

CSIF – Communication Service Interface between distributed automation application/function and 5G system

Fig. 1

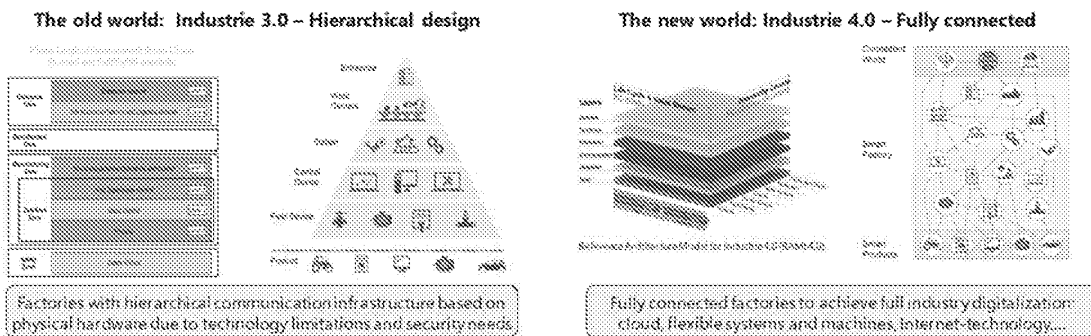


Fig. 2

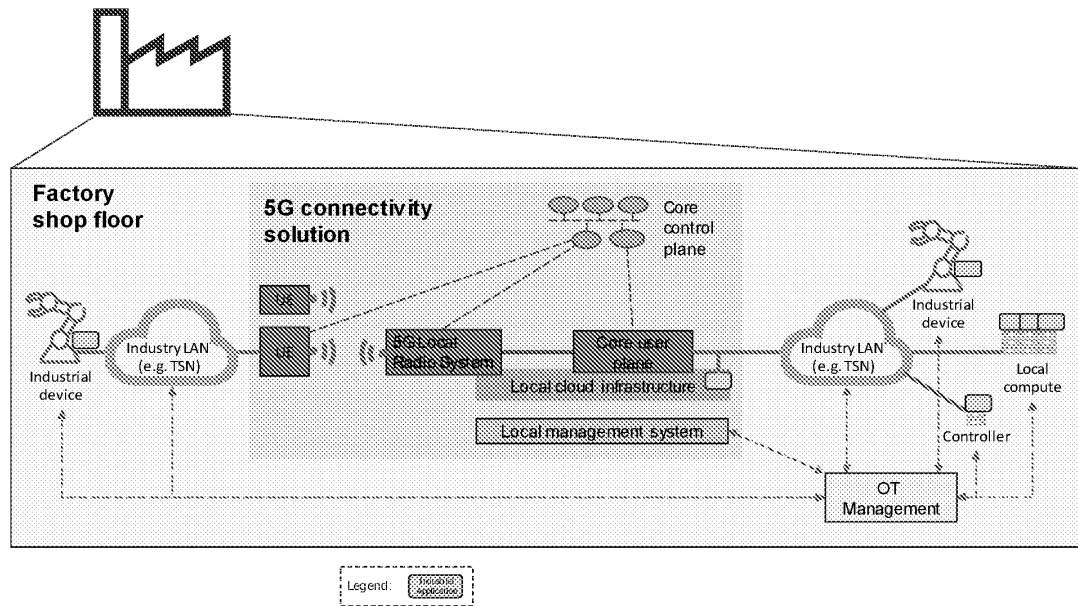


Fig. 3

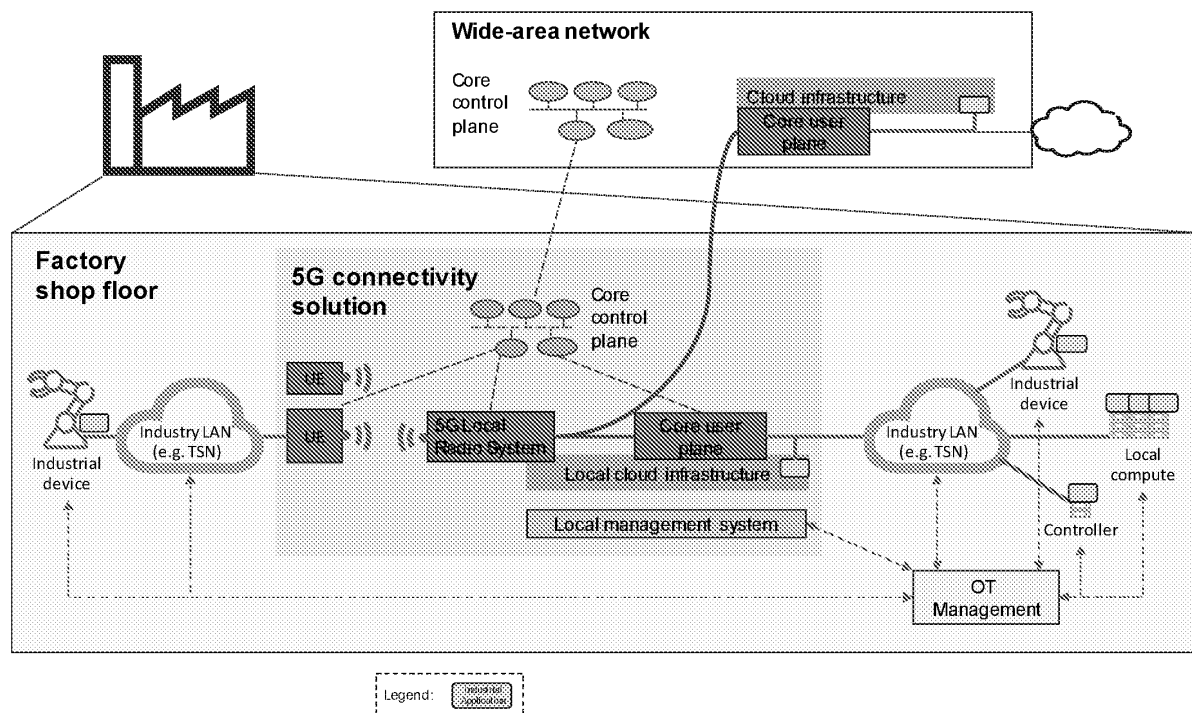
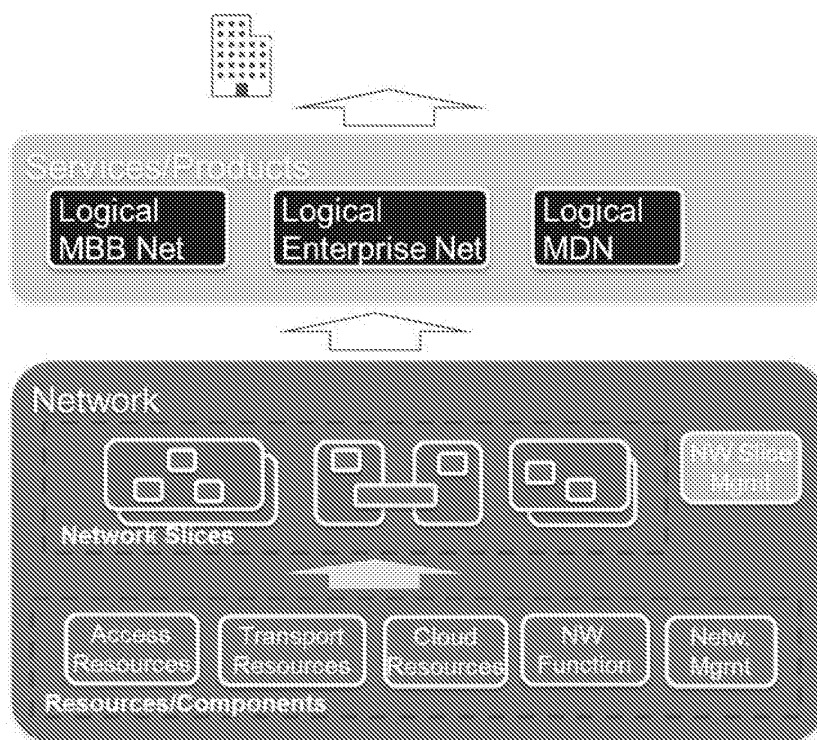


Fig. 4

**Fig. 5**

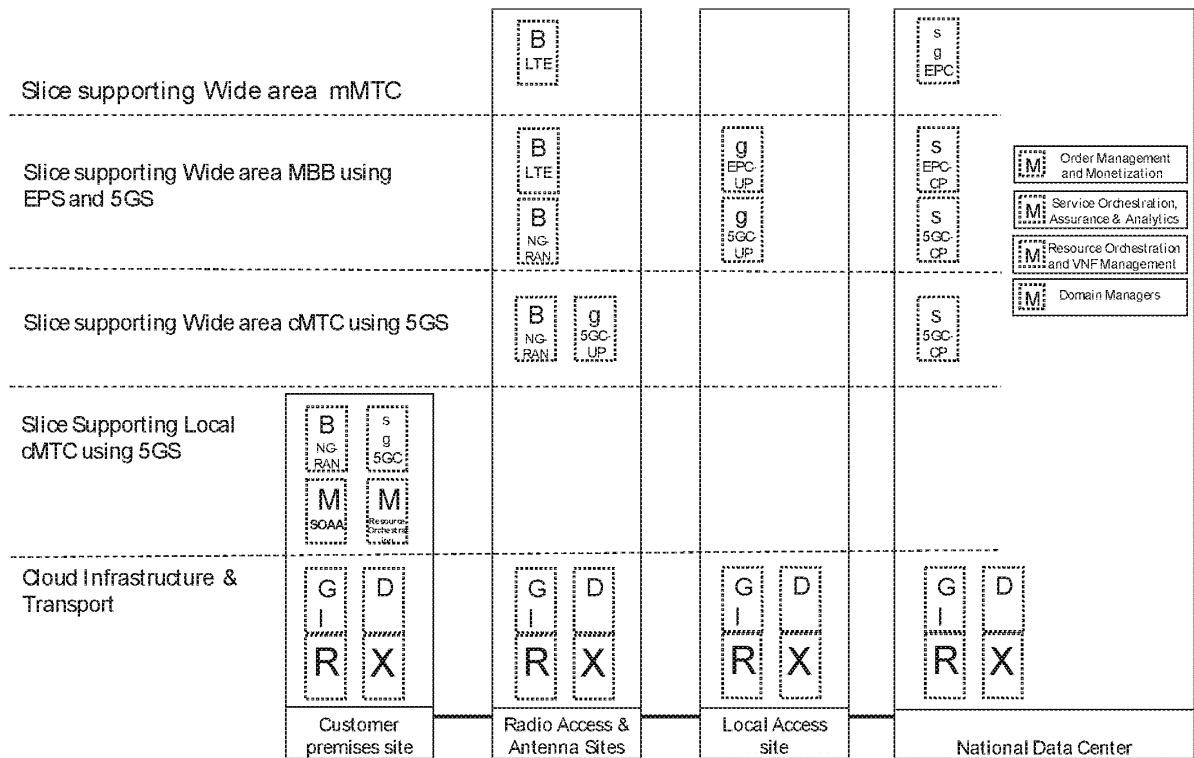


Fig. 6

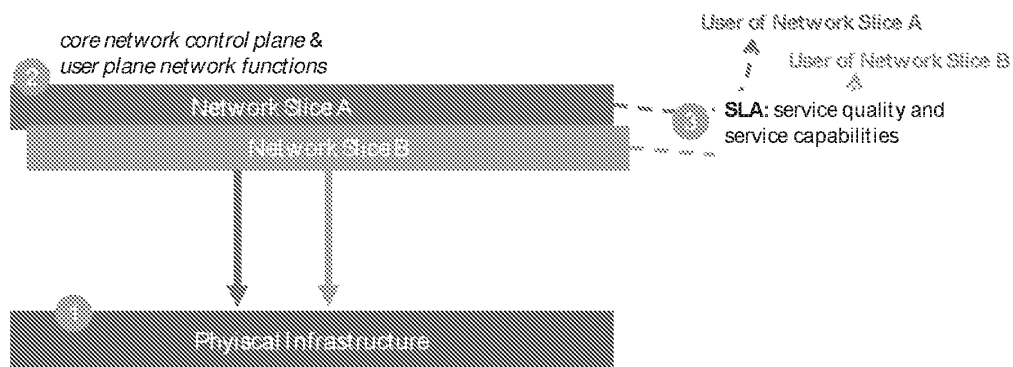


Fig. 7

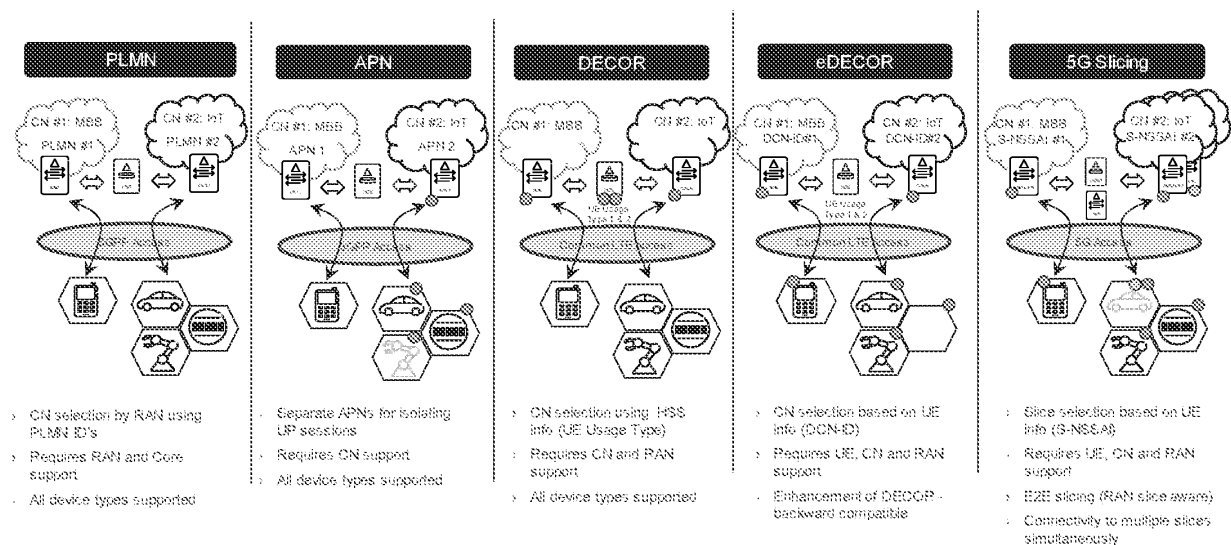


Fig. 8

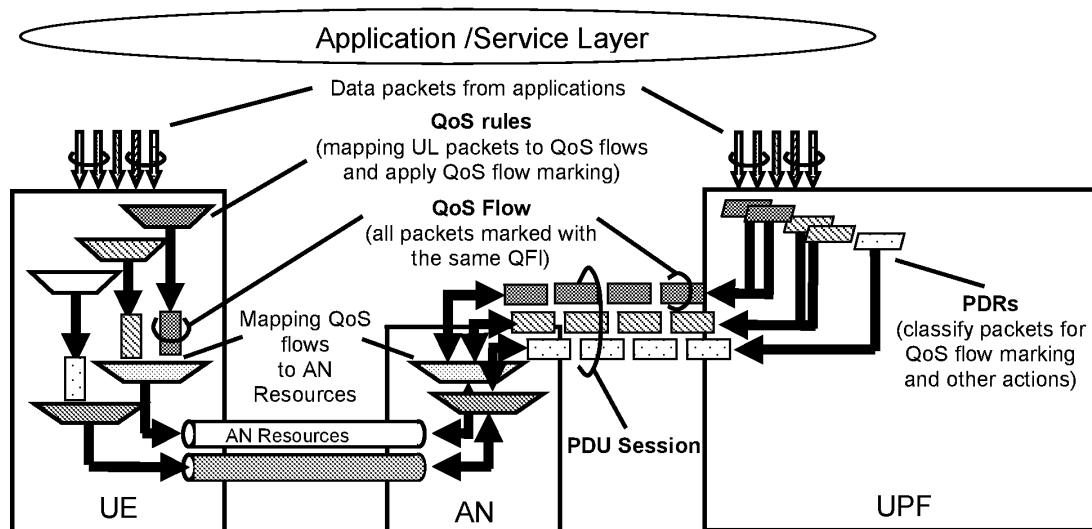


Fig. 9

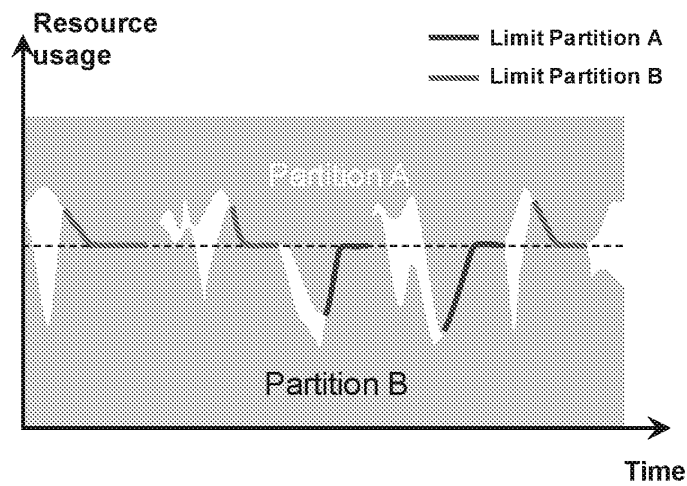


Fig. 10

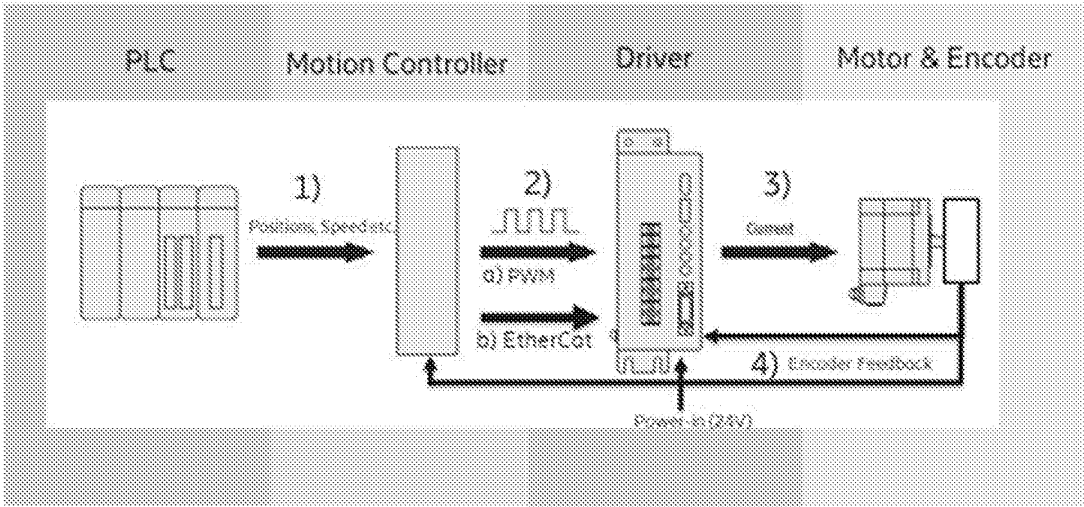


Fig. 11

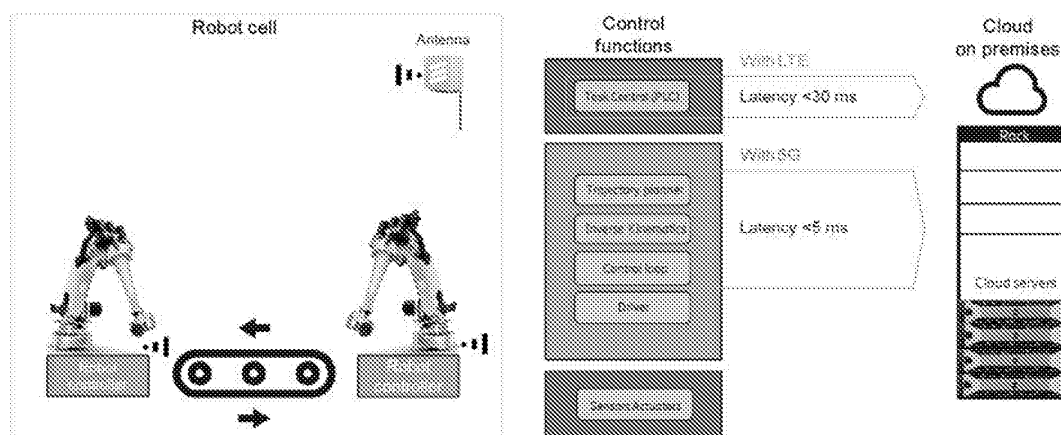


Fig. 12

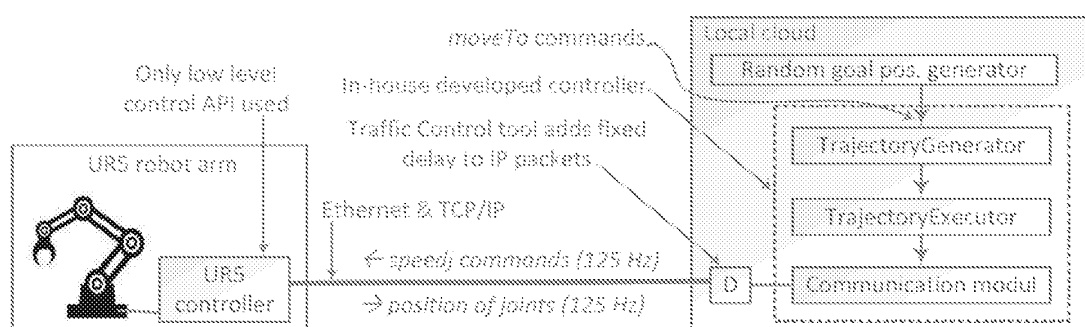


Fig. 13

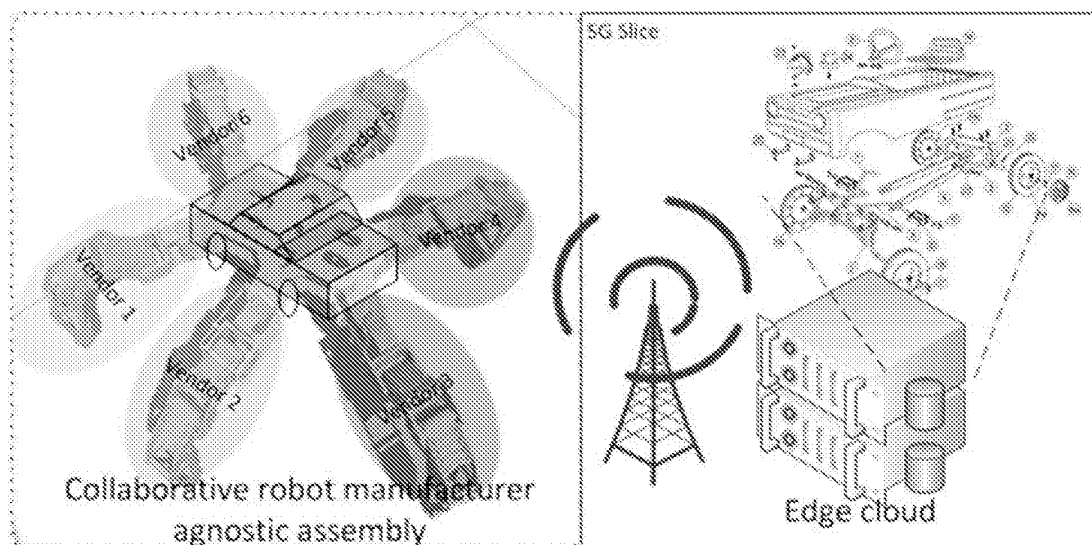


Fig. 14

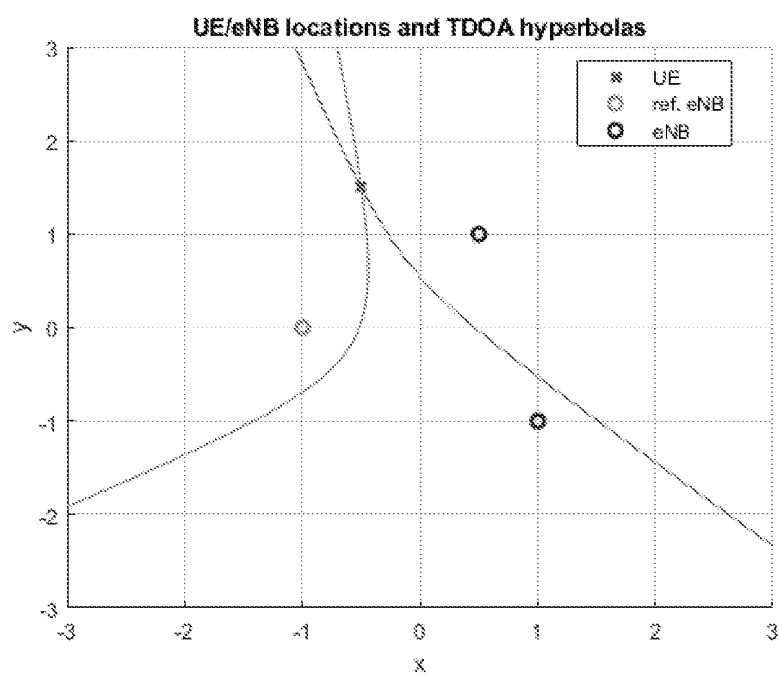


Fig. 15

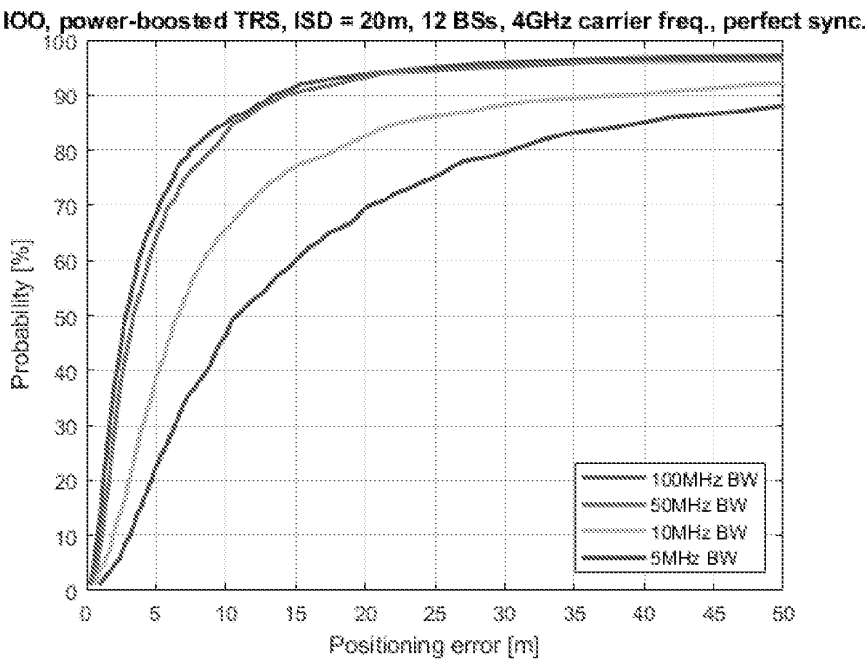


Fig. 16

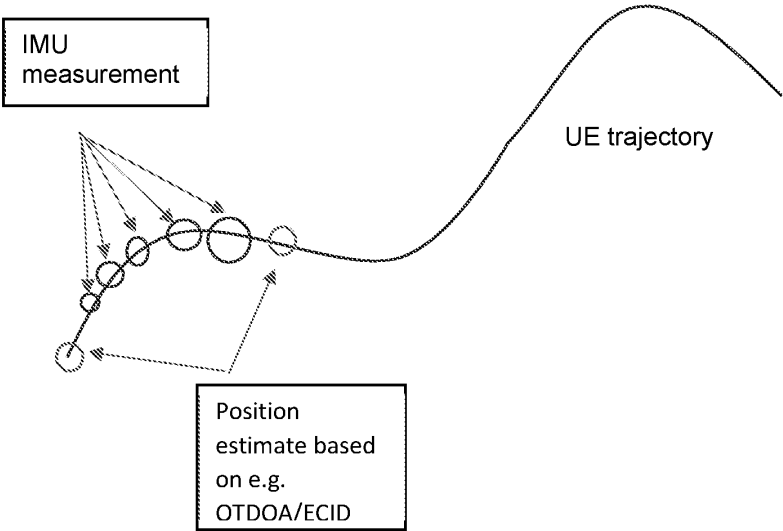
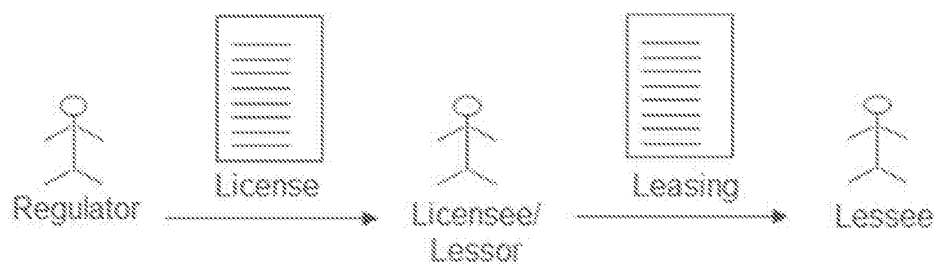
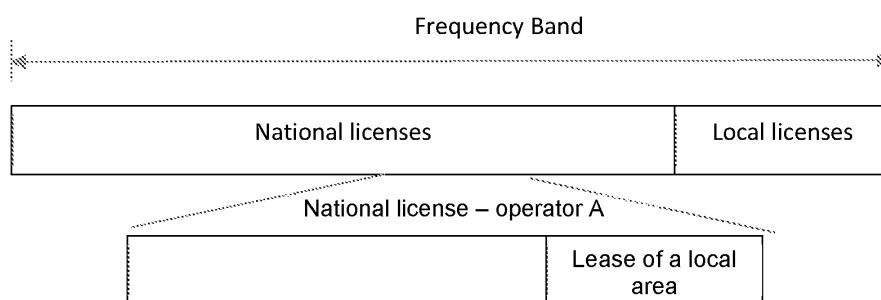
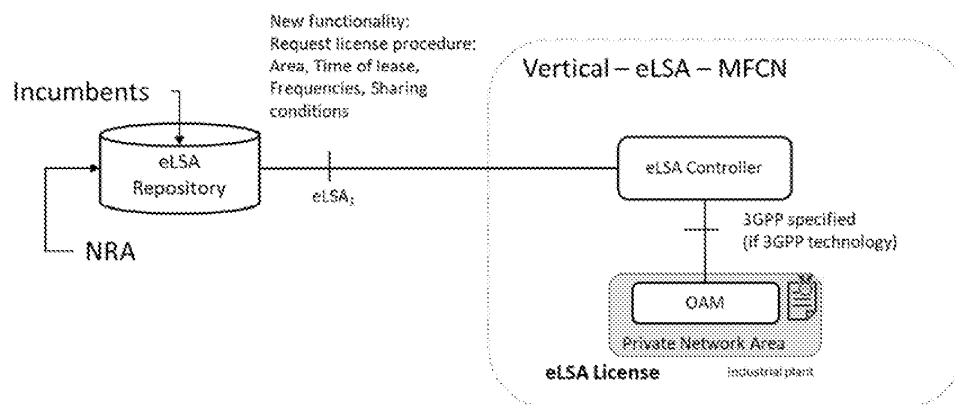
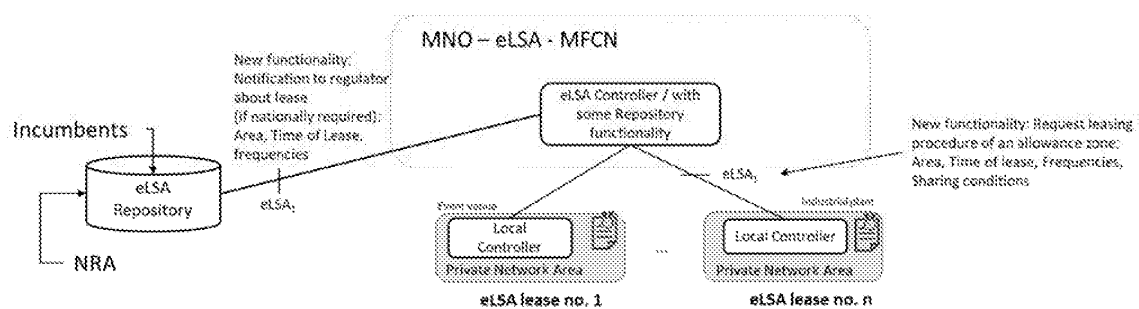


Fig. 17

**Fig. 18****Fig. 19**

**Fig. 20****Fig. 21**

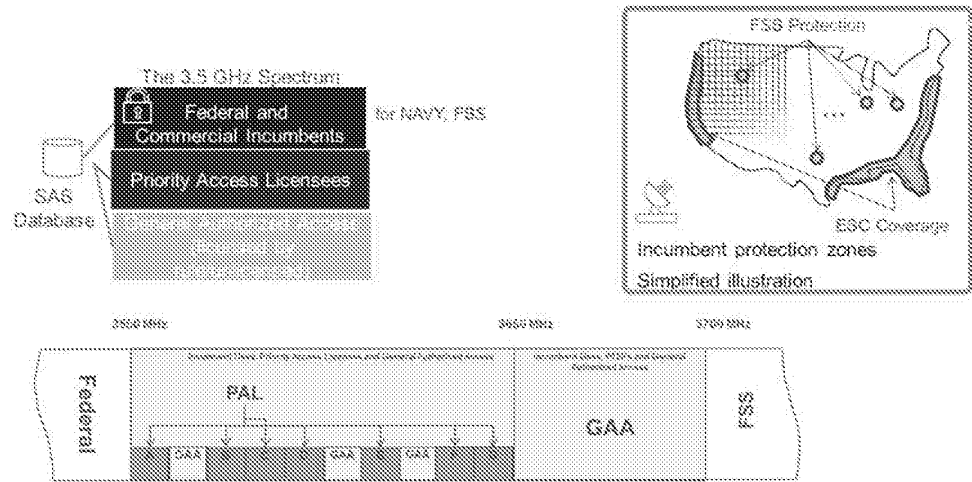


Fig. 22

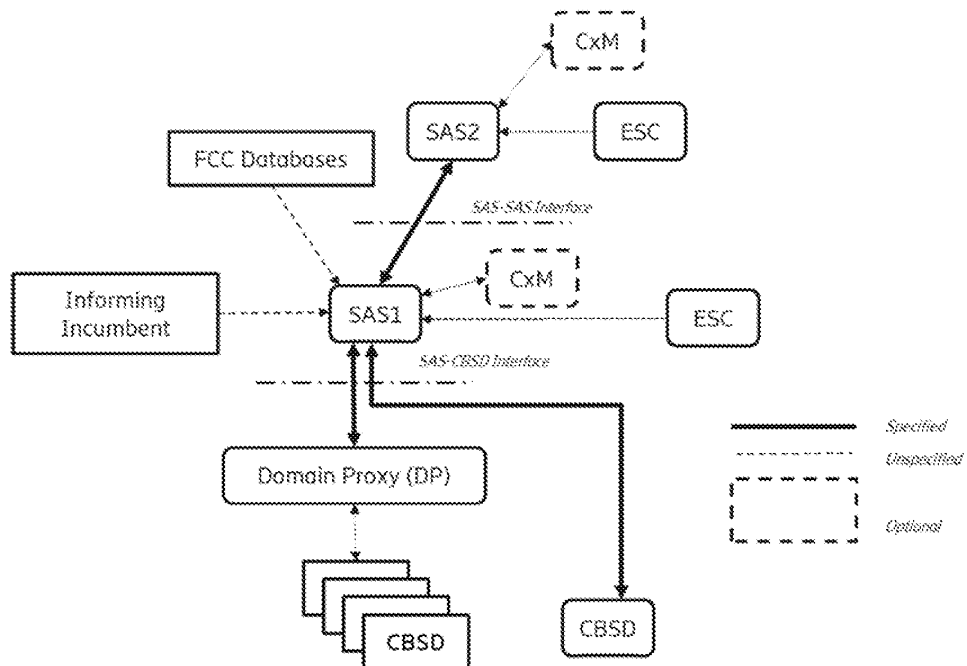
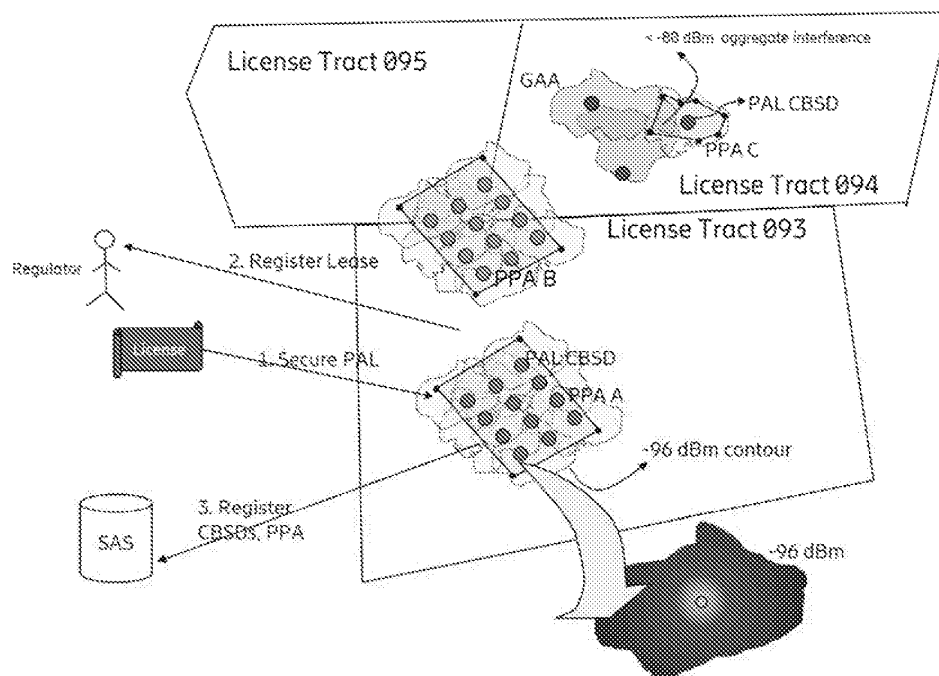


Fig. 23

**Fig. 24**

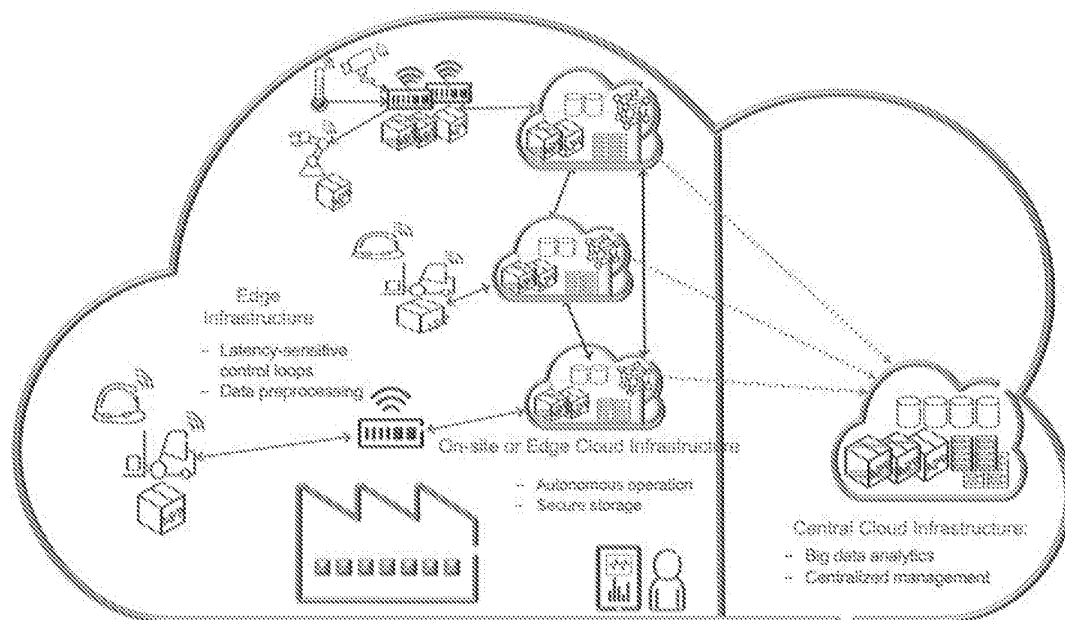


Fig. 25

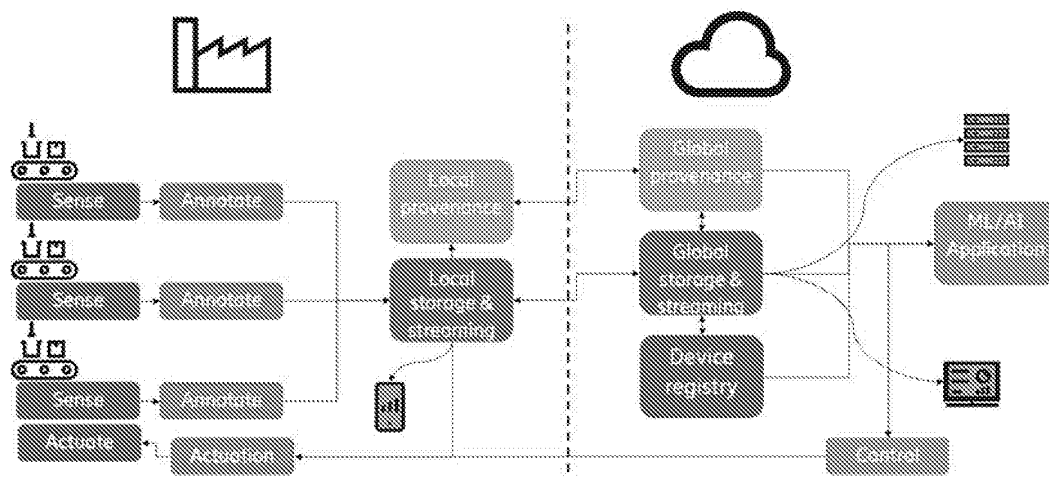


Fig. 26

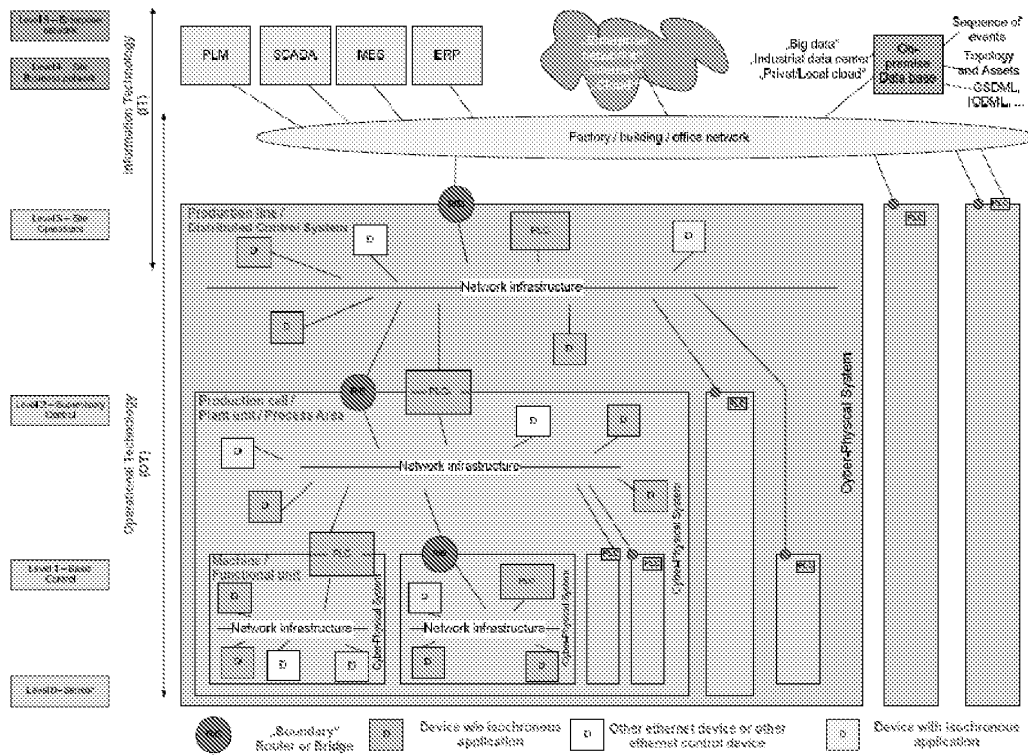
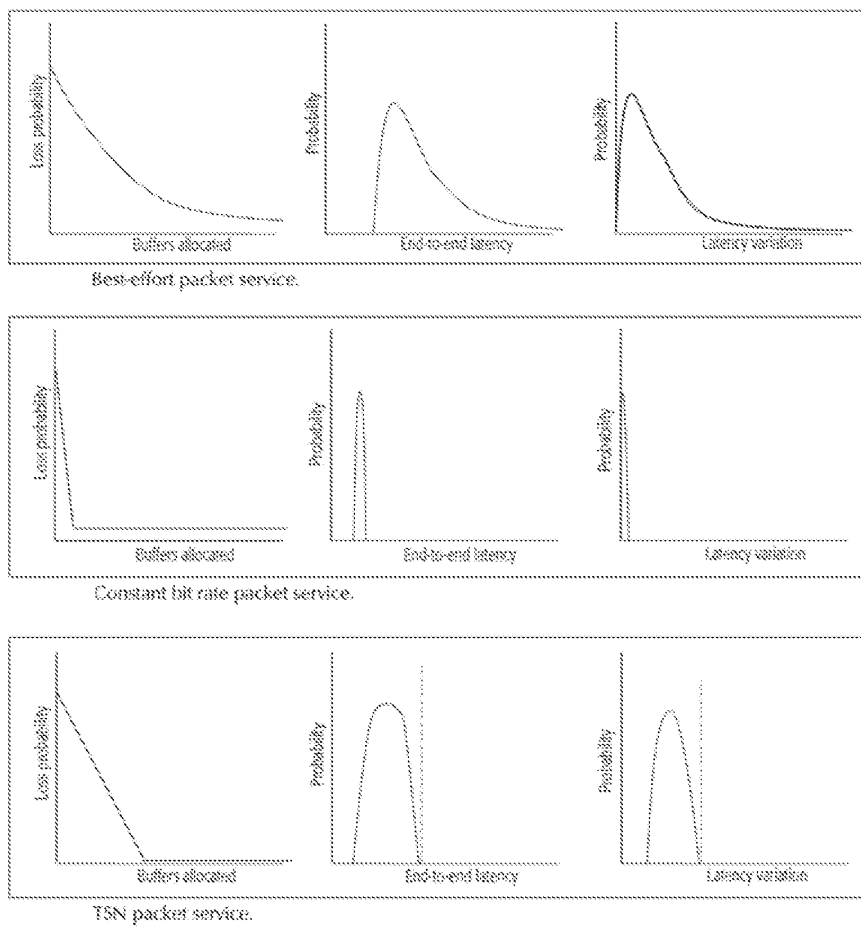


