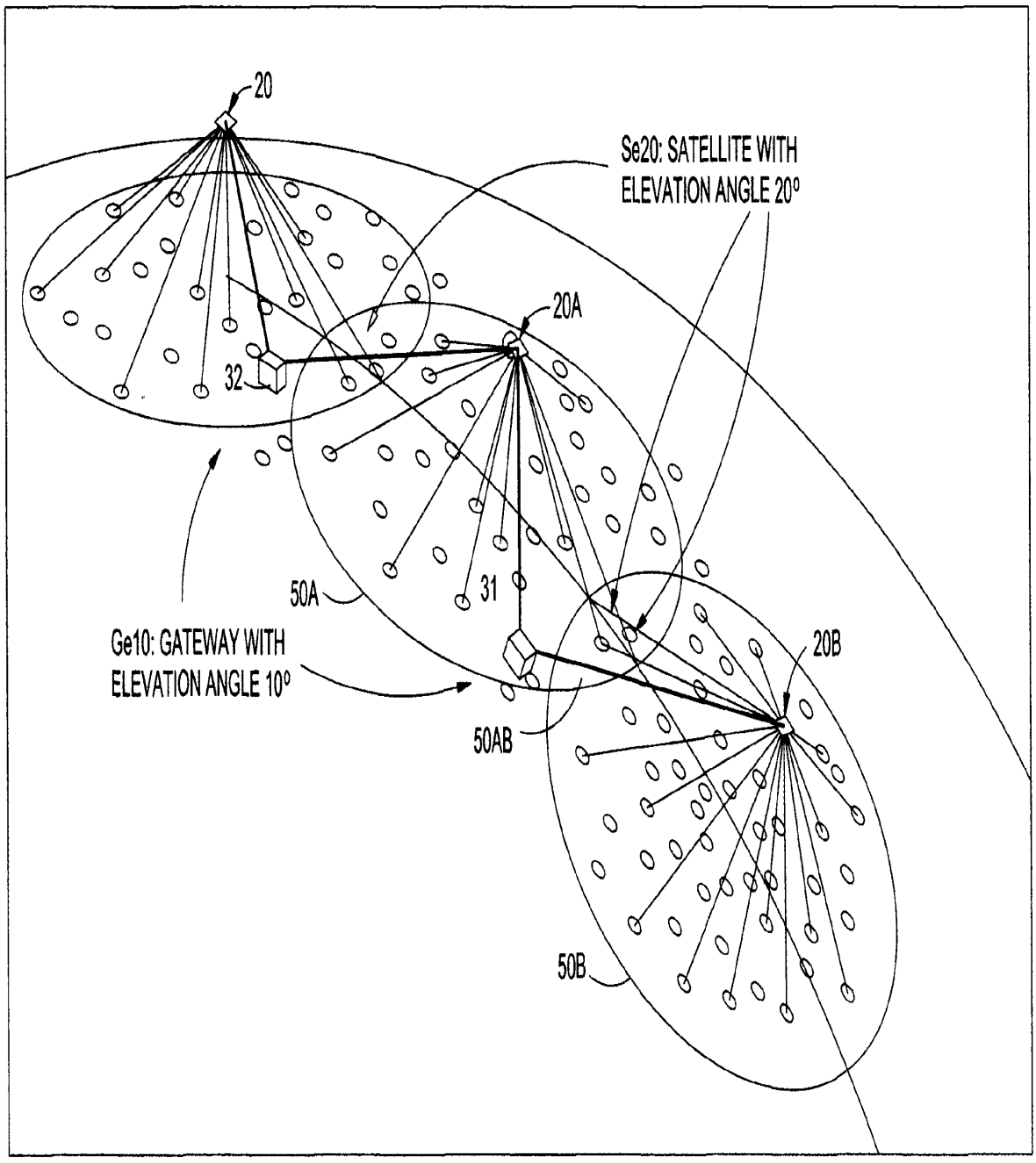
