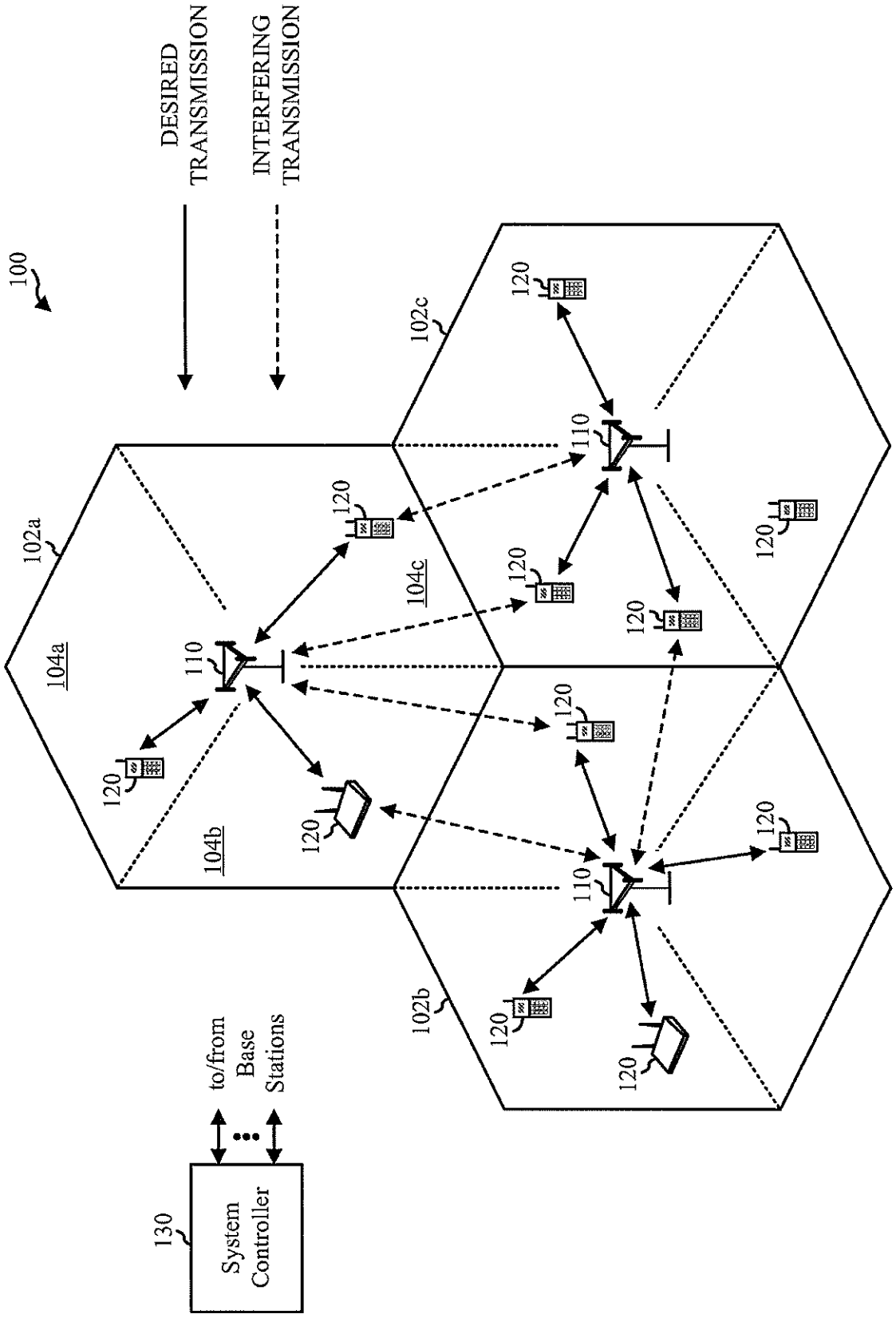

DESIRED TRANSMISSION
INTERFERING TRANSMISSION
100
102a
102b
102c
104a
104b
104c
110
120
130
System Controller
to/from Base Stations

FIG. 1

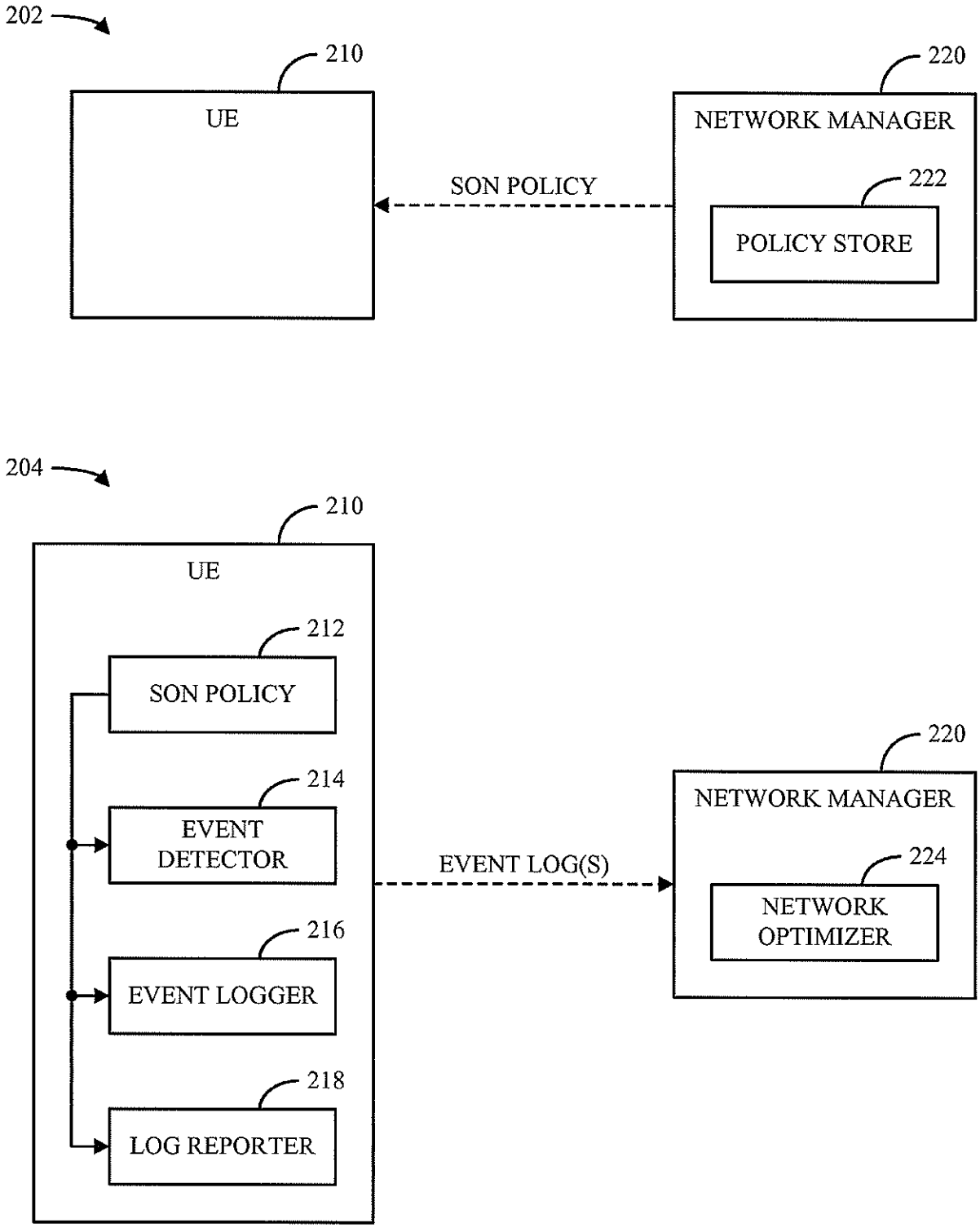

202
210
UE
220
NETWORK MANAGER
SON POLICY
222
POLICY STORE
204
210
UE
212
SON POLICY
214
EVENT DETECTOR
216
EVENT LOGGER
218
LOG REPORTER
EVENT LOG(S)
220
NETWORK MANAGER
224
NETWORK OPTIMIZER

