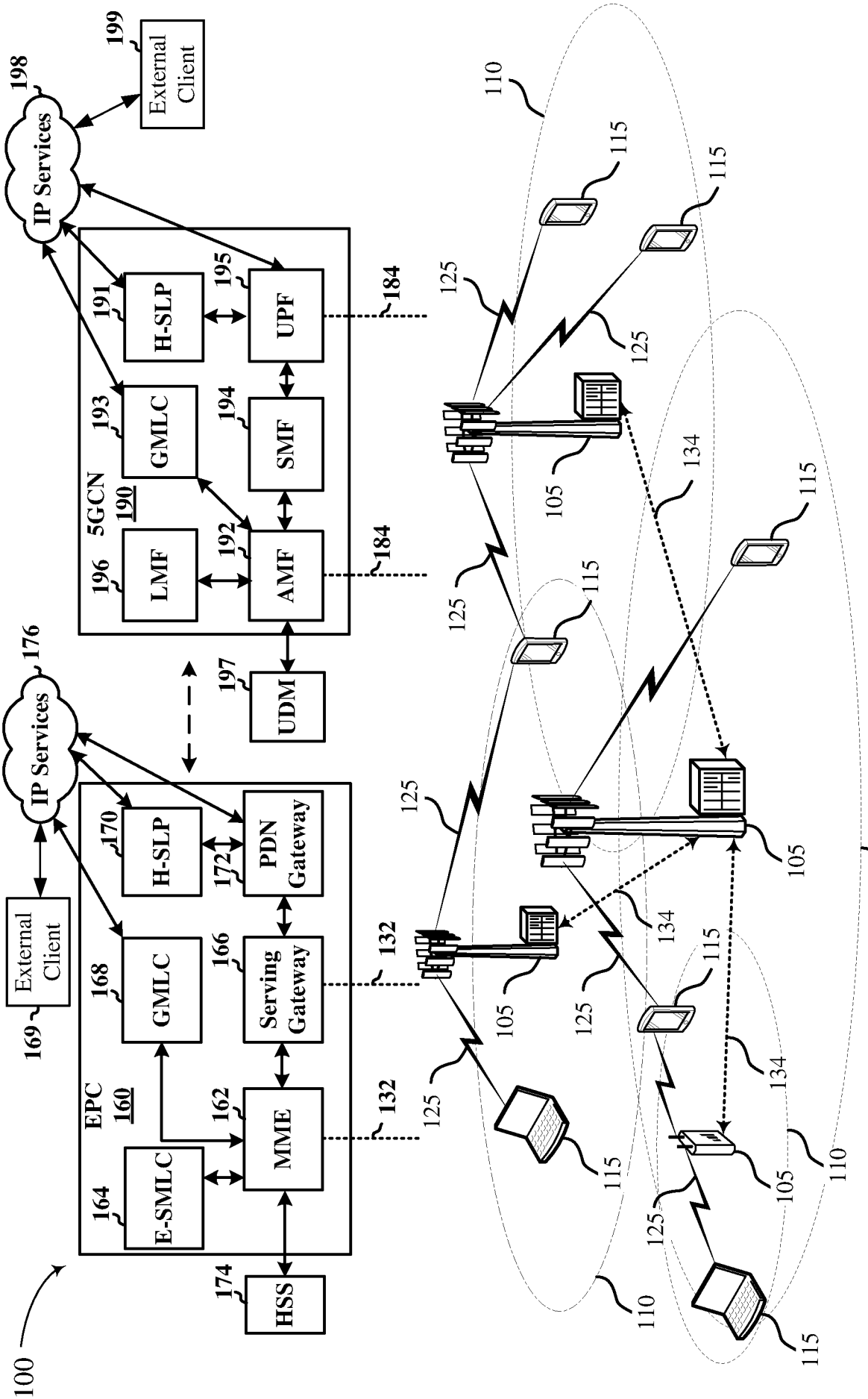

100
IP Services
198
External Client
199
5GCN
190
GMLC
193
H-SLP
191
LMF
196
AMF
192
SMF
194
UPF
195
184
UDM
197
IP Services
176
External Client
169
EPC
160
GMLC
168
H-SLP
170
E-SMLC
164
MME
162
Serving Gateway
166
PDN Gateway
172
HSS
174
132
110
115
125
105
134

FIG. 1

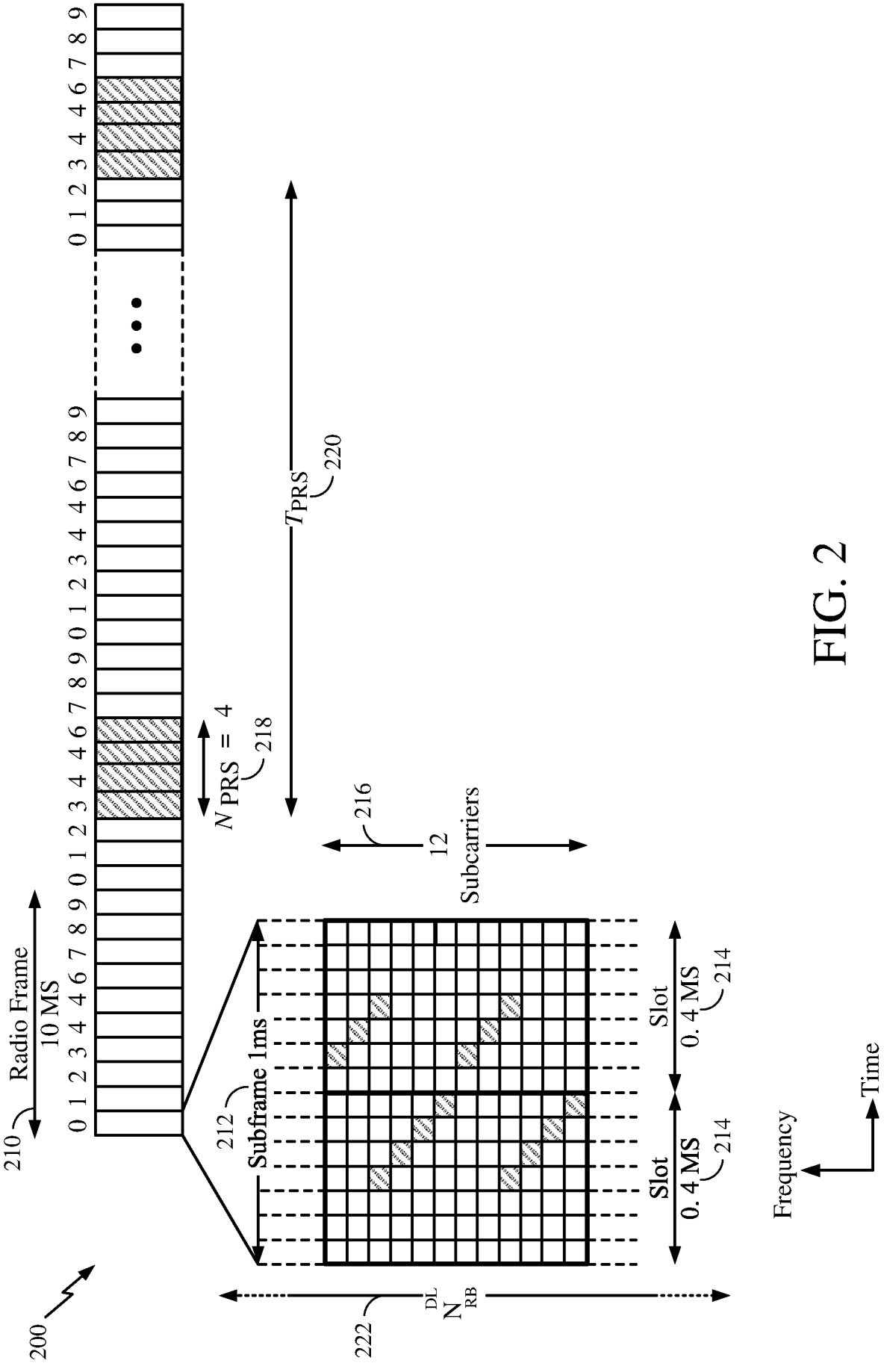

200
210
Radio Frame
10 MS
0 1 2 3 4 4 6 7 8 9 0 1 2 3 4 4 6 7 8 9 0 1 2 3 4 4 6 7 8 9 0 1 2 3 4 4 6 7 8 9
$N_{PRS} = 4$
218
T_{PRS}
220
216
12
Subcarriers
212
Subframe 1ms
Slot
0. 4 MS
214
Slot
0. 4 MS
214
222
N_{RB}^{DL}
Frequency
Time

