FIG. 1

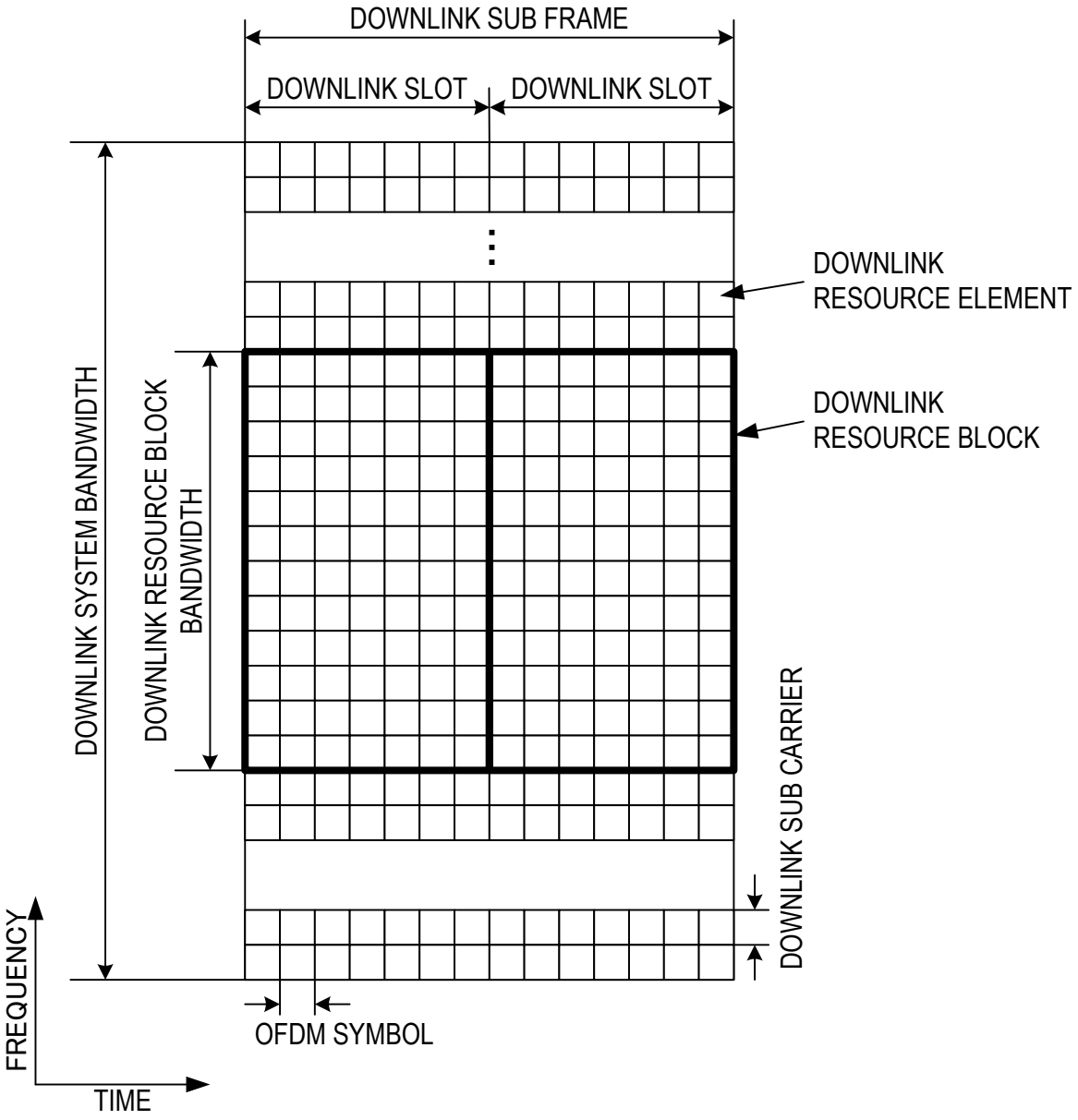

DOWNLINK SUB FRAME
DOWNLINK SLOT
DOWNLINK SLOT
DOWNLINK RESOURCE ELEMENT
DOWNLINK RESOURCE BLOCK
DOWNLINK SYSTEM BANDWIDTH
DOWNLINK RESOURCE BLOCK BANDWIDTH
DOWNLINK SUB CARRIER
OFDM SYMBOL
FREQUENCY
TIME

FIG. 2

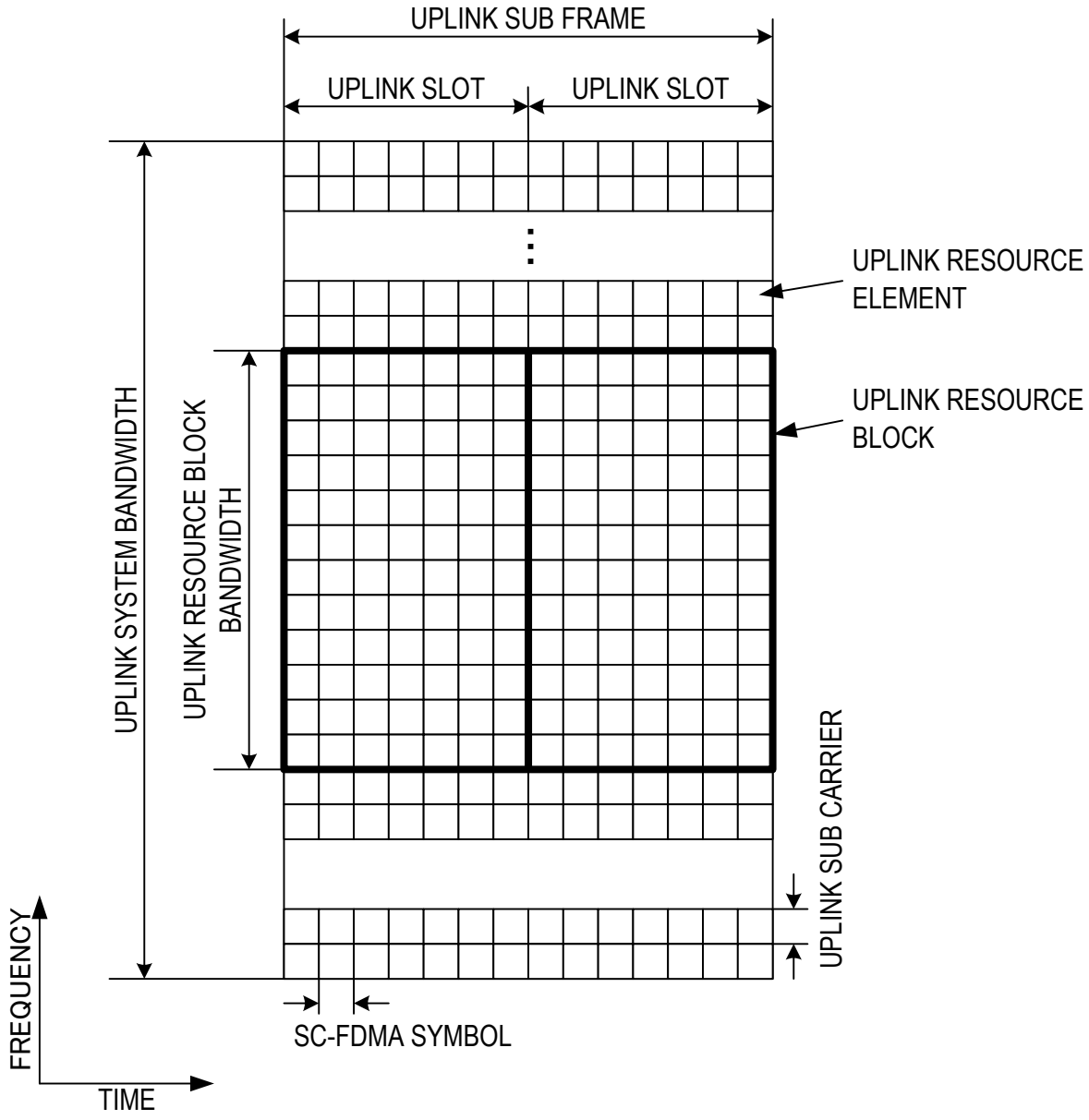

UPLINK SUB FRAME
UPLINK SLOT
UPLINK SLOT
UPLINK RESOURCE ELEMENT
UPLINK RESOURCE BLOCK
UPLINK SYSTEM BANDWIDTH
UPLINK RESOURCE BLOCK BANDWIDTH
UPLINK SUB CARRIER
SC-FDMA SYMBOL
FREQUENCY
TIME

