Trials@uspto.gov
Tel: 571-272-7822

Paper 7
Entered: October 5, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NETGEAR, INC.,
Petitioner,

v.

WSOU INVESTMENTS, LLC d/b/a BRAZOS LICENSING AND DEVELOPMENT,
Patent Owner.

IPR2022-00516
Patent 7,512,096 B2

Before THU A. DANG, BRIAN J. McNAMARA, and JOHN A. HUDALLA, *Administrative Patent Judges.*

DANG, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. Background

Netgear, Inc. ("Petitioner") filed a Petition requesting an *inter partes* review of claims 1–3 and 10 ("the challenged claims") of U.S. Patent No. 7,512,096 B2 (Ex. 1001, "the '096 patent"). Paper 2 ("Pet."). WSOU Investments, LLC d/b/a Brazos Licensing and Development ("Patent Owner") filed a Preliminary Response. Paper 6 ("Prelim. Resp.").

Under 37 C.F.R. § 42.4(a), the Board has authority to determine whether to institute an *inter partes* review. Applying the standard set forth in 35 U.S.C. § 314(a), which requires demonstration of a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim, we grant Petitioner's request and institute an *inter partes* review of all challenged claims.

B. Related Proceedings

Petitioner identifies the '096 patent as the subject of *WSOU Investments, LLC d/b/a Brazos Licensing and Development v. Netgear, Inc*., Civil Action No. 1:21-cv-1117 (D. Del. July 30, 2021) ("the parallel litigation"). Pet. 1.

C. The '096 Patent

The '096 patent, titled "Communicating Data Between an Access Point and Multiple Wireless Devices Over a Link," issued on March 31, 2009, from Application No. 10/996,617, filed on November 24, 2004. Ex.1001, codes (54), (45), (21), (22). The '096 patent relates to communication of data over a network between an access point (AP) having

first and second antennas, and first and second mobile stations. *Id.* at code (57).

The ’096 patent recognizes that telecommunication service providers exchange fee-based wireless and wireline traffic between mobile users and APs over a network to provide a variety of services. *Id.* at 1:16–19. According to the ’096 patent, one well-known standard, the Institute of Electrical and Electronics Engineers (IEEE) 802.11 specification, describes the operation of mobile stations and APs in a wireless local area network (WLAN). *Id.* at 1:31–34. Space division multiple access (SDMA) has been studied as a tool that uses spatial dimension to simultaneously transmit to, or receive from, multiple radios at the same carrier frequency. *Id.* at 1:57–60. Sophisticated schemes, such as dynamic beam-forming, have been implemented to apply SDMA to wireless mobile communications, especially to cellular systems. *Id.* at 2:4–13.

The method of the ’096 patent comprises weighting first data at the access point to transmit the first data using the first and second antennas so that the first mobile station only receives the first data. *Id.* at code (57). Similarly, the method comprises weighting second data at the access point to transmit the second data using the first and second antennas so that the second mobile station only receives the second data. *Id.* Figure 5 of the ’096 patent, depicting transmission to first and second mobile stations using first and second antennas at an access point, is reproduced below.

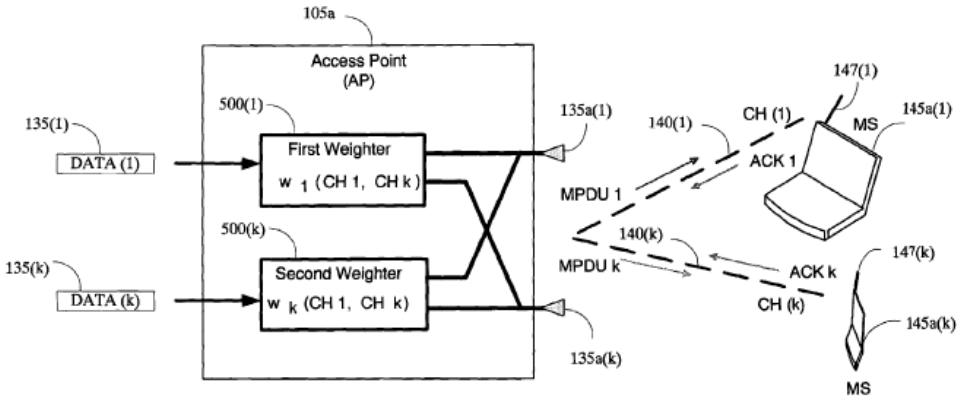


FIGURE 5

Figure 5 shows SDMA transmission to first and second mobile stations 145a(l,k) with first and second antennas at access point 105a based on the IEEE 802.11 standard. *Id.* at 8:30–35. As shown in Figure 5, access point 105a comprises first weighter 500(l) to weight first data 135(l) based on channel estimates of first and second radio channels 140(l,k) ("w_1(CHl,CHk)"), and second weighter 500(k) to weight second data 135(k) based on channel estimates of first and second radio channels 140(l,k) ("w_k(CHl,CHk)"). *Id.* at 8:35–42. In operation, weighted first and second data 135a(l,k) may be transmitted by both antennas at access point 105a over associated first and second radio channels 140(l,k) to first and second mobile stations 145a(l,k) for selective reception. *Id.* at 8:43–47.

To couple access point 105a to first and second mobile stations 145(l,k) through WLAN 115, at least one of access point 105a, first and second mobile stations 145(l,k), and the SDMA downlink may be defined at least in part by the IEEE 802.11 standard to establish the network. *Id.* at 7:36–53. A SDMA module may estimate first radio channel 140(l) from access point 105a to first mobile station 145(l) over a pilot interval, and may estimate second radio channel 140(k) from access point 105a to second

mobile station 145(k) over the pilot interval. *Id.* at 7:41–46. A pilot interval is a predetermined time period for transmission of a signal, either at a single frequency or several independent frequencies, for supervisory purposes including control, equalization, continuity, synchronization, or reference. *Id.* at 7:46–50.

D. The Challenged Claims

Of the challenged claims, claim 1 is the only independent claim. Claim 1 is reproduced below:

> 1. A method for communicating data over a network between an access point having a first and a second antenna and a first and a second mobile station, the method comprising:
>
> weighting a first data at said access point to transmit said first data using said first and second antennas so that said first mobile station only receives said first data; and
>
> weighting a second data at said access point to transmit said second data using said first and second antennas so that said second mobile station only receives said second data;
>
> increasing a first data rate of transmission of said first data and a second data rate of transmission of said second data using a single carrier frequency in a radio frequency communication based on a transmission protocol;
>
> discriminating transmissions of said first and said second data on a downlink in said radio frequency communication based on a spatial dimension;
>
> applying a space division multiple access based on said transmission protocol to said transmissions to transmit said first and said second data substantially concurrently from said access point to said first and second mobile stations, respectively;

> defining at least one of said access point, said first and second mobile stations, and said downlink at least in part by Institute of Electrical and Electronics Engineers (IEEE) 802.11 standard to establish said network including a wireless local area network;
>
> coupling said access point to said first and second mobile stations through said wireless local area network;
>
> estimating a first radio channel from said access point to said first mobile station over a pilot interval; and
>
> estimating a second radio channel from said access point to said second mobile station over said pilot interval.

Ex. 1001, 13:24–57.

E. Asserted Grounds of Unpatentability

Petitioner challenges the patentability of claims 1–3 and 10 of the '096 patent on the following grounds (Pet. 16–17):

Claim(s) Challenged	35 U.S.C. §[1]	Reference(s)/Basis
1	102	Perahia[2]
1–3	102	Li[3]
10	103	Li, Perahia

[1] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. §§ 102, 103, effective March 16, 2013. Because the application from which the '096 patent issued was filed before this date, the pre-AIA versions of §§ 102, 103 apply.

[2] US Patent No. 7,352,718 B1, issued April 1, 2008, filed July 22, 2003 (Ex. 1004, "Perahia").

[3] US Patent No. 8,199,723 B2, issued June 12, 2012, filed December 23, 2003 (Ex. 1005, "Li").