FIG. 2

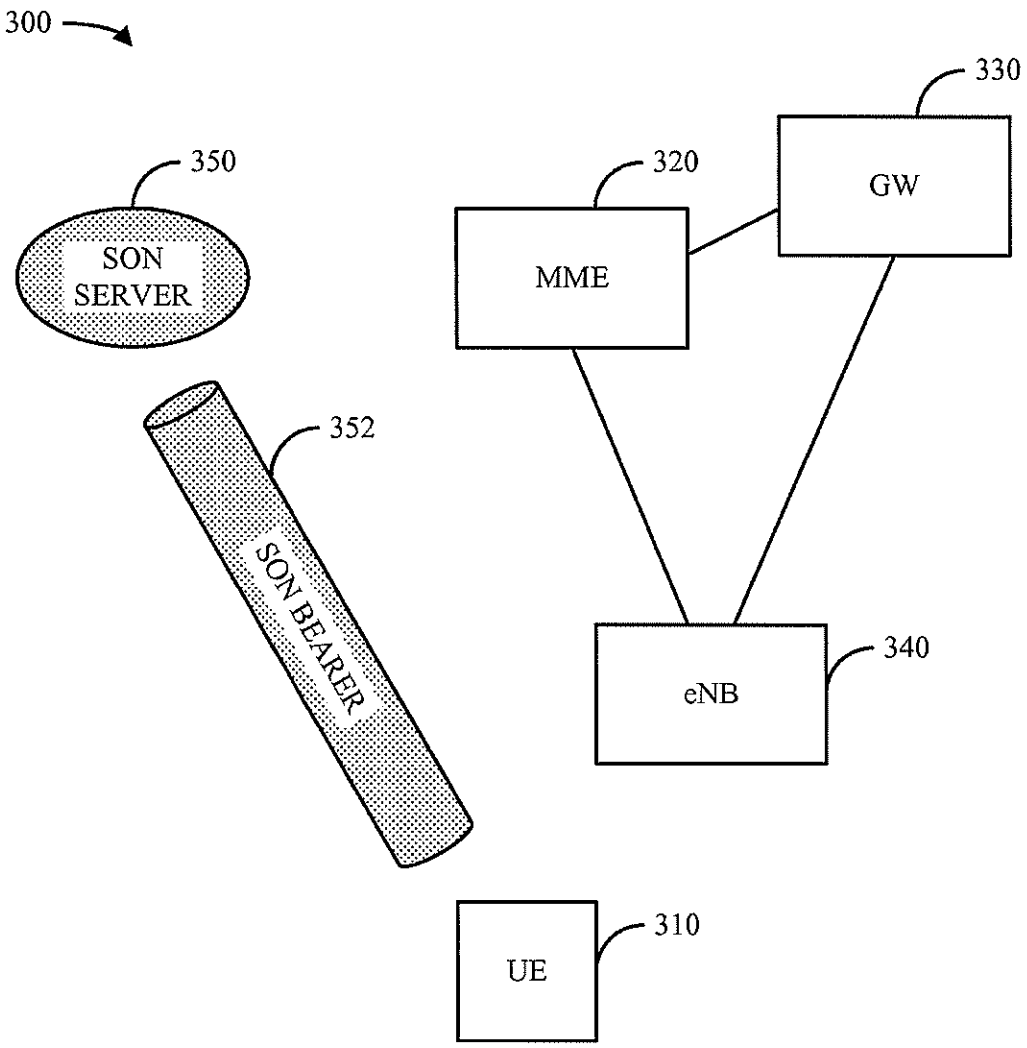


FIG. 3

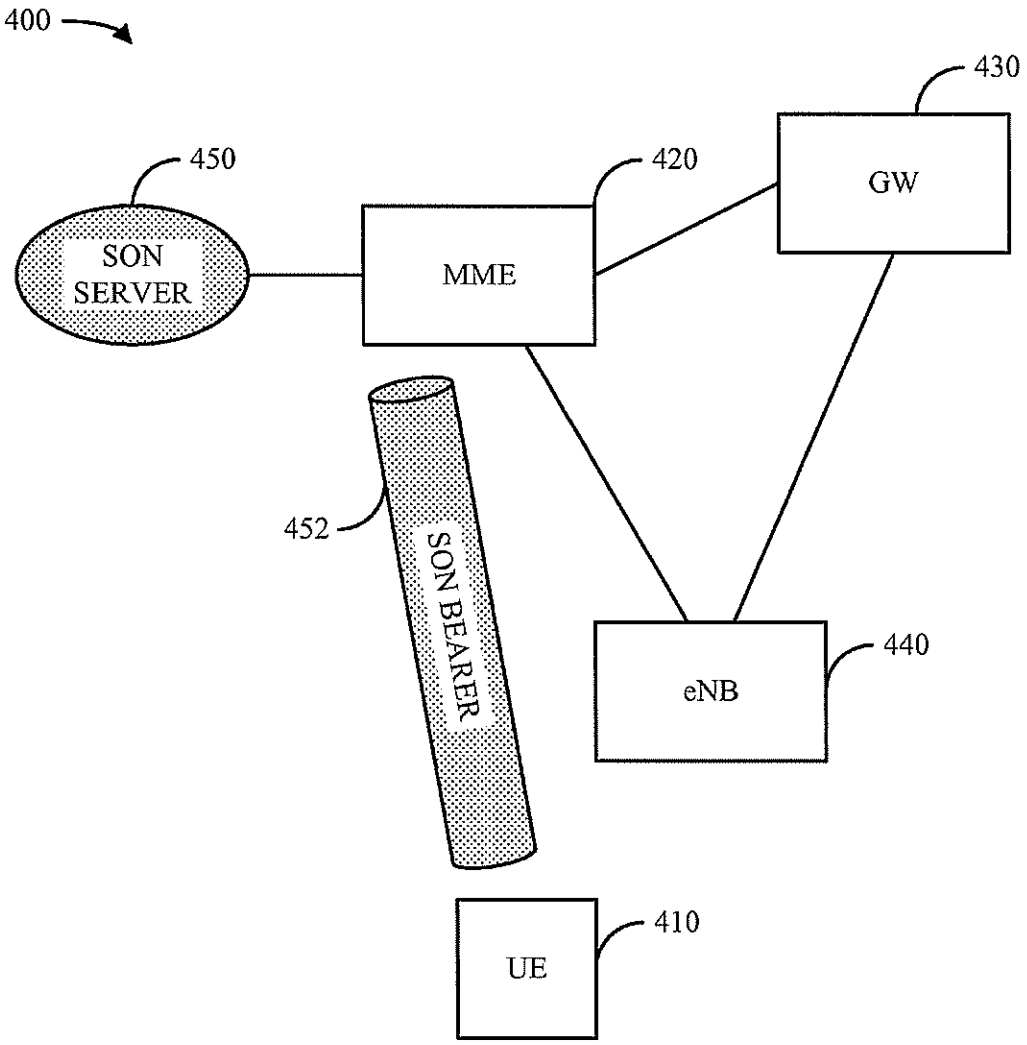


FIG. 4

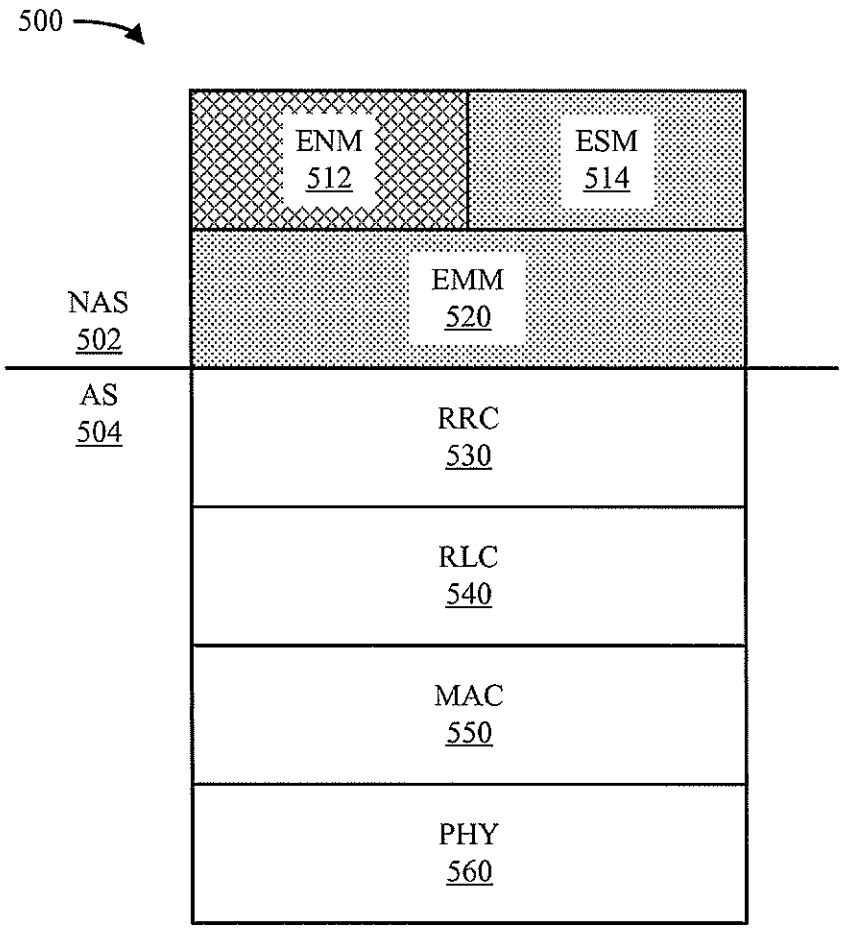

500
ENM
512
ESM
514
EMM
520
NAS
502
AS
504
RRC
530
RLC
540
MAC
550
PHY
560

FIG. 5

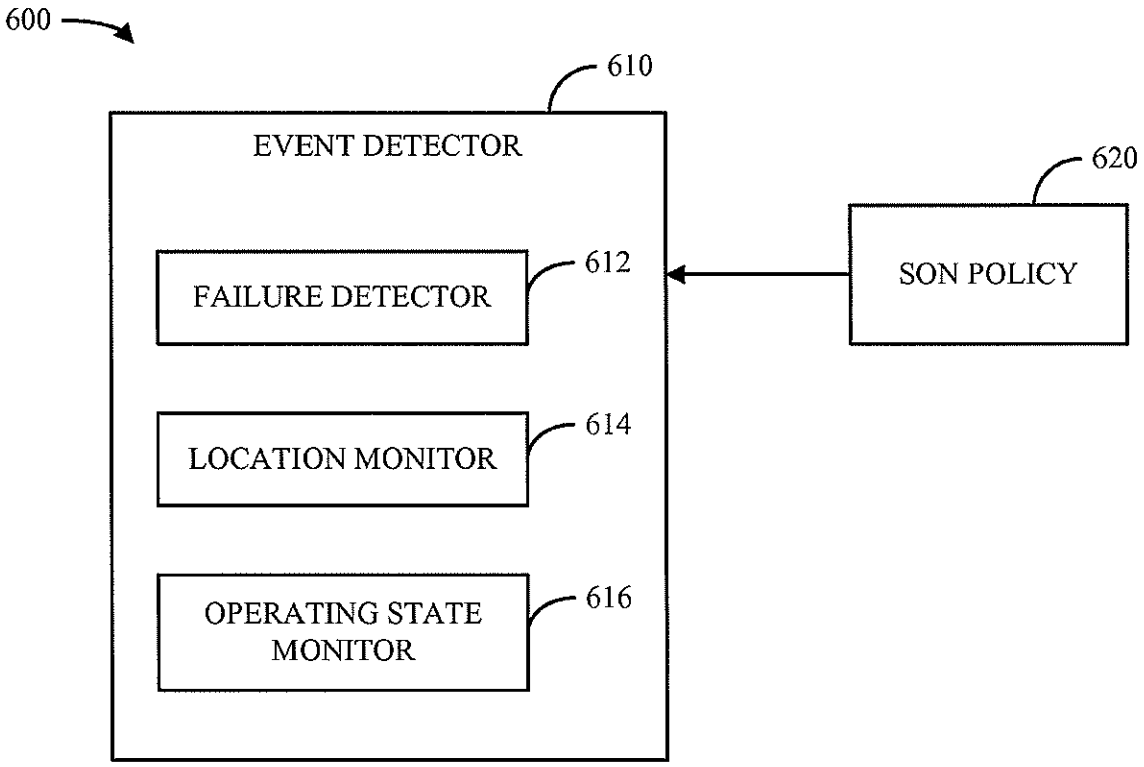

600
610
EVENT DETECTOR
620
SON POLICY
612
FAILURE DETECTOR
614
LOCATION MONITOR
616
OPERATING STATE MONITOR

FIG. 6

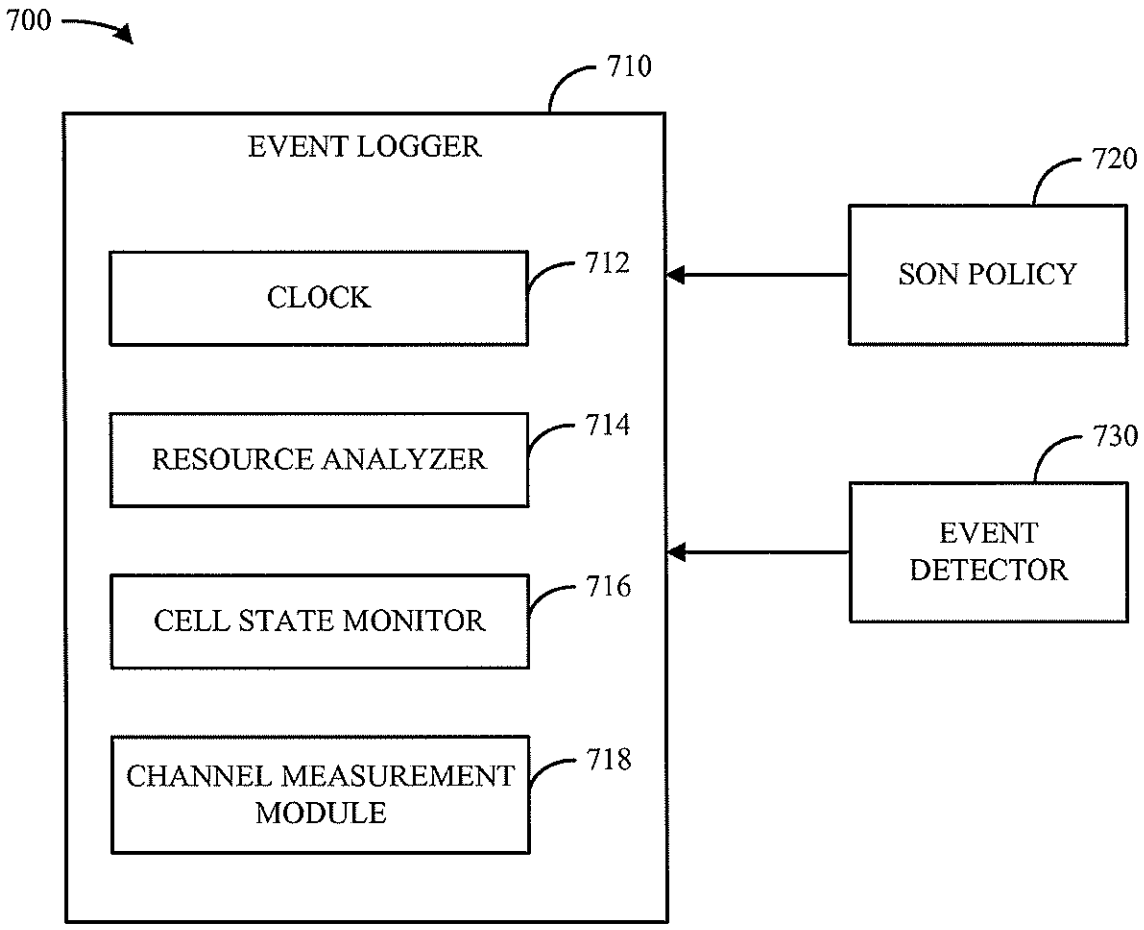

700
710
EVENT LOGGER
720
SON POLICY
712
CLOCK
714
RESOURCE ANALYZER
730
EVENT DETECTOR
716
CELL STATE MONITOR
718
CHANNEL MEASUREMENT MODULE

