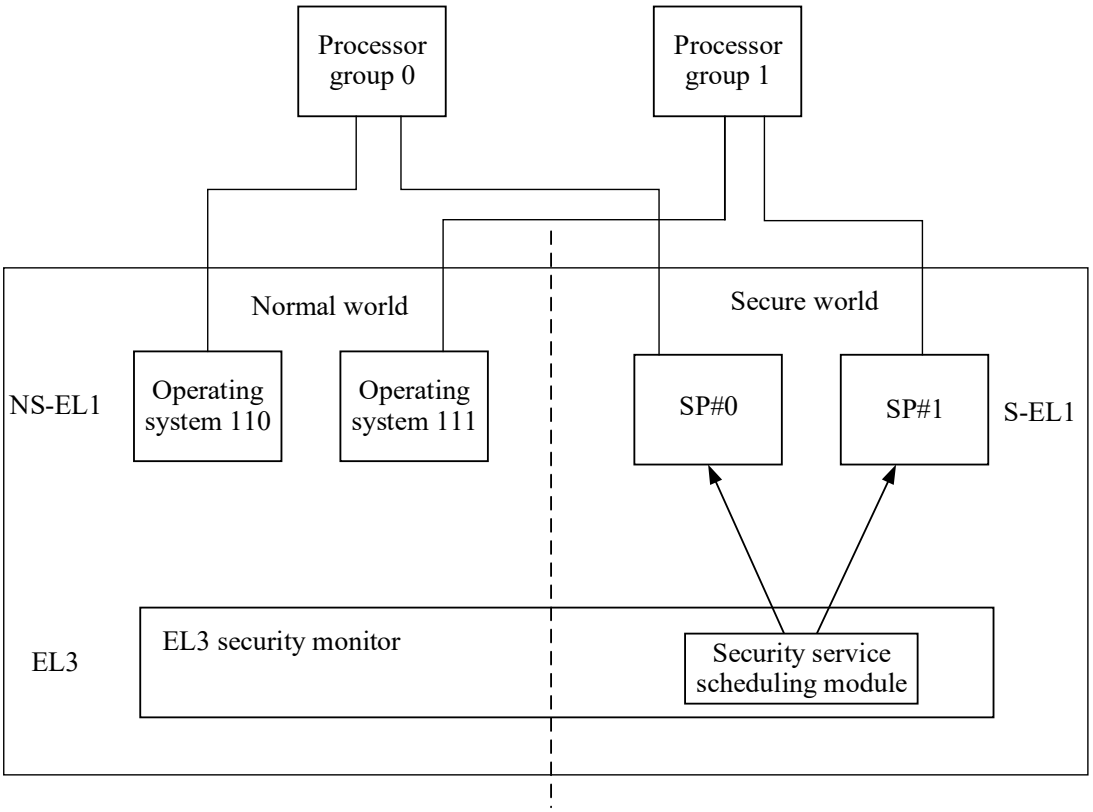

Processor group 0
Processor group 1
Normal world
Secure world
NS-EL1
Operating system 110
Operating system 111
SP#0
SP#1
S-EL1
EL3
EL3 security monitor
Security service scheduling module

