

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

QUECTEL WIRELESS SOLUTIONS CO. LTD.,
Petitioner,

v.

KONINKLIJKE PHILIPS N.V.,
Patent Owner.

IPR2021-00559
Patent 9,635,599 B2

Before KEVIN F. TURNER, HYUN J. JUNG, and RUSSELL E. CASS,
Administrative Patent Judges.

JUNG, *Administrative Patent Judge.*

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. Background and Summary

Quectel Wireless Solutions Co. Ltd. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting institution of an *inter partes* review of claims 19–21, 33, and 35–42 of U.S. Patent No. 9,635,599 B2 (Ex. 1001, “the

'599 patent"). Koninklijke Philips N.V. ("Patent Owner") filed a Preliminary Response (Paper 6, "Prelim. Resp.").

Under 35 U.S.C. § 314, an *inter partes* review may not be instituted "unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." Upon consideration of the Petition and Preliminary Response and for the reasons explained below, we determine that Petitioner has not shown a reasonable likelihood of prevailing with respect to at least one of the challenged claims.

Thus, we do not institute an *inter partes* review of claims 19–21, 33, and 35–42 of the '599 patent.

B. Real Parties in Interest

Petitioner identifies Quectel Wireless Solutions Co. Ltd. as a real party in interest (Pet. 83), and Patent Owner identifies Koninklijke Philips N.V. as a real party in interest (Paper 5, 2).

C. Related Matters

Petitioner indicates that the '599 patent is the subject of *Koninklijke Philips N.V. v. Quectel Wireless Solutions Co. Ltd.*, Case No. 20-cv-01707 (D. Del.). Pet. 83; Paper 5, 2; Ex. 1100 (Complaint). A related patent is challenged in IPR2021-00558.

D. The '599 Patent (Ex. 1001)

The '599 patent issued on April 25, 2017 from an application filed on October 1, 2015, that is a continuation of an application filed on April 23, 2002 which claims priority to a foreign application filed on April 25, 2001. Ex. 1001, codes (22), (30), (45), (63), 1:7–11.

The '599 patent "relates to a radio communication system and further relates to primary and secondary stations for use in such a system and to a method of operating such a system." Ex. 1001, 1:15–18. The '599 patent

“describes a system with particular reference to the Universal Mobile Telecommunications System (UTMS)” but states that its “techniques are equally applicable to use in other mobile radio systems.” *Id.* at 1:18–22.

Figure 1 of the '599 patent is reproduced below.

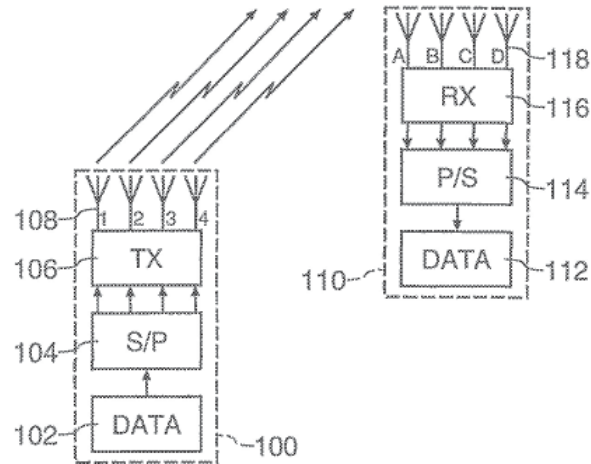


FIG. 1

Figure 1 is a block schematic diagram of a Multi-Input Multi-Output radio system for transmitting downlink packet data from primary station 100 to secondary station 110. Ex. 1001, 3:42–43, 3:66–4:1. Primary station 100 includes data source 102 that provides a data stream for transmitting to secondary station 110. *Id.* at 4:1–3. Serial to parallel converter 104 generates a plurality of data sub-streams, and transmitter 106 arranges those sub-streams to be sent to antennas 108. *Id.* at 4:3–7. In describing the same figure, instead of continuing with primary station 100 and secondary station 110, the '599 patent begins using base station 100 or BS 100 and mobile station 110 or MS 110. *See id.* at 4:6–9.

MS 110 has antennas 118, and the signals received are provided to receiver 116 that extracts the data sub-streams from the received signal. Ex. 1001, 4:33–37. Parallel to serial converter 114 recombines the data sub-

streams and provides the recombined data stream to data output block 112.
Id. at 4:37–39.

The '599 patent states that “[a]n ARQ (Automatic Repeat reQuest) scheme is needed to ensure correct delivery of each data packet.” Ex. 1001, 2:13–15; *see also id.* at 4:66–5:12 (describing “[a]n example of an ARQ scheme operating in known manner . . . in FIG. 3.”). Figure 4 of the '599 patent is reproduced below.

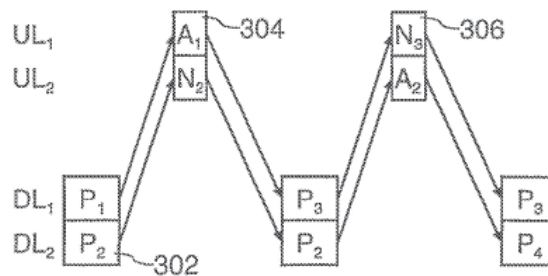


FIG. 4

Figure 4 is a diagram illustrating the operation of an ARQ scheme according to the '599 patent. Ex. 1001, 3:49–51. In Figure 4, “each data sub-stream is allocated a separate ARQ channel.” *Id.* at 5:35–36. In the example shown in the figure, at 302, BS 100 transmits substantially simultaneously two packets P₁ and P₂ on downlink data sub-streams DL₁ and DL₂. *Id.* at 5:37–41. The transmission “can be done in a CDMA (Code Division Multiple Access) system using the same channelisation and scrambling codes.” *Id.* at 5:42–44.

At 304, MS 110 receives only packet P₁ correctly and transmits substantially simultaneously acknowledgement A₁ and negative acknowledgement N₂ on uplink data sub-streams UL₁ and UL₂. Ex. 1001, 5:45–51. In response, BS 100 re-transmits packet P₂ on DL₂ and transmits next packet P₃ on DL₁. *Id.* at 5:51–53.

