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Paper 10
Date Entered: June 10, 2015

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

KYOCERA CORPORATION, and
KYOCERA COMMUNICATIONS, INC.,
Petitioner,

v.

ADAPTIX, INC.,
Patent Owner.

Case IPR2015-00318
Patent 7,454,212 B2

Before GLENN J. PERRY, TREVOR M. JEFFERSON, and
JUSTIN BUSCH, *Administrative Patent Judges*.

PERRY, *Administrative Patent Judge*.

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

INTRODUCTION

A. Background

Kyocera Corporation and Kyocera Communications Inc. (collectively, "Petitioner") filed a Petition (Paper 1, "Pet.") requesting an *inter partes* review of claims 1, 8–13, 15, 18, 19, and 23–29 of U.S. Patent No. 7,454,212 B2 (Ex. 1003, "the '212 patent"). Adaptix, Inc. ("Patent Owner") filed a Preliminary Response. Paper 6 ("Prelim. Resp."). We have jurisdiction under 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted unless "the information presented in the petition . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." *See* 37 C.F.R. § 42.108(c). For reasons that follow, we deny the petition.

B. Related Proceedings

Petitioner indicates that the '212 patent is involved in numerous lawsuits pending in district courts in Texas and California. Pet. 1–2. The '212 patent is also involved in Case IPR2014-01525 (Decision to Institute April 8, 2015) brought by a different Petitioner. The '212 patent was involved in Case IPR2014-01408 brought by a different Petitioner and which was terminated prior to a decision on its Petition.

THE ’212 PATENT

A. The Invention

The ’212 patent describes a particular technique[1] for adaptive channel allocation of subcarriers of an orthogonal frequency division multiple access (OFDMA) cellular communications system including multiple base stations and multiple subscriber units. Ex. 1003, Abstract. It is described as a “distributed, reduced-complexity approach.” *Id.* at 3:4–5. Each subscriber unit uses pilot symbols received from its subcarrier allocating base station to measure “channel and interference information” for available subcarriers. *Id.* at Abstract. The ’212 patent specification describes as an example that the “channel and interference information” can be determined by measuring a “signal-to-interference plus noise ratio (SINR)”. *Id.* at 3:21. A subscriber unit making measurements selects “candidate subcarriers.” *Id.* at Abstract. An allocating base station receives a list of the “candidate subcarriers” and, based on additional information, prunes the set of “candidate subcarriers” to a smaller subset of “selected subcarriers.” The subscriber unit, after receiving the “selected subcarriers” provides “additional feedback” to the base station which updates its subcarriers for communicating with the base station. *Id.*

B. Illustrative Claims

Among the challenged claims, Independent claims 1 and 18, both reproduced below, are illustrative.

> 1. A method for subcarrier selection for a system employing orthogonal frequency division multiple access

[1] From the list of references and citations in those references, there appear to be many different techniques for dynamic channel allocation.

(OFDMA) comprising:

a subscriber unit measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station;

the subscriber unit selecting a set of candidate subcarriers;

the subscriber unit providing feedback information on the set of candidate subcarriers to the base station;

the subscriber unit receiving an indication of subcarriers of the set of subcarriers selected by the base station for use by the subscriber unit; and

the subscriber unit submitting updated feedback information, after being allocated the set of subcarriers to be allocated an updated set of subcarriers, and thereafter the subscriber unit receiving another indication of the updated set of subcarriers.

18. An apparatus comprising:

a plurality of subscriber units in a first cell operable to generate feedback information indicating clusters of subcarriers desired for use by the plurality of subscriber units; and

a first base station in the first cell,

the first base station operable to allocate OFDMA subcarriers in clusters to the plurality of subscriber units;

each of said plurality of subscriber units to measure channel and interference information for the plurality of subcarriers based on pilot symbols received from the first base station and at least one of the plurality of subscriber units to select a set of candidate subcarriers from the plurality of subcarriers, and

said at least one subscriber unit to provide feedback information on the set of candidate subcarriers to the base station and to receive an indication of subcarriers from the set of subcarriers selected by the first base station for use by the at least one subscriber unit, and wherein the subscriber unit submits updated feedback information after being allocated the set of subscriber units to receive an updated set of subcarriers and thereafter receives another indication of the updated set of subcarriers.

