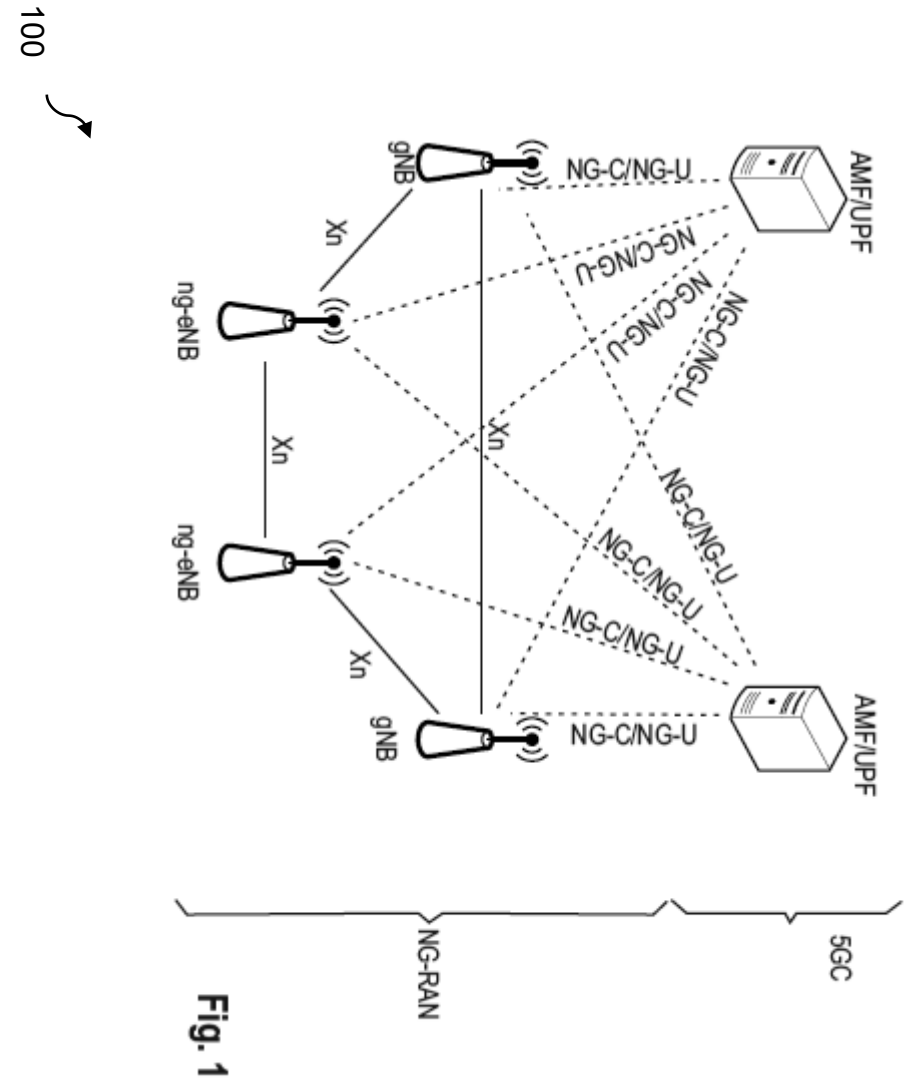
100
gNB
NG-C/NG-U
AMF/UPF
Xn
NG-C/NG-U
NG-C/NG-U
NG-C/NG-U
ng-eNB
Xn
Xn
NG-C/NG-U
NG-C/NG-U
ng-eNB
NG-C/NG-U
Xn
gNB
NG-C/NG-U
AMF/UPF
NG-RAN
5GC

Fig. 1

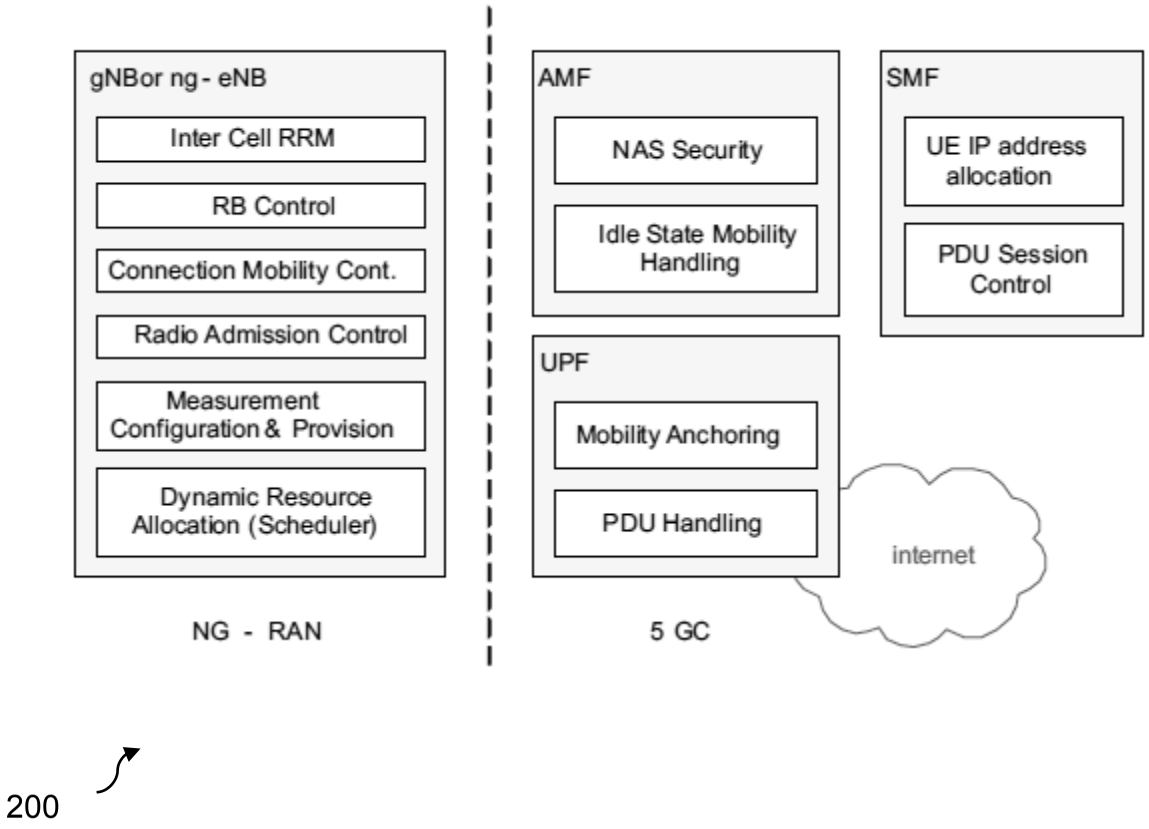
gNBor ng - eNB
Inter Cell RRM
RB Control
Connection Mobility Cont.
Radio Admission Control
Measurement Configuration & Provision
Dynamic Resource Allocation (Scheduler)
NG - RAN
AMF
NAS Security
Idle State Mobility Handling
SMF
UE IP address allocation
PDU Session Control
UPF
Mobility Anchoring
PDU Handling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

