UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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AMERICAN AIRLINES, INC. AND SOUTHWEST AIRLINES CO.,

Petitioners,

v.

INTELLECTUAL VENTURES I LLC,

Patent Owner.

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Case No. IPR2025-01055
U.S. Patent No. 8,027,326

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**PATENT OWNER'S PRELIMINARY RESPONSE**

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## I. INTRODUCTION

The Petition challenges claims 1-18 of U.S. Patent No. 8,027,326 under three Grounds. Institution should be denied for the reasons set forth below.

Claim 1 of the '326 Patent recites "*partially* filling the frequency *gap* between the first channel and the second channel by adding one or more data subcarriers into the frequency gap." The other challenged independent claims contain similar limitations. Both the language in the claims requiring that the "gap" be *included* in the transmitted signal, as well as multiple unequivocal statements during the prosecution history, make clear that systems where the frequency gap is *fully* filled and *completely eliminated* prior to transmission are *outside* the scope of the challenged claims.

In Grounds 1 and 3, the Petition relies on Mori for the limitation reciting "*partially* filling the frequency gap between the first channel and the second channel." However, in Mori -- just like the art distinguished during prosecution -- the frequency gap is *fully filled* and *totally eliminated* prior to signal transmission. Thus, the mappings to Mori in Grounds 1 and 3 fail to disclose "*partially* filling the frequency gap," as claimed.

After erroneously mapping the claim limitations reciting "*partially* filling the frequency gap" to Mori's disclosure of *fully* filling the frequency gap, Grounds 1 and 3 each make a single-sentence, conclusory allegation that "to the extent the claim

requires partially (as opposed to completely) filling the frequency gap, it would be obvious to a POSITA to modify the teachings" of the references "to the extent necessary to satisfy the claim limitation." Petition, 28 and 67. Completely absent from Grounds 1 and 3 is *any* reasoning explaining *why* such a modification would have been obvious. Petitioners' expert makes the same single-sentence allegations in his declaration for Grounds 1 and 3, but also fails to provide *any* reasoning explaining *why* such a modification would have been obvious. *See*, Ex. 1004, ¶¶ 159, 359.

In addition, the purported motivation for combining Gardner and Mori in Ground 1 is completely unsupported. Petitioners' obviousness theory is premised on the unsupported allegations that Gardner "suggested combining channel bonding and MIMO" or disclosed "channel bonding and MIMO as compatible IEEE 802.11a extension options." However, the Petition is devoid of evidence that Gardner suggested or disclosed such information.

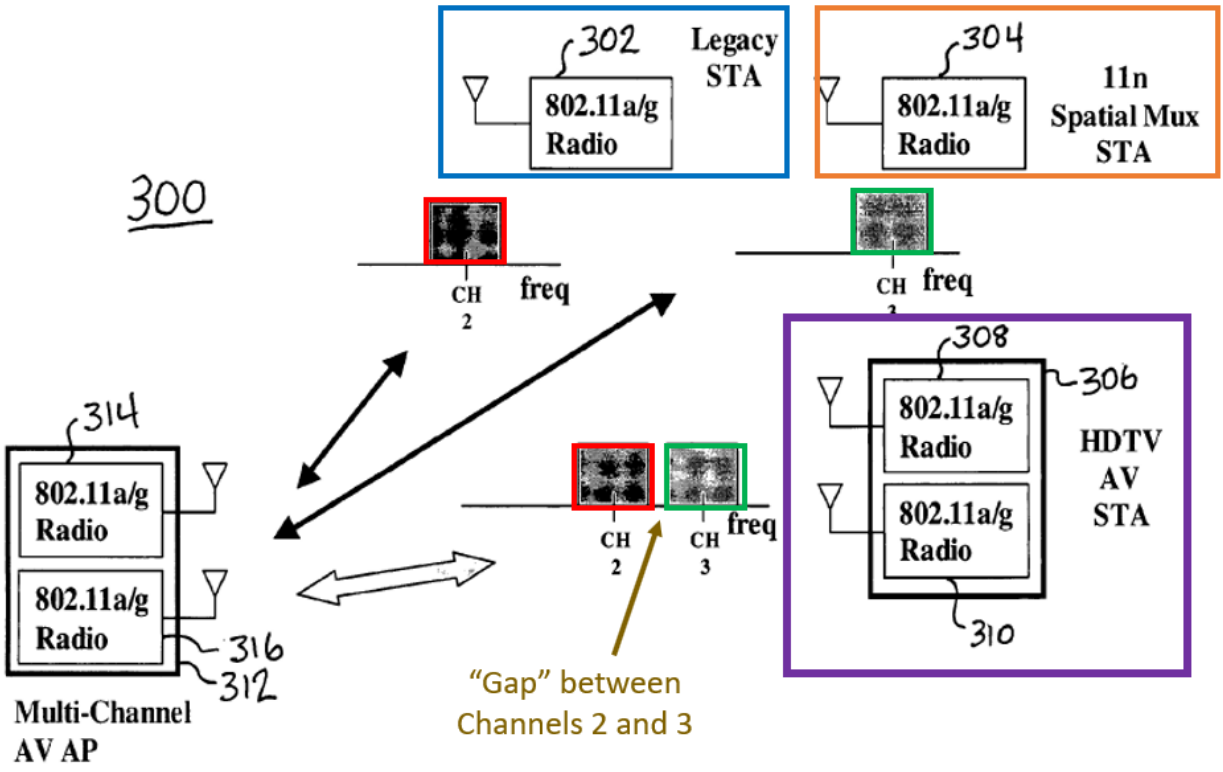
Finally, the purported motivation for combining Mori, Lu and Williams in Ground 3 is also deficient. There, the Petition relies exclusively on contentions that the references purportedly relate to the same field or disclose related (or "complementary") subject matter. The fact that references are in the same field or disclose similar subject matter is insufficient by itself to establish a motivation to combine the references.

For these reasons, and the reasons set forth below, institution should be denied.

## II. SPECIFICATION OF '326 PATENT

The '326 Patent discloses techniques for achieving "expanded bandwidth (wide band) WLAN operations" that reuse aspects of "existing single channel radio designs." Ex. 1001, 3:60-61. The specification recognized that "devices associated with the 802.11 family of standards are varied" and that it is critical that newly adopted standards "accommodate new and legacy equipment alike." *Id.*, 9:35-39. The specification explains that "one aspect of the present invention provides a method and system for achieving the required high data rate of newer standards, e.g., 802.11n, while preserving the utility and access of legacy systems, e.g., 802.11a/g equipment." *Id.*, 9:39-43.

Figure 3 (reproduced below with colored annotations added) "is a schematic diagram representing an exemplary 802.11n WLAN system 300 having legacy 802.11a/g stations 302 [blue] operating at channel 2 [red] and 304 [orange] operating at channel 3 [green]. In addition, system 300 includes a networked device 306 [purple] ... which includes a dual-chain wideband receiver comprising a first radio or receiver station 308 and a second radio or receiver station 310, respectively operating on channels 2 and 3." *Id.*, 9:44-52. As shown, there is a gap (gold arrow) in the frequency spectrum between channels 2 and 3.




Aspects of the '326 Patent provide techniques for *partially* "filling the gap" in the frequency spectrum between, e.g., channels 2 and 3 above, with extra OFDM subcarriers. *Id.*, 9:67-10:1. The '326 Patent explains that in a system "without gap fill" that allocates 64 subcarriers per channel (or 128 subcarriers for two channels), only *96 subcarriers* are used for data, yielding a data rate of *108 Mbps*. *Id.*, 10:29-31. In the context of a system "without gap fill," unused subcarriers are positioned between channels, e.g., unused subcarriers would be in the "gap" between channels 2 and 3 in Figure 3 shown above. By contrast, the '326 Patent disclosed an example of a system that increased from *96 to 108* the number of subcarriers used for data by

*adding* additional data *subcarriers in the gap*, which increased the data rate to *121.5 Mbps*. *Id*., 10:31-36.

An example of the *partial* gap filling disclosed (and claimed) in the '326 Patent is illustrated by Figures 50 and 51, which are reproduced below with colored annotations added by Patent Owner. "FIG. 50 is a graphical representation of signal components and processing involving two 802.11a signals with a two channel transmitter given 25 MHz spacings." *Id*., 16:27-29. In the composite transmitted signal of FIG. 50, there is a gap [red box] in the frequency spectrum between the two channels. "FIG. 51 is a graphical representation of the signal components and processing of FIG. 50 with [a] filled-gap OFDM technique characterized by 25 MHz spacing." *Id*., 16:29-32. In Figure 51, gap-filling techniques are applied to *partially* fill the gap [green box] between the channels with additional OFDM subcarriers.