Fig. 27

**Fig. 28**

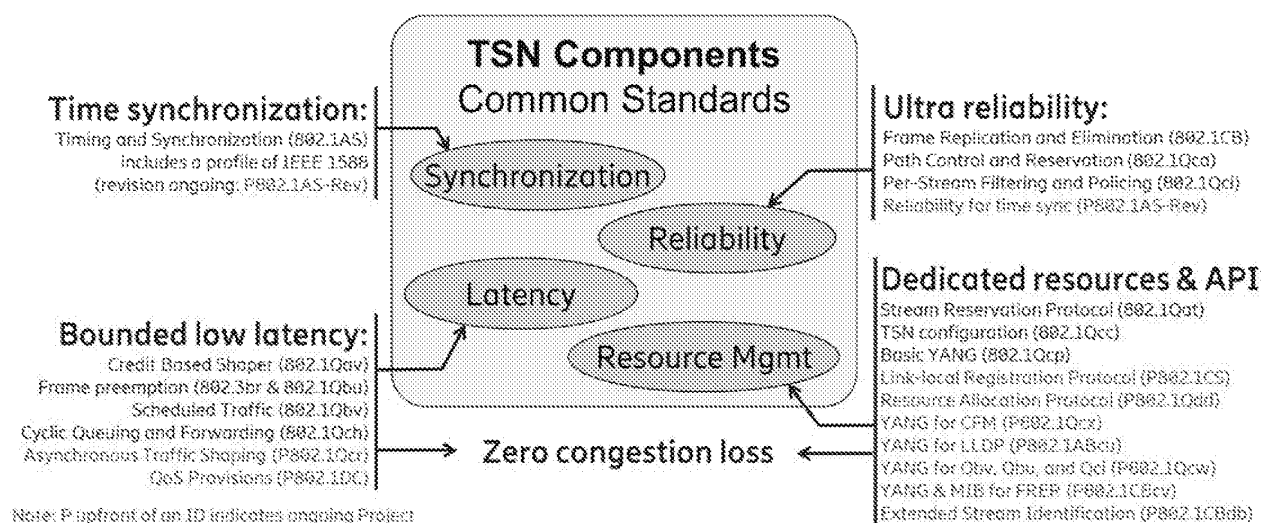


Fig. 29

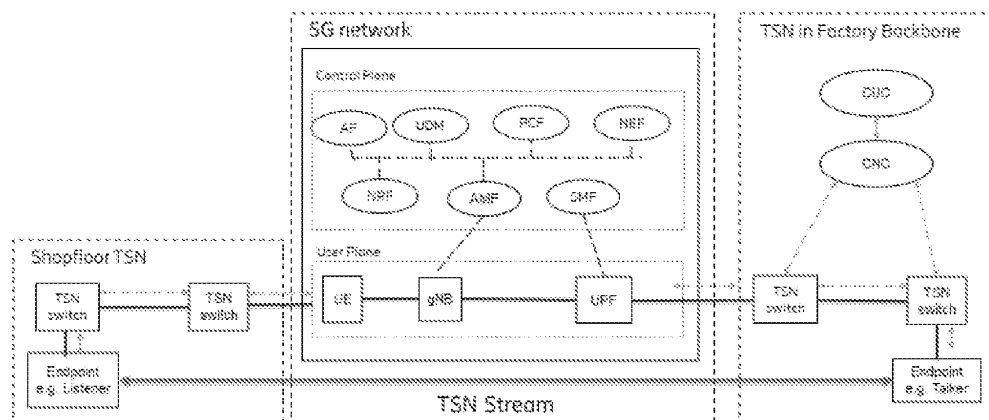
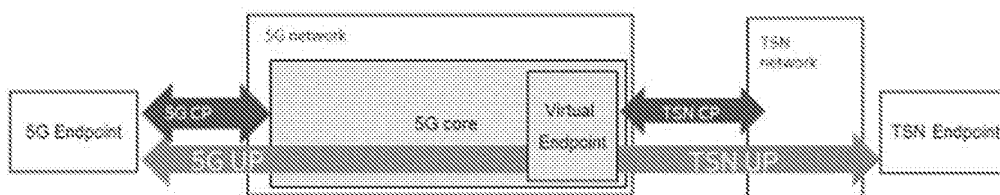
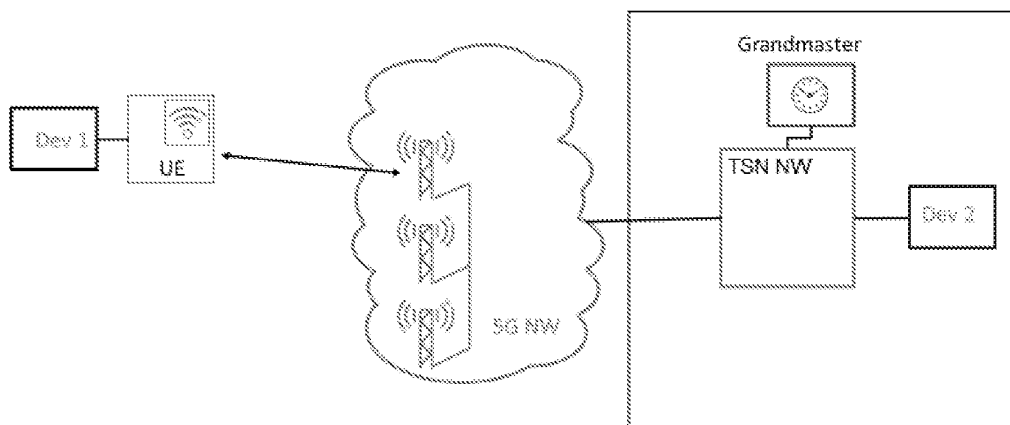


Fig. 30

**Fig. 31****Fig. 32**

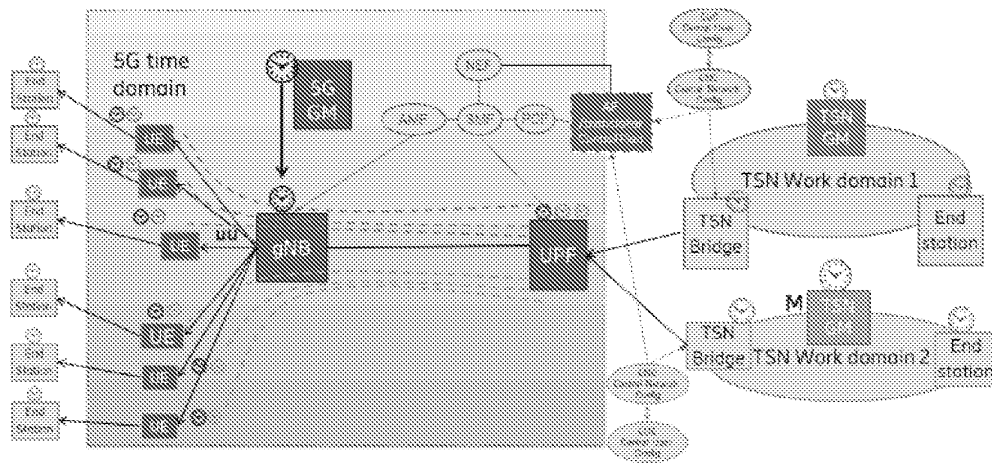


Fig. 33

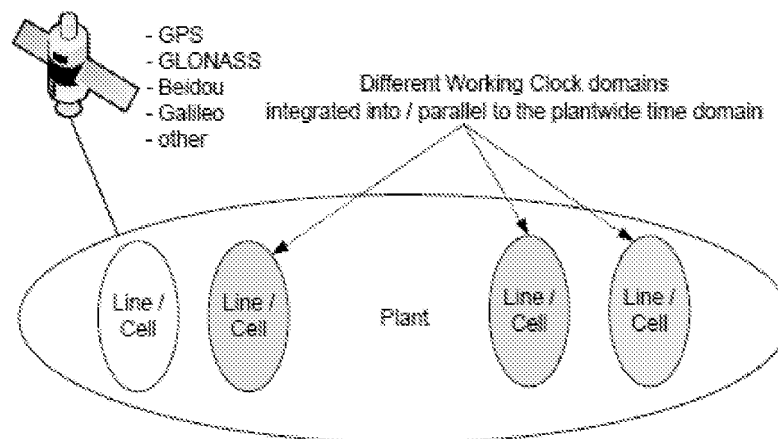
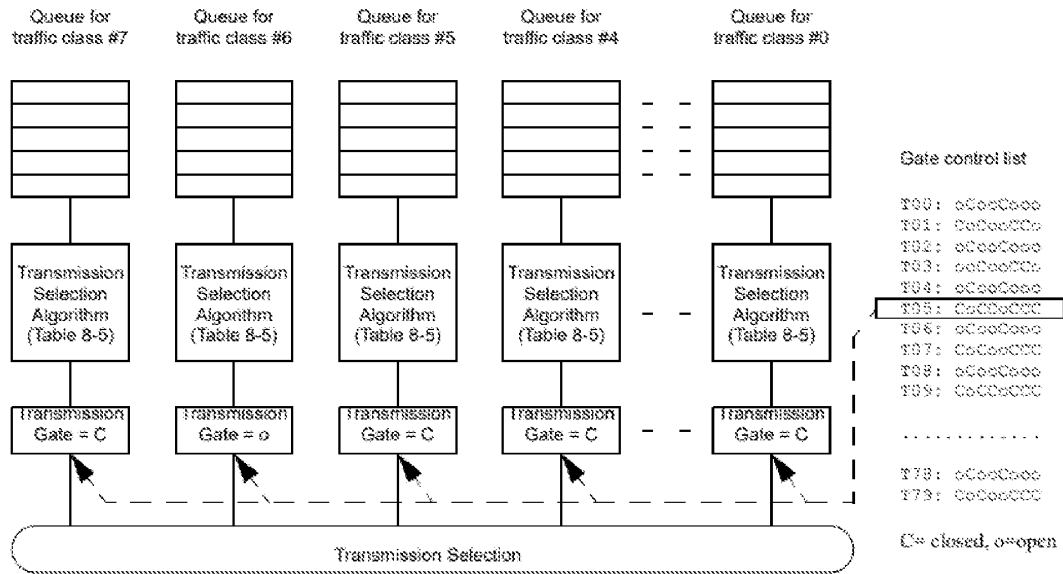
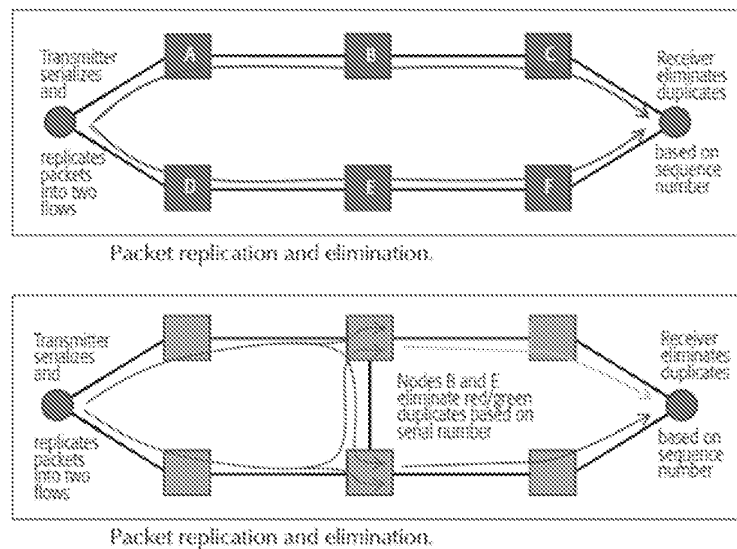


Fig. 34

**Fig. 35****Fig. 36**

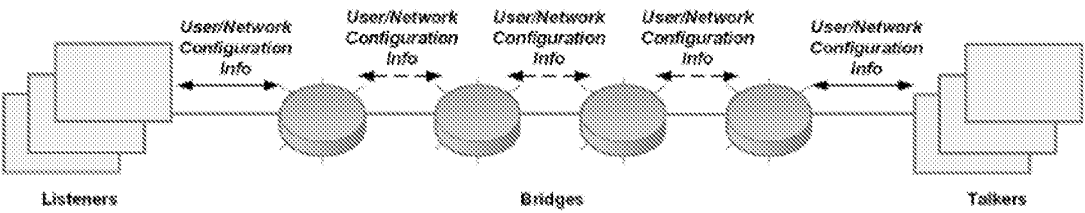


Fig. 37

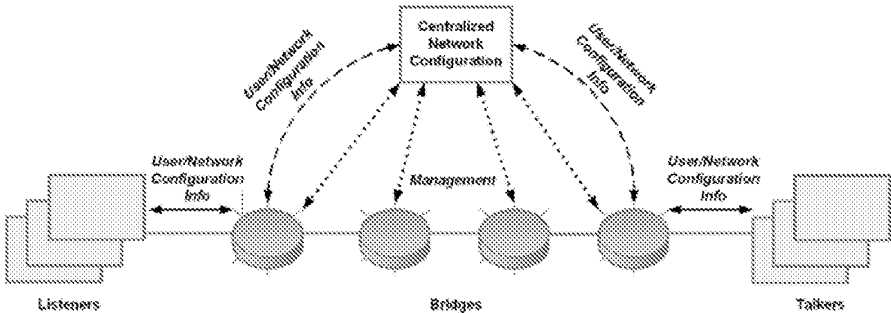


Fig. 38

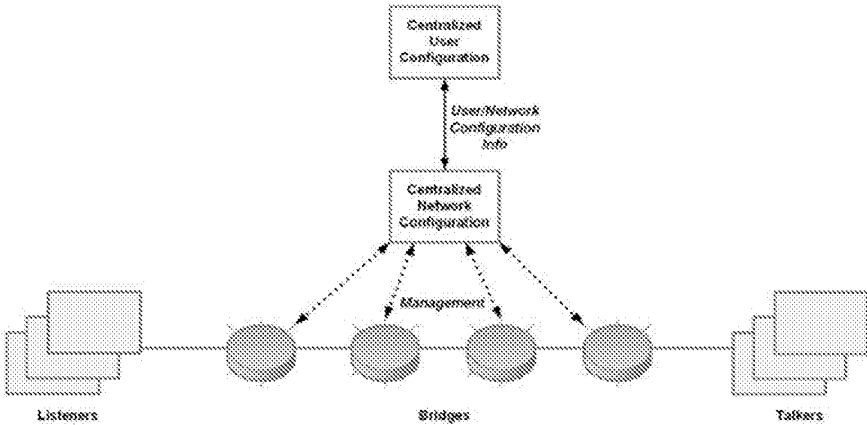


Fig. 39

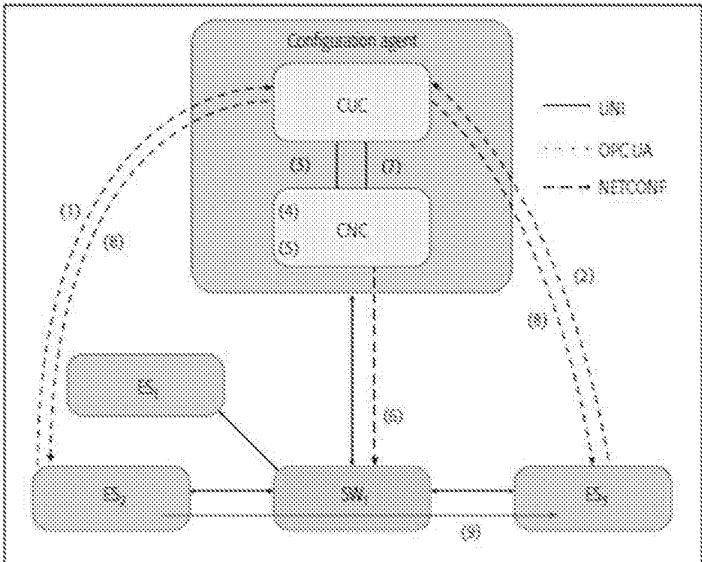


Fig. 40

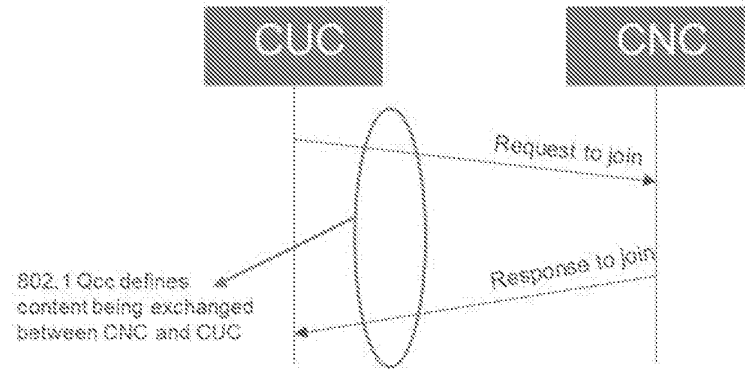
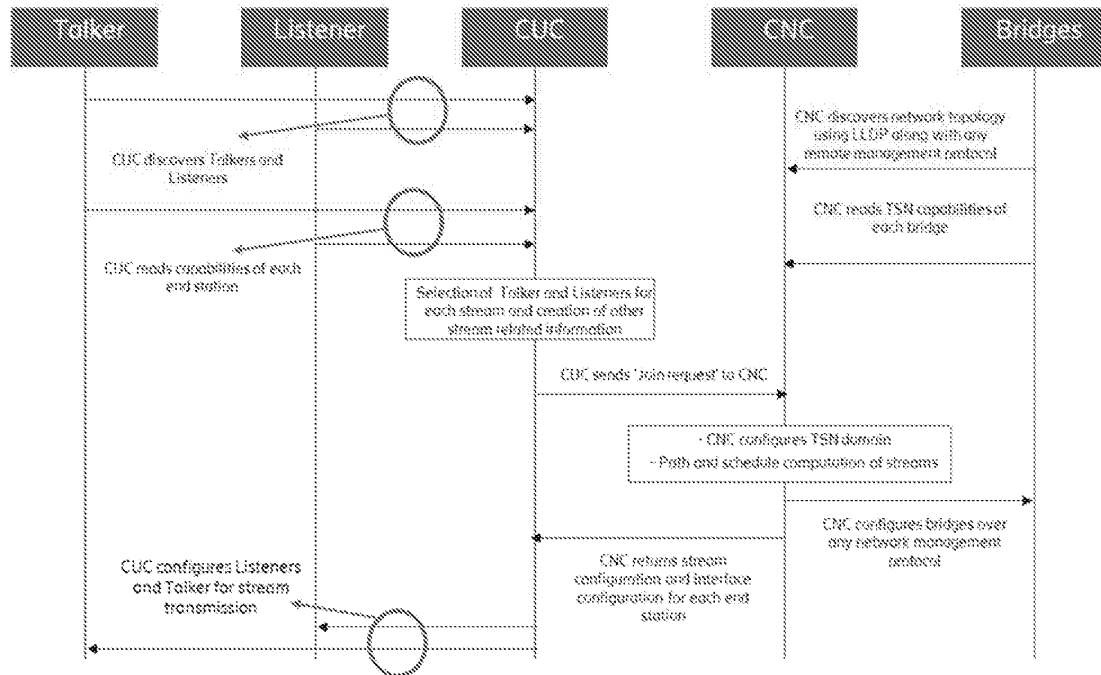
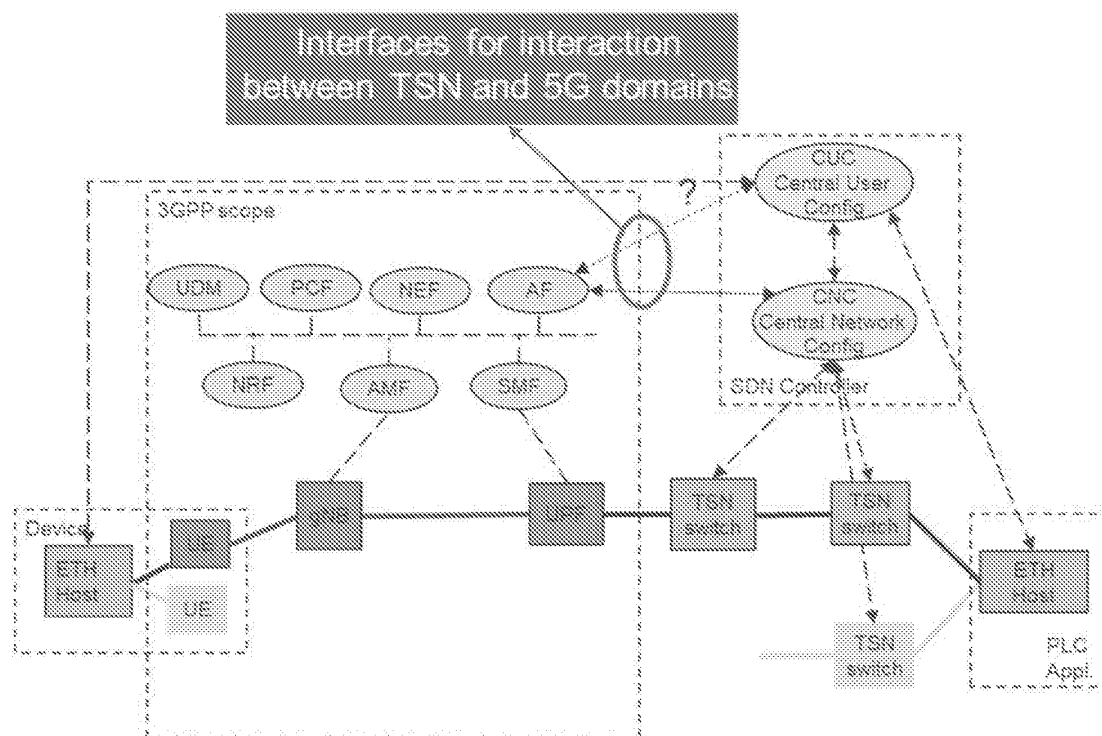
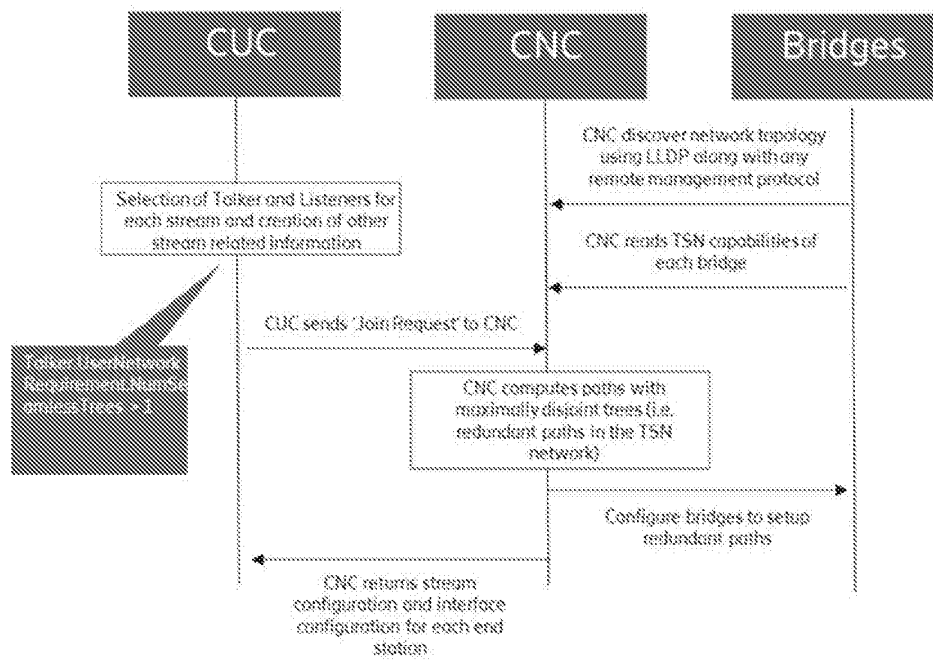


Fig. 41

**Fig. 42**

**Fig. 43**

**Fig. 44**

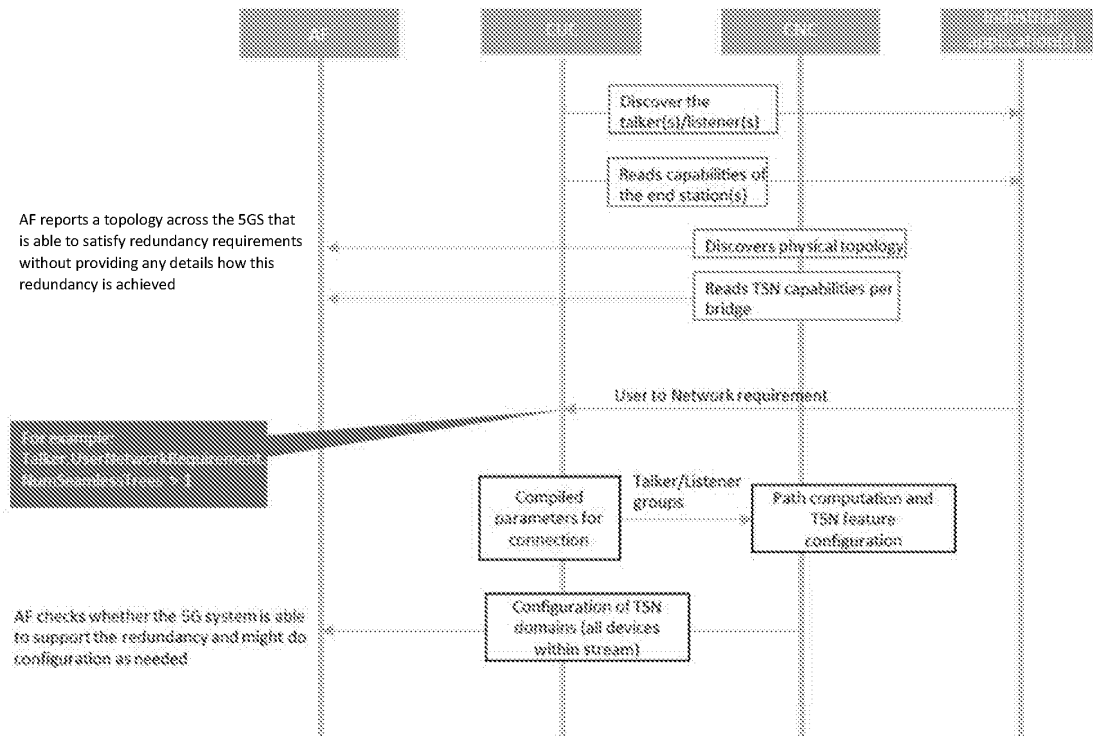


Fig. 45

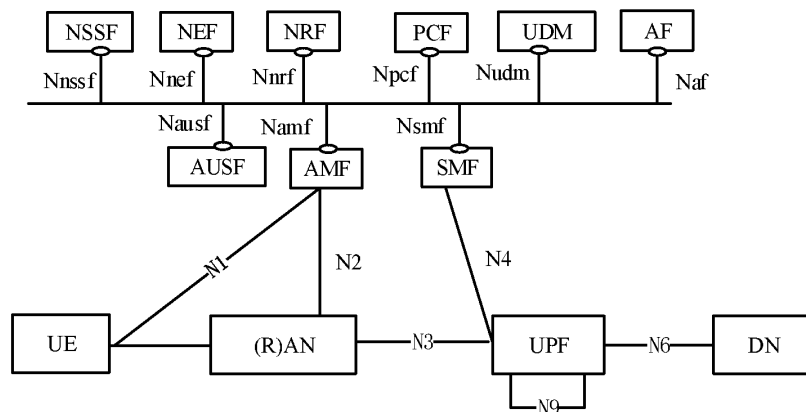


Fig. 46

CHAIN CONTROLLER CONCEPT

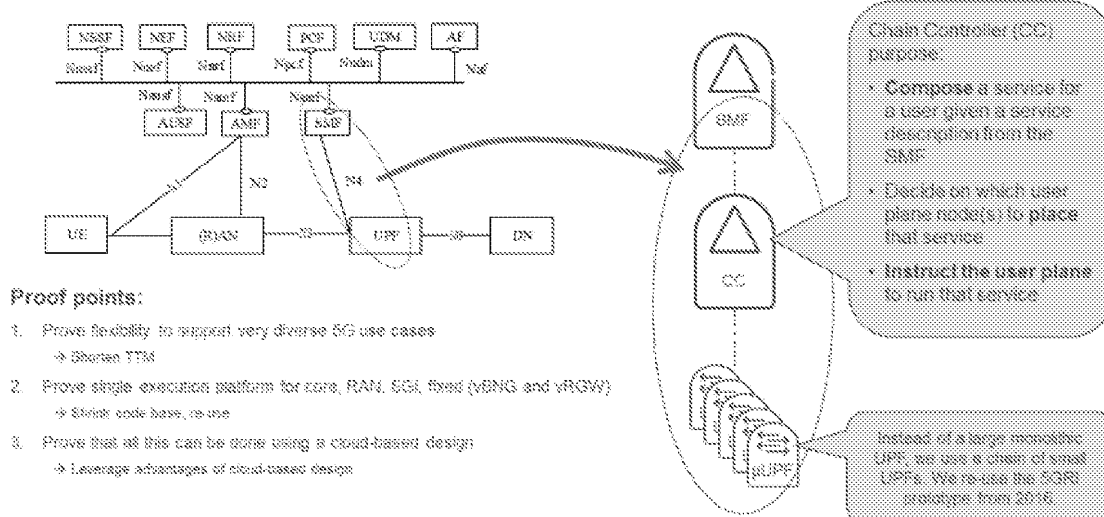


Fig. 47

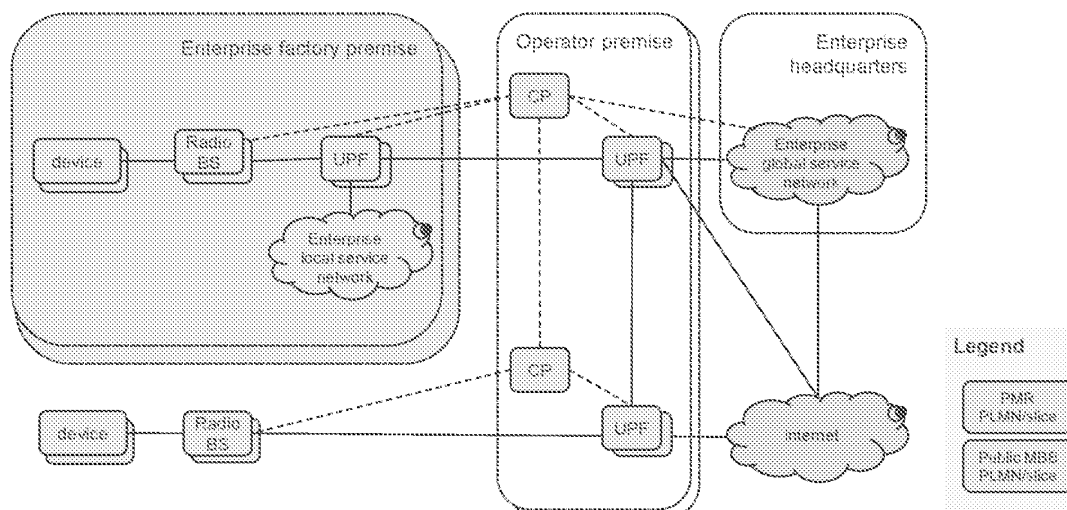
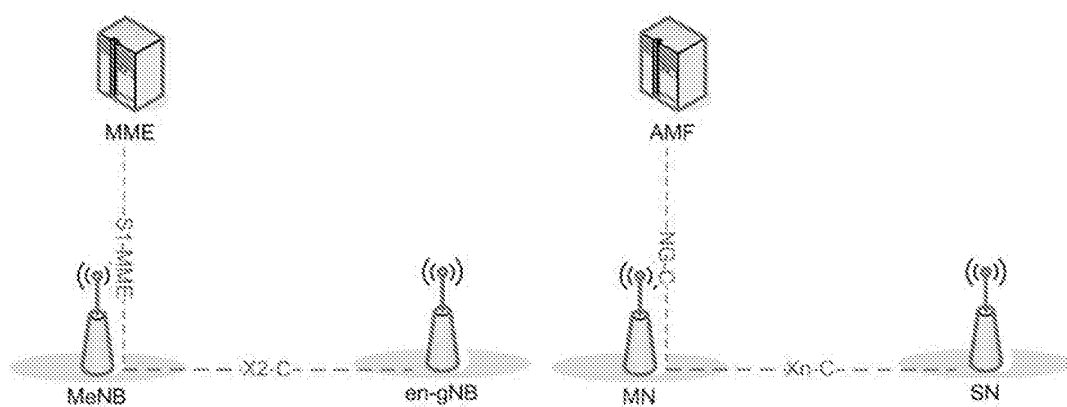
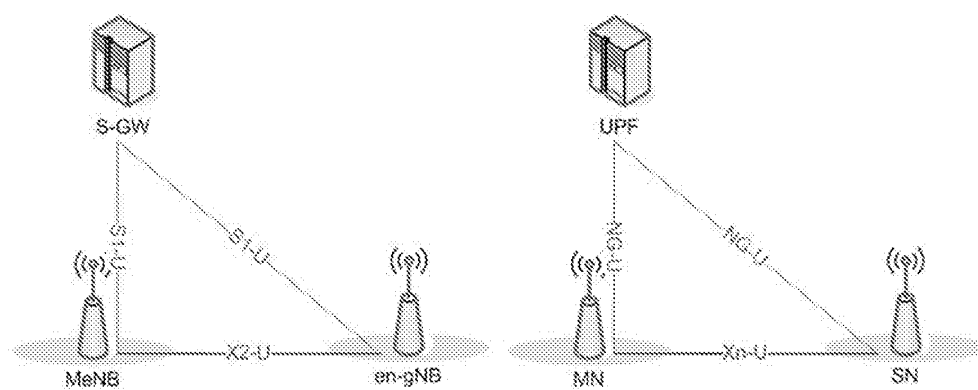


Fig. 48

**Fig. 49****Fig. 50**

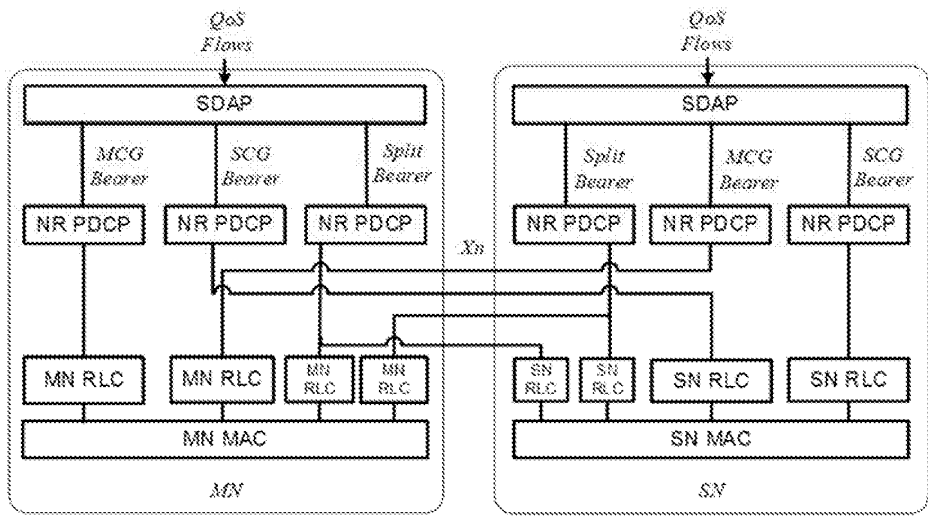


Fig. 51

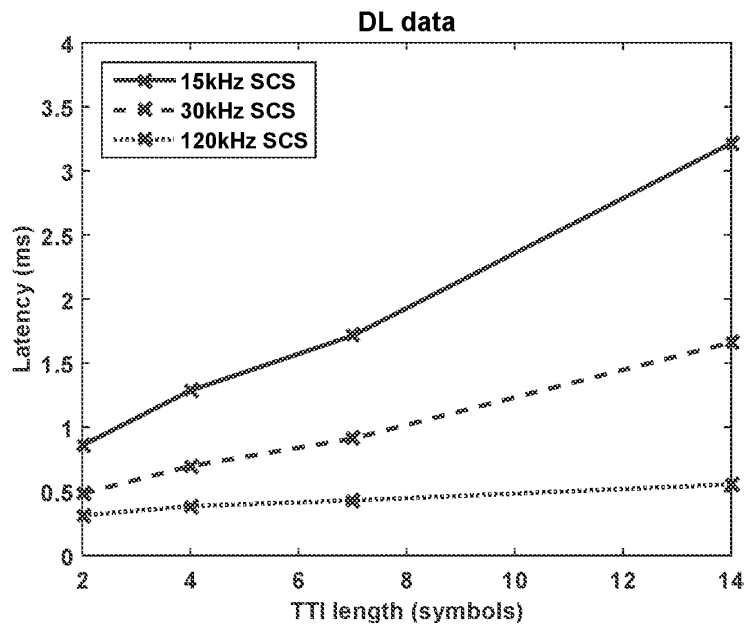


Fig. 52

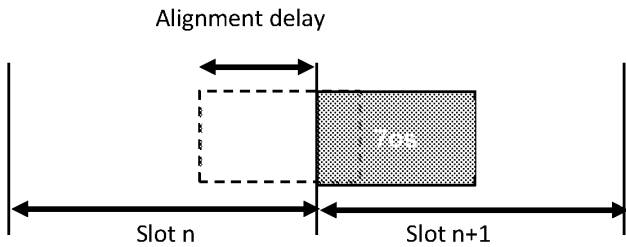


Fig. 53

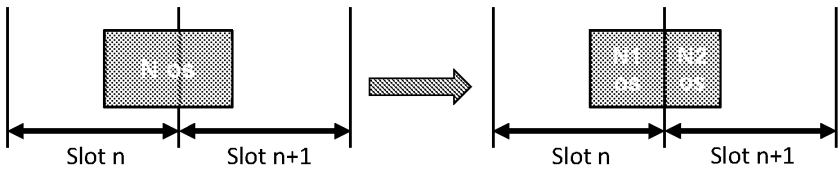


Fig. 54

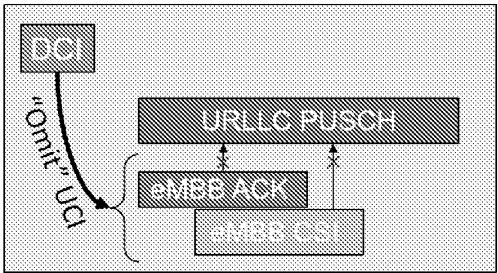
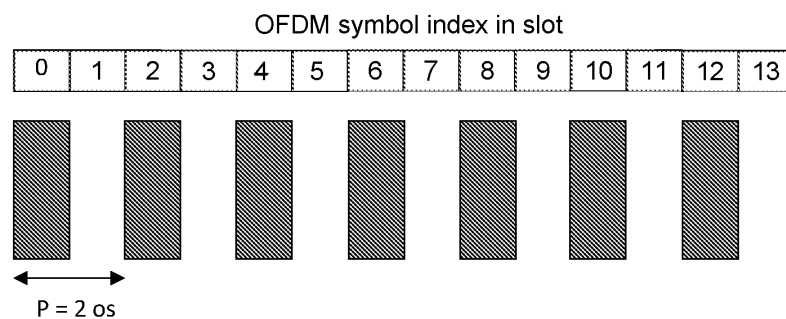
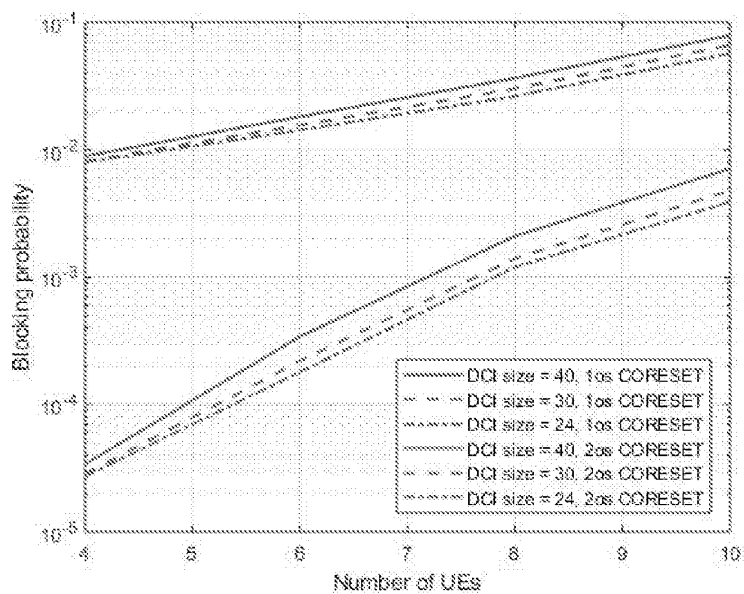
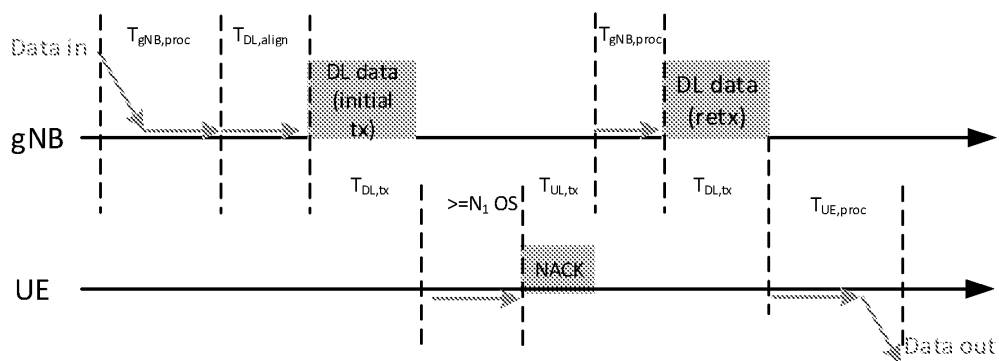
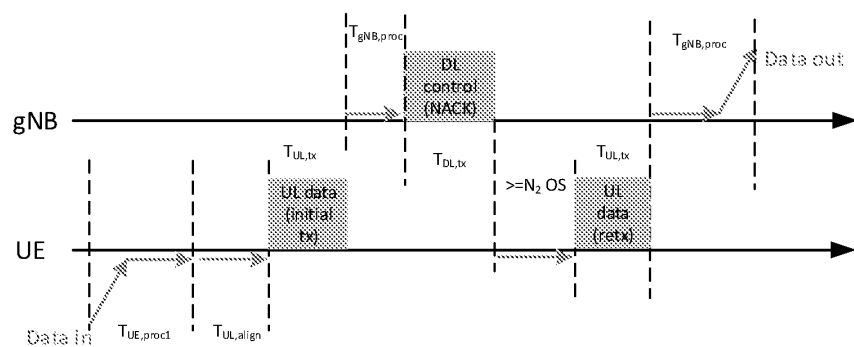


Fig. 55

**Fig. 56****Fig. 57**

**Fig. 58****Fig. 59**

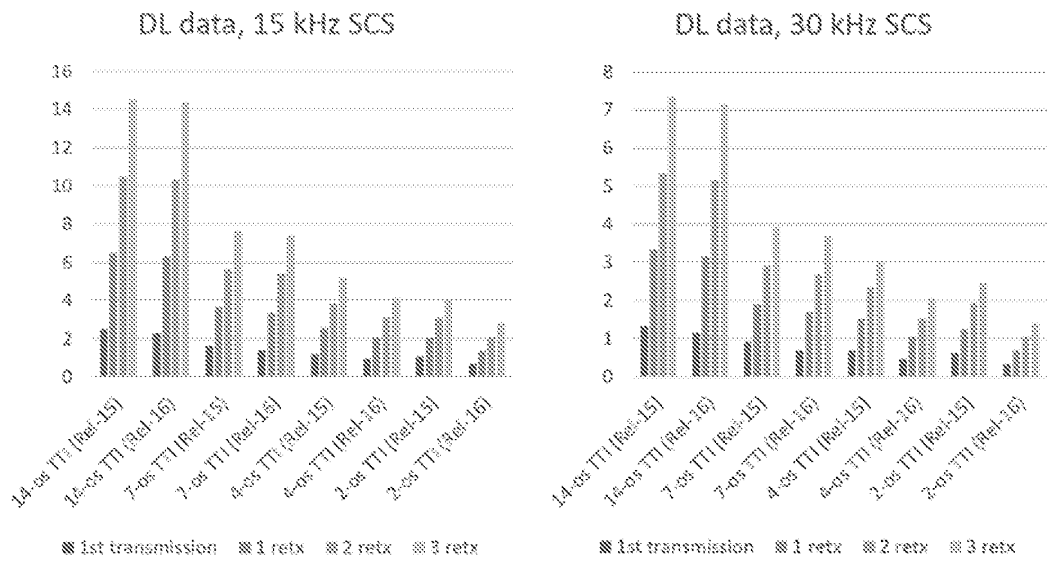


Fig. 60

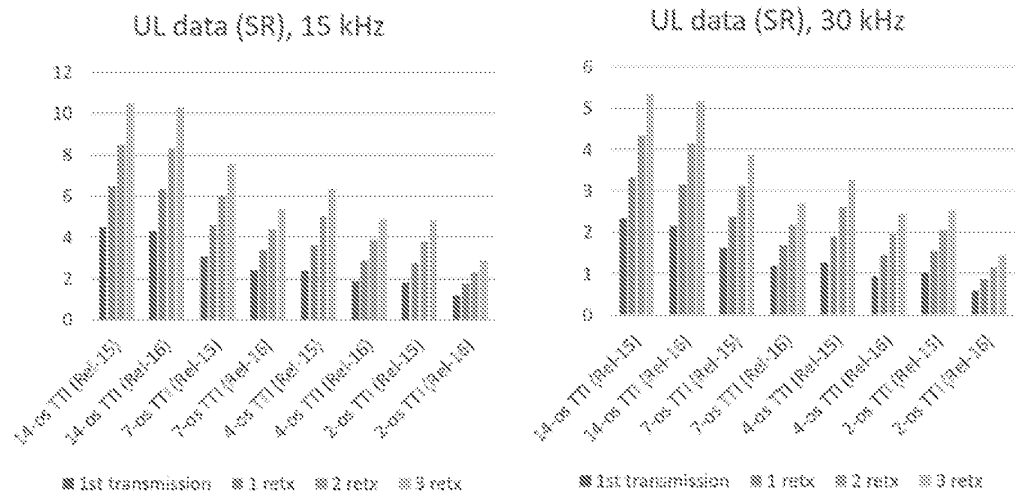
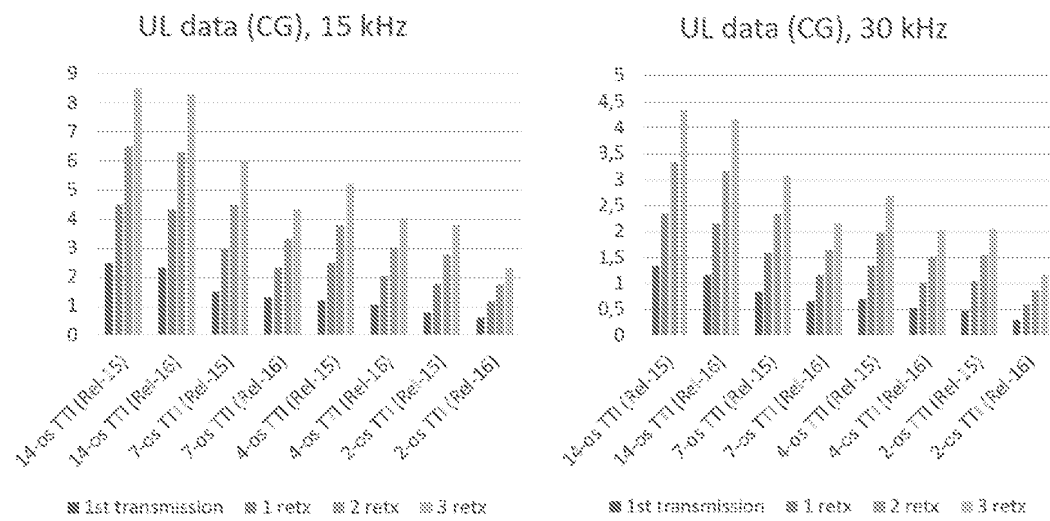
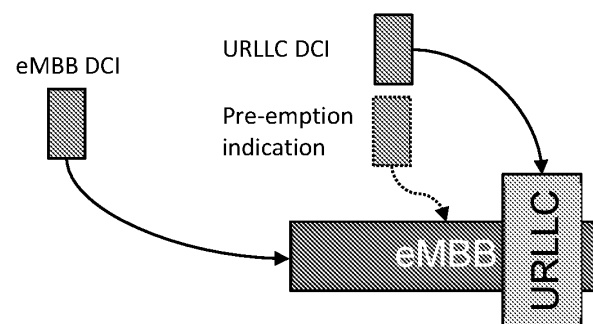


