

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

QUALCOMM INCORPORATED,

Petitioner,

v.

COBBLESTONE WIRELESS, LLC,

Patent Owner.

IPR2024-01336
Patent 7,924,802 B2

PATENT OWNER'S RESPONSE

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I. INTRODUCTION

Despite raising nine separate grounds (under lead references Rick, Suzuki and Fernandez), Petitioner fails to meet its burden as to any challenged claim. The primary prior art does not disclose critical limitations and Petitioner does not contend those deficiencies are otherwise obvious or disclosed in the secondary references. Moreover, Petitioner's obviousness arguments are little more than ipse dixit reasoning, amounting to a checklist of obviousness grounds without adequate support or reasoning. The identified art and combinations do not disclose or render obvious the challenged claims.

A. Person Of Ordinary Skill in the Art

For the purposes of this IPR only, Patent Owner does not dispute Petitioner's definition of a person of ordinary skill in the art (POSITA). Pet. 4. Patent Owner reserves the right to argue alternative POSA definitions in other proceedings.

B. Claim Construction

Absent a clear indication to the contrary, claim terms carry their plain and ordinary meanings to a skilled artisan. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). Unless otherwise indicated, and for purposes of this proceeding only, the claim terms should be given their plain and ordinary meaning.

II. THE CHALLENGED CLAIMS ARE PATENTABLE OVER THE ASSERTED ART

The Petition challenges the claims based on three sets of grounds: Ground 1 based on Rick, Grounds 2-5 based on Suzuki, and Grounds 6-9 based on Fernandez. As explained below, Grounds 1 through nine fail to support unpatentability of any of the challenged claims.

A. The Asserted Art Does Not Disclose Transmitting “Information” as Required by Independent Claim 1 (Grounds 1, 2, and 6)

Claim 1 requires a method transmitting “information” comprising the steps of “transmitting first information...” and “simultaneously transmitting second information.” Thus, claim 1 makes clear that the “first information” and “second information” are part of the “information” that appears in the preamble. These are not random signals or disparate transmissions, but rather information that is transmitted in an organized way, involving a first and second part that is transmitted simultaneously from the same transmitter. Ex. 2013 [Declaration of Dr. Cooklev], ¶37. Petitioner fails to demonstrate that the asserted art discloses this method, pointing instead to the transmission of random signals, signals that are not transmitted at all, or that do not constitute “information.” Accordingly, the identified combinations do not render claim 1 obvious or claims 2-4 and 6-9 which depend therefrom.

1. Petitioner Fails to Show that Rick Transmits the Claimed “Information” (Ground 1)

Petitioner argues that the disclosure in Rick regarding the “transmission of N CDMA signals,’ each of which ‘may carry any type of data for any service” meets the limitations of claim 1, equating the transmission of any CDMA signal to the transmission of the claimed “first information” and “second information.” Not so. Claim 1 defines the first and second information as part of the information transmitted over the wireless channel. ¶37. The first and second information are therefore related to one another and are part of the information recited in the preamble. *Id.*

The specification provides multiple examples emphasizing this relationship between the first and second information. *Id.*, ¶38. For example, in one embodiment, the transmitted information comprises a plurality of OFDM symbols, with a first symbol corresponding to the first information and the second information corresponding to a second symbol. *Id.*; Ex. 1001 [’802 patent], 2:16-20. In another embodiment, the information transmitted is wireless protocols, and the first information corresponds to a first wireless protocol and the second information corresponds to a second protocol. Ex. 2013, ¶38; Ex. 1001, 2:36-38. In each embodiment, the first and second information are related to one another and part of a greater information package that is transmitted. *See* Ex. 2013, ¶38; Ex. 1001, 2:39-41 (transmitting the same data at two different frequencies as the first and second

information), 2:42-44 (transmitting first and second information produced from the same data stream using coding or data mapping).

Petitioner, however, identifies no such “first information” and “second information” as those terms are used in claim 1 of the ’802 patent. Ex. 2013, ¶39. Instead, Petitioner points only to Rick’s disclosure of a multi-carrier transmitter that can transmit on multiple frequency channels. Pet., 13, 15-16. But merely transmitting on multiple frequencies is not the same as transmitting a related set of information. Ex. 2013, ¶40. Rick makes this clear, explaining that the goal of the invention is to allow multiple types of wireless devices wielded by potentially multiple users to transmit simultaneously. *Id.*; Ex. 1021, 1:21-23. Rick thus does not disclose or render obvious claim 1 under Ground 1. Ex. 2013, ¶40.

2. Petitioner Fails to Show that Suzuki Transmits the Claimed “Information” (Ground 2)

Here again, Petitioner points to a disclosure in Suzuki regarding transmission at two different frequency ranges as the transmission of the claimed first and second information. Pet., 19-21. But as with Rick, the identified disclosure and argument do not address the claimed relationship between the first and second information. Ex. 2013, ¶42. Instead, Suzuki focuses, as does Petitioner, on transmission over different frequency bands. The mere transmission over multiple frequencies does not amount

to the transmission of information broken into a first and second information that are simultaneously transmitted. *Id.*

Similar to Rick, Suzuki looks to solve the problem of using multiple wireless systems simultaneously and providing a single hub. *Id.*, ¶43; Ex. 1004 [Suzuki] [0004-0006]. Suzuki gives as one example two different businesses using two different frequencies. Ex. 2013, ¶43; Ex. 1004 [Suzuki] [0006]. But two different business with two different wireless systems that send two completely different and unrelated data streams coincidentally at the same time is not the claimed method of transmitting information where that information is sent as first information and second information simultaneously. Ex. 2013, ¶43.

Moreover, Petitioner points to the transmission of predistorted signals in Suzuki as the claimed “information.” Pet., 19 (“Thus, one of the predistorted signals is the ***first information***.”), 21 (identifying a second predistorted signal as the second information). The predistortion compensation data identified by Petitioner, however, has no information content that is transmitted. Ex. 2013, ¶43. The predistortion compensation data is used by a digital predistortion system to counteract the distortion. *Id.* As described in greater detail in Section II.B.1, the predistortion signals identified by Petitioner are cancelled out by Suzuki’s amplifier and are thus never transmitted as required by the claim.

Suzuki thus does not disclose or render obvious claim 1 under Ground 2. *Id.*

3. Petitioner Fails to Show that Fernandez and/or Montojo Transmits the Claimed “Information” (Ground 6)

Petitioner fails to demonstrate that the combination of Fernandez and Montojo renders claim 1 obvious. Ex. 2013, ¶96. Petitioner points to “data 1” and “data 2” in Fernandez’s Figure 2A as the “first information” and “second information” of claim 1. Pet., 80-81. But there is no disclosure in Fernandez that data 1 and data 2 are related or are part of an organized transmission of information. Ex. 2013, ¶96. Fernandez does not even describe the data contained in “data 1” and “data 2,” focusing instead of the use of multi-signal generators. Ex. *Id.*; Ex.1005, [0008]. Petitioner again fails to meet its burden to show that the asserted art discloses or otherwise renders obvious claim 1. Ex. 2013, ¶96.

Moreover, as addressed in Section II.C.2 below, a POSA would **not** have been motivated to combine Fernandez and Montojo as Petitioner advocates. Petitioner relies on this combination for the requirement that the first and second information be sent over the same transmitter. Absent this improper combination, Petitioner has no argument that claim 1 is met and cannot prove the unpatentability of claim 1.

B. Grounds 2-5: The Challenged Claims Are Further Patentable Over Suzuki Alone or in Combination with the Asserted Art

1. Petitioner Fails to Show that Suzuki Discloses or Renders Obvious Independent Claims 10 and 17 (Ground 2-5)

Petitioner's Grounds 2-5 under Suzuki fail to disclose multiple additional limitations required by claims 10 and 17 in addition to the "information" discussed above. Petitioner relies "on two alternative theories" to challenge claims 10 and 17, arguing that Suzuki's embodiments in Figures 6 and 8 render these claims obvious. Pet., 31. But with regards to Suzuki's Figure 6, Petitioner fails to show that it discloses first and second digital signals that contain data "to be transmitted." Ex. 2013, ¶¶49-57. Instead, Petitioner points to pre-distortion signals that are cancelled by the distortion caused by the amplifier before transmission and are neither transmitted nor contain data "to be transmitted." *Id.* Petitioner's reliance upon Suzuki's Figure 8 fails for two reasons. *Id.*, ¶¶58-73. First, Figure 8 does not disclose both a "first" and "second" upconverted signal. Second, Petitioner relies upon Suzuki's Figure 17A for the disclosure of the claimed two frequency ranges with the specifically claimed properties, but that figure is inapplicable to Suzuki's Figure 8 embodiment, and the balance of Suzuki states that its Figure 8 embodiment does not disclose the claimed frequency ranges.

