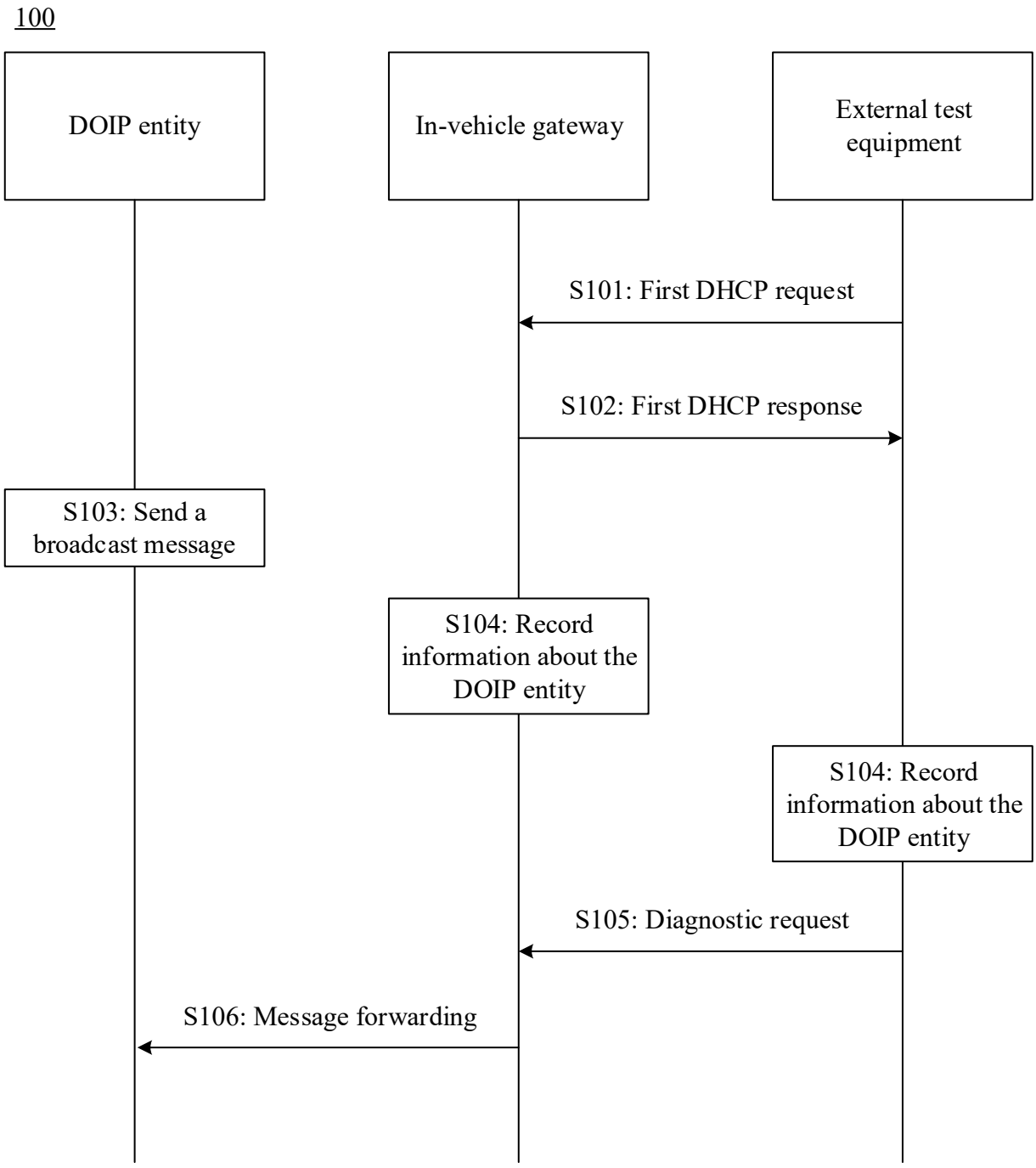

100
DOIP entity
In-vehicle gateway
External test equipment
S101: First DHCP request
S102: First DHCP response
S103: Send a broadcast message
S104: Record information about the DOIP entity
S104: Record information about the DOIP entity
S105: Diagnostic request
S106: Message forwarding

