

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ERICSSON INC.
NOKIA OF AMERICA CORPORATION
Petitioners

v.

XR COMMUNICATIONS, LLC, D/B/A VIVATO TECHNOLOGIES,
Patent Owner

IPR2024-00613
Patent No. 10,715,235

PATENT OWNER RESPONSE

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PATENT OWNER'S EXHIBIT LIST

Ex.	Description
2001	Docket Control Order, <i>XR Communications LLC d/b/a Vivato Technologies v. AT&T Inc. et al</i> , No. 2:23-cv-00202-JRG-RSP, Dkt. 40 (E.D. Tex. August 25, 2023)
2002	Declaration of Declaration of Branimir Vojcic, D.Sc. and <i>Curriculum Vitae</i> as Appendix A
2003	Transcript of Deposition of Dr. Mark P. Mahon on January 7, 2025
2004	3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Physical channels and mapping of transport channels onto physical channels (FDD) (Release 1999)
2005	Claim Construction Order, <i>XR Communications LLC d/b/a Vivato Technologies v. AT&T Inc. et al</i> , No. 2:23-cv-00202-JRG-RSP, Dkt. 99 (E.D. Tex. November 14, 2024)

I. INTRODUCTION

The Board granted institution on a single ground of obviousness, based on Agee (Ex. 1004) in combination with Butler (Ex. 1005). The arguments presented herein and the additional evidence submitted, such as the testimony from XR Communications' expert witness Dr. Branimir Vojcic (Ex. 2002), demonstrate that Petitioners have failed to establish obviousness of the challenged claims and that Petitioners' challenge should be rejected.

Petitioners fail to establish that the prior art combination or any modification would satisfy the properly construed claims. In several aspects, Petitioners and their expert contradict the plain and ordinary meaning of the claim terms, reading out entire claim limitations. For example, Petitioners ignore Claim 4's requirement that the content within the claimed third signal comprise data configured to be used by the remote station to modify the placement of transmission peaks and transmission nulls in a subsequent signal transmission. For another example, Petitioners fail to show signal information comprising one or more of a specified list of items, as required by claims 5 and 15.

In multiple limitations, Petitioners assert that a POSITA would have been motivated to make modifications to Agee in order to meet the claim limitations of the '235 patent. But as set forth in detail below and in the declaration of Dr. Vojcic,

Petitioners' arguments rest on nothing more than conclusory ipse dixit or hindsight-based analysis.

II. THE '235 PATENT

A. Overview

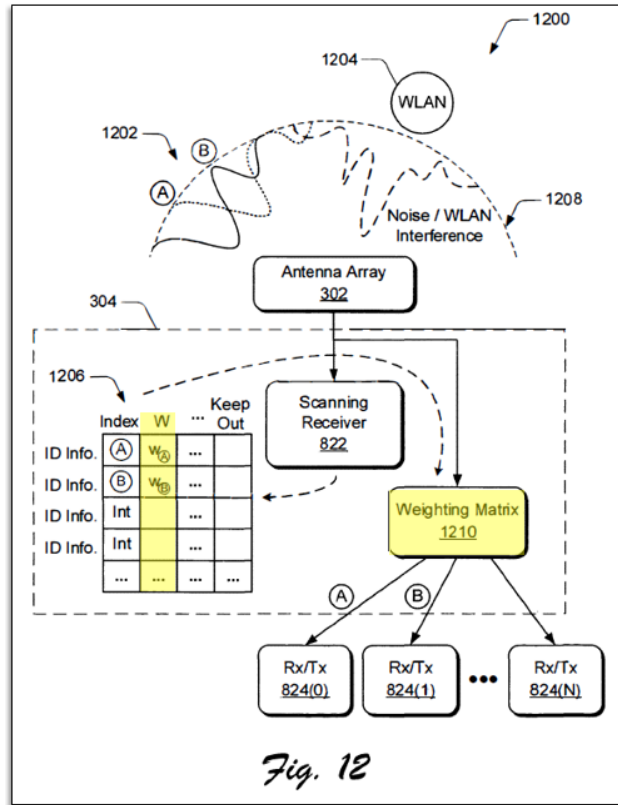
The '235 Patent (Ex. 1001) is entitled "Directed wireless communication" and relates to "a multi-beam directed signal system [] implemented to communicate over a wireless communication link via an antenna assembly with client devices." '235 patent at 3:11-15. The '235 Patent discloses a wireless communications apparatus that comprises an "antenna array 302" with a plurality of "antenna elements" to emanate an array of multiple directed communication beams 214(1), 214(2),...214(N). Ex. 1001, FIGS. 2, 3. The '235 Patent teaches that the apparatus receives signal transmissions simultaneously via directed communication beams. *Id.* at 3:38-52 ("An increase in communication range is achieved by beamforming directed communication beams which simultaneously transmit directed signals and receive communication signals from different directions via receive and transmit beamforming networks.").

In one embodiment, "antenna array 302 can include sixteen antenna elements..." from which "sixteen different communication beams 602(0), 602(1),...,602(15) are formed," each of which may have beam patterns that "differ in width, shape, number, angular coverage, azimuth, and so forth." *Id.* at 9:12-34;

6:61-7:5 (“directed communication beams 214 of antenna array 302 can be directionally controllable”). In one embodiment, only thirteen of the beams are used for transmission and reception. *Id.* at 9:34-60.

The '235 Patent apparatus receives signal transmissions via the directed communication beams from other devices or “nodes within the wireless routing network.” Ex. 1001 at 24:25-34. Further, the '235 Patent apparatus determines signal information regarding each of the simultaneously received signals. *Id.* at 15:44-16:49, 24:25-25:30. In the Figure 12 embodiment, the “signal control and coordination logic 304 includes the scanning receiver 822 that is configured to update routing information 1206 with regard to the received signals.” *Id.* at 24:25-67. The disclosures regarding “scanning receiver 822” at columns 15-16 elaborates that the “scanning receiver 822” determines “routing and signal information which can include transmit power level information, transmit data rate information, antenna pointing direction information, weighting information, constraints information, null/zero location information, peak location information...frequency information, timing information, user and node authentication information, keep out area information, etc.” *Id.* at 15:44-16:49. Figure 12 describes how a set of weighting values is determined based on differing signal information for each received signal from each node.

For example, as shown in Figure 12 below, “communication and/or data transfer signals are received from sources 1202 (e.g., sources A and B).” *Id.* at 24:25-34. These signals are provided to a “signal control and coordination logic 304” which includes a “scanning receiver 822 that is configured to update routing information 1206 with regard to the received signals.” *Id.* at 24:35-25:30. More specifically, the routing information 1206 includes a routing table, and the “routing table includes stored weighting values (w) each associated with a particular signal source 1202 (e.g., sources A and B)...[a] description of the received signal(s) can be stored in the routing table in the form of the pattern of weighting of the signal(s). In this example, a polynomial expansion in z , $w(z)=w_0+w_1z+w_2z^2+w_3z^3+w_4z^4+ \dots +w_iz^i$ can be utilized to establish the values of the weights (w_i) to be applied to a weight vector.” *Id.* Figure 12 is depicted below.