FIG. 2

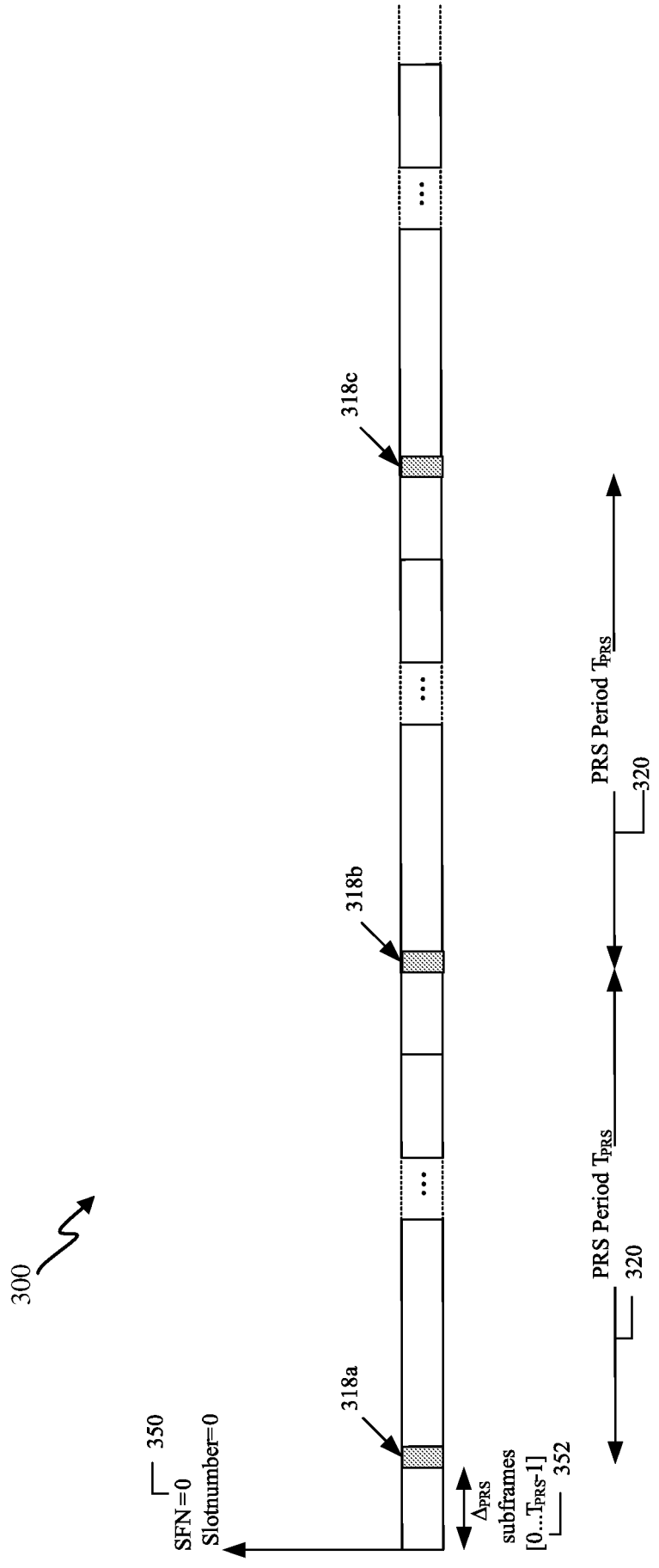

300
350
SFN=0
Slotnumber=0
318a
318b
318c
Δ_{PRS}
subframes
[0...T_{PRS}-1]
352
PRS Period T_{PRS}
320
PRS Period T_{PRS}
320

FIG. 3

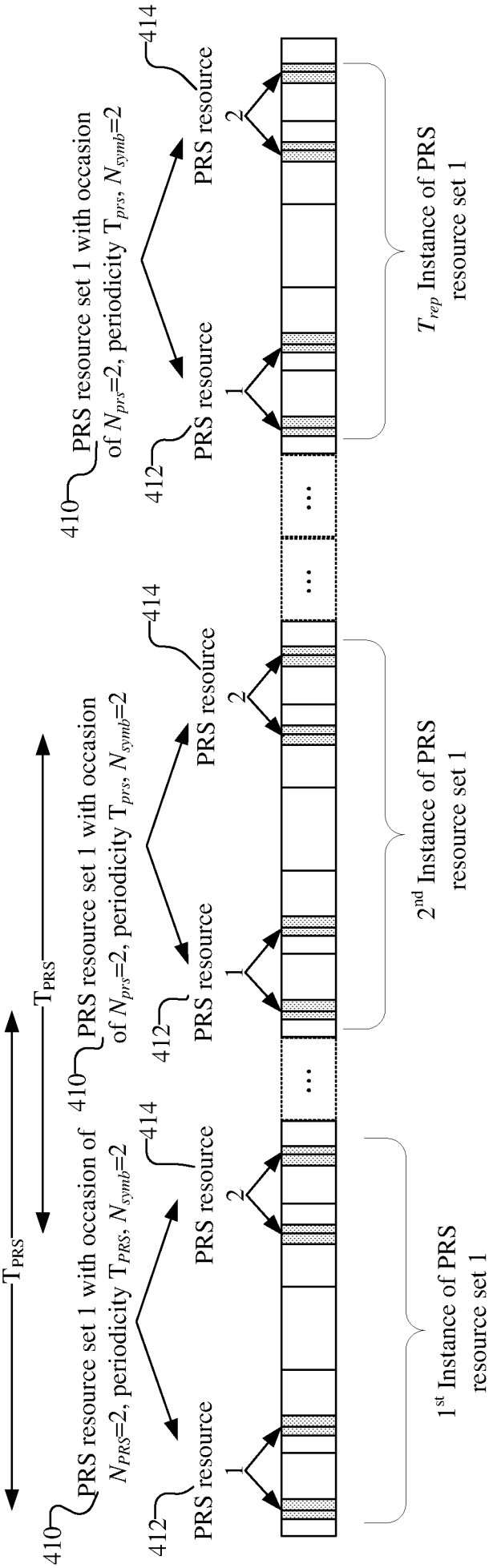

410
PRS resource set 1 with occasion of N_{PRS}=2, periodicity T_{PRS}, N_{symb}=2
T_{PRS}
412
PRS resource
414
PRS resource
1
2
1st Instance of PRS resource set 1
410
PRS resource set 1 with occasion of N_{prs}=2, periodicity T_{prs}, N_{symb}=2
412
PRS resource
414
PRS resource
2nd Instance of PRS resource set 1
410
PRS resource set 1 with occasion of N_{prs}=2, periodicity T_{prs}, N_{symb}=2
412
PRS resource
414
PRS resource
T_{rep} Instance of PRS resource set 1