FIG. 3

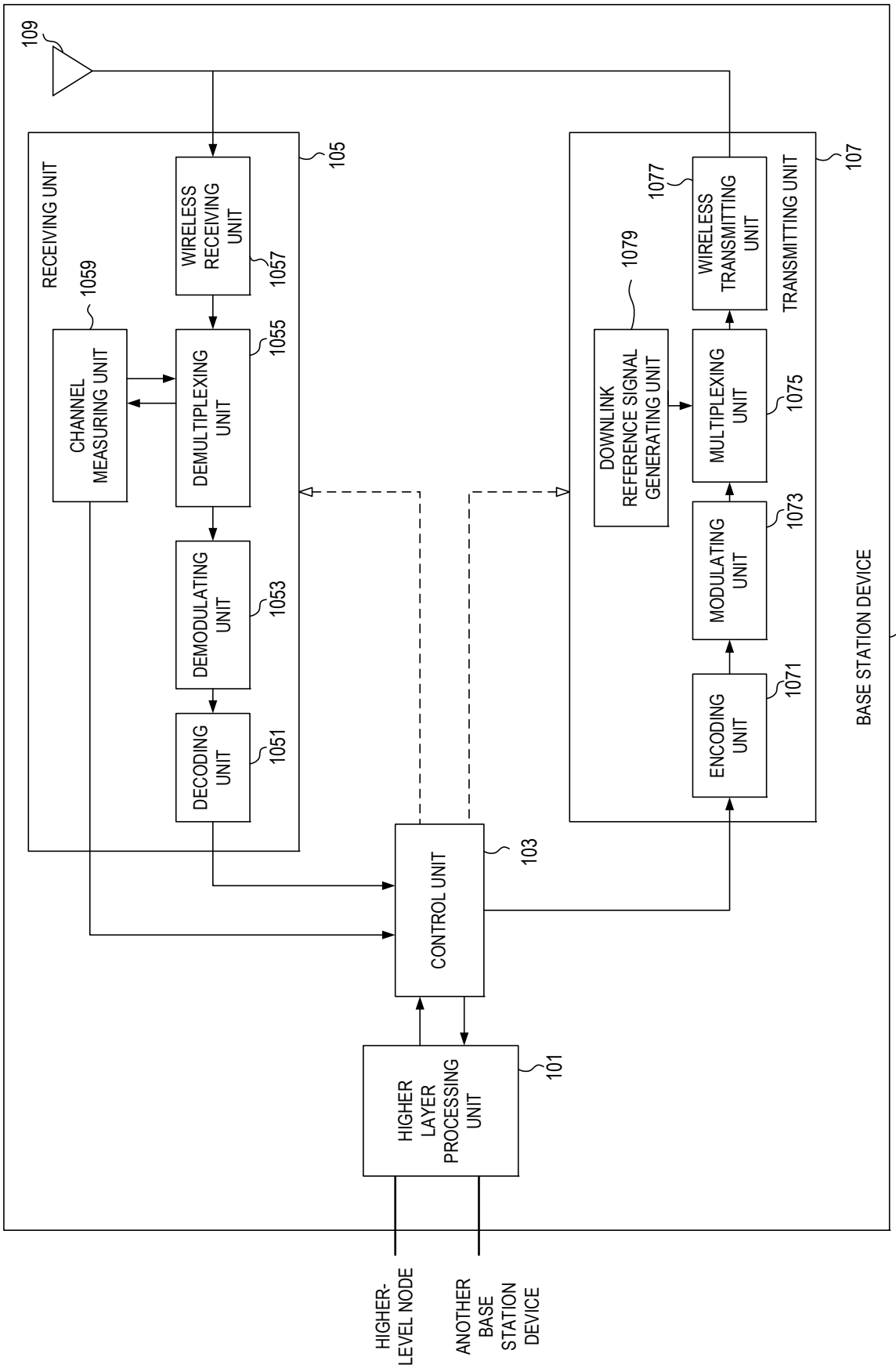

109
RECEIVING UNIT
105
WIRELESS RECEIVING UNIT
1057
1059
CHANNEL MEASURING UNIT
DEMULTIPLEXING UNIT
1055
DEMODULATING UNIT
1053
DECODING UNIT
1051
TRANSMITTING UNIT
107
1077
WIRELESS TRANSMITTING UNIT
1079
DOWNLINK REFERENCE SIGNAL GENERATING UNIT
MULTIPLEXING UNIT
1075
MODULATING UNIT
1073
ENCODING UNIT
1071
CONTROL UNIT
103
HIGHER LAYER PROCESSING UNIT
101
BASE STATION DEVICE
1
HIGHER-LEVEL NODE
ANOTHER BASE STATION DEVICE

FIG. 4

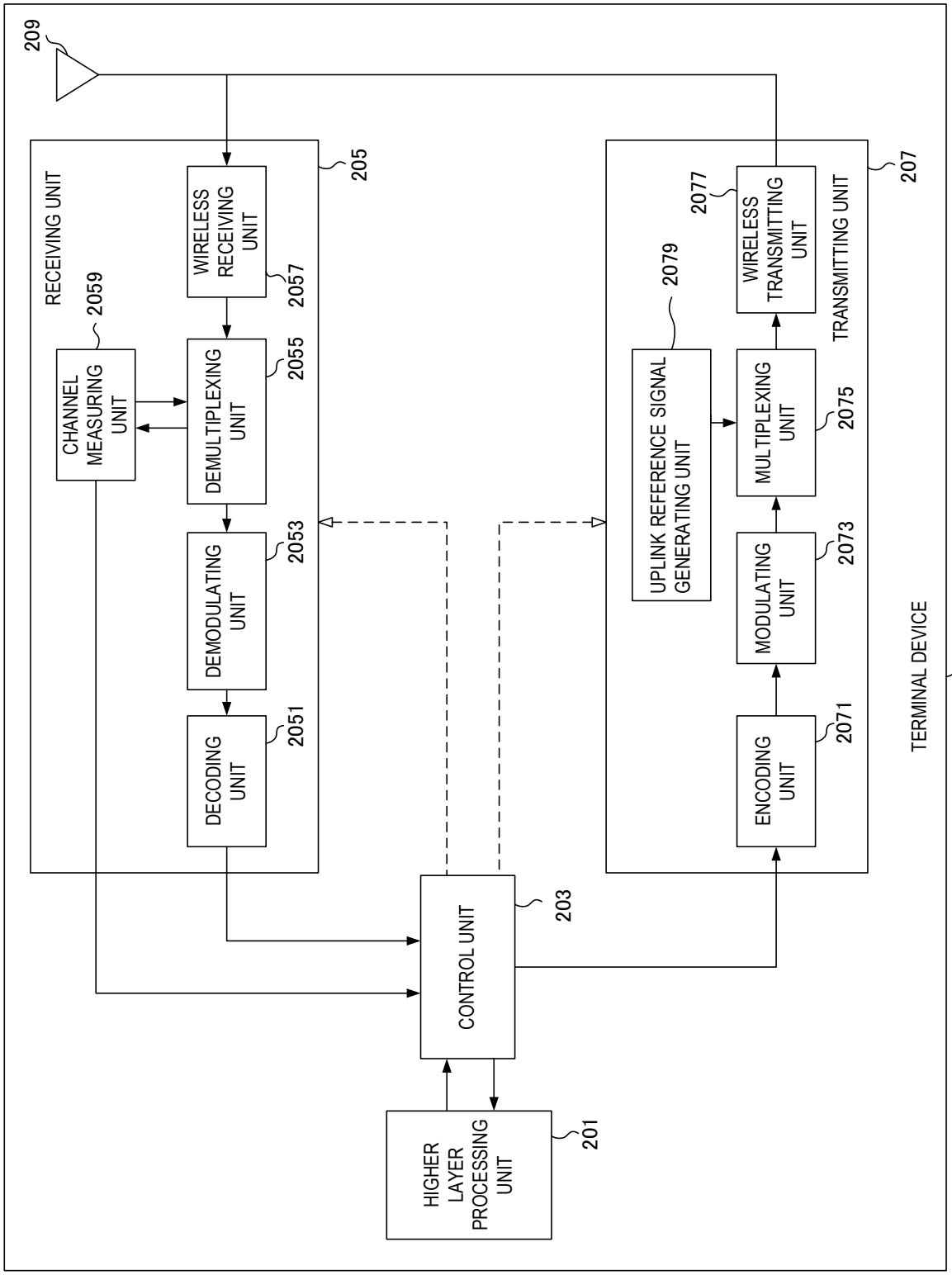

209
RECEIVING UNIT
205
WIRELESS RECEIVING UNIT
2057
CHANNEL MEASURING UNIT
2059
DEMULTIPLEXING UNIT
2055
DEMODULATING UNIT
2053
DECODING UNIT
2051
TRANSMITTING UNIT
207
WIRELESS TRANSMITTING UNIT
2077
UPLINK REFERENCE SIGNAL GENERATING UNIT
2079
MULTIPLEXING UNIT
2075
MODULATING UNIT
2073
ENCODING UNIT
2071
CONTROL UNIT
203
HIGHER LAYER PROCESSING UNIT
201
TERMINAL DEVICE
2

