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KR1020040006398 A*

KR1020070023850 A

KR1019950022279 A

KR1020060014657 A

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(54)

(57)

, GSM

(time division multiplex, TDM

700 MHz

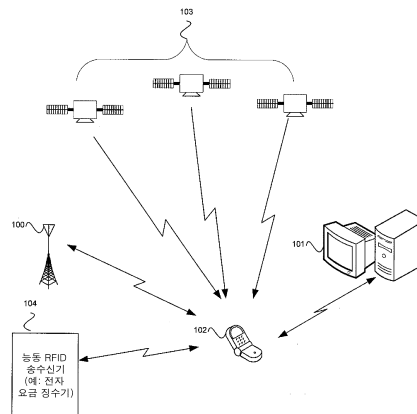
700 MHz

WCDMA, HSPA, HSUPA, GSM, GPRS, EDGE, W-Fi, FM, NFC, NFC

, GPS, DVB

DC

- 1



1

(time division multiplex, TDM

(timeslots)

1

(tuning)

(configuration)

2

1

(tuning)

3

1

4

5

1

6

1

(near-field communication, NFC)

(DC)

7

(code section)

(storage)

(TDM

1

(tuning)

(configuration)

8

(TDM)

1

(tuning)

(configuration)

9

8

10

8

[0001]

[0002]

GPS

(GPS navigation)

(hands-free capability)

[0003]

(Bluetooth)

PLL

GPS

[0004]

PLL ,

[0005]

[0006]

[0007]

(time division multiplex, TDM

(timeslots)

[0008]

1

1

(tuning)

[0009]

1

2

[0010]

(compensating)

(configuration)

[0011]

[0012]

(near-field communication, NFC)
(DC)

[0013]

600 MHz

[0014]

600 MHz

[0015]

, GPS

DMB

FM

NFC

, WCDMA, HSPA, HSUPA, GSM, GPRS, EDGE, Wi-Fi,

[0016]

TDM

GSM

[0017]

(code section)

(storage)

(TDM

[0018]

1

1

[0019]

1

2

[0020]

- [0021] , ,
- [0022] , (NFC) ,
(DC)
- [0023] , 600 MHz
- [0024] , 600 MHz
- [0025] , , WCDMA, HSPA, HSUPA, GSM, GPRS, EDGE, W-Fi ,
, GPS, DMB, FM, NFC
- [0026] , TDM, GSM
- [0027] , (TDM) ,
- [0028] , 1 , 1
- [0029] , 1 , 2
- [0030] ,
- [0031] ,
- [0032] , (NFC) ,
(DC)
- [0033] , 600 MHz
- [0034] , 600 MHz
- [0035] , , WCDMA, HSPA, HSUPA, GSM, GPRS, EDGE, W-Fi ,
, GPS, DMB, FM, NFC
- [0036] , TDM, GSM
- [0037] ,
- [0038] ,

GSMRX GSM

[0039]

GSM TDM (time slots)

700MHz

700MHz

WCDMA HSPA HSUPA GSM GPRS, EDGE, W-Fi, Bluetooth, GPS, DVB
 FM NFC NFC DC

[0040]

1
 1, RFID (104), (100), (103), (101)
 (102) RFID (104) (near field
 communication, NFC) (logic), (circuitry),
 (code) RFID (104), RFID (140)
 (102) NFC

[0041]

(100) (102) (102)
 (100) GSM TDMA (102)
 (102)

[0042]

(103) (103)
 (102)
 (103) GPS(global positioning
 satellite)

[0043]

(101) (101) 802.11 WLAN
 (101)
 (102) (101) (102)
 (subscriber identity module, SIM)

[0044]

(102) (102) GSM
 (time division multiple access, TDMA) (100)
 GSM (102)

(102) (102) (101) (10)
(102) 2) RFID (104) NFC GPS

[0045] (102)

(common antenna)

GSMRX()

GSM

[0046] 2 (205), (200), GSMRX (201), GSM TX (203), TX (202), GPS RX (205)
(204), DMB RX (207) NFC RX (206) (205) 26
GSM 4 16 1 (102)

[0047] (200) (205) (200) (102) (200)
(200) , 8 (102) GSM RX
(201) , 1 (100) , GSM TX (203)
(100) (102)
TX (202)
GPS RX (204)
NFC RX (206)

