

Service Manual

LG-C660

Table Of Contents

1. INTRODUCTION.....	3	4.6 Checking GSM Block.....	92
1.1 Purpose	3	4.7 GPS/WIFI/BT RF Components.....	98
1.2 Regulatory Information	3	4.8 GPS/WIFI/BT SIGNAL PATH	100
1.3 Abbreviations.....	5	4.9 GPS/WIFI/BT Trouble shooting	102
2. PERFORMANCE.....	7	4.10 Power ON Trouble shooting	108
2.1 Product Name.....	7	4.11 Charging Trouble shooting.....	112
2.2 Supporting Standard.....	7	4.12 3M FF Camera trouble shooting.....	116
2.3 Main Parts : Solution	7	4.13 Main LCD trouble shooting	119
2.4 HW Features	8	4.14 Audio Trouble shooting	121
2.5 SW Features	10	4.15 SIM Detect Trouble shooting	134
2.6 HW SPEC.	13	4.16 Side key trouble shooting.....	135
3. TECHNICAL BRIEF	21	4.17 Vibrators Trouble shooting	136
3.1 GENERAL DESCRIPTION	21	4.18 Motion Sensor on/off trouble shooting.....	138
3.2 GSM MODE	23	4.19 Compass Sensor on/off trouble shooting	140
3.3 UMTS MODE	25	4.20 Shield Can Disassembly Guide.....	142
3.4 GPS RECEIVER.....	28	5. DOWNLOAD	144
3.5 LO GENERATION and DISTRIBUTION CIRCUIT.....	28	6. BLOCK DIAGRAM.....	157
3.6 OFF-CHIP RF COMPONENTS	29	7. CIRCUIT DIAGRAM	163
3.7 Digital Baseband(DBB/MSM7227T).....	34	8. BGA Pin Map	172
3.8 Hardware Architecture.....	35	9. PCB LAYOUT.....	177
3.9 Subsystem (MSM7227T).....	37	10. CALIBRATION.....	179
3.10 Power Block.....	40	10.1 General Description.....	179
3.11 External memory interface	45	10.2 Requirement	179
3.12 H/W Sub System.....	46	10.3 Calibration Setup	180
3.13 Audio and sound	55	10.4 Tachyon Installation	180
3.14 Display.....	61	10.5 Tachyon Start	181
3.15 Vibrators (Q-Coin Motor)	63	10.6 Overview of RF Calibration	185
3.16 Compass Sensor.....	65	11. Hidden Menu	189
3.17 Motion Sensor	66	12. EXPLODED VIEW & REPLACEMENT PART LIST	195
3.18 Main Features	67	12.1 EXPLODED VIEW	195
3.19 Main component	64	12.2 Replacement Parts	196
4. TROUBLE SHOOTING	74	12.3 Accessory	222
4.1 RF Component	74		
4.2 SIGNAL PATH	75		
4.3 Checking TCXO Block.....	78		
4.4 Checking GSM TX Module(GSM PAM + ASM) Block	80		
4.5 Checking WCDMA Block	82		

1. INTRODUCTION

1.1 Purpose

This manual provides the information necessary to repair, calibration, description and download the features of this model.

1.2 Regulatory Information

A. Security

Toll fraud, the unauthorized use of telecommunications system by an unauthorized part (for example, persons other than your company's employees, agents, subcontractors, or person working on your company's behalf) can result in substantial additional charges for your telecommunications services. System users are responsible for the security of own system. There are may be risks of toll fraud associated with your telecommunications system. System users are responsible for programming and configuring the equipment to prevent unauthorized use. The manufacturer does not warrant that this product is immune from the above case but will prevent unauthorized use of common carrier telecommunication service of facilities accessed through or connected to it. The manufacturer will not be responsible for any charges that result from such unauthorized use.

B. Incidence of Harm

If a telephone company determines that the equipment provided to customer is faulty and possibly causing harm or interruption in service to the telephone network, it should disconnect telephone service until repair can be done. A telephone company may temporarily disconnect service as long as repair is not done.

C. Changes in Service

A local telephone company may make changes in its communications facilities or procedure. If these changes could reasonably be expected to affect the use of the phones or compatibility with the net work, the telephone company is required to give advanced written notice to the user, allowing the user to take appropriate steps to maintain telephone service.

D. Maintenance Limitations

Maintenance limitations on the phones must be performed only by the manufacturer or its authorized agent. The user may not make any changes and/or repairs expect as specifically noted in this manual. Therefore, note that unauthorized alternations or repair may affect the regulatory status of the system and may void any remaining warranty.

E. Notice of Radiated Emissions

This model complies with rules regarding radiation and radio frequency emission as defined by local regulatory agencies. In accordance with these agencies, you may be required to provide information such as the following to the end user.

F. Pictures

The pictures in this manual are for illustrative purposes only; your actual hardware may look slightly different.

G. Interference and Attenuation

A phone may interfere with sensitive laboratory equipment, medical equipment, etc. Interference from unsuppressed engines or electric motors may cause problems.

H. Electrostatic Sensitive Devices

ATTENTION

Boards, which contain Electrostatic Sensitive Device (ESD), are indicated by the  sign.

Following information is ESD handling:

- Service personnel should ground themselves by using a wrist strap when exchange system boards.
- When repairs are made to a system board, they should spread the floor with anti-static mat which is also grounded.
- Use a suitable, grounded soldering iron.
- Keep sensitive parts in these protective packages until these are used.
- When returning system boards or parts like EEPROM to the factory, use the protective package as described.

1.3 Abbreviations

For the purposes of this manual, following abbreviations apply:

APC	Automatic Power Control
BB	Baseband
BER	Bit Error Ratio
CC-CV	Constant Current – Constant Voltage
DAC	Digital to Analog Converter
DCS	Digital Communication System
dBm	dB relative to 1 milli watt
DSP	Digital Signal Processing
EEPROM	Electrical Erasable Programmable Read-Only Memory
ESD	Electrostatic Discharge
FPCB	Flexible Printed Circuit Board
GMSK	Gaussian Minimum Shift Keying
GPIO	General Purpose Interface Bus
GSM	Global System for Mobile Communications
IPUI	International Portable User Identity
IF	Intermediate Frequency
LCD	Liquid Crystal Display
LDO	Low Drop Output
LED	Light Emitting Diode
OPLL	Offset Phase Locked Loop

1. INTRODUCTION

PAM	Power Amplifier Module
PCB	Printed Circuit Board
PGA	Programmable Gain Amplifier
PLL	Phase Locked Loop
PSTN	Public Switched Telephone Network
RF	Radio Frequency
RLR	Receiving Loudness Rating
RMS	Root Mean Square
RTC	Real Time Clock
SAW	Surface Acoustic Wave
SIM	Subscriber Identity Module
SLR	Sending Loudness Rating
SRAM	Static Random Access Memory
PSRAM	Pseudo SRAM
STMR	Side Tone Masking Rating
TA	Travel Adapter
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
UART	Universal Asynchronous Receiver/Transmitter
VCO	Voltage Controlled Oscillator
VCTCXO	Voltage Control Temperature Compensated Crystal Oscillator
WAP	Wireless Application Protocol

2. PERFORMANCE

2.1 Product Name

LG-C660 : WCDMA900/2100+EGSM/GSM850/DCS/PCS
(HSDPA 3.6Mbps GPRS Class 12 / EDGE Class 12)

2.2 Supporting Standard

Item	Feature	Comment
Supporting Standard	WCDMA(FDD1,8)/EGSM/GSM850/DCS1800/PCS1900 with seamless handover Phase 2+(include AMR) SIM Toolkit : Class 1, 2, 3, C-E	
Frequency Range	WCDMA(FDD1) TX : 1920 – 1980 MHz WCDMA(FDD1) RX : 2110 – 2170 MHz WCDMA(FDD8) TX : 880 – 915 MHz WCDMA(FDD8) RX : 925 – 960 MHz EGSM TX : 880 – 915 MHz EGSM RX : 925 – 960 MHz GSM850 TX : 824 – 849 MHz GSM850 RX : 869 – 894 MHz DCS1800 TX : 1710 – 1785 MHz DCS1800 RX : 1805 – 1880 MHz PCS1900 TX : 1850 – 1910 MHz PCS1900 RX : 1930 – 1990 MHz	
Application Standard	WAP 2.0	

2.3 Main Parts : Solution

Item	Part Name	Comment
Digital Baseband	MSM7227T : Qualcomm	
Analog Baseband	PM7540 : Qualcomm	
RF Chip	RTR6285 : Qualcomm	

2.4 HW Features

Item		Feature	Comment
Form Factor		Bar Qwerty Type	
Battery		1) Capacity : Standard , Li-Ion , 1,500mAh	
		2) Packing Type : Soft Pack	
Size		Standard : 119.5 x59.7 x 12.9mm	
Weight		128g	With Battery
Volume		TBD	
PCB		L1B1 type, 8 Layers , 0.8t	
Stand by time		2G Up to 500 hrs (TBD)	@ Paging Period 9 (2G)
		3G Up to 400 hrs (TBD)	@ DRX 7 (3G)
Charging time		3 hrs (TBD)	@ Power Off / 1,500mAh
Talk time		2G Up to 250mins (TBD)	@ Tx=Max(2G)
		3G Up to 350 mins (TBD)	@ Tx = 12dBm (3G)
RX sensitivity		WCDMA(FDD1) : -106.7 dBm WCDMA(FDD2) : -103.7 dBm WCDMA(FDD5) : -103.7 dBm EGSM : -105 dBm GSM850 : -105 dBm DCS 1800 : -105 dBm PCS 1900 : -105 dBm	
TX output power	WCDMA/ GSM/ GPRS	WCDMA : 24dBm/3.84MHz,+1/-3dBm EGSM : 33dBm GSM850 : 33 dBm DCS 1800 : 30 dBm PCS 1900 : 30 dBm	Class3(WCDMA) Class4 (EGSM) Class4 (GSM850) Class1 (PCS) Class1 (DCS)
	EDGE	GSM 900 : 27 dBm DCS 1800 : 26 dBm PCS 1900 : 26 dBm	E2 (GSM900) E2 (PCS) E2 (DCS)
GPRS compatibility		GPRS Class 10	
EDGE compatibility		EDGE Class 10	
SIM card type		Plug-In SIM 3V /1.8V	
Display		Main LCD(QVGA) TFT Main LCD(2.8', 320 x 240)	
Built-in Camera		3M CMOS Camera	

2. PERFORMANCE

Status Indicator	No	
Keypad	Qwerty Key : 37 Function Key : 4 Side Key : 2 Power Key : 1	Function Key: Home,Back, menu, Serach Side Key : Volume up,down
ANT	Main : Internal Fixed Type	
System connector	5 Pin	
Ear Phone Jack	3.5Phi, 4 Pole, Stereo	
PC synchronization	Yes	
Memory	NAND Flash : 4Gbit SDRAM : 2Gbit	
Speech coding	FR, EFR, HR,AMR	
Data & Fax	Built in Data & Fax support	
Vibrator	Built in Vibrator	
BlueTooth	3.0 w/o High Speed	
MIDI(for Buzzer Function)	SW Decoded 72Poly	
Music Player	MP3/ WMA/AAC/HE-AAC/EAAC+	
Video Player	MPEG-4 / H.263 / H.264	
Camcorder	MPEG-4 / H.263 / H.264	
Voice Recording	Yes	
Speaker Phone mode Support	Yes	
Travel Adapter	Yes	
CDROM	No	
Stereo Headset	Yes	
Data Cable	Yes	
T-Flash (External Memory)	Yes	2GB included (up to 32GB supported)

2.5 SW Features

Item	Feature	Comment
RSSI	0 ~ 4 Levels	
Battery Charging	0 ~ 6 Levels	
Key Volume	0 ~ 7 Level	
Audio Volume	1 ~ 15 Level	
Time / Date Display	Yes	
Multi-Language	Yes	English/French/German/Spanish/Italian/Danish/Dutch/Korean
Quick Access Mode	Dialing / Contact / Menu / Message / Camera	
PC Sync	No	
Speed Dial	No	Voice mail center -> 1 key
Profile	Yes	not same with feature phone setting
CLIP / CLIR	Yes	
Phone Book	Name / Number / Email / Chat Id / Website / Postal addresses / Organizations / Groups / BirthdayNotes / Ringtone	There is no limitation on the number of items. It depends on available memory amount.
Last Dial Number	Yes	There is no limitation on the number of items. It depends on available memory amount.
Last Received Number	Yes	There is no limitation on the number of items. It depends on available memory amount.
Last Missed Number	Yes	There is no limitation on the number of items. It depends on available memory amount.
Search by Number / Name	Name	
Group	Yes	There is no limitation on the number of items. It depends on available memory

2. PERFORMANCE

		amount.
Fixed Dial Number	Yes	
Service Dial Number	No	
Own Number	Yes	Read only (add/edit/delete are not supported)
Voice Memo	Yes	Support voice recorder
Call Reminder	No	
Network Selection	Automatic	
Mute	Yes	
Call Divert	Yes	
Call Barring	Yes	
Call Charge (AoC)	Yes	
Call Duration	Yes	
SMS (EMS)	There is no limitation on the number of items. It depends on available memory amount.	EMS does not support.
SMS Over GPRS	No	
EMS Melody / Picture	No	
Send / Receive / Save	No	
MMS MPEG4	Yes	
Send / Receive / Save	Yes	
Long Message	MAX 459 characters	SMS 3pages
Cell Broadcast	Yes	
Download	Over the Web	
Game	Yes	
Calendar	Yes	
Memo	Yes	There is no limitation on the number of items. It depends on available memory amount.
World Clock	No	
Unit Convert	No	

2. PERFORMANCE

Stop Watch	No	
Wall Paper	Yes	
WAP Browser	No	Support only web browser based on webkit. WAP stack and wml are not supported.
Download Melody / Wallpaper	Yes	Over web browser
SIM Lock	Yes	Operator Dependent
SIM Toolkit	Class 1, 2, 3, C	
MMS	Yes	Google MMS Client
EONS	Yes	
CPHS	Yes	V4.2
ENS	No	
Camera	Yes	3M FF
JAVA	Yes	CLDC V1.1 / MIDP V2.1 Download Over Web
Voice Dial	No	
IrDa	No	
Bluetooth	Yes	3.0 w/o High Speed
FM radio	Yes	
GPRS	Yes	Class 10
EDGE	Yes	Class 10
Hold / Retrieve	Yes	
Conference Call	Yes	Max. 6
DTMF	Yes	
Memo pad	No	
TTY	No	
AMR	Yes	
SyncML	Yes	
IM	Yes	
Email	Yes	

2.6 HW SPEC.

2.6.1 GSM transceiver specification

Item	Specification
Phase Error	Rms : 5° Peak : 20°
Frequency Error	GSM : 0.1 ppm DCS/PCS : 0.1 ppm
EMC(Radiated Spurious Emission Disturbance)	GSM/DCS : < -28dBm
Transmitter Output power and Burst Timing	GSM : 5dBm – 33dBm ± 3dB DCS/PCS : 0dBm – 30dBm ± 3dB
Burst Timing	<3.69us
Spectrum due to modulation out to less than 1800kHz offset	200kHz : -36dBm 600kHz : -51dBm/-56dBm
Spectrum due to modulation out to larger than 1800kHz offset to the edge of the transmit band	GSM : 1800-3000kHz : < -63dBc(-46dBm) 3000kHz-6000kHz : < -65dBc(-46dBm) 6000kHz < : < -71dBc(-46dBm) DCS : 1800-3000kHz : < -65dBc(-51dBm) 6000kHz < : < -73dBc(-51dBm)
Spectrum due to switching transient	400kHz : -19dBm/-22dBm(5/0), -23dBm 600kHz : -21dBm/-24dBm(5/0), -26dBm
Reference Sensitivity – TCH/FS	Class II(RBER) : -105dBm(2.439%)
Usable receiver input level range	0.012(-15 - -40dBm)
Intermodulation rejection – Speech channels	± 800kHz, ± 1600kHz : -98dBm/-96dBm (2.439%)
AM Suppression GSM : -31dBm DCS : -29dBm	-98dBm/-96dBm (2.439%)
Timing Advance	± 0.5T

2.6.2 WCDMA transmitter specification

Item	Specification
Transmit Frequency	Band1 : 1920 MHz ~ 1980 MHz Band8 : 880 ~ 915 MHz
Maximum Output Power	+24 dBm / 3.84 MHz, +1 / -3 dB
Frequency Error	within ± 0.1 PPM
Open Loop Power Control	Normal Conditions : within ± 9 dB, Extreme Conditions : within ± 12 dB
Minimum Transmit Power	< -50 dBm / 3.84 MHz
Occupied Bandwidth	< 5 MHz at 3.84 Mcps (99% of power)
Adjacent Channel Leakage Power Ratio (ACLR)	> 33 dB @ ± 5 MHz, > 43 dB @ ± 10 MHz
Spurious Emissions $ f-f_c > 12.5$ MHz	< -36 dBm / 1 kHz RW @ $9 \text{ kHz} \leq f < 150 \text{ kHz}$ < -36 dBm / 10 kHz RW @ $150 \text{ kHz} \leq f < 30 \text{ MHz}$ < -36 dBm / 100 kHz RW @ $30 \text{ MHz} \leq f < 1 \text{ GHz}$ < -30 dBm / 1 MHz RW @ $1 \text{ GHz} \leq f < 12.75 \text{ GHz}$ < -60 dBm / 3.84 MHz RW @ $869 \text{ MHz} \leq f \leq 894 \text{ MHz}$ < -60 dBm / 3.84 MHz RW @ $1930 \text{ MHz} \leq f \leq 1900 \text{ MHz}$ < -60 dBm / 3.84 MHz RW @ $2110 \text{ MHz} \leq f \leq 2155 \text{ MHz}$ < -67 dBm / 100 kHz RW @ $925 \text{ MHz} \leq f \leq 935 \text{ MHz}$ < -79 dBm / 100 kHz RW @ $935 \text{ MHz} < f \leq 960 \text{ GHz}$ < -71 dBm / 100 kHz RW @ $1805 \text{ MHz} \leq f \leq 1880 \text{ MHz}$ < -41 dBm / 300 kHz RW @ $1884.5 \text{ MHz} < f < 1919.6 \text{ MHz}$
Transmit Intermodulation	< -31 dBc @ 5 MHz & < -41 dBc @ 10 MHz when Interference CW Signal Level = -40 dBc
Error Vector Magnitude	< 17.5 %, when Pout $\geq$ -20 dBm
Peak Code Domain Error	< -15 dB at Pout $\geq$ -20 dBm

2.6.3 WCDMA receiver specification

Item	Specification
Receive Frequency	Band1 : 2110 ~ 2170 MHz Band8 : 925 ~ 960 MHz
Reference Sensitivity Level	Band1 : BER < 0.001 when Îor = -106.7 dBm / 3.84 MHz Band8 : BER < 0.001 when Îor = -103.7 dBm / 3.84 MHz
Maximum Input Level	BER < 0.001 when Îor = -25 dBm / 3.84 MHz
Adjacent Channel Selectivity (ACS)	ACS > 33 dB where BER < 0.001 when Îor = -92.7 dBm / 3.84 MHz & loac = -52 dBm / 3.84 MHz @ ±5 MHz
Blocking Characteristic	BER < 0.001 when Îor = -103.7 dBm / 3.84 MHz & lblocking = -56 dBm / 3.84 MHz @ Fuw(offset) = ±10 MHz or lblocking = -44 dBm / 3.84 MHz @ Fuw(offset) = ±15 MHz
Spurious Response	BER < 0.001 when Îor = -103.7 dBm / 3.84 MHz & lblocking = -44 dBm
Intermodulation	BER < 0.001 when Îor= -103.7 dBm / 3.84 MHz & louw1 = -46 dBm @ Fuw1(offset) = ±10 MHz & louw2 = -46 dBm / 3.84 MHz @ Fuw2(offset) = ±20 MHz
Spurious Emissions	< -57 dBm / 100 kHz BW @ 9 kHz ≤ f < 1 GHz < -47 dBm / 1 MHz BW @ 1 GHz ≤ f ≤ 12.75 GHz
Inner Loop Power Control In Uplink	Adjust output(TPC command)
	cmd 1dB 2dB 3dB
	+1 +0.5/1.5 +1/3 +1.5/4
	0 -0.5/+0.5 -0.5/+0.5 -0.5/+0.5
	-1 -0.5/-1.5 -1/-3 -1.5/-4
	group(10equal command group)
	+1 +8/+12 +16/+24

2.6.4 HSDPA transmitter specification

Item	Specification				
Transmit Frequency	Band1 : 1920 MHz ~ 1980 MHz Band8 : 880 ~ 915 MHz				
Maximum Output Power	Sub-Test 1=1/15, 2=12/15 21~25dBm / 3.84 MHz 3=13/15 4=15/8 20~25dBm / 3.84 MHz 5=15/7 6=15/0 19~25dBm / 3.84 MHz				
HS-DPCCH	Sub-test in table C.10.1.4	Power step	Power step slot boundary	Power step size, P [dB]	Transmitter power step tolerance [dB]
	5	1	Start of Ack/Nack	6	+/- 2.3
		2	Start of CQI	1	+/- 0.6
		3	Middle of CQI	0	+/- 0.6
		4	End of CQI	5	+/- 2.3
Spectrum Emission Mask	Sub-Test : 1=1/15, 2=12/15, 3=13/15, 4=15/8, 5=15/7, 6=15/0				
	Frequency offset from carrier Δf		Minimum requirement		Measurement Bandwidth
	2.5 ~ 3.5 MHz		$-35-15 \times (\Delta f - 2.5) \text{dBc}$		30 kHz
	3.5 ~ 7.5 MHz		$-35-1 \times (\Delta f - 3.5) \text{dBc}$		1 MHz
	7.5 ~ 8.5 MHz		$-35-10 \times (\Delta f - 7.5) \text{dBc}$		1 MHz
	8.5 ~ 12.5 MHz		-49dBc		1 MHz

2. PERFORMANCE

Adjacent Channel Leakage Power Ratio (ACLR)	Sub-Test : 1=1/15, 2=12/15, 3=13/15, 4=15/8, 5=15/7, 6=15/0 > 33 dB @ ± 5 MHz > 43 dB @ ± 10 MHz
Error Vector Magnitude	< 17.5 %, when Pout $\geq$ -20 dBm

2.6.5 HSDPA receiver specification

Item	Specification
Receive Frequency	Band1 : 2110 ~ 2170 MHz Band8 : 925 – 960 MHz
Maximum Input Level (BLER or R), 16QAM Only	Sub-Test : 1=1/15, 2=12/15, 3=13/15, 4=15/8, 5=15/7, 6=15/0 BLER < 10% or R >= 700kbps

2.6.6 WLAN 802.11b transceiver specification

Item	Specification
Transmit Frequency	2400 MHz ~ 2483.5 MHz (CH1~CH13)
Tx Power Level	≤ 20dBm under (Europe), ≤ 30dBm under (USA)
Frequency Tolerance	within ±25 PPM
Chip clock Frequency Tolerance	within ±25 PPM
Spectrum Mask	≤ -30 @ $f_c - 22\text{MHz} < f < f_c - 11\text{MHz}$ and $f_c + 11\text{MHz} < f < f_c + 22\text{MHz}$ ≤ -50 @ $f < f_c - 22\text{MHz}$ and $f > f_c + 22\text{MHz}$
Power ramp on/off time	≤ 2us
Carrier Suppression	≤ -15dB
Modulation Accuracy (Peak EVM)	≤ 35%
Spurious Emissions	< -36 dBm @ 30MHz ~ 1GHz < -30 dBm above @ 1GHz ~ 12.75GHz < -47 dBm @ 1.8GHz ~ 1.9GHz < -47 dBm @ 5.15GHz ~ 5.3GHz
Rx Min input Sensitivity	≤ -76dBm(1Mbps,2Mbps,5.5Mbps,11Mbps) @ FER ≤ 8%
Rx Max input Sensitivity	≥ -10dBm(1Mbps,2Mbps,5.5Mbps,11Mbps) @ FER ≤ 8%
Rx Adjacent Channel Rejection	≥ 35dB @FER ≤ 8%, interference input signal -70dBm@ $f_c \pm 25\text{MHz}$ (11Mbps)

2.6.7 WLAN 802.11g transceiver specification

Item	Specification
Transmit Frequency	2400 MHz ~ 2483.5 MHz (CH1~CH13)
Tx Power Level	≤ 20dBm under (Europe), ≤ 30dBm under (USA)
Frequency Tolerance	within ±25 PPM
Chip clock Frequency Tolerance	within ±25 PPM
Spectrum Mask	≤ -20 @ ±11MHz offset (9Mhz ~ 11MHz) ≤ -28 @ ±20MHz offset (11MHz ~ 20Mhz) ≤ -40 @ ±30MHz offset (20MHz ~ 30Mhz)
Transmitter constellation error (rms EVM)	≤ -5dB
Spurious Emissions	< -36 dBm @ 30MHz ~ 1GHz < -30 dBm above @ 1GHz ~ 12.75GHz < -47 dBm @ 1.8GHz ~ 1.9GHz < -47 dBm @ 5.15GHz ~ 5.3GHz
Rx Min input Sensitivity	PER ≤ 10% -82dBm@6Mbps, -81dBm@9Mbps, -79dBm@12Mbps -77dBm@18Mbps, -74dBm@24Mbps, -70dBm@36Mbps -66dBm@48Mbps, -65dBm@54Mbps
Rx Max input Sensitivity	≥ -20dBm(6,9,12,18,24,36,48,54Mbps) @ PER ≤ 10%
Rx Adjacent Channel Rejection	PER ≤ 10%, ACR ≥ 16dB@6Mbps, ACR ≥ 15dB@9Mbps, ACR ≥ 13dB@12Mbps, ACR ≥ 11dB@18Mbps, ACR ≥ 8dB@24Mbps, ACR ≥ 4dB@36Mbps ACR ≥ 0dB@48Mbps, ACR ≥ -1dB@54Mbps ※ ACR shall be measured by setting the desired signal's strength 3 dB above the rate-dependent sensitivity specified in min input sensitivity

2.6.8 WLAN 802.11n transceiver specification

Item	Specification
Transmit Frequency	2400 MHz ~ 2483.5 MHz (CH1~CH13)
Tx Power Level	≤ 20dBm under (Europe), ≤ 30dBm under (USA)
Frequency Tolerance	within ±25 PPM
Chip clock Frequency Tolerance	within ±25 PPM
Spectrum Mask	≤ -20 @ ±11MHz offset (9Mhz ~ 11MHz) ≤ -28 @ ±20MHz offset (11MHz ~ 20Mhz) ≤ -40 @ ±30MHz offset (20MHz ~ 30Mhz)
Transmitter constellation error (rms EVM)	≤ -5dB
Spurious Emissions	< -36 dBm @ 30MHz ~ 1GHz < -30 dBm above @ 1GHz ~ 12.75GHz < -47 dBm @ 1.8GHz ~ 1.9GHz < -47 dBm @ 5.15GHz ~ 5.3GHz
Rx Min input Sensitivity	PER ≤ 10% -82dBm@6Mbps, -81dBm@9Mbps, -79dBm@12Mbps -77dBm@18Mbps, -74dBm@24Mbps, -70dBm@36Mbps -66dBm@48Mbps, -65dBm@54Mbps
Rx Max input Sensitivity	≥ -20dBm(6,9,12,18,24,36,48,54Mbps) @ PER ≤ 10%
Rx Adjacent Channel Rejection	PER ≤ 10%, ACR ≥ 16dB@6Mbps, ACR ≥ 15dB@9Mbps, ACR ≥ 13dB@12Mbps, ACR ≥ 11dB@18Mbps, ACR ≥ 8dB@24Mbps, ACR ≥ 4dB@36Mbps ACR ≥ 0dB@48Mbps, ACR ≥ -1dB@54Mbps ※ ACR shall be measured by setting the desired signal's strength 3 dB above the rate-dependent sensitivity specified in min input sensitivity

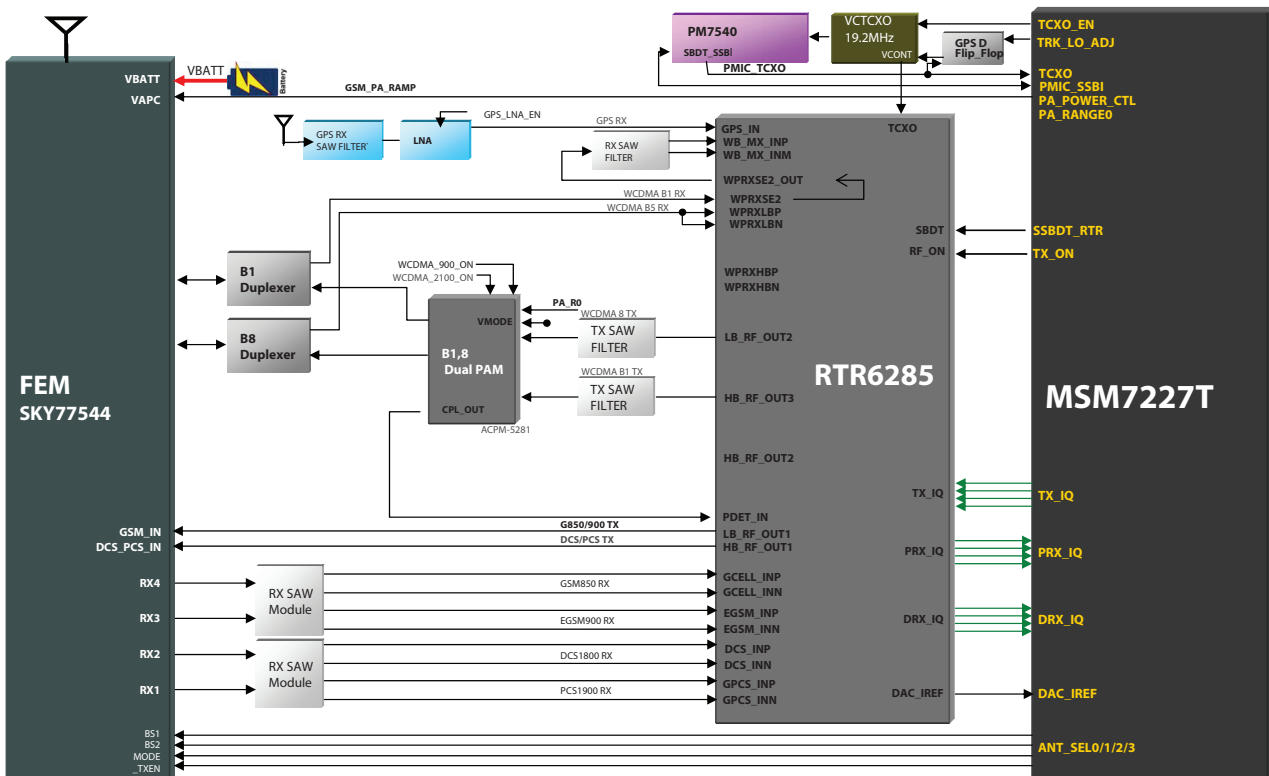
2.6.9 GPS receiver specification

Item	Specification
Receive Frequency	1574.42 MHz ~ 1576.42 MHz
Minimum Sensitivity	1 satellite ≥ -142dBm, 7 satellites ≥ -147dBm at coarse time aiding

3. TECHNICAL BRIEF

3.1 GENERAL DESCRIPTION

The LG-C660 supports UMTS-900, UMTS-2100, GSM-850, GSM-900, GSM-1800, and GSM-1900 based GSM/GPRS/EDGE/UMTS. All receivers and the UMTS transmitter use the radioOne1Zero-IF architecture to eliminate intermediate frequencies, directly converting signals between RF and baseband. The quad-band GSM transmitters use a baseband-to-IF upconversion followed by an offset phase-locked loop that translates the GMSK-modulated or 8-PSK-modulated signal to RF.



[Figure 3.1] Block diagram of RF part

A generic, high-level functional block diagram of LG-C660 is shown in Figure 3-1. One antenna collects base station forward link signals and radiates handset reverse link signals. The antenna connects with receive and transmit paths through a ASM(Antenna-Switch-Module).

The UMTS receive paths each include an LNA, an RF band-pass filter, and a downconverter that translate the signal directly from RF-to-baseband using radioOne ZIF techniques. The RFIC's Rx analog baseband outputs, for the receive chains, connect to the MSM IC. The UMTS and GSM Rx baseband outputs share the same inputs to the MSM IC.

For the transmit chains, the RTR6285 IC directly translates the Tx baseband signals (from the MSM device) to an RF signal using an internal LO generated by integrated onchip PLL and VCO. The RTR6285 IC outputs deliver fairly high-level RF signals that are first filtered by Tx SAWs and then amplified by their respective UMTS PAs. In the GSM receive path, the received RF signals are applied through their band-pass filters and down-converted directly to baseband in the RTR6285 transceiver IC. These baseband outputs are shared with the UMTS receiver and routed to the MSM IC for further signal processing.

The GSM/EDGE transmit path employs one stage of up-conversion and, in order to improve efficiency, is divided into phase and amplitude components to produce an open-loop Polar topology:

1. The on-chip quadrature up-converter translates the GMSK-modulated signal or 8-PSK modulated signal, to a constant envelope phase signal at RF;
2. The amplitude-modulated (AM) component is applied to the ramping control pin of Polar power amplifier from a DAC within the MSM. LG-C660 power supply voltages are managed and regulated by the PM7540 Power Management IC. This versatile device integrates all wireless handset power management, general housekeeping, and user interface support functions into a single mixed signal IC.

It monitors and controls the external power source and coordinates battery recharging while maintaining the handset supply voltages using low dropout, programmable regulators.

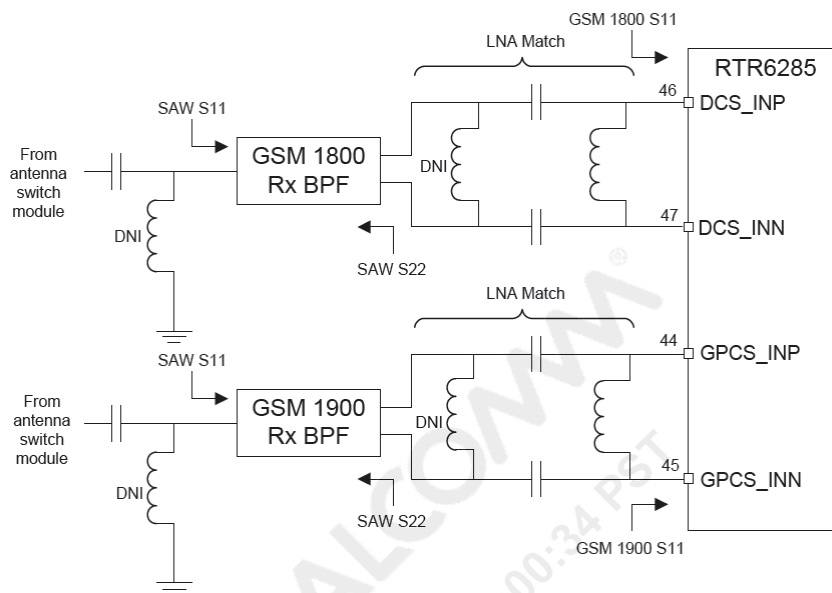
The device's general housekeeping functions include an ADC and analog multiplexer circuit for monitoring on-chip voltage sources, charging status, and current flow, as well as user-defined off-chip variables such as temperature, RF output power, and battery ID.

Various oscillator, clock, and counter circuits support IC and higher-level handset functions. Key parameters such as under-voltage lockout and crystal oscillator signal presence are monitored to protect against detrimental conditions.

3.2 GSM MODE

3.2.1 GSM RECEIVER

The GSM-850, GSM-900, GSM-1800, and GSM-1900 receiver inputs of RTR6285 are connected directly to the transceiver front-end Module. GSM-850, GSM-900, GSM-1800, and GSM-1900 receiver inputs use differential configurations to improve common-mode rejection and second-order non-linearity performance. For example Figure 3-2 shows receiver input topologies for DCS and PCS (GSM-850/900 have the same receiver input topologies). The balance between the complementary signals is critical and must be maintained from the RF filter outputs all the way into the IC pins



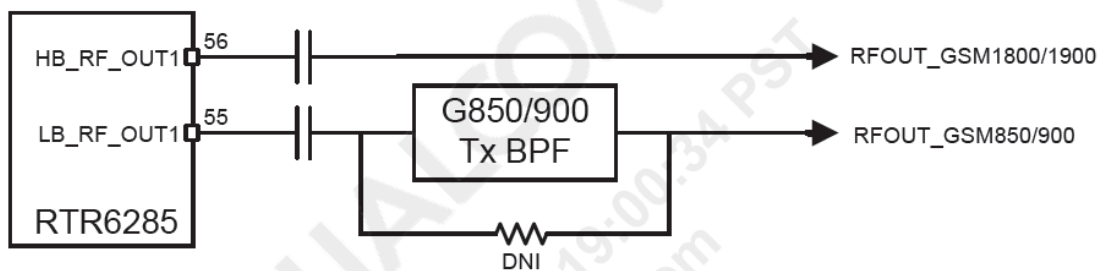
[Figure 3.2] DCS and PCS Receiver Inputs Topologies

Since GSM-850, GSM-900, GSM-1800, and GSM-1900 signals are time-division duplex (the handset can only receive or transmit at one time), switches are used to separate Rx and Tx signals in place of frequency duplexers – this is accomplished in the switch module. The GSM-850, GSM-900, GSM-1800, and GSM-1900 receive signals are routed to the RTR6285 through band selection filters and matching networks that transform single-ended 50-Ω sources to differential impedances optimized for gain and noise figure. The RTR input uses a differential configuration to improve second-order intermodulation and common mode rejection performance. The RTR6285 input stages include MSM-controlled gain adjustments that maximize receiver dynamic range.

The amplifier outputs drive the RF ports of the quadrature RF-to-baseband downconverters. The downconverted baseband outputs are multiplexed and routed to lowpass filters (one I and one Q) having passband and stopband characteristics suitable for GMSK or 8-PSK processing. These filter circuits include DC offset corrections. The filter outputs are buffered and passed on to the MSM7227T IC for further processing as shown in Figure 3-2.

3.2.2 GSM TRANSMITTER

The RTR6285 transmitter outputs(HB_RF_OUT1 and LB_RF_OUT1) include on-chip output matching inductors. 50ohm output impedance is achieved by adding a series capacitor at the output pins. The capacitor value may be optimized for specific applications and PCB characteristics based on pass-band symmetry about the band center frequency as shown in Figure 3-3.



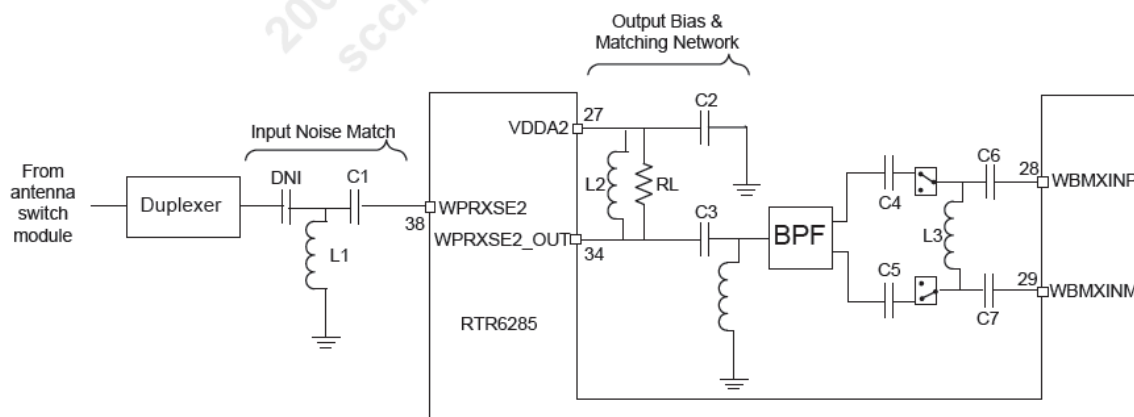
[Figure 3.3] GSM Transmitter Outputs Topologies

The RTR6285 IC is able to support GSM 850/900 and GSM 1800/1900 mode transmitting. This design guideline shows a tri-band GSM application. Both high-band and low band outputs are followed by resistive pads to ensure that the load presented to the outputs remains close to 50ohm.

3.3 UMTS MODE

3.3.1 UMTS RECEIVER

The UMTS duplexer receiver output is routed to LNA circuits within the RTR6285 device as shown in Figure 3-4. The UMTS Rx input is provided with an on-chip LNA that amplifies the signal before a second stage filter that provides differential downconverter as shown in Figure 3-5. This second stage input is configured differentially to optimize secondorder intermodulation and common mode rejection performance. The gain of the UMTS frontend amplifier and the UMTS second stage differential amplifier are adjustable, under MSM control, to extend the dynamic range of the receivers. The second stage UMTS Rx amplifiers drive the RF ports of the quadrature RF-to-baseband downconverters. The downconverted UMTS Rx baseband outputs are routed to lowpass filters having passband and stopband characteristics suitable for UMTS Rx processing. These filter circuits allow DC offset corrections, and their differential outputs are buffered to interface shared with GSM Rx to the MSM IC. The UMTS baseband outputs are turned off when the RTR6285 is downconverting GSM signals and on when the UMTS is operating.



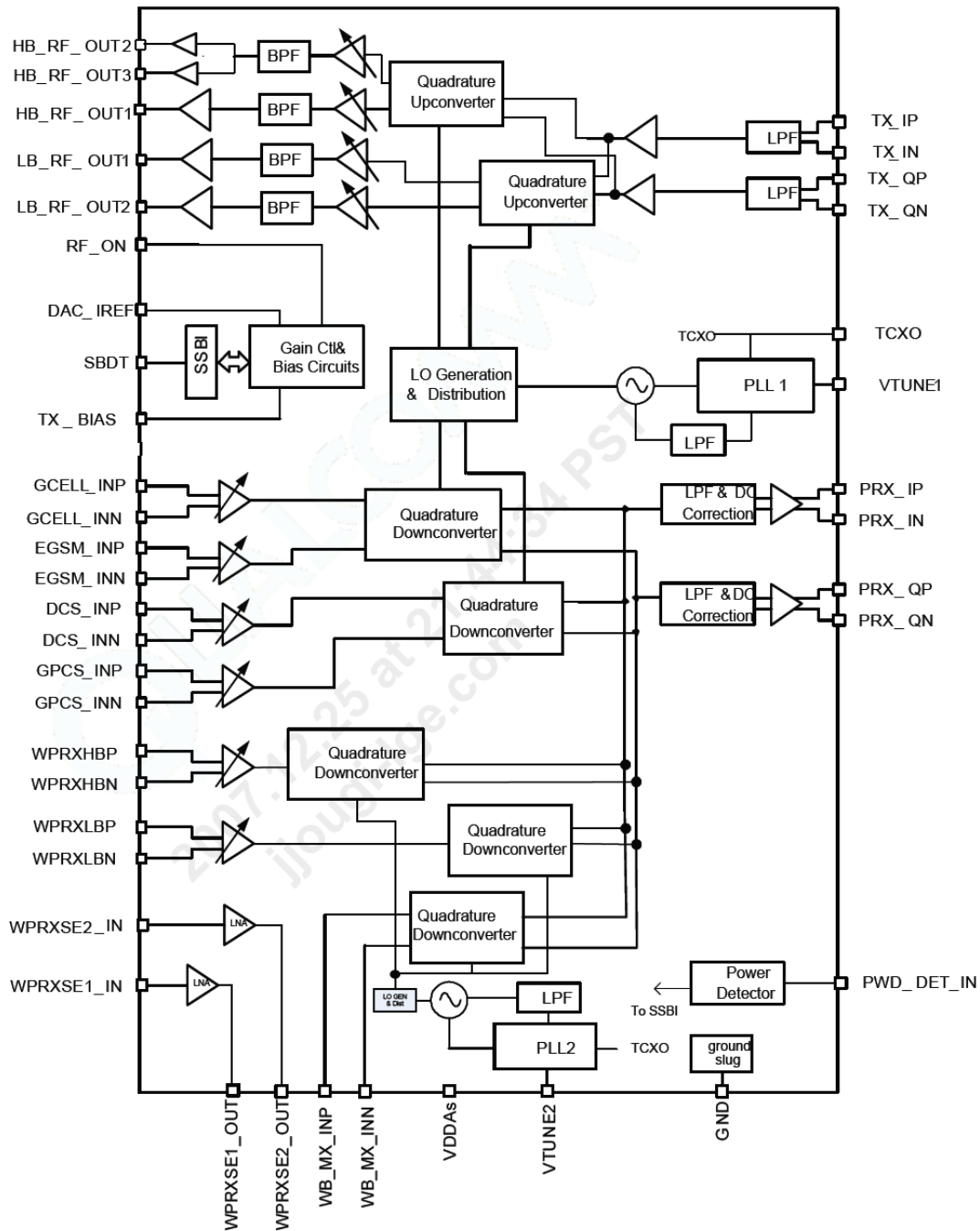
[Figure 3.4] UMTS Receiver Inputs Topologies

3.3.2 UMTS TRANSMITTER

The UMTS Tx path begins with differential baseband signals (I and Q) from the MSM device. These analog input signals are amplified, filtered, and applied to the quadrature up-converter mixers. The up-converter output is amplified by multiple variable gain stages that provide transmit AGC control. The AGC output is filtered and applied to the driver amplifier; this output stage includes an integrated matching inductor that simplifies the external matching network to a single series capacitor to achieve the desired 50- Ω interface.

The RTR6285 UMTS output is routed to its power amplifier through a bandpass filter, and delivers fairly high-level signals that are filtered and applied to the PA. Transmit power is delivered from the duplexer to the antenna through the switch module. The transceiver LO synthesizer is contained within the RTR6285 IC with the exception of the off-chip loop filter components and the VC-TCXO. This provides a simplified design for multimode applications. The PLL circuits include a reference divider, phase detector, charge pump, feedback divider, and digital logic generator.

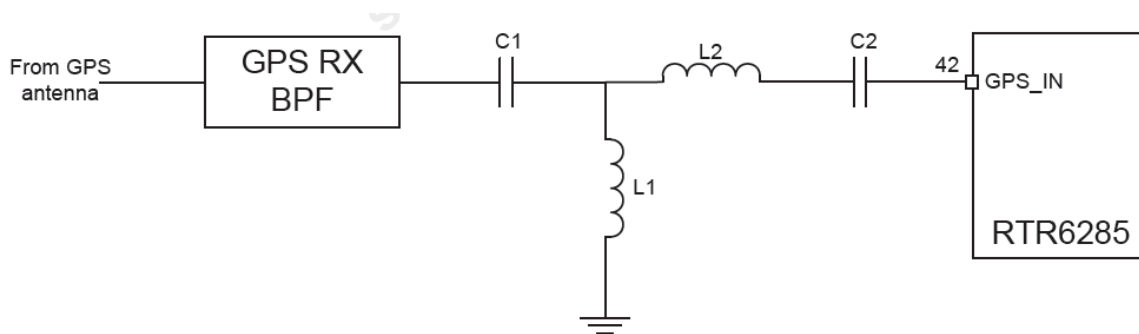
UMTS Tx. Using only PLL1, the LO generation and distribution circuits create the necessary LO signals for nine different frequency converters. The UMTS transmitter also employs the ZIF architecture to translate the signal directly from baseband to RF. This requires FLO to equal FRF, and the RTR6285 IC design achieves this without allowing FVCO to equal FRF. The RTR6285 IC is able to support UMTS 2100/1900/1800/1700 and 850 mode transmitting. This design guideline shows only UMTS 2100 applications..



[Figure 3.5] RTR6285 IC Functional Block Diagram

3.4 GPS RECEIVER

The GPS receiver input employs a single-ended connection realized by this pin. The GPS input is routed from the GPS antenna switch, through a band pass filter and then an impedance transformer circuit that optimally matches the impedance looking into the GPS LNA. The impedance transformer circuit topology is shown in Figure 3-6.



[Figure 3.6] GPS Input Network Topology

3.5 LO GENERATION and DISTRIBUTION CIRCUIT

The integrated LO generation and distribution circuits are driven by internal VCOs to support various modes to yield highly flexible quadrature LO outputs that drive all GSM/EDGE, UMTS band and GPS up-converters and down-converters; with the help of these LO generation and distribution circuits, true zero-IF architecture is employed in all GSM and UMTS band receivers and transmitters to translate the signal directly from RF-to-baseband and from baseband-to-RF. Two fully functional fraction-N synthesizers, including VCOs and loop filters, are integrated within the RTR6285 IC. In addition, the RTR6285 has a third synthesizer used for GPS operation. The first synthesizer (PLL1) in the RTR6285 creates the transceiver Los that support the UMTS transmitter, and all four GSM band receivers and transmitters including: GSM850, GSM900, GSM1800, and GSM1900. The second synthesizer (PLL2) in the RTR6285 IC provides the LO for the UMTS primary receiver. For the RTR6285 IC only, the second synthesizer also provides the LO for the secondary UMTS receiver. The third synthesizer (PLL3), only in the RTR6285 IC, provides the LO for the GPS receiver. An external TCXO input signal is required to provide the synthesizer frequency reference to which the PLL is phase and frequency locked. The RTR6285 ICs integrate most of the PLL loop filter components on-chip except for three off-chip loop filter-series capacitors, which significantly reduces off-chip component requirement. With the integrated fractional-N PLL synthesizers, the RTR6285 ICs have the advantage of more flexible loop bandwidth control, fast lock time, and low-integrated phase error.

3.6 OFF-CHIP RF COMPONENTS

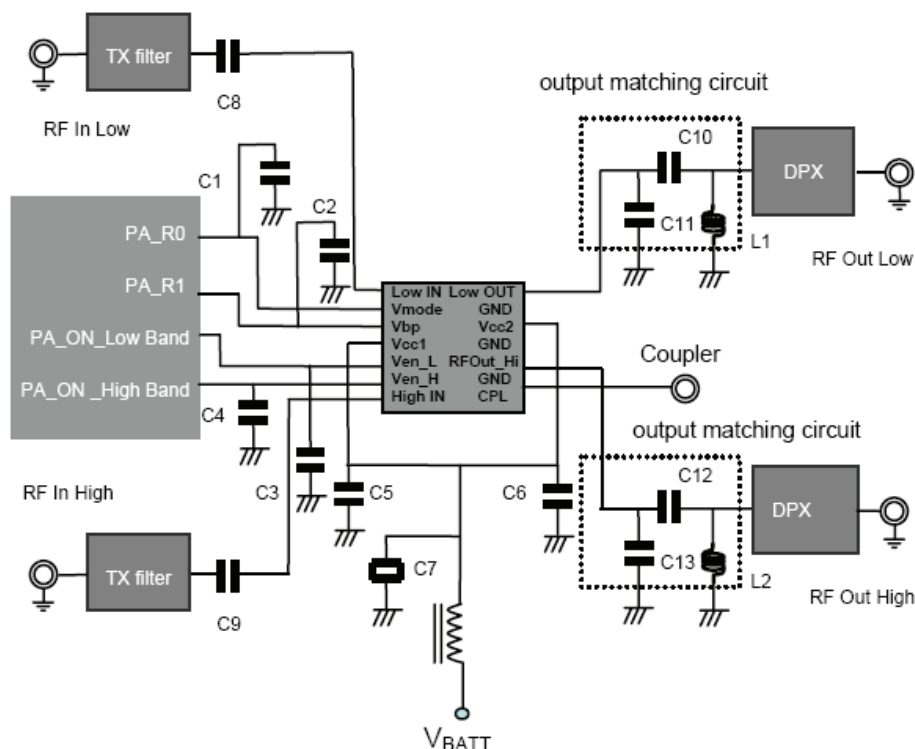
3.6.1 UMTS PAM (U1002, ACPM-5281)

The ACPM-5281 is a dual-band PAM (Power Amplifier Module) designed for UMTS Band1 and Band8. The ACPM-5281 meets stringent UMTS linearity requirements. The 4mmx5mm form factor 14-pin surface mount package is self contained, incorporating 50ohm input and output matching networks.

The ACPM-5281 features 5th generation of CoolPAM circuit technology which supports 3 modes – bypass, mid and high power modes. The CoolPAM is stage bypass technology which enables power amplifier to lower power consumption. Active bypass feature is added to 5th generation to enhance power added efficiency at low output range and this technology extends talk time of mobiles more by further saving power amplifier's current consumption.

The power amplifier is manufactured on an advanced InGaP HBT (hetero-junction Bipolar Transistor) MMIC (microwave monolithic integrated circuit) technology offering state-of-the-art reliability, temperature stability and ruggedness.

The Module is housed in a cost effective, small and thin 4x5mm package..



[Figure 3.7] ACPM-5281 Peripheral Circuits

3.6.2 ASM + GSM PAM (U1001, SKY77544)

SKY77544 is a transmit and receive Front End Module (FEM) designed in a very low profile (0.9 mm), compact form factor for quad-band cellular handsets comprising GSM850/900, DCS1800, and PCS1900 operation — a complete transmit VCO-to-Antenna and Antenna-to-receive SAW filter solution. The FEM also supports Class 12 General Packet Radio Service (GPRS) multi-slot operation and EDGE Polar Modulation. WCDMA switch-through support is provided by three dedicated high-linearity ports.

The module consists of a GSM850/900 PA and DCS1800/PCS1900 PA block, impedance matching circuitry for 50 Ω input and output impedances, Tx harmonic filtering, high linearity low insertion loss switches, and a CMOS Power Amplifier Control (PAC) block. A custom silicon integrated circuit contains decoder circuitry to control the RF switch while providing a low current external control interface. An integrated temperature sensor provides an analog voltage based on the temperature of the module.

Fabricated in InGaP/GaAs, the Hetero junction Bipolar Transistor (HBT) PA blocks support the GSM850/900 bands and DCS1800/PCS1900 bands. Both PA blocks share common power

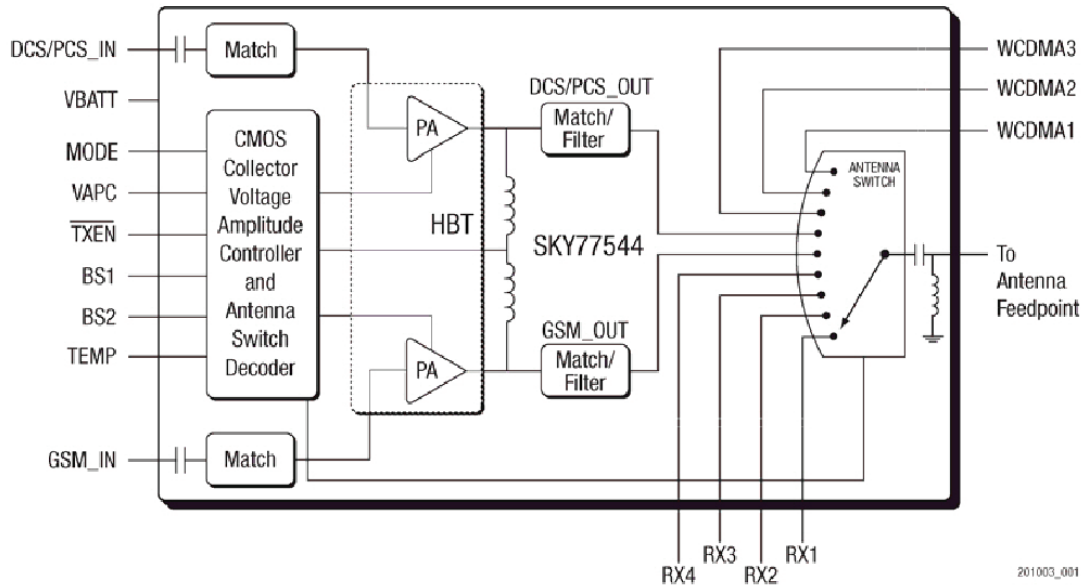
supply pads to distribute current. The output of the PA block and the outputs to the seven

receive pads connect to the antenna pad through a highly linear antenna switch. The WCDMA

and Rx ports feature a 0 volts DC offset level, which eliminates any need for external blocking capacitors. The InGaP/GaAs die, switch die, Silicon (Si) controller die, and passive components are mounted on a multi-layer laminate substrate and the entire assembly is encapsulated with plastic overmold.

RF input and output ports of the SKY77544 are internally matched to a 50 Ω load to reduce the number of external components for a quad-band design. Extremely low leakage current of the FEM maximizes handset standby time. Band selection and control of transmit and receive RF signal flows are performed by use of four external control pads. See Figure 3.9 shown on overleaf. Mode of operation Tx, Rx, Band (GSM850, GSM900, DCS, PCS, and UMTS) is controlled with 4 logic inputs: BS1, BS2, Mode, and TxEN. Proper timing of the TxEN input and the VAPC input ensures high isolation between the antenna and Tx-VCO while the VCO is being tuned prior to the transmit burst. The Enable input controls the initial turn-on of the PAC circuitry to minimize battery drain.

The integrated power amplifier control (PAC) function provides envelope amplitude control by reducing sensitivity to input drive, temperature, power supply, and process variation.



[Figure 3-8] SKY77544 Block Diagram

Mode	Input Control Bits			
	$\overline{\text{TxEN}}$	MODE	BS1	BS2
Standby	0	0	0	0
Tx_LOW BAND	0	0	0	1
Tx_HIGH BAND	0	0	1	1
TBD	0	1	0	1
TBD	0	1	1	1
Rx1	1	X	0	0
Rx2	1	X	0	1
Rx3	1	X	1	1
Rx4	1	X	1	0
WCDMA1	0	0	1	0
WCDMA2	0	1	0	0
WCDMA3	0	1	1	0

[Figure 3-9] SKY77544 Control Logic

3.6.4 19.2MHz VCTCXO (X300, TG5021CG_19.2MHz)

The Voltage Controlled Temperature Compensated Crystal Oscillator (VCTCXO) provides the reference frequency for all RFIC synthesizers as well as clock generation functions within the MSM7227T IC. The oscillator frequency is controlled by the MSM7227T ICs.

TRK_LO_ADJ pulse density modulated signal in the same manner as the transmit gain control TX_AGC_ADJ. A two-pole RC low pass filter is recommended on this control line.

The PM7540 IC controls the handset power-up sequence, including a special VCTCXO warm-up interval before other circuits are turned on. This warm-up interval (as well as other TCXO controller functions) is enabled by the MSM TCXO_EN line . The PM7540 IC VREG_TCXO regulated output voltage is used to power the VCTCXO and is enabled before most other regulated outputs. Any GSM mode power control circuits within the MSM7227T IC require a reference voltage for proper operation and sufficient accuracy. Connecting the PM7540 IC REF_OUT directly to the MSM7227T IC GSM_PA_DAC_REF provides this reference. This sensitive analog signal needs a 0.1 μ F low frequency filter near to MSM side, and isolate from digital logic and clock traces with ground on both sides, plus ground above and below if routed on internal layers.

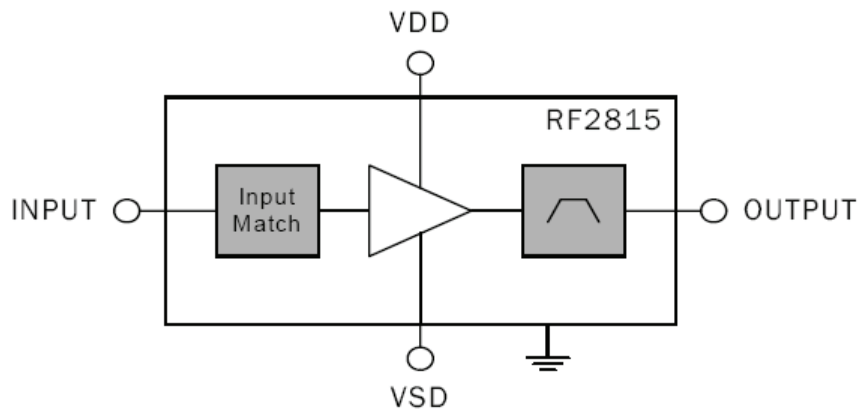
Parameter	Symbol	Value			Unit	Note
		Min	Typ	Max		
Supply voltage	Vcc	2.66	2.8	2.94	V	Vcc+2.8V+/-5%
Supply voltage	Vcc-GND	-0.3		4.5	V	
Storage temperature	T_stg	-40		85	°C	
Operating temperature	TOPR	-30	+25	+85	°C	
Current consumption	Icc	-	-	1.4	mA	
DC-cut capacitor	Cc	0.01			μ F	
freq. tolerance	F_tol(OSC)			+/-2.0	ppm	
freq. tolerance After reflow soldering				+/-2.0	ppm	
Freq_stability/ temperature	Fo-Tc	+/-2.0			ppm	T_use= 30°Cto+85°C Based df Freq.at +25°C
Freq_stability/ Load	Fo_Load	+/-2.0			ppm	Load : 10 K Ω /10pf+/-10%
Freq_stability/ aging	F-aging	+/-0.7			ppm	T_use= 25°CFirst Year
Tuning voltage range	Fcont	Min	Typ	Max		
		-12.5ppm		7.8ppm		
		+7.8ppm		=12.5ppm		
Tuning sensitivity		7.8ppm/V to 12.5ppm/V				
Controll input resistance	Rin	500K Ω Min				VC_GND(DC Level)
Hannonics		-5dBc Max				

[Figure 3-10] TG5021CG_19.2MHz Electrical Characteristics

3.6.5 GPS LNA (U1003, RF2815)

The RF2815 is a GPS Low Noise Amplifier with an integrated SAW filter at the output. Low noise figure, along with high gain, achieved by the RF2815 makes it ideal for GPS receivers requiring high sensitivity. This module builds upon RFMD's leading edge pHEMT process and integrates input matching and low loss high rejection SAW filter at the output. This results in high performance and a reduced solution size. The ease of implementation simplifies the receiver design.

The RF2815 is packaged in a compact 3.3 mm x 2.1 mm x 1.0 mm package with low external component count required to achieve the best-in-class performance.



[Figure 3-11] RF2815 Functional Block Diagram

3.7 Digital Baseband(DBB/MSM7227T)

3.7.1 General Description

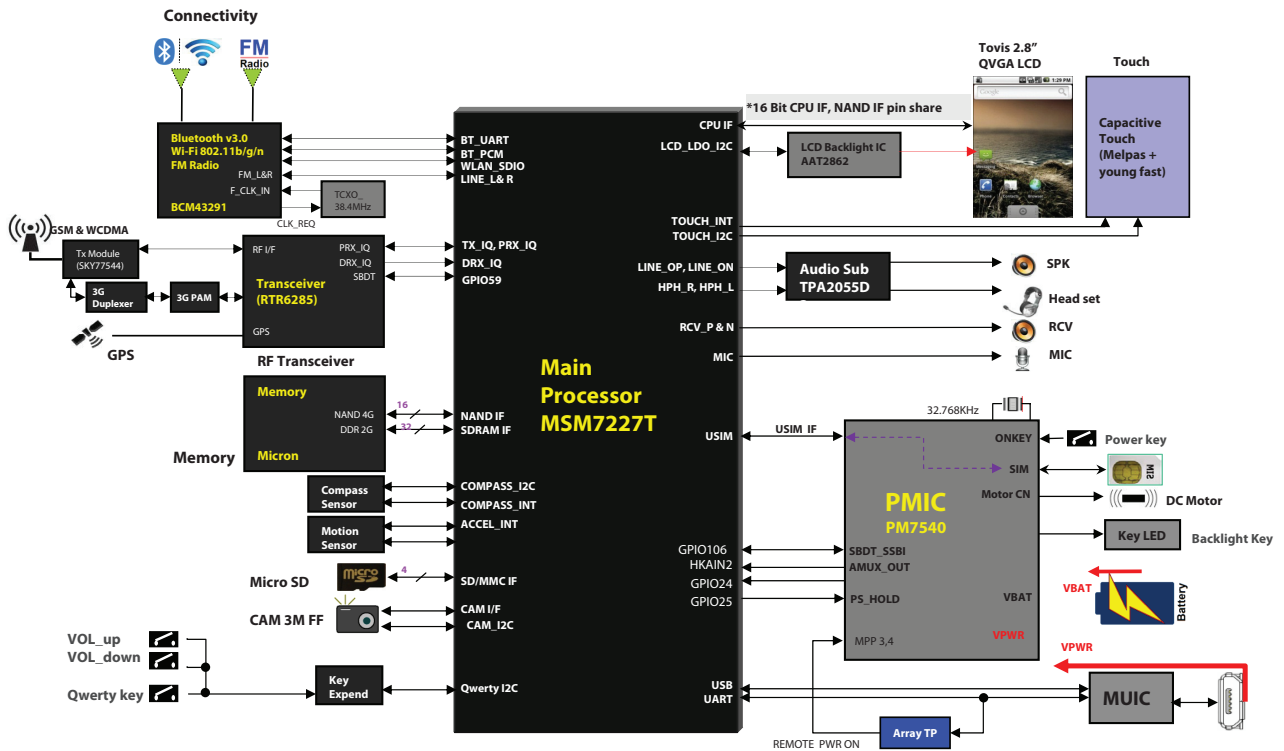
A. Features (MSM7227T)

The basic MSM7227T system solution consists of the MSM7227T, RTR6285™, and PM7540™ ICs, plus AMSS™ system software with the SURF7227™ platform available for development. General features include:

- WCDMA Rel'99 plus HSDPA and HSUPA
- GSM/GPRS/EDGE
- High-performance ARM1136JF-S™ application processor at up to 600 MHz; QDSP5000™ at 320 MHz
- High-performance ARM926EJ-S™ modem processor at up to 400 MHz; QDSP4000™ at 122.88 MHz
- Java® hardware acceleration for faster Java-based games and other applets
- Support for Bluetooth® 2.1 EDR via an external Bluetooth System-on-Chip (SoC)
- High-speed, serial mobile display digital interface (MDDI) that optimizes the interconnection cost between the MSM device and the LCD panel
- Receive diversity support for WCDMA mode, thereby providing improved capacity and data throughput
- USB 2.0 compliant high-speed USB core with limited OTG capabilities
- Integrated high-speed USB PHY
- Integrated wideband stereo codec for digital audio applications
- Direct interface to digital camera module with video front-end (VFE) image processing
- GPS position location capabilities
- Vocoder support (GSM-HR, FR, EFR, AMR, and AMR-WB/+)
- Advanced 12 × 12 × 1.05 mm, 0.4 mm pitch, 560 NSP

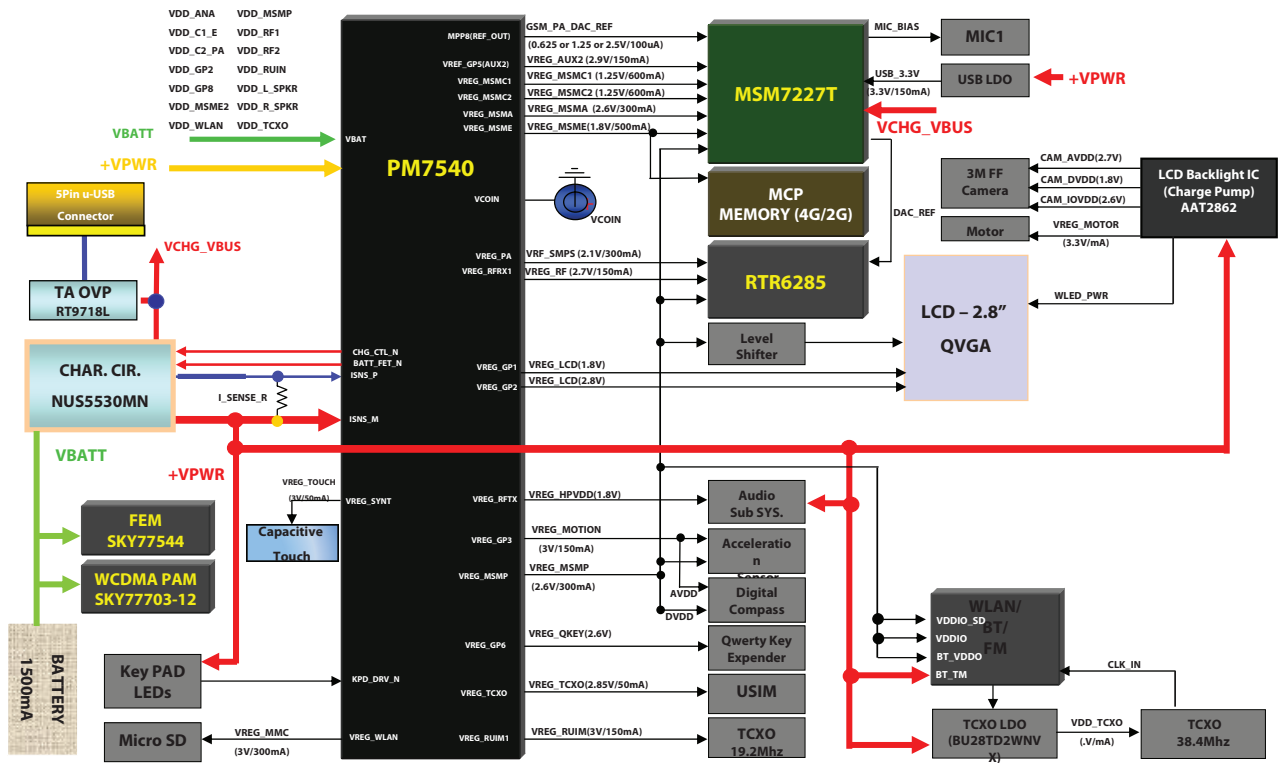
3.8 Hardware Architecture

<System HW Block>



[Figure 3.12] Block Diagram

<Power Block>



[Figure 3.13] Simplified Block Diagram

3.9 Subsystem (MSM7227T)

3.9.1 ARM Microprocessor Subsystem

The MSM7227T device uses an embedded ARM1136JF-S, ARM926EJ-S microprocessor. This microprocessor, through the system software, controls most of the functionality for the MSM, including control of the external peripherals such as the keypad, LCD, SDRAM, and NANDFlash devices. Through a QUALCOMM proprietary single-wire SBI (SSBI) the ARM926EJ-S configures and controls the functionality of the RTR6285 and PM7540 devices.

3.9.2 WCDMA Subsystem

The WCDMA subsystem performs the data conversions and signal processing necessary to maintain the WCDMA air interface between the handset and the base station (and also the WCDMA network). The subsystem components include:

- Searcher engine
- Demodulating fingers
- Combining block
- Frame deinterleaver
- Viterbi decoder
- Reverse link subsystem
- Turbo decoder

On the forward link traffic channel, the WCDMA subsystem searches, demodulates, and decodes incoming pilot, sync, paging, and traffic channel information. It extracts low bit-rate packet data from the forward link traffic channel and sends the packet data to the vocoder for processing. On the reverse link, the WCDMA subsystem processes the packet data from the vocoder and modulates the reverse traffic channel.

3.9.3 GSM Subsystem

The GSM subsystem performs the data conversions and signal processing necessary to maintain the GSM air interface, including PA gain control for GPRS support. For GSM, the power profile ramps up before the burst and ramps down afterward. For GPRS, transmit bursts can occur in as many as four sequential slots and the PA must be ramped up and down smoothly between each slot, holding the desired output power level during each burst. GSM support includes:

- GSM release '99 (circuit switching)
- GPRS (packet switching)
- EDGE E2 power class for 8 PSK

3.9.4 RF Interface

The RF interface communicates with the mobile station's external RF and analog baseband circuits. Signals to these circuits control signal gain in the Rx and Tx signal path and maintain The system's frequency reference.

3.9.5 Single-wire serial bus interface (SSBI)

The MSM7227T device's SSBI is designed specifically to be a quick, low pin count control protocol for QUALCOMM's RTR6285 and PM7540 ASICs. Using the SSBI, the RTR6285 and PM7540 devices can be configured for different operating modes and for minimum power consumption, extending battery life in Standby mode. The SBI also controls DC baseband offset errors.

3.9.6 Audio function

MSM7227T audio functions include the analog Rx and Tx paths (or stereo wideband codec), audio digital signal processing (DSP) that provides adjustable gains and filtering, PCM circuits for interfacing with external devices, and additional audio DSP that actually implements encoding and decoding. Other key features include:

- The wideband codec supports stereo music/ringer melody applications in addition to the 8 kHz voice band applications on the forward link.
- A PCM interface allows an external codec to be used instead of the internal codec; this supports inter-IC Sound (I2S) modes that allow an external stereo DAC or SADC to be used.
- Currently in AMSS baseline only I2S output mode is supported (SDAC-only, no SADC support).
- Audio decoder summing and headset switch detection are included.
- Audio DSP includes the Rx and Tx filters needed to meet ITU-T G.712 requirements.
- A programmable sidetone path provides for summing part of the Tx audio into the Rx path.
- Many codec parameters are configurable via SBI registers.
- The audio processing is configured through QDSP5 command types and is not directly controlled by the microprocessor.

3.9.7 Vocoder Subsystem

The MSM7227T device's QDSP4000 supports AMR,FR,EFR and HR. In addition, the QDSP4000 has modules to support the following audio functions: DTMF tone generation, DTMF tone detection, Tx/Rx volume controls, Tx/Rx automatic gain control (AGC), Rx Automatic Volume Control (AVC), EarSeal Echo Canceller (ESEC), Acoustic Echo Canceller (AEC), Noise Suppression (NS), and programmable, 13-tap, Type-I, FIR, Tx/Rx compensation filters. The MSM7227T device's integrated ARM9TDMI processor downloads the firmware into the QDSP4000 and configures QDSP4000 to support the desired functionality.