FIG. 5

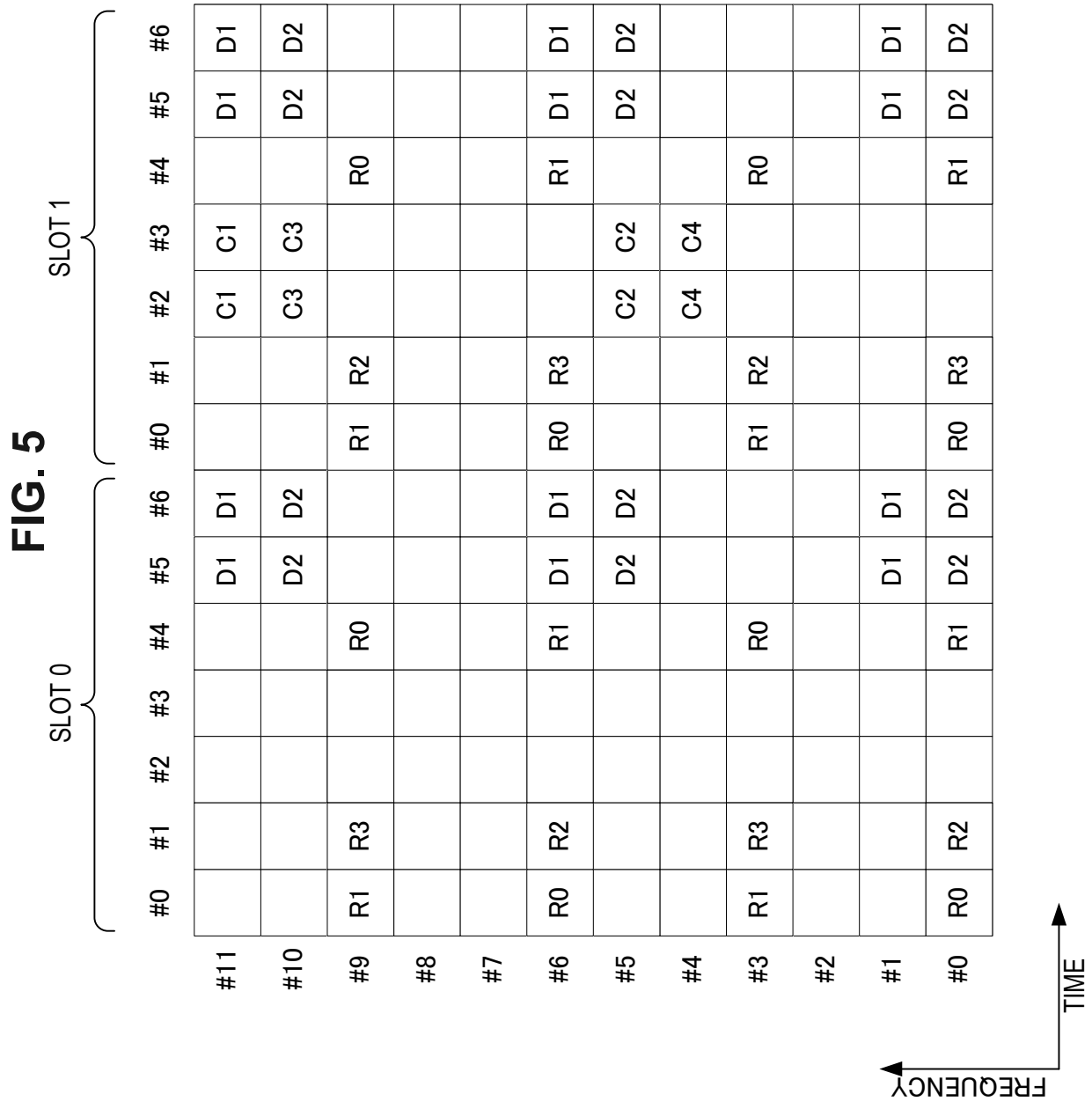

SLOT 0
SLOT 1
#0 #1 #2 #3 #4 #5 #6 #0 #1 #2 #3 #4 #5 #6
#11 D1 C1 C1 D1 D1
#10 D2 C3 C3 D2 D2
#9 R1 R3 R0 R2 R1 R0
#8
#7
#6 R0 R2 R1 D1 D1 R0 R3 R1 D1 D1
#5 D2 D2 C2 C2 D2 D2
#4 C4 C4
#3 R1 R3 R0 R1 R2 R0
#2
#1 D1 D1 D1 D1
#0 R0 R2 R1 D2 D2 R0 R3 R1 D2 D2
FREQUENCY
TIME

FIG. 6

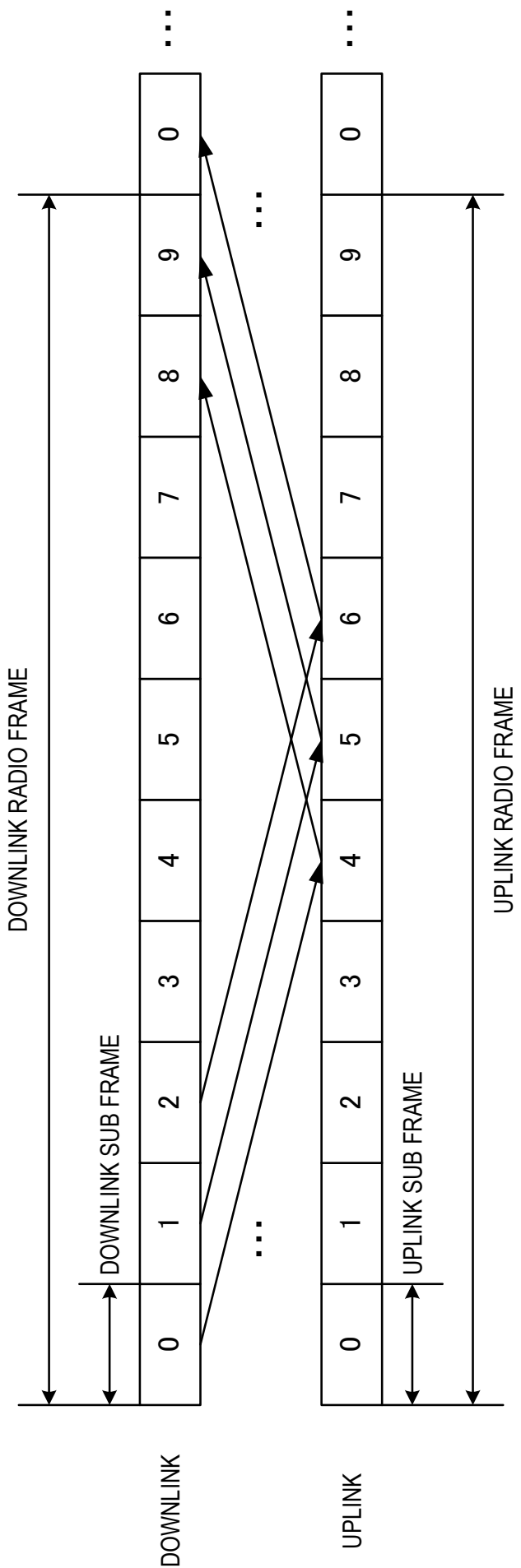

DOWNLINK
UPLINK
DOWNLINK RADIO FRAME
UPLINK RADIO FRAME
DOWNLINK SUB FRAME
UPLINK SUB FRAME
0
1
2
3
4
5
6
7
8
9
...

FIG. 7

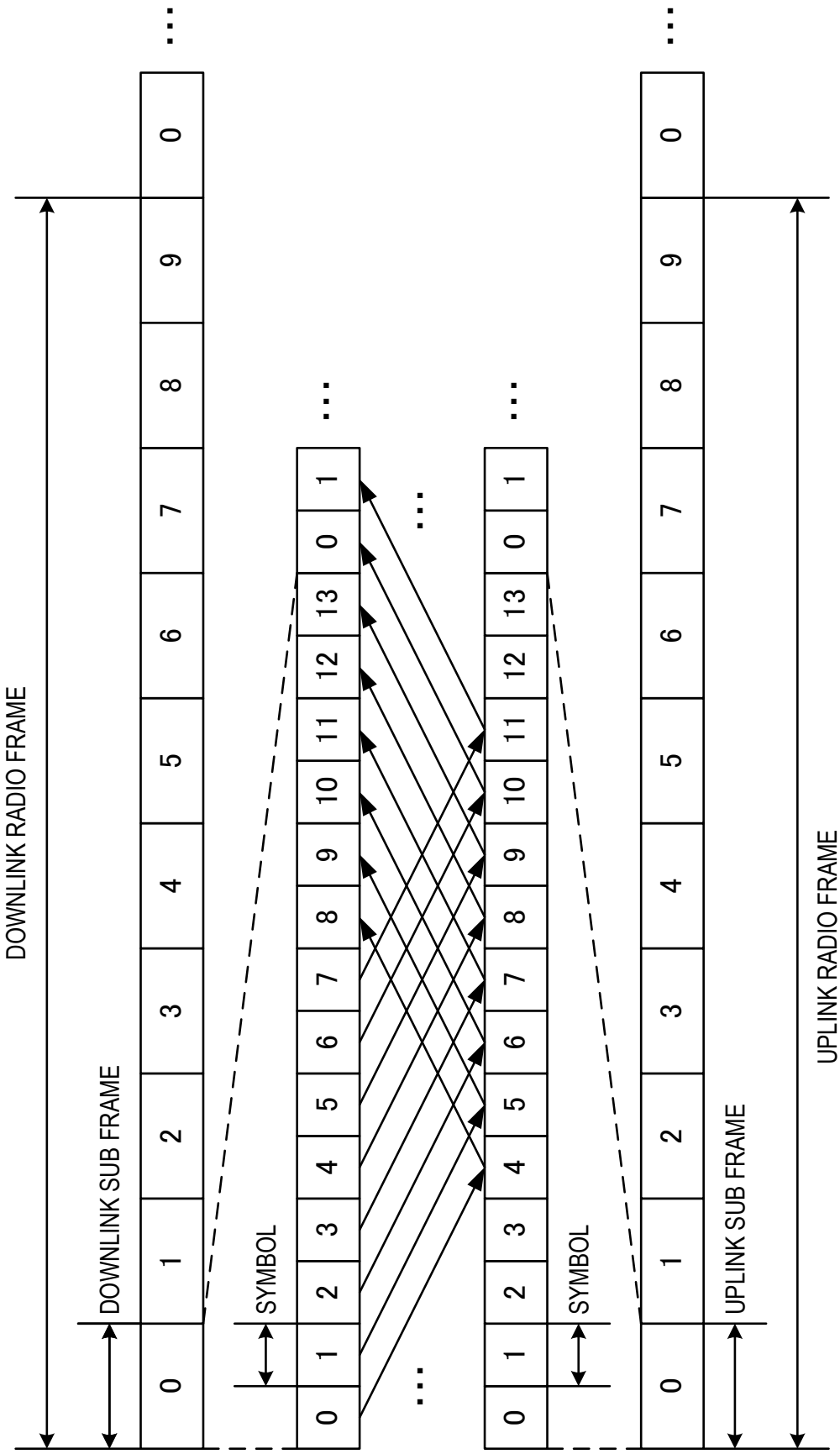

DOWNLINK RADIO FRAME
DOWNLINK SUB FRAME
SYMBOL
UPLINK RADIO FRAME
UPLINK SUB FRAME
SYMBOL
0
1
2
3
4
5
6
7
8
9
10
11
12
13