[0048] 3a (time division multiplex, TDM (software definable
3a (311) (309, 310)
radio, SDR(305), DSP(306), SDR(305) RX (300), TX (301), PLL(302), (303) (304)
DSP(306) RX (307) TX (308)

[0049] RX (300) RF RX (300) GSM
TDMA RX (300) RX (300)
, WAN GPS
RX (300) RX (300) 1 (100)
1 (101)
RX (300) RF
RF
RX (300) DSP I

[0050] TX (301) TX (301) GSM TX
I Q
(301) , WAN GPS
TX (301) , TX
RF TX

(301) , (100)
 , (101) TX (301)
 RF
 RF

[0051] (303) RX
 (300) TX (301) PLL(302)
 RX (300) (quadrature phase demodulator)
 RX I Q

[0052] PLL(302) PLL(302) N
 (fractional N synthesizer) PLL (303)
 (non-integer multiple)
 (303) 1 MHz PLL 1 MHz *MN
 , M N , PLL

[0053] (304) SDR (304)
 SDR(305)
 (304) DSP(306)
 DSP(306) (304)
 (304)
 SDR(305)
 SDR(305) 1 GSM TX (2
 203) SDR(305) 2
 TX (2 202)
 DSP(306)

[0054] DSP(306) SDR(305) I Q SDR(305)
 I Q DSP(306) SDR(305)
 RX (308, 307) DSP(306)

[0055] (304) DSP(306) DSP(306)
 I Q
 (304) GSM
 DSP(306)
 DSP(306) (308) I
 Q SDR(305) (304)
 GSMTX DSP(306) DSP(306)
 GSM TX (308) I Q
 SDR(305)

[0056] (311) RX TX
 (routing) RX TX
 (311) RX TX

(309) , RX TX (310)
 , 1 GHz , 50 MHz
 , (311)
 , 1 TX 2
 RX
 (311) GSM TX (301)
 , NFC RX (310) RX (309)
 (300)

[0057] 3b 3b
 , (312) (313)
 , DSP(306)
 , DSP(306) (312) 4 13 8
 (312)

[0058] (313) (313)
 TDMA
 TDMA

[0059] , 3a DSP(306) , 4 16 8
 , DSP(306)
 (313) , SDR(
 3a 305) , (311)
 , 1 (304) SDR(305) GSM
 , (311) GSM SDR(305)
 (309) 2 (304)
 (304) , NFC RX SDR(305)
 (311) (310) SDR(305) RX NFC

[0060] , GSM TX , NFC RX
 , (304) SDR(305) (311)
 (1 102)
 (idle mode)

[0061] 4 4
 (400) , (401) NFC (402)
 RF (400) RF (401)
 (3a 311)

[0062] (400) WCDMA HSPA HSPA GSM GPRS, EDGE, W-Fi, , GPS DVB
 (401) FM
 , 13 MHz NFC
 , 4 , NFC (402)

[0063] 5 5
 (500) , (503) (504)
 (match filters)(502) (multiplexers)(501)

(3a 304) , (500) RF

(503) , (304) (500) (504) ,
(500) 700 MHz

HSPA, HSUPA, GSM, GPRS, EDGE, W-Fi, , GPS, DVB , VDMA
FM, NFC , 700 MHz

[0064]

(501) RF , SDR(3a 305) (304) ,
(304) , TX RX
(504) (503)

(501)

[0065]

(502) (tuning)

4) SDR(305) (30)

[0066]

(500) RF , 700 MHz

(504) (503) , 700 MHz (501)

RF , GSM RF 900 MHz

(503) 900 MHz (503) (502) 2.5 GHz

(503) (502) 2.5 GHz (504) FM
NFC RF

[0067]

6a , (602), (604) (606)
(602a, ..., 602b) (02) (602a, ..., 602b) ,
(606) (604)
(604a, ... 604b) (604a, ..., 604b)

[0068]

(602), (604), RF
(602), (604), RF

(5 503) (5 504)
RF (5 501) SDR(3 305)
(606) (602a, ... 602b) RF
(604a, ..., 604b)

(null subset) RF
(602a, ..., 602b) (subset) (602a, ... 602b)
(set) (604a, ..., 604b) (604a, ..., 604b)

(602a, ... 602b) (602)
(602a, ... 602b)

[0076] 6c , 6c , (650) , n-
 (614, 616, ... 618) (650) (650a,
 650b, 650c, ... 650d), (651a, 651b, ... 651c) (655, 656)

