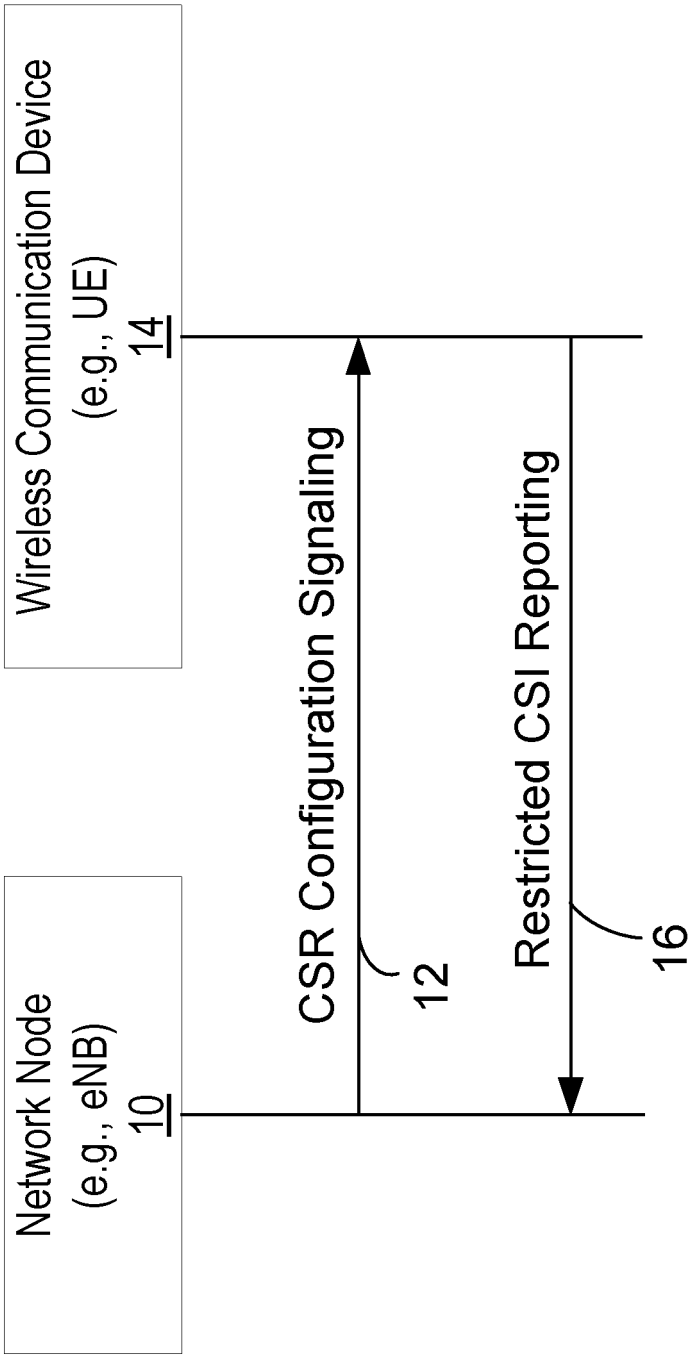
Wireless Communication Device
(e.g., UE)
14
Network Node
(e.g., eNB)
10
CSR Configuration Signaling
12
Restricted CSI Reporting
16