FIG. 7

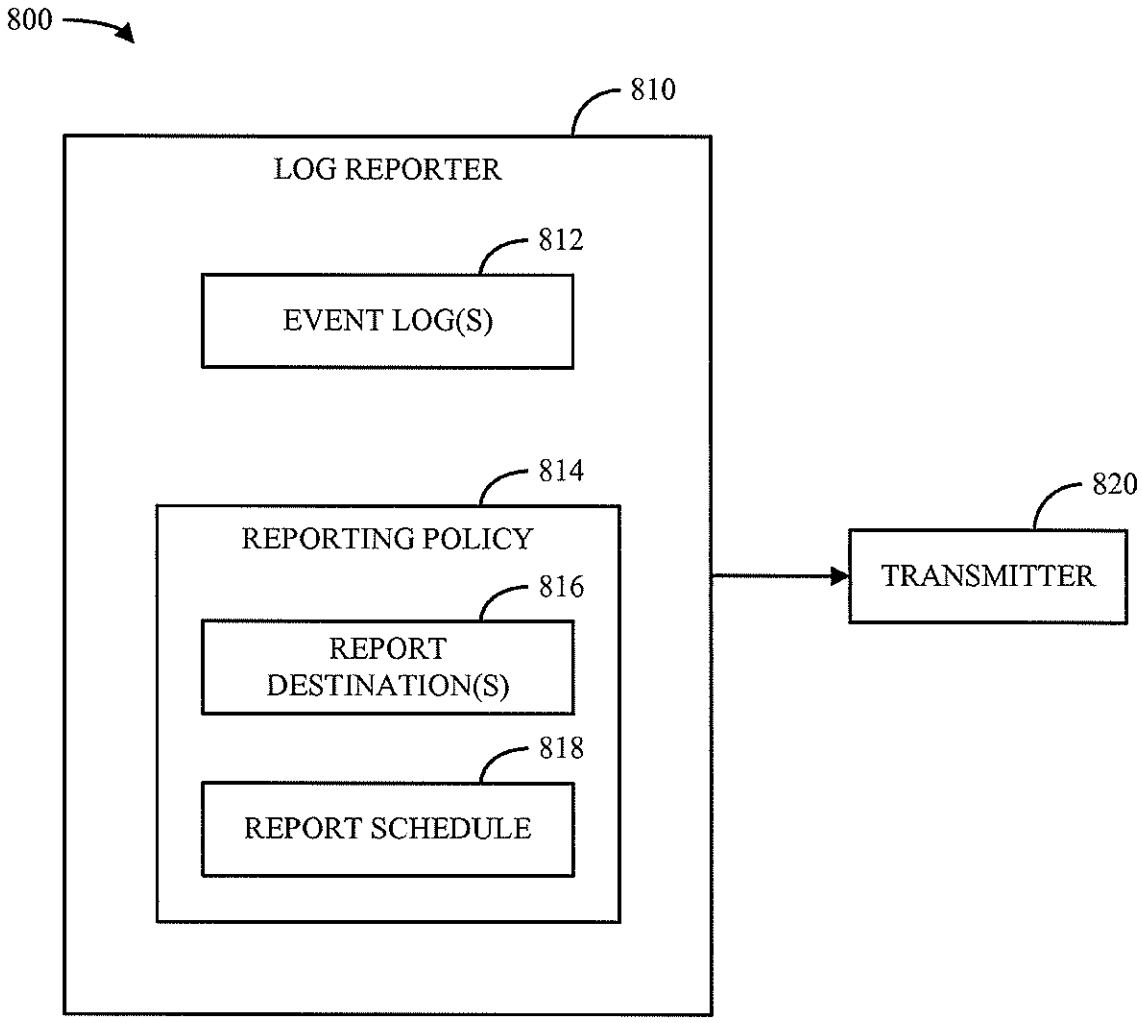

800
810
LOG REPORTER
812
EVENT LOG(S)
814
REPORTING POLICY
816
REPORT DESTINATION(S)
818
REPORT SCHEDULE
820
TRANSMITTER

FIG. 8

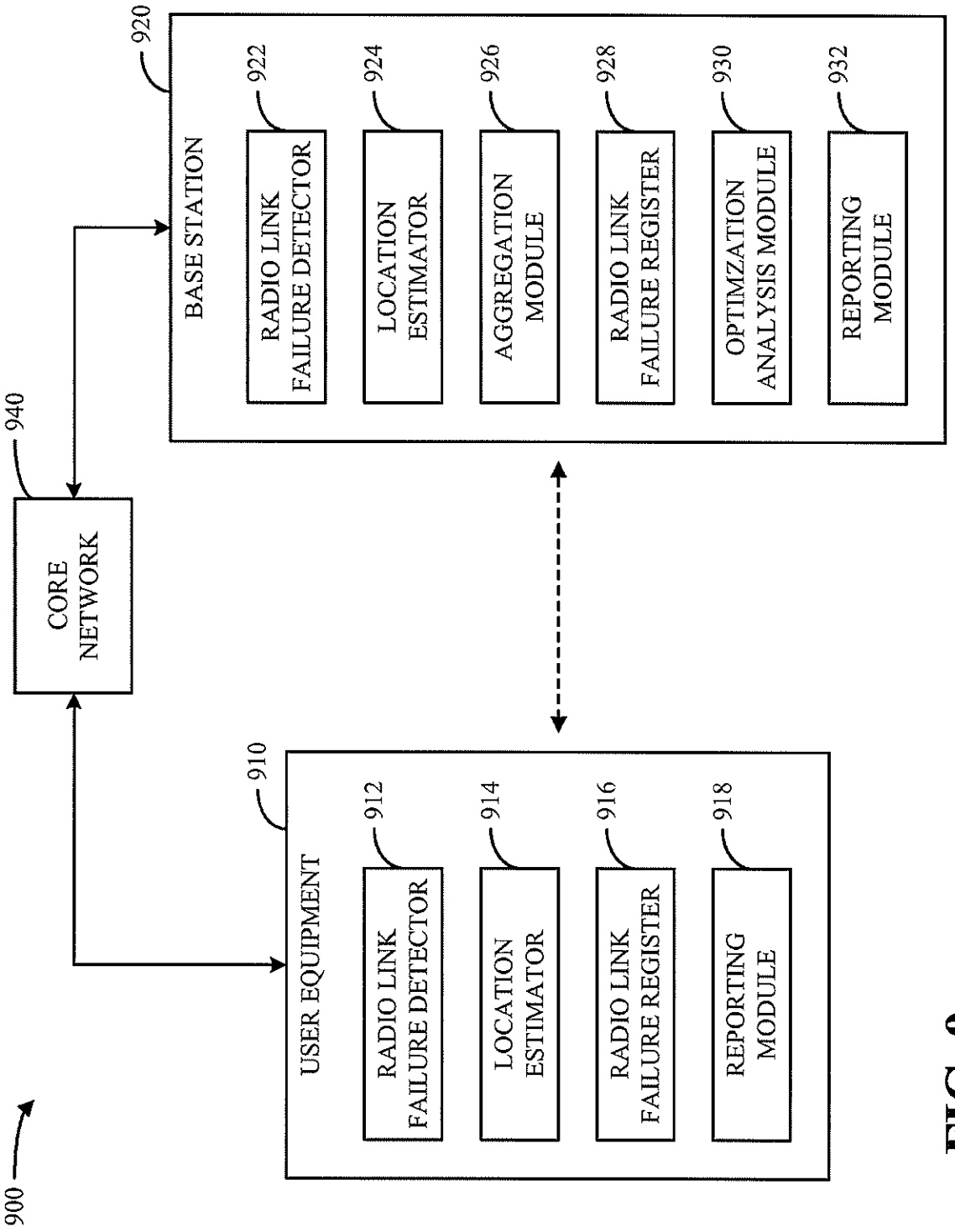

900
940
CORE NETWORK
920
BASE STATION
922
RADIO LINK FAILURE DETECTOR
924
LOCATION ESTIMATOR
926
AGGREGATION MODULE
928
RADIO LINK FAILURE REGISTER
930
OPTIMZATION ANALYSIS MODULE
932
REPORTING MODULE
910
USER EQUIPMENT
912
RADIO LINK FAILURE DETECTOR
914
LOCATION ESTIMATOR
916
RADIO LINK FAILURE REGISTER
918
REPORTING MODULE

FIG. 9

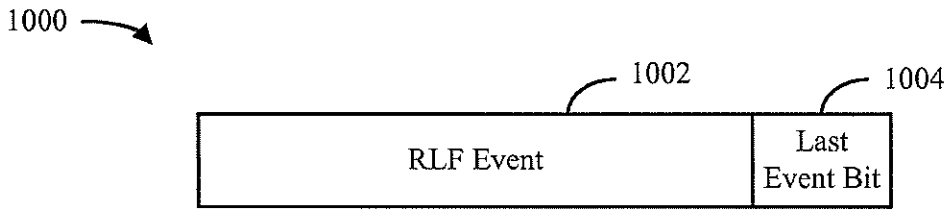

1000
1002
1004
RLF Event
Last Event Bit

FIG. 10

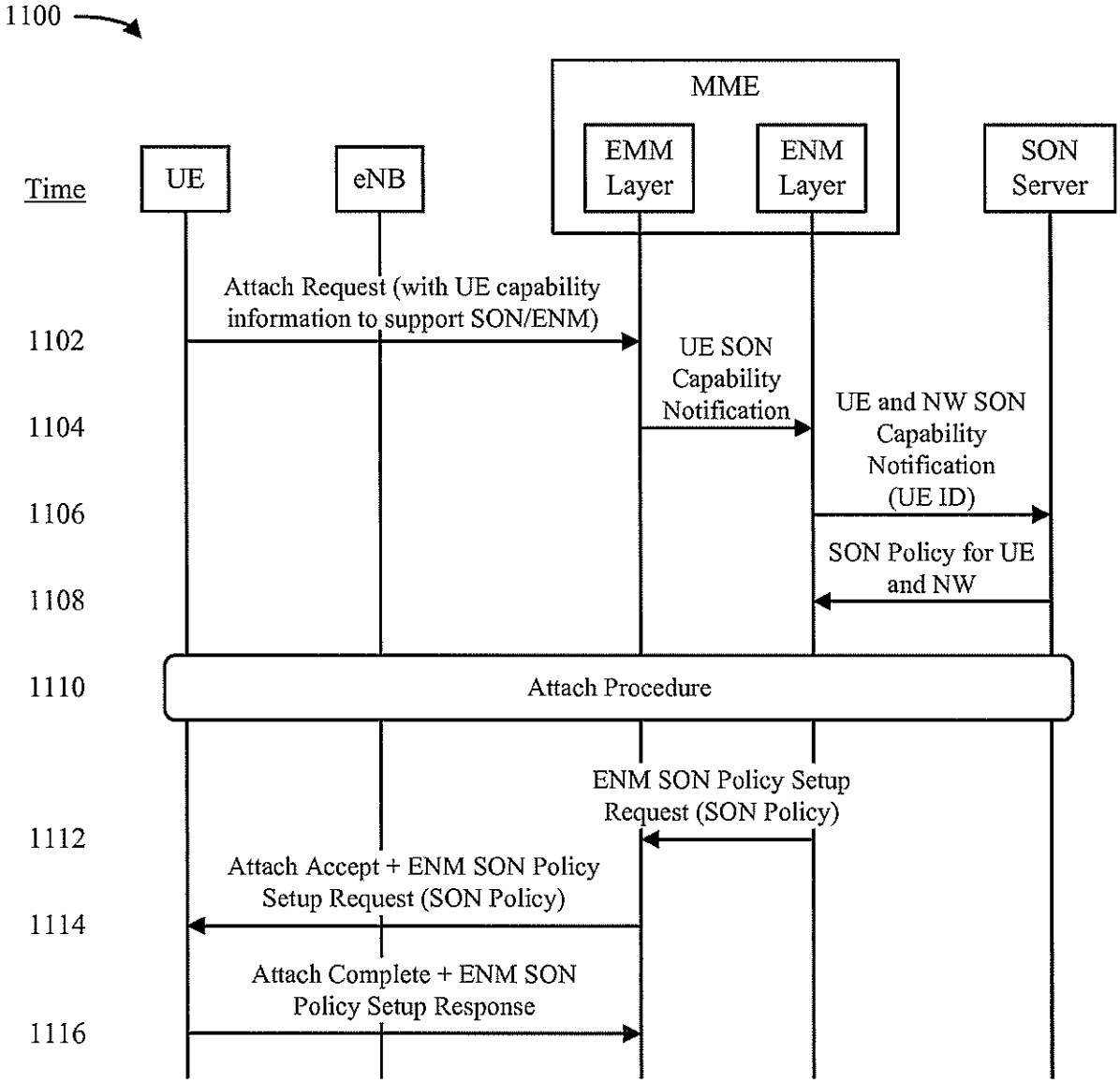

1100
MME
EMM Layer
ENM Layer
SON Server
Time
UE
eNB
Attach Request (with UE capability information to support SON/ENM)
1102
UE SON Capability Notification
1104
UE and NW SON Capability Notification (UE ID)
1106
SON Policy for UE and NW
1108
1110
Attach Procedure
ENM SON Policy Setup Request (SON Policy)
1112
Attach Accept + ENM SON Policy Setup Request (SON Policy)
1114
Attach Complete + ENM SON Policy Setup Response
1116

