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(B1)

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(11)
(24)

2004 11 06
10-0455286
2004 10 22

(21) 10-2002-0001696
(22) 2002 01 11

(65)
(43)

10-2003-0061157
2003 07 18

(73) 416

(72) 606 702

718 105 1008

101 1303

(74)

:

(54)

(PPG),

(EDA),

(EMG)

(EGG)

(SKT),

(ECG),

가

1
 2 1
 3a 3b
 4a (PPG)
 4b
 5a 2 (ECG)
 5b 5d R-peak
 6 Burg
 7a (EDA)
 7b (EDA)
 (SCR)
 8
 9a (ICA)
 9b ICA
 10a (EGG)
 10b (time-varying spectrum)
 11
 12

가 가 2000 가 200

가 가

2000-041437

2001-28961

(RF tag)

/

2001-3479 'Animal's intention translational method'

,가

가

가

가
 가

, US 5046453, 'Animal training apparatus'

가
 (cold fluid)가

US 5054428, 'Method and apparatus for remote conditioned cue control of animal training stimulus'
가 (duration)

가

, WO99/42968 'Pet locator system' 가 (Pet) (movable

object)

WO96/30882 'Wireless pet containment system'

가

가

, (a)

; (b)

; (c)

(SVM)

(b)

(a)

, (b1)

; (b2)

; (b3)

(b

1)

(b2)

; (b4)

(b3)

(peak)

(b)

(a)

, (b1')

b2')

; (b3')

(b1')

; (

; (b4')

(b2')

(b3')

(Teager's energy operator, TEO)

; (b5')

가 가 (R-peak)

(Burg algorithm)

; (b6')

(autoregressive modeling)

(b)

(a)

, (b1'')

; (b2'')

(b1'')

; (b3'')

(b2'')

(smoothing)

; (b4'')

(Bartlett window)

(convolution)

(threshold) 가 2

가 (Heart rate variability), (electrodermal activity), (skin temperature) (intenti on)

3a 3b 3b (200) 3a 가 3a 3b 가 가 (200) (SKT), (ECG), (100) (PPG), (EDA), (EMG) (EGG) , A/D (210) RF (220) (signal recovery) (210) RF (200) (230) (230) (add-on)

가 (230) (pacemaker) sinoatrial node(SA node) (phonocardiography), 3a (photoplethysmography, PPG) (200) 가 (electrocardiography, ECG), 가

Medical instrumentation (J. G. Webster, 1999)

3b 2 3 (PPG) 가 4a 4b PPG (median filter)(410) (lowpass filter, 400) (baseline movement) (matched filter)(420) (peak) 5a 2 3 (ECG) , 5b 5d 5b 5a (bandpass filter)(500) QRS complex (510) 5c (510)

(Teager's energy operator, TEO)(520) : Kyung Hwan Kim et al., 'Neural spike sorting under nearly 0 dB signal-to-noise ratio using nonlinear energy operator and artificial neural network classifier, IEEE Transactions on biomedical engineering, 2000)

R-peak R-R (time series)

5d (520)

(smoothing), (downsampling)

g) 'An efficient algorithm for spectral analysis of heart rate variability,' IEEE Trans. Biomed. Eng., vol. 33, 1986 (R. D. Berger et. al)

6 Burg

Burg (autoregressive modeling)

0.0043-0.04 Hz (, very low frequency, VLF), 0.04-0.15 Hz (, low frequency, LF) 0.15-0.4 Hz (, high frequency, HF) 3 . Burg

Statistical digital signal processing and modeling (: M. Hayes), Wiley, 1996

10 %

R-peak

7a 3a, 3b (EDA) 3a
3b (electrodermal activity, EDA)

7a EDA (level) (skin conductance response, SCR) (duration),
SCR (SCR)

7b (EDA) (SCR)

EDA 256 Hz (700) 10
-12 1 (710) (720)

: M. Hayes), Wiley, 1996) Bartlett window(: Statistical digital signal processing and modeling (convolution) (smoothing) SCR (730)

(SKT) (threshold) 2 (thermistor) SCR

(230)

가

(250) , EDA SCR (230) , SCR , SKT (10%), SKT 9

(240)

가 가 가

(240)

(250)

