FIG.1

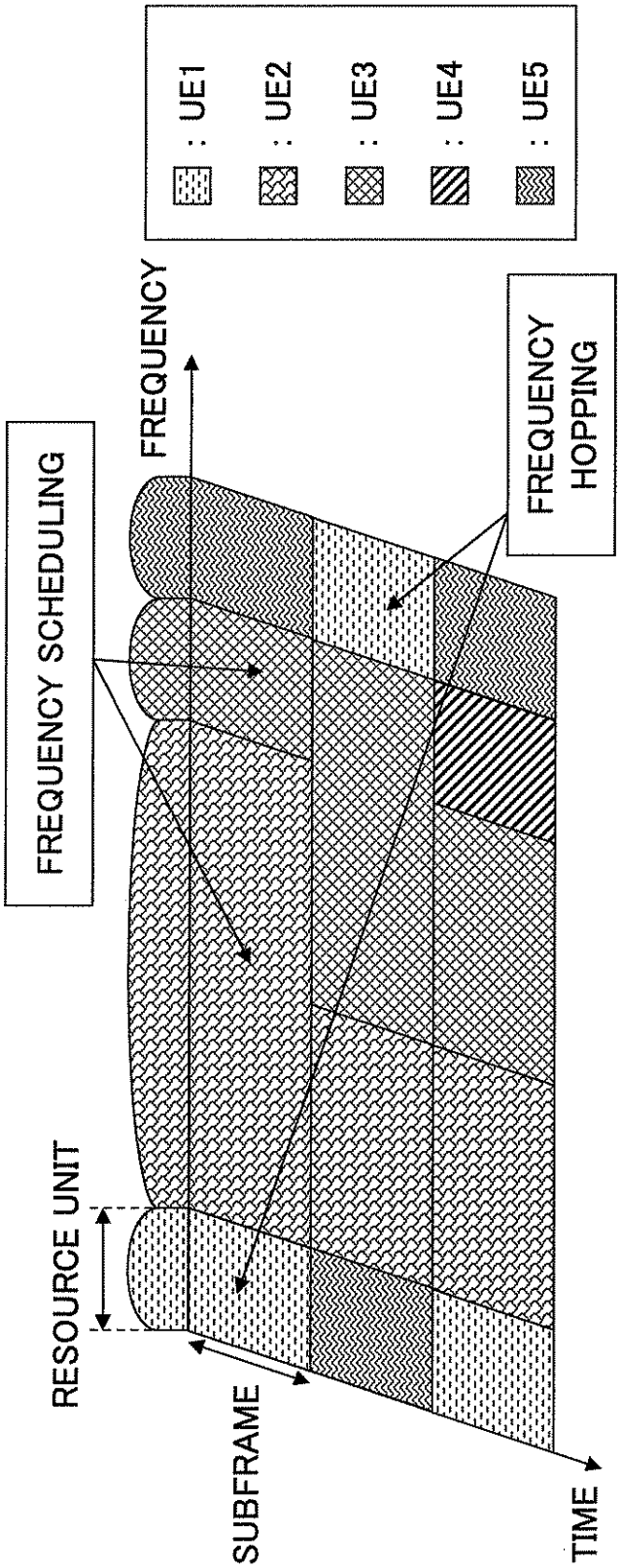

: UE1
: UE2
: UE3
: UE4
: UE5
FREQUENCY
FREQUENCY SCHEDULING
FREQUENCY HOPPING
RESOURCE UNIT
SUBFRAME
TIME

FIG.2

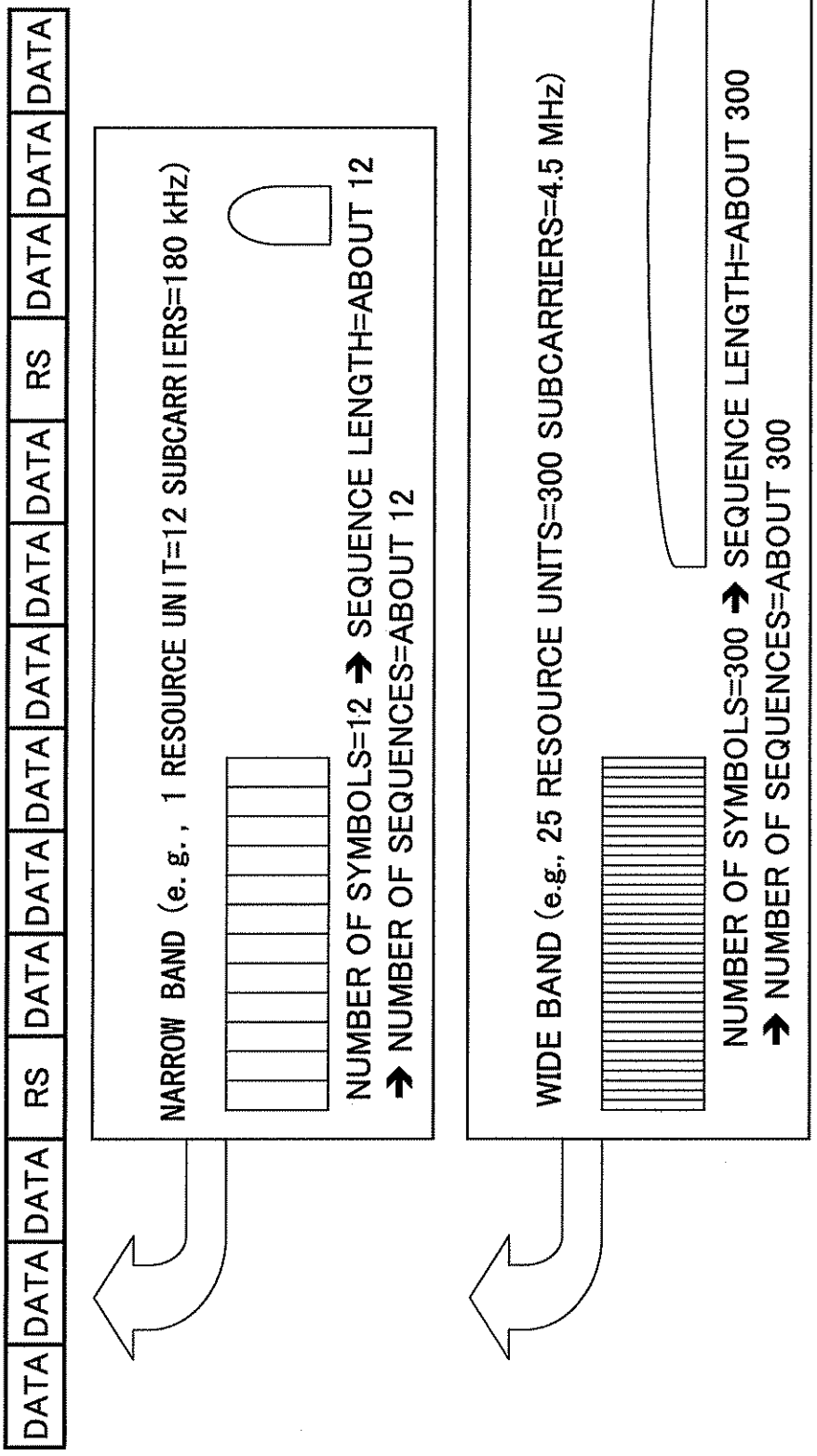

1 ms SUBFRAME
DATA
DATA
DATA
RS
DATA
DATA
DATA
DATA
DATA
RS
DATA
DATA
DATA
NARROW BAND (e.g., 1 RESOURCE UNIT=12 SUBCARRIERS=180 kHz)
NUMBER OF SYMBOLS=12 → SEQUENCE LENGTH=ABOUT 12
→ NUMBER OF SEQUENCES=ABOUT 12
WIDE BAND (e.g., 25 RESOURCE UNITS=300 SUBCARRIERS=4.5 MHz)
NUMBER OF SYMBOLS=300 → SEQUENCE LENGTH=ABOUT 300
→ NUMBER OF SEQUENCES=ABOUT 300