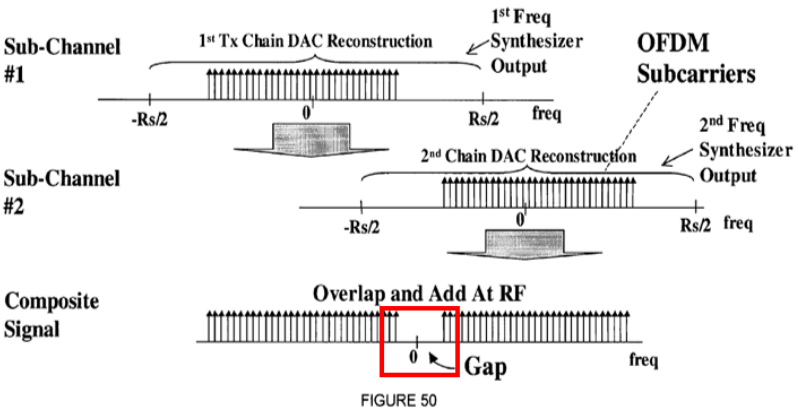



FIGURE 50

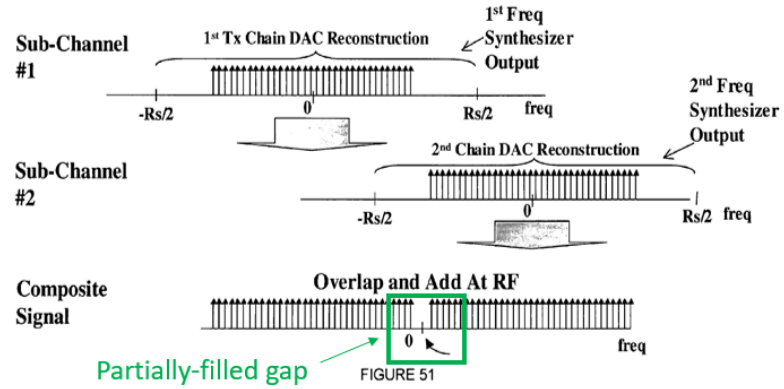



FIGURE 51

## III. PROSECUTION HISTORY OF '326 PATENT

The '326 Patent matured from U.S. Patent Appl. 11/033,524, filed on January 12, 2005 ("the Application"). The prosecution history included six office actions, two Advisory Action, and seven responses filed by the Applicant. As explained more fully below, numerous statements made by the Applicant during the prosecution history make clear a system where the *guard bands are **fully** used to connect channels* along the frequency axis is *outside the scope of the claims*, which are limited to "***partially*** filling the frequency gap." *See*, e.g., Sections II(H), (J) and (L), *infra*.

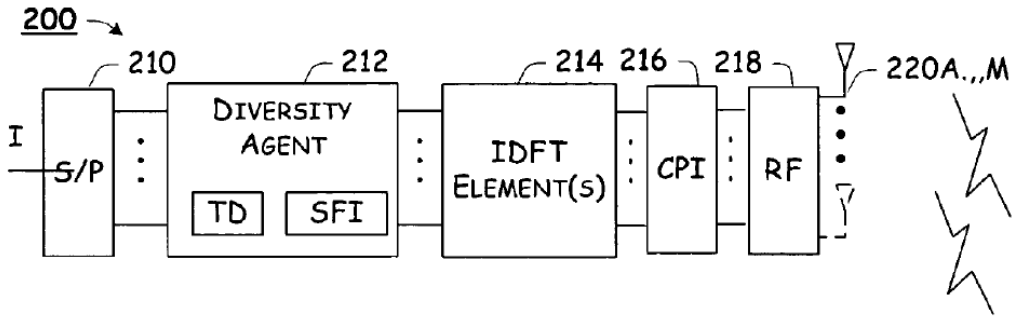
As originally filed, claims 1 and 9 of the Application recited:

> 1. A method for increasing data rates and data throughput in a network, the method comprising the steps of:
>
> identifying at least a first channel and a second channel;
>
> combining the first channel and the second channel using channel bonding with orthogonal frequency division multiplexing (OFDM); and
>
> transmitting the first channel and the second channel in parallel to a receiver.
>
> 9. The method of claim 1 further comprising the steps of:
>
> identifying a gap between two signals; and
>
> filling the gap with subcarriers.

Ex. 1002, 391.

**A. First Office Action**

In the first Office Action, the Examiner rejected claims 1 and 9 as anticipated by U.S. Patent Appl. No. 2005/0157682 (Sandhu) [Ex. 2026]. Sandhu disclosed the addition of an OFDM processing technique "to a multiple input, multiple output (MIMO) transceiver that utilizes more than one transmit/receive chain at each end of the wireless link." Ex. 2026, [0015]. Sandhu's transmitter architecture 200 (reproduced below) included a "serial to parallel transform 210, a (transmit) diversity agent 212, one or more inverse discrete Fourier transform (IDFT) element(s) 214, a cyclic prefix, or guard interval insertion element 216 coupled with one or more antenna(e) 220A . . . M through an associated one or more radio frequency (RF) elements 218." *Id*., [0031].




In Sandhu, "the diversity agent 212 selectively introduces an element of transmit diversity into the information streams received from the S/P transform 210." *Id*., [0033]. "The time domain content from the IDFT element(s) 214 is passed to CPI [cyclic prefix insertion] element(s) 216" which "introduce a cyclical prefix, or a guard interval in the signal, before it is passed to a radio frequency (RF) front-end 218 for amplification, filtering and subsequent transmission via an associated one or more antenna(e) 220A . . . M." *Id.*, [0036].

Sandhu disclosed an embodiment, where "diversity agent 212 may ensure that adjacent coded bits are mapped onto nonadjacent subcarriers" to perform tone interleaving where an "interleaver depth determines how many tones separate adjacent coded bits." *Id.*, [0049]. Sandhu explained that "this separation should be equal to the coherence bandwidth of the channel, e.g., N/L (where N=DFT size, and L=the length of the channel response in time)." *Id.* Sandhu explained that, "for arbitrary values of N (e.g., 96 or 108 when multiple 802.11a channels are bonded together to provide high throughput), the separation of adjacent coded bits is a key design criterion that determines performance." *Id.,* [0056].

In rejecting original claim 1 as anticipated by Sandhu, the Examiner reasoned that Sandhu identified multiple channels, combined the multiple channels using channel bonding with orthogonal frequency division multiplexing (OFDM), and transmitted the first channel and the second channel in parallel to a receiver. Ex. 1002, 313-314. The Examiner further reasoned that the "filling a gap" limitation in dependent claim 9 was met by Sandhu's disclosure of "a number of OFDM tones." *Id*.

### B. Response To First Office Action

In response to the first Office Action, the Applicant made several amendments to claim 1 which, *inter alia*, incorporated the "gap filling" limitation of dependent claim 9 into the amended claim 1:

> 1. (Currently Amended) A method for increasing data rates and data throughput in a network, the method comprising ~~the steps of~~:
>
> ~~identifying~~ selecting at least a first channel and a second channel;
>
> filling a gap between the first channel and the second channel with a subcarrier;
>
> combining the first channel and the second channel using channel bonding with orthogonal frequency division multiplexing (OFDM); and
>
> transmitting the first channel and the second channel in parallel to a receiver.

*Id*., 296. In the Remarks accompanying the claim amendments, the Applicant argued that "Sandhu does not disclose gap filling between carriers, much less 'filling a gap

between the first channel and the second channel with a subcarrier' as recited in amended claim 1." *Id.*, 301.

### C. Second Office Action

The Examiner responded with a second Office Action finally rejecting claim 1 as obvious based on Sandhu. *Id.*, 285-286. The Examiner acknowledged that Sandhu failed to "explicitly disclose filling a gap between the first channel and the second channel with a subcarrier." *Id.*, 286. The Examiner reasoned, however, that Sandhu teaches that there are "N OFDM channels in a port," and "one skilled in the art would be motivated to consider all the channels other than the first channel and the second channel as a subcarrier. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to fill a gap between the first channel and the second channel with a subcarrier to efficiently use the port." *Id.*

### D. Response To Second Office Action

In response to the second Office Action, the Applicant argued that the "filling the gap" limitation in claim 1 was not obvious over Sandhu:

> Applicants submit that *"filling the gap" as disclosed in the specification does not merely mean "conside[ring] all the channels other than the first channel and the second channel as a subcarrier"* as asserted by the Examiner. Office Action, p. 3. Rather, "filling the gap" as described in one embodiment in the specification as (sic) involving "the use of additional subcarriers ... between two single channels" whose "center frequencies ... are separated by 20 MHz." Specification, ¶0088. ...

