which describes that the user equipment may send a buffer-

IPR2016-01229
Patent 7,881,236 B2

status-report message in Msg3. Pet. 63–64 (citing Ex. 1009, abst., ¶ 72). In addition, Petitioner contends that one of ordinary skill would have combined this teaching with those of the other references. Pet. 62–63. Petitioner contends that the combination would "increase the data efficiency of the random access procedure, as taught by Kitazoe-II," which "would have been predictable because" the references "describe techniques related to wireless networks using the 'LTE' protocol." *Id.* at 63–64 (citing Ex. 1003 ¶¶ 138–139). Patent Owner does not respond to these contentions.

We are persuaded that Petitioner both identifies relevant disclosure in Kitazoe II that meets the limitation of claim 5 and provides sufficient articulated reasoning with rational underpinning for combining the teachings of Kitazoe, Niu, and Specification 321 with that of Kitazoe II. That is, Petitioner's analysis for claims 1 and 4 sufficiently establishes that those claims are unpatentable for the reasons discussed above, and that one of skill in the art would additionally store information about a buffer status report in the data stored in the Msg3 buffer in accordance with the teachings of Kitazoe II. Accordingly, we conclude that Petitioner demonstrates, by a preponderance of the evidence, that claim 5 is unpatentable under 35 U.S.C. § 103(a) over Kitazoe, Niu, Specification 321, and Kitazoe II.

III. CONCLUSION

We conclude that Petitioner demonstrates, by a preponderance of the evidence, that claims 1–4, 6–10, 12, and 13 are unpatentable under 35 U.S.C. § 103(a) over Kitazoe, Niu, and Specification 321; and that claim 5 is unpatentable under 35 U.S.C. § 103(a) over Kitazoe, Niu, Specification 321, and Kitazoe II.

IPR2016-01229
Patent 7,881,236 B2

IV. ORDER

It is

ORDERED that, based on a preponderance of the evidence, claims 1–10, 12, and 13 of U.S. Patent No. 7,881,236 B2 are held to be unpatentable; and

FURTHER ORDERED that, because this is a final written decision, parties to this proceeding seeking judicial review of our decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2016-01229
Patent 7,881,236 B2

PETITIONER

Walter Renner
IPR00035-0009IP1@fr.com

Roberto Devoto
Daniel Smith
PTABInbound@fr.com

PATENT OWNER

Cyrus Morton
Ryan Schultz
ROBINS KAPLAN LLP
cmorton@robinskaplan.com
rschultz@robinskaplan.com

43
Appx142

Trials@uspto.gov   Paper 32
571-272-7822   Entered: March 26, 2018

UNITED STATES PATENT AND TRADEMARK OFFICE

_____

BEFORE THE PATENT TRIAL AND APPEAL BOARD

_____

APPLE INC., MICROSOFT CORPORATION,
MICROSOFT MOBILE OY, and
MICROSOFT MOBILE INC. (F/K/A/ NOKIA INC.),
Petitioner,

v.

EVOLVED WIRELESS LLC,
Patent Owner.

_____

Case IPR2016-01229
Patent 7,881,236 B2

_____

Before WILLAM V. SAINDON, PATRICK M. BOUCHER, and
TERRENCE W. McMILLIN, *Administrative Patent Judges*.

BOUCHER, *Administrative Patent Judge*.

DECISION
Denying Patent Owner's Request for Rehearing
37 C.F.R. § 42.71(d)

Appx143

IPR2016-01229
Patent 7,881,236 B2

Patent Owner requests rehearing of our Final Written Decision holding claims 1–10, 12, and 13 of U.S. Patent No. 7,881,236 ("the '236 patent") unpatentable. Paper 28 ("Req. Reh'g"). Pursuant to our authorization, Petitioner filed an Opposition (Paper 30) and Patent Owner filed a Reply (Paper 31). By email correspondence, we denied Petitioner's requests either to expunge Patent Owner's Reply from the record as advancing new arguments or to authorize Petitioner to file a sur-reply.

For the reasons set forth below, Patent Owner's Request for Rehearing is denied.

I. BACKGROUND

"The burden of showing a decision should be modified lies with the party challenging the decision." 37 C.F.R. § 42.71(d). When requesting rehearing of a decision, the party must identify specifically all matters the party believes the Board misapprehended or overlooked, and the place where each matter was previously addressed in the record. *Id.*

Patent Owner's Request for Rehearing focuses on the "transmitting" limitations of independent method claim 1 and the corresponding limitations of independent apparatus claim 7. The "transmitting" limitations of claim 1 recite:

> transmitting the data stored in the Msg3 buffer to the base station using the UL Grant signal received on the specific message, *if* there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message; and
> transmitting new data to the base station in correspondenc with the UL Grant signal received on the specific message, *if* there is no data stored in the Msg3 buffer when receiving the UL

IPR2016-01229
Patent 7,881,236 B2

> Grant signal on the specific message or the specific message is
> not the random access response message.

Ex. 1001, col. 16, l. 59–col. 17, l. 3 (emphases added). In the Final Written
Decision, we agreed with Patent Owner that, under the broadest reasonable
interpretation, the recitation of "if" in these limitations introduces necessary
conditions rather than sufficient conditions. Paper 27 ("Dec."), 12–17. That
is, the operation of the two "transmitting" limitations can be described as
follows:

> Those limitations implicate two conditions, resulting in different
> data being transmitted depending on whether both conditions are
> satisfied or not. The first condition is whether "there is data
> stored in the Msg3 buffer when receiving the UL Grant signal on
> the specific message," and the second condition is whether "the
> specific message is the random access response message." . . .
> "If" both conditions are satisfied, the "data stored in the Msg3
> buffer" are transmitted to the base station; and "if" either
> condition is not satisfied, "new data" are transmitted to the base
> station.

Id. at 12 (citations omitted). This construction is frequently referred to by
the parties as the "only when" construction.

Although Petitioner advocated for a broader construction in which the
recitation of "if" more broadly introduces *sufficient* conditions, the Petition
also addressed the construction we adopted. Paper 2, 40–41; *see* Dec. 33
(noting Petitioner's alternative argument). In addition to the documentary
prior art cited by the Petition, Petitioner also relied on a Declaration by
Jonathan Wells, Ph.D., which we accorded evidentiary weight. Ex. 1003;
see Dec. 32–34. In contrast, we did not accord weight to a Declaration by
Todor Cooklev, Ph.D., proffered by Patent Owner, because that declaration

3
Appx145

IPR2016-01229
Patent 7,881,236 B2

was unsworn and therefore defective.[1] Ex. 2011; Dec. 10–11. Petitioner's

evidence cannot be rebutted by Patent Owner's unsworn attorney argument.

See Gemtron Corp. v. Saint-Gobain Corp., 572 F.3d 1371, 1380 (Fed. Cir.

2009) ("[U]nsworn attorney argument . . . is not evidence and cannot rebut

. . . evidence.").   Thus, the weight of the evidence greatly favored Petitioner.

Weighing that evidence—even adopting the construction of the

"transmitting" limitations advocated by Patent Owner—we concluded that

Petitioner demonstrated sufficiently that both "transmitting" limitations are

disclosed by Kitazoe. Dec. 33–35. Ultimately, we concluded that Petitioner

demonstrated, by a preponderance of the evidence, that both independent

claims 1 and 7 are unpatentable over the combination of art considered, and

that the claims that depend therefrom are also unpatentable. *Id.* at 42.

In its Request for Rehearing, Patent Owner contends that "[t]he Board

should reconsider its Final Written Decision . . . for two independent

reasons." Req. Reh'g 1. First, Patent Owner contends that we "overlooked

the Patent Owner's argument about why the additional UL Grant it discussed

in the Response is not a 'contrived hypothetical' but is instead grounded in

the '236 patent's specification." *Id.* Second, "and more importantly," Patent

Owner contends that we overlooked an argument advanced by Patent Owner

in its response that the prior art relied on by Petitioner "does not create the

conditions that test" the adopted construction. *Id.*

---

[1] In the Final Written Decision, we noted that, despite having notice of the
defect with the Cooklev Declaration, Patent Owner took no affirmative steps
to cure the defect. Dec. 11. Patent Owner did not request leave to cure the
defect in the Cooklev Declaration with its Request for Rehearing or
otherwise.

IPR2016-01229
Patent 7,881,236 B2

II. ANALYSIS

Both of Patent Owner's contentions are grounded in its position that that Kitazoe did not consider conditions that could test whether the Msg3 buffer data are transmitted if the conditions recited in the claims are not met.[2] Req. Reh'g 6. That is, Patent Owner does not dispute in its Request for Rehearing that transmission occurs when the conditions *are* met. *Id.*; *see also* Paper 14, 40 ("Patent Owner does not dispute that [Kitazoe] shows transmission of the Msg3 buffer data . . . taking place after receipt of a random access response."). Instead, Patent Owner bases its request on an argument that Kitazoe insufficiently addresses the circumstance of what behavior results when the conditions are *not* met.

In addressing the "transmitting" limitations, the Final Written Decision considered and addressed this circumstance, i.e. "when at least one of the recited conditions is not met." Dec. 34. In addressing that circumstance, we cited disclosure by Kitazoe identified by Petitioner that "teach that the encrypted scheduled transmission message, i.e., the 'new data,' is transmitted only after the random access procedure is complete." *Id.* at 34–35.

In its Request for Rehearing, Patent Owner reiterates its argument that "Kitazoe 'takes a narrow view of what can occur during a random access procedure.'" Req. Reh'g 9 (quoting Paper 14, 41). Instead, as it did in its Response, Patent Owner "illustrate[s] a more complex case of UL Grant

---

[2] There appears to be an important omission of the word "not" in the following sentence of the Request for Rehearing: "And fatal to Petitioner's argument, the one place they looked—Kitazoe—admittedly did not consider conditions that could test the [*sic*] whether the Msg3 buffer data is transmitted if Condition X is [*not*] met." Req. Reh'g 6.

IPR2016-01229
Patent 7,881,236 B2

reception." *Id.* But we expressly considered this "more complex case"—for which Patent Owner relies on unsworn attorney argument and the unsworn Cooklev Declaration—in light of the cross-examined testimony of Dr. Wells. Dec. 34–35. As summarized in the Final Written Decision, Dr. Wells testified that Patent Owner's "more complex case" is a "contrived hypothetical" that does not "relate[] to what is described in Kitazoe." *Id.* at 35 (quoting Ex. 2010, 60:21–22, 61:6–8). That such a case may have been discussed in the Specification of the '236 patent is not relevant to what a person of ordinary skill in the art would understand from Kitazoe's teachings. *See* Req. Reh'g 11–12.

Although we have reconsidered Patent Owner's reiterated argument, we do not now reach a different conclusion. Patent Owner effectively attempts to intensify Petitioner's burden by casting the already narrower construction of "if" adopted by the Final Written Decision as encompassing a negative limitation. Req. Reh'g 5–6. That is, Patent Owner contends that Petitioner could only make a sufficient showing by exhaustively demonstrating that no prior art performs the respective "transmitting" steps when the conditions are not met. *Id.* at 6 ("Petitioners didn't look everywhere."). This argument demands too much by relying on hypothetical scenarios not addressed by the reference itself, with the attorney argument by Patent Owner supported only by the defective Declaration of its witness. As in the Final Written Decision, we continue to accord weight to the contrary testimony of Dr. Wells, while not according weight to the testimony of Dr. Cooklev.