FIG.3

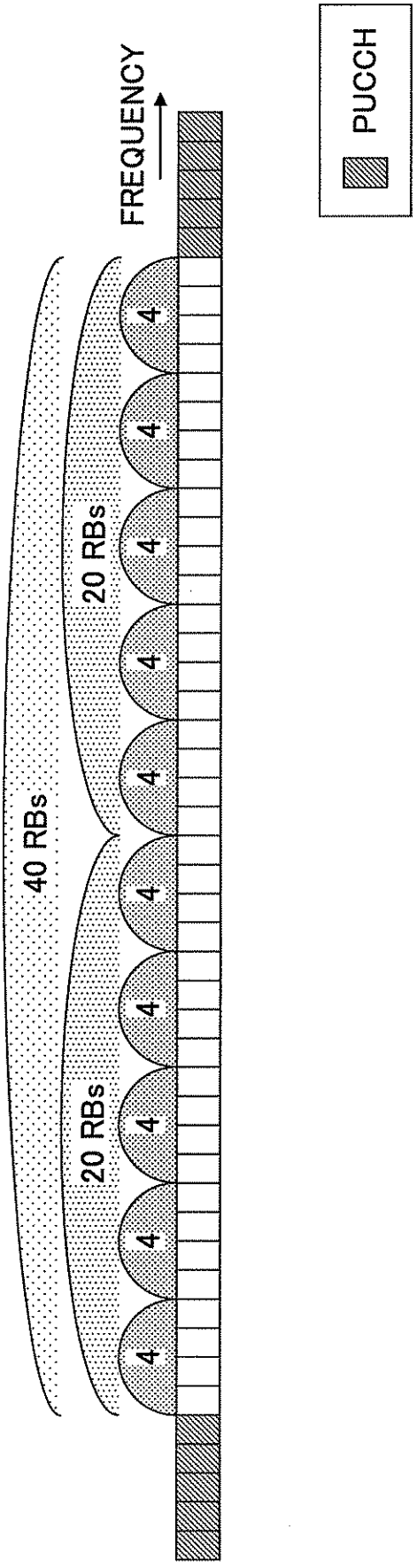


FIG.4

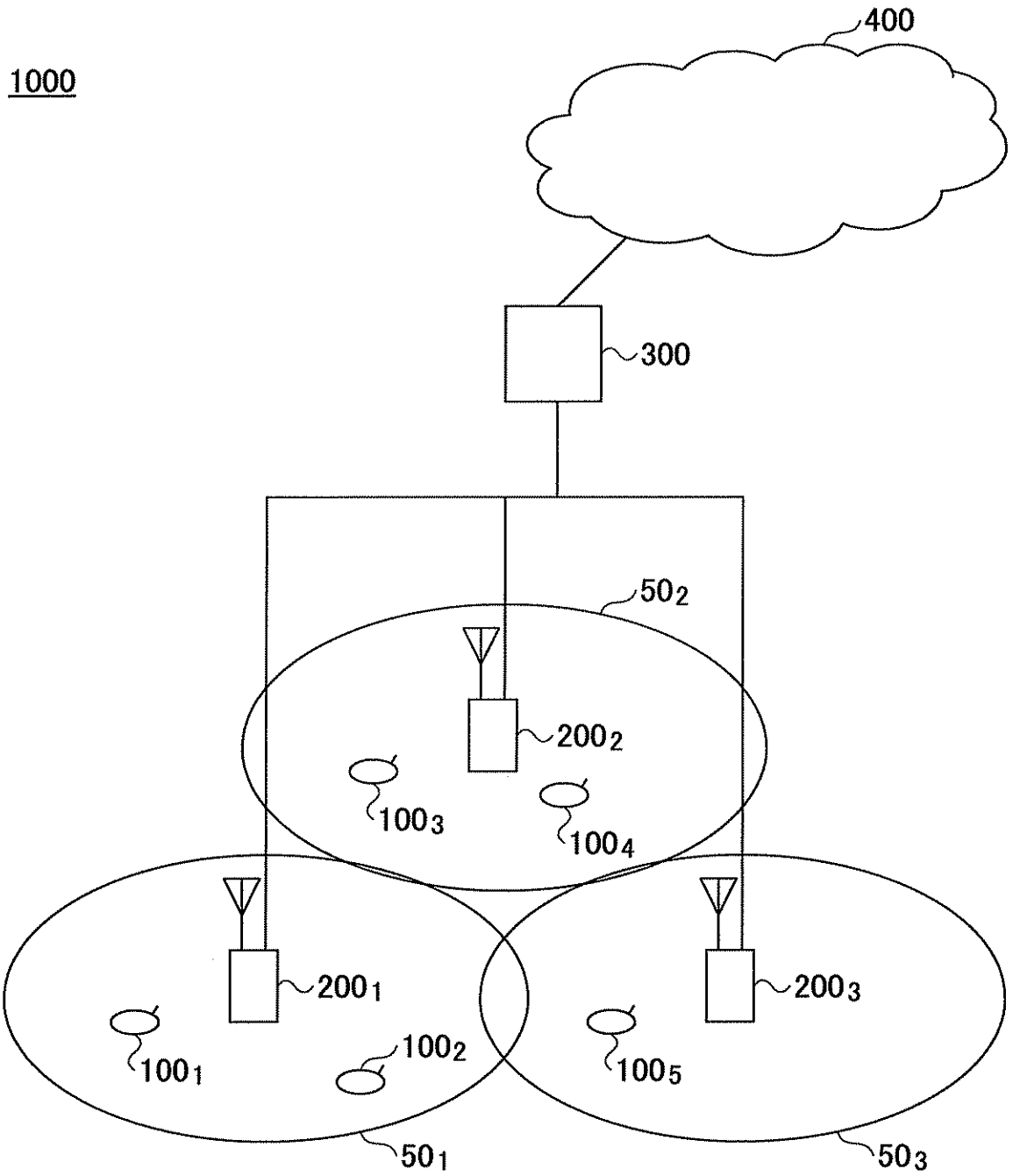

1000
400
300
50_2
200_2
100_3
100_4