Petitioner relies on Suzuki alone for the limitations discussed in greater detail below and does not argue that these limitations are present in the other art identified

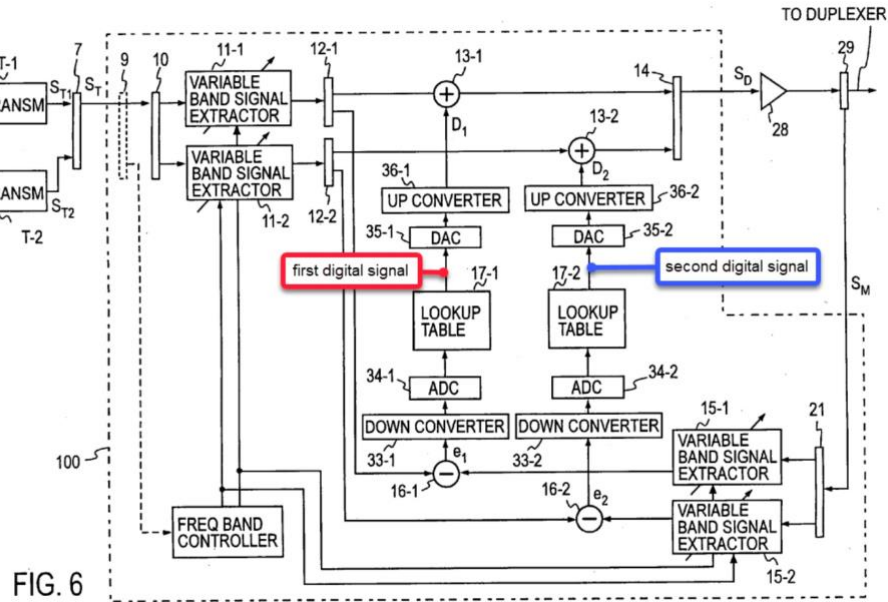
in Grounds 2-5 or that the missing limitations would be otherwise obvious. Thus, claims 10, 13, 14, 17, and 21-25 are further patentable over the combinations asserted in Grounds 2-5.

a) *Petitioner's Reliance on Suzuki Fig. 6 Fails*

Suzuki's Fig. 6 does not disclose or render obvious either claim 10 or 17 because it fails to disclose first/second digital signals comprising first/second data "***to be transmitted***," as required by both independent claims. *Id.*, ¶49.

Claim 10 recites "receiving a first digital signal comprising first data ***to be transmitted***." Ex. 1001 ['802] cl. 10. Similarly, it recites "receiving a second digital signal comprising second data ***to be transmitted***." *Id.* Claim 17 similarly recites first and second digital signals comprising first and second data to be transmitted. *Id.*, cl. 17. Petitioner contends that these limitations are satisfied by certain predistortion signals present in Suzuki's Figure 6. Pet., 31. Petitioner's argument fails, however, because these predistortion signals are ***never transmitted*** and do not contain any data that is ever transmitted. Ex. 2013, ¶50. Indeed, the predistortion signals are cancelled out by Suzuki's amplifier and can thus never be transmitted as claimed. *Id.*

Specifically, in the context of Suzuki Fig. 6, Petitioner relies on the output of the lookup tables 17-1 and 17-2 as the claimed first and second digital signals that allegedly contain the first and second data to be transmitted:



Pet., 31-32. Petitioner, thus, relies on what it calls a “first digital signal” and “second digital signal” added in red and blue, respectively, in Petitioner’s annotation.

Petitioner’s argument fails, however, because these signals are not transmitted and do not contain data “to be transmitted.” Ex. 2013, ¶¶50-51, 54. Rather, Suzuki makes clear that the signals output from lookup tables 17-1 and 17-2 are merely pre-distortion signals that are cancelled in amplifier 28 prior to any transmission. *Id.*, ¶54. Specifically, Suzuki discloses a “predistorter that compensates for a distortion of a power amplifier” in a transmitter. Ex. 1004 [Suzuki] [0001]. The amount of the predistortion that needs to be applied to the input signal of the power amplifier is determined through a lookup table. *Id.*, [0003]; Ex. 2013, ¶54. Suzuki explains that the output of lookup tables 17-1 and 17-2 are these pre-distortion components D₁ and

D₂ that are intended to compensate for the distortion caused by the power amplifier 28:

The distortion compensation data D₁ and D₂ read out from the lookup tables 17-1 and 17-2 are converted into analog signals at the DACs 35-1 and 35-2, further converted into high frequency signals at the upconverters 36-1 and 36-2 and provided to adders 13-1 and 13-2.

Ex. 1004 [Suzuki] [0063].; Ex. 2013, ¶54. The adders 13-1 and 13-2 add the distortion compensation data D₁ and D₂ to the underlying signal that is first predistorted and then amplified (cancelling the predistortion) prior to transmission.

Ex. 1004 [Suzuki] [0047]; *see also id.*, [0046] (“The distortion compensation data are such one for canceling the detected distortion components.”); Ex. 2013, ¶54.

It is undisputed that the output of lookup tables 17-1 and 17-2 are predistortion compensation signals, and that Petitioner relies on these predistortion signals as the claimed first and second digital signals. Pet., 31 (“...used to receive predistortion compensation data from lookup tables 17-1 and 17-2, which are the first and second digital signal, respectively.”). But as is clear from the above, the output of lookup tables 17-1 and 17-2 (distortion compensation data D₁ and D₂) are not digital signals that are either transmitted by the transmitter or contain “data to be transmitted.” Ex. 2013, ¶55. Distortion compensation data D₁ and D₂ are not transmitted by the transmitter because they are cancelled by the distortion caused by the power amplifier when the signal is amplified before transmission. *Id.* Distortion compensation data

D₁ and D₂ also do not contain data to be transmitted; instead, they merely contain distortion compensation components that are cancelled out before transmission. *Id.*

Notably, Petitioner's flawed mapping of Suzuki Figure 6 to the claims is not an oversight. Rather, because the embodiment of Figure 6 is an "analog circuit," its input and processing are mostly analog, which do not meet the claim limitation requiring receiving a first/second "digital signal." *Id.*, ¶56; Ex. 1004 [Suzuki] [0063]. The input and output of the lookup table 17-1 and 17-2 are the only digital signals in Figure 6 because those lookup tables "are implemented through digital signal processing." Ex. 2013, ¶56; Ex. 1004 [Suzuki] [0063]. Thus, Petitioner is forced to rely on these transitory, cancelled out digital signals which are never transmitted and contain no data that is ever transmitted.

For the foregoing reasons, Petitioner fails to show that Suzuki's Figure 6 embodiment discloses either claim 10 or 17 or that Suzuki renders these claims obvious.

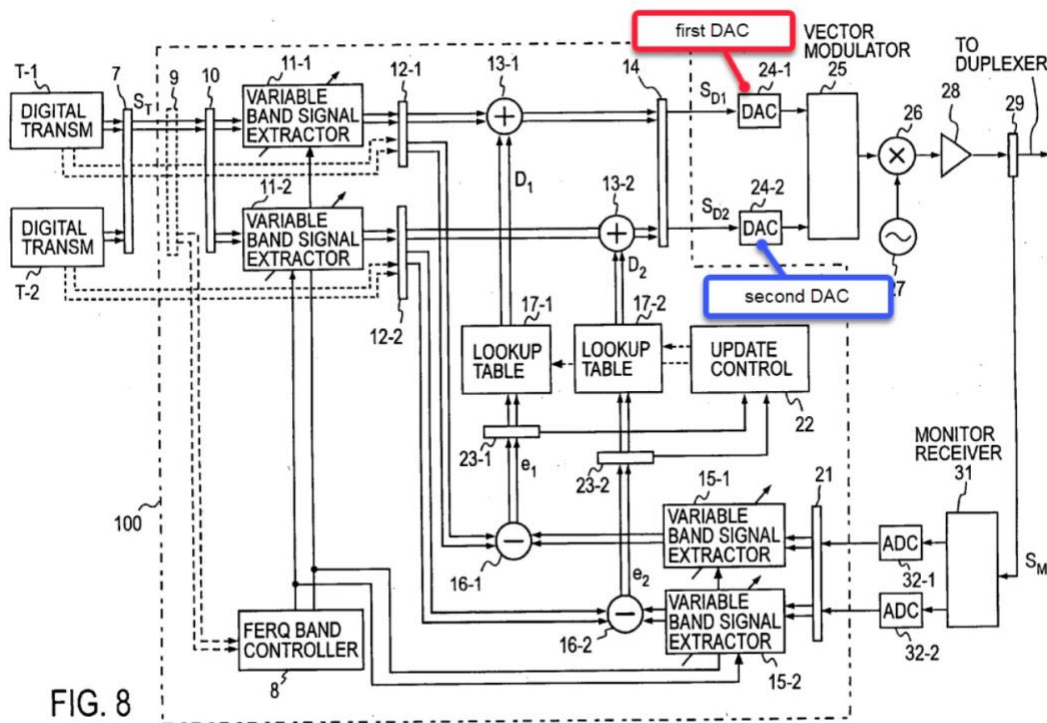
b) *Petitioner's Reliance on Suzuki Fig. 8 Fails.*

Petitioner fails to show that Suzuki's Figure 8 discloses or renders obvious either claim 10 or claim 17 for two reasons. First, Suzuki is not shown to disclose two distinct up-converted analog signals as required by the claims. Second, Petitioner fails to show that the up-converted analog signals of Suzuki's Figure 8 contain two distinct frequency ranges with the specifically claimed properties.

