Features of AN430

1. Wave Type

- CELLULAR : G7W
- PCS: G7W
- AWS: G7W

2. Frequency Scope

Transmit Frequency (MHz)			Receive Frequency (MHz)			
CELLULAR	**PCS**	**AWS**	**CELLULAR**	**PCS**	**AWS**	**GPS**
824.82 ~ 848.19	1850~1910	1710~1755	869.82~893.19	1930~1990	2110~2155	1575.42

3. Rated Output Power : CELLULAR = 0.251W

PCS = 0.251W

AWS = 0.282W

4. Output Conversion Method : This is possible by correcting the key board channel.

5. Voltage and Current Value of Termination Part Amplifier (Catalogue included)

MODE	Part Name	Voltage	Current	Power
CELLULAR	ACPM7353	4.2V	700mA	0.251W
PCS		4.2V	700mA	0.251W
AWS	AWT6309R	4.2V	700mA	0.282W

6. Functions of Major Semi-Conductors

Classification	Function
QSC6075	Terminal operation control and digital signal processing Converts RF signal to baseband signal Converts baseband signal to RF signal
MCP (TYA00B001AMGF)	NAND (2Gbit) + DDR (1Gbit) Storing of terminal operation program

7. Frequency Stability

- CELLULAR : ± 0.5PPM
- PCS : ± 0.1PPM
- AWS : ± 0.1PPM

CDMA Mobile Subscriber Unit
AN430

SERVICE MANUAL

Triple BAND, Triple Mode
[PCS/Cellular/AWS/GPS]
CDMA MOBILE PHONE

Table of Contents

General Introduction

The AN430 phone has been designed to operate on the latest digital mobile communication technology, Code Division Multiple Access (CDMA). This CDMA digital technology has greatly enhanced voice clarity and can provide a variety of advanced features. Currently, CDMA mobile communication technology has been commercially used in Cellular and Personal Communication Service (PCS). The difference between them is the operating frequency spectrum. Cellular uses 800MHz and PCS uses 1.9GHz. The AN430 support GPS Mode, we usually call it tri-band phone. Also, AN430 works on Advanced Mobile Phone Service (S-GPS). We call it dual-mode phone. If one of the Cellular, PCS base stations is located nearby, Call fail rate of triple-mode phone is less than dual-mode phone or single-mode phone.

The CDMA technology adopts DSSS (Direct Sequence Spread Spectrum). This feature of DSSS enables the phone to keep communication from being crossed and to use one frequency channel by multiple users in the same specific area, resulting that it increases the capacity 10 times more compared with that in the analog mode currently used. Soft/Softer Handoff, Hard Handoff, and Dynamic RF power Control technologies are combined into this phone to reduce the call being interrupted in a middle of talking over the phone.

Cellular and PCS CDMA network consists of MSO (Mobile Switching Office), BSC (Base Station Controller), BTS (Base station Transmission System), and MS (Mobile Station). The following table lists some major CDMA Standards.

CDMA Standard	Designator	Description
Basic air interface	TIA/EIA/IS-95-A/B/C ANSI J-STD-008	Protocol between MS and BTS for Cellular & AMPS Protocol between MS and BTS for PCS
Network	TIA/EIA/IS-634 TIA/EIA/IS/651 TIA/EIA/IS-41-C TIA/EIA/IS-124	MAS-BS PCSC-RS Intersystem operations Nom-signaling data comm.
Service	TIA/EIA/IS-96-B TIA/EIA/IS-99 TIA/EIA/IS-637 TIA/EIA/IS-657	Speech CODEC Assign data and fax Short message service Packet data
Performance	TIA/EIA/IS-97 TIA/EIA/IS-98 ANSI J-STD-018 ANSI J-STD-019 TIA/EIA/IS-125	Cellular base station Cellular mobile station PCS personal station PCS base station Speech CODEC

* TSB –74: Protocol between an IS-95A system and ANSI J-STD-008

Chapter1. System Introduction

1. CDMA Abstract

The CDMA mobile communication system has a channel hand-off function that is used for collecting the information on the locations and movements of mobile telephones from the cell site by automatically controlling several cell site through the setup of data transmission routes, and then enabling one switching system to carry out the automatic remote adjustment. This is to maintain continuously the call state through the automatic location confirmation and automatic radio channel conversion when the busy subscriber moves from the service area of one cell site to that of another by using automatic location confirmation and automatic radio channel conversion functions. The call state can be maintained continuously by the information exchange between switching systems when the busy subscriber moves from one Cellular system area to the other Cellular system area.

In the Cellular system, the cell site is a small-sized low output type and utilizes a frequency allocation system that considers mutual interference, in an effort to enable the re-use of corresponding frequency from a cell site separated more than a certain distance.

Unlike the time division multiple access (TDMA) or frequency division multiple access (FDMA) used in the band limited environment, the Code Division Multiple Access (CDMA) system which is one of digital Cellular systems is a multi-access technology under the interference limited environment. It can process more number of subscribers compared to other systems (TDMA system has the processing capacity three times greater than the existing FDMA system whereas CDMA system, about 12~15 times of that of the existing system).

CDMA system can be explained as follows; TDMA or CDMA can be used to enable each person to talk alternately or provide a separate room for each person when two persons desire to talk with each other at the same time, whereas FDMA can be used to enable one person to talk in soprano, whereas the other in bass (one of the two talkers can carry out synchronization for hearing in case there is a bandpass filter function in the area of the hearer). Another available method is to make two persons to sing in different languages at the same time, space, and frequency when wishing to let the audience hear the singing without being confused. This is the characteristic of CDMA.

On the other hand, when employing the CDMA technology, each signal has a different pseudo-random binary sequence used to spread the spectrum of carrier. A great number of CDMA signals share the same frequency spectrum. In the perspective of frequency area or time area, several CDMA signals are overlapped. Among these types of signals, only desired signal energy is selected and received through the use of pre-determined binary sequence; desired signals can be separated, and then received with the correlators used for recovering the spectrum into its original state. At this time, the spectrums of other signals that have different codes are not recovered into its original state, and appears as the self-interference of the system.

2. Features and Advantages of CDMA Mobile Phone

2.1 Various Types of Diversities

When employing the narrow band modulation (30kHz band) that is the same as the analog FM modulation system used in the existing Cellular system, the multi-paths of radio waves create a serious fading. However, in the CDMA broadband modulation (1.25MHz band), three types of diversities (time, frequency, and space) are used to reduce serious fading problems generated from radio channels in order to obtain high-quality calls.
Time diversity can be obtained through the use of code interleaving and error correction code whereas frequency diversity can be obtained by spreading signal energy to wider frequency band. The fading related to normal frequency can affect the normal 200~300KHz among signal bands and accordingly, serious effect can be avoided.
Moreover, space diversity (also called path diversity) can be realized with the following three types of methods.
First, it can be obtained by the duplication of cell site receive antenna. Second, it can be obtained through the use of multi-signal processing device that receives a transmit signal having each different transmission delay time and then, combines them. Third, it can be obtained through the multiple cell site connection (Soft Handoff) that connects the mobile station with more than two cell sites at the same time.

2.2 Power Control

The CDMA system utilizes the forward (from a base station to mobile stations) and backward (from the mobile station to the base station) power control in order to increase the call processing capacity and obtain high-quality calls.
In case the originating signals of mobile stations are received by the cell site in the minimum call quality level (signal to interference) through the use of transmit power control on all the mobile stations, the system capacity can be maximized. If the signal power of mobile station is received too strong, the performance of that mobile station is improved. However, because of this, the interference on other mobile stations using the same channel is increased and accordingly, the call quality of other subscribers is reduced unless the maximum accommodation capacity is reduced.
In the CDMA system, forward power control, backward open loop power control, and closed loop power control methods are used. The forward power control is carried out in the cell site to reduce the transmit power on mobile stations less affected by the multi-path fading and shadow phenomenon and the interference of other cell sites when the mobile station is not engaged in the call or is relatively nearer to the corresponding cell site. This is also used to provide additional power to mobile stations having high call error rates, located in bad reception areas or far away from the cell site.
The backward open loop power control is carried out in a corresponding mobile station; the mobile station measures power received from the cell site and then, reversely increases/decreases transmit power in order to compensate channel changes caused by the forward link path loss and terrain characteristics in relation to the mobile station in the cell site. By doing so, all the mobile transmit signals received by the base station have same strength.
Moreover, the backward closed loop power control used by the mobile station is performed to control power using the commands issued out by the cell site. The cell site receives the signal of each corresponding mobile station and compares this with the pre-set threshold value and then, issues out power increase/decrease commands to the corresponding mobile station every 1.25msec (800 times per second). By doing so, the gain tolerance and the different radio propagation loss on the forward/backward link are complemented.

2.3 Voice Encoder and Variable Data Speed

The bi-directional voice service having variable data speed provides voice communication which employs voice encoder algorithm having power variable data rate between the base station and the mobile station. On the other hand, the transmit voice encoder performs voice sampling and then, creates encoded voice packets to be sent out to the receive voice encoder, whereas the receive voice encoder demodulates the received voice packets into voice samples.

One of the two voice encoders described in the above is selected for use depending on inputted automatic conditions and message/data; both of them utilize four-stage frames of 9600, 4800, 2400, and 1200 bits per second for Cellular and 14400,7200,3600,1800 bits per second for PCS, so PCS provide relatively better voice quality (almost twice better than the existing cellular system). In addition, this type of variable voice encoder utilizes adaptive threshold values on selecting required data rate. It is adjusted in accordance with the size of background noise and the data rate is increased to high rate only when the voice of caller is inputted.

Therefore, background noise is suppressed and high-quality voice transmission is possible under the environment experiencing serious noise. In addition, in case the caller does not talk, data transmission rate is reduced so that the transmission is carried out in low energy. This will reduce the interference on other CDMA signals and as a result, improve system performance (capacity increased by about two times).

2.4 Protecting Call Confidentiality

Voice privacy is provided in the CDMA system by means of the private long code mask used for PN spreading. Voice privacy can be applied on the traffic channels only. All calls are initiated using the public long code mask for PN spreading. The mobile station user may request voice privacy during call setup using the origination message or page response message, and during traffic channel operation using the long code transition request order.

The Transition to private long code mask will not be performed if authentication is not performed. To initiate a transition to the private or public long code mask, either the base station or the mobile station sends a long code transition request order on the traffic channel.

2.5 Soft Handoff

A handoff in which the mobile station commences communications with a new base station without interrupting communications with the old base station. Soft handoff can only be used between CDMA channels having identical frequency assignments.

2.6 Frequency Re-Use and Sector Segmentation

Unlike the existing analog Cellular system, the CDMA system can reuse the same frequency at the adjacent cell. there is no need to prepare a separate frequency plan. Total interference generated on mobile station signals received from the cell site is the sum of interference generated from other mobile stations in the same cell site and interference generated from the mobile station of adjacent cell site. That is, each mobile station signal generates interference in relation to the signals of all the other mobile stations.

Total interference from all the adjacent cell sites is the ratio of interference from all the cell sites versus total interference from other mobile stations in the same cell site (about 65%). In the case of directional cell site, one cell normally uses a 120° sector antenna in order to divide the sector into three. In this case, each antenna is used only for 1/3 of mobile stations in the cell site and accordingly, interference is reduced by 1/3 on the average and the capacity that can be supported by the entire system is increased by three times.

2.7 Soft Capacity

The subscriber capacity of the CDMA system is flexible depending on the relation between the number of users and service classes. For example, the system operator can increase the number of channels available for use during the busy hour despite the drop in call quality. This type of function requires 40% of normal call channels in the standby mode during the handoff, in an effort to avoid call disconnection resulting from the lack of channels.
In addition, in the CDMA system, services and service charges are classified further into different classes so that more transmit power can be allocated to high class service users for easier call set-up; they can also be given higher priority of using hand-off function than the general users.

3. Structure and Functions of Tri-band CDMA Mobile Phone

The hardware structure of CDMA mobile phone is made up of radio frequency (RF) part and logic part. The RF part is composed of Receiver part (Rx), Transmitter part (Tx) and Local part (LO). For the purpose of operating on tri-band, It is necessary dual Tx path, tri Rx path, dual PLL and switching system for band selection. The mobile phone antenna is connected with the frequency separator which divide antenna input/output signals between Cellular frequency band (824~894 MHz) and PCS frequency band (1850~1990MHz). Each separated path is linked with the Cellular duplexer and PCS duplexer. Duplexer carries out separating Rx band and Tx band. The Rx signals from the antenna are converted into intermediate frequency(IF) band by the frequency synthesizer and frequency down converter. And then, pass SAW filter which is a band pass filter for removing out image frequency. The IF output signals that have been filtered is converted into digital signals via Analog-to-Digital Converter (ADC). In front of the ADC, switching system is required to choose which band path should be open. The digital signals send to 5 correlators in each CDMA de-modulator. Of these, one is called a searcher whereas the remaining 4 are called data receivers (fingers). Digitalized IF signals include a great number of call signals that have been sent out by the adjacent cells. These signals are detected with pseudo-noise sequence (PN Sequence). Signal to interference ratio (C/I) on signals that match the desired PN sequence are increased through this type of correlation detection process, but other signals obtain processing gain by not increasing the ratio. The carrier wave of pilot channel from the cell site most adjacently located is demodulated in order to obtain the sequence of encoded data symbols. During the operation with one cell site, the searcher searches out multi-paths in accordance with terrain and building reflections. On three data receivers, the most powerful 3 paths are allocated for the parallel tracing and receiving. Fading resistance can be improved a great deal by obtaining the diversity combined output for de-modulation. Moreover, the searcher can be used to determine the most powerful path from the cell sites even during the soft handoff between the two cell sites. Moreover, 3 data receivers are allocated in order to carry out the de-modulation of these paths. Output data that has been demodulated changes the data string in the combined data row as in the case of original signals(deinterleaving), and then, are demodulated by the forward error correction decoder which uses the Viterbi algorithm.

