

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS AMERICA, INC.
and SAMSUNG ELECTRONICS CO., LTD.,
Petitioner,

v.

COLLISION COMMUNICATIONS, INC.,
Patent Owner.

IPR2024-01250
Patent 8,089,946 B2

Before BART A. GERSTENBLITH, CHARLES J. BOUDREAU, and
KEVIN C. TROCK, *Administrative Patent Judges*.

GERSTENBLITH, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. Background

Samsung Electronics America, Inc. and Samsung Electronics Co., Ltd. (collectively, “Petitioner”) filed a Petition (Paper 3, “Pet.”) requesting institution of *inter partes* review of claims 1–5, 7, 9–16, and 20 (“the Challenged Claims”) of U.S. Patent No. 8,089,946 B2 (Ex. 1001, “the ’946 patent”). Collision Communications, Inc. (“Patent Owner”) filed a Preliminary Response (Paper 7, “Prelim. Resp.”). On March 7, 2025, we authorized each of the parties to file a two-page brief “addressing the effect of the USPTO’s recent rescission of the June 21, 2022, Director’s memorandum entitled *Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation*. Ex. 3002 (email dated Mar. 7, 2025). Thereafter, Petitioner and Patent Owner filed their respective briefs. *See* Papers 9 (Petitioner’s brief), 10 (Patent Owner’s brief).

An *inter partes* review may be instituted only if “the information presented in the petition . . . and any [preliminary] response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a) (2018). For the reasons given below, on this record Petitioner has not established a reasonable likelihood that it would prevail in showing the unpatentability of any of the Challenged Claims. Accordingly, we do not institute an *inter partes* review.

B. Related Proceedings

The parties identify the following pending litigation involving the ’946 patent: *Collision Communications, Inc. v. Samsung Electronics Co.*

Ltd., 2-23-cv-00587 (E.D. Tex.). Pet. 77; Paper 8 (Patent Owner’s Updated Mandatory Notices), 2. Patent Owner also identifies the following as related proceedings: *Collision Communications, Inc. v. Nokia Corporation*,¹ 2-21-cv-00308 (E.D. Tex.); *Collision Communications, Inc. v. Lenovo Group Limited*, 2-23-cv-00594 (E.D. Tex.); *Collision Communications, Inc. v. Telefonaktiebolaget LM Ericsson*, 2-21-cv-00327 (E.D. Tex.); IPR2022-01233; IPR2024-01247; IPR2024-01248; IPR2024-01249; IPR2024-01500; IPR2025-00011; IPR2025-00284; IPR2025-00285; IPR2025-00301; IPR2025-00302; and IPR2025-00303. Paper 8, 3–4.

C. Real Parties in Interest

Petitioner identifies Samsung Electronics America, Inc. and Samsung Electronics Co., Ltd. as real parties in interest. Pet. 77. Patent Owner identifies Collision Communications, Inc. as the real party in interest. Paper 4 (Patent Owner’s Mandatory Notices), 2.

D. The Asserted Grounds of Unpatentability and Declaration Evidence

Petitioner challenges the patentability of claims 1–5, 7, 9–16, and 20 of the ’946 patent on the following three grounds (Pet. 3):

¹ Patent Owner refers to the defendant in this case as “Nokia Networks & Solutions Oy.” Paper 8, 2.

Claim(s) Challenged	35 U.S.C. § ²	Reference(s)/Basis
1–5, 7, 9–16, 20	103(a)	Walton ³
1–5, 7, 9–16, 20	103(a)	Walton, Learned ⁴
20	103(a)	Walton, Learned, Quigley ⁵

Additionally, Petitioner supports its challenge with a Declaration of Paul S. Min, Ph.D. (Ex. 1003). Patent Owner supports its Preliminary Response with a Declaration of Giuseppe Caire (Ex. 2001).

E. The '946 Patent

The '946 patent “relates to wireless networks, and more particularly, to a wireless digital signal demodulator and modulator for wireless networks where efficient use of allocated frequency bandwidth is desirable.” Ex. 1001, 1:17–20. The '946 patent teaches, as background, that “[w]ireless networks are employed to facilitate the communication between computers and other electronic devices. Digitally modulated signals like binary phase shift keying (BPSK) or quadrature phase shift keying (QPSK) signals are transmitted between the various network nodes.” *Id.* at 1:24–28. The '946 patent explains that, “[w]hat is needed . . . is a bandwidth efficient wireless network modem capable of exploiting the channel densities possible

² The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. § 103 that became effective on March 16, 2013. The '946 patent was filed before March 16, 2013 (*see, e.g.*, Ex. 1001, code (22)), and, therefore, we apply the pre-AIA version of the statutory basis for unpatentability.

³ U.S. Patent Application Publication No. US 2003/0235147 A1, published Dec. 25, 2003 (Ex. 1004, “Walton”).

⁴ U.S. Patent No. 7,190,743 B2, issued Mar. 13, 2007 (Ex. 1005, “Learned”).

⁵ U.S. Patent No. 7,139,283 B2, issued Nov. 21, 2006 (Ex. 1006, “Quigley”).

with multiuser receivers.” *Id.* at 3:4–6. And that “there is a need for a wireless digital signal demodulator/modulator for wireless networks where efficient use of allocated frequency bandwidth is desirable.” *Id.* at 3:6–9.