FIG. 1

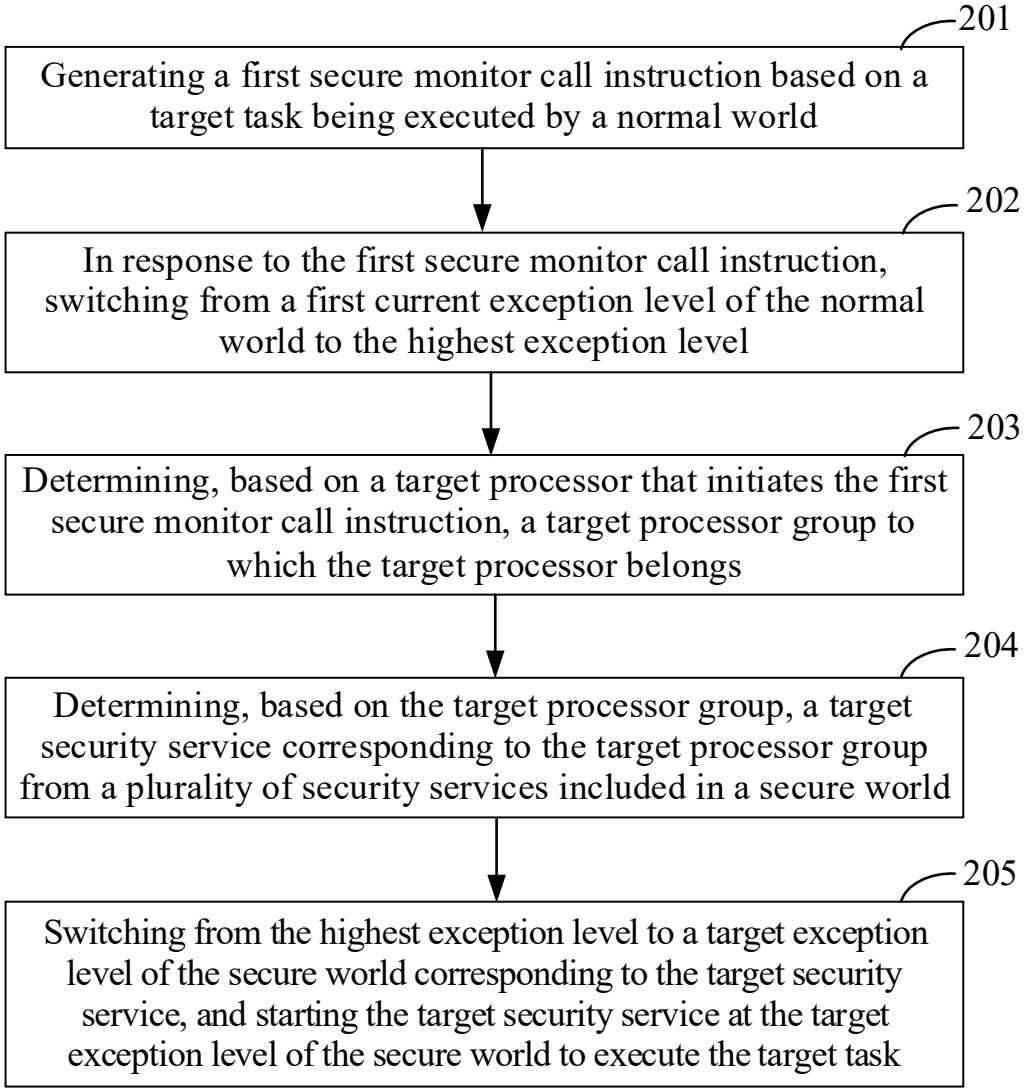

201
Generating a first secure monitor call instruction based on a target task being executed by a normal world
202
In response to the first secure monitor call instruction, switching from a first current exception level of the normal world to the highest exception level
203
Determining, based on a target processor that initiates the first secure monitor call instruction, a target processor group to which the target processor belongs
204
Determining, based on the target processor group, a target security service corresponding to the target processor group from a plurality of security services included in a secure world
205
Switching from the highest exception level to a target exception level of the secure world corresponding to the target security service, and starting the target security service at the target exception level of the secure world to execute the target task

FIG. 2

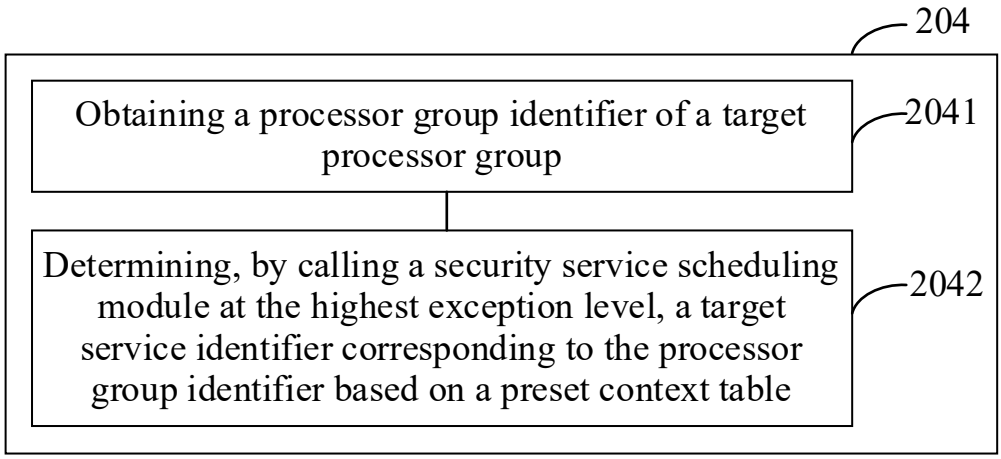

204
Obtaining a processor group identifier of a target processor group
2041
Determining, by calling a security service scheduling module at the highest exception level, a target service identifier corresponding to the processor group identifier based on a preset context table
2042

