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H04J 11/00
H04B 3/00

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2003 07 31

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(71) 가 가
가 가 1006

(72) , 814-0033 , - , - , , 6-13-27- 204

가,
, 811-1251 , - , 가 , , 1-30-2-303

, 818-0071 , - , , 1-12-3-506

(74)

:

(54)

A/D , D/A 가 , ,
, 가 .

가 가

가

()

가

가

가

가

가

가

2000-165304

가

25 2000-165304

25 (600) (601) (602) QAM(Quadrature Amplitude Modulation)

(603) (604) (605) D/A (606) (607)

(608) (609) (610) A/D (611) (612)

(613) QAM (614)

25 2000-165304

(Orthogonal Frequency Division Multiplexing) (, 「OFDM 」)

25

(608) 가 (601)

QAM (602)

(603), (604)

D/A (605), (606)

(608) (607) (608)

(608) (607) (609)

(611), (612) () QAM (610) QAM QAM ()

613) (614)

, OFDM

가

가 (multi-value)

가

2a , 2b

3 1

4 3

5 3

6 2

7 3

8 7

9 7

10a 4 GLT
 10b 4 GLT

11a 4 ELT , 11b 4
 ELT

12a FIR , 12b FIR

13a (poly-phase) , 13b

14 13a 13b

15a 3, 6, 7 , 15b 3, 6, 7

16

17 10

18 가

19 OFDM

20

21 3, 6, 7

22 13

23a , 23b

24 14

25 2000-165304

26 가

27 OFDM .

28 1 .

29 가 WOFDM .

30 2 .

31a , 31

b 31a ALC .

1a 24 .

(1)

1a , 2a , 1b , 2b .

1a, 1b, 2a, 2b .

가 Sinc (Sinx/x)가 . , , 1a 1b ,

2a , 2a 2 , 2b 2b .

2a , 2, 2 . 1

가 가 .

3 1 (100) .

3 , (101) , (111) . (101) (102) , (103) , D
 /A (104) , (105) , (106) , (111) (112)
) , (100) (113) , A/D (114) , (115) , (116)
 (101) , (111) , (121) , (122) .

1) (100) (101) (100) 4 5 . 4 (100) (11
 가 , 'N' 2 , 'M' 'N' 'M'
 가 , 1 , 4
 'N' 2 가 , 2

4 (101) .

(102) ()
 , 「00011111010110100」 (「00」, 「01」, 「11」, 「10」, 「10」, 「11」, 「01」, 「00」
 2 「01」, 「11」, 「10」 「+1」, 「+3」, 「-3」, 「-1」 (102) 「00」, 「
 (Pulse Amplitude M

odulation, PAM) (103) 'T1' PAM (103)
 'T1' 1 (103) 'T1' 2 PAM (104)
 () (105) (104)
 (106) (106) (110) (121)
 , 5 (111)
 , (121) (110) (112)
 (114) 가 (113) , A/D (114) (113) A/D
 (115)
 (116) 가
 , 1 , 가
 가 ,
 , OFDM 가
 가 ,
 (2)
 6 2 2 , 1
 6 , (101) , (111) (101) (102) , (103) ,
 SSB(Single Side Band,) (107) , D/A (104) , ()
 105) , (106) (111) (112) , (113) ,
 SSB (117) , (115) , (116)
 (100) (101) , (111) , (121) , (122)
 4 5 , 2 ,
 'N' 2 가 , 2 1
 , 4 , (101) (102)
 () , 「0001111010110100」
 「00」, 「01」, 「11」, 「10」, 「10」, 「11」, 「01」, 「00」 2
 「+1」, 「+3」, 「-3」, 「-1」 (102) 「00」, 「01」, 「11」, 「10」
 (PAM) (103) 'T1' (103) 'T1' PAM
 2 PAM (107) 1 D/A (104) ()
 SSB) (105) (121) (106)
 (106) (110)
 , 5 (111)
 , (121) (110) (112)

(114) 가 , (113) A/D (113) A/D
 , A/D (114)
 . SSB (117)
 (down-convert) (115) 가
 (116) 가
 , 1 가 OFDM 가
 가 가
 가 가
 가

(3)
 7 3 (100)
 7 , (101) , (111) (101) (102) , (103) ,
 D/A (104) , (108) , (105) , (106) , (111)
 , (112) , (113) , A/D (114) , (118) , (115)
 , (116) (100) (101) , (111) , (121)
 , (122)

1) (100) (101) (100) 8 9 8 (100) (11
 , , 'N' 2 , 9 4
 , 8 (101)

(102) ()
 , 「0001111010110100」 (「00」, 「01」, 「11」, 「10」, 「10」, 「11」, 「01」, 「00」
 2 (102) 「00」, 「
 01」, 「11」, 「10」 (Quadrature Amplitude Modulation, QAM)
 'T2' 2 (103)
 1
 (108) , D/A (104)
 (106) (105) (121) (

106) (110)
 , 9 (111)
 , (121) (110)
 (114) (113) A/D (114) (112) (113) A/D
 , (118)
 가 (115)
 (116)

가 ,
 , OFDM 가 가 ,

(4)

formation, GLT) (103) (115) 3, 6 7 4
 ation, LOT) . GLT (Generalized Lapped orthogonal Trans
 (Lapped Orthogonal Transform
 10a 4 GLT
 10b 4 GLT
 , 4 GLT 가 , FIR
 , 가 , GLT ,
 , 가 ,
 10a 10b 가 , 가 ,
 , 가 ,
 가 .

(5)

on, ELT) (103) (115) 3, 6 7 5
 . ELT MLT(Modulated Lapped Transformation)
 (Extended modulated Lapped Transformati
 11a 4 ELT , 11b 4
 ELT
 , 5 , ELT FIR
 가 .
 11a 11b 가 , 4 LOT GLT
 , 가 (100)
 가 .

(6)

12a (115) 3, 6, 7 (100) (103)
 . 12a FIR 12a, 12b, 13a 13b FIR
 , 13b , 13a
 , FIR 12a 12b 12a
 12b , (201) 'N' , (202) FIR , (203)
 FIR (202) FIR , (204) 2 가 . (103)
 (200)가 .
 , (211) FIR , (212) FIR (211) FIR , (213)
 1/N (115) (210)가

(202 211) (103) FIR (203) (210) FIR (212) 가 FIR
 (115) (1) (2)가 .

[1]

	1	2	3	4	5	6	7	8
h1	18	17	16	15	14	13	12	11
h2	28	27	26	25	24	23	22	21
h3	38	37	36	35	34	33	32	31
h4	48	47	46	45	44	43	42	41

[2]

	1	2	3	4	5	6	7	8
h1	11	12	13	14	15	16	17	18
h2	21	22	23	24	25	26	27	28
h3	31	32	33	34	35	36	37	38
h4	41	42	43	44	45	46	47	48

(1) (2) 4 'h' FIR
 . FIR , 7 , , 8 가
 7 가 ' MN' 'M' , 'N' 8 가
 , (301) , (302) 13a 13b , 13a 13b ,
 1 N , (303) 2 가 , (304)
 (300)가 (103)
 , (311) 1 , (312) 1/N , (313)
 (115) (310)가 .
 14 13a 13b (301 313) 14 , (321) , (322) 2
 가 (300) , (301) (310) (313) 가
 . (1) (2) (3)
 (10) .

[3]

	1	2
h1	15	11

h2	25	21
h3	35	31
h4	45	41

[4]

	1	2
h1	16	12
h2	26	22
h3	36	32
h4	46	42

[5]

	1	2
h1	17	13
h2	27	23
h3	37	33
h4	47	43

[6]

	1	2
h1	18	14
h2	28	24
h3	38	34
h4	48	44

[7]

	1	2
h1	11	15
h2	12	16
h3	13	17

(7)
 15a 3, 6, 7 (100) (103) (115) (100)
 400) 15b 3, 6, 7 (103) ELT (115)
 (410) (103) (115)

15a 15b , (401) (Discrete Cosine Transforming, DCT) , (402) 1
 , (403) , (404) 2 , (405)
 N , (406) 2 가 , (407) 1
 (400)가 , (411) 1 , (412)
 1/N , (413) 2 , (414) , (404) 1
 , (416) (403 414) 16 (410)
 가 16
 , 6 가 DCT 가

(8)
 7 8 3, 6, 7 (100) (103) 3, 6,
 (100) (115) , (101) (111) (115) , (122)
 , (101) (103) (111) (101) (111)
 (101)) , S/N 가 , S/N (,
 , 가 , S/N 가 , S/N 가
 , 가 가 , 가
 가 , 가 가

(9)
 9 3, 6, 7 (103) (115)
 , (101) (101) (103) (111) (115) 7
 , (101) (103) (111) (101) (115)
 2) , (111) (111) (115) , (12)
 가 , (101)
 , S/N 가 , S/N 가
 , S/N 가 가

가 , 가 , 가 , 8

(10)

17 10 (, 3, 6 7 (122)
) , 10
 4 .

17 , (102) , (103) , (122) .

가 (102) , 「+1」, 「+3」, 「-3」, 「-1」. 「+1」, 「+3」, 「-3」, 「-1」
 가 (122)가 (102)

1 , 4 2 , 1 4
 , (103) , 3

가 , 가 , 가
 가 .

18 , 10 가 18, 19, 20
 , 19 OFDM
 , 20

가 19 18 OFDM
 가 , 18 ()
 가 , 10 , 20
 , 10

(11)

21 3, 6, 7 (11
 (122)) , 11

21 , (116) , (115) , (122) .

가 (115) (110) (116)

0 (116) (122)

11 , (110)

(122) , (110) , 가

가 .

(12)

12
3 4

(122)

11 가

(122)
(102)

(102)

가

(122)

가

가

2

2,

가 4
3

11
(122)

1

3

(4)

가

(13)

22

13

(122)

13

가

1(

2(

)

3

1

2

22

(S11 S21)

1

2

1

가

(S14).

1

(S13),

(S12)

1

2

(S15).

1

2

1

(S22),

1

2

(S21)

가

2

(111)

2

2

(S23),

(S24).

1

(S16).

S/N

(S11)

(S13)

1

(S17),

가

2)

13

가

23a

23b

(10

, 4

2

23a 23b

13
(102)

13

가

(14)

24 ,) 14 1(,) 2(1 2 3 .
 24 , (S31) 1 1 (S41), S/N (S42). , S/N
 2 (S43).
 S/N 1 2 (S32), S/N
 (S34), 2 .
 , (110) 가 가 ,
 가 .
 14 , 가

(15)

28 15 .
 28 , (10) , (11) (10) , (12) (11) , (13)
 (12) (11) (10) , (14) WOFDM(Wave
 letbase-Orthogonal Frequency Division Multiplex,
 AGC(Automatic Gain Control) , (15) AGC (14) WOFDM
 WOFDM , (16) WOFDM (17) WOFDM WOFDM , (19) 가
 18) ALC (16) WOFDM WOFDM WOFDM WOFDM (19) 가
 (10) 가 (10) (10) (13) AGC
 (14) , (19) , WOFDM (15) (12) 'a'가
 ALC (16) (18)
 , WOFDM 29 . 29 가
 WOFDM
 29 , (10) , 가
 , (10) 가
 , 14 WOFDM WOFDM AGC (14) , WO
 FDM (17) , WOFDM (17) WOFDM WOFDM ALC (16) ,
 M (16) (18) 가 가 , ALC (16) WOFDM (19) 가
 ALC (18) ,
 , (18) WOFDM (19) WOFDM (17)
 WOFDM ALC (16) ,

, WOFDM (17) WOFDM ALC (16)
 , (18) WOFDM (17) WOFDM WOFDM (17) WOFDM
 ALC (16) , ALC (16) ,
 , (18) WOFDM (17) WOFDM ALC (16) ,
 ALC (16) , WOFDM (17) WOFDM ALC (16)
 , (18) WOFDM (17) WOFDM ALC (16)
 , (18) WOFDM (17) WOFDM ALC (16)
 , (18) ALC (16)
 , (18) ALC (16)
 , (18) ALC (16)
 (16)
 30 16
 30 , (10), (11), (12), (13), AGC (14), WOFDM (15), ALC (1
 6), WOFDM (17), (18), (19) 28 , (1) (mother unit), (2) (1) (10) ,
 (child unit) .
 30 (2) AGC (14) 16 (18) (19) (1) (1)
 'a' , (18) 'b' (2)
 , (2) AGC (14) (19) 1 , (1)
 가 (2) , (1)
 , 16 (1) , (1) (10) (2) 가
 , WOFDM (15) , WOFDM WOFDM AGC (14) , WOFDM
 (17) , WOFDM (17) WOFDM WOFDM ALC (16) , ALC
 (16) 가 (19) 가
 (18) 가 , (2) WOFDM WOFDM (15) , WOFDM

WOFDM (1) ALC WOFDM (16) , ALC (17) , WOFDM (17) WOFDM (18) 가 , (2)가
 , (1) (18) WOFDM (17) WOFDM ALC (16) 가 ,
 ALC (16) (2)

가

2002-015058

2002-061454

가

(57)

1.

D/A

A/D

A/D

2.

D/A

A/D

A/D

3.

D/A

A/D , A/D

4.

1 3

가

5.

1 3

가

6.

1 3

7.

1 3

8.

1 3

가

가

9.

7

가

10.

1 3

/

11.

10

12.

10

2

13.

10

14.

1

15.

WOFDM

AGC ;

WOFDM

WOFDM ;

WOFDM

WOFDM

WOFDM ;

WOFDM

WOFDM

ALC ;

ALC

16.

15
FDM

WOFDM

WOFDM

WOFDM

ALC

WO

ALC

17.

15

ALC

WOFDM

WOFDM

WOFDM

WOFDM

ALC

18.

15

ALC

WOFDM

WOFDM

WOFDM

WO

FDM

ALC

19.

15

ALC

WOFDM

WOFDM

ALC

WOFDM

WOFDM

20.

15

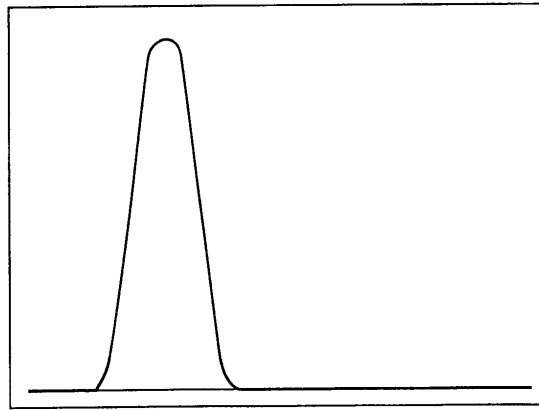
WOFDM

WOFDM

ALC

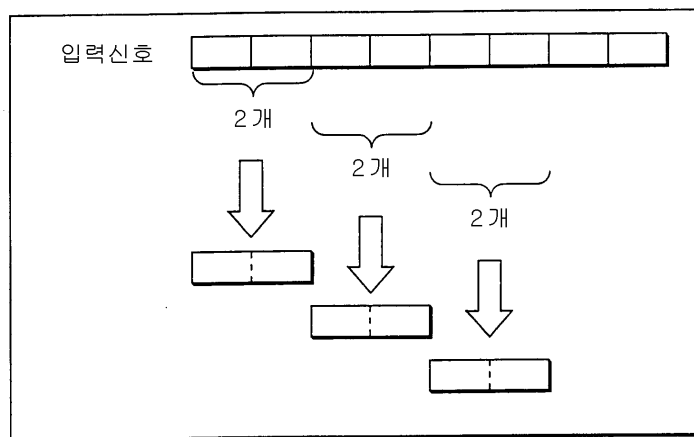
21.

1b



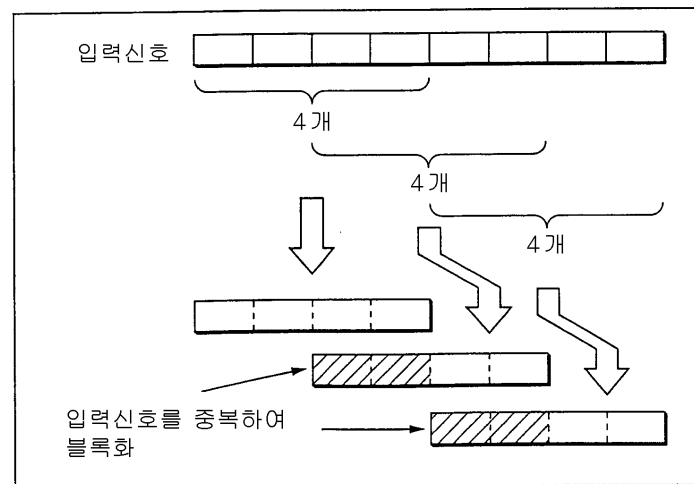
주파수 스펙트럼

2a

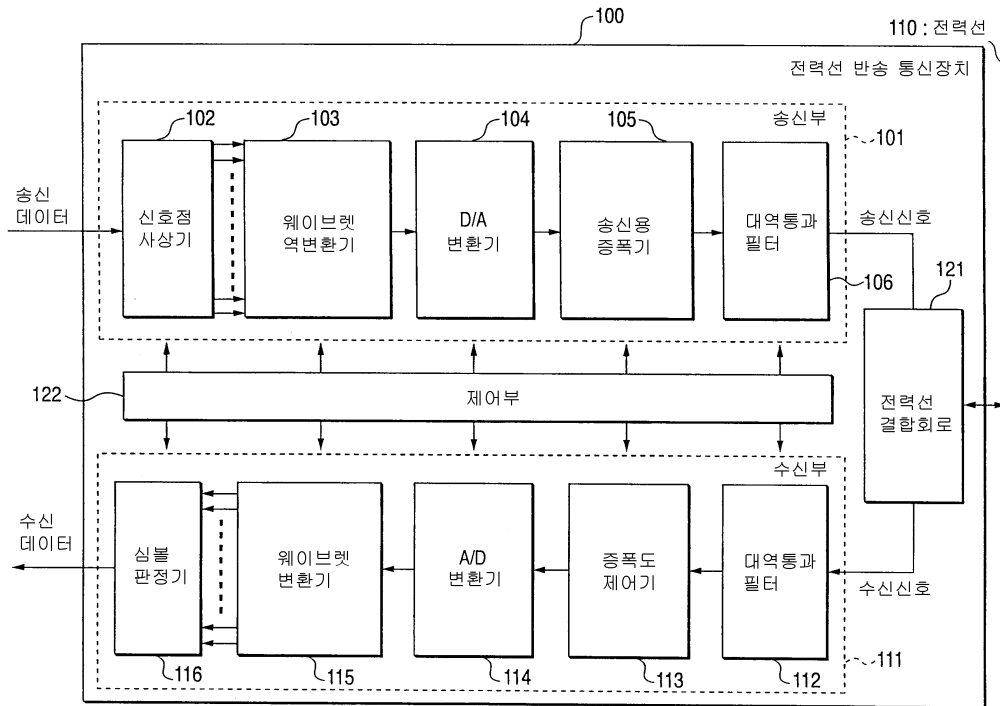


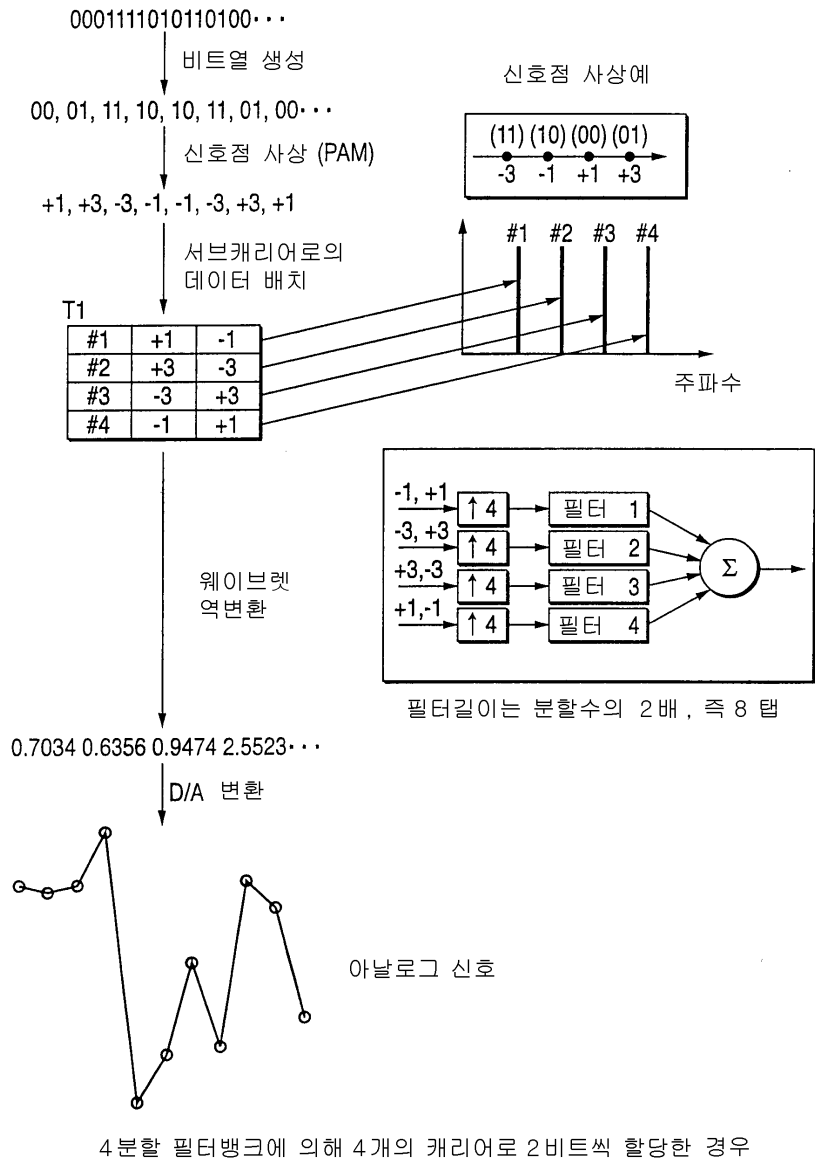
푸리에 변환 (분할수 = 2 의 경우)

2b

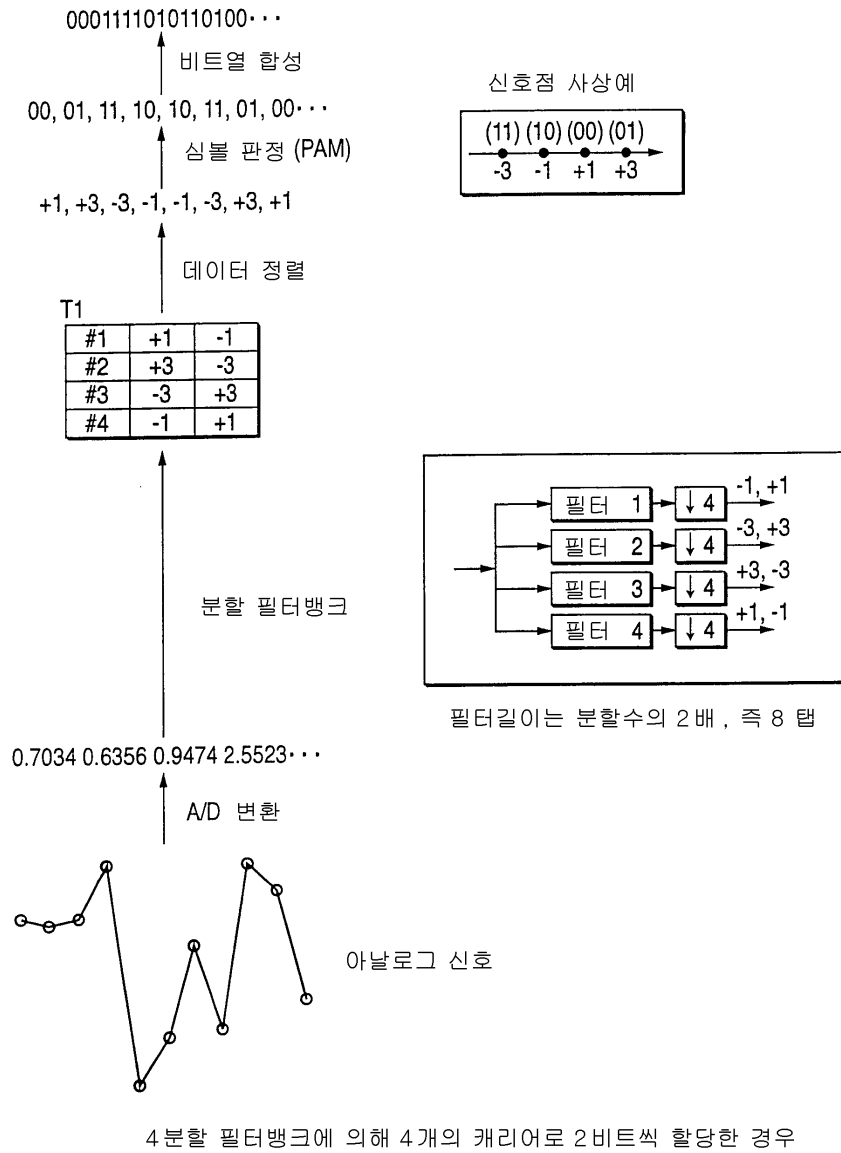


웨이브렛 변환
(분할수 = 2, 중복도 = 2 의 경우)

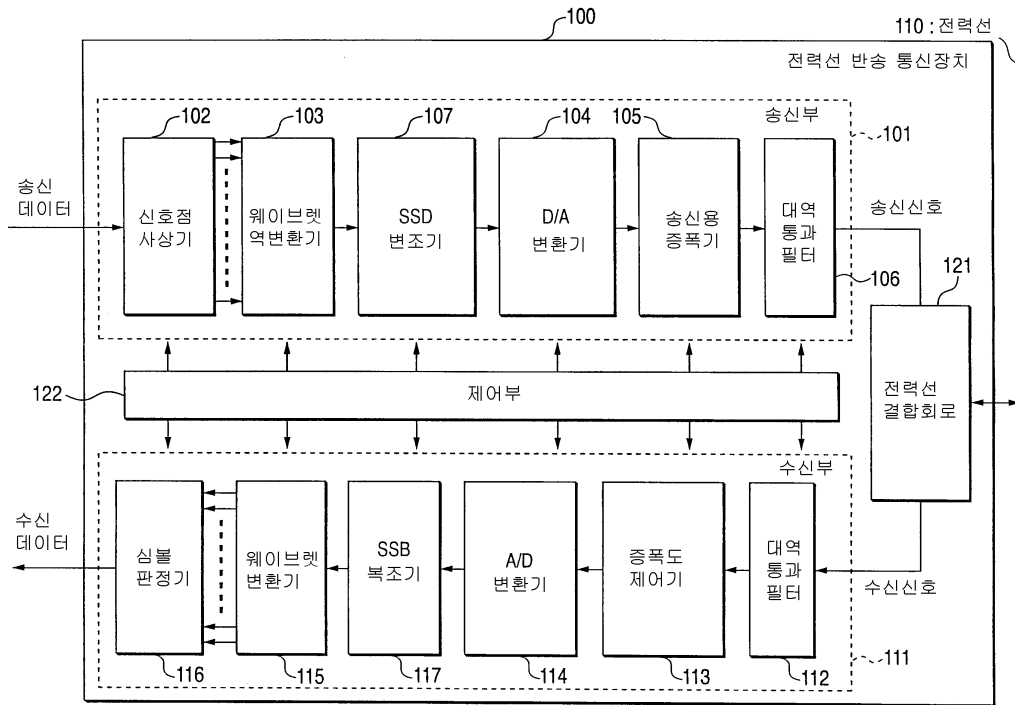




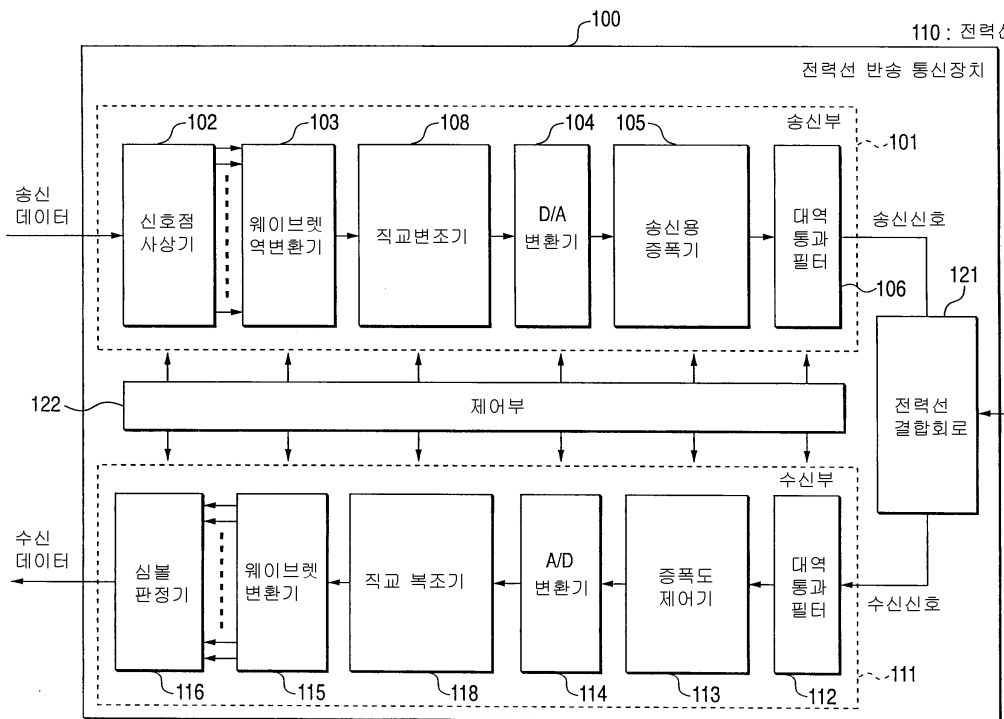
5

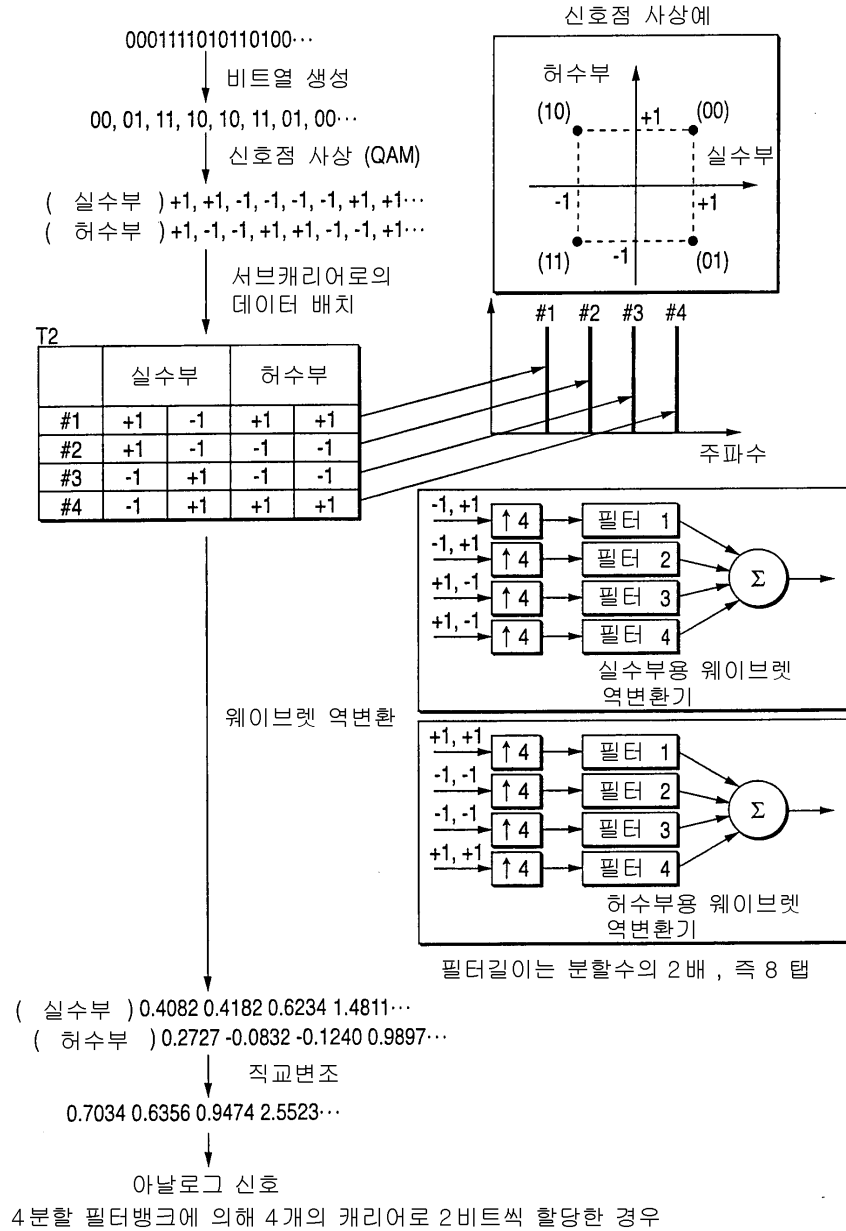


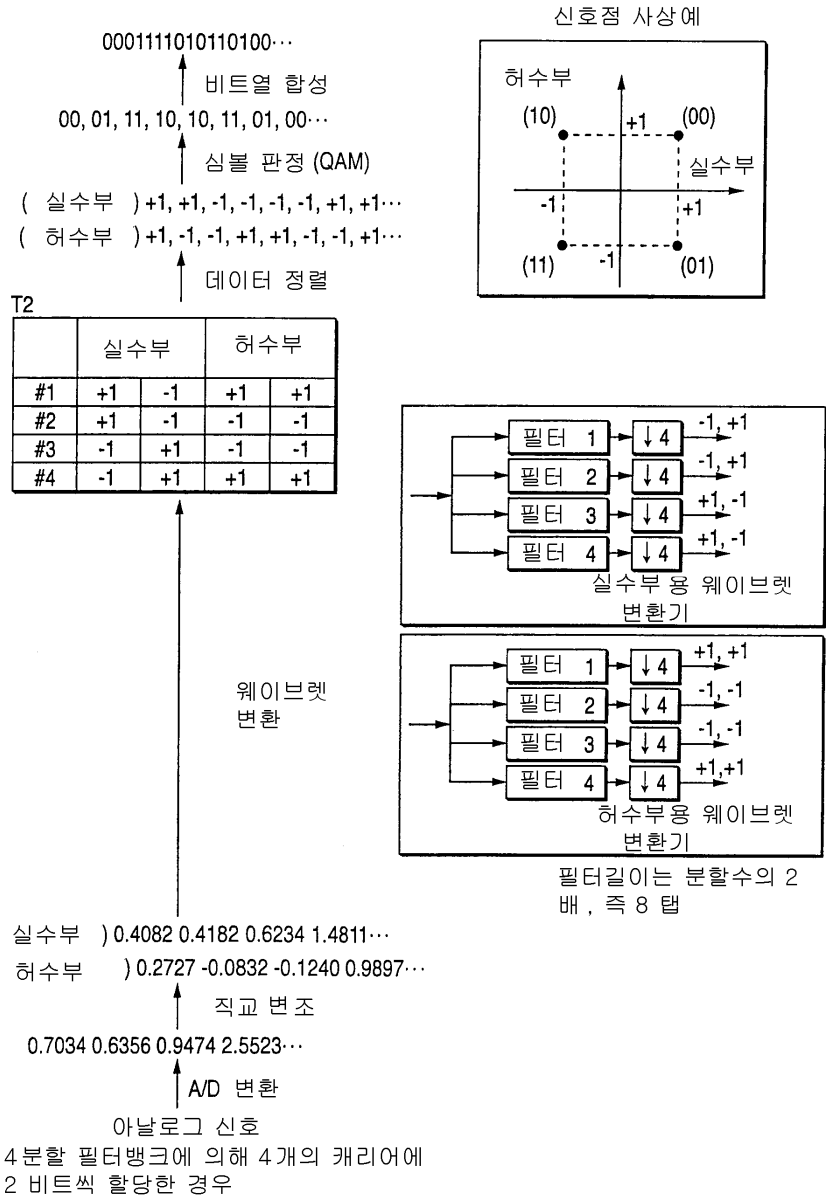
6



7

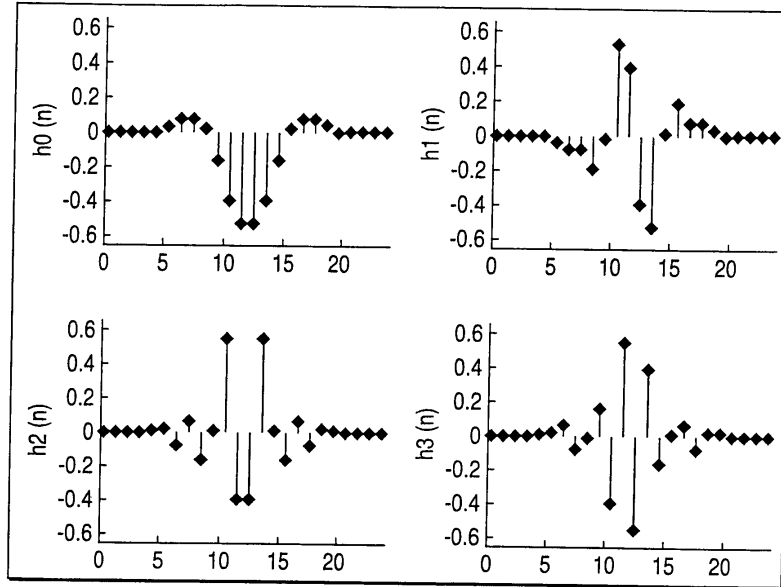






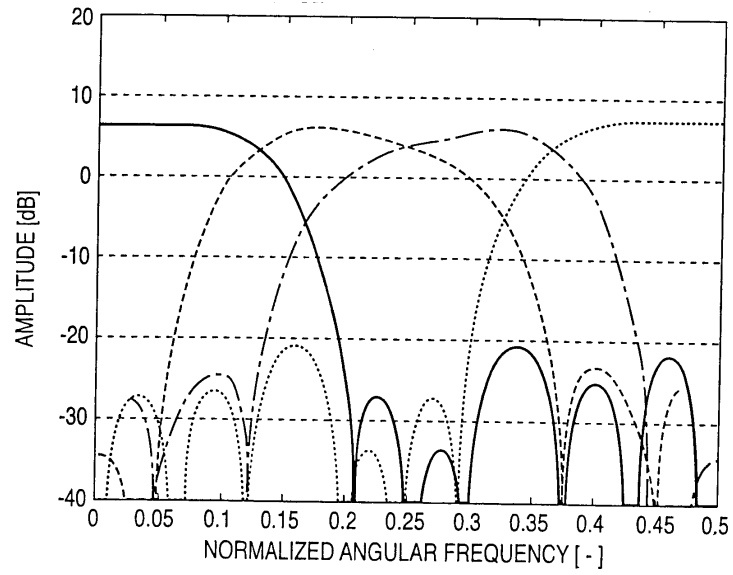
10a

GLT 필터뱅크의 임펄스 응답예 (4분할)



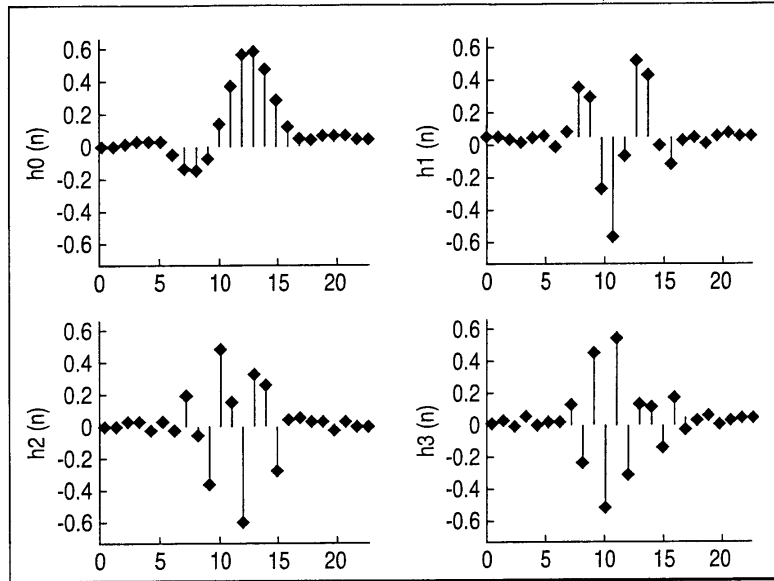
10b

GLT 필터뱅크의 주파수 응답예 (4분할)



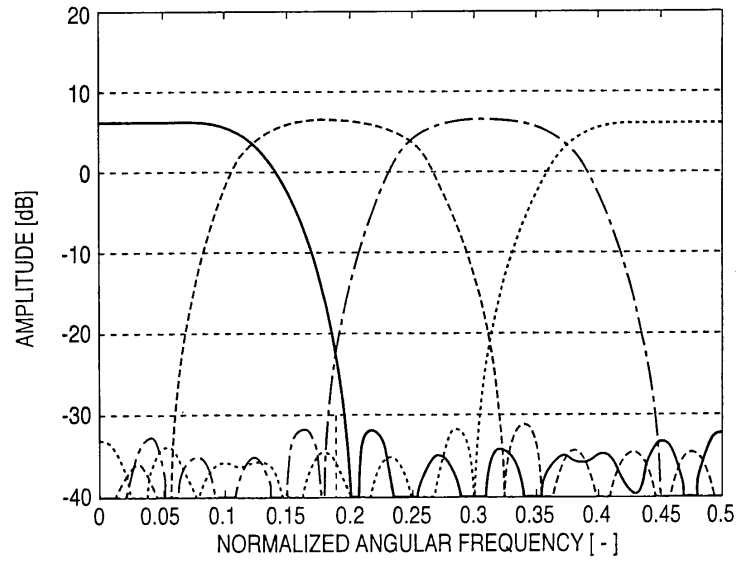
11a

ELT 필터뱅크의 임펄스 응답예 (4분할)

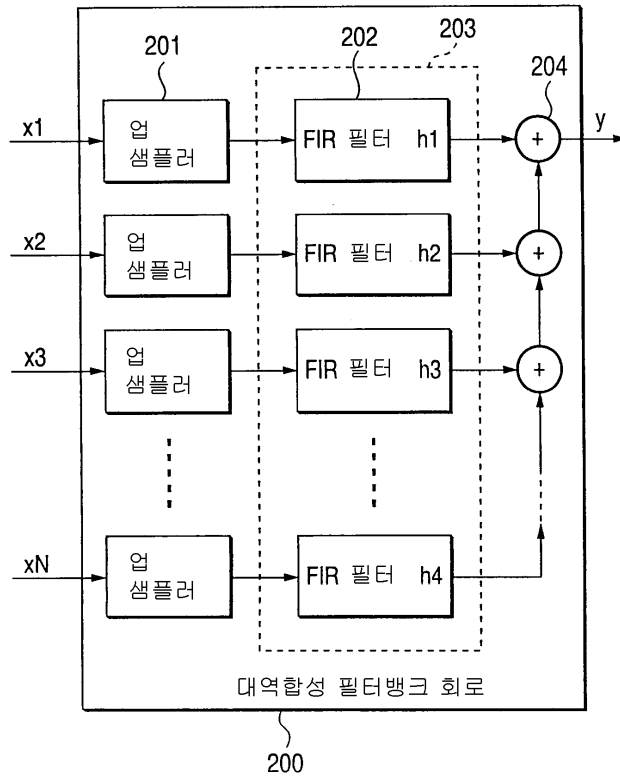


11b

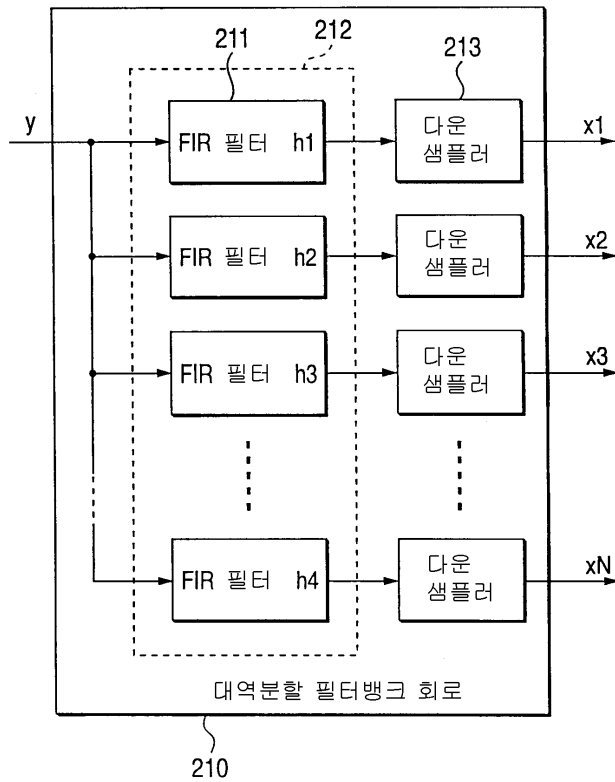
ELT 필터뱅크의 주파수 응답예 (4분할)



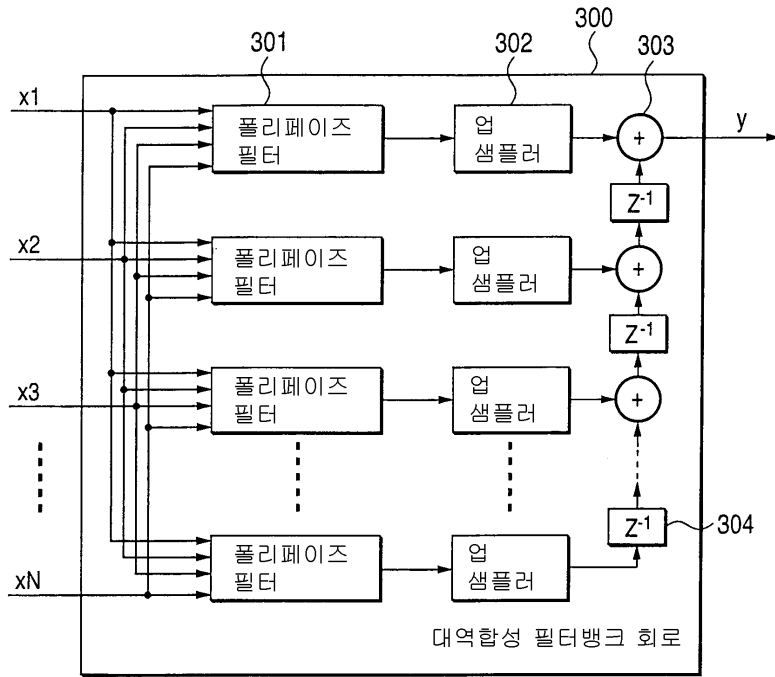
12a



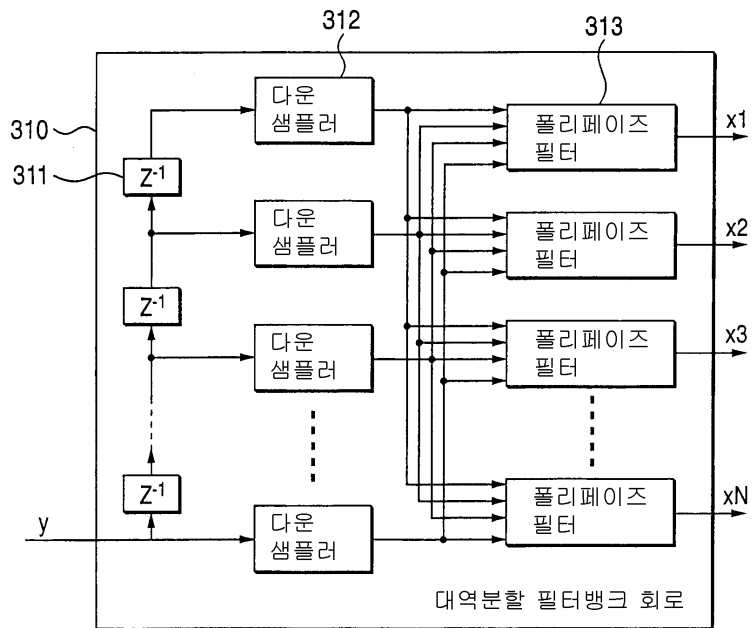
12b



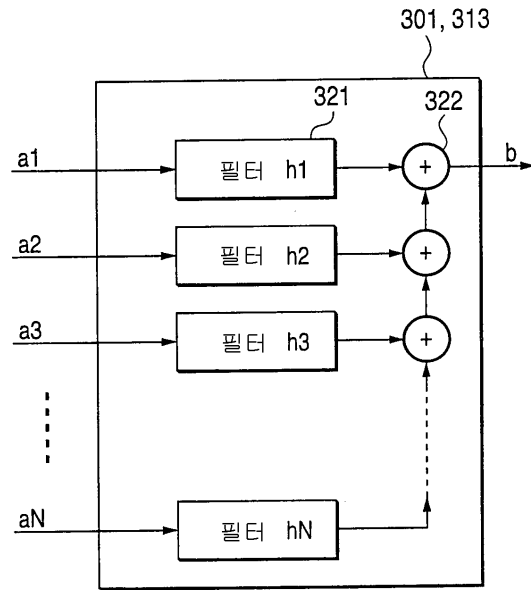
13a



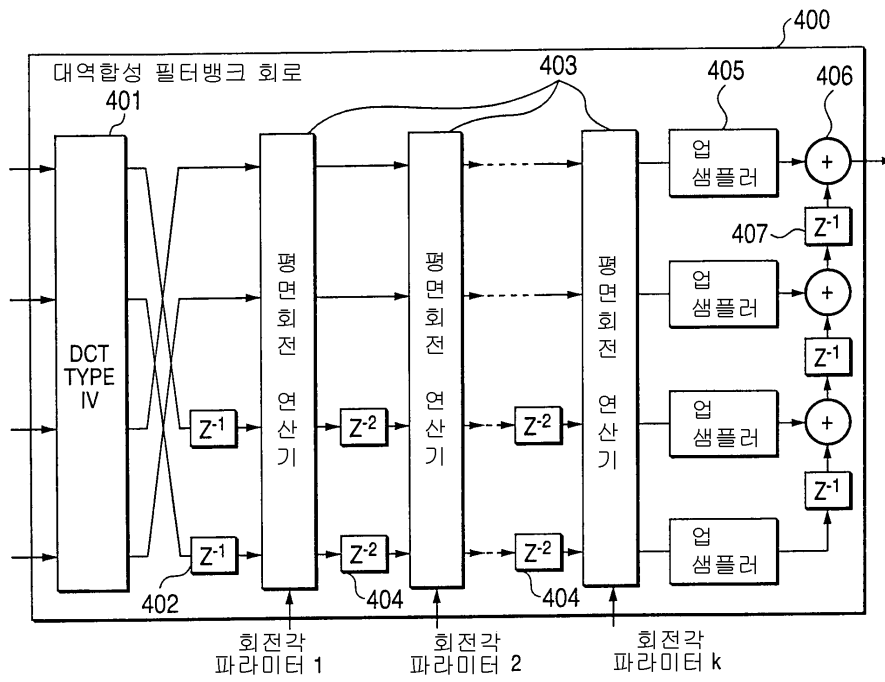
13b



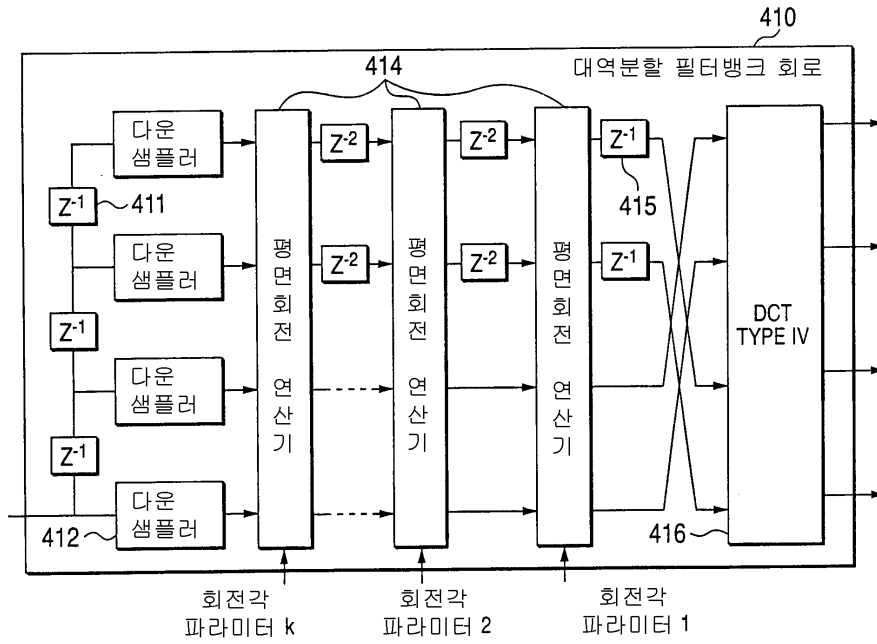
14



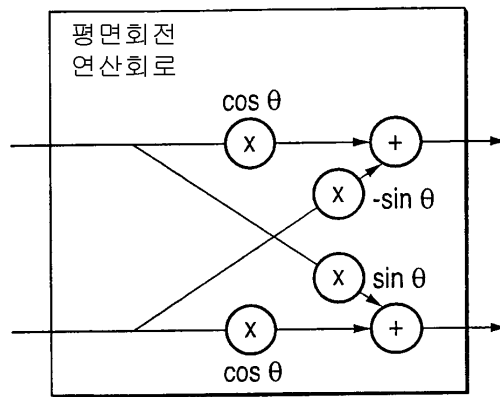
15a



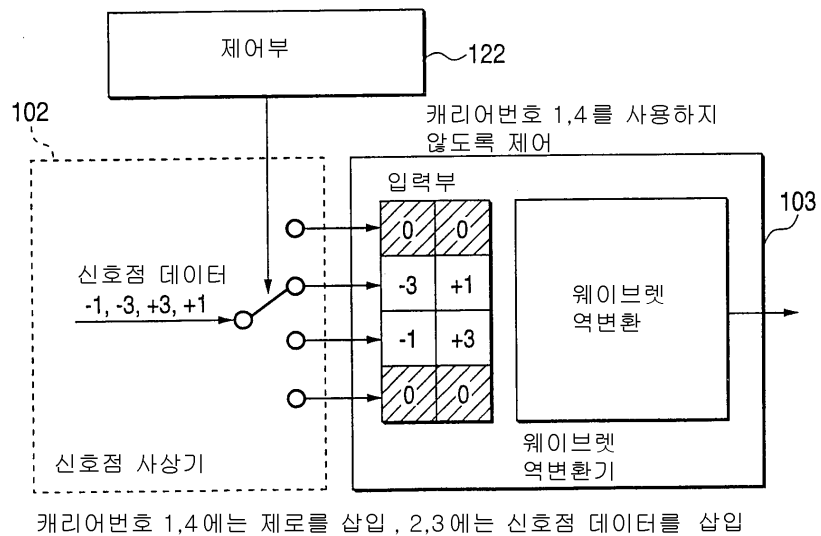
15b



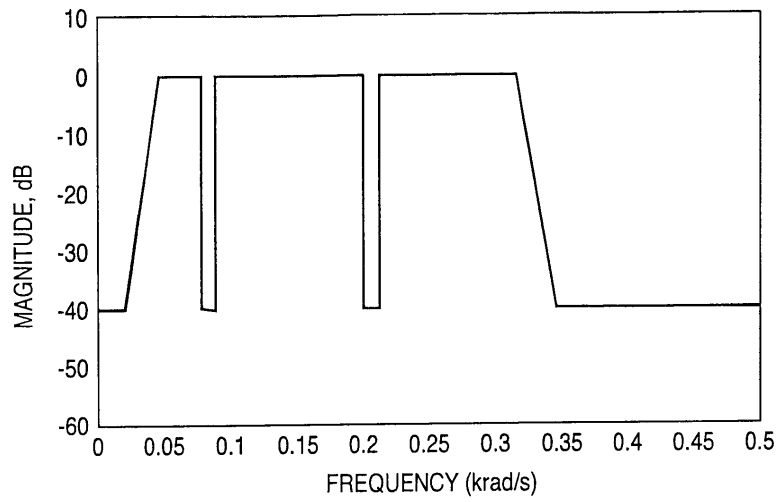
16



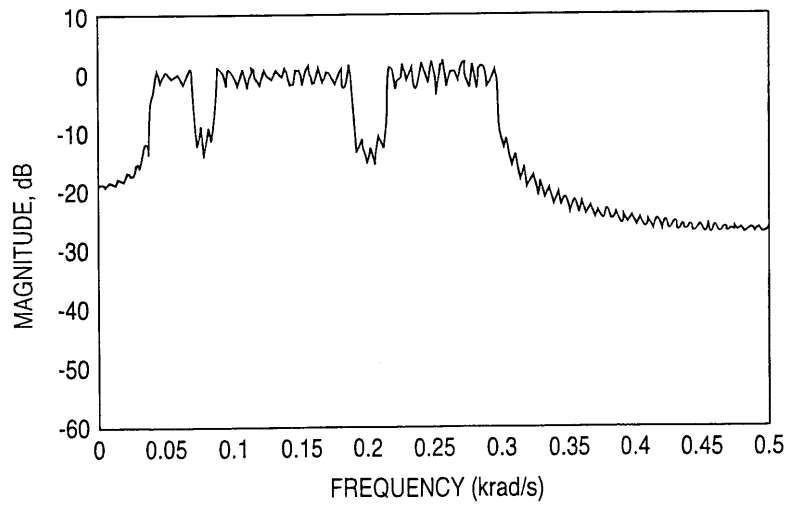
17



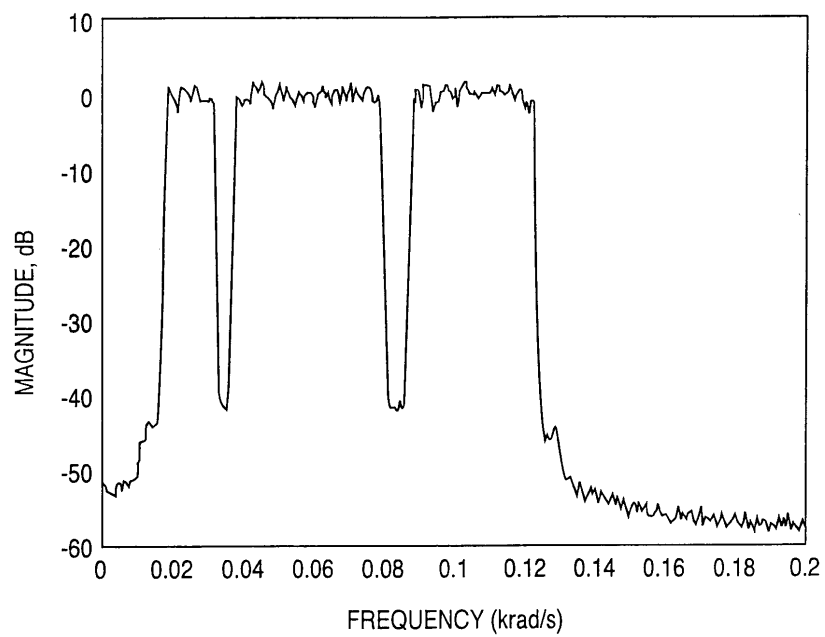
18



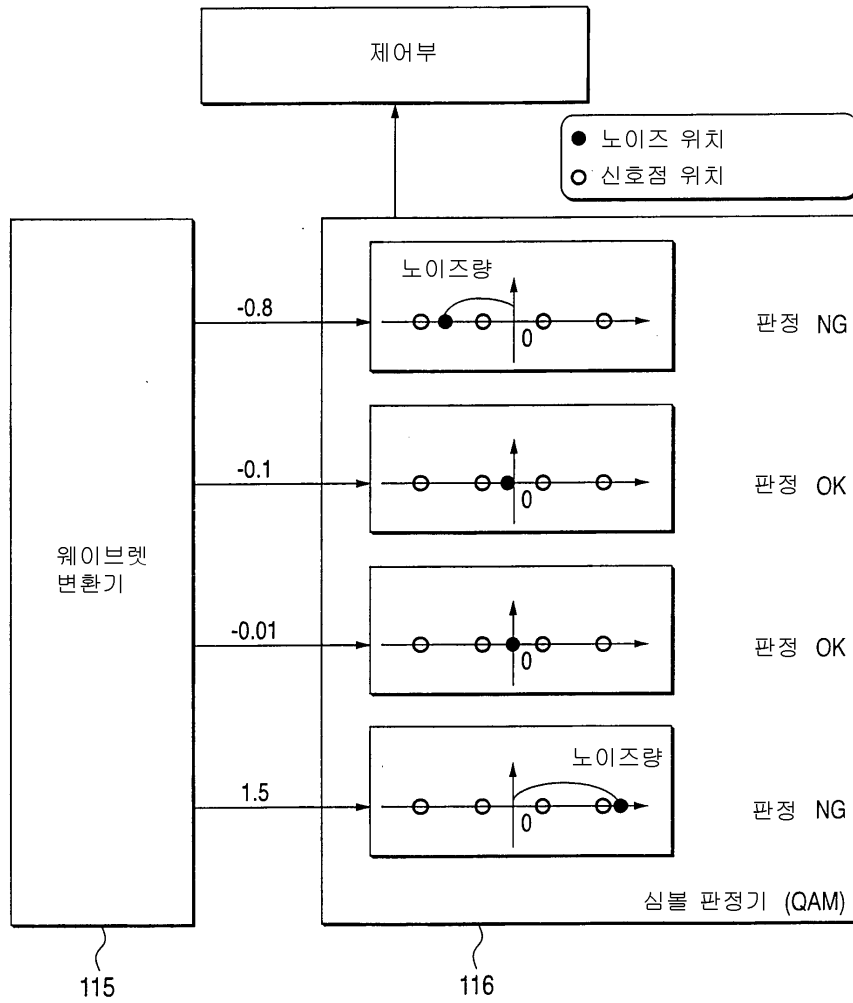
19



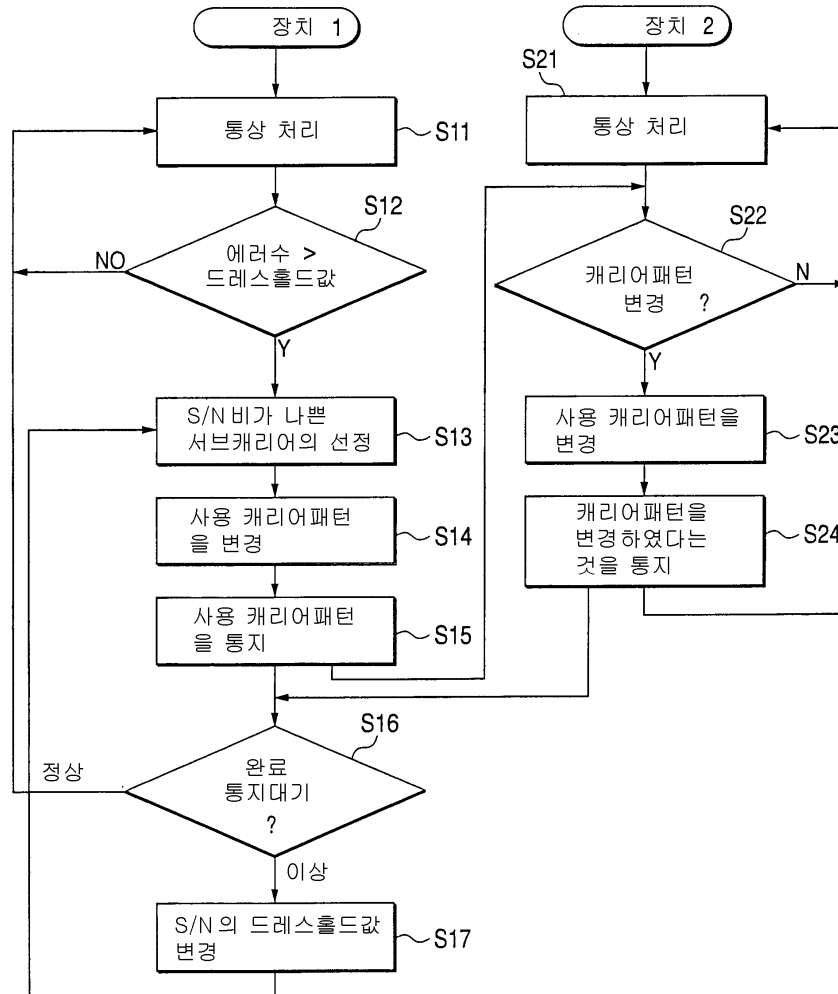
20



21

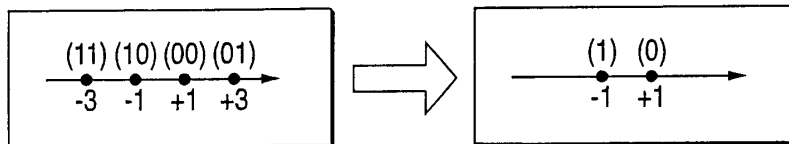


22



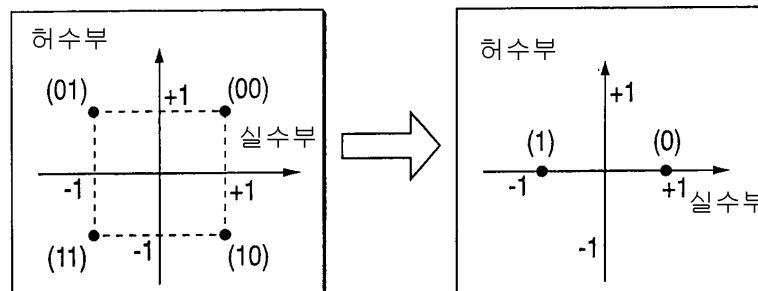
23a

PAM의 경우

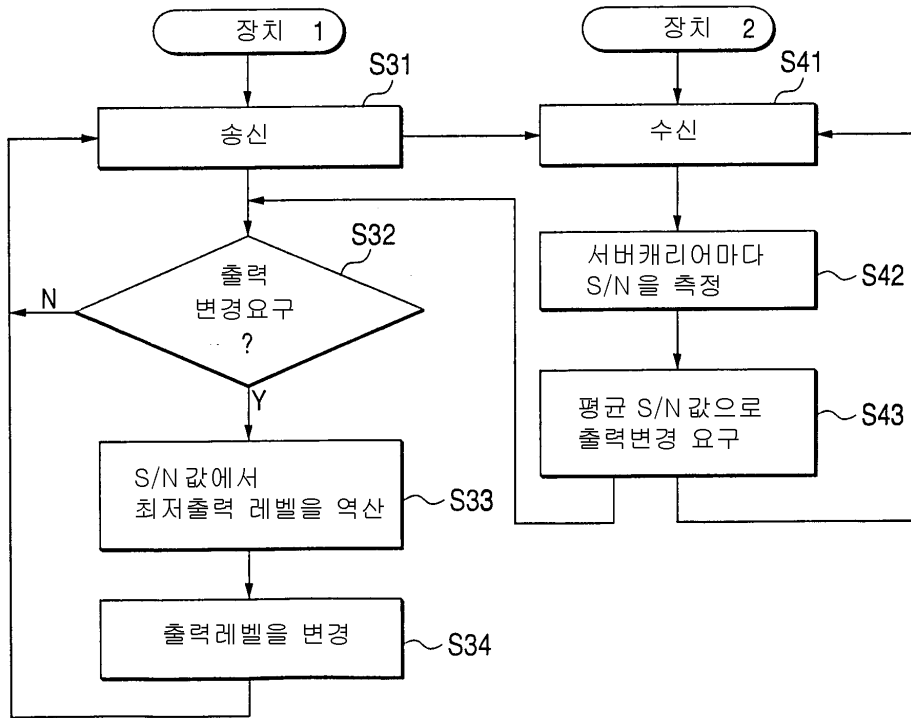


23b

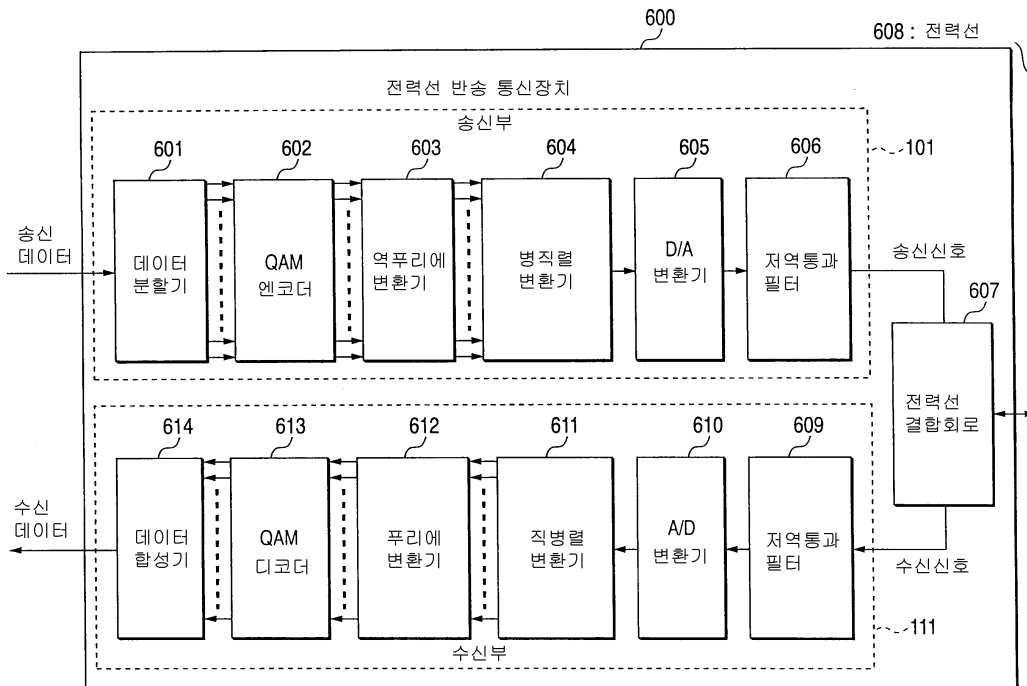
QAM의 경우



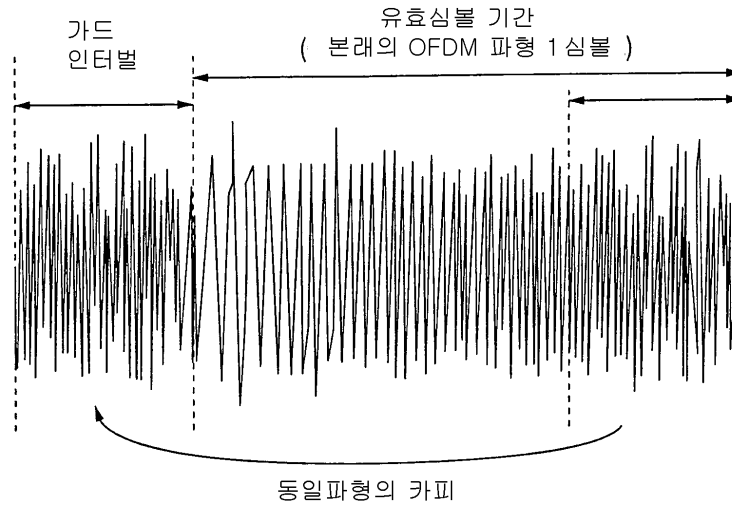
24



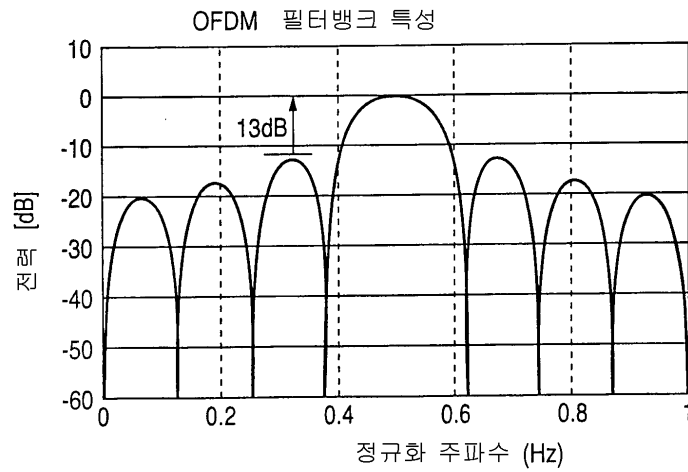
25



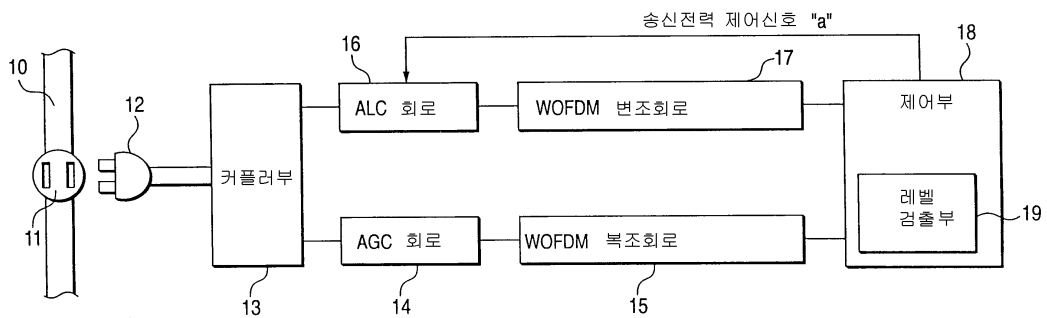
26



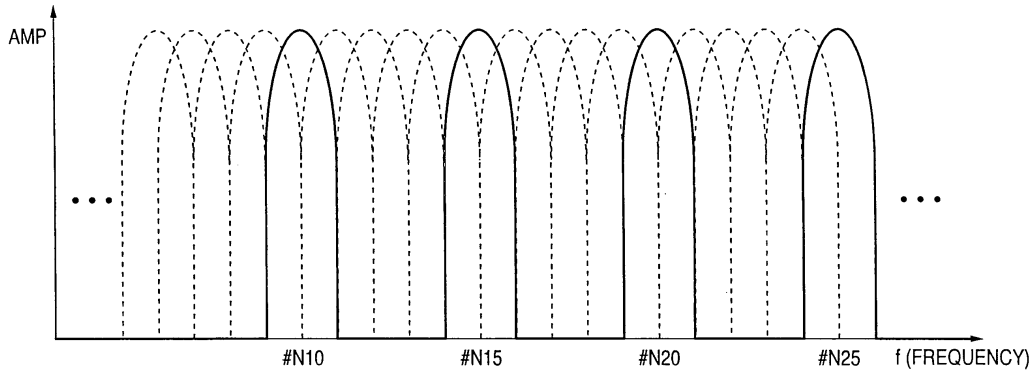
27



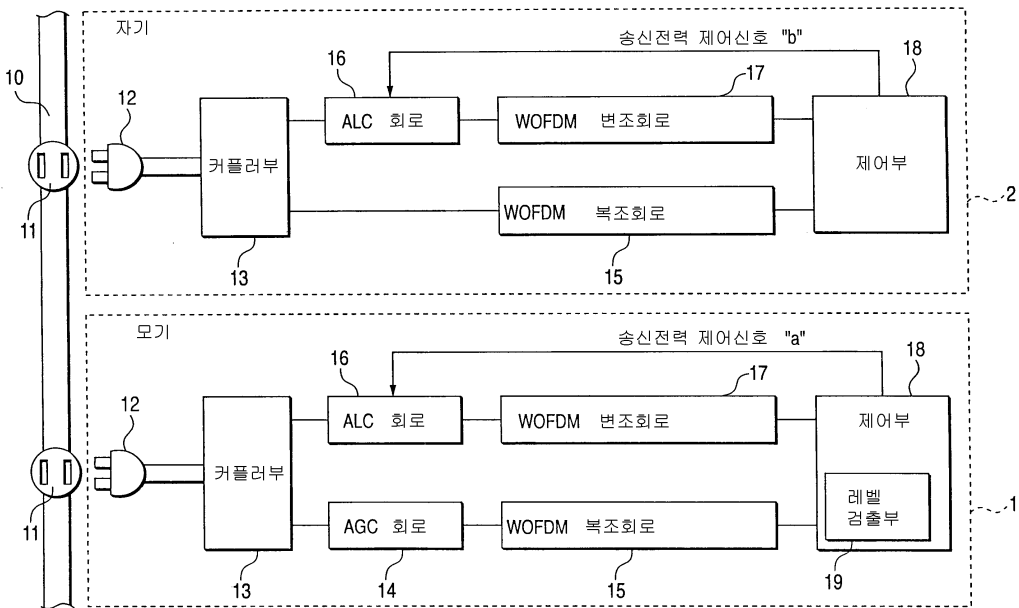
28



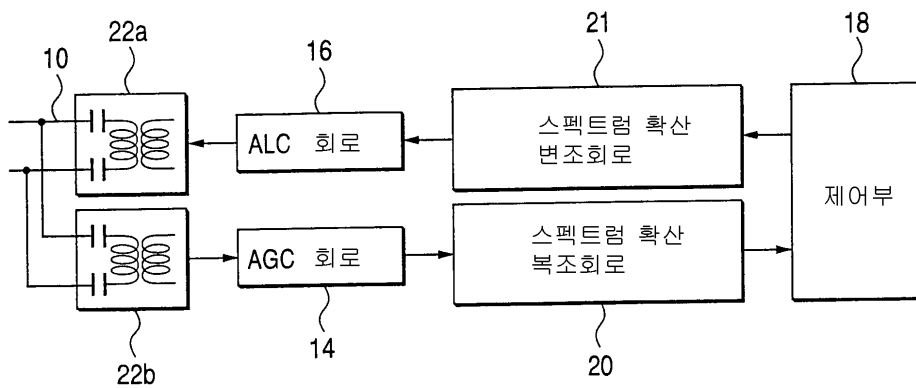
29



30



31a



31b