Figure 1 of the ’946 patent is reproduced below.

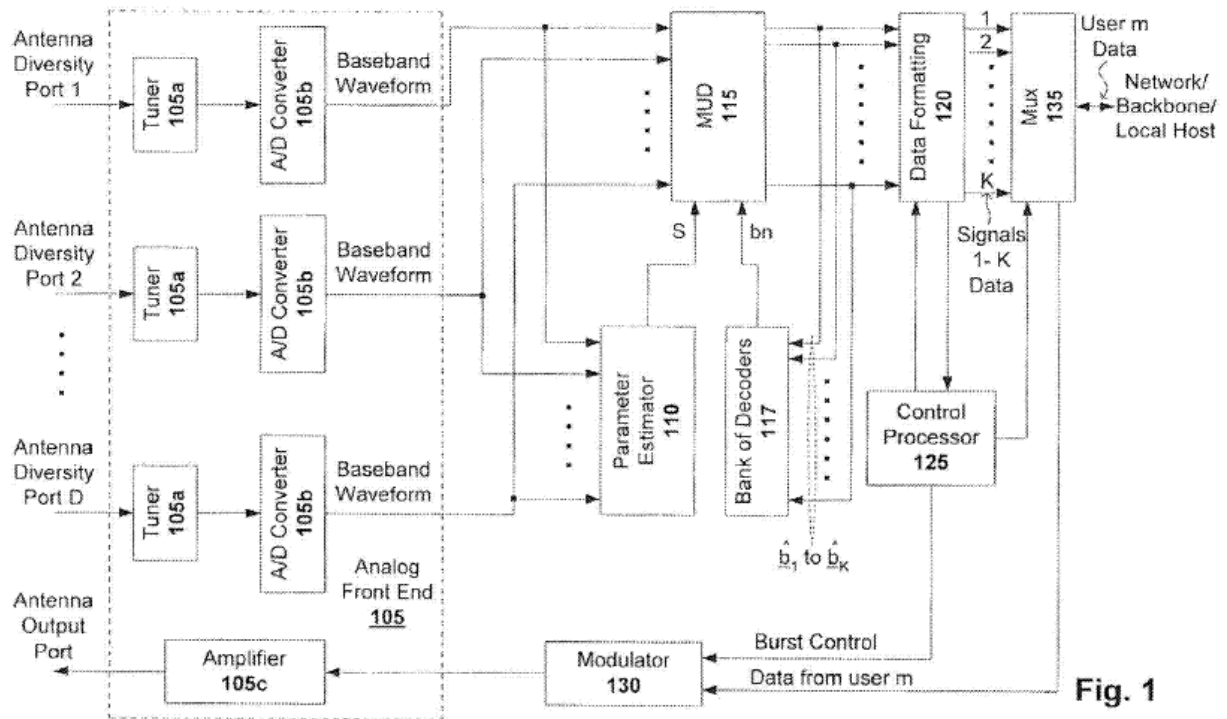


Figure 1 “illustrates a block diagram of a modem configured for demodulating/modulating co-channel signals in the radiofrequency band.”

Ex. 1001, 5:18–21. The ’946 patent explains that “[t]he modem includes an analog front end 105, a parameter estimator module 110, a multiuser detection (MUD) module 115, a bank of decoders 117, a data formatting module 120, a control processor 125, a modulator 130, and a demultiplexer 135.” *Id.* at 12:46–50. Analog front end 105 “includes a number of antenna inputs, with each input associated with a tuner 105a and an analog-to-digital (A/D) converter 105b, and an amplifier 105c.” *Id.* at 12:50–53.

The '946 patent explains the following about the “receiver side”:

On the receiver side, wirelessly transmitted signals are received at the antenna diversity ports, processed through the analog front end 105, demodulated/recovered by modules 110, 115, and 117, and formatted by data formatting module 120. The resulting data signals 1-K are then provided to demultiplexer 135, which is adapted to select data signal *m*, the signal of interest (one of the data signals 1-K). This selected signal *m* is then provided to user *m*, for example, via a network or direct connections. The data formatting module 120 and the demultiplexer 135 operate pursuant to control input from the control processor 125.

Ex. 1001, 12:54–64. On the transmitter side,

the demultiplexer 135 receives transmission data *m* from the network/backbone or local host using a bidirectional line from user *m*. The data is modulated by module 130 in accordance with burst control provided by the control processor 125, amplified by amplifier 105c, and provided to the antenna output port for wireless transmission. In general, control processor 125 controls the flow of data out of the modulator 130, thereby controlling when the modem transmits, and when the modem does not transmit for user *m*.

Id. at 12:65–13:7.

The '946 patent teaches that data formatting module 120 “is implemented in conventional technology, but is further adapted to operate in conjunction with the control processor 125. In particular, control processor 125 may be configured to select the formatting mode in which the data formatting module 120 operates.” Ex. 1001, 14:20–24. The '946 patent explains the following regarding control processor 125:

The control processor 125 is configured to detect whether the wirelessly received data for each user *k* has been transmitted in accordance with the principles of the present invention, and also to detect which of the received data signals 1-K is the intended

data signal m, based on packet header information provided by the data formatting module 120. The control processor 125 enables the corresponding transmission mode (e.g., legacy mode or bandwidth efficient mode in accordance with the present invention). The control processor 125 also executes the channel assignment arbitration sequences and data transmission timing sequences necessary to operate in accordance with the present invention.