Claim(s) Challenged	35 U.S.C. §[1]	Reference(s)/Basis
1–3	102	Wax[4]
10	103	Wax, Perahia

Petitioner relies on the Declaration of Robert Akl, D.Sc. (Ex. 1003) in support of its unpatentability contentions.

II. ANALYSIS

A. Claim Construction

We construe each claim "in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent." 37 C.F.R. § 42.100(b). Under this standard, claim terms are generally given their plain and ordinary meaning as would have been understood by a person of ordinary skill in the art (POSITA) at the time of the invention and in the context of the entire patent disclosure. *Phillips v. AWH Corp*., 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc).

Petitioner contends that it is presently unaware of any claim construction disputes between the parties relevant to the unpatentability arguments in this Petition, and thus, "Petitioner does not ask the Board to construe any claim terms at this time." Pet. 17. Patent Owner similarly contends that "at this time Patent Owner does not propose any terms for construction." Prelim. Resp. 3.

[4] US Patent No. 8,014,366 B2, issued September 6, 2011, filed August 13, 2004 (Ex. 1006, "Wax").

Nevertheless, Patent Owner contends that language in claim 1 "requires estimating a first radio channel being performed 'over a pilot interval,'" wherein "estimating a second radio channel is required to be performed 'over' the same pilot interval as estimating a first radio channel was performed." Prelim. Resp. 7. According to Patent Owner, the prior art fails to disclose estimating first and second channel over the same pilot interval. In essence, Patent Owner would have us require the time for estimating of the first and second channels to be exactly co-extensive in order to meet the "pilot interval" limitations of claim 1.

In light of the parties' arguments and evidence, we find that it is necessary to construe "pilot interval," to the extent necessary to resolve the disputed issues before us.

"pilot interval"

As Petitioner points out (Pet. 23), the Specification of the '096 patent defines the "pilot interval" as "a predetermined time period for transmission of a signal, either at a single frequency or several independent frequencies, for supervisory purposes including control, equalization, continuity, synchronization, or reference." *See* Ex. 1001, 7:46–50. However, Patent Owner contends that the prior art discloses transmitting data for first and second channel estimations in different time periods, which cannot be performing the estimations over the same pilot interval, as required by the recited language of claim 1. *See* Pet. 7, 12, 16

We agree with Patent Owner that "estimating a second radio channel . . . over *said* pilot interval" requires that the second radio channel be estimated over *the same* pilot interval as estimating a first radio channel was

performed. *See* Prelim. Resp. 7. Nevertheless, given that a pilot interval is "predetermined time period . . . for supervisory purposes" (Ex. 1001, 7:41–53), we find that the time for estimating the first and second radio channels need not be exactly co-extensive in order to meet the "same pilot interval" limitation. For example, the pilot interval could be a longer predetermined period of time encompassing (1) the beginning and ending of estimating the first radio channel, then (2) some other activity such as "control, equalization, continuity, synchronization, or reference," and then (3) the beginning and ending of estimating the second radio channel—so long as all of these are activities are for supervisory purposes. This comports with the Specification of the '096 patent, which merely mentions "pilot interval" as the period of time over which the SMDA module estimates the first and second radio channels from the access point to the respective first and second mobile stations. That is, the Specification of the '096 patent does not limit "pilot interval" to a time period for simultaneous and co-extensive estimation of first and second radio channels, as Patent Owner appears to be advocating.

Therefore, for the foregoing reasons, based on the present record, we determine the term "said pilot interval" in the phrase "estimating a second radio channel . . . over said pilot interval" recited in claim 1 does not require the time for estimating the first and second radio channels to be co-extensive. Instead, the "pilot interval" could be a longer predetermined supervisory period that encompasses non-simultaneous estimating of the first and second radio channels. The parties are invited to address this claim construction issue during trial.

We do not provide any further constructions for "pilot interval" or any other claim terms. *See, e.g., Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) ("The Board is required to construe 'only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy'" (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc*., 200 F.3d 795, 803 (Fed. Cir. 1999) (holding that "only those terms need to be construed that are in controversy, and only to the extent necessary to resolve the controversy"))); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co*., 868 F.3d 1013, 1017 (Fed. Cir. 2017) (applying *Vivid Techs*. in the context of an *inter partes* review).

B. Principles of Law

To establish anticipation, each and every element in a claim, arranged as recited in the claim, must be found in a single prior art reference. *Net MoneyIN, Inc. v. VeriSign, Inc*., 545 F.3d 1359, 1371 (Fed. Cir. 2008). There is no requirement that the prior art must use the same words to describe a claim element in order to teach or disclose that claim element. Identity of terminology is not required for a claim element to be anticipated by the prior art without resort to obviousness. *See In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009); *In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990).

It is proper to take into account not only the literal and specific teachings of the reference, but also the inferences which one skilled in the art would reasonably be expected to draw therefrom. *In re Preda*, 401 F.2d 825, 826 (CCPA 1968). For anticipation, the dispositive question is whether one skilled in the art would reasonably understand or infer from a prior art reference that every claim element is disclosed in that reference. *Eli Lilly*

and Co. v. Los Angeles Biomedical Research Inst. at Harbor-UCLA Med. Ctr., 849 F.3d 1073, 1074–75 (Fed. Cir. 2017).

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007).

C. Anticipation by Perahia

Petitioner contends that claim 1 of the '096 patent is anticipated by Perahia. Pet. 18–27. In response, Patent Owner contends Perahia does not disclose various limitations of challenged claim 1. Prelim. Resp. 3–8.

1. Perahia

Perahia, titled "Spatial Division Multiple Access for Wireless Networks," is directed to multiple input multiple output ("MIMO") and SDMA technology in conjunction with the IEEE 802.11 standard that enables simultaneous communication of data packets to or from multiple users. Ex. 1004, codes (54), (57). Perahia discloses a method of operating an access point, wherein the method includes: sending a first packet to a first subscriber unit via a first spatial subchannel, and sending a second packet to a second subscriber unit via a second subchannel, wherein sending the first packet and sending the second packet begin and end substantially simultaneously. *Id.* at 2:28–37.

The IEEE 802.11a standard employs orthogonal frequency division multiplexing (OFDM), where the available bandwidth is effectively divided into a plurality of subchannels that are orthogonal in the frequency domain,

with each such subchannel being occupied by a subcarrier or tone. *Id.* at 4:28–33. In 802.11a, some of the values are always zero and others carry pilot tones used for phase synchronization, wherein the resulting series of time domain samples is augmented with a cyclic prefix prior to transmission. *Id.* at 4:37–41. An illustration of Perahia's wireless communication system employing SDMA techniques is depicted in Figure 1, reproduced below:

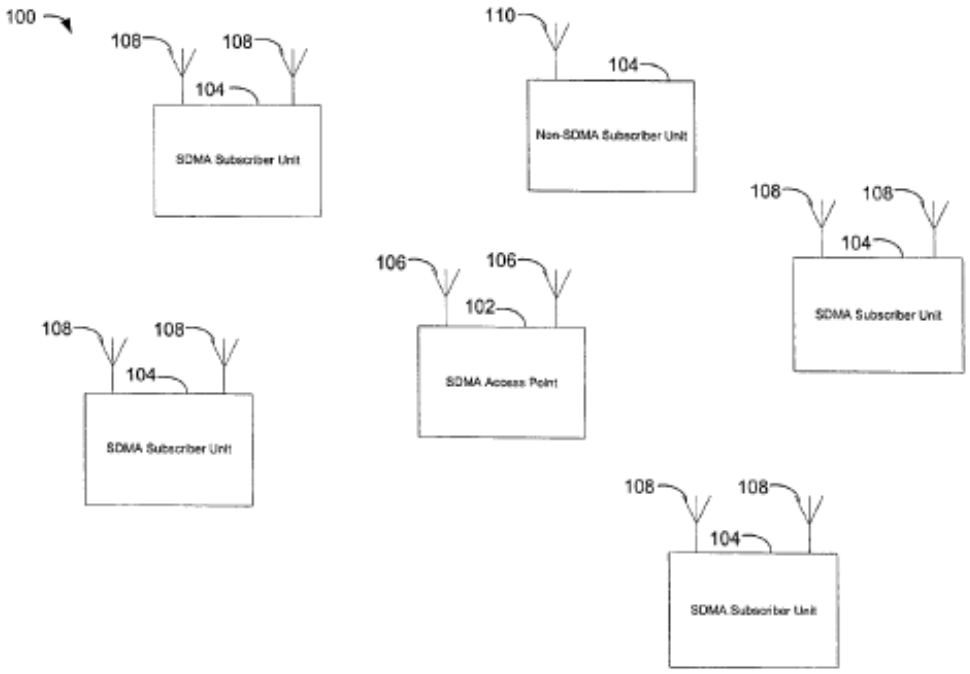


Fig. 1

Figure 1 shows wireless network 100 including access point 102 and numerous subscriber units 104. *Id.* at 4:47–50. Access point 102 is equipped with two antennas 106 to support SDMA operations. *Id.* at 4:53–54. Access point 102 may either transmit simultaneously to two or more subscriber units 104 or simultaneously receive upstream transmission from two or more subscriber units 104, as an extension of the IEEEE 802.11a standard. *Id.* at 4:66–5:4.

