

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DISH NETWORK, L.L.C.,
Petitioner,

v.

TQ DELTA, LLC,
Patent Owner.

Case IPR2016-01470
Patent 8,611,404 B2

Before SALLY C. MEDLEY, TREVOR M. JEFFERSON, and
MATTHEW R. CLEMENTS, *Administrative Patent Judges*.

CLEMENTS, *Administrative Patent Judge*.

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

I. INTRODUCTION

In this *inter partes* review, instituted pursuant to 35 U.S.C. § 314, DISH Network, L.L.C. (“Petitioner”) challenges claims 6, 11, 16, and 20 (“the challenged claims”) of U.S. Patent No. 8,611,404 B2 (Ex. 1001, “the ’404 patent”), owned by TQ Delta, LLC (“Patent Owner”). We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed below, Petitioner has shown by a preponderance of the evidence that the challenged claims are unpatentable. Patent Owner’s Motion to Exclude is *dismissed*.

A. Procedural History

Petitioner filed a Petition requesting an *inter partes* review of claims 6, 11, 16, and 20 of the ’404 patent. Paper 1 (“Pet.”). Patent Owner filed a Preliminary Response. Paper 10. On February 9, 2017, we instituted *inter partes* review of claims 6, 11, 16, and 20 of the ’404 patent as unpatentable under 35 U.S.C. § 103(a)¹ over Bowie,² Vanzielegghem,³ and ANSI T1.413.⁴ Paper 14 (“Inst. Dec.”), 22.

¹ The Leahy-Smith America Invents Act, Pub. L. No. 112–29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. §§ 102 and 103. Because the ’404 patent has an effective filing date before the effective date of the applicable AIA amendments, we refer to the pre-AIA versions of 35 U.S.C. §§ 102 and 103.

² U.S. Patent No. 5,956,323; issued Sept. 21, 1999 (Ex. 1004) (“Bowie”).

³ EP 0 883239 A1; issued Sept. 12, 1998 (Ex. 1005) (“Vanzielegghem”).

⁴ *Network and Customer Installation Interfaces – Asymmetric Digital Subscriber Line (ADSL) Metallic Interface*, AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) T1.413-1995 STANDARD (Ex. 1006) (“ANSI T1.413” or “the 1995 ADSL Standard”).

Thereafter, Patent Owner filed a Patent Owner Response (Paper 26, “PO Resp.”), to which Petitioner filed a Reply (Paper 29, “Reply”). Pursuant to an Order (Paper 39), Patent Owner filed a listing of alleged statements and evidence in connection with Petitioner’s Reply it deemed to be beyond the proper scope of a reply. Paper 40. Petitioner filed a response to Patent Owner’s listing. Paper 41.

We held a hearing on November 8, 2017, and a transcript of the hearing is included in the record. Paper 43 (“Tr.”).

B. Related Proceedings

The parties indicate that the ’404 patent is the subject of several district court cases and related *inter partes* reviews. Pet. 2–3; Paper 6, 2–3.

C. The ’404 Patent (Ex. 1001)

The ’404 patent discloses a method and apparatus for establishing a power management sleep state in a multicarrier system. Ex. 1001, 1:31–33. The ’404 patent discloses an asynchronous digital subscriber loop (ADSL) system having a first transceiver located at the site of a customer’s premises (“CPE transceiver”) and a second transceiver located at the local central telephone office (“CO transceiver”). *Id.* at 3:62–67. The transceivers include a transmitter section for transmitting data over a digital subscriber line and a receiver section for receiving data from the line. *Id.* at 4:14–17. The transceivers further include a clock, controller, frame counter, and a state memory. *Id.* at 4:58–5:15. Typically, data is communicated in the form of a sequence of data frames, sixty-eight frames for ADSL, followed by a synchronization frame. *Id.* The sixty-nine frames comprise a “superframe.” *Id.*

The power down operation of the CPE transceiver begins on receipt of a power-down indication. *Id.* at 6:27–30. The CPE transceiver responds to the power-down indication by transmitting to the CO transceiver an “‘Intend to Enter Sleep Mode’” notification. *Id.* at 6:39–42. The CO transceiver responds by transmitting an “Acknowledge Sleep Mode” notification to the CPE transceiver, and the CPE transceiver transmits an “Entering Sleep Mode” notification to the CO transceiver. *Id.* at 6:53–65. The CO transceiver detects the notification and transmits its own “Entering Sleep Mode” notification. *Id.* at 6:65–67. The CO transceiver stores its state in its own state memory corresponding to the state memory of the CPE transceiver. *Id.* at 6:67–7:2. The CO transceiver continues to advance the frame count and the superframe count during the period of power-down in order to ensure synchrony with the CPE transceiver when communications are resumed. *Id.* at 7:9–12. The CO transceiver further continues to monitor the subscriber line for an “Exiting Sleep Mode” notification, and the CPE transceiver transmits this signal when it receives an “Awaken” indication. *Id.* at 7:57–64. In response to the “Awaken” signal, CPE transceiver retrieves its stored state from state memory and restores full power to its circuitry. *Id.* at 7:64–66. CO Transmitter detects “Exit Sleep Mode” notification and restores its state and power. *Id.* at 8:1–4.

D. Illustrative Claim

Petitioner challenges claims 6, 11, 16, and 20 of the ’404 patent. Pet. 5. Claims 6, 11, and 16 are independent claims. Claim 6 is illustrative of the claims at issue and is reproduced below:

6. An apparatus comprising a transceiver operable to:
receive, in a full power mode, a plurality of superframes,

wherein the superframe comprises a plurality of data frames followed by a synchronization frame;

receive, in the full power mode, a synchronization signal;
transmit a message to enter into a low power mode;

store, in a low power mode, at least one parameter associated with the full power mode operation wherein the at least one parameter comprises at least one of a fine gain parameter and a bit allocation parameter;

receive, in the low power mode, a synchronization signal;
and

exit from the low power and restore the full power mode by using the at least one parameter and without needing to reinitialize the transceiver.

Ex. 1001, 10:29–43.

II. ANALYSIS

A. Claim Construction

We interpret claims of an unexpired patent using the broadest reasonable construction in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b); *see Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142–46 (2016). Under the broadest reasonable construction 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).

1. “low power mode”

In our Decision on Institution, we construed “low power mode” to mean “a mode in which power to the circuitry is reduced for the purpose of power conservation.” Inst. Dec. 5–6. Neither party addressed this

construction in subsequent briefing. Based on the record developed during this proceeding, we continue to apply this construction.

2. “*fine gain parameter*”

In our Decision on Institution, we construed “fine gain parameter” to mean “a parameter used to determine power level on a per subcarrier basis.” Inst. Dec. 6–7. Neither party addressed this construction in subsequent briefing. Based on the record developed during this proceeding, we continue to apply this construction.

3. “*transceiver*”

In our Decision on Institution, we construed “transceiver” to mean “a communications device capable of transmitting and receiving.” Inst. Dec. 7. Neither party addressed this construction in subsequent briefing. Based on the record developed during this proceeding, we continue to apply this construction.

4. “*synchronization signal*”

Each independent claim recites a “synchronization signal.” We did not construe this term in our Decision on Institution.