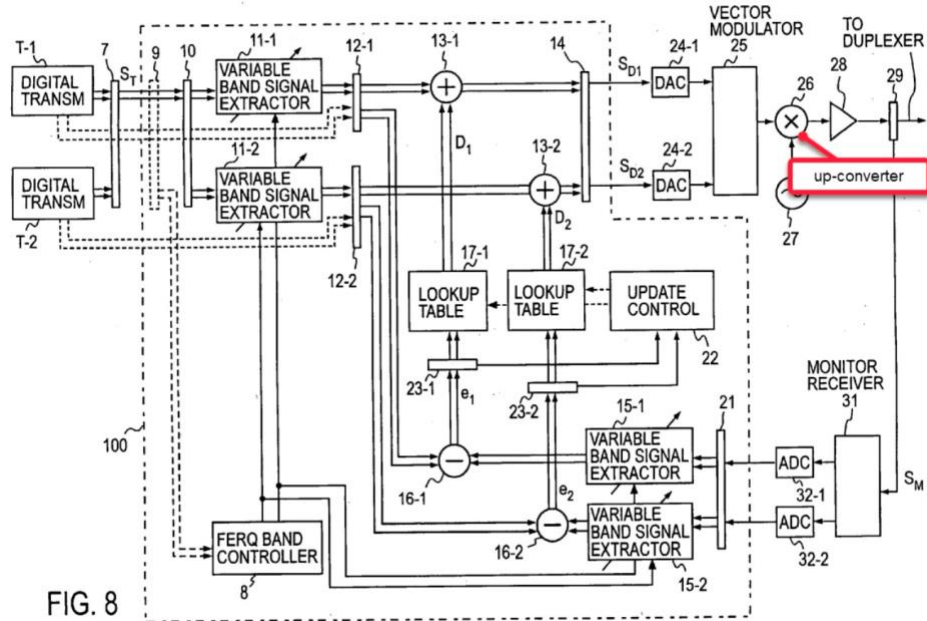
(1) Petitioner Fails to Show the Disclosure of a First and a Second Up-Converted Signal.

Claim 10 recites “up-converting the first analog signal to a first RF center frequency to produce a *first* up-converted analog signal.” Ex. 1001 [’802] cl. 10. Claim 10 then recites “up-converting the second analog signal to a first RF center frequency to produce a *second* up-converted analog signal.” *Id.* Claim 17 recites similar limitations. *Id.*, cl. 17. Thus, these claims plainly require two distinct upconverted analog signals. Ex. 2013, ¶58. Petitioner fails to show that Suzuki Figure 8 discloses this limitation. *Id.*

Petitioner relies on the output of the Digital-to-Analog Converters (DAC) 24-1 and 24-2 as the two claimed analog signals to be subsequently up-converted:



Pet., 35. Petitioner next contends that the outputs of DAC 24-1 and 24-2 are upconverted in up-converter 26:

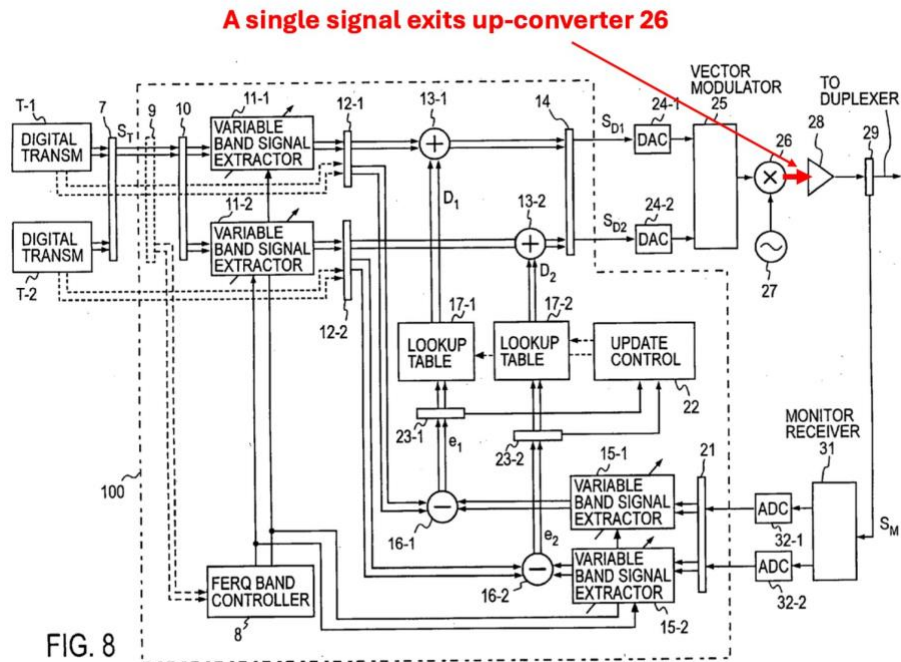


Pet., 38. But as is clear from the figure above, the outputs of DAC 24-1 and 24-2 are not separately up-converted to produce a “first” and a “second” up-converted signal. Ex. 2013, ¶60. Instead, they are combined in Vector Modulator 25 to produce a single combined signal, which is then transmitted to up-converter 26 to produce a single up-converted signal:

The vector modulated *signal* is *frequency-converted into a transmission signal* of a radio frequency band by a carrier signal from a local oscillator 27 and power amplified at the power amplifier 28 and supplied to an antenna (not shown) via a duplexer (not shown).

Ex. 2013, ¶60; Ex. 1004 [Suzuki] [0058]; *see also id.*, [0069] (explaining that Figure 8 is similar to Figure 5 as relevant for this discussion).

That Suzuki's Figure 8 produces a single up-converted signal is also clear from the figure itself, which shows a single line coming out of the up-converter 26:



Ex. 2013, ¶61.

Petitioner also presents an alternate theory “[t]o the extent Patent Owner argues frequency-converter 26 is not an up-converter,” proposing the addition of up-converters to the output signals of DAC 24-1 and 24-2. Pet. 38. However, Patent Owner, for purposes of this proceeding, does not dispute that element 26 is an up-converter. Therefore, Petitioner’s alternative theory to add additional up-converters to Suzuki’s Figure 8 is on its own terms inapplicable to this proceeding. Specifically, the signal in pre-distorter of Figure 8 is already a baseband signal which is subsequently up-converted by converter 26, and therefore there is no need to make

the alternate modification proposed by Petitioner to add additional upconverters. *See* Pet., 38 (explaining the motivation for its alternate theory as the more efficient processing of baseband signals). Thus, Petitioner’s proposed alternative does not apply and does not cure the deficiency in Figure 8 addressed above.

For the foregoing reasons, Petitioner has not shown that Suzuki’s Figure 8 discloses or renders obvious either claim 10 or claim 17.

(2) Petitioner Fails to Show Disclosure of Two Up-Converted Frequency Ranges as Claimed.

Claims 10 and 17 also require two distinct up-converted frequency ranges with specific properties. Ex. 2013, ¶62. Specifically, claim 10 recites that “the first up-converted analog signal comprises *a first up-converted frequency range*” that spans one-half of the up-converted frequency range on either side of the first RF center frequency. Ex. 1001 [’802] cl. 10. Claim 10 further recites “the second up-converted analog signal comprises *a second up-converted frequency range*” that spans one-half of the up-converted frequency range on either side of the first RF center frequency. *Id.* Claim 10 further recites that the “frequency difference between the first RF center frequency and the second RF center frequency is greater than the sum of one-half the first frequency range and one-half the second frequency range.” *Id.* Claim 17 recites corresponding limitations. Therefore, both claims recite two distinct up-converted frequency ranges with specifically claimed properties. Ex. 2013, ¶62.

Under its alternative theory under Figure 8, Petitioner, again, relies upon Suzuki's Figure 8's predistorter. Pet., 40. To argue that the output of Suzuki Figure 8's predistorter contains two separate up-converted frequency ranges with the specifically claimed properties, Petitioner relies on Suzuki Figure 13A, which discloses a graph showing a signal with two different frequencies bands. *Id.*

Petitioner assumes that Figure 13A applies to Figure 8's embodiment and shows the frequency profile of the signal output from Figure 8's predistorter. Pet., 35-36, 18-20. As explained below, however, contrary to Petitioner's assumption, Suzuki never discloses that its Figure 13A frequency profile applies to the output signal of Figure 8's predistorter and, in fact, states that Figure 8's output signal contains a single frequency band, not two frequency bands as shown in Figure 13A. Ex. 2013, ¶64. Petitioner makes no attempt to show that Figure 8 otherwise discloses the claimed frequency ranges and, therefore, fails.

Suzuki's Figure 8 is part of Suzuki's "fifth embodiment." Ex. 1004 [Suzuki] [0069]. Suzuki Figure 13A, by contrast, is a part of Suzuki's "eighth embodiment" (Fig. 12). Ex. 1004 [Suzuki] [0078]-[0079]. Ex. 2013, ¶65. Significantly, Suzuki confirms that the "eighth embodiment" does not relate to Figure 8. *Id.* Rather, as Suzuki makes clear, the eighth embodiment discloses a "frequency band controller 8" for the embodiments disclosed in Figures 1, 6, 7 and 9, but **not** Figure 8:

FIG. 12 shows an exemplary configuration of a frequency band controller 8 for automatically controlling the variable band signal extractors 11-1, 11-2, 15-1 and 15-2 in the embodiment of each analog predistorter shown in **FIGS. 1, 6, 7 and 9**.

Id., Ex. 1004 [Suzuki] [0078].

Thus, Suzuki never discloses that the Figure 13A frequency profile applies to the output signal of Figure 8's predistorter; it instead confirms that Figure 13A does **not** apply to Figure 8. Ex. 2013, ¶66. But that is not all. Suzuki further states that the output signal of Figure 8's pre-distorter contains only a single frequency band, not two frequency bands as shown in Figure 13A (and as required by the claims). *Id.* Specifically, Suzuki explains that its Figure 8 embodiment is similar to its Figure 5 embodiment, except that the lookup tables 17-1 and 17-2 in the Figure 8 embodiment can be updated. *Id.*; Ex. 1004 [Suzuki] [0069]. In its Figure 5 embodiment, Suzuki discloses the output signal of the pre-distorter as containing a single frequency band, not two distinct frequency bands as disclosed in Figure 13A:

The vector modulated signal is frequency-converted into a transmission signal ***of a radio frequency band*** by a carrier signal from a local oscillator 27 and power amplified at the power amplifier 28 and supplied to an antenna (not shown) via a duplexer (not shown).

