

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

U.S. Patent No.: 7,454,212

Issue Date: November 18, 2008

OFDMA WITH ADAPTIVE SUBCARRIER-CLUSTER
CONFIGURATION AND SELECTIVE LOADING

Case IPR2015-00318

PATENT OWNER ADAPTIX, INC. PRELIMINARY RESPONSE

CONTENTS

I.	INTRODUCTION.....	1
A.	Grounds of Petitioner’s Proposed Rejections.....	1
II.	BACKGROUND.....	3
A.	Summary of the prosecution of the ‘212 patent.	3
B.	Summary of the subject matter of the ‘212 patent.	4
III.	STANDARD FOR GRANTING INTER PARTES REVIEW.....	5
IV.	CLAIM CONSTRUCTION OF THE CHALLENGED CLAIMS.....	5
A.	Claim construction.....	6
V.	LIMITATIONS ON SUBMISSIONS OF TESTIMONIAL EVIDENCE.	10
VI.	INDEPENDENT CLAIMS 1 AND 18 ARE PATENTABLE OVER PETITIONER’S PROPOSED REJECTIONS BASED ON OBVIOUSNESS.	11
A.	Independent claims 1 and 18 are patentable over the proposed obviousness rejections under 35 U.S.C. § 103(a) based on Frodigh in view of Sollenberger and based on Frodigh in view of Sollenberger and Ritter.	11
B.	Independent claims 1 and 18 are patentable over the proposed obviousness rejections under 35 U.S.C. § 103(a) based on Frodigh in view of Chuang, and based on Frodigh in view of Chuang and Ritter.	31
C.	Independent claims 1 and 18 are patentable over the proposed obviousness rejection under 35 U.S.C. § 103(a) based on Alamouti in view of Minegishi and Ritter.....	40
VII.	OBJECTIVE INDICIA OF NONOBVIOUSNESS.....	51
A.	The objective indicia of nonobviousness support a finding that the claimed invention of independent claims 1 and 18 are patentable.....	54
VIII.	CONCLUSION.	60

TABLE OF AUTHORITIES

Cases

<u>Cable Elec. Prods., Inc. v. Genmark, Inc.</u> , 770 F.2d 1015, 1027 (Fed. Cir. 1985).	59
<u>In re Dow Chem. Co.</u> , 837 F.2d 469 (Fed. Cir. 1988).....	57
<u>In re Gershon</u> , 372 F.2d 535, 539 (C.C.P.A. 1967).....	57
<u>In re Ratti</u> , 270 F.2d 810, 813 (C.C.P.A. 1959).....	28, 49
<u>In re Translogic Tech., Inc.</u> , 504 F.3d 1249, 1257 (Fed. Cir. 2007).....	6
<u>Newell Cos. v. Kenney Mfg. Co.</u> , 864 F.2d 757, 768 (Fed. Cir. 1988).	57

Statutes

35 U.S.C. § 102	3
35 U.S.C. § 103	1, 3
35 U.S.C. § 103(a)	2, 3, 11, 31, 40
35 U.S.C. § 314(a)	5, 60

Regulations

37 C.F.R. § 42.108	1
37 C.F.R. § 42.108(c).....	1, 5
37 C.F.R. § 42.300(b).	6

Other Authorities

MPEP 2143.01(VI)	28
Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,756 (Aug. 14, 2012) ..	5

LIST OF EXHIBITS

Exhibit No.	Exhibit
2001	Expert report of Michael Caloyannides, Ph.D., concerning rebuttal to expert report of Thomas Fuja, Ph.D. regarding validity of U.S. Patent Nos. 6,947,748 and 7,454,212, August 27, 2014 (hereinafter “Caloyannides Report”).
2002	Notice of Allowance dated August 22, 2008 for the U.S. Patent No. 7,454,212 (hereinafter “August 22, 2008 Notice of Allowance”).
2003	Universal Mobile Telecommunication System (UMTS); UMTS Terrestrial Radio Access (UTRA); Concept evaluation (UTMS 30.06 version 3.0.0).
2004	ETSI Technical Committee SMG, Special Mobile Group, Report of Meeting No. 24 held in Madrid 15-19 December 1997.
2005	ETSI Technical Committee SMG, Special Mobile Group, Report of Meeting No. 24bis held in Paris 28-29 January 1998.

**PATENT OWNER RESPONSE TO PETITIONER'S
STATEMENT OF MATERIAL FACTS**

Frodigh (Ex. 1004)

Petitioner's Assertion: “Frodigh discloses a ‘method and system of adaptive channel allocation’ where a subset of subcarriers is chosen from a larger set of subcarriers available for communications on a link. Ex. 1004, Frodigh at Abstract. The mobile units periodically perform signal quality and interference measurements in support of the adaptive allocation functionality. *Id.*”

Patent Owner's Response: *Denied*. As discussed in section VI.B.1.c of the Preliminary Response, Patent Owner notes that channel information measurements are not used in support of channel allocation. To the contrary, the channel and interference information measurements are used for subcarrier deselection of previously allocated subcarriers. (Frodigh at col. 12, lines 1-21.)

Sollenberger (Ex. 1005)

Petitioner's Assertion: “Sollenberger teaches wireless stations detecting the level of each of a plurality of pilot signals. *Id.* at Abstract. The wireless station generates a list of preferred traffic channels by using the detected levels of these pilot signals, and then transmits the list to the associated base station. *Id.* This information is used for channel assignment. *Id*; see also, Ex. 1005, Sollenberger at 8:40-63.”

Patent Owner's Response: *Denied*. Petitioner does not explain what is “this information.”

Ritter (Ex. 1006)

Petitioner's Assertion: “Ritter is an adaptive allocation system which uses OFDMA carriers. Ex. 1006, at 6. In Ritter, each mobile station measures the quality of various segments of the frequency spectrum, determines at least one suitable segment based on the quality measurement, and transmits the appropriate information to the base station. *Id.* at 12-14. The base station then uses that information to assign segments to the mobile station. *Id.* at 12-14.

Patent Owner's Response: *Denied*. Petitioner does not explain what is “appropriate information.” Ritter mentions mobile stations entering “information” into a priority list relating to suitable segments without further explanation regarding what the “appropriate information” is or how it is used by the base station to assign segments. (Ritter at pages 12-14.)

Chuang (Ex. 1007)

Petitioner's Assertion: “Chuang discloses a system for using pilot signals to permit mobile units to evaluate channel interference for the purposes of facilitating an adaptive channel allocation system. Ex. 1007, Chuang at 708, lines 12-19.”

Patent Owner's Response: *Denied*. It is unclear whether Petitioner is asserting that Chuang evaluates “channel information” or “interference information” when making reference to “channel interference.”

Alamouti (Ex. 1008)

Petitioner's Assertion: “Alamouti discloses an adaptive channel allocation system wherein the mobile unit measures channel quality and uses that information to make assignment requests. Ex. 1008, Alamouti at 24:23-46, 55-60.”

Patent Owner's Response: *Denied*. It is unclear what Petitioner means by an “adaptive” channel allocation system. Accordingly, Patent Owner denies that Alamouti discloses an adaptive channel allocation system.

Minegishi (Ex. 1009)

Petitioner's Assertion: “Minegishi was not considered during prosecution of the ‘212 patent. Minegishi discloses an adaptive channel allocation system wherein the mobile unit measures channel quality and uses that information to make channel assignment requests. Ex. 1009, Minegishi at 2:65-3:26.”

Patent Owner's Response: *Denied.* It is unclear what Petitioner means by an “adaptive” channel allocation system. Accordingly, Patent Owner denies that Minegishi discloses an “adaptive” channel allocation system as alleged but instead discloses a *static* admission system.

I. INTRODUCTION.

The present Petition for inter partes review is directed to U.S. Patent No. 7,454,212 (“’212 patent”). Patent Owner notes four of the six references relied upon by Petitioner, including both primary references, were considered by the Office during the prosecution of the ’212 patent. Unsatisfied with the Office’s review during regular prosecution, Petitioner filed the present Petition for *inter partes* review.

Furthermore, under 37 C.F.R. § 42.108, in order for the Board to grant review of the Petition, Petitioner must prove that there is a reasonable likelihood that at least one of the challenged claims is unpatentable. (See 37 C.F.R. § 42.108(c).) As discussed below, the challenged claims are patentable over Petitioner’s proposed rejections included in the Petition. Thus, Petitioner has failed to prove that there is a reasonable likelihood that at least one of the claims challenged in the Petition is unpatentable, and has failed to satisfy the threshold requirement for granting the Petition under 37 C.F.R. § 42.108. Accordingly, the Board should deny the Petition.

A. Grounds of Petitioner’s Proposed Rejections.

The Petition is directed to claims 1, 8-13, 15, 18, 19, and 23-29 (including independent claims 1 and 18), and proposes various grounds of rejection under 35 U.S.C. § 103 against the subject claims including the following:

1. Claims 1, 8, 11-13, 18, 19, 23, and 26-28 (including independent claims 1 and 18) are allegedly invalid under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 6,795,424 to Frodigh et al (“Frodigh”) (Ex. 1004) in view of U.S. Patent No. 6,052,594 to Chuang et al. (“Sollenberger”) (Ex. 1005);

2. Claims 1, 8-13, 15, 18, 19, 23-27, and 29 (including independent claims 1 and 18) are allegedly invalid under 35 U.S.C. § 103(a) as being obvious over Frodigh in view of Sollenberger and German Patent No. DE19800953 to Ritter¹ (“Ritter”) (Ex. 1006);

3. Claims 1, 8, 11, 12, 18, 23, and 26-28 (including independent claims 1 and 18) are allegedly invalid under 35 U.S.C. § 103(a) as being obvious over Frodigh in view of “A Pilot Based Dynamic Channel Assignment Scheme For Wireless Access TDMA/FDMA Systems” to Chuang et al. (“Chuang”) (Ex. 1007);

4. Claims 1, 8-12, 15, 18, 23-27, and 29 (including independent claims 1 and 18) are allegedly invalid under 35 U.S.C. § 103(a) as being obvious over Frodigh in view of Chuang and Ritter; and

¹ Patent Owner notes that Petitioner did not provide a copy of the German patent document as an exhibit, and Petitioner also did not provide an affidavit attesting to the accuracy of the translation thereof.

