

IPR2024-01336
U.S. Patent No. 7,924,802

Patent Owner's Demonstratives

December 16, 2025

Demonstrative Exhibit – Not Evidence

Roadmap

- Independent Claims
 - Petition Fails as to Claims 10 and 17
 - Petition Fails as to Claim 24
 - Petition Fails as to Claim 1
- Dependent Claims

INDEPENDENT CLAIMS 10 and 17

Grounds 2-5

Grounds 2-5 – Claims 10 and 17, Suzuki

Thus, it is unsurprising Suzuki and other references disclose or at least render obvious claim 10. Ex. 1003, ¶128. Petitioner also relies on two alternative theories for this claim, that Suzuki's embodiments in Figures 6 and 8 render this claim obvious.

Pet. at 31

Claims 13, 17, and 21 mirror the above claims as set forth in the following chart. Suzuki renders these claims obvious for the same reasons as above. Ex. 1003, ¶¶152-60.

Pet. at 44

- Petitioner's alternative theories fail
 - Suzuki Figure 6 does not disclose or render obvious first and second digital signals comprising first and second data ***to be transmitted***
 - Suzuki Figure 8 does not disclose or render obvious
 - Two distinct upconverted analog signals
 - Or upconverted signals with two distinct frequency ranges

POR at 7-18

10. A method of transmitting information in a wireless communication channel comprising:

receiving a first digital signal comprising first data **to be transmitted**;

receiving a second digital signal comprising second data **to be transmitted**;

17. 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;

Grounds 2-5 – Suzuki Figure 6

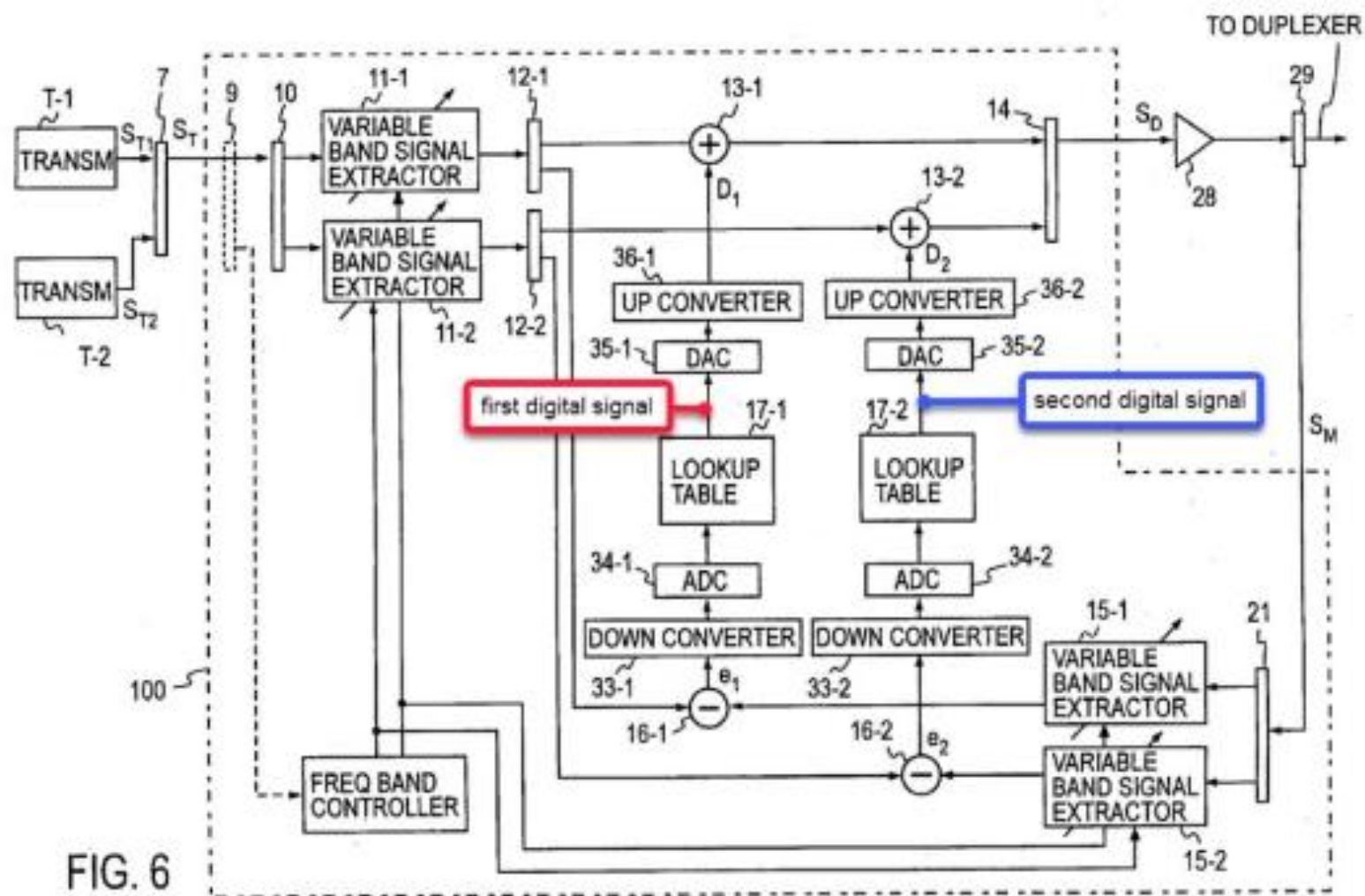


FIG. 6

Pet. at 31-32

Grounds 2-5 – Suzuki Figure 6

Suzuki tells us signals are cancelled and not for transmission

[0063] FIG. 6 shows the third embodiment where the present invention is configured by an analog circuit. Since the lookup tables 17-1 and 17-2 are implemented through digital signal processing, the reference signals e_1 and e_2 are converted from high frequency signals to base band signals by down-converters 33-1 and 33-2 and then converted to digital signals at the ADCs 34-1 and 34-2. The distortion compensation data D_1 and D_2 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 up-converters 36-1 and 36-2 and provided to the adders 13-1 and 13-2. The arrangements other than the

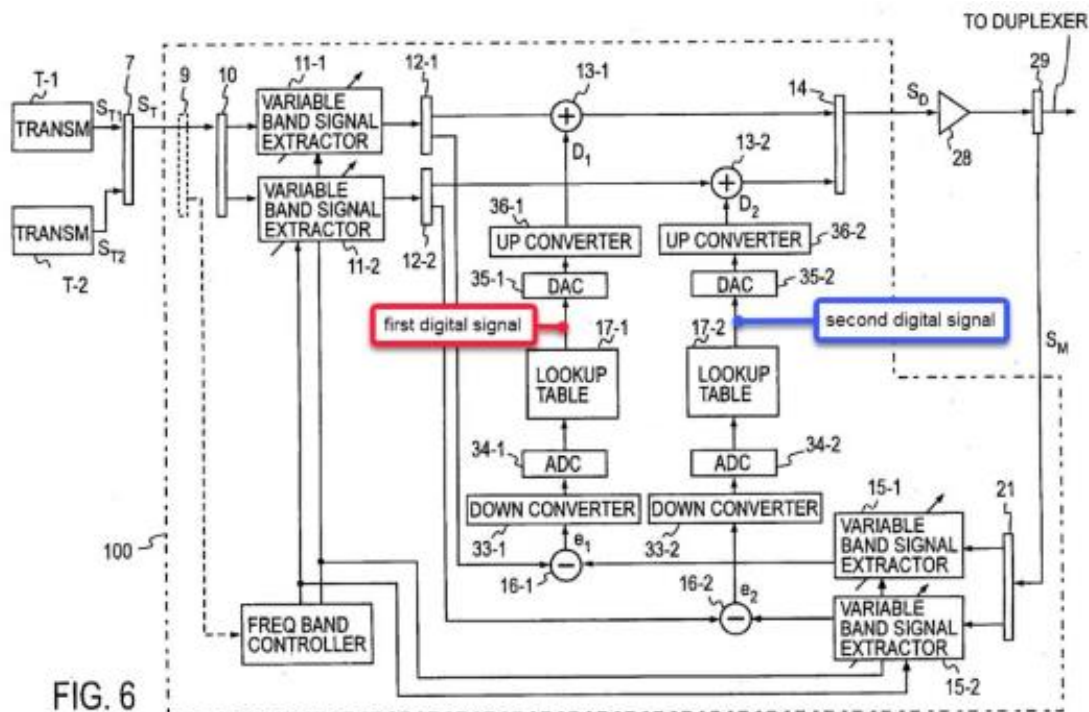
signals. By using the differences e_1 and e_2 detected in respective frequency bands, i.e., distortion components, as reference signals, corresponding distortion compensation data are read out from the lookup tables 17-1 and 17-2 and provided to the adders 13-1 and 13-2, respectively. The distortion compensation data are such one for canceling the detected distortion components. The distortion compensation data, which are predetermined for the distortion components produced by a power amplifier at respective frequency bands, are stored in the lookup tables 17-1 and 17-2.