B. Challenged Claims

Petitioners challenge claims 1-5, 8-12, and 15-19 of the '235 Patent. Pet. at 29. The independent claims are claims 1, 8, and 15. The other claims are dependent claims that depend (directly or indirectly) from independent claims 1, 8, and 15. For illustrative purposes, claims 1, 4, 5, and 8 are reproduced below:

Identifier	Independent Claim 1
[1.0]	A receiver for use in a wireless communications system, the receiver comprising: an antenna, wherein the antenna comprises a first antenna element and a second antenna element;
[1.1]	a transceiver operatively coupled to the antenna and configured to transmit and receive electromagnetic signals using the antenna;;

Identifier	Independent Claim 1
[1.2]	a processor operatively coupled to the transceiver, the processor configured to:
[1.3]	receive a first signal transmission from a remote station via the first antenna element and a second signal transmission from the remote station via the second antenna element simultaneously;
[1.4]	determine first signal information for the first signal transmission;
[1.5]	determine second signal information for the second signal transmission, wherein the second signal information is different than the first signal information;
[1.6]	determine a set of weighting values based on the first signal information and the second signal information;
[1.7]	wherein the set of weighting values is configured to be used by the transceiver to construct one or more beam-formed transmission signals;
[1.8]	cause the transceiver to transmit a third signal to the remote station via the antenna, the third signal comprising content based on the set of weighting values.

Identifier	Dependent Claim 4
[4]	The receiver as recited in claim 1, wherein the content comprises data configured to be used by the remote station to modify the placement of one or more transmission peaks and one or more transmission nulls in a subsequent signal transmission.
Identifier	Dependent Claim 5
[5]	The receiver as recited in claim 4, wherein the set of weighting values is further based on one

Identifier	Independent Claim 8
[8.0]	A method in a wireless communications system, the method comprising:
[8.1]	receiving a first signal transmission from a remote station via a first antenna element of an antenna and a second signal transmission from the remote station via a second antenna element of the antenna simultaneously, wherein the first signal transmission and the second signal transmission comprise electromagnetic signals comprising one or more transmission peaks and one or more transmission nulls;
[8.2]	determining first signal information for the first signal transmission;
[8.3]	determining second signal information for the second signal transmission, wherein the second signal information is different than the first signal information;
[8.4]	determining a set of weighting values based on the first signal information and the second signal information, wherein the set of weighting values is configured to be used by the remote station to construct one or more beam-formed transmission signals; and
[8.5]	transmitting to the remote station a third signal comprising content based on the set of weighting values.

III. PRIORITY DATE AND LEVEL OF ORDINARY SKILL

The '235 Patent issued from U.S. Pat. App. No. 15/495,539 filed April 24, 2017 claiming priority through continuation applications to U.S. Provisional Pat. App. No.60/423,660 filed on November 2, 2002. For purposes of this IPR, Patent

Owner does not assert a priority date earlier than the November 2002 provisional date. The parties do not otherwise present a material dispute over the priority date.

Petitioner¹ proposes that for the '235 Patent, a “POSITA in November 2002 would have been familiar with wireless communications networks, including the design of beamforming using multiple antennas. A POSITA would have at least a Bachelor’s degree in Electrical Engineering or equivalent, and at least two years of work experience. A more advanced degree can substitute for some work experience.” Pet. 6-7; *see also* Mahon Decl. ¶ 39. For purposes of this IPR, Patent Owner does not challenge Petitioner’s proposed definition.

IV. CLAIM CONSTRUCTION

The Board does not construe any claim terms unnecessary to resolve the parties’ dispute. Petitioners and Dr. Mahon do not propose any claim constructions, and Petitioners propose that “each claim term be given its plain and ordinary meaning.” Pet. at 6. Patent Owner agrees that no express constructions are necessary and the claims of the '235 Patent carry their plain and ordinary meaning in view of the claim language and specification. *See* Vojcic Decl ¶¶ 33-35.

¹ This Patent Owner Response may refer to “the Petition,” “Petitioner,” “Petitioners,” as well as Petitioners’ expert “Dr. Mahon,” and “Mahon declaration.” For convenience, these references should be understood to be interchangeable. For example, references to a position/argument of Petitioners / the Petition should be understood to apply to the corresponding position/argument of Dr. Mahon / Mahon declaration, and vice versa.

A claim construction order was entered in a prior district court action against different defendants that was resolved due to settlement. Ex. 1017, *XR Comm's LLC v. Cisco Sys.*, No. 6:21-cv-00623-ADA, Dkt. No. 56 (W.D. Tex. Sept. 30, 2022). In that action, the Western District of Texas adopted the following constructions relevant to the claims at issue here:

Term	Court's Construction
“transmission nulls” U.S. Patent No. 10,715,235, Cls. 2, 4, 8, 12, 16	Plain and ordinary meaning wherein the plain-and-ordinary meaning is “portions of one or more spatially distributed patterns of electromagnetic signals where transmissions of no or insignificant energy are selectively directed.”
“transmission peaks” U.S. Patent No. 10,715,235, Cls. 2, 4, 8, 12, 16	Plain-and-ordinary meaning ¹ [¹ Note not for the jury: The plain-and-ordinary meaning of “transmission peaks” includes relative maxima.]
“third signal comprising content based on the set of weighting values” U.S. Patent No. 10,715,235, Cls. 1, 8 and 15	Plain-and-ordinary meaning wherein the plain-and-ordinary means that the “third signal” is “based on the set of weighting values.”
“the set of weighting values is configured to be used by the remote station to construct one or more beam-formed transmission signals” U.S. Patent No. 10,715,235, Cl. 8	Not indefinite. Plain-and- ordinary meaning.

Term	Court's Construction
“remote station” U.S. Patent No. 10,715,235, Cls. 1,4,8,9,12,15	Plain and ordinary meaning.

Further, in the related district court action involving Petitioners, the Court issued a claim construction order. *See* Ex. 2005, CC Order, *XR Communications LLC d/b/a Vivato Technologies v. AT&T Inc. et al*, No. 2:23-cv-00202-JRG-RSP, Dkt. 99 (E.D. Tex. November 14, 2024). In that order, the Court only construed one term, “transceiver,” and found it carries its plain and ordinary meaning (Ex. 2005 at 33-34, 39). The parties also agreed to a plain and ordinary meaning construction of the term “transmission nulls.” Those constructions are shown as follows:

Term	Court's Construction
“transceiver” U.S. Patent No. 10,715,235, Cls. 1, 15, 18-19	Plain and ordinary meaning

Term	Agreed Construction
“transmission nulls” U.S. Patent No. 10,715,235, Cls. 1, 15, 18-19	Plain and ordinary meaning, i.e., “portions of a transmission pattern where transmissions of no or insignificant energy are selectively directed.”

The arguments in this Patent Owner Response apply the plain and ordinary meaning of the claim terms and would be the same either without claim constructions or under the WDTex and EDTex claim construction orders.

V. THE PETITION FAILS TO SHOW UNPATENTABILITY FOR ANY CHALLENGED CLAIM

The Petition fails to show unpatentability for any challenged claim: claims 1-5, 8-12, and 15-19. The deficiencies for challenged claims are presented on a claim-by-claim basis below. But at the outset, several general points are worth noting.