3.9.8 Mode Select and JTAG Interfaces

The mode pins to the MSM7227T device determine the overall operating mode of the ASIC. The options under the control of the mode inputs are Native mode, which is the normal subscriber unit operation, ETM mode, which enables the built-in trace mode, and test mode for factory testing. The MSM7227T device meets the intent of the ANSI/IEEE 1149.1A-1993 feature list. The JTAG interface can be used to test digital interconnects between devices within the mobile station during manufacture.

3.9.9 General-Purpose Input/Output Interface

The MSM7227T IC includes 133 general purpose input/output (GPIO) pins, and each can be configured as a digital input or digital output. Inputs can be set to have a pull-up, pull-down, keeper, or no-pull. Output drive strength is also programmable. Software assigns functions to the GPIOs and their configurations are set accordingly. Some of the GPIO pins have alternate functions supported on them. The alternate functions include USB interface, additional RAM, ROM, general-purpose chip selects, parallel LCD interface, and a UART interface. The function of these pins is documented in the various software releases.

3.9.10 UART

The MSM7227T device employs three UARTs. UART1 has dedicated pins while UART2 and UART3 share multiplexed pins.

- UART1 for Bluetooth
- UART2 for USIM interface
- UART3 for data

3.9.11 USB

The MSM7227T IC supports one High Speed USB (HS-USB) USBH port with built-in PHY and one Full Speed USB-UICC port. The MSM7227T IC supports USB interfaces using two controllers:

- The primary controller is the HS-USB port with an integrated physical layer (PHY). This HS-USB port is also capable of supporting USB operations at low-speed and full-speed.
- The secondary controller is the FS USB-UICC port, which only supports host mode functionality.

3.10 Power Block

3.10.1 General

MSM7227T, included RF, is fully covered by PM7540 (Qualcomm PMIC). PM7540 cover the power of MSM7227T, MSM memory, RF block, Bluetooth, USIM and TCXO.

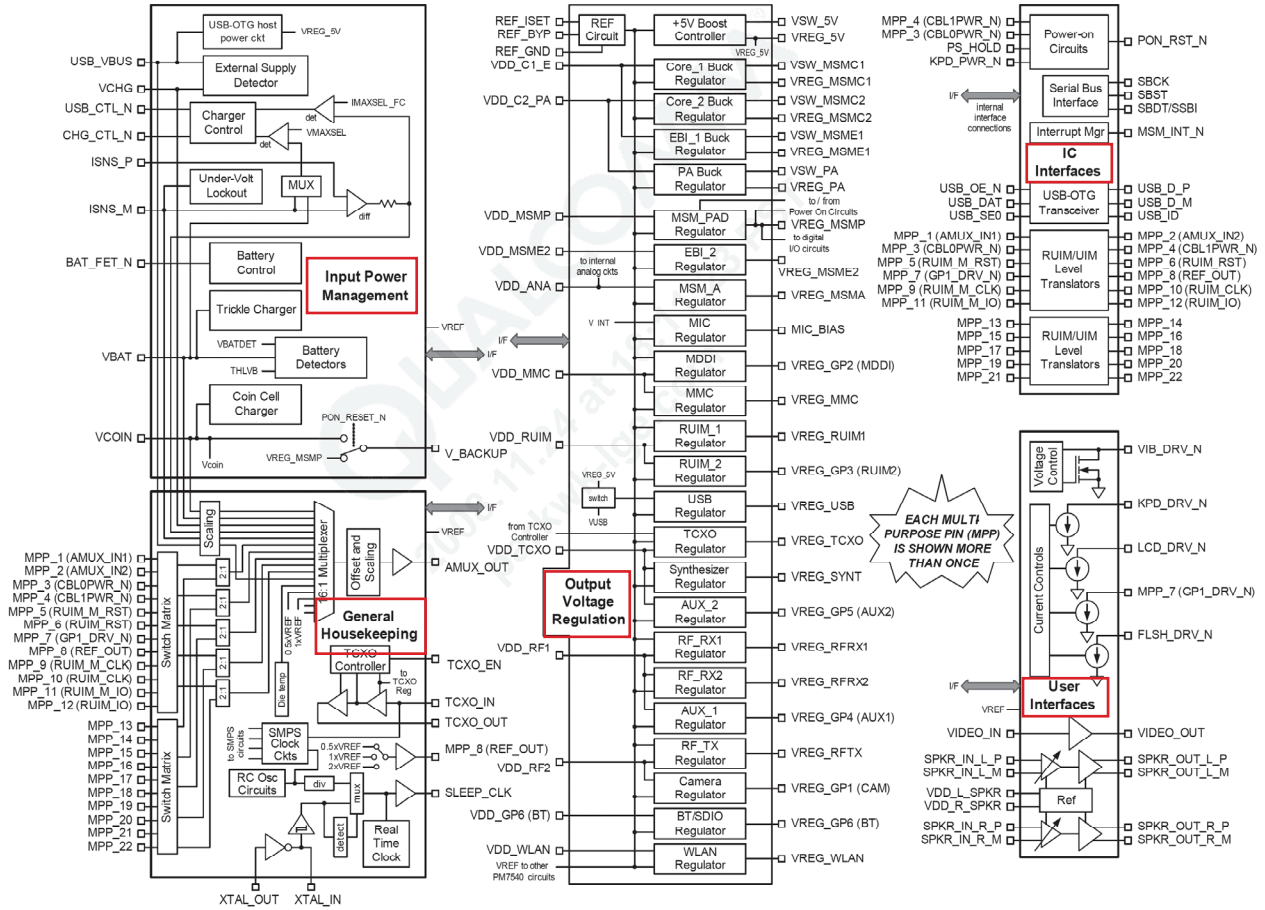
Major power components are :

PM7540 (U501) : Phone main PMIC

3.10.2 PM7540

The PM7540 device (Figure) integrates all wireless handset power management. The power management portion accepts power from all the most common sources – battery, external charger, adapter, coin cell back-up – and generates all the regulated voltages needed to power the appropriate handset electronics. It monitors and controls the power sources, detecting which sources are applied, verifying that they are within acceptable operational limits, and coordinates battery and coin cell recharging while maintaining the handset electronics supply voltages. Eight programmable output voltages are generated using low dropout voltage regulators, all derived from a common trimmed voltage reference. A dedicated controller manages the TCXO warm-up and signal buffering, and key parameters (under-voltage lockout and crystal oscillator signal presence) are monitored to protect against detrimental conditions. MSM device controls and statuses the PM7540 IC using Single-wire SBI(SSBI) supplemented by an Interrupt Manager for time-critical information. Another dedicated IC Interface circuit monitors multiple trigger events and controls the power-on sequence.

3. TECHNICAL BRIEF



[Figure 3.14] PM7540 functional block diagram

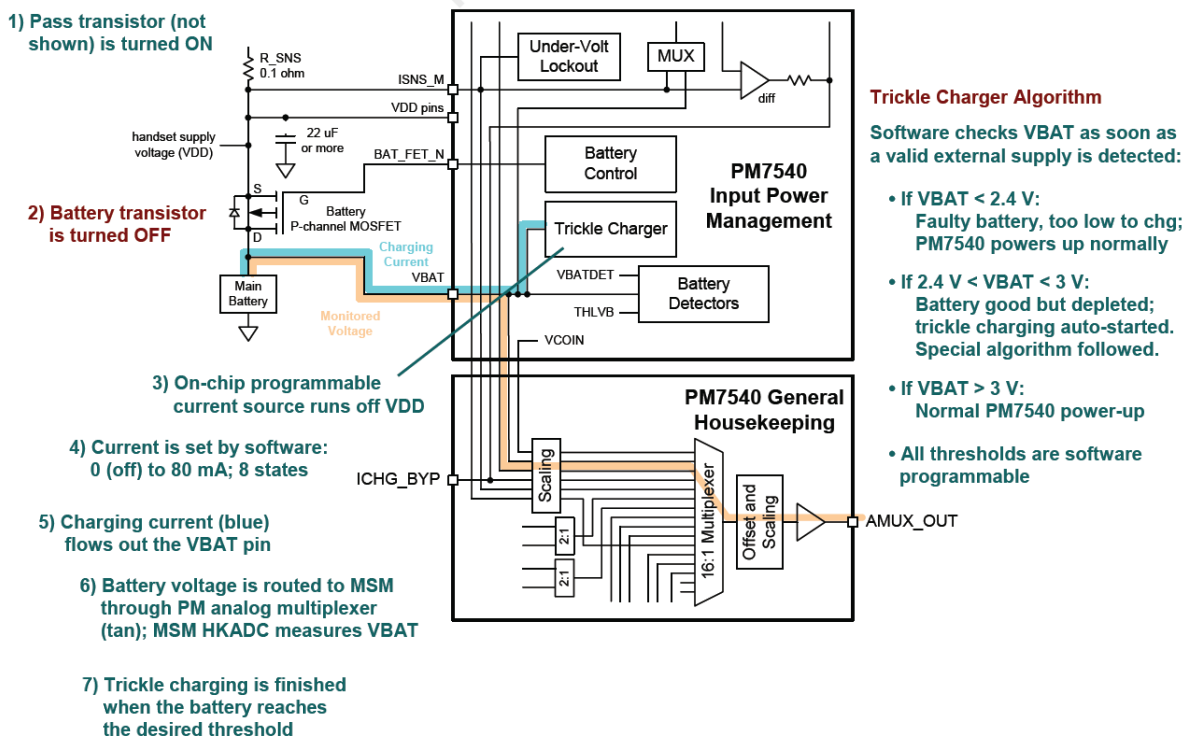
3.10.3 Charging control

A programmable charging block in PM7540 is used for battery charging. It is possible to set limits for the charging current. The external supply typically connects directly to pin (VCHG). The voltage on this pin (VCHG) is monitored by detection circuitry to ascertain whether a valid external supply is applied or not. For additional accuracy or to capture variations over time, this voltage is routed internally to the housekeeping ADC via the analog multiplexer. PM7540 circuits monitor voltages at VCHARGER and ICHARGE pins to determine which supply should be used and when to switch between the two supplies. These pins are connected to the Source (or emitter) and Drain (or collector) contacts of the pass transistor respectively.

3.10.3.1 Trickle Charging

Trickle Charging of the main battery, enabled through SBI control and powered from VDD, is provided by the PM7540 IC. The trickle charger is on-chip programmable current source that supplies current from VDD to pin (VBAT). Trickle charging can be used for lithium-ion and nickel-based batteries, with its performance specified below (3.2V). The charging current is set to 80mA.

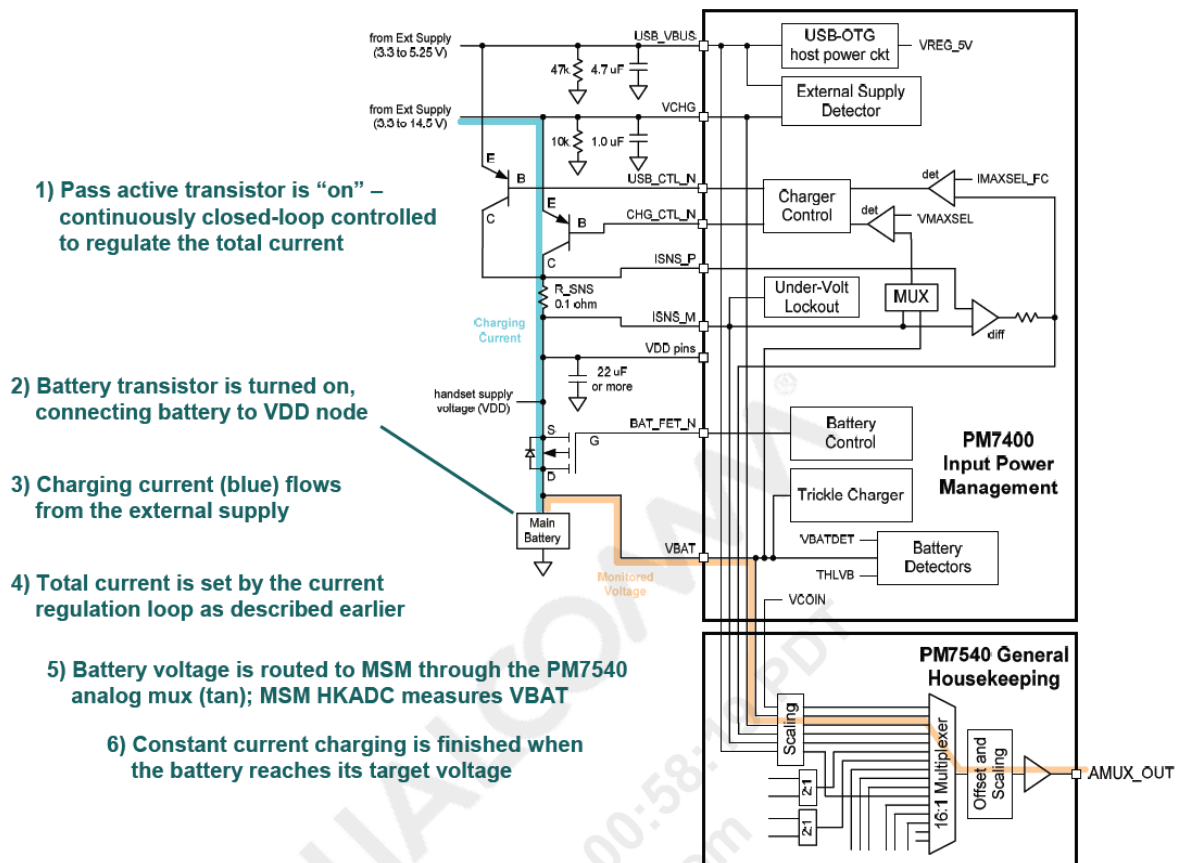
Parameter	Min	Typ	Max	Unit
Trickle Current	60	80	100	mA



[Figure 3.15] PM7540 Charging Flow (TC Charging)

3.10.3.2 Constant Current Charging

The PM7540 IC supports constant current charging of the main battery by controlling the charger pass transistor and the battery transistor. The constant current charging continues until the battery reaches its target voltage, 4.2V.



[Figure 3.16] PM7540 Charging Flow (CC Charging)

3.10.3.3 Constant Voltage Charging

Constant voltage charging begins when the battery voltage reaches a target voltage, 4.2V. The end of constant voltage charging is commonly detected 10% of the full charging current.

3.10.3.4 LG-C660 Charging Specification

- Charging Method : CC & CV (Constant Current & Constant Voltage)
- Maximum Charging Voltage : 4.2V
- Maximum Charging Current : 700mA
- Nominal Battery Capacity : 1500mAh
- Charging time : Max. 3h
- Full charge indication current (icon stop current) : 50mA

3.10.3.5 LG-C660 battery bar icon display

Battery Bar Number	Specification	
BAR 6 (Full)	90% over	Remain %
BAR 6 --> 5	90% → 89%	
BAR 5 --> 4	70% → 69%	
BAR 4 --> 3	50% → 49%	
BAR 3 --> 2	30% → 29%	
BAR 2 --> 1	15% → 14%	
BAR 1 --> 0	5% → 4%	
Low Battery Pop-up	4% ~ 15% : One Time popup (No call)	
Critical Low Battery Pop-up	0% ~ 3% : Popup at every level change (No call)	
POWER OFF	0%	

[Table 3.1] LG-C660 battery bar specification

3.11 External memory interface

3.11.1 MSM7227T

The MSM7227T device was designed to provide two distinct memory interfaces. EBI1 was targeted for supporting DDR synchronous memory devices. EBI2 was targeted towards supporting slower asynchronous devices such as LCD, NAND flash, SRAM, NOR flash etc. To support the high-bandwidth, high-density, and low-latency requirements of the advanced on-chip applications, the MSM7227T IC has two high-speed, high-performance memory slave interfaces: the external bus interface 1 (EBI1) and the stack memory interface (SMI). To achieve higher bandwidth and better use of the memory device interface, the SMI accepts multiple commands for the external memory

device. The SMI interface acts as a slave device to all of the bus masters within the MSM device. The masters arbitrate to gain access to the SMI, and upon obtaining the access, they issue commands to the SMI. The bus masters are connected to the SMI through an advanced extensible interface (AXI) bus bridge (or global interconnect block) and communicate over a 64-bit, non-blocking AXI bus protocol. The AXI bus bridge provides the arbitration logic for all of the bus masters.

EBI1 Features

- Support for only low-power memories at 1.8-V I/O power supply voltage
- AXI bus frequencies up to 133 MHz
- A 16-bit/32-bit static and dynamic memory interface

DDR SDRAM interface features include:

- Supports both 32-bit DDR SDRAM devices, up to 133-MHz bus speed
- Supports auto precharge and manual precharge
- Supports partial refresh
- Separate CKE pin per chip-select to support partial operation mode
- Idle power down to save idling power consumption

EBI2 Features

- Support for asynchronous FLASH and SRAM(16bit & 8bit).
- Interface support for byte addressable 16bit devices(UB_N & LB_N signals).
- 2Mbytes of memory per chip select.
- Support for 8 bit/16bit wide NAND flash.
- Support for parallel LCD interfaces, port mapped of memory mapped(8 or 16 bit)

3.11.2 LG-C660 External memory Interface

- Multi Chip Package : DDR SDRAM and NAND Flash merged 1 package
- 2Gbit Mobile DDR SDRAM / 4Gbit NAND Flash

Interface Spec				
Part Name	Product Gr	Maker	Operation Voltage	Speed
MT29C4G48MAZAPAKD-5IT	NAND	MICRON	1.8V	42ns
	SDRAM		1.8V	200MHz

3.12 H/W Sub System

3.12.1 RF Interface

3.12.1.1 RTR6285 (WCDMA_Tx, GSM_Tx/Rx)

MSM7227T controls RF part(RTR6285) using these signals.

- RTR6285_SSBI : SSBI I/F signals for control Sub-chipset
- RTR_TXON : Power AMP on RF part
- RTR_RX_I/Q_M/P, RTR_TX_I/Q_M/P : I/Q for T/Rx of RF
- RTR_DAC_REF : Reference input to the MSM Tx data DACs

3.12.1.2 The others

TRK_LO_ADJ : TCXO(19.2M) Control

PA_ON0/PA_RANGE0 : WCDMA(2100) TX Power Amp Enable

ANT_SEL[0-3] : Ant Switch Module Mode Selection(WCDMA,GSM Tx/Rx,DCS-PCS Tx/Rx)

GSM_PA_RAMP : Power Amp Gain Control of APC_IC

3.12.1.3 RF2815 (GPS LNA)

- * GPS_LNA_EN : GPS LNA Enable Signal (GPS LNA Shutdown)

3.12.1.4 BCM43291SKUBG (BT / WiFi chip)

WiFi

- * WLAN_CMD : WLAN SDIO Command Line.
- * WLAN_CLK : WLAN SDIO Clock Input.
- * WLAN_SDIO[3:0] : WLAN SDIO Data Line.
- * WLAN_RESET_N : Low asserting reset for WLAN core.
- * WLAN_WAKEUP : WLAN Wakeup Input.
- * WLAN_HOST_WAKEUP : WL_HOST_WAKEUP signal output.

BT

- * BT_UART_RXD : Bluetooth UART Serial Input.
- * BT_UART_RTS : Bluetooth UART Request to Send. Active-low request.
- * BT_UART_CTS : Bluetooth UART Clear to Send. Active-low clear.
- * BT_UART_TXD : Bluetooth UART Serial Output.
- * BT_PCM_CLK : BT PCM clock, can be PCM-master (output) or PCM-slave (input).
- * BT_PCM_DIN : BT PCM data input.
- * BT_PCM_SYNC : BT PCM sync signal, can be PCM-master (output) or PCM-slave (input).
- * BT_PCM_DOUT : BT PCM data output.
- * BT_WAKEUP : BT Wakeup Input.
- * BT_HOST_WAKEUP : BT Host Wakeup Output
- * BT_RESET_N : Low asserting reset for BT core.

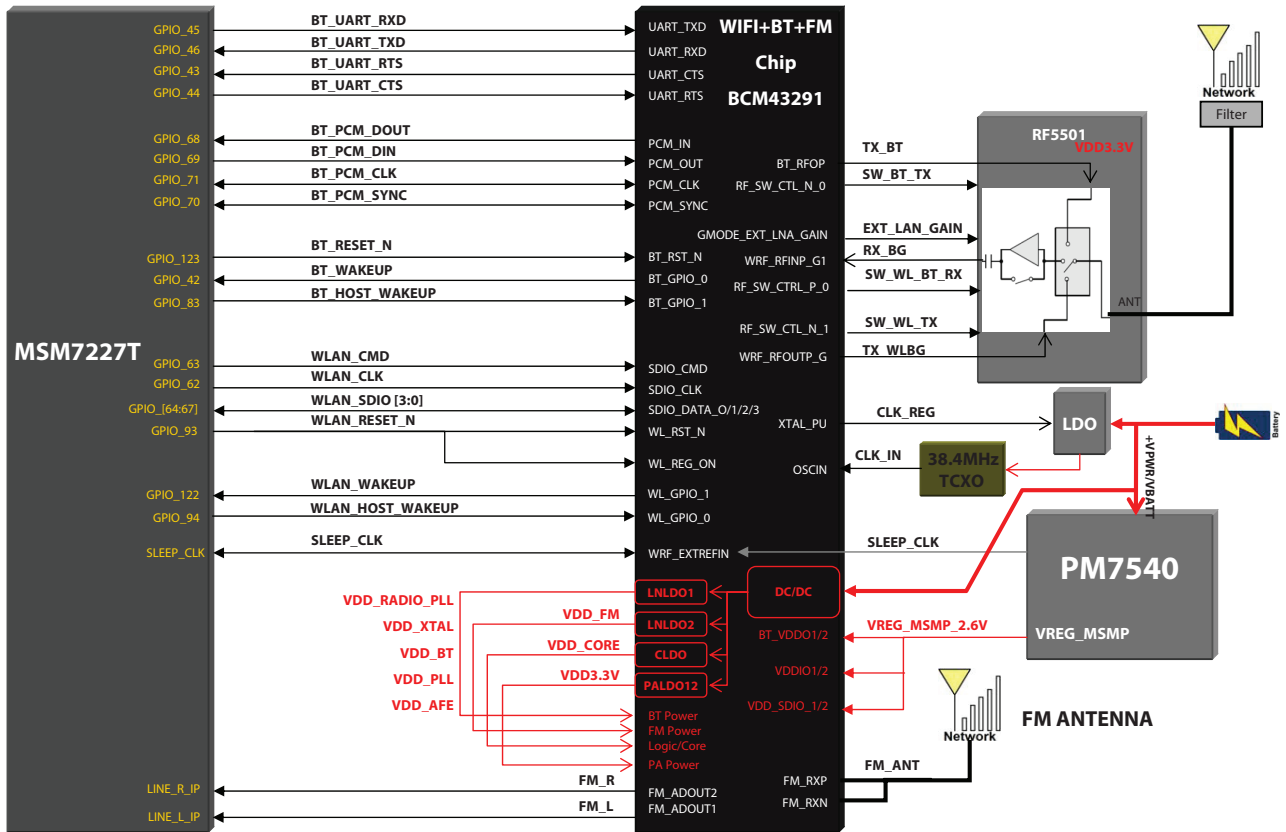
Common

- * SLEEP_CLK : LPO clock (32.768kHz) input. Used for low-power mode timing.
- * CLK_IN : Crystal amplifier input or frequency reference input.
- * CLK_REQ : Crystal Circuit / Reference Clock Enable (active-high)

FM Radio

- * FM_ANT : FM RF input.
- * SLEEP_CLK : External reference oscillator input. (32.768KHz)
- * FM_R : Right audio line output – digital input data.
- * FM_L : Left audio line output – digital frame synchronization.

3. TECHNICAL BRIEF



[Figure 3.17] Wi-Fi/BT/FM Interface Block Diagram

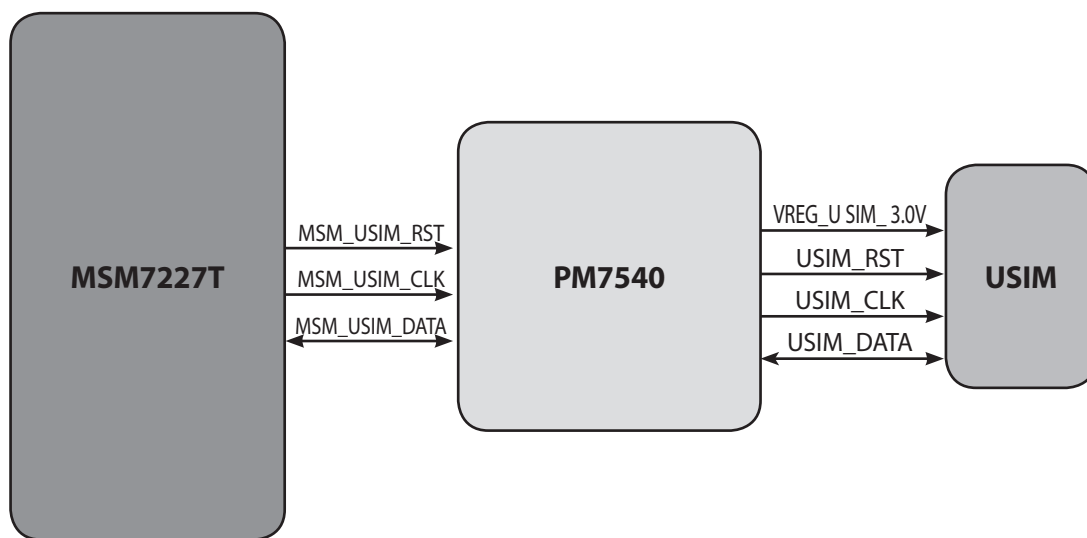
3.12.2 MSM Sub System

3.12.2.1 USIM Interface

SIM interface scheme is shown in Figure.

And, there control signals are followed

- USIM_CLK : USIM Clock
- USIM_Reset : USIM Reset
- USIM_Data : USIM Data T/Rx



[Figure 3.18] SIM Interface

3.12.2.2 UART Interface

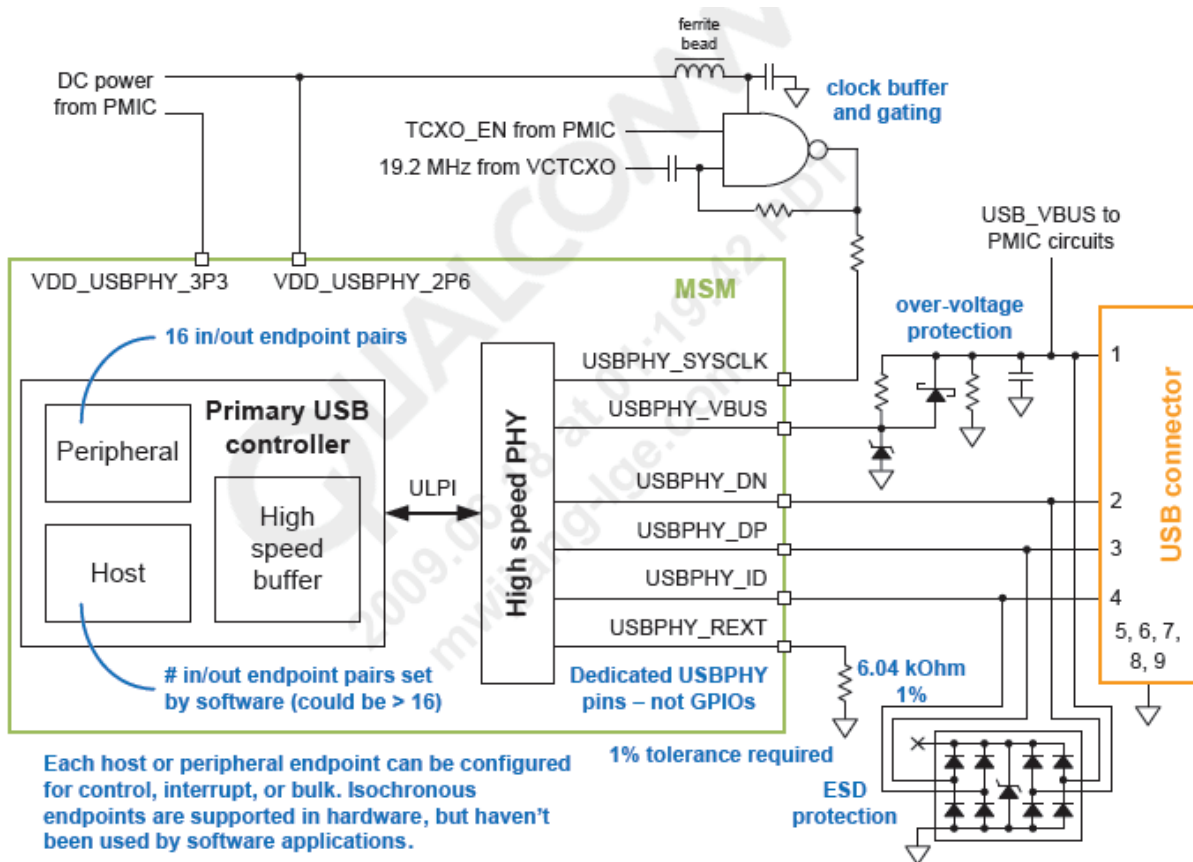
UART signals are connected to MSM GPIO through IO connector with 115200 bps speed.

GPIO_Map	Name	Note
GPIO_86	UART3_RX	Data_Rx
GPIO_87	UART3_TX	Data_Tx

[Table 3.2] UART Interface

3.12.2.3 HS-USB

The High-Speed USB module contains an embedded UTMI+ core with a built-in transceiver eliminating the need for an external PHY. The HS-USB port is a standard 4-pin interface that connects directly to the USB connector (USBPHY_DP, USBPHY_DN, USBPHY_ID and USBPHY_VBUS). Two additional pins are required for PHY operations which include an external reference resistor pin (USBPHY_REXT) and a USB system clock pin (SYS_CLK) which the USB PHY uses to lock its internal PLL (SYS_CLK)



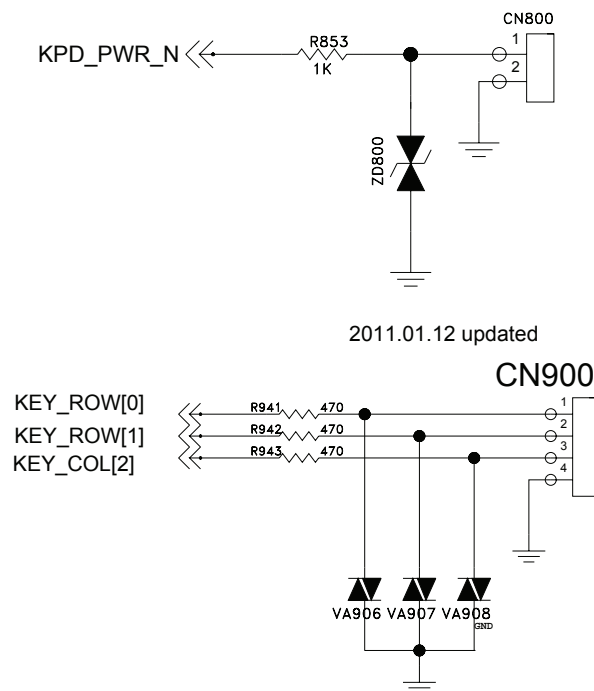
[Figure 3.19] HS-USB connections and architecture

3.12.3 KEY

3.12.3.1 Side key

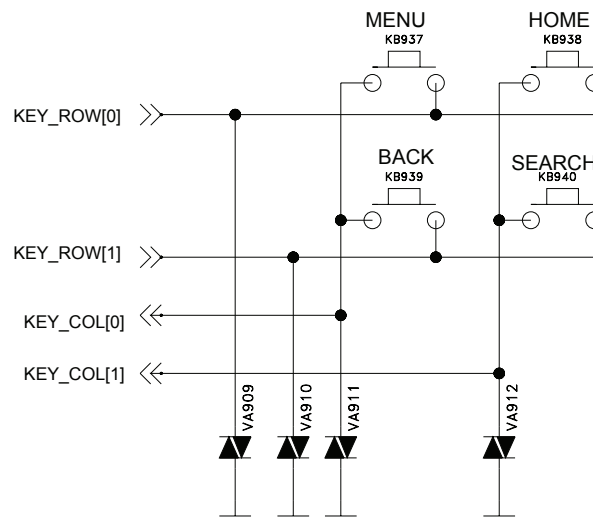
There are 1 Power key, 2 side keys and 4 Android keys that are controlled by MSM7227T.

Refer to the circuit.



[Figure 3.20] Power and Volume Side key

2011.01.12 updated

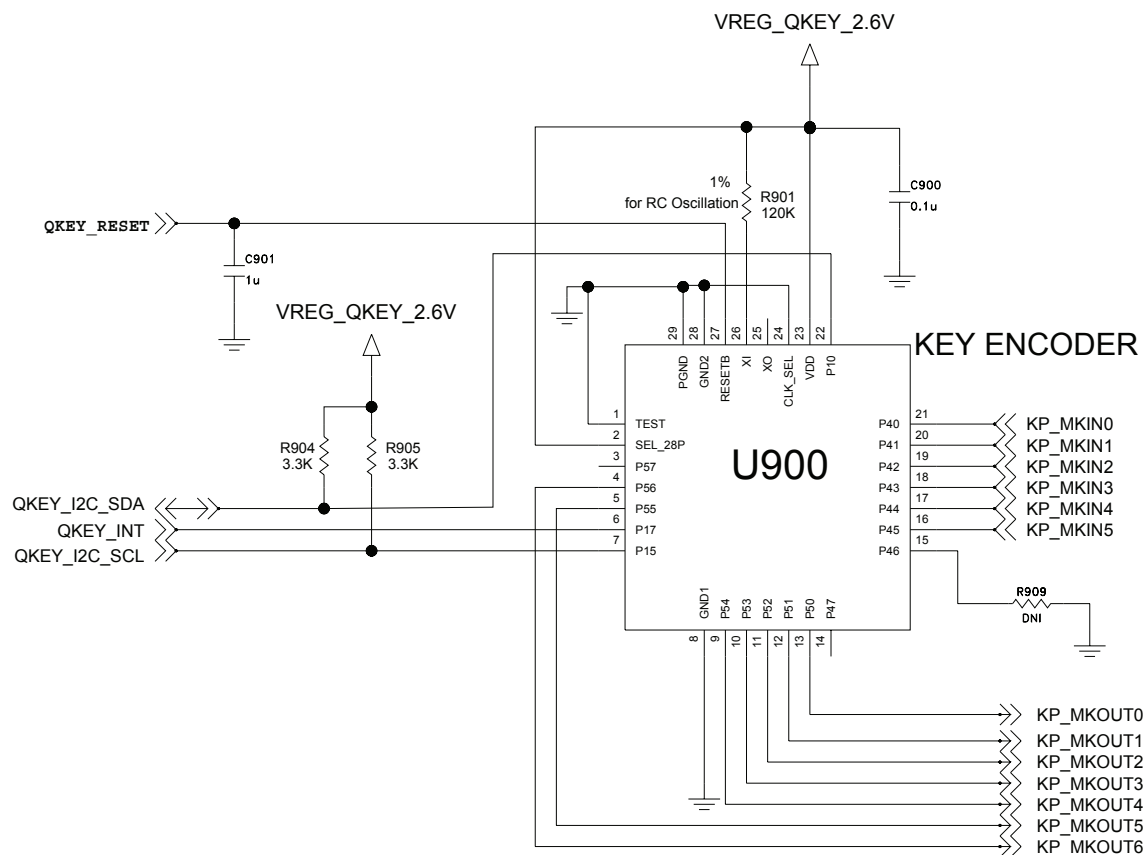


[Figure 3.21] Android keys (Menu, Home, Back, Search)

3.12.3.2 Qwerty Key

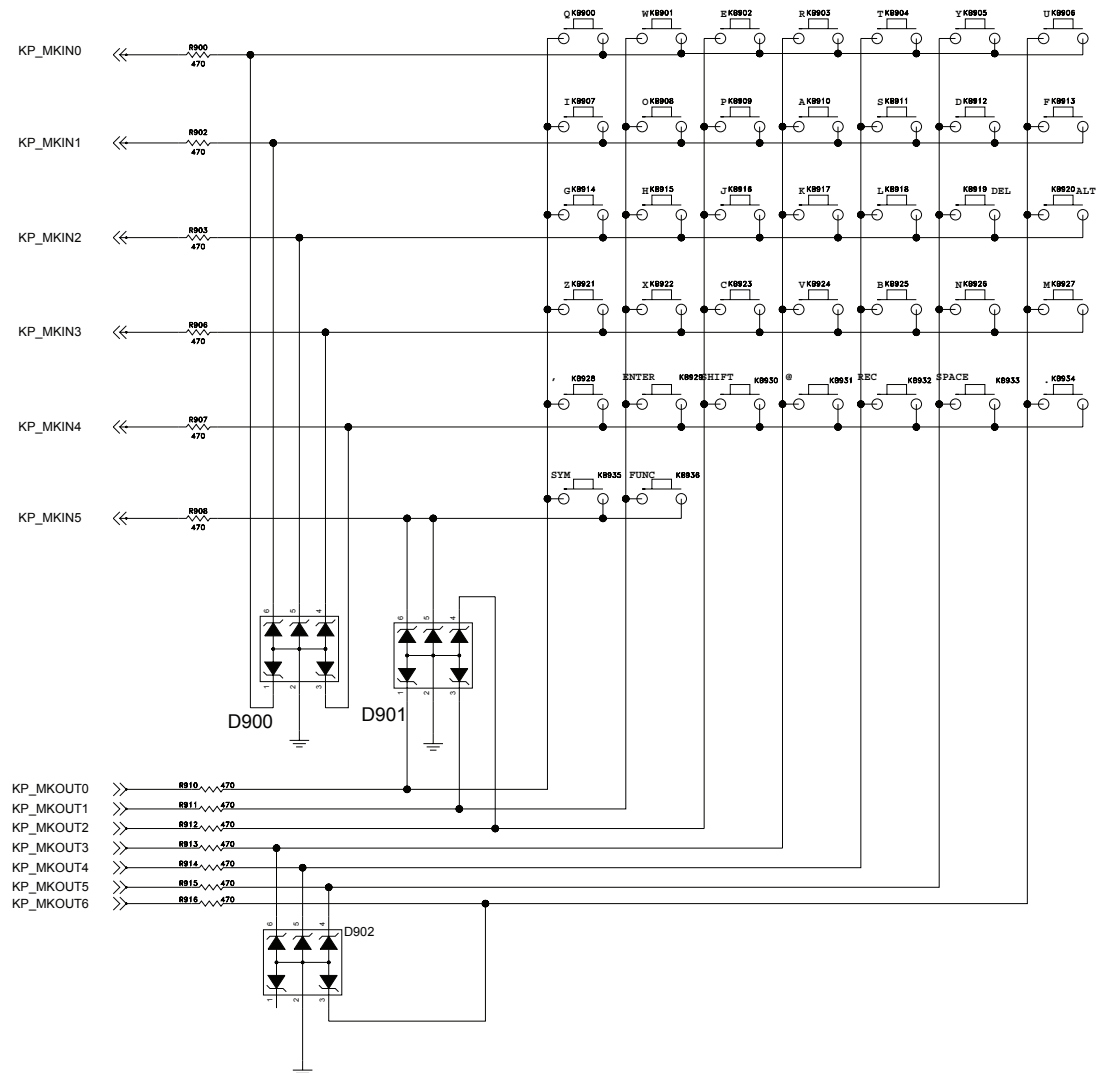
There are Qwerty Key buttons that are controlled by Keycoder IC(PP2106M3)

Refer to the circuit.



[Figure 3.22] Qwerty Key (Key encoder IC)

3. TECHNICAL BRIEF

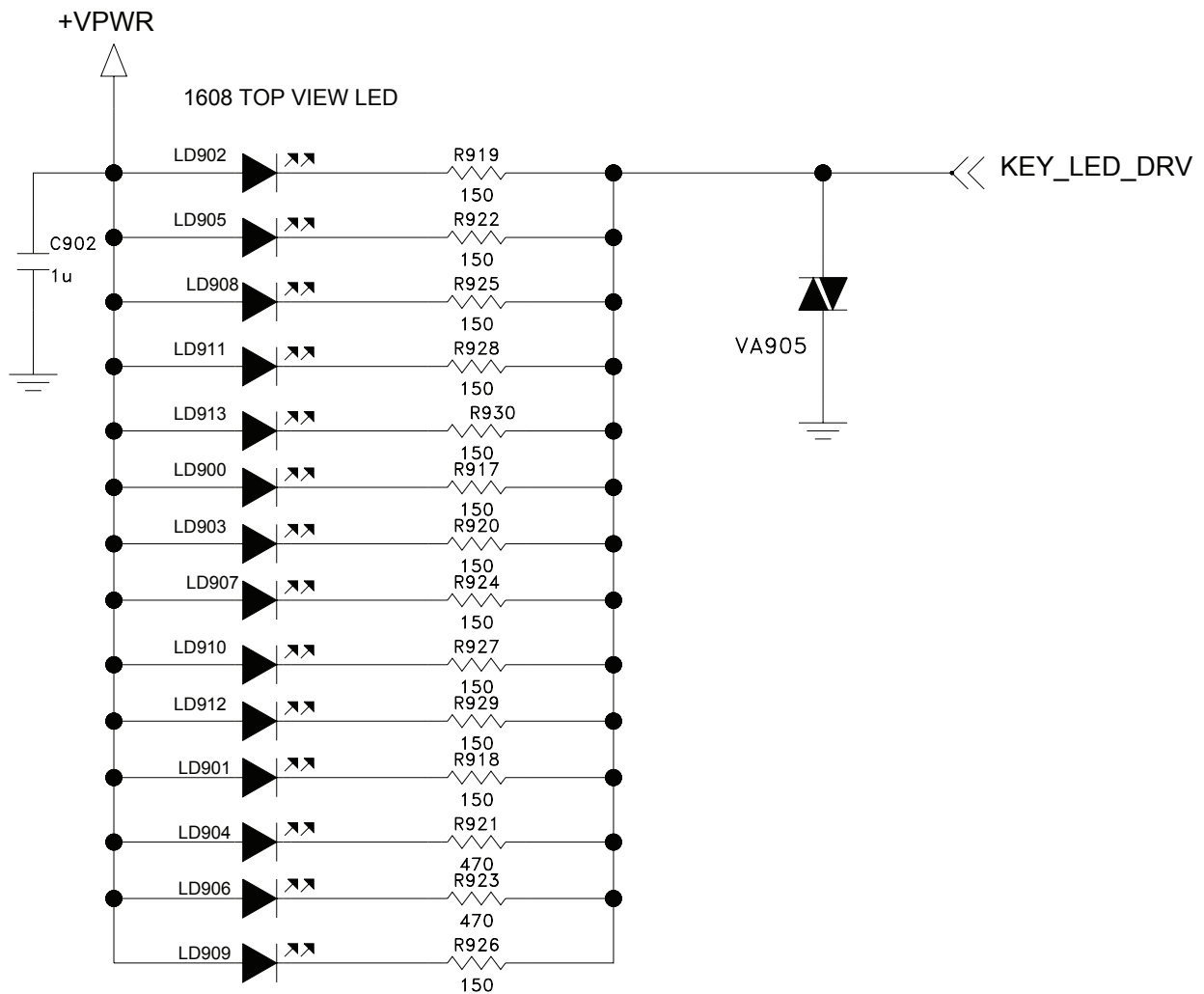


MUSCAT Qwerty Key Arrangement								
		GPIO 1 KP_MKOUT0	GPIO3 KP_MKOUT1	GPIO 5 KP_MKOUT2	GPIO 7 KP_MKOUT3	GPIO 9 KP_MKOUT4	GPIO 11 KP_MKOUT5	GPIO 13 KP_MKOUT6
GPIO 0	KP_MKIN0	Q	W	E	R	T	Y	U
GPIO 2	KP_MKIN1	I	O	P	A	S	D	F
GPIO 4	KP_MKIN2	G	H	J	K	L	DEL	ALT
GPIO 6	KP_MKIN3	Z	X	C	V	B	N	M
GPIO 8	KP_MKIN4	,	ENTER	SHIFT	@	REC	SPACE	.
GPIO 10	KP_MKIN5	SYM	FUNC					

[Figure 3.23] Qwerty Key Matrix

3.12.3.3 KEY Backlight

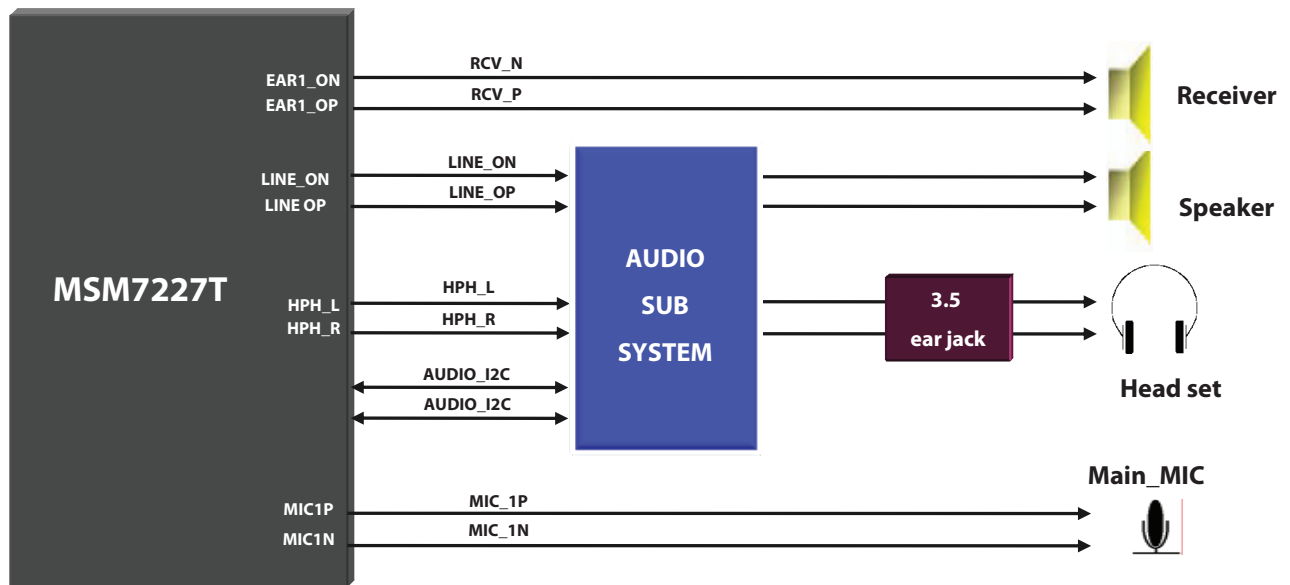
There are 14 white LED for Qwerty keys and Android 4 keys in backlight circuit.



[Figure 3.24] KEY Backlight (for Qwerty and Android key)

3.13 Audio and sound

3.13.1 Overview of Audio path



[Figure 3.25] Block diagram of Audio & Sound path

3.13.2 Audio signal processing & interface

3.13.2.1 MSM7227T audio interface

The MSM7227T audio front end comprises the stereo wideband codec, PCM interface, and additional DSP audio processing. The stereo wideband codec allows the MSM7227T device to support stereo music/ringer melody applications in addition to the 8 kHz voice band applications on the forward link.

In the audio transmit path, the device operates as 13-bit linear converter with software, selectable 8 kHz and 16 kHz sampling rate. In the audio receive path, the device operates as a software-selectable 13-bit or 16-bit linear converter with software selectable 8 kHz, 16 kHz, 22.05 kHz, 24 kHz, 32 kHz, 44.1 kHz, or 48 kHz sampling rate. Through software, the Rx path can be configured as either a mono or stereo output. New to the MSM7227T device is a transmit (Tx) ADC path that now supports stereo wideband sampling. The integrated codec contains all of the required conversion and amplification stages for the audio front end. The codec operates as a 13-bit linear codec with the transmit (Tx) and receive (Rx) filters designed to meet ITU-T G.712 requirements.

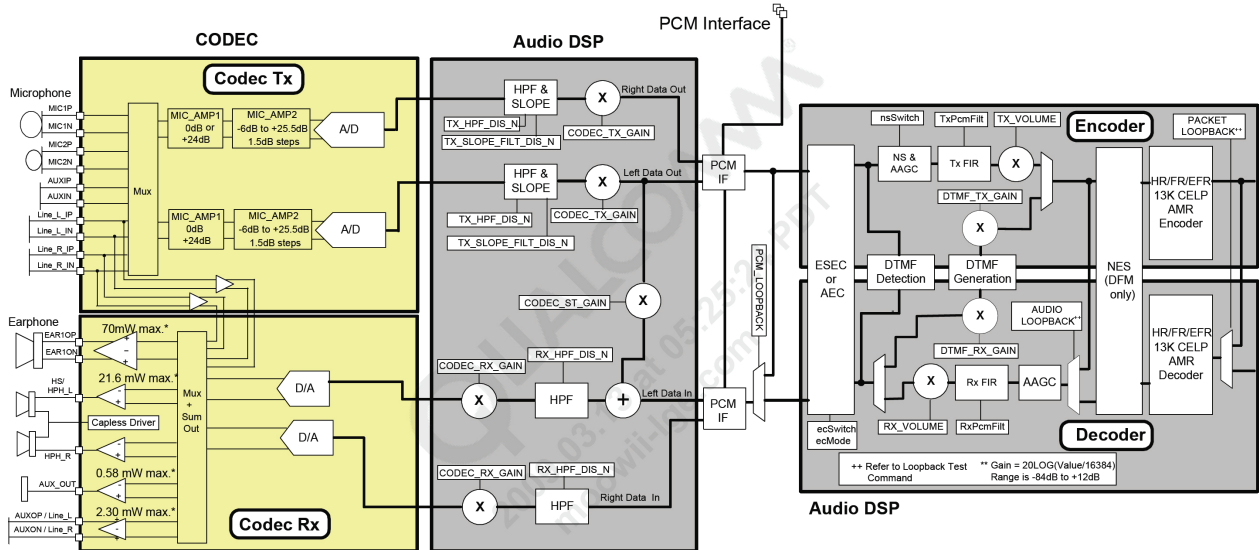
The codec includes a programmable side tone path for summing a portion of the Tx audio into the Rx path. An on-chip voltage/current reference is provided to generate the precise voltages and currents required by the codec. This circuit requires a single capacitor of 0.1 μ F to be connected between the CCOMP and GND pins. The on-chip voltage reference also provides a microphone bias voltage required for electret condenser microphones typically used in handset applications. The MICBIAS output pin is designed to provide 1.8 V DC while delivering as much as 1 mA of current.

Audio decoder summing and headset switch detection are included. The codec interface includes the amplification stages for both the microphone and earphone. On the transmit (Tx) path, the interface supports two differential microphone inputs, a differential auxiliary input, and a stereo line input. On the receive (Rx) path the interface supports one differential earphone output, a stereo single-ended headphone output, one differential auxiliary output, and stereo single-ended line outputs. The codec is configured by the codec SBI registers. The codec interface is shown in Figure.

Also part of the audio front end is the PCM interface. The PCM interface allows for an external codec to be used instead of the internal codec. This interface can be used in I2S mode which will allow for an external stereo DAC to be used. Finally, the audio front end includes additional DSP audio processing that does gains, filtering and other audio processing.

The DSP audio processing is configured through the QDSP5000 command types and is not directly controlled by the microprocessor.

3. TECHNICAL BRIEF



[Figure 3.26] Detailed diagram of MSM7227T audio interface

3.13.2.2 TPA2055D3 audio interface

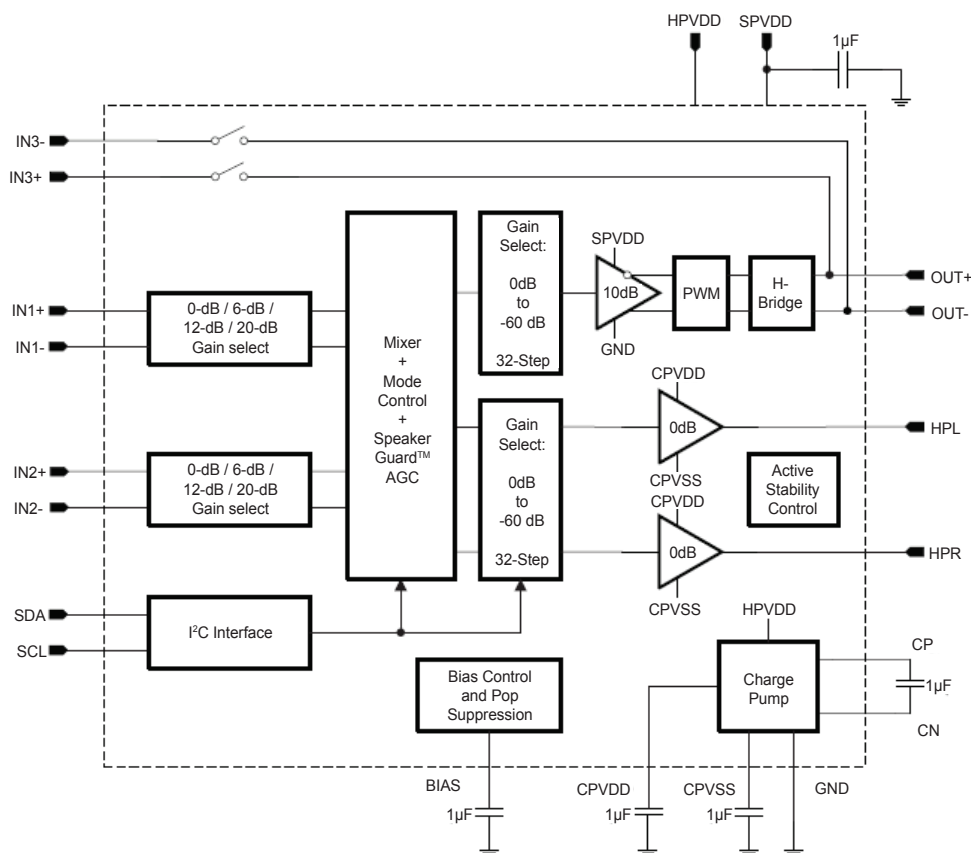
The TPA2055D3 is an audio subsystem with a mono class-D power amplifier, a stereo class-G DirectPath™ headphone amplifier, and bypass switches. Class-G improves MP3 playback time while DirectPath eliminates the need for external dc-blocking output capacitors. The headphone amplifier drives up to 35mW into 16-ohm speakers from a 1.8-V supply.

The subsystem includes two stereo single-ended (SE) inputs. The stereo inputs are also configurable as differential mono inputs. Each input channel has an independent volume control. Inputs can be individually selected or mixed together. Input impedances remain constant over all input and output gains.

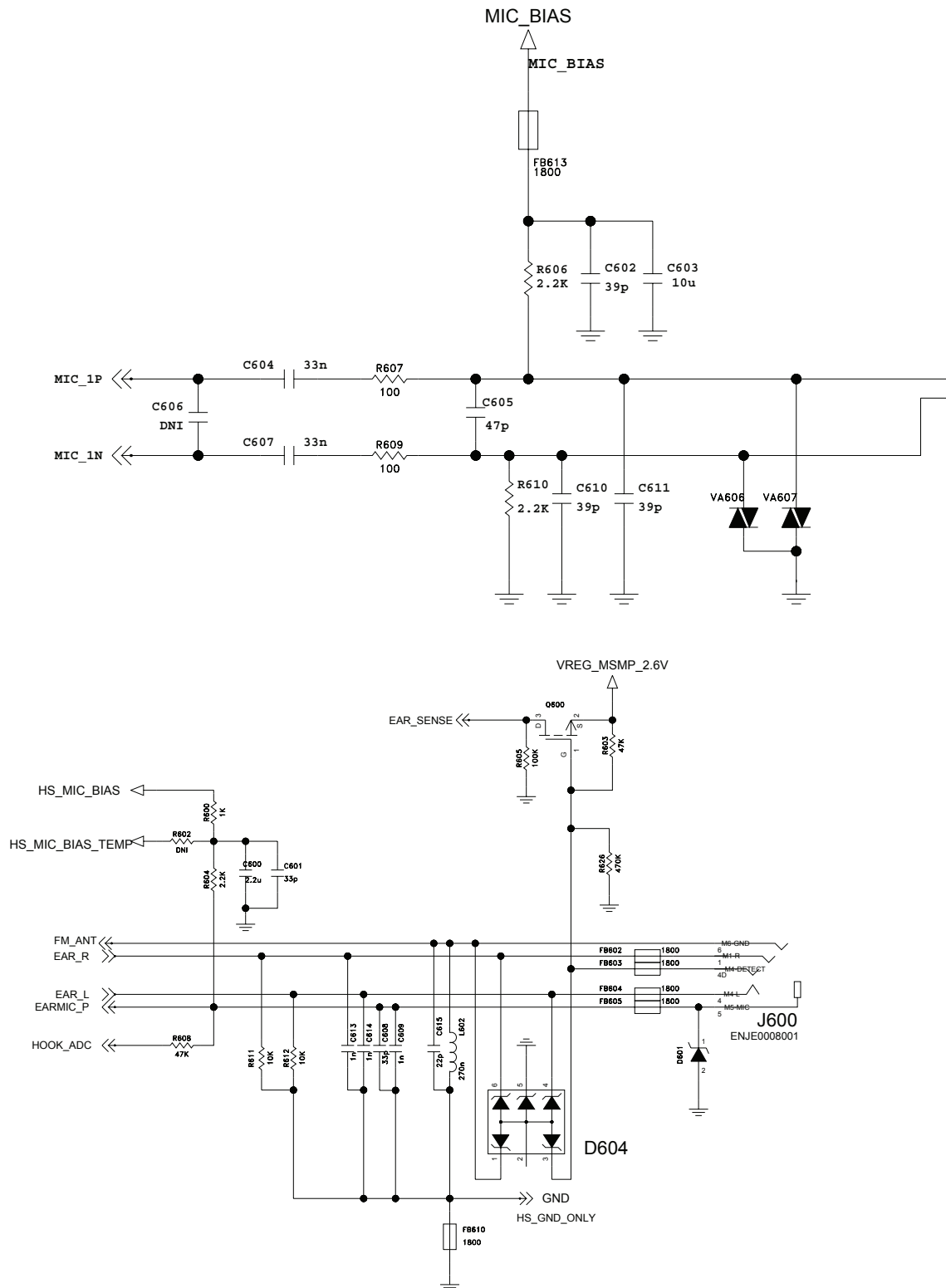
Operating mode and volume levels are controlled over an I²C interface. The I²C interface is compatible over a 1.5V to 5.5V digital supply range.

The TPA2055D3 uses SpeakerGuard™ Limiter technology to prevent output clipping distortion and excessive power to the speakers and headphones. The speaker and headphone amplifier outputs have independent limiter levels, allowing optimum loudness and protection for each output.

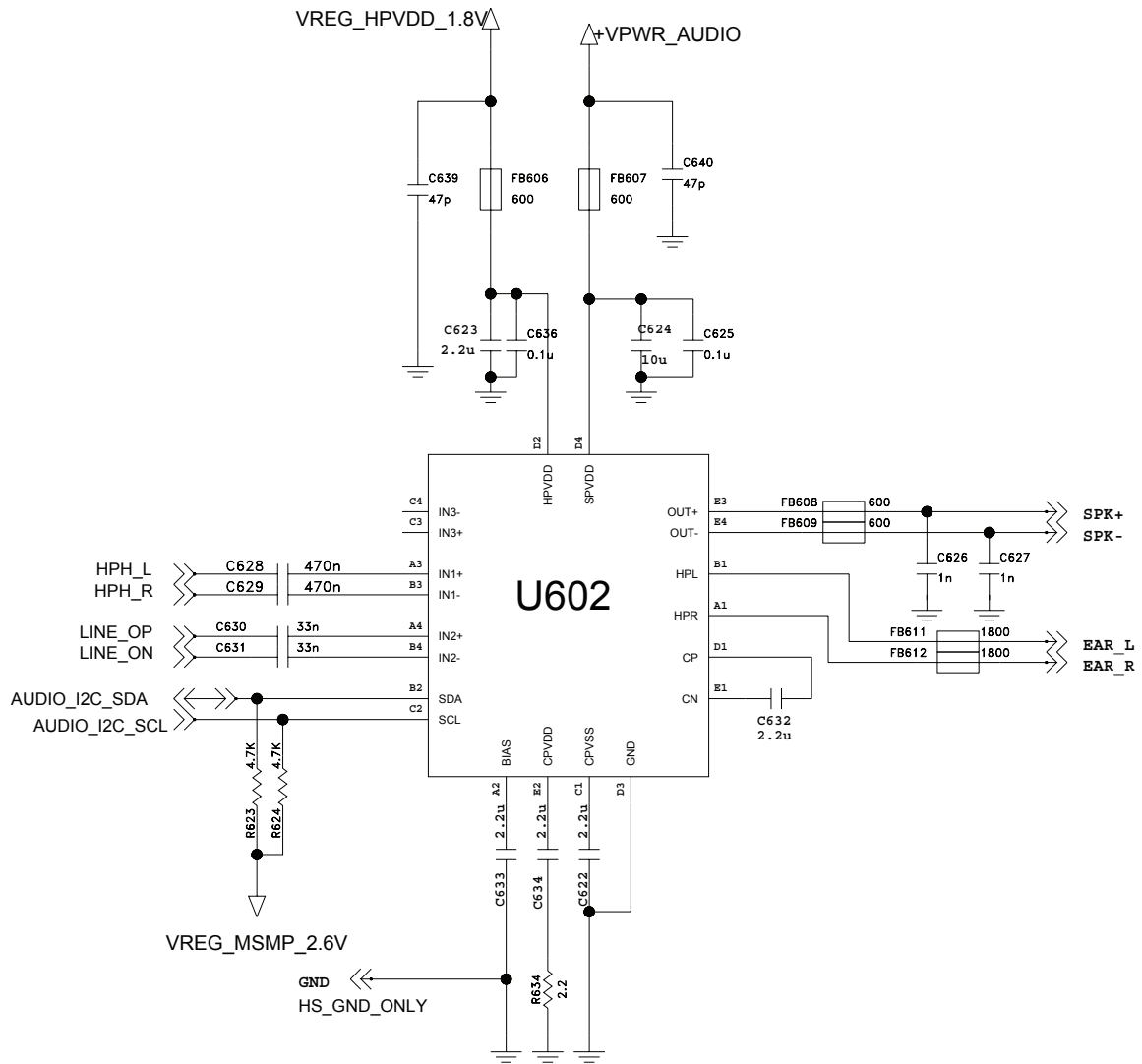
The TPA2055D3 is available in a 0.5 mm pitch 20-bump WCSP with less than 0.8 mm height.



[Figure 3.27] Detailed diagram of TPA2055D3 audio interface



[Figure 3.28] Mic & 3.5Pi Ear Jack Connector

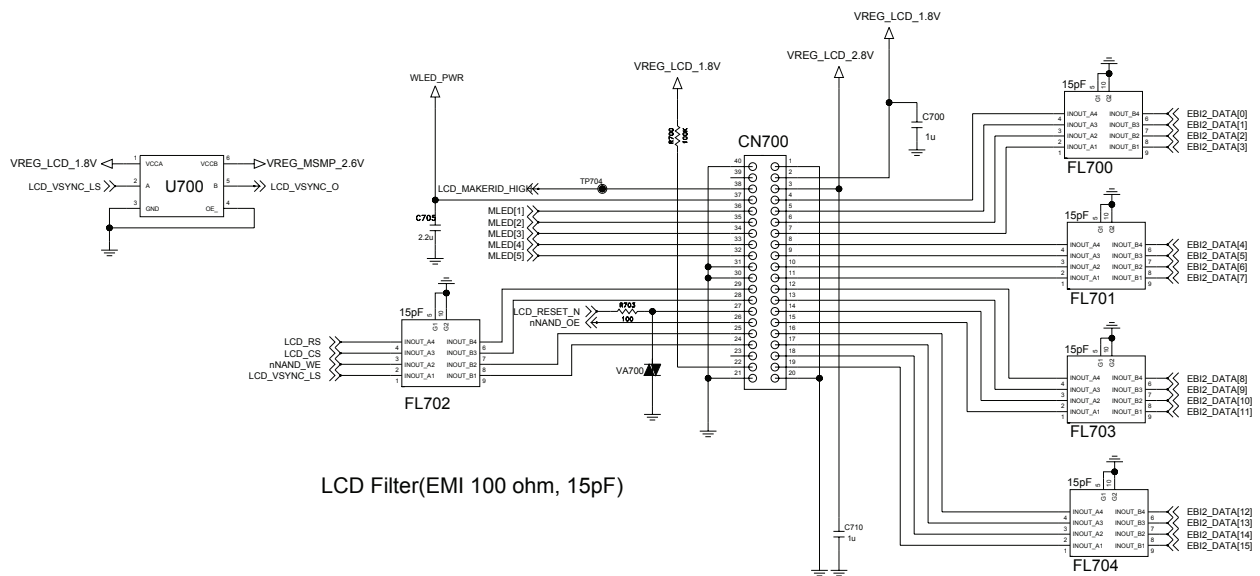


[Figure 3.29] Audio SUB System

3.14 Display

LCD module is connected with 40-pin B to B connector placed on the PCB bottom.

The LCD is controlled by CPU Interface in MSM7227T.



[Figure 3.30] Schematic of LCD connector in Main PCB

3. TECHNICAL BRIEF

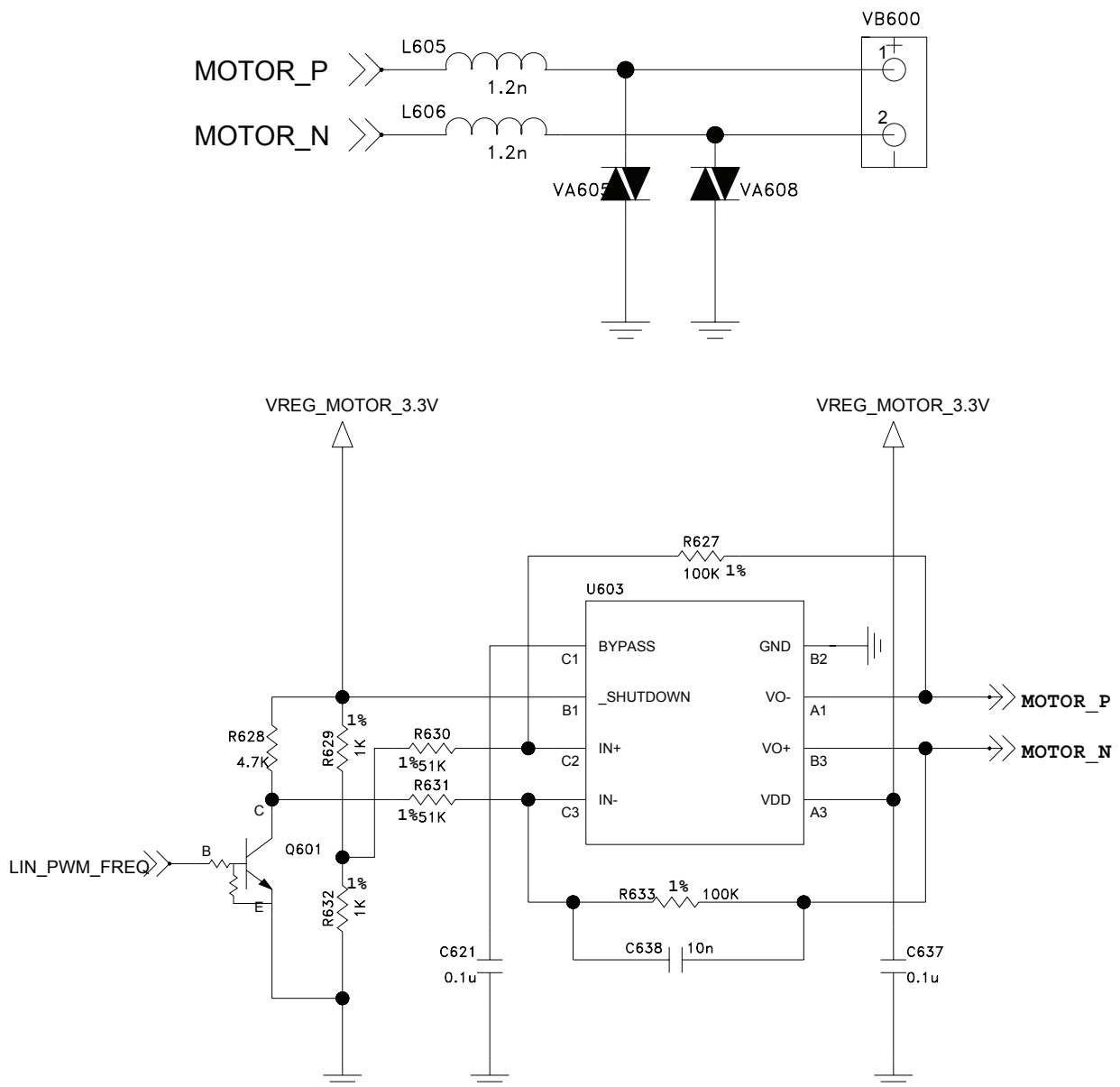
Pin No.	Symbol	Description	Remark
1	GND	-	Ground
2	VDDIO	I	Power supply for LDI and LCM (I/O)
3	VCC	I	Power supply for LDI and LCM (Logic & ANALOG)
4	D0	I/O	Bi-Direction Data Bus
5	D1	I/O	Bi-Direction Data Bus
6	D2	I/O	Bi-Direction Data Bus
7	D3	I/O	Bi-Direction Data Bus
8	D4	I/O	Bi-Direction Data Bus
9	D5	I/O	Bi-Direction Data Bus
10	D6	I/O	Bi-Direction Data Bus
11	D7	I/O	Bi-Direction Data Bus
12	D8	I/O	Bi-Direction Data Bus
13	D9	I/O	Bi-Direction Data Bus
14	D10	I/O	Bi-Direction Data Bus
15	D11	I/O	Bi-Direction Data Bus
16	D12	I/O	Bi-Direction Data Bus
17	D13	I/O	Bi-Direction Data Bus
18	D14	I/O	Bi-Direction Data Bus
19	D15	I/O	Bi-Direction Data Bus
20	GND	-	Ground
21	GND	-	Ground
22	IF MODE0	I	Selection of Data Bus (8bit or 16bit), Note1)
23	N.C	-	No connection
24	VSYNC_O	O	Out put of frame synchronization signal
25	WRB	I	Write-Strobe Signal, Active low
26	RDB	I	Read-Strobe Signal, Active low
27	RESETB	I	Reset pin, Initialize the LSI at the low level
28	CSB	I	Chip Select, Active low
29	RS	I	Select the Register-High: control, Low: Index/Status
30	IF MODE1	I	Selection of Data Bus (8bit or 16bit), Note1)
31	GND	-	Ground
32	LED5	I	Cathode of LED5
33	LED4	I	Cathode of LED4
34	LED3	I	Cathode of LED3
35	LED2	I	Cathode of LED2
36	LED1	I	Cathode of LED1
37	LEDA	-	Anode of LED(1,2,3,4,5)
38	Maker ID (H)	O	Maker ID (High)
39	LED_PWM	O	BLU Control Signal
40	GND	-	Ground

[Table 3.3] Interface between LCD Module and Main PCB

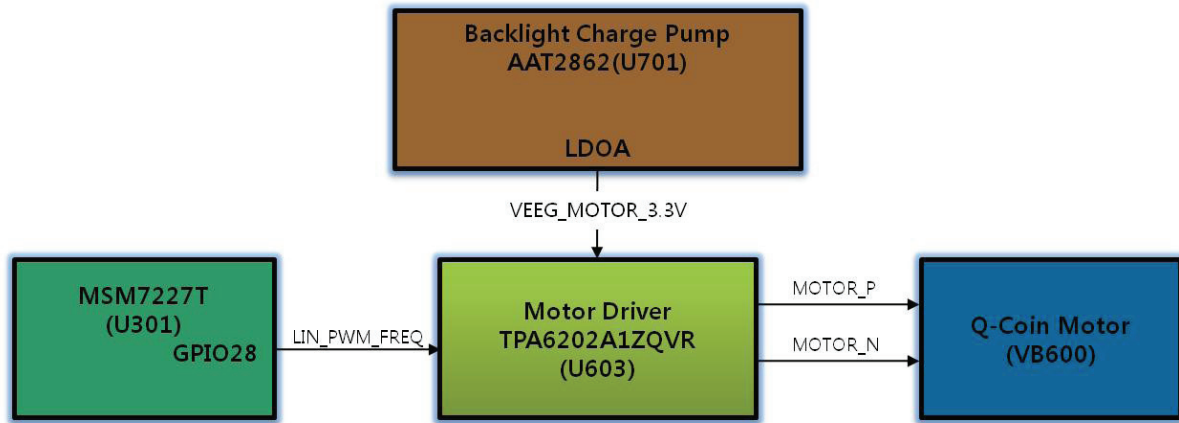
3.15 Vibrators (Q-Coin Motor)

The strength of vibration is determined by the duty cycle of PWM (LIN_PWM_FREQ)

U603 is Q-Coin motor driver amplifier IC.



