

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AMERICAN AIRLINES, INC. AND SOUTHWEST AIRLINES CO.,

Petitioners,

v.

INTELLECTUAL VENTURES I LLC,

Patent Owner.

Case No. IPR2025-01510
U.S. Patent No. 10,103,845

PATENT OWNER'S PRELIMINARY RESPONSE

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PATENT OWNER’S EXHIBIT LIST

Ex. 2001	<i>American Airlines, Inc. and v. Intellectual Ventures II LLC</i> , IPR2025-00785 and IPR2025-00786, Paper 11 (PTAB August 29, 2025) (declining to exercise discretion to deny IPRs).
Ex. 2002	<i>American Airlines, Inc. and v. Intellectual Ventures II LLC</i> , IPR2025-00782 and IPR2025-00931, Paper 12 (PTAB September 19, 2025) (declining to exercise discretion to deny IPRs).
Ex. 2003	<i>American Airlines, Inc. and v. Intellectual Ventures II LLC</i> , IPR2025-00987 and IPR2025-01055, Paper 9 (declining to exercise discretion to deny IPRs).
Ex. 2004	IAM 2014, <i>What’s inside IV’s patent portfolio?</i>
Ex. 2005	Abstract of Title for U.S. Patent No. 10,103,845
Ex. 2006	PC Mag, July 2, 2013
Ex. 2007	Southwest Airlines Press Release dated May 11, 2022, entitled “Southwest Airlines Chooses Viasat’s High-Speed In-Flight Connectivity for New Aircraft Deliveries”
Ex. 2008	Southwest Airlines - Optional Travel Charges for travel on or after May 28, 2025
Ex. 2009	American Airlines Press Release Dated December 11, 2014
Ex. 2010	Fortune, <i>The Crazy Economics of Inflight Wifi</i> , 2015
Ex. 2011	American Airlines WiFi Connectivity Pricing, 2025
Ex. 2012	U.S. Patent Publ. No. 2004/0136349 (Walton 2004)
Ex. 2013	U.S. Patent Publ. 2002/0067759 (Ertel)
Ex. 2014	U.S. Patent Publ. 2005/0147079 (Lakkis)
Ex. 2015	U.S. Patent Publ. 2003/0156570 (Alamouti)

I. INTRODUCTION

The Petition challenges claims 1-21 (the Challenged Claims) of U.S. Patent No. 10,103,845 (the ‘845 Patent) based on four grounds. For at least the following reasons, the Petition fails to demonstrate a reasonable likelihood of success and institution should therefore be denied.

The ‘845 Patent had a long prosecution history, during which the Applicant narrowed the claims over the course of multiple amendments to a specific architecture that distinguished the claims from “conventional embodiments” of “dual mode” communication systems with multiple antennas. Ex. 1002, 11-12. The specific architecture claimed requires the use of “first transmitters” (plural) *and* “second transmitters” (plural) -- or *at least four transmitters* in total -- in first and second modes. “The first transmitters” and “the second transmitters” are each recited *five* times in claim 1, resulting in a long list of interrelated claimed requirements for each of “the first transmitters” and “the second transmitters.” The Petition avoids specifying within the relied on references the *particular* components that allegedly correspond “the first transmitters” and “the second transmitters,” and in turn avoids walking through how such *specific components* perform *all* of the functionality required of “the first transmitters” and “the second transmitters” as specified in the claims. The Petition’s approach glosses over these details, treating them as trivial. They are not. As explained in detail below, identifying “*first transmitters*” and

“second transmitters” in the relied on references that meet all of the functions specified in the claim language for each such component is neither straightforward nor trivial.

The grounds that rely on combining references are also deficient because the Petition fails to provide any rationale why a POSITA would have combined the references as proposed. In arguing that a motivation to combine exists, the Petition's arguments are limited to allegations that the references: (i) are in the same field, involve the same issues or have mutual relevance, and (ii) would have been routine to combine. Completely absent is any rationale explaining why such a POSITA would have been motivated to combine the references.

Finally, the Petition attempts to use an Expert Declaration to fill gaps in the references and analysis set forth in the Petition. However, the Expert Declaration merely restates the Petition's deficient assertions without providing additional substantive explanation. As a result, the Board should afford it little weight.

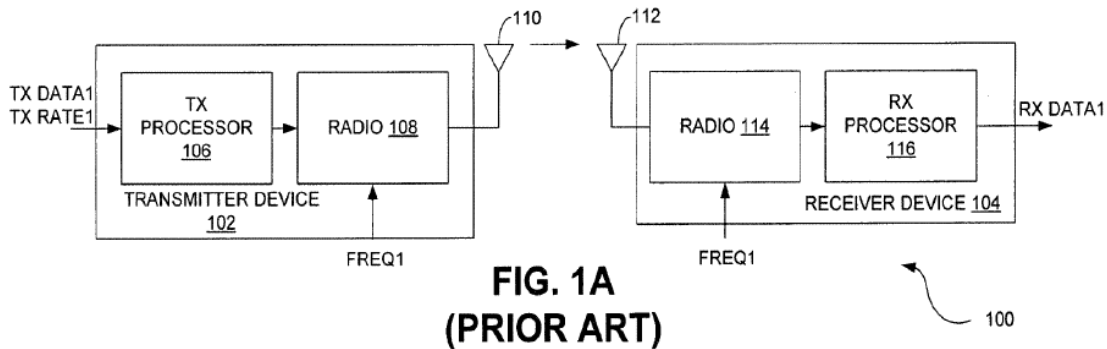
For these reasons, and as explained more fully below, institution should be denied.

II. SPECIFICATION OF ‘845 PATENT

A. Background

1. Description of Legacy Devices

The “Related Art” described in the ‘845 Patent included “legacy radios” or “legacy devices” that utilized single-in, single-out (SISO) orthogonal frequency division multiplexing (OFDM) and were compliant with IEEE 802.11 standards. Ex. 1001, 1:29-36 and 2:3-16. Diagrams illustrating an exemplary SISO system that used OFDM and was compliant with IEEE 802.11 standards, and the spectrums of signals processed by such system, were shown in Figures 1A and 1B (labelled ‘Prior Art’) reproduced below:



As shown in Figure 1A, “[t]he SISO system 100 comprises a transmitter device 102 and a receiver device 104. The transmitter device 102 comprises a

transmit (TX) processor 106, radio circuitry 108, and antenna 110. The receiver device 104 comprises an antenna 112, radio circuitry 114, and receive (RX) processor 116.” *Id.*, 1:32-37. Figure 1B “illustrates spectrums of the signals processed” by system 100.” *Id.*, 2:3-4. “[E]ach OFDM symbol 118 provided by the transmitter device 102 comprises 52 subcarriers (partially shown for brevity) centered at a defined reference or carrier frequency (designated in FIGS. 1A and 1B as *FREQ1*), with a bandwidth (BW) of approximately 20 mega-Hertz (MHz). The spectrum 120 resulting from processing at the receiver device 104 is centered at the same reference or carrier frequency (*FREQ1*).” *Id.*, 2:5-13.

2. Description of Spatial Multiplexing And MIMO Devices

The “Related Art” also included “spatial multiplexing.” *Id.*, 2:17-31. The ‘845 Patent explained that in, e.g., cellular systems, “a RF modulated signal from a transmitter device may reach a receiver device via a number of transmission paths. The characteristics of the transmission paths typically vary over time due to a number of factors such as fading and multi-path.” *Id.*, 2:17-23. In order to “provide diversity against deleterious path effects and improve performance,” the ‘845 Patent explained that “multiple transmit and receive antennas may be used for data transmission.” *Id.*, 2:23-26. The ‘845 Patent identified “spatial multiplexing” as a diversity technique, “where a transmission channel is divided into multiple “spatial channels” through which independent streams can be transmitted and received via

multiple transmit and receive antennas, respectively.” *Id.*, 2:26-31. Diagrams illustrating an exemplary multiple-input multiple-output (MIMO) OFDM system, and the spectrums of signals processed by such system, were shown in Figures 2A and 2B (labelled ‘Prior Art’) reproduced below:

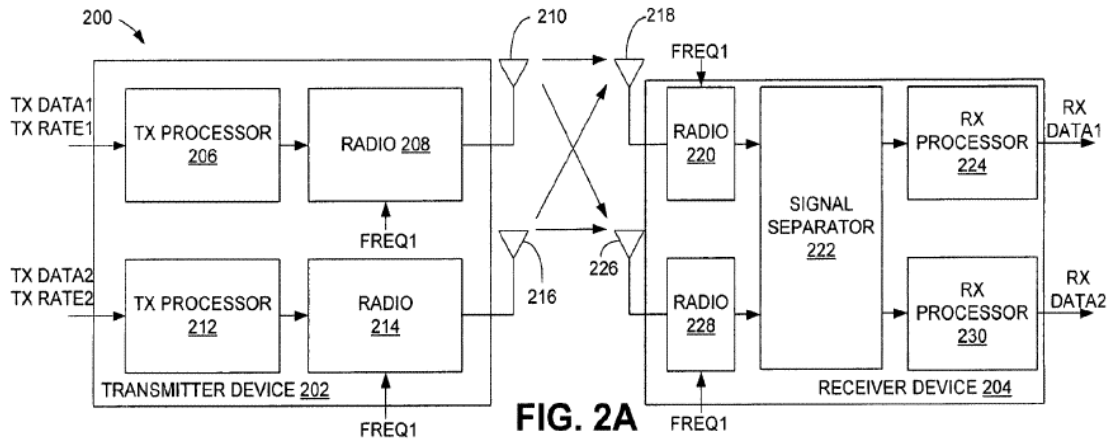


**FIG. 2A
(PRIOR ART)**

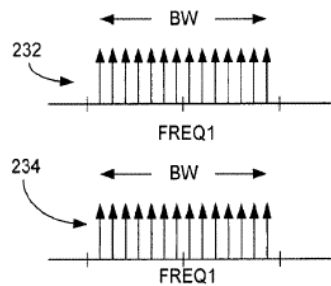
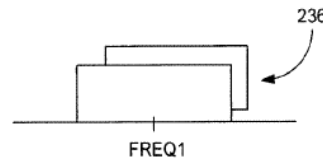


**FIG. 2B
(PRIOR ART)**



“The MIMO system 200 employs multiple transmit antennas and multiple receive antennas for data transmission. Through spatial multiplexing, a MIMO channel formed by the transmit and receive antennas may be decomposed into independent channels. Each of the independent channels is also referred to as a spatial subchannel of the MIMO channel.” *Id.*, 2:33-40. Figure 2B ”illustrates spectrums of the signals processed in the MIMO system 200.” *Id.*, 2:63-64. “As shown, the OFDM symbols

232 and 234 are comprised of subcarriers centered at the same reference or carrier frequency (FREQ1), each with a bandwidth (BW) of approximately 20 MHz. The spectrum 236 resulting from processing at the receiver device 204 is centered at the same frequency (FREQ1).” *Id.*, 2:64-3:3.

B. Detailed Description

1. Dual-Mode Architecture That Reuses Same Components For Spatial Multiplexing And Expanded Bandwidth Signaling

The Detailed Description discloses “bandwidth expansion and spatial multiplexing systems” (referred to as “BES systems”) comprised of “a dual-use or dual mode architecture that provides for expanded bandwidth signaling that can also be utilized for multiple-input, multiple output (MIMO) spatial multiplexing.” *Id.*, 4:6-12. The disclosed systems are implemented using “an architecture where the same or similar hardware is largely reused for MIMO spatial multiplexing and/or expanded bandwidth signaling.” *Id.*, 4:12-15. As the ‘845 Patent teaches, the dual mode architecture allows for the cost-effective use of legacy devices:

... In the disclosed embodiments, the dual nature of a transceiver is exploited by tuning to a defined frequency (spatial multiplexing) or different frequency (bandwidth expansion). Such techniques can increase the data rate by spatial multiplexing (use of multiple transmit/receive chains with antennas in a multi-path environment and a signal separator in the receiver device), while enabling reuse of the same architecture as a bandwidth expansion radio device ... By providing the ability to operate in either or both configurations using the same architecture, demand for increased data rates can be fulfilled using legacy radios or devices in a cost effective manner. *Id.*, 4:24-42 (emphasis added).