FIG. 8

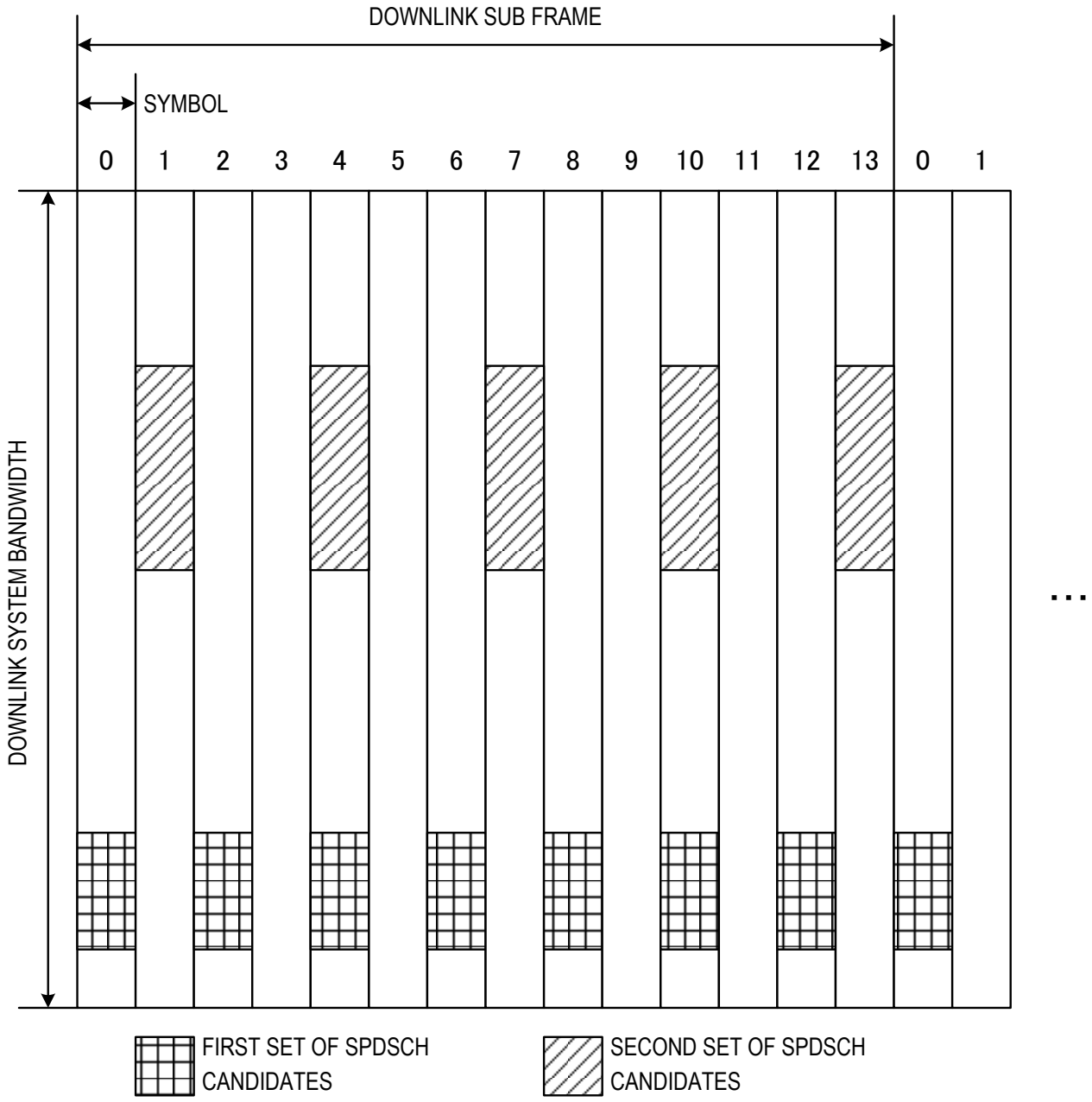

DOWNLINK SUB FRAME
SYMBOL
0 1 2 3 4 5 6 7 8 9 10 11 12 13 0 1
DOWNLINK SYSTEM BANDWIDTH
...
FIRST SET OF SPDSCH CANDIDATES
SECOND SET OF SPDSCH CANDIDATES

FIG. 9

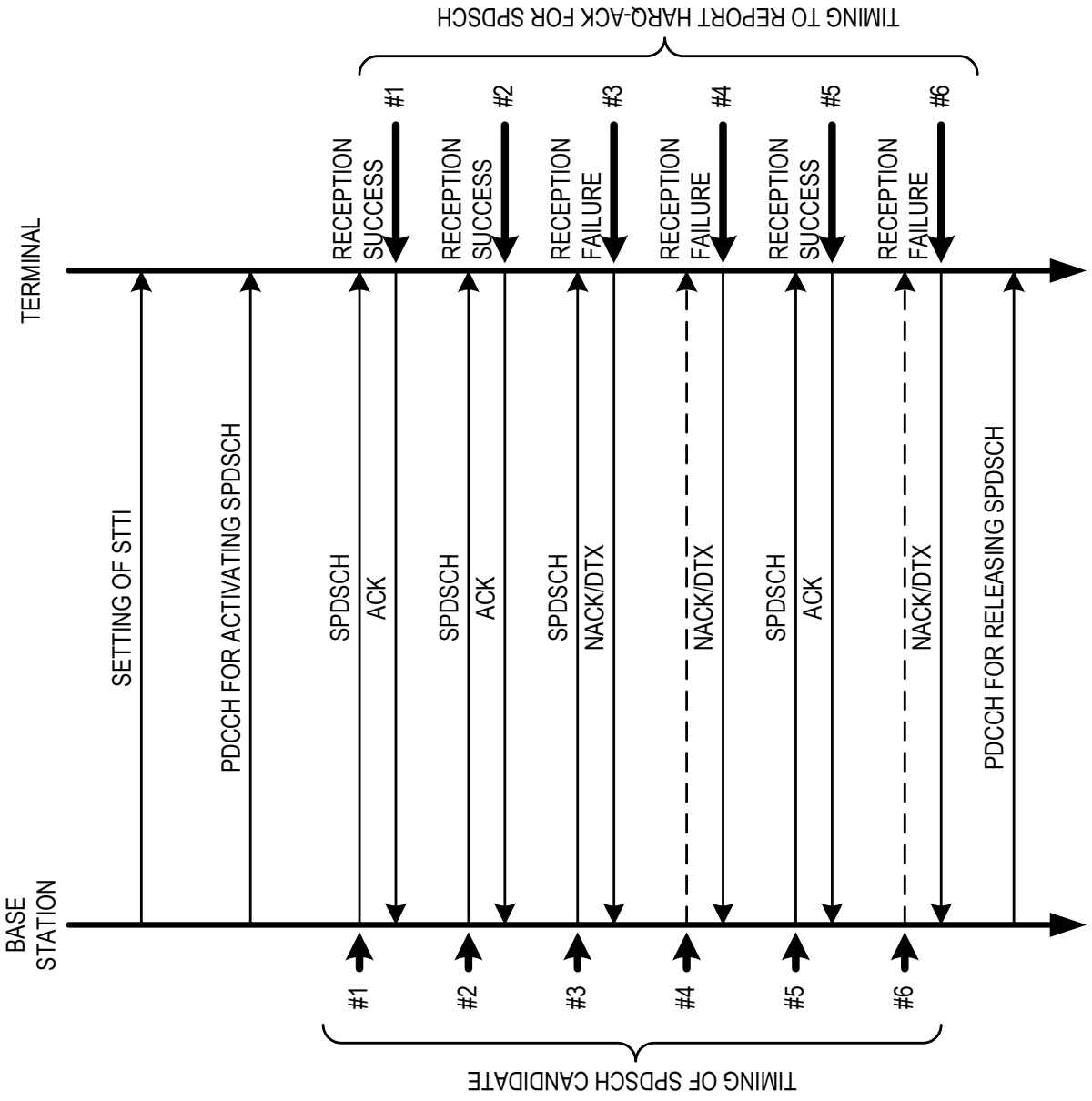

TIMING TO REPORT HARQ-ACK FOR SPDSCH
#1
#2
#3
#4
#5
#6
RECEPTION SUCCESS
RECEPTION SUCCESS
RECEPTION FAILURE
RECEPTION FAILURE
RECEPTION SUCCESS
RECEPTION FAILURE
TERMINAL
SETTING OF STTI
PDCCH FOR ACTIVATING SPDSCH
SPDSCH
ACK
SPDSCH
ACK
SPDSCH
NACK/DTX
NACK/DTX
SPDSCH
ACK
NACK/DTX
PDCCH FOR RELEASING SPDSCH
BASE STATION
#1
#2
#3
#4
#5
#6
TIMING OF SPDSCH CANDIDATE