First, Petitioner does not propose any claim constructions, and the parties agree that terms of the '235 Patent carry their plain and ordinary meaning. At certain points, Petitioners refer to Patent Owner's statements or alleged positions during prosecution or in other IPRs. In general, Petitioner's references are inaccurate or taken out of context. It is also unclear how Petitioners relying on prosecution or other IPRs given that there are no proposed constructions, and no argument regarding lexicography or disclaimer. Indeed, Petitioner's expert Dr. Mahon's declaration contains no opinions regarding disclaimer or lexicography, as he confirmed in deposition. *See* Mahon Dep. at 16-18, 20-6 ("Q: Do you offer any opinions about 'lexicography' or 'disclaimer' in this case? A: I do not.").

Second, Petitioners assert that Agee alone renders obvious the challenged claims. Although the Petition lists an alternative ground of Agee and Butler, this ground is essentially the same. The Petition does not rely on any specific teachings or modifications based on the Butler patent and merely asserts that a Butler matrix would be known to a POSITA. Therefore, this Patent Owner Response focuses on Agee since the crux of the Petition is single-reference obviousness. But these arguments equally apply to the alternative ground of Agee and Butler.

Third, Petitioner and Dr. Mahon fail to sufficiently articulate an obviousness combination or modification for Agee. For example, Dr. Mahon fails to identify the differences between Agee and the challenged claims and then propose any specific modifications to Agee to arrive at the challenged claims. In deposition, Dr. Mahon confirmed that he didn't propose any modifications for Agee:

11 My question is: Do you discuss any modifications
12 of Agee alone; for example, changes one would make to
13 Agee to -- to render the '235 claims obvious?

14 A. I'm not sure I understand your question.

15 Q. Let me ask you a different way.

16 Do you -- do you discuss in your opinions any
17 modifications or changes to Agee?

18 A. No. My opinion is that Agee renders
19 obvious the asserted claims based on the knowledge of a
20 person of ordinary skill in the art at the time of the
21 invention, and that alone is sufficient.

22 Q. So do you believe that any changes or
23 modifications to Agee are -- are necessary?

24 A. Not outside of the scope of anything I've
25 discussed in my declaration from the perspective of a

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1 person of ordinary skill in the art, and I don't recall
2 anything right now that's coming to mind that I -- I
3 discussed.

Mahon Dep. at 33-34.

A. Independent Claim 1

The Petition fails to show that Agee, alone or in combination with Butler, renders obvious independent claim 1. *See* Vojcic Decl ¶¶ 44–67

1. Petitioners' Theory

Petitioner only presents one coherent theory for claim 1 based on Agee, alone or in combination with Butler. The theory is Agee's disclosure related to pilot signals. The Petition argues that Agee teaches or suggests a processor that is configured to receive a first signal transmission at a first antenna element from a remote station and a second signal transmission at a second antenna element from the remote station—a pilot signal. The Petition argues that signals transmitted from Agee's remote station include a pilot signal and that these signals are simultaneously sampled at multiple antenna elements.

Petitioner argues that the different signal strengths at different antenna elements are measured, and “[t]hese measurements are passed into the circuitry of [phase] shifters and dividers / combiners.” Mahon Decl. ¶ 342; Pet. at 14. Petitioner argues that the measured signal strengths at different antenna elements correspond to the recited first signal information and second signal information. *See* Pet. 61.

For limitation [1.6], the Petition contends that the output data from the Butler matrix, that is, the output from processing the pilot signal information, is used to calculate weights based on the received pilot signal information—“combiner weights.” The Petition refers to “combiner output data” as the data that is outputted by the Butler matrix after processing (that is, combining) the alleged information signals received at the antenna elements. *See, e.g.,* Mahon Dec. ¶ 324 (discussing

combiner feeds and distributer feeds). The Petition states that “the received pilot data tones (‘x’) is received by the FFT-LS algorithm to calculate the weights.” The Petition argues that “[t]he ‘combiner weights W’ are used to form beams and nulls for receiving and transmitting data.” Pet. at 68; *see also* Mahon Decl. ¶¶ 549–550.

The Board discussed the above theory in its institution decision and found it sufficient for institution based on the preliminary record and under the reasonable unlikelihood standard. The Board did not discuss any other theories or find them to be coherent or sufficient.

Importantly, none of the other theories the Petition suggests (or purports to preserve) for claim 1 is coherent or sufficient. For example, claim 1 requires that the “first signal” and “second signal” from [1.3] being used to determine “first signal information” that is different than “second signal information” in [1.4] and [1.5] further being used to “determine a set of weighting values” in [1.6]. For limitation [1.6], the Petition’s theory requires Agee’s “pilot signal” or “pilot data tones” to serve as the claimed “signal information” used to calculate Agee’s “weights.” Pet. at 64-69.

The Petition presents in cursory fashion references to possible alternative mappings of “signal information” in Agee. Pet. at 62-64. All fail, as explained in Patent Owner’s Preliminary Response. First, the Petition identifies as possible examples of “signal information” the following: “antenna pointing direction

information,” “null/zero location information,” “peak location information,” “frequency information,” and “timing information.” Pet. at 62-63. All of these are examples of signal information from the '235 Patent itself, not from Agee or any other prior art reference. The teachings from the '235 Patent cannot be used to render the patent itself obvious.

Second, the Petition states that “Agee’s 32 different OFDM tones are all separate transmissions at different frequencies and thus provide ‘frequency information.’” Pet. at 63. But the Petition does not explain how Agee “determines” such frequency information, which is insufficient to show [1.4] or [1.5]. *Id.* The Petition does not identify any element in Agee that “determines” frequency information. *Id.* There is no explanation in the Petition how “frequency information” is used to determine weighting values in limitation [1.6]. Pet. 64-69. The only reference to frequency at in limitation [1.6] is in support of the argument, introduced in limitation [1.3], that each individual tone is a separate “transmission signal,” and that Agee performs its weight determination algorithm on a per-tone basis. Pet. at 67-68; *see id.* at 44 (contending that limitation [1.3] is met through “Agee’s use of OFDM which transmits (and receives) multiple different OFDM tones simultaneously”). The Petition’s theory is that the weighting value is determined the same way for each individual tone, but there is no contention that this involves frequency information.

But the Petition does not allege or explain how such “frequency information” is “used” to compute weights in limitation [1.6]. Pet. 63-69. The Petition says that Agee discloses that the “combining weights” are “applied over as broad a range of tones (frequency channels k)” but cites nothing in Agee which indicates that weights are determined based on the specific frequency k . While a weight may be determined for each frequency, the numerical value of that frequency has no impact on the determination of the weight in Agee. Agee’s alleged disclosure that weights are computed for the entire OFDM symbol comprising 32 tones does not show that the value of the frequency has any impact on the determined weights. The Petition does not clearly articulate any theory regarding frequency values and identifies no support in Agee that frequencies themselves are used in any way to calculate weights. Pet. 63-69.

