

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.,
Petitioner,

v.

CHANBOND LLC,
Patent Owner.

Case IPR2016-01744
Patent 7,941,822 B2

Before JONI Y. CHANG, JENNIFER S. BISK, and
JACQUELINE T. HARLOW, *Administrative Patent Judges*.

HARLOW, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
Determining Claims 1, 2, 5, 6, 19, 20, 23, and 29
Have Been Shown To Be Unpatentable
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Cisco Systems, Inc. (“Petitioner”), filed a Petition requesting an *inter partes* review of claims 1, 2, 5, 6, 19, 20, 23, and 29 of U.S. Patent No. 7,941,822 B2 (Ex. 1001, “the ’822 patent”). Paper 1 (“Pet.”). ChanBond LLC (“Patent Owner”), filed a Preliminary Response. Paper 8 (“Prelim. Resp.”). We determined that the information presented in the Petition demonstrated a reasonable likelihood that Petitioner would prevail in challenging claims 1, 2, 5, 6, 19, 20, 23, and 29 as unpatentable under 35 U.S.C. § 103(a). Pursuant to 35 U.S.C. § 314, the Board instituted trial on March 3, 2017, as to those claims of the ’822 patent. Paper 10 (“Institution Decision” or “Inst. Dec.”).

Following our institution, Patent Owner filed a Response to the Petition (Paper 13, “PO Resp.”) and Petitioner filed a Reply to the Patent Owner Response (Paper 17, “Reply”).¹ An oral hearing was held on November 1, 2017. The transcript of the hearing has been entered into the record. Paper 27 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. Based on the record before us, we conclude that Petitioner has demonstrated

¹ Petitioner filed a Reply to Patent Owner’s Response to Petition on July 31, 2017. Paper 15. That same day, Petitioner filed a Corrected Reply to Patent Owner’s Response to Petition. Paper 17. All references in this Decision to Petitioner’s Reply are to Paper 17.

by a preponderance of the evidence that claims 1, 2, 5, 6, 19, 20, 23, and 29 of the '822 patent are unpatentable.

A. Related Matters

The '822 patent is asserted in several cases in the District of Delaware. Pet. 3; Paper 5, 1–3. In addition, Petitioner challenged, and we declined to institute *inter partes* review of, claims 13 and 14 of the '822 patent in IPR2016-01746. IPR2016-01746, Paper 10.

Petitioner also challenged, and we declined to institute *inter partes* review of, various claims of two patents related to the '822 patent: U.S. Patent No. 8,341,679 B2 (“the '679 patent”) and U.S. Patent No. 8,984,565 B2 (“the '565 patent”). *Cisco Sys., Inc. v. ChanBond LLC*, Case IPR2016-01889, Paper 10 (PTAB Mar. 29, 2017); *Cisco Sys., Inc. v. ChanBond LLC*, Case IPR2016-01890, Paper 10 (PTAB Mar. 29, 2017); *Cisco Sys., Inc. v. ChanBond LLC*, Case IPR2016-01891, Paper 10 (PTAB Mar. 29, 2017); *Cisco Sys., Inc. v. ChanBond LLC*, Case IPR2016-01898, Paper 10 (PTAB Mar. 29, 2017); *Cisco Sys., Inc. v. ChanBond LLC*, Case IPR2016-01899, Paper 10 (PTAB Mar. 29, 2017); *Cisco Sys., Inc. v. ChanBond LLC*, Case IPR2016-01900, Paper 10 (PTAB Mar. 29, 2017).

Separately, RPX Corporation challenged the patentability of claims 1–31 of the '822 patent in IPR2016-00234. On May 25, 2017, we issued a Final Written Decision in IPR2016-00234 determining that claims 1–31 of the '822 patent had not been shown to be unpatentable over references

distinct from those at issue here. *RPX Corp. v. ChanBond LLC*, Case IPR2016-00234, Paper 28 (PTAB May 25, 2017).

B. The '822 Patent

The '822 patent is titled “Intelligent Device System and Method for Distribution of Digital Signals on a Wideband Signal Distribution System.” Ex. 1001, at [54]. The '822 patent is a division of U.S. Patent Application No. 09/749,258, filed on December 27, 2000, and now issued as U.S. Patent No. 7,346,918. *Id.* at [62].

The '822 patent is directed to systems and methods for the “distribution of digital signals onto, and off of, a wideband signal distribution system.” Ex. 1001, 1:24–29. The '822 patent aims to address the difficulties created by adapting existing telephone and data networks to accommodate the greater demands of transmitting television and video data. *Id.* at 1:31–36. In particular, the '822 patent explains that “digital TV/video applications clog data networks, even with the use of available compression techniques,” and “[a]nalog RF distribution may require special cables and infrastructure.” *Id.* at 1:36–40. According to the '822 patent, one solution to this problem would be to transport digitized data on an analog carrier “in a format that would allow for greater amounts of data to be carried at one time, such as by modulated RF.” *Id.* at 2:15–16. The '822 patent, therefore, discloses a “network of intelligent devices” that “enables digital video, IP voice/data/video, to be modulated and demodulated onto and off of” “a wideband signal distribution system.” *Id.* at 2:30–34.

The '822 patent describes, as a preferred embodiment, an “intelligent device” that receives an RF signal that has been modulated onto two or more RF channels, and combines that information back into a single stream. Ex. 1001, 10:55–11:31. Figure 5 of the '822 patent, depicting this intelligent device, is reproduced below.

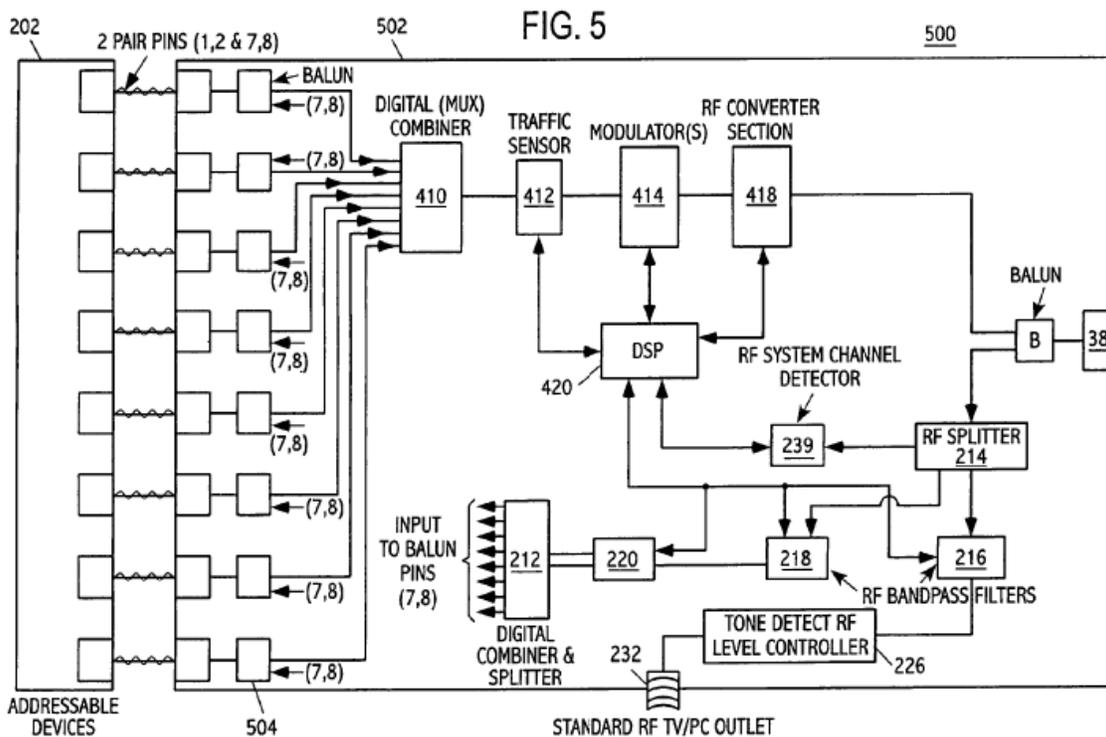


Figure 5 of the '822 patent illustrates the signal path from intelligent device 502 to addressable devices 202. *Id.* at 10:55–11:31. As shown in Figure 5, RF splitter 214 splits the signal entering intelligent device 502, and sends information regarding the RF channels in use to RF system channel detector 239. *Id.* at 10:55–60. In addition, the modulated RF signal is differentiated into an IP portion and a non-IP portion, according to the information frequency on the incoming carrier. *Id.* at 10:60–64. The non-IP

portion of the signal passes through bandpass filter 216 and is fed to a standard RF television or computer outlet. *Id.* at 10:66–11:2. The IP portion of the signal passes through bandpass filter 218, and is demodulated by demodulator 220, which strips the RF carrier signal from the digital baseband signal. *Id.* at 11:15–20. Subsequently, the digital signals are combined by digital combiner 212, to achieve a parallel to serial conversion. *Id.* at 11:20–25. This signal is routed to addressable device 202. *Id.* at 11:25–31.

