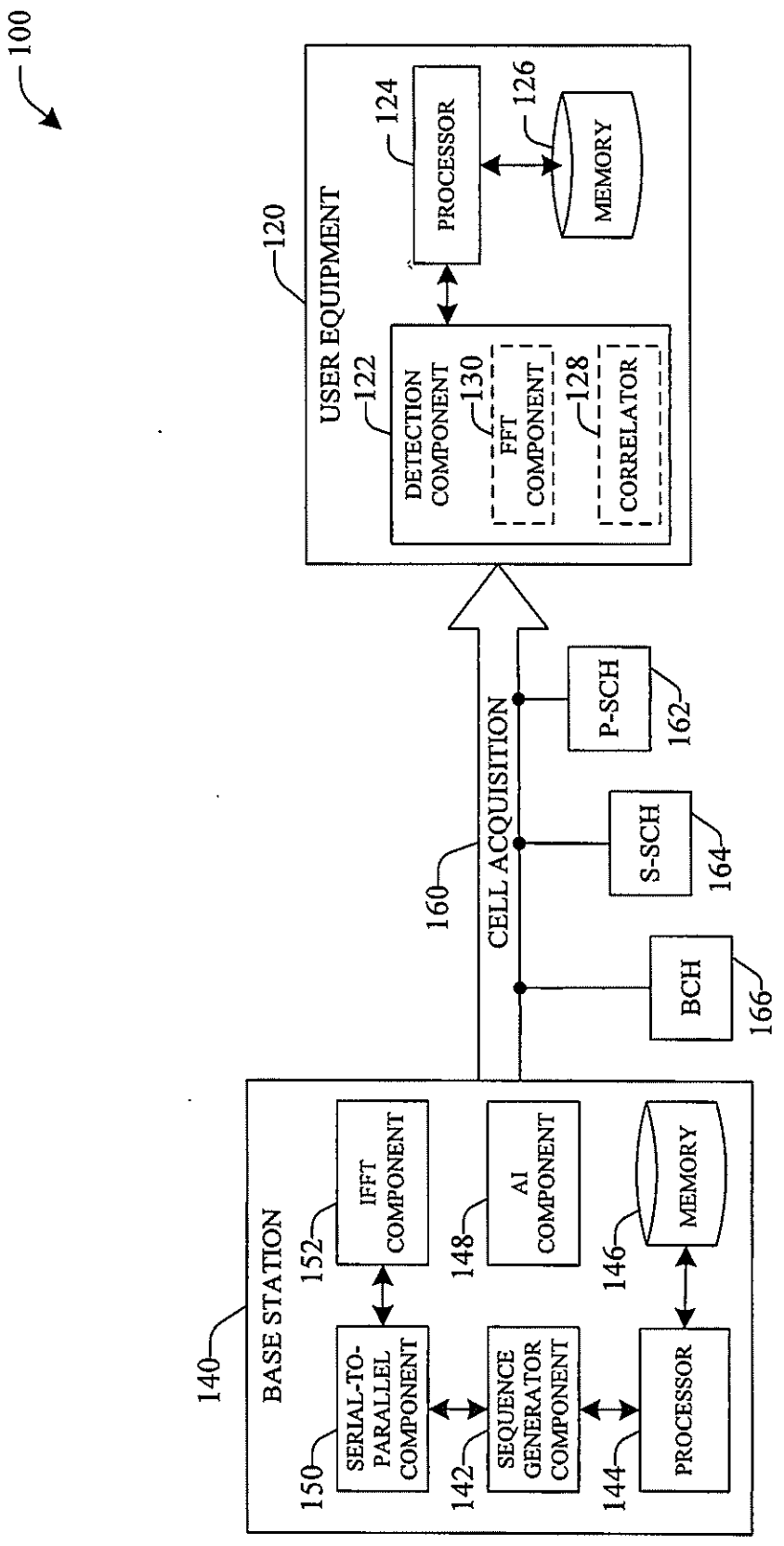
100
120
USER EQUIPMENT
124
PROCESSOR
126
MEMORY
122
DETECTION COMPONENT
130
FFT COMPONENT
128
CORRELATOR
160
CELL ACQUISITION
P-SCH
162
S-SCH
164
BCH
166
140
BASE STATION
IFFT COMPONENT
152
AI COMPONENT
148
MEMORY
146
SERIAL-TO-PARALLEL COMPONENT
150
SEQUENCE GENERATOR COMPONENT
142
PROCESSOR
144

FIG. 1

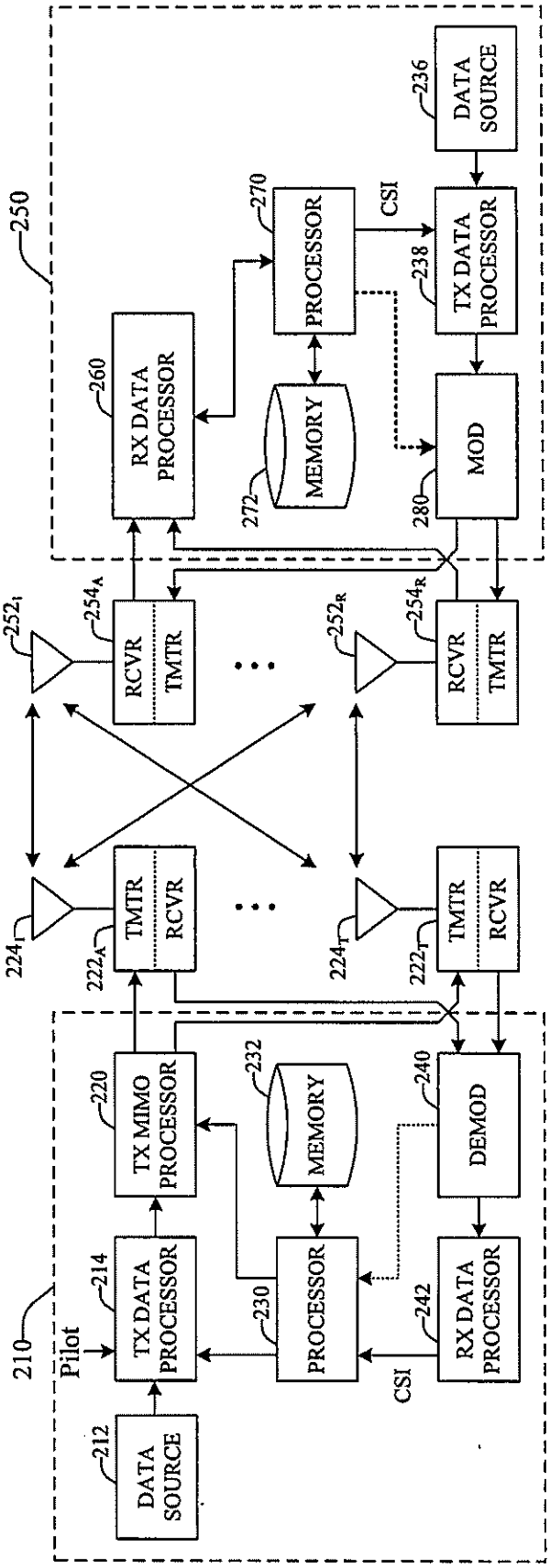
200
250
236
DATA SOURCE
270
PROCESSOR
CSI
238
TX DATA PROCESSOR
260
RX DATA PROCESSOR
MEMORY
272
280
MOD
252_1
254_A
RCVR
TMTR
252_R
254_R
RCVR
TMTR
224_1
222_A
TMTR
RCVR
224_T
222_T
TMTR
RCVR
210
Pilot
220
TX MIMO PROCESSOR
232
MEMORY
240
DEMOD
214
TX DATA PROCESSOR
230
PROCESSOR
242
RX DATA PROCESSOR
CSI
212
DATA SOURCE