An illustration of one embodiment of Perahia's receiver used in an access point or a subscriber unit is depicted in Figure 2, reproduced below:

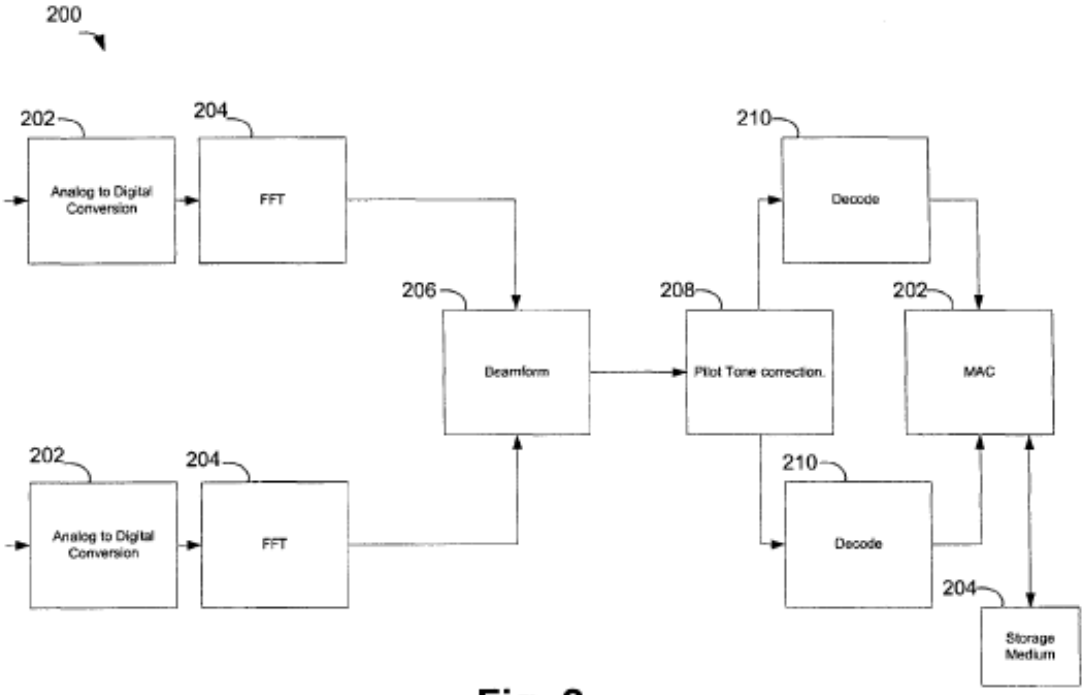


Fig. 2

Figure 2 shows receiver 200 used in access point 102 or subscriber units 104. *Id.* at 5:11–13. In receiver 200, subcarrier values corresponding to each antenna or polarization are input to beamformer 206, which in turn recovers the transmitted spatial subchannel data streams by applying a weighting matrix to the beamformer input. *Id.* at 5:24–27. The weighting matrix is based on a matrix channel estimate and on signal to interference plus noise ratio (SINR). *Id.* at 5:28–30. Pilot tone correction block 208 corrects the phase offset among subcarriers in accordance with the 802.11a standard. *Id.* at 5:32–35. The outputs of decode block 210 are combined into MAC layer packets by MAC layer processor 202, which is then shared with a transmitter. *Id.* at 5:38–43.

The preambles for first and second subscriber units may be simultaneously transmitted by two simultaneous transmitting subscriber units or by a single access point. *Id.* at 8:61–64. In a preamble, the long symbols are specified by the 802.11a standard and are used for channel estimation. *Id.* at 9:4–5, 9:29–30. Perahia references U.S. Patent Application No. 10/355,500 titled "High Data Rate Wireless Bridging" for describing the manner in which long symbols are used for channel estimation. *Id.* at 9:14–18.

To operate a subscriber unit in a MIMO communication system, an OFDM signal is transmitted via a first spatial subchannel, wherein first channel training information on the OFDM signal is transmitted in a first channel period, and during a second channel training period, the OFDM signal is quieted to allow transmission of second channel training information by another subscriber unit. *Id.* at 3:4–12.

2. Analysis

Petitioner contends that the '096 patent is directed to "increasing data transfer rates in a wireless network employing the IEEE 802.11 standard" (Pet. 1 (citing Ex. 1001, 2:67–3:8, 5:30–45)), wherein Perahia "taught the claimed subject matter before the '096 Patent." *Id.* In particular, according to Petitioner, Perahia discloses "the same issue—increased downlink data transfer rates in an IEEE 802.11 network—and the same solution—use of weighted signals in a Space Division Multiple Access framework to permit simultaneous data transfer to multiple mobile units." *Id.*

For the reasons discussed below, we determine the evidence and arguments presented show a reasonable likelihood Petitioner would prevail in establishing that claim 1 is anticipated by Perahia.

i. Preamble - "A method for communicating data over a network between an access point having a first and second antenna and a first and second mobile station" (claim 1).

Petitioner contends that Perahia discloses a method of communicating over a network between an access point having multiple antennas and two mobile stations. Pet. 18 (citing Ex. 1004, 4:53–54). According to Petitioner, Perahia's "subscriber units" are mobile stations. *Id.* (citing Ex. 1003 ¶ 66). Referencing Figure 1 of Perahia, Petitioner contends that the figure depicts "access point 102 with two antennas 106 in the center surrounded by five mobile stations 104." *Id.* (citing Ex. 1004, Fig. 1). At this stage of the proceeding, Patent Owner does not present arguments in the Preliminary Response addressing the specific merits of Petitioner's contentions with respect to the preamble. *See generally* Prelim. Resp.

Having reviewed all of Petitioner's assertions regarding the preamble, as well as the supporting evidence, we determine on this record that Petitioner has made a sufficient showing that Perahia discloses a "method for communicating data over a network between an access point having a first and second antenna and a first and second mobile station," as recited in claim 1.[5]

[5] Because Petitioner has shown that the recitations in the preamble are satisfied by Perahia, there is no need at this time to determine whether the preambles are limiting. *See Realtime Data,* 912 F.3d at 1375.

ii. "weighting a first data at said access point to transmit said first data using said first and second antenna," "weighting a second data at said access point to transmit said second data using said first and second antenna" (claim 1)

Citing to its declarant, Dr. Akl, Petitioner contends that "[g]enerating weights, also referred to as beamforming, is a routine function in SDMA." Pet. 19 (citing Ex. 1003 ¶ 48). Petitioner then contends that Perahia discloses the "weighting" limitations. *Id.* (citing Ex. 1003 ¶¶ 69–70). According to Petitioner, Perahia uses a "beamformer" that applies a "weighting matrix" to the beamformer inputs, wherein the weighted signals travel to a "decode block" before being "recombined into MAC layer packets." *Id.* (citing Ex. 1004, 5:24–27, 5:32–43). Relying on Dr. Akl, Petitioner contends that, like the '096 patent, "Perahia's beamforming may be based on channel estimates," wherein Perahia's beamforming "ensures that signals are directed to their respective target—*i.e.*, the first station receives only the first data and the second [station] receives only the second data." *Id.* at 19–20 (citing Ex. 1004, 5:28–30; Ex. 1003 ¶ 69 ("A POSITA understands that this data weighting for use in MIMO results in each station only receiving the data that the access point specifically sent to it")).