Figure 1

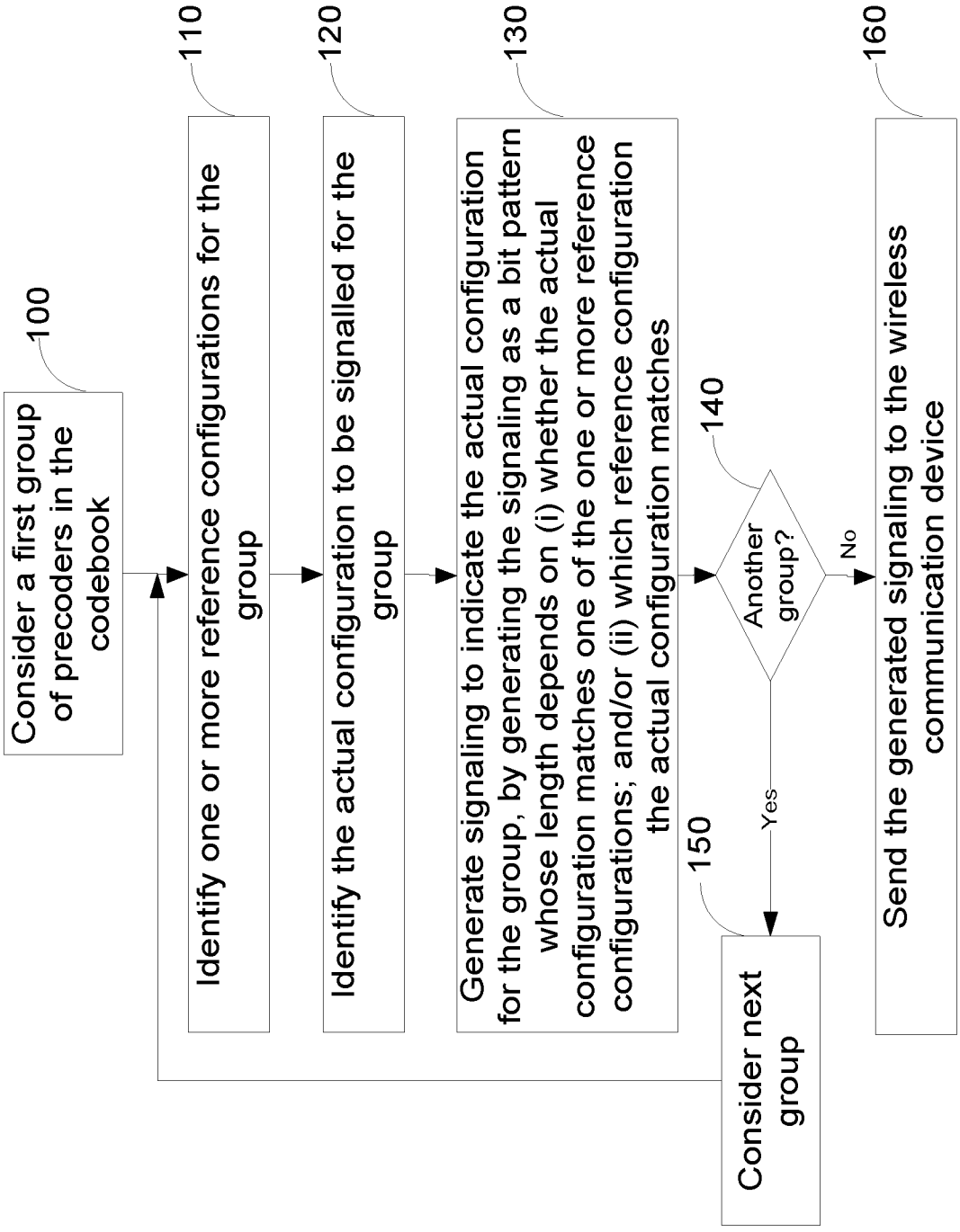
Consider a first group of precoders in the codebook
100
Identify one or more reference configurations for the group
110
Identify the actual configuration to be signalled for the group
120
Generate signaling to indicate the actual configuration for the group, by generating the signaling as a bit pattern whose length depends on (i) whether the actual configuration matches one of the one or more reference configurations; and/or (ii) which reference configuration the actual configuration matches
130
Another group?
140
Yes
No
Consider next group
150
Send the generated signaling to the wireless communication device
160

Figure 2

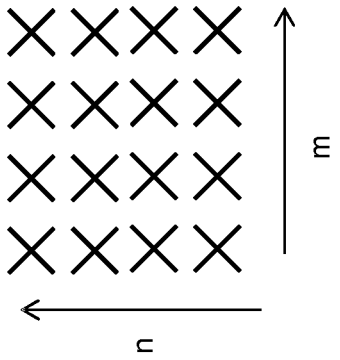

Figure 3

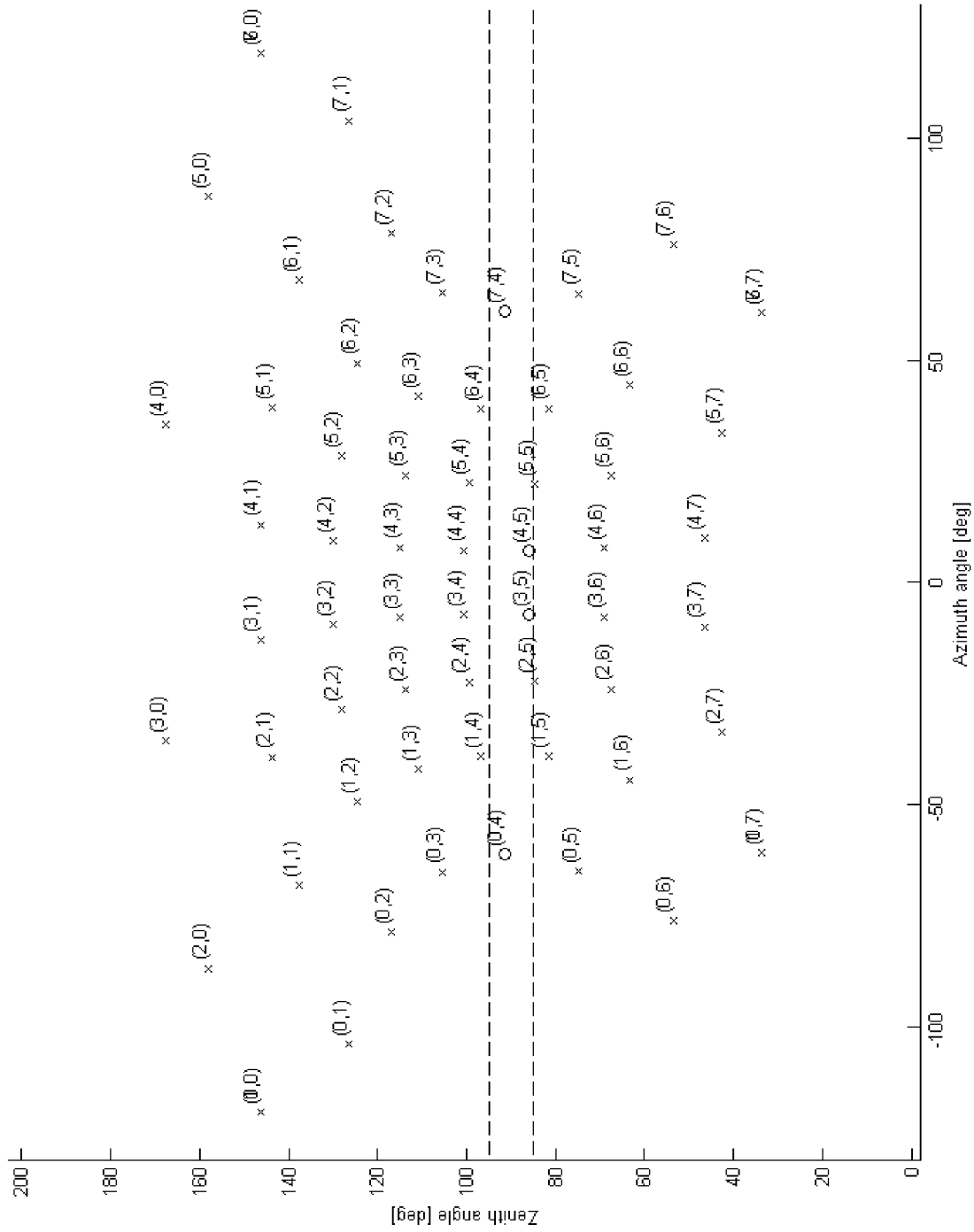
Zenith angle [deg]
Azimuth angle [deg]
200
180
160
140
120
100
80
60
40
20
0
-100
-50
0
50
100

