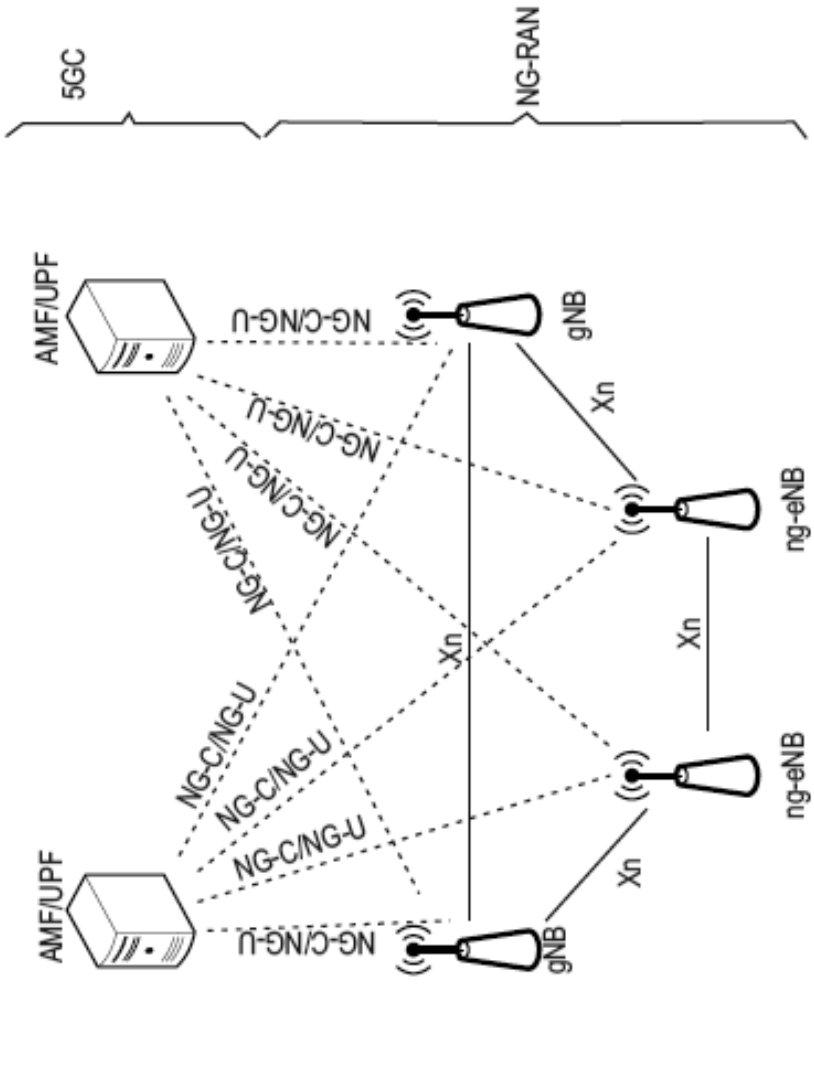

5GC
NG-RAN
AMF/UPF
AMF/UPF
NG-C/NG-U
NG-C/NG-U
NG-C/NG-U
NG-C/NG-U
NG-C/NG-U
NG-C/NG-U
NG-C/NG-U
NG-C/NG-U
gNB
gNB
ng-eNB
ng-eNB
Xn
Xn
Xn
Xn
100

Figure 1

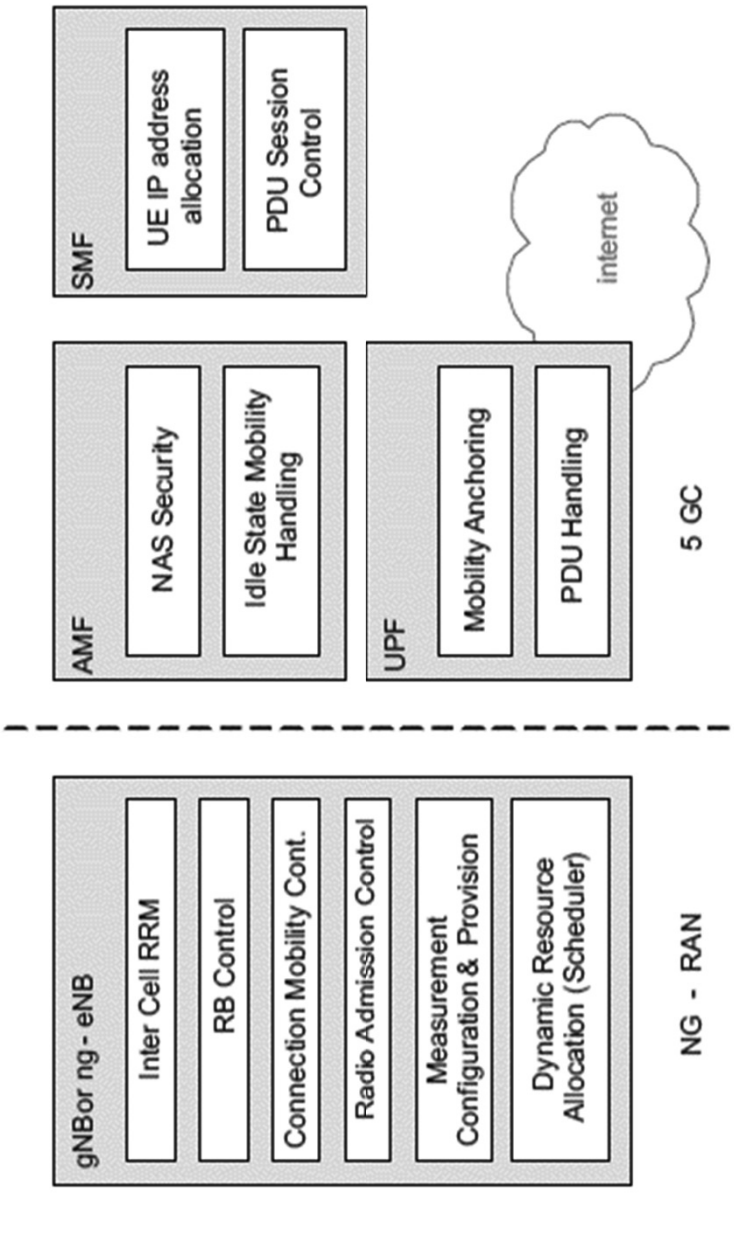

gNBor ng - eNB
Inter Cell RRM
RB Control
Connection Mobility Cont.
Radio Admission Control
Measurement Configuration & Provision
Dynamic Resource Allocation (Scheduler)
NG - RAN
AMF
NAS Security
Idle State Mobility Handling
UPF
Mobility Anchoring
PDU Handling
SMF
UE IP address allocation
PDU Session Control
internet
5 GC
200