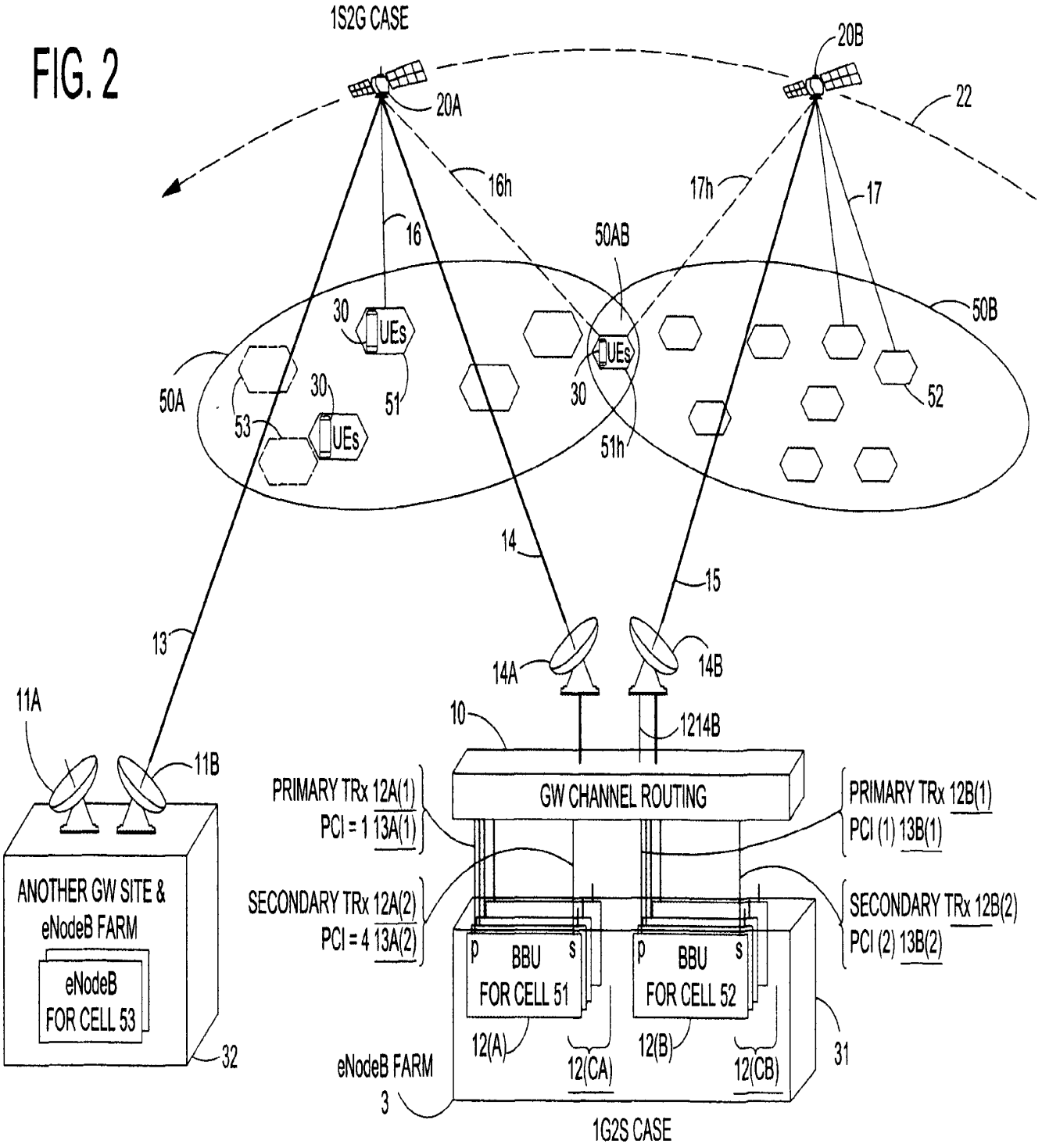