2. Exemplary BES System

Diagrams illustrating an exemplary BES system, and the spectrum of signals processed by such a system, were shown in Figures 3A and 3B, which are reproduced below:

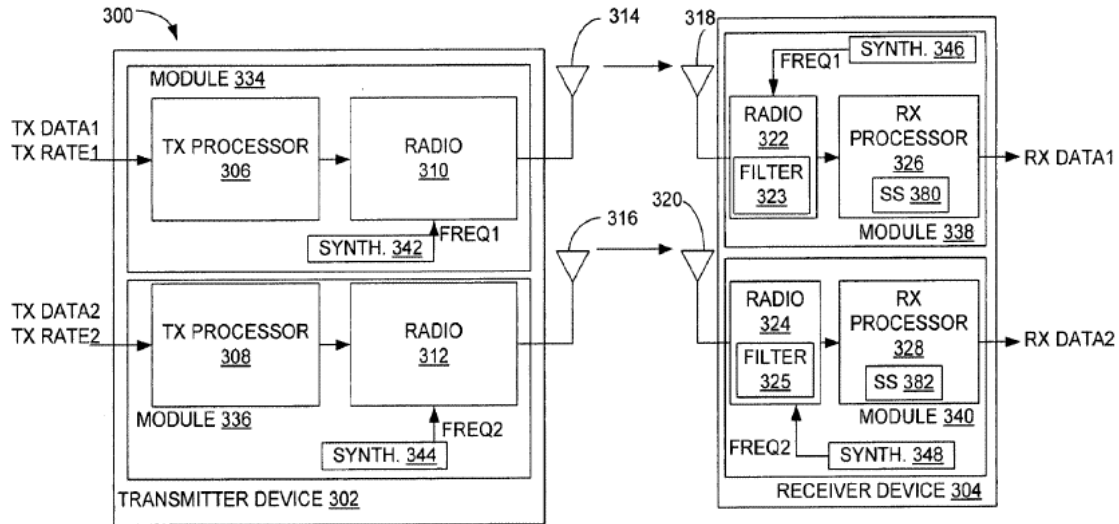


FIG. 3A

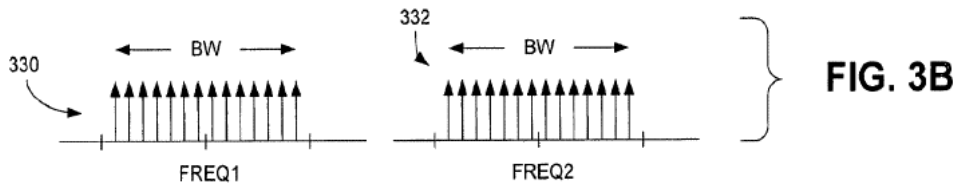


FIG. 3B

“The transmitter device 302 comprises two modules 334 and 336. Module 334 comprises a transmit (TX) processor 306, radio circuitry 310, antenna 314, and synthesizer 342. Module 336 comprises a transmit (TX) processor 308, radio circuitry 312, antenna 316, and synthesizer 344.” *Id.*, 5:1-7. “Transmit processors 306 and 308 encode and interleave the incoming data (designated TX data1 and TX data2 at TX data rate1 and TX data rate2, respectively), ... map the interleaved data

into respective subcarrier channels as frequency domain symbols, and include further processing for the insertion of training signals, cyclic extensions (e.g., guard intervals), and inverse fast Fourier transformation (IFFT) and wave shaping. The processed subcarriers are provided to the radio circuitry 310 and 312, which provides filtering, modulation, and amplification functionality. Radio circuitry 310 and 312 receive reference or carrier frequency signals FREQ1 and FREQ2 from synthesizers 342 and 344, respectively, resulting in transmission of signals at distinct reference or carrier frequencies.” *Id.*, 5:12-28.

Figure 3B depicts “exemplary spectrums for OFDM symbols of the BES system 300” where “the OFDM symbols 330 and 332 comprise subcarriers of equal bandwidth (BW) (e.g., 20 mega-Hertz (MHz) each), but at distinct reference or carrier frequencies (FREQ1 and FREQ2) as opposed to the conventional mechanisms of using the same reference or carrier frequency.” *Id.*, 6:13-20.

Figures 3C and 3D (reproduced below) depict “exemplary adjacent and non-adjacent spectrums, respectively, of the BES system 300.” *Id.*, 6:21-23.

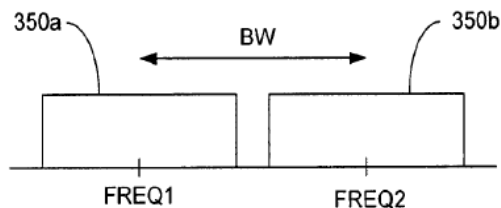


FIG. 3C

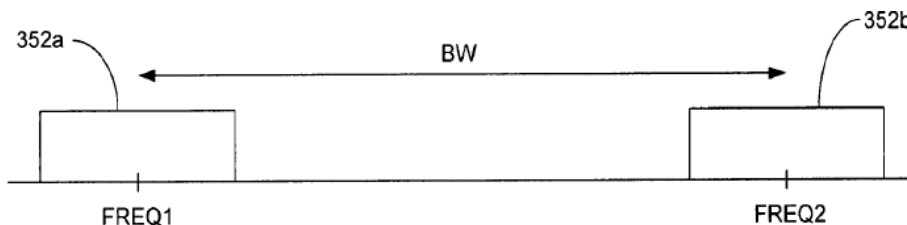


FIG. 3D

Figure 3C illustrates "adjacent spectrums 350a and 350b (or channels) as generated during the processing of the received signals at the receiver device 304," while Figure 3D illustrates non-adjacent frequency spectrums 352a, 352b "generated during the processing of the received signals at the receiver device 304." *Id.*, 6:23-29. The '845 Patent explains that, since the bandwidth of spectrums 352a, 352b can be much greater than 20 MHz, the disclosed expanded bandwidth technique "may provide several benefits, such as finding a free or available channel (since there is no requirement that the channels be adjacent)." *Id.*, 6:29-39.

3. Additional Embodiments Of BES Systems

Figures 4-6 (reproduced below) illustrate the flexibility provided by other embodiments of a BES system.



FIG. 4

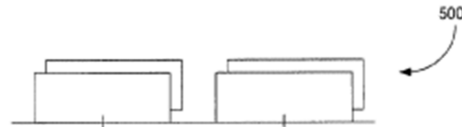


FIG. 5



FIG. 6

Figure 4 illustrates a frequency spectrum 400 corresponding to a 4×4 MIMO (four transmitters and four receivers) “spatial multiplexing BES system operating in a 20 MHz channel, implemented using fourth order spatial multiplexing and first order expanded bandwidth.” *Id.*, 6:64-7:1. In this embodiment, “the data rate is increase[d] above the base rate (e.g., 20 MHz channels), and is achieved using only spatial multiplexing and no bandwidth expansion (e.g., greater than 20 MHz).” *Id.*, 7:1-4. In another embodiment shown in Figure 5, “a BES system can be implemented using 2×2 spatial multiplexing distributed across two 20 MHz channels ... as a second order spatial multiplexing, second order expanded bandwidth spectrum 500.” *Id.*, 7:4-8. In the embodiment of Figure 6, “a BES system can be implemented using first order spatial multiplexing and fourth order expanded bandwidth spectrum 600.” *Id.*, 7:16-19.

III. PROSECUTION HISTORY OF THE ‘845 PATENT

The ‘845 Patent matured from U.S. Patent Appl. 13/628,424 (the Application). As discussed next, the ‘845 Patent had a long prosecution history, during which the Applicant narrowed the claims over the course of multiple amendments to distinguish the claims from “conventional embodiments” of “dual mode” communication systems with multiple antennas. Ex. 1002, 11-12 (emphasis added).

A. Initial Office Actions

As originally filed, claim 1 of the Application broadly recited as follows:

1. A method comprising:

transmitting in a first mode using symbols from at least two transmitters operating on separate data streams and generating separate transmit symbols for transmission in the same frequency band over separate antennas; and

transmitting in a second mode using symbols from at least two transmitters operating on the separate data streams and generating separate transmit symbols for transmission in a plurality of non-overlapping frequency channels. *Id.*, 570.

In the first two Office Actions, the Examiner rejected the claims for obviousness-type double patenting over U.S. Patent No. 8,289,835. *Id.*, 518-529 and 461-472. After the Applicant filed a Terminal Disclaimer (*id.*, 451), the Examiner rejected the claims for obviousness over U.S. Patent Publ. No. 2004/0136349 (Walton 2004) (Ex. 2012) in view of U.S. Patent Publ. 2002/0067759 (Ertel) (Ex. 2013). The Examiner summarized Walton 2004 as disclosing “a MIMO system

supports multiple spatial multiplexing modes” and Ertel as disclosing “a method of efficient implementation of space division/multiple access for a synchronous CDMA communication system for improved performance and greater flexibility. Ex. 1002, 414. The Examiner mapped most of the limitations of claim 1 to Walton 2004, but acknowledged that Walton 2004 “does not elaborate about ‘non-overlapping frequency channels.” *Id.*, 415-418. However, the Examiner reasoned that it would have been obvious “to integrate Walton’s disclosures of a MIMO system [having] multiple spatial multiplexing modes” with Ertel’s disclosure of “space division/multiple access for a synchronous CDMA system.” *Id.*, 1510.

In response, the Applicant amended claim 1 to further recite that the “at least two transmitters” were “at a base station.” *Id.*, 396. The Applicant argued that the aspect of Walton 2004 relied on in the rejection was “describing the use of a common frequency band for each direction of communication traffic—uplink from the mobile station and downlink from the base station,” and therefore failed to disclose “generating separate transmit symbols for transmission by the at least two transmitters at the base station in the same frequency band over separate antennas.” *Id.*, 402. The Applicant also argued that Ertel failed to teach “non-overlapping frequency channels.” *Id.*, 403.

B. Fourth Office Action

In the next Office Action, the Examiner finally rejected the claims for obviousness over Walton 2004 in view of U.S. Patent Publ. 2005/0147079 (Lakkis) (Ex. 2014). In response to Applicant's argument that the relied on portion of Walton 2004 was "describing the use of a common frequency band for each direction of communication traffic," the Examiner found that Walton 2004 contained additional disclosures of a channel response matrix which met all of Applicant's claimed limitations. *Id.*, 363-364. The Examiner emphasized the disclosure in Walton 2004 that a "MIMO system may utilize a single carrier or multiple carriers ... provided by orthogonal frequency division multiplexing (OFDM)" which "effectively partitions the overall system bandwidth into multiple (N_F) orthogonal subbands" where "each subband is associated with a respective carrier that may be modulated with data." *Id.*, 364. In response to Applicant's argument that Ertel failed to teach "non-overlapping frequency channels," the Examiner introduced Lakkis which disclosed: "Preferably, sub-channels 200 are non-overlapping as this allows each subchannel to be processed independently in the receiver." *Id.*, 365-366.

In response, the Applicant amended claim 1 as follows:

1. (Currently Amended) A method comprising:
in a first mode:
generating separate first mode transmit symbols by
at least two transmitters operating on separate data streams at a base
station; and

~~transmitting in a first mode using the separate first mode transmit symbols from the at least two transmitters at a base station operating on separate data streams and generating separate transmit symbols for transmission by the at least two transmitters at the base station in the same frequency band over separate antennas across a spectrum of frequencies that is the same for each of the at least two transmitters; and~~

in a second mode:

generating separate second mode transmit symbols by the at least transmitters operating on separate data streams;

transmitting the separate second mode transmit symbols from a first transmitter across a first spectrum of frequencies; and

~~transmitting in a second mode using the separate second mode transmit symbols from the second transmitter across a second spectrum of frequencies, wherein the first spectrum of frequencies does not overlap with the second spectrum of frequencies at least two transmitters operating on the separate data streams and generating separate transmit symbols for transmission in a plurality of non-overlapping frequency channels. Ex. 1002, 343.~~

In the accompanying Remarks, the Applicant argued that Lakkis fails to teach transmitting the separate second mode transmit symbols from a first transmitter across a first spectrum of frequencies and from a second transmitter across a second spectrum of frequencies, “wherein the first spectrum of frequencies does not overlap with the second spectrum of frequencies.” *Id.*, 351.

C. Appeal And Affirmance Of The Examiner’s Rejection

The Examiner responded with an Advisory Action which entered the previous amendments, but found that they did not place the application in condition for allowance. *Id.*, 340. The Applicant appealed the Examiner’s rejection to the Board, again arguing that Lakkis failed to disclose that “the first spectrum of frequencies

does not overlap with the second spectrum of frequencies” in the context of the other limitations in claim 1. *Id.*, 303-307. The Board subsequently affirmed the Examiner’s rejection. *Id.*, 229-238.

D. Request for Continued Examination

After losing the appeal, the Applicant filed a Request for Continued Examination (RCE) where the Applicant further amended claim 1 as follows:

1. (Currently Amended) A method of operation a transceiver in a dual mode, the method comprising:

in a first mode:

generating separate first mode transmit symbols by at least two transmitters operating on separate data streams at a base station; and

transmitting the separate first mode transmit symbols from the at least two transmitters over separate antennas across a spectrum of frequencies that is the same for each of the at least two transmitters; and

in a second mode:

generating separate second mode transmit symbols by the at least transmitters operating on separate data streams;

transmitting the separate second mode transmit symbols from a first transmitter across a first spectrum of frequencies; and

transmitting the separate second mode transmit symbols from the second transmitter across a second spectrum of frequencies, wherein the first spectrum of frequencies does not overlap with the second spectrum of frequencies;

wherein the transceiver is capable of operating in both the first mode and the second mode such that at least a portion of the operation in the first mode overlaps with at least a portion of the operation in the second mode. *Id.*, at 213.