FIG. 1

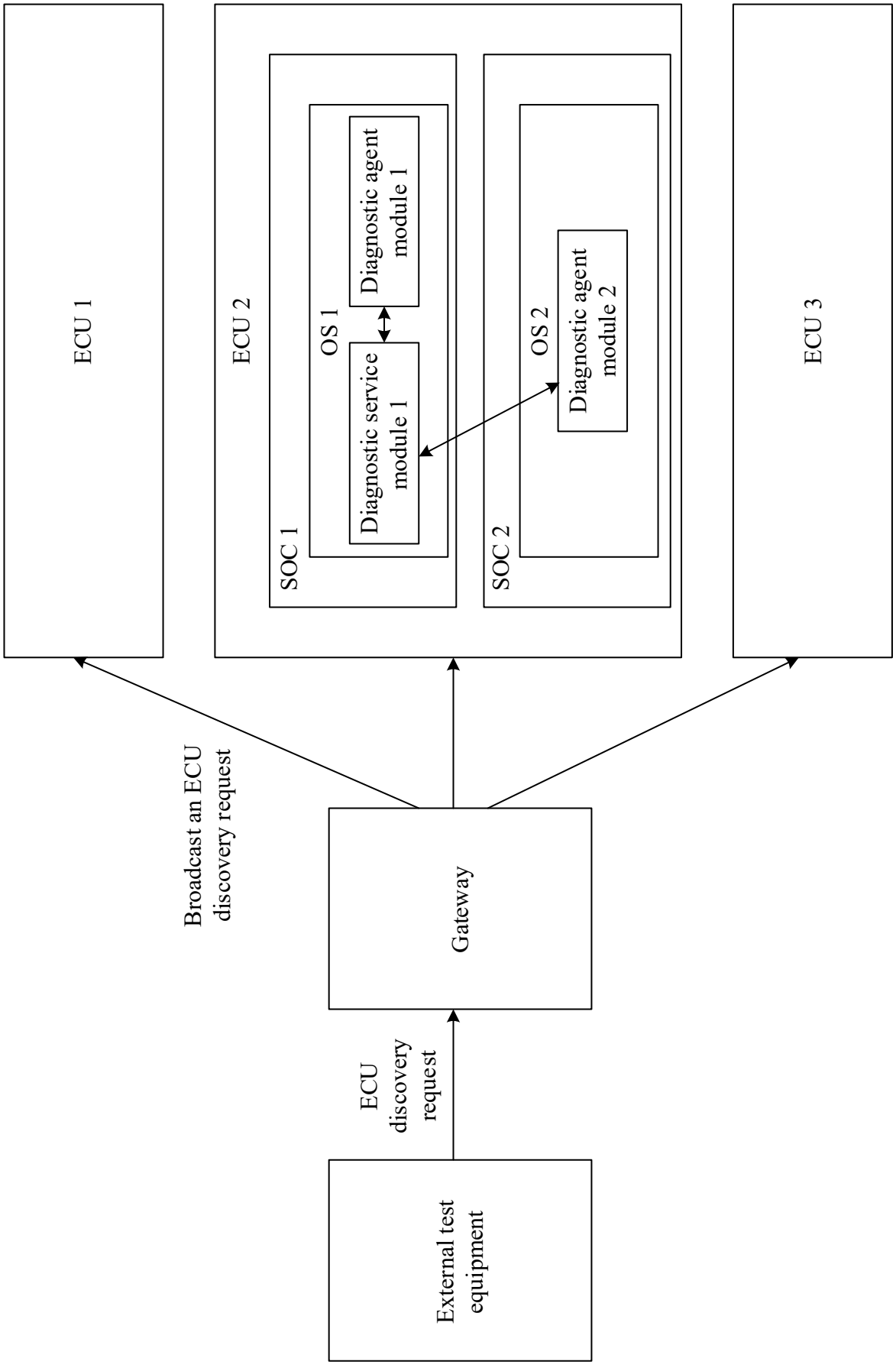

External test equipment
ECU discovery request
Gateway
Broadcast an ECU discovery request
ECU 1
ECU 2
SOC 1
OS 1
Diagnostic service module 1
Diagnostic agent module 1
SOC 2
OS 2
Diagnostic agent module 2
ECU 3