Further, there is no suggestion or showing that Agee discloses any determination of per-tone weighting values based on the overall number of tones, which is fixed at 32, in the Petition’s own theory. And if “32” is the signal information in the Petition’s theory, the Petition does not and cannot plausibly show that Agee discloses a *determination* of this value as claimed, nor how there could be a determination of “different” second signal information in [1.5] where, as here, every signal in the Petition’s invalidity theory of Agee with Butler is an OFDM signal comprising the same number of tones (32 tones).

Third, the Petition attempts to map “signal information” as “timing information” by pointing to a “observed timing offset.” Pet. at 63. There is no explanation or support for this theory. The Petition apparently references its discussion at 52-54, which does not mention any “timing information” as described in the '235 Patent and instead discusses the detection of pilot signals. And “timing information” appears nowhere else in the Petition, such as in [1.6].

Fourth, the Petition identifies “pseudodelays” as “node authentication information.” Pet. at 63. There is no explanation or support for this apparent non sequitur, except for references that pseudodelays are “unique to each transmit note,” *e.g.* Pet. at 52. “Node authentication information” appears nowhere else in the Petition, and “pseudodelays” are not even mentioned in connection with limitations 1.6 or 1.7.

Fifth, the Petition alleges that there are “peaks” in “observed pseudodelays” which are “peak location information.” Pet. at 63. The Petition contains no discussion of the supposed detection of “peaks” in Agee to support this theory, or any explanation of what information in Agee is contended to meet the limitation. Rather, the Petition merely quotes the phrases “peak location information” and “null/zero location information,” neither of which appears in Agee, and neither of which appears anywhere else in the Petition.

Sixth, the Petition identifies “azimuth and elevation” and “link quality statistics.” Pet. at 63: The Petition again provides no explanation why these words relate in any way to the '235 Patent claims. “Azimuth” and “elevation” appear nowhere else in the Petition; “link quality statistics” appears in unexplained quotations, but not for limitations 1.6 or 1.7.

2. The Pilot Signal Theory Fails

Accordingly, the Petition presents no other invalidity theory where “first signal information” and “second signal information” in [1.4] or [1.5] used to determine the weighting values in [1.6]. The only arguably coherent theory presented is the one discussed in the institution decision based on a pilot signal transmitted from Agee’s remote station.

The Petition fails to show that Agee’s pilot signal or pilot signal theory renders obvious claim 1. Although the Board found that the pilot signal theory was sufficient for institution, it did not make any findings based on a full record or under the preponderance of evidence standard. Further, the Board did not specifically or fully address several of Patent Owner’s arguments that have merit. Those arguments are summarized below for further consideration by the Board.

The Petition argues that Agee “teaches the Butler outputs collectively (‘combiner output data’) constitute a determination of different signal informations. For example, the first and second signal informations are Butler output #1 and Butler

output #2.” Pet. at 64. But this argument is unsupported by any citation in Agee or what a POSITA would understand.

The Petition fails to show that “Butler output #1” or “Butler output #2” are “signal information” of [1.4] or [1.5] or that such outputs are “signal information” used to determine “weighting values” in [1.6]. In describing the Agee and Butler prior art, the Petition alleges that a Butler matrix output is the “‘combined’ signals from multiple antennas being received and aggregated.” Pet. 8. But in view of the Petition’s clear assertion that a Butler matrix output is a combined “signal,” the Petition fails to show or explain for [1.4] or [1.5] how the Butler matrix output, which is a “combined signal” (Pet. 8), is “signal information.” Pet. 64. The Petition’s argument that each output is a “determination of different signal informations resulting from multiple signals” is unsupported evidence and is contradicted by the Petition’s assertion that each Butler output is a combined “signal” which is combined from multiple signals.

This is shown by the Petition’s own discussion of Butler, which states that the output ports of a Butler matrix, in the context of reception, “output the ‘combined’ *signals* from multiple antennas being received and aggregated to form each reception beam.” Pet. at 8. This is further confirmed by reference to the figure from the well-known Butler reference, showing the analog components that make up the matrix. The combiners and phase shifters that form the Butler matrix perform combining

and phase-shifting the various signals to produce output signals (in the context of reception) at the feed terminals.

A further problem of mapping “Butler outputs” as “signal information” determined by the claimed “processor” is that the Petition’s theory requires that the Butler matrix outputs are *inputs* to the claimed “processor” of [1.2]. Pet. 42 (“The DSP [processor] receives and processes the Butler matrix outputs from the antennas.”). But if the Butler matrix outputs are inputs to the DSP “processor” (as alleged for [1.2]), then the Butler matrix outputs cannot also be “signal information” that is “determined” by the “processor” as required under [1.4] and [1.5].

The Petition also fails to show that Agee determines weighting values in limitation [1.6] based on signal strength. The Petition argues that “Agee’s Butler matrix measures different signal information (signal strengths) received on each antenna even for the same signal wave due to the phase differences resulting from the antennas’ spatial separation.” Pet. at 62. This argument fails to meet Petitioners’ burden to prove obviousness, for several reasons. These reasons were raised in Patent Owner’s Preliminary Response and were not specifically or fully addressed in the institution decision.

First, Agee does not teach anything about “signal strength” or about a Butler matrix deriving or determining “signal strength.” A POSITA would not understand a Butler matrix as “determining” or “measuring” signal strength. Nor does the

Petition or Dr. Butler sufficiently explain this beyond asserting it. Second, the Petition fails to show a “first signal” and “second signal” from [1.3] being used to determine some “second signal strength information” which is *different than* “first signal strength information,” as required in [1.4] and [1.5].

Third, the Petition fails to show any determination of beamforming weights in [1.6] based on *any* determined signal strengths in Agee, or any determination of weights based on a *first* signal strength which is *different* than the *second* signal strength. Pet. at 61-62, 64-69. I note that there is no sufficient reference or discussion to “strength” anywhere in the [1.6] analysis. Pet. at 64-69. Further, the cited disclosures from Agee teach determinations based on the actual OFDM tones and symbols, not based on “signal strength.” *See, e.g.*, Pet. at 68 (“EX-1004, 65:24-46 (‘K is the number of tones used in a single FFT-base LS algorithm’ used to calculate ‘combiner weights.’)).

B. Dependent Claims 4, 12

The Petition fails to show that Agee, alone or in combination with Butler, renders obvious dependent claim 4 for the same reasons as independent claim 1 and for additional reasons. *See* Vojcic Decl. ¶¶ 69–86.

Claim 4 recites: “The receiver as recited in claim 1, wherein the content comprises data configured to be used by the remote station to modify the placement of one or more transmission peaks and one or more transmission nulls in a

subsequent signal transmission.” The same requirement appears in dependent claim 12.

Here, “the content” refers back to part of limitation [1.8], “cause the transceiver to transmit a third signal to the remote station via the antenna, the third signal comprising *content* based on the set of weighting values.” The third signal comprises content, and the content comprises the “data” of claim 4.

As an initial matter, the Petition does not articulate or adequately explain what the alleged “third signal” (transmitted by the transceiver to the remote station via the antenna) is or how it allegedly meets the additional claim 4 requirement “wherein the content comprises data configured to be used by the remote station to modify the placement of [transmission peaks/nulls] in a subsequent signal transmission.” The Petition and Dr. Mahon’s theory for claim 4 is not understandable. For claim 1, Dr. Mahon appears to be relying on (any) generic signal as the alleged “third signal” But for a generic signal transmitted from the receiver to the remote station, there is no showing or explanation for why or how it includes content that includes “data configured to be used by the remote station to modify the placement of [transmission peaks/nulls] in a subsequent signal transmission.”