C. Asserted Grounds of Unpatentability

Petitioner asserts the following challenges under 35 U.S.C. § 103(a) against claims 1, 8–13, 15, 18, 19, and 23–29 (Pet. 5).

Prior Art	Claim(s)
Frodigh[2] and Sollenberger[3]	1, 8, 11–13, 18, 19, 23, and 26–28
Frodigh, Sollenberger, and Ritter[4]	1, 8–13, 15, 18, 19, 23–27, and 29
Frodigh and Chuang[5]	1, 8, 11–12, 18, 23, and 26–28
Frodigh, Chuang, and Ritter	1, 8–12, 15, 18, 23–27, and 29

[2] U.S. Patent No. 5,726,978, Mar. 10, 1998 (Ex. 1004, "Frodigh").
[3] U.S. Patent No. 6,052,594, Apr. 18, 2000 (Ex. 1005, "Sollenberger")
[4] DE 19800953 C1, July 29, 1999. The parties refer to Exhibit 1006 as "Ritter," which is an English translation of DE 19800953 C1. The German patent document has been entered as Exhibit 1015.
[5] J. C-I Chuang, N. R. Sollenberger, and D. C. Cox, *A Pilot Based Dynamic Channel Assignment Scheme for Wireless Access TDMA/FDMA Systems*, 2 1993 2ND IEEE INT'L CONF. ON UNIVERSAL PERSONAL COMMC'NS 706–712 (1993). Exhibit 1007 ("Chuang").

Prior Art	Claim(s)
Alamouti[6], Minegishi[7], and Ritter	1, 8–13, 15, 18, 19, 23–26, and 29

CLAIM CONSTRUCTION

A. Claim Interpretation

In an *inter partes* review, the Board construes claim terms in an unexpired patent using their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,764 (Aug. 14, 2012).

Petitioner submitted various claim term constructions adopted by the District Court in related litigation. Pet. 7–13. Patent Owner indicated agreement with certain of those terms. *See* Prelim. Resp. 6–9.

B. "pilot symbol" (claims 1 and 18)

Patent Owner agrees with the meaning of "pilot symbols" articulated by the District Court in related litigation as "symbols, sequences, or signals known to both the base station and subscriber." Prelim. Resp. 9, Ex. 1013, 17. According to the '212 specification,

> Referring to FIG. 1B, each base station periodically broadcasts pilot OFDM symbols to every subscriber within its cell (or sector) (processing block **101**). The pilot symbols, often referred to as a sounding sequence or signal, are known to both the base station and the subscribers. In one embodiment, each pilot symbol covers the entire OFDM frequency bandwidth. The pilot symbols

[6] U.S. Patent 5,933,421, Aug. 3, 1999 (Ex. 1008, "Alamouti").
[7] U.S. Patent 6,072,988, June 6, 2000 (Ex. 1009, "Minegishi").

> may be different for different cells (or sectors). The pilot symbols can serve multiple purposes: time and frequency synchronization, channel estimation and signal-to-interference/noise (SINR) ratio measurement for cluster allocation.

Ex. 1003, 5:32–42. We agree with the District Court construction and adopt it.

C. "channel and interference information" (claims 1 and 18) and "SINR" (claim 19)

The parties have not proposed a construction of "channel and interference information" appearing in claims 1 and 18. The parties do, however, propose different constructions for "SINR" appearing in claim 19, which depends from claim 18. We construe "SINR" in dependent claim 19 to be a more specific characterization of "channel and interference information," recited in claim 18.

Patent Owner agrees with the meaning of "SINR" articulated by the District Court as "signal-to-interference-plus-noise ratio." Ex. 1010, 23. Patent Owner notes that the specification expressly defines the term SINR as "signal-to-interference-plus-noise ratio." Ex. 1003, 3:21.

