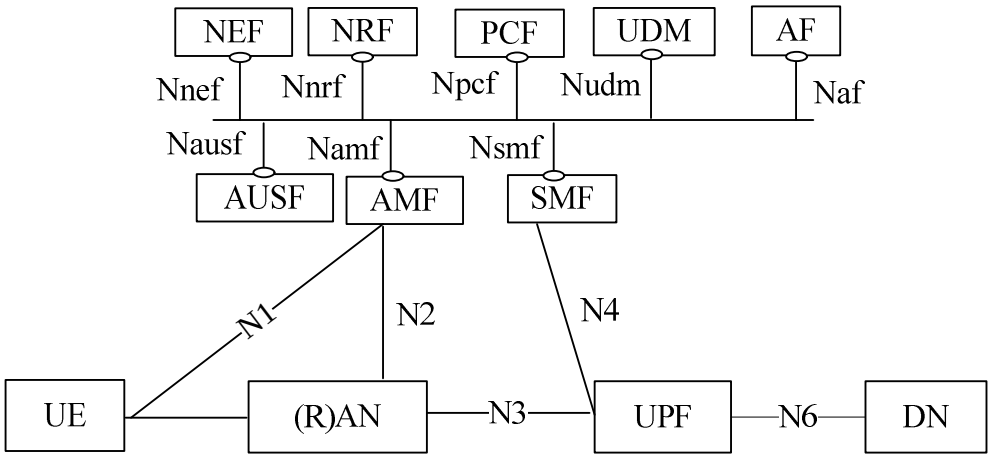

NEF
NRF
PCF
UDM
AF
Nnef
Nnrf
Npcf
Nudm
Naf
Nausf
Namf
Nsmf
AUSF
AMF
SMF
N1
N2
N4
UE
(R)AN
N3
UPF
N6
DN