> The Examiner has not provided any support for the contention that one skilled in the art would consider "all the channels other than the first channel and the second channel as a subcarrier" as asserted in the Office Action. ... *Id*., 263-264, (emphasis added).

**E. Advisory Action**

In response, the Examiner issued an Advisory Action disagreeing with the Applicant's arguments:

> ... The limitation of "*filling the gap* between the first channel and the second channel with a subcarrier" in claim 1 is *very broad*. As acknowledged by Applicant (page 6, 1st paragraph), Sandhu discloses using multiple channels in an allocated spectrum. *Examiner interprets the first channel of the spectrum as the first channel in the claim 1 and the last channel of the spectrum as the second channel by a subcarrier, and the channels between the first and the last channel in the spectrum is considered as "filling the gap between the first channel and the second channel"* ... Therefore, Sandhu discloses the limitation of "filling the gap between the first channel and the second channel with a subcarrier," even though Sandhu does not explicitly uses the term of "filling gap between the first channel and the second channel" ... *Id*., 255 (emphasis added).

**F. Response To Advisory Action**

In response to the Advisory Action, the Applicant requested that claim 1 be amended as follows:

> 1. (Currently Amended) A method for increasing data rates and data throughput in a network, the method comprising:
>
> selecting at least a first channel and a second channel, the first and second channels being adjacent and each having a number of data subcarriers, wherein the data subcarriers of the first channel and the data subcarriers of the second channel are separated by a frequency gap corresponding to one or more guard bands between the first and second channels;

> filling [[a]] the frequency gap between the first channel and the second channel with a ~~subcarrier~~ plurality of data subcarriers;
>
> combining the first channel and the second channel using channel bonding with orthogonal frequency division multiplexing (OFDM); and
>
> transmitting data subcarriers occupying the first channel and the second channel in parallel to a receiver.

*Id*., 237. In the accompanying Remarks, the Applicant cited to the examples in the specification discussed in Section II, *supra*, where a system "without gap fill" that allocates 64 subcarriers per channel (or 128 subcarriers for two channels) uses only *96 subcarriers* for data (yielding a data rate of *108 Mbps*), while a system that applied the disclosed "gap filling" techniques increased from *96 to 108* the number of subcarriers used for data by *adding* additional data *subcarriers in the gap*, which increased the data rate to *121.5 Mbps*. Ex. 1002, 7. In the accompanying Remarks, the Applicant argued:

> As claimed in claim 1, "filling the frequency gap between the first channel and the second channel with a plurality of data subcarriers" where the "frequency gap corresponding to one or more guard bands between the first and second channels" is *different from the insertion of a channel between spectrum endpoints* described in the section the Advisory Action quoted above. *See* Advisory Action, pp. 2-3. Rather, *the insertion of a whole channel would not involve the insertion of insertion subcarriers into guard bands, much less into "a frequency gap corresponding to one or more guard bands* between the first and second channels" as recited in claim 1. *Id.*, 249 (emphasis added).

### G. Third Office Action

After the Applicant filed a Request for Continued Examination requesting consideration of the amendments set forth in Applicant's prior response, the Examiner issued a third Office Action in which the Examiner rejected claim 1 for both indefiniteness and obviousness. With respect to indefiniteness, the Examiner stated:

> Independent claim 1 recites "the first and second channels being adjacent and each having a number of data subcarriers, wherein the data subcarriers of the first channel and the data subcarriers of the second channel are separated by a frequency gap corresponding to one or more guard bands between the first and second channels; filling a frequency gap between the first channel and the second channel with a plurality of data subcarriers." *This limitation needs clarity*. For example, *the first and second channels are not adjacent if there is "a frequency gap" filled "with a plurality of data subcarriers" between them*. *Id.*, 215 (emphasis added).

Additionally, the Examiner rejected claim 1 as obvious over Sandhu in view of U.S. Patent Publication No. 2002/0034214 (Okada). *Id.*, 249 (emphasis added). The Examiner acknowledged that "Sandhu does not explicitly disclose filling a frequency gap between the first channel and the second channel with a plurality of data subcarriers," but argued that this limitation was met by Okada. *Id.*, 217-218.

With reference to Figure 1 (reproduced below with colored annotations added), Okada explained that in OFDM, "each channel is normally provided with band gaps [green arrow] for preventing interference from the adjacent channels,

which are referred to as guard bands" that "reduce the efficiency of frequency exploitation." Ex. 2027, [0007]. With reference to Figure 2 (also reproduced below), Okada disclosed that "when transmitting three streams of information through respective three information channels (Ch.1, Ch2, Ch3), the guard bands separating the channels can be removed and the three information channels can be connected in the sense of frequency axis for signal transmission."

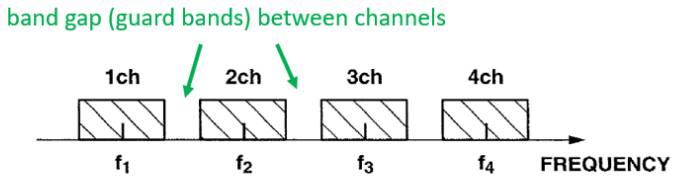



FIG.1

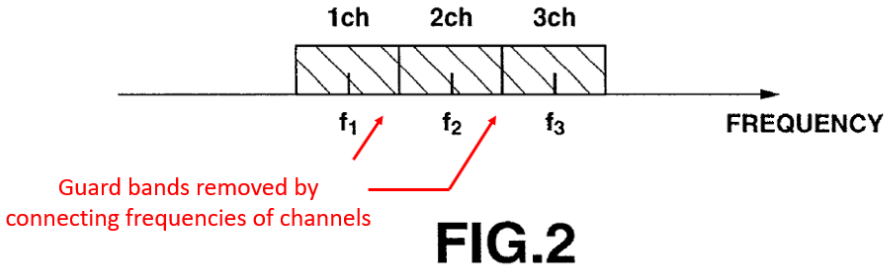



FIG.2

In the third Office Action, the Examiner reasoned that Figure 2 of Okada disclosed filling the frequency gap between channels depicted in Figure 1 of Okada with a plurality of data subcarriers. Ex. 1002, 218. Put another way, the Examiner reasoned that the "filling the gap" limitation was met by *entirely removing the guard*

*bands between channels and connecting adjacent channels (without any gap) along the frequency axis*.

### H. Response To Third Office Action

In response to the Examiner's prior interpretation of the "filling the gap" limitation as being met by *entirely removing the guard bands between channels* and connecting adjacent channels (*without any gap*) along the frequency axis, the Applicant amended claim 1 to make clear that, in Applicant's invention, the gap was *not fully filled* but instead the gap was *partially* filled:

> 1. (Currently Amended) A method for increasing data rates and data throughput in a network, the method comprising:
>
> selecting at least a first channel and a second channel, the first and second channels being adjacent *without any other channels therebetween* and each having a number of data subcarriers, wherein the data subcarriers of the first channel and the data subcarriers of the second channel are separated by a frequency gap corresponding to one or more guard bands between the first and second channels;
>
> *partially* filling the frequency gap between the first channel and the second channel with a plurality of data subcarriers;
>
> combining the first channel and the second channel using channel bonding with orthogonal frequency division multiplexing (OFDM); and
>
> transmitting data subcarriers occupying the first channel and the second channel in parallel to a receiver.

Ex. 1002, 195.

In the accompanying Remarks, the Applicant first addressed the Examiner's indefiniteness rejection by explaining that "while the first and second channels recited in claim 1 are 'without any other channels therebetween,' the first and second

channels themselves are 'separated by a frequency gap corresponding to one or more guard bands between the first and second channels.' *Id*., 7 (emphasis added).