FIG. 2

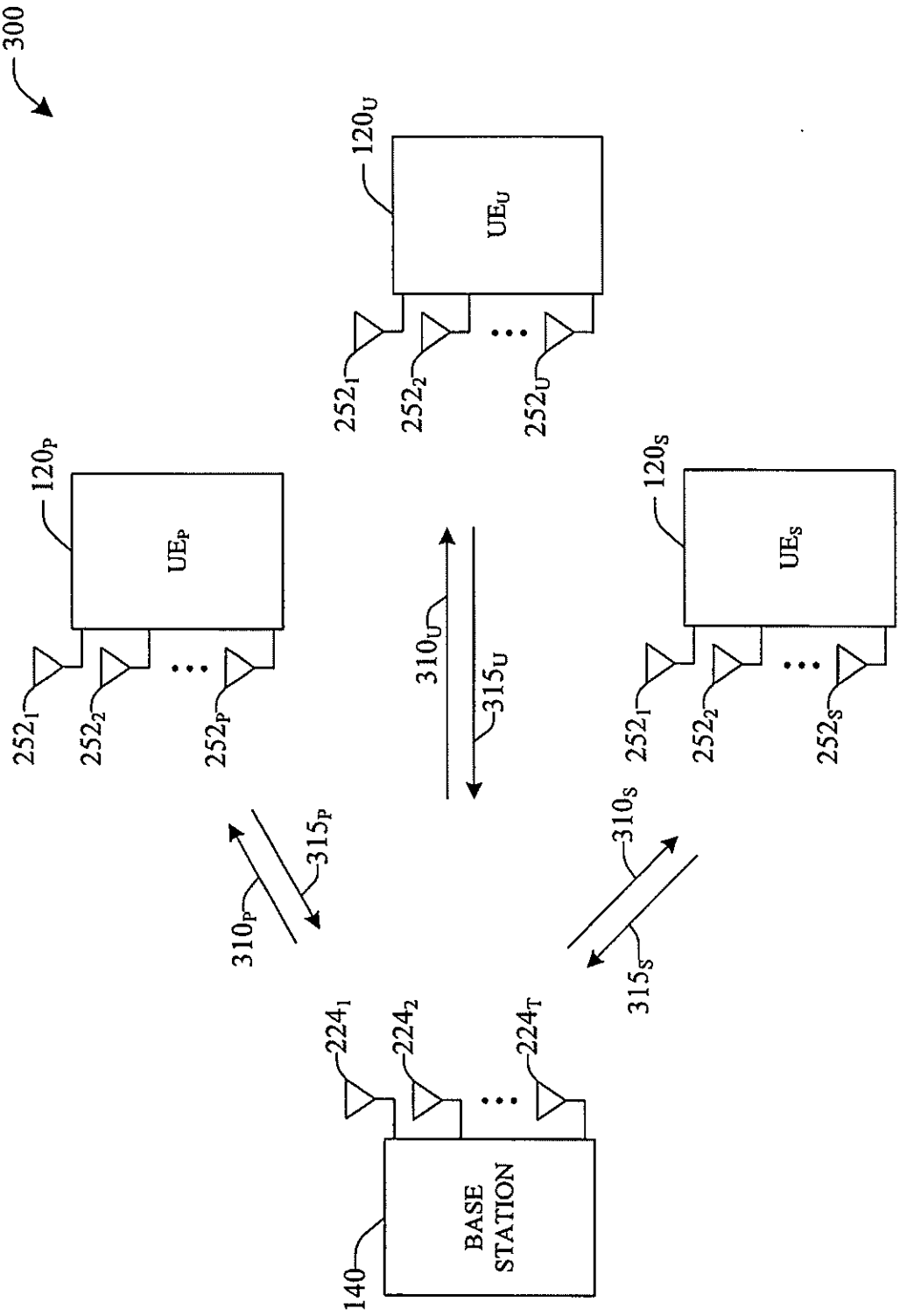
300
120U
UEU
252₁
252₂
252U
120P
UEP
252₁
252₂
252P
310U
315U
120S
UES
252₁
252₂
252S
310P
315P
310S
315S
224₁
224₂
224T
BASE STATION
140