FIG. 10

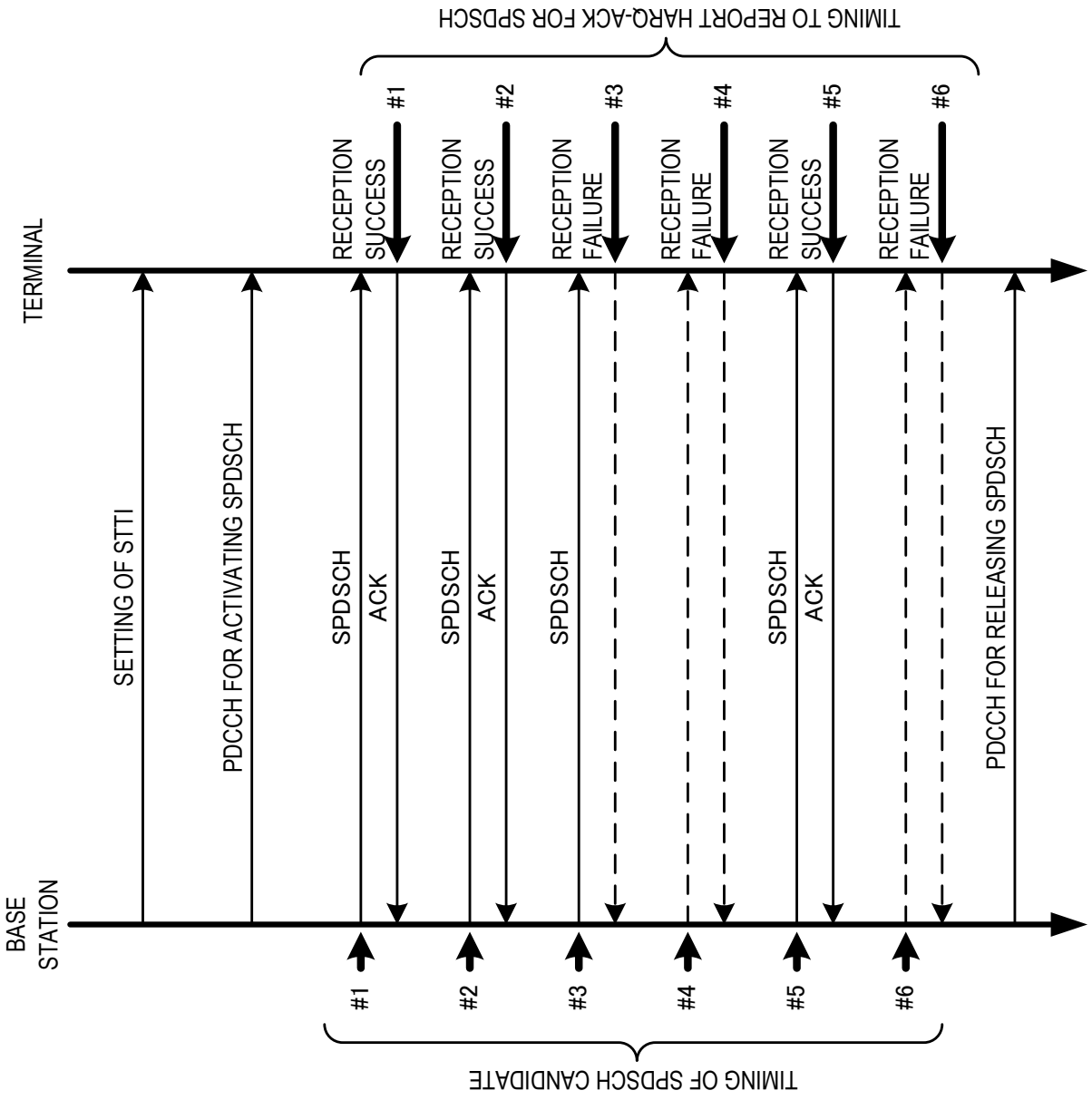

TERMINAL
BASE STATION
SETTING OF STTI
PDCCH FOR ACTIVATING SPDSCH
SPDSCH
ACK
RECEPTION SUCCESS
RECEPTION FAILURE
PDCCH FOR RELEASING SPDSCH
#1
#2
#3
#4
#5
#6
TIMING OF SPDSCH CANDIDATE
TIMING TO REPORT HARQ-ACK FOR SPDSCH

FIG. 11

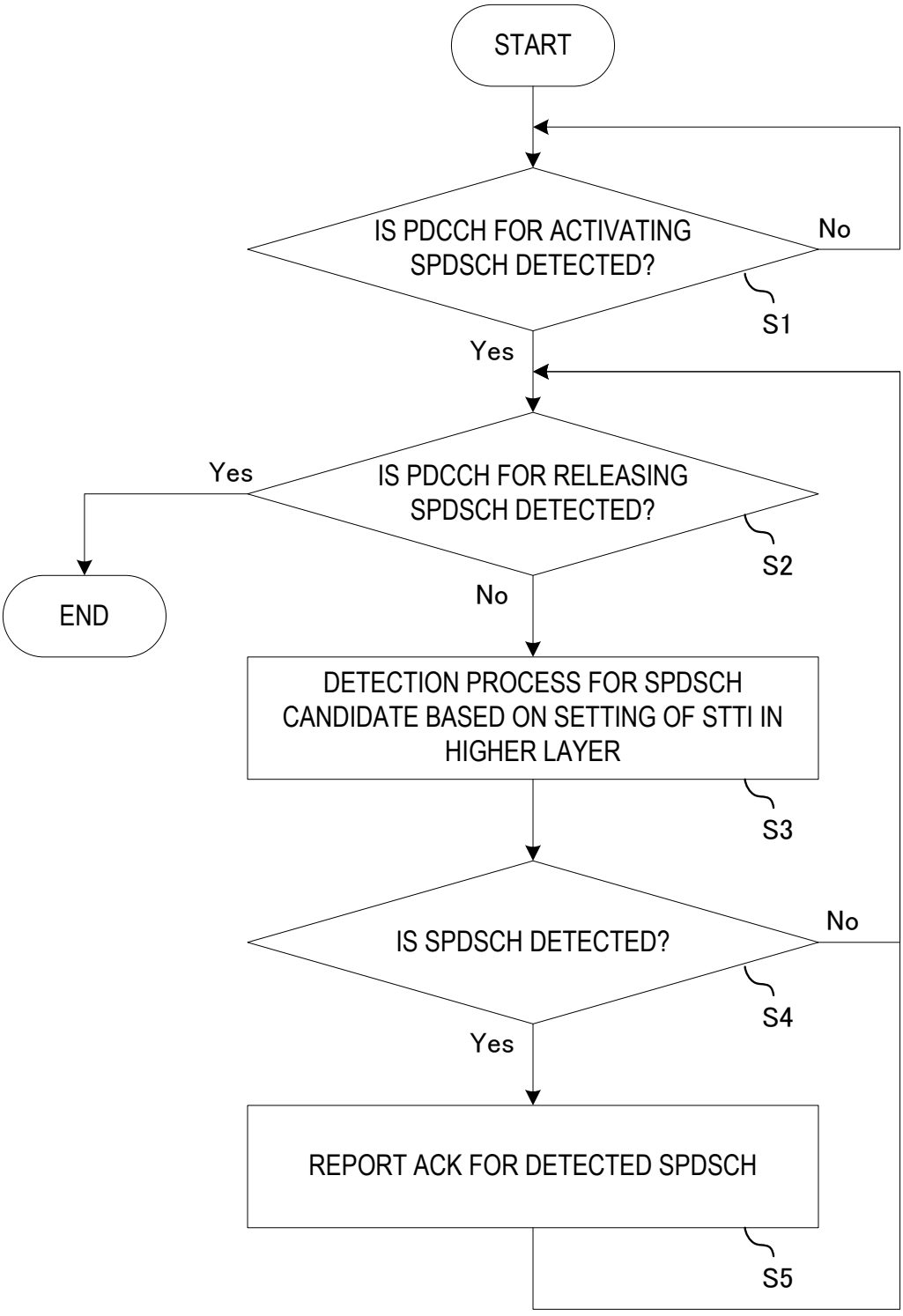

START
IS PDCCH FOR ACTIVATING SPDSCH DETECTED?
No
S1
Yes
IS PDCCH FOR RELEASING SPDSCH DETECTED?
Yes
S2
END
No
DETECTION PROCESS FOR SPDSCH CANDIDATE BASED ON SETTING OF STTI IN HIGHER LAYER
S3
IS SPDSCH DETECTED?
No
S4
Yes
REPORT ACK FOR DETECTED SPDSCH
S5

FIG. 12

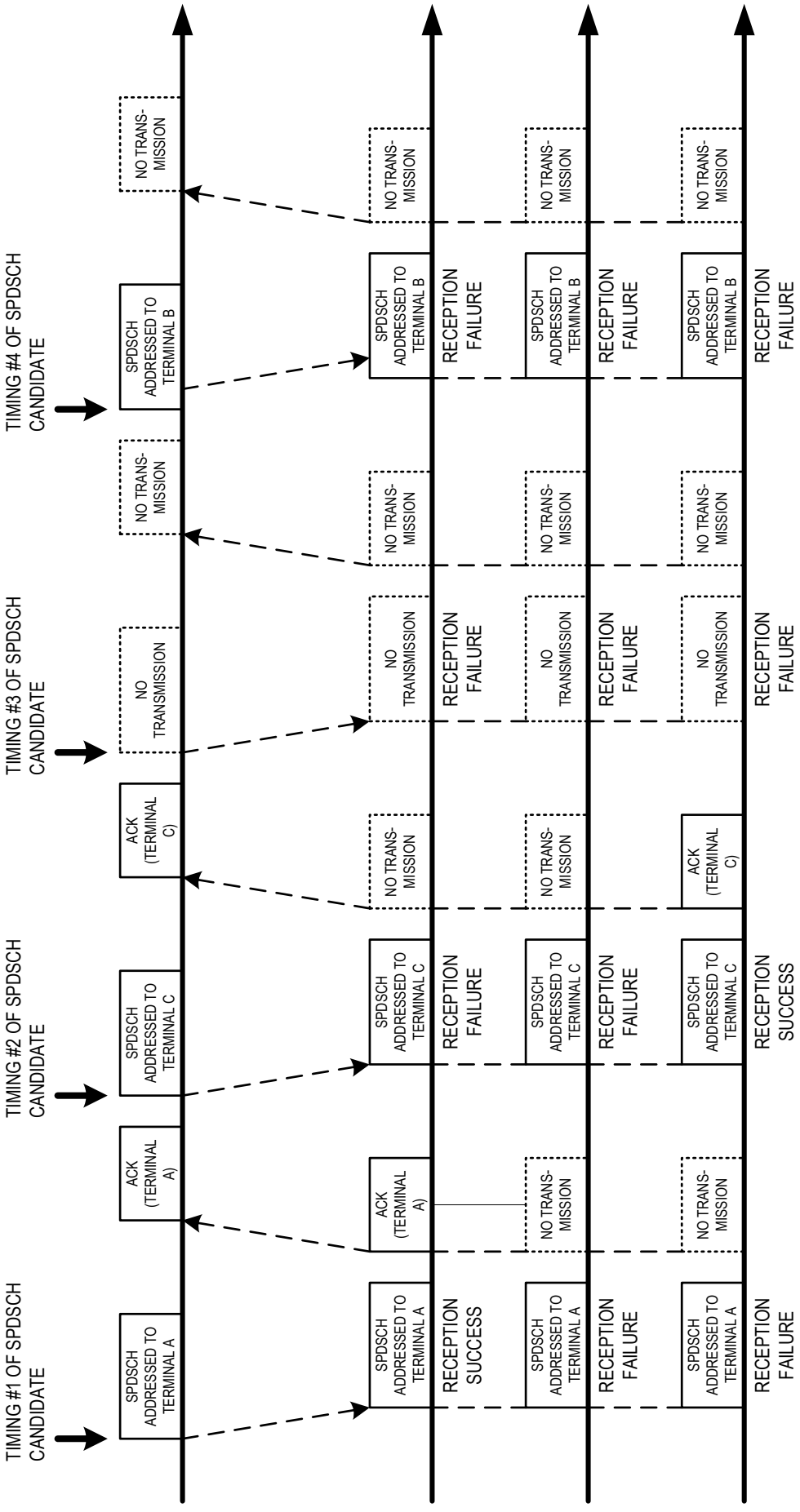

TIMING #1 OF SPDSCH CANDIDATE
TIMING #2 OF SPDSCH CANDIDATE
TIMING #3 OF SPDSCH CANDIDATE
TIMING #4 OF SPDSCH CANDIDATE
SPDSCH ADDRESSED TO TERMINAL A
SPDSCH ADDRESSED TO TERMINAL C
NO TRANSMISSION
SPDSCH ADDRESSED TO TERMINAL B
NO TRANS-MISSION
ACK (TERMINAL A)
ACK (TERMINAL C)
RECEPTION SUCCESS
RECEPTION FAILURE
TERMINAL A
TERMINAL B
TERMINAL C