5. Claims 1, 8-13, 15, 18, 19, 23-26, and 29 (including independent claims 1 and 18) are allegedly invalid under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,933,421 to Alamouti et al. (“Alamouti”) (Ex. 1008) in view of U.S. Patent No. 6,072,988 to Minegishi (“Minegishi”) (Ex. 1009) and Ritter.

As explained below, Patent Owner submits that claims 1, 8-13, 15, 18, 19, and 23-29, are patentable over the respective five (5) grounds of rejection proposed in the Petition.

II. BACKGROUND.

A. Summary of the prosecution of the ‘212 patent.

The application for the ‘212 patent was filed on August 8, 2005 as U.S. Serial No. 11/199,586. The application for the ‘212 patent was published as U.S. Publication No. 2006/0083210 on April 20, 2006. The ‘212 patent issued on November 18, 2008. The parent to the ‘212 patent (U.S. Patent No. 6,947,748) was filed December 15, 2000.

During prosecution of the ‘212 patent, the Office rejected the pending claims over various rejections under 35 U.S.C. §§ 102 and 103 based on Ritter alone or in combination with other references. Patent Owner filed numerous claim amendments and arguments during prosecution to distinguish these various rejections, and on August 22, 2008, a Notice of Allowance (Ex. 2002) was mailed

by the Office stating that the “prior art of record does not teach or fairly suggest, a base station selecting a set of candidate sub-carriers for use by a subscriber unit and sending to the subscriber unit an indication of the selection, and the subscriber unit, after receiving the selected sub-carriers and the selection indication, submitting updated feedback information to be allocated an updated set of sub-carriers and thereafter the subscriber unit receiving another indication of the updated set of sub-carriers, as recited, particularly, in claims 1 and 30; and a base station allocating a first portion of a plurality of sub-carriers to a subscriber unit and allocating a second portion of sub-carriers to the same subscriber unit, after allocating to each subscriber unit in the cell, so as to increase the bandwidth allocated to the same subscriber unit, as recited in claims 58 and 60.” (August 22, 2008 Notice of Allowance (Ex. 2002), pages 3 and 4.)

B. Summary of the subject matter of the ‘212 patent.

The ‘212 patent is related to a method and apparatus for subcarrier selection for systems employing orthogonal frequency division multiple access (OFDMA). In one embodiment, a method for subcarrier selection in systems employing OFDMA includes a subscriber measuring channel and interference information for subcarriers based on pilot symbols received from a base station, the subscriber selecting a set of candidate subcarriers, the subscriber providing feedback information on the set of candidate subcarriers to the base station, and the

subscriber receiving an indication of subcarriers of the set of subcarriers selected by the base station for use by the subscriber. (See Ex. 1003 (‘212 patent) at 2:19-30.) According to the ‘212 patent, “each subscriber reports to the base station its updated selection of clusters... [t]hen the base station further performs the reselection and informs the subscriber about the new cluster allocation.” (Ex. 1003 (‘212 patent) at 6:63-67.)

III. STANDARD FOR GRANTING INTER PARTES REVIEW.

The Board may only grant a petition for *inter partes* review where “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.” (35 U.S.C. § 314(a) and 37 C.F.R. § 42.108(c).) The petitioner bears the burden of showing that this statutory threshold has been met. (See Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,756 (Aug. 14, 2012) (“The Board ...may institute a trial where the petitioner establishes that the standards for instituting the requested trial are met ”).) As discussed below, claims 1, 8-13, 15, 18, 19, and 23-29 are patentable over the respective five (5) proposed grounds of rejection. As such, Petitioner has failed to meet its burden under 35 U.S.C. § 314(a), and thus, Patent Owner respectfully requests that the Board deny institution of an *inter partes* review based on the Petition.

IV. CLAIM CONSTRUCTION OF THE CHALLENGED CLAIMS.

A. Claim construction.

In an *inter partes* review, claim terms of an unexpired patent are given their broadest reasonable construction in light of the specification of the patent in which they appear. (37 C.F.R. § 42.300(b).) Furthermore, under the broadest reasonable interpretation standard, claims are given their ordinary and customary meaning in view of the specification as would be understood by one of ordinary skill in the art (“one of ordinary skill”) at the time of the invention. (In re Translogic Tech., Inc., 504 F.3d 1249, 1257 (Fed. Cir. 2007).)

Patent Owner agrees with the claim construction orders from the district court proceedings (i.e., Exs. 1010 and 1013). To the extent Petitioner argues that the Board should adopt a construction contrary to the district courts, Patent Owner disagrees. Furthermore, should the Board construe any claim terms to be inconsistent with the district courts, Patent Owner reserves the right to present evidence, including expert testimony, to rebut such a construction.

1. Effect of Preambles.

Patent Owner respectfully submits that the preamble of claim 1, which states, “[a] method for subcarrier selection for a system employing orthogonal frequency division multiple access (OFDMA),” is necessary to give life, meaning and vitality to the claim, and provides context essential to understanding the claimed invention.

First, Patent Owner notes the different scope of the preambles in method claim 1 and method claim 32 respectively. While claim 32 simply says “[a] method comprising”, claim 1 says “[a] method for subcarrier selection for a system employing orthogonal frequency division multiple access (OFDMA).”

Second, Patent Owner notes that the specification for the ‘212 patent makes clear that the measuring of channel and interference information based on pilots is done for the purposes of subcarrier selection. (See col. 5, line 43-51; Fig. 3 and col. 8, lines 48-60.)

Third, Petitioner acknowledged this requirement in independent claim 1 in its characterization of the ‘212 patent: “The ‘212 patent describes a method and apparatus for enabling subcarrier selection in a cellular system... To make the selection, each subscriber measures channel and interference information for a plurality of subcarriers. (Petition at page 5.)

In the absence of the preamble being limiting, the measuring step of claim 1 would be without context, and meaningless to the remainder of the claim.

In the event that the Board preliminarily adopts any claim term definitions not consistent with Patent Owner’s position, Patent Owner reserves the right to further argue its positions in a Response if an *inter partes* review is instituted.

2. Meaning of the claim recitation of “arbitrarily ordering.”

Patent Owner agrees with the meaning of “arbitrarily order[ed/ing]” articulated by the District Court as “order[ed/ing] in an order not known by the base station.” (Ex. 1010 at 33.)

In the event that the Board preliminarily adopts any claim term definitions not consistent with Patent Owner’s position, Patent Owner reserves the right to further argue its positions in a Response if an *inter partes* review is instituted.

3. Meaning of the claim recitation of “sequential ordering.”

Petitioner asserts that the Board should construe “sequentially ordering” to mean at least “ordering according to a priority (e.g., a priority list).” (Petition, page 8.) Patent Owner disagrees. In pertinent part, the ‘212 patent indicates that “[b]y transmitting the SINR of all the clusters in the group sequentially, only the group index instead of all the cluster indices, needs to be transmitted.” (Ex. 1003 (‘212 patent) at 12:15-18.) To that end, “FIG. 7 illustrates an exemplary format for indicating a group based cluster allocation,” where “a group ID, ID1, is followed by the SINR values for each of the clusters in the group.” (Ex. 1003 (‘212 patent) at 12:20-23.) Thus, in the ‘212 patent, it is not necessary to individually identify the clusters, because the order of the clusters is known by the base station. Clearly, in the ‘212 patent, “sequential ordering” does not mean ordering according to a priority. As such, Patent Owner submits that “sequentially ordering” should be construed as “ordering in an order known by the base station.”

In the event that the Board preliminarily adopts any claim term definitions not consistent with Patent Owner's position, Patent Owner reserves the right to further argue its positions in a Response if an *inter partes* review is instituted.

4. Meaning of the claim recitation of "pilot symbols."

Patent Owner agrees with the meaning of "pilot symbols" articulated by the District Court as "symbols, sequences, or signals known to both the base station and subscriber." (Ex. 1013 at 17.)

In the event that the Board preliminarily adopts any claim term definitions not consistent with Patent Owner's position, Patent Owner reserves the right to further argue its positions in a Response if an *inter partes* review is instituted.

5. Meaning of the claim recitation of "SINR."

Patent Owner agrees with the meaning of "SINR" articulated by the District Court as "signal-to-interference-plus-noise ratio." (Ex. 1010, p. 23.)

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 (C/I)." (Petition, pgs. 8 and 9.) To support this assertion, Petitioner asserts 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-ratio’ (SINR) can be broadly used interchangeably.” (Petition, p. 9.)

In response, Patent Owner notes that Petitioner ignores the fact that the specification expressly defines the term SINR as “signal-to-interference-plus-noise ratio.” (‘212 patent, 3:21.) Patent Owner respectfully submits that the Board should construe the term SINR to be the same as the definition contained in the specification of the ‘212 patent and as articulated by the District Court.

In the event that the Board preliminarily adopts any claim term definitions not consistent with Patent Owner’s position, Patent Owner reserves the right to further argue its positions in a Response if an *inter partes* review is instituted.