Bayes' rule (Pattern classification, 2nd ed., (: R. O. Duda, P. E. Hart, D. G. Stock), 2000 , Wiley)

가

Baye

s' rule Parzen window classifier, multilayer perceptron

가

(generalization)

(Linear projection)

Wiley) 'Fisher projection Pattern classification, 2nd ed.'(: R. O. Duda, P. E. Hart, D. G. Stock, 2000, 2 (projection)

가

ne, SVM (support vector machine) (statistical learning theory) (mapping) (generalization performance) (classification error)

SVM V. Vapnik, 'An overview of statistical learning theory,' IEEE Transactions on neural network, vol. 10, no. 5, pp. 988-999, 1999 (230)

(degree of happiness), (degree of sadness), (degree of stress), (degree of anger), (252) SVM (240) (254)

ICA (independent component analysis, (post-processing) (200) ICA

(electrogastrogram, EGG) 3b

(200) (motion artifact)

(200) ICA (blind source separation) (instrumentation noise) ICA

Aapo Hyvarinen, Independent component analysis, Wiley, 2001

10a (time-varying spectrum) 50, 10 9 10b 10a 10b

Burg (autoregressive model)

J. Chen IEEE Transactions on Biomedical Engineering 1993 "Spectral analysis of episodic rhythmic variations in the cutaneous electrogastragram"

(230) (peak)

(spectral width) 2 (spectral width) 10b (peak) (250) (240)

11

가

가

(zero-clipping) (smoothing) (envelope detection)

(heart rate variability), (EDA), (SKT)

가

) (250) (130) (260)
100 가 120
(260)

가
12

(photodiode) (200) (1200)
LED(light emitting diode)
2
() 가

RS-232C

(230),

(240), (250) (icon) / 가
PDA

가
가 가 (200) (1210) 가
가 가

가

가

가

가 가 가
, HDD, ROM, RAM, CD-ROM, CD-RW,
) 가 가

(PPG),

(EDA),

(EMG)

(EGG)

(SKT),

(ECG),

가

가 가 가 가 가 (PDA)
가 가

(b2'') (b1'') ;
 (b3'') (b2'') (Bartlett window) (convolution)
 (smoothing) ;
 (b4'') (threshold) 가 2

7.
 3 (c) 6 (a)

8.
 7 (b) (a) (independent component analysis)
 (blind source separation)
 (autoregressive modeling) (Burg algorithm)
 (time-varying spectrum)
 (c) (b) 2
 (support vector machine)

9.
 3 (c) 6 (a)

10.
 3 (c) 6 (a)

11.
 3 (d) 6 (c)

12.
 3 (e) 6 (a) (c) 가
 (f)

13.

14.

(peak)

modeling)

가 가

(R-peak)
(Burg algorithm)

(Teager's energy operator, TEO)

(autoregressive

15.

(smoothing)

(Bartlett window)