Petitioner asserts that, despite the District Court's construction of SINR to mean "signal-to-interference-plus-noise ratio," the Board should construe SINR to mean "signal-to-interference-plus-noise ratio and related measures such as signal-to-interference ratio (SIR or S/I), carrier-to-interference-plus-noise ratio (C/(I+N)), and carrier-to-interference ratio (C/I)." Pet. 9. To support this assertion, Petitioner reasons that "[b]ecause, the 'noise' is fixed while the interference is variable and often substantially larger than noise, the terms 'signal-to-interference ratio' (SIR or S/I, or C/I, where C stands for ‘carrier,’ which is equivalent to ‘signal’) and ‘signal-to-interference-plus-noise-ration’ (SINR) can be broadly used interchangeably.” *Id.*

We are not persuaded by Petitioner to adopt Petitioner’s proposed equivalence of these ratios, each of which appears to have a clear meaning on its own. While there may be situations (e.g., noise fixed) in which two different measurements provide the same result, there is no reason to adopt a sweeping equivalence.

Based on the literal claim language and the doctrine of claim differentiation, we construe “channel and interference information” (appearing in independent claims 1 and 18) to be broader than the term “SINR.” “Channel and interference information” is not defined in the ’212 patent specification and there is no evidence presented that it is a term of art. For purposes of this opinion, we construe the term as including various measurements that characterize a channel’s signal strength and interference. SINR is a specific example of such a characterization. *See* Ex. 1003, 3:21.

D. Preamble (claim 1)

Petitioner argues that the preamble of claim 1 should not be regarded as limiting it to OFDMA. Pet. 10. Patent Owner argues that the preamble should be limiting for three reasons: 1) claim 1 should be differentiated from claim 32; 2) the ’212 patent specification describes enabling subcarrier selection in a cellular system; and 3) the preamble provides context for understanding the measuring step of claim 1. Prelim. Resp. 6–7.

For purposes of this decision we do not regard the preamble limitation “OFDMA” to be limiting. First, there is no need for the claim 1 preamble to differentiate from claim 32 — as there are differences between these claims other than the OFDMA limitation in the preamble of claim 1. Second, there is no persuasive evidence of record that the steps described by the body of claim 1 can not be carried out in a cellular system that is not OFDMA. Third, there is no persuasive evidence in the record thus far that the measuring step of claim 1 only makes sense in an OFDMA system. Such evidence may be presented at trial, but is not presently in the record. Thus, for purposes of this decision, we regard claim 1 as not being limited to OFDMA.

REFERENCES AND ARGUMENTS

A. Frodigh and Sollenberger

Petitioner submits that the subject matter of claims 1, 8, 11–13, 18, 19, 23, and 26–28 would have been obvious over the combination of Frodigh and Sollenberger. Petitioner provides a detailed analysis of each of the claims, applies the prior art, and relies on the testimony of Nicholas Bambos, Ph.D. Pet. 13–36; Exhibit 1012. Petitioner relies on the same portions of Frodigh and Sollenberger with respect to both independent claims 1 and 18. Pet. 14–16, 33. For both claims 1 and 18, Petitioner relies upon Frodigh for all claim features except for the claim limitation requiring channel and interference measurements based on pilot symbols received from a base station. For this feature, Petitioner relies upon Sollenberger. *See e.g.*, Pet. 15.

1. Frodigh

Frodigh describes a method and system of adaptive channel allocation (ACA) in an orthogonal frequency division multiplexed (OFDM) system to lower co-channel interference between cells. Ex. 1004, 4:25–31. Frodigh Fig. 2 is reproduced below.

