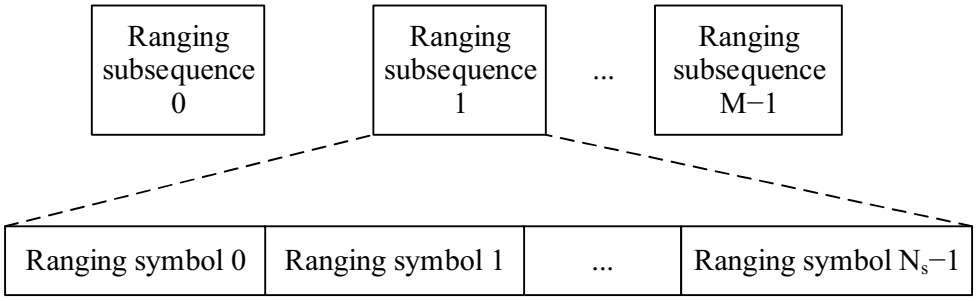

FIG. 1

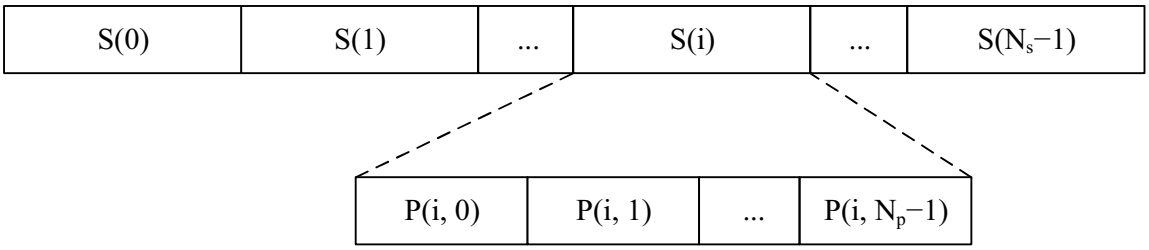

FIG. 2

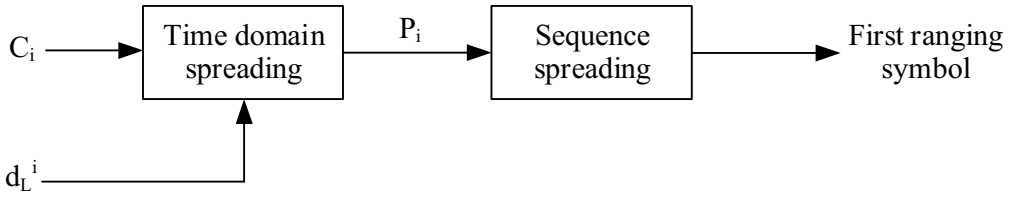

FIG. 3

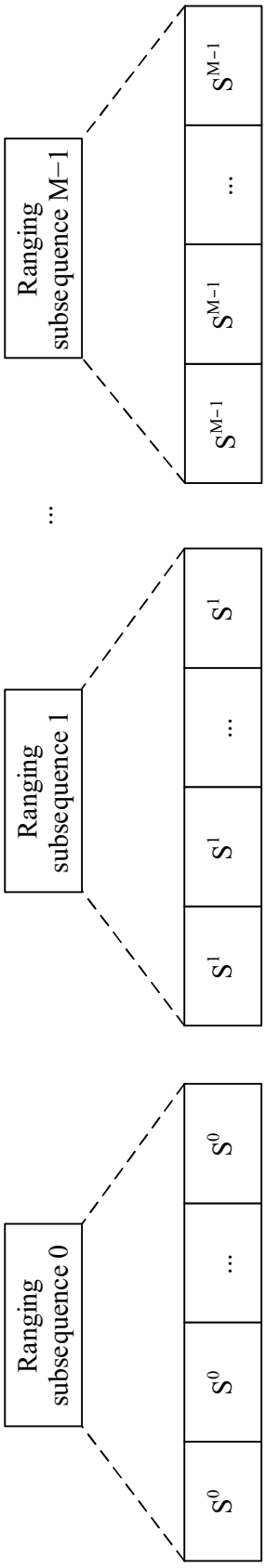
Ranging subsequence 0
S0
S0
...
S0
Ranging subsequence 1
S1
S1
...
S1
...
Ranging subsequence M−1
SM−1
SM−1
...
SM−1

FIG. 4

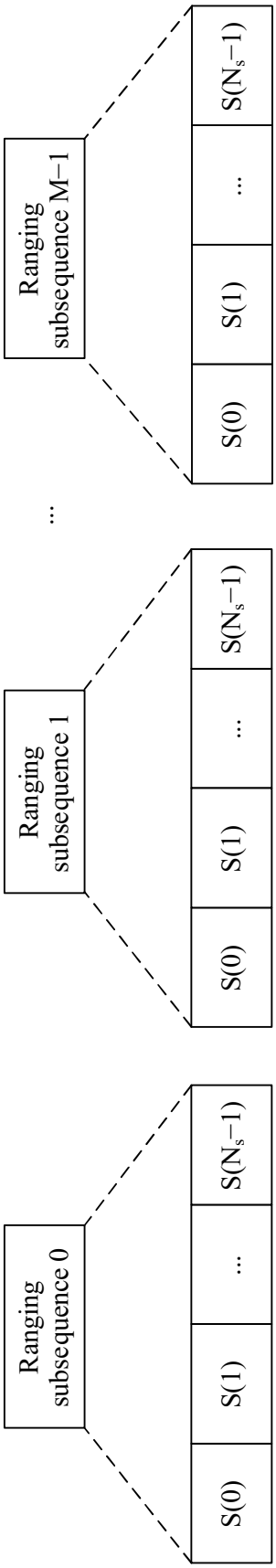
Ranging subsequence 0
S(0)
S(1)
...
S(N_s−1)
Ranging subsequence 1
S(0)
S(1)
...
S(N_s−1)
...
Ranging subsequence M−1
S(0)
S(1)
...
S(N_s−1)