Fig. 2

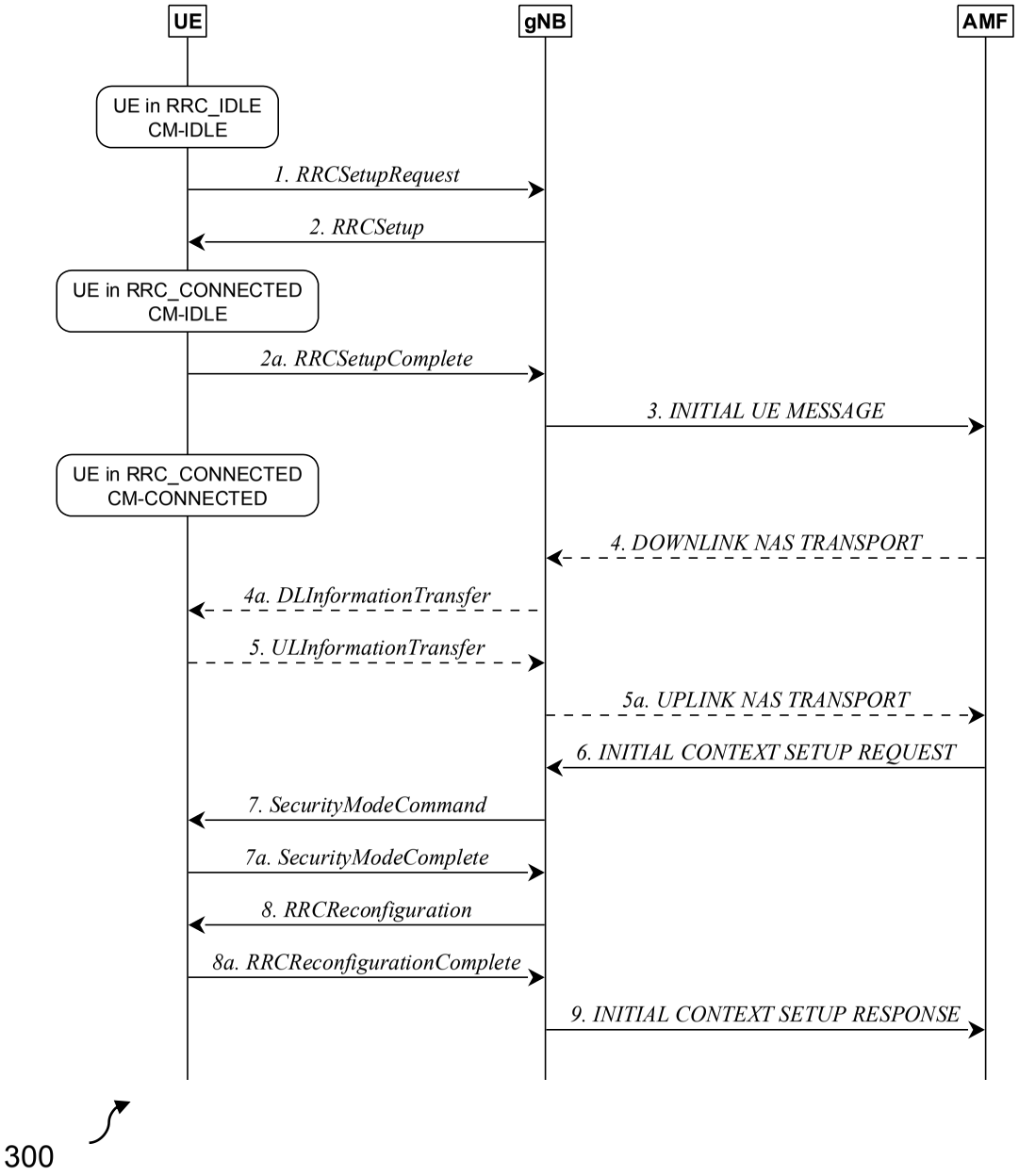
UE
gNB
AMF
UE in RRC_IDLE
CM-IDLE
1. RRCSetupRequest
2. RRCSetup
UE in RRC_CONNECTED
CM-IDLE
2a. RRCSetupComplete
3. INITIAL UE MESSAGE
UE in RRC_CONNECTED
CM-CONNECTED
4. DOWNLINK NAS TRANSPORT
4a. DLInformationTransfer
5. ULInformationTransfer
5a. UPLINK NAS TRANSPORT
6. INITIAL CONTEXT SETUP REQUEST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

