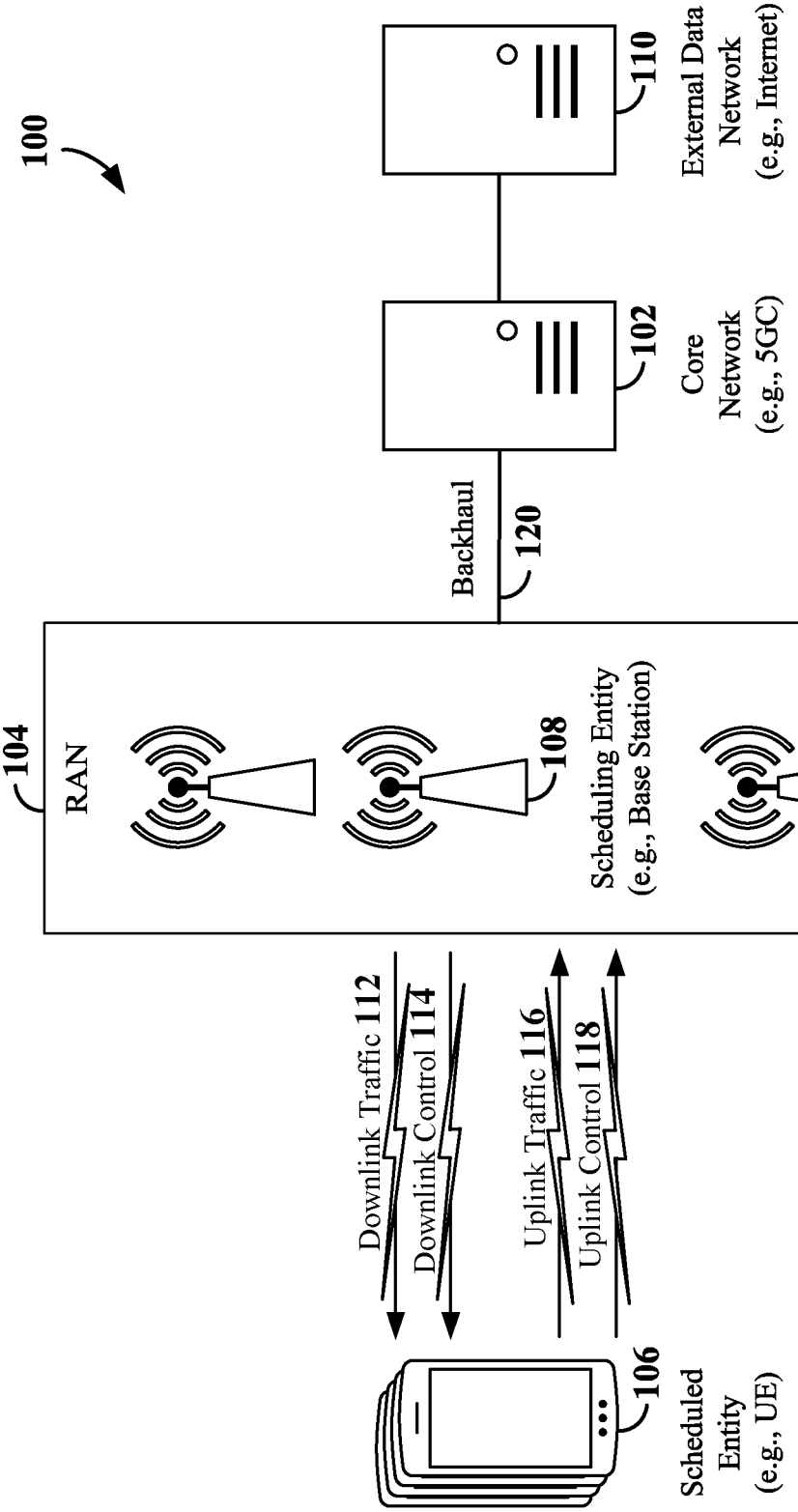

100
104
RAN
108
Scheduling Entity
(e.g., Base Station)
Backhaul
120
102
Core
Network
(e.g., 5GC)
110
External Data
Network
(e.g., Internet)
Downlink Traffic 112
Downlink Control 114
Uplink Traffic 116
Uplink Control 118
106
Scheduled
Entity
(e.g., UE)

FIG. 1

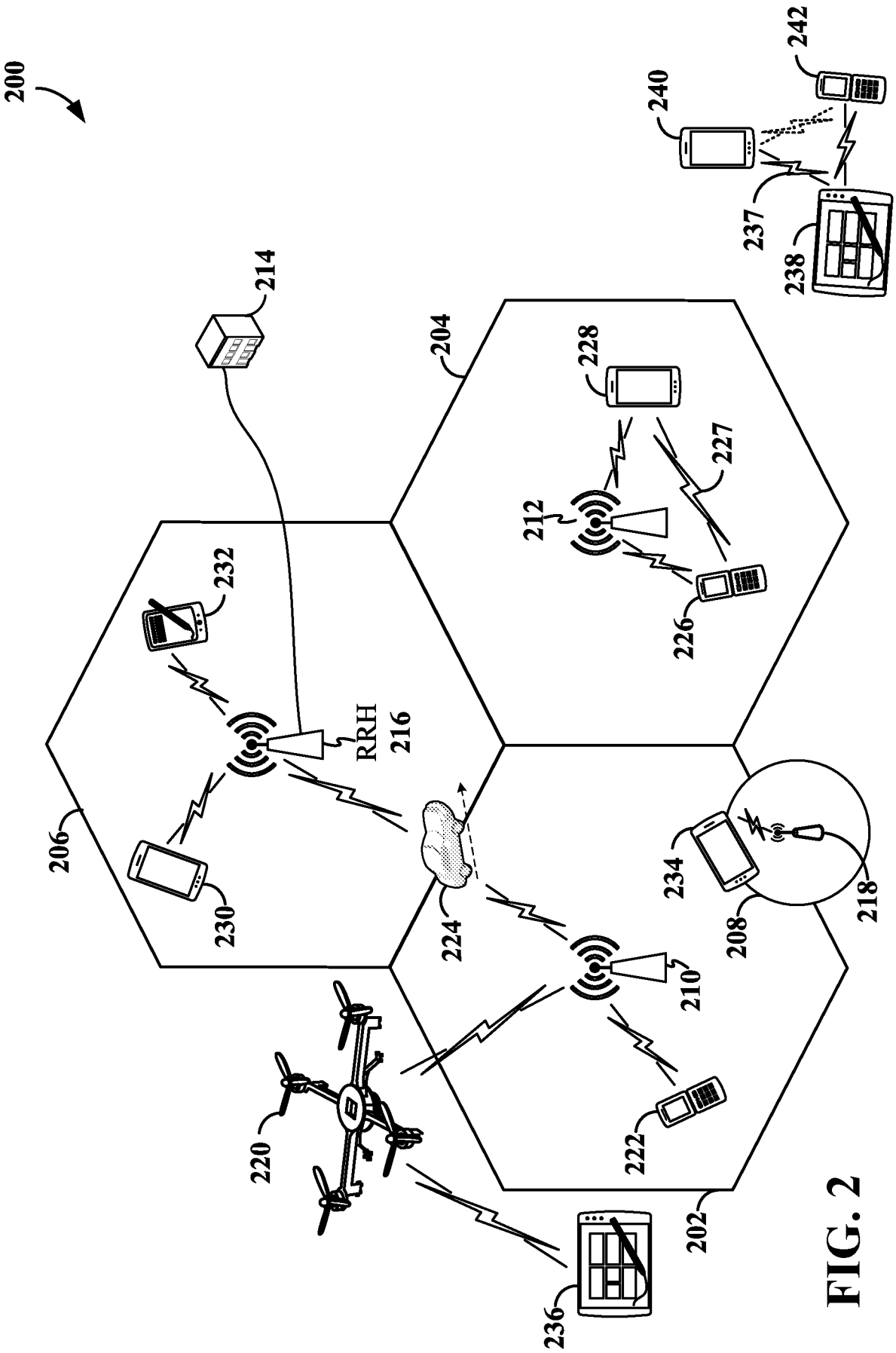

200
202
204
206
208
210
212
214
216
RRH
218
220
222
224
226
227
228
230
232
234
236
237
238
240
242

FIG. 2

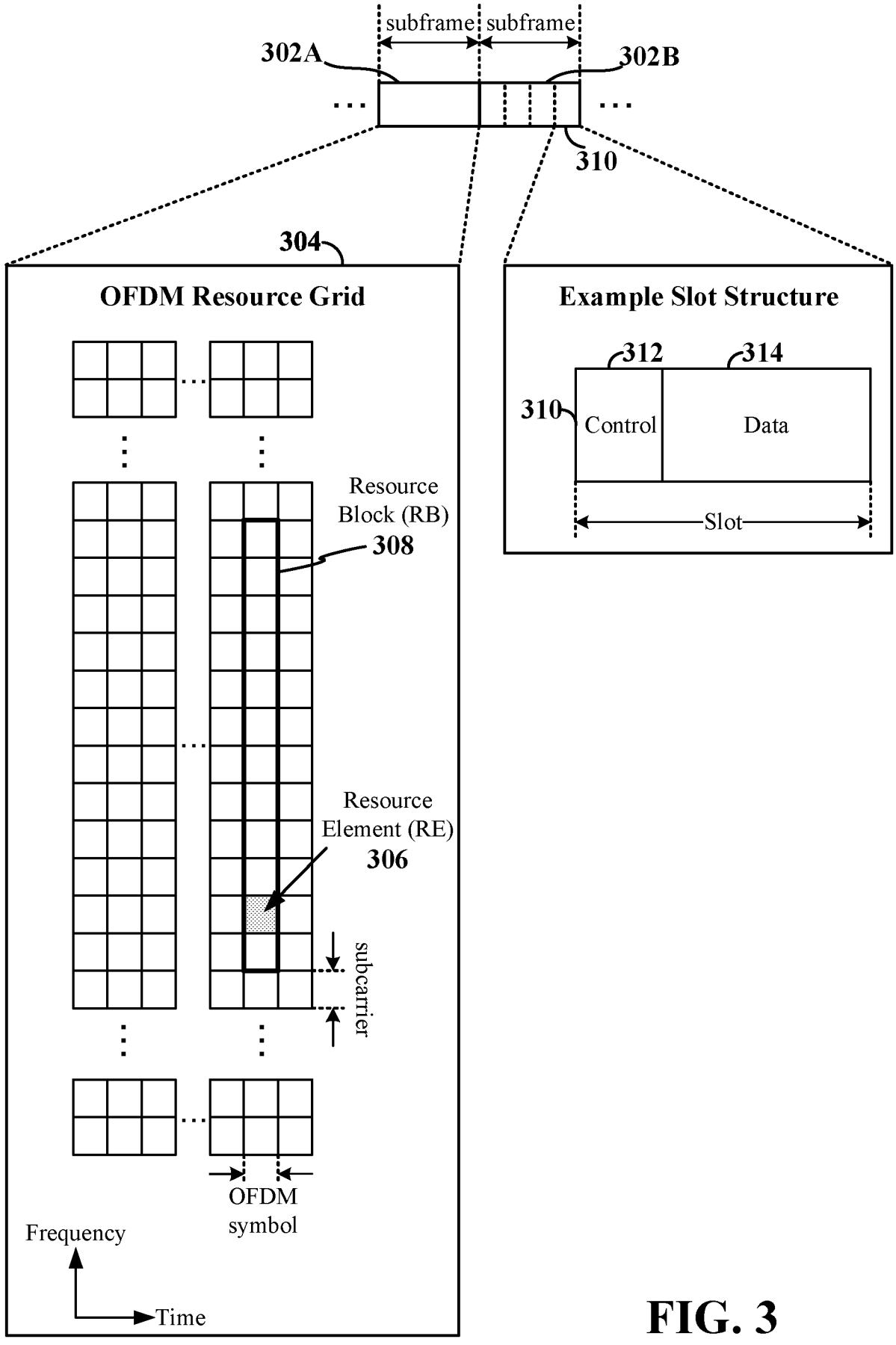

subframe
subframe
302A
302B
310
304
OFDM Resource Grid
Example Slot Structure
312
314
310
Control
Data
Slot
Resource Block (RB)
308
Resource Element (RE)
306
subcarrier
OFDM symbol
Frequency
Time