In the accompanying remarks, the Applicant argued that, while “Walton discloses four modes including a ‘single-user steered mode,’ a ‘single-user non-

steered mode,’ a ‘multi-user steered mode,’ and a ‘multi-user non-steered mode,’ ... Walton does not appear to indicate that any of its devices are capable in operating in any two of these modes simultaneously. As such, Walton fails to disclose, teach, or suggest that ‘the transceiver is capable of operating in both the first mode and the second mode such that at least a portion of the operation in the first mode overlaps with at least a portion of the operation in the second mode,’ as claimed.” *Id.*, at 219-220 (emphasis added).

E. Non-Final Rejection Following RCE

The Examiner responded with a non-final office action which included a new matter rejection. The Examiner asserted that the newly added limitation reciting “wherein the transceiver is capable of operating in both the first mode and the second mode such that at least a portion of the operation in the first mode overlaps with at least a portion of the operation in the second mode,” was not supported by the specification. *Id.*, at 168-169. The Examiner also rejected the claims for obviousness over Walton 2004 and Lakkis. There, the Examiner mapped the claimed “first mode” to the “MIMO TDD mode that use[s] spatial multiplexing on the same frequency bands or subbands” and the claimed “second mode” to the “MIMO FDD mode that use[s] frequency division multiplexing on the different frequency bands or subbands” in Walton 2004. *Id.*, at 170-176.

F. Response To Non-Final Rejection Following RCE

Next, the Applicant amended claim 1 by deleting the language that was the subject of the Examiner's new matter rejection, and substituting the following: "wherein a first transmitter of the at least two transmitters operates in a hybrid mode utilizing both bandwidth expansion and spatial multiplexing." *Id.*, 144. In response to the prior art rejection, the Applicant argued that the combination of Walton and Lakkis fails to disclose a dual mode transceiver where "a first transmitter ...operates in a hybrid mode utilizing both bandwidth expansion and spatial multiplexing." *Id.*, 152.

G. Supplemental Amendment

Following an Interview (*id.*, 121), the Applicant filed a Supplementary Amendment narrowing claim 1 to require a transceiver that included (i) "first transmitters" (plural) and "second transmitters" (plural), i.e., at least four transmitters in total, and (ii) "first antennas" (plural) and "second antennas" (plural), i.e., at least four antennas in total. *Id.*, 124. The amendments also recited that the "first mode" was "based on spatial multiplexing" while the "second mode" was "based on spatial multiplexing and bandwidth expansion." *Id.* The amendments further narrowed claim 1 to a specific arrangement in which (i) the same "first transmitters" (plural) and "second transmitters" (plural) were used in the first and second modes, respectively, to generate the first mode and second mode transmit

symbols, and (ii) the first mode and second mode transmit symbols from the same “first transmitters” (plural) and “second transmitters” (plural) are transmitted in specified, different manners with the same “first antennas” (plural) and “second antennas” (plural). *Id.* The amendments made to narrow claim 1 are set forth below:

1. (Currently Amended) A method of operation of a transceiver in a dual mode, the method comprising:

in a first mode based on spatial multiplexing:

generating separate first mode transmit symbols by ~~at least two~~ first transmitters and second transmitters; ~~operating on separate data streams at a base station~~; and

transmitting the separate first mode transmit symbols from the ~~at least two~~ first transmitters and the second transmitters over ~~separate~~ first antennas and second antennas across a spectrum of frequencies that is ~~[[the]]~~ same for each of the ~~at least two~~ first transmitters and the second transmitters; and

in a second mode based on the spatial multiplexing and bandwidth expansion:

generating separate second mode transmit symbols by the ~~at least~~ first transmitters and the second transmitters; ~~operating on separate data streams~~;

transmitting the separate second mode transmit symbols from ~~a first transmitter~~ the first transmitters over the first antennas across a first spectrum of frequencies; and

transmitting the separate second mode transmit symbols from the second transmitters over the second antennas across a second spectrum of frequencies, wherein the first spectrum of frequencies does not overlap with the second spectrum of frequencies. ~~frequencies; wherein a first transmitter of the at least two transmitters operates in a hybrid mode utilizing both bandwidth expansion and spatial multiplexing.~~ *Id.*

Thus, in the specific arrangement of amended claim 1, the “first transmitters” and “second transmitters” (at least four in total) are used in the first mode to (i)

generate the first mode transmit symbols, and (ii) the first mode transmit symbols from the same “first transmitters” and “second transmitters” are transmitted with “first antennas” and “second antennas” (again, at least four in total) across a spectrum of frequencies that is the same for each of the “first transmitters” and “second transmitters.” The claimed arrangement further required that the same “first transmitters” and “second transmitters” used in the first mode are also to be used in the second mode to generate the second mode transmit symbols and further that, in the second mode, (i) the second mode transmit symbols from the same “first transmitters” are transmitted with the same “first antennas” across a first spectrum of frequencies, and (ii) the second mode transmit symbols from the same “second transmitters” are transmitted with the same “second antennas” across a second spectrum of frequencies that does not overlap with the first spectrum of frequencies.

In the accompanying remarks, the Applicant argued the prior art failed to meet the new claim language, emphasizing that the prior art failed to disclose “performing spatial spreading and bandwidth expansion by transmitting through **two transmitters for a first spectrum of frequencies and transmitting through other two transmitters for a second spectrum of frequencies.**” *Id.*, 126-127 (emphasis in original).

H. Final Rejection, Response After Final Action And Allowance

The Examiner responded with a final rejection, rejecting the claims as obvious over Walton 2004 and U.S. Patent Publ. 2003/0156570 (Alamouti) (Ex. 2015). *Id.*, 78-90. The Applicant responded by further narrowing claim 1 as follows:

1. (Currently Amended) A method of operation of a transceiver in a plurality of modes including at least a first mode and a second mode, ~~a dual mode~~, the method comprising:

in [[a]] the first mode based on spatial multiplexing:
generating separate first mode transmit symbols by first transmitters of the transceiver and second transmitters of the transceiver; and

transmitting the separate first mode transmit symbols from the first transmitters and the second transmitters over a first set of antennas and a second set of antennas across a spectrum of frequencies that is same for each of the first transmitters and the second transmitters; and

in [[a]] the second mode based on the spatial multiplexing and bandwidth expansion:

generating separate second mode transmit symbols by the first transmitters and the second transmitters;

transmitting the separate second mode transmit symbols from the first transmitters over the first set of antennas across a first spectrum of frequencies; and

transmitting the separate second mode transmit symbols from the second transmitters over the second set of antennas across a second spectrum of frequencies, wherein the first spectrum of frequencies does not overlap with the second spectrum of frequencies.

Id., 48.

The narrowing amendments specified, *inter alia*, that the first transmitters and second transmitters, as well as the first and second modes, were all associated with the same transceiver.

In the next Office Action, the Examiner allowed the application. In the Reasons for Allowance, the Examiner found:

Each independent claim identifies the uniquely distinct features, particularly:

transmitting the separate first mode transmit symbols from the first transmitters and the second transmitters over a first set of antennas and a second set of antennas across a spectrum of frequencies that is same for each of the first transmitters and the second transmitters; and

...

transmitting the separate second mode transmit symbols from the first transmitters over the first set of antennas across a first spectrum of frequencies; and

transmitting the separate second mode transmit symbols from the second transmitters over the second set of antennas across a second spectrum of frequencies, wherein the first spectrum of frequencies does not overlap with the second spectrum of frequencies.

...

All the prior art disclose conventional embodiments and methods of dual mode in multi-antennas communication systems, either singularly or in combination, fail to anticipate or render the above features obvious. *Id.*, 11-12 (emphasis added).

IV. CLAIMS OF THE ‘845 PATENT

Independent claim 1 of the ‘845 Patent is directed to a dual mode transceiver that implements spatial multiplexing in a first mode using at least four transmitters and at least two sets of antennas, where the transceiver reuses the same components to implement spatial multiplexing and bandwidth expansion in a second mode. *See*, e.g., Ex. 1001, 4:24-42 (describing techniques for implementing spatial multiplexing “while enabling reuse of the same architecture as a bandwidth expansion radio

device”). As the Examiner found during prosecution, the independent claims of the ‘845 Patent recite “uniquely distinct features” which distinguish the claims from conventional dual mode systems. Ex. 1002, 11-12.

The specific architecture recited in claim 1 (reproduced below with color coding added) requires the use of the same “first transmitters” (colored in red) and “second transmitters” (colored in blue) in both of the first and second modes, respectively, to generate separate first mode and second mode transmit symbols. In addition, the claimed architecture requires that the first and second mode transmit symbols generated from the same “first transmitters” (colored in red) and “second transmitters” (colored in blue) be transmitted with the same “first set of antennas” (colored in green) and “second set of antennas” (colored in purple) in a different specified manner in the first and second modes. As depicted with color coding below, after initially introducing “first transmitters” (colored in red), the claim refers back to “the first transmitters” four times; and after initially introducing “second transmitters” (colored in blue), the claim refers back to “the second transmitters” four times. Likewise, the claim introduces “a first set of antennas” (colored in green) and “a second set of second antennas” (colored in purple) when describing the operation of the first mode, and then refers back to “the first set of antennas” (colored in green) and “the second set of second antennas” (colored in purple) when describing the operation of the second mode:

1. A method of operation of a transceiver in a plurality of modes including at least a first mode and a second mode, the method comprising:

in the first mode based on spatial multiplexing:

generating separate first mode transmit symbols by **first transmitters** of the transceiver and **second transmitters** of the transceiver; and

transmitting the separate first mode transmit symbols from **the first transmitters** and **the second transmitters** over **a first set of antennas** and **a second set of antennas** across a spectrum of frequencies that is same for each of **the first transmitters** and **the second transmitters**; and

in the second mode based on the spatial multiplexing and bandwidth expansion:

generating separate second mode transmit symbols by **the first transmitters** and **the second transmitters**;

transmitting the separate second mode transmit symbols from **the first transmitters** over **the first set of antennas** across a first spectrum of frequencies; and

transmitting the separate second mode transmit symbols from **the second transmitters** over **the second set of antennas** across a second spectrum of frequencies, wherein the first spectrum of frequencies does not overlap with the second spectrum of frequencies.

By reciting “first transmitters” (plural) and “second transmitters” (plural), claim 1 requires at least four transmitters. Similarly, by reciting “a first set of antennas” (plural) and “a second set of antennas” (plural), claim 1 also requires at least four antennas.

Finally, claim 1 specifies the details of how the at least four transmitters and the at least four antennas are used in each mode. In the spatial multiplexing mode (or “first mode”), the claim recites that first mode transmit signals are transmitted

across a spectrum of frequencies that is the “same for each of the first transmitters and the second transmitters.” In other words, in the “first mode,” symbols from each of the at least four transmitters are transmitted across a common frequency spectrum. In the spatial multiplexing and bandwidth expansion (or “second mode”), the claim recites a different requirement, namely, the second mode transmit symbols from the first transmitters are transmitted from the first set of antennas across a first spectrum of frequencies, and the second mode transmit symbols from the second transmitters are transmitted over the second set of antennas across a second spectrum of frequencies that is different from the first spectrum of frequencies.

As the Examiner found, independent claim 1 (and the other independent claims of the ‘845 Patent) recite “uniquely distinct features” which distinguish the claims from conventional dual mode systems. Ex. 1002, 11-12. Those unique features are claimed in the context of “first transmitters” (plural) and “second transmitters” (plural) which interact with “a first set of antennas” (plural) and “a second set of of antennas” (plural) in a specified manner where the same hardware used to implement a spatial multiplexing mode is reused for a spatial multiplexing and bandwidth expansion mode. As explained later, the Petition fails to demonstrate that the relied on references meet the rigorous limitations of the claims of the ‘845 Patent.

V. PRIOR ART RELIED ON IN PETITION

Ground 1 of the Petition alleges that all Challenged Claims are obvious over U.S. Patent Application No. 2002/0154705 to Walton alone. Ground 2 alleges that all Challenged Claim are obvious over Walton 2002 and Maltsev. Ground 3 alleges that all Challenged Claim are obvious over Ishikawa alone. In Ground 4, the Petition alleges that all Challenged Claims are obvious over Ishikawa and Gardner. Each of the relied on references is discussed next.