Id. at 14:29–40. The '946 patent continues:

The recovered data signals 1-K are output by the data formatting module 120, and provided to the demultiplexer 135, which selects the intended signal m based on input provided by the control processor 125. In one example embodiment, the control processor 125 receives packet header information for each of the received signals 1-K from the data formatting module 120. The packet header information of a data signal includes, among other information, the intended destination of that data signal. As such, the data signal intended for a particular modem can be identified, while the other received data signals can be ignored. Thus, the control processor 125 interrogates header information, and provides a control signal to the demultiplexer 135 that allows only the intended data signal m to be passed. In addition, the control processor 125 uses the packet headers of the interfering modems to determine which modems are sharing the channel. The source and destination addresses of the packet headers allow the control processor 125 to maintain logs of which modems are able to successfully transmit and receive data simultaneously. These logs facilitate adaptive scheduling techniques.

Id. at 14:41–61.

F. Illustrative Claim

Claims 1, 10, and 20 are the independent challenged claims.

Claims 2–5, 7, and 9 depend from claim 1. Claims 11–16 depend directly or indirectly from claim 10. Claim 1 is illustrative of the claimed subject

matter and is reproduced below with Petitioner's bracketing (identifying the preamble (1pre) and limitations 1a–1d) added for reference:

1. [1pre] A modem which enables efficient use of bandwidth in a multiuser wireless network including a plurality of modems in the presence of interference and noise, the modem comprising:

[1a] a multiuser detection (MUD) module configured to simultaneously demodulate and recover K wirelessly transmitted signals using co-channel demodulation;

[1b] a data formatting module operatively coupled to the multiuser detection module, and configured to produce network data packets for at least one of the K recovered signals;

[1c] a control processor operatively coupled to the formatting module, and configured to detect with which protocol mode the at least one of the K recovered signals was transmitted, and to enable a corresponding transmission mode including one of a legacy protocol mode and a bandwidth efficient aggressive access protocol mode that exploits co-channel demodulation capabilities of the modem, wherein the signals of the one of a legacy protocol mode can be selected from the group consisting of low data rate BPSK, QPSK, [Gaussian minimum-shift keying (GMSK)] and [orbital angular momentum (OAM)]; and

[1d] a demultiplexer operatively coupled to the data formatting module and the control processor, and configured to select one of the recovered K wirelessly transmitted signals as a target signal intended for a user associated with the modem, where the selection is based on a control input from the control processor, wherein the data formatting module supports multiple types of

format modes, and the control processor is configured to select a network data packet formatting mode in which the data formatting operates.

Ex. 1001, 23:22–52; *see* Pet. 2⁶ (indicating Petitioner’s bracketing).

II. ANALYSIS

A. Legal Standards – Obviousness

The U.S. Supreme Court set forth the framework for applying the statutory language of 35 U.S.C. § 103 in *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966):

Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

The Supreme Court explained in *KSR International Co. v. Teleflex Inc.* that

[o]ften, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion

⁶ The Petition contains two sets of page numbers 1–8, the first set starting with the Exhibit List and the second set starting with the Introduction. This citation is to page “2” of the first set of page numbers 1–8. Pet. 2 (List of Challenged Claims). Other citations herein to the first set of pages 1–8 are clear from the context of the citation.

claimed by the patent at issue. To facilitate review, this analysis should be made explicit.

550 U.S. 398, 418 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” (alteration in original))).

“Whether an ordinarily skilled artisan would have been motivated to modify the teachings of a reference is a question of fact.” *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1327 (Fed. Cir. 2016) (citations omitted). “[W]here a party argues a skilled artisan would have been motivated to combine references, it must show the artisan ‘would have had a reasonable expectation of success from doing so.’” *Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1360–61 (Fed. Cir. 2017) (quoting *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1068–69 (Fed. Cir. 2012)).

B. Level of Ordinary Skill in the Art

Petitioner, supported by Dr. Min’s testimony, proposes that a person of ordinary skill in the art at the time of the invention would have had “at least a bachelor’s [degree] in [electrical engineering, computer engineering, or computer science], physics, or equivalent, and two years of experience with cellular telecommunications, radio-access network architectures, protocols and signal propagation in wireless networks.” Pet. 3 (citing Ex. 1003 ¶ 59). Dr. Min testifies that “[a]dditional education could substitute for professional experience and vice versa.” Ex. 1003 ¶ 59. Additionally, Petitioner contends that Dr. Min “exceeded this level of

experience by the priority date.” Pet. 3 (citing Ex. 1010 (curriculum vitae of Dr. Min)).

In its Preliminary Response, Patent Owner does not take a position on the relevant level of ordinary skill in the art. *See generally* Prelim. Resp.

At this stage of the proceeding and on the present record, we adopt Petitioner’s uncontested proposed level of ordinary skill in the art, which we find consistent with the level of ordinary skill in the art reflected by the ’946 patent and the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978).