Patent Owner argues that this term should be construed to mean “a signal used to maintain a timing relationship between transceivers by correcting errors or differences between a timing reference of the transmitter of the signal and a timing reference of the receiver of the signal.” PO Resp. 19–20. Patent Owner identifies the timing reference signal disclosed in the ’404 patent as the recited “synchronization signal” and argues that the timing reference signal provides for timing synchronization between two transceivers—i.e., to synchronize their respective clocks—not for frame synchronization—i.e., to detect the boundaries of the transmitted

superframe. *Id.* at 19–22. According to Patent Owner, “Petitioner agrees that ‘the timing reference signal’ corresponds to the claimed “synchronization signal.” *Id.* at 21 (citing Pet. at 28–29). Finally, Patent Owner argues that its proposed construction is correct because a “synchronization signal” is used to maintain timing synchronization by correcting errors between respective timing references of the transmitter and the receiver of a signal. *Id.* at 23.

Petitioner counters that “by correcting errors or differences between a timing reference of the transmitter and a timing reference of the receiver of the signal” is not supported by the ’404 patent and is “much narrower than the broadest reasonable interpretation.” Pet. Reply 1–2. According to Petitioner, nothing in the ’404 patent requires correcting errors or differences between timing references. *Id.* at 2–3. Petitioner argues that Patent Owner admits there are other uses for a synchronization signal besides correcting errors and that the dictionary definition on which Patent Owner relies is for the term “synchronous transmission,” whereas the same dictionary separately defines “synchronization” as “[t]he timing of separate elements or events to occur simultaneously.” *Id.* at 3–4 (quoting Ex. 1060, 6). Petitioner also points to testimony in a related case, IPR2016-01466, in which Patent Owner’s declarant admitted that the “by correcting” language was added because of arguments made by Petitioner’s expert in that case. *Id.* at 4. Petitioner contends that no construction is necessary but, to the extent we construe the term, we should construe it to mean “a signal used to maintain a timing relationship between transceivers.” *Id.* at 5.

Having considered the arguments and evidence, we agree with Patent Owner that the “synchronization signal” corresponds to timing

synchronization, not to frame synchronization. This is consistent with the '404 patent's description of "normal (non-sleep mode) operation":

During normal (non-sleep mode) operation, a phase-lock loop (PLL) 62 receives from the FFT 56 a timing reference signal 62a (see FIG. 1A) via a line 62b. The timing reference signal 62a is transmitted from the transmitter with which the receiver 16 communicates (e.g., the CO transmitter). This signal is advantageously a pure tone of fixed frequency and phase which is synchronized with the Master Clock in the transmitter; its frequency defines the frame rate of the transceivers. Other forms of timing signal may, of course, be used, but use of a pure tone has the advantage of simplicity and reliability even when portions of the transceiver are powered down in accordance with the invention. The PLL 62 locks itself to this signal and drives clock 30 in synchronism with the Master Clock in the driving transmitter. This also synchronizes frame counter 34 of the CPE transceiver to the corresponding frame counter of the CO transceiver. Control of the receiver section is provided by the controller 32.

Ex. 1001, 5:37–53 (emphasis omitted).

Notwithstanding our agreement with Patent Owner that "synchronization signal" does not correspond to frame synchronization, we are not persuaded that Patent Owner's proposed construction is correct because it also is overly broad in one way and overly narrow in another. First, "used to . . . maintain a timing relationship between transceivers" is arguably broad enough to encompass the timing of superframe boundaries and, therefore, encompass the very frame synchronization that Patent Owner tries to distinguish. Moreover, Patent Owner does not attempt to find support in the '404 patent for "timing relationship," relying instead upon the testimony of its declarant. PO Resp. 19–20 (citing Ex. 2003 ¶ 53). Second, Patent Owner proposes to limit the way in which the timing relationship is

maintained “by correcting errors or differences between a timing reference of the transmitter of the signal and a timing reference of the receiver of the signal.” *Id.* We agree with Petitioner that that language is not supported by the Specification, and the dictionary definition upon which Patent Owner relies is not persuasive.

Because both parties agree that timing reference signal 62a corresponds to the recited “synchronization signal” and because the only purpose disclosed for timing reference signal 62a is being used, by PLL 62, to “drive[] clock 30 in synchronism with the Master Clock in the driving transmitter” (Ex. 1050 5:49–50), we determine that “synchronization signal” means “a signal allowing synchronization between the clock of the transmitter of the signal and the clock of the receiver of the signal.”

5. “*parameter associated with
the full power mode operation*”

Patent Owner proposes construing this term to mean “parameter associated with the transmission and/or reception of data during normal operation.” PO Resp. 23. The ’404 patent describes storing a list of parameters comprising the “state” of transceiver. Ex. 1001, 6:67–7:9. Patent Owner argues that this list “includes only communication protocol-specific parameters that are used for the transmission of data and does not include loop characteristics.” *Id.* at 24.

Petitioner counters that the term should have its ordinary and customary meaning. Pet. Reply 6–7. Petitioner argues that fine gain and bit allocation parameters are explicitly required by the claims, that the claim language “wherein the at least one parameter *comprises*” expressly indicates that the “at least one parameter” includes, but is not limited to, fine gain and

bit allocation parameter, and that the Specification clearly contemplates additional parameters other than those listed. *Id.* at 6–7 (citing Ex. 1001, 7:3–4).

Having considered the arguments and evidence, we are not persuaded that this term requires an express construction. Patent Owner’s proposed construction merely replaces “full power mode operation” with “transmission and/or reception of data during normal operation.” The parties, however, do not dispute the meaning of “full power mode operation.” As a result, it is not clear that Patent Owner’s proposed construction adds any necessary clarity. Accordingly, an express construction is not necessary to resolve the disputes between the parties.

B. Level of Ordinary Skill in the Art

Petitioner contends that a hypothetical person of ordinary skill in the art, with respect to and at the time of the ’404 patent, “would hold a bachelor’s degree or the equivalent in electrical engineering (or related academic fields) and at least five years of additional work experience in the area of digital and/or telecommunication system design, as applicable to DSL systems, or equivalent work experience.” Pet. 12.

Patent Owner contends that such a person “would have had a bachelor’s degree in electrical engineering (or a similar technical degree or equivalent work experience) and at least 3 years of experience working with such multicarrier communication systems.” PO Resp. 18–19.

We determine that no express finding on a specific corresponding level of technical education and experience is necessary. Here, the level of ordinary skill in the art is reflected by 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. The Parties' Post-Institution Arguments

In our Decision on Institution, we concluded that the arguments and evidence advanced by Petitioner demonstrated a reasonable likelihood that claims 6, 11, 16, and 20 of the '404 patent are unpatentable under 35 U.S.C. § 103(a) over Bowie, Vanzielegheem, and ANSI T1.413. Inst. Dec. 22. We must now determine whether Petitioner has established by a preponderance of the evidence that the specified claims are unpatentable over the cited prior art. 35 U.S.C. § 316(e). We previously instructed Patent Owner that “any arguments for patentability not raised in the [Patent Owner Response] will be deemed waived.” Paper 15, 5–6; *see also* 37 C.F.R. § 42.23(a) (“Any material fact not specifically denied may be considered admitted.”); *In re Nuvasive, Inc.*, 842 F.3d 1376, 1379–1382 (Fed. Cir. 2016) (holding Patent Owner waived an argument addressed in Preliminary Response by not raising the same argument in the Patent Owner Response). Additionally, the Board’s Trial Practice Guide states that the Patent Owner Response “should identify all the involved claims that are believed to be patentable and state the basis for that belief.” Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012).