Patent Owner responds that the Petition points "only to a passage regarding a 'beamformer' . . . , but those passages relate to a **receiver**," wherein the Petition cites "to nothing else in Perahia for both of these ***transmitting*** limitations." Prelim. Resp. 4 (citing Pet. 9–10; Ex. 1004, 5:11–43, Fig. 2). Moreover, Patent Owner contends that the Petition fails to address the required "transmitting each of the first data using both said first and second antennas and the required transmitting of the second data using

both the first and second antennas." *Id.* (citing Pet. 19–20). According to Patent Owner, Perahia's disclosure of the transmitter system is only that "the radio frequency signals are 'transmitted via the appropriate antenna element.'" *Id.* at 6 (citing Ex. 1004, 6:14–15).

We find unavailing Patent Owner's arguments that the Petition cites to nothing in Perahia for the "***transmitting*** limitations." Prelim. Resp. 4. Rather, Petitioner contends that Perahia's beamforming "ensures that signals are *directed to their respective target*" so that the first station receives only the first data and the second station receives only the second data. Pet. 19–20 (citing Ex. 1004, 5:28–30) (emphasis added). That is, in Perahia, beamformer 206 applies a weighting matrix to the beamformer input, pilot tone correction block 208 corrects phase offset among subcarriers in accordance with the 802.11a standard, and then the outputs of decode block 210 are combined into MAC layer packets, which is then *shared with a transmitter to be transmitted*. *See* Ex. 1004, 5:24–43. According to Dr. Akl, a POSITA would have understood that "this data weighting for use in MIMO results in each station only receiving the data that the access point *specifically sent* to it." Ex. 1003 ¶ 69 (emphasis added).

On this preliminary record, we are persuaded that Petitioner has made a sufficient showing that Perahia discloses "weighting a first data at said access point to transmit said first data," and "weighting a second data at said access point to transmit said second data," as recited in claim 1. *See* Ex. 1001, 13:28–34.

We also find unavailing Patent Owner's arguments that the Petition fails to address the required transmitting each of the first data and the second data "using both said first and second antennas." Prelim. Resp. 4. In

contrast, Petitioner contends that Perahia's access point 102 is equipped with two antennas 106, *both* are used to support SDMA operations. Pet. 18 (citing Ex. 1004, 4:53–54). That is, in Perahia, "subcarrier values corresponding to ***each*** antenna or polarization" are input to beamformer 206, which in turn applies a weighting matrix to the beamformer input. *See* Ex. 1004, 5:24–43 (emphasis added). That is, in Perahia, subcarrier values from both antennas are used as input to the beamformer at the access point for weighting and eventual transmission of data. *Id.*

On this preliminary record, we are persuaded that Petitioner has made a sufficient showing that Perahia discloses weighting first data and second data at the access point to transmit the respective first data and second data "using said first and second antenna," as recited in claim 1.

iii. "estimating a first radio channel from said access point to said first mobile station over a pilot interval," "estimating a second radio channel from said access point to said second mobile station over said pilot interval" (claim 1)

Citing Dr. Akl's testimony, Petitioner contends that "[c]hannel estimation over a pilot channel is a routine process in IEEE 802.11 WLAN," wherein "Perahia estimates the radio channels from the access point to the mobile stations over a pilot interval." Pet. 23 (citing Ex. 1003 ¶ 50). According to Petitioner, "Perahia transmits 'channel training information' in a 'channel training period'—which is a pilot interval—for one subscriber unit, and then switches 'to allow transmission of second channel training information by another subscriber unit.'" *Id.* (citing Ex. 1004, 3:4–12; Ex. 1003 ¶ 87).

Moreover, Petitioner contends that Perahia discloses that the IEEE 802.11a standard also provides for "the use of preamble including special symbols for use in synchronization and carrier estimation," wherein the preamble precedes the data carrying portion of the signal and "includes a 'long symbol' for 'channel estimation.'" Pet. 23–24 (citing Ex. 1004, 9:2–5). Petitioner notes that Perahia references the patent application that later issued as U.S. Patent No. 7,352,688, which "teaches the use of long symbols during a 'channel training period' for channel estimation." *Id.* at 24 (citing Ex. 1008, 6:7–45; Ex. 1003 ¶ 86).

Further, Petitioner contends that Perahia also discloses "pilot tones" for the channel estimation practice of "phase synchronization" and "correct[ing] phase offset," wherein "[p]ilot tones are transmitted over a pilot interval." Pet. 24 (citing Ex. 1004, 4:37–39, 5:32–35; Ex. 1003 ¶ 87).

Patent Owner responds that the Petition and Perahia fail to show that the estimating of a second radio channel takes place over the same interval over which the estimating of the first radio channel occurred. Prelim. Resp. 6. Although Patent Owner acknowledges that Petitioner points to Perahia's "long symbols" transmitted in preambles for use in channel estimation, Patent Owner contends that Perahia confirms that "the set of 'long symbols' to 'client 2' is not sent during the same period as the set of 'long symbols' to 'client 1.'" *Id.* at 7 (citing Pet. 23–24; Ex. 1004, Figs. 7–8). In particular, Patent Owner contends that Perahia expressly teaches "the 'first channel training information' is sent during 'a **first** channel training **period**,' and a second channel training information is sent 'during a **second** channel training **period**.'" *Id.* at 8.

On the present record, we do not agree with Patent Owner's contention that, because Perahia discloses transmitting first channel training information "in a first channel training period," and allowing transmission of second channel training information "during a second channel training period," Perahia fails to show that the estimating of a second radio channel takes place over the same interval over which the estimating of the first radio channel occurred. Prelim. Resp. 6–7. As discussed above, "over said pilot interval" as recited in claim 1 does not require the time for estimating the first and second radio channels to be co-extensive.

Relying on Dr. Akl's testimony, Petitioner contends that Perahia transmits channel training information in a "'channel training period'—which is a pilot interval." Pet. 23 (citing Ex. 1004, 3:4–12; Ex. 1003 ¶ 87). Dr. Akl testified that, like the '096 patent, Perahia discloses channel estimation. Ex. 1003 ¶¶ 84–85. According to Dr. Akl, Perahia incorporates U.S. Patent No. 7,352,688 (Ex. 1008) by reference, which discloses antenna elements 1 and 2, wherein "[d]uring a first portion of the channel training period, one antenna element transmits a guard interval 504 followed by two long symbols 506 while the other antenna element is quiet," and "[t]hen the first element goes into a quiet period." *See* Ex. 1003 ¶ 87 (citing Ex. 1004, 8:61–64, 9:4–5, 9:29–30, Figs. 7–8; Ex. 1008, 6:26–45). That is, Dr. Akl testified that Perahia discloses a "pilot interval" that includes a "first *portion*" for estimating a first channel and another portion for estimating a second channel in a channel training period. *Id.* (emphasis added).

On this preliminary record, we are persuaded that Petitioner has made a sufficient showing that Perahia discloses "estimating a first radio channel from said access point to said first mobile station over a pilot interval," and

"estimating a second radio channel from said access point to said second mobile station over said pilot interval," as recited in claim 1.

iv. Remaining Limitations (claim 1)

Relying on Dr. Akl's testimony, Petitioner contends that Perahia discloses the remaining limitations of claim 1. Pet. 20–23 (citing Ex. 1004, code (57), 1:57–2:3, 2:30–35, 3:64–4:25, 4:66–5:3, 6:19–29, 6:65–67, 7:13–15, 8:19–22, Fig. 1; Ex. 1003 ¶¶ 71–78, 80–82). At this stage in the proceeding, Patent Owner does not address separately Petitioner's explanations and supporting evidence regarding the dependent claims. *See generally* Prelim. Resp.

