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Paper 60
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 IPR2013-00636
Patent 6,424,625 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 claim 1 of U.S. Patent No. 6,424,625 (Ex. 1001, "the '625 patent"). Paper 3 ("Pet."). Telefonaktiebolaget L. M. Ericsson[1] ("Patent Owner") filed an election to waive its Preliminary Response. Paper 19. On March 10, 2014, we instituted an *inter partes* review of claim 1on certain grounds of unpatentability alleged in the Petition. Paper 25 ("Dec. to Inst.").

After institution of trial, Patent Owner filed a Patent Owner Response (Paper 34, "PO Resp.") and a Motion to Amend (Paper 36, "Mot. to Amend"). Petitioner filed a Reply (Paper 45, "Pet. Reply") and an Opposition to Patent Owner's Motion to Amend (Paper 44, "Opp. to Mot. to Amend"). Patent Owner filed a Reply to Petitioner's Opposition to its Motion to Amend. Paper 47 ("PO Reply"). 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 claim 1 of the '625 patent is unpatentable. Petitoner's Motion to Amend 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 38.

[2] A transcript of the oral hearing is included in the record as Paper 59.

A. Related Proceedings

Petitioner and Patent Owner indicate that the '625 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"). 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: IPR2013-00601 (U.S. Patent No. 6,772,215) and IPR2013-00602 (U.S. Patent No. 6,466,568). Pet. 2.

B. The '625 patent

The '625 patent relates generally to Automatic Repeat Request (ARQ) techniques for transferring data in fixed/wireless data networks. Ex. 1001, 1:7–9. ARQ techniques commonly are used in data networks to ensure reliable data transfer and to protect data sequence integrity. *Id.* at 1:13–15. The integrity of data sequences normally is protected by sequentially numbering packets and applying certain transmission rules. *Id.* at 1:20–22. By doing so, the receiver receiving the packets can detect lost packets and thereby request that the transmitter retransmit the affected data packets. *Id.* at 1:15–20. According to the '625 patent, there were three main ARQ schemes: Stop-and-Wait; Go-Back-N; and Selective Reject. *Id.* at 1:23–25. All three provide a mechanism for transferring packets to a receiver in a data network in an appropriate order. *Id.* at 1:25–27.

Normally, it is desirable to transfer all packets without data loss. *Id.* at 3:46–47. Sometimes, however, sending significantly

delayed packets provides no benefit—e.g., where the delay causes the information in the packets to become outdated and therefore useless to the receiver. *Id.* at 3:47–51. Examples of delay-sensitive applications are, e.g., telephony, video conferencing, and delay-sensitive control systems. *Id.* at 3:51–53. According to the '625 patent, prior art ARQ methods did not recognize and allow for situations where data packets have a limited lifetime, and therefore, fail to minimize bandwidth usage by not sending (or resending) significantly delayed or outdated data packets. *Id.* at 4:9–13.

To address these issues, the '625 patent discloses an ARQ technique that minimizes bandwidth usage by accounting for data packets that have an arbitrary but limited lifetime. *Id.* at 4:16–19. Exemplary embodiments of the invention include enhanced "Go-Back-N" and "Selective Reject" techniques that discard outdated data packets. *Id.* at 4:21–25. In an exemplary embodiment of the invention, the progress of a bottom part of a sender window of the transmitter is reported to the receiver in order to allow the receiver to properly skip packets which do not exist anymore because they have been discarded. *Id.* at 5:15–21. Thus, the receiver can be commanded to skip or overlook the packets that have been discarded or, in other words, to release any expectation of receiving the packets that have been discarded. *Id.* at 5:22–27. In the case where the transmitter discards a packet, it orders the receiver to accept the next packet by setting a Receiver Packet Enforcement Bit ("RPEB") in the ARQ header of the next packet and sending the packet to the receiver. *Id.* at

5:28–32. When the receiver receives the packet, the RPEB will cause the receiver to accept the packet. *Id.* at 5:32–33.

Figure 8 is reproduced below.

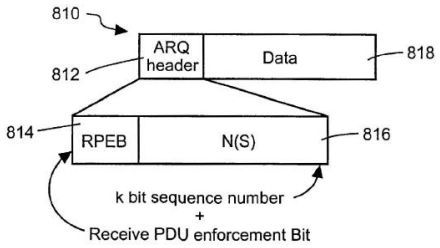


FIG. 8

Figure 8 shows ARQ packet 810 with ARQ header 812 and data portion 818. *Id.* at 5:33–35. Header 812 includes RPEB 814 and k-bit sequence number N(S) 816. *Id.* at 5:35–37. RPEB 814 may be used in a variety of situations. *Id.* at 5:41–43. For example, if a NACK is sent by a receiver, received by the transmitter, and is valid for one discarded data packet, then the next data packet to be retransmitted can have RPEB set to TRUE. *Id.* at 5:43–48. In another example, if a retransmission timer expires and one or more data packets have been discarded, the next incoming data packet to be transmitted (or the first data packet to be retransmitted) can have RPEB set to TRUE. *Id.* at 5:49–53. If RPEB is TRUE and the difference between the sequence number and the Expected Sequence Number (ESN) of the next packet to be received is less than the window size (i.e., half the maximum sequence number), the packet will be accepted and forwarded to a higher layer (as long as the data in the packet is also correct). *Id.* at 5:62–63, 6:32–36. In this way, the various embodiments of the invention increase throughput of a communications system using ARQ packets by discarding outdated packets. *Id.* at 9:60–62.

C. Illustrative Claim

Claim 1, the sole challenged claim, is reproduced below:

> 1. A method for discarding packets in a data network employing a packet transfer protocol including an automatic repeat request scheme, comprising the steps of:
>
> a transmitter in the data network commanding a receiver in the data network to a) receive at least one packet having a sequence number that is not consecutive with a sequence number of a previously received packet and b) release any expectation of receiving outstanding packets having sequence numbers prior to the at least one packet; and
>
> the transmitter discarding all packets for which acknowledgment has not been received, and which have sequence numbers prior to the at least one packet.

