

IPR2024-00868

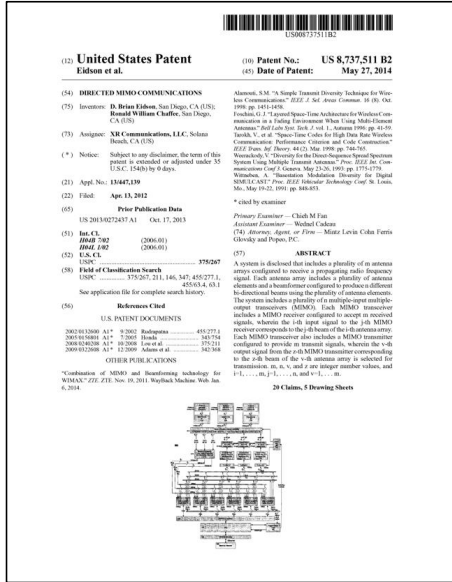
*Ericsson Inc., Nokia of America Corp. v.
XR Communications LLC*

U.S. Patent No. 8,737,511

Patent Owner's Demonstratives

Hearing: Sept. 24, 2025

'511 Patent, Claim 1

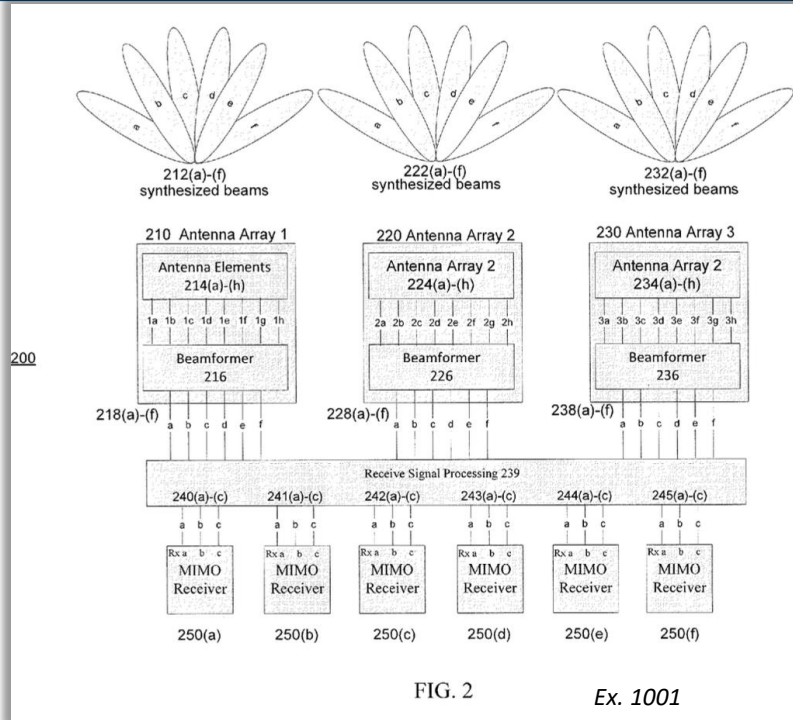


Ex. 1001

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

1. A system comprising:
m antenna arrays configured to receive a propagating radio frequency signal and configured to transmit a propagating radio frequency signal, each of the antenna arrays comprising:
a plurality of antenna elements; and
a beamformer configured to produce n different bi-directional beams using the plurality of antenna elements; and
n multiple-input multiple-output transceivers (MIMO), each MIMO transceiver comprising:
a MIMO receiver configured to process m different received signals, wherein an i-th received signal to a j-th MIMO receiver corresponds to a j-th beam of an i-th antenna array; and
a MIMO transmitter configured to process m different transmit signals, wherein a v-th transmit signal from a z-th MIMO transmitter corresponds to a z-th beam of a v-th antenna array,
wherein m, n, v, and z are integer number values, wherein $i=1, \dots, m$, $j=1, \dots, n$, and $v=1, \dots, m$, wherein $n \geq 2$ and $m \geq 2$, wherein $z=1, \dots, w$, and wherein $n \geq w \geq 2$.