Having reviewed Petitioner's arguments and supporting evidence in the present record, we determine Petitioner has made a sufficient showing that Perahia discloses the remaining limitations of claim 1.

v. Conclusion

For the foregoing reasons, we determine that the evidence and arguments presented show a reasonable likelihood that Petitioner would prevail in establishing that the subject matter of claim 1 is anticipated by Perahia.

D. Anticipation by Li and Obviousness over Li and Perahia

Petitioner also contends that claims 1–3 of the '096 patent are anticipated by Li, and that claim 10 would have been obvious over Li in view of Perahia. Pet. 27–40. In response, Patent Owner contends that Li does not disclose various limitations of claim 1. Prelim. Resp. 8–12.

1. Li

Li, titled "Parallel Wireless Communication Apparatus, Method, and System," relates to an access point in a IEEE 802.11 compatible wireless

network that communicates with multiple mobile stations simultaneously using SDMA. Ex. 1005, codes (54) (57). An illustration of one embodiment of Li's wireless network is depicted in Figure 1, reproduced below:

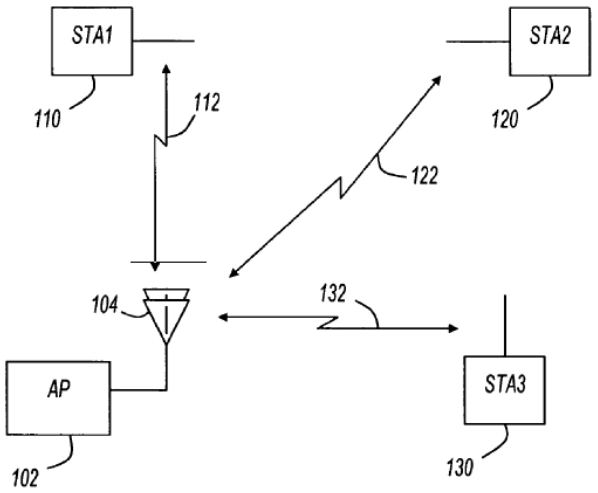


FIG. 1

Figure 1 is a diagram of wireless network 100 that includes access point 102 and mobile stations 110, 120, and 130, wherein one or more of mobile stations 110, 120, 130, or access point 102 may operate in compliance with any IEEE 801.11 standard. *Id.* at 1:51–61. As shown in Figure 1, access point 102 includes multiple antennas 104 capable of communicating using SDMA. *Id.* at 2:17–20.

Access point 102 uses zero-forcing beamformers for both downlink and uplink of signals to achieve SDMA. *Id.* at 2:48–50. According to Li, zero-forcing beamforming is a known technique for SDMA interference cancelation using channel state information, wherein channel state information is gathered by access point 102 during a prior uplink packet reception, referred to as "estimating spatial channels." *Id.* at 2:50–56.

To obtain channel state information of all mobile stations before SDMA transmission and reception, access point 102 sends IEEE 802.11 Null-data frames to the mobile stations and estimates the stations' channels from the received acknowledgement (ACK) frames. *Id.* at 2:57–3:3. Frames other than Null-data frames and Ack frames are utilized to estimate spatial channels, wherein a network-allocation-vector (NAV) is set at the end of the last utilized frame to prevent an unintended station from acquiring the medium during the SDMA training process. *Id.* at 3:12–22.

For parallel communication, access point 102 sets the NAV of all mobile stations in the vicinity to prevent unintended mobile stations from interfering with the beamformed signals. *Id.* at 4:52–61.

2. Analysis

Petitioner contends that, like the '096 patent, Li observes that an access point may communicate with many different stations, wherein Li's access point "'is capable of maintaining simultaneous 802.11 compliant communications with multiple mobile stations' and 'may be any type of access point having multiple antennas capable of communicating using [SDMA].'" Pet. 14 (citing Ex. 1004, 1:62–2:32). Further, according to Petitioner, Li further discloses "'zero-forcing beamformers,' i.e., signal weighting, and 'estimating spatial channels,' i.e., radio channels." *Id.* (citing Ex. 1004, 2:48–56). For the reasons discussed below, we determine the evidence and arguments presented show a reasonable likelihood Petitioner would prevail in establishing that claims 1–3 are anticipated by Li, and that claim 10 would have been obvious over Li in view of Perahia.

a. Claim 1

i. *"weighting a first data at said access point to transmit said first data using said first and second antenna," "weighting a second data at said access point to transmit said second data using said first and second antenna" (claim 1)*

Relying on Dr. Akl's testimony, Petitioner contends that "[g]enerating weights . . . is a routine function in SDMA." Pet. 28 (citing Ex. 1003 ¶ 48). According to Dr. Akl, channel estimation over a pilot channel "is a routine process in an IEEE 802.11 WLAN." *See* Ex. 1003 ¶ 50.

Referring to Li, Petitioner contends that, to achieve SDMA, Li weights first and second data at the access point so that the first and second mobile stations receive only their respective data. Pet. 28. In particular, Petitioner contends that Li discloses a "zero-forcing beamformer for both downlink and uplink of first signals to achieve SDMA," and explains that "[b]eamforming is a type of data weighting." *Id.* (citing Ex. 1003 ¶¶ 48, 91). According to Petitioner, to ensure that the first and second mobile stations receive only their respective data, Li's access point defines a "network-allocation-vector (NAV)" for all mobile stations to prevent unintended mobile stations from interfering with the beamformed signals. *Id.* at 28–29 (citing Ex. 1005, 4:54–56; Ex. 1003 ¶ 91).

Patent Owner responds that "[t]he Petition completely fails to address the claim language in both limitations that require 'weighting a [first/second] data . . . so that the [first/second] mobile station only receives said [first/second] data.'" Prelim. Resp. 9 (alterations by Patent Owner). According to Patent Owner, Li's NAV is merely transmitted directly to the mobile stations, and "is not used in any 'weighting.'" *Id.* Further, Patent

Owner contends that there is no showing anywhere in the Petition or Li of "the required transmitting each of the first data using both said first and second antennas" and "the required transmitting of the second data using both the first and second antennas." *Id.* at 11 (citing Pet. 28–29).

We find unavailing Patent Owner's arguments that the Petition fails to address the required limitation of "weighting" first and second data so that the first and second mobile stations only receive the respective first and second data. Prelim. Resp. 9. In particular, Petitioner relies on Li, which, similar to the '096 patent, discloses applying an access point in an IEEE 802.11 compatible network to communicate with multiple mobile stations simultaneously using SDMA. *See* Ex. 1005, codes (54), (57). As Patent Owner acknowledges, in Li, the mobile stations are set (using NAV) so that unintended mobile stations will not interfere with the beamforming signals. Prelim. Resp. 9; *See also* Ex. 1005, 3:12–22. Further, according to Petitioner, Li discloses a "zero-forcing beamformer for both downlink and uplink of first signals to achieve SDMA," wherein, as Dr. Akl testified, "[b]eamforming is a type of data weighting." Pet. 28 (citing Ex. 1003 ¶¶ 48, 91). That is, according to Petitioner, to achieve SDMA, Li's beamforming weights first and second data at the access point so that the first and second mobile stations receive only their respective data. *Id.* at 28.

