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Paper 10
Entered: April 18, 2019

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

WILSON ELECTRONICS, LLC,
Petitioner,

v.

CELLPHONE-MATE, INC.,
Patent Owner.

Case IPR2018-01774
Patent 9,402,190 B2

Before NEIL T. POWELL, GEORGIANNA W. BRADEN, and JON M. JURGOVAN, *Administrative Patent Judges.*

POWELL, *Administrative Patent Judge*.

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

I. INTRODUCTION

Wilson Electronics, LLC ("Petitioner") filed a Petition (Paper 2, "Pet.") requesting an *inter partes* review of claims 1–4, 6, 8, 18–20, and 24 of U.S. Patent No. 9,402,190 B2 (Ex. 1001, "the '190 patent"). Cellphone-Mate, Inc. ("Patent Owner") filed a Preliminary Response. Paper 8 ("Prelim. Resp.").

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314. For the reasons discussed below, we deny the Petition and do not institute *inter partes* review.

II. BACKGROUND

A. Related Matters

According to the parties, the '190 patent is asserted in *Wilson Electronics, LLC v. Cellphone-Mate, Inc. d/b/a SureCall and Shenzhen SureCall Communication Tech. Co. Ltd.*, Case No. 2:17-cv-00305-DB (D. Utah). Pet. 1; Paper 4, 2 (Patent Owner's Mandatory Notices).

B. The Asserted Grounds of Unpatentability and Evidence of Record

Petitioner contends that claims 1–4, 6, 8, 18–20, and 24 of the '190 patent are unpatentable based on the following grounds:

Reference(s)	Statutory Basis	Challenged Claim(s)
Layne[1], Sahota[2], and McKay[3]	35 U.S.C. § 103[4]	1–4, 6, 8, 19, 20, and 24
Zhuo[5], Layne, and Sahota	35 U.S.C. § 103	18
Duo Repeater[6]	35 U.S.C. § 103	1, 2, 6, 8, and 19
Duo Repeater and Sahota	35 U.S.C. § 103	3, 4, 20, and 24
Duo Repeater and TEKO Repeater[7]	35 U.S.C. § 103	18

Pet. 2–3.

[1] U.S. Patent No. 7,250,830 B2, iss. July 31, 2007 (Ex. 1011).

[2] U.S. Patent Application No. 2012/0302188 A1, pub. Nov. 29, 2012 (Ex. 1008).

[3] U.S. Patent Application No. 2004/0166802 A1, pub. Aug. 26, 2004 (Ex. 1007).

[4] Because the claims at issue have an effective filing date after March 16, 2013, the effective date of the applicable provisions of the Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284. 284 (2011) ("AIA"), we apply the AIA version of 35 U.S.C. § 103 in this Decision.

[5] Chinese Patent Publication No. 201699704 U, pub. Jan. 05, 2011 (Ex. 1005).

[6] Duo-i6525 User Manual, version 1.2, Advanced RF Technologies, Inc. (Ex. 1009).

[7] Communication from Teko Telecom S.p.A to Federal Communications Commission (Ex. 1006).

Petitioner also relies on the Declaration of Dr. William T. Rallston. Ex. 1002. Patent Owner relies on the Declaration of Dr. Todd Moon. Ex. 2001.

C. The '190 Patent

The '190 patent describes a multi-band radio frequency (RF) signal booster. Ex. 1101, [57]. As shown below in Figure 1 of the '190 patent, signal booster 2 receives downlink signals from base station 1 on antenna 5a, and boosts and retransmits the signals on antenna 5b to mobile devices 3a, 3b, 3c, and network device 4. *Id.* at 3:50–67.

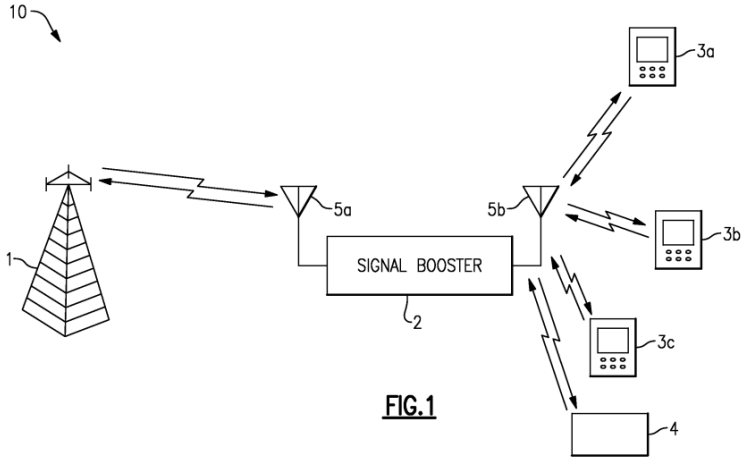

FIG. 1

Signal booster 2 of Figure 1, above, also receives uplink channel signals from mobile devices 3a, 3b, 3c, and network device 4 on antenna 5b, and boosts and retransmits those signals from antenna 5a to base station 1. *Id.* Mobile devices 3a, 3b, 3c, and network device 4 communicate with the base station on different frequency bands (e.g., for 2G, 3G, 4G) using different wireless carriers (e.g., AT&T, Verizon, etc.). *Id.* at 4:20–44. Signal booster 2 thus provides boost for signals on channels of multiple frequency bands. *Id.* at 3:60–63, 4:45–48. Signal booster 2 is useful, for example, in a building where

base station signals are weak and users operate multiple devices requiring different frequency bands and/or wireless carriers. *Id.* at 3:67–4:3, 1:36–38, 4:20–25.

Further details of an embodiment of a signal booster to boost uplink and downlink channels for two frequency bands are shown below in Figure 3 of the '190 patent.

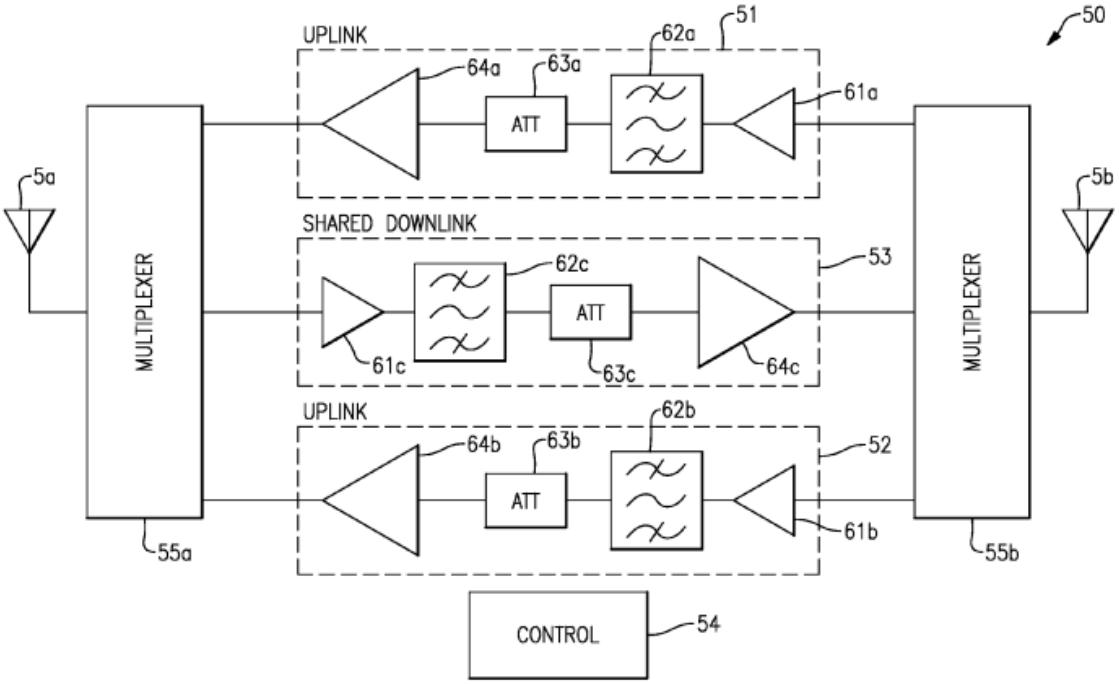

FIG.3

Specifically, in Figure 3, above, signal booster 50 includes first and second multiplexers 55a, 55b, first to third amplification paths 51–53, and control circuit 54. *Id.* at 7:63–67. Multiplexers 55a, 55b of signal booster 50 connect to respective antennas 5a, 5b by cables or wires. *Id.* at 7:67–8:3. Respective terminals of multiplexers 55a, 55b connect to opposite ends of the amplification paths 51–53. *Id.* at 8:6–18. As shown in Figure 3, each amplification path 51–53 includes respective low noise amplifier (LNA) 61a, 61b, 61c, band-pass filter 62a, 62b, 62c, attenuator 63a, 63b,

63c, and power amplifier (PA) 64a, 64b, 64c, which are cascaded together. *Id.* at 8:19–40.