C. Inter Partes Review Proceedings Involving Related Patents

As set forth above, the '679 patent, which is a division of the '822 patent (Ex. 2004, at [62]), and the '565 patent, which is a continuation of the '679 patent (Ex. 2001, at [60]), were the subject of several proceedings in which we declined to institute *inter partes* review. *See, e.g., Cisco*, IPR2016-01889, Paper 10 (declining to institute review of the '565 patent).²

Central to our decision not to institute *inter partes* review in the proceedings concerning the '679 and '565 patents was our interpretation of the claim term “RF channel”—a term that does not appear in the challenged claims of the '822 patent. In those proceedings, we concluded that the

² Because the Board reached substantially similar conclusions in each proceeding, for the sake of brevity citations will be provided to representative portions of IPR2016-01889 only.

broadest reasonable interpretation of “RF channel” “does not include code channels—for example, data streams created by [code division multiple access (“CDMA”)]—but instead refers only to frequency bands, such as those created by FDMA.” *Cisco*, IPR2016-01889, Paper 10, slip op. at 13–14. In reaching this conclusion, we noted that the patents-at-issue “discuss[] RF channels in terms of frequency bands.” *Id.* at 10. Furthermore, in response to argument that CDMA channels are encompassed by the claims because the specification “teaches that both analog and digital signals can be sent using modulation carrier, such as in digital PCS and cellular telephone and that the cellular CDMA defines two types of channels—CDMA and code channels” (*id.* at 11 (internal quotation omitted)), we observed that “Petitioner does not explain why this would be the case and does not cite to any evidence” to support the conclusion that an ordinarily skilled artisan would understand “RF channel” to include CDMA and code channels (*id.*).

D. Illustrative Claim

Of the challenged claims, claims 1 and 19 are independent. Claim 1, reproduced below, is illustrative of the claimed subject matter.

1. An intelligent device for receiving and processing RF signals, comprising:

an input configured to receive a modulated RF signal containing multiple channels, and to receive channel in use information which identifies each channel in the modulated RF signal that includes information addressed to at least one addressable device;

a demodulator unit configured to demodulate at least two channels contained in the modulated RF signal when the channel

in use information identifies the at least two channels as containing information addressed to the at least one addressable device; and

a combiner configured to combine the at least two channels demodulated by the demodulator unit into a digital stream when the channel in use information identifies the at least two channels as containing information addressed to the at least one addressable device, and to output the digital stream to the at least one addressable device.

Ex. 1001, 12:22–40.

Claim 19 recites a similar device, but requires “a detector configured to detect each channel contained in the received modulated RF signal that includes information addressed to at least one addressable device, and to generate channel in use information identifying each channel that includes information addressed to the at least one addressable device” (*id.* at 15:5–10), in lieu of “an input configured to . . . receive channel in use information which identifies each channel in the modulated RF signal that includes information addressed to at least one addressable device” (*id.* at 12:24–28), as recited by claim 1.

E. Instituted Ground of Unpatentability

We instituted *inter partes* review in this proceeding based on the following patentability challenge:

Claims	Basis	References
1, 2, 5, 6, 19, 20, 23, and 29	§ 103(a)	Tiedemann, Gilhousen, and Gorsuch

Petitioner relies on the Declaration of Anthony Wechselberger (“Wechselberger Declaration,” Ex. 1002) to support its Petition and Reply.

Patent Owner relies on the Declaration of Scott M. Nettles, Ph.D. (“Nettles Declaration,” Ex. 2002) to support its Response to the Petition.

II. ANALYSIS

A. *Level of Skill in the Art*

Petitioner contends that a person of ordinary skill in the art for the ’822 patent would have “been an engineer or physicist with at least a bachelor’s degree, or equivalent experience, in electrical engineering, or a related field.” Pet. 19 (citing Ex. 1002 ¶¶ 26–33). Petitioner further asserts that such an artisan would have had “at least three years of industry experience in the fields of analog and digital communications, inclusive of exposure to telecommunications standards as applied in wired and wireless broadband networks, or equivalent work experience.” *Id.* at 19–20 (citing Ex. 1002 ¶¶ 26–33).

Patent Owner does not dispute Petitioner’s proposal, or otherwise address the level of skill in the art at the time of invention of the ’822 patent in its Response. *See generally*, PO Resp. Patent Owner’s expert, Dr. Nettles, however, provides an opinion regarding the level of skill in the field. Specifically, Dr. Nettles opines that an ordinarily skilled artisan at the time of invention of the ’822 patent would have possessed an “undergraduate or graduate degree in a field such as computer science, electrical engineering, or equivalent (e.g., computer engineering).” Ex. 2002

¶ 17. Dr. Nettles further opines that such an artisan would also have had “work experience (which, in some instances may have been achieved through post-graduate degree-related activities) with the design of networking or communication devices, including but not limited to cable modems, routers, wireless network interfaces, satellite telephone handsets, and the like.” *Id.* Dr. Nettles additionally states that “[s]uch an individual would have studied and had some design experience with RF and digital signal distribution systems (including receiver architectures, modems, and signal processors).” *Id.* In evaluating the differences between his own and Mr. Wechselberger’s assessments of the level of skill in the field, Dr. Nettles testifies that his assessment “differs slightly from the standard offered by Mr. Wechselberger, but in expressing my opinions in this declaration I have considered these distinctions and determined that they do not alter my conclusions.” *Id.*

The formulations offered by Mr. Wechselberger and Dr. Nettles do not differ in any way that is material to this Decision. Based on our review of the record, we adopt Petitioner’s definition of a person of ordinary skill in the field at the time of invention of the ’822 patent, with the understanding that the level of skill is also reflected in the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). In addition, we have reviewed the credentials of Mr. Wechselberger (Ex. 1003) and Dr. Nettles (Ex. 2002), and we consider each of them to be qualified to opine on the level of skill and the knowledge of a person of ordinary skill in the art at the time of the invention.

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are given their broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b). Under the broadest reasonable interpretation standard, claim terms are given their ordinary and customary meaning as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). “The correct inquiry in giving a claim term its broadest reasonable interpretation in light of the specification is . . . an interpretation that corresponds with what and how the inventor describes his invention in the specification, i.e., an interpretation that is consistent with the specification.” *In re Smith Int’l, Inc.*, 871 F.3d 1375, 1382–83 (Fed. Cir. 2017) (internal quotation omitted).

“While we read claims in view of the specification, of which they are a part, we do not read limitations from the embodiments in the specification into the claims.” *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014). A claim term is only given a special definition different from the term’s plain and ordinary meaning if the “patentee . . . clearly set[s] forth a definition of the disputed claim term other than its plain and ordinary meaning.” *Thorner v. Sony Comput. Entm’t. Am., LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012) (citations omitted). Under this standard, we may take into account definitions or other explanations provided in the written description of the specification. *In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997). In this regard, we observe that [t]he specification acts as a

dictionary when it . . . defines terms by implication.” *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Grp., Inc.*, 262 F.3d 1258, 1268 (Fed. Cir. 2001) (internal quotation omitted). However, any special definition for a claim term must be set forth in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

“A patentee can also disavow claim scope, but the standard is similarly exacting.” *Akamai Techs., Inc. v. Limelight Networks, Inc.*, 805 F.3d 1368, 1375 (Fed. Cir. 2015). “[C]laims are not necessarily and not usually limited in scope simply to the preferred embodiment.” *RF Del. v. Pac. Keystone Techs., Inc.*, 326 F.3d 1255, 1263 (Fed. Cir. 2003).

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. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

1. “channel”

The term “channel” appears repeatedly throughout the challenged claims of the ’822 patent. Independent claim 1, for example, recites: 1) “an input configured to receive a modulated RF signal *containing multiple channels*, and to receive *channel in use information* which identifies *each channel* in the modulated RF signal . . . ;” 2) “a demodulator unit configured to demodulate *at least two channels* contained in the modulated RF signal when the *channel in use information* identifies the *at least two channels* as

containing information. . . ;” and 3) “a combiner configured to combine the *at least two channels* demodulated by the demodulator unit into a digital stream when the *channel in use information* identifies the *at least two channels* as containing information” Ex. 1001, 12:22–40 (emphasis added). In our Institution Decision, we construed “channel” to mean “a path for transmitting electric signals.” Inst. Dec. 11.

Petitioner agrees with that construction (Pet. 16), and asserts that the claims of the ’822 patent “refer to channels in the context of a modulated RF signal containing multiple channels but do not mandate the specific size or types of channels contained in the RF signal” (*id.*). Thus, according to Petitioner, the term “channel,” as it is used in the ’822 patent, encompasses, for example, the frequency band channels used in Frequency Division Multiple Access (“FDMA”) systems, the code channels used in Code Division Multiple Access (“CDMA”) systems, and the time slots used in Time Division Multiple Access (“TDMA”) systems. *Id.* at 17.

Patent Owner responds that “channel” should instead be interpreted to mean “frequency band.” PO Resp. 7. Patent Owner contends that both the claims and the specification of the ’822 patent indicate that the recited “‘channel’ is not any channel, but an ‘RF channel.’” *Id.* at 8 (citing Ex. 2002 ¶ 33) (emphasis omitted). Specifically, Patent Owner points to the recitation of “an input configured to receive a modulated RF signal containing multiple channels” (Ex. 1001, 12:24–25, 15:3–4) in claims 1 and 19 of the ’822 patent as supporting its proffered construction, reasoning that “[t]he channels contained within a ‘modulated RF signal’ are necessarily

‘RF channels.’” Prelim. Resp. 8 (citing Ex. 2002 ¶ 33) (emphasis omitted). Patent Owner further contends that Petitioner’s expert, Mr. Wechselberger agrees that the channels of the ’822 patent are RF channels. *Id.* (citing Ex. 1002 ¶ 122).

Patent Owner additionally asserts that “channel” is used interchangeably with “RF channel” and “frequency channel” throughout the specification of the ’822 patent. PO Resp. 8–12. According to Patent Owner, “[e]ach of the embodiments of the ’822 Patent’s invention discloses ‘channels’ that are ‘RF channels’ or ‘frequency channels,’ i.e., frequency bands in a frequency division multiplexing scheme.” *Id.* at 11. Therefore, reasons Patent Owner, “the specification consistently uses the term ‘RF channel’” to denote a frequency band, but also uses the abbreviated forms ‘frequency channel’ and ‘channel’ as a shorthand, as a person of ordinary skill would readily understand.” *Id.* at 11–12.