FIG. 2

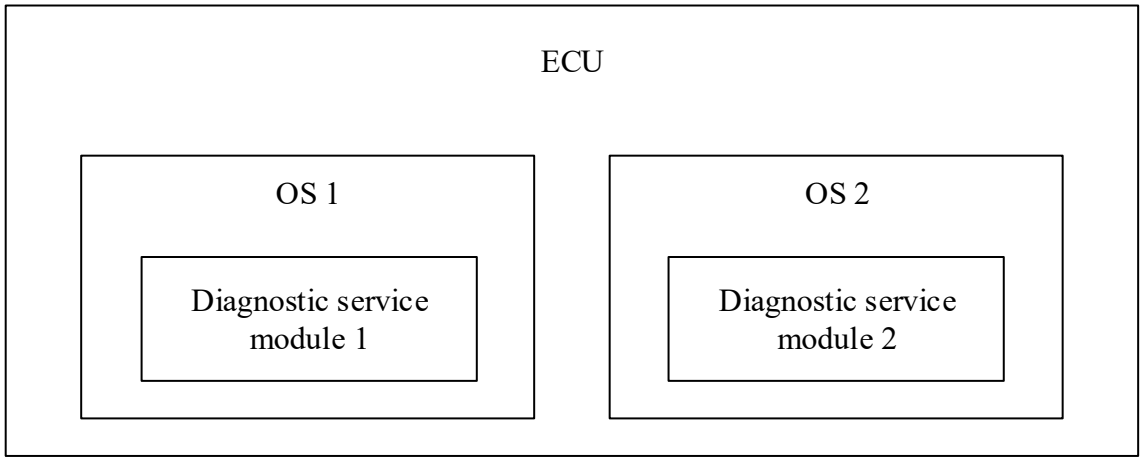

ECU
OS 1
Diagnostic service module 1
OS 2
Diagnostic service module 2

FIG. 3

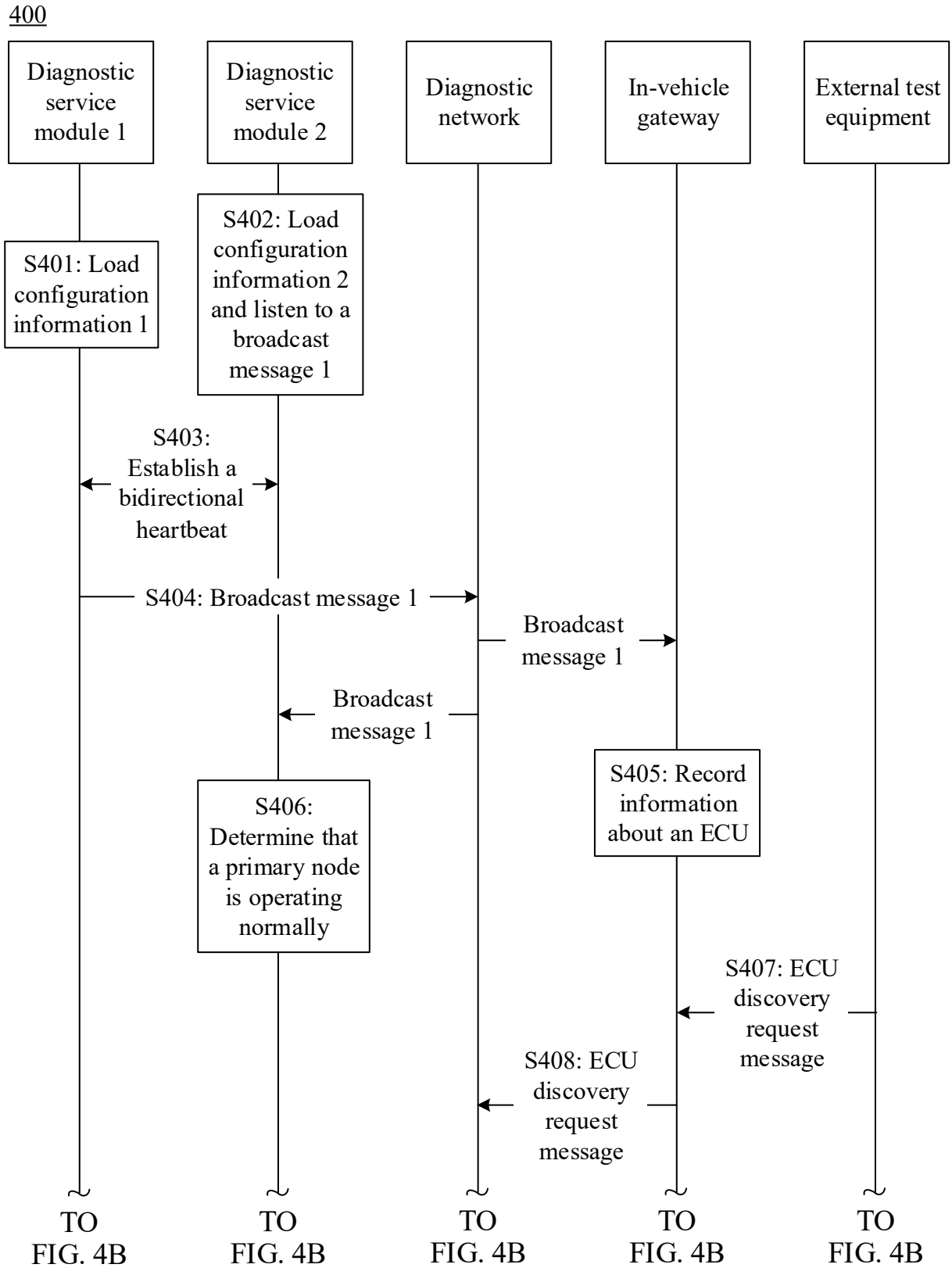

400
Diagnostic service module 1
Diagnostic service module 2
Diagnostic network
In-vehicle gateway
External test equipment
S401: Load configuration information 1
S402: Load configuration information 2 and listen to a broadcast message 1
S403: Establish a bidirectional heartbeat
S404: Broadcast message 1
Broadcast message 1
Broadcast message 1
S405: Record information about an ECU
S406: Determine that a primary node is operating normally
S407: ECU discovery request message
S408: ECU discovery request message
TO FIG. 4B
TO FIG. 4B
TO FIG. 4B
TO FIG. 4B
TO FIG. 4B