V. LIMITATIONS ON SUBMISSIONS OF TESTIMONIAL EVIDENCE.

Patent Owner introduces the “Expert report of Michael Caloyannides, Ph.D., concerning rebuttal to expert report of Thomas Fuja, Ph.D. regarding validity of U.S. Patent Nos. 6,947,748 and 7,454,212” (Ex. 2001) (hereinafter “Caloyannides Report”) dated August 27, 2014 from the United States District Court for the Northern District of California San Jose Division in Case Nos.: 5:13-cv-01776-PSG; 5:13-cv-01777-PSG; 5:13-cv-01778-PSG; 5:13-cv-01844-PSG; and 5:13-cv-02023-PSG (hereinafter “District Court proceeding”). Patent Owner submits that the Caloyannides Report is not new testimonial evidence as the Caloyannides

Report was prepared and filed in the District Court proceeding prior to the accorded filing date (November 26, 2014) of the Petition by Petitioner. In the Caloyannides Report, Dr. Caloyannides considered many of the same references used by Petitioner in the Petition. Therefore, Patent Owner cites to the Caloyannides Report in support of conclusions being made by Dr. Caloyannides that Patent Owner relies upon. Furthermore, Patent Owner reserves the right to present its positions and supplement the arguments presented herein as necessary with new testimonial evidence in a Response if an *inter partes* review is instituted.

VI. INDEPENDENT CLAIMS 1 AND 18 ARE PATENTABLE OVER PETITIONER'S PROPOSED REJECTIONS BASED ON OBVIOUSNESS.

A. Independent claims 1 and 18 are patentable over the proposed obviousness rejections under 35 U.S.C. § 103(a) based on Frodigh in view of Sollenberger and based on Frodigh in view of Sollenberger and Ritter.

With respect to Grounds 1 and 2 of rejection under 35 U.S.C. § 103(a), Petitioner alleges that claims 1, 8, 11-13, 18, 19, 23, and 26-28 (including independent claims 1 and 18) are unpatentable as being obvious over Frodigh in view of Sollenberger (Ground 1), and alleges that claims 1, 8-13, 15, 18, 19, 23-27, and 29 (also including independent claims 1 and 18) are unpatentable as being obvious over Frodigh in view of Sollenberger and Ritter (Ground 2). As discussed below, independent claims 1 and 18 are patentable over Grounds 1 and 2 of rejection because, at the very least, the combinations of references promulgated in

Grounds 1 and 2 do not result in every aspect of the claimed invention of independent claims 1 and 18. And, as explained below, each of the approaches to channel allocation in Frodigh, Sollenberger, and Ritter have performance shortcomings compared to the approach of the '212 patent.

Moreover, as discussed below in Section VII, the historical record of the related industry of cellular data networks with respect to the objective indicia of nonobviousness establishes that the combinations of Grounds 1 and 2 were not readily apparent, and shows that Petitioner has relied upon impermissible hindsight in promulgating these combinations of references.

1. Neither Petitioner's combination of Frodigh and Sollenberger nor Petitioner's combination of Frodigh, Sollenberger, and Ritter discloses a subscriber or plurality of subscribers measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station, as recited in independent claims 1 and 18.

Petitioner's combination of Frodigh in view Sollenberger (Ground 1) and Petitioner's combination of Frodigh in view of Sollenberger and Ritter (Ground 2) do not result in each and every element of the claimed invention of independent claims 1 and 18.

As discussed below, with respect to independent claims 1 and 18, Frodigh does not disclose using pilot symbols for any reason, and Sollenberger does not disclose measuring both channel and interference information based on pilot symbols received from a base station, and more specifically, and as explained

below, from a serving base station (i.e. making the channel allocation in question). Moreover, with respect to independent claim 1, Frodigh does not disclose measuring both channel and interference information as part of a method for subcarrier selection, as per the limitation found in the preamble. With respect to independent claim 18, Frodigh does not disclose a plurality of subscribers measuring both channel and interference information for the same plurality of subcarriers. For these reasons, Petitioner's proposed combinations in Grounds 1 and 2 of rejection do not result in each and every element of independent claims 1 and 18.

a. Pertinent recitations of independent claims 1 and 18 that serve in distinguishing Grounds 1 and 2 of rejection.

Independent claim 1 recites a “method for subcarrier selection ... comprising: a subscriber unit measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station,” and independent claim 18 recites “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.” As such, independent claim 1 requires a subscriber unit that measures both channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station, and independent claim 18 requires a plurality of subscribers that each measure both channel and interference information for the same plurality of subcarriers based on

pilot symbols received from an allocating base station. Furthermore, independent claim 1 indicates that the measuring of both the channel and interference information is being done as part of a method for subcarrier selection, and independent claim 18 indicates that the measuring of both channel and interference information is being done “to select a set of candidate subcarriers from the plurality of subcarriers.” Petitioner’s Grounds 1 and 2 of rejection do not result in these requirements of independent claims 1 and 18.

b. Petitioner’s Grounds 1 and 2 of rejection rely on identical sections of Frodigh and Sollenberger to disclose the recitations of independent claims 1 and 18 with respect to pilot symbols.

Petitioner’s Ground 1 of rejection indicates that the recitations of independent claims 1 and 18 with respect to pilot symbols are both taught by the same sections of Frodigh and Sollenberger. (Petition, pgs. 14-16 and 33.) Moreover, Petitioner’s Ground 2 (Frodigh, Sollenberger, and Ritter) merely adds Ritter to disclose an OFDMA system and states “[g]round 1 above explains how Frodigh in view of Sollenberger teaches the remaining elements of claim 1, and those of claims 8, [sic] 1-13, 18-19, 23 and 27.” (Petition at page 37.) As such, Petitioner relies on the same sections of Frodigh and Sollenberger in both Grounds 1 and 2 for the recitations of independent claims 1 and 18 with respect to pilot symbols. Thus, in regards to the recitations of independent claims 1 and 18 with respect to pilot symbols, Patent Owner’s rebuttal will focus on rebutting

Petitioner's Ground 1 of rejection, with the understanding that such a rebuttal is also applicable to rebut Petitioner's Ground 2 of rejection.

c. Neither Frodigh nor Sollenberger disclose measuring both channel and interference information based on pilot symbols from an allocating base station, as recited independent claims 1 and 18.

i. Frodigh does not disclose using pilot symbols for any reason.

As discussed above, Frodigh is relied upon in combination with Sollenberger in Petitioner's Grounds 1 and 2 of rejection to disclose the recitations of independent claims 1 and 18 with respect to pilot symbols. In response, Patent Owner notes that Frodigh does not disclose using pilot symbols for any reason.

ii. Sollenberger does not disclose measuring both channel and interference information based on pilot symbols from a (i.e. allocating) base station.

Given that Frodigh does not disclose using pilot symbols for any reason, Petitioner relies on Sollenberger for such teachings with respect to pilot symbols. As discussed above, independent claim 1 recites a "method for subcarrier selection ... comprising: a subscriber unit measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station," and independent claim 18 recites "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." As discussed below, Sollenberger does not disclose measuring both channel and interference

information based on pilot symbols from an allocating base station as required by independent claims 1 and 18.

(1) Sollenberger does not disclose measuring both channel and interference information based on pilot symbols.

Petitioner asserts that “Sollenberger discloses a subscriber [‘wireless station’] measuring channel and interference information [‘measured power of a particular pilot frequency,’ ‘signal to interference ratio’].” (Petition at page 15.)

Accordingly, Petitioner equates the “measured power of a particular pilot frequency” with the “channel information” and the “signal to interference ratio” with the “interference information” of independent claim 1. In response, Patent Owner submits that Sollenberger does not disclose measuring both channel and interference information based on pilot symbols.

As explained below, the measuring of the “power of a particular pilot frequency” discussed in Sollenberger is merely how Sollenberger assesses interference on a corresponding carrier. (Sollenberger at col. 9, lines 7-11.) It has nothing to do with signal strength on the corresponding carrier. As such, Sollenberger does not measure “channel information” (i.e., a desired signal) based on the pilot signals. Instead, for purposes of signal power S, Sollenberger teaches “S is a desired signal power of a downlink transmission signal from the base station to the wireless station and is based on paging information.” (Sollenberger

at col. 9, lines 19-21.) Receiving a desired signal power based on paging information is not the same thing as a measuring signal power based on a pilot signal. In any event, the claim makes clear that both channel and interference are measured from the same thing (pilot symbols) and Sollenberger teaches two separate things (pilots and paging) for assessing channel and interference information.

For these reasons, Sollenberger also does not teach measuring both channel and interference information based on pilot symbols. Therefore, Sollenberger does not disclose a “method for subcarrier selection ... comprising: a subscriber unit measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station,” as required by independent claim 1, and does not disclose “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,” as required by independent claim 18.

(2) Sollenberger does not disclose measuring channel and interference information based on pilot symbols from a (i.e. allocating) base station.

Patent Owner also submits that Sollenberger does not disclose measuring channel and interference information from a base station that is the same as the allocating base station, as required by independent claims 1 and 18.

Independent claim 1 recites, in relevant part:

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 providing feedback information on the set of candidate subcarriers to the base station; [and]

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

(Emphasis added.) Similarly, independent claim 18 recites, in relevant part:

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; [and]

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.

(Emphasis added.)