C. Claim Construction

In an *inter partes* review proceeding, claims are construed using the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. § 282(b). *See* 37 C.F.R. § 42.100(b) (2024). The claim construction standard includes construing claims in accordance with the ordinary and customary meaning of such claims, as would have been understood by one of ordinary skill in the art at the time of the invention. *See id.*; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc). In construing claims in accordance with their ordinary and customary meaning, we take into account the specification and prosecution history. *Phillips*, 415 F.3d at 1315–17.

Additionally, only terms that are in controversy need to be construed, and these need be construed only to the extent necessary to resolve the controversy. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the

controversy.”)(quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Neither party contends that any claim terms require an express construction to resolve the present controversy. Pet. 8 (“For purposes of this Petition only, Petitioner does not believe any terms require a formal construction.”); *see generally* Prelim. Resp. Nonetheless, Petitioner explains that the Petition is structured such that “Ground 1 is based on Patent Owner’s infringement contentions in the district court litigation, where the claimed ‘MUD module’ is generally mapped to multiple-input multiple-output (MIMO) receivers in a wireless network.” Pet. 2. Petitioner contends that “[u]nder this broad interpretation of a ‘MUD module,’ Walton’s MIMO receiver renders every challenged claim obvious.” *Id.* In contrast to Ground 1, the Petition states that “Ground 2 is based on the plain meaning of ‘MUD module,’ which is a component that detects, separates, and decodes signals from multiple users transmitting simultaneously over the same frequency band.” *Id.* Petitioner contends that, “[a]pplying the correct meaning of the term, Walton’s MIMO receiver does not necessarily comprise a MUD module.” *Id.* Therefore, Petitioner explains that “Ground 2 combines Walton with Learned, which expressly discloses [a] multi-user detector, and thus renders every challenged claim obvious in combination with Walton.” *Id.* at 2–3.⁷ In other words, the Petition presents Ground 1 and Grounds 2/3 as alternatives depending on the meaning of

⁷ Although not specifically relevant to claim construction, Petitioner explains that “Ground 3 further combines Walton and Learned with Quigley, to the extent Patent Owner argues Walton does not disclose providing a burst control input.” Pet. 3.

“MUD module,” where Ground 1 is based on Petitioner’s understanding of Patent Owner’s interpretation of the term and Grounds 2 and 3 are based on Petitioner’s interpretation of the term as having its plain meaning. Petitioner further contends that “[e]very other claim term carries its ‘ordinary and customary meaning’” *Id.* at 8.

Although Petitioner presents a potential dispute regarding the meaning of “MUD module,” we need not construe this term expressly because the determination we reach herein does not depend on which meaning MUD module is applied. Accordingly, we do not construe any claim terms expressly because express constructions are not necessary to resolve the controversy before us. *See Realtime Data*, 912 F.3d at 1375.

D. Ground 1: Obviousness over Walton

Petitioner, relying on the testimony of Dr. Min, contends that claims 1–5, 7, 9–16, and 20 would have been obvious to one of ordinary skill in the art in light of Walton. Pet. 10–57. Patent Owner opposes Petitioner’s challenge. *See, e.g.,* Prelim. Resp. 30–40.

1. Scope and Content of the Prior Art

a. Walton (Ex. 1004)

Walton is directed to “data communication, and more specifically to techniques for transmitting data using a number of diversity transmission modes in MIMO [orthogonal frequency division multiplexing (OFDM)] systems.” Ex. 1004 ¶ 2. Walton teaches a multiuser network wherein “receive processor 260 . . . receives and processes the streams of samples from all receivers 254 to provide recovered symbols (i.e., demodulated data).” *Id.* ¶ 42. Walton explains that “receive (RX) data processor 262 then symbol demaps, deinterleaves, and decodes the recovered symbols to

obtain the user-specific data.” *Id.* ¶ 43. Walton teaches “various coding and modulation schemes that may be used to achieve a range of spectral efficiencies (or bit rates) using convolutional and Turbo codes.” *Id.* ¶ 56. In Table 1, Walton uses BPSK, QPSK, 16-QAM (quadrature amplitude modulation), and 64-QAM for bit rates, and Walton explains that “[o]ther modulation schemes . . . may also be used.” *Id.* ¶ 57.

2. *Claim 1*

Petitioner contends Walton would have rendered the subject matter of claim 1 obvious to one of ordinary skill in the art. Pet. 10–27. Patent Owner, *inter alia*, contends that the Petition fails to show that Walton’s demultiplexer is configured to select one of the recovered K wirelessly transmitted signals as a target signal based on a control input from the control processor, as recited in limitation 1d. Prelim. Resp. 37–40. Because we find this issue dispositive for Petitioner’s challenge based on Walton, we focus our discussion here.

Limitation 1d recites:

a demultiplexer operatively coupled to the data formatting module and the control processor, and configured to select one of the recovered K wirelessly transmitted signals as a target signal intended for a user associated with the modem, *where the selection is based on a control input from the control processor*, wherein the data formatting module supports multiple types of format modes, and the control processor is configured to select a network data packet formatting mode in which the data formatting operates.

Pet. 2 (emphasis added); *see* Ex. 1001, 23:43–52. The Petition divides limitation 1d into three clauses as reflected in the discussion below.