Patent Owner also contends that our construction of the term “RF channel” as “frequency band” in proceedings concerning the related ’679 and ’565 patents supports interpreting the purportedly “closely related” term “channel” to have the same meaning in the instant proceedings. PO Resp. 12. Patent Owner similarly argues that our findings in the “present proceedings are consistent with a construction of both ‘channel’ and ‘RF channel’ as frequency bands.” *Id.* at 13. Moreover, asserts Patent Owner, we should identically construe “channel” and “RF channel” to “harmonize” the intrinsic record for the patent family that includes the ’822, ’679, and ’565 patents. *Id.* at 18.

In reply, Petitioner asserts that Patent Owner's proposal to restrict "channel" to frequency channels contradicts the ordinary meaning of that term. Reply 4. According to Petitioner, "'channel' is a basic, well-known term in the art," the ordinary meaning of which "encompasses various types of channels—including CDMA channels." *Id.* Petitioner further contends that the applicants for the '822 patent did not act as their own lexicographer with regard to the term "channel," and, thus, there is no basis for restricting the meaning of "channel" to encompass only a particular type of channel. *Id.* at 7. In this vein, Petitioner argues that "[t]he '822 Patent contains no express definitions for 'channel,' nor does it use 'channel' as shorthand for 'RF channel.'" *Id.* To the contrary, asserts Petitioner, the applicants for the '822 patent used different claim terms within the same patent family, specifying that the recited channel is an "RF channel" in the '679 and '565 patents, and referring simply to a "channel" in the '822 patent. *Id.* at 7–8. Petitioner additionally contends that the '822 patent "uses 'channel' in contexts with modifiers that are not frequency specific," and encompass other channel types. *Id.* at 8.

Petitioner likewise contends that the applicants for the '822 patent did not disavow CDMA channels from the scope of the term "channel." Reply 9. In this regard, Petitioner asserts that the '822 patent is not limited to a single embodiment, but suggests channel types in addition to frequency bands. *Id.* at 11. Petitioner further asserts that the examples and embodiments disclosed by the '822 patent are non-limiting, and, therefore, even if Patent Owner is correct that the embodiments described relate solely

to RF channels, the '822 patent does not disavow CDMA channels from claim scope. *Id.* at 11–12.

On the record before us, we conclude that the broadest reasonable interpretation of the term “channel” as used in the '822 patent is “a path for transmitting electric signals,” consistent with its plain and ordinary meaning.

As an initial matter, we determine that the ordinary meaning of “channel” encompasses a variety of channel types, including CDMA. Patent Owner does not expressly address the plain meaning of “channel” in its Response (*see* PO Resp. 7–19); however, the testimony of Patent Owner’s expert, Dr. Nettles, comports with our understanding of the ordinary meaning of this term. For example, Dr. Nettles testifies that, in general, “channel” is “a very broad term” that describes “something that you can use for communication.” Ex. 1043, 32:17–24. Dr. Nettles further testifies that, although “you could certainly add modifiers to the word ‘channel’ which would cause you to start thinking about either modulation schemes or multiple access techniques,” “‘channel’ itself doesn’t say anything about the specific modulation scheme.” Ex. 1043, 33:10–22; *see also id.* at 31:22–32:13, 34:10–18. As discussed in greater detail below, the specification of the '822 patent likewise reflects that the plain and ordinary meaning of “channel” encompasses a variety of channel types, including CDMA. *See, e.g.*, Ex. 1001, 5:24–39 (describing analog and digital “transmission channels” and observing that “both analog and digital signals can be sent using modulation carriers, such as in digital PCS and cellular telephone”); Ex. 1043, 33:6–9 (“Well, I mean, just to be clear, even -- even in the context

of the '822 patent, the word 'channel' doesn't have – doesn't imply a particular modulation scheme.”). Accordingly, based on the record before us, we determine that the plain and ordinary meaning of “channel” encompasses “a path for transmitting electric signals.”

The claims of the '822 patent use “channel” in a manner consistent with its plain and ordinary meaning, and are devoid of any basis for restricting that term to exclude CDMA channel types. Indeed, by their plain language, the challenged claims are indifferent to whether frequency channels or CDMA channels are used. *See, e.g.*, Ex. 1001, 12:22–40; *see also* Pet. 10. For example, language directed to “frequency channel-specific structure or functionality, such as ‘channel widths,’ ‘6 MHz channels,’ or ‘frequency bands’” does not appear in those claims. *See, e.g.*, Ex. 1001, 12:22–40; *see also* Pet. 10.

We are unpersuaded by Patent Owner’s contention that the recitation of “an input configured to receive a modulated RF signal containing multiple channels” (Ex. 1001, 12:24–25, 15:3–4) in claims 1 and 19 of the '822 patent supports a narrow interpretation of “channel” limited to frequency bands (PO Resp. 8). Patent Owner reads this claim phrase as necessarily requiring that the recited “channels” must be frequency bands because they are channels within a “modulated RF signal.” PO Resp. 8. Such reading is, at best, superficial. According to Patent Owner’s expert, Dr. Nettles, the term “RF signal” refers generally to signals within the radio frequency portion of the electromagnetic spectrum. Ex. 1043, 23:5–24:8. As Dr. Nettles explains, “RF signal” encompasses signals used by many

systems, from AM and FM radio to 3G and 4G cell phones, and RF signals can be used to transmit CDMA data. Ex. 1043, 22:15–25:21. Consistent with Dr. Nettles’ understanding, the ’822 patent expressly identifies a variety of technologies that utilize RF signals for data transmission, but employ modulation schemes other than FDMA, and use channels other than frequency bands—for example, cellular telephone systems. Ex. 1001, 5:35–39.

Furthermore, Patent Owner’s characterization of Mr. Wechselberger’s testimony as endorsing Patent Owner’s proposed interpretation of “channel” (PO Resp. 8) relies on selectively truncated portions of that testimony. A complete review of Mr. Wechselberger’s testimony reveals that he unambiguously testifies that the claim phrase “a modulated RF signal containing multiple channels” (Ex. 1001, 12:24–25, 15:3–4) does not require a particular type of multiplexing to provide the channel in the RF signal:

The claims do not discuss any type multiplexing technique for providing a channel in the RF signal—instead only referring to “a modulated RF signal containing multiple channels.” In my opinion a POSITA would understand this usage in the claims to identify RF channels—that is channels in an RF signal—but not specify or require a particular type of multiplexing or modulation to provide the channel in the RF signal.

Ex. 1002 ¶ 122.

Accordingly, an ordinarily skilled artisan at the time of invention of the ’822 patent would have understood that the “modulated RF signal” recited in claims 1 and 19 refers not to one specific modulation scheme, such as FDMA, but encompasses the set of modulation schemes known in the

communications art at that time. Such an ordinarily skilled artisan would have additionally recognized that the “multiple channels” contained in that “modulated RF signal” would have encompassed the set of channels used in the various known RF modulation schemes, including, for example, CDMA channels and code channels. *See* Ex. 1002 ¶ 122.

The specification and prosecution history of the ’822 patent likewise support construing “channel” as “a path for transmitting electric signals.” As an initial matter, Patent Owner does not identify (*see* PO Resp. 7–19), and we do not discern any express definition of the term “channel” in the specification of the ’822 patent. *Cf.* Ex. 1001, 7:6–9 (defining “wideband”). In addition, we note that Patent Owner does not contend, and we do not ascertain record support for the proposition that the applicants for the ’822 patent equated the terms “channel” and “RF channel” or “frequency channel,” or otherwise narrowed the meaning of “channel” during prosecution. Rather, Patent Owner argues that we should interpret “channel” as being limited to a “frequency band” because the ’822 patent purportedly uses “channel” interchangeably with, or as shorthand for, “RF channel” and “frequency channel” (PO Resp. 8). We do not find Patent Owner’s position persuasive.

The ’822 patent consistently and explicitly identifies the particular type of channel being discussed; it does not use “channel” interchangeably with “RF channel” or “frequency channel.” In fact, the term “RF channel” itself appears in the description of the preferred embodiments of the ’822 patent more than twenty times. *See* Ex. 1002 ¶ 122. Moreover, the portions

of the '822 patent to which Patent Owner points as supporting its position that “channel” and “RF channel” or “frequency channel” are used interchangeably, instead reflect the '822 patent's consistent use of modifiers to expressly identify the particular type of channel described.

For example, Patent Owner relies on select portions of the following paragraph to support its contention that the '822 patent uses the unadorned word “channel” as shorthand for “RF channel” (PO Resp. 8–9):

The wideband signal distribution system **10** may allow for distribution of, for example, 29 channels, *wherein each channel is 6 MHz in width*, and it is known that such channels can handle analog video signals. However, where digital information can be transmitted over the RF channel, each 6 MHz channel can handle, depending on the modulation technique used, in excess of 40 megabits per second of digital information, and new modulation techniques may increase this information to, and in excess of, 100 megabits per second. This 40 megabits per second transmission allows for the transmission rate in excess of one gigabit/sec of digital information to be carried on the sum of the 29 RF channels in the wideband signal distribution system **10**. Using advanced modulation techniques will allow the wideband signal distribution system **10** to be expanded up to 60, or more, channels, thereby further increasing throughput data rate.