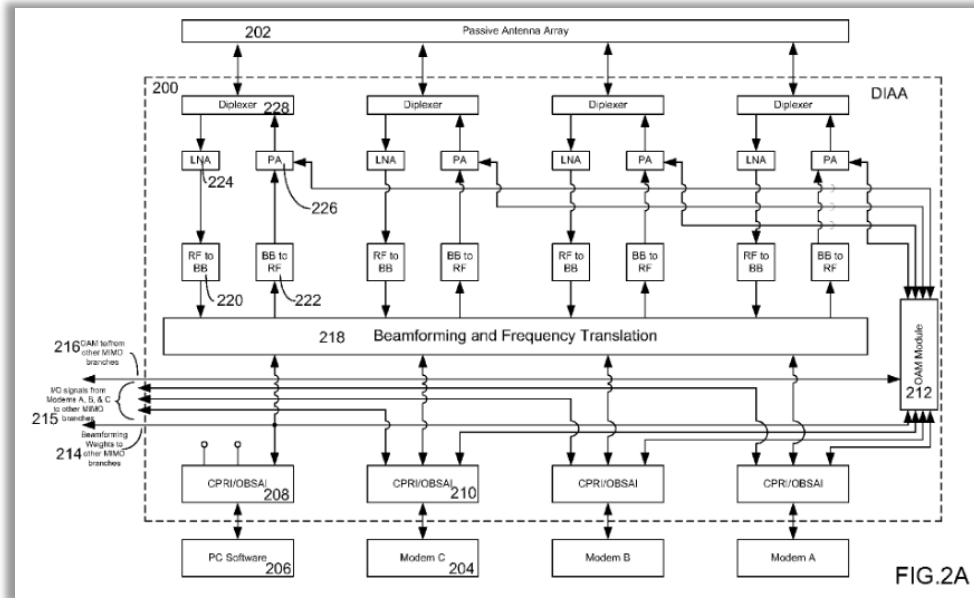
'511 Patent, Fig. 2



DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Trigui Fig. 2

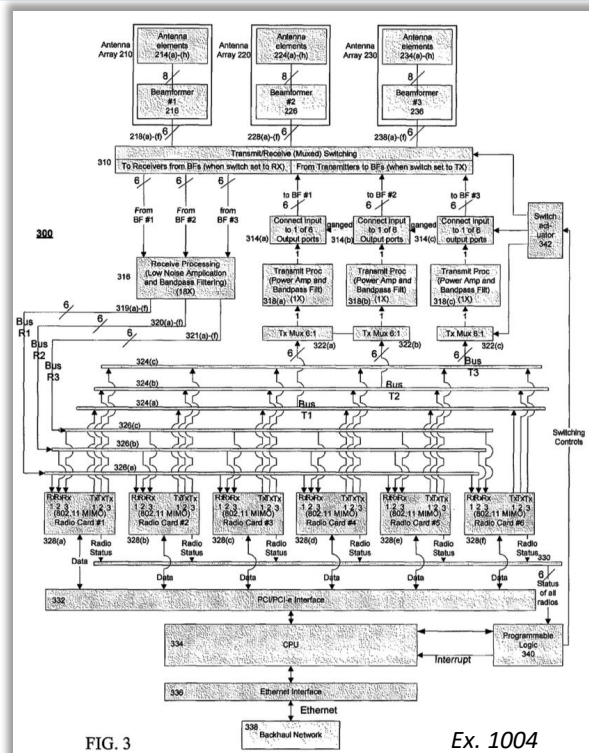


Ex. 1004

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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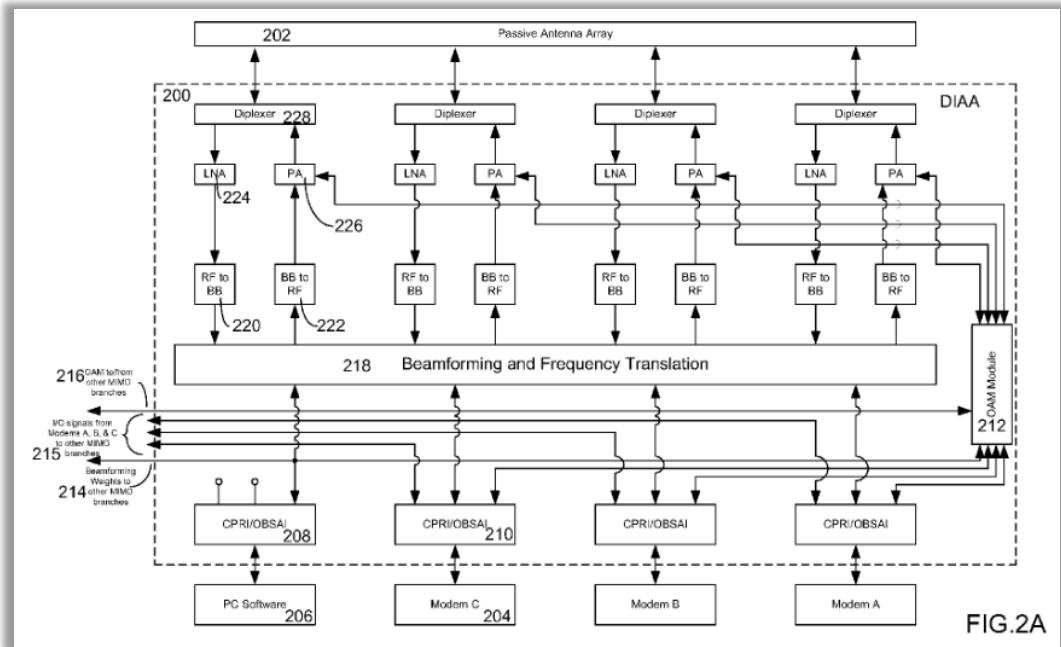
Trigui Fig. 3



DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Trigui Fig. 2A

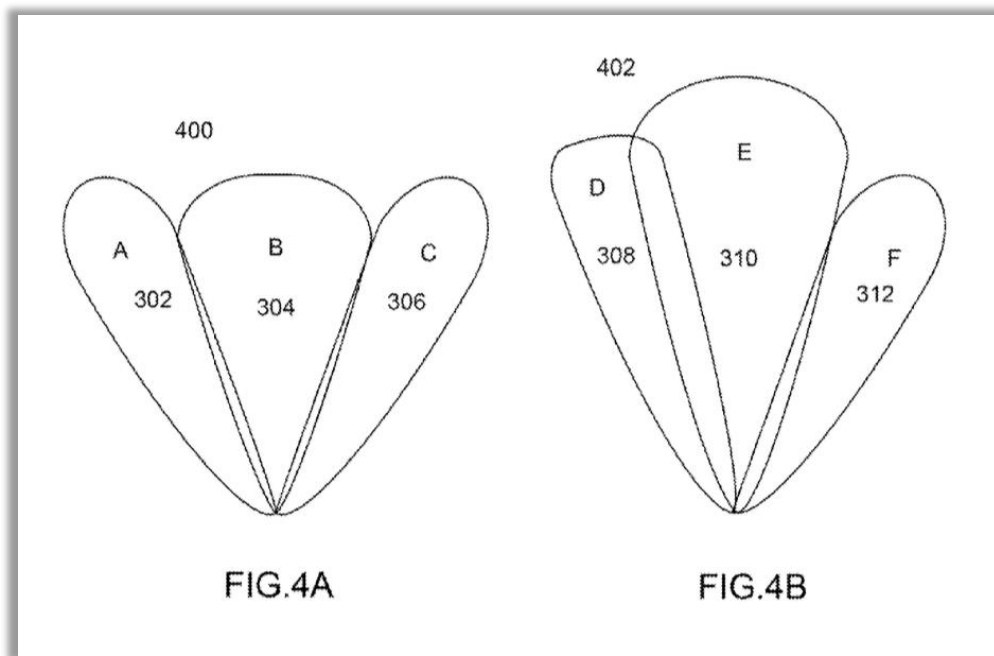


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Trigui Figs. 4A, 4B



Ex. 1004

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Trigui Fig. 6

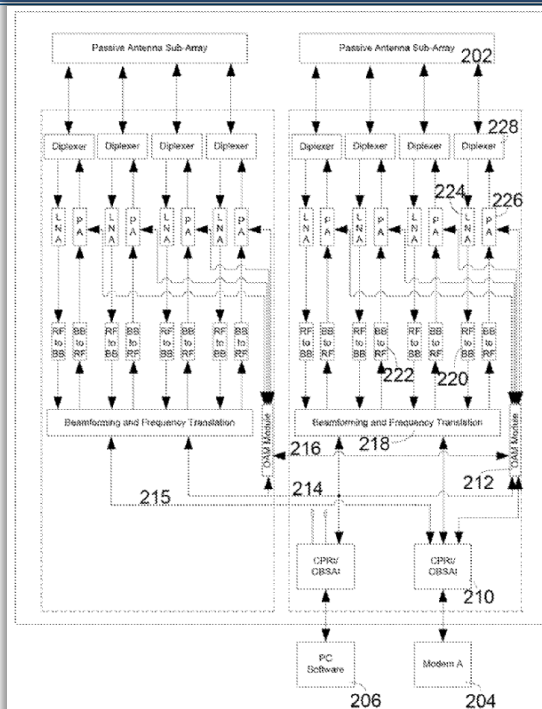
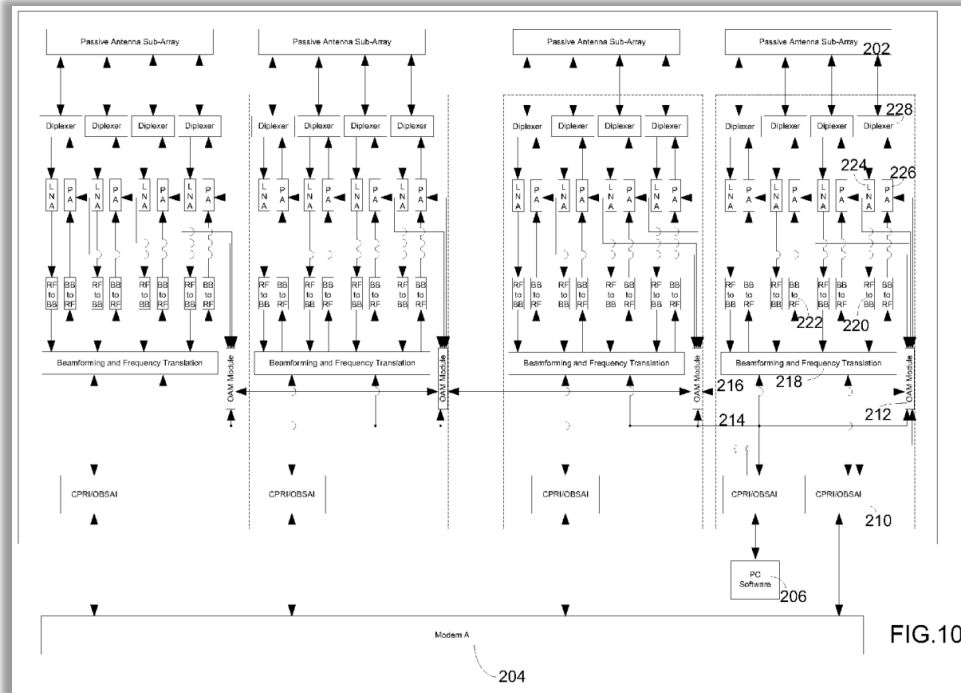


FIG.6

Ex. 1004

Trigui Fig. 10



DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Ex. 1004

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Trigui – Each Modem Connected to All Branches

Petition's Quotation:

stations[.]” Ex-1004, [0036]-[0037]. Trigui states that the “I/Q signals 215 from any of the modems, as well as the beamforming weights 214, can be sent to the other MIMO branches” for transmission. Ex-1004, [0041]; Fig. 2A; Ex-1003, ¶¶219-220. This is shown in the signals leaving Figure 2A to the left (which are highlighted in the annotation).