FIGURE 4

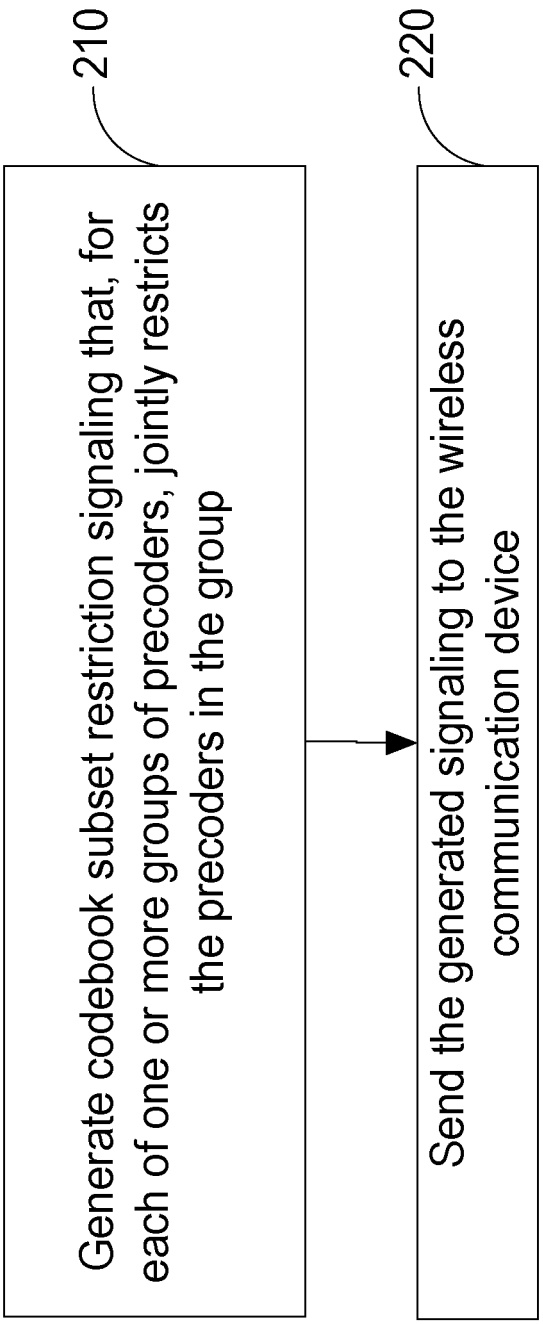
210
Generate codebook subset restriction signaling that, for each of one or more groups of precoders, jointly restricts the precoders in the group
220
Send the generated signaling to the wireless communication device

Figure 5

$$\varphi_n = e^{j\pi n/2}$$

$$v_m = \begin{bmatrix} 1 & e^{j2\pi m/32} & e^{j4\pi m/32} & e^{j6\pi m/32} \end{bmatrix}^{\mathrm{T}}$$