FIG. 13

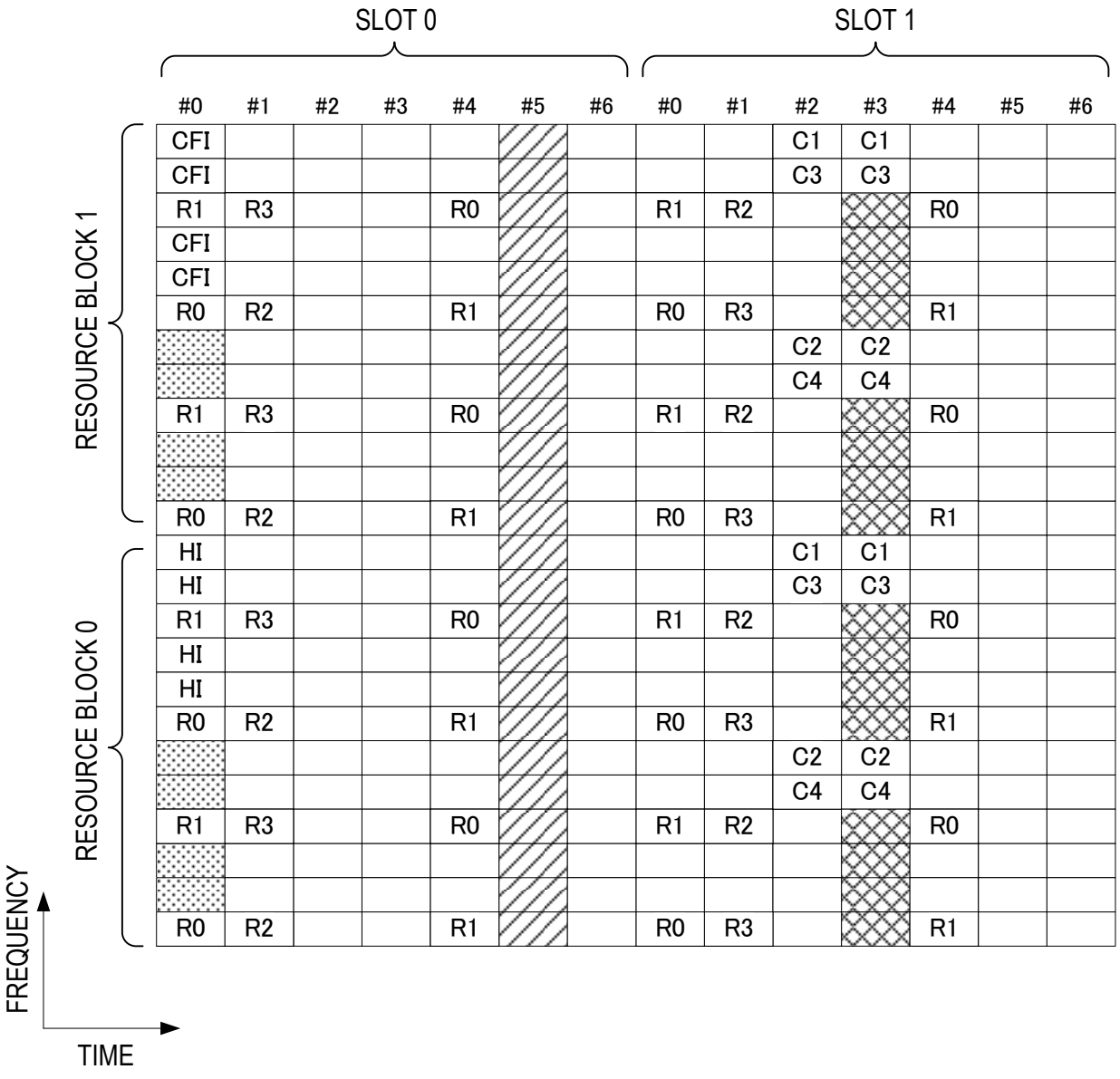

SLOT 0
SLOT 1
#0 #1 #2 #3 #4 #5 #6 #0 #1 #2 #3 #4 #5 #6
RESOURCE BLOCK 1
RESOURCE BLOCK 0
CFI CFI R1 R3 R0 CFI CFI R0 R2 R1 R1 R3 R0 R0 R2 R1
HI HI R1 R3 R0 HI HI R0 R2 R1 R1 R3 R0 R0 R2 R1
C1 C1 C3 C3 R1 R2 R0 R0 R3 R1 C2 C2 C4 C4 R1 R2 R0 R0 R3 R1
C1 C1 C3 C3 R1 R2 R0 R0 R3 R1 C2 C2 C4 C4 R1 R2 R0 R0 R3 R1
FREQUENCY
TIME

FIG. 14

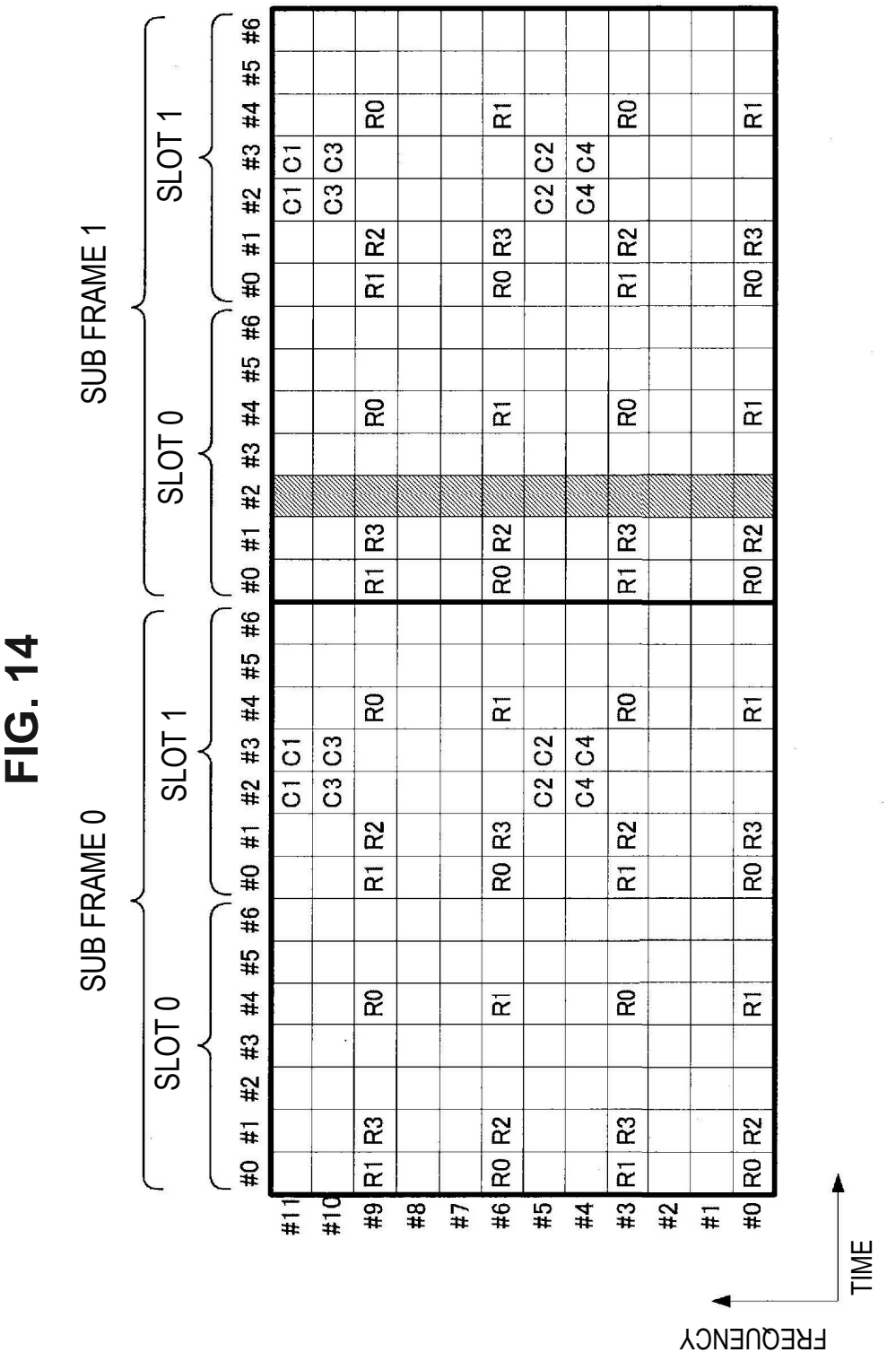

SUB FRAME 0
SUB FRAME 1
SLOT 0
SLOT 1
SLOT 0
SLOT 1
#0 #1 #2 #3 #4 #5 #6 #0 #1 #2 #3 #4 #5 #6 #0 #1 #2 #3 #4 #5 #6 #0 #1 #2 #3 #4 #5 #6
#11
#10
#9
#8
#7
#6
#5
#4
#3
#2
#1
#0
TIME
FREQUENCY