Mobile station user information send out from the mobile station to the cell site pass through the digital voice encoder via a mike. Then, they are encoded and forward errors are corrected through the use of convolution encoder. Then, the order of code rows is changed in accordance with a certain regulation in order to remove any errors in the interleaver. Symbols made through the above process are spread after being loaded onto PN carrier waves. At this time, PN sequence is selected by each address designated in each call.

Signals that have been code spread as above are digital modulated (QPSK) and then, power controlled at the automatic gain control amplifier (AGC Amp). Then, they are converted into RF band by the frequency synthesizer synchronizing these signals to proper output frequencies.

Transmit signals obtained pass through the duplexer filter and then, are sent out to the cell site via the antenna.

4. Specification

4.1 General Specification

4.1.1 Transmit/Receive Frequency Interval :

1) CELLULAR : 45 MHz
2) PCS : 80 MHz
3) AWS : 400MHz

4.1.2 Number of Channels (Channel Bandwidth)

1) CELLULAR : 20 Channels
2) PCS : 48 Channels
3) AWS : 36 Channels

4.1.3 Operating Voltage : DC 3.2~4.2V

4.1.4 Battery Power Consumption : DC 3.7V

	SLEEP	IDLE	MAX POWER
CELLULAR	1.5 mA	150mA	700 mA (24.0 dBm)
PCS	1.5 mA	150mA	700 mA (24.0 dBm)
AWS	1.5 mA	150mA	700 mA (24.5 dBm)

4.1.5 Operating Temperature : -20°C ~ +50°C

4.1.6 Frequency Stability

1) CELLURAR : ± 0.5PPM
2) PCS : ± 0.1PPM
3) AWS : ± 0.1PPM:

4.1.7 Antenna : Internal Antenna, 50

4.1.8 Size and Weight

1) Size : 103x48x15.9mm
2) Weight :105.4g

4.1.9 Channel Spacing

1) CELLULAR : 1.25MHz
2) PCS : 1.25 MHz
3) AWS : 1.25MHz

4.1.10 Battery Type, Capacity and Operating Time. Unit = Hours : Minutes

		Standard (900mAh)
Standby Time	**PCS (Slot Cycle 2)**	About 170 Hrs (SCI=2)
	AWS (Slot Cycle 2)	About 170 Hrs (SCI=2)
	DCN (Slot Cycle 2)	About 170 Hrs (SCI=2)
Talk Time	**PCS (Slot Cycle 2)**	180 Min .(typical duplexer,10dBm output)
	AWS (Slot Cycle 2	180 Min .(typical duplexer,10dBm output)
	DCN (Slot Cycle 2)	180 Min .(typical duplexer,10dBm output)

4.2 Receive Specification

4.2.1 Frequency Range

1) CELLULAR : 869.820 MHz ~ 893.190 MHz
2) PCS : 1930 MHz ~ 1990 MHz
3) AWS : 2110 MHz ~ 2115 MHz
4) GPS : 1575.42 MHz

4.2.2 Local Oscillating Frequency Range :

1) CELLULAR : 3404.0 MHz ~ 3576.0 MHz
2) PCS : 3860.0 MHz ~ 4000.0 MHz
3) AWS : 4220.0 MHZ ~ 4310.0 MHz
4) GPS : 3150.84 MHz

4.2.3 Sensitivity

1) CELLULAR : -104dBm (C/N 12dB or more)
2) PCS : -104dBm (C/N 12dB or more)
3) PCS : -104dBm (C/N 12dB or more)
4) GPS : -148.5dBm

4.2.4 Selectivity

1) CELLULAR : 3dB C/N Degration (With Fch± 1.25 kHz : -30dBm)
2) PCS : 3dB C/N Degration (With Fch± 1.25 kHz : -30dBm)
3) AWS : 3dB C/N Degration (With Fch± 1.25 kHz : -30dBm)

4.2.5 Interference Rejection

1) Single Tone : -30dBm at 900 kHz (CELLULAR), -30dBm at 1.25MHz (PCS/AWS)
2) Two Tone : -43dBm at 900 kHz & 1700kHz (CELLULAR), -43dBm at 1.25 MHz & 2.05 MHz (PCS/AWS)

4.2.6 Spurious Wave Suppression : Maximum of -80dB

4.2.7 CDMA Input Signal Range

Dynamic area of more than -104~ -25 dB: 79dB at the 1.23MHz band.

4.3 Transmit Specification

4.3.1 Frequency Range

1) CELLULAR : 824.820MHz ~ 848.190MHz
2) PCS : 1850 MHz ~ 1910 MHz
3) AWS : 1710 MHz ~1755 MHz

4.3.2 Output Power

1) CELLULAR : 0251W
2) PCS: 0.251W
3) AWS : 0.282W

4.3.3 CDMA TX Frequency Deviation :

1) CELLULAR: ±300Hz or less

2) PCS: ± 150Hz

3) AWS : ± 150Hz

4.3.4 CDMA TX Conducted Spurious Emissions

1) CELLULAR: 900kHz : - 42 dBc/30kHz below

1.98MHz : - 54 dBc/30kHz below

2) PCS/AWS : 1.25MHz: - 42 dBc/30kHz below

1.98MHz : - 50 dBc/30kHz below

4.3.5 CDMA Minimum TX Power Control

1) CELLULAR: - 50dBm below

2) PCS: -50dBm below

3) AWS : -50dBm below

4.4 MS (Mobile Station) Transmitter Frequency

4.4.1 CELLULAR mode

Ch #	Center Freq. (MHz)	Ch #	Center Freq. (MHz)
1011	824.640	404	837.120
29	825.870	445	838.350
70	827.100	486	839.580
111	828.330	527	840.810
152	829.560	568	842.040
193	830.790	609	843.270
234	832.020	650	844.500
275	833.250	697	845.910
316	834.480	738	847.140
363	835.890	779	848.370

4.4.2 PCS mode

Ch #	Center Freq (MHz)	Ch #	Center Freq (MHz)	Ch #	Center Freq (MHz)
25	1851.25	425	1871.25	825	1891.25
50	1852.50	450	1872.50	850	1892.50
75	1853.75	475	1873.75	875	1893.75
100	1855.00	500	1875.00	900	1895.00
125	1856.25	525	1876.25	925	1896.25
150	1857.50	550	1877.50	950	1897.50
175	1858.75	575	1878.75	975	1898.75

200	1860.00	600	1880.00	1000	1900.00
225	1861.25	625	1881.25	1025	1901.25
250	1862.50	650	1882.50	1050	1902.50
275	1863.75	675	1883.75	1075	1903.75
300	1865.00	700	1885.00	1100	1905.00
325	1866.25	725	1886.25	1125	1906.25
350	1867.50	750	1887.50	1150	1907.50
375	1868.75	775	1888.75	1175	1908.75

4.4.3 AWS mode

Ch #	Center Freq (MHz)	Ch #	Center Freq (MHz)	Ch #	Center Freq (MHz)
25	1711.25	325	1726.25	625	1741.25
50	1712.50	350	1727.50	650	1742.50
75	1713.75	375	1728.75	675	1743.75
100	1715.00	400	1730.00	700	1745.00
125	1716.25	425	1731.25	725	1746.25
150	1717.50	450	1732.50	750	1747.50
175	1718.75	475	1733.75	775	1748.75
200	1720.00	500	1735.00	800	1750.00
225	1721.25	525	1736.25	825	1751.25
250	1722.50	550	1737.50	850	1752.50
275	1723.75	575	1738.75	875	1753.75
300	1725.00	600	1740.00		

4.5 MS (Mobile Station) Receiver Frequency

4.5.1 CELLULAR mode

Ch. #	Center Freq. (MHz)	Ch. #	Center Freq. (MHz)
1011	869.640	404	882.120
29	870.870	445	883.350
70	872.100	486	884.580
111	873.330	527	885.810
152	874.560	568	887.040
193	875.790	609	888.270
234	877.020	650	889.500
275	878.250	697	890.910
316	879.480	738	892.140
363	880.890	779	893.370

4.5.2 PCS mode

Ch #	Center Freq (MHz)	Ch #	Center Freq (MHz)	Ch #	Center Freq (MHz)
25	1931.25	425	1951.25	825	1971.25
50	1932.50	450	1952.50	850	1972.50
75	1933.75	475	1953.75	875	1973.75
100	1935.00	500	1955.00	900	1975.00
125	1936.25	525	1956.25	925	1976.25
150	1937.50	550	1957.50	950	1977.50
175	1938.75	575	1958.75	975	1978.75
200	1940.00	600	1960.00	1000	1980.00
225	1941.25	625	1961.25	1025	1981.25
250	1942.50	650	1962.50	1050	1982.50
275	1943.75	675	1963.75	1075	1983.75
300	1945.00	700	1965.00	1100	1985.00
325	1946.25	725	1966.25	1125	1986.25
350	1947.50	750	1967.50	1150	1987.50
375	1948.75	775	1968.75	1175	1988.75

4.5.3 AWS Mode

Ch #	**Center Freq (MHz)**	**Ch #**	**Center Freq (MHz)**	**Ch #**	**Center Freq (MHz)**
25	2111.25	325	2126.25	625	2141.25
50	2112.50	350	2127.50	650	2142.50
75	2113.75	375	2128.75	675	2143.75
100	2115.00	400	2130.00	700	2145.00
125	2116.25	425	2131.25	725	2146.25
150	2117.50	450	2132.50	750	2147.50
175	2118.75	475	2133.75	775	2148.75
200	2120.00	500	2135.00	800	2150.00
225	2121.25	525	2136.25	825	2151.25
250	2122.50	550	2137.50	850	2152.50
275	2123.75	575	2138.75	875	2153.75
300	2125.00	600	2140.00		

4.5.4 GPS mode : 1575.42 MHz

4.5.5 Bluetooth mode : 2400 MHz ~ 2483.5 MHz

4.6 AC Adaptor : See Appendix

4.7 Cigar Lighter Charger : See Appendix

4.8 Hand-Free Kit : See Appendix

5. Installation

5.1 Installing a Battery Pack

1) The Battery pack is keyed so it can only fit one way. Align the groove in the battery pack with the rail on the back of the phone until the battery pack rests flush with the back of the phone.
2) Slide the battery pack forward until you hear a “click”, which locks the battery in place.

5.2 For Adapter Use

1) Plug the adapter into a wall outlet. The adapter can be operated from a 110~220V source. When AC power is connected to the adapter.
2) Insert the adapter IO plug into the phone with the installed battery pack.
.

5.3 For Mobile Mount

5.3.1 Installation Position

In order to reduce echo sound when using the Hands-Free Kit, make sure that the speaker and microphone are not facing each other and keep microphone a generous distance from the speaker.

5.3.2 Cradle Installation

Choose an appropriate flat surface where the unit will not interface with driver’s movement or passenger’s comfort. The driver/user should be able to access the phone with ease. Using the four self-tapping screws provided, mount the supplied bracket on the selected area. Then with the four machine screws provided, mount the counterpart on the reverse side of the reverse side of the cradle. Secure the two brackets firmly together by using the two bracket joint screws provide. The distance between the cradle and the interface box must not exceed the length of the main cable.

5.3.3 Interface Box

Choose an appropriate flat surface (somewhere under the dash on the passenger side is preferred) and mount the IB bracket with the four self-tapping screws provided. Clip the IB into the IB bracket.

5.3.4. Microphone Installation

Install the microphone either by clipping I onto the sunvisor (driver’s side) or by attaching it to door post (driver’s side), using a velcro adhesive tape (not included).

5.3.5 Cable Connections

5.3.5.1 Power and Ignition Cables

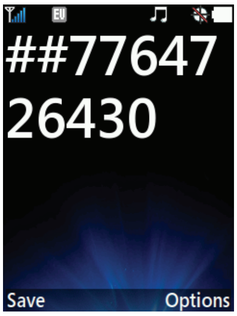
Connect the red wire to the car battery positive terminal and the black wire to the car ground. Connect the green wire to the car ignition sensor terminal. (In order to operate HFK please make sure to connect green wire to ignition sensor terminal.) Connect the kit's power cable connector to the interface box power receptacle.

5.3.5.2 Antenna Cable Connection

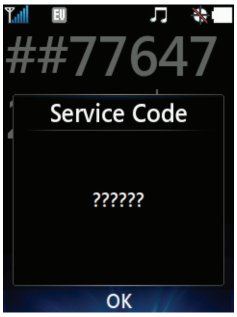
Connect the antenna coupler cable connector from the cradle to the external antenna connector. (Antenna is not included.)

CHAPTER 2. NAM Input Method (Inputting of telephone numbers included)

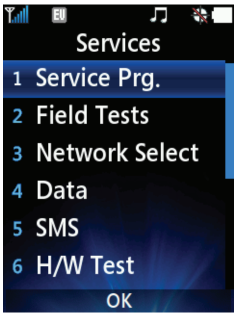
1.Press ##7764726430 and select SEND.



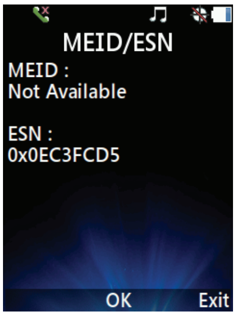
2. Enter six digit numbers as service code



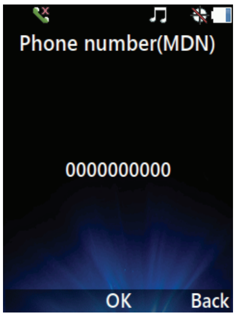
3. Select "Service Prg" and press OK.



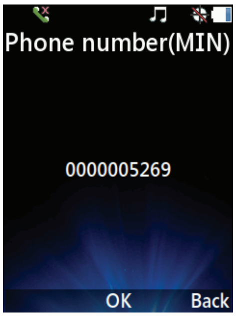
4. Check MEID/ESN and press OK.



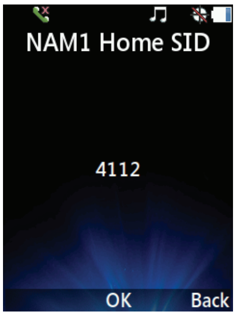
5. Input the MDN (phone number) and press OK to store the MDN.