FIG. 4

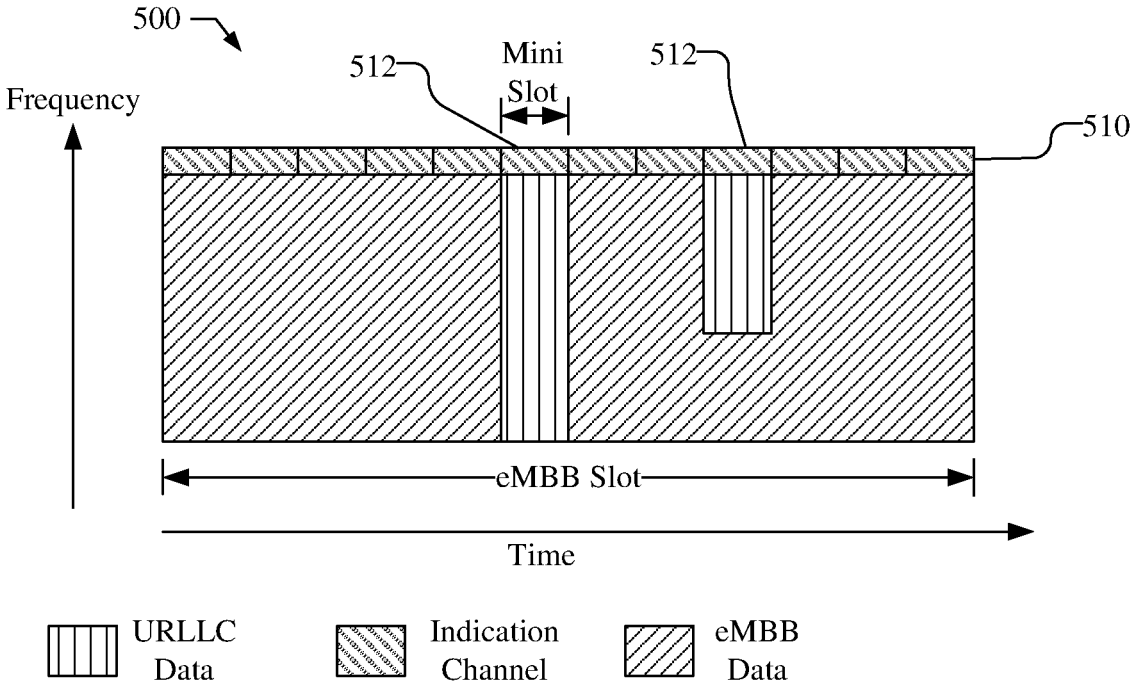

500
512
Mini Slot
512
510
Frequency
eMBB Slot
Time
URLLC Data
Indication Channel
eMBB Data