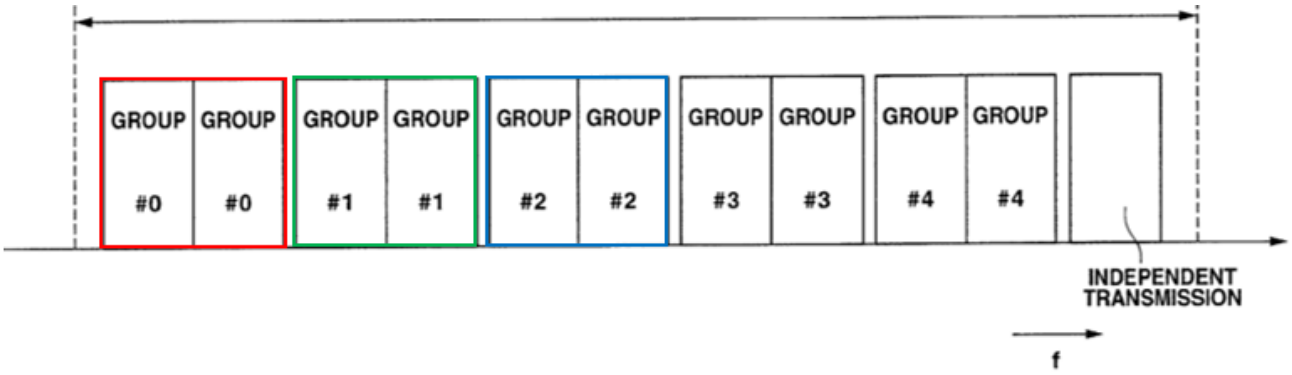
In response to the obviousness rejection, the Applicant explained:

> Okada states that "with OFDM, each channel is normally provided with band gaps for preventing interference, which are referred to as guard bands and have a predetermined frequency bandwidth as shown in FIG. 1. ... " Okada, ¶0007. Okada continues: "when transmitting three streams of information through respective three information channels (Chl, Ch2, Ch3), the guard bands separating the channels can be removed and the three *information channels can be connected* in the sense of frequency axis for signal transmission as illustrated in FIG. 2." Okada, ¶ 0009 (emphasis added). Thus, *Okada describes removing all guard bands* between the channels. *In contrast*, amended claim 1 recites "*partially filling the frequency gap* between the first channel and the second channel with a plurality of data subcarriers." *Id*., 201 (emphasis added).

These Remarks, combined with the Applicant's claim amendment reciting that the frequency gap was *partially* filled, made clear that a system (like Okada) where the *guard bands are entirely removed* and adjacent channels are *connected* (*without any gap*) along the frequency axis was *outside the scope of the claims*.

## I. Fourth Office Action

In the next Office Action, the Examiner maintained the rejection of claim 1 as obvious over Sandhu and Okada. *Id*., 178-179. Relying on Figure 25 of Okada (reproduced below with colored annotations added), the Examiner reasoned that Okada discloses *partially* filling the frequency gap between Group #0 (red) and Group #2 (blue) with the subcarriers in Group #1 (green). *Id*., 179.




**J. Response To Fourth Office Action**

In response, the Applicant amended claim 1 as follows:

> 1. (Currently Amended) A method for increasing data rates and data throughput in a network, the method comprising:
>
> selecting at least a first channel and a second channel, the first and second channels being adjacent without any other channels therebetween and each having a number of data subcarriers, wherein the data subcarriers of the first channel and the data subcarriers of the second channel are separated by a frequency gap corresponding to one or more guard bands between the first and second channels;
>
> partially filling the frequency gap between the first channel and the second channel ~~with a plurality of~~ by adding one or more data subcarriers into the frequency gap;
>
> combining the first channel and the second channel using channel bonding with orthogonal frequency division multiplexing (OFDM); and
>
> transmitting data subcarriers occupying the first channel and the second channel in parallel to a receiver.

*Id*., 154. In response to the Examiner's position that Figure 25 of Okada disclosed *partially* filling the frequency gap because in Figure 25 of Okada *all* guard bands are *removed*, the Applicant argued:

> Okada indicates that Figure 25 depicts "five connected transmission groups" where "each group contain[s] two segments", and where "each segment correspond[s] to an information channel." Okada, ¶0183, 0185. In other words, each group of Figure 25 is made up of two

> channels. ... Okada does not disclose or suggest filling a frequency gap corresponding to guard band(s) between adjacent channels "without any other channels therebetween"; rather, *Okada discloses use of connected transmission groups* that are made up of channels. ...
>
> [A]s argued in the previous response, at most, Okada merely describes *removing all guard bands* between the channels (Okada, ¶ 0009), not "*partially* filling the frequency gap between the first channel and the second channel with a plurality of data subcarriers."
>
> As Okada does not disclose or suggest at least "*partially* filling a frequency gap between the first channel and the second channel by adding one or more data subcarriers into the frequency gap" as recited in amended claim 1, Applicant submits Okada does not cure the admitted deficiencies of Sandhu. *Id*., 162-163 (emphasis added).

Thus, the Applicant again made clear that a system (like Okada) where the *guard bands are entirely removed* and adjacent channels are *connected* along the frequency axis was *outside the scope of the claims*.

### K. Fifth Office Action

In the next Office Action, the Examiner again maintained the rejection of claim 1 as obvious over Sandhu and Figure 25 of Okada. *Id*., 125-127. The Examiner's rejection also referred to another reference (Mazur) that disclosed frequency reuse techniques. More specifically, the Examiner stated:

> Okada discloses a frequency gap between the first channel and the second channel may be removed ("the guard bands separating the channels can be removed" [0009]) and be partially reused similar to other kinds of unused bandwidth (e.g., as disclosed by Mazur et al, "reuse patterns and guard bands ... this means that a 1/3 frequency reuse pattern must be deployed," col. 2, lines 35-41). One or more data subcarriers can be added to the unused frequency gap by adding into the frequency gap (FIG. 25 shows adding one or more data subcarriers

into the frequency gap. For example, group #1 is added to the gap between group #0 and group #2). *Id*., 127.

### L. Response To Fifth Office Action

In response, the Applicant further amended claim 1 as follows:

> 1. (Currently Amended) A method for increasing data rates and data throughput in a network, the method comprising:
>
> selecting at least a first channel and a second channel, wherein the first channel and the second channels ~~being~~ are adjacent without any other channels therebetween, wherein the first channel and the second channel [[and]] each have a plurality ~~having a number~~ of data subcarriers, wherein the data subcarriers of the first channel and the data subcarriers of the second channel are separated by a frequency gap corresponding to one or more guard bands between the first and second channels;
>
> partially filling the frequency gap between the first channel and the second channel by adding one or more data subcarriers into the frequency gap;
>
> combining the first channel and the second channel using channel bonding with orthogonal frequency division multiplexing (OFDM); and
>
> transmitting data subcarriers occupying the first channel, [[and]] the second channel, and the frequency gap in parallel to a receiver.

*Id*., 115. Among other things, these amendments clarified that the *frequency gap was included in the transmitted signal*. Inclusion of the frequency gap in the transmitted signal necessarily requires that the frequency gap be *only partially filled* -- but *not fully filled* -- with added data subcarriers at the time of transmission, because if the frequency gap were *fully filled it would no longer exist* as the time of signal transmission. In the accompanying Remarks, the Applicant *distinguished* systems

like Figure 25 of Okada where the guard bands are *fully* used to connect channels along the frequency axis:

> Okada teaches that "when transmitting three streams of information through respective three information channels (Ch 1, Ch2, Ch3), the guard bands separating the channels can be removed and the three information channels can be connected in the sense of frequency axis for signal transmission as illustrated in FIG. 2." ¶[0009]. Thus, *Okada teaches removing the guard bands and combining the channels in such a way to **fully** use the guard band*, i.e., connect the channels in the sense of frequency axis. ... However, *merely removing guard bands as disclosed by Okada is not the same as "partially filling the frequency gap* between the first channel and the second channel by adding one or more data subcarriers into the frequency gap," as claimed. Id., 105 (emphasis added).

Here, the Applicant reiterated for a third time that a system where the *guard bands are **fully** used to connect channels* along the frequency axis was *outside the scope of the claims* which recite "***partially*** filling the frequency gap."

**M. Sixth Office Action**

After the Applicant filed a Request for Continued Examination requesting consideration of Applicant's prior response, the Examiner rejected claim 1 as obvious over Sandhu in view of U.S. Patent No. 6,438,115 (Mazur). *Id*., 58-60. Mazur disclosed the application of "frequency reuse patterns and guard bands" including a 1/3 frequency reuse pattern where "all base station sites transmit in three sectors and with a different set of physical channels in each sector." Ex. 2028, 2:37-43. In the Office Action, the Examiner reasoned that this aspect of Mazur disclosed

that a frequency gap "can be partially reused similar to other kinds of unused bandwidth," rendering claim 1 obvious. *Id*., 60.

### N. Response To Sixth Office Action

In response, the Applicant further amended claim 1 in order to distinguish Mazur's frequency reuse techniques:

> 1. (Currently Amended) A method for increasing data rates and data throughput in a network, the method comprising:
>
> selecting at least a first channel and a second channel, wherein the first channel and the second channel are adjacent without any other channels therebetween, n first channel and the second channel each have a plurality of data subcarriers, wherein the data subcarriers of the first channel and the data subcarriers of the second channel are separated by a frequency gap corresponding to one or more guard bands between the first and second channels;
>
> partially filling the frequency gap between the first channel and the second channel by adding one or more data subcarriers into the frequency gap such that the one or more guard bands are at least partially filled with at least some of the one or more data subcarriers;
>
> combining the first channel and the second channel using channel bonding with orthogonal frequency division multiplexing (OFDM); and
>
> transmitting data subcarriers occupying the first channel, the second channel, and the frequency gap in parallel to a receiver.