FIG. 4A

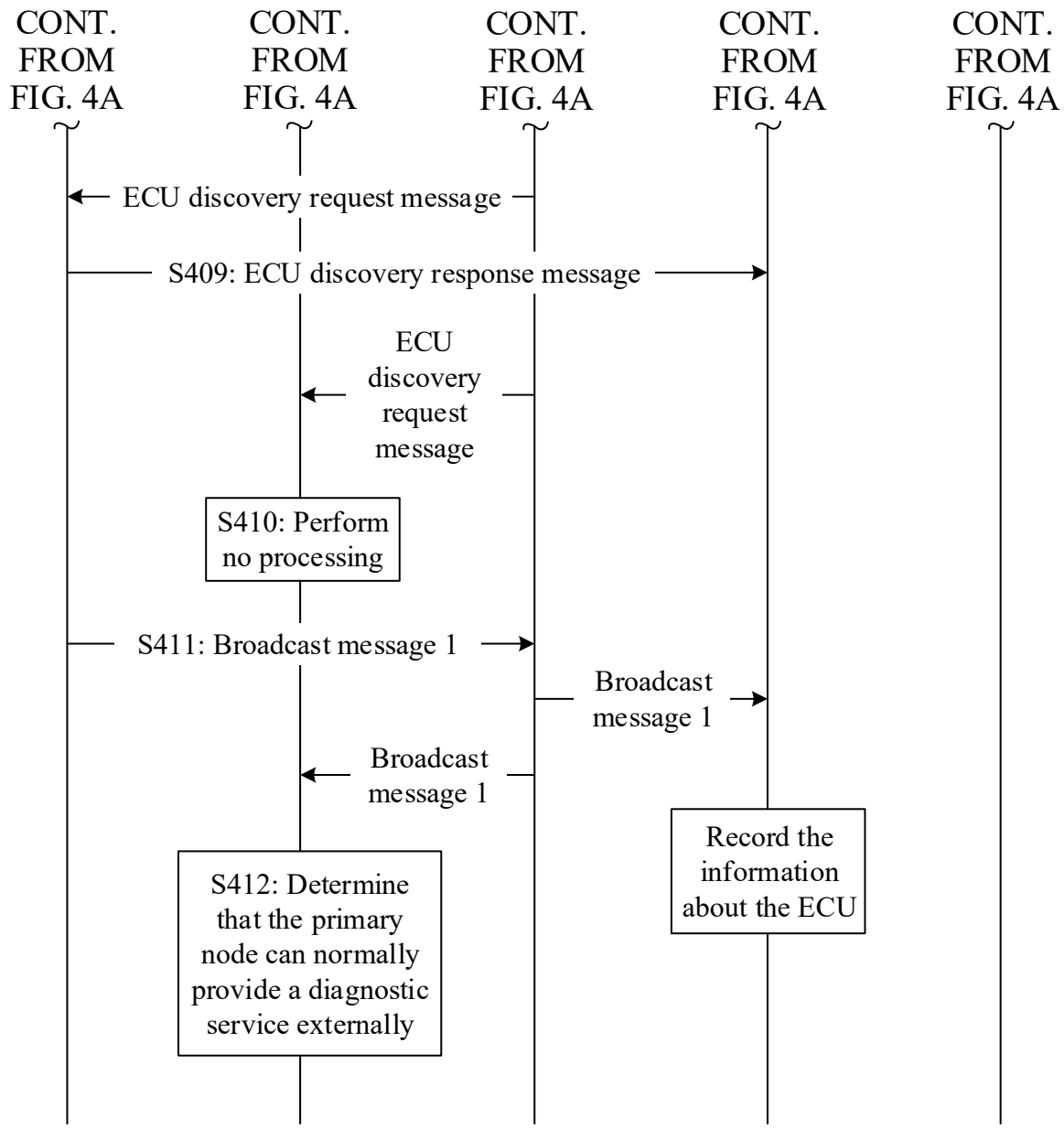

CONT. FROM FIG. 4A
CONT. FROM FIG. 4A
CONT. FROM FIG. 4A
CONT. FROM FIG. 4A
CONT. FROM FIG. 4A
ECU discovery request message
S409: ECU discovery response message
ECU discovery request message
S410: Perform no processing
S411: Broadcast message 1
Broadcast message 1
Broadcast message 1
Record the information about the ECU
S412: Determine that the primary node can normally provide a diagnostic service externally