FIG. 3

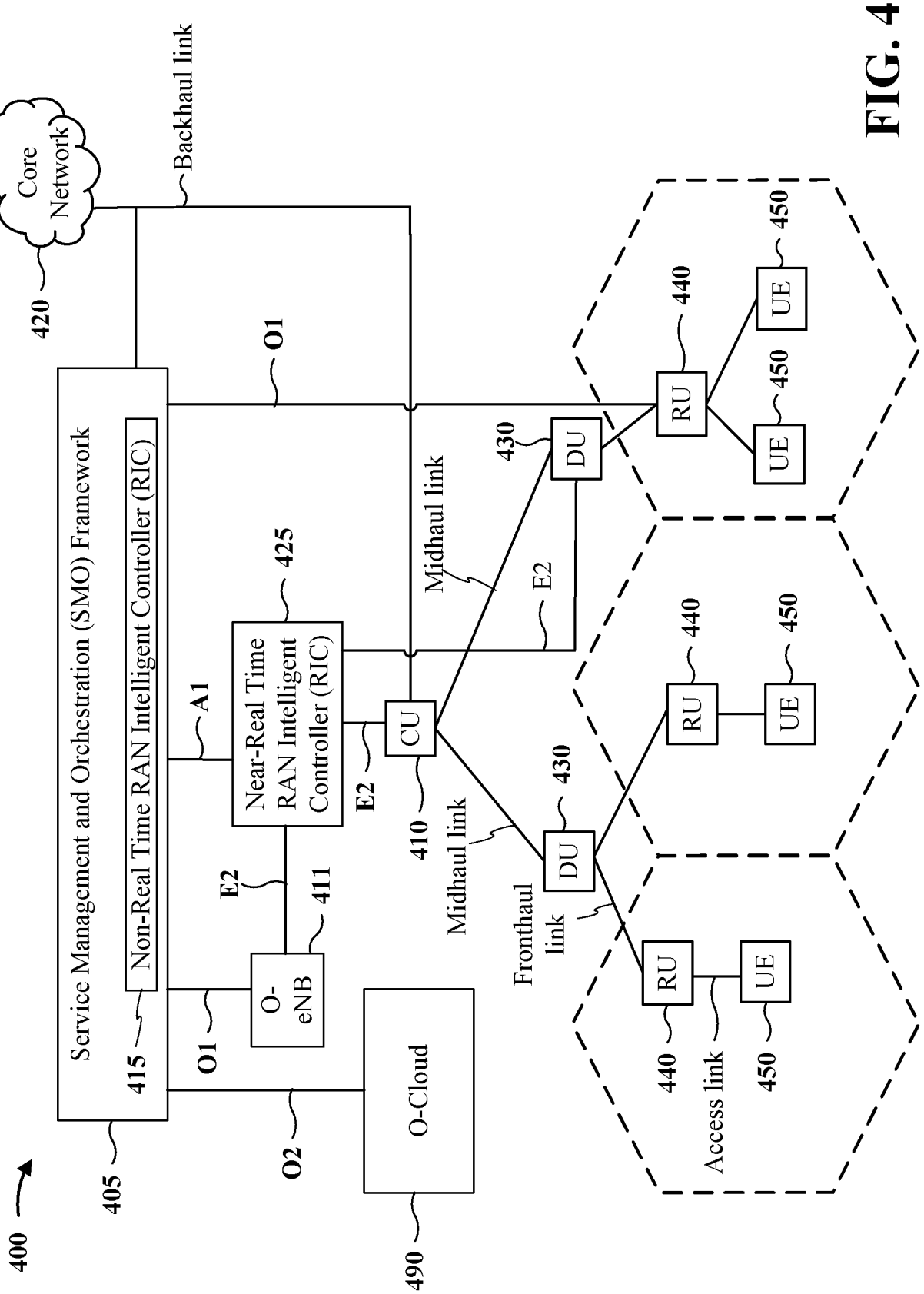

400
405
Service Management and Orchestration (SMO) Framework
Non-Real Time RAN Intelligent Controller (RIC)
415
A1
Near-Real Time RAN Intelligent Controller (RIC)
425
O1
O2
O-eNB
411
E2
O-Cloud
490
Core Network
420
Backhaul link
O1
CU
410
E2
Midhaul link
DU
430
Midhaul link
Fronthaul link
E2
RU
440
UE
450
Access link

FIG. 4

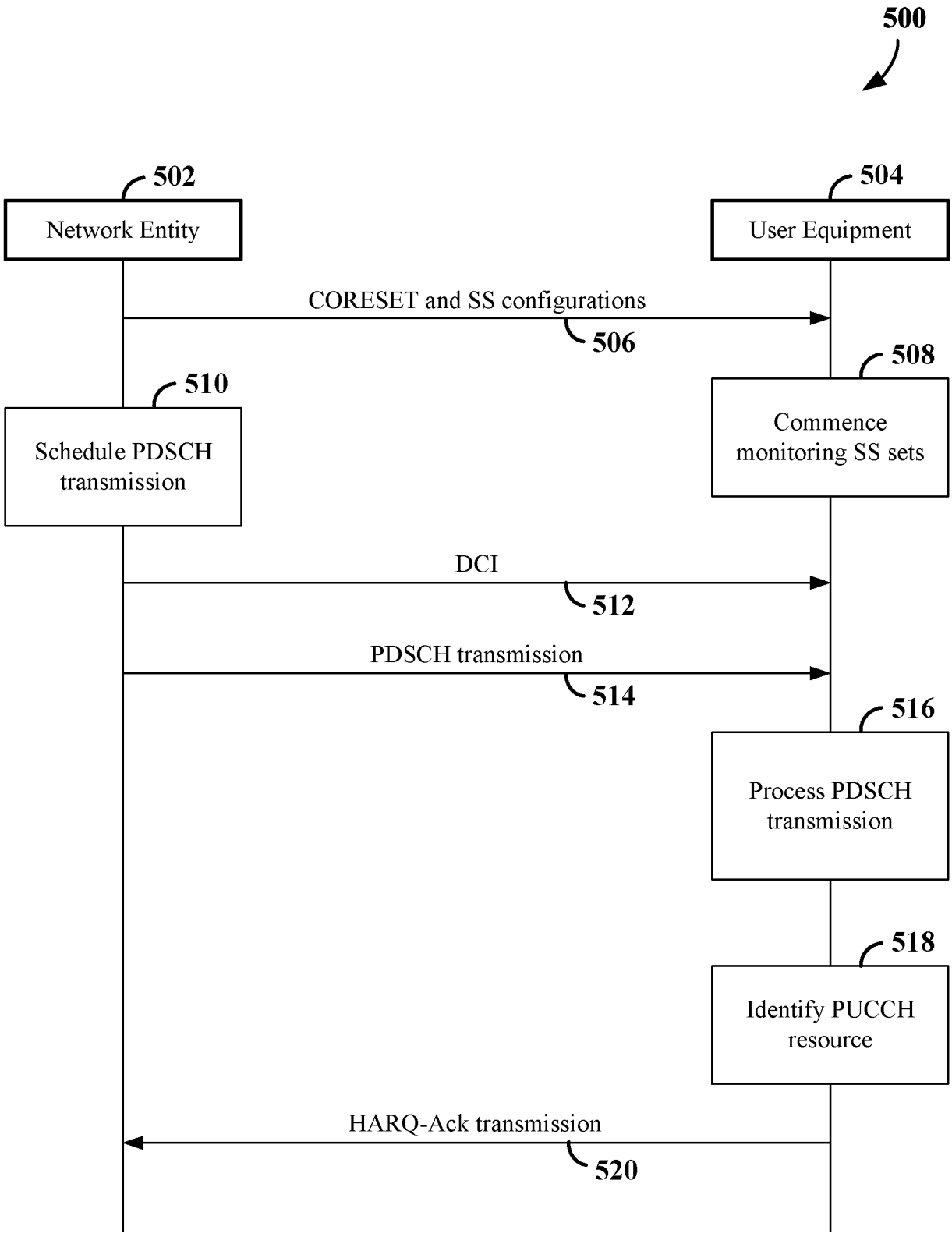

500
502
Network Entity
504
User Equipment
CORESET and SS configurations
506
508
Commence monitoring SS sets
510
Schedule PDSCH transmission
DCI
512
PDSCH transmission
514
516
Process PDSCH transmission
518
Identify PUCCH resource
HARQ-Ack transmission
520

FIG. 5

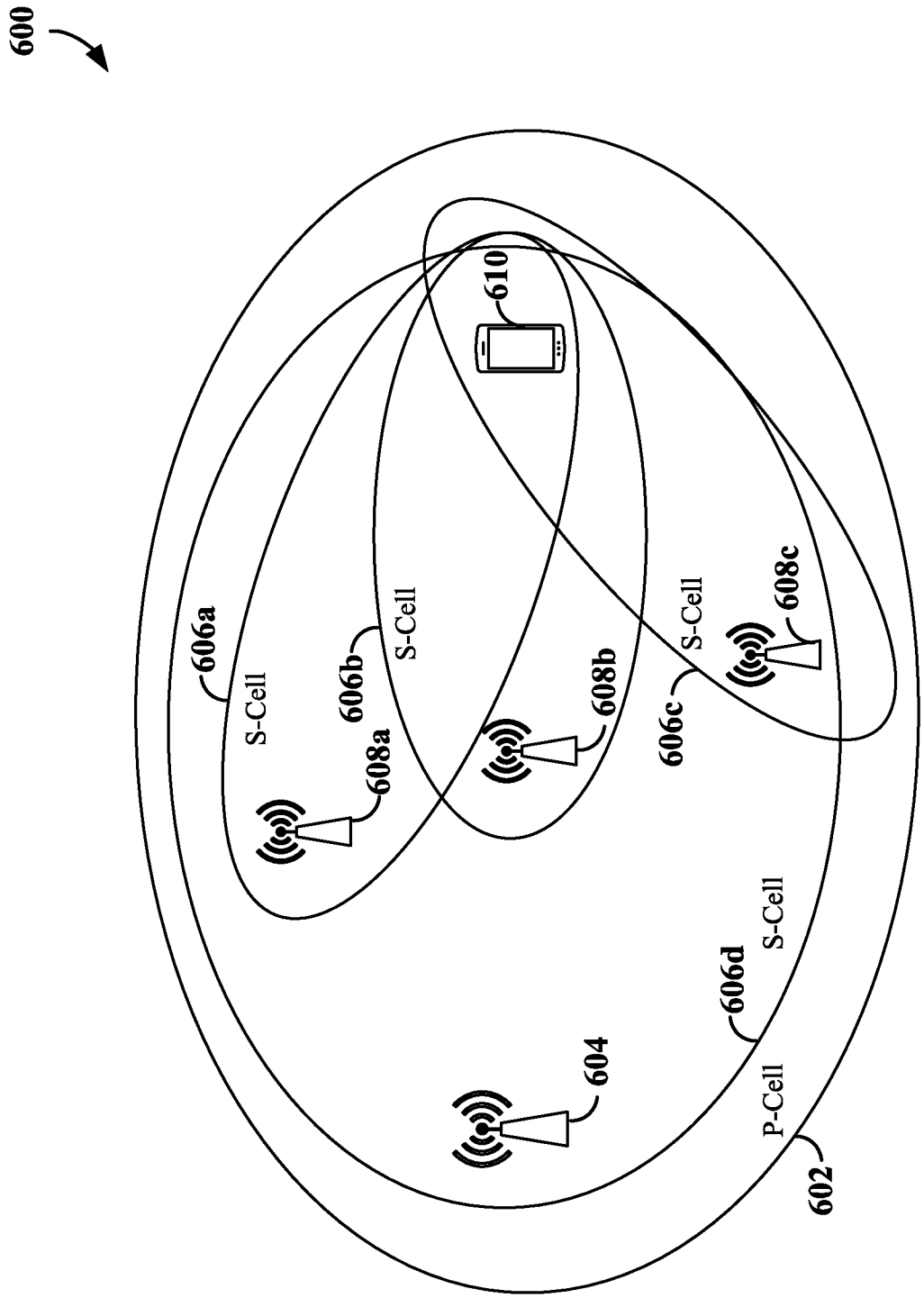

600
602
604
606a
S-Cell
606b
S-Cell
606c
S-Cell
606d
S-Cell
P-Cell
608a
608b
608c
610