Accordingly, both independent claims 1 and 18 require that the pilot symbols upon which the channel and interference measurements are to be based, must be from the same base station making the subcarrier allocation, not the neighboring base stations. In contrast, Sollenberger teaches that, “[t]he pilot

frequency signals are turned off for the entire frame so that the wireless stations associated with base station BS1 can monitor pilot frequency signals generated by other base stations.” (Sollenberger at col. 11, lines 36-39.) Thus, contrary to the requirements of independent claims 1 and 18, the wireless stations of Sollenberger do not measure anything based on pilot symbols received from the base station making the subcarrier allocation.

For these reasons, Sollenberger also does not teach measuring channel and interference information based on pilot symbols from an allocating base station. Therefore, Sollenberger again does not disclose a “method for subcarrier selection ... comprising: a subscriber unit measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station,” as required by independent claim 1, and does not disclose “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,” as required by independent claim 18.

d. Frodigh does not disclose measuring both channel and interference information as part of a method for subcarrier selection for a system employing OFDMA, as required by independent claim 1.

Independent claim 1 recites a “method for subcarrier selection for a system employing OFDMA ... comprising: a subscriber unit measuring channel and interference information for a plurality of subcarriers based on pilot symbols

received from a base station.” Notwithstanding that Petitioner points to Sollenberger for purposes of the pilot portion for this claim element, Petitioner subdivides the element and points to Frodigh for purposes of measuring channel and interference information on a plurality of subcarriers.

As discussed above, each of the limitations of independent claim 1 should be construed in a context of facilitating subcarrier selection in an OFDMA system. Therefore, independent claim 1 requires that the measuring of channel and interference information for a plurality of subcarriers be performed as part of a method for subcarrier selection for a system employing OFDMA. Petitioner acknowledged this requirement in independent claim 1 in its characterization of the ‘212 patent: “The ‘212 patent describes a method and apparatus for enabling subcarrier selection in a cellular system... To make the selection, each subscriber measures channel and interference information for a plurality of subcarriers.” (Petition at page 5.) As discussed below, Frodigh does not disclose measuring channel and interference information for a plurality of subcarriers as part of a method for subcarrier selection. Petitioner asserts that “Frodigh discloses a subscriber [‘mobile station’] measuring channel and interference information [‘signal quality (C/I’ and ‘interference level (I)’] for a plurality of subcarriers [‘subset of M subcarriers,’ ‘all N available subcarriers’]” with respect to independent claim 1’s recitation of “a subscriber unit measuring channel and

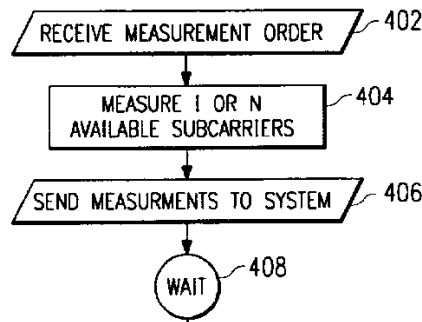
interference information for a plurality of subcarriers.” (Petition at page 14.) As such, Petitioner equates the “signal quality C/I” with the “channel information” and equates the “interference level (I)” with the “interference information.” However, Frodigh only uses interference information for subcarrier selection. Frodigh does not use channel information for subcarrier selection. Therefore, Frodigh does not disclose measuring channel and interference information for a plurality of subcarriers as part of a method for subcarrier selection.

i. Frodigh only uses interference information for subcarrier selection.

Frodigh only utilizes the “interference level (I)” (interference information) for subcarrier selection. Whereas, Frodigh discloses that the “signal quality (C/I)” (channel information) is used solely for deselection of previously allocated subcarriers, i.e., the exact opposite of a method for subcarrier selection. That is, Frodigh discloses using signal quality C/I for deselection only after the channels have been allocated. In contrast, the ‘212 patent uses channel information as part of a method for subcarrier selection. As such, unlike the ‘212 patent, Frodigh may never select the best channels (i.e. those with the highest C:I ratio) because Frodigh relies solely on interference I for channel selection.

Consider Frodigh’s explanation of subcarrier selection referring to Fig. 4A (reproduced in relevant part below):

FIG. 4A

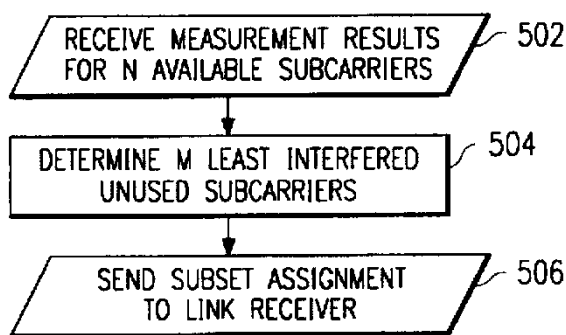


[A]t step 402 the link receiver receives from the system a measurement order message to measure interference (I) on each

of a group of N subcarriers available for the link. ... Next, at step 404 the I measurements are performed. Then, from step 404 the process moves to step 406 where the I measurement results are sent to the system. ... After transmitting the I measurement results the process moves to step 408 where the link receiver waits for a response from the system.

(Frodigh at col. 9, line 63 to col. 10, line 12.) Next, Frodigh refers to Fig. 5 (reproduced in relevant part below) to explain how the system assigns subcarriers while the mobile station is in wait step 408:

FIG. 5



At step 502 the results of the I measurement performed on the N subcarriers at the link receiver are received by the ACA processor. Next, at step 504 the ACA processor determines the M least

interfered unused subcarriers from the results of the I measurements made on the N subcarriers. From step 504 the process then moves to

step 506 where a subcarrier assignment message assigning the subset of the least interfered M subcarriers to the link is sent to both the link receiver and the link transmitter.

(Frodigh at col. 10, lines 17-26.) Then:

The link receiver which has been in the wait state at 408 now moves to step 410 and receives the channel assignment message assigning the subset of M subcarriers to the link. Next, the process moves to step 412 as the link receiver begins receiving on the link using the assigned subset of M subcarriers.

(Frodigh at col. 10, lines 37-42.) As such, Frodigh is clear, the mobile station (link receiver) measures the interference level I, transmits the measurement to the system, and the system assigns channels based solely on the lowest interference levels. In short, Frodigh only uses interference information for subcarrier selection.

ii. Frodigh does not use channel information for subcarrier selection.

Frodigh cannot use the signal quality C/I measurement (channel information) to select the subcarriers. As discussed below, Frodigh does not even measure C/I until after the subcarriers have been assigned and are being used by the mobile station. (Frodigh at col. 9, line 60 to col. 11, line 5.) Frodigh discloses that the mobile station is already receiving on the assigned subcarriers at step 412, and that signal quality C/I is not measured until at step 426:

From step 412 the process now moves to step 414 and waits for further input. At step 416 an input is received. ... At decision step 418 the link receiver determines if a call end signal has been received. ... If a call end has not been received, the process moves to step 420 and the link receiver determines whether a measurement timer message has been received. ... [The specification of Frodigh never explains step 422.] If a measurement timer message has been received the process moves to step 424. At step 424 the link receiver measures I on the set of N subcarriers. ... From step 424 the process moves to step 426 and the link receiver measures C/I on each of the subset of M subcarriers.

(Frodigh at col. 10, line 42 to col. 11, line 5.) In summary, Frodigh discloses that the mobile station (link receiver) has already received an assignment of the M subcarriers allocated (step 410) and is receiving traffic on the link comprising the M subcarriers (step 412) before the signal quality C/I is ever measured (step 426). Moreover, C/I is only measured on the subset of M subcarriers which the mobile station is already using. That is, C/I (which Petitioner equates with “channel information”) is not measured on the available subcarriers, but rather, it is only measured on subcarriers that have already been allocated to the mobile station for the sole purpose of *deselection*. Accordingly, Frodigh is clear, given that the

allocation of subcarriers for use by the mobile station occurs before signal quality C/I is even measured and C/I is only measured on subcarriers already allocated to the mobile station for the purpose of deselection, signal quality C/I is not measured for subcarrier selection. In short, Frodigh does not use channel information for subcarrier selection.

iii. Because Frodigh only uses interference information for subcarrier selection, and Frodigh does not use channel information for subcarrier selection, Frodigh does not disclose measuring both channel and interference information as part of a method for subcarrier selection as required by independent claim 1.

As discussed above, the mobile station (link receiver) measures the interference level I, transmits the measurement to the system, and the system assigns channels based solely on the lowest interference levels in Frodigh. Furthermore, as discussed above, given that the allocation of subcarriers for use by the mobile station occurs before signal quality C/I is even measured and C/I is only measured on subcarriers already allocated to the mobile station for the purpose of *deselection*, signal quality C/I is not measured for purposes of subcarrier *selection* in Frodigh. Therefore, for these reasons, Frodigh does not disclose a “method for subcarrier selection for a system employing OFDMA ... comprising: a subscriber unit measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station,” as required by independent claim 1.

e. Frodigh does not disclose a plurality of subscribers measuring both channel and interference information for the same plurality of subcarriers, as required by independent claim 18.

Independent claim 18 recites “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.” Accordingly, independent claim 18 requires that each of the subscribers measure channel and interference information on the same subcarriers. In contrast, Frodigh discloses that each mobile station only measures the signal quality C/I (channel information according to Petitioner) on the particular subset M subcarriers that that mobile station is already using. (Frodigh at col. 11, lines 3-5.) That is, each mobile station measures the signal quality C/I on a different set of subcarriers. As such, for this reason, Frodigh does not disclose “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,” as required by independent claim 18.

f. Petitioner’s combination of Frodigh and Sollenberger does not disclose each and every aspect of the independent claims 1 and 18, and thus, independent claims 1 and 18 are patentable over Petitioner’s Grounds 1 and 2 of rejection.