FIG. 3

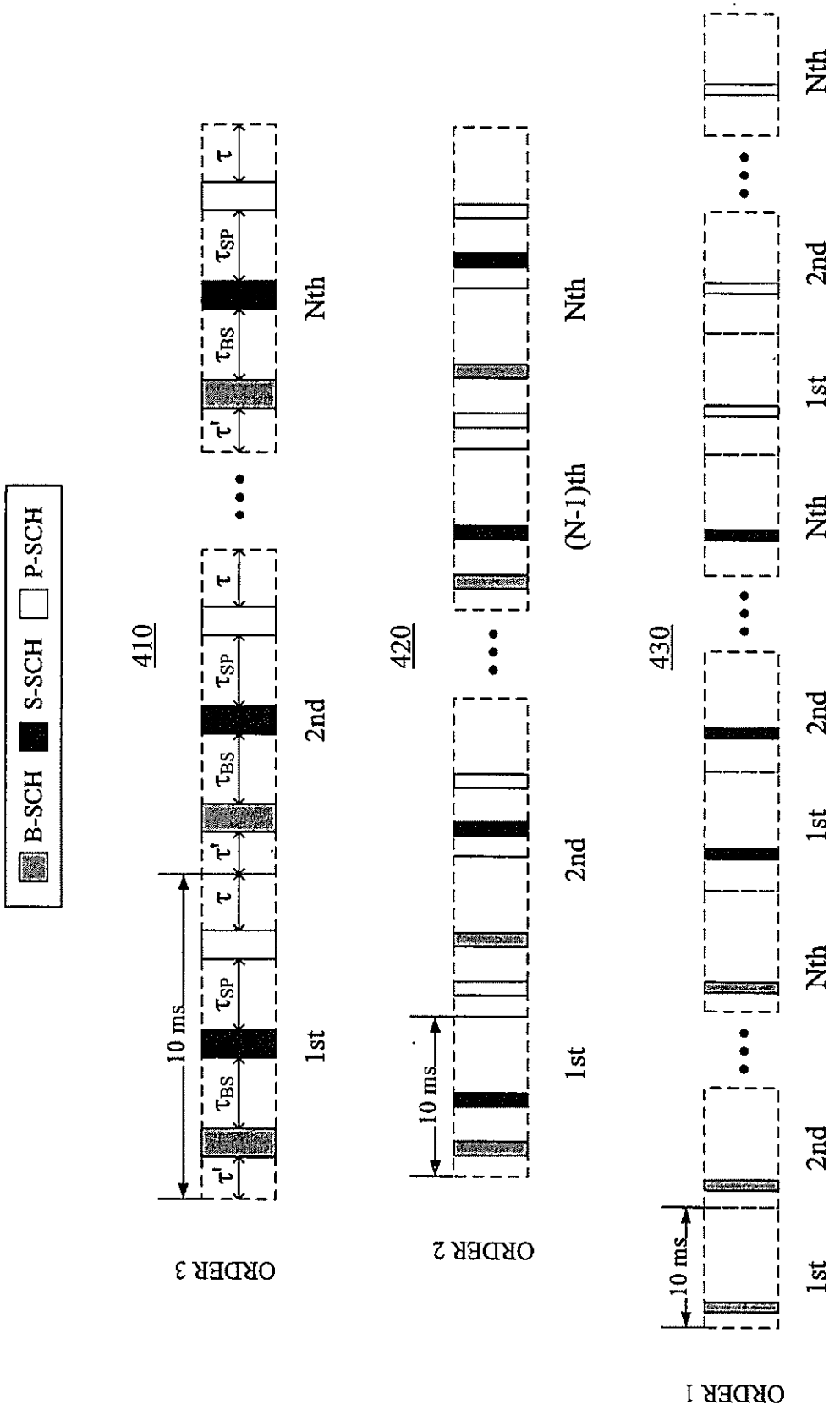
B-SCH
S-SCH
P-SCH
410
420
430
ORDER 3
ORDER 2
ORDER 1
10 ms
1st
2nd
Nth
(N-1)th
τ
τ'
τSP
τBS

FIG. 4

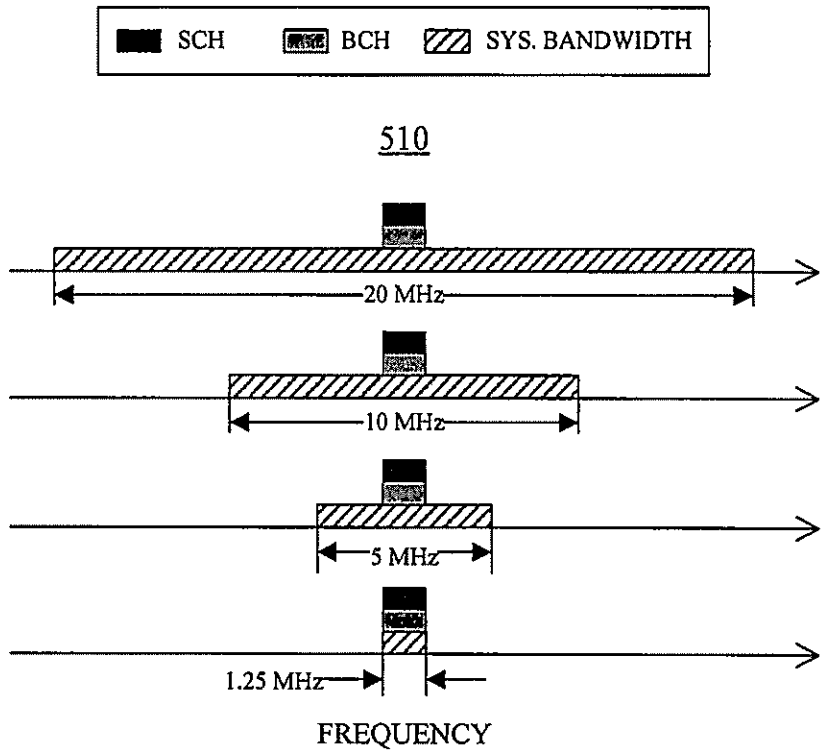
SCH
BCH
SYS. BANDWIDTH
510
20 MHz
10 MHz
5 MHz
1.25 MHz
FREQUENCY

FIG. 5A

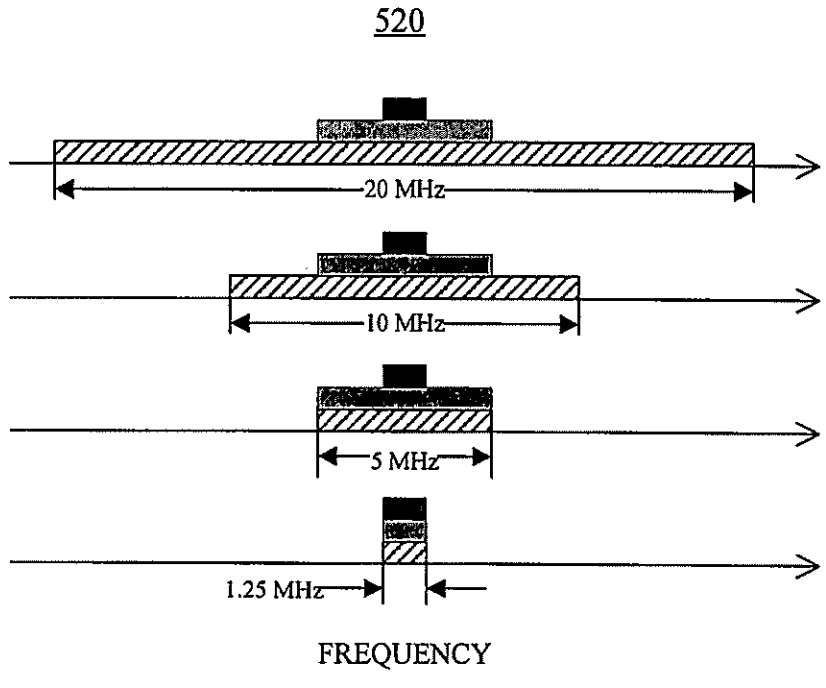
520
20 MHz
10 MHz
5 MHz
1.25 MHz
FREQUENCY