200_1
200_3
100_1
100_2
100_5
50_1
50_3

FIG.5

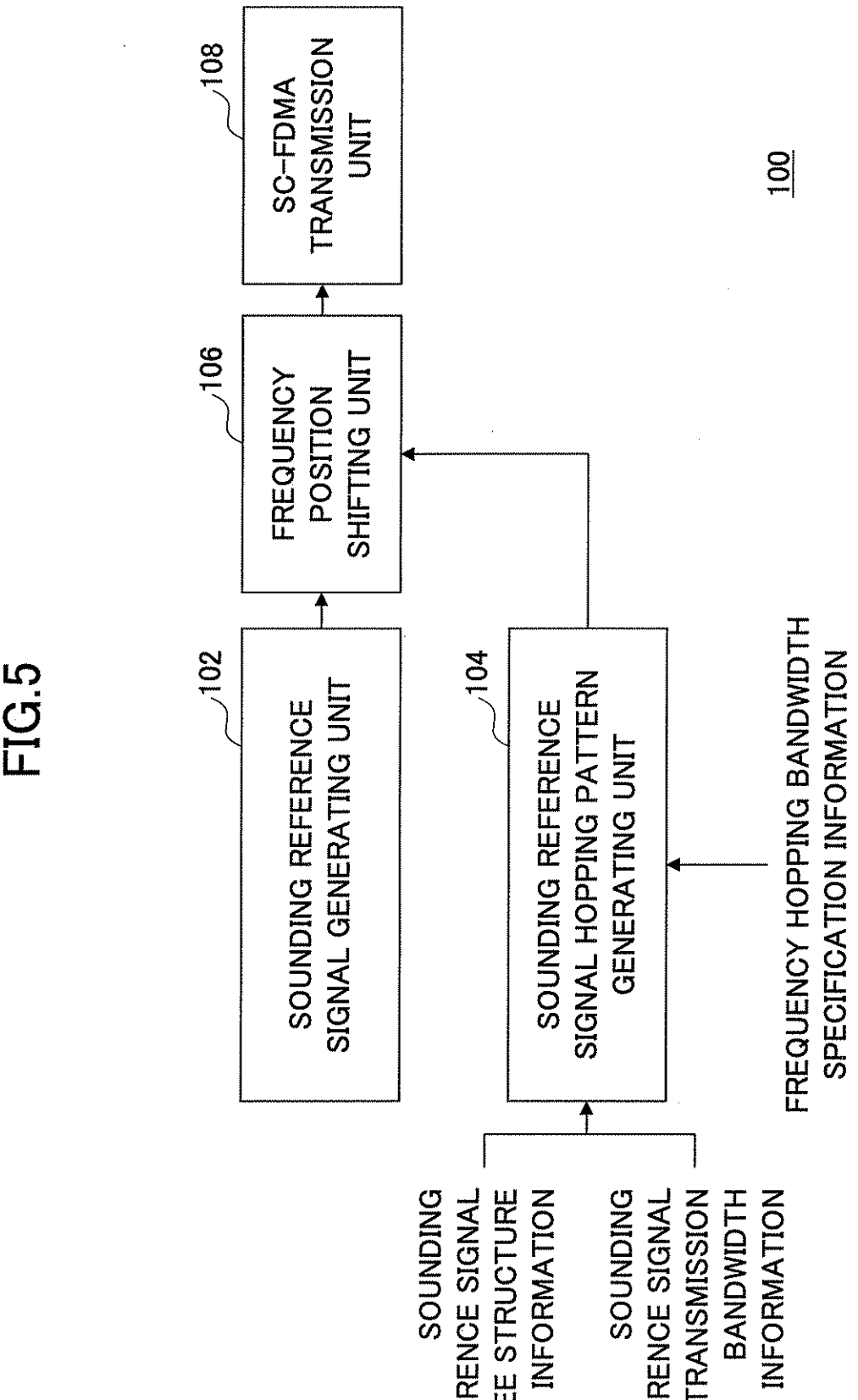
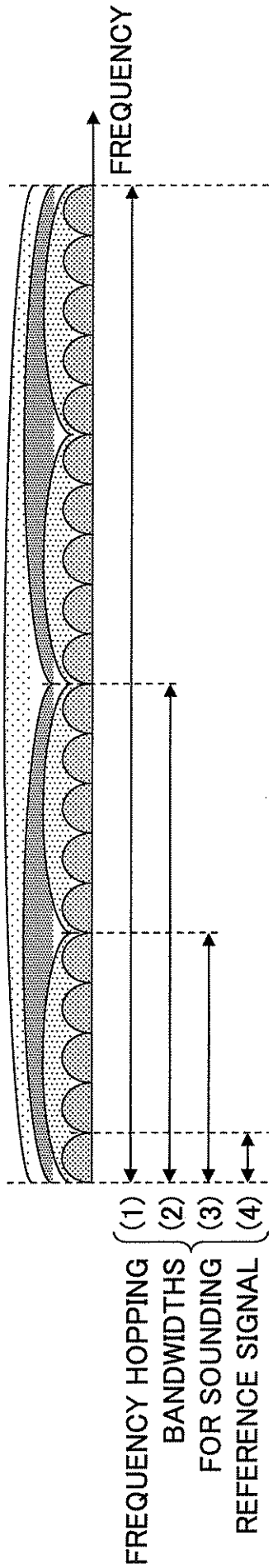

