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Paper 10
Entered: December 16, 2014

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ERICSSON INC. and
TELEFONAKTIEBOLAGET LM ERICSSON,
Petitioner,

v.

INTELLECTUAL VENTURES I LLC,
Patent Owner.

Case IPR2014-00963
Patent 6,952,408 B2

Before JOSIAH C. COCKS, WILLIAM A. CAPP, and
DAVID C. MCKONE, *Administrative Patent Judges.*

MCKONE, *Administrative Patent Judge*.

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

A. Background

Ericsson Inc. and Telefonaktiebolaget LM Ericsson (collectively "Petitioner") filed a Corrected Petition (Paper 6, "Pet.") to institute *inter partes* review of claims 1–16 of U.S. Patent No. 6,952,408 B2 (Ex. 1001, "the '408 patent"). Intellectual Ventures I LLC ("Patent Owner") filed a Preliminary Response (Paper 8, "Prelim. Resp.").

Upon consideration of the Petition and Preliminary Response, we conclude, under 35 U.S.C. § 314(a), that Petitioner has shown a reasonable likelihood that it would prevail with respect to each of the challenged claims. Accordingly, we institute an *inter partes* review of claims 1–16 of the '408 patent.

B. Related Matters

Patent Owner has asserted the '408 patent against various companies in several lawsuits filed in the United States District Court for the District of Delaware. Pet. 1; Paper 5, at 1.

C. References Relied Upon

Petitioner relies upon the following prior art references:

Ex. 1006	US 5,592,480	Jan. 7, 1997	("the '480 patent")
Ex. 1007	US 5,537,435	July 16, 1996	("the '435 patent")
Ex. 1008	US 6,788,729 B1	Sept. 7, 2004	("the '729 patent")
Ex. 1009	US 5,430,713	July 4, 1995	("the '713 patent")
Ex. 1010	US 5,428,602	June 27, 1995	("the '602 patent")

Recommendation GSM 05.02, Radio Sub-system Link Control, EUROPEAN TELECOMMUNICATIONS STANDARDS INSTITUTE, v. 3.8.0 (Dec. 1995) (Ex. 1012, "GSM 05.02")

Recommendation GSM 05.10, Digital cellular telecommunication system (Phase2+); Radio subsystem synchronisation, EUROPEAN TELECOMMUNICATIONS STANDARDS INSTITUTE, v. 5.0.0 (May 1996) (Ex. 1013, "GSM 05.10")

Michael A. Komara, *RF Design for Multi-Carrier Wireless Systems*, IEEE SOUTHCON/96 98–103 (June 25–27, 1996) (Ex. 1014, "Komara")

RAYMOND STEELE, MOBILE RADIO COMMUNICATIONS 698–700 (1995) (Ex. 1017, "Steele")

D. The Asserted Grounds

Petitioner contends that the challenged claims are unpatentable based on the following specific grounds (Pet. 3):

References	Basis	Claims Challenged
The '480 patent	§ 102(b)	1–16
The '480 patent, the '435 patent, and GSM 05.02	§ 103(a)	1–16
The '729 patent	§ 102(e)	1–4
The '602 patent, the '713 patent, and Steele	§ 103(a)	1–16
The '480 patent, the '713 patent, GSM 05.02, GSM 05.10, and Komara	§ 103(a)	1–16

II. ANALYSIS

A. The '408 Patent

The '408 patent is directed to a method for frequency hopping in cellular wireless communication. Ex. 1001, Abstract. Frequency hopping is

a modulation technique in which a transmission frequency is changed according to a schedule in order to reduce the amount of interference experienced at particular frequencies. *Id.* at 2:23–29; 2:33–36; 11:19–24. Frequency hopping is used, for example, in the Groupe Spécial Mobile ("GSM") set of mobile communications standards developed by the European Telecommunications Standards Institute ("ETSI"). *Id.* at 3:1–5. Communications between mobile stations (e.g., cellular phones) and basestations can include several logical channels time division multiplexed into recurring time slots of a single radio frequency ("RF") channel. *Id.* at 11:43–45. In frequency hopping, a mobile station maintains its time slot when hopping to a different frequency. *Id.* at 11:45–50.

A preferred embodiment of the invention of the '408 patent is illustrated in Figure 1, reproduced below:

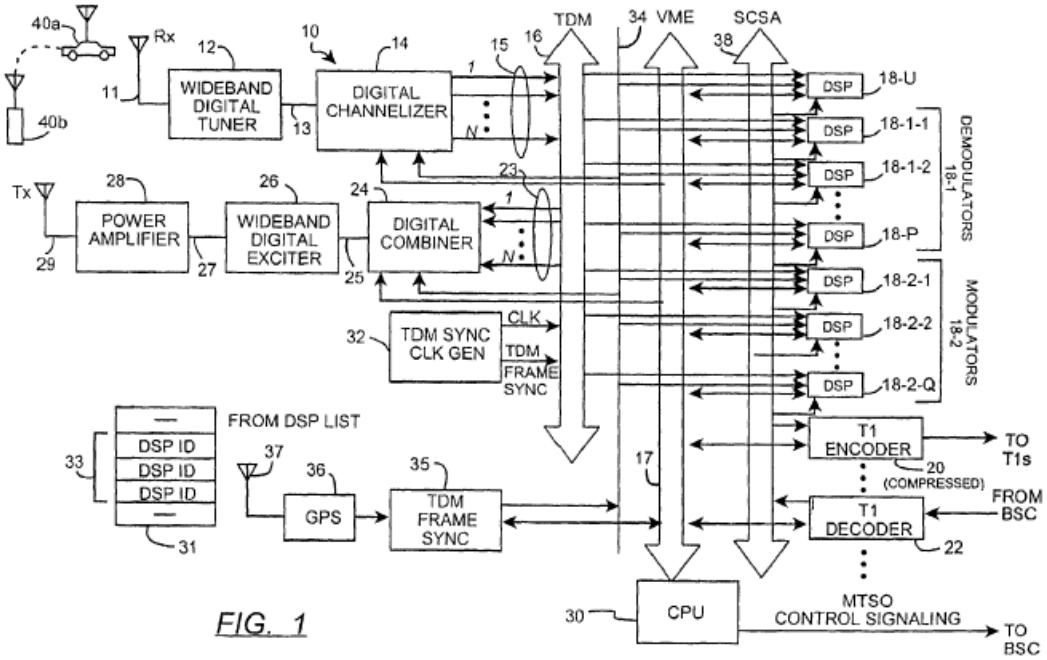

FIG. 1

Figure 1 is a block diagram of wideband digital basestation 10 in communication with mobile subscriber terminals 40a, 40b. *Id.* at 3:46–48; 4:36–38. Wideband digital tuner 12 receives a composite RF modulated signal (e.g., modulated voice or data) from a mobile subscriber terminal (e.g., 40a, 40b), down converts the signal to an intermediate frequency, and converts it from analog to digital. *Id.* at 4:53–59. Digital channelizer 14 receives the composite digital signal 13 from digital tuner 12 and separates it into a plurality of digital channel signals 15. *Id.* at 5:1–3.

The digital channel signals are provided to a plurality of digital signal processors ("DSPs") over time division multiplex ("TDM") bus 16. *Id.* at 31–34. The DSPs (e.g., 18-1-1 to 18-P) demodulate the digital channel signals. *Id.* at 5:31–34; 5:49–51. The TDM bus is configured to route the same recurring time slot to a particular demodulator DSP such that the DSP performs baseband processing for the same mobile station before and after a change in RF frequency. *Id.* at 12:22–24. In other words, the TDM bus routes a physical RF channel to the DSP corresponding to the correct logical channel for the mobile station.

Figure 8, reproduced below, is an example of a structure to indicate to the TDM bus how to map digital channel signals to DSPs. *Id.* at 11:50–58.

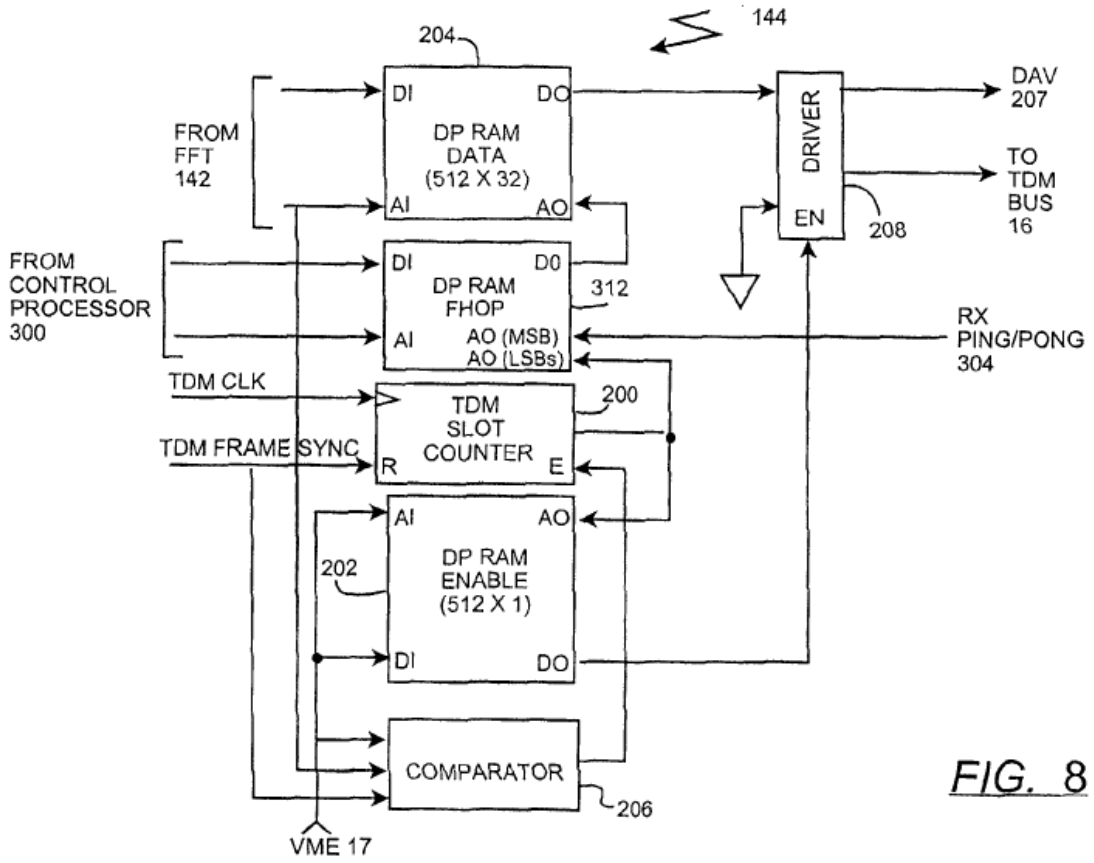

FIG. 8

Figure 8 is a block diagram of a TDM dual port ("DP") driver 144 within digital channelizer 14. *Id.* A control processor for the basestation supplies indications of current and next physical RF channel-to-logical channel mappings to frequency hop dual port random access memory ("FHOP DP-RAM") 312, which stores the current and next values in address locations that differ by the most significant address bit. *Id.* at 11:57–11. RX PING/PONG signal 304 toggles according to a hop sequence interval, causing the TDM bus to be remapped at a rate corresponding to the hop sequence interval. *Id.* at 12:15–21. The hop sequence interval can be synchronized to a timing signal from a Global Positioning System ("GPS") receiver (*see* Fig. 1, items 35–37). *Id.* at 12:31–31–56.