Ex. 1001, 6:50–65 (emphasis added). When considered in its entirety, as set forth above, however, it is clear that this paragraph does not haphazardly interchange the generic term “channel” and more particularized term “RF channel.” Rather, the very first sentence of the above paragraph expressly characterizes the channels described as being 6 MHz in width, thus, making plain that the channels referred to are of a particular type, namely, frequency bands. Because the statement “29 channels, wherein

each channel is 6 MHz in width” (*id.* at 6:51–52) expressly identifies the channels in question as frequency bands—*i.e.*, RF channels—it cannot be said that the above quoted paragraph demonstrates the interchangeability of “channel” and “RF channel” or “frequency band” in the ’822 patent. Instead, this passage indicates that the applicants for the ’822 patent recognized the breadth of the term “channel,” and took care to specify the particular type of channel being discussed. *See* Ex. 2003, 28:7–14 (“Well, the type of channels that it’s talking about here -- for example, it specifically says each channel is 6 megahertz in width. That is a frequency band.”); PO Resp. 9 (quoting the same).

The same holds true with regard to the additional portions of the ’822 patent relied upon by Patent Owner (PO Resp. 9–11): these portions of the specification either explicitly identify the channels in question as “RF channels” (Ex. 1001, 10:49–51, 10:60–11:18), or refer to “channel width,” and increasing channel width “from 6 MHz per channel to 12 MHz per channel” (9:65–10:22), indicating that the relevant channels are frequency bands. Ex. 1001, 9:65–11:18. Patent Owner does not identify, and we do not discern, support for the proposition that the unmodified term “channel,” as it is used in the ’822 patent claims, means “RF channel.”

Patent Owner’s argument that “channel” should be construed as “frequency band” because each embodiment of the ’822 patent purportedly “discloses ‘channels’ that are ‘RF channels’ or ‘frequency channels,’ *i.e.*, frequency bands in a frequency division multiplexing scheme” (PO Resp. 11), is similarly unavailing. Our reviewing court has “expressly

rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment.” *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004). Moreover, even accepting, *arguendo*, Patent Owner’s contention that the disclosed embodiments of the ’822 patent are directed to RF channels, Patent Owner has not identified “clear limiting descriptions of the invention in the specification or prosecution history” that would support restricting the meaning of “channel” to a particular type of channel, *i.e.*, a frequency band. *Aventis Pharma S.A. v. Hospira, Inc.*, 675 F.3d 1324, 1330 (Fed. Cir. 2012). Nor has Patent Owner demonstrated intent by the applicants for the ’822 patent “to deviate from the ordinary and accustomed meaning of [‘channel’] by including in the specification expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope.” *Id.* (internal quotation omitted). Neither has Patent Owner shown that the applicants for the ’822 patent used the term “channel” “throughout the entire patent specification, in a manner consistent with only a single meaning,” so as to define that term “by implication.” *Bell Atl.*, 262 F.3d at 1271.

To the contrary, the ’822 patent expressly provides that “the embodiment presented herein is exemplary, and the manner of use of an equivalent component system will be apparent to those skilled in the art and is within the scope of the present invention.” Ex. 1001, 7:14–19; *see also id.* at 12:15–19 (“Those of ordinary skill in the art will recognize that many modifications and variations of the present invention may be implemented.

The foregoing description and the following claims are intended to cover all such modifications and variations.”).

Furthermore, the ’822 patent uses the term “channel” in contexts that are not limited to frequency bands. For example, in the “Detailed Description of the Invention,” the ’822 patent discusses analog and digital “transmission channels,” and observes that “both analog and digital signals can be sent using modulation carriers, such as in digital PCS and cellular telephone, DBS (direct broadcast satellite), wireless cable and cellular wireless cable, or hybrid fiber coax” (*id.* at 5:24–30, 5:35–39). Moreover, at the time of invention of the ’822 patent, digital PCS and cellular telephone systems were known to use CDMA channels operating in the frequency range of “5 MHz to in excess of 1 GHz,” which the ’822 patent defines as the frequency range for “wideband” systems. Ex. 1001, 7:6–10; Ex. 1011, 6:18–33; Ex. 1009, 1:23–25; Ex. 1043, 25:16–18. The ’822 patent also describes the application of complex coding methods, such as quadrature amplitude modulation (“QAM”), to signals sent over a “transmission channel.” *Id.* at 5:46–53.

As these teachings make plain, an ordinarily skilled artisan at the time of invention of the ’822 patent would have recognized that the various RF transmission systems identified in the ’822 patent (e.g., cellular telephone and cable television systems) employ different multiplexing schemes (e.g., CDMA and FDMA) that use distinct channel types (e.g., code channels and frequency bands) for data transmission. *See* Pet. 16–17; Ex. 1002 ¶ 122. Stated differently, our interpretation of the term “channel”

as it is used in the '822 patent “corresponds with what and how the inventor describes his invention in the specification.” *Smith*, 873 F.3d at 1383. We do not rely on the absence of inconsistency between our interpretation and the specification of the '822 patent to arrive at our construction of “channel.” *See id.* at 1382–83 (“The correct inquiry in giving a claim term its broadest reasonable interpretation in light of the specification is not whether the specification proscribes or precludes some broad reading of the claim term adopted by the examiner. And it is not simply an interpretation that is not inconsistent with the specification.”) Rather, our construction of “channel” reflects the fact that the '822 patent uses the broader term “channel” to encompass various communications paths, *i.e.*, paths for transmitting electrical signals, and employs the narrower term “RF channel” to refer to specific examples and embodiments describing a particular type of communications path, *i.e.*, a frequency band. Accordingly, we conclude that an ordinarily skilled artisan would have appreciated that the broadest reasonable interpretation of the term “channel” as it is used in the '822 patent is “a path for transmitting electric signals.”

Patent Owner contends that the above-described portions of the '822 patent merely provide “a general overview of the state of ‘traditional’ technology *prior* to the invention, with a specific emphasis on the most relevant prior art—namely, frequency multiplexed channels.” PO Resp. 15. Patent Owner further asserts that the “term ‘modulation carriers’ makes no reference to any specific multiplexing technique, and would not be understood by a person of ordinary skill as an invitation to apply techniques

other than frequency multiplexing.” *Id.* (internal citation omitted). We do not find these arguments persuasive. The ’822 patent does not indicate that discussion of “[t]raditional baseband and multiplexed analog signals” pertains to the disclosed “digital PCS and cellular telephone” systems. Ex. 1001, 5:24–39. Further, the ’822 patent describes an embodiment of a “wideband signal distribution system” that “can be utilized for distributing any wideband signals, which wideband signals may be any digital or analog signal, or any RF carrier signal between 5 MHz to in excess of 1 GHz” (*id.* at 6:1–8)—a range that encompasses digital PCS and cellular telephone systems. In addition, the fact that the term “modulation carriers” “makes no reference to any specific multiplexing technique” (PO Resp. 15.; Ex. 2002 ¶ 40) confirms that the term is agnostic to the multiplexing technique employed, and highlights, rather than undermines, that “modulation carriers” encompasses CDMA. In this regard, we note that Patent Owner relies solely on Dr. Nettles’ unsupported, conclusory testimony that “modulation carriers” “would not be understood by a person of ordinary skill as an invitation to apply techniques other than frequency multiplexing” (Ex. 2002 ¶ 40); testimony to which we give little weight (37 C.F.R. § 42.65(a)).

Moreover, even crediting Patent Owner’s characterization of the ’822 patent’s discussion of transmission channels, digital PCS, and cellular telephone systems as background for the preferred embodiments, the fact remains that the ’822 patent uses the unmodified term “channel” to refer generally to “a path for transmitting electric signals,” and consistently deploys narrowing modifiers, such as “RF channel,” “frequency channel”

and descriptions of “channel width” when referring to a frequency band. *Compare* Ex. 1001, 5:24–39, *with* 6:50–65. Contrary to Patent Owner’s implication (PO Resp. 11), the ’822 patent need not expressly state that the disclosed embodiments encompass channels other than frequency bands for that to be the case. *See Liebel-Flarsheim*, 358 F.3d at 906 (“expressly reject[ing] the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment.”). Rather, because the ’822 patent includes neither an intentional statement of restriction, nor a disavowal of claim scope, and because that patent does not use “channel” “in a way that necessarily restricts the term” to a frequency band, we decline to import that limitation from the preferred embodiment into the claims. *Info-Hold, Inc. v. Applied Media Techs. Corp.*, 783 F.3d 1262, 1267 (Fed. Cir. 2015).

In addition, our construction of “channel” as “a path for transmitting electric signals” in the instant proceedings is wholly consistent with our construction of the narrower term “RF channel” as describing a particular type of channel, namely, a “frequency band,” in proceedings concerning the related ’679 and ’565 patents (*Cisco*, IPR2016-01889, Paper 10 at 11). As an initial matter, it is beyond dispute that the claims of the ’822 patent recite a different term—“channel”—than the claims of the ’679 and ’565 patents—“RF channel.” *Compare* Ex. 1001, 12:22–40, *with* Ex. 2004, 12:22–13:18, *and* Ex. 2001, 12:21–13:2. The recitation of a narrower, more specific term in the claims of the ’679 and ’565 patents, which share the same specification as the ’822 patent and claim substantially similar subject

matter, suggests conscious recognition on the part of the applicants for the related patents that “channel” and “RF channel” have distinct meanings.