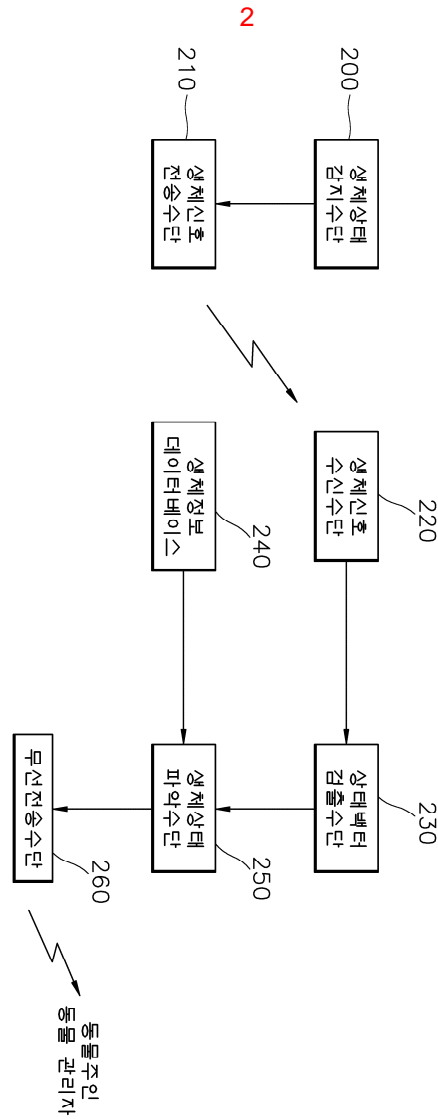
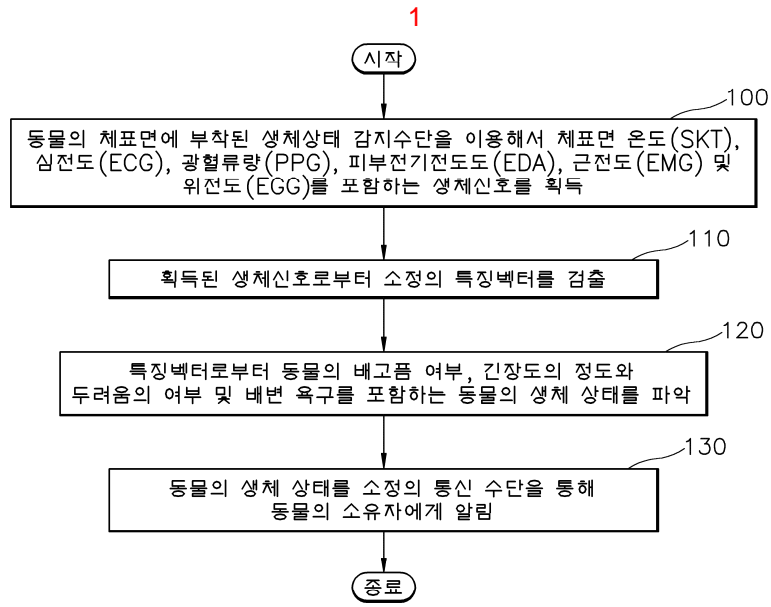
(convolution)

(threshold) 가 2

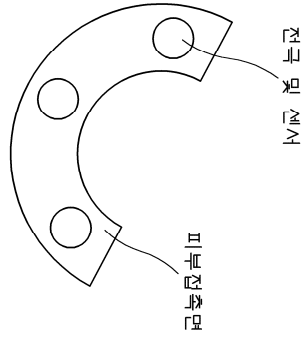
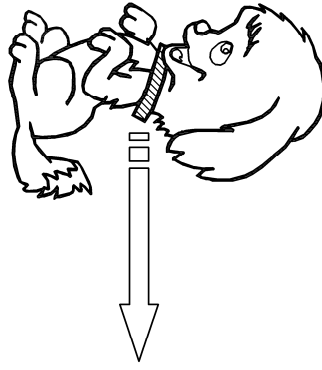
16.

13

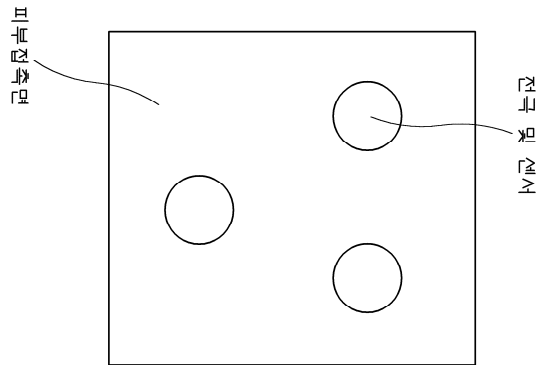
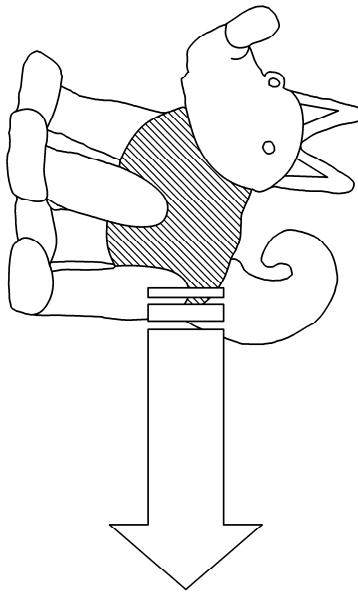
15