IPR2016-01229
Patent 7,881,236 B2

For these reasons, we are not persuaded that the Final Written Decision misapprehended or overlooked any argument by Patent Owner that would justify a change in that Decision.

III. ORDER

Accordingly, it is

ORDERED that Patent Owner's Request for Rehearing is *denied*.

7

IPR2016-01229
Patent 7,881,236 B2

PETITIONER

Walter Renner
Roberto Devoto
Daniel Smith
FISH & RICHARDSON P.C.
IPR00035-0009IP2@fr.com
PTABInbound@fr.com

PATENT OWNER

Cyrus Morton
Ryan Schultz
ROBINS KAPLAN LLP
cmorton@robinskaplan.com
rschultz@robinskaplan.com

US007881236B2

(12) **United States Patent**   (10) **Patent No.:**   **US 7,881,236 B2**
Park et al.   (45) **Date of Patent:**   **Feb. 1, 2011**

(54) **DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME**

(75) Inventors: **Sung Jun Park**, Anyang-Si (KR); **Seung June Yi**, Anyang-Si (KR); **Young Dae Lee**, Anyang-Si (KR); **Sung Duck Chun**, Anyang-Si (KR)

(73) Assignee: **LG Electronics Inc.**, Seoul (KR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **12/538,514**

(22) Filed: **Aug. 10, 2009**

(65)   **Prior Publication Data**

US 2010/0035581 A1   Feb. 11, 2010

Related U.S. Application Data

(60) Provisional application No. 61/087,988, filed on Aug. 11, 2008.

(30)   **Foreign Application Priority Data**

Jun. 25, 2009   (KR)   10-2009-0057128

(51) **Int. Cl.**
H04L 12/56   (2006.01)
H04J 1/16   (2006.01)
(52) **U.S. Cl.** **370/278**; 370/329; 370/412
(58) **Field of Classification Search** 370/329, 370/412, 278
See application file for complete search history.

(56)   **References Cited**

U.S. PATENT DOCUMENTS

7,660,279 B2 * 2/2010 Brueck et al. 370/328
2007/0042784 A1   2/2007 Anderson

2007/0115871 A1   5/2007 Zhang et al.

(Continued)

FOREIGN PATENT DOCUMENTS

JP   2008-103862 A   5/2008

(Continued)

OTHER PUBLICATIONS

LG Electronics, "Corrections to the random access response reception," 3GPP TSG-RAN WG2 #62, May 5-9, 2008, p. 3, paragraph 5.1.4.

(Continued)

Primary Examiner—John Pezzlo
(74) *Attorney, Agent, or Firm*—Birch, Stewart, Kolasch & Birch, LLP

(57)   **ABSTRACT**

A mobile communication technology, and, more particularly, a method for efficiently transmitting data stored in a message **3** (Msg**3**) buffer and a user equipment for the same is disclosed. The method of transmitting data by a user equipment in uplink includes receiving an uplink (UP) Grant signal from a base station on a specific message, determining whether there is data stored in a message **3** (Msg**3**) buffer when receiving the UL Grant signal on the specific message, determining whether the specific message is a random access response message, and transmitting the data stored in the Msg**3** buffer to the base station using the UL Grant signal received on the specific message, if there is data stored in the Msg**3** buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message.

13 Claims, 10 Drawing Sheets
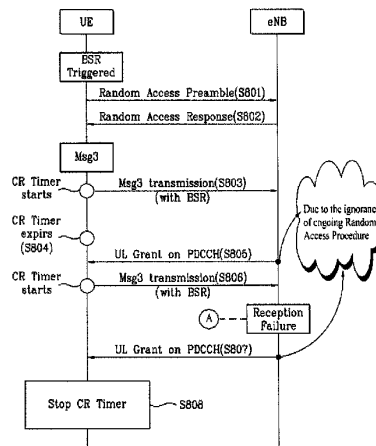
US 7,881,236 B2

Page 2

U.S. PATENT DOCUMENTS

2010/0034162 A1*	2/2010	Ou et al.	....	370/329
2010/0037113 A1*	2/2010	Maheshwari et al.	....	714/748

FOREIGN PATENT DOCUMENTS

KR	10-2007-0055004 A	5/2007
KR	10-2007-0107619 A	11/2007
KR	10-2008-0030941 A	4/2008

WO	WO 2008/023932 A1	2/2008

OTHER PUBLICATIONS

3GPP TS 36.321 V8.2.0., 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA) Medium Access Control (MAC) protocol specification (Release 8), pp. 1-33, May 2008.

3rd Generation Partnership Project (3GPP), "Enforcing New Transmission After Flushing HARQ Process", pp. 1-6, Feb. 9-13, 2009, Athens, Greece, XP050323002.

* cited by examiner

U.S. Patent   Feb. 1, 2011   **Sheet 1 of 10**   **US 7,881,236 B2**

FIG. 1

U.S. Patent   Feb. 1, 2011   Sheet 2 of 10   **US 7,881,236 B2**

FIG. 2

RRC
RLC
MAC
PHY

UE

RRC
RLC
MAC
PHY

E−UTRAN

FIG. 3

PDCP
RLC
MAC
PHY

UE

PDCP
RLC
MAC
PHY

E−UTRAN

Appx154

U.S. Patent　　　　**Feb. 1, 2011**　　　　**Sheet 3 of 10**　　　　**US 7,881,236 B2**

FIG. 4

Appx155

U.S. Patent   Feb. 1, 2011   **Sheet 4 of 10**   **US 7,881,236 B2**

FIG. 5

```
        ┌──────┐                                    ┌──────┐
        │  UE  │                                    │ eNB  │
        └──────┘                                    └──────┘
           │                                           │
  S501     │        Random Access Preamble             │
           │──────────────────────────────────────────▶│
           │                                           │
           │        Random Access Response        S502 │
           │◀──────────────────────────────────────────│
           │                                           │
  S503     │         Scheduled Transmission            │
           │──────────────────────────────────────────▶│
           │                                           │
           │         Contention Resolution        S504 │
           │◀──────────────────────────────────────────│
           │                                           │
```