In addition, as set forth above, when describing frequency bands, as opposed to channels more broadly, the ’822 patent specification consistently deploys modifiers that an ordinarily skilled artisan would have understood as limiting the relevant channel to an RF channel. The recognition that the shared specification of the ’822, ’679, and ’565 patents takes pains to identify the specific type of channel under discussion is apparent throughout our analysis of the interpretation of “RF channel” in the proceedings addressing the ’679 and ’565 patents. *Cisco*, IPR2016-01889, Paper 10 at 9–11. For example, in that analysis, we explained that although the term is not expressly defined, “RF channel” is used throughout the shared specification in a manner “consistent with a meaning related to a frequency band.” *Id.* at 9. In particular, we identified the specification discussion of “‘RF carrier channel width,’ ‘RF guardband width,’ ‘RF band pass filters 216,’ ‘each 6 MHz [RF] channel,’ and ‘band-pass filter 810 that passes only the RF channels having wireless information thereon’” as supporting our conclusion that “RF channel” means “frequency band.” *Id.* at 9–10 (internal citations omitted; alteration in original). In summing up our analysis, we stated “we see no use of the term ‘RF channel’ . . . that is inconsistent with a definition restricted to frequency bands. Further, we see no use of the term that is consistent with a broader definition of the term.” *Id.* at 10.

Notably absent from our analysis is any suggestion that “channel” and “RF channel” share the same meaning. Indeed, contrary to Patent Owner’s

assertion, our alteration of “each 6 MHz channel” to “each 6 MHz [RF] channel” in our analysis of the construction of “RF channel” for the ’679 and ’565 patents in no way suggests that we “treated those terms interchangeably” (PO Resp. 13). Rather, the addition of “RF” simply highlights, as explained above, that an ordinarily skilled artisan would have recognized that a “6 MHz channel” is a “frequency band,” because the modifier “6 MHz” identifies the channel type under discussion as an “RF channel.”

Similarly, our rejection of the argument that “RF channel” should be broadly construed to encompass CDMA channels based on the specification teaching that “both analog and digital signals can be sent using modulation carrier, such as in digital PCS and cellular telephone and that the cellular CDMA defines two types of channels—CDMA and code channels” (*Cisco*, IPR2016-01889, Paper 10 at 11 (internal quotation omitted)) is not, as Patent Owner now suggests, tantamount to a determination that the specification excludes channels other than RF channels. Instead, as we explained, the discussion of additional channel types in the shared specification does not support broadening the meaning of the narrow term “RF channels” to encompass other channel types as well. *Id.* at 11 (“Nothing in the cited portions of the ’595 patent or Petitioner’s argument persuades us that a person of ordinary skill in the art would understand the term ‘RF channel’ to include the terms ‘CDMA channels’ or ‘code channels.’”).

Accordingly, for the reasons set forth above, we interpret the claim term “channel” to mean “a path for transmitting electric signals.”

2. *Other Claim Terms*

In the Decision on Institution, we concluded that the claim terms “address,” “addressed,” and “addressable device,” for which Petitioner proffered constructions (Pet. 18–19), and for which Patent Owner countered plain and customary meaning should apply (Prelim. Resp. 13–16), did not require express construction. Inst. Dec. 6. Neither Petitioner nor Patent Owner challenges this determination. *See* PO Resp. 20 (“Patent Owner believes that the Board can resolve all of the issues in dispute without construing ‘address’ and related terms.”); Reply 2–14.

Accordingly, we conclude that none of the claim terms “address,” “addressed,” and “addressable device,” requires express construction.

B. Prior Art Relied Upon

1. Overview of Tiedemann

Tiedemann describes a “method and apparatus for transmitting a high rate data packet in a CDMA communication system.” Ex. 1009, Abstract. In particular, Tiedemann discloses a communication system that, when a user’s transmission exceeds the capacity of the primary channel assigned to that user, provides “an additional channel or set of channels for use in conjunction with the primary channel to enable the transmission of high rate data.” *Id.* at 1:10–17.

Figure 1 of Tiedemann is reproduced below:

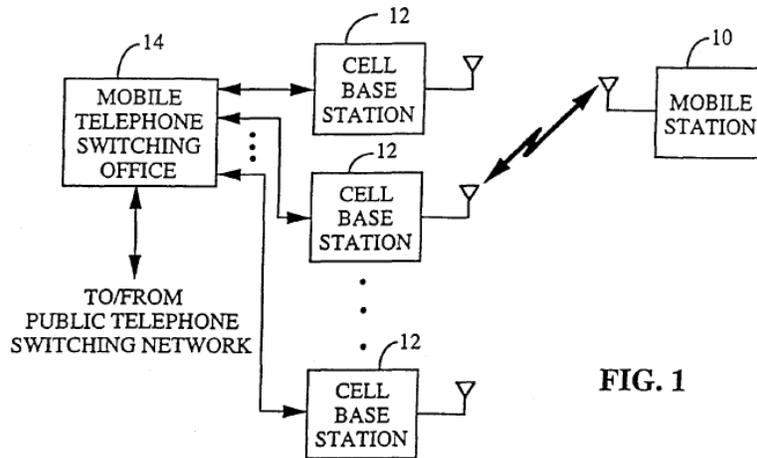


Figure 1 depicts an exemplary implementation of the communication system disclosed by Tiedemann. *Id.* at 3:41–43. As indicated in Figure 1, mobile station 10 transmits information to, and receives information from, cell base station 12. *Id.* at 3:43–44; 3:55–61. Tiedemann discloses that mobile station 10 and cell base station 12 are each capable of high rate data transmission. *Id.* at 3:59–61.

Tiedemann explains that when the rate of a user’s transmission exceeds the capacity of the primary channel assigned to that user, “the communication system determines whether sufficient additional channels are available for the transmission of the high rate data. If sufficient additional channels are available, they are assigned to the user for transmission of the high rate data.” *Id.* at 2:40–45. Tiedemann discloses that prior to initiating the high rate transmission, “the transmitter sends a message, referred to herein as the first channel assignment message, to the receiver indicating a forthcoming high rate data transmission. In the exemplary embodiment, the channel assignment message identifies the additional channels that will be

used to support the high rate data service.” *Id.* at 2:46–53. Tiedemann teaches that “[b]y using the first channel assignment message the receiving system need not demodulate all possible channels at all times which greatly reduces power consumption of the mobile station.” *Id.* at 2:56–59.

With regard to the receiver system, Tiedemann explains that upon receipt of the message, that system “initializes a set of additional demodulators to demodulate the high-rate data in accordance with the information provided in the first channel assignment message. The high-rate data is demodulated by the primary channel demodulator and the additional channel demodulators and the demodulated frames are combined and provided to the user.” *Id.* at 3:1–7.

Figure 3 of Tiedemann is reproduced below.

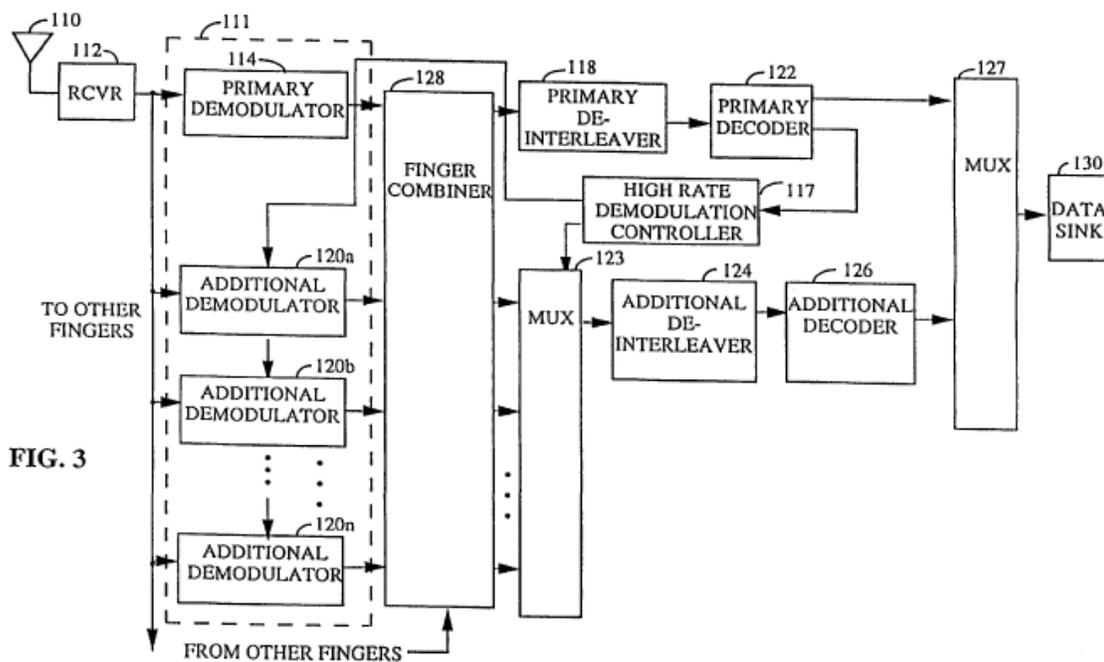


Figure 3 is a block diagram of the receiver system described by Tiedemann. *Id.* at 3:28–29. Tiedemann discloses that “[t]he RF signal is received by antenna **110** and provided to receiver **112**. Receiver **112** amplifies and down converts the received signal and provides the received signal to primary demodulator **114** and additional demodulators **120a–120n**.” *Id.* at 7:50–53. Subsequent to demodulation, “[m]ultiplexer (MUX) **127** combines the decoded data transmitted on the primary channel with the decoded data transmitted on the additional channels. The reassembled data packet is provided to data sink **130**.” *Id.* at 8:21–24.