Pet. at 34; Sur-reply at 5-6

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Trigui – Each Modem Connected to All Branches



Prof. Kevin Negus
Petitioner's Expert

220. Consistent with annotated FIG. 2A shown above, Trigui teaches that “one or more modems 204, such as, for example, baseband modules of cellular base stations, are connected via one or more fiber optic interfaces, respectively, to one or more digital interface cores 208, 210 within the DIAA 200” and further that “Although FIG. 2A illustrates only a single MIMO branch DIAA, the present invention contemplates the use of multiple MIMO branches” and accordingly, “I/Q signals 215 from any of the modems, as well as the beamforming weights 214, can be sent to other MIMO branches” (see, for example, ¶¶ 105 and 107 above). In my opinion, this disclosure

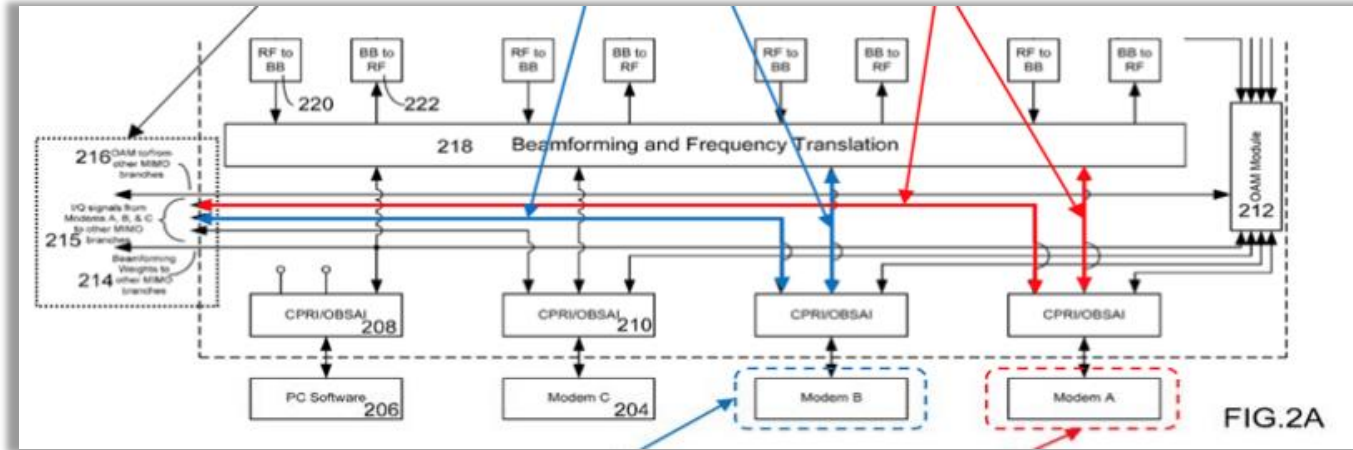
Ex. 2003 ¶ 220 (cited, Pet. at 34); Sur-reply at 5-6

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Trigui – Each Modem Connected to All Branches

Petition's Annotation

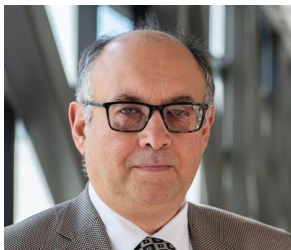


Ex. 1004; Pet. at 35 (excerpt); Sur-reply 4-6

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Trigui – Each Modem Connected to All Branches



Prof. Todor Cooklev
Patent Owner's Expert

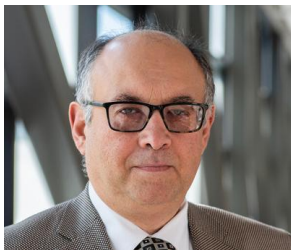
123. These two “ways” that the Petitioners are trying to create are inflexible and incompatible with the teachings of Trigui. Trigui teaches flexibility, which is achieved by connecting the modem in Figure 10 to all four subarrays of the DIAA. Further, these two ways are incompatible with Figure 10 because the figure shows four identical MIMO branches and a separate OBSAI/CPRI interface

Ex. 2003 ¶ 123; Sur-reply at 5

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Trigui – Each Modem Connected to All Branches



Prof. Todor Cooklev
Patent Owner's Expert

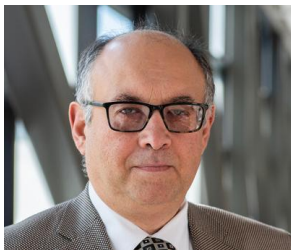
to every branch. The IQ samples received on that interface are aimed for that branch. Because there is separate, dedicated interface to each branch, none of these “direct-connect” and “cross-connect” techniques, is correct. Again, modem A (the only modem shown in Figure 10) is connected to all four branches. Consequently, the “two ways” that Dr. Negus has created are not shown in Figure 10, and, more significantly, cannot be made to be shown because they contradict the Trigui reference. The annotation of Dr. Negus is unsupported.