FIG. 5B

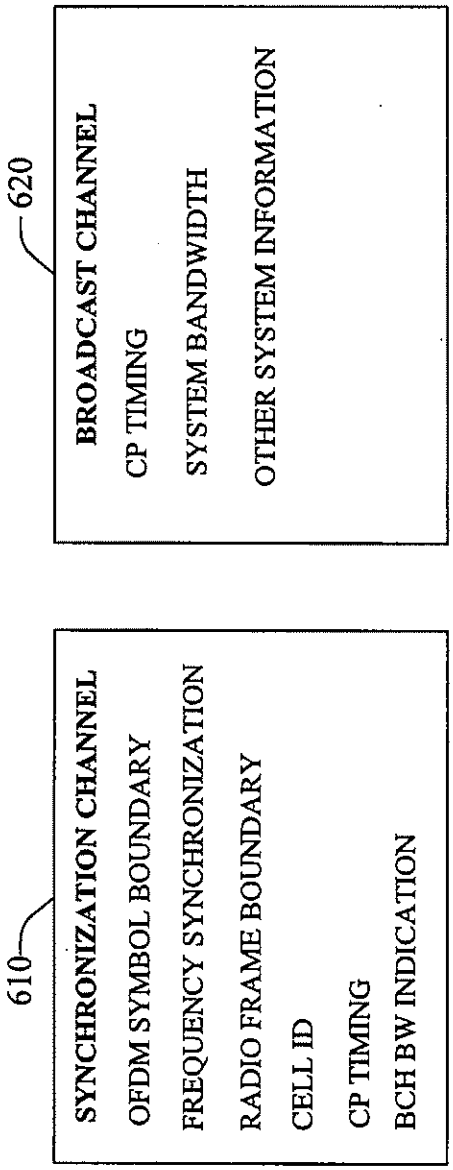
610
SYNCHRONIZATION CHANNEL
OFDM SYMBOL BOUNDARY
FREQUENCY SYNCHRONIZATION
RADIO FRAME BOUNDARY
CELL ID
CP TIMING
BCH BW INDICATION
620
BROADCAST CHANNEL
CP TIMING
SYSTEM BANDWIDTH
OTHER SYSTEM INFORMATION