Appx156

U.S. Patent   Feb. 1, 2011   Sheet 5 of 10   **US 7,881,236 B2**

FIG. 6
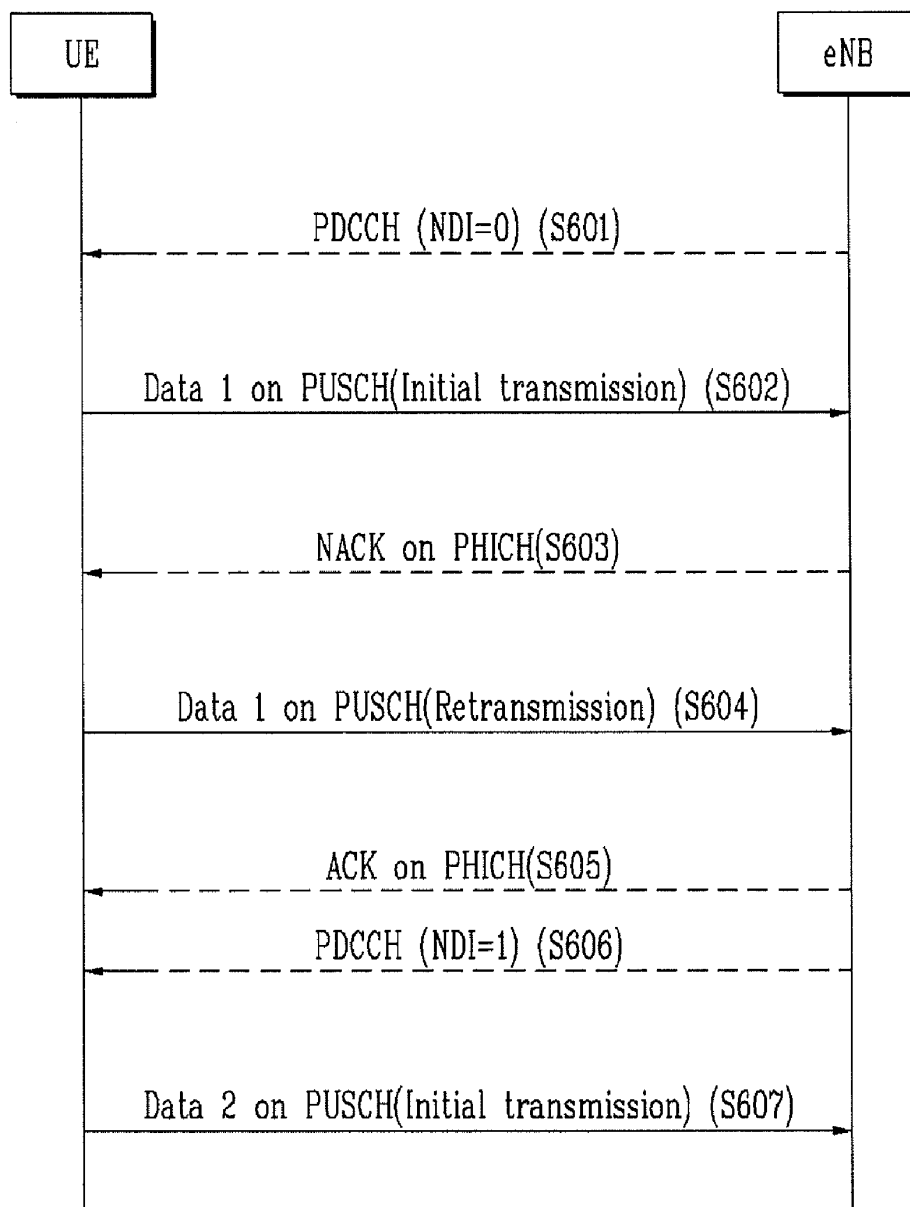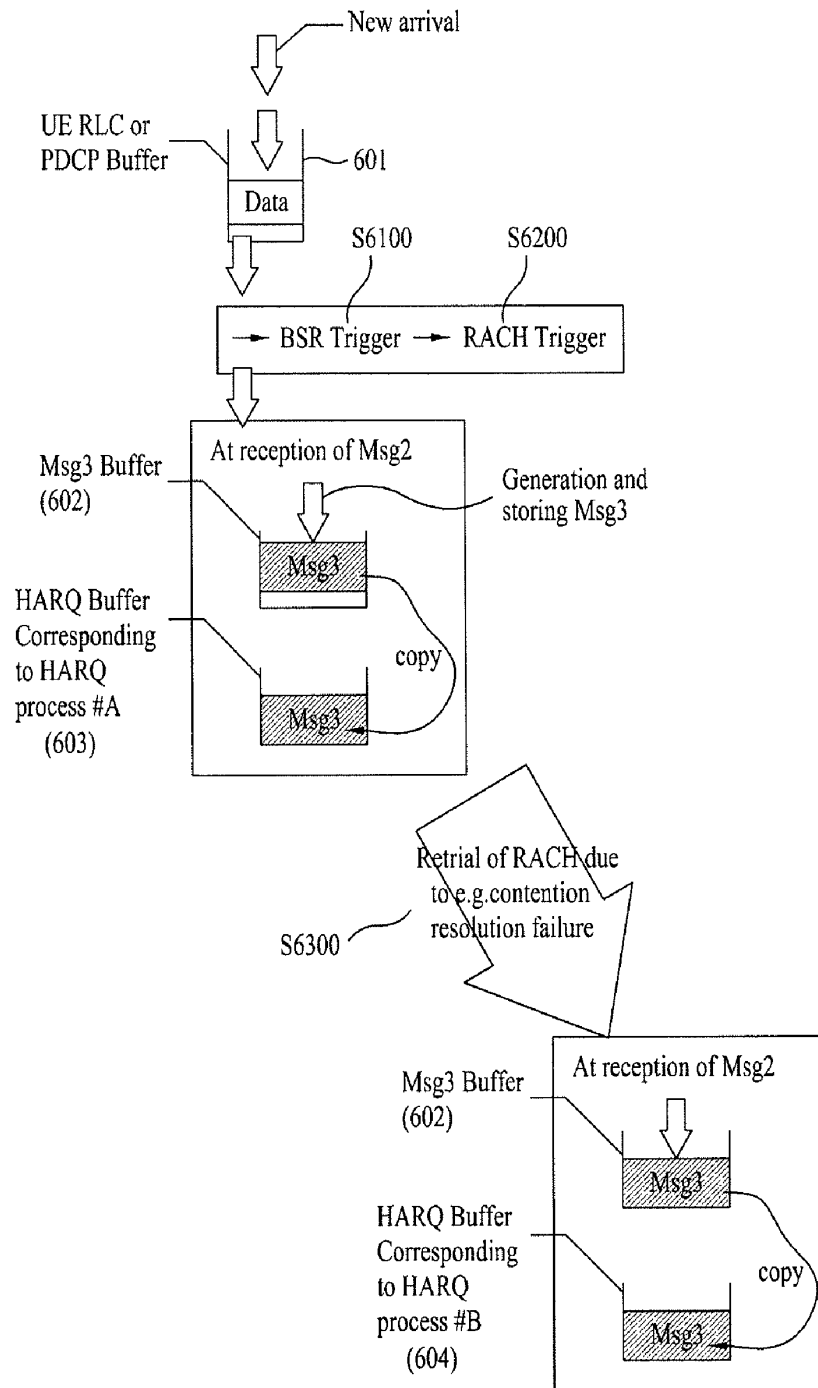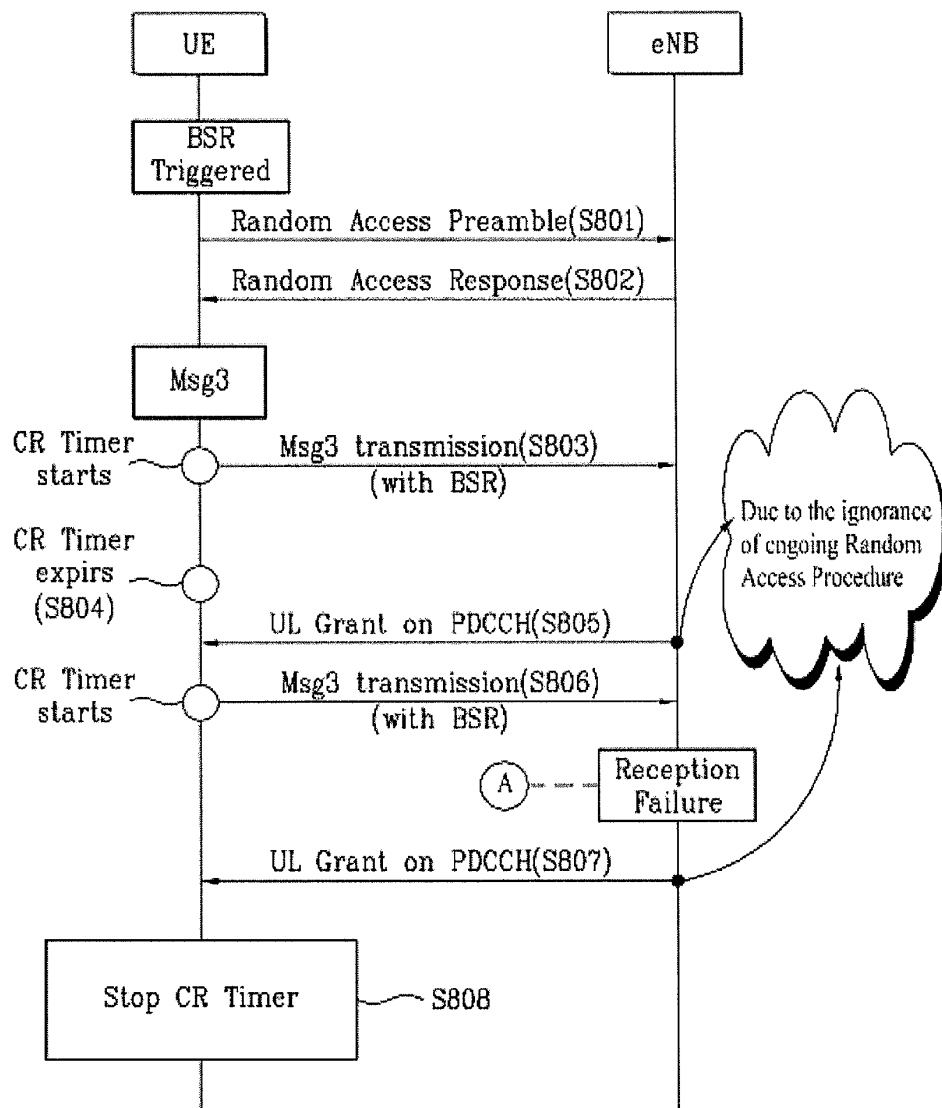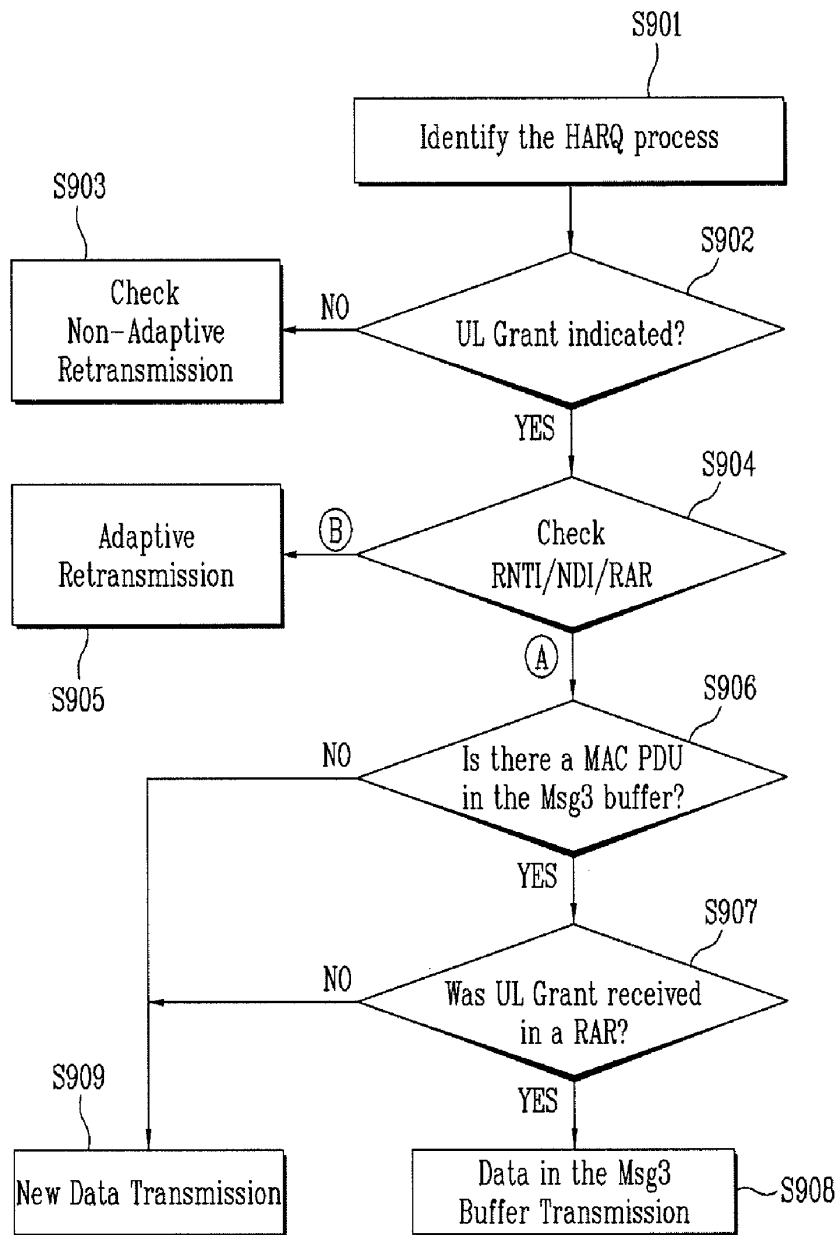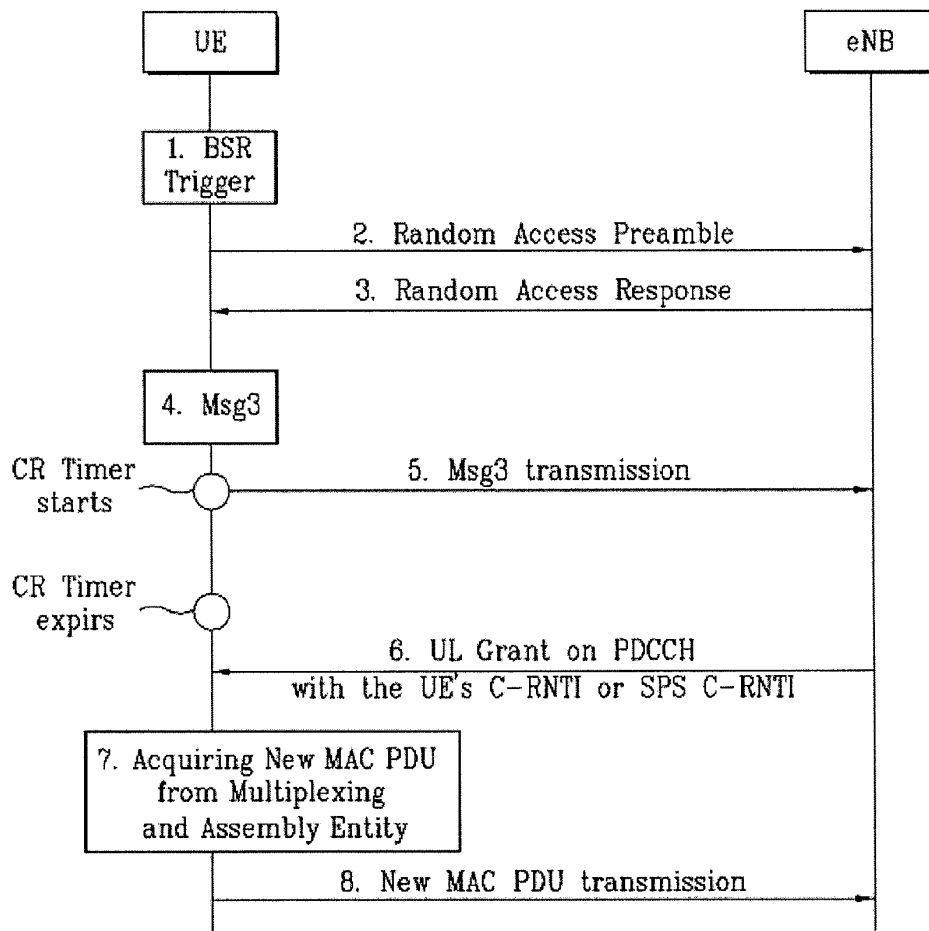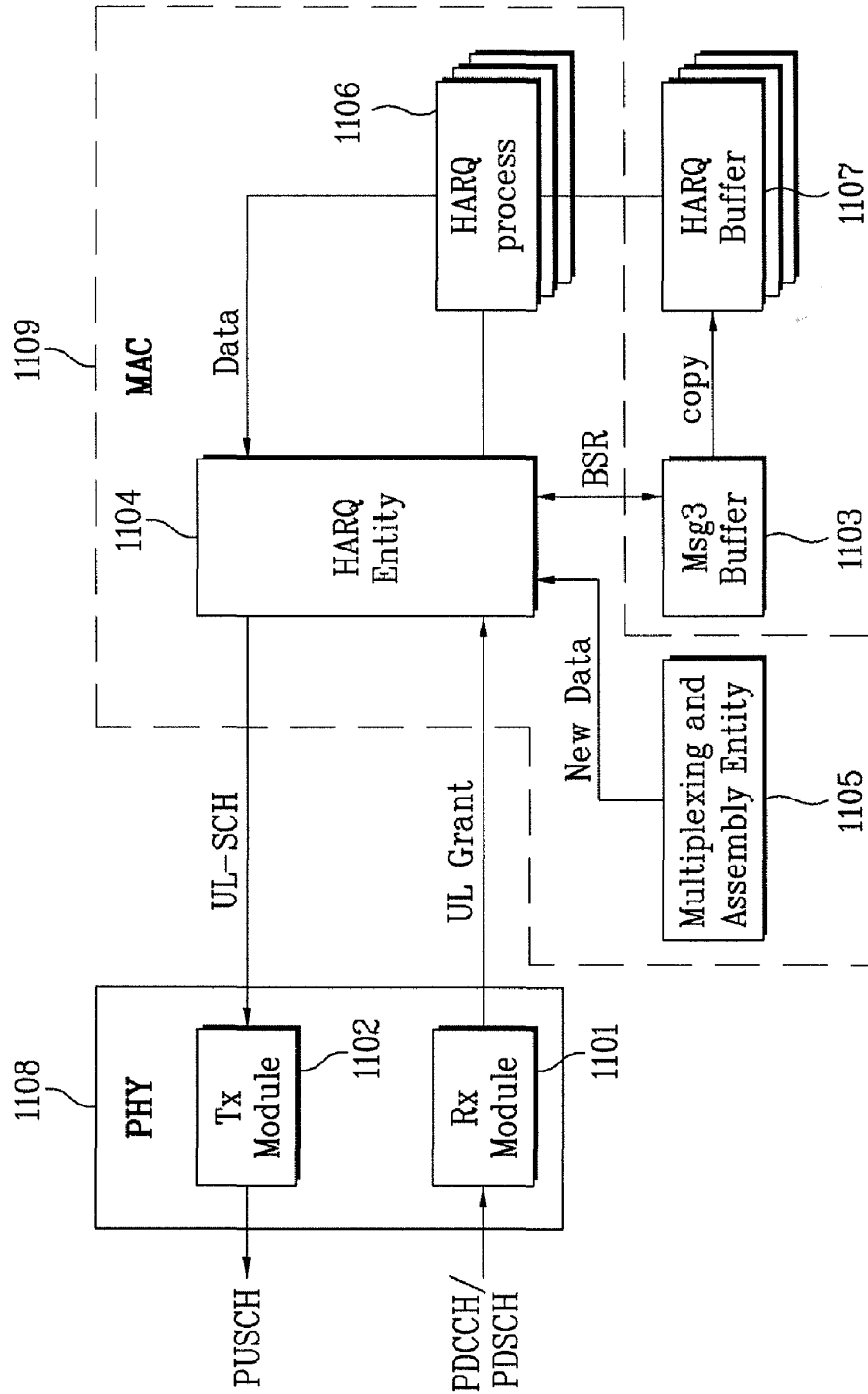
U.S. Patent   Feb. 1, 2011   **Sheet 6 of 10**   **US 7,881,236 B2**