[0077] (3a 304) (651a, 651b, ..., 651c) ,
 (650) ,
 (650a, 650b, 650c, ... 650d) RF
 650c, ... 650d) RF (650a, 650b,
 RF (651a, 651b, ... 651c)

[0078] (304) , DSP(3a 306) , (center
 frequency drift) DSP(306)
 (614, 616, ... 618)
 618) (304) , (614, 616, ...
 (651a, 651b, ... 651c) (signal integrity indicators),
 (304) (304)
 (304) (614, 616, ... 618)
 (651a, 651b, ... 651c) DSP(306) (304) , DSP(30
 6) (304)
 (614, 616, ... 618)

[0079] (650) (650a, 650b, ..., 650c)
 (650a, 650b, ..., 650c)
 () , (star) , , ,
 (650a)
 (650a)
 (650) RF
 (650) ,

[0080] , 6b (614, 616, ..., 618) (630)
 , (650) (655, 656)
 , (614) (655)
 (656) (620a, 620b)
 (614) (655) (620a)
 (656) (620a, 620b)

[0081] 7a , 7a , (700) DSP(3a 306) SDR
 (3a 305) (3a 304) ,
 DSP(306) , (312)
 , DSP(306) (312) , 4 16
 8 DSP(306)
 (304) SDR(305)
 DSP(306) (304) , 1 GSMRX(2 201) ,
 2 BT TX(2 202) , (304)
 (3b 313) , (3a 313)

GSM TDM

[0082] (701) , DSP(306) (702) , (304)
 , (304) (703)
 DSP(306) (701)
 (704) , DSP(306)
 , DSP(306)
 (308) (polling) , DSP(306)
 SDR(305) RX (300) I Q
 , (701)

[0083] (705) , (304)
 , (304) , GSMRX(201) (303)
 , PLL(302) (706)
 DSP(306) I Q SDR(305) TX (301)
 , SDR(305) RX (300) DSP(306) I Q
 , (700)

[0084] 7b
 (708) , (3a 304)
 , GSMRX(2 201)
 , (304)
 , PLL(3a 302) (3a 303)
 (709) , (304) (5 501)
 , (711) ,
 , 600 MHz (710)
 , 600 MHz
 NFC , (713) NFC
 DC (714) ,

[0085] 7c
 (715) TX RX , (716)
 (tuning) ,
 , (717) , (716)

[0086] 8a
 , 8a
 , (5 504 503) (850)
 , 8a 88 MHz 108 MHz FM
 , (850) 88 MHz 108 MHz FM
 , (850) 5 MHz (504, 503)
 , (504, 503)
 2a , (
 16783U01) ,

[0087] (852) f_{DC} , f_{DC} (504, 503)

f_{CFA} (504, 503) (852)

1 (852)

f_{CFA} f_{DC}

[0088] 8b 8b 8a (5, 504, 503) f_{DC}

f_{CFA}(863) (1)

102 (504, 503) f_{DC} (860)

(862) f_{DC} f_{CFA}(863)

(862) , 0.5

[0089] 8c 8c 8a (1, 102)

(5, 504, 503)

503 (5, 504, 503)

(antenna hopping)

[0090] f_{DC} (102) (863)

f_{CFA}(863)

1 (5, 502) (873) f_{CA1}

(873) f_{DC} f_{CA1}

(872) 0.9

[0091] (502) f_{CA2} (875)

(875) (873) f_{DC}

f_{DC} f_{CA2}

(874) 0.4 (873) (875)

3a 304 DSP

[0092] (102) (signal aggregation) (5)

500 DSP(304) (anal og signal DSP)

aggregator

(Nyquist)

FM 36,000 KHz

28

DSP(304)

[0093]

(102)

(spikes and dips)

(bit error rate)

[0094]

(102)

(504, 503)

(102)

[0095]

, 4

[0096]

8d

8d

(800 812)
(5 502) 1

(800) DSP(3a 304)
(502) 1 (504, 503)

(802)

(502) 1
(5 500)

[0097]

(804)

(500)

DSP(304)

(806) DSP(304)

(808)

(810)

[0098]

(808)

DSP(304)

(812)

DSP(304)

(502)

(804)

[0099]

(810)

DSP(304)

(812)

[0100]

8e

8e

(820 826)

(820) DSP(3a 304)

1 (5 502)
 (5 504, 503)
 (822) (502)
 1
 (5 500)
 [0101] (824)
 (500)

DSP(304)
 DSP(304)