[Figure 3.31] Vibrator Circuit & Drive Amplifier circuit

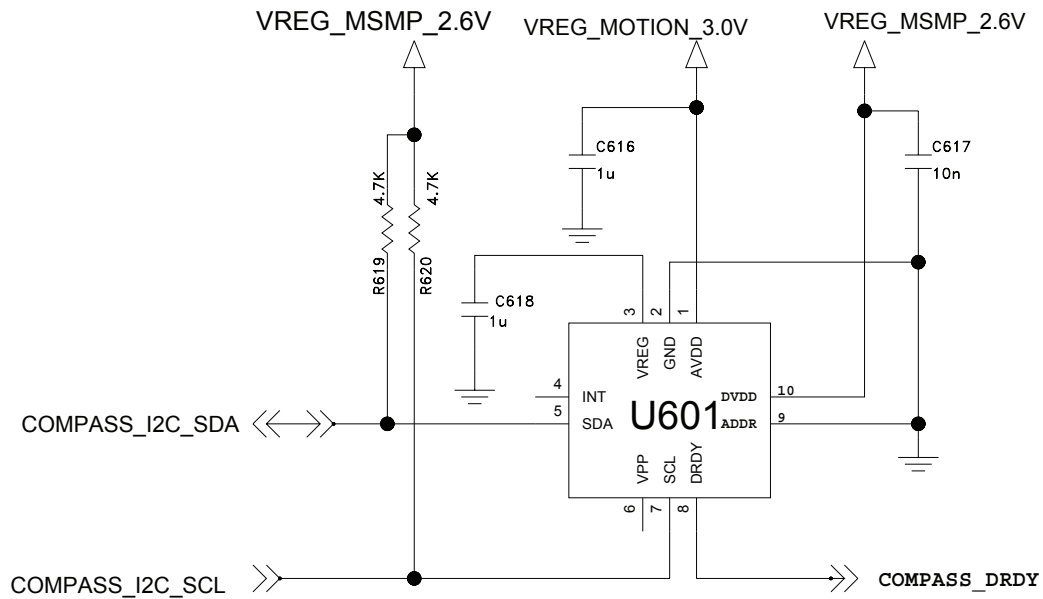


[Figure 3.32] Vibrator Block Diagram

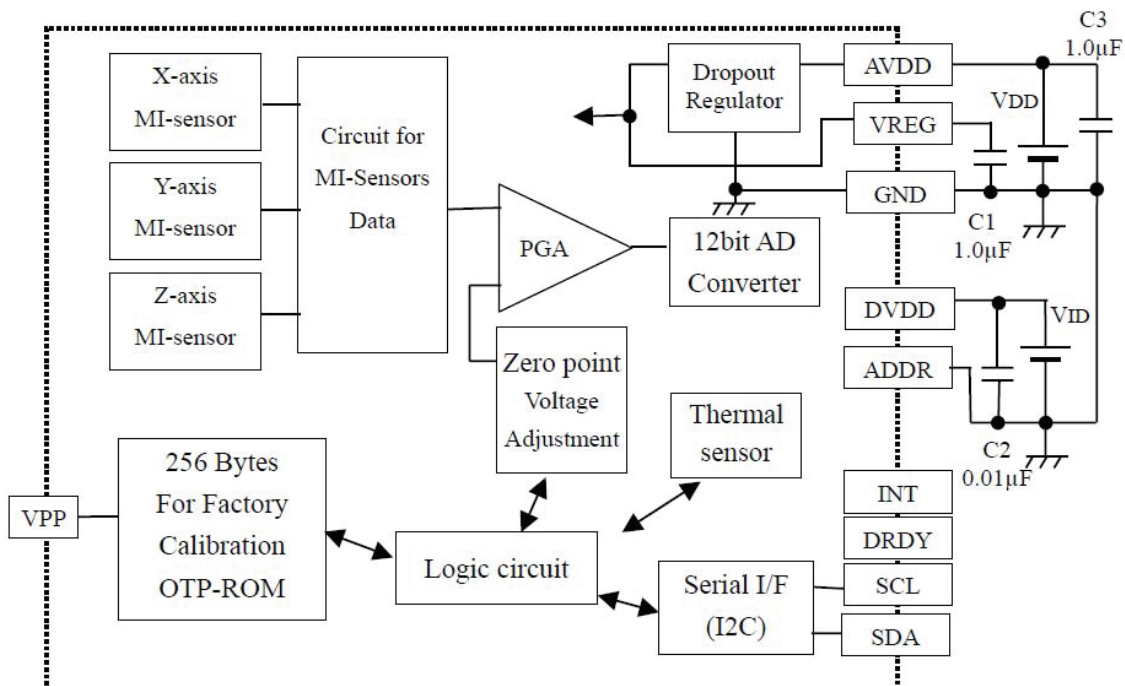
3.16 Compass Sensor

If a customer buy the application SW, the sensor support a electric compass function

U601 : AMI306 IC used I2C interface to MSM7227T



[Figure 3.33] Compass Sensor Schematic

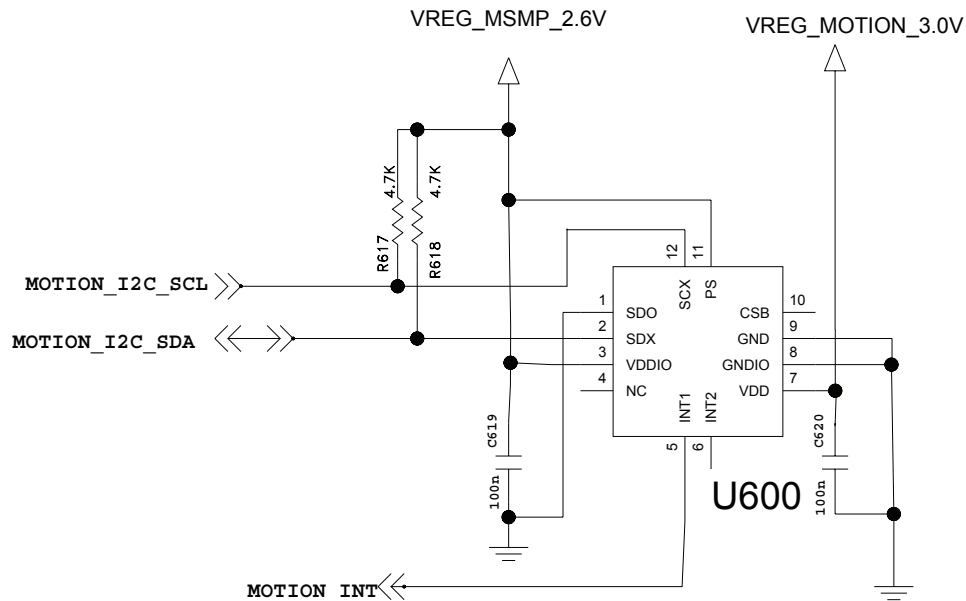


[Figure 3.34] Compass Sensor Block Diagram

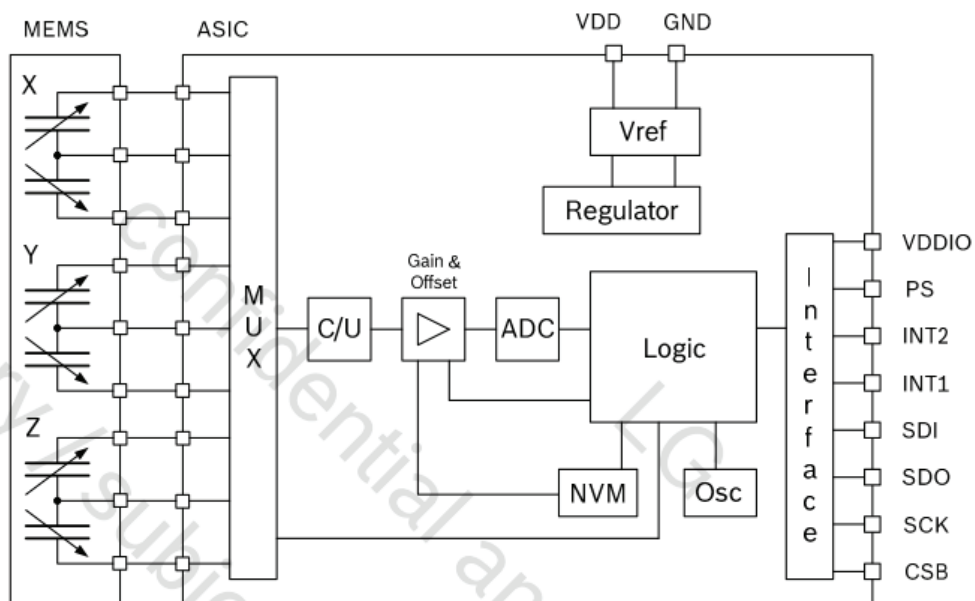
3.17 Motion Sensor

According to tilt the cell phone, the screen is had rotated automatically.

U600 : BMA250 IC used I2C interface to MSM7227T



[Figure 3.35] Motion Sensor Schematic



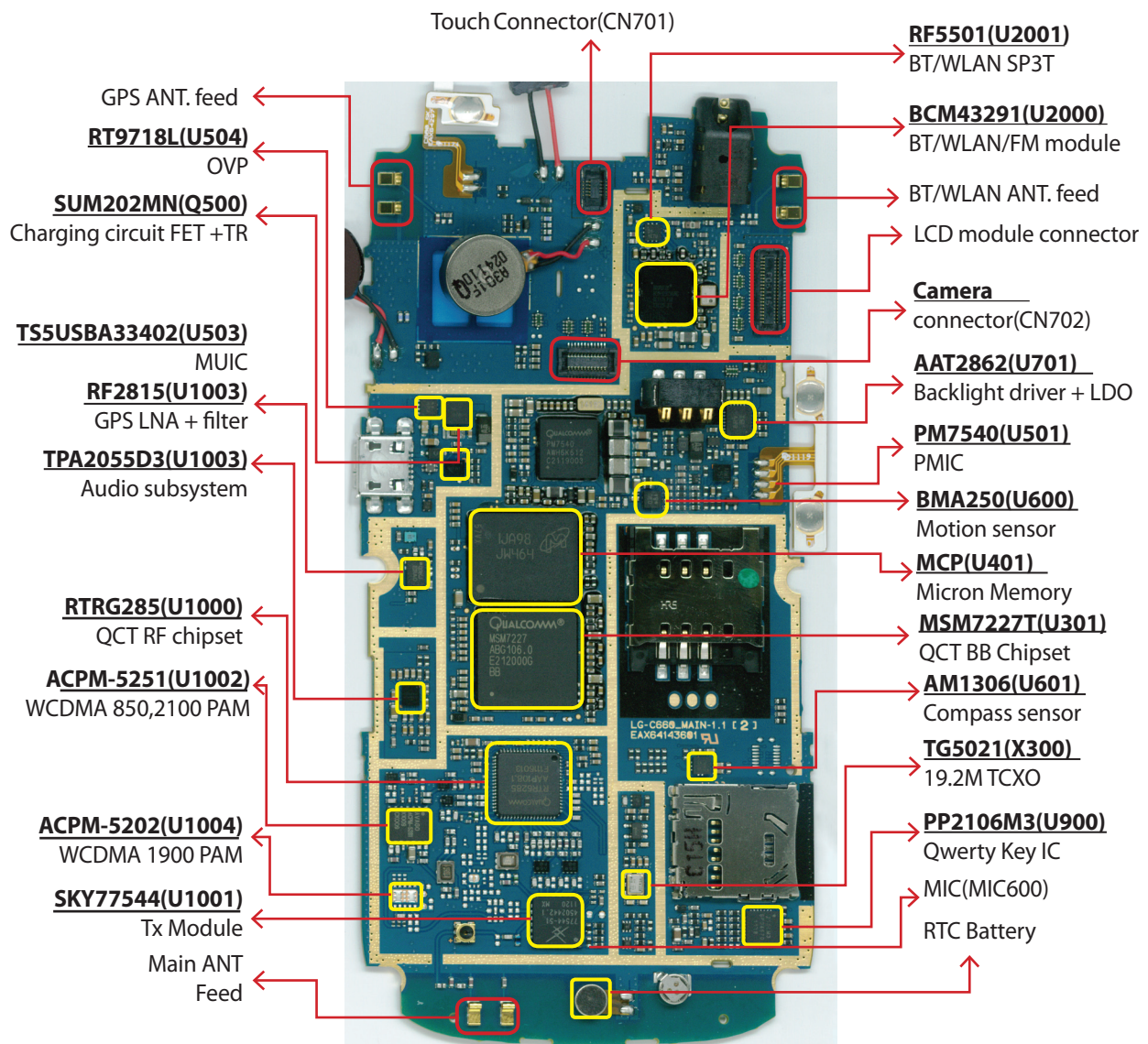
[Figure 3.36] Motion Sensor Block Diagram

3.18 Main Features

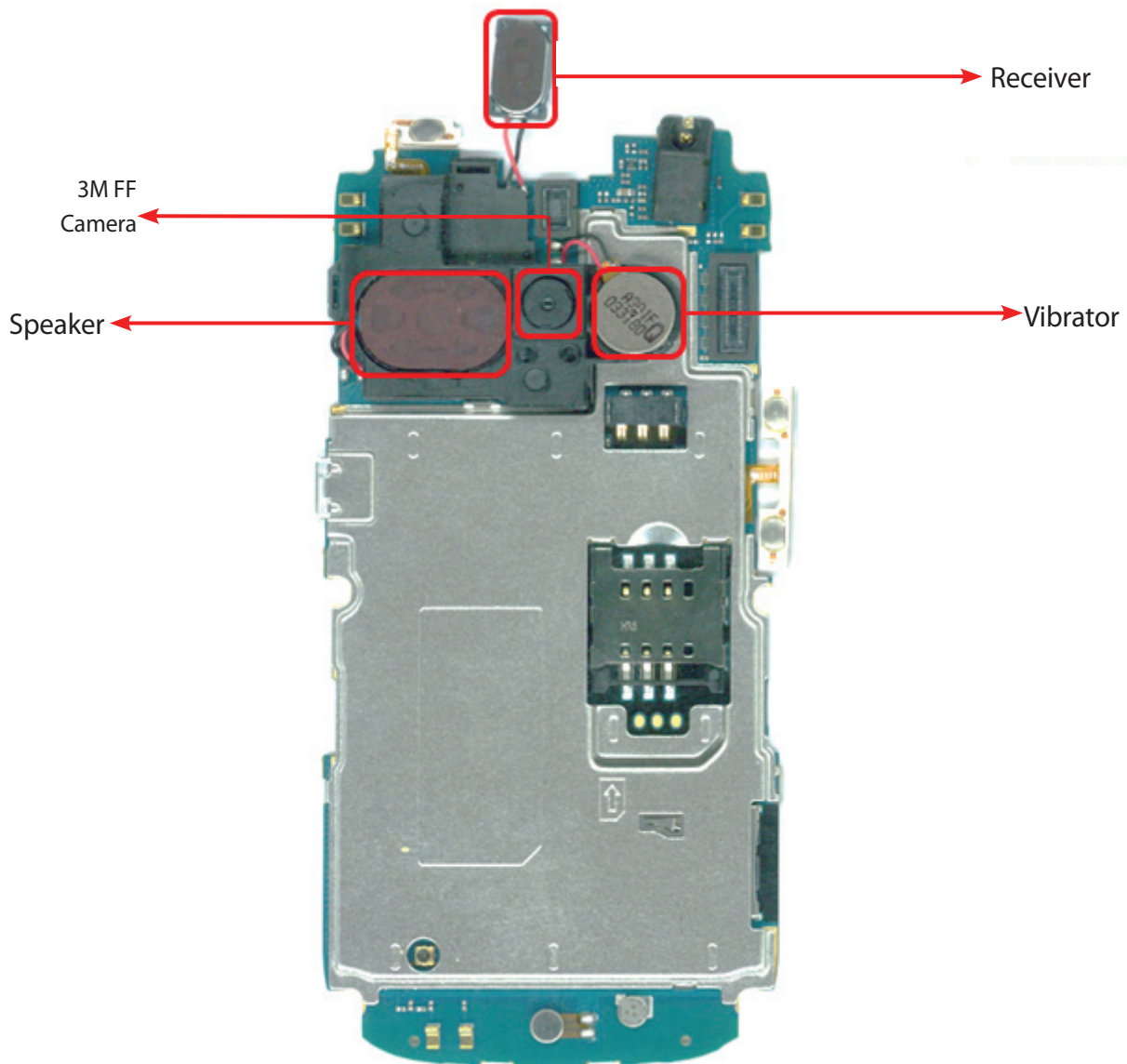
3.18.1 LG-C660 Main Features

- QWERTY Type design
- UMTS 2100 + UMTS 900 + GSM 900 + DCS 1800 + PCS 1900 + GSM850 based GSM/GPRS/EDGE/UMTS
- HSDPA 3.6Mbps
- TFT Main LCD(2.8' QVGA, 240 x 320)
- Capacitive/Electrostatic Touch Window
- 3M FF Camera
- 3.5Phi Stereo Headset & Speaker phone
- Mobile XMF –Mobile DLS / Scaleable Polyphony
- MP3/ WMA/AAC/HE-AAC/EAAC+
- MPEG4 encoder/decoder and play/save
- JPEG en/decoder
- Supports Bluetooth and HS-USB
- Supports WLAN(802.11b, 802.11g, 802.11n)
- Supports FM Radio
- 1500 mAh (Li-Ion)

3.18.2 LG-C660 Main component (bottom)

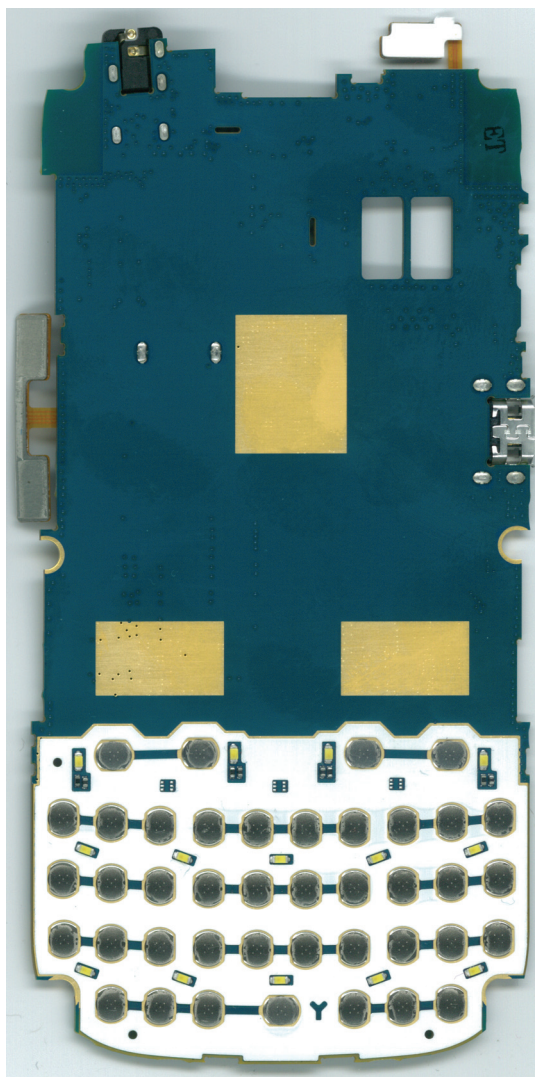


3.18.3 LG-C660 Main component (bottom & Holder)



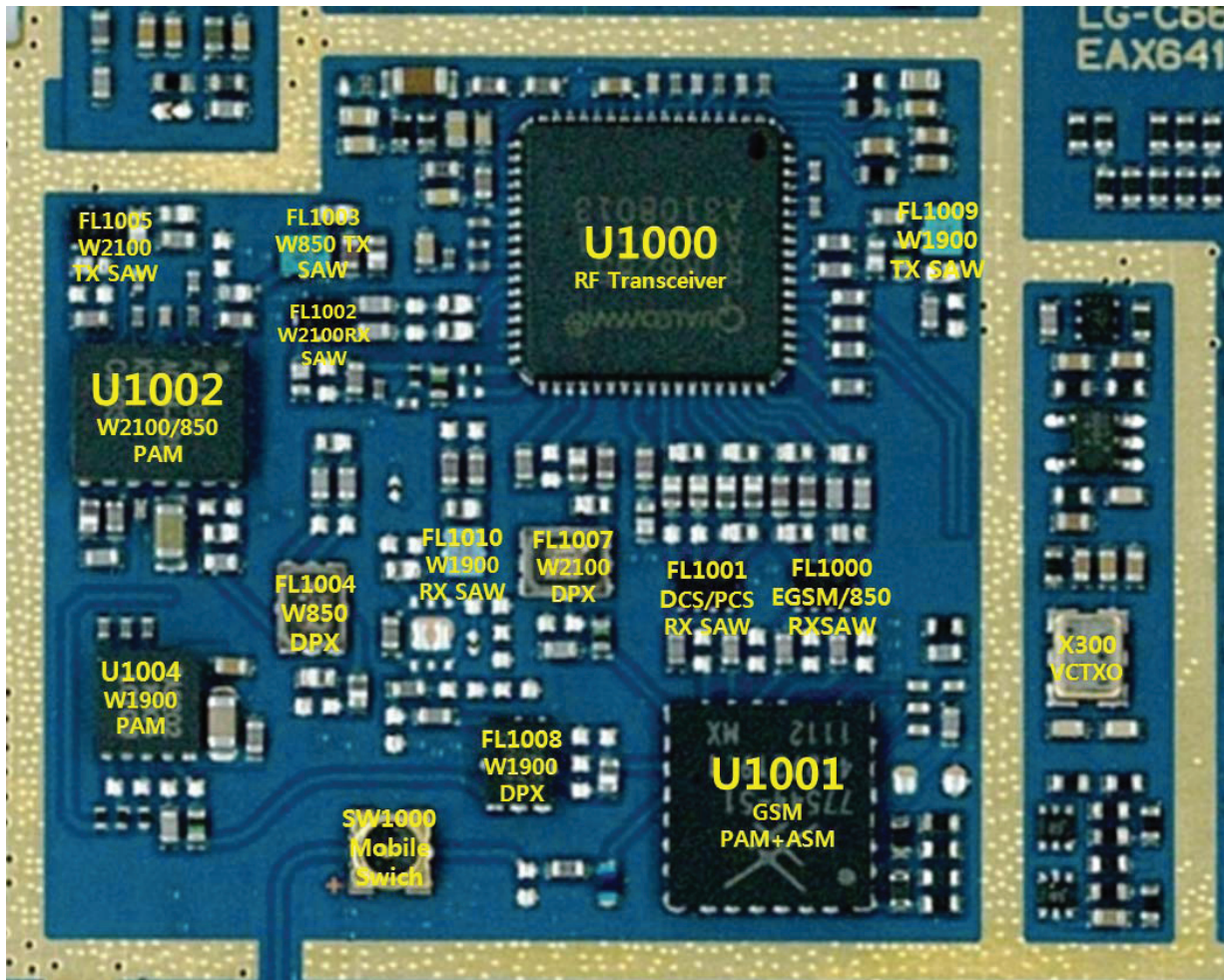
[Figure 3.38] Main Board Component Bottom & Holder

3.18.4 LG-C660 Main component (Top)



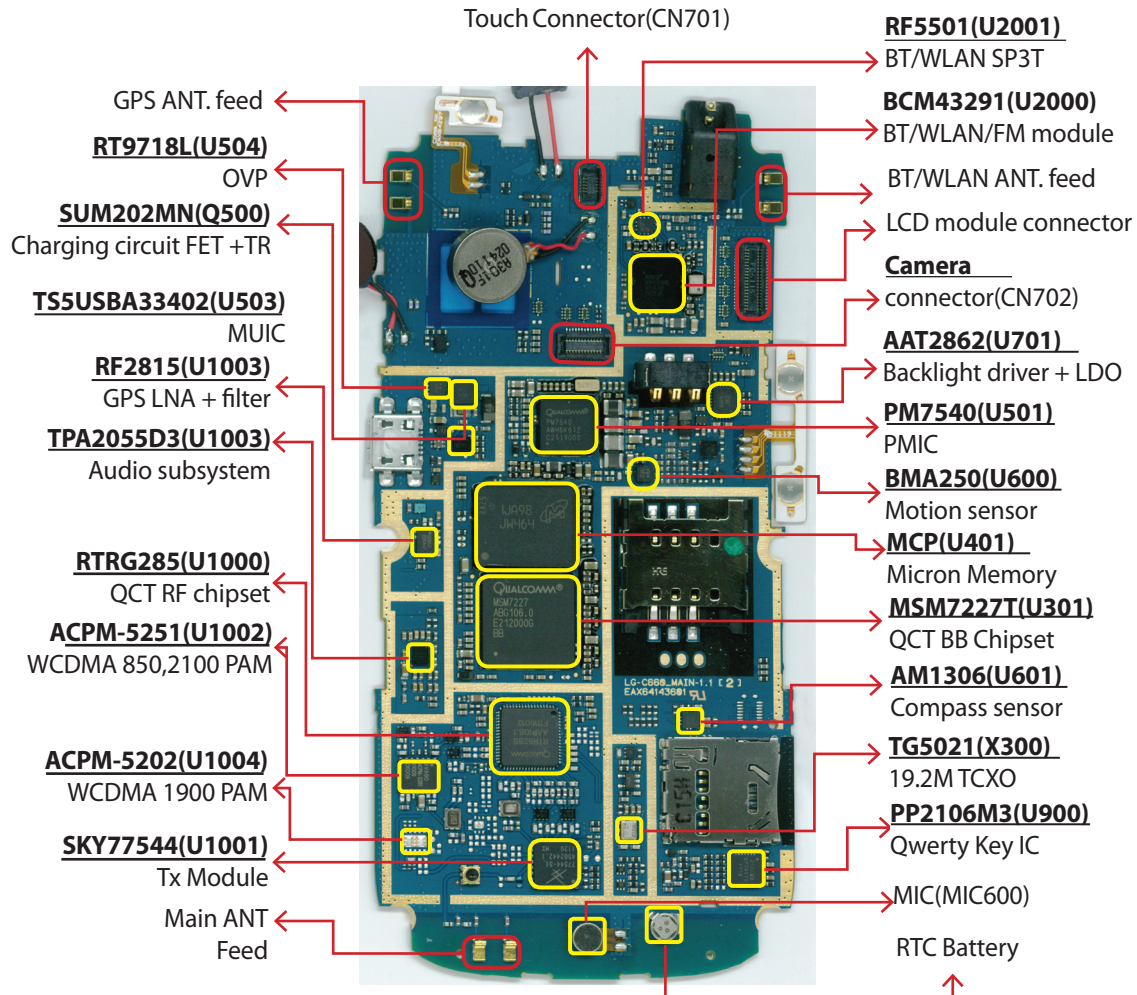
[Figure 3.39] Main Board Component Main Board Top

3.18.5 RF of LG-C660



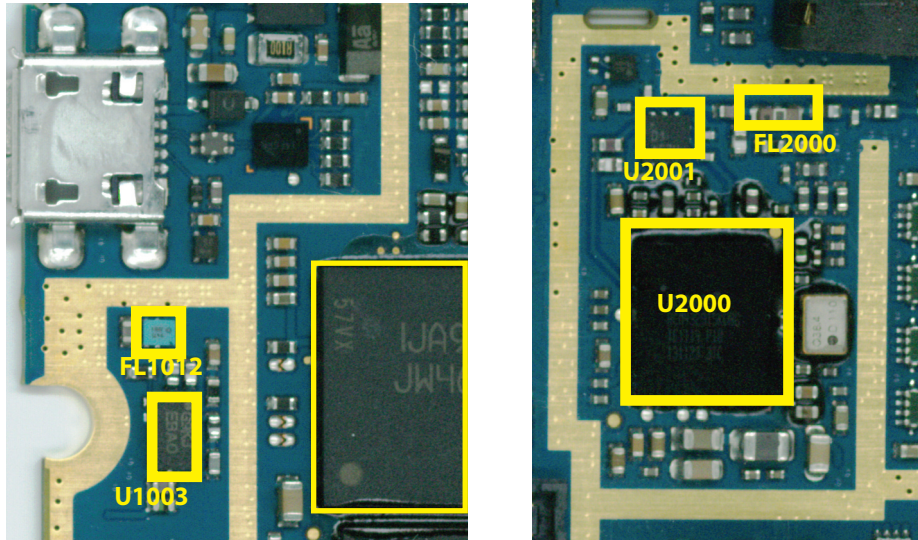
Reference	Description	Reference	Description
U1000	RTR6285(Transceiver)	FL1004	WCDMA (V) Duplexer
U1001	GSM TX Module (ASM + GSM/EDGE PAM)	FL1005	WCDMA (I) TX SAW Filter
U1002	WCDMA Dual (I,V) PAM	FL1007	WCDMA (I) Duplexer
U1004	WCDMA Single(II) PAM	FL1008	WCDMA (II) Duplexer
FL1000	EGSM/850 Rx saw filter	FL1009	WCDMA (II) TX SAW Filter
FL1001	DCS/PCS Rx saw filter	FL1010	WCDMA (II) RX SAW Filter
FL1002	WCDMA (I) RX SAW Filter	X300	VCTCXO(19.2MHz)
FL1003	WCDMA (V) TX SAW Filter	SW1000	RF Antenna Connector

3.18.6 Base Band and Power of LG-C660



Reference	Description	Reference	Description
J600	3.5 Pi connector	CN702	Camera connector
U1003	Audio Sub System	S800	Micro SD card socket
X500	Crystal	U401	Memory
U501	PMIC	U301	MSM7227T
J800	SIM connector	U503	MUIC
BAT500	Backup battery	CN500	Battery connector
U504	OVP	MIC600	MIC
Q500	Charging IC	U900	Qwerty Key EnCoder
U601	Compass sensor	U701	Backlight charge pump
U600	Motion sensor	CN701	Touch connector

3.18.7 GPS, WIFI of LG-C660

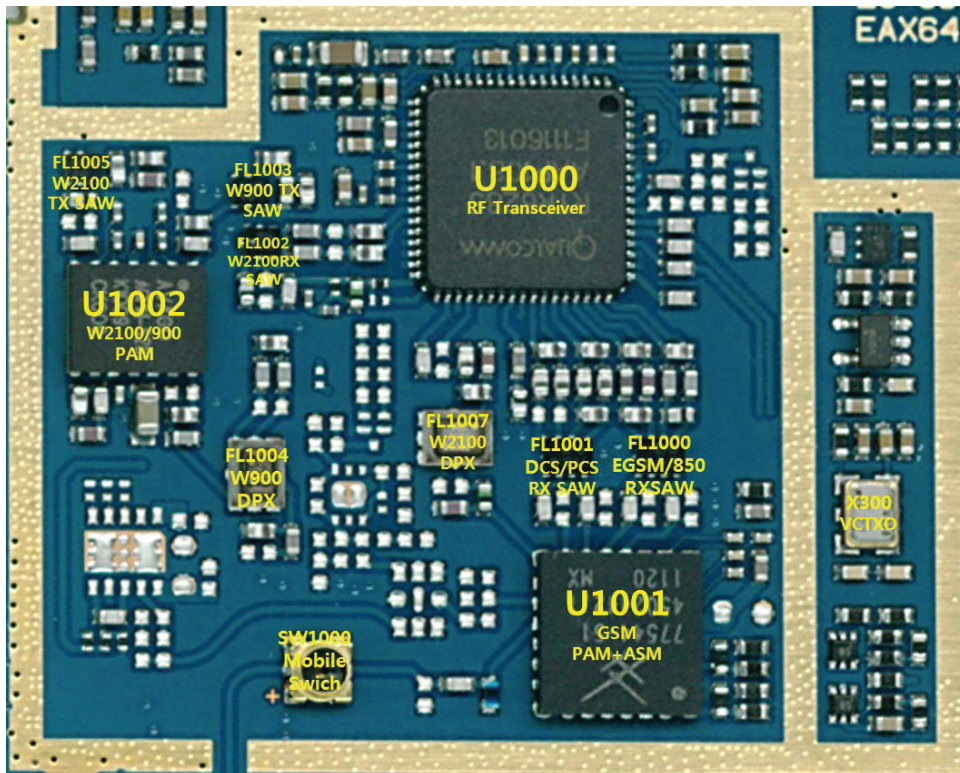


Reference	Description	Reference	Description
U2000	WiFi(11bg)+BT+FM(Rx) Chip	U1003	GPS LNA
U2001	SP3T+LNA	FL1012	GPS SAW Filter

4. TROUBLE SHOOTING

4. TROUBLE SHOOTING

4.1 RF Component

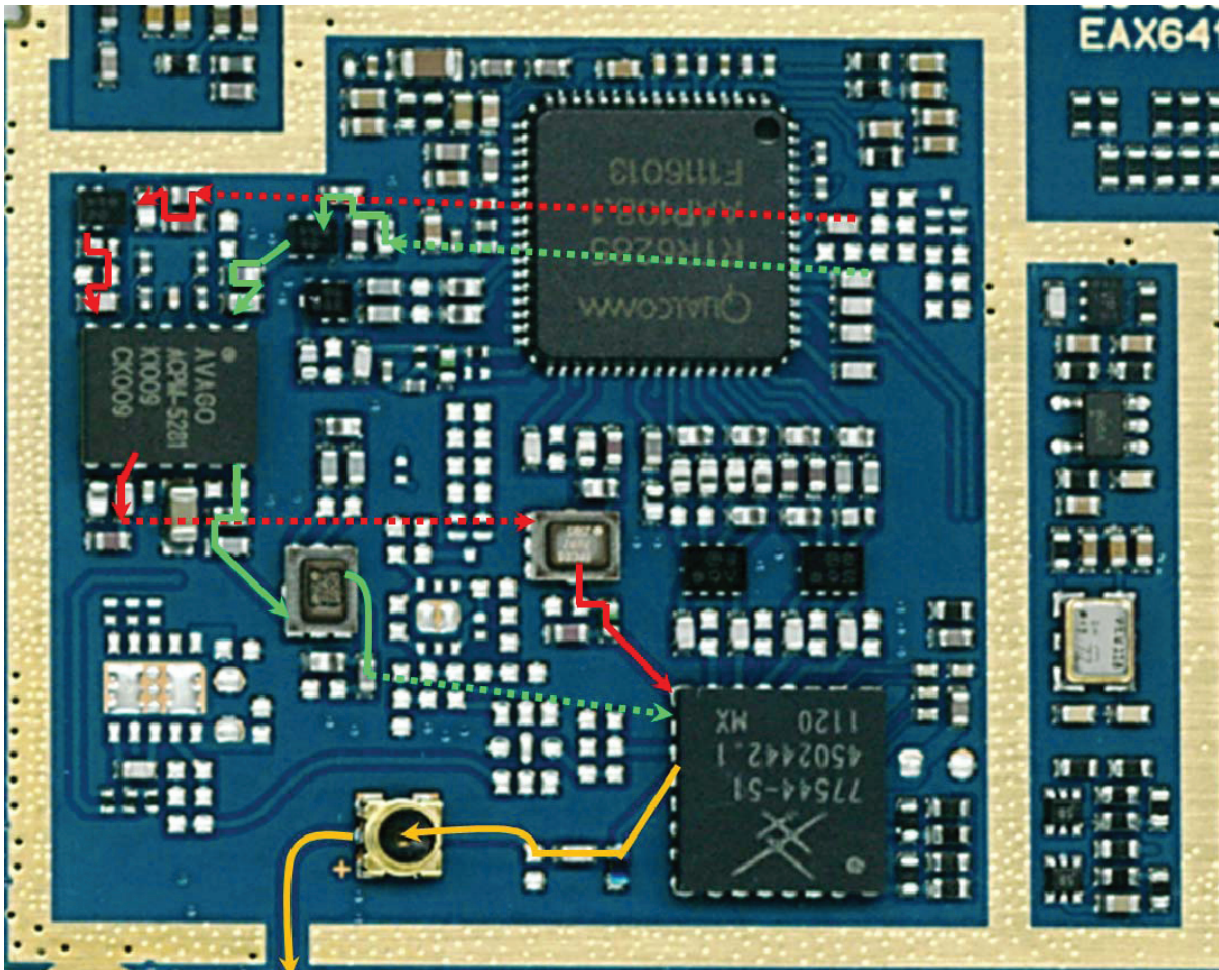


RF component (WCDMA / GSM)

Reference	Description	Reference	Description
U1000	RTR6285(Transceiver)	FL1003	WCDMA (VIII) TX SAW Filter
U1001	GSM TX Module (ASM + GSM/EDGE PAM)	FL1004	WCDMA (VIII) Duplexer
U1002	WCDMA Dual (I,VIII) PAM	FL1005	WCDMA (I) TX SAW Filter
FL1000	EGSM/850 Rx saw filter	FL1007	WCDMA (I) Duplexer
FL1001	DCS/PCS Rx saw filter	X300	VCTCXO(19.2MHz)
FL1002	WCDMA (I) RX SAW Filter	SW1000	RF Antenna Connector

4.2 SIGNAL PATH

4.2.1 WCDMA TX Signal PATH



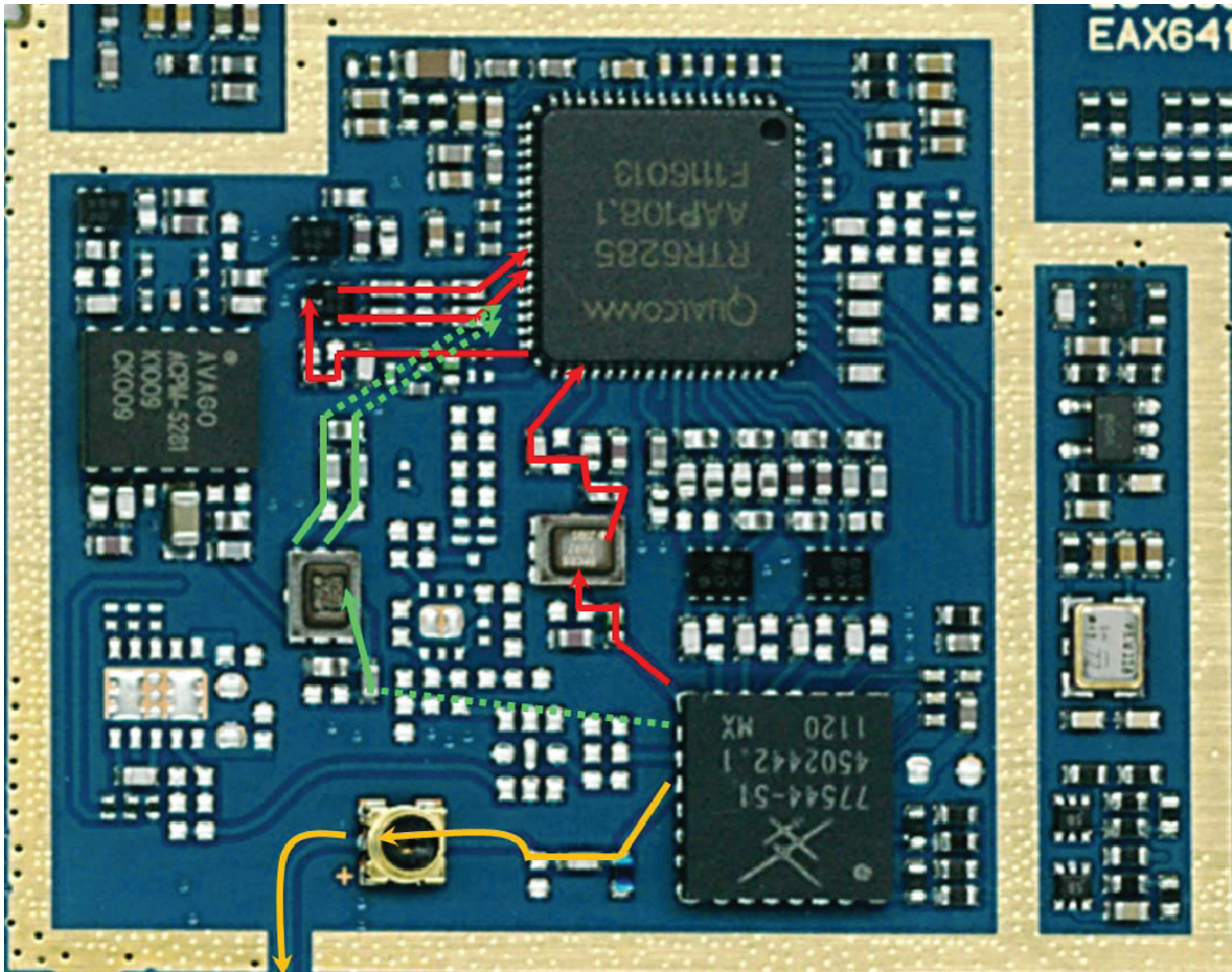
WCDMA I and II/V Band TX Signal PATH

1. WCDMA 2100 TX PATH

2. WCDMA 900 TX PATH

3. COMMON TX/RX PATH

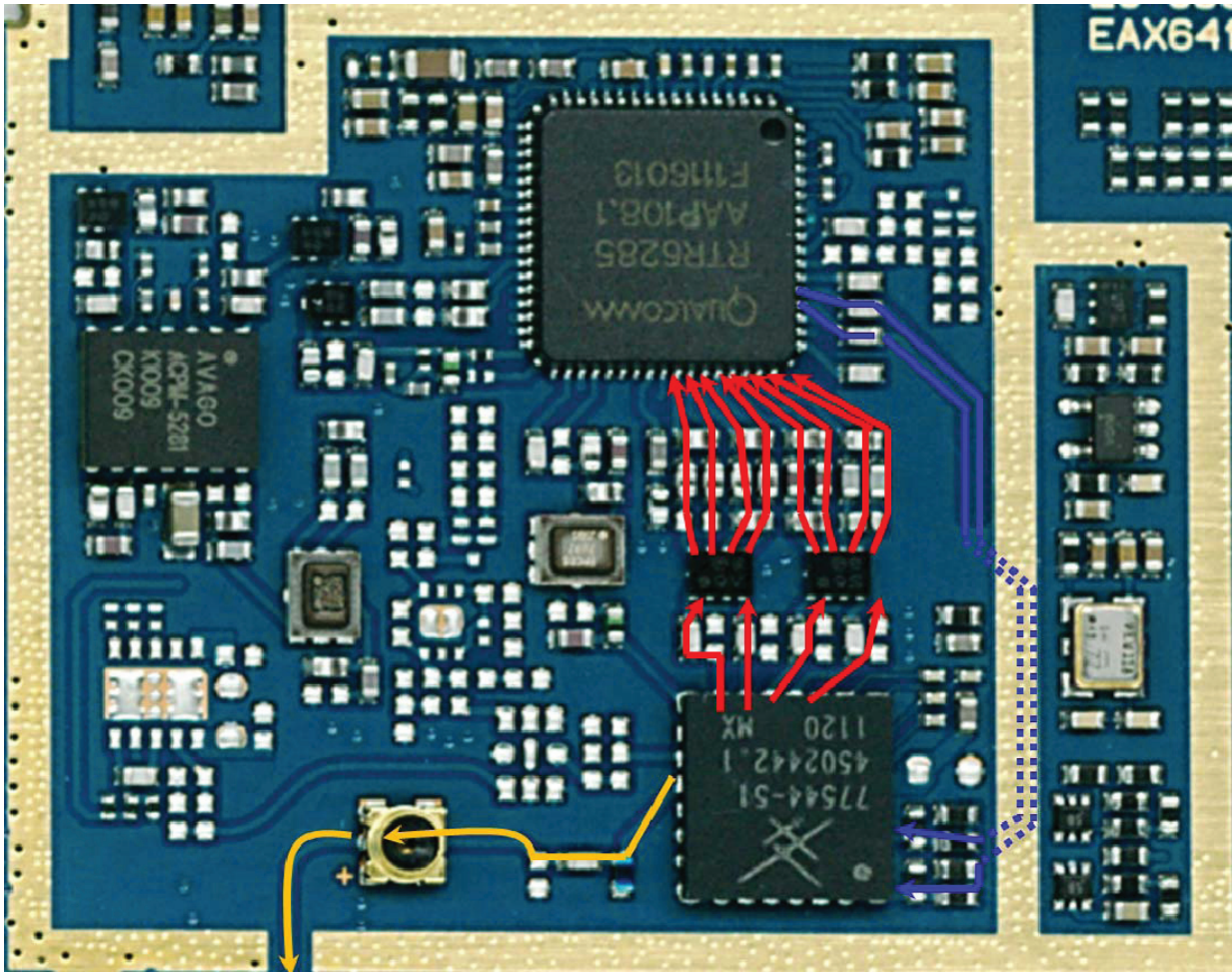
4.2.2 WCDMA RX Signal PATH



WCDMA I and II/V Band RX Signal PATH

1. WCDMA 2100 RX PATH
2. WCDMA 900 TX PATH
3. COMMON TX/RX PATH

4.2.3 GSM TX/RX Signal PATH

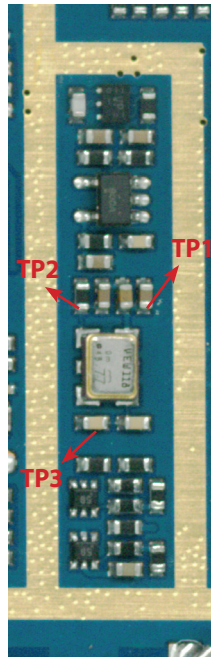


GSM850/GSM900/DCS/PCS's RX/TX Signal PATH

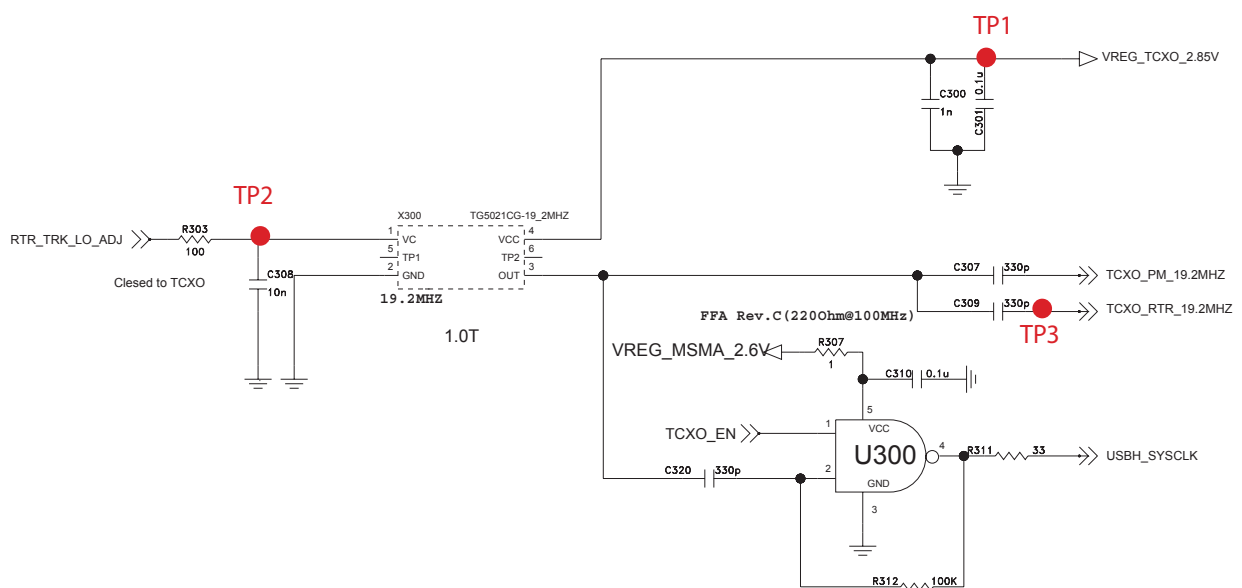
1. GSM850/GSM900/DCS1800/PCS1900 RX PATH
2. GSM850/GSM900/DCS1800/PCS1900 TX PATH
3. COMMON TX/RX PATH

4.3 Checking TCXO Block

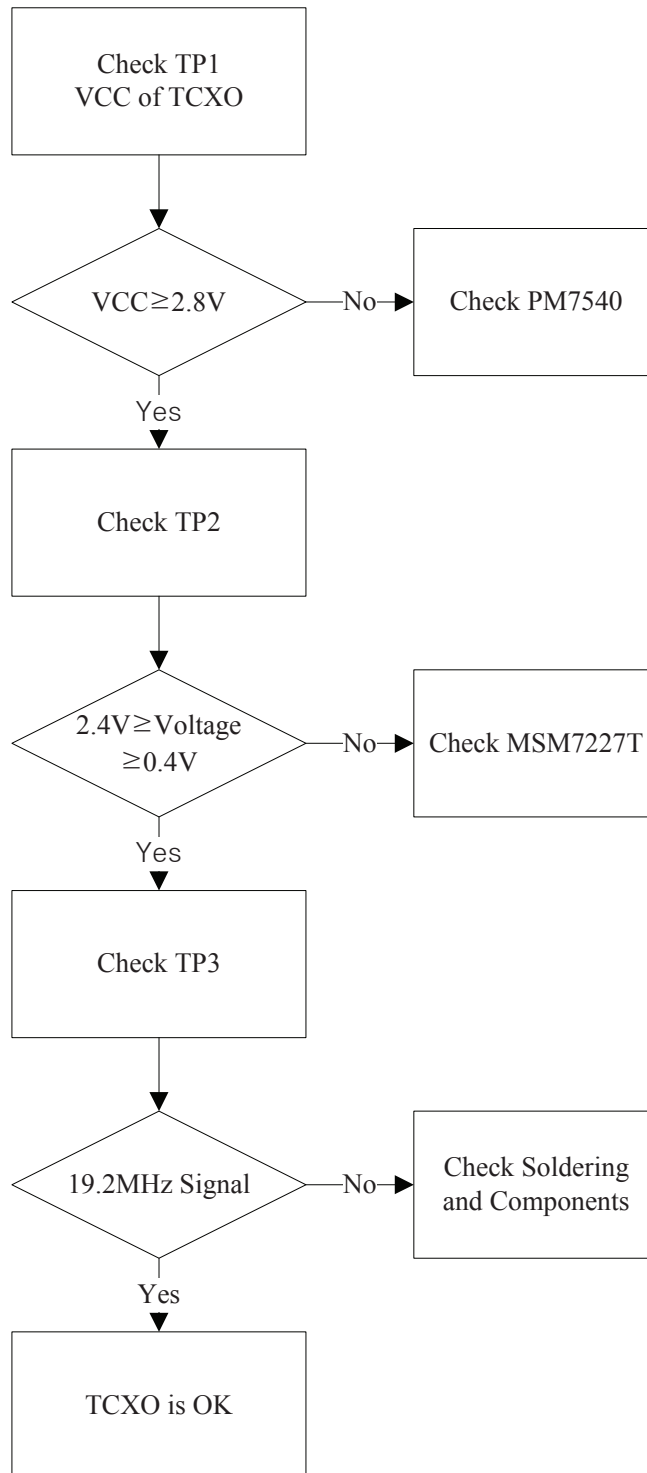
The output frequency (19.2MHz) of TCXO (X2001) is used as the reference one of RTR6285 and PM7540 internal VCO.



<Test Point (TCXO Block)>

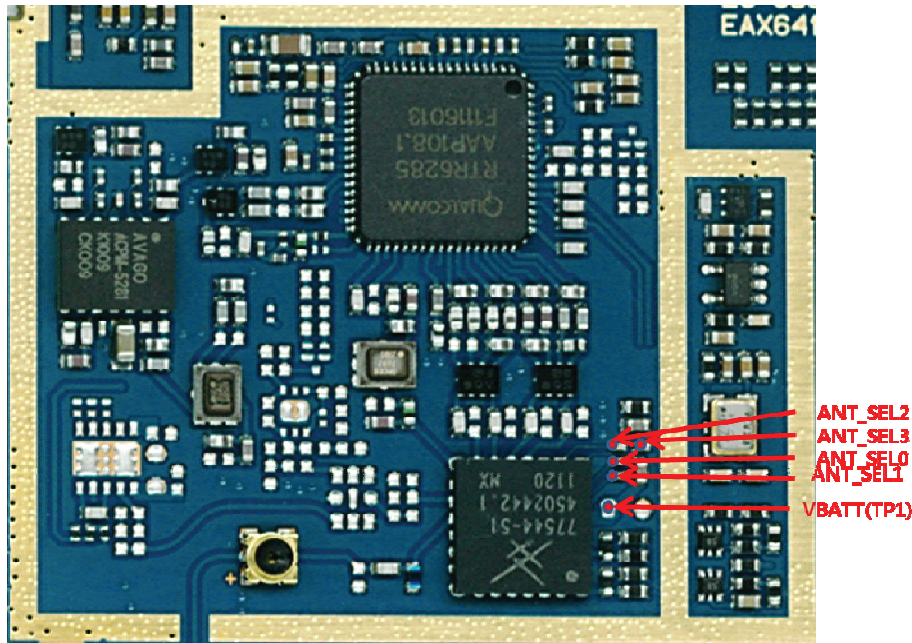


<Schematic of the Crystal Part (19.2MHz)>

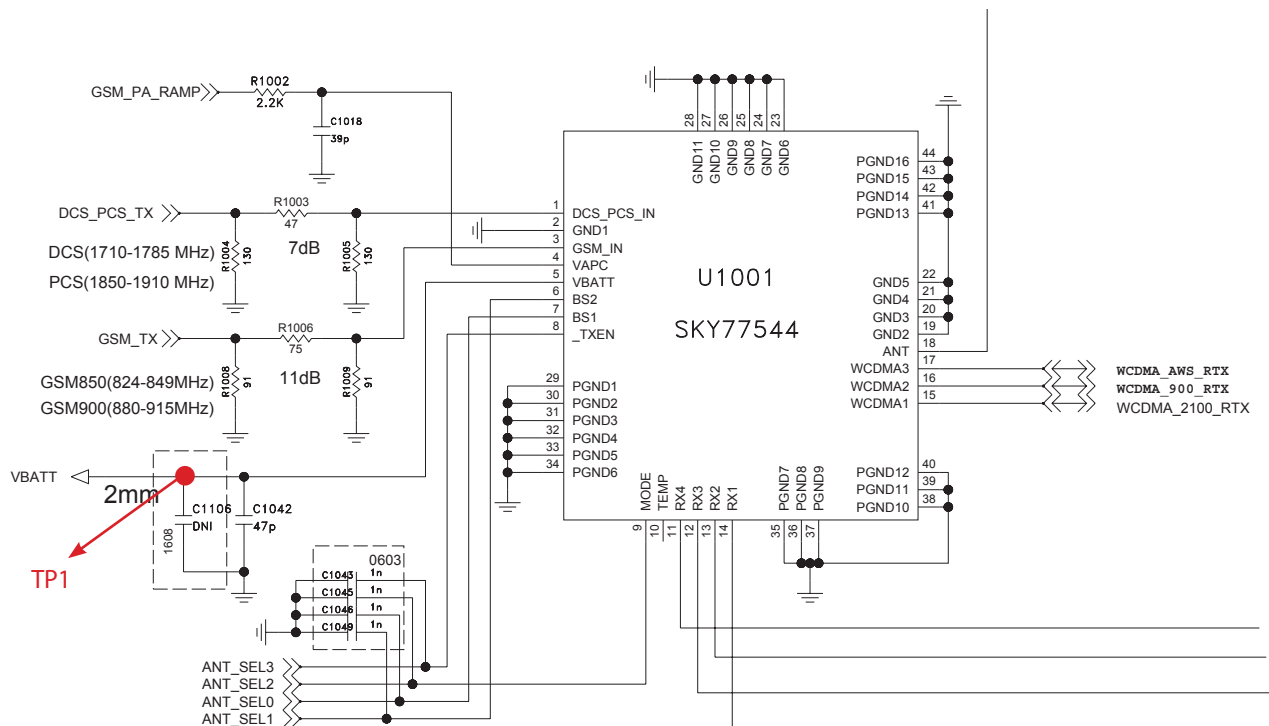


<Checking Flow>

4.4 Checking GSM TX Module(GSM PAM + ASM) Block



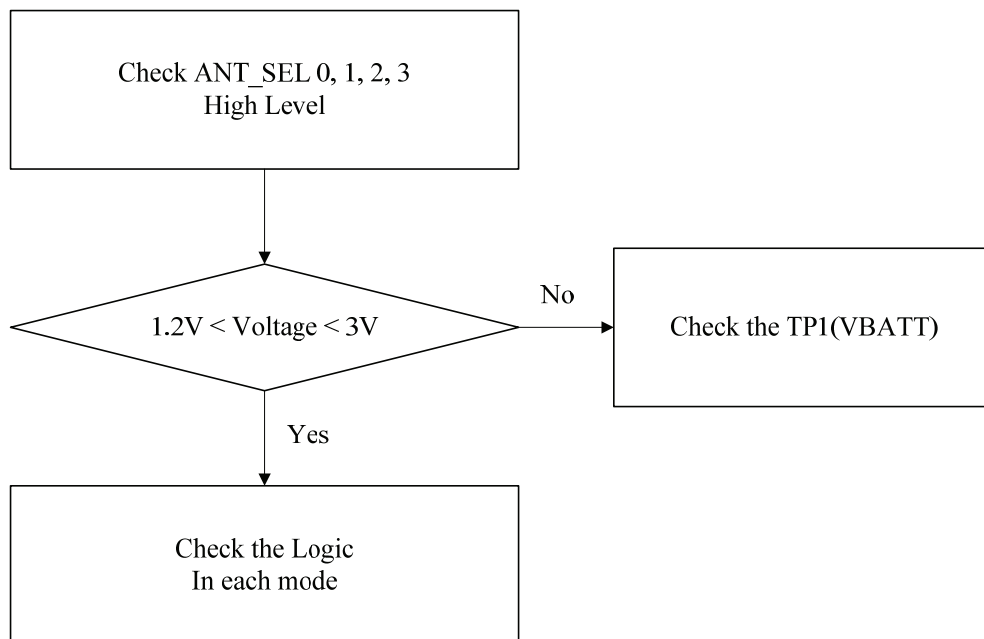
<Test Point (GSM TX Module)>



<Schematic of the Antenna Switch Block>

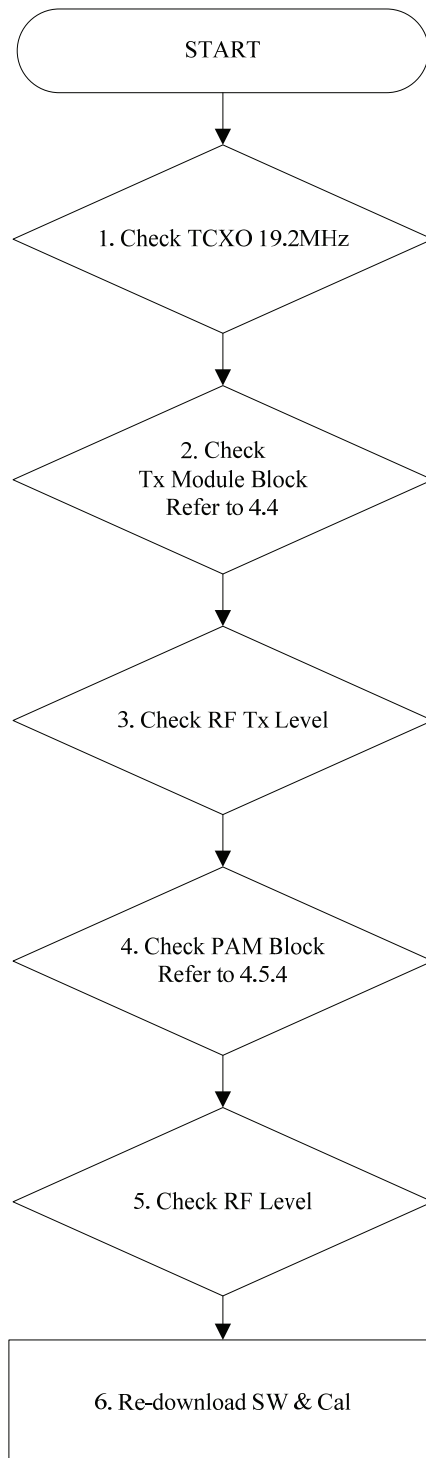
ANTENNA SWITCH MODULE LOGIC(SKY77544)

	ANT_SEL0	ANT_SEL1	ANT_SEL2	ANT_SEL3
GSM850/GSM900 TX	LOW	HIGH	LOW	LOW
DCS1800/PCS1900 TX	HIGH	HIGH	LOW	LOW
PCS1900 RX	LOW	LOW	LOW (X)	HIGH
DCS1800 RX	LOW	HIGH	LOW (X)	HIGH
GSM900 RX	HIGH	HIGH	LOW (X)	HIGH
GSM850 RX	HIGH	LOW	LOW (X)	HIGH
W2100	HIGH	LOW	LOW	LOW
W900(W850)	LOW	LOW	HIGH	LOW
W1700	HIGH	LOW	HIGH	LOW



<Checking Flow>

4.5 Checking WCDMA Block



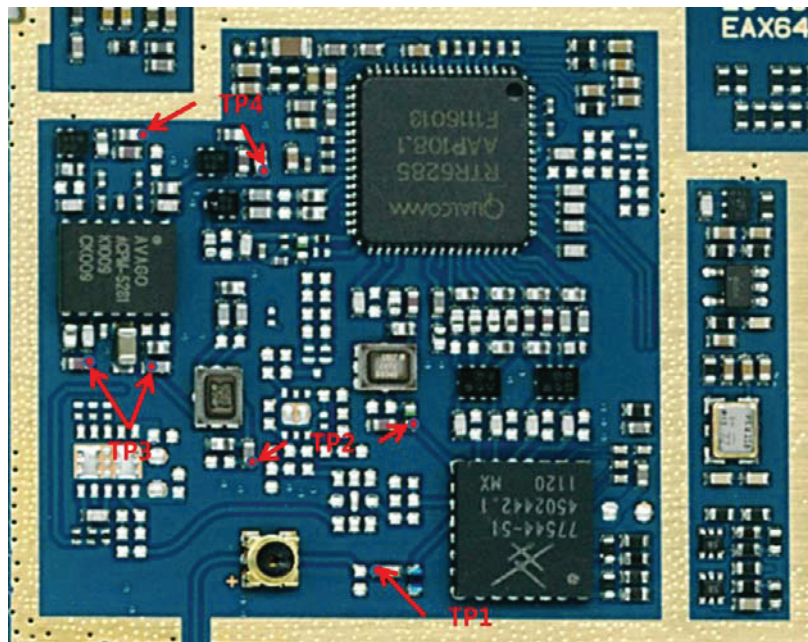
4.5.1 Checking TCXO Block

Refer to 4.3

4.5.2. Checking Tx Module Block

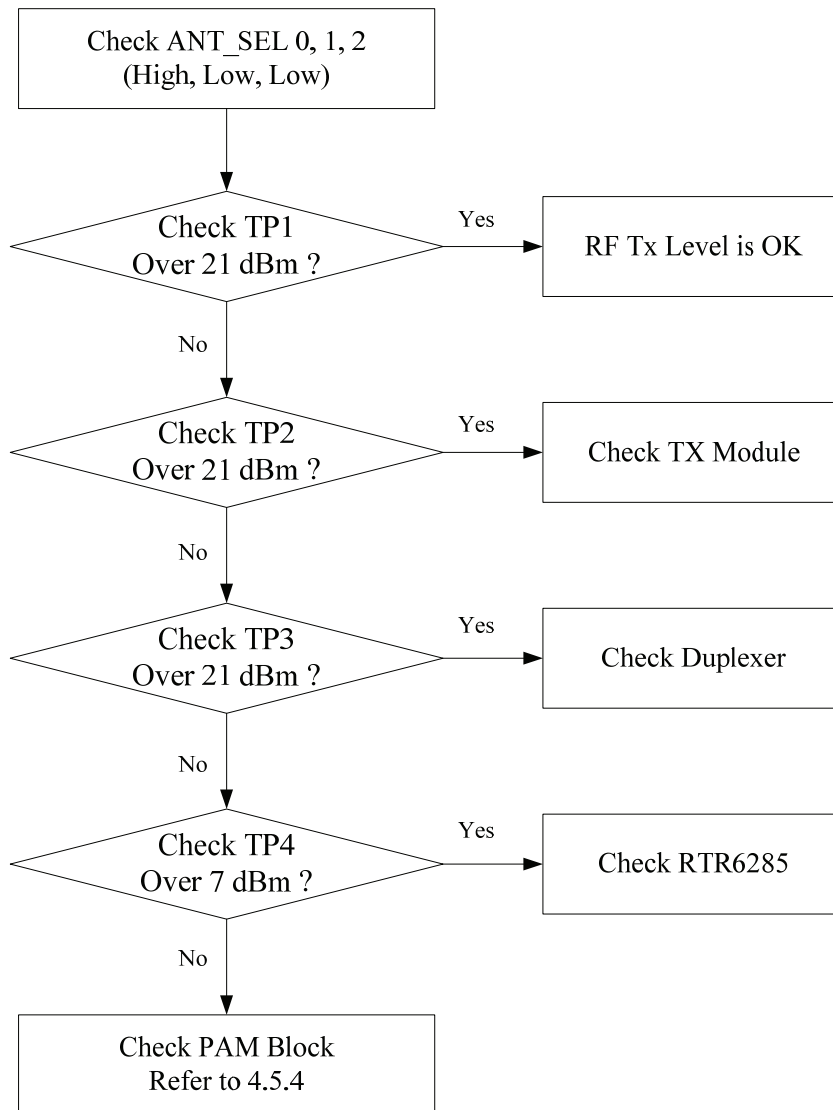
Refer to 4.4

4.5.3. Checking WCDMA RF TX Level



<Test Point (WCDMA RF TX Level)>





RTR6285 Maximum output Power = 7 dBm
RTR6285 minimum output Power = -80 dBm
PAM(ACPM-5281) = Maximum input Power = 10 dBm

<Checking Flow>

4.5.4. Checking WCDMA PAM Block

PAM control signal

PA_ON0 (C1084), PA_ON1(C1086) : PAM Enable

PA_R0: PAM Gain Control

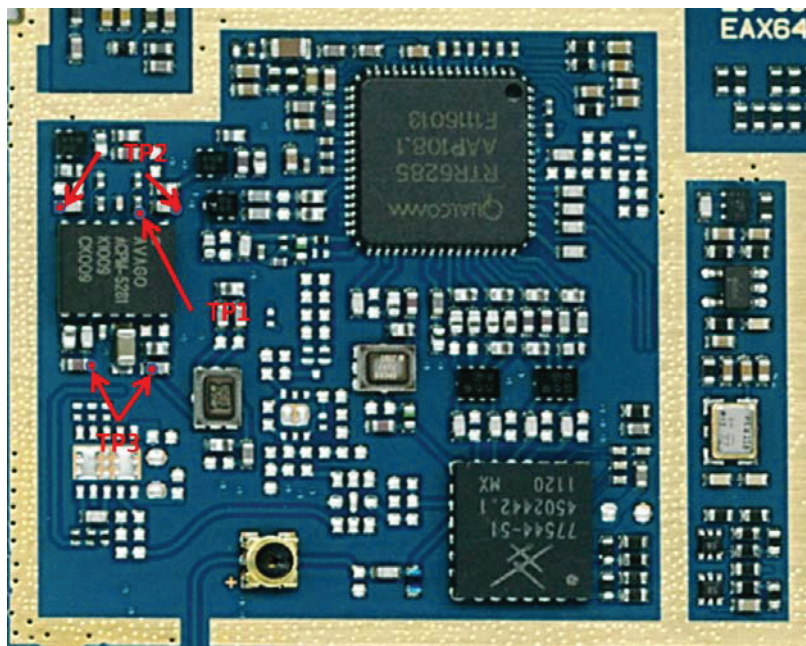
PA_ON must be HIGH (over 2.6V)

PAM IN/OUT Signal :