Although the Petition is unclear, Petitioner may argue (or attempt to argue) that the “third signal” is a pilot signal. Assuming that is the case, Patent Owner responds on that basis. For the claim language “data configured to be used by the

remote station to modify the placement of one or more transmission peaks and one or more transmission nulls in a subsequent signal transmission,” Dr. Mahon points to “the pilot signals that each Agee BS transmits to the other BSs.” Mahon Decl. ¶ 621. For this to invalidate claim 4, Dr. Mahon must show at least: (1) that the “third signal” of limitation [1.8] comprises Agee’s “pilot signals”; and (2) that Agee’s “pilot signals” are “data configured to be used by the remote station...” Dr. Mahon fails show either of these things, and they are addressed in turn.

First, Dr. Mahon does not show that the “third signal” of limitation [1.8] comprises “pilot signals.” Dr. Mahon’s analysis of limitation [1.8] only discusses “combiner” weights, which in his theory “are used as distributor / transmit weights.” Ex. 1003, ¶ 600. In Dr. Mahon’s theory, “Agee’s output data is modified by the weights (as shown in elements [1.6]-[1.7] before it is transmitted (elements [1.4]-[1.7] above) and therefore meets this element.” This analysis says nothing about “pilot signals” being included in the “third signal.”

Dr. Mahon’s analysis of limitation [1.4]-[1.7] suggests that, in his theory, Agee’s pilot signal is something used to determine the claimed set of weighting values, *i.e.*, that the pilot signal is part of the first and second signal information. For example, the first real paragraph of the limitation 1.6 analysis says that “Agee uses a pilot data signal (the ‘combiner output data’) that it receives from the Butler matrix.” Mahon Decl. ¶ 538. And Dr. Mahon points to specific “usage (and

calculations) of the pilot symbols received from the butler matrix... for calculating the weights for the received pilot symbol.” *Id.* ¶ 544. The rest of Dr. Mahon’s discussion of the limitation similarly confirms that the pilot signal is something used to determine the weighting values. *Id.* ¶¶ 545-572.

In other words, Dr. Mahon only ever opines on “pilot signals” as something received by the apparatus of claim 1, and specifically as inputs to the weight determination of limitation 1.7. He does not show that Agee discloses or renders obvious pilot signals that are transmitted by the by the apparatus of claim 1, or that pilot signals are “output data... modified by the weights,” which is the only thing he points to as the third signal of limitation 1.8.

As discussed in claim 1 above, Petitioner argues that the “pilot signal” corresponds to the “first signal” and “second signal” of limitation [1.3], and also corresponds to the “first signal information” and “second signal information” of limitations [1.4] and [1.5]. This confirms my opinion that Dr. Mahon’s analysis of claim 1 maps Agee’s pilot signals to the signals that are *received* by the apparatus of claim 1, not to anything *transmitted* by the apparatus, such as the third signal of limitation 1.8.

Petitioner and Dr. Mahon’s discussion of claim 4 likewise does not show that the pilot signal is part of the third signal of limitation 1.8. Limitation 1.8 requires “the third signal comprising content based on the set of weighting values.” Dr.

Mahon's claim 4 analysis does not address this requirement at all. He says that pilot signals are "used to construct the receive weights" as discussed in elements 1.4-1.7. Ex. 1004 ¶ 622. But this sentence, as well as Dr. Mahon's discussion of elements 1.4-1.7, is talking about the pilot signals *received* by the apparatus of claim 1 (*i.e.* the first/second signals), not any signal *transmitted* by the apparatus of claim 1 (the third signal).

Dr. Mahon also states that "Agee's BS's use the pilot signals received from other (transmitting) BS's to calculate receive weights... those receive weights are used for transmit weights that form beam-formed transmissions that modify the placement of peaks and nulls in subsequent transmissions." Mahon Decl. ¶ 624. This, again, refers only to pilot signals *received* by a station (first/second signals), and says nothing about a pilot signal *transmitted* by a station (third signal).

Second, Petitioner and Dr. Mahon fails to show that Agee's pilot signal constitutes "data configured to be used by the remote station..." The concept of a pilot signal is generally understood by a POSITA. A pilot signal, including in context of Agee, is a tone with a predefined structure and content that is known to both the transmitter and receiver. Pilot signals are *not* data. As a POSITA would readily understand (including from introductory-level information theory) that encoding data requires and involves some amount of entropy or uncertainty in the signal, with a direct relationship between the amount of entropy and the amount of data that can

be conveyed. When a signal is fixed and predefined, it contains no data. A pilot signal is fixed and predefined and contains no data.

The specific pilot signals described in Agee are also fixed and predefined and contain no data. Agee describes the pilot signals in figures 21 and 28. The pilot signal is determined by “one or more of the originating node, recipient node, and network or group channel organization,” and is “modified by a network code mask.” Ex. 1004 at 58:17-21. Agee describes a specific algorithm to generate the pilot tone from these specific inputs. *Id.* at 58:16-52. This algorithm involves pseudorandom sequences, which are fixed and predefined sequences based on an input that have some of the numerical properties of a random sequence. A pseudorandom sequence does not and cannot contain more data than the input used to calculate the pseudorandom sequence. Agee explains that having pilot tones defined by the node and network identifiers “allows the network to pilot the communication through the network from origin to destination regardless of the intervening channels it takes.” *Id.* at 58:36-42.

Petitioner might try to argue that Agee’s pilot tones contain data because Agee uses the term “pilot data” several times. *See, e.g.*, Ex. 1004 at 32:28-31, 36:51-55, 64:52-65:22, 65:64-67, 68:5-9. But that phrase refers to the fixed, predefined sequence of tones that constitutes the pilot signal, and is used within the discussion of how to generate or interpret the pilot signal itself. For example, Agee describes a computation involving a “known segment of transmitted pilot data,” where “the pilot

data transmitted over the pilot signal” is defined by a set of equations that are known by both the transmitter and receiver with no data inputs. *Id.* at 64:47-48, 64:54-65:45. This is in contrast to “the remaining *information-bearing symbols*” described in the following paragraph, which are defined to contain “the uplink and downlink data symbols provided by prior encoding, encryption, symbol randomization, and channel reemphasis stages.” *Id.* at 65:48-57.

This context confirms that the pilot signals are predetermined based on “one or more of the originating node, recipient node, and network or group channel organization” (Ex. 1004 at 58:17-21) and do not contain any other data, much less “data configured to be used by the remote station to modify the placement of one or more transmission peaks and one or more transmission nulls in a subsequent signal transmission” as claimed in the '235 Patent.

The pilot signal in Agee is similar to the common pilot channel (CPICH) in 3G in that it only contains predetermined bit/symbol sequence (“The CPICH is a fixed rate (30 kbps, SF=256) downlink physical channel that carries a pre-defined bit/symbol sequence.” Ex. 2004, 3GPP TS 25.211 v3.9.0 (2001-12) at 5.3.3.1). The CPICH, just as Agee’s pilot, does not carry data from a transport layer (the transport layer carries user and upper layer signaling messages) as shown below. Thus, a POSITA at the time of invention would not consider Agee’s pilot to carry any data.