At 306, MS 110 then receives only packet P_2 correctly and, thus, sends acknowledgements A_2 and N_3 on UL1 and UL2. Ex. 1001, 5:53–56. BS 100 re-transmits P_3 on DL_1 and transmits next packet P_4 on DL_2 . *Id.* at 5:56–58. “BS 100 and/or MS 110 may make use of packets 302 received incorrectly to identify bad radio channels (i.e. bad antennas 108 or bad antenna beams), to enable performance to be optimised by avoiding such antennas or beams.” *Id.* at 6:1–4.

E. Illustrative Claim

The '599 patent includes claims 1–42, of which Petitioner challenges claims 19–21, 33, and 35–42. Of those, claims 19 and 33 are independent, and claim 19 is reproduced below.

A method of operating a radio communication system having a communication channel comprising a plurality of paths between a primary station having a plurality of antennas and a secondary station having at least one antenna, the method comprising:

transmitting, by the primary station, substantially simultaneously a plurality of data packets to the secondary station, each data packet being transmitted via a different subset of the plurality of paths,

receiving, by the secondary station, the plurality of data packets,

determining, by the secondary station, whether each data packet is received correctly;

notifying the primary station, by the secondary station, whether each data packet is received correctly, wherein notifying the primary station whether each data packet is received correctly comprises transmitting, a positive acknowledgement (ACK) for each of the plurality of data packets that are received correctly and a negative acknowledgement (NACK) for each of the plurality of data packets that are not received correctly, and wherein the same channelization and scrambling parameters are utilized for transmission of each positive acknowledgment

(ACK) or negative acknowledgment (NACK) corresponding to said plurality of data packets; and
sending the primary station, by the secondary station, an indication of a number of simultaneous data streams that the secondary station is capable of receiving or processing.

Ex. 1001, 10:38–67.

F. Asserted Prior Art and Proffered Testimonial Evidence

Petitioner identifies the following references as prior art in the asserted grounds of unpatentability:

Name	Reference	Exhibit
Raleigh	US 6,144,711, issued Nov. 7, 2000	1004
Dabak	US 6,643,338 B1, issued Nov. 4, 2003, filed Dec. 3, 1998	1013
Eriksson	US 6,865,233 B1, issued Mar. 8, 2005, filed Feb. 19, 1999	1012
Fong	WO 01/80476 A1, published Oct. 25, 2001, filed Apr. 17, 2001	1005
TS25.301	3rd Generation Partnership Project, Technical Specification Group Radio Access Network, “Radio Interface Protocol Architecture (3G TS25.301 version 3.3.0),” 3G TS25.301 version 3.3.0 (Dec. 1999)	1014
TS25.213	3rd Generation Partnership Project, Technical Specification Group Radio Access Network, “Spreading and modulation (FDD),” 3G TS25.213 version 3.2.0 (Mar. 2000)	1010
TS25.306	3rd Generation Partnership Project, Technical Specification Group Radio Access Network, “UE Radio Access Capabilities,” 3G TS25.306 version 3.0.0 (Dec. 2000)	1006

Pet. 8–9; *see also id.* at 9 (arguing that April 25, 2001 is the earliest possible priority date); Ex. 1015 (Declaration of Craig Bishop regarding the public accessibility of Exs. 1006, 1010, 1014). Petitioner further provides a Declaration of Robert Akl D.Sc. (Ex. 1003).

G. Asserted Grounds

Petitioner asserts that claims 19–21, 33, and 35–42 would have been unpatentable on the following grounds:

Claims Challenged	35 U.S.C. §	References/Basis
19, 20, 33, 35–38, 40–42	103 ¹	Raleigh, Fong, TS25.213, TS25.306
21, 39	103	Raleigh, Fong, TS25.213, TS25.306, Eriksson
19, 20, 33, 36–38, 40–42	103	Dabak, TS25.301, Fong, TS25.213, TS25.306
21, 35, 39	103	Dabak, TS25.301, Fong, TS25.213, TS25.306, Eriksson

II. ANALYSIS

A. Legal Standards

In *inter partes* reviews, the petitioner bears the burden of proving unpatentability of the challenged claims, and the burden of persuasion never shifts to the patent owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail in an *inter partes* review, the petitioner must support its challenges by a preponderance of the evidence. 35 U.S.C. § 316(e) (2018); 37 C.F.R. § 42.1(d) (2019).

Petitioner contends that the challenged claims of the ’599 patent are unpatentable under § 103(a). A claim is unpatentable under § 103(a) 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

¹ The relevant sections of the Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (Sept. 16, 2011), took effect on March 16, 2013. Because the ’599 patent claims priority to an application filed before that date, our citations to 35 U.S.C. § 103 are to its pre-AIA version.

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) where in evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). When evaluating a combination of teachings, we must also “determine 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)). Whether a combination of elements produces a predictable result weighs in the ultimate determination of obviousness. *Id.* at 416–417.

B. Level of Ordinary Skill in the Art

Petitioner asserts that one of ordinary skill in the art “would have had Bachelor’s degree in electrical engineering, computer engineering, computer science, or a related field, and 2–3 years of experience related to the design or development of wireless communication systems, or the equivalent.” Pet. 14 (citing Ex. 1003 ¶ 19). Petitioner also argues that “[a]dditional graduate education could substitute for professional experience, or significant experience in the field could substitute for formal education.” *Id.* (citing Ex. 1003 ¶ 19).

Patent Owner does not address Petitioner’s proposed level of ordinary skill and does not propose its own level of ordinary skill. *See generally* Prelim. Resp.

Based on the record, we adopt Petitioner’s asserted level of ordinary skill to determine whether there is a reasonable likelihood that Petitioner would prevail with respect to at least one of the claims challenged in the Petition. This level of skill in the art is consistent with the disclosure of the ’599 patent and the prior art of record. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995).

C. Claim Construction

In an *inter partes* review based on a petition filed on or after November 13, 2018, the claims are construed

using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.