FIG. 6

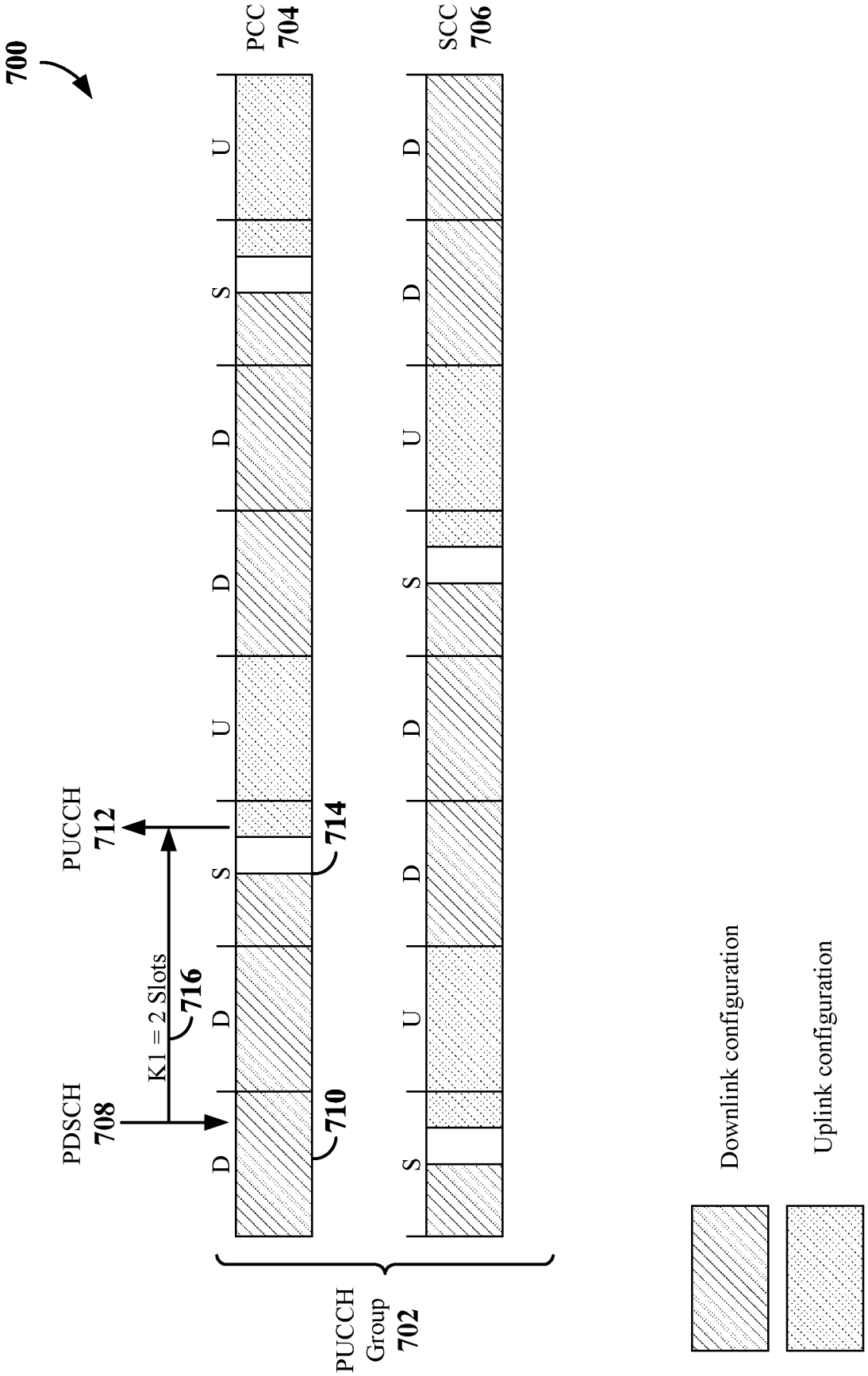

700
PCC
704
SCC
706
PUCCH
712
PDSCH
708
K1 = 2 Slots
716
714
710
D
D
D
D
S
U
U
D
D
S
U
D
D
S
U
D
D
S
U
PUCCH
Group
702
Downlink configuration
Uplink configuration

FIG. 7

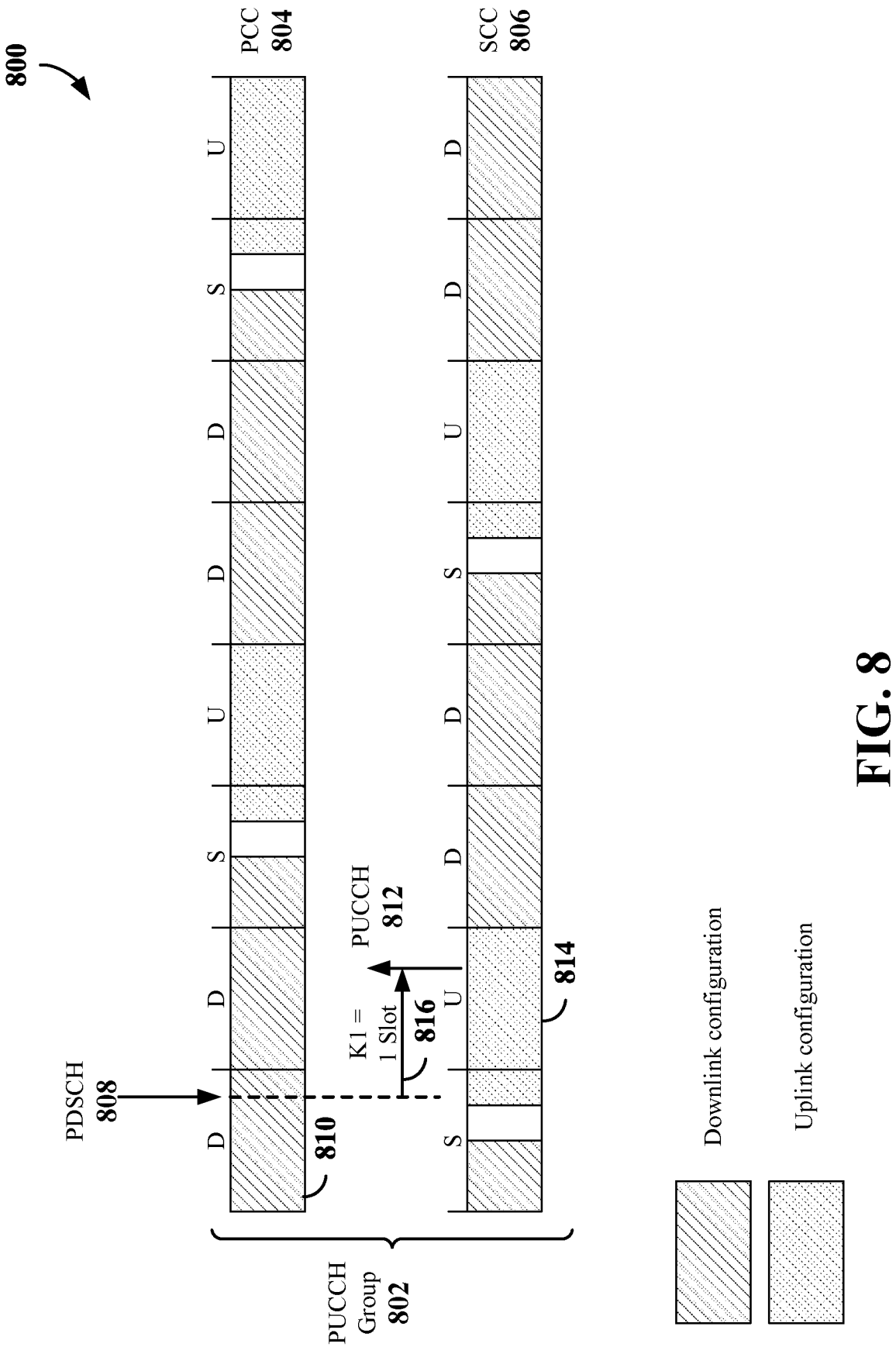

800
PCC
804
SCC
806
D
D
D
S
U
D
D
U
D
S
U
D
D
S
U
PDSCH
808
810
K1 =
1 Slot
816
PUCCH
812
814
PUCCH
Group
802
Downlink configuration
Uplink configuration

FIG. 8

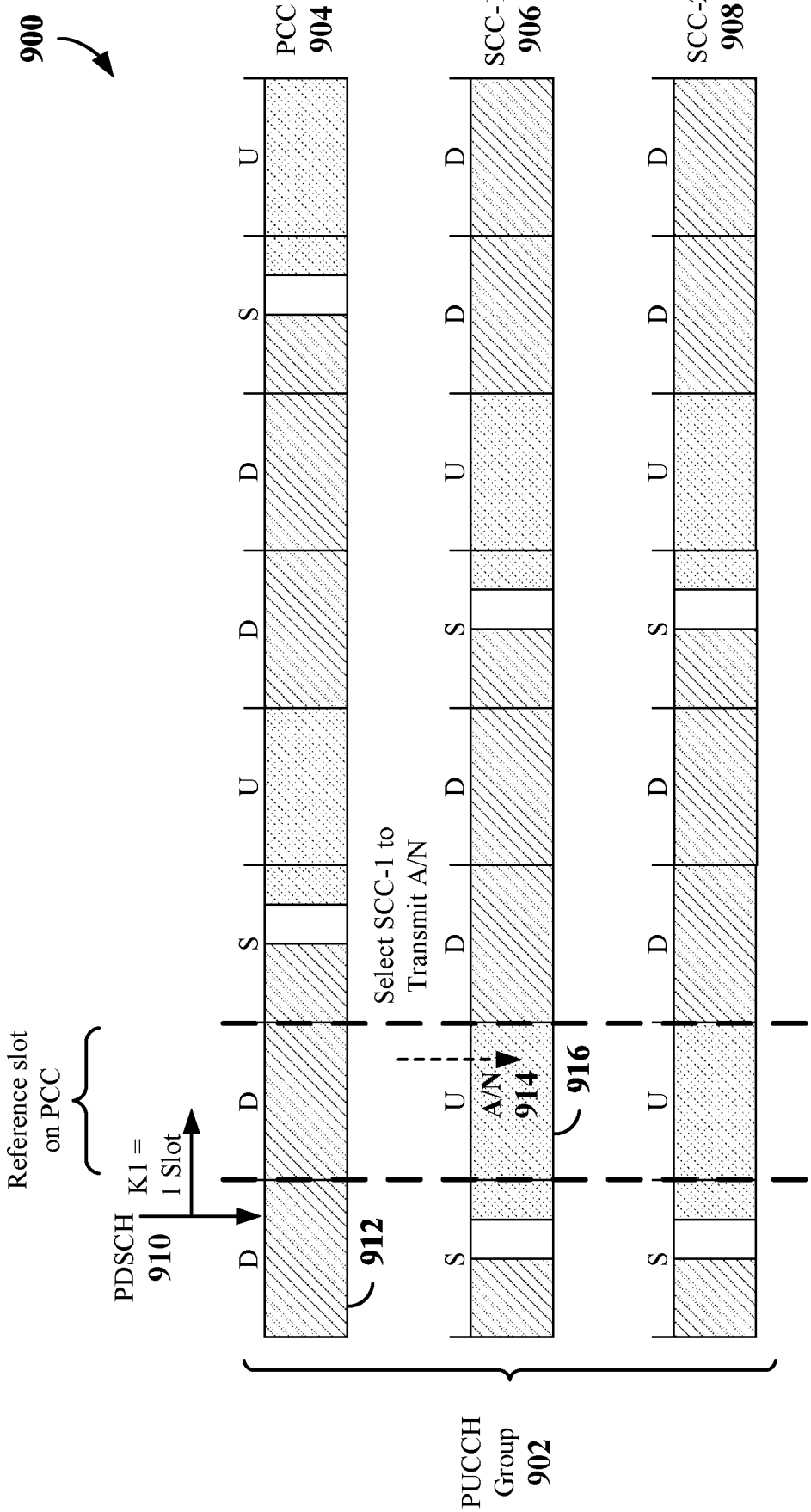

900
PCC
904
SCC-1
906
SCC-2
908
Reference slot
on PCC
PDSCH
910
K1 =
1 Slot
912
Select SCC-1 to
Transmit A/N
A/N
914
916
PUCCH
Group
902
Downlink configuration
Uplink configuration