FIG. 1

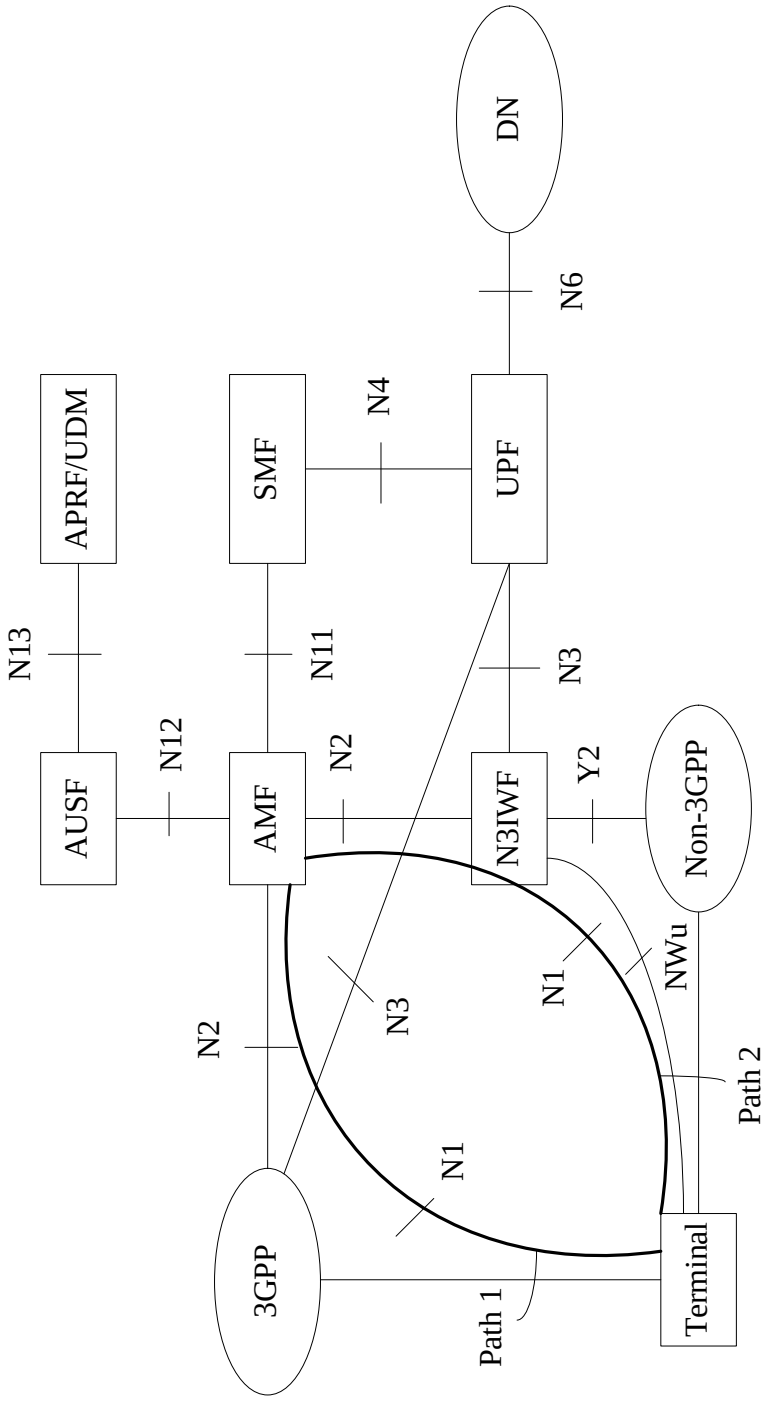

DN
N6
APRF/UDM
SMF
N4
UPF
N13
N11
N3
AUSF
N12
AMF
N2
N3IWF
Y2
Non-3GPP
N2
N3
N1
NWu
Path 2
N1
3GPP
Path 1
Terminal