Ex. 2013, ¶66; Ex. 1004 [Suzuki] [0058].

Petitioner does not address any of the above. Petitioner does not address why it believes Suzuki's Figure 13A applies to the Figure 8 embodiment when Suzuki states that it does not. Nor does Petitioner address why it believes Suzuki's Figure 8 embodiment discloses two distinct frequency ranges as claimed when Suzuki

discloses only a single frequency band. “It is of the utmost importance that petitioners in the IPR proceedings adhere to the requirement that the initial petition identify ‘with particularity’ the ‘evidence that supports the grounds for the challenge to each claim.... Accordingly, an IPR petitioner may not raise in reply ‘an entirely new rationale’ for why a claim would have been obvious.” *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324 (Fed. Cir. 2019).

Petitioner fails to meet its burden to show that Suzuki’s Figure 8 embodiment discloses either claim 10 or 17. Given the deficiencies in Petitioner’s Figure 6 and Figure 8 “alternative” arguments, claims 10 and 17 are patentable over Suzuki, alone or in combination with the identified art, as are dependent claims 13, 14, and 21-23. Ex. 2013, ¶¶44-73.

2. Petitioner Fails to Show that Suzuki Renders Claim 7 Obvious (Ground 2)

Claim 7 depends from claim 1 and adds the further limitation that the first and second data are the same data across two different frequencies. Petitioner and Dr. Almeroth do not identify anything in Suzuki or Chen disclosing transmission of the same data as claimed. Instead, Petitioner points to a disclosure in Suzuki that it can “transmit[] both signals in 800 MHz band **and** in 1.5 GHz simultaneously.” [citing Suzuki ¶7]. A POSITA would therefore understand that the same information is being transmitted across two different frequencies.” Pet., 29 (citing Ex. 1003, ¶123. I

disagree. Dr. Almeroth does not provide any support for this argument, just copies the words from the Petition. Dr. Almeroth's conclusory and hindsight-driven opinion due no weight because it merely repeats Petitioner's conclusory attorney argument. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (“[Petitioner's] expert testimony in support of this theory is equally unavailing, adding nothing beyond the conclusory statements in [the] petition.”); *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15-16 (P.T.A.B. Aug. 24, 2022) (precedential).

But Petitioner's argument is also not supported and contrary to the understanding of a person skilled in the art. Ex. 2013, ¶¶86-87. Assuming *arguendo*, Suzuki transmits “both signals in 800 MHz band **and** in 1.5 GHz simultaneously,” a POSITA still would not conclude that the same information is transmitted. *Id.* Transmitting the same information does not follow from transmitting at two different frequency bands and Petitioner does not provide support for this position. *Id.*

The Petitioner argues that a person skilled in the art “would be faced with limited design choices for data to be transmitted using Suzuki's system—...either send the same data on the two frequencies or send different data.” Pet., 29 (citing Ex. 1003, ¶124). This opinion is based on hindsight and Petitioner points to no motivation to alter Suzuki to meet the limitations of claim 7 in full. “Merely stating that a particular [claim] element is a design choice does not make it obvious. The Board

must offer a reason for why a [POSA] would have made *the specific design choice*.” *Cutsforth, Inc. v. MotivePower, Inc.*, 636 F. App’x 575, 578 (Fed. Cir. 2016).

Moreover, there were any number of design choices and complexities that would need to be taken into account, including hardware, software, and the use of the digital signal processing method of space-time block coding as an alternative. Ex. 2013, ¶87 Moreover, Suzuki looked to solve a different problem, sending multiple different signals from multiple different devices. *Id.* There is no teaching in Suzuki that sending the same data was desirable or obvious, just the opposite. *Id.*

3. Petitioner Fails to Show that Suzuki and Jalali Discloses or Renders Obvious Claims 7, 8, and 22 (Ground 3)

Claim 7 adds the limitation to claim 1 that the “first information and second information are the same data transmitted across two different frequencies.” Claim 8 adds the limitation to claim 1 that “the first information and second information are from the same data stream.” Claim 22 adds the limitation to claim 17 that the second data corresponds to the first data and wherein the power amplifier outputs a third up-converted signal comprising the up-converted first analog signal and the up-converted second analog signal.

Petitioner argues that claims 7, 8, and 22 are obvious in light of Suzuki and Jalali based on a sentence in Jalali that “the overall transmission channel is essentially divided into a number of (L) parallel sub-channels that are used to transmit the same

or different data.” Pet., 51-52. “In the Suzuki-Jalali combination, Suzuki would likewise transmit information that is the same data or from the same data stream or correspond with each other, on different frequency bands.” *Id.*, 52. Although Petitioner cites Dr. Almeroth’s declaration (paragraphs 175-177), Dr. Almeroth only repeats the same language and does not offer additional support or evidence. *See Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (“[Petitioner’s] expert testimony in support of this theory is equally unavailing, adding nothing beyond the conclusory statements in [the] petition.”); *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15-16 (P.T.A.B. Aug. 24, 2022) (precedential).

But Petitioner fails to provide any actual evidence why a person of skill in the art would have been motivated to transmit the same data ***across two different frequencies*** as required by claim 7 or across the same data stream, as required by claim 8. Petitioner does not differentiate between the claims or address their specific limitations. Petitioner provides no reason that the modifications would have been obvious other than applying hindsight with the benefit of the drafted claims of the ’802 patent. Moreover, Petitioner ignores the second half of claim 22 altogether: “wherein the power amplifier outputs a third up-converted signal comprising the up-converted first analog signal and the up-converted second analog signal.” Petitioner fails to meet its burden as to these claims given the lack of evidence or argument.

Contrary to Petitioner’s argument, there were more than just “two choices: either send the same data on the two frequencies or send different data.” Pet. 28. A person of skill in the art would have understood that there were multiple possible hardware and software configurations and multiple choices to solve the problem posed by Suzuki. Ex. 2013, ¶75.

Furthermore, the goal of Suzuki was not sending the same information, sending data across the same data stream, or sending corresponding data. *Id.* Instead, Suzuki looked to solve the problem of sending multiple different signals from multiple different devices. *Id.* There is no teaching in Suzuki that sending the same data was desirable or obvious, but rather the opposite. *Id.* In addition, the proposed combination would have led to further complications with the power amplifier in Suzuki, teaching against such a combination.

4. Petitioner Fails to Show that Suzuki in view of Chen Discloses or Renders Obvious Independent Claim 24 and Dependent Claim 25 (Ground 4)

Ground 4 challenges independent claim 24 and dependent claim 25 based the combination of Suzuki and Chen. As explained below, Ground 4 fails to render the claims unpatentable. Ex. 2013, ¶76.

Claim 24 requires “a first down-converter” that outputs a “first downconverted signal,” and “a second down-converter” that outputs a “second downconverted signal.” Ex. 1001 [’802] cl. 24. The claim then recites a filter that “receives the first

and second down-converted signals.” *Id.* Petitioner contends that this limitation is disclosed by Chen, tacitly admitting these limitations are not present in Suzuki. Petitioner relies on Chen’s down-converters 306 and 310 as the claimed first and second down-converters, and on Chen’s filter 328c as the claimed filter. Pet., 70-71. Petitioner then argues that the outputs of Chen’s down-converters 306 and 310 are “provided directly to [Chen’s] filter 328c.” *Id.*, 71 (citing Ex. 1009 [Chen] 14:13-15).

Petitioner, however, misapprehends Chen. As explained below, the analog outputs of Chen’s down-converters 306 and 310 are **not** received by Chen’s filter 328c. Ex. 2013, ¶78. Rather, the analog outputs are converted to digital signals in the Analog to Digital Converter 322. *Id.* It is these modified, digitalized signals, not the analog outputs of down-converters 306 and 310, that are provided to the filter 328c. *Id.* Therefore, Chen does not disclose that the “first” and “second” “down-converted signal[s]” output from the two down-converters are “receive[d]” by the claimed “filter.” *Id.* In this regard, Petitioner’s mapping of Chen is the exact opposite of the ’802 patent’s embodiments, where the down-converted signals are provided to the filter first and, only thereafter, are changed from analog to digital. *Id.*

Petitioner relies on Chen’s Figure 6 embodiment for the disclosure of a filter (blue) that purportedly receives the claimed first and second down-converted signals output from the two downconverters (green and orange):

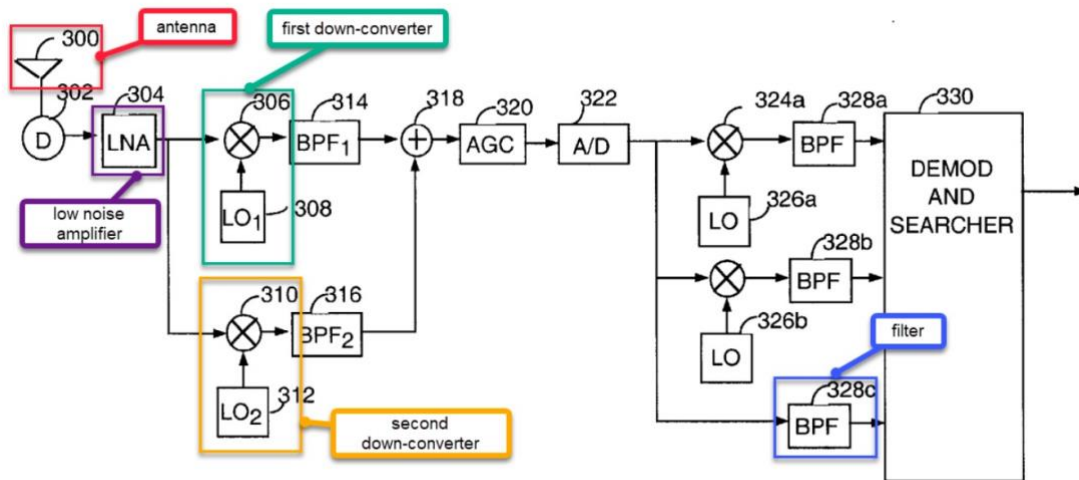


FIG. 6

Pet., 70-71. As explained below, however, Chen's filter 328c does not receive the *analog* down-converted signals output from down-converters 306 and 310. Rather, it receives different, *digital* signals. Ex. 2013, ¶79.