With a complete record before us, we note that we have reviewed arguments and evidence advanced by Petitioner to support its unpatentability contentions where Patent Owner chose not to address certain limitations in its Patent Owner Response. In this regard, the record now contains persuasive, unrebutted arguments and evidence presented by Petitioner regarding the manner in which the asserted prior art teaches corresponding

limitations of the claims against which that prior art is asserted. Based on the preponderance of the evidence before us, we conclude that the prior art identified by Petitioner teaches or suggests all uncontested limitations of the reviewed claims. The limitations that Patent Owner contests in the Patent Owner Response are addressed below.

D. Obviousness over Bowie, Vanzielegghem, and ANSI T1.413

Petitioner contends that claims 6, 11, 16, and 20 of the '404 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Bowie, Vanzielegghem, and ANSI T1.413. Pet. 12–57.

1. Principles of Law

A claim is unpatentable under § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) when in evidence, objective indicia of non-obviousness (i.e., secondary considerations). *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We analyze this asserted ground based on obviousness with the principles identified above in mind.

2. Bowie Overview

Bowie discloses a power conservation system for transmission systems in which data is modulated over a communications loop from a central office location to a customer premise. Ex. 1004, 1:4–8. Bowie

discloses that to provision ADSL service, ADSL units are located at each end of a wire loop, a first ADSL unit at the customer premises (CPE) and a second ADSL unit at the telephone company central office (COT). *Id.* at 3:51–58. Data is arranged in a structure known as a “frame” prior to transmission. *Id.* at 3:66–67.

ADSL units enter a low power mode to reduce power requirements. *Id.* at 5:6–8. CPE unit initiates low power mode by sending a “shut-down” signal to the COT unit. *Id.* at 5:8–10. Both the CPE unit and COT unit may store loop characteristics that enable rapid resumption of user data transmission when units return to full power mode. *Id.* at 5:18–25. Each unit then enters low power mode by shutting off the now unnecessary sections of the signal processing, transmitting, and receiving circuitry. *Id.* at 5:26–28. After shutdown, the loop is in an inactive state. *Id.* at 5:28–29.

The units return to full power mode after the CPE unit transmits to the COT unit a resume signal. *Id.* at 5:48–59. The stored loop characteristics are used to restore the loop parameters. *Id.* at 5:60–66.

3. Vanzielegghem Overview

Vanzielegghem discloses a transmitter that modulates a plurality of carriers with data received by the transmitter to derive symbols. Ex. 1005, 1:3–10. Vanzielegghem discloses an Asymmetrical Digital Subscriber Line (ADSL) transceiver unit located in the central office ATU-C. *Id.* at 5:8–15. Bits of data received are grouped into frames and the frames are transferred to coding circuit MMC. *Id.* at 6:11–16. Coding circuit MMC maps the frames to carriers and modulates the carriers to Discrete Multi-tone (DMT) symbols. *Id.* at 6:16–20. For every 68 DMT symbols transmitted on the communication line, a synchronization symbol is also transmitted. *Id.* at

6:26–27. The combination of the synchronization symbol and the 68 DMT symbols is considered a superframe. *Id.* at 6:36–39. After generating 256 superframes, coding circuit MMC generates a “line-monitoring superframe” that contains information used to measure the quality of transmission on the communication line. *Id.* at 6:40–45. The combination of 256 superframes and a line-monitoring superframe is considered a hyperframe. *Id.* at 6:45–48.

4. *ANSI T1.413 Overview*

ANSI T1.413 discloses electrical characteristics of Asymmetric Digital Subscriber Line (ADSL) signals appearing at a network interface. Ex. 1006, Abstract. ADSL allows for the provision of Plain Old Telephone Service (POTS) and a variety of digital channels. *Id.* at 1. Digital channels consist of full duplex low-speed channels and simplex high-speed channels in the direction from the network to the customer premises, and low-speed channels in the opposite direction. *Id.*

5. *Petitioner’s Initial Positions*

Petitioner contends that a combination of Bowie, Vanzielegghem, and ANSI T1.413 would have rendered obvious claims 6, 11, 16, and 20 of the ’404 patent. Pet. 12–57. We have reviewed the Petition, Patent Owner’s Response, and Petitioner’s Reply, as well as the relevant evidence discussed in those papers and other record papers, and are persuaded that the record establishes Petitioner’s contentions for claims 6, 11, 16, and 20, and we adopt Petitioner’s contentions discussed below as our own.

For example, claim 6 recites “[a]n apparatus comprising a transceiver.” As discussed above, “transceiver” is defined as a “communication device capable of transmitting and receiving.” *See supra*

Section II.A.3. Petitioner argues that Bowie discloses “a method of conserving power in a terminal unit having a transmitter and receiver for modulated data communications.” Pet. 19–20 (quoting Ex. 1004, 2:9–11; citing Ex. 1004, Abstract, 3:34–50, Fig. 1). We are persuaded by Petitioner’s showing and find that Bowie’s terminal unit is a “transceiver.”

Claim 6 further recites “receive, in a full power mode, a plurality of superframes, wherein the superframe comprises a plurality of data frames followed by a synchronization frame.” Petitioner argues that the combination of Bowie and ANSI T1.413 discloses this limitation. Petitioner argues that Bowie discloses ADSL units that transmit and receive frames, where a “frame is an arrangement of bits including both user data and signaling information required by the ADSL units.” Pet. 20–21 (quoting Ex. 1004, 3:66–4:2). Petitioner further argues that Bowie discloses that “the ADSL units . . . may enter low power mode *when user data transmission is complete*” and, therefore, the data transmission occurs in full power mode. *Id.* at 21–22 (quoting Ex. 1004, 5:6–8; citing Ex. 1004, 3:2–4, 3:37–41, 5:22–24, 5:25–28, 5:60–6:2, 7:23–27, Fig. 3) (emphasis omitted). Petitioner argues that ANSI T1.413 discloses the use of superframes, where “[e]ach superframe is composed of 68 ADSL data frames, numbered 0 to 67, which shall be encoded and modulated into DMT symbols, followed by a *synchronization symbol*, which carries [sic] no user or overhead bit-level data.” *Id.* 23 (quoting Ex. 1006, 40; citing Ex. 1006, 72). Petitioner explains that ANSI T1.413’s “synchronization symbol” is the same as the claimed “synchronization frame.” *Id.* at 23–24 (citing Ex. 1004, Fig. 5). Petitioner argues that a person with ordinary skill in the art would have combined ANSI T1.413’s disclosure of the structure of superframes with

Bowie's transmission system because Bowie utilizes ADSL units and ANSI T1.413 provides the standards for ADSL. *Id.* at 24–25. Petitioner argues that a person with ordinary skill in the art “would understand that Bowie's ADSL units . . . must transmit and receive superframes.” *Id.* at 25 (citing Ex. 1002 ¶¶ 124–126) (reference numerals omitted). We are persuaded by Petitioner's showing and find that Bowie's terminal units are ADSL units that received, in full power mode, superframes comprising a plurality of data frames followed by a synchronization frame.