FIG. 5

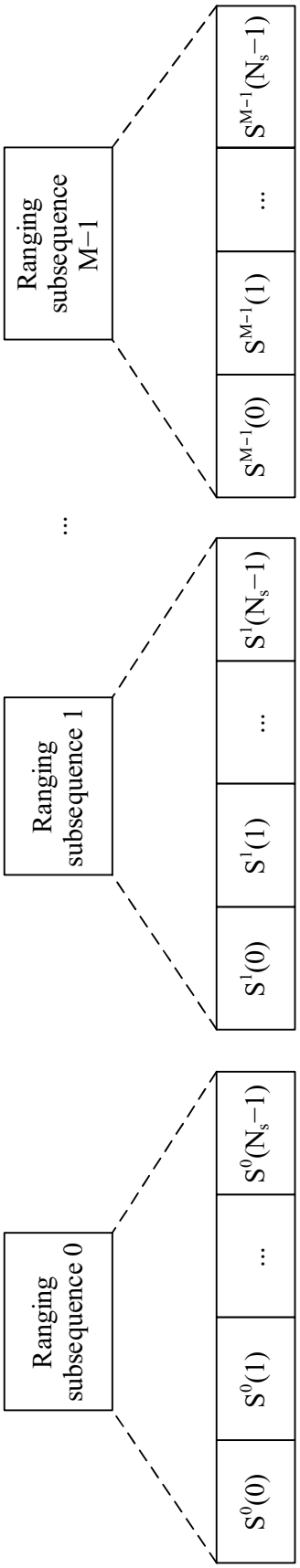
Ranging subsequence 0
S0(0)
S0(1)
...
S0(Ns−1)
Ranging subsequence 1
S1(0)
S1(1)
...
S1(Ns−1)
...
Ranging subsequence M−1
SM−1(0)
SM−1(1)
...
SM−1(Ns−1)

FIG. 6

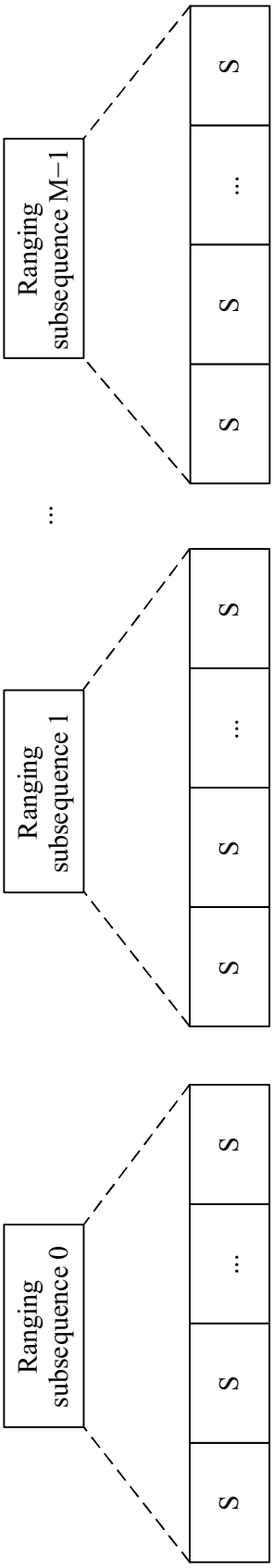
Ranging subsequence 0
S
S
...
S
Ranging subsequence 1
S
S
...
S
...
Ranging subsequence M−1
S
S
...
S