FIG. 4B

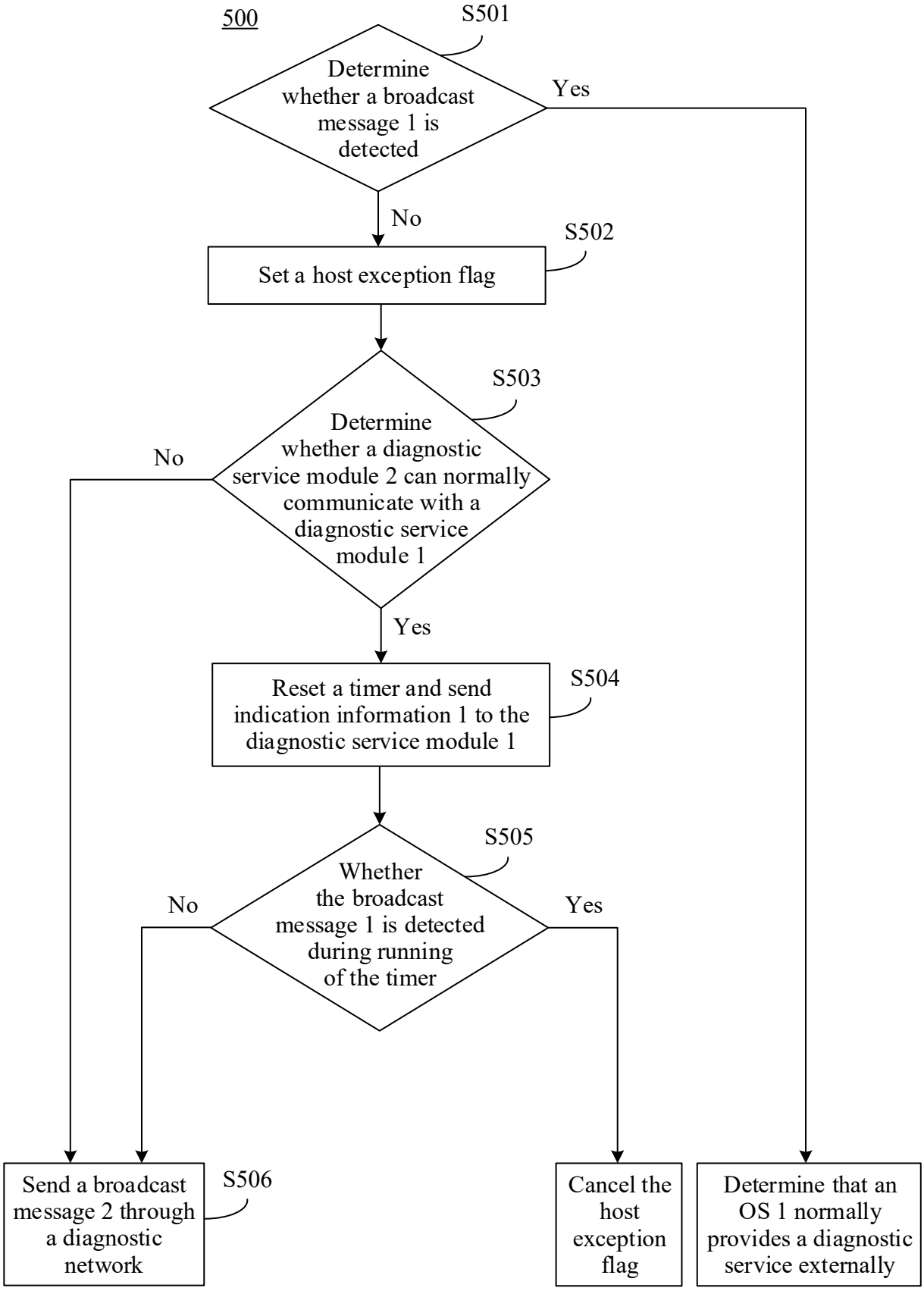

500
S501
Determine whether a broadcast message 1 is detected
Yes
No
S502
Set a host exception flag
S503
Determine whether a diagnostic service module 2 can normally communicate with a diagnostic service module 1
No
Yes
S504
Reset a timer and send indication information 1 to the diagnostic service module 1
S505
Whether the broadcast message 1 is detected during running of the timer
No
Yes
S506
Send a broadcast message 2 through a diagnostic network
Cancel the host exception flag
Determine that an OS 1 normally provides a diagnostic service externally