Figure 2

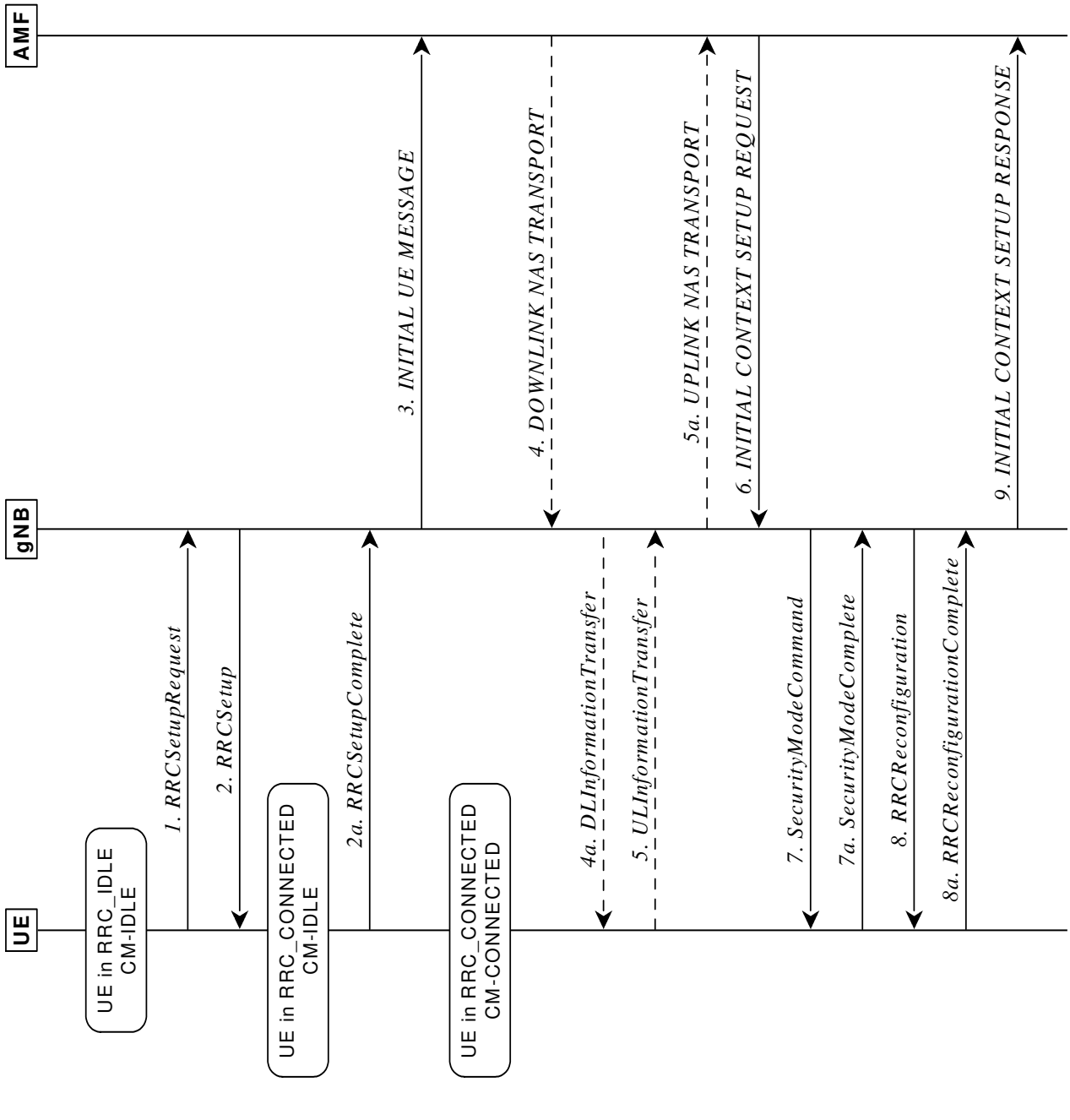

UE
gNB
AMF
UE in RRC_IDLE CM-IDLE
1. RRCSetupRequest
2. RRCSetup
UE in RRC_CONNECTED CM-IDLE
2a. RRCSetupComplete
UE in RRC_CONNECTED CM-CONNECTED
3. INITIAL UE MESSAGE
4. DOWNLINK NAS TRANSPORT
4a. DLInformationTransfer
5. ULInformationTransfer
5a. UPLINK NAS TRANSPORT
6. INITIAL CONTEXT SETUP REQUEST
7. SecurityModeCommand
7a. SecurityModeComplete
8. RRCReconfiguration
8a. RRCReconfigurationComplete
9. INITIAL CONTEXT SETUP RESPONSE
300

Figure 3

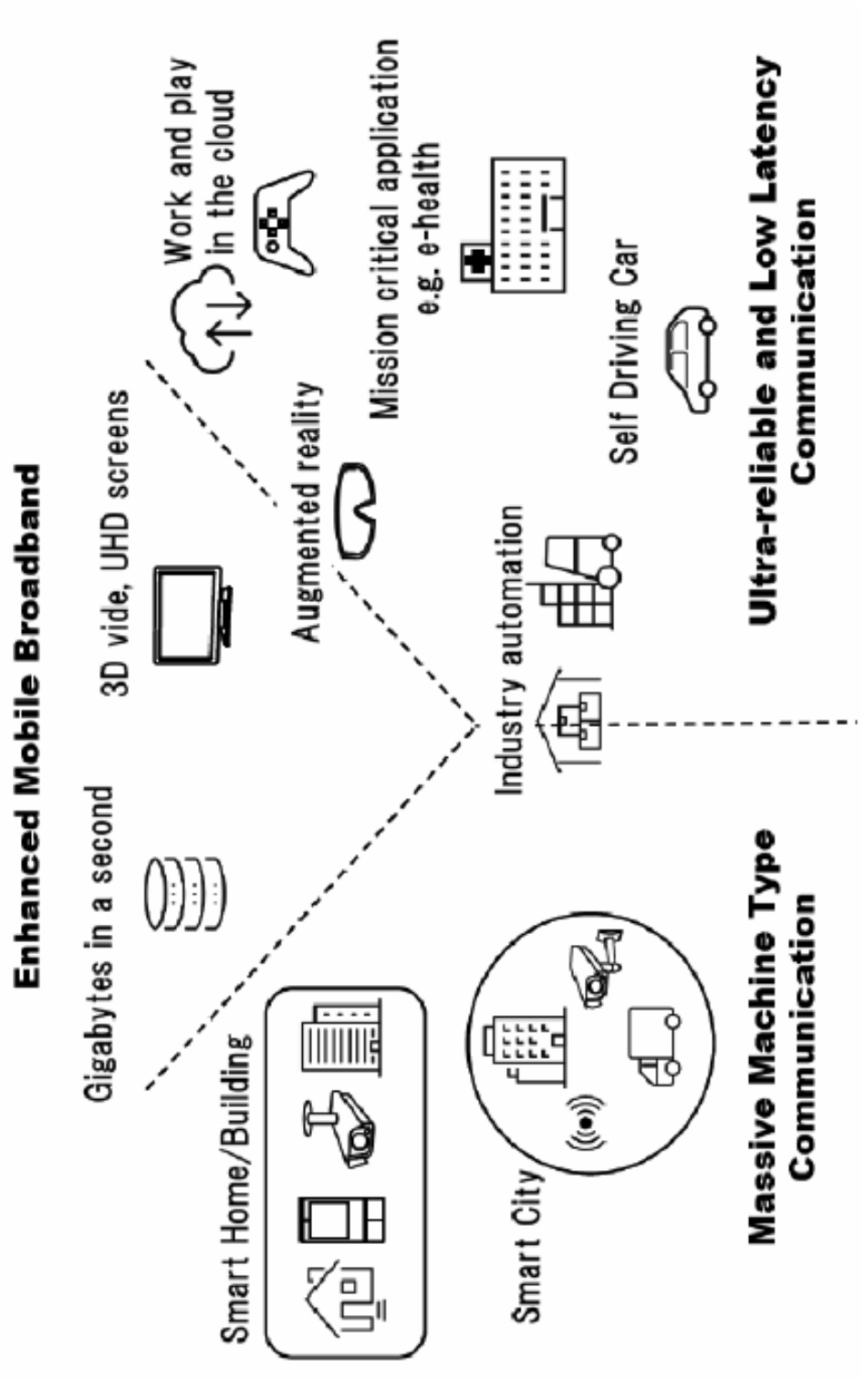

Enhanced Mobile Broadband
Gigabytes in a second
3D vide, UHD screens
Work and play in the cloud
Augmented reality
Mission critical application e.g. e-health
Smart Home/Building
Industry automation
Self Driving Car
Ultra-reliable and Low Latency Communication
Smart City
Massive Machine Type Communication
400