First, the Petition addresses “[a] demultiplexer . . . configured to select one of the recovered K wirelessly transmitted signals as a target signal intended for a user associated with the modem.” Pet. 23 (omission in original). Regarding this clause of limitation 1d, Petitioner contends:

Although this limitation recites a “demultiplexer,” the function the element is described as performing (“select[ing] one of the recovered K wirelessly transmitted signal”) is that of a “multiplexer.” EX1003, ¶¶104-105. A [person of ordinary skill in the art] would have been familiar with demultiplexers and multiplexers, and would have known that a demultiplexer takes a single input signal and outputs multiple signals, while a multiplexer (also often referred to as a “data selector”) takes multiple signals as input and selects one of the input signals to forward. *Id.* Accordingly, a [person of ordinary skill in the art] would have understood the claimed “demultiplexer” implements functionality that in the prior art would be attributed to a multiplexer.

Walton teaches a multiplexer configured to select one of the recovered K wirelessly transmitted signals as a target signal intended for a user associated with the modem because “multiplexer 1140 *receives the recovered symbols [i.e., the recovered K wirelessly transmitted signals]* from RX subband processors 1120a through 1120f *and multiplexes these symbols into a recovered symbol stream, $\hat{s}_i(n)$, for receive antenna i [i.e., a target signal intended for a user].*” EX1004, ¶156; EX1003, ¶¶104-107.

Walton further confirms that the “receive (RX) data processor 262 [] symbol demaps, deinterleaves, and decodes the recovered symbols to obtain the user-specific data,” i.e., *a target signal intended for a user.* EX1004, ¶43; *see also* Claim 17 (“The method of claim 1, wherein at least one data stream is *user-specific* and transmitted for a *specific receiver device.*”).

Pet. 23–24 (alterations and omissions in original).

Second, the Petition addresses “[o]peratively coupled to the data formatting module and the control processor.” Pet. 25. Petitioner contends the following regarding this clause of limitation 1d: “Figure 11 (below) in Walton ‘is a block diagram of an RX antenna processor within the RX diversity processor,’ (EX1004, ¶29) which includes Walton’s multiplexer. The RX diversity processor is in turn included in Walton’s receive processors 260. EX1004, Figs. 2, 9, 11.” Pet. 25. Petitioner includes the following annotated version of Walton’s Figure 11.

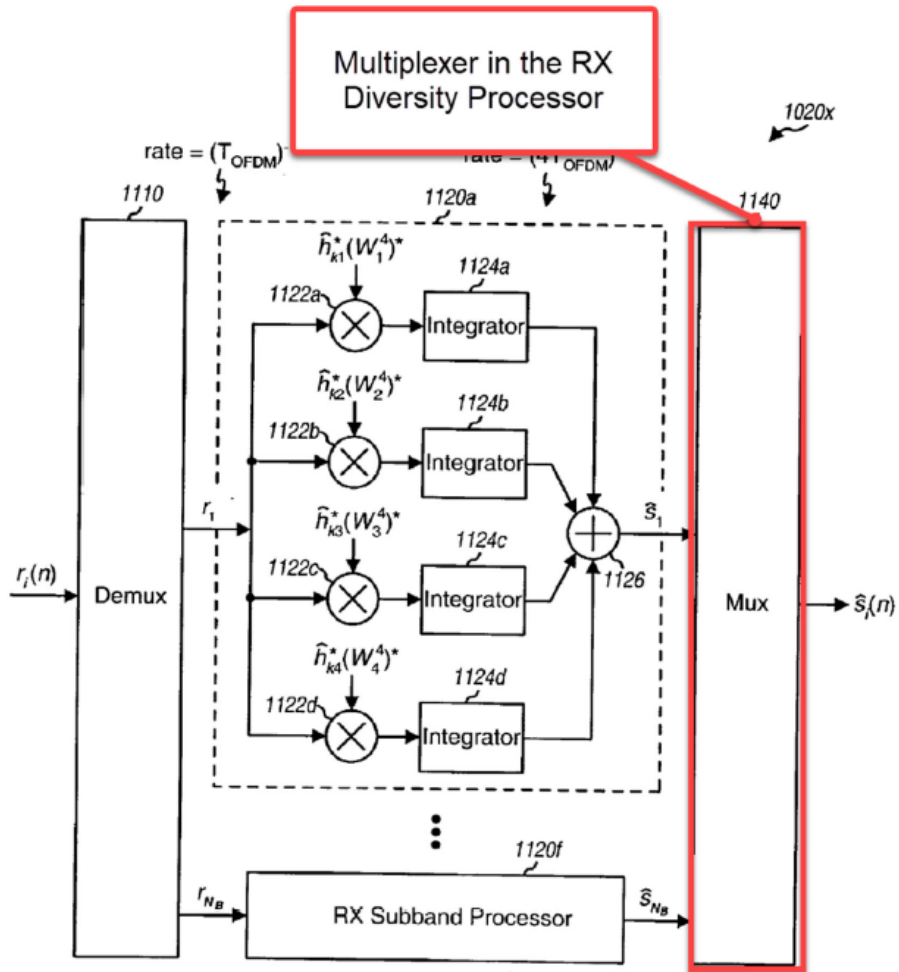
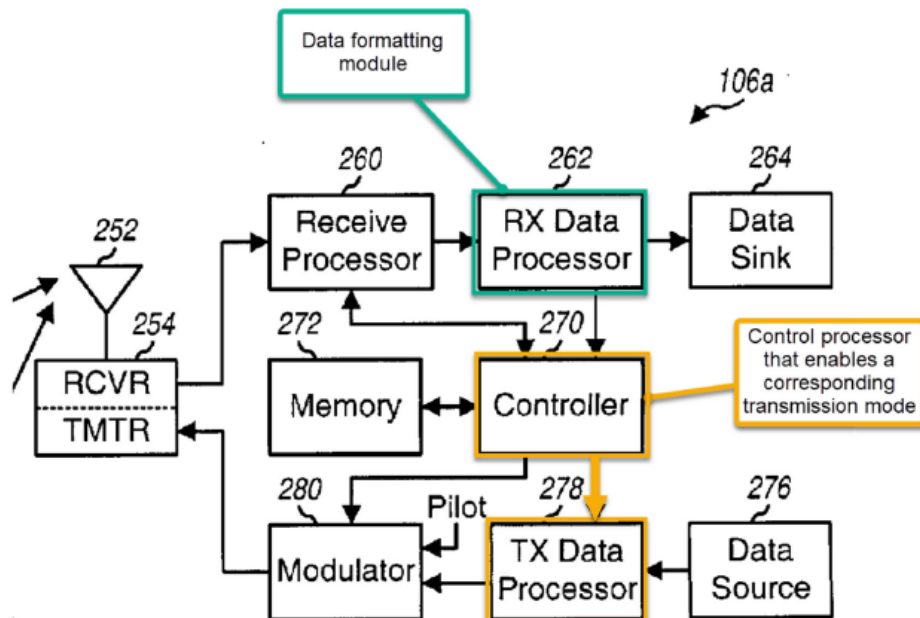