FIG. 5A

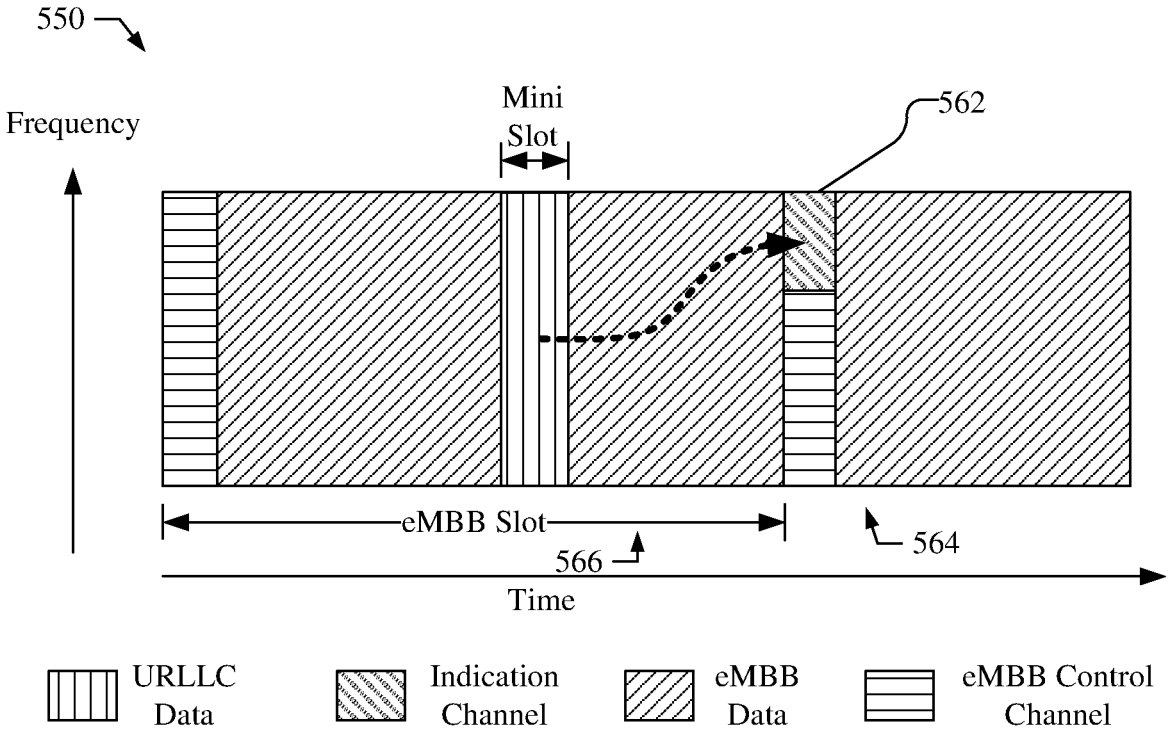

550
Mini Slot
562
Frequency
eMBB Slot
564
566
Time
URLLC Data
Indication Channel
eMBB Data
eMBB Control Channel

FIG. 5B

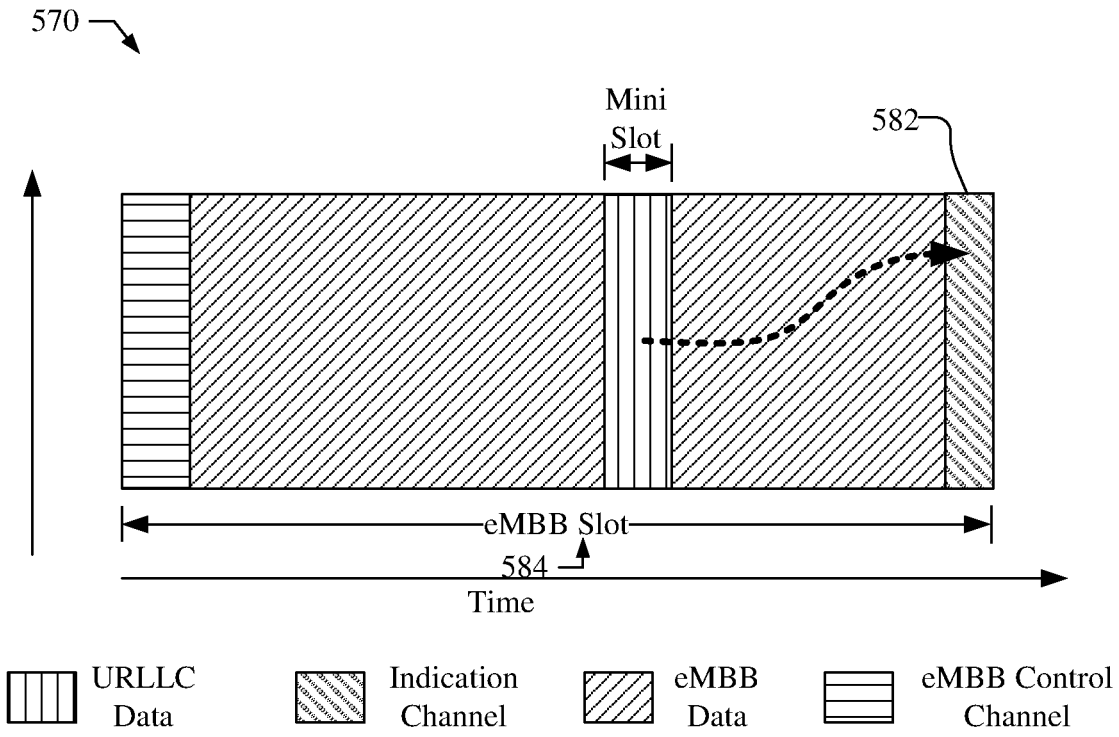

570
Mini
Slot
582
eMBB Slot
584
Time
URLLC
Data
Indication
Channel
eMBB
Data
eMBB Control
Channel

FIG. 5C

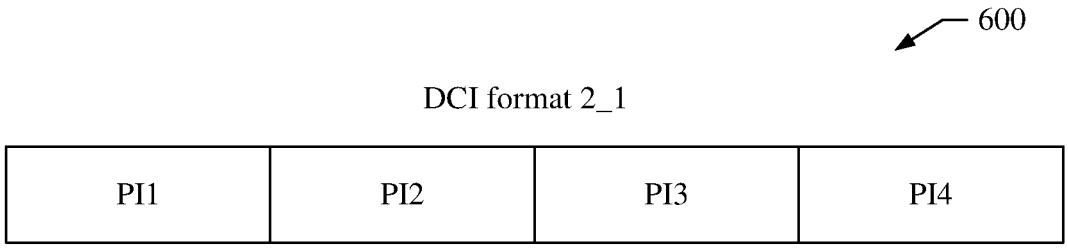

600
DCI format 2_1
PI1
PI2
PI3
PI4

Fig. 6

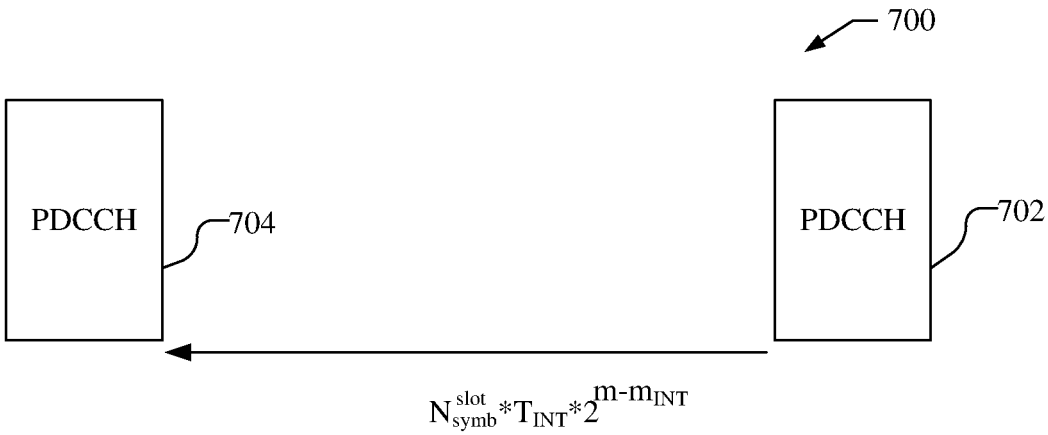

700
PDCCH
704
PDCCH
702
$N_{symb}^{slot}*T_{INT}*2^{m-m_{INT}}$

Fig. 7