100
102
SOUNDING REFERENCE SIGNAL GENERATING UNIT
104
SOUNDING REFERENCE SIGNAL HOPPING PATTERN GENERATING UNIT
106
FREQUENCY POSITION SHIFTING UNIT
108
SC-FDMA TRANSMISSION UNIT
SOUNDING REFERENCE SIGNAL TREE STRUCTURE INFORMATION
SOUNDING REFERENCE SIGNAL TRANSMISSION BANDWIDTH INFORMATION
FREQUENCY HOPPING BANDWIDTH SPECIFICATION INFORMATION

FIG.6


FREQUENCY
FREQUENCY HOPPING BANDWIDTHS FOR SOUNDING REFERENCE SIGNAL
(1)
(2)
(3)
(4)

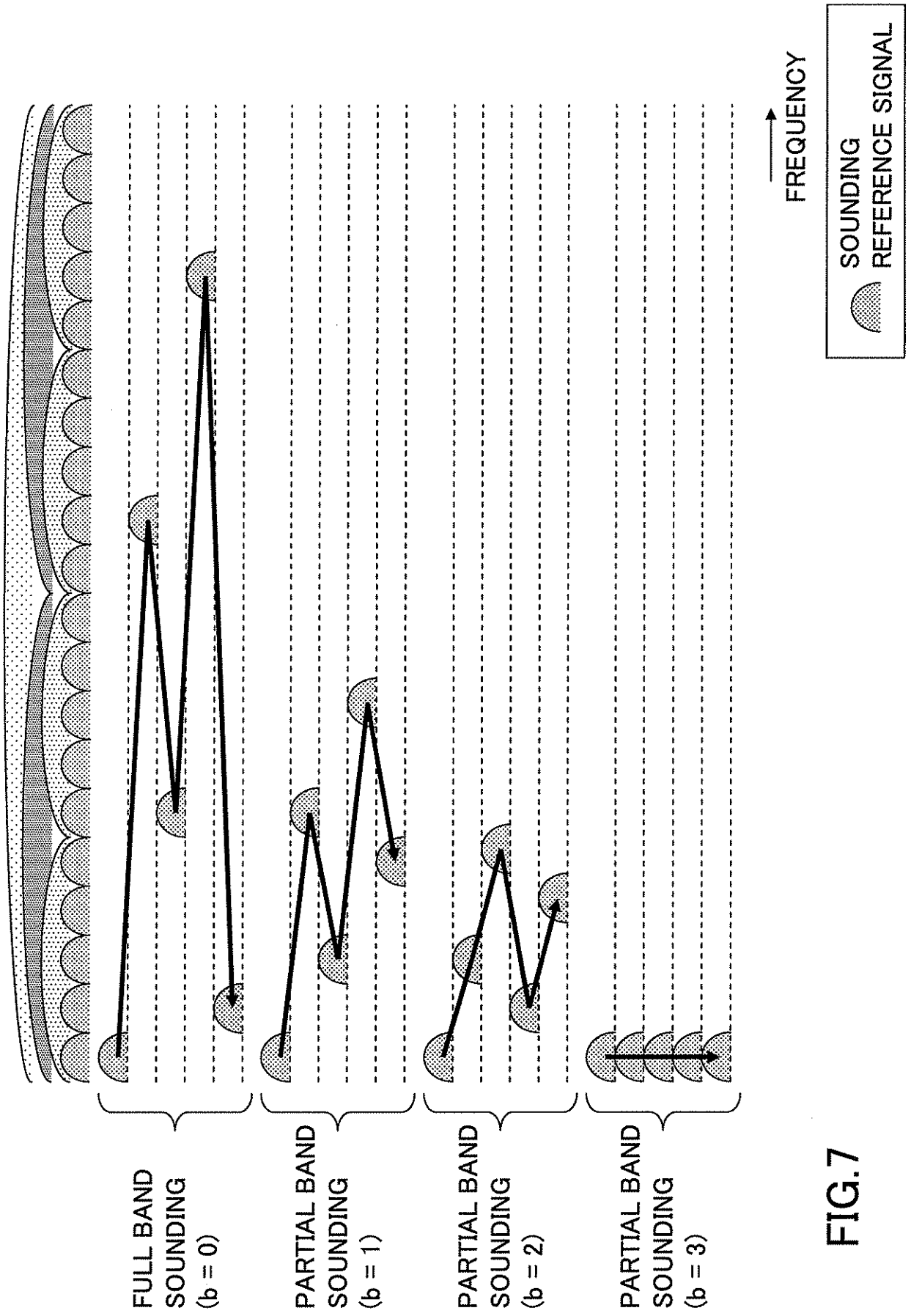

FULL BAND SOUNDING (b = 0)
PARTIAL BAND SOUNDING (b = 1)
PARTIAL BAND SOUNDING (b = 2)
PARTIAL BAND SOUNDING (b = 3)
FREQUENCY
SOUNDING REFERENCE SIGNAL

FIG.7

FIG.8

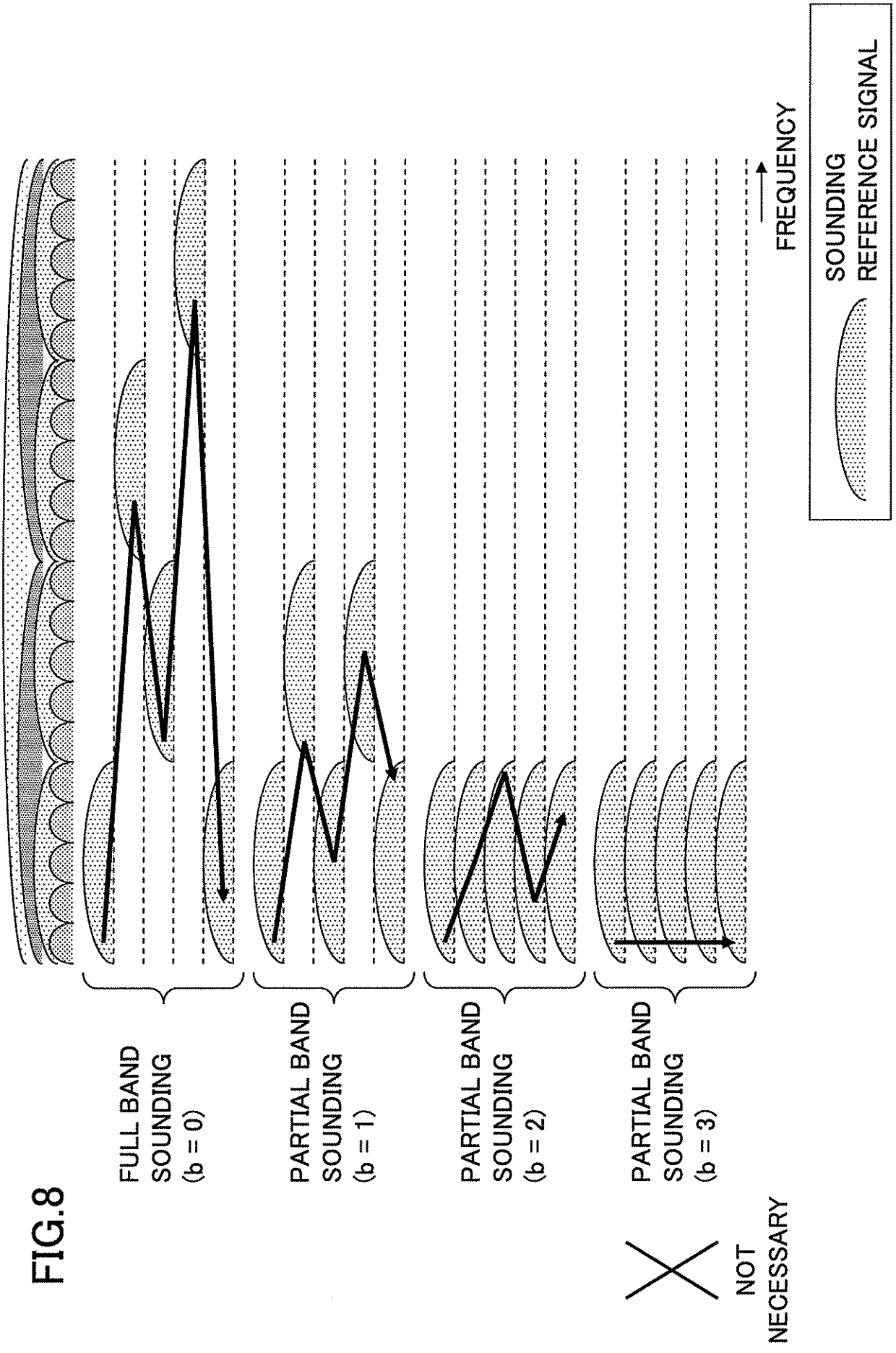

FULL BAND SOUNDING (b = 0)
PARTIAL BAND SOUNDING (b = 1)
PARTIAL BAND SOUNDING (b = 2)
PARTIAL BAND SOUNDING (b = 3)
NOT NECESSARY
FREQUENCY
SOUNDING REFERENCE SIGNAL