In Figure 3 of the '190 patent, first and second amplification paths 51, 52 boost uplink signals of respective first and second frequency bands, but third amplification path 53 is shared and boosts downlink signals for both frequency bands. *Id.* at 10:29–60. Sharing of amplification path 53 is possible because the downlink signals are in frequency bands that are close to one another. *Id.* at 10:15–28. Sharing of components reduces the component count and size of the signal booster, and does not require a filter with a sharp passband, which may be costly and large. *Id.* at 6:66–7:8.

Figure 2B of the '190 patent, shown below, depicts a frequency spectrum showing band-pass filter passbands for different uplink and downlink channels of respective frequency bands. The multiple frequency

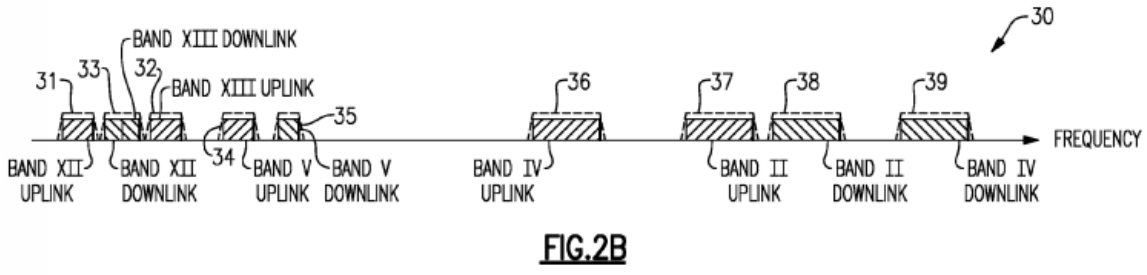

FIG.2B

bands shown in Figure 2B, above, include telecommunications technologies such as Universal Mobile Telecommunications System (UMTS) Band II, Band IV, Band V, Band XII, and Band XIII. *Id.* at 4:26–30, 5:5–38. Advanced Wireless Services (AWS) operates on Band IV, Personal Communication Services (PCS) operates on Band II, and Cellular (CLR) services operates on Band V. *Id.* at 4:30–35. UMTS, AWS, PCS, and CLR are third generation (3G) technologies. Long Term Evolution (LTE)

operates on Band XII and Band XIII. *Id.* at 4:35–40. LTE is a fourth generation (4G) technology.

In Figure 2B, passbands 31, 32 of band-pass filters 62a, 62b pass signals on uplink Band XII and uplink band XIII, but reject signals outside of these bands. *Id.* at 7:45–62. Also, as shown in Figure 2B, Band XII and Band XIII are in reverse duplex so the downlink channels are adjacent to one another. Accordingly, passband 33 of band-pass filter 62c is configured to pass both downlink Band XII and downlink Band XIII. *Id.* at 8:33–40, 10:46–59.

D. Illustrative Claim

Claims 1 and 19 are independent. Each of claims 2–4, 6, 8, 18, 20, and 24 depends, directly or indirectly, from one of independent claims 1 and 19. Claim 1 is reproduced below:

1. A radio frequency signal booster comprising:

a printed circuit board (PCB) comprising:

a shared amplification path configured to provide amplification to at least a portion of a first downlink channel of a first frequency band and to provide amplification to at least a portion of a second downlink channel of a second frequency band, wherein the first frequency band and the second frequency band are different frequency bands,

wherein the shared amplification path comprises a first band-pass filter configured to pass the at least a portion of the first downlink channel and the at least a portion of the second downlink channel, wherein the shared amplification path is further configured to simultaneously boost both the at least a portion of the first downlink channel and the at least a portion of the second downlink channel,

wherein the first downlink channel and the second downlink channel are adjacent in frequency to one another,

wherein the shared amplification path further comprises at least one amplifier.

Ex. 1001, 20:51–21:5.

III. ANALYSIS

A. Claim Construction

In an *inter partes* review filed before November 13, 2018, claim terms in an unexpired patent are given their broadest reasonable construction in light of the specification of the patent. 37 C.F.R. § 42.100(b) (2016).[8] Consistent with that standard, we assign claim terms their ordinary and customary meaning, as would be understood by one of ordinary skill in the art at the time of the invention, in the context of the entire patent disclosure. *See In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Only those terms that are in controversy need be construed, and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

[8] The Office recently changed the claim construction standard used in *inter partes* review proceedings. 37 C.F.R. § 42.100(b) (2018). As stated in the Federal Register notice, however, the new rule applies only to petitions filed on or after November 13, 2018, and, therefore, does not impact this matter. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340, 51,340 (Oct. 11, 2018) (stating "[t]his rule is effective on November 13, 2018 and applies to all IPR, PGR and CBM petitions filed on or after the effective date").

In the "Claim Construction" section of the Petition, Petitioner discusses the meaning of "contiguous," "abutting," and "adjacent." Pet. 4–5. Asserting that the challenged claims do not recite "contiguous" or "adjacent," Patent Owner disputes Petitioner's proposed meaning of "abutting." Prelim. Resp. 11–12. Our analysis of the parties' patentability dispute does not require express construction of any claim term.

B. Alleged Obviousness over Layne, Sahota, and McKay

1. Overview of Layne

Layne is titled "Dual Band Full Duplex Mobile Radio." Ex. 1011, [54]. Layne's radio operates in various transceiver modes (simplex, half duplex, full duplex) on multiple frequency bands, particularly Public Safety Frequency Bands at 700 MHz and 800 MHz. *Id.* at 1:8–19, 2:24–28. As shown below in Layne's Figure 2, the Public Safety Frequency Bands are set up to use frequency bands 50 (7L) and 56 (8H) for receive operation in each of the 700 and 800 MHz frequency ranges, and use frequency bands 52 (7H) and 54 (8L) for transmit operations in each of the 700 and 800 MHz frequency ranges. *Id.* at 3:3–11.

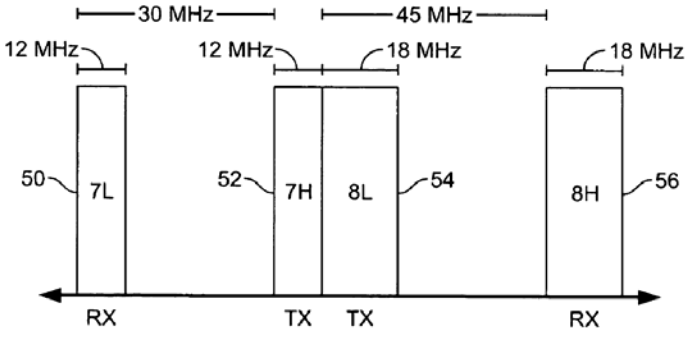

FIG. 2

As shown in Figure 3 below, Layne's dual band full duplex mobile radio 80 includes transmit portion 94 with dual band filter 30, and receive

portion 102 with dual band filter 28. *Id.* at 1:48–51, 3:22–27. Circulator 110 connects to transmit portion 94 and receive portion 102 and provides transmit and receive switching. *Id.* at 1:51–53, 4:7–10. Transmit portion 94 includes attenuator 92, amplifier 90, attenuator 88, power amplifier 86, switch 85, and filter 30 configured to pass signals in the 7H and 8L frequency bands and reject signals in the 7L and 8H frequency bands. *Id.* at 3:53–59, 3:65–4:6.

