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Paper 66
Entered: March 6, 2015

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BROADCOM CORPORATION,
Petitioner,

v.

WI-FI ONE, LLC,
Patent Owner.

Case IPR2013-00601
Patent 6,772,215 B1

Before KARL D. EASTHOM, KALYAN K. DESHPANDE, and MATTHEW R. CLEMENTS, *Administrative Patent Judges*.

CLEMENTS, *Administrative Patent Judge*.

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

I. INTRODUCTION

Broadcom Corporation ("Petitioner") filed a Petition requesting *inter partes* review of claims 1, 2, 4, 6, 8, 15, 22, 25, 26, 29, 32, 34, 45, 46, 49, 52, and 54 (the "challenged claims") of U.S. Patent No. 6,772,215 B1 (Ex. 1001, "the '215 patent"). Paper 3 ("Pet."). Telefonaktiebolaget L. M. Ericsson[1] ("Patent Owner") filed an election to waive its Preliminary Response. Paper 22. On March 10, 2014, we instituted an *inter partes* review of all challenged claims on certain grounds of unpatentability alleged in the Petition. Paper 29 ("Dec. to Inst.").

After institution of trial, Patent Owner filed a Patent Owner Response (Paper 40, "PO Resp.") to which Petitioner filed a Reply (Paper 49, "Pet. Reply"). Patent Owner filed a Motion to Exclude (Paper 53), which Petitioner opposed (Paper 58). Patent Owner filed a Reply to Petitioner's Opposition to its Motion to Exclude. Paper 59. Oral hearing was held on December 8, 2014.[2]

The Board has jurisdiction under 35 U.S.C. § 6(c). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

Petitioner has shown, by a preponderance of the evidence, that claims 1, 2, 4, 6, 8, 15, 22, 25, 26, 29, 32, 34, 45, 46, 49, 52, and 54 of the '215 patent are unpatentable. Patent Owner's Motion to Exclude is denied.

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[1] On July 11, 2014, Patent Owner filed an Updated Mandatory Notice indicating that the '215 patent had been assigned to Wi-Fi One, LLC, and that Wi-Fi One, LLC and PanOptis Patent Management, LLC were now the real parties-in-interest. Paper 43.

[2] A transcript of the oral hearing is included in the record as Paper 65.

A. Related Proceedings

Petitioner and Patent Owner indicate that the ’215 patent is involved in a case captioned *Ericsson Inc. v. D-LINK Corp.*, Civil Action No. 6:10-cv-473 (E.D. Tex.) (“D-Link Lawsuit”), and in an investigation at the U.S. International Trade Commission captioned *In the Matter of Certain Electronic Devices, Including Wireless Communication Devices, Tablet Computers, Media Players and Televisions, and Components Thereof*, ITC Inv. No. 337-TA-862. Pet. 1–2; Paper 6, 1. Patent Owner also identifies an appeal at the Federal Circuit captioned *Ericsson Inc. v. D-LINK Corp.*, Case Nos. 2013-1625, -1631, -1632, and -1633. Paper 6, 1. Petitioner also filed two petitions for *inter partes* review of related patents: IPR2013-00602 (U.S. Patent No. 6,466,568) and IPR2013-00636 (U.S. Patent No. 6,424,625).

B. The ’215 Patent

The ’215 patent relates to the telecommunications field and, in particular, to a method for minimizing feedback responses in Automatic Repeat Request (ARQ) protocols. Ex. 1001, 1:14–17. When data is conveyed between nodes in a network, certain algorithms are used to recover from the transmission of erroneous data and the loss of data between the nodes. *Id.* at 1:20–23. An algorithm commonly used is referred to as an ARQ protocol. *Id.* at 1:23–25. Each node, or peer entity, in a network includes a receiver and a sender. *Id.* at 1:26–29. The units of data conveyed between peer entities commonly are referred to as Protocol Data Units (“PDUs”). *Id.* at 1:29–30. The basic function of an ARQ protocol is to allow the receiver to request that the sender retransmit PDUs that were lost

during transmission or contained errors. *Id.* at 1:33–37. The receiver can inform the sender about which PDUs were received correctly and/or can inform the sender about which PDUs were *not* received correctly. *Id.* at 1:38–41. When the sender receives this information, it retransmits the "lost" PDUs. *Id.* at 1:41–42. Several ARQ protocols, such as Stop-and-Wait ARQ, Go-back-N ARQ, and Selective-Repeat ARQ, existed at the time that the '215 patent was filed and were well known. *Id.* at 2:17–21.

Figure 1 of the '215 patent is reproduced below.