Fig. 3

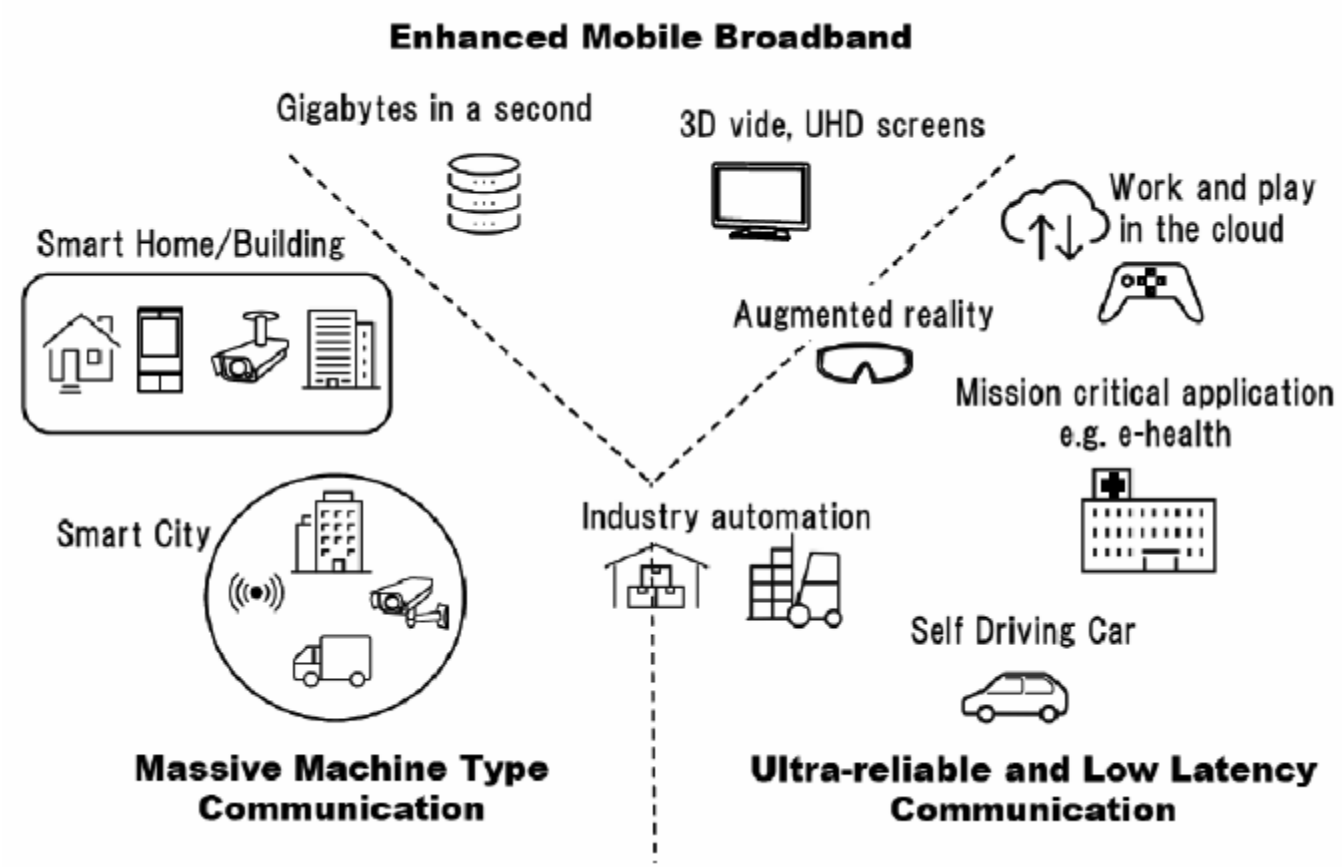
Enhanced Mobile Broadband
Gigabytes in a second
3D vide, UHD screens
Work and play in the cloud
Smart Home/Building
Augmented reality
Mission critical application e.g. e-health
Smart City
Industry automation
Self Driving Car
Massive Machine Type Communication
Ultra-reliable and Low Latency Communication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

Fig. 4

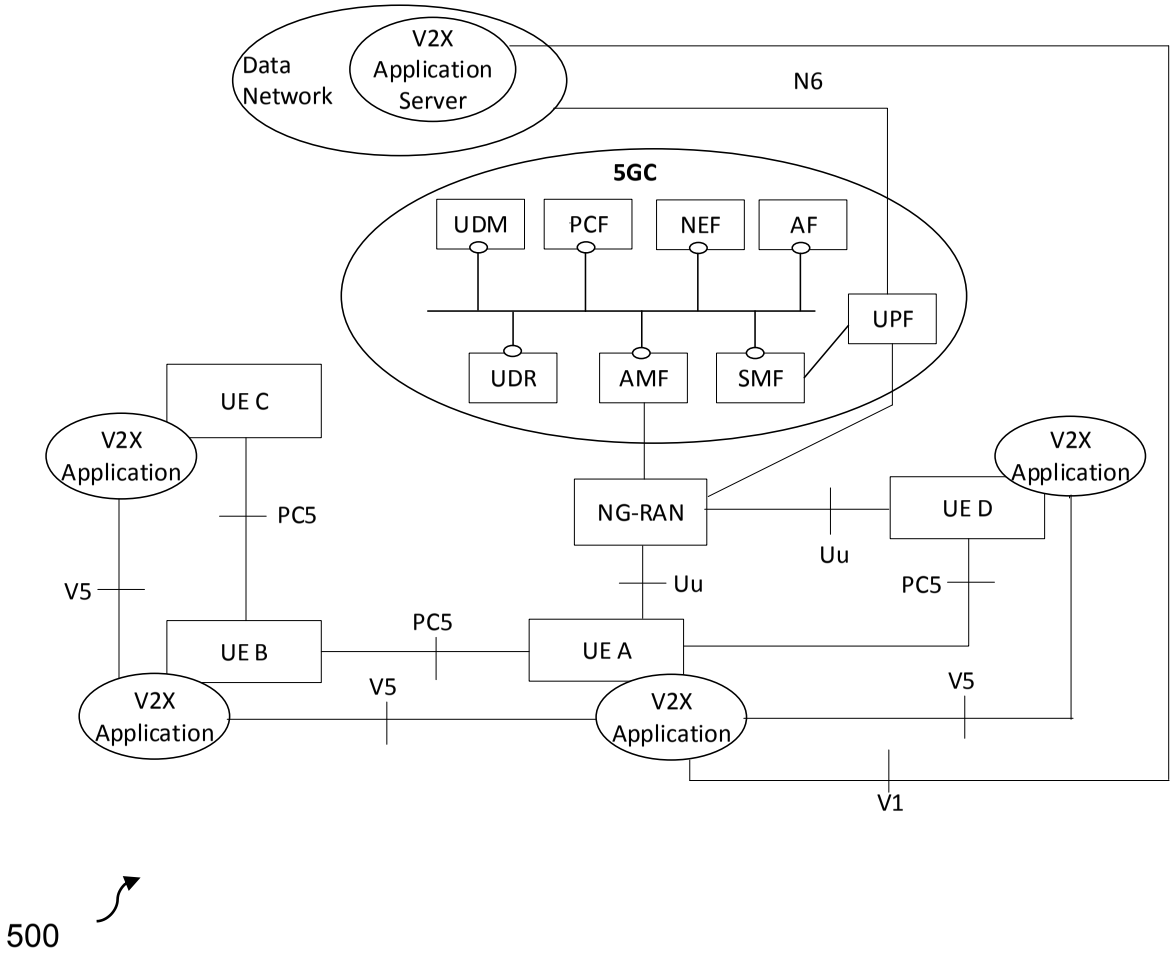
Data Network
V2X Application Server
N6
5GC
UDM
PCF
NEF
AF
UPF
UDR
AMF
SMF
UE C
V2X Application
PC5
V5
NG-RAN
Uu
UE D
V2X Application
PC5
UE B
PC5
UE A
V5
V5
V2X Application
V2X Application
V1
500