As discussed above, Frodigh does not disclose using pilot symbols for any reason, and Sollenberger does not disclose measuring both channel and interference information based on pilot symbols from an allocating base station.

Therefore, the combination of Frodigh in view of Sollenberger does not result in a “method for subcarrier selection ... comprising: a subscriber unit measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station,” as recited in independent claim 1, and does not result in “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,” as recited independent claim 18.

Furthermore, because Frodigh only uses interference information for subcarrier selection, and Frodigh does not use channel information for subcarrier selection, Frodigh does not disclose a “method for subcarrier selection for a system employing OFDMA ... comprising: a subscriber unit measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station,” as required by independent claim 1. Also, because Frodigh does not disclose a plurality of subscribers measuring both channel and interference information for the same plurality of subcarriers, Frodigh does not disclose “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,” as required by independent claim 18.

Therefore, for these reasons, the combination of Frodigh in view Sollenberger does not result in each and every recitation of independent claims 1

and 18. As discussed above, this rebuttal is equally applicable to overcome both Grounds 1 and 2 of rejection, and thus, Patent Owner submits that independent claims 1 and 18 are patentable over Grounds 1 and 2 of rejection.

2. Modifying Frodigh to use the channel information for subcarrier selection would change the principle of operation thereof, and hence, one of ordinary skill would not make such a modification.

As discussed above, Frodigh discloses that the signal quality C/I is only measured on subcarriers already allocated to the mobile station for the purpose of deselection. Furthermore, Frodigh is clear with respect to its utilization of signal quality C/I: signal quality C/I is not measured for the purpose of subcarrier selection.

If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. (MPEP 2143.01(VI), citing to In re Ratti, 270 F.2d 810, 813 (C.C.P.A. 1959) (A combination of references was not obvious where the combination “would require a substantial reconstruction and redesign of the elements shown in [a reference] as well as a change in the basic principles under which the [reference’s] construction was designed to operate.”).)

Given that Frodigh knows how to measure signal quality C/I, but then discloses utilizing the signal quality C/I measurement solely for deselection

purposes, Patent Owner submits that any modification of Frodigh to use the signal quality C/I measurement for selection purposes, as opposed to the interference level I alone as taught by Frodigh, would change the principle of operation thereof. Frodigh does not teach using pilots to measure channel and interference information on a plurality of subcarriers. That is why Frodigh has to rely only on interference measurements for channels that are not allocated to the user. Accordingly, the mobile station is only able to measure the channel quality (C/I) on the channels that have already been allocated to it (see e.g. col. 8, lines 59-63). As such, one of ordinary skill would not modify Frodigh in such a manner, which demonstrates that independent claims 1 and 18 are not obvious and are patentable over Grounds 1 and 2 of rejection.

3. The method and apparatus of independent claims 1 and 18 have performance advantages over Frodigh and Sollenberger that shows Petitioner has relied on impermissible hindsight in constructing the combination thereof.

As discussed above, Frodigh relies solely on interference information for channel selection. (Frodigh at col. 10, lines 17-26.) Furthermore, Sollenberger also relies solely on interference based on pilot symbols for channel selection. (Sollenberger col. 9, lines 6-11 and 19-21.) Accordingly, neither Frodigh nor Sollenberger, nor any proper combination thereof, discloses a “method for subcarrier selection ... comprising: a subscriber unit measuring channel and interference information for a plurality of subcarriers based on pilot symbols

received from a base station,” as recited in independent claim 1, and “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,” as recited in independent claim 18. Therefore, neither Frodigh nor Sollenberger is capable of achieving the performance advantage realized by the method and apparatus disclosed in the ‘212 patent and recited in independent claims 1 and 18. This is because, under this combination, even if a channel with superior signal strength had interference slightly higher than the interference of other channels, wherein the other channels have vastly inferior signal strength, the channel with superior signal strength would *never* be chosen. So, unlike the ‘212 patent, neither Frodigh nor Sollenberger adaptively allocate subcarriers based on *channel and* interference information, thus making them incapable of insuring that each subscriber enjoys a “high channel gain” as afforded by the method and apparatus of the ‘212 patent. (‘212 patent at col. 1, lines 52-59.)

Given the deficiencies in Frodigh and Sollenberger, and the advantages realized by the method and apparatus of the ‘212 patent, it appears that Petitioner has relied upon impermissible hindsight in promulgating these combinations of references in Grounds 1 and 2. Petitioner has reviewed the teachings of the ‘212 patent and impermissibly relied upon hindsight to construct the combinations of references in Grounds 1 and 2. Such reliance on impermissible hindsight

demonstrates that independent claims 1 and 18 are patentable. For this reason and those discussed above, Patent Owner submits that independent claims 1 and 18 are patentable over Petitioner's Grounds 1 and 2 of rejection.

B. Independent claims 1 and 18 are patentable over the proposed obviousness rejections under 35 U.S.C. § 103(a) based on Frodigh in view of Chuang, and based on Frodigh in view of Chuang and Ritter.

With respect to Grounds 1 and 2 of rejection, Petitioner alleges that claims 1, 8, 11-12, 18, 23, and 26-28 (including independent claims 1 and 18) are unpatentable as being obvious over Frodigh in view of Chuang (Ground 3), and alleges that claims 1, 8-12, 15, 18, 23-27, and 29 (also including independent claim 1 and 18) are unpatentable as being obvious over Frodigh in view of Chuang and Ritter (Ground 4). As discussed below, independent claims 1 and 18 are patentable over Grounds 3 and 4 of rejection because, at the very least, the combinations of references promulgated in Grounds 3 and 4 do not result in every aspect of the claimed invention of independent claims 1 and 18.

Moreover, as discussed below in Section VII, the historical record of the related industry of cellular data networks with respect to the objective indicia of nonobviousness establishes that that the combinations of Grounds 3 and 4 were not readily apparent, and shows that Petitioner has relied upon impermissible hindsight in promulgating these combinations of references.

- 1. Neither Petitioner's combination of Frodigh and Chuang nor Petitioner's combination of Frodigh, Chuang, and Ritter discloses a subscriber measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station.**

Petitioner's combination of Frodigh in view of Chuang (Ground 3) and Petitioner's combination of Frodigh in view of Chuang and Ritter (Ground 4) do not disclose a subscriber measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station.

- a. Independent claim 1 is patentable over Petitioner's Grounds 3 and 4 because Chuang also fails to disclose measuring channel and interference information based on pilot symbols.**

With respect to independent claim 1, Petitioner's Grounds 3 and 4 of rejection are identical to Grounds 1 and 2 of rejection, except for the replacement of Sollenberger with Chuang to allegedly disclose "a subscriber unit measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station," as recited in independent 1. Therefore, Patent Owner's argumentation with respect to Frodigh in view of Grounds 1 and 2 of rejection is equally applicable to Grounds 3 and 4 of rejection as applied to independent claim 1. Furthermore, as discussed below, Chuang (like Sollenberger) does not disclose measuring both channel and interference information based on pilot symbols. Thus, in similar fashion to Grounds 3 and 4 of rejection,

Petitioner's proposed combinations in Grounds 3 and 4 of rejection do not result in each and every element of independent claim 1.

b. Independent claim 18 is similarly patentable over Petitioner's Grounds 3 and 4.

With respect to independent claim 18, Petitioner alleges that Frodigh, apparently alone², discloses “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,” as recited in independent claim 18. (Petition at pages 42-44.) Therefore, Patent Owner's argumentation with respect to Frodigh in view of Grounds 1 and 2 is also equally applicable to Grounds 3 and 4 of rejection as applied to independent claim 18. Moreover, even if Petitioner meant to include Chuang in combination with Frodigh in Grounds 3 and 4 with

² The Petition includes a claim chart asserting that Chuang discloses the recitation from independent claim 1 “based on pilot symbols received from a base station,” followed by the sentence “Frodigh discloses the remaining limitations of claim 1, and those of claims 8, 11-12, 18, 23 and 26-28 as set forth in Ground 1 above.” (Petition at p. 42.) Nowhere does the Petition indicate that the independent claim 18 recitation of “based on pilot symbols received from the first base station,” is taught by Chuang. As such, it appears as though Petitioner is contending that this recitation in independent claim 18 is taught by Frodigh alone.

respect to independent claim 18, independent claim 18 remains patentable. As discussed below, Chuang (like Sollenberger) does not disclose measuring both channel and interference information based on pilot symbols. Thus, in similar fashion to Grounds 3 and 4 of rejection, Petitioner's proposed Grounds 3 and 4 of rejection based on Frodigh (whether or not Chuang is included in combination therewith) do not result in each and every element of independent claim 18.

c. Neither Frodigh nor Chuang disclose measuring both channel and interference information for a plurality of subcarriers based on pilot symbols, as recited in independent claims 1 and 18.

i. Frodigh does not disclose using pilot symbols for any reason.

Frodigh is relied upon in combination with Chuang in Petitioner's Ground 3 of rejection, and is relied upon, apparently alone, in Petitioner's Ground 4 of rejection, to disclose the recitations of independent claims 1 and 18 with respect to pilot symbols. In response, Patent Owner notes that Frodigh does not disclose using pilot symbols for any reason.

ii. Chuang does not disclose measuring both channel and interference information for a plurality of subcarriers based on pilot symbols.

Patent Owner submits that nothing in Chuang discloses the portable measuring channel information based on pilot symbols. While Petitioner, tellingly, does not point to anything as disclosing measuring channel information based on pilot symbols, one might still mistakenly conclude that Chuang measures signal

strength of the subcarriers based on beacons. However, the beacons are used by the portable to determine which port to communicate with, not to determine strength of traffic subcarriers.