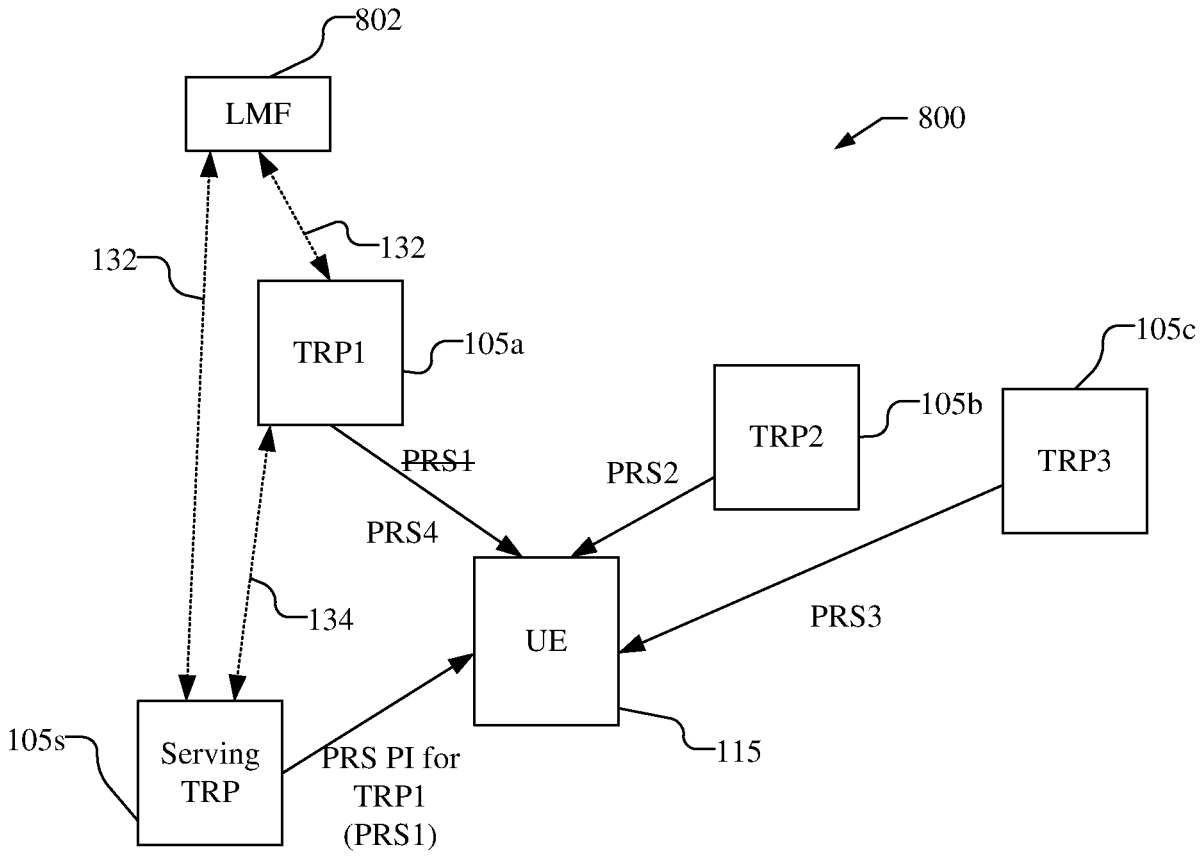

802
LMF
800
132
132
TRP1
105a
105c
105b
TRP2
TRP3
PRS1
PRS2
PRS4
134
UE
PRS3
105s
Serving TRP
PRS PI for TRP1 (PRS1)
115

Fig. 8

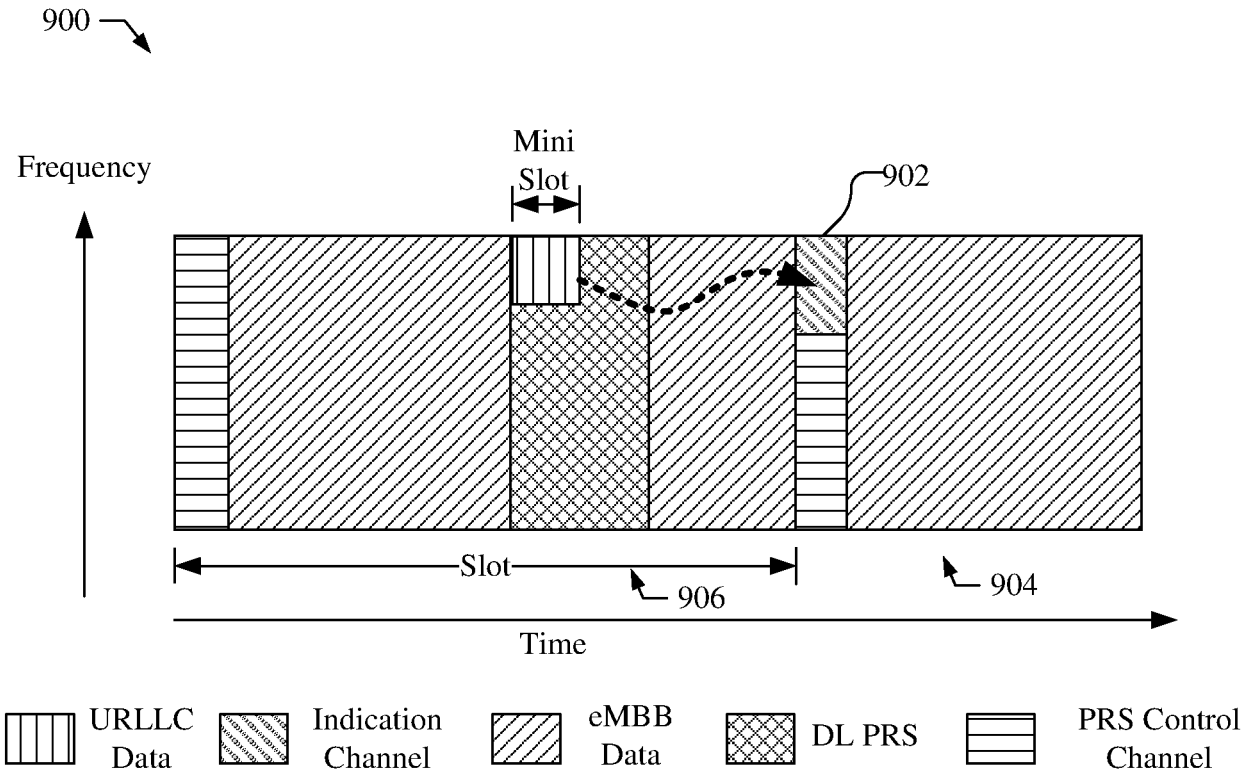

900
Frequency
Mini
Slot
902
Slot
906
904
Time
URLLC
Data
Indication
Channel
eMBB
Data
DL PRS
PRS Control
Channel

FIG. 9

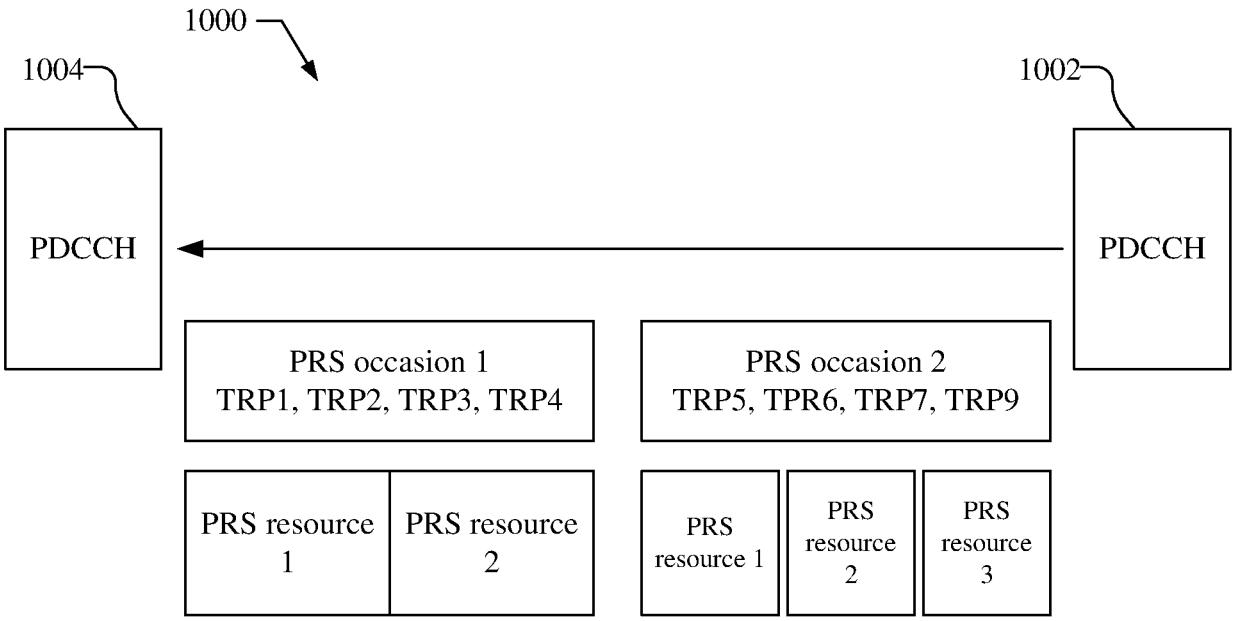

1000
1004
1002
PDCCH
PDCCH
PRS occasion 1
TRP1, TRP2, TRP3, TRP4
PRS occasion 2
TRP5, TPR6, TRP7, TRP9
PRS resource 1
PRS resource 2
PRS resource 1
PRS resource 2
PRS resource 3