Figure 4

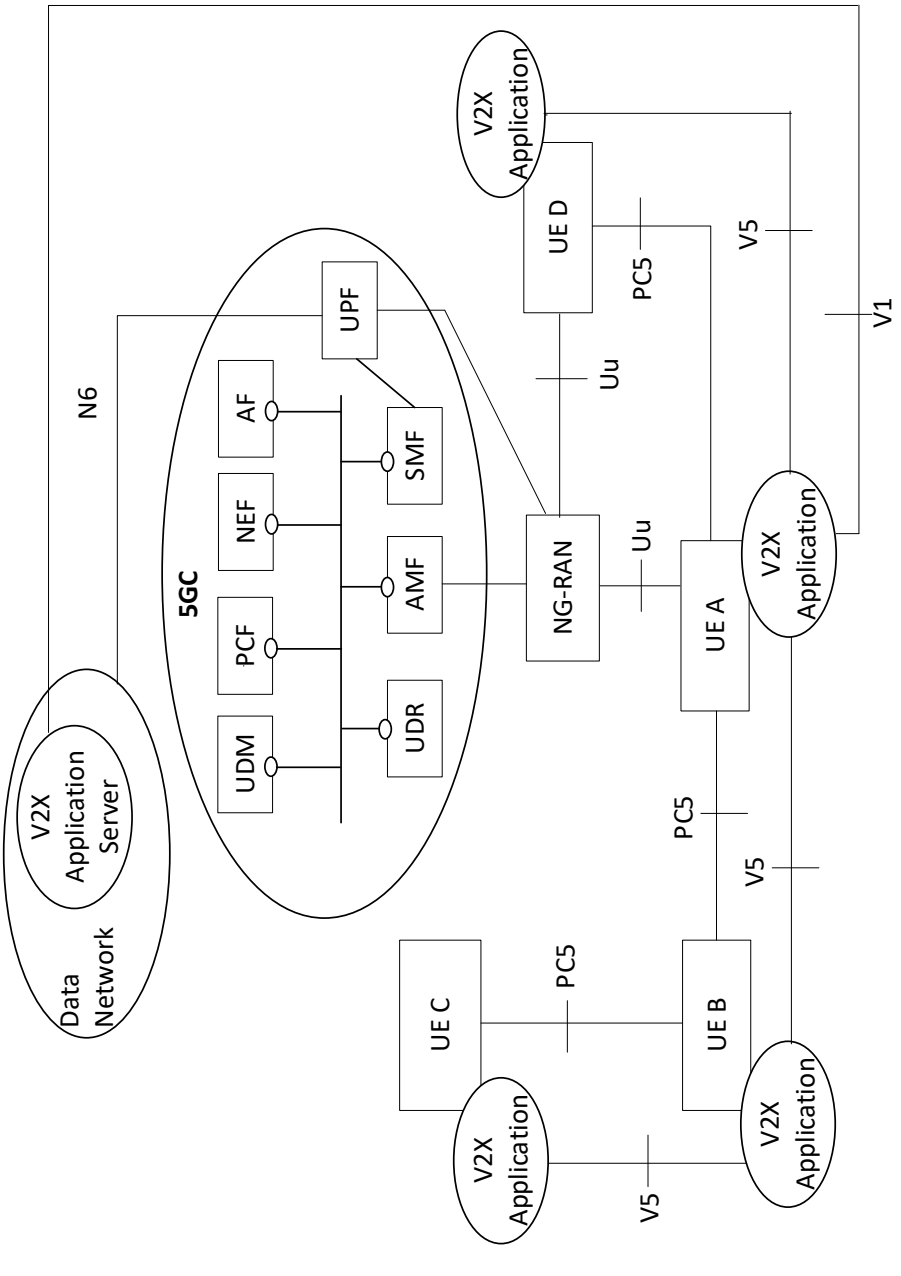

Data Network
V2X Application Server
N6
5GC
UPF
AF
NEF
PCF
UDM
SMF
AMF
UDR
NG-RAN
Uu
Uu
UE A
UE B
UE C
UE D
V2X Application
V2X Application
V2X Application
V2X Application
PC5
PC5
V5
V5
V5
V1
500

Figure 5

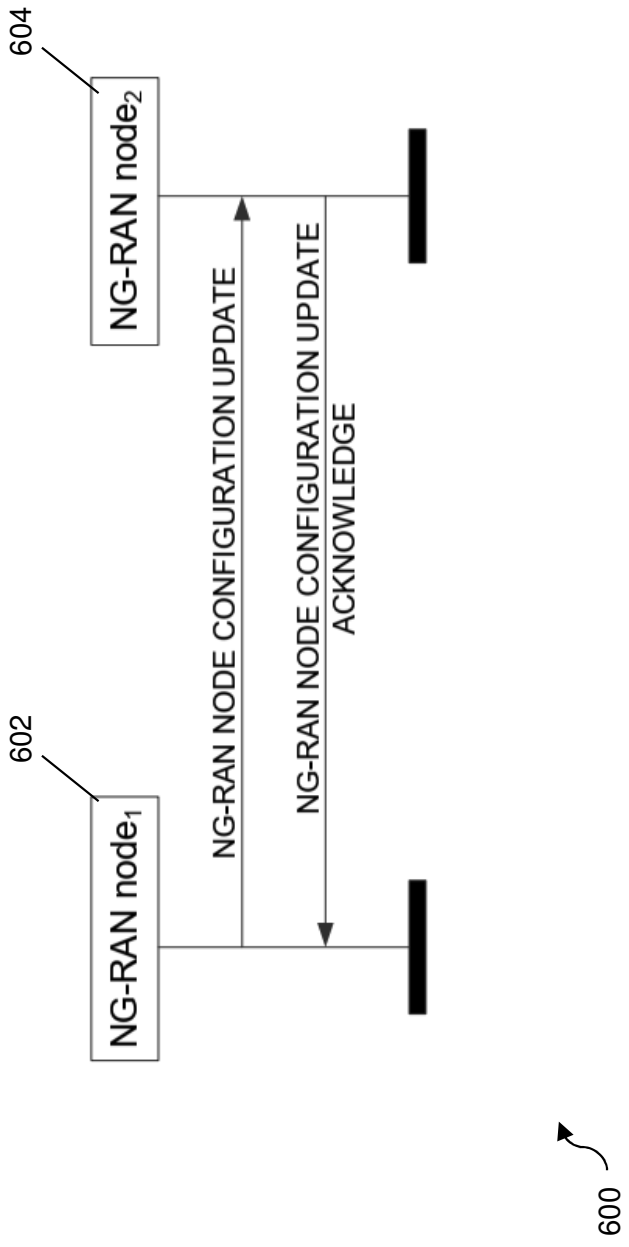

604
NG-RAN node2
602
NG-RAN node1
NG-RAN NODE CONFIGURATION UPDATE
NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE
600