Chen's Figure 6 embodiment is explained with reference to the annotated version of Figure 6 below, demonstrating that filter 328c does not receive the analog outputs of down-converters 306 and 310. *Id.*, ¶80. Down-converter 306 (green) down-converts signals 250a, 250b and 250c. *Id.*; Ex. 1009 [Chen] 13:63-66. Downconverter 310 (orange) down-converts signal 252a. Ex. 2013, ¶80; Ex. 1009 [Chen] 14:1-3. The outputs of the down-converters 306 and 310 are combined and then pass through (among other circuit elements) analog to digital converter (A/D 322) (purple), where the signals are converted from analog to digital. Ex. 2013, ¶80; Ex. 1009 [Chen] 14:7-12. It is these modified, digitalized signals 250a and 252a—

not the analog outputs of down-converters 306 and 310—that are provided to filter 328c (blue). Ex. 2013, ¶80; Ex. 1009 [Chen] 14:13-15.

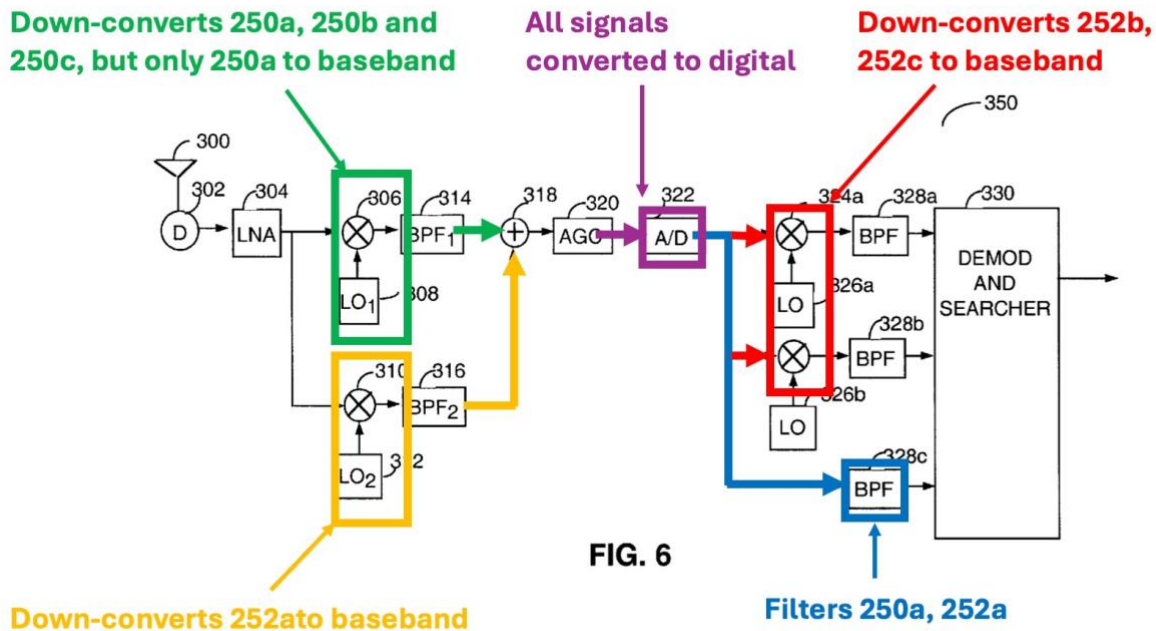
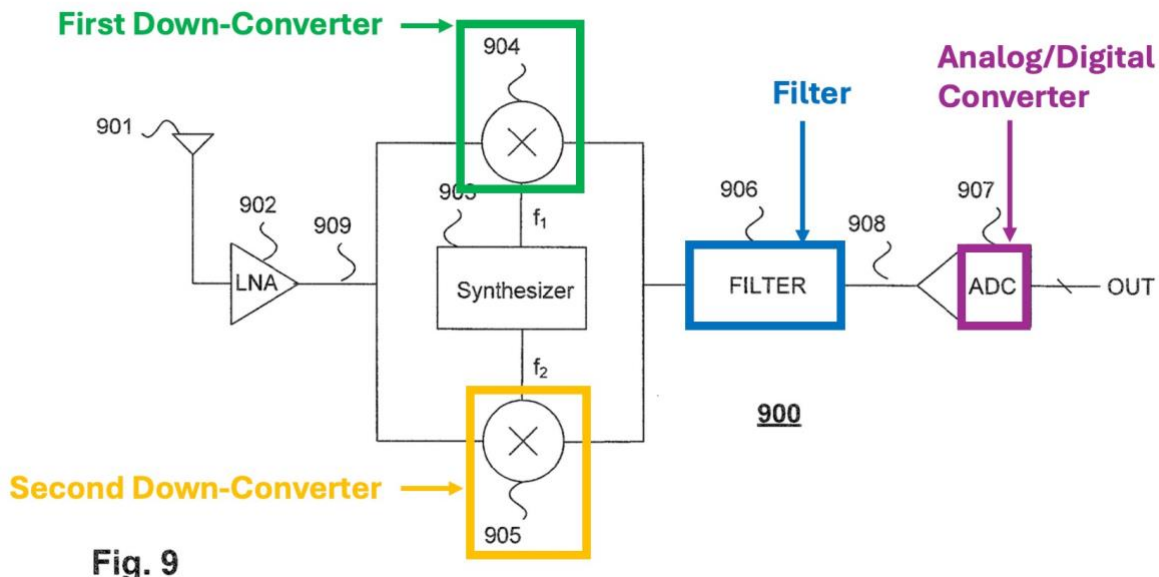


FIG. 6

The '802 patent's specification further supports the understanding that Chen's filter does not disclose receiving the claimed first and second down-converted signals. Ex. 2013, ¶81. For example, the '802 patent's Figure 9 (reproduced in annotated form below) discloses a receiver embodiment where the claimed filter 906 (blue) receives the first and second down-converted signals from down-converters 904 and 905 (green and orange), before those signals are converted to digital signals by Analog to Digital Converter 907 (purple):



Id., ¶81; Ex. 1001 [’802] Fig. 5; *see also id.*, 11:60-64. The ’802 patent’s process wherein analog signals are sent to the filter and then converted from analog to digital is, thus, the exact opposite of Chen’s process which converts the signals from analog to digital prior to being received by the filter.

Further supporting the fact that a POSITA would not have understood the analog output of downconverters 306 and 310 to be the same signal that is in the digitalized input of the filter 328c, analog and digital signals have distinct and recognized differences. Ex. 2013, ¶82. For example, as a textbook provided by Petitioner itself explains, over a given time interval, “an infinite number of possible different” analogue waveforms exist, “in contrast to only a finite number of possible digital messages.” *Id.*; Ex. 1023 [Lathi] 11-12. This is because a digital signal contains only binary messages, whereas an analog signal is “characterized by data

whose values vary over a continuous range.” Ex. 2013; ¶82; Ex. 1023, 11-12. As another example, in a digital signal: the data can be recovered correctly as long as the distortion and the noise are within limits. Ex. 2013; ¶82. In contrast, the waveform in an analog message is important, and even a slight distortion or interference in the waveform will cause an error in the received signal. *Id.* Clearly, a digital communication system is more rugged than an analog communication system in the sense that it can better withstand noise and distortion (as long as they are within a limit). *Id.*; Ex. 1023 [Lathi] 11. As another difference, Lathi explains, “[t]he main reason for the superiority of digital systems over analog ones is the viability of regenerative repeaters in the former.” Ex. 2013; ¶82; Ex. 1023 [Lathi] 11.

Ignoring Chen’s disclosure, the ’802 patent’s teachings, and the fundamental difference between analog and digital signals, Petitioner argues:

Chen discloses the output of the mixer 306 and downconverter 310 are, after downconversion, “already at baseband” and “provided directly to filter 328c.” Ex. 1009, 14:13-15.

Pet., 71. Petitioner misapprehends the cited portion of Chen which, read in the context of the embodiment, does not change the fact that the output of the downconverters 306 and 310 are analog signals that are changed to digital before being provided to filter 328c. Ex. 2013, ¶¶83-84. This is explained below.