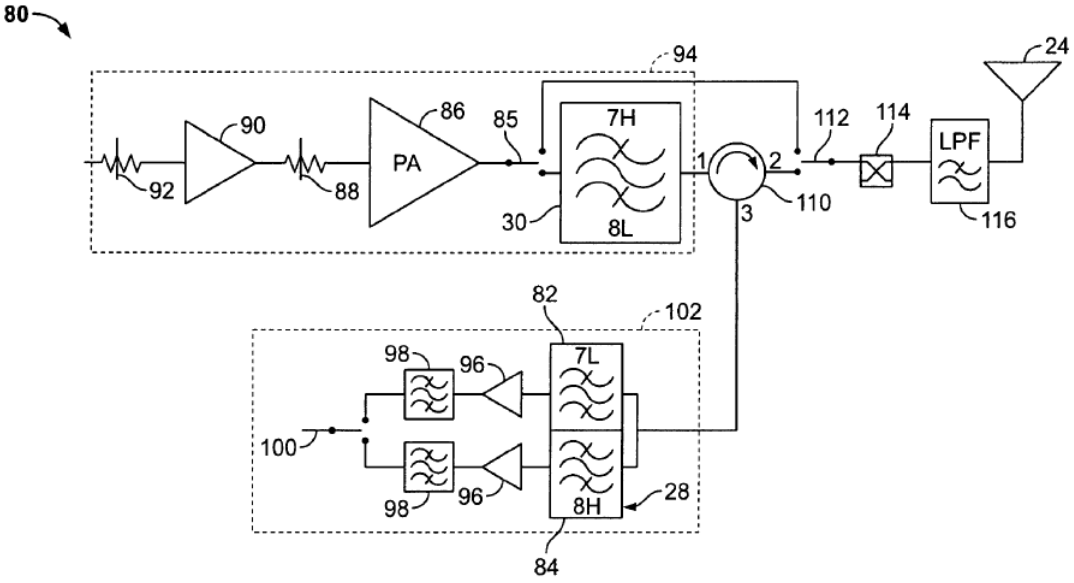

FIG. 3

As shown above in Layne's Figure 3, receive portion 102 includes first filter 82 configured to pass signals in the 7L frequency band (*id.* at 3:31–34), and second filter 84 configured to pass signals in the 8H frequency band (*id.* at 3:34–36). Receive filter 28 thus passes signals in the 7L and 8H frequency bands, but rejects signals in the 7H and 8L frequency bands. *Id.* at 3:36–39. Receive portion 102 further includes amplifiers 96, which may be low-noise amplifiers or preamplifiers (*id.* at 3:44–47), and filters 98 which may be surface acoustic wave (SAW) filters (*id.* at 3:47–51).

Switch 100 selects between the filtered 7L and 8H frequency bands. *Id.* at 3:49–51.

In half duplex mode, switches 85 and 112 bypass circulator 110 and transmit filter 30, whereas, in full duplex mode, switches 85 and 112 are connected to the transmit filter 30 and circulator 110. *Id.* at 4:7–21.

2. Overview of Sahota

Sahota is titled "Tunable Multi-Band Receiver" and describes a receiver with antenna tuning network 420, tunable notch filter 430, and LNA 440 coupled in series, as shown below in Sahota's Figure 4A. Ex. 1008 ¶ 36.

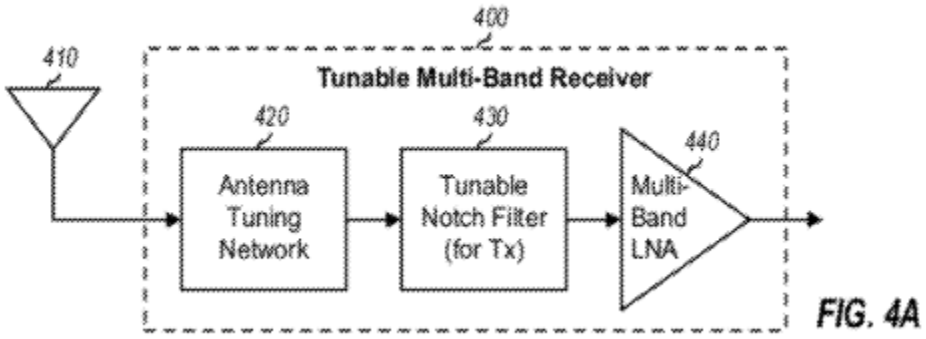

FIG. 4A

Sahota also provides a table listing various frequency bands, as shown in Table 1 below.

TABLE 1

Frequency Band	Transmit Band Uplink (MHz)	Receive Band Downlink (MHz)	Common Name	Frequency Band
UMTS Band I	1920-1980	2110-2170	IMT-2000	
UMTS Band II	1850-1910	1930-1990	PCS	GSM 1900
UMTS Band III	1710-1785	1805-1880	DCS	GSM 1800
UMTS Band IV	1710-1770	2110-2170		
UMTS Band V	824-849	869-894	Cellular	GSM 850
UMTS Band VI	830-840	875-885		
UMTS Band VII	2500-2570	2620-2690		
UMTS Band VIII	880-915	925-960		
UMTS Band IX	1750-1785	1845-1880		
UMTS Band X	1710-1770	2110-2170		
UMTS Band XI	1428-1453	1476-1501		
UMTS Band XII	698-716	728-746		
UMTS Band XIII	777-787	746-756		
UMTS Band XIV	788-798	758-768		
	890-915	935-960		GSM 900

Ex. 1008 ¶ 69. Sahota also discloses its tunable multi-band receiver may be implemented on a printed circuit board (PCB), and that the receiver can be part of a larger device. *Id.* ¶¶ 81, 82.

3. Overview of McKay

McKay is titled "Cellular Signal Enhancer." Ex. 1007, [54]. In Figure 19, shown below, McKay discloses a downlink signal path with filter 238, LNA 240, band-pass filter 242, variable gain amplifier (VGA) 244, PA 246, coupler 248, and band-pass filter 250 connected in series. *Id.* ¶¶ 96, 103, 104.