With regard to beacons, Chuang discloses:

The interference measurement process at a portable for channel selection is separate from that for selecting a target port by measuring beacon signals. The former involves the measurement of active traffic channels which may include power control, which the latter involves measurement of non power-controlled signals designed specifically to permit accurate determination of the strongest ports by portables.

(Chuang at page 707, col. 1, lines 45-51.) Moreover, “*every port* must provide beacon signals and *every active channel* much [sic] be indicated by the pilot signals.” (Chuang at page 707, col. 2, lines 50-52, emphasis in original.) Also, “[a]ll portables measure the signal strengths of the beacons and select the strongest port for communications purposes.” (Chuang at page 708, col. 1, lines 13-15.) As such, the portable in Chuang uses the beacons to find the port with the strongest signal and decides to communicate with that port, then Chuang uses the pilots from the other ports to determine the potential interference. As such, Chuang does not disclose measuring both channel and interference information based on pilot symbols. In any event, the claim makes clear that both channel and interference

information are measured based on the same thing (pilot symbols), while Chuang discloses two different things (pilots and beacons).

As such, Patent Owner submits Chuang does not disclose “a subscriber unit measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station,” as recited in independent claim 1. Moreover, even if Petitioner meant to include Chuang in Ground 3 and 4 with respect to independent claim 18, Patent Owner submits that Chuang does not disclose “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,” as recited in independent claim 18.

iii. Chuang does not disclose subcarriers.

Given that Chuang is not an OFDM based system, Chuang is silent with respect to subcarriers. As such, Patent Owner submits Chuang does not disclose “a subscriber unit measuring channel and interference information *for a plurality of subcarriers* based on pilot symbols received from a base station,” as recited in independent claim 1. Also, Patent Owner submits that Chuang does not disclose, regarding claim 18, “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,” as recited in independent claim 18.

iv. Chuang is redundant in light of Sollenberger.

Moreover, Petitioner's reliance on such redundant proposed rejections with respect to independent claim 1 should be viewed for what it is: an acknowledgement that Sollenberger does not disclose a subscriber unit that measures both channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station, as required by independent claims 1 and 18. However, Petitioner's attempt to remedy the ails of Grounds 1 and 2 using Chuang are fatally flawed. This is because the inventors of Sollenberger, Justin Che-I Chuang and Nelson Ray Sollenberger, are also the authors of Chuang, and the "pilot signals" they described in Chuang are utilized in nearly the identical manner as those they described in Sollenberger. (See section VI.A.1.c. above.) As such, for the same reasons discussed above with regard to Sollenberger, Chuang fails to disclose "a subscriber unit measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station," as recited in independent 1, and Chuang fails to disclose "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," as recited in independent claim 18.

d. Frodigh does not disclose measuring both channel and interference information as part of a method for subcarrier selection, as required by independent claim 1.

For the same reasons discussed above with respect to Grounds 1 and 2 of rejection, Frodigh does not disclose measuring both channel and interference information as part of a method for subcarrier selection. As such, Frodigh does not disclose a “method for subcarrier selection for a system employing OFDMA ... comprising: a subscriber unit measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station,” as required by independent claim 1.

e. Frodigh does not disclose a plurality of subscribers measuring both channel and interference information for the same plurality of subcarriers, as required by independent claim 18.

Also, for the same reasons discussed above with respect to Grounds 1 and 2 of rejection, Frodigh does not disclose measuring both channel and interference information for the same plurality of subcarriers. As such, Frodigh does not disclose “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,” as required by independent claim 18.

f. Petitioner’s combination of Frodigh and Chuang does not disclose each and every aspect of independent claims 1 and 18, and thus, independent claims 1 and 18 are patentable over Petitioner’s Grounds 3 and 4 of rejection.

As discussed above, Frodigh does not disclose using pilot symbols for any reason, and Chuang does not disclose measuring both channel and interference information based on pilot symbols. Therefore, the combination of Frodigh in

view of Chuang does not result in a “method for subcarrier selection ... comprising: a subscriber unit measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station,” as recited in independent claim 1, and does not result in “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,” as recited in independent claim 18.

Furthermore, for the reasons discussed with respect to Grounds 1 and 2 of rejection, Frodigh does not disclose a “method for subcarrier selection for a system employing OFDMA ... comprising: a subscriber unit measuring channel and interference information for a plurality of subcarriers based on pilot symbols received from a base station,” as required by independent claim 1, and Frodigh also does not disclose “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,” as required by independent claim 18.

Therefore, for these reasons, the combination of Frodigh in view of Chuang does not result in each and every recitation of independent claim 1, and Frodigh (whether or not Chuang is included in combination therewith) does not result in each and every element of independent claim 18. This rebuttal is equally applicable

to overcome both Grounds 3 and 4 of rejection, and thus, Patent Owner submits that independent claims 1 and 18 are patentable over Grounds 3 and 4 of rejection.

2. Modifying Frodigh to use the channel information for subcarrier selection would change the principle of operation thereof, and hence, one of ordinary skill would not make such a modification, and Petitioner has used impermissible hindsight to construct the combinations of references in Grounds 1 and 2.

For the same reasons discussed with respect to Grounds 1 and 2, Patent Owner submits that (1) any modification of Frodigh to use the signal quality C/I measurement for selection purposes would change the principle of operation thereof, and one of ordinary skill would not modify Frodigh in such a manner, and (2) Petitioner has reviewed the teachings of the '212 patent and impermissibly relied upon hindsight to construct the combinations of references in Grounds 3 and 4. For these reasons, and those discussed above, Patent Owner submits that independent claims 1 and 18 are patentable over Petitioner's Grounds 3 and 4 of rejection.

C. Independent claims 1 and 18 are patentable over the proposed obviousness rejection under 35 U.S.C. § 103(a) based on Alamouti in view of Minegishi and Ritter.

With respect to Ground 5 of rejection, Petitioner alleges that claims 1, 8-13, 15, 18, 19, 23-26, and 29 (including independent claims 1 and 18) are unpatentable under 35 U.S.C. § 103(a) as being obvious over Alamouti in view of Minegishi and Ritter. In response, Patent Owner submits that the combination of Alamouti in

view of Minegishi and Ritter, at the very least, does not result in every aspect of the claimed invention of independent claims 1 and 18. The combination of Alamouti, Minegishi, and Ritter 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. Thus, for at least this reason, independent claims 1 and 18 are patentable over Ground 5 of rejection.

Moreover, as discussed below in Section VII, the historical record of the related industry with respect to the objective indicia of nonobviousness establishes that the combination of Ground 5 was not readily apparent, and shows that Petitioner has relied upon impermissible hindsight in promulgating this combination of references.

1. Petitioner's combination of Alamouti, Minegishi, and Ritter 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 recited in independent claims 1 and 18.

Petitioner's combination of Alamouti in view of Minegishi and Ritter (Ground 5) does not result in each and every limitation of the claimed invention of independent claims 1 and 18. Ritter is not relied upon for the recitations of independent claims 1 and 18 with respect to 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, and, even though Alamouti and Minegishi are

relied upon for those recitations, Alamouti and Minegishi do not actually disclose such recitations. For these reasons, Petitioner's proposed combinations in Grounds 1 and 2 of rejection do not result in each and every element of independent claims 1 and 18.

a. Pertinent recitations of independent claims 1 and 18 that serve in distinguishing Ground 5 of rejection.

Independent claim 1 recites "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," and independent claim 18 recites "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." As such, both independent claims 1 and 18 require a subscriber unit that submits updated feedback in order to receive a new set of subcarriers after being allocated a first set of subcarriers. That is, independent claims 1 and 18 of the '212 patent are directed to a method and apparatus for dynamic subcarrier selection. Meaning, the system continues to seek the best subcarriers even after the first allocated subcarriers are being used.

b. Neither Alamouti nor Minegishi disclose a subscriber unit that submits updated feedback in order to receive a new set of subcarriers after being allocated a first set of subcarriers.

Petitioner asserts that the above-quoted recitations of independent claims 1 and 18 are disclosed either by Alamouti or Minegishi. (Petition at pages 48, 49, and 58.) However, unlike the updateable system of independent claims 1 and 18, Alamouti and Minegishi are both static admission control systems. They allocate a channel and, as far as Alamouti and Minegishi are concerned, the process of channel allocation is complete, there is no further submitting feedback information in order to receive of an updated channel allocation. Such static systems are the antithesis of the method and apparatus of the '212 patent, which includes the notion of updating feedback and indications of allocations.

i. Minegishi does not update its channel allocation.

To support the assertion that the above-discussed recitations of independent claims 1 and 18 are disclosed by Minegishi, Petitioner cites to column 2, line 65 to column 3, line 26 of Minegishi and indicates that “Minegishi and similar references expressly disclose re-taking measurements on a set of candidate channels after that set is first identified based on channel quality measurements.” (Petition at pages 48 and 49.)

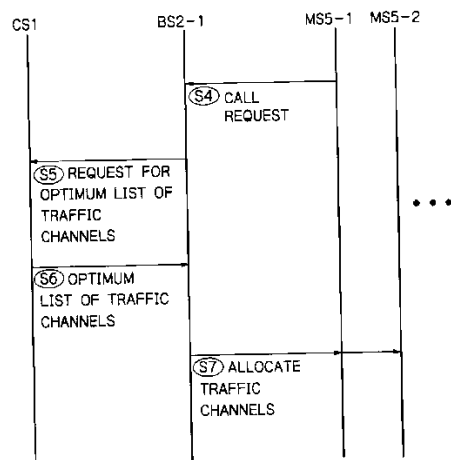
In response, Patent Owner notes that Petitioner does not assert that Minegishi discloses updating after allocation, as required by independent claims 1 and 18. This is because Minegishi does not disclose such a feature. Rather, Minegishi discloses a static admission control system, and that “according to the

present invention, since an optimum list of traffic channels are realized in a standby mode, the optimum traffic channels can be allocated to mobile stations immediately upon receipt of a call request of one of the mobile stations.”