As noted in connection with Chen’s annotated Figure 6 above, that embodiment processes four signals: 250a, 250b, 250c and 252a. *Id.*, ¶84; Ex. 1009

[Chen] 13:51-57. Down-converter 310 (orange) only processes signal 252a and downconverts it to baseband. Ex. 2013, ¶84; Ex. 1009 [Chen] 14:1-6. The remaining three signals 250a, 250b and 250c are all down-converted by mixer 306 (green), but only signal 250a is downconverted all the way to baseband. Ex. 2013, ¶84; Ex. 1009 [Chen] 13:63-66, 14:10-14. The other two signals, 250b and 250c, are down-converted to an intermediate frequency. Ex. 2013, ¶84; Ex. 1009 [Chen] 13:63-66, 14:10-14. The signals 250b and 250c are later down-converted to baseband in downconverters 324a and 324b (red) after being converted to digital signals (purple). Ex. 2013, ¶84; Ex. 1009 [Chen] 14:10-16. This process is schematically shown in the annotated Fig. 6 above. Ex. 2013, ¶84

In this context, Chen explains that, after signals 250a and 252a are converted to digital signals in A/D 322 (blue), they are “provided directly” to filter 328c since they are already down-converted to baseband and, unlike signals 250b and 250c, do not need further down-conversion:

The filtered signal from filter 314 is summed with the filtered signal from filter 316 in summer 318. ***The summed signal is amplified by automatic gain control (AGC) 320. The amplified signal is provided to analog to digital (A/D) converter 322.*** The digital signals are provided to downconverters 324a, 324b and filter (BPF) 328c. ***Downconverters 324a and 324b bring the signals carried on carriers 250b and 250c down to base band. The signal carried on carriers 250a and 252a are already at baseband and is provided directly to filter 328c.***

Ex. 2013, ¶85; Ex. 1009 [Chen] 14:7-16. Thus, as is clear, Chen’s statement that the signals 250a and 252a are “provided directly to filter 328c” does not mean that the

downconverted signals that are the outputs of the down-converters 306 and 310 are “provided directly” to filter 328c. Ex. 2013, ¶85. Instead, “provided directly” refers to the fact that the signals are already at baseband and do not need to be further downconverted before being sent to the filter 328c. Ex. 2013, ¶85; Ex. 1009 [Chen] 14:13-15. Chen is clear that the output of down-converters 306 and 310 are summed, then changed to digital signals, and it is these modified, digital signals that are transmitted to filter 328c, not the analog output of the down-converters. Ex. 2013, ¶85.

In short, once the analog outputs of the down-converters 306 and 310 in Chen are modified and converted to digital signals in the A/D 322, they are no longer the down-converted signals that were output from the down-converters 306 and 310. Ex. 2013, ¶¶78-85. They are, instead, different signals with fundamentally different characteristics. *Id.* This is confirmed by the ’802 patent which teaches providing analog signals to the filter *before* converting them into digital signals, and by Petitioner’s own Exhibit 1023 [Lathi]. *Id.* For the foregoing reasons, Petitioner fails to show that Chen discloses or renders obvious claim 24.

Finally, although Petitioner includes claim 25 in Ground 4 (Pet., 57), Petitioner presents no argument or evidence that the combination of Suzuki and Chen renders that claim obvious (*see* Pet., 71 (addressing limitation 24c and then skipping directly to Ground 5 without addressing claim 25 in Ground 4)). Indeed, Petitioner’s only

discussion in Ground 4 is a cross reference to Claim 2 (Pet., 57 (“For Claim 25, *see* Ground 2, Claim 2”), without any discussion of the actual proposed combination Suzuki/Chen combination, how the proposed Suzuki/Chen combination would render the claimed invention of claim 25 obvious as a whole, or why a person of skill in the art would be motivated to make such a combination. Petitioner’s failure to identify its position with particularity, by itself, compels a finding that Petitioner fails to meet its burden. *See* 35 U.S.C. § 312(a)(3); 37 C.F.R. §§ 42.104, 42.22; *Intelligent Bio- Systems, Inc. v. Illumina Cambridge, Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016).

C. Grounds 6-9: The Challenged Claims Are Further Patentable Over Fernandez in Combination with the Asserted Art

Fernandez-based Grounds 6-9 challenge all independent claims 1, 10, 17 and 24, as well as dependent claims 2-4, 6-9, 13, 14, 21-23, and 25. Pet., 4. For claim 17 (and dependent claims 21-23), while the claim requires that the first and second digital signals be provided by a “baseband digital system,” Petitioner fails to make a *prima facie* case of obviousness by failing to point to any “baseband digital system” at all, let alone one that provides its putative first and second digital signals. Petitioner also fails to show the obviousness of independent claims 10 and 17 (and dependent claims 13, 14, 17, and 21-23) for an additional reason. Both claims require an amplifier that receives two up-converted signals. Fernandez undisputedly does not disclose this limitation because it utilizes a different amplifier for each signal, and

Petitioner fails to show how or why a POSITA would have modified Fernandez in view of Montojo to meet the claims. Petitioner further fails to show that the Fernandez Grounds render obvious claims 24 and 25 for the same reasons discussed in connection with the Suzuki Grounds: Chen’s filter does not receive the output signals of its up-converters. In addition, Petitioner fails to show that claims 7, 8, or 22 are obvious over Fernandez in view of Montojo and Jalali, failing to address the full scope of the claims as written. Finally, Petitioner fails to show that a person of skill in the art would have been motivated to combine Fernandez, Montojo, and Etamed as required by Ground 9.

1. Petitioner Fails to Point To “A Baseband Digital System” That Provides a First and a Second Baseband Signal (Claims 17 and 21-23) (Grounds 6, 7, and 9)

Independent Claim 17 recites “[a] wireless communication system comprising: a baseband digital system for providing a first digital signal comprising a first data to be transmitted and a second digital signal comprising a second data to be transmitted.” Ex. 1001 [’802] cl. 17.¹ Thus, the “baseband digital system” provides both the first and second digital signals to be transmitted. Ex. 2013, ¶108. Petitioner contends that Fernandez discloses this limitation by pointing to two digital signals (Pet., 98) but fails to identify any “baseband digital system” that provides these two signals

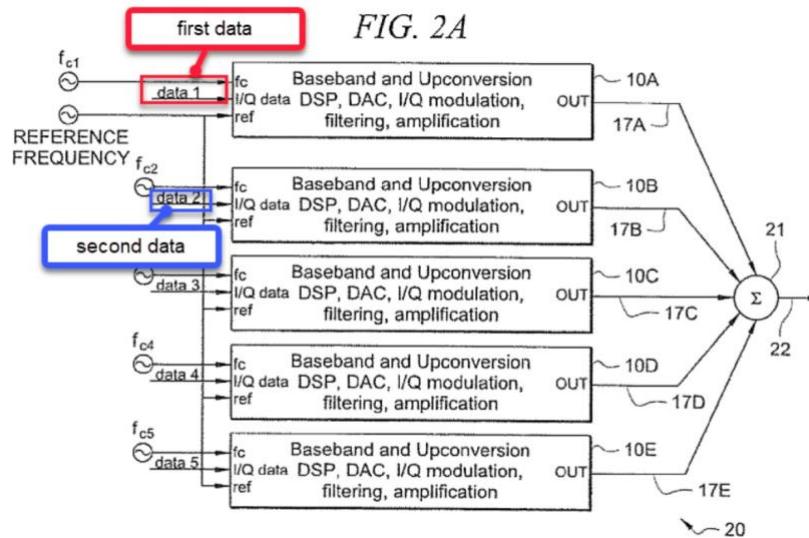
¹ Claims 21-23 depend from claim 17 and are likewise patentable over the identified art.

(i.e., the putative first and second digital signals). Pet., 98 (citing back to the discussion of 10a).²

Petitioner argues (in a single sentence) that “Fernandez further discloses a baseband digital system.” Pet., 98 (citing Ex. 1005 [Fernandez] [0006]). The cited portion of Fernandez, however, only discloses the “[s]tandard notation for complex baseband and passband signals.” Ex. 2013, ¶109; Ex. 1005 [Fernandez] [0006]. In other words, it discloses the mathematical formula for representing a baseband signal. Ex. 2013, ¶109. But it says nothing whatsoever about “a baseband digital system,” much less one that provides the claimed first and second digital signals. *Id.*

The Petition (at 98) also cites its discussion of limitation 10a, but that does not cure the deficiency. *Id.*, ¶110. There, Petitioner relies upon the following version of Fernandez’s Figure 2A, and specifically on “data 1” and “data 2,” which Petitioner identifies as the claimed first and second digital data signals.:

² Although Petitioner makes the cited arguments in Ground 6, Petitioner does not contend these limitations are met by any of the additional references cited in Grounds 7 and 9 or attempt to cure the deficiencies identified herein.



Pet., 88. Figure 2A, however, does not disclose where data 1 and data 2 originate from. Ex. 2013, ¶111. Neither the figure, nor the corresponding disclosure indicate that these data signals are sent from a “baseband digital system.” *Id.*; See also Ex. 1005 [Fernandez] [0008]. Even Petitioner’s own allegations only state that “[a]s depicted in [Fernandez’s] Figure 2A, each signal generator receives input ‘data’ resulting in RF signals 17A-17E,” but say nothing about the where the input data originates from. Pet., 87.