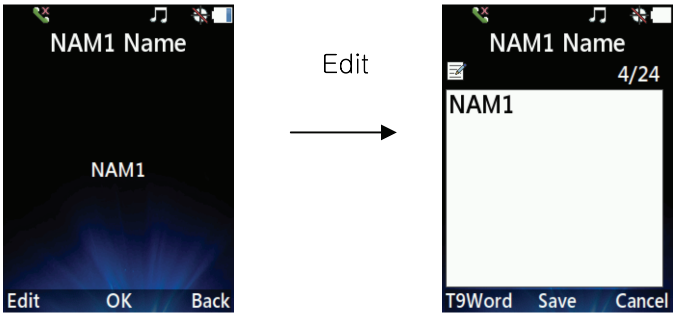
6. Input the MIN and press OK



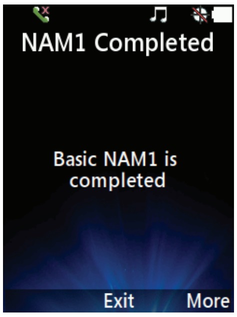
7. Input Home SID and press OK



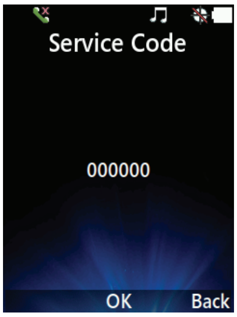
8. Select Edit to change NAM1 Name. And input NAM1 Name and press Save. Choose OK for next item.



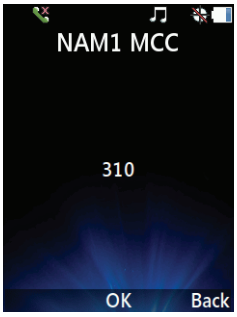
9. NAM1 is completed. Select More if you want to check more items.



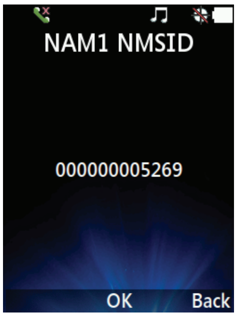
10. Check Service Code and press OK.



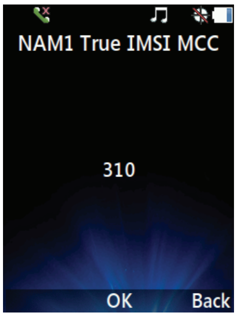
11. Input MCC and press OK



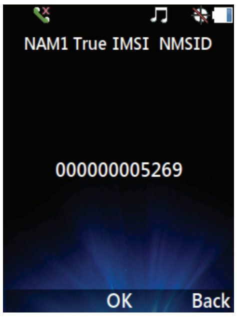
12. Input NMSID and press OK.



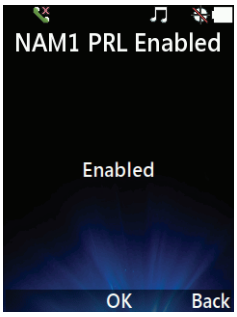
13. Input True IMSI MCC and press OK.



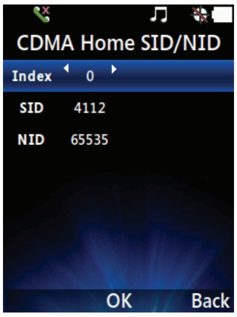
14. Input True IMSI NMSID and press OK.



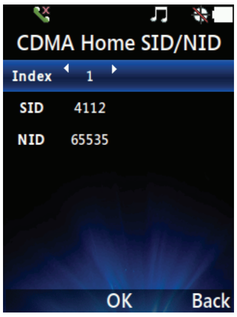
15. Check PRL Enabled and press OK



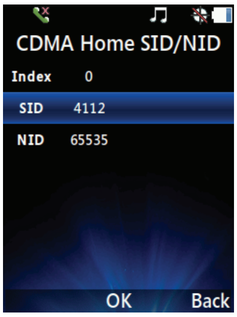
16. Select a index of 0~19 using left or right navigation key.



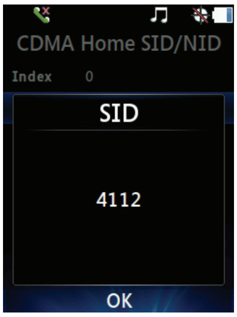
Right key



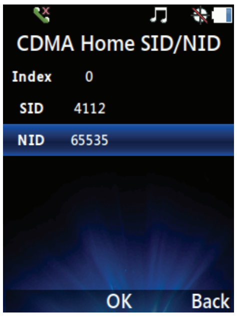
16.1 Select SID and press OK. And input SID and press OK.



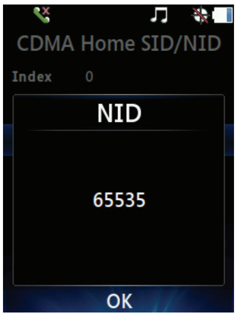
OK key



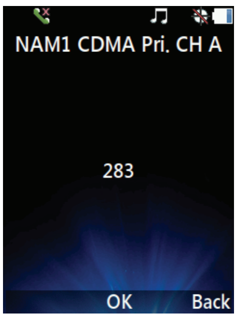
16.2 Select NID and press OK. And input NID and press OK.



OK key

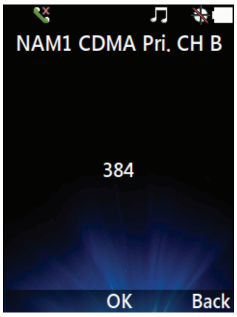


17. Input CDMA primary Channel A and press OK.

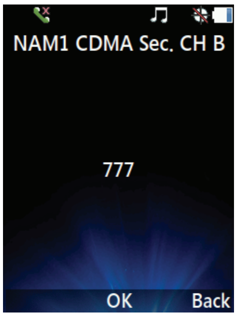


18. Input CDMA Secondary Channel A and press OK.

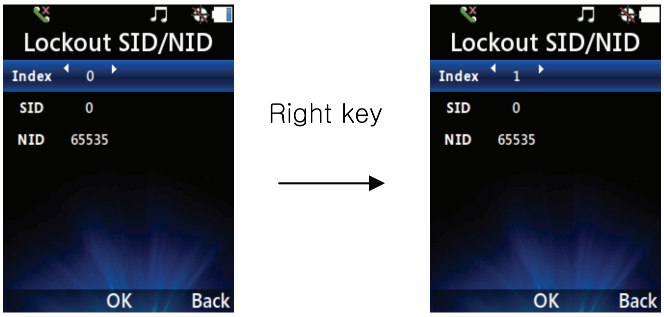
19. Input CDMA Primary Channel B and press OK.



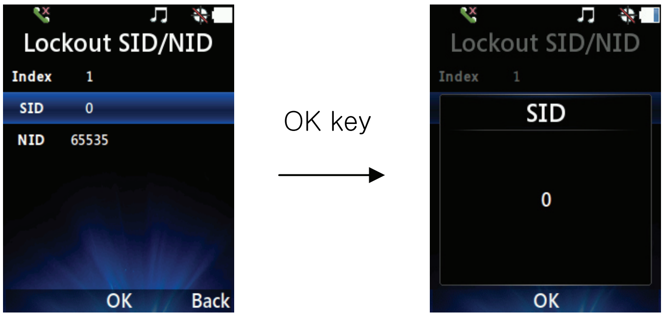
20. Input CDMA Secondary Channel B and press OK.



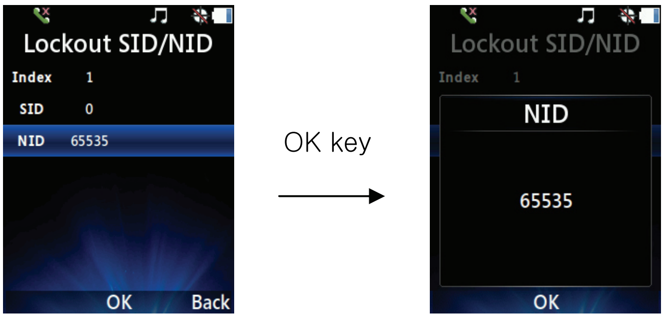
21. Select a index of 0~9 using left or right navigation key.



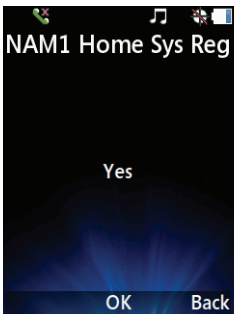
21.1 Select SID and press OK. And input SID and press OK.



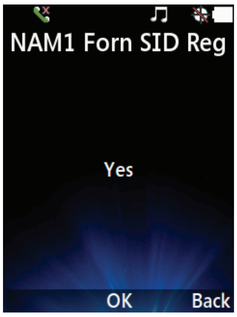
21.2 Select NID and press OK. And input NID and press OK.



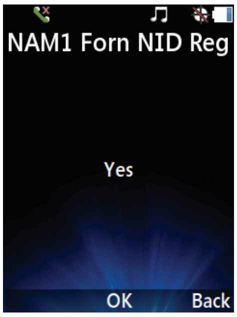
22. Choose Yes or No as NAM1 Home Sys Reg using Navigation key.
And press OK.



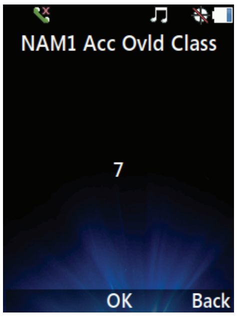
23. Choose Yes or No as NAM1 Foreign SID Reg using Navigation key.
And press OK.



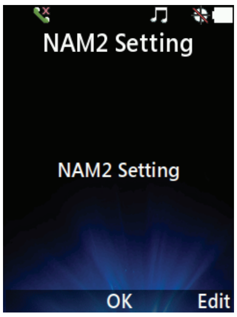
24. Choose Yes or No as NAM1 Foreign NID Reg using Navigation key.
And press OK.



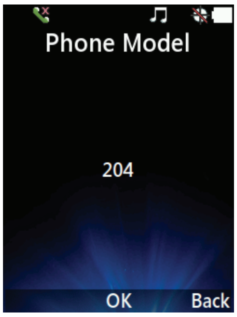
25. Input ACCOLC and press OK.



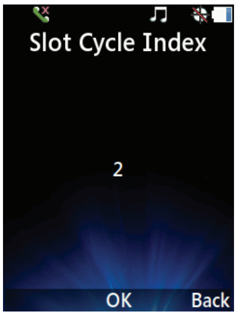
26. Choose Edit if you want to change NAM2 Setting. Otherwise press OK.



27. Check Phone Model. And press OK.



28. Check Slot Cycle Index and press OK.



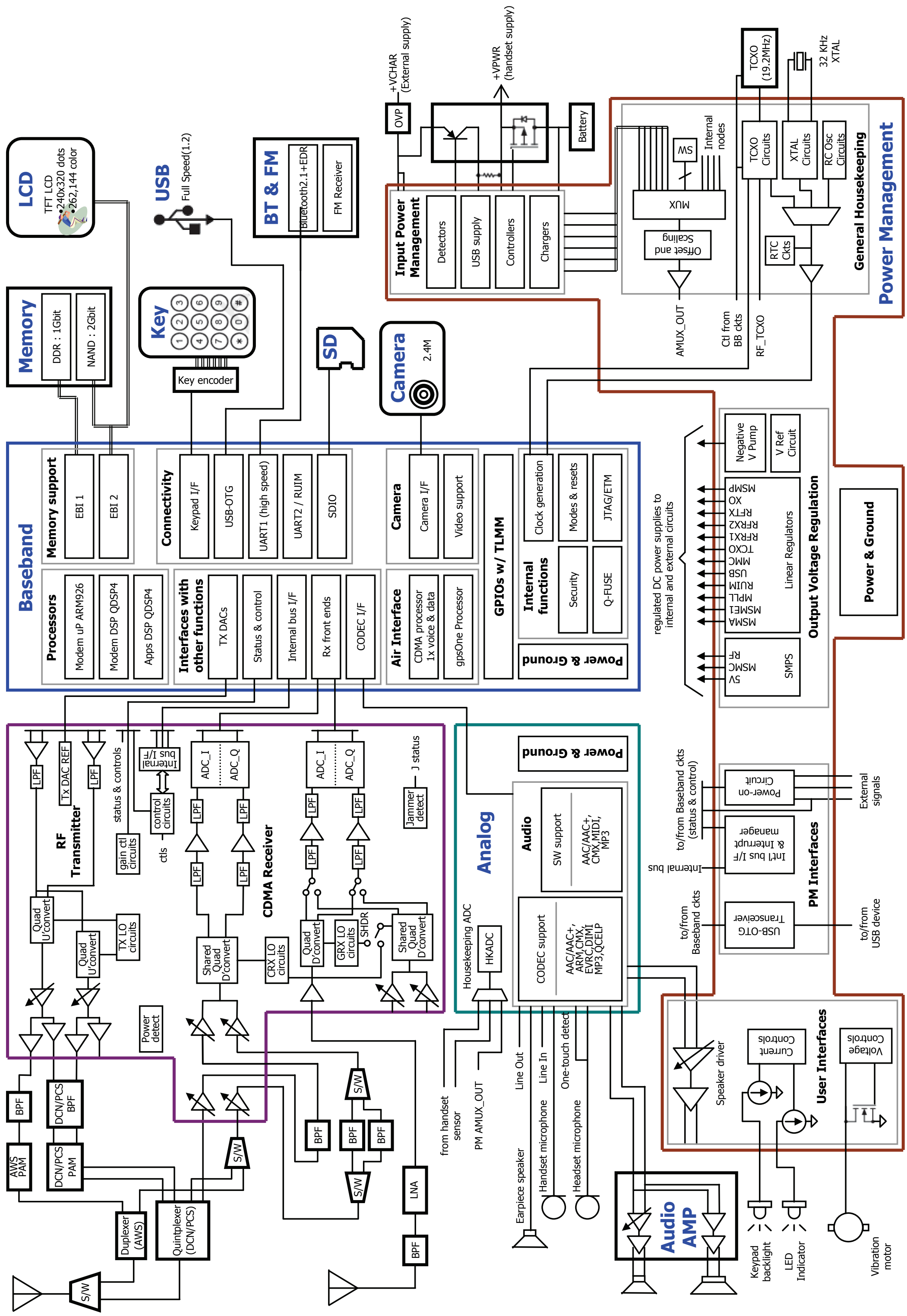
CHAPTER 3. Circuit Description

1. RF Transmit/Receive Part

1.1 Overview

The Tx and Rx part employs the Direct Conversion system. The Tx and Rx frequencies are respectively 824.04~848.97MHz and 869.04~893.97MHz for cellular and 1850~1910MHz and 1930~1990MHz for PCS and 1710MHz~1755MHz and 2110MHz~2155MHz for AWS. The block diagram is shown in [Figure 1-1].
RF signals received through the antenna are seperated by quintplexer. RF Signal fed into the low noise amplifier (in QSC6075) through the quintplexer. Then, they are combined with the signals of local oscillator (VCO) at the down conversion mixer (in QSC6075) in order to create Base-band frequency. Then, this signal is changed into digital signal by the analog to digital converter (ADC, A/D Converter), and the digital circuit part of the QSC (Qualcomm Single Chip) 6075 processes the data from ADC. The digital processing part is a demodulator.
In the case of transmission, RF transmitter (in QSC6075) receives QPSK-modulated analog signal from the QSC6075. In QSC6075, the baseband quadrature signals are upconverted to the Cellular or PCS/AWS frequency bands and amplified to provide signal drive capability to the power amp.
After that, the RF signal is amplified by the Power Amp in order to have enough power for radiation. Finally, the RF signal is sent out to the cell site via the antenna after going through the coupler and quintplexer.