FIG. 11

Id. Walton’s Figure 11 “is a block diagram of an RX antenna processor within the RX diversity processor and which may be used for the Walsh

diversity scheme.” Ex. 1004 ¶ 27. Petitioner annotated Figure 11 to include a red box around Multiplexer (Mux) 1140, which Petitioner labels “Multiplexer in the RX Diversity Processor.” Pet. 25.

The Petition further asserts that, “[a]s discussed in limitation 1b and shown in Figure 2 (below), the receive processor (and thus the multiplexer) *is operatively coupled* to both the RX data processor (the *data formatting module*) and the controller (the *control processor*).” Pet. 26. Petitioner’s annotated version of a portion of Walton’s Figure 2 is reproduced below.



Id. Figure 2 “is a block diagram of an embodiment of an access point and two terminals.” Ex. 1004 ¶ 20. Petitioner includes a portion of Figure 2 showing one of the terminals—106a. Pet. 26; Ex. 1004 ¶¶ 20, 38. Petitioner annotates this portion of Figure 2 to identify RX Data Processor 262 as a “Data formatting module,” Controller 270 as “Control processor that enables a corresponding transmission mode,” and emphasizes, with yellow, an arrow pointing from Controller 270 to TX Data Processor 278. Pet. 26.

Third, the Petition addresses “[w]here the selection is based on a control input from the control processor, wherein the data formatting module supports multiple types of format modes, and the control processor is configured to select a network data packet formatting mode in which the data formatting operates.” Pet. 26. Petitioner contends the following regarding this clause of limitation 1d:

Walton discloses that controller 270 (*i.e.*, ***the control processor***) “direct[s] the operation at the access point and the terminal,” and “may be designed to perform various functions related to diversity processing at the receiver,” including “determin[ing] the diversity transmission mode used for each data stream . . . [and] further direct[ing] the operation of RX diversity processor.”

Id. at 26–27 (alterations and omissions in original). Petitioner asserts that a person of ordinary skill in the art

would have understood that the controller processor, by directing the operation and the terminal and determining the diversity transmission mode, provides a **control input** that is used to **select the network data packet formatting mode** corresponding to the terminal operation and diversity transmission mode. EX1003, ¶¶109-111. EX1004, ¶44. In addition, as discussed above, Walton discloses multiple diversity transmission modes (*i.e.*, **multiple types of format modes**) that are supposed by the RX data processor (the **data formatting module**). *Id.* ¶¶14, 72-75, 135-140; EX1003, ¶¶109-111.

Id. at 27.

Patent Owner contends that “[a]ll of the challenged claims require that the claimed demultiplexer must select a target signal based on a control input received from the control processor,” as reflected in emphasis in Patent Owner’s recitation of limitation 1d:

a demultiplexer operatively coupled to the data formatting module and the control processor, and **configured to select one of the recovered K wirelessly transmitted signals as a target signal** intended for a user associated with the modem, **where the selection is based on a control input from the control processor**, wherein the data formatting module supports multiple types of format modes, and the control processor is configured to select a network data packet formatting mode in which the data formatting operates.