2. Overview of Gilhousen

Gilhousen, which is incorporated by reference into Tiedemann, describes a “method and system for constructing PN sequences that provide orthogonality between the users so that mutual interference will be reduced, allowing higher capacity and better link performance” in a mobile cellular or satellite phone system. Ex. 1010, 4:38–42. Gilhousen expressly describes the use of addressing in a CDMA communication system, explaining that “[a] signal addressed to a particular user is multiplied by the outer PN sequences and by a particular Walsh sequence, or sequence of Walsh sequences, assigned by the system controller for the duration of the user's telephone call.” *Id.* at 10:7–12. Gilhousen likewise discloses that the PN_U sequence, i.e., the sequence generated by the mobile unit in a mobile-to-cell link, can take into account factors “such as the mobile unit address or user ID to provide discrimination among users.” *Id.* at 15:58–66.

3. Overview of Gorsuch

Gorsuch describes techniques for “high speed data and voice service over standard wireless connections via an unique integration of ISDN protocols and existing cellular signaling such as is available with Code Division Multiple Access (CDMA) type modulated systems.” Ex. 1011, 2:21–25. Gorsuch teaches that high data rates are achieved through the dynamic allocation of bandwidth to specific CDMA subscriber units based on data rate determinations. *Id.* at Abstract. In particular, Gorsuch explains that “a number of subchannels are defined within a standard CDMA channel bandwidth, . . . such as by assigning different codes to each subchannel. The instantaneous bandwidth needs of each on-line subscriber unit are met by dynamically allocating multiple subchannels of the RF carrier on an as needed basis for each session.” *Id.* at 2:27–34.

Figure 1 of Gorsuch is reproduced below:

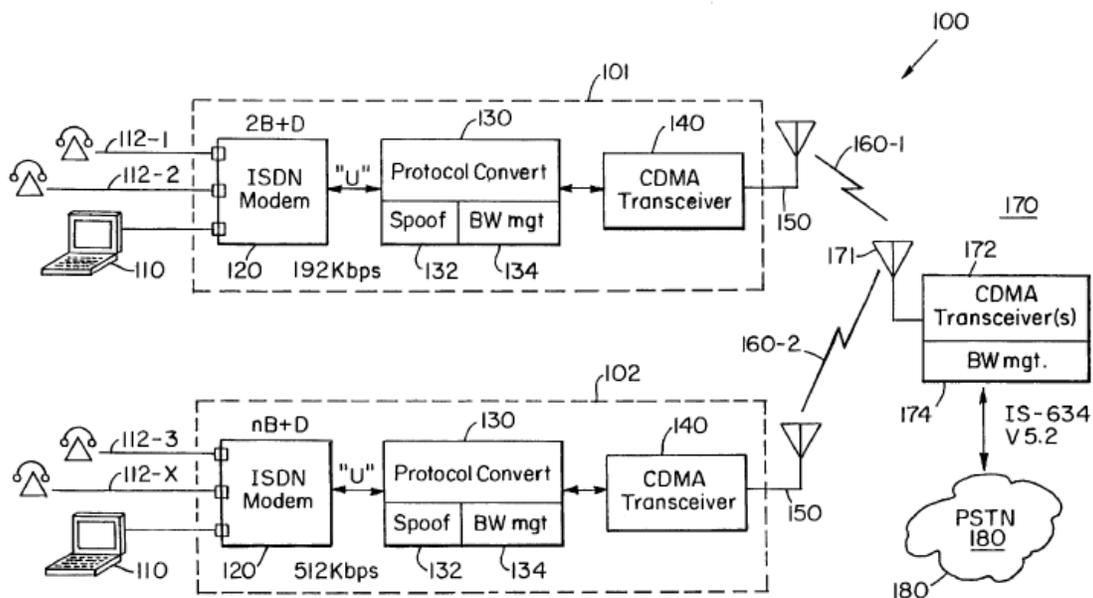


Figure 1 “is a block diagram of a system **100** for providing high-speed data and voice service over a wireless connection by seamlessly integrating a digital data protocol such as, for example, Integrated Services Digital Network (ISDN) with a digitally modulated wireless service such as Code Division Multiple Access (CDMA).” *Id.* at 3:29–34. As shown in Figure 1, subscriber units 101 and 102 connect wirelessly to base station 170, thereby permitting data transmission between portable computing device 110 and other devices, such as those connected to Public Switched Telephone Network 180. *Id.* at 3:36–47.

*C. Obviousness Based on
Tiedemann, Gilhousen, and Gorsuch*

Petitioner asserts that claims 1, 2, 5, 6, 19, 20, 23, and 29 are unpatentable under 35 U.S.C. § 103(a) as obvious in view of Tiedemann, Gilhousen, and Gorsuch. Pet. 21–46. Claims 2, 5, and 6 depend from claim 1, and claims 20, 23, and 29 depend from claim 19. In support of its assertion, Petitioner provides detailed explanations as to how the combination of Tiedemann, Gilhousen, and Gorsuch discloses each claim limitation (*id.*), and relies upon the Wechselberger Declaration (Ex. 1002) to support its positions.

Patent Owner responds that the cited combination does not render obvious the challenged claims of the '822 patent under Patent Owner's proposed construction of “channel” as meaning “a frequency band.” PO Resp. 26–37. Patent Owner additionally argues that, applying any construction of “channel,” the proposed combination does not render the

challenged claims obvious because it would have been inoperable. *Id.* at 37–51. Patent Owner relies on the Nettles Declaration (Ex. 2002) to support its assertions.

Upon review of Petitioner’s contentions and supporting evidence, as well as Patent Owner’s Response and supporting evidence, we determine that Petitioner has demonstrated, by a preponderance of the evidence, that claims 1, 2, 5, 6, 19, 20, 23, and 29 of the ’822 patent are unpatentable based on the combination of Tiedemann, Gilhousen, and Gorsuch.

1. Principles of Law

A patent claim is unpatentable under 35 U.S.C. § 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 ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).³

³ Neither party introduces objective evidence of non-obviousness or argues that the existence of secondary considerations impacts this Decision’s obviousness analysis. Accordingly, our analysis is based upon the first three of the four Graham factors.

In that regard, an obviousness analysis “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR*, 550 U.S. at 418. In *KSR*, the Supreme Court also stated that an invention may be found obvious if trying a course of conduct would have been obvious to a person having ordinary skill:

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. In that instance the fact that a combination was obvious to try might show that it was obvious under § 103.

KSR, 550 U.S. at 421. “*KSR* affirmed the logical inverse of this statement by stating that § 103 bars patentability unless ‘the improvement is more than the predictable use of prior art elements according to their established functions.’” *In re Kubin*, 561 F.3d 1351, 1359–60 (Fed. Cir. 2009) (citing *KSR*, 550 U.S. at 417).

2. *Rationale to Combine*

We have reviewed the Petition and the supporting evidence to which we are directed as to why an ordinarily skilled artisan would have sought to combine Tiedemann, Gilhousen, and Gorsuch, and how such an artisan would have combined those references to arrive at the claimed invention. We are persuaded that an ordinarily skilled artisan would have had reason to,

and a reasonable expectation of success in incorporating the teachings of Gilhousen and Gorsuch, including the use of addressing, as taught by Gilhousen, and the addition of addressable devices, a protocol converter, and an ISDN modem, as taught by Gorsuch, into the system disclosed by Tiedemann. *See* Pet. 20–21, 37–38; Ex. 1002 ¶¶ 191–194, 200–204.

Tiedemann, Gilhousen, and Gorsuch are all analogous art. Pet. 17 (citing Ex. 1002 ¶¶ 171–173). Notably, each of these references is in the same field of endeavor as the '822 patent, and they share the same art classifications as that patent. *Id.* at 20 (citing Ex. 1002 ¶ 171). Indeed, as discussed above, Tiedemann explicitly incorporates Gilhousen by reference, (Ex. 1009, 1:41–47), and expressly refers to the teachings of Gilhousen throughout its specification (*see, e.g., id.* at 3:53–55, 3:64–67, 4:55–58, 7:10–13). In the same vein, Tiedemann and Gorsuch each address the problem of transmitting high rate data over existing communications infrastructure, and teach the selective use of multiple channels in an RF signal to send high-rate data streams in multiple smaller data streams allows for high-rate data transfer while efficiently using the available RF spectrum. *See* Pet. 21 (citing Ex. 1002 ¶ 172).

We also find that the combination of Gorsuch's addressable devices, modem, and protocol converter with Tiedemann's mobile station would be nothing more than combining prior art elements according to known methods to yield predictable results. Pet. 37 (citing Ex. 1002 ¶¶ 200–204). In this regard, we note Mr. Wechselberger's testimony that "Gorsuch's protocol converter allows portable computers to use standard network

protocols, ‘existing conventional ISDN modems,’ and ‘existing CDMA transceivers’ to connect to the Internet over multi-channel RF signaling systems similar to Tiedemann’s multi-channel RF systems.” Ex. 1002 ¶ 201. Mr. Wechselberger also testifies that “Tiedemann’s mobile station leaves open the possibility a combination with the Gorsuch’s protocol converter, modem and addressable devices through the disclosure that Tiedemann’s data sink can consist of ‘further processing elements.’” *Id.* Based on these disclosures by Tiedemann and Gorsuch, Mr. Wechselberger concludes that an ordinarily skilled artisan would have understood that “adding Gorsuch’s teachings of addressable devices, modems, and protocol converters with Tiedemann’s mobile station would yield the predictable result of allowing portable computers and telephones to access the Internet and PSTN over multi-channel RF links using Tiedemann’s mobile station.” *Id.* We credit Mr. Wechselberger’s testimony, as it is consistent with the prior art disclosures.