[Figure 1-1] Block Diagram of AN430



1.2 Description of Rx Part Circuit

1.2.1 SPDT(Single Pole Double Throw) RF switch (U1002)

The main function of SPDT switch is to prohibit the other band signals from flowing into the one band circuit and vice versa. RF designer can use common tri-band antenna regardless of frequency band (800, 1900 and 1700/2100 MHz). The specification of AN430 SPDT switch is described below:

■ **Electrical Specifications (Ta=25°C, V_{DD}=2.6V, $V_{CTL(H)}$=1.8V, $V_{CTL(L)}$=0V、C4,5=4pF)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_{DD}	Current Consumption	-	-	75	-	µA
f_0	Operation Frequency	-	0.8	-	3.0	GHz
IL	Insertion Loss (Port1-Port2,3)	0.8～1.0GHz	-	0.25	-	dB
		1.0～2.0GHz	-	0.30	-	dB
		2.0～3.0GHz	-	0.35	-	dB
ISO	Isolation (Port1-Port2,3)	0.8～1.0GHz	-	29.0	-	dB
		1.0～2.0GHz	-	29.0	-	dB
		2.0～3.0GHz	-	22.5	-	dB
$P_{in\ 0.5dB}$	Input Power for 0.5dB Compression	2.0GHz	-	33.0	-	dBm

■ **Linearity Measurement Data (Ta=25°C, VDD=2.6V,VCTL(H)=1.8V, VCTL(L)=0V)**

Symbol	Parameter	Conditions	Typ.	Unit
IIP2	Input 2nd Order Intercept Point (Port1-Port2,3)	Cell Band:881MHz f_1=837MHz, P_{in}=26dBm f_2=1718MHz, P_{in}=-20dBm(Jammer)	119	dBm
		PCS Band:1965MHz f_1=1885MHz, P_{in}=26dBm f_2=3850MHz, P_{in}=-20dBm(Jammer)	119	dBm
		UMTS/AWS Band:2132MHz f_1=1733MHz, P_{in}=26dBm f_2=3865MHz, P_{in}=-20dBm(Jammer)	123	dBm
TBR	Triple Beat Rate (Port1-Port2,3)	Cell Band:880MHz f_1=835MHz, P_{in}=21.5dBm f_2=836MHz, P_{in}=21.5dBm f_3=881MHz, P_{in}=-30dBm(Jammer)	91	dBc
		PCS Band:1959MHz f_1=1880MHz, P_{in}=21.5dBm f_2=1881MHz, P_{in}=21.5dBm f_3=1960MHz, P_{in}=-30dBm(Jammer)	85	dBc
		UMTS/AWS Band:2131MHz f_1=1732MHz, P_{in}=13.5dBm f_2=1733MHz, P_{in}=13.5dBm f_3=2132MHz, P_{in}=-30dBm(Jammer)	83	dBc

1.2.2 Quintplexer (U1003)

The ACFM-7107 is a quintplexer that combines a US PCS duplexer, a cellular band duplexer and a S-GPS band filter into a single, miniature package with a single antenna port.
The main function of quintplexer is to prohibit the other band signals from flowing into the one band circuit and vice versa. RF designer can use common tri-band antenna regardless of frequency band (800, 1575 and 1900 MHz). The specification of AN430 quintplexer is described below:

ACFM-7107 Electrical Specifications, Z_0=50 Ω, T_C [1] [2] [4] as indicated

			– 30°C			+25°C			+85°C		
Symbol	**Parameter**	**Units**	**Min**	**Typ [3]**	**Max**	**Min**	**Typ [3]**	**Max**	**Min**	**Typ [3]**	**Max**
Cellular Duplexer Performance											
	Antenna Port to Cellular Receive Port										
S41	Insertion Loss in Rx band (869–894 MHz)	dB			3.6		1.5	3.6			3.6
S41	Insertion Loss Ripple (p-p) in Rx Band	dB						1.5			
S41	Attenuation in Tx band (824–849 MHz)	dB	55			55	66		50		
S41	Attenuation 0–804 MHz	dB	25			25	36		25		
S41	Attenuation in Tx 2nd harmonic band (1648–1698 MHz)	dB	30			30	54		30		
S41	Attenuation in Tx 3rd harmonic band (2472–2547 MHz)	dB	19			19	44		19		
S44	Return Loss of Rx Port in Rx Band (869–894 MHz)	dB	9			9	17		9		
S11	Return Loss of Antenna Port in Rx Band (869–894 MHz)	dB	9			9	17		9		
	Cellular Transmit Port to Antenna Port										
S15	Insertion Loss in Tx band (824–849 MHz)	dB			2.9		1.4	2.9			2.9
S15	Insertion Loss Ripple (p-p) in Tx Band	dB						1.5			
S15	Attenuation in Rx band (869–894 MHz)	dB	39			40	58		37		
S15	Attenuation, 0–804 MHz	dB	20			20	39		20		
S15	Attenuation in GPS band (1574.4–1576.4 MHz)	dB	37			37	48		37		
S15	Attenuation in Tx 2nd harmonic band (1648–1698 MHz)	dB	20			20	46		20		
S15	Attenuation in Tx 3rd harmonic band (2472–2547 MHz)	dB	8			8	25		8		
S55	Return Loss of Tx Port in Tx band (824–849 MHz)	dB	9			9	14		9		
S11	Return Loss of Antenna port in Tx Band (824–849 MHz)	dB	9			9	14		9		
	Isolation, Cellular Transmit Port to Cellular Receive Port										
S45	Isolation, Tx to Rx port in Rx Band (869–894 MHz)	dB	40			40	56		40		
S45	Isolation, Tx to Rx port in Tx Band (824–849 MHz)	dB	55			55	67		55		

ACFM-7107 Electrical Specifications, Z_0=50 Ω, T_C [1] [2] [4] as indicated

Symbol	Parameter	Units	– 30°C			+25°C			+85°C		
			Min	Typ [3]	Max	Min	Typ [3]	Max	Min	Typ [3]	Max
PCS Duplexer Performance											
	Antenna Port to PCS Receive Port										
S31	Insertion Loss in Rx Band (1930.5–1989.5 MHz)	dB			3.6		1.6	3.6			3.6
S31	Insertion Loss Ripple (p-p) in Rx Band	dB						1.5			
S31	Attenuation in Tx Band (1850.5–1909.5 MHz)	dB	50			50	61		50		
S31	Attenuation 0.03–1770 MHz	dB	20			20	41		20		
S31	Attenuation 2025–3500 MHz	dB	30			30	56		30		
S31	Attenuation 3500–3700 MHz	dB	27			27	56		27		
S31	Attenuation 3820–4000 MHz	dB	23			23	34		23		
S33	Return Loss of Rx Port in Rx Band (1930.5–1989.5 MHz)	dB	9			9	15		9		
S11	Return Loss of Antenna Port in Rx Band (1930.5–1989.5 MHz)	dB	9			9	17		9		
	PCS Transmit Port to Antenna Port										
S12	Insertion Loss in Tx Band (1850.5–1909.5 MHz)	dB			3.1		1.5	3.1			3.1
S12	Insertion Loss Ripple (p-p) in Tx Band	dB						1.5			
S12	Attenuation in Rx Band (1930.5–1989.5 MHz)	dB	39			39	46		39		
S12	Attenuation 0.03–1570 MHz	dB	15			15	43		15		
S12	Attenuation in GPS Band (1574.4–1576.4 MHz)	dB	27			27	30		27		
S12	Attenuation 1580 – 1700 MHz	dB	25			25	39		25		
S12	Attenuation in Tx 2nd harmonic band (3701–3819 MHz)	dB	10			10	21		10		
S12	Attenuation in Tx 3rd harmonic band (5551.5–5728.5 MHz)	dB	8			8	32		8		
S22	Return Loss of Tx Port in Tx band (1850.5–1909.5 MHz)	dB	9.5			9.5	15		9.5		
S11	Return Loss of Antenna port in Tx Band (1850.5–1909.5 MHz)	dB	9			9	14		9		
	Isolation, PCS Transmit Port to PCS Receive Port										
S32	Isolation, Tx to Rx port in Rx Band (1930.5–1989.5 MHz)	dB	40			40	51		40		
S32	Isolation, Tx to Rx port in Tx Band (1850.5–1855 MHz) (1855–1909.5 MHz)	dB	53 54			53 54	64 64		53 54		

1.2.3 Duplexer (DP1000)

The duplexer consists of the Rx bandpass filter (BPF) and the Tx BPF which has the function of separating Tx and Rx signals in the full duplex system for using the common antenna. The Tx part BPF is used to suppress noises and spurious out of the Tx frequency band. The Rx BPF is used to receive only Rx signal coming from the antenna, which is usually called preselector. It's main function is to limit the bandwidth of spectrum reaching the LNA and mixer, attenuate receiver spurious response and suppress local oscillator energy. As a result frequency sensitivity and selectivity of mobile phone increase. The specification of UN430 duplexer described below ;

[Tx→ANT]

Item	Specification	
	-30 to 85°C	typ.
Nominal Center Frequency(fc)	1732.5MHz	
Insertion Loss (1710 to 1755MHz)	2.0 dB max.	1.6 dB
Absolute Attenuation		
1) 0.3 to 1550 MHz	30 dB min.	42 dB
2) 1550 to 1600 MHz	38 dB min.	47 dB
3) 1670 to 1675 MHz	8 dB min.	35 dB
4) 1805 to 1880 MHz	30 dB min.	45 dB
5) 1930 to 1990 MHz	35 dB min.	44 dB
6) 2110 to 2155 MHz	45 dB min.	52 dB
7) 2400 to 2500 MHz	30 dB min.	39 dB
8) 3420 to 3510 MHz	26 dB min.	35 dB
9) 5130 to 5265 MHz	15 dB min.	21 dB
10) 5265 to 6000 MHz	8 dB min.	18 dB
Ripple Deviation (1710 to 1755MHz)	1.0 dB max.	0.3 dB
Any 3.84MHz Ripple Deviation (1710 to 1755MHz)	0.5 dB max.	0.2 dB
VSWR		
(1710 to 1755MHz Ant)	2.0 max.	1.7
(1710 to 1755MHz Tx)	2.0 max.	1.7
Ant Port Matching Impedance(nominal)	50Ω	
Tx Port Matching Impedance(nominal)	50Ω	
Rx Port Matching Impedance(nominal)	50Ω	
Input Signal Level	1.0W, 50000 hours (50°C)	

[Tx→Rx]

Item	Specification	
	-30 to 85°C	typ.
Isolation		
1) 1710 to 1755 MHz	52 dB min.	54 dB
2) 2110 to 2155 MHz	44 dB min.	46 dB

[ANT→Rx]

Item	Specification	
	-30 to 85°C	typ.
Nominal Center Frequency(fc)	2132.5MHz	
Insertion Loss (2110to 2155MHz)	2.5 dB max.	2.0 dB
Absolute Attenuation		
1) 0.3 to 1310 MHz	30 dB min.	46 dB
2) 1310 to 1355 MHz	38 dB min.	46 dB
3) 1355 to 1710 MHz	38 dB min.	46 dB
4) 1710 to 1755 MHz	48 dB min.	54 dB
5) 1755 to 1910 MHz	30 dB min.	40 dB
6) 1910 to 1980 MHz	25 dB min.	39 dB
7) 1980 to 2025 MHz	10 dB min.	20 dB
8) 2240 to 2400 MHz	8 dB min.	16 dB
9) 2400 to 2500 MHz	35 dB min.	47 dB
10) 2500 to 3820 MHz	15 dB min.	27 dB
11) 3820 to 3910 MHz	15 dB min.	23 dB
12) 4220 to 4310 MHz	10 dB min.	21 dB
13) 5530 to 5665 MHz	30 dB min.	39 dB
14) 5665 to 6000 MHz	25 dB min.	35 dB
Ripple Deviation (2110 to 2155MHz)	1.0 dB max.	0.3 dB
Any 3.84MHz Ripple Deviation (2110 to 2155MHz)	0.5 dB max.	0.2 dB
VSWR		
(2110 to 2155MHz Ant)	2.0 max.	1.5
(2110 to 2155MHz Rx)	2.0 max.	1.7
Ant Port Matching Impedance(nominal)	50Ω	
Tx Port Matching Impedance(nominal)	50Ω	
Rx Port Matching Impedance(nominal)	50Ω	