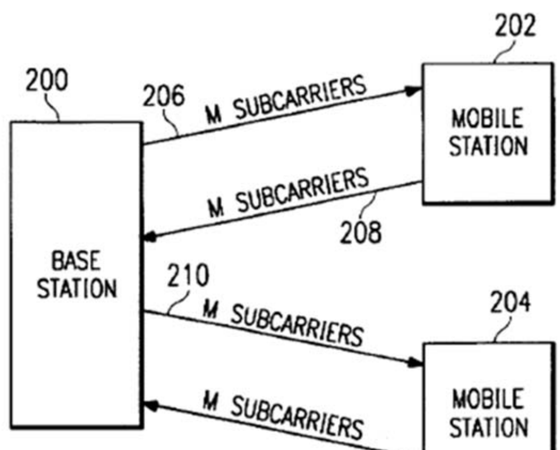
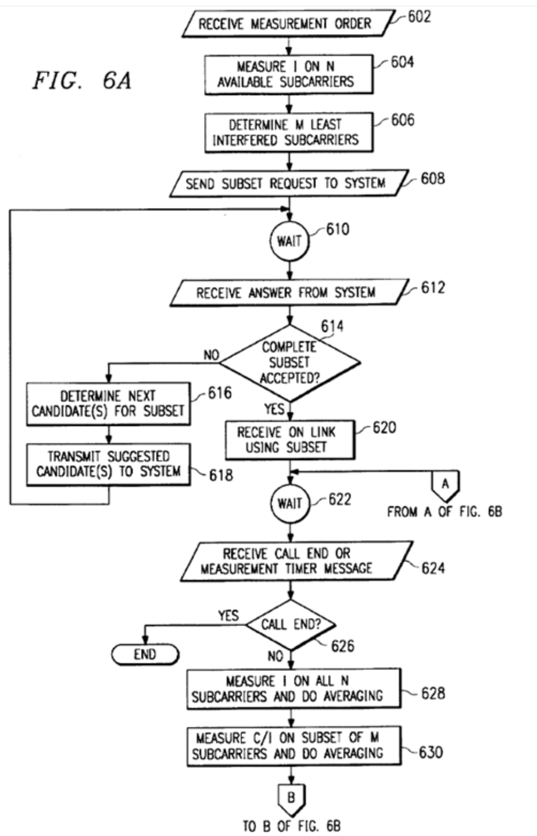


FIG. 2

Frodigh Figure 2 illustrates allocation of subcarriers in an orthogonal frequency division multiplexed system. Ex. 1004, 5:30–33. Base station 200 communicates with mobile station 202 over downlink 206 and uplink 208. Base station 200 also communicates with mobile station 204 over downlink 210 and uplink 212. Transmissions on links 206, 208, 210 and 212 are made over the system RF channel. Voice and data to be transmitted on each link are modulated onto a number (M) of subcarriers. Each link 206, 208, 210 and 212, within the cell uses a separate subset of M subcarriers. Particular subcarriers may only be used for one link at a time within a cell. Ex 1004, 7:51–63.

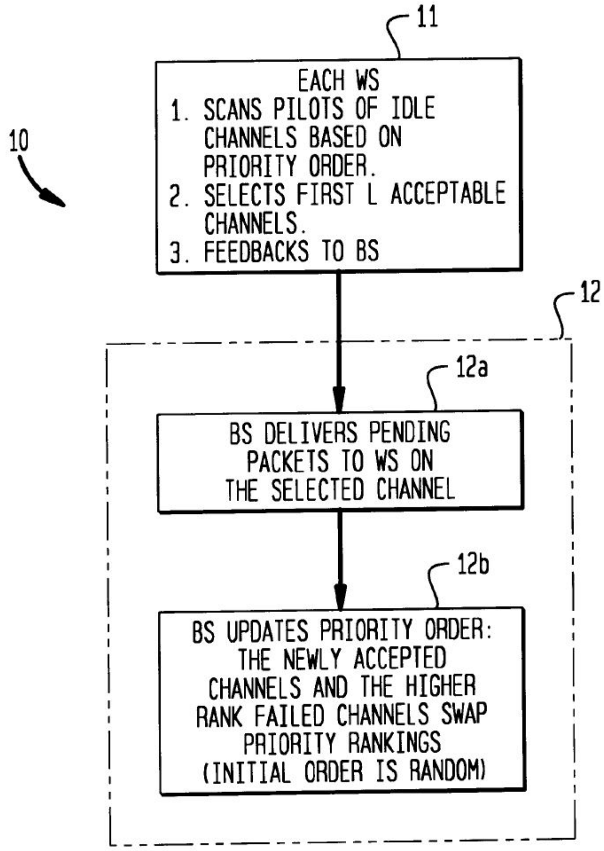
An initial subset of M subcarriers is chosen from a larger group of N subcarriers. *Id.* at 4:50–51. As communications take place on the M subcarriers, a mobile station periodically measures signal quality level (C/I) of the M subcarriers and the interference level (I) of all N available subcarriers. *Id.* at 4:56–59. If it is determined that a more preferred unused subcarrier exists the system reconfigures the subset of M subcarriers to include the unused subcarrier. *Id.* at 4:62–67. An embodiment of Frodigh's subcarrier substitution is illustrated in its Figure 6A, reproduced below.