Ex. 1004 [0063]

Ex. 1004 [0046], POR at 10

POR at 10, citing Ex. 2013 at ¶¶49-56

Grounds 2-5 – Suzuki Figure 6



Pet. at 31-32

- Pet. Identified first and second digital signal
- But these are outputs from lookup tables 17-1 and 17-2
- Cancelled in amplifier prior to transmission
- Not digital signals that are transmitted by the transmitter and do not contain “data to be transmitted”

POR at 9-11, citing Ex. 2013, ¶¶ 50-54

Grounds 2-5 – Claim 10

10. A method of transmitting information in a wireless communication channel comprising:
receiving a first digital signal comprising first data to be transmitted;
receiving a second digital signal comprising second data to be transmitted;

up-converting the first analog signal to a first RF center frequency to produce a first up-converted analog signal, wherein the first up-converted analog signal comprises a first up-converted frequency range from the first RF center frequency minus one-half the first frequency range to the first RF center frequency plus one-half the first frequency range; up-converting the second analog signal to a second RF center frequency greater than the first center RF frequency to produce a second up-converted analog signal, wherein the second up-converted analog signal comprises a second up-converted frequency range from the second RF center frequency minus one-half the second frequency range to the second RF center frequency plus one-half the second frequency range, and wherein a 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;

combining the first up-converted analog signal and the second up-converted analog signal to produce a combined up-converted signal;

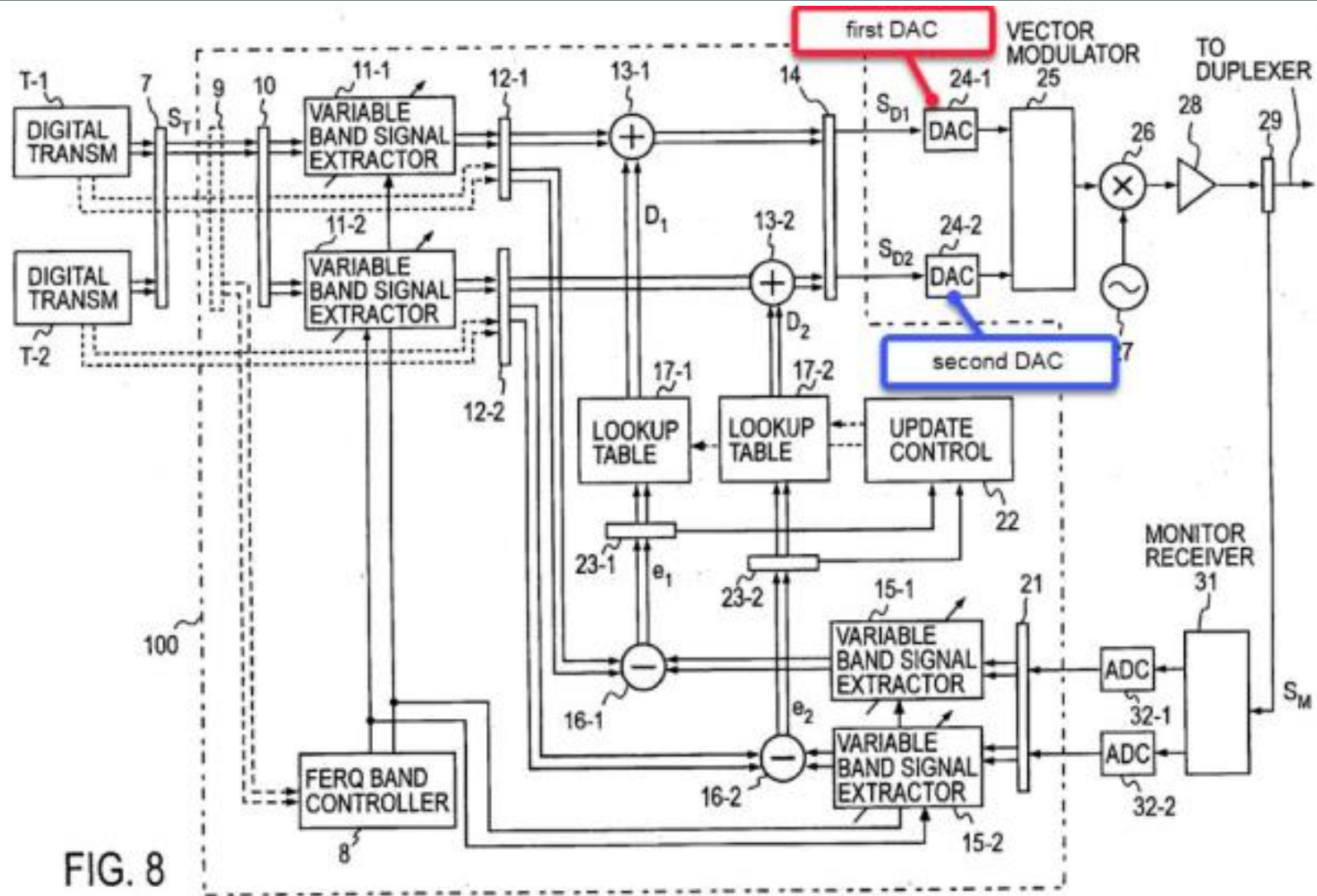
17. A wireless communication system comprising:

a first up-converter circuit having a first input coupled to receive the first analog signal and a second input coupled to receive a first modulation signal having a first RF frequency...;

a second up-converter circuit having a first input coupled to receive the second analog signal and a second input coupled to receive a second modulation signal having a second RF frequency...,

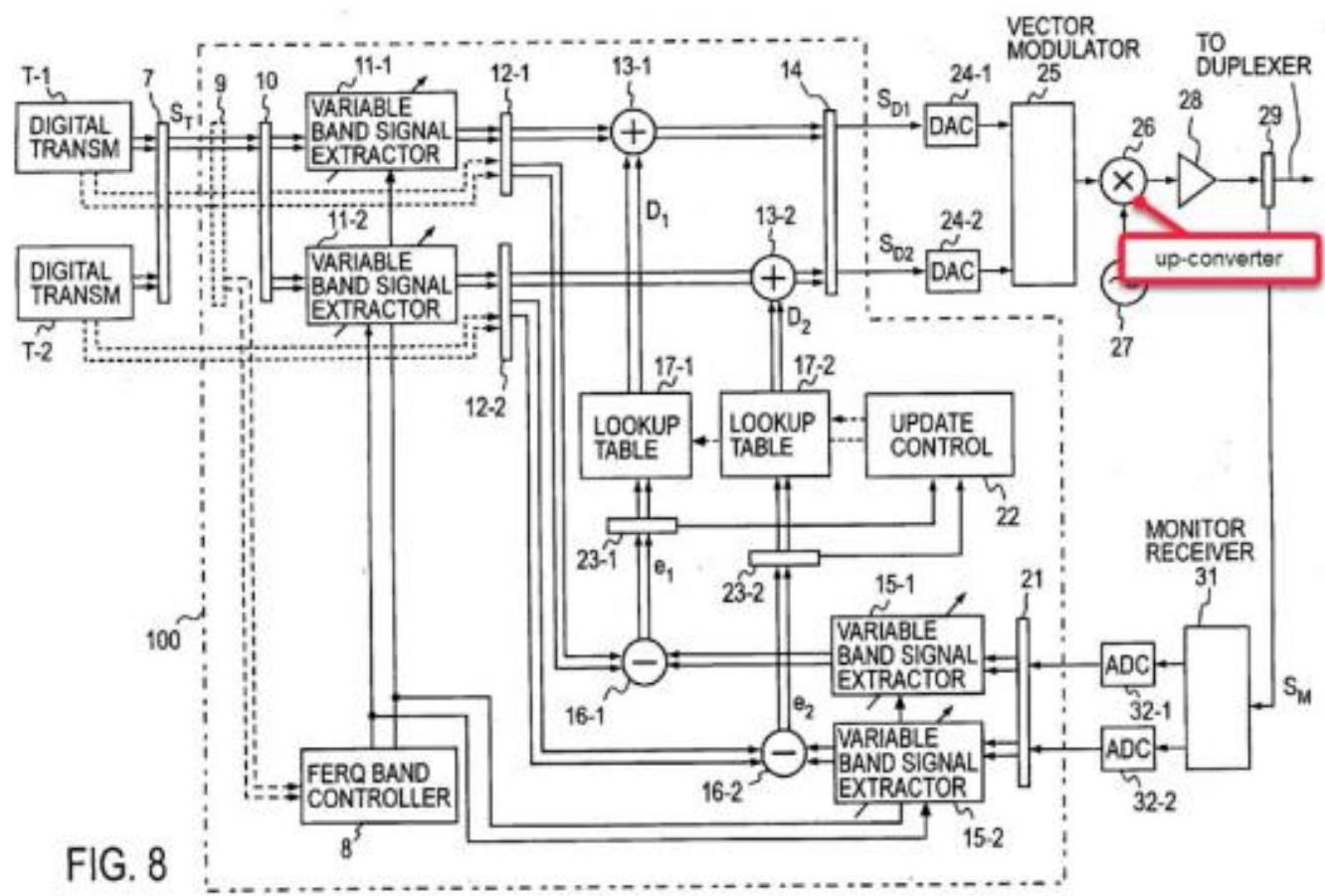
a power amplifier coupled to receive the first and second up-converted analog signals, wherein the bandwidth of the power amplifier is greater than the difference between a lowest frequency in the first up-converted frequency range and a highest frequency in the second up-converted frequency range.