We also find unavailing Patent Owner's contention that there is no showing anywhere in the Petition or Li of "the required transmitting each of the first data using both said first and second antennas." Prelim. Resp. 11. Here, Petitioner contends that Li's access point 102 includes multiple antennas 104 capable of communicating using SDMA operations. Pet. 27, 33–34 (citing Ex. 1005, 2:17–20). Li explains that SDMA is a technology

that allows multiple simultaneous independent transmission from one wireless device that has multiple antennas. *See* Ex. 1005, 2:17–20. Li further explains that SDMA increases both user density and network throughput by utilizing spatial channels in the environment, wherein multiple spatial channels are formed by a combination of the signal paths and the antenna patterns between an AP and multiple mobile stations. *Id.* at 2:42–47. That is, in Li, antennas from the plurality of antennas are used for forming the multiple spatial channels for the transmission of data. *Id.*

On this preliminary record, we are persuaded that Petitioner has made a sufficient showing that Li discloses "weighting a first data at said access point to transmit said first data using said first and second antenna," and "weighting a second data at said access point to transmit said second data using said first and second antenna," as recited in claim 1.

ii. "estimating a first radio channel from said access point to said first mobile station over a pilot interval," "estimating a second radio channel from said access point to said second mobile station over said pilot interval" (claim 1)

Petitioner repeats its contention that "[c]hannel estimation over a pilot channel is a routine process in the IEEE 802.11 WLAN," relying on Dr. Akl's testimony. Pet. 31 (citing Ex. 1003 ¶ 50). Thus, Petitioner contends that Li also estimates the radio channels from the access point to the first and second mobile stations over a pilot interval. *Id.* In particular, Petitioner contends that Li's Figures 2 and 3 show frame sequences to estimate channel state information of communication channels, wherein the channel state information of all mobile stations in a parallel group are obtained before SDMA transmission and reception. *Id.* at 31–32 (citing

Ex. 1005, 2:57–3:27). According to Petitioner, "this pre-transmission period is a pilot interval." *Id.* (citing Ex. 1003 ¶ 97).

Patent Owner responds that "the Petition and Li fail to show that the estimating of a second radio channel takes place over the same interval over which the estimating of the first radio channel occurs." Prelim. Resp. 12. Patent Owner contends that Li's Figures 2 and 3 confirm that "data null2" to mobile station 2 is not sent during the same period as "data nul1" to mobile station 1, but instead the period over which estimating of a second radio channel "is a completely stand-alone and separate interval that follows the period over which estimating of a first radio channel has occurred." *Id.* Pointing to Figures 2 and 3 of Li, Patent Owner contends that the access points set different and separate NAV periods for ach "data null[x]" sent. *Id.* at 7.

On the present record, we do not agree with Patent Owner's contention that because Li's "data null2" to mobile station 2 is not sent during the same period as "data null1" to mobile station 1, Li fails to show that the estimating of a second radio channel takes place over the same interval over which the estimating of the first radio channel occurs. Prelim. Resp. 12. As discussed above, "over said pilot interval" recited in claim 1 does not require the time for estimating the first and second radio channels to be co-extensive.

Here, relying on Dr. Akl's testimony, Petitioner contends that Li estimates channel state information of the plurality of communication channels in a pre-transmission period, i.e., a "pilot interval." Pet. 31–32 (citing Ex. 1005, 2:57–3:27; Ex. 1003 ¶ 97). According to Dr. Akl, Li discloses channel estimation like the '096 patent, wherein, as the '096 patent

defines and as a POSITA would have understood, estimating spatial channels occurs over a pilot interval, i.e., the time period where a signal is transmitted "for supervisory purposes." Ex. 1003 ¶ 97 (citing Ex. 1001, 7:46–50).

On this preliminary record, we are persuaded that Petitioner has made a sufficient showing that the Li discloses "estimating a first radio channel from said access point to said first mobile station over a pilot interval," and "estimating a second radio channel from said access point to said second mobile station over said pilot interval," as recited in claim 1.

iii. Remaining limitations (claim 1)

Relying on Dr. Akl's testimony, Petitioner contends that Li discloses the remaining limitations of claim 1. Pet. 29–31 (citing Ex. 1005, 1:51–66, 2:12–16, 2:24–26, 2:42–47, 4:5–6, 5:6–8, 5:38–44, Figs. 1–3; Ex. 1003 ¶¶ 71, 73, 92, 94–96). At this stage in the proceeding, Patent Owner does not address separately Petitioner's explanations and supporting evidence regarding the dependent claims. *See generally* Prelim. Resp.

Having reviewed Petitioner's arguments and supporting evidence in the present record, we determine Petitioner has made a sufficient showing that Li discloses the remaining limitations of claim 1.

b. Dependent claims 2 and 3

With respect to claim 2, Petitioner contends that the claimed step "is closely related to the 'channel estimation' limitation" of claim 1, and, relying on the testimony of Dr. Akl, further contends that "[i]nitialization of a transmission protocol is a routine process in wireless communication." Pet. 32 (citing Ex. 1001, 9:5–25; Ex. 1003 ¶ 99). Petitioner then contends that Li discloses this limitation. *Id.* at 32–33 (citing Ex. 1005, 2:57–3:11;

Ex. 1003 ¶ 100). With respect to claim 3, which depends from claim 2, Petitioner relies on the testimony of Dr. Akl to assert that "[t]he MPDU and ACK frames are part of the IEEE 802.11 standard," wherein "Li discloses this exchange of MPDUs and ACK frames." *Id.* at 33 (citing Ex. 1005, 2:57–3:11; Ex. 1003 ¶¶ 51, 100, 102).

At this stage in the proceeding, Patent Owner does not address separately Petitioner's explanations and supporting evidence regarding dependent claims 2 and 3. *See generally* Prelim. Resp.

Having reviewed Petitioner's arguments and supporting evidence in the present record, we determine Petitioner has made a sufficient showing that Li discloses the subject matter of dependent claims 2 and 3.

c. Dependent claim 10

Claim 10 depends from claim 3 and further recites using time division multiple access (TDMA) to partition a channel between SDMA and non-SDMA modes. Pet. 36. Citing to Dr. Akl's testimony for support, Petitioner contends that "TDMA was well-known prior to the '096 Patent priority date." *Id.* at 37 (citing Ex. 1003 ¶ 105).

Petitioner further relies on Perahia for disclosing this limitation. Pet. 37 (citing Ex. 1003 ¶¶ 108–109). In particular, citing to Perahia's Figure 9, Petitioner contends that Perahia discloses dual modes—an SDMA period reserved for serving "SDMA client" and a non-SDMA period serving "standard clients." *Id.* (citing Ex. 1004, 3:13–30, 8:11–22, Fig. 9). Petitioner contends that it would have been obvious to a POSITA to combine the teachings of Li and Perahia that "address the same issue: enhancing throughput in a wireless network through the use of SDMA." *Id.* at 38 (citing Ex. 1004, 2:11–14; Ex. 1005, 2:42–44; Ex. 1003 ¶¶ 110, 113).

According to Petitioner, a POSITA would have implemented "the SDMA/ non-SDMA partition of Perahia in Li's network because some mobile stations do not operate in SMDA mode." *Id.* at 39 (citing Ex. 1004, Fig. 1).

At this stage in the proceeding, Patent Owner does not address separately Petitioner's explanations and supporting evidence regarding dependent claim 10. *See generally* Prelim. Resp.

Having reviewed Petitioner's arguments and supporting evidence in the present record, we are preliminarily persuaded by Petitioner's contention that a POSITA would have found it obvious to combine the teachings of Li and Perahia for enhancing throughput through the use of SDMA, as testified by Dr. Akl. Pet. 38 (citing Ex. 1003 ¶¶ 110, 113). Accordingly, we determine Petitioner has made a sufficient showing that the combination of Li and Perahia teaches the subject matter of dependent claim 10.

d. Conclusion

For the foregoing reasons, we determine the evidence and arguments presented show a reasonable likelihood Petitioner would prevail in establishing that claims 1–3 are anticipated by Li, and that claim 10 would have been obvious over Li in view of Perahia.

E. Anticipation by Wax and Obviousness over Wax and Perahia

Petitioner contends that claims 1–3 of the '096 patent is anticipated by Wax, and that claim 10 would have been obvious over Wax in view of Perahia. Pet. 40–52. In response, Patent Owner contends that Wax does not disclose various limitations of claim 1. Prelim. Resp. 13–16.