FIG. 9

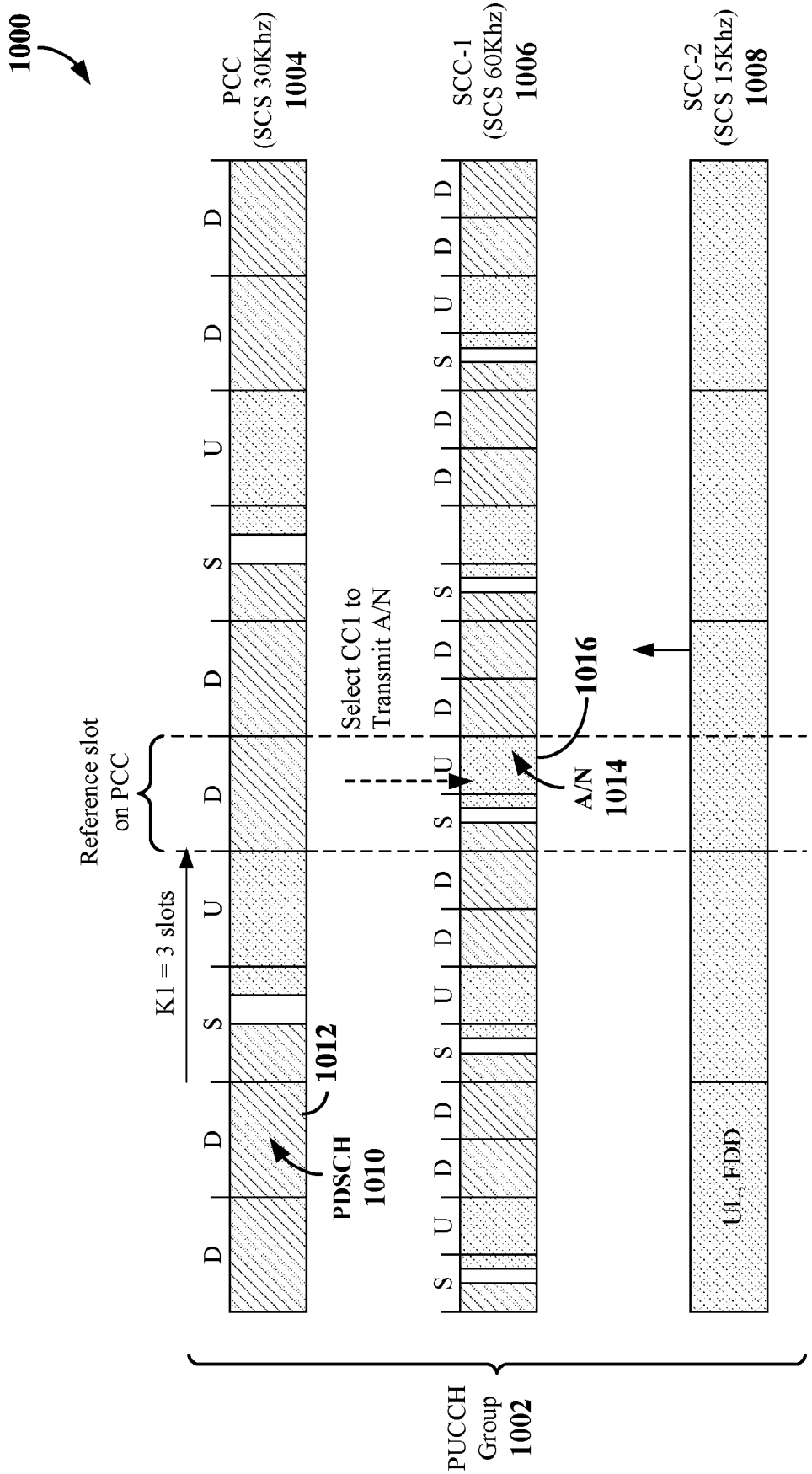

1000
PCC
(SCS 30Khz)
1004
SCC-1
(SCS 60Khz)
1006
SCC-2
(SCS 15Khz)
1008
Reference slot
on PCC
K1 = 3 slots
PDSCH
1010
1012
Select CC1 to
Transmit A/N
A/N
1014
1016
UL, FDD
PUCCH
Group
1002

FIG. 10

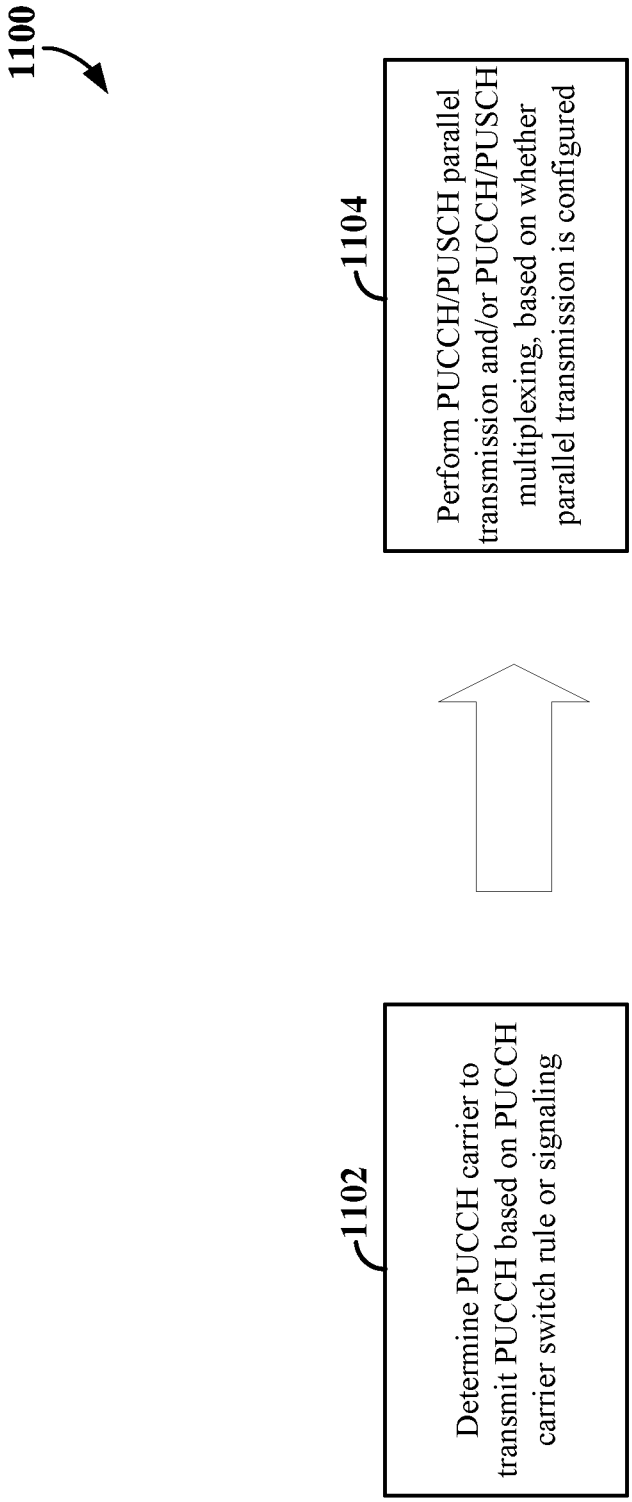

1100
1102
Determine PUCCH carrier to transmit PUCCH based on PUCCH carrier switch rule or signaling
1104
Perform PUCCH/PUSCH parallel transmission and/or PUCCH/PUSCH multiplexing, based on whether parallel transmission is configured

FIG. 11

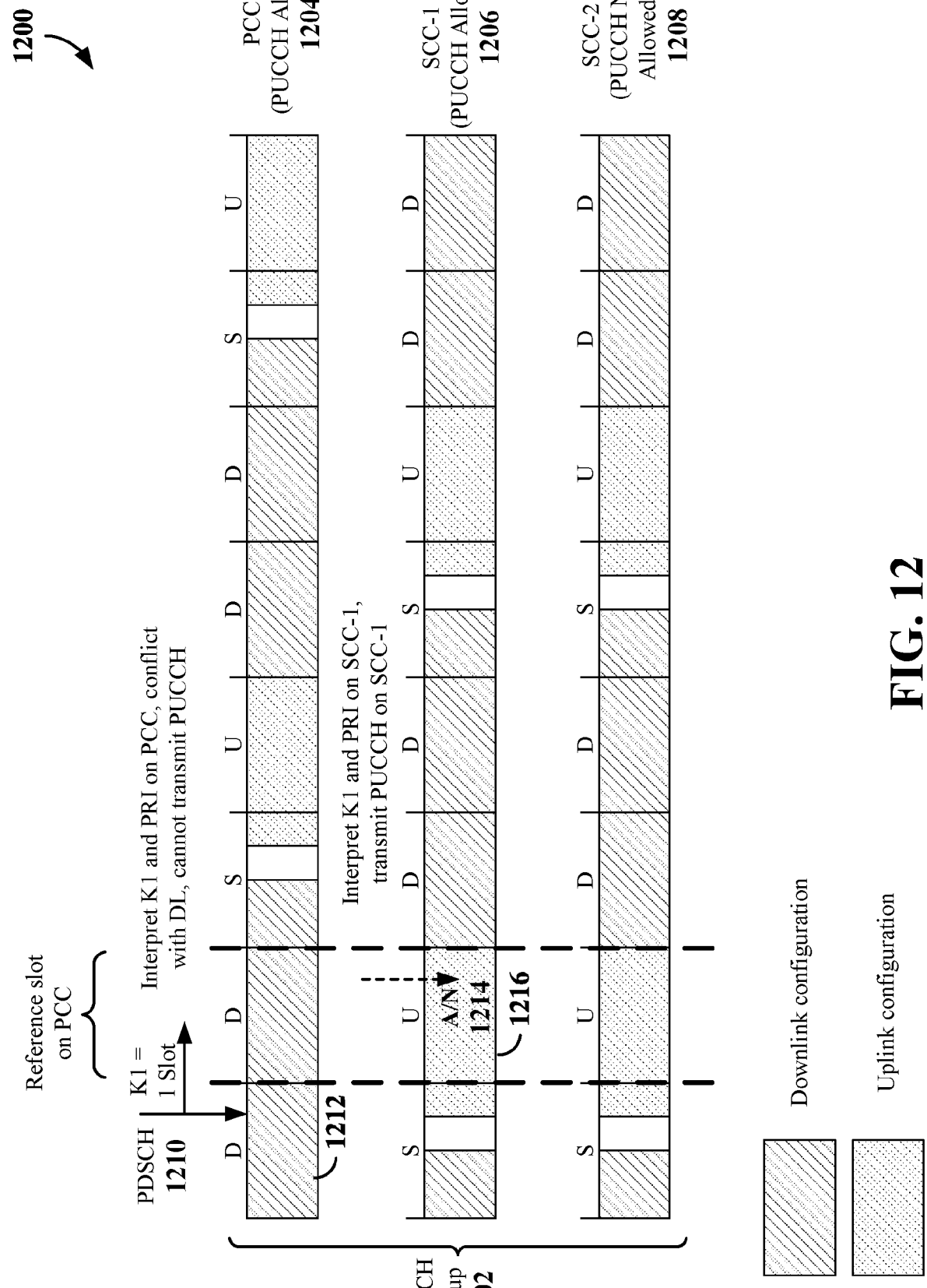

1200
PCC (PUCCH Allowed) 1204
SCC-1 (PUCCH Allowed) 1206
SCC-2 (PUCCH Not Allowed) 1208
Reference slot on PCC
K1 = 1 Slot
PDSCH 1210
Interpret K1 and PRI on PCC, conflict with DL, cannot transmit PUCCH
Interpret K1 and PRI on SCC-1, transmit PUCCH on SCC-1
1212
A/N
1214
1216
PUCCH Group 1202
D
S
U
Downlink configuration
Uplink configuration