FIG. 5

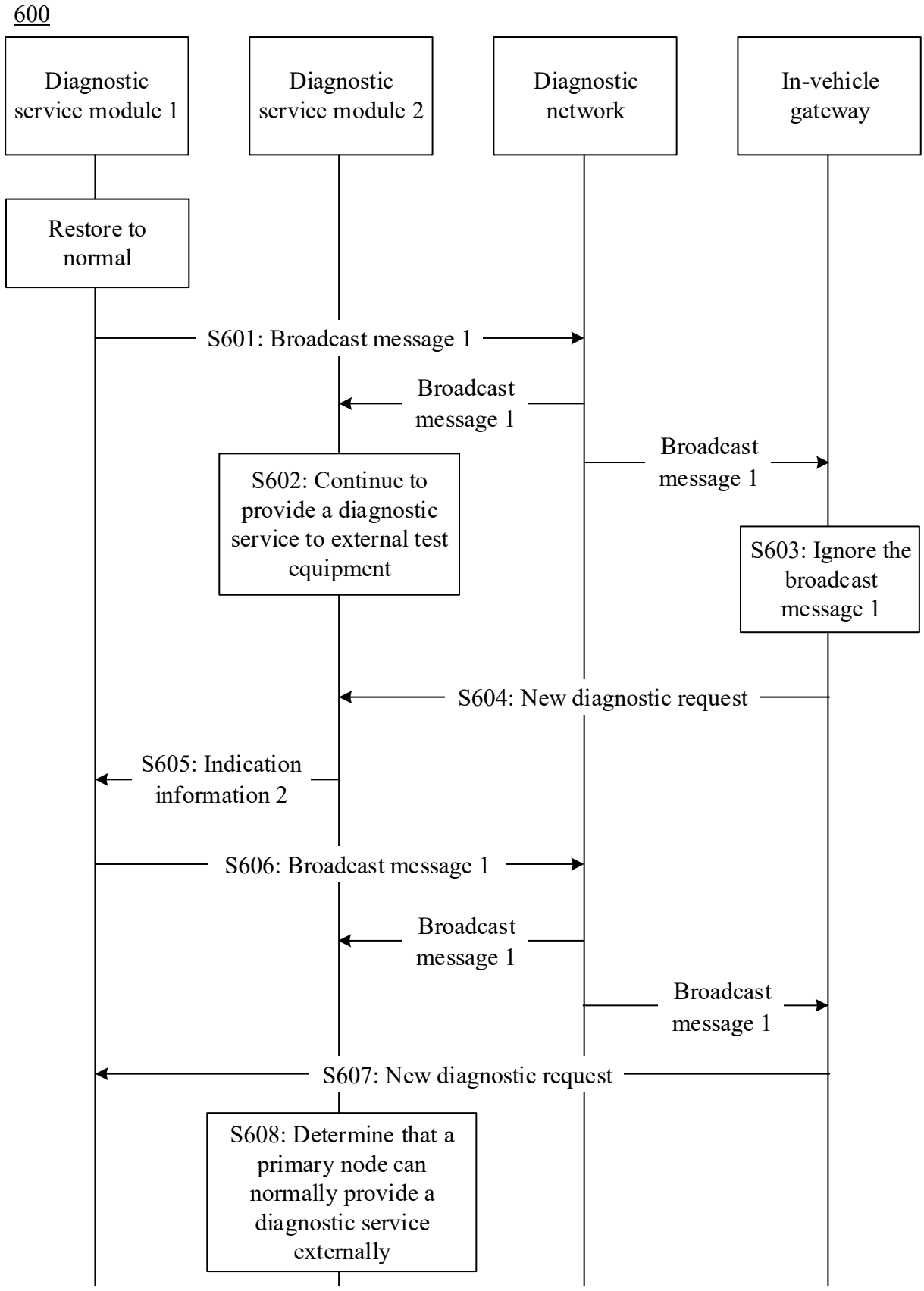

600
Diagnostic service module 1
Diagnostic service module 2
Diagnostic network
In-vehicle gateway
Restore to normal
S601: Broadcast message 1
Broadcast message 1
Broadcast message 1
S602: Continue to provide a diagnostic service to external test equipment
S603: Ignore the broadcast message 1
S604: New diagnostic request
S605: Indication information 2
S606: Broadcast message 1
Broadcast message 1
Broadcast message 1
S607: New diagnostic request
S608: Determine that a primary node can normally provide a diagnostic service externally