Grounds 2-5 – Suzuki Figure 8



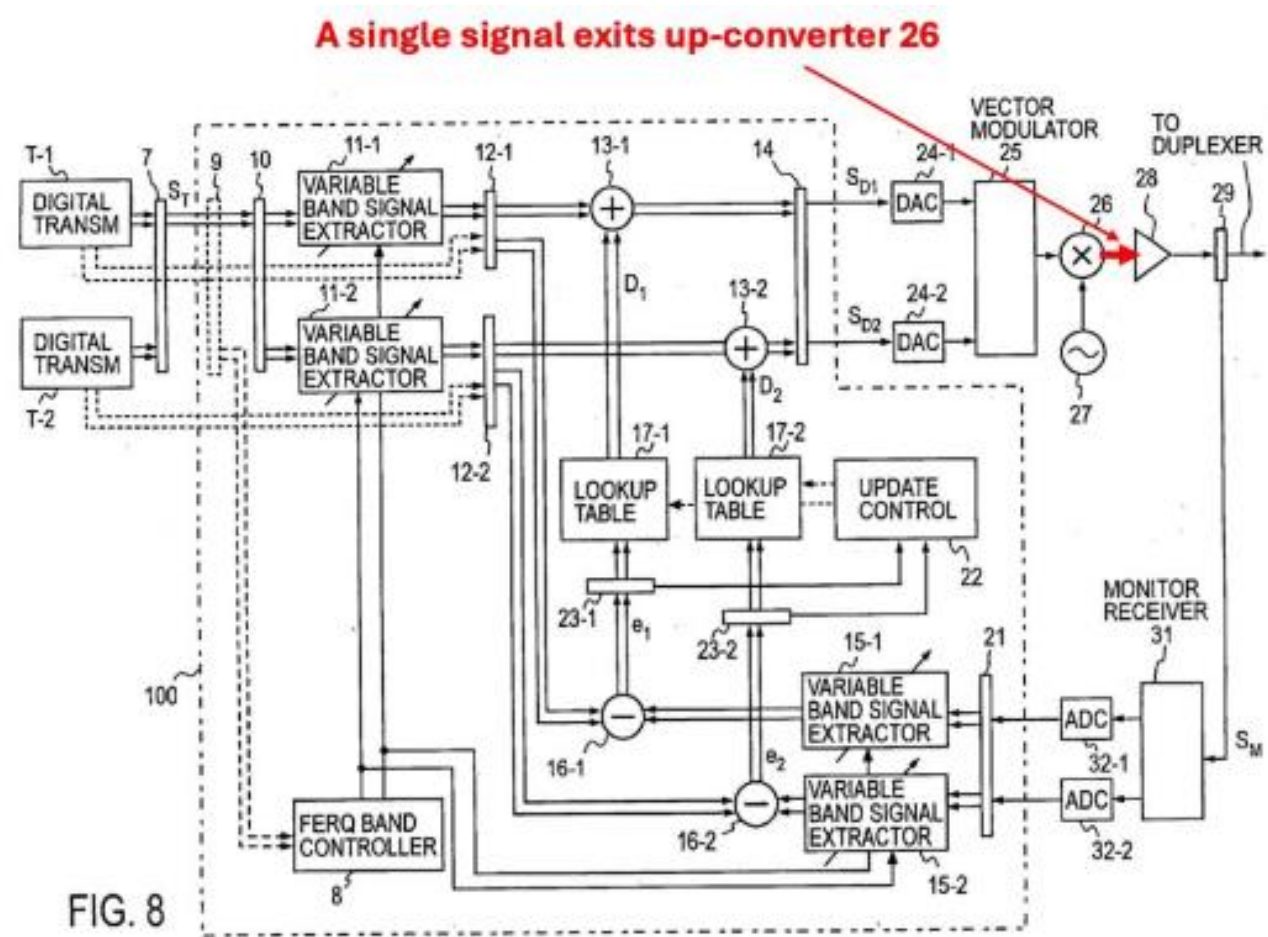
Pet. at 35-38

Figure 8 only produces a single upconverted signal



POR at 12-13, citing Ex. 2013 at ¶¶58-61

Figure 8 only produces a single upconverted signal



POR at 14

Suzuki tells us there is only one upconverted signal

The vector modulator 25 produces vector modulated signals based on the two analog signals and provides the vector modulated signals to a frequency converter 26. 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. 1004 [0058], POR at 13, citing Ex. 2013 at ¶60

Figure 8 only produces a single upconverted signal

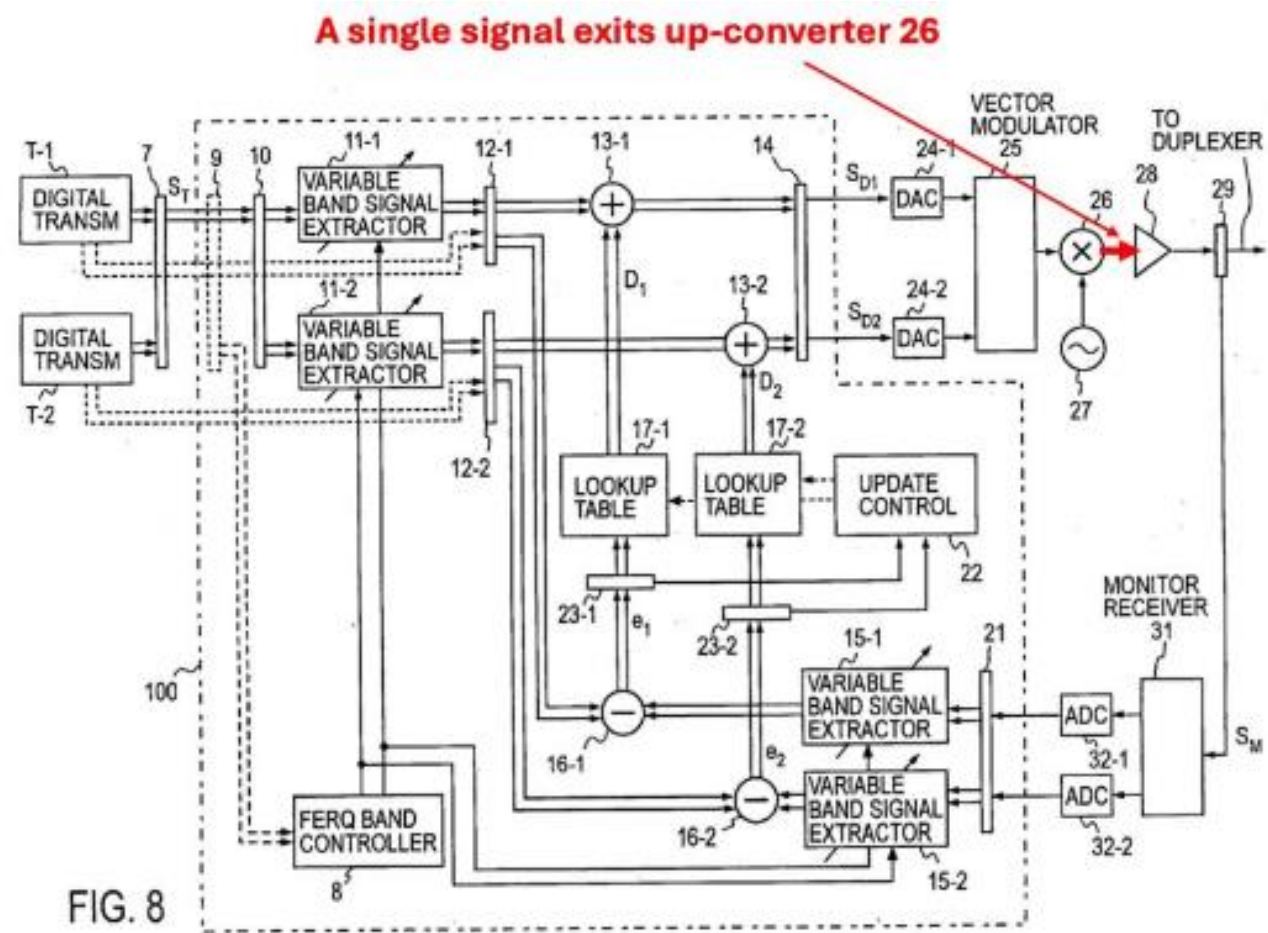


FIG. 8

POR at 16

Grounds 2-5 – Claim 10

10. A method of transmitting information in a wireless communication channel comprising:
receiving a first digital signal comprising first data to be transmitted;
receiving a second digital signal comprising second data to be transmitted;

up-converting the first analog signal to a first RF center frequency to produce a first up-converted analog signal, wherein the first up-converted analog signal comprises a first up-converted frequency range from the first RF center frequency minus one-half the first frequency range to the first RF center frequency plus one-half the first frequency range;

up-converting the second analog signal to a second RF center frequency greater than the first center RF frequency to produce a second up-converted analog signal, **wherein the second up-converted analog signal comprises a second up-converted frequency range from the second RF center frequency minus one-half the second frequency range to the second RF center frequency plus one-half the second frequency range, and wherein a 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;**

combining the first up-converted analog signal and the second up-converted analog signal to produce a combined up-converted signal;

Demonstrative Exhibit – Not Evidence

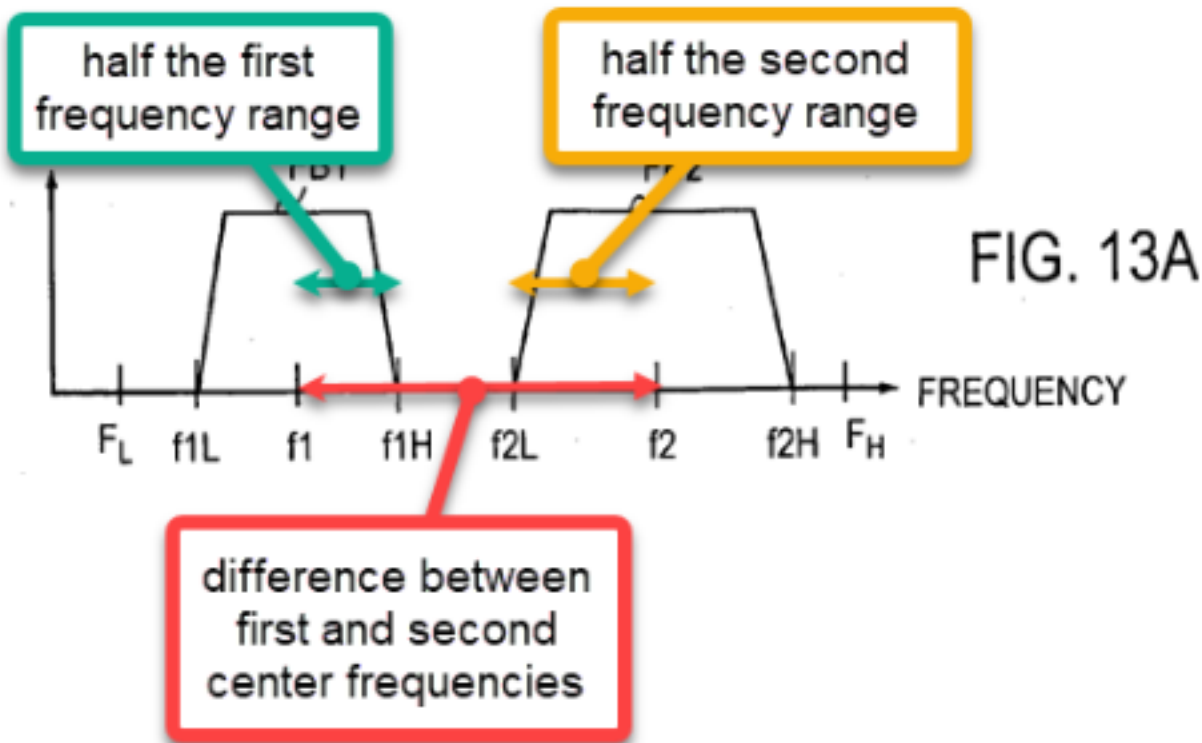
17. A wireless communication system comprising:

a first up-converter circuit having a first input coupled to receive the first analog signal and a second input coupled to receive a first modulation signal having a first RF frequency, wherein the first up-converter outputs a first up-converted analog signal comprising a first up-converted frequency range from the first RF frequency minus one-half the first frequency range to the first RF frequency plus one-half the first frequency range;

a second up-converter circuit having a first input coupled to receive the second analog signal and a second input coupled to receive a second modulation signal having a second RF frequency, wherein the second up-converter outputs a second up-converted analog signal comprising a second up-converted frequency range from the second RF frequency minus one-half the second frequency range to the second RF frequency plus one-half the second frequency range, and **wherein frequency difference between the first RF frequency and the second RF frequency is greater than the sum of one-half the first frequency range and one-half the second frequency range;**