D. Prior Art Supporting the Instituted Grounds

The following prior art was asserted in the instituted grounds:

Garrabrant	US 5,610,595	Mar. 11, 1997	Ex. 1002
Andreas Hettich, "Development and performance evaluation of a Selective Repeat-Automatic Repeat Request (SR-ARQ) protocol for transparent, mobile ATM access" (April 17, 1996) (diploma paper, Aachen Tech. University)("Hettich")			Ex. 1003
Walke	DE 19543280	May 22, 1997	Ex. 1004
Hettich (English language translation)[3]			Ex. 1007
Walke	DE 19543280 (English translation) [4]	May 22, 1997	Ex. 1008

[3] All references in this decision to "Hettich" are to the English translation (Ex. 1007) of the German thesis.
[4] All references in this decision to "Walke" are to the English translation (Ex. 1008) of the German patent publication.

E. The Instituted Grounds of Unpatentability

The following table summarizes the challenges to patentability on which we instituted *inter partes* review:

Reference	**Basis**
Garrabrant	§ 102
Hettich	§ 102
Walke	§ 103

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. 8–9. 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 9–12. 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 '625 patent in the D-Link Lawsuit. *Id.* at 12–15.

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 11). The arguments and evidence are unpersuasive for same reasons explained in our Decision on Patent Owner's Motion for Additional Discovery (Paper 20), 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. Preamble

Petitioner proposes that the preamble of claim 1 should not be construed to limit claim 1. Pet. 17–18. Specifically, Petitioner argues that the terms used in the preamble are not later referred to or necessary to understand the body of claim 1, and that the preamble merely states the purpose or intended use of the invention. *Id.* at 17. Petitioner further argues that, during prosecution of the '625 patent, the Patent Owner did not rely on the preamble to distinguish the prior art. *Id.* at 18.

"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)).

On this record, because claim 1 defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention, we agree that the preamble does not limit claim 1.

2. "commanding"

Petitioner argues that "commanding" should be construed to mean "an instruction represented in a control field to cause an addressed device to execute a specific control function." Pet. 18–19 (emphasis and internal quotation marks omitted). Petitioner's proposed construction is similar to the definition of "command" from the *IEEE Dictionary*. Pet. 19 n.3 (citing Ex. 1011, 214–215). Petitioner argues that this construction is consistent with the claims and specification of the '625 patent, which describes the commanding step being carried out by an enforcement bit ("RBEP bit"). *Id.* (citing Ex. 1001, Abstract, claim 3). Petitioner argues that the definition proposed by Patent Owner in the Texas Litigation was overly broad because one of ordinary skill would not understand a packet to be a command to receive simply because the receiver receives it. Pet. 19–20 (citing Ex. 1006 ¶ 38).

The '625 patent states that, "the receiver can be *commanded* to skip or overlook the packets which have been discarded, or in other words, to release any expectation of receiving the packets which have been discarded." Ex. 1001, 5:22–25 (emphasis added). The '625 patent further explains that, "[i]n the case where the transmitter discards a packet, it orders the receiver to accept the next packet, by setting a certain Receiver Packet Enforcement Bit (RPEB) in the ARQ

header of the next packet and sending the packet to the receiver." *Id.* at 5:28–32. The result is that, "[w]hen the receiver receives the packet, the RPEB bit will cause the receiver to accept the packet." *Id.* at 5:32–33. Thus, not every received packet "commands" the receiver to perform the rest of the claimed limitation; only a packet whose RPEB bit is set "commands" the receiver to do so. Moreover, Petitioner's proposed construction is consistent with how a person of ordinary skill in the art would have understood the term at the time that the '625 patent was filed. *See* Ex. 1011, 214–215. Accordingly, in the Decision to Institute, we construed "commanding" to mean "an instruction represented in a control field to cause an addressed device to execute a specific control function." Dec. to Inst. 8–9.

Patent Owner argues that this construction "does not represent the broadest reasonable construction" (PO Resp. 19) because it "improperly imports limitations from the specification" by reciting "represented in a control field" (*Id.* at 20). According to Patent Owner, the broadest reasonable interpretation of "commanding" is "exercising a dominating influence." *Id.* at 19–20.

Patent Owner's proposed construction relies heavily on extrinsic evidence in the form of a definition from http://www.merriam-webster.com. Patent Owner does not even attempt to establish that this definition is contemporaneous with the effective filing date of the '625 patent. Nevertheless, to the extent that "an instruction represented in a control field" incorporates a limitation from the Specification, we modify our construction to clarify that the command need not be in any particular format, such as the RPEB bit

of the preferred embodiment; it need only cause an addressed device to execute a specific control function. Accordingly, we construe "commanding" to mean "causing an addressed device to execute a specific control function."

C. Claim 1 – Anticipation by Garrabrant

Petitioner argues that claim 1 is unpatentable under 35 U.S.C. § 102(b) as anticipated by Garrabrant. Pet. 28–37. In support of this ground of unpatentability, Petitioner provides detailed explanations as to how each claim limitation is disclosed by Garrabrant, and relies upon the Declaration of Dr. Harry Bims (Ex. 1006). *Id.* (citing Ex. 1006 ¶¶ 47–70).

Patent Owner argues that claim 1 is not anticipated by Garrabrant because Garrabrant does not disclose (1) "commanding a receiver to . . . receive," as recited in claim 1; (2) "commanding a receiver to . . . release," as recited in claim 1; and (3) "discarding all packets for which acknowledgment has not been received, and which have sequence numbers prior to the at least one packet," as recited in claim 1. PO Resp. 20–37.

Upon consideration of the parties' contentions and supporting evidence, we determine that Petitioner has not demonstrated, by a preponderance of the evidence, that claim 1 is anticipated by Garrabrant.

Garrabrant (Exhibit 1002)

Garrabrant describes a method and apparatus for transmitting data in a packet radio communication system having data sources, destinations, and intermediate repeaters. Ex. 1002, Abstract.