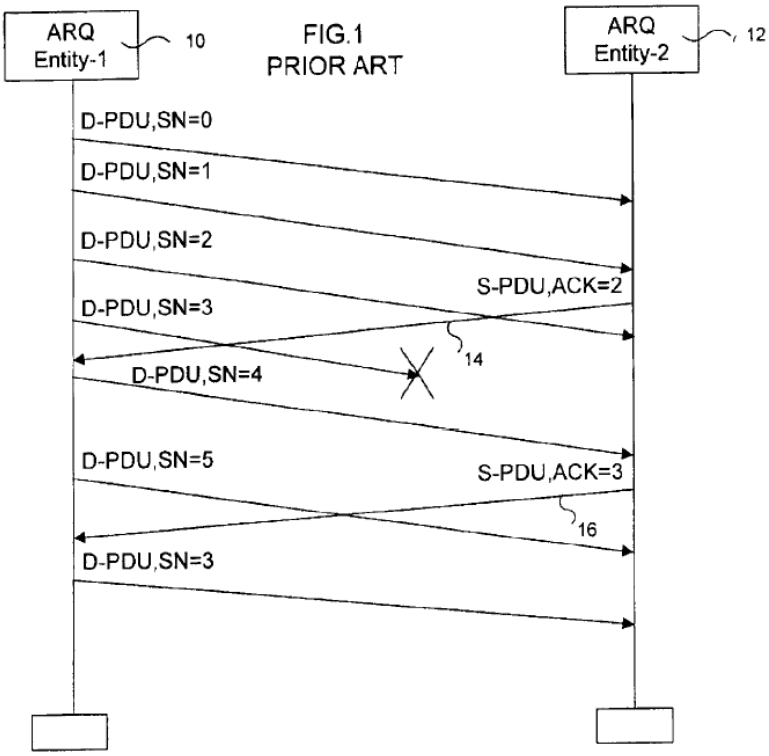

Figure 1 illustrates the use of ARQ protocols. *Id.* at 2:22–23. A sequence of transmitted Data-PDUs ("D-PDUs") and Status-PDUs ("S-PDUs") is shown. *Id.* at 2:28–29. A D-PDU includes user data, a sequence number ("SN"), and possibly piggybacked error control information. *Id.* at 2:29–31. The sequence number ("SN") is associated with each D-PDU to identify that

specific D-PDU. *Id.* at 2:32–34. An S-PDU includes status information but no user information. *Id.* at 2:31–32.

According to the ’626 patent, two main methods were used in the prior art for coding the SNs within S-PDUs: (1) a list of SNs to be retransmitted; and (2) a bitmap to represent the SNs to be retransmitted. *Id.* at 2:48–52. As such, known S-PDUs included a format identifier that could be used by a receiver to distinguish between the different PDU formats.

Figures 2 and 3 of the ’215 patent are reproduced below:

FIG. 2
PRIOR ART

PDU_format=S-PDU
Length=5
SN=3
SN=4
SN=5
SN=9
SN=16

FIG.3
PRIOR ART

PDU_format=S-PDU
SSN=2
BITMAP=0100001111111000

Figure 2 shows an S-PDU that uses the list method to code SNs. *Id.* at 2:60–62. Figure 3 shows an S-PDU that uses the bitmap method to code SNs. *Id.* at 3:18–19. According to the ’215 patent, a significant problem with existing ARQ protocols is that fixed length messages are used, which leads to a waste of bandwidth because unnecessary overhead information is transmitted. *Id.* at 3:46–50; *see also id.* at Table 1, 4:1–13. According to the ’215 patent, a significant need existed for a method that can be used to minimize the size of S-PDUs in an ARQ protocol or, if it is not possible to fit all SNs into a single S-PDU, to maximize the number of SNs in an S-PDU with limited size. *Id.* at 4:33–38.

To address these issues, the ’215 patent discloses a method whereby different mechanisms for indicating erroneous D-PDUs can be combined in a single S-PDU. *Id.* at 4:43–48. Each message includes three fields: type information, length information, and a value. *Id.* at 5:60–66. In a first embodiment of the invention, a bitmap message can be constructed using a number of methods to represent the length of the bitmap (i.e., the LENGTH field). *Id.* at 6:19–48. Likewise, a list message can list only erroneous SNs or can combine the prior art list method with the list of only erroneous SNs. *Id.* at 6:58 –7:51. In accordance with a second embodiment of the invention, a number of different message types can be combined to create an S-PDU. *Id.* at 7:52–54. Figure 8, reproduced below, illustrates how an S-PDU can be constructed in accordance with this embodiment:

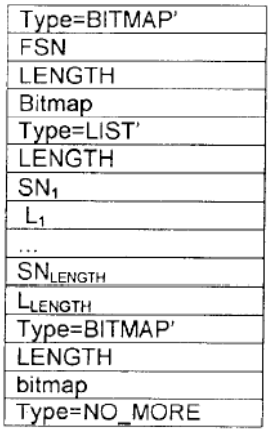

FIG. 8

As shown in Figure 8, the resulting S-PDU includes two BITMAP’ messages and one LIST’ message. *Id.* at 8:43–44. For comparison with the prior art techniques, Table 3 is reproduced below.