Fig. 5

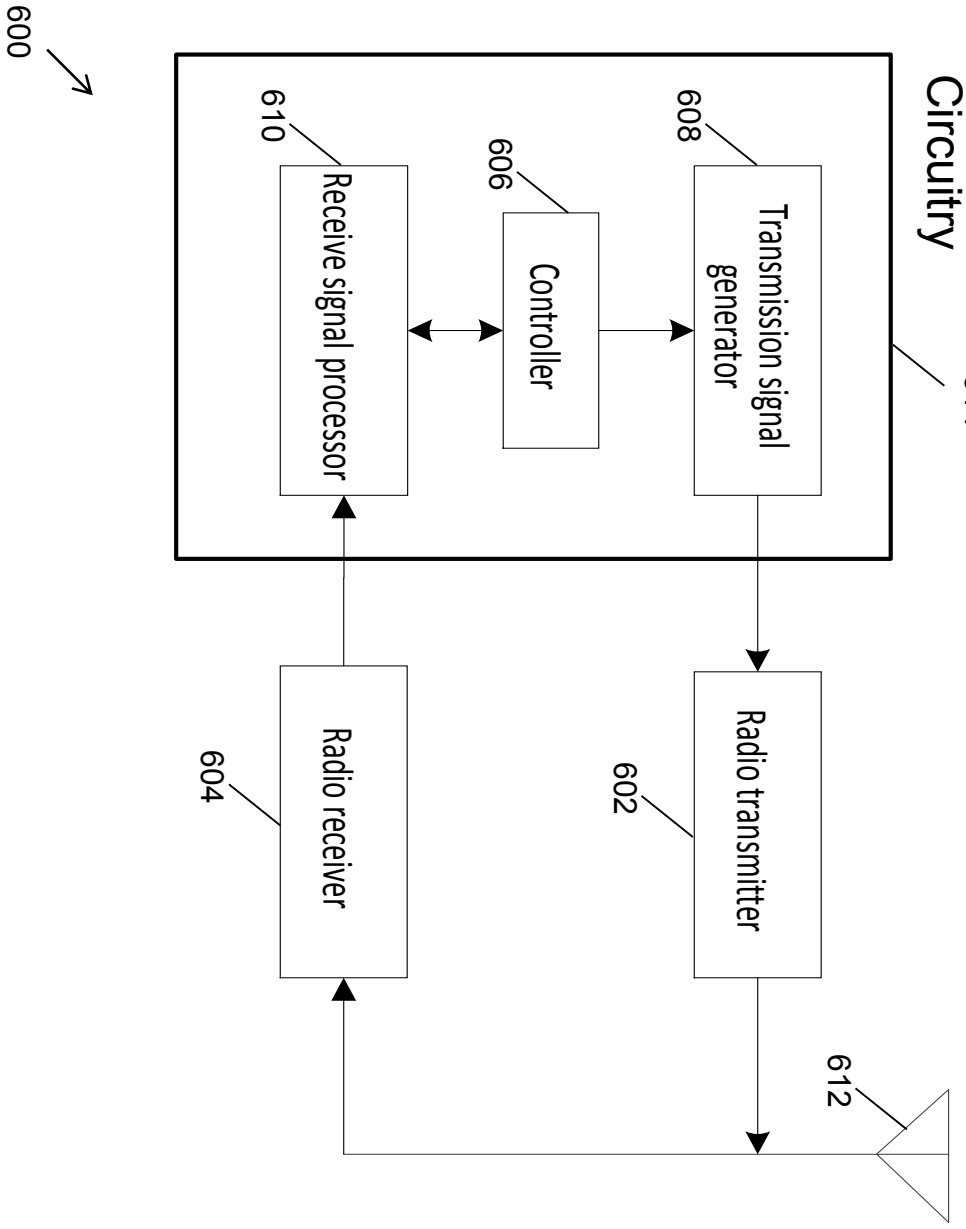
600
Circuitry
614
608
Transmission signal generator
606
Controller
610
Receive signal processor
602
Radio transmitter
604
Radio receiver
612

Fig. 6

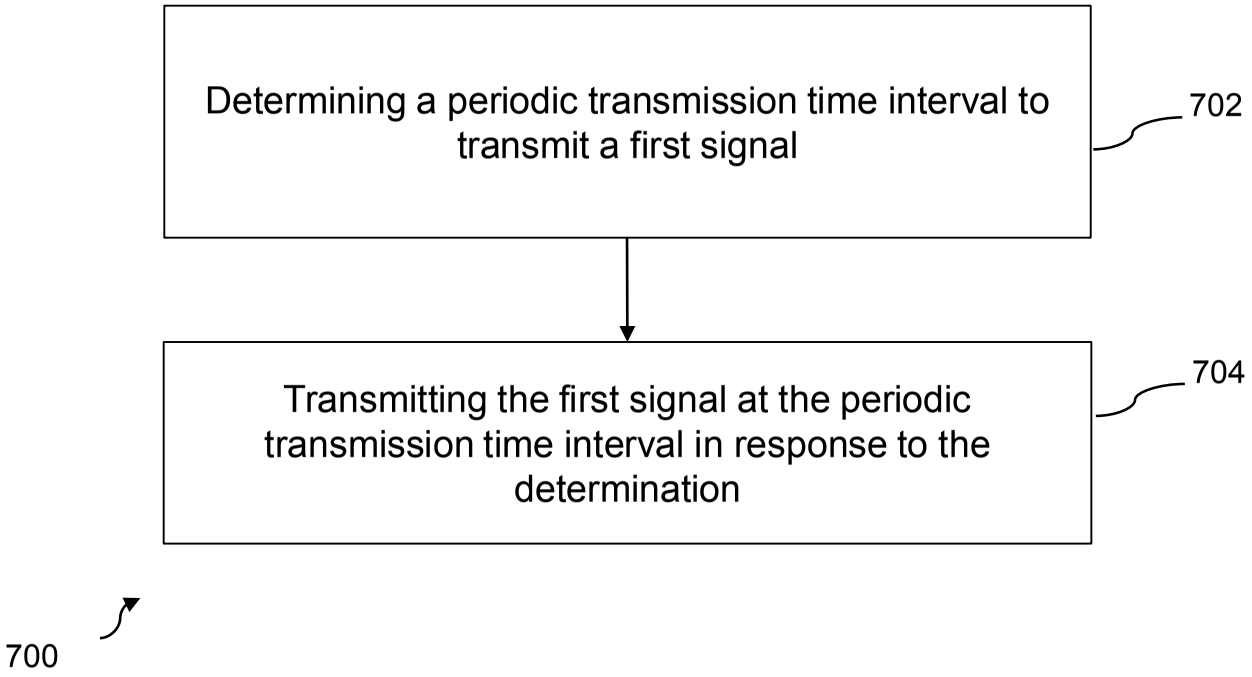
Determining a periodic transmission time interval to transmit a first signal
702
Transmitting the first signal at the periodic transmission time interval in response to the determination
704
700