FIG. 6

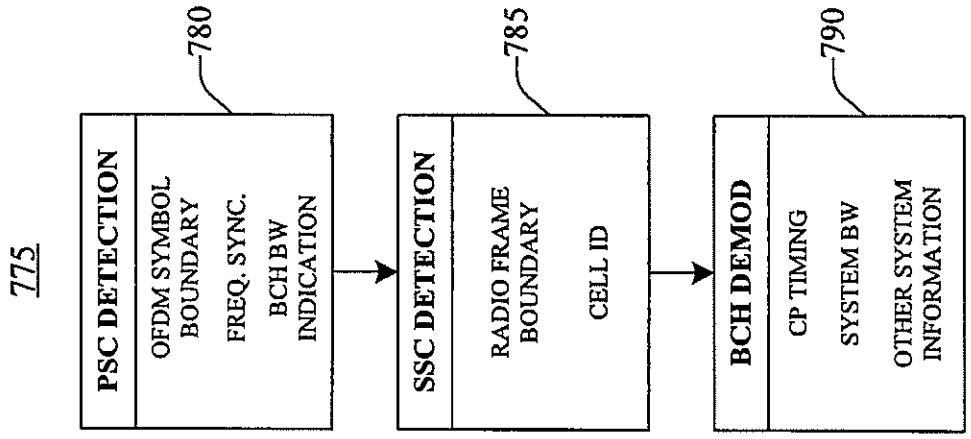

FIG. 7C

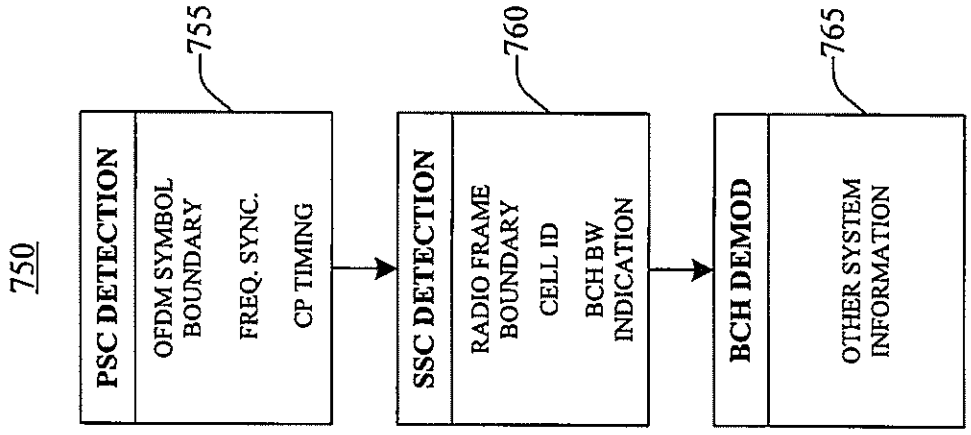

FIG. 7B

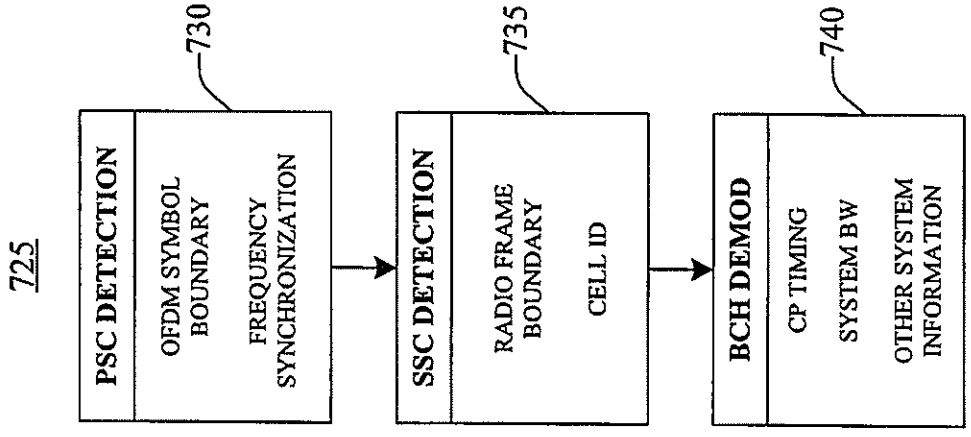

FIG. 7A

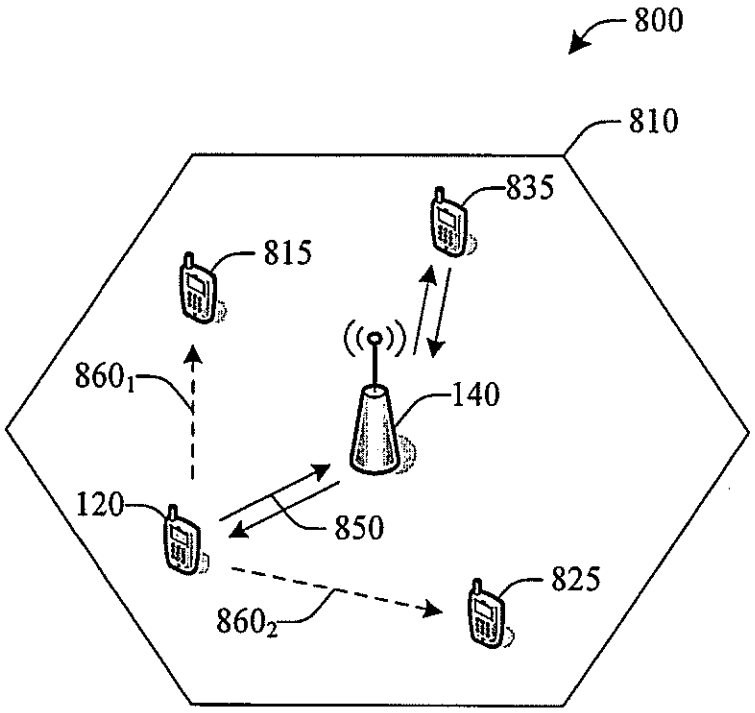
800
810
835
815
860_1
140
120
850
825
860_2

FIG. 8A

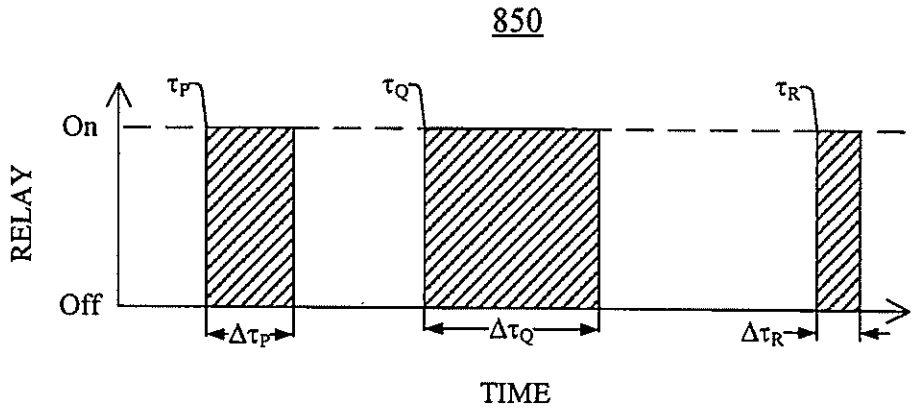
850
τ_P
τ_Q
τ_R
On
Off
RELAY
$\Delta\tau_P$
$\Delta\tau_Q$
$\Delta\tau_R$
TIME