*Id*., 39. In arguing that amended claim 1 was not met by Sandhu and Mazur, the Applicant emphasized the requirement that the frequency gap be "*partially*" filled:

> ... [A]ccording to Mazur, a 1/3 frequency reuse pattern means that there are three different sets of physical channels divided over one base station site. Dividing three different sets of physical channels over one base station site is not the same as the claimed "*partially* filling a frequency gap between the first channel and the second channel by adding one or more data subcarriers into the frequency gap." ...

> In addition, Mazur teaches away from an embodiment wherein "one or more guard bands [within a frequency gap between two channels] are at least partially filled with ... one or more data subcarriers," as claimed. ... Mazur discusses the importance of maintaining guard bands between carriers. ...
>
> Furthermore, the combination of Mazur and Sandhu also fails to disclose, teach, or suggest such an element. ... [N]owhere does Sandhu provide any indication that a "frequency gap" between channels is "*partially fill[ed]* with ... data subcarriers." Likewise, the combination of Mazur's general disclosure of "frequency reuse patterns" and Sandhu's brief mention of "channel bonding" fails to disclose, teach, or suggest that a "frequency gap" between channels is "*partially fill[ed]* with ... data subcarriers." *Id*., 45-46 (emphasis added).

### O. Examiner's Amendment And Notice Of Allowance

In response, the Examiner sought and received authorization to file an Examiner Amendment requiring: "*using full spectral synthesis capability of a fast Fourier transform or an inverse fast Fourier transform*" to fill at least some of the subcarriers in the one or more guard bands with the one or more data subcarriers. *Id*., 31. In connection with the Examiner's Amendment, the Examiner issued a Notice of Allowance. *Id*., 30-31.

## IV. CLAIM CONSTRUCTION

In *Phillips v. AWH Corp*. 415 F.3d 1303, 1314-1318 (Fed. Cir. 2005) (en banc), the Federal Circuit explained that intrinsic evidence --, i.e., the claims, specification and prosecution history -- are to be used to discern the meaning of claim terms. As the Court explained, "the claims themselves provide substantial

guidance as to the meaning of particular claim terms," and "the prosecution history provides evidence of how the PTO and the inventor understood the patent." *Id*.

Claim 1 of the '326 Patent recites "*partially* filling the frequency gap between the first channel and the second channel by adding one or more data subcarriers into the frequency gap." Both the language in the "transmitting" step in claim 1, as well as the prosecution history, make clear that systems where the *guard bands are fully filled* and the frequency gap is *totally eliminated*, are outside the scope of the claims.

First, the "transmitting" step in claim 1 requires that the *frequency gap be included in the transmitted signal*. Inclusion of the frequency gap in the transmitted signal necessarily requires that the frequency gap be *only partially filled* -- but *not fully filled* -- with added data subcarriers at the time of transmission, because if the frequency gap were *fully filled it would no longer exist* at the time of signal transmission.

Second, during the prosecution history, the Applicant repeatedly stated that that systems where the guard bands are *entirely removed* and adjacent channels are *connected* along the frequency axis are *outside the scope of the claims*. *See*, *e.g.*, Ex. 1002, 201 ("*Okada describes removing all guard bands* between the channels. *In contrast*, amended claim 1 recites "*partially filling the frequency gap* between the first channel and the second channel with a plurality of data subcarriers") (emphasis added); 162-163 ("*Okada discloses use of connected transmission groups* that are

made up of channels. ... [A]s argued in the previous response, at most, Okada merely describes *removing all guard bands* between the channels (Okada, ¶ 0009), not "*partially* filling the frequency gap between the first channel and the second channel with a plurality of data subcarriers") (emphasis added); and 105 ("*Okada teaches removing the guard bands and combining the channels in such a way to* ***fully*** *use the guard band*, i.e., connect the channels in the sense of frequency axis. ... However, *merely removing guard bands as disclosed by Okada is not the same as "partially filling the frequency gap* between the first channel and the second channel by adding one or more data subcarriers into the frequency gap," as claimed").[1]

As explained more fully below, the Petition implicitly argues that claim 1 covers systems (like Okada) where the *guard bands are fully filled (and thereby entirely removed*) by *connecting channels* along the frequency axis. Petition, 28 (arguing in the alternative "to the extent the claim requires partially (as opposed to completely) filling the frequency gap"). While the Petition fails to explain the basis for its interpretation of "*partially* filling the frequency gap" as covering *fully* filling

[1] In the district court, Petitioner Southwest alleges that "partially filling the frequency gap" between the first and second channels in independent claim 1 is indefinite because "[t]he specification does not provide an explanation of what constitutes '*partially' filling/filled* in a way that *distinguishes it from fully filling/filled*." Ex. 2014, 194. Petitioner's indefiniteness position is necessarily predicated on an understanding that the claims cover *partially filling* the gap by not *fully* filling the gap.

the frequency gap, to the extent Petitioners were to argue that such an interpretation is supported by other language in the claim specifying the use of "full spectral synthesis capability of a fast Fourier transform or an inverse fast Fourier transform" to "at least partially" fill the one or more guard bands with the one or more data subcarriers, such an argument would lack merit. The "at least" language is present there to specify that the "*full spectral synthesis capability of a fast Fourier transform or an inverse fast Fourier transform*" is used for *at least some of the gap filling*. The requirement that "at least" some of the gap filling use a "full spectral synthesis capability" does not transform claim 1 into one that covers a *completely* filled frequency gap. On the contrary, the requirement in the "transmitting" step that the frequency gap *exist* at the time of transmission, as well as the Applicant's repeated statements during the prosecution history, make clear that systems that *fully* fill the frequency gap are *outside* the scope of the claims.

## V. GROUND 1 FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD OF SUCCESS

Ground 1 fails to demonstrate a reasonable likelihood of success. As explained below, Ground 1 relies on Mori for the limitation reciting "*partially* filling the frequency gap between the first channel and the second channel." However, in Mori -- just like the art distinguished during prosecution -- the frequency gap is *fully*

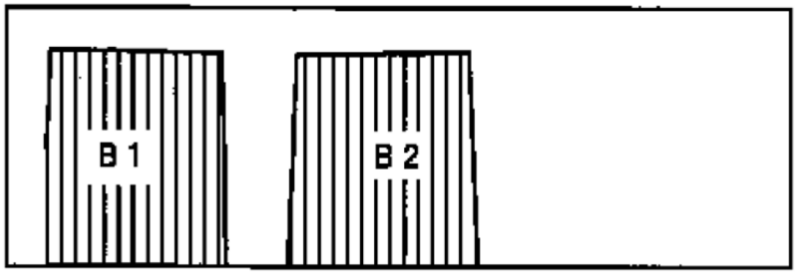
*filled* and *totally eliminated* prior to signal transmission. Thus, the mappings to Mori fail to disclose "*partially* filling the frequency gap," as claimed.

After erroneously mapping the limitations reciting "*partially* filling the frequency gap" to Mori's disclosure of *fully* filling the frequency gap, Ground 1 makes a single-sentence, conclusory allegation that "to the extent the claim requires partially (as opposed to completely) filling the frequency gap, it would be obvious to a POSITA to modify the teachings" of the references "to the extent necessary to satisfy the claim limitation." Petition, 28. Completely absent is *any* reasoning explaining *why* such a modification would have been obvious.

Moreover, the purported motivation for combining Gardner and Mori in Ground 1 is completely unsupported. Petitioners' obviousness theory is premised on the unsupported allegations that Gardner "suggested combining channel bonding and MIMO" or disclosed "channel bonding and MIMO as compatible IEEE 802.11a extension options." However, the Petition is devoid of evidence that Gardner suggested or disclosed such subject matter.

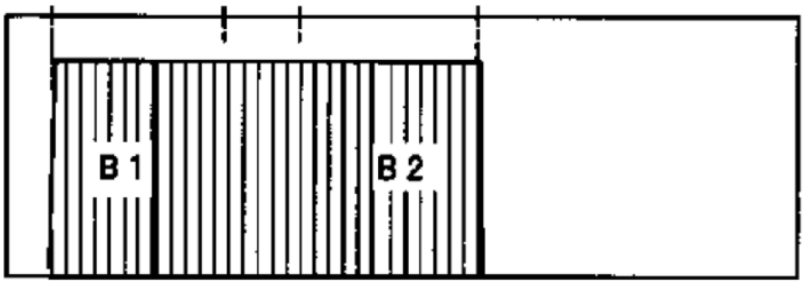
### A. With Respect To The Claim Limitations That Recite "*Partially* Filling The Frequency Gap," The Petition Erroneously Relies On Mori's Disclosure Of *Fully* Filling The Gap

In Ground 1, the Petition maps channels B1 and B2 in Figure 9(f) of Mori (reproduced below) to the claimed "first channel" and "second channel" that "are separated by a frequency gap." Petition, 23-25.