When PAM is under the operation of high power mode (PA_R0(C1084):Low),

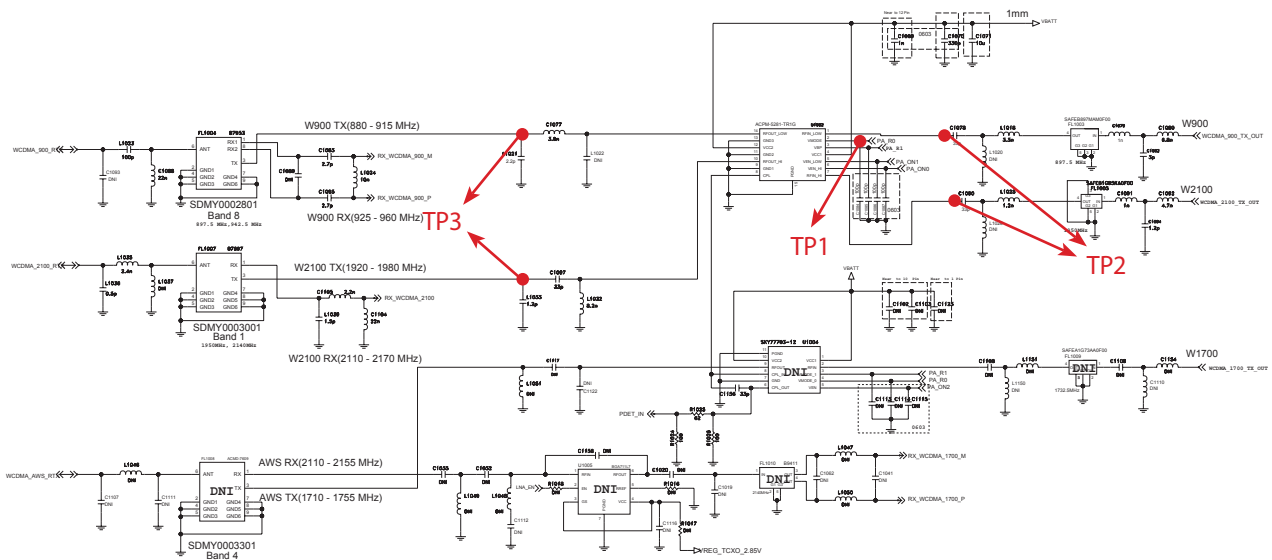
PAM OUT power must be over 21 dBm

PAM IN power must be under 10 dBm

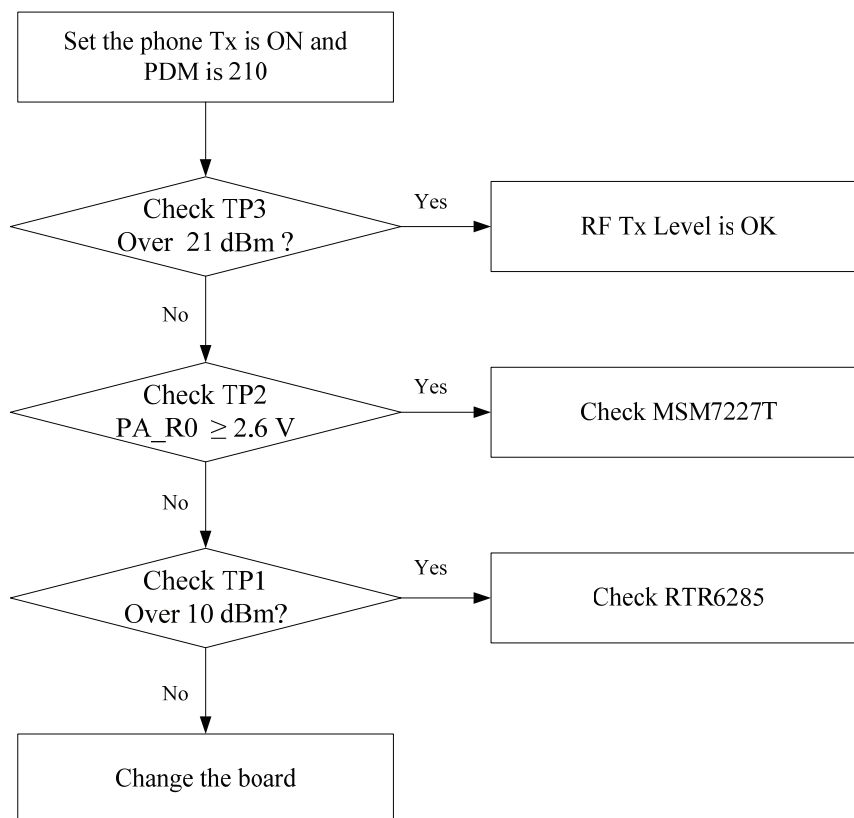


<Test Point (WCDMA PAM Block)>

4. TROUBLE SHOOTING

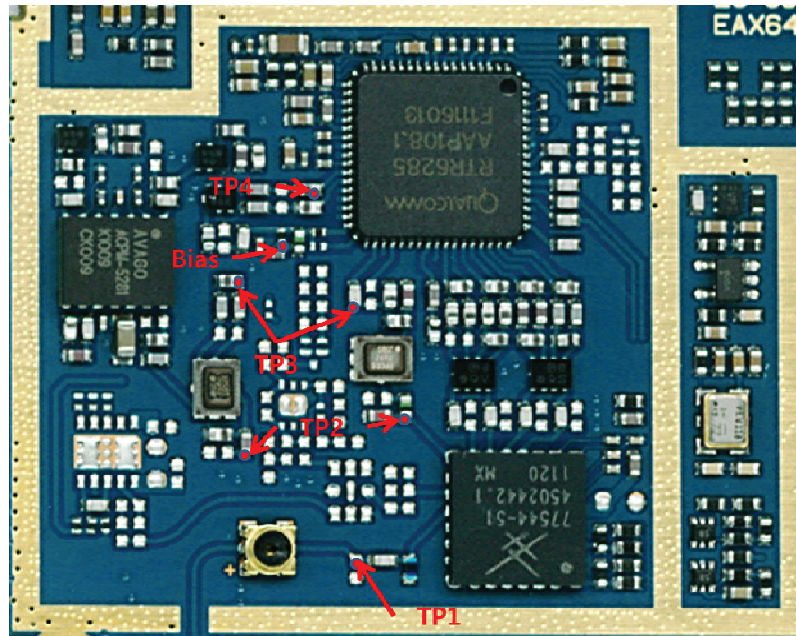


<Schematic of 3G Tx Part>

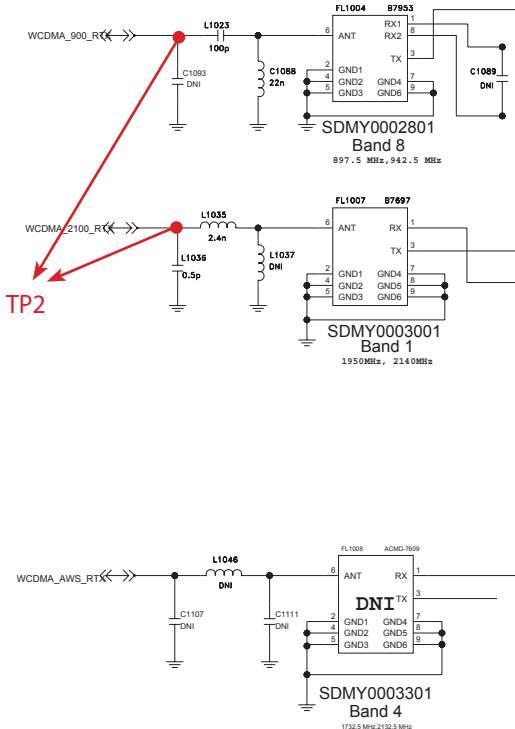


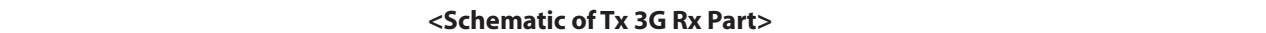
<Checking Flow>

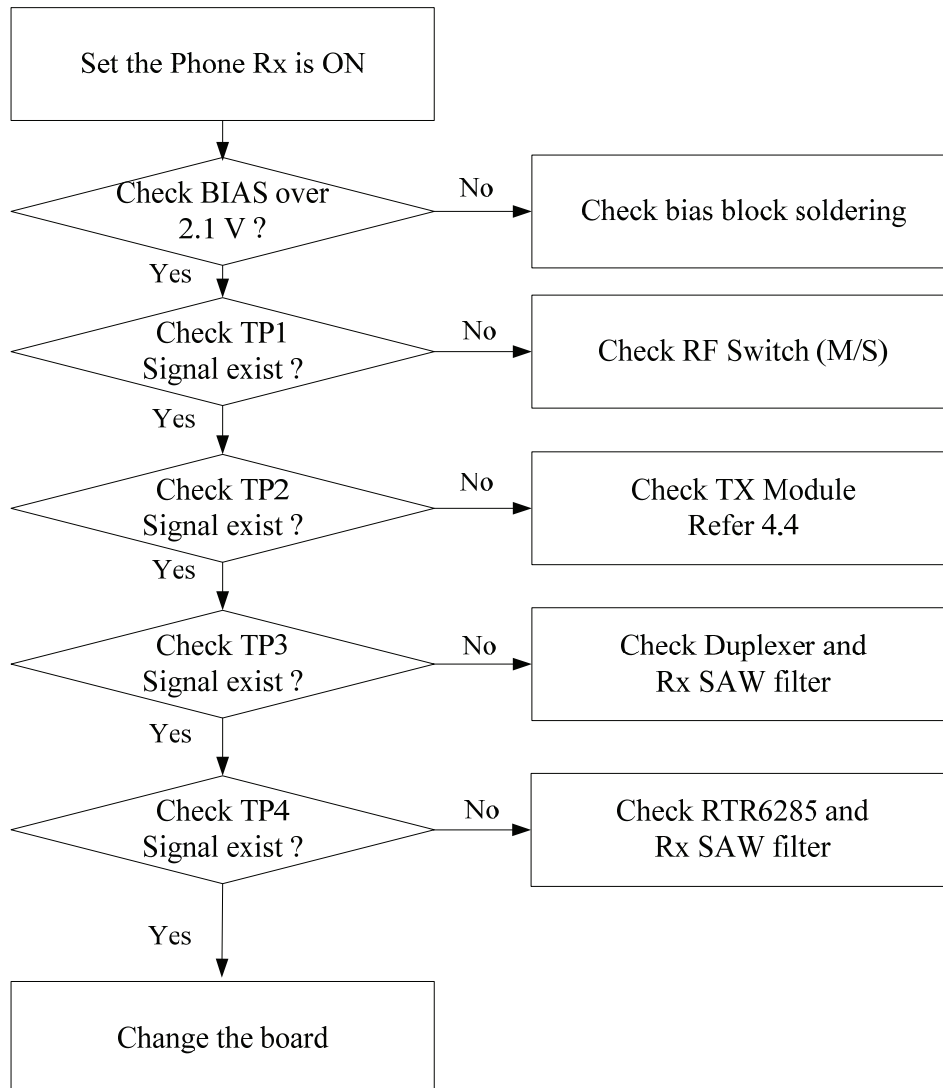
4.5.5. Checking WCDMA RF Rx Level



<Test Point (WCDMA RF Rx Level)>

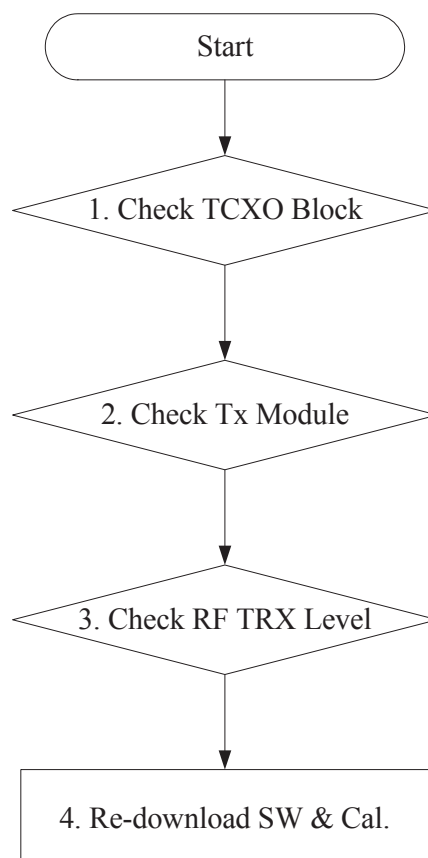
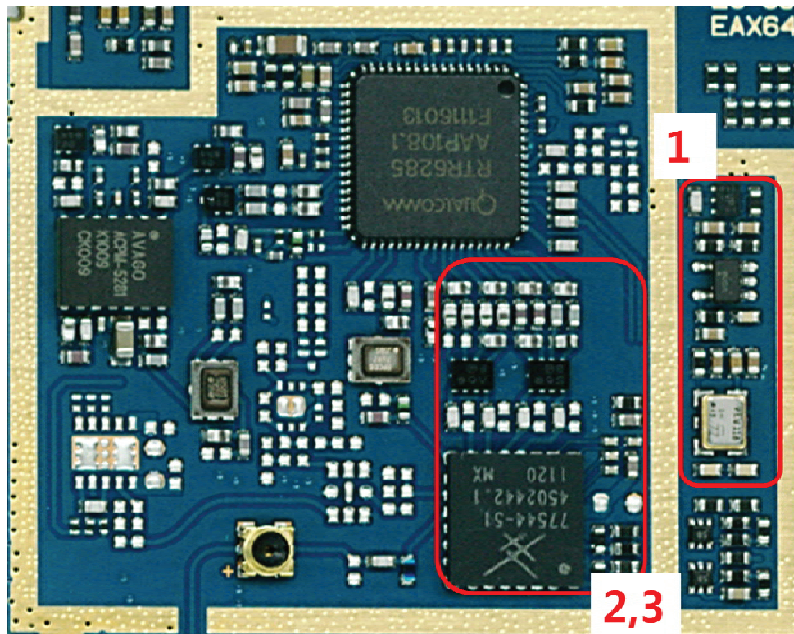






<Checking Flow>

4.6. Checking GSM Block



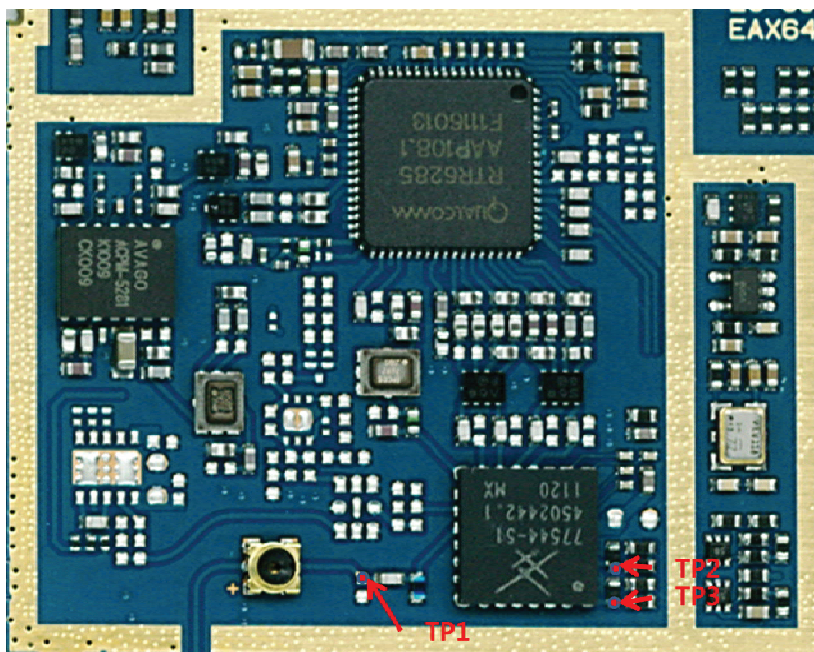
4.6.1 Checking TCXO Block

Refer to 4.3

4.6.2 Checking Tx module Block

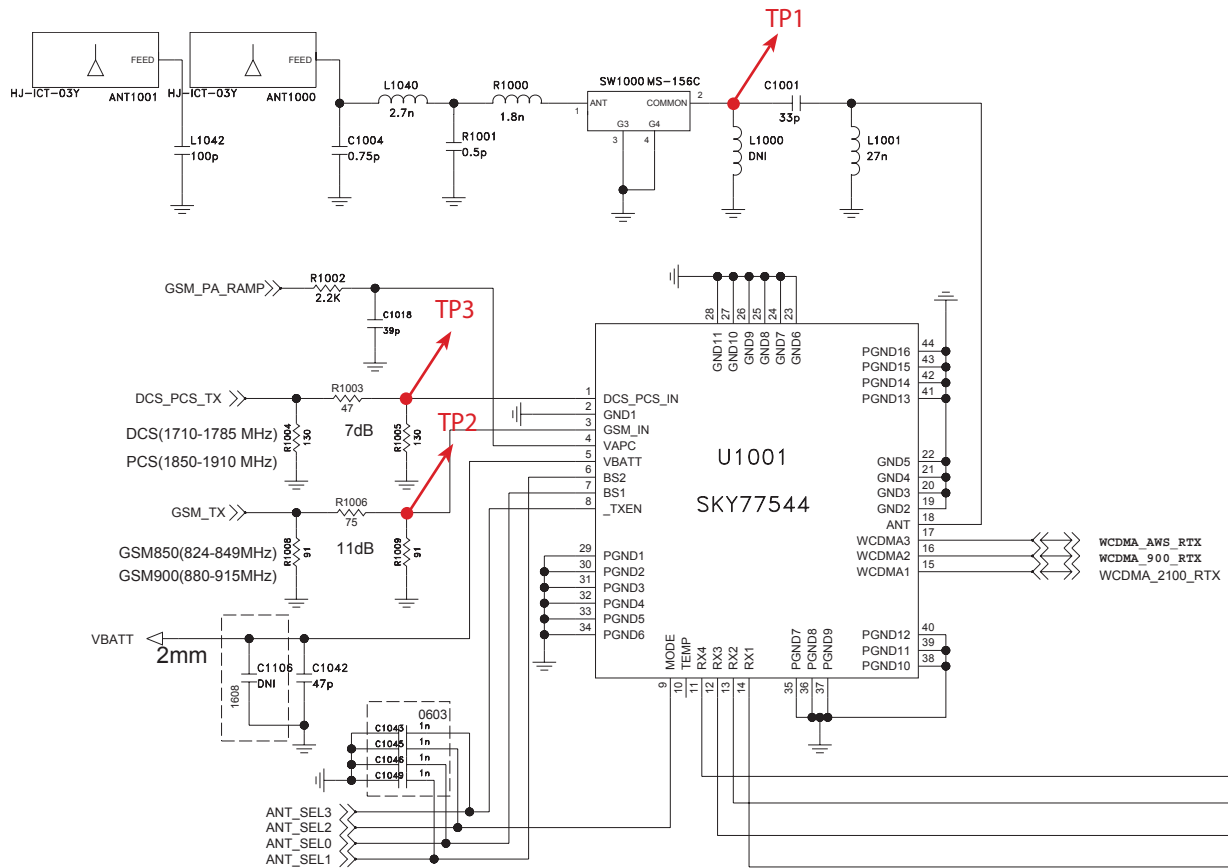
Refer to 4.4

4.6.3 Checking RF TX level



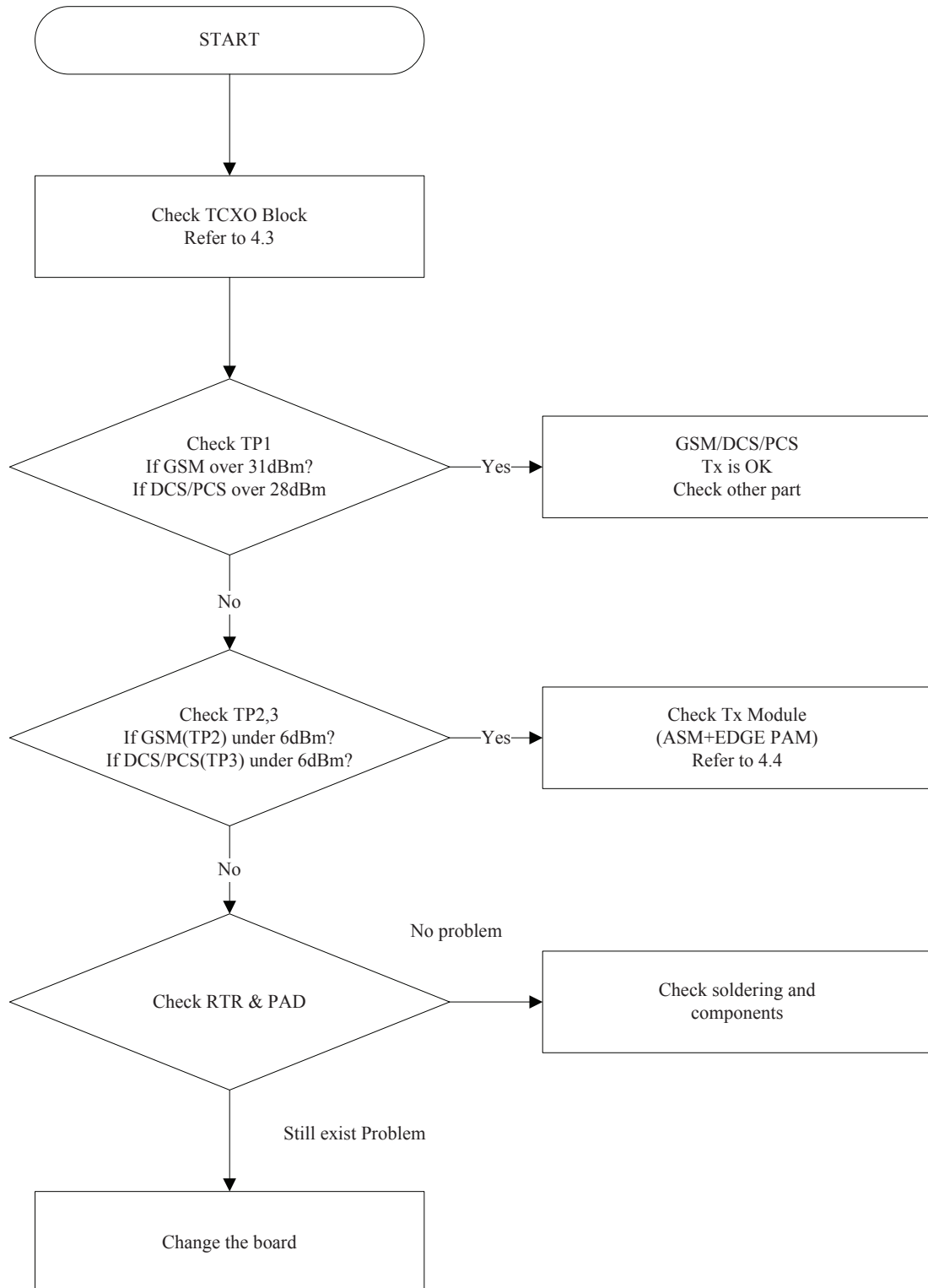
<Test Point (GSM RF Tx Level)>

4. TROUBLE SHOOTING



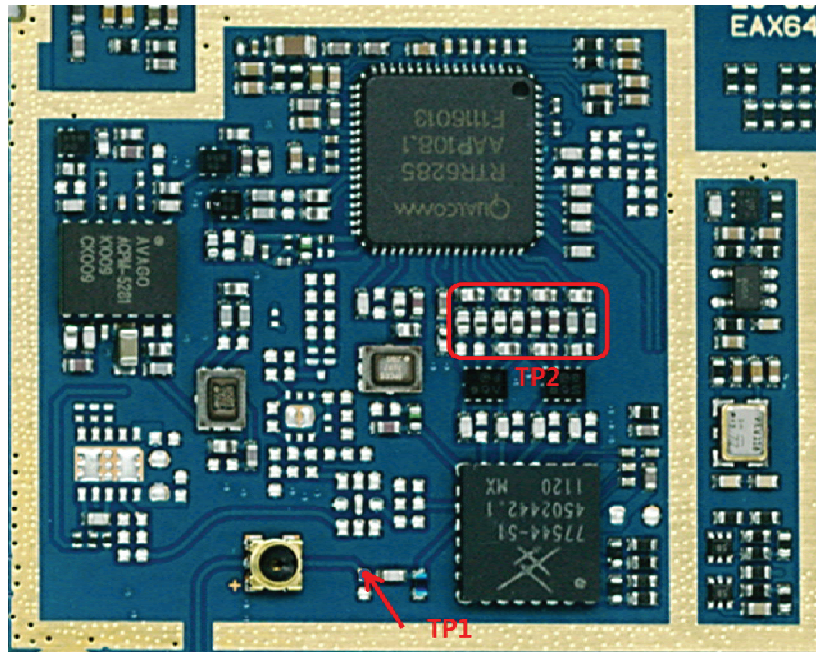
<Schematic of GSM/DCS/PCS Tx Block>

4. TROUBLE SHOOTING

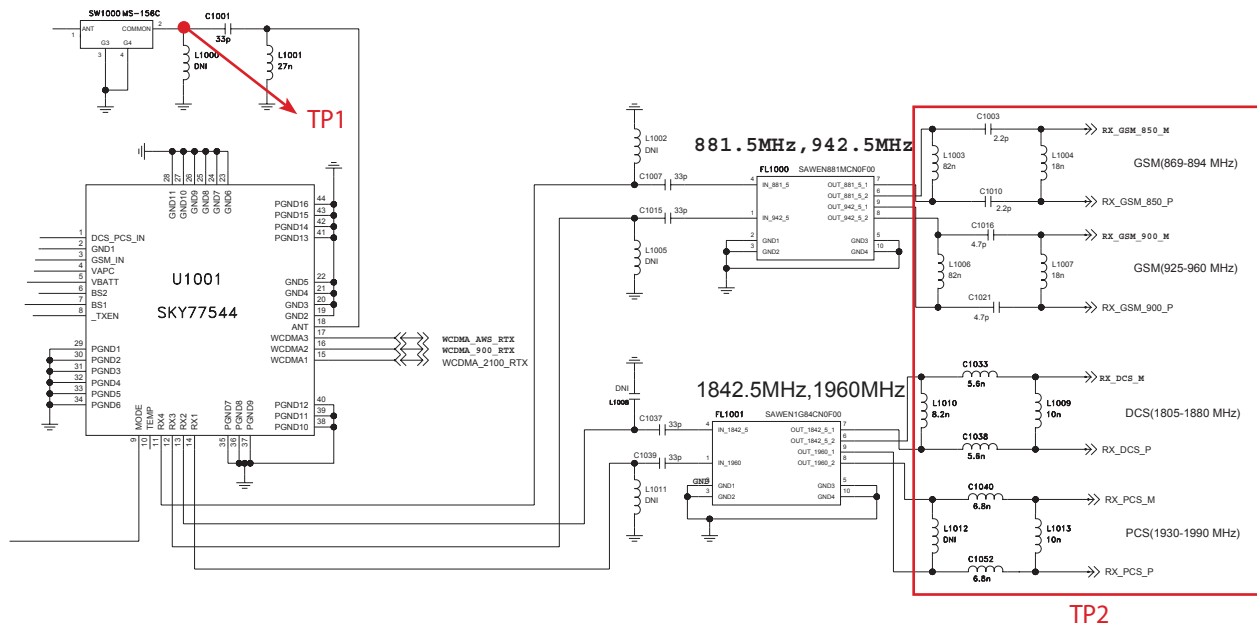


<Checking Flow>

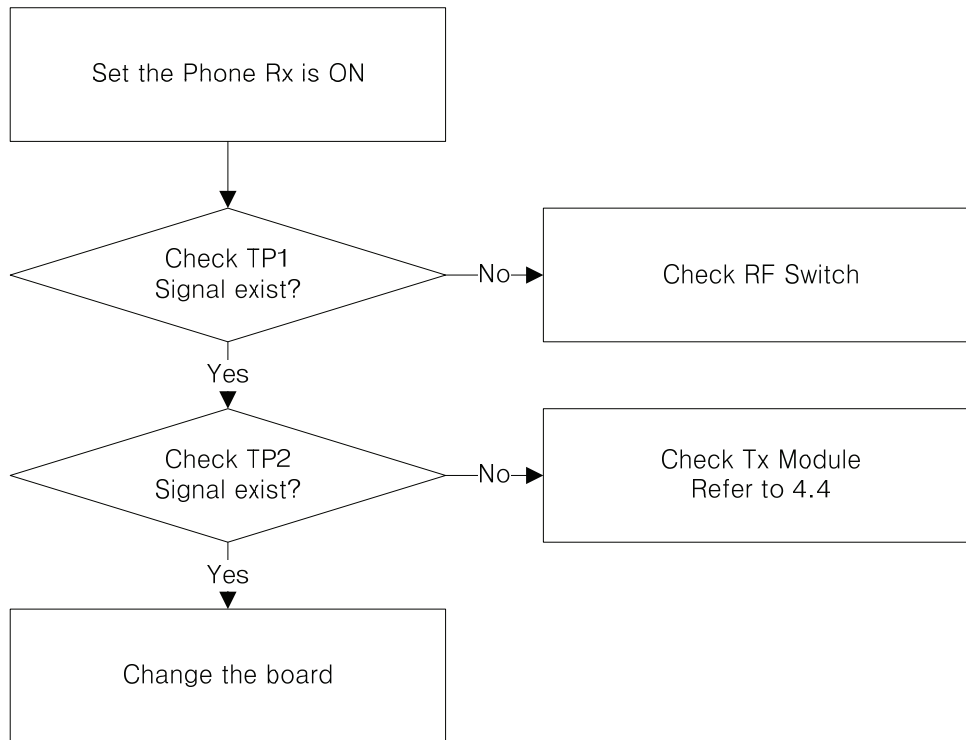
4.6.4 Checking RF Rx Block



<Test Point (GSM RF Rx Level)>

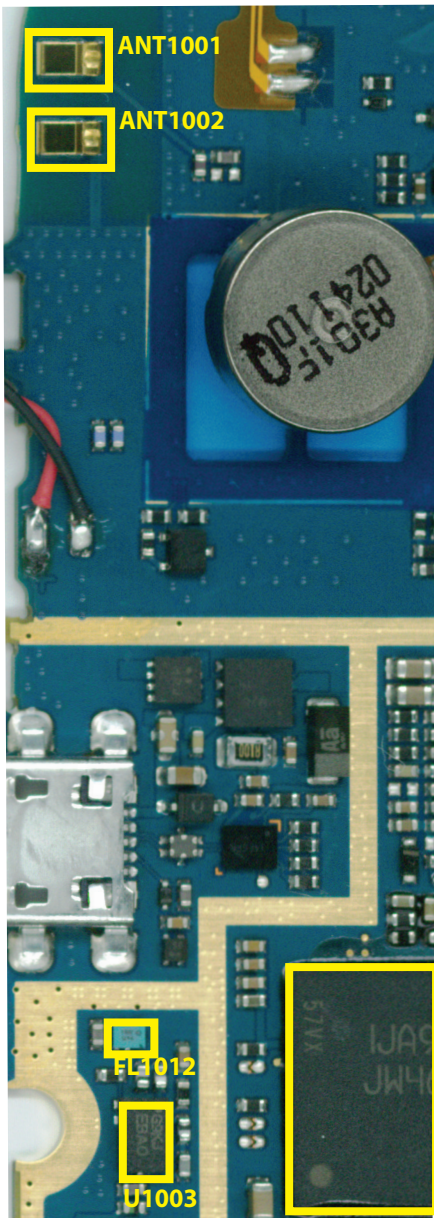


<Schematic of GSM/DCS/PCS Rx Block>



<Checking Flow>

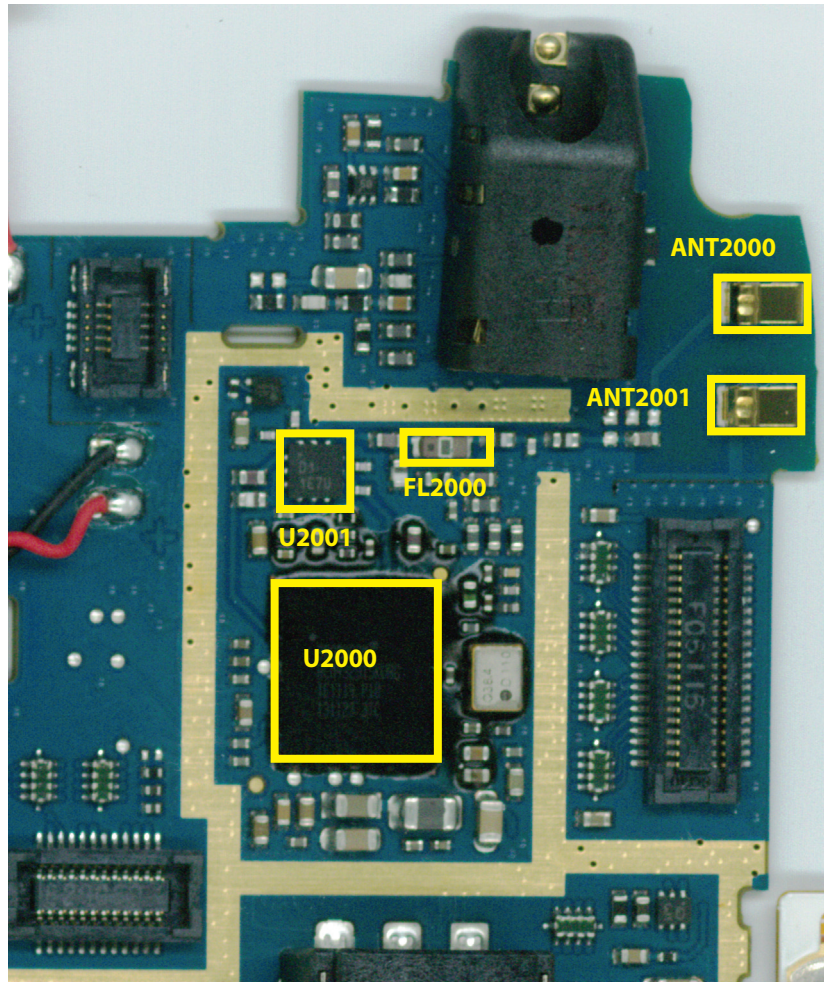
4.7 GPS/WIFI/BT RF Components



Reference	Description
ANT1003	ANTENNA PAD connected to FPCB type antenna
ANT1002	GND PAD
FL1012	GPS SAW FILTER
U1003	GPS LNA

<RF Components(GPS)>

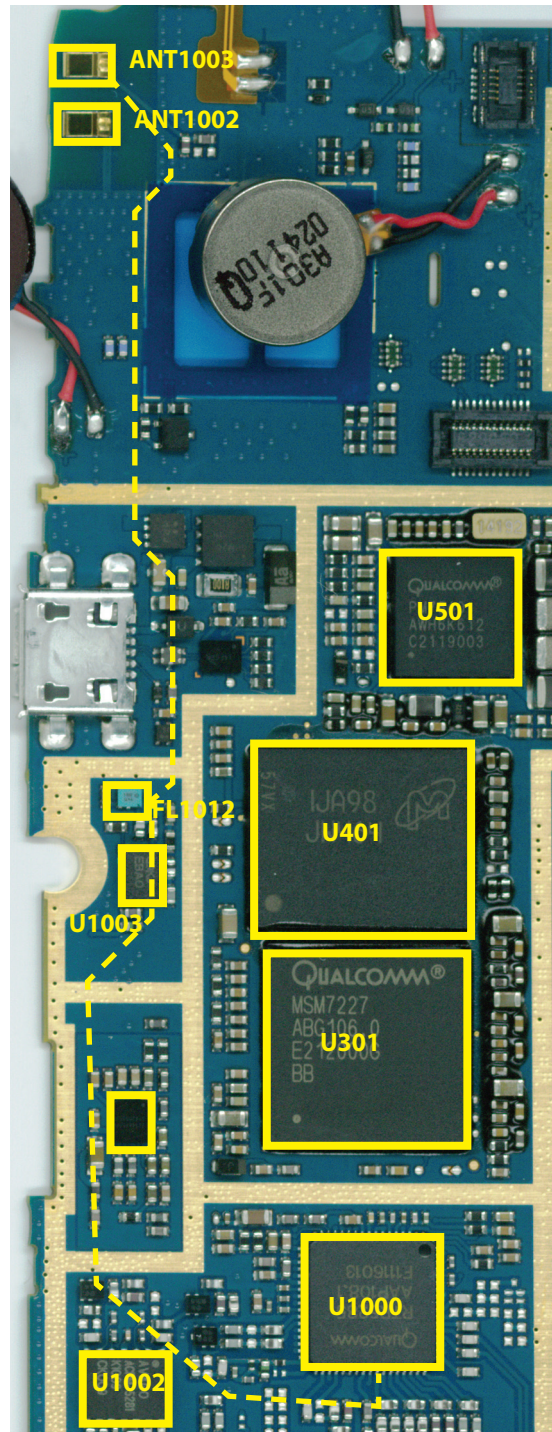
4. TROUBLE SHOOTING



<RF component (WiFi / BT)>

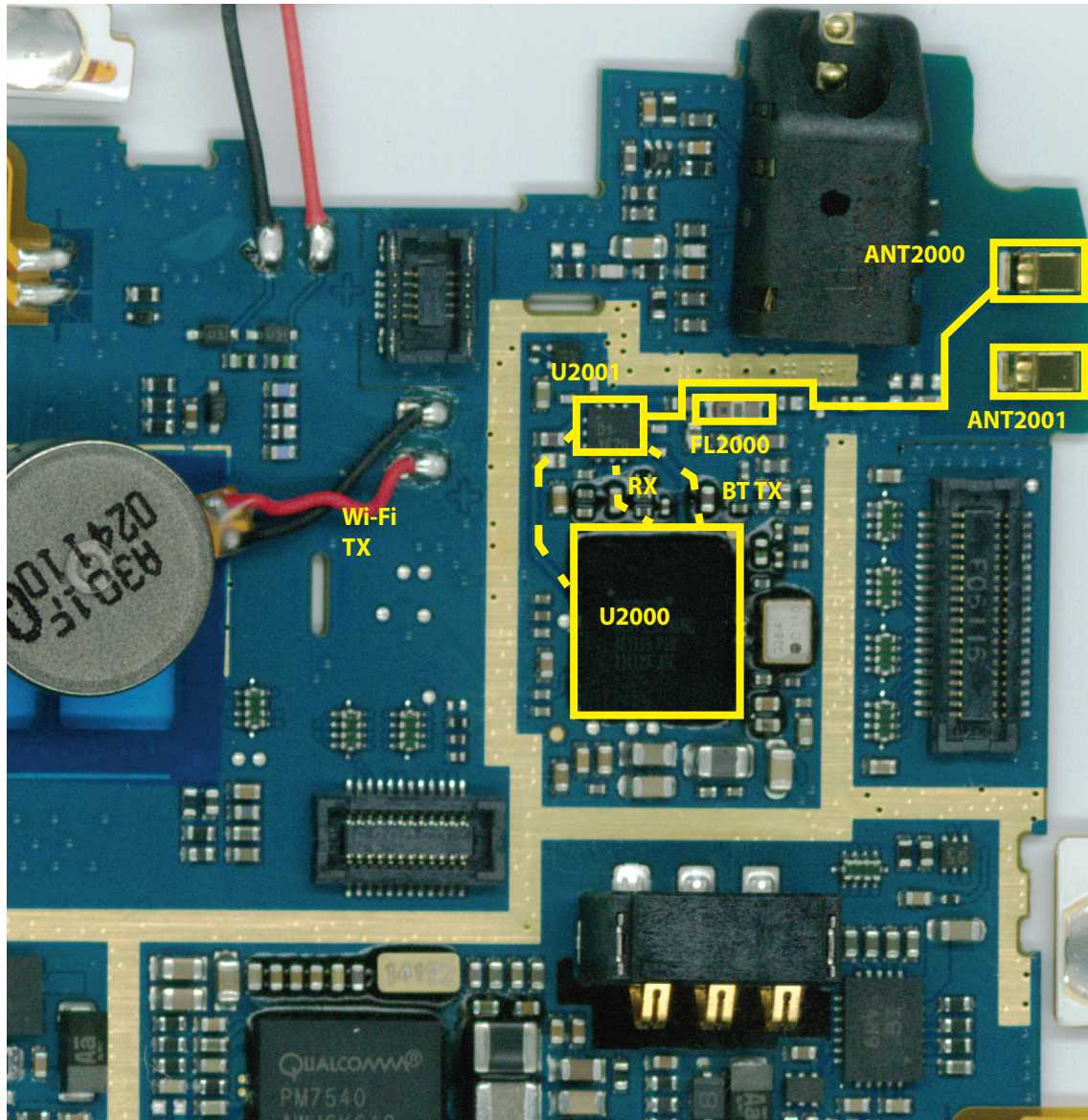
Reference	Description
ANT2000	ANTENNA PAD connected to FPCB type antenna
ANT2001	GND PAD
FL2000	Wi-Fi / BT Filter
U2001	SP3T + LNA for Wi-Fi / BT
U2000	Wi-Fi / BT chip

4.8 GPS/WIFI/BT SIGNAL PATH



<GPS Signal PATH (main board bottom)>

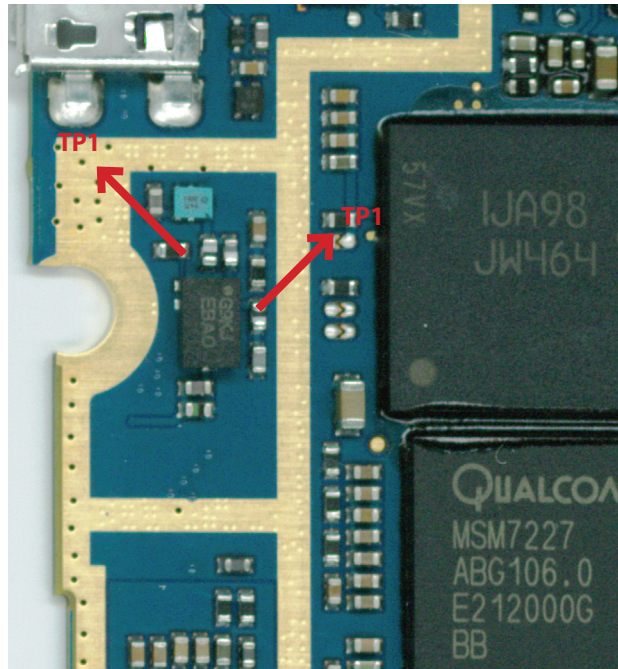
4. TROUBLE SHOOTING



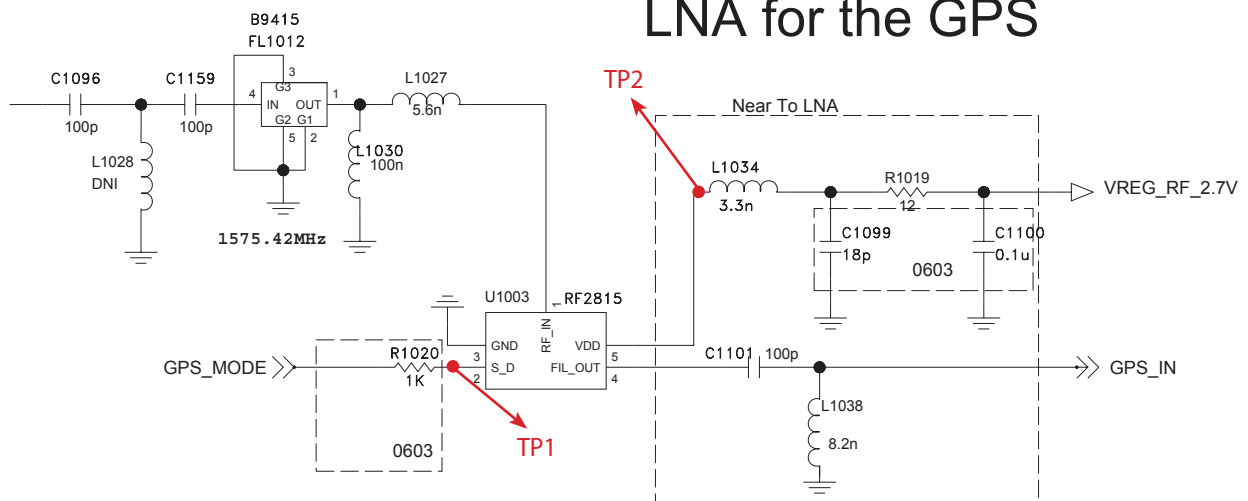
<WiFi / BT Signal PATH>

4.9 GPS/WIFI/BT Trouble shooting

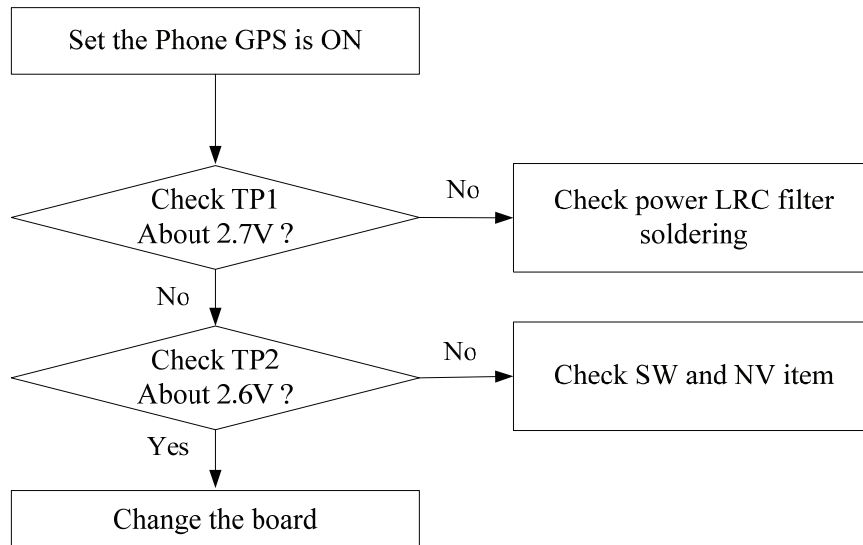
4.9.1 A-GPS Block



LNA for the GPS

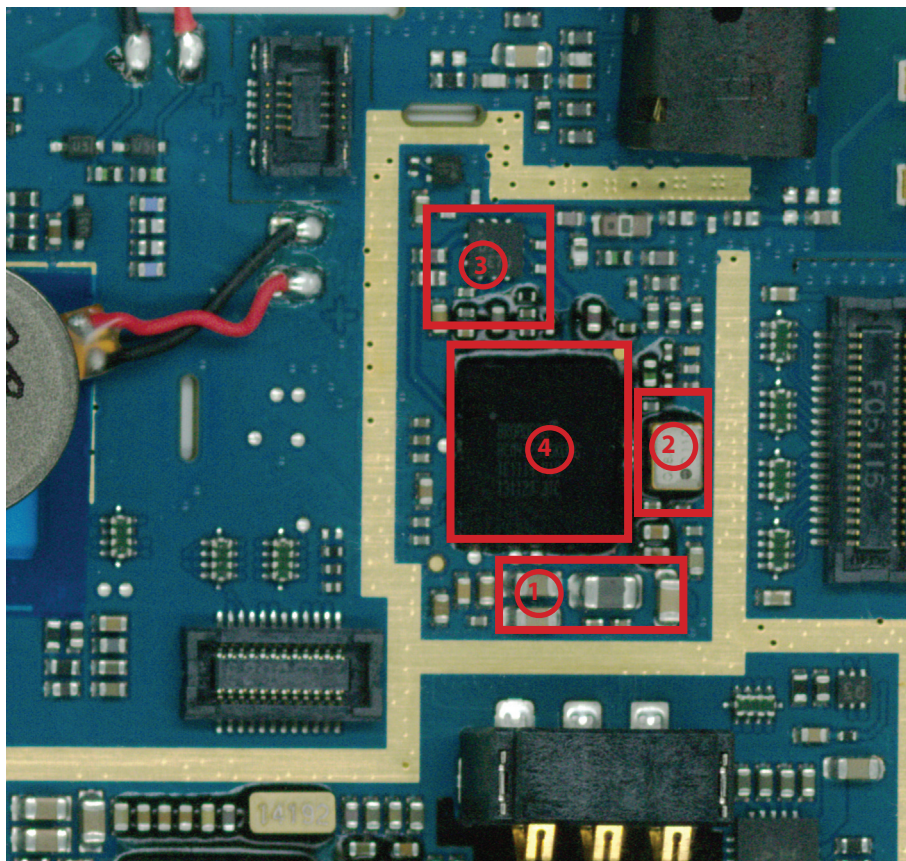


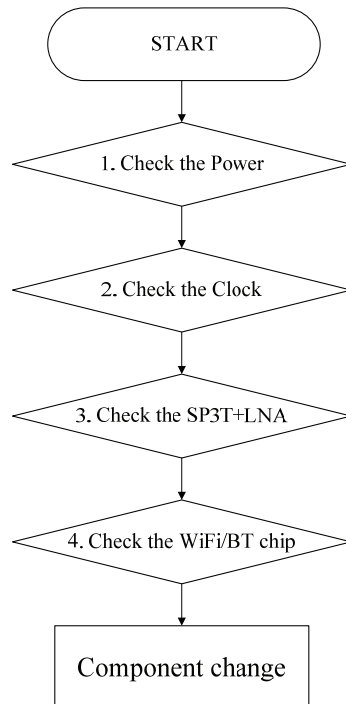
<Schematic of the A-GPS block>



<Checking Flow>

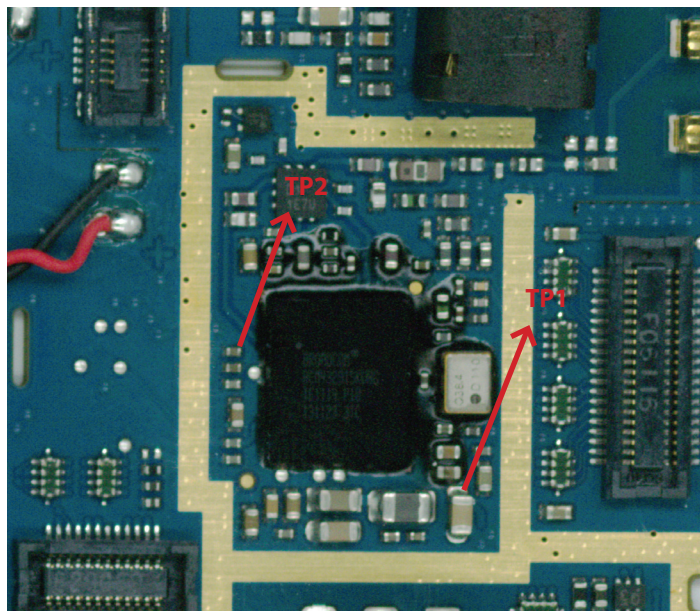
4.9.2 WLAN/BT/FM Block





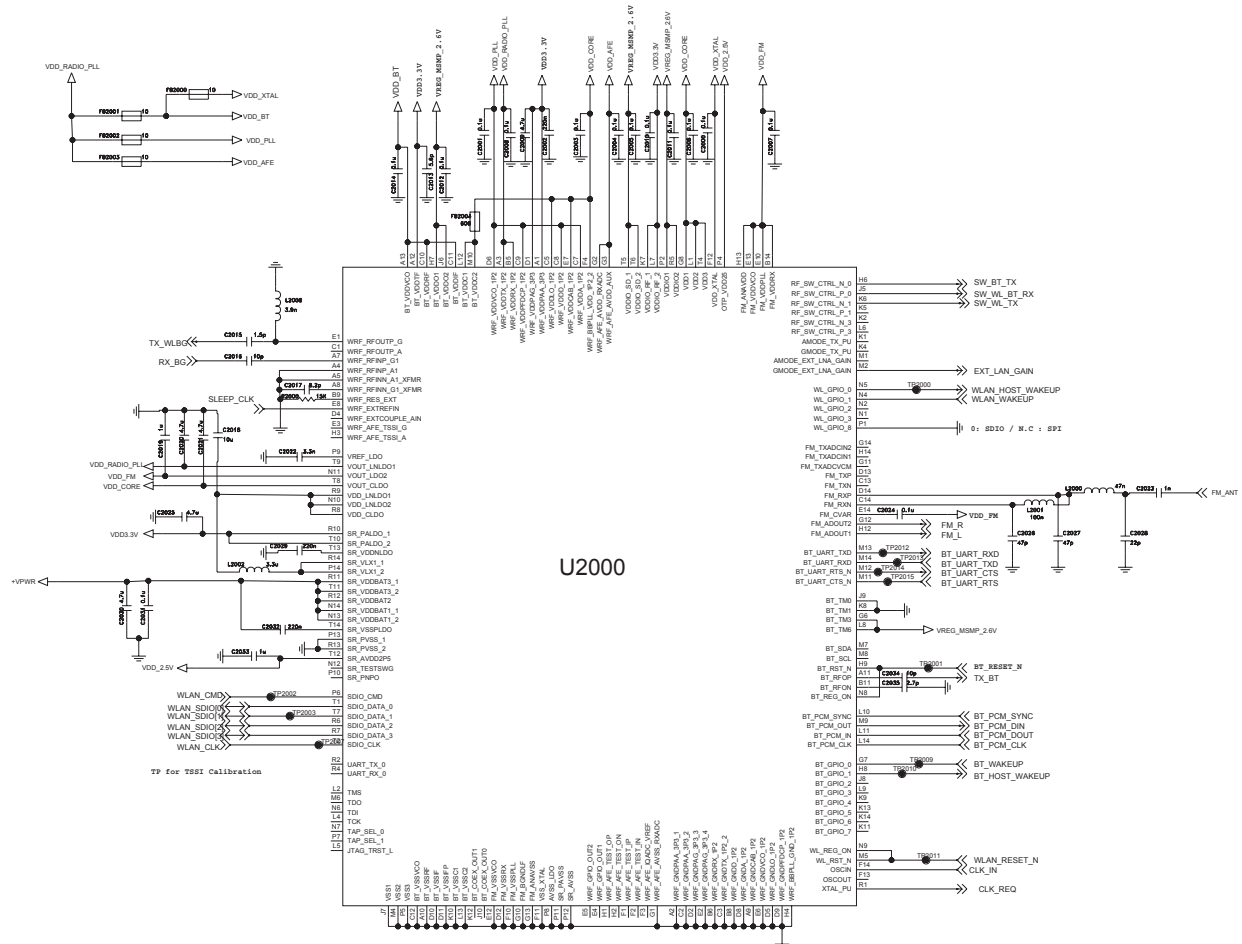
<Checking Flow Overview>

Main chip part

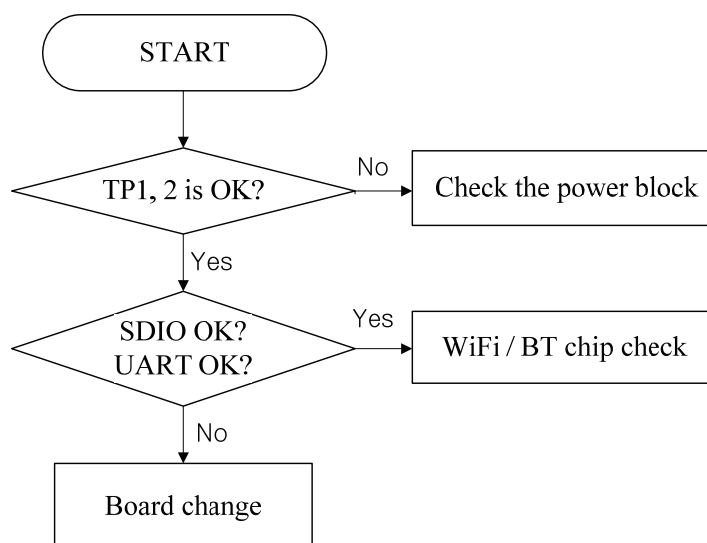


Test point	Net name	Description
TP1	+VPWR	Power for BT/WiFi BB core and WiFi power Amp. (V Batt)
TP2	VREG_MSMP_2.6V	Power for BT power Amp.and Host interface (2.6V)

4. TROUBLE SHOOTING

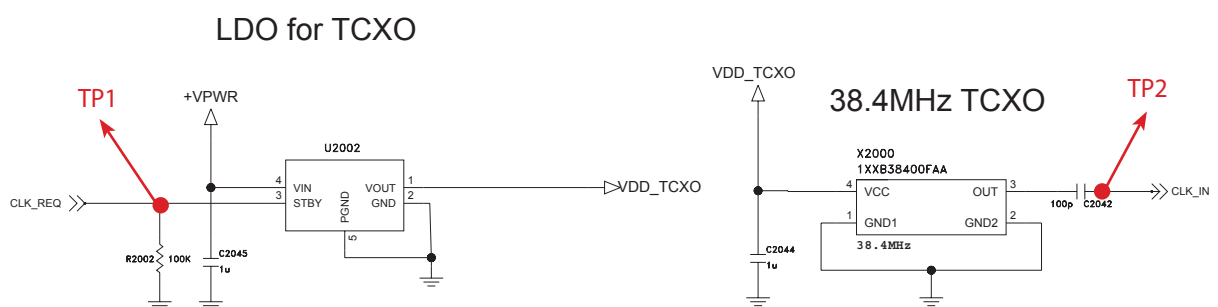
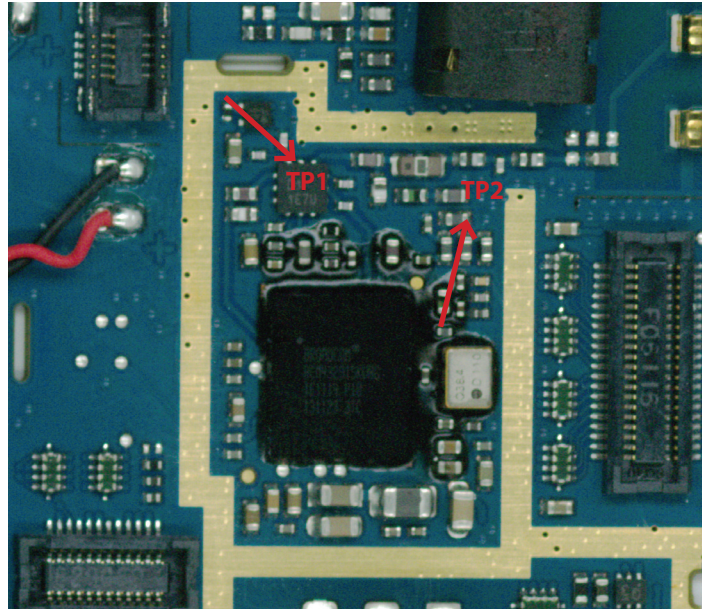


<Schematic of WiFi/BT/FM>



<Checking Flow>

Main clock part

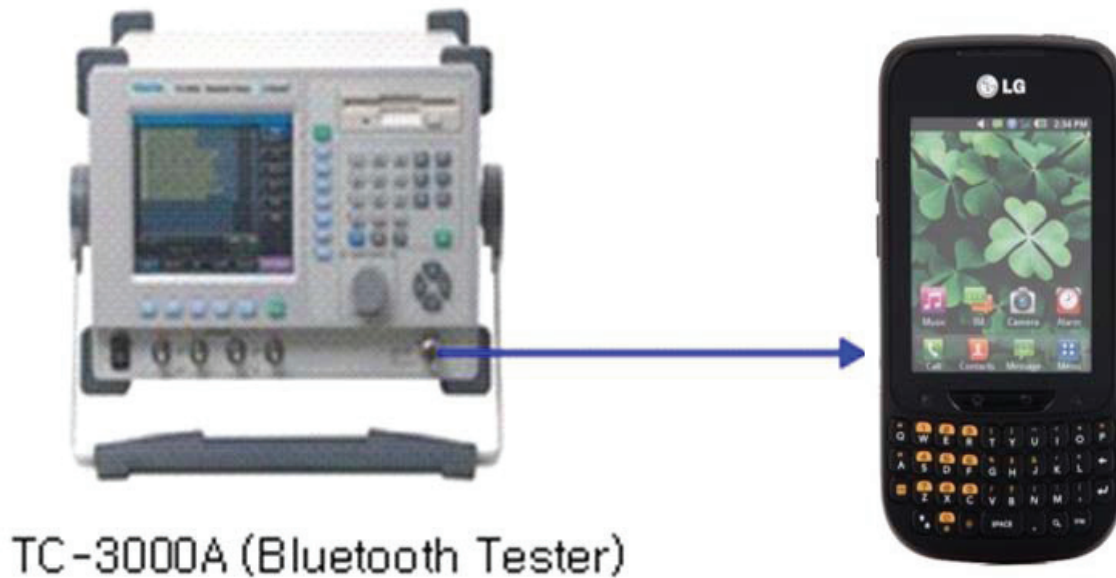


<Schematic of 38.4MHz TCXO>

Test Point	Net name	Description
TP1	CLK_REQ	On/Off Control external clock source 0 : TCXO off 1 : TCXO on
TP2	XTALP	TCXO output clock : 26MHz

Test Point of TCXO

4. TROUBLE SHOOTING



- Bluetooth RF Test procedure

1. Set phone to Bluetooth test-mode.

- Blue tooth ON: Enter Test Mode(3845#*660#) → WCDMA-only → Module Test → BT DUT → DUT mode → Click

2. Insert a phone in a TEMCELL (in case of radiation test)

3. Set 'discover' after push menu button of the tester and select the link analyzer.

4. After 'set test mode', confirm the connection state.

5. Measure the power of full channel after hopping mode is selected to 'ON'

6. You can select wanted test cases after getting an optimized power

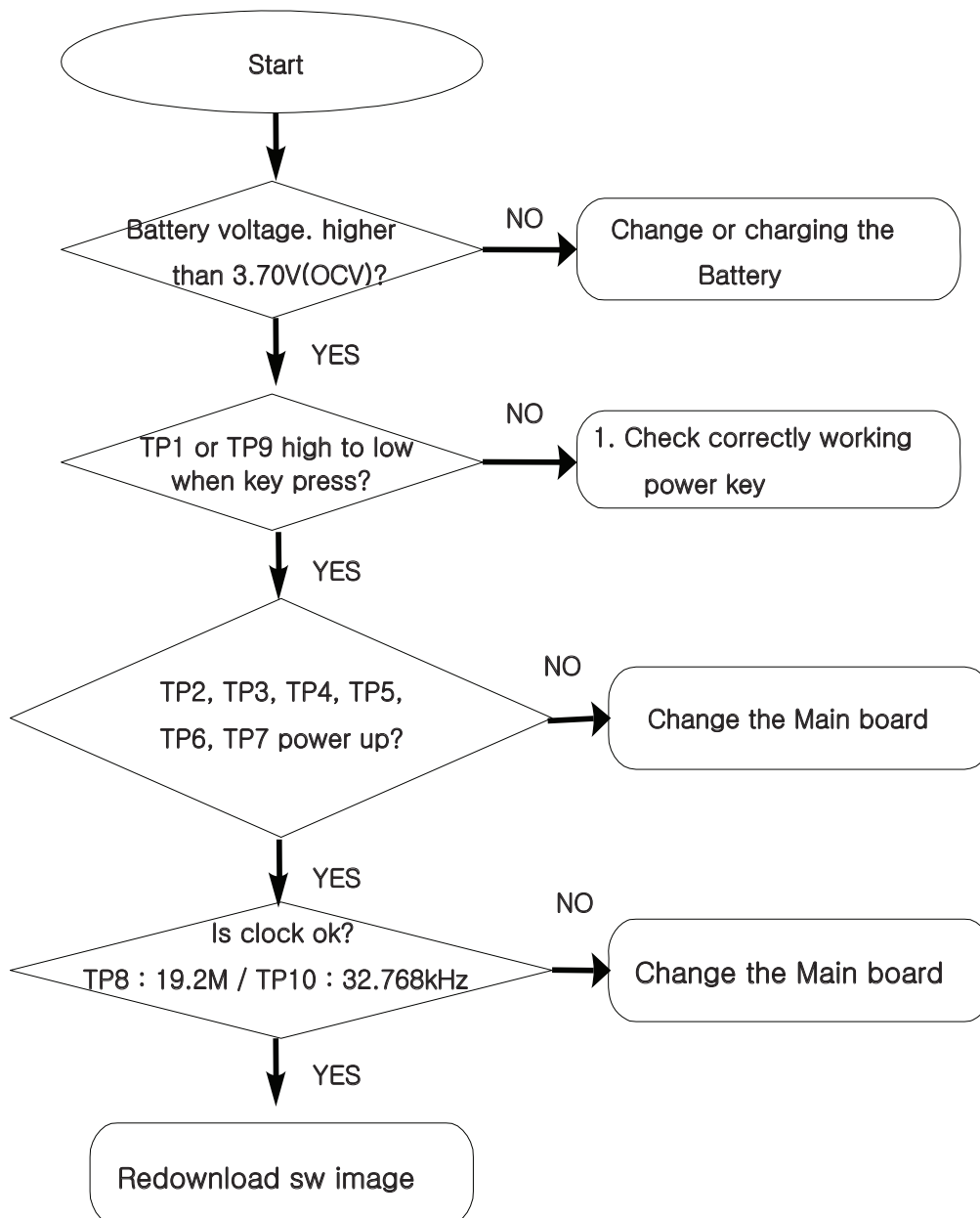
7. Blue tooth On/Off

- Menu Key → settings → Wireless controls → Bluetooth → Turn on/Turn off

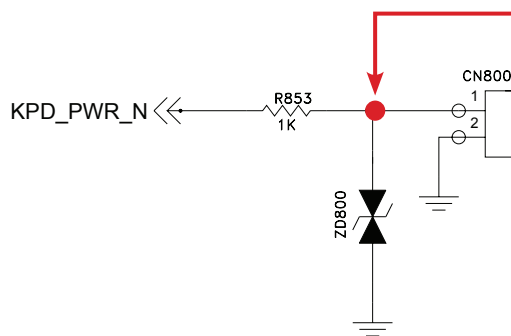
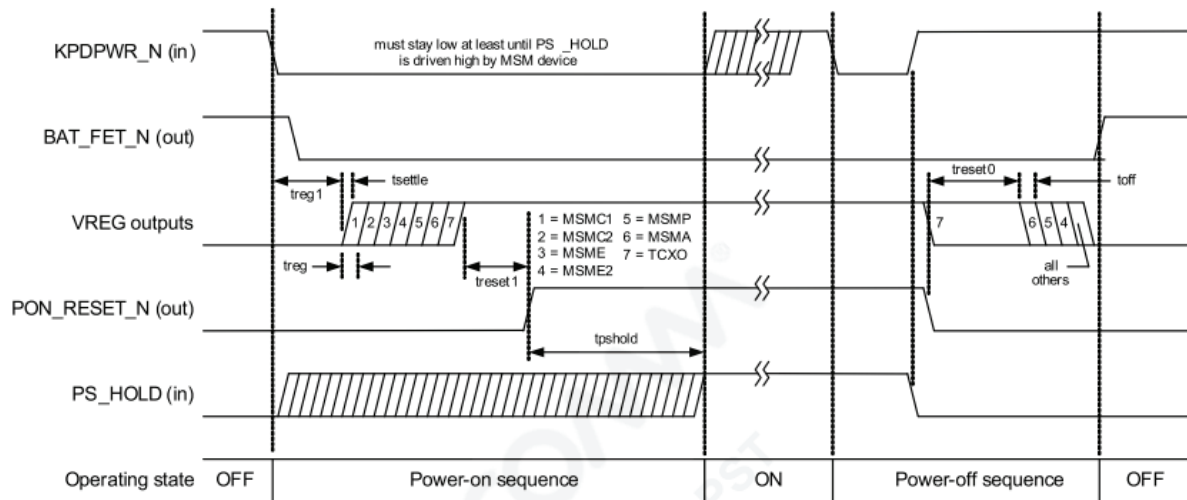
4.10 Power ON Trouble shooting

Power On sequence of C660 is :

Power key press → TP1 go to low → PM7540 Power Up → TP3(C526), TP7(C525), TP2(C524), TP4(C540), TP5(C565), TP6(C300) power ON → Phone booting and TP9(D502) go to High

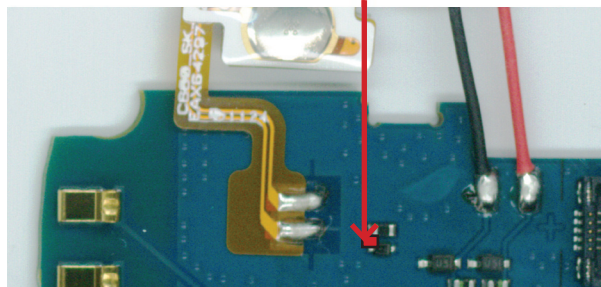


4. TROUBLE SHOOTING

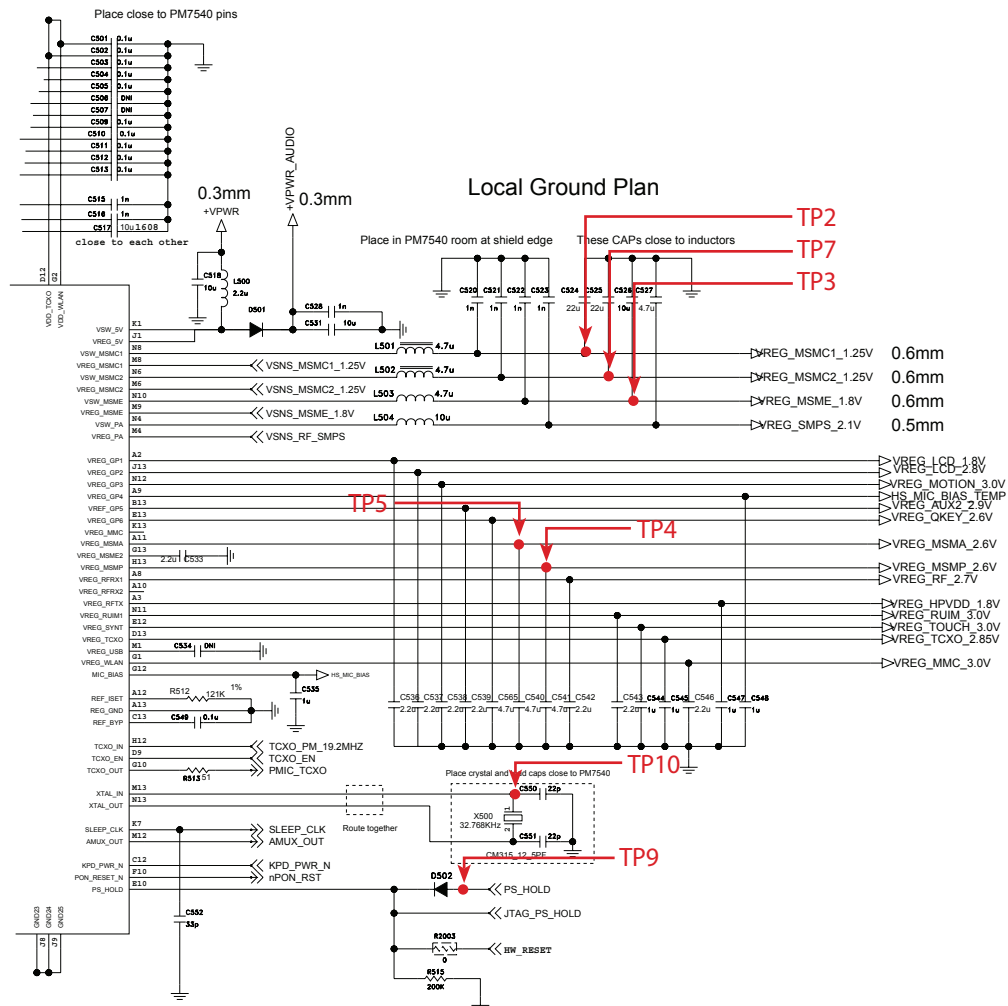


Changed (Rev.C)

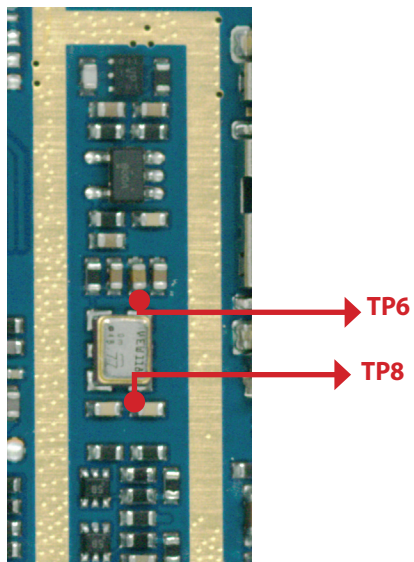
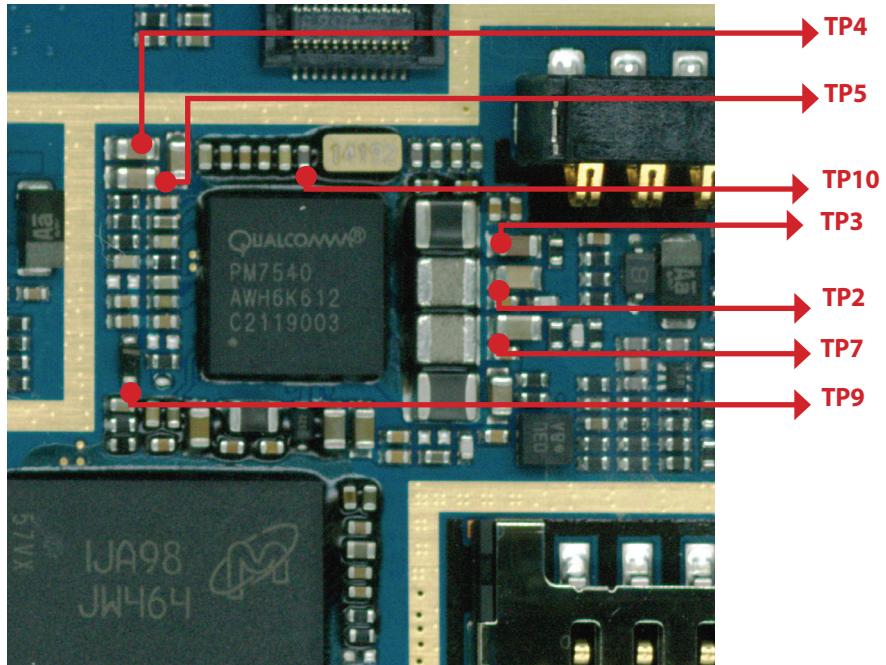
TP1 : KPD_PWR_N go to low



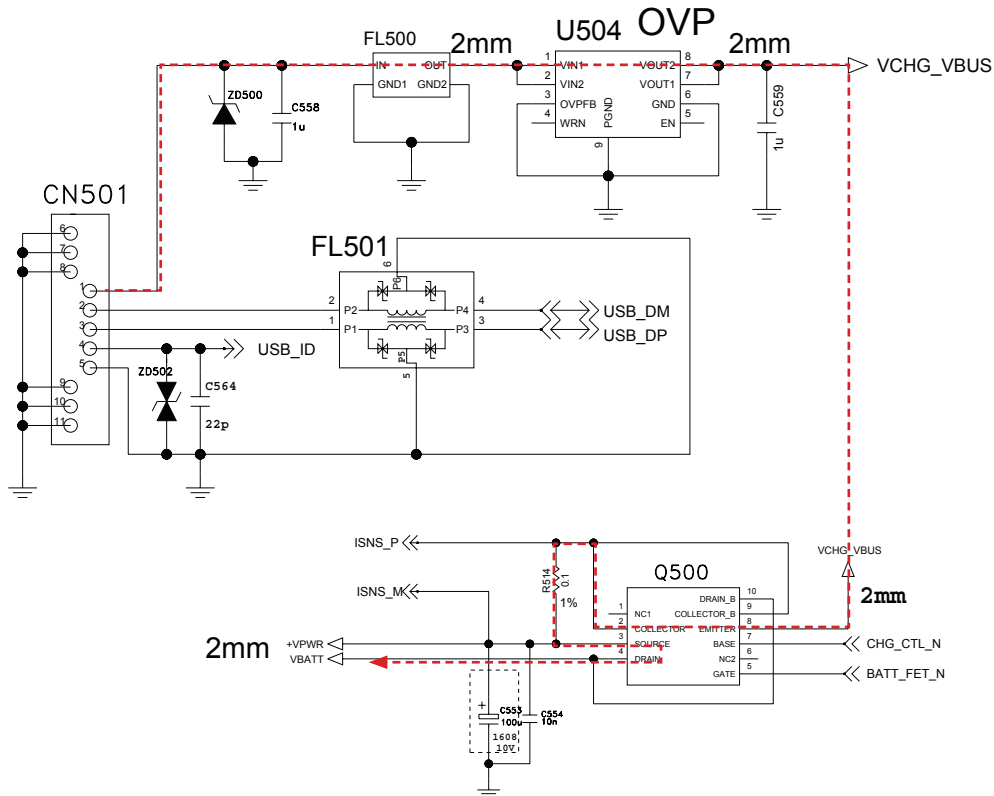
4. TROUBLE SHOOTING



4. TROUBLE SHOOTING



4.11 Charging Trouble shooting



Charging path

Charging Procedure

- Connect TA or u-USB cable
- Control the charging current by PM7540 IC
- Charging current flows into the battery

Check Point

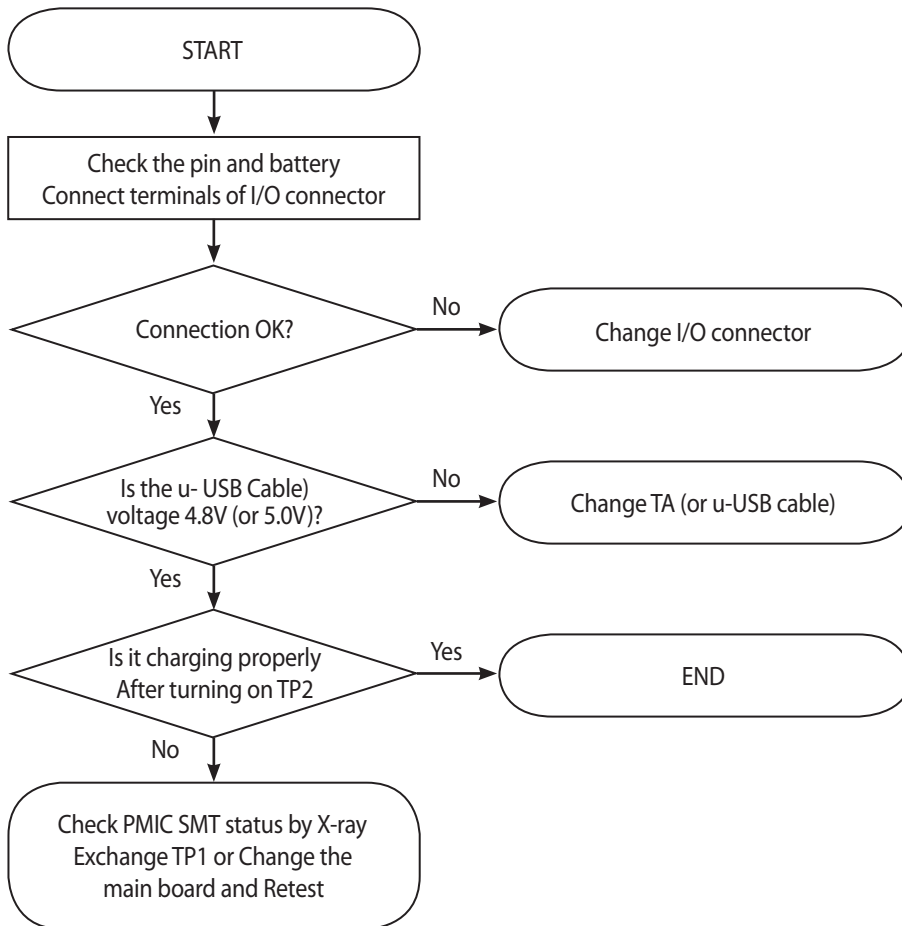
- Connection of TA or USB cable
- Charging current path (NUS5530MN)
- Battery

Troubleshooting Setup

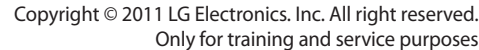
- Connect TA and battery to the phone

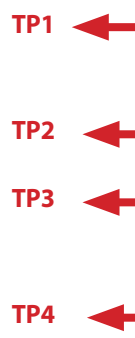
Troubleshooting Procedure

- Check the charger (TA or USB cable) connector
- Check the OVP circuit
- Check the charging current path
- Check the battery



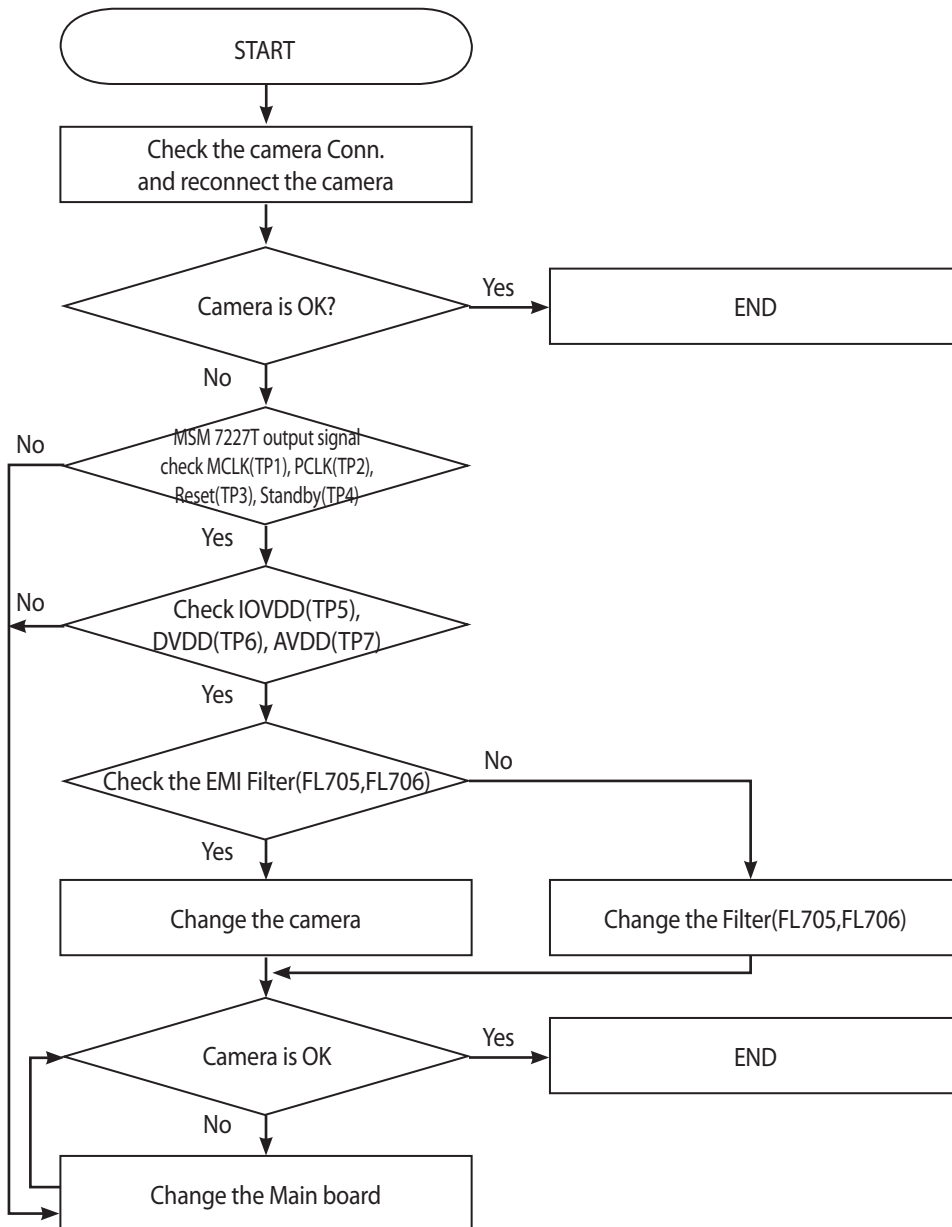
[Charger Troubleshooting Flow]



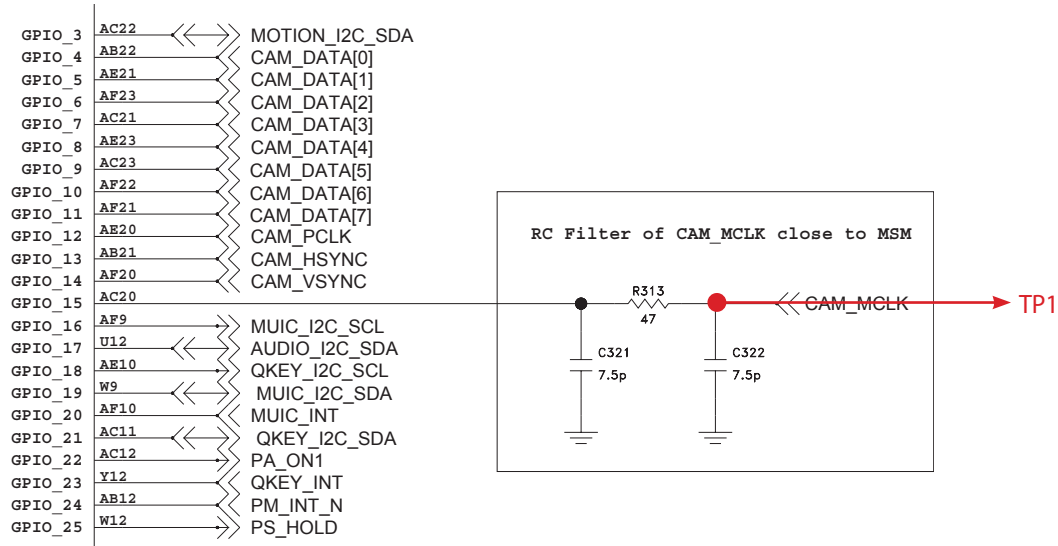


4.12 3M FF Camera trouble shooting

3M camera control signals are generated by MSM7227T.