6.1 Mapping of transport channels onto physical channels

Figure 27 summarises the mapping of transport channels onto physical channels.

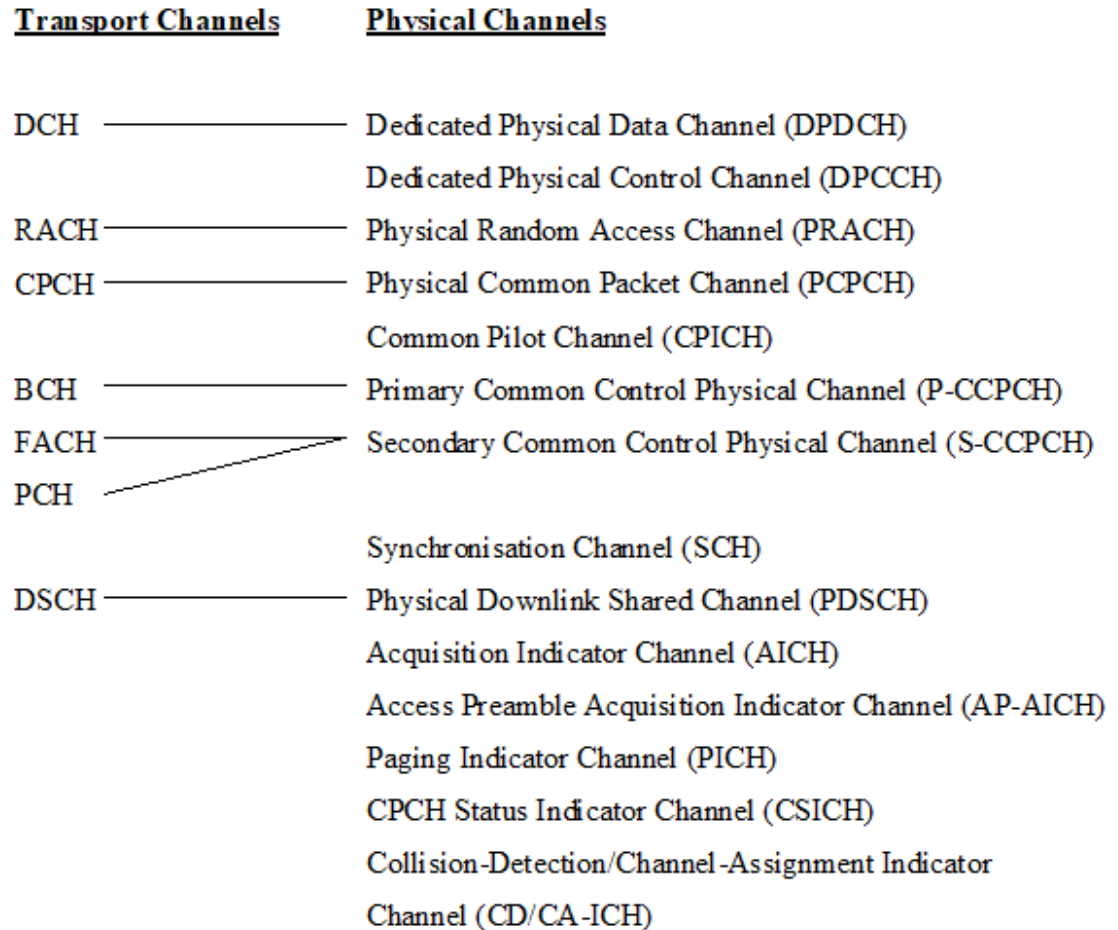


Figure 27: Transport-channel to physical-channel mapping

3GPP TS 25.211 v3.9.0 (2001-12) at 6.1.

Dr. Mahon also states that “Agee’s BS’s use the pilot signals received from other (transmitting) BS’s to calculate receive weights. As detailed in elements 1.7-1.8 and claim 2, those receive weights are used for transmit weights that form beam-formed transmissions that modify the placement of peaks and nulls in subsequent transmissions.” Mahon Decl. ¶ 624. Dr. Mahon does not explain the connection

between his discussion of elements 1.7-1.8 and claim 2—which relate to the first and second signals and to the weight determination of claim 1—and the different limitation of claim 4, which relates to the third signal and to the placement of transmission peaks and nulls by the remote station in a subsequent transmission.

C. Dependent Claims 5, 11

Petitioner fails to show that Agee, alone or in combination with Butler, renders obvious dependent claim 5 for the same reasons as independent claim 1 and dependent claim 4, and for additional reasons. *See* Vojcic Decl. ¶¶ 87-96.

Claim 5 recites: “The receiver as recited in claim 4, wherein the set of weighting values is further based on one or more of: a transmit power level, a data transmit rate, an antenna direction, quality of service data, or timing data.” The same requirement appears in dependent claim 11.

Here, “the set of weighting values” refers back to limitation [1.6], “determine a set of weighting values based on the first signal information and the second signal information.” Dependent claim 5 recites “*further* based on . . .” The plain meaning of this claim language is that the set of weighting values must be based on at least two things: (1) the first and second signal information (as recited in limitation [1.6]) *and also* (2) “a transmit power level, a data transmit rate, an antenna direction, quality of service data, or timing data” (as recited in claim 5).

Petitioner and Dr. Mahon fails to show this requirement of “further based on . . .” and his opinions for claim 5 are conclusory and incorrect. First, Dr. Mahon did not point to anything in Agee that would show that “a transmit power level, a data transmit rate, an antenna direction, quality of service data, or timing data” are used explicitly in weight coefficient calculations. I discuss this in my rebuttal of claim 1 above.

Second, Petitioner and Dr. Mahon’s only theory for limitation [1.6] is that “signal strength” is the alleged first signal information and the second signal information. But there is no showing in limitation [1.6] that the determination of a set of weighting values is based on anything else. To the extent that Dr. Mahon attempts to argue that transmit power level and antenna direction affect the pilot signal strength in the first and second signal information limitations, they have been already exploited for the purpose in claim 1 and could not be used for “the set of weighting values is further based.” At most, Dr. Mahon argues that the weighting values are based on one thing (signal strength), and it would be nonsensical to say that it is based on multiple things that subsumed by or indirectly related to signal strength.

Third, to the extent that Petitioner and Dr. Mahon mapped “frequency data (OFDM tones at different frequencies)” to “a data transmit rate,” that is incorrect. OFDM tones at different frequencies are not “a data transmit rate.” Further, Dr.

Mahon does not point to anything in Agee that shows any of frequency data, a data transmit rate, pseudo delay, or link quality statistics are used in the calculation or determination of weight coefficients. That is not shown or explained in claim 5 or claim 1.