Fig. 7

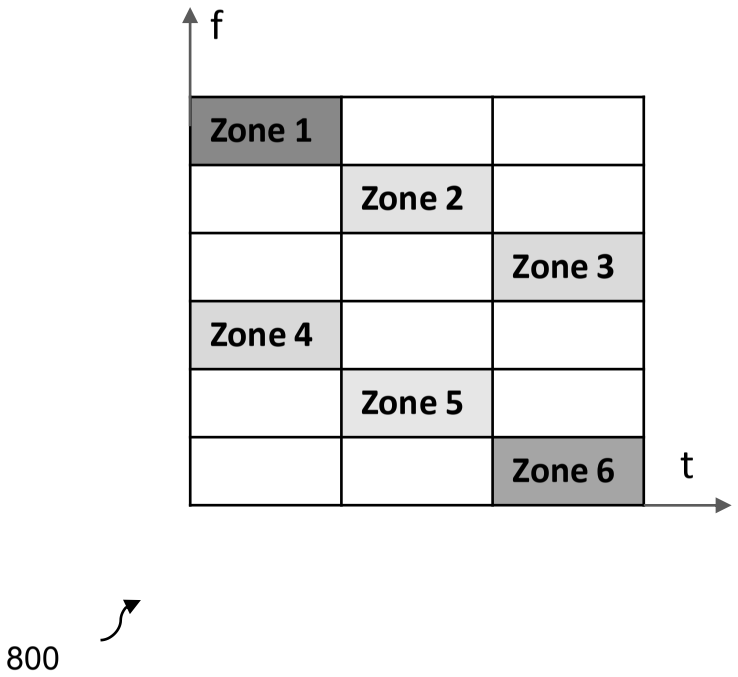

Fig. 8

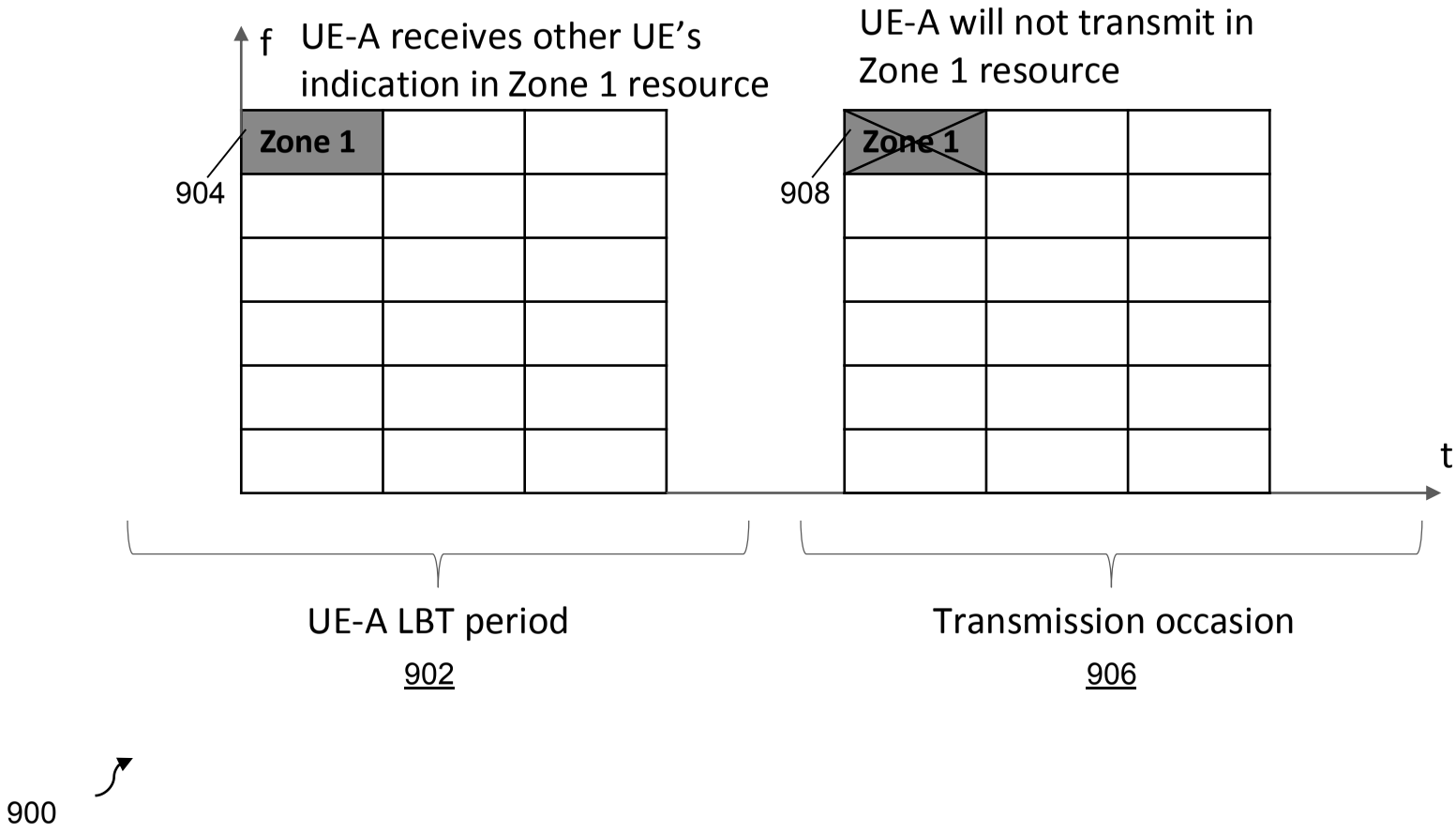
f
UE-A receives other UE's indication in Zone 1 resource
Zone 1
904
UE-A will not transmit in Zone 1 resource
Zone 1
908
t
UE-A LBT period
902
Transmission occasion
906
900