Claim 6 also recites “receiv[ing], in the full power mode, a synchronization signal.” Petitioner argues that the combination of Bowie, Vanzielegghem, and ANSI T1.413 disclose this limitation. Petitioner argues, that as discussed above, the combination of Bowie and ANSI T1.413 discloses ADSL units that communicate, in full power mode, with a superframe that includes a synchronization frame. Pet. 26. Petitioner argues that Vanzielegghem discloses a pilot tone that carries a synchronization frame, and the pilot tone is the same as the claimed “synchronization signal.” *Id.* (citing Ex. 1005, 2:6–13). Specifically, Petitioner argues that Vanzielegghem discloses that the transmitter operates in full power mode and user data is grouped into frames, which is then modulated and transmitted as a superframe. *Id.* at 28 (citing Ex. 1005, 6:5–39). Petitioner further argues that Vanzielegghem discloses that “the 69th frame of the superframe is reserved for the synchronization frame and its corresponding synchronization signal (i.e., pilot tone).” *Id.* (citing Ex. 1005, 6:26–29). Petitioner argues that this disclosure in Vanzielegghem is consistent with the description in the '404 patent, where a superframe is received and a synchronizing pilot tone is extracted from the superframe. *Id.* at 28–29

(citing Ex. 1001, 5:37–53; Ex. 1005, 5:45–57). Petitioner concludes that it would have been obvious to a person with ordinary skill in the art to combine the pilot tone or synchronization signal, as disclosed by Vanzielegghem, with the ADSL units of Bowie because both Bowie and Vanzielegghem use the standard set forth in ANSI T1.413 and in order to maintain the frequency synchronization disclosed by Vanzielegghem. *Id.* at 28–31 (citing Ex. 1002 ¶¶ 129–135; Ex. 1005, 5:45–57, 6:58–7:5; Ex. 1006, 64). We are persuaded by Petitioner’s showing and find that Vanzielegghem’s pilot tone teaches the recited “synchronization signal” and that it would have been obvious to modify the superframe received by Bowie’s ADSL units to include a synchronizing frame carried by a pilot tone.

Claim 6 additionally recites “transmit[ing] a message to enter into a low power mode.” Petitioner argues that Bowie discloses this limitation. Petitioner argues that Bowie discloses sending a shut-down signal to either unit to “enter low-power mode by shutting off the now unnecessary sections of the signal processing, transmitting, and receiving circuitry.” Pet. 32 (quoting Ex. 1004, 5:17–27; citing Ex. 1004, 5:6–27, 5:30–32, 7:12–19, 7:28–32, 7:51–53). Petitioner argues that the shut-down signal is a series of signaling bits, and, therefore, is a message. *Id.* (citing Ex. 1001, 6:44–65; Ex. 1002 ¶¶ 137–142). We are persuaded by Petitioner’s showing and find that Bowie’s transmission of a shut-down signal teaches transmitting a message to enter into a low power mode.

Claim 6 also recites “stor[ing], in a low power mode, at least one parameter associated with the full power mode operation.” Petitioner argues that Bowie discloses this limitation. Petitioner argues that Bowie discloses

“[u]pon receipt of the shut-down signal, the COT unit . . . optionally stores in memory . . . characteristics of the loop . . . that were determined by the CPE to COT handshaking.” Pet. 33 (quoting Ex. 1004, 5:18–25; citing Ex. 1004, 7:23–26, 8:8–9, 8:22–25, 9:1–5) (reference numerals omitted).

Petitioner argues that Bowie then discloses that when exiting low power mode and resuming full power mode, “these parameters are retrieved from memory . . . and used to enable data transmission to resume quickly by reducing the time needed to determine loop transmission characteristics.” *Id.* at 33–34 (quoting Ex. 1004, 5:60–66) (reference numerals omitted). We are persuaded by Petitioner’s showing and find that Bowie’s characteristics of the loop determined during handshaking are “at least one parameter associated with the full power mode operation” and that Bowie’s storage and retrieval of those characteristics from memory teaches this limitation.

Claim 6 additionally recites “wherein the at least one parameter comprises at least one of a fine gain parameter and a bit allocation parameter.” Petitioner argues that the combination of Bowie and ANSI T1.413 discloses this limitation. Petitioner argues that ANSI T1.413 discloses that the initialization process of ADSL units includes “each receiver communicates to its far-end transmitter the number of bits and relative power levels to be used on each DMT sub-carrier.” Pet. 35–36 (quoting Ex. 1006, 105) (emphasis omitted); *see* Ex. 1006, 106, 128–129; *see* Pet. 37–38. Petitioner explains that ANSI T1.413’s “number of bits” is the claimed “bit allocation parameter,” and the “relative power levels to be used on each DMT sub-carrier” is the claimed “fine gain parameter.” *Id.* at 36–37 (citing Ex. 1006, 54, 106); *see supra* Section II.A.2. Petitioner argues that Bowie can be modified to include the “bit allocation parameter” and

“fine gain parameter” because these parameters are “needed to ‘physically connect’ and ‘establish a communications link’ between the transceivers so that the data transmission can occur over the link.” *Id.* at 38 (citing Ex. 1006, 105). Petitioner concludes that it would have been obvious to a person with ordinary skill in the art to combine the “bit allocation parameter” and “fine gain parameter” disclosed by ANSI T1.413 with Bowie because the ADSL units in Bowie “must comply with ADSL standards to function properly.” *Id.* at 39–40 (citing Ex. 1004, 3:24–4:9, 4:55–58; Ex. 1006, Abstract; Ex. 1002 ¶¶ 151–152; *see* Ex. 1004, 3:44–47; *see* Ex. 1019, 3). We are persuaded by Petitioner’s showing and find that ANSI T1.413’s “number of bits” is the claimed “bit allocation parameter,” ANSI T1.413’s “relative power levels to be used on each DMT sub-carrier” is the claimed “fine gain parameter,” and that it would have been obvious to modify Bowie to store these parameters along with other characteristics of the loop that were determined by the CPE to COT handshaking.

Claim 6 further recites “receive, in the low power mode, a synchronization signal.” Petitioner argues that the combination of Bowie and Vanzielegheem discloses this limitation. Petitioner argues that Vanzielegheem discloses that units enter an idle mode when no user data is being transmitted, however, superframes are still transmitted in order to maintain synchronization. Pet. 40–41 (citing Ex. 1005, 2:6–13, 3:5–11, 7:13–50, 8:49–56, 9:21–36). Petitioner argues that these superframes only include a single pilot tone carrier, which is the same as the claimed “synchronization signal.” *Id.* (citing 3:58–4:6). Petitioner argues that a person with ordinary skill in the art would have been motivated to combine the pilot tone or synchronization signal transmitted in low power mode, as

disclosed by Vanzieleghem, with Bowie in order to maintain synchronization during low power modes, thereby allowing units to quickly resume transmitting user data. *Id.* at 41–43 (citing Ex. 1004, 5:17–25, 5:62–66; Ex. 1005, 2:6–13, 7:20–25; Ex. 1002 ¶¶ 155–157). We are persuaded by Petitioner’s showing and find that it would have been obvious to modify Bowie to receive, in low power mode, the pilot tone taught by Vanzieleghem.