Codebook for 2-layer CSI reporting using antenna ports 15 to 22

i_1	i_2			
	0	**1**	**2**	**3**
0 – 15	$W^{(2)}_{2i_1,2i_1,0}$	$W^{(2)}_{2i_1,2i_1,1}$	$W^{(2)}_{2i_1+1,2i_1+1,0}$	$W^{(2)}_{2i_1+1,2i_1+1,1}$
i_1	i_2			
	4	**5**	**6**	**7**
0 – 15	$W^{(2)}_{2i_1+2,2i_1+2,0}$	$W^{(2)}_{2i_1+2,2i_1+2,1}$	$W^{(2)}_{2i_1+3,2i_1+3,0}$	$W^{(2)}_{2i_1+3,2i_1+3,1}$
i_1	i_2			
	8	**9**	**10**	**11**
0 – 15	$W^{(2)}_{2i_1,2i_1+1,0}$	$W^{(2)}_{2i_1,2i_1+1,1}$	$W^{(2)}_{2i_1+1,2i_1+2,0}$	$W^{(2)}_{2i_1+1,2i_1+2,1}$
i_1	i_2			
	12	**13**	**14**	**15**
0 – 15	$W^{(2)}_{2i_1,2i_1+3,0}$	$W^{(2)}_{2i_1,2i_1+3,1}$	$W^{(2)}_{2i_1+1,2i_1+3,0}$	$W^{(2)}_{2i_1+1,2i_1+3,1}$
where $W^{(2)}_{m,m',n} = \frac{1}{4}\begin{bmatrix} v_m & v_{m'} \\ \varphi_n v_m & -\varphi_n v_{m'} \end{bmatrix}$				

Figure 6

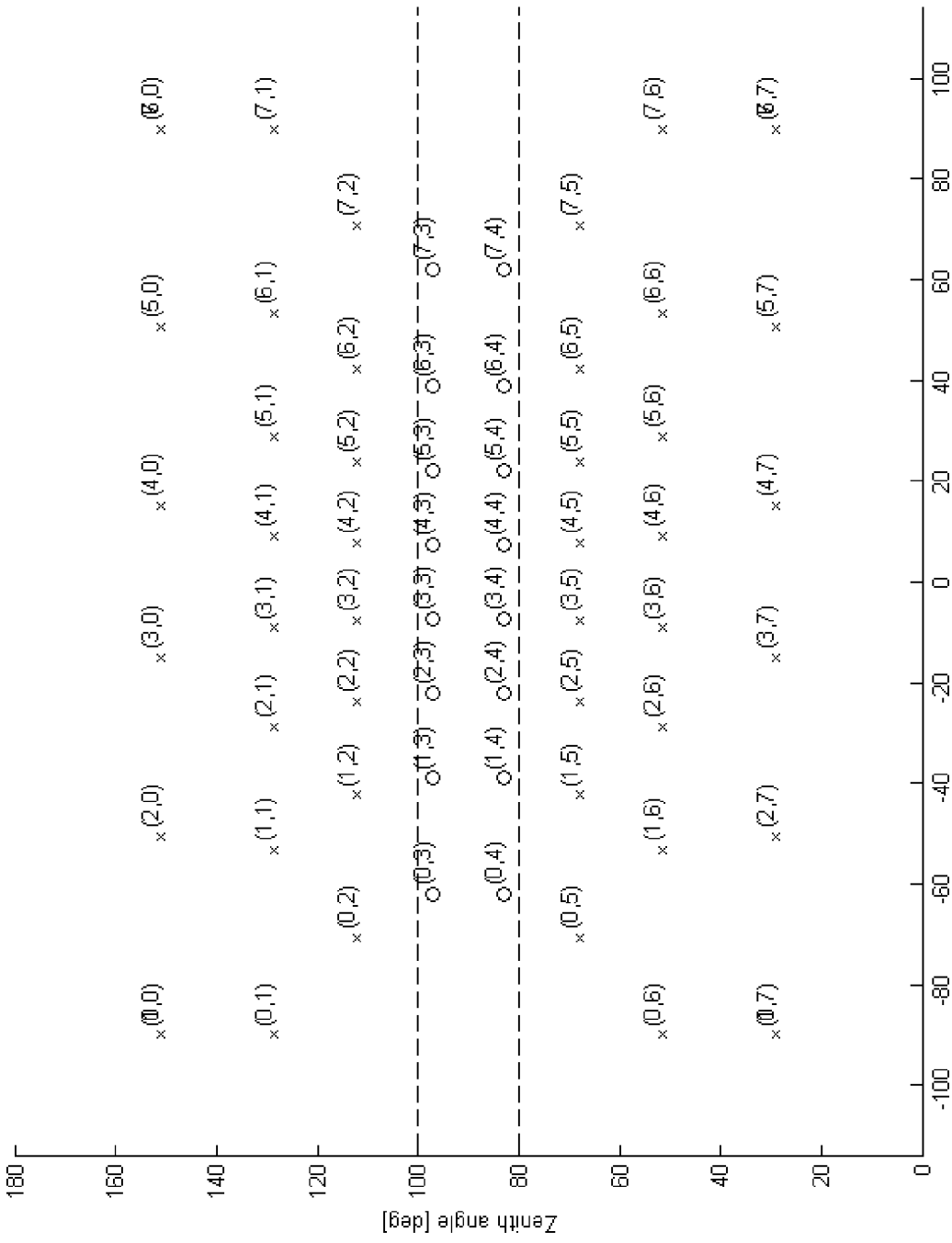
Zenith angle [deg]
Azimuth angle [deg]
180
160
140
120
100
80
60
40
20
0
-100
-80
-60
-40
-20
0
20
40
60
80
100