FIG. 12

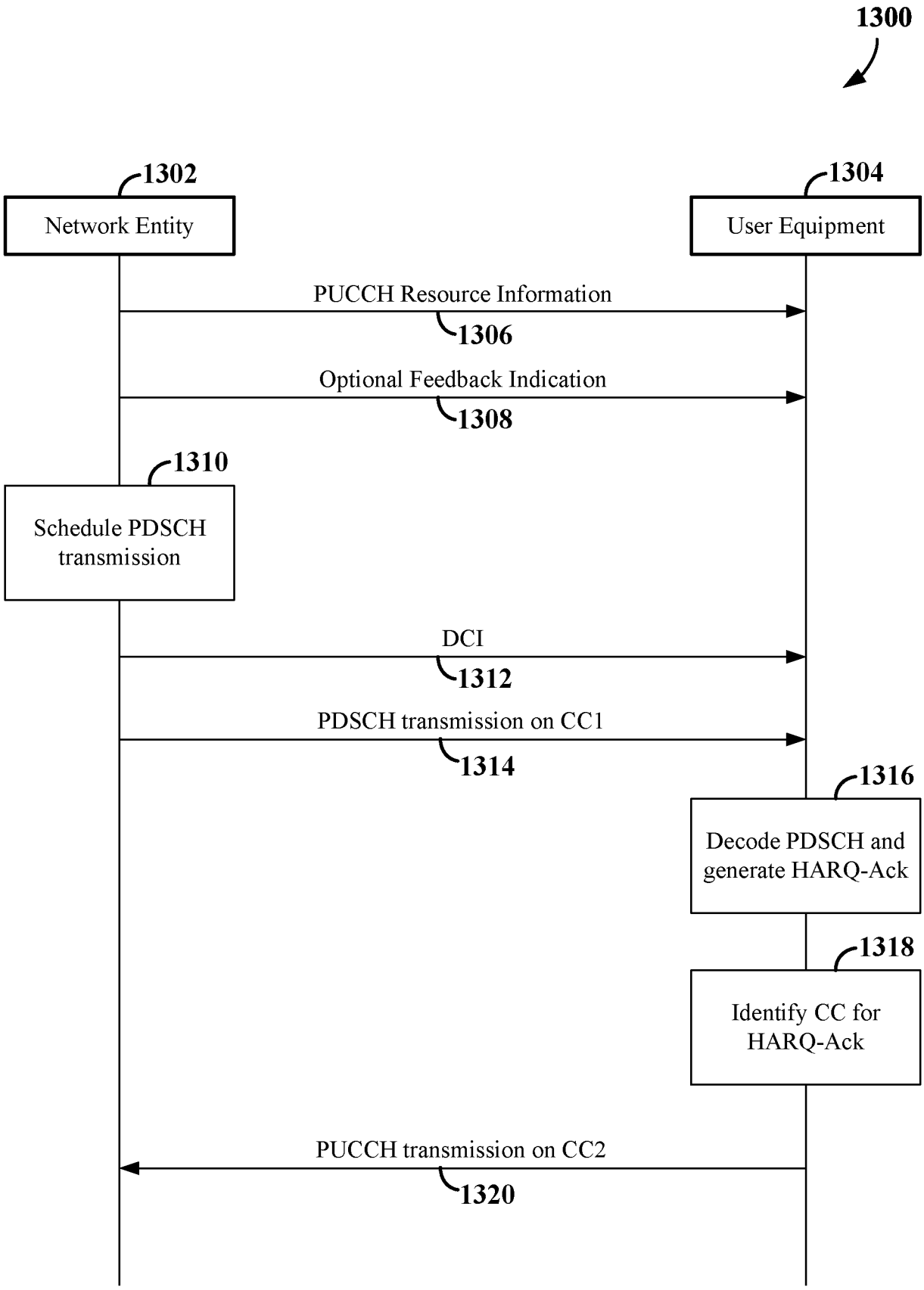

1300
1302
Network Entity
1304
User Equipment
PUCCH Resource Information
1306
Optional Feedback Indication
1308
1310
Schedule PDSCH transmission
DCI
1312
PDSCH transmission on CC1
1314
1316
Decode PDSCH and generate HARQ-Ack
1318
Identify CC for HARQ-Ack
PUCCH transmission on CC2
1320

FIG. 13

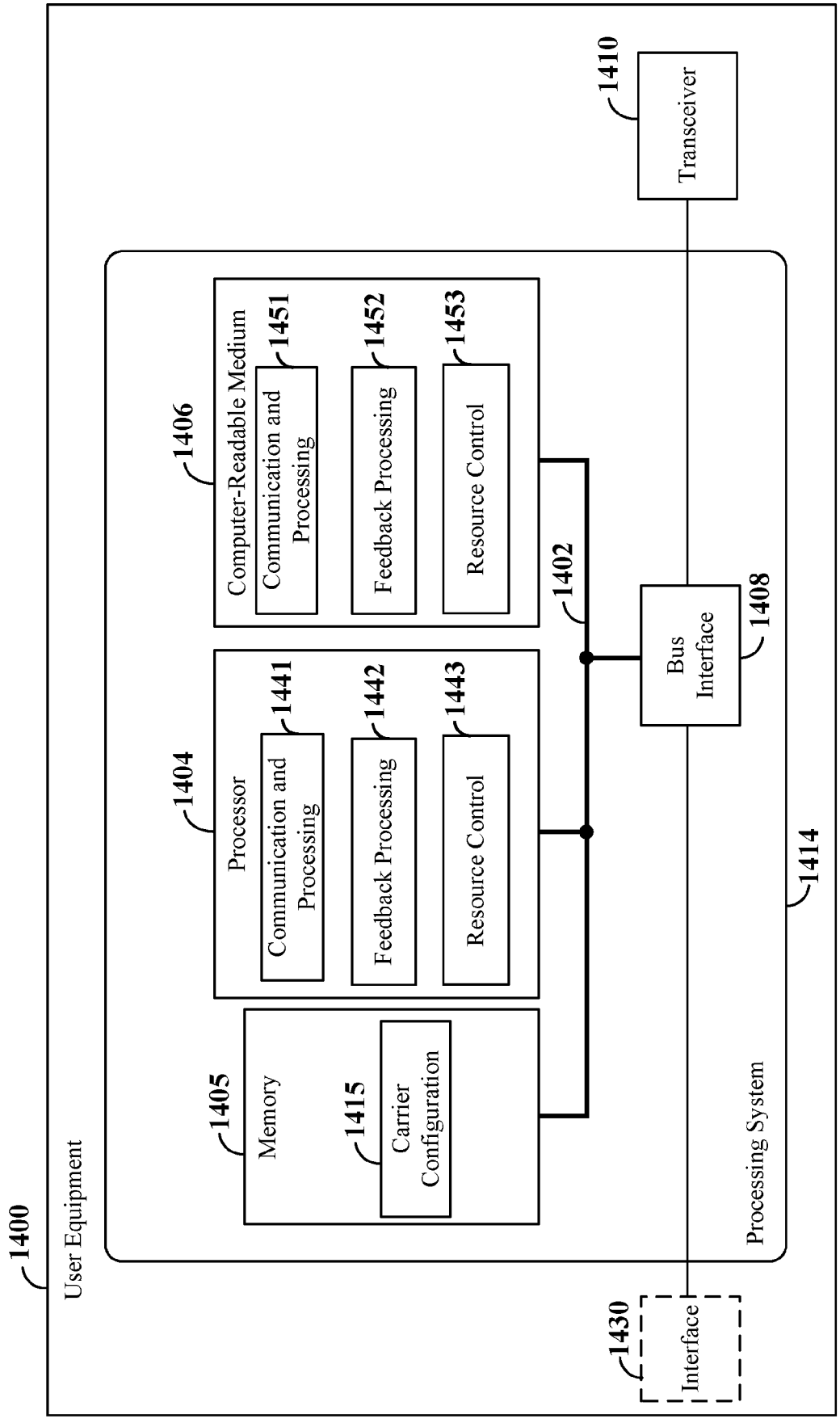

1400
User Equipment
1410
Transceiver
1406
Computer-Readable Medium
1451
Communication and Processing
1452
Feedback Processing
1453
Resource Control
1404
Processor
1441
Communication and Processing
1442
Feedback Processing
1443
Resource Control
1402
1405
Memory
1415
Carrier Configuration
Bus Interface
1408
1414
Processing System
1430
Interface