(Minegishi at col. 3, lines 46-50, (emphasis added).) The whole point of Minegishi is that because there is a substantial amount of work required to determine an optimal channel, all of the allocation work should be done ahead of a call request to enable immediate channel allocation. And, presumably because of all this required work, once allocated, the channels remain allocated indefinitely. This is confirmed by Minegishi’s description of related art that identifies the following problem in the prior art, “since traffic channels are checked and one of the traffic channels is selected upon receipt of a call connection request from a mobile station, it takes a long time to allocate an optimum traffic channel to the mobile station.”

(Minegishi at col. 1, lines 22-26 (emphasis added).) In order to solve the problem of such a long delay, prior to channel allocation, Minegishi discloses a system wherein the mobile stations that are in standby mode are actively measuring reception levels, calculating interference, and transmitting a priority list of preferred channels to the base station, so that when a call is requested, the base station already knows what channels the mobile user prefers; thereby eliminating the problematic delay in allocating a channel. (Minegishi at col. 2, line 51 to col. 3, line 26, emphasis added.)

Interestingly, it is this description of the standby operation, which occurs prior to any channel allocation in Minegishi, that Petitioner cites to in the Petition at pages 48 and 49 as allegedly disclosing “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,” as recited in independent claim 1, and as allegedly disclosing “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,” as recited in independent claim 18. (Emphasis added.) Fig. 6 (reproduced below) and the accompanying description at column 7, lines 27-45 are where channel allocation are disclosed in Minegishi.

Fig. 6

As shown in Fig. 6 and the accompanying description, the allocation of traffic channels S7 from the base station BS2-1 to mobile stations MS5-1 and MS5-2 is the very last action described in Minegishi. There is literally no discussion of what happens after channel allocation. Therefore, Minegishi does not disclose “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” (emphasis added), as recited in independent claim 1, and does not disclose “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,” as recited in independent claim 18.

ii. Alamouti also does not update its channel allocation.

With respect to Alamouti, Petitioner does not point to any passages thereof for disclosing the above-discussed recitations of independent claims 1 and 18. Instead, Petitioner asserts the following, even though Alamouti is an admission system:

A person of ordinary skill in the art would have understood by December of 1999 that the conditions encountered by the mobile unit would be changing with a very short time scale, and as such the

process of measurement, reporting and assignment should be repeated for reasons of efficiency, thus satisfying claim limitations [e][1] and [e][2] above. *Id.* As such, Alamouti renders obvious those limitations if it is found not to disclose those limitations expressly.

(Petition at page 49.) However, as discussed above, Alamouti is a static admission control system. Alamouti is merely concerned with the initial allocation. It says nothing about a subscriber submitting updated feedback information, after the initial allocation, and thereafter receiving an indication of updated subcarriers. As such, Patent Owner respectfully submits that Petitioner's assertion regarding Alamouti alone rendering this claim recitation obvious is clearly not supportable. Therefore, Alamouti also does not disclose "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" (emphasis added), as recited in independent claim 1, and also does not disclose "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," as recited in independent claim 18.

iii. Petitioner's combination of Alamouti, Minegishi, and Ritter does disclose each and every aspect of the independent claims 1 and 18, and thus, independent

claims 1 and 18 are patentable over Petitioner's Ground 5 of rejection.

Given that neither Alamouti nor Minegishi disclose the above-quoted recitations of independent claims 1 and 18 with respect to 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, and Petitioner relies on Alamouti and Minegishi for disclosing these recitations, Ground 5 of rejection fails. The combination of Alamouti in view of Minegishi and Ritter does not result in each and every recitation of independent claims 1 and 18.

2. Modifying Alamouti and Minegishi to provide updated feedback information would change the principle of operation thereof, and hence, one of ordinary skill would not make such a modification.

Alamouti and Minegishi are both static admission control systems. As such, as discussed above, both Alamouti and Minegishi allocate a channel and, as far as Alamouti and Minegishi are concerned, the process of channel allocation is complete. In Alamouti and Minegishi, there is no further submitting feedback information in order to receive of an updated channel allocation. At the very least, Alamouti and Minegishi do not appreciate the importance of updating feeding information and updating channel allocation, and therefore, Alamouti and Minegishi are not well suited to mobile network applications.

Patent Owner submits that modifying either Alamouti or Minegishi to submit updated feedback information in order to receive a new set of subcarriers

after being allocated a first set of subcarriers would change the principle of operation thereof (see In re Ratti). Thus, one of ordinary skill would not modify Alamouti and Minegishi in such a manner, which demonstrates that independent claims 1 and 18 are not obvious and are patentable over Ground 5 of rejection.

Moreover, Patent Owner submits that, given the differences of Alamouti and Minegishi with respect to the claimed invention of independent claims 1 and 18, it appears that Petitioner has relied upon impermissible hindsight in promulgating these combinations of references in Ground 5.

3. The method and apparatus of independent claims 1 and 18 have performance advantages over Alamouti and Minegishi that shows Petitioner has relied on impermissible hindsight in constructing the combination thereof.

As discussed above, both Alamouti and Minegishi are static admission control systems. Accordingly, neither Alamouti nor Minegishi, nor any proper combination thereof, discloses “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,” as recited in independent claim 1, and “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,” as recited in independent claim 18. Therefore, neither Alamouti nor Minegishi is capable of achieving the

performance advantage realized by independent claims 1 and 18 in that if a subscriber's channel and interference conditions changed, Alamouti and Minegishi's system would not update the feedback to notify the system of the change, and would not receive an indication of an updated set of subcarriers. This could result in a subscriber using a suboptimal channel when there could be another channel which is optimal for that subscriber.

Given the deficiencies in Alamouti and Minegishi, and the advantages realized by the method and apparatus of the '212 patent, it appears that Petitioner has relied upon impermissible hindsight in promulgating these combinations of references in Ground 5. Petitioner has reviewed the teachings of the '212 patent and impermissibly relied upon hindsight to construct the combinations of references in Ground 5. Such reliance on impermissible hindsight demonstrates that independent claims 1 and 18 are patentable. For this reason, Patent Owner submits that independent claims 1 and 18 are patentable over Petitioner's Grounds 1 and 2 of rejection.

4. Additionally, Petitioner does not fully articulate why one of ordinary skill would modify Alamouti as indicated in Ground 5 of rejection.

According to Petitioner, "[a] person of ordinary skill in the art would have understood by December of 1999 that the conditions encountered by the mobile unit would be changing with a very short time scale, and as such the process of

measurement, reporting and assignment,” thus satisfying the above-quoted claim recitations of independent claims 1 and 18. Petitioner’s assertion regarding Alamouti alone is erroneous at least because, other than relying on impermissible hindsight, Petitioner failed to articulate what the alleged “conditions encountered by the mobile unit [that] would be changing with a very short time scale” are and why those conditions are different in December 1999 than they were in February 1997 (the filing date of Alamouti). As such, Petitioner has failed to provide sufficient rationale to modify the static admission control system disclosed in Alamouti to result in independent claims 1 and 18 with respect to 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.

VII. OBJECTIVE INDICIA OF NONOBVIOUSNESS.

In the late 1990s, almost every major telecom company in the world got together to consider potential solutions to make cellular service faster and more efficient. In doing so, the industry leaders and their delegates (including two of the named inventors of the references relied on by Petitioner) considered three possible OFDMA based solutions, none which were similar to the ‘212 patent. The OFDMA based solutions were summarily dismissed as inferior to the non-OFDMA proposals, by every single telecom leader present. This industry-wide consideration and dismissal of an OFDMA based solution demonstrates that,

despite their best efforts, the industry leaders were not able to envision the OFDMA based solution embodied in the '212 patent, which of course, eventually became the industry standard.

Regardless of the historical record, Petitioner argues that it would have been obvious to one having ordinary skill in the art in 2000 to combine the various cited references discussing OFDMA, OFDM, FDMA, and TDMA to arrive at the claimed invention of the '212 patent. This is a perplexing position for Petitioner to take in the face of the above-discussed consideration and rejection of OFDMA based technology for a 3rd generation cellular system before the filing of the parent of the '212 patent and the widespread adoption of the OFDMA approaches claimed in the '212 patent for purposes of 4G wireless thereafter. As illustrated by Ex. 2003-2005, at two meetings of telecom experts convening to discuss and vote on the best technology to pursue as the basis for the future "3G" international cellular standard that took place shortly before the filing of the '212 patent, three different OFDMA based modes were presented, *none of which suggested the claimed invention*. The three different OFDMA based modes were rejected in favor of both WCDMA and TD/CDMA technologies, which were designed to address frequency specific channel conditions by averaging communications over the entire channel and simply dealing with frequency specific channel conditions as a problem to be avoided. (See Ex. 2005 generally and at p. 25.) Presumably

because the submitted OFDMA modes did not address how to effectively deal with changing frequency specific channel conditions as set out in the '212 patent.

OFDM (e.g., WiFi) was also available at the time and was well known as a local area network (LAN) technology that used all frequencies to communicate with users at different times, yet was not even considered as the basis for a next generation cellular system.