[0102] (826) DSP(034)
 (502) (504, 503)

[0103] (machine-readable storage)

(309) GSM TDM (200) TDM (200)
 (310)
 (firmware)

[0104] , WDMA HSPA HSUPA GSM GPRS, EDGE, W-Fi, , GPS DVB
 (309)
 , FM NFC
 (310) (DC) (402)

[0105] (309) (310)
 (309) (310)

[0106] , GSM TDM (200) (309)
 TDM (200)
 (310)

[0107] , WDMA HSPA HSUPA GSM GPRS, EDGE, W-Fi, , GPS DVB
 (309)

[0108] , FM NFC , (310) (DC) (402) , (309) (310) (309)

[0109] (310) , GSM TDM (200) TDM (200) (309) (310)

[0110] , ~~WCDMA~~ HSPA HSUPA GSM GPRS, EDGE, W-Fi, , GPS DVB , FM (310) (DC) (402) NFC

[0111] (309) (310) (309) (310) ,

[0112] (computer program product) (a) (conversion) , (b)

[0113]

[0114] 1

[0115] 2

[0116] 3a

[0117] 3b

[0118] 4

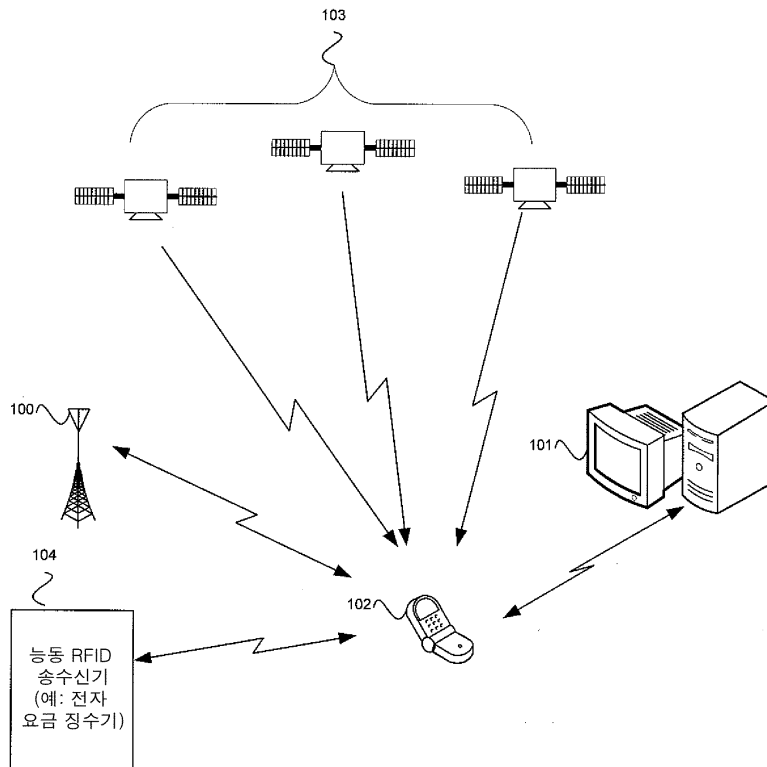
[0119] 5

[0120] 6a

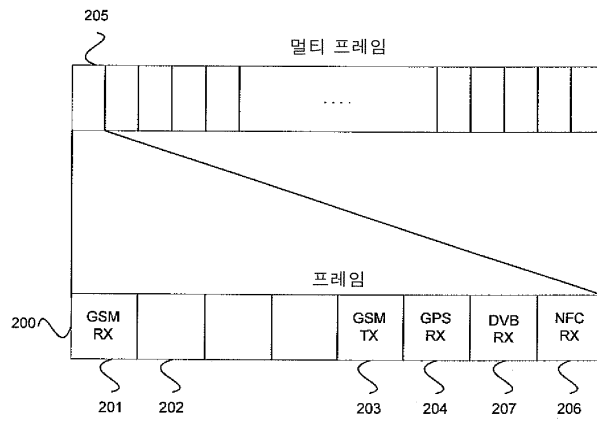
[0121] 6b

- [0122] 6c , n-
- [0123] 7a ,
- [0124] 7b ,
- [0125] 7c ,
- [0126] 8a ,
- [0127] 8b ,
- [0128] 8c ,
- [0129] 8d ,
- [0130] 8e ,