Data to be transmitted from the basestation to mobile stations are handled similarly. *Id.* at 6:44–45. With reference to Figure 1, DSPs 18-2-1 through 18-2-Q modulate the data, which are routed to digital combiner 24 via TDM bus 16. *Id.* at 6:47–56. Digital combiner 24 combines the data, which it receives in multiple RF frequencies, into a composite signal. *Id.* at 7:7–9; 8:5–7. Digital exciter 26 then generates a composite RF signal to be transmitted over an antenna to the mobile stations. *Id.* at 7:9–13.

Claim 1, reproduced below, is illustrative of the claimed subject matter:

> 1. A method for frequency hopping in a cellular communications system having multiple mobile subscribers communicating on a plurality of different physical RF channels on any time division multiplexed scheme with a basestation having a broadband transceiver, said method comprising the steps of:
>
> operating said broadband transceiver using a plurality of transceiver RF frequencies, each of which represents one of said physical RF channels; and
>
> changing from a first of said physical RF channels upon which said mobile subscribers communicate with said basestation to a second of said physical RF channels, while maintaining a same logical channel.

B. Claim Construction

The Board interprets claims of an unexpired patent using the broadest reasonable construction. *See* 37 C.F.R. § 42.100(b). Claim terms generally 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. *See In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

1. "broadband transceiver"

The parties agree that "broadband transceiver" should be construed to mean "a transceiver that covers a substantial portion of the bandwidth available to the wireless service provider who is operating the basestation." Pet. 12–13; Prelim. Resp. 12–13. The parties' agreement, however, does not resolve their dispute as to the applicability of the '602 and '713 patents to the challenged claims.

Each of the '602 and '713 patents describes a system in which RF signals are transmitted and received by a set of transceivers that, collectively, transmit or receive a broadband spectrum. *See* Ex. 1010 (the '602 patent), 1:66–2:3:

> The system comprises at least two, preferably four, transceiver units 6a, 6b and 6c. In a GSM system, each transceiver is full-duplex, and the duplex spacing between its receiving and transmitting RF frequencies is 45 MHz. The frequency range utilized by the system is preferably from 800 to 1,000 MHz. The transceivers 6a to 6c have mutually different fixed transmitting and receiving frequencies. Outputs 10a to 10c in the transceivers 6a to 6c are connected to a radio-frequency combiner circuit 1, which combines the transmitters of the transceivers 6a to 6c to a common transmitting antenna 2 and the receivers to a common receiving antenna 3.

Ex. 1009 (the '713 patent), 2:5–16:

> Also coupled to the TRX bus 13 is a plurality of transceivers, four of which are shown as 14–17. In a typical system, each transceiver, e.g., 14, will transmit radio frequency (RF) signals to and receive RF signals from a number of mobile end users,

> e.g., 18. . . . The channel control unit, e.g., 10, will determine what frequency to be used for each user in each frame and direct baseband signals to the appropriate transceiver adapted to the desired frequency.

Petitioner contends that the collections of transceivers disclosed in the '602 and '713 patents are broadband transceivers. Pet. 50. Patent Owner characterizes the '602 and '713 patents as disclosing transceiver units that are only able to process single-frequency signals and argues that such transceivers are not "broadband transceivers." Prelim. Resp. 33–35.

The '408 patent is directed to "a method of performing frequency hopping with a wideband[1] transceiver configured in a modular manner" (Ex. 1001, 2:33–35) and describes a basestation that includes "one or more wideband digital tuners" (*id.* at 4:17–19). The '408 patent further explains the following:

> Digital tuner 12 is wide band in the sense that it covers a substantial portion of the bandwidth available to the wireless service provider who is operating the basestation 10. For example, if the air interface implemented by the basestation 10 is GSM, the wideband digital tuner 12 may downconvert 5 MegaHertz (MHz) bandwidth in the 1900 MHz range which contains as many as 25 receive RF channel signals, each having approximately 200 kiloHertz (kHz) bandwidth.

Id. at 4:60–67. Although the '408 patent does not state explicitly that a broadband transceiver or tuner is a single transceiver that transmits or receives a wideband signal rather than a set of single-frequency transceivers, the patent explains that the output of tuner 12 is a composite signal that is

[1] The specification of the '408 patent does not use the term "broadband transceiver." Nevertheless, the parties agree that "wideband" and "broadband" are interchangeable. Pet. 12–13; Prelim. Resp. 12–13.

separated, using a Fast Fourier Transform ("FFT") processor of a digital channelizer, into individual channel signals. *Id.* at 5:1–30. This suggests that the described broadband transceiver is a single transceiver that transmits or receives a single composite signal rather than a set of transceivers each receiving an individual channel signal.

In arguing for its proposed claim construction, Petitioner does not explain why it would be reasonable to construe a broadband transceiver to include a collection or set of single-frequency transceivers. *See* Pet. 12–13. Nor does Petitioner provide any explanation in its application of the '602 and '713 patents to the challenged claims. *See* Pet. 50. Rather, Petitioner simply cites to the disclosures of single-frequency transceivers in those patents. *See id.* Petitioner also cites to the testimony of its declarant, Dr. Wayne Stark (Ex. 1003, "Stark Decl."), both in support of its claim construction and application of "broadband transceiver." *See id.* at 12–13, 50 (citing Ex. 1003 ¶¶ 73, 171). Dr. Stark, however, does not explain how the term "broadband transceiver" applies to collections of single-frequency transceivers. *See* Ex. 1003 ¶¶ 73, 171. Thus, Petitioner has not persuaded us that a broadband transceiver can include a set of single-frequency transceivers.