A. U.S. Patent Application No. 2002/0154705 (“Walton 2002”)

U.S. Patent Application No. 2002/0154705 (“Walton 2002”) (Ex. 1005) is similar to Walton 2004 (Ex. 2012), which was the primary reference relied on by the Examiner during prosecution. Both references have the same lead inventor and disclosed multi-mode transmission/receiver systems based on MIMO in the context of OFDM. *Compare*, e.g., Ex. 1005, ¶[0016] (“the channel streams are modulated using ... OFDM modulation”) and ¶[0024] (“FIG. 1 is a diagram of a multiple-input multiple-output (MIMO communications system”), with Ex. 2012, ¶¶ [0005]-[0006] (describing conventional MIMO system), ¶[0011] (“FIG. 1 shows a multiple-access MIMO system”) and ¶[0026] (“Multiple carriers may be provided by orthogonal frequency division multiplexing (OFDM)”). The close similarity between the conventional MIMO systems disclosed in the two Walton references is depicted graphically below:

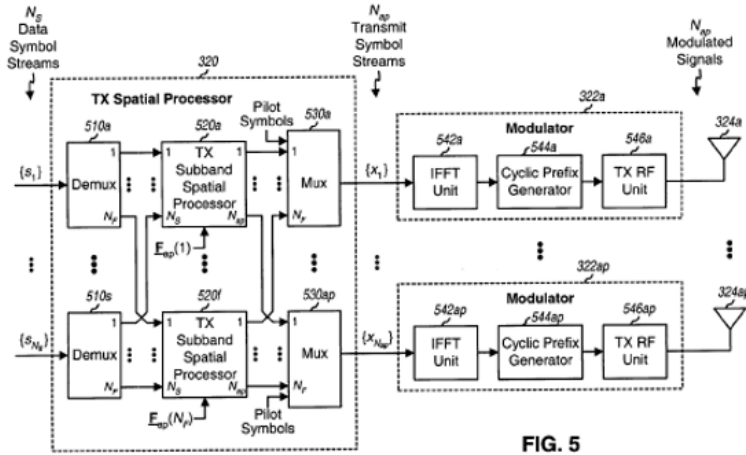


FIG. 5

← Walton 2004

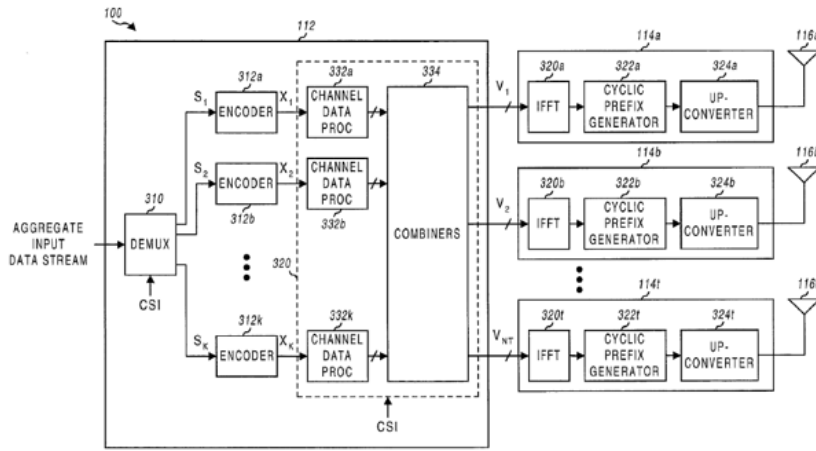


FIG. 3

← Walton 2002

In addition, both references disclose multi-mode MIMO systems that implement a combination of spatial multiplexing, frequency or temporal diversity. Compare, Ex. 1005, ¶[0013] (describing “a transmitter unit for use in a communication system and configurable to provide antenna, frequency, or temporal diversity, or a combination thereof, for transmitted signals”) and ¶[0043] (“[a]s used herein, antenna diversity refers to the transmission and/or reception of data over more than one antenna, frequency diversity refers to the transmission of data over

more than one sub-band, and temporal diversity refers to the transmission of data over more than one time period. ... spatial diversity refers to the use of multiple transmit and receive antennas to improve the reliability”) with Ex. 2012, ¶[0027] (“[t]he MIMO system supports multiple spatial multiplexing modes”) and ¶[0155] (“MIMO system 100 may be a time division duplex (TDD) or a frequency division duplex system”).

Figure 1 of Walton 2002 (depicted below with colored annotations added) illustrates a communications system in which a first system 110 is in communication with a second system 120. Ex. 1005, ¶[0032]. System 110 discloses a single transmitter unit¹ comprised of a single transmit data processor 112 (red) that “(1) receives or generates data, (2) processes the data to provide antenna, frequency, or temporal diversity, or a combination thereof, and (3) provides processed modulation symbols to a number of modulators (MOD) 114_a through 114_t [blue].” *Id.* “Each modulator 114 further processes the modulation symbols and generates an RF modulated signal suitable for transmission. The RF modulated signals from modulators 114_a through 114_t are then transmitted from respective

¹ Ex. 1005, ¶[0035] (“communications system 100 is shown to include one transmitter unit (i.e., system 110) and one receiver unit (i.e., system 120)”) (emphasis added).

antennas 116a through 116t [green] over communications links 118 to system 120.”

Id.

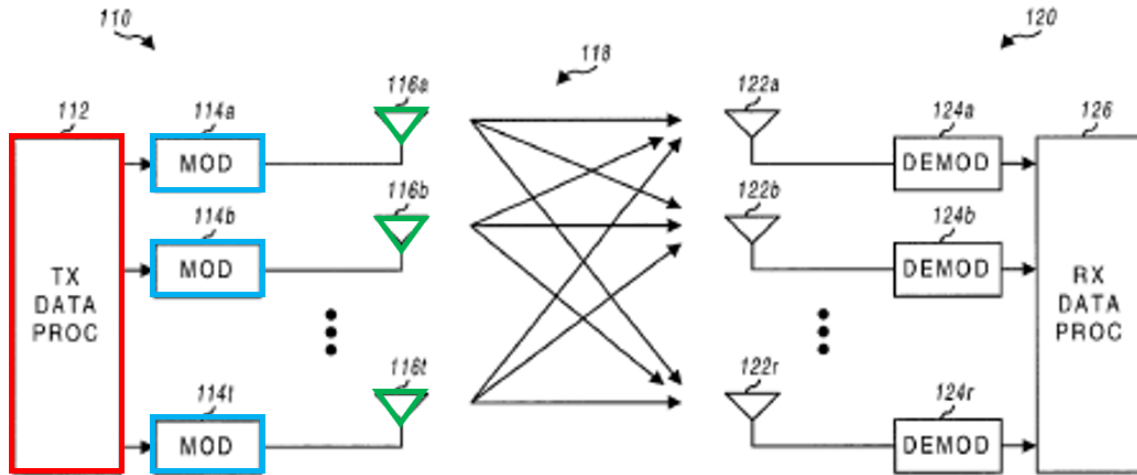


FIG. 1

Figure 3 of Walton 2002 (depicted below with colored annotations added) depicts an embodiment of the single data processor 112 of system 110 in Figure 1. *Id.*, ¶[0096]. An aggregate input data stream that includes all data to be transmitted is provided to a demultiplexer (DEMUX) 310, which demultiplexes the input data stream into channel data streams S_1 through S_k (identified with red circles). *Id.* Each channel data stream is provided to a corresponding encoder 312a-312k (identified with blue boxes), each of which encodes one of the channel data streams S_1 through S_k into a corresponding one of the encoded data streams X_1 through X_x (identified with green circles). *Id.*, ¶[0107].

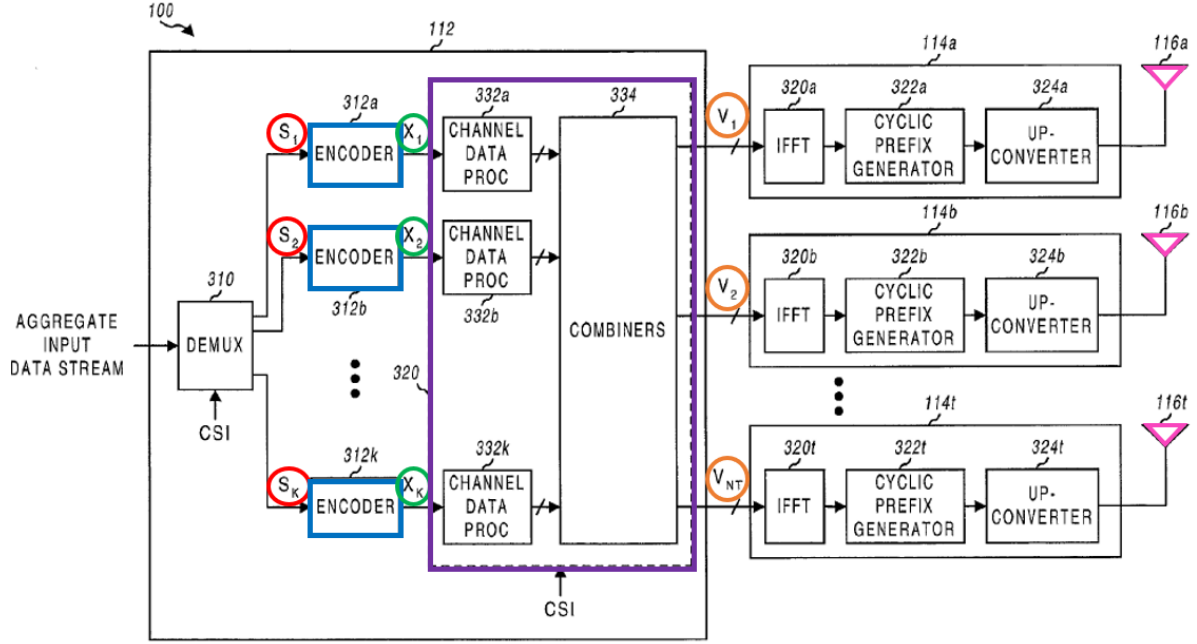


FIG. 3

The encoded data streams X_1 through X_x are then provided to a data processor 320 (purple box) comprised of channel data processors 332a-332k and combiners 334. Data processor 320 processes the encoded data corresponding to the channel data streams to generate NT modulation symbol vectors, V_1 through V_{NT} , (orange circles) such that there is one modulation symbol vector for each of the transmit antennas 116a through 116t (pink triangles). *Id.*, ¶¶ [0098], [0104].

B. U.S. Patent No. 7,885,178 (“Maltsev”)

U.S. Patent No. 7,885,178 (“Maltsev”) (Ex. 1007) discloses a receiver that “may receive an OFDM symbol on a wideband communication channel. The wideband channel may comprise one or more subchannels that are frequency-

division multiplexed (i.e., separated in frequency) and within a predetermined frequency spectrum." *Id.*, 2:14-19.

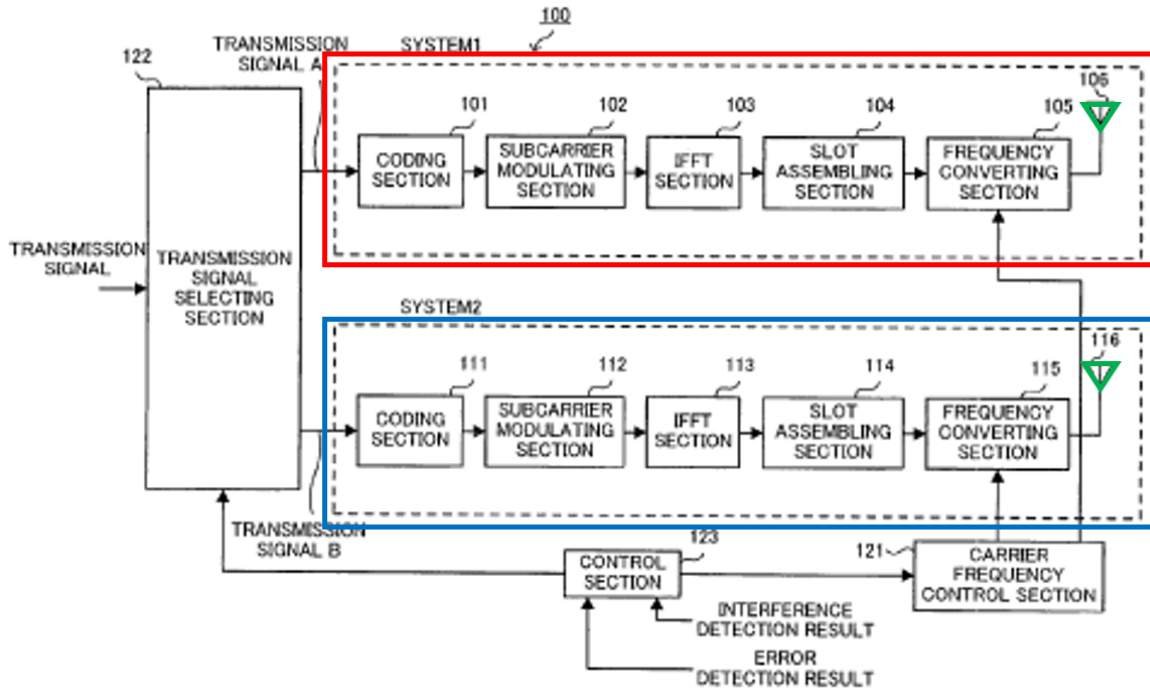
C. U.S. Patent No. 7,130,592 (“Ishikawa”)

U.S. Patent No. 7,130,592 (“Ishikawa”) (Ex. 1006) is directed to a problem that occurs with spatial multiplexing when a receiver “cannot perform separation and reproduction of the transmission signal subjected to space multiplex” due to “interference from another cell and the circumstances of the propagation path.” Ex. 1006, 1:46-51. Ishikawa describes the object of the invention in the context of a single transmitter:

The object of the invention may be achieved by a radio transmitting apparatus having a transmitter for transmitting the same or different information using a plurality of antennas, an acquirer for acquiring a circumstance of a propagation path, and a controller for determining whether the acquired circumstance is a good circumstance or a poor circumstance. ... In a case that the determined circumstance is a poor circumstance, the controller sets different transmission frequencies for the plurality of antennas and allows the transmitter to transmit different information from the plurality of antennas. *Id.*, 2:12-26 (emphasis added).