FIG. 7

FIG. 8

U.S. Patent   Feb. 1, 2011   **Sheet 8 of 10**   **US 7,881,236 B2**

FIG. 9

U.S. Patent   **Feb. 1, 2011**   **Sheet 9 of 10**   **US 7,881,236 B2**

FIG. 10

FIG. 11

US 7,881,236 B2

DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Application No. 61/087,988, filed on Aug. 11, 2008, which is hereby incorporated by reference as if fully set forth herein.

This application claims the benefit of Korean Patent Application No. 10-2009-0057128, filed on Jun. 25, 2009, which is hereby incorporated by reference as if fully set forth herein.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a mobile communication technology, and more particularly, to a method for efficiently transmitting data stored in a message 3 (Msg3) buffer and a user equipment for the same.

2. Discussion of the Related Art

As an example of a mobile communication system to which the present invention is applicable, a 3rd Generation Partnership Project Long Term Evolution (3GPP LTE) communication system will be schematically described.

FIG. 1 is a schematic view showing the network architecture of an Evolved Universal Mobile Telecommunication System (E-UMTS) as an example of a mobile communication system.

The E-UMTS is evolved from the existing UMTS and has been currently standardized in the 3GPP. Generally, the E-UMTS may be called an LTE system.

An E-UMTS network may be largely divided into an Evolved UMTS Terrestrial Radio Access Network (E-UTRAN) 101 and a Core Network (CN) 102. The E-UTRAN 101 may include a User Equipment (UE) 103, a base station (hereinafter, referred to as an "eNode B" or "eNB") 104, and an Access Gateway (AG) 105 positioned at the end of the network and connected to an external network. The AG 105 may be divided into a portion for processing user traffic and a portion for processing control traffic. At this time, an AG for processing new user traffic and an AG for processing control traffic may communicate with each other using a new interface.

One or more cells may exist in one eNode B. A plurality of eNode Bs may be connected by an interface for transmitting the user traffic or control traffic. The CN 102 may include the AG 105 and a node for registering a user of the UE 103. An interface for distinguishing between the E-UTRAN 101 and the CN 102 may be used.

Layers of radio interface protocol between the UE and the network may be classified into a first layer L1, a second layer L2 and a third layer L3 based on three lower layers of an Open System Interconnection (OSI) reference model that is widely known in the field of communication systems. A physical layer belonging to the first layer provides an information transfer service using a physical channel. A Radio Resource Control (RRC) layer belonging to the third layer serves to control radio resources between the UE and the network. The UE and the network exchange an RRC message via the RRC layer. The RRC layer may be distributed and located at network nodes of the eNode B 104 and the AG 105. Alternatively, the RRC layer may be located at only the eNode B 104 or the AG 105.

FIGS. 2 and 3 show the structures of radio interface protocols between the UE and the UTRAN based on a 3GPP radio access network standard.

The radio interface protocols of FIGS. 2 and 3 are horizontally formed of a physical layer, a data link layer and a network layer. The radio interface protocols are vertically formed of a user plane for transmitting data information and a control plane for transmitting control signals. In detail, FIG. 2 shows the layers of a radio protocol control plane and FIG. 3 shows the layers of a radio protocol user plane. The protocol layers of FIGS. 2 and 3 may be divided into a first layer (L1), a second layer (L2) and a third layer (L3) based on three lower layers of an OSI reference model that is widely known in the field of communication systems.

Hereinafter, the layers of the control plane of the radio protocol of FIG. 2 and the user plane of the radio protocol of FIG. 3 will be described.

A physical (PHY) layer of the first layer provides an information transfer service to an upper layer using a physical channel. The PHY layer is connected to an upper layer, such as a Medium Access Control (MAC) layer, via a transport channel. Data is transferred between the MAC layer and the PHY layer via the transport channel. At this time, the transport channel is largely divided into a dedicated transport channel and a common transport channel, depending on whether or not a channel is shared. Data is also transferred between different PHY layers, such as a physical layer of a transmitting side and a physical layer of a receiving side, via a physical channel using radio resources.

Various layers exist in the second layer. First, the MAC layer serves to map various logical channels to various transport channels and serves to multiplex several logical channels into one transport channel. The MAC layer is connected to a Radio Link Control (RLC) layer, which is an upper layer, by the logical channel. The logical channel may be largely divided into a control channel for transmitting information about the control plane and a traffic channel for transmitting information about the user plane according to the kinds of information transmitted.

The RLC layer of the second layer serves to segment and concatenate data received from an upper layer so as to adjust data size such that a lower layer transmits data in a radio section. In addition, the RLC provides three modes, namely, a Transparent Mode (TM), an Unacknowledged Mode (UM) and an Acknowledged Mode (AM) in order to guarantee various Quality of Services (QoSs) requested by Radio Bearers (RBs). In particular, the AM RLC performs a retransmission function using an Automatic Repeat and Request (ARQ) function for reliable data transmission.

A Packet Data Convergence Protocol (PDCP) layer of the second layer performs a header compression function to reduce the size of an Internet Protocol (IP) packet header that includes unnecessary control information and has a relatively large size, for effective transmission in a radio section having a relatively small bandwidth when transmitting an IP packet such as an IPv4 packet or an IPv6 packet. Therefore, only necessary information in a header portion of data is transmitted so as to improve transmission efficiency of the radio section. In the LTE system, the PDCP layer also performs a security function, which includes ciphering for preventing data from being intercepted by a third party and integrity protection for preventing data from being handled by a third party.

A Radio Resource Control (RRC) located at a highest portion of the third layer is defined only in the control plane. The RRC layer handles logical channels, transport channels and physical channels for the configuration, re-configuration and release of RBs. Here, the RBs refer to logical paths provided by the first and second layers of the radio protocol, for data transfer between the UE and the UTRAN, and the

US 7,881,236 B2

3

configuration of the RBs refers to a process of defining the characteristics of the radio protocol layer and channel necessary for providing a specific service, and setting detailed parameters and operation methods. Each of the RBs is divided into a signaling RB and a data RB. The SRB is used as a path for transmitting an RRC message in the control plane (C-plane), and the DRB is used as a path for transmitting user data in the user plane (U-plane).