FIG. 2

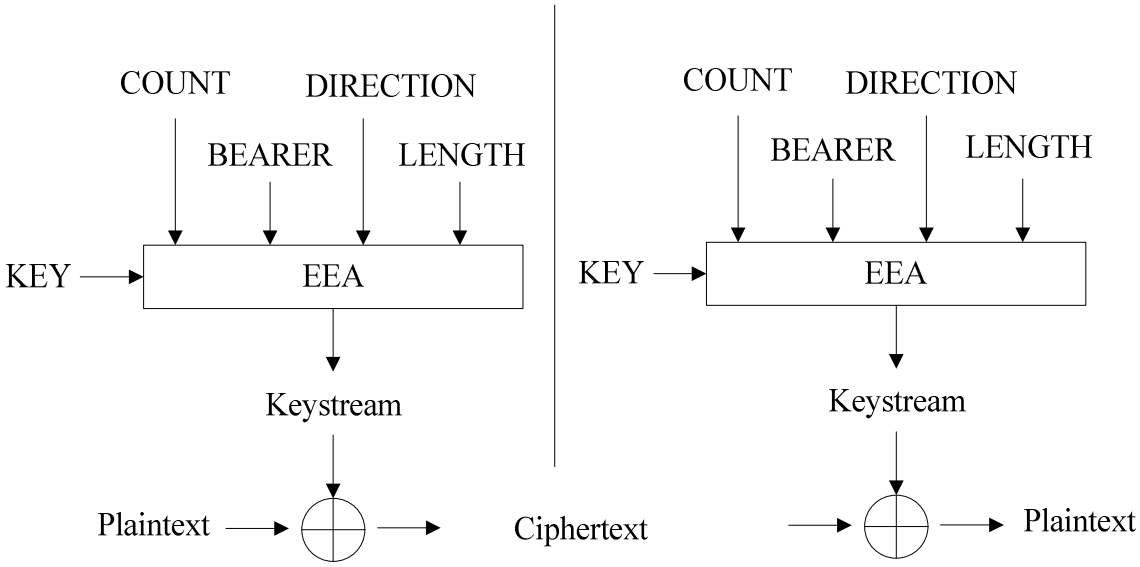


FIG. 3

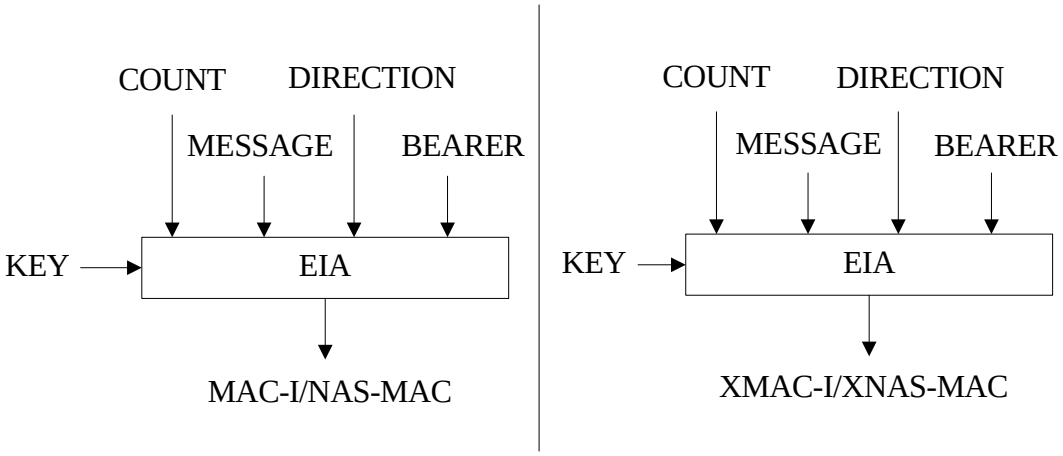


FIG. 4

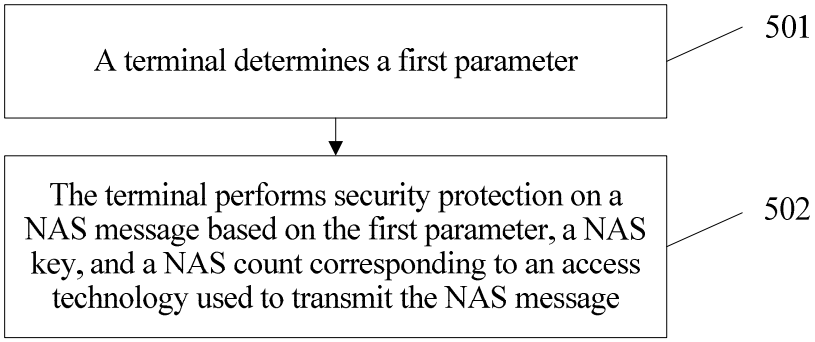


FIG. 5

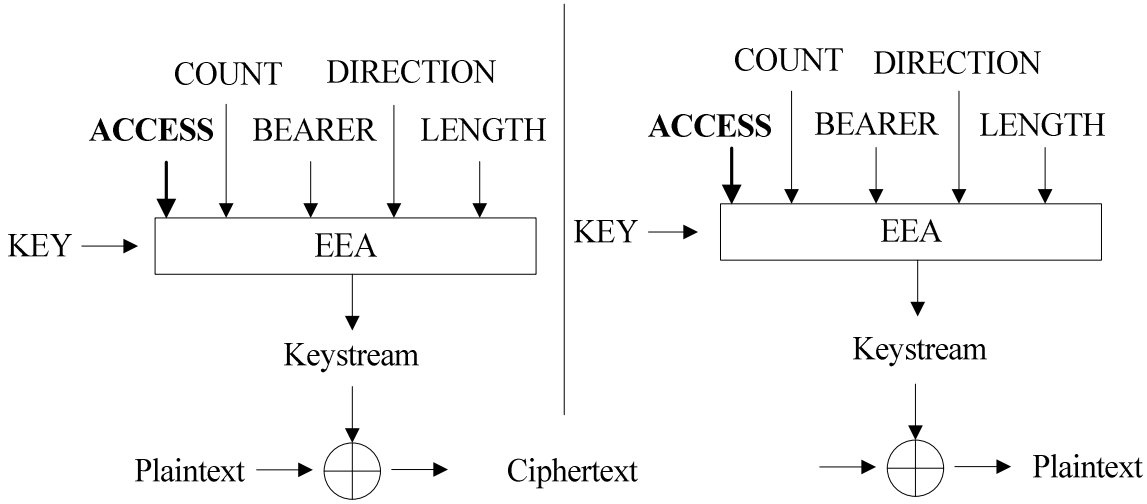

COUNT
DIRECTION
ACCESS
BEARER
LENGTH
KEY
EEA
Keystream
Plaintext
Ciphertext
COUNT
DIRECTION
ACCESS
BEARER
LENGTH
KEY
EEA
Keystream
Plaintext