37 C.F.R. § 42.100(b) (2019); *see Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc).

Petitioner argues that “[a]s of the filing of this Petition, no party has alleged instances of specialized claim terms requiring departure from the plain and ordinary meaning” and that “no formal construction is necessary in this proceeding.” Pet. 14. Patent Owner responds that “data packet” is a “key term” for which Petitioner fails to apply the ordinary and customary meaning and proposes an interpretation with citations to the record. Prelim. Resp. 13–18.

Because our analysis below does not depend on a particular interpretation for any claim term, we determine that no claim term requires express interpretation. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (construing explicitly only those claim terms in

controversy and only to the extent necessary to resolve the controversy); *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (applying *Vivid Techs.* in the context of an *inter partes* review).

D. Challenges Based on Raleigh

Petitioner challenges claims 19, 20, 33, 35–38, and 40–42 as unpatentable over Raleigh, Fong, TS25.213, and TS25.306 with citations to the asserted references and declarant testimony. Pet. 8, 23–46. Petitioner also challenges claims 21 and 39 as unpatentable over the same combination of references further combined with Eriksson. *Id.* at 8, 48–49.

Patent Owner responds that Raleigh fails to teach or suggest several limitations of the claims and that Petitioner fails to provide an adequate reason for combining Raleigh with Fong. Prelim. Resp. 19–31.

For the reasons stated below, Petitioner fails to show a reasonable likelihood of prevailing with respect to one claim in its challenges based on Raleigh.

1. Raleigh (Ex. 1004)

Raleigh “relates to digital communication and more particularly to a space-time communication system.” Ex. 1004, 1:18–20. Figure 6 of Raleigh is reproduced below.

Multipath can be more paths between a remote and one radio port
and one or more paths between the remote and another radio port.

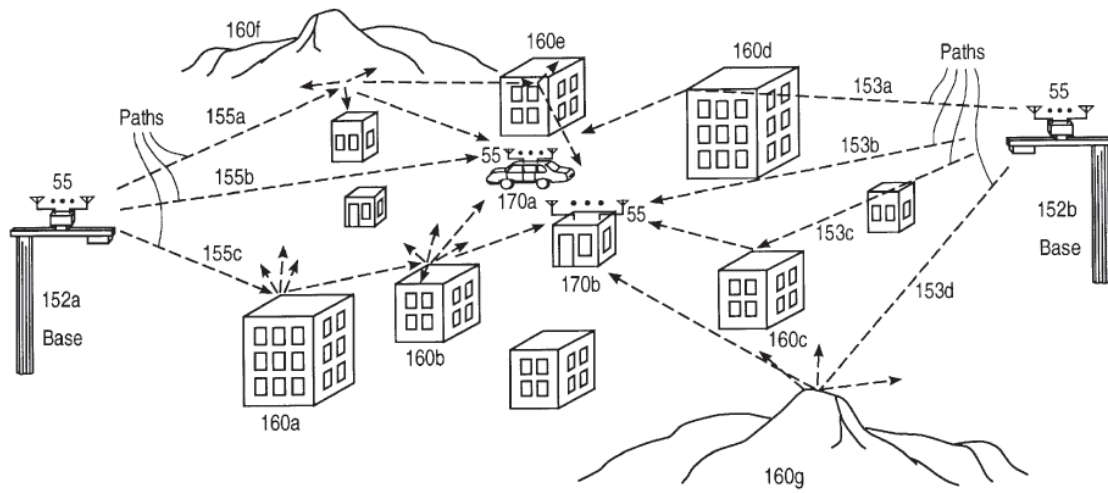


FIG. 6

Figure 6 shows a communication scenario where multipath is found. Ex. 1004, 3:14–15. According to Raleigh, there is a need for “a system for more effectively taking advantage of multiple transmitter antennas and/or multiple receiver antennas.” *Id.* at 1:60–62.

A wireless embodiment of Raleigh “operates with an efficient combination of a substantially orthogonalizing procedure (SOP) in conjunction with . . . a plurality of both transmitter and receiver antenna elements.” Ex. 1004, 2:10–16. “The SOP decomposes the time domain space-time communication channel that may have inter symbol interference (ISI) into a set of parallel, space-frequency, SOP bins.” *Id.* at 2:16–19.

In Raleigh, the SOP establishes substantially independent spatial channels, and Raleigh describes the spatial processing at each bin in terms of symbols transmitted. Ex. 1004, 16:8–34. In such applications, Raleigh states that “an advantageous embodiment . . . involves encoding the input data sequence into a digital symbol stream that is then routed in various

beneficial ways through the available parallel space frequency subchannels.”
Id. at 23:3–9.

This embodiment uses a three layer coding system. Ex. 1004, 23:23–24. “The fourth layer of coding involves an ARQ code that recognizes Reed Solomon codeword errors at the receiver in the Receiver ARQ Buffer Control 450 and requests a codeword retransmission from the Transmitter ARQ Buffer Control 400,” and “[t]he retransmission request is made through a Reverse Link Control Channel 460.” *Id.* at 23:36–42. According to Raleigh, “[t]he reverse control channel is a well known radio system concept,” and “[t]he detailed operation of the RS encoder and decoder, as well as the ARQ system is well known to one skilled in the art.” *Id.* at 23:42–43, 23:47–49.

2. *Fong (Ex. 1005)*

Fong relates “particularly to the servicing of packetized communications within . . . cellular wireless networks.” Ex. 1005, 3:3–5.² Fong states that “packet data units are passed from a link layer of a transmitter, e.g., base station or mobile IO station, to a physical layer where they are inserted into a physical layer frame,” and “[t]he physical layer frame of the transmitter then transmits the physical layer frame to a receiver, e.g., mobile station or base station across a wireless link.” *Id.* at 5:8–12.

According to Fong, “[i]f the receiving physical layer receives the physical layer frame error free, the receiving physical layer sends a positive acknowledgement to the transmitting physical layer across the wireless link,” and “if the receiving physical layer does not receive the physical layer

² Because Petitioner cites to the exhibit pages of Fong, we also cite to the exhibit pages in this Decision.

frame error free, the receiving physical layer sends a negative acknowledgment to the transmitting physical layer across the wireless link.” Ex. 1005, 5:12–16; *see also id.* at 10:21–35 (describing how the receive side physical layer operations provide negative and positive acknowledgements with the logic diagram shown in Fig. 5).