TABLE 3

	Size of S-PDU (bits)		
	State-of-the-art solutions		Combination
	LIST	BITMAP	solution
1	42	141	38
2	114	141	74
3	138	141	78
4	282	141	121
5	114	141	53

Table 3 shows the sizes of S-PDUs constructed in accordance with the prior art list and bitmap methods, and also with the combination method described in accordance with the second embodiment. *Id.* at 9:27–30. As illustrated by Table 3, the size of S-PDUs resulting from the combination method described in the '215 patent is significantly smaller than that of the S-PDUs resulting from the prior art methods. *Id.* at 9:32–35.

C. Illustrative Claim

Of the challenged claims, claims 1, 15, 25, and 45 are independent. Claim 1 is reproduced below:

> 1. A method for minimizing feedback responses in an ARQ protocol, comprising the steps of:
>
> sending a plurality of first data units over a communication link;
>
> receiving said plurality of first data units; and
>
> responsive to the receiving step, constructing a message field for a second data unit, said message field including a type identifier field and at least one of a sequence number field, a length field, and a content field.

D. The Instituted Ground of Unpatentability

We instituted *inter partes* review of claims 1, 2, 4, 6, 8, 15, 22, 25, 26, 29, 32, 34, 45, 46, 49, 52, and 54 under 35 U.S.C. § 102 as anticipated by Seo (US 6,581,176, issued June 17, 2003) (Ex. 1002).

II. ANALYSIS

A. 35 U.S.C. § 315(b)

Patent Owner argues that "Petitioner is subject to the 35 U.S.C. § 315(b) bar as a privy to the D-Link Defendants, and because the D-Link Defendants are real parties-in-interest to this action, despite Petitioner's failure to designate them as such under 35 U.S.C. § 312(a)(2)." PO Resp. 8. According to Patent Owner, Petitioner is in privity with defendants named in the D-Link Lawsuit (*Ericsson Inc. v. D-Link Corp.*, 6:10-cv-473) because, *inter alia*, "[Petitioner] has an indemnity relationship with Dell and Toshiba." *Id.* at 8–12. Patent Owner also argues that the defendants named in the D-Link Lawsuit (the "D-Link Defendants") are real parties-in-interest to this proceeding because Petitioner has a "substantive legal relationship with at least Dell and Toshiba," Petitioner used the same prior art references as the D-Link Defendants, and the Petition was filed after the D-Link Defendants abandoned their invalidity case regarding the '215 patent in the D-Link Lawsuit. *Id.* at 12–14.

Petitioner counters that "[Patent] Owner has raised this identical argument twice, and failed each time," and that "[t]his third attempt relies on *exactly the same arguments [Patent] Owner made to this Board and the Federal Circuit* and should be rejected for the same reasons." Pet. Reply 1. Petitioner continues that, "[Patent] Owner offers no new reason whatsoever

for this Board to reverse its prior decision that [Patent] Owner's proferred 'evidence' and legal authorities fail to amount to anything more than 'speculation' or 'a mere possibility' that [Petitioner] is in privity with the D-Link Defendants or that the D-Link Defendants are real parties-in-interest." *Id.* We find Petitioner's arguments persuasive.

Patent Owner's arguments and evidence are not different substantively from the arguments and evidence presented in its Motion for Additional Discovery (Paper 14). The arguments and evidence are unpersuasive for same reasons explained in our Decision on Patent Owner's Motion for Additional Discovery (Paper 23), which we adopt and incorporate by reference.

B. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *see also In re Cuozzo Speed Technologies, LLC*, No. 2014-1301, 2015 WL 448667, at *5–*8 (Fed. Cir. Feb. 4, 2015) ("Congress implicitly adopted the broadest reasonable interpretation standard in enacting the AIA," and "the standard was properly adopted by PTO regulation"). Under the broadest reasonable interpretation standard, claim terms are given their ordinary and customary meaning as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). An inventor may rebut that presumption by providing a definition of the term in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480

(Fed. Cir. 1994). In the absence of such a definition, limitations are not to be read from the specification into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

1. *"responsive to the receiving step, constructing a message field for a second data unit, said message field including a type identifier field"*

Petitioner proposes that this phrase be construed as "responsive to the receiving step, generating a message field including a field that identifies the message type of the feedback response message from a number of different message types." Pet. 5. Petitioner states that this construction was proposed by Patent Owner and adopted by the Court in the D-Link Lawsuit. Pet. 8 (citing Ex. 1005, 9). Petitioner does not dispute this construction. Pet. 8. The proposed construction replaces "constructing" with "generating," and replaces "type identifier field" with "a field that identifies the message type of the feedback response message from a number of different message types." Although this construction has been adopted in the D-Link Lawsuit, we are not persuaded that it is the broadest reasonable interpretation of this limitation.

For example, the antecedent basis for "*the* feedback response message" in the proposed construction is the "feedback responses" of the preamble. "In general, a preamble limits the invention if it recites essential structure or steps, or if it is 'necessary to give life, meaning, and vitality' to the claim." *Catalina Marketing Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (quoting *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999)). "Conversely, a preamble is not limiting 'where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or

intended use for the invention.'" *Id.* (quoting *Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997)).