FIG. 7

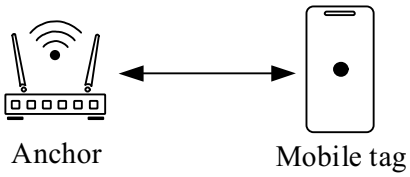

FIG. 8

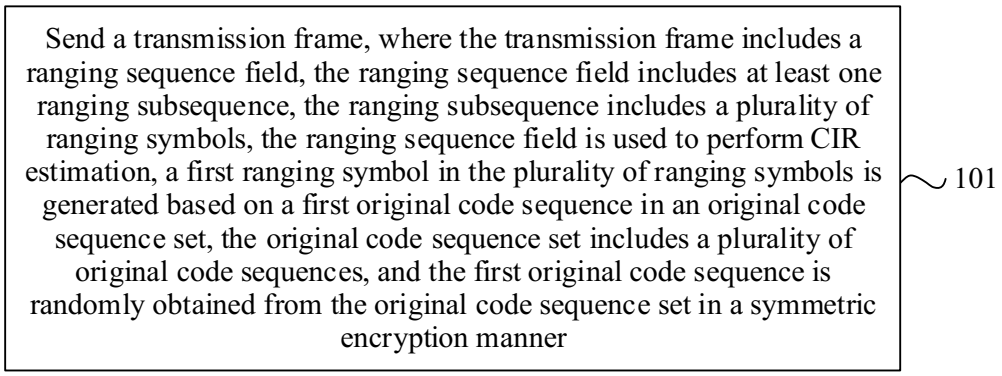

FIG. 9

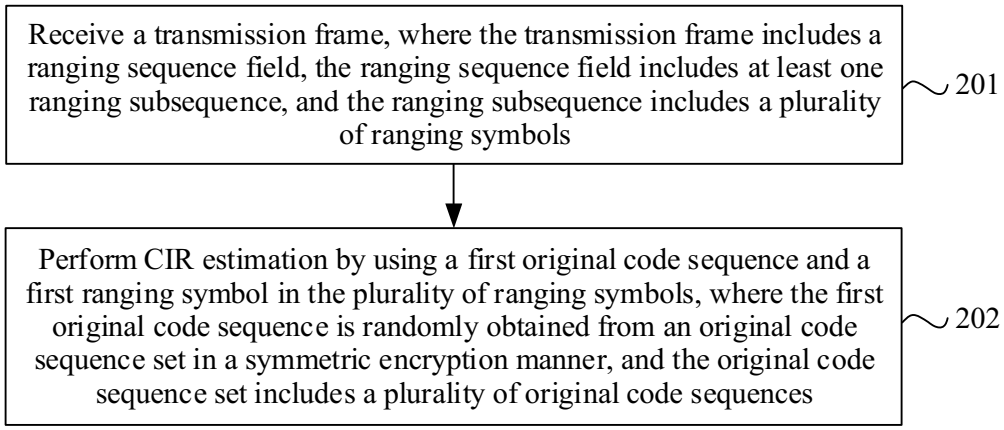

FIG. 10

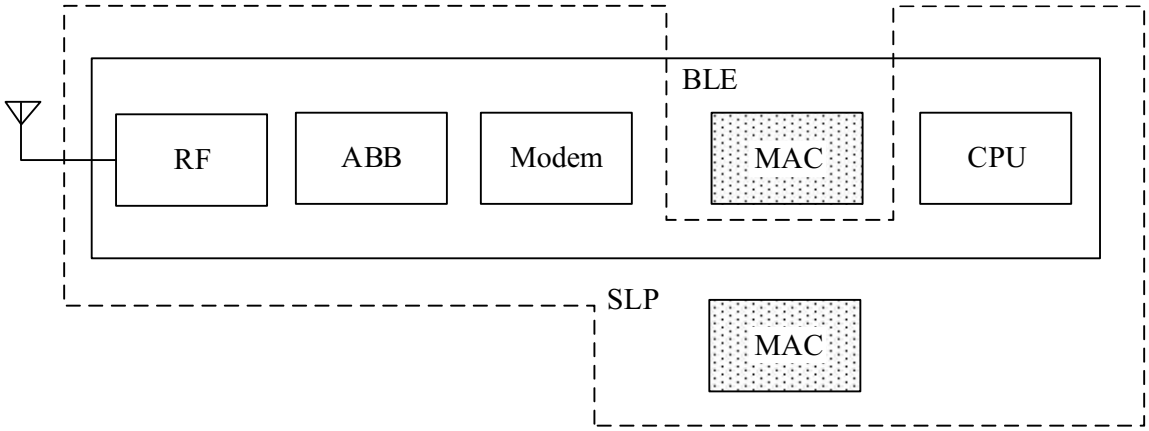

FIG. 11

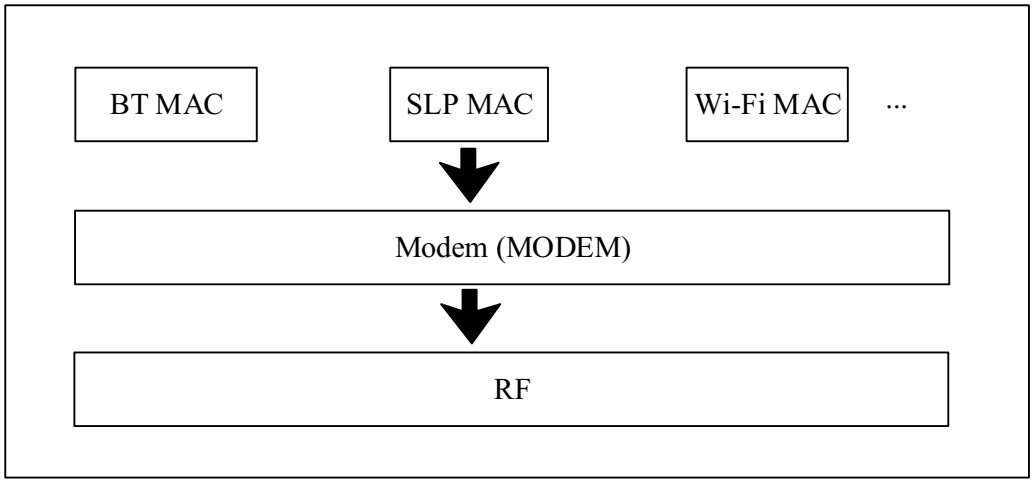

FIG. 12

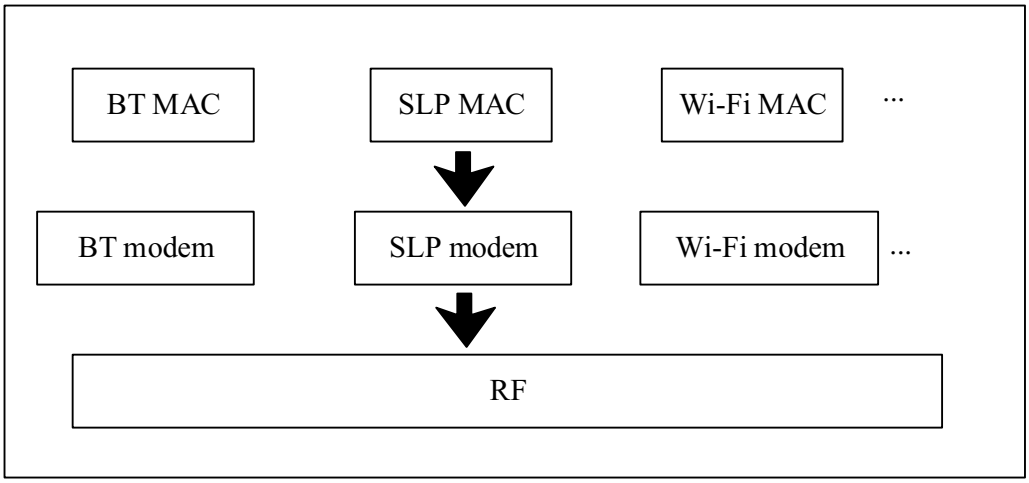

FIG. 13

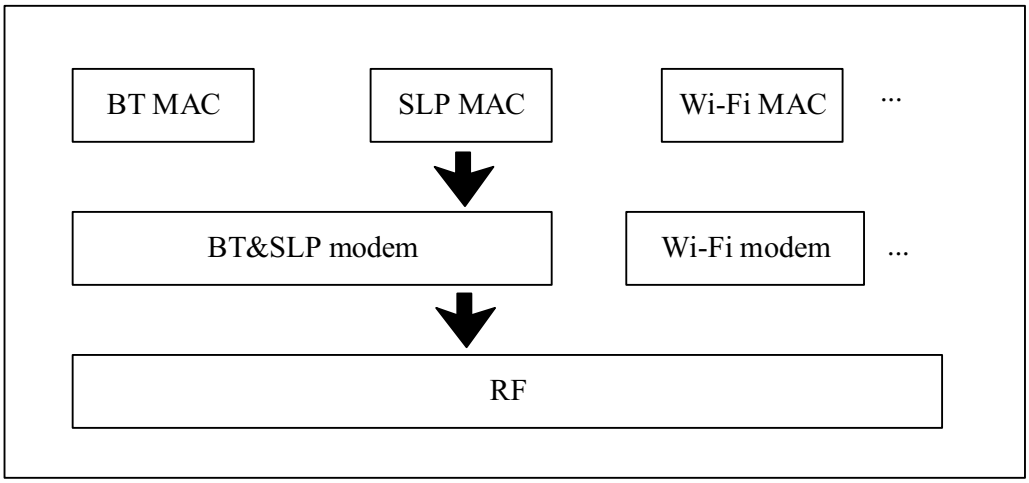

FIG. 14

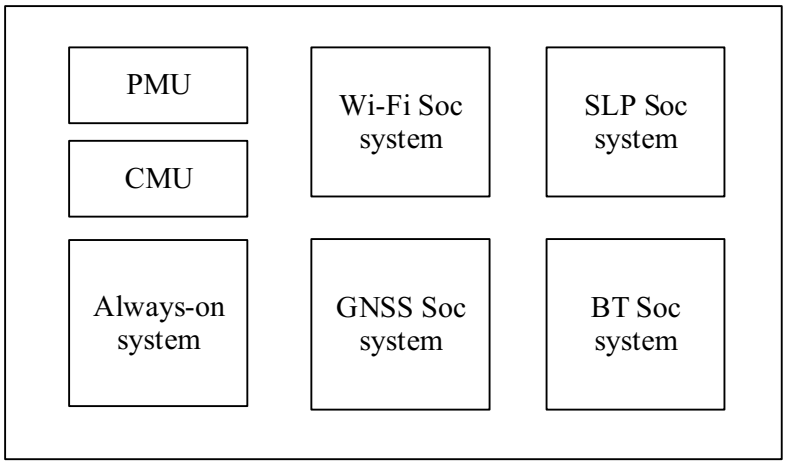