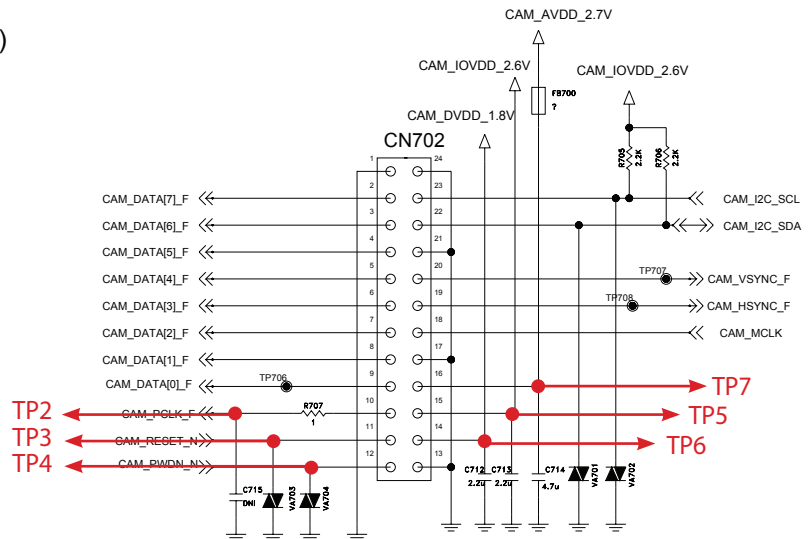
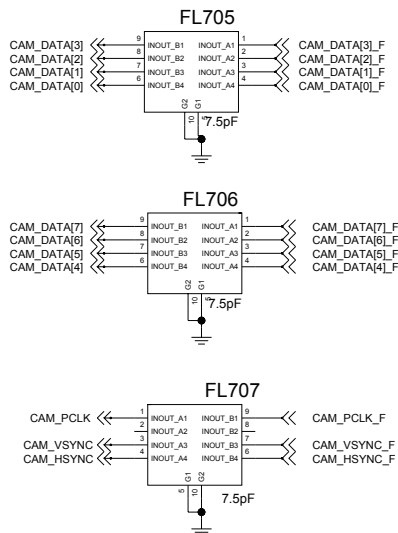


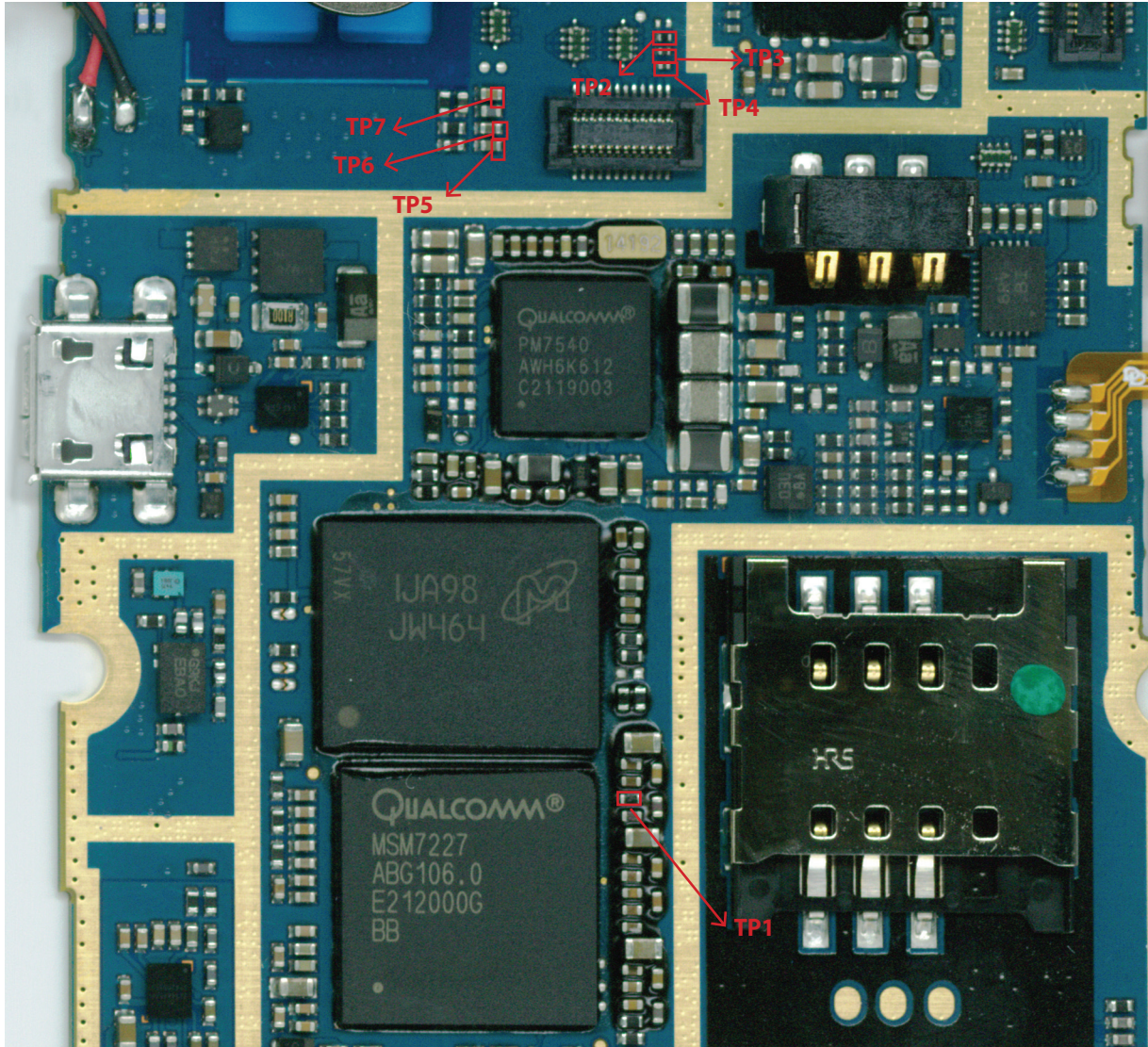
4. TROUBLE SHOOTING



3M MAIN CAMERA FF 7.0x7.0x4.1t

Camera Filter(EMI 100 ohm, 7.5pF)

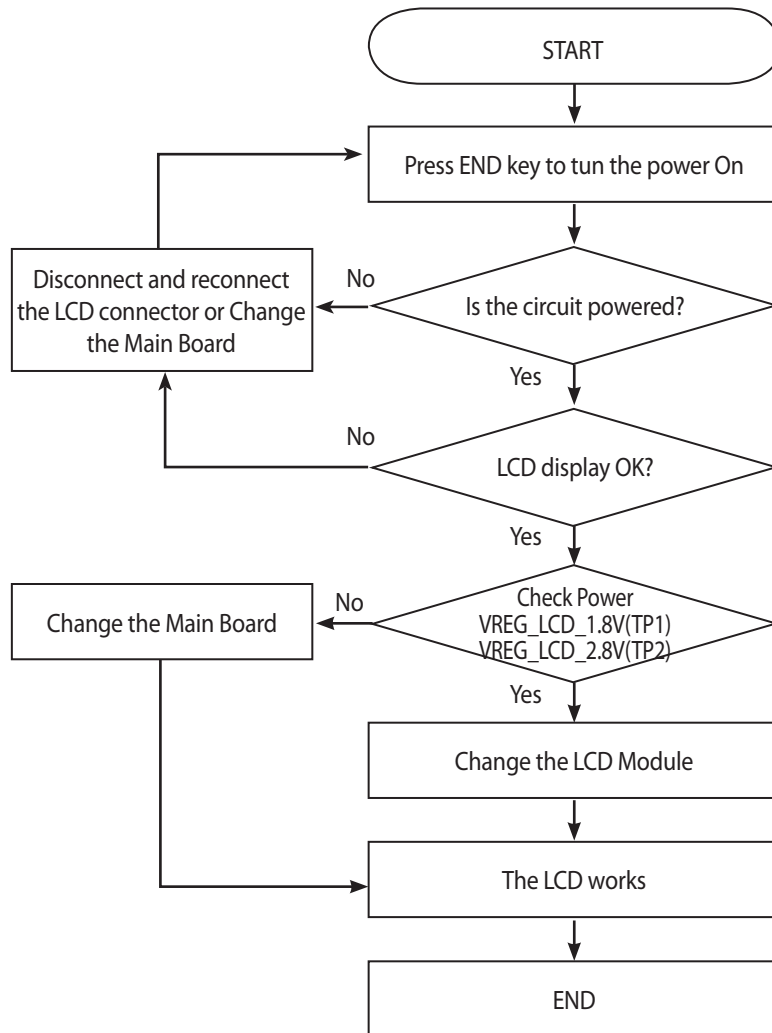


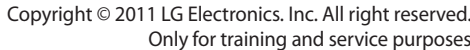
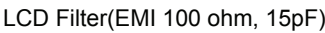


4.13 Main LCD trouble shooting

Main LCD control signals are generated by MSM7227T.

Those signal's path are : MSM7227T -> LCD Module



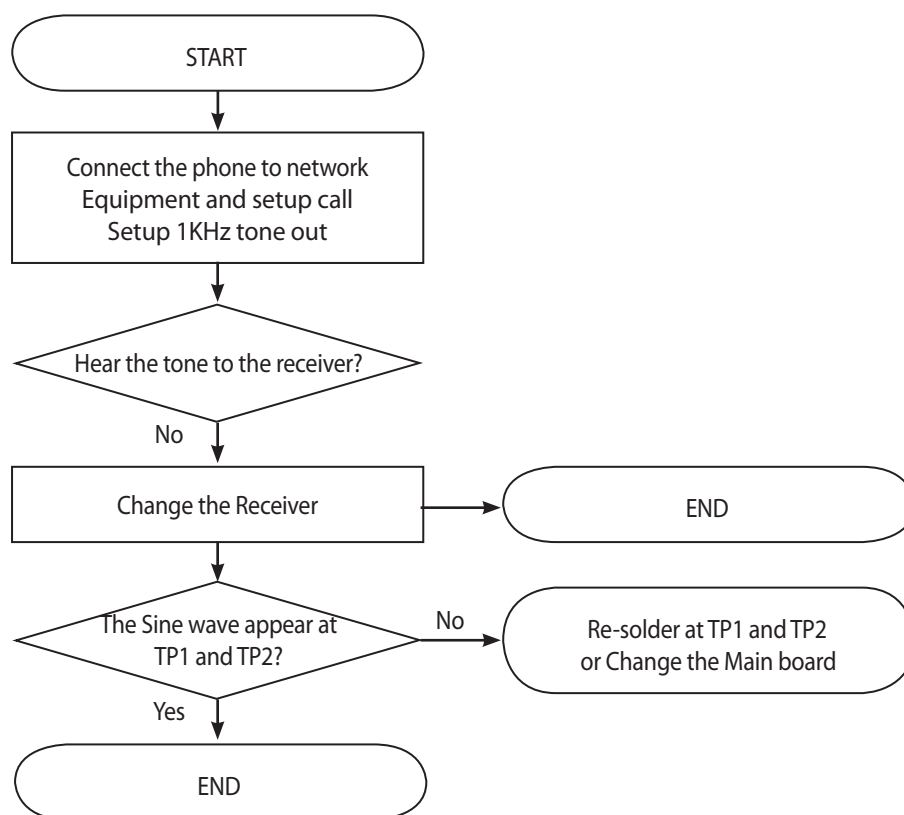


4.14 Audio Trouble shooting

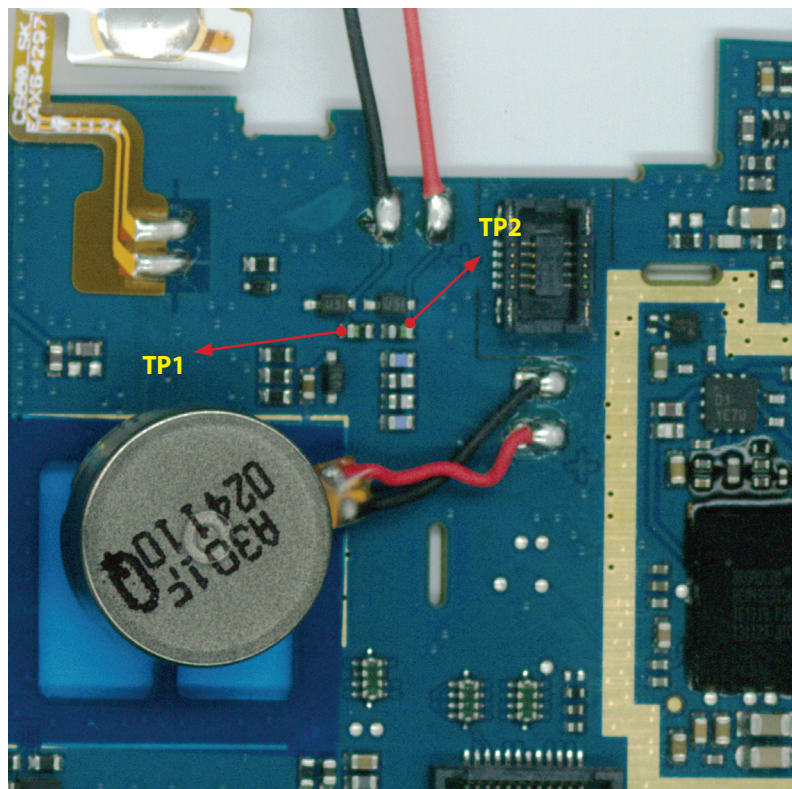
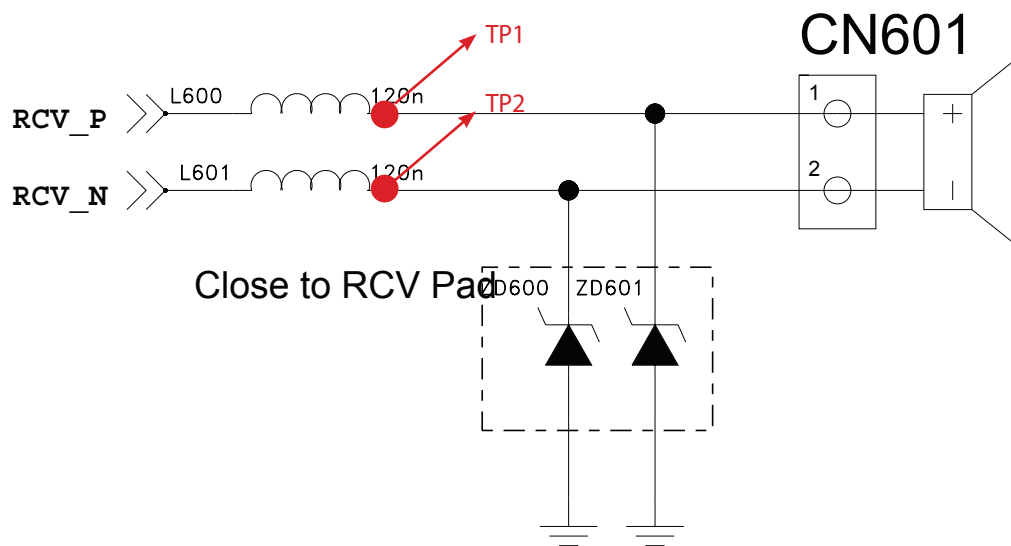
4.14.1 Receiver path

Voice Receiver path as below:

MSM7227T RCV_N / RCV_P → L600, L601 → RCV Pad.



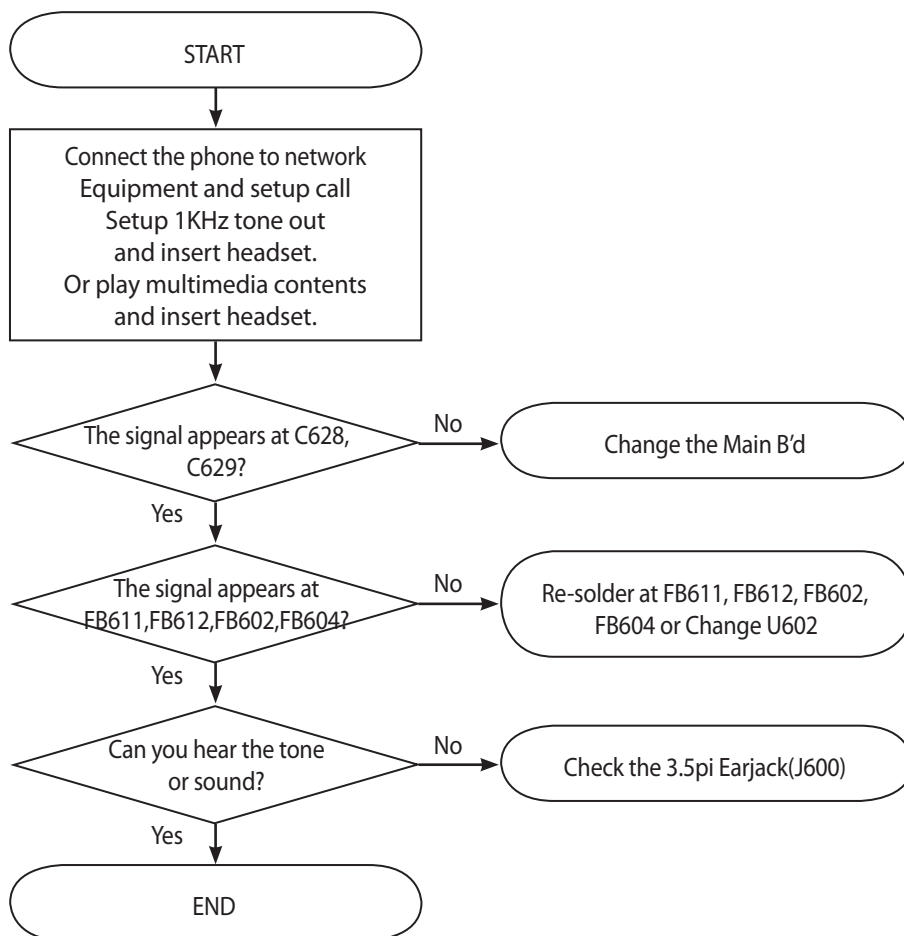
4. TROUBLE SHOOTING



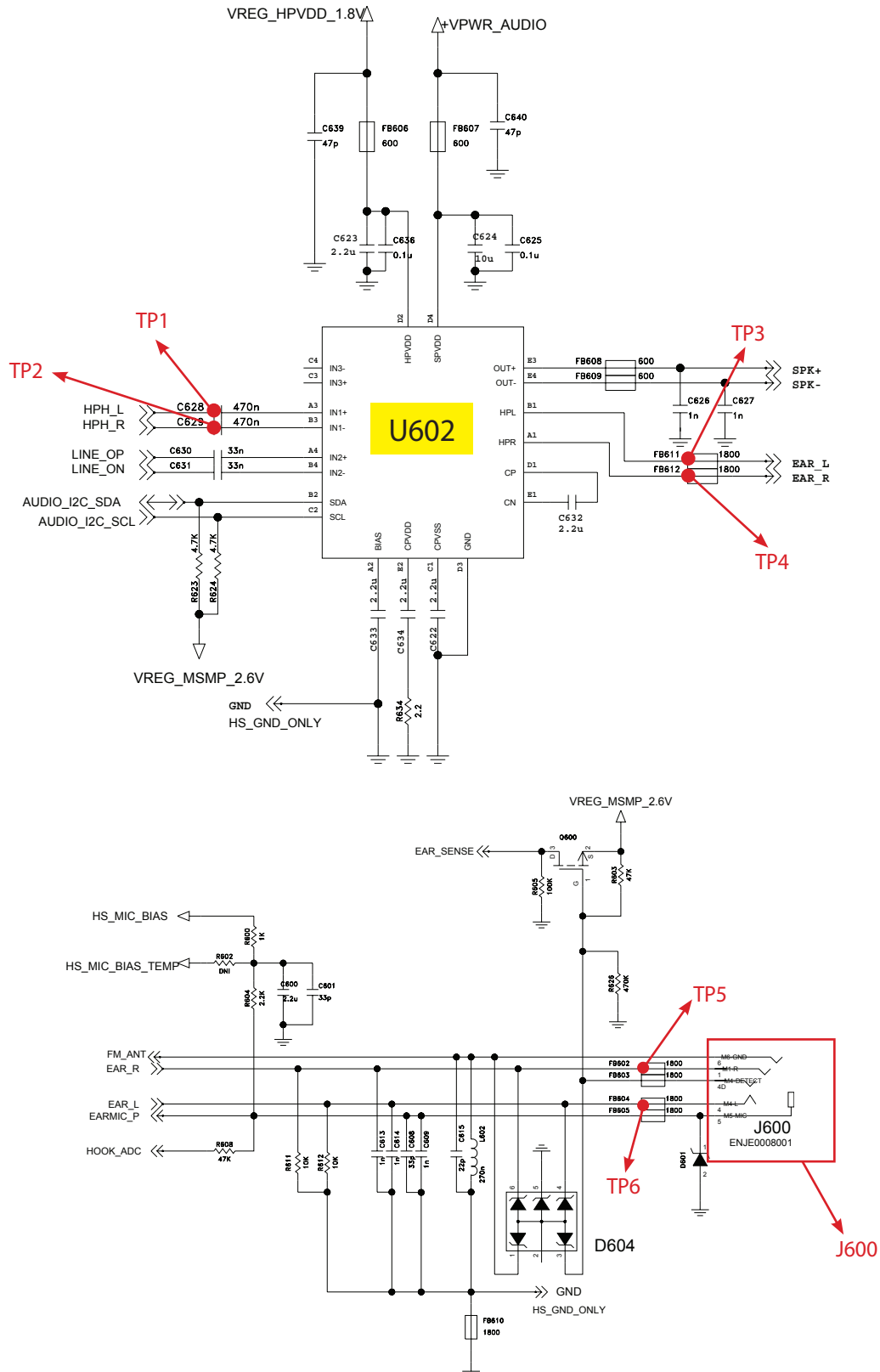
4.14.2 Headset path (Voice & Multimedia play)

Voice path & Multimedia play for headset as below:

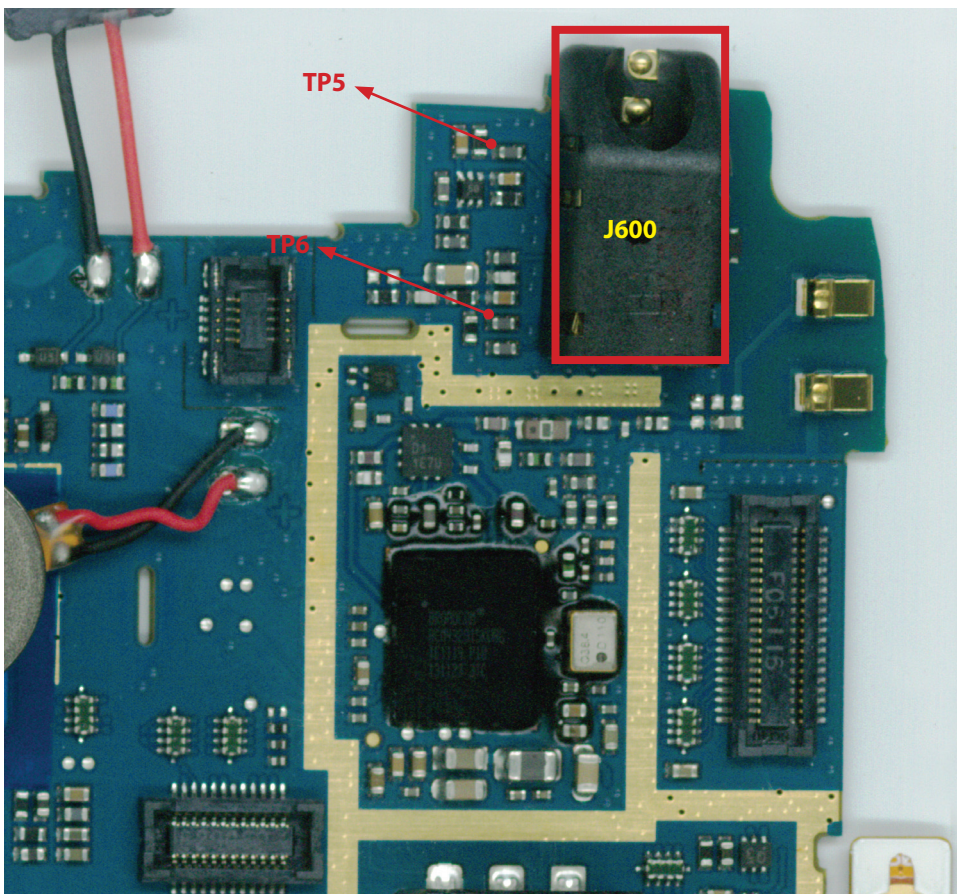
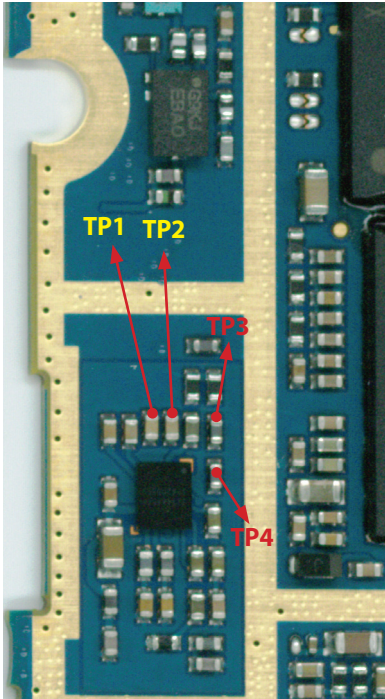
MSM7227T HPH_R, HPH_L → C628, C629 → U602(audio subsystem) → FB611, FB612 → FB602, FB604
→ J600(Earjack connector)



4. TROUBLE SHOOTING



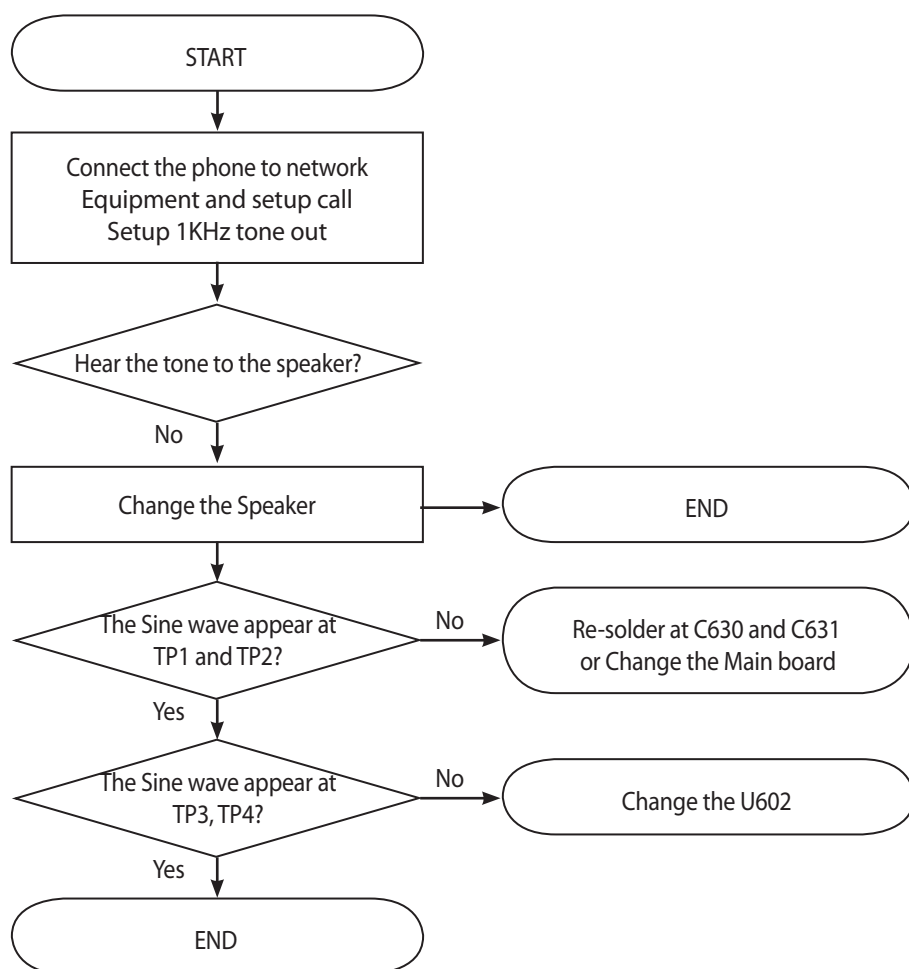
4. TROUBLE SHOOTING



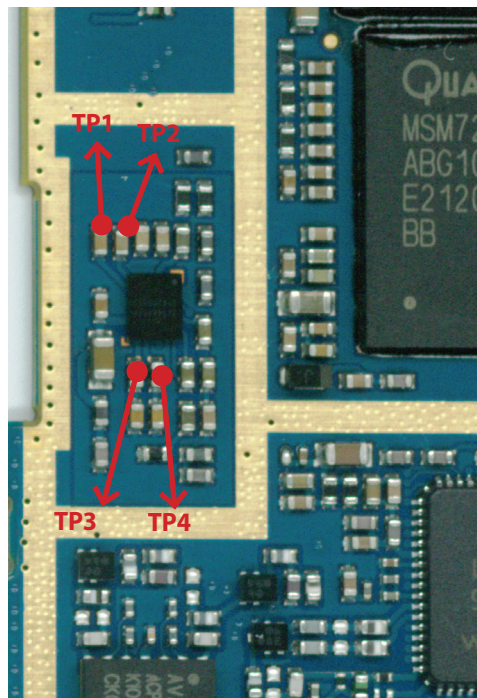
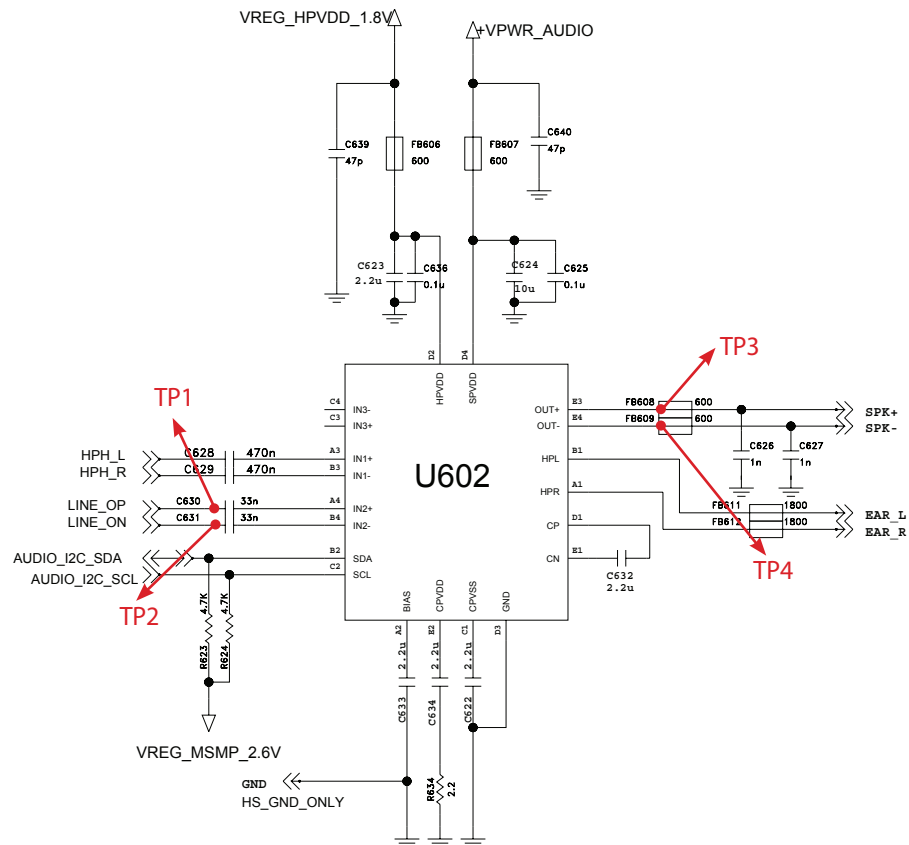
4.14.3 Loud speaker path (voice speaker phone & multimedia play)

Loud speaker path as below:

MSM7227T LINE_OP, ON → C630, C631 → U602(Audio subsystem) → FB608, FB609
→ SPK/RCV Pad.



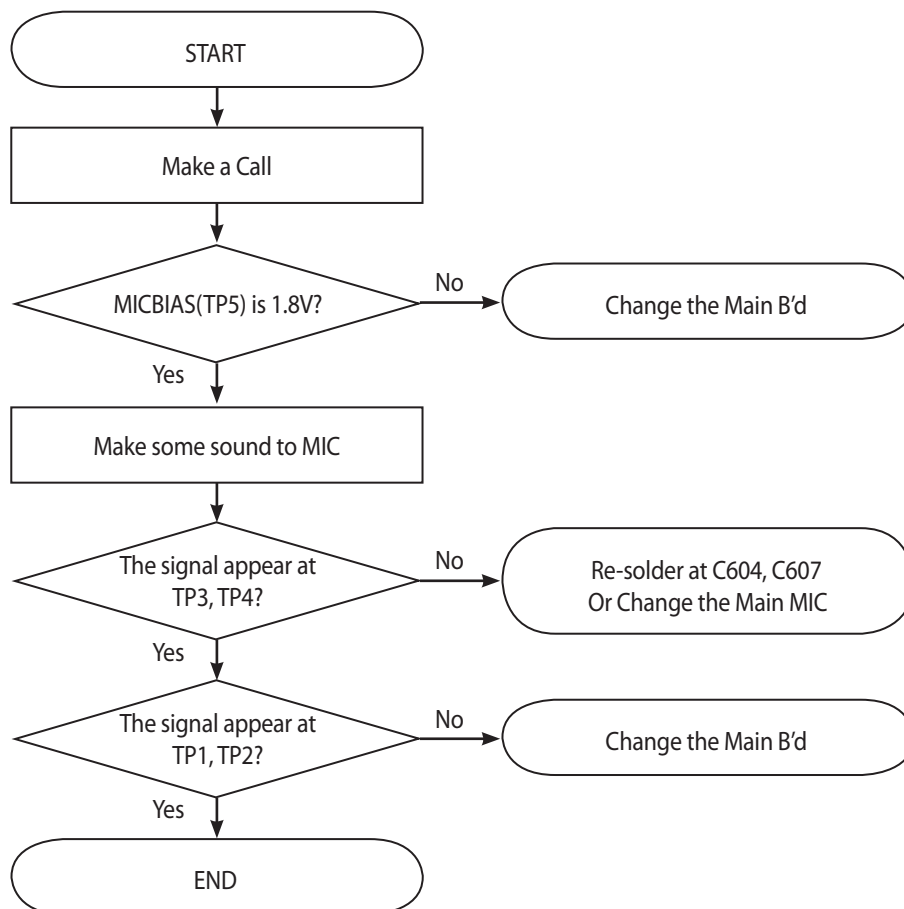
4. TROUBLE SHOOTING



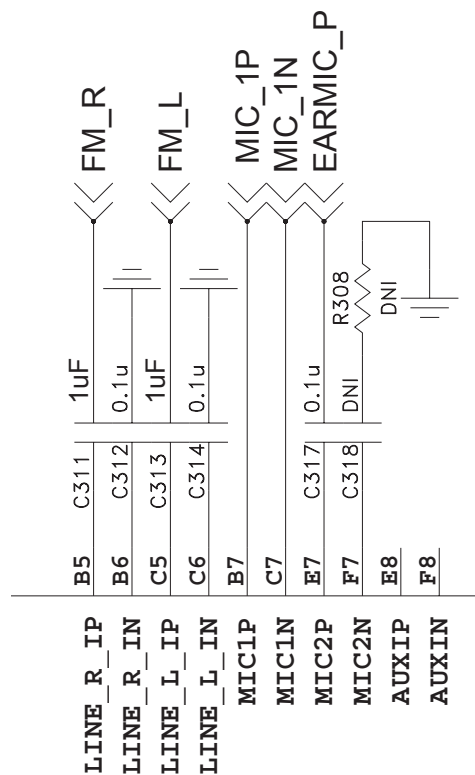
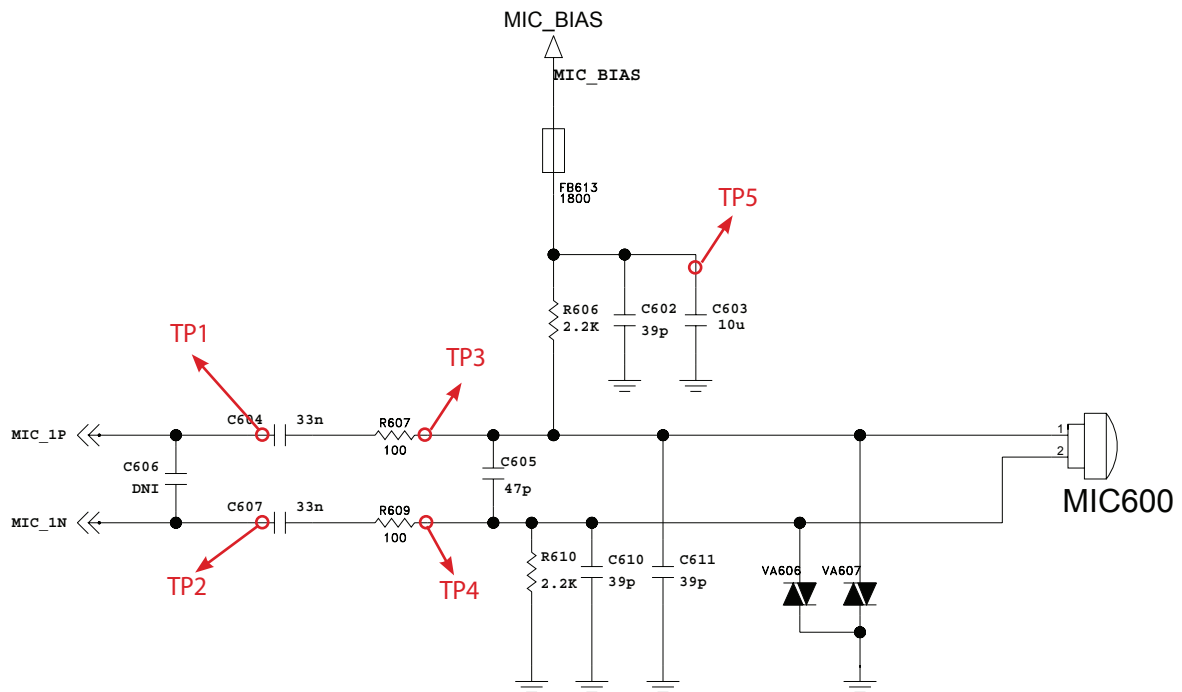
4.14.4 Microphone for Main MIC

Main Microphone path as below:

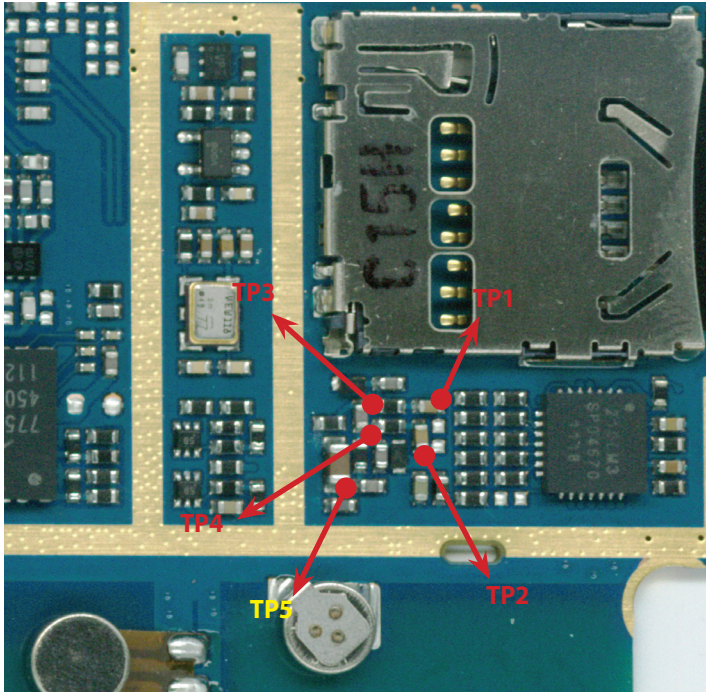
MIC → FB5013 → C2017 → MSM7227T



4. TROUBLE SHOOTING



4. TROUBLE SHOOTING

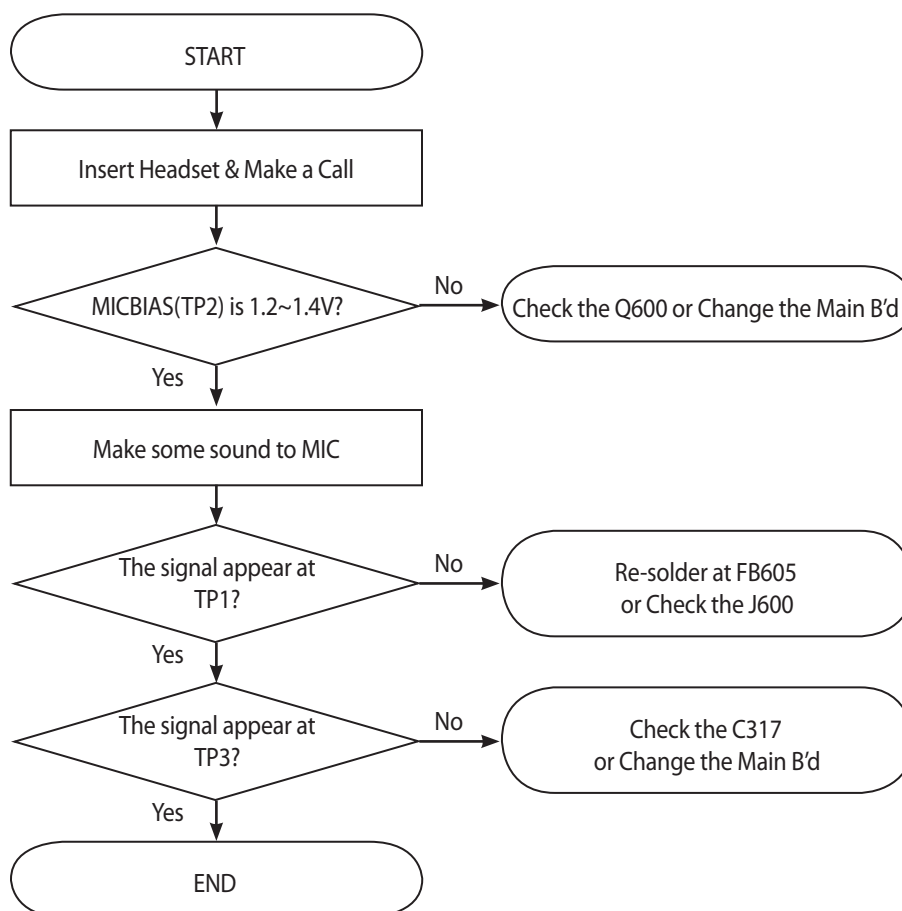


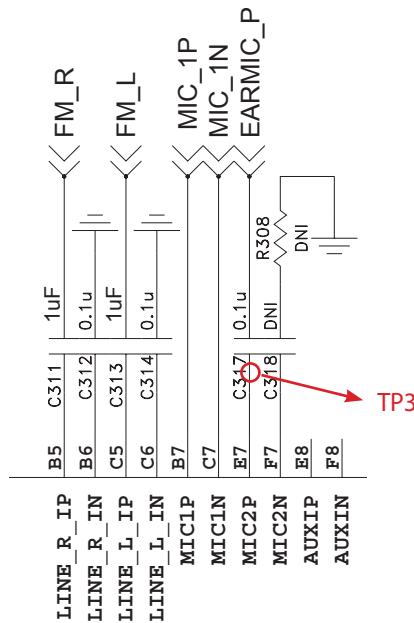
4.14.5 Microphone for headset

MIC for Headset path as below:

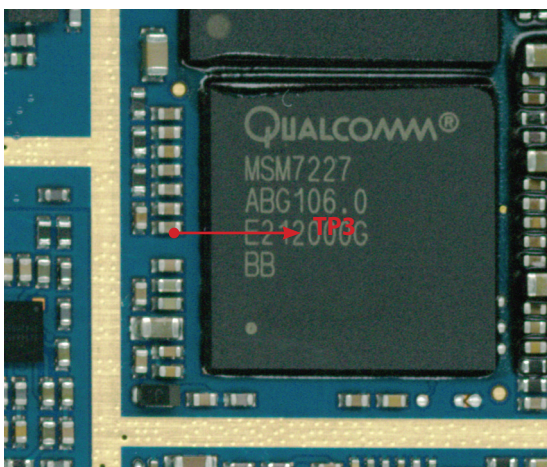
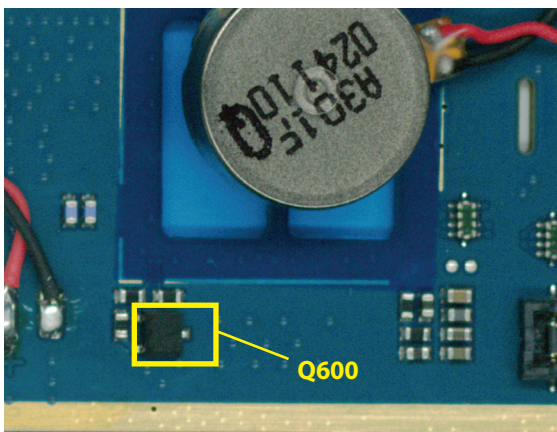
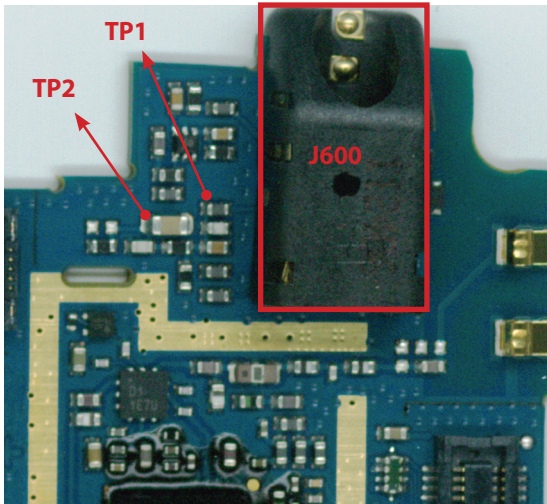
Insert Headset → Interrupt which are the signal of Headset detecting arise in EAR_SENSE

→ HS_MIC_BIAS:1.2~1.4V (MICBIAS) → MIC signal → FB605 → C317 → MSM7227T





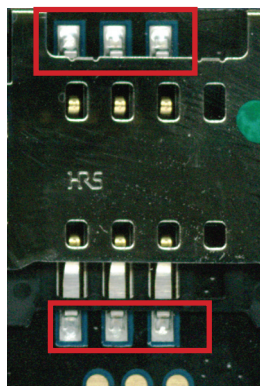
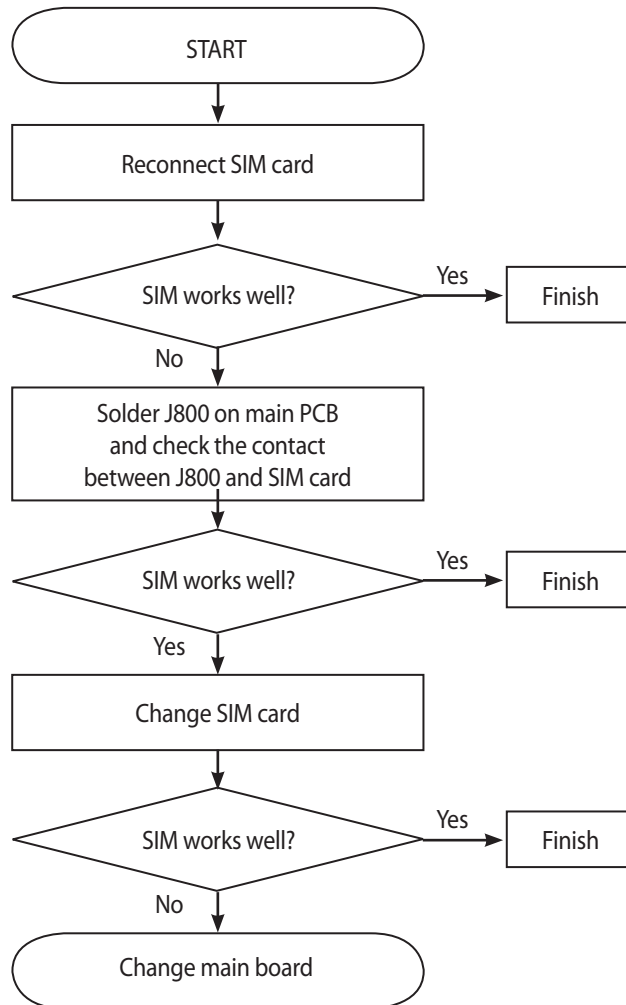
4. TROUBLE SHOOTING



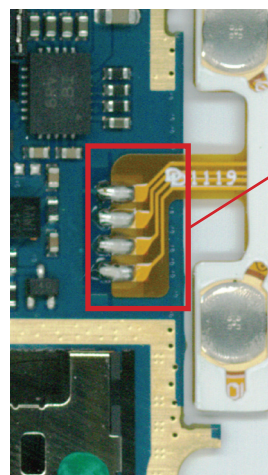
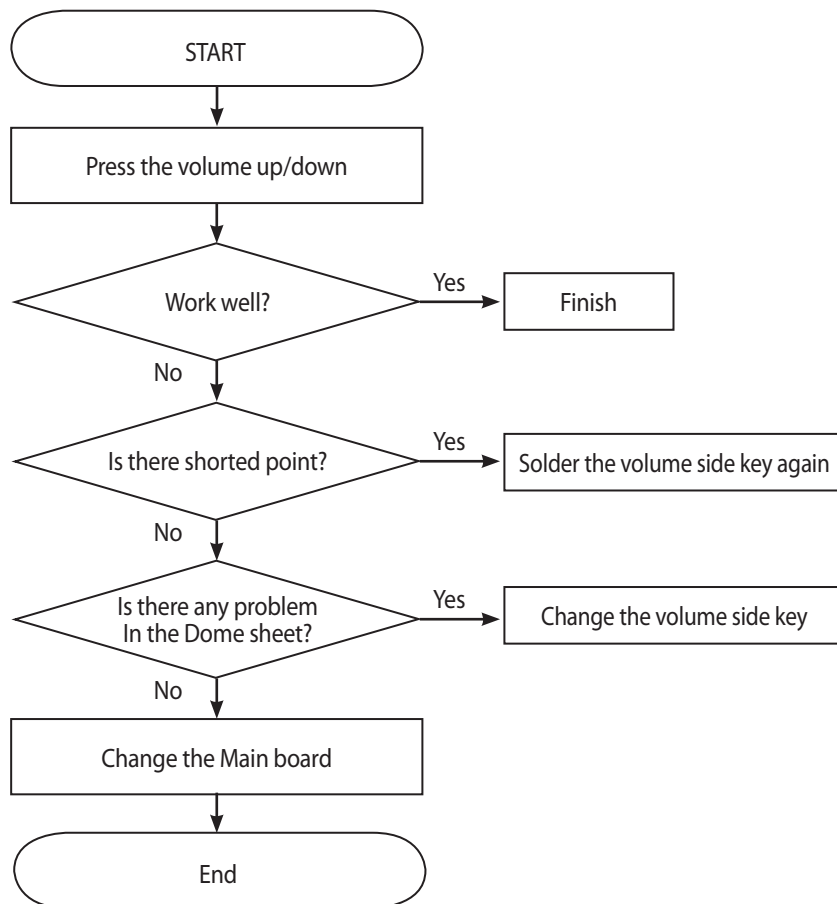
4.15 SIM Detect Trouble shooting

MSM generates SIM interface signals(1.8V level) to PM7540.

PM7540 converts SIM interface signals to 3V.



4.16 Side key trouble shooting



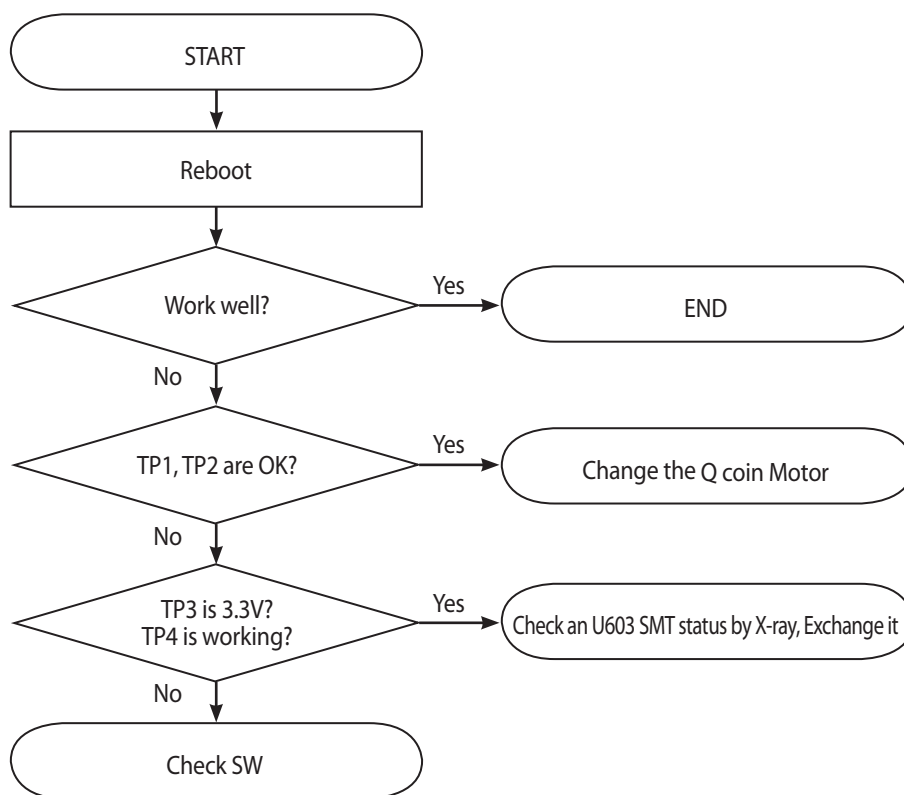
Check this point

4.17 Vibrators Trouble shooting

Q coin Motor is worked as below :

touch touch-window → Vibration feedback

U603 : Used the PWM pulse



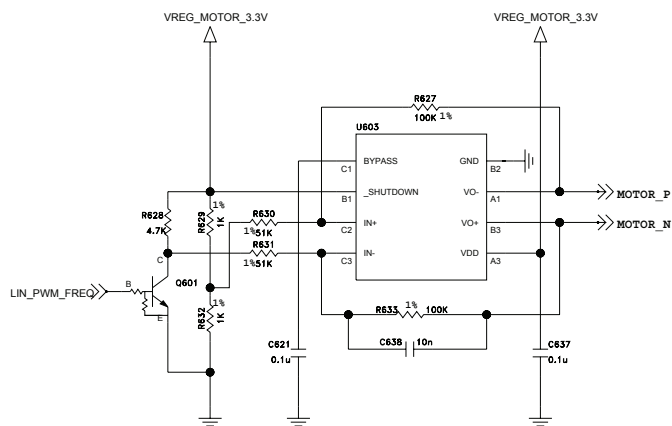
Measurement

VREG_MOTOR_3.3V(TP1)

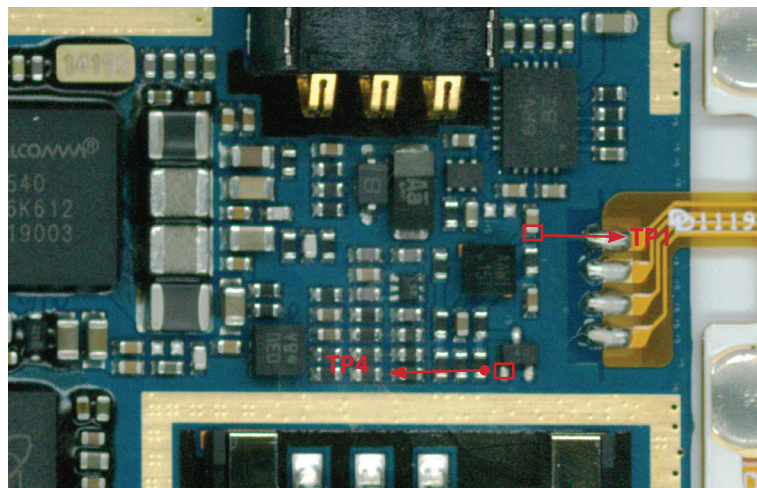
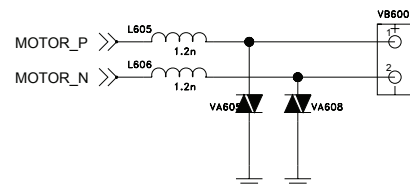
MOTOR_P(TP2) / MOTOR_N(TP3)

LIN_PWM_FREQ(TP4)

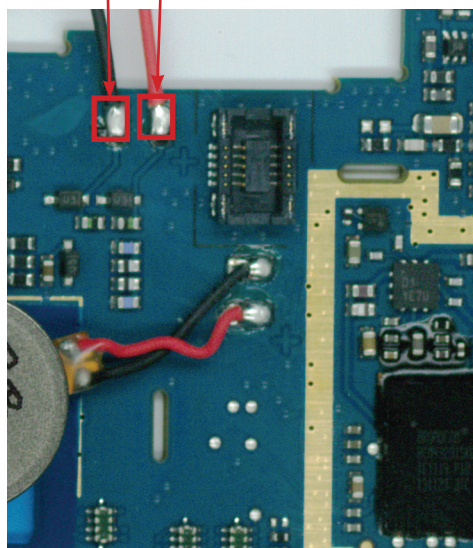
Q-coin MOTOR



MOTOR (Q-Coin)



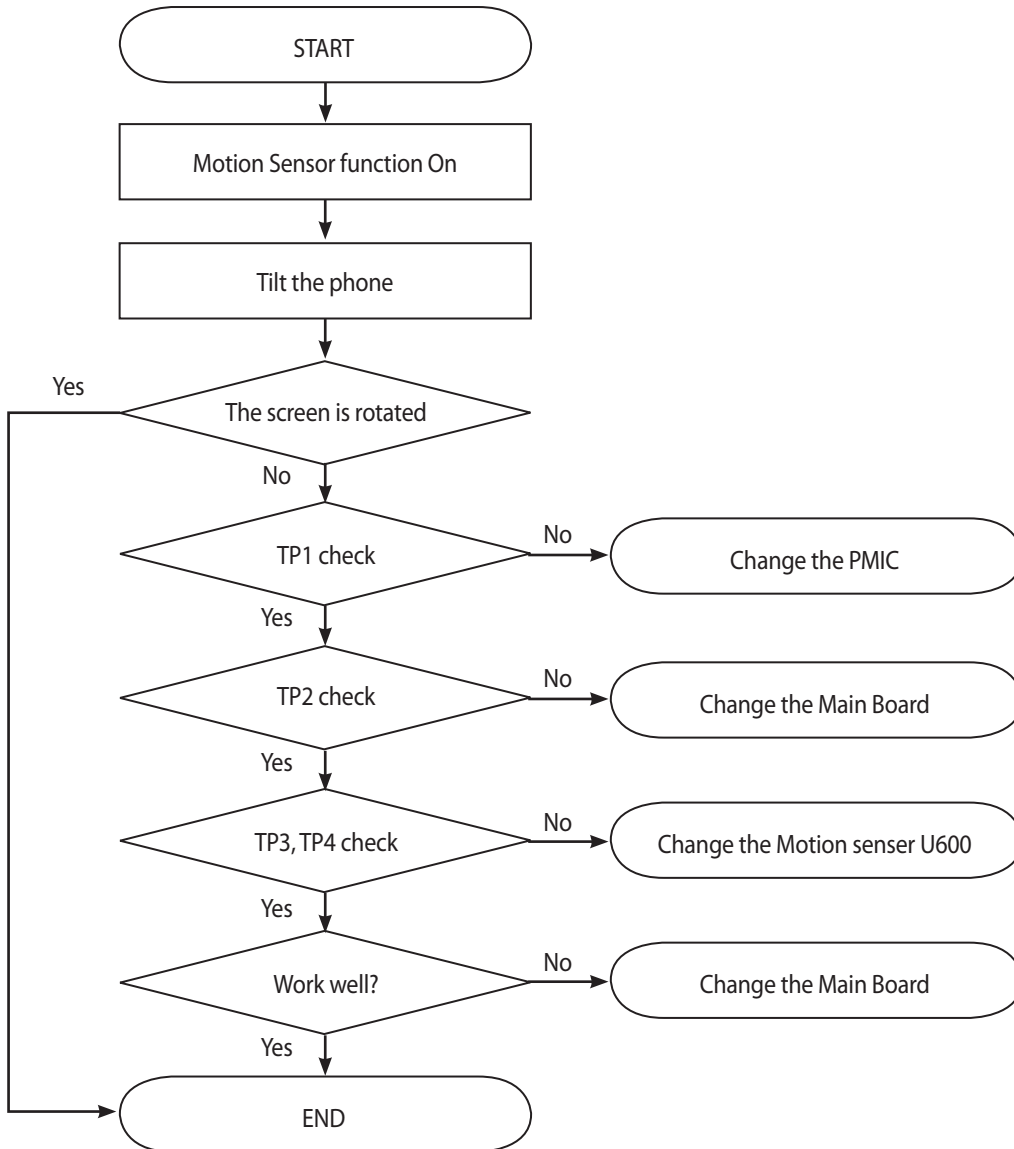
TP3 TP2



4.18 Motion Sensor on/off trouble shooting

Motion Sensor is worked as below :

Accelerometer Sensor function On → Tilt the phone (90°) → The screen is had rotated automatically.