1.2.2 LNAs (U2001)

The QSC6075 has cellular and PCS LNAs, respectively. The characteristics of Low Noise Amplifier (LNA) are low noise figure, high gain, high intercept point and high reverse isolation. The frequency selectivity characteristic of mobile phone is mostly determined by LNA.
The specification of LG-AN430 LNAs are described below:

1.2.2.1 Cellular CDMA LNA performance specifications

Parameter	Comments	Min	Typ	Max	Unit
Input frequency range		869		894	MHz
Input VSWR (in-band)	50-Ω with external match		2:1		–
Output VSWR (in-band)	50-Ω with external match		2:1		–
Gain mode 0 (G0)					
Power gain			16.0		dB
Noise figure	Small signal		1.4		dB
Input IP3	Jammers at -43 dBm	-2.0			dBm
Gain mode 1 (G1)					
Power gain			4.0		dB
Noise figure			5.0		dB
Input IP3	Jammers at -32 dBm	+5.0			dBm
Gain mode 2 (G2)					
Power gain			-6.0		dB
Noise figure			8.0		dB
Input IP3	Jammers at -20 dBm	+12			dBm
Gain mode 3 (G3)					
Power gain			-20		dB
Noise figure			20		dB
Input IP3	Jammers at -10 dBm	+10			dBm

1.2.2.2 **PCS CDMA LNA performance specifications**

Parameter	Comments	Min	Typ	Max	Unit
Input frequency range		1930		1990	MHz
Input VSWR (in-band)	50-Ω with external match		2:1		–
Output VSWR (in-band)	50-Ω with external match		2:1		–
Gain mode 0 (G0)					
Power gain			16.0		dB
Noise figure	Small signal		1.6		dB
Input IP3	Jammers at -43 dBm	-2.0			dBm
Gain mode 1 (G1)					
Power gain			-3.0		dB
Noise figure			4.0		dB
Input IP3	Jammers at -20 dBm	+10			dBm
Gain mode 2 (G2)					
Power gain			-20		dB
Noise figure			20		dB
Input IP3	Jammers at -12 dBm	+10			dBm

1.2.3 GPS LNA (U1012)

The characteristics of Low Noise Amplifier (LNA) are low noise figure, high gain, high intercept point and high reverse isolation. The frequency selectivity characteristic of mobile phone is mostly determined by LNA.
The specification of LG-AN430 GPS LNA is described below

Symbol	Parameter and Test Condition	Units	Min.	Typ	Max.
G	Gain	dB	11	12.7	-
NF[6]	Noise Figure	dB	-	0.85	1.1
IP1dB	Input 1dB Compressed Power	dBm	-	3.2	-
IIP3[8]	Input 3rd Order Intercept Point (2-tone @ Fc +/- 2.5MHz)	dBm	-	7.0	-
S11	Input Return Loss	dB	-	-9.0	-
S22	Output Return Loss	dB	-	-10	-
S12	Reverse Isolation	dB	-	-24	-
Cell Band Rejection	Relative to 1.575GHz @ 827.5MHz	dBc	45	59	-
PCS Band Rejection	Relative to 1.575GHz @ 1885MHz	dBc	45	55	-
Idd	Supply DC current at Shutdown (SD) voltage Vsd=2.6V	mA	-	8	13
Ish	Shutdown Current @ VSD = 0V	uA	-	0.1	-

1.2.4 Down-converter Mixers (U2001)

The QSC6075 device performs signal down-conversion for Cellular, PCS and GPS tri-band applications. It contains all the circuitry (with the exception of external filters) needed to support conversion of received RF signals to baseband signals. The three down-converting Mixers (Cellular, PCS and GPS), and an LO Buffer Amplifier to buffer the RF VCO to the RF Transmit Up-converter. The GPS LNA & mixers offer the most advanced and integrated CDMA Rx solution designed to meet cascaded Noise Figure (NF) and Third-order Intercept Point (IIP3) requirements of IS-98C and J-STD-018 specifications for Sensitivity, Two-Tone Inter-modulation, and Single-tone Desense.
Operation modes and band selection are specially controlled from the Qualcomm Single Chip QSC6075.

1.2.5 Rx RF SAW FILTERs(F1004, F1005,F1006)

The main function of Rx RF SAW filter is to attenuate mobile phone spurious frequency, attenuate direct RF frequency pick up, attenuate noise at the image frequency originating in or amplified by the LNA and suppress second harmonic originating in the LNA. The Rx RF SAW filter usually called image filter.

1.2.6 RF Receiver(U2001)

The circuit functions of the RF Receive (in QSC6075) include Rx Automatic Gain Controller (AGC) with 90 dB dynamic range, quadrature RF mixers, down-conversion mixer from RF to base-band, low pass filters and Analog to Digital Converters (ADC) for converting to digital base-band. The RFR includes clock generators that drive the digital processor and a VCO which generates the LO frequency for base-band down-conversion.
Switching system is located in front of the RFR RX_IN_C_LB and RX_IN_C_HB terminal and is for band selection between cellular and PCS. The Rx AGC either amplifies or attenuates the received CDMA RF signal to provide a constant-amplitude signal to the I/Q down-converter. The RF output of the Rx AGC amplifier separate into I-channel and Q-channel base-band components and down-converted by mixer with quadrature LO. LO signals are generated by a Voltage Controlled Oscillator (VCO) and frequency stabilized by external varactor-tuned resonant tank circuit. The I/Q down converter outputs the CDMA signals at baseband frequency. Low-pass filtering enables the receiver to select the desired baseband signals from the effects of unwanted noise or adjacent-channel interference. I/Q base band components are converted to digital signals by two identical 4-bit ADCs.

1.3 Description of Transmit Part Circuit

1.3.1 RF Transmitter (U2001)

The RF Transmitter(in QSC6075, base-band-to-RF Transmit Processor) performs all Tx signal-processing functions required between digital base-band and the Power Amplifier Module (PAM). The base-band quadrature signals are up-converted to the Cellular or PCS frequency bands and amplified to provide signal drive capability to the PAM. The RFT includes an RF mixer for upconverting analog baseband to RF, a programmable PLL for generating Tx LO frequency, two cellular and two PCS driver amplifiers and Tx power control through an 85 dB VGA. As added benefit, the single sideband upconversion eliminates the need for a band pass filter normally required between the upconverter and driver amplifier.

I, I/, Q and Q/ signals proceed from the QSC6075 are analog signal. In CDMA mode, These signals are modulated by Quadrature Phase Shift King (QPSK). I and Q are 90 deg. out of phase, and I and I/ are 180 deg. Tx IF signal can be obtained by mixing analog signal with 228.6MHz (Cellular)/263.6(PCS) 1st local osillator frequency which is generated by Tx VCO. The Tx IF signal is amplified by AGC controlled by QSC6075. The second mixer on RFT converts IF signals into RF signals. After passing through the upconverter , RF signal is inputted into the Power Amplifier Module.

1.3.1.1 Cellular CDMA transmit signal path performance specifications

Parameter	Comments	Min	Typ	Max	Unit
RF outputs					
Output frequency range		824		849	MHz
Output power	Average channel power	7			dBm
Minimum output power	Average channel power			-75	dBm
Isolation between cellular outputs		21			dB
Isolation: TX_OUT to PWR_DET_IN		30			dB
Output VSWR	50-Ω system		2.5:1		–
Baseband-to-RF signal path					
Gain flatness over frequency		-1.5		+1.5	dB
ACPR 885 kHz offsets 1.98 MHz offsets	 $P_{OUT} \leq$ +7dBm P_{OUT} > +7dBm $P_{OUT} \leq$ +7dBm P_{OUT} >+7dBm			 -48.0 -42.5 -63.0 -54.5	 dBc/30 kHz dBc/30 kHz dBc/30 kHz dBc/30 kHz
In-band spurious signals	100 kHz bandwidth; offset > 4 MHz			-43	dBm
Harmonics ($2f_0$, $3f_0$)	PA mode			-10	dBc
Out-of-band noise power	PA mode F_{TX} + 45 MHz 1574 to 1577 MHz		Figure 3-43		
Carrier leakage At maximum P_{out} At minimum P_{out}	PA mode			 -24 -5.0	 dBc dBc
In-band image leakage At maximum P_{out} At minimum P_{out}	PA mode			 -24 -12	 dBc dBc

1.3.1.2 PCS (AWS) CDMA transmit signal path performance specifications

Parameter	Comments	Min	Typ	Max	Unit
RF outputs					
Output frequency range (PCS)		1850		1910	MHz
Output frequency range (AWS)		1710		1755	MHz
Output power	Average channel power	7			dBm
Minimum output power	Average channel power			-75	dBm
Isolation between PCS outputs		21			dB
Isolation: TX_OUT to PWR_DET_IN		30			dB
Output VSWR	50-Ω system		2.5:1		–
Baseband-to-RF signal path					
Gain flatness over frequency		-1.5		+1.5	dB
ACPR 1.25 MHz offsets	 $P_{OUT} \leq +7dBm$ $P_{OUT} > +7dBm$			 -48.0 -42.5	 dBc/30 kHz dBc/30 kHz
1.98 MHz offsets	$P_{OUT} \leq +7dBm$ $P_{OUT} > +7dBm$			-57 -50.5	dBc/30 kHz dBc/30 kHz
In-band spurious signals	1 MHz bandwidth; offset > 4 MHz			-43	dBm
Harmonics ($2f_0$, $3f_0$)	At P_{rated}			-10	dBc
Out-of-band noise power	PA mode F_{TX} + 80 MHz 1574 to 1577 MHz		Figure 3-43		
Carrier leakage At maximum P_{out} At minimum P_{out}	PA mode		 -24 -5.0		 dBc dBc
In-band image leakage At maximum P_{out} At minimum P_{out}	PA mode		 -24 -12		 dBc dBc

1.3.2 Dual Power Amplifier(U1008 , Cellular/PCS) / AWS Power Amplifier (U1007)

The power amplifier that can be used in the PCS, Cellular and AWS mode has linear amplification capability and high efficiency. For higher efficiency, it is made up of one MMIC (Monolithic Microwave Integrated Circuit) for which RF input terminal and internal interface circuit are integrated onto one IC after going through the AlGaAs/GaAs HBT (heterojunction bipolar transistor) process. The module of power amplifier is made up of an output end interface circuit including this MMIC. The maximum power that can be inputted through the input terminal is +10dBm and conversion gain is about 28dB. RF transmit signals that have been amplified through the power amplifier are sent to the quintplexer.

1.4 Description of Frequency Synthesizer Circuit

1.4.1 Voltage Control Temperature Compensation Crystal Oscillator (VCTCXO, U1015)

The temperature variation of mobile phone can be compensated by TCXO. The reference frequency of a mobile phone is -30~+85 °C. The receives frequency tuning signals called TRK_LO_ADJ from QSC6075 as 0.5V~2.5V DC via R and C filter in order to generate the reference frequency of 19.2MHz and input it into the frequency synthesizer of UHF band. Frequency stability depending on temperature is ± 1.5 ppm.

2. Digital/Voice Processing Part

2.1 Overview

The digital/voice processing part processes the user's commands and all the digital and voice signal in order to operate in the phone. This part is made up of a keypad/LCD, a receptacle, a voice processing unit, a modem, a memory unit, and a power supply unit.

2.2 Configuration

2.2.1 Keypad/LCD and Receptacle Part

This is used to transmit keypad signals to QSC6075. It is made up of a keypad backlight part that illuminates the keypad, LCD part that displays the operation status onto the screen, and a receptacle that receives and sends out voice and data with external sources.

2.2.2 Voice Processing Part

The voice processing part is made up of an audio codec used to convert MIC signals into digital voice signals and digital voice signals into analog voice signals, amplifying part for amplifying the voice signals and sending them to the ear piece, amplifying part that amplifies ringer signals coming out from QSC6075, and amplifying part that amplifies signals coming out from MIC and transferring them to the audio processor.

2.2.3 QSC(Qualcomm Single Chip) 6075 Part

QSC6075 is the core elements of CDMA terminal and carries out the functions of CPU, encoder, interleaver, deinterleaver, Viterbi decoder, Mod/Demod, and vocoder.

2.2.4 Memory Part

The memory part is made up of a DDR/NAND memory

2.2.5 Power Supply Part

The power supply part is made up of circuits for generating various types of power, used for the digital/voice processing part.

2.3 Circuit Description

2.3.1 Keypad/LCD and Receptacle Part

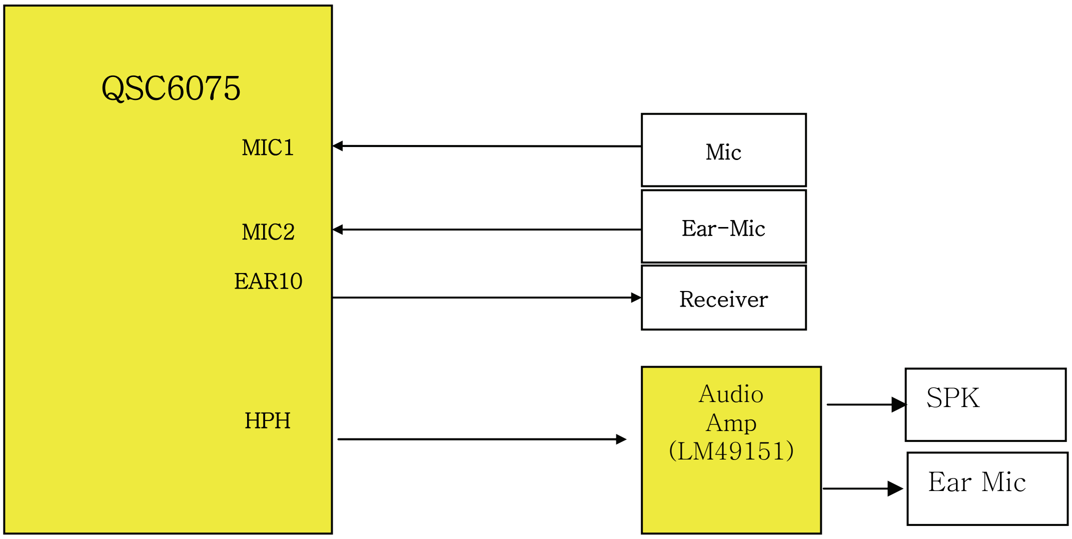
Once the keypad is pressed, the key signals are sent out to a keyboard encoder IC(PP2106M2) for processing. In addition, when the key is pressed, the keypad lights up through the use of 3 LEDs. The terminal status and operation are displayed on the screen for the user with the characters and icons on the LCD.
Moreover, it exchanges audio signals and data with external sources through the receptacle, and then receives power from the battery or external batteries.