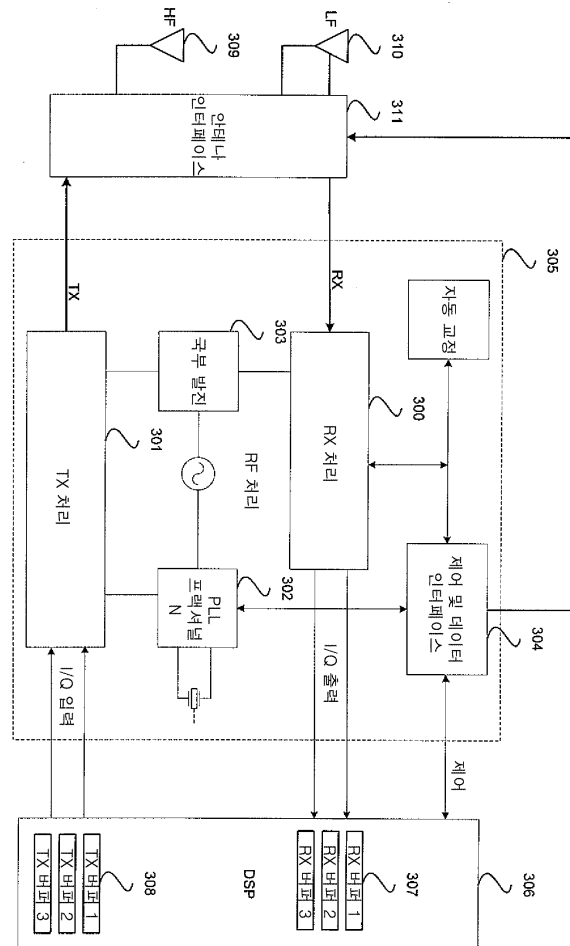
1



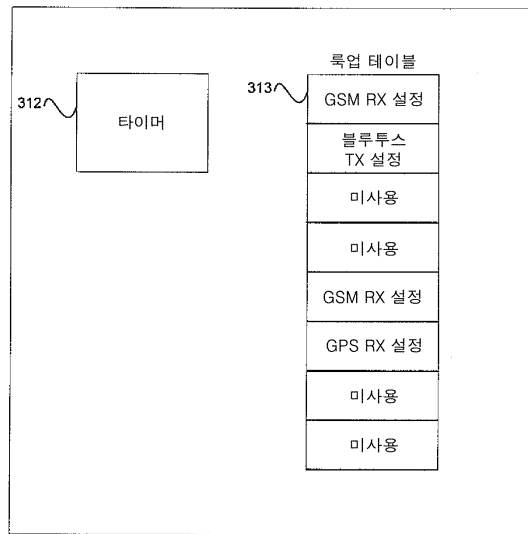
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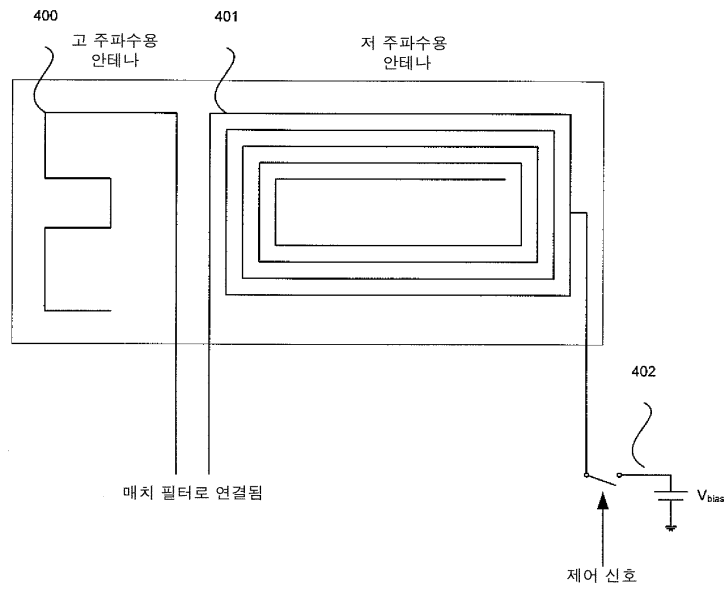
3a