Measurement

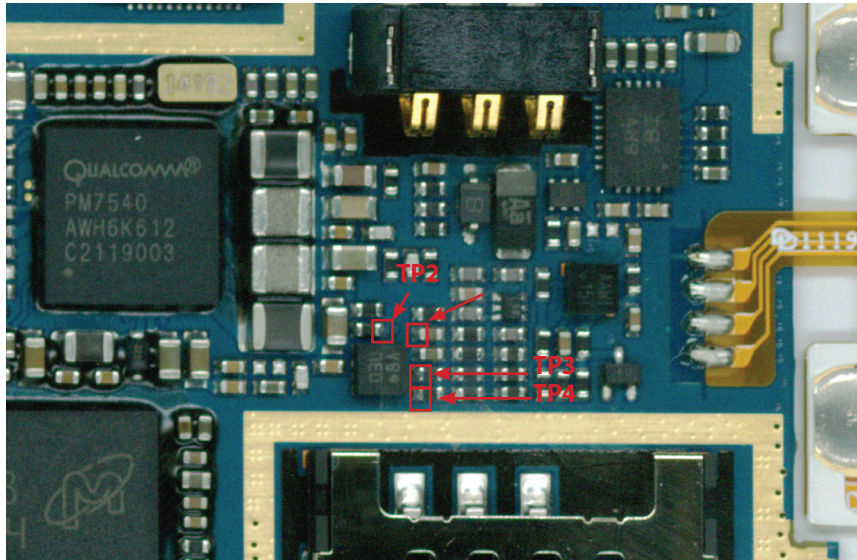
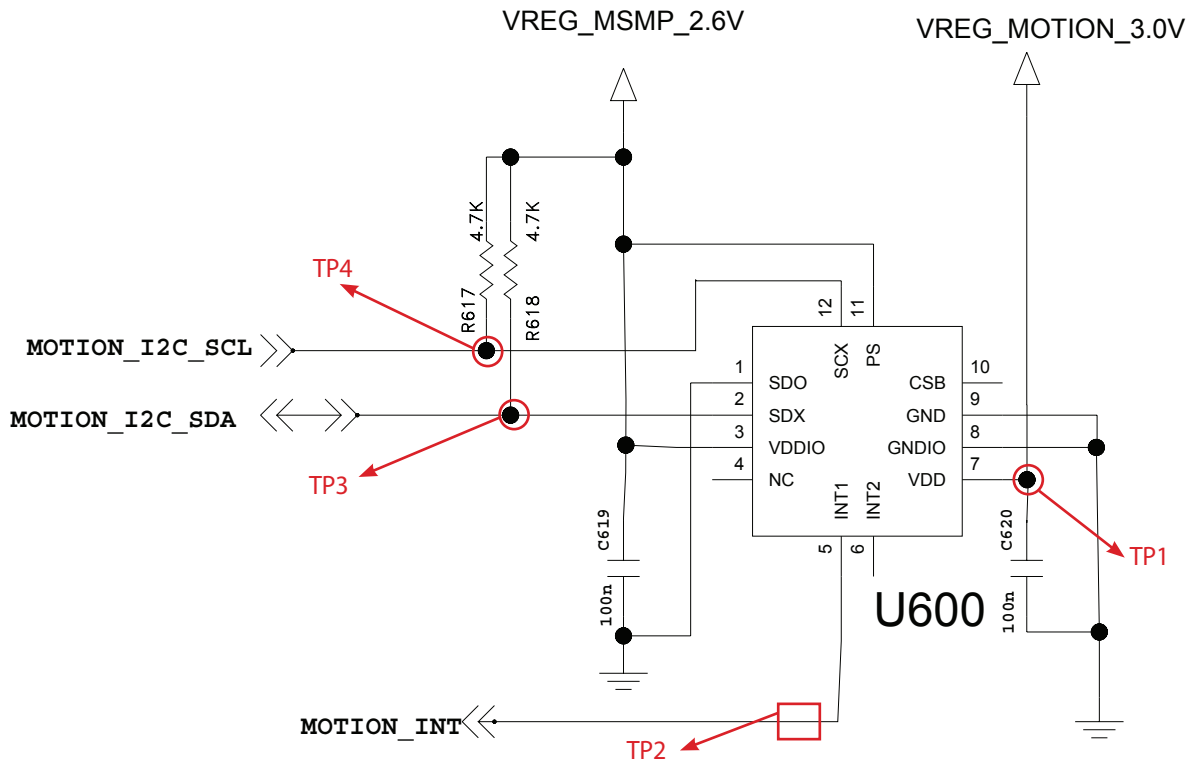
VREG_MOTION_3.0V(TP1)

MOTION_INT(TP2)

MOTION_I2C_SDA(TP3)

MOTION_I2C_SCL(TP4)

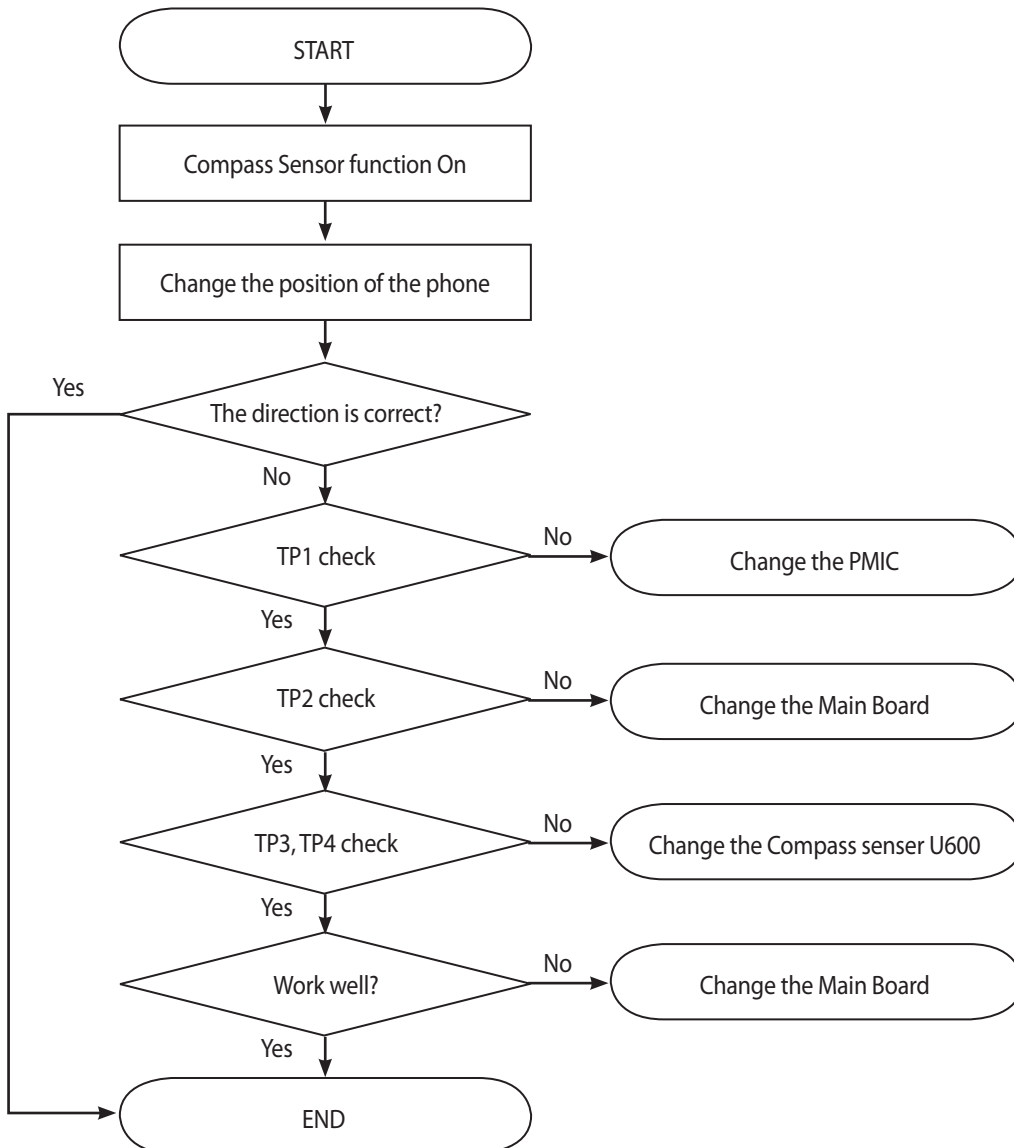
4. TROUBLE SHOOTING



4.19 Compass Sensor on/off trouble shooting

Compass Sensor is worked as below :

Compass Sensor function On



Measurement

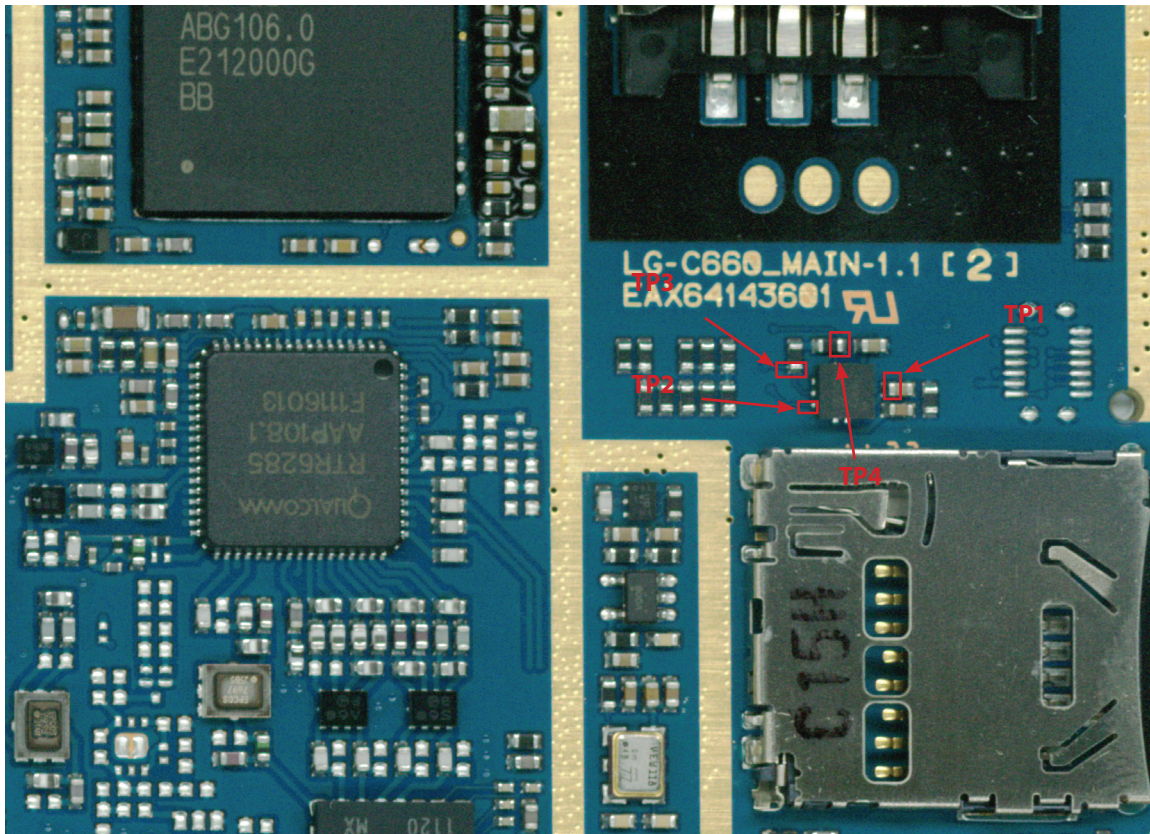
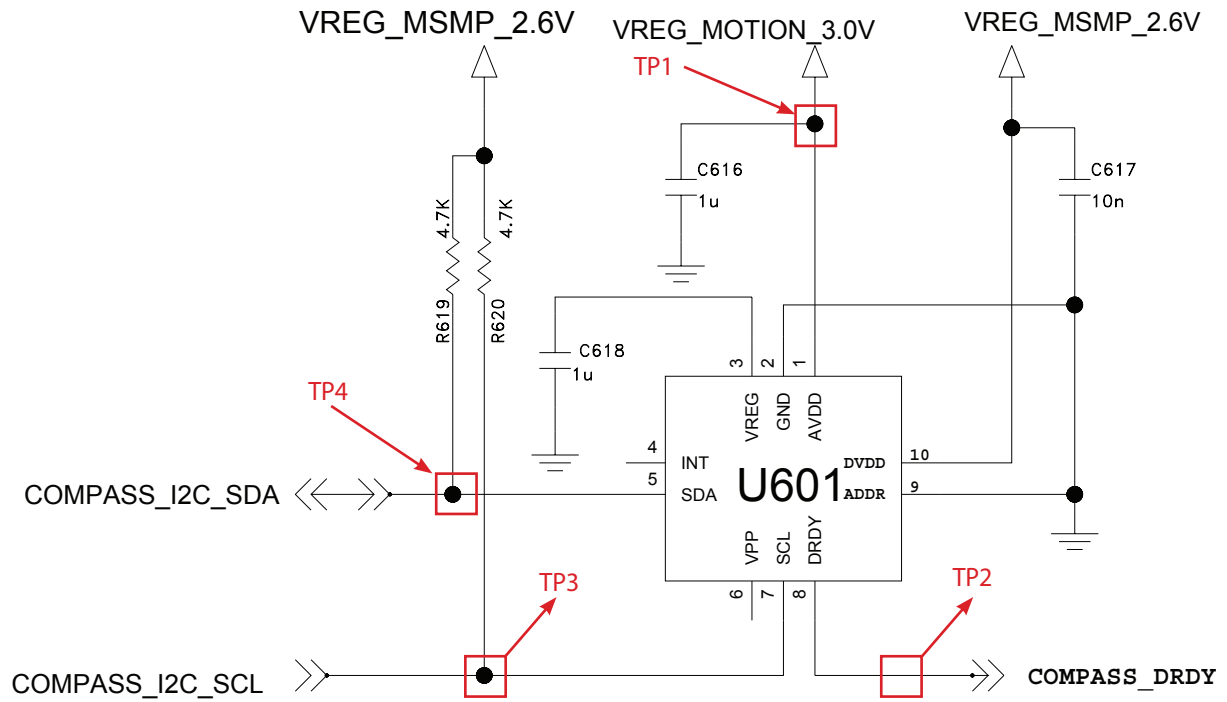
VREG_MOTION_3.0V(TP1)

COMPASS_DRDY(TP2)

COMPASS_I2C_SCL(TP3)

COMPASS_I2C_SDA(TP4)

4. TROUBLE SHOOTING



4.20 Shield Can Disassembly Guide

Disassembly order : Motor → Holder → Camera Connector → Shield Can

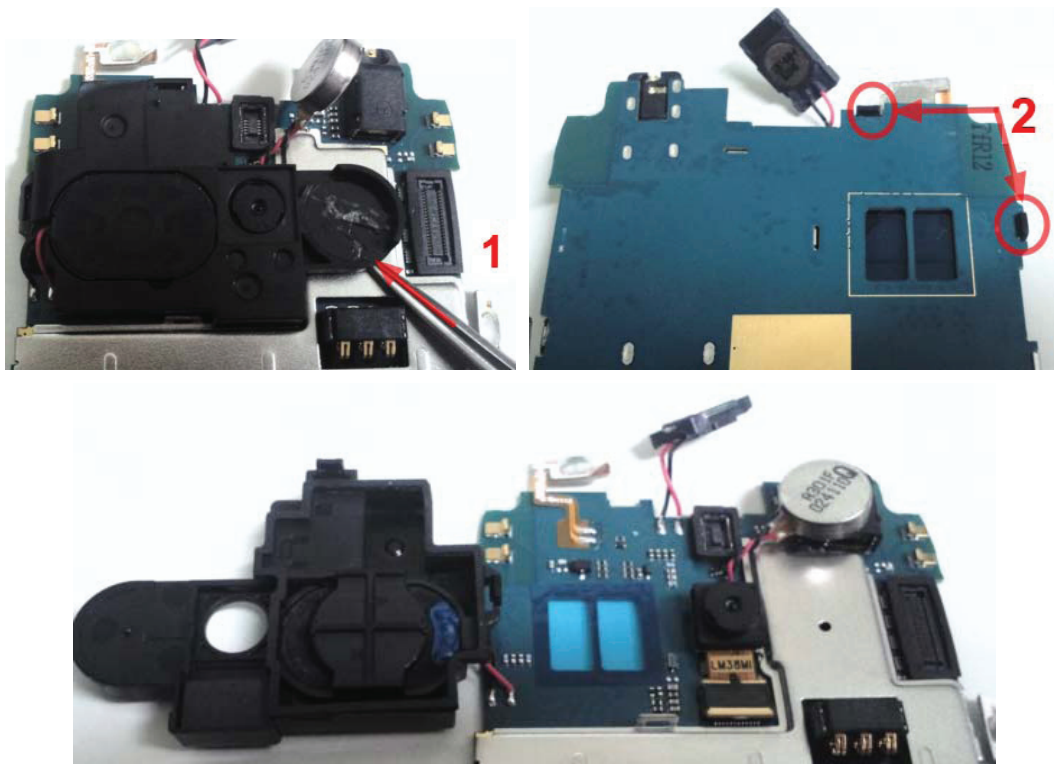
4.20.1 Motor Disassembly

Disassemble motor from holder.



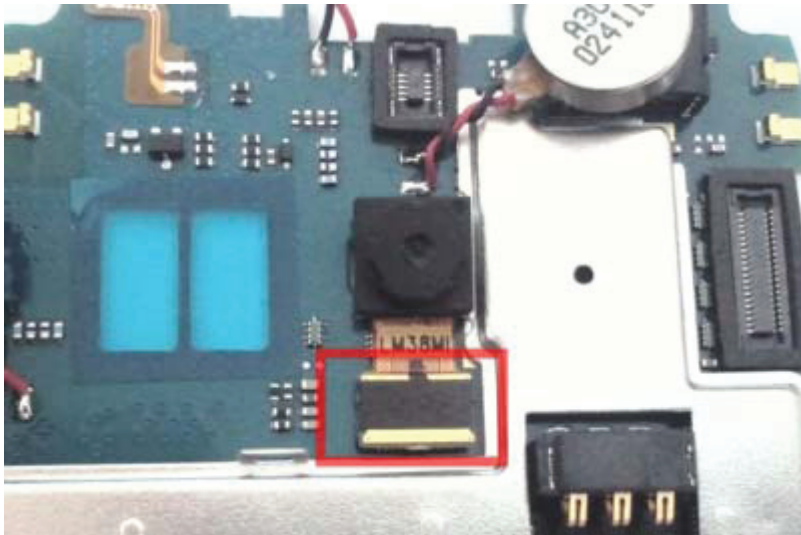
4.20.2 Holder Disassembly

Disassemble holder in order(1→2), and disassemble the holder.



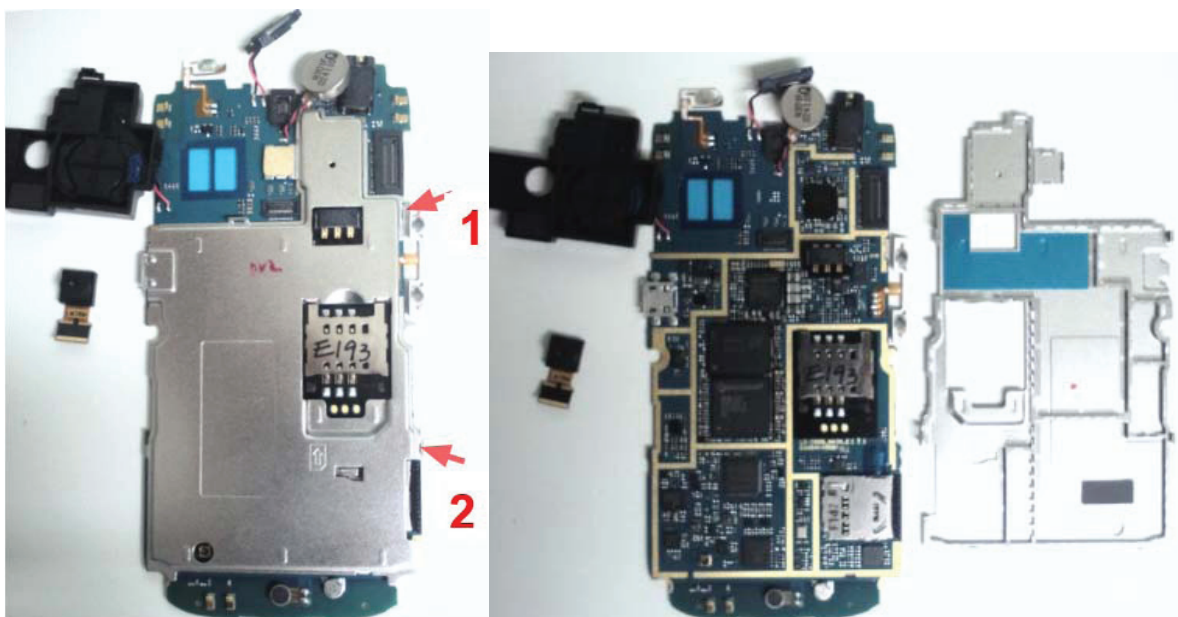
4.20.3 Camera Connector Disassembly

Disassemble Camera connector from main PCB.

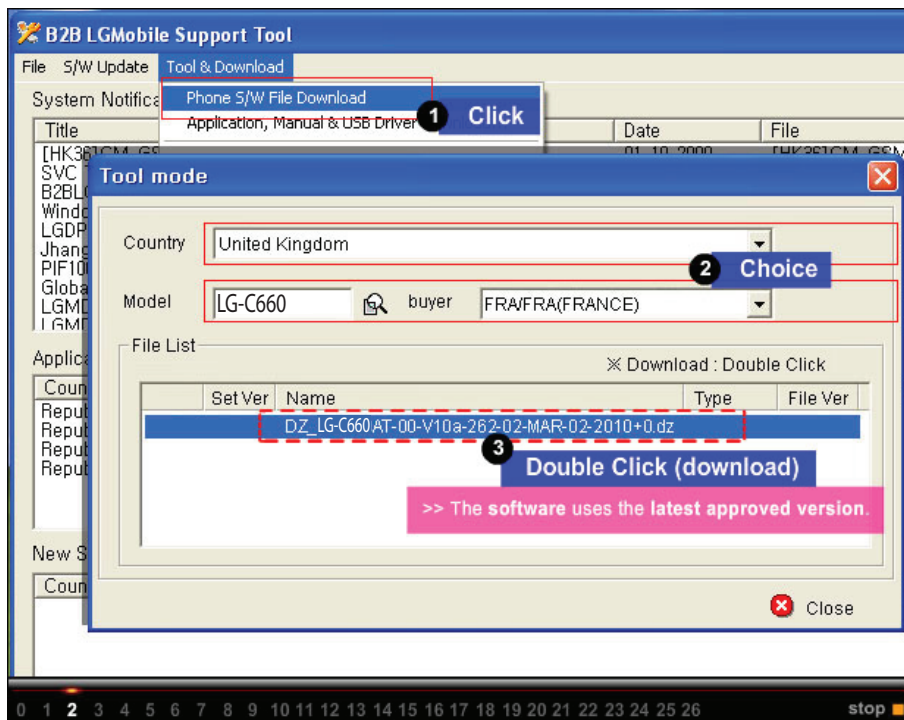
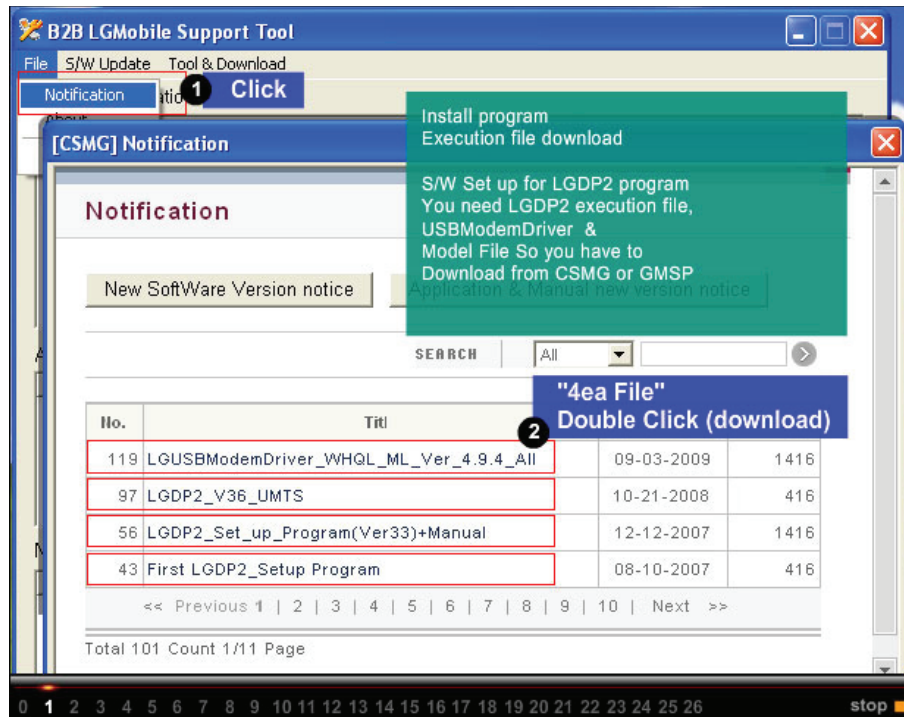


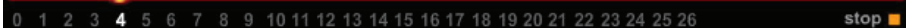
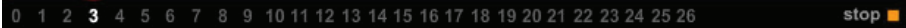
4.20.4 Shield Can Disassembly

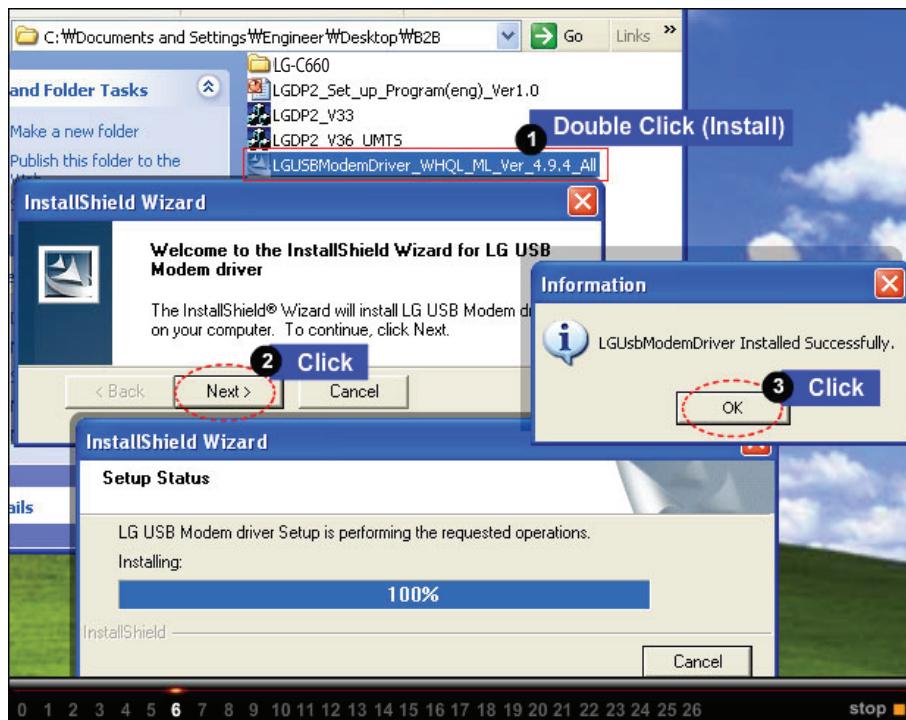
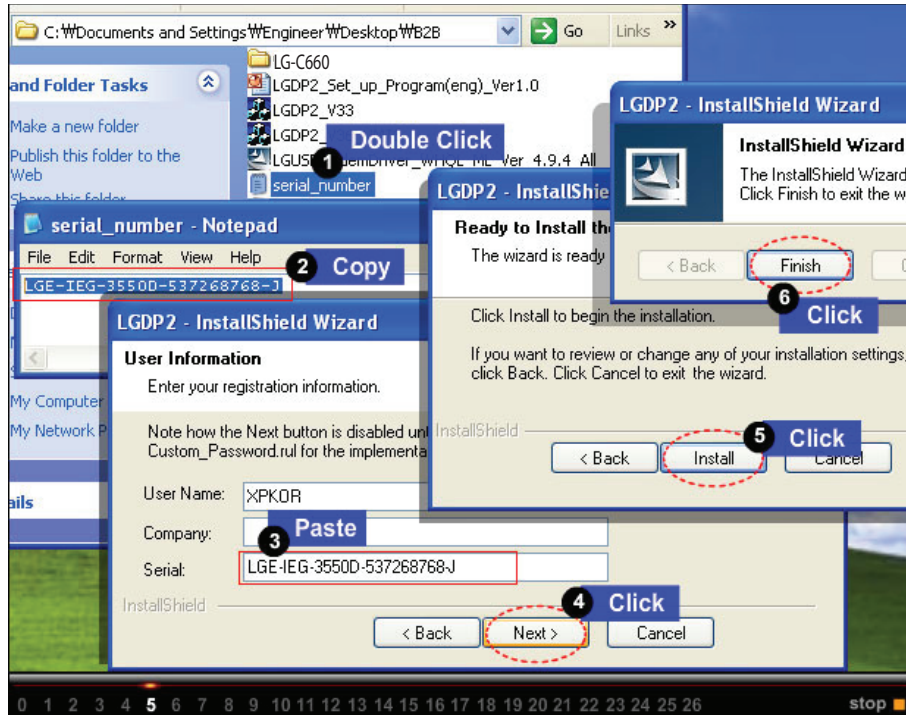
Disassemble hooks on the right side(1),(2) from main PCB, and then lift to disassemble shield can.



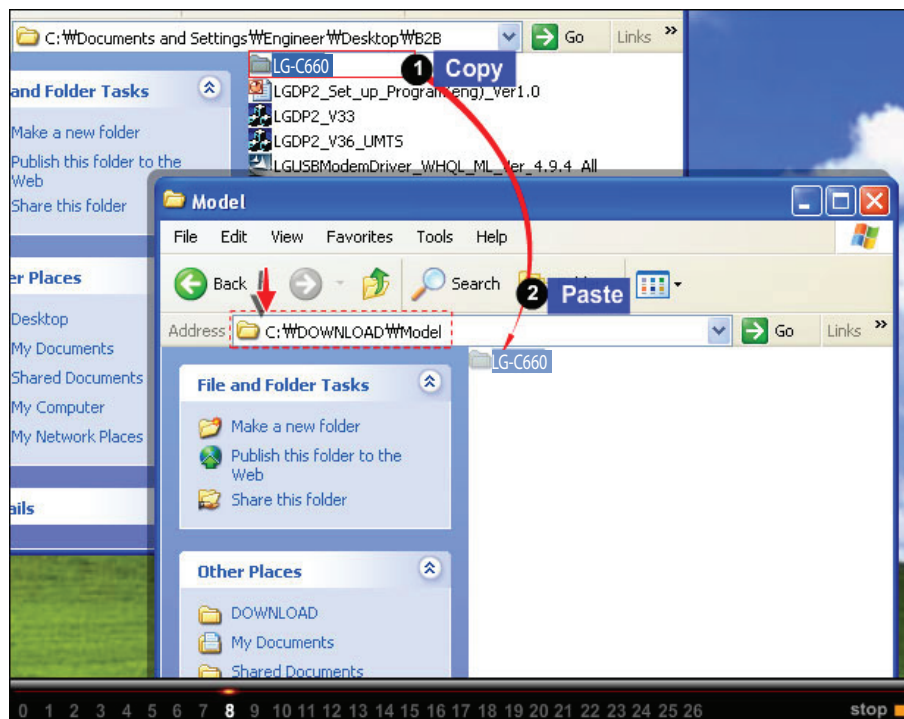
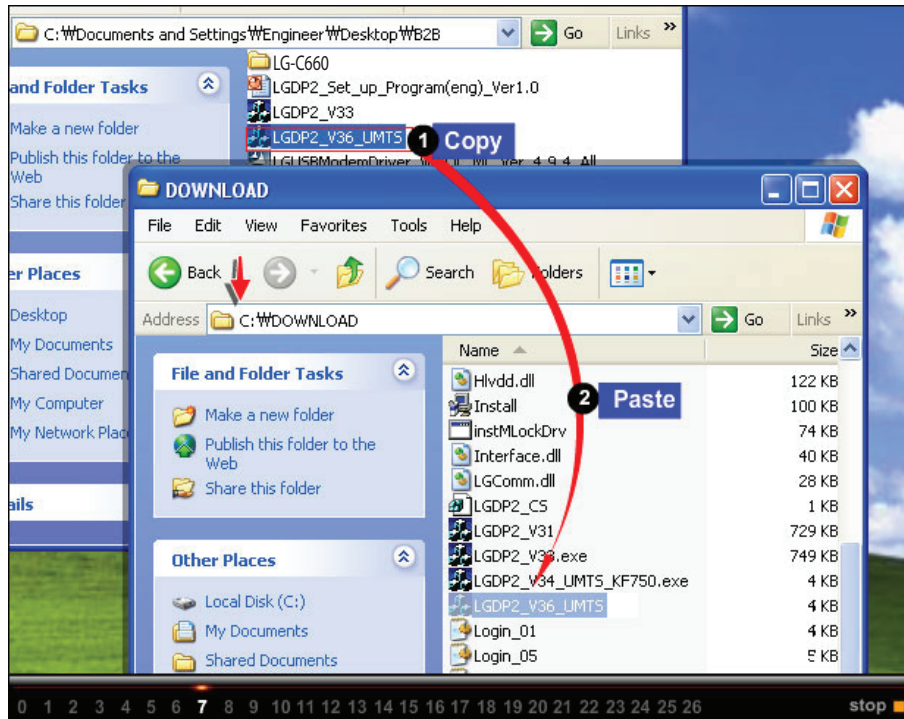
5. DOWNLOAD



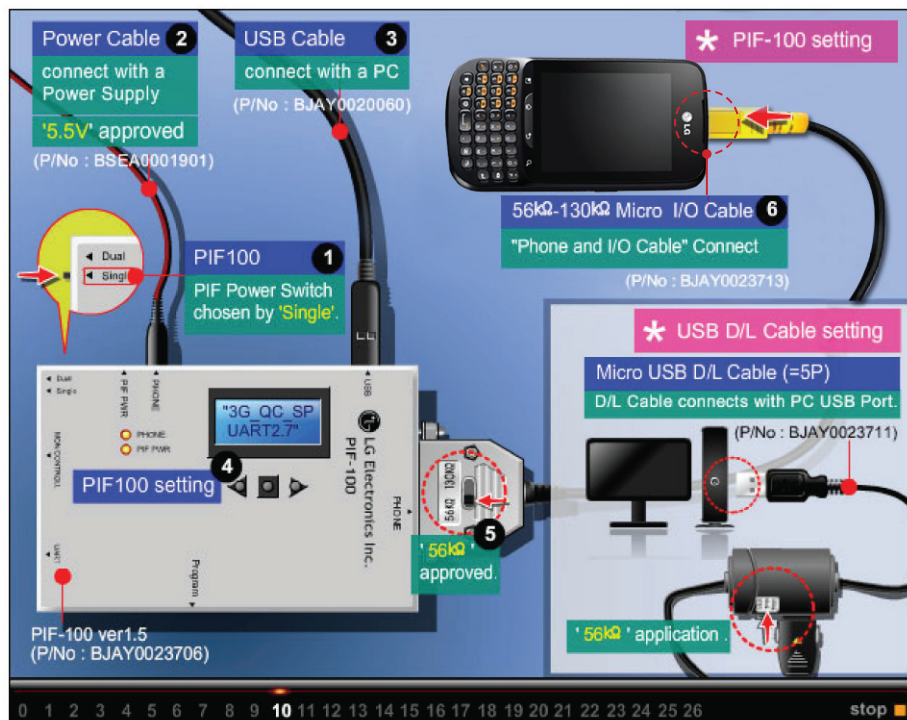
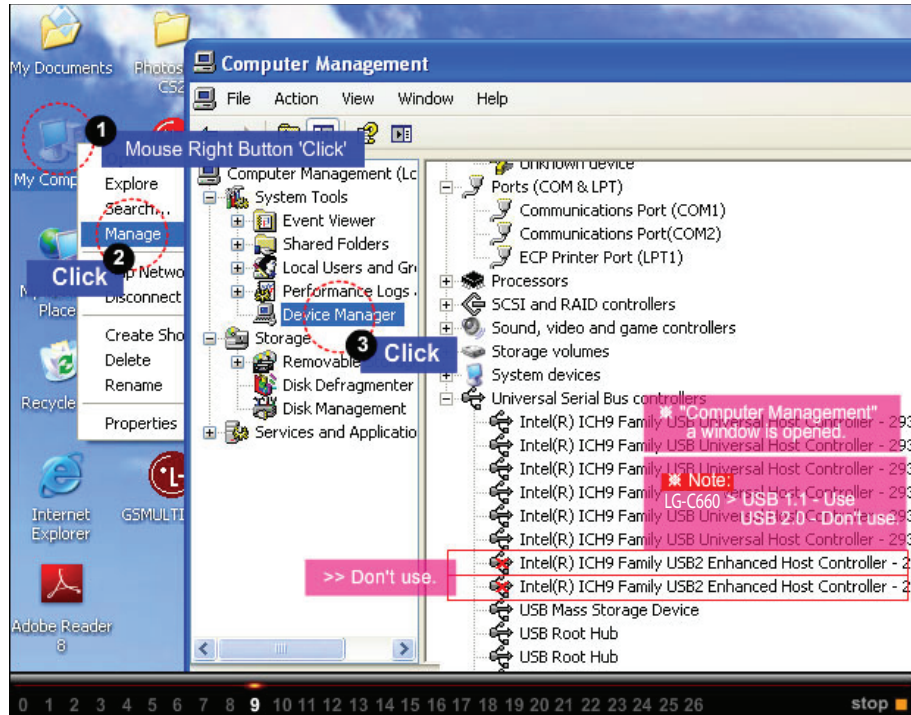


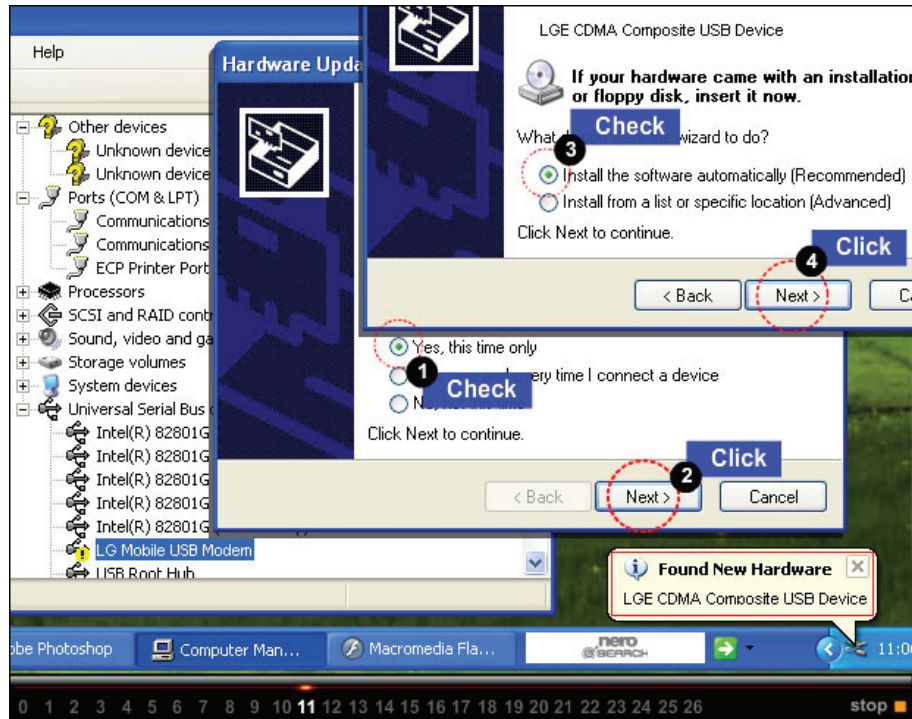


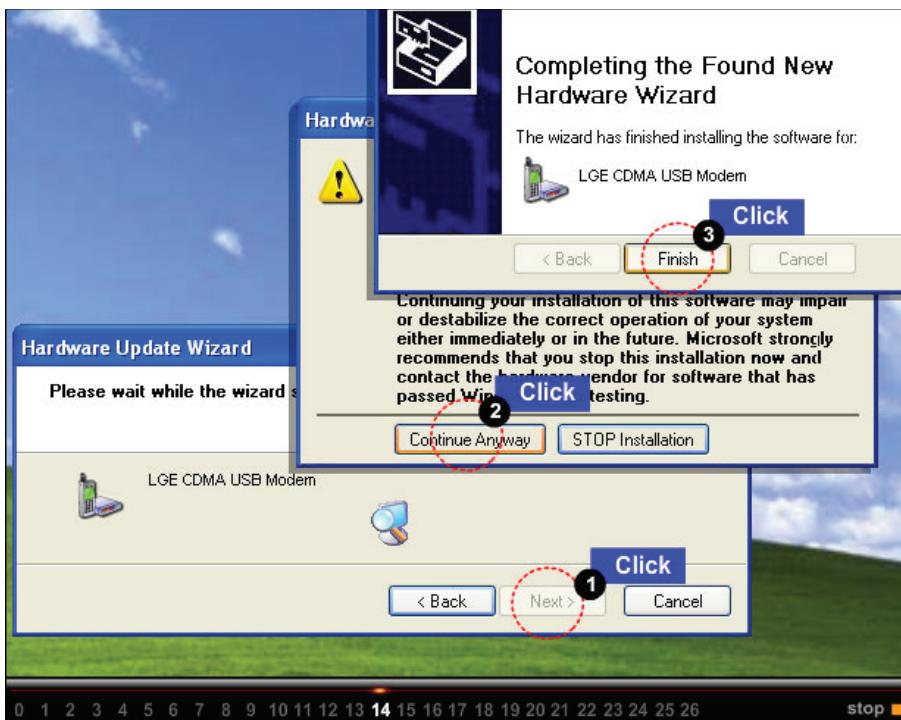
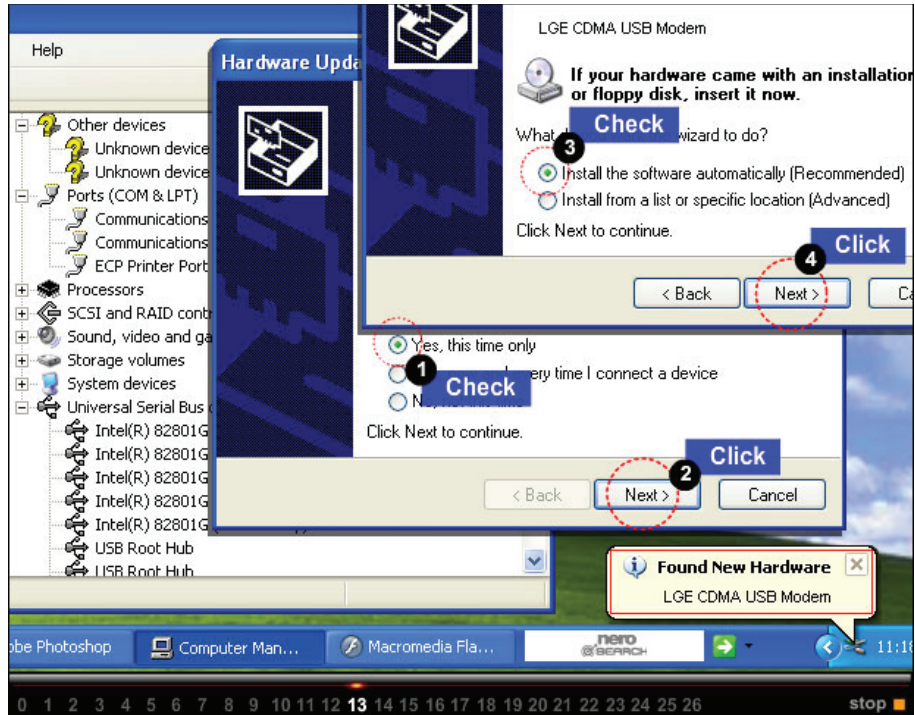
5. DOWNLOAD

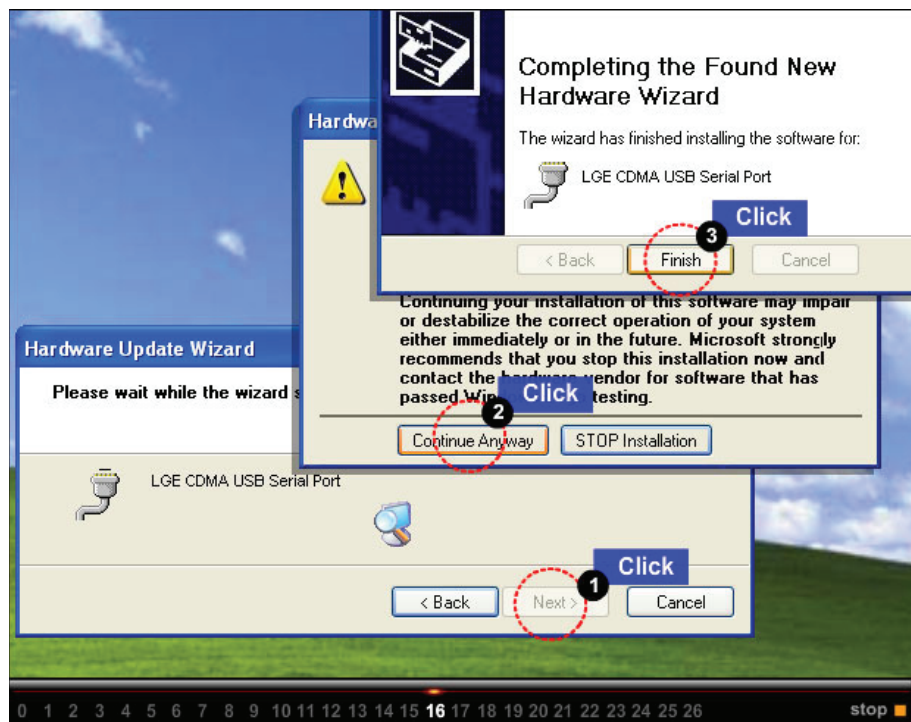
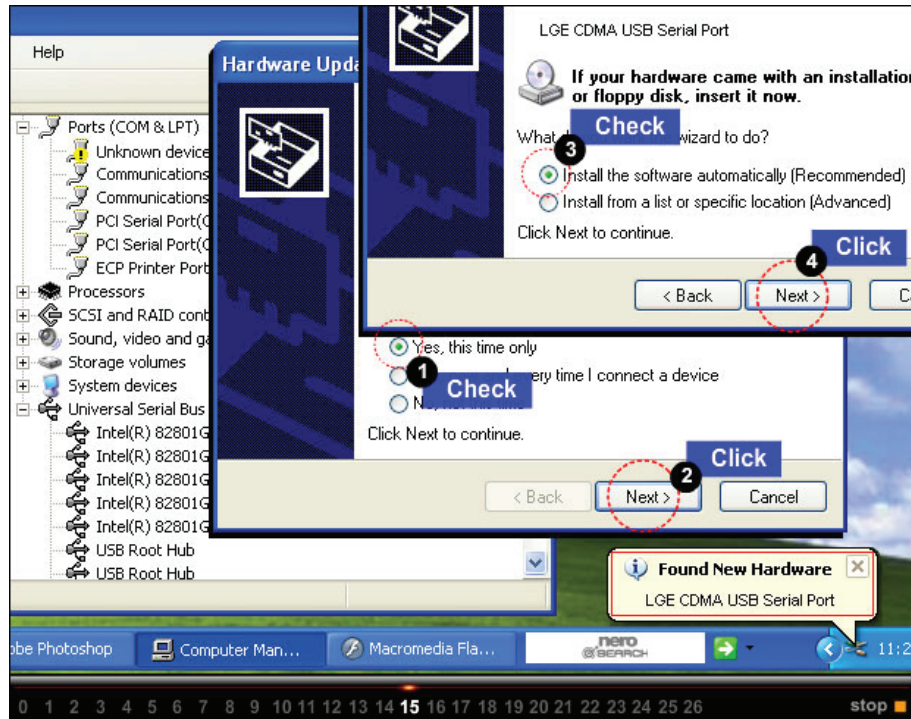


5. DOWNLOAD

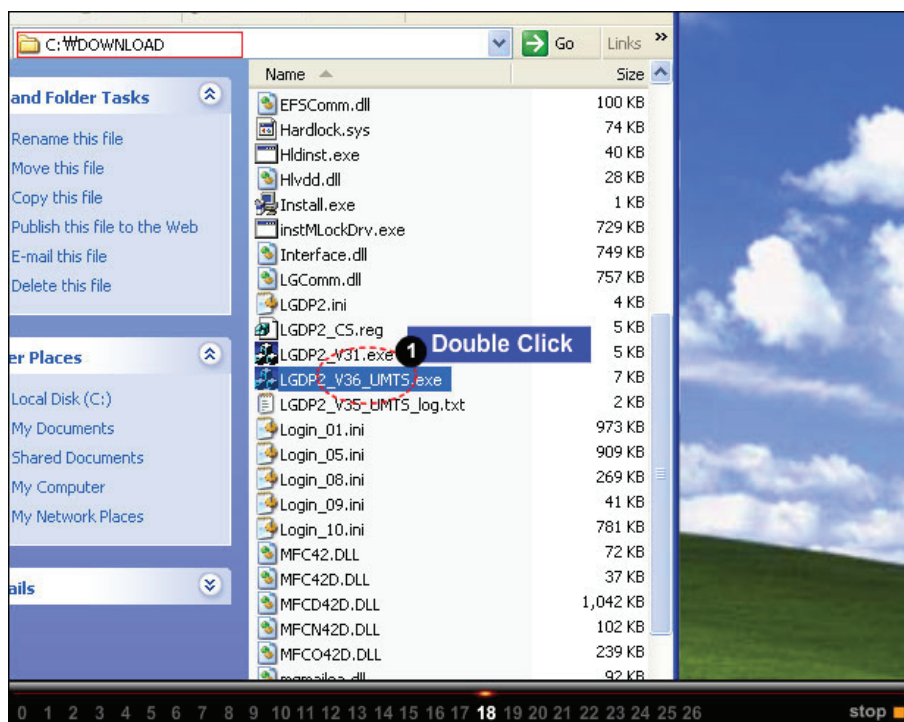
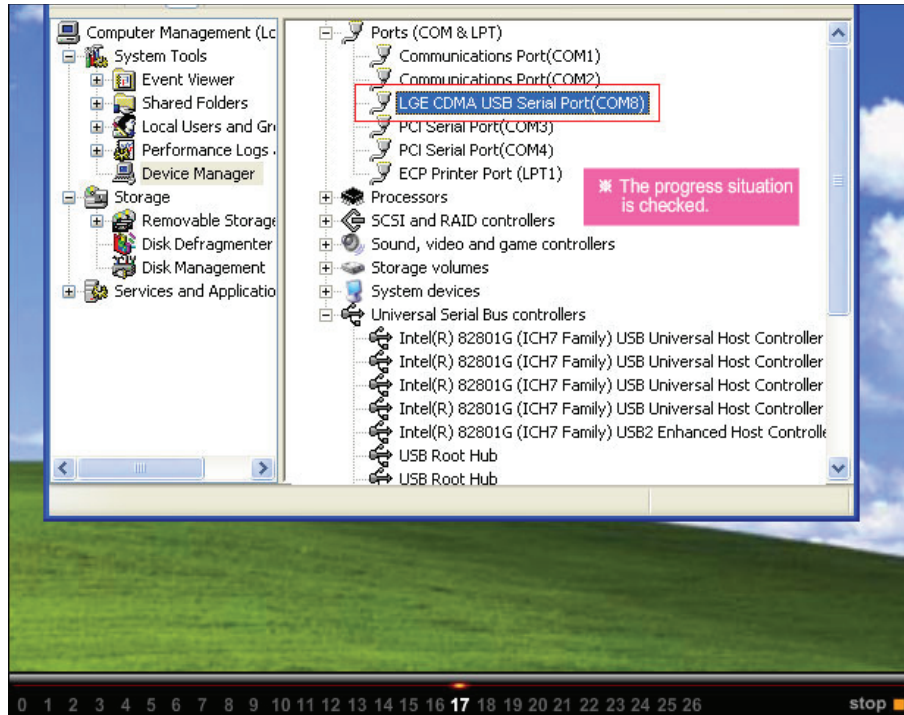




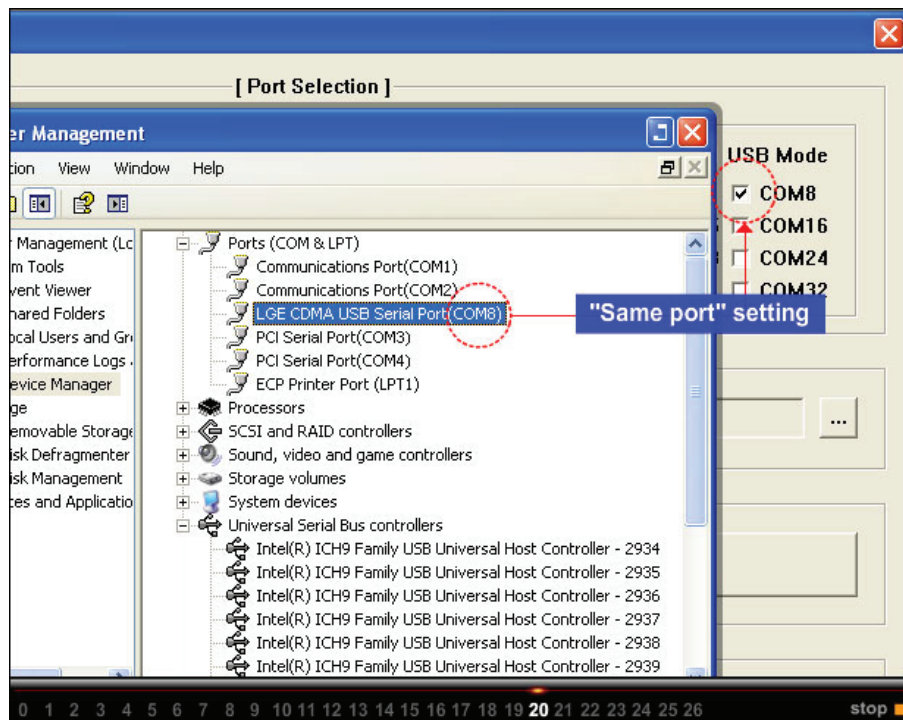
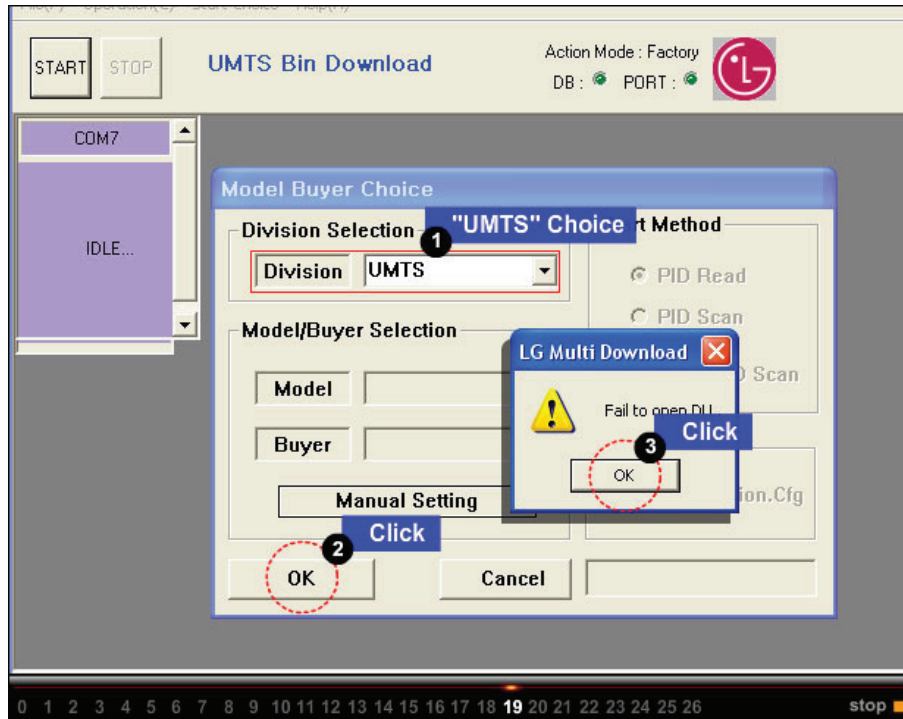




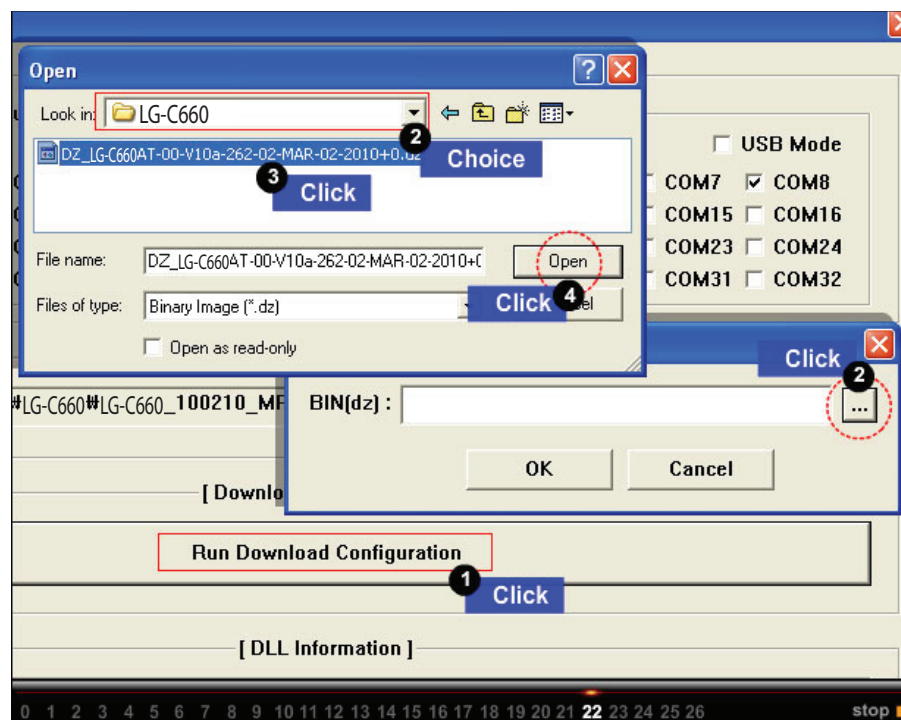
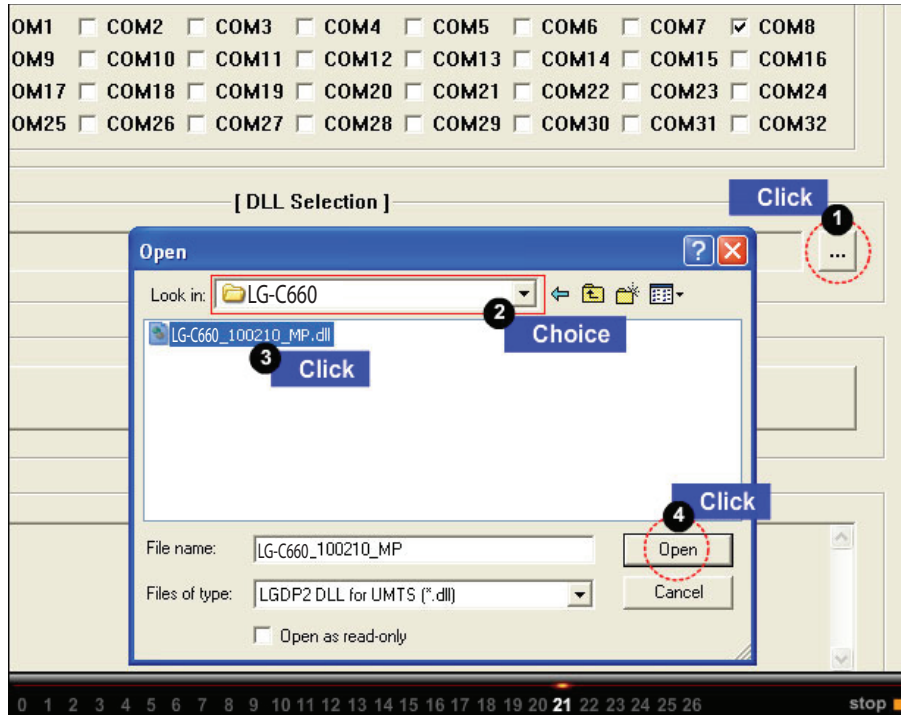
5. DOWNLOAD



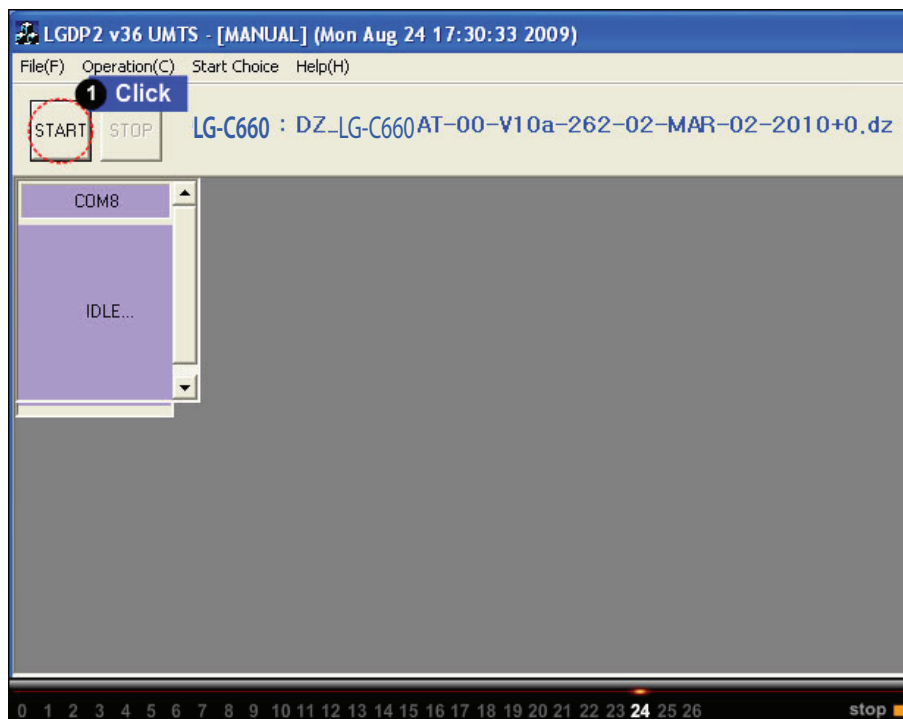
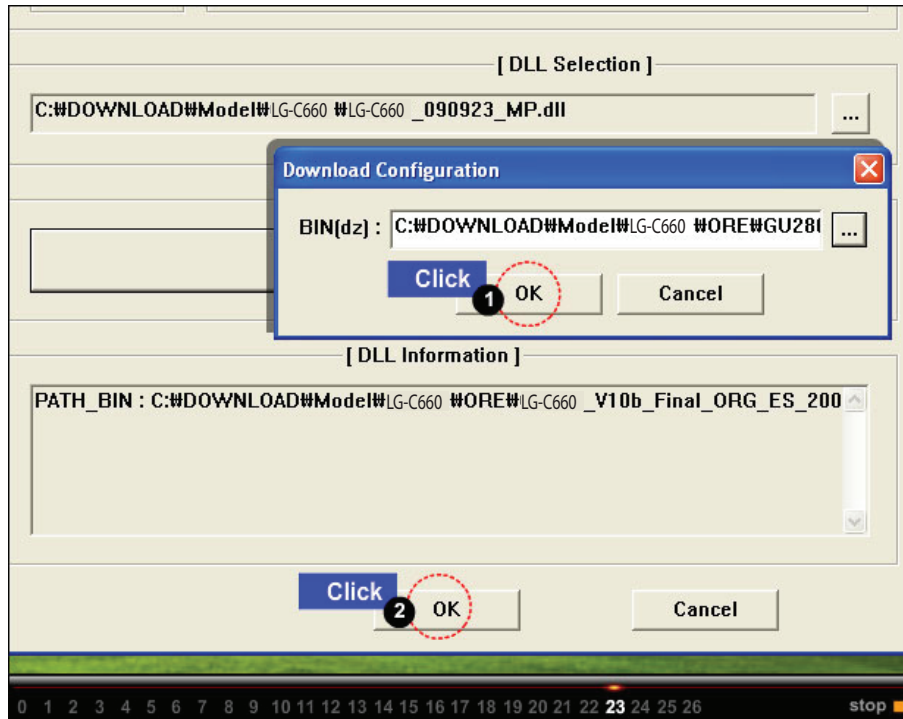
5. DOWNLOAD



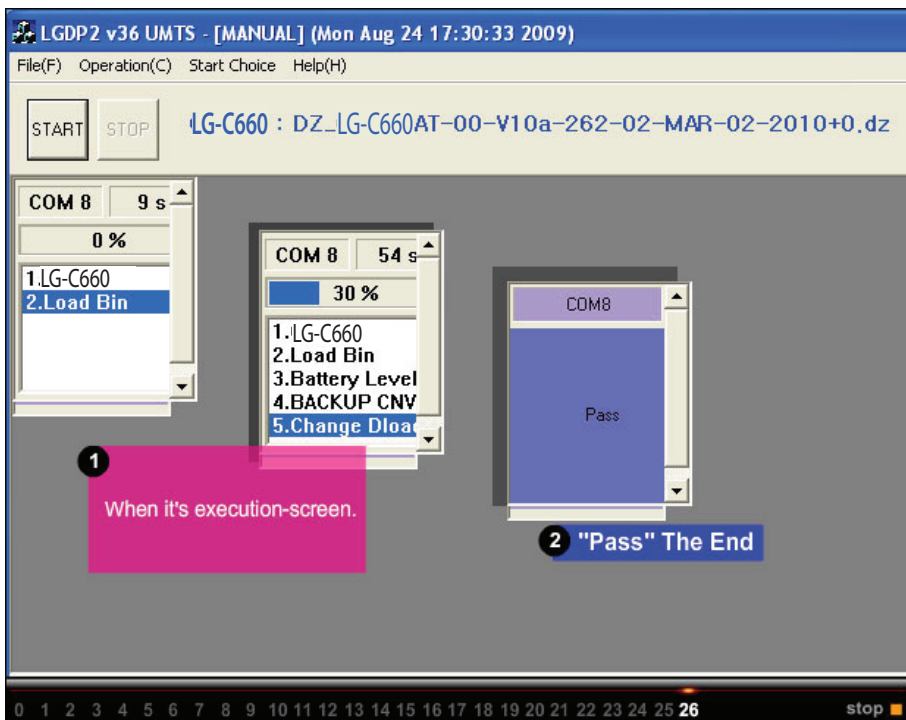
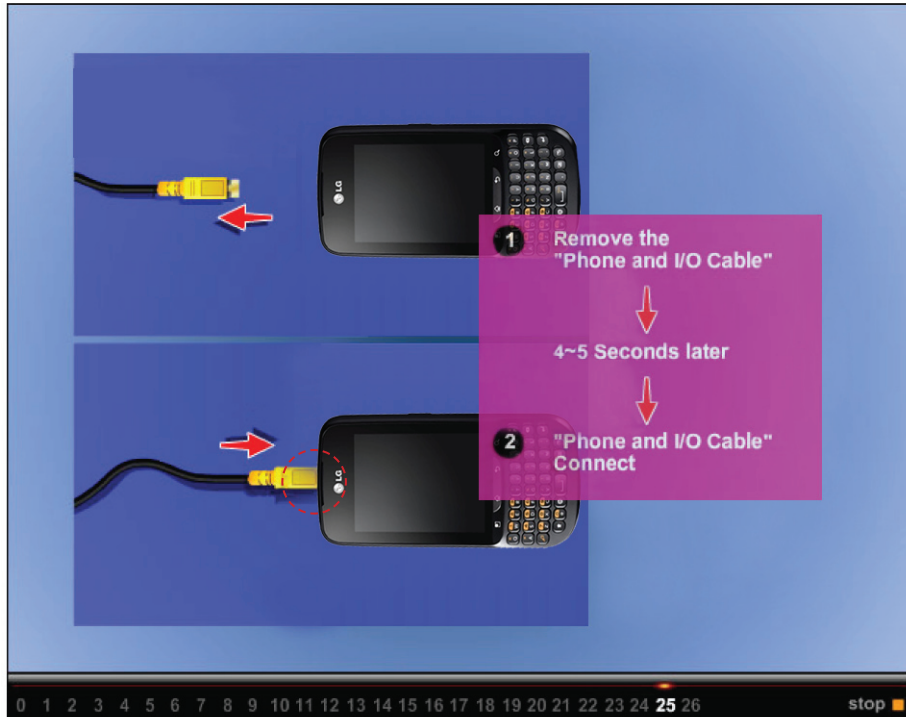
5. DOWNLOAD