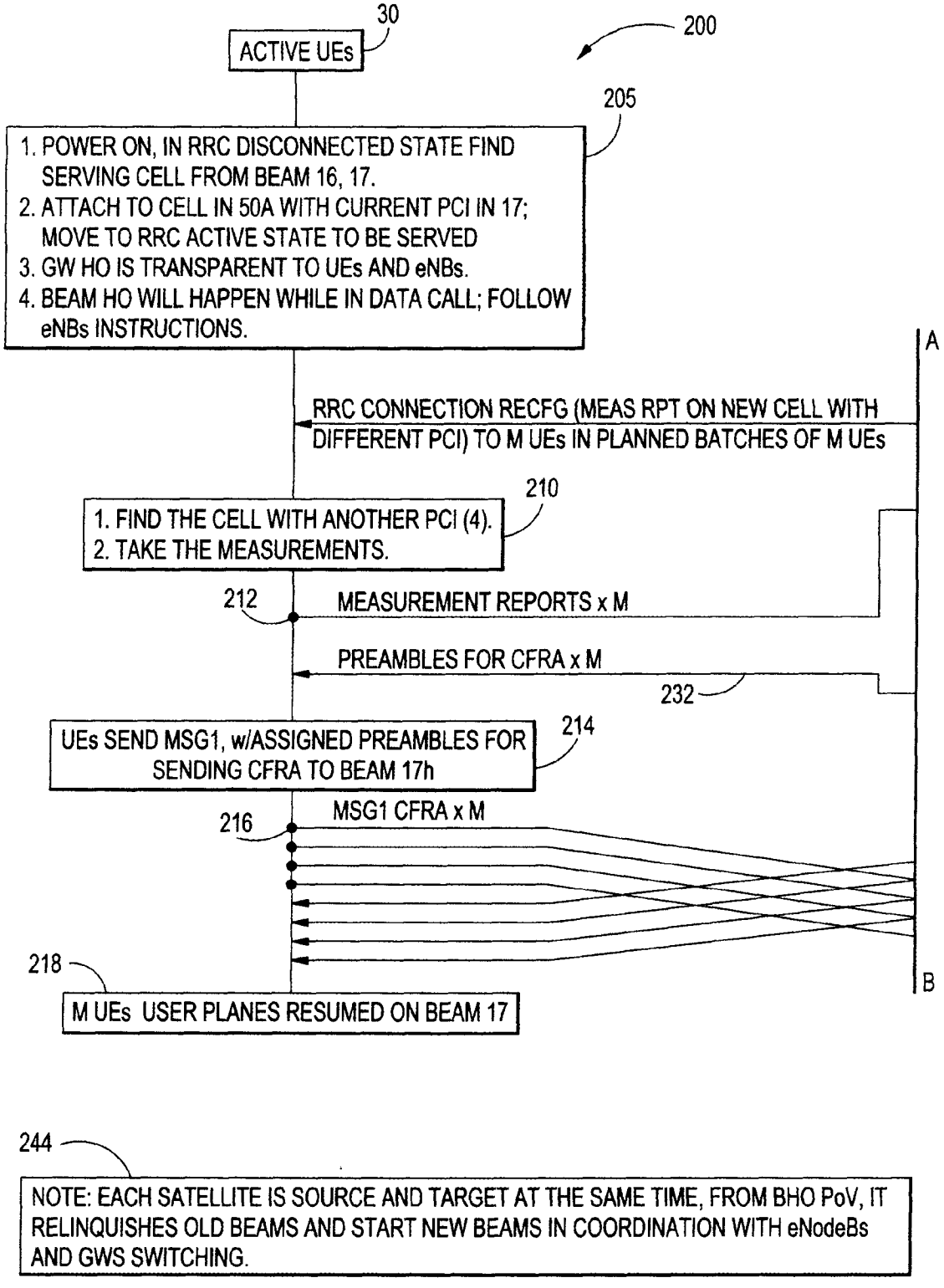
FIG. 1

REPLACEMENT SHEET

FIG. 2



REPLACEMENT SHEET



244

NOTE: EACH SATELLITE IS SOURCE AND TARGET AT THE SAME TIME, FROM BHO PoV, IT RELINQUISHES OLD BEAMS AND START NEW BEAMS IN COORDINATION WITH eNodeBs AND GWS SWITCHING.