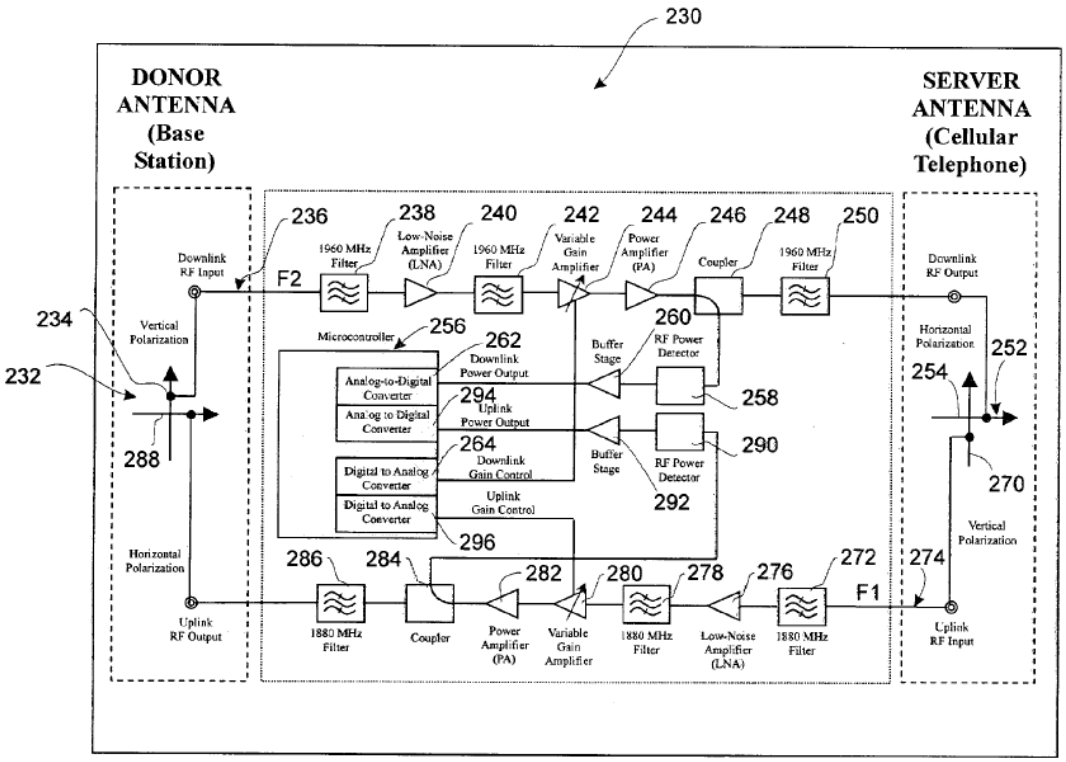

FIG 19

Similarly, McKay's Figure 19, shown above, discloses an uplink signal path with filter 272, LNA 276, filter 278, VGA 280, PA 282, coupler 284, and filter 286 connected in series. Ex. 1007 ¶ 110.

4. Discussion

Asserting that Layne teaches many of the limitations of the challenged claims, Petitioner asserts that the claim limitations not taught by Layne would have been obvious in view of Sahota and McKay. Pet. 22–44. Patent Owner disagrees. Prelim. Resp. 16–22, 39–52.

Patent Owner alleges that Petitioner's obviousness contention fails for multiple reasons. Patent Owner argues that Petitioner has not addressed adequately claim 1's recitation of "a shared amplification path configured to provide amplification to at least a portion of a first downlink channel of a

first frequency band and to provide amplification to at least a portion of a second downlink channel of a second frequency band." Ex. 1001, 20:53–57; Prelim. Resp. 16–22. Additionally, Patent Owner argues that objective evidence of non-obviousness contradicts Petitioner's assertion of obviousness. *Id.* at 39–52. We turn now to detailed discussions of the issues raised by the parties' contentions.

a. The Dispute Regarding a "shared amplification path configured to provide amplification to at least a portion of a first downlink channel of a first frequency band and to provide amplification to at least a portion of a second downlink channel of a second frequency band"

Petitioner asserts that "*Layne* discloses or suggests this limitation. Specifically, Layne states that 'the transmit filter 30 passes signals in the 7H and 8L frequency bands and rejects or filters signals in the 7L and 8H frequency bands.'" Pet. 23 (citing Ex. 1011, 3:57–39). Additionally, Petitioner asserts that a person of ordinary skill in the art would recognize that the amplification path also amplifies frequency bands 7H and 8L at the same time. *Id.* (citing Ex. 1002 ¶ 49). Although "[t]he combined frequency band 7H and frequency band 8L are uplink channels," Petitioner contends that "the circuitry for amplifying an uplink channel is no different than the circuitry for amplifying a downlink channel." *Id.* at 24. In support of this contention, Petitioner cites the testimony of Dr. Ralston, paragraph 110 of McKay, and a portion of the '190 patent. *Id.*

Patent Owner argues that Petitioner does not demonstrate that a shared amplification path for download channels is either taught by or obvious over the references. Prelim. Resp. 16–21. Patent Owner

emphasizes that Petitioner concedes Layne does not disclose a shared amplification path for downlink channels, but a shared amplification path for uplink channels. *Id.* at 16. Patent Owner also notes that Petitioner does not allege either McKay or Sahota teaches a shared amplification path for downlink channels. *Id.* at 18. Patent Owner notes, for example, that McKay fails to teach any combined amplification path for either uplink or downlink channels. *Id.* (citing Ex. 1007, Fig. 19; Ex. 2001 ¶ 47).

Additionally, Patent Owner contends that Petitioner does not show obviousness with the assertion that "the circuitry for amplifying an uplink channel is no different than the circuitry for amplifying a downlink channel." *Id.* at 16–21. This assertion conflicts with Layne itself and lacks adequate evidentiary support, Patent Owner argues. *Id.* at 16–19. Patent Owner asserts that Layne has significantly different circuits for uplink and downlink channels, explaining that:

> Layne's combined ***uplink*** amplification path . . . consists of attenuator 92 connected in series with amplifier 90, attenuator 88, power amplifier 86, switch 85, and then transmit filter 30. Ex. 1011 at Fig. 3, 3:65-4:1. On the other hand, the two downlink amplification paths shown in the bottom, dotted-line box 102, consists of receive filters 82 and 84 (in parallel), followed by amplifiers 96 (in parallel), filters 98 (in parallel), and switch 100. *Id.* at 3:44-52. Layne explains that switch 100 is used to select between the two filtered signals. *Id*. at 3:47-51. A [person of ordinary skill in the art] would recognize that only one downlink signal is active in Layne at any given time due to the switch 100. Ex. 2001 ¶¶ 45-46. Accordingly, Layne discloses two downlink amplification paths that are structurally very different from Layne's combined uplink amplification path.

Id. at 17.

Patent Owner further argues that Petitioner does not demonstrated the existence of a motivation to substitute a shared amplification path for Layne's separate downlink channels. *Id.* at 19–22. Noting that Layne teaches separate, mutually exclusive downlink paths selected by its switch 100, Patent Owner asserts that Petitioner does not explain how or why a person of ordinary skill in the art would have replaced these downlink paths with a shared downlink path. *Id.* at 19–20. Patent Owner also argues that modifying Layne to be a signal booster would render it "unfit for its purpose as a mobile radio." *Id.* at 21. Patent Owner adds that "a [person of ordinary skill in the art] would not combine Layne with Sahota because the tunable notch filter taught by Sahota is the antithesis of the combined band-pass filter for multiple channels taught by Layne." *Id.* at 22. Additionally, Patent Owner argues that Petitioner's citation of the '190 patent is hindsight analysis that does not show the existence of a motivation to modify prior to Patent Owner's disclosure. *Id.* at 20–21.

Patent Owner persuades us that Petitioner does not demonstrate sufficiently that the claimed shared amplification path for downlink channels would have been obvious in view of Layne, Sahota, and McKay. Petitioner concedes that Layne's shared amplification path is for uplink channels, not downlink channels. Pet. 24. And Petitioner does not allege or demonstrate that McKay or Sahota teaches a shared amplification path for downlink channels. *See* Pet., generally.

Nor does Petitioner demonstrate sufficiently that it would have been obvious to modify Layne to have a shared amplification path for downlink channels. Petitioner addresses Layne's lack of a shared amplification path for downlink channels with the assertion that uplink paths and downlink

paths have the same configuration of circuitry. Pet. 24. We find this unavailing. Patent Owner persuades us that Layne discloses separate paths for its two downlink channels, and that the circuits for the uplink paths have significantly different configurations from the circuit for the uplink paths. Prelim. Resp. 16–18. Thus, not all uplink and downlink paths have the same configuration of circuitry. Without addressing the different circuit configurations of Layne's uplink and downlink paths, Petitioner and Dr. Ralston cite McKay as disclosing an example with uplink and downlink paths having similar or the same configuration. Pet. 24 (citing Ex. 1007 ¶ 110); Ex. 1002 ¶ 50 (citing Ex. 1007 ¶ 110). In view of Layne, Dr. Ralston's testimony and McKay demonstrate, at most, that the circuit configurations of uplink and downlink paths could be the same.