FIG. 3

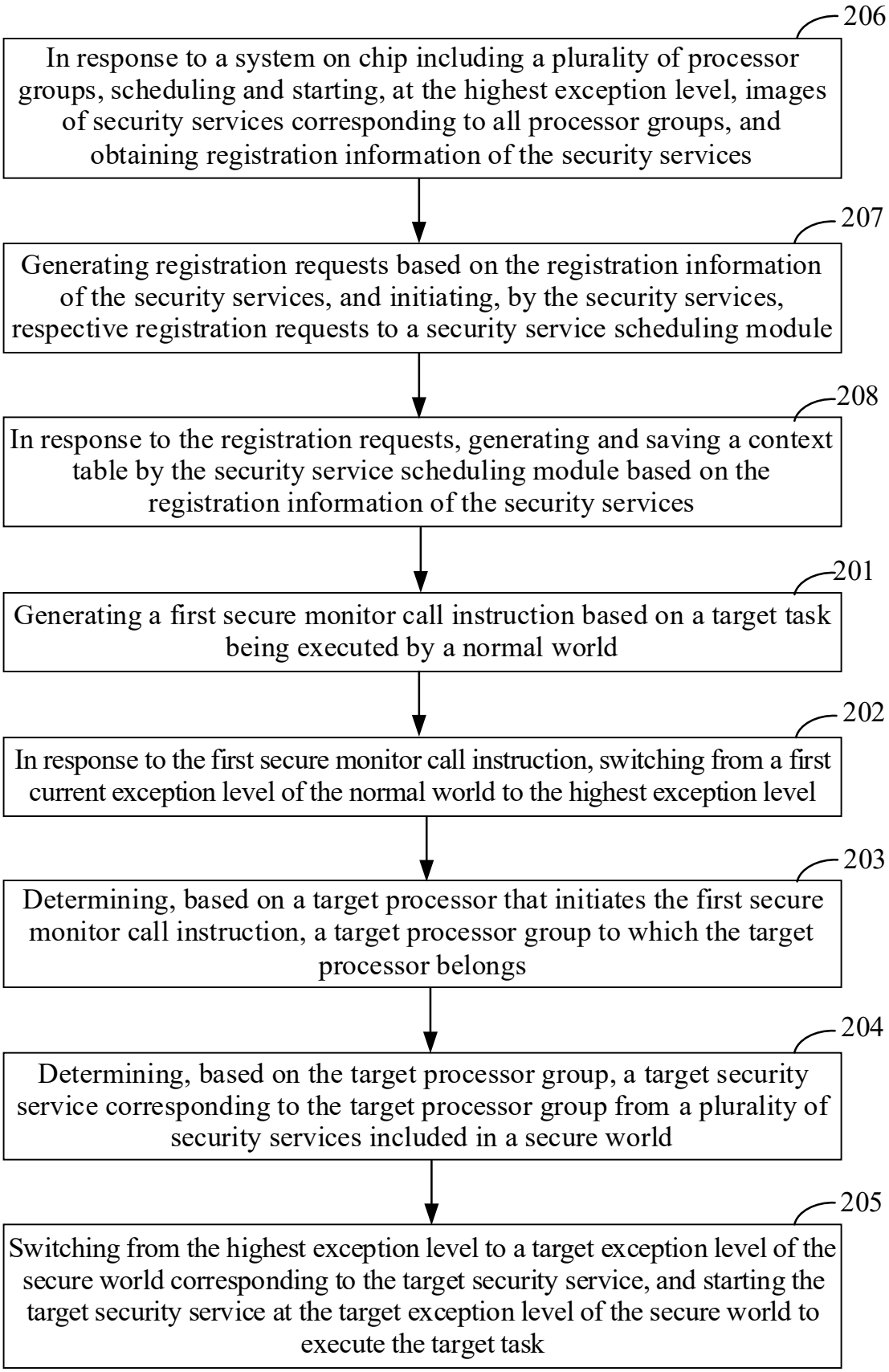

206
In response to a system on chip including a plurality of processor groups, scheduling and starting, at the highest exception level, images of security services corresponding to all processor groups, and obtaining registration information of the security services
207
Generating registration requests based on the registration information of the security services, and initiating, by the security services, respective registration requests to a security service scheduling module
208
In response to the registration requests, generating and saving a context table by the security service scheduling module based on the registration information of the security services
201
Generating a first secure monitor call instruction based on a target task being executed by a normal world
202
In response to the first secure monitor call instruction, switching from a first current exception level of the normal world to the highest exception level
203
Determining, based on a target processor that initiates the first secure monitor call instruction, a target processor group to which the target processor belongs
204
Determining, based on the target processor group, a target security service corresponding to the target processor group from a plurality of security services included in a secure world
205
Switching from the highest exception level to a target exception level of the secure world corresponding to the target security service, and starting the target security service at the target exception level of the secure world to execute the target task