Fig. 61

**Fig. 62****Fig. 63**

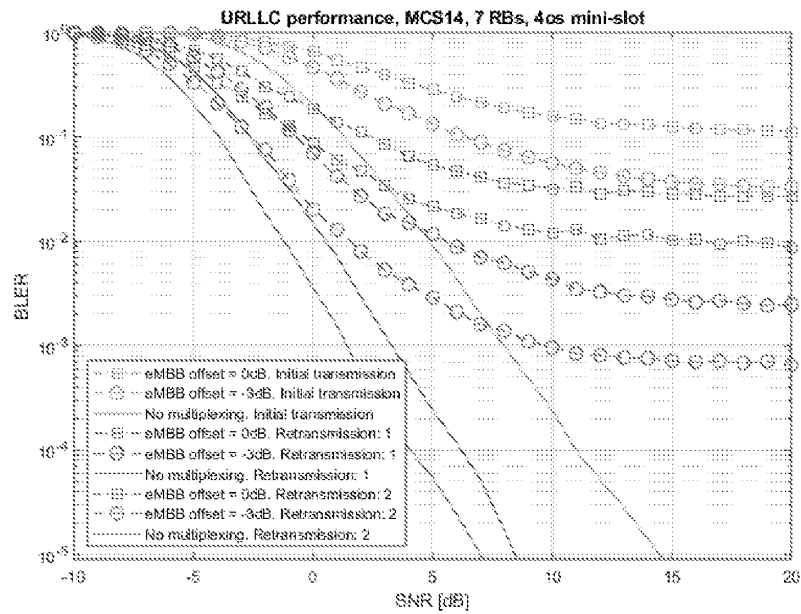


Fig. 64

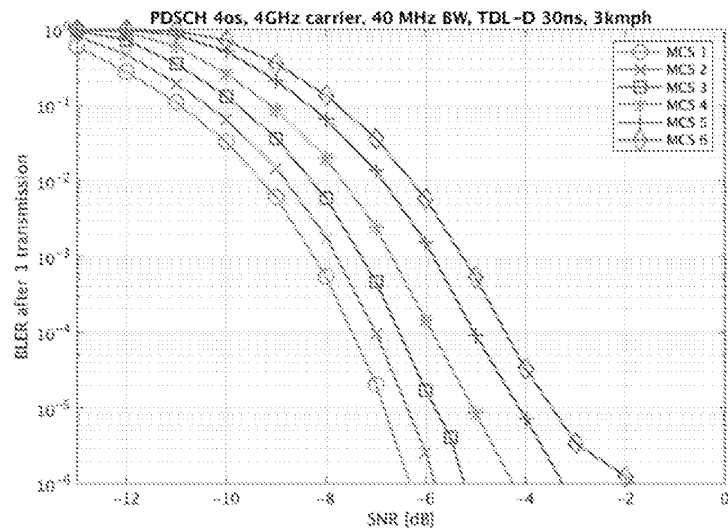
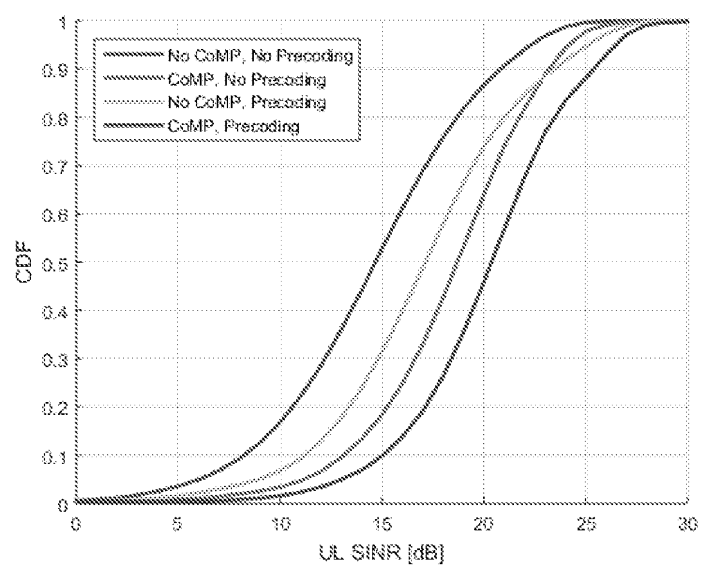
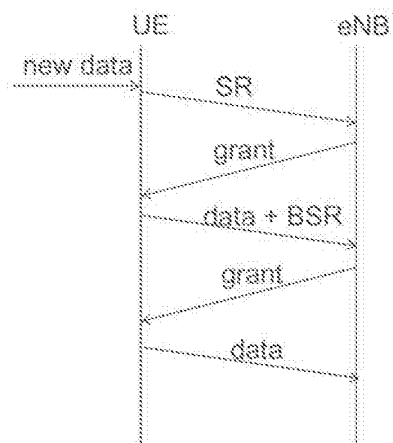
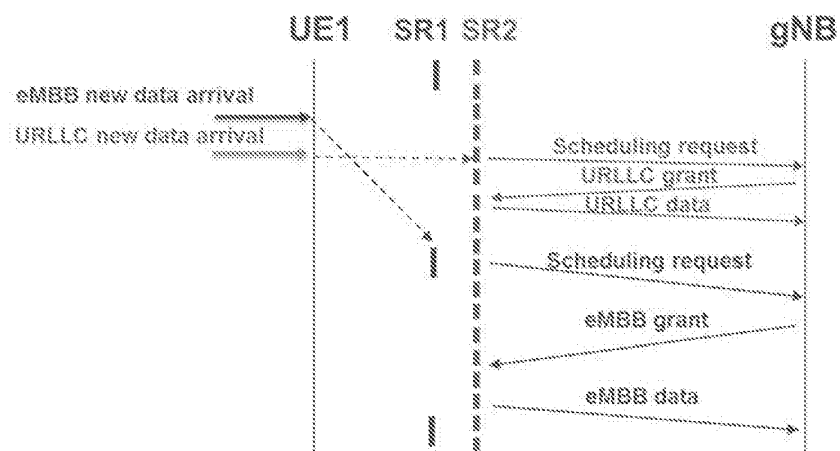
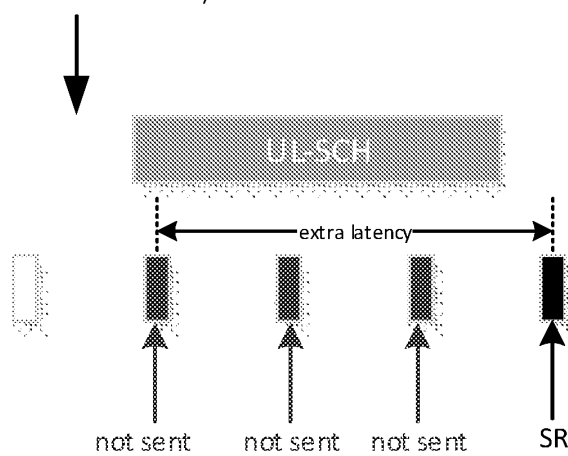


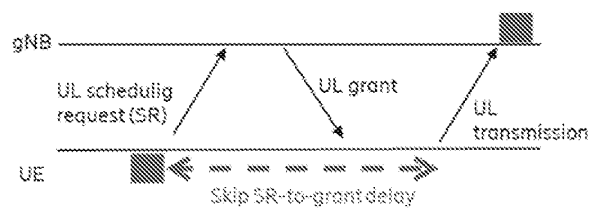
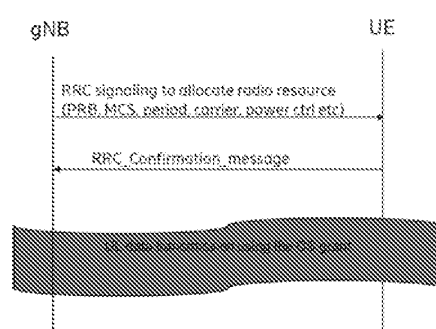
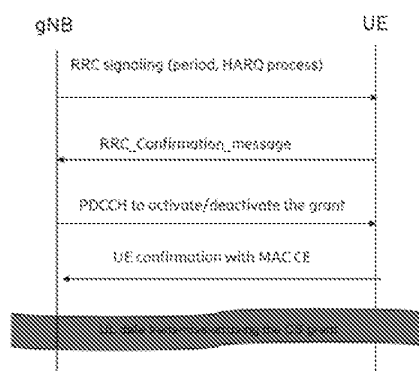
Fig. 65

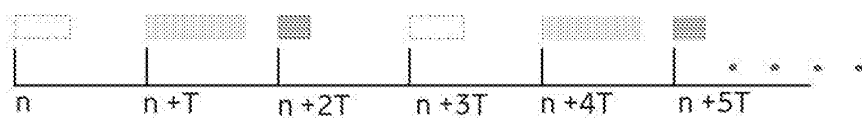
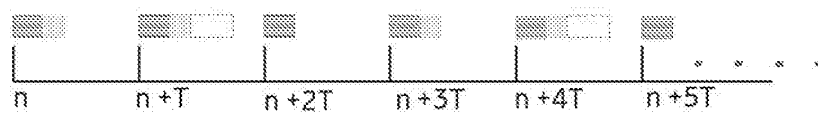
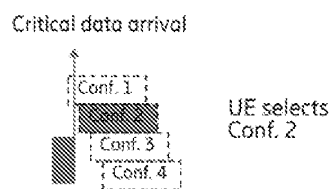
**Fig. 66****Fig. 67**

**Fig. 68**

1. Data arrival
2. MAC PDU for UL-SCH is already built and cannot include BSR MAC CE

**Fig. 69**

**Fig. 70****Fig. 71****Fig. 72**

**Fig. 73****Fig. 74****Fig. 75**

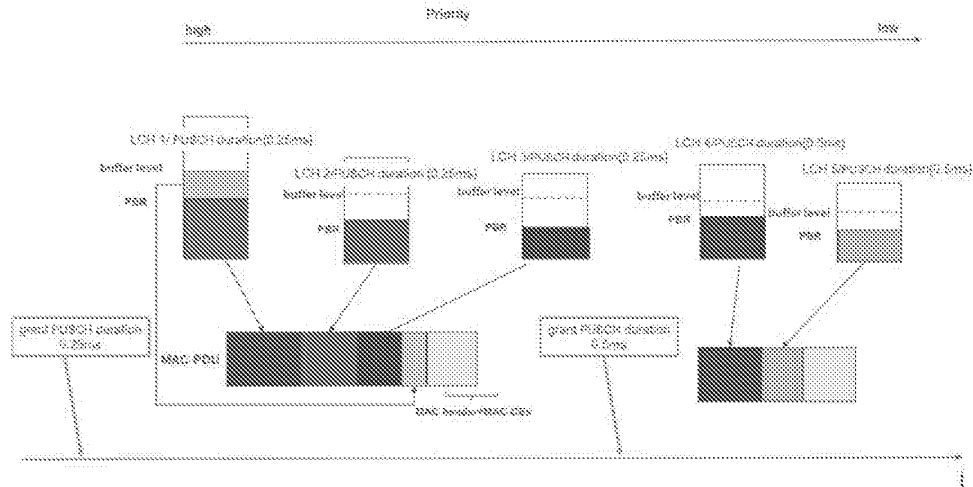


Fig. 76

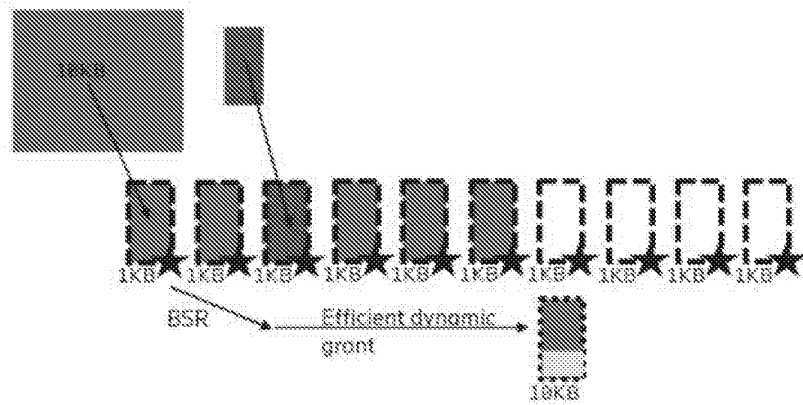
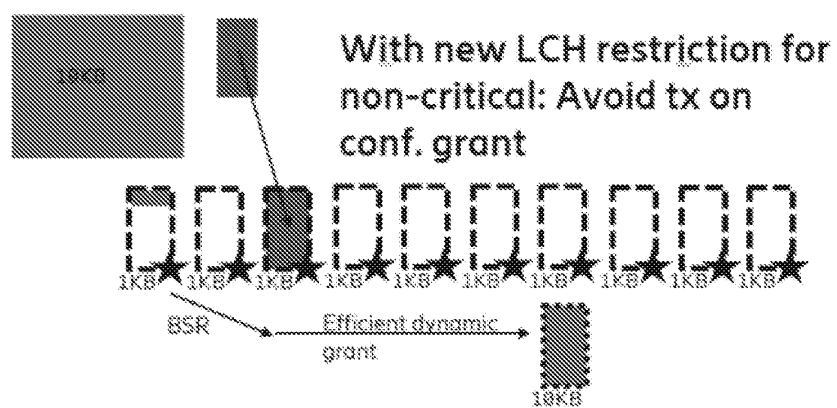
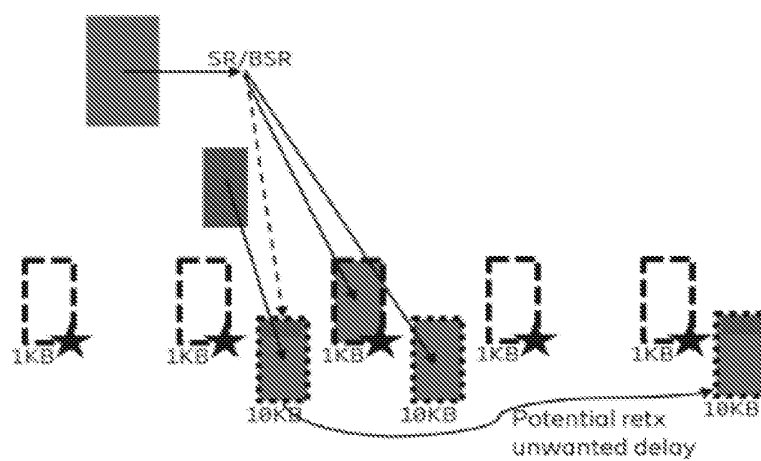


Fig. 77

**Fig. 78****Fig. 79**

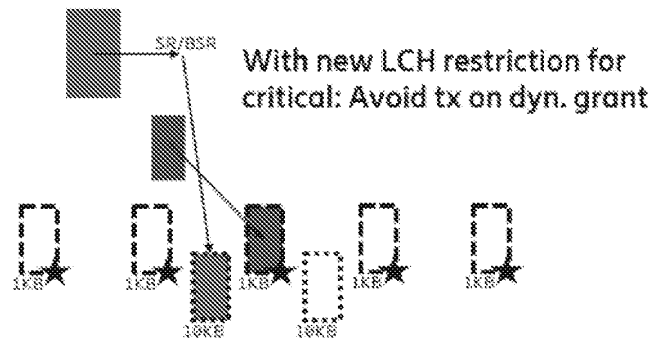


Fig. 80

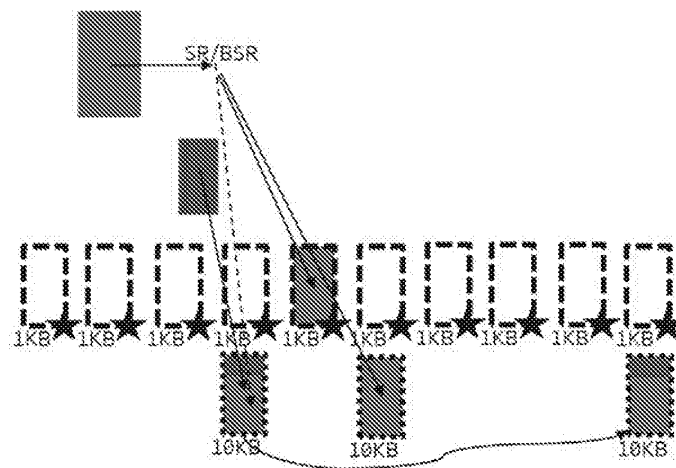
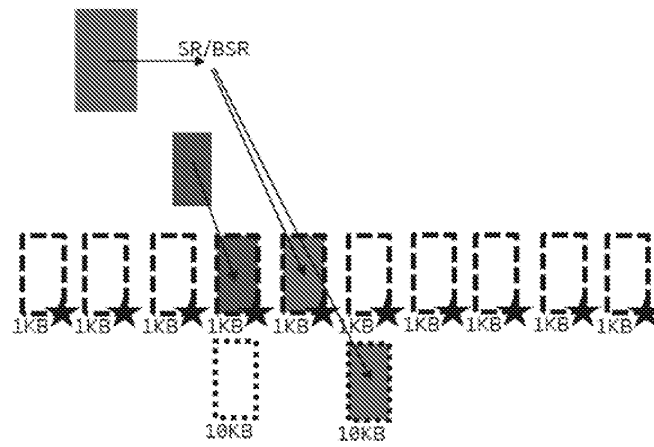
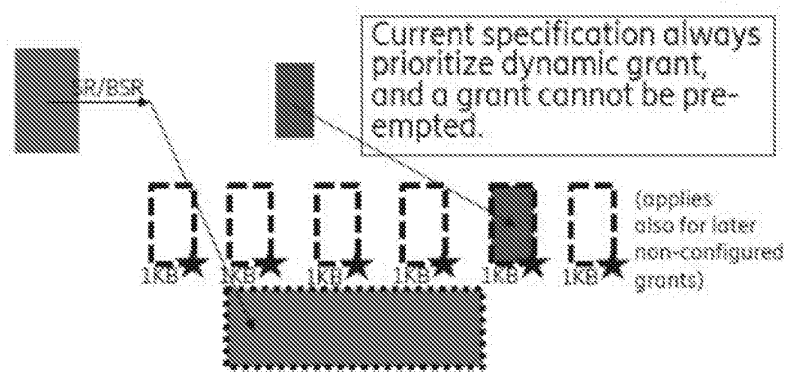
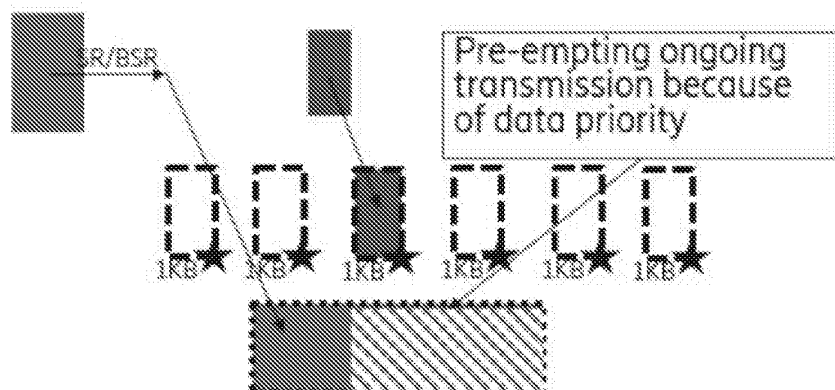
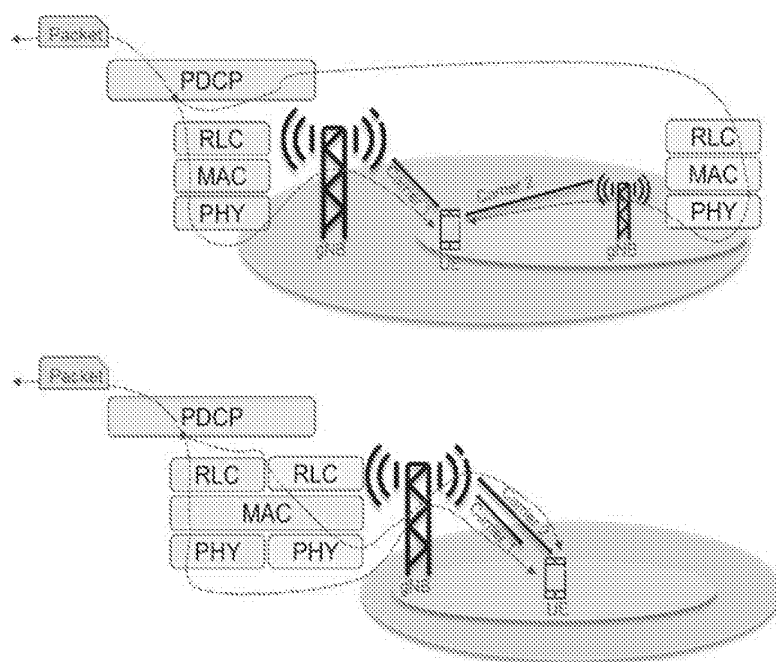
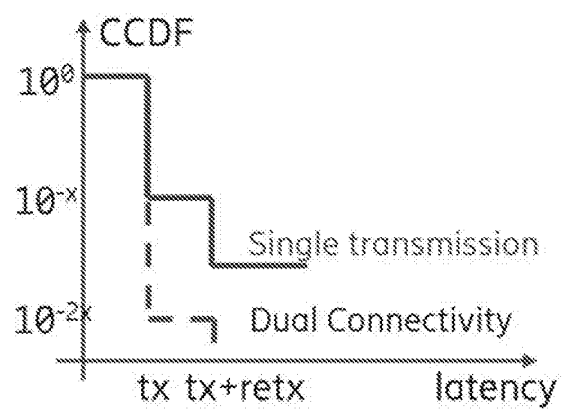
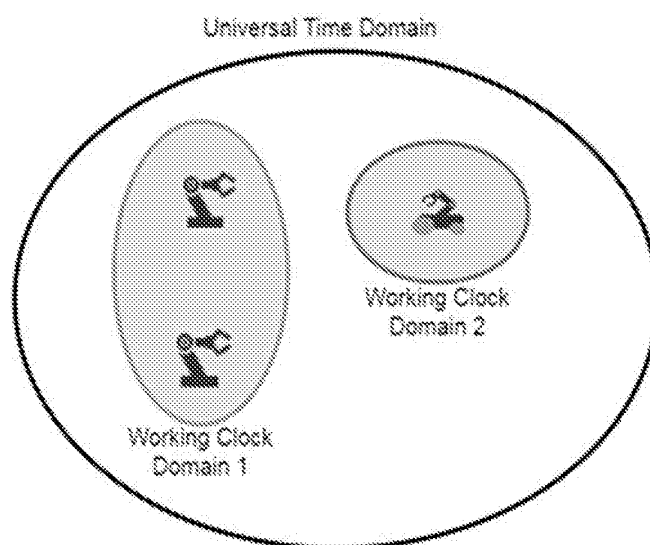
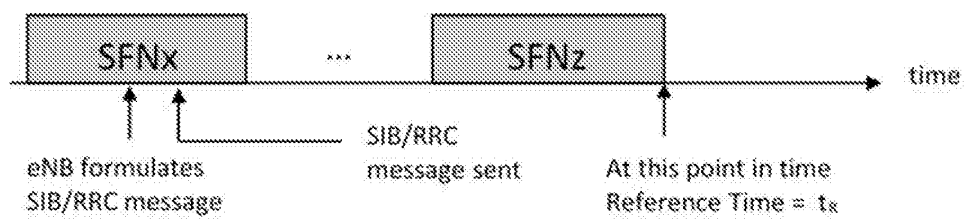
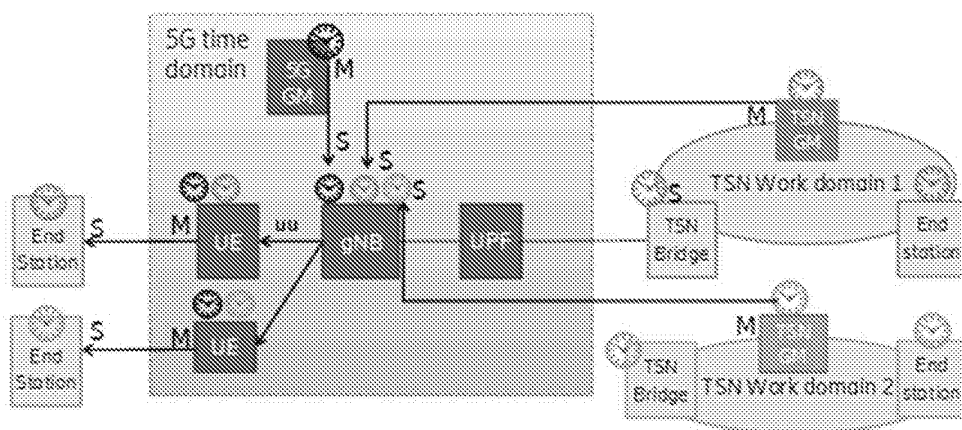


Fig. 81

**Fig. 82****Fig. 83**

**Fig. 84****Fig. 85**

**Fig. 86****Fig. 87**

**Fig. 88****Fig. 89**

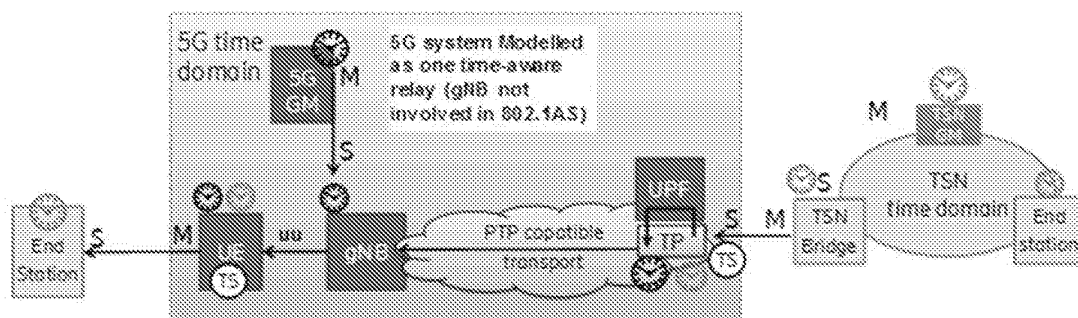


Fig. 90

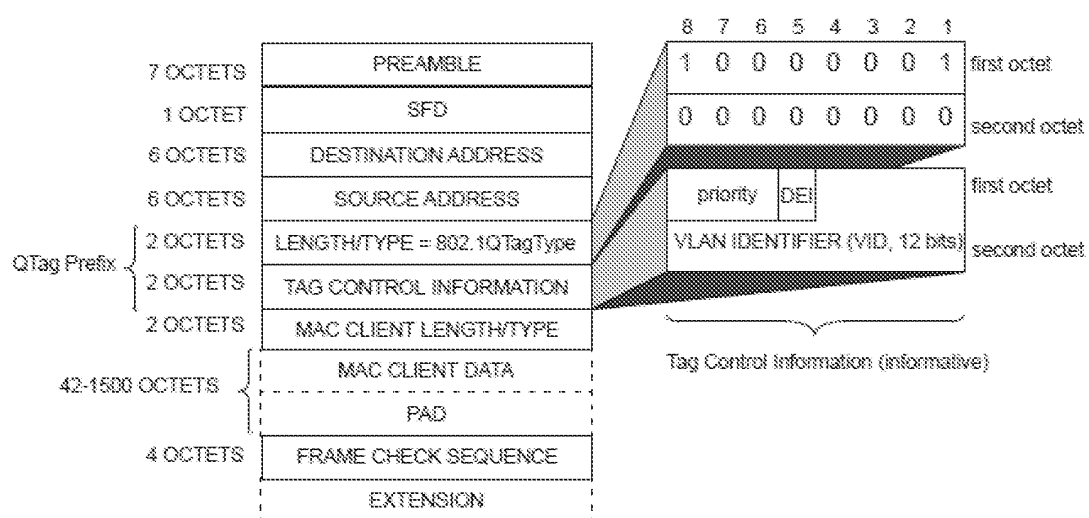


Fig. 91

Frame size (w/o FCS)	Gain with compression of header to 3 bytes (%) (src, dst, VID, E-type)	Frame size (w/o FCS)	Gain with compression of header to 5 bytes (%) (src, dst, VID, E-type)
64	23.44	64	20.31
128	11.72	128	10.16
256	5.86	256	5.08
512	2.93	512	2.54
1024	1.46	1024	1.27
1518	0.99	1518	0.86

Fig. 92

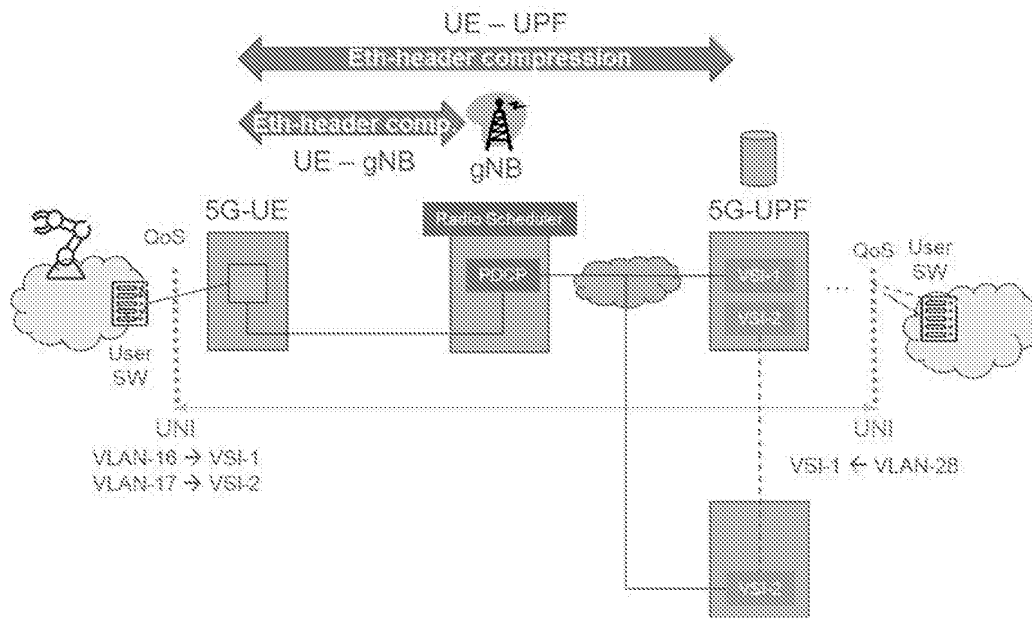


Fig. 93

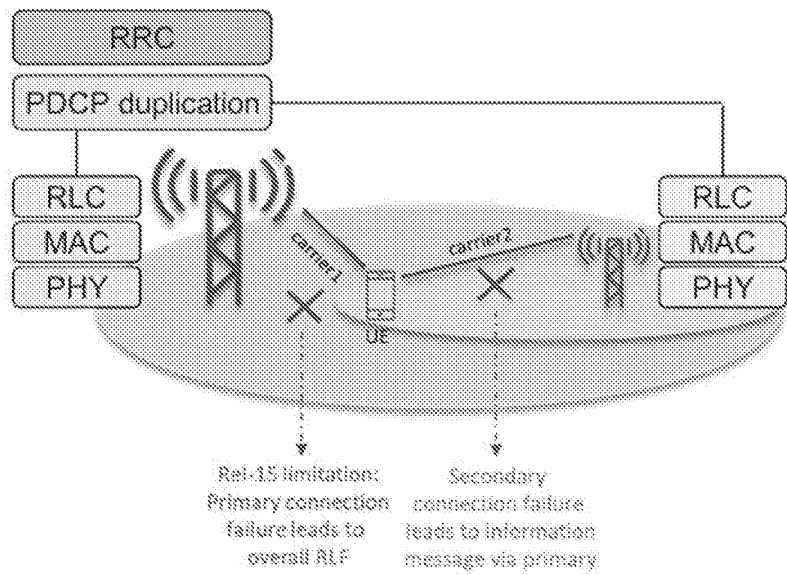


Fig. 94

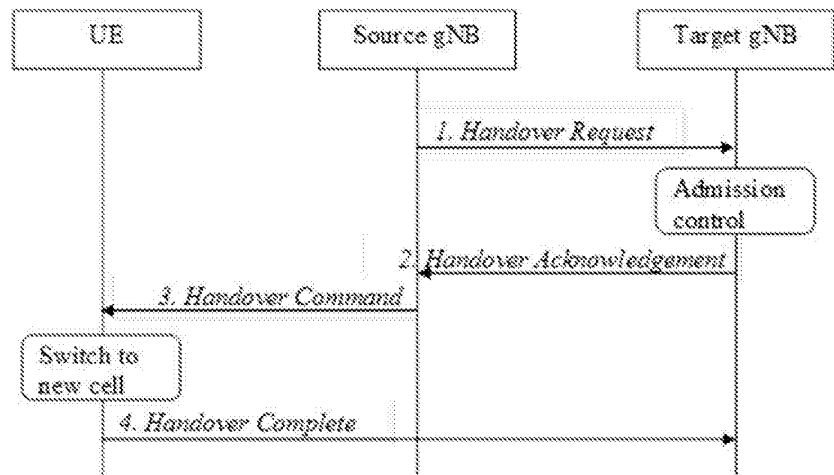
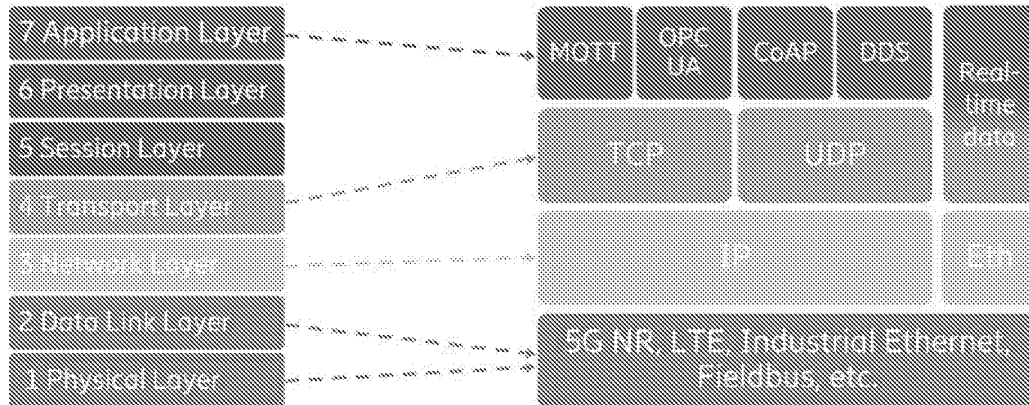
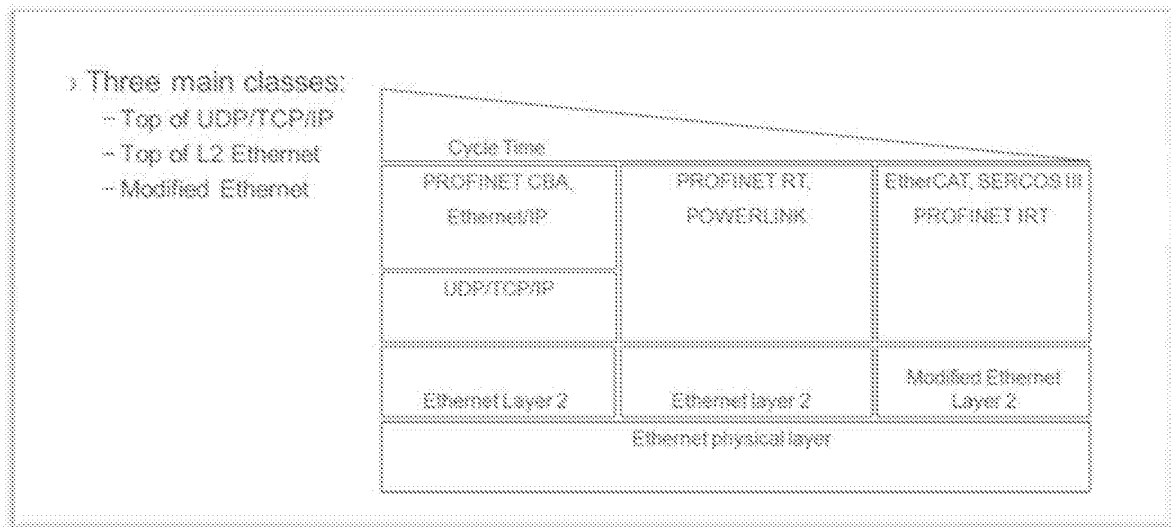


Fig. 95

**Fig. 96****Fig. 97**

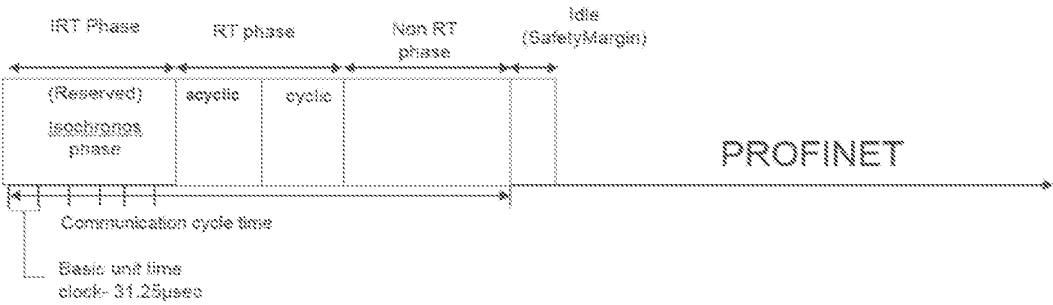
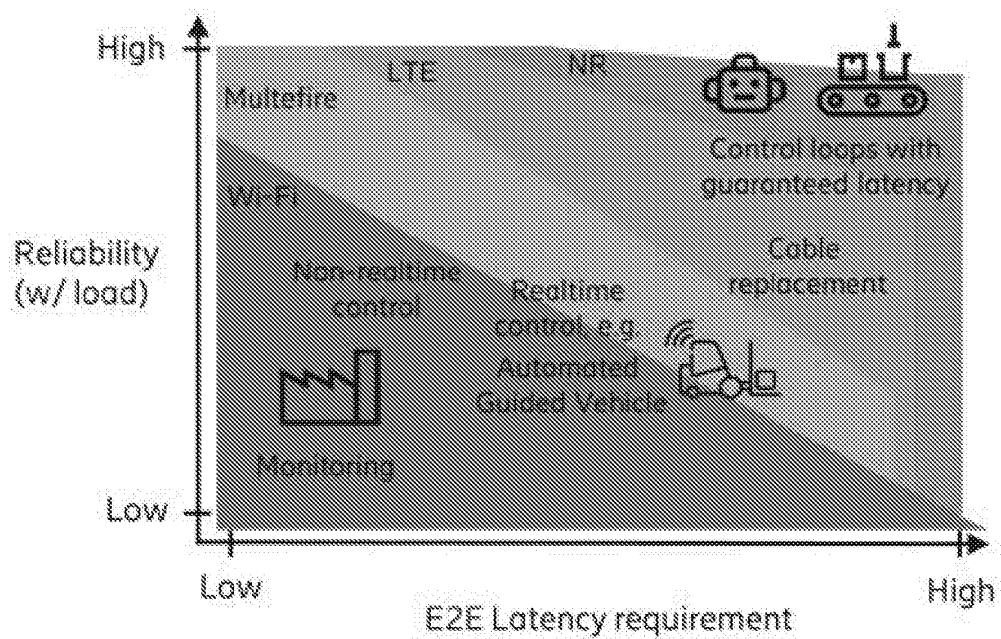


Fig. 98

56 Bits	8 Bits	6 Byte	6 Byte	2 byte	2 byte	36..1490 bytes	4 byte
Preamble	SYNCH	Dest Addr	Src Addr	Ether type	Frame ID	RT.-User data	FCS

Fig. 99

**Fig. 100**

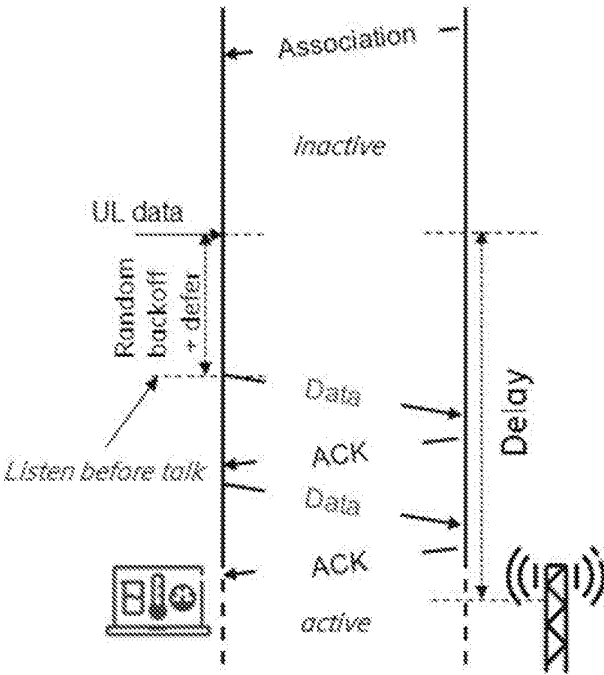


Fig. 101

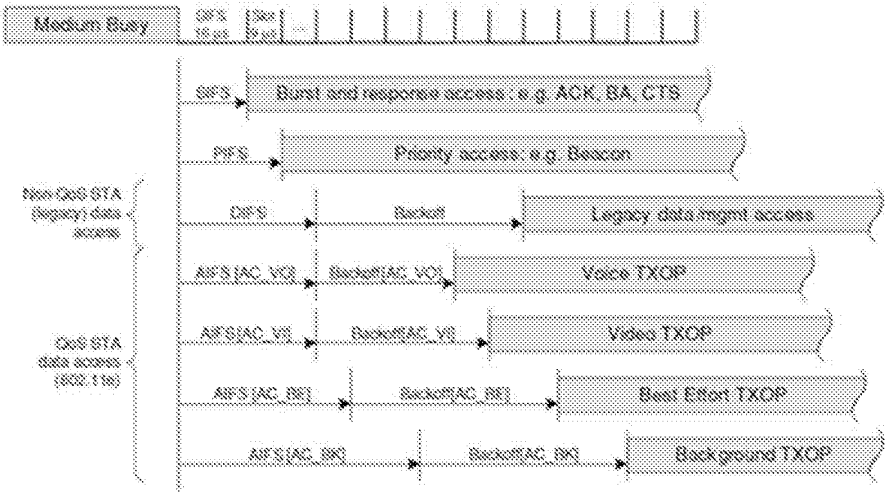
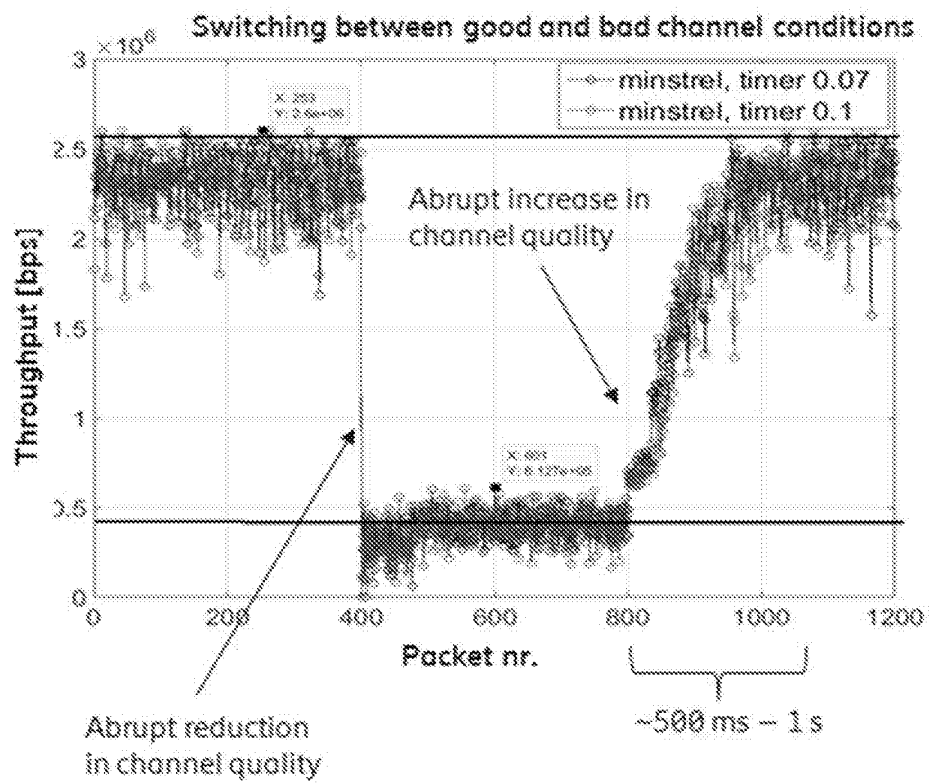
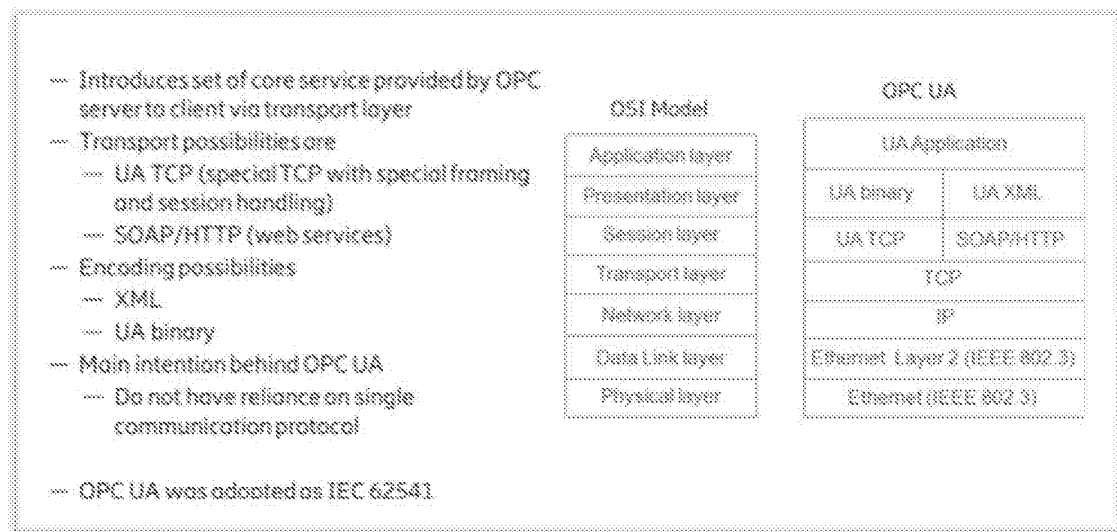
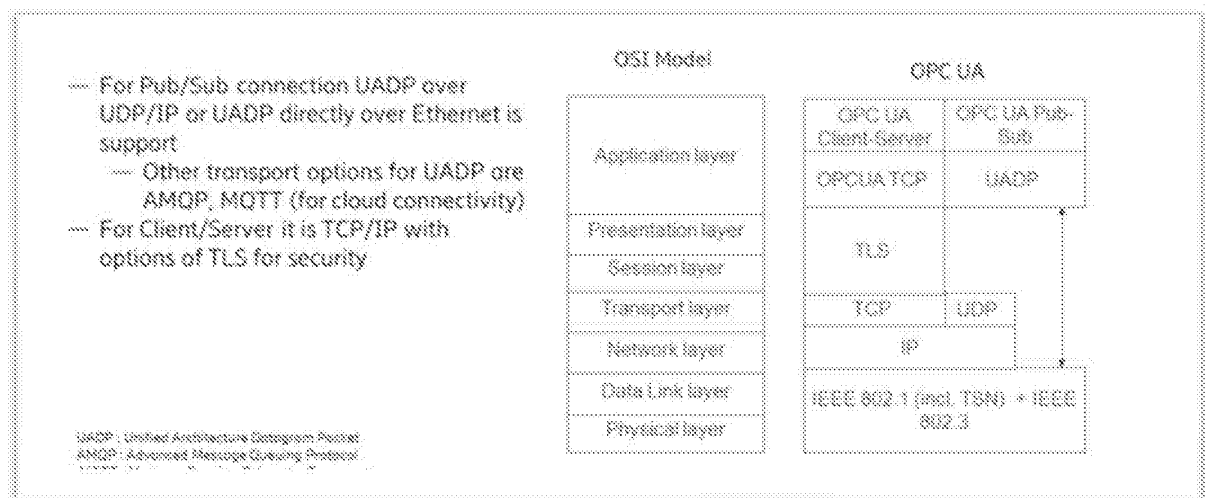
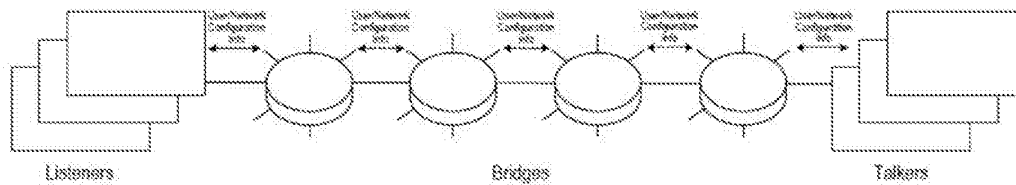
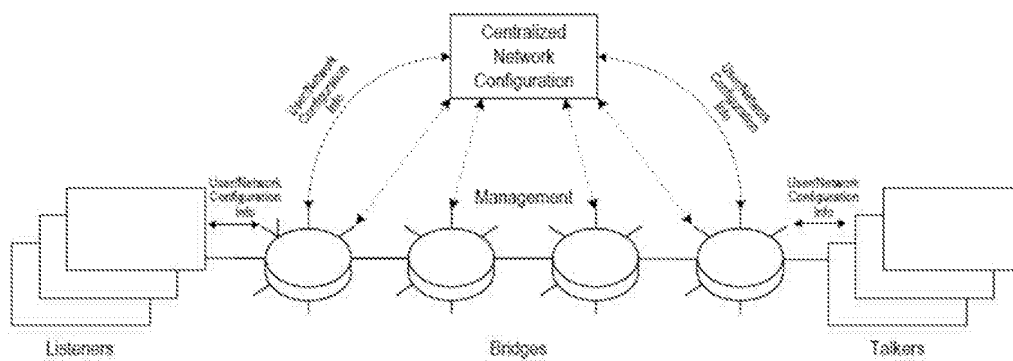
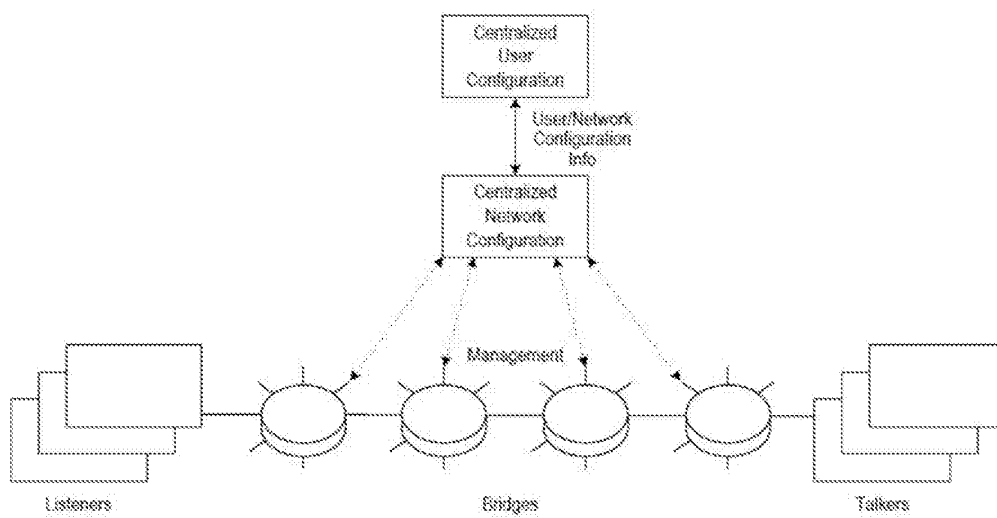