FIG.9

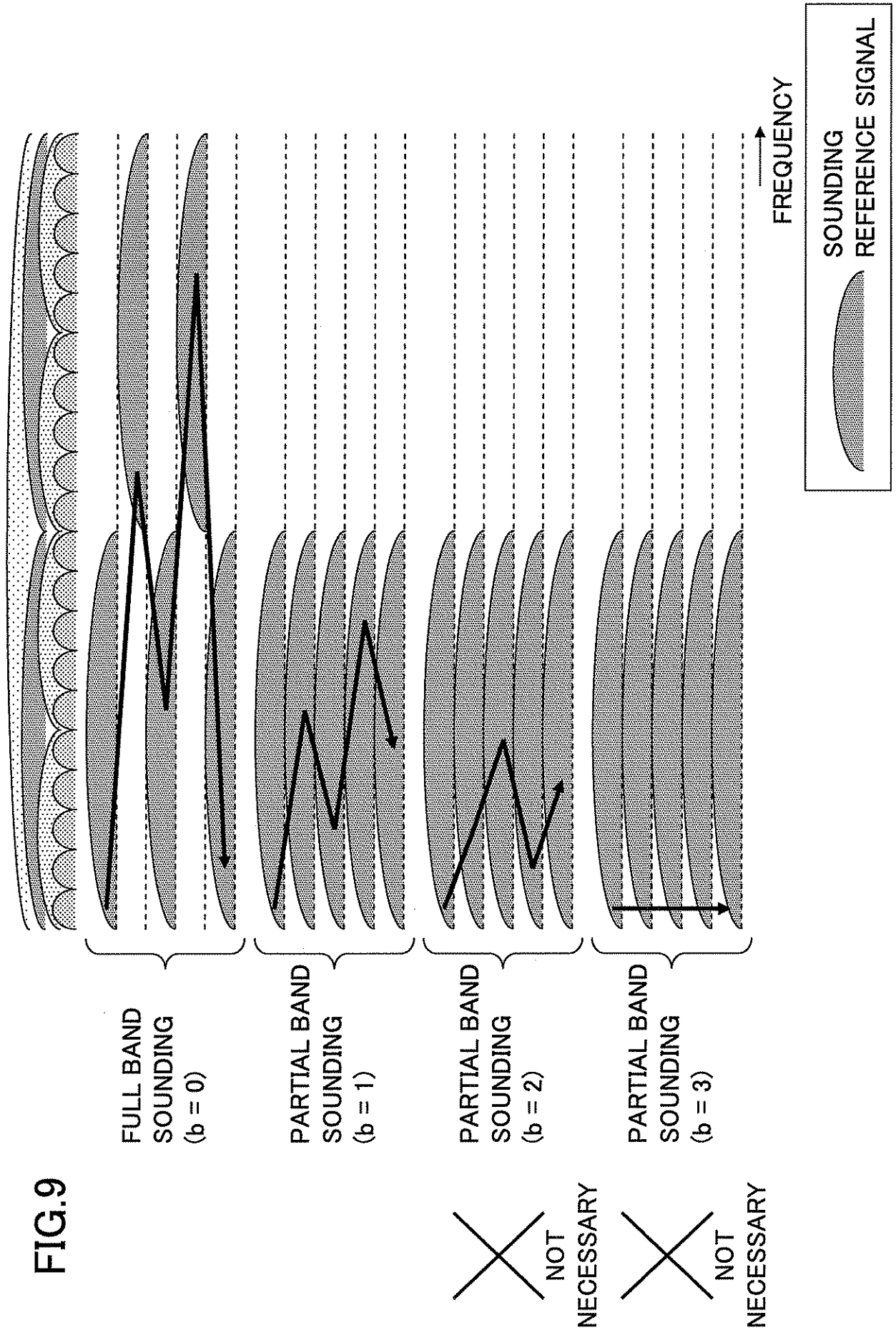

FULL BAND SOUNDING (b = 0)
PARTIAL BAND SOUNDING (b = 1)
PARTIAL BAND SOUNDING (b = 2)
PARTIAL BAND SOUNDING (b = 3)
NOT NECESSARY
NOT NECESSARY
FREQUENCY
SOUNDING REFERENCE SIGNAL