Grounds 2-5 – Separate and Specific Frequency Ranges

Petitioner relies on Figure 13A



Pet. at 24-25, 40-41

Grounds 2-5 –Separate and Specific Frequency Ranges

- Figure 13A does not apply to Figure 8's embodiment and cannot not show frequency profile of Figure 8
 - Figure 8 is Suzuki's "fifth embodiment. Ex. 1004 [¶0069], POR at 16.
 - Figure 13A is Suzuki's "eighth embodiment. Ex. 1004 [¶0078-79], POR at 16.

Eighth Embodiment

[0078] 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. The frequency band controller 8 of the embodiment consists of a frequency band detector 8A and a frequency band setting unit 8B. The frequency band detector 8A consists of a mixer 8A1, a local oscillator 8A2, a sweep signal generator 8A3 and a low-pass filter (referred to as an LPF) 8A4.

[0079] The input transmitting signal S_T of the predistorter 100 is branched to the mixer 8A1 of the band controller 8 by the divider 9 of each of the abovementioned embodiments. The transmitting signal S_T is assumed to include signals in dual frequency bands FB1 and FB2 whose center frequencies are f_1 and f_2 as shown in FIG. 13A, for example. The

Ex. 1004 [0078]

INDEPENDENT CLAIMS 10 and 17

Grounds 6-9

Grounds 6-9 – Claims 10 and 17 – Power Amplifier

10. A method of transmitting information in a wireless communication channel comprising:

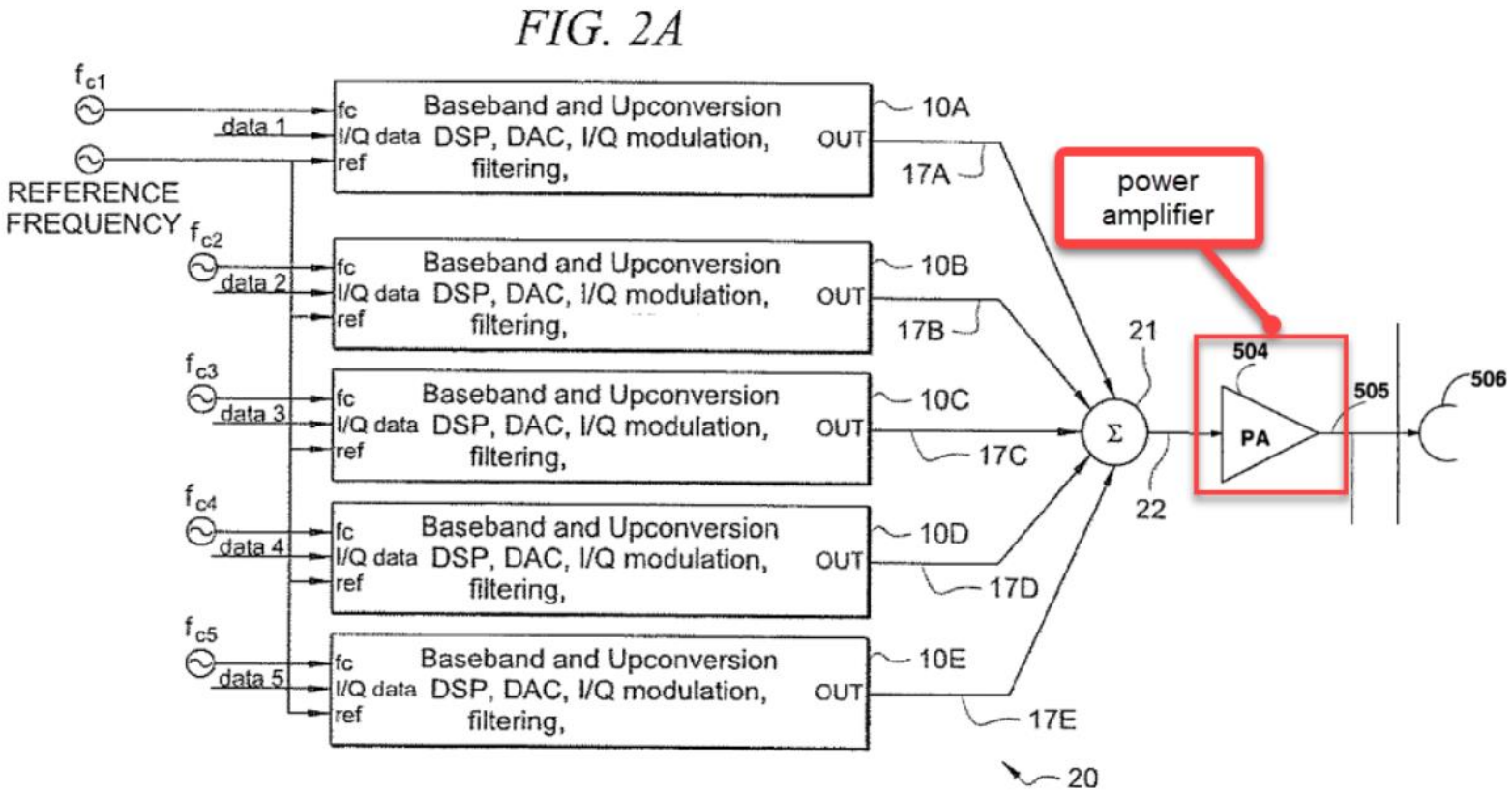
combining the first up-converted analog signal and the second up-converted analog signal to produce a combined up-converted signal;

amplifying the combined up-converted signal in a power amplifier resulting in an amplified combined up-converted signal;
and

17. A wireless communication system comprising:

a power amplifier coupled to receive the first and second up-converted analog signals,
wherein the bandwidth of the power amplifier is greater than the difference between a lowest frequency in the first up-converted frequency range and a highest frequency in the second up-converted frequency range

Petitioner relies on Fernandz/Montojo Combination



Pet. at 95-96

No Motivation for Fernandz/Montojo

Petitioner’s Evidence

[0005] Effective transmitter design for a multi-carrier terminal could embrace multiple power amplification circuits, each dedicated to one carrier and each including a power amplifier. However, limitations on space, manufacturing cost, power consumption and other factors dictate the need to share resources among the carriers, including power amplification circuitry. Accordingly, it would be advantageous to utilize a single power amplifier for transmission of a plurality of carriers transmitted by a multi-carrier terminal.

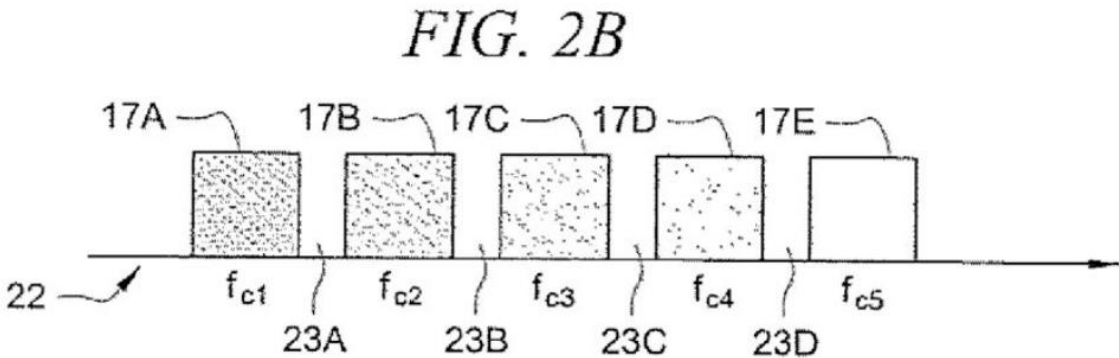
Pet. at 95, citing Ex. 1006 [0005]

Montojo’s Teaching

[0007] 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. For example, in a combined CDMA2000_1x/_CDMA2000_1xEV-DO wireless communication system, presume that the 1x carrier takes precedence in the allocation of transmitter power over the DO carrier in order to avoid degradation in the voice cell coverage. Because the 1x carrier has priority over the DO carrier, the only power limitations imposed on the 1x carrier other than the peak power of the power amplifier are battery capacity and spectrum emission control schemes to limit the transmit power of mobile stations. Therefore, if the DO carrier has lower priority than the 1x carrier, it would be desirable to allocate to the DO carrier only some portion of transmitter power not used by the 1x carrier. POR at 36, Ex. 1006 [0007]

No Motivation for Fernandez/Montojo

Fernandez – Equal Amplification



POR at 37-38, citing Ex. 2013 at ¶¶102-03; Ex. 1004 at [0008], Fig. 2B

Montojo – Priority Amp. and Transmission

power of mobile stations. Therefore, if the DO carrier has lower priority than the 1x carrier, it would be desirable to allocate to the DO carrier only some portion of transmitter power not used by the 1x carrier.