FIG. 11

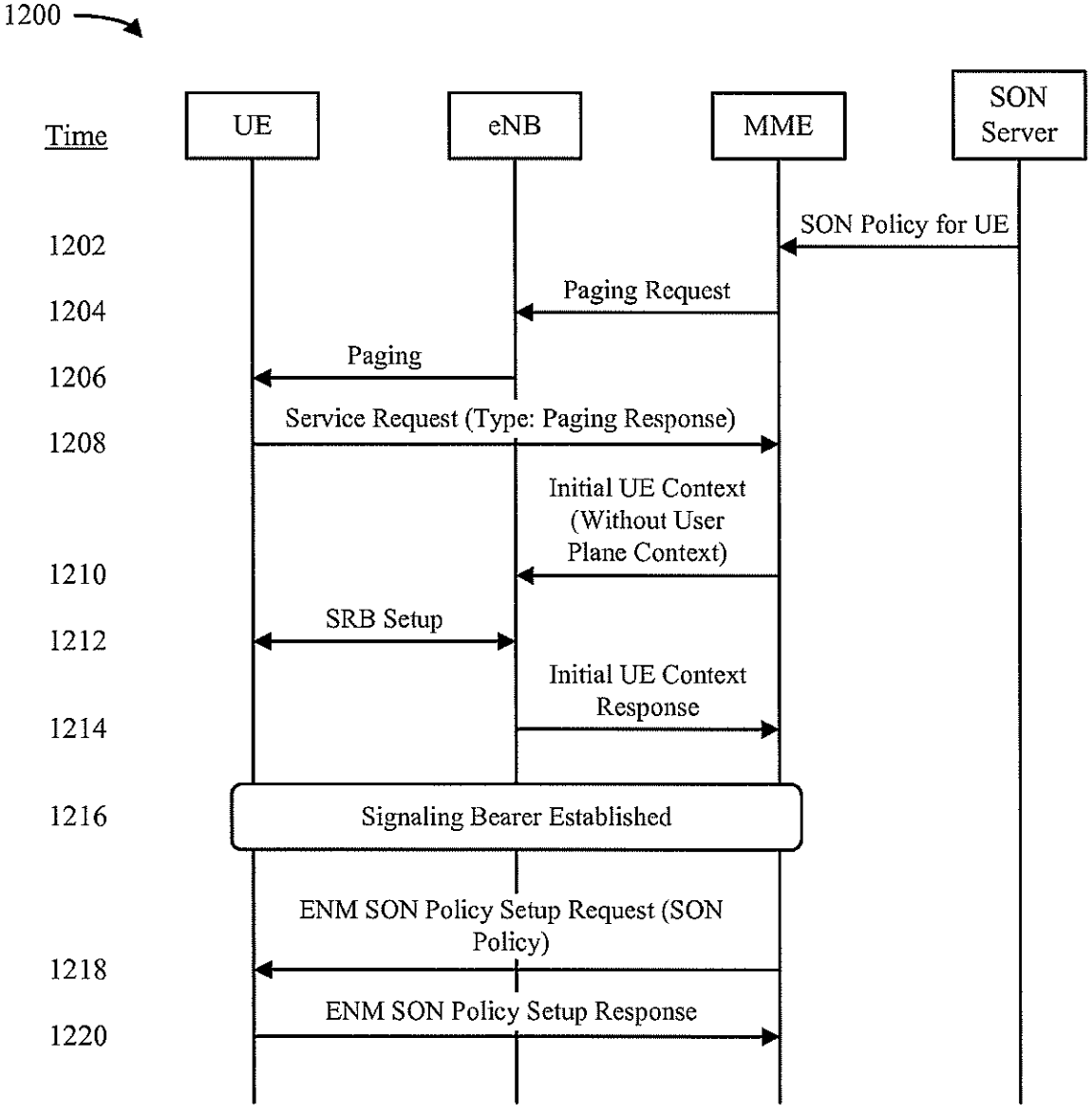

1200
Time
UE
eNB
MME
SON Server
1202
SON Policy for UE
1204
Paging Request
1206
Paging
1208
Service Request (Type: Paging Response)
Initial UE Context (Without User Plane Context)
1210
1212
SRB Setup
Initial UE Context Response
1214
1216
Signaling Bearer Established
ENM SON Policy Setup Request (SON Policy)
1218
ENM SON Policy Setup Response
1220

FIG. 12

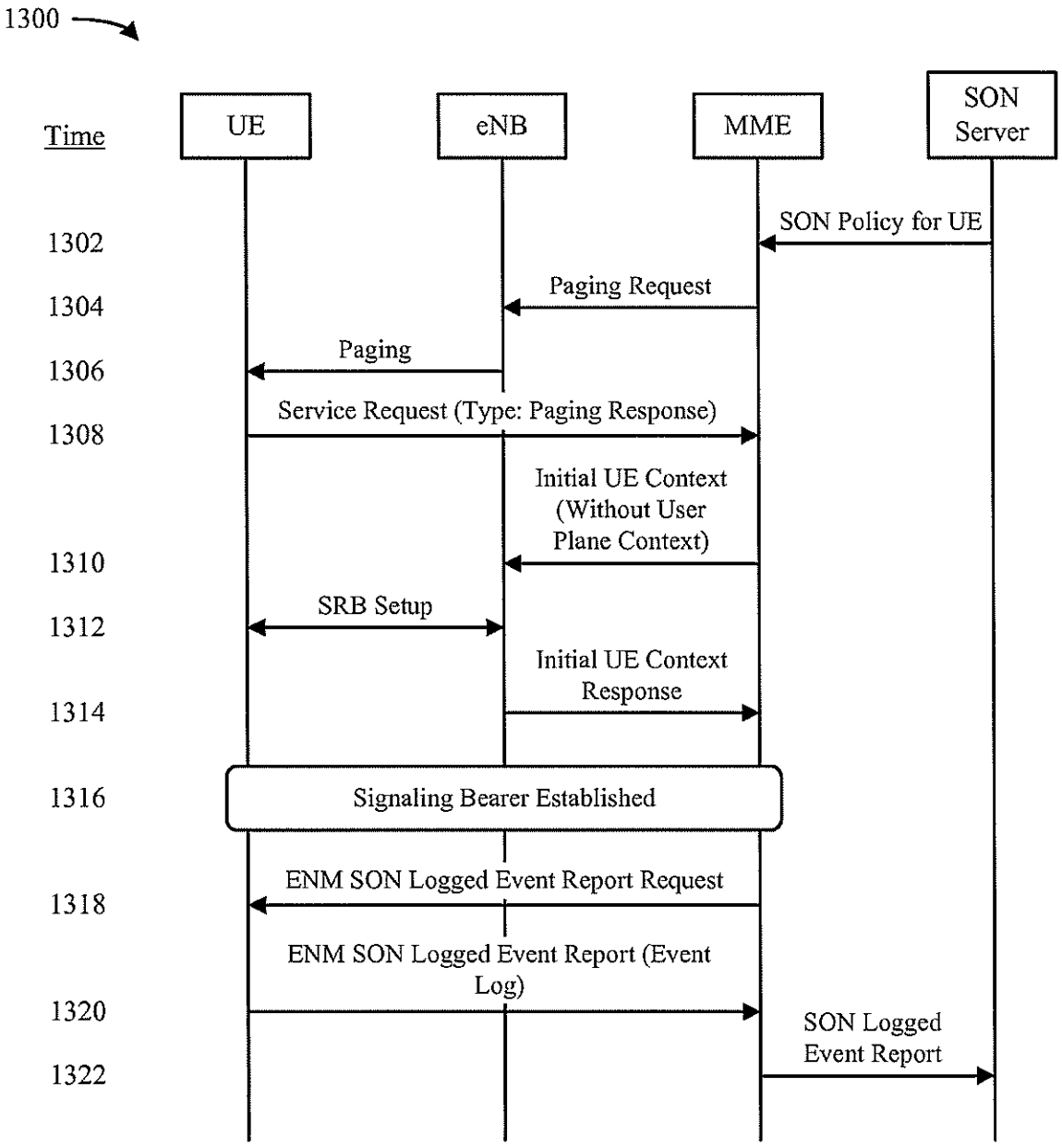

1300
Time
UE
eNB
MME
SON Server
1302
SON Policy for UE
1304
Paging Request
1306
Paging
1308
Service Request (Type: Paging Response)
Initial UE Context (Without User Plane Context)
1310
1312
SRB Setup
Initial UE Context Response
1314
1316
Signaling Bearer Established
1318
ENM SON Logged Event Report Request
ENM SON Logged Event Report (Event Log)
1320
SON Logged Event Report
1322

FIG. 13

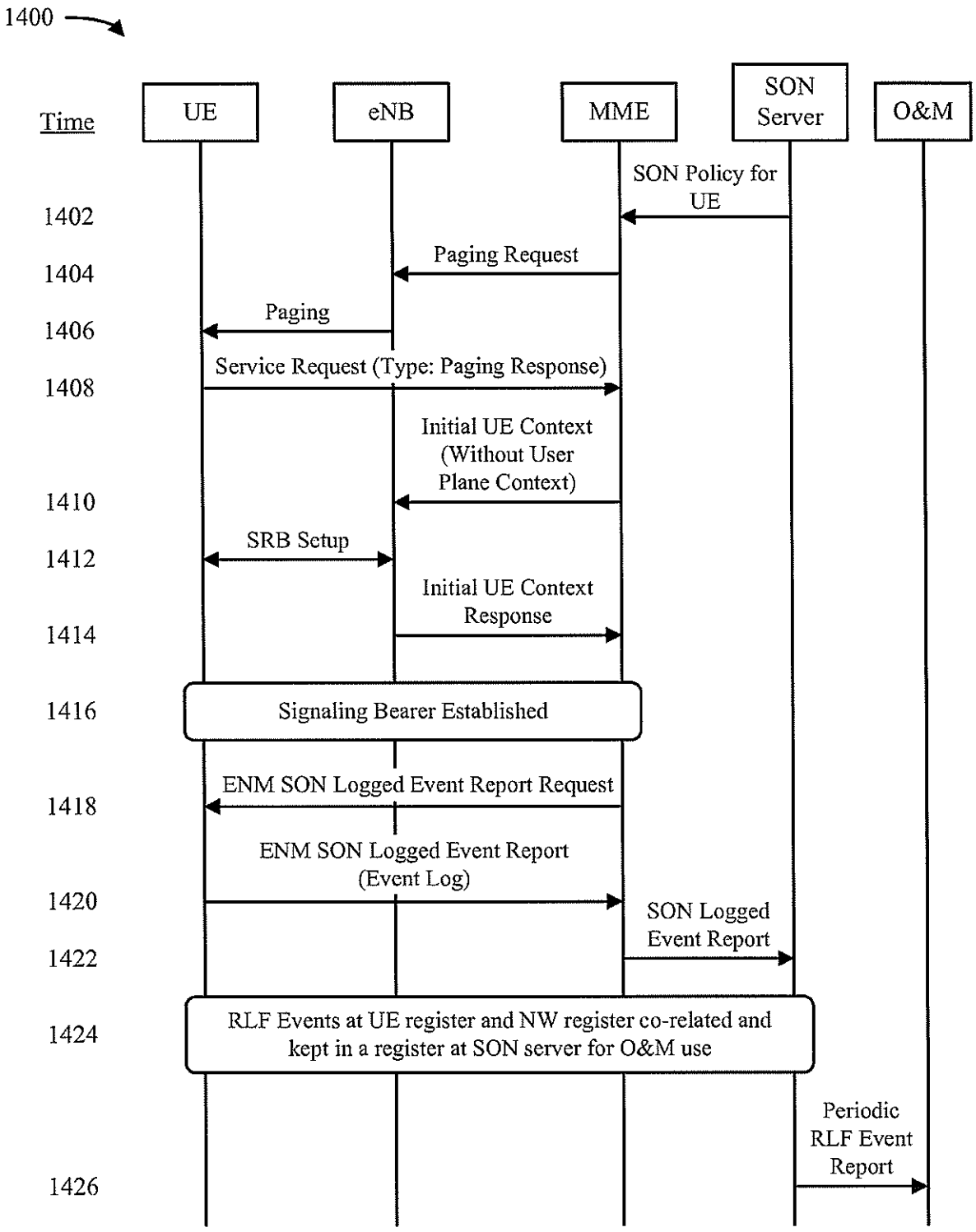

1400
Time
UE
eNB
MME
SON Server
O&M
SON Policy for UE
1402
Paging Request
1404
Paging
1406
Service Request (Type: Paging Response)
1408
Initial UE Context (Without User Plane Context)
1410
SRB Setup
1412
Initial UE Context Response
1414
1416
Signaling Bearer Established
ENM SON Logged Event Report Request
1418
ENM SON Logged Event Report (Event Log)
1420
SON Logged Event Report
1422
1424
RLF Events at UE register and NW register co-related and kept in a register at SON server for O&M use
Periodic RLF Event Report
1426