Accordingly, for purposes of this decision, we adopt the construction agreed to by the parties, namely, "a transceiver that covers a substantial portion of the bandwidth available to the wireless service provider who is operating the basestation," but clarify that such a transceiver does not include a set of single-frequency transceivers.

2. Remaining Claim Terms

For purposes of this decision, no other claim term in the '408 patent requires express construction.

C. Anticipation by the '480 Patent

Petitioner contends that the '480 patent anticipates claims 1–16. Pet. 14–35. The '480 patent, also assigned to Patent Owner, describes a wideband wireless basestation. Ex. 1006, Abstract. Figure 1 of the '480 patent, reproduced below, illustrates an example:

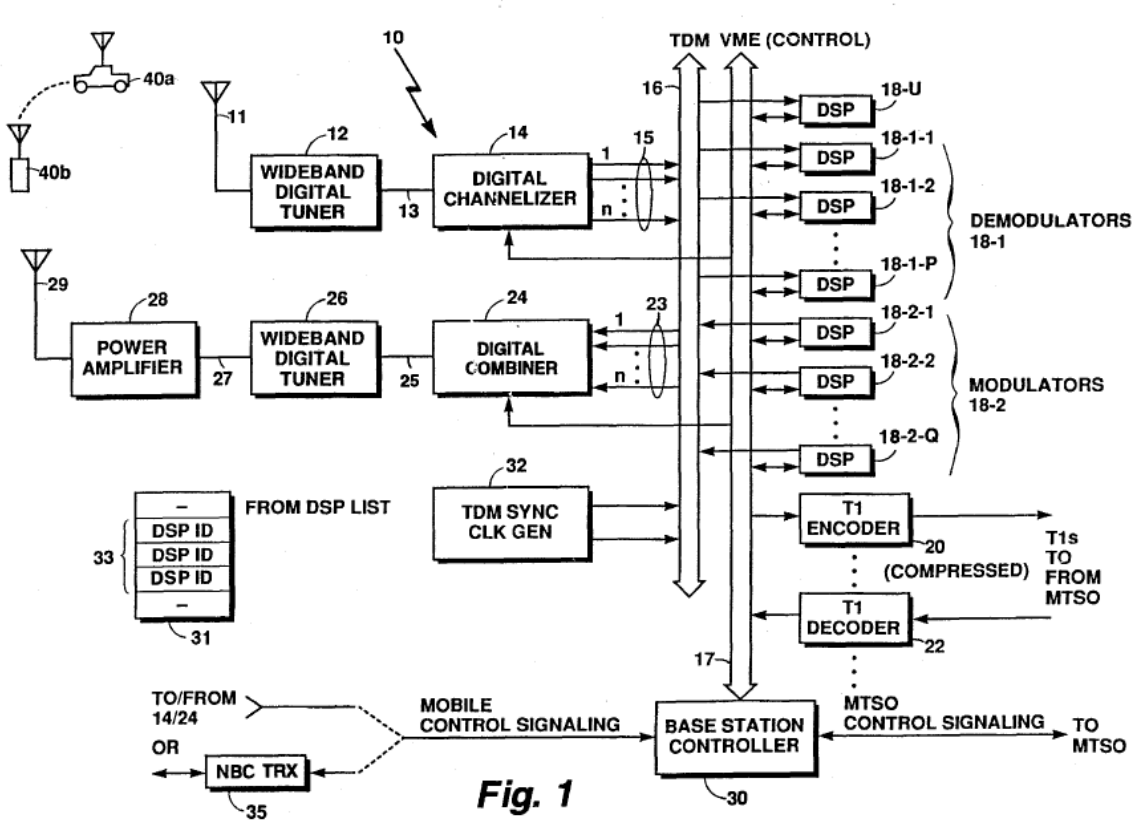

Fig. 1

Figure 1 is a block diagram of a wideband digital basestation. *Id.* at 4:26–28.

The ’480 and ’408 patents are not related; however, they share significant disclosure. For example, wideband digital tuners 12, 26, digital channelizer 14, digital combiner 24, TDM bus 16, modulators 18-2, and demodulators 18-1 are described similarly to the components sharing those designations in Figure 1 of the ’408 patent, reproduced above. *Compare* Ex. 1006, 5:28–6:26; 6:60–7:35, *with*, Ex. 1001, 4:60–5:56; 6:35–7:12. We are persuaded that Petitioner has made a threshold showing that the ’480 patent discloses a basestation having a broadband transceiver (e.g., wideband digital tuner 12), as recited in claim 1.

The parties, however, dispute whether the ’480 patent discloses a method for frequency hopping, and, specifically, whether it discloses “changing from a first of said physical RF channels upon which said mobile subscribers communicate with said basestation to a second of said physical RF channels, while maintaining a same logical channel,” as recited in claim 1. As Petitioner points out (Pet. 17–18), according to the ’480 patent, “[t]he particular modulation . . . used [in the described system] may be anyone of a number of different wireless (air interface) standards such as . . . frequency hopping standards such as the European Groupe Speciale Mobile (GSM) . . . .” Ex. 1006, 5:9–17. Petitioner acknowledges, however, that the ’480 patent does not include the detailed discussion of frequency hopping presented in the ’408 patent, including the discussion of the dedicated memory component depicted in Figure 8 of the ’408 patent (reproduced above) used to facilitate frequency hopping. Pet. 16–17.