FIG. 3(a)

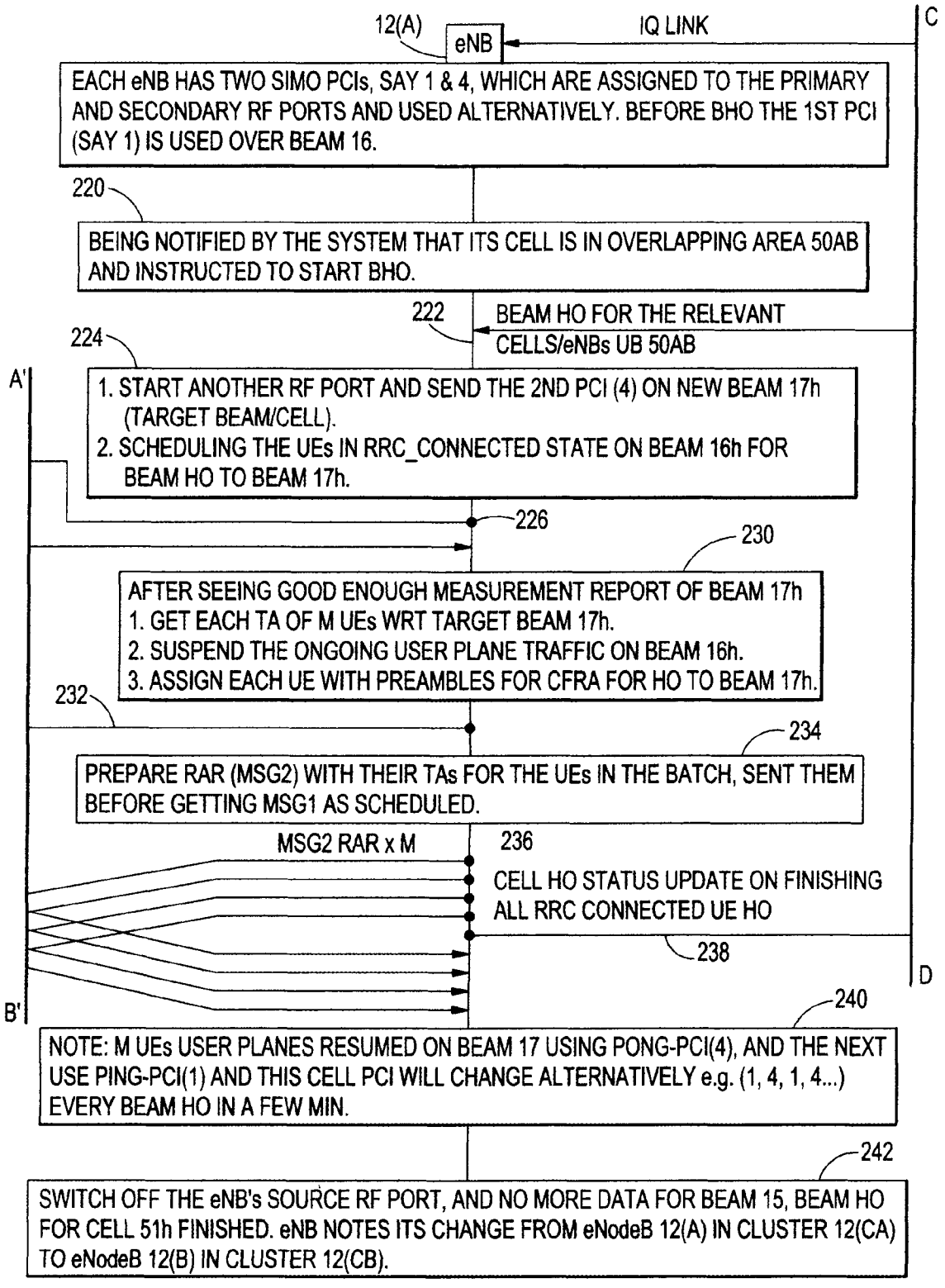

12(A)
eNB
IQ LINK
C
EACH eNB HAS TWO SIMO PCIs, SAY 1 & 4, WHICH ARE ASSIGNED TO THE PRIMARY AND SECONDARY RF PORTS AND USED ALTERNATIVELY. BEFORE BHO THE 1ST PCI (SAY 1) IS USED OVER BEAM 16.
220
BEING NOTIFIED BY THE SYSTEM THAT ITS CELL IS IN OVERLAPPING AREA 50AB AND INSTRUCTED TO START BHO.
222
BEAM HO FOR THE RELEVANT CELLS/eNBs UB 50AB
224
A'
1. START ANOTHER RF PORT AND SEND THE 2ND PCI (4) ON NEW BEAM 17h (TARGET BEAM/CELL).
2. SCHEDULING THE UEs IN RRC_CONNECTED STATE ON BEAM 16h FOR BEAM HO TO BEAM 17h.
226
230
AFTER SEEING GOOD ENOUGH MEASUREMENT REPORT OF BEAM 17h
1. GET EACH TA OF M UEs WRT TARGET BEAM 17h.
2. SUSPEND THE ONGOING USER PLANE TRAFFIC ON BEAM 16h.
3. ASSIGN EACH UE WITH PREAMBLES FOR CFRA FOR HO TO BEAM 17h.
232
234
PREPARE RAR (MSG2) WITH THEIR TAs FOR THE UEs IN THE BATCH, SENT THEM BEFORE GETTING MSG1 AS SCHEDULED.
MSG2 RAR x M
236
CELL HO STATUS UPDATE ON FINISHING ALL RRC CONNECTED UE HO
238
D
B'
240
NOTE: M UEs USER PLANES RESUMED ON BEAM 17 USING PONG-PCI(4), AND THE NEXT USE PING-PCI(1) AND THIS CELL PCI WILL CHANGE ALTERNATIVELY e.g. (1, 4, 1, 4...) EVERY BEAM HO IN A FEW MIN.
242
SWITCH OFF THE eNB's SOURCE RF PORT, AND NO MORE DATA FOR BEAM 15, BEAM HO FOR CELL 51h FINISHED. eNB NOTES ITS CHANGE FROM eNodeB 12(A) IN CLUSTER 12(CA) TO eNodeB 12(B) IN CLUSTER 12(CB).

FIG. 3(b)