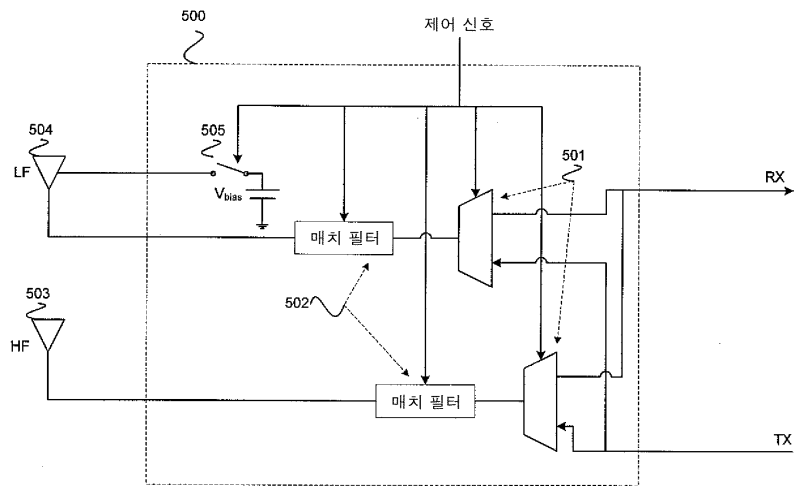
3b



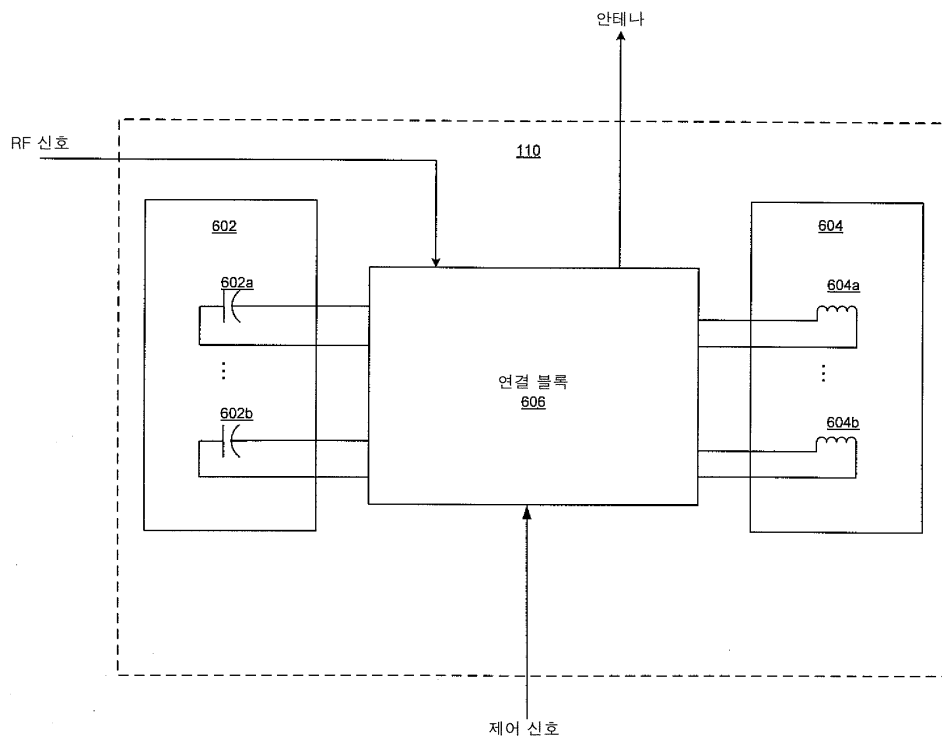
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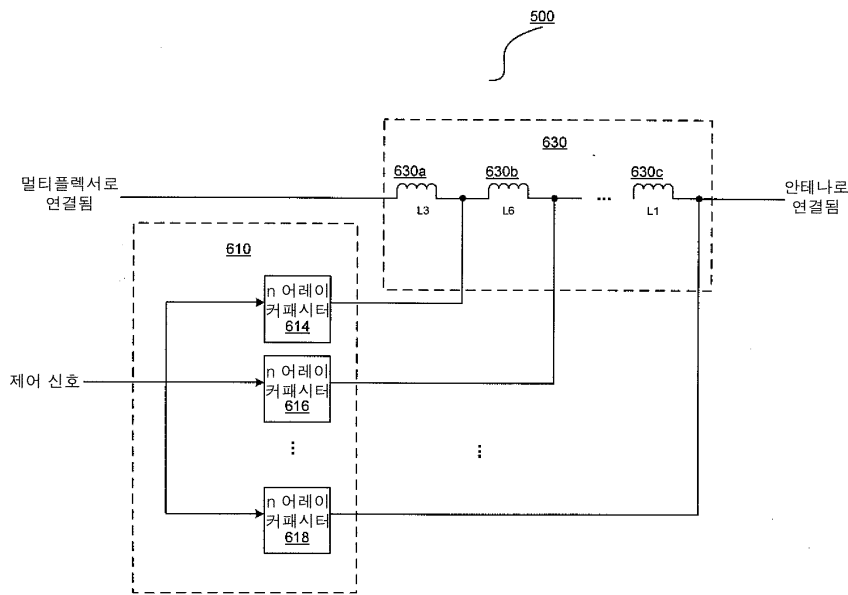
5