To anticipate, a reference must “show all of the limitations of the claims arranged or combined in the same way as recited in the claims.” *Net MoneyIN, Inc. v. Verisign, Inc.*, 545 F.3d 1359, 1370 (Fed. Cir. 2008);

accord In re Bond, 910 F.2d 831, 832 (Fed. Cir. 1990). However, as Petitioner argues (Pet. 21–22), "a prior art reference must be 'considered together with the knowledge of one of ordinary skill in the pertinent art.'" *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (quoting *In re Samour*, 571 F.2d 559, 562, (CCPA 1978)). According to Petitioner's declarant, Dr. Stark, "a [person of ordinary skill in the art] would have understood that explicit reference to GSM [in Ex. 1006, 5:9–16] to include reference to the constituent part of the GSM standard that specifies frequency hopping, *i.e.*, GSM 05.02 [Ex. 1012]." Ex. 1003 ¶ 90. In light of this testimony, Petitioner argues that "[a]s evidenced by GSM 05.02, a [person of ordinary skill in the art] would understand that the GSM standard contains details about how frequency hopping works, including formula and algorithms for generating initial and subsequent frequency hopping mappings, which could easily be programmed into the DP RAM and basestation controller disclosed in the '480 Patent." Pet. 20. Specifically, relying on Dr. Stark's testimony, Petitioner argues that GSM 05.02 discloses algorithms for "changing from a first of said physical RF channels upon which said mobile subscribers communicate with said basestation to a second of said physical channels while maintaining a same logical channel," as recited in claim 1. *Id.* 23–24 (citing Ex. 1012 §§ 5.6, 6.2, 6.2.1–6.2.3; Ex. 1003 ¶¶ 32–36, 90–97).

Patent Owner responds that Petitioner's references to GSM 05.02 show that the '480 patent, by itself, does not disclose the claimed frequency hopping techniques. Prelim. Resp. 20. Patent Owner further argues that, because it lacks the dedicated memory and supporting components that the '408 patent describes for performing frequency hopping, the '480 patent lacks an enabling disclosure of frequency hopping. *Id.* at 20–23. As to

Petitioner's contention regarding the knowledge of GSM 05.02 a skilled artisan would have brought, Patent Owner argues that the mapping structure described in the '480 patent could not have generated the frequency hopping sequence described in GSM 05.02 simply through programming. *Id.* at 23–26.

For purposes of this decision, we credit Dr. Stark's testimony (Ex. 1003 ¶ 90) that the '480 patent's reference (Ex. 1006, 5:9–16) to the GSM frequency hopping standard would have been understood by a skilled artisan to be a direct reference to GSM 05.02. We also credit Dr. Stark's testimony that GSM 05.02 describes an algorithm for "changing from a first of said physical RF channels upon which said mobile subscribers communicate with said basestation to a second of said physical RF channels, while maintaining a same logical channel," as recited in claim 1, and that a basestation complying with the GSM frequency hopping standard (e.g., the basestation described in the '480 patent) would have implemented the algorithm. Ex. 1003 ¶¶ 91–97. In light of this evidence, Petitioner has made a threshold showing that, when in compliance with the GSM frequency hopping standard, the '480 patent's controller and circuitry would have been programmed to change from a first physical RF channel to a second physical RF channel while maintaining a same logical channel, as recited in claim 1.

Regarding claims 2–10 and 12–16, we have reviewed the evidence and argument in the Petition, including the claim charts and Dr. Stark's testimony, and are persuaded that Petitioner has made a threshold showing that the additional limitations of these claims are disclosed in the '480 patent. Accordingly, on this record, Petitioner has shown a reasonable

likelihood that it would prevail with respect to claims 1–10 and 12–16 as anticipated by the ’480 patent.

Regarding claim 11, Petitioner argues that the ’480 patent teaches accommodating different air interfaces, including those, such as the IS-95A standard, that require the use of a GPS signal for a basestation’s timing. Pet. 27–28. Petitioner argues that, in light of this, a skilled artisan would have understood that a GPS receiver could be used to effect synchronization in the basestation of the ’480 patent. *Id.* at 28. We are not persuaded. As explained above, for claim 1, Petitioner argues that the basestation of the ’480 patent is configured for a GSM frequency hopping air interface. Petitioner, however, does not introduce persuasive evidence that the ’480 patent’s basestation, configured for a GSM air interface, nevertheless necessarily would have derived timing from a GPS receiver in conformance with a different interface standard. Yet, that is, evidently, the underlying premise of Petitioner’s anticipation ground as to claim 11. Accordingly, Petitioner has not shown a reasonable likelihood that it would prevail with respect to claim 11 as anticipated by the ’480 patent.

D. Obviousness Over the ’480 Patent, the ’435 Patent, and GSM 05.02

Petitioner contends that claims 1–16 would have been obvious over the ’480 patent, the ’435 patent, and GSM 05.02. Pet. 35–42. Petitioner raises this ground “[t]o the Extent the Board disagrees that the frequency hopping features of GSM as described in Ground 1 [anticipation by the ’480 patent] would be understood by a [person of ordinary skill in the art] from the teachings of the ’480 patent.” Pet. 36. Petitioner provides explicit

citations to GSM 05.02 for claims 1, 2, and 4, and refers to its evidence of anticipation to show obviousness of claims 5–16. Pet. 39–42. Petitioner contends that a skilled artisan would have combined the '480 patent and GSM 05.02 because the '480 patent expressly references frequency hopping standards such as GSM. *Id.* at 38.

Patent Owner responds that the '480 patent is incapable of supporting frequency hopping, GSM 05.02 provides only a desired outcome and mathematical description of a frequency-hopping algorithm, and GSM 05.02 does not show how the '480 patent could be transformed into a system that would support frequency hopping. Prelim. Resp. 26–27. We are not persuaded by Patent Owner's argument. The '480 patent states that its described basestation supports frequency hopping standards such as GSM. Ex. 1006, 5:9–17. As explained above, for purposes of this decision, we credit Dr. Stark's testimony that GSM 05.02 describes a frequency hopping algorithm that would have been implemented as part of the '480 patent's basestation.