Figure 6

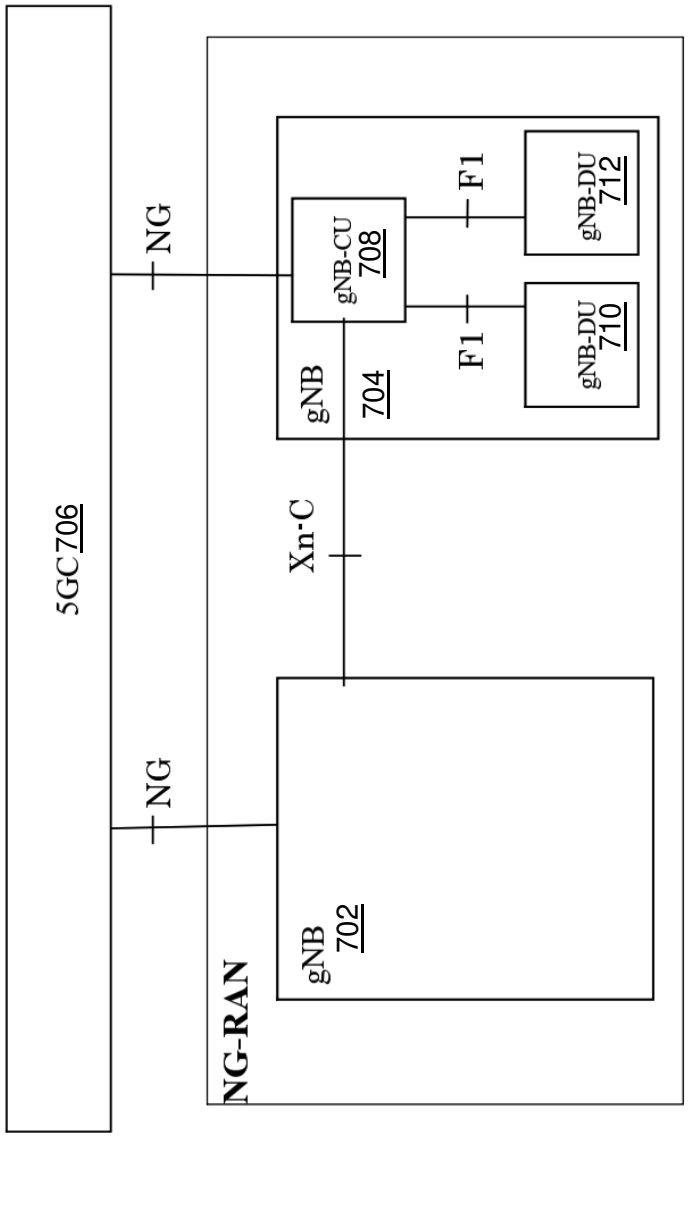

5GC 706
NG
NG
NG-RAN
gNB 702
Xn-C
gNB 704
gNB-CU 708
F1
F1
gNB-DU 710
gNB-DU 712
700

Figure 7

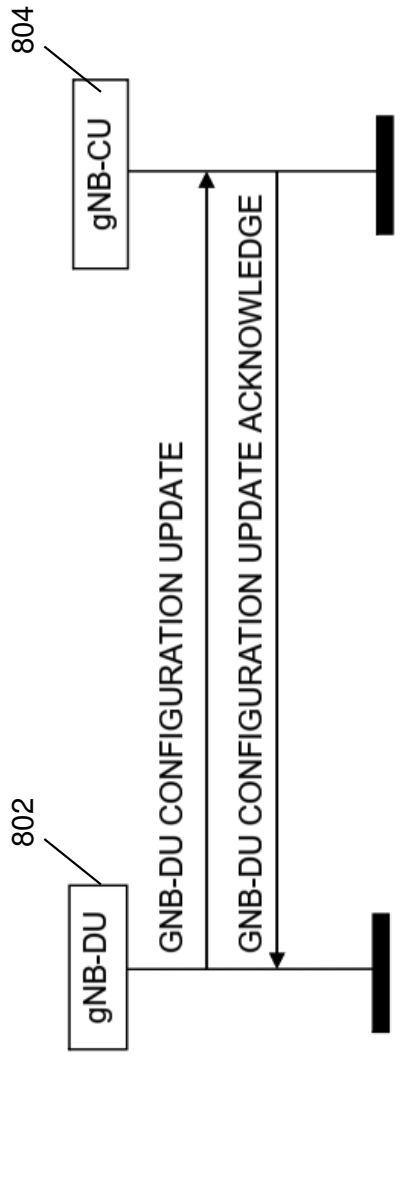

804
gNB-CU
802
gNB-DU
GNB-DU CONFIGURATION UPDATE
GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE
800

Figure 8

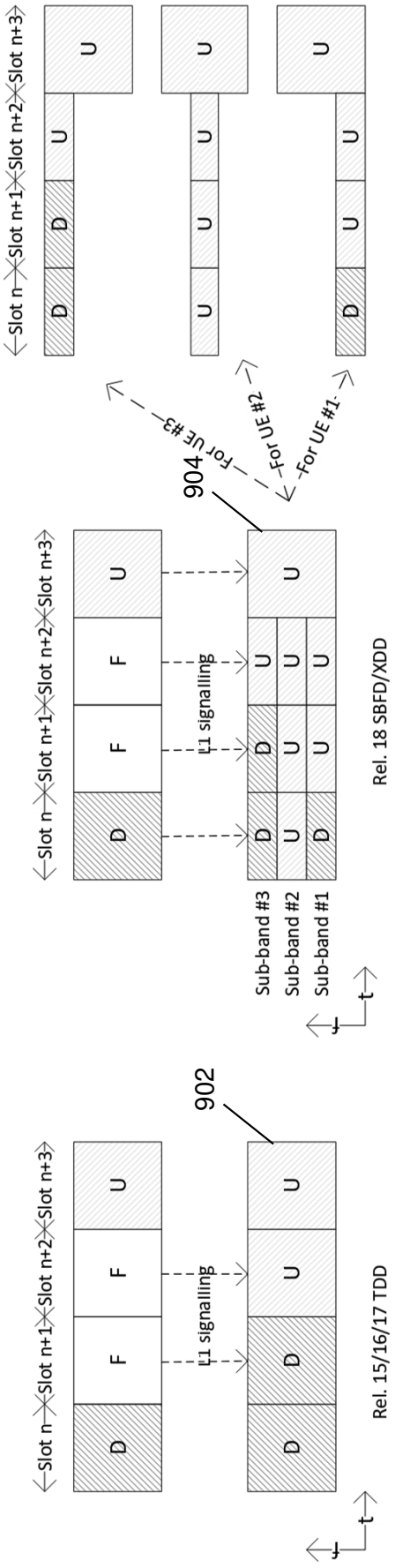

Slot n
Slot n+1
Slot n+2
Slot n+3
D
F
U
L1 signalling
902
Rel. 15/16/17 TDD
904
For UE #3
For UE #2
For UE #1
Sub-band #3
Sub-band #2
Sub-band #1
f
t
Rel. 18 SBFD/XDD