Fig. 102

**Fig. 103**

**Fig. 104****Fig. 105**

**Fig. 106****Fig. 107**

**Fig. 108**

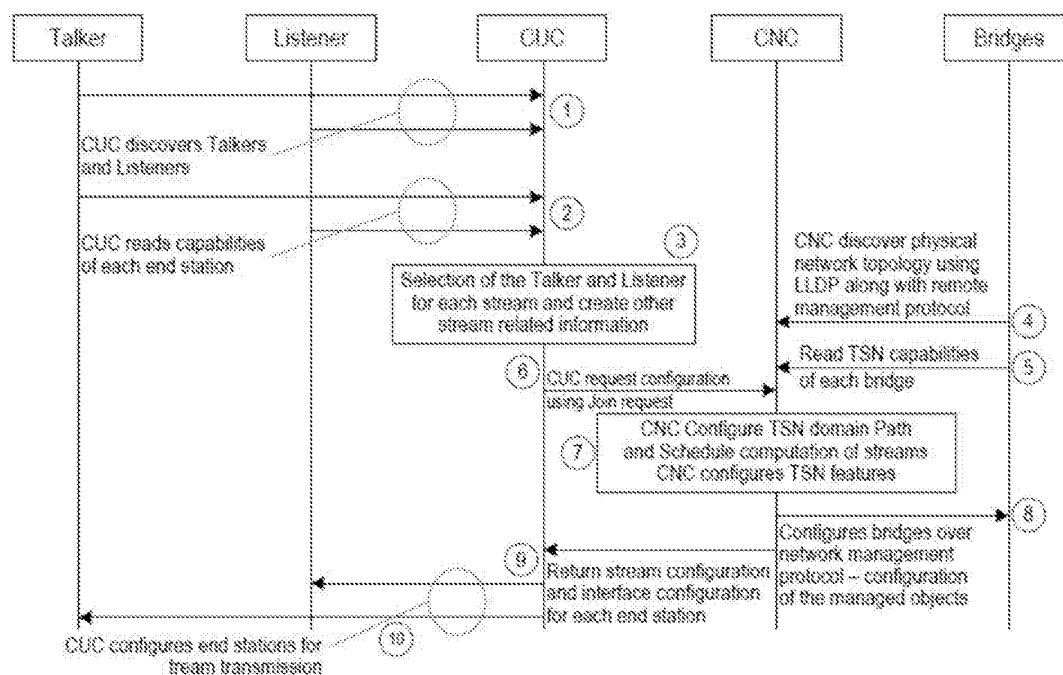
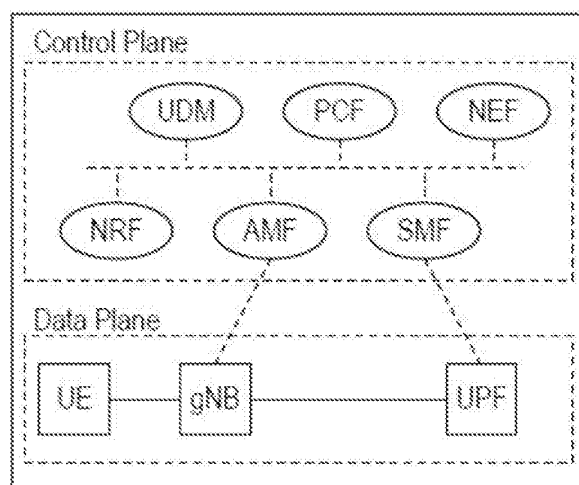


Fig. 109



UPF: User Plane Function
 NRF: Network Repository Function
 AMF: Access Management Function
 SMF: Session Management Function
 NEF: Network Exposure Function
 PCF: Policy Control Function
 UDM: Unified Data Management

Fig. 110

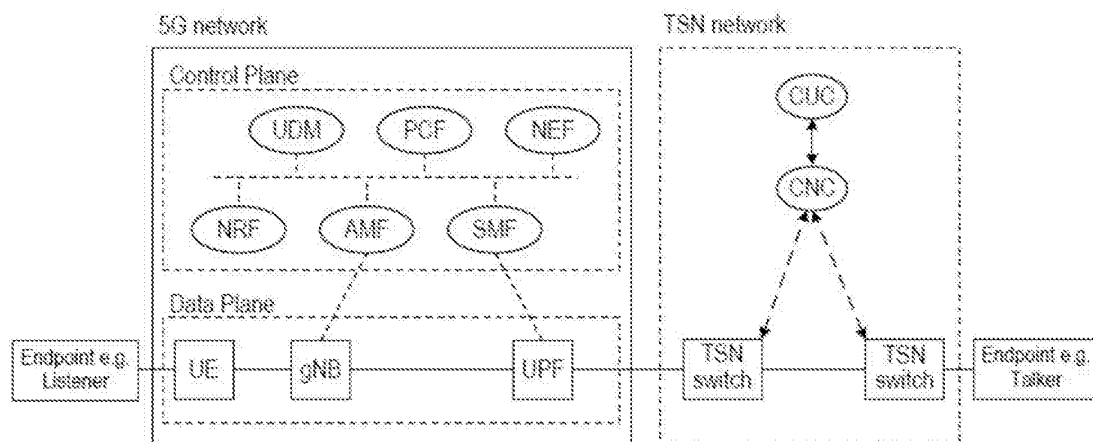


Fig. 111

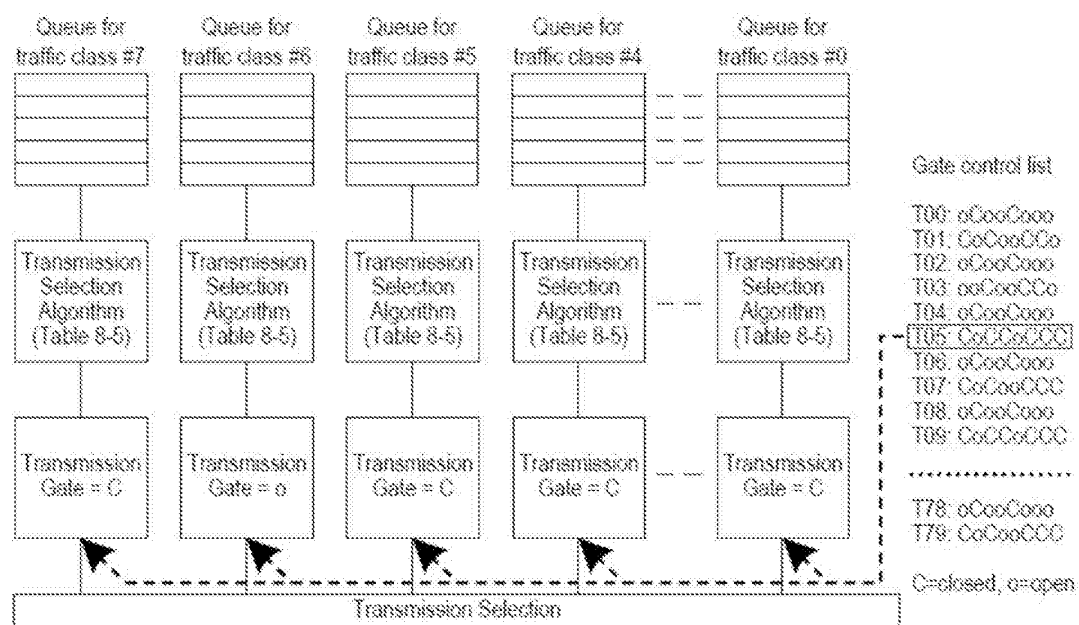
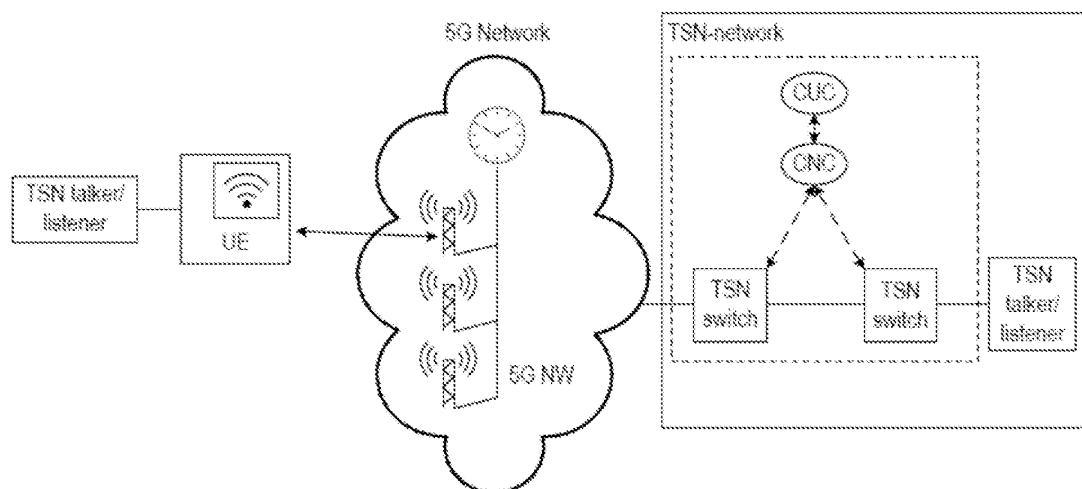


Fig. 112

**Fig. 113**

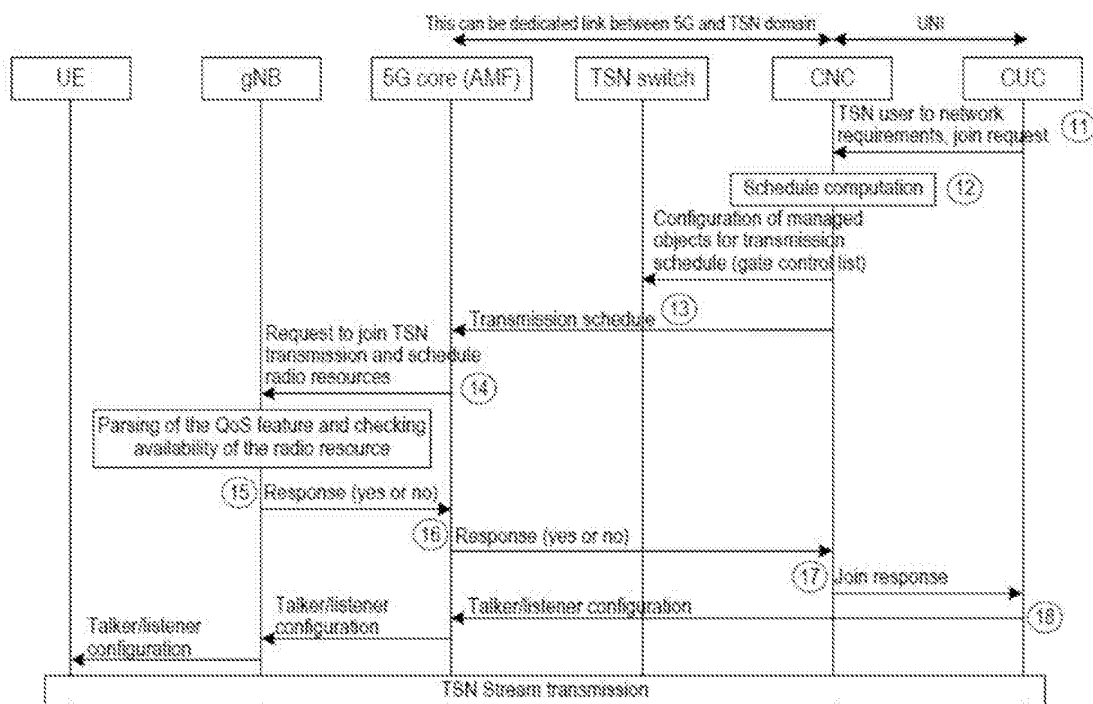


Fig. 114

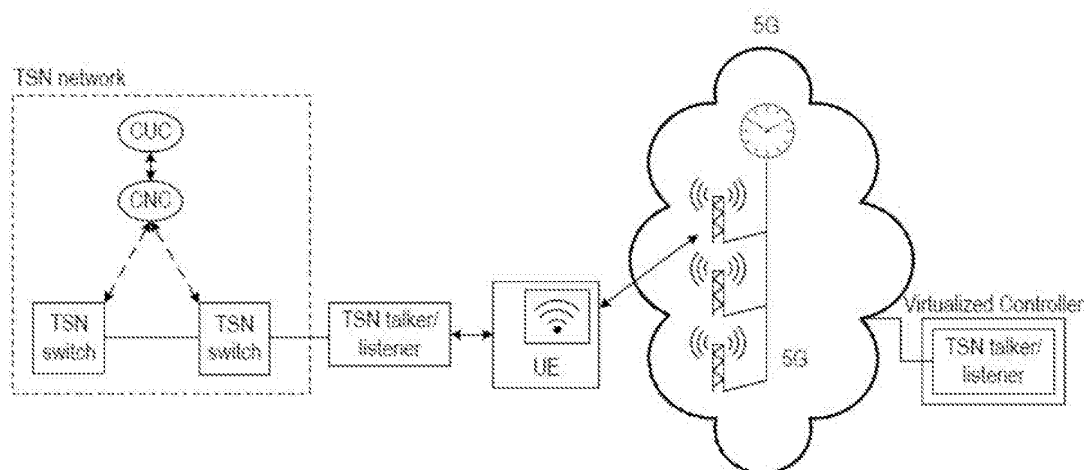
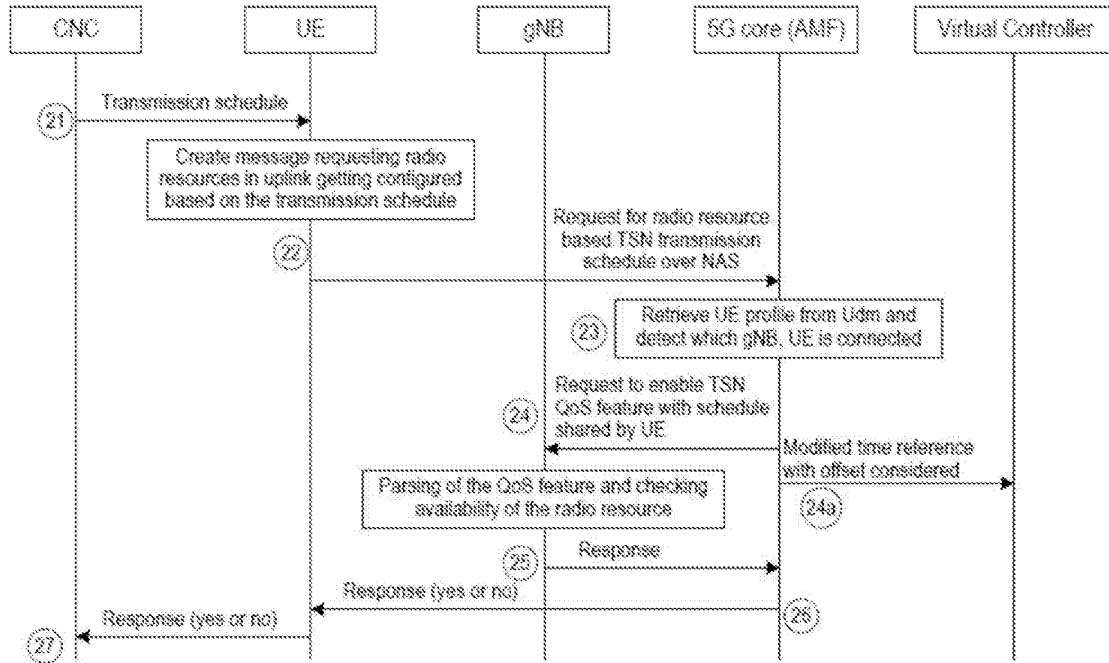
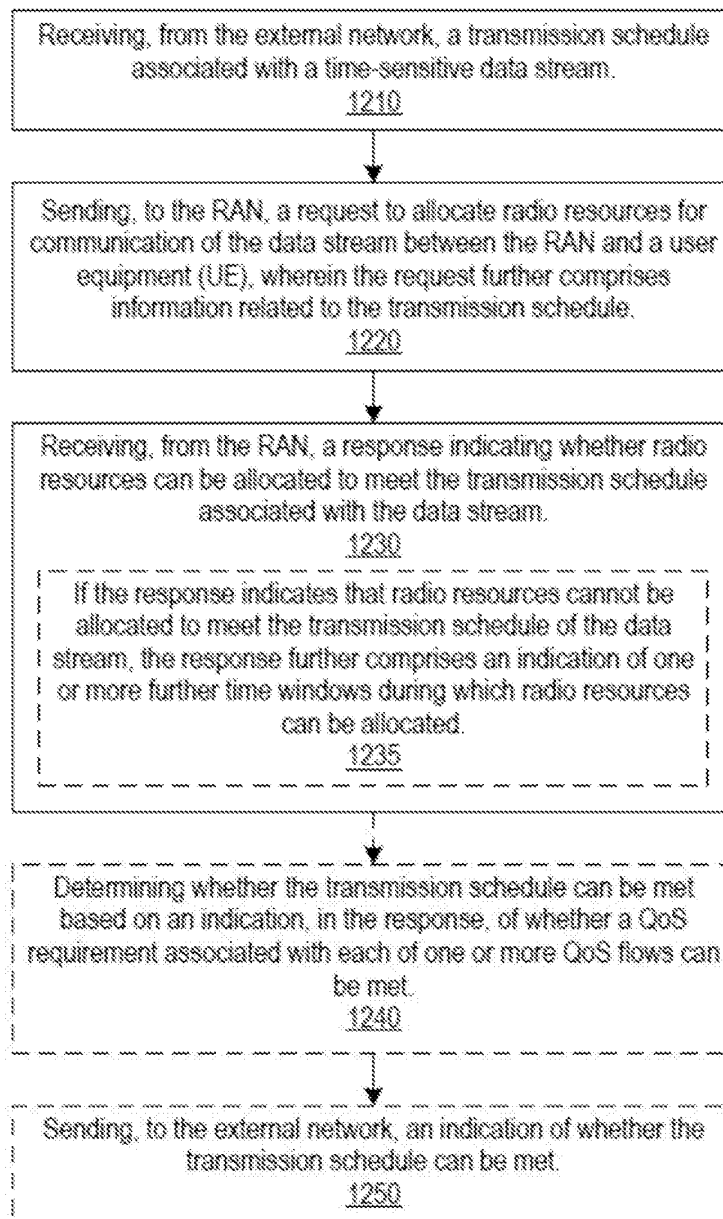
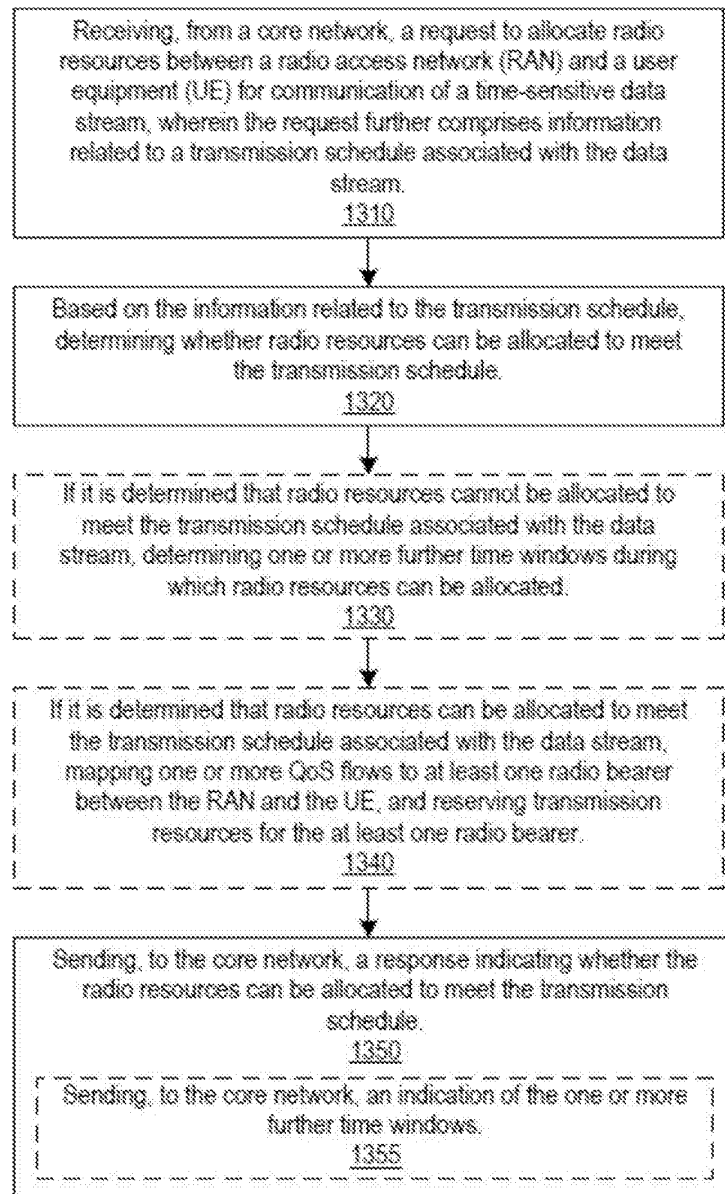
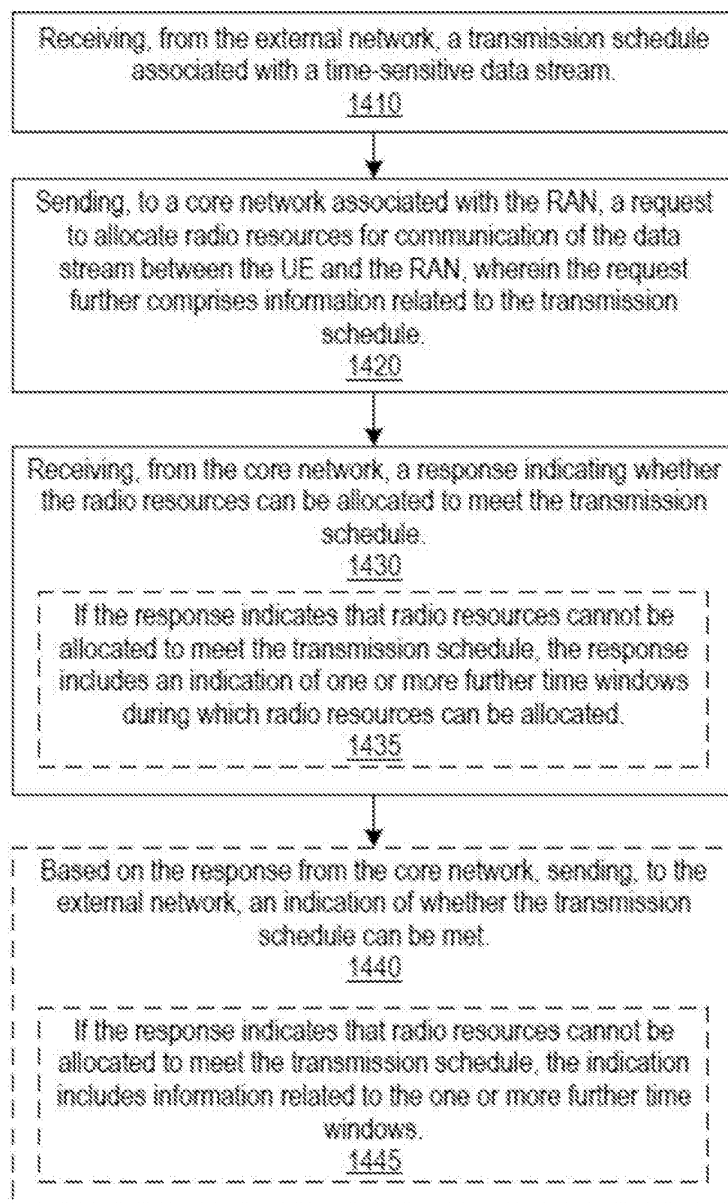


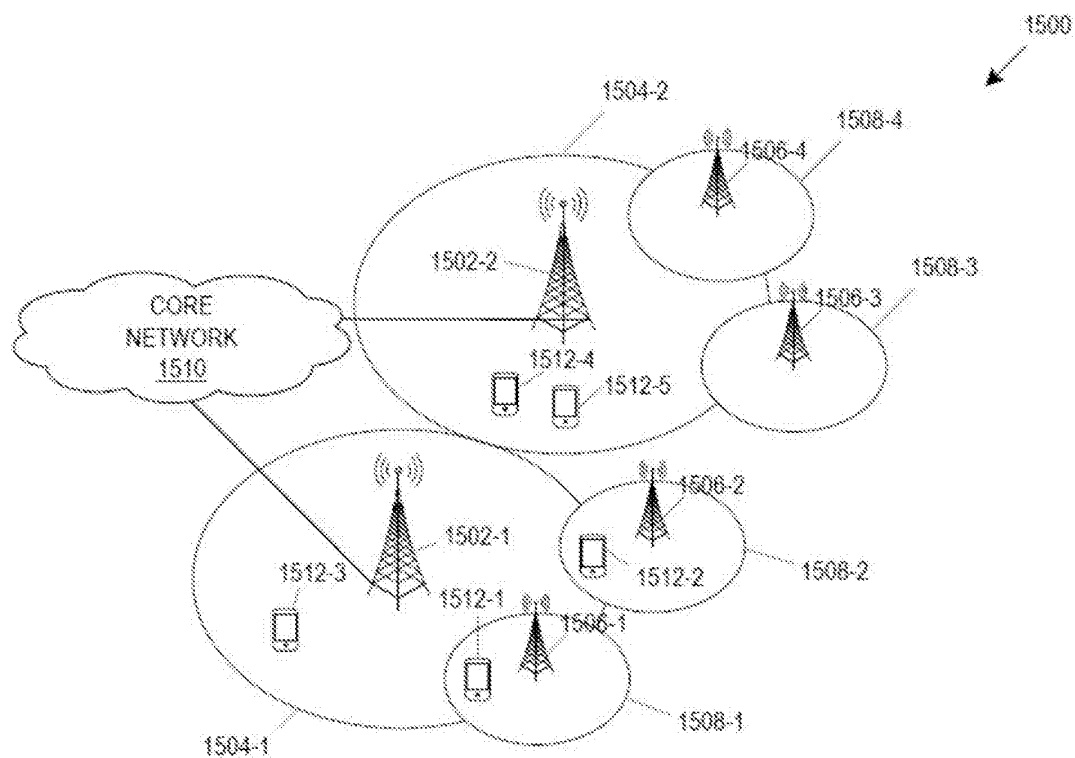
Fig. 115

**Fig. 116**

**Fig. 117**

**Fig. 118**

**Fig. 119**

**Fig. 120**

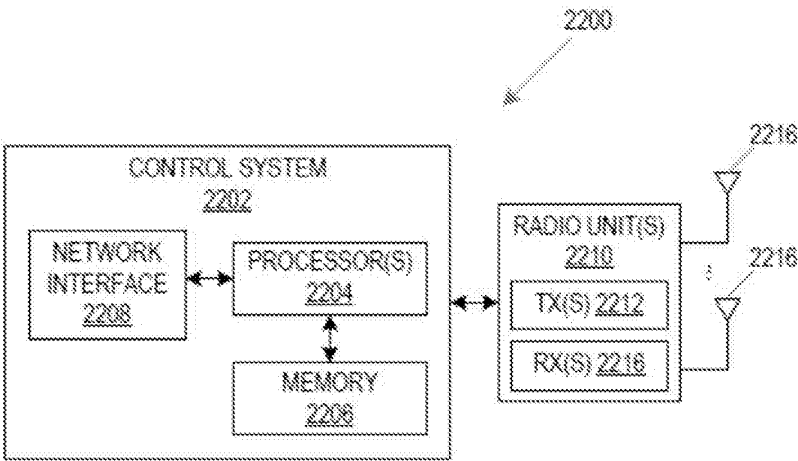


Fig. 121

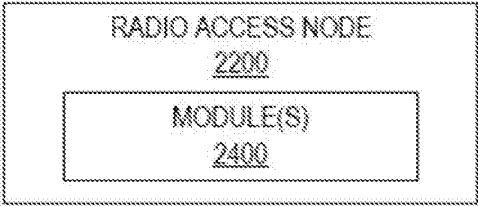
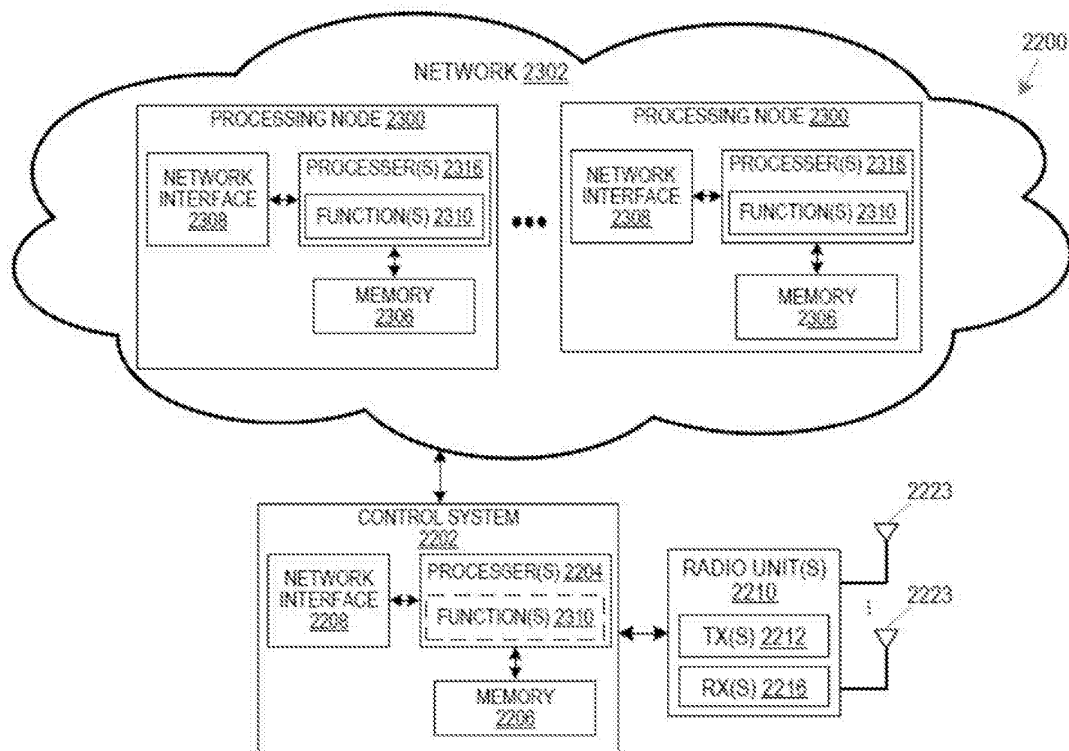
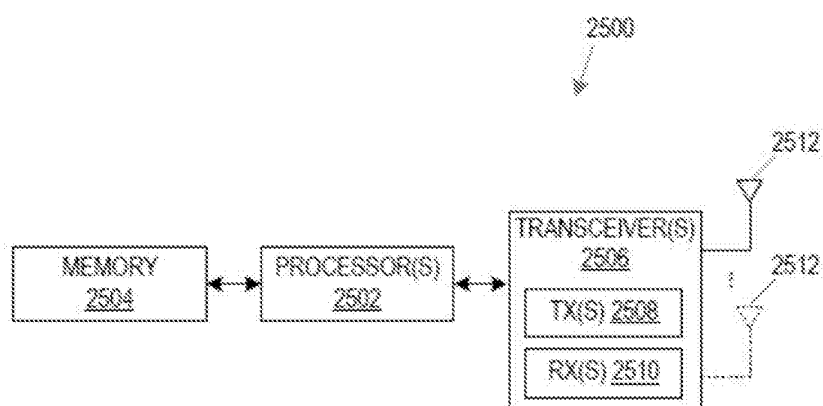


Fig. 122

**Fig. 123****Fig. 124**

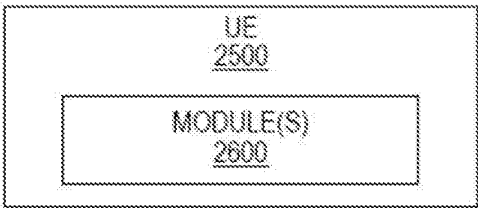
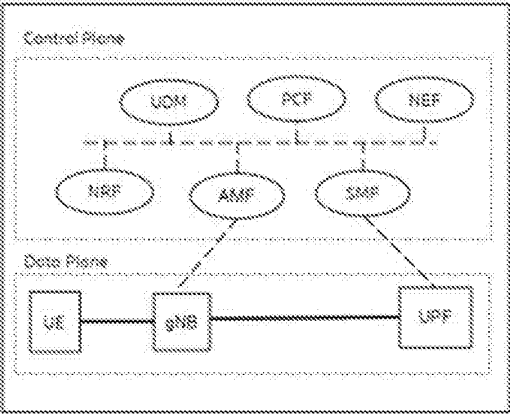


Fig. 125



UPF: User Plane Function
NRF: Network Repository Function
AMF: Access Management Function
SMF: Session Management Function
NEF: Network Exposure Function
PCF: Policy Control Function
UDM: Unified Data Management

Fig. 126

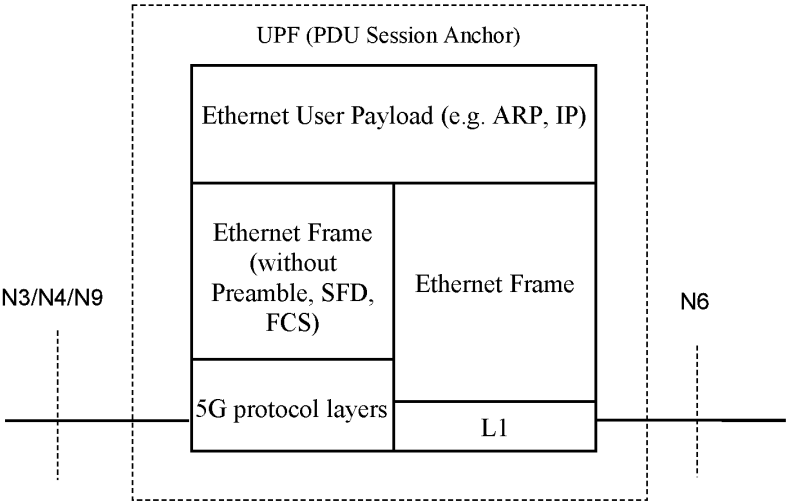


Fig. 127

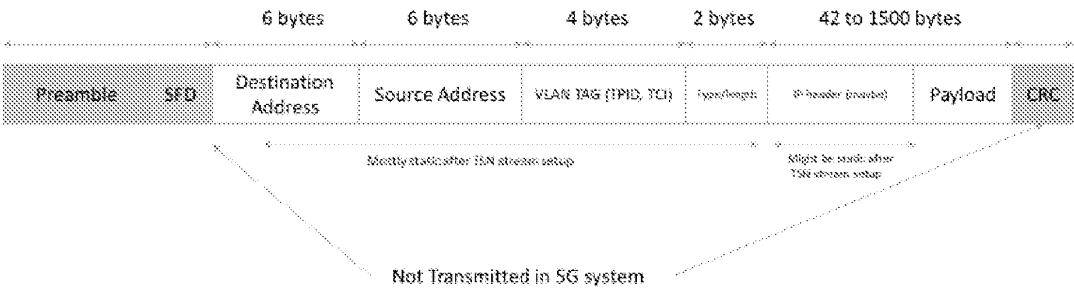
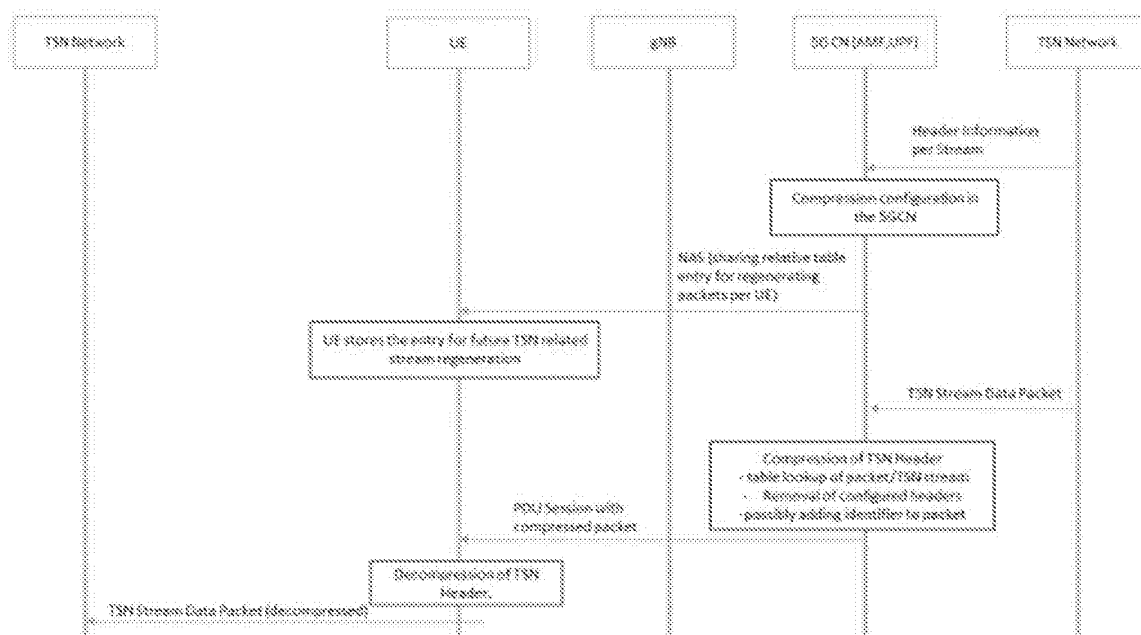
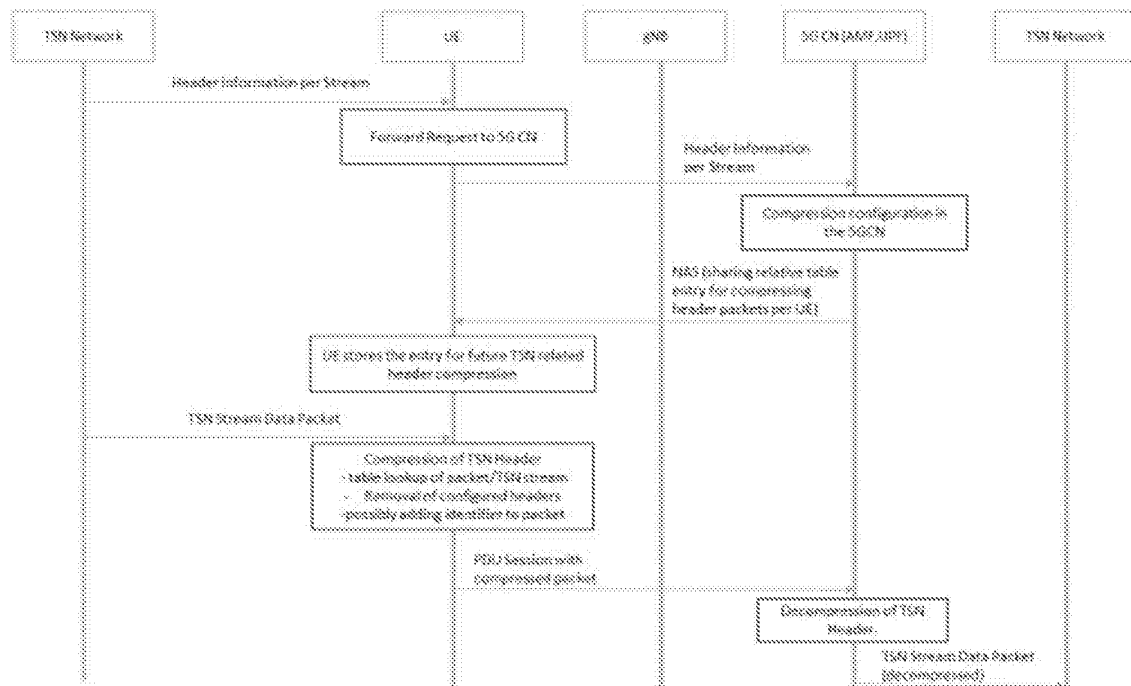
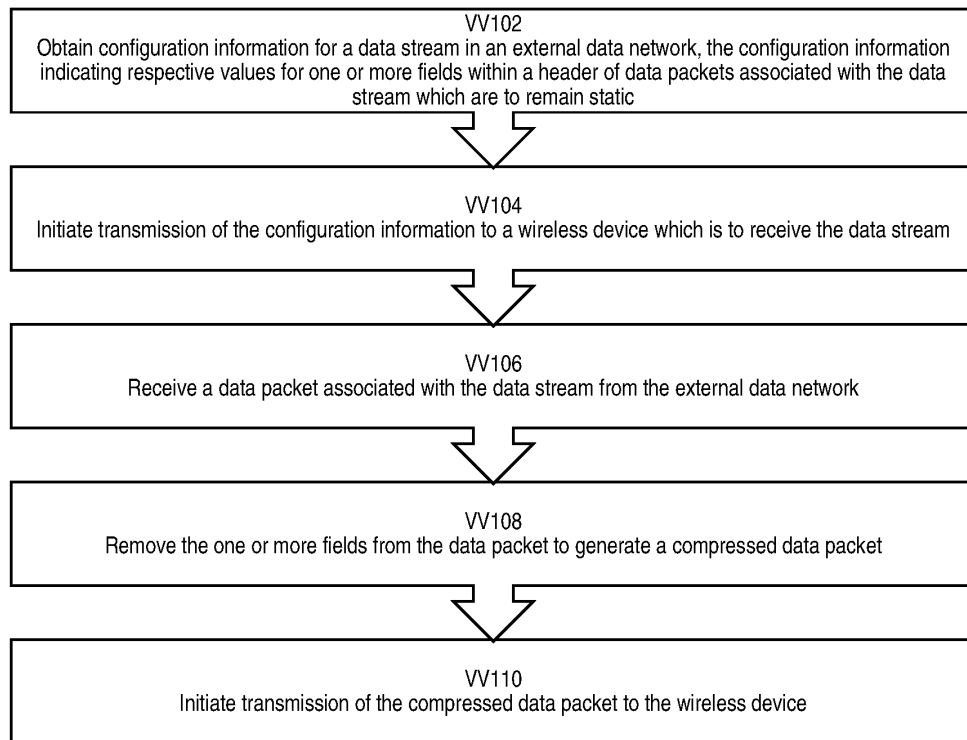
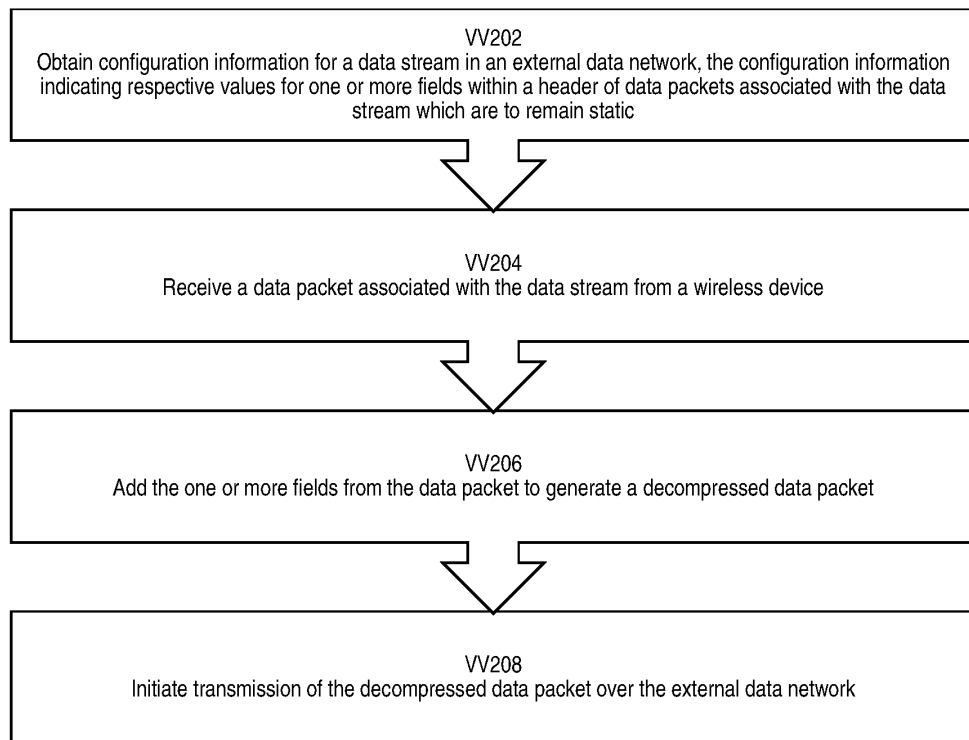


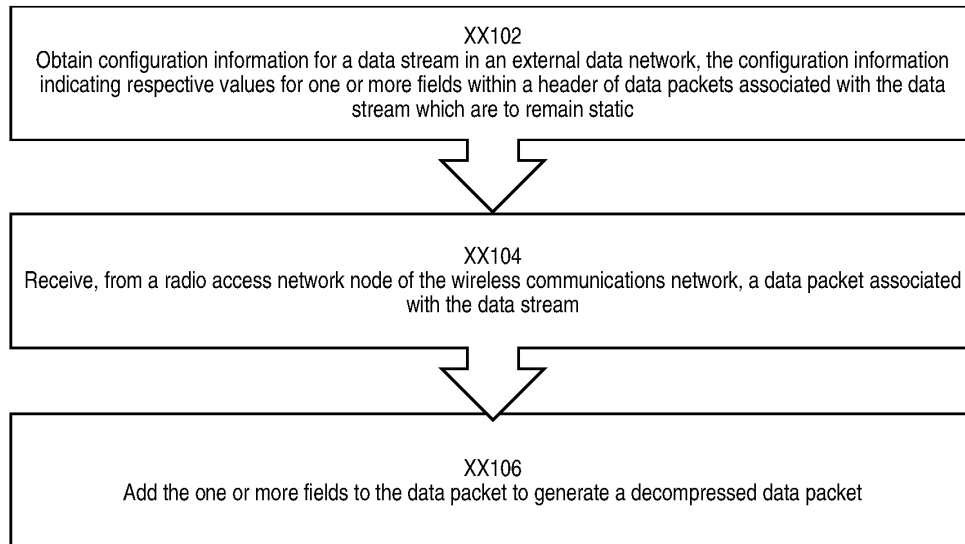
Fig. 128

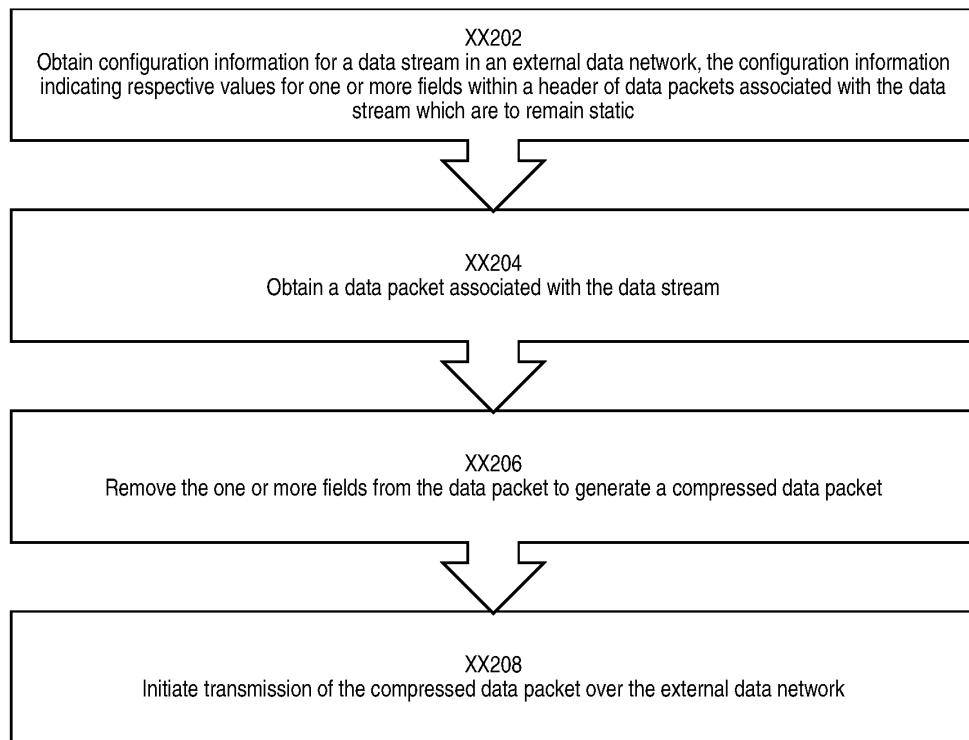
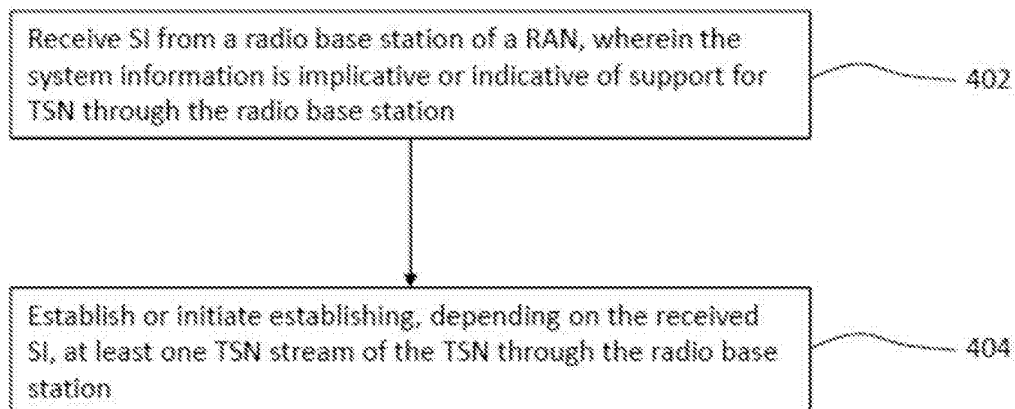
**Fig. 129**