[0008] Furthermore, when the 1x and DO carriers are simultaneously transmitted, it would be desirable that the power of the multi-carrier waveform transmitted by the multi-carrier 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 operations of existing communication systems.

POR at 37-38, Ex. 1006 at [0006]-[0007]

Grounds 6-9 – Claims 10 and 17 – Power Amplifier

10. A method of transmitting information in a wireless communication channel comprising:

combining the first up-converted analog signal and the second up-converted analog signal to produce a combined up-converted signal;

amplifying the combined up-converted signal in a power amplifier resulting in an amplified combined up-converted signal;
and

17. A wireless communication system comprising:

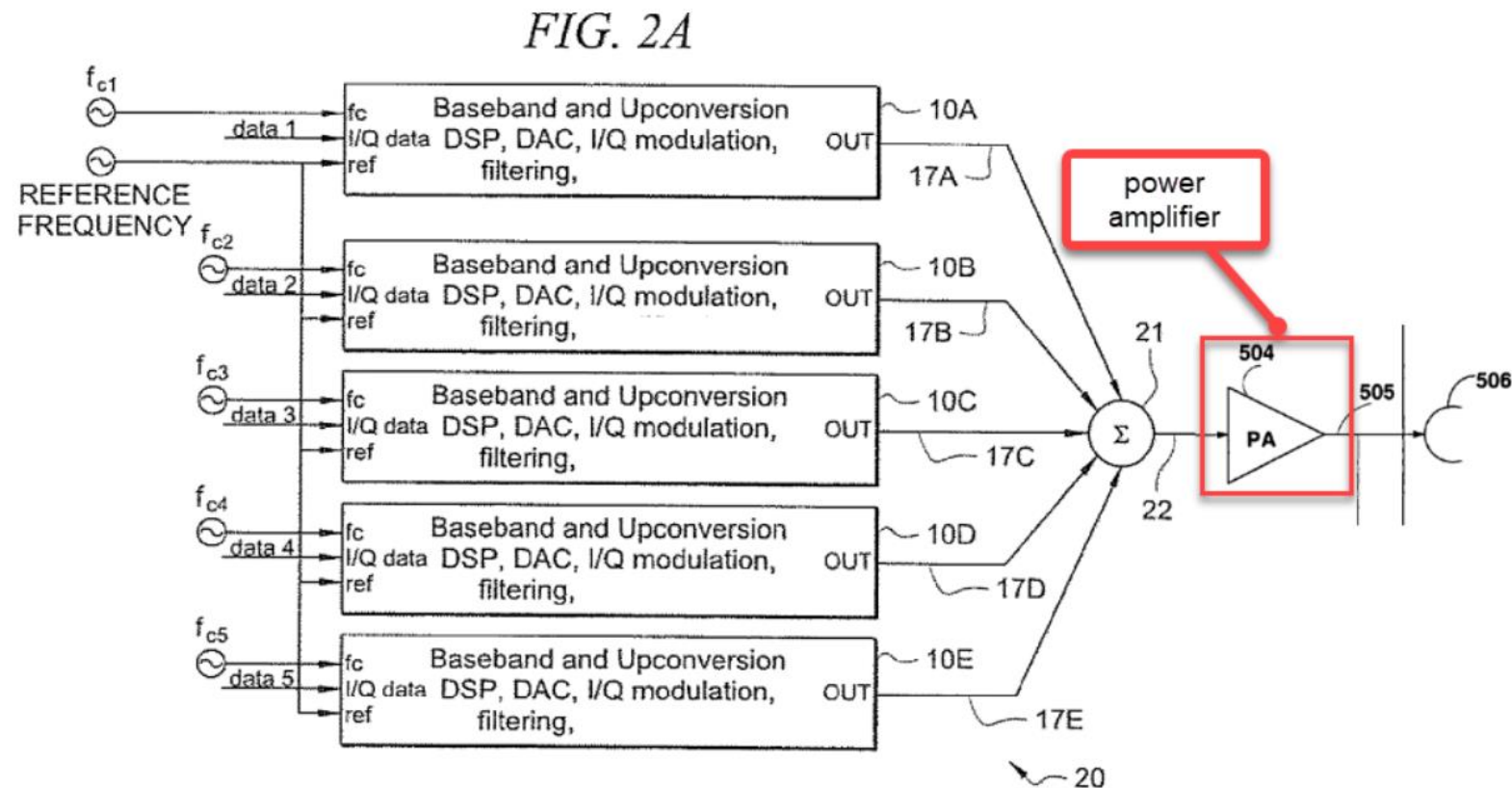
a power amplifier coupled to receive the first and second up-converted analog signals,
wherein the bandwidth of the power amplifier is greater than the difference between a lowest frequency in the first up-converted frequency range and a highest frequency in the second up-converted frequency range

No Motivation for Fernandez/Montojo

Claim Limitation	Corresponding Claim Limitation(s)
17a	10a. Fernandez further discloses a baseband digital system . Ex. 1005, ¶6 (“upconvert[] baseband signal[s]”), ¶11 (“general method is provided to increase a digitally synthesized signal's bandwidth by frequency interleaving multiple (i.e., at least 2) digitally synthesized signal sources of narrower bandwidth ”).
17b	10c
17c	10d
17d	10e
17e	10f
17f	10h

Pet. at 98

No Motivation for Fernandez/Montojo



Pet. at 95-96

17. 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;

Petitioner’s sole evidence regarding 17a

Claim Limitation	Corresponding Claim Limitation(s)
17a	10a. Fernandez further discloses a <i>baseband digital system</i> . Ex. 1005, ¶6 (“upconvert[] baseband signal[s]”), ¶11 (“general method is provided to increase a digitally synthesized signal's bandwidth by frequency interleaving <i>multiple (i.e., at least 2) digitally synthesized signal sources of narrower bandwidth</i> ”).

Pet. at 98

Petitioner's sole evidence regarding 17a

[0006] Standard notation for complex baseband and passband signals is as follows. The baseband signal is designated $x_c(t)$ and is referred to as the complex envelope. A passband signal is designated $x_z(t)$ and is the upconverted baseband signal.

$x_z(t)=x_1(t)+jx_Q(t)$, where $x_1(t)$ and $x_Q(t)$ are real signals.

$$x_c(t)=\sqrt{2}\cdot Re[x_z(t)\cdot e^{j2\pi f_c t}]$$

$$x_c(t)=\sqrt{2}\cdot [x_1(t)\cos(2\pi f_c t)-x_Q(t)\sin(2\pi f_c t)]$$

Ex. 1005 at [0006]

[0011] The present invention is directed to systems and methods which employ frequency interleaving for generating wideband signals. According to embodiments of the present invention, a general method is provided to increase a digitally synthesized signal's bandwidth by frequency interleaving multiple (i.e., at least 2) digitally synthesized signal sources of narrower bandwidth. Frequency interleaving creates a continuous wideband signal (i.e., one without holes, such as holes **23A-23D** in the exemplary multi-carrier signal **22** of FIG. **2B**) by summing multiple narrower band signals that overlap in frequency. According to certain embodiments, digital signal processing (DSP) and analog mixing are used to create the multiple narrower band signals such that a high fidelity, continuous wideband signal is produced when the multiple narrower band signals are summed.

Ex. 1005 at [0011]

Grounds 6-9 – Claim 17 – A Baseband Digital System

- “Standard notation for complex baseband and passband signals” = mathematical formula

+

- General discussion of frequency interleaving

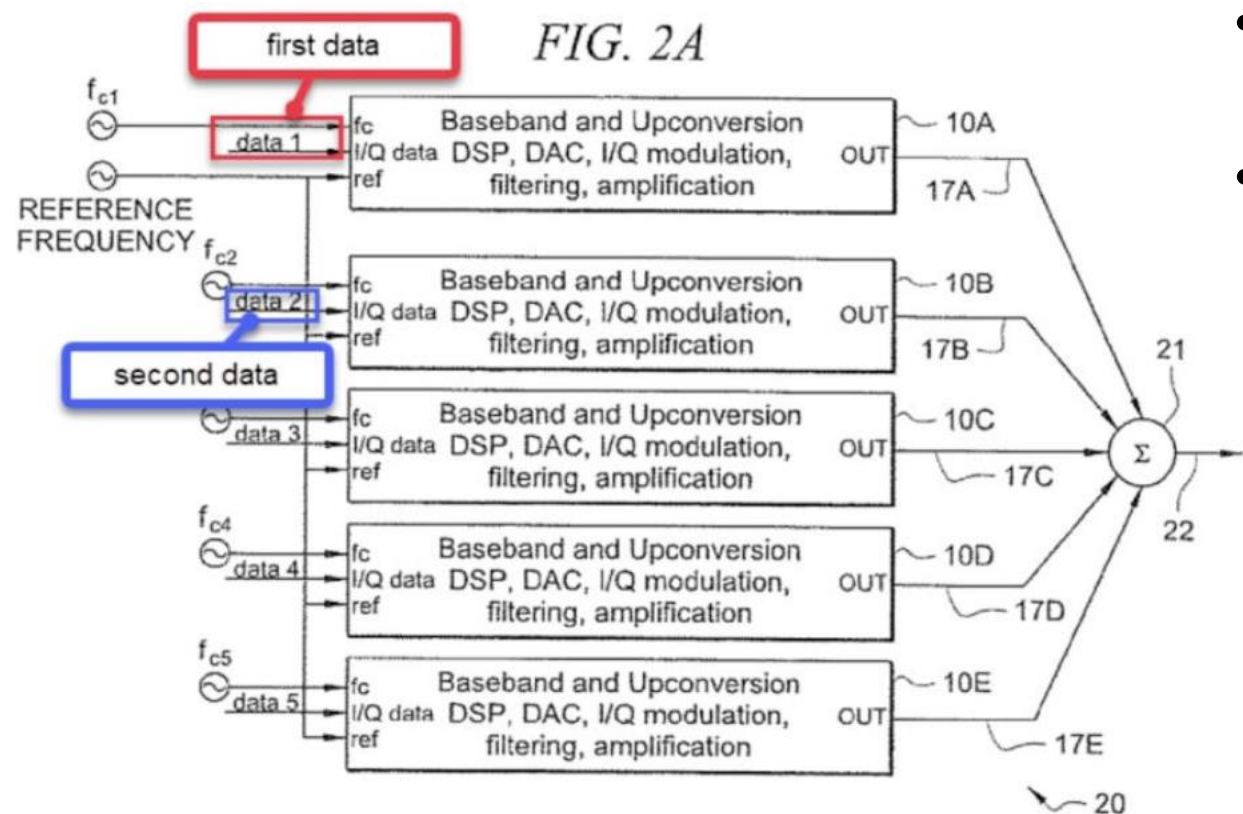
≠

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;

POR at 32-34, citing Ex. 2013 ¶¶110-113

Grounds 6-9 – Claim 17 – A Baseband Digital System

Evidence regarding 10a does not cure 17a deficiency



- Figure 2A does not show where "data 1" and "data 2" come from
- No discussion in 10a portion of petition of "a baseband digital system" sending first and second signal containing first and second information.