Figure 7

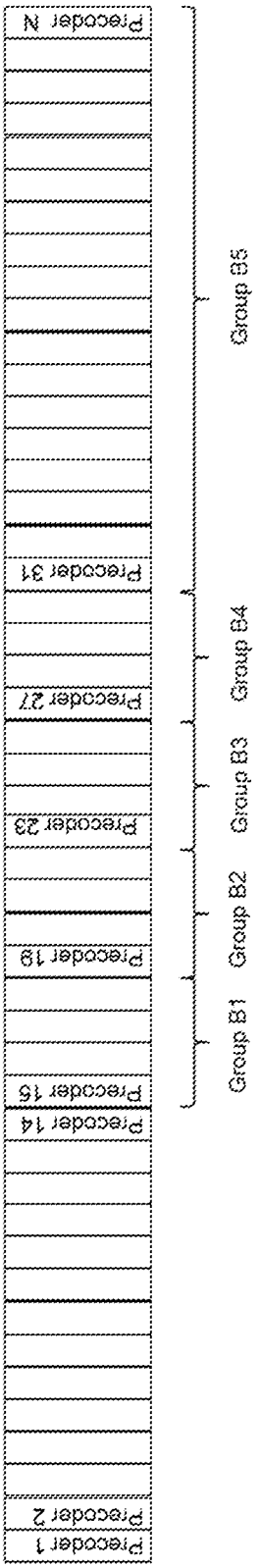
Precoder 1
Precoder 2
Precoder 14
Precoder 15
Precoder 18
Precoder 23
Precoder 27
Precoder 31
Precoder N
Group B1
Group B2
Group B3
Group B4
Group B5

Figure 8

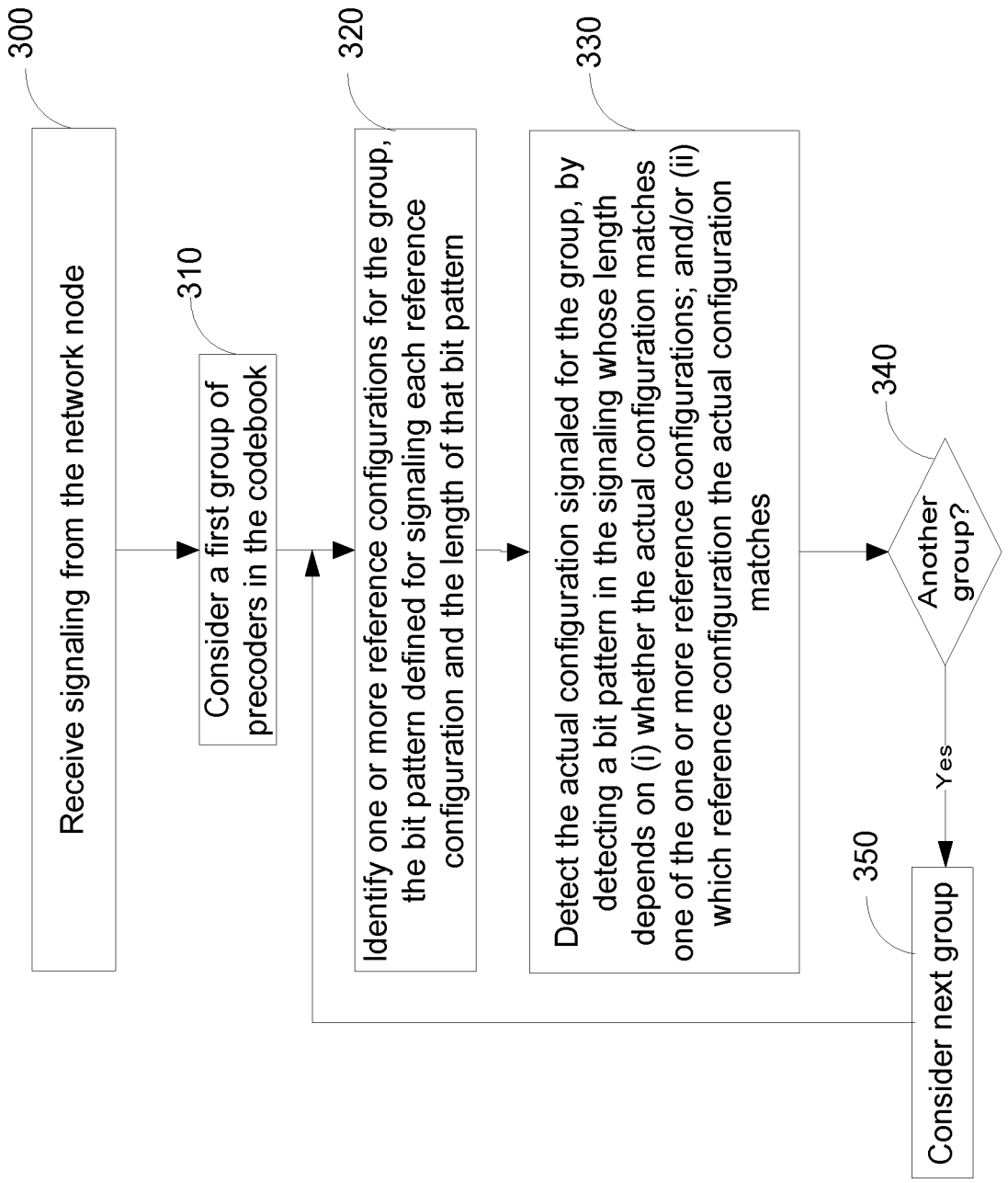
300
Receive signaling from the network node
310
Consider a first group of precoders in the codebook
320
Identify one or more reference configurations for the group, the bit pattern defined for signaling each reference configuration and the length of that bit pattern
330
Detect the actual configuration signaled for the group, by detecting a bit pattern in the signaling whose length depends on (i) whether the actual configuration matches one of the one or more reference configurations; and/or (ii) which reference configuration the actual configuration matches
340
Another group?
Yes
350
Consider next group