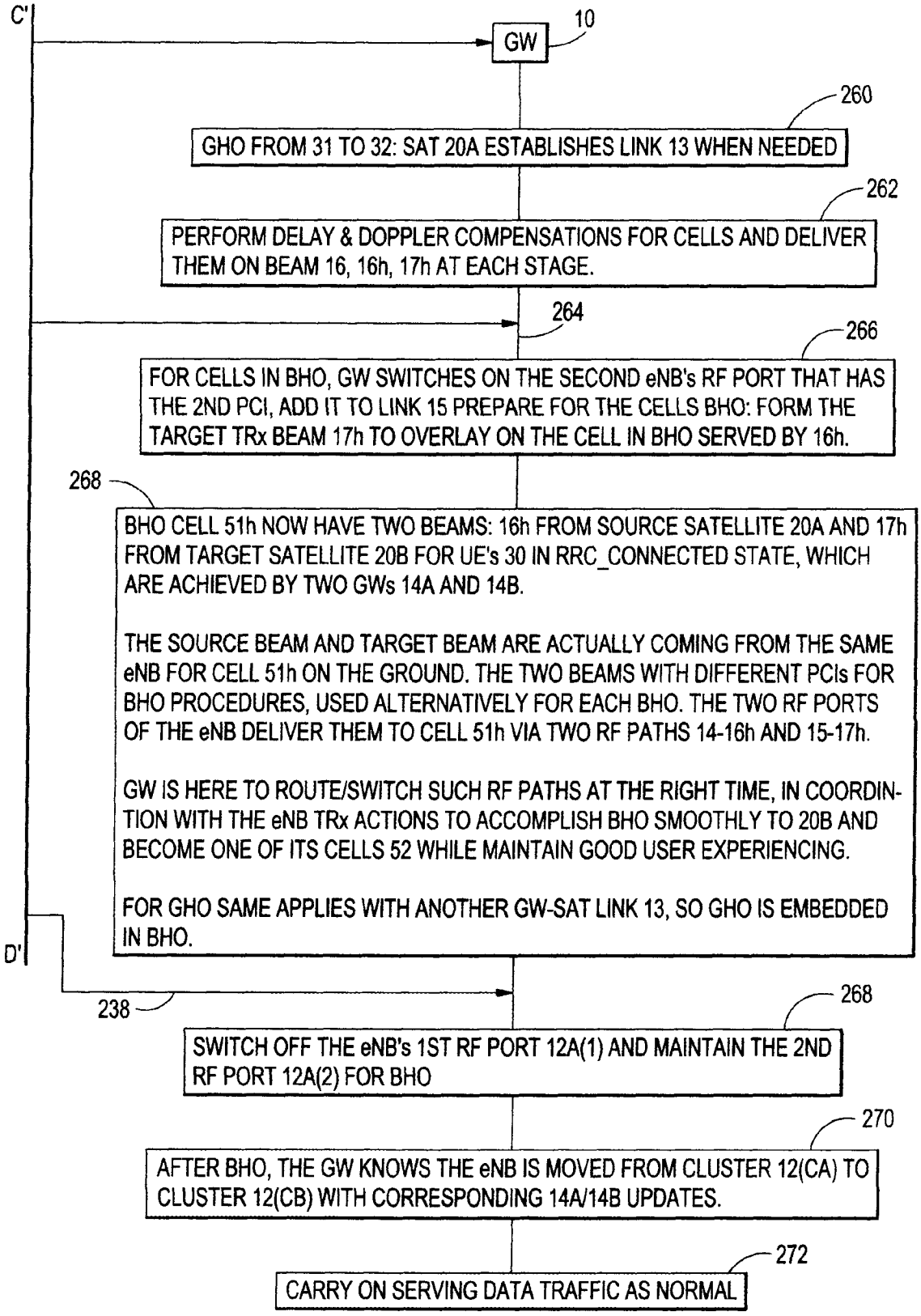

C'
GW
10
260
GHO FROM 31 TO 32: SAT 20A ESTABLISHES LINK 13 WHEN NEEDED
262
PERFORM DELAY & DOPPLER COMPENSATIONS FOR CELLS AND DELIVER THEM ON BEAM 16, 16h, 17h AT EACH STAGE.
264
266
FOR CELLS IN BHO, GW SWITCHES ON THE SECOND eNB's RF PORT THAT HAS THE 2ND PCI, ADD IT TO LINK 15 PREPARE FOR THE CELLS BHO: FORM THE TARGET TRx BEAM 17h TO OVERLAY ON THE CELL IN BHO SERVED BY 16h.
268
BHO CELL 51h NOW HAVE TWO BEAMS: 16h FROM SOURCE SATELLITE 20A AND 17h FROM TARGET SATELLITE 20B FOR UE's 30 IN RRC_CONNECTED STATE, WHICH ARE ACHIEVED BY TWO GWs 14A AND 14B.
THE SOURCE BEAM AND TARGET BEAM ARE ACTUALLY COMING FROM THE SAME eNB FOR CELL 51h ON THE GROUND. THE TWO BEAMS WITH DIFFERENT PCIs FOR BHO PROCEDURES, USED ALTERNATIVELY FOR EACH BHO. THE TWO RF PORTS OF THE eNB DELIVER THEM TO CELL 51h VIA TWO RF PATHS 14-16h AND 15-17h.
GW IS HERE TO ROUTE/SWITCH SUCH RF PATHS AT THE RIGHT TIME, IN COORDINTION WITH THE eNB TRx ACTIONS TO ACCOMPLISH BHO SMOOTHLY TO 20B AND BECOME ONE OF ITS CELLS 52 WHILE MAINTAIN GOOD USER EXPERIENCING.
FOR GHO SAME APPLIES WITH ANOTHER GW-SAT LINK 13, SO GHO IS EMBEDDED IN BHO.
D'
238
268
SWITCH OFF THE eNB's 1ST RF PORT 12A(1) AND MAINTAIN THE 2ND RF PORT 12A(2) FOR BHO
270
AFTER BHO, THE GW KNOWS THE eNB IS MOVED FROM CLUSTER 12(CA) TO CLUSTER 12(CB) WITH CORRESPONDING 14A/14B UPDATES.
272
CARRY ON SERVING DATA TRAFFIC AS NORMAL