FIG. 6

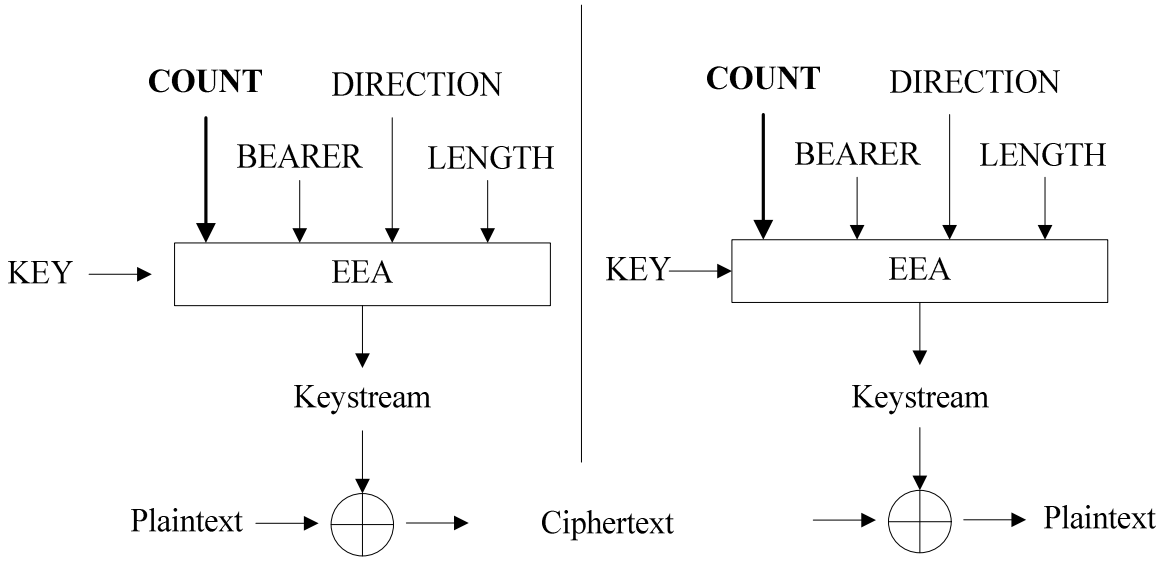

COUNT
DIRECTION
BEARER
LENGTH
KEY
EEA
Keystream
Plaintext
Ciphertext
COUNT
DIRECTION
BEARER
LENGTH
KEY
EEA
Keystream
Plaintext

FIG. 7

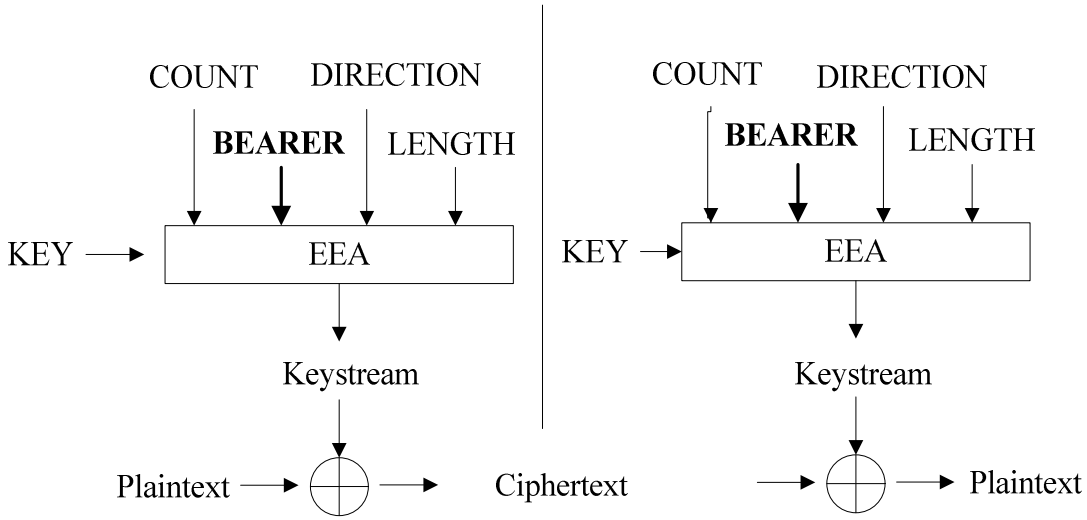

COUNT
DIRECTION
BEARER
LENGTH
KEY
EEA
Keystream
Plaintext
Ciphertext
COUNT
DIRECTION
BEARER
LENGTH
KEY
EEA
Keystream
Plaintext

FIG. 8

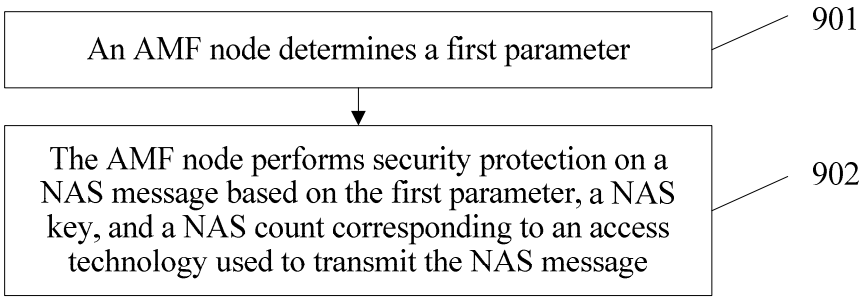

An AMF node determines a first parameter
901
The AMF node performs security protection on a NAS message based on the first parameter, a NAS key, and a NAS count corresponding to an access technology used to transmit the NAS message
902