FIG. 14

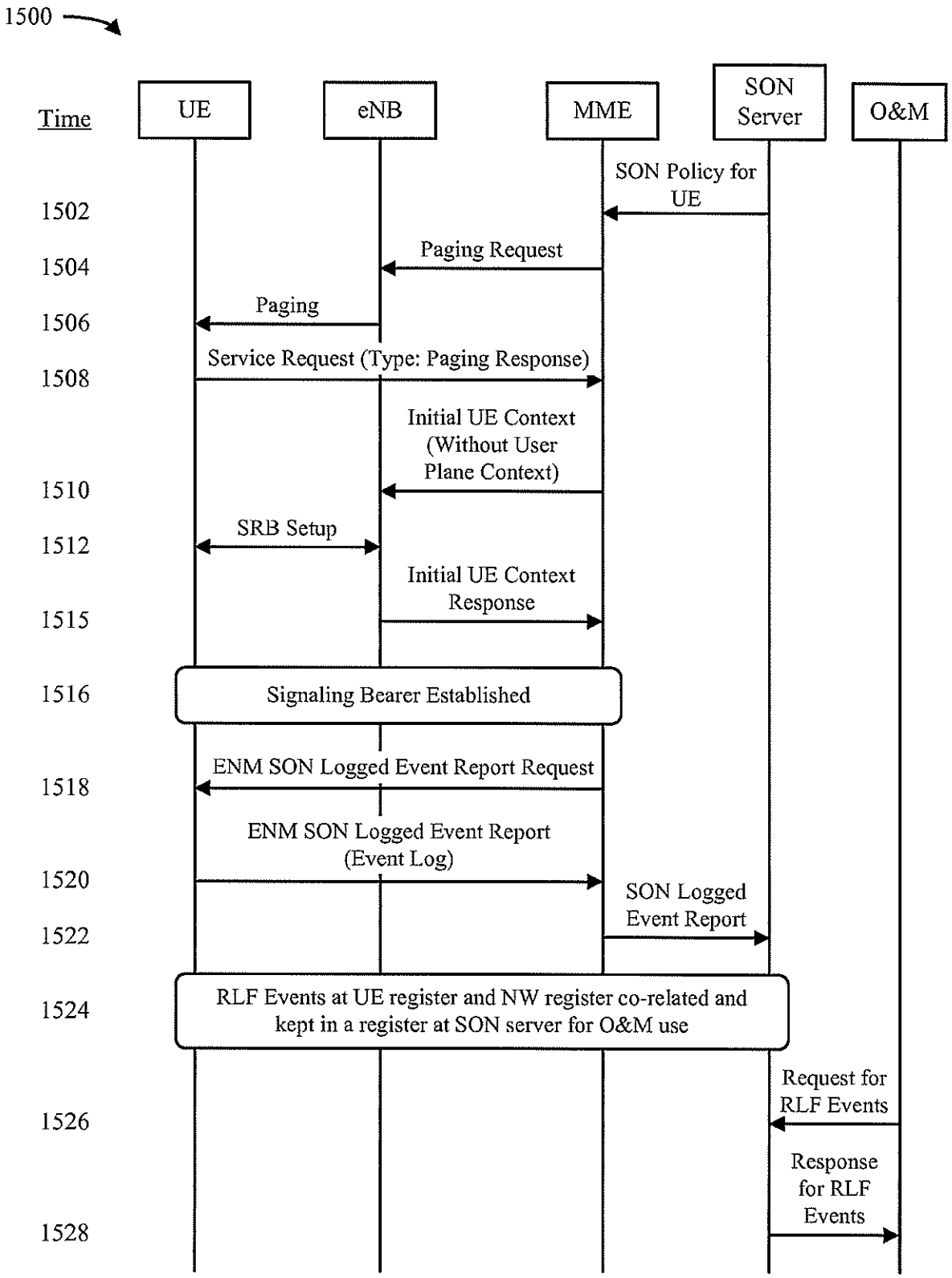

1500
Time
UE
eNB
MME
SON Server
O&M
SON Policy for UE
1502
Paging Request
1504
Paging
1506
Service Request (Type: Paging Response)
1508
Initial UE Context (Without User Plane Context)
1510
SRB Setup
1512
Initial UE Context Response
1515
Signaling Bearer Established
1516
ENM SON Logged Event Report Request
1518
ENM SON Logged Event Report (Event Log)
1520
SON Logged Event Report
1522
RLF Events at UE register and NW register co-related and kept in a register at SON server for O&M use
1524
Request for RLF Events
1526
Response for RLF Events
1528

FIG. 15

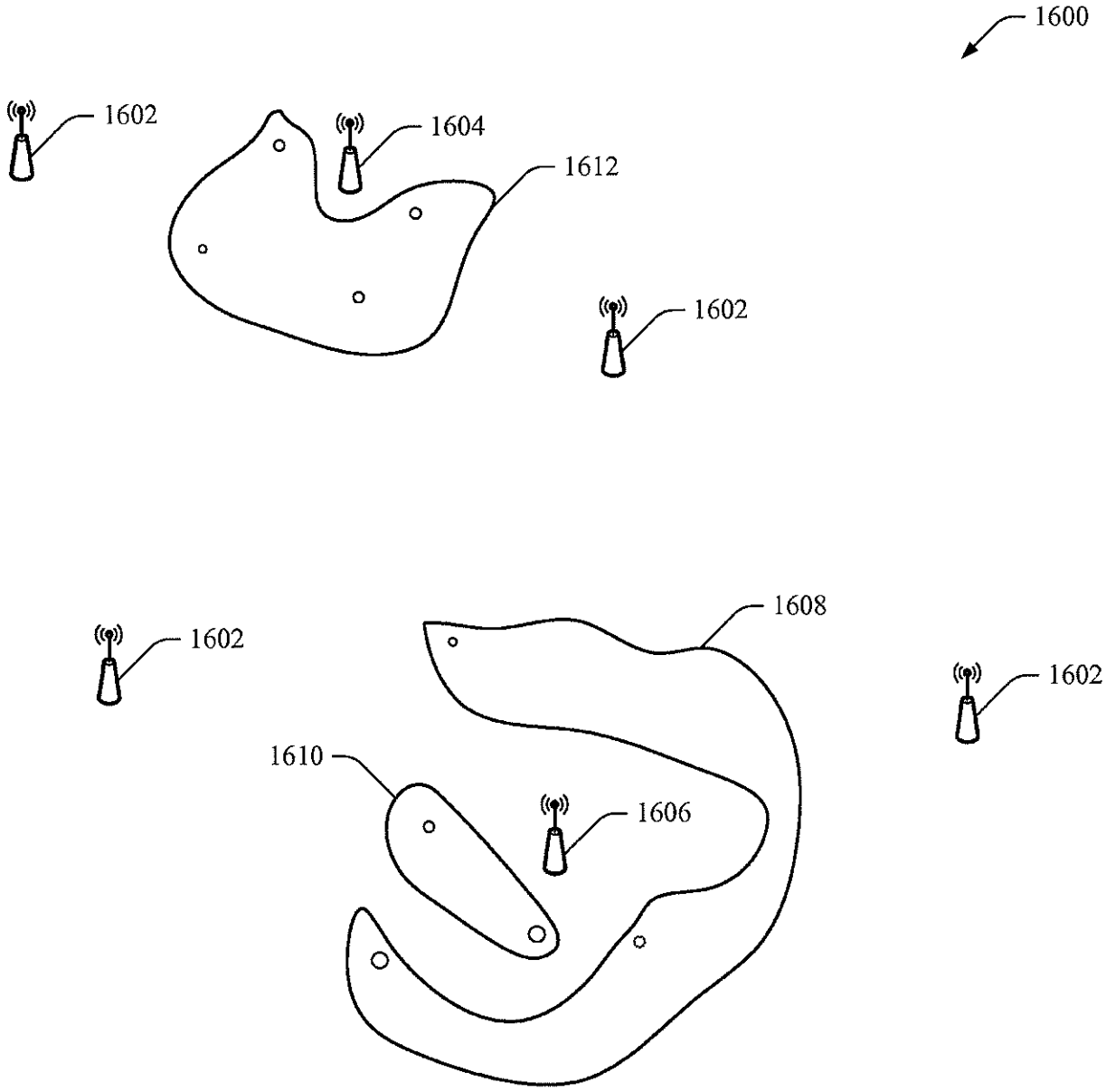


FIG. 16

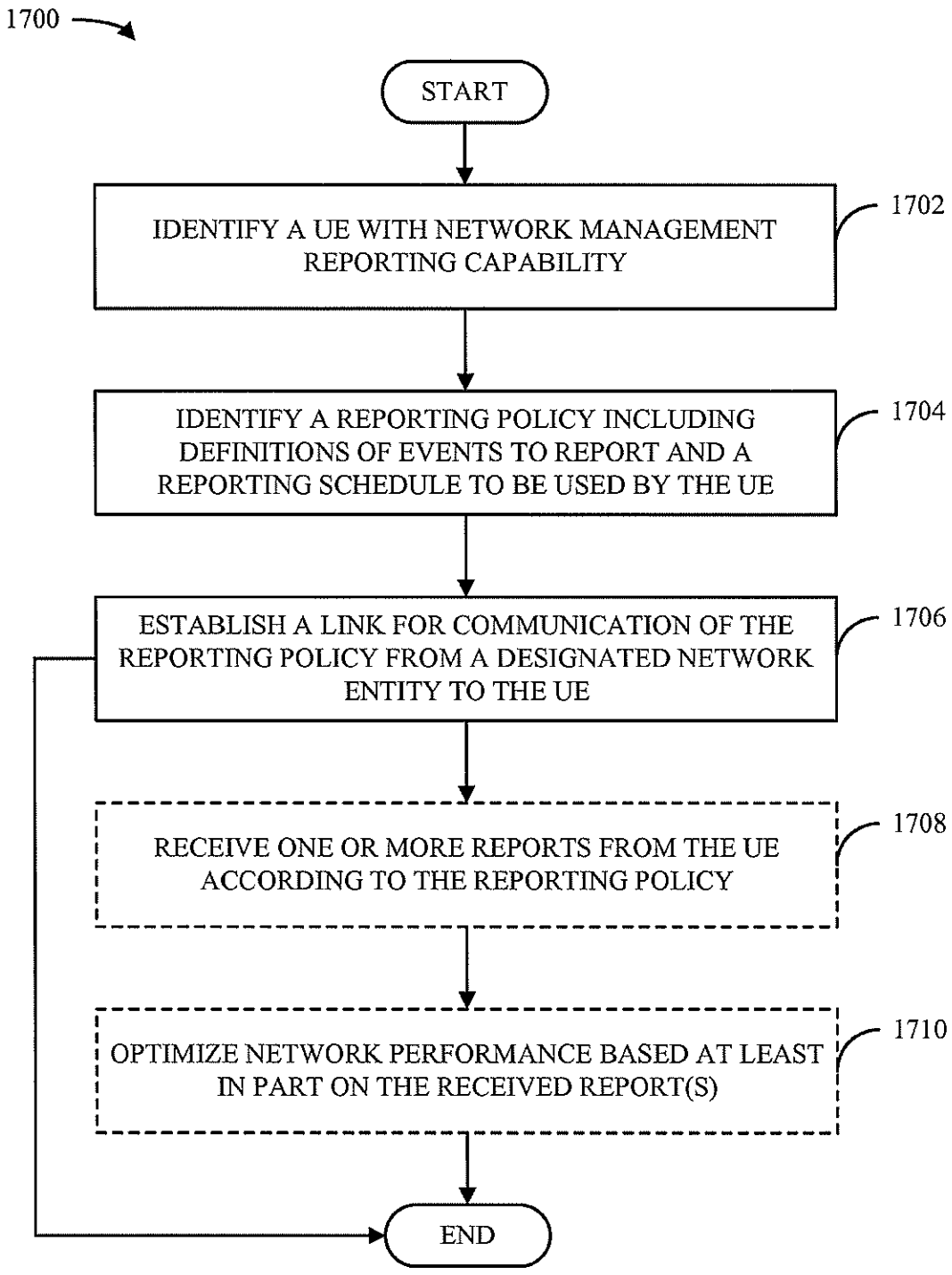

1700
START
IDENTIFY A UE WITH NETWORK MANAGEMENT REPORTING CAPABILITY
1702
IDENTIFY A REPORTING POLICY INCLUDING DEFINITIONS OF EVENTS TO REPORT AND A REPORTING SCHEDULE TO BE USED BY THE UE
1704
ESTABLISH A LINK FOR COMMUNICATION OF THE REPORTING POLICY FROM A DESIGNATED NETWORK ENTITY TO THE UE
1706
RECEIVE ONE OR MORE REPORTS FROM THE UE ACCORDING TO THE REPORTING POLICY
1708
OPTIMIZE NETWORK PERFORMANCE BASED AT LEAST IN PART ON THE RECEIVED REPORT(S)
1710
END