According to a packet protocol, a sequence index is used to prevent duplicate packets from being received by requiring that the sequence number fall within a sequence number window at each device. *Id.* The sequence number window is incremented each time a packet is received. *Id.* The sequence number also is used to cause the retransmission of packets that are lost, at which time the sequence number window in the devices that are affected are reset to allow transmission of the lost packet. *Id.*

Figure 7A is reproduced below.

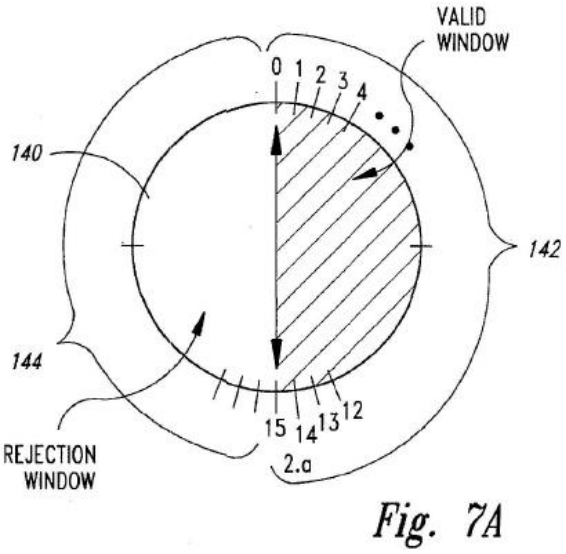


Fig. 7A

Figure 7A illustrates a window used with the packet radio communication system of the '625 patent according to the protocol of the '625 patent before the transmission of a message. *Id.* at 9:9–13. The window has circle 140 with sequence numbers on the circumference of the circle representing the possible values that can be contained in a set of possible sequence numbers. *Id.* at 9:13–16. Some predetermined fraction of the set of possible sequence numbers constitutes the set of sequence numbers in "valid" window 142, and

the set of remaining possible sequence numbers constitutes the set of sequence numbers in "rejection" window 144. *Id.* at 9:20–24.

When the message source does not receive a response ("UA") acknowledging receipt of the transmitted message, the message is retransmitted for a certain predetermined number of times. *Id.* at 10:4–8. A source unit and a destination unit will allow as many messages as there are in "valid" window 142 to become lost while still maintaining synchronization. *Id.* at 10:15–17.

Figures 8A and 8B, reproduced below, show what happens if five packets are lost. *Id.* at 10:17–18.

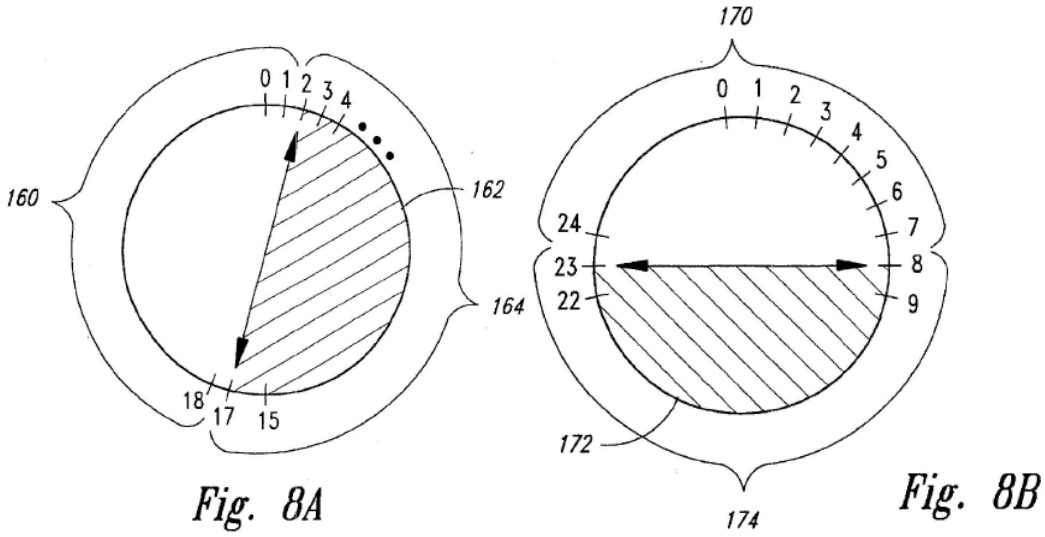


Fig. 8A Fig. 8B

Figure 8A illustrates rejection window 160 in circle set of acceptable sequence numbers 162 at a destination unit of the packet radio communication system *before* the rejection window is updated in response to the receipt of a "lost" message. *Id.* at 10:18–24. Figure 8B illustrates rejection window 170 in circle set of acceptable sequence numbers 172 at the destination unit *after* the rejection window is updated in response to the receipt of a "lost" message. *Id.* at 10:24–28. In Figure 8A, it is assumed that out of 8 packets sent,

packets 0 and 1 were successfully received to define "valid" window 164 and packets 2 through 6 were lost. *Id.* at 10:28–30. As a result, "valid" window 164 did not advance further. *Id.* at 10:30–32. Each time a packet was transmitted, the sender unit incremented its sequence count. *Id.* at 10:32–34. However, because these packets were lost, the destination unit did not receive them and "valid" window 164 is still set between 2 and 17. *Id.* at 10:34–37. When packet 7 eventually arrives at the destination unit, it falls within "valid" window 164 and is accepted by the destination unit. *Id.* at 10:37–39. The destination unit then sets its internal sequence count to 8 as shown in Figure 8B and slides its "valid" window 164 to the position of "valid" window 174, shown in Figure 8B, to allow packets 8 through 23. *Id.* at 10:39–42.

Analysis

Independent claim 1 recites

> a transmitter in the data network commanding a receiver in the data network to a) receive at least one packet having a sequence number that is not consecutive with a sequence number of a previously received packet and b) release any expectation of receiving outstanding packets having sequence numbers prior to the at least one packet.