Claim 6 also recites “exit from the low power and restore the full power mode by using the at least one parameter and without needing to reinitialize the transceiver.” Petitioner argues that Bowie discloses this limitation. Petitioner argues that Bowie discloses that “[u]pon receipt of [a] resume signal, the receiving ADSL unit returns the signal processing . . . transmitting . . . and receiving . . . circuitry to full power mode.” Pet. 43–44 (quoting Ex. 1004, 5:60–62; citing Ex. 1004, 3:1–10, 6:30–33) (reference numerals omitted). Petitioner argues that Bowie further discloses that the loop transmission characteristics are “retrieved from memory . . . and used to enable data transmission to resume quickly by reducing the time needed to determine loop transmission characteristics.” *Id.* at 44 (quoting Ex. 1004, 5:60–6:2; citing Ex. 1004, 6:30–34, 8:8–12, 8:22–25, 9:1–5) (reference numerals omitted). Petitioner explains that a person with ordinary skill in the art would have understood this to mean that the “parameters are used to restore data transmission on the loop without having to perform the ‘handshaking’ (or initialization) process again.” *Id.* (citing Ex. 1002 ¶ 160). Petitioner further argues that the ADSL units of Bowie, as modified by ANSI T1.413, would store the loop characteristics of the “bit allocation” and “fine gain” parameters that would allow the ADSL units from “not having to

perform initialization exchanges C-B&G and R-B&G.” *Id.* at 45 (citing Ex. 1002 ¶¶ 161–162). We are persuaded by Petitioner’s showing and find that Bowie’s retrieval of stored characteristics and use of those characteristics to enable data transmission to resume quickly teaches this limitation.

Petitioner further argues that Bowie, Vanzielegthem, ANSI T1.413 and the ’404 patent are analogous art because they are all in the “field of power conservation in multicarrier communications system and, more specifically, to implementing low power / sleep modes in these systems.” Pet. 18–19 (citing Ex. 1004, 3:24–4:9, 4:55–58, Ex. 1005, 1:1–21; Ex. 1006, 45, 70; Ex. 1002 ¶ 121). Petitioner further explains that Bowie, Vanzielegthem, and the ’404 patent employ ADSL technology and, therefore, employ the standards set forth by ANSI T1.413. *Id.* at 19 (citing Ex. 1001, 1:37–47, 3:62–67; Ex. 1004, 3:23–50; Ex. 1005, 1:1–21; Ex. 1006, 3). We are persuaded by Petitioner’s showing and find that Bowie, Vanzielegthem, ANSI T1.413 are analogous art.

Petitioner has provided a similar detailed analysis of claims 11, 16, and 20. *See* Pet. 45–57. Notwithstanding Patent Owner’s arguments, which we have considered and which we address below, we are persuaded by Petitioner’s showing, which we adopt as our own findings and conclusions, that claims 6, 11, 16, and 20 are unpatentable under 35 U.S.C. § 103(a) as obvious over Bowie, Vanzielegthem, and ANSI T1.413.

6. Patent Owner’s Assertions Concerning the References

Patent Owner argues that the challenged claims would not have been obvious over the combination of Bowie, Vanzielegthem, and ANSI T1.413

for the following reasons: (1) the combination of references does not teach a “parameter associated with the full power mode operation,” as recited in independent claims 6, 11, and 16 (PO Resp. 25–30); (2) the combination of references does not teach “storing, in [a/the] low power mode, . . . at least one of a fine gain parameter and a bit allocation parameter,” as recited in independent claims 6, 11, and 16 (*id.* at 31–37); (3) the combination of references does not teach “[exit/exiting] from the low power mode and [restore/restoring] the full power mode . . . without needing to reinitialize the transceiver,” as recited in independent claims 6, 11, and 16 (*id.* at 38–42); (4) a person of ordinary skill in the art would not have modified Bowie to receive a “synchronization signal” in low power mode (*id.* at 42–48). We address each argument in turn.

*a. “parameter associated with the
full power mode operation”*

Patent Owner argues that what is stored in Bowie—i.e., the “characteristics of the loop 220 that were determined by CPE to COT handshaking” (Ex. 1004, 5:18–19) or “loop transmission characteristics” (*id.* at 5:62–63)—“cannot be reasonably said to be ‘associated’ with the full power mode” because they “are independent of any full power or low power mode.” PO Resp. 25–26. According to Patent Owner, parameters “associated with the full power mode” “are different from ‘loop characteristics’ because they are determined, in part, from loop characteristics and other information in a separate step of the initialization process,” and, therefore, “a [person of ordinary skill in the art] would not have characterized any of the parameters associated with the full power

mode (such as fine gain and bit allocation parameters) as being ‘loop characteristics,’ or vice versa.” *Id.* at 26–27.

Petitioner counters that Bowie’s “loop characteristic parameters are also associated with the full power mode as they ‘enable data transmission to resume quickly by reducing the time needed to determine loop transmission characteristics’ when the system wakes up from its sleep mode” and because “[w]ithout these parameters there could be no data transmission as required by the full power mode.” Pet. Reply 8–9. Furthermore, Petitioner points out that Patent Owner attacks Bowie alone, whereas Petitioner is relying upon Bowie *and* ANSI T1.413 for this limitation. *Id.* at 9–10.

We agree with Petitioner. Patent Owner’s argument is based upon its contention that “parameter associated with the full power mode operation” should be understood to “include[] only those communication protocol-specific parameters that are used for the transmission of data and does not include loop characteristics.” PO Resp. 24. We disagree. The plain language of the claim—“associated with”—is very broad and the Specification does not define or limit “parameter associated with the full power mode operation” to exclude loop characteristics. Patent Owner relies upon a list of state parameters described in the ’404 patent at column 7, lines 2–9, but that passage does not support Patent Owner’s argument because it discloses that “[t]he state . . . preferably includes *at least*” the parameters listed, as opposed to “[t]he state . . . preferably includes *only*” the parameters listed. We, therefore, agree with Petitioner that the Specification contemplates parameters other than those listed explicitly in column 7 of the ’404 patent. Pet. Reply 6–7.

Also, we disagree with Patent Owner's contention Bowie's loop characteristics "are physical attributes of the transmission loop" like "loop length, wire gauge, wire composition, resistance, inductance, capacitance, *etc.*" PO Resp. 25. Bowie expressly distinguishes "loop loss characteristics" from these physical attributes by describing loop loss characteristics as "a function of" these physical attributes. Ex. 1004, 5:1–3. In addition, Bowie discloses "loop loss characteristics" as merely one example of the type of information exchanged during handshaking. *Id.* As a result, we disagree with Patent Owner's contention that Bowie stores only physical attributes of the transmission loop.