FIG. 15

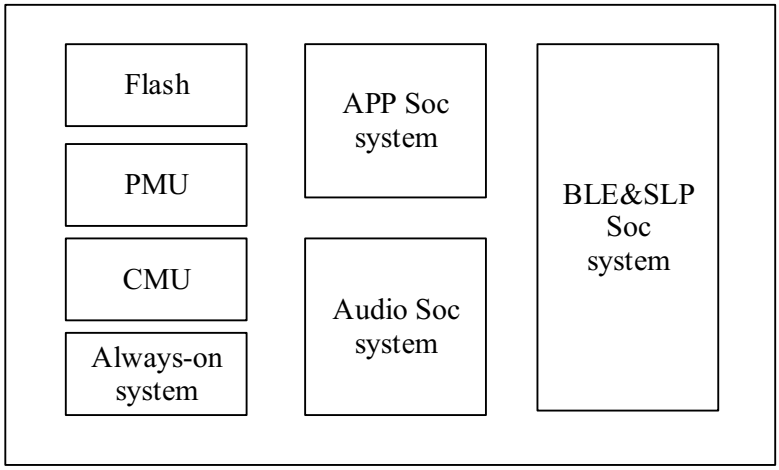

FIG. 16

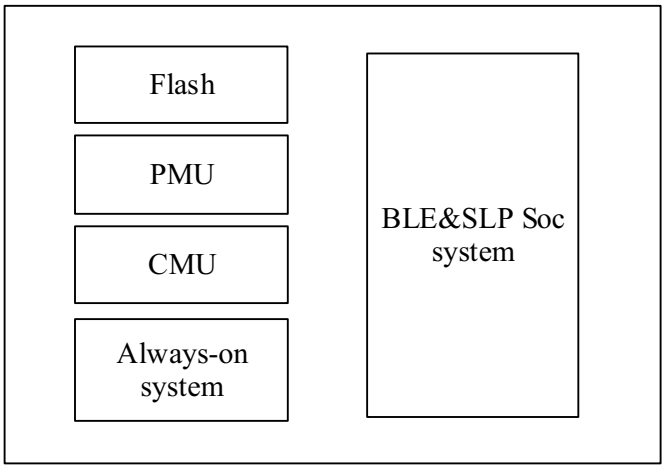

FIG. 17

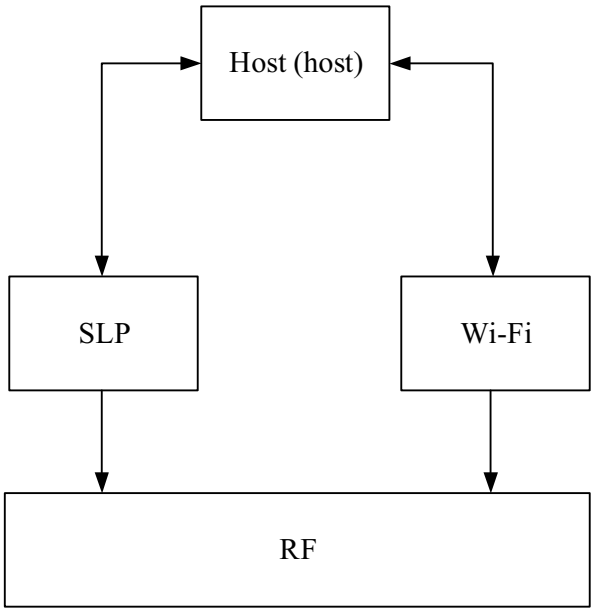

FIG. 18

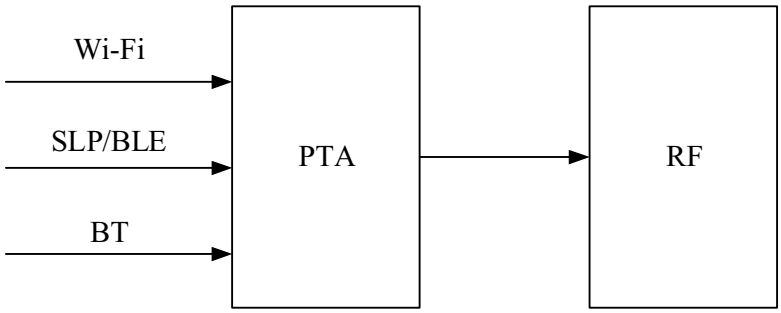

FIG. 19

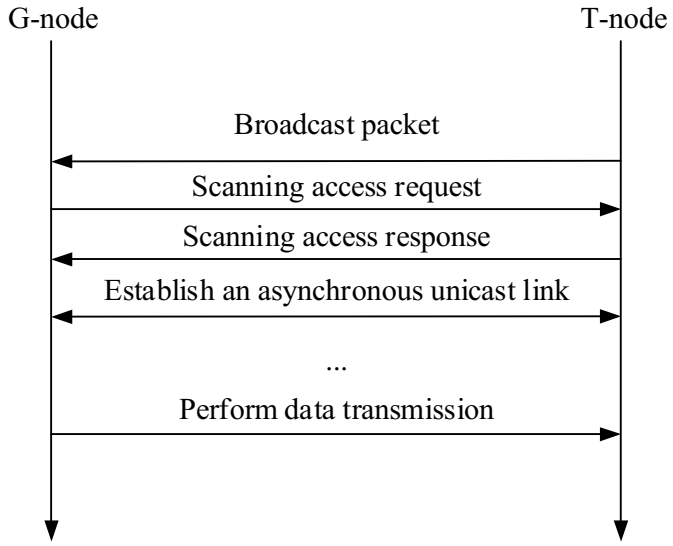
G-node
T-node
Broadcast packet
Scanning access request
Scanning access response
Establish an asynchronous unicast link
...
Perform data transmission