**Mori, Fig. 9(f)**

The Petition then maps Figure 9(g) of Mori (reproduced below), to the limitation in claim 1 requiring "*partially* filling the frequency gap between the first channel and the second channel." Petition, 26-27.

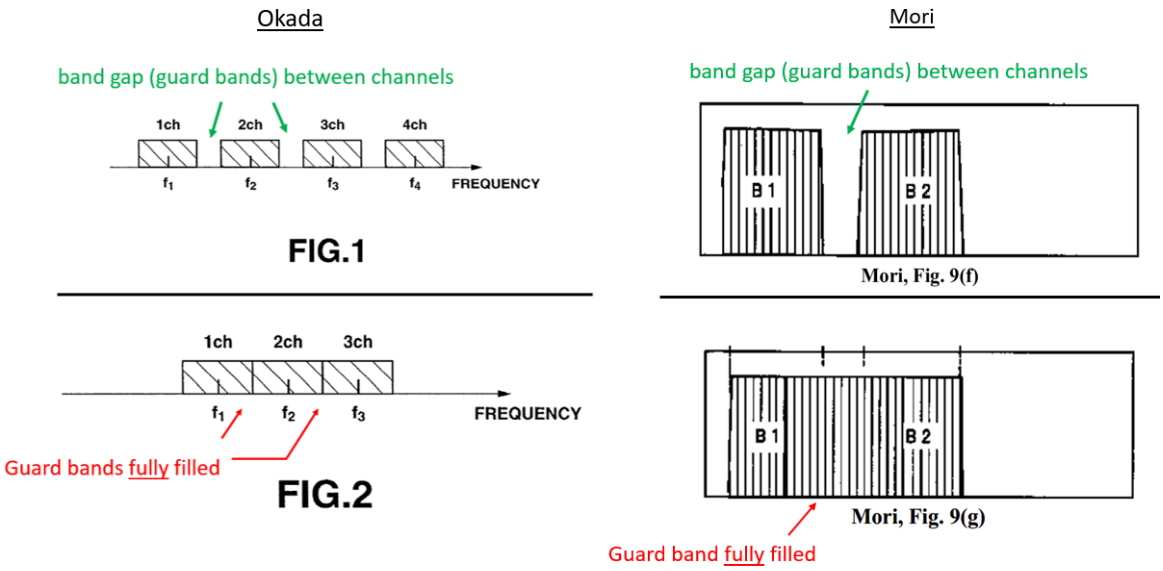



**Mori, Fig. 9(g)**

There can be no dispute that, in Figure 9(g) of Mori, the previous frequency gap between the first channel and the second channel (depicted in Figure 9(f)) has been completely eliminated and *fully filled* with subcarriers, rather than being filled *partially* with subcarriers, as claimed.

As explained in Section IV, *supra*, both the language in the "transmitting" step in claim 1, as well as the prosecution history, make clear that the limitation reciting "*partially* filling the frequency gap between the first channel and the second

channel" in claim 1 is not by a system where the *guard bands are fully filled* and the frequency gap is *totally eliminated*. Simply put, Ground 1 of the Petition fails to demonstrate a reasonable likelihood because in Mori -- just like the art distinguished during prosecution -- the *guard bands are fully filled* and the frequency gap is *totally eliminated*. In this respect, the disclosure of *fully* filling the frequency gap in Figures 1 and 2 of Okada (left side) which was distinguished from the "*partially* filling" limitation in claim 1 during prosecution is no different from Mori's disclosure in Figures 9(f) and 9(g) of *fully* filling the frequency gap (right side).




As discussed in detail in Section IV, *supra*, both the language in the "transmitting" step in claim 1, as well as the prosecution history, make clear that the recitation in claim 1 of "*partially* filling the frequency gap between the first channel

and the second channel" is not met by the mappings to Mori set forth in Ground 1 where Mori's *guard bands are fully filled*.

Similar to independent claim 1, independent claims 16 and 18 of the '326 Patent recite "means for *partially* filling the frequency gap" or "instructions to *partially* fill the frequency gap." In Ground 1, the mappings to Mori of these corresponding limitations in independent claims 16 and 18 are deficient for the same reasons explained above in connection with claim 1. In addition, the mappings to the dependent claims that are the subject of Ground 1 are deficient because the mappings for the dependent claims are all predicated on the flawed mappings of independent claims 1, 16 and 18 to Mori explained above.

### B. The Petition's Alternative Assertion That It Would Have Been Obvious To Modify The References So That The Gap Was Not Completely Filled Is Deficient

After erroneously mapping the limitations in independent claims 1, 16 and 18 reciting "*partially* filling the frequency gap between the first channel and the second channel" to Mori's disclosure in Figures 9(f) and 9(g) of *fully* filling the frequency gap, the Petition makes the following conclusory assertion:

> Moreover, to the extent the claim requires partially (as opposed to completely) filling the frequency gap, it would be obvious to a POSITA to modify the teachings of Gardner and Mori to the extent necessary to satisfy the claim limitation. EX.1004, ¶156. Petition, 28.

Completely absent from the Petition is *any* reasoning explaining *why* such a

modification would have been obvious. The expert declaration discloses a similar sentence making the same allegation, but also fails to provide *any* reasoning explaining *why* such a modification would have been obvious. See, Ex. 1004, ¶156.

A petitioner cannot satisfy its burden of proving obviousness by employing "mere conclusory statements," but "must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). The Petition's assertion that "to the extent the claim requires partially (as opposed to completely) filling the frequency gap, it would be obvious to a POSITA to modify the teachings of Gardner and Mori ... to satisfy the claim limitation" is nothing more than a conclusory statement and lacks specific reasoning based on evidence, so it fails to establish a reasonable likelihood of prevailing with respect to any of the claims challenged in Ground 1.

### C. The Purported Motivation For Combining Gardner And Mori In Ground 1 Is Completely Unsupported

In Ground 1, the Petition repeatedly alleges that a POSITA would have been motived to combine Gardner and Mori because Gardner discloses channel bonding and MIMO as "compatible" IEEE 802.11a extension options. From the Petition:

> A POSITA would be motivated to select Mori's adjacent channels B1 and B2 for Gardner's non-degenerate MIMO by the suggestion of *combining channel bonding and MIMO in Gardner*. EX.1004, ¶147. Petition, 25 (emphasis added).

* * *

As discussed above, *Gardner discloses channel bonding and MIMO as compatible* IEEE 802.11a extension options. Petition, 27 (emphasis added).

* * *

As discussed above, Gardner discloses channel bonding and MIMO as compatible IEEE 802.11a extension options. Petition, 29 (emphasis added).

* * *

A POSITA would be motivated to employ Mori's adjacent channels B1 and B2 (and the data subcarriers inserted into the guard band therebetween) for Gardner's non-degenerate MIMO by *the suggestion of combining channel bonding and MIMO in Gardner*. EX.1004, ¶147. Petition, 32 (emphasis added).

Completely lacking from the Petition is any explanation of how *Gardner discloses channel bonding and MIMO as compatible* IEEE 802.11a extension options. The Petition (at 20) cites to Gardner (at 2:17-19) and alleges that this passage of Gardner describes channel bonding. The paragraph of Gardner where this passage appears is set forth in full below:

Various options for IEEE 802.11a extensions that would support higher data rates have been considered. One option is to use multiple channels to transmit the data stream; for example, data could be multiplexed between two 54 Mbps streams occupying two contiguous 20 MHz channels to obtain a rate of 108 Mbps. *Using multiple channels, however, would reduce the LAN capacity (i.e., the number of nodes) because each transmitter would require more of the available RF spectrum. Moreover, such schemes may not be permitted under*

> *existing telecommunication regulations in some areas (e.g., Europe)*. Ex. 1006, 2:15-26 (emphasis added).

To the extent that this passage from Gardner even relates to "channel bonding" (a term Gardner nowhere mentions), the passage makes clear that channel bonding has drawbacks. After discussing two other options with their own drawbacks, Gardner states its objective, which is a solution that, unlike the option discussed at 2:15-26 (quoted above), does not require "more of the available RF spectrum":

> Therefore, it would be desirable to provide a system that supported increased data rate and operating range *while not requiring additional bandwidth* or additional RF chains at every network node (i.e., component unit or AP) or requiring capability knowledge to be shared between every node. Ex. 1006, 2:63-67 (emphasis added).

To the extent that the cited passage of Gardner (2:15-17) relied on in the Petition even relates to channel bonding, it is clear that, in Gardner's view, channel bonding has drawbacks that Gardner's solution avoids, rather than a technique that Gardner adopts.