Moreover, we agree with Petitioner that the Petition relies upon the combination of Bowie and ANSI T1.413 to teach the recited "parameter," despite addressing the limitation in two parts (*compare* Pet. 33–35 (addressing the first part of the "store" limitation), *with* Pet. 35–40 (addressing the wherein clause)). Pet. Reply 9–10. Nonobviousness cannot be established by attacking references individually where, as here, the ground of unpatentability is based upon the teachings of *a combination* of references. *In re Keller*, 642 F.2d 413, 426 (CCPA 1981). Rather, the test for obviousness is whether the combination of references, taken as a whole, would have suggested the patentee's invention to a person of ordinary skill in the art. *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). Here, we are persuaded that (1) ANSI T1.413's "number of bits . . . on each DMT subcarrier" is the claimed "bit allocation parameter;" (2) ANSI T1.413's "relative power levels to be used on each DMT sub-carrier" is the claimed "fine gain parameter;" and (3) a person of ordinary skill in the art would have modified Bowie "so that the 'handshaking' and 'loop loss

characteristics’ stored during the low power mode can include the bit allocation and/or fine gain parameters described in the 1995 ADSL Standard as being exchanged during the initialization process.” Pet. Reply 9; Pet. 36, 38.

b. Whether a person of ordinary skill in the art would have modified Bowie to store bit allocation parameter and fine gain parameter

Patent Owner argues that Petitioner’s reason to modify Bowie to store bit allocation parameter and fine gain parameter is inadequate. PO Resp. 32–35. Specifically, Patent Owner contends that Petitioner’s reason constitutes “conclusory hindsight and [is] technologically false” because there is no evidence “that a [person of ordinary skill in the art] would have known prior to the ’404 patent that storing bit allocation or fine gain parameters in particular during low power mode would inherently or necessarily enable data transmission to resume more quickly.” *Id.* at 33–34.

Petitioner counters that “[b]oth experts agree that the ‘handshaking’ process in Bowie is the same ‘initialization’ process described in the 1995 ADSL Standard” (Pet. Reply 11), that “Bowie expressly describes storing the ‘characteristics of the loop 220 that were determined by CPE to COT handshaking’ when the system powers down to a low power mode” (*id.* at 12), and that ANSI T1.413 teaches that “‘fine gain’ and ‘bit allocation’ parameters are exchanged as part of the ‘handshaking’ process that is implemented in Bowie” (*id.*). Petitioner concludes that:

Bowie’s express teaching of storing parameters to aid in the “rapid resumption of user data transmission” provides clear motivation to combine with the exchange of “fine gain” and “bit allocation” parameters from the 1995 ADSL Standard that aid in the establishing a link for user data transmission, and vice

versa. Thus, the motivations to combine Bowie and the 1995 ADSL Standard again flow directly from the references themselves.

Pet. Reply 12; *see also* Pet. 39–40 (explaining that “[s]toring [bit allocation and fine gain] parameters would achieve the predictable result of ‘enabl[ing] data transmission to resume quickly by reducing the time needed to determine loop transmission characteristics’” (quoting Ex. 1004, 5:62–66).

We agree with Petitioner. Bowie teaches storing the “characteristics of the loop 220 that were determined by CPE to COT handshaking” when the system powers down to a low power mode for the express purpose of “enabl[ing] data transmission to resume quickly by reducing the time needed to determine loop transmission characteristics.” Ex. 1004, 5:17–19, 5:62–66; *see also id.* at 5:22–25 (“Storing loop characteristics enables rapid resumption of user data transmission when the units are returned to full power mode.”). Bit allocation parameter and fine gain parameter are two characteristics that are determined by CPE to COT handshaking. Pet. Reply 12 (citing Ex. 1006, 54, 103); Pet. 35–38. Thus, we agree with Petitioner that the motivation provided expressly in Bowie for storing information obtained through handshaking applies equally to storing bit allocation parameter and fine gain parameter, and that a person of ordinary skill in the art would have had reason to do so.

Patent Owner also argues that Bowie’s teachings undermine Petitioner’s reason to modify Bowie to store bit allocation parameter and fine gain parameter because Bowie requires re-calculating those parameters when it comes out of low power mode. PO Resp. 35–37. Petitioner counters that Patent Owner is misrepresenting Bowie, which actually “indicates that, when loop characteristics are stored, re-initialization – or

‘handshaking’ – ‘*may* be required’ upon wake up in limited circumstances, but not in *every* circumstance.” Pet. Reply 13 (citing Ex. 1004, 6:30–41).

According to Petitioner,

If initialization were required every time the ADSL unit powers up, as PO argues, then (a) there would be no logical reason to store the loop characteristics (and certainly no reason for Bowie to suggest storing them), and (b) “resumption of user data transmission” would not be “rapid” because it would require the same amount of time to initialize every time.

Id.

We agree with Petitioner. Patent Owner’s argument is predicated on a mischaracterization of Bowie. Bowie teaches that additional handshaking “may” be required (Ex. 1004, 6:33–42), not that loop characteristics “*are* re-determined upon the Bowie device coming out of low power mode” (PO Resp. 36 (emphasis added)) and “*have to be* re-determined upon coming out of low power mode” (*id.* at 37 (emphasis added)). Patent Owner’s counsel argued at the hearing that Bowie uses “may” only to mean permitted at a point in time—e.g., may now occur (Tr. 27:15–17), but that is not persuasive because Bowie uses “may” to mean “might” or “may or may not,” at least at column 6, lines 38–41: “Handshaking information may be required where, for example, loop characteristics have changed due, for example, to temperature-dependent changes in loop resistance.”

As a result, we remain persuaded by Petitioner that a person of ordinary skill in the art would have modified Bowie “so that the ‘handshaking’ and ‘loop loss characteristics’ stored during the low power mode can include the bit allocation and/or fine gain parameters described in the 1995 ADSL Standard as being exchanged during the initialization process.” Pet. Reply 9; Pet. 38.

c. “[exit/exiting] from the low power and
[restore/restoring] the full power mode
... without needing to reinitialize the transceiver”

Patent Owner argues Bowie does not teach “without needing to reinitialize” because “some re-initialization does occur” when Bowie exits low power mode and resumes full power mode. PO Resp. 38–39. Patent Owner also argues that “the ADSL initialization process includes several other steps” and “[n]owhere does Bowie teach avoiding these other initialization steps upon resuming full power mode.” *Id.* at 39. Petitioner counters that Bowie teaches that additional handshaking “may occur”—not “does occur” as Patent Owner contends—and that “may” is permissive and, therefore, does not require re-initialization as Patent Owner suggests. Pet. Reply 14. According to Petitioner, Bowie requires additional handshaking “in only limited circumstances” such as “where, for example, loop characteristics have changed due, for example, to temperature-dependent changes in loop resistance.” *Id.* at 15 (quoting Ex. 1004, 6:38–41). Petitioner points out that “[i]f handshaking were *always* required then this last passage in Bowie serves no purpose because handshaking would occur regardless of temperature changes.” *Id.*

We agree with Petitioner. This argument, like the immediately preceding argument, is predicated on a mischaracterization of Bowie. Bowie teaches that additional handshaking “may” be required (Ex. 1004, 6:33–42), not that loop characteristics “*are* re-determined upon the Bowie device coming out of low power mode” (PO Resp. 36 (emphasis added)) and “*have to be* re-determined upon coming out of low power mode” (*id.* at 37 (emphasis added)). Patent Owner’s counsel argued at the hearing that Bowie uses “may” only to mean permitted at a point in time—e.g., may now

occur (Tr. 27:15–17)—but that is not persuasive because Bowie uses “may” to mean “might” or “may or may not,” at least at column 6, lines 38–41: “Handshaking information may be required where, for example, loop characteristics have changed due, for example, to temperature-dependent changes in loop resistance.”