For the reasons given above, Petitioner has made a threshold showing that each of the limitations of claims 1–10 and 12–16 is taught in the '480 patent and GSM 05.02. Petitioner also has articulated a reason to combine that has rational underpinning. *See In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness").

Regarding claim 11, Petitioner argues that a skilled artisan would have understood that a GPS receiver could have been used to effect

synchronization, citing to Dr. Stark's testimony. Pet. 28 (citing Ex. 1003 ¶¶ 38, 109). According to Dr. Stark, GPS was well-known and available globally and a skilled artisan would have found it ordinary and commonplace to derive timing from GPS signals. Ex. 1003 ¶ 38. On this record, Petitioner has made a threshold showing that the additional limitation of claim 11 is taught in the '480 patent and GSM 05.02.

The '435 patent also is assigned to Patent Owner. Petitioner contends that the '435 patent provides further details regarding digital channelizers and combiners in basestations, including dynamic mapping of digital channelizer outputs to DSP inputs (Pet. 36–38) and cites the '435 patent as further evidence of the obviousness of claims 3 and 4 (*id.* at 41–42). Petitioner argues that a skilled artisan would have combined the '435 patent with the '480 patent and GSM 05.02 because the '435 and '480 patents share a common assignee and are both directed to frequency hopping in cellular communication. *Id.* at 38. Because we are persuaded that the '480 patent and GSM 05.02 teach the limitations of claims 3–16, a combination that includes the '435 patent also teaches these limitations.

In sum, Petitioner has shown a reasonable likelihood that it would prevail with respect to claims 1–16 as obvious over the '480 patent, the '435 patent, and GSM 05.02.

E. Anticipation by the '729 Patent

Petitioner contends that the '729 patent anticipates claims 1–4. Pet. 42–45. The '729 patent describes a frequency-hopping basestation for use in a GSM system. Ex. 1008, Abstract; 3:49–53. Figures 2, reproduced below, illustrates an example:

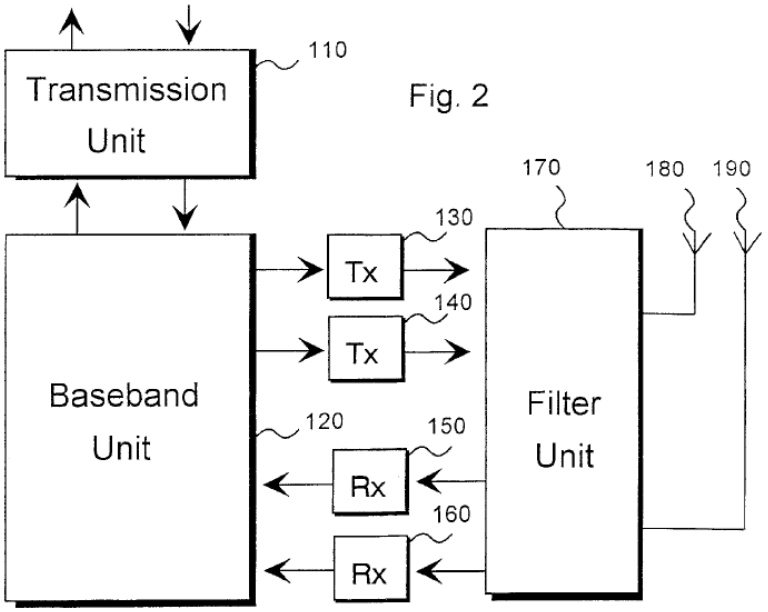

Figure 2 is a block diagram of a base station. *Id.* at 3:38. The base station includes multiple transmitter units 130, 140 and multiple receiver units 150, 160. *Id.* at 4:1–3. According to the '729 patent, these transmitter and receiver units "operate on a broadband basis, which means that they are able to process several narrowband signals. However, the frequency band of an individual transmitter or receiver unit is narrower than the entire frequency band of the base station." *Id.* at 4:2–8. The transmitter and receiver units interface with baseband unit 120.

Figure 3, reproduced below, illustrates baseband unit 120 in further detail:

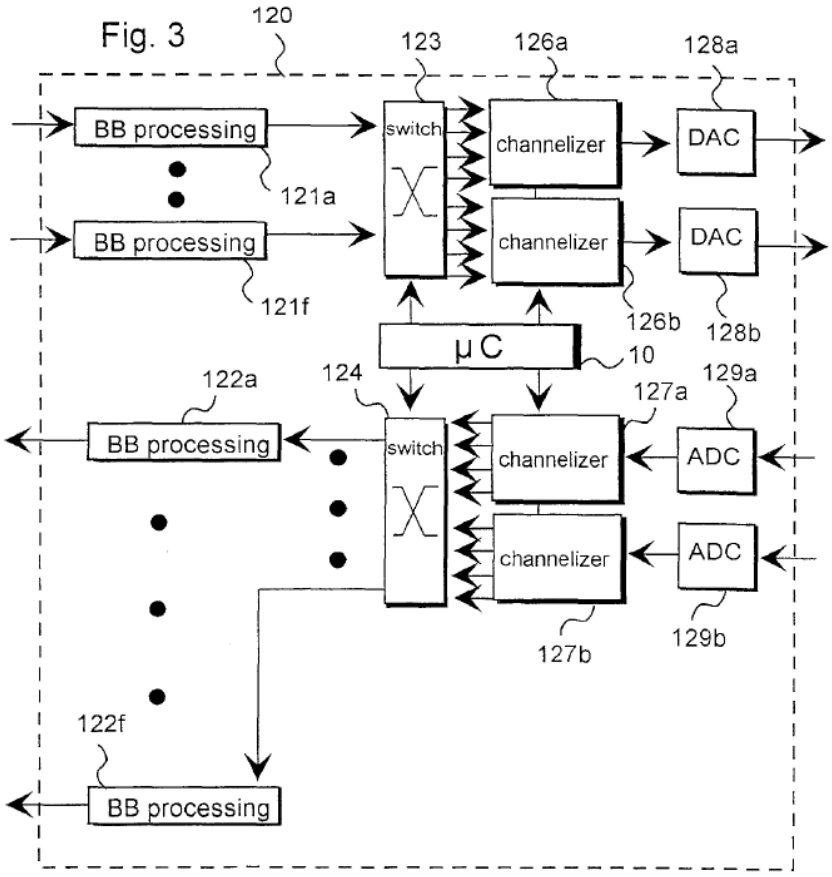

Figure 3 is a block diagram of baseband unit 120 of the basestation shown in Figure 2. *Id.* at 3:39. In the direction of the base station receiving data from mobile stations, analog-to-digital converters ("ADCs") 129a, 129b receive analog broadband signals from receiver units 150, 160 and convert them into digital signals. *Id.* at 5:8–16. Channelizers 127a, 127b separate the broadband signals into individual channels. *Id.* at 4:57–62. Controller 10 controls switching means 124 to route the channels to baseband processing means 122a–122f according to a frequency hopping sequence. *Id.* at 5:17–30. Switching means 124 can be a time-switched bus. *Id.* at 5:61–65.

Petitioner contends that channelizers 127a, 127b in conjunction with the switching means 124 perform "changing from a first of said physical RF

channels upon which said mobile subscribers communicate with said basestation to a second of said physical RF channels, while maintaining a same logical channel," as recited in claim 1. Pet. 44. Patent Owner responds that the '729 patent's description of "means of cooperation of the switching means and the channeling means" (Ex. 1008, 4:64–65) does not disclose this limitation and argues that Petitioner has not provided any explanation of how this disclosure meets the claim language. Prelim. Resp. 30–32.

We agree with Patent Owner. The passage of the '729 patent cited by Petitioner does not disclose explicitly "changing from a first of said physical RF channels upon which said mobile subscribers communicate with said basestation to a second of said physical RF channels, while maintaining a same logical channel," as recited in claim 1. The Petition cites, without explanation or argument, to Dr. Stark's testimony, for support. Pet. 44 (citing Ex. 1003 ¶¶ 144–48). Dr. Stark testifies that a person of ordinary skill in the art would understand from the '729 patent's description of a GSM example that the '729 patent discloses changing from one physical channel to another while maintaining a same logical channel. Ex. 1003 ¶ 148 (citing Ex. 1012 § 6). In the absence of argument or explanation in the Petition, Petitioner's citation to Dr. Stark's testimony is an improper incorporation by reference of argument from Dr. Stark's declaration into the Petition. *See* 37 C.F.R. § 42.6(a)(3) ("Arguments must not be incorporated by reference from one document into another document."). Thus, we do not consider Dr. Stark's testimony on this issue.

In sum, we are not persuaded that Petitioner is likely to show that the '729 patent discloses "changing from a first of said physical RF channels

upon which said mobile subscribers communicate with said basestation to a second of said physical RF channels, while maintaining a same logical channel," as recited in claim 1. Accordingly, Petitioner has not shown a reasonable likelihood that it would prevail with respect to claim 1 and its dependent claims 2–4 as anticipated by the '729 patent.

F. Obviousness Over the '602 Patent, the '713 Patent, and Steele

Petitioner contends that claims 1–16 would have been obvious over the '602 patent, the '713 patent, and Steele. Pet. 45–57. Petitioner cites both the '602 and '713 patents as teaching "operating a broadband transceiver using a plurality of transceiver RF frequencies, each of which represents one of said physical RF channels," as recited in claim 1. Pet. 50. Steele is not cited for this limitation. *See id.* Patent Owner contends that neither the '602 patent nor the '713 patent teaches frequency hopping using a broadband transceiver. Prelim. Resp. 33–35.

The '602 patent describes frequency hopping in radio transmitter and receiver systems. Ex. 1010, Abstract. According to the '602 patent, the invention is directed to "a radio transceiver for transmitting at least one outbound signal in at least two transmitting frequencies, which frequencies vary in accordance with a predetermined frequency-hopping sequence." *Id.* at 1:66–2:3. Petitioner contends that this description teaches "operating a broadband transceiver using a plurality of transceiver RF frequencies, each of which represents one of said physical RF channels," as recited in claim 1. Pet. 50. Petitioner does not provide any argument explaining why its cited evidence meets this claim limitation. Petitioner cites to the testimony of Dr. Stark. *Id.* (citing Ex. 1003 ¶ 171). However, Dr. Stark cites to a

different portion of the ’602 patent (Ex. 1010, 3:17–19) and does not explain how either citation teaches the claim limitation. Ex. 1003 ¶ 171.

As Patent Owner points out (Prelim. Resp. 33), the ’602 patent explains that “[t]he basic idea of the invention is that a separate dedicated fixed-frequency transmitter or receiver is provided for each transmitting or receiving frequency.” Ex. 1010, at 2:17–19. To carry out frequency hopping, “the frequency of an outbound signal is caused to hop in accordance with a predetermined hopping algorithm by switching a baseband signal to the different transmitters in sequence. Signals from the fixed-frequency transmitters are combined to a transmitting antenna by a combiner circuit.” *Id.* at 2:21–27. The ’602 patent further explains that “[i]n a GSM system, each transceiver is full-duplex, and the duplex spacing between its receiving and transmitting RF frequencies is 45MHz,” and that the transceivers of the preferred embodiment, transceivers 6a to 6c (shown in Figure 1), “have mutually different fixed transmitting and receiving frequencies.” *Id.* at 3:13–20. Thus, the ’602 patent makes clear that each transceiver transmits at a single, fixed frequency and receives at a single, fixed frequency (although the transmit and receive frequencies might be different).