FIG. 3(c)

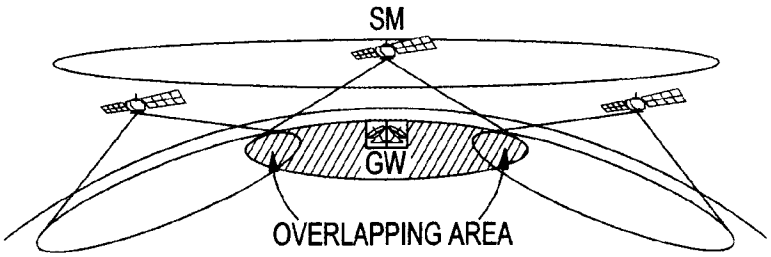


FIG. 4(a)

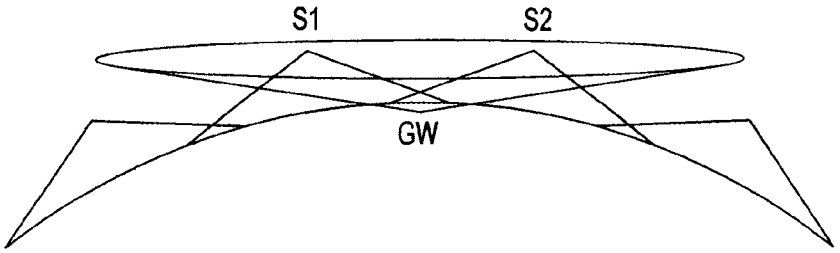


FIG. 4(b)

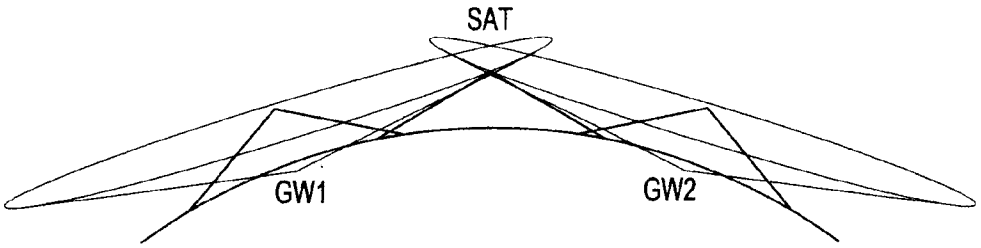


FIG. 4(c)