A block diagram of Ishikawa’s radio transmitting apparatus 100 is shown in Figure 1 of the reference (reproduced below with colored annotations added). *Id.*, 2:30-32. Ishikawa refers to the entire radio transmitting apparatus collectively as a

single transmitter² which “includes a system 1 [red box] that transmits a transmission signal A and a system 2 [blue box] that transmits a transmission signal B.” *Id.*, 3:19-23. Each of system 1 and system 2 include an antenna (green triangles).



Referring to Figure 1 above, the coding section 101 of system 1 (red box) receives and encodes transmission signal A. “The coded signal is modulated for each subcarrier by the subcarrier modulating section 102, and thereafter the resultant is outputted to the IFFT section 103. The IFFT section 103 provides inverse fast Fourier transform (IFFT) to an output signal of the subcarrier modulating section 103 to generate an OFDM signal. A guard interval and a

² Ex. 1006, 3:19-23 (“The radio transmitting apparatus (transmitter) 100 illustrated in FIG. 1 includes a system 1 that transmits a transmission signal A and a system 2 that transmits a transmission signal B”) (emphasis added).

preamble are inserted to the generated OFDM signal by the slot assembling section 104, and thereafter the resultant is output[ted] to the frequency converting section 105 ... [which] upconverts an output signal of the slot assembling section 104 to a radio frequency (transmission frequency), which is independently controlled by the carrier frequency control section 121. The upconverted transmission signal is transmitted via the antenna 106. Moreover, the same processing as the transmission signal A of the system 1 is provided to the transmission signal B of the system 2 [blue box].” *Id.*, 3:62-7:12.

Ishikawa states that the transmitter 100 can be deployed in the following four use cases where different transmissions take place in each use case from the two antennas 106 and 116:

... The first case is a space multiplex case, namely, a case in which different information (transmission signal A≠transmission signal B) is transmitted from two antennas 106 and 116 with the same frequency (for example, FIG. 3). The second case is a frequency multiplex case, namely, a case in which different information (transmission signal A≠transmission signal B) is transmitted from two antennas 106 and 116 with the different frequencies (for example, FIG. 4). The case system is a space diversity case, namely, a case in which the same information (transmission signal A=transmission signal B) is transmitted from two antennas 106 and 116 with the same frequency (for example, FIG. 5). The fourth case is a frequency diversity case, namely, a case in which the same information (transmission signal A=transmission signal B) is transmitted from two antennas 106 and 116 with the different frequencies (for example, FIG. 6). The control section 123 adaptively switches among these four radio communication methods based on ... *Id.*, 5:15-37 (emphasis added).

D. U.S. Patent No. 7,916,803 (“Gardner”)

U.S. Patent No. 7,916,803 (“Gardner”) (Ex. 1008) discloses a modified preamble that “is used by extended devices that operate at higher rates, MIMO or other extensions relative to strict 802.11a-compliant devices.” *Id.*, 2:39-41. “The modified preamble is usable for signaling, to legacy devices as well as extended devices, to indicate capabilities and to cause legacy devices or extended devices to defer to other devices such that the common communication channel is not subject to unnecessary interference.” *Id.*, 2:48-54.

VI. BURDEN OF PROOF

The Petitioner bears the burden of specifying “where each element of the claim is found in the prior art patents or printed publications relied upon.” 37 CFR 42.104(b)(4) (emphasis added). Here, the Petition fails to meet this burden with respect to, e.g., the “first transmitters” and “second transmitters” recited in the independent claims of the ‘845 Patent. While the Petition alleges that the relied on references generally comprise transmitters, the Petition avoids identifying with specificity the particular components from each prior reference that allegedly correspond to the “first transmitters” and “second transmitters,” each of which is recited multiple times throughout the independent claims and is required to perform multiple specific functions.

As explained above, claim 1 requires the use of: (i) the same “first transmitters” and “second transmitters” in both of the first and second modes, respectively, to generate separate first mode and second mode transmit symbols, and (ii) transmission of the first and second mode transmit symbols from the same “first transmitters” and “second transmitters” with the same “first set of antennas” and “second set of antennas,” respectively. Claim 1 further requires that: (i) in the spatial multiplexing mode (first mode), the first mode transmit signals are transmitted across a spectrum of frequencies that is the “same for each of the first transmitters and the second transmitters,” and (ii) in the spatial multiplexing and bandwidth expansion (second mode), duplicative transmissions of the second mode transmit symbols are transmitted “from the first transmitters over the first set of antennas across a first spectrum of frequencies,” and “from the second transmitters over the second set of antennas across a second spectrum of frequencies.

Having failed in the first instance to identify with specificity the particular components from each prior reference that allegedly correspond to the “first transmitters” and “second transmitters,” the Petition fails to demonstrate that the relied on references include “first transmitters” and “second transmitters” that each perform the specific functions required of each such component as specified in the claims.

As explained in more detail below, identifying “first transmitters” and “second transmitters” in the relied on references that meet all of the functions specified in the claim language for each such component is neither straightforward nor trivial. Perhaps that is why the Petition avoided specifying “where each element of the claim is found in the prior art patents or printed publications relied upon” as required under the rules. 37 CFR 42.104(b)(4). In any event, the Petition’s failure to do so mandates denial of institution in this proceeding.

VII. GROUND 1 FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD OF SUCCESS ON THE MERITS

Ground 1 alleges that all of the Challenged Claims are obvious over Walton 2002. In Ground 1, the Petition never identifies within Walton 2002 the particular components that allegedly correspond “the first transmitters” and “the second transmitters” nor walks through how such specific components perform all of the functionality required of “the first transmitters” and “the second transmitters” as specified in, for example, independent claim 1.

A. The Petition Mischaracterizes Walton 2002 As Disclosing A Transceiver With Multiple Transmitters

Focusing initially on independent claim 1, the “first transmitters” and “second transmitters” are initially introduced in Element 1[a][i] of claim 1. In connection with this claim element, the Petition begins by mischaracterizing Walton 2002 in a manner to suggest that the reference discloses multiple transmitter units (plural)

when in fact the reference makes no such statement. In particular, the Petition (at 28) alleges:

Regarding the generation of separate first mode transmit symbols by first and second transmitters, the transmitter disclosed in Walton “provide[s] antenna, frequency, or temporal diversity, or a combination thereof, for transmitted signals.” Ex.1005 ¶13. Transmitter units include “a system data processor,” which “generate[s] one or more (NT) modulation symbol vector streams.” Ex.1005 ¶13. Each vector stream “includes a sequence of modulation symbol vectors representative of data in one or more channel data streams.” Ex.1005 ¶13. (emphasis added).

However, the Petition’s lone citation above to Walton 2002 at ¶13 fails to disclose multiple transmitter units (plural). There, Walton 2002 refers only to one transmitter unit -- not multiple ones. In particular, Walton 2002 at ¶13 states:

An embodiment of the invention provides a transmitter unit for use in a communications system and configurable to provide antenna, frequency, or temporal diversity, or a combination thereof, for transmitted signals. The transmitter unit includes a system data processor, one or more modulators, and one or more antennas. The system data processor receives and partitions an input data stream into a number of (K) channel data streams and further processes the channel data streams to generate one or more (N_T) modulation symbol vector streams. Each modulation symbol vector stream includes a sequence of modulation symbol vectors representative of data in one or more channel data streams. Ex. 1005, [0013] (emphasis added).

Later in connection with Element 1[a][i], the Petition again mischaracterizes Walton 2002 in a manner to suggest that the reference discloses a singular transceiver unit with multiple transmitter units (plural) when in fact the reference makes no such statement. In particular, the Petition (at 29) alleges:

Walton describes Figure 1, above, as “a diagram of a multiple-input multiple-output (MIMO) communications system 100 ... [that] can be operative to provide a combination of antenna, frequency, and temporal diversity to increase spectral efficiency, improve performance, and enhance flexibility.” Ex.1005 ¶31. “For simplicity, communications system 100 is shown to include one transmitter unit (i.e., system 110) and one receiver unit (i.e., system 120)” but that other configurations of its system are possible, including multiple transmitter units and/or receiver units. Ex.1005 ¶35. (emphasis added).

However, the Petition’s lone citation above, to Walton 2002 at ¶35, fails to disclose a transceiver that includes multiple transmitters. There, Walton 2002 refers to a multi-user communication system (e.g., a CDMA cellular network) with multiple users each of which has a transmitter/receiver unit. In particular, Walton 2002 at ¶35 states:

For simplicity, communications system 100 is shown to include one transmitter unit (i.e., system 110) and one receiver unit (i.e., system 120). However, other variations and configurations of the communications system are possible. For example, in a multi-user, multiple access communications system, a single transmitter unit may be used to concurrently transmit data to a number of receiver units. Also, in a manner similar to soft-handoff in an IS-95 CDMA system, a receiver unit may concurrently receive transmissions from a number of transmitter units. The communications system of the invention may include any number of transmitter and receiver units. (emphasis added).

Walton 2002 is described in the context of a “CDMA system [that] supports voice and data communication between users over a terrestrial link” where a “soft handoff results in redundant transmissions from two or more base stations” to a single subscriber “to improve reliability.” Ex. 1005, [0004], [0009]. Nothing about

the relied on passage at ¶35 of Walton 2002 expressly or inherently discloses a singular transceiver unit with multiple transmitter units (plural).

B. The Petition Fails To Specifically Identify Components In Walton 2002 Corresponding To “The First Transmitters” And “The Second Transmitters”

Besides mischaracterizing what Walton 2002 actually says, the Petition (at 28) makes the following statement in connection with its analysis of Element 1[a][i] where the “first transmitters” and “second transmitters” are initially introduced into claim 1:

Walton further discloses:

The system data processor may include one or more channel data processors, encoders, demultiplexers, and combiners. In a specific implementation, each encoder encodes a respective channel data stream to generate an encoded data stream, each channel data processor processes a respective encoded data stream to generate a stream of modulation symbols, each demultiplexer demultiplexes the stream of modulation symbols into one or more symbol sub-streams, and each combiner selectively combines the symbol sub-streams to generate a modulation symbol vector stream for an associated antenna. Ex. 1005, ¶15. (emphasis added)

However, after quoting the above passage from Walton 2002, the Petition fails to explain how the various “channel data processors, encoders, demultiplexers, and combiners” disclosed in Walton 2002 specifically map to “the first transmitters” and “the second transmitters” recited in independent claim 1. For example, is the Petition alleging that one pair of the encoders correspond to “the first transmitters” and a