FIG. 14

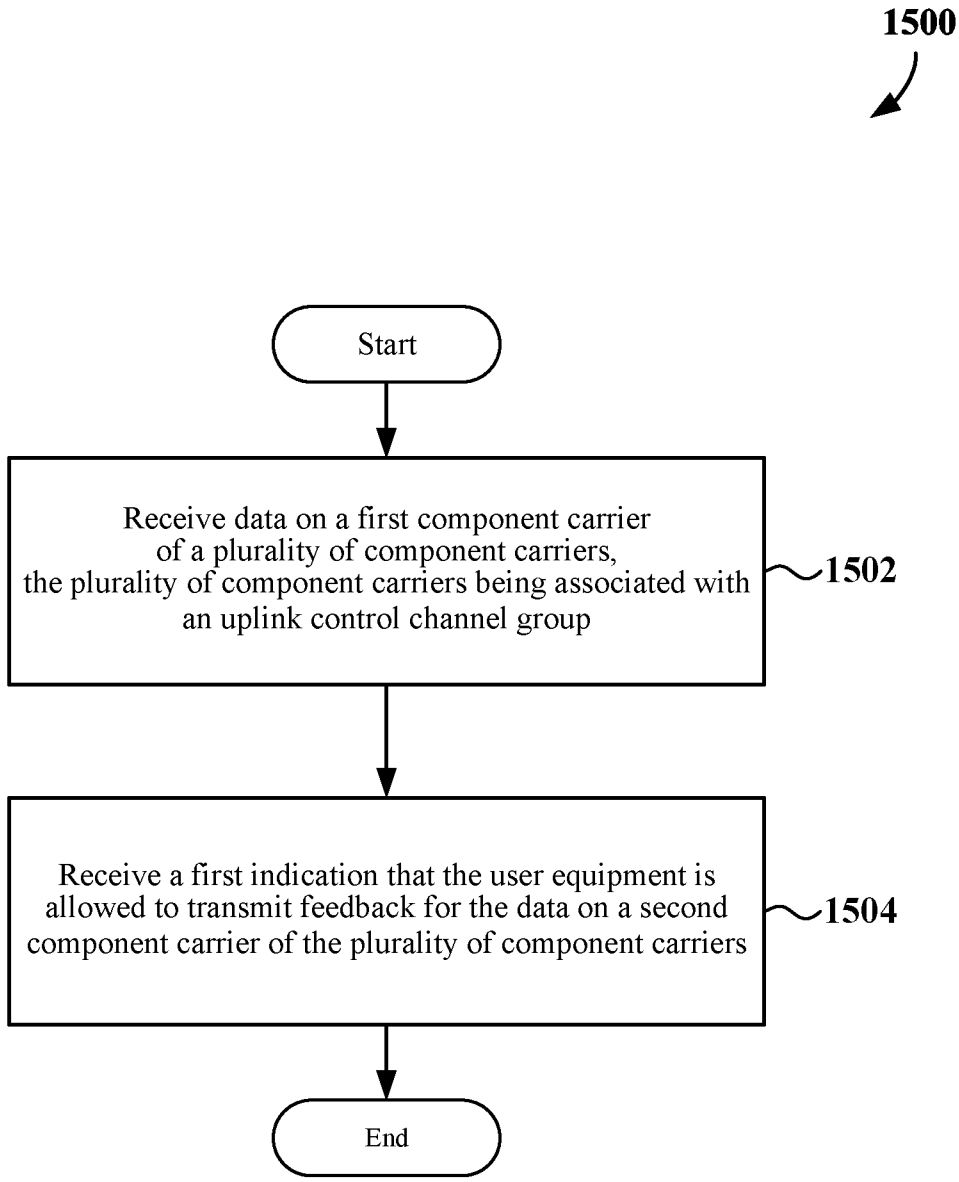

1500
Start
Receive data on a first component carrier of a plurality of component carriers, the plurality of component carriers being associated with an uplink control channel group
1502
Receive a first indication that the user equipment is allowed to transmit feedback for the data on a second component carrier of the plurality of component carriers
1504
End

FIG. 15

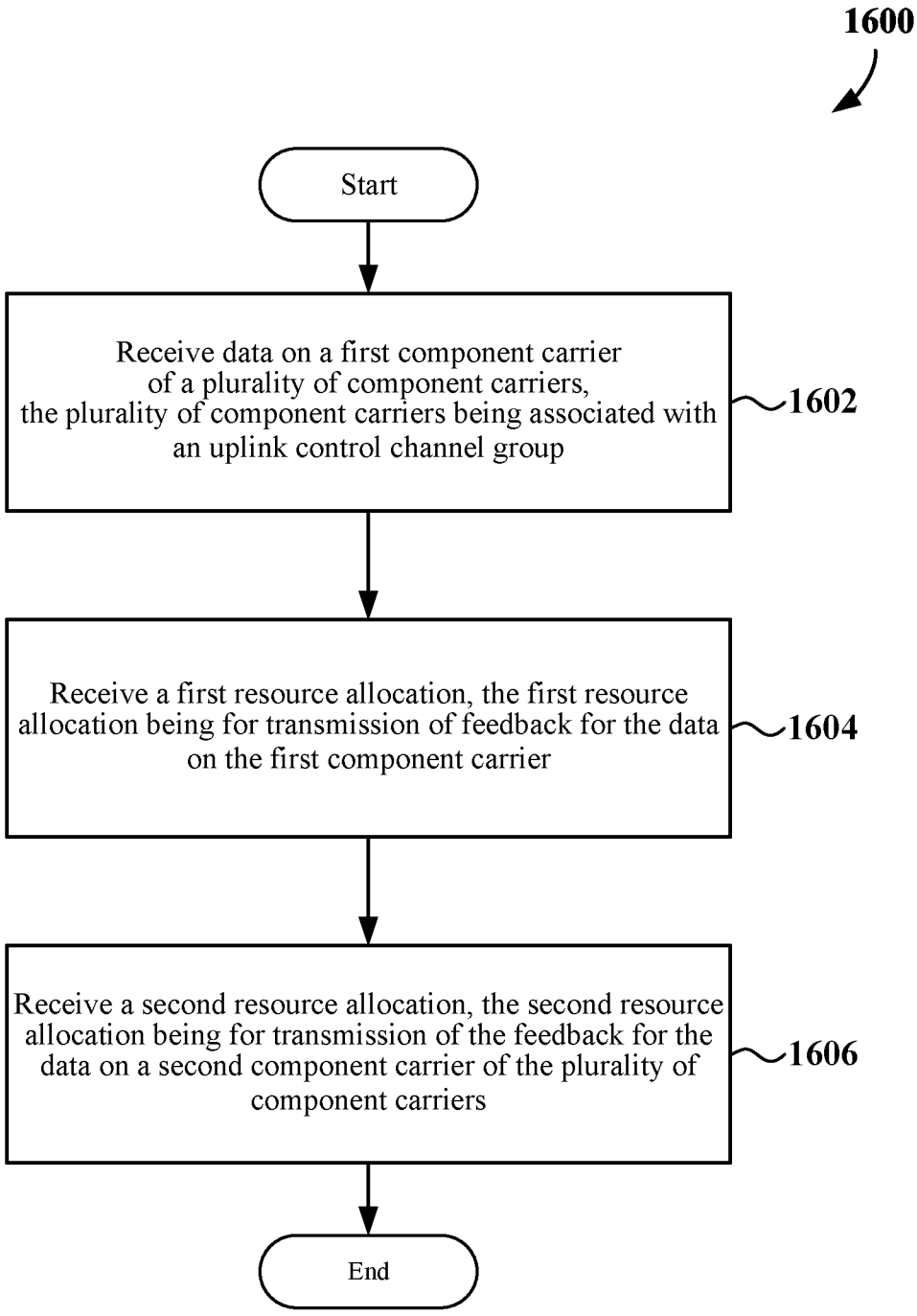

1600
Start
Receive data on a first component carrier of a plurality of component carriers, the plurality of component carriers being associated with an uplink control channel group
1602
Receive a first resource allocation, the first resource allocation being for transmission of feedback for the data on the first component carrier
1604
Receive a second resource allocation, the second resource allocation being for transmission of the feedback for the data on a second component carrier of the plurality of component carriers
1606
End

FIG. 16

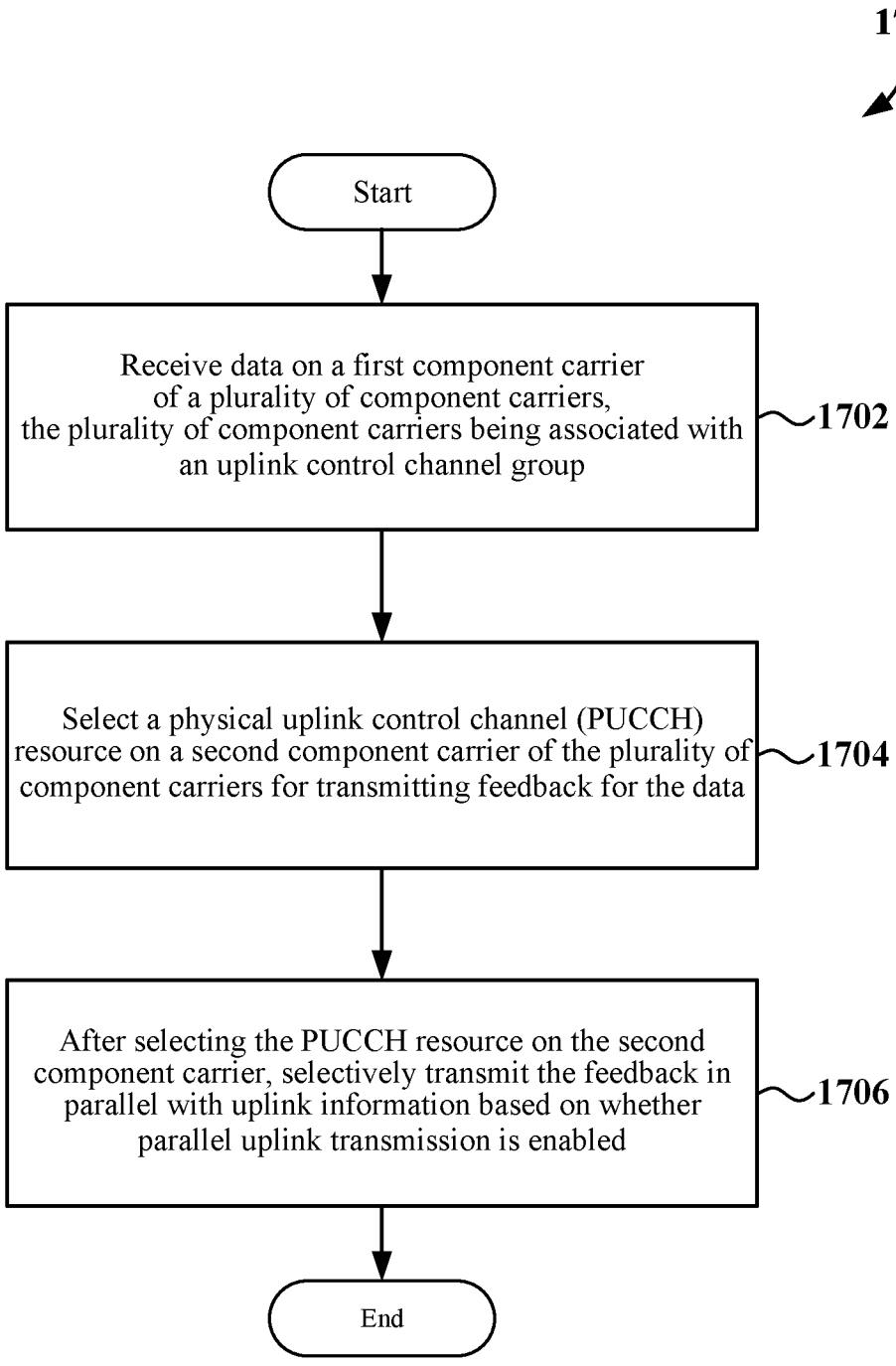

1700
Start
Receive data on a first component carrier of a plurality of component carriers, the plurality of component carriers being associated with an uplink control channel group
1702
Select a physical uplink control channel (PUCCH) resource on a second component carrier of the plurality of component carriers for transmitting feedback for the data
1704
After selecting the PUCCH resource on the second component carrier, selectively transmit the feedback in parallel with uplink information based on whether parallel uplink transmission is enabled
1706
End