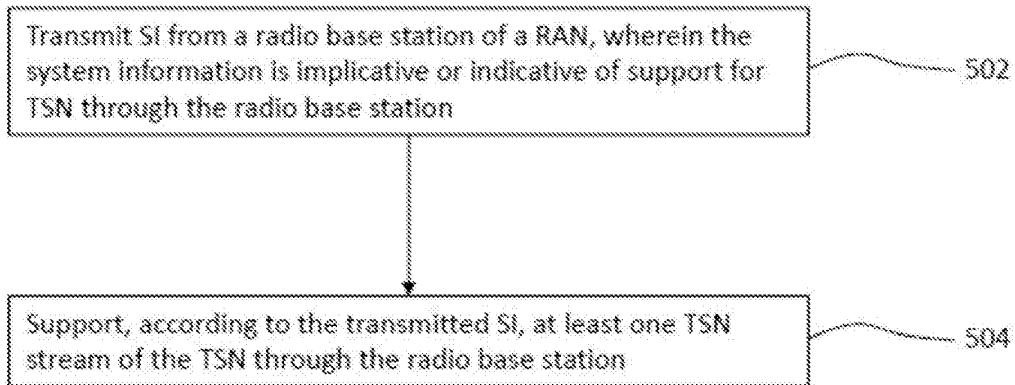
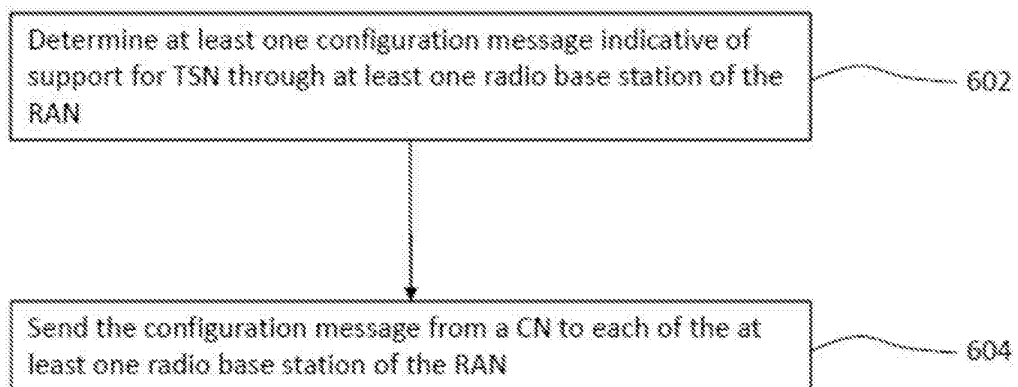
**Fig. 130**

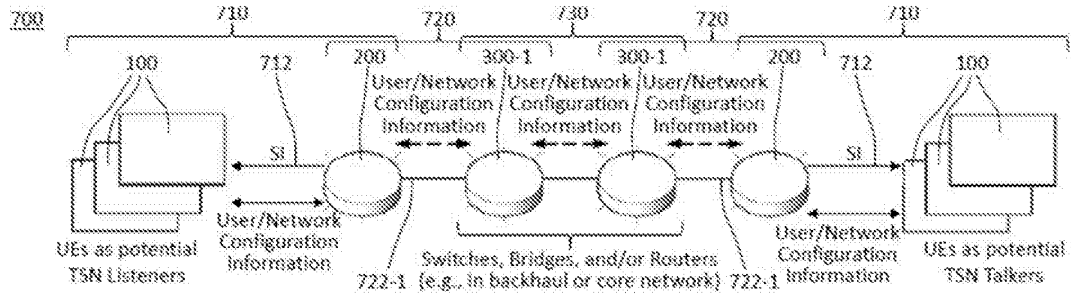
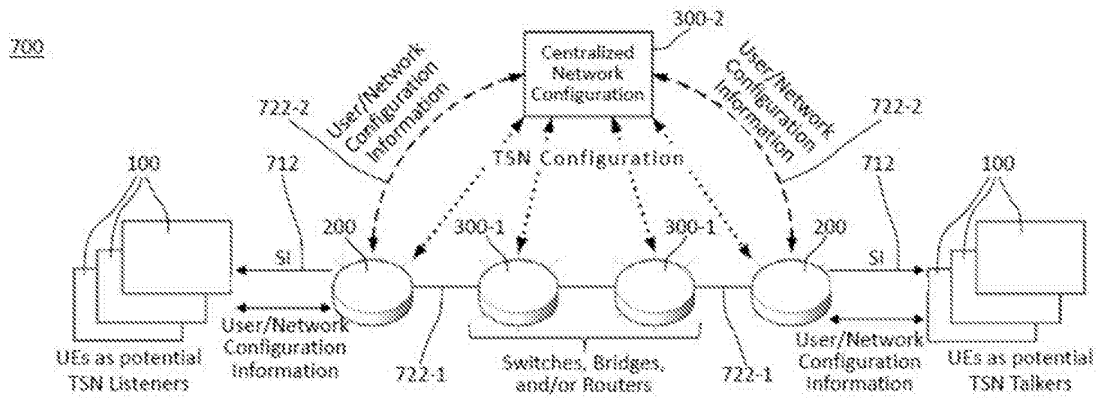
**Fig. 131**

**Fig. 132**

**Fig. 133**

**Fig. 134****Fig. 135**

**Fig. 136****Fig. 137**

**Fig. 138****Fig. 139**

700

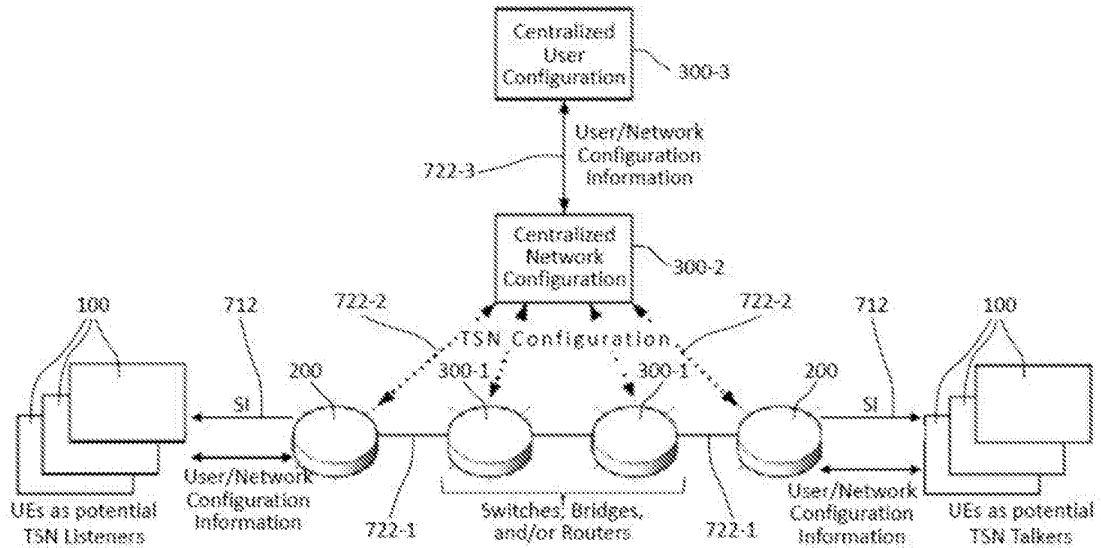


Fig. 140

700

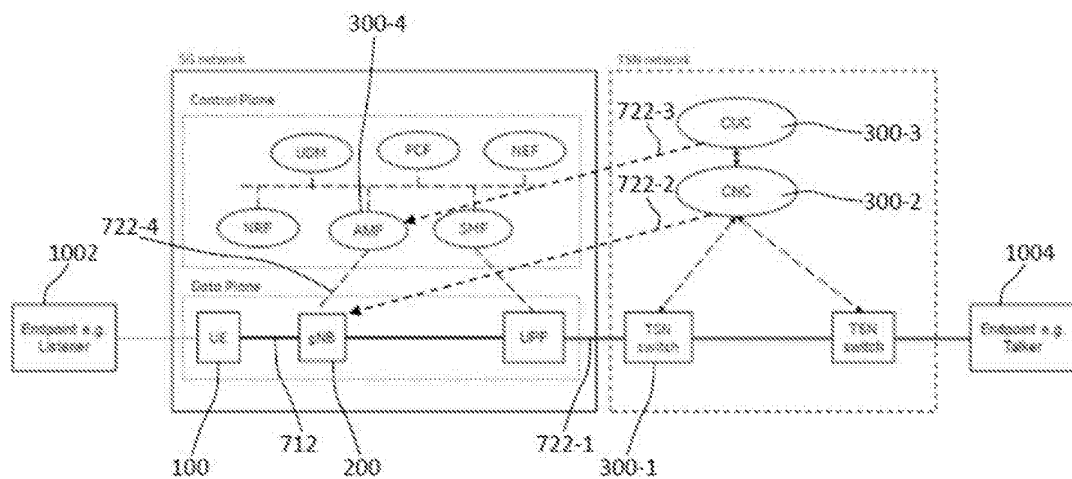


Fig. 141

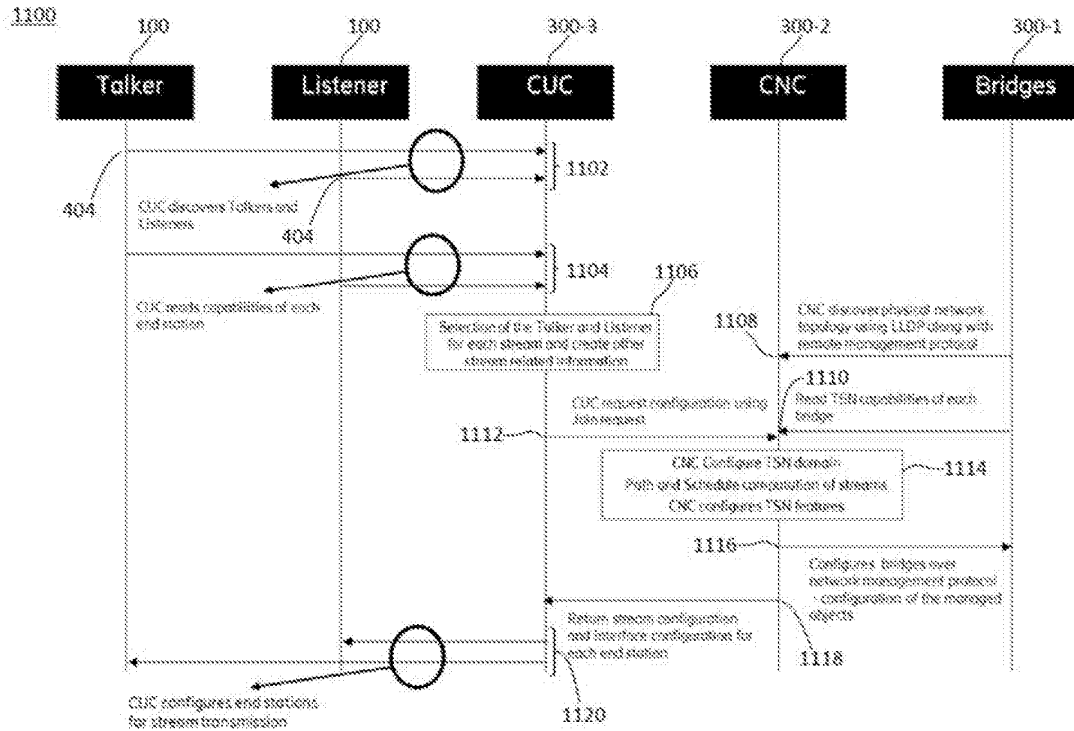


Fig. 142

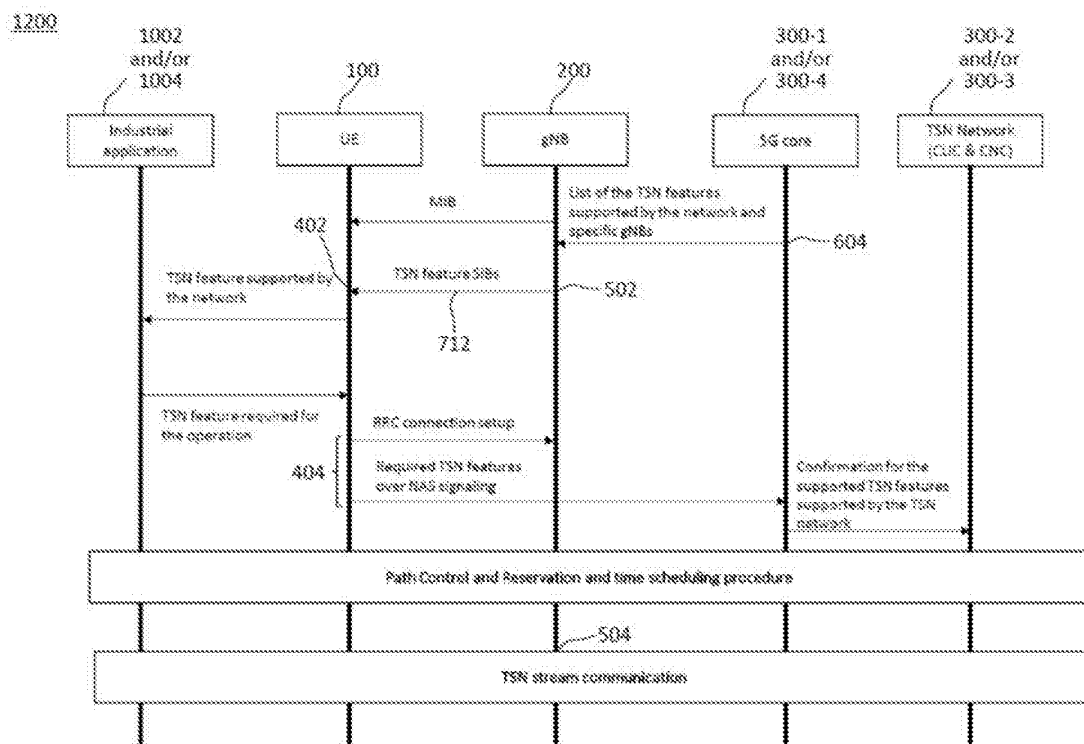


Fig. 143

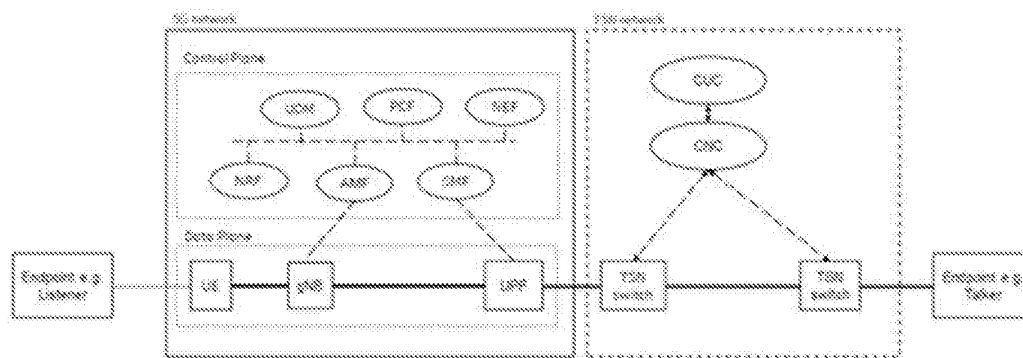
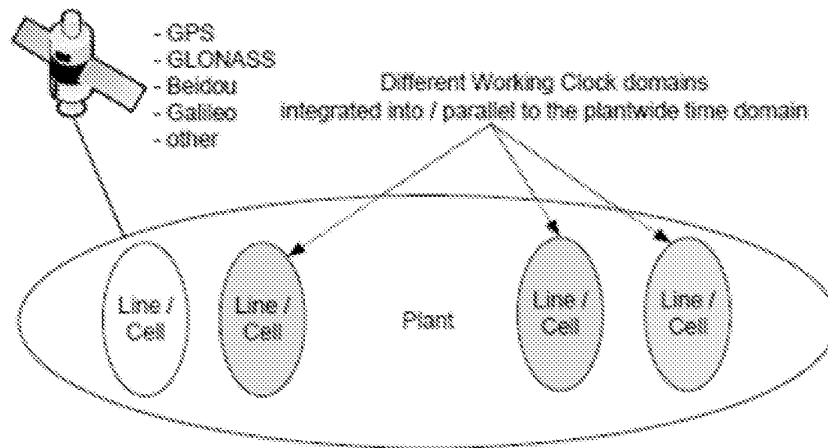
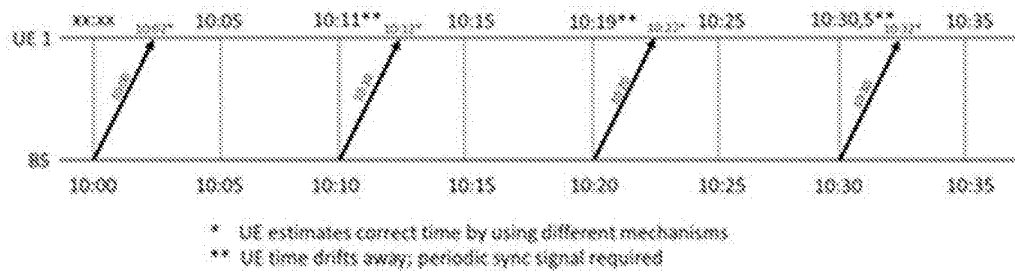


Fig. 144

**Fig. 145****Fig. 146**

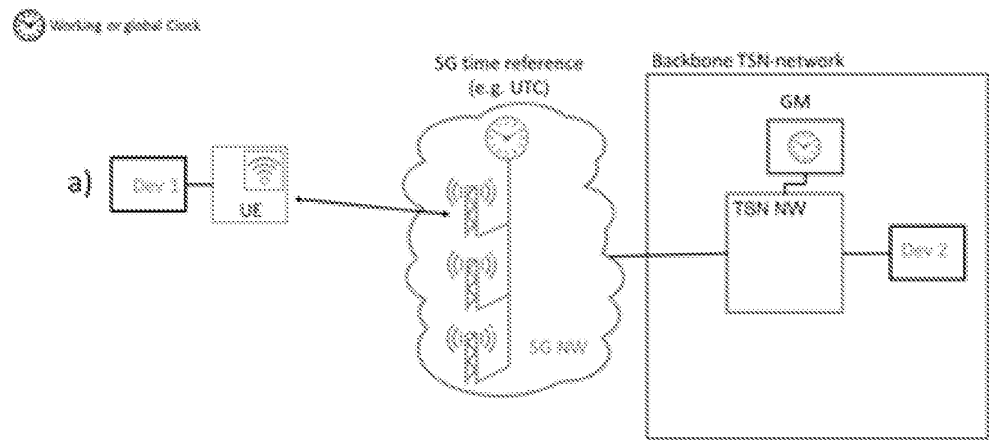


Fig. 147

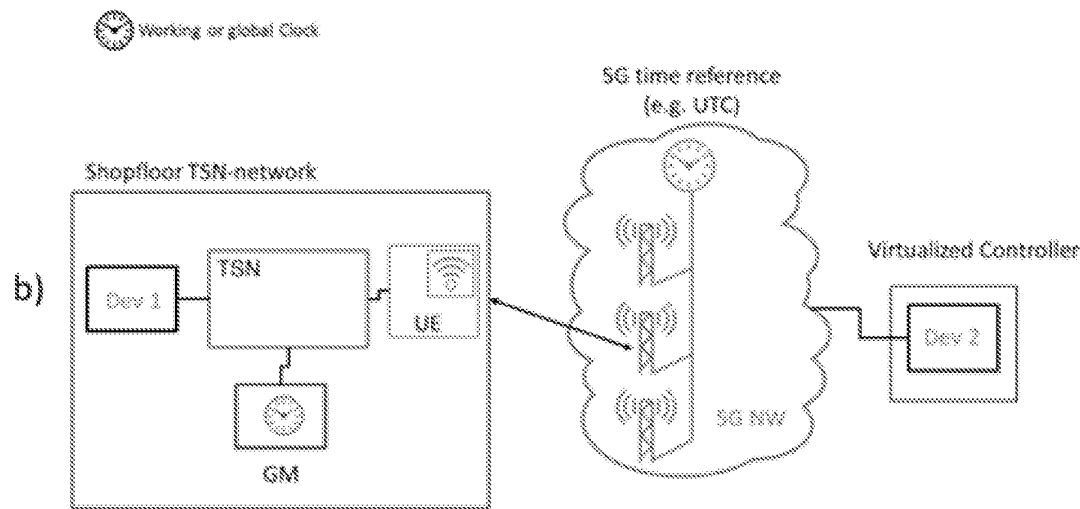


Fig. 148

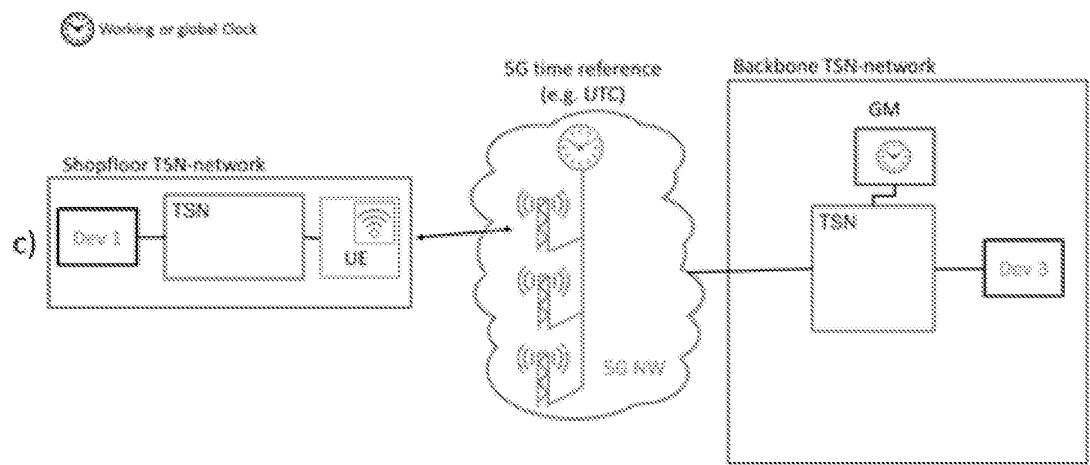


Fig. 149

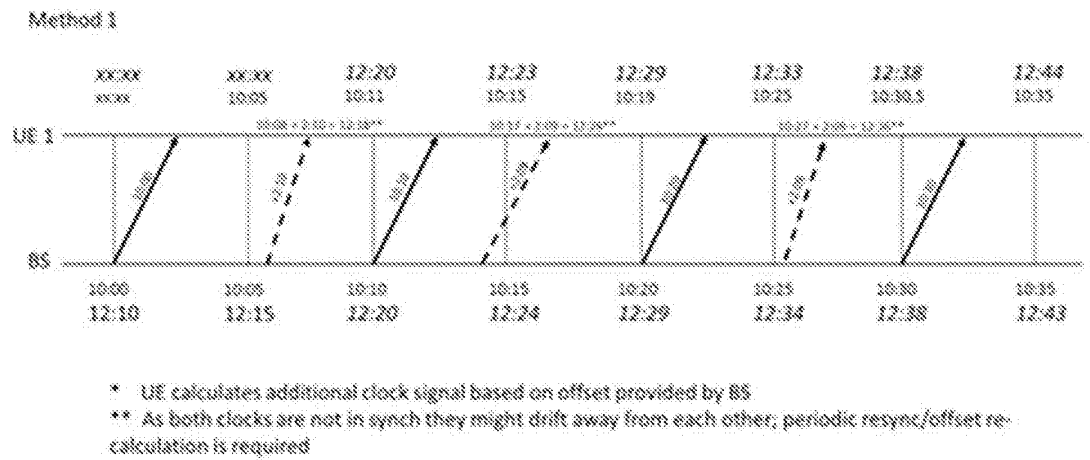
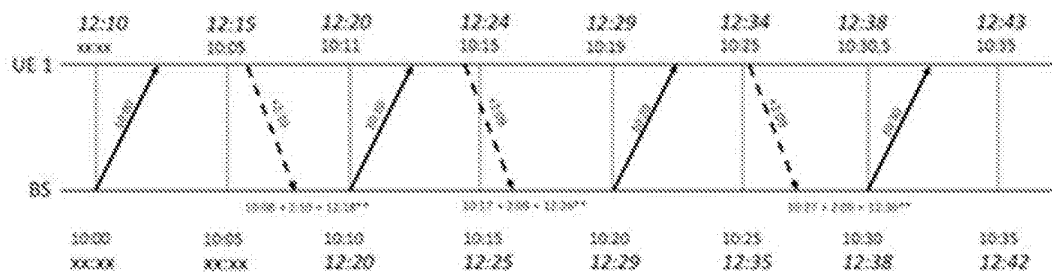


Fig. 150

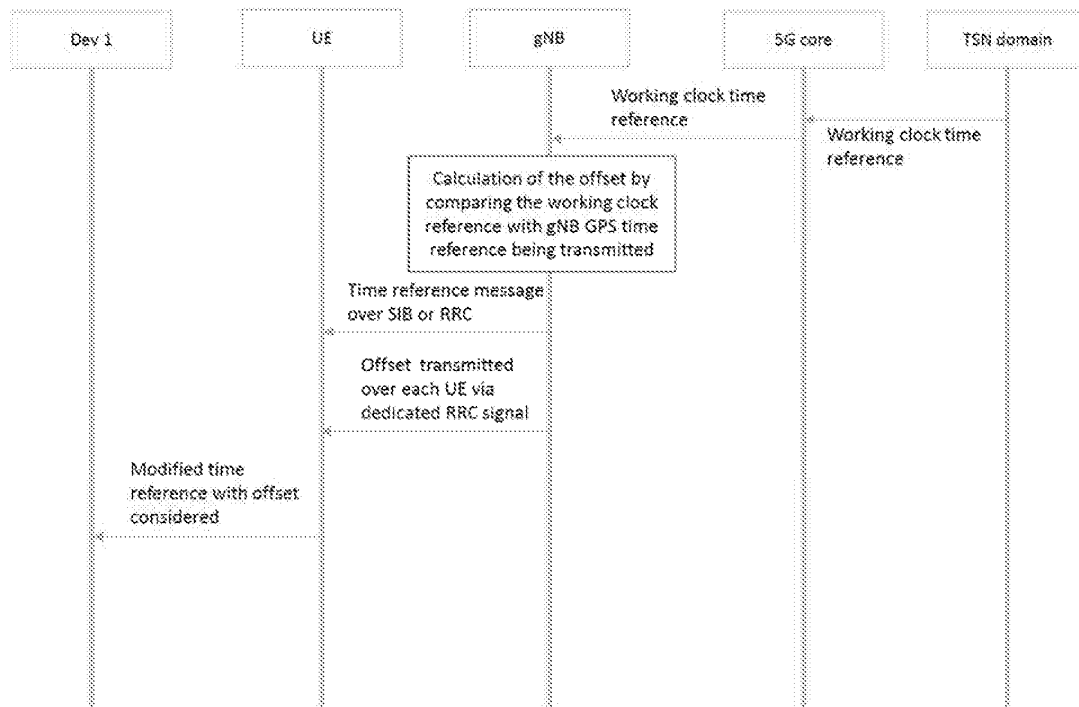
Method 2



* BS calculates additional clock signal based on offset provided by UE

** As both clocks are not in synch they might drift away from each other; periodic resync/offset re-calculation is required

Fig. 151

**Fig. 152**

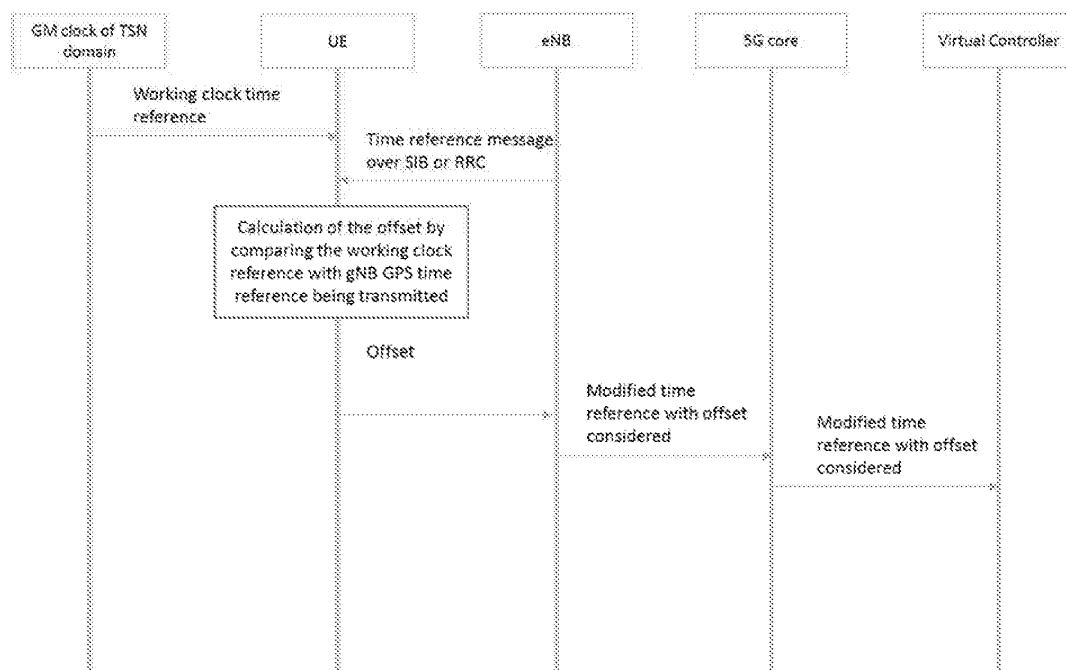


Fig. 153

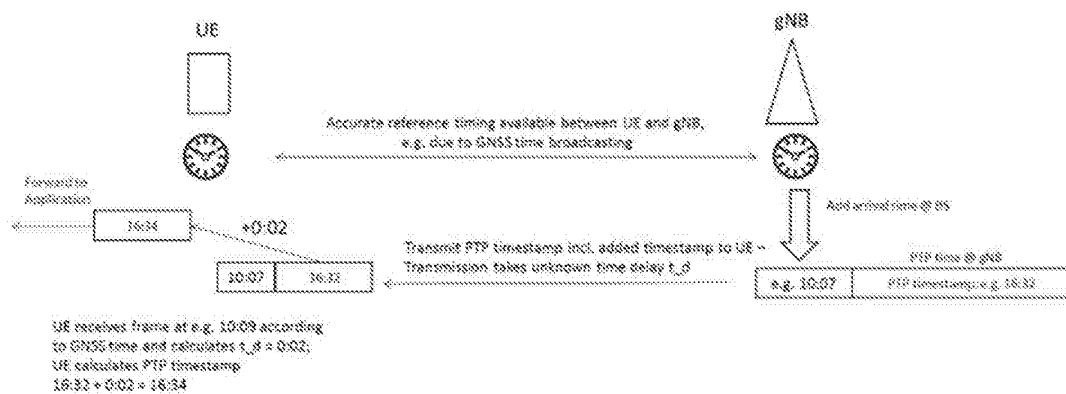
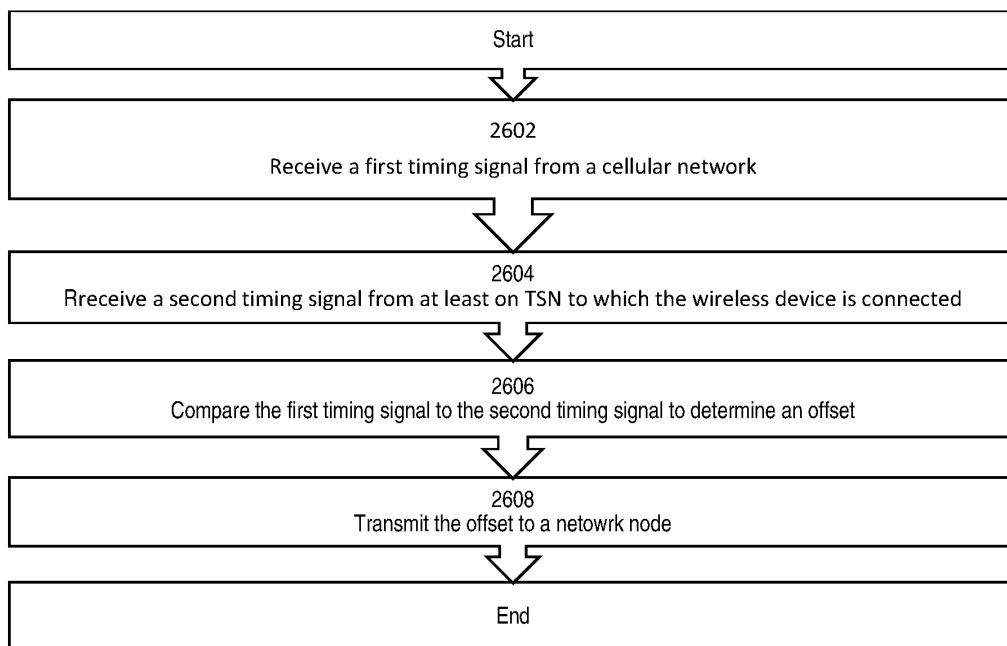
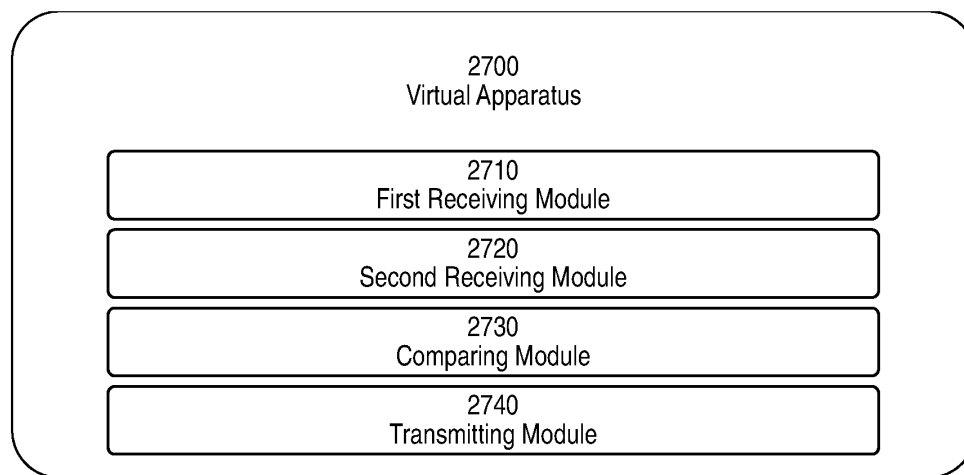
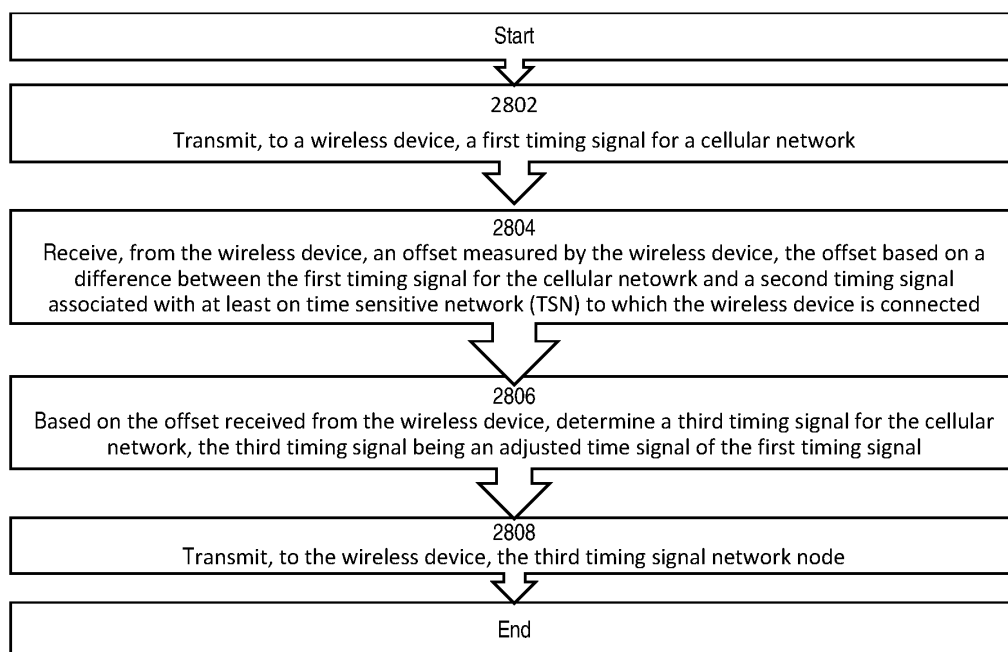
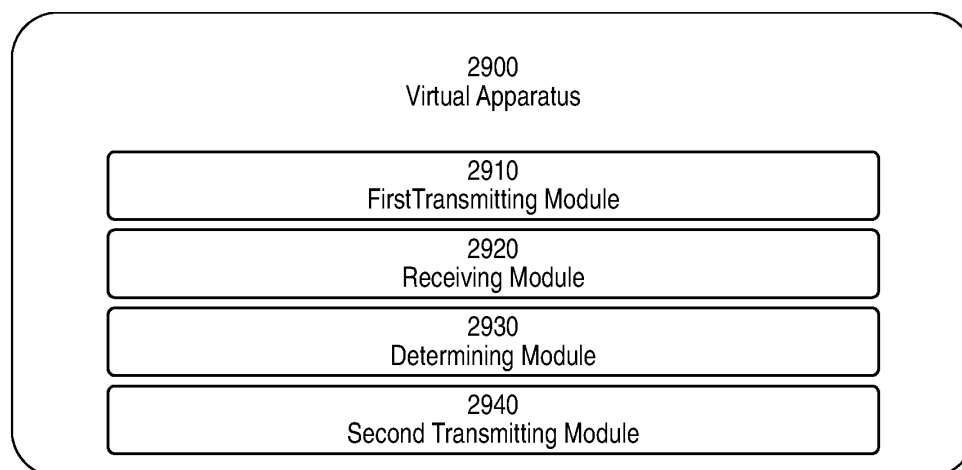


Fig. 154

**Fig. 155****Figure 156**

**Fig. 157****Fig. 158**

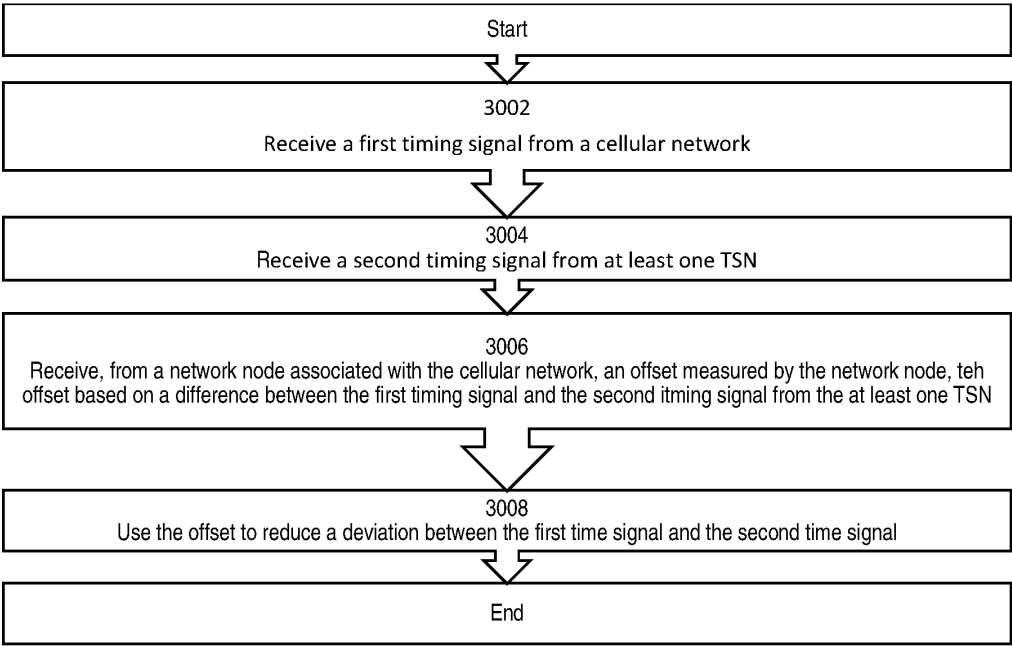


Fig. 159

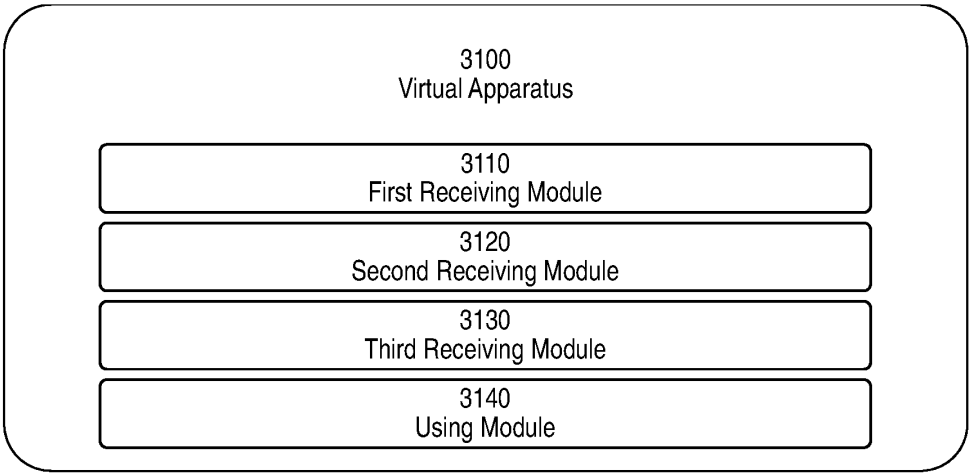


Fig. 160

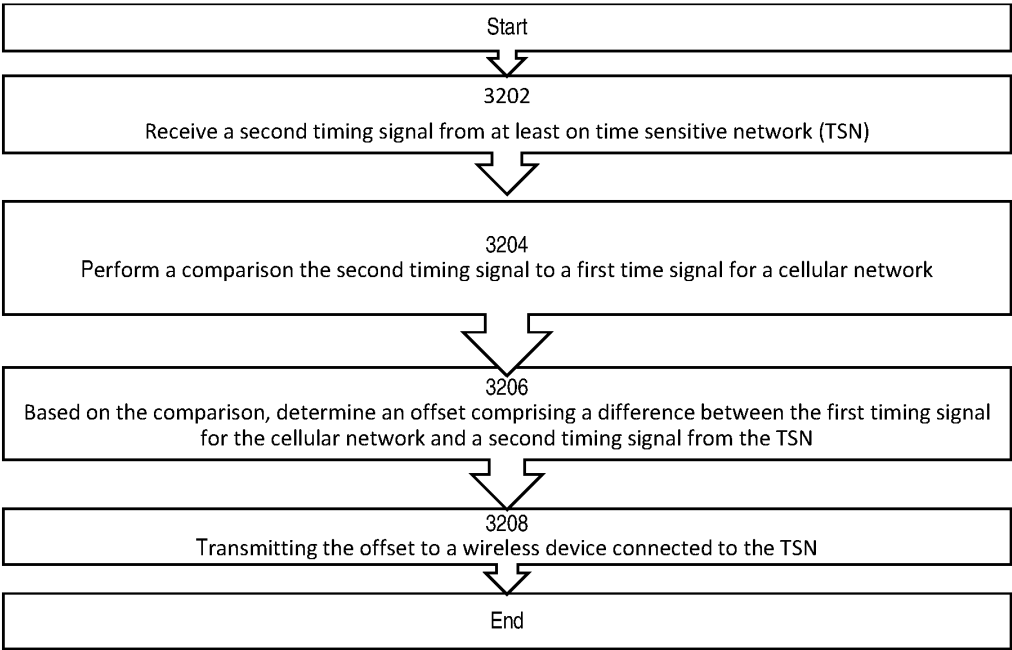


Fig. 161

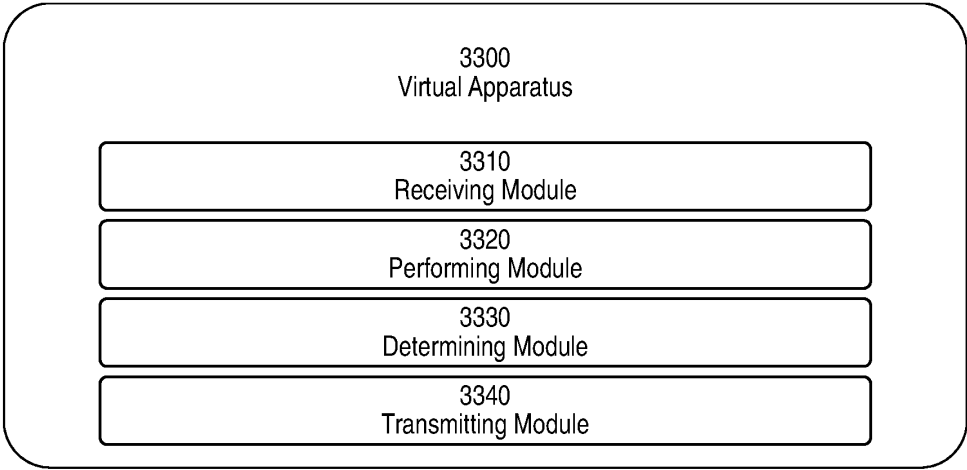
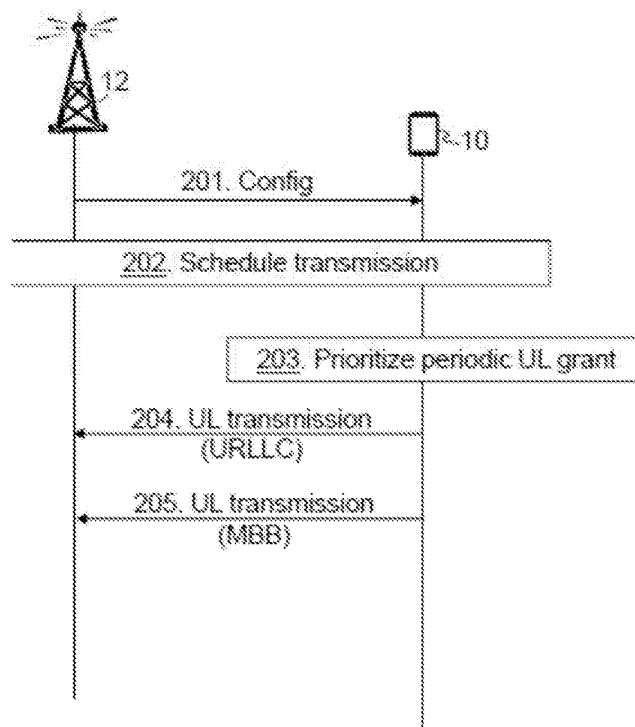
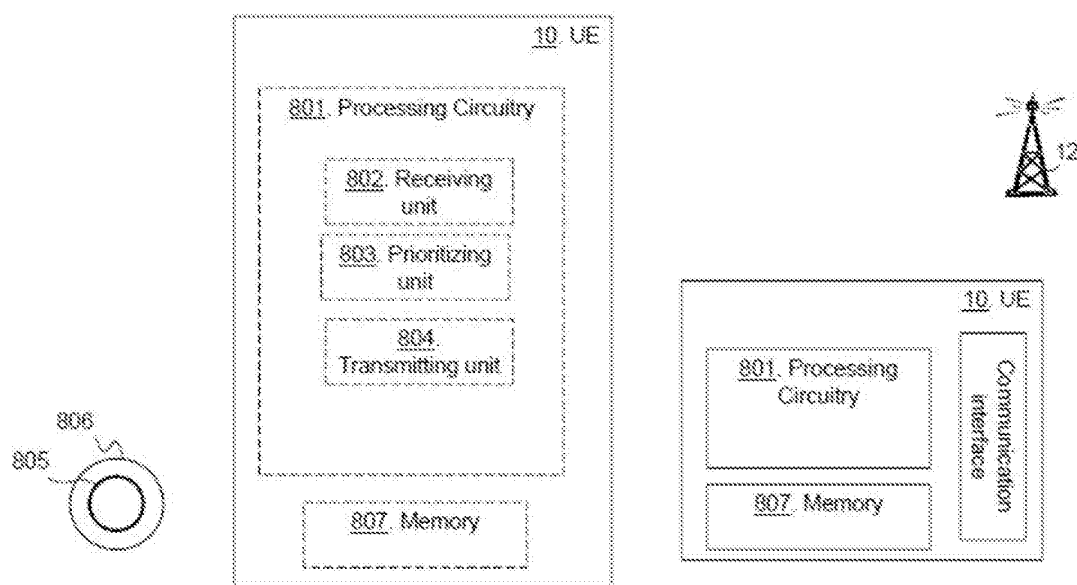
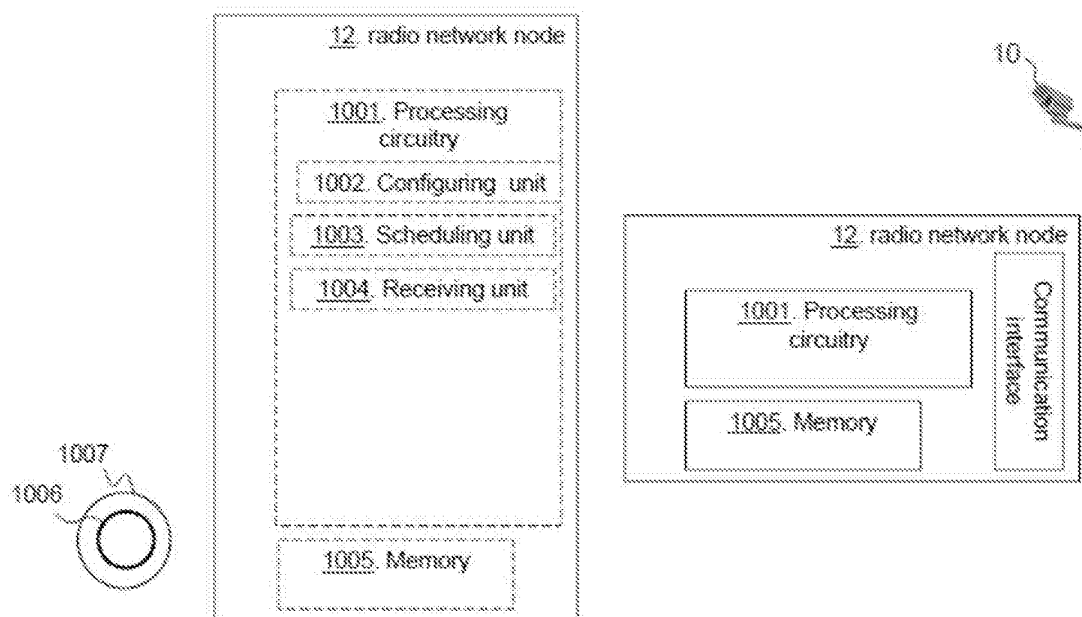
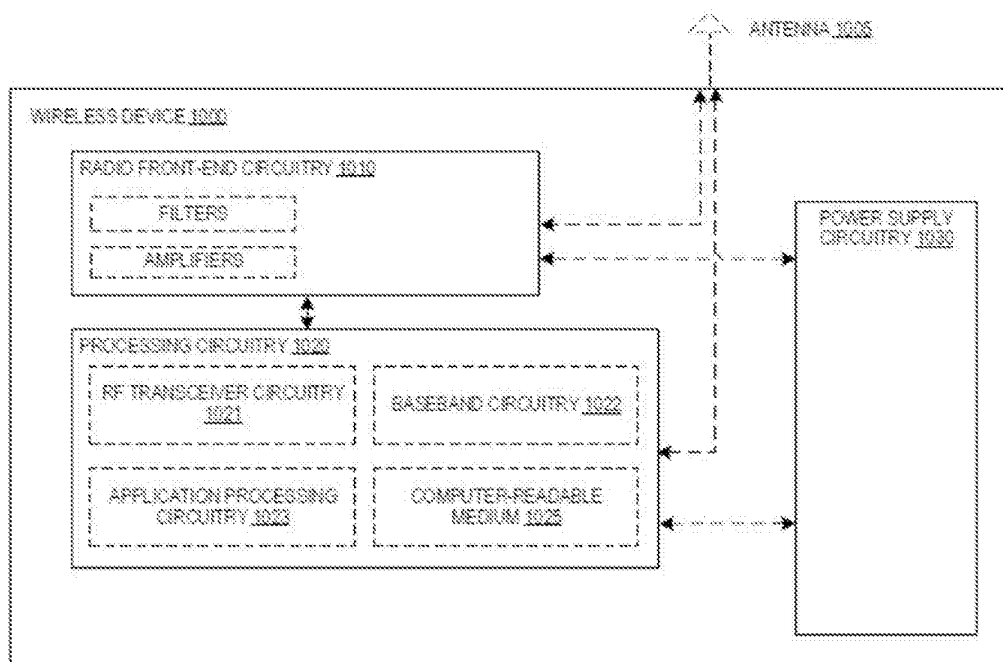
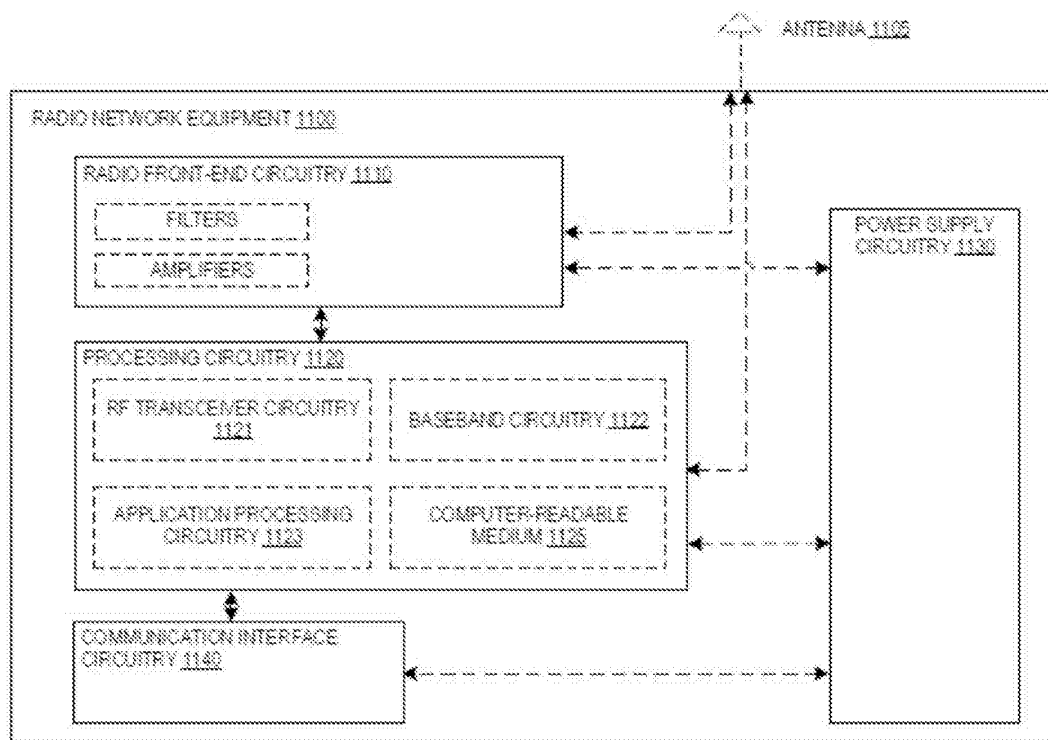