FIG. 4

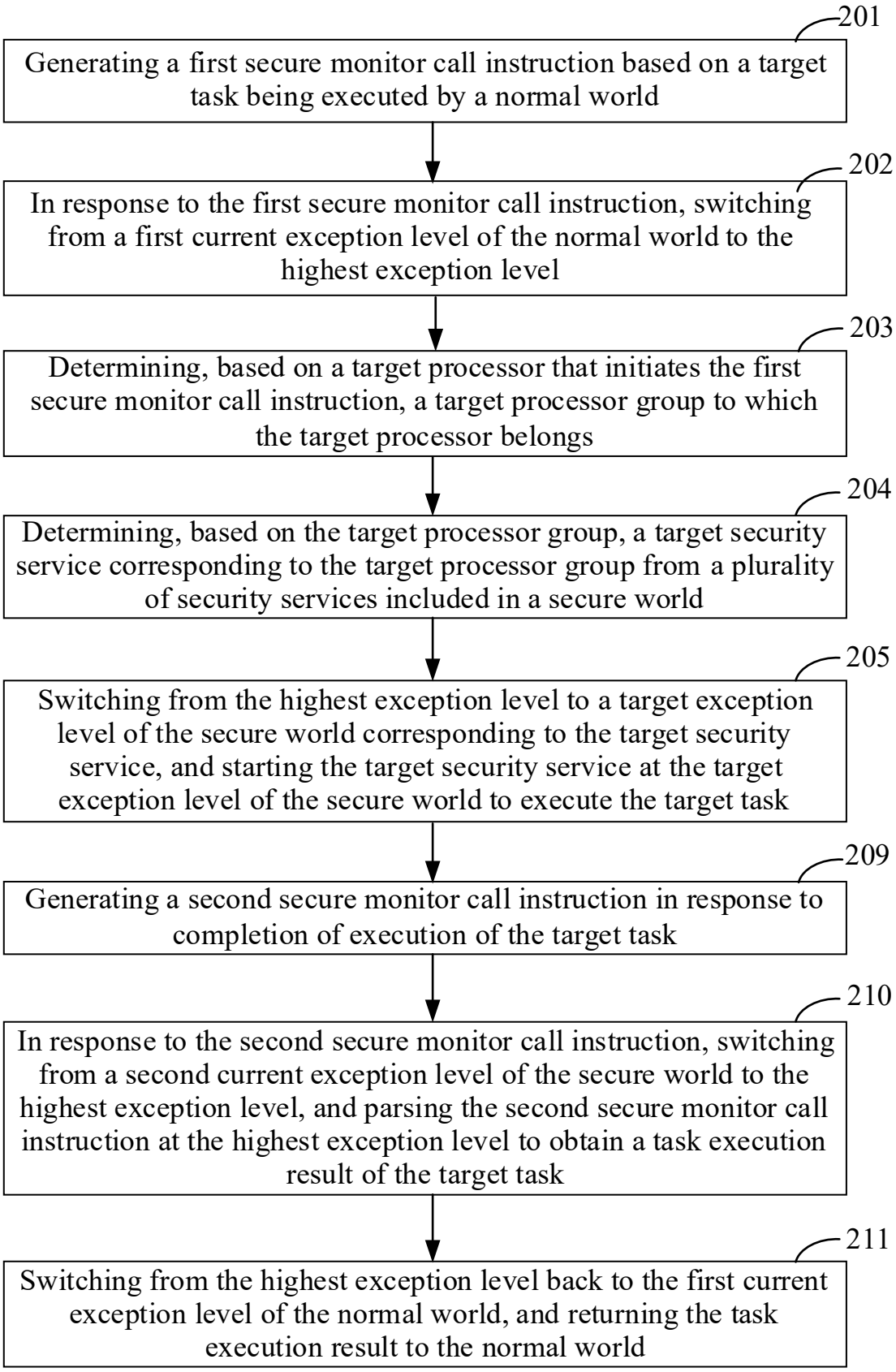

201
Generating a first secure monitor call instruction based on a target task being executed by a normal world
202
In response to the first secure monitor call instruction, switching from a first current exception level of the normal world to the highest exception level
203
Determining, based on a target processor that initiates the first secure monitor call instruction, a target processor group to which the target processor belongs
204
Determining, based on the target processor group, a target security service corresponding to the target processor group from a plurality of security services included in a secure world
205
Switching from the highest exception level to a target exception level of the secure world corresponding to the target security service, and starting the target security service at the target exception level of the secure world to execute the target task
209
Generating a second secure monitor call instruction in response to completion of execution of the target task
210
In response to the second secure monitor call instruction, switching from a second current exception level of the secure world to the highest exception level, and parsing the second secure monitor call instruction at the highest exception level to obtain a task execution result of the target task
211
Switching from the highest exception level back to the first current exception level of the normal world, and returning the task execution result to the normal world