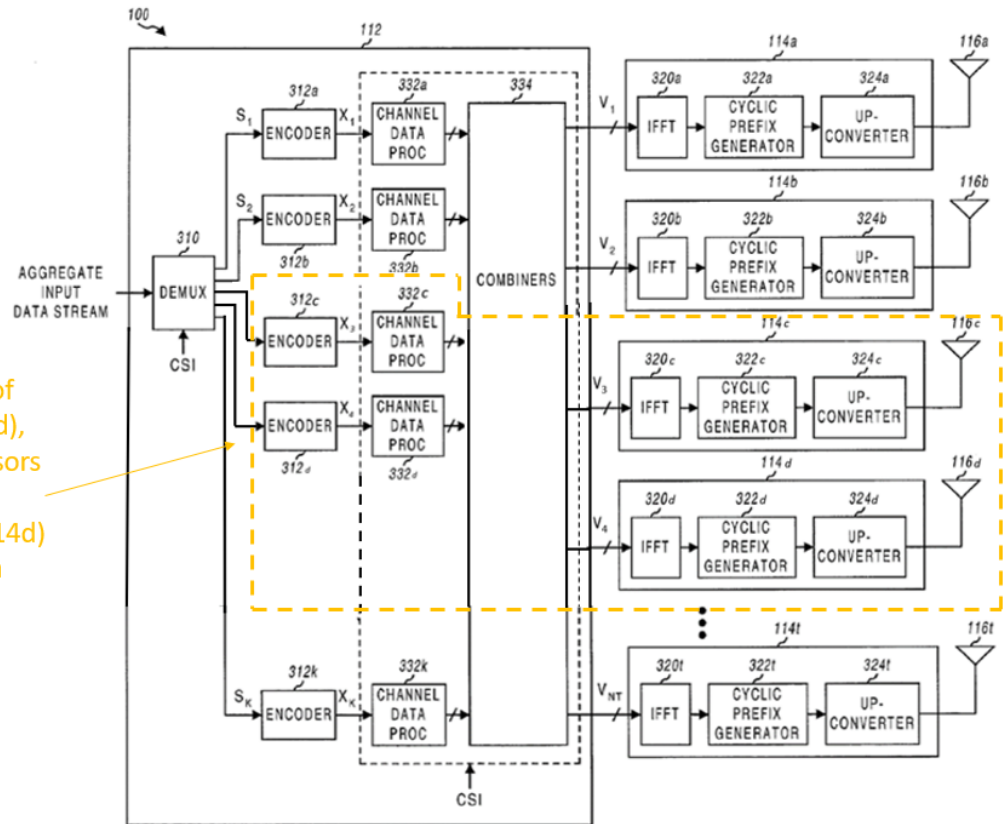
different pair of the encoders correspond to “the second transmitters”? The Petition doesn’t say. Or is the Petition alleging that a pair of the channel data processors correspond to “the first transmitters” and another pair correspond to “the second transmitters”? Again, the Petition doesn’t say. Or is the Petition alleging that the demultiplexers and/or combiners disclosed by Walton 2002 map to “the first transmitters” and “the second transmitters”? Again, the Petition doesn’t say.

As explained next, identifying “*first transmitters*” and “*second transmitters*” in Walton 2002 that meet all of the functions specified in the claim language for each such component is neither straightforward nor trivial.

C. Mapping Aspects Of Walton 2002 To “The First Transmitters” And “The Second Transmitters” Is Not Trivial Or Straightforward

Figure 3 of Walton 2002 depicts the various “channel data processors, encoders, demultiplexers, and combiners” disclosed in Walton 2002, but only shows *three* encoders (312a, 312b and 312k), *three* channel data processors (332a, 332b and 332k) and *three* antennas (116a, 116b and 116t). Since claim 1 requires at least *four* transmitters and at least *four* antennas, Patent Owner has created a modified version of Figure 3 of Walton 2002 (depicted below) showing additional encoders, channel data processors and antennas, in an effort to demonstrate the non-trivial nature of mapping the various “channel data processors, encoders, demultiplexers, and combiners” disclosed in Walton 2002 to “the first transmitters” and “the second transmitters” recited in independent claim 1.

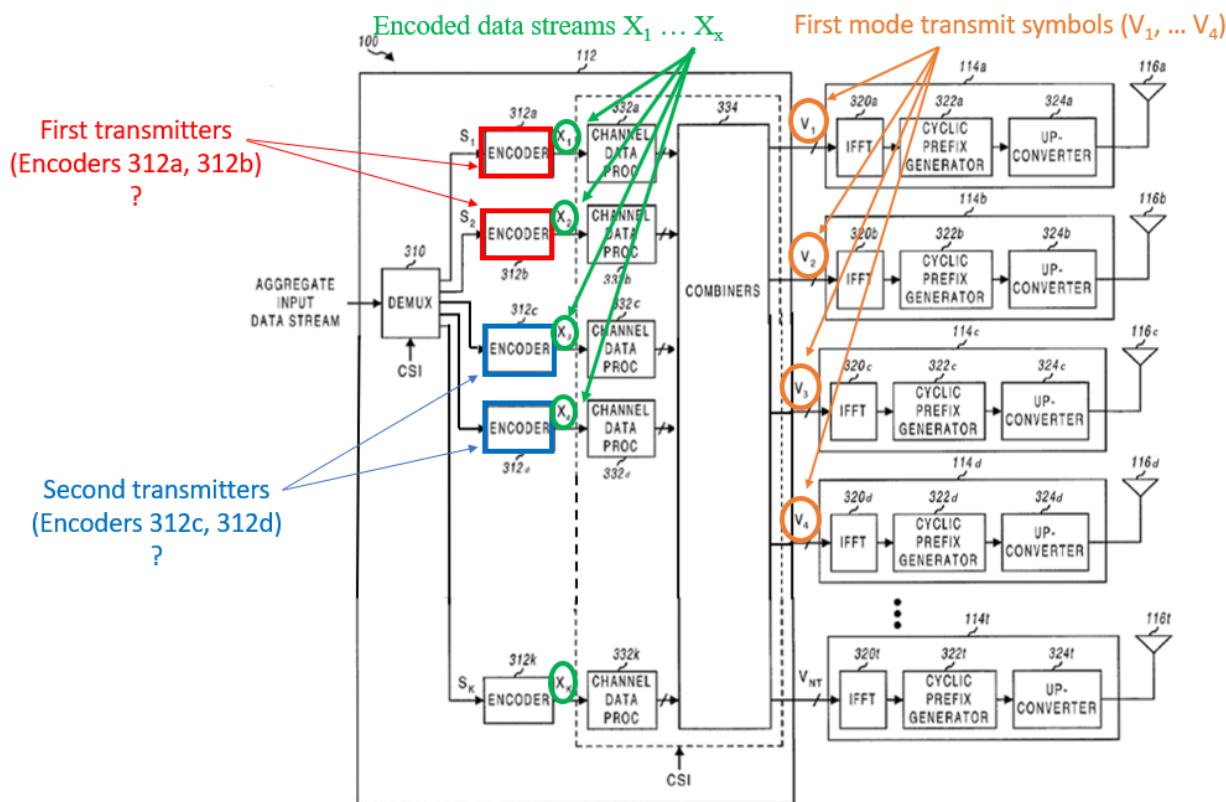
Two additional sets of encoders (312c, 312d), channel data processors (332c, 332d) and modulators (114c, 114d) added for illustration purposes



To be clear, the modified version of Figure 3 depicts the additional components -- i.e., encoders 312c and 312d, channel data processors 332c and 332d, and modulators 114c and 114d with antennas 116c and 116d, respectively -- in the orange dotted box that are not shown in the original version of Figure 3 set forth in Walton 2002.

The Petition maps “the separate first mode transmit symbols” and “the separate second mode transmit symbols” that claim 1 specifies as being generated by “the first transmitters” and “the second transmitters,” to the “(N_T) modulation

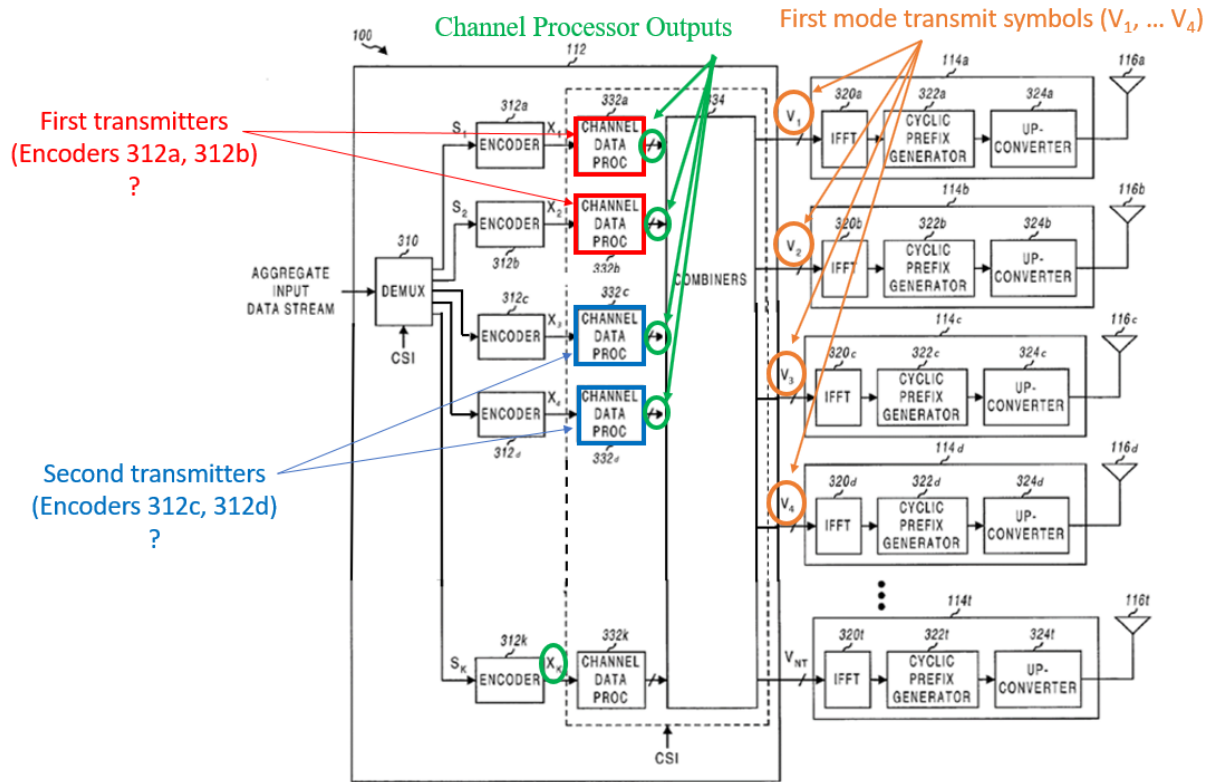
symbol vector streams”³ which are identified with orange coloring in the modified version of Figure 3 below. Staying with that mapping for the separate first and second mode transmit symbols, consider the case illustrated below where Patent Owner has attempted to map encoders 312a, 312b (red coloring) to “the first transmitters” and encoders 312c, 312d (blue coloring) to “the second transmitters.”



³ See, Petition, 28 (“Regarding the generation of separate first mode transmit symbols by first and second transmitters, the transmitter disclosed in Walton” includes “a system data processor,” which ‘generate[s] one or more (NT) modulation symbol vector streams’”) and 36 (“Walton discloses the symbol generation limitations of the ‘845 Patent with its transmitters comprising “system data processor[s]” that “generate one or more (NT) modulation symbol vector streams”).

Such a mapping clearly fails to meet the claim language requiring that “the separate first mode transmit symbols” and “the separate second mode transmit symbols” are generated by “the first transmitters” and “the second transmitters” because the encoded data streams X_1 through X_x (identified in green) output by the encoders (identified in red, blue) do not correspond to the “ (N_T) modulation symbol vector streams” (orange) which the Petition maps to “the separate first mode transmit symbols” and “the separate second mode transmit symbols.” Moreover, even assuming for purposes of argument that, in the mapping depicted above, the encoded data streams X_1 through X_x (identified in green) were the same as “the separate first mode transmit symbols” and “the separate second mode transmit symbols” (to be clear, they do not), the Petition still would have failed to explain how: (i) in the spatial multiplexing mode, the first mode transmit signals are transmitted across a spectrum of frequencies that is the “same for each of the first transmitters and the second transmitters” (corresponding to the encoders identified in red, blue), and (ii) in the spatial multiplexing and bandwidth expansion mode, the second mode transmit symbols from the first transmitters (identified in red) are transmitted from the first set of antennas across a first spectrum of frequencies, and the second mode transmit symbols from the second transmitters (identified in blue) are transmitted over the second set of antennas across a second spectrum of frequencies that is different from the first spectrum of frequencies.

Alternatively, consider the case illustrated in the diagram below where Patent Owner attempted to map Channel Data Processors 332a, 332b (red coloring) to “the first transmitters” and Channel Data Processors 332c, 332d (blue coloring) to “the second transmitters.”