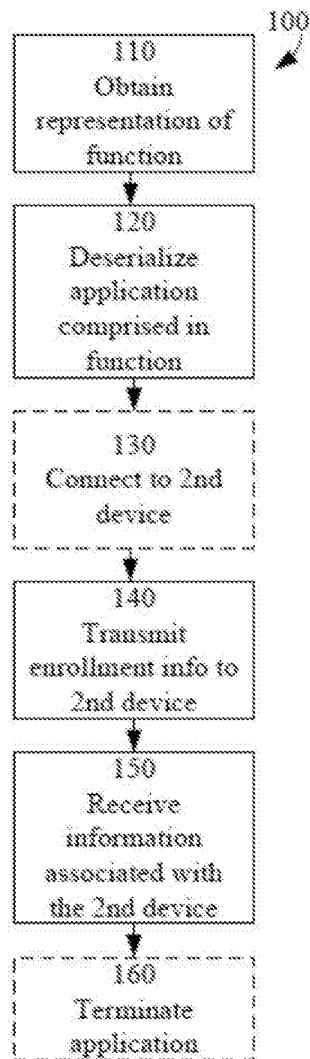
Fig. 162

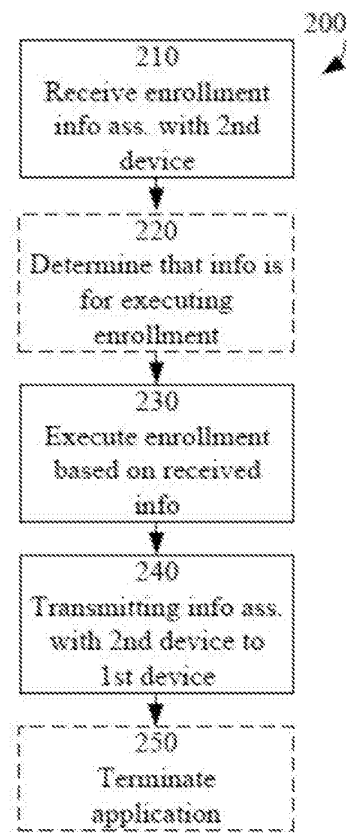
**Fig. 163**

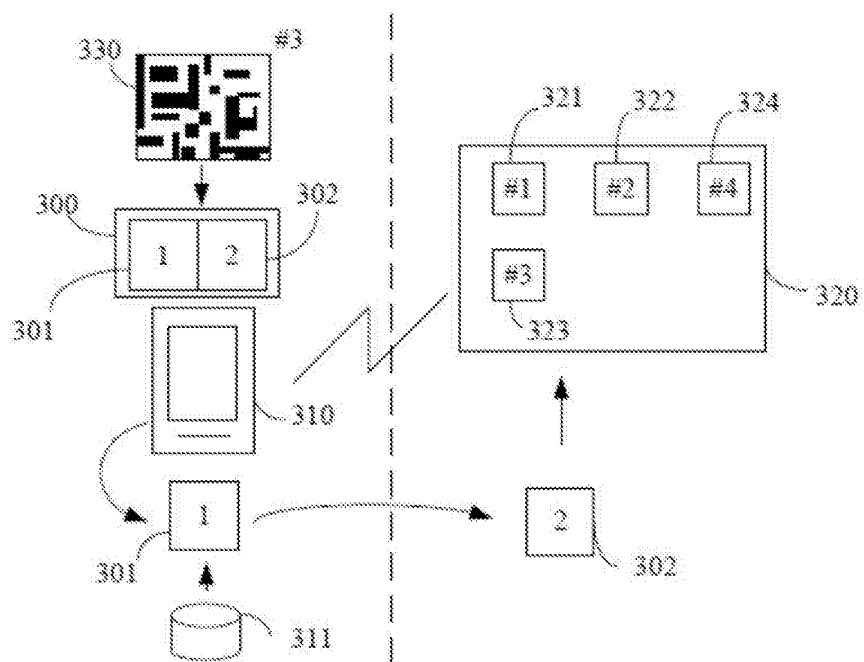
**Fig. 164****Fig. 165**

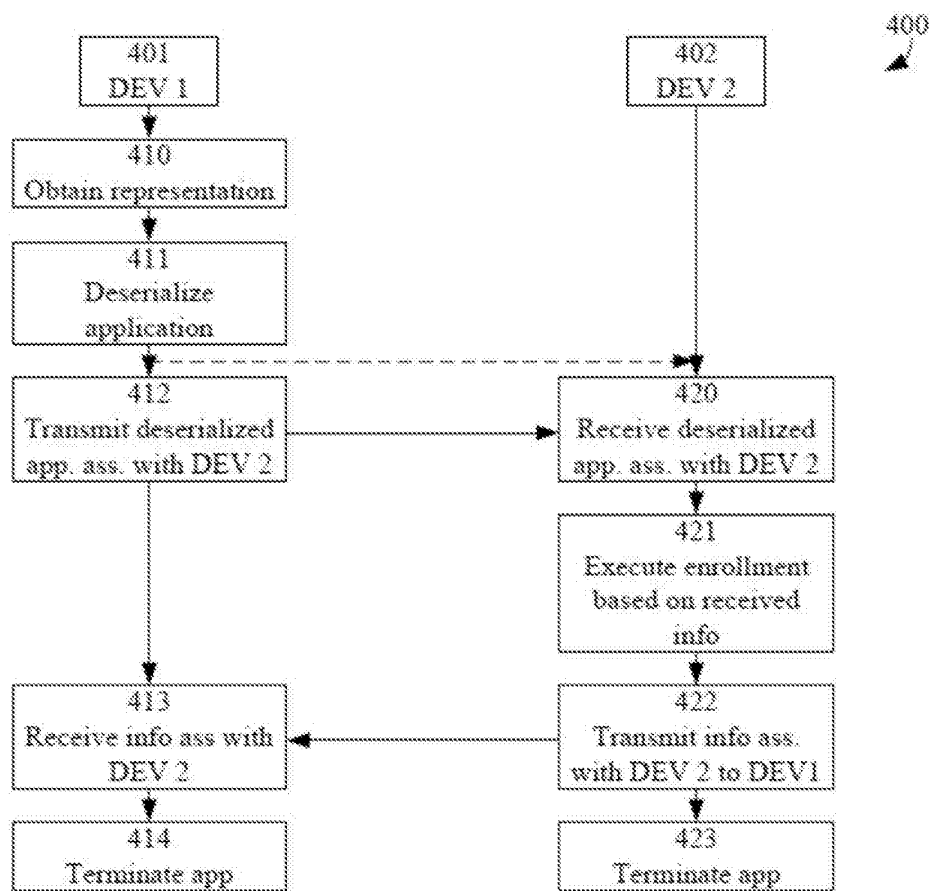
**Fig. 166**

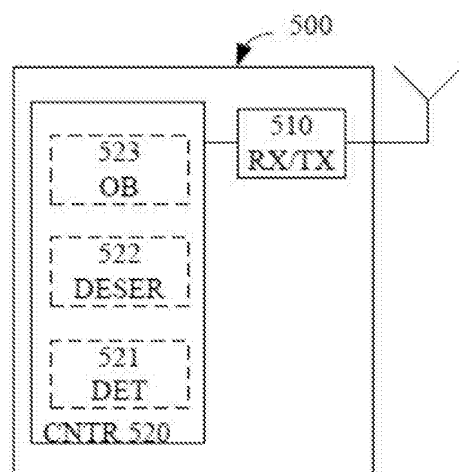
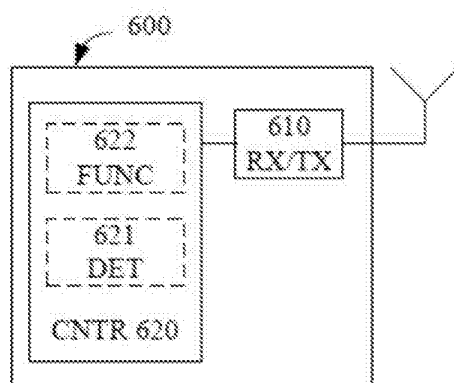
**Fig. 167**

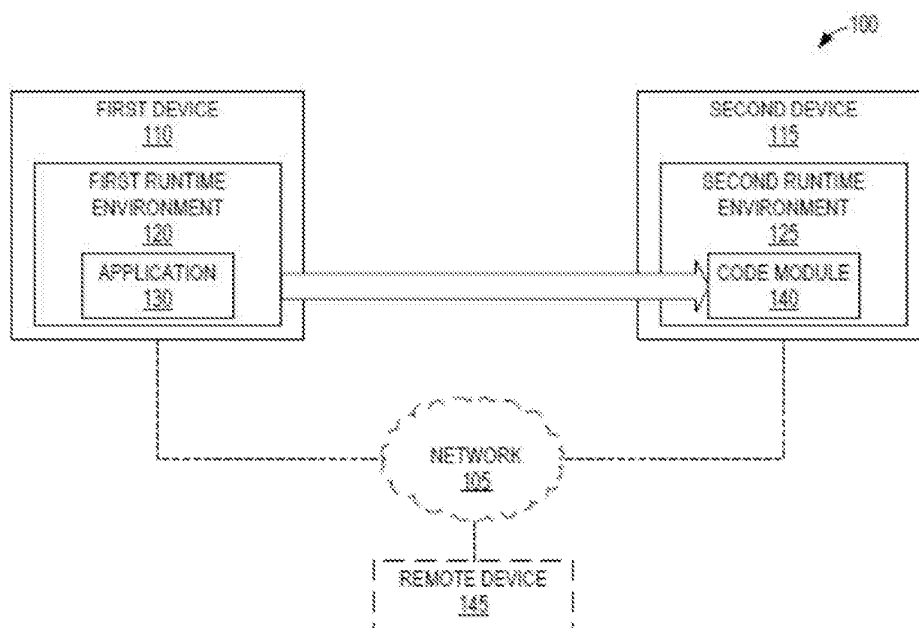
**Fig. 168**

**Fig. 169**

**Fig. 170**

**Fig. 171**

**Fig. 172****Fig. 173**

**Fig. 174**

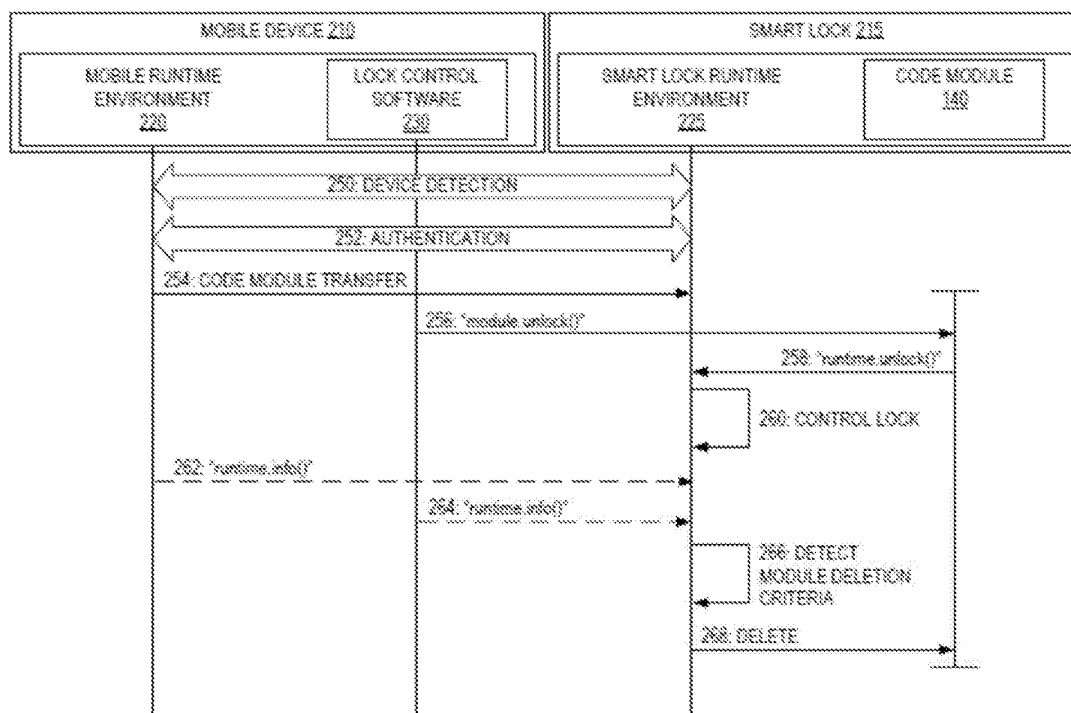


Fig. 175

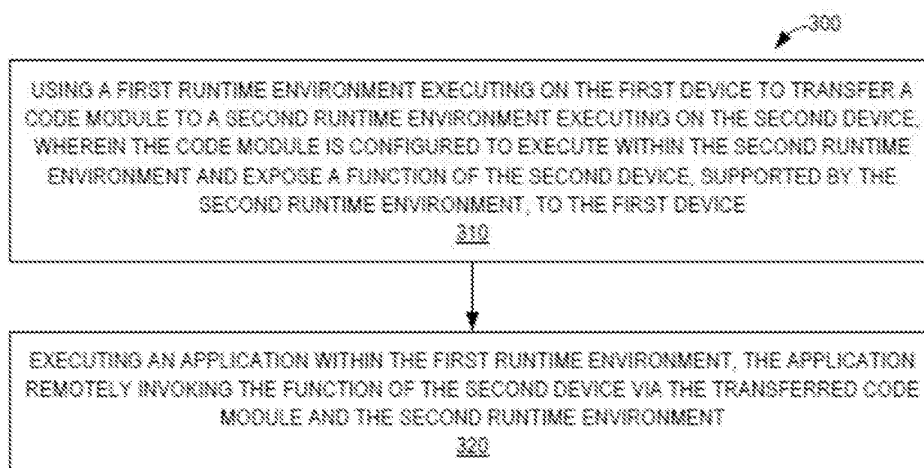
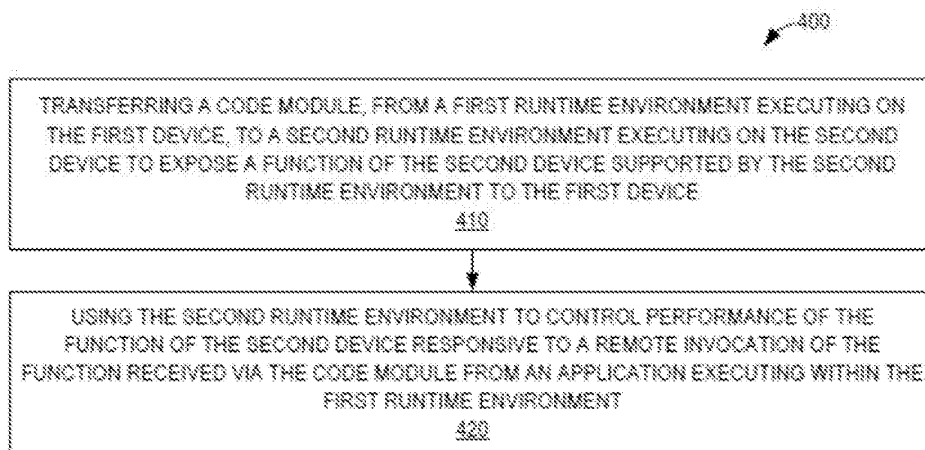
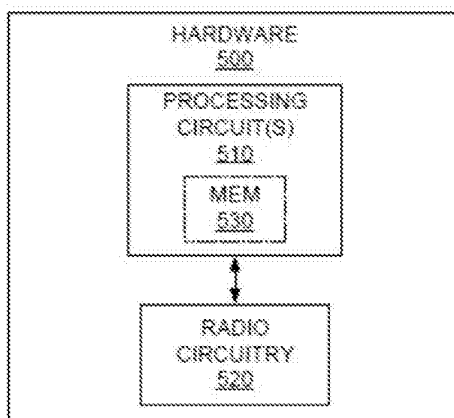
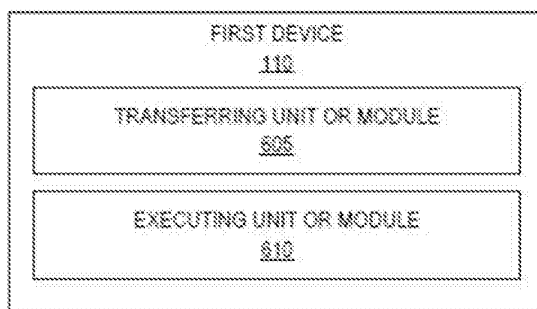
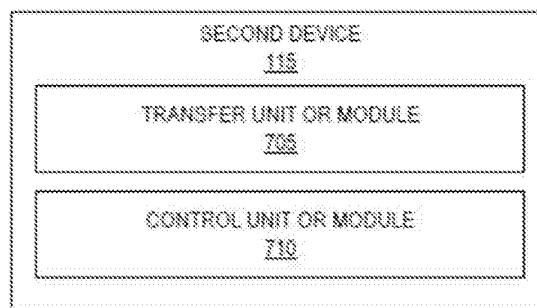


Fig. 176

**Fig. 177****Fig. 178**

**Fig. 179****Fig. 180**

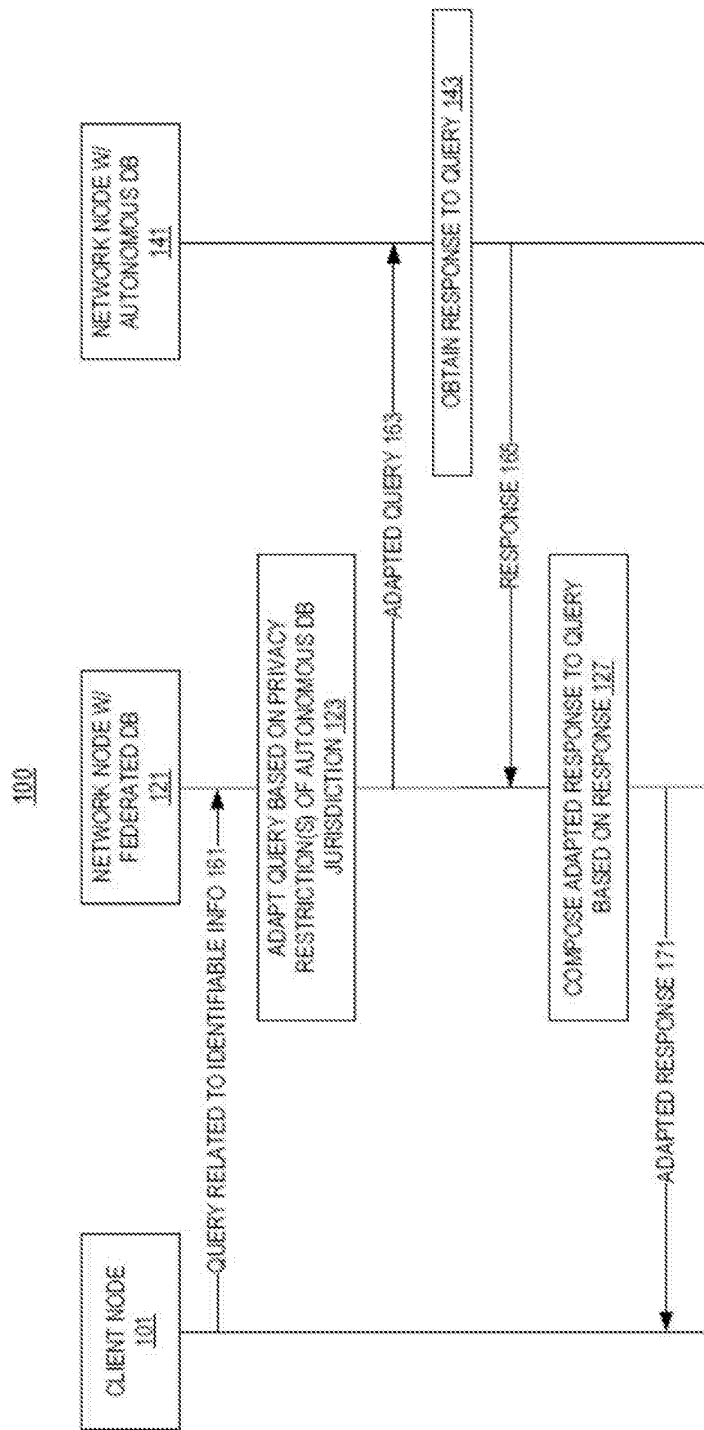


Fig. 181

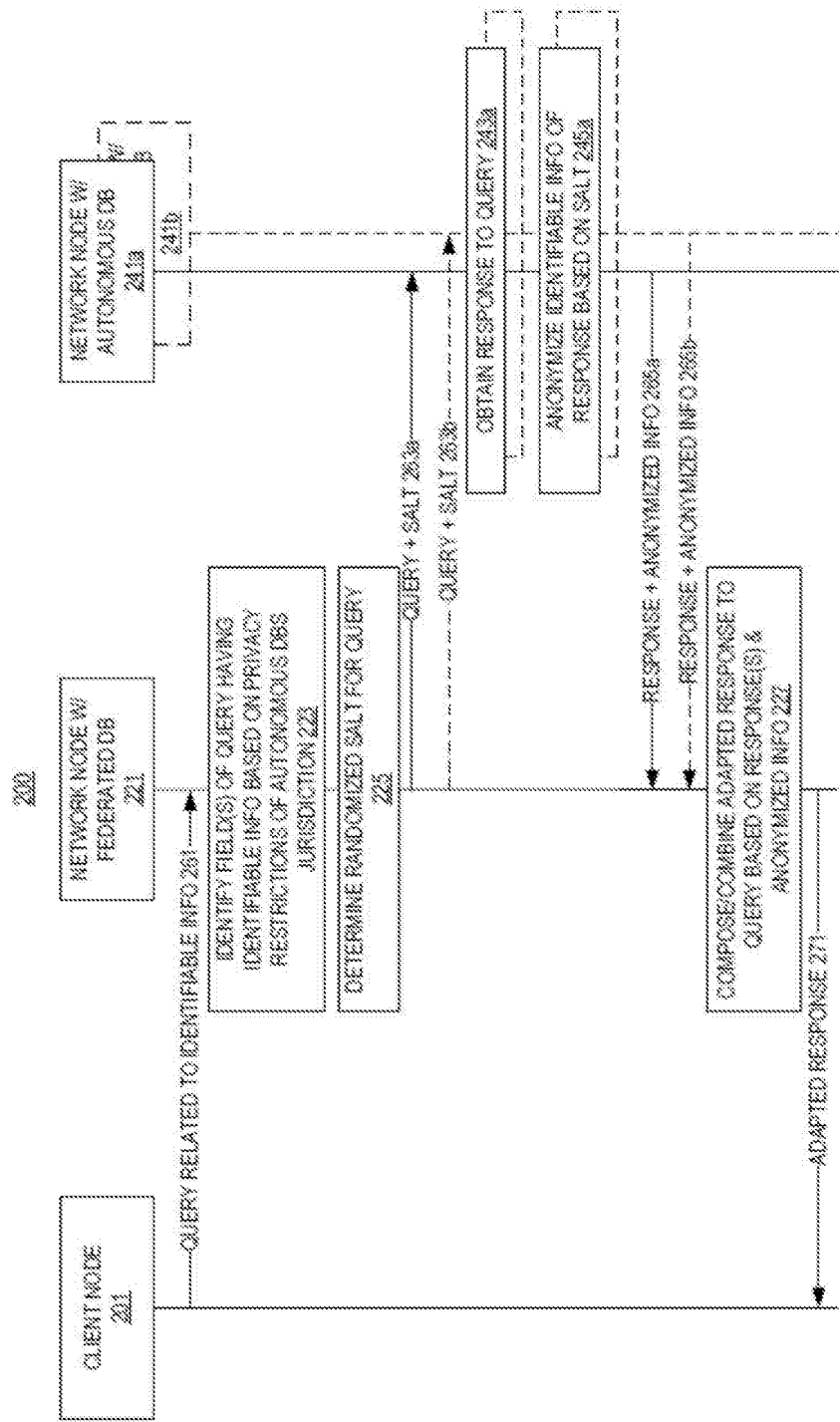
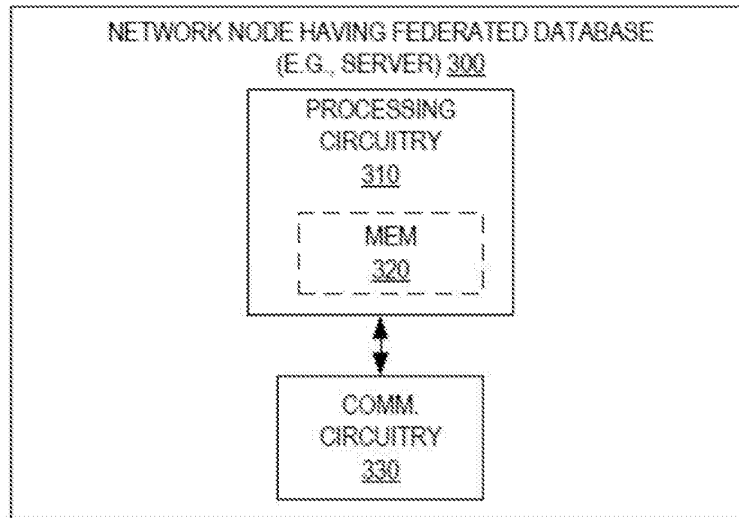


Fig. 182

**Fig. 183**

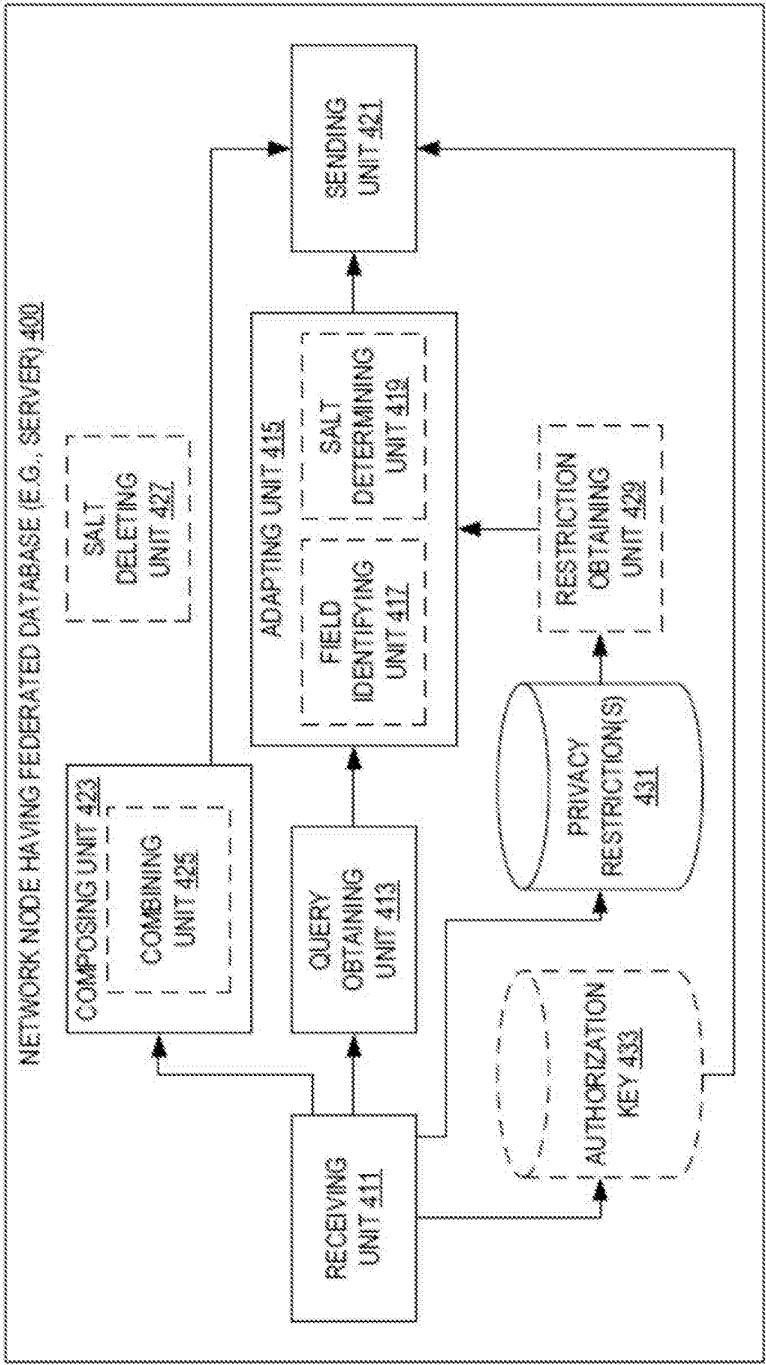
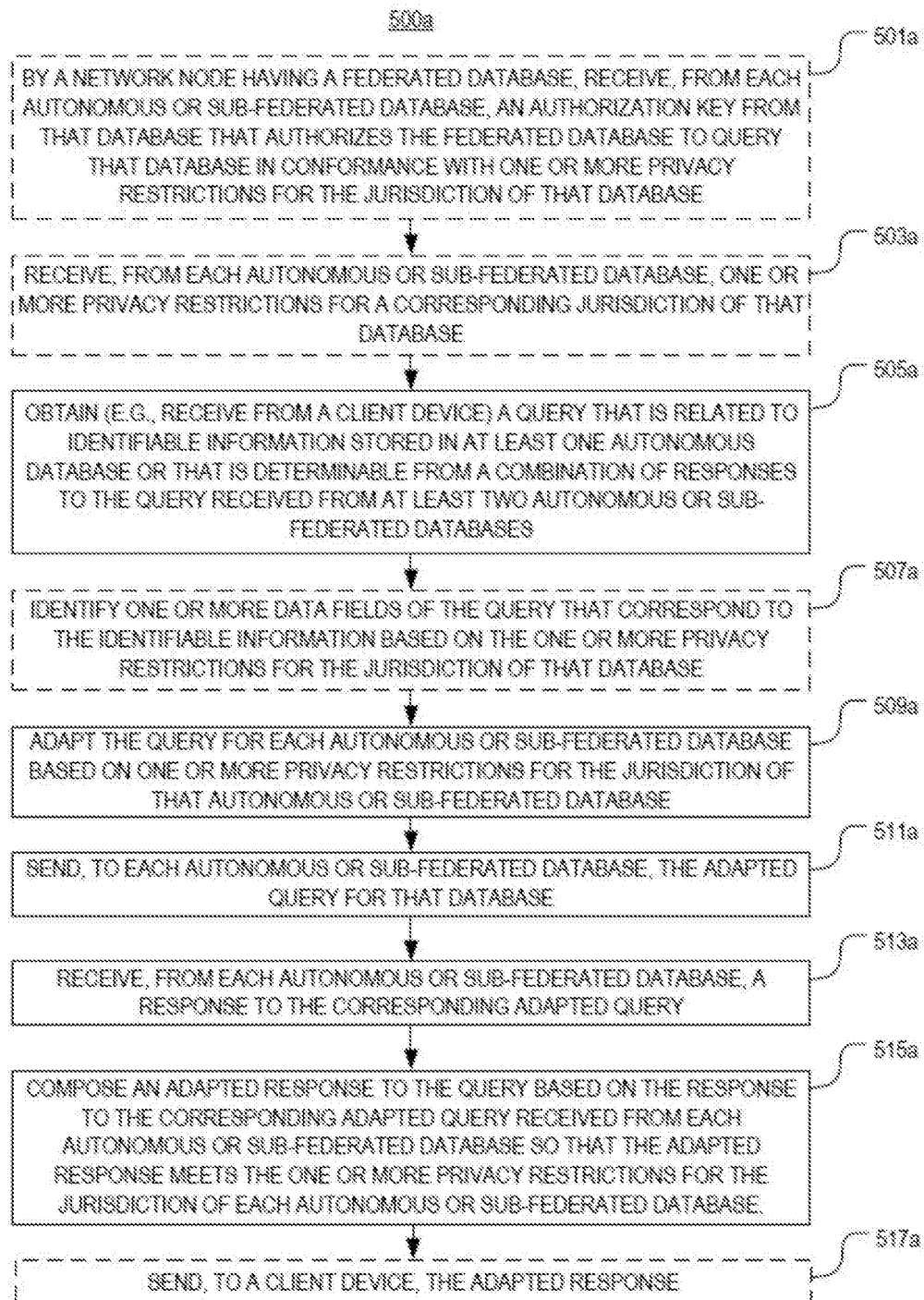
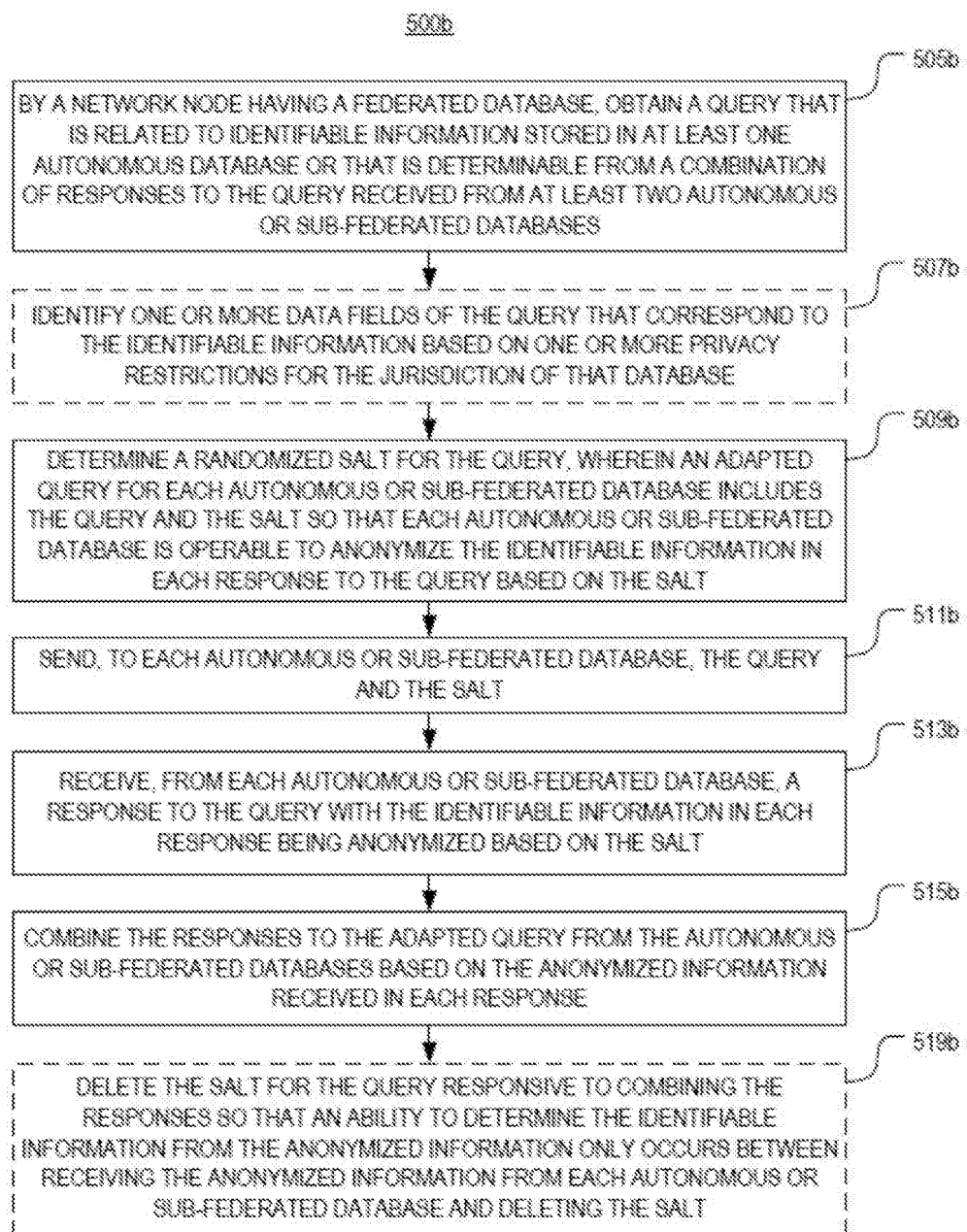
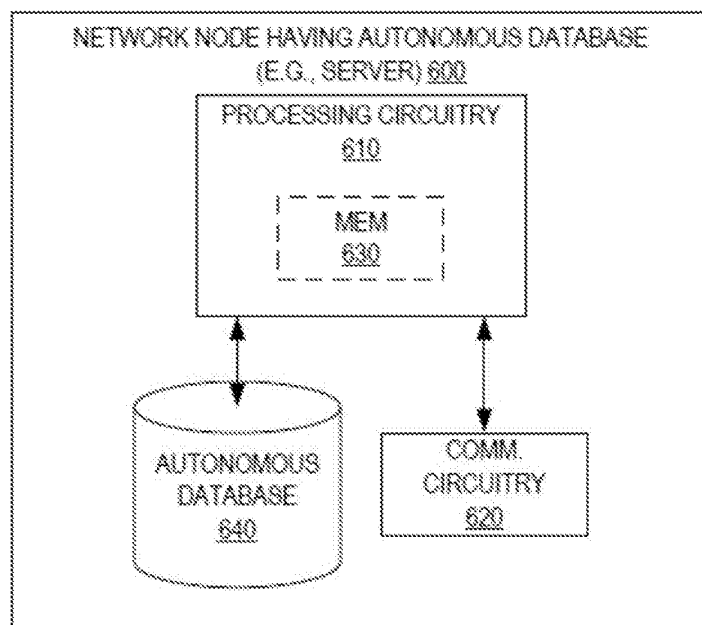


Fig. 184

**Fig. 185**

**Fig. 186**

**Fig. 187**

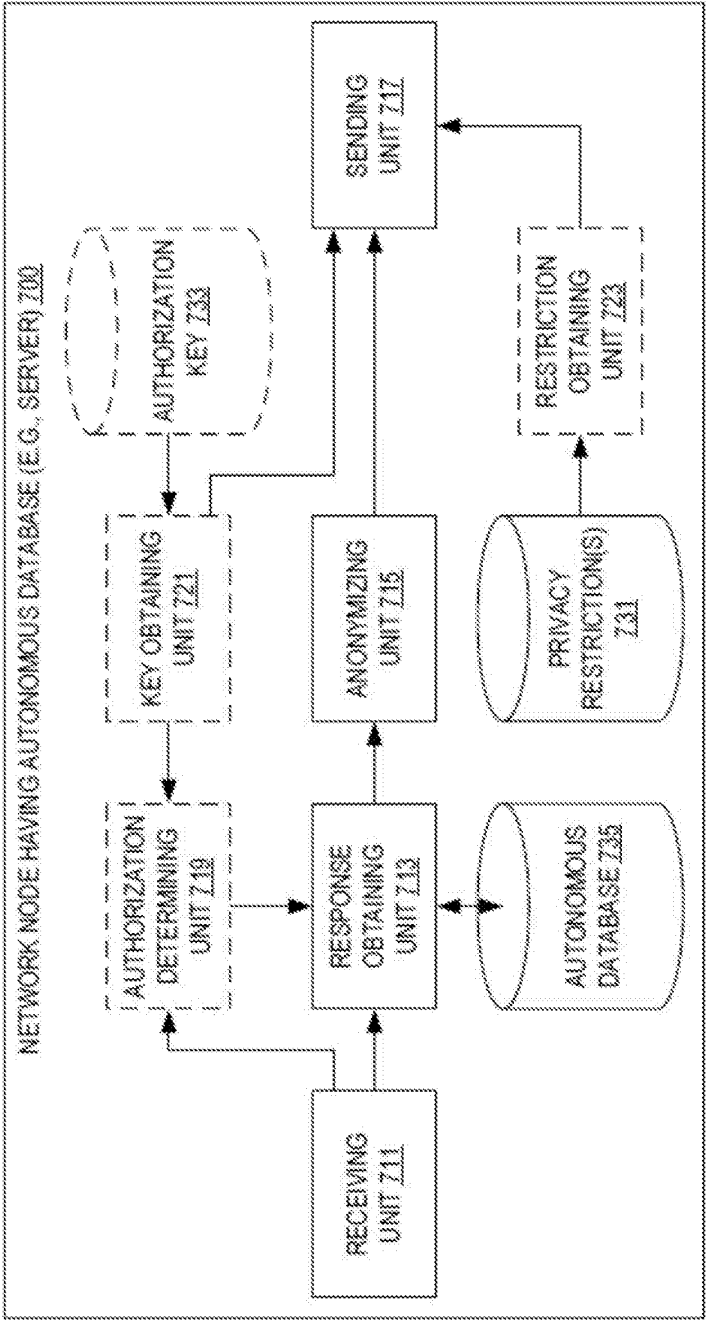
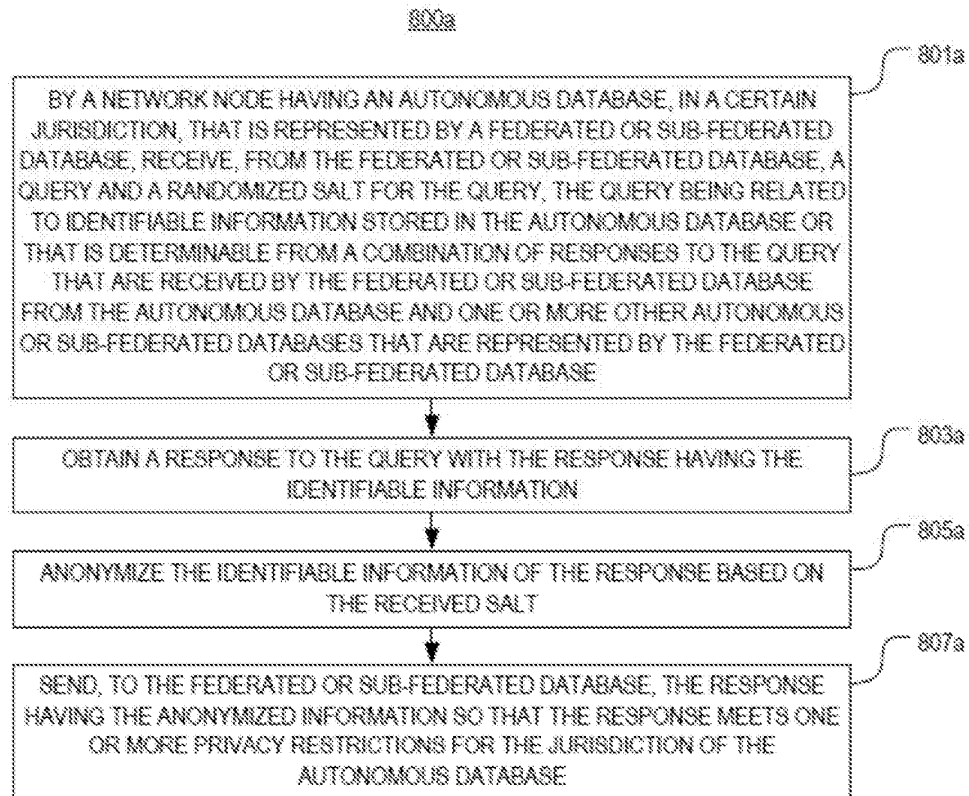
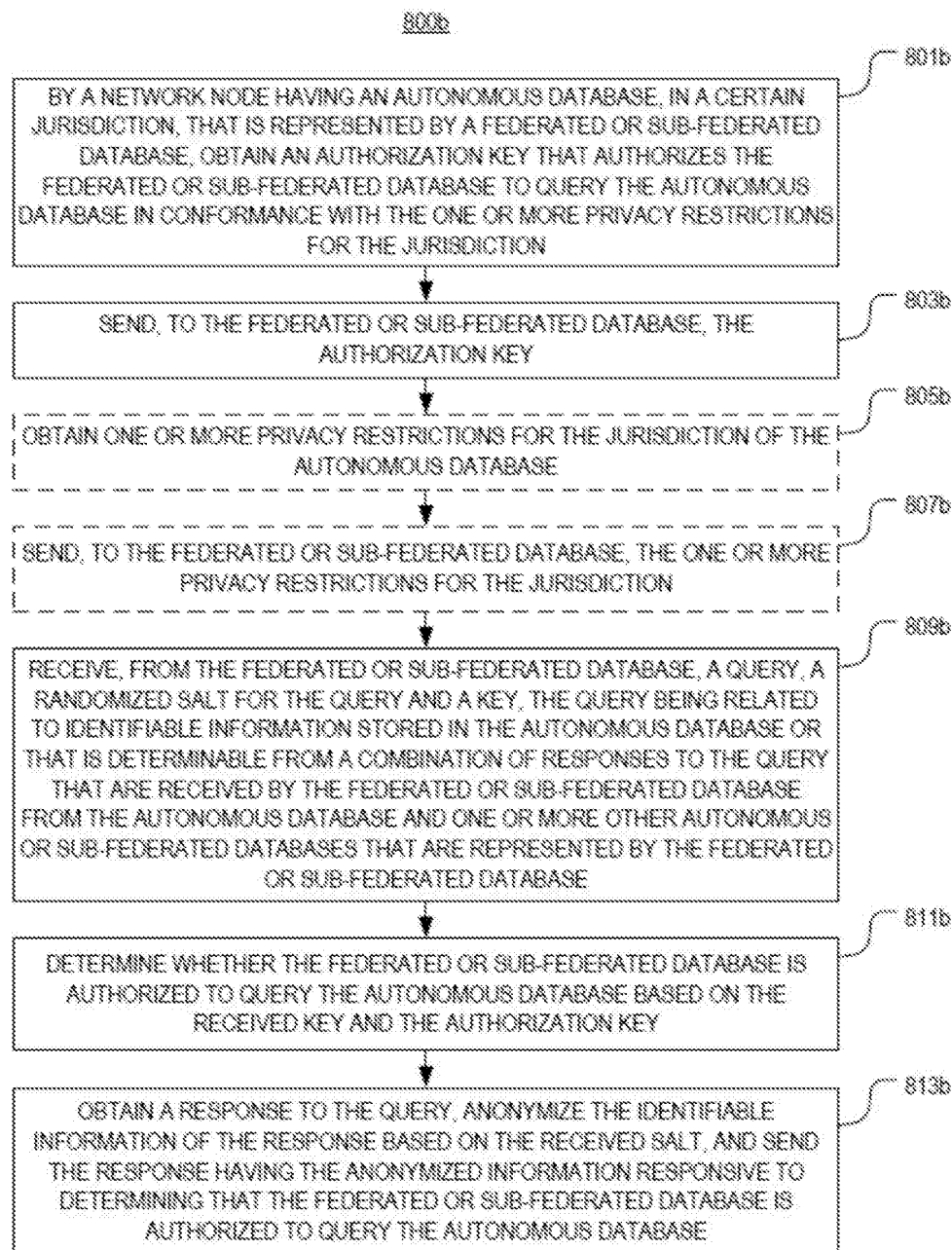