2.3.2 Audio Processing Part

MIC signals are amplified through OP AMP, inputted into the audio codec(included in QSC6075) and converted into digital signals. Oppositely, digital audio signals are converted into analog signals after going through the audio codec. These signals are amplified at the audio amplifier and transmitted to the ear-piece. The signals from QSC6075 activate the ringer by using signals generated in the timer in QSC6075.

2.3.3 MODEM Part

QSC6075 is the core element of CDMA system terminal that includes ARM926 EJS microprocessor core. It supports both CDMA and GPS, operating in both the cellular and PCS spectrums. The subsystems within the QSC6075 include a CDMA processor, a multi-standard Vocoder, an integrated CODEC with earpiece and microphone amplifiers, general-purpose ADC for subsytem monitoring, an ARM926 EJS microprocessor, and both Universal Serial Bus(USB) and an RS-232 serial interfaces supporting forward and reverse link data communications of 307.2 Kbps simultaneously. And it also contains complete digital modulation and demodulation systems for CDMA standards, as specified in IS-95-A/B/C.
In QSC, coded symbols are interleaved in order to cope with multi-path fading. Each data channel is scrambled by the long code PN sequence of the user in order to ensure the confidentiality of calls. Moreover, binary quadrature codes are used based on walsh functions in order to discern each channel. Data created thus are 4-phase modulated by one pair of Pilot PN code and they are used to create I and Q data.
When received, I and Q data are demodulated into symbols by the demodulator, and then de-interleaved in reverse to the case of transmission. Then, the errors of data received from Viterbi decoder are detected and corrected. They are voice-decoded at the vocoder in order to output digital voice data.



[Figure 2-2] Block Diagram of Digital/Voice Processing Part

2.3.4 Memory Part

MCP contents 2Gbits NAND flash memory and 1Gbits DDR SRAM. In the Flash Memory part of MCP are programs used for terminal operation. The programs can be changed through down loading after the assembling of terminals. On the SDRAM data generated during the terminal operation are stored temporarily.

2.3.5 Power Supply Part

When the battery voltage (+3.7V) is fed and the PWR key of keypad is pressed, the power-up circuitry in PM (power management) circuit(in QSC6075) is activated by the PWR_ON_SW/ signal, and then the LDO regulators embedded in PM circuit are operated and +1.3V_MSMC, +2.6V_MSMP, +1.8V_MSME1 and +2.1V_MSMA are generated.
The Rx part (+2.1V_RFRX) and Tx part voltage (+2.1V_RFTX) are regulated by QSC6075

2.3.6 Logic Part

The logic part consists of internal CPU of QSC, RAM, MCP. The QSC6075 receives TCXO (=19.2MHz) from U1015 and controls the phone in both CDMA and GPS modes. The major components are as follows:

CPU

The ARM926 EJS microprocessor includes a 3 stage pipelined RISC architecture, both 32-bit ARM and 16-bit THUMB instruction sets, a 32-bit address bus, and a 32-bit internal data bus. It has a high performance and low power consumption.

MCP

Flash ROM is used to store the terminal's program. Using the down-loading program, the program can be changed even after the terminal is fully assembled.

SDRAM is used to store the internal flag information, call processing data, and timer data.

KEYPAD

For key recognition, key matrix is setup using Qwerty Chip(PP2106M2)

3 LEDs and backlight circuitry are included in the keypad for easy operation in the dark.

LCD MODULE

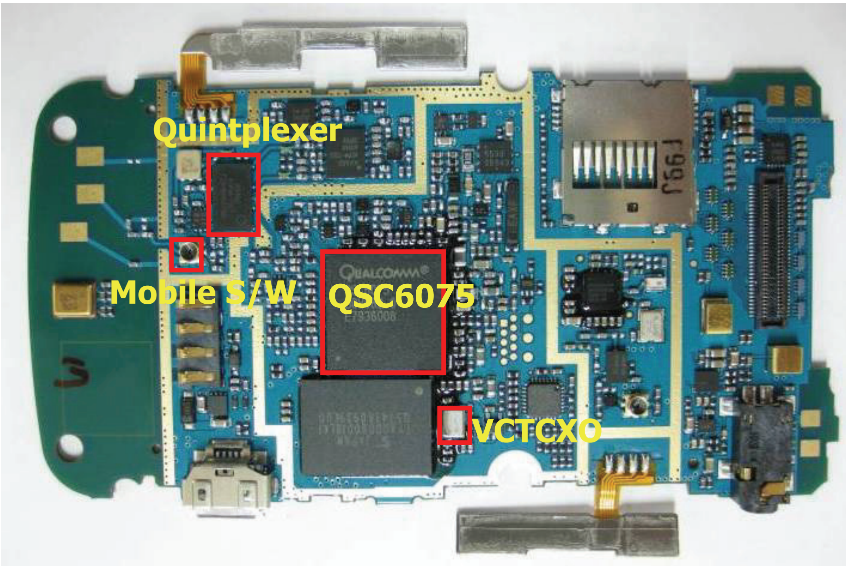
LCD module contains a controller which will display the information onto the LCD by 16-bit data from the QSC6075.