Figure 9

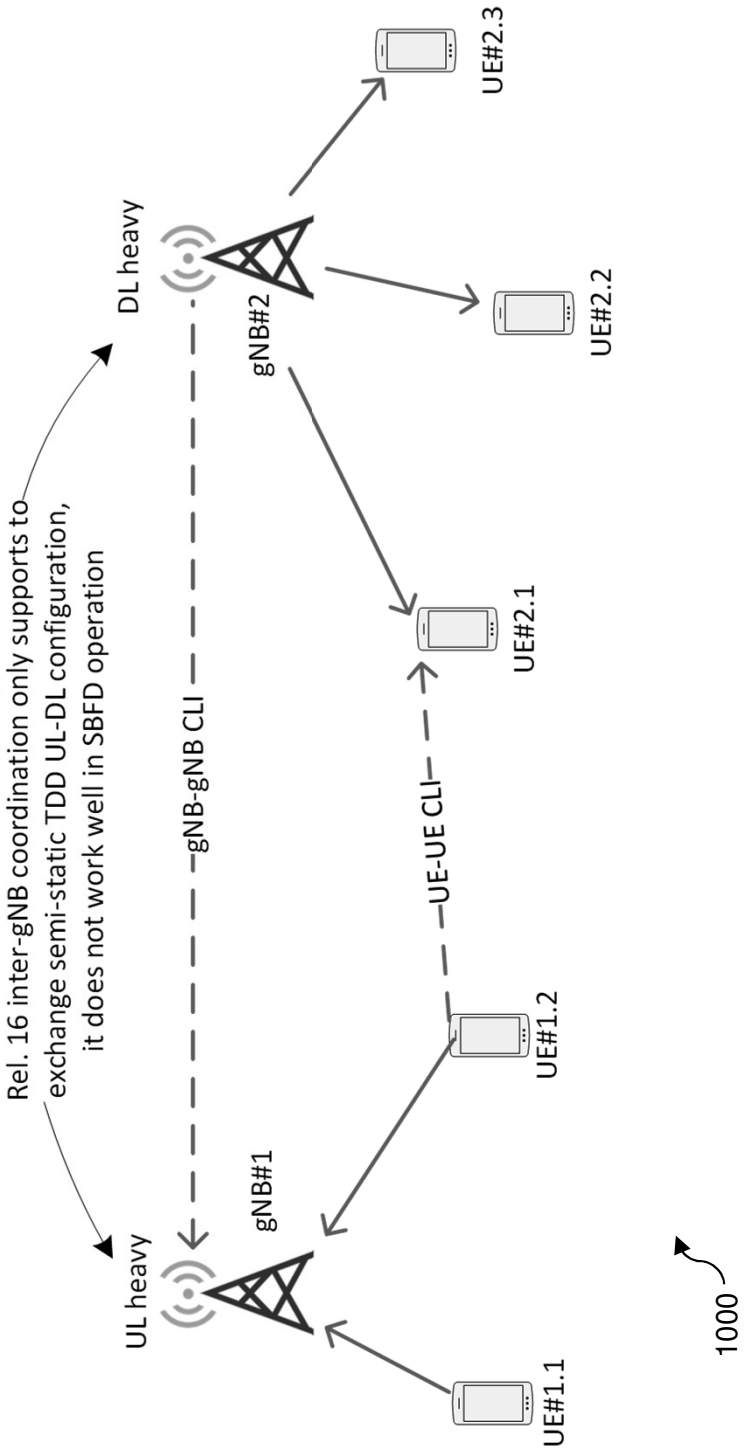

Rel. 16 inter-gNB coordination only supports to exchange semi-static TDD UL-DL configuration, it does not work well in SBFD operation
DL heavy
UL heavy
gNB#2
gNB#1
gNB-gNB CLI
UE-UE CLI
UE#2.3
UE#2.2
UE#2.1
UE#1.2
UE#1.1
1000

Figure 10

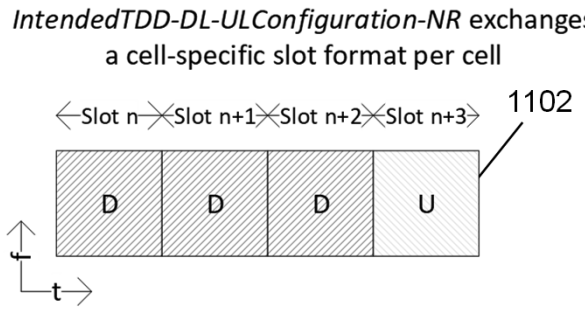


Figure 11A

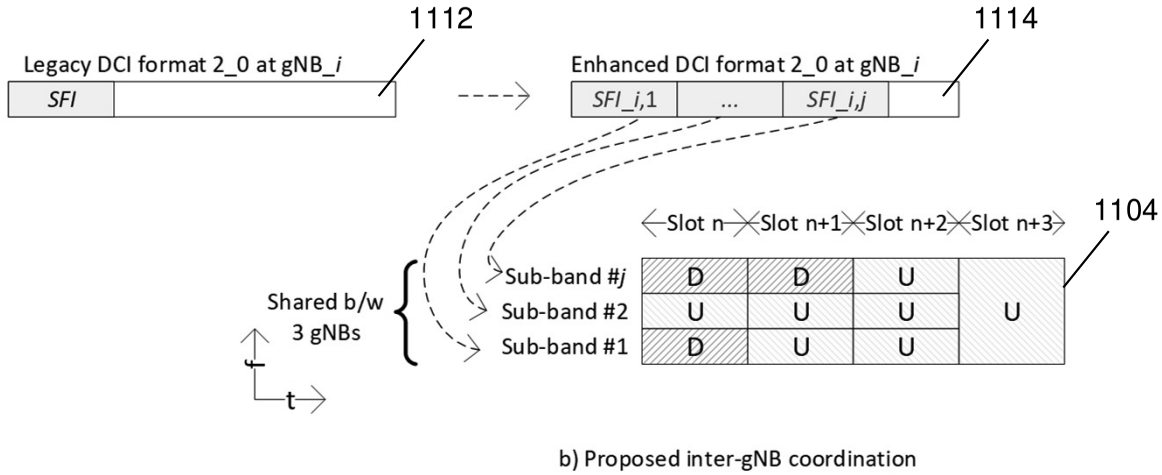


Figure 11B

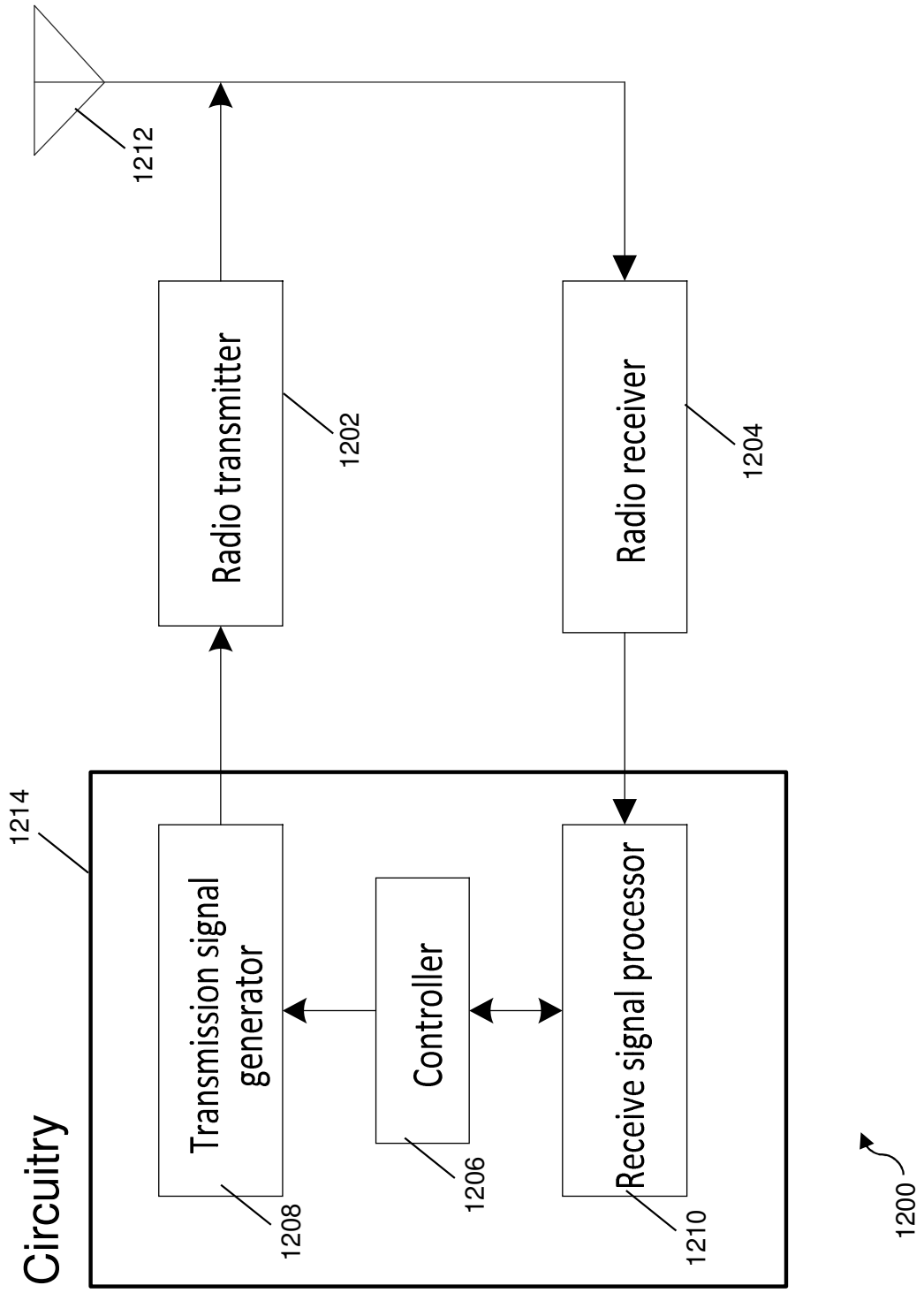

1212
Radio transmitter
1202
Radio receiver
1204
1214
Circuitry
Transmission signal generator
1208
Controller
1206
Receive signal processor
1210
1200