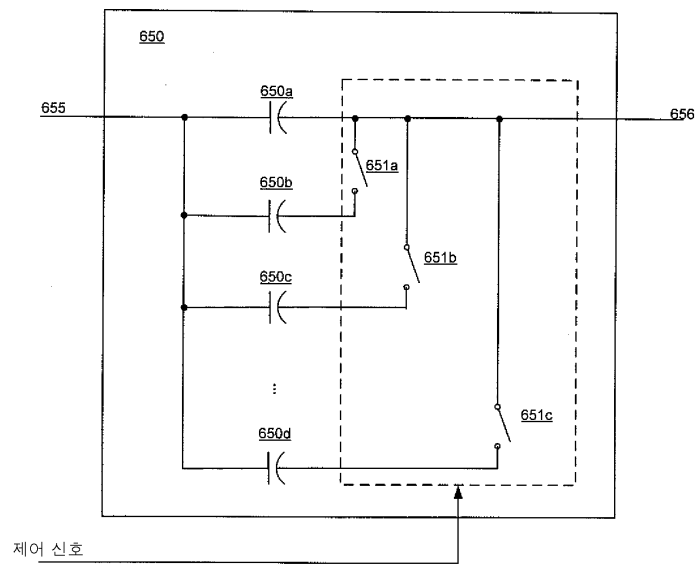
6a



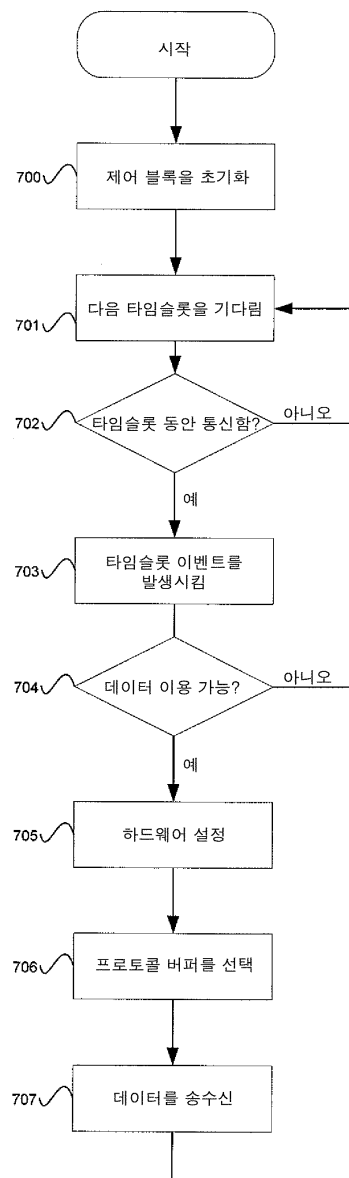
6b



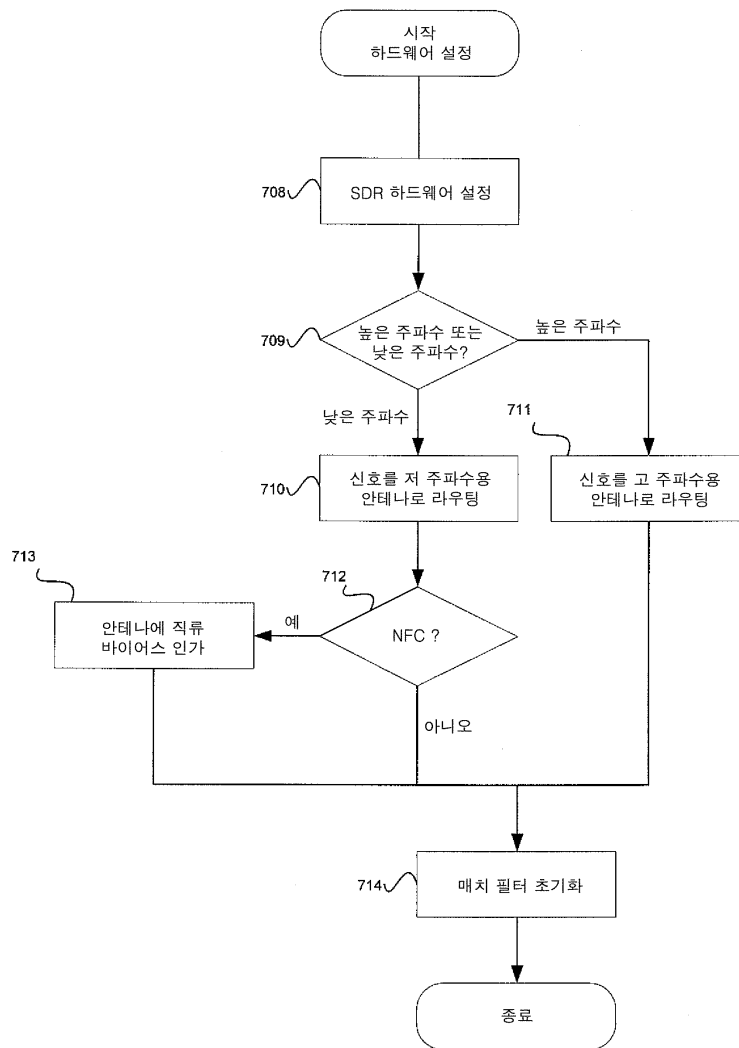
6c