FIG. 9

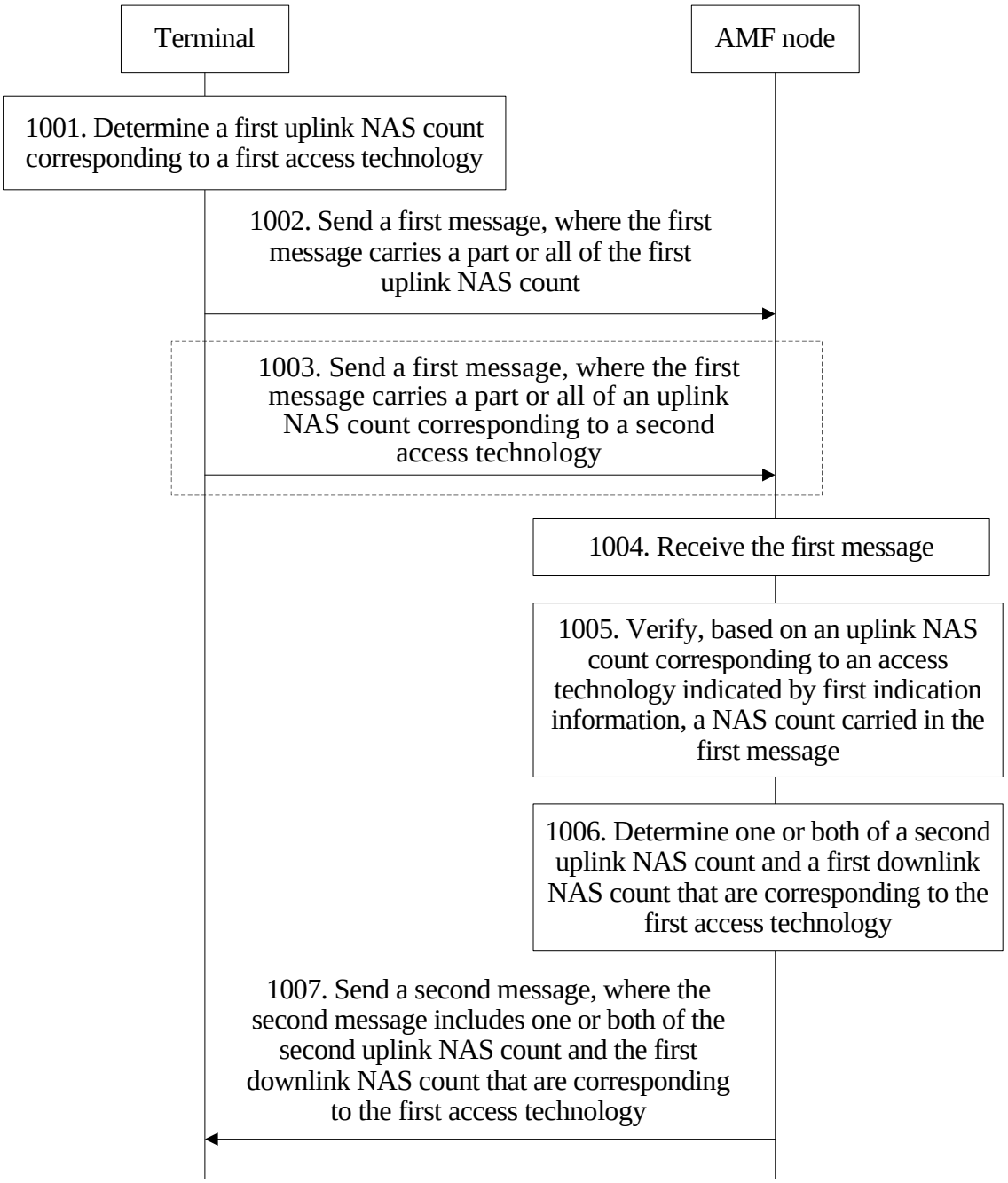

Terminal
AMF node
1001. Determine a first uplink NAS count corresponding to a first access technology
1002. Send a first message, where the first message carries a part or all of the first uplink NAS count
1003. Send a first message, where the first message carries a part or all of an uplink NAS count corresponding to a second access technology
1004. Receive the first message
1005. Verify, based on an uplink NAS count corresponding to an access technology indicated by first indication information, a NAS count carried in the first message
1006. Determine one or both of a second uplink NAS count and a first downlink NAS count that are corresponding to the first access technology
1007. Send a second message, where the second message includes one or both of the second uplink NAS count and the first downlink NAS count that are corresponding to the first access technology