Figure 12

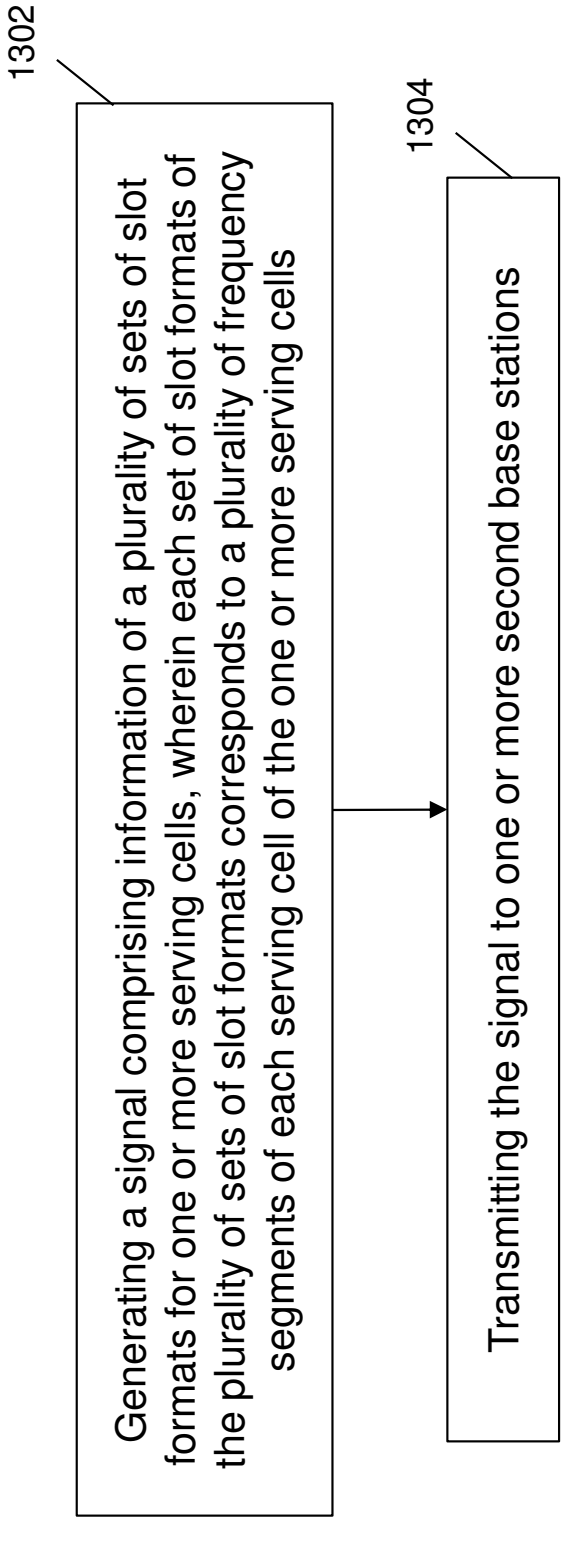

1302
Generating a signal comprising information of a plurality of sets of slot formats for one or more serving cells, wherein each set of slot formats of the plurality of sets of slot formats corresponds to a plurality of frequency segments of each serving cell of the one or more serving cells
1304
Transmitting the signal to one or more second base stations
1300