FIG. 17

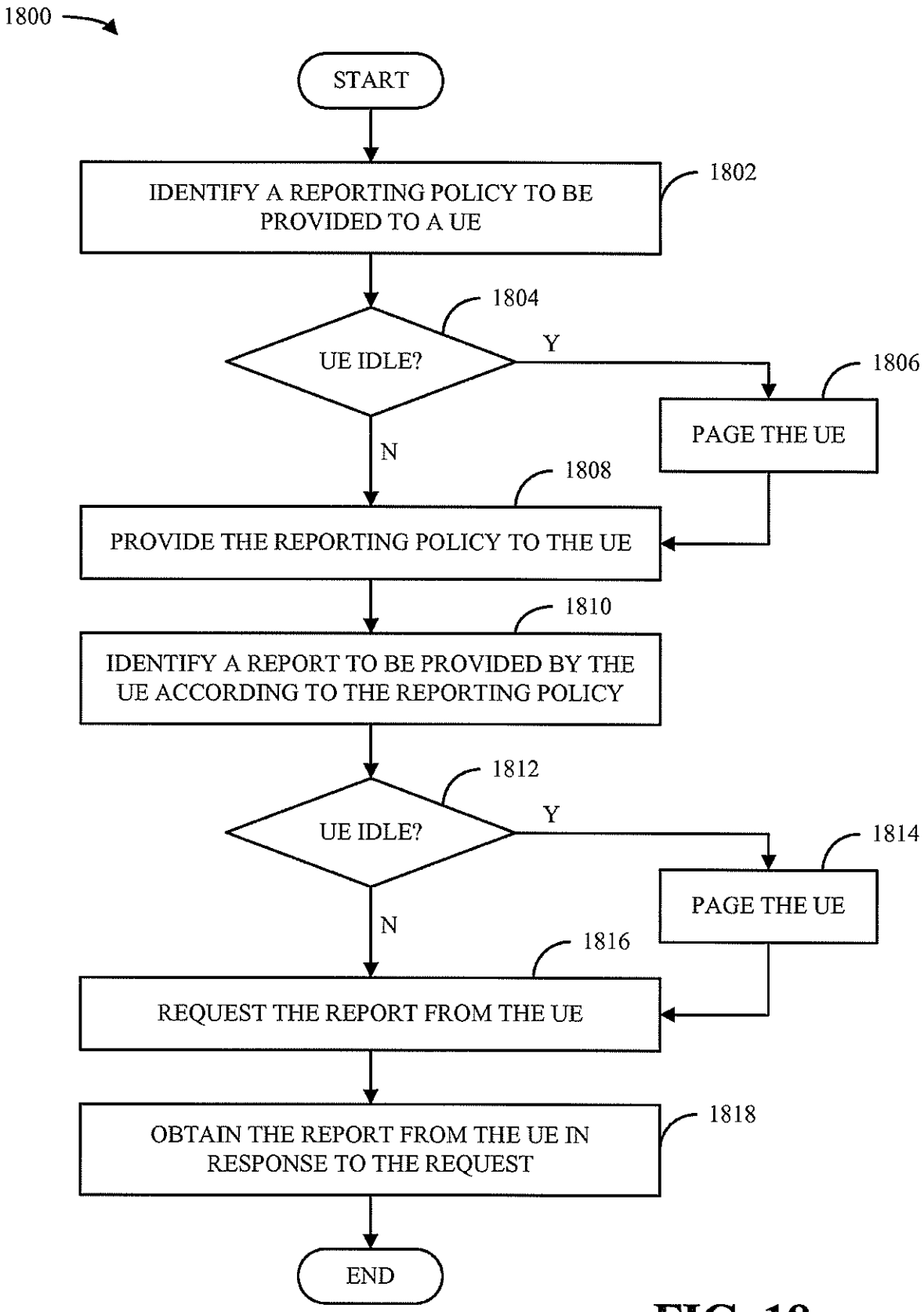

1800
START
IDENTIFY A REPORTING POLICY TO BE PROVIDED TO A UE
1802
1804
UE IDLE?
Y
1806
PAGE THE UE
N
1808
PROVIDE THE REPORTING POLICY TO THE UE
1810
IDENTIFY A REPORT TO BE PROVIDED BY THE UE ACCORDING TO THE REPORTING POLICY
1812
UE IDLE?
Y
1814
PAGE THE UE
N
1816
REQUEST THE REPORT FROM THE UE
1818
OBTAIN THE REPORT FROM THE UE IN RESPONSE TO THE REQUEST
END

FIG. 18

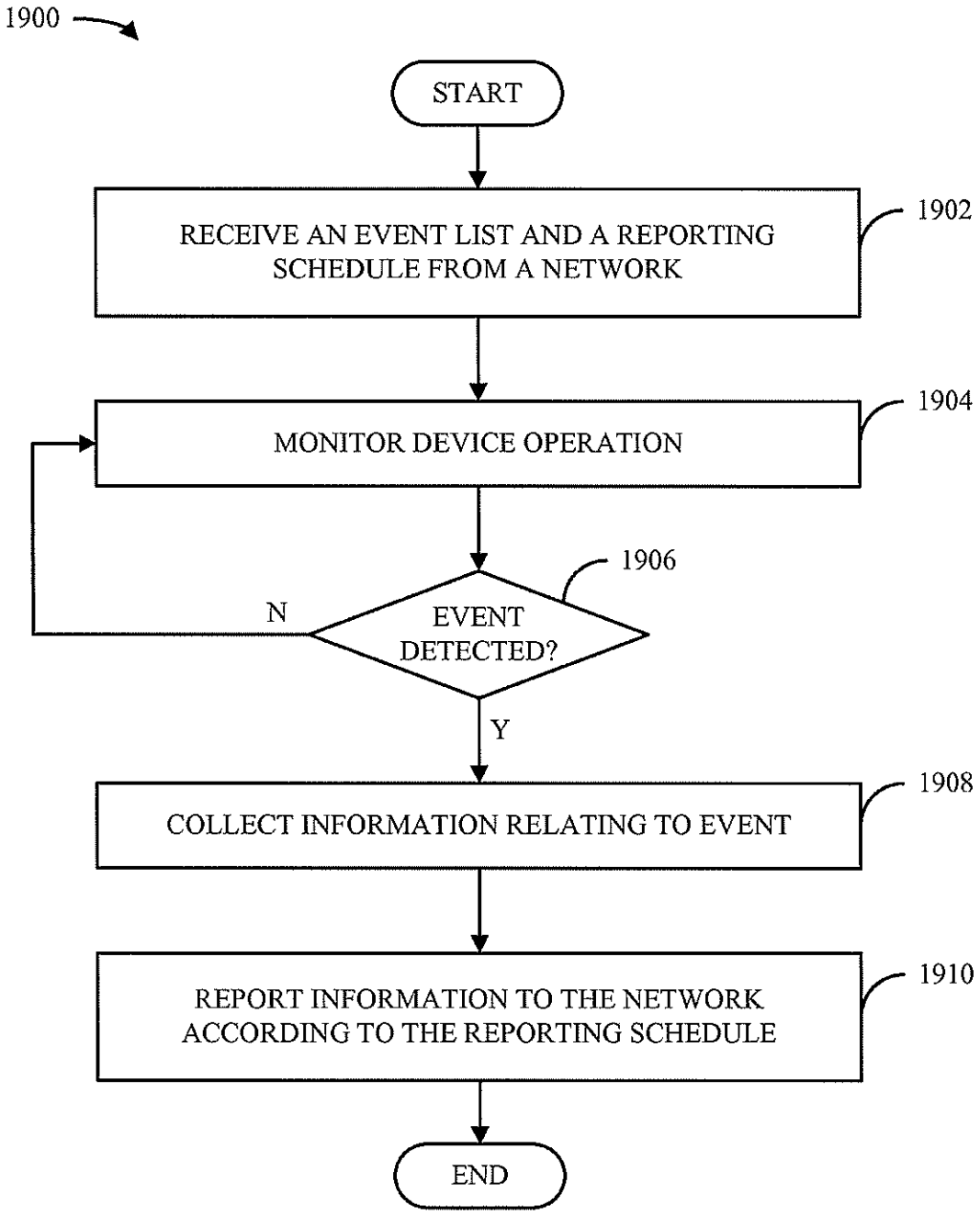

1900
START
RECEIVE AN EVENT LIST AND A REPORTING SCHEDULE FROM A NETWORK
1902
MONITOR DEVICE OPERATION
1904
1906
EVENT DETECTED?
N
Y
COLLECT INFORMATION RELATING TO EVENT
1908
REPORT INFORMATION TO THE NETWORK ACCORDING TO THE REPORTING SCHEDULE
1910
END

FIG. 19

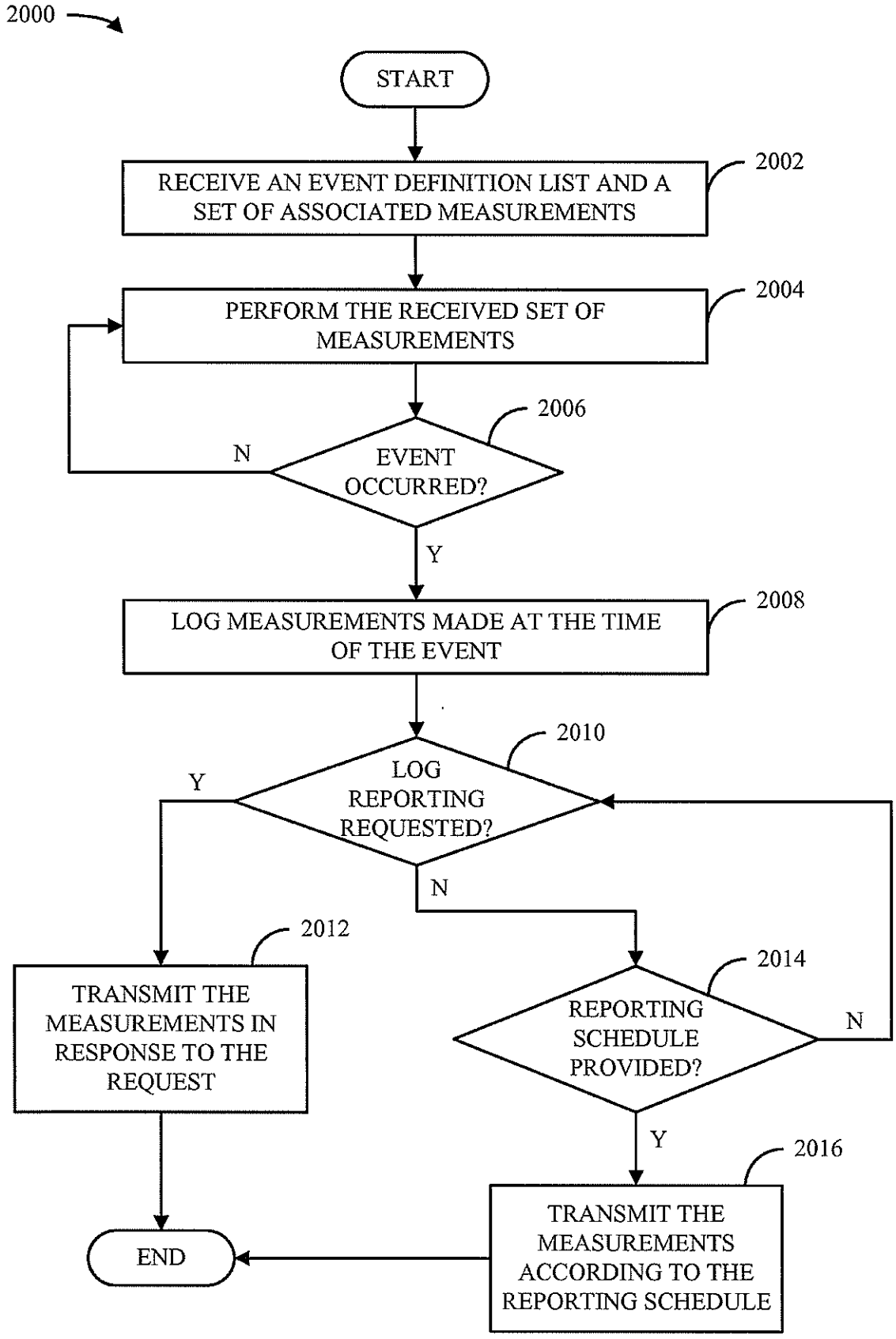

2000
START
RECEIVE AN EVENT DEFINITION LIST AND A SET OF ASSOCIATED MEASUREMENTS
2002
PERFORM THE RECEIVED SET OF MEASUREMENTS
2004
EVENT OCCURRED?
2006
N
Y
LOG MEASUREMENTS MADE AT THE TIME OF THE EVENT
2008
LOG REPORTING REQUESTED?
2010
Y
N
TRANSMIT THE MEASUREMENTS IN RESPONSE TO THE REQUEST
2012
REPORTING SCHEDULE PROVIDED?
2014
N
Y
TRANSMIT THE MEASUREMENTS ACCORDING TO THE REPORTING SCHEDULE
2016
END