FIG. 5

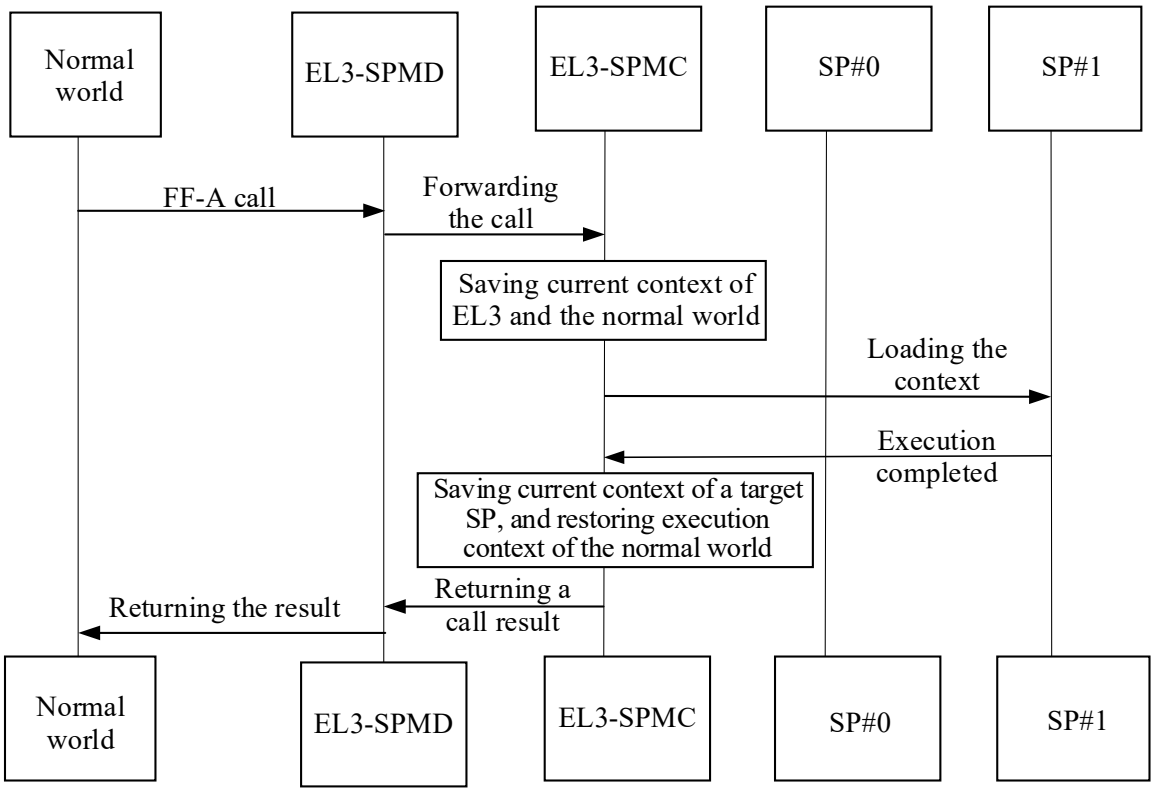

Normal world
EL3-SPMD
EL3-SPMC
SP#0
SP#1
FF-A call
Forwarding the call
Saving current context of EL3 and the normal world
Loading the context
Execution completed
Saving current context of a target SP, and restoring execution context of the normal world
Returning a call result
Returning the result
Normal world
EL3-SPMD
EL3-SPMC
SP#0
SP#1