Downlink transport channels for transmitting data from a network to a UE may include a Broadcast Channel (BCH) for transmitting system information and a downlink Shared Channel (SCH) for transmitting user traffic or a control message. The traffic or the control message of a downlink multicast or broadcast service may be transmitted via the downlink SCH or via a separate Downlink Multicast Channel (MCH). Uplink transport channels for transmitting data from a UE to a network may include a Random Access Channel (RACH) for transmitting an initial control message and an uplink SCH for transmitting user traffic or a control message.

Downlink physical channels for transmitting information transferred via the downlink transport channels in a radio section between a network and a UE may include a Physical Broadcast Channel (PBCH) for transmitting information about a BCH, a Physical Multicast Channel (PMCH) for transmitting information about an MCH, a Physical Downlink Shared Channel (PDSCH) for transmitting information about a PCH and a downlink SCH, and a Physical Downlink Control Channel (PDCCH) (also referred to as a DL L1/L2 control channel) for transmitting control information provided by the first layer and the second layer, such as downlink (DL) or uplink (UL) scheduling grant information. Uplink physical channels for transmitting information transferred via the uplink transport channels in a radio section between a network and a UE may include a Physical Uplink Shared Channel (PUSCH) for transmitting information about an uplink SCH, a Physical Random Access Channel (PRACH) for transmitting information about an RACH, and a Physical Uplink Control Channel (PUCCH) for transmitting control information provided by the first layer and the second layer, such as a HARQ ACK or NACK, a Scheduling Request (SR), a Channel Quality Indicator (CQI) report.

Hereinafter, a random access procedure provided by an LTE system will be schematically described based on the above description.

First, a UE performs the random access procedure in the following cases.

when the UE performs initial access because there is no RRC Connection with an eNode B,

when the UE initially accesses a target cell in a handover procedure,

when the random access procedure is requested by a command of an eNode B,

when there is uplink data transmission in a situation where uplink time synchronization is not aligned or where a specific radio resource used for requesting radio resources is not allocated, and

when a recovery procedure is performed in case of radio link failure or handover failure.

In the LTE system, there are provided two procedures in selecting a random access preamble: one is a contention based random access procedure in which the UE randomly selects one preamble within a specific group for use, and another is a non-contention based random access procedure in which the UE uses a random access preamble allocated only to a specific UE by the eNode B. The non-contention based random access procedure may be used only in the

4

handover procedure or when it is requested by the command of the base station, as described above.

A random access procedure of a UE with a specific eNode B may largely include (1) a step of, at the UE, transmitting a random access preamble to the eNode B (hereinafter, referred to as a "message 1" transmitting step if such use will not lead to confusion), (2) a step of receiving a random access response from the eNode B in correspondence with the transmitted random access preamble (hereinafter, referred to as a "message 2" receiving step if such use will not lead to confusion), (3) a step of transmitting an uplink message using the information received by the random access response message (hereinafter, referred to as a "message 3" transmitting step if such use will not lead to confusion), and (4) a step of receiving a message corresponding to the uplink message from the eNode B (hereinafter, referred to as a "message 4" receiving step if such use will not lead to confusion).

In the random access procedure, the UE stores data to be transmitted via the message 3 in a message 3 (Msg3) buffer and transmits the data stored in the msg3 buffer in correspondence with the reception of an Uplink (UL) Grant signal. The UL Grant signal indicates information about uplink radio resources which may be used when the UE transmits a signal to the eNode B, and is received on a random access response message received on a PDCCH or a PUSCH in the LTE system. According to the current LTE system standard, it is defined that, if the UL Grant signal is received in a state in which data is stored in the Msg3 buffer, the data stored in the Msg3 buffer is transmitted regardless of the reception mode of the UL Grant signal. As described above, if the data stored in the Msg3 buffer is transmitted in correspondence with the reception of all UL Grant signals, problems may occur. Accordingly, there is a need for research to solve such problems.

SUMMARY OF THE INVENTION

Accordingly, the present invention is directed to a data transmission method and a user equipment for the same that substantially obviate one or more problems due to limitations and disadvantages of the related art.

An object of the present invention is to provide a data transmission method and a user equipment for the same, which is capable of solving a problem which may occur when data stored in a message 3 (Msg3) buffer is transmitted according to a reception mode of an Uplink (UL) Grant signal.

Additional advantages, objects, and features of the invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objectives and other advantages of the invention may be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

To achieve these objects and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, a method of transmitting data by a user equipment through an uplink includes receiving an uplink grant (UL Grant) signal from a base station on a specific message, determining whether there is data stored in a message 3 (Msg3) buffer when receiving the UL Grant signal on the specific message, determining whether the specific message is a random access response message, and transmitting the data stored in the Msg3 buffer to the base station using the UL Grant signal received on the specific

US 7,881,236 B2

<div style="display:flex">
<div>

5

message, if there is data stored in the Msg**3** buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message.

If there is no data stored in the Msg**3** buffer when receiving the UL Grant signal on the specific message or the specific message is not the random access response message, new data may be transmitted to the base station in correspondence with the UL Grant signal received on the specific message.

The UL Grant signal received on the specific message may be a UL Grant signal received on a Physical Downlink Control Channel (PDCCH). In this case, the user equipment may transmit new data in correspondence with the UL Grant signal received on the PDCCH.

The UL Grant signal received on the specific message may be a UL Grant signal received on a random access response message received on Physical Downlink Shared Channel (PDSCH). In this case, if there is data stored in the Msg**3** buffer when receiving the UL Grant signal on the random access response message, the user equipment may transmit the data stored in the buffer in the Msg**3** buffer using the UL Grant signal received on the random access response message.

The data stored in the Msg**3** buffer may be a Medium Access Control Protocol Data Unit (MAC PDU) including a user equipment identifier, and the data stored in the Msg**3** buffer further include information about a buffer status report (BSR) if the user equipment starts the random access procedure for the BSR.

In another aspect of the present invention, a user equipment includes a reception module receiving an uplink grant (UL Grant) signal from a base station on a specific message, a transmission module transmitting data to the base station using the UL Grant signal received on the specific message, a message **3** (Msg**3**) buffer storing UL data to be transmitted in a random access procedure, and a Hybrid Automatic Repeat Request (HARQ) entity determining whether there is data stored in the Msg**3** buffer when the reception module receives the UL Grant signal and the specific message is a random access response message, acquiring the data stored in the Msg**3** buffer if there is data stored in the Msg**3** buffer when the reception module receives the UL Grant signal and the specific message is the random access response message, and controlling the transmission module to transmit the data stored in the Msg**3** buffer to the base station using the UL Grant signal received by the reception module on the specific message.

The user equipment may further include a multiplexing and assembly entity used for transmission of new data. In this case, the HARQ entity may acquire the new data to be transmitted from the multiplexing and assembly entity if there is no data stored in the Msg**3** buffer when the reception module receives the UL Grant signal on the specific message or the received message is not the random access response message, and control the transmission module to transmit the new data acquired from the multiplexing and assembly entity using the UL Grant signal received by the reception module on the specific message.

The user equipment may further include one or more HARQ processes, and HARQ buffers respectively corresponding to the one or more HARQ processes. In this case, the HARQ entity may transfer the data acquired from the multiplexing and assembly entity or the Msg**3** buffer to a specific HARQ process of the one or more HARQ processes and control the specific HARQ process to transmit the data acquired from the multiplexing and assembly entity or the Msg**3** buffer through the transmission module.

</div>
<div>

6

When the specific HARQ process transmits the data stored in the Msg**3** buffer through the transmission module, the data stored in the Msg**3** buffer may be controlled to be copied into a specific HARQ buffer corresponding to the specific HARQ process, and the data copied into the specific HARQ buffer may be controlled to be transmitted through the transmission module.

The UL Grant signal received by the reception module on the specific message may be a UL Grant signal received on a Physical Downlink Control Channel (PDCCH). In this case, the HARQ entity may control new data to be transmitted in correspondence with the received UL Grant signal received on the PDCCH.

The UL Grant signal received by the reception module on the specific message may be a UL Grant signal received on a random access response message received on Physical Downlink Shared Channel (PDSCH), and the HARQ entity may control the data stored in the Msg**3** buffer to be transmitted using the UL Grant signal received on the random access response message if there is data stored in the Msg**3** buffer when the reception module receives the UL Grant signal on the random access response message.

According to the above-described embodiments of the present invention, it is possible to transmit data stored in a Msg**3** buffer according to a reception mode of a UL Grant signal, without confusion.

It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

FIG. **1** is a schematic view showing the network architecture of an Evolved Universal Mobile Telecommunication System (E-UMTS) as an example of a mobile communication system;

FIGS. **2** and **3** are views showing the structures of radio interface protocols between a user equipment (UE) and a UMTS Terrestrial Radio Access Network (UTRAN) based on a 3rd Generation Partnership Project (3GPP) radio access network standard;

FIG. **4** is a view illustrating an operating procedure of a UE and a base station (eNode B) in a non-contention based random access procedure;

FIG. **5** is a view illustrating an operating procedure of a UE and an eNode B in a contention based random access procedure;

FIG. **6** is a view illustrating an uplink Hybrid Automatic Repeat Request (HARQ) scheme;

FIG. **7** is a view illustrating a method of transmitting a message **3** in a random access procedure when uplink radio resources are requested;

FIG. **8** is a view illustrating a problem which may occur when data stored in a message **3** buffer is transmitted by an Uplink (UL) Grant signal received on a message other than a random access response message;

FIG. **9** is a flowchart illustrating a method of transmitting uplink data by a UE according to a preferred embodiment of the present invention;

</div>
</div>

US 7,881,236 B2

7

FIG. **10** is a view illustrating a method of transmitting uplink data when a Buffer status Report (BSR) is triggered in a UE, according to an embodiment of the present invention; and

FIG. **11** is a schematic view showing the configuration of a UE according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Hereinafter, the preferred embodiments of the present invention will be described with reference to the accompanying drawings. It is to be understood that the detailed description which will be disclosed along with the accompanying drawings is intended to describe the exemplary embodiments of the present invention, and is not intended to describe a unique embodiment which the present invention can be carried out. Hereinafter, the detailed description includes detailed matters to provide full understanding of the present invention. However, it will be apparent to those skilled in the art that the present invention can be carried out without the detailed matters. For example, the following description will be made on the assumption that a mobile communication system is a 3rd Generation Partnership Project Long Term Evolution (3GPP LTE) system, but the present invention is applicable to other mobile communication systems excluding the 3GPP LTE system.

In some instances, well-known structures and devices are omitted in order to avoid obscuring the concepts of the present invention and the important functions of the structures and devices are shown in block diagram form. The same reference numbers will be used throughout the drawings to refer to the same or like parts.

In the following description, it is assumed that a terminal includes a mobile or fixed user end device such as a user equipment (UE) and a mobile station (MS), and a base station includes a node of a network end communicating with a terminal, such as a Node-B, an eNode B, and a base station.