In support of the incorrect notion that Gardner suggested combining channel bonding and MIMO in Gardner, the Petition (at 25) cited to Paragraph 147 of the Declaration of Petitioner's expert. Absent from that portion of the expert's Declaration (reproduced below) is *any* statement that Gardner "suggested combining channel bonding and MIMO" or disclosed "channel bonding and MIMO as compatible IEEE 802.11a extension options":

> 147. A POSITA would be motivated to select the "adjacent bands B1 and B2" of Mori for the "multiple streams … each [sent] via a separate antenna data stream" of Gardner based on suitability for obtaining "the benefits of MIMO…, notably increased spectral efficiency (and thus, increased data rate) without increasing the required bandwidth or constellation density and without decreasing the operating range." Ex.1006, 11:7-12. Ex. 1004, ¶147.

The reliance of Petitioner's Expert on 11:7-12 of Gardner is similarly unavailing, as that passage (reproduced below) fails to mention "combining channel bonding and MIMO" or describe "channel bonding and MIMO as compatible IEEE 802.11a extension options":

> ... As shown in the drawings, most of the components of transmitters 100 and 120 are identical, except that degenerate transmitter 120 has a combiner 215, while non-degenerate transmitter 100 has a second antenna 110b.
>
> The transmitter 100, 120 receives a data sequence from a data source (not shown). The data sequence is encoded by a forward error correction (FEC) encoder 202. ...

Simply put, the Petition is devoid of evidence that Gardner "suggested combining channel bonding and MIMO" or disclosed "channel bonding and MIMO as compatible IEEE 802.11a extension options." Since the motivations to combine Gardner and Mori in Ground 1 are predicated on these unsupported allegations, the Petition has failed to demonstrate that a POSITA would have been motivated to combine the references as alleged in Ground 1. For this further reason, the Petition has failed to demonstrate a reasonable likelihood of success with respect to any of the claims challenged in Ground 1.

### 1. The Fact That References Relate To The Same Field Standing Alone, Is Insufficient To Establish A Motivation To Combine

Petitioners' contentions that Gardner and Mori purportedly relate to the same field or goal (Pet. at 20-21) do not, by themselves, establish a reason to combine the references. The Federal Circuit has made clear that establishing that prior art references are within the same field of endeavor (or otherwise "analogous") is only a threshold admissibility inquiry; it does not itself supply the motivation to combine. See *Donner Tech., LLC v. Pro Stage Gear*, LLC, 979 F.3d 1353, 1358–60 (Fed. Cir. 2020) (analogous-art test determines whether a reference may be considered at all and is "separate from" whether there is a reason to combine); *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004) (defining analogous art as same field of endeavor or reasonably pertinent to the problem). Even when references qualify as analogous, the challenger still must carry the distinct burden to "explain why a person of ordinary skill in the art would have combined elements from specific references *in the way the claimed invention does*." *TQ Delta, LLC v. Cisco Sys.*, 942 F.3d 1352, 1360 (Fed. Cir. 2019) (emphasis original); *Securus Techs., Inc. v Glob. Tel*Link Corp.,* 701 F. App'x 971, 976-77 (Fed. Cir. 2017) (non-precedential) (holding that "[s]uch short-cut logic would lead to the conclusion that any and all combinations of elements known in [a] broad field would automatically be obvious, without the need for further analysis."); *Microsoft Corp. v. Enfish, LLC,* 662 F. App'x 981, 990

(Fed. Cir. 2016) (non-precedential) (holding that "the Board correctly concluded" that the petitioner "did not articulate a sufficient motivation to combine" where the only reason given was "that the references were directed to the same art or same techniques").

### 2. The Lack Of A Non-Conclusory Explanation "Why" The References Would Be Combined Is Fatal

The remainder of Petitioners' arguments for combining Gardner and Mori fare no better. The Petition makes the conclusory assertions "Gardner and Mori have complementary purposes" and that "[t]he combination of Gardner and Mori allows multiple spatial transmission paths to be employed, each for OFDM symbols resulting from channel bonding, to improve throughput for a data stream." Petition, 20-21. These allegations do not add up to a motivation to combine. The fact that a combination of references *could* be combined to achieve some advantage does not by itself explain why a POSITA *would* have been motivated to combine the references as alleged. As the Federal Circuit has explained time and again, "[t]he obviousness inquiry does not merely ask whether a skilled artisan could combine the references, but instead asks whether 'they would have been motivated to do so.'" *Adidas AG v. Nike, Inc.,* 963 F.3d 1355, 1359 (Fed. Cir. 2020) (quoting *InTouch Techs., Inc. v. VGO Commc'ns, Inc.,* 751 F.3d 1327, 1352 (Fed. Cir. 2014)).

Similarly, Petitioners' conclusory assertions that "[t]o the extent that any feature is not disclosed in either Gardner or Mori, it would have been routine to add the features of Mori to the system of Gardner or vice versa" and "[a] POSITA would have thus been motivated to combine Gardner and Mori" (Pet., 21) also lack supporting evidence or an explanation demonstrating *why* a POSITA would have combined the references.

In the present case, the lack of a "why" is dispositive: a determination of obviousness cannot be reached where the record lacks an "explanation as to how or why the references would be combined to produce the claimed invention." *TriVascular, Inc. v. Samuels,* 812 F.3d 1056, 1066 (Fed. Cir. 2016); *Virtek Vision Int'l ULC, Inc.,* 97 F.4th at 886 ("These disclosures, however, do not provide any reason why a skilled artisan would use 3D coordinates instead of angular directions in a system"). Conclusions that a skilled artisan "could" have combined references, is not enough; the record must show that the artisan would have been motivated to make the specific combination in the manner claimed. *In re Magnum Oil Tools Int'l, Ltd*., 829 F.3d 1364, 1380–81 (Fed. Cir. 2016) (reversing where the petitioner and Board relied on "conclusory statements" and improperly shifted the burden; petitioner must prove a motivation to combine with reasoned analysis and evidentiary support); *TQ Delta, LLC v. Cisco Sys., Inc.,* 942 F.3d 1352, 1359–60 (Fed. Cir. 2019) (vacating where the Board failed to adequately explain why a skilled

artisan would have combined the references); *Polaris Innovations Ltd. v. Samsung Elecs. Co*., 882 F.3d 1056, 1070 (Fed. Cir. 2018) (reversing for lack of substantial-evidence support for the Board's motivation-to-combine finding). Nor may "common sense" or generalized assertions about routine optimization substitute for the required reasoning and proof. *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1362 (Fed. Cir. 2016) (warning against replacing analysis and evidence with "common sense" to fill gaps in the proof); *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1330–31 (Fed. Cir. 2019) (rejecting reliance on generic design incentives without record evidence tying them to the specific combination). The Federal Circuit has also emphasized that hindsight cannot supply the missing rationale; the proponent must identify a contemporaneous reason in the prior art or the knowledge of a skilled artisan that would have prompted the specific modification or combination. *Leo Pharm. Prods., Ltd. v. Rea*, 726 F.3d 1346, 1356–57 (Fed. Cir. 2013) (reversing where the Board's combination rested on impermissible hindsight).

### 3. A Reasonable Expectation Of Success Is Insufficient To Establish A Motivation To Combine

The Petition's conclusory assertion that "[a] POSITA would have thus been motivated to combine Gardner and Mori with a reasonable expectation of success" (Pet., 21) addresses the wrong issue and is also totally conclusory. "The obviousness inquiry does not merely ask whether a skilled artisan could combine the references,

but instead asks whether 'they would have been motivated to do so.'" *Adidas AG,* 963 F.3d 1355, 1359 (quoting *InTouch Techs.,* 751 F.3d 1327, 1352. In other words, a reasonable expectation of success ("could combine references") does not establish a motivation to combine ("would have been motivated to do so"). An expectation of success cannot cure the deficiencies of Petitioners' conclusory and unsupported allegations that a POSITA would have been motivated to combine Gardner and Mori.

## VI. GROUND 2 FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD OF SUCCESS

Ground 2 challenges dependent claims 12 and 13. Ground 2 relies on the mappings for claim 1 in Ground 1 which, as set forth in Section IV, *supra*, are deficient for numerous reasons. Accordingly, for the reasons set forth in in Section IV, *supra*, Ground 2 fails to demonstrate a reasonable likelihood of success.

## VII. GROUND 3 FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD OF SUCCESS

Ground 3 also fails to demonstrate a reasonable likelihood of success. As explained below, Ground 3 also relies on Mori for the limitation reciting "*partially* filling the frequency gap between the first channel and the second channel." However, in Mori -- just like the art distinguished during prosecution -- the frequency gap is *fully filled* and *totally eliminated* prior to signal transmission.

Thus, the mappings to Mori fail to disclose "*partially* filling the frequency gap," as claimed.