Ex. 2003 ¶ 123; Sur-reply at 5

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Trigui – Each Modem Connected to All Branches



Prof. Todor Cooklev
Patent Owner's Expert

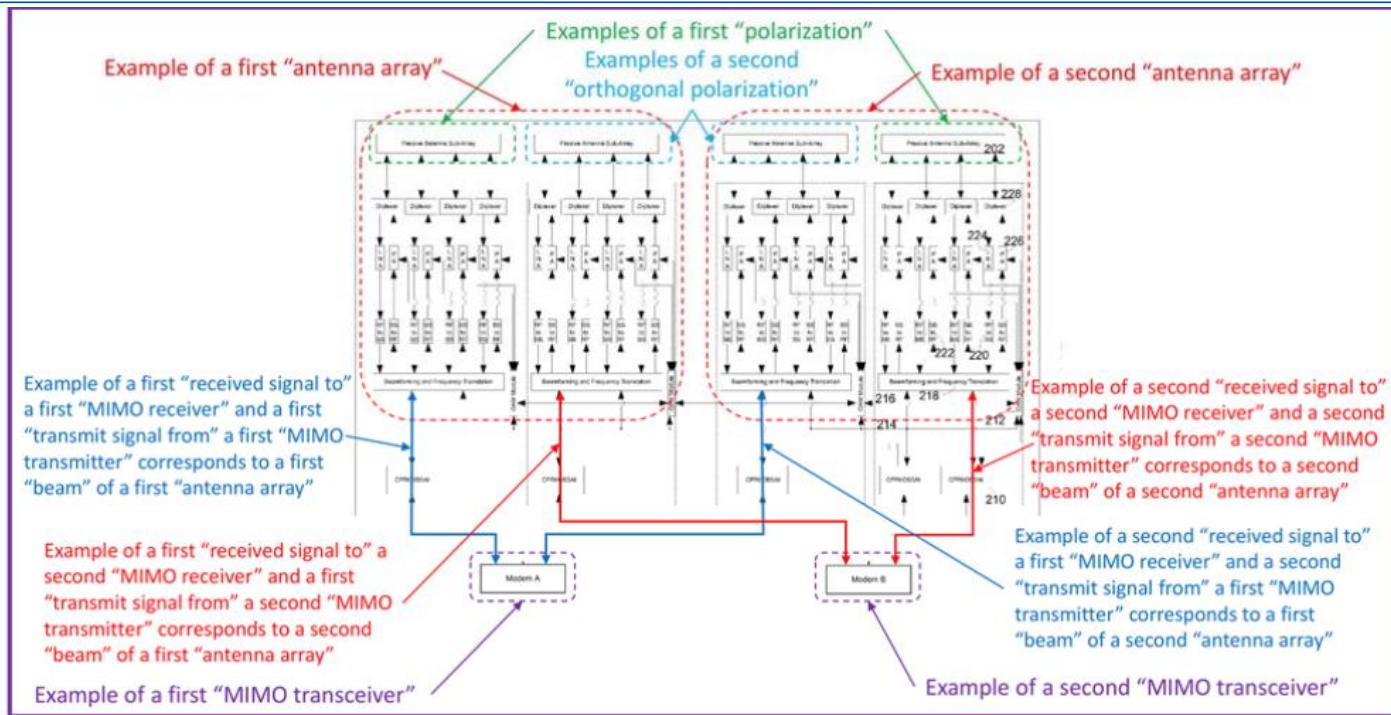
124. Dr. Negus seems to argue that, if there is sharing with a second operator, the 1st and the 3rd branches would be exclusively devoted to the first operator, and the 2nd and the 4th to the second operator. I disagree. This type of sharing would reduce the number of branches to which an operator can connect, based on the presence of other operators. A POSITA would have understood that that type of sharing is not attractive and even not viable given the OBSAI/CPRI interface to every branch.

Ex. 2003 ¶ 124; Sur-reply at 5

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Trigui – Petitioner’s Modification, Removing Connections