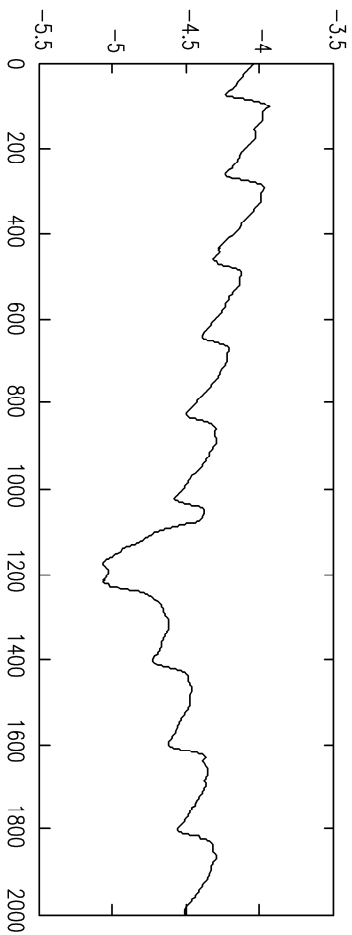
3a



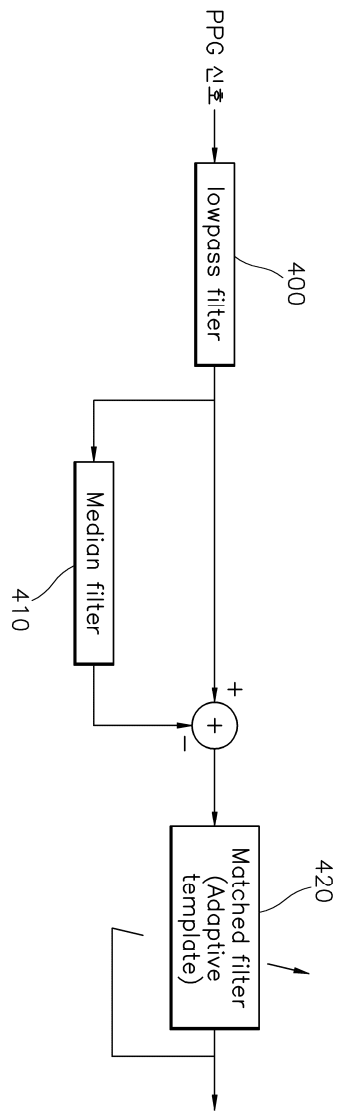
3b



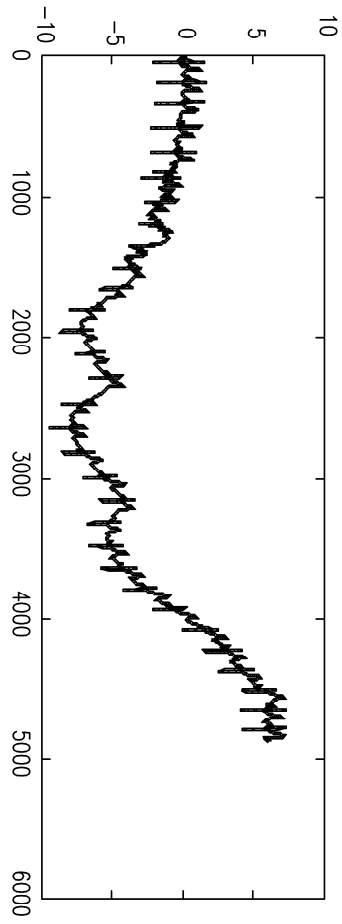
4a



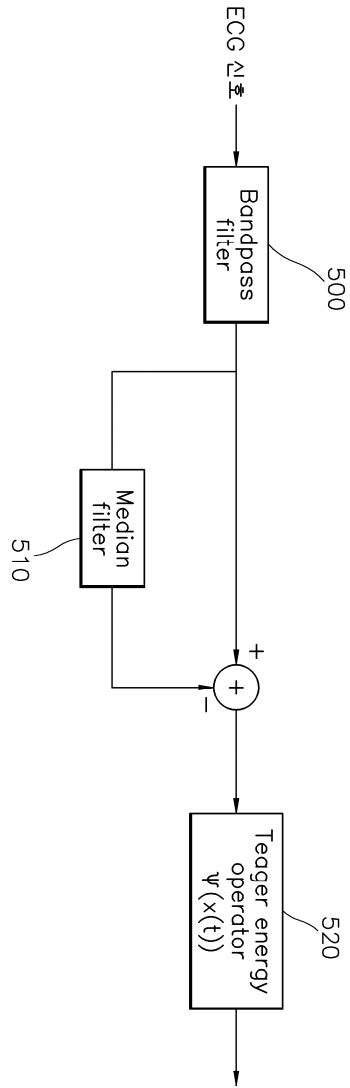
4b

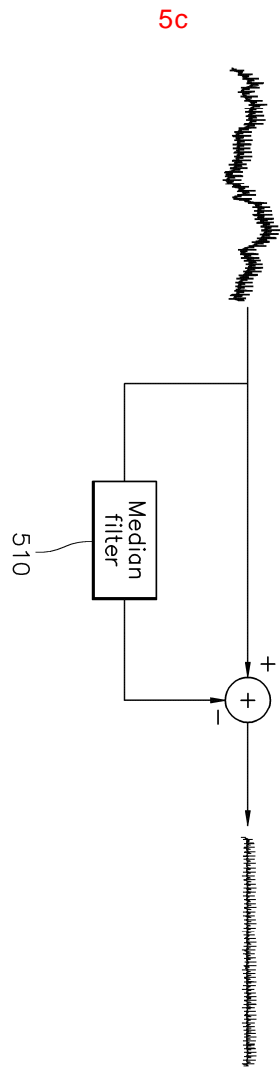