Petitioner relies upon Garrabrant's disclosure of sending a "lost" message that instructs the receiver to move its window forward upon receipt of the next received packet. Pet. 31 (citing Ex. 1002, Figs. 8A, 8B, 10:14–42). In the example illustrated in Figures 8A and 8B, the "lost" message instructs the receiver to receive a packet (packet 7) having a sequence number that is not consecutive with a sequence number of a previously received packet (packets 0 and 1), and release

any expectation of receiving outstanding packets having sequence numbers prior to the at least one packet (i.e., moving "valid" window forward to allow packets 8 through 23, thereby giving up on packets 2 through 5). *Id.*

Patent Owner argues as follows:

> A "lost" message is not a unique command (or even a command for that matter); a "lost" message that is received by a receiver is no different from, nor treated differently from any other message (or packet) received by the receiver—that is why Garrabrant puts that term in quotes. (*See id.* at 10:18-28 ("a 'lost' message").) Upon receipt of a message, the Garrabrant receiver adjusts its valid window (and concomitantly the rejection window) based upon the sequence number of every received message—whether that received message is a "lost" message or one received in sequence.

PO Resp. 26. According to Patent Owner, "[a]n analysis of Figs. 8A and 8B shows that the 'lost' message disclosed in Garrabrant does not command the receiver to accept anything, let alone a packet." *Id.* at 28. Although Garrabrant describes Figure 8B as representing the rejection window after it is updated in response to receipt of "a 'lost' message" (Ex. 1002, 10:24–28), Patent Owner argues that the "lost" message referred to is actually packet 7. PO Resp. 29 (citing 1002, 10:37–42). Patent Owner also argues that if the "lost" message were a command, it would be listed in Garrabrant's two tables of commands, which it is not. *Id.* at 24–25.

Petitioner counters that Garrabrant's description of "a 'lost' message" refers to "a control message *named* 'lost.'" Pet. Reply 7. Petitioner emphasizes Garrabrant's disclosure that "the rejection window [is] updated in response to the receipt of a 'lost' message."

Id. With respect to the tables of commands, Petitioner argues that "Garrabrant never states that the messages in the tables are the 'only' commands allowed" and that "Garrabrant never excludes other commands from being present." *Id.* at 8. Petitioner concludes that "[Patent] Owner's argument does not preclude either of these types of command messages from transmitting the 'lost' message." *Id.* at 9.

In light of the arguments and evidence, we are not persuaded that Petitioner has demonstrated, by a preponderance of the evidence, that Garrabrant discloses a control message named "lost." Garrabrant describes the rejection window in Figure 8B as having been "updated in response to the receipt of a 'lost' message." Ex. 1002, 10:24–28. Later in the same paragraph, however, Garrabrant states explicitly that valid window 174 is updated "[w]hen packet 7 eventually arrives . . . and is accepted by the destination unit." *Id.* at 10:37–42. Together, the two sentences imply that packet 7 is the "lost" message referred to at column 10, line 28. Garrabrant, however, describes only packets 2 through 6—not packet 7—as lost (*Id.* at 10:30), which implies that packet 7 is not a "lost" message. We note, however, that Garrabrant describes packets 2 through 6 as lost (without quotes). *Id.* at (10:28–30 ("In FIG. 8A it is assumed that out of 8 packets sent, packets 0 and 1 were successfully received to define the "valid" window 164 and packets 2 through 6 were lost."). We, therefore, interpret Garrabrant's use of lost (without quotes) to mean truly lost (i.e., never received by the receiver), and its use of "lost" (with quotes) to mean transmitted but not yet received, as packet 7 is at the time depicted in Figure 8A. As a result, we agree with Patent Owner that Garrabrant discloses

updating the window in response to packet 7, and does not disclose a separate control message named "lost." Because we are not persuaded that Garrabrant discloses a control message named "lost," we are not persuaded that Garrabrant discloses "causing an addressed device to execute a specific control function," as required by our construction of "commanding."

Our determination is supported by the fact that Petitioner's contention that a separate "lost" message is received before packet 7 is inconsistent with the disclosure in Garrabrant. If we were to accept Petitioner's contention that the described "lost" message is a separate control message that updates the valid window as shown in Figure 8B, then valid window 174 shown in Figure 8B would be set to allow only packets 8 through 23 before packet 7 arrived and, therefore, packet 7 would not be "accepted by the destination unit" when it "eventually arrives," as Garrabrant states. Ex. 1002, Fig. 8B, 10:39–42. Casting further doubt upon Petitioner's contention that the described "lost" message is a control message is the omission of any such message from the tables of commands disclosed in Garrabrant. *Id.* at 6:5–45.

Conclusion

We are not persuaded that Petitioner has demonstrated, by a preponderance of the evidence, that claim 1 is unpatentable as anticipated by Garrabrant.

D. Claim 1 – Anticipation by Hettich

Petitioner argues that claim 1 is unpatentable under 35 U.S.C. § 102(b) as anticipated by Hettich. Pet. 37–41. In support of this ground of unpatentability, Petitioner provides detailed explanations as

to how each claim limitation is disclosed by Hettich, and relies upon the Declaration of Dr. Bims (Ex. 1006). *Id.* (citing Ex. 1006 ¶¶ 79–90).

Patent Owner argues that claim 1 is not anticipated by Hettich because Hettich does not disclose (1) "commanding a receiver to . . . receive," as recited in claim 1; (2) "commanding a receiver to . . . release," as recited in claim 1; and (3) "discarding all packets for which acknowledgment has not been received, and which have sequence numbers prior to the at least one packet," as recited in claim 1. PO Resp. 37–46.

Upon consideration of the parties' contentions and supporting evidence, we determine that Petitioner has demonstrated, by a preponderance of the evidence, that claim 1 is anticipated by Hettich.