FIG. 6

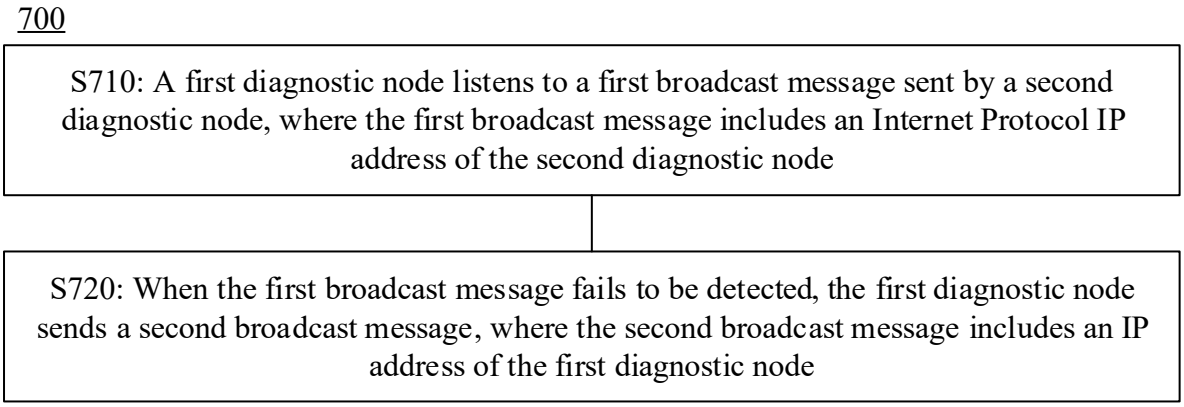


FIG. 7

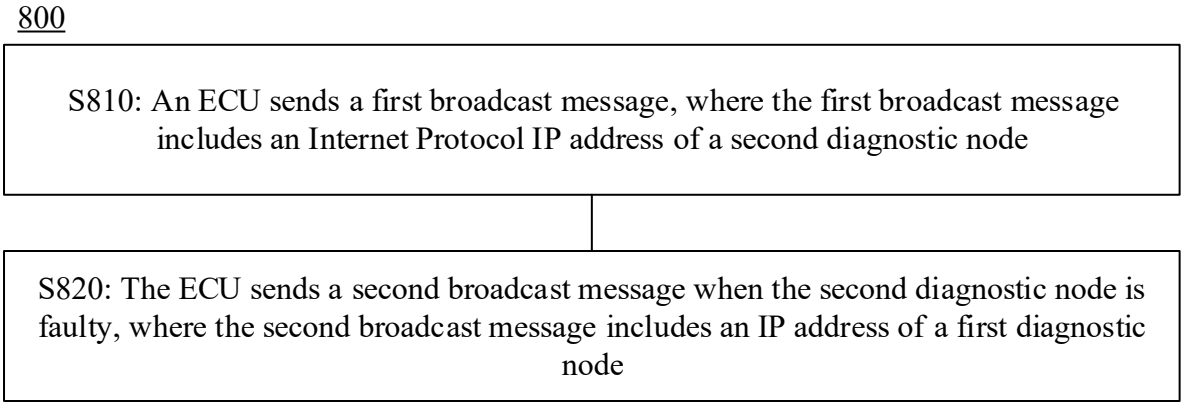


FIG. 8

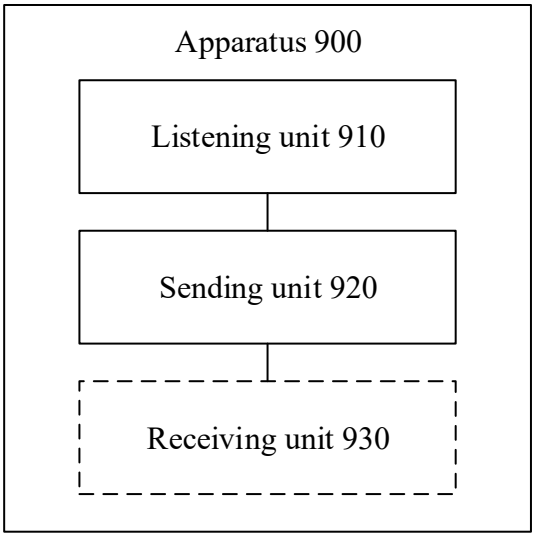


FIG. 9

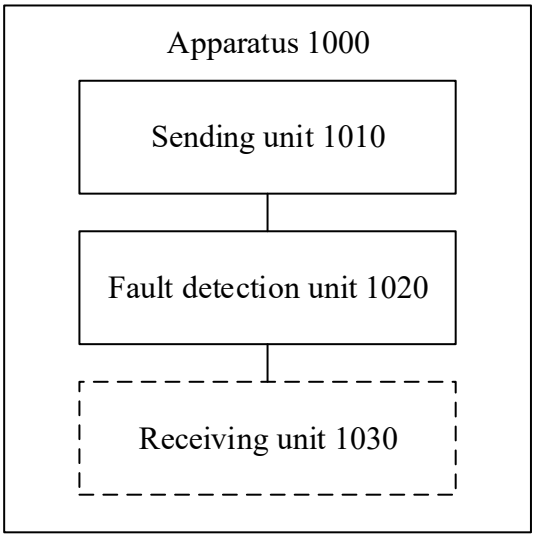

Apparatus 1000
Sending unit 1010
Fault detection unit 1020
Receiving unit 1030

FIG. 10

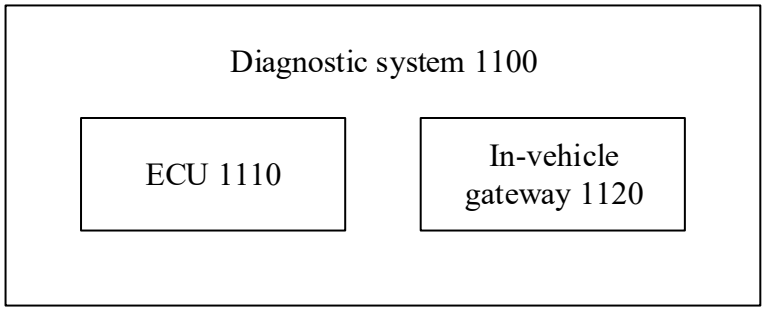

Diagnostic system 1100
ECU 1110
In-vehicle gateway 1120

FIG. 11