The Petition (at 98) also cites Ex. 1005 [Fernandez] [0011], which states that “a general method is provided to increase a digitally synthesized signal’s bandwidth by frequency interleaving.” This statement, however, is irrelevant. Ex. 2013, ¶112. It says nothing whatsoever about “a baseband digital system” much less one that provides the first and second digital signals. *Id.* It merely discloses how to frequency interleave multiple narrower bandwidth signals to create a continuous wider band

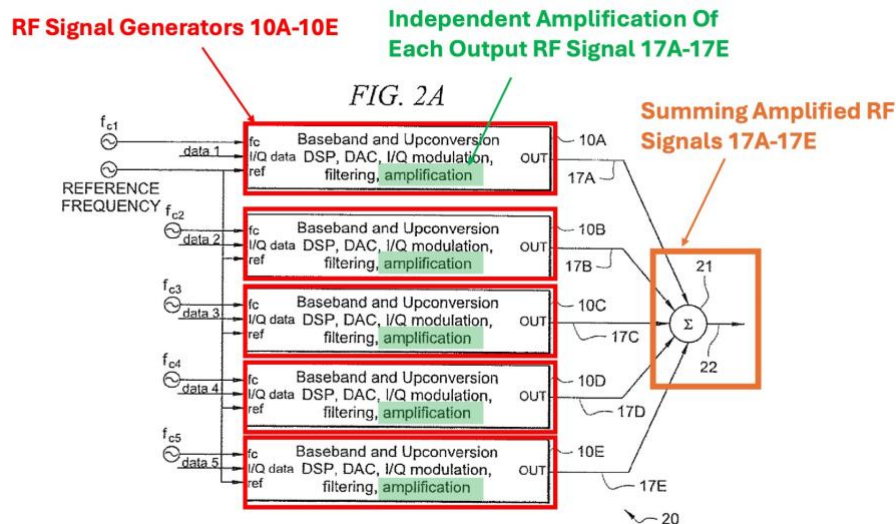
signal. *Id.* It does not disclose the source of the multiple narrower bandwidth signals and does not disclose that they are provided by “a baseband digital system.”

And, even assuming arguendo that Fernandez’s paragraph 11 is relevant to the limitation-in-question, Petitioner’s argument would still fail. *Id.* Paragraph 11 concerns “embodiments of [Fernandez’s] ***present invention*** ...” But Petitioner does not rely on Fernandez’s present invention. Rather, it relies exclusively upon Fernandez’s discussion of admitted prior art for all other claim limitations. *Id.*; Pet., 87-98 (citing Ex. 1005 [Fernandez] ¶¶5-6, 8-9 & Figs. 1, 2A-2B). Petitioner does not demonstrate why the teachings of Fernandez’s invention apply to the prior art Fernandez claims to have improved upon, nor does it explain how a POSITA would modify Fernandez’s prior art in view of its invention to satisfy the claims or why a person skilled in the art would be motivated to do such a thing with a reasonable expectation of success. Ex. 2013, ¶112. For example, Fernandez’s invention produces signals that have completely different frequency profiles than the signals Petitioner relies upon for the alleged disclosure of the claims. *Id.*; *compare* Ex. 1005 [Fernandez] Fig. 2A (frequency profile of Fernandez’s prior art relied upon by Petitioner) *with* Fig. 6 (frequency profile of a Fernandez embodiment).

For the foregoing reasons, Petitioner fails to show that the Fernandez grounds 6, 7, and 9 disclose independent claim 17 or claims 21-23 which depend therefrom. Ex. 2013, ¶113.

2. Petitioner Fails to Show That a POSITA Would Have Been Motivated to Combine Fernandez and Montojo as Proposed (Claims 1, 10, 17) (Grounds 6-9)

Claim 10 recites “amplifying the combined up-converted signal in a power amplifier.” Ex. 1001 [’802], cl. 10. Claim 17 recites “a power amplifier” that receives the first and second upconverted signals. *Id.*, cl. 17. It is undisputed that Fernandez does not disclose either limitation and Petitioner makes no argument to the contrary. Ex. 2013, ¶¶97; Pet., 95. As shown in Fernandez’s Fig. 2A, each RF signal generator 10A-10E has its own power amplifier, and the amplified RF signals are then summed together in summer 21. Ex. 2013, ¶¶97. Therefore, there is no single power amplifier in Fernandez that receives and amplifies both the first and second up-converted signals. *Id.*



To remedy this deficiency, Petitioner relies upon the combination of Fernandez and Montojo. Pet., 95 (discussing claim 10), 98 (relying on discussion of claim 10 for

claim 17); *see also* Ex. 1003 [Almeroth Decl.] ¶273 (“In my opinion, Fernandez in view of Montojo renders obvious this limitation.”).

Petitioner, however, has failed to show why and how a POSITA would have modified Fernandez in view of Montojo so as to render claims 10 and 17, and the asserted art teaches against such a combination. Ex. 2013, ¶99. Montojo explains that even though it may be desirable to share an amplifier among different carriers, it is not practical to do so if all carriers are to be amplified based on their needs:

If a multi-carrier terminal has a single power amplifier for simultaneous transmission of different types of carrier signals, the power amplifier may be subject to ***power constraints imposed by spectral emission requirements, by on-board battery capacity, and also by any priority among the carriers.***

Id.; Ex. 1006 [Montojo] [0007].

To address this problem, Montojo discloses an apportionment system where the power amplifier amplifies the highest priority carrier according to its needs and will amplify the next priority carrier(s) only to the extent any amplification power is left over. Ex. 2013, ¶100; Ex. 1006 [Montojo] [0009]-[0010]. This is also precisely how Montojo’s Figure 5 embodiment relied upon by Petitioner works. Ex. 2013, ¶100; Pet., 77-78, 95-96.

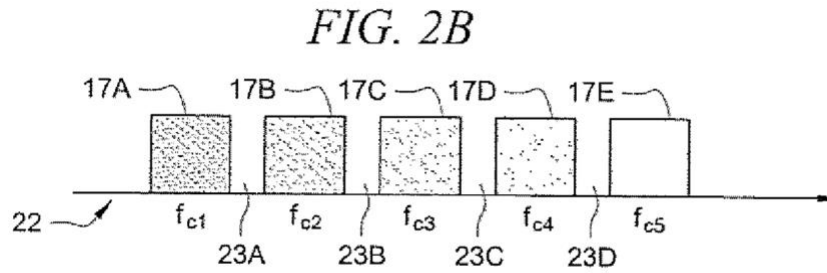
Specifically, Montojo explains that the power amplifier accesses a “priority list 512” to obtain the priority and power needs of the different carriers. Ex. 2013, ¶101; Ex. 1006 [Montojo] [0045].

Then:

According to the priority appointment scheme, the highest priority carrier is allocated as much of MaxTxPowerAnalog as is necessary to satisfy whatever transmission requirements apply to it. Any lower priority carrier (say, carrier y) will be accorded whatever remains of MaxTxPowerAnalog after allocation to active carriers with higher priority.

Ex. 1006 [Montejo] [0045].

Petitioner has not shown if Montejo's priority-based power amplifier would be desirable or even functional in a system such as Fernandez, which is why Fernandez discloses that each signal generator has its own power amplifier to begin with. Ex. 2013, ¶102. Specifically, Fernandez is directed at "wideband signal generation." *Id.*; Ex. 1004 [Fernandez] [0001]. Similarly, in its background of the invention (relied upon by Petitioner), Fernandez discusses a system for generating wideband signals. Ex. 2013, ¶102; Ex. 1004 [Fernandez] [0005] ("A desire often arises for generating a wideband digital signal."). Fernandez discloses that this wideband signal is generated by summing together multiple narrower band signals. Ex. 2013, ¶102; Ex. 1004 [Fernandez] [0008]. This wideband signal generated by summing together narrower band signals (as Fernandez explains was done in its prior art) is shown in Fig. 2A, where all narrow band signals 17A-17E are shown as substantially equally amplified:



Ex. 2013, ¶102.

Petitioner makes no attempt to show how (or why) a priority-based amplifier that amplifies only the first signal based on its needs and which may or may not amplify other signals depending on the left-over, would be either functional or desirable in Fernandez. For example, Petitioner does not address how Fernandez’s system would work if the first signal (17A in Fig. 2A) is fully amplified, but the second signal (17B in Fig. 2B) is only partially amplified, and the remaining signals are not amplified at all. Ex. 2013, ¶103. *Samsung Elecs. Co. Ltd. v. KAIST IP US LLC*, IPR201701046, Papers 12 at 18-20 (Oct. 2, 2017) and 14 at 7 (Jan. 22, 2018) (holding that “[a]lthough proof of physical or bodily incorporation is not required,” petitioner fails “to explain sufficiently *how* a POSA would have implemented Hieda’s source/drain contact areas in Inaba’s device,” where compatibility of references was neither “self-evident” nor explained) (emphasis in original); *Alcon Inc. v. AMO Dev., LLC*, IPR2021-00853, Paper 48, 50-56 (Dec. 2, 2022) (“the evidence supports that it would have been no[t] simple or well-understood or obvious matter to make the

combination” where, *inter alia*, “Petitioner never satisfactorily explains just how the combination would work”); *see also Canon, Inc. v. WSOU Invests., LLC*, IPR2022-01532, Paper 14, 18-21 (Apr. 14, 2023) (rejecting a combination where “Petitioner has not provided sufficient details about how its proposed combination would work.”); *Acclarent, Inc. v. Albritton*, IPR2018-00268, Paper 12, 7-8 (Jan. 31, 2019) (the Petition’s “allegations amount to little more than an opinion that one would have combined the references in a manner to allow performance of the claimed method step, without sufficient guidance as to how and why [a POSITA] would do so.”).