FIG. 20

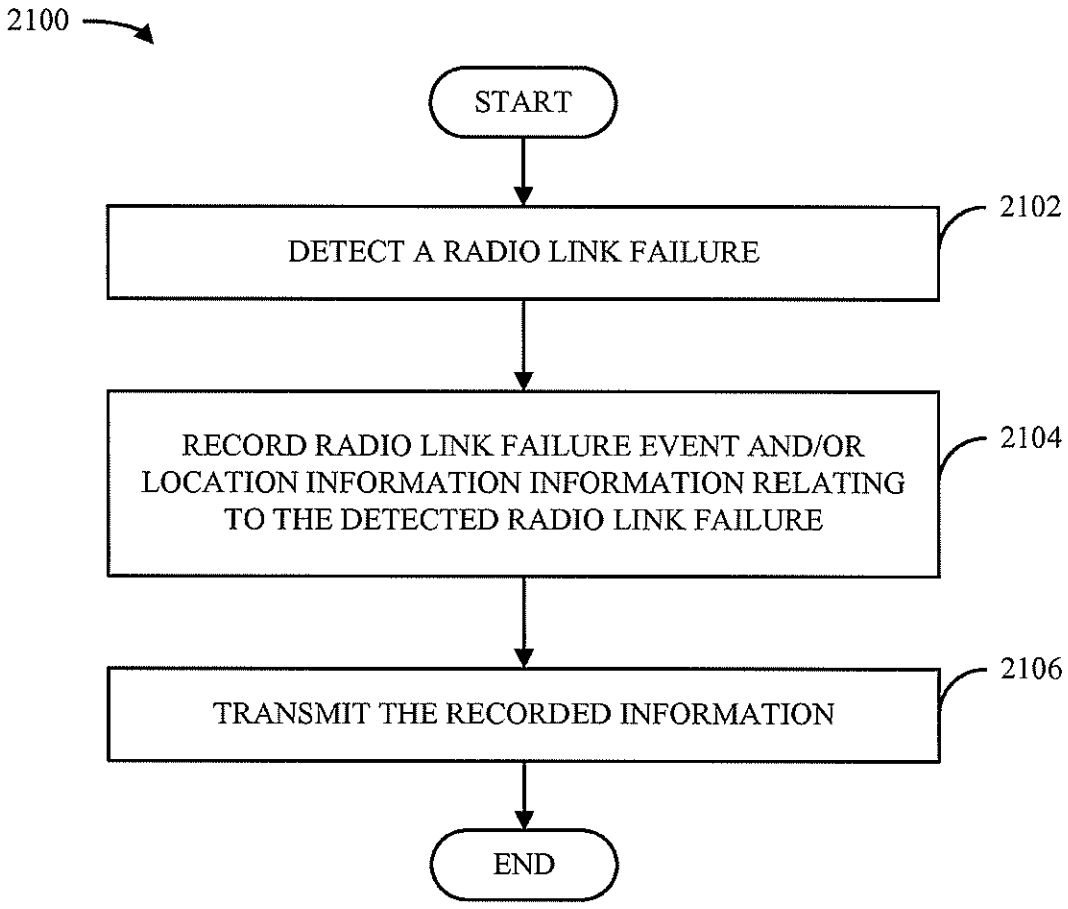

2100
START
DETECT A RADIO LINK FAILURE
2102
RECORD RADIO LINK FAILURE EVENT AND/OR LOCATION INFORMATION INFORMATION RELATING TO THE DETECTED RADIO LINK FAILURE
2104
TRANSMIT THE RECORDED INFORMATION
2106
END

FIG. 21

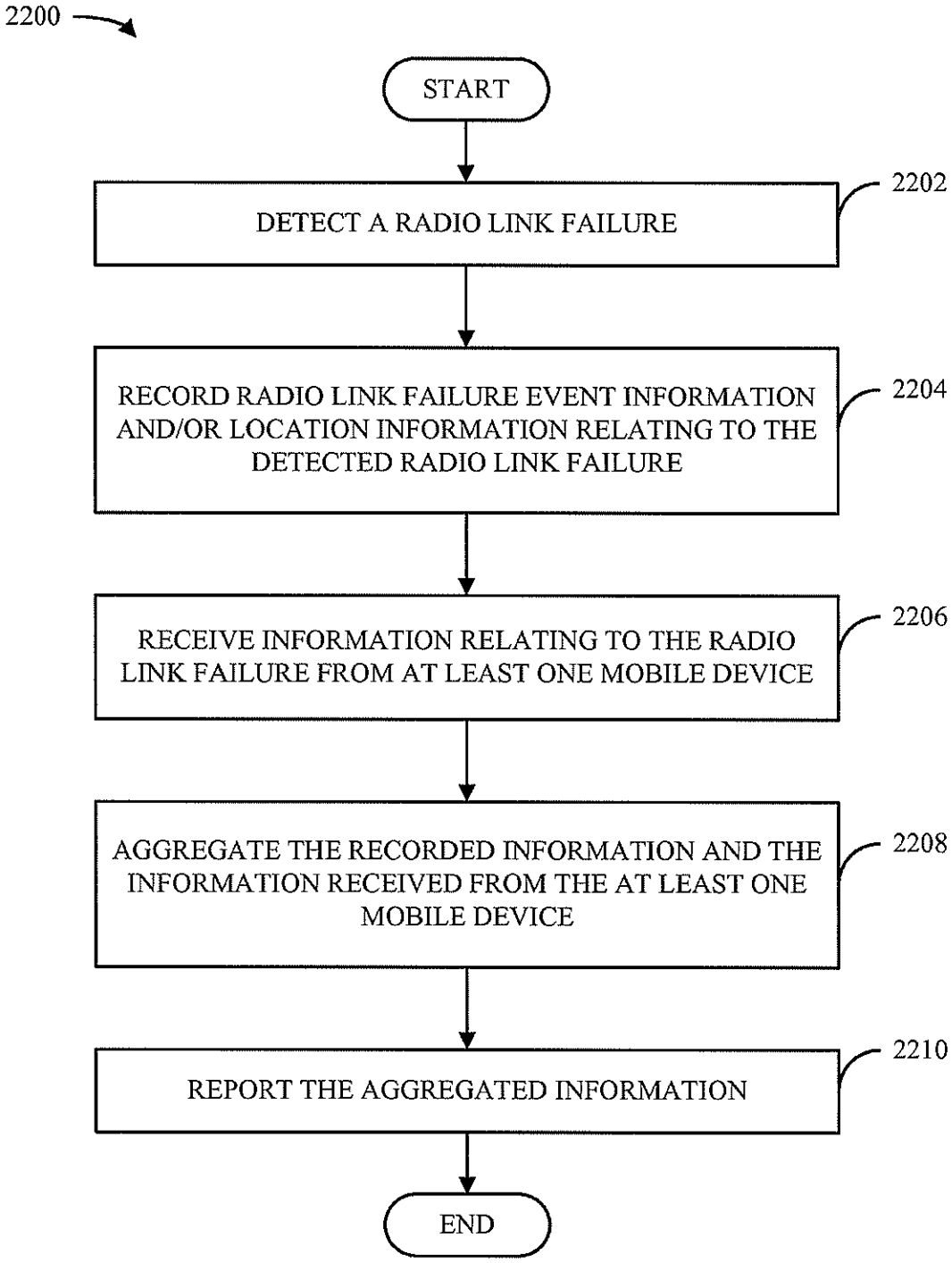

2200
START
DETECT A RADIO LINK FAILURE
2202
RECORD RADIO LINK FAILURE EVENT INFORMATION AND/OR LOCATION INFORMATION RELATING TO THE DETECTED RADIO LINK FAILURE
2204
RECEIVE INFORMATION RELATING TO THE RADIO LINK FAILURE FROM AT LEAST ONE MOBILE DEVICE
2206
AGGREGATE THE RECORDED INFORMATION AND THE INFORMATION RECEIVED FROM THE AT LEAST ONE MOBILE DEVICE
2208
REPORT THE AGGREGATED INFORMATION
2210
END

FIG. 22

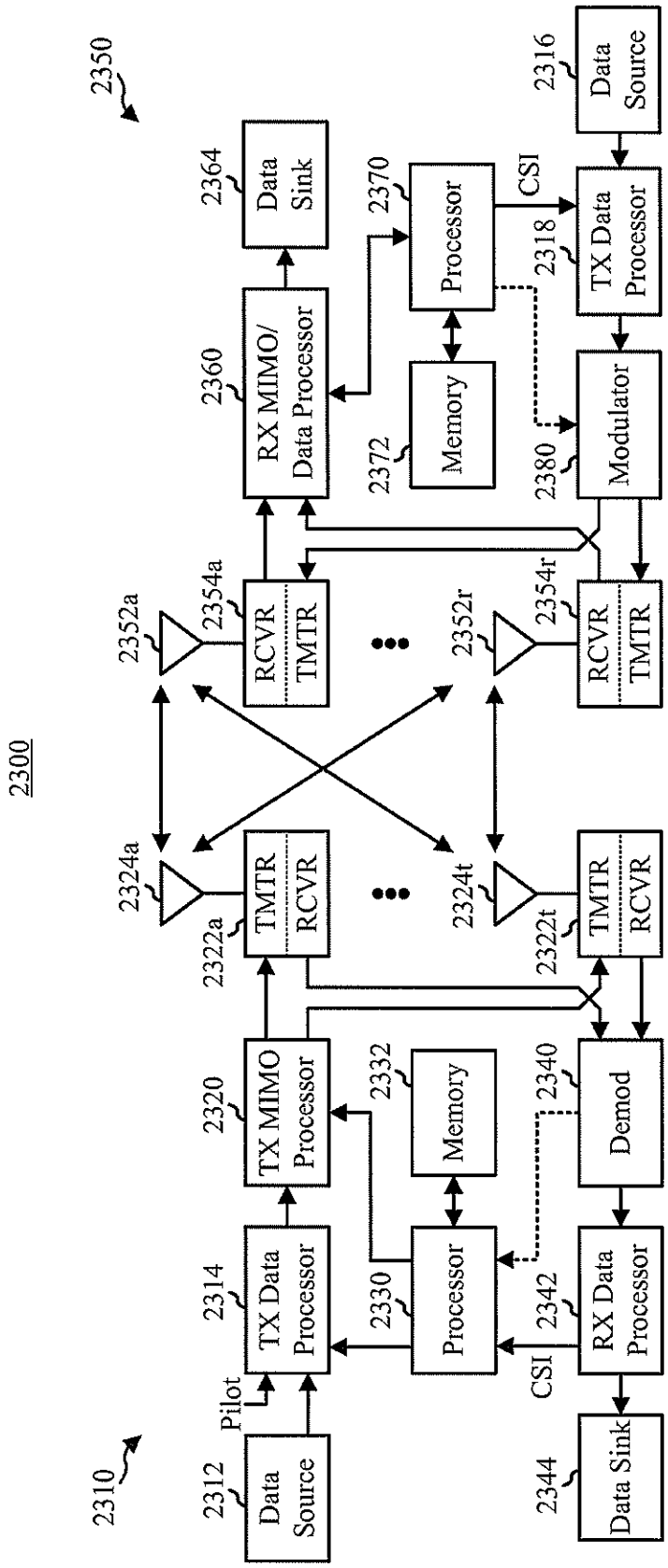

2300
2310
2312
Data Source
Pilot
2314
TX Data Processor
2320
TX MIMO Processor
2322a
TMTR
RCVR
2322t
TMTR
RCVR
2324a
2324t
2330
Processor
2332
Memory
2340
Demod
2342
RX Data Processor
CSI
2344
Data Sink
2350
2352a
2352r
2354a
RCVR
TMTR
2354r
RCVR
TMTR
2360
RX MIMO/ Data Processor
2364
Data Sink
2370
Processor
2372
Memory
CSI
2318
TX Data Processor
2380
Modulator
2316
Data Source