Demonstrating that uplink and downlink paths could be the same does not demonstrate why a person of ordinary skill in the art would have modified Layne. Petitioner must articulate a *reason why* a person of ordinary skill in the art would combine the prior art references. *In re NuVasive*, 842 F.3d 1376, 1382 (Fed. Cir. 2016); *Metalcraft of Mayville, Inc. v. The Toro Co.*, 848 F.3d 1358, 1366 (Fed. Cir. 2017) ("[I]t is insufficient to simply conclude the [prior art] combination would have been obvious without identifying any reason why a person of skill in the art would have made the combination."); *see Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (emphasis added) (citation omitted) ("[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention").

Petitioner's citation of the '190 patent as evidence of obviousness is also unavailing. Petitioner relies on the '190 patent's disclosure that

> [a]lthough the signal booster 50 has been described in the context of a single amplification path boosting multiple downlink channels, the teachings herein are applicable to configurations in which a single amplification path is used to boost multiple uplink channels. For example, the teachings herein are applicable to configurations in which a shared amplification path is used to boost the uplink channels of two frequency bands that are adjacent, such as when the duplex of the first and second frequency bands is reversed such that the bands' uplink channels are positioned between the bands' downlink channels.

Ex. 1001, 10:60–11:3. According to Petitioner, this disclosure demonstrates that "the circuitry for amplifying an uplink channel is no different than the circuitry for amplifying a downlink channel." Pet. 24.

Contrary to Petitioner's assertion, it is not clear to us that the cited disclosure teaches identity between the circuitry of uplink and downlink paths. Additionally, assuming the cited disclosure does demonstrate some similarity between amplifying uplink and downlink channels, Petitioner again fails to provide sufficient persuasive evidence or reasoning as to why a person of ordinary skill in the art would have modified Layne.

Moreover, we agree with Patent Owner that Petitioner's reliance on the cited portion of the '190 patent is impermissible hindsight. *See* Prelim. Resp. 20–21. Pet. 30. "It is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious." *In re Fritch*, 972 F.2 1260, 1266 (Fed. Cir. 1992) (citing *In re Gorman*, 933 F.2d 982, 987 (Fed. Cir. 1991)). Thus, we find that Petitioner's allegation of what is allegedly known now (after seeing the disclosure of the '190 patent) does

not support an assertion of unpatentability under 35 U.S.C. § 103, which precludes patentability "if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious *before the effective filing date of the claimed invention*" (emphasis added).

On the whole, Petitioner's arguments and evidence demonstrate no more than the possibility that a person of ordinary skill in the art could have modified Layne, without providing sufficient reasoning or evidence as to why a person of ordinary skill in the art would have modified Layne to meet the claimed invention. Conclusory statements alone, even those provided by a declarant, are inadequate to demonstrate a rationale for why a person of ordinary skill in the art would combine the teachings from prior art references. *NuVasive*, 842 F.3d at 1383. Instead, Petitioner's arguments must be supported by a "reasoned explanation." *Id.* (citing *In re Lee*, 277 F.3d 1338, 1342, 1345 (Fed. Cir. 2002)). Consequently, Petitioner has not demonstrated a reasonable likelihood of prevailing on its assertion that independent claim 1 would have been obvious over Layne, Sahota, and "alternatively" McKay. *See Metalcraft*, 848 F.3d at 1366 ("[I]t is insufficient to simply conclude the [prior art] combination would have been obvious without identifying any reason why a person of skill in the art would have made the combination."). We understand that a person of ordinary skill is a person of ordinary creativity, not an automaton, but "[w]ithout any explanation as to how or why the references would be combined to arrive at the claimed invention, we are left with only hindsight bias that *KSR* warns against." *Id.* at 1367 ("'[T]he obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation,'

we also recognize that we cannot allow hindsight bias to be the thread that stitches together prior art patches into something that is the claimed invention." (quoting *KSR*, 550 U.S. at 420–21)). Petitioner's arguments and evidence regarding independent claim 19 suffer from the same problems. *See* Pet. 38. And Petitioner's treatment of dependent claims 2–4, 6, 8, 20, and 24 does not cure the deficiencies in the challenges of claims 1 and 19. *See* Pet. 29–36, 42–44.

b. Objective Evidence of Non-Obviousness

Factual inquiries for an obviousness determination include secondary considerations based on evaluation and crediting of objective evidence of nonobviousness. *See Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). Notwithstanding what the teachings of the prior art would have suggested to one of ordinary skill in the art at the time of the invention, the totality of the evidence submitted, including objective evidence of nonobviousness, may lead to a conclusion that the challenged claims would not have been obvious to one of ordinary skill in the art. *In re Piasecki*, 745 F.2d 1468, 1471–72 (Fed. Cir. 1984). Secondary considerations may include any of the following: long-felt but unsolved needs, failure of others, unexpected results, commercial success, copying, licensing, and praise. *See Graham*, 383 U.S. at 17; *Leapfrog Enters., Inc. v. Fisher–Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007). Here, Patent Owner argues that (i) long-felt but unresolved need, (ii) industry praise, (iii) failure of others to obtain the claimed invention, (iv) commercial success, and (v) copying indicates that the challenged claims would not have been obvious to a person of ordinary skill in the art. Prelim. Resp. 39–52.

(1) Nexus between the Claimed Invention and Force5 Product

"[O]bjective evidence of non-obviousness must be commensurate in scope with the claims which the evidence is offered to support." *Asyst Techs., Inc. v. Emtrak, Inc.*, 544 F.3d 1310, 1316 (Fed. Cir. 2008) (quoting *In re Grasselli*, 713 F.2d 731, 743 (Fed. Cir. 1983)); *see In re Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011). In a related requirement, in order to be accorded substantial weight, there must be a nexus between the merits of the claimed invention and the evidence of secondary considerations. *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995). "Nexus" is a legally and factually sufficient connection between the objective evidence and the claimed invention, such that the objective evidence should be considered in determining nonobviousness. *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988). The burden of showing that there is a nexus lies with the patent owner. *Id.*; *see In re Paulsen*, 30 F.3d 1475, 1482 (Fed. Cir. 1994). "[T]here is a presumption of nexus for objective considerations when the patentee shows that the asserted objective evidence is tied to a specific product and that product is 'the invention disclosed and claimed in the patent.'" *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1329 (Fed. Cir. 1997).

Patent Owner states that "[a] nexus between the objective evidence and a novel feature of the claimed invention is presumptively attributed to the patented invention where the product is coextensive with the claimed features." Prelim. Resp. 47 (citing *Muniauction, Inc. v. Thomson Corp.*, 532 F.3d 1318, 1328 (Fed. Cir. 2008)). Patent Owner states that its declarant, Dr. Moon, compared the Force5 to each of the challenged claims of the '190

patent, alleging the Force5 practices and is coextensive with every challenged claim of the '190 patent. *Id.* (citing Ex. 2001 ¶¶ 70–76; Ex. 2006). We accept Dr. Moon's testimony and give it due weight in assessing the obviousness challenge, although we do not agree that all of the objective evidence of nonobviousness has a nexus to the claimed invention for reasons to be explained in later sections of this decision.

(2) Long-Felt but Unsatisfied Need in the Art

Patent Owner contends the first commercial embodiment of the '190 patent, the SureCall's Force5, was a breakthrough in the signal booster industry, for the first time providing a signal boost that could simultaneously amplify 4G LTE signals for both AT&T and Verizon. Prelim. Resp. 39–40. Patent Owner asserts that, before Force5, a customer would have to buy and install a 4G booster that operated for only a specific carrier. *Id.* at 40 (citing Ex. 2003 ¶ 17; Ex. 2004 ¶ 13; Ex. 2005 ¶ 14). Using a 4G booster to enhance one carrier's signal, however, could cause interoperability problems by interfering with another carrier's signal. *Id.* at 40–41 (citing Ex. 2003 ¶ 18; Ex. 2005 ¶ 15). Patent Owner also recognizes that users in a building, for example, are unlikely to use the same cell phone carrier, so the limitation to use only one carrier's 4G booster was problematic. *Id.* (citing Ex. 2003 ¶ 18; Ex. 2005 ¶ 16). Patent Owner contends EVDOinfo blog recognized the need to solve this long-known problem. *Id.* at 41 (citing Ex. 2004 ¶ 21; Ex. 2013). Coinciding with the announcement of Force5, EVDOinfo states that "Cellphone-Mate has announced the release of a product that has been *long-anticipated by users* wanting to boost the signal to multiple networks at the same time." *Id.* (citing Ex. 2004 ¶ 21; Ex. 2013). Patent Owner relies on the declarations of Laine Matthews and Jonathan Bacon to support its

position. Ex. 2003 ¶¶ 4, 10; Ex. 2004 ¶¶ 4, 6. We find the EVDOinfo blog article to be consistent with the declarants' testimony, which tends to demonstrate a long-felt but unsolved need in the art for the claimed invention.