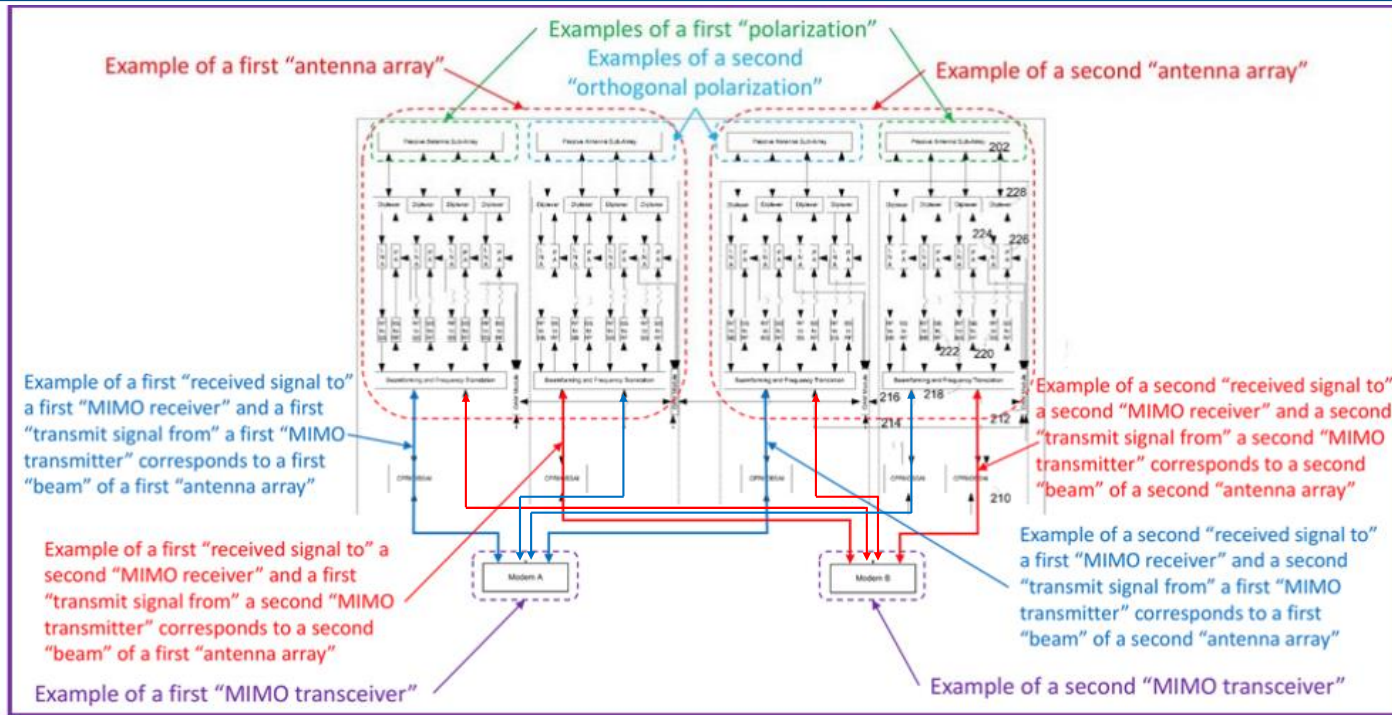


DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Ex. 1004; Ex. 1003 ¶¶ 251-235; Pet. at 39 (excerpt); Sur-reply 4-6

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Trigui – Each Modem Connected to All Branches

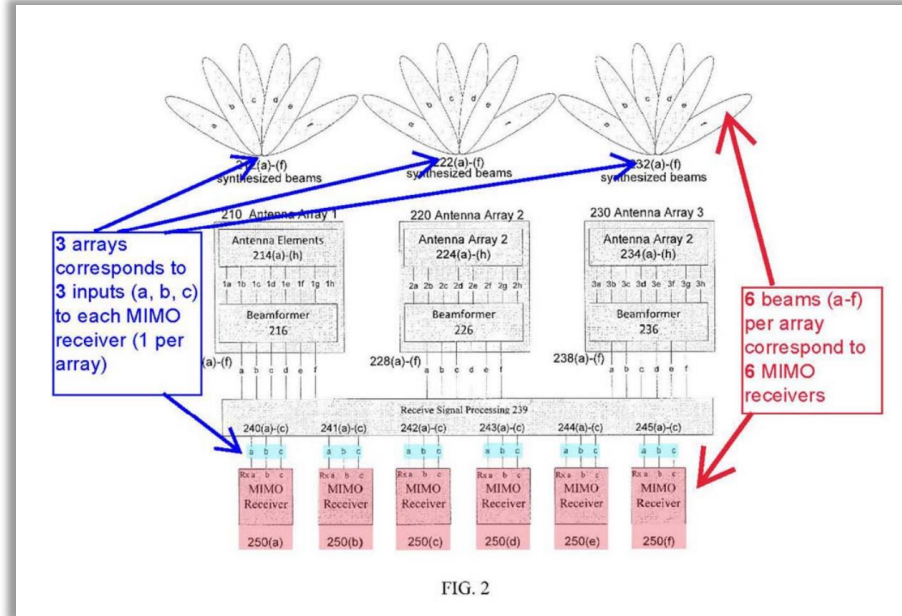


DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Ex. 1004; Ex. 1003 ¶¶ 251-235; Pet. at 39 (further annotated); Sur-reply 4-6 17

'511 Patent Teaches One Input Per Array

Petitioner's Annotation:



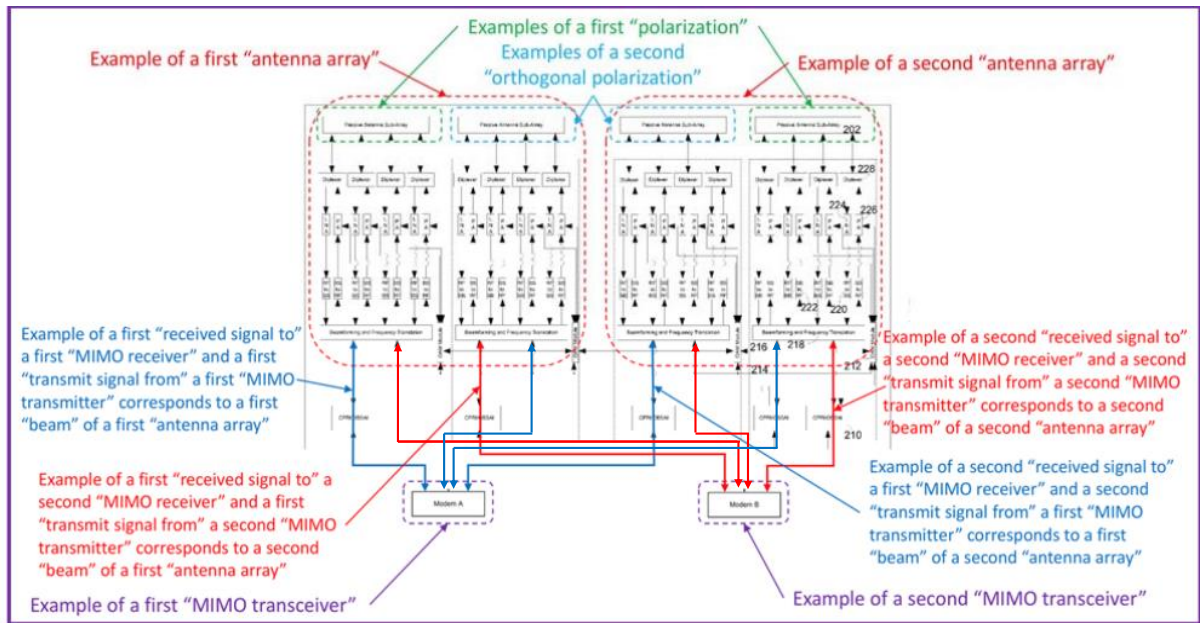
Pet. at 31 (annotation of Ex. 1001, Fig. 2)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Trigui – Two Inputs Per Array

Two arrays
correspond to
four inputs to
each MIMO
receiver: two
per array



Ex. 1004; Ex. 1003 ¶¶ 251-235; Pet. at 39 (further annotated); Sur-reply 4-6

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Trigui – n different bidirectional beams



Prof. Kevin Negus
Petitioner's Expert

117. Moreover, Trigui also states that “FIG. 4A and FIG. 4B illustrate possible beam patterns 400 402 of the broadcast subsector signals of Operator 1 314 and Operator 2 316, respectively, based on the frequency allocation 300 of FIG. 3A” and notes that “While shown as separate beam patterns, it should be noted that beam patterns 400 and 402 are able to propagate over the same region and overlap each other, therefore enabling sharing of a passive antenna, transceivers, and the total power of the DIAA” (emphasis added, see, for example, Ex. 1004 at [0062], FIG. 4A and FIG. 4B as reproduced below).

Ex. 2003 ¶ 117; Sur-reply at 11

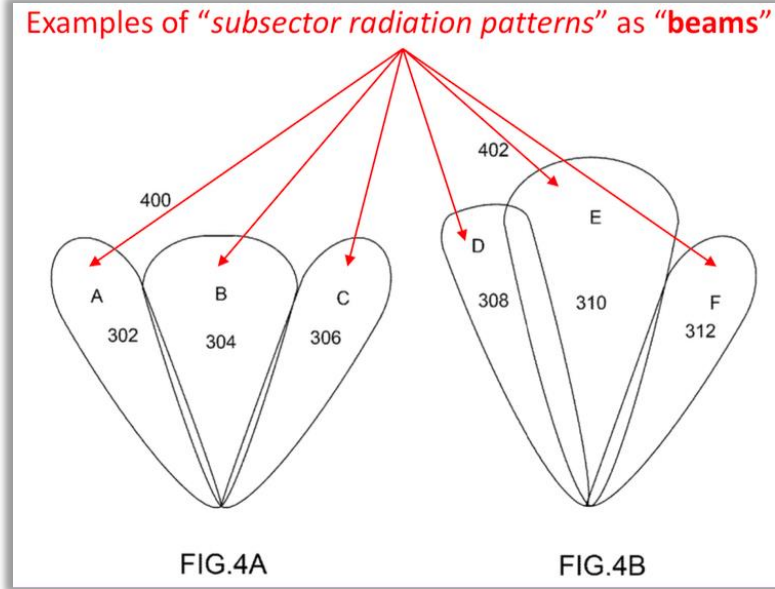
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Trigui – n different bidirectional beams



Prof. Kevin Negus
Petitioner's Expert



Ex. 2003 ¶ 187; Sur-reply at 11

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Trigui – n different bidirectional beams

Accordingly, a POSA would understand that Trigui discloses a “beamformer” for forming bi-direction beams that includes “beamforming” module 218 in Figure 2A, alone or in combination with the circuits for converting: (1) baseband signals to RF signals in the transmit direction, and (2) RF signals to baseband in the receive direction. Ex-1003, ¶186.