Fig. 9

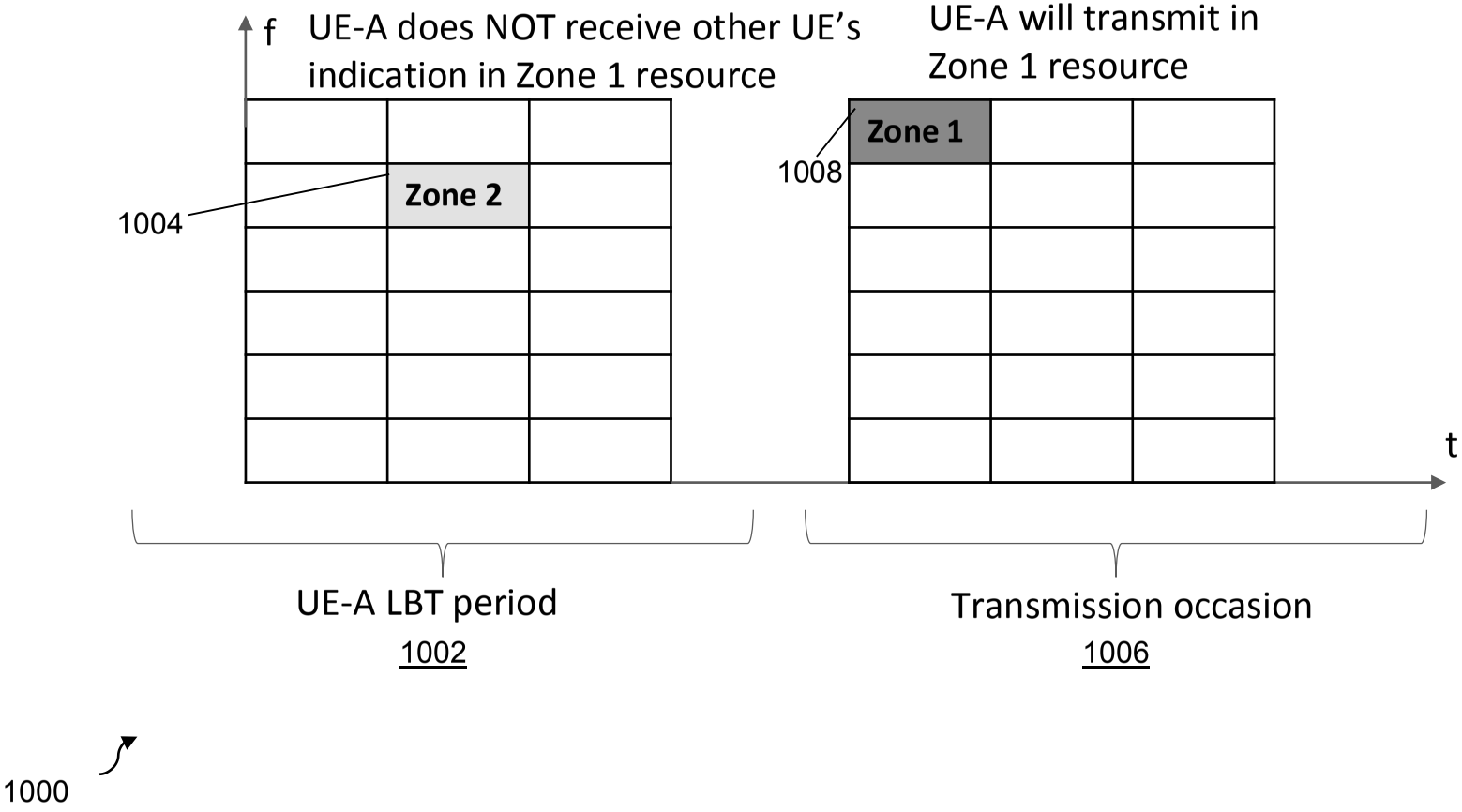
f
UE-A does NOT receive other UE's indication in Zone 1 resource
UE-A will transmit in Zone 1 resource
Zone 1
1008
Zone 2
1004
t
UE-A LBT period
1002
Transmission occasion
1006
1000