Figure 9

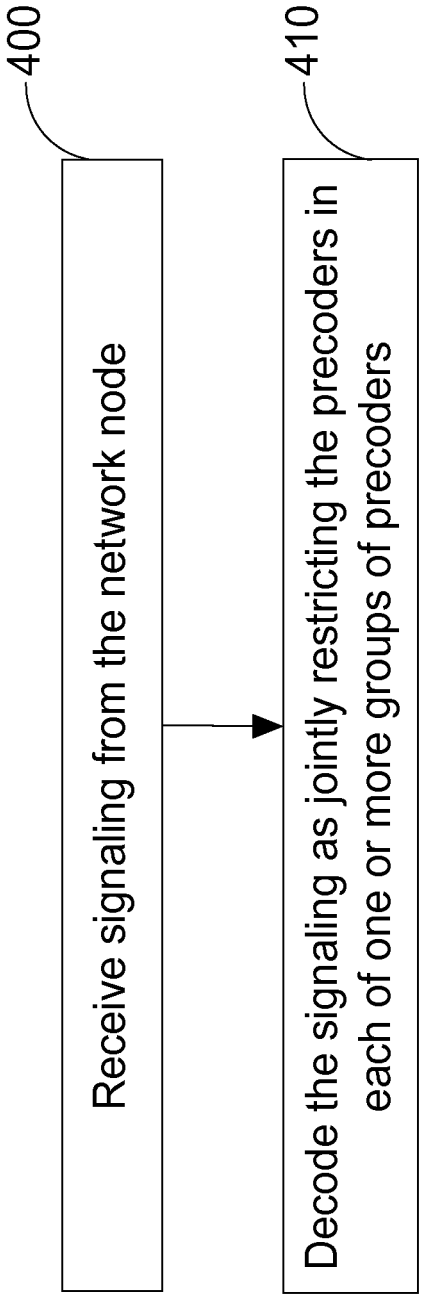
400
Receive signaling from the network node
410
Decode the signaling as jointly restricting the precoders in each of one or more groups of precoders

Figure 10

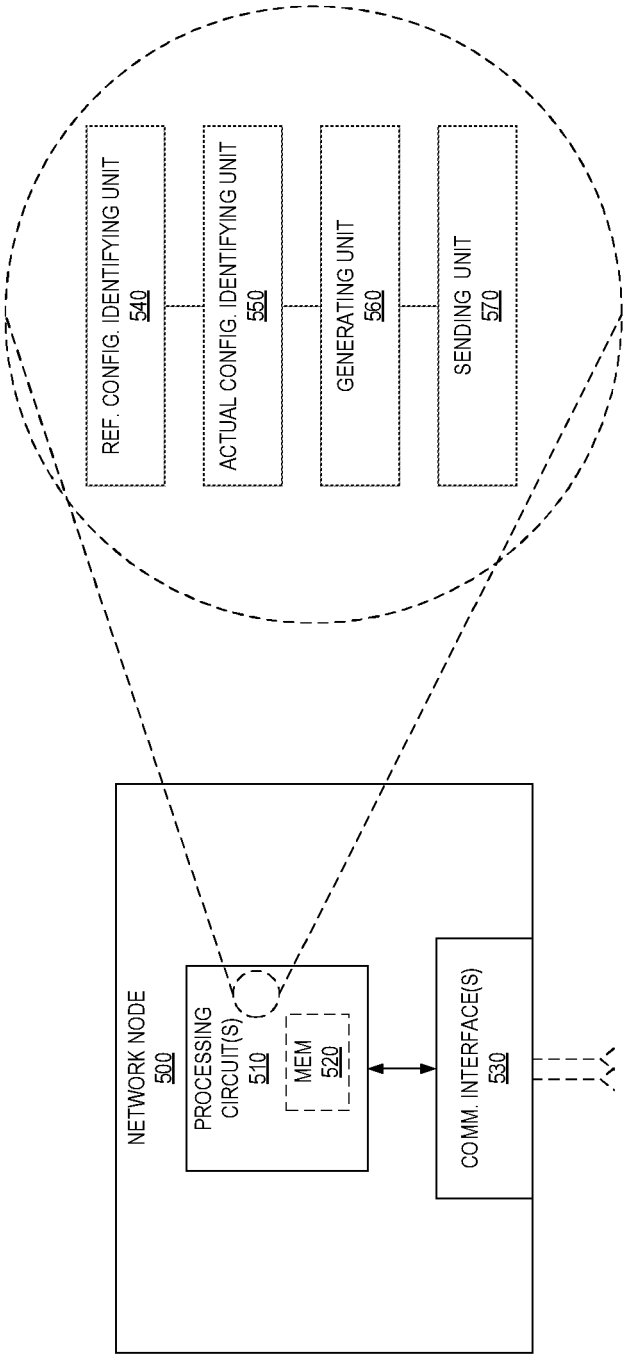
NETWORK NODE
500
PROCESSING CIRCUIT(S)
510
MEM
520
COMM. INTERFACE(S)
530
REF. CONFIG. IDENTIFYING UNIT
540
ACTUAL CONFIG. IDENTIFYING UNIT
550
GENERATING UNIT
560
SENDING UNIT
570