Again, such a mapping would clearly fail to meet the claim language requiring that “the separate first mode transmit symbols” and “the separate second mode transmit symbols” are generated by “the first transmitters” and “the second transmitters” because the data streams (identified in green) output by the Channel Data Processors (identified in red, blue) do not correspond to the “(N_T) modulation symbol vector streams” (orange) which the Petition maps to “the separate first mode transmit

symbols” and “the separate second mode transmit symbols.” Moreover, even assuming for purposes of argument that, in the mapping depicted above, the data streams (identified in green) output by the Channel Data Encoders were the same as “the separate first mode transmit symbols” and “the separate second mode transmit symbols” (to be clear, they do not), the Petition still would have failed to explain how: (i) in the spatial multiplexing mode, the first mode transmit signals are transmitted across a spectrum of frequencies that is the “same for each of the first transmitters and the second transmitters” (corresponding the Channel Data Processors identified in red, blue), and (ii) in the spatial multiplexing and bandwidth expansion mode, the second mode transmit symbols from the first transmitters (identified in red) are transmitted from the first set of antennas across a first spectrum of frequencies, and the second mode transmit symbols from the second transmitters (identified in blue) are transmitted over the second set of antennas across a second spectrum of frequencies that is different from the first spectrum of frequencies.

Simply put, the Petition’s reliance on the general disclosure in Walton 2002 of various “channel data processors, encoders, demultiplexers, and combiners” falls short of the rigor required to demonstrate that Walton 2002 discloses “first transmitters” and “second transmitters” that each perform the specific functions required of each such component as specified in the Challenged Claims. While the above discussion focused primarily on how the Petition is deficient in mapping

Walton 2002 to independent claim 1, the same analysis holds for the other independent claims (and the dependent claims) of the ‘845 Patent which contain substantially the same limitations.

D. The Petition’s Attempt To Use Expert Testimony To Fill Gaps In The Deficient Mappings Set Forth In The Petition Is Unavailing

Where, as here, an expert declaration merely restates a petition’s conclusory assertions without providing additional substantive explanation, the Board should afford it little weight. *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15-17 (PTAB 2022) (precedential). The Federal Circuit has likewise affirmed discounting expert testimony that “merely repeated” a petitioner’s arguments “nearly verbatim” without meaningful independent analysis. *Facebook, Inc. v. Windy City Innovations, LLC*, 973 F.3d 1321, 1340-41 (Fed. Cir. 2020).

Here, the analysis of how Walton 2002 maps to the claims of the ‘845 Patent set forth in the Expert Declaration simply repeats (almost verbatim) the arguments set forth in the Petition. Compare, e.g., Petition 25-41 (arguments purporting to map Walton 2002 to independent claims 1, 7, 11 and 18) with Expert Declaration, ¶¶71-74 [Element 1pre], 78-80 [Element 1a], 84-85 [Element 1b], 89-93 [Element 1c], 97-98 [Element 1d], 107-108 [Element 1e], 110 [Element 1f], and 115 [Element 1g]. As was the case with the Petition, the Expert Declaration fails to map with any specificity particular components from Walton 2002 to “the first transmitters” and “the second transmitters,” or walk through how, e.g., such specific components

perform all of the recited functionality required of “the first transmitters” and “the second transmitters.” Under *Xerox* and *Facebook*, expert testimony like that presented here, which simply repeats the Petition’s arguments without further analysis or reasoning, is entitled to little or no weight.

VIII. GROUND 2 FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD OF SUCCESS ON THE MERITS

Ground 2 alleges that the Challenged Claims are obvious over Walton 2002 and Maltsev. As explained below, Ground 2 is deficient for the same reasons as Ground 1. In addition, Ground 2 is deficient because the Petition fails to provide any rationale why a POSITA would have combined Walton 2002 and Maltsev as proposed.

A. As Was The Case In Ground 1, In Ground 2 The Petition Fails To Specifically Identify Components In Walton 2002 Corresponding To “The First Transmitters” And “The Second Transmitters”

In Ground 2, the Petition continues to rely solely on Walton 2002 for the “the first transmitters” and “the second transmitters” recited in the independent claims. Thus, for the reasons discussed above in connection with Ground 1, the Petition fails in Ground 2 to demonstrate that Walton 2002 discloses “first transmitters” and “second transmitters” that each perform the specific functions required of each such component as specified in the Challenged Claims.

B. The Petition Fails To Explain Why A POSITA Would Have Been Motivated To Combine Walton 2002 With Maltsev

In addition, Ground 2 is deficient because the Petition fails to provide any rationale why a POSITA would have combined Walton 2002 and Maltsev as proposed. The Petition (at 21-22) devotes two pages to the proposed combination of Walton 2002 and Maltsev. There, the Petition asserts that: (i) “[b]oth references are analogous” because “they originate in the same field of endeavor” and “are directed to the same problem,” (ii) it was “routine to combine MIMO spatial multiplexing techniques with bandwidth expansion techniques,” and (iii) a “POSITA would have been further motivated to combine the references given their mutual relevance to the ongoing development of the 802.11n standard.” Petition, 21-22. These assertions collectively amount to allegations that the references are in the same field and would have been “routine” to combine. Completely lacking is any explanation why a POSITA would have been motivated to combine the references. For example, the Petition does not allege that Walton 2002 had a shortcoming or deficiency that a POSITA would have looked to Maltsev to solve. Nor does the Petition allege any other rationale that would have motivated a POSITA to combine the references.

For completeness, below is the totality of the Petition’s argument for combining Walton 2002 and Maltsev:

A POSITA would have been motivated to combine the teachings

of Walton with those of Maltsev. Ex.1003 ¶61. Both references are analogous: they originate in the same field of endeavor (OFDM-based wireless data transmission) and are directed towards the same problem as the ‘845 Patent: increasing the throughput and reliability of OFDM data transmissions. E.g., Ex.1005 ¶12 (describing a communications system “capable of providing increased spectral efficiency, improved performance, and enhanced flexibility by employing a combination of antenna, frequency, and temporal diversity”); Ex.1007 1:24-31 (describing a need for an OFDM communications system capable of greater bandwidth).

Moreover, at the time of the ‘845 Patent’s purported invention, it was routine to combine MIMO spatial multiplexing techniques with bandwidth expansion techniques such as frequency division duplexing (FDD). Ex.1009 at 2:53-54 (U.S. Patent No. 7,324,429, filed on October 23, 2003 and disclosing a MIMO system that “may be a time division duplex (TDD) system or a frequency division duplex (FDD) system.”); Ex.1008, Cover (“The extended devices might use multiple antenna techniques (MIMO) ... and/or multi-channel techniques.”). Thus, it would have been a simple combination of known elements to obtain a predictable result to modify Walton with the MIMO-wideband channel system of Maltsev. Ex.1003 ¶64. A

A POSITA would have been further motivated to combine the references given their mutual relevance to the ongoing development of the 802.11n standard. Ex.1003 ¶63. For example, both are dedicated to enhancing OFDM data transmission via the use of MIMO spatial multiplexing and bandwidth expansion, two central features of the 802.11n standard. Ex.1012 at 3, 7, 19 (2009 Cisco Presentation noting that development of 802.11n began in 2002 and that MIMO and channel-bonded 40 MHz Channels were two of the standard’s central advancements).

Thus, combining Walton and Maltsev would have been a predictable, routine step in developing an improved wireless data transmission methodology in line with contemporary developments in the 802.11n standard. The combination would require neither extensive experimentation nor undue burden but would rather reflect the normal course of development in the field given 802.11n’s publicly available and collaborative development process and the references’ similarity. Ex.1003 ¶¶62-63. Petition, 21-22 (emphasis added).

Completely absent is any rationale explaining why such a POSITA would have been motivated to combine the references. Remarkably, the expert declaration alleges even less than this in support of the proposed combination, alleging only that both references (i) were in the same field (Ex. 1003, ¶62), (ii) pertained to “the contemporaneous development of the 802.11 wireless standard,” (*id.*, ¶63) and (iii) “would have been a simple combination of known elements.” *Id.*, ¶64. Again, completely absent from the Expert Declaration is any rationale explaining why such a POSITA would have been motivated to combine the references.

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 assertions for combining the references are nothing more than conclusory statements that lack specific reasoning based on evidence.

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

Petitioners’ contentions that Walton 2002 and Maltsev purportedly relate to the same field or problem (Pet. at 21-22) do not, by themselves, establish a reason to combine the references. 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 Walton 2002 and

Maltsev fare no better. The Petition makes the conclusory assertions that the references have “mutual relevance” and pertained to “the contemporaneous development of the 802.11 wireless standard.” Petition, 21-22. These allegations do not add up to a motivation to combine. The fact that a combination of references could be combined does not by itself explain why a POSITA would have been motivated to combine the references. 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).

In connection with Ground 2, 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*, 829 F.3d 1364, 1380–81 (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 assertions that “combining Walton and Maltsev

would have been a predictable, routine step in developing an improved wireless data transmission methodology in line with contemporary developments in the 802.11n standard” and would have required “neither extensive experimentation nor undue burden,” (Pet., 21-22) address the wrong issue and are 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. 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 Walton 2002 and Maltsev.

In summary, Ground 2 is deficient because the Petition fails to provide any rationale why a POSITA would have combined Walton 2002 and Maltsev in the manner proposed.

IX. GROUND 3 FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD OF SUCCESS ON THE MERITS

Ground 3 alleges that the Challenged Claims are obvious over Ishikawa alone. As was the case in Ground 1, in Ground 3 the Petition never identifies in Ishikawa the particular components from the reference that allegedly correspond “the first transmitters” and “the second transmitters” and then walk through how such specific

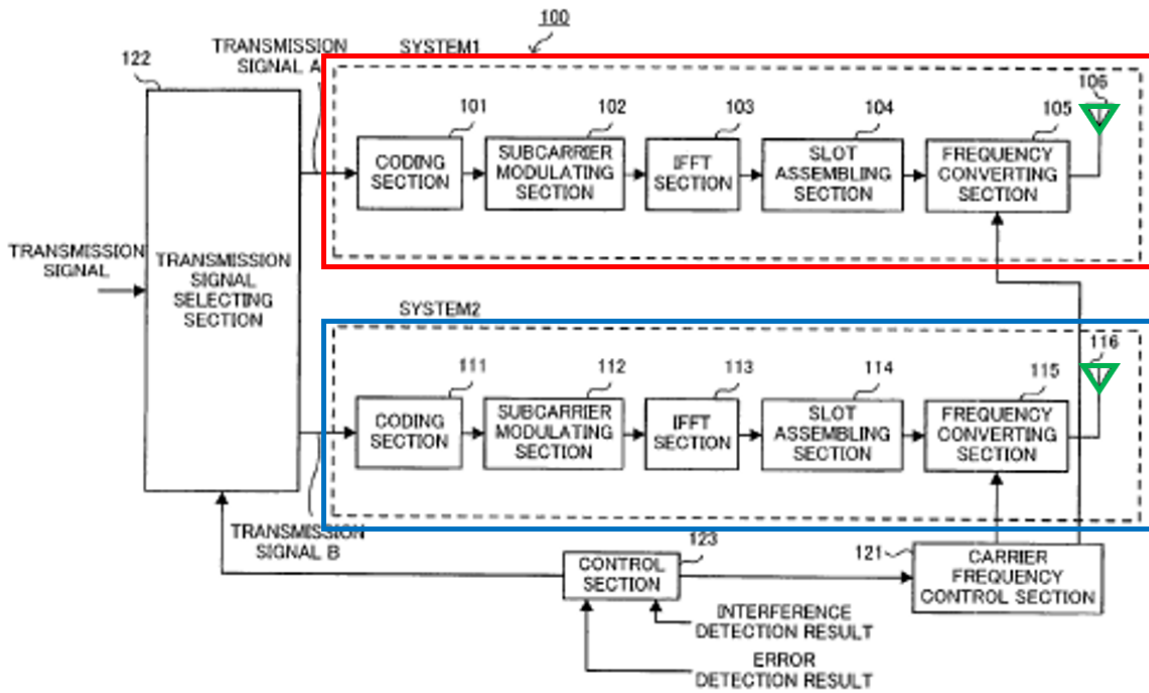
components perform all of the functionality required of “the first transmitters” and “the second transmitters” as specified in, for example, independent claim 1. In addition, as was the case with Ground 1, the aspects of the Declaration of Petitioners’ Expert pertaining to Ground 3 are entitled to little weight, as they largely parrot the arguments in the Petition with no additional explanation or reasoning.

A. The Petition Fails To Specifically Identify Components In Ishikawa Corresponding To “The First Transmitters” And “The Second Transmitters”

As mentioned previously, Ishikawa describes the object of the invention in the context of a single transmitter and refers to the entire radio transmitting apparatus collectively as a single transmitter which “includes a system 1 that transmits a transmission signal A and a system 2 that transmits a transmission signal B.” Ex. 1006, 1:46-51 (“The object of the invention may be achieved by a radio transmitting apparatus having a transmitter for transmitting the same or different information using a plurality of antennas”) and 3:19-23 (“The radio transmitting apparatus (transmitter) 100 illustrated in FIG. 1 includes ...”) (emphasis added). Ishikawa never expressly or inherently discloses four transmitters, as required by the claim language.

