

(19) (KR)  
(12) (A)

(51) 。 Int. Cl.<sup>7</sup>  
H04N 7/24  
H04B 1/66

(11)  
(43)

10-2004-0105741  
2004 12 16

(21) 10-2004-7013617

(22) 2004 09 01

2004 09 01

(86) PCT/IB2002/000723

(87)

WO 2003/077235

(86) 2002 03 12

(87)

2003 09 18

(71) -02150

4

(72) 44534 - 17

-33720 1 7

(74)

:

(54)

1 2 (300)  
, 1 2 (310) 1  
1 (336)

2 , 가 (336) , 가 , 가 가 2  
2 , 가

3

1 1 2  
가 1 , 가 1

44 kHz ( CD ) 16 /

MPEG -3(MP3), MPEG-2 MPEG-4

가 .

(scalable)

affic shaping) (traffic conditioning) (tr

(bit-rate scalability; ) 가 (mono)

( , 가 )

가 .

ISO/IEC 14496-3:2001(E), (Subpart) 4 MPEG-4 가 ,

AAC( Advanced Audio Coding; ) , M

PEG-4 , CELP(Code Excited Linear Prediction; )

AMR-WB(Adaptive Multi-Rate Wideband; ) 3

CELP 3 (3rd Generation Partnership Project; 3GPP) TS 26.190

V5.0.0 (2001-03)

MPEG-4

(frequency selective switching unit; FSSU) (

) FSSU (alt

ernative) ( ,

)

2 가

FSS 가

가 ,

, 12 kbps - 24 kbps 가

(crack), (pop) .

, 가

가 가

가

(transcoder),

가  
 FSS 가  
 FSS 0 가  
 2가  
 가  
 가 0  
 가 (low end) 가 (band split)  
 가

0  
 10%

가 0

가

- 1
- 2
- 3
- 4
- 5
- 6

- 1
- 4

(FSS)

7 6

AAC /

1 (110,120,130) (100,112,122,132) 1 (132)  
 (public switched telephone network; PSTN; 130) (110) (110)  
 (110) (104) (102) (100) GSM, UMTS D-AMPS 가  
 (124) (122) (120)  
 (110) (100) (110) (112) , GSM UMTS (1  
 (122) (122) (120) CD DVD (124)  
 (100,112)  
 , 1 가 가  
 2 (250) (200) (100) (200)  
 1 (250) (110) (104) (100) (200)  
 02)) (250) (206)( (100) 1 (104) (250) (1  
 (200) (262) (264) ,  
 / (260) (262) (264) ,  
 (codec) (262)가 가 가 / (2  
 60) / (270) / (270) , (27  
 2)가 가 가  
 ; TX) RF (270) ( 2 ) (RF) (282)  
 RF (280) (284; RX) RF (280) ,  
 (electromagnetic wave) (250)  
 (206) RF 가,  
 (200) RF (230) (250) (280) 가 , R  
 F (230) RF (232; TX) RF (234; RX) (234)  
 (282) RF  
 / (220) (224)  
 / (210) (210) , (214)  
 (250) (262)  
 (204), , PCM ( )  
 (110) , PSTN(130) (120)  
 , (PCM 가 , (200) (250)  
 ) (202) / (210) (212)  
 (122) 가 / (132)  
 , 가 / (220) (222) ,

(250) RF (230) (232) (206) /  
 (270) RF (280) (284) (284) (260)  
 (264) (274) (264) / (254) (254)  
 (250) (250) / (260), /  
 (270) RF (280) (292) (290) RF 가 (23  
 0) (200) / (210), / (220) RF (23  
 (242) (240)

3 2 (262)  
 (262) CELP AMR-WB (304) 3 AAC  
 EG -3 (MP3), MPEG-4 AAC, MPEG-2 AAC, ISO/MP  
 (discrete cosine transform) (wavelet)

P ) , MP3, AAC, AMR-NB(Adaptive Multi-Rate Narrow Band;  
 Full Rate; ) AMR-WB CELP (304) CEL  
 EFR(Enhanced

CELP , AAC  
 , ISO/IEC 14496-3:  
 2001(E), 4 , AMR-WB CELP 3 ; 3rd Generatio  
 n Partnership Project; 3GPP) TS 26.190 V5.0.0 (2001-03) , 3 A  
 MR-WB CELP AAC , 3 AAC

TNS (Temporal Noise Shaping; ).  
 (temporal envelope )

LTP (Long Term Prediction; ) (redundancy)

IC (Intensity/Coupling) .

PNS (Perceptual Noise Substitution; ).

M/S ( / ).

PCM , 1  
 (122) (300) PSTN(13)  
 A/D

10ms

(300) (330) (300) (300)  
 (304) (300) (304) (300)  
 (310) (302) 가 (306) (304)  
 (314) 2 (370) (312)  
 (222)  
 (304) (308) (316)

(318)

(304)

(318) (300)

(300) (320) (324) 가

(318) (322) 3

(320,322) , MPEG-4 (modified discrete cosine tran

sform; MDCT)

3 (328) (320,322)

(330) (320,322)

MDCT 4 1024

MDCT 49 (401,402,...,449) (400)

MDCT

(324) (326) (334)

(334) (326) MDCT (326) MDCT (336)

) FSSU(332) (304)

(324) MDCT (334) (336)

(336) (400) (401-449) , FSSU(332) (324)

(338,340)

$$\text{지각엔트로피} = \frac{\text{신호에너지}}{\text{마스킹한계}}$$

(330) 가

1999 10 30 11 4 7 ACM (Wang, Y., Vilermo,

M. 'An Excitation Level Based Psychoacoustic Model for Audio Compression', The 7th ACM International Mu

ltimedia Conference, October 30 to November 4, 1999 Orlando, Florida, USA)

(342) , FSSU(332) (338,340) , (324,336)

가 가 ( )

5 FSS (500) (501-549)

(324) (336) (401-449) FSSU(332)

(344,346) (360,362) (400) (401-449)

(501-549) , 2 FSS

(310,370) (314) 가

FSSU(332) (401-449) (336/362) FSS

(324/360) MDCT 4 AAC

(500) 6 7 / (348)

가 (336) (356) 가

(401-449) (350) (304)

가 (358,364)

0

(360/362)

가

(352,354) , (350) (334)  
 (401-449) (Fast Fourier Transform; FFT) MDCT  
 (400) (304)  
 (multiplication factor; 7 (710) )  
 (348)  
 / (348) 6 7  
 ISO/IEC 14496-3:2001(E), 4 AAC 4.B.10-11 /  
 / (600) 2- AAC (610) 가 ,  
 1 AAC 가 AAC (610) 가 ,  
 AAC 가 AAC (620) AAC (630) ( , 0  
 ) 가 0 2 AAC (630) ( , 0  
 7 AAC (610) / (702) FSSU(3  
 32) AAC (610) (706) , (708) AAC (708)  
 (718) 가 , (coloring)' 가  
 ( )  
 (quantization round) ,  
 가 가  
 (global optimum) 가 ,  
 ( 가 ) 가 ,  
 , 7 (710-720) ( , FSSU(332) (704))  
 (714) 가 ,  
 가 , 가 ,  
 ( ) (354) ,  
 (710) , 3 (354) ,  
 가 ,  
 가 ,  
 (708) (714)  
 , 7 (712) (712) (714)  
 ( , 0) 4 ,  
 (714) ,  
 3가 (breaking condition) :

1. ,
2. 가 가 ,

3.

(720) ,  
 0 , FFS , 가  
 ( (716) ) , , 가  
 .( , , .)  
 0 , ,  
 6 , (630) , , 6 (610) . 2 (6  
 30) , , 가 0 , , 2 (6  
 , (630) 1 MPEG-4 AAC (610) .  
 , , 0 , , 0 , , (0 )  
 가 1 , , 0 , , (0 )  
 가 ,  
 , GSM UMTS (transcoder)  
 . GSM , PSTN(130) 64 kbps PCM / (transcoder/rate  
 adapter unit; TRAU) (enhanced full rate; EFR) 13-16 kbps GSM ( full rate; FR)  
 base transceiver station; BTS) - (base station sub-system; BSS) , ( mobile switching center; MS  
 C)  
 (ASIC)  
 2 (200)/ (250) (240/290) (242/ 292) , 가  
 , ( 1 (100,112) )  
 ( 1 (122) ) .  
 , 가 FFS ( 500) (401-449) , 가 M  
 DCT 가 , 2 , 1  
 . 1 2 , , 가 2  
 , , 1 , 2  
 , 2 가 0 . 1  
 , , 가 , 2 , , 가  
 1 가 , , 2 , , 가  
 , , , 가



- 2 6 , 가 (401-449)  
449)
9. 2 6 , 가  
가 (401-449)
10. 1 9 ,
11. 10 , 0
12. 1 11 , 1
13. 12 , 1 (Adaptive Multi-Rate Wideband(AMR-WB))
14. 1 13 , 2 AAC( Advanced Audio Coding)
15. 2 14 ,  
(336) (401-449) , (710) ; (350)  
(336) 가 가
16. 1 15 , 1 (310) 1 1  
가 (336)가 1
17. (240) (242) 가 ,  
1 16
18. 1 16
19. 1 1 2  
(300) 1 (310) 가 1 (304);  
1 (336) (334); 2  
1

(332); 2 가 2

(336) 가 가 가 ;

가 2 (356) ,  
2 (356)

**20.**

19 , (300) (336) (401-44  
9) , 가 2 (356)

**21.**

19 20 , 1 (Adaptive Multi-Rate Wideband;  
AMR-WB)

**22.**

19 21 , 2 AAC( Advanced Audio Coding)

**23.**

19 22

**24.**

2 , 1 1 가 1 2 , 2 가  
2 ;  
;

**25.**

24 ,

**26.**

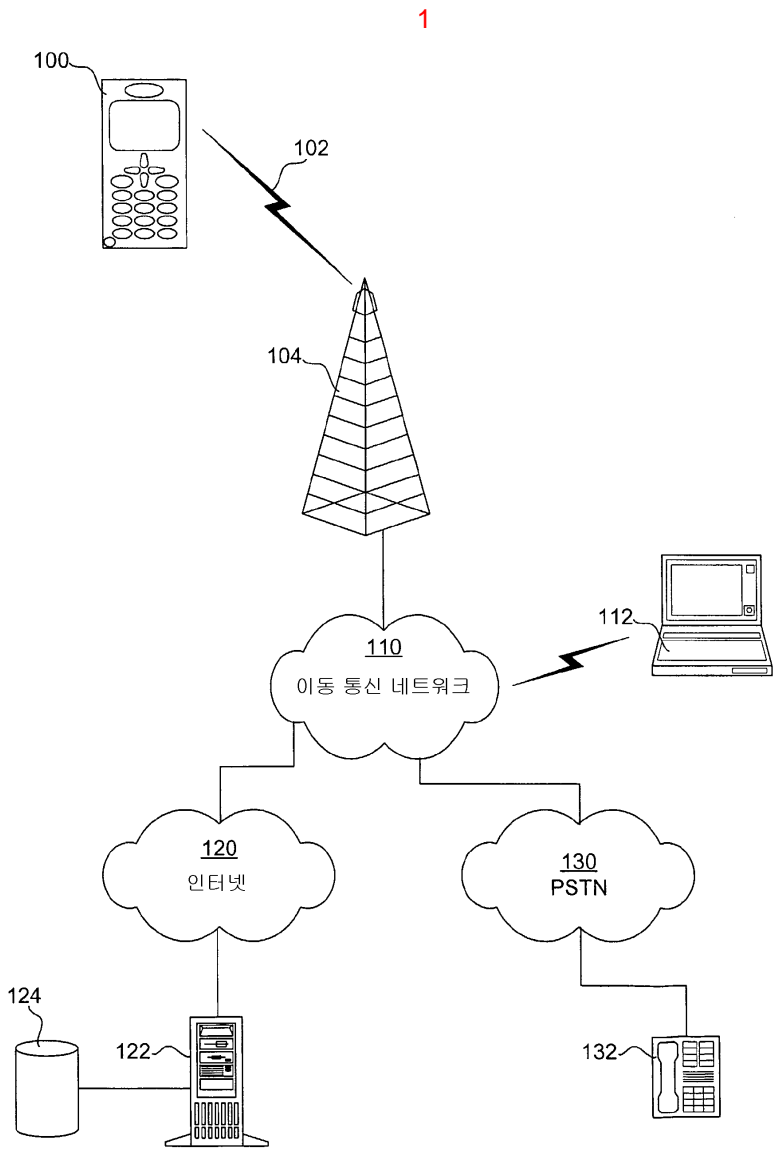
24 , 2

**27.**

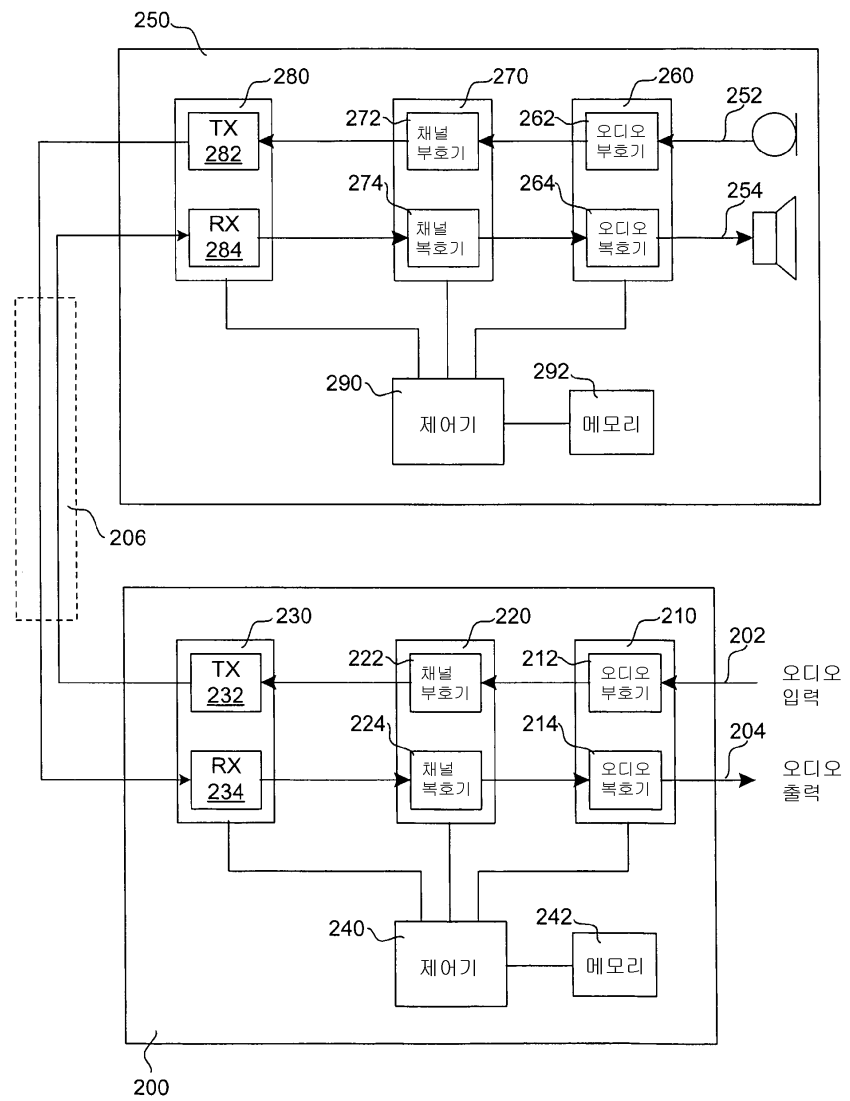
26 ,

**28.**

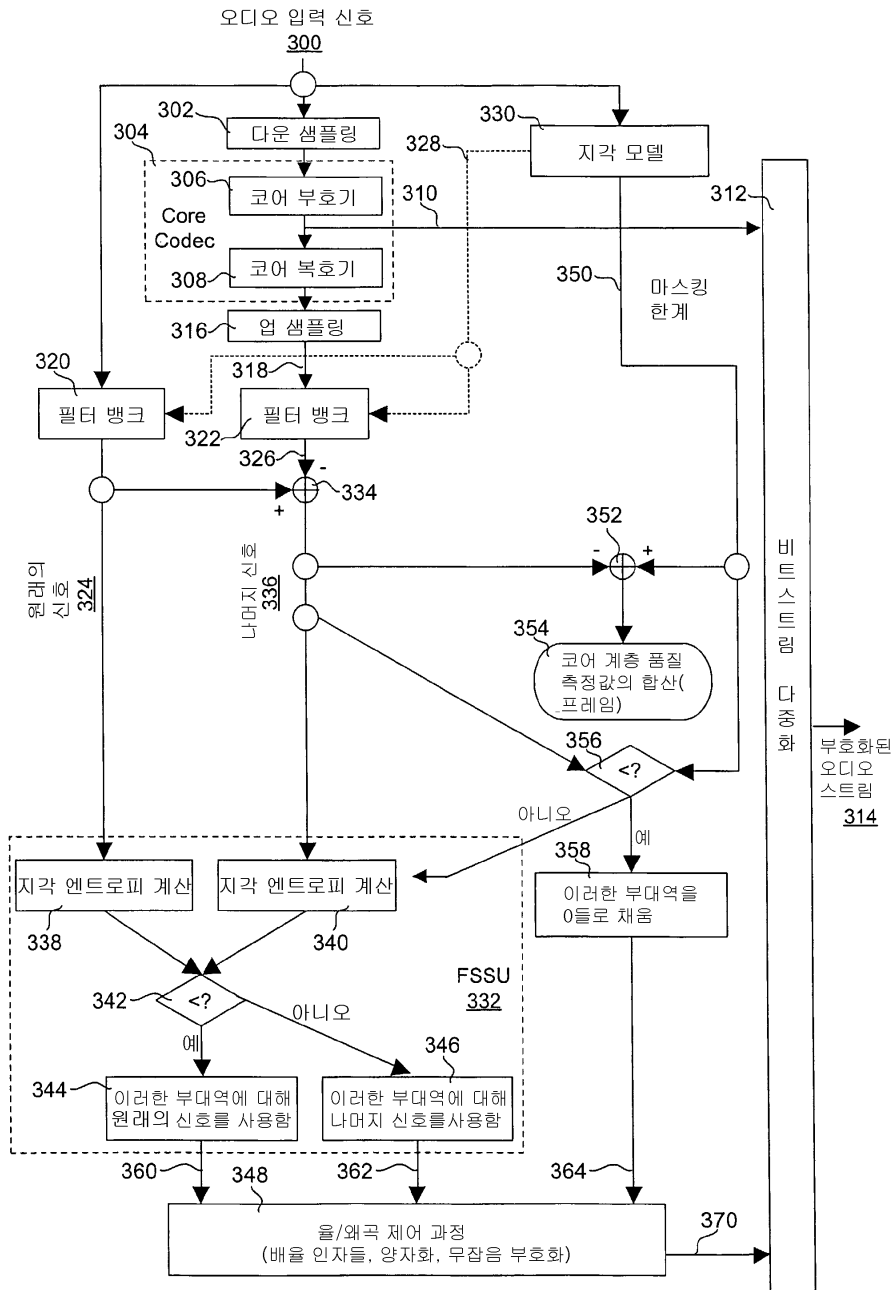
19 22 , 24 (110) (200).  
23 29. (104) (110) (200).  
28 30. (100,112) (110) (200).  
28



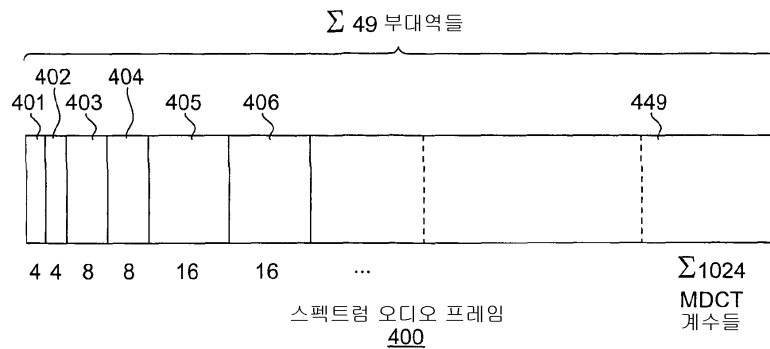
2



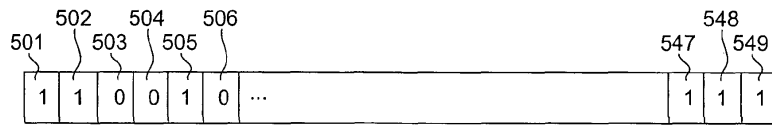
3



4

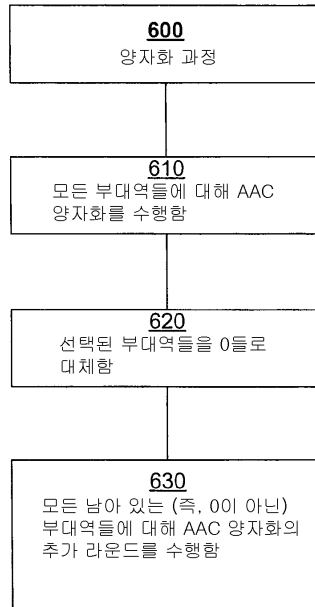


5

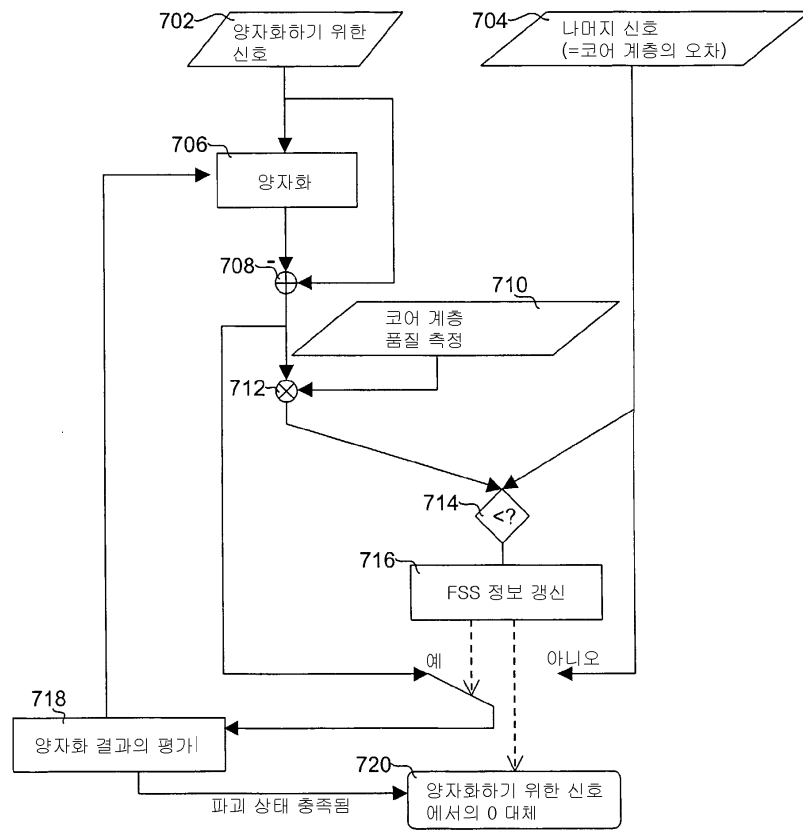


FSS 어레이  
500

6



7



수정된 울/왜곡 제어 루프