FIG. 20

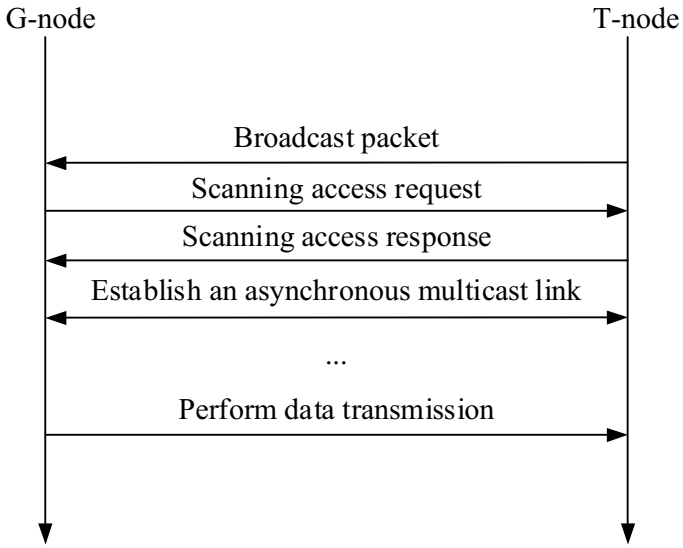
G-node
T-node
Broadcast packet
Scanning access request
Scanning access response
Establish an asynchronous multicast link
...
Perform data transmission

FIG. 21

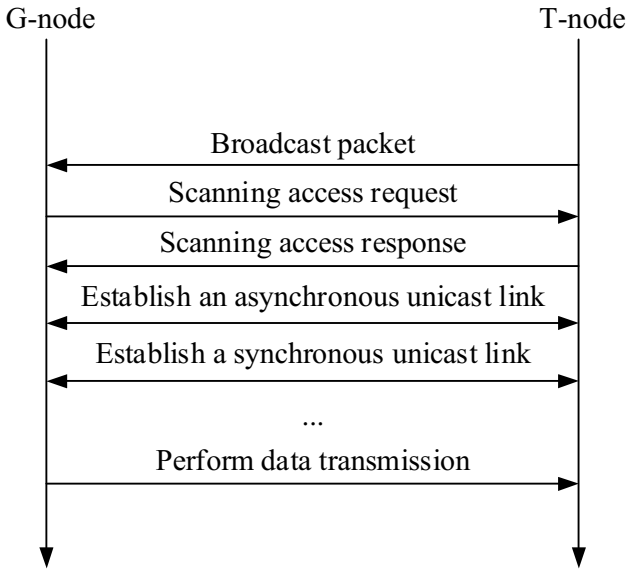
G-node
T-node
Broadcast packet
Scanning access request
Scanning access response
Establish an asynchronous unicast link
Establish a synchronous unicast link
...
Perform data transmission

FIG. 22

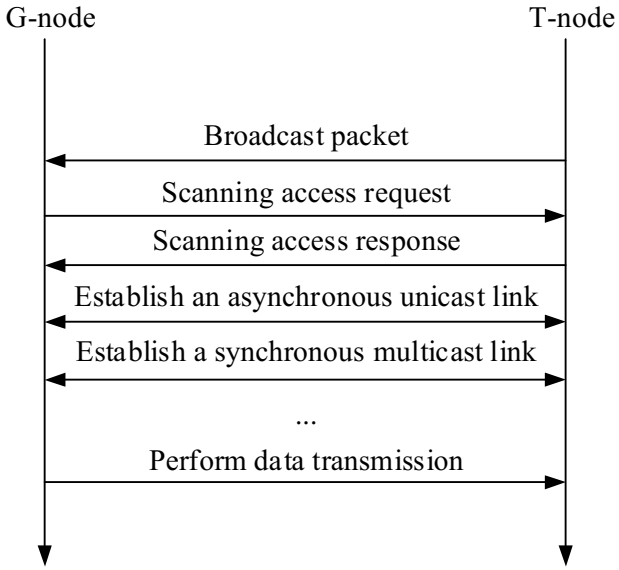
G-node
T-node
Broadcast packet
Scanning access request
Scanning access response
Establish an asynchronous unicast link
Establish a synchronous multicast link
...
Perform data transmission

FIG. 23

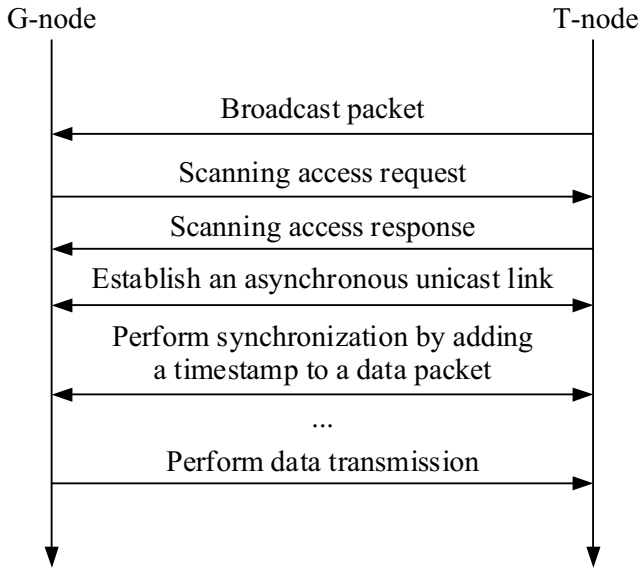
G-node
T-node
Broadcast packet
Scanning access request
Scanning access response
Establish an asynchronous unicast link
Perform synchronization by adding a timestamp to a data packet
...
Perform data transmission

FIG. 24

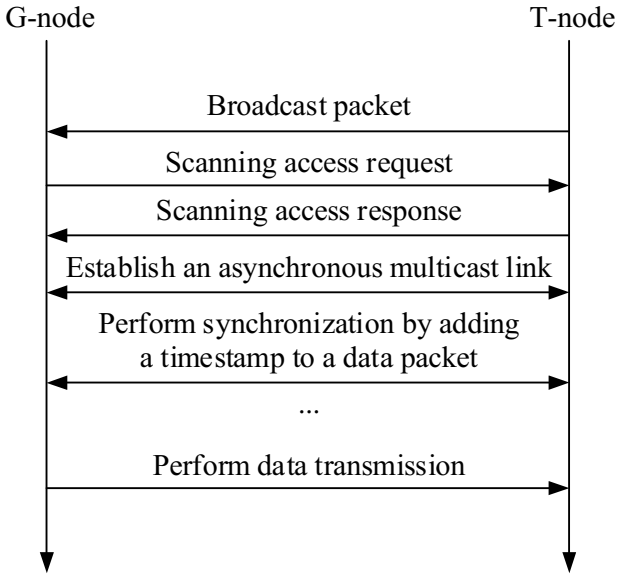
G-node
T-node
Broadcast packet
Scanning access request
Scanning access response
Establish an asynchronous multicast link
Perform synchronization by adding a timestamp to a data packet
...
Perform data transmission