Figure 11

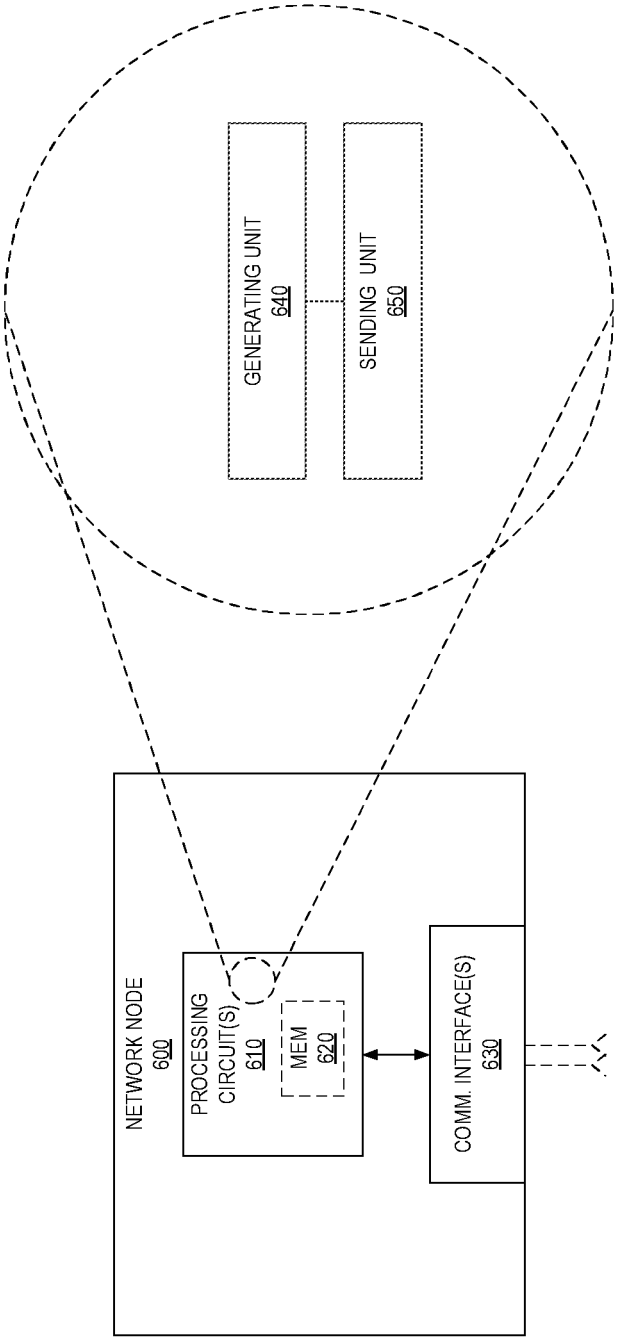
GENERATING UNIT
640
SENDING UNIT
650
NETWORK NODE
600
PROCESSING
CIRCUIT(S)
610
MEM
620
COMM. INTERFACE(S)
630