We also credit Mr. Wechselberger’s testimony that each of Tiedemann and Gorsuch discloses an RF signal distribution system “for dividing high-rate data streams addressed to devices into multiple smaller data-rate streams, and sending them over multiple channels in an RF signal,” as well as “devices for selectively receiving the multiple channels in an RF signal containing the smaller data rate streams based on channel in use information, [and] combining those data streams” *Id.* ¶ 171. We further agree with Mr. Wechselberger that “combining these references would increase the functionality of Tiedemann’s system because it would

enable end devices (e.g., Tiedemann cell phones) to effectively communicate high-rate data with a PSTN via a standard CDMA communication system.” *Id.* ¶ 202.

We likewise credit Mr. Wechselberger’s testimony that systems allowing cellular phones to connect to portable computers and act as wireless modems for those computers were well-known in the art at the time of invention of the ’822 patent, as evidenced by the Qualcomm Data Connectivity Kit User Guide (Ex. 1002 ¶ 203), and thus, the same “commercial factors” that led to the creation of such systems “would also motivate the combination of Gorsuch’s teaching of multiple addressable devices, network interface, and protocol converter with the ‘further processing elements’ of Tiedemann’s data sink (130)” (*id.* ¶ 204). In this regard, we highlight Mr. Wechselberger’s testimony concerning the Qualcomm Data Connectivity Kit User Guide (Ex. 1017). Ex. 1002 ¶ 186. As Mr. Wechselberger testifies, the Qualcomm Data Connectivity Kit User Guide “teaches users how to connect their computers to their Qualcomm phone and use it as a wireless modem.” *Id.* ¶ 187. Mr. Wechselberger additionally testifies that the Qualcomm Data Connectivity Kit “enabled CDMA cell phones (such as the mobile station 10 in Tiedemann) to connect with laptops (such as the device 110 in Gorsuch) and act as a wireless modem for the laptops.” *Id.* ¶ 186. Indeed, the Qualcomm Data Kit User Guide explicitly identifies Tiedemann as a patent that describes the data connectivity kit functionality. Ex. 1017, 3.

Based on the record before us, we conclude that Petitioner has articulated sufficient reasoning with rational underpinnings to establish, by a preponderance of the evidence, that an ordinarily skilled artisan at the time of invention of the '822 patent would have combined Tiedemann, Gilhousen, and Gorsuch to arrive at the invention claimed.

Patent Owner contends that combining the addressable devices, modem, and protocol converter taught by Gorsuch with Tiedemann's mobile station would "clearly be inoperable, and thus teach[] away from the claimed invention" because "Gorsuch's protocol converter 130 is configured to receive data via a CDMA wireless protocol, whereas Tiedemann's multiplexer 127 outputs data via a wired interface." PO Resp. 42. According to Patent Owner, "it would not be enough to just 'drop' Gorsuch's protocol converter 130 and ISDN modem 120 into Tiedemann's receiver system to obtain the claimed apparatus, because Gorsuch's protocol converter 130 would require an input that Tiedemann's multiplexer 127 cannot provide." *Id.* at 43. Patent Owner further argues that the Petition does not adequately set forth the details of the proposed combination, citing several examples of the purported inadequacies in Petitioner's explanation of how the proposed combination would be implemented. *Id.* at 43–51. Patent Owner contends that "[a]s a result of Petitioner's lack of specificity in alleging obviousness of the challenged claims, Patent Owner is left guessing which specific combination of features in the references it should be responding to." *Id.* at 51.

We do not find Patent Owner’s arguments persuasive. Neither physical combinability nor bodily incorporation is required to establish obviousness. *Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC*, 825 F.3d 1373, 1381 (Fed. Cir. 2016) (“[I]t is not necessary that [the cited references] be physically combinable to render obvious the [challenged patent]. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference. . .” (internal quotations omitted)). Rather, the test for obviousness is “whether a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention.” *Id.* And, for the reasons set forth above concerning the disclosures of Tiedemann, Gilhousen, and Gorsuch, as well as the knowledge in the art, exemplified, for example, by the Qualcomm Data Connectivity Kit User Guide, we determine that an ordinarily skilled artisan at the time of invention of the ’822 patent would have had reason to make the cited combination and arrive at the claimed invention.

Patent Owner additionally identifies several alleged deficiencies in the combination proposed by Petitioner. We do not find Patent Owner’s contentions availing. Turning first to Patent Owner’s assertion that Tiedemann and Gorsuch cannot be combined because “Gorsuch’s protocol converter 130 is configured to receive data via a CDMA wireless protocol, whereas Tiedemann’s multiplexer 127 outputs data via a wired interface” (PO Resp. 42), we agree with Petitioner that it would have been within the ability of an ordinarily skilled artisan at the time of invention to use a wired

input in place of a wireless input (Reply 23; Ex. 1002 ¶¶ 254–256). *See, e.g., In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) (concluding it would have been obvious to substitute electrical components for optical components). Moreover, as Petitioner explains, “*Gorsuch* even suggests that protocol converter 130 could be modified to use a wired input.” Reply 23–24; *see also* Ex. 1002 ¶¶ 167, 254–256; Ex. 1011, 4–12, Fig. 1.

Patent Owner’s argument that *Gorsuch* and *Tiedemann* cannot be combined because each reference includes its own CDMA interface and bandwidth allocation scheme (PO Resp. 45) fails for similar reasons. Namely, this argument depends on physically incorporating *Tiedemann*’s CDMA interface into *Gorsuch*’s subscriber unit. But, as explained above, the physical combinability of the discrete circuitry disclosed by *Tiedemann* and *Gorsuch* is not required to establish obviousness. *See Mouttet*, 686 F.3d at 1332. Rather, for the reasons set forth above, we determine that an ordinarily skilled artisan would have sought to combine *Tiedemann*, *Gilhausen*, and *Gorsuch* to arrive at the broad functionality of receiving and processing an RF signal to output a digital stream to an addressable device recited in the challenged claims.

We are likewise unconvinced by Patent Owner’s assertion that the low level protocol used by *Tiedemann*’s base station requires modifications to provide data, rather than simply voice. PO Resp. 46. *Tiedemann* does not restrict itself to voice; instead, *Tiedemann* describes an “improved communication system wherein a user transmits *data* on a primary channel” and is provided additional channels when the transmission exceeds the

capacity of the primary channel, in order to “enable the transmission of *high rate data*.” Ex. 1009, 1:11–18 (emphasis added); *see also* Ex. 1002 ¶¶ 140–149 (explaining that packets disclosed by Tiedemann “are a means of transmitting digital data” and that the channels disclosed by Tiedemann support “voice or data” traffic.); Ex. 1043, 66:22–67:2. Indeed, reference to Tiedemann in the Qualcomm Data Connectivity Kit User Guide (Ex. 1017, 3), combined with the fact that it was well-known at the time of invention to communicate non-voice data over a Public Switched Telephone Network (Ex. 1002 ¶ 186; Ex. 1011, 4:54–58; Ex. 1017, 93) indicates that Tiedemann encompasses non-voice data communications. Moreover, for the reasons set forth by Mr. Wechselberger, it would have been within the capability of an ordinarily skilled artisan at the time of invention of the ’822 patent to configure a base station to transmit data. Ex. 1002 ¶¶ 95, 146–147, 152–173, 180–204.

Patent Owner also argues that Petitioner’s explanation of the proposed combination of Tiedemann and Gorsuch is so lacking in detail that one can neither “determine what level of skill the combination would require,” nor “whether the combination ‘would not have worked for its intended purpose or otherwise taught away from the invention.’” PO Resp. 50 (quoting *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1326 (Fed. Cir. 2009)). Patent Owner contends, therefore, that “the Petition and supporting declaration fail to allege obviousness with the required particularity,” and, therefore “Petitioner has failed to meet its burden of proving unpatentability of the challenged claims.” *Id.* at 51.

We do not agree with Patent Owner's contentions. As set forth above, Petitioner and its expert, Mr. Wechselberger have provided a sufficiently detailed description of the proposed combination of Tiedemann, Gilhousen, and Gorsuch to establish that an ordinarily skilled artisan would have made that combination and arrived at the claimed invention. Patent Owner has not identified any portion of the cited references that "criticize[s], discredit[s], or otherwise discourage[s]" the claimed invention. *DePuy Spine*, 567 F.3d at 1326. Moreover, we have considered, and, for the reasons stated above, rejected the alleged deficiencies in that combination that have been identified by Patent Owner. Absent a specifically identified gap in Petitioner's rationale for combining Tiedemann, Gilhousen, and Gorsuch, Patent Owner's assertion that Petitioner's explanation is insufficiently detailed is disingenuous and incongruent with the dictate that "we do not ignore the modifications that one skilled in the art would make to a device borrowed from the prior art" in evaluating obviousness. *In re Icon Health & Fitness, Inc.*, 496 F.3d 1374, 1382 (Fed. Cir. 2007). Rather, we agree with Petitioner that the proposed combination represents nothing more than the use of a known technique, in a manner that would have been within the level of skill of an ordinary artisan, to "improve similar devices in the same way." *KSR*, 550 U.S. at 417.

In addition, we observe that the level of detail regarding the proposed combination of Tiedemann, Gilhousen, and Gorsuch provided by Petitioner and Mr. Wechselberger far outstrips the level of detail provided in the '822 patent itself. Indeed, the absence of meaningful disclosure of the

details of implementation in the '822 patent suggests that the design particulars Patent Owner now quibbles over would have been well within the grasp of an ordinarily skilled artisan. Further, Dr. Nettles' testimony concerning the rationale to combine Tiedemann, Gilhousen, and Gorsuch (*see, e.g.*, Ex. 2002 ¶¶ 82–91), which closely mirrors the Patent Owner Response (*see, e.g.*, PO Resp. 41–51), is often conclusory, and does not persuade us that the proposed combination is set forth in insufficient detail. 37 C.F.R. § 42.65(a).