Fong also describes that “ARQ operations at the physical layer depend upon a fast feedback from the receive side to a transmit side,” wherein “the positive or negative acknowledge (ACK) signal is sent on a fast reverse feedback-signaling channel.” Ex. 1005, 11:3–5. In one implementation, the ACK signal is one bit, and “the ACK bit is punctured into the reverse pilot channel and extracted at the transmit side.” *Id.* at 11:5–11. “Another potential implementation is to use the reverse dedicated control channel (R-DCCH) to carry this one bit ACK information.” *Id.* at 11–13.

3. TS25.213 (Ex. 1010)

TS25.213 is a “Technical Specification (TS)” from the “3rd Generation Partnership Project” and “describes spreading and modulation for UTRA Physical Layer FDD mode.” Ex. 1010, 5, 7. Figure 1 of TS25.213 is reproduced below.

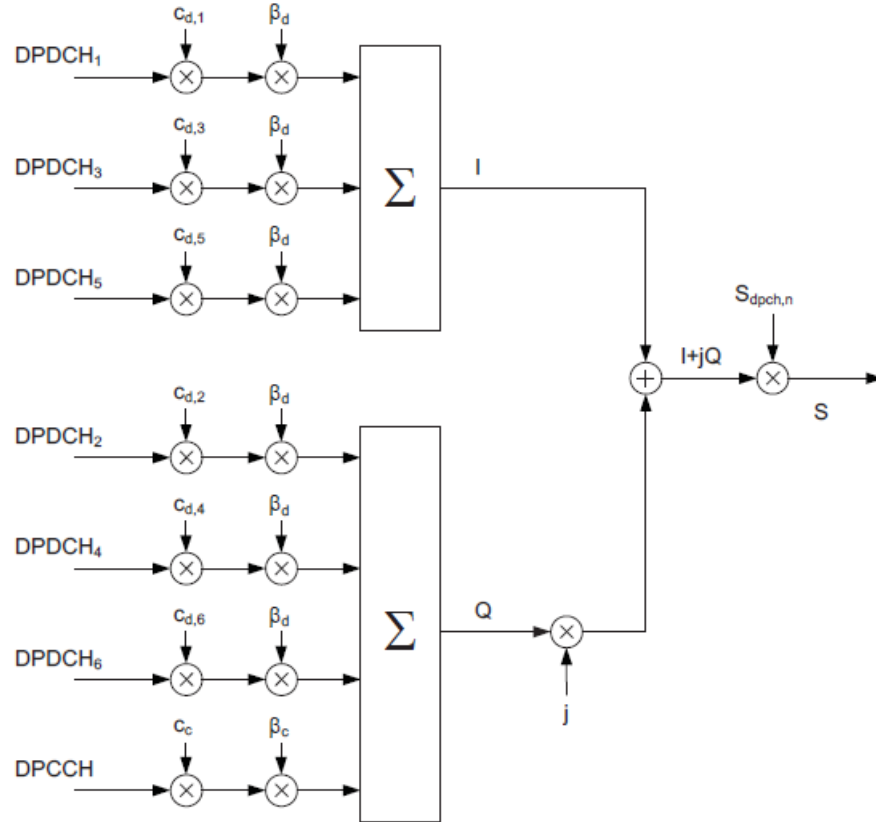


Figure 1: Spreading for uplink DPCCH and DPDCHs

Figure 1 shows uplink spreading of Dedicated Physical Control Channels (“DPCCH”) and Dedicated Physical Data Channels (“DPDCH”). Ex. 1010, 7–8. Channelization codes $c_{d,n}$ spread DPDCH to chip rate, and channelization code c_c spreads DPCCH to the chip rate. *Id.* at 7. The spread signals are then weighted by gain factors β_c and β_d . *Id.* at 8. Thereafter, the weighted signals are summed and scrambled by $S_{dpch,n}$ and applied to radio frames. *Id.* at 9. As shown, “[o]ne DPCCH and up to six parallel DPDCHs can be transmitted simultaneously.” *Id.* at 7.

4. TS25.306 (Ex. 1006)

TS25.306 is a “Technical Specification” from the “3rd Generation Partnership Project” and “identifies the parameters of the access stratum part of the UE radio access capabilities.” Ex. 1006, 4, 5. The abbreviation “UE”

stands for “User Equipment.” *Id.* at 5. Petitioner’s excerpt of Table 5.1 of TS25.306 is reproduced below.

5.1 Value ranges

Table 5.1: UE radio access capability parameter value ranges

		UE radio access capability parameter	Value range
⋮			
PHY parameters	Transport channel parameters in downlink	Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum sum of number of bits of all turbo coded transport blocks being received at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum number of simultaneous transport channels	4, 8, 16, 32
⋮			
	FDD Physical channel	Maximum number of DPCH/PDSCH codes to be simultaneously received	1, 2, 3, 4, 5, 6, 7, 8

Pet. 35 (emphases added by Petitioner); *see also* Ex. 1006, 13–14, Table 5.1. The table lists value ranges for possible UE radio access capability parameter settings. *Id.* at 13.

5. *Independent Claim 19*

- a) *“transmitting, by the primary station, substantially simultaneously a plurality of data packets to the secondary station, each data packet being transmitted via a different subset of the plurality of paths”*

For the limitation quoted above, which Petitioner labels “[19.1],” Petitioner argues that Raleigh alone teaches or suggests the transmitting step. Pet. 5, 24–26 (citing Ex. 1003 ¶¶ 83–87; Ex. 1004, 6:57–62, 16:8–24, 16:36–47, 16:59–61, 17:16–39, 23:3–38). In particular, Petitioner argues that “Raleigh discloses transmitting data symbols over a plurality of paths, or ‘substantially independent received spatial subchannels.’” *Id.* at 25. Petitioner also argues that “Figure 22 shows an example multilayer coding system where the symbol outputs of a single encoder are distributed among all of the available space frequency subchannels, where symbols are transmitted from a transmitter device to a receiver device.” *Id.* (citing Ex. 1004, 23:9–12, 23:23–24, Fig. 22). Petitioner further argues that “Raleigh describes the use of ‘Spatial Processing’ to transmit, by the transmitter, multiple data symbols in parallel (substantially simultaneously),” “that each data symbol is transmitted via a different subset of the plurality of paths,” and “that input symbols are transmitted via different ‘spatial directions’ of the communication channel.” *Id.* at 25–26 (citing Ex. 1003 ¶ 86; Ex. 1004, 16:8–24, 16:36–48, 16:59–61, 23:23–38).