Fig. 188

**Fig. 189**

**Fig. 190**

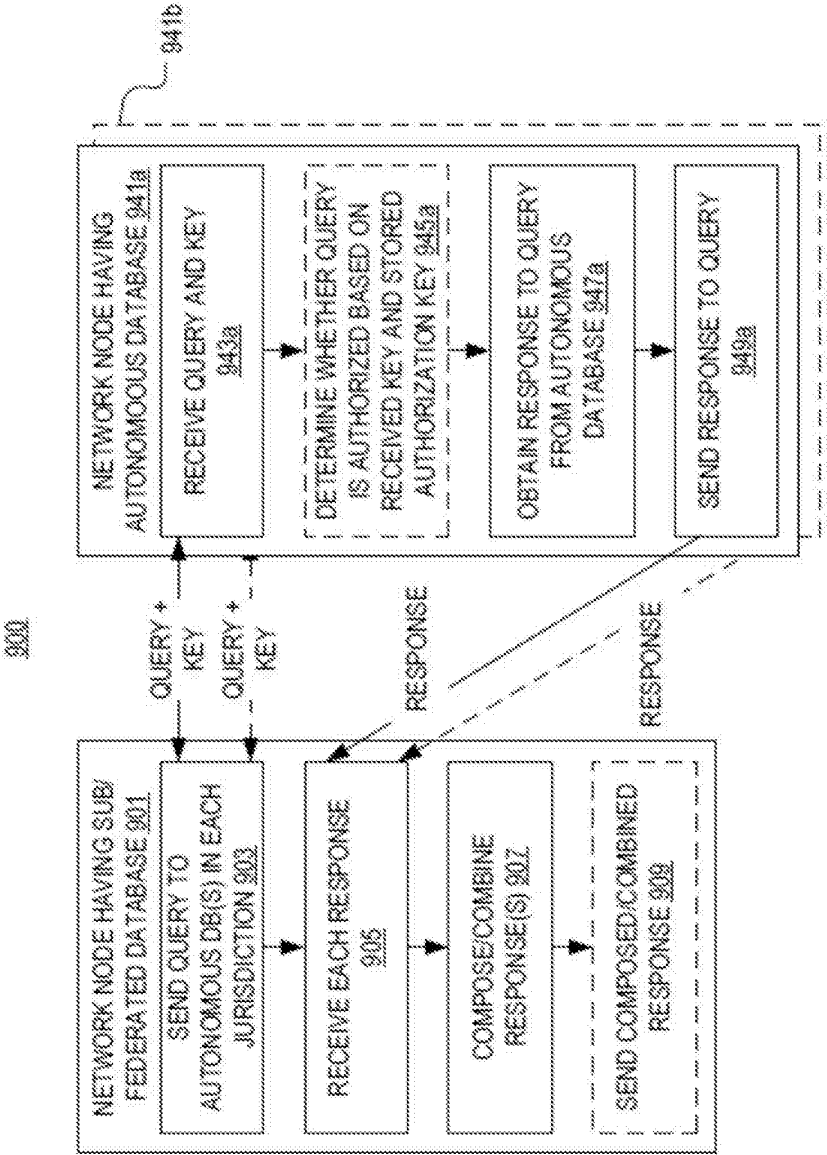


Fig. 191

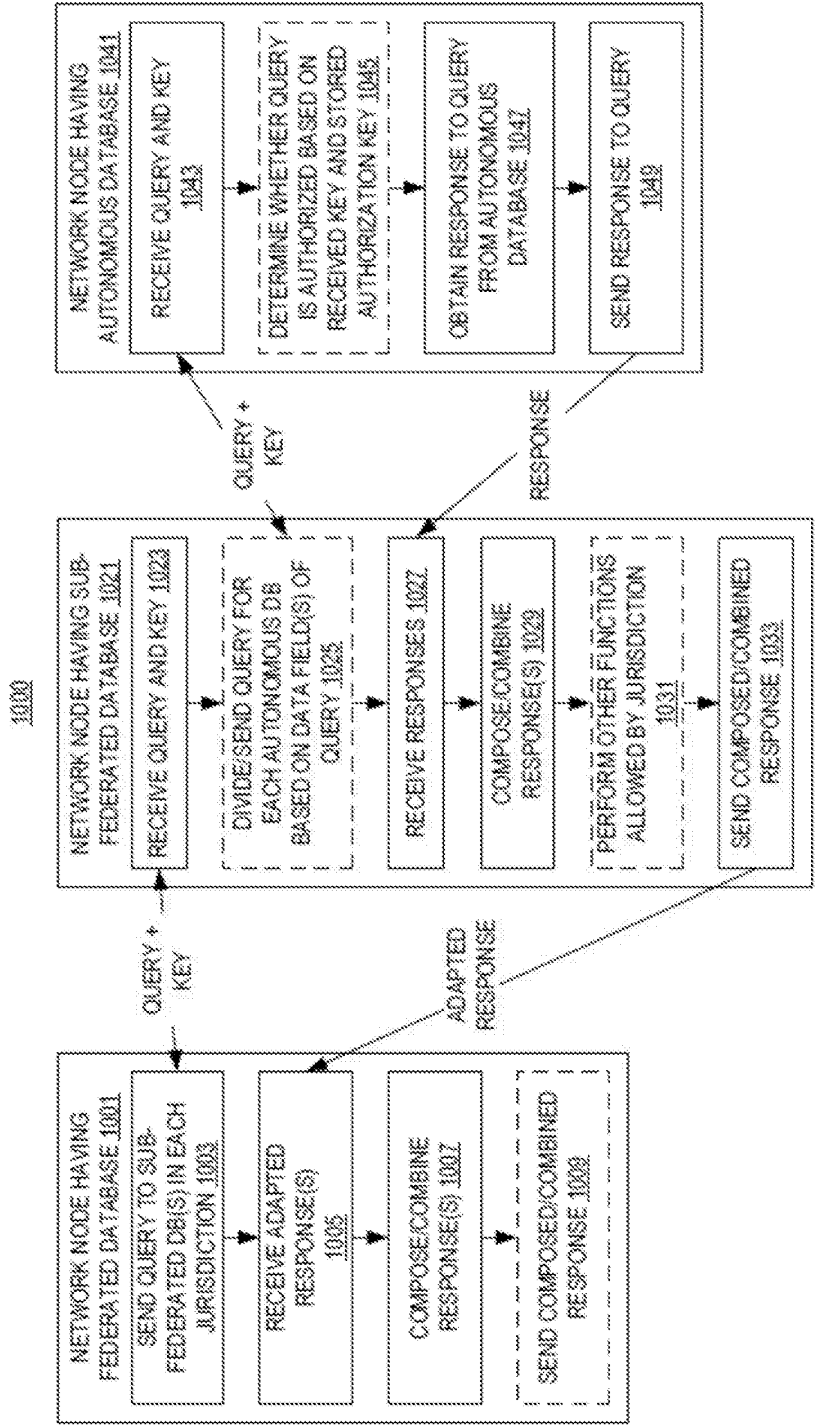


Fig. 192

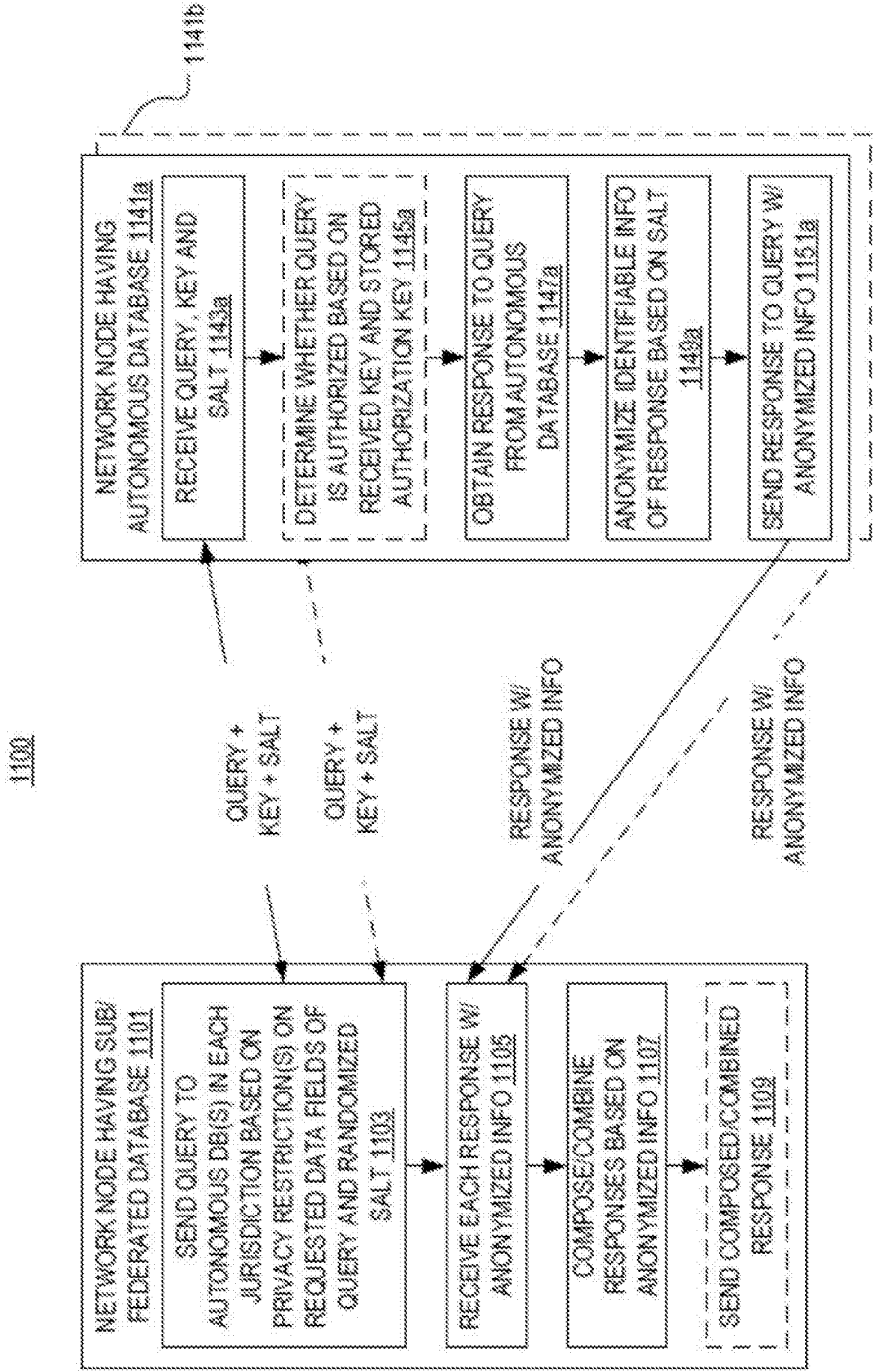


Fig. 193

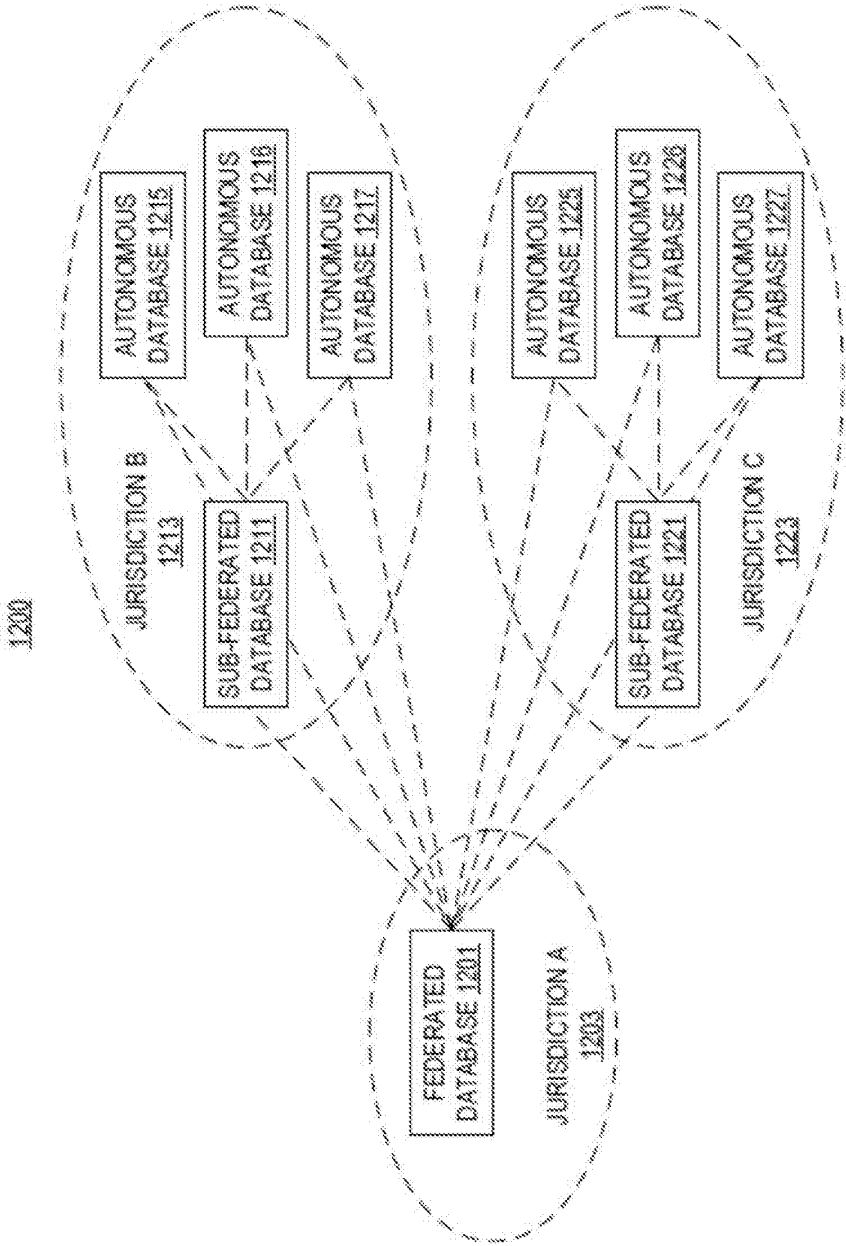


Fig. 194

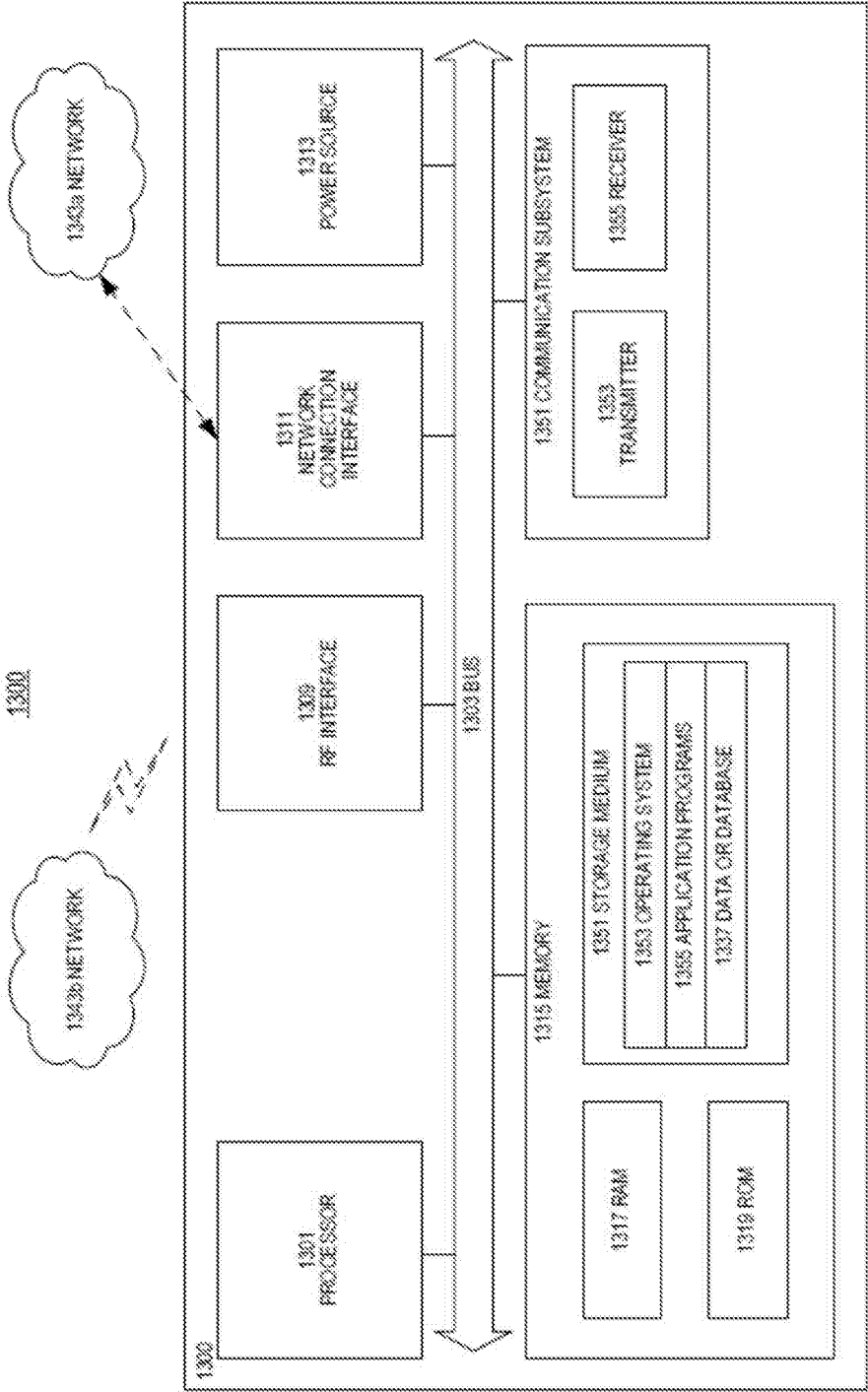


Fig. 195

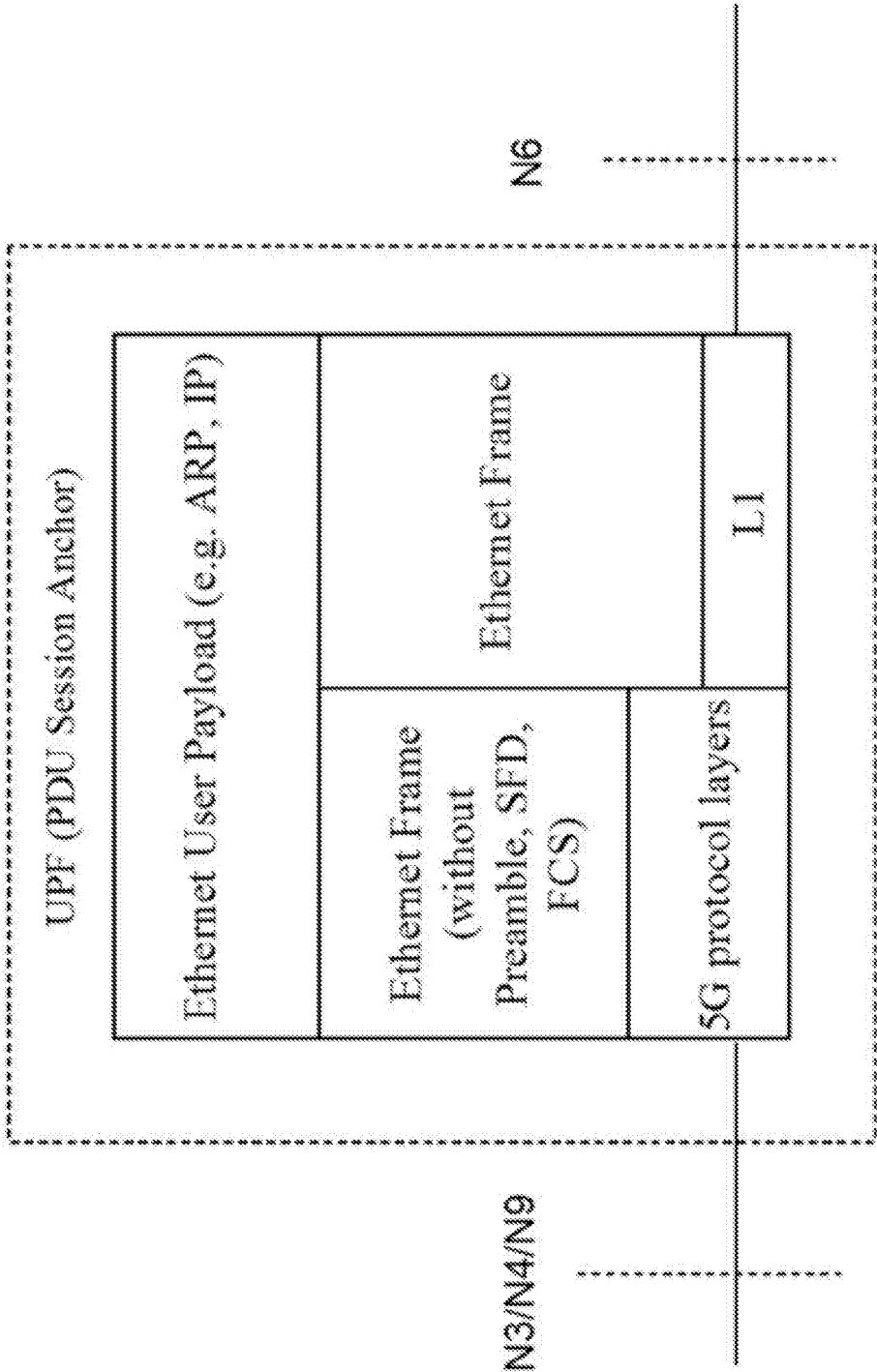


Fig. 196

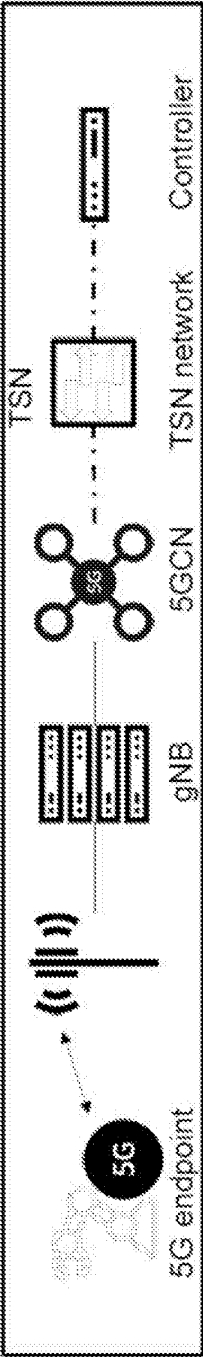


Fig. 197

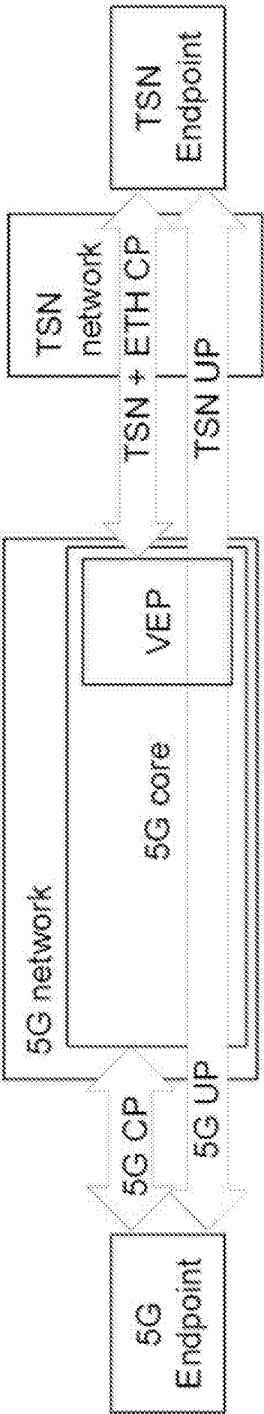


Fig. 198

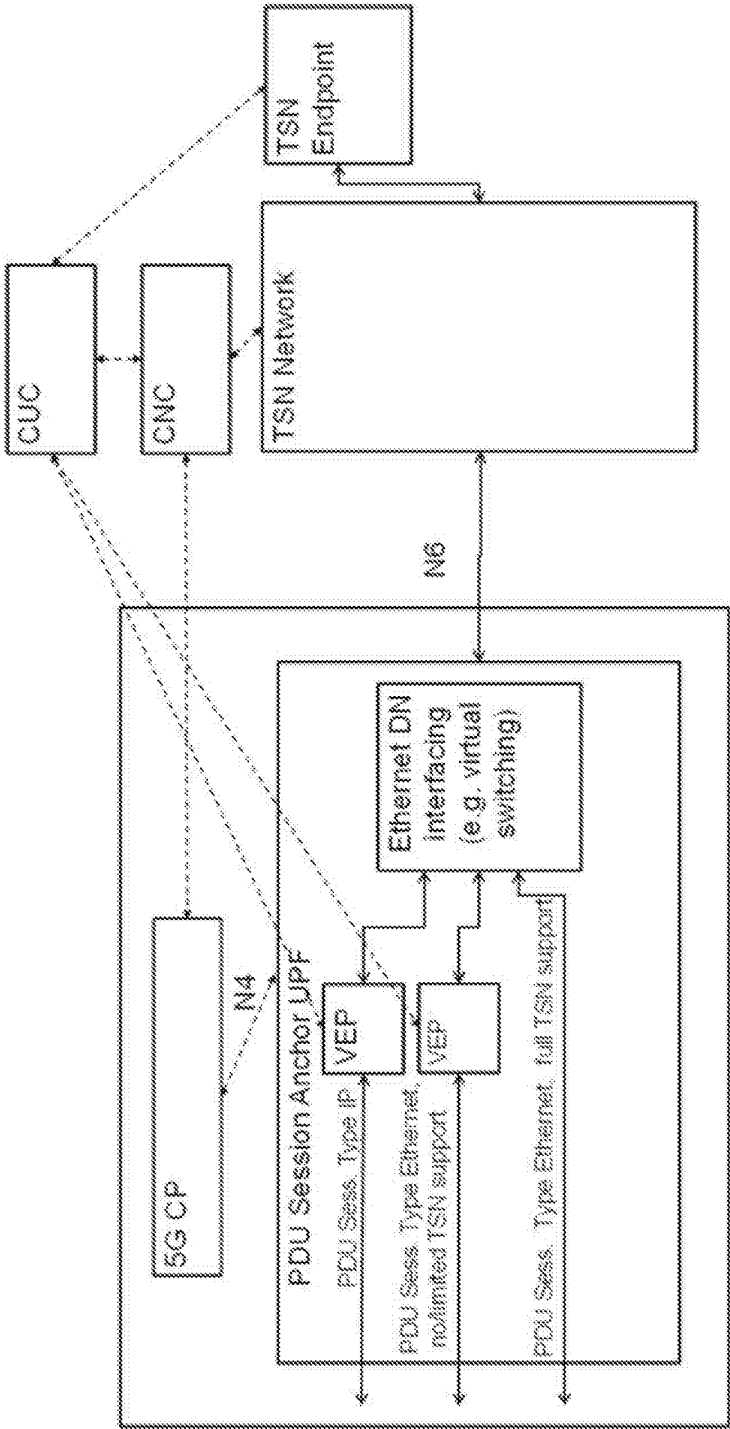


Fig. 199

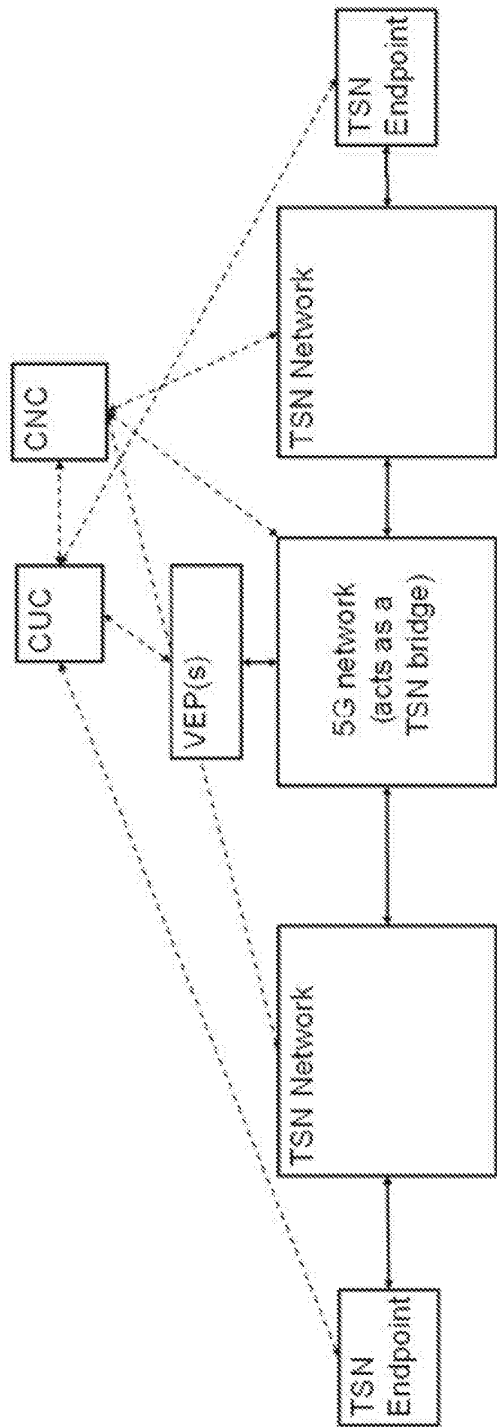
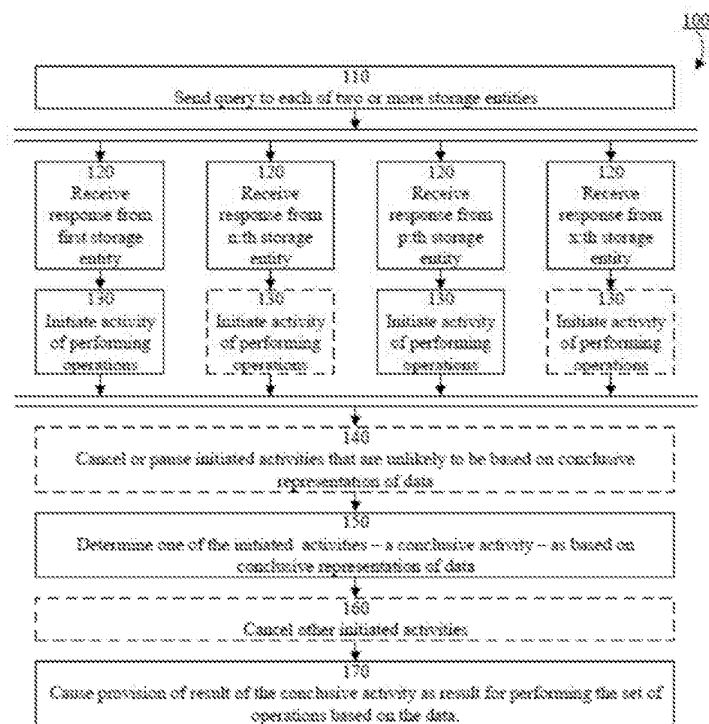
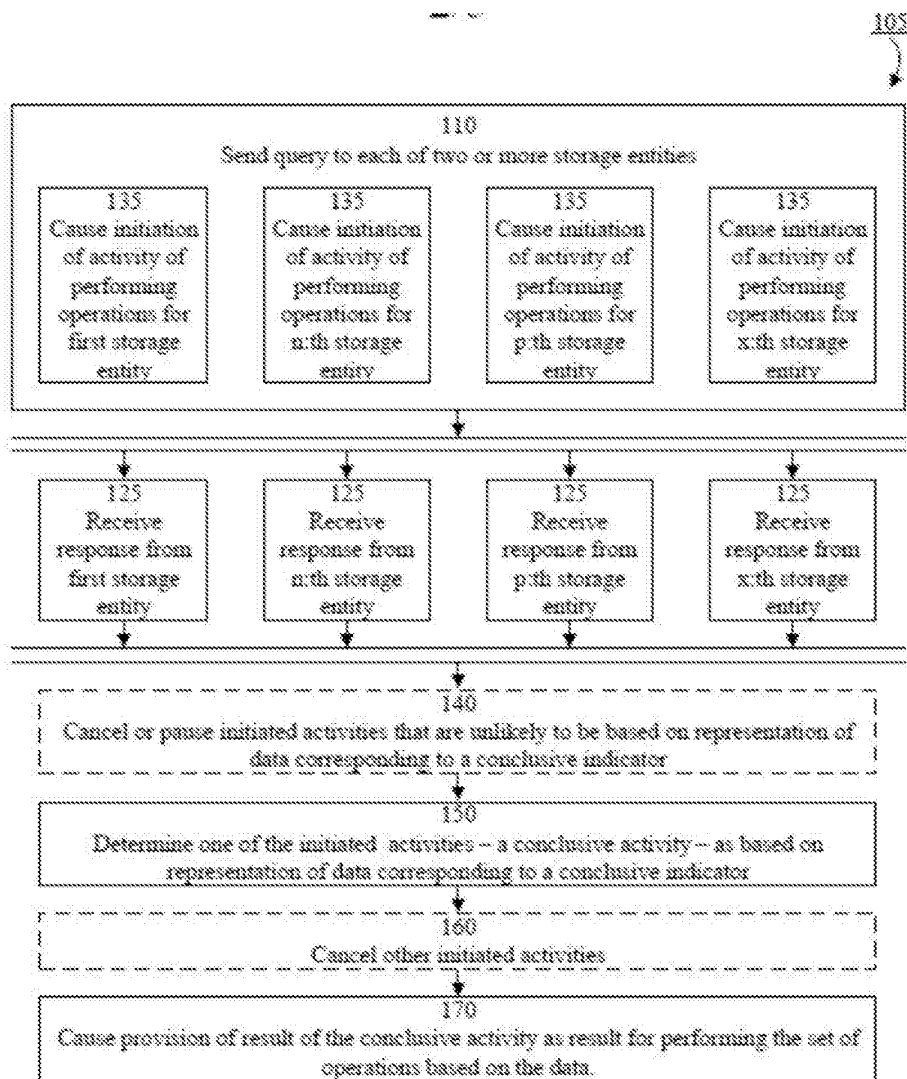
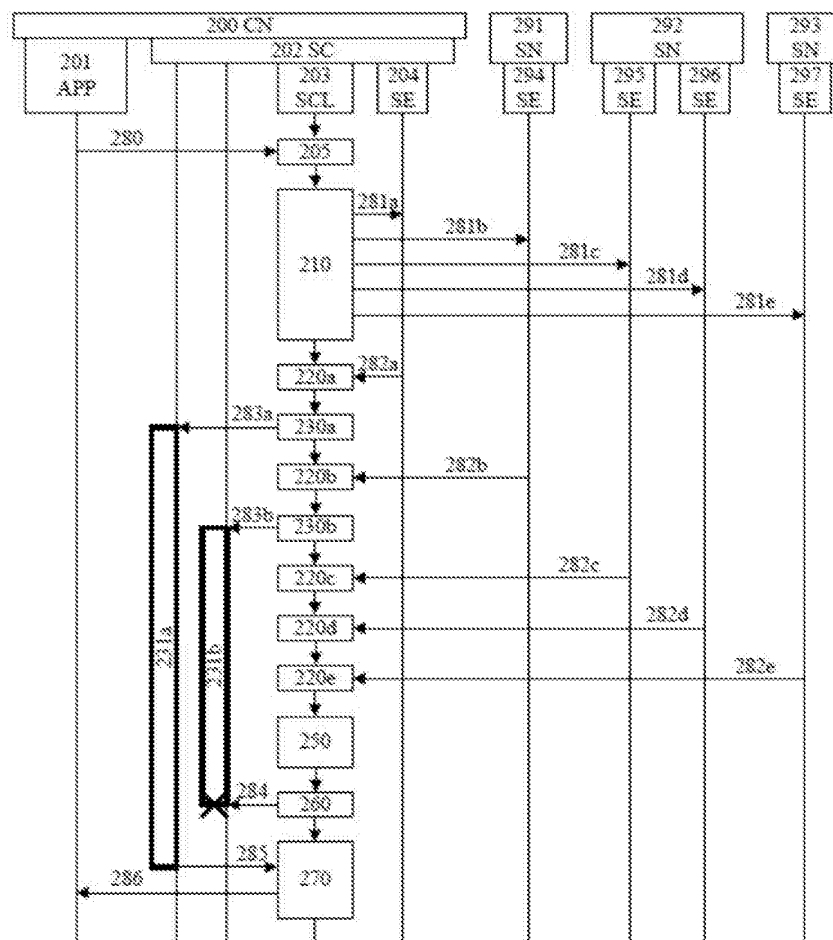