CHAPTER 4. Trouble Shooting

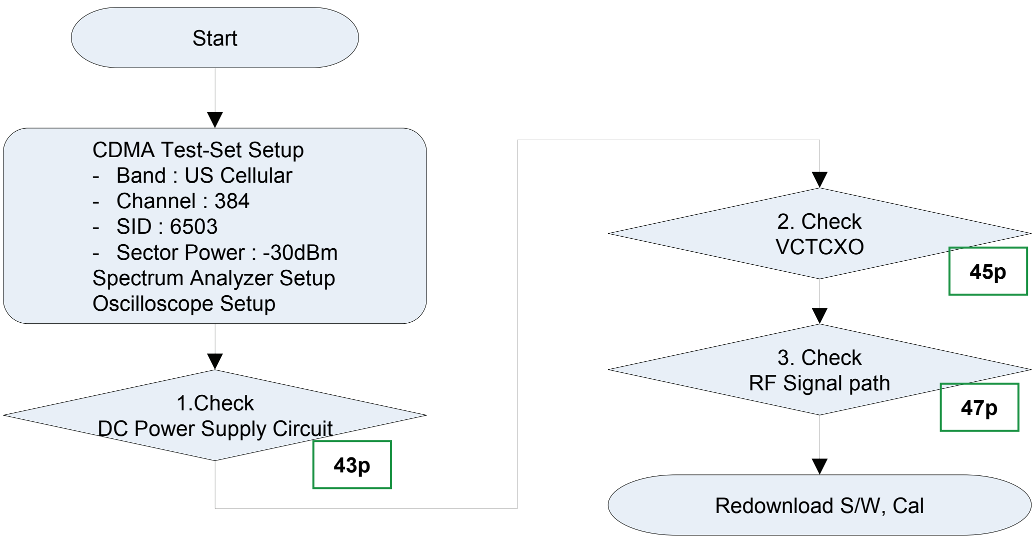
4.1 Rx Part Trouble

4.1.1 DCN Rx

Test Point

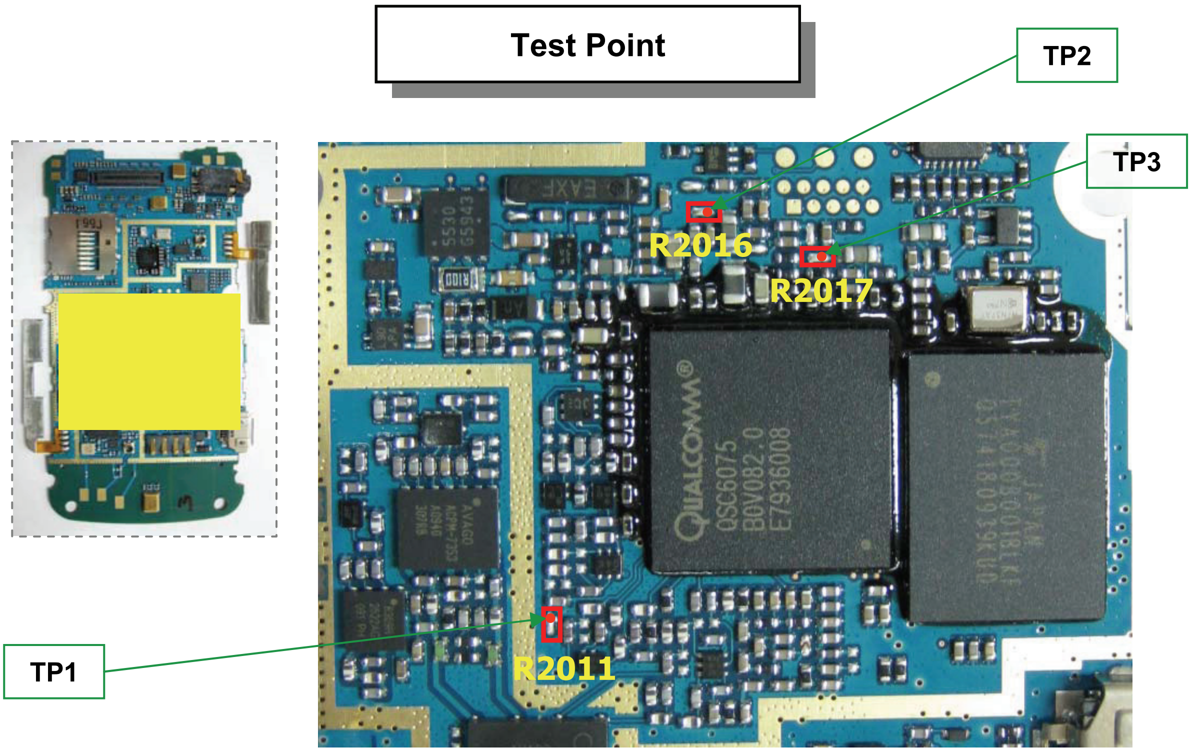


Check flow

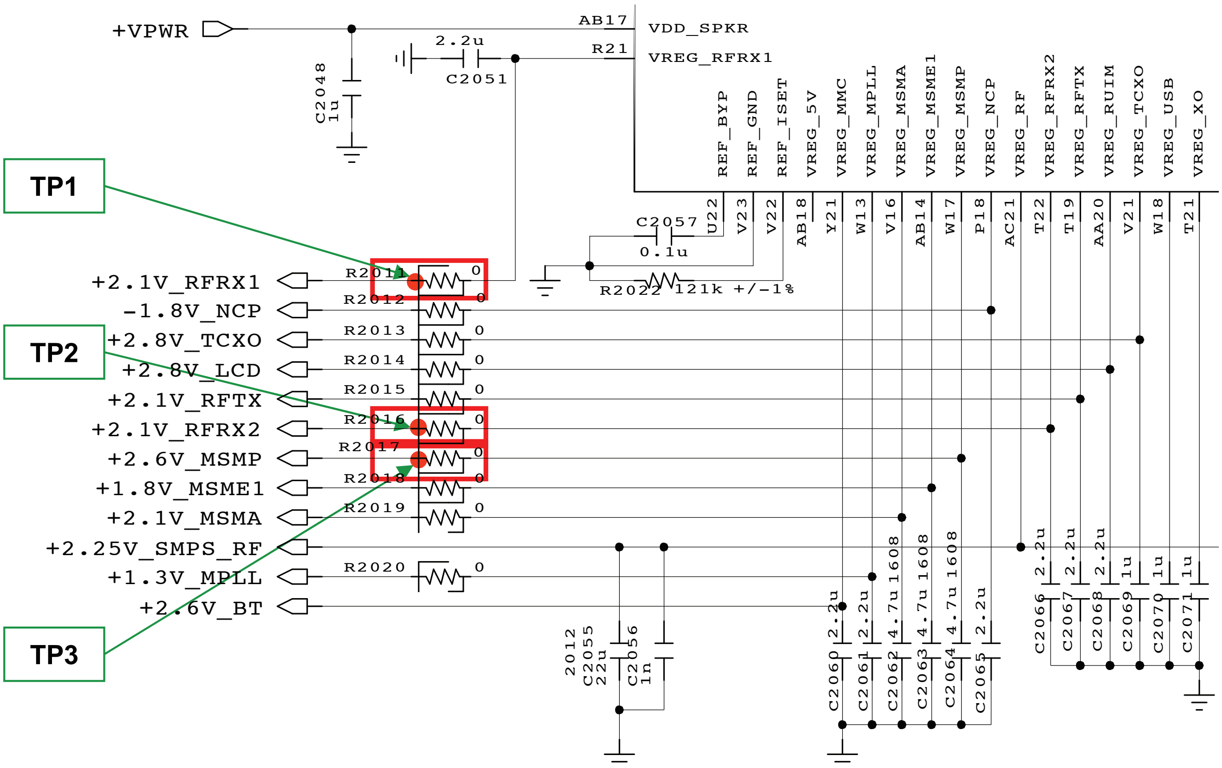


4.1.1.1 Checking DC Power supply circuit (PMIC)

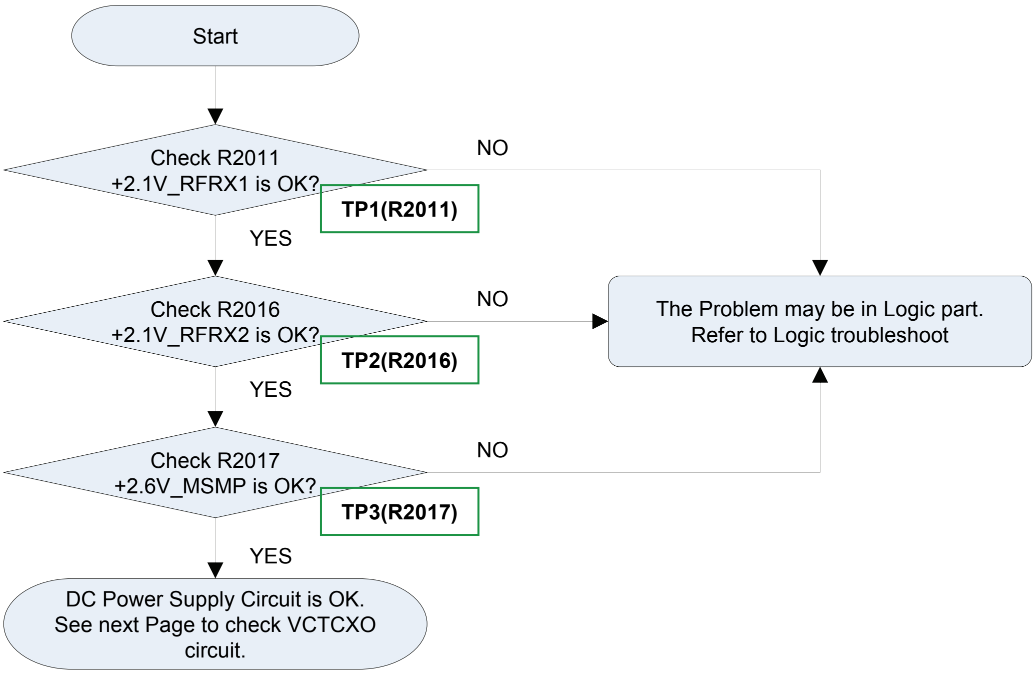
Test Point



Circuit Diagram

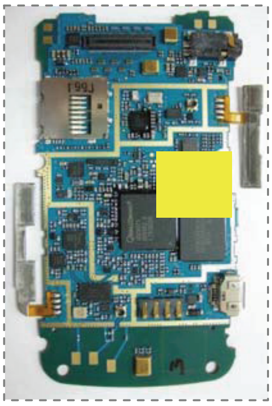


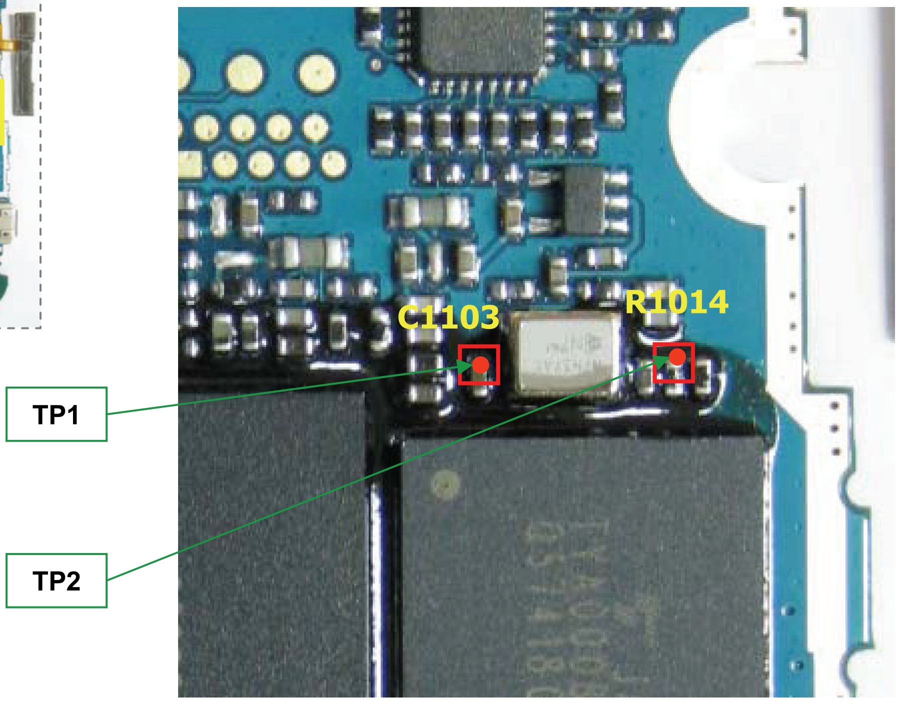
Checking Flow



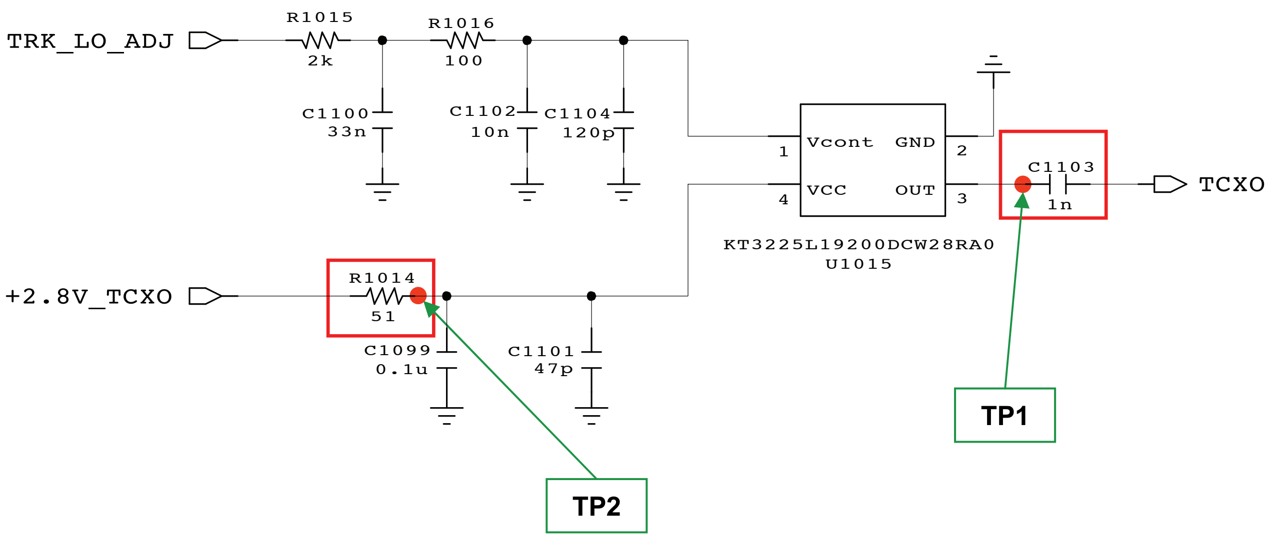
4.1.1.2 Checking VCTCXO circuit

Test Point

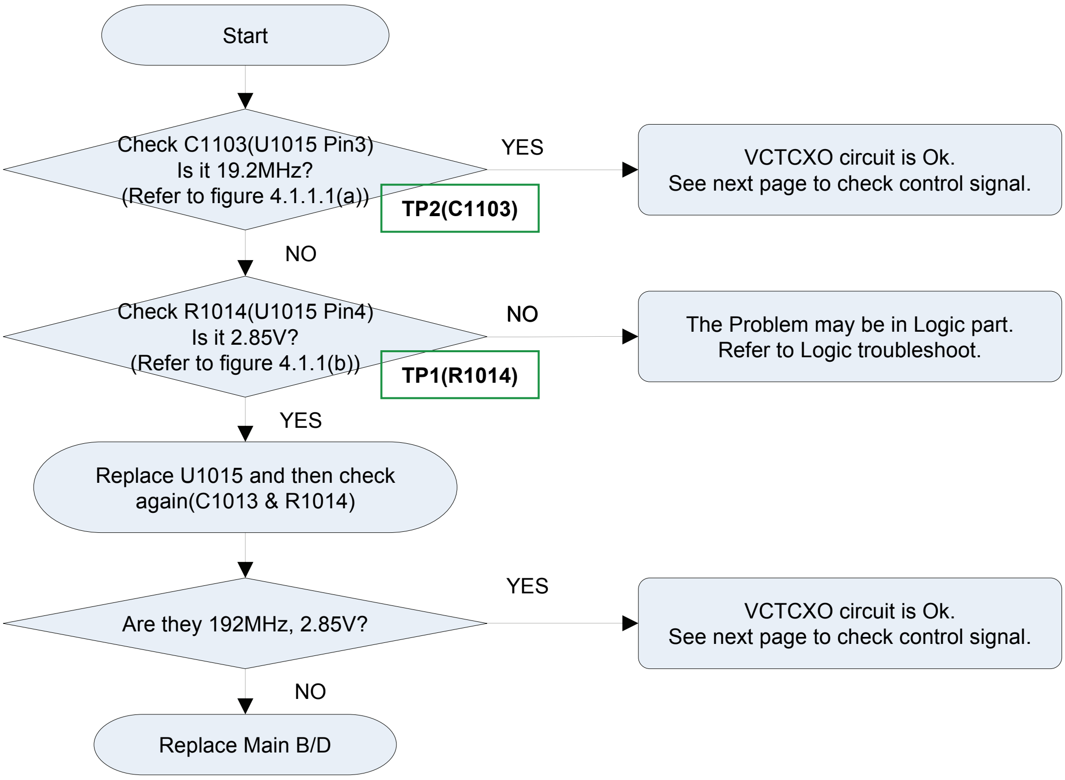




Circuit Diagram



Checking Flow



Waveform

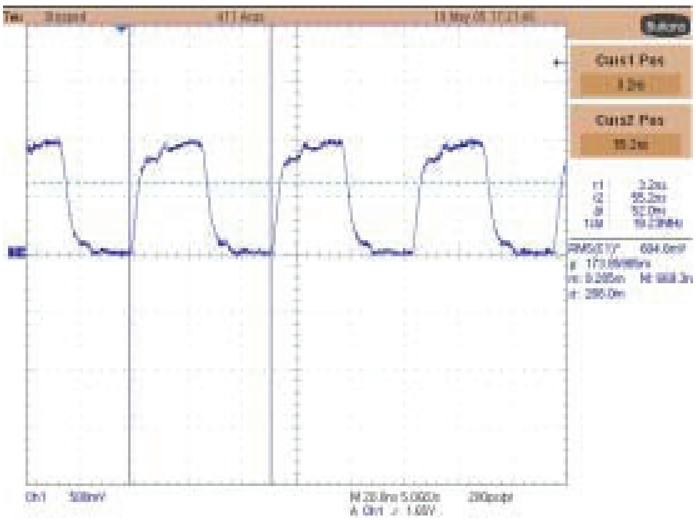


Figure 4.1.1 (a)

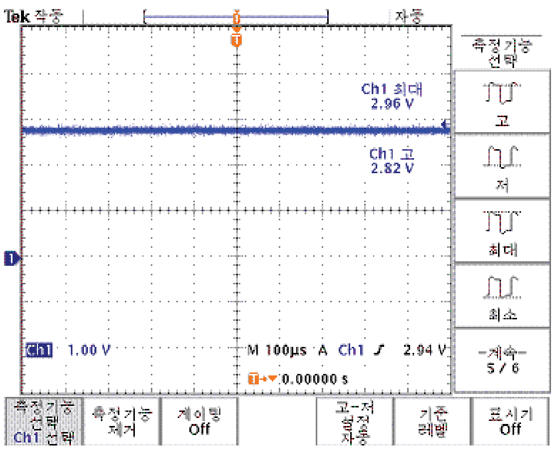
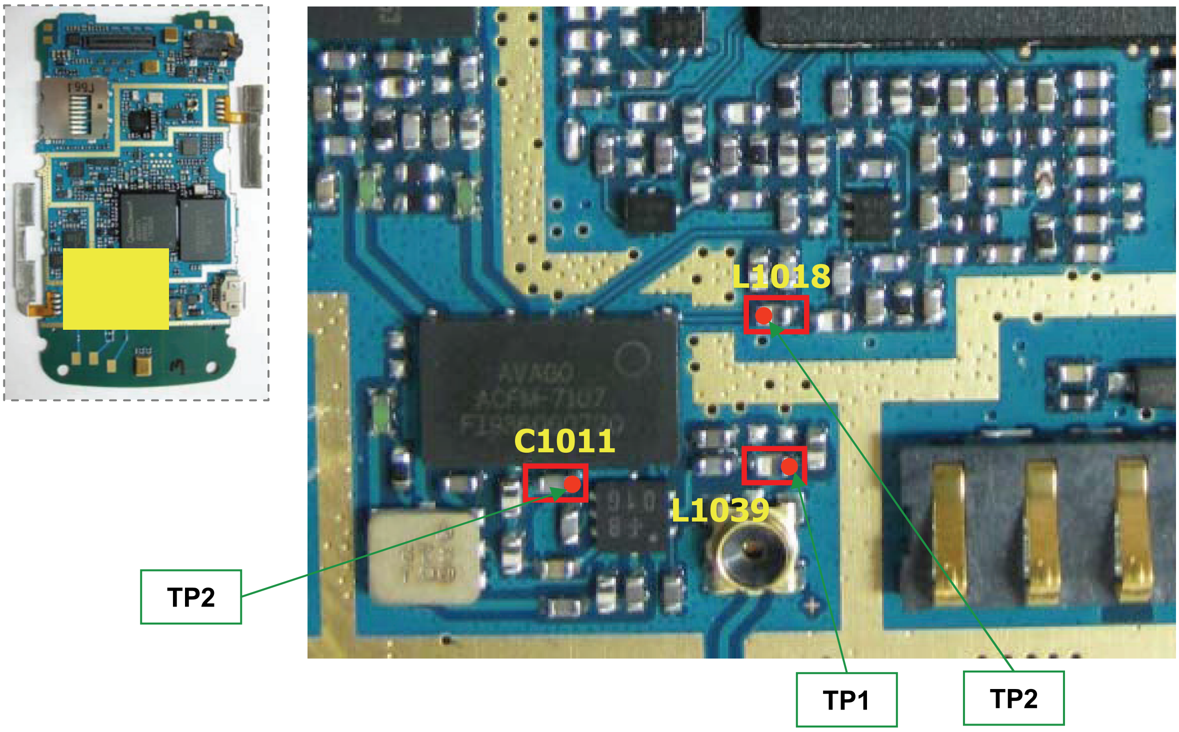