Prelim. Resp. 37. But, Patent Owner contends, (1) “[t]he Petition does not even assert, much less prove, that the purported *Walton* demultiplexer selects a target signal based on control input from the control processor” and (2) “[t]he Petition fails to identify any evidence that the purported *Walton* control processor provides any control input to the purported *Walton* demultiplexer.” *Id.*

First, as noted above, Patent Owner contends that, “critically, the Petition does not even assert” that “multiplexer 1140 . . . select[s] a target signal based on a control input received from the control processor.” Prelim. Resp. 38. “Instead, the Petition irrelevantly asserts only that *Walton*’s ‘multiplexer 1140’ selects a ‘network data packeting format mode’ based on a control input.” *Id.* (citing Pet. 27). But, Patent Owner argues, “**this is the wrong selection**. The claims do not require that the demultiplexer select a ‘network data packeting format mode’ based on the control input from the control processor. Rather, the claims require that the demultiplexer **select a target signal based on that control input**.” *Id.* Patent Owner contends that “[t]he selection asserted by Petition[er] is a completely different selection, and is performed by the control processor, not the demultiplexer.” *Id.* at 39 (referring to the last clause of limitation 1d, which recites “**the control processor is configured to select a network data packet**

formatting mode in which the data formatting operates” (quoting Ex. 1001, claims 1, 10, 20)). Patent Owner asserts that the Petition does not acknowledge or attempt to explain the rewriting of the claims and, because the actual language of the claims requires something different, “the Petition fails and should be denied.” *Id.* (citing Pet. 27).

Second, Patent Owner contends that Walton does not disclose the claimed “control input.” Prelim. Resp. 39. Patent Owner asserts “the Petition also fails to identify any evidence that the purported *Walton* control processor provides any control input to the purported *Walton* demultiplexer, as required by each challenged claim.” *Id.* Patent Owner contends that “[t]he Petition asserts *Walton*’s controller 270 is the claimed ‘control processor’ and Walton’s multiplexer 1140 is the claimed ‘demultiplexer.’ But controller 270 in *Walton* does not provide a control input to multiplexer 1140, and the Petition identifies no evidence to the contrary.” *Id.* at 40 (citing Pet. 23–25). Rather, “the Petition is entirely silent on multiplexer 1140 receiving a control input from the controller 270.” *Id.* (citing Pet. 23–25). Patent Owner contends “[t]his failure of proof is yet another reason the Petition has not established the required likelihood of prevailing on this limitation.” *Id.*

Limitation 1d recites two “configured to select” clauses. The first clause states “*a demultiplexer . . . configured to select one of the recovered K wirelessly transmitted signals as a target signal intended for a user associated with the modem.*” Ex. 1001, 23:44–47 (emphasis added); Pet. 2. Following this recitation, limitation 1d states, “where the selection *is based on a control input from the control processor.*” *Id.* at 23:47–48 (emphasis added); Pet. 2. The second “configured to select” clause states “*the control*

processor is configured to select a network data packet formatting mode in which the data formatting operates.” Ex. 1001, 23:50–52 (emphasis added), Pet. 2. But the Petition does not assert that the selection of the first “configured to select” clause (“select one of the recovered K wirelessly transmitted signals”) is “based on a control input from the control processor.” Rather, Petitioner contends that one of ordinary skill in the art “would have understood that the controller processor, by directing the operation at the terminal and determining the diversity transmission mode, provides a **control input** that is used to **select the network data packet formatting mode** corresponding to the terminal operation and diversity transmission mode.” Pet. 27 (citing Ex. 1003 ¶¶ 109–111; Ex. 1004 ¶ 44). That selection is the second “configured to select” clause (“the control processor is configured to select a network data packet formatting mode in which the data formatting operates”). The Petition fails to provide any argument or evidence that the first “configured to select” clause is “based on a control input from the control processor” as recited by limitation 1d.⁸ Thus, we agree with Patent Owner that the Petition fails to address each clause of limitation 1d. *See* Prelim. Resp. 37–39.

Accordingly, for the reasons discussed above, we find the Petition deficient, and, therefore, we determine that Petitioner has not shown that Walton teaches the subject matter of claim 1.

⁸ Dr. Min similarly fails to provide any testimony that the first “configured to select” clause is “based on a control input from the control processor” as recited by limitation 1d. *See* Ex. 1003 ¶¶ 110–111 (opining as to this clause of limitation 1d), ¶¶ 103–111 (opining as to limitation 1d).

3. *Claims 2–5, 7, 9–16, and 20*

Claims 2–5, 7, and 9 depend from claim 1. Therefore, the deficiency identified in the Petition regarding claim 1 also applies to the Petition’s analysis of dependent claims 2–5, 7, and 9.

Independent claims 10 and 20 recite subject matter substantially similar to limitation 1d of claim 1, and Petitioner relies on the arguments and evidence presented in the context of claim 1 when addressing claims 10 and 20. Specifically, Petitioner relies on its arguments and evidence directed to limitation 1d when addressing the substantially similar language of limitations 10e and 20i. *See* Pet. 42 (relying on the Petition’s discussion of limitation 1d for a substantially similar clause of limitation 10e), 55 (relying on the Petition’s discussion of limitation 10e⁹ for a substantially similar clause of limitation 20i). Thus, the deficiency identified in the Petition regarding limitation 1d of claim 1 also applies to the Petition’s analysis of independent claims 10 and 20. Additionally, claims 11–16 depend, directly or indirectly, from claim 10 and, therefore, the same deficiency applies to these dependent claims as well.