POR at 33, citing Ex. 2013 at ¶¶111-113

Pet. at 88

INDEPENDENT CLAIM 24

Grounds 4 and 8

24. An electronic circuit comprising:

a first down-converter circuit having a first input coupled to receive a first up-converted signal, a second input coupled to receive a first demodulation signal having a first RF frequency, and an output, wherein the first down-converter circuit outputs a first down-converted signal on the first down-converter output;

a second down-converter circuit having a first input coupled to receive the first up-converted signal, a second input coupled to receive a second demodulation signal having a second RF frequency different than the first RF frequency, and an output, wherein the second down-converter outputs a second down-converted signal on the second down-converter output, wherein the first up-converted signal comprises a first signal modulated at the first RF frequency and a second signal modulated at the second RF frequency; and

a filter having an input coupled to the output of the first down-converter and the output of the second down-converter, and in accordance therewith, **the filter receives the first and second down-converted signals.**

Petitioner's Mapping of Chen

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; Ex. 1003, ¶220.

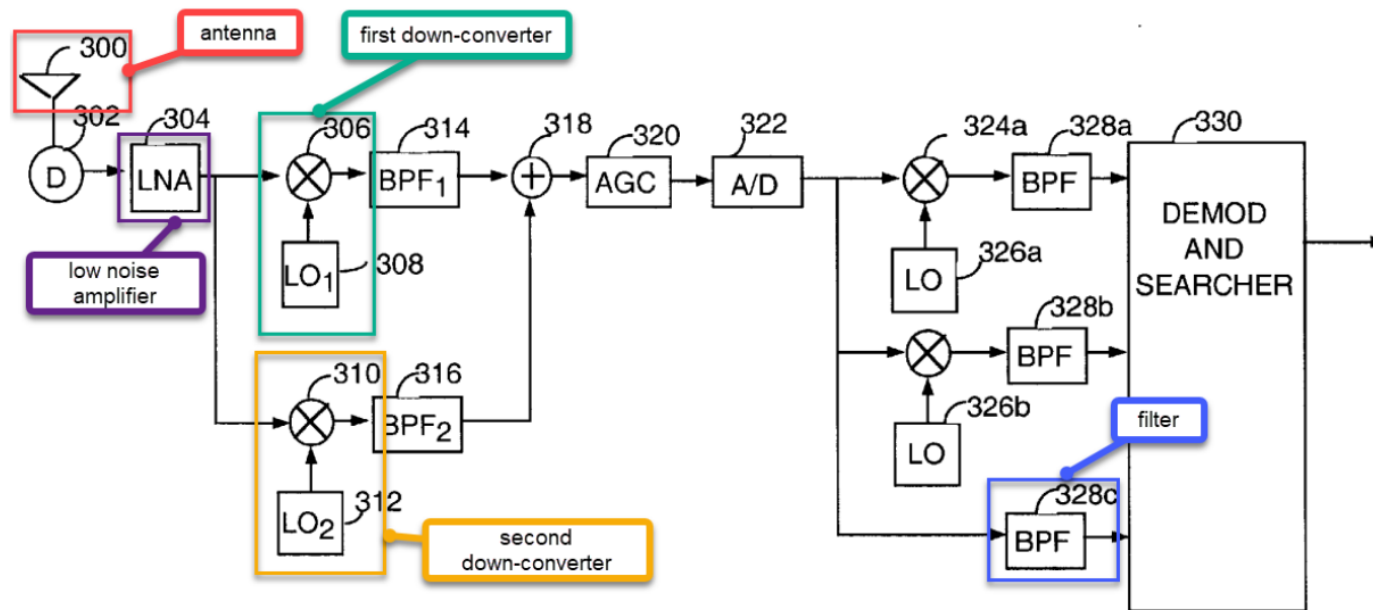
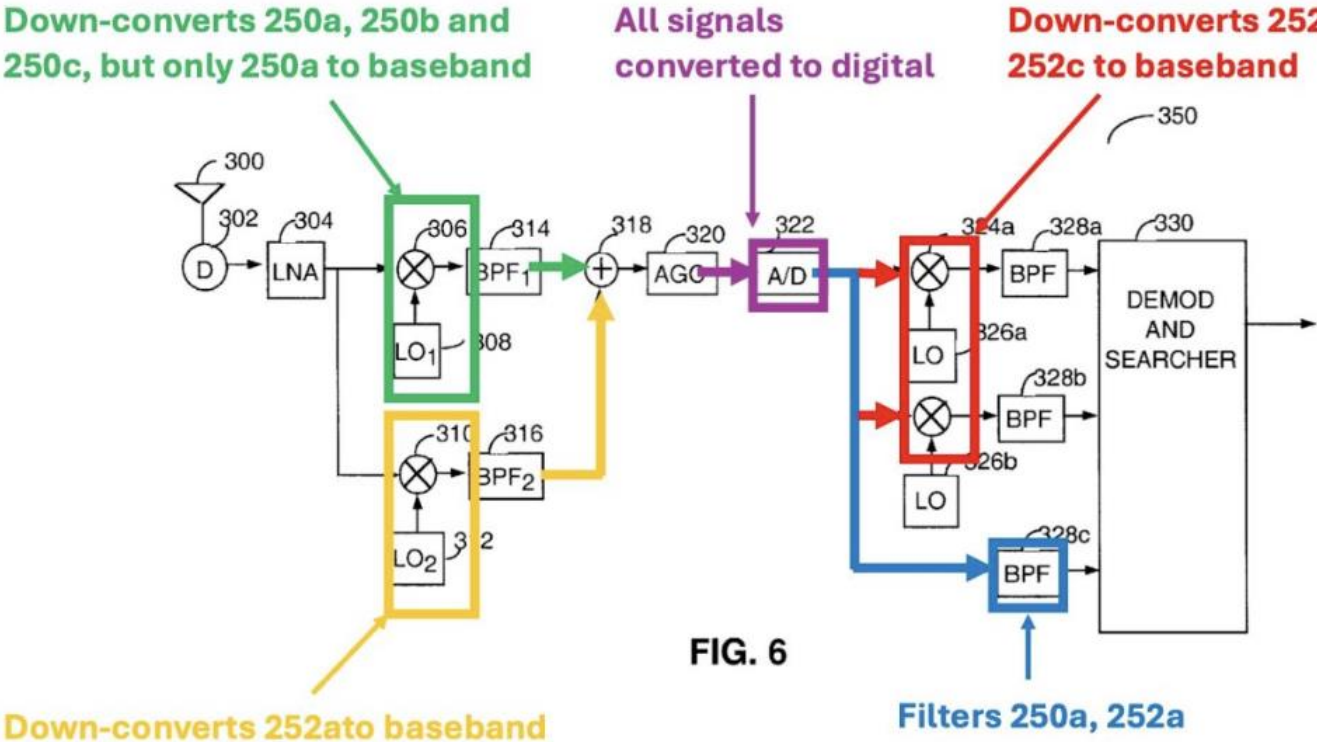


FIG. 6

Petitioner’s Mapping of Chen Is Wrong

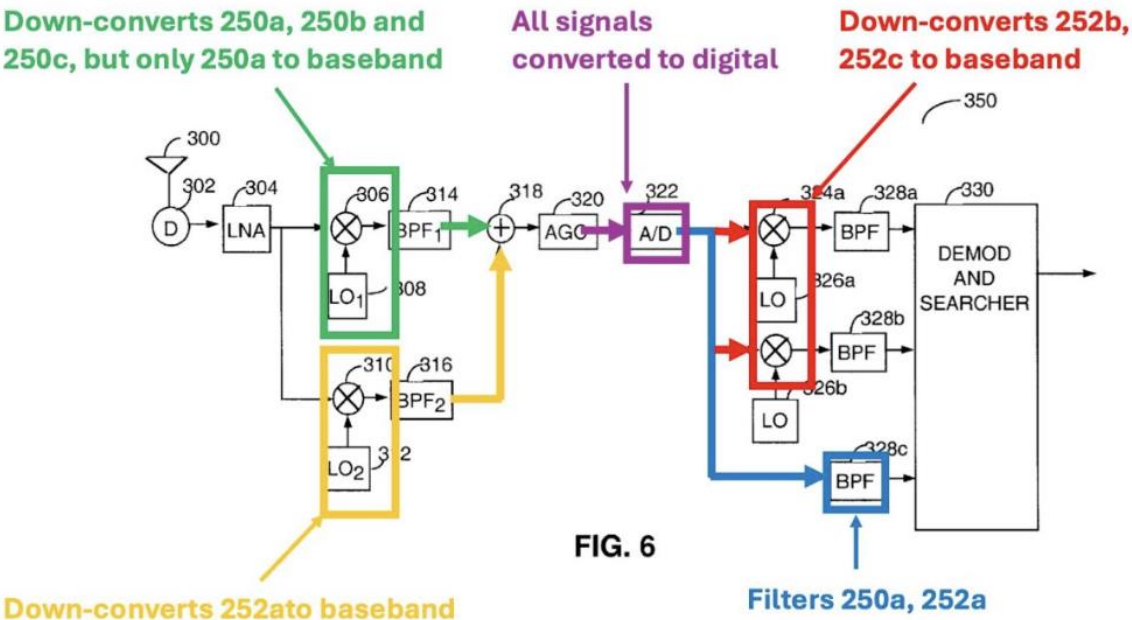


- Not all signals down-converted to baseband
- Not all signals passed directly to Filter 328c
- Not the same signal received at Filter 328c