If we were to adopt Petitioner's proposed construction, it would introduce a dependency upon the preamble, thereby causing the preamble to limit the invention.[3] Accordingly, in the Decision to Institute, we explained that we were not persuaded that Petitioner's proposed construction would be the broadest reasonable interpretation of the claim because no term of the claim, as drafted, has its antecedent basis in the preamble. Dec. to Inst. 10.

Patent Owner argues that we provided, in the Decision to Institute, "no case law for [the] proposition that introducing a dependency upon the preamble would cause the preamble to limit the invention," and that this proposition "appears to be focused on antecedent basis issue." PO Resp. 26. As we explained in the Decision to Institute, Patent Owner's proposed construction uses the phrase "the feedback response," the antecedent basis for which is the "feedback response" of the preamble. Dec. to Inst. 10. We decline to construe claim 1 in a way that the preamble becomes "necessary to give life, meaning, and vitality" to the claim. *Id.* Moreover, the plain language of claim 1 requires the "type identifier field" be included in a "message field for *a second data unit*" (emphasis added). It does not require that that "message field" be for a "feedback response." By requiring the recited "type identifier field" to "identif[y] a message type of *a feedback response message*," Patent Owner's proposed construction implicitly limits

[3] This result would be contrary to Petitioner's proposed construction of the preambles as non-limiting. Pet. 7, 8.

the recited "second data unit" to a feedback response message. Patent Owner provides no support for such a construction.

The '215 patent does not define explicitly the term "type identifier field," but does uses it several times to describe a field in an S-PDU that indicates whether that S-PDU includes a list or a bitmap. Ex. 1001, 6:20, 8:2, 8:16; *see also id.* at 7:58–61, 8:8–10, 8:55–57 (describing a "type identifier"). For example, Table 2 depicts a column labeled "Type Identifier," that includes NO_MORE, LIST', BITMAP', and ACK. *Id.* at 9:1–9. Accordingly, in the Decision to Institute, we construed "type identifier field" as "a field of a message that identifies the type of that message."

Patent Owner argues that our construction is overly broad because it "would cover a mere S-PDU as in the prior art . . . [b]ut the specification distinguishes 'the present invention' from the prior art S-PDU." PO Resp. 26 (citing Ex. 1001, 4:38–40, 4:43–63). Patent Owner does not elaborate. Petitioner counters that "[Patent] Owner concedes invalidity under the Board's construction based on the admitted prior art," and that "invalidity of the claims in light of the prior art is not grounds for rejecting this Board's well-reasoned claim construction." Pet. Reply 4.

We are not persuaded by Patent Owner's arguments. Patent Owner's proposed construction differs from ours in that it limits the message to "a feedback message" and states explicitly what is only implicit in our construction—i.e., "from a number of different message types." It is not evident which of those two additional limitations Patent Owner contends distinguish the prior art S-PDU. Indeed, the '215 patent describes the prior

art S-PDU as a "feedback response" (*See, e.g.*, Ex. 1001, 2:38–45) and describes how it may have a number of different message types (*See, e.g., id.* at 2:63–3:45, Figs. 2, 3). In any event, the '215 patent distinguishes "the present invention"—not the "type identifier field"—from the prior art. Even assuming that the patentee intended to draft the claims, as a whole, to distinguish a prior art S-PDU, Patent Owner identifies insufficient support in the claims or Specification for its proposed construction of the term "type identifier field."

Finally, in the Decision to Institute, we alternatively construed "type identifier field" as "any type of data." Dec. to Inst. 11–12. Patent Owner argues that "[b]ecause the type identifier field is not instructional or otherwise written material, the 'printed matter' doctrine does not apply." PO Resp. 27. According to Patent Owner, "the type identifier field in the challenged claims is not printed matter, and further, it defines functional characteristics of the claimed method and system." *Id.* at 31. We are persuaded that the recited "type identifier field" is not non-functional descriptive material.

Accordingly, we maintain our construction of "type identifier field" as "a field of a message that identifies the type of that message."

2. *"means for receiving said plurality of first data units, and constructing one to several message fields for a second data unit, said one to several message fields including a type identifier field and at least one of a sequence number field, a length field, a content field, a plurality of erroneous sequence number fields, and a plurality of erroneous sequence number length fields, each of said plurality of erroneous sequence number fields associated with a respective one of said plurality of erroneous sequence number length fields"*

Independent claim 45 recites a "means for receiving . . . ." Petitioner contends that this term is a means-plus-function element invoking 35 U.S.C. § 112, paragraph 6[4]. We agree because (1) the limitation uses the phrase "means for"; (2) the term "means for" is modified by functional language; and (3) the term "means for" is not modified by any structure recited in the claim to perform the claimed function. In the Decision to Institute, we determined that the function of the "means for receiving . . ." is

> *receiving* said plurality of first data units, *and constructing* one to several message fields for a second data unit, said one to several message fields including a type identifier field and at least one of a sequence number field, a length field, a content field, a plurality of erroneous sequence number fields, and a plurality of erroneous sequence number length fields, each of said plurality of erroneous sequence number fields associated with a respective one of said plurality of erroneous sequence number length field.