As described above, in the following description, a problem which may occur when data stored in a message **3** (Msg**3**) buffer is transmitted according to a reception mode of an Uplink (UL) Grant signal will be described in detail and a method of solving the problem will be described. Transmission and reception of a signal using a random access procedure and a Hybrid Automatic Repeat Request (HARQ) scheme will be described in detail.

FIG. **4** is a view illustrating an operating procedure of a terminal (UE) and a base station (eNode B) in a non-contention based random access procedure.

(1) Random Access Preamble Assignment

As described above, a non-contention based random access procedure may be performed (1) in a handover procedure and (2) when the random access procedure is requested by a command of an eNode B. Even in these cases, a contention based random access procedure may be performed.

First, it is important that a specific random access preamble without the possibility of collision is received from the eNode B, for the non-contention based random access procedure. Methods of receiving the random access preamble may include a method using a handover command and a method using a Physical Downlink Control Channel (PDCCH) command. The UE receives an assigned random access preamble (S**401**).

(2) Message **1** Transmission

The UE transmits the preamble to the eNode B after receiving the assigned random access preamble from the eNode B as described above (S**402**).

8

(3) Message **2** Transmission

The UE attempts to receive a random access response within a random access response reception window indicated by the eNode B through a handover command or system information after transmitting the random access preamble in step S**402** (S**403**). More specifically, the random access response information may be transmitted in the form of a Medium Access Control (MAC) Packet Data Unit (PDU), and the MAC PDU may be transferred via a Physical Downlink Shared Channel (PDSCH). In addition, the UE preferably monitors the PDCCH in order to enable to the UE to properly receive the information transferred via the PDSCH. That is, the PDCCH may preferably include information about a UE that should receive the PDSCH, frequency and time information of radio resources of the PDSCH, a transfer format of the PDSCH, and the like. Here, if the PDCCH has been successfully received, the UE may appropriately receive the random access response transmitted on the PDSCH according to information of the PDCCH. The random access response may include a random access preamble identifier (e.g. Random Access-Radio Network Temporary Identifier (RA-RNTI)), an UL Grant indicating uplink radio resources, a temporary C-RNTI, a Time Advance Command (TAC), and the like.

As described above, the reason why the random access response includes the random access preamble identifier is because a single random access response may include random access response information of at least one UE and thus it is reported to which UE the UL Grant, the Temporary C-RNTI and the TAC are valid. In this step, it is assumed that the UE selects a random access preamble identifier matched to the random access preamble selected by the UE in step S**402**.

In the non-contention based random access procedure, it is determined that the random access procedure is normally performed, by receiving the random access response information, and the random access procedure may be finished.

FIG. **5** is a view illustrating an operating procedure of a UE and an eNode B in a contention based random access procedure.

(1) Message **1** Transmission

First, the UE may randomly select a single random access preamble from a set of random access preambles indicated through system information or a handover command, and select and transmit a Physical Random Access Channel (PRACH) capable of transmitting the random access preamble (S**501**).

(2) Message **2** Reception

A method of receiving random access response information is similar to the above-described non-contention based random access procedure. That is, the UE attempts to receive its own random access response within a random access response reception window indicated by the eNode B through the system information or the handover command, after the random access preamble is transmitted in step S**501**, and receives a Physical Downlink Shared Channel (PDSCH) using random access identifier information corresponding thereto (S**502**). Accordingly, the UE may receive a UL Grant, a Temporary C-RNTI, a TAC and the like.

(3) Message **3** Transmission

If the UE has received the random access response valid for the UE, the UE may process all of the information included in the random access response. That is, the UE applies the TAC, and stores the temporary C-RNTI. In addition, data which will be transmitted in correspondence with the reception of the valid random access response may be stored in a Msg**3**

US 7,881,236 B2

9   10

buffer. A process of storing the data in the Msg**3** buffer and transmitting the data will be described later with reference to FIG. **7**.

The UE uses the received UL Grant so as to transmit the data (that is, the message **3**) to the eNode B (S**503**). The message **3** should include a UE identifier. In the contention based random access procedure, the eNode B may not determine which UEs are performing the random access procedure, but later the UEs should be identified for contention resolution.

Here, two different schemes for including the UE identifier may be provided. A first scheme is to transmit the UE's cell identifier through an uplink transmission signal corresponding to the UL Grant if the UE has already received a valid cell identifier allocated by a corresponding cell prior to the random access procedure. Conversely, the second scheme is to transmit the UE's unique identifier (e.g., S-TMSI or random ID) if the UE has not received a valid cell identifier prior to the random access procedure. In general, the unique identifier is longer than the cell identifier. If the UE has transmitted data corresponding to the UL Grant, the UE starts a contention resolution (CR) timer.

(4) Message **4** Reception

After transmitting the data with its identifier through the UL Grant included in the random access response, the UE waits for an indication (instruction) from the eNode B for contention resolution. That is, the UE attempts to receive the PDCCH so as to receive a specific message (S**504**). Here, there are two schemes to receive the PDCCH. As described above, the UE attempts to receive the PDCCH using its own cell identifier if the message **3** transmitted in correspondence with the UL Grant is transmitted using the UE's cell identifier, and the UE attempts to receive the PDCCH using the temporary C-RNTI included in the random access response if the identifier is its unique identifier. Thereafter, in the former scheme, if the PDCCH is received through its own cell identifier before the contention resolution timer is expired, the UE determines that the random access procedure has been normally performed and completes the random access procedure. In the latter scheme, if the PDCCH is received through the temporary C-RNTI before the contention resolution timer has expired, the UE checks data transferred by the PDSCH indicated by the PDCCH. If the unique identifier of the UE is included in the data, the UE determines that the random access procedure has been normally performed and completes the random access procedure.

Hereinafter, the LTE system, by way of example, a uplink Hybrid Automatic Repeat Request (HARQ) scheme of a MAC layer will be described, concentrating on the transmission of uplink data.

FIG. **6** is a view illustrating an HARQ scheme.

A UE may receive UL Grant information or UL scheduling information from an eNode B on a PDCCH (step S**601**), in order to transmit data to the eNode B by the HARQ scheme. In general, the UL scheduling information may include a UE identifier (e.g., a C-RNTI or a Semi-Persistent Scheduling C-RNTI), resource block assignment, transmission parameters (modulation, coding scheme and redundancy version), and a New Data Indicator (NDI). In the LTE system, the UE has eight HARQ processes and the HARQ processes are synchronously performed with Transmission Time Intervals (TTIs). That is, specific HARQ processes may be sequentially assigned according to points in time when data is received, in a manner of using the first HARQ process at TTI **9** and using the second HARQ process at TTI **10** after a first

HARQ process is used at TTI **1**, a second HARQ process is used at TTI **2**, . . . , and an eighth HARQ process is used at TTI **8**.

In addition, since the HARQ processes are synchronously assigned as described above, a HARQ process connected to a TTI in which a PDCCH for initial transmission of specific data is received is used for the transmission of the data. For example, if it is assumed that the UE has received a PDCCH including UL scheduling information at an Nth TTI, the UE transmits data at an $(N+4)^{th}$ TTI. In other words, a Kth HARQ process assigned at the $(N+4)^{th}$ TTI is used for the transmission of the data. That is, the UE may transmit the data to the eNode B on a PUSCH according to the UL scheduling information after checking the UL scheduling information transmitted to the UE by monitoring the PDCCH at every TTI (step S**602**).

When the data has been received, the eNode B stores the data in a soft buffer and attempts to decode the data. The eNode B transmits an ACK signal if the decoding of the data succeeds and transmits an NACK signal if the decoding of the data fails. An example in which the decoding of the data fails and the eNode B transmits the NACK signal on a Physical HARQ Indicator Channel (PHICH) is shown in FIG. **6** (step S**603**).

When the ACK signal has been received from the eNode B, the UE determines that the transmission of the data to the eNode B succeeds and transmits next data. However, when the UE receives the NACK signal as shown in FIG. **6**, the UE may determine that the transmission of the data to the eNode B has failed and retransmit the same data by the same scheme or a new scheme (step S**604**).

The HARQ retransmission of the UE may be performed by a non-adaptive scheme. That is, the initial transmission of specific data may be performed when the PDCCH including the UL scheduling information should be received, but the retransmission may be performed even when the PDCCH is not received. In the non-adaptive HARQ retransmission, the data is retransmitted using the same UL scheduling information as the initial transmission at a TTI at which a next HARQ process is assigned, without receiving the PDCCH.

The HARQ retransmission of the UE may be performed by an adaptive scheme. In this case, transmission parameters for retransmission are received on the PDCCH, but the UL scheduling information included in the PDCCH may be different from that of the initial transmission according to channel statuses. For example, if the channel status is better than that of the initial transmission, transmission may be performed at a high bit rate. In contrast, if the channel status is worse than that of the initial transmission, transmission may be performed at a lower bit rate than that of the initial transmission.

If the UE receives the UL scheduling information on the PDCCH, it is determined whether data which should be transmitted at this time is data which is initially transmitted or previous data which is retransmitted, by an NDI field included in the PDCCH. The NDI field is toggled in the order of 0, 1, 0, 1, . . . whenever new data is transmitted as described above, and the NDI field of the retransmission has the same value as that of the initial transmission. Accordingly, the UE may compare the NDI field with the previously transmitted value so as to determine whether or not the data is retransmitted.

The UE counts the number of times of transmission (CURRENT_TX_NB) whenever data is transmitted by the HARQ scheme, and deletes the data stored in the HARQ buffer when CURRENT_TX_NB has reached a maximum transmission number set in an RRC layer.

US 7,881,236 B2

11

When the retransmitted data is received, the eNode B attempts to combine the received data and the data stored in the soft buffer due to the failure of the decoding by various schemes and decodes the combined data. The eNode B transmits an ACK signal to the UE if the decoding succeeds and transmits an NACK signal to the UE if the decoding fails. The eNode B repeats a process of transmitting the NACK signal and receiving the retransmitted data until the decoding of the data succeeds. In the example of FIG. **6**, the eNode B attempts to combine the data retransmitted in step S**604** and the data which is previously received and stored and decodes the combined data. The eNode B transmits the ACK signal to the UE on the PHICH if the decoding of the received data succeeds (step S**605**). The UE may transmit the UL scheduling information for the transmission of next data to the UE on the PDCCH, and may transmit the NDI toggled to 1 in order to report that the UL scheduling information is not used for the adaptive retransmission, but is used for the transmission of new data (step S**606**). The UE may transmit new data to the eNode B on the PUSCH corresponding to the received UL scheduling information (step S**607**).

The random access procedure may be triggered in the above-described cases as described above. Hereinafter, the case where the UE requests UL radio resources will be described.

FIG. **7** is a view illustrating a method of transmitting a message **3** in a random access procedure when UL radio resources are requested.

When new data is generated in a transfer buffer **601** of the UE, for example, an RLC buffer and a PDCP buffer, the UE should generally inform the eNode B of information about the generation of the data. More accurately, when data having priority higher than that of data stored in the transfer buffer of the UE is generated, the UE informs the eNode B that the data is generated.