FIG. 23

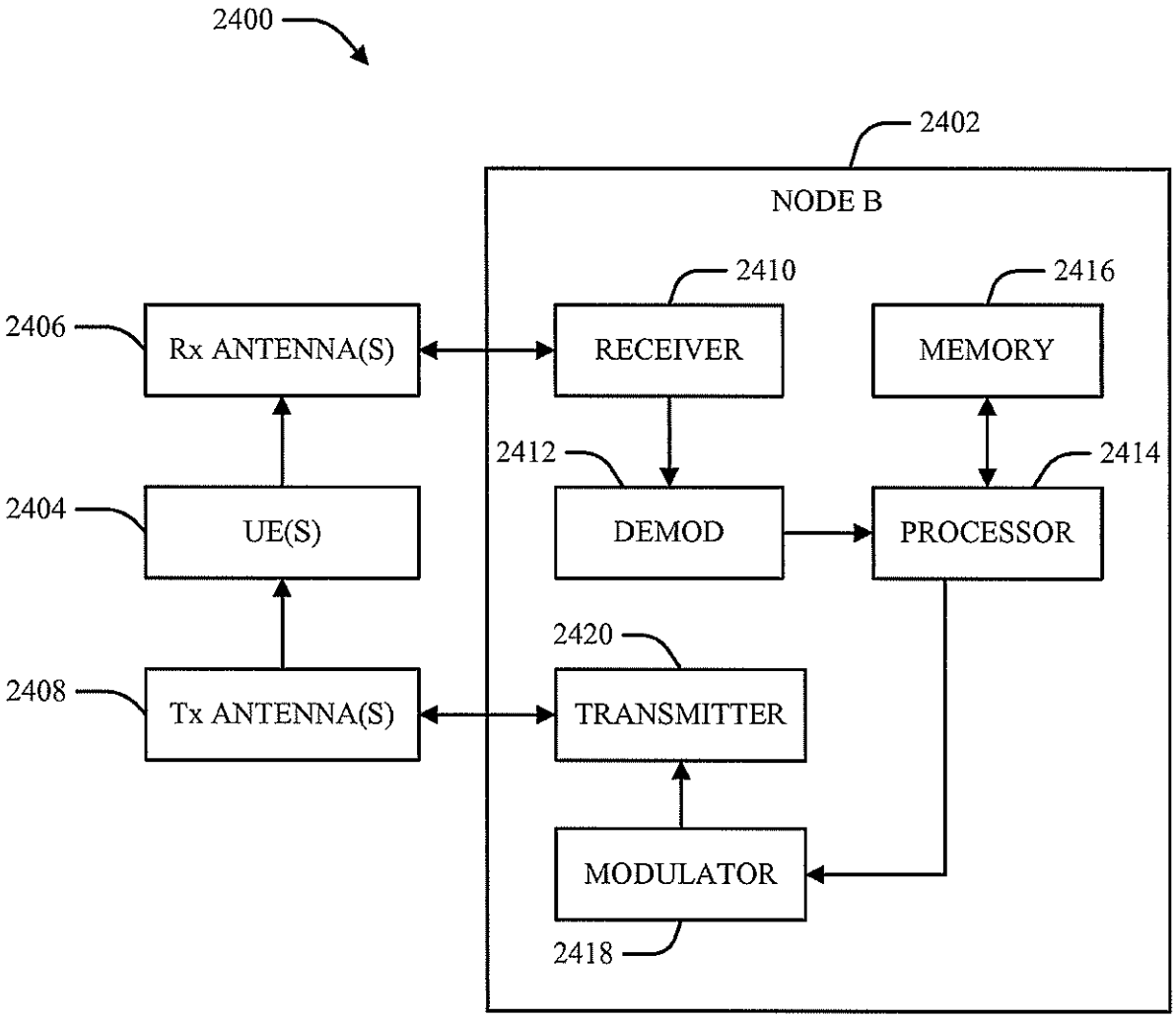

2400
2402
NODE B
2410
2416
2406
Rx ANTENNA(S)
RECEIVER
MEMORY
2412
2414
2404
UE(S)
DEMOD
PROCESSOR
2420
2408
Tx ANTENNA(S)
TRANSMITTER
MODULATOR
2418

FIG. 24

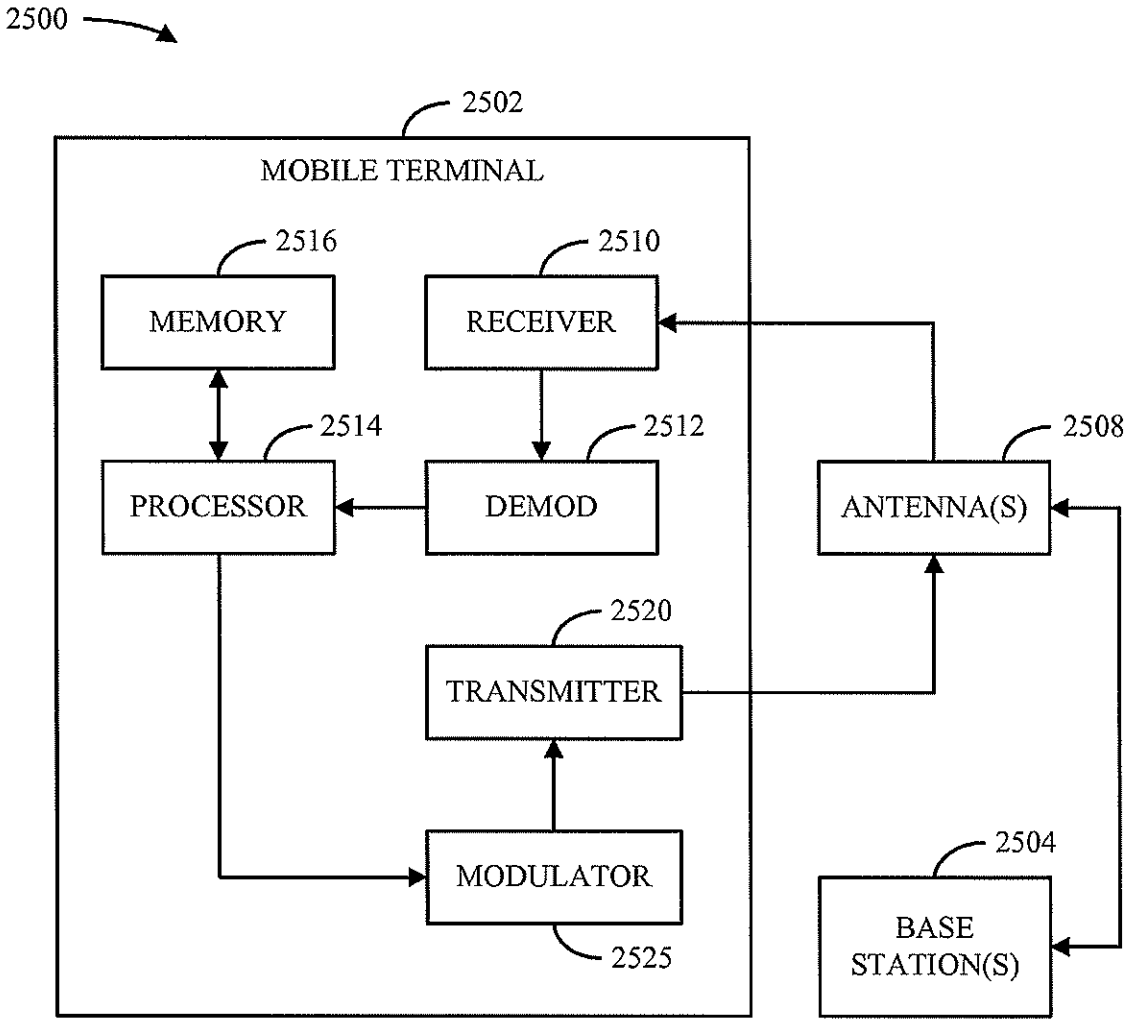

2500
2502
MOBILE TERMINAL
2516
MEMORY
2510
RECEIVER
2514
PROCESSOR
2512
DEMOD
2508
ANTENNA(S)
2520
TRANSMITTER
MODULATOR
2525
2504
BASE STATION(S)

FIG. 25

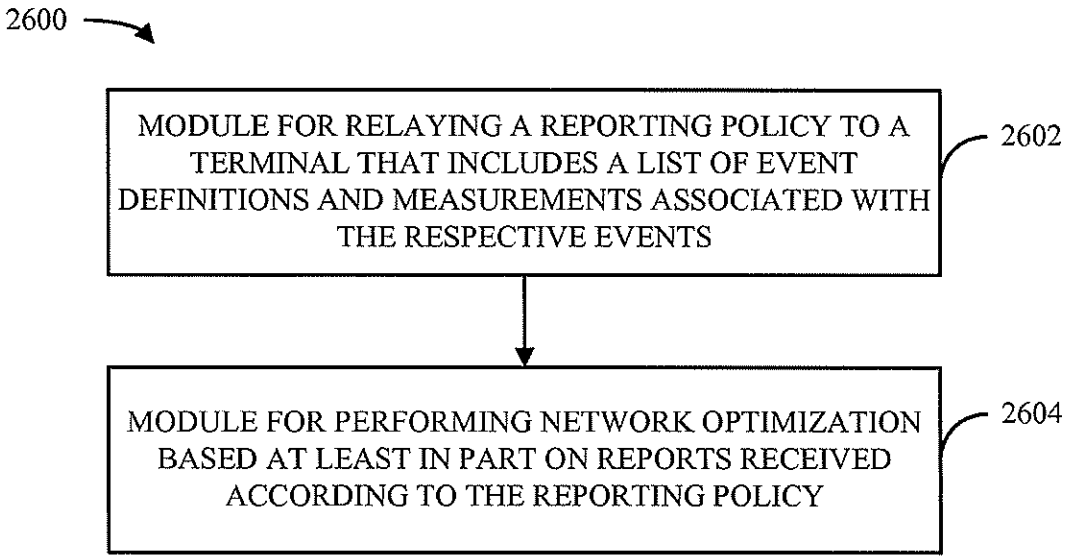

2600
MODULE FOR RELAYING A REPORTING POLICY TO A TERMINAL THAT INCLUDES A LIST OF EVENT DEFINITIONS AND MEASUREMENTS ASSOCIATED WITH THE RESPECTIVE EVENTS
2602
MODULE FOR PERFORMING NETWORK OPTIMIZATION BASED AT LEAST IN PART ON REPORTS RECEIVED ACCORDING TO THE REPORTING POLICY
2604

FIG. 26

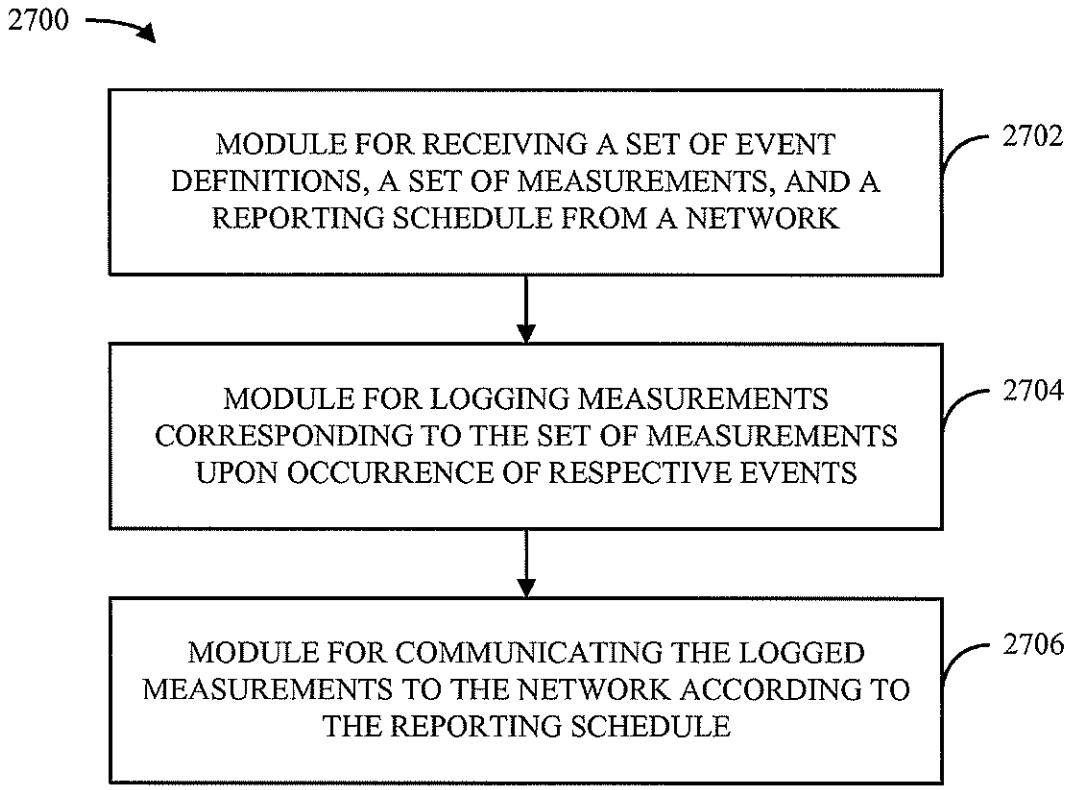

2700
MODULE FOR RECEIVING A SET OF EVENT DEFINITIONS, A SET OF MEASUREMENTS, AND A REPORTING SCHEDULE FROM A NETWORK
2702
MODULE FOR LOGGING MEASUREMENTS CORRESPONDING TO THE SET OF MEASUREMENTS UPON OCCURRENCE OF RESPECTIVE EVENTS
2704
MODULE FOR COMMUNICATING THE LOGGED MEASUREMENTS TO THE NETWORK ACCORDING TO THE REPORTING SCHEDULE
2706

FIG. 27