(3) Industry Praise for the Claimed Invention

As explained in *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1051 (Fed. Cir. 2016) (en banc):

> Evidence that the industry praised a claimed invention or a product that embodies the patent claims weighs against an assertion that the same claimed invention would have been obvious. Industry participants, especially competitors, are not likely to praise an obvious advance over the known art. Thus, if there is evidence of industry praise of the claimed invention in the record, it weighs in favor of the non-obviousness of the claimed invention.

Apple, 839 F.3d at 1053.

Patent Owner contends SureCall introduced the Force5 signal booster to the industry and public on April 30, 2012. Prelim. Resp. 42 (citing Ex. 2003 ¶ 20; Ex. 2004 ¶ 15; Ex. 2005 ¶ 31; Ex. 2009). Patent Owner asserts the industry's reaction was immediate praise. *Id.* The EVDOinfo blog noted that the Force5 was "the first and ONLY amplifier currently available that supports ALL of those frequencies," which included Verizon 4G and AT&T 4G. *Id.* (citing Ex. 2013). Patent Owner's declarants testify that Petitioner's then-CEO appeared irritated and in disbelief that another engineering group could make such advancements before Petitioner, and that Petitioner's then-Director of Business Development viewed the Force5 as a groundbreaking achievement. *Id.* at 41–42 (citing Ex. 2003 ¶¶ 22, 24; Ex. 2004 ¶ 19).

Patent Owner further states it publicly displayed the Force5 device at the Cellular Telecommunications Industry Association (CTIA) trade show from May 7 to 10, 2012 in New Orleans, Louisiana. *Id.* at 43 (citing Ex. 2004 ¶¶ 16–17). Patent Owner's declarants testify industry members, including Petitioner's then-Director of Marketing, recognized the Force5 as a groundbreaking advancement, which the attending media allegedly recognized as the most compelling booster device at CTIA 2012 because of its 5-band capability. *Id.* (citing Ex. 2003 ¶ 22; Ex. 2004 ¶ 17).

Patent Owner contends its Force5 continued to garner praise for months and even years after its introduction. *Id.* The EVDOinfo blog published an article stating "[u]ntil now customers only had a few options to repeat both 3G and 4G LTE signal within a building. Option one was to shell out for a Cellphone-Mate Force-5, which is the only wireless amplifier on the market that currently supports 3G/4G AWS and LTE." *Id.* (citing Ex. 2004 ¶ 22; Ex. 2014). The same article indicated customers could boost 3G and 4G LTE signals without using a Force5 by using multiple boosters together, but this would only allow a consumer to boost 4G LTE for a particular carrier, i.e., AT&T or Verizon, but not both. *Id.* (citing Ex. 2014). 3gstore blog published an article concerning Force5 that is similar to the EVDOinfo blog articles. *Id.* at 44 (citing Ex. 2015). RCR Wireless News hosted a webinar with the inventor of the '190 patent, Hongtao Zhan, to explain Force5's ability to boost 4G LTE signal for all major cell phone carriers in the US. *Id.* (citing Ex. 2005 ¶ 41; Ex. 2022).

Patent Owner further states that on July 9, 2013, GizmoChat, another industry blog, noted "[u]p until Q4 of 2012, you had to mix and match multiple cellular amplifiers in order to cover the[] 5 major bands. This was a

very expensive and complicated thing to do. Cellphone-Mate was the first cellular amplifier company to do this." *Id.* at 45 (citing Ex. 2004 ¶ 24; Ex. 2016). The GizmoChat article further stated "[n]ow one system with a single amplifier can take care of all the major carrier frequencies used in the US and Canada. That's a big deal." *Id.* (emphasis omitted). GizmoChat also posted videos discussing the Force5 with the inventor "because of its renown in the industry and groundbreaking technological advancement to boost 5-bands simultaneously." *Id.* (citing Ex. 2005 ¶¶ 42–43; Ex. 2023; Ex. 2024).

Patent Owner states that industry publication "Commercial Integrator" published in June 2014 that the Force5 won the 2014 BEST Award for cell booster technology. *Id.* at 46 (citing Ex. 2003 ¶ 27; Ex. 2004 ¶ 27; Ex. 2010). The article stated "when [the Force5] was first released in 2012, it was the first self-contained cell booster on the market to support 2G, 3G and 4G service for every major carrier." *Id.* (citing Ex. 2010). On June 30, 2014, EVDOinfo blog echoed this statement and added "[d]ue to this, the Force5 has become the leading choice of professional installers everywhere." *Id.* (citing Ex. 2017). Patent Owner further adds the praise awarded to Force5 is due to SureCall's patented 5-band technology. *Id.* (citing Ex. 2003 ¶ 28; Ex. 2004 ¶ 29).

We credit the 2014 BEST Award and accompanying article (Ex. 2010) regarding an award given by an unbiased panel of industry leaders and the editors of Commercial Integrator, with special consideration for innovation, functionality, competitive advantages and benefits to the installer. *See id.* at 45–46. The statements in this EVDOinfo blog and the 2014 BEST Award articles are consistent with the evidence provided in the

other articles and given in the testimony. Accordingly, Patent Owner presents considerable evidence tending to demonstrate industry praise in the relevant industry for the product encompassed by the challenged claims.

(4) Failure of Others to Obtain the Claimed Invention

Patent Owner contends that in January 2013, six months after introduction of the Force5, Petitioner released its AG Pro-Quint booster, but that it did not deliver the feature that made Force5 desirable in the market—the simultaneous amplification of AT&T and Verizon 4G LTE signals. *Id.* at 48–49 (citing Ex. 2003 ¶ 32; Ex. 2004 ¶ 31; Ex. 2012). According to Patent Owner, the AG Pro-Quint booster required the user to select only one of Verizon or AT&T to be boosted, but could not operate simultaneously with both carriers. *Id.* Patent Owner contends this is evidence of nonobviousness, citing *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1054 (Fed. Cir. 1988) ("[F]ailure of others to provide a feasible solution to a long standing problem is probative of nonobviousness."). *Id.* at 49.

We credit the AG Pro-Quint booster's lack of simultaneous amplification of AT&T and Verizon 4G LTE signals as evidence of a failure of another to obtain the claimed invention. *Id.* at 48–49 (citing Ex. 2003 ¶ 32; Ex. 2004 ¶ 31; Ex. 2012). The absence of the capability to simultaneously boost AT&T and Verizon 4G LTE signals implies Petitioner's device lacked the claimed invention's shared amplification path with band-pass filter allowing Band XII and Band XIII downlink signals.

(5) Commercial Success

Patent Owner asserts it has experienced dramatic increases in its sales volume and revenue directly attributable to the technology covered by

the '190 patent. Prelim. Resp. 49–50 (citing Ex. 2005 ¶¶ 36–37; Ex. 2021). Patent Owner attributes the increase as "the result of SureCall's claimed 5-band technology" that "boost[s] signals for voice, text, and 4G LTE signal for all North American cell carriers, a capability that Patent Owner specifically touts on all of its 5-band capable products." *Id.*

We note, however, that claim 1 of the '190 patent does not recite boosting signals for five bands. "[C]ommercial success [requires] a nexus . . . [to] the claimed invention." *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1349–50 (Fed. Cir. 2012). Accordingly, we do not credit Patent Owner's commercial success as demonstrating non-obviousness, at least with respect to independent claim 1 due to a lack of nexus between Patent Owner's evidence of commercial success with the scope of the challenged claims.