Figure 13

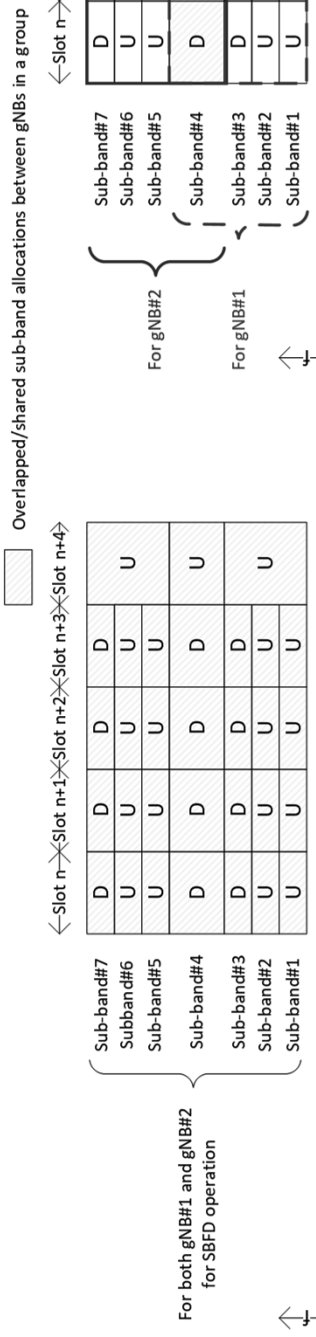


Figure 14A

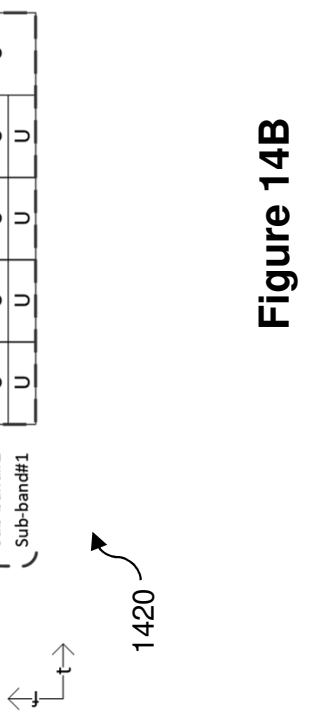


Figure 14B

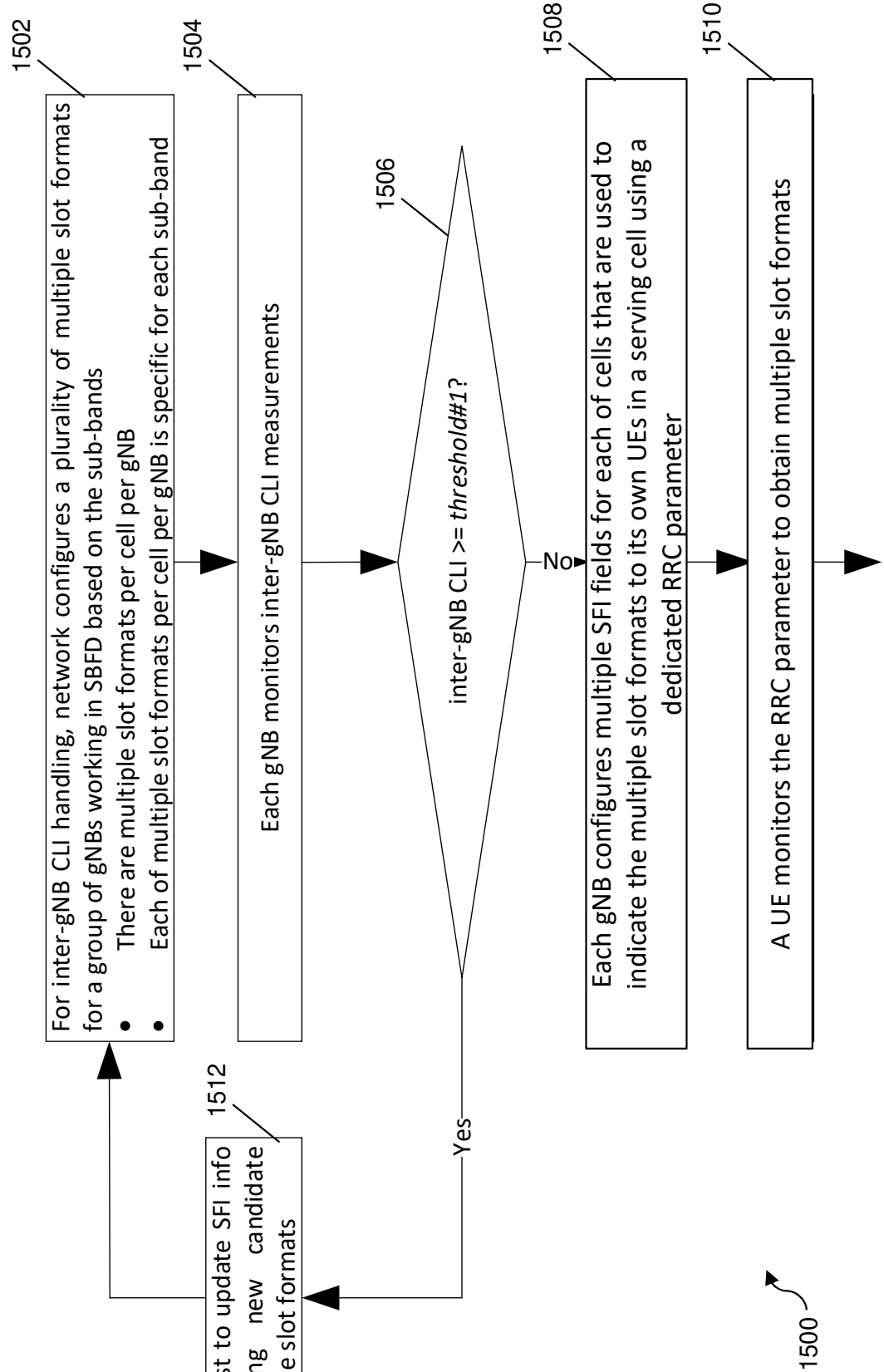

1502
For inter-gNB CLI handling, network configures a plurality of multiple slot formats for a group of gNBs working in SBFD based on the sub-bands
There are multiple slot formats per cell per gNB
Each of multiple slot formats per cell per gNB is specific for each sub-band
1504
Each gNB monitors inter-gNB CLI measurements
1506
inter-gNB CLI >= threshold#1?
No
Yes
1508
Each gNB configures multiple SFI fields for each of cells that are used to indicate the multiple slot formats to its own UEs in a serving cell using a dedicated RRC parameter
1510
A UE monitors the RRC parameter to obtain multiple slot formats
1512
Request to update SFI info including new candidate multiple slot formats
1500

Figure 15

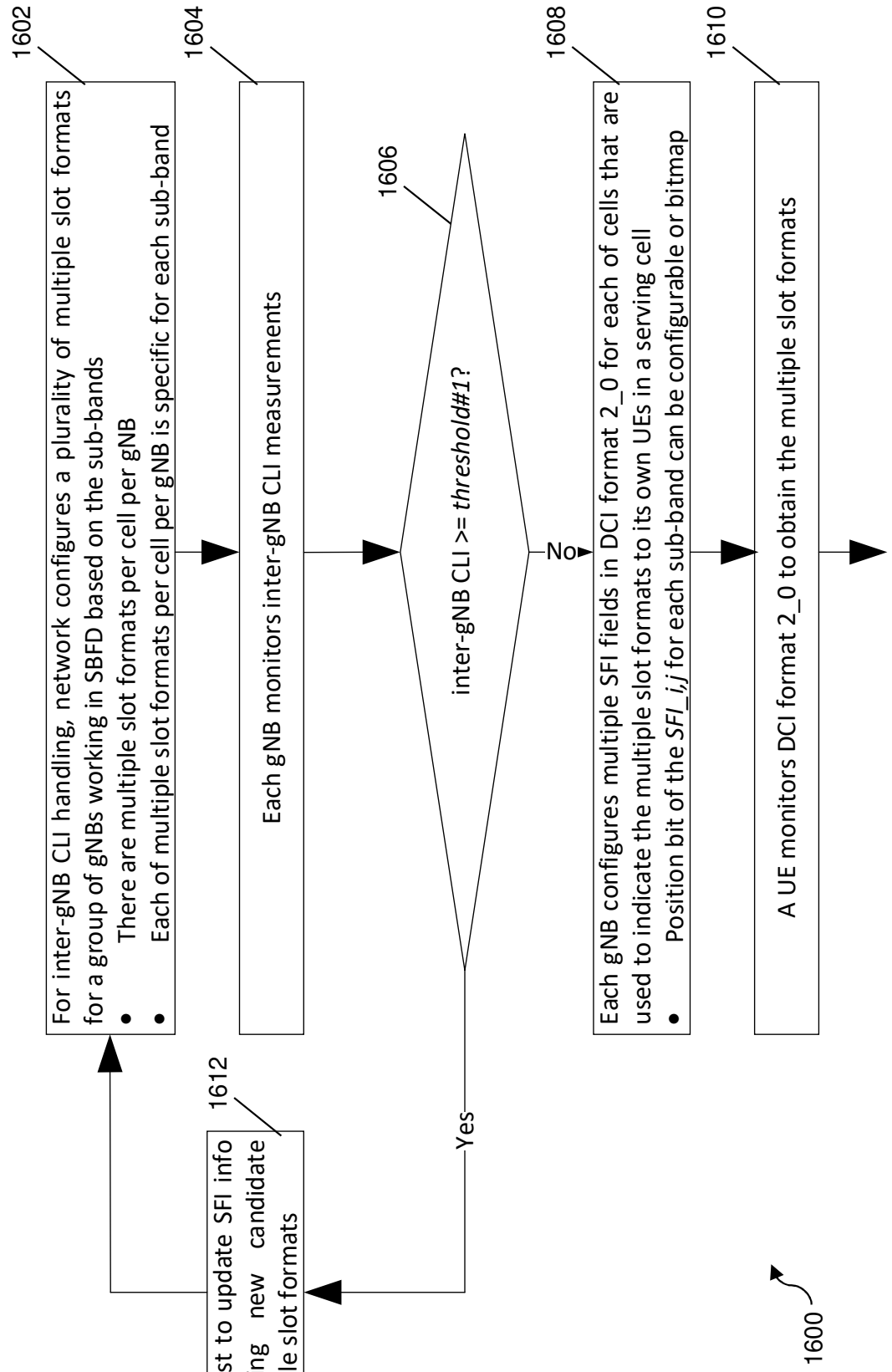

1602
For inter-gNB CLI handling, network configures a plurality of multiple slot formats for a group of gNBs working in SBFD based on the sub-bands
There are multiple slot formats per cell per gNB
Each of multiple slot formats per cell per gNB is specific for each sub-band
1604
Each gNB monitors inter-gNB CLI measurements
1606
inter-gNB CLI >= threshold#1?
No
Yes
1608
Each gNB configures multiple SFI fields in DCI format 2_0 for each of cells that are used to indicate the multiple slot formats to its own UEs in a serving cell
Position bit of the SFI_i,j for each sub-band can be configurable or bitmap
1610
A UE monitors DCI format 2_0 to obtain the multiple slot formats
1612
Request to update SFI info including new candidate multiple slot formats
1600