Petitioner points to steps 628 and 630 of Frodigh Figure 6A. These steps indicate that a mobile station measures interference on all N subcarriers and measures C/I on subset M of the subcarriers. Pet. 14.

2. Sollenberger

Sollenberger describes dynamically assigning channels for wireless packet communications. Ex. 1005, [57] (Title). Sollenberger Figure 1 is reproduced below.



Sollenberger's Figure 1 is a flow diagram showing an overview of its subcarrier assignment process. Ex. 1005, 7:16–17. A paging message is transmitted from a base station to a wireless station when a data packet is received for downlink transmission to the wireless station. "In response to the paging message, a level of each of a plurality of pilot frequency signals is detected at the wireless station. Each pilot frequency corresponds to a downlink traffic channel and is transmitted by base stations to which the downlink traffic channel is assigned." *Id.* at 6:63–66. The wireless station generates a list of preferred traffic channels based on a priority order of traffic channels and on detected levels of the pilot frequency signals, and transmits the list to the associated base station (reference numeral 11, item 3) which assigns a downlink traffic channel (reference numeral 12a). Ex. 1005, Abstract, Figure 1.

3. Combination of Frodigh and Sollenberger

Petitioner relies upon Sollenberger with respect to limitations of claims 1 and 18 requiring channel measurements based on pilot symbols from a base station. Pet. 15.

Patent Owner distinguishes between "channel information" and "interference information" and argues that Sollenberger measures only "interference information." Prelim. Resp. 16–17. Given our construction of "channel and interference information" we are not persuaded by this argument.

However, we do find persuasive Patent Owner's argument that Sollenberger does not describe measuring channel and interference information based on pilot symbols transmitted from a base station that is the same as the allocating base station. Prelim. Resp. 15–19.

Sollenberger states:

> In response to the paging message, a level of each of a plurality of pilot frequency signals is detected at the wireless station. Each pilot frequency signal corresponds to a downlink traffic channel and is transmitted by base stations to which the downlink traffic channel is assigned.

Ex. 1005, 6:63–66. Sollenberger further states:

> According to the invention, a wireless station, such as a mobile station or wireless terminal, performs interference measurements for determining acceptable channels, from the point of view of the wireless station, after the wireless station has been informed by a base station of pending data packets for delivery to the wireless station. The wireless station scans a pilot signal frequency band using

> fast Fourier transform (FFT) technique for detecting pilot signals that respectively correspond to channels that are currently being used for downlink transmission. A feedback channel is then used for informing a base station of acceptable channels. To avoid more than one wireless station in the same cell from selecting the same acceptable channel, a list of more than one acceptable channel is provided by the wireless station.

Id. at 7:60–8:7.

According to Patent Owner, Sollenberger measures power on subcarriers only to assess interference (power generated by interfering transmissions). Prelim. Resp. 15–16 (citing to Ex. 1005, 9:7–11). Given our construction of "channel and interference information" Sollenberger measures channel and interference information. However, Sollenberger's measurements are made in response to paging signals and are carried out by listening to the pilot frequencies for competing downlink traffic. Sollenberger does not suggest making measurements based on the "pilot symbols" transmitted by the allocating base station. Rather, Sollenberger measures signal levels that are present on "pilot frequencies" that would interfere with use of those frequencies.

The record does not establish that Sollenberger bases its measurements on "pilot symbols" from the allocating base station as claims 1 and 18 require.

Petitioner does not rely on Sollenberger as describing an OFDMA system. Petitioner acknowledges that Frodigh does not explicitly describe an OFDMA system. Petitioner relies on Dr. Bambos' declaration testimony to establish that one of ordinary skill would regard Frodigh as describing OFDMA. Pet. 13.