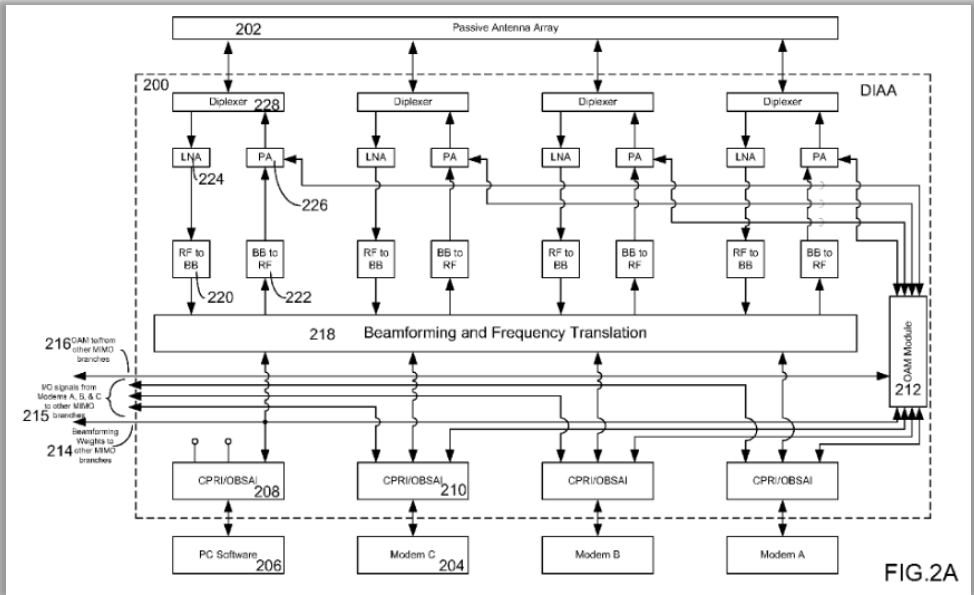
Each of Trigui’s arrays can produce multiple beams (*n different bi-directional beams*). For example, Figures 4A and 4B, annotated by Dr. Negus below, each shows a configuration of 3 beams being generated by a single array. Ex-1004, [0062]; Ex-1003, ¶¶187-188.

Pet. at 26; Sur-reply at 11

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Trigui – n different bidirectional beams



Ex. 1004

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

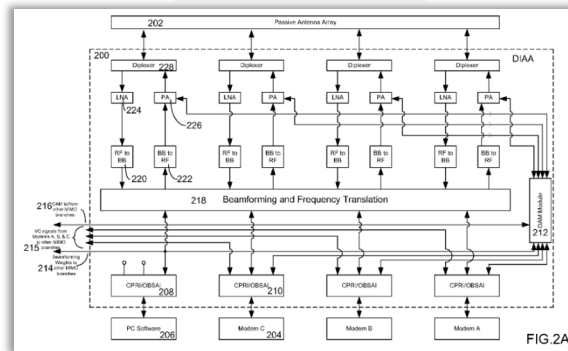
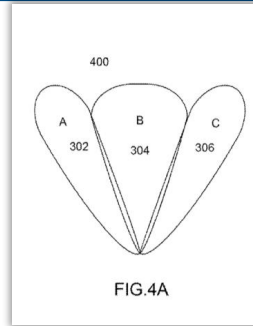
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XR Communications, LLC, Ex. 2008

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Trigui – n different bidirectional beams



Ex. 1004

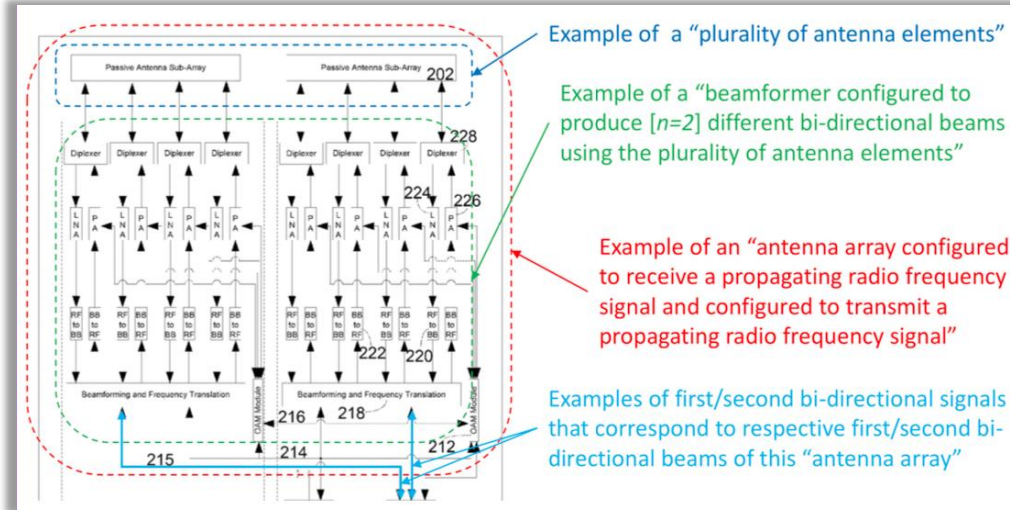
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Trigui – n different bidirectional beams



Prof. Kevin Negus
Petitioner's Expert



Ex. 2003 ¶ 192; Sur-reply at 11

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Trigui – n different bidirectional beams



Prof. Kevin Negus
Petitioner's Expert

204. Moreover, a POSITA would understand that with such a “*multiple of antenna elements*” that are “*similarly polarized*” within each “*antenna*” among “*antenna groups*” that are “*positioned*” such that “*there is relatively low correlation or no correlation between signals to be transmitted (or being received) by any one of the antennas from different groups*” that these “*antennas*” would “*provide gain in a prescribed solid angle different from the other*” (see ¶ 179 above) as known in the art (see, for example, ¶¶ 141 and 152-153 above), or hence would disclose to a POSITA at least “**different bi-directional beams using the plurality of antenna elements**”.

Ex. 2003 ¶ 204; Sur-reply at 12

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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