Figure 16

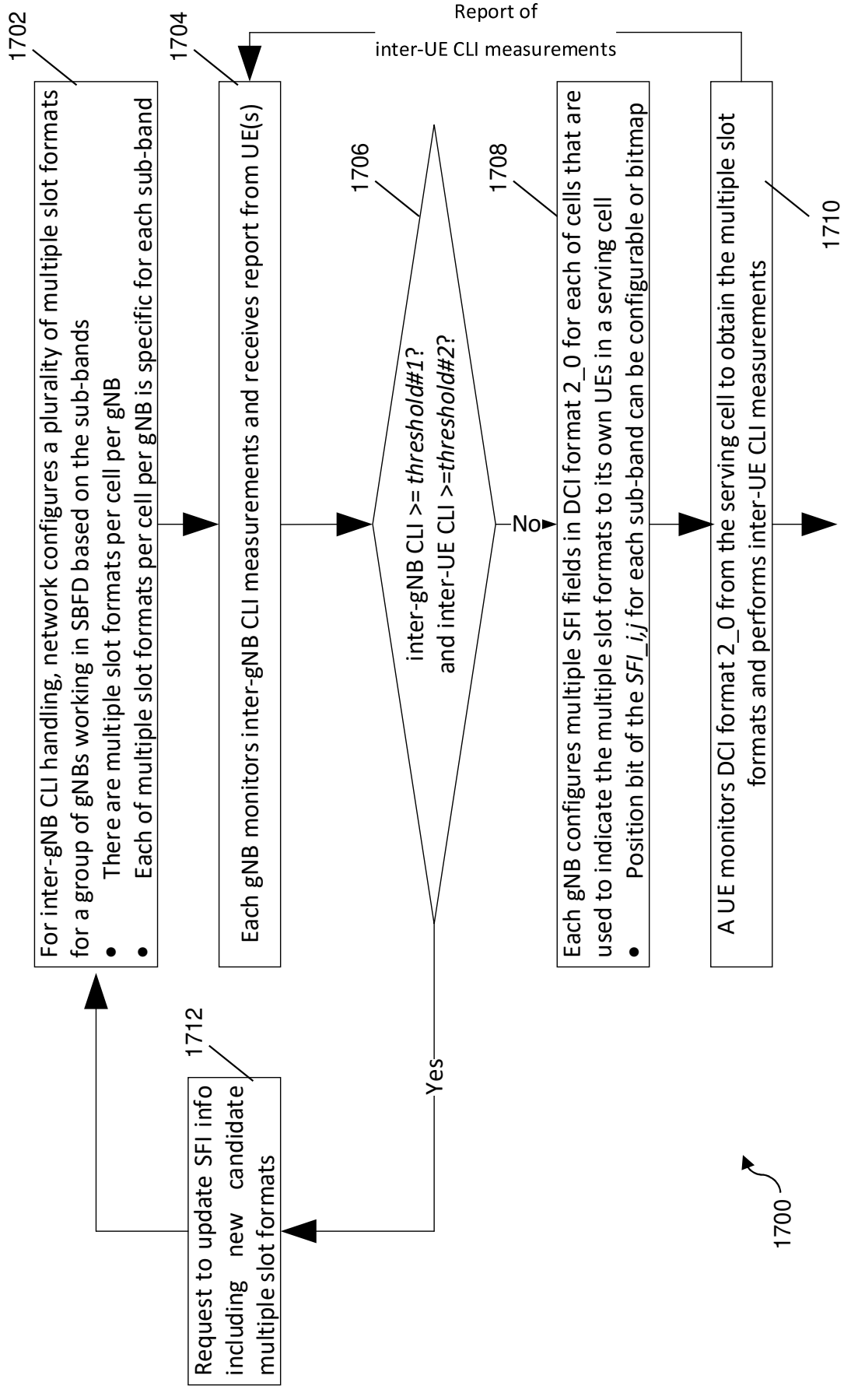

1702
For inter-gNB CLI handling, network configures a plurality of multiple slot formats for a group of gNBs working in SBFD based on the sub-bands
There are multiple slot formats per cell per gNB
Each of multiple slot formats per cell per gNB is specific for each sub-band
1704
Each gNB monitors inter-gNB CLI measurements and receives report from UE(s)
Report of
inter-UE CLI measurements
1706
inter-gNB CLI >= threshold#1?
and inter-UE CLI >=threshold#2?
No
1708
Each gNB configures multiple SFI fields in DCI format 2_0 for each of cells that are used to indicate the multiple slot formats to its own UEs in a serving cell
Position bit of the SFI_i,j for each sub-band can be configurable or bitmap
1710
A UE monitors DCI format 2_0 from the serving cell to obtain the multiple slot formats and performs inter-UE CLI measurements
Yes
1712
Request to update SFI info including new candidate multiple slot formats
1700

Figure 17

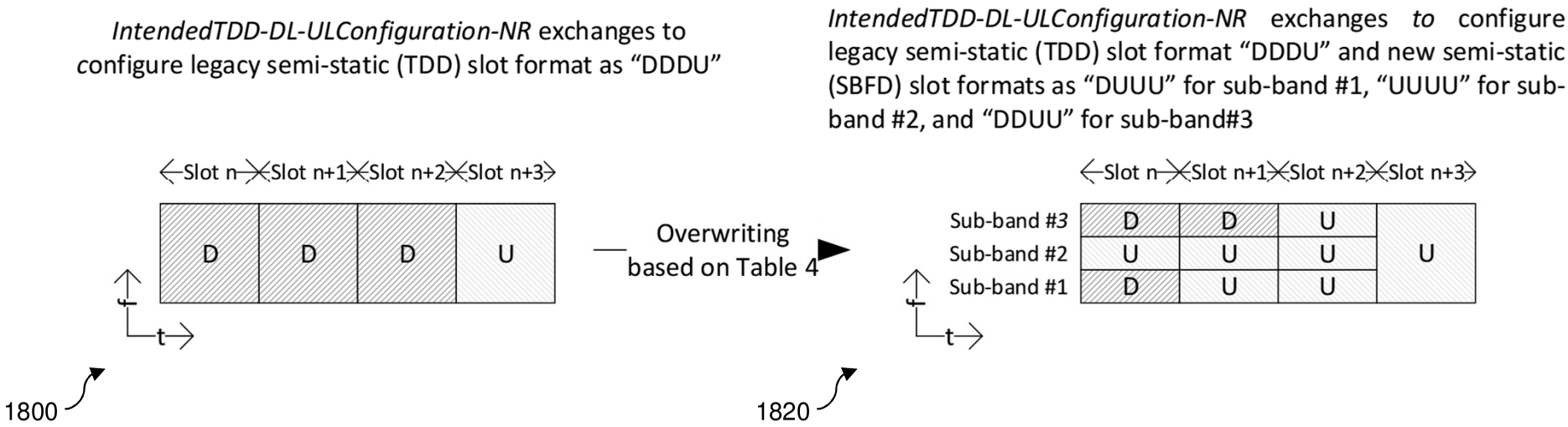

IntendedTDD-DL-ULConfiguration-NR exchanges to configure legacy semi-static (TDD) slot format as “DDDU”
IntendedTDD-DL-ULConfiguration-NR exchanges *to* configure legacy semi-static (TDD) slot format “DDDU” and new semi-static (SBFD) slot formats as “DUUU” for sub-band #1, “UUUU” for sub-band #2, and “DDUU” for sub-band#3
Slot n
Slot n+1
Slot n+2
Slot n+3
D
D
D
U
f
t
Overwriting based on Table 4
Sub-band #3
Sub-band #2
Sub-band #1
D
D
U
U
U
U
U
D
U
U
1800
1820

Figure 18