Patent Owner responds that Raleigh fails to teach or suggest a plurality of data packets transmitted substantially simultaneously, and each data packet transmitted via a different subset of a plurality of paths, as required by independent claim 19, because Raleigh describes symbols instead of data packets. Prelim. Resp. 19 (citing Pet. 5, 24–26); *see also id.* at 21–22 (arguing that Raleigh’s “symbol” is not the recited “data packet”

under Patent Owner’s proposed interpretation) (citing Ex. 1004, 5:35–51, 25:41–55). Patent Owner argues that Petitioner’s relied-upon portions of Raleigh relate to data symbols, not data packets, as recited by claim 19, and quotes arguments from the Petition with emphases on Petitioner’s use of “symbol.” *Id.* at 19–21 (quoting from Pet. 25–26).

Patent Owner further argues that Petitioner’s declarant testimony “merely quotes the same portion of Raleigh as cited in the Petition without further elaboration.” Prelim. Resp. 21 (citing Ex. 1003 ¶¶ 84–87). Patent Owner additionally asserts that “[t]he Petition does not allege that any of the other references cited in Ground 1, either alone or in combination, disclose or suggest this claim limitation and, indeed, they do not disclose or suggest this claim limitation.” *Id.* at 22. Patent Owner provides arguments why the other cited references fail to teach or suggest the limitation. *Id.* at 22–23 (citing Ex. 1005, 7:19–22).

As pointed out by Patent Owner (Prelim. Resp. 19–20), Petitioner’s relied-upon portions of Raleigh relate only to symbols. *See* Pet. 24–26. The cited portions of Raleigh explicitly describe and show “symbols,” “a digital symbol stream,” “symbol outputs,” and “data symbols.” Ex. 1004, 6:57–62 (describing that “symbols from one subchannel do not substantially interfere with symbols from another subchannel”), 16:8–24 (describing spatial processing of symbols), 16:36–47 (describing the acceptance of inputs), 16:59–61 (describing received signal sample depending on input symbols), 17:16–39 (describing “substantially independent multiple streams of symbols”), 23:3–38 (describing “a digital symbol stream” and “symbol outputs”).

Petitioner, however, does not further argue or provide additional evidence that Raleigh’s symbols teach or suggest the recited “data packets.”

See Pet. 24–26. Petitioner’s declarant testimony also does not explain further the arguments or evidence presented in the Petition and does not provide additional evidence beyond that cited in the Petition. See Ex. 1003 ¶¶ 83–87. Other than Raleigh and declarant testimony, Petitioner does not point elsewhere in the record for the recited “data packet.” See Pet. 24–26.

Because Petitioner does not explain or point to evidence in the record that symbols would be understood to teach or suggest the recited data packets, Petitioner does not show sufficiently that Raleigh teaches or suggests “transmitting, by the primary station, substantially simultaneously a plurality of data packets to the secondary station, each data packet being transmitted via a different subset of the plurality of paths,” as required by independent claim 19.

b) *“receiving, by the secondary station, the plurality of data packets”*

Petitioner labels the limitation quoted above “[19.2].” Pet. 5. Petitioner contends that Raleigh teaches or suggests the limitation. *Id.* at 26–27 (citing Ex. 1003 ¶ 88–91; Ex. 1004, 16:39–46, 16:59–63, Figs. 4–6). Patent Owner responds that Raleigh does not teach or suggest receiving data packets as required by claim 19 because Raleigh describes symbols, not data packets. Prelim. Resp. 23–24.

Petitioner relies on portions of Raleigh discussed above that pertain to symbols. See Pet. 26–27. Petitioner’s declarant testimony does not explain further the arguments or evidence presented in the Petition and does not provide additional evidence beyond that cited in the Petition. Ex. 1003 ¶¶ 88–91. Thus, for the same reasons stated above, Petitioner provides insufficient argument and evidence that Raleigh teaches or suggests

“receiving, by the secondary station, the plurality of data packets,” as required by claim 19.

- c) *“notifying the primary station, by the secondary station, whether each data packet is received correctly, wherein notifying the primary station whether each data packet is received correctly comprises transmitting, a positive acknowledgement (ACK) for each of the plurality of data packets that are received correctly and a negative acknowledgement (NACK) for each of the plurality of data packets that are not received correctly”*

For the limitation quoted above, which Petitioner labels “[19.4],” Petitioner proposes combining Raleigh and Fong. Pet. 5, 29–30 (citing Ex. 1003 ¶¶ 97–99; Ex. 1005, 5:8–16, 10:29–35, Fig. 5). Petitioner argues that “[f]or the reasons articulated above (*supra*, Analysis of Ground 1, [19.3]), the resulting Raleigh system (as modified according to Fong’s suggestion) would provide this notifying operation.” *Id.* at 30 (citing Ex. 1003 ¶ 98).

For “determining, by the secondary station, whether each data packet is received correctly,” labeled “[19.3],” Petitioner argues that, “[t]o the extent that Raleigh does not explicitly disclose element [19.3],” Fong teaches determining whether received data packets are good based on known error correction operations. Pet. 28 (citing Ex. 1005, 10:21–28, Fig. 5).

According to Petitioner, the proposed combination of Raleigh and Fong (1) “would have predictably provided a system where a secondary station (receiver) can determine whether data is correctly received so that data can be retransmitted, as needed,” (2) “would have been merely the application of a known technique (determining whether data is correctly received at a receiver, as taught by Fong) to a known system (Raleigh’s communication system) ready for improvement to yield predictable results,”

and (3) “would have led to predictable results without significantly altering or hindering the functions performed by the wireless communication system.” Pet. 28–29 (citing Ex. 1003 ¶ 95).