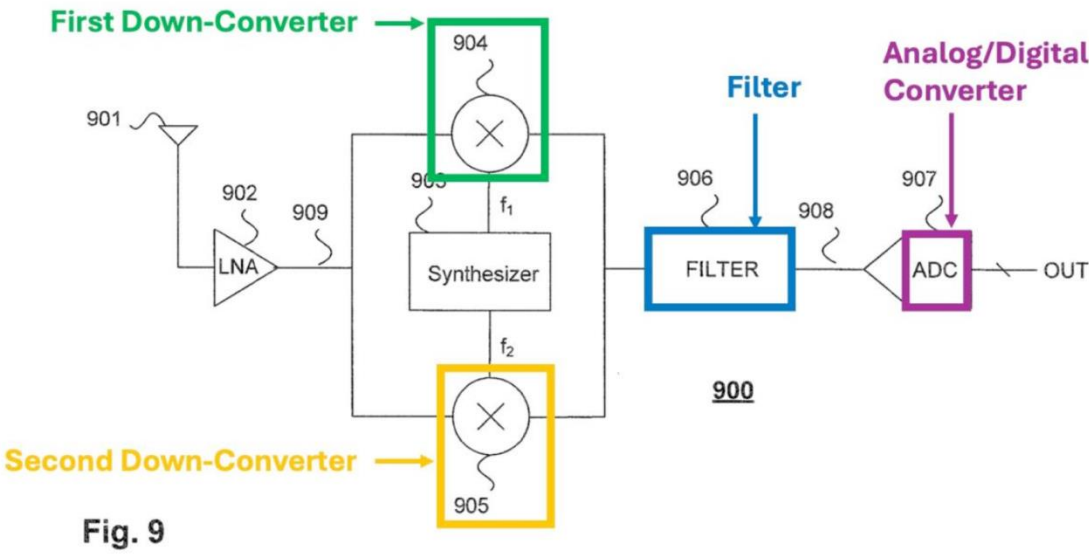
POR at 22-29, citing Ex. 2013 at ¶¶ 76-85

Petitioner’s Mapping of Chen is Wrong

Chen Fig. 6

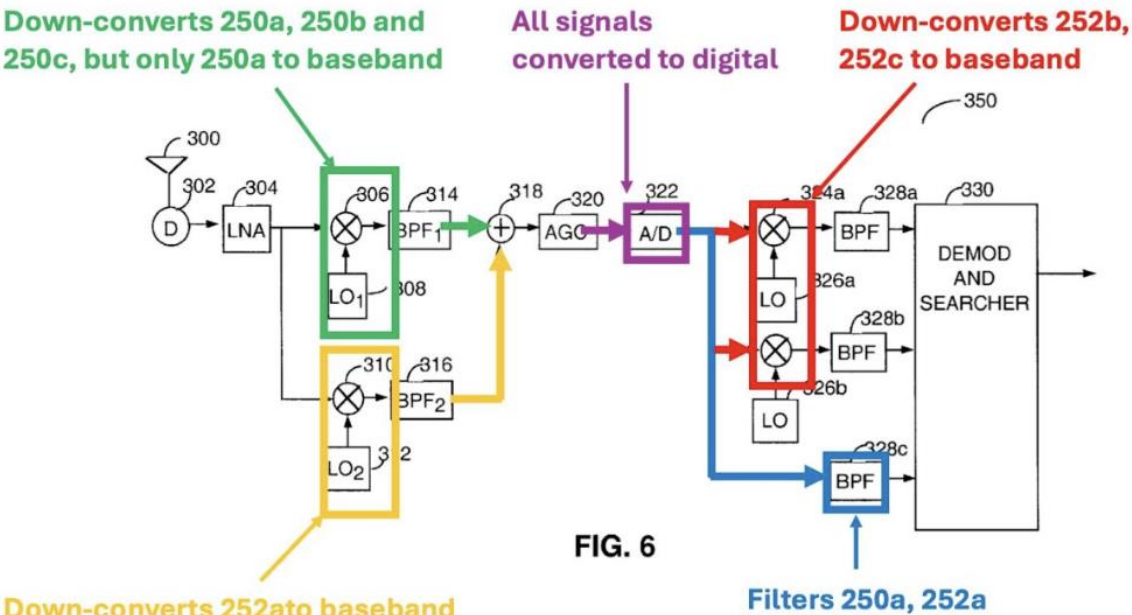


'802 Patent Fig. 9



Petitioner’s Mapping of Chen is Wrong

Chen Fig. 6



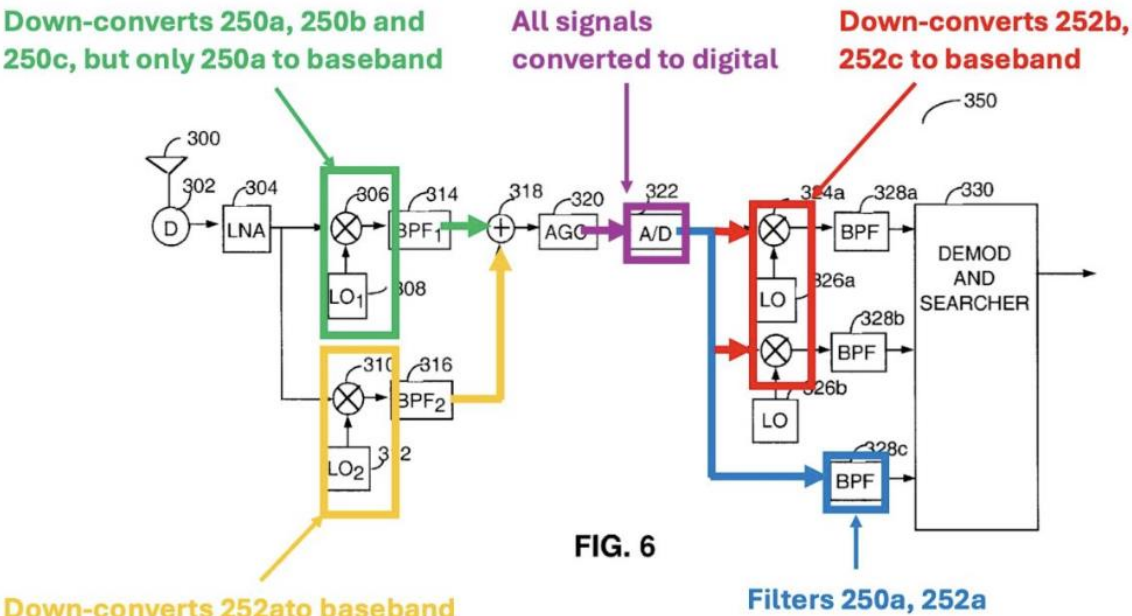
Signals **250a, 250b, 250c** and **252a** are received at antenna **300** and provided through duplexer **302** to low noise amplifier (LNA) **304**. The amplified signal is provided to mixer **306**. Mixer **306** down converts the signal in accordance with a signal provided by local oscillator **308** which brings the 5 MHz band consisting of carriers **250a, 250b** and **250c** down to a MHz wide baseband signal. The down converted signal is low pass filtered by filter (BPF₁) **314** which is a low pass filter with a 5 MHz pass band. The received signal is also provided to downconverter **310** which brings the signal carried on carrier **252a** down to base band. The down converted signal is low pass filtered by filter (BPF₂) **316** which is a low pass filter with a 1.23 MHz pass band.

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 downcon-

Ex. 1009 at 13:60-14:11

Petitioner’s Mapping of Chen is Wrong

Chen Fig. 6



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. The signals 250a and 252a act as interference to one another in the demodulation process but given sufficient coding and spreading gain, both the signals can be demodulated. In the present context of searching, it more often than not be the case that no signal is found and in that case the signal degradation will be minimum.

Ex. 1009 at 14:11-20

INDEPENDENT CLAIM 1

Grounds 1, 2, and 6

"Information" in Claim 1

What is claimed is:

1. A method of transmitting information in a wireless communication channel comprising: 60
transmitting first information across a first frequency range using a wireless transmitter, the first frequency range having a first center frequency, a first highest frequency, and a first lowest frequency; and
simultaneously transmitting second information across a 65
second frequency range using the same wireless transmitter, the second frequency range having a second center frequency greater than the first center frequency, a second highest frequency, and a second lowest frequency.

- A method of transmitting information that includes
 - Transmitting "first information"
 - Simultaneously transmitting "second information"
- First and second information are part of "information"

The Claimed "Information" in the '802 Patent

— In one embodiment, first information and second information comprise a plurality of OFDM symbols, wherein a first symbol is transmitted during a first time slot across the first frequency range and a second symbol is transmitted during the first time slot across the second frequency range, and

Ex. 1001 at 2:16-20, POR at 3

In one embodiment, the first information corresponds to a first wireless protocol and the second information corresponds to a second wireless protocol.

In one embodiment, the first information and the second information are the same data transmitted across two different frequencies.

In one embodiment, the first information and the second information are produced from the same data stream using coding or data mapping.