Hettich (Exhibit 1007)

Hettich describes a new link access protocol based on known ARQ protocols and adjusted for the special requirements of the Mobile Broadband System ("MBS") project. Ex. 1007, 4–5. Specifically, Hettich discloses an Adaptive Selective Repeat ("ASR") ARQ protocol that is a modified Selective Reject ("SR") ARQ and uses a Selective Reject (SREJ) PDU to request an individual frame again. *Id.* at 29–30. Hettich further discloses a Delay PDU that "is used to inform receivers that cells have been discarded." *Id.* at 34. The Delay PDU "is sent in the opposite direction instead of an acknowledgement"—i.e., from transmitter to receiver—and has RN (the lowest frame number that has not been received correctly yet) set equal to SN, where SN is the highest number of all of the discarded

cells. *Id.* at 28, 34. If the receiver receives a Delay PDU, it stops waiting for cells with sequence numbers less than or equal to RN. *Id.* at 35. The receiver then shifts its window and issues a corresponding acknowledgement. *Id.*

Analysis

Independent claim 1 recites

> a transmitter in the data network commanding a receiver in the data network to a) receive at least one packet having a sequence number that is not consecutive with a sequence number of a previously received packet and b) release any expectation of receiving outstanding packets having sequence numbers prior to the at least one packet.

Petitioner relies upon Hettich's disclosure of a Delay PDU that commands a receiver to shift its window, thereby releasing any expectation of receiving packets having sequence numbers less than or equal to SN and allowing the receiver to receive packets with sequence numbers greater than SN. Pet. 34–35.

Claim 1 also recites "the transmitter discarding all packets for which acknowledgment has not been received, and which have sequence numbers prior to the at least one packet." Petitioner relies upon Hettich's disclosure that the transmitter sets RN=SN in the Delay PDU, where "*SN* is the highest number of all the discarded cells," and "there cannot be valid (not discarded) cells with lower sequence numbers." *Id.* at 34. Thus, the transmitter discards all packets with sequence numbers below SN.

We are persuaded that the evidence cited by Petitioner supports Petitioner's contentions. Patent Owner presents several arguments as to why Hettich does not teach all of the limitations of the claims. PO

Resp. 37–46. Petitioner responds to these arguments. Pet. Reply 11–13. We address each argument in turn below.

"commanding a receiver to receive"

Patent Owner argues that, "the Delay PDU causes Hettich's receiver to 'stop[] waiting for cells,'" but "does not 'command' or 'order' the receiver to accept any packet, as required by the claim language." PO Resp. 39. According to Patent Owner, "[t]hat the receiver moves its window forward to allow it 'to receive a packet after SN' shows that the receiver, not the transmitter controls packet reception."

Petitioner counters that "claim 1 does not require identifying a specific sequence number. Nor does it require that the next received packet have that specific sequence number. Claim 1 only requires that there be a command to receive 'at least one packet,' which in Hettich are sequence numbers to N+1, N+2, N+3, etc." Pet. Reply 11.

We find Petitioner's arguments persuasive. Receipt of a Delay PDU causes Hettich's receiver to "shift[] the window." Ex. 1007, 35. As a result of that shift, Hettich's receiver will accept a packet, such as N+2 or N+3, that has "a sequence number that is not consecutive with a sequence number of a previously received packet," as required by claim 1. Pet. Reply 11; Ex. 1007, 35–36. Patent Owner's argument that the receiver controls packet reception because it moves its window forward is not persuasive because it does so in response to Hettich's Delay PDU sent by the transmitter.

"commanding a receiver to release"

Patent Owner argues that "a Delay PDU does not command a receiver to release expectations of receiving outstanding packets having a sequence number *prior to* a received out of sequence packet" because it "merely release[s] expectation of receiving outstanding packets having sequence numbers equal to or less than the sequence number of the Delay PDU, not packets having sequence numbers prior to the out of sequence packet." PO Resp. 40. Patent Owner argues that, in Hettich, it is possible for the next packet received by the receiver to have a non-sequential SN. *Id.* at 40–41. Patent Owner then acknowledges that the next packet received by the receiver could be sequential, but argues that a person of ordinary skill in the art would not expect it to be. *Id.* at 41–42.

Petitioner counters that Hettich's "transmitter would be able to send the DELAY N command and then send packet N+1 next, and this would be readily understood." Pet. Reply 12. Petitioner also argues that, "[a]t a minimum, Hettich implicitly discloses (and certainly does not exclude) sending N+1 as the next packet." *Id.* Finally, Petitioner argues that "claim 1 does not require the next packet actually sent to have any particular sequence number, only that the receiver be ready to receive 'at least one packet' not consecutive with a previously received packet (such as N+1) and release expectations of receiving prior packets (such as N, N-1, etc.)." *Id.*

Although this limitation is amenable to two interpretations, we find Petitioner's arguments persuasive under both. To the extent that this limitation is construed to require releasing expectation of *all*

packets having a sequence number prior to the received out of sequent packet, Hettich teaches that the Delay PDU—*i.e.*, the out of sequence packet—commands the receiver to release expectation of receiving packets having a sequence number lower than SN by instructing the receiver that cells with sequence numbers less than SN have been discarded. Ex. 1007, 34. Patent Owner concedes that the Delay PDU "release[s] expectation of receiving outstanding packets having sequence numbers *equal to or less than* the sequence number of the Delay PDU." PO Resp. 40 (emphasis added). Thus, when SN is equal to the sequence number of the Delay PDU, the receiver "release[s] any expectation of receiving outstanding packets having sequence numbers prior to the at least one packet [i.e., the Delay PDU]," as recited in claim 1. Ex. 1007, 34–36. To the extent that this limitation is construed to require releasing expectation of receiving *at least some* outstanding packets, Hettich's Delay PDU does so when SN is less than the sequence number of the Delay PDU. *Id.*

With respect to whether the next packet would be sequential, claim 1 does not require that the next received packet have a particular sequence number. It requires only that that packet's sequence number "is not consecutive with a sequence number of a previously received packet." As a result, Patent Owner's arguments are not persuasive because they are not commensurate with the limitations of the claim.