5a

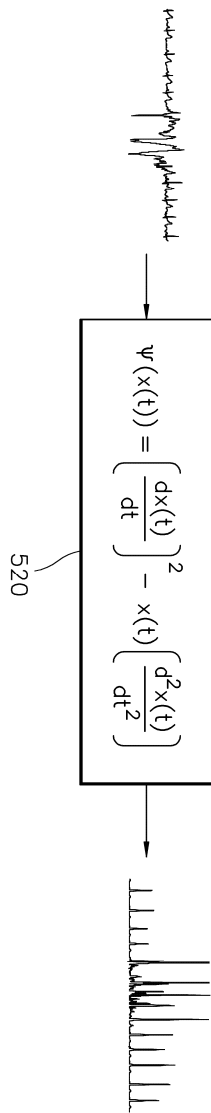


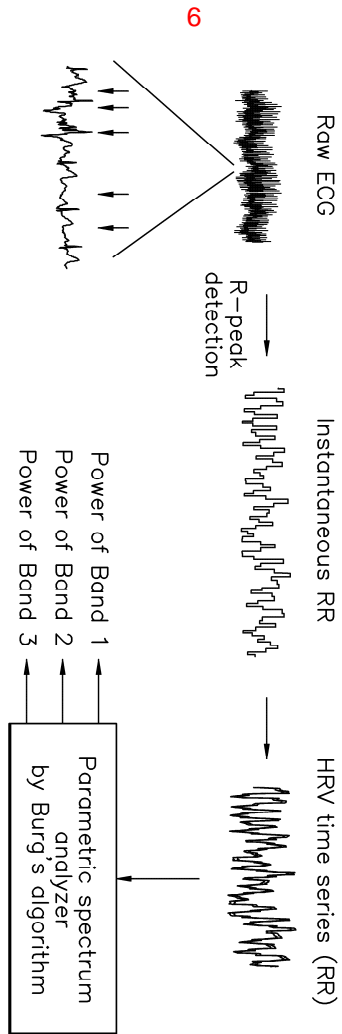
5b



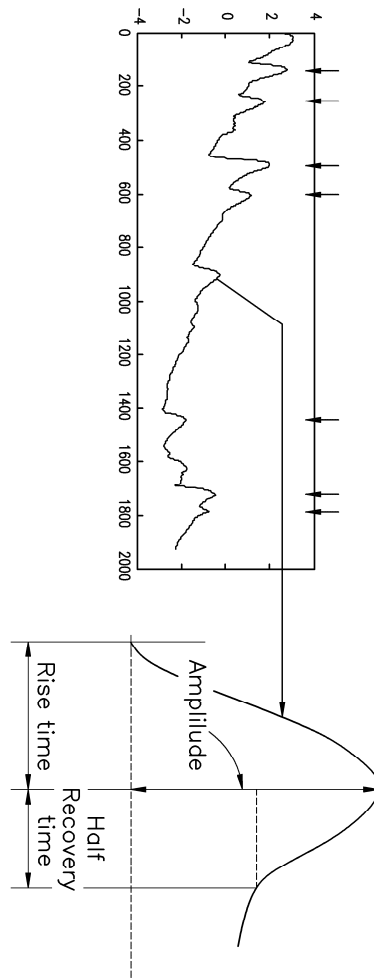


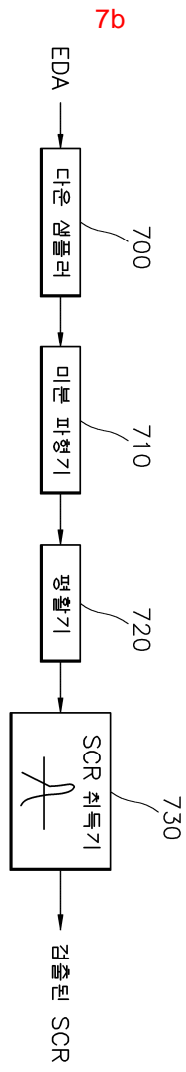
5d

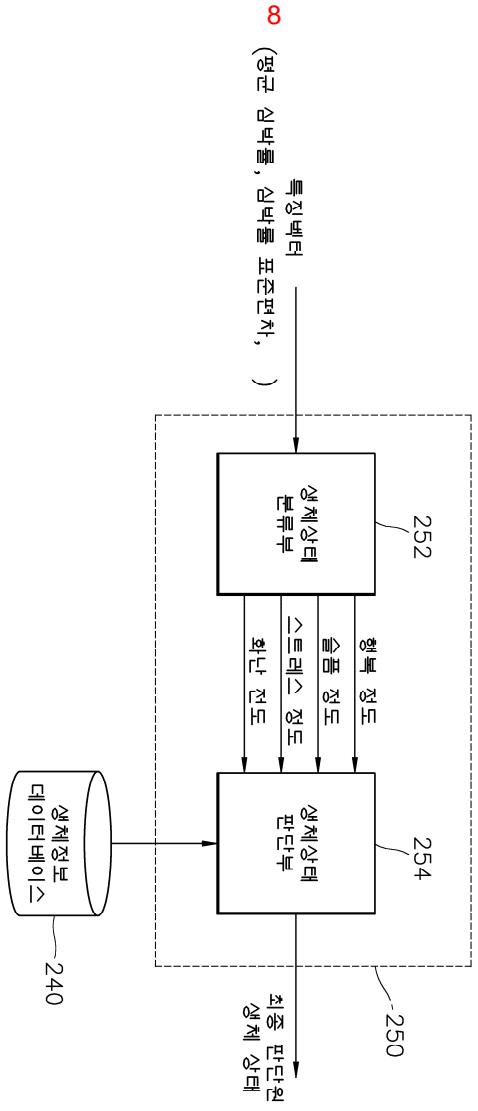