FIG. 25

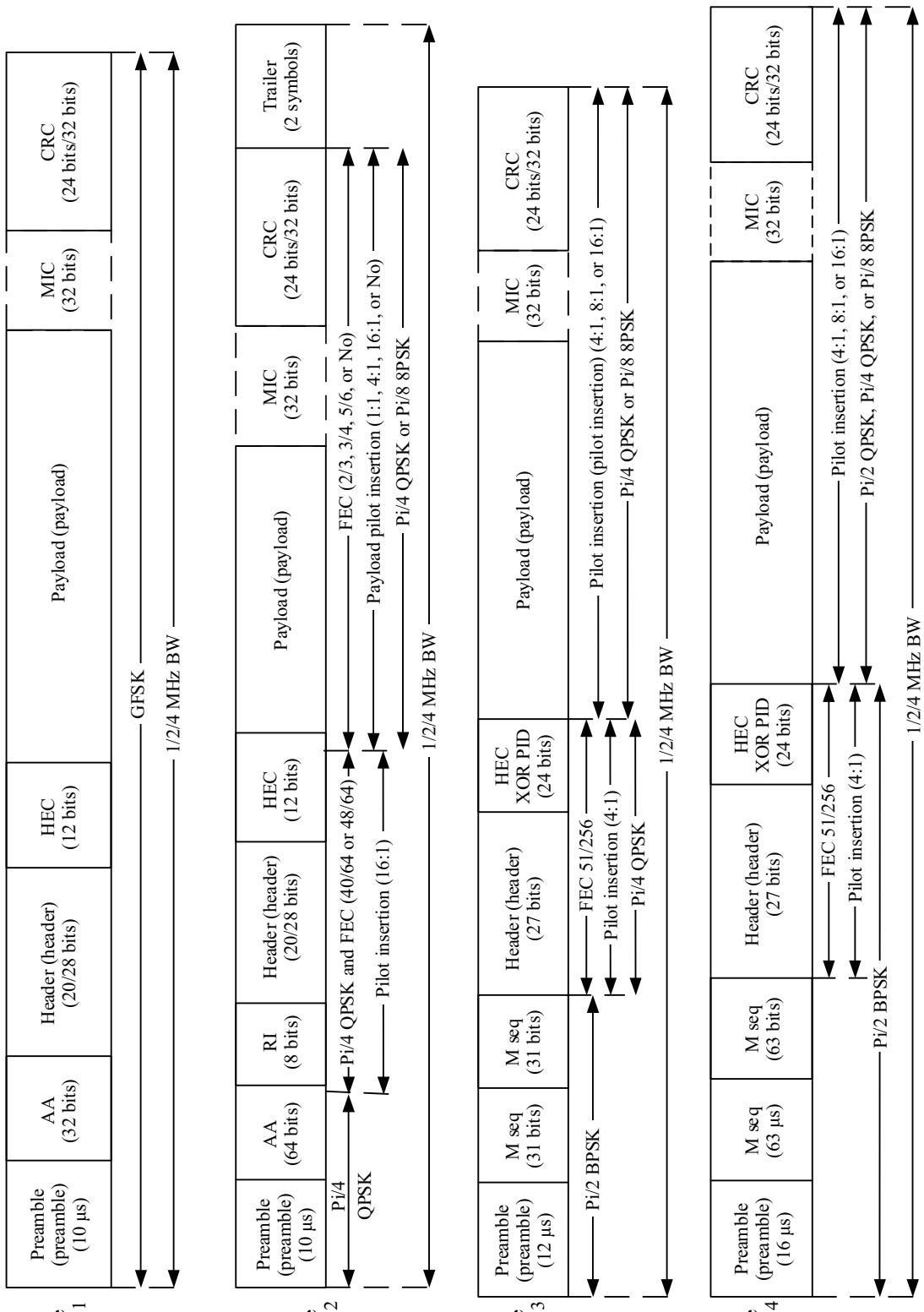
Frame format 1
Preamble (preamble) (10 μs)
AA (32 bits)
Header (header) (20/28 bits)
HEC (12 bits)
Payload (payload)
MIC (32 bits)
CRC (24 bits/32 bits)
GFSK
1/2/4 MHz BW
Frame format 2
Preamble (preamble) (10 μs)
AA (64 bits)
RI (8 bits)
Header (header) (20/28 bits)
HEC (12 bits)
Payload (payload)
MIC (32 bits)
CRC (24 bits/32 bits)
Trailer (2 symbols)
Pi/4 QPSK
Pi/4 QPSK and FEC (40/64 or 48/64)
Pilot insertion (16:1)
FEC (2/3, 3/4, 5/6, or No)
Payload pilot insertion (1:1, 4:1, 16:1, or No)
Pi/4 QPSK or Pi/8 8PSK
1/2/4 MHz BW
Frame format 3
Preamble (preamble) (12 μs)
M seq (31 bits)
M seq (31 bits)
Header (header) (27 bits)
HEC XOR PID (24 bits)
Payload (payload)
MIC (32 bits)
CRC (24 bits/32 bits)
Pi/2 BPSK
FEC 51/256
Pilot insertion (4:1)
Pi/4 QPSK
Pilot insertion (pilot insertion) (4:1, 8:1, or 16:1)
Pi/4 QPSK or Pi/8 8PSK
1/2/4 MHz BW
Frame format 4
Preamble (preamble) (16 μs)
M seq (63 μs)
M seq (63 bits)
Header (header) (27 bits)
HEC XOR PID (24 bits)
Payload (payload)
MIC (32 bits)
CRC (24 bits/32 bits)
Pi/2 BPSK
FEC 51/256
Pilot insertion (4:1)
Pilot insertion (4:1, 8:1, or 16:1)
Pi/2 QPSK, Pi/4 QPSK, or Pi/8 8PSK
1/2/4 MHz BW