Discarding unacknowledged packets

Patent Owner argues that, "Hettich is silent as to whether acknowledgment has been received for any of the non-discarded cells having sequence numbers between the Delay PDU and the next

received out of order packet." PO Resp. 43. According to Patent Owner, "the transmitter in Hettich may contain one or more non-discarded cells for which acknowledgement has not been received, and which have sequence numbers prior to the first cell that the receiver received after reception of the Delay PDU." *Id.*

Petitioner counters that "[w]hile possible, it is understood that the transmitter could send DELAY N and then send packet N+1." Pet. Reply 13. According to Petitioner, "as long as the transmitter discards packets meeting the conditions of claim 1, claim 1 is met whether or not the transmitter discards other packets." *Id.*

We find Petitioner's arguments to be persuasive. Hettich discloses that the "[t]he Delay PDU is used to inform receivers that cells have been discarded." Ex. 1007, 34. "SN is the highest number of all of the discarded cells." *Id.* Thus, Hettich discloses that the transmitter discards all packets having sequence numbers less than or equal to SN. Patent Owner concedes that SN may be the sequence number of the Delay PDU itself. PO Resp. 40 (the Delay PDU "release[s] expectation of receiving outstanding packets having sequence numbers *equal to or less than* the sequence number of the Delay PDU." (emphasis added)). Thus, Hettich discloses "discarding all packets . . . which have sequence numbers prior to the at least one packet [i.e., the Delay PDU]" because the transmitter discards *all* packets that have a sequence number prior to the Delay PDU. It discards all packets that have a sequence number prior to the Delay PDU, including, *inter alia*, those "for which acknowledgement has not

been received," as required by claim 1. Thus, we are persuaded that Hettich discloses the limitation.

Conclusion

We determine that Petitioner has established, by a preponderance of evidence, that Hettich anticipates claim 1.

E. Claim 1 – Obviousness over Walke

Petitioner argues that claim 1 is unpatentable under 35 U.S.C. § 103(a) as obvious over Adams. Pet. 41–47. In support of this ground of unpatentability, Petitioner provides detailed explanations as to how each claim limitation is taught or suggested by Walke, and relies upon the Declaration of Dr. Bims. *Id*. (citing Ex. 1006 ¶¶ 91–99).

Patent Owner argues that claim 1 is not obvious over Walke because Walke does not disclose (1) "commanding a receiver to . . . receive," as recited in claim 1; (2) "commanding a receiver to . . . release," as recited in claim 1; and (3) "discarding all packets for which acknowledgment has not been received, and which have sequence numbers prior to the at least one packet," as recited in claim 1. PO Resp. 46–54.

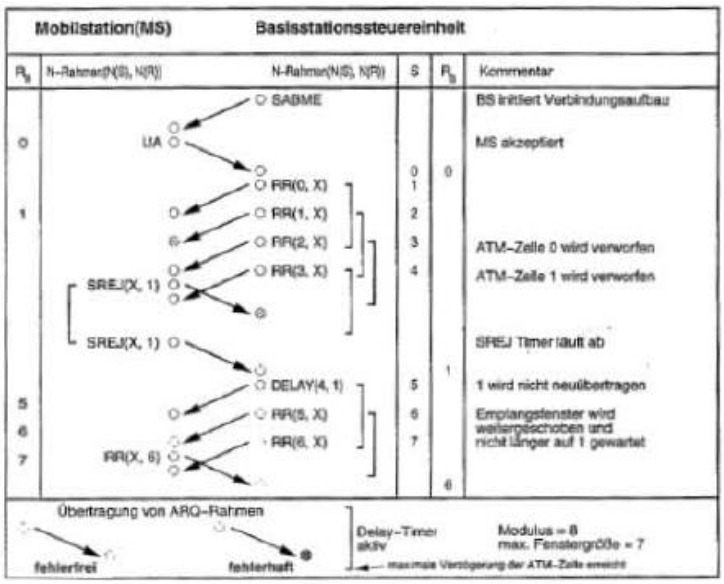
Upon consideration of the parties' contentions and supporting evidence, we determine that Petitioner has not demonstrated, by a preponderance of the evidence, that claim 1 is obvious over Walke.

Walke (Exhibit 1008)

Walke describes a mobile communication system in which Asynchronous Transfer Mode ("ATM") network cells can be transmitted via a radio interface with a quality of service comparable

to that achieved ordinarily by a fixed network of similar capacity. Ex. 1008, col. 3. Walke discloses "specific measures to ensure that the required connection-specific quality of service parameters 'maximum ATM cell-loss rate' and 'maximum ATM cell delay' are complied with," namely, "error-correction processes involving automatic repeat request (ARQ) processes." *Id.* The error correction process according to the invention uses an improved selective repeat (SR) algorithm by using a Selective Reject (SREJ) order to request retransmission of individual ATM cells. *Id.* at col. 11. In one embodiment of the error correction process, the sending station can reject ATM cells that have exceeded their maximum permitted delay. If a receiver issues a retransmission request for an ATM cell, but the cell reaches its maximum delay in the meantime, the sender rejects the ATM cell. *Id.* at col. 12. The sender informs the receiver that this ATM cell will not be retransmitted by using a delay order, which is treated as an acknowledgement, but is generated by the sender and sent to the receiver. *Id.* at cols. 12–13. The receipt sequence number N(R) in this command is set to the sequence number of the rejected ATM cell. *Id.* The delay command is piggybacked by an N frame and, as a result, the N frame becomes a delay frame. *Id.*

Figure 9 of Walke is reproduced below.