After erroneously mapping the limitations reciting "*partially* filling the frequency gap" to Mori's disclosure of *fully* filling the frequency gap, Ground 3 makes a single-sentence, conclusory allegation that "to the extent the claim requires partially (as opposed to completely) filling the frequency gap, it would be obvious to a POSITA to modify the teachings" of the references "to the extent necessary to satisfy the claim limitation." Petition, 67. Completely absent is *any* reasoning explaining *why* such a modification would have been obvious.

In addition, the purported motivation for combining Mori, Lu and Williams in Ground 3 is also deficient. The Petition relies exclusively on contentions that the references purportedly relate to the same field or disclose related (or "complementary") subject matter. The fact that references are in the same field or disclose similar subject matter is insufficient by itself to establish a motivation to combine the references.

### A. With Respect To The Claim Limitations That Recite "*Partially* Filling The Frequency Gap," The Petition Erroneously Relies On Mori's Disclosure Of *Fully* Filling The Gap

As was the case in Ground 1, in Ground 3 the Petition maps channels B1 and B2 in Figure 9(f) of Mori to the claimed "first channel" and "second channel" that "are separated by a frequency gap." Petition, 62-63. Similarly, like Ground 1,

Ground 3 relies on Mori's disclosure in Figure 9(g) wherein the previous frequency gap between the first channel and the second channel (depicted in Figure 9(f) of Mori) has been completely eliminated and *fully filled* with subcarriers, rather than being filled *partially* with subcarriers, as claimed. Petition, 65 (*citing*, Mori, Figs. 9(f)-(g)). As explained in Section IV(A), *supra*, in Figure 9(g) of Mori -- just like the art distinguished during prosecution -- the *guard bands are fully filled* and the frequency gap is *totally eliminated*.

As discussed in detail in Section IV, *supra*, both the language in the "transmitting" step in claim 1, as well as the prosecution history, make clear that the recitation in claim 1 of "*partially* filling the frequency gap between the first channel and the second channel" in claim 1 is not met by these mappings to Mori where the *guard bands are fully filled*.

Similar to independent claim 1, independent claims 16 and 18 of the '326 Patent recite "means for *partially* filling the frequency gap" or "instructions to *partially* fill the frequency gap." In Ground 3, the mappings to Mori of these corresponding limitations in independent claims 16 and 18 are deficient for the same reasons explained above in connection with claim 1. In addition, the mappings to the dependent claims that are the subject of Ground 3 are deficient because the mappings for the dependent claims are all predicated on the flawed mappings of independent claims 1, 16 and 18 to Mori explained above.

### B. The Petition's Alternative Assertion That It Would Have Been Obvious To Modify The References So That The Gap Was Not Completely Filled Is Deficient

In Ground 3, after erroneously mapping the limitations in independent claims 1, 16 and 18 reciting "*partially* filling the frequency gap between the first channel and the second channel" to Mori's disclosure in Figures 9(f) and 9(g) of *fully* filling the frequency gap, the Petition makes the following conclusory assertion:

> Moreover, to the extent the claim requires partially (as opposed to completely) filling the frequency gap, it would be obvious to a POSITA to modify the teachings of Mori, Lu, and Williams to the extent necessary to satisfy the claim limitation. EX.1004, ¶359. Petition, 67.

As was the case in Ground 1, completely absent from Ground 3 is *any* reasoning explaining *why* such a modification would have been obvious. The expert declaration discloses a similar sentence making the same allegation, but also fails to provide *any* reasoning explaining *why* such a modification would have been obvious. See, Ex. 1004, ¶359.

A petitioner cannot satisfy its burden of proving obviousness by employing "mere conclusory statements," but "must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). The Petition's assertion that "to the extent the claim requires partially (as opposed to completely) filling the frequency gap, it would be obvious to a POSITA to modify the teachings

of Gardner and Mori ... to satisfy the claim limitation" is nothing more than a conclusory statement and lacks specific reasoning based on evidence, so it fails to establish a reasonable likelihood of prevailing with respect to any of the claims challenged in Ground 3.

### C. The Purported Motivation For Combining Mori, Lu And Williams In Ground 3 Is Deficient

In Ground 3, the Petition's arguments that a POSITA would have been motivated to combine Mori, Lu and Williams rely exclusively on contentions that the references purportedly relate to the same field or disclose related (or "complementary") subject matter. From the Petition:

> Each of Mori, Lu, Bolinth, and Williams are concerned with improving data transfer in wireless communications. (citations omitted).
>
> Both Mori and Lu describe, either explicitly or implicitly, the concept of channel bonding—that is, "simultaneously transmit[ting] data . . . over two adjacent channels as if it were a single channel with twice the bandwidth." (citations omitted).
>
> Both Mori and Lu describe or suggest using guard band subcarriers for data. (citations omitted). Williams describes inserting repeated data in guard bands, to combat inter-symbol interference. (citations omitted).
>
> Both Mori and Lu describe or suggest use of MIMO (spatial diversity) in combination with channel bonding and guard band data subcarriers. (citations omitted).
>
> Mori and Lu are complementary, with Mori describing channel bonding and gap-filling in detail while Lu describes signaling to ensure

> compatibility between systems that use MIMO, channel bonding, and gap-filling with those that do not. (citations omitted).

Petition, 59-60.

Petitioners' contentions that the references purportedly relate to the same field or disclose related (or "complementary") subject matter do not by themselves establish a reason to combine the references. *Securus Techs,* 701 F. App'x 971, 976-77 (non-precedential) (holding that "[s]uch short-cut logic would lead to the conclusion that any and all combinations of elements known in [a] broad field would automatically be obvious, without the need for further analysis."); *Microsoft Corp., LLC,* 662 F. App'x 981, 990 (non-precedential) (holding that "the Board correctly concluded" that the petitioner "did not articulate a sufficient motivation to combine" where the only reason given was "that the references were directed to the same art or same techniques"); *Johns Manville,* IPR2018-00827, Paper 9 at 10-11 (rejecting an argument that two references were similar and belonged to the same field was a sufficient reason to combine those references). Petitioners' same field/complimentary argument is "simply too conclusory" to show that a POSITA would have combined the references in the manner claimed. *Securus Techs., Inc.,* 701 F. App'x at 976.

The remainder of Petitioners' arguments for combining Mori, Lu and Williams consist of conclusory assertions that "[i]t would have been routine to add

the features of Lu and Williams to the system of Mori" and "[a] POSITA would have been motivated to combine Mori, Lu, and Williams, with a reasonable expectation of success." Petition, 60. These conclusory allegations do not add up to a motivation to combine. Even if it would have been "routine" to add combine aspects of the references (which has not been proven), this fact merely points to the notion that references *could* be combined, but by itself fails to explain why a POSITA *would* have been motivated to combine the references as alleged. *Adidas AG,* 1355, 1359 ("[t]he obviousness inquiry does not merely ask whether a skilled artisan could combine the references, but instead asks whether 'they would have been motivated to do so'"). The Petition's failure to explain "why" a POSITA would have been motivated to combine Mori, Lu and Williams is fatal to Ground 3.

The Petition's conclusory assertion in Ground 3 that "[a] POSITA would have thus been motivated to combine Mori, Lu and Williams with a reasonable expectation of success" (Pet., 60) addresses the wrong issue and is also totally conclusory. "The obviousness inquiry does not merely ask whether a skilled artisan could combine the references, but instead asks whether 'they would have been motivated to do so.'" *Adidas AG,* 751 F.3d 1327, 1352. As explained above, a reasonable expectation of success ("could combine references") does not establish a motivation to combine ("would have been motivated to do so"). An expectation of success cannot cure the deficiencies of Petitioners' conclusory and unsupported

allegations that a POSITA would have been motivated to combine Mori, Lu and Williams.

## VIII. CONCLUSION

For all of the reasons set forth above, the Petition fails to demonstrate a reasonable likelihood of success with respect to any of the challenged claims. Therefore, institution should be denied.

Respectfully submitted,

Dated: September 22, 2025

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## CERTIFICATE OF COMPLIANCE WITH WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), I certify that this **PATENT OWNER'S PRELIMINARY RESPONSE** complies with the type-volume limits set forth in the Memorandum and 37 C.F.R. § 42.24 because it contains 10,172 words, excluding the parts of the Brief that are exempted by 37 C.F.R. § 42.24(a), according to the word processing system used to prepare this Brief.

Respectfully submitted,

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## CERTIFICATE OF SERVICE

The undersigned certifies that pursuant to 37 C.F.R. § 42.6(e), a copy of the foregoing **PATENT OWNER'S PRELIMINARY RESPONSE** was served via email (as consented to by counsel) on September 22, 2025 to lead and backup counsel of record for Petitioner as follows:


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