FIG. 8B

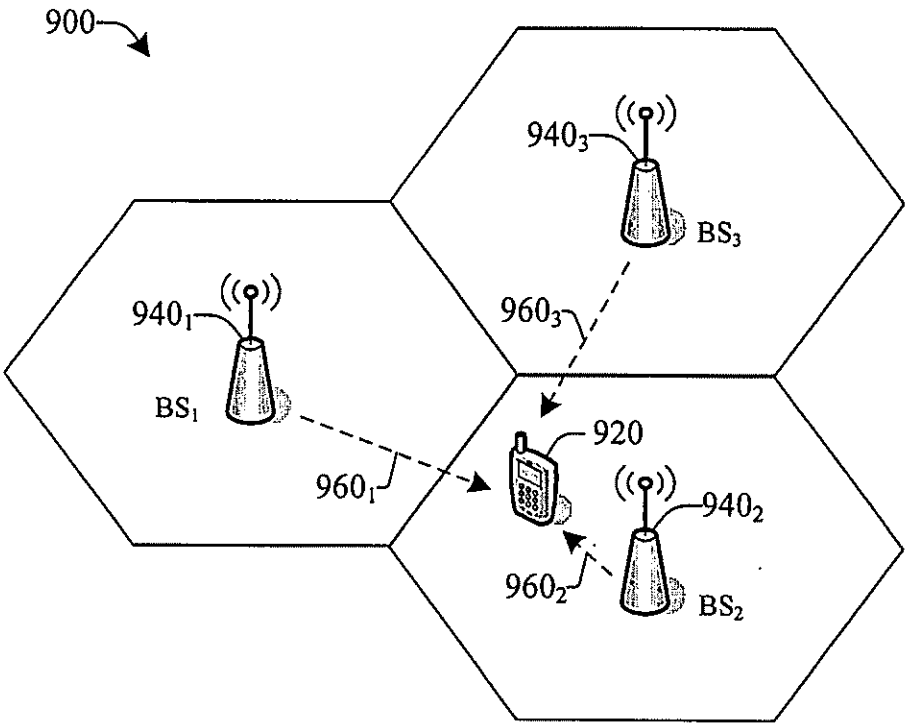

FIG. 9A

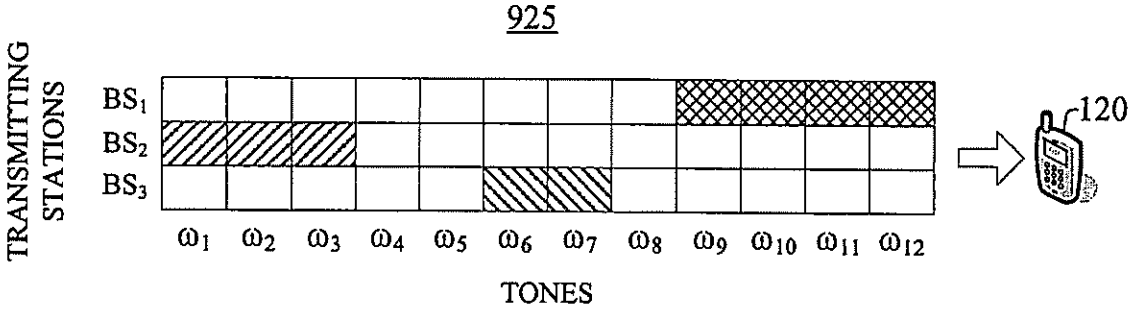

FIG. 9B

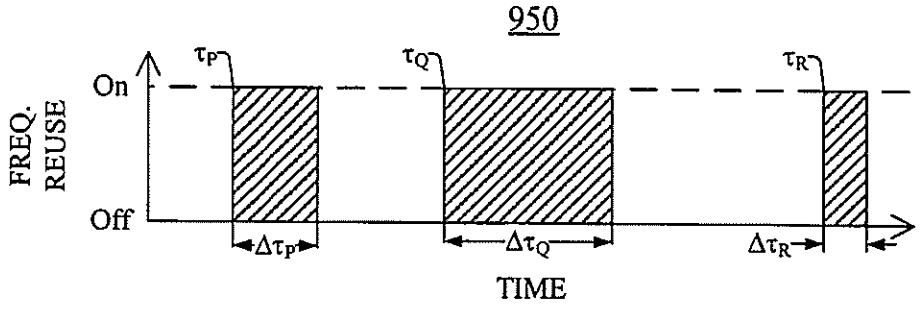

FIG. 9C

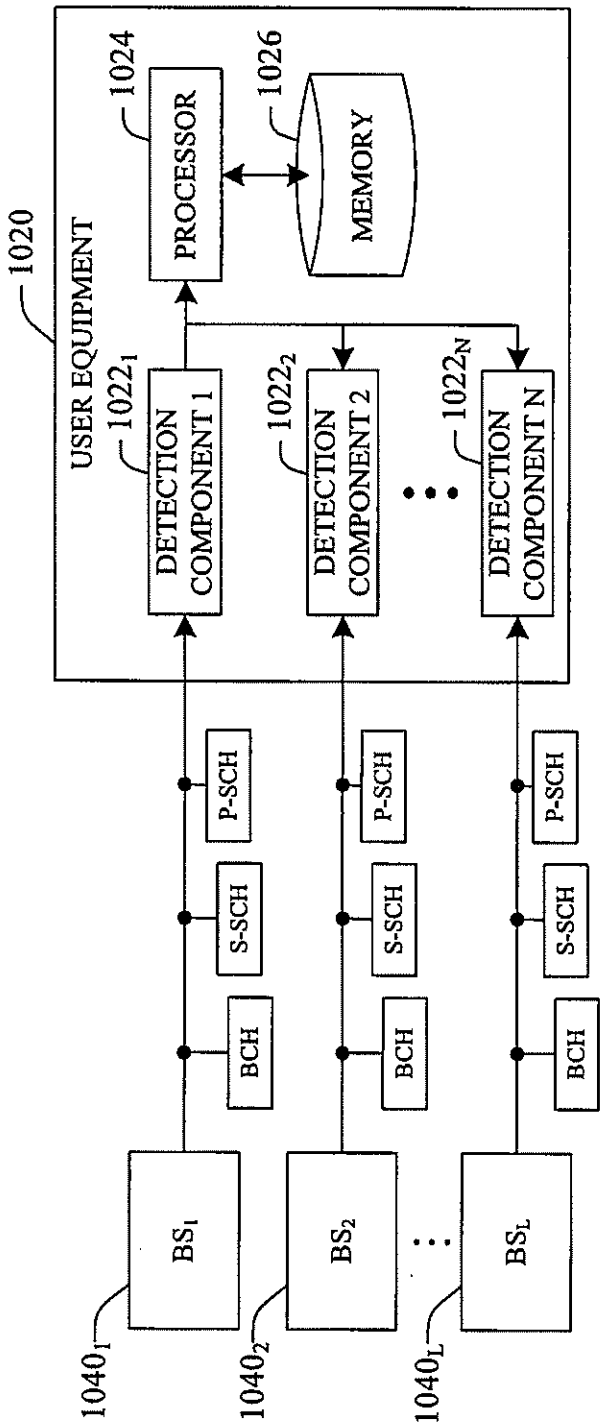
1020
USER EQUIPMENT
1024
PROCESSOR
1026
MEMORY
1022$_1$
DETECTION COMPONENT 1
1022$_2$
DETECTION COMPONENT 2
1022$_N$
DETECTION COMPONENT N
P-SCH
S-SCH
BCH
BS$_1$
BS$_2$
BS$_L$
1040$_1$
1040$_2$
1040$_L$