ATM cell 0 is rejected
ATM cell 1 is rejected
SREJ timer expires
1 is not retransmitted
Receive window is widened and no longer waited on 1
Delay timer active
Maximum delay of ATM cell achieved

[See FIG. 8 for other words in diagram]

FIG. 9: Treatment of rejected ATM cells

Figure 9 shows an exemplary protocol sequence showing the treatment of outdated ATM cells. *Id.* at cols. 12–13. ATM cell RR(0, X) is received correctly. *Id.* ATM cell RR(1, X) is not received correctly. ATM cell RR(2, X) is received correctly. *Id.* The receiver sends a selective reject message SREJ(X, 1) indicating that ATM cell RR(1, X) was not received. *Id.* The transmitter decides to discard ATM cell RR(1, X) so it sends DELAY(4, 1) to the receiver. The DELAY message "tells the receiver not to wait for anything else on frame 1 and it is able to widen its receive window." *Id.* at col. 13.

Analysis

Independent claim 1 recites

> a transmitter in the data network commanding a receiver in the data network to a) receive at least one packet having a sequence number that is not consecutive with a sequence number of a previously received packet and b) release any expectation of receiving outstanding packets having sequence numbers prior to the at least one packet.

Petitioner relies upon Walke's teaching of a DELAY message that instructs the receiver to receive a packet (i.e., packet #4 in the example of Figure 9) and release expectation of receiving an outstanding packet (i.e., packet #1 in the example of Figure 9) having a sequence number prior to the at least one packet. Pet. 44–46 (citing Ex. 1008, cols. 12–13 (Section 2.6)). Petitioner provides an example and acknowledges that, "[i]n this example . . . the DELAY (4,1) message causes the receiver to release packet #1, but not packets #2 and #3 (and thus not 'all packets . . . [that] have sequence numbers prior to the at least one packet' as recited in Claim 1 of the '625 patent)." Pet. 44. Petitioner argues, however, that one of ordinary skill in the art would understand that Walke discloses the claimed method under certain conditions—i.e., where the DELAY message is DELAY(n, n-1). Pet. 44–45, 47.

Patent Owner argues that "Walke does not disclose a receiver releasing any expectation of receiving outstanding packets because the Walke Delay message addresses only a single packet." PO Resp. 49. According to Patent Owner, "[i]f multiple outstanding packets having sequence numbers between the discarded packet identified by the Delay message and the first received message exist, the Delay message would not have released any expectation of receiving those outstanding packets." *Id.*

Petitioner counters that Walke performs the method in certain circumstances and that, "a method claim is anticipated whenever the method is performed, no matter how frequently." Pet. Reply 14 ("For example, when Delay (4, 3) is sent and only packet #3 is outstanding,

the method of releasing expectation of receiving "all" outstanding packets below #4 (*i.e.*, #3) is met.").

We are persuaded by Patent Owner's argument. Because Walke's DELAY message identifies only a single packet, it is a command to release any expectation of receiving only one packet having a particular sequence number, not a command "release any expectation of receiving outstanding *packets* [plural] having sequence numbers prior to the at least one packet," as required by claim 1 (emphasis added).

Conclusion

We are persuaded that Petitioner has not demonstrated, by a preponderance of the evidence, that claim 1 is unpatentable as obvious over Walke.

F. Patent Owner's Motion to Amend

Patent Owner moves to substitute claim 20 for challenged claim 1 if we find claim 1 unpatentable. Mot. to Amend 1. As stated above, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 1 is unpatentable. Therefore, Patent Owner's Motion to Amend is before us for consideration. For the reasons set forth below, Patent Owner's Motion to Amend is *denied*.

Proposed substitute claim 20 is reproduced below:

> 20. (Proposed substitute for Original claim 1) A method for discarding packets in a data network employing a packet transfer protocol including an automatic repeat request scheme, comprising the steps of:
>
> a transmitter in the data network commanding a receiver having a receiver window in the data network to

> a) receive at least one packet having a sequence number that is not consecutive with a sequence number of a previously received packet, wherein the sequence number of the at least one packet is outside of the receiver window and
>
> b) release any expectation of receiving outstanding packets having sequence numbers prior to the at least one packet; and
>
> the transmitter discarding all packets for which acknowledgment has not been received, and which have sequence numbers prior to the at least one packet.

Mot. to Amend 1–2.

As the moving party, Patent Owner bears the burden of proof to establish that it is entitled to the relief requested. 37 C.F.R. § 42.20(c). Therefore, Patent Owner's proposed substitute claims are not entered automatically, but only upon Patent Owner having demonstrated by a preponderance of the evidence the patentability of those substitute claims. *See, e.g.*, 37 C.F.R. § 42.1(d) (noting that the "default evidentiary standard [in proceedings before the Board] is a preponderance of the evidence").

1. Written Description Support

A motion to amend claims must identify clearly the written description support for each proposed substitute claim. 37 C.F.R. § 42.121(b). The requirement that the motion to amend must set forth the support in the original disclosure of the patent is with respect to *each claim*, not for a particular feature of a proposed substitute claim. The written description test is whether the original disclosure of the application relied upon reasonably conveys to a person of ordinary skill in the art that the inventor had possession of the claimed subject

matter as of the filing date. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). Thus, the motion should account for the claimed subject matter as a whole, i.e., the *entire* proposed substitute claim, when showing where there is sufficient written description support for each claim feature. *See Nichia Corp. v. Emcore Corp.*, Case IPR2012-00005, slip op. at 4 (PTAB June 3, 2013) (Paper 27).

In its Motion to Amend, Patent Owner addresses the written description support for the claimed subject matter as a whole. Mot. to Amend 4–8. For the added "wherein" clause, Patent Owner cites two portions of the '625 patent. *Id.* at 6. Petitioner argues that neither passage describes reception of a packet outside of the receiver window. Opp. to Mot. to Amend 4–6. Patent Owner counters that Petitioner's argument "is premised on the faulty assumption that the receiver and transmitter windows must be of identical size W." PO Reply 1–2. We, however, find Petitioner's arguments persuasive.