Fig. 10

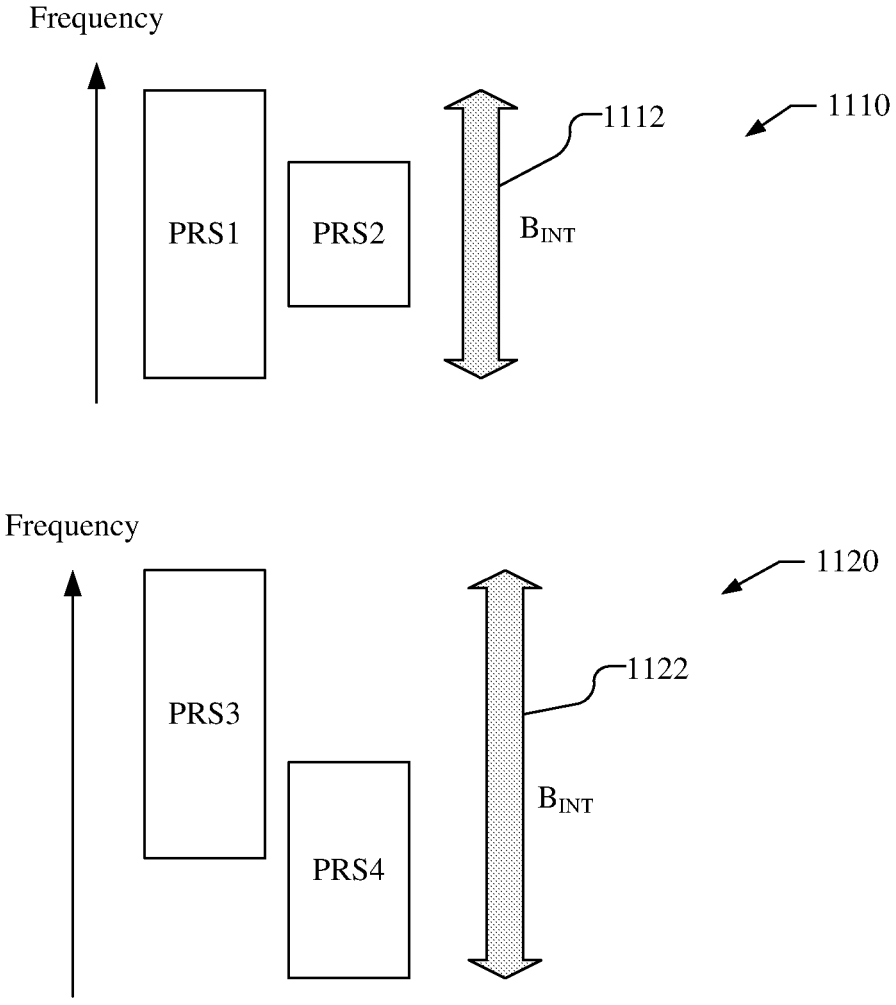

Frequency
PRS1
PRS2
1112
1110
B_{INT}
Frequency
PRS3
PRS4
1120
1122
B_{INT}

Fig. 11

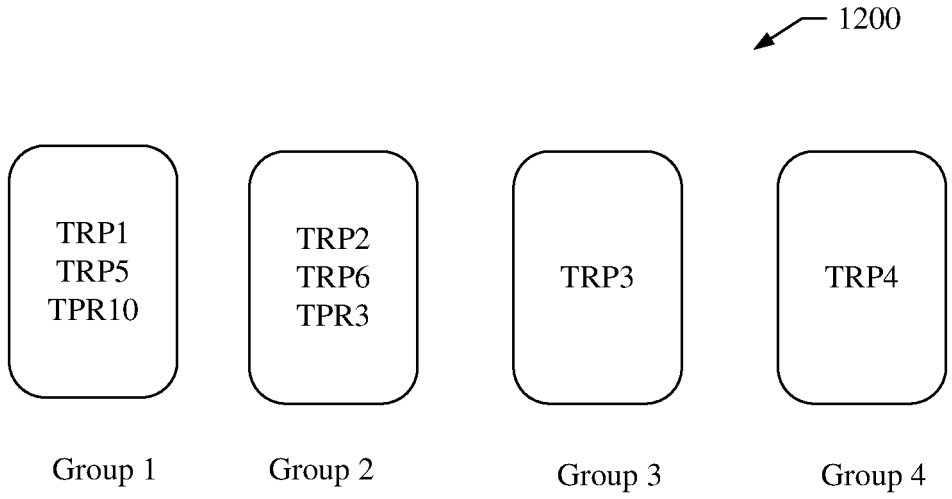

1200
TRP1
TRP5
TPR10
TRP2
TRP6
TPR3
TRP3
TRP4
Group 1
Group 2
Group 3
Group 4

Fig. 12

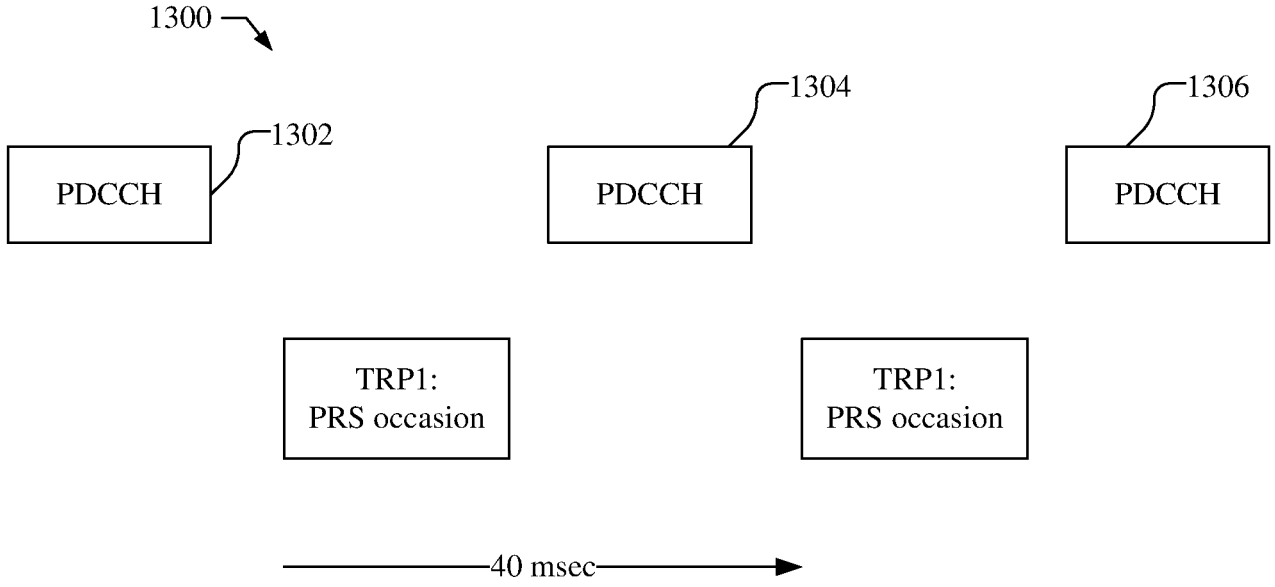

1300
1302
PDCCH
1304
PDCCH
1306
PDCCH
TRP1:
PRS occasion
TRP1:
PRS occasion
40 msec

Fig. 13

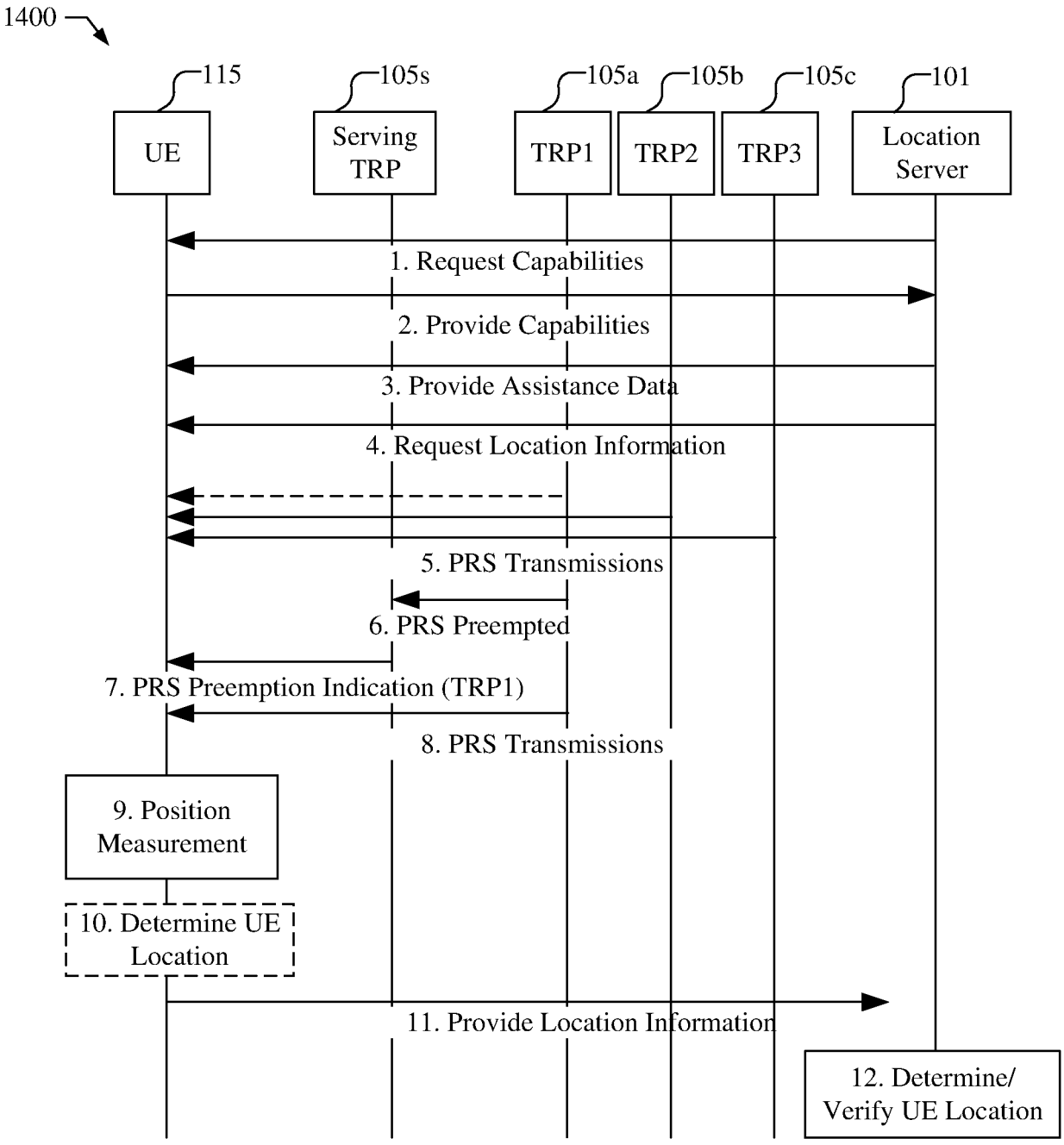

1400
115
105s
105a
105b
105c
101
UE
Serving TRP
TRP1
TRP2
TRP3
Location Server
1. Request Capabilities
2. Provide Capabilities
3. Provide Assistance Data
4. Request Location Information
5. PRS Transmissions
6. PRS Preempted
7. PRS Preemption Indication (TRP1)
8. PRS Transmissions
9. Position Measurement
10. Determine UE Location
11. Provide Location Information
12. Determine/ Verify UE Location