Ex. 1001 at 2:36-44, POR at 3-4

- In each example, first and second information are related and part of collective information

The Claimed "Information" in the '802 Patent

Petitioner's Citation

mitter 800, for example, including signals 911 and 912. In this example, the signals 911 and 912 carry the same information (data). For example, signal 911 may be an analog signal

Ex. 1001 at 11:30-32, Pet. Reply at 4

- Question is not just what information means, but what is "first information" and "second information" as claimed
- Single example cited by Petitioner does not erase relationship between first and second information or that they are part of single, organized, collective information

The Claimed "Information" in the '802 Patent

Context of Petitioner's Citation

FIG. 9 illustrates a wireless communication receiver according to one embodiment of the present invention. System 900 includes an antenna 901, low noise amplifier 902 (LNA), a down-converter 404, a down-converter 905, a synthesizer 903, a filter 906, and an analog-to-digital converter (ADC) 907. Frequency content 910 may be transmitted as an electromagnetic signal described above and received by antenna 901. The electromagnetic signal received by antenna 901 may include an up-converted analog signal from transmitter 800, for example, including signals 911 and 912. In this example, the signals 911 and 912 carry the same information (data). For example, signal 911 may be an analog signal up-converted to a first RF frequency, and signal 912 may be the same analog signal up-converted to a second RF frequency. A low noise amplifier 902 has an input coupled to antenna 901 to receive the up-converted RF signals, and outputs an amplified up-converted signal on line 909. In a differential system, line 909 may be two signal lines (e.g., a

Petitioner's Ground 1 Rick Mapping

(a) 1a

“Transmitting first information across a first frequency range using a wireless transmitter”: Rick discloses “transmission of N CDMA signals,” each of which “may carry any type of data for any service.” Ex. 1021, 3:19, 3:35-36 (disclosing $N > 1$). The data for one of the CDMA signals is a ***first information***. Ex. 1000 ¶¶88-89. **Pet. at 13**

“Simultaneously transmitting second information across a second frequency range using the same wireless transmitter”: The “second information” is shown in Rick in Fig. 2, annotated below—it is either the CDMA data on channel 2, or the CDMA data on channel N (Ex. 1003, ¶¶88-89): **Pet. at 15**

Petitioner's Ground 2 Suzuki Mapping

Suzuki states the predistorter output is formed by combining (at combiner 14) predistorted signals from adders 13-1 and 13-2. Ex. 1004, ¶45. Thus, one of the predistorted signals is the *first information*. Ex. 1003, ¶99.

Pet. at 19

The predistorter output combines two predistorted signals from adders 13-1 and 13-2, one of which is the first information and the other is the *second information*. Ex. 1004, ¶45. Each predistorted signal is transmitted on a frequency

Pet. at 21

Petitioner's Ground 6 Fernandez Mapping

Fernandez discloses multiple “signal generators” that receive “data” as input.

Ex. 1005, ¶8; Fig. 2A. In Figure 2A, “data 1” is the *first information*. The signal

Pet. at 80

Fernandez discloses “data 2” (*second information*) is converted into “RE signal[] 17B” (*second frequency range*) as part of “the multi-carrier wireless signal 22.” Ex. 1005, ¶8; Fig. 2A; Ex. 1003, ¶¶242-43.

Pet. at 81

All Grounds Fail as to "Information" in Claim 1

What is claimed is:

1. A method of transmitting information in a wireless communication channel comprising: 60
transmitting first information across a first frequency range using a wireless transmitter, the first frequency range having a first center frequency, a first highest frequency, and a first lowest frequency; and
simultaneously transmitting second information across a 65
second frequency range using the same wireless transmitter, the second frequency range having a second center frequency greater than the first center frequency, a second highest frequency, and a second lowest frequency.

- Petitioner only identifies generation of random signals or data
- Petitioner never identifies information that is transmitted where there is a first and second part of the information transmitted simultaneously
- Reply does not cure this deficiency

DEPENDENT CLAIMS

Grounds 2-9

No Evidence as to Claim 25

D. Ground 4: Claims 14 and 24-25 are obvious over Suzuki and Chen

Independent Claims 1, 10, and 17 are directed to generating and transmitting a multi-carrier signal. By contrast, Claims 14 and 24 are directed to receiving and processing said signal using a conventional low-noise amplifier (claim 14), down-converters (claims 14 and 24), and a filter (claim 24). Chen describes a receiver with such components, and a POSITA would have found it obvious to combine Suzuki's transmitter with Chen's receiver. Ex. 1003, ¶186. For Claim 25, *see* Ground 2, Claim 2. *Id.*

Pet. at 57

No Evidence as to Claim 25

H. Ground 8: Claims 14 and 24-25 are obvious over Fernandez, Montojo and Chen

As discussed in Ground 4, Chen describes a receiver that processes multi-carrier wireless transmissions as claimed by claims 14 and 24. The discussion in Ground 4 with respect to Suzuki equally applies to Fernandez's data and frequency ranges. Ex. 1003, ¶298. And it would have been obvious to combine the Fernandez- Montojo transmitter with Chen's receiver for the same reasons discussed in Ground 4, including the benefits (and necessity) of conventional low noise amplifier, downconverters, and filter claimed in claims 14 and 24, and that this process is disclosed throughout the literature. Ex. 1003, ¶¶299. For Claim 25, see Ground 6, Claim 2. *Id.*

Pet. at 101

Grounds 4 and 8 – Claim 25

25. The communication system of claim 24 wherein first signal has a first frequency range and the second signal has a second frequency range, and wherein the frequency difference between **the first RF frequency** and the **second RF frequency** is greater than the sum of one-half the first frequency range and one-half the second frequency range.

2. The method of claim 1 wherein frequency difference between **the first center frequency** and the **second center frequency** is greater than the sum of one-half the first frequency range and one-half the second frequency range.

No Evidence as to Claim 25

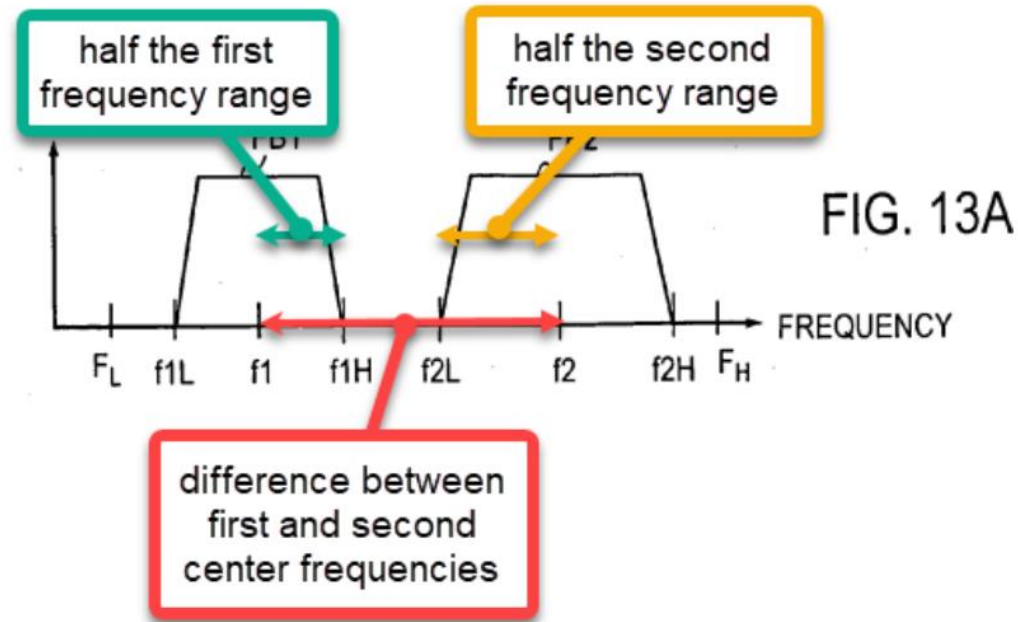
2. Claim 2

A POSITA would understand the additional limitation of claim 2 requires the first and second frequency ranges are not overlapping. Ex. 1003, ¶111.

The below annotated Figure 13A illustrates how this limitation is met by Suzuki. The length of the red arrow (the difference between first and second center frequencies) is greater than the length of the green and orange arrows combined (the sum of one half of each of the two frequency ranges). Ex. 1003, ¶112.

Pet. at 24

No Evidence as to Claim 25



Suzuki teaches f_1 and f_2 are the true centers of their respective frequency ranges. Ex. 1004, ¶80; Ex. 1003, ¶113

Pet. at 25

Grounds 4 and 8 – Claim 25

24. An electronic circuit comprising:
a first down-converter circuit having a first input coupled to receive a first up-converted signal, a second input coupled to receive a first demodulation signal having a first RF frequency, and an output, wherein the first down-converter circuit outputs a first down-converted signal on the first down-converter output;
a second down-converter circuit having a first input coupled to receive the first up-converted signal, a second input coupled to receive a second demodulation signal having a second RF frequency different than the first RF frequency, and an output, wherein the second down-converter outputs a second down-converted signal on the second down-converter output, **wherein the first up-converted signal comprises a first signal modulated at the first RF frequency and a second signal modulated at the second RF frequency**; and
a filter having an input coupled to the output of the first down-converter and the output of the second down-converter, and in accordance therewith, the filter receives the first and second down-converted signals.

25. The communication system of claim 24 wherein **first signal** has a first frequency range and the **second signal** has a second frequency range, and wherein the frequency difference between the first RF frequency and the second RF frequency is greater than the sum of one-half the first frequency range and one-half the second frequency range.

1. A method of transmitting information in a wireless communication channel comprising:
transmitting **first information across a first frequency range** using a wireless transmitter, the first frequency range having a first center frequency, a first highest frequency, and a first lowest frequency; and
simultaneously transmitting **second information across a second frequency range** using the same wireless transmitter, the **second frequency range having a second center frequency greater than the first center frequency, a second highest frequency, and a second lowest frequency**.

2. The method of claim 1 wherein frequency difference between the first center frequency and the second center frequency is greater than the sum of one-half the first frequency range and one-half the second frequency range.