This indicates that the UE requests radio resources to the eNode B in order to transmit the generated data. The eNode B may assign proper radio resources to the UE according to the above information. The information about the generation of the data is called a buffer status report (hereinafter, referred to as "BSR"). Hereinafter, as described above, the request for the transmission of the BSR is represented by triggering of the BSR transmission (S**6100**). If the BSR transmission is triggered, the UE should transmit the BSR to the eNode B. However, if the radio resources for transmitting the BSR are not present, the UE may trigger a random access procedure and attempt to request radio resources (S**6200**).

As described above, if the random access procedure for requesting the radio resources to the eNode B is triggered, the UE may transmit a random access preamble to the eNode B and receive a random access response message corresponding thereto as described with reference to FIGS. **4** and **5**. In addition, a message **3** (that is, a MAC PDU) including a UE identifier and a BSR may be generated and stored in a Msg**3** buffer **602**, in a MAC layer of the UE through a UL Grant signal included in the random access response message. The message **3** stored in the Msg**3** buffer **602** may be copied and stored in a HARQ process buffer **603** indicated by the UL Grant information. FIG. **7** shows, by way of example, the case where the HARQ process A is used for the transmission of the message **3**. Thus, the message **3** is copied to the HARQ buffer **603** corresponding to the HARQ process A. The message **3** stored in the HARQ buffer **603** may be transmitted to the eNode B on a PUSCH.

Meanwhile, if the UE should perform retrial of the random access procedure due to contention resolution failure, the UE may transmit the random access preamble to the eNode B

12

again and receive a random access response (S**6300**). However, in the retried random access procedure, the UE uses the message **3** stored in the Msg3 buffer **602** again, without generating a new message **3**. That is, the UE may copy and store the MAC PDU corresponding to the message **3** stored in the Msg**3** buffer **602** in a HARQ buffer **604**, and transmit the MAC PDU, according to the UL Grant signal included in the random access response received in the retried random access procedure. FIG. **7** shows the case where the reattempted random access procedure is performed by a HARQ process B. The data stored in the Msg**3** buffer **602** may be copied into the HARQ buffer B and transmitted.

As described above, if the random access response is received while the random access procedure is performed, the UE stores the message **3** stored in the Msg**3** buffer in the HARQ buffer and transmits the message **3**. As described above, in the current the LTE system standard for the HARQ process, it is defined that the transmission of the data stored in the Msg**3** buffer is triggered by the reception of any UL Grant signal. Accordingly, the CR timer may be erroneously driven such that an erroneous contention resolution process is performed. Due to the erroneous contention resolution procedure, the above-described BSR may not be normally transmitted and the UE may come to deadlock. This problem will be described in detail with reference to FIG. **8**.

FIG. **8** is a view illustrating a problem which may occur when data stored in a Msg3 buffer is transmitted by an Uplink (UL) Grant signal received on a message other than a random access response message.

As described with reference to FIG. **7**, the UE may trigger the BSR when high priority data is generated, transmit the random access preamble in order to transmit the BSR to the eNode B (S**801**), and receive the random access response corresponding thereto (S**802**).

Thereafter, the UE may transmit a message **3** including the BSR via UL Grant information included in the random access response message received in step S**802** (S**803**). If the message **3** is transmitted, the CR timer is operated as described with reference to FIG. **5**.

If the random access procedure is completed before the CR timer expires, the UE determines that the random access procedure has not been successfully completed (S**804**). In this case, the UE may try to restart the random access procedure from the transmission of the random access preamble.

At this time, since the eNode B does not yet know that the UE is performing the random access procedure, the eNode B may transmit a UL Grant signal independent of the random access procedure on a masked PDCCH (S**805**). In this case, according to the current LTE system standard, the UE transmits the message **3** stored in the Msg**3** buffer according to the UL Grant signal received on the PDCCH in step S**805** (S**806**). In addition, when the message **3** is transmitted, the CR timer is restarted. That is, even when the UE does not perform the transmission of the random access preamble and the reception of the random access response message, the CR timer is restarted in step S**806**.

Although the CR timer is started as the UE transmits the message **3** in step S**806**, the eNode B may not know that the UE is performing the random access procedure because the reception of the random access preamble and the transmission of the random access response message are not performed. If another UL Grant signal is received on the PDCCH including the UE identifier (S**807**), the UE determines that the ongoing random access procedure is successfully completed. Accordingly, the UE may stop the ongoing CR time (S**808**).

If the message **3** transmitted to the eNode B in step S**806** is not successfully received by the eNode B (A), the UE no

US 7,881,236 B2

13

longer transmits the message **3** including the BSR. Accordingly, if additional data is not generated, the UE may not transmit the data generated in the transfer buffer to the eNode B.

The above-described problem will be described as follows.

According to the current LTE system standard, if the UL Grant signal is received in a state in which the data is stored in the Msg**3** buffer, the UE transmits the data stored in the Msg**3** buffer to the eNode B. At this time, the UL Grant signal may be transmitted by the eNode B, not for the transmission of the data stored in the Msg**3** buffer, but for the transmission of other data. Accordingly, the CR timer may be erroneously started.

In addition, if the eNode B does not know that the CR timer is erroneously started in the UE and transmits the UL Grant signal for the transmission of other data as described with reference to FIG. **8**, information (e.g., BSR) to be transmitted through the message **3** may be lost.

In addition, the UE may not receive a message **4** for completing a proper contention resolution procedure even with respect to the ongoing random access procedure.

In a preferred embodiment of the invention for solving the above-described problem, the data stored in the Msg**3** buffer is restrictively transmitted only in the case where the UL Grant signal received from the eNode B is received on the random access response message, but not in all cases where the UL Grant signal is received from the eNode B. If the UL Grant signal is received on the masked PDCCH not by the random access response message but by the UE identifier (C-RNTI or a Semi Persistent Scheduling Radio Network Temporary Identifier (SPS-RNTI)) in a state in which the data is stored in the Msg**3** buffer, a method of acquiring and transmitting new data (MAC PDU) to the eNode B instead of the data stored in the Msg**3** buffer is suggested.

FIG. **9** is a flowchart illustrating a method of transmitting UL data by a UE according to a preferred embodiment of the present invention. In more detail, FIG. **9** shows the operation of a HARQ entity of the UE according to an embodiment of the present invention at every TTI.

First, the HARQ entity of the UE may identify a HARQ process associated with a TTI (S**901**). If the HARQ process associated with the TTI is identified, the HARQ entity of the UE may determine whether or not a UL Grant signal received from the eNode B indicated at the TTI (S**902**). The UE may determine whether or not a HARQ buffer corresponding to the HARQ process is empty if there is no information about the received UL Grant signal at the TTI, and perform non-adaptive retransmission as described with reference to FIG. **6** if there is data in the HARQ buffer (S**903**).

Meanwhile, if there is a UL Grant signal received from the eNode B at the TTI, it may be determined (1) whether the UL Grant signal is not received on the PDCCH indicated by the temporary C-RNTI and the NDI is toggled from the value during transmission prior to the HARQ process, (2) whether there is previous NDI and this transmission is initial transmission of the HARQ process, (3) whether the UL Grant signal is received on the PDCCH indicated by the C-RNTI and the HARQ buffer of the HARQ process is empty, or (4) whether the UL Grant signal is received on the random access response message (S**904**). If any one of the conditions (1) to (4) is satisfied in step S**904** (A), the method progresses to step S**906**. In contrast, if any one of the conditions (1) to (4) is not satisfied in step S**904** (B), the method progresses to step S**905** of performing adaptive retransmission using the UL Grant signal (S**905**).

Meanwhile, the UE determines whether there is data in the Msg**3** buffer in step S**906** (S**906**). In addition, even when there

14

is data in the Msg**3** buffer, the UE determines whether the received UL Grant signal is received on the random access response message (S**907**). That is, the UE according to the present embodiment transmits the data stored in the Msg**3** buffer only when there is data in the Msg**3** buffer when receiving the UL Grant signal and the UL Grant signal is received on the random access response message (S**908**). If there is no data in the Msg**3** buffer when receiving the UL Grant signal or the UL Grant is not received on the random access response message, the UE determines that the eNode B makes a request not for the transmission of the data stored in the Msg**3** buffer but for transmission of new data, and performs new data transmission (S**909**). In more detail, the HARQ entity of the UE may be controlled such that a MAC PDU including new data from a multiplexing and assembly entity is acquired and is transmitted through the HARQ process.

Hereinafter, an example applied to a process of transmitting a BSR by the UE which operates by the embodiment described with reference to FIG. **9** as shown in FIG. **8** will be described.

FIG. **10** is a view illustrating a method of transmitting UL data when a BSR is triggered in a UE, according to an embodiment of the present invention.

As described above, new data may be generated in the RLC and PDCP buffers of the UE. It is assumed that the generated new data has higher priority than that of the data already stored in the RLC and PDCP buffers. The UE may trigger the BSR transmission in order to inform an eNode B of information about the generation of the data (step **1**).

The UE should transmit the BSR according to BSR transmission trigger, but, in a special case, there may be no radio resource for transmitting the BSR. In this case, the UE may trigger a random access procedure for transmitting the BSR. It is assumed that the random access procedure triggered in the present embodiment is the contention based random access procedure described with reference to FIG. **5**.

The UE may transmit a random access preamble to the eNode B according to the triggering of the random access procedure (step **2**).

The eNode B may receive the random access preamble transmitted by the UE and transmit a random access response message to the UE (step **3**). The UE may receive the random access response message.

The UE may generate a message **3** including the BSR and a UE identifier according to a UL Grant signal included in the random access response message received in step **3** and store the message **3** in a Msg**3** buffer (step **4**).

The UE may select a HARQ process according to the UL Grant information included in the random access response message received in step **3** and copy and store the message **3** stored in the Msg**3** buffer in the buffer corresponding to the selected HARQ process. Thereafter, the data stored in the HARQ buffer may be transmitted to the eNode B according to the UL HARQ procedure described with reference to FIG. **6** (step **5**). The UE starts (or restarts) the CR timer by the transmission of the message **3**.

When the CR timer expires, the UE may perform retrial of the random access procedure. That is, a random access preamble and a PRACH resource may be prepared to be selected and transmitted to the eNode B. However, in a state in which the CR timer is not operated, the UE may receive the UL Grant signal from the eNode B on a PDCCH masked by a UE identifier (step **6**).

When the UL Grant signal has been received on the PDCCH in step **6**, the UE generates new data different from the data stored in the Msg**3** buffer according to the UL Grant

US 7,881,236 B2

15

16

information received in step **6** as a new MAC PDU, unlike the procedure of the embodiment of FIG. **8** for transmitting the message **3** stored in the Msg**3** buffer according to the UL Grant information received in step **6** (step **7**). In more detail, if the UE receives the UL Grant signal in step **6** but does not receive the UL Grant signal on the random access response message, a MAC PDU for transmitting not the data stored in the Msg**3** buffer but new data from a multiplexing and assembly entity may be acquired and transmitted using a HARQ process corresponding thereto.