FIG. 10

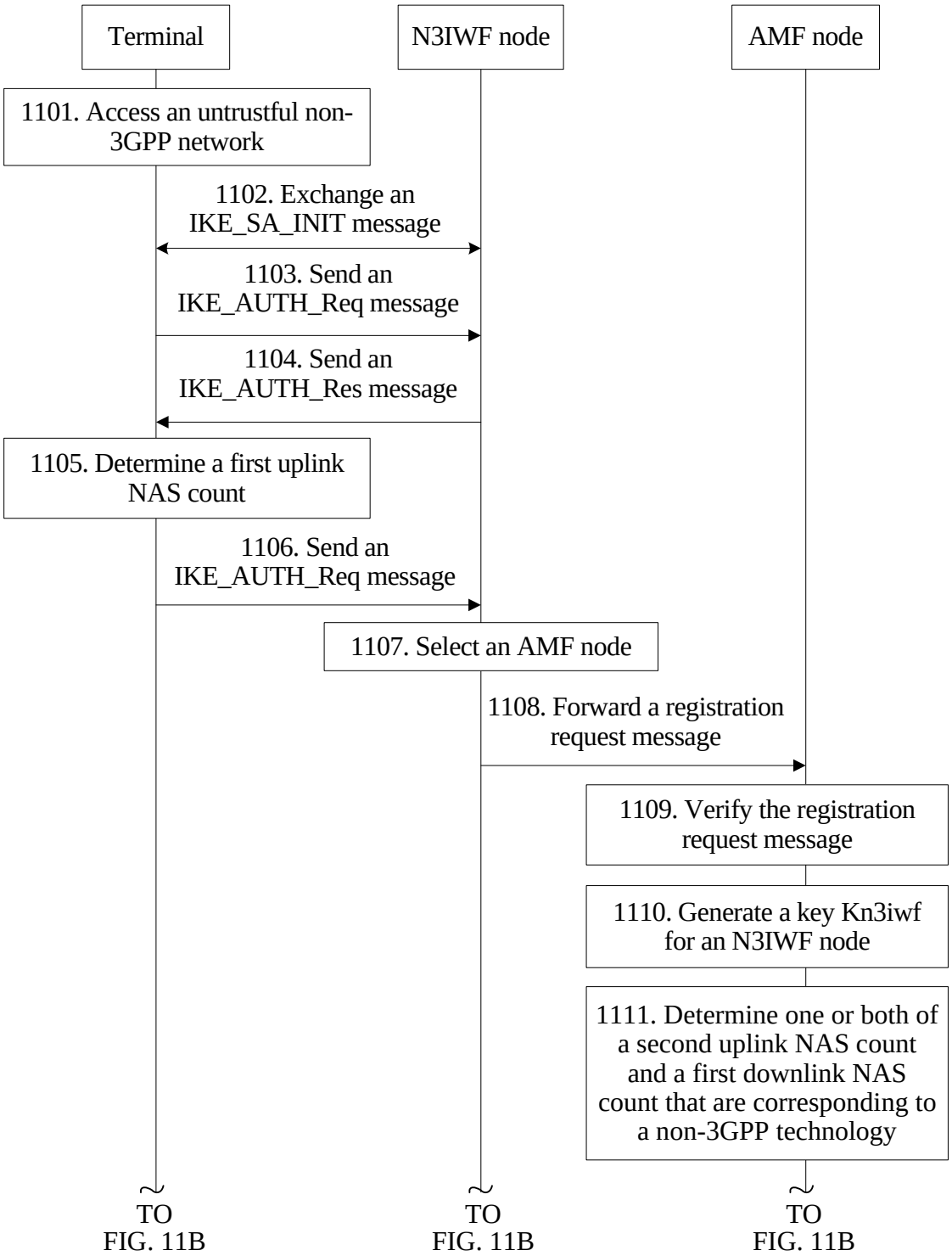

Terminal
N3IWF node
AMF node
1101. Access an untrustful non-3GPP network
1102. Exchange an IKE_SA_INIT message
1103. Send an IKE_AUTH_Req message
1104. Send an IKE_AUTH_Res message
1105. Determine a first uplink NAS count
1106. Send an IKE_AUTH_Req message
1107. Select an AMF node
1108. Forward a registration request message
1109. Verify the registration request message
1110. Generate a key Kn3iwf for an N3IWF node
1111. Determine one or both of a second uplink NAS count and a first downlink NAS count that are corresponding to a non-3GPP technology
TO FIG. 11B
TO FIG. 11B
TO FIG. 11B