1. Wax

Wax, titled "WLAN Capacity Enhancement Using SDM," discloses a method for communication over a WLAN, wherein downlink signals are

transmitted simultaneously to the stations in a set using spatial division multiplexing (SDM). Ex. 1006, codes (54), (57). In Wax, the SDM technique permits an access point to transmit respective downlink signals simultaneously to multiple stations in a spatial multiplexing group (SMG). *Id.* at 1:54–64. The access point comprises multiple antennas and an SDM beamforming circuit which generates a specific beam pattern for each of the stations while suppressing interference from other signals. *Id.* An illustration of Wax's WLAN system with SDM is depicted in Figure 1, reproduced below:

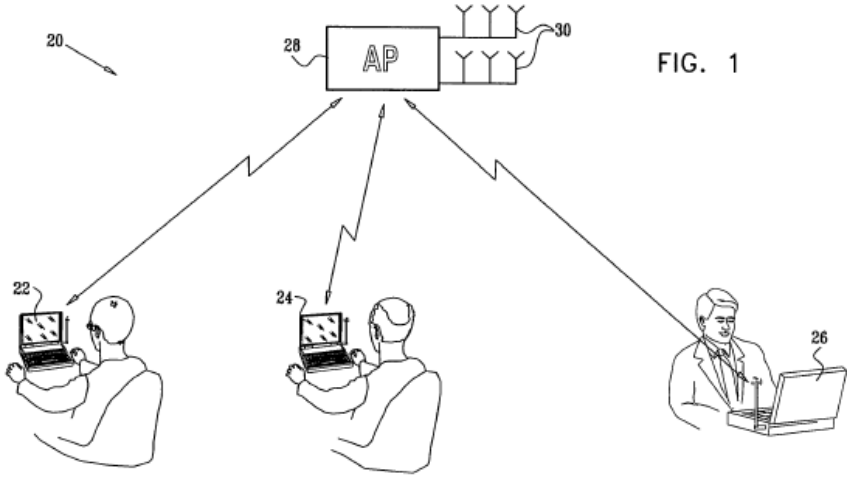


FIG. 1

Figure 1 illustrates WLAN system 20 comprising access point 28, which communicates with stations 22, 24, 26, on a given frequency channel. *Id.* at 11:61–65. As shown in Figure 1, access point 28 comprises array of antennas 30, which permit access point 28 to perform SDM among the stations. *Id.* at 12:4–6.

Selecting the set of stations includes processing uplink signals to determine respective signatures of the stations and transmitting the downlink

signals, wherein transmitting the downlink signals includes calculating respective beamforming weights for the stations responsively to the respective spatial signatures and applying the beamforming weights to the downlink signals. *Id.* at 2:38–45. An illustration of one embodiment of Wax's access point is depicted in Figure 2, reproduced below:

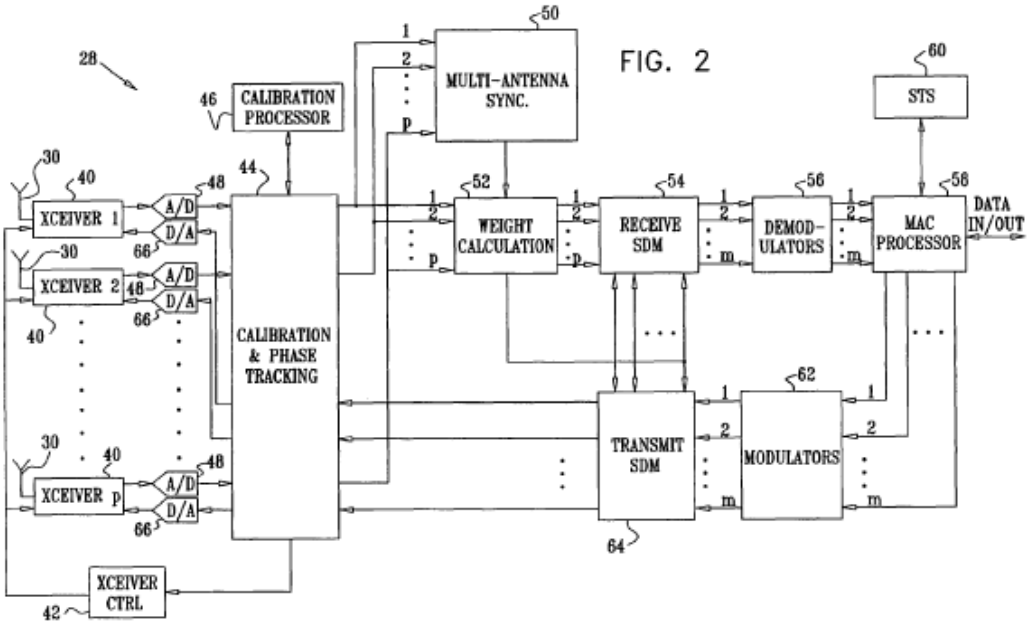


Figure 2 illustrates in detail access point 28. *Id.* at 12:4–6. As shown in Figure 2, access point 28 comprises plural radio transceivers 40, one coupled to each of antennas 30. *Id.* at 12:49–50. Calibration processor 46 determines the required corrections to be applied to the radio signals, and instructs circuit 44 to implement these corrections. *Id.* at 12:61–64. After phase and response compensation by circuit 44, digital samples are input to multi-antenna synchronization and carrier acquisition circuit 50. *Id.* at

13:6–9. Based on the corrected input signals from circuit 44 and the timing provided by circuit 50, weight calculation circuit 52 determines beamforming weights for each of the stations. *Id.* at 13:13–25.

2. Analysis

Petitioner contends that like the '096 patent and the other prior art, Wax acknowledges the interference problem associated with simultaneous downlink transmission, and proposes a solution of "enhancing the capacity of a WLAN by spatial division multiplexing (SDM)." Pet. 15 (citing Ex. 1006, 1:42–46, 1:54–60). According to Petitioner, Wax discloses an IEEE 802.11 access point that comprises multiple antennas and an SDM beamforming circuit which generates a specific beam pattern for each of the stations. *Id.* (citing Ex. 1006, 1:60–64, 12:16–29). Petitioner also contends that Wax also provides an initialization routine that includes the access point sending a station a null data packet and, in return, the mobile station responds with an acknowledgement. *Id.* at 16 (citing Ex. 1006, 29:17–20).

For the reasons discussed below, we determine the evidence and arguments presented show a reasonable likelihood Petitioner would prevail in establishing that claims 1–3 are anticipated by Wax, and that claim 10 would have been obvious over Wax in further view of Perahia.

a. Claim 1

i. "weighting a first data at said access point to transmit said first data using said first and second antenna," "weighting a second data at said access point to transmit said second data using said first and second antenna," (claim 1)

Petitioner contends that Wax's access point "comprises an array of antennas, which permit the access point to perform spatial division

multiplexing (SDM) among the stations," wherein the access point comprises multiple antennas "so that it is able 'to transmit respective downlink signals simultaneously to multiple stations.'" Pet. 40 (citing Ex. 1006, 1:54–64; Ex. 1003 ¶ 115). According to Petitioner, in Wax, weight calculation circuit 52 uses the signals received and the spatial signatures calculated to calculate beamforming weights for all stations in an SMG. *Id.* at 41–42 (citing Ex. 1006, 2:41–57, 31:19–22, Fig. 9; Ex. 1003 ¶¶ 48, 116). Patent Owner responds by contending that the Petition "fails to even address, much less show, the required transmitting each of the first data using both said first and second antennas," and "the required transmitting of the second data using both the first and second antennas." Prelim. Resp. 13.