FIG. 6

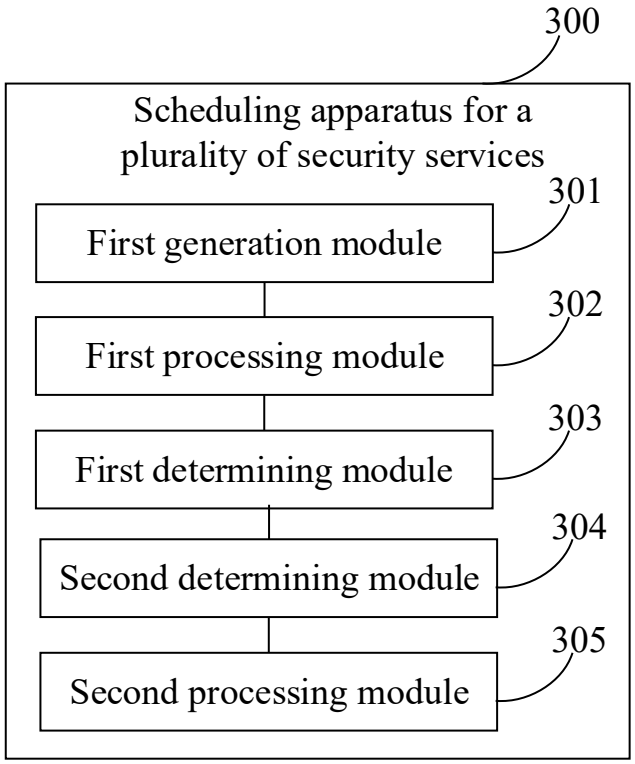

300
Scheduling apparatus for a plurality of security services
301
First generation module
302
First processing module
303
First determining module
304
Second determining module
305
Second processing module

FIG. 7

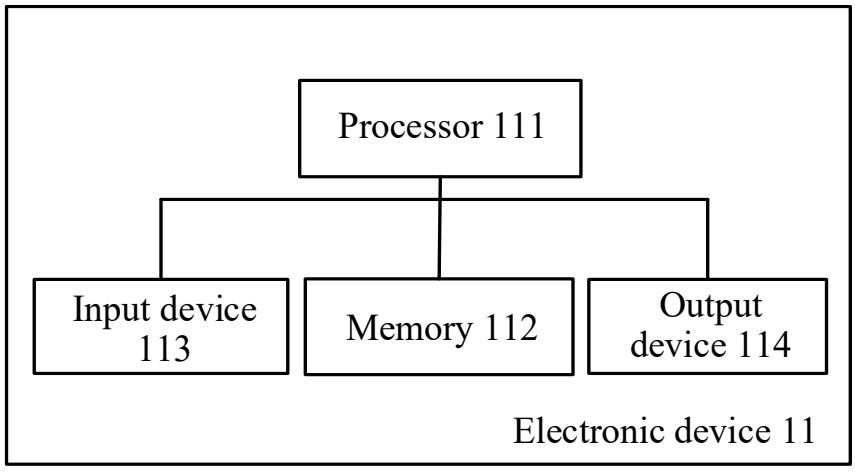

Processor 111
Input device 113
Memory 112
Output device 114
Electronic device 11

FIG. 8