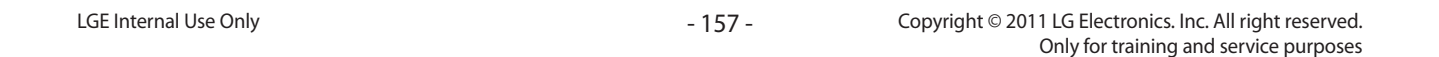


5. DOWNLOAD

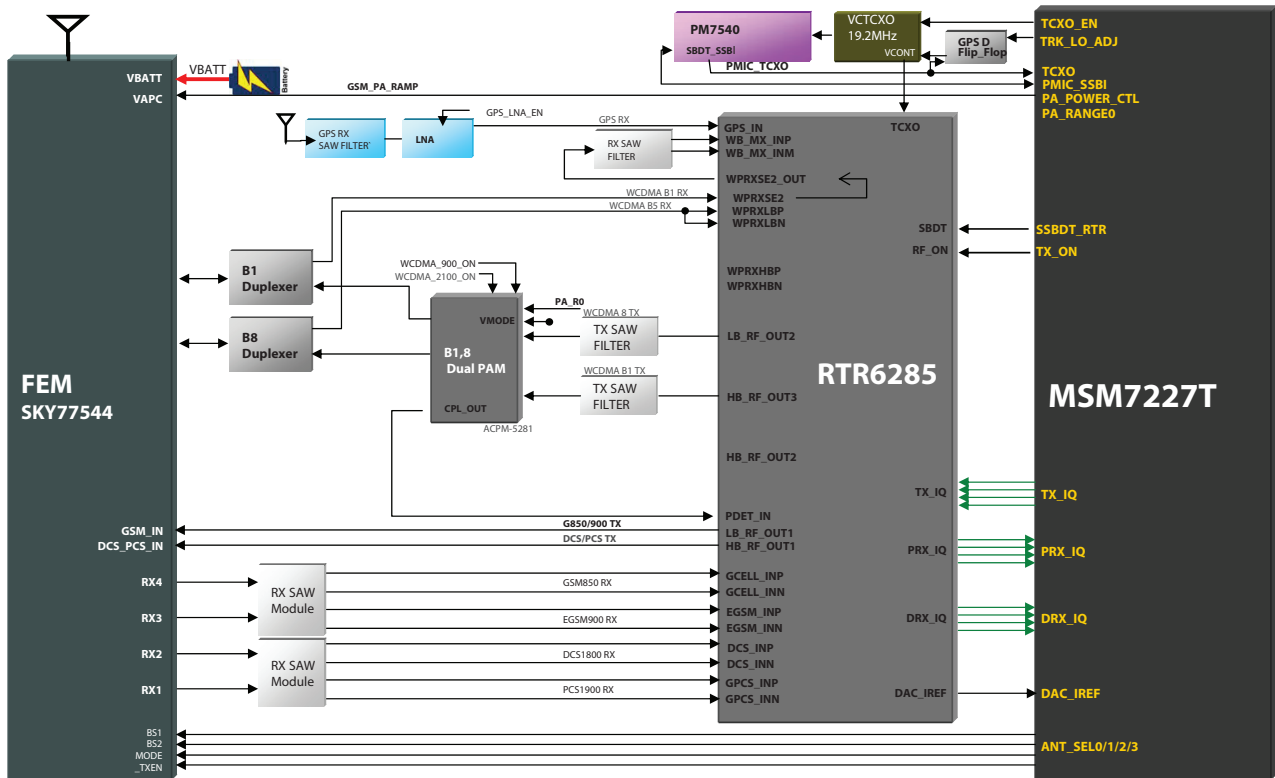


5. DOWNLOAD



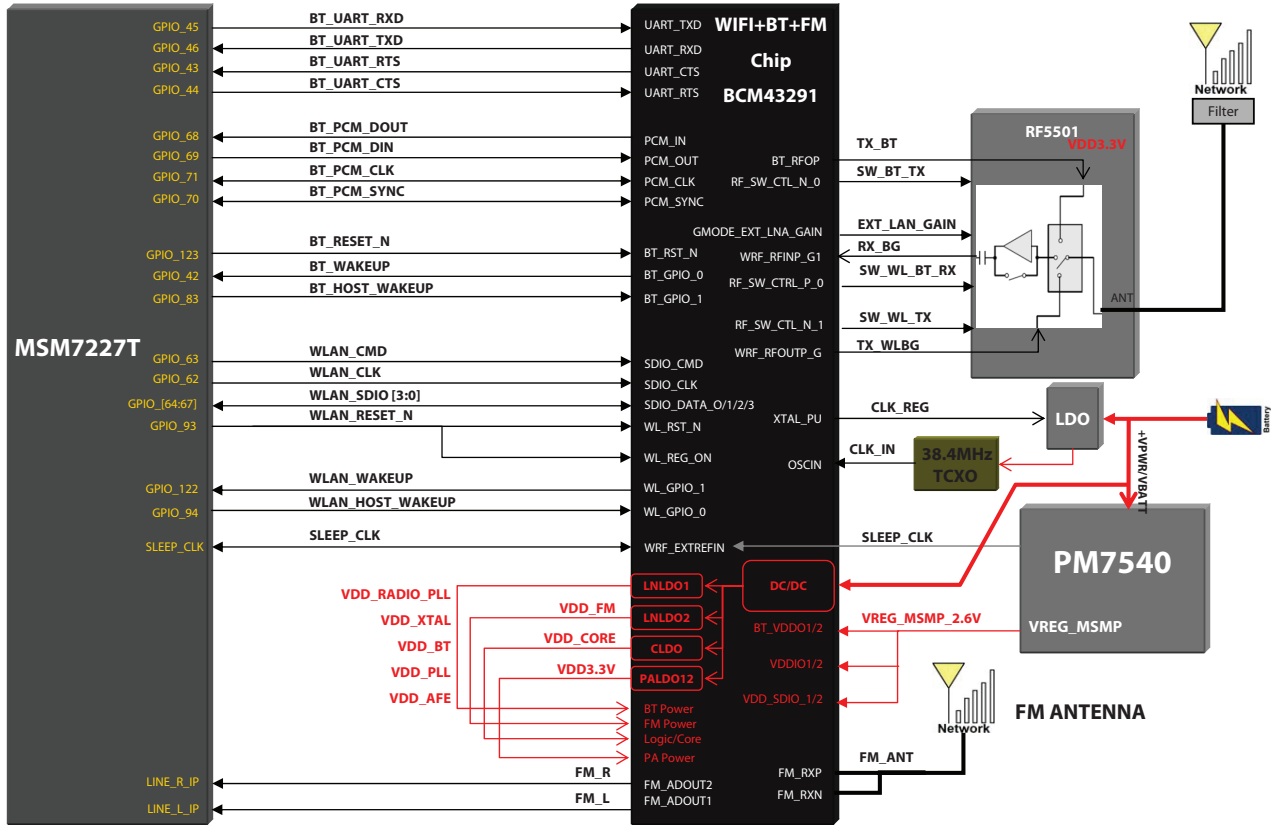


6. BLOCK DIAGRAM



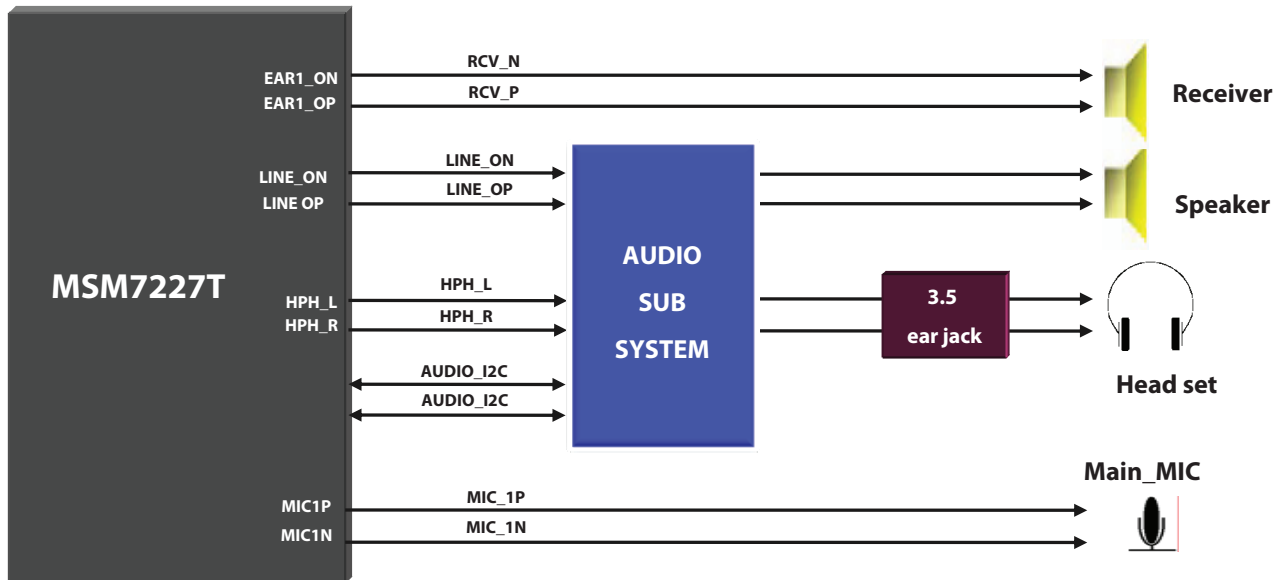
<RF Part Block Diagram>

6. BLOCK DIAGRAM



<BT/WiFi Part Block Diagram>

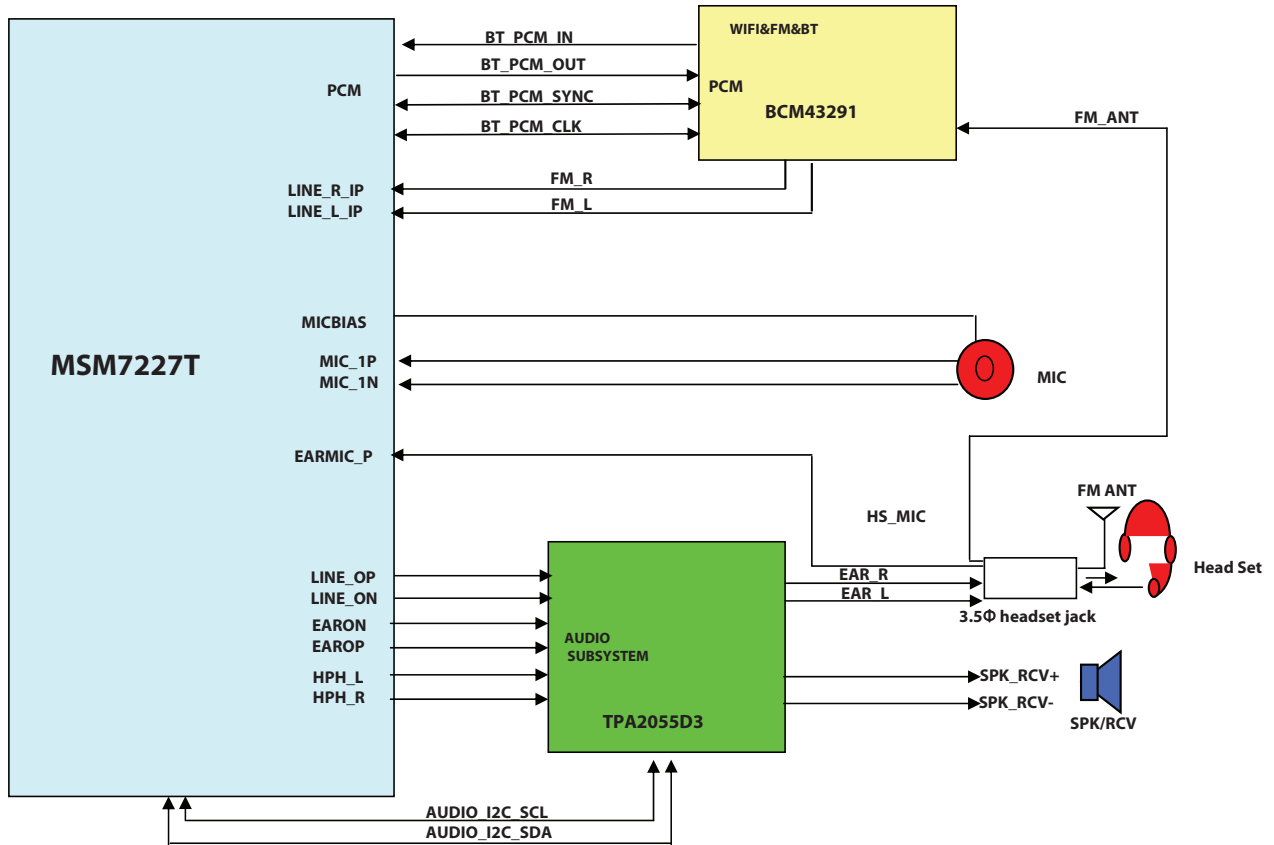
6. BLOCK DIAGRAM

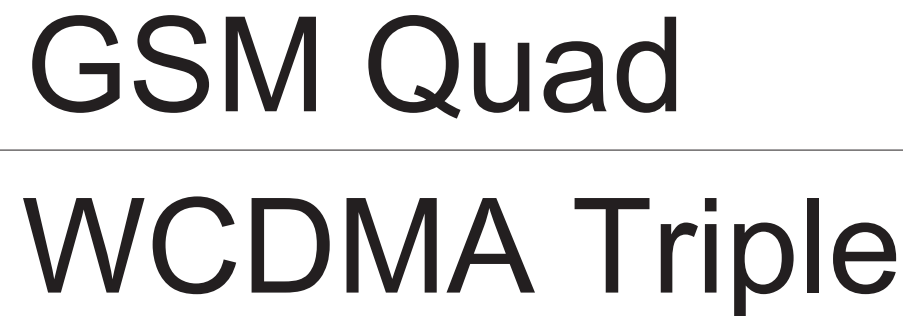


<Power Block Diagram>



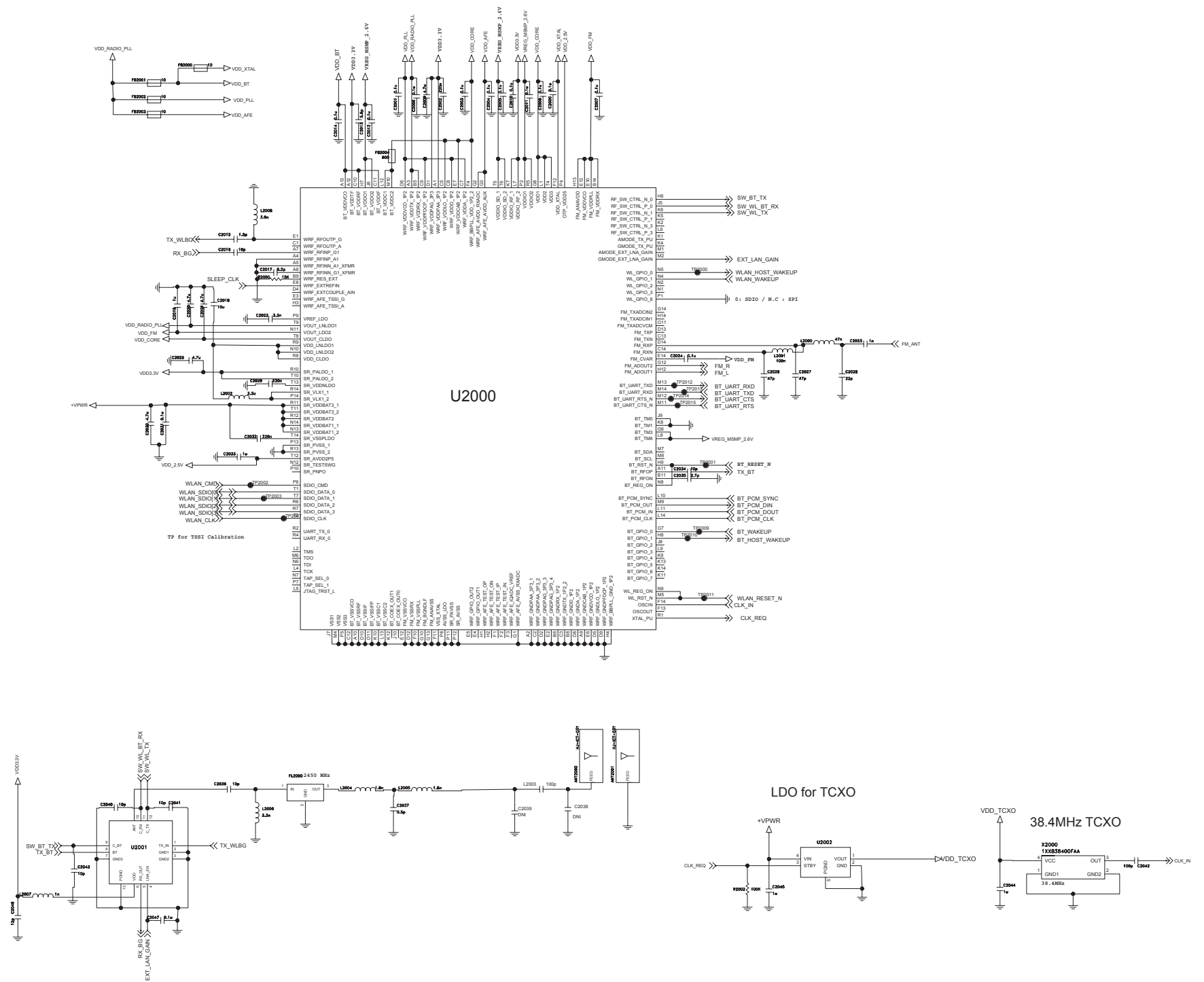
6. BLOCK DIAGRAM



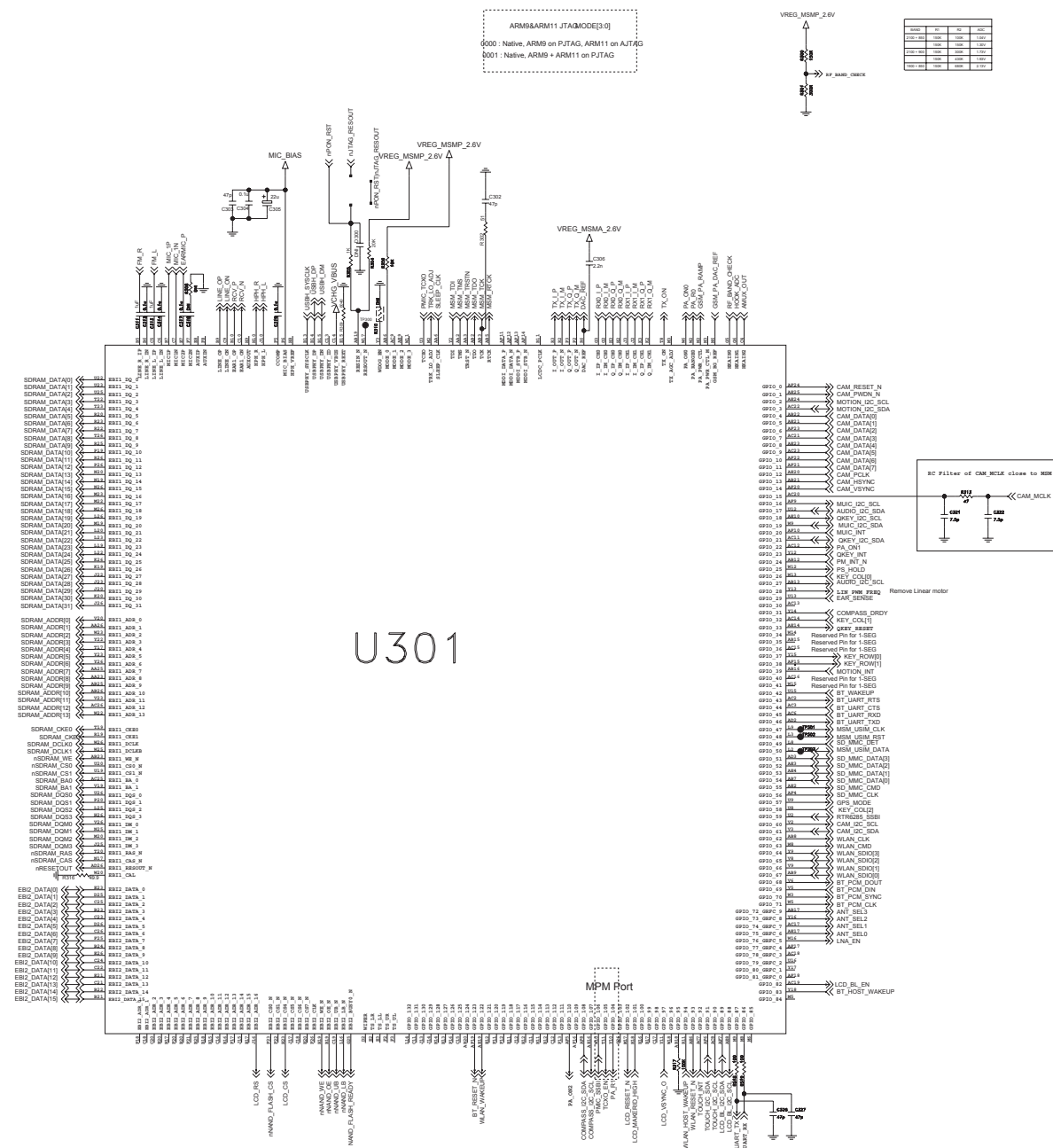


The image displays a complex PCB layout for a multi-band radio receiver. The layout is organized into several functional blocks, each labeled with its primary function and frequency range:

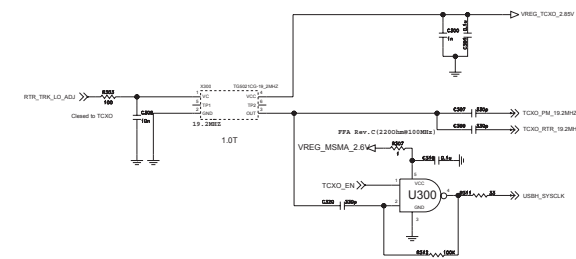
- GPS LNA for the GPS:** This section includes an antenna input, a matching network with inductors (L1008, L1009, L1010) and capacitors (C1008, C1009), and a low-noise amplifier (LNA) stage using a BGA15 FL1012. It also features a variable frequency oscillator (VFO) section with a VREG_RF_2.7V supply and a GPS_IN output.
- W2100 RX (2110 - 2170 MHz):** This receiver stage uses a W2100 RX chip, a matching network (L1017, L1018, L1019), and a low-pass filter (LPF) (C1072, C1073, C1074, C1075, C1076, C1077, C1078, C1079, C1080, C1081, C1082, C1083, C1084, C1085, C1086, C1087, C1088, C1089, C1090, C1091, C1092, C1093, C1094, C1095, C1096, C1097, C1098, C1099, C1100, C1101, C1102, C1103, C1104, C1105, C1106, C1107, C1108, C1109, C1110, C1111, C1112, C1113, C1114, C1115, C1116, C1117, C1118, C1119, C1120, C1121, C1122, C1123, C1124, C1125, C1126, C1127, C1128, C1129, C1130, C1131, C1132, C1133, C1134, C1135, C1136, C1137, C1138, C1139, C1140, C1141, C1142, C1143, C1144, C1145, C1146, C1147, C1148, C1149, C1150, C1151, C1152, C1153, C1154, C1155, C1156, C1157, C1158, C1159, C1160, C1161, C1162, C1163, C1164, C1165, C1166, C1167, C1168, C1169, C1170, C1171, C1172, C1173, C1174, C1175, C1176, C1177, C1178, C1179, C1180, C1181, C1182, C1183, C1184, C1185, C1186, C1187, C1188, C1189, C1190, C1191, C1192, C1193, C1194, C1195, C1196, C1197, C1198, C1199, C1200, C1201, C1202, C1203, C1204, C1205, C1206, C1207, C1208, C1209, C1210, C1211, C1212, C1213, C1214, C1215, C1216, C1217, C1218, C1219, C1220, C1221, C1222, C1223, C1224, C1225, C1226, C1227, C1228, C1229, C1230, C1231, C1232, C1233, C1234, C1235, C1236, C1237, C1238, C1239, C1240, C1241, C1242, C1243, C1244, C1245, C1246, C1247, C1248, C1249, C1250, C1251, C1252, C1253, C1254, C1255, C1256, C1257, C1258, C1259, C1260, C1261, C1262, C1263, C1264, C1265, C1266, C1267, C1268, C1269, C1270, C1271, C1272, C1273, C1274, C1275, C1276, C1277, C1278, C1279, C1280, C1281, C1282, C1283, C1284, C1285, C1286, C1287, C1288, C1289, C1290, C1291, C1292, C1293, C1294, C1295, C1296, C1297, C1298, C1299, C1300, C1301, C1302, C1303, C1304, C1305, C1306, C1307, C1308, C1309, C1310, C1311, C1312, C1313, C1314, C1315, C1316, C1317, C1318, C1319, C1320, C1321, C1322, C1323, C1324, C1325, C1326, C1327, C1328, C1329, C1330, C1331, C1332, C1333, C1334, C1335, C1336, C1337, C1338, C1339, C1340, C1341, C1342, C1343, C1344, C1345, C1346, C1347, C1348, C1349, C1350, C1351, C1352, C1353, C1354, C1355, C1356, C1357, C1358, C1359, C1360, C1361, C1362, C1363, C1364, C1365, C1366, C1367, C1368, C1369, C1370, C1371, C1372, C1373, C1374, C1375, C1376, C1377, C1378, C1379, C1380, C1381, C1382, C1383, C1384, C1385, C1386, C1387, C1388, C1389, C1390, C1391, C1392, C1393, C1394, C1395, C1396, C1397, C1398, C1399, C1400, C1401, C1402, C1403, C1404, C1405, C1406, C1407, C1408, C1409, C1410, C1411, C1412, C1413, C1414, C1415, C1416, C1417, C1418, C1419, C1420, C1421, C1422, C1423, C1424, C1425, C1426, C1427, C1428, C1429, C1430, C1431, C1432, C1433, C1434, C1435, C1436, C1437, C1438, C1439, C1440, C1441, C1442, C1443, C1444, C1445, C1446, C1447, C1448, C1449, C1450, C1451, C1452, C1453, C1454, C1455, C1456, C1457, C1458, C1459, C1460, C1461, C1462, C1463, C1464, C1465, C1466, C1467, C1468, C1469, C1470, C1471, C1472, C1473, C1474, C1475, C1476, C1477, C1478, C1479, C1480, C1481, C1482, C1483, C1484, C1485, C1486, C1487, C1488, C1489, C1490, C1491, C1492, C1493, C1494, C1495, C1496, C1497, C1498, C1499, C1500, C1501, C1502, C1503, C1504, C1505, C1506, C1507, C1508, C1509, C1510, C1511, C1512, C1513, C1514, C1515, C1516, C1517, C1518, C1519, C1520, C1521, C1522, C1523, C1524, C1525, C1526, C1527, C1528, C1529, C1530, C1531, C1532, C1533, C1534, C1535, C1536, C1537, C1538, C1539, C1540, C1541, C1542, C1543, C1544, C1545, C1546, C1547, C1548, C1549, C1550, C1551, C1552, C1553, C1554, C1555, C1556, C1557, C1558, C1559, C1560, C1561, C1562, C1563, C1564, C1565, C1566, C1567, C1568, C1569, C1570, C1571, C1572, C1573, C1574, C1575, C1576, C1577, C1578, C1579, C1580, C1581, C1582, C1583, C1584, C1585, C1586, C1587, C1588, C1589, C1590, C1591, C1592, C1593, C1594, C1595, C1596, C1597, C1598, C1599, C1600, C1601, C1602, C1603, C1604, C1605, C1606, C1607, C1608, C1609, C1610, C1611, C1612, C1613, C1614, C1615, C1616, C1617, C1618, C1619, C1620, C1621, C1622, C1623, C1624, C1625, C1626, C1627, C1628, C1629, C1630, C1631, C1632, C1633, C1634, C1635, C1636, C1637, C1638, C1639, C1640, C1641, C1642, C1643, C1644, C1645, C1646, C1647, C1648, C1649, C1650, C1651, C1652, C1653, C1654, C1655, C1656, C1657, C1658, C1659, C1660, C1661, C1662, C1663, C1664, C1665, C1666, C1667, C1668, C1669, C1670, C1671, C1672, C1673, C1674, C1675, C1676, C1677, C1678, C1679, C1680, C1681, C1682, C1683, C1684, C1685, C1686, C1687, C1688, C1689, C1690, C1691, C1692, C1693, C1694, C1695, C1696, C1697, C1698, C1699, C1700, C1701, C1702, C1703, C1704, C1705, C1706, C1707, C1708, C1709,



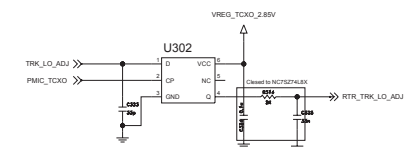
Main BB chip



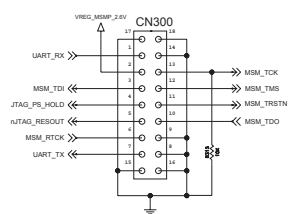
TCXO Circuit



GPS D FLIP-FLOP



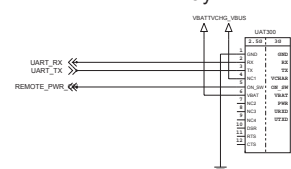
ARM9&ARM11 JTAG



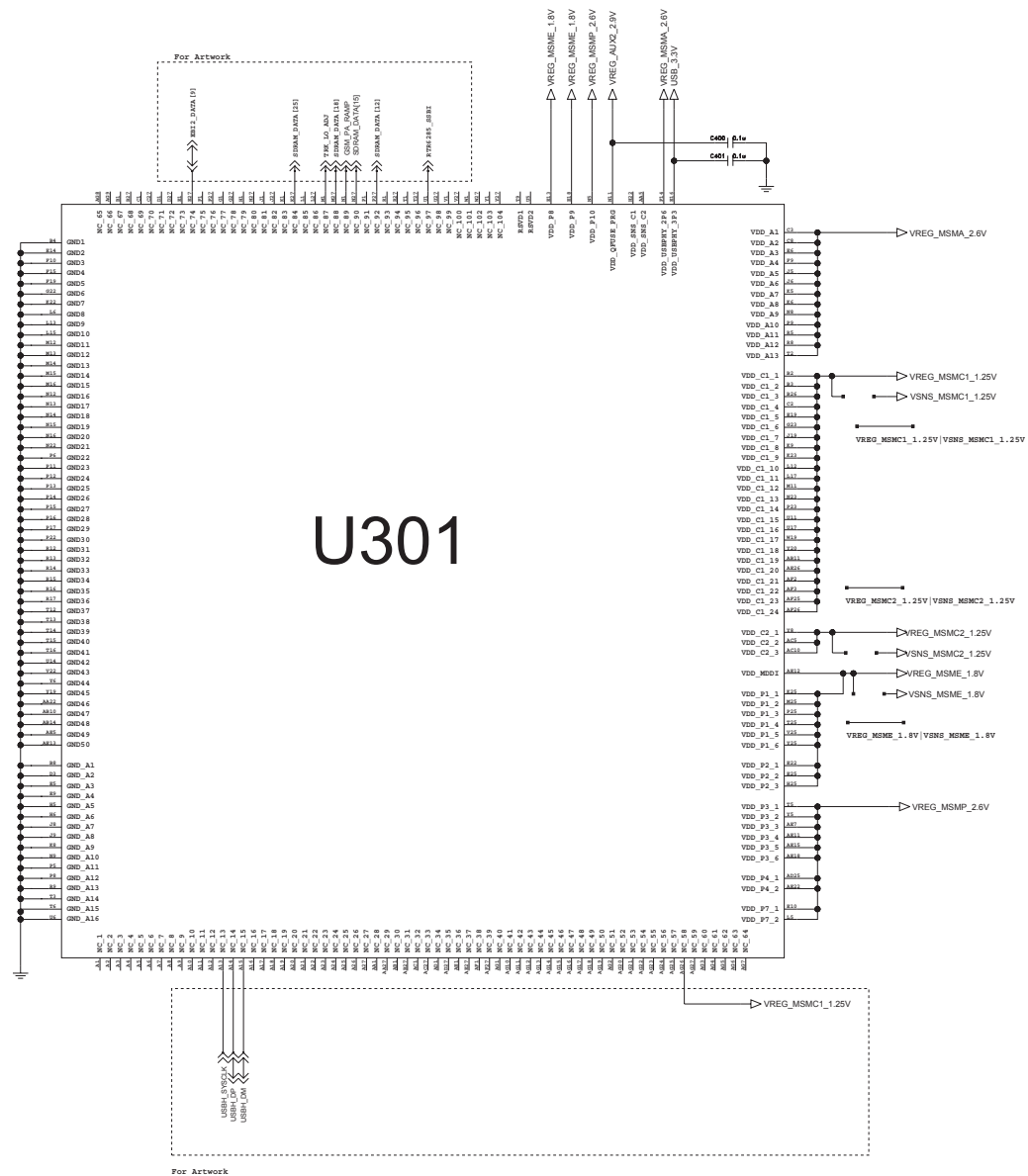
NEST JIG
2010.01.18 updated



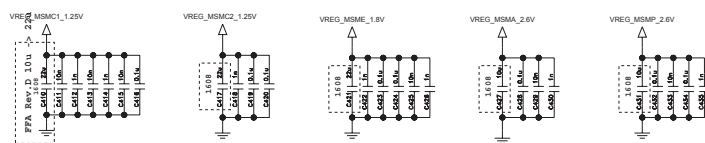
Array TP



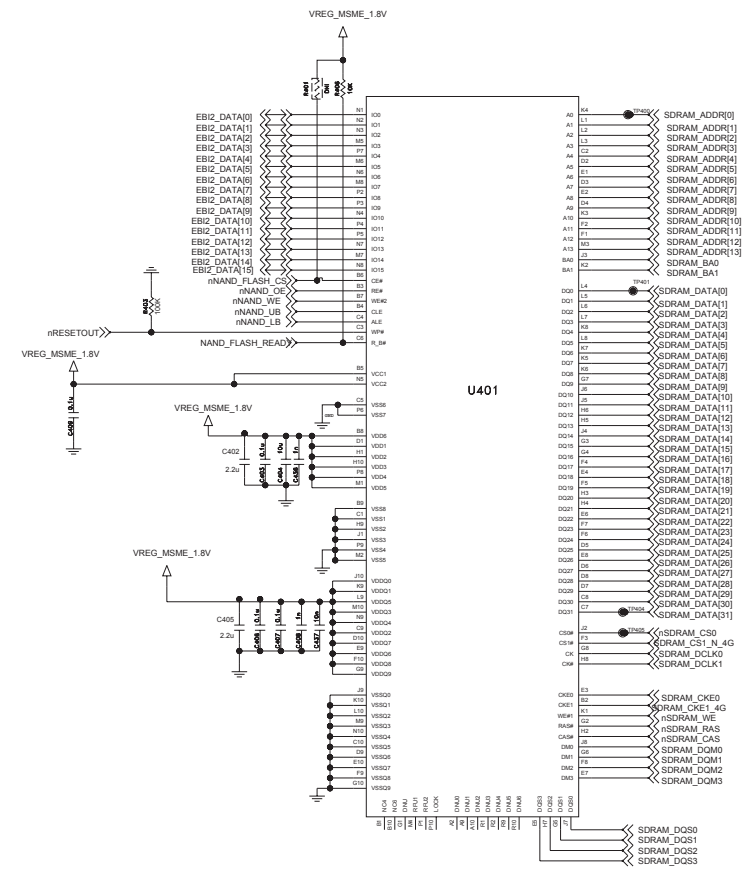
MSM7227 Power Part



Cap for MSM7227 Power



DDR SDRAM
NAND 4G / SDRAM 2G
Micron MCP



chip sel1 + clk1 Should be NC 4G/4G



[illegible]

PCB Revision check ADC				
REV	R1	R2	VDD	ADC
EVb	150K Ω	10K Ω	2.6 V	.16 V
A	150K Ω	47K Ω	2.6 V	0.43 V
B	150K Ω	68K Ω	2.6 V	0.56 V
C	150K Ω	100K Ω	2.6 V	0.72 V
D	150K Ω	150K Ω	2.6 V	0.90 V
EVb	150K Ω	300K Ω	2.6 V	1.2 V
REV 1.0	150K Ω	470K Ω	2.6 V	1.36 V
REV 1.1	150K Ω	680K Ω	2.6 V	1.47 V

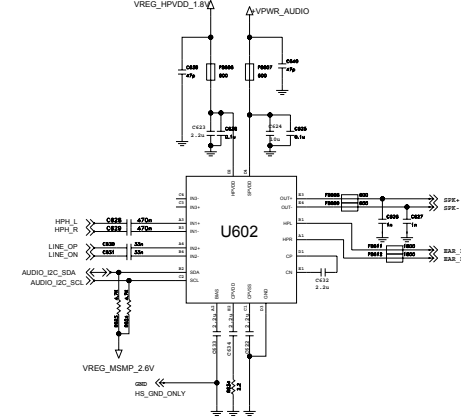
The schematic shows the VBACKUP pin connected to a pull-up resistor (labeled 007500) and a capacitor connected to ground.

The schematic diagram illustrates the USB-to-serial converter circuit. It features a CN501 USB connector connected to a USB-to-serial converter IC (FL501). The FL501 is connected to a USB-to-serial driver IC (FL500) and a USB-to-serial receiver IC (U504 OVP). The circuit is powered by a 5V USB supply and a 12V USB supply. The output is a 5V USB supply. The circuit is labeled with component values and pin numbers.

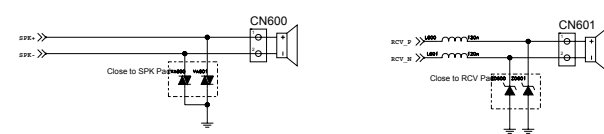
[illegible]

The schematic diagram illustrates the electrical connections for the CN500 module. It shows the VREG_MIMP_2.6V and VBATT power rails. The VBAT_SENSE and VBAT_TEMP pins are connected to the module. A 2mm scale bar is provided for reference. The module is labeled CN500. Other components shown include C601 (10k), C602 (10k), and C603 (10k).

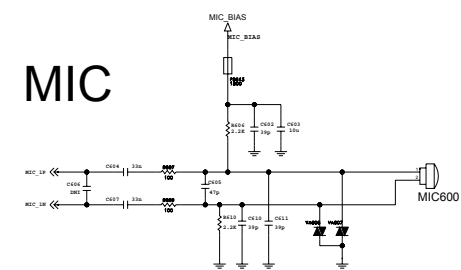
Audio SUB SYSTEM



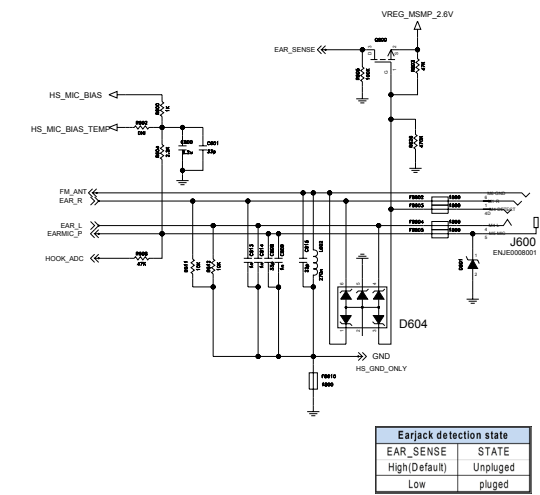
SPEAKER RECEIVER



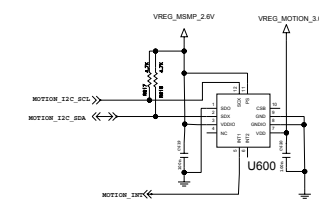
MIC



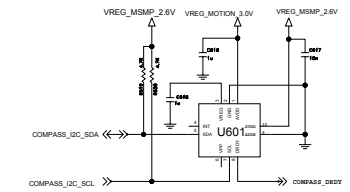
3.5pi EAR JACK



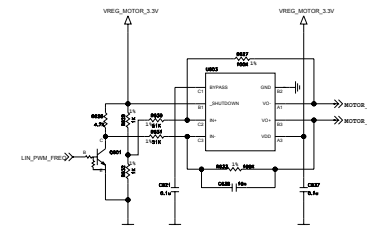
MOTION SENSOR



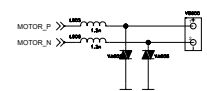
COMPASS SENSOR



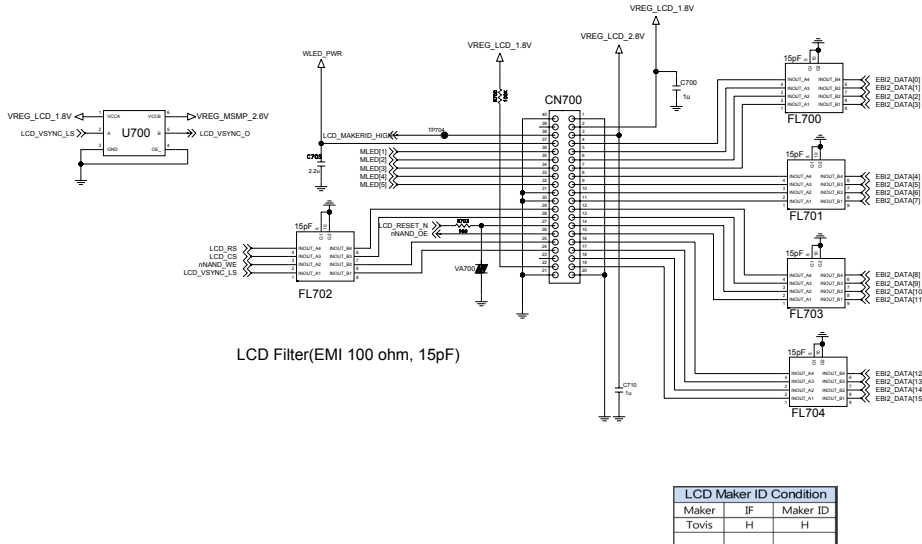
Q-coin MOTOR



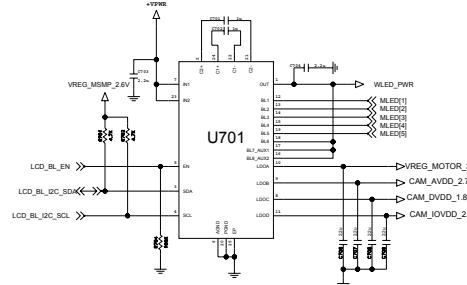
MOTOR (Q-Coin)



2.8" QVGA LCD

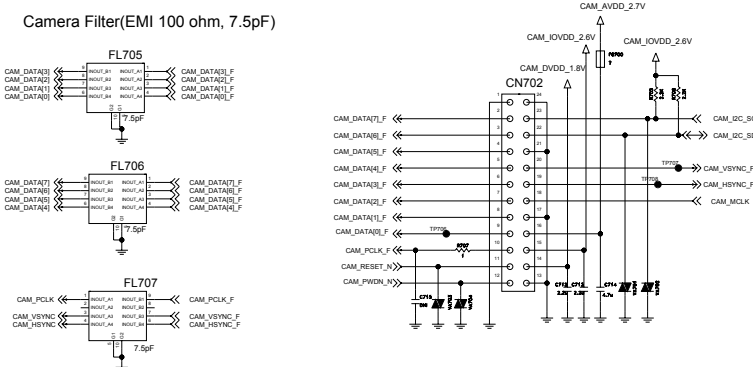


Backlight Charge Pump

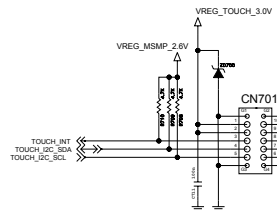


3M MAIN CAMERA FF

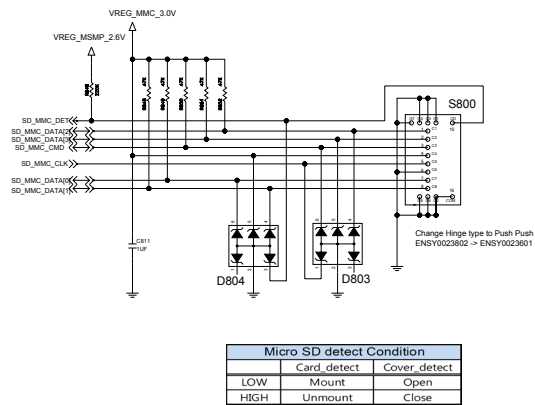
7.0x7.0x4.1ft



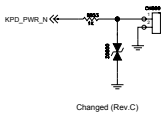
Touch



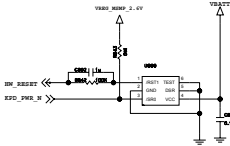
MicroSD



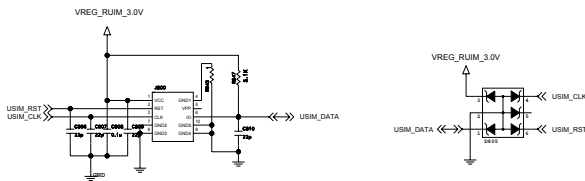
POWER KEY



H/W RESET IC



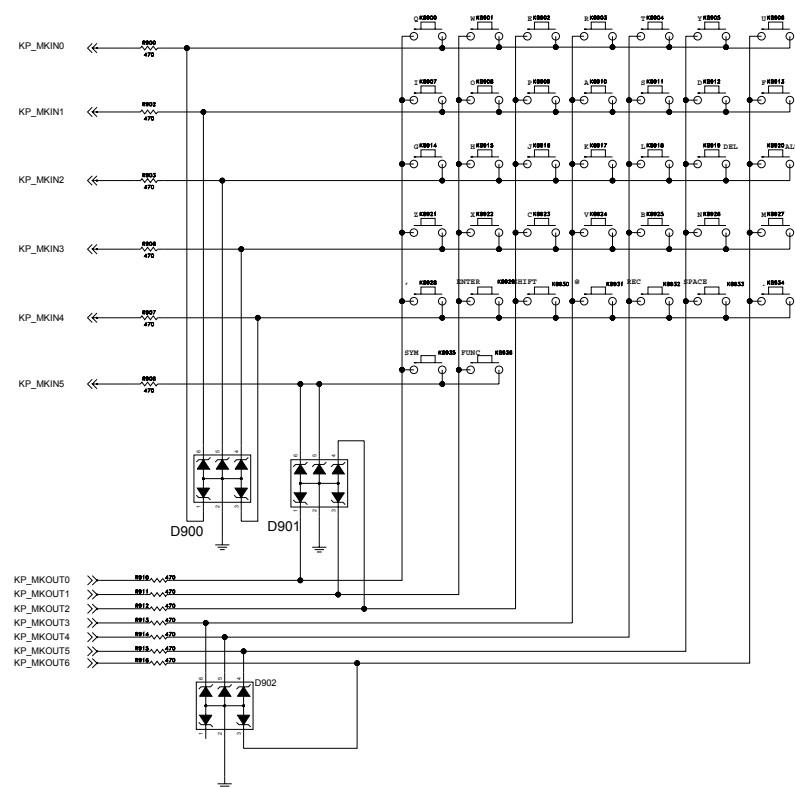
USIM Socket



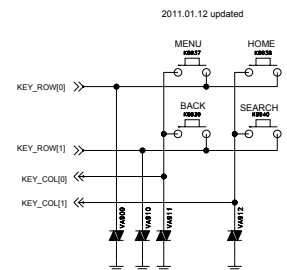
HOLE



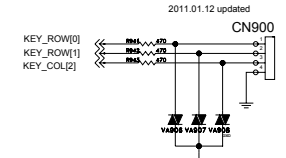
Qwerty+VOL KEY



Android KEY

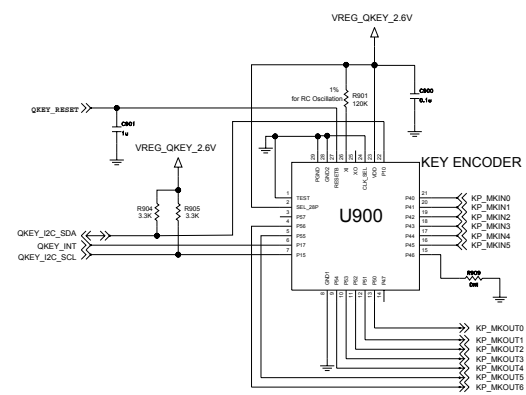


VOLUME SIDEKEY

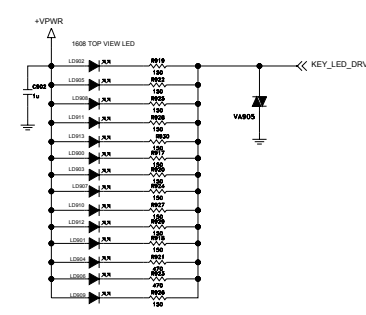


MUSCAT Qwerty Key Arrangement								
		GPIO 1	GPIO3	GPIO 5	GPIO 7	GPIO 9	GPIO 11	GPIO 13
		KP_MKOUT0	KP_MKOUT1	KP_MKOUT2	KP_MKOUT3	KP_MKOUT4	KP_MKOUT5	KP_MKOUT6
GPIO 0	KP_MKIN0	Q	W	E	R	T	Y	U
GPIO 2	KP_MKIN1	I	O	P	A	S	D	F
GPIO 4	KP_MKIN2	G	H	J	K	L	DEL	ALT
GPIO 6	KP_MKIN3	Z	X	C	V	B	N	M
GPIO 8	KP_MKIN4	,	ENTER	SHIFT	@	REC	SPACE	.
GPIO 10	KP_MKIN5	SYM	FUNC					

QWERTY IC

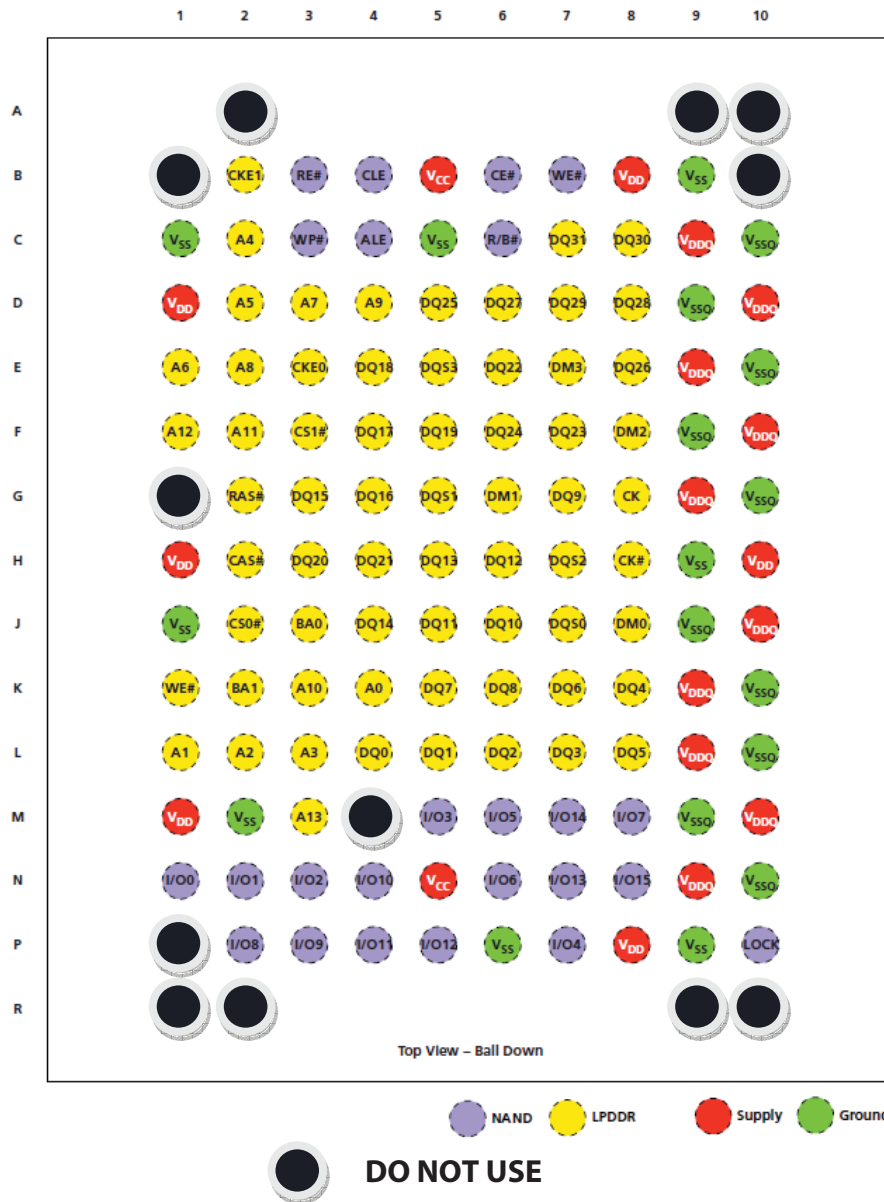


Key LED

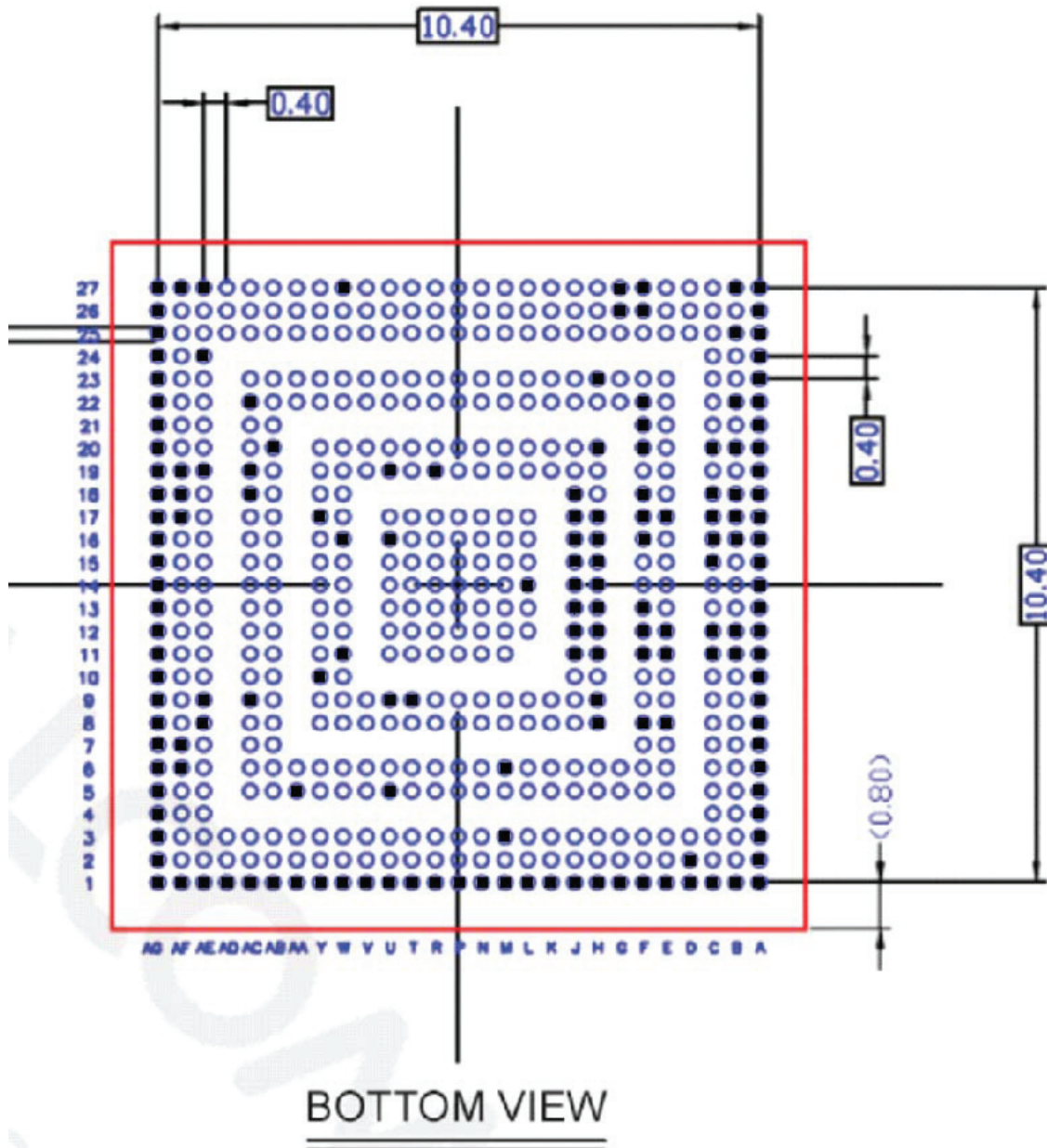


8. BGA PIN MAP

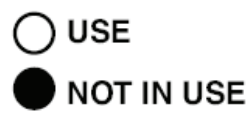
MCP - MICRON (Top View)



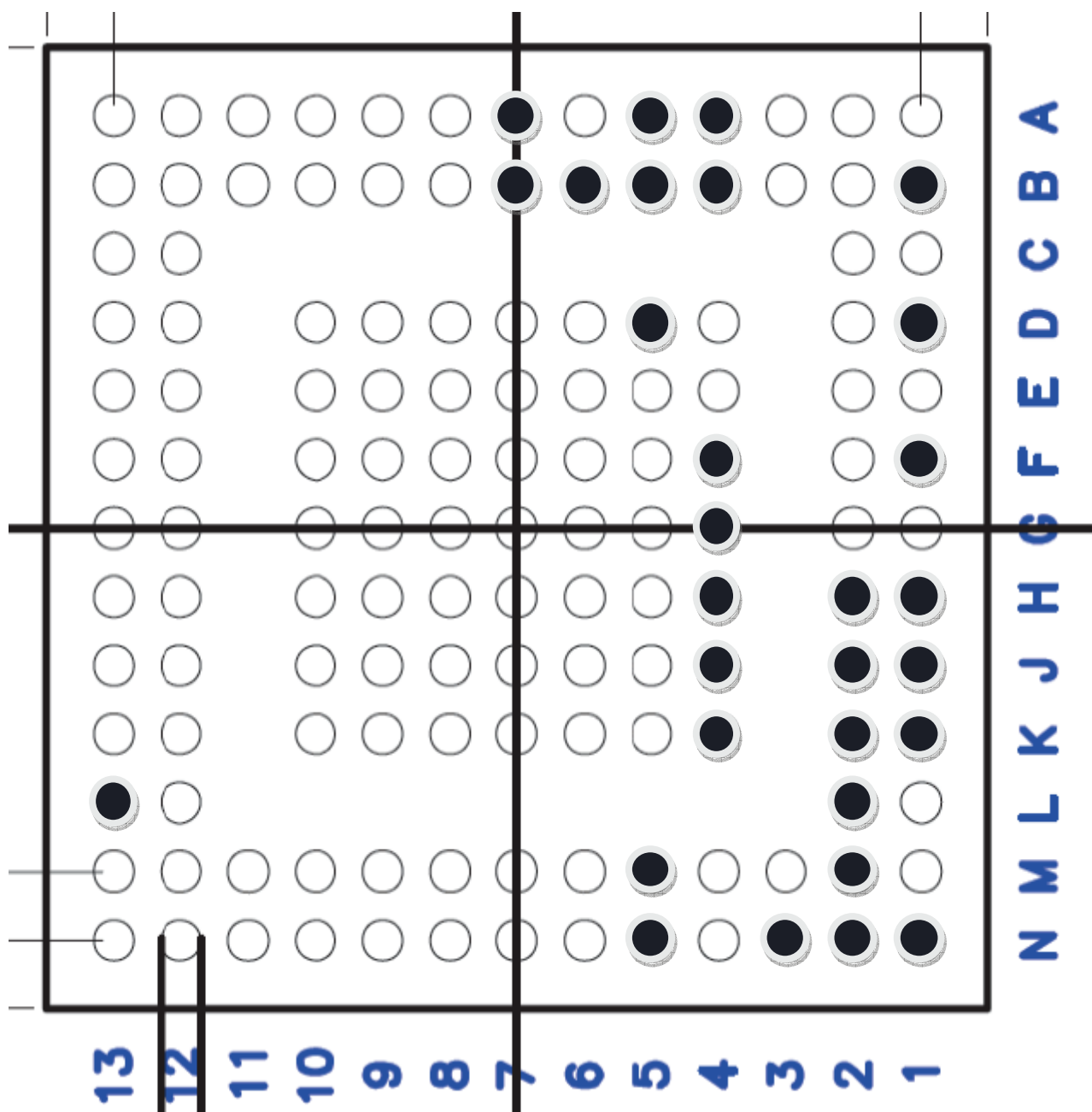
MSM7227T



- USE
- NOT IN USE



PM7540(PMIC)



○ USE
● NOT IN USE

BCM43291 (Bottom View)

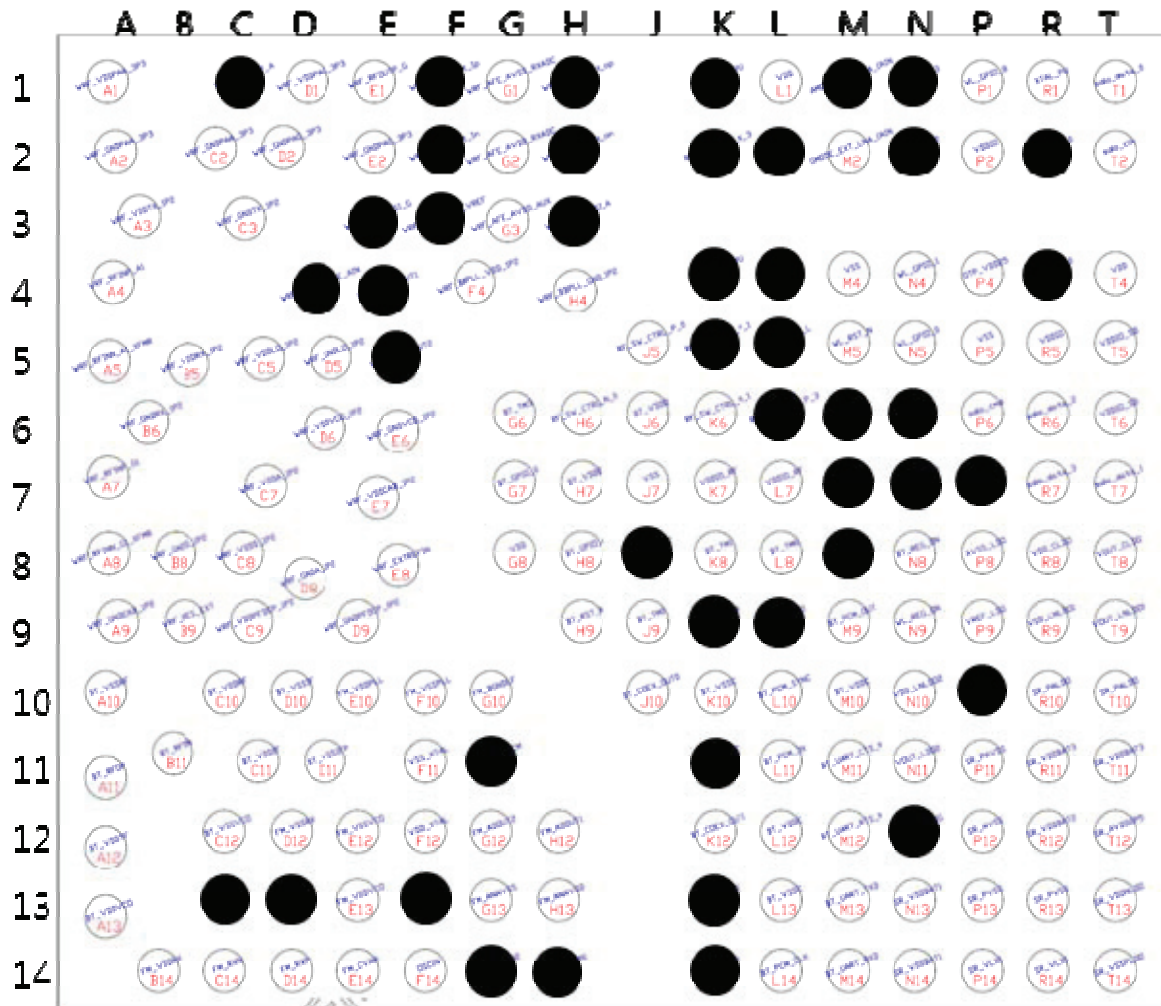
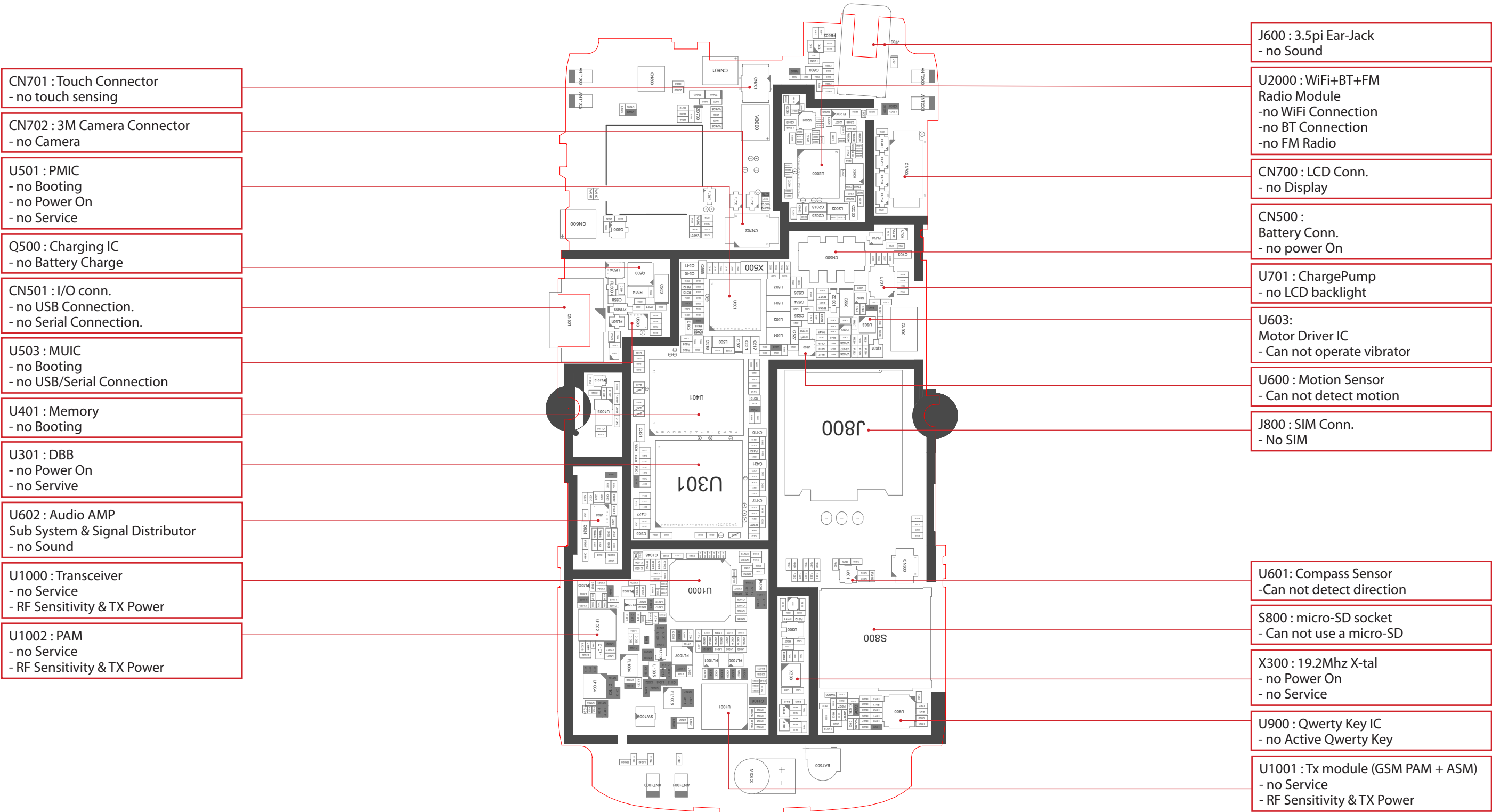


Figure 24: 182-Ball WLBGA Ball Map (Bottom view)



LD900~913 : Key LED
- no Lighting



LG-C660_MAIN_SPFY0246001_1.1_BOT

10. CALIBRATION

10.1 General Description

This document describes how to install and use the RF calibration software(Tachyon) of LG 3G/Smart mobile phone with Qualcomm Chipsets.

10.2 Requirement

Requirements for RF calibration of LGE mobile phone are outlined in the following sections.

10.2.1 Hardware

- 1) Desktop or laptop computer
- 2) Agilent 8960 Series 10 (E5515C) Testset
- 3) GPIB card and cable for communicating with Agilent 8960 Series 10 Testset
- 4) Power Supply, or 4V battery, and power cable for putting power on the mobile phone.
- 5) Data(USB or UART) cables for connecting the mobile phone to computer
- 6) RF Antenna cable

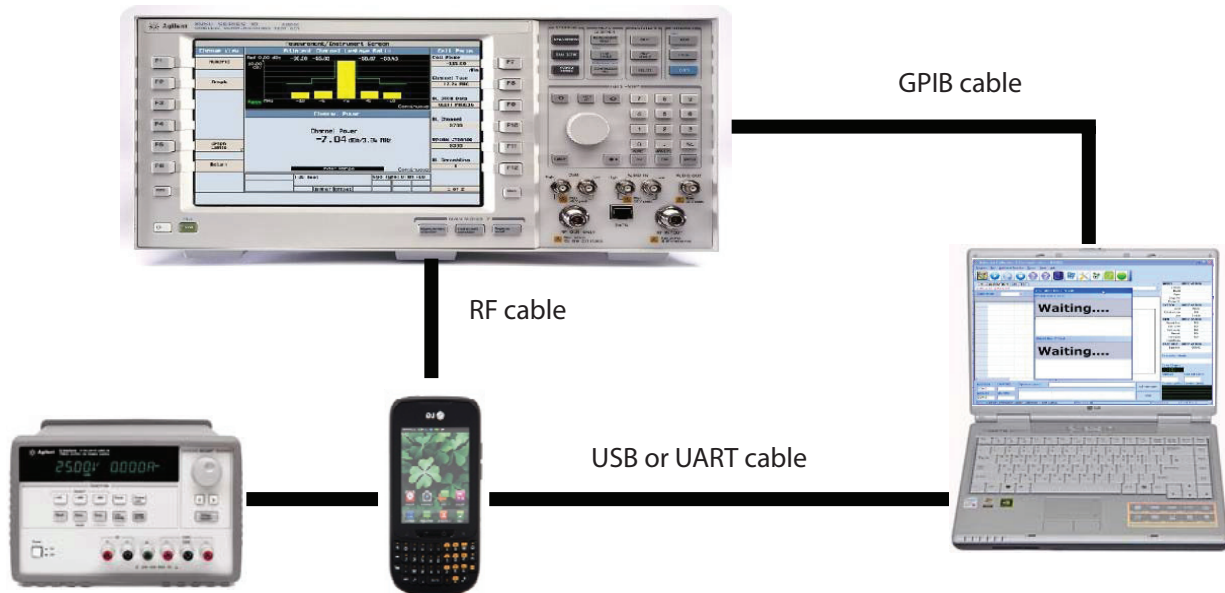
10.2.2 driver

- 1) National Instruments GPIB & VISA driver
- 2) LGE mobile USB driver
- 3) Data cable driver(optional)

10.2.3 System

- 1) Windows XP SP2 or better
- 2) RAM 512M or greater
- 3) HDD 1GB of available space

10.3 Calibration Setup



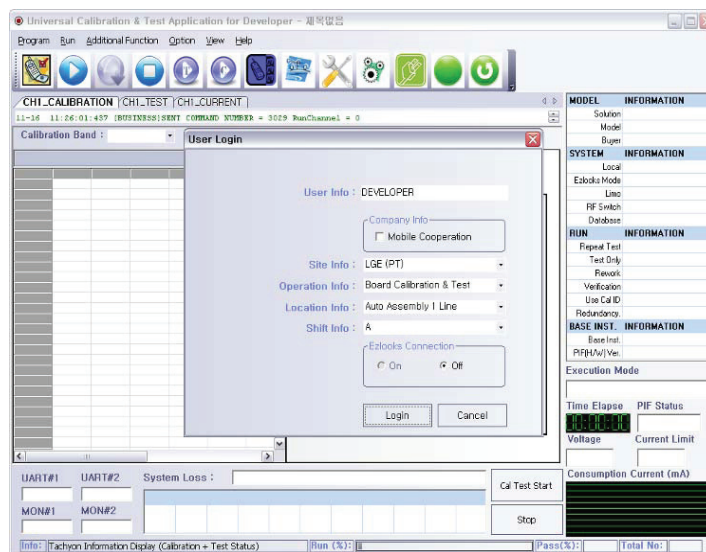
10.4 Tachyon Installation

- 1) Install Tachyon_setup_Eng_20090326 to C:/LGE/Tachyon directory.
- 2) Unzip Tachyon_Release_20110331.zip, and overwrite all files to the same path.
- 3) Install OCX_Registration.bat in C:/LGE/Tachyon/OCX/ directory for registering Tachyon Components.

10.5 Tachyon Start

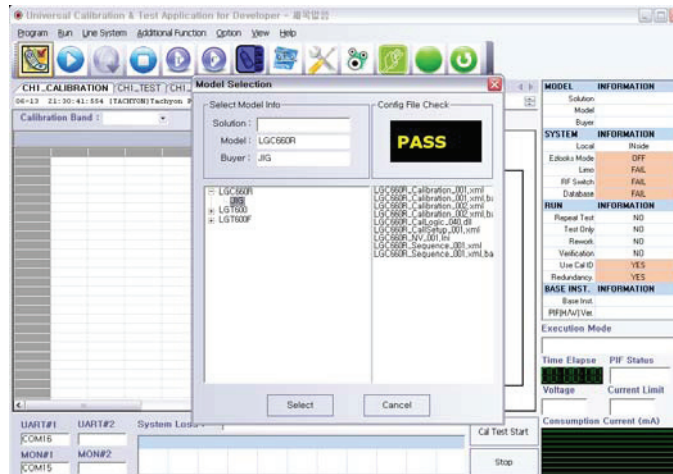
After hardware setup is completed successfully and Tachyon program is installed ordinarily, RF calibration or Auto Test can be start in the following procedure.

- 1) Execute Tachyon.exe in C:/LGE/Tachyon directory.
- 2) Click login button in the following dialog window.

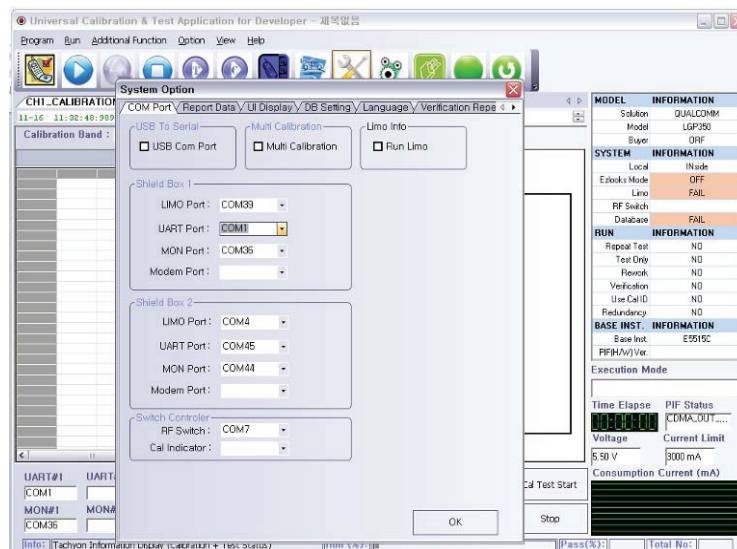


10. CALIBRATION

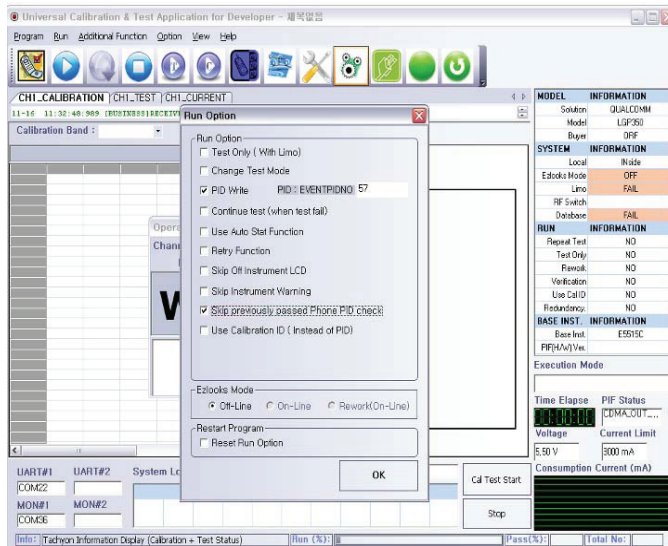
- 3) Click "model selection" button in toolbar for selecting the appropriate model.
- 4) double click C660/C660h in model tree, and then click "select" button.



- 5) Click "system option" button in toolbar to connect the mobile phone to the Tachyon. Choose the right UART and MON Port in shield Box 1 or 2, where MON port should be chosen only if PIF, USB to UART converter, is used to connect a phone.



- 7) Check "PID write" and "Skip previously Phone PID check".
(PID is the number for LGE internal production)



- 3) Execute Hecaton.exe for setting RF cable loss to Agilent 8960. If not, Tachyon can't run.
In the First, There aren't any RF cable loss files in C:/LGE/Tachyon/Config. So two files for the RF antenna cable and MS cable loss should be created in this program.



- 9) Click "Calibration+Auto Test" button in Toolbar. Now RF calibration and autotest will start.
For more information, refer to the manual in C:/LGE/Tachyon/Manual folder.

10.6 Overview of RF Calibration

10.6.1 Supported entry of RF Calibration

Most of the calibration for C660/C660h follows the recommendations of the Qualcomm. Table 1-1 and Table 1-2 describe the information of RF calibration items for C660/C660h. For more information, please refer to RF NV item documents for RTR6285.

Table 1-1. WCDMA calibration

Calibration	WCDMA 2100	WCDMA 900	description
Tx Sweep Calibration	○	○	Tx output power measurement
Tx Hdet Calibration	○	○	HDET ADC vs Tx power measurement
Tx Comp vs Freq Calibration	○	○	Tx channel compensation
Tx Secondary Comp vs Freq Calibration	X	X	Specific only for RTR6285
Tx Lim vs Freq Calibration	○	○	Tx target power compensation
Rx DVGA Gain Offset Calibration	○	○	Rx DVGA gain measurement
Rx DVGA Gain Offset vs Freq Calibration	○	○	RX DVGA gain channel compensation
Rx LNA Range Offset Calibration	○	○	LNA gain measurement
Rx LNA Range Offset vs Freq Calibration	○	○	LNA gain channel compensation

Table 1-2. GSM calibration

Calibration	GSM900	GSM850	GSM1800	GSM1900	description
VCO Calibration	○	X	X	X	VCO PDM measurement
Thermistor Calibration	X	X	X	X	Thermistor max/min ADC measurement
Tx External Polar Calibration	○	○	○	○	Tx output power measurement
Polar path delay Calibration	X	X	X	X	Tx PM and AM signal path delay compensation
Carrier Suppression Calibration	X	X	X	X	Carrier power compensation
Rx Gain Range Calibration	○	○	○	○	Rx Gain measurement

10.6.2 Calibration Feature

This section describes the information used in calibration items in more detail.

[1] WCDMA band

Table 1-3 describes the calibration feature for WCDMA band.

Table 1-3. Feature of Tx/Rx calibration in WCDMA 2100/900 band

Item		Sub Item	WCDMA 2100	WCDMA 900
Calibration Channel		Tx	9883	2787
		Rx	10833	3012
Tx Target Power(dBm)			22.5	22.5
PAM gain switching(dBm)		High to low gain	11.0	11.0
		Low to high gain	14.0	14.0
High Gain Mode	Calibrated PDM Range	Max	214	201
		Min	162	106
	PDM step		2	3
	Measured data of 32 array		26	25
	Threshold of Power Range(dBm)	≥ Up threshold	25.0	25.0
		≤ Low threshold	6.0	6.0
Low Gain Mode	Calibrated PDM Range	Max	210	225
		Min	75	69
	PDM step		5	6
	Measured data of 32 array		27	26
	Threshold of Power Range(dBm)	≥ Up threshold	15.0	16.0
		≤ Low threshold	-55.0	-53.0
Allowable power range in HDET range(dBm)		≥ Lower limit	16.5	16.5
		≤ Upper limit	24.5	24.5
Allowable HDET adc range		≥ Lower limit	30	35
		≤ Upper limit	190	220
DVGA Calibration Power(dBm)			-74.0	-74.0
DVGA Calibration Range		≥ Lower limit	130	50
		≤ Upper limit	300	300
LNA Calibration Power(dBm)		Range 0-1	-66.0	-68.0
		Range 1-2	-42.0	-50.0
		Range 2-3	-26.0	-38.0
		Range 3-4	X	-26.0

[2] Quad GSM band

Table 1-4 describes the calibration feature for Quad GSM bands.