Patent Owner responds that “Raleigh already uses Reed Solomon coding to allow for detecting whether data is correctly received in the system of Raleigh in order for data to be retransmitted, as needed, so there is no need for any system of Fong for checking for correctly received data in Raleigh.” Prelim. Resp. 26; *see also id.* at 27–28 (arguing similarly that “Raleigh already uses Reed Solomon coding to allow for detecting whether data is correctly received in the system of Raleigh in order for data to be retransmitted as needed” and adding that “there would have been no need for any system of Fong for checking for correctly received data in Raleigh”). Patent Owner argues that “there is no improvement provided for Raleigh because Raleigh already has a way to check for errors in received data using the Reed Solomon coding.” *Id.* at 26. Patent Owner further argues that “Reed Solomon codewords in Raleigh are not data packets, so there is no need for any system of Fong for checking for data errors in Raleigh.” *Id.*

Petitioner fails to provide sufficient reasons for modifying Raleigh in view of Fong. Petitioner argues that, from Raleigh alone, one of ordinary skill in the art “would have understood that the Reed Solomon codewords are used to determine whether the secondary station correctly received the data packets, and if not, a retransmission is requested.” Pet. 27 (citing Ex. 1003 ¶ 93; Ex. 1004, 23:36–44). Petitioner then argues that one of ordinary skill in the art would have combined Raleigh and Fong to “provide[] a system where a secondary station (receiver) can determine whether data is correctly received so that data can be retransmitted, as needed.” *Id.* at 28.

Petitioner proposes modifying Raleigh for a feature that Petitioner contends is already present in Raleigh. *See* Pet. 27–28. Petitioner’s other asserted reason, applying the known technique of “determining whether data is corrected received at a receiver” to Raleigh’s known system, also does not address adequately why one of ordinary skill in the art would have modified Raleigh for a feature that Petitioner argues Raleigh already has. *See id.* at 28. Petitioner’s final reason likewise does not address why one of ordinary skill in the art would have modified Raleigh for a feature that Petitioner argues Raleigh already has. *See id.* at 29.

Additionally, Petitioner’s asserted reasons for combining Raleigh and Fong do not address modifying Raleigh to transmit positive acknowledgements. Petitioner refers to its arguments for “determining, by the secondary station, whether each data packet is received correctly” to contend that “the resulting Raleigh system (as modified according to Fong’s suggestion) would provide this notifying operation.” *See* Pet. 30 (citing Ex. 1003 ¶ 98). As discussed above, Petitioner’s reasons for modifying Raleigh in view of Fong’s suggestion address only determining whether data is received correctly by the receiver. *See* Pet. 28–29 (citing Ex. 1003 ¶ 95). Petitioner’s reasons for modification do not go on to address why Raleigh must be modified to transmit positive and negative acknowledgments, even though Raleigh already provides for retransmission without such acknowledgements. *See id.*

Moreover, we do not understand Petitioner to be arguing that one of ordinary skill in the art, aware of Fong, would have understood Raleigh already sends positive and negative acknowledgments because Petitioner’s arguments expressly indicate that Petitioner is relying on Fong for sending such acknowledgements. *See* Pet. 28–29 (arguing that Raleigh omits

discussion of the detailed operations of ARQ but “Fong discloses the detailed operations of ARQ and retransmission”), 29–30 (arguing “Fong discloses sending either a positive or a negative acknowledgement”).

Petitioner’s declarant testimony does not explain further the asserted reasons for combining Raleigh and Fong. Ex. 1003 ¶¶ 88–91, 95, 98. Specifically, paragraph 95 of Petitioner’s declarant testimony similarly only addresses modifying Raleigh to determine whether data is received correctly. Specifically, for the determining step, Petitioner’s declarant states that one of ordinary skill in the art “would have been motivated to combine the teachings of Raleigh with those of Fong in order to provide a receiver that determines whether data transmitted by the transmitter is received with[] or without error for several reasons” and “would have recognized that applying the ARQ and retransmission teachings of Fong (including determining whether data is correctly received) to Raleigh’s wireless communication system (and to its receiver, specifically) would have led to predictable results without significantly altering or hindering the functions performed by the wireless communication system.” Ex. 1003 ¶ 95.

For the notifying step, Petitioner’s declarant states that “[a]n acknowledgement is sent regarding the physical layer frame depending on whether an error is determined to be present” and that “[f]or at least these reasons and the reasons discussed above with respect to [the determining step], the combination of Raleigh and Fong discloses this notification by the secondary station.” Ex. 1003 ¶ 98.

For the reasons above, Petitioner’s arguments do not present a sufficient reason why one of ordinary skill in the art would have modified Raleigh in view of Fong for the recited step of:

notifying the primary station, by the secondary station, whether each data packet is received correctly, wherein notifying the primary station whether each data packet is received correctly comprises transmitting, a positive acknowledgement (ACK) for each of the plurality of data packets that are received correctly and a negative acknowledgement (NACK) for each of the plurality of data packets that are not received correctly.

6. Independent Claim 33

Independent claim 33 recites “at least one antenna configured . . . to receive a plurality of data packets that were transmitted substantially simultaneously . . . , each data packet being communicated via a different subset of the plurality of paths” and “at least one computer processing circuit configured to: . . . transmit, a positive acknowledgment (ACK) for each of the plurality of data packets that are received correctly and a negative acknowledgement (NACK) for each of the plurality of data packets that are not received correctly.” Ex. 1001, 12:44–50, 12:53–57.

For claim 33, Petitioner refers to its arguments for independent claim 19 and adds arguments that Raleigh teaches the recited processing circuit. Pet. 39–41 (citing also Ex. 1003 ¶¶ 119–127). Petitioner does not provide any further explanation or citations to evidence. *Id.*; Ex. 1003 ¶¶ 119–120, 123–127 (referring testimony for claim 19).

Thus, for the same reasons discussed above for claim 19, Petitioner fails to show that claim 33 is unpatentable over Raleigh, Fong, TS25.213, and TS25.306.