Dr. Bambos testifies that one of ordinary skill would understand that Frodigh teaches OFDMA. His logic in arriving at this conclusion is essentially 1) the ’212 patent states that OFDMA is another method for multiple access using the basic format of OFDM (Ex. 1012, 33 (citing Ex. 1003, 2:39–43)); 2) Frodigh teaches an OFDM system adapted for multiple mobile stations (*Id.* (citing Ex. 1004, 4:25–31, Fig. 2, 202 and 204)); and 3) multiple mobile stations use different subcarriers at the same time (*Id.* (citing Ex. 1004, 7:51–63, Fig. 2, 206, 208, 210 and 212)). Therefore, Dr. Bambos concludes, one of ordinary skill in the art would conclude that Frodigh teaches an OFDMA system.

We do not find this logic to be persuasive. It is inappropriate for Dr. Bambos to rely on the ’212 patent itself to argue what Frodigh teaches. In addition, there are ways other than OFDMA to make an OFDM modulation scheme available to multiple subscribers (*e.g.* TDMA). For at least these reasons, we are not persuaded that Frodigh teaches OFDMA.

Recognizing the potential weakness that neither Frodigh nor Sollenberger describes an OFDMA system, Petitioner proposes a “Ground 2” challenge that includes Ritter (see below), which describes an OFDMA system.

Because neither Frodigh nor Sollenberger describe an OFDMA system as required by independent claim 18, we decline to grant the Petition as to independent claim 18 and its dependent claims 19, 23, and 26–28 based only on Frodigh and Sollenberger.

Accordingly, we determine that Petitioner has not established a reasonable likelihood of prevailing in establishing that claims 1, 8, 11–13, 18, 19, 23, and 26–28 are unpatentable as obvious over Frodigh and Sollenberger.

B. Frodigh, Sollenberger, and Ritter

Petitioner submits that the subject matter of claims 1, 8–13, 15, 18, 19, 23–27, and 29 would have been obvious over the combination of Frodigh, Sollenberger, and Ritter. Petitioner submits a detailed analysis of each of the claims, applies the prior art, and relies on the testimony of Professor Nicholas Bambos. Pet. 13–36 (discussing Frodigh and Sollenberger) and Pet. 36–42 (including discussion of Ritter); Exhibit 1012.

The only substantial difference between this challenge and the one above relying only on Frodigh and Sollenberger is that Ritter is cited for its teaching of OFDMA. *See* "Ground 2" claim chart at Pet. 36–37. Petitioner does not rely upon Ritter regarding measurement of channel and interference information based on pilot symbols from an allocating base station. Thus, the addition of Ritter does not overcome the insufficiency of Sollenberger's teaching noted above.

The addition of Ritter does not overcome the deficiencies noted with respect to claim 1, above. These deficiencies also apply to claim 18.

Accordingly, we determine that Petitioner has not established a reasonable likelihood of prevailing in establishing that claims 1, 8–13, 15, 18, 19, 23–27, and 29 are unpatentable as obvious over Frodigh, Sollenberger, and Ritter.

C. Frodigh and Chuang

Petitioner submits that the subject matter of claims 1, 8, 11–12, 18, 23, and 26–28 would have been obvious over the combination of Frodigh and Chuang. Petitioner provides a claim chart (Pet 42) that discusses Chuang only with respect to the "pilot symbol" limitation. Petitioner also relies on the testimony of Professor Nicholas Bambos. Pet. 42–44; Exhibit 1012.

1. Chuang

Chuang is an article describing pilot-based dynamic channel assignment in a TDMA[8] system. Ex. 1007, Title.

2. Combination of Frodigh and Chuang

Petitioner relies upon Chuang only as meeting the claim 1 and claim 18 limitations requiring measurements "based on pilot symbols received from a base station." Petitioner relies upon Frodigh as meeting the remaining limitations of claims 1 and 18. Pet. 42.

Patent Owner argues that Chuang (like Sollenberger) does not teach measuring both channel and interference information based on pilot symbols. Prelim. Resp. 32. We agree with Patent Owner's argument (Prelim. Resp. 34–35) that Chuang utilizes "beacons" to determine which port to communicate with, and not to determine strength of traffic subcarriers.