In the first passage cited by Patent Owner, the '625 patent describes reception of a packet *within* the receiver window (Ex. 1001, 6:32–36 ("If the difference between N(S) and ESN (for example, ESN1 is less than 2^{k-1}"), not reception of a packet *outside* of the receiver window. Patent Owner's expert, Dr. Akl, testified that the receiver window size may not equal the transmitter window size (Opp. to Mot. to Amend 5 (citing Ex. 1021, 116:3–118:19)), and Patent Owner argues the same (PO Reply 1–2), but this contention is undermined by Patent Owner's acknowledgement that "[t]he receiver and the transmitter must use the same arbitrary value for W so that the

receiver knows which packets to properly receive." PO Reply 1. As a result, we are not persuaded that column 6, lines 32 to 36 of the '625 patent support the proposed "wherein clause."

With respect to the second passage cited by Patent Owner, we agree with Petitioner that "[t]his disclosure simply describes having a receiver window size of up to 2^{k-1} positions; it does *not* describe receiving a packet *outside* the receiver window." Opp. to Mot. to Amend 6.

Accordingly, we are not persuaded that Patent Owner has shown adequate written description support for the proposed amendment.

2. Patentability over Prior Art

The patent owner bears the burden of proof in demonstrating patentability of the proposed substitute claims over the prior art in general, and, thus, entitlement to add these claims to its patent. *See Idle Free*, Paper 26 at 7. In a motion to amend, the patent owner must show that the conditions for novelty and non-obviousness are met with respect to the prior art available to one of ordinary skill in the art at the time of the invention. With regard to obviousness as the basis of potential unpatentability of the proposed substitute claims, the patent owner should present and discuss facts which are pertinent to the first three underlying factual inquiries of *Graham*: (1) the scope and content of the prior art, (2) differences between the claimed subject matter and the prior art, and (3) the level of ordinary skill in the art, *with special focus on the new claim features* added by the proposed substitute claims. *See Graham v. John Deere Co.*, 383 U.S.

1, 17–18 (1966). The patent owner should identify each new claim feature, and come forward with technical facts and reasoning about that particular feature. Some discussion and analysis should be made about the specific technical disclosure of the closest prior art as to each particular feature, and the level of ordinary skill in the art, in terms of ordinary creativity and the basic skill set of a person of ordinary skill in the art, regarding the feature.

Here, we are unpersuaded that Patent Owner has demonstrated, by a preponderance of the evidence, that the proposed substitute claims are patentable. Specifically, we are not persuaded that the proposed substitute claims are patentable over the combination of Hettich and Vornefeld.

Patent Owner argues that Vornefeld does not anticipate proposed substitute claim 20 because it "creates rather than releases expectation of cells having a lower sequence number." Mot. to Amend 11. It also does not render obvious proposed substitute claim 20, according to Patent Owner, because "one ordinary skill in the art would not combine a reference such as Vornefeld that creates expectations with a reference that releases expectations of receiving cells having lower sequence numbers." *Id.*

Petitioner counters that "[Patent] Owner admits that the concept of receiving packets outside a receiver window is not, by itself, novel, and identifies this mechanism in Vornefeld" and that Patent Owner's expert, Dr. Akl, "testified that it is inherent that one of skill in the art would know to transmit a packet outside the receiver window." Opp. to Mot. to Amend 7 (citing Mot. to Amend 10; Ex. 1021, 129:4–14,

144:12–144:5). Moreover, according to Petitioner, Vornefeld does not merely "create expectation of cells having a lower sequence number," as Patent Owner contends. Rather, it teaches releasing expectation of receiving at least one outstanding I-frame that has a sequence number prior to the most recently received I-frame. *Id.* at 7–9.

Patent Owner replies that proposed substitute claim 20 is not anticipated by Vornefeld. PO Reply 2–4. Patent Owner argues that because "Vornefeld[']s] receiver in Fig. 5.3 continues to wait for SN2, expectations for all outstanding packets are not released." *Id.* at 3. According to Patent Owner, "[t]he Vornefeld receiver cannot release expectations for outstanding cells because the upper layers in the receiver may require those outstanding cells." *Id.* Finally, Patent Owner argues that Broadcom has failed to rebut Patent Owner's showing of patentability because "Broadcom ignores many limitations of the amended claim, including the "releasing" limitation, the "discarding limitation," and the "transmitter limitations." *Id.*

We find Petitioner's arguments persuasive. Patent Owner acknowledges that the "concept of receiving packets outside a receiver window is not, by itself, novel," and cites Vornefeld as an example. Mot. to Amend 10. Because the added feature is not novel, we must analyze whether proposed substitute claim 20 would have been non-obvious over Vornefeld and other known prior art, such as Hettich.

We are not persuaded by Patent Owner's argument that a person of ordinary skill in the art would not have combined Vornfeled

with a reference such as Hettich. Specifically, we are not persuaded that Vornefeld "creates rather than releases expectation of cells having a lower sequence number" (Mot. to Amend 10), because Vornefeld's mechanism does result in releasing any expectation of outstanding packets having sequence numbers prior to the at least one packet (Opp. to Mot. to Amend 7–9).

We also are not persuaded by Patent Owner's arguments that proposed substitute claim 20 is "not anticipated by Vornefeld" (PO Reply 2) because anticipation is not the sole inquiry with respect to patentability; we also consider non-obviousness. For the same reasons, we are not persuaded by Patent Owner's argument that "Broadcom ignores many limitations of the amended claims, including the 'releasing' limitation, the 'discarding limitation,' and the 'transmitter limitations.'" PO Reply 3. As discussed above, we are persuaded that these other limitations are taught by Hettich.

Finally, we are not persuaded by Patent Owner's argument that Vornefeld does not release expectations for "all" outstanding packets (PO Reply 3) because proposed substitute claim 20 does not require releasing expectations for "all" outstanding packets.

3. Conclusion

For the foregoing reasons, Patent Owner has not, in its Motion to Amend, satisfied its burden of proof.

III. CONCLUSION

Petitioner has demonstrated, by a preponderance of the evidence, that claim 1 of the '625 patent is unpatentable under

35 U.S.C. § 102(b) as anticipated by Hettich. Petitoner's Motion to Amend is denied.

IV. ORDER

Accordingly, it is

ORDERED that claim 1 of the '625 patent is held unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Amend is *denied*; 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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