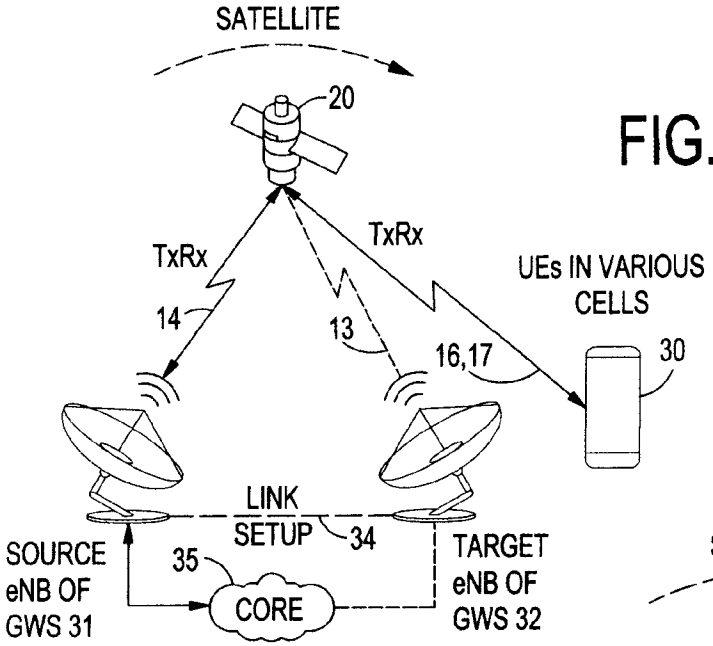


FIG. 5(a)

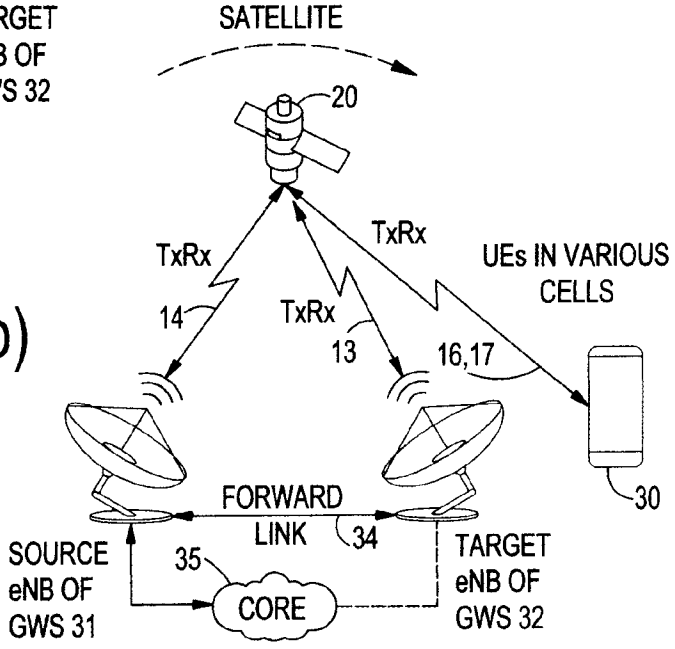


FIG. 5(b)

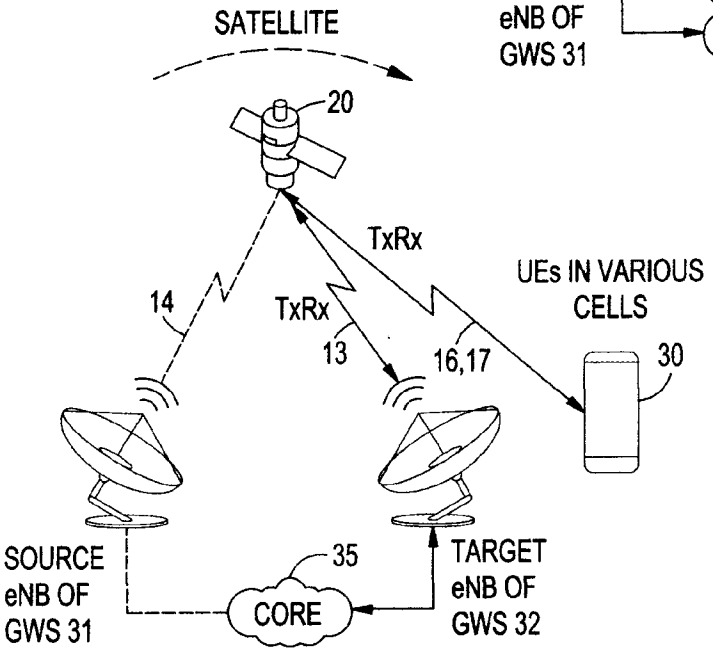


FIG. 5(c)