Figure 12

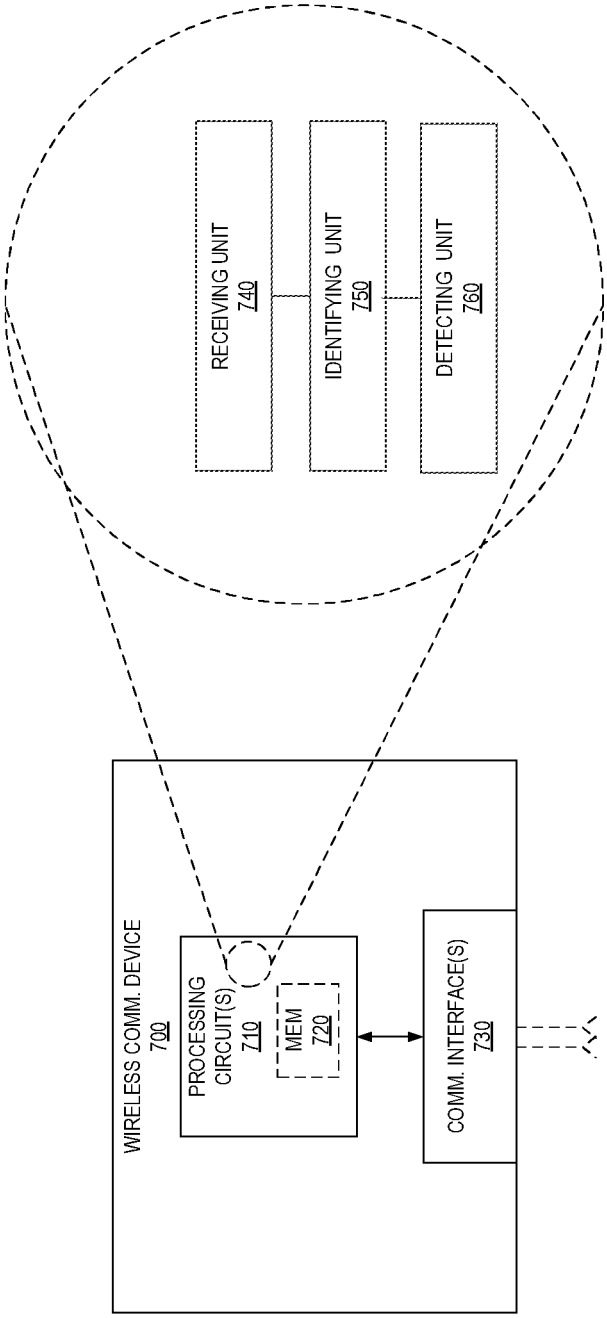
RECEIVING UNIT
740
IDENTIFYING UNIT
750
DETECTING UNIT
760
WIRELESS COMM. DEVICE
700
PROCESSING CIRCUIT(S)
710
MEM
720
COMM. INTERFACE(S)
730

Figure 13

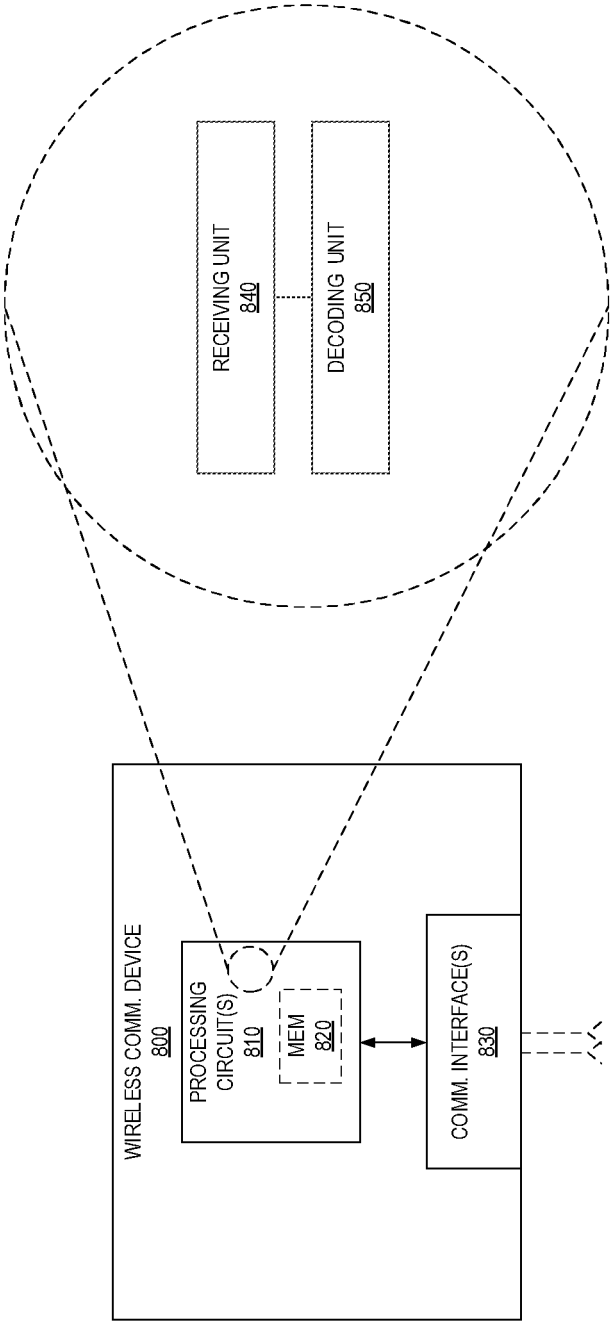
RECEIVING UNIT
840
DECODING UNIT
850
WIRELESS COMM. DEVICE
800
PROCESSING CIRCUIT(S)
810
MEM
820
COMM. INTERFACE(S)
830

Figure 14