Fig. 10

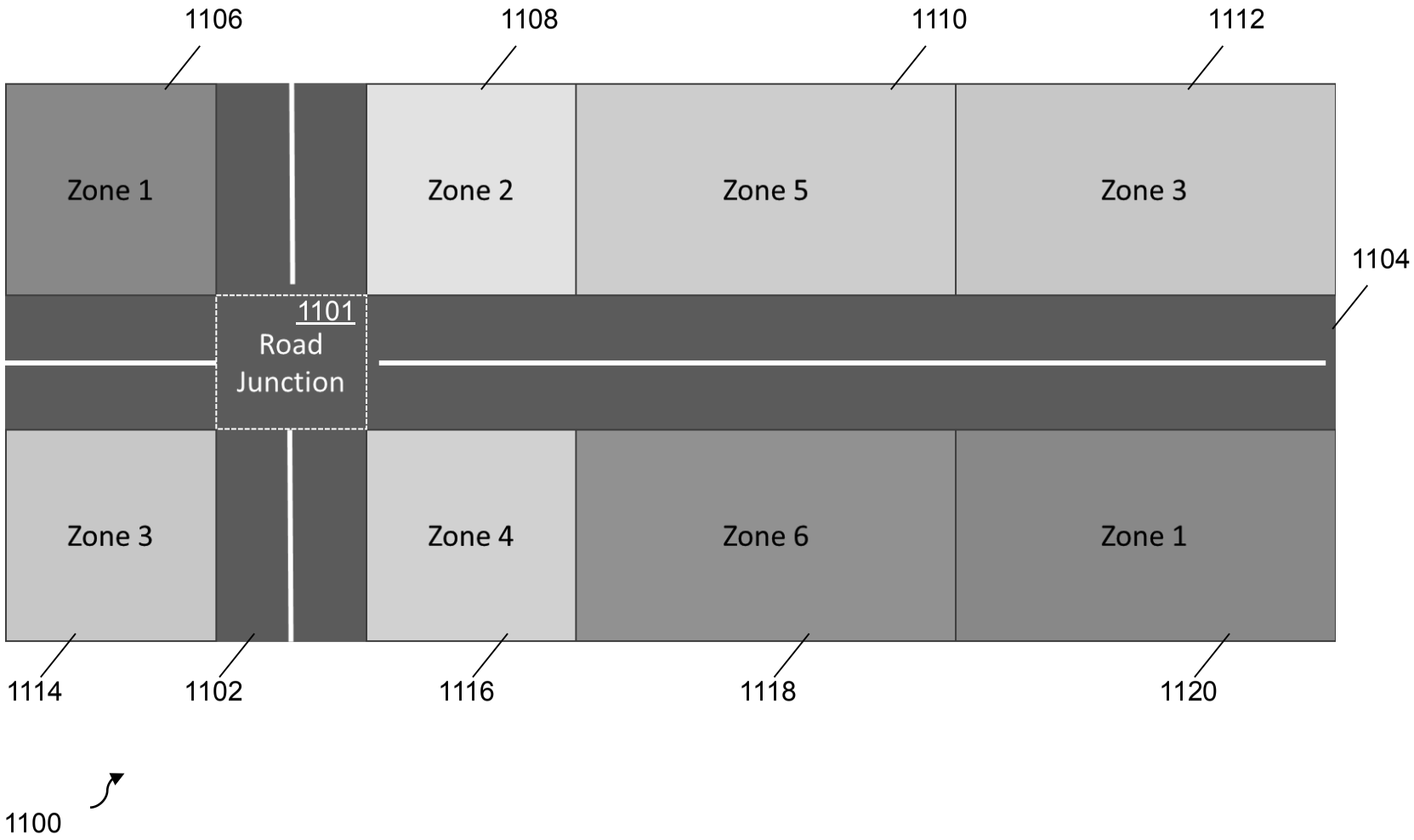
1106
1108
1110
1112
Zone 1
Zone 2
Zone 5
Zone 3
1104
1101
Road
Junction
Zone 3
Zone 4
Zone 6
Zone 1
1114
1102
1116
1118
1120
1100

Fig. 11

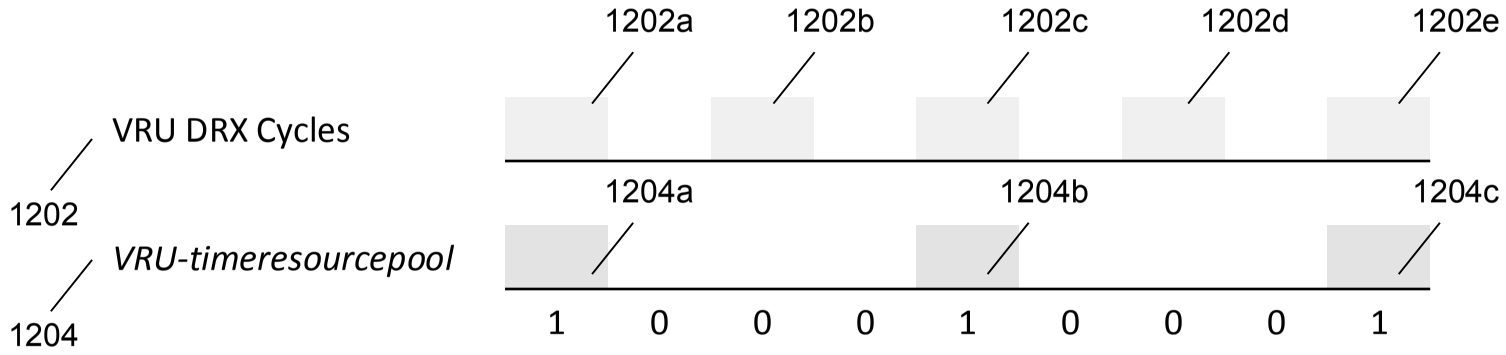
1202a
1202b
1202c
1202d
1202e
VRU DRX Cycles
1202
1204a
1204b
1204c
VRU-timeresourcepool
1204
1 0 0 0 1 0 0 0 1