FIG. 11A

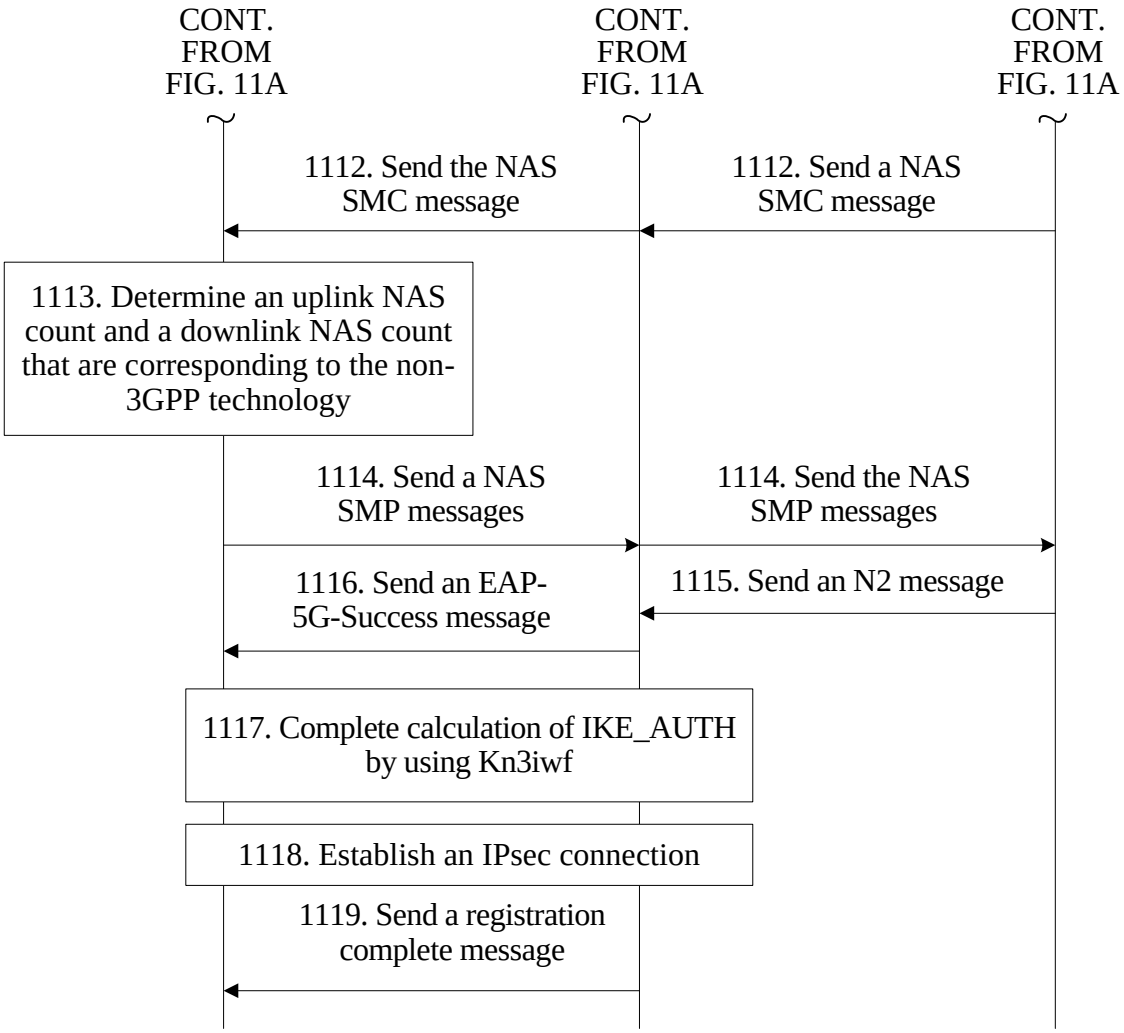

CONT. FROM FIG. 11A
CONT. FROM FIG. 11A
CONT. FROM FIG. 11A
1112. Send the NAS SMC message
1112. Send a NAS SMC message
1113. Determine an uplink NAS count and a downlink NAS count that are corresponding to the non-3GPP technology
1114. Send a NAS SMP messages
1114. Send the NAS SMP messages
1116. Send an EAP-5G-Success message
1115. Send an N2 message
1117. Complete calculation of IKE_AUTH by using Kn3iwf
1118. Establish an IPsec connection
1119. Send a registration complete message