Patent Owner argues that the set of single-frequency transceivers described in the ’602 patent is not a broadband transceiver. Prelim. Resp. 33–34. We agree. As explained in Section II.B.1, a broadband transceiver does not include a set of single-frequency transceivers.

The ’713 patent describes a circuit for providing frequency hopping in a TDMA system. Ex. 1009, Abstract. The ’713 patent describes a basestation that transmits and receives mobile communications using a

plurality of transceivers (shown as transceivers 14–17 in Figure 1). Ex. 1009, 1:67–2:6. According to the '713 patent,

> In a typical system, each transceiver, e.g., 14, will transmit radio frequency (RF) signals to and receive RF signals from a number of mobile end users, e.g., 18. . . . The channel control unit, e.g., 10, will determine what frequency to be used for each user in each frame and direct baseband signals to the appropriate transceiver adapted to the desired frequency.

Id. at 2:6–16. Petitioner cites this disclosure, as well as Figure 2, as teaching a broadband transceiver. Pet. 49–50.

Patent Owner responds that the '713 patent does not teach a broadband transceiver. Prelim. Resp. 34. Instead, Patent Owner points out, the '713 patent explains that "[a] plurality of transceivers is coupled [on] the bus, each transceiver adapted to transmit and receive on a single carrier frequency messages assigned to specific time slots corresponding to that transceiver." *Id.* (quoting Ex. 1009, 1:48–52). Rather than changing physical RF channels in a broadband transceiver, Patent Owner argues, the '713 patent describes that "the frequency to a particular user will vary by altering the transceiver which transmits to that user, recalling that each transceiver is fixed at a specific frequency." Prelim. Resp. 35 (quoting Ex. 1009, 4:36–39). We further note that the '713 patent explains the following, with reference to Figure 2:

> A plurality of transceivers, four of which are shown as 50–53 [of Figure 2], are also coupled to the TRX bus. Each transceiver, e.g., 50, is adapted to transmit and receive RF signals between the base station and a multiplicity of users (typically eight), e.g., 54. *Each transceiver is tuned to a single frequency*.

Ex. 1009, 2:66–3:3 (emphasis added).

As with the ’602 patent, the ’713 patent describes transmitting and receiving with a plurality of single-frequency transceivers. As explained in Section II.B.1, a broadband transceiver does not include a set of single-frequency transceivers.

As noted above, Petitioner does not cite Steele as teaching a broadband transceiver. *See* Pet. 48–51. Because none of the ’602 patent, the ’713 patent, and Steele teaches “a basestation having a broadband transceiver” or “operating said broadband transceiver,” as recited in claim 1, we are persuaded that the combination of these references would not have rendered claim 1 or its dependent claims obvious.

Accordingly, Petitioner has not shown a reasonable likelihood that it would prevail with respect to claims 1–16 as obvious over the ’602 patent, the ’713 patent, and Steele.

G. Obviousness Over the ’480 Patent, the ’713 Patent, GSM 05.02, GSM 05.10, and Komara

Petitioner contends that claims 1 and 11 would have been obvious over the ’480 patent, the ’713 patent, GSM 05.02, GSM 05.10, and Komara for the reasons given in the claim charts for Ground 2 (obviousness over the ’480 patent and GSM 05.02) and Ground 4 (obviousness over the ’602 patent, the ’713 patent, and Steele) along with additional disclosure from Komara. Pet. 58–59. Regarding the remaining claims (2–10 and 12–16), Petitioner contends that they “are obvious at least for the reasons described above for Grounds 1, 2, and 4, taken together” with the disclosure in Komara cited for claim 1. *Id.* at 58.

The claim chart for Ground 2, in turn, incorporates the claim chart for Ground 1 (anticipation by the '480 patent). The claim chart for Ground 4 relies on the '602 patent and Steele, which are not asserted in its allegations of obviousness over the '480 patent, the '713 patent, GSM 05.02, GSM 05.10, and Komara. Moreover, for claims 13 and 15, the claim chart for Ground 4 incorporates the claim chart for Ground 2. Petitioner, however, has not explained sufficiently the particular evidence from the various claim charts it contends teaches the various limitations of the challenged claims.

On this record, we are unable to discern how Petitioner is applying the '480 patent, the '713 patent, GSM 05.02, GSM 05.10, and Komara to the claims of the '408 patent. Accordingly, Petitioner has not shown a reasonable likelihood that it would prevail with respect to claims 1–16 as obvious over the '480 patent, the '713 patent, GSM 05.02, GSM 05.10, and Komara.

III. CONCLUSION

We institute an *inter partes* review of claims 1–16. The Board has not yet made a final determination of the patentability of these claims or the construction of any claim term.

IV. ORDER

For the reasons given, it is

ORDERED that *inter partes* review is instituted as to claims 1–16 on the following grounds:

(1) Claims 1–10 and 12–16 under 35 U.S.C. § 102(b) as anticipated by the ’480 patent; and

(2) Claims 1–16 under 35 U.S.C. § 103(a) as obvious over the ’480 patent, the ’435 patent, and GSM 05.02.

No other ground is authorized; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(a), *inter partes* review of the ’408 patent is hereby instituted commencing on the entry date of this Order, and pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial.

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