FIG. 17

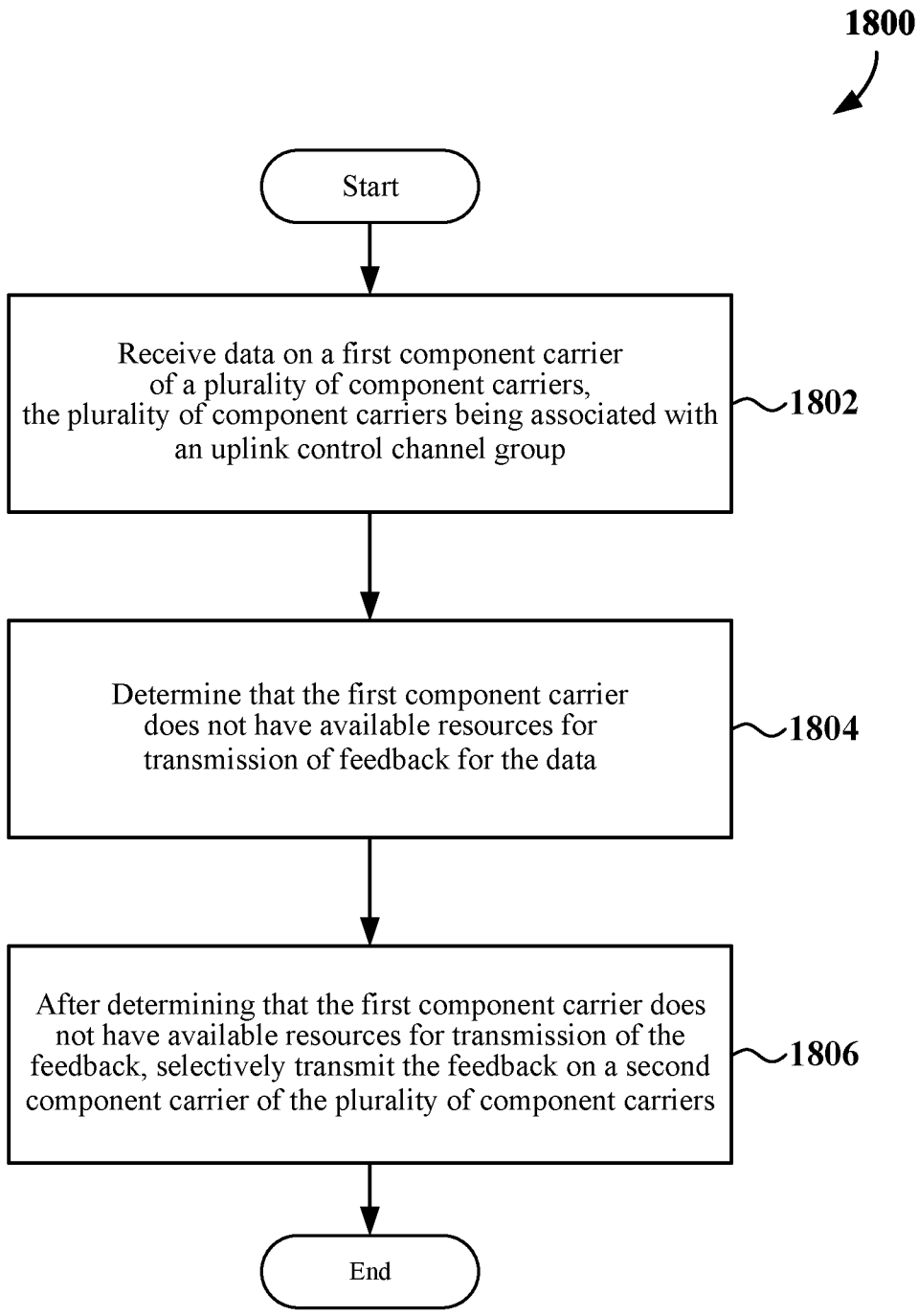

1800
Start
Receive data on a first component carrier of a plurality of component carriers, the plurality of component carriers being associated with an uplink control channel group
1802
Determine that the first component carrier does not have available resources for transmission of feedback for the data
1804
After determining that the first component carrier does not have available resources for transmission of the feedback, selectively transmit the feedback on a second component carrier of the plurality of component carriers
1806
End

FIG. 18

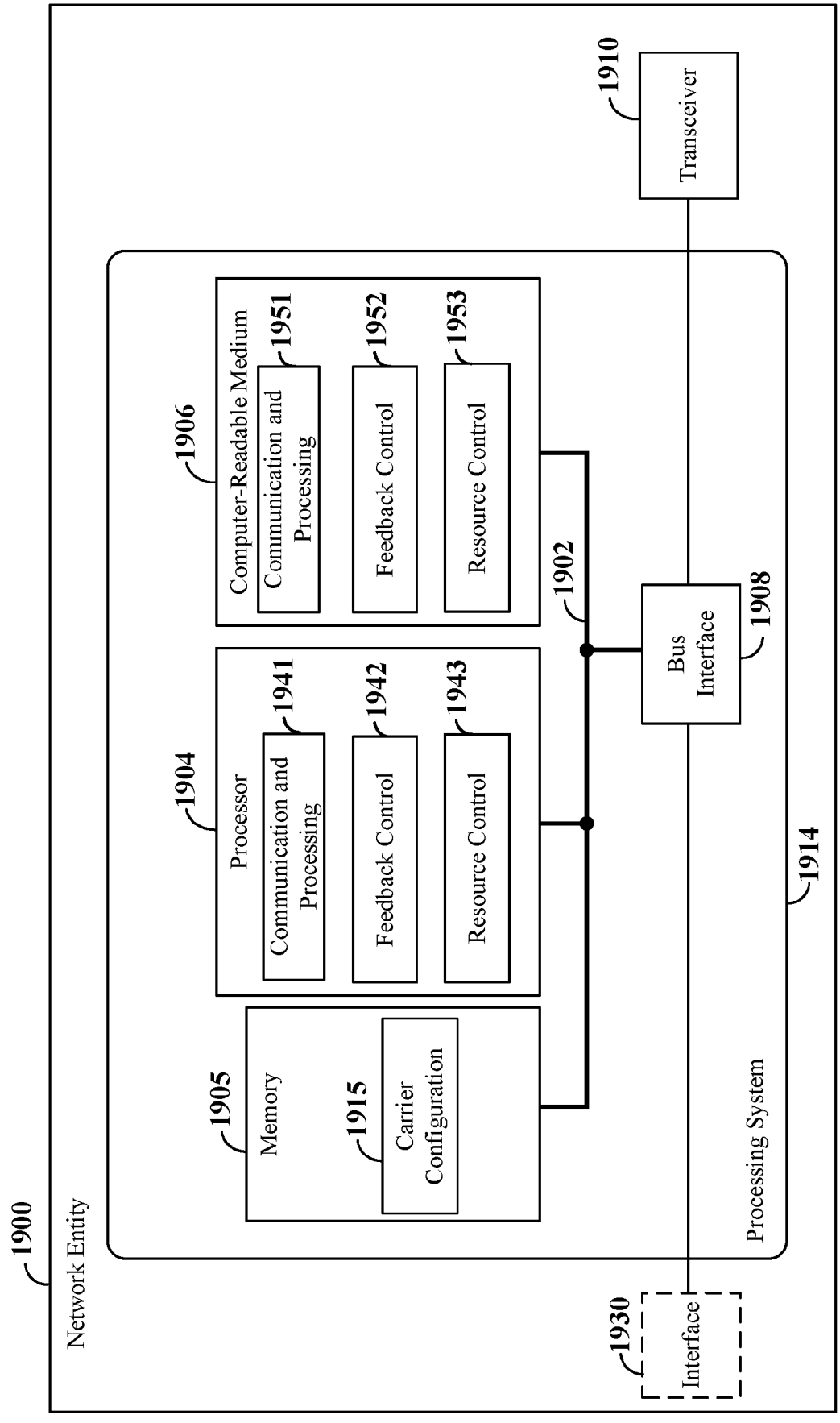

1900
Network Entity
1910
Transceiver
1914
Processing System
1902
1908
Bus Interface
1930
Interface
1904
Processor
1941
Communication and Processing
1942
Feedback Control
1943
Resource Control
1906
Computer-Readable Medium
1951
Communication and Processing
1952
Feedback Control
1953
Resource Control
1905
Memory
1915
Carrier Configuration

FIG. 19

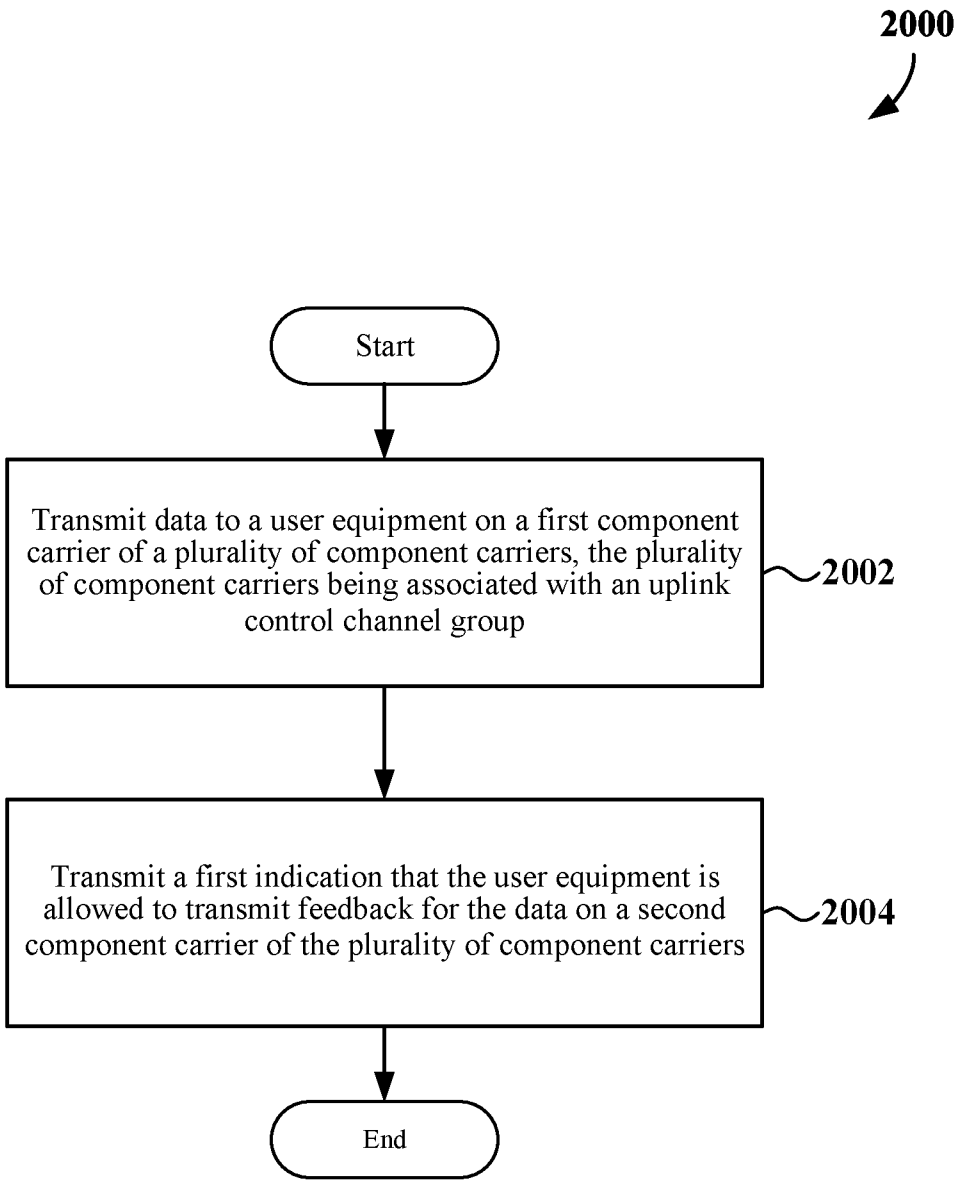

2000
Start
Transmit data to a user equipment on a first component carrier of a plurality of component carriers, the plurality of component carriers being associated with an uplink control channel group
2002
Transmit a first indication that the user equipment is allowed to transmit feedback for the data on a second component carrier of the plurality of component carriers
2004
End