Nor does the combination of Fernandez and Montojo otherwise render obvious using a single amplifier and subsequent single antenna in Fernandez. Ex. 2013, ¶104. Montojo teaches a person skilled in the art that using a single amplifier has substantial, and potentially impractical, drawbacks. *Id.*; Ex. 1006 [Montojo] [0007] (“the power amplifier may be subject to power constraints imposed by spectral emission requirements, by on-board battery capacity, and also by any priority among the carriers.”); [0008] (“it would be desirable that the power of the multi-carrier waveform transmitted by the multicarrier terminal be limited to a level such that spectral emission goals are not compromised. It is further desirable to preserve these power constraints while requiring little modification to the equipment and operation of existing communication systems.”).

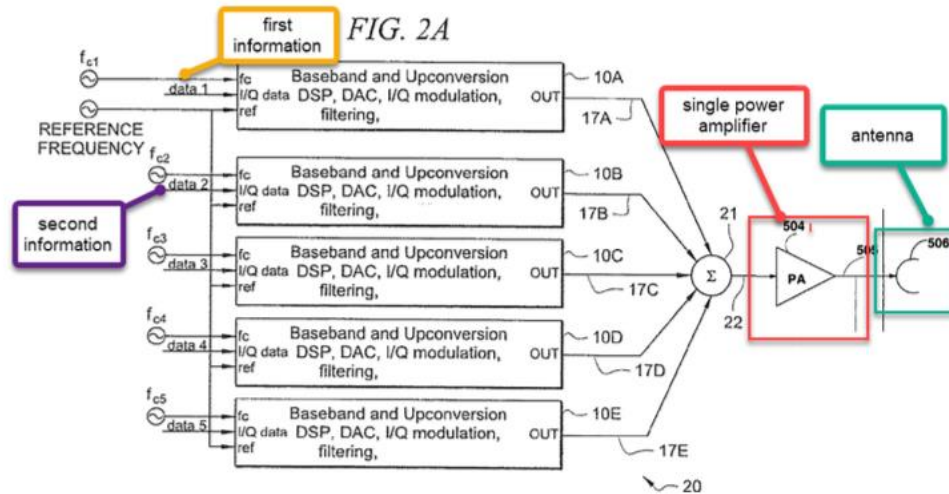
It is because of these drawbacks that Montojo discloses a need in the art for a system that would allow practically sharing a single power amplifier, which Montojo teaches is possible through its priority-based apportionment:

Therefore, there is a need in the art for a scheme for allocating the transmit power of a carrier according to a priority in a multi-carrier terminal in which a single power amplifier is utilized for transmitting a plurality of carrier signals simultaneously.

Ex. 1006 [Montojo] [0009]; Ex. 2013, ¶¶104-106.

In light of the drawbacks and obstacles of using a single amplifier that would amplify multiple carriers, Petitioner also does not perform any balancing of benefits and drawbacks to prove that a POSITA would in fact be motivated to modify Fernandez's disclosed system to use a single power amplifier for all carriers. *See, e.g., Arctic Cat Inc. v. Polaris Indus.*, 795 Fed. Appx. 827, 833 (Fed. Cir., 2019) (“[t]he Board must weigh the benefits and drawbacks of the modification against each other, to determine whether there would be a motivation to combine.”) (citing *Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000)).

Claim 1 requires transmission of first and second information from the **same transmitter**. Ex. 2013, ¶107. Similar to claims 10 and 17, Petitioner does not contend that Fernandez discloses this limitation, relying instead on the same amalgam of Fernandez, adding Montojo's power amplifier and antenna after Fernandez's signal summation.



Pet., 82 (“In Fernandez-Montojo, this signal is sent over a single antenna....”). But, as described above, a POSITA would not have been motivated to combine Fernandez and Montojo in the manner Petitioner urges. Ex. 2013, ¶107.

For the foregoing reasons, Petitioner has not shown that the combination of Fernandez and Montojo discloses or renders obvious independent claims 1, 10 or 17, or claims 6-9, 13, 14, or 21-23 which depend therefrom.

3. Petitioner Fails to Show that Fernandez, in Combination with Montojo and Chen Disclose Independent Claim 24 and Dependent Claim 25 (Ground 8)

For claim 24, Petitioner relies on its discussion in Ground 4 (based on Suzuki). Pet., 101 (“As discussed in Ground 4, Chen describes a receiver that processes multi-carrier wireless transmissions as claimed by claims 14 and 24. ... And it would have been obvious to combine the Fernandez-Montojo transmitter with Chen’s receiver for the same reasons discussed in Ground 4”).

However, as discussed in Section II.B.3 with respect to Ground 4, Chen does not disclose a filter that receives the upconverted signals output from the first and second claimed up-converters. Ex. 2013, ¶114. Therefore, for the same reasons, Petitioner has fails to show that the Fernandez-based grounds disclose claim 24 or claim 25 which depends therefrom. *Id.*

Moreover, Petitioner does not separately provide any support for its contention that it would have been obvious to combine Fernandez with Montojo *and* Chen. Petitioner cites Dr. Almeroth’s declaration, but his opinions are conclusory arguments that it would have been obvious to combine the three references for the same reasons it would have been obvious to combine Suzuki and Chen. Suzuki and Fernandez are not the same reference, and Petitioner (and its expert) cannot simply hand-waive an argument from one reference to the other. Moreover, Dr. Almeroth’s declaration makes clear that he relies on hindsight for this combination, arguing that it would have been “for the same reasons discussed in Ground 4, *including the benefits* (and necessity) of the convention low noise amplifier, downconverters, and filter *claimed in claims 14 and 24*, and the fact this process is disclosed throughout the literature. Petitioner’s argument admits to using the benefits provided by the claimed invention (as opposed to the benefit of the proposed combination) to guide his analysis.

Moreover, Petitioner fails to provide evidence or argument specifically addressing the validity of claim 25 at all in Ground 8. Instead, Petitioner’s sole

sentence addressing Claim 25 in Ground 8 is a cross-reference back to Ground 6, claim 2. Pet., 101. Here again, Petitioner fails to provide any discussion of the actual proposed combination of Fernandez, Montojo, and Chen, how the proposed combination would render the claimed invention of claim 25 obvious as a whole, or why a person of skill in the art would be motivated to make such a combination. This single sentence, pointing to a claim directed to a different invention and a different combination is facially deficient and cannot be used to deem claim 25 unpatentable.

4. Petitioner Fails to Show that Fernandez in Combination with Montojo and Jalali Discloses or Renders Obvious Claims 7, 8, and 22 (Ground 7)

Claim 7 adds the limitation to claim 1 that the “first information and second information are the same data transmitted across two different frequencies.” Claim 8 adds the limitation to claim 1 that “the first information and second information are from the same data stream.” Claim 22 adds the limitation to claim 17 that the second data corresponds to the first data and wherein the power amplifier outputs a third up-converted signal comprising the up-converted first analog signal and the up-converted second analog signal.

Petitioner reiterates verbatim its argument from Ground 3, namely that claims 7, 8, and 22 are obvious in light of Fernandez, Montojo, and Jalali based on a sentence in Jalali that “the overall transmission channel is essentially divided into a number of (L) parallel sub-channels that are used to transmit the same or different data.” Pet.,

100. “In the Fernandez-Montojo-Jalali combination, Fernandez would likewise transmit information that is the same data or from the same data stream on different bands.” *Id.* Although Petitioner cites Dr. Almeroth’s declaration (paragraph 295), Dr. Almeroth only repeats the same language and does not offer additional support or evidence.

But Petitioner fails to provide any actual evidence why a person of skill in the art would have been motivated to transmit the same data *across two different frequencies* as required by claim 7 or across the *same data stream*, as required by claim 8. Petitioner does not differentiate between the claims or address their specific limitations. Petitioner provides no reason that the modifications would have been obvious other than applying hindsight with the benefit of the drafted claims of the ’802 patent. Moreover, Petitioner ignores the second half of claim 22 altogether: “wherein the power amplifier outputs a third up-converted signal comprising the up-converted first analog signal and the up-converted second analog signal.” Petitioner fails to meet its burden as to these claims given the lack of evidence or argument.

5. Petitioner Fails to Show that It Would Have Been Obvious to Combine Fernandez, Montojo, and Etemad (Ground 9)

Petitioner contends that claims 6, 13, and 21 are obvious in light of Fernandez, Montojo, and Etemad, but again makes little effort to provide any support or even argument as to why this is so. Petitioner instead cites its discussion of Ground 5,

which propounds the combination of Suzuki and Etemad. Here again, Petitioner makes little effort to meet its burden as to Ground 9.

Petitioner argues that a POSITA would have reasonably expected this combination to succeed because TDD and FDD were “well-known” and because “[i]mplementing TDD and FDD into Fernandez-Montojo would have been well within the capabilities of a POSITA.” Pet., 102. But Petitioner is merely reciting the list of factors for an obviousness analysis and checking them off without any actual support or evidence. Petitioner does not address what, if any changes, would have to be made to its Frankensteined Fernandez-Montojo circuit, what difficulties would have been encountered in such a change, the cost involved, or why a POSITA would have been motivated to make such a combination in the first place.

IV. CONCLUSION

For the foregoing reasons, the challenged claims should be found not unpatentable.

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CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITS

This Patent Owner Preliminary Response (the “POPR”) consists of 9,545 words, excluding table of contents, table of authorities, certificate of service, this certificate, or table of exhibits. The POR complies with the type-volume limitation of 14,000 words as mandated in 37 C.F.R. § 42.24. In preparing this certificate, counsel has relied on the word count of the word-processing system used to prepare the paper (Microsoft Word).

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that the following documents were served by electronic service, by consent between the parties (Pet. at 106-107), on the date signed below:

PATENT OWNER'S PRELIMINARY RESPONSE

EXHIBITS 2013-2014

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