We find Patent Owner's arguments unavailing. As Dr. Akl testified, Wax discloses "enhancing the capacity of a WLAN by spatial division multiplexing," wherein the access point comprises multiple antennas and a beamforming circuit which "generates a specific beam pattern for each of the stations." Ex. 1003 ¶ 115 (citing Ex. 1006, 1:54–64). In particular, in Wax, access point 28 comprises an array of p antennas 30 (typically 6 antennas) which permit the access point to perform spatial division multiplexing among m stations (typically 4) in an SMG, wherein m is less than or equal to p. *Id.* at 12:4–6. That is, the plurality (p) of antennas are used for transmitting data to the plurality (m) of stations by spatial division multiplexing, wherein the transmission is not a one-to-one transmission between the antennas and the stations. *Id.*

Transmit SDM circuit 64 applies beamforming coefficients to a plurality of modulated sample streams for transmission via antennas 30. *Id.*

at 13:44–48. That is, weighting of the data at the access point is performed for transmission using the antennas. *Id.*

On this preliminary record, we are persuaded that Petitioner has made a sufficient showing that Wax discloses "weighting a first data at said access point to transmit said first data using said first and second antenna," and "weighting a second data at said access point to transmit said second data using said first and second antenna," as recited in claim 1.

ii. "estimating a first radio channel from said access point to said first mobile station over a pilot interval," "estimating a second radio channel from said access point to said second mobile station over said pilot interval" (claim 1)

Petitioner contends that Wax's system obtains the "spatial signature" of each mobile station, which "is another term for estimating radio channels." Pet. 45 (citing Ex. 1006, 29:44–47; Ex. 1003 ¶ 123). In particular, Petitioner contends that Wax's access point obtains the channel estimates by using "standard messaging provided by the 802.11 standard in order to prompt the desired station to transmit an uplink signal," wherein "the preamble of which is used 'to estimate a spatial signature for the station, at a signature calculation step.'" *Id.* (citing Ex. 1006, 29:15–47). Relying on Dr. Akl's testimony, Petitioner contends that the access point sends the station a packet containing null data, which will cause the station to return an acknowledgement (ACK) packet, wherein "[t]his standard exchange—the same one described in the '096 Patent . . . —takes place over a pilot interval." *Id.* (citing Ex. 1001, 7:41–8:6; Ex. 1003 ¶ 123).

Patent Owner responds that Wax's access point 28 prompts each of the stations "to transmit *individually, in sequence*," which "confirms that

each station is treated individually and completely separately, one at a time." Prelim. Resp. 16 (citing Ex. 1006, 29:9–11, Fig. 11). That is, according to Patent Owner, Wax discloses that the period over which estimating of a second radio channel takes place is "completely stand-alone and separate interval" that follows the period over which estimating of a first radio channel had occurred. *Id.*

We find Patent Owner's arguments unavailing. In particular, on the present record, we do not agree with Patent Owner's contention that, because Wax's transmits data "*individually, in sequence*," Wax does not disclose estimating of first and second radio channel over the same interval. Prelim. Resp. 16. As discussed above, "over said pilot interval" as recited in claim 1 does not require the time for estimating the first and second radio channels to be co-extensive.

Here, relying on Dr. Akl's testimony, Petitioner contends that Wax obtains a "spatial signature" of each mobile station, which is another term for estimating radio channels, wherein the access point and the stations exchange "null" data and acknowledgement packets "over a pilot interval." Pet. 45 (citing Ex. 1003 ¶ 123). In particular, Dr. Akl testified that a POSITA would have understood that "this communication occurs over the pilot interval and is the same communication procedure described in the '096 Patent." Ex. 1003 ¶ 123.

On this preliminary record, we are persuaded that Petitioner has made a sufficient showing that Wax discloses "estimating a first radio channel from said access point to said first mobile station over a pilot interval," and "estimating a second radio channel from said access point to said second mobile station over said pilot interval," as recited in claim 1.

iii. Remaining limitations (claim 1)

Relying on Dr. Akl's testimony, Petitioner contends that Wax discloses the remaining limitations of claim 1. Pet. 42–45 (citing Ex. 1006, 1:38–40, 1:54–64, 4:41–53, 11:61–67, 12:16–29, 37:31–34, 41:4–5, Fig. 1; Ex. 1003 ¶¶ 71, 115, 117–122). At this stage in the proceeding, Patent Owner does not address separately Petitioner's explanations and supporting evidence regarding the remaining limitations of claim 1. *See generally* Prelim. Resp.

Having reviewed Petitioner's arguments and supporting evidence in the present record, we determine Petitioner has made a sufficient showing that Wax discloses the remaining limitations of claim 1.

b. Dependent claims 2 and 3

With respect to claim 2, relying on the testimony of Dr. Akl, Petitioner contends that Wax performs the "routine exercise" of initializing the transmission protocol before starting transmission over the downlink. Pet. 46 (citing Ex. Ex. 1003 ¶ 126). In particular, Petitioner contends that Wax first defines a spatial multiplexing group (SMG) of mobile stations based on the characteristics of the uplink signals, disables further uplink signals from these stations while it determines weighting for the stations, and once that is complete, commences downlink transmissions to the mobile stations. *Id.* at 46 (citing Ex. 1006, 26:48–52, 27:5–26, 27:32–35, Fig. 9). With respect to claim 3, which depends from claim 2, Petitioner relies on the testimony of Dr. Akl to assert that "[t]he MPDU and ACK frames are part of the IEEE 802.11 standard," wherein "Wax discloses the access point and mobile stations exchanging packets containing null data and acknowledgements as part of its initialization process," with the packet

containing null data being "a type of PDU in the IEEE 802.11 standard." *Id.* at 47 (citing Ex. 1006, 29:17–20; Ex. 1003 ¶¶ 51, 128).

At this stage in the proceeding, Patent Owner does not address separately Petitioner's explanations and supporting evidence regarding dependent claims 2–3. *See generally* Prelim. Resp.

Having reviewed Petitioner's arguments and supporting evidence in the present record, we determine Petitioner has made a sufficient showing that Wax discloses the subject matter of dependent claims 2–3.

c. Dependent claim 10

Claim 10 depends from claim 3 and further recites using TDMA to partition a channel between SDMA and non-SDMA modes. Pet. 51. Petitioner contends that, as discussed above, Perahia discloses this limitation. *Id.* Petitioner contends that a POSITA would have combined Wax with the TDMA partition of Perahia, wherein, as Dr. Akl testified, "the implementation details of the software updates for the combination would be minimal and would provide reasonable expectation of success." *Id.* at 51–52 (citing Ex. 1003 ¶¶ 132–133).

At this stage in the proceeding, Patent Owner does not address separately Petitioner's explanations and supporting evidence regarding dependent claim 10. *See generally* Prelim. Resp.

Having reviewed Petitioner's arguments and supporting evidence in the present record, we are preliminarily persuaded by Petitioner's contention that a POSITA would have found it obvious to combine Wax with the TDMA partition of Perahia, as testified by Dr. Akl. Pet. 51–52 (citing

Ex. 1003 ¶¶ 132–133). Accordingly, we determine Petitioner has made a sufficient showing that the combination of Wax and Perahia teaches the subject matter of dependent claim 10.

d. Conclusion

For the foregoing reasons, we determine the evidence and arguments presented show a reasonable likelihood that Petitioner would prevail in establishing that claims 1–3 are anticipated by Wax, and that claim 10 would have been obvious over Wax in view of Perahia.

III. CONCLUSION

Because we determine that Petitioner has demonstrated a reasonable likelihood that it would prevail in showing at least one of the challenged claims is unpatentable, we institute *inter partes* review as to all challenged claims and grounds presented in the Petition. At this stage of the proceeding, we have not made a final determination as to the patentability of any of these challenged claims.

IV. ORDER

For the reasons given, it is

ORDERED that pursuant to 35 U.S.C. § 314, an *inter partes* review is instituted on all grounds and on all claims challenged in the Petition, i.e., as to claims 1–3 and 10 of the ’096 patent to determine whether:

1) claim 1 is unpatentable under 35 U.S.C. § 102 as anticipated by Perahia;

2) claims 1–3 are unpatentable under 35 U.S.C. § 102 as

anticipated by Li;

3) claim 10 is unpatentable under 35 U.S.C. § 103 as obvious over Li and Perahia;

4) claims 1–3 are unpatentable under 35 U.S.C. § 102 as anticipated by Wax; and

5) claim 10 is unpatentable under 35 U.S.C. § 103 as obvious over Wax and Perahia; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial, which commences on the entry date of this Decision.

PETITIONER:

Amr O. Aly
Lisa M. Schoedel
Yusuf Esat
JENNER & BLOCK LLP
aaly@jenner.com
lschoedel@jenner.com
yesat@jenner.com

PATENT OWNER:

Ryan Loveless
James Etheridge
Brett Mangrum
Brian Koide
Jeffrey Huang
Nathan Cummings
ETHERIDGE LAW GROUP
ryan@etheridgelaw.com
ipteam@etheridgelaw.com
brett@etheridgelaw.com
brian@etheridgelaw.com
jeff@etheridgelaw.com
nathan@etheridgelaw.com