7. Dependent Claims 20, 21, and 35–42

Petitioner argues with citations to the references and declarant testimony that claims 20, 35–38, and 40–42 are unpatentable over Raleigh, Fong, TS25.213, and TS25.306. Pet. 8, 36–39, 41–46. In another ground, Petitioner contends with citations to the references and declarant testimony

that dependent claims 21 and 39 are unpatentable over Raleigh, Fong, TS25.213, TS25.306, and Eriksson. Pet. 8, 48–49.

Patent Owner responds that claims 35–38 and 40–42 depend from independent claim 33 and that Petitioner has not shown unpatentability for the same reasons asserted for claim 33. Prelim. Resp. 32. Patent Owner responds that claim 21 depends from independent claim 19, claim 39 depends from independent claim 33, and Eriksson does not address the deficiencies of Raleigh. Prelim. Resp. 32–33. Patent Owner, thus, argues that Petitioner has not shown that claims 21 and 39 are unpatentable. *Id.* at 33.

Petitioner’s arguments for these claims do not remedy the deficiencies discussed above for the challenged independent claims. Pet. 36–39, 41–46, 48–49. Petitioner, thus, fails to show that claims 20, 35–38, and 40–42 are unpatentable over Raleigh, Fong, TS25.213, and TS25.306 and that claims 21 and 39 are unpatentable over Raleigh, Fong, TS25.213, TS25.306, and Eriksson.

E. Challenges Based on Dabak

Petitioner challenges claims 19, 20, 33, 36–38, and 40–42 as unpatentable over Dabak, TS25.301, Fong, TS25.213, and TS25.306. Pet. 8, 52–68. Petitioner also challenges claims 21, 35, and 39 as unpatentable over Dabak, TS25.301, Fong, TS25.213, TS25.306, and Eriksson. *Id.* at 9, 68–71.

Patent Owner responds that Dabak fails to teach or suggest several limitations of the claims and that Petitioner fails to provide an adequate reason for combining the asserted references. Prelim. Resp. 33–46.

For the reasons stated below, Petitioner fails to show a reasonable likelihood of prevailing with respect to one claim in its challenges based on Dabak.

1. *Dabak (Ex. 1013)*

Dabak “relates to wideband code division multiple access (WCDMA) for a communication system and more particularly to space time block coded transmit antenna diversity for WCDMA.” Ex. 1013, 1:9–12. Figure 2 of Dabak is reproduced below.

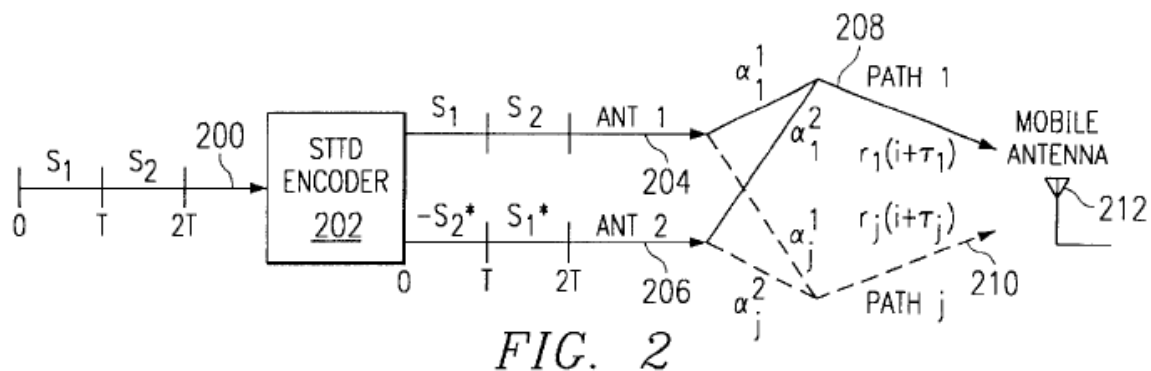


Figure 2 is “a block diagram showing signal flow in an STTD encoder” that can be used with a transmitter. Ex. 1013, 3:18–20, 3:58–59. “The STTD encoder receives symbol S_1 at symbol time T and symbol S_2 at symbol time $2T$ on lead 200” and “produces symbol S_1 on lead 204 and symbol— S_2^* on lead 206 at symbol time T , where the asterisk indicates a complex conjugate operation.” *Id.* at 3:60–65. “The STTD encoder then produces symbol S_1 on lead 204 and symbol S_1^* on lead 206 at symbol time $2T$.” *Id.* at 3:66–4:1. “The bit or chip signals of these symbols are transmitted serially along respective paths 208 and 210” and “subsequently received at a remote mobile antenna 212 after a transmit time τ_j corresponding to the j^{th} path.” *Id.* at 4:2–3, 4:10–13.

2. *Independent Claim 19*

- a) *“transmitting, by the primary station, substantially simultaneously a plurality of data packets to the secondary station, each data packet being transmitted via a different subset of the plurality of paths”*

Petitioner argues that Dabak alone teaches or suggests the limitation quoted above and referred to as “[19.1].” Pet. 5, 53 (citing Ex. 1003 ¶¶ 159–161; Ex. 1013, 1:15–22, 3:44–53, 3:58–4:17, Fig. 2). In particular, Petitioner argues that “Figure 2 show[s] data symbols S1 and -S2* transmitted substantially simultaneously during the symbol time 0~T, and data symbols S1* and S2 transmitted substantially simultaneously during the symbol time T~2T, all from a transmitter to a receiver.” *Id.* (citing Ex. 1003 ¶ 160; Ex. 1013, 3:58–4:17).

Patent Owner responds that Dabak fails to teach or suggest a plurality of data packets transmitted substantially simultaneously, and each data packet transmitted via a different subset of a plurality of paths, as required by independent claim 19. Prelim. Resp. 33–34. Specifically, Patent Owner argues that the relied-upon portions of Dabak describe data symbols, not data packets; that Dabak’s symbols “are not transmitted substantially simultaneously on different paths,” and that “the signal from the first antenna ANT 1 and the signal from the second antenna ANT 2 are both transmitted along plural signal paths, which are the same Paths 1 . . . j for both signals.” *Id.* at 36–37 (citing Ex. 1013, 3:60–4:1, 4:6–10, 4:18–5:30, Figs. 2, 3, 8).