Moreover, we disagree with Patent Owner’s contention that “without needing to reinitialize” requires skipping *all* steps of initialization. Even if we assume Patent Owner is correct that Bowie does not avoid “several other steps” of the ADSL initialization process (PO Resp. 39), we are still persuaded that Bowie teaches exiting low power mode and restoring full power mode “without needing to reinitialize the transceiver” because we interpret that phrase to be satisfied as long as the *entire* initialization process is not needed. In other words, that limitation is satisfied if any step of initialization is avoided, and does not require that *every* step of initialization be avoided. This interpretation is consistent with the ’404 patent, which states, for example, that “full transmission and reception capabilities of the transceiver are quickly restored when needed, without requiring *the full* (and time-consuming) initialization commonly needed to restore such transceivers to operation after inactivity.” Ex. 1001, Abstract (emphasis added); *see also id.* at 8:4–12 (“the CPE transceiver can begin transmitting immediately or after only a few frames delay, since it need not repeat *the initialization that was earlier required* to establish the requisite parameters.” (emphasis added)). Thus, we agree with Petitioner that Bowie’s teachings of “rapid resumption of user data transmission when the units are returned to full power mode” and using stored parameters “to enable data transmission to resume quickly by reducing the time needed to determine loop transmission

characteristics” teaches use of those stored parameters instead of, as in initialization, determining those parameters.

Patent Owner also argues that Bowie “would have led a [person of ordinary skill in the art] in a direction divergent from the invention of the claims” because Bowie “engag[es] in ‘additional handshaking’ upon coming out of a low power mode and before resuming transmission of user data” whereas the ’404 patent does not. PO Resp. 40–42 (citing *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994)). Petitioner counters that the ’404 patent *does* perform re-initialization in some circumstances, which “is exactly how Bowie functions.” Pet. Reply 15–16 (citing Ex. 1001, 8:24–35).⁵

We agree with Petitioner. This argument is predicated in part on Patent Owner’s mischaracterization of Bowie as *requiring* additional handshaking when exiting low power mode and resuming full power mode, whereas Bowie actually teaches only that additional handshaking *may* be required. Moreover, to the extent Patent Owner contends that the ’404

⁵ Patent Owner objects to this argument in Petitioner’s Reply as beyond the scope of what is appropriate for a reply. See Paper 40. We have considered Patent Owner’s objection, but disagree. Replies are a vehicle for responding to arguments raised in a corresponding patent owner response. Petitioner’s arguments and evidence that Patent Owner objects to are not beyond the proper scope of a reply because we find that they fairly respond to Patent Owner’s arguments raised in Patent Owner’s Response. See *Idemitsu Kosan Co. LTD. v. SFC Co. LTD.*, 870 F.3d 1376, 1381 (Fed. Cir. 2017) (“This back-and-forth shows that what *Idemitsu* characterizes as an argument raised ‘too late’ is simply the by-product of one party necessarily getting the last word. If anything, *Idemitsu* is the party that first raised this issue, by arguing—at least implicitly—that Arakane teaches away from non-energy-gap combinations. SFC simply countered, as it was entitled to do.” (emphasis added)).

patent discloses *never* performing re-initialization, that too is a mischaracterization. The '404 patent discloses

On resuming communication, it may be desirable for the CPE transceiver to transmit several frames of test (known) data (step 100) before resuming transmission of user data. This enables the system to verify that system conditions have not changed so significantly as to require renewed initialization. If the CO transceiver receives these without error, it notifies the CPE transceiver (step 102) and the latter resumes full user data transmission (steps 104 and 106). Otherwise, *reinitialization must be performed* (steps 104 and 108) before user data transmission occurs.

Ex. 1001, 8:24–35 (emphasis added). Thus, in the '404 patent, as in Bowie, re-initialization (or “additional handshaking” in Bowie) *may* be required under certain circumstances. Accordingly, we are not persuaded that Bowie would have led a person of ordinary skill in the art in a “divergent direction” from the '404 patent.

*d. Whether a person of ordinary skill in the art
would have modified Bowie to transmit
Vanzieleghe's pilot tone*

i. Teaching Away

Patent Owner argues that Bowie teaches away from the proposed modification because “modifying the Bowie unit to receive the alleged synchronization signal of Vanzieleghe while in the low power mode would conflict with Bowie’s goal of reducing power consumption.” PO Resp. 43. According to Patent Owner, “the intended purpose of Bowie is to save maximum power” by shutting off its receiver, transmitter, and signal processing circuitry in low power mode, and “[m]odifying the Bowie device to receive Vanzieleghe[’s] alleged synchronization signal while in the low

power mode would defeat this purpose” because “the Bowie device would have to be modified to keep the receiver and signal processing circuitry activated during the low power mode” to demodulate either Vanzieleghe’s sync frame or its pilot tone. *Id.* at 43–45. Patent Owner further argues that receiving Vanzieleghe’s alleged synchronization signal would require the loop to be active during low power mode, but Bowie teaches that the loop is *inactive* during low power mode. *Id.* at 45–46.

Petitioner counters that Bowie’s intended purpose is not to save “maximum” power and does not require its receiver, transmitter, and signal processing circuitry to remain “off” during low power mode. Pet. Reply 16–17. To the contrary, Bowie teaches explicitly that “the particular circuit components that can be placed in a low power mode may vary among differing brands, models, and versions of ADSL units.” Ex. 1004, 5:45–47. Petitioner further argues that, even assuming some circuitry in Bowie’s receiver is “on” to receive a synchronization signal, power saving is still achieved because the transmitter is “off.” Pet. Reply 17–18. Moreover, according to Petitioner, the power needed to demodulate the pilot tone taught in Vanzieleghe is significantly less than the power needed to demodulate a typical superframe with 68 carriers. *Id.* at 18.

We agree with Petitioner. Patent Owner’s argument is predicated on a mischaracterization of Bowie, which teaches ways to reduce power, but does not teach that “maximum” power reduction is its intended purpose. Patent Owner also relies heavily on Bowie’s teaching that its loop is “inactive” during low per mode, but that teaching does not imply that all circuitry must be shut off during low power mode in order to achieve Bowie’s intended purpose. The very next sentence in Bowie describes Resume Signal

Detector 115 remaining “on” in order to “remain capable of signal detection during low power operation.” Ex. 1004, 5:28–30; *see also id.* at 5:55–56 (“This detector 115 *remains operative* when the unit 232 is in low-power mode.” (emphasis added)). Thus, Bowie explicitly recognizes the need for some circuitry to remain “on” during low power mode to receive signals. As a result, we are not persuaded that Bowie teaches away from the modification proposed by Petitioner.

ii. Render inoperable

Patent Owner also argues that “modifying the Bowie device to receive Vanzieleghe’s ‘frame synchronization’ signal while it is in the low power mode would also have the deleterious effect of preventing the Bowie unit from even going into the low power mode” because Vanzieleghe’s pilot tone “may have signal strength at 16 kHz – the same frequency that Bowie’s resume signal detector is configured to receive” and, therefore, “Bowie’s resume signal detector could be triggered by Vanzieleghe’s pilot tone, causing Bowie’s unit to enter a fully operational state even if no resume signal is transmitted.” PO Resp. 47–48.