FIG.10

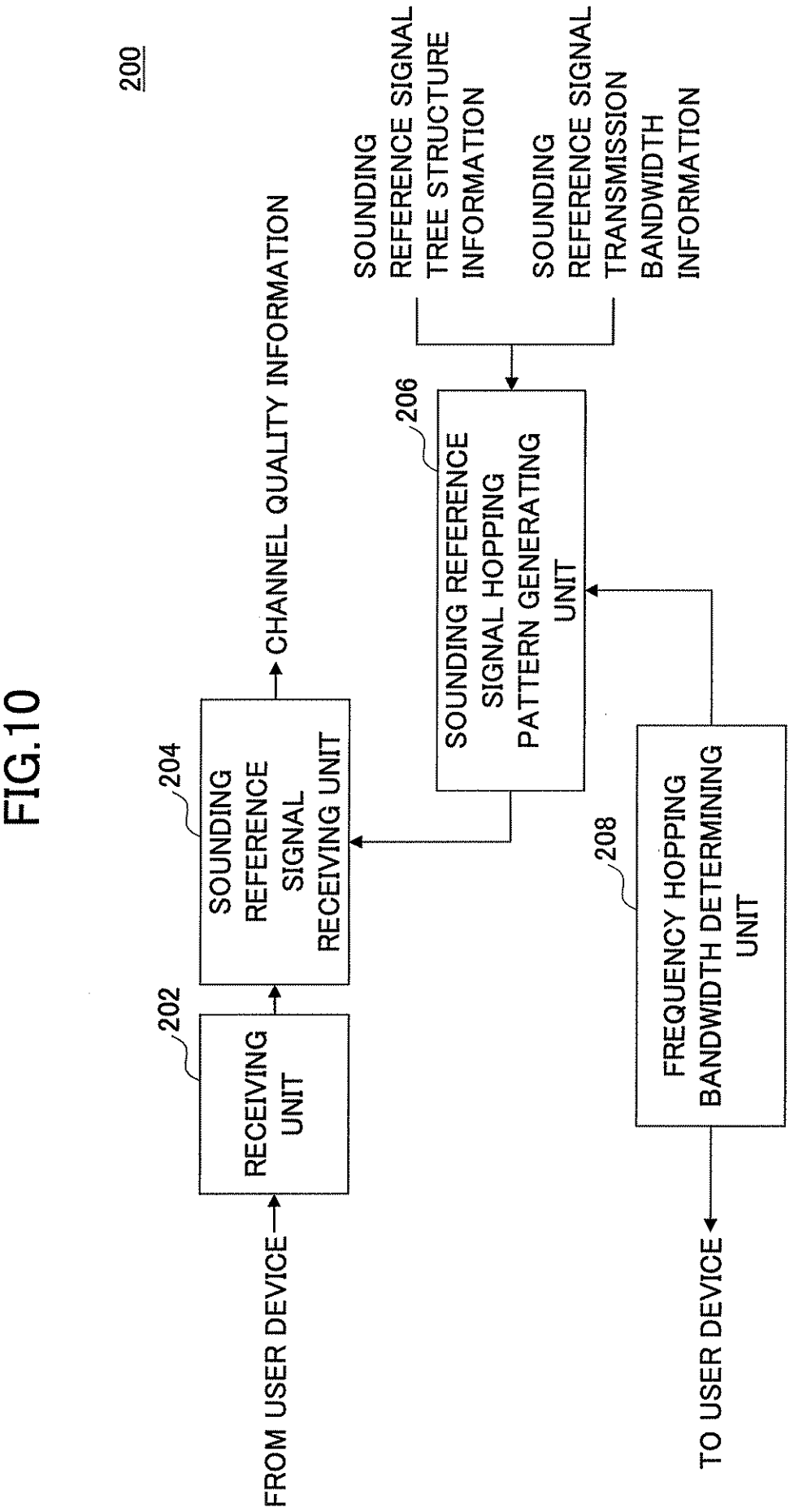

200
FROM USER DEVICE
202
RECEIVING UNIT
204
SOUNDING REFERENCE SIGNAL RECEIVING UNIT
CHANNEL QUALITY INFORMATION
206
SOUNDING REFERENCE SIGNAL HOPPING PATTERN GENERATING UNIT
SOUNDING REFERENCE SIGNAL TREE STRUCTURE INFORMATION
SOUNDING REFERENCE SIGNAL TRANSMISSION BANDWIDTH INFORMATION
208
FREQUENCY HOPPING BANDWIDTH DETERMINING UNIT
TO USER DEVICE