Patent Owner also responds that the “Petition does not allege that any of the other references cited in Ground 3, either alone or in combination, disclose or suggest this claim limitation and, indeed, they do not disclose or suggest this claim limitation.” Prelim. Resp. 37. Patent Owner further

provides arguments that TS25.301, Fong, TS25.213, and TS25.306 fail to teach or suggest transmitting substantially simultaneously data packets via a different subset of paths. *Id.* at 37–38.

As argued by Patent Owner (Prelim. Resp. 36–37), Petitioner’s relied-upon portions of Dabak relate only to symbols. *See* Pet. 53. The cited portions of Dabak explicitly describe “symbols.” Ex. 1013, 1:15–22 (describing code division multiple access systems), 3:44–53 (describing a transmitter that receives and encodes symbols), 3:58–4:17 (describing the signal flow in an encoder shown in Fig. 2). Petitioner, however, does not further argue or provide additional evidence that Dabak’s symbols teach or suggest the recited “data packets.” *See* Pet. 53.

Petitioner’s declarant testimony also does not explain further the arguments or evidence presented in the Petition and does not provide additional evidence beyond that cited in the Petition. *See* Ex. 1003 ¶¶ 159–161. Other than Dabak and declarant testimony, Petitioner does not point elsewhere in the record for the recited “data packet.” *See* Pet. 53.

Also, Petitioner fails to show that Dabak’s symbols are transmitted substantially simultaneously with each symbol being transmitted via a different subset of paths. Instead, Dabak shows in Figure 2 and describes that “symbols are transmitted serially along respective paths 208 and 210,” and that Figure 2 shows symbols sent on all the paths between transmitting antennas ANT 1 and ANT 2 and receiving Mobile Antenna 212. Ex. 1013, 4:2–3, 4:10–13, Fig. 2.

Petitioner, thus, does not show sufficiently that Dabak teaches or suggests “transmitting, by the primary station, substantially simultaneously a plurality of data packets to the secondary station, each data packet being

transmitted via a different subset of the plurality of paths,” as required by independent claim 19.

b) *“receiving, by the secondary station, the plurality of data packets”*

Petitioner contends that Dabak teaches or suggests the limitation quoted above and referred to as “[19.2]. Pet. 5, 53–54 (citing Ex. 1003 ¶¶ 162–163; Ex. 1013, 4:18–30, 6:8–14, Figs. 2, 8). Patent Owner responds that Raleigh does not teach or suggest receiving data packets as required by claim 19 because Dabak describes symbols, not data packets. Prelim. Resp. 38–39.

Petitioner relies on portions of Dabak discussed above that pertain to symbols. *See* Pet. 53–54. Petitioner’s declarant testimony does not explain further the arguments or evidence presented in the Petition and does not provide additional evidence beyond that cited in the Petition. Ex. 1003 ¶¶ 162–163. Thus, for the reasons stated above, Petitioner provides insufficient argument and evidence that Dabak teaches or suggests “receiving, by the secondary station, the plurality of data packets,” as required by claim 19.

3. *Independent Claim 33*

Independent claim 33 recites “at least one antenna configured . . . to receive a plurality of data packets that were transmitted substantially simultaneously . . . , each data packet being communicated via a different subset of the plurality of paths.” Ex. 1001, 12:44–50.

For claim 33, Petitioner refers to its arguments for independent claim 19 and adds arguments that Dabak teaches the recited processing circuit. Pet. 62–63 (citing also Ex. 1003 ¶¶ 186–193). Petitioner does not

provide any further explanation or citations to evidence. *Id.*; Ex. 1003 ¶¶ 186–187, 190–193 (referring testimony for claim 19).

Thus, for the same reasons discussed above for claim 19, Petitioner fails to show that claim 33 is unpatentable over Dabak, TS25.301, Fong, TS25.213, and TS25.306.

4. Challenges to Dependent Claims 20, 21, 35–39, and 40–42

Petitioner argues with citations to the references and declarant testimony that claims 20, 36–38, and 40–42 are unpatentable over the proposed combination of Dabak, TS25.301, Fong, TS25.213, and TS25.306. Pet. 61–62, 63–68. In another ground, Petitioner argues that claims 21, 35, and 39 are unpatentable over the above proposed combination further modified by Eriksson with citations to these references and declarant testimony. Pet. 68–71.

Patent Owner responds that claim 20 depends from independent claim 19, claims 36–38 and 40–42 depend from independent claim 33, and that Petitioner fails to show that the asserted references teach or suggest these challenged dependent claims for the reasons discussed for claims 19 and 33. Prelim. Resp. 45. Patent Owner also responds that Eriksson does not remedy the deficiencies of Petitioner’s proposed combination based on Dabak, and thus, Petitioner fails to show that the references teach or suggest dependent claims 21, 35, and 39. *Id.* at 46.

Petitioner’s arguments for these claims do not remedy the deficiencies discussed above for the challenged independent claims. Pet. 61–62, 63–71. Petitioner, thus, fails to show that claims 20, 36–38, and 40–42 are unpatentable over the proposed combination of Dabak, TS25.301, Fong, TS25.213, and TS25.306 and that claims 21, 35, and 39 are unpatentable over Dabak, TS25.301, Fong, TS25.213, TS25.306, and Eriksson.

III. CONCLUSION

For the reasons above, Petitioner does not show that there is a reasonable likelihood that it would prevail with respect to at least one of the challenged claims.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is denied, and no *inter partes* review is instituted.

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Patent 9,635,599 B2

FOR PETITIONER:

Michael T. Hawkins
Jennifer J. Huang
Baile Xie
Patrick J. Bisenius
Jun Li
Nicholas Stephens
Kim Leung
Rishi Gupta
Terry J. Stalford
FISH & RICHARDSON P.C.
IPR51477-0005IP1@fr.com
jhuang@fr.com
xie@fr.com
bisenius@fr.com
Li@fr.com
nstephens@fr.com
leung@fr.com
rgupta@fr.com
stalford@fr.com

FOR PATENT OWNER:

George C. Beck
Eley O. Thompson
Justin M. Sobaje
Matthew Horton
FOLEY & LARDNER LLP
PhilipsIPRs-Quectel@foley.com
GBeck@foley.com
EThompson@foley.com