Dec. to Inst. 12–15. We also construed the structure for performing the recited function to be the sender and receiver of a peer entity. *Id.* Neither party disputes our initial construction of this term, and Patent Owner agrees

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[4] Section 4(c) of the AIA re-designated 35 U.S.C. § 112, ¶ 6, as 35 U.S.C. § 112(f). Pub. L. No. 112-29, 125 Stat. 284, 296–07 (2011). Because the '215 patent has a filing date before September 16, 2012 (effective date), we will refer to the pre-AIA version of 35 U.S.C. § 112, in this decision.

with our determination of the corresponding structure (PO Resp. 31). We maintain our construction.

3. "for minimizing feedback responses in an ARQ protocol" (Preambles)

The preamble of each independent claim recites "for minimizing feedback responses in an ARQ protocol." In the Decision to Institute, we determined that the preambles do not limit the claims. Dec. to Inst. 15. Neither party disputes our initial construction of this term, and Patent Owner agrees with it (PO Resp. 32[5]). We maintain our construction.

4. "means for sending a plurality of first data units over said communication link to said second peer entity"

Independent claim 45 recites a "means for sending . . . ." Petitioner contends that this term is a means-plus-function element invoking 35 U.S.C. § 112, paragraph 6. We agree because (1) the limitation uses the phrase "means for"; (2) the term "means for" is modified by functional language; and (3) the term "means for" is not modified by any structure recited in the claim to perform the claimed function. In the Decision to Institute, we determined that the function of the "means for sending a plurality of first data units over said communication link to said second peer entity" is "sending a plurality of first data units over said communication link to said second peer entity." Dec. to Inst. 15–17. We also construed the structure for performing the recited function to be the sender of a peer entity. *Id.*

[5] Patent Owner's Response appears to have swapped headings IV.B.3 and IV.B.4 inadvertently, such that this claim term is argued under the heading "for minimizing feedback responses in an ARQ protocol," and that term is argued under the heading "means for sending."

Neither party disputes our initial construction of this term, and Patent Owner agrees with our determination of the corresponding structure (PO Resp. 31–32[6]). We maintain our constructions.

C. The Challenged Claims – Anticipated by Seo

Petitioner argues that claims 1, 2, 4, 6, 8, 15, 22, 25, 26, 29, 32, 34, 45, 46, 49, 52, and 54 are unpatentable under 35 U.S.C. § 102(b) as anticipated by Seo. Pet. 21–45. In support of this ground of unpatentability, Petitioner provides detailed explanations as to how each claim limitation is disclosed by Seo, and relies upon the Declaration of Dr. Bims (Ex. 1004). *Id.* (citing Ex. 1004 ¶¶ 31–70).

Patent Owner counters that claim 1 is not anticipated by Seo because (1) Seo's NAK_TYPE does not "identif[y] the message type of a feedback response message from a number of different message types," as the parties' proposed construction of "type identifier field" requires, because Seo discloses only a single message type; and (2) Seo's NAK_TYPE field is not included in a "message field," as required by each of the challenged claims. PO Resp. 37–40. Patent Owner also argues that Seo does not disclose a length field, as required by independent claim 15. *Id.* at 40–41.

Upon consideration of the parties' contentions and supporting evidence, we determine that Petitioner has demonstrated, by a preponderance of the evidence, that claims 1, 2, 4, 6, 8, 15, 22, 25, 26, 29, 32, 34, 45, 46, 49, 52, and 54 are anticipated by Seo.

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[6] *See* n.5 above.

Seo (Exhibit 1002)

Seo describes a method for transmitting control frames and user data frames in a mobile radio communications system. Ex. 1002, 1:10–12. Specifically, Seo discusses a modification of the Radio Link Protocol ("RLP") specified in international standard IS-707 for a Code Division Multiple Access ("CDMA") mobile radio communication system. *Id.* at 1:14–19, 5:28–30. According to the RLP retransmission procedure, a Negative Acknowledgement ("NAK") RLP control frame for a particular user data frame can be transmitted more than once at the same time to ensure reliability and, in response to receiving each NAK, the missing user data frame will be retransmitted. According to the invention of Seo, rather than transmitting each NAK corresponding to each missed user data frame, a single NAK corresponding to *all* missed user data frames is transmitted to the sender. *Id.* at 5:31–36.

Figure 4 of Seo is reproduced below:

FIELD	LENGTH (BITS)
SEQ	8
CTL	4
RE_NUM	2
NAK_TYPE	2
NAK_SEQ	4
L_SEQ_HI	4
FIRST	12
LAST	12
FCS	16
PADDING	VARIABLE
NAK_Map_Count	2
NAK_Map	
NAK_Map_SEQ	12
NAK_Map	8

FIG. 4

Figure 4 shows the structure of a RLP NAK control frame according to the invention of Seo. *Id.* at 5:42–43. The NAK control frame of Seo includes a field NAK_TYPE with a length of 2 bits to indicate a NAK type. *Id.* at 5:53–54.