Figure 1 of Ishikawa is reproduced again below (with coloring added by Patent Owner). Ishikawa’s single transmitter 100 “includes a system 1 [red box] that transmits a transmission signal A and a system 2 [blue box] that transmits a

transmission signal B.” *Id.*, 3:19-23. Each of system 1 and system 2 include an antenna (green triangles).



The Petition does not allege that System 1 and System 2 in Figure 1 of Ishikawa are separate transmitters. However, even if the Petition had made such an allegation, it would only demonstrate the existence of two transmitters in Ishikawa, rather than the four transmitters required by the recitation of “first transmitters” (plural) and “second transmitters” (plural) in independent claim 1.

As noted above, the “first transmitters” and “second transmitters” are initially introduced into claim 1 in Element 1[a][i]. In connection with that claim element, the Petition avoids explicitly specifying what components within Ishikawa allegedly correspond to “the first transmitters” and “the second transmitters” recited in claim

1. Instead, the Petition points to Ishikawa's disclosure of four different use cases in which the transmitter 100 can be deployed, where different transmissions take place in each use case from the two antennas 106 and 116. In so doing, the Petition quotes, out of context, Ishikawa's reference to "four radio communication systems" in order to erroneously suggest that the reference discloses four transmitters when the reference discloses nothing of the kind. Ishikawa's disclosure of the four different use cases for transmitter 100 is set forth below. The surrounding context makes clear that the "four radio communication systems" mentioned in Ishikawa (as set forth in the first sentence of the second paragraph below) refer to four different use cases of antenna 106 (in System 1) and antenna 116 (in System 2) -- rather than at least four transmitters as claimed:

An explanation will be next given of the contents of the aforementioned adaptive control at the transmitter 100 with reference to FIGS. 3 to 6. Additionally, a case in which four channels (frequency bands) including channel 1 (CH1) to channel 4 (CH4) are used is hereinafter explained as an example. Moreover, in FIGS. 3 to 6, antenna #1 denotes the antenna 106 of the system 1, and antenna #2 denotes the antenna 116 of the system 2.

In this embodiment, the transmitter 100 can use four radio communication systems. The first case is a space multiplex case, namely, a case in which different information (transmission signal A≠transmission signal B) is transmitted from two antennas 106 and 116 with the same frequency (for example, FIG. 3). The second case is a frequency multiplex case, namely, a case in which different information (transmission signal A≠transmission signal B) is transmitted from two antennas 106 and 116 with the different frequencies (for example, FIG. 4). The case system is a space diversity case, namely, a case in which the same information (transmission signal A=transmission signal B) is

transmitted from two antennas 106 and 116 with the same frequency (for example, FIG. 5). The fourth case is a frequency diversity case, namely, a case in which the same information (transmission signal A=transmission signal B) is transmitted from two antennas 106 and 116 with the different frequencies (for example, FIG. 6). The control section 123 adaptively switches among these four radio communication methods based on ... *Id.*, 5:6-37 (emphasis added).

Having failed in the first instance to clearly identify with specificity the particular components in Ishikawa that allegedly correspond to the “first transmitters” (plural) and “second transmitters” (plural),” the Petition fails to demonstrate that the relied on references include “first transmitters” and “second transmitters” that each perform the specific functions required of each such component as specified in the claims. For example, the Petition never identifies in Ishikawa, the particular components that allegedly correspond “the first transmitters” (plural) and walk through how such specific components perform all of the following: (i) generate separate first mode and second mode transmit symbols, (ii) in the spatial multiplexing mode, the first mode transmit symbols are transmitted across a spectrum of frequencies that is the “same for each of the first transmitters,” and (iii) in the spatial multiplexing and bandwidth expansion, the second transmit symbols from the first transmitters are transmitted from the first set of antennas across a first spectrum of frequencies that is different from a second spectrum of frequencies used by the second set of antennas. Nor does the Petition ever identify the particular components in Ishikawa that allegedly correspond “the second

transmitters” (plural) and walk through how such *specific components* perform *all* of the functions required of the second transmitters as specified in claim 1.

Ground 3 is therefore deficient and fails to demonstrate a reasonable likelihood of success.

B. The Petition’s Attempt To Use Expert Testimony To Fill Gaps In The Deficient Mappings Set Forth In Ground 3 Is Unavailing

Similar to Ground 1, the analysis purporting to map Ishikawa to the claims of the ‘845 Patent set forth in the Expert Declaration simply repeats (almost verbatim) the arguments set forth in the Petition. Compare, e.g., Petition 53-68 (arguments purporting to map Ishikawa to independent claims 1, 7, 11 and 18) with Expert Declaration, ¶¶75-76 [Element 1pre], 81-83 [Element 1a], 87 [Element 1b], 94-95 [Element 1c], 100-103 [Element 1d], 107-108 [Element 1e], 111-112 [Element 1f], and 117 [Element 1g]. As was the case with the Petition, the Expert Declaration fails to map with any specificity particular components from Ishikawa to “the first transmitters” and “the second transmitters” recited in the independent claims, or walk through how, e.g., such *specific components* perform *all* of the recited functionality required of “the first transmitters” and “the second transmitters.” Under *Xerox* and *Facebook*, expert testimony like that presented in connection with Ground 3 which simply repeats the Petition’s arguments without further analysis or reasoning is entitled to little or no weight.

In summary, the Petition’s high-level reliance on Ishikawa’s “transmitter 100” with System 1 and System 2 falls short of the rigor required to demonstrate that Ishikawa discloses “first transmitters” (plural) and “second transmitters” (plural) that each perform the specific functions required of each such component as specified in the Challenged Claims. In addition, the repetitive testimony presented by Petitioners’ Expert, which lacks further analysis or reasoning beyond that set forth in the Petition, is insufficient to fill the gaps in the mappings presented in Ground 3. While the above discussion focused primarily on how the Petition is deficient in mapping Ishikawa to independent claim 1, the same analysis holds for the other independent claims (and the dependent claims) of the ‘845 Patent which contain substantially the same limitations.

X. GROUND 4 FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD OF SUCCESS ON THE MERITS

Ground 4 alleges that the Challenged Claims are obvious over Ishikawa and Gardner. As explained below, Ground 4 is deficient for the same reasons as Ground 3. In addition, Ground 4 is deficient because the Petition fails to provide any rationale why a POSITA would have combined Ishikawa and Gardner as proposed.

A. As Was The Case In Ground 3, In Ground 4 The Petition Fails To Specifically Identify Components In Ishikawa Corresponding To “The First Transmitters” And “The Second Transmitters”

In Ground 4, the Petition continues to rely solely on Ishikawa for the “the first transmitters” and “the second transmitters” recited in the independent claims. Thus,

for the reasons discussed above in connection with Ground 3, the Petition fails in Ground 4 to demonstrate that Ishikawa discloses “first transmitters” and “second transmitters” that each perform the specific functions required of each such component.

B. The Petition Fails To Explain Why A POSITA Would Have Been Motivated To Combine Ishikawa With Gardner

In addition, Ground 4 is deficient because the Petition fails to provide any rationale why a POSITA would have combined Ishikawa and Gardner in the manner proposed. The Petition (at 22-24) devotes two pages to the proposed combination of Ishikawa and Gardner. There, the Petition asserts that: (i) “Gardner is analogous to Ishikawa” because they are “from the same field of endeavor,” “are directed to the same issue,” and both have “relevance to the 802.11n standard,” (ii) it was “routine to combine MIMO spatial multiplexing techniques with bandwidth expansion techniques,” and (iii) putting the references together “would have been a simple combination of known elements to obtain a predictable result.” Petition, 22-24. These assertions collectively amount to allegations that the references are in the same field and would have been “routine” to combine. Completely lacking is any allegation explaining why a POSITA would have been motivated to combine the references. For example, the Petition does not allege that Ishikawa had a shortcoming or deficiency that a POSITA would have looked to Gardner to solve. Nor does the Petition allege any other rationale that would have motivated a POSITA

to combine the references.

For completeness, below is the totality of the Petition’s argument for combining Ishikawa and Gardner:

A POSITA would have been motivated to combine the teachings of Ishikawa and Gardner. Ex.1003 ¶65. Gardner is analogous to Ishikawa in that it is from the same field of endeavor (OFDM-based wireless communication) and is directed to the same issue as that of the ‘845 Patent (increasing OFDM data throughput and reliability). Ex.1006 1:60-2:11 (describing a system capable of improving spectrum efficiency and transmission rate using adaptive selection of frequency/space multiplexing); Ex.1008 2:28-32 (“One approach to obtaining higher data rates is the use of more bandwidth. Another approach, used by itself or as well as the use of more bandwidth, is MIMO ... channels.”).

Moreover, the practices of transmitting in non-adjacent channels and using the “gap” between channels to transmit additional data were both well-known techniques at the time of ‘845 Patent’s filing. *E.g.*, Ex.1010 at 3:20-4:10 (International Patent App. No. WO2003003646A2, filed in July 2002 and published in January 2003 discussing transmitting on non-adjacent channels for greater flexibility and efficiency); Ex.1011 at 4 (2003 Texas Instruments white paper discussing transmitting additional data in the empty guard band between adjacent channels). As noted in the previous section, it was also routine to combine MIMO spatial multiplexing techniques with bandwidth expansion techniques. Thus, it would have been a simple combination of known elements to obtain a predictable result to modify Ishikawa with Gardner’s teachings regarding the combination of spatial multiplexing and bandwidth expansion, as well as regarding transmitting on non-adjacent channels and gap filling. Ex.1003 ¶68.

Further, like Ishikawa, Gardner’s subject matter (enabling MIMO devices for bandwidth expansion) and its relevance to the 802.11n standard would have motivated a POSITA to combine the two references. Ex.1003 ¶67; Ex.1012 at 3, 7 (2009 Cisco Presentation noting that development of 802.11n began in 2002 and that MIMO is the “heart of 802.11n.”).

Thus, combining Ishikawa and Gardner would have been a predictable, routine step in developing an improved wireless data transmission methodology in line with contemporary developments in the 802.11n standard. Ex.1003 ¶¶66-67.

Petition, 22-24 (emphasis added).

Completely absent is any rationale explaining why such a POSITA would have been motivated to combine the references as proposed. The Expert Declaration simply parrots the same points, alleging that both references (i) were in the same field (Ex. 1003, ¶66), (ii) pertained to “the contemporary development of the 802.11 wireless standard” and “well-known techniques” (*id.*, ¶¶67-68), and (iii) “would have been a simple combination of known elements.” *Id.*, ¶68. Again, completely absent from the Expert Declaration is any rationale explaining why such a POSITA would have been motivated to combine the references as proposed.

The conclusory assertions advanced in the Petition and repeated by Petitioners’ expert are insufficient to prove obviousness because they fail to “articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.” *In re Magnum Oil Tools*, 829 F.3d 1364, 1380.

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

As explained previously, Petitioners’ contentions that Ishikawa and Gardner purportedly relate to the same field or problem (Pet. at 22-24) do not, by themselves,

establish a reason to combine the references. 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.*, 979 F.3d 1353, 1358–60; *In re Bigio*, 381 F.3d 1320, 1325. 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*, 942 F.3d 1352, 1360 (emphasis original).

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

The remainder of Petitioners’ arguments for combining Ishikawa and Gardner fare no better. The Petition makes the conclusory assertions that the references involved “well-known techniques” and both had “relevance to the 802.11 wireless standard” Petition, 23-24. 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. “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.

In connection with Ground 4, 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.*, 812 F.3d 1056, 1066. 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*, 829 F.3d 1364, 1380–81; *TQ Delta*, 942 F.3d 1352, 1359–60; *Polaris Innovations*, 882 F.3d 1056, 1070. Nor may generalized assertions about routine optimization substitute for the required reasoning and proof. *Arendi*, 832 F.3d 1355, 1362; *Henny Penny*, 938 F.3d 1324, 1330–31.

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

The Petition’s conclusory assertions that “it would have been routine to combine” the references, and the combination “would have been a simple combination of known elements to obtain a predictable result,” (Pet., 23) address the wrong issue and are 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. Again, a reasonable expectation of success (“could combine references”) does

not establish a motivation to combine (“would have been motivated to do so”).

In summary, Ground 4 is deficient because the Petition fails to provide any rationale why a POSITA would have combined Ishikawa and Gardner in the manner proposed.

XI. CONCLUSION

For the above reasons, institution should be denied.

Respectfully submitted,

Dated: January 14, 2026

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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 13,870 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,

Dated: January 14, 2026

By: /Daniel H. Golub/
Daniel H. Golub
Registration No. 33,701

*Counsel for Patent Owner
Intellectual Ventures I LLC*

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 January 14, 2026 to lead and backup counsel of record for Petitioner as follows:

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