(6) Copying

Patent Owner's declarants testify that Petitioner's engineering department requested a Force5 device to test and evaluate it for competitive analysis, but was unable to release a commercial booster capable of simultaneously amplifying the AT&T and Verizon 4G LTE signals until February 2014. Prelim. Resp. 50–52 (citing Ex. 2003 ¶¶ 34–36; Ex. 2004 ¶¶ 32, 33). Patent Owner's declarants, however, do not show here that Petitioner's boosters incorporated the claimed invention. Thus, Patent Owner does not establish on this record that Petitioner copied the claimed invention.

c. Summary

We find Petitioner has not demonstrated a reasonable likelihood of prevailing on its assertion of obviousness over Layne, Sahota, and McKay.

For the reasons explained above in Section III.B.4.a, Petitioner has not provided sufficiently persuasive reasoning or evidence to provide rational underpinning for its conclusion of obviousness. This alone precludes a reasonable likelihood of prevailing. Further undermining Petitioner's challenge, for the reasons explained in Section III.B.4.b, Patent Owner presents evidence tending to show a long-felt, unsatisfied need for the claimed invention, industry praise for the claimed invention, as well as failure of another to produce the claimed invention.

C. Alleged Obviousness of Claim 18 over Zhuo, Layne, and Sahota

1. Overview of Zhuo

Zhuo is titled "Tri-band Wireless Repeater." Ex. 1005, [54]. Zhuo purports to solve the technical problem of providing "a tri-band wireless repeater with more frequency resources available for use, which can cost-effectively relieve the capacity stress in a single-band networking mode, so as to achieve the goals of reducing the network construction cost and simplifying the project installation." *Id.* ¶ 11. In other words, the repeater can operate with multiple frequency bands, permitting simultaneous operation of 2G and 3G, and also reduces network construction cost and simplifies project installation by accommodating multiple frequencies with a single repeater, rather than requiring multiple sets of equipment, one for each frequency. *Id.* ¶¶ 10–11.

As shown in Figure 2 below, Zhuo's tri-band wireless repeater comprises donor-end multiplexer 1, retransmission-end multiplexer 2, monitoring circuit 3, power supply circuit 4, and signal path 5 connected between donor-end multiplexer 1 and retransmission-end multiplexer 2. *Id.* ¶ 20. Donor-end multiplexer 1 communicates with base station (BS), and

retransmission-end multiplexer 2 communicates with mobile station (MS). *Id.* ¶ 27.

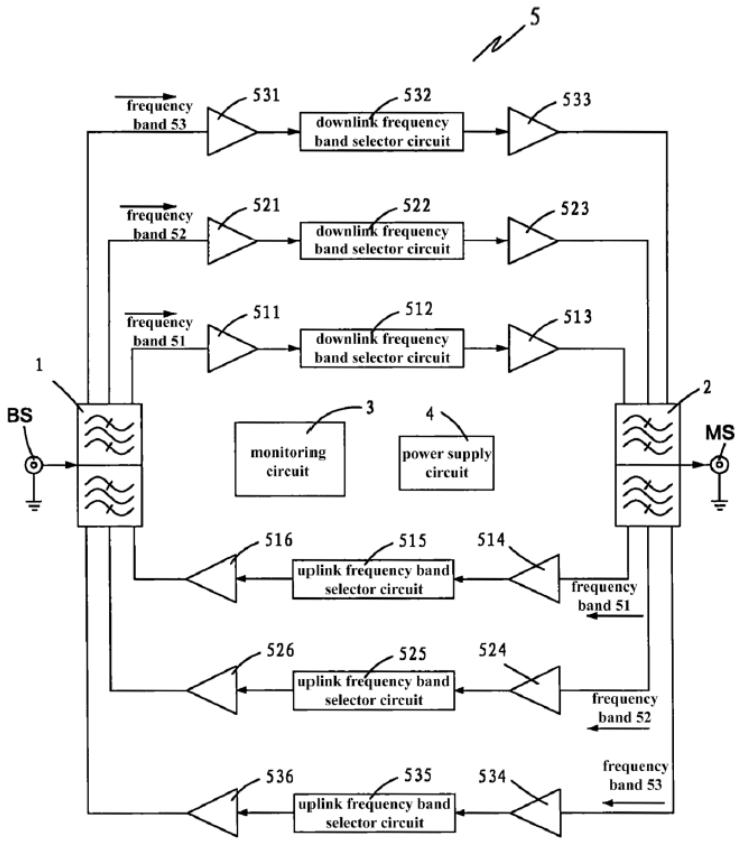

Fig. 2

As shown in Zhuo's Figure 2, reproduced above, signal path 5 includes uplink and downlink circuitry for each of frequency bands 51, 52, and 53. *Id.* ¶ 20. Specifically, the downlinks for frequency bands 51, 52, and 53 include respective low-noise amplifier circuits 511, 521, 531, frequency band selection[9] circuits 512, 522, 532, and power amplifier circuits 513, 523, and 533. *Id.* ¶¶ 21–23. Similarly, the uplinks for

[9] Zhuo's specification uses the term "selection" to refer to these circuits, but Zhuo's Figure 2 uses the term "selector" to indicate the same circuits.

frequency bands 51, 52, 53 include respective low-noise amplifier circuits 514, 524, 534, frequency band selection circuits 515, 525, 535, and power amplifier circuits 516, 526, and 536. *Id.* ¶¶ 21–23.

Monitoring circuit 3 detects and controls each circuit of signal path 5 in the three frequency bands, including locking the local oscillator circuit required for frequency conversion and detecting the power of each link. *Id.* ¶ 24. Power supply circuit 4 powers the circuitry of the tri-band wireless repeater. *Id.* ¶ 25.

2. Discussion

Claim 18 depends from independent claim 1. Ex. 1001, 22:11. In addition to the limitations of claim 1, claim 18 recites that "the PCB is configured to provide amplification to a plurality of frequency bands, wherein the plurality of frequency bands comprise Band II, Band IV, Band V, Band XII, and Band XIII." *Id.* at 22:11–14.

Petitioner asserts that the frequency bands recited in claim 18 were known and used. Pet. 44. Petitioner asserts that Sahota discloses the frequency bands recited in claim 18. *Id.*

Petitioner cites Zhuo as disclosing a signal booster with three different uplink amplification paths and three different downlink amplification paths. *Id.* at 45–46. According to Petitioner, "*Zhuo* discloses that the signal booster can be applied to frequency band selection and amplification of numerous different uplink and downlink mobile communication signals." *Id.* at 46. Petitioner concludes by asserting that

> When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this

> leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. *KSR*, 550 U.S. at 416. The [person of ordinary skill in the art] would know from *Zhuo* that multiple different frequency signals could be amplified in a single signal booster. The [person of ordinary skill in the art] would know from *Layne* that contiguous cellular frequency signals can be amplified on a common pathway. The [person of ordinary skill in the art] would understand from *Sahota* that the downlink channels for Bands XII and XIII are contiguous cellular frequency bands and that Band II, Band IV, Band V are cellular frequency bands. The [person of ordinary skill in the art] wanting to amplify the bands recited in claim 18 would have been motivated to modify *Zhuo* in view of *Layne* and *Sahota* to do so.

Id.

Patent Owner argues that Petitioner does not identify the basis of its obviousness contentions with sufficient particularity. Prelim. Resp. 22–25. Patent Owner argues that Petitioner does not explain how the cited references teach the limitations of independent claim 1. *Id.* at 23–25. Patent Owner also argues that Petitioner does not explain how a person of ordinary skill in the art would have modified the teachings of the references in such a way that they would meet all of the limitations of claim 18. *Id.* at 25.