FIG. 26

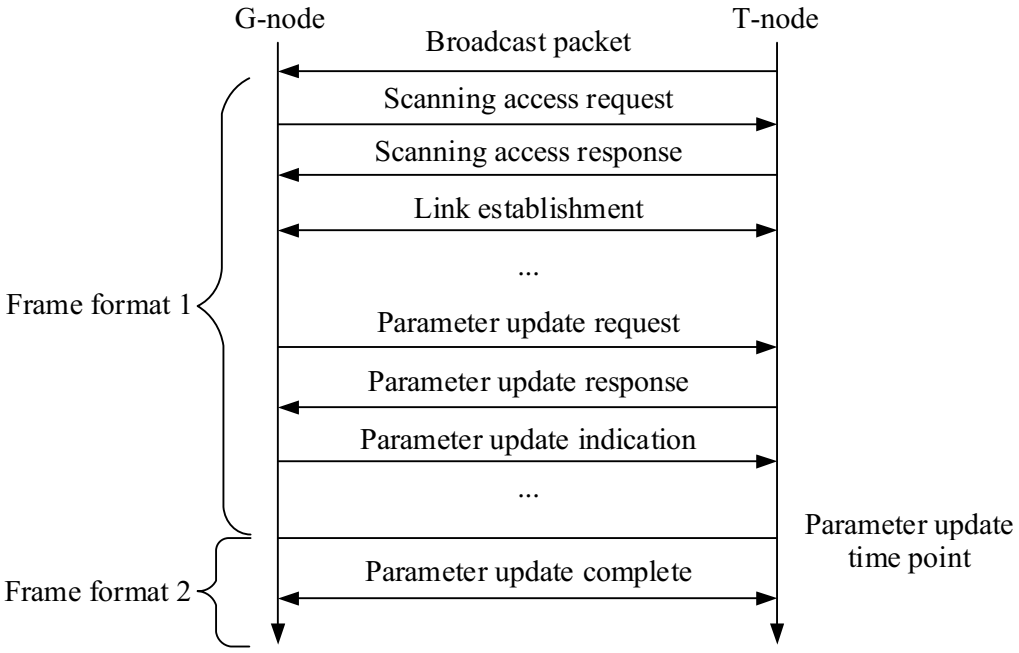
G-node
T-node
Broadcast packet
Scanning access request
Scanning access response
Link establishment
...
Frame format 1
Parameter update request
Parameter update response
Parameter update indication
...
Parameter update time point
Parameter update complete
Frame format 2

FIG. 27

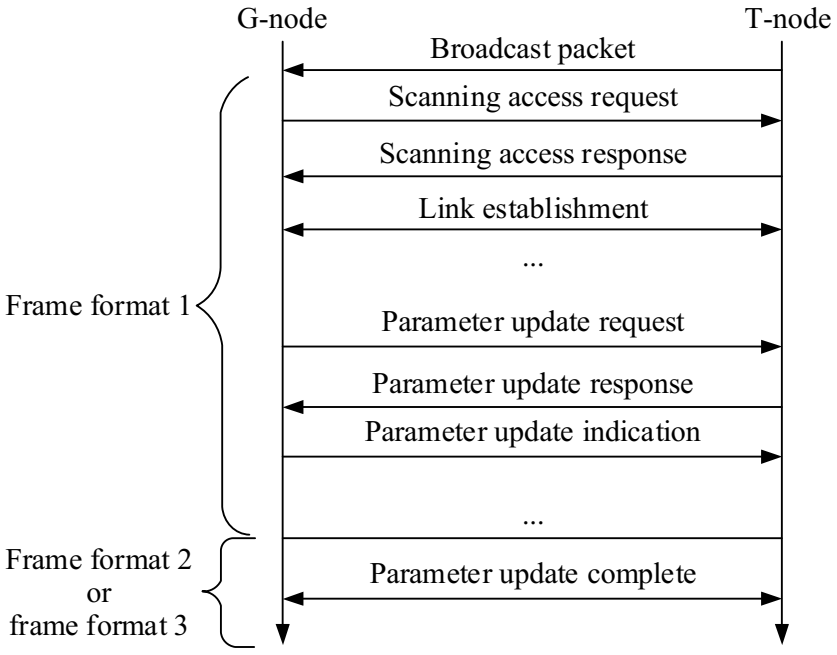
G-node
T-node
Broadcast packet
Scanning access request
Scanning access response
Link establishment
...
Frame format 1
Parameter update request
Parameter update response
Parameter update indication
...
Frame format 2
or
frame format 3
Parameter update complete

FIG. 28

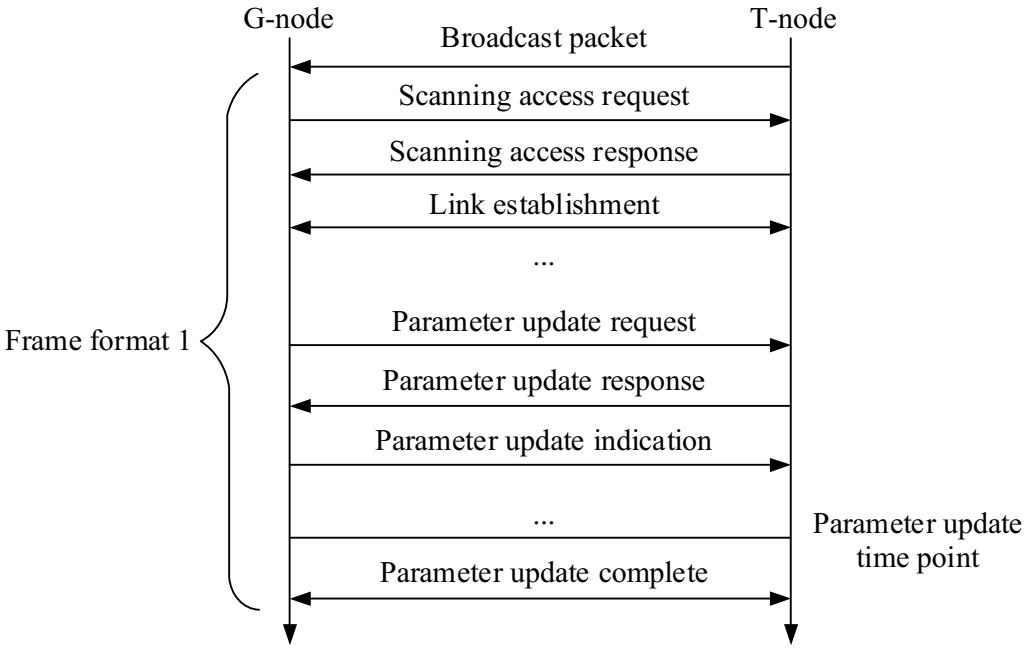
G-node
T-node
Broadcast packet
Scanning access request
Scanning access response
Link establishment
...
Parameter update request
Parameter update response
Parameter update indication
...
Parameter update complete
Frame format 1
Parameter update time point