FIG.11

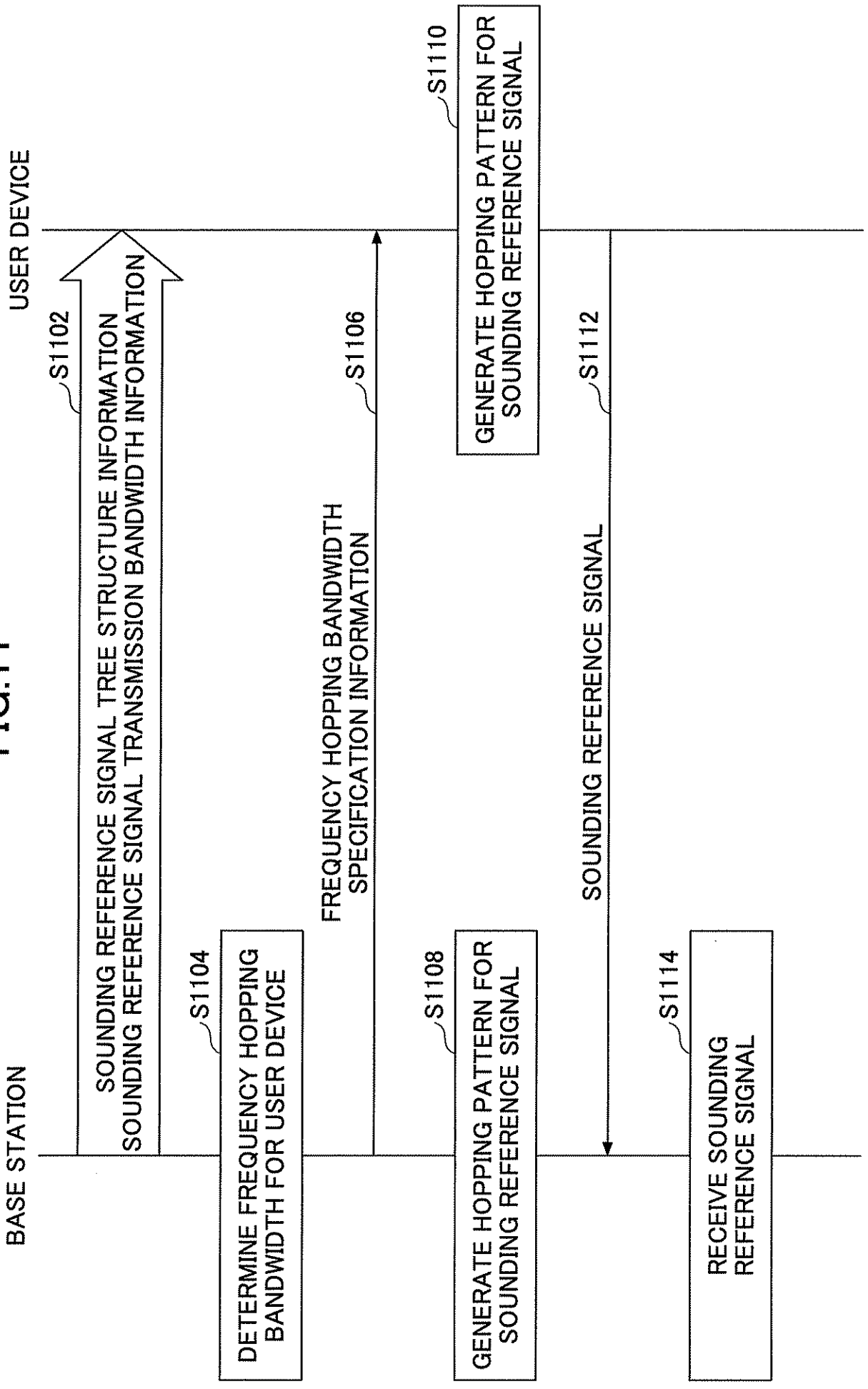
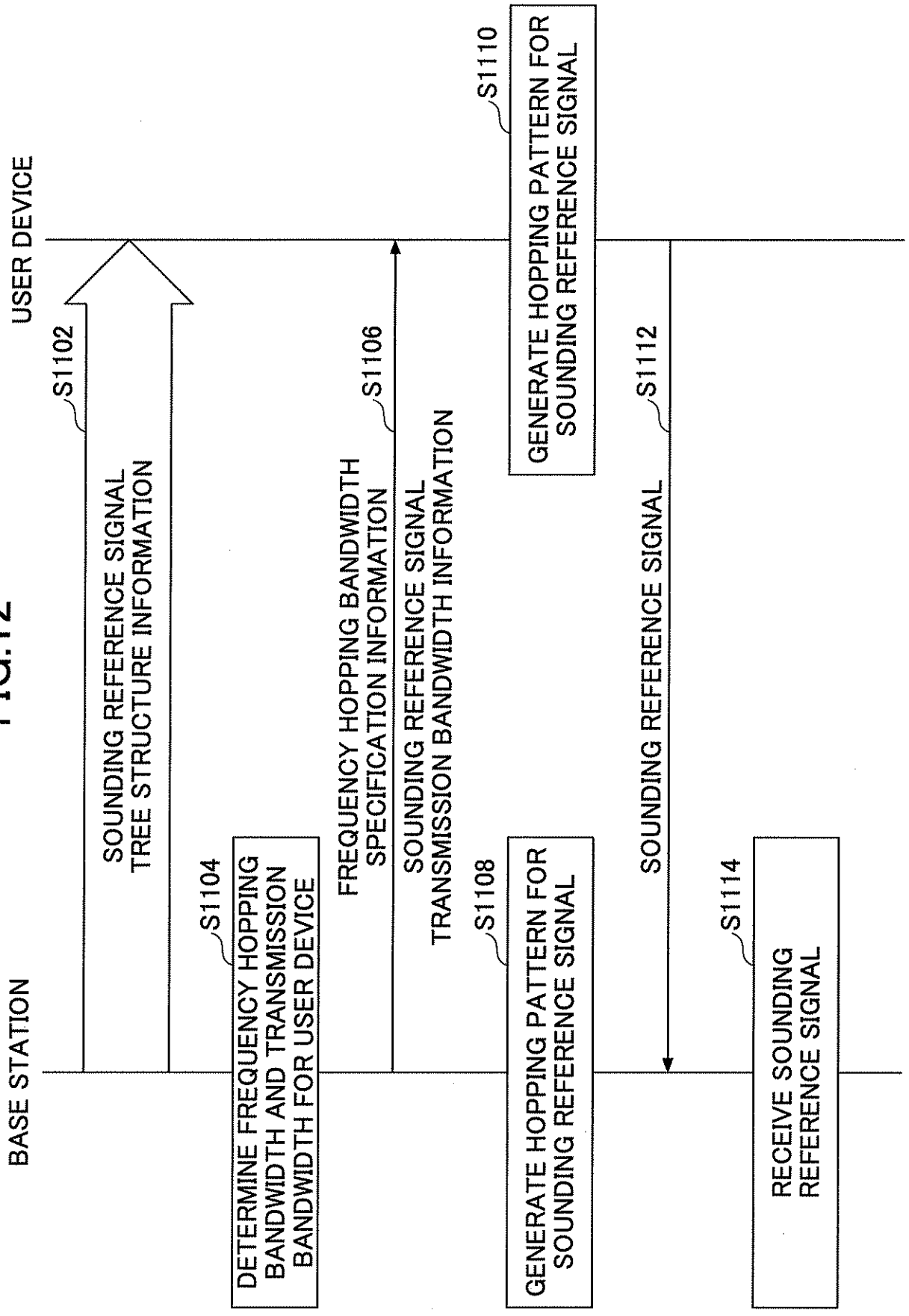

BASE STATION
USER DEVICE
S1102
SOUNDING REFERENCE SIGNAL TREE STRUCTURE INFORMATION
SOUNDING REFERENCE SIGNAL TRANSMISSION BANDWIDTH INFORMATION
S1104
DETERMINE FREQUENCY HOPPING BANDWIDTH FOR USER DEVICE
S1106
FREQUENCY HOPPING BANDWIDTH SPECIFICATION INFORMATION
S1108
GENERATE HOPPING PATTERN FOR SOUNDING REFERENCE SIGNAL
S1110
GENERATE HOPPING PATTERN FOR SOUNDING REFERENCE SIGNAL
S1112
SOUNDING REFERENCE SIGNAL
S1114
RECEIVE SOUNDING REFERENCE SIGNAL

FIG.12


BASE STATION
USER DEVICE
S1102
SOUNDING REFERENCE SIGNAL
TREE STRUCTURE INFORMATION
S1104
DETERMINE FREQUENCY HOPPING BANDWIDTH AND TRANSMISSION BANDWIDTH FOR USER DEVICE
S1106
FREQUENCY HOPPING BANDWIDTH SPECIFICATION INFORMATION
SOUNDING REFERENCE SIGNAL TRANSMISSION BANDWIDTH INFORMATION
S1108
GENERATE HOPPING PATTERN FOR SOUNDING REFERENCE SIGNAL
S1110
GENERATE HOPPING PATTERN FOR SOUNDING REFERENCE SIGNAL
S1112
SOUNDING REFERENCE SIGNAL
S1114
RECEIVE SOUNDING REFERENCE SIGNAL