After the new MAC PDU is generated, the UE according to the present embodiment may select a HARQ process according to the UL Grant signal received in step **6**, store the MAC PDU newly generated in step **7** in the buffer corresponding to the HARQ process, and transmit the MAC PDU to the eNode B according to the UL HARQ procedure (step **8**).

Thereafter, the UE may perform a random access procedure including the transmission of the random access preamble and the reception of the random access response and transmit the BSR stored in the Msg**3** buffer to the eNode B.

According to the above-described embodiment, it is possible to prevent the eNode B from erroneously operating the CR timer due to the UL Grant signal transmitted not for transmission of the data stored in the Msg**3** buffer but for transmission of new data. Accordingly, the problem that the message **3** is lost may be solved. In addition, the random access procedure of the UE with the eNode B may be normally performed.

Unlike the above-described embodiment, as another embodiment of the present invention, a method of performing a process while ignoring the UL Grant signal if the UL Grant signal is received from the eNode B on the PDCCH masked by the UE identifier during the random access procedure of the UE may be implemented. In this case, the UE may transfer the message **3** to the eNode B by the normal random access procedure, and the eNode B may retransmit the UL Grant signal for the transmission of new data after the random access procedure of the UE is completed.

Hereinafter, the configuration of the UE for implementing the above-described embodiment of the present invention will be described.

FIG. **11** is a schematic view showing the configuration of a UE according to an embodiment of the present invention.

As shown in FIG. **11**, the UE according to the present embodiment may include a reception (Rx) module **1101** for receiving a UL Grant signal from an eNode B on a specific message, a transmission (TX) module **1102** for transmitting data to the eNode B using the received UL Grant signal, a Msg**3** buffer **1103** for storing UL data transmitted in a random access procedure, and a HARQ entity **1104** for controlling the transmission of UL data of the UE.

In particular, the HARQ entity **1104** of the UE according to the present embodiment performs a function of determining whether there is data stored in the Msg**3** buffer **1103** when the Rx module **1101** receives the UL Grant signal and a function of determining whether the Rx module **1101** receives the UL Grant signal on a random access response message. If there is data stored in the Msg**3** buffer **1103** when the Rx module **1101** receives the UL Grant signal and the RX module **1101** receives the UL Grant signal on the random access response message, the data stored in the Msg**3** buffer **1103** is controlled to be acquired and transmitted to the eNode B. If there is no data stored in the Msg**3** buffer **1103** when the Rx module **1101** receives the UL Grant signal and the RX module **1101** receives the UL Grant signal not on the random access response message but on the PDCCH, the data stored in the Msg**3** buffer **1103** is not transmitted but new data is acquired

from the multiplexing and assembly entity in the form of a MAC PDU and is transmitted to the eNode B.

In addition, in order to perform the UL HARQ procedure, the UE according to the present embodiment may include one or more HARQ processes **1106** and HARQ buffers **1107** corresponding to the HARQ processes **1106**. In the current LTE system, eight independent HARQ processes are defined for use, but the present invention is not limited thereto.

Meanwhile, the HARQ entity **1104** according to the present embodiment may transfer the data acquired from the multiplexing and assembly entity **1105** or the msg**3** buffer **1103** to a specific HARQ process **1106** using the above-described configuration, and control the specific HARQ process **1106** to transmit the data acquired from the multiplexing and assembly entity **1105** or the Msg**3** buffer **1103** through the Tx module **1102**. As described above, if the specific HARQ process **1106** transmits the data stored in the Msg**3** buffer **1103** through the Tx module **1102** as described above, the data stored in the Msg**3** buffer **1103** may be copied into the specific HARQ buffer **1107** corresponding to the specific HARQ process **1106** and the data copied into the specific HARQ buffer **1107** may be transmitted through the Tx module **1102**.

At this time, the data stored in the Msg**3** buffer **1103** is a MAC PDU including a UE identifier and may further include information such as a BSR according to the purpose of the random access procedure.

In the configuration of the UE shown in FIG. **11**, the Tx module **1102** and the Rx module **1101** may be configured as a physical layer processing module **1108**, and the HARQ entity **1104**, the multiplexing and assembly entity **1105** and one or more HARQ processes **1106** may be configured as a MAC layer module **1109**. However, the invention is not limited thereto. In addition, the Msg**3** buffer **1103** and the HARQ buffers **1107** corresponding to the HARQ processes **1106** may be implemented using any storage medium.

Although the signal transmission or reception technology and the UE for the same are applied to a 3GPP LTE system, they are applicable to various mobile communication systems having a similar procedure, in addition to the 3GPP LTE system.

It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention covers the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

What is claimed is:

1. A method of transmitting data by a user equipment through an uplink, the method comprising:

   receiving an uplink grant (UL Grant) signal from a base station on a specific message;

   determining whether there is data stored in a message **3** (Msg**3**) buffer when receiving the UL Grant signal on the specific message;

   determining whether the specific message is a random access response message;

   transmitting the data stored in the Msg**3** buffer to the base station using the UL Grant signal received on the specific message, if there is data stored in the Msg**3** buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message; and

   transmitting new data to the base station in correspondence with the UL Grant signal received on the specific message, if there is no data stored in the Msg**3** buffer when

US 7,881,236 B2

17

receiving the UL Grant signal on the specific message or the specific message is not the random access response message.

2. The method according to claim **1**, wherein the transmitting the new data to the base station includes:

acquiring a Medium Access Control Protocol Data Unit (MAC PDU) from a multiplexing and assembly entity; and

transmitting the MAC PDU to the base station.

3. The method according to claim **1**, wherein the UL Grant signal received on the specific message is a UL Grant signal received on a Physical Downlink Control Channel (PDCCH), and

wherein the user equipment transmits new data in correspondence with the UL Grant signal received on the PDCCH.

4. The method according to claim **1**, wherein the data stored in the Msg**3** buffer is a Medium Access Control Protocol Data Unit (MAC PDU) including a user equipment identifier.

5. The method according to claim **4**, wherein the data stored in the Msg**3** buffer further includes information about a buffer status report (BSR) if the user equipment starts a random access procedure for the BSR.

6. The method of claim **1**, wherein the UL Grant signal received on the specific message is either a UL Grant signal received on a Physical Downlink Control Channel (PDCCH) or a UL Grant signal received on the random access response message.

7. A user equipment, comprising:

a reception module adapted to receive an uplink grant (UL Grant) signal from a base station on a specific message;

a transmission module adapted to transmit data to the base station using the UL Grant signal received on the specific message;

a message **3** (Msg**3**) buffer adapted to store UL data to be transmitted in a random access procedure;

a Hybrid Automatic Repeat Request (HARQ) entity adapted to determine whether there is data stored in the Msg**3** buffer when the reception module receives the UL Grant signal and the specific message is a random access response message, acquiring the data stored in the Msg**3** buffer if there is data stored in the Msg**3** buffer when the reception module receives the UL Grant signal and the specific message is the random access response message, and controlling the transmission module to transmit the data stored in the Msg**3** buffer to the base station using the UL Grant signal received by the reception module on the specific message; and

a multiplexing and assembly entity used for transmission of new data,

wherein the HARQ entity acquires the new data to be transmitted from the multiplexing and assembly entity if there is no data stored in the Msg**3** buffer when the

18

reception module receives the UL Grant signal on the specific message or the received message is not the random access response message, and controls the transmission module to transmit the new data acquired from the multiplexing and assembly entity using the UL Grant signal received by the reception module on the specific message.

8. The user equipment according to claim **7**, further comprising:

one or more HARQ processes; and

HARQ buffers respectively corresponding to the one or more HARQ processes,

wherein the HARQ entity transfers the data acquired from the multiplexing and assembly entity or the Msg**3** buffer to a specific HARQ process of the one or more HARQ processes and controls the specific HARQ process to transmit the data acquired from the multiplexing and assembly entity or the Msg**3** buffer through the transmission module.

9. The user equipment according to claim **8**, wherein, when the specific HARQ process transmits the data stored in the Msg**3** buffer through the transmission module, the data stored in the Msg**3** buffer is controlled to be copied into a specific HARQ buffer corresponding to the specific HARQ process, and the data copied into the specific HARQ buffer is controlled to be transmitted through the transmission module.

10. The user equipment according to claim **7**, wherein the UL Grant signal received by the reception module on the specific message is a UL Grant signal received on a Physical Downlink Control Channel (PDCCH), and

wherein the HARQ entity controls new data to be transmitted in correspondence with the received UL Grant signal received on the PDCCH.

11. The user equipment according to claim **7**, wherein the UL Grant signal received by the reception module on the specific message is a UL Grant signal received on a random access response message received on Physical Downlink Shared Channel (PDSCH), and

wherein the HARQ entity controls the data stored in the Msg**3** buffer to be transmitted using the UL Grant signal received on the random access response message if there is data stored in the Msg**3** buffer when the reception module receives the UL Grant signal on the random access response message.

12. The user equipment according to claim **7**, wherein the data stored in the Msg**3** buffer is a Medium Access Control Protocol Data Unit (MAC PDU) including a user equipment identifier.

13. The user equipment of claim **7**, wherein the UL Grant signal received on the specific message is either a UL Grant signal received on a Physical Downlink Control Channel (PDCCH) or a UL Grant signal received on the random access response message.

* * * * *

Certificate of Compliance
with Type-Volume Limitation, Typeface Requirements,
and Type Style Requirements

The undersigned hereby certifies that this brief complies with the

type-volume limitation of Federal Circuit Rule 32(a). The brief contains

12,609 words, excluding the parts of the brief exempted by Federal Rule of

Appellate Procedure 32(f) and Federal Circuit Rule 32(b).

The undersigned also hereby certifies that this brief complies with the

typeface requirements of Federal Rule of Appellate Procedure 32(a)(5) or

Federal Circuit Rule 28.1 and the type style requirements of Federal Rule of

Appellate Procedure 32(a)(6). the brief has been prepared in a proportionally

spaced typeface using Microsoft Office Word 2010 in 14-point Book Antiqua

type style, with 14-point or larger Book Antiqua type style headings.

As permitted by Federal Rules of Appellate Procedure 32(a)(7)(C)(i)

and 32(g), the undersigned has relied upon the word count of this word

processing system in preparing this certificate.

Dated: October 4, 2018   By: /s/Ryan M. Schultz
                                     Ryan M. Schultz
                                     Counsel for Appellant

Proof of Service

I hereby certify that on October 4, 2018, the foregoing APPELLANT

EVOLVED WIRELESS LLC'S OPENING BRIEF was filed with the Clerk of

the Court for the United States Court of Appeals for the Federal Circuit

using the appellate CM/ECF system which constitutes service on all

parties represented by attorneys who have registered for the CM/ECF

system, and that a copy was served on counsel of record for all parties via

e-mail through the system.

Dated: October 4, 2018   By: /s/Ryan M. Schultz
                                           Ryan M. Schultz
                                           Counsel for Patent Owner-Appellant
                                           Evolved Wireless LLC

89337671.1