FIG. 10

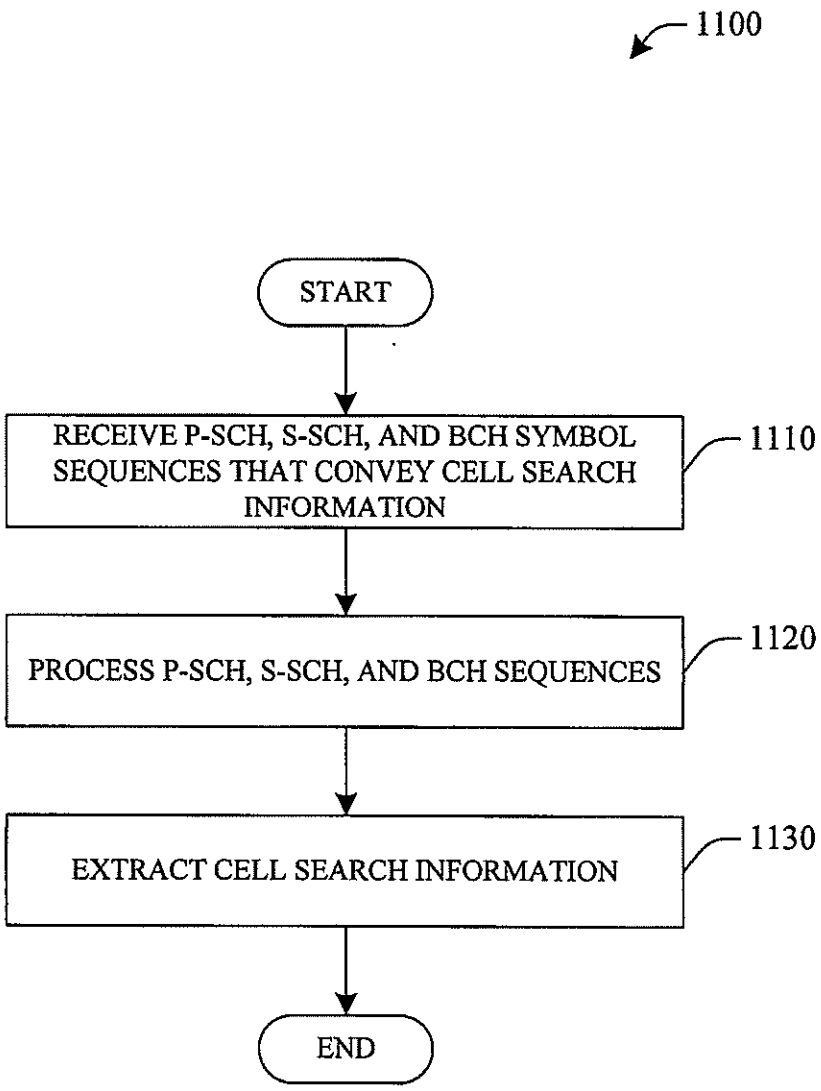
1100
START
RECEIVE P-SCH, S-SCH, AND BCH SYMBOL SEQUENCES THAT CONVEY CELL SEARCH INFORMATION
1110
PROCESS P-SCH, S-SCH, AND BCH SEQUENCES
1120
EXTRACT CELL SEARCH INFORMATION
1130
END

FIG. 11

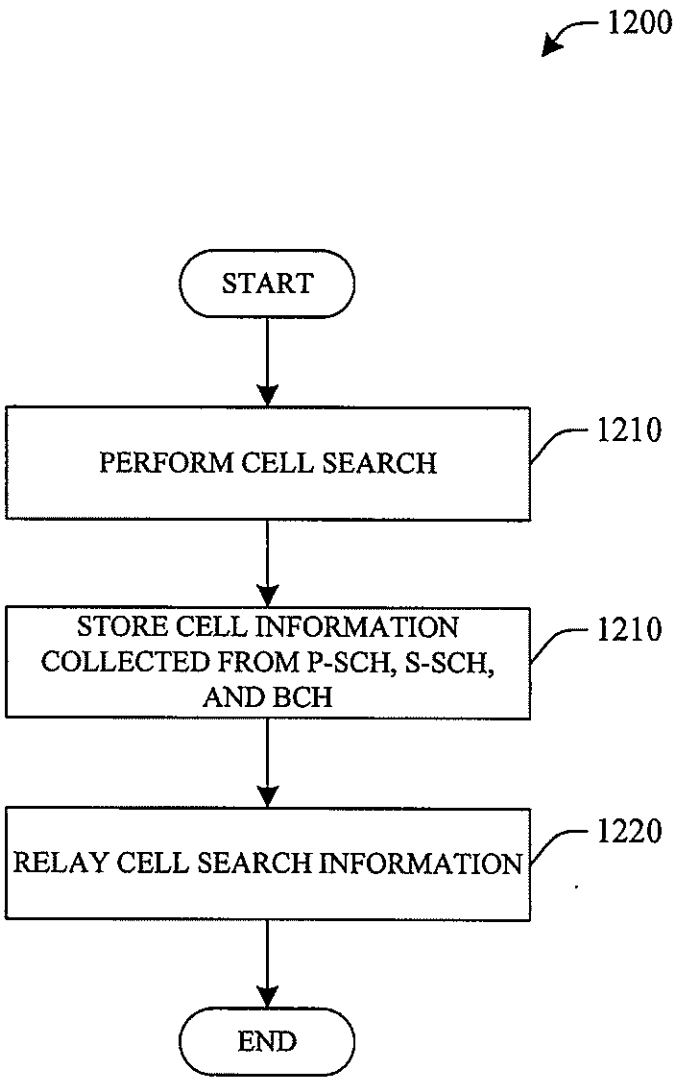
1200
START
PERFORM CELL SEARCH
1210
STORE CELL INFORMATION COLLECTED FROM P-SCH, S-SCH, AND BCH
1210
RELAY CELL SEARCH INFORMATION
1220
END