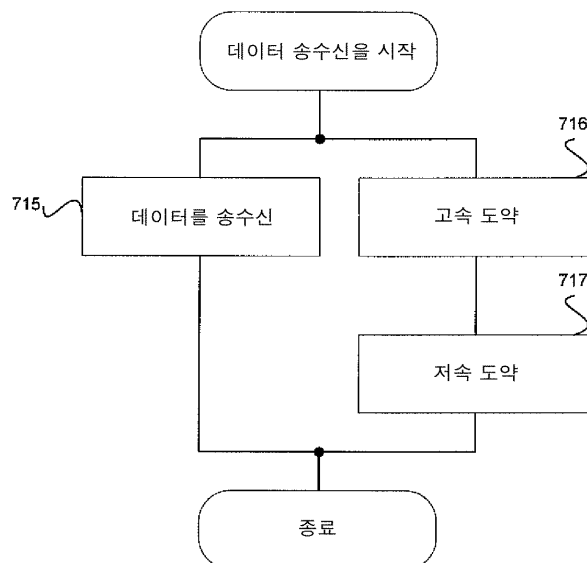
7a



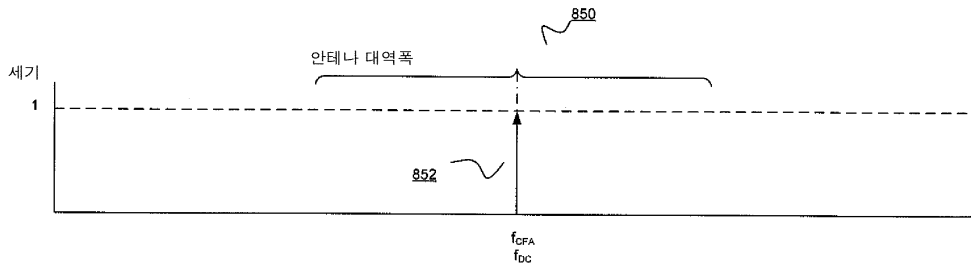
7b



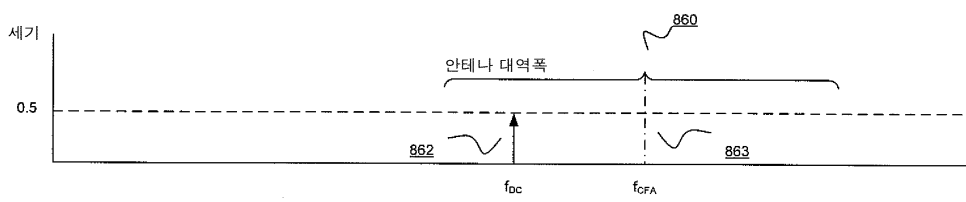
7c



8a



8b



8c