Indeed, as discussed above for claim 1, the Petition merely states that “Agee’s 32 different OFDM tones are all separate transmissions at different frequencies and thus provide ‘frequency information.’” Pet. at 63. And there is no explanation in the Petition how “frequency information” is used to determine weighting values in limitation [1.6]. Pet. 64-69. The only reference to frequency at in limitation [1.6] is in support of the argument, introduced in limitation [1.3], that each individual tone is a separate “transmission signal,” and that Agee performs its weight determination algorithm on a per-tone basis. Pet. at 67-68; *see id.* at 44 (contending that limitation [1.3] is met through “Agee’s use of OFDM which transmits (and receives) multiple different OFDM tones simultaneously”). The Petition’s theory is that the weighting value is determined the same way for each individual tone, but there is no contention that this involves frequency information.

The Petition does not allege or explain how such “frequency information” is “used” to compute weights in limitation [1.6]. Pet. 63-69. The Petition says that Agee discloses that the “combining weights” are “applied over as broad a range of tones (frequency channels k)” but cites nothing in Agee which indicates that weights

are determined based on the specific frequency k . While a weight may be determined for each frequency, the numerical value of that frequency has no impact on the determination of the weight in Agee. Agee's alleged disclosure that weights are computed for the entire OFDM symbol comprising 32 tones does not show that the value of the frequency has any impact on the determined weights. The Petition does not clearly articulate any theory regarding frequency values and identifies no support in Agee that frequencies themselves are used in any way to calculate weights. Pet. 63-69.

Further, the Petition mentions "signal information" as "timing information" by pointing to a "observed timing offset." Pet. at 63. There is no explanation or support for this theory. The Petition apparently references its discussion at 52-54, which does not mention any "timing information" as described in the '235 Patent and instead discusses the detection of pilot signals. And "timing information" appears nowhere else in the Petition, such as in [1.6].

Further, Petition mentions "azimuth and elevation" and "link quality statistics." Pet. at 63: The Petition again provides no explanation why these words relate in any way to the '235 Patent claims. "Azimuth" and "elevation" appear nowhere else in the Petition; "link quality statistics" appears in unexplained quotations, but not for limitations 1.6 or 1.7.

D. Independent Claim 8

The Petition fails to show that Agee, alone or in combination with Butler, renders obvious independent claim 8. *See* Vojcic Decl. ¶¶ 97–106.

Claim 8 contains the same requirements of limitations [1.3]-[1.6]. Thus, for the same reasons discussed for limitations [1.3]-[1.6], Petitioner and Dr. Mahon fails to show obviousness of claim 8. Claim 8 also contains additional requirements, and Dr. Mahon fails to show obviousness of the additional requirements.

Limitation [8.4] recites: “determining a set of weighting values based on the first signal information and the second signal information, wherein the set of weighting values is configured to be used **by the remote station** to construct one or more beam-formed transmission signals.” The bolded text is different from claim 1. Claim 8 requires the weighting values to be configured for use by the remote station, not for use by the apparatus practicing the claimed method.

Petitioner and Dr. Mahon seems to suggest that limitation 8.4 should be construed to have the same meaning as limitation 1.7, that is, to require weighting values configured to be used by the apparatus practicing the claimed method, and not by the remote apparatus. *See* Ex. 1003 ¶¶ 630-641. Dr. Mahon does not explain what he believes is the correct construction of limitation 8.4.

Limitation 8.4 has a plain and ordinary meaning and a POSITA reading the claim in the context of the intrinsic record would understand that the limitation is

being used in its plain and ordinary sense. Specifically, it requires the weighting values to be configured to be used by the remote station to construct one or more beam-formed transmission signals. Petitioner and Dr. Mahon has not shown any reason the claims should be given a different interpretation.

In paragraphs 632-639, Dr. Mahon argues that, based on statements in the prosecution history, “the calculation of weights by the station receiving the first and second signal information (e.g., Agee’s BS) [should be] sufficient to disclose this element.” Mahon Decl. ¶ 634; *see generally id.* ¶¶ 632-39. This is not correct. The plain meaning of the claim states that the station receiving the first and second signal information (*i.e.*, the station practicing the claimed method) performs the step of “determining a set of weighting values.” That is necessary, but not sufficient to meet the limitation. It is also necessary that the weights are configured for use by the remote station. Nothing in paragraphs 632-639 contradicts the plain language that the weights must be configured for use by the remote station.

Petitioner and Dr. Mahon fails to meet his burden to show obviousness based on the plain meaning of claim 8. Even if claim 8 does not require the data to be transmitted to be the weights themselves, it does not follow that *any* signal transmitted by the transceiver meets claim 8. But that appears to be Dr. Mahon and Petitioners’ position. And the primary (if not only support) for this position is based

on inaccurate and out-of-context characterizations of the prosecution history and prior IPRs.

Petitioner and Dr. Mahon presents an alternative theory “if the claims required that the data being transmitted between the nodes to be the weights themselves.” Ex. 1003 ¶ 642. That is also not the plain and ordinary meaning of the claim language, which simply requires the weights to be configured to be used by the remote station. Under this alternative theory, Dr. Mahon opines that it would be obvious for one base station to transmit “its weights” (*i.e.*, the weights determined for use by the first base station) to another base station, which “could use those weights for its own beamforming because of the reciprocal channel conditions.” *Id.* This is speculative, conclusory, and not based on any evidence. And it is still wrong, because Dr. Mahon does not show any determination of weights configured to be used by the remote station within the claimed method. Dr. Mahon is suggesting that the remote station makes its own determination based on the weights determined for use by the first base station. That is not what the claim requires.

Finally, Dr. Mahon opines that “because of reciprocity, the transmit weights used by Agee’s BS would be the same as the receive weights used by the remote station,” and “each of Agee’s BS’s have the capacity to employ the weight calculation.” Ex. 1003 ¶ 643. But the claim language requires the weights to be configured to be used by the remote station to ***construct one or more beam-formed***

transmission signal.” Dr. Mahon’s theory for claim 1 focuses on the transmit weights, which are the weights used to construct transmission signals. Even under Dr. Mahon’s theory that the transmit weights are the same as the receive weights used by a remote station, he has failed to show that the receive weights are “configured to be used by the remote station to construct one or more beam-formed transmission signals” as claimed.

E. Independent Claim 15

The Petitioner fails to show that Agee, alone or in combination with Butler, renders obvious independent claim 15. *See* Vojcic Decl. ¶¶ 114-120

Claim 15 contains the same requirements of limitations [1.3]-[1.6]. Thus, for the same reasons discussed for limitations [1.3]-[1.6], the Petition fails to show obviousness of claim 15. Claim 15 also contains a similar limitation to claim 5, by reciting “the first signal transmission comprising first signal information, wherein the first signal information *comprises one or more of: a transmit power level, a data transmit rate, an antenna direction, quality of service data, or timing data*” (limitation [15.4]) and “determine a set of weighting values based on the first signal information and the second signal information” (part of limitation [1.6]). Thus, for the same reasons discussed in claim 5, Petitioner and Dr. Mahon fails to show obviousness of claim 15.

The Petition and Dr. Mahon provide no independent or sufficient analysis of claim 15. They merely cite back to limitations [1.3]-[1.6] and claim 5. And the Petition and Dr. Mahon merely assert that “the first signal information comprises’ multiple different recited options” and that “the signal informations are used to determine the weighting values.” Pet. at 81.