Accordingly, we determine that Petitioner has not established a reasonable likelihood of prevailing in establishing that claims 1, 8, 11–12, 18, 23, and 26–28 are unpatentable as obvious over Frodigh, and Chuang.

[8] Time Division Multiple Access.

D. Frodigh, Chuang, and Ritter

Recognizing the potential weakness that neither Frodigh nor Chuang describe OFDMA systems, Petitioner includes a “Ground 4” challenge including Ritter, which describes an OFDMA system. However, Ritter is not cited as meeting any of the limitations for which Petitioner relies upon Frodigh and Chuang.

Accordingly, we determine that Petitioner has not established a reasonable likelihood of prevailing in establishing that claims 1, 8–12, 15, 18, 23–27, and 29 are unpatentable as obvious over Frodigh, Chuang, and Ritter.

E. Alamouti, Minegishi, and Ritter

Petitioner submits that the subject matter of claims 1, 8–13, 15, 18, 19, 23–26, and 29 would have been obvious over the combination of Alamouti, Minegishi, and Ritter. Petitioner submits a detailed analysis of each of the claims, applies the prior art, and relies on the testimony of Professor Nicholas Bambos. Pet. 44–60; Exhibit 1012.

1. Alamouti

Alamouti describes a method for frequency division duplex communication. Ex. 1008, Title. More specifically, it utilizes a combination of time division duplex (TDD), frequency division duplex (FDD), time division multiple access (TDMA) and orthogonal frequency division multiplexing (OFDM). Ex. 1008, Abstract. Its multiple subscriber access is achieved using TDMA and not OFDMA.

2. Minegishi

Minegishi describes a mobile communication system that allocates optimum traffic channels among mobile stations. Ex. 1009, Title, Abstract.

3. Combination of Alamouti, Minegishi, and Ritter

Patent Owner argues that the combination of references does not disclose a subscriber unit that submits *updated feedback* information in order to receive a new set of subcarriers after being allocated a first set of subcarriers, as required by independent claims 1 and 18. Prelim. Resp. 41. We agree with Patent Owner that, according to Alamouti, once channels are allocated, there is no feedback from the subscriber unit to the base. We note the "procedure" set forth in Alamouti at column 24. Ex. 1008, 24:23–46.

Petitioner acknowledges (Pet. 49) that reliance on Alamouti requires that we find that one of ordinary skill would have understood by December 1999 that conditions encountered by subscriber units would be changing with a very short time scale and that it would be appropriate to repeat reporting and assignment, as claimed. We are not willing to make that leap on this record.

Petitioner looks to Minegishi (Pet. 48–49) to overcome this deficiency by pointing to Ex. 1009, 2:65–3:26 whereat Minegishi discloses re-taking measurements on a set of candidate channels after that set is first identified based on channel quality measurements. However, Patent Owner correctly notes that Minegishi retakes measurements, but not after *allocation*. Patent Owner further notes that Minegishi takes these measurements during standby mode operation. Ex. 1009, 3:46–50. Thus, Minegishi is searching regularly during standby mode to establish a good channel list. Then, when it is time to transmit, it uses the list it has established, thereby eliminating delays in allocating channels with a back and forth process with the base station, such as the double feedback scheme described by claims 1 and 18.

Accordingly, we determine that Petitioner has not established a reasonable likelihood of prevailing in establishing that claims 1, 8–13, 15, 18, 19, 23–26, and 29 of the ’212 patent are unpatentable as obvious over Alamouti, Minegishi, and Ritter.

F. *Objective Evidence of Non-obviousness*

In view of our conclusions above, we do not reach the issue of Patent Owner’s objective evidence of non-obviousness.

CONCLUSION

For the foregoing reasons, Petitioner has not persuaded us that the information presented in the Petition establishes a reasonable likelihood that Petitioner would prevail in establishing that claims 1, 8–13, 15, 18, 19, and 23–29 are unpatentable.

ORDER

For the reasons given, it is hereby

ORDERED that the Petition is denied and no *inter partes* review is instituted.

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