Fig. 12

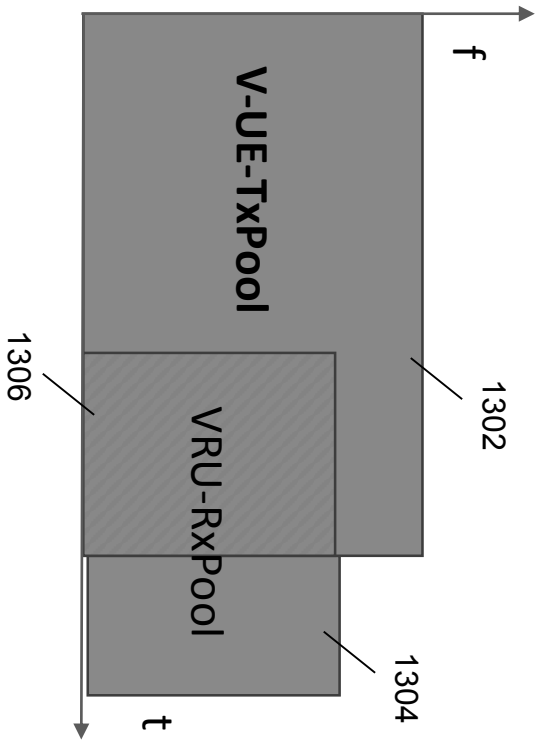

Fig. 13A

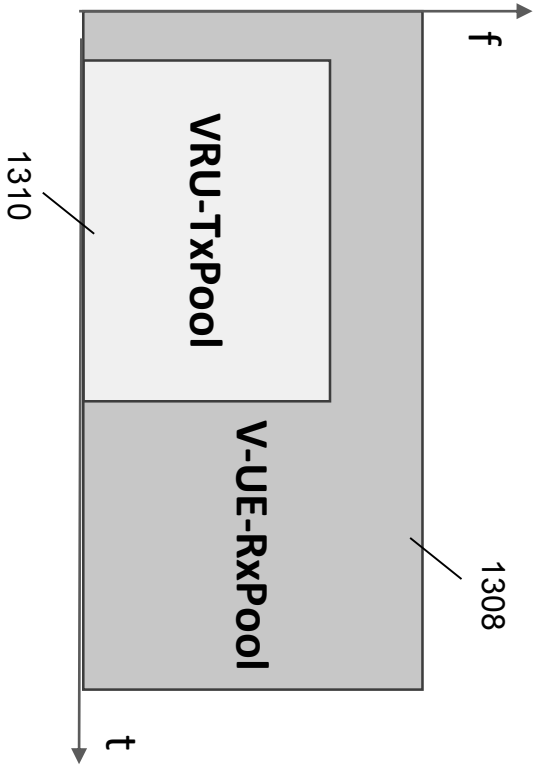

Fig. 13B

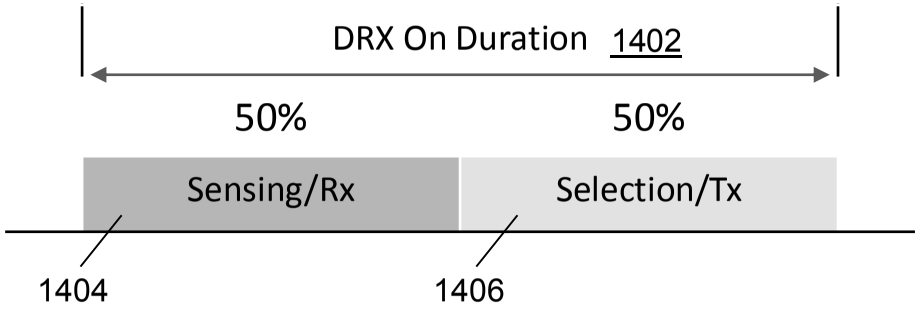

Fig. 14A

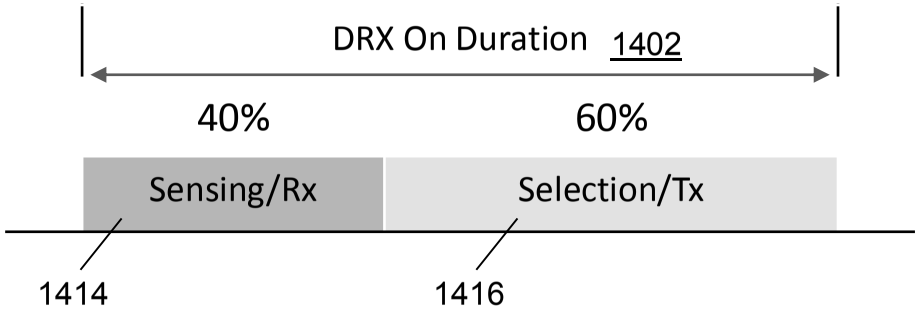

Fig. 14B

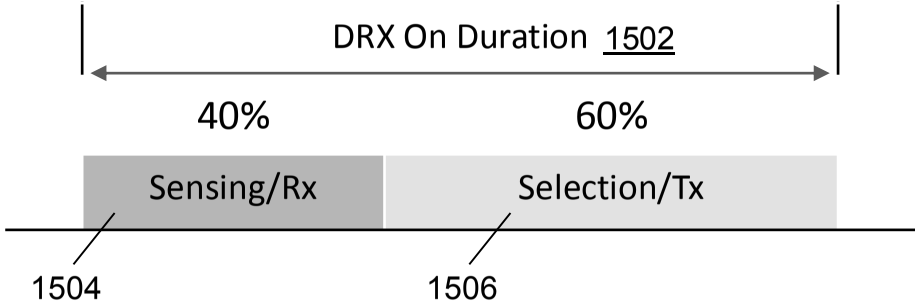

Fig. 15A

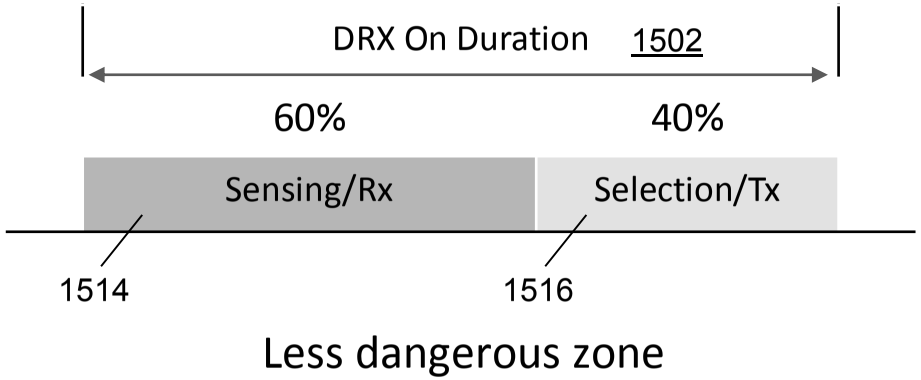

Fig. 15B

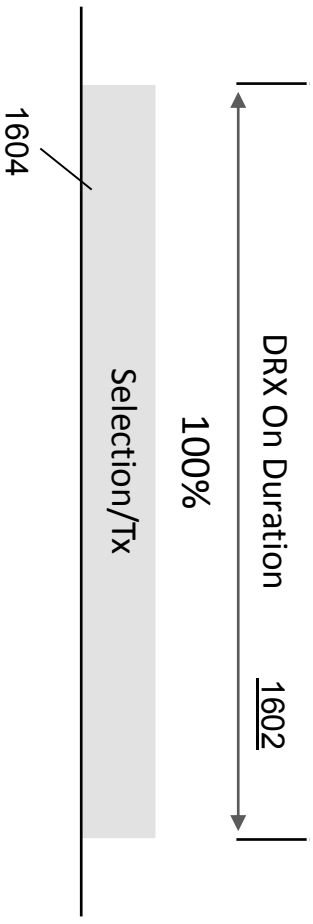

Fig. 16