Accordingly, for above-stated reasons, we determine that an ordinarily skilled artisan at the time of invention of the '822 patent would have had reason to, and a reasonable expectation of success in, combining Tiedemann, Gilhousen, and Gorsuch to arrive at the claimed invention.

3. Claims 1 and 19

We have reviewed the Petition and the supporting evidence to which we are directed as to how the combination of Tiedemann, Gilhousen, and Gorsuch teaches or suggests each limitation of independent claims 1 and 19. We are persuaded that mobile station 10, disclosed by Tiedemann, is an intelligent device that receives and processes RF signals. Pet. 22–23; Ex. 1002 ¶ 176. We are additionally persuaded that Tiedemann discloses “an input configured to receive a modulated RF signal containing multiple channels.” Pet. 24–25; Ex. 1002 ¶ 177. As Petitioner explains, each of Tiedemann's mobile stations 10 “is assigned a ‘primary channel’ and ‘an additional channel or set of channels’ are used to provide high-rate data transmission to the mobile station.” Pet. 24; Ex. 1002 ¶ 177. Furthermore,

each mobile station includes an antenna 110 and receiver 112 to receive such modulated RF signals. Pet. 24; Ex. 1002 ¶ 177.

Patent Owner asserts that Tiedemann fails to disclose an intelligent device that receives “a modulated RF signal containing multiple channels” because CDMA systems, including the system taught by Tiedemann, do not disclose “receiving . . . *at least two frequency channels.*” PO Resp. 26–27 (emphasis added). As explained above regarding the construction of the term “channel,” however, the challenged claims do not require that the recited “multiple channels” must be “frequency channels” (*i.e.*, “RF channels”). Rather, the broadest reasonable interpretation of “channel” as it is used in the ’822 patent is “a path for transmitting electric signals,” and encompasses, for example, CDMA and code channels, in addition to the frequency band channels used in FDMA. Furthermore, we agree with Petitioner that “Tiedemann teaches that, depending upon the type of multiple access system used, the multiple channels in the RF signal are provided in different ways,” for example, in “CDMA systems, the channels are distinguished by a Walsh sequence imposed on the RF signal.” Pet. 25; *see also* Ex. 1002 ¶¶ 181–216. Accordingly, we are persuaded that the CDMA and code channels disclosed by Tiedemann satisfy the claim 1 and 19 requirements for “a modulated RF signal containing multiple channels.”

We further determine that Petitioner has shown that the combination of Tiedemann, Gilhousen, and Gorsuch teaches or suggests “an input configured . . . to receive channel in use information which identifies each channel in the modulated RF signal that includes information addressed to at

least one addressable device,” as recited in claim 1. Pet. 25–28, 35–38; Ex. 1002 ¶¶ 178, 195–212. With regard to the requirement that the recited input be configured to receive channel in use information, Mr. Wechselberger testifies that “at the onset of high-data rate transmission, the base station’s cell controller 40 ‘generates a channel assignment message, which indicates the additional Walsh channel or channels that will be used to carry the high rate data’” (Ex. 1002 ¶ 208), and that this “channel assignment message is received at the mobile unit’s antenna 110 and used by the mobile unit to determine the required demodulators to activate” (*id.* ¶ 212).

As to the additional requirement that the channel in use information identify “each channel in the modulated RF signal that includes information addressed to at least one addressable device,” Petitioner explains that “Gorsuch discloses multiple addressable devices in the form of portable computers (110) and telephones (112-1, -2, -3, -x) that connect to the PSTN and the Internet over a multi-channel RF signal using Gorsuch’s subscriber unit (101)” (Pet. 35), and “discloses channel-in-use information (‘control information’) that identifies channels carrying data addressed to the addressable devices” (*id.* at 36).

In addition, Mr. Wechselberger testifies that

Tiedemann could be modified by Gorsuch’s protocol converter, ISDN modem, and addressable devices so that Tiedemann’s mobile station is connected through the RF cellular system to a PSTN and can communicate using the same protocols set out in Gorsuch. As such, a POSITA would understand that the mobile unit 10 in Tiedemann could be attached to devices

112, 110 that would be addressed according to the Q.931 protocol.

Ex. 1002 ¶ 199. Mr. Wechselberger further testifies that “Tiedemann’s mobile station leaves open the possibility a combination with the Gorsuch’s protocol converter, modem and addressable devices through the disclosure that Tiedemann’s data sink can consist of ‘further processing elements.’” *Id.* ¶ 201. We credit Mr. Wechselberger’s testimony, as it is consistent with the prior art disclosures.

Claim 19 replaces the claim 1 requirement for “an input configured to . . . receive channel in use information which identifies each channel in the modulated RF signal that includes information addressed to at least one addressable device” (Ex. 1001, 12:24–28) with a requirement for “a detector configured to detect each channel contained in the received modulated RF signal that includes information addressed to at least one addressable device, and to generate channel in use information identifying each channel that includes information addressed to the at least one addressable device” (*id.* at 15:5–10). We are persuaded that the combination of Tiedemann, Gilhousen, and Gorsuch teaches or suggests this “detector” element of claim 19. Pet. 38–41; Ex. 1002 ¶¶ 213–218.

In this regard, we are persuaded that “Tiedemann discloses a detector in the form of its mobile station’s RF receiver, demodulator, and decoder circuitry that receives, detects, and decodes each channel in the RF signal that contains information addressed to the mobile station.” Pet. 39. As Petitioner explains, Tiedemann’s “receiver (112), primary demodulator (114) and finger combiner (128), working in conjunction with the primary

de-interleaver (118), primary channel decoder (122) detect the primary channel assigned to the mobile station (10).” *Id.* We are likewise persuaded by Petitioner’s explanation that “[w]hen the primary channel contains data, the primary channel decoder (122) generates channel-in-use information by providing the decoded primary channel data to the multiplexer (127).” *Id.* at 40. Specifically, “[p]rimary channel decoder (122) provides the decoded channel assignment message to the high-rate data controller (117) which generates channel-in-use information in the form of the ‘Walsh sequence identification and PN code information’ of the additional channels in the RF signal containing data addressed to the addressable device.” *Id.* at 40–41.

Petitioner has also established that “Tiedemann expressly discloses at least four demodulators (114, 120a, b, and n) and at least three channels (primary and additional channels, plural) being demodulated by these demodulators” (Pet. 43), responsive to identification of those channels by the channel assignment message as containing data addressed to the mobile station (*id.* at 42–43). Moreover, for the reasons set forth in greater detail above, we determine that Petitioner has shown that “the at least one addressable device is rendered obvious over Tiedemann’s mobile station (ground 1) in combination with the multiple addressable devices (portable computers 110 and telephones 112), modem, and protocol converter of Gorsuch.” *Id.* at 43.

Akin to its “multiple RF channel” argument, addressed above, Patent Owner contends that Tiedemann fails to disclose demodulating “*at least two* RF channels,” because the CDMA system of Tiedemann “purposely

combines multiple radio transmissions into a *single* radio frequency channel, on a *single* frequency.” PO Resp. 27. For the same reasons set forth above, however, we agree with Petitioner that the requirement for “a demodulator unit configured to demodulate at least two channels contained in the modulated RF signal” is satisfied by demodulation circuit 111 of Tiedemann, including primary demodulator 114 and additional demodulators 120a–n, because Tiedemann teaches that the disclosed demodulators demodulate the primary and additional channels contained in the modulated RF signal of Tiedemann’s CDMA transmission. Pet. 41–43.

Petitioner has additionally established that “Tiedemann’s combiner (MUX, 127) combines the data from the primary channel, demodulated by the primary demodulator (114), and the data from the additional channels, demodulated additional channel demodulators (120a–n), and outputs them to the user or data sink (130) in the mobile station (10)” (*id.* at 44), as well as that, as set out in Gorsuch, the addressable devices of the proposed combination (Gorsuch’s portable computers 110 and telephones 112) “receive the data stream from the subscriber station (101, 102), combined by the channel mux (438), and output by the ISDN modem (120) via the digital output (222) or the analog to digital converter (221)” (*id.* at 45–46). *See also* Ex. 1002 ¶¶ 195–199, 224.

Although we recognize Patent Owner’s argument that the primary and additional channels disclosed by Tiedemann do not satisfy the claim 1 requirement that the combiner be configured to combine “the at least two

channels demodulated by the demodulator unit” (PO Resp. 28), for the reasons discussed above, we do not find that argument persuasive.

Accordingly, we conclude that Petitioner has established, by a preponderance of the evidence, that the combination of Tiedemann, Gilhousen, and Gorsuch renders obvious the devices of claims 1 and 19.

4. Claims 2, 5, 6, 20, 23 and 29

Patent Owner does not separately argue the patentability of challenged dependent claims 2, 5, 6, 20, 23, and 29. *See* PO Resp., *passim*. We have reviewed Petitioner’s evidence, arguments, and claim charts as to those claims, which we adopt as our own, and, conclude that Petitioner has established by a preponderance of the evidence that those claims would have been rendered obvious by the combination of Tiedemann, Gilhousen, and Gorsuch. Pet. 46–59; Ex. 1002 ¶¶ 226–282.

III. CONCLUSION

For the foregoing reasons, we conclude that Petitioner has shown, by a preponderance of the evidence, that claims 1, 2, 5, 6, 19, 20, 23, and 29 of the ’822 patent are unpatentable.

IV. ORDER

It is

ORDERED that claims 1, 2, 5, 6, 19, 20, 23, and 29 of the '822 patent are unpatentable;

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.

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