FIG. 20

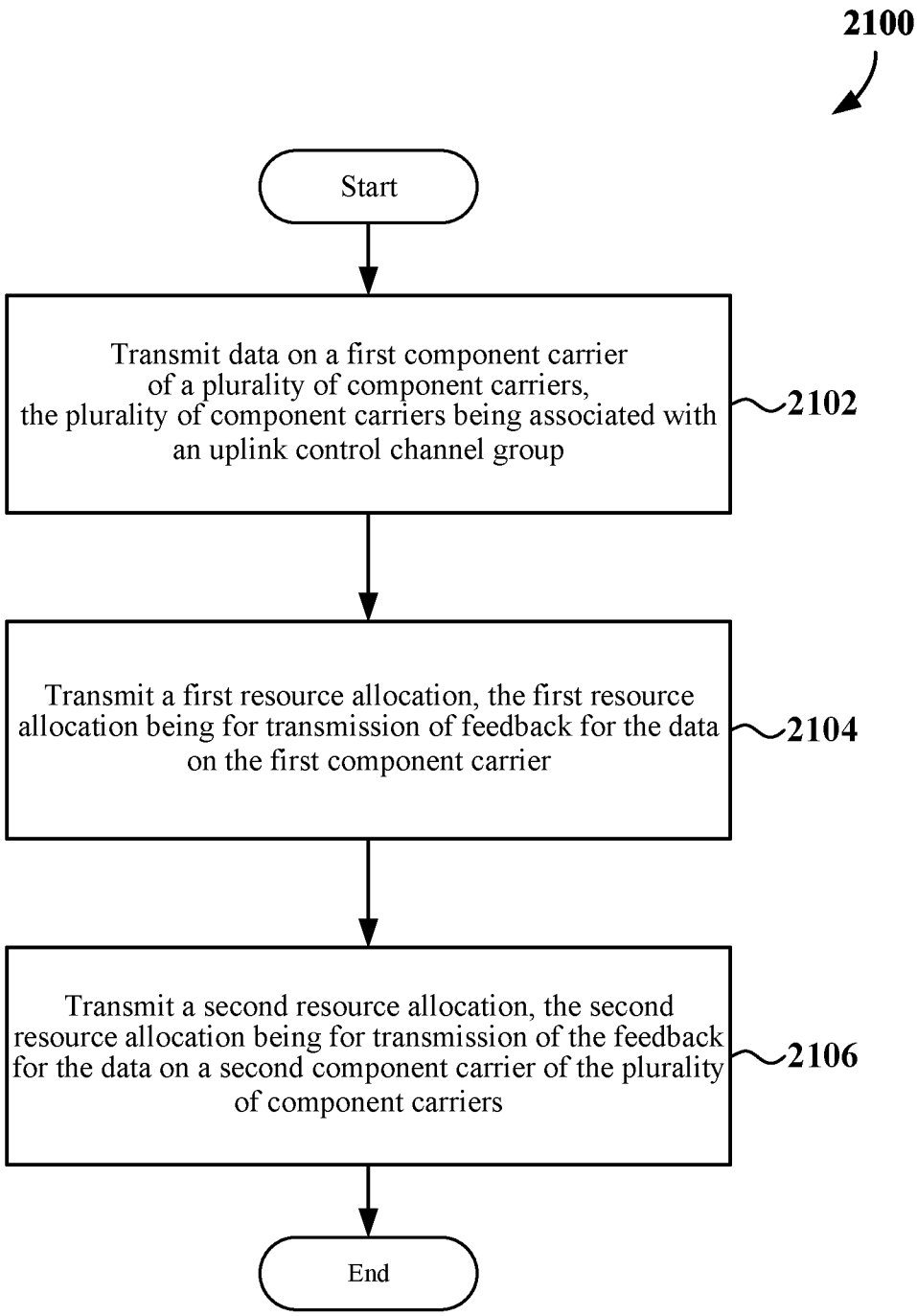

2100
Start
Transmit data on a first component carrier of a plurality of component carriers, the plurality of component carriers being associated with an uplink control channel group
2102
Transmit a first resource allocation, the first resource allocation being for transmission of feedback for the data on the first component carrier
2104
Transmit a second resource allocation, the second resource allocation being for transmission of the feedback for the data on a second component carrier of the plurality of component carriers
2106
End

FIG. 21

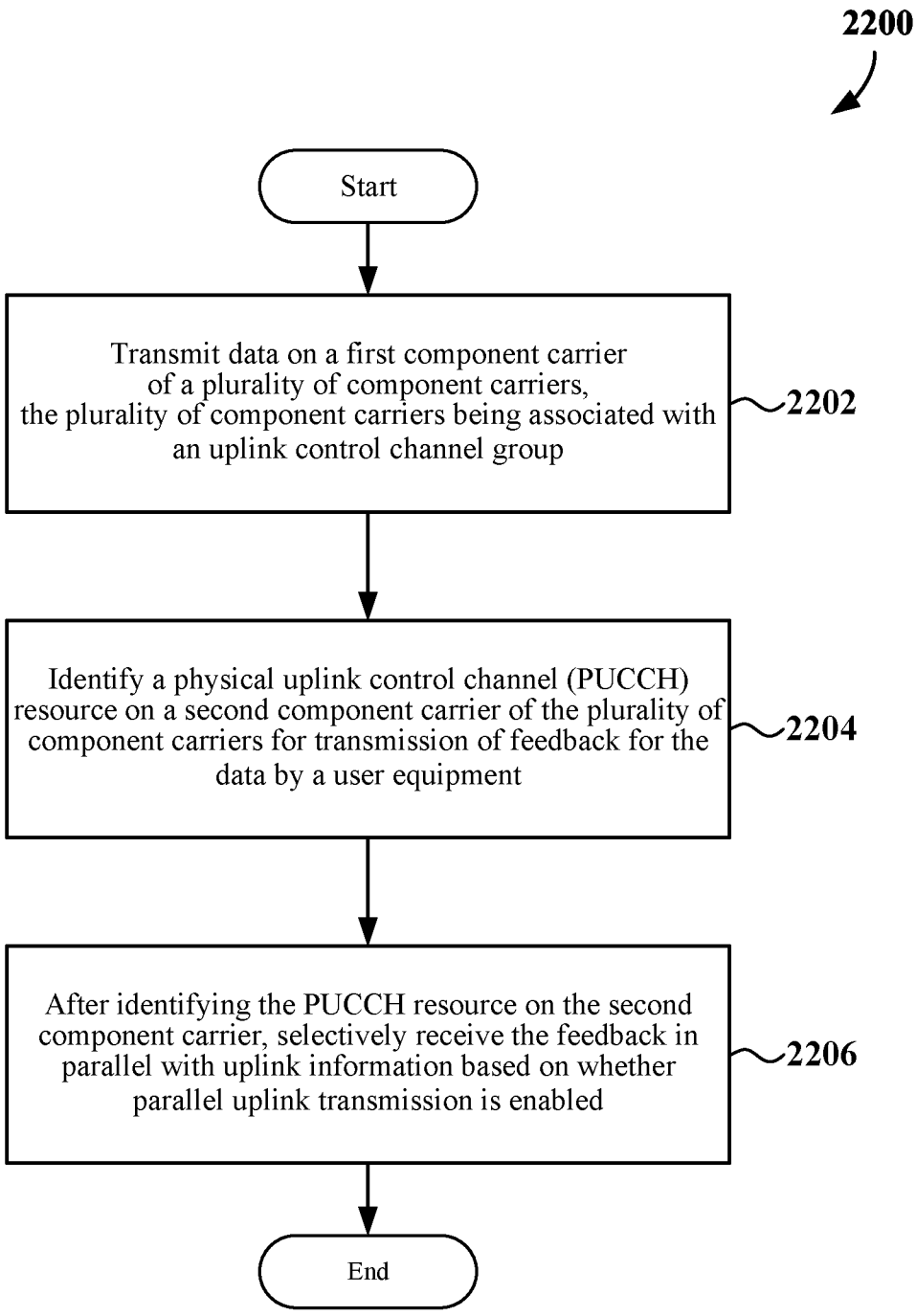

2200
Start
Transmit data on a first component carrier of a plurality of component carriers, the plurality of component carriers being associated with an uplink control channel group
2202
Identify a physical uplink control channel (PUCCH) resource on a second component carrier of the plurality of component carriers for transmission of feedback for the data by a user equipment
2204
After identifying the PUCCH resource on the second component carrier, selectively receive the feedback in parallel with uplink information based on whether parallel uplink transmission is enabled
2206
End

FIG. 22

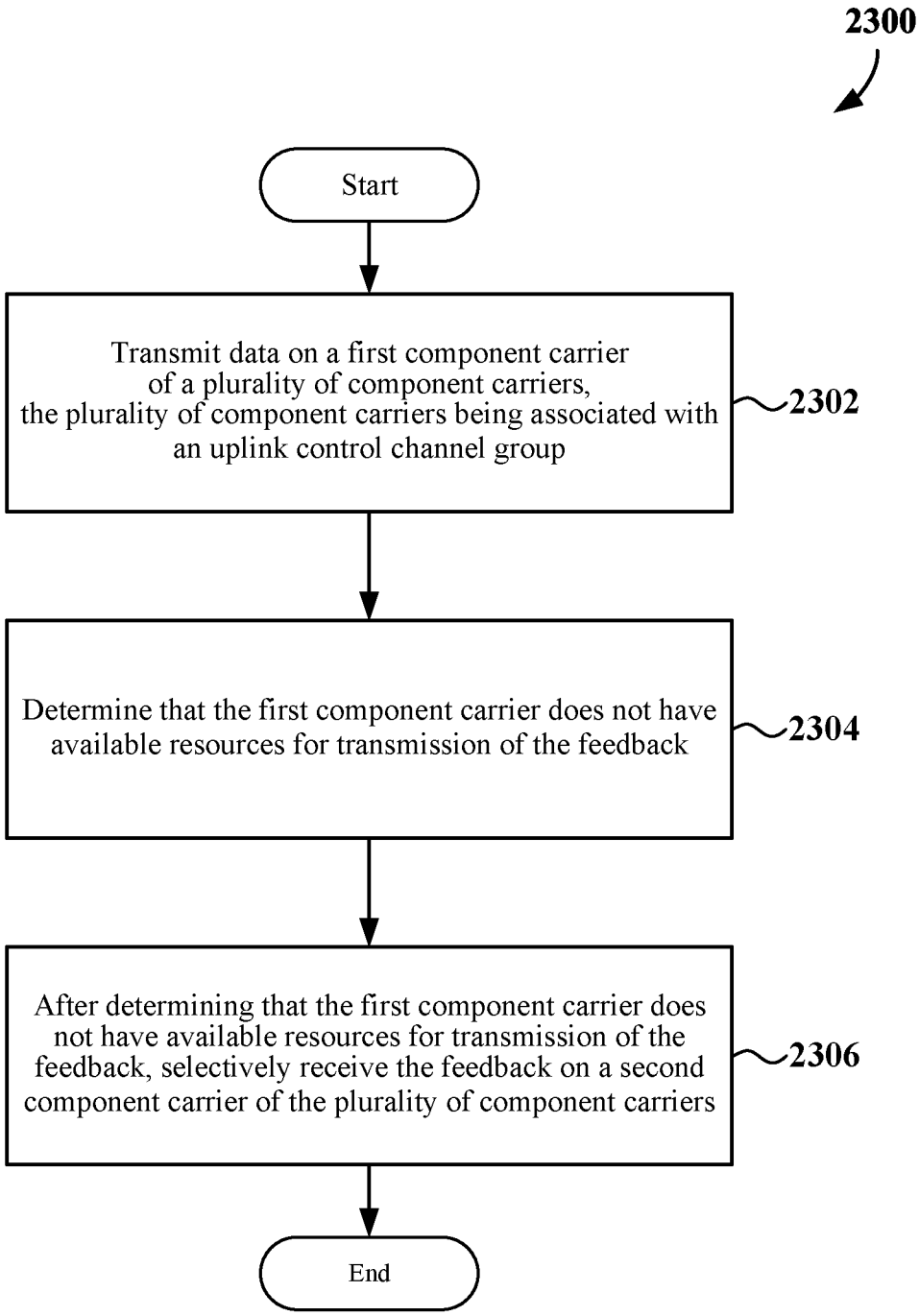

2300
Start
Transmit data on a first component carrier of a plurality of component carriers, the plurality of component carriers being associated with an uplink control channel group
2302
Determine that the first component carrier does not have available resources for transmission of the feedback
2304
After determining that the first component carrier does not have available resources for transmission of the feedback, selectively receive the feedback on a second component carrier of the plurality of component carriers
2306
End

FIG. 23