Accordingly, for the reasons discussed above and in the context of claim 1, we find the Petition deficient, and, therefore, we determine that Petitioner has not shown that Walton teaches the subject matter of claims 2–5, 7, 9–16, and 20.

⁹ As noted, the Petition’s discussion of this clause of limitation 10e solely points to the Petition’s discussion of limitation 1d. Pet. 42.

E. Ground 2: Obviousness over Walton and Learned

Petitioner contends the combination of Walton and Learned would have rendered the subject matter of claims 1–5, 7, 9–16, and 20 obvious to one of ordinary skill in the art. Pet. 58–71. Petitioner asserts Learned is “directed to a multiuser detector that uses a tree decoder and a parameter estimation unit to reduce signal processing time to a minimum.” *Id.* at 58. Petitioner contends “[i]t would have been obvious to combine the multiuser detection techniques in Learned with the MIMO system of Walton.” *Id.* (citing Ex. 1003 ¶¶ 216–224).

In addressing claim 1 under this ground, Petitioner contends “Walton discloses limitations 1pre and 1b-1d as set forth in Ground 1.” Pet. 61–62. Similarly, for limitation 10e of independent claim 10, Petitioner relies on its arguments raised in the context of addressing claim 10 in Ground 1. *Id.* at 69 (arguing “Walton discloses limitations 10pre and 10d-10h as set forth in Ground 1”). And the same is true of limitation 20i. *See id.* at 70 (“Walton discloses limitations 20pre-20d and 20h-20l as set forth in Ground 1.”).¹⁰ In other words, as reflected in the Petition’s references to Ground 1, Petitioner does not rely on Learned to address limitations 1d, 10e, or 20i but instead

¹⁰ Dr. Min’s testimony is similar. In opining as to claim 1, Dr. Min specifically addresses only limitation 1a. *See* Ex. 1003 ¶¶ 225–230. Dr. Min does not address limitation 1d. *See id.* ¶¶ 216–230 (opining on Ground 2 and the application of the combination of Walton and Learned to claim 1). And, as with the Petition, Dr. Min relies on his testimony related to Walton and Ground 1 when addressing limitations 10e and 20i. *See id.* ¶¶ 245 (“As discussed, Walton discloses limitations 10pre and 10d-10h as set forth in Ground 1. I address limitations 10a-10c below.”), 250 (“Walton discloses limitations 20pre-20d and 20h-20l as set forth in Ground 1. Limitations 20e-20g are addressed below.”).

relies for those limitations only on its arguments raised in the context of Walton and Ground 1, discussed above. Therefore, the deficiency identified in the Petition regarding Ground 1 also affects all of the claims challenged in this ground.

Accordingly, for the reasons discussed above and in the context of Ground 1, we find the Petition deficient, and, therefore, we determine that Petitioner has not shown that the combination of Walton and Learned teaches the subject matter of claims 1–5, 7, 9–16, and 20.

F. Ground 3: Obviousness over Walton, Learned, and Quigley

Petitioner contends the combination of Walton, Learned, and Quigley would have rendered the subject matter of claim 20 obvious to one of ordinary skill in the art. Pet. 72–74. In addressing claim 20, Petitioner contends “Quigley . . . is directed to techniques for data transmission to permit multiple access from cable modems.” *Id.* at 72 (citing Ex. 1006, Abs.). Petitioner asserts, “[i]t would have been obvious to a [person of ordinary skill in the art] to combine the burst control input disclosed in Quigley into the combined Walton-Learned system.” *Id.* (citing Ex. 1003 ¶¶ 256–261). Petitioner’s analysis of claim 20 focuses only on limitation 20k and does not specifically address any of the other limitations of claim 20 (e.g., limitation 20i, which we discuss above).¹¹ *See id.* at 73–74 (limitation 20k). As reflected above, Petitioner does not rely on Quigley to address limitation 20i. Therefore, the deficiency identified in the Petition regarding Ground 1 also affects claim 20 under this ground.

¹¹ Dr. Min similarly addresses limitation 20k of claim 20 and does not specifically address the other limitations of claim 20, such as limitation 20i. *See* Ex. 1003 ¶¶ 262–263 (limitation 20k), 256–263 (Ground 3).

Accordingly, for the reasons discussed above and in the context of Ground 1, we find the Petition deficient, and, therefore, we determine that Petitioner has not shown that the combination of Walton, Learned, and Quigley teaches the subject matter of claim 20.

III. CONCLUSION

For the reasons discussed above, we find that Petitioner has not demonstrated a reasonable likelihood that it would prevail in showing the unpatentability of any of the Challenged Claims.

IV. DISCRETIONARY DENIAL

Patent Owners contends that the factors set forth in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 9 (PTAB Mar. 20, 2020) (precedential), weigh heavily in favor of discretionary denial. Prelim. Resp. 40–46; Paper 10. Petitioner disagrees. Pet. 74–77; Paper 9. In light of the conclusion reached above, we need not address the parties’ arguments regarding discretionary denial.

V. ORDER

Accordingly, it is

ORDERED that the Petition is *denied* as to the Challenged Claims of the ’946 patent; and

FURTHER ORDERED that no *inter partes* review is instituted.

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