Fig. 200

**Fig. 201**

**Fig. 202**

**Fig. 203**

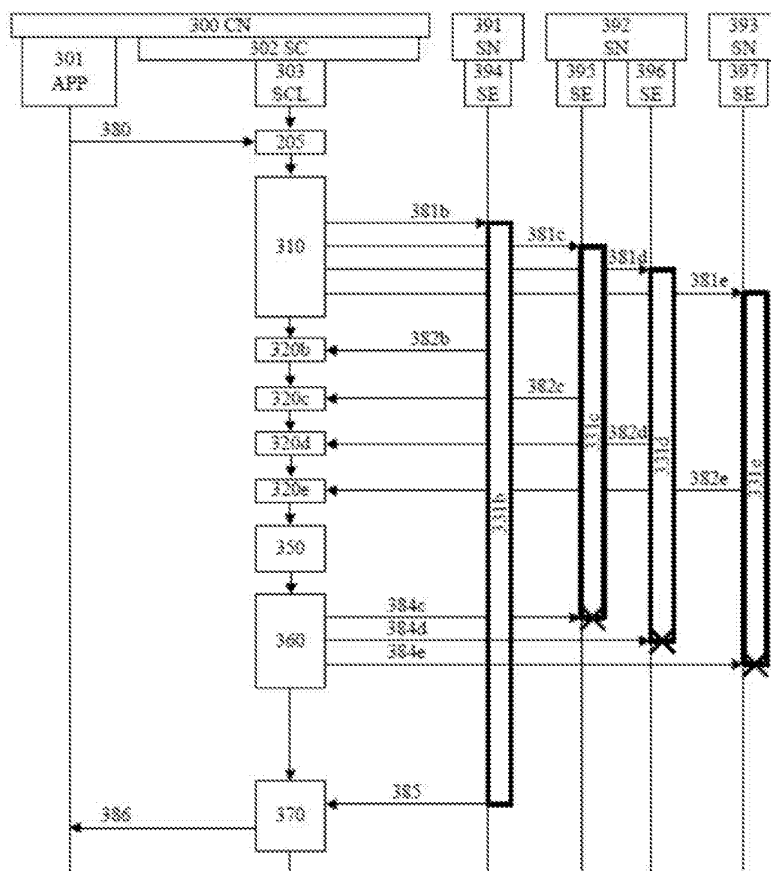


Fig. 204

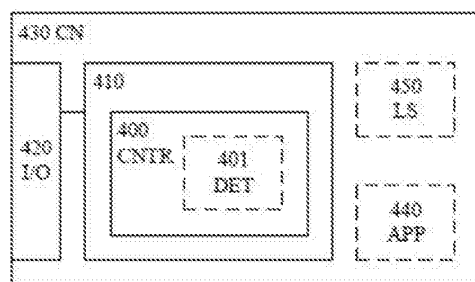


Fig. 205

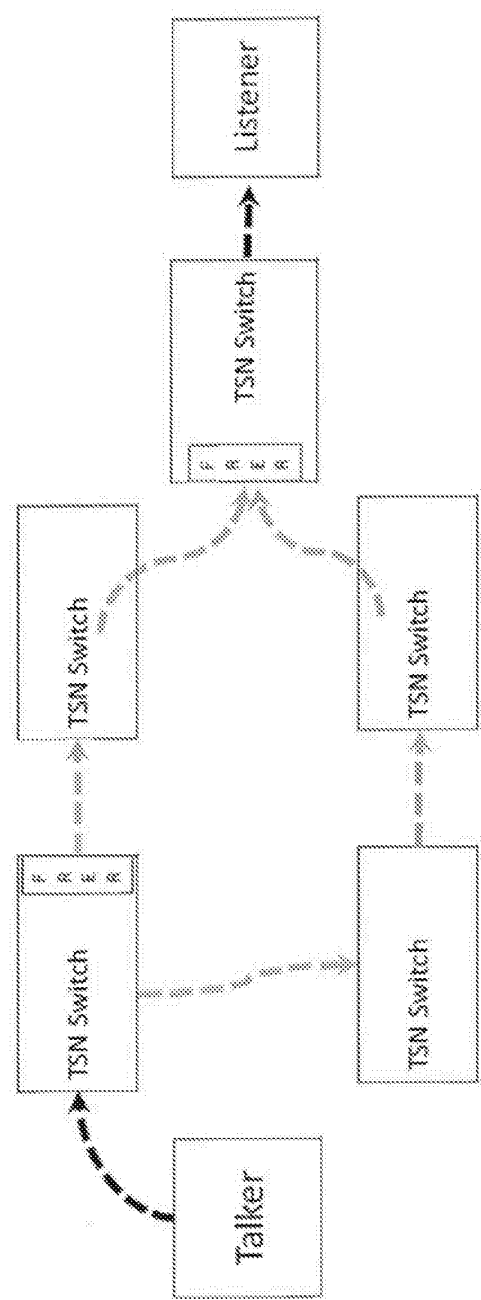


Fig. 206

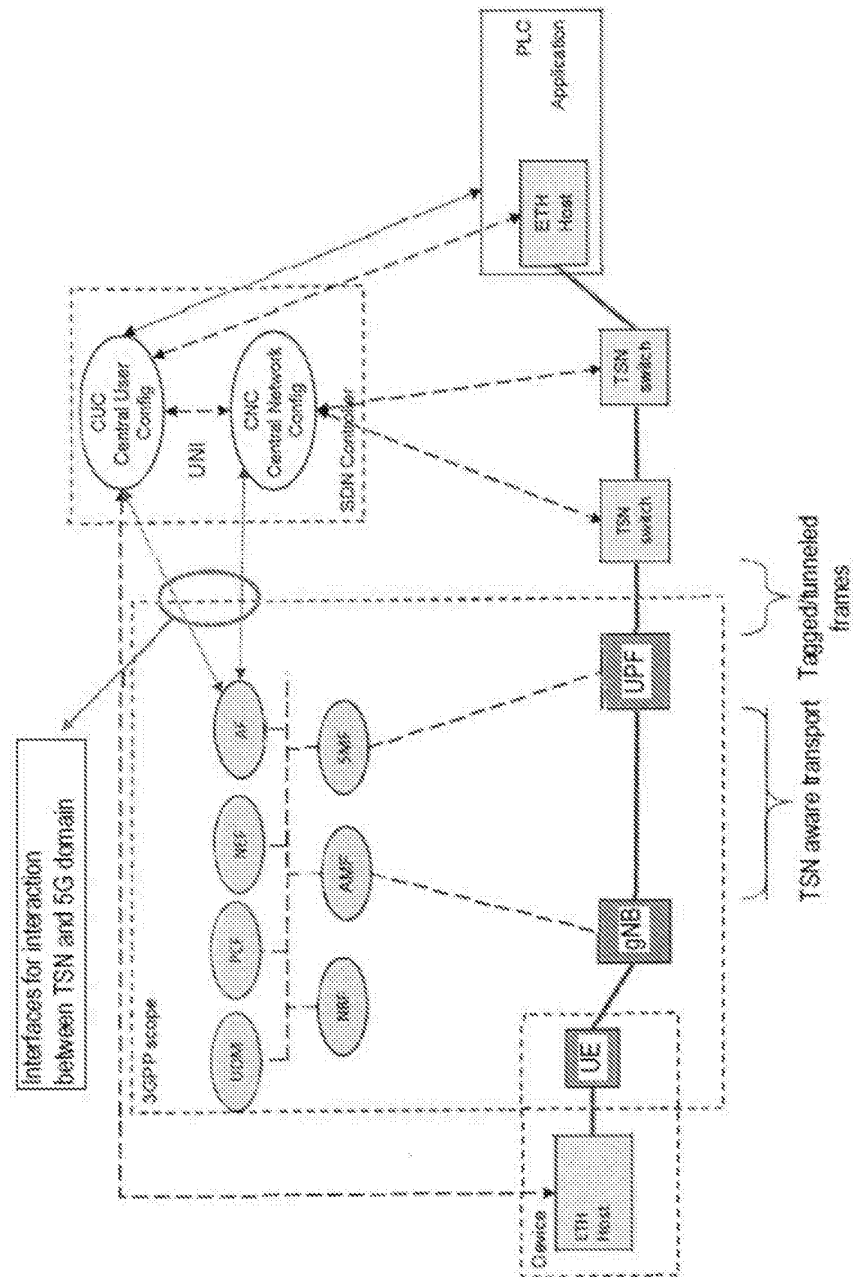


Fig. 207

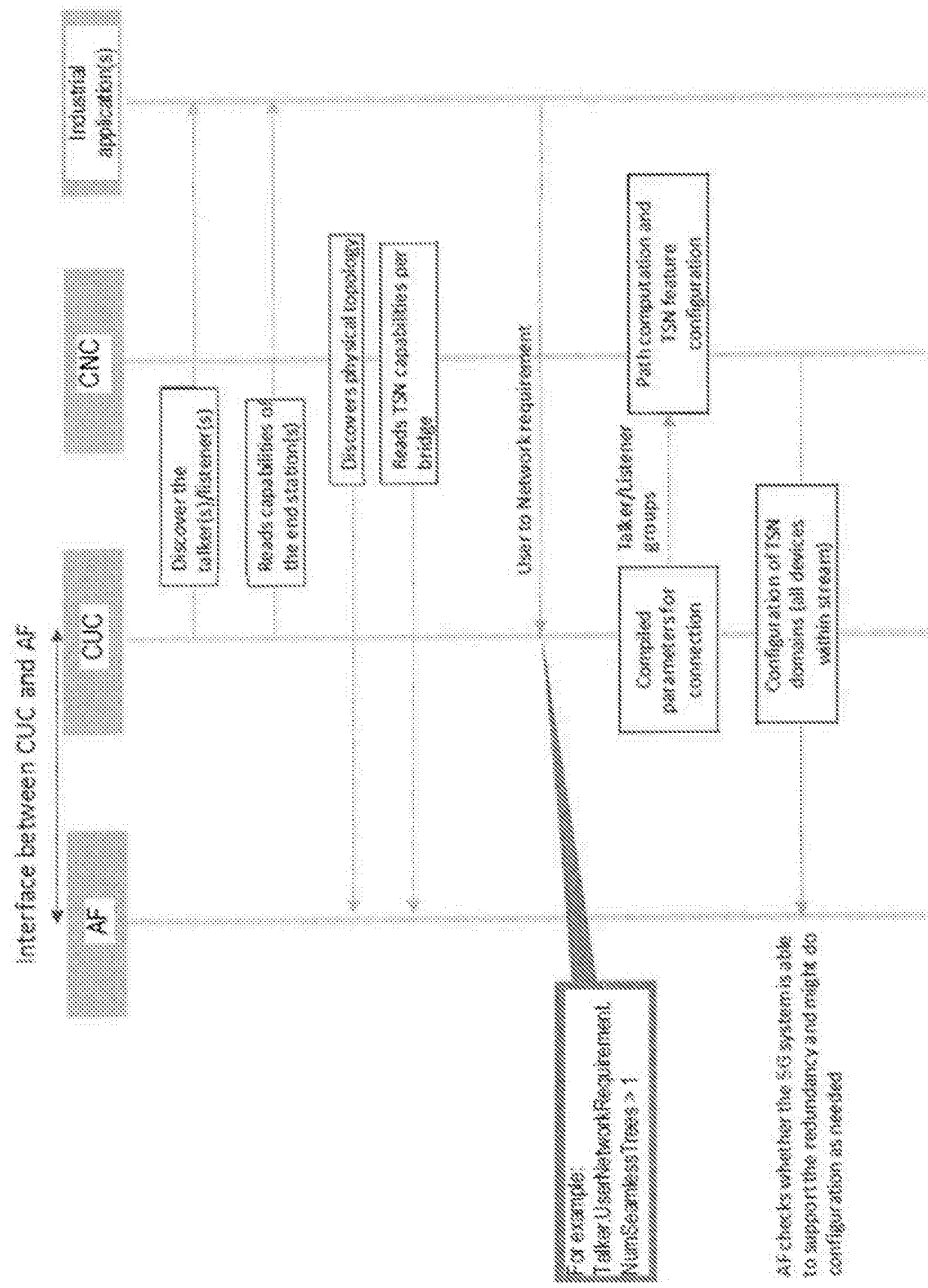


Fig. 208

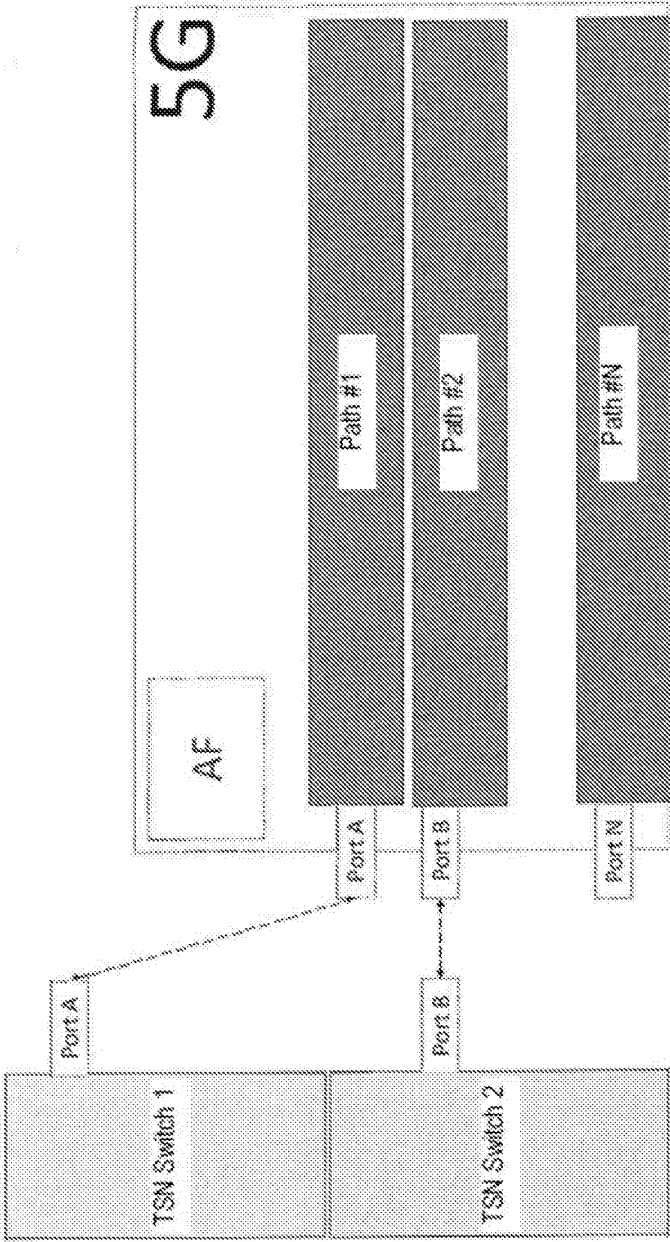


Fig. 209

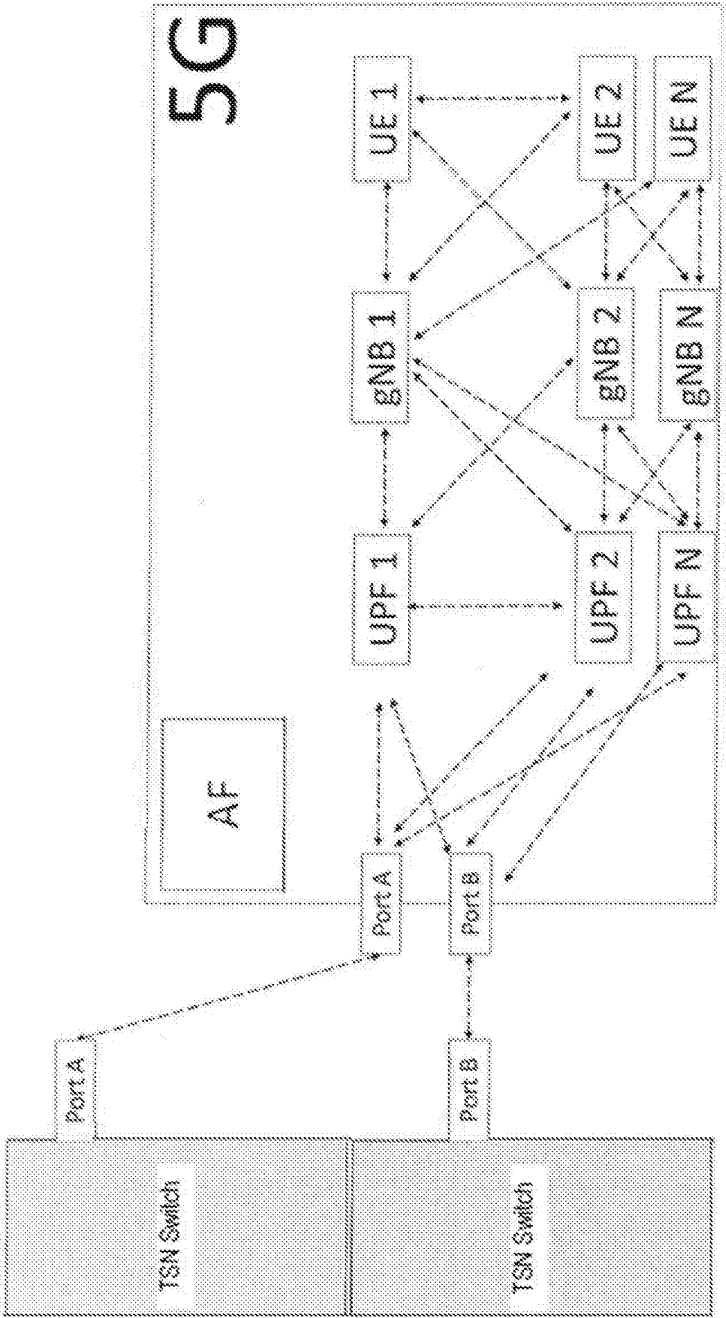
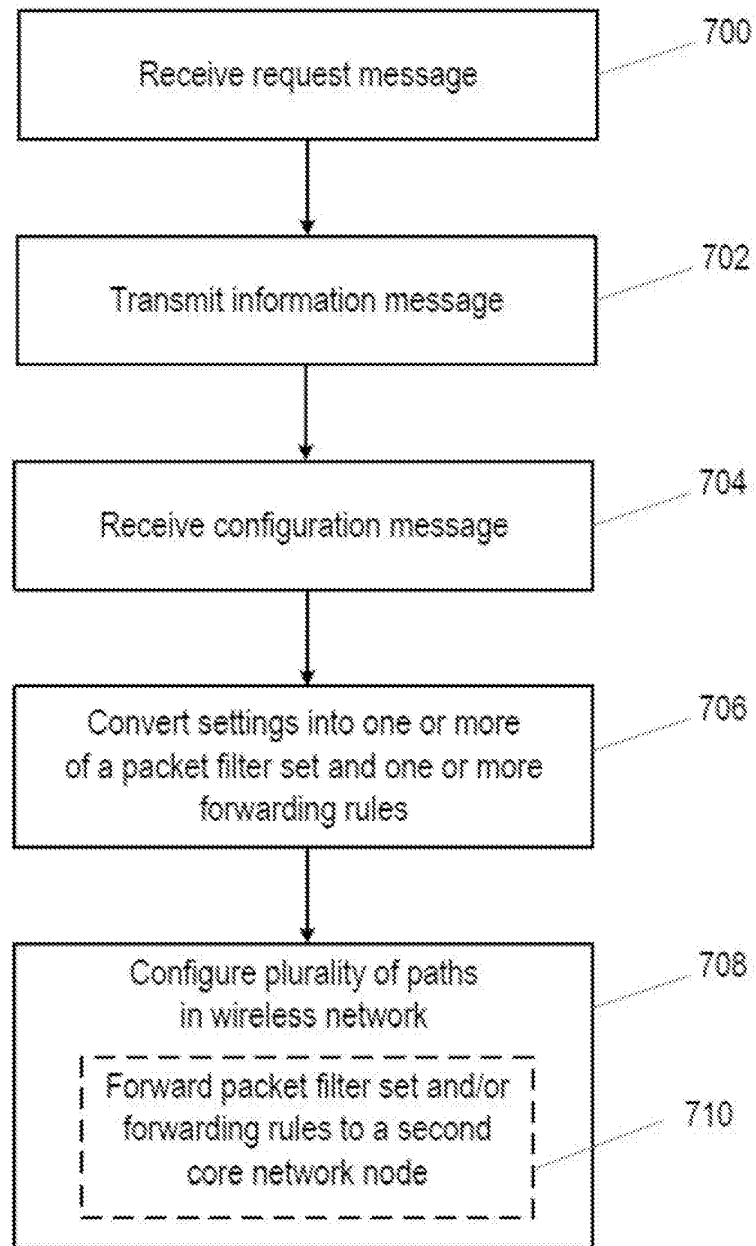
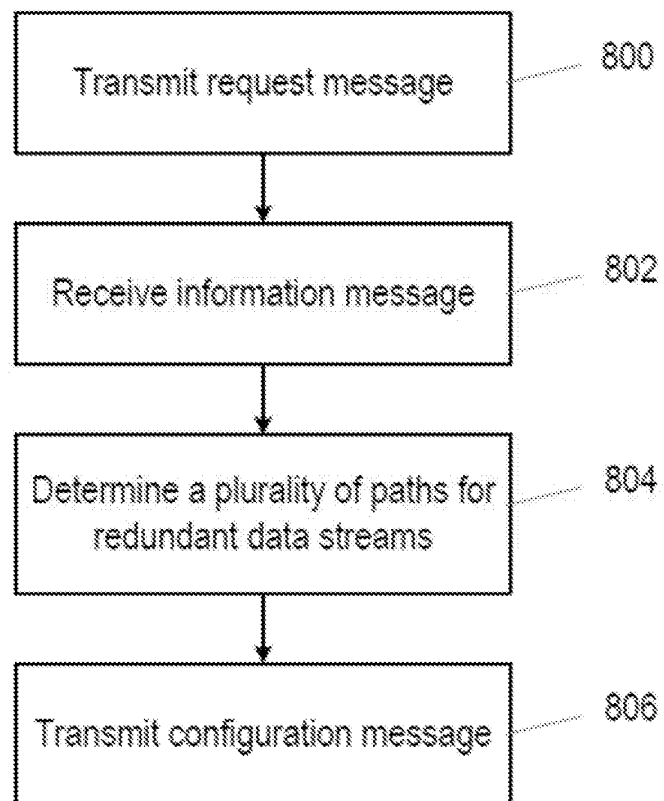


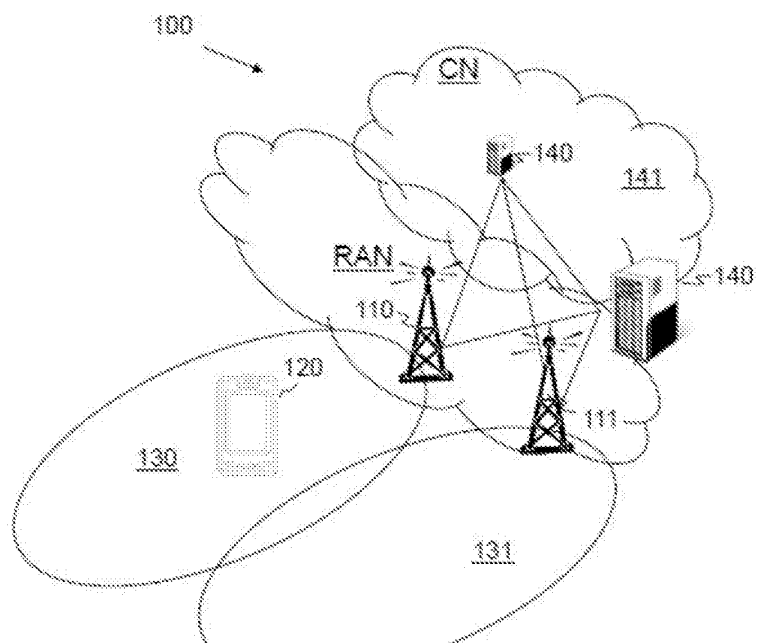
Fig. 210

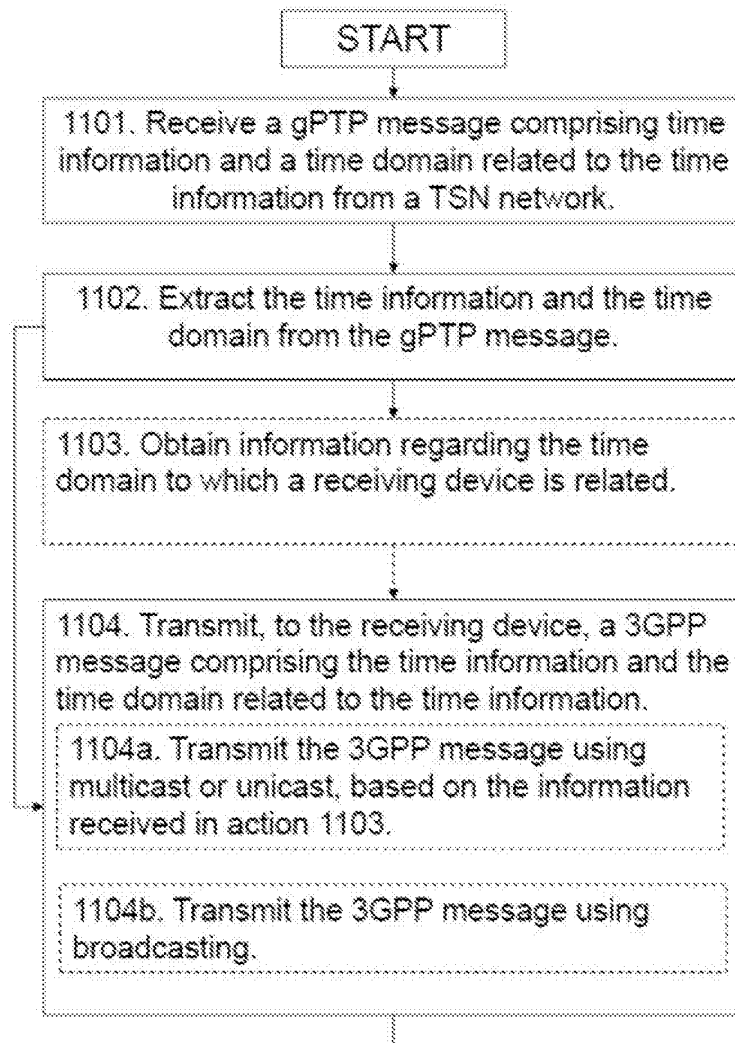
**Fig. 212**

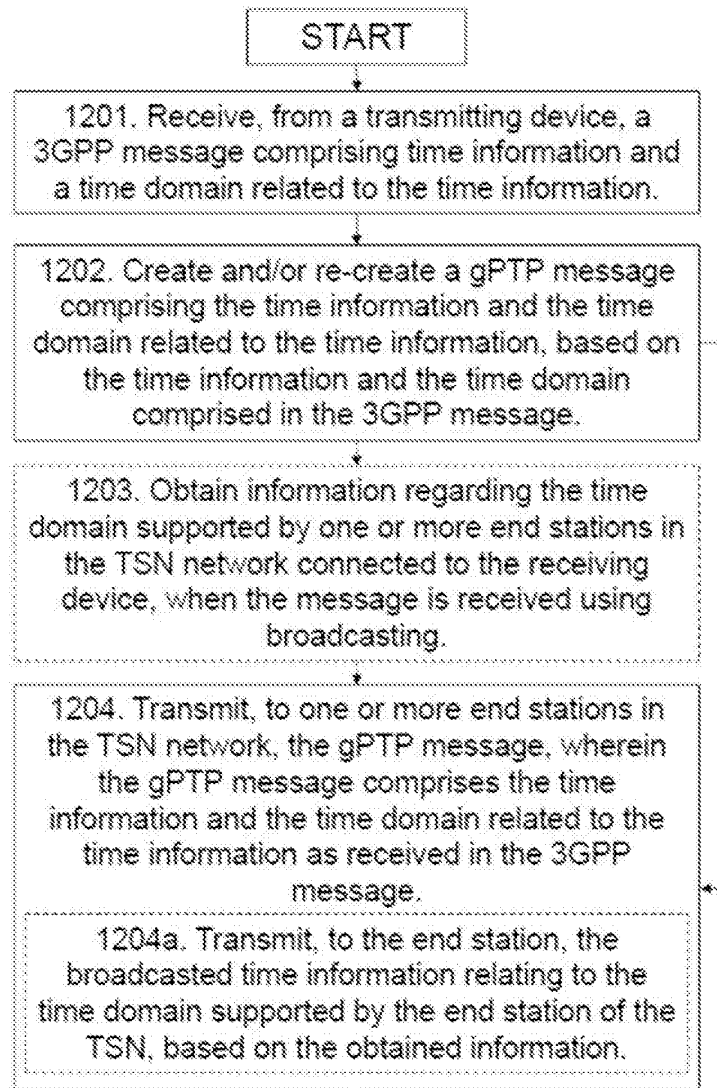
**Fig. 213**

PTP Message Header Format									
Data									
7	6	5	4	3	2	1	0	Octets	Offset
transportSpecific		messageType							
Reserved		versionPTP							
messageLength									
domainNumber									
Reserved									
Flags									
correctionField									
Reserved									
sourcePortIdentity									
sequenceID									
controlField									
logMessageInterval									

Fig. 214

**Fig. 215**

**Fig. 216**

**Fig. 217**

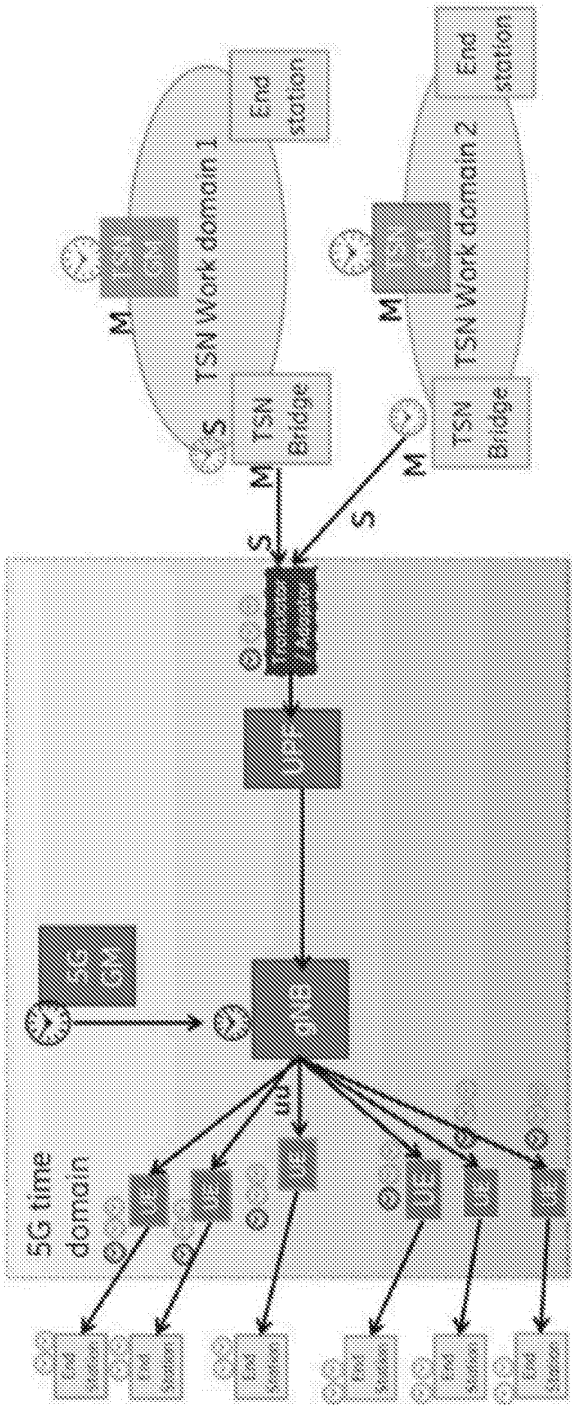


Fig. 218

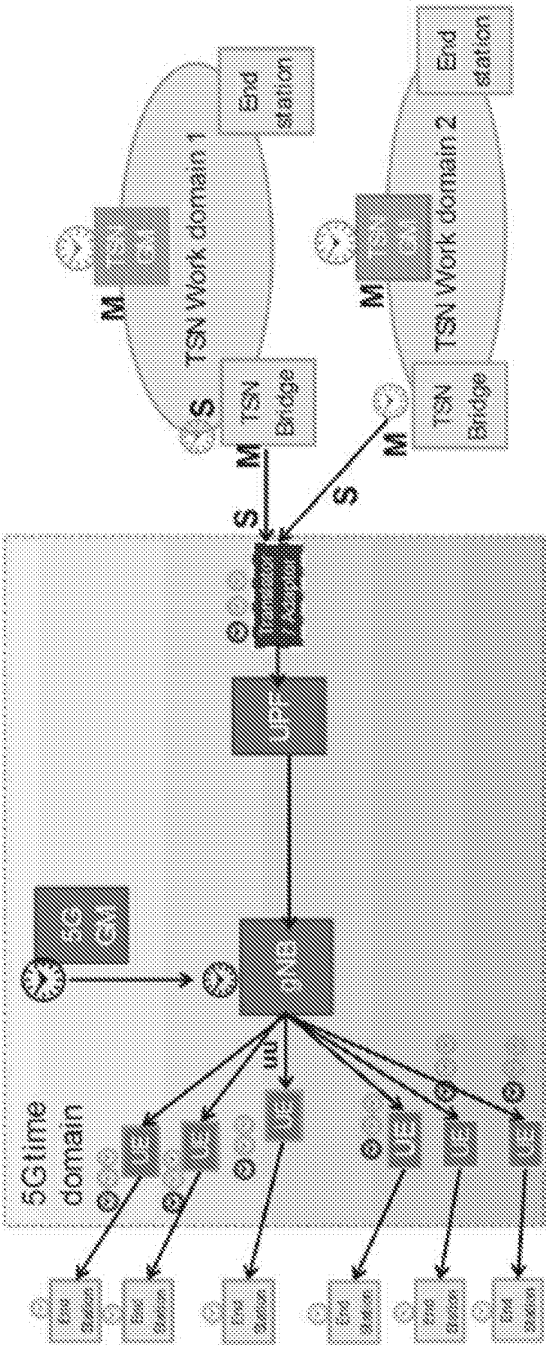


Fig. 219

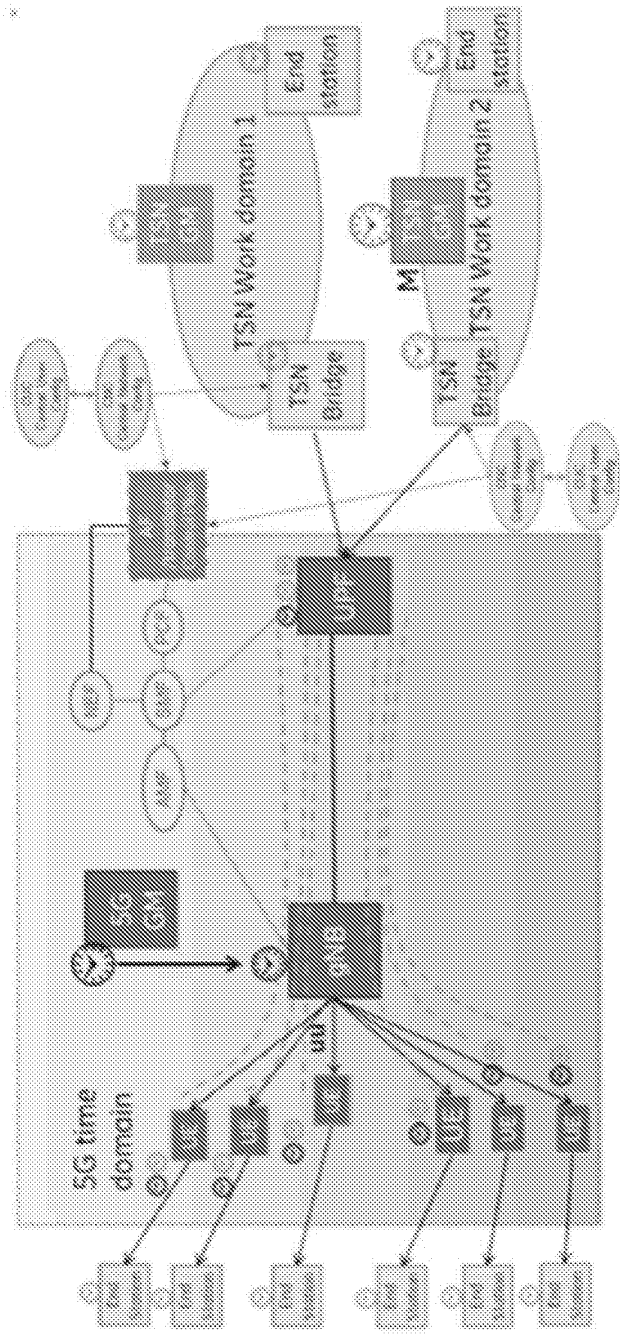
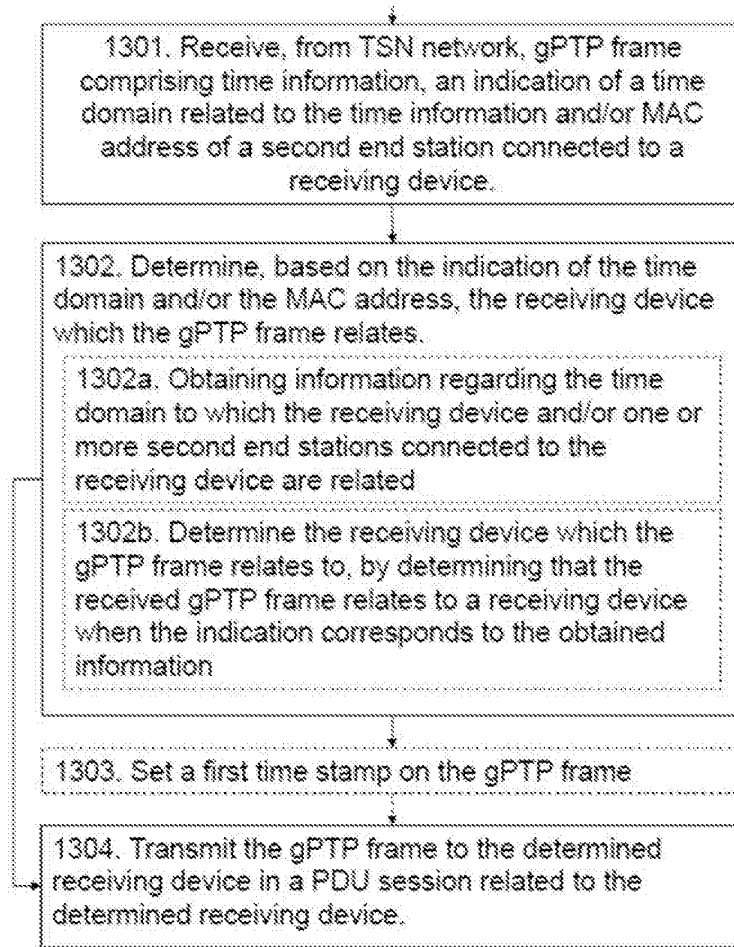
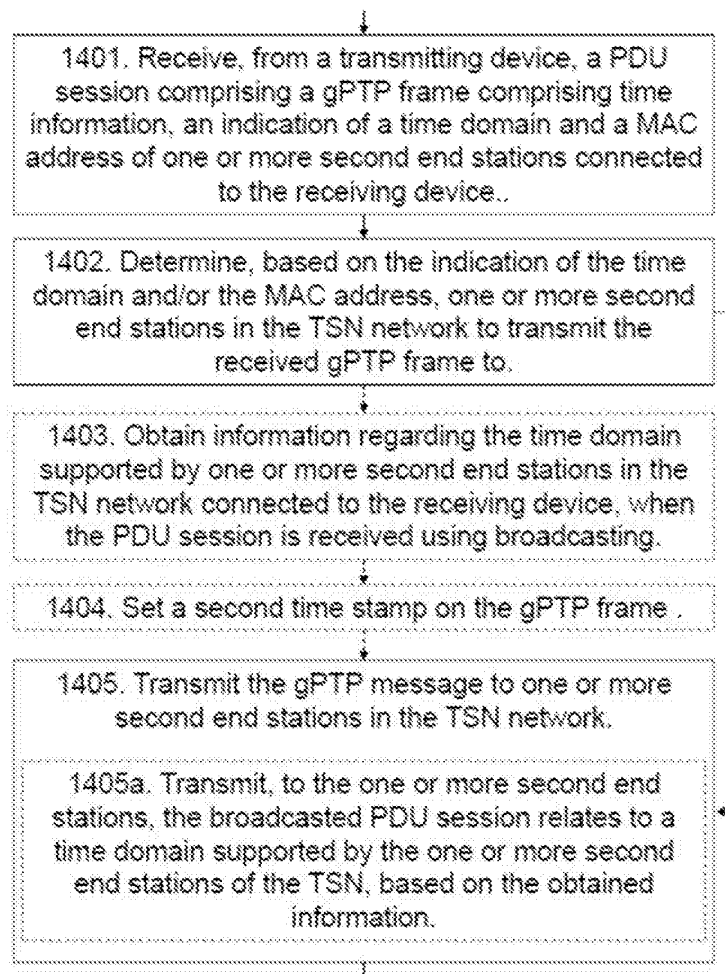
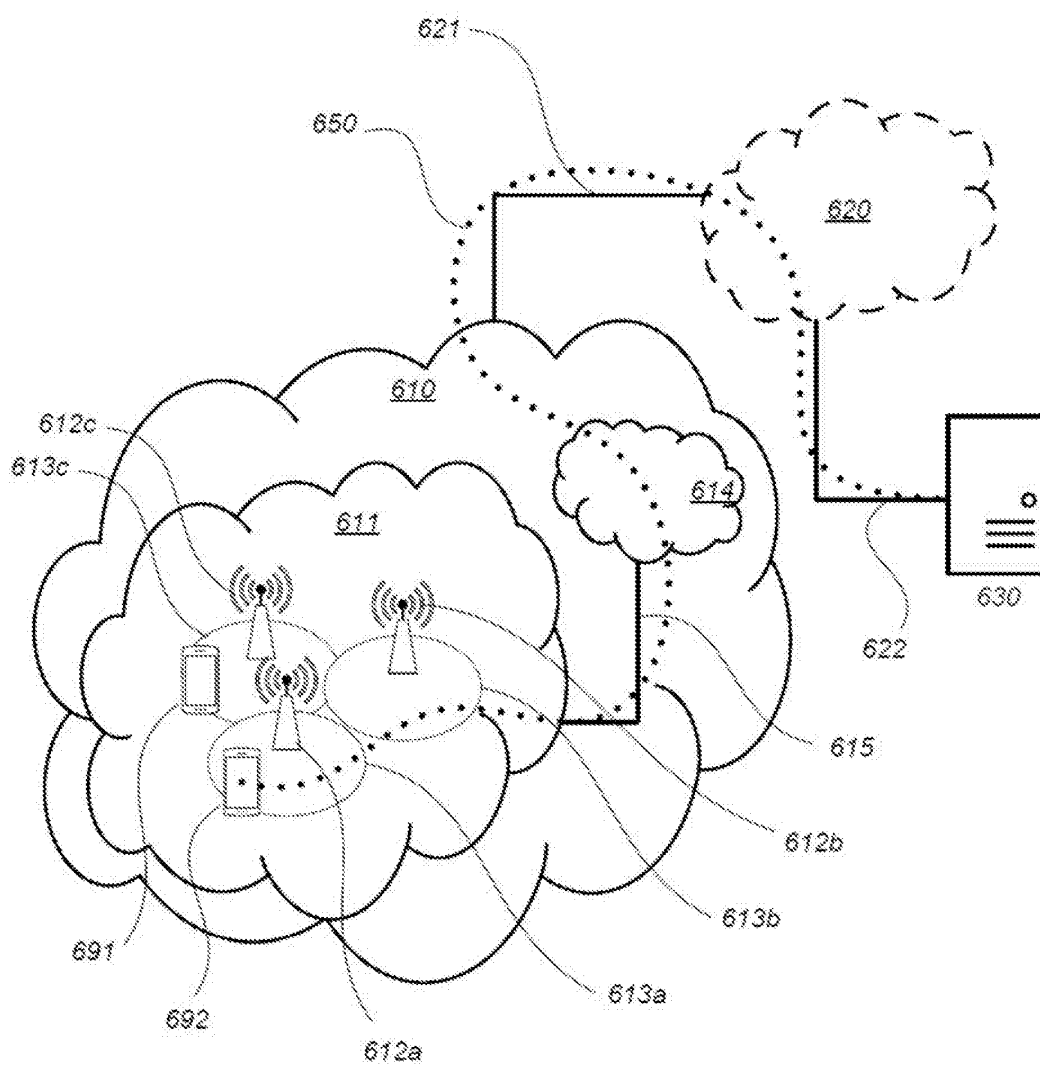


Fig. 220

**Fig. 221**

**Fig. 222**

**Fig. 223**

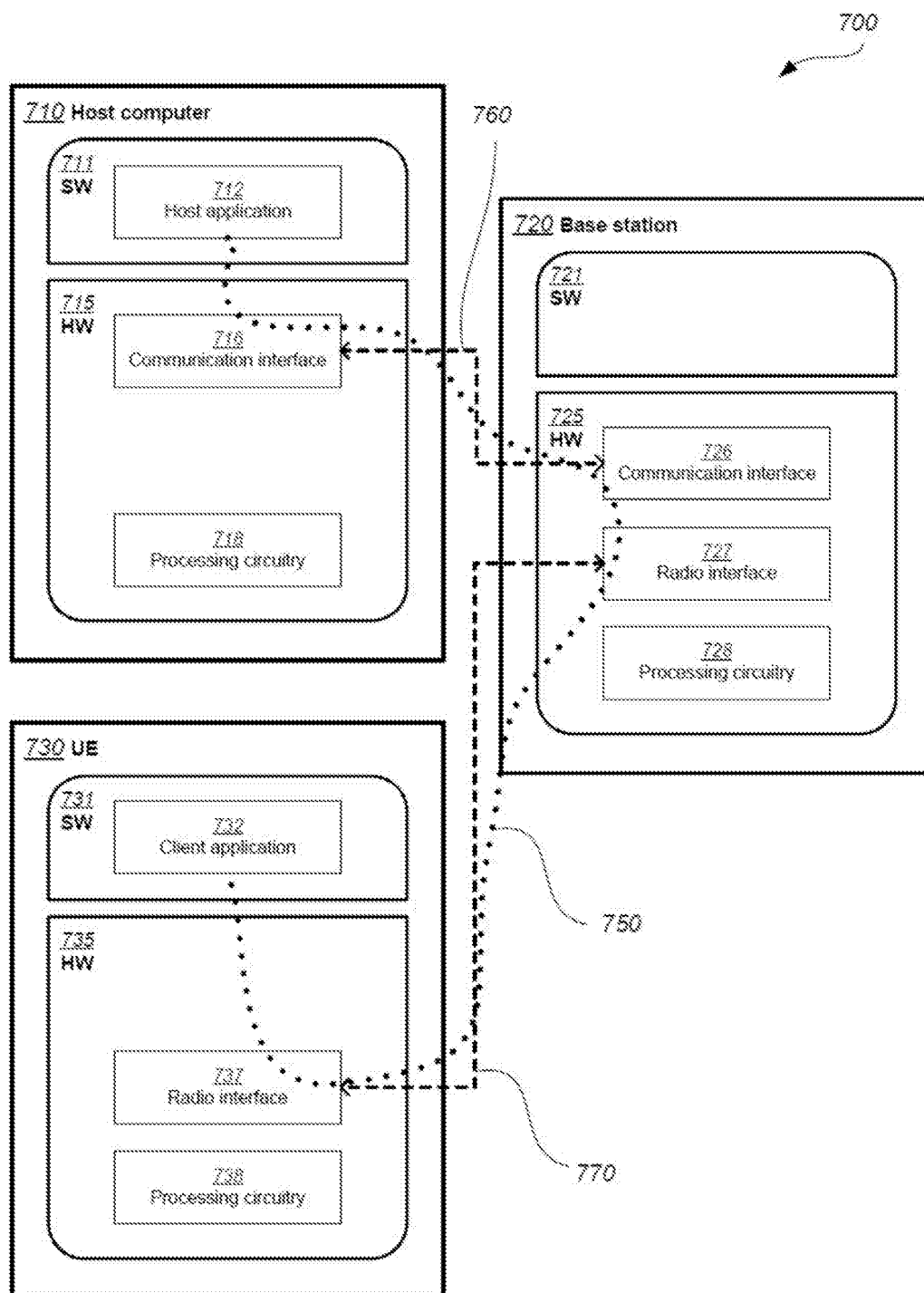
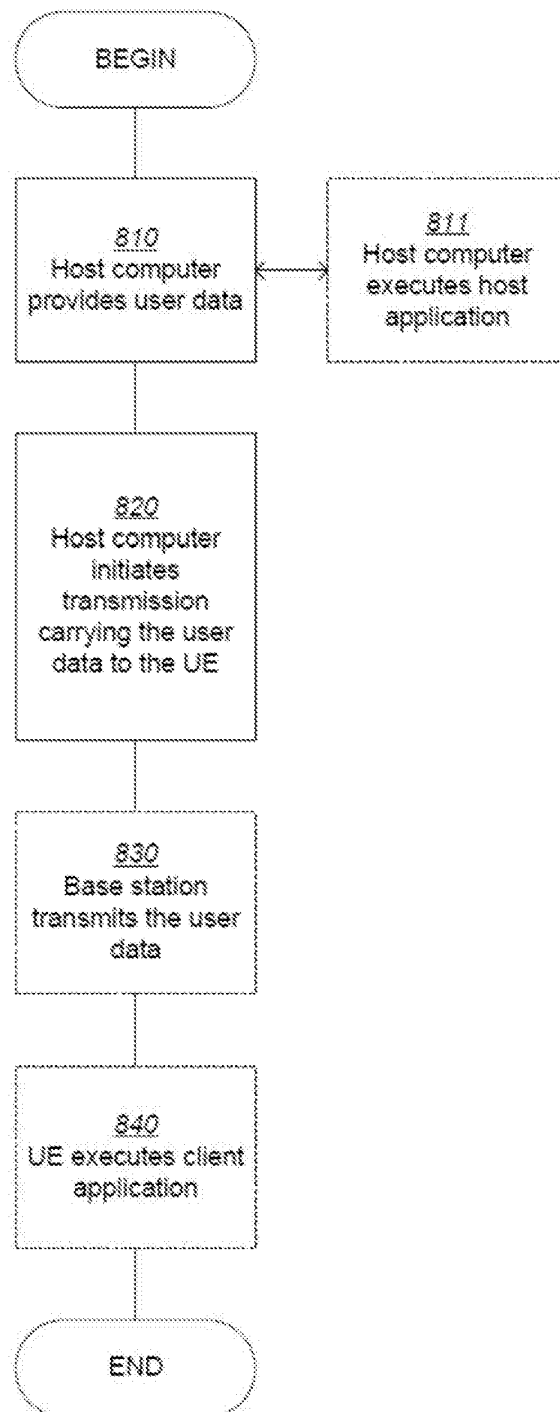
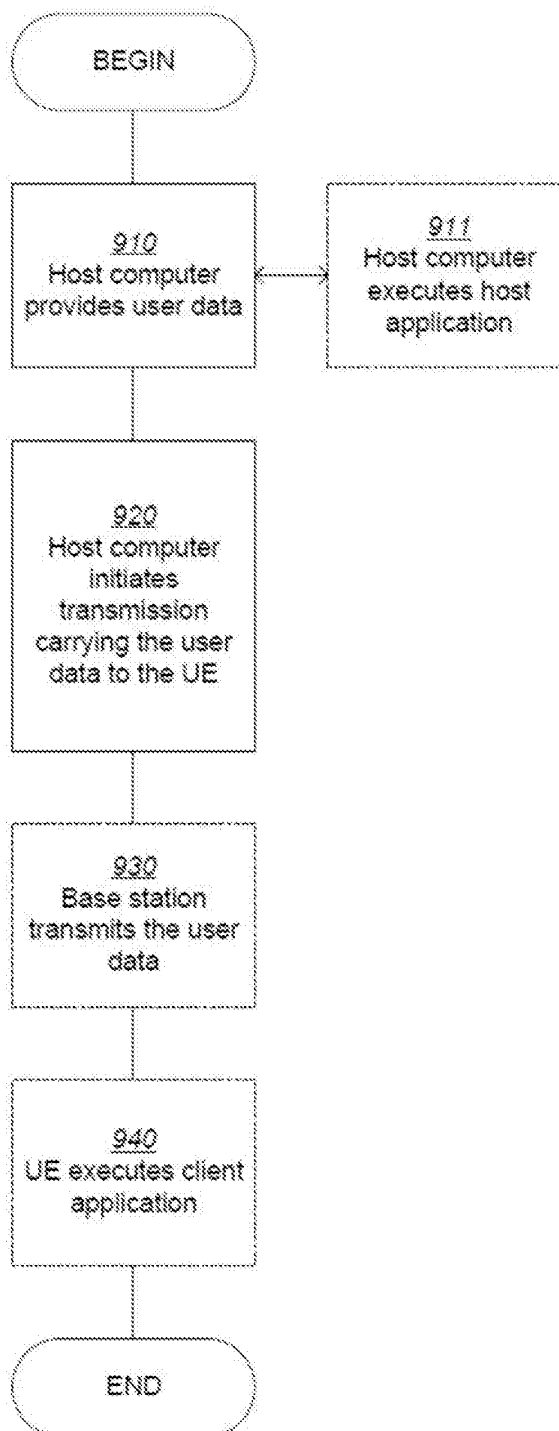
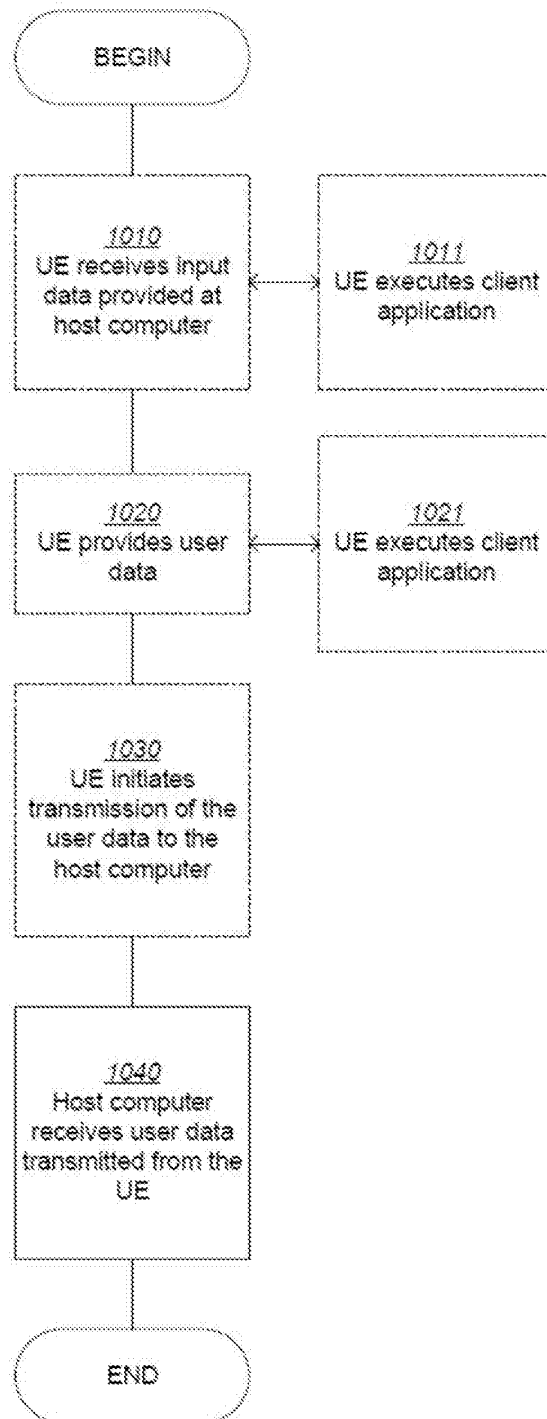
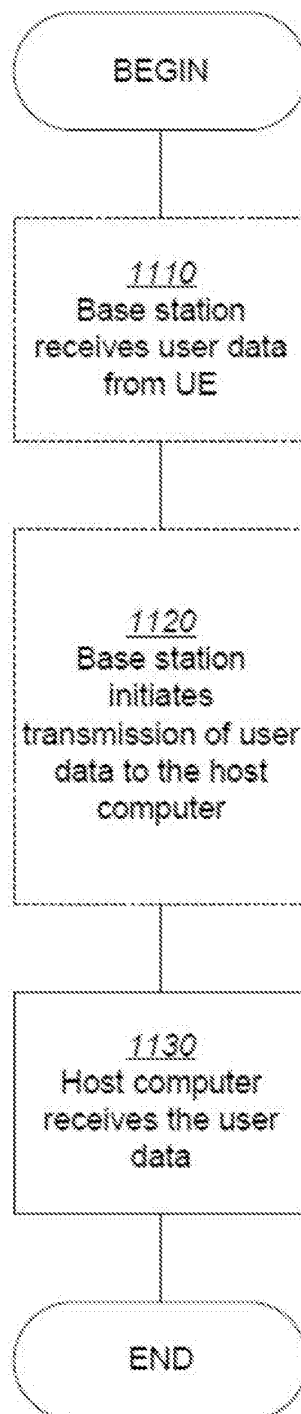


Fig. 224

**Fig. 225**

**Fig. 226**

**Fig. 227**

**Fig. 228**