FIG. 14

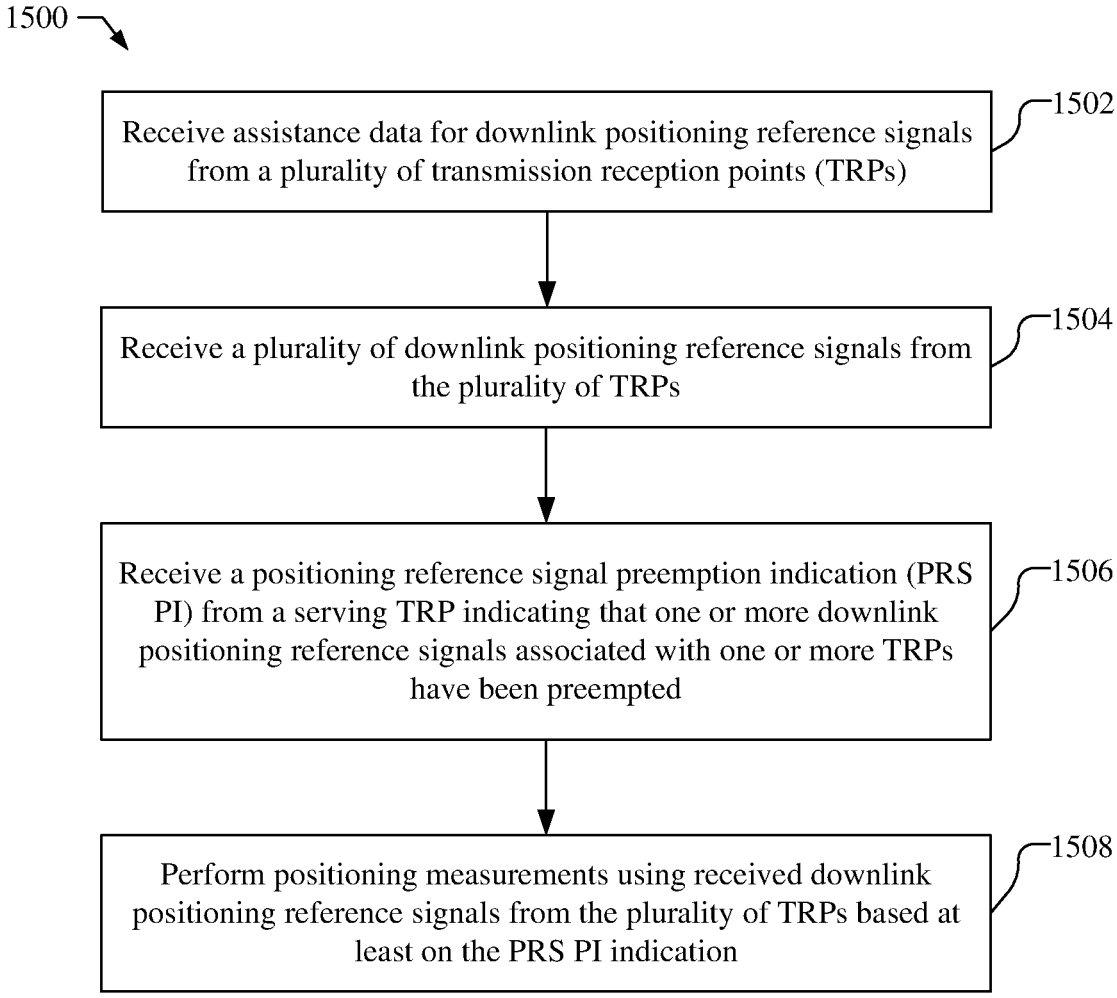

1500
Receive assistance data for downlink positioning reference signals from a plurality of transmission reception points (TRPs)
1502
Receive a plurality of downlink positioning reference signals from the plurality of TRPs
1504
Receive a positioning reference signal preemption indication (PRS PI) from a serving TRP indicating that one or more downlink positioning reference signals associated with one or more TRPs have been preempted
1506
Perform positioning measurements using received downlink positioning reference signals from the plurality of TRPs based at least on the PRS PI indication
1508

Fig. 15

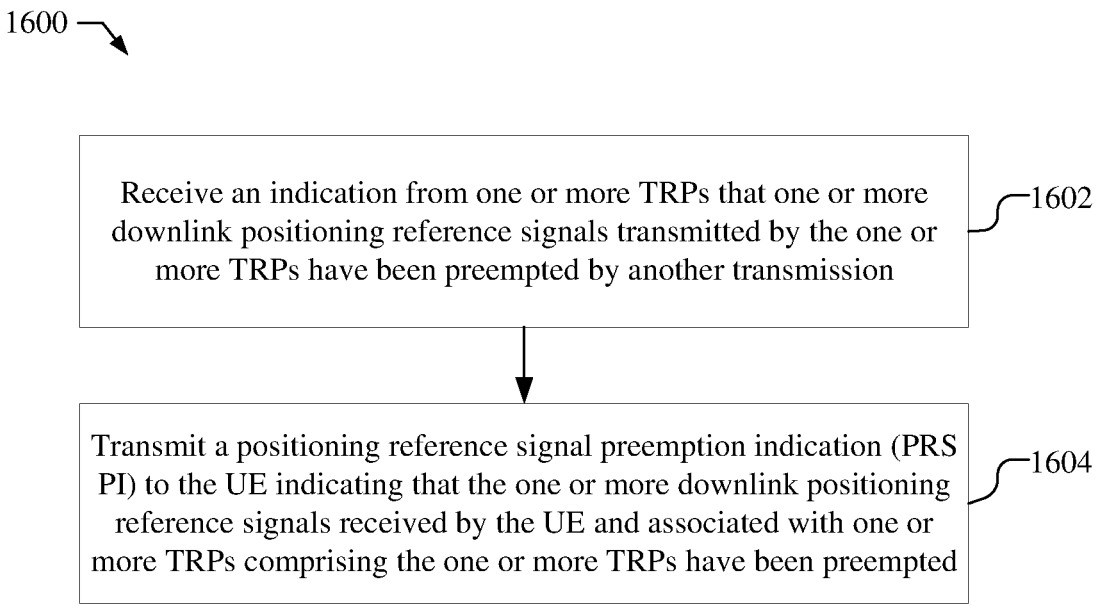

1600
Receive an indication from one or more TRPs that one or more downlink positioning reference signals transmitted by the one or more TRPs have been preempted by another transmission
1602
Transmit a positioning reference signal preemption indication (PRS PI) to the UE indicating that the one or more downlink positioning reference signals received by the UE and associated with one or more TRPs comprising the one or more TRPs have been preempted
1604