FIG. 12

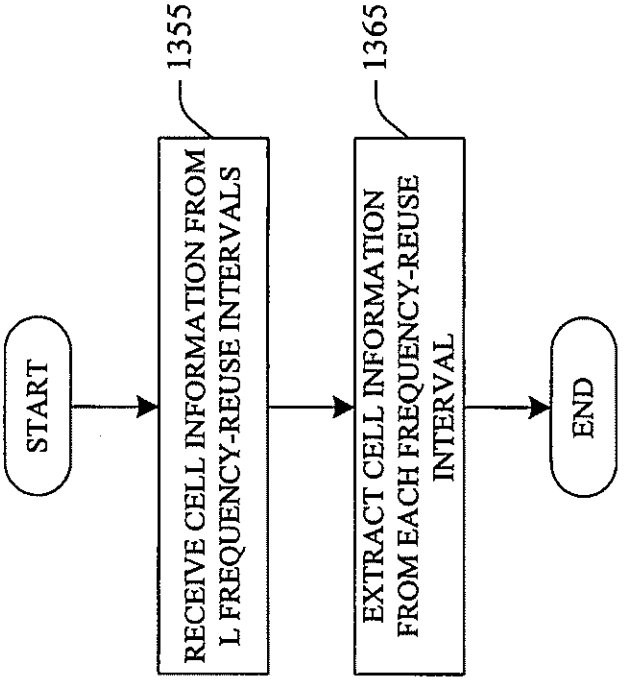

FIG. 13B

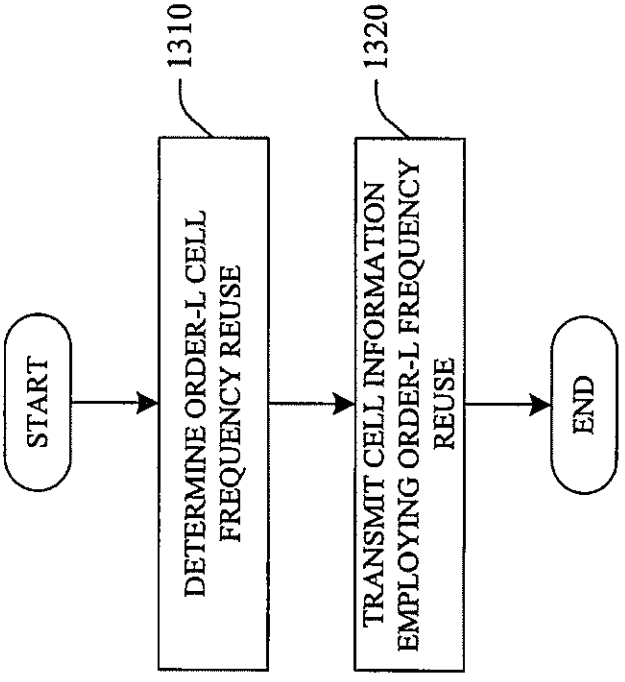

FIG. 13A

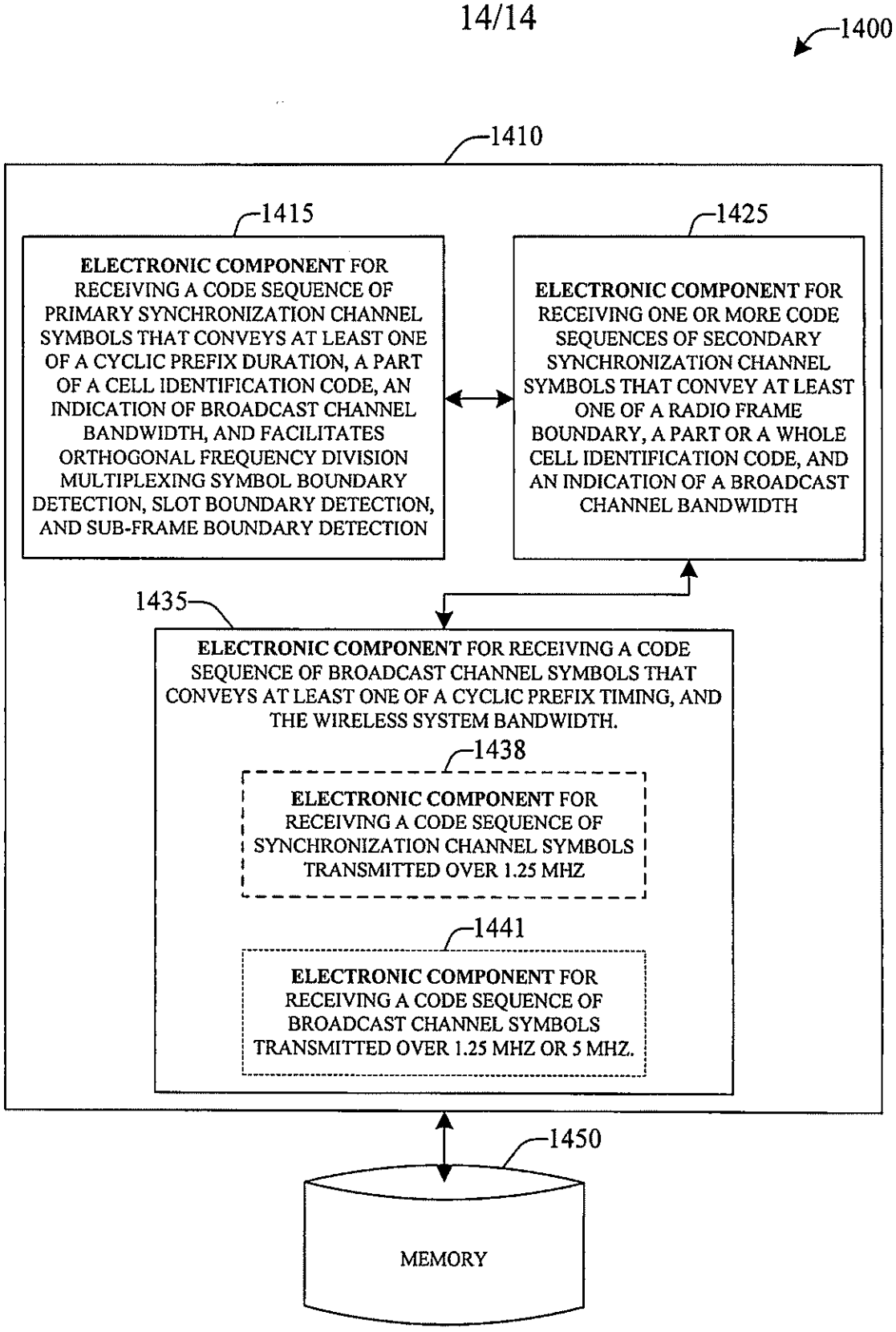
1400
1410
1415
ELECTRONIC COMPONENT FOR RECEIVING A CODE SEQUENCE OF PRIMARY SYNCHRONIZATION CHANNEL SYMBOLS THAT CONVEYS AT LEAST ONE OF A CYCLIC PREFIX DURATION, A PART OF A CELL IDENTIFICATION CODE, AN INDICATION OF BROADCAST CHANNEL BANDWIDTH, AND FACILITATES ORTHOGONAL FREQUENCY DIVISION MULTIPLEXING SYMBOL BOUNDARY DETECTION, SLOT BOUNDARY DETECTION, AND SUB-FRAME BOUNDARY DETECTION
1425
ELECTRONIC COMPONENT FOR RECEIVING ONE OR MORE CODE SEQUENCES OF SECONDARY SYNCHRONIZATION CHANNEL SYMBOLS THAT CONVEY AT LEAST ONE OF A RADIO FRAME BOUNDARY, A PART OR A WHOLE CELL IDENTIFICATION CODE, AND AN INDICATION OF A BROADCAST CHANNEL BANDWIDTH
1435
ELECTRONIC COMPONENT FOR RECEIVING A CODE SEQUENCE OF BROADCAST CHANNEL SYMBOLS THAT CONVEYS AT LEAST ONE OF A CYCLIC PREFIX TIMING, AND THE WIRELESS SYSTEM BANDWIDTH.
1438
ELECTRONIC COMPONENT FOR RECEIVING A CODE SEQUENCE OF SYNCHRONIZATION CHANNEL SYMBOLS TRANSMITTED OVER 1.25 MHZ
1441
ELECTRONIC COMPONENT FOR RECEIVING A CODE SEQUENCE OF BROADCAST CHANNEL SYMBOLS TRANSMITTED OVER 1.25 MHZ OR 5 MHZ.
1450
MEMORY

FIG. 14