FIG. 11B

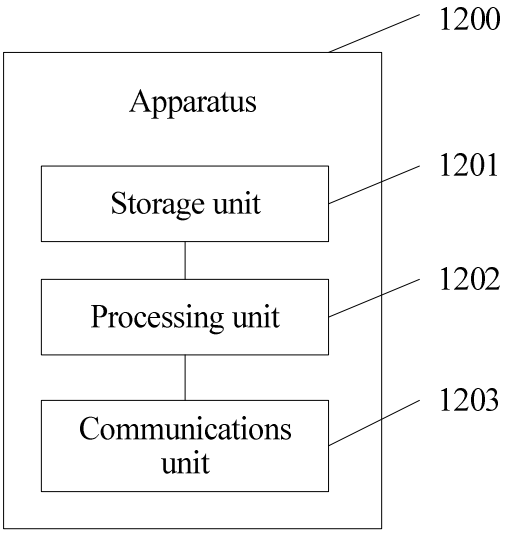

1200
Apparatus
1201
Storage unit
1202
Processing unit
1203
Communications unit

FIG. 12

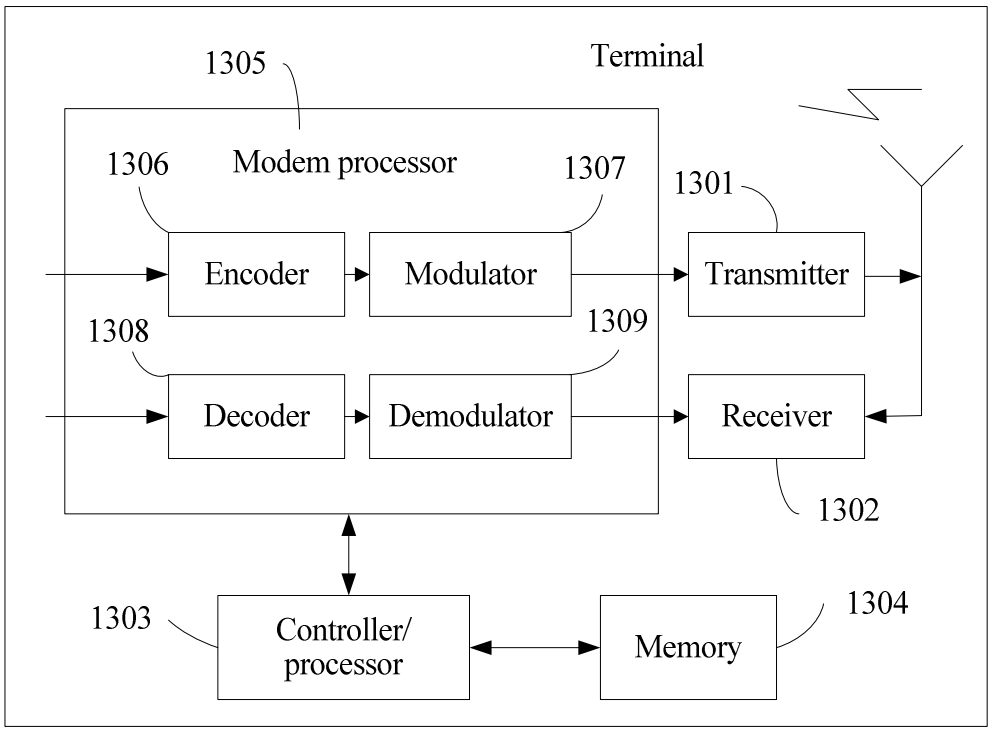

Terminal
1305
Modem processor
1306
1307
1301
Encoder
Modulator
Transmitter
1308
1309
Decoder
Demodulator
Receiver
1302
1303
Controller/ processor
Memory
1304

FIG. 13

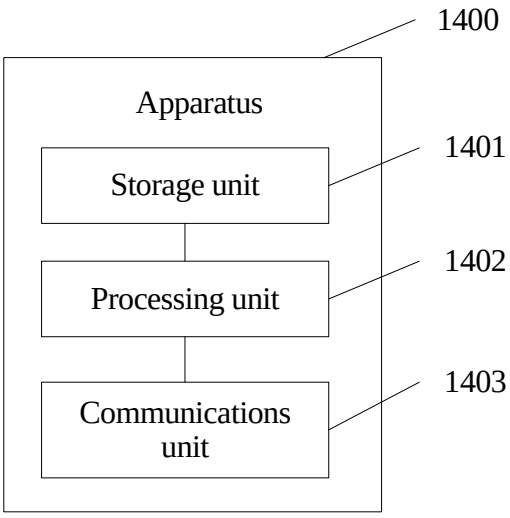

1400
Apparatus
1401
Storage unit
1402
Processing unit
1403
Communications unit

FIG. 14

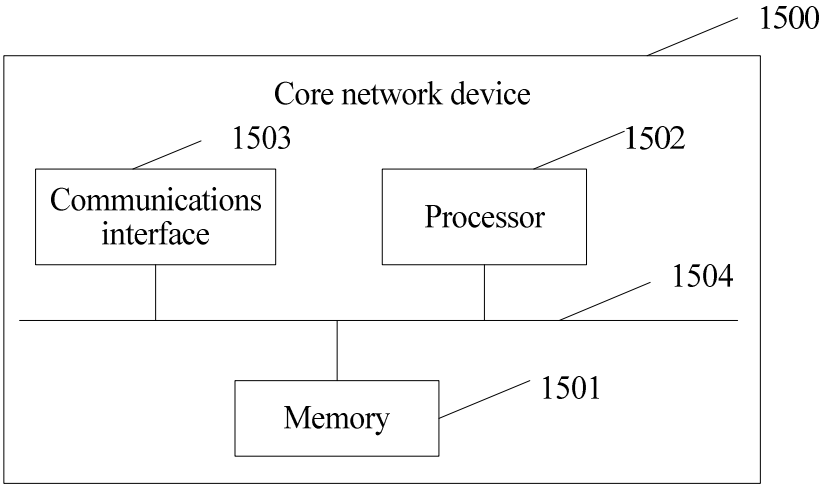

1500
Core network device
1503
Communications interface
1502
Processor
1504
1501
Memory

FIG. 15