Petitioner counters that Bowie “provides numerous options for implementing the resume signal,” that “[a] 16kHz resume signal is merely one option,” and “a remote possibility of both Bowie’s resume signal and Vanzieleghe’s pilot tone being set at the same frequency (e.g., 16kHz), as the PO suggests (POR, 48) is not enough to defeat obviousness when Bowie discloses other frequency and tone options for its resume signal that would differentiate it from Vanzieleghe’s pilot tone.” Pet. Reply 19–20.

We agree with Petitioner. Patent Owner has hypothesized one dysfunctional way to combine Bowie and Vanzieleghe, but Bowie does

not require a resume signal of 16 kHz. To the contrary, Bowie teaches expressly that its “resume signal may be an AC signal greater than 4 kHz or may be a multi-tone AC signal.” Ex. 1004, 2:45–47. We are persuaded that it would have been within the level of ordinary skill in the art to select a frequency for Bowie’s resume signal such that Vanzieleghe’s pilot tone would not be mistaken for the resume signal.

7. Summary

For the foregoing reasons, we are persuaded that Petitioner has established, by a preponderance of the evidence, that claims 6, 11, 16, and 20 of the ’404 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Bowie, Vanzieleghe, and ANSI T1.413.

E. Patent Owner’s Motion to Exclude

Patent Owner filed a Motion to Exclude (Paper 33, “Motion”). Petitioner filed an Opposition to Patent Owner’s Motion (Paper 37, “Opp.”), and Patent Owner filed a Reply in support of its Motion (Paper 38). As movant, Patent Owner has the burden of proof to establish that it is entitled to the requested relief. *See* 37 C.F.R. § 42.20(c). For the reasons stated below, Patent Owner’s Motion to Exclude is *dismissed*.

1. Exhibits 1019, 1035, 1036, and 1052

Patent Owner moves to exclude Exhibits 1019, 1035, 1036, and 1052. Motion 1–3. These exhibits appear to be printouts of articles published on the Internet. Ex. 1019; Ex. 1035; Ex. 1036; Ex. 1052. Patent Owner argues that we should exclude them under Rule 901 of the Federal Rules of Evidence (“FRE”) because there is no evidence that they are authentic and they do not fall within any of the self-authenticating exceptions of FRE 902. Motion 1–2. Exhibit 1019 was cited only in connection with Petitioner’s

discussion of the Motorola CopperGold chip set, on which we do not rely. Exhibit 1035 does not appear to have been cited by Petitioner or by Mr. Hoarty. Exhibit 1036 was cited only in paragraph 76 of Mr. Hoarty's declaration. Exhibit 1052 was cited only in paragraph 168 of Mr. Hoarty's declaration. Although Mr. Hoarty cites Exhibits 1036 and 1052 in his declaration (Ex. 1002 ¶¶ 76, 168), we did not rely on Exhibits 1036 and 1052, or on Mr. Hoarty's statements with respect to Exhibits 1036 and 1052 in rendering our decision. We also did not and need not consider Exhibits 1019 and 1035. We have determined that Petitioner has demonstrated, by a preponderance of the evidence, that the challenged claims are unpatentable, without considering the specific objected to evidence or the portion of Mr. Hoarty's statements that discuss Exhibits 1036 and 1052. Accordingly, we *dismiss* Patent Owner's Motion to Exclude as moot as to Exhibits 1019, 1035, 1036, and 1052.

*2. Exhibits 1021–1031, 1033, 1038–1043,
1045–1048, and 1051*

Patent Owner moves to exclude Exhibits 1021–1031, 1038, 1039, 1043, and 1047. Motion 3–4. Exhibits 1021–1030 appear to be Technical Reports of the ADSL Forum. Exhibits 1031, 1038, and 1039 appear to be PowerPoint presentations. Exhibit 1043 is styled “ETSI TS 102 250-2 V2.5.1 (2016-06).” Exhibit 1047 is styled “ADSL2 and ADSL2plus – THE NEW ADSL STANDARDS, March 25, 2003.” Patent Owner argues that we should exclude them under Rule 901 of the Federal Rules of Evidence (“FRE”) because there is no evidence that they are authentic and they do not fall within any of the self-authenticating exceptions of FRE 902. Motion 3–4. Patent Owner also argues that they are hearsay under FRE 801 and 802.

Id. Patent Owner also moves to exclude Exhibits 1033, 1041, 1042, 1046, and 1051 under FRE 901 and FRE 801–802. Mot. 4. Finally, Patent Owner moves to exclude Exhibits 1023–1028, 1035, 1039–1041, 1045, 1047, and 1048, on the grounds that “none of these exhibits were specifically cited or referenced in the Petition or Hoarty declaration).” Mot. 5.

Petitioner argues that these exhibits are not hearsay because “[t]hey are offered for what they describe, and not to prove the truth of the matter asserted.” Opp. 3. According to Petitioner, Exhibits 1021, 1022, 1029–1031, 1033, 1038, 1042 and 1043 are cited in the technology tutorial section of Mr. Hoarty’s declaration, Exhibit 1046 is cited by Mr. Hoarty for corroboration, Exhibits 1023–1028, 1040, 1041, 1045, 1047, 1048, and 1051 are listed solely in Mr. Hoarty’s “materials considered” section “because they are relevant ‘references [that] accurately characterize the state of the art at the relevant time’ and were considered by Petitioner’s expert as part of preparing his declaration. (Ex. 1002, ¶ 25.)” *Id.* at 4. Petitioner also argues that, even if these exhibits are hearsay, Petitioner’s expert is permitted to rely upon them regardless of their admissibility. *Id.*

We did not and need not consider Exhibits 1021–1031, 1033, 1038–1043, 1045–1048, and 1051. We have determined that Petitioner has demonstrated, by a preponderance of the evidence, that the challenged claims are unpatentable, without considering the specific objected to evidence. Accordingly, we *dismiss* Patent Owner’s Motion to Exclude as moot as to Exhibits 1021–1031, 1033, 1038–1043, 1045–1048, and 1051.

III. CONCLUSION

Petitioner has demonstrated, by a preponderance of the evidence, that claims 6, 11, 16, and 20 of the '404 patent are unpatentable under 35 U.S.C. § 103(a) over Bowie, Vanzielegthem, and ANSI T1.413.

IV. ORDER

Accordingly, it is

ORDERED that claims 6, 11, 16, and 20 of the '404 patent are held *unpatentable*;

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

FURTHER ORDERED that, because this is a Final Written Decision, 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.

IPR2016-01470
Patent 8,611,404 B2

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