Petitioner is required, in its Petition, to "identif[y], in writing and with particularity, each claim challenged, the grounds on which the challenge to each claim is based, and the evidence that supports the grounds for the challenge." 35 U.S.C. § 312(a)(3). Additionally, 37 C.F.R. § 42.104(b)(4) requires that the Petition explain "[h]ow the construed claim is unpatentable under the statutory grounds identified

in paragraph (b)(2) of this section. The petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon."

We find that the Petition does not meet these requirements. The Petition's challenge of claim 18 based on Zhuo, Layne and Sahota does not discuss any limitation of claim 1 with particularity, much less explain with particularity how the cited references teach any limitation of claim 1. *See* Pet. 44–46. As discussed in Section III.B.4.a above, the Petition discusses the limitations of claim 1 when alleging obvious over the combination of Layne, Sahota, and McKay. *See* Pet. 22–29. But the challenge of claim 18 does not rest on McKay and, thus, does not build from the explanation in the challenge of claim 1. Furthermore, even if the challenge of claim 18 did build from the challenge of claim 1, the challenge of claim 18 does not cure the above-discussed deficiencies in the Petition's assertion that claim 1 would have been obvious over Layne, Sahota, and McKay. In view of the Petition's failure to address adequately the limitations of claim 1, as well as the objective evidence of non-obviousness discussed above in Section III.B.4.b, Petitioner has not demonstrated a reasonable likelihood of prevailing on its challenge of claim 18 as allegedly obvious over Zhuo, Layne, and Sahota.

D. Grounds Based on Duo Repeater

Petitioner presents three grounds based on Duo Repeater. Petitioner challenges claims 1, 2, 6, 8, and 19 as allegedly obvious over Duo Repeater. Pet. 47–57. Petitioner challenges claims 3, 4, 20, and 24 as allegedly obvious over Duo Repeater and Sahota. *Id.* at 57–64. Finally, Petitioner

challenges claim 18 as allegedly obvious over Duo Repeater and the TEKO Repeater. *Id.* at 64–67.

1. Overview of Duo Repeater

Duo Repeater states it is a user manual for a product called the Duo-i6525 from Advanced RF Technologies, Los Angeles, California. Ex. 1009, 1. Duo Repeater includes a block diagram labeled Figure 4, shown below.

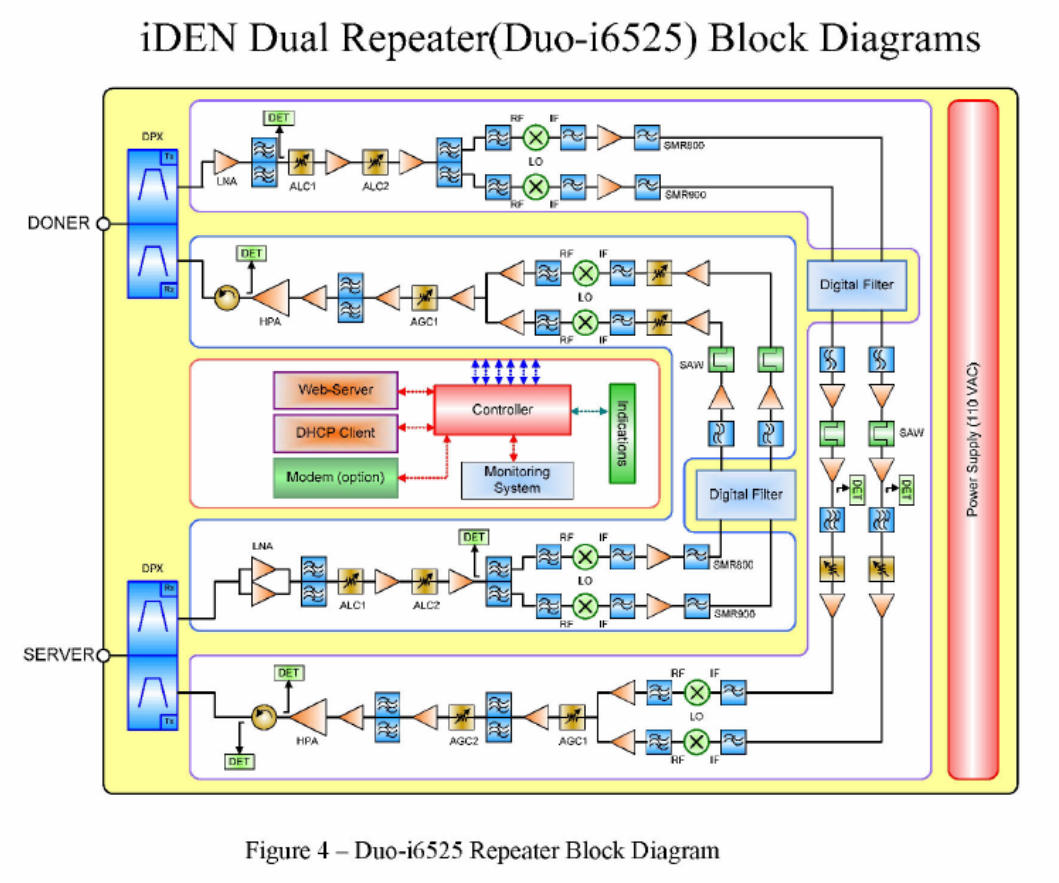

Figure 4 – Duo-i6525 Repeater Block Diagram

Although the description of this block diagram is sparse, Duo Repeater indicates its down converter module and up converter module are similarly configured, each including band-pass filters and amplifiers (including high power amplifiers (HPAs)). Ex. 1009, 10. On the left side of

Figure 4, duplexer pairs (i.e., quadplexers) are shown connected to the down converter and up converter modules. *Id.* at 9, 11.

2. Issue of Whether Duo Repeater is a Printed Publication

Petitioner asserts Duo Repeater "was available at least from the public records of the Federal Communications Commission [FCC] on February 9, 2007." Pet. 12. Duo Repeater further includes a release date shown below:

> Version 1.2 (Released January 19, 2007)
> Information in this document is subject to change without notice.
> Advanced RF Technologies, Inc. 1996–2007.
> All rights reserved.

Ex. 1009, 3.

Patent Owner contends Petitioner failed to present any evidence that Duo Repeater is a prior art printed publication. Prelim. Resp. 26–30. Specifically, Patent Owner contends Petitioner provided no evidence to confirm the February 9, 2007 date. *Id.* at 29. Patent Owner further argues Petitioner does not rely on the January 19, 2007 date as a publication date, and in any case, contends the date alone is not sufficient to show public accessibility. *Id.* (citing *Google LLC v. IPA Techs. Inc.*, IPR2018-00475, Paper 7 at 8–15 (PTAB July 20, 2018)).

"A reference will be considered publicly accessible if it was 'disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art exercising reasonable diligence, can locate it.'" *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1348 (Fed. Cir. 2016) (quoting *Kyocera Wireless Corp. v. Int'l Trade Comm'n*, 545 F.3d 1340, 1350 (Fed. Cir. 2008)).

We agree with Patent Owner that Petitioner does not present sufficient evidence that Duo Repeater is a printed publication. Petitioner does not

identify the "public records of the Federal Communications Commission" it contends establish Duo Repeater as a printed publication or provide any evidence upon which to base the assertion these "public records" were either disseminated or accessible to the interested public. Pet. 12. Likewise, there is insufficient evidence to explain the meaning of Duo Repeater's "release date," or whether and how the document was disseminated or otherwise made available to the public as of the release date.

Accordingly, for the stated reasons, the Petition does not persuade us of a reasonable likelihood of showing obviousness for any of the grounds based on Duo Repeater.

IV. CONCLUSION

In light of the foregoing, Petitioner has not demonstrated a reasonable likelihood of prevailing on any of its challenges.

V. ORDERS

It is hereby

ORDERED that the Petition is denied as to all challenges to the claims of the '190 patent.

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