This fails for the reasons discussed and introduces additional problems. First, the Petitioner and Dr. Mahon did not point to anything in Agee (for either claims 1 or 5) that would show “a transmit power level, a data transmit rate, an antenna direction, quality of service data, or timing data” are used explicitly in weight coefficient calculations. Second, Dr. Mahon’s only theory for limitation [1.6] is that “signal strength” is *both* the alleged first signal information and the second signal information. Even as to claim 15, Dr. Mahon does not address the second signal information at all, except referring back to claim [1.6], so must be “signal strength.”

But there is no showing in the Petition or declaration that the determination of a set of weighting values is based two things: (1) “signal strength” as the alleged second signal information and (2) something else as the alleged first signal information. To the extent that Dr. Mahon attempts to argue that transmit power level and antenna direction affect the pilot signal strength in the first signal information limitations, Dr. Mahon has already alleged for claim 1 that the first signal information is “signal strength.” Since Dr. Mahon argued the first signal

information is one thing (signal strength), it is incorrect to say that it is also multiple things that are subsumed by or indirectly related to signal strength.

Further, the Petition, Dr. Mahon has always treated the first signal information and second signal information as the same thing (signal strength of the same signal). It is therefore inconsistent to characterize the first signal information as “signal strength” and the second signal information as something else. Any attempt to equate “signal strength” with “a transmit power level” is also unsupported. A POSITA would know they are different concepts, have different values, and may be affected by different factors. I also disagree that “a transmit power level” is used by Agee in weight coefficient calculations. That is even further removed than his theory for “signal strength.” There is no sufficient showing that any processor in Agee “determines” the transmit power level at a particular antenna, and that setting weight values can be considered “based on” a transmit power level.

F. Dependent Claims 17

The Petition fails to show that Agee, alone or in combination with Butler, renders obvious dependent claim 17 for the same reasons as independent claim 15 and for additional reasons. *See* Vojcic Decl. ¶¶ 112-127.

Claim 17 recites: “The apparatus as recited in claim 16, wherein the processor is configured to receive a fourth signal transmission from an interferer source, the fourth signal transmission being undesired, and the processor is configured to store

identifying information concerning the undesired interferer source and the remote station.”

Dr. Mahon’s analysis of Claim 17 is conclusory and incorrect. Dr. Mahon fails to show that the additional requirements of claim 7, including “the processor is configured to store identifying information concerning the undesired interferer source and the remote station” is rendered obvious. Dr. Mahon states “Agee stores “identifying information” about each node that includes, for example, the “known” pilot data for each node as well as the “pseudodelay” discussed in element 1.4-1.6 above. EX-1004, 64:43-67:28, 58:16-67, claim 53.” I disagree with this statement. Dr. Mahon also fails to show that “know” pilot data and “pseudodelay” would be considered “identifying information.” For example, there is no explanation that it is possible to specifically identify each node based on known pilot data or pseudo delay.

The citations from EX-1004 that Dr. Mahon used do not support his “for each node...” assertion. There is no support that identifying information concerning undesired interference sources is stored. The statement in Agee “Unauthorized pilot symbols, and symbols intended for other nodes in the network, are not so transformed and continue to appear as random noise at the recipient node (See FIGS. 38A, 38B),” does not mean that identifying information concerning interference sources is stored. EX-1004, 66:16-20. A POSITA would understand this statement

to be a consequence of the MMSE beamformer that attempts to maximize the SNIR but does not even know the direction and identity of interference sources, as it treats them as noise.

Dr. Mahon states “Agee’s BS stores the identifying node information for every node (not just directly connected nodes) because data might be passed through “intervening” nodes to its destination. EX-1004, 58:16-42.” Mahon at 662. This is incorrect. 1004, 58:16-42 does not support Dr. Mahon’s statement.

Since there is no teaching in Agee of storing identifying information concerning undesired interference sources, Dr. Mahon at 663-666 tries to explain his obviousness theory. He states that that it would be obvious to modify Agee to store identifying information about undesired interference sources (“storing “identifying information” for each node in a network would be, at most, an obvious modification to Agee, Mahon at 663”). I disagree. A POSITA would not find that obvious because the MMSE beamformer in Agee suppresses interference in a blind manner.

G. Dependent Claims 18

The fails to show that Agee, alone or in combination with Butler, renders obvious dependent claims 18 for the same reasons as independent claim 15 and dependent claim 17, and for additional reasons. *See* Vojcic Decl. ¶¶ 129–133.

Claim 18 recites: “The apparatus as recited in claim 17, wherein the processor is configured to identify a further interferer signal transmission from the interferer

source, and to identify a further desired signal transmission from the remote station, wherein the processor is further configured to prevent the transceiver from transmitting a fifth signal transmission via the antenna during reception of the further desired signal transmission but to allow the transceiver to transmit a sixth signal transmission via the antenna during reception of the further interferer signal transmission.”

Dr. Mahon fails to show at least that the requirement that “wherein the processor is further configured to **prevent** the transceiver from transmitting a fifth signal transmission . . .” Dr. Mahon does not present any evidence or explanation showing that transmission is prevented. At most Dr. Mahon argues that the transceiver does not transmit during certain periods but makes not showing of prevention (or processor being configured to prevent).

Moreover, Dr. Mahon’s analysis for Claim 18 is incorrect. Dr. Mahon states “Because BS “A” has the same “transmit” slot as the BS to which no link is shown (the “interferer sources” above), the transceiver is allowed to transmit a sixth signal transmission via the antenna during reception of the further interferer signal transmission. Even though BS “A” is not shown having a link connecting it to the other black circle nodes, the antennas at BS A will still “receive” the transmitted information (even while transmitting themselves). The antennas receive the energy Declaration of Dr. Mark P. Mahon Page 279 of 286 in the form of the radio waves

regardless of whether the BS A is sampling and using that energy induced on the antenna during its transmit time slot as a result of the transmissions from the other black circle nodes.” Mahon at 675.

This is wrong incorrect and contradicts what Dr. Mahon stated at 674. In a TDD only transmit chain or the receive chain is operating in a time slot. The apparatus can't transmit and receive simultaneously. The fact that an electromagnetic (EM) wave is impinging on the antenna does not represent receiving. Since the receive chain is disabled, when transmitting, the EM wave “seen” by the antenna will not be converted to an electric signal that passes through to receiver chain down to the baseband processing. Dr. Mahon's statement is inconsistent to the understanding of a POSITA.

VI. CONCLUSION

For the foregoing reasons, Patent Owner respectfully requests that the Board find that challenged claims 1-5, 8-12, and 15-19 of the '235 Patent have not been shown to be unpatentable.

Date: January 24, 2025

Respectfully submitted,

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CERTIFICATION REGARDING WORD COUNT

Pursuant to 37 C.F.R. §42.24(d), I certify that there are 9,212 in the paper excluding the portions exempted under 37 C.F.R. §42.24(a)(1).

Date: January 24, 2025

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e)(1), I certify that the above document was served on January 24, 2025 by filing this document through the Patent Trial and Appeal Case Tracking System as well as delivering a copy via electronic mail upon the following attorneys of record for the Petitioner:

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