FIG. 29

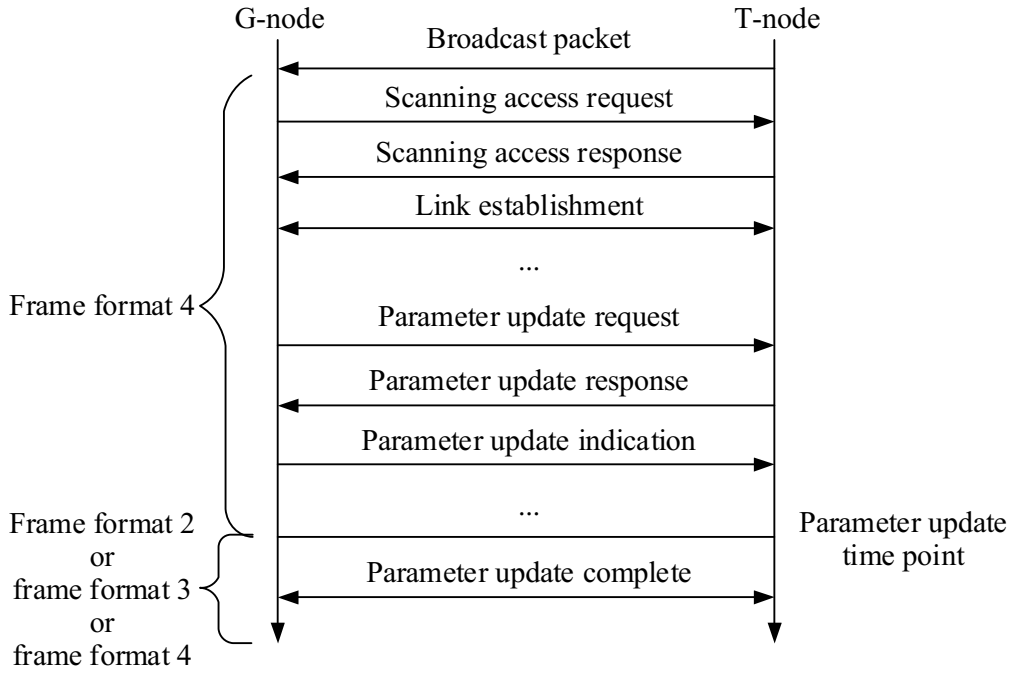
G-node
T-node
Broadcast packet
Scanning access request
Scanning access response
Link establishment
...
Parameter update request
Parameter update response
Parameter update indication
...
Parameter update complete
Frame format 4
Frame format 2
or
frame format 3
or
frame format 4
Parameter update time point

FIG. 30

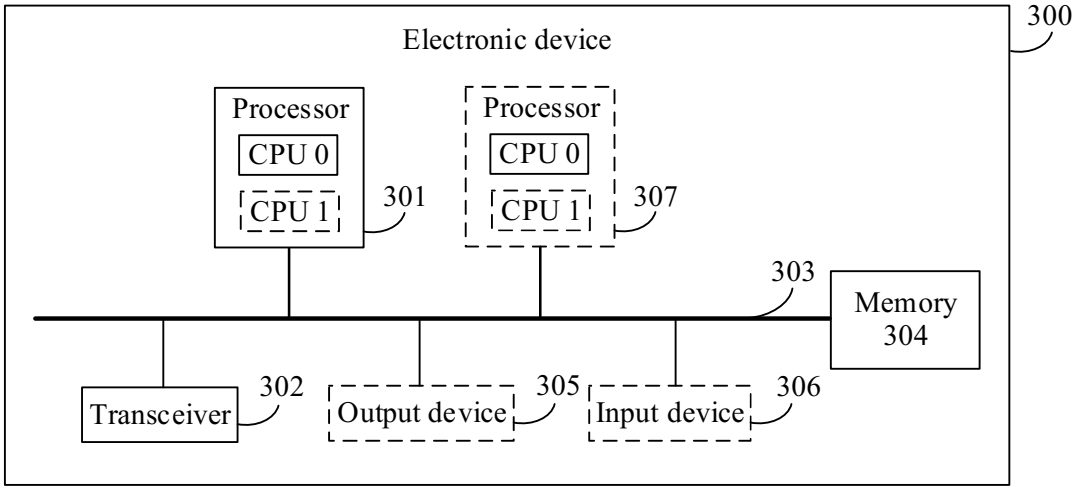

FIG. 31

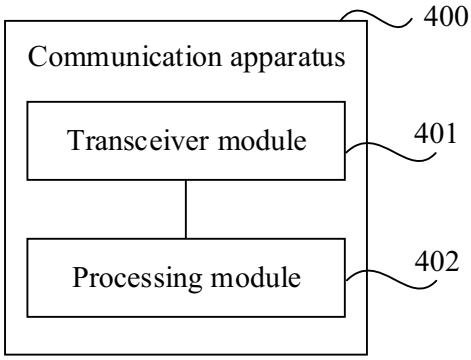

FIG. 32

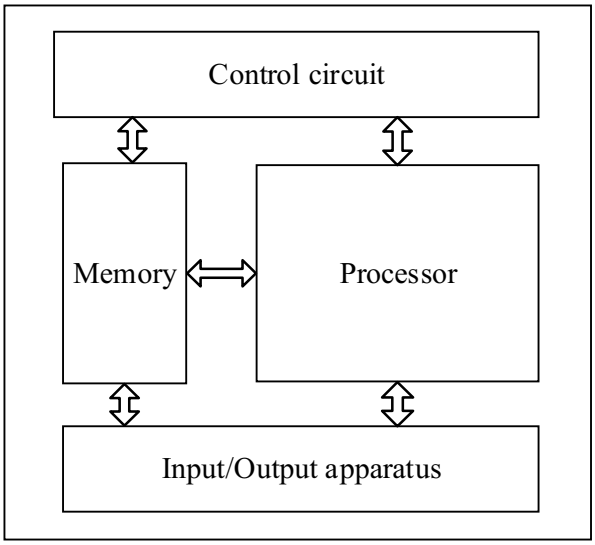

FIG. 33