Table 1-4. Feature of Tx/Rx calibration in Quad GSM band

Item	Sub item	GSM 900	GSM 850	GSM 1800	GSM 1900
Tx Calibration channel	F1	975	128	512	512
	F2	124	251	885	810
Power range in AMAM/AMPM NVs (dBm)	Max	34.0	34.0	31.0	31.5
	Min	-20.0	-20.0	-20.0	-20.0
Rx Gain Range Calibration Power (dBm)	Range 0	-80	-80	-80	-80
	Range 1	-80	-80	-80	-80
	Range 2	-50	-50	-50	-50
	Range 3	-50	-50	-50	-50
	Range 4	-50	-50	-50	-50
Rx Gain Range Calibration Range (Lower limit/Upper limit)	Range 0	1900/2500	1900/2500	1900/2500	1900/2500
	Range 1	1200/2300	1700/2300	1700/2300	1700/2300
	Range 2	1300/1900	1300/1900	1300/1900	1300/1900
	Range 3	1200/1800	1200/1800	1200/1800	1200/1800
	Range 4	1100/1700	1100/1700	1100/1700	1100/1700
Tx External Polar calibration PDM table	13025,1900,1950,2000,2050,2100,2150,2200,2250,2300,2350,2400,2450,2500,2550,2600,2650,2700,2750,2800,2850,2900,2950,3000,3075,3150,3225,3300,3375,3450,3525,3600,3675,3750,3825,3900,3975,4050,4125,4200,4275,4350,4425,4500,4575,4650,4725,4800,4875,4950,5025,5100,5175,5250,5325,5400,5475,5550,5625,5700,5775,5850,5925,6025,6125,6225,6325,6425,6525,6625,6725,6825,6925,7025,7125,7225,7325,7425,7525,7625,7725,7825,7925,8025,8125,8225,8325,8425,8525,8625,8725,8825,8925,9025,9125,9225,9325,9425,9525,9625,9725,9825,9925,10025,10125,10225,10325,10425,10525,10625,10725,10825,10925,11025,11125,11225,11375,11525,11675,11825,11975,12125,12275,12425,12575,12725,12875,13025,13175,13325,13475,13625,13775,13925,14075,14225,14375,14525,14675,14825,14975,15125,15275,15425,15575,15725,15875,16025,16175,16300				

[3] Channels of RF Calibration

Table 1-5 WCDMA Channel

W2100 Tx	9621	9638	9656	9673	9691	9708	9726	9743	9761	9778	9796	9813	9831	9848	9866	9883
W2100 Rx	10571	10588	10606	10623	10641	10658	10676	10693	10711	10728	10746	10763	10781	10798	10816	10833
W900 Tx	2712	2722	2733	2743	2754	2765	2776	2787	2796	2806	2815	2825	2834	2844	2853	2863
W900 Rx	2937	2947	2958	2968	2979	2990	3001	3012	3021	3031	3040	3050	3059	3069	3078	3088

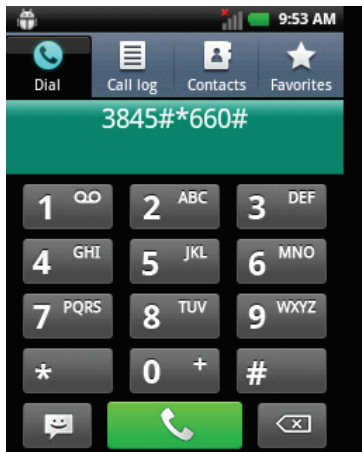
Table 1-5 GSM850/GSM900 Channel

GSM850	12 8	14 5	16 3	180	19 8	215	23 3	251
GSM900	1	31	62	92	12 4	97 5	10 00	10 23

Table 1-7 GSM1800/GSM1900 Channel

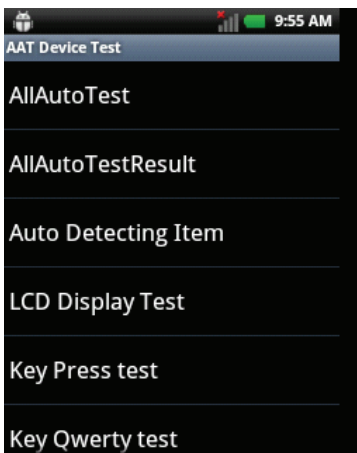
GSM1800	512	537	562	587	612	637	662	687	712	737	762	787	812	837	862	885
GSM1900	512	532	552	572	592	612	632	652	672	692	712	732	752	772	792	810

11. Hidden Menu



Hidden Menu Start

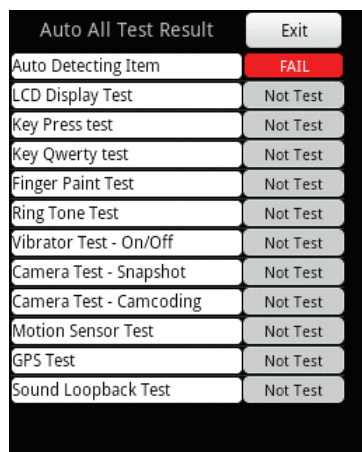
Start shortcut keys: 3845#*660#



Device Test List

All Auto Test :

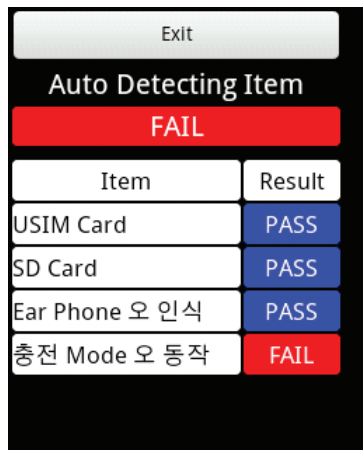
- > All Auto Test menu click
- > Continuous information on the menu, giving you ability test



Auto All Test Result

Auto All Test Result

- > From the factory with the ability to view the results screen



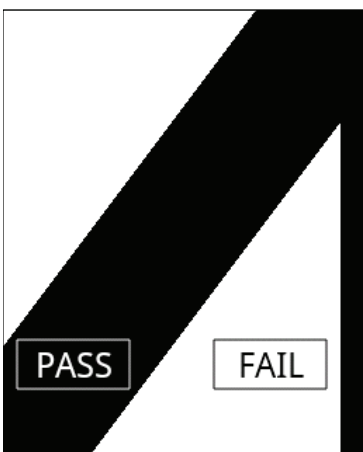
Auto Detecting Item

USIM Card recognition check
SD Card recognition check
Ear Phone misrecognition check
Charging Mode operation check



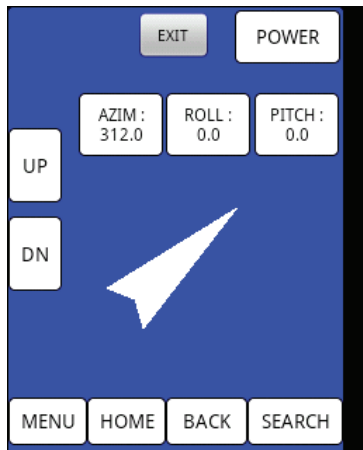
All Auto Test Device Test List

Auto All Test : Device functionality testing at the factory to use
Auto All Test Result : Test Result
Auto Detecting Item
LCD Display Test : Display test
Key Press test
Key Qwerty test
Finger Paint Test : Test Touch
Ring Tone Test
Vibrator Test – On/Off : Vibrator test
Camera Test - Snapshot test
Camera Test – Camcoding test
Motion Sensor test : Motion Sensor test
GPS BT Wifi Test
Sound Loopback Test : N/A



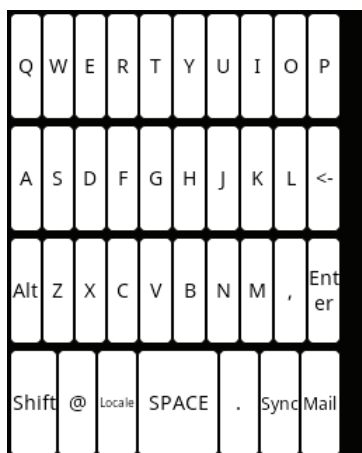
LCD Test List

Click on the following screen
- White Display
- Black Display



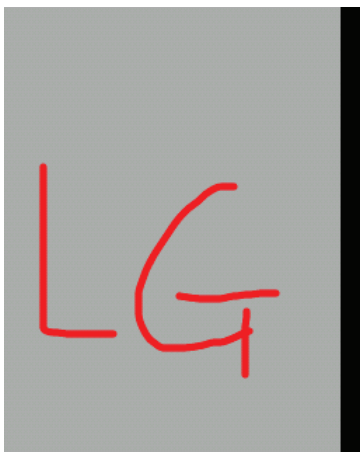
Key / Compass Test

Up/Down key : Check Recognition
 Power key : Check Recognition
 Menu key : Check Recognition
 Home key : Check Recognition
 Back key : Check Recognition
 Search key : Check Recognition
 Compass test



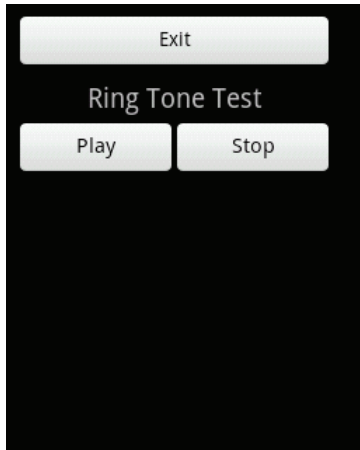
Qwerty Key

All qwerty key : Check Recognition



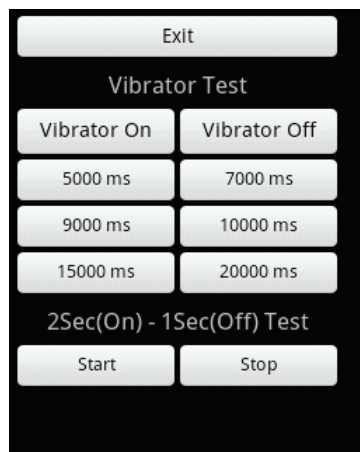
Finger Paint Test

Draw Finger Paint & check touch recognition



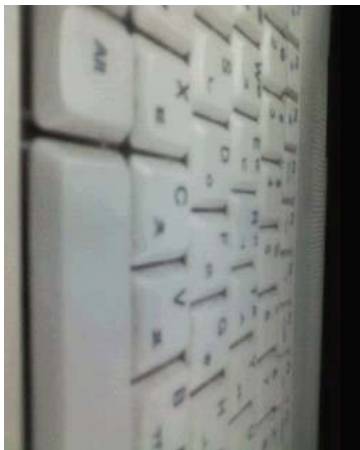
Ringtone Test

Play & Check Ring tone Sound



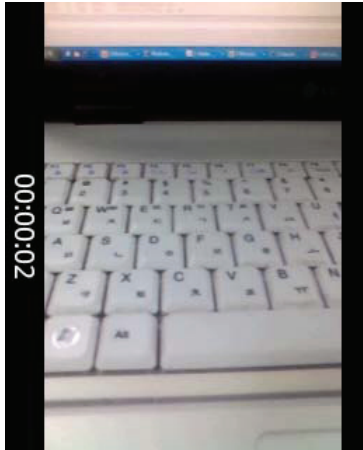
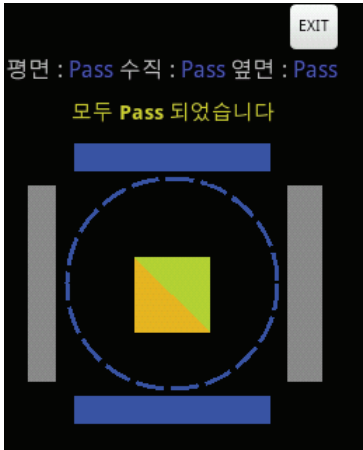
Vibrator test

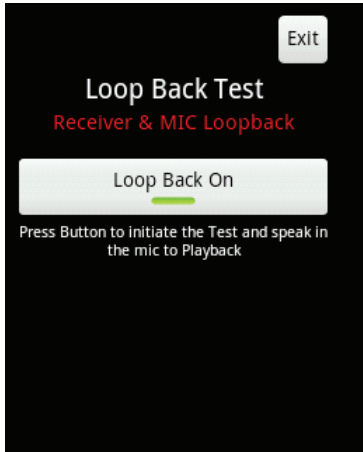
A case-by-state vibration tests



Camera test-snapshot

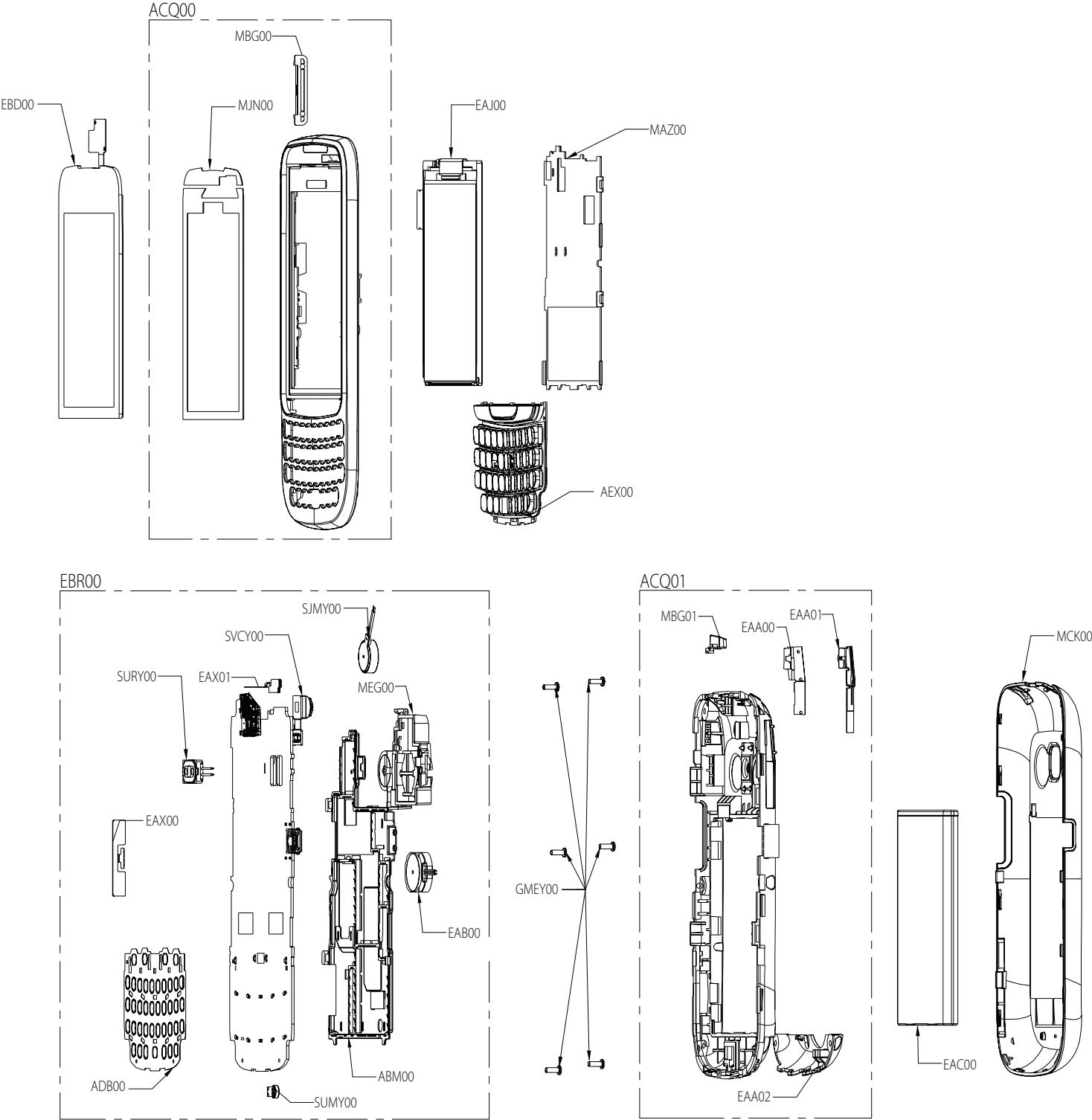
Camera snapshot test

	Camera test-Camcoding -> Camera Camcoding test
	Motion Sensor Test -> Check the operation of the sensor in the direction of set -> Place set to flat & check -> Place set to vertical & check -> Place set to horizontal & check
	GPS BT WiFi Test GPS Test : GPS check recognition Bluetooth Scanning : BT check recognition WiFi Scanning : WiFi check recognition

	Loop Back test Test Receiver & MIC Loopback
---	---

12. EXPLODED VIEW & REPLACEMENT PART LIST

12.1 EXPLODED VIEW



Location	Description
MAZ00	Bracket
EAJ00	LCD,Module-TFT
EBD00	Touch Window Assembly
ACQ00	Cover Assembly,Front
MBG00	Button
MJN00	Tape,Window
AEX00	Keypad Assembly,Main
ACQ01	Cover Assembly,Rear
MBG01	Button
EAA00	PIFA Antenna,WiFi
EAA01	PIFA Antenna,GPS
EAA02	PIFA Antenna,Multiple
EBR00	PCB Assembly,Main
ABM00	Can Assembly,Shield
ADB00	Dome Assembly,Metal
EAB00	Speaker,Dual Mode
EAX00	PCB,Sidekey
EAX01	PCB,Sidekey
SJMY00	Motor,DC
SUMY00	Microphone,Condenser
SURY00	Receiver
SVCY00	Camera Module
MEG00	Holder
GMEY00	Screw,Machine
EAC00	Rechargeable Battery,Lithium Ion
MCK00	Cover,Battery

12. EXPLODED VIEW & REPLACEMENT PART LIST

12.2 Replacement Parts <Mechanic component>

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	PartNumber	Spec	Remark
1	AGQ000000	Phone Assembly	AGQ86520501	LGC660.AITABK BK:Black -	
2	MEZ002100	Label, Approval	MLAA0062316	COMPLEX GU280 OREBK ZZ:Without Color COMPLEX, (empty), , , , ,	
2	ACQ100400	Cover Assembly, EMS	ACQ85711901	LGC660.AITABK BK:Black -	
3	ACQ003400	Cover Assembly, Bar	ACQ85554001	LGC660.AFRAZY BK:Black -	
4	MAZ00	Bracket	MAZ63164501	PRESS STS 304 0.4 LGC660.AFRAZY BK:Black -	
4	MEZ000000	Label	MLAZ0038303	COMPLEX LG-LC3200 WA:White PRINTING, PPRI PRINTING	
4	MHK000000	Sheet	MHK63585701	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
4	EAJ00	LCD, Module-TFT	EAJ61829401	LM283DN3A QVGA 2.83INCH 240X320 500CD COLOR 70% 4/3 500 60Hz Inverter N - TOVIS	
4	MJN061101	Tape, Protect	MJN67987001	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
4	EBD00	Touch Window Assembly	EBD61046101	H031 CAPACITIVE TOUCH F/F MELFAS 6000 2.8 BB - Young Fast Optoelectronics Co., Ltd.	
4	MJN061102	Tape, Protect	MJN67995901	COMPLEX LGC660.AITABK ZZ:Without Color -	
4	ACQ00	Cover Assembly, Front	ACQ85554101	LGC660.AFRAZY BK:Black -	
5	MCK032700	Cover, Front	MCK66726401	MOLD PC LGC660.AFRAZY BK:Black -	
6	MET099500	INSERT, NUT	MICE0016907	MECH_COMMON ZY, ZZ, PRESS, STS, , , , ,	
5	MBG00	Button	MBG64262801	COMPLEX LGC660.AFRAZY BK:Black -	
5	MAZ000000	Bracket	MAZ63164401	PRESS STS 304 0.4 LGC660.AFRAZY BK:Black -	
5	MCQ074200	Damper, Speaker	MCQ66647701	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
5	MCQ043300	Damper, LCD	MCQ66647801	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
5	MEV000000	Insulator	MEV63879501	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
5	MHK000000	Sheet	MHK63466501	COMPLEX LGC660.AFRAZY ZZ:Without Color -	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
5	MJN00	Tape, Window	MJN67849201	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
4	MCQ000000	Damper	MCQ66729001	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
4	AEX00	Keypad Assembly, Main	AEX73757401	LGC660.AFRAZY BK:Black -	
3	ACQ01	Cover Assembly, Rear	ACQ85569601	LGC660.AFRAZY BK:Black -	
4	MBG01	Button	MBG64262901	COMPLEX LGC660.AFRAZY BK:Black -	
4	MEZ000900	Label, After Service	MLAB0001102	COMPLEX C2000 CGRSV WA:White C2000 USASV DIA 4.0 PRINTING,	
4	MJN061100	Tape, Protect	MJN67968701	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
4	EAA00	PIFA Antenna, WiFi	EAA62565201	KI-B24667 SINGLE -2DB 5 FPCB Type - KOMATECH CO., LTD	
4	EAA01	PIFA Antenna, GPS	EAA62565101	KI-B15666 DUAL -2DB 5 FPCB Type - KOMATECH CO., LTD	
4	EAA02	PIFA Antenna, Multiple	EAA62565001	HIL-02A87-0000AA MULTI -2DB 5 LDS Type - E.M.W CO., LTD.	
4	MCK063300	Cover, Rear	MCK66726501	MOLD LUPOY LGC660.AFRAZY BK:Black -	
4	MJN061101	Tape, Protect	MJN67998601	COMPLEX LGC660.AITABK ZZ:Without Color -	
4	MCQ000000	Damper	MCQ66605601	COMPLEX LGC660.AFRAZY BK:Black -	
4	MCQ049800	Damper, Motor	MCQ66647901	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
4	MCQ015701	Damper, Connector	MCQ66648101	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
4	MCQ074200	Damper, Speaker	MCQ66667201	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
4	MCQ015700	Damper, Connector	MCQ66667301	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
4	MCQ074201	Damper, Speaker	MCQ66667401	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
4	MCR000000	Decor	MCR64471101	MOLD ABS LGC660.AFRAZY BK:Black -	
4	MDJ000000	Filter	MDJ63204701	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
4	MDJ000001	Filter	MDJ63204801	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
4	MEG000000	Holder	MEG62799801	COMPLEX LGC660.AFRAZY BK:Black -	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
4	MJN009400	Tape, Camera	MJN67849701	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
4	MJN000000	Tape	MJN67887301	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
4	MJN000001	Tape	MJN67887401	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
4	MKC009400	Window, Camera	MKC64058801	COMPLEX LGC660.AFRAZY BK:Black -	
3	EAN011400	IC, Memory Card, MICRO SD	EAN61826701	MMAGR02GUECA-2MBTN 2GBYTE 2.7VTO3.6V MICRO SD CARD 15.0x11.0x1.0MM TR 8P MicroSD Card 2GB SAMSUNG ELECTRONICS CO., LTD.	
3	EBR00	PCB Assembly, Main	EBR73961101	LGC660.AITABK 1.0 Main	
4	EBR071800	PCB Assembly, Main, SMT	EBR73251103	LGC660.AITABK 1.0 Main	
5	EBR071700	PCB Assembly, Main, SMT Top	EBR73251401	LGC660.AFRAZY 1.1 Main	
6	EAX010000	PCB, Main	EAX64143601	LGC660.AFRAZY 1.1 FR-4 Stack via 8 0.8T Main	
5	EBR071600	PCB Assembly, Main, SMT Bottom	EBR73251301	LGC660.AFRAZY 1.2 Main	
6	SW1000	Connector, RF	ENWY0008701	MS-156C NONE STRAIGHT SOCKET SMD T/REEL AU 50OHM 400mDB HIROSE KOREA CO., LTD	
5	MEZ000000	Label	MLAZ0038301	COMPLEX LG-VX6000 ZZ:Without Color PID Label 4 Array PRINTING,	
4	EBR071500	PCB Assembly, Main, Insert	EBR73886601	LGC660.AFRAZY 1.1 Main	
5	ABM00	Can Assembly, Shield	ABM73556101	LGC660.AFRAZY BK:Black -	
6	MBK070300	Can, Shield	MBK62992501	PRESS STS 304BA 0.3 LGC660.AFRAZY ZZ:Without Color -	
6	MDS000000	Gasket	MDS63740001	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
6	MCQ000000	Damper	MCQ66767301	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
6	MEV000000	Insulator	MEV63930701	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
5	ADB00	Dome Assembly, Metal	ADB73698101	LGC660.AFRAZY ZZ:Without Color -	
5	EAB00	Speaker, Dual Mode	EAB62308301	1812-8T-04W3P Nd-Fe-B 700mW 8OHM 91DB 720HZ 1812*3.0T wire 10mm DCCA coil WIRE KIRYN TELECOM CO., LTD	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
5	EAX00	PCB, Sidekey	EAX64122101	LGC660.AFRAZY C POLYI Double 2 0.18 Sidekey	
5	EAX01	PCB, Sidekey	EAX64297801	LGC660.AFRAZY D POLYI Double 2 0.18 Sidekey	
5	RAA050100	Resin, PC	BRAH0001301	UF-1060	
5	SJMY00	Motor, DC	SJMY0007118	MVMF-A301F 2.0 V, 40 mA, 10*3.0, Q-Coin 12mm Wire, 3V, - LG INNOTEK CO., LTD	
5	SUMY00	Microphone, Condenser	SUMY0003815	B4010AL443-49 -44DB 2.2KOHM OMNI 1.1TO10V 4x1.0t FPCB GoerTek Inc.	
5	SURY00	Receiver	SURY0010114	BWBR1207L-04B-P 30mW 32OHM 105DB 0HZTO0HZ WIRE - BUJEON ELECTRONICS CO., LTD	
5	SVCY00	Camera Module	SVCY0029201	HSIS-LM38MIFF LG-P350 PRT HANSUNG ELCOMTEC CO., LTD.	
5	MEG00	Holder	MEG62799701	MOLD PC LGC660.AFRAZY BK:Black -	
5	MEV000000	Insulator	MEV63892401	COMPLEX LGC660.AFRAZY ZZ:Without Color -	
3	GMEY00	Screw, Machine	GMEY0013901	BH + 1.4mM 4mM MSWR FZB N - ARIMA COMMUNICATIONS CORP.	
1	AGF000000	Package Assembly	AGF76259701	LGC660.AITABK ZZ:Without Color LG-C660 ITA (TR3W2/ITA UB/480ea)	
2	MAY047100	Box, Master	MBEE0059803	COMPLEX KP100.AGBRLA ZZ:Without Color TR3_20ea Master Box	
2	MEZ003500	Label, Barcode	MLAC0004541	PRINTING HB620 KPNBK ZZ:Without Color GSM standard_unit box label_90*40	
2	MEZ047200	Label, Master Box	MLAJ0004402	PRINTING CG300 CGR DG ZZ:Without Color LABEL MASTER BOX(for CGR TDR 2VER. mbox_label) GSM standard_master box label	
2	MAF086500	Bag, Vinyl	MBAD0005204	COMPLEX LG-LX260 SPRAG ZZ:Without Color -	
2	MAY084000	Box, Unit	MAY65230202	BOX Paper 127 68 117 5 COLOR LGC330.AITAAQ ZZ:Without Color LG-C660 ITA (TR3W2/Italian)	
2	MEZ000000	Label	MLAZ0050901	COMPLEX KU990.AGBRBK ZZ:Without Color Battery Warning Label (Lithium ion Battery Label)	
2	AGJ000000	PALLET ASSY	APLY0002401	KP100 ARERP RP, ZZ, TR3 STD(Body-480ea) Pallet Assy	
3	MBEC00	Box, Carton	MBEC0002001	COMPLEX KG270 AREBK ZZ:Without Color BOX, TW, PBO PBOTW	
3	MCCL00	Cap, Box	MCCL0000401	COMPLEX KG270 AREBK ZZ:Without Color BOX, TW, PBO PBOTW	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
3	MPCY00	Pallet	MPCY0013203	COMPLEX KG800 DEUBK BL:Blue COMPLEX, PCX COMPLEX	
1	AAD000000	Addition Assembly	AAD85869301	LGC660.AITABK BK:Black -	
2	MEZ000000	Label	MLAZ0051201	COMPLEX KP170 ITASV ZZ:Without Color -	
2	MCK00	Cover, Battery	MCK66726601	MOLD PC LGC660.AFRAZY BK:Black -	

12. EXPLODED VIEW & REPLACEMENT PART LIST

12.2 Replacement Parts <Main component>

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	PartNumber	Spec	Remark
6	VA909, VA910, VA911, VA912	Varistor	SEVY0001001	EVLC14S02050 14V 0% 50F 1.0*0.5*0.6 NONE SMD R/TP AMOTECH CO., LTD.	
6	LD900, LD901, LD902, LD903, LD904, LD905, LD906, LD907, LD908, LD909, LD910, LD911, LD912, LD913	LED, Chip	EDLH0005901	WHITE 2.85~3.15 20mA 45~60mcd (X:Y=0.273/0.295~0.332/0.358) 75mW 1608 R/TP 2P -	
6	R921, R923	Resistor, Chip	ERHZ0000484	MCR01MZP5J471 470OHM 5% 1/16W 1005 R/TP - ROHM.	
6	R918, R926	Resistor, Chip	ERHZ0000463	MCR01MZP5J330 33OHM 5% 1/16W 1005 R/TP - ROHM.	
6	VA606, VA607	Diode, TVS	EDTY0008606	PRSB6.8C 4.7V 5.7 - - 10W - R/TP 2P 1 PROTEK DEVICES INC.	
6	C616, C618, C700, C701, C702, C710, C811, C901	Capacitor, Ceramic, Chip	ECCH0004904	GRM155R60J105K 1uF 10% 6.3V X5R -55TO+85C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	C1034, C300, C408, C412, C414, C418, C422, C426, C430, C435, C436, C515, C516, C520, C521, C522, C523, C528, C555, C609, C613, C614, C626, C627	Capacitor, Ceramic, Chip	ECCH0000143	MCH155CN102KK 1nF 10% 50V X7R -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	C1001, C1006, C1007, C1008, C1012, C1015, C1017, C1037, C1039, C1044, C1051, C1074, C1078, C1090, C1097, C1156, C323, C500, C552, C561, C601, C608	Capacitor, Ceramic, Chip	ECZH0000830	C1005C0G1H330JT000F 33pF 5% 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	R1002, R519, R524, R525, R604, R606, R610, R705, R706	Resistor, Chip	ERHZ0000443	MCR01MZP5J222 2.2KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C2010, C2031, C501, C502, C503, C504, C505, C509, C511, C512, C513, C556, C557, C562, C625, C801	Capacitor, Ceramic, Chip	ECZH0003103	GRM36X7R104K10PT 100nF 10% 10V X7R - 55TO+125C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
6	C402, C405, C533, C536, C537, C538, C539, C542, C543, C546, C622, C623, C632, C633, C634, C704, C706, C707, C708, C709, C712, C713	Capacitor, Ceramic, Chip	ECCH0000198	CL05A225MQ5NSNC 2.2uF 20% 6.3V X5R -55TO+85C 1005 R/TP . SAMSUNG ELECTRO-MECHANICS CO., LTD.	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	R511, R603, R608, R848, R849, R850, R851, R852	Resistor, Chip	ERHZ0000486	MCR01MZP5J473 47KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	L1018	Inductor, Multilayer, Chip	ELCH0001034	HK1005 3N3S-T 3.3NH 0.3NH - 300mA 0.16OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP TAIYO YUDEN CO., LTD	
6	C1065, C1096, C1101, C1159, L1014, L1023, L1042, L2003	Capacitor, Ceramic, Chip	ECZH0000813	C1005C0G1H101JT 100pF 5% 50V NP0 -55TO+125C 1005 R/TP - TDK KOREA COOPERATION	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	C1028, C1030, C1053, C1055, C1059, C1066, C301, C304, C310, C312, C314, C317, C318, C319, C324, C400, C401, C403, C406, C407, C409, C416, C419, C420, C423, C424, C428, C432, C434, C510, C532, C549, C636, C637, C808	Capacitor, Ceramic, Chip	ECCH0002001	C1005JB0J104KT000F 0.1uF 10% 6.3V Y5P - 30TO+85C 1005 R/TP - TDK CORPORATION	
6	C1070	Capacitor, Ceramic, Chip	ECCH0009109	C0603X7R1H331KT00NN 330pF 10% 50V X7R - 55TO+125C 0603 R/TP - TDK CORPORATION	
6	C410, C417, C421, C524, C525	Capacitor, Ceramic, Chip	ECCH0017501	CL10A226MQ8NRNE 22uF 20% 6.3V X5R -55TO+85C 1608 R/TP 0.8MM SAMSUNG ELECTRO- MECHANICS CO., LTD.	
6	C1013, C2023	Capacitor, Ceramic, Chip	EAE62282201	GRM033R71E102KA01D 0.000000001F 10% 25V X7R -55TO+125C 0603 R/TP 0.3+/-0.03 MM MURATA MANUFACTURING CO., LTD.	
6	U601	IC, Magnetic Sensor	EBD60985501	AMI306 1.7 to 3.6V - QFN R/TP 8P - AICHI STEEL CORPORATION	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	R617, R618, R619, R620, R628, R708, R709, R710	Resistor, Chip	ERHY0000254	MCR01MZP5J472 4.7KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C1072, C1081, C1083, C1095	Capacitor, Ceramic, Chip	ECCH0000175	GRM1555C1H2R7B 2.7pF 0.1PF 50V NP0 - 55TO+125C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
6	C2025, C2030	Capacitor, Ceramic, Chip	ECCH0007802	CL10A475KP8NNNC 4.7uF 10% 10V X5R -55TO+85C 1608 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	FB602, FB603, FB604, FB605, FB610, FB611, FB612, FB613, R308	Filter, Bead	SFBH0008102	BLM15HD182SN1D 1800 ohm 1.0X0.5X0.5 25% 2.2 ohm 0.2A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	
6	R921, R923	Resistor, Chip	ERHZ0000484	MCR01MZP5J471 470OHM 5% 1/16W 1005 R/TP - ROHM.	
6	R626	Resistor, Chip	ERHZ0000487	MCR01MZP5J474 470KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C1040, C1052, C1080	Inductor, Multilayer, Chip	ELCH0001049	1005GC2T6N8JLF 6.8NH 5% - 250mA 0.32OHM 3GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	R917, R919, R920, R922, R924, R925, R927, R928, R929, R930	Resistor, Chip	ERHZ0000420	MCR01MZP5J151 150OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C600, C703	Capacitor, Ceramic, Chip	ECCH0005602	GRM188R61C225K 2.2uF 10% 16V X5R -55TO+85C 1608 R/TP - MURATA MANUFACTURING CO., LTD.	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	C1036, C1054, C1056, C2009, C2020, C2021, C714	Capacitor, Ceramic, Chip	ECCH0017601	CL05A475MQ5NRNC 4.7uF 20% 6.3V X5R -55TO+85C 1005 R/TP 0.5MM SAMSUNG ELECTRO- MECHANICS CO., LTD.	
6	L501, L502	Inductor, Wire Wound, Chip	EAP61746201	1239AS-H-4R7N=P2 4.7UH 30% - 1A - - 0.252OHM - - SHIELD 2.5X2MM NONE R/TP TOKO, INC.	
6	C1024, C1026, C1058, C1060, C1061, C1067, C2000, C2001, C2003, C2004, C2005, C2006, C2007, C2008, C2011, C2012, C2014, C2024, C2047	Capacitor, Ceramic, Chip	ECCH0009101	C0603X5R0J104KT00NN 0.1uF 10% 6.3V X5R - 55TO+85C 0603 R/TP - TDK CORPORATION	
6	R302, R513	Resistor, Chip	ERHZ0000490	MCR01MZP5J510 51OHM 5% 1/16W 1005 R/TP - ROHM.	
6	CN501	Connector, I/O	ENRY0009601	GU074-5P-SD-E1500 5P 0.65MM ANGLE RECEPTACLE DIP R/TP - LS Mtron Ltd.	
6	R1004, R1005	Resistor, Chip	ERHZ0000415	MCR01MZP5J131 130OHM 5% 1/16W 1005 R/TP - ROHM.	
6	FB606, FB607, FB608, FB609	Filter, Bead	SFBH0006806	CIM05J601NC 600 ohm 1.0X0.5X0.5 25% 0.6 ohm 0.3A SMD R/TP 2P 0 SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	C553, C560	Capacitor, TA, Conformal	ECTH0002703	TCTAL1A107M8R 0.0001F 20% 10V 50UA - 55TO+125C 0OHM 3.2x1.6x1.1 NONE SMD R/TP ROHM CO., LTD.	
6	D502	Diode, Switching	EAH61532901	BA891_ 1V 35V - - 0SEC 715mW SOD523 R/TP 2P 1 NXP Semiconductors	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	C308, C411, C413, C415, C425, C429, C433, C437, C554, C563, C617, C638	Capacitor, Ceramic, Chip	ECCH0000155	MCH153CN103KK 10nF 10% 16V X7R -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	R520	Resistor, Chip	ERHZ0000203	MCR01MZP5F1002 10KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	C628, C629	Capacitor, Ceramic, Chip	ECZH0001217	GRM155R60J474K 470nF 10% 6.3V X5R -25TO+70C 1005 BK-DUP - MURATA MANUFACTURING CO., LTD.	
6	R306, R315, R406, R503, R611, R612	Resistor, Chip	ERHZ0000405	MCR01MZP5J103 10KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C1027, C1029, C1064, C550, C551, C564, C615, C806, C807, C809, C810	Capacitor, Ceramic, Chip	ECCH0000115	MCH155A220JK 22pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	R1014	Resistor, Chip	ERHY0009504	MCR006YZPJ102 1KOHM 5% 1/20W 0603 R/TP - ROHM.	
6	R1007, R634	Resistor, Chip	ERHZ0000456	MCR01MZP5J2R2 2.2OHM 5% 1/16W 1005 R/TP - ROHM.	
6	U603	IC, Speaker Amplifier	EUSY0404001	TPA6202A1ZQVR BGA, 8, R/TP, Class AB SPK Amp, IC, Audio AmplifierIC, Audio Amplifier - BGA R/TP 8P - TEXAS INSTRUMENTS KOREA LTD, HONGKONG BRANCH.	
6	R1025	Resistor, Chip	ERHY0009531	MCR006YZPJ620 62OHM 5% 1/20W 0603 R/TP - ROHM.	
6	C1048, C526, C603	Capacitor, Ceramic, Chip	ECCH0005604	GRM188R60J106M 10000000 pF, 6.3V, M, X5R, TC, 1608, R/TP, 0.8 mm MURATA MANUFACTURING CO., LTD.	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	C1043, C1045, C1046, C1049, C1069	Capacitor, Ceramic, Chip	ECZH0025920	GRM033R71C102K 1nF 10% 16V X7R -55TO+125C 0603 R/TP - MURATA MANUFACTURING CO., LTD.	
6	R1006	Resistor, Chip	ERHZ0000509	MCR01MZIP5J750 75OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C1082	Capacitor, Ceramic, Chip	ECCH0000104	MCH155A030C 3pF 0.25PF 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	R307, R845	Resistor, Chip	ERHZ0000434	MCR01MZIP5J1R0 1OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C2015, L1029, L1039	Capacitor, Ceramic, Chip	ECZH0000822	C1005C0G1H1R5CT000F 1.5pF 0.25PF 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	FL1007	Filter, Duplexer, IMT	SDMY0003001	B7697 2140000000 2112.4 to 2167.6 1950000000 1922.4 to 1977.6 2.2 1.8 2.5x2.0x0.89 DUAL SMD R/TP - EPCOS PTE LTD.	
6	R521, R523, R623, R624, R701, R702	Resistor, Chip	ERHZ0000485	MCR01MZIP5J472 4.7KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C1042, C302, C303, C326, C327, C605, C639, C640	Capacitor, Ceramic, Chip	ECCH0000122	MCH155A470JK 47pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	ZD600, ZD601, ZD700	Diode, TVS	EDTY0008610	PLW0501H-LF 800mV 6V 12.5V 16A 250W SOD523 R/TP 2P 1 PROTEK DEVICES INC.	
6	C508, C705	Capacitor, Ceramic, Chip	ECCH0007804	CL05A225MP5NSNC 2.2uF 20% 10V X5R -55TO+85C 1005 R/TP 0.5MM SAMSUNG ELECTRO- MECHANICS CO., LTD.	
6	R901	Resistor, Chip	ERHZ0000213	MCR01MZIP5F1203 120KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	FL1012	Filter, Saw	SFSY0033401	B9415 1575.42 1.4*1.1*0.4 SMD R/TP 5P EPCOS PTE LTD.	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	R303, R318, R319, R607, R609, R703	Resistor, Chip	ERHY0003301	MCR01MZP5J101 100OHM 5% 1/16W 1005 R/TP - ROHM.	
6	R1003, R313	Resistor, Chip	ERHZ0000483	MCR01MZP5J470 47OHM 5% 1/16W 1005 R/TP - ROHM.	
6	L1006	Inductor, Multilayer, Chip	ELCH0004717	1005GC2T82NJLF 82NH 5% - 150mA 2.1OHM 700MHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	C1003, C1010, L1021	Capacitor, Ceramic, Chip	ECCH0000901	C1005C0G1H2R2CT000F 2.2pF 0.25PF 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	L503	Inductor, Wire Wound, Chip	ELCP0009411	LQM2HPN4R7MGCL 4.7UH 20% - 800mA 0.11OHM - - SHIELD 2.5X2X1MM NONE - MURATA MANUFACTURING CO., LTD.	
6	R847	Resistor, Chip	ERHZ0000530	RC1005J512CS 5.1KOHM 5% 1/16W 1005 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	C2046	Capacitor, Ceramic, Chip	ECZH0000816	C1005C0G1H120JT000F 12pF 5% 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	C1033, C1038	Inductor, Multilayer, Chip	ELCH0001054	1005GC2T5N6SLF 5.6NH 0.3NH - 300mA 0.27OHM 3.2GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	C325, C604, C607, C630, C631	Capacitor, Ceramic, Chip	ECCH0000161	MCH153CN333KK 33nF 10% 16V X7R -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	C1005, C1014	Capacitor, Ceramic, Chip	ECCH0009206	GRM0335C1E680J 68pF 5% 25V X7R -55TO+125C 0603 R/TP - MURATA MANUFACTURING CO., LTD.	
6	ANT1000, ANT1001, ANT1002, ANT1003, ANT2000, ANT2001	Contact	MCIZ0008201	COMPLEX LG-VN530 VRZ DW:DARK BROWN PRESS, BeCu, , 3.0, 1.5, 1.5,	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	R1020, R305, R507, R510, R600, R629, R632, R853	Resistor, Chip	ERHZ0000404	MCR01MZP5J102 1KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C1079, C1091	Inductor, Multilayer, Chip	ELCH0005020	HK1005 1N0S 1NH 0.3NH - 300mA 0.08OHM 10GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP TAIYO YUDEN CO., LTD	
6	L2001	Inductor, Multilayer, Chip	ELCH0003842	LQG15HSR10J02D 100NH 5% - 150mA 1.25OHM 600MHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	L2007	Inductor, Multilayer, Chip	ELCH0003831	LQG15HS1N0S02D 1NH 0.3NH - 300mA 0.07OHM 10GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	C1057, C1063, C1100, C621, C900	Capacitor, Ceramic, Chip	ECCH0000182	GRM155R61A104K 0.1uF 10% 10V X5R -55TO+85C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
6	R918, R926	Resistor, Chip	ERHZ0000463	MCR01MZP5J330 33OHM 5% 1/16W 1005 R/TP - ROHM.	
6	FL500	Filter, EMI/Power	SFEY0015301	NFM18PC104R1C3 ESD/EMI 0HZ 0.1uF 0H SMD R/TP MURATA MANUFACTURING CO., LTD.	
6	FB700	Filter, Bead	EAM62131201	CIM05J121NC 120 ohm 1.0X0.5X0.5 25% 0.3 ohm 0.5A SMD R/TP 2P 0 SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	R517	Resistor, Chip	ERHZ0000288	MCR01MZP5F4703 470KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	C1105	Inductor, Multilayer, Chip	ELCH0004721	1005GC2T2N2SLF 2.2NH 0.3NH - 300mA 0.16OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	L1016	Inductor, Multilayer, Chip	ELCH0003844	LQG15HS2N0S02D 2NH 0.3NH - 300mA 0.1OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	L1001	Inductor, Multilayer, Chip	ELCH0012501	LQW15AN27NG00D 27NH 2% - 280mA 0.52OHM 3.5GHZ 25 NON SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	C1075, L2004, L2005, R1000	Inductor, Multilayer, Chip	ELCH0001412	LL1005-FHL1N8S 1.8NH 0.3NH - 400mA 0.14OHM 15GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP TOKO, INC.	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	C2019, C2045, C311, C313, C514, C535, C544, C545, C547, C548, C559, C802, C902	Capacitor, Ceramic, Chip	ECZH0001215	C1005X5R1A105KT000F 1uF 10% 10V X5R - 55TO+85C 1005 R/TP - TDK KOREA COOPERATION	
6	U1000	IC, RF Transceiver, 3G	EUSY0344001	RTR6285 1.8VTO3V, 2.7VTO3V 500mW QFN R/TP 68P QUALCOMM INCORPORATED.	
6	C1068, C1084, C1085, C1086, C1087, C2042	Capacitor, Ceramic, Chip	ECCH0009103	C0603C0G1H101JT00NN 100pF 5% 50V X7R - 55TO+125C 0603 R/TP - TDK CORPORATION	
6	U1002	IC, Power Amplifier	SMPY0020101	ACPM-5281-TR1 dBm, %, A, dBc, dB, 4x5, SMD, 3G Dual PAM B1+8. Coupler Integrated, LGA, R/TP, AVAGO TECHNOLOGIES INTERNATIONAL SALES PTE. LIMITED	
6	C1088, C1104	Inductor, Multilayer, Chip	ELCH0004711	1005GC2T22NJLF 22NH 5% - 200mA 0.8OHM 1.5GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	U501	IC, PMIC	EUSY0342201	PM7540 -0.5~18 N/A 0W CSP R/TP 137P - QUALCOMM INCORPORATED.	
6	R512	Resistor, Chip	ERHZ0004201	RC1005F1213CS 121KOHM 1% 1/16W 1005 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	R317, R403, R605, R704, R842	Resistor, Chip	ERHZ0000406	MCR01MZP5J104 100KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	CN701	Connector, BtoB	ENBY0058601	51338-9873 10P 0.40MM STRAIGHT FEMALE SMD R/TP 1.5M - HANKOOK MOLEX	
6	U2000	IC Assembly	EUSY0433901	BCM43291SKUBG WLBGA , 181 , R/TP , WiFi(11bgn)+BT+FM(Rx), BT3.0+HS, 6.57x5.62x0.55, 182pin, 0.4p , , IC Assembly BROADCOM ASIA DISTRIBUTION PTE LTD	
6	C2016	Capacitor, Ceramic, Chip	ECCH0000110	MCH155A100D 10pF 0.5PF 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	FB2000, FB2001, FB2002, FB2003	Filter, Bead	SFBH0007102	BLM15AG100SN1D 10 ohm 1.0X0.5X0.5 5 ohm 0.05 ohm 1A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	
6	L1009, L1013, L1024	Inductor, Multilayer, Chip	ELCH0001048	1005GC2T10NJLF 10NH 5% - 250mA 0.42OHM 2.5GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	X2000	Oscillator, TCXO	EXST0002601	1XXB38400FAA 38.4 MHz, 1.5 PPM, 10 pF, SMD, 2.5*2.0*0.8, 38.4, 1.5PPM, 1.8V, 2.5, 2.0, 0.8, SMD, R/TP DAISHINKU CORPORATION.	
6	L1004, L1007	Inductor, Multilayer, Chip	ELCH0004714	1005GC2T18NJLF 18NH 5% - 200mA 0.65OHM 1.6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	L1027	Inductor, Multilayer, Chip	ELCH0001036	HK1005 5N6S-T 5.6NH 0.3NH - 300mA 0.23OHM 4GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP TAIYO YUDEN CO., LTD	
6	R501, R522	Resistor, Chip	ERHZ0000537	MCR01MZP5F6803 680KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	FL1005	Filter, Saw	SFSY0028101	SAFE1G95KA0F00 1950 1.4*1.1*0.6 SMD R/TP 5P MURATA MANUFACTURING CO., LTD.	
6	R300, R500	Resistor, Chip	ERHZ0000222	MCR01MZP5F1503 150KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	FL705, FL706, FL707	Filter, EMI/Power	SFEY0011401	ICVE10184E070R101FR ESD/EMI 0HZ 7.5pF 0H SMD R/TP INNOCHIPS TECHNOLOGY	
6	FL2000	Filter, Dielectric	SFDY0003201	DEA162450BT-2096A1-H BPF 2.45GHZ 100MHz SMD R/TP 3P TDK CORPORATION	
6	C1009, C1011, C1047	Capacitor, Ceramic, Chip	ECCH0009106	C0603X7R1C103KT 10nF 10% 10V X7R -55TO+125C 0603 R/TP - TDK CORPORATION	
6	R310, R401, R404, R405	Wire Pad, Open	SAFO0000501	AX3100 ATL SV_SHIPBACK, MAIN, A, 0OHM_1005_DNI	
6	L1034	Inductor, Multilayer, Chip	ELCH0001405	LL1005-FHL3N3S 3.3NH 0.3NH - 400mA 0.16OHM 9.1GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP TOKO, INC.	
6	U503	IC, MUIC	EUSY0372001	TS5USBA33402YZPR TS5USBA33402, MUIC WCSP R/TP 20P TEXAS INSTRUMENTS KOREA LTD, HONGKONG BRANCH.	
6	U301	IC, Digital Baseband Processor, 3G	EUSY0392303	MSM7227T 560 NSP, ARM11(600M), UPA5.7, FWGA, 8M, WVGA30fps, WM, BMP, Android BGA R/TP 560P QUALCOMM INCORPORATED.	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	R514	Resistor, Chip	ERHZ0003901	RC2012FR100CS 0.1OHM 1% 1/8W 2012 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	D604, D803, D804, D805	Diode, TVS	EDTY0009801	VSMF05LCC 5V 6V 12V 2A 25W SOT-963 R/TP 6P 5 PROTEK DEVICES INC.	
6	U2002	IC, LDO Voltage Regulator	EUSY0407101	BU28TD4WNVX SSON004, 4, R/TP, 2.8V 150mA Single LDO, IC, LDO Voltage RegulatorIC, LDO Voltage Regulator ROHM.	
6	U700	IC, Level Translator	EUSY0391601	NLSV1T244-D 0.9~4.5V - LEVEL SHIFTER - R/TP 6P - SCG HONG KONG SAR LTD.	
6	ZD501	Diode, TVS	EDTY0008601	PSD05-LF 5V 6 13.5V 42A 500W SOD323 R/TP 2P 1 PROTEK DEVICES INC.	
6	C2002, C2029	Capacitor, Ceramic, Chip	ECCH0032801	GRM033R60J224M 0.00000022F 20% 6.3V X5R - 55TO+85C 0603 R/TP 0.3MM MURATA MANUFACTURING CO., LTD.	
6	C1092	Inductor, Multilayer, Chip	ELCH0001035	HK1005 4N7S-T 4.7NH 0.3NH - 300mA 0.21OHM 4GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP TAIYO YUDEN CO., LTD	
6	L1025, L605, L606	Inductor, Multilayer, Chip	ELCH0001411	LL1005-FHL1N2S 1.2NH 0.3NH - 400mA 0.1OHM 16GHZ 7 SHIELD NONE 1.0X0.5X0.5MM R/TP TOKO, INC.	
6	R516	Resistor, Chip	ERHZ0000206	MCR01MZP5F10R0 10OHM 1% 1/16W 1005 R/TP - ROHM.	
6	R304	Resistor, Chip	ERHZ0000438	MCR01MZP5J203 20KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	R1021	Resistor, Chip	ERHY0009501	MCR006YZPJ000 0OHM 5% 1/20W 0603 R/TP - ROHM.	
6	R2000	Resistor, Chip	ERHY0042402	RC0201JR-0715KL 15KOHM 5% 1/20W 0603 R/TP - YAGEO CORPORATION	
6	VA600, VA601, VA605, VA608	Varistor	SEVY0010501	IECS0505C040FR 10V 0% 4E-12F 1.0x0.5x0.3 IEC61000-4-1 (ESD) level #4 SMD R/TP INNOCHIPS TECHNOLOGY	
6	R630, R631	Resistor, Chip	ERHZ0000295	MCR01MZP5F5102 51KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	FL700, FL701, FL702, FL703, FL704	Filter, EMI/Power	SFEY0010501	ICVE10184E150R101FR ESD/EMI 0HZ 15pF 0H SMD R/TP INNOCHIPS TECHNOLOGY	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	VA909, VA910, VA911, VA912	Varistor	SEVY0001001	EVL14S02050 14V 0% 50F 1.0*0.5*0.6 NONE SMD R/TP AMOTECH CO., LTD.	
6	L600, L601	Inductor, Multilayer, Chip	ELCH0003843	LQG15HSR12J02D 120NH 5% - 150mA 1.3OHM 600MHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	R1008, R1009	Resistor, Chip	ERHZ0000517	MCR01MZP5J910 910OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C1071, C2018, C427, C431, C517, C518, C531, C624	Capacitor, Ceramic, Chip	ECCH0007803	CL10A106MP8NNNC 10uF 20% 10V X5R -55TO+85C 1608 R/TP 0.8MM SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	R1013	Resistor, Chip	ERHZ0000212	MCR01MZP5F1202 12KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	C2033, C2044	Capacitor, Ceramic, Chip	ECCH0017301	CL03A105MQ3CSNH 0.000001F 20% 6.3V X5R - 45TO+85C 0603 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	C527, C540, C541, C565	Capacitor, Ceramic, Chip	ECCH0006201	C1608X5R0J475KT000N 4.7uF 10% 6.3V X5R - 55TO+85C 1608 R/TP - TDK CORPORATION	
6	R316	Resistor, Chip	ERHY0000104	MCR01MZP5F49R9 49.9OHM 1% 1/16W 1005 R/TP - ROHM.	
6	VA701, VA702	Varistor	SEVY0004301	ICVL0518100Y500FR 18V 0% 10F 1.0*0.5*0.55 NONE SMD R/TP INNOCHIPS TECHNOLOGY	
6	L1010, L1032	Inductor, Multilayer, Chip	ELCH0004705	1005GC2T8N2JLF 8.2NH 5% - 250mA 0.37OHM 2.8GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	C307, C309, C320	Capacitor, Ceramic, Chip	ECCH0000137	C1005X7R1H331KT000F 0.33nF 10% 50V X7R - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	C2034, C2040, C2041, C2043	Capacitor, Ceramic, Chip	ECCH0009514	MCH032A(AN)100DK 10pF 0.5PF 25V X7R - 55TO+125C 0603 R/TP - ROHM.	
6	U1003	IC, RF Amplifier	SMZY0025501	RF2815 3.3*2.1*1.0, FILTER+GPS LNA+FILTER MODULE, GPS, RF MICRO DEVICES INC	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	VA703, VA704	Varistor	SEVY0008901	ICVS0318150FR 18V 0% 15pF 0.6*0.3*0.33 NONE SMD R/TP INNOCHIPS TECHNOLOGY	
6	C321, C322	Capacitor, Ceramic, Chip	ECCH0010501	GRM1555C1H7R5D 7.5pF C0G TYPE(No X7R) MURATA MANUFACTURING CO., LTD.	
6	D601	Diode, TVS	EAH61435301	PLW0501D 5V 6V @ 1mA(min.) 9.8V 10A 150W DFN R/TP 2P 1 PROTEK DEVICES INC.	
6	C619, C620, C711	Capacitor, Ceramic, Chip	ECZH0004402	CL05F104ZO5NNNC 0.1uF -20TO+80% 16V Y5V - 30TO+85C 1005 R/TP - SAMSUNG ELECTRO- MECHANICS CO., LTD.	
6	C305	Capacitor, TA, Conformal	ECTH0001903	F980J226MMA 22 uF, 6.3V, M, L_ESR, 1608, R/TP NICHICON CORPORATION, EAST JAPAN SALES OFFICE	
6	L1030	Inductor, Multilayer, Chip	ELCH0001430	LL1005-FHLR10J 100NH 5% - 150mA 2.2OHM 1.03GHZ 10 SHIELD NONE 1.0X0.5X0.5MM R/TP TOKO, INC.	
6	Q601	TR, Bipolar	EBK61592201	LTC014EEBFS8 NPN 0V 0V 50V 100mA 0A 35 150mW EMT3 R/TP 3P ROHM Semiconductor KOREA CORPORATION	
6	FL1001	Filter, Saw, Dual	SFSB0001902	SAWEN1G84CN0F00 1842.5MHz, 1960MHz 1.8*1.4*0.5 SMD R/TP 10P MURATA MANUFACTURING CO., LTD.	
6	R312, R627, R633	Resistor, Chip	ERHZ0000204	MCR01MZF5F1003 100KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	C2035	Capacitor, Ceramic, Chip	ECCH0032901	GRM0335C1H2R7C 2.7pF 0.25PF 50V C0G - 55TO+125C 0603 R/TP 0.3MM MURATA MANUFACTURING CO., LTD.	
6	R1011, R1012	Resistor, Chip	ERHZ0003801	MCR01MZF5J5R1 5.1OHM 5% 1/16W 1005 R/TP - ROHM.	
6	L602	Inductor, Multilayer, Chip	ELCH0010402	LK1005 R27K-T 270NH 10% - 25mA 0.91OHM 120MHZ 10 SHIELD NONE 1.0X0.5X0.5MM R/TP TAIYO YUDEN CO., LTD	
6	C2026, C2027	Capacitor, Ceramic, Chip	ECZH0025917	GRM0335C1E470J 47pF 5% 25V NP0 -55TO+125C 0603 R/TP - MURATA MANUFACTURING CO., LTD.	
6	R904, R905	Resistor, Chip	ERHZ0000465	MCR01MZF5J332 3.3KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	U401	IC, MCP, NAND	EAN62113301	MT29C4G48MAZAPAKD-5 IT NAND/4G SDRAM/2G 1.7VTO1.95V 13.0*10.5*1.1 R/TP 137P NAND+DDR SDRAM TFBGA 4Gb NAND(34n, 1die, 2KB, x16, SLC, 4bit)+2Gb DDR400(50n, 1die, x32) MICRON SEMICONDUCTOR ASIA PTE LTD.	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	C1077	Inductor, Multilayer, Chip	ELCH0004712	1005GC2T3N9SLF 3.9NH 0.3NH - 300mA 0.22OHM 4GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	R309	Resistor, Chip	ERHY0024201	RC1005F6041CS 6.04KOHM 1% 1/16W 1005 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	C1018, C602, C610, C611	Capacitor, Ceramic, Chip	ECCH0000120	MCH155A390J 39pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	R2002, R700	Resistor, Chip	ERHY0009506	MCR006YZPJ104 100KOHM 5% 1/20W 0603 R/TP - ROHM.	
6	FL1003	Filter, Saw	SFSY0037501	SAFE897MAM0F00 897.5MHz 1.4*1.1*0.6 SMD R/TP 5P MURATA MANUFACTURING CO., LTD.	
6	L1036, R1001	Capacitor, Ceramic, Chip	ECZH0001002	C1005CH1H0R5BT000F 0.5pF 0.1PF 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	C2037	Capacitor, Ceramic, Chip	ECCH0009208	GRM0335C1ER50C 0.5pF 0.25PF 25V X7R - 55TO+125C 0603 R/TP - MURATA MANUFACTURING CO., LTD.	
6	L2002	Inductor, Wire Wound, Chip	ELCP0012101	CIG21L3R3MNE 0H 20% - 800mA - - 0.22OHM - - SHIELD 2X1.25X1MM NONE - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	R1010	Resistor, Chip	ERHZ0000402	MCR01MZP5J100 10OHM 5% 1/16W 1005 R/TP - ROHM.	
6	R1022, R2003	PCB ASSY, MAIN, PAD SHORT	SAFP0000401	LG-LU3000 LGTBK, MAIN, A,	
6	U602	IC, Audio Sub System	EUSY0420001	TPA2055D3 1.6~5.5V 0W WLCSP R/TP 20P - TEXAS INSTRUMENTS INCO.	
6	D501	Diode, Switching	EDSY0011901	SDB310Q 340mV 30V 200mA 1A 0SEC 150mW EMD2 R/TP 2P 1 AUK CORP	
6	ZD502, ZD800	Diode, TVS	EDTY0010101	ESD9B5.0ST5G ESD9B5.0ST5G, SOD-923, 5 V, 300 mW, R/TP, 15pF SCG HONG KONG SAR LTD.	
6	FB2004	Filter, Bead	EAM62070901	BLM03AX601SN1D 600 ohm 0.6X0.3X0.3 25% 0.85 ohm 0.25A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	
6	R314	Resistor, Chip	ERHZ0000236	MCR01MZP5F2001 2KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	U600	IC, Acceleration Sensor	EBD61025601	BMA250 1.65 to 3.6V 10Bit 2X2 Accelerometer Sensor - LGA R/TP 12P - BOSCH SENSORTTEC GMBH	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	R846	Resistor, Chip	ERHZ0000445	MCR01MZP5J224 220KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	L1017, L1019	Inductor, Multilayer, Chip	ELCH0004707	1005GC2T1N5SLF 1.5NH 0.3NH - 300mA 0.13OHM 7GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	C1023, C1025, C2028	Capacitor, Ceramic, Chip	ECCH0009216	GRM0335C1E220J 22pF 5% 25V X7R -55TO+125C 0603 R/TP - MURATA MANUFACTURING CO., LTD.	
6	L2008	Inductor, Multilayer, Chip	ELCH0001057	1005GC2T3N9SLF 3.9NH 0.3NH - 300mA 0.22OHM 4GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	C1016, C1021	Capacitor, Ceramic, Chip	ECZH0000839	C1005C0G1H4R7CT000F 4.7pF 0.25PF 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	J800	Card Socket	ENSY0024302	KP09NC-6S-2.54SF SIM 6P ANGLE SMD R/TP Stroke : 11.25mm HIROSE KOREA CO., LTD	
6	R1024, R1026	Resistor, Chip	ERHY0009503	MCR006YZPJ101 100OHM 5% 1/20W 0603 R/TP - ROHM.	
6	FL501	Filter, EMI/Power	SFEY0016301	ICMEF112P900M COMMON MODE NOISE FILTER 0HZ 0F 0H SMD R/TP INNOCHIPS TECHNOLOGY	
6	U800	IC, Reset	EAN62009101	FT7521L6X 2~5V 0~5V 5mW MICROPAC R/TP 6P 1-Input Reset IC, Delay 7.5s FAIRCHILD SEMICONDUCTOR HONG KONG LTD.	
6	L1040	Inductor, Multilayer, Chip	ELCH0001056	1005GC2T2N7SLF 2.7NH 0.3NH - 300mA 0.17OHM 5.5GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	R502	Resistor, Chip	ERHZ0000488	MCR01MZP5J4R7 4.7OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C1094, L1033	Capacitor, Ceramic, Chip	ECCH0000701	C1005C0G1H1R2CT000F 1.2pF 0.25PF 50V NP0 - 55TO+125C 1005 R/TP - TDK CORPORATION	
6	L2000	Inductor, Multilayer, Chip	ELCH0004124	LLV0603-FH47NJ 47NH 5% - 50mA 2.7OHM 1.1GHZ 6 SHIELD NONE 0.6X0.3X0.3MM R/TP TOKO, INC.	
6	L500	Inductor, Wire Wound, Chip	ELCP0008017	CIG21L2R2MNE 2.2UH 30% - 1.3A 0.08OHM - - SHIELD 2X1.25X1MM NONE - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	C1004	Capacitor, Ceramic, Chip	ECCH0000196	MCH155A0R75C 0.75pF 0.25PF 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	BAT500	Capacitor Assembly	SMZY0023501	PAS311HR-VG1 3.8 Backup Capacitor 0.03F, Module Assembly, KOREA TAIYO YUDEN.CO., LTD.	
6	U1001	Module, Tx Module	SMRH0006201	SKY77544 0DBM 0DB 0% 0A 0A 0DB 0DBM 0DBM 0P 0.0x0.0x0.0MM - SKYWORKS SOLUTIONS INC.	
6	L1038	Inductor, Multilayer, Chip	ELCH0003838	LQG15HS8N2J02D 8.2NH 5% - 300mA 0.24OHM 3.7GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	L2006	Inductor, Multilayer, Chip	ELCH0004709	1005GC2T3N3SLF 3.3NH 0.3NH - 300mA 0.19OHM 4.5GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	J600	Jack, Phone	EAG62831701	KJA-PH-3-0176 4P 4P ANGLE R/TP 3.5M BLACK 5P 6.5x12.6x4.0t, Short Detect, All DIP type KSD CO., LTD	
6	R1019	Resistor, Chip	ERHZ0000348	MCR01MZP5F12R0 12OHM 1% 1/16W 1005 R/TP - ROHM.	
6	FL1004	Filter, Duplexer, IMT	SDMY0002801	B7953 942500000 925 to 960 897500000 880 to 915 3.8 2.9 2.5x2.0x0.94 DUAL SMD R/TP - EPCOS PTE LTD.	
6	L504	Inductor, Wire Wound, Chip	ELCP0008016	MIPS2520D100 10UH 30% - 200mA 0.28OHM - - SHIELD 2.5X2X1MM NONE - FDK CORPORATION.	
6	L1015	Inductor, Multilayer, Chip	ELCH0001408	LL1005-FHL6N8J 6.8NH 5% - 300mA 0.23OHM 5.6GHZ 9 SHIELD NONE 1.0X0.5X0.5MM R/TP TOKO, INC.	
6	R707	Resistor, Chip	EBC62035901	RC0201FR-071RL 1OHM 1% 1/20W 0603 R/TP - YAGEO CORPORATION	
6	U300	IC, MCP, NOR	EUSY0216301	NC7SV00P5X_NL SC70 , 5 PIN, R/TP , Single 2-Input NAND Gate FAIRCHILD SEMICONDUCTOR	
6	C2017	Capacitor, Ceramic, Chip	ECCH0042005	GRM0335C1E8R2BD01D 8.2 pF, 25V, B, C0G, TC, 0603, R/TP, 0.0000000000082, 0.1PF, 25V, C0G, - 55TO+125C, 0603, R/TP, 0.3 mm MURATA MANUFACTURING CO., LTD.	
6	CN702	Connector, BtoB	ENBY0034201	GB042-24S-H10-E3000 24P 0.40MM STRAIGHT SOCKET SMD R/TP 1M - LS Mtron Ltd.	
6	U2001	Filter, Separator, FEM	SMZY0028001	RF5501 - - - RF5501, QFN, 12p, 2.0*2.0*0.5, SP3T+LNA for BT/WiFi with BCM4325/29/30 RF MICRO DEVICES INC	
6	X300	Oscillator, VCTCXO	EAW61543601	X1G003581002700 19.2MHZ 2PPM 2.8V 2.5x2.0x0.8MM ; SMD R/TP EPSON TOYOCOM CORP	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	ZD500	Diode, TVS	EDTY0008602	PSD12-LF 12V 13.3 25.9V 21A 500W SOD323 R/TP 2P 1 PROTEK DEVICES INC.	
6	L1035	Inductor, Multilayer, Chip	ELCH0003828	LQG15HS2N4S02D 2.4NH 0.3NH - 300mA 0.15OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	FL1000	Filter, Saw, Dual	SFSB0001802	SAWEN881MCN0F00 881.5MHz, 1960MHz 1.8*1.4*0.5 SMD R/TP 10P MURATA MANUFACTURING CO., LTD.	
6	U502	IC, LDO Voltage Regulator	EUSY0407201	BU33TD4WNVX SSON004, 4, R/TP, 3.3V 150mA Single LDO, IC, LDO Voltage RegulatorIC, LDO Voltage Regulator ROHM.	
6	S800	Socket, Card	ENSY0023601	SCHA4B0402 Micro-SD 8P ANGLE SMD R/TP - ALPS ELECTRIC KOREA CO., LTD.	
6	R301	Resistor, Chip	ERHY0000290	MCR01MZP5J304 300KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	U504	IC, Over Voltage Protection	EUSY0407301	RT9718L WDFN8, 8, R/TP, Programmable OVP, IC, ChargerIC, Charger - - WDFN R/TP 8P - RICHTEK TECHNOLOGY CORP.	
6	C1099	Capacitor, Ceramic, Chip	ECCH0000113	MCH155A180J 18pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	U302	IC, Flip Flop	EUSY0408201	74LVC1G79GM 1.65~5.5V - D FLIP-FLOP SOT R/TP 6P - STC CORP.	
6	C2032	Capacitor, Ceramic, Chip	ECZH0001216	C1005X5R1A224KT000E 220nF 10% 10V X5R - 55TO+85C 1005 R/TP - TDK KOREA COOPERATION	
6	X500	Crystal	EXXY0024301	CM315(12.5PF) 32.768KHZ 20PPM 12.5PF 32*15 SMD R/TP CITIZEN DISPLAYS CO., LTD.	
6	U900	IC, Bus Controller	EUSY0300008	PP2106M3 1.8/2.6V 1mA - MLF R/TP 28P - G5 CORPORATION	
6	C2013	Capacitor, Ceramic, Chip	ECCH0000185	GRM1555C1H5R6C 5.6pF 0.25PF 50V NP0 - 55TO+125C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
6	R518	Resistor, Chip	ERHZ0000318	MCR01MZP5F8062 80.6KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	Q600	FET	EQFP0010601	RZF013P01 TUMT3, .8 W, -12 V, 1.3 A, R/TP, P-CHANNEL, MOSFET, -12V, 10V, 1.3A, 260m OHM, 0.8W, UMT3, R/TP, 3P ROHM.	
6	CN500	Connector, Terminal Block	ENZY0030401	KQ03LV-3R 3, 2.5 mm, STRAIGHT, Gold, Twin One board 5.4mm HIROSE KOREA CO., LTD	

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	PartNumber	Spec	Remark
6	L1003	Inductor, Multilayer, Chip	ELCH0001425	LL1005-FHL82NJ 82NH 5% - 150mA 1.9OHM 1.15GHZ 10 SHIELD NONE 1.0X0.5X0.5MM R/TP TOKO, INC.	
6	C404	Capacitor, Ceramic, Chip	ECCH0007805	CL05A106MQ5NUNC 10uF 20% 6.3V X5R -55TO+85C 1005 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	C306	Capacitor, Ceramic, Chip	ECCH0000147	MCH155CN222KK 2.2nF 10% 50V X7R -55TO+125C 1005 R/TP - ROHM.	
6	R515	Resistor, Chip	ERHZ0000439	MCR01MZP5J204 200KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	U701	IC, Sub PMIC	EUSY0378001	AAT2862 AAT2862, TQFN34, 24, R/TP, 3x4x0.8 Advanced Analogic Technologies HK Limited	
6	CN700	Connector, BtoB	ENBY0036001	GB042-40S-H10-E3000 40P 0.4MM STRAIGHT SOCKET SMD R/TP 1M ENGINEERING PLASTIC UL94V-0 AU OVER NI LS Mtron Ltd.	
6	FL1002	Filter, Saw	SFSY0028201	SAFE2G14FB0F00 - - - 2P MURATA MANUFACTURING CO., LTD.	
6	C558	Capacitor, Ceramic, Chip	ECZH0003503	GRM188R61E105K 1uF 10% 25V X5R -55TO+85C 1608 R/TP - MURATA MANUFACTURING CO., LTD.	
6	Q500	FET	EQFP0011301	SUM202MN DFN8, 2.5 W, -20 V, -5.3 A, R/TP, FET, TR, MOSFET, -20, 12, -5.3, 48m, 2.5, R/TP, 8P AUK CORP	
6	C2022	Capacitor, Ceramic, Chip	ECCH0000149	MCH155CN332KK 3.3nF 10% 50V X7R -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	C2036	Capacitor, Ceramic, Chip	ECCH0000112	MCH155C150J 15pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	

12. EXPLODED VIEW & REPLACEMENT PART LIST

12.3 Accessory

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	PartNumber	Spec	Remark
2	AFN053800	Manual Assembly, Operation	AFN75552503	LGC660.AITABK ZZ:Without Color LGC660 manual assy for ITA	
3	MBM062600	Card, Quick Reference	MBM63479001	COMPLEX LGC660.AITABK ZZ:Without Color Simple for LGC660 ITA	
3	MBM062601	Card, Quick Reference	MBM63479101	COMPLEX LGC660.AITABK ZZ:Without Color Safety Guide for LGC660 ITA	
3	MBM087200	Card, Warranty	MCDF0001105	PRINTING LGP920.AITAML ZZ:Without Color Warranty card for Italy	
2	EAB010200	Earphone, Stereo	SGEY0003744	EMB-LGE004MSKB 3mW 16OHM 115DB 85HZTO126HZ 1M BLACK 3.5 L TYPE STEREO 4POLE PLUG - CRESYN CO., LTD	
2	EAY060000	Adapters	SSAD0038301	100-240V, 5060 Hz, 5.1 V, 700 mA, CE, AC-DC Adaptor, 90Vac~264Vac, 5.1V, 700mA, 5060, WALL 2P, USB,	
2	EAC00	Rechargeable Battery, Lithium Ion	EAC61700001	BL-44JN-WWU-TOCAD PRISMATIC 3.7V 1.5AH 300mAH 61x44x4.4 65x44x4.8 BLACK Bar type, Top cap Screw joint 444461, 1500mAh, Bar Type (Top cap screw joint), WW, Up TOCAD DONGHWA	
2	EBX000000	Accessory, Data Cable	SGDY0016701	KCA-ET-8-0020 KCA-ET-8-0020 Micro USB, 1.2M KSD CO., LTD	