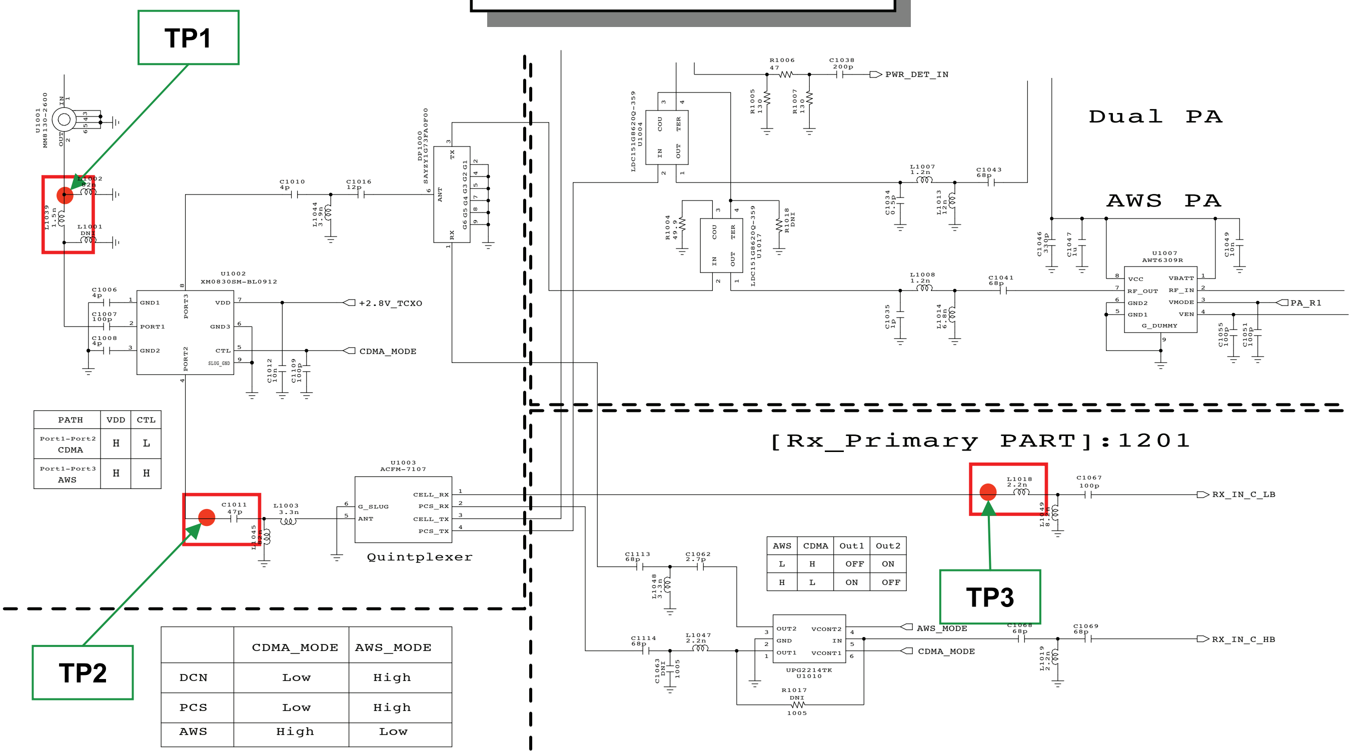
Figure 4.1.1 (b)

4.1.1.3 Checking RF signal path (Mobile S/W, SP2T, Quintplexer)

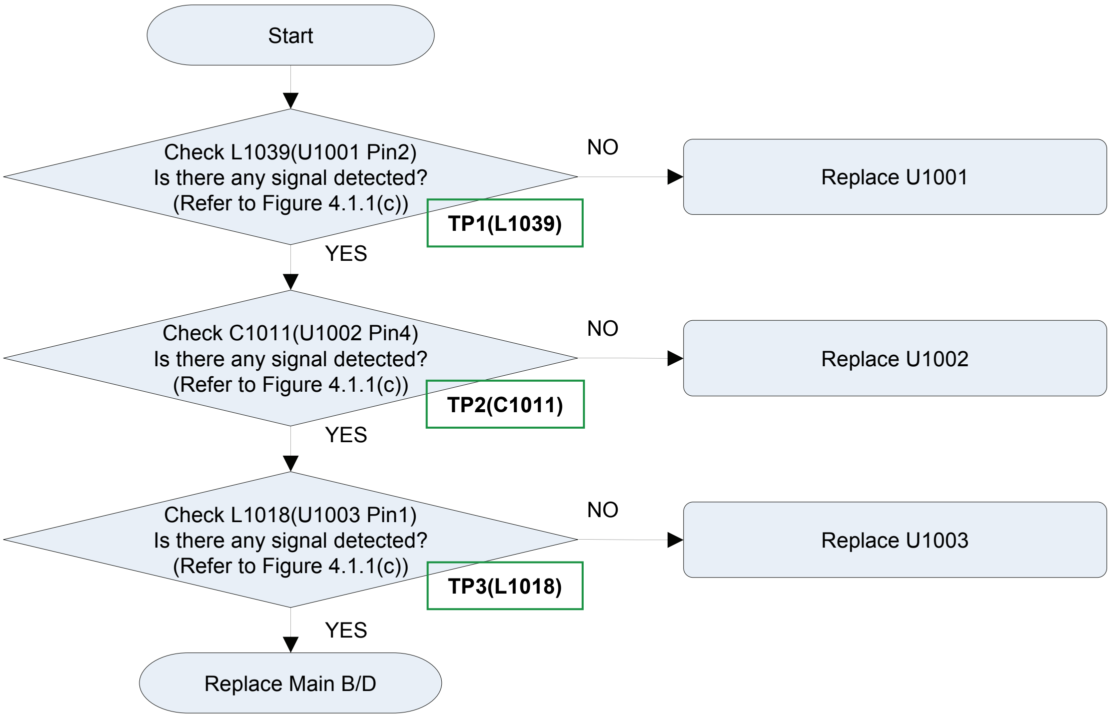
Test Point



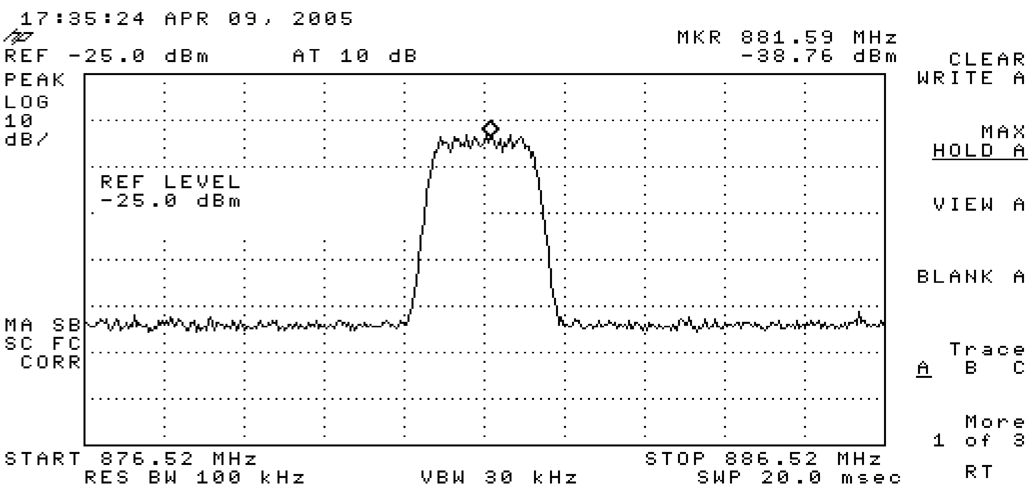
Circuit Diagram



Checking Flow



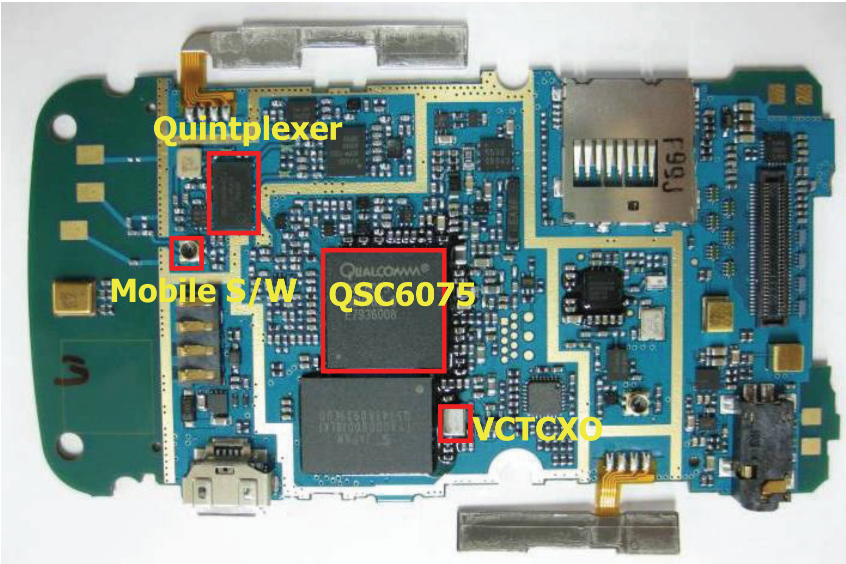
Waveform



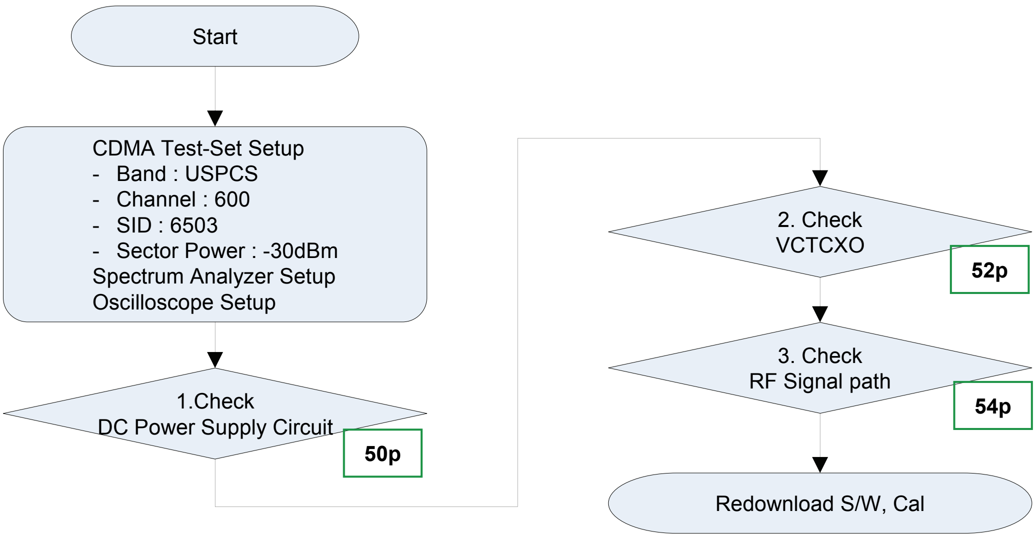
4.1.1 (c)

4.1.2 PCS Rx

Test Point

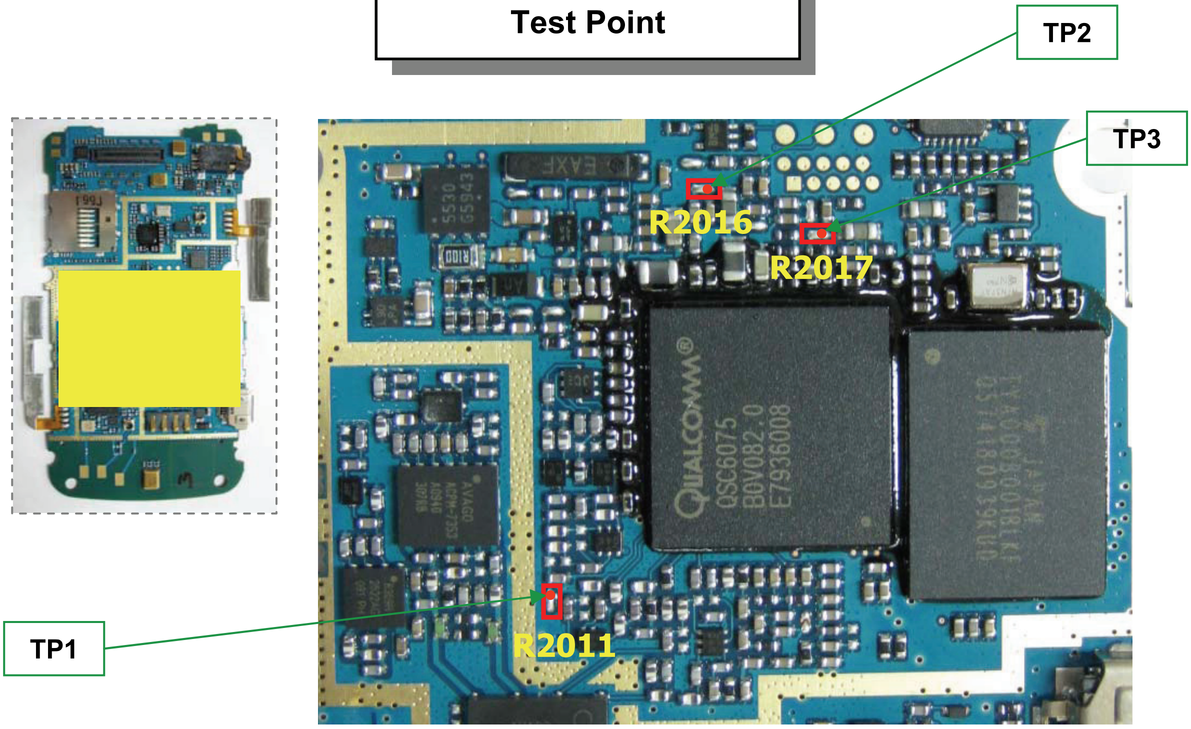


Check flow