Given that the telecom experts at the time rejected OFDMA based technologies in favor of approaches that used averaging techniques to handle Rayleigh fading, would it really have been obvious to one having only ordinary skill in the art to produce a superior system utilizing OFDMA as claimed and which was adopted for 4G LTE? Even Mikael Gudmondson, co-inventor of Frodigh, the primary reference in Grounds 1-4, and Gerhard Ritter, the inventor of Ritter, the secondary reference in Grounds 2, 4, and 5 (and the primary reference relied upon by the USPTO during regular prosecution), and their employers Ericsson and Siemens, respectively, voted against an OFDMA based system, and instead supported the same technologies as the aforementioned telecom experts. (See Ex. 2005 generally and at pgs. 16, 18 and 25.) In fact, Gudmondson was one of the presenters for the WCDMA based proposal. (Ex. 2003, p. 29, Ex. 2004, p. 23, and Ex. 2005, p. 5.) Moreover, the OFDMA approaches did not receive a single vote at either meeting. (Ex. 2004, p. 27 and Ex. 2005, p. 7.)

A. The objective indicia of nonobviousness support a finding that the claimed invention of independent claims 1 and 18 are patentable.

In support of a finding of nonobviousness with respect to the objective indicia of nonobviousness, Patent Owner will discuss the skepticism of the experts prior to the filing of the parent of the '212 patent, the long-felt need to maximize data throughput on a cellular network and the failure of others to do so prior to the parent of the '212 patent, and the commercial successes of the products utilizing the technology claimed in the '212 patent. These objective considerations of nonobviousness also reinforce that Petitioner has relied upon impermissible hindsight in promulgating the proposed rejections of independent claims 1 and 18.

According to the Supreme Court, when making a determination of whether a claim is obvious, the decision-maker must evaluate objective indicia of nonobviousness. (*Graham*, 17.) These facts, which often include skepticism of experts, long-felt need and the failure of others, and commercial success, are often referred to as “secondary considerations.” The Federal Circuit reminds us that these facts are not secondary in importance, but merely second in time. (See Trustwall Sys. Corp. v. Hydro-Air Engr., Inc., 813 F.2d 1207, 1212 (Fed. Cir. 1997).) In fact, the Federal Circuit holds that these facts “can establish that an invention appearing to have been obvious in light of the prior art was not” and that these facts may be “the most probative and cogent evidence in the record.” (Rambus Inc. v. Rea, 731 F.3d 1248, 1256 (Fed. Cir. 2013) (internal

quotes omitted).) This is because “[i]t helps turn back the clock and place the claims in the context that led to their invention.” (*Id.* (internal quotes omitted).)

In December 1997, the European Telecommunication Standards Institute (“ETSI”) released TR 101 146 version 3.0.0 entitled “Universal Mobile Telecommunication System (UMTS); UMTS Terrestrial Radio Access (UTRA); Concept evaluation (UTMS 30.06 version 3.0.0)” (“ETSI UTRA Evaluation”) attached hereto as Ex. 2003. The ETSI UTRA Evaluation discusses four proposed concepts to be pursued as the next UMTS standard, i.e., “3G.” Annex B of the ETSI UTRA Evaluation explains three OFDMA based approaches referred to collectively as “Concept β ”. (Ex. 2003, pgs. 174-301.) During the two meetings held to discuss the proposed concepts, the OFDMA based approaches received zero votes. That is, not a single delegate viewed the OFDMA based approaches as the best option to pursue.

In Madrid, on December 15-19, 1997, ETSI held the first meeting which was “attended by 270 delegates, including delegations from ANSI T1P1, RITT (China), ARIB (Japan), chairs of GSM MoU and UMTS Forum as well as 5 ETSI Board members.” (Report of Meeting No. 24, Ex. 2004, p. 2.) Qualcomm’s European subsidiary sent two delegates and Ericsson sent fourteen, including Mikael Gudmundson (Co-inventor of Frodigh (Ex. 1004) to the meeting. (Ex. 2004, pgs. 49-105.) As discussed above, Petitioner acquired the mobile phone

manufacturing operations of Qualcomm Incorporated, and hence, the attendance of Qualcomm's European subsidiary at the industry meeting may fairly be attributable to Petitioner.

In Madrid, the delegates were asked to vote for one of the four proposed concepts. Concept β (which included three different modes of OFDMA) received 0% of the votes, while concept α (wideband direct-sequence CDMA) received 58.45%, and concept δ (WB-TDMA/CDMA) received 41.55%. (Ex. 2004, pgs. 26-27.) Notably, Akio Sasaki even pointed out that "very few members in ARIB [Japan] want to study OFDMA." (Ex. 2004, p. 21.)

The next meeting was in Paris, on January 28-29, 1998, to review and vote on the four proposals again. The Paris Meeting was attended by 316 delegates, including two from Qualcomm's European subsidiary and seventeen from Ericsson (including Gudmundson). (Ex. 2005, pgs. 14-19.) Also in attendance was Gerhard Ritter of Siemens, the inventor of Ritter (Ex. 1006). (Ex. 2005, p. 18.) Patent Owner notes that both Gudmundson and Ritter filed their patent applications prior to the Paris Meeting. Again, not one person voted for the OFDMA based proposal. Concept β (which included three different modes of OFDMA) received 0% of the votes, while concept α (wideband direct-sequence CDMA) received 61.1%, concept γ (WB-TDMA) received 0.2%, and concept δ (wideband direct-sequence CDMA) received 38.7%. (Ex. 2005, p. 7.)

However, despite the historical record, Petitioner now contends it would have been obvious to one having only ordinary skill in the art at the time to construct the proposed grounds of rejection. In other words, Petitioner is contending that those having less experience and knowledge than the top experts in the field would have recognized the path that none of the top experts themselves saw.

“The skepticism of an expert, expressed before these inventors proved him wrong, is entitled to fair evidentiary weight.” (In re Dow Chem. Co., 837 F.2d 469 (Fed. Cir. 1988).) The fact that experts representing essentially all of the major wireless telecom companies expressed skepticism of pursuing an OFDMA based approach weighs heavily against Petitioner’s assertion that it would have been obvious to make further modifications to the existing OFDMA technology to arrive at the invention claimed in the ‘212 patent.

The relevance of long-felt need and the failure of others to the issue of obviousness depends on several factors. First, the need must have been a persistent one that was recognized by those of ordinary skill in the art. (In re Gershon, 372 F.2d 535, 539 (C.C.P.A. 1967).) Second, the long-felt need must not have been satisfied by another before the invention by applicant. (Newell Cos. v. Kenney Mfg. Co., 864 F.2d 757, 768 (Fed. Cir. 1988).)

As pointed out by Dr. Caloyannides there was a long-felt need to provide a new generation of wireless technology that would improve throughput:

A longstanding objective in cellular communications systems has always been to increase the throughput for dependable data communications to/from mobile wireless devices. This need has been exacerbated by the fact that large percentages of legacy telephony users have been disconnecting their wired telephones altogether and using their mobile telephones for all of their telecommunications needs, both voice and data. Cellular networks and devices, therefore, have been under unrelenting pressure to accommodate data communications at faster and faster data rates by an increasing number of users who demand it.

(Ex. 2001, par. 333.)

This long-felt need was not satisfied by the 3G technology that resulted from the above-discussed meetings. This is evidenced by the fact that the industry realized that they needed to pursue 4G technology and the fact that almost nobody is producing products utilizing 3G.

OFDMA technology utilizing the particular methods and apparatuses taught in the '212 patent was adopted in the 4G/LTE mobile phones. The fact that "4G/LTE mobile phones may achieve data transmission rates that are 10 to 100

times faster than 3G mobile phones” evidences that the 4G/LTE did solve the long felt need. (Ex. 2001, par. 340.)

“[F]or commercial success of a product embodying a claimed invention to have true relevance to the issue of non-obviousness, that success must be shown to have in some way been due to the nature of the claimed invention.” (Cable Elec. Prods., Inc. v. Genmark, Inc., 770 F.2d 1015, 1027 (Fed. Cir. 1985).) As noted by Dr. Caloyannides:

The adoption of LTE by carriers and handset manufacturers is in large part because of this increase in throughput, which is in large part because of the deployment of FSS in current LTE networks. The ability to optimally deploy FSS (and thus achieve maximum throughput) requires the claimed inventions of both the ‘212 and ‘748 patents. The ‘212 patent claims, e.g., claim 1, facilitate repeated subband feedback—an essential element of FSS (which uses this feedback to make channel allocation decisions) ... Further information and evidence about the commercial success that has followed the use of these aspects of the ‘212 and ‘748 patents is provided in my infringement reports involving the same patents.

(Ex. 2001, par. 344.) Accordingly, the advanced methods of the ‘212 claims are responsible for a portion of the increase in throughput of 4G/LTE as specified in

Exhibit 2001 and it is the resulting increase in speed that is responsible for the commercial success of the 4G/LTE based products.

Given the above-discussed skepticism, long-felt need and failure of others, and commercial success associated with the claimed methods and apparatuses of the '212 patent, Patent Owner submits that the claims of the '212 patent are not obvious. Furthermore, these objective indicia of nonobviousness also reinforce that Petitioner has relied upon impermissible hindsight (fourteen years after the fact) in promulgating the proposed rejections of independent claims 1 and 18.

VIII. CONCLUSION.

For the above-discussed reasons, Patent Owner submits that the claims are patentable over the respective five (5) grounds of rejection proposed in the petition. As such, Petitioner has failed to meet its burden under 35 U.S.C. § 314(a), and thus, Patent Owner respectfully requests that the Board deny institution of an *inter partes* review based on the petition.

Respectfully submitted,

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CERTIFICATE OF SERVICE

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