FIG. 15

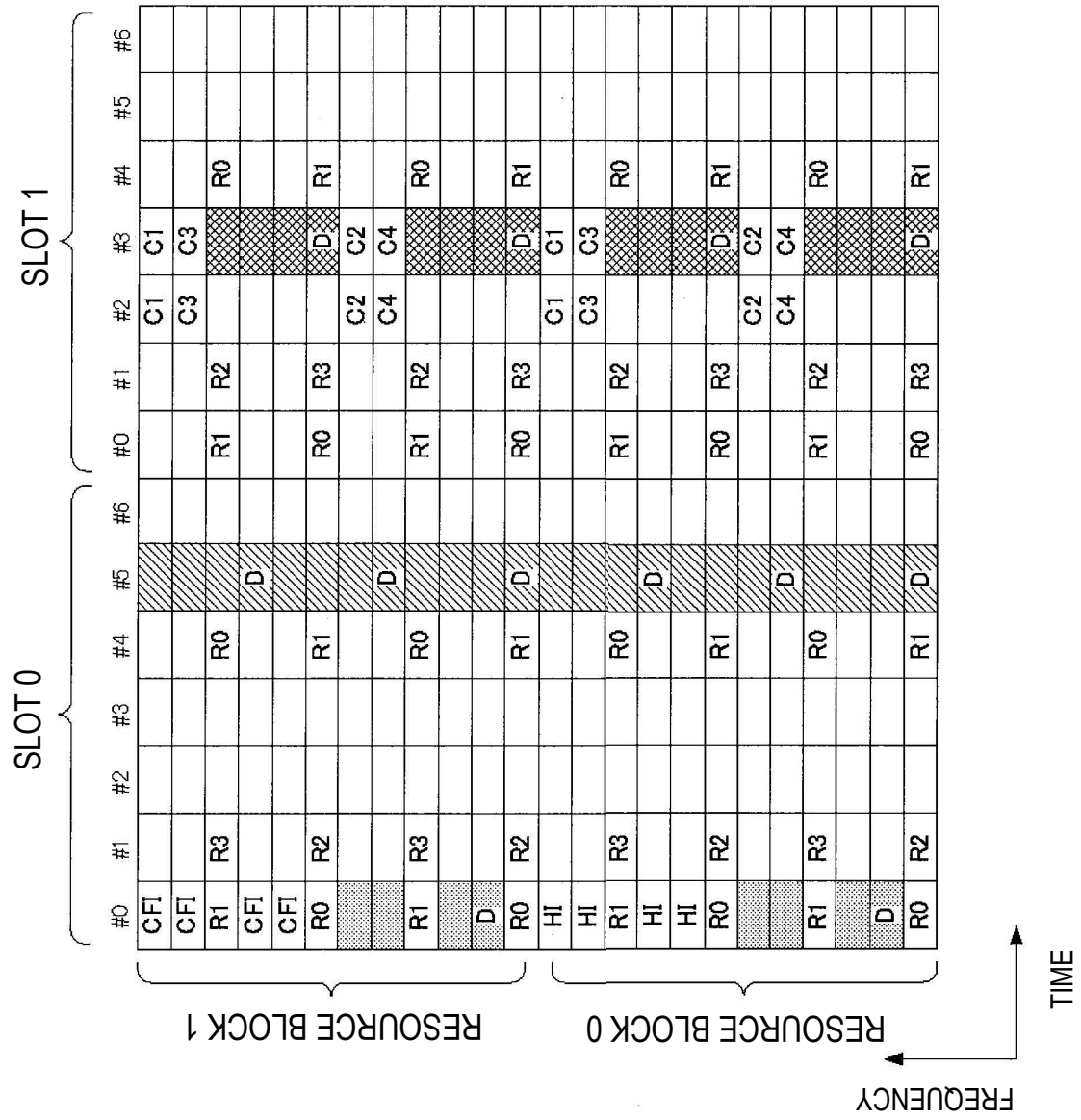

SLOT 0
SLOT 1
#0 #1 #2 #3 #4 #5 #6
RESOURCE BLOCK 0
RESOURCE BLOCK 1
FREQUENCY
TIME

FIG. 16

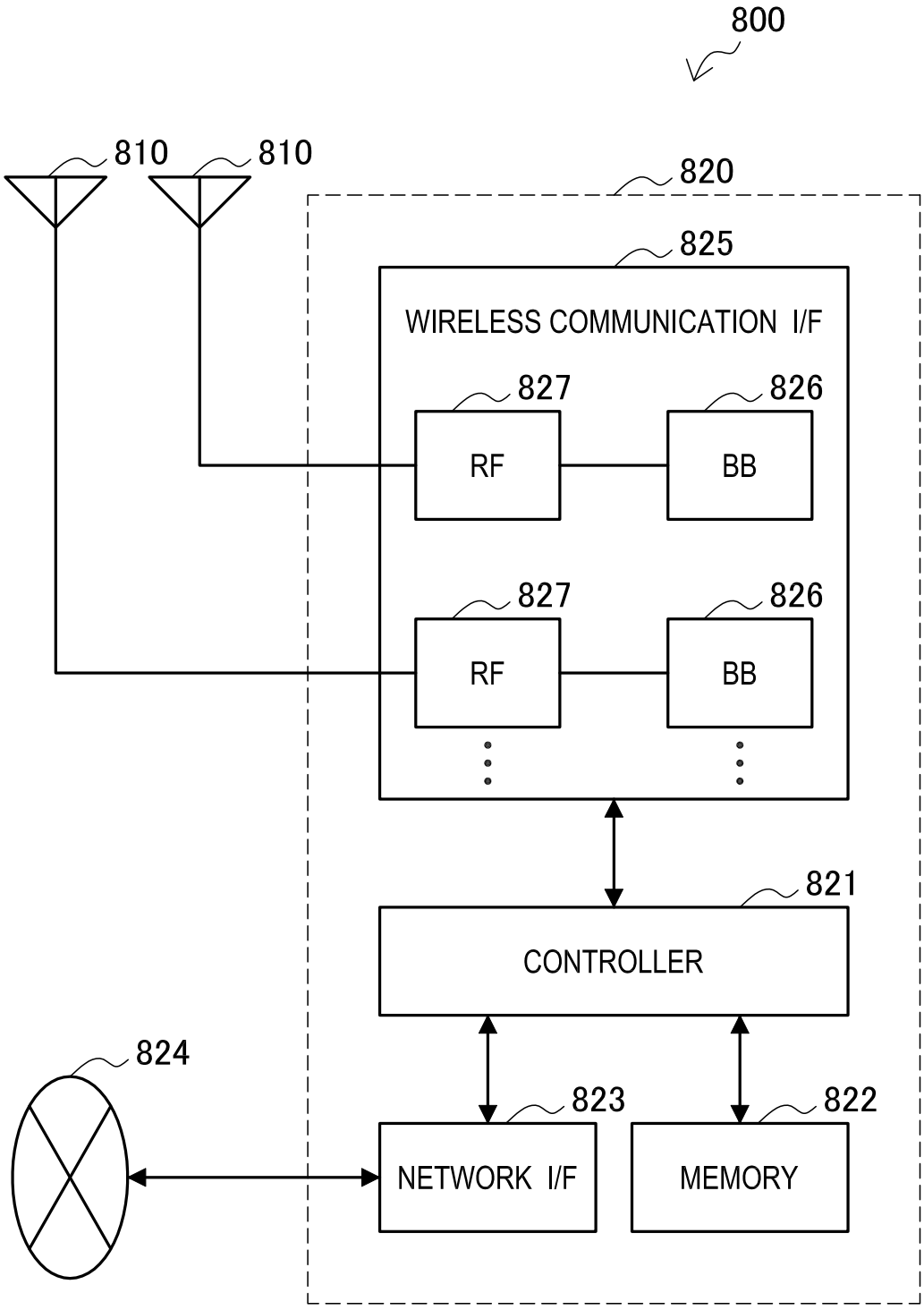

800
810
810
820
825
WIRELESS COMMUNICATION I/F
827
826
RF
BB
827
826
RF
BB
821
CONTROLLER
824
823
822
NETWORK I/F
MEMORY

FIG. 17

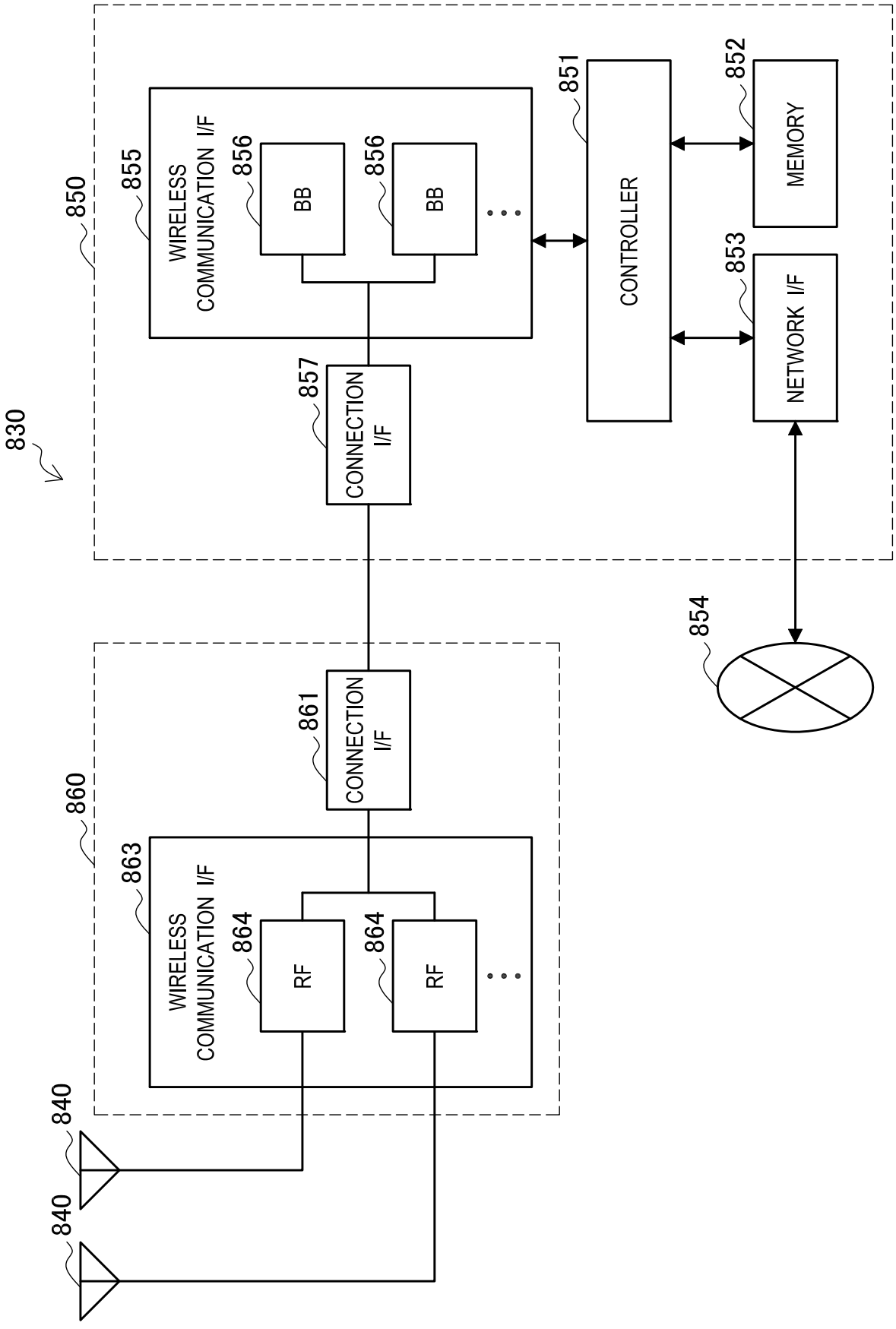

830
850
855
WIRELESS COMMUNICATION I/F
856
BB
856
BB
851
CONTROLLER
852
MEMORY
853
NETWORK I/F
857
CONNECTION I/F
854
860
863
WIRELESS COMMUNICATION I/F
864
RF
864
RF
861
CONNECTION I/F
840
840

FIG. 18