If the value of NAK_TYPE is "00," the receiver is requesting retransmission of a range of missed user data frames (*Id.* at 5:54–57), and the fields FIRST, LAST, FCS, and padding exist (*Id.* at 6:18–19). FIRST is the 12-bit sequence number of the first data frame for which retransmission is requested. *Id.* at 5:63–65. LAST is the 12-bit sequence number of the last data frame for which retransmission is requested. *Id.* at 5:65–67. SEQ, with a length of 8 bits, is a data frame sequence number. *Id.* at 5:57–58.

If the value of NAK_TYPE is "01," the receiver is requesting retransmission of missed user data frames using a bitmap, and the field NAK_MAP_COUNT exists. *Id.* at 6:8–21. If the value of the field NAK_MAP_COUNT+1 exists, then the fields NAK_MAP_SEQ and NAK_MAP exist. *Id.* at 6:21–22. NAK_MAP_SEQ is the 12-bit sequence number of the first data frame in the NAK Map for which retransmission is requested. *Id.* at 6:8–11. NAK_MAP is an 8-bit bitmap identifying the missing user data frames for which retransmission is requested, wherein the most significant bit corresponds to the user data frame identified by NAK_MAP_SEQ+1. *Id.* at 6:11–15.

Analysis

In light of the arguments and evidence, Petitioner has demonstrated, by a preponderance of the evidence, that the challenged claims are unpatentable as anticipated by Seo.

For example, independent claim 1 recites "sending a plurality of first data units over a communication link." Seo discloses a "transmitting station" that sends user data frames to a "receiving station" over a "radio section between a receiving station and the transmitting station." Ex. 1002, 5: 28–41; *see also id.* at 8:24–27 ("transferring user data frames of a radio link protocol (RLP) from a transmitting station to a receiving station"), Fig. 6 ("Transmitting Station A"). The user data frames transport user traffic data. *Id.* at 1:21–22.

Claim 1 also recites "receiving said plurality of first data units." Seo discloses a "receiving station" that receives user data frames from the "transmitting station." *Id.* at 1:21–22, 5:28–41, 8:24–27, Fig. 6 ("Receiving Station B").

Finally, claim 1 recites "responsive to the receiving step, constructing a message field for a second data unit, said message field including a type identifier field and at least one of a sequence number field, a length field, and a content field." Seo discloses an "RLP NAK" message that includes a field NAK_TYPE that identifies whether the message identifies a range of sequence numbers or uses a bitmap. If the value of NAK_TYPE is "00," the RLP NAK message includes two fields—FIRST and LAST—with "the 12-bit sequence number of the first data frame for which a retransmission is required," and "the 12-bit number of the last data frame for which a retransmission is required," respectively. Ex. 1002, 5:54–57, 5:63–67, 6:17–18. If the value of NAK_TYPE is "01," the RLP NAK message includes a field NAK_MAP_SEQ with "the 12-bit sequence number of the first data frame in this NAK Map for which [] retransmission is requested." *Id.* at

6:9–11. On this record, we are persuaded that Seo's RLP NAK message includes a type identifier field (NAK_TYPE), and a sequence number field (FIRST, LAST, or NAK_MAP_SEQ). We are persuaded that Seo discloses this limitation whether "type identifier field" is construed to mean "a field of a message that identifies the type of that message," or, in the alternative, to mean any type of data.

Claim 2 recites "wherein said message field comprises a bitmap message." Claim 6 recites similarly "wherein said content field comprises a bitmap." Seo discloses that, if the value of NAK_TYPE is "01," the RLP NAK message includes a field NAK_MAP "with a length of 8 bits [that] is a bit-map identifying the missing user data frames for which a retransmission is requested." *Id.* at 6:11–13. On this record, we are persuaded that Seo discloses claims 2 and 6.

Claim 4 recites "wherein said sequence number field includes any sequence number from said plurality of first data units." Claim 8 recites similarly "wherein said second data unit comprises information about missing or erroneous said first data units." As discussed above, the RLP NAK message includes fields with sequence numbers for which *re*transmission is requested—i.e., the sequence number of a data unit previously sent by the transmitting station but not missed by the receiving station. *See, e.g.*, *Id.* at 2:46–51 ("That is, the receiving station requests the transmitting station to retransmit the *missed* user data frames hereto.") (emphasis added). On this record, we are persuaded that Seo discloses claims 4 and 8.

Petitioner also argues that claims 15, 22, 25, 26, 29, 32, 34, 45, 46, 49, 52, and 54 are disclosed by Seo. Pet. 23–33, 38–41. We are persuaded that the evidence of record supports Petitioner's contentions.

Patent Owner presents several arguments as to how Petitioner has failed to provide an adequate reason to modify the references to reach the claimed invention and why Seo does not teach all of the limitations of the claims. PO Resp. 32–42. Petitioner responds to these arguments. Pet. Reply 1–15. We address each argument in turn below.