Fig. 16

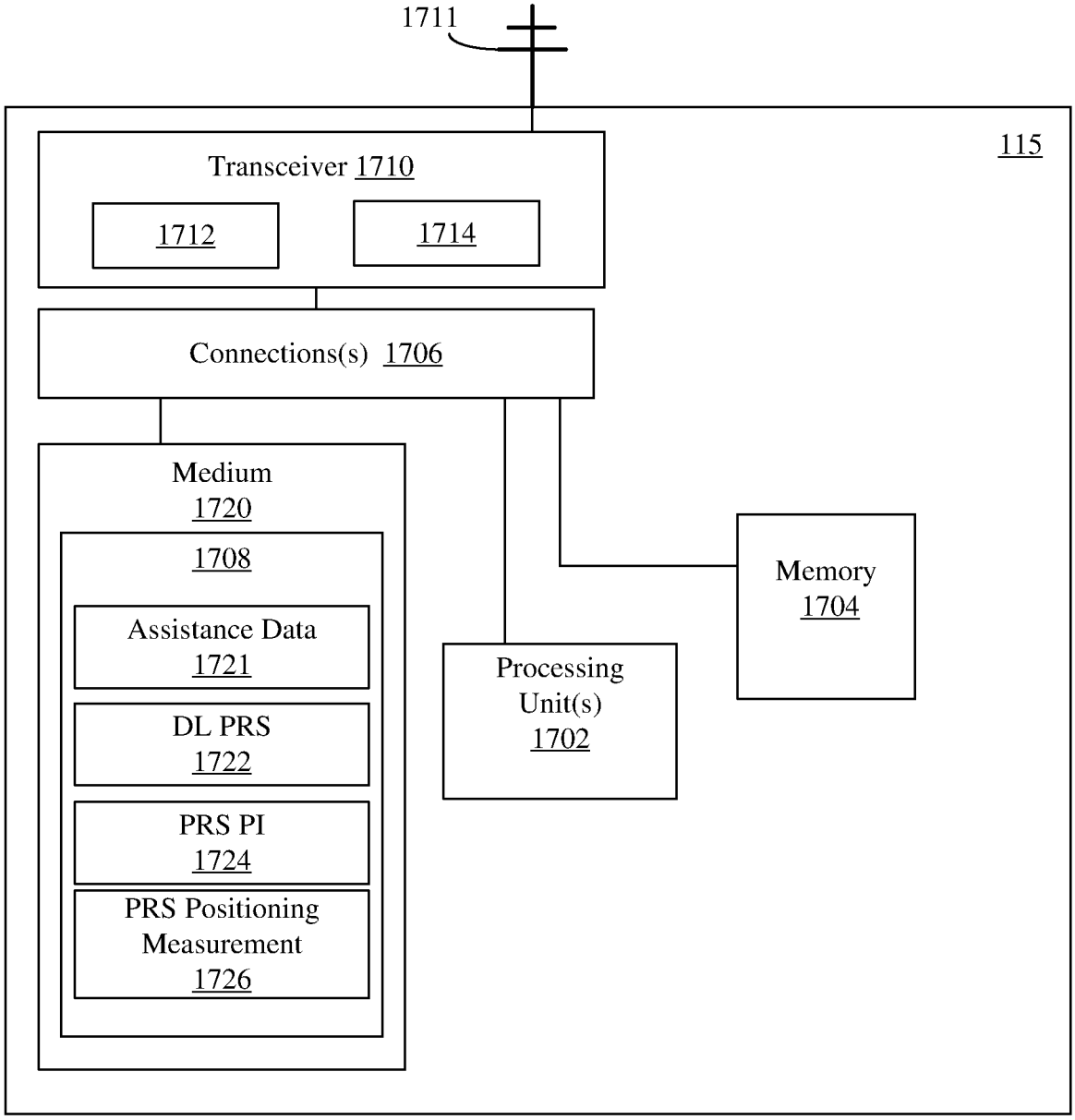

1711
115
Transceiver 1710
1712
1714
Connections(s) 1706
Medium
1720
1708
Assistance Data
1721
DL PRS
1722
PRS PI
1724
PRS Positioning
Measurement
1726
Memory
1704
Processing
Unit(s)
1702

FIG. 17

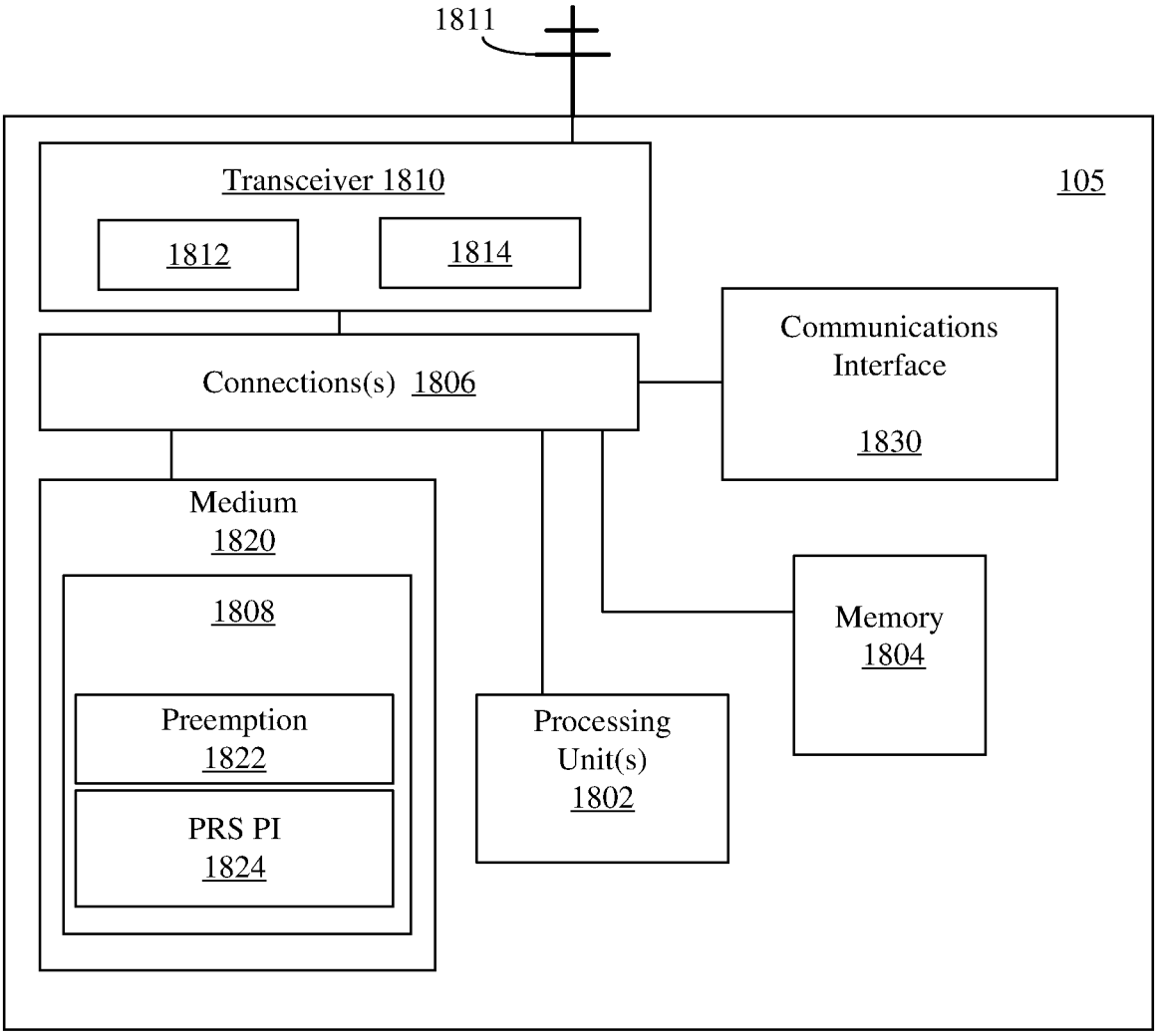

1811
Transceiver 1810
1812
1814
105
Connections(s) 1806
Communications Interface
1830
Medium
1820
1808
Preemption
1822
PRS PI
1824
Memory
1804
Processing Unit(s)
1802

FIG. 18