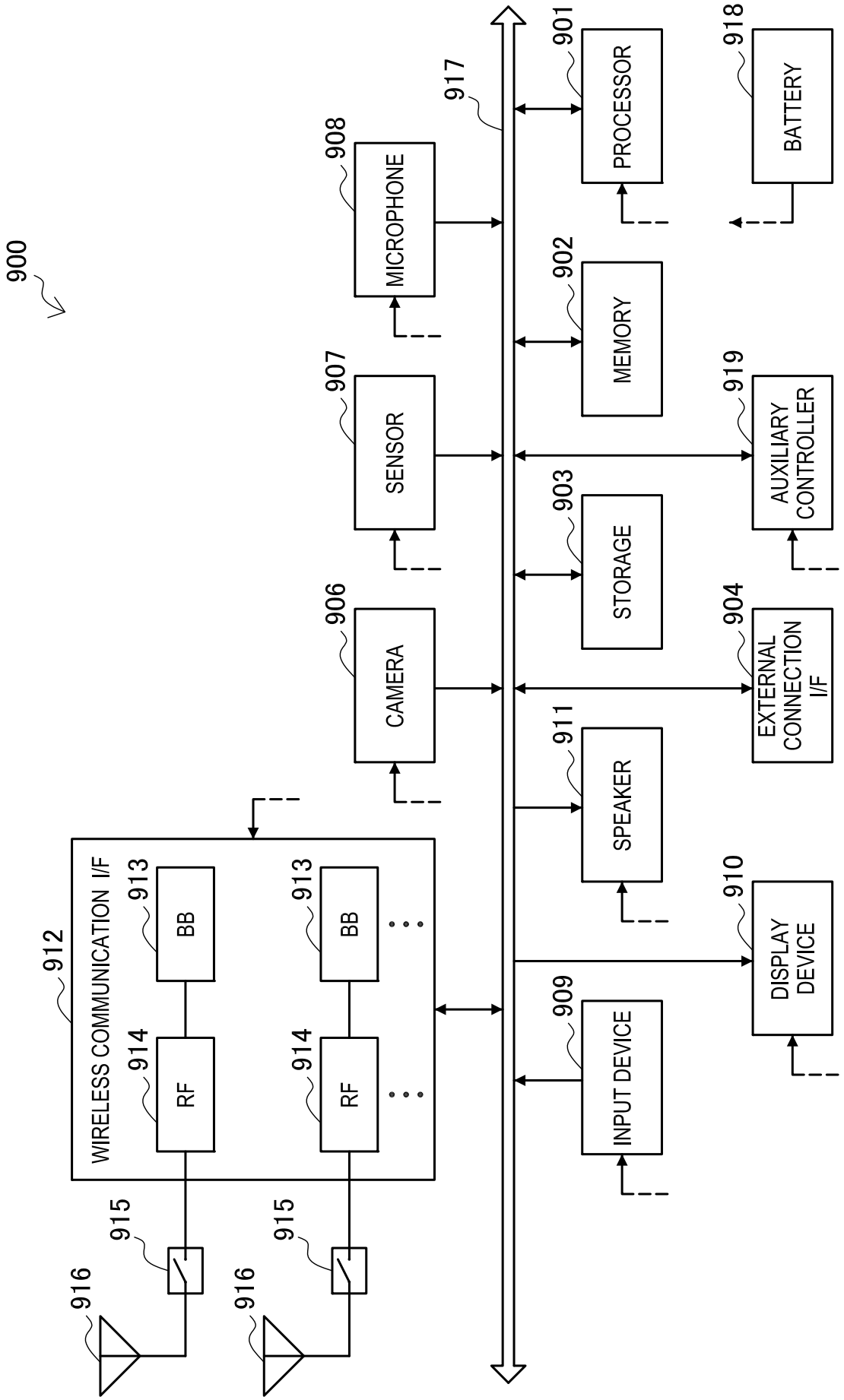
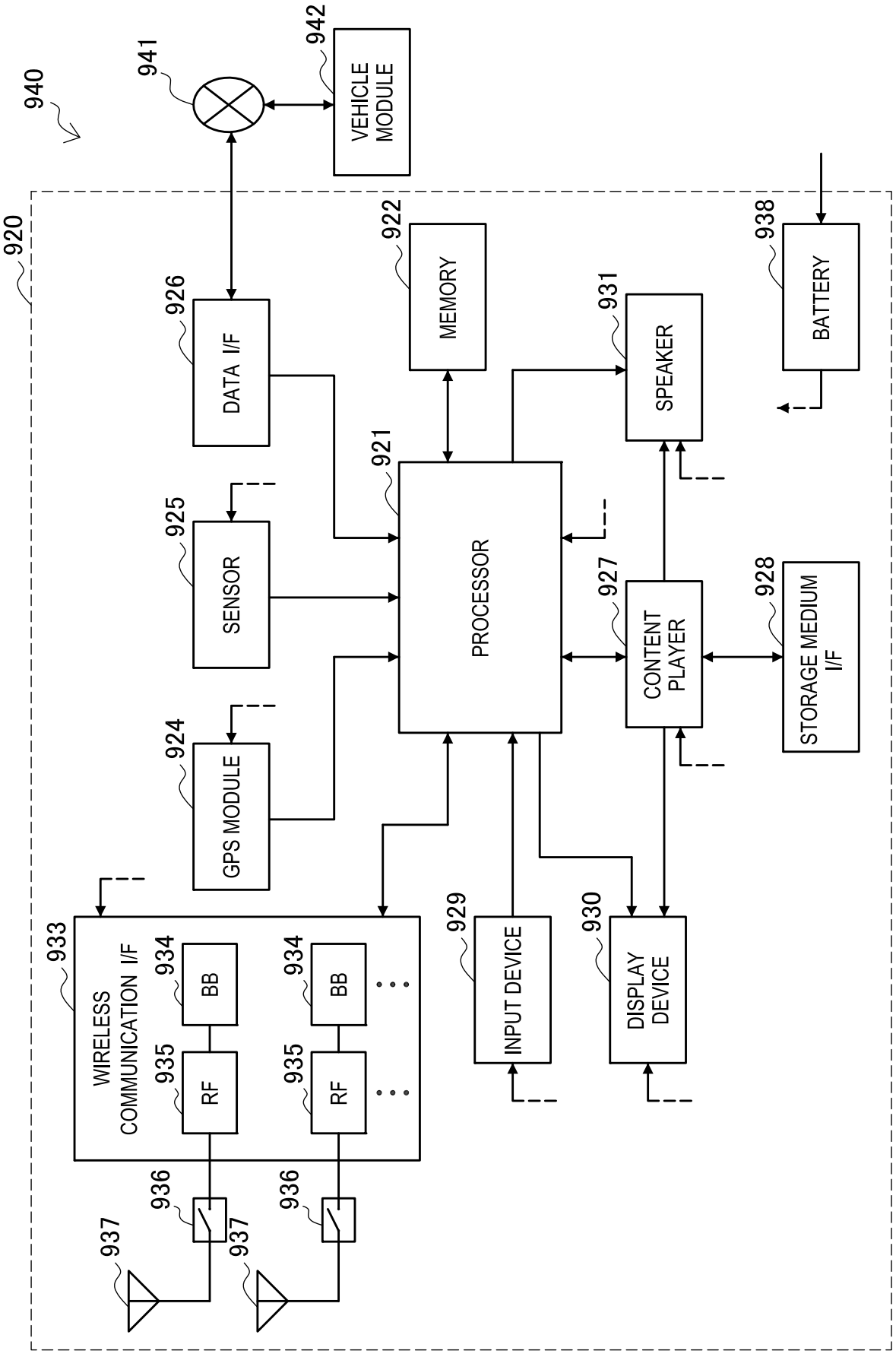

900
WIRELESS COMMUNICATION I/F
912
BB
913
RF
914
915
916
917
MICROPHONE
908
SENSOR
907
CAMERA
906
PROCESSOR
901
MEMORY
902
STORAGE
903
SPEAKER
911
INPUT DEVICE
909
BATTERY
918
AUXILIARY CONTROLLER
919
EXTERNAL CONNECTION I/F
904
DISPLAY DEVICE
910

FIG. 19


940
941
942
VEHICLE MODULE
920
922
MEMORY
938
BATTERY
926
DATA I/F
931
SPEAKER
921
PROCESSOR
925
SENSOR
927
CONTENT PLAYER
928
STORAGE MEDIUM I/F
924
GPS MODULE
933
WIRELESS COMMUNICATION I/F
934
BB
935
RF
929
INPUT DEVICE
930
DISPLAY DEVICE
936
937