Whether Seo discloses "a number of different message types"

Patent Owner argues that, "the NAK_TYPE field in Seo does not 'identif[y] the message type of a feedback response message from a number of different message types' because Seo merely discloses a single message type." PO Resp. 37. According to Patent Owner, "Seo's NAK frame has a constant size and format, containing both a bitmap and a list, regardless of NAK_TYPE," and "the NAK frame . . . always contains the same fields whose content varies with the contents of the NAK_TYPE field." *Id.* at 38. Patent Owner continues that "Seo's NAK_TYPE field merely indicates which fields within the message field will contain zero values and which fields will contain non-zero values." *Id*. According to Patent Owner, "Figure 4 represents a single control frame that includes fields for both a list of first and last sequence numbers and bitmaps," and that the "only change is that certain fields contain non-zero values, depending on the value of the NAK_TYPE." *Id.* at 39.

Petitioner counters that "Seo never limits the NAK message to a fixed length," and that "[e]ven if all the NAK messages in Seo had the same fixed

length, it would not prove that the NAK messages all have the same fields" because the length of a message does not necessarily determine its type. Pet. Reply 6. According to Petitioner, "Seo does not require that all fields shown in Figure 4 be used with all types of NAKs." *Id*. Petitioner continues that, "Seo describes how different fields 'exist' in different types of NAKs, as indicated by the value of NAK_TYPE." *Id.* at 6–7. We find Petitioner's arguments to be persuasive.

As an initial matter, Patent Owner's argument is based upon its proposed construction of "type identifier field," which we declined to adopt for the reasons above. In any event, we are not persuaded that Seo discloses only a single message type, as Patent Owner contends. Seo discloses explicitly that some fields in the RLP NAK control frame depicted in Figure 4 exist only if NAK_TYPE is "00," whereas other fields exist only if NAK_TYPE is "01." Ex. 1002, 6:18–22 ("[i]f a value of the field NAK_TYPE is '00', the fields FIRST, LAST, FCS, padding, exist. If a value of the 20 field NAK_TYPE is'01', the field NAK_MAP COUNT exi[st]. If a value of the field NAK_MAP COUNT+1 exists, there exist the fields NAK_MAP SEQ and NAK_MAP."); *see also id.* at claim 11. Patent Owner argues that Seo uses to the term "exist" to mean "contain non-zero values," and that those fields of Figure 4 which are not said to "exist" contain only zero values (PO Resp. 38–39), but cites nothing in Seo to support its interpretation. The only evidence Patent Owner offers is the testimony of its expert, Dr. Robert Akl, who merely repeats the language of the Patent Owner Response. Ex. 2020 ¶ 51.

In contrast, Petitioner's expert, Dr. Bims, testifies that Seo uses the common sense meaning of "exist," and testifies that "it would make sense to include unnecessary fields in a NAK message, such as FIRST and LAST fields in a NAK message of the bitmap NAK_TYPE, or bitmap fields in a First/Last type of NAK." Ex. 1013 ¶¶ 4–6. In this regard, we credit the testimony of Dr. Bims. We conclude that Seo discloses an RLP NAK control frame that includes certain fields only when NAK_TYPE is "00" and includes other fields only when NAK_TYPE is "01." Accordingly, we are not persuaded by Patent Owner's argument that NAK_TYPE is not a "type identifier field" because it does not identify the type of a message from a number of different message types.

Whether NAK_TYPE is included in a "message field"

Patent Owner argues that, "NAK_TYPE is not part of the message, but rather part of the S-PDU header." PO Resp. 39. According to Patent Owner, "'the type identifier field' must be part of the 'said message field'" and distinguishes "fields that were included in the header of the PDU such as the PDU_format field shown in the admitted prior art." *Id.* at 39–40. Patent Owner argues that certain benefits of the invention are achieved because "the claimed 'type identifier field' [is] in the message body as opposed to the fixed length header." *Id.* at 40.

Petitioner counters that "neither the claims nor the specification of the '215 patent make a distinction between providing information in a 'header' versus in a 'payload' or in any other portion of a message." Pet. Reply 10. Petitioner continues that, "The '215 patent refers to its Figures 4-7 as 'messages' without differentiating any parts of those messages, such as those

fields that include control information (type) and those fields that contain data content." *Id.* at 11 (citing Ex. 1013 ¶ 10). Moreover, according to Petitioner, "[t]he amendment did not add any requirement that a type identifier field be in a particular portion of the message (header, payload, or elsewhere);" instead, "the type identifier field was *always* part of the 'message field' – the amendment just made clear that the type identifier field was a necessary element, and not just one of several optional fields within the message field." *Id.* at 12. We find Petitioner's arguments to be persuasive.

Patent Owner relies entirely on the testimony of its expert, Dr. Akl, to support its construction of "message" as excluding headers. PO Resp. 39–40 (citing Ex. 2020 ¶¶ 52, 53). However, neither the claims nor the Specification of the '215 patent distinguish a header from the recited "message." Indeed, the term "header" is not even used in the '215 patent. Moreover, Dr. Bims testifies that "the type field in Figures 4-7 of the '215 patent contain bits that tell a receiver how to process the substance of the data that follows, and therefore, would be considered part of a header as opposed to a "payload." Ex. 1013 ¶ 10. We, therefore, see no basis to construe the term "message" to exclude a header. Accordingly, we are not persuaded that Seo's NAK_TYPE is not included in a "message field."

Dependent claim 15

Patent Owner argues that claim 15 requires that each message field must include a "length field" because it requires

> at least one of (i) '*a length field*', (ii) 'a plurality of erroneous sequence number-fields . . . each of said plurality of erroneous sequence number fields associated with a respective one of said

> plurality of erroneous sequence number *length fields*,' and (iii) 'a plurality of erroneous sequence number *length fields*.'

PO Resp. 41. In other words, Patent Owner contends that the "each of" clause at the end of claim 15 should be read in conjunction with "a plurality of erroneous sequence number-fields," recited earlier in the claim. *Id*. According to Patent Owner, "Seo does not disclose a length field" because "[n]either the FIRST/LAST nor the BITMAP section of the NAK Control frame teaches or discloses a length field. *Id*.

Petitioner counters that the "each of" clause should be read in conjunction with the "plurality of erroneous sequence number length fields," that immediately precedes it in the claim. Pet. Reply 14. According to Petitioner, "[Patent] Owner's argument gives no meaning to the phrase "at least one of." *Id*. We find Petitioner's arguments to be persuasive.

The "each of" clause references both "said plurality of erroneous sequence number fields" and "said plurality of erroneous sequence number length fields." Nothing about the clause itself suggests that it should be read in conjunction with the "plurality of erroneous sequence number-fields, as opposed to with the "plurality of erroneous sequence number length fields." When a claim recites, "at least one of A, B, and C, each of said B associated with said C," the intuitive interpretation is to read the "each of" clause as part of C. Patent Owner points to nothing in the Specification of the '215 patent that supports its counter-intuitive interpretation. Accordingly, we are not persuaded that claim 15 requires a "length field" and, therefore, are not persuaded that Seo fails to disclose claim 15.

Dependent claims

Patent Owner argues that dependent claims 2, 4, 6, 8, 22, 26, 29, 32, 34, 46, 49, 42, and 54 are not anticipated by Seo because they depend from an independent claim that is not anticipated. PO Resp. 41–42. We are not persuaded by Patent Owner's arguments regarding the independent claims for the reasons discussed above.

Conclusion

We are persuaded that Petitioner has demonstrated, by a preponderance of the evidence, that claims 1, 2, 4, 6, 8, 15, 22, 25, 26, 29, 32, 34, 45, 46, 49, 52, and 54 are unpatentable as anticipated by Seo.

D. Patent Owner's Motion to Exclude

Patent Owner's Motion to Exclude seeks to exclude (1) Exhibit 1010, entitled "TIA/EIA Interim Standard; Data Service Options for Wideband Spread Spectrum Systems," TIA/EIA/IS-707-A (Revision of TIA/EIA/IS-707); and (2) paragraph 7 of the Reply Declaration of Dr. Bims (Ex. 1013). Paper 53, 2–4. As movant, Patent Owner has the burden of proof to establish that it is entitled to the requested relief. *See* 37 C.F.R. § 42.20(c). For the reasons stated below, Patent Owner's Motion to Exclude is *dismissed as moot*.

Patent Owner argues that Exhibit 1010 should be excluded because (1) it is irrelevant under Rule 403 because it is dated 4–8 months after Seo and is not, therefore, contemporaneous evidence of how a person of ordinary skill in the art would have interpreted Seo; (2) Petitioner has not shown why the exhibit could not have been included in the Petition; (3) it does not respond to any argument raised by Patent Owner in its response; (4) it is not

relevant to any issue in the case (Fed. R. Evid. 401, 403); (5) it has not been authenticated, and no evidence links it to the version of IS-707.2 referenced in Seo (Fed. R. Evid. 901); and (6) it is inadmissible hearsay because Broadcom is attempting to prove the truth of the matter asserted, including its alleged publication date (Fed. R. Evid. 801, 802). Paper 53, 2–3 (citing *Hilgraeve, Inc. v. Symantec Corp.*, 271 F. Supp. 2d 964, 974–75 (E.D. Mich. 2003)). Patent Owner argues that paragraph 7 of Dr. Bims' Declaration should be excluded because it "[f]or the same reasons above as to Exhibit 1010." *Id.* at 4.

Because we have not relied upon Exhibit 1010, the motion is *dismissed* as moot as to Exhibit 1010 and paragraph 7 of Exhibit 1013.

III. CONCLUSION

Petitioner has shown, by a preponderance of the evidence, that claims 1, 2, 4, 6, 8, 15, 22, 25, 26, 29, 32, 34, 45, 46, 49, 52, and 54 of the '215 patent are unpatentable.

IV. ORDER

Accordingly, it is

ORDERED that pursuant claims 1, 2, 4, 6, 8, 15, 22, 25, 26, 29, 32, 34, 45, 46, 49, 52, and 54 of the '215 patent are held unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Exclude is *dismissed as moot*; and

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

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