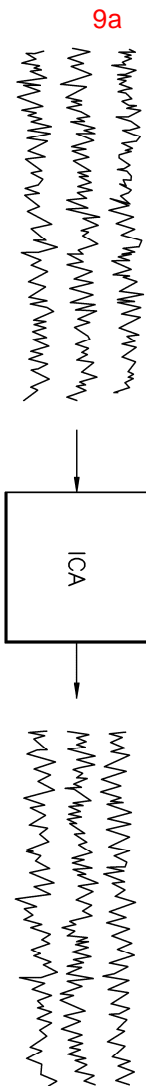


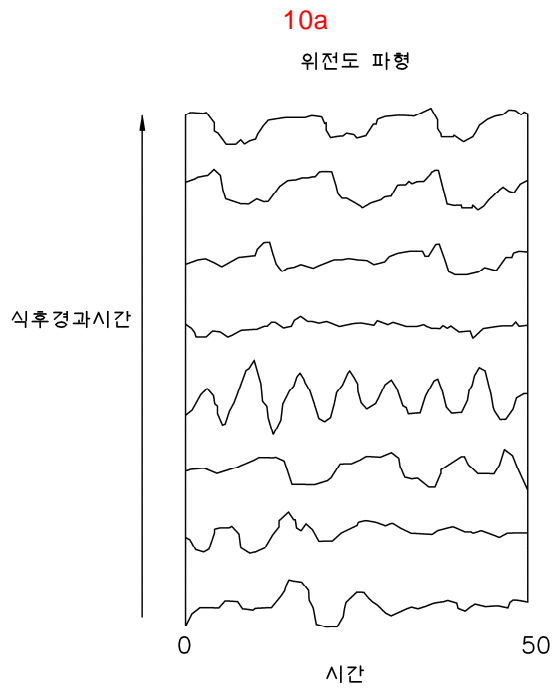
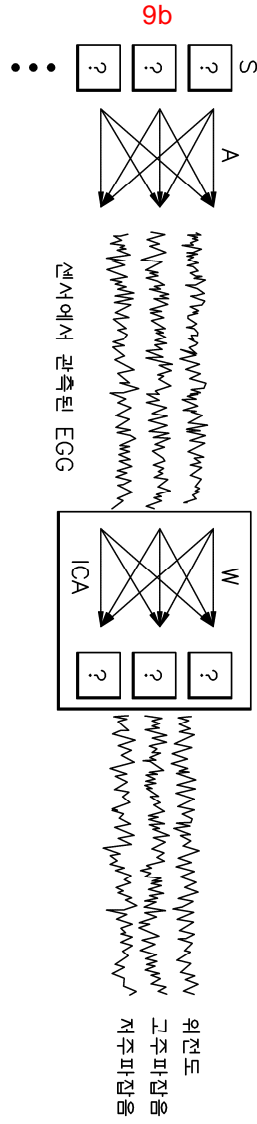
7a





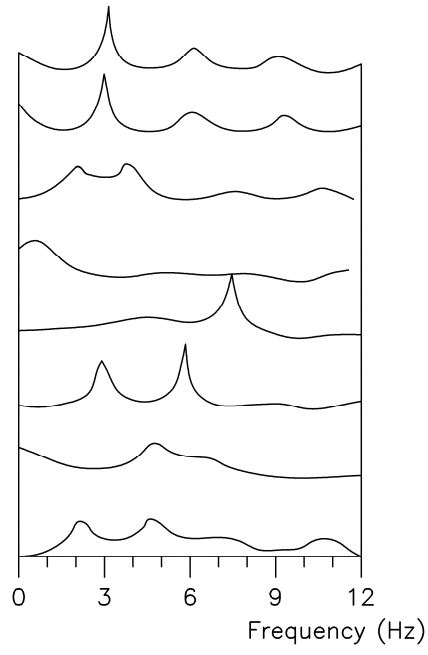




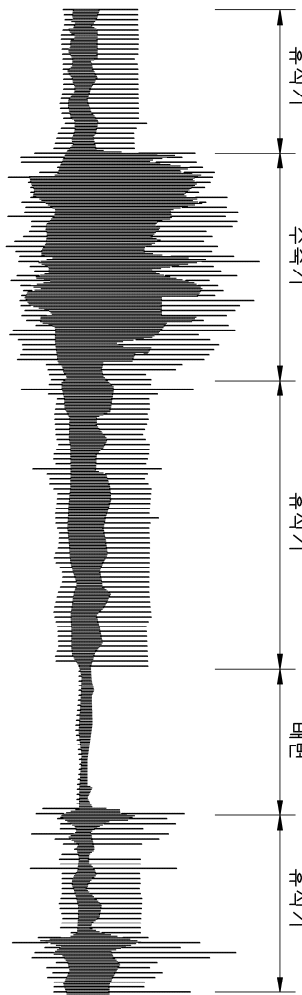


10b

스펙트럼



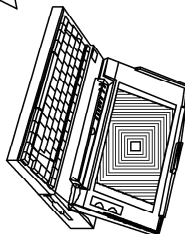
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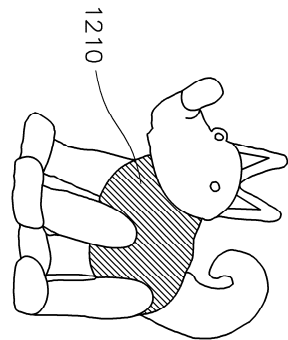
12



무선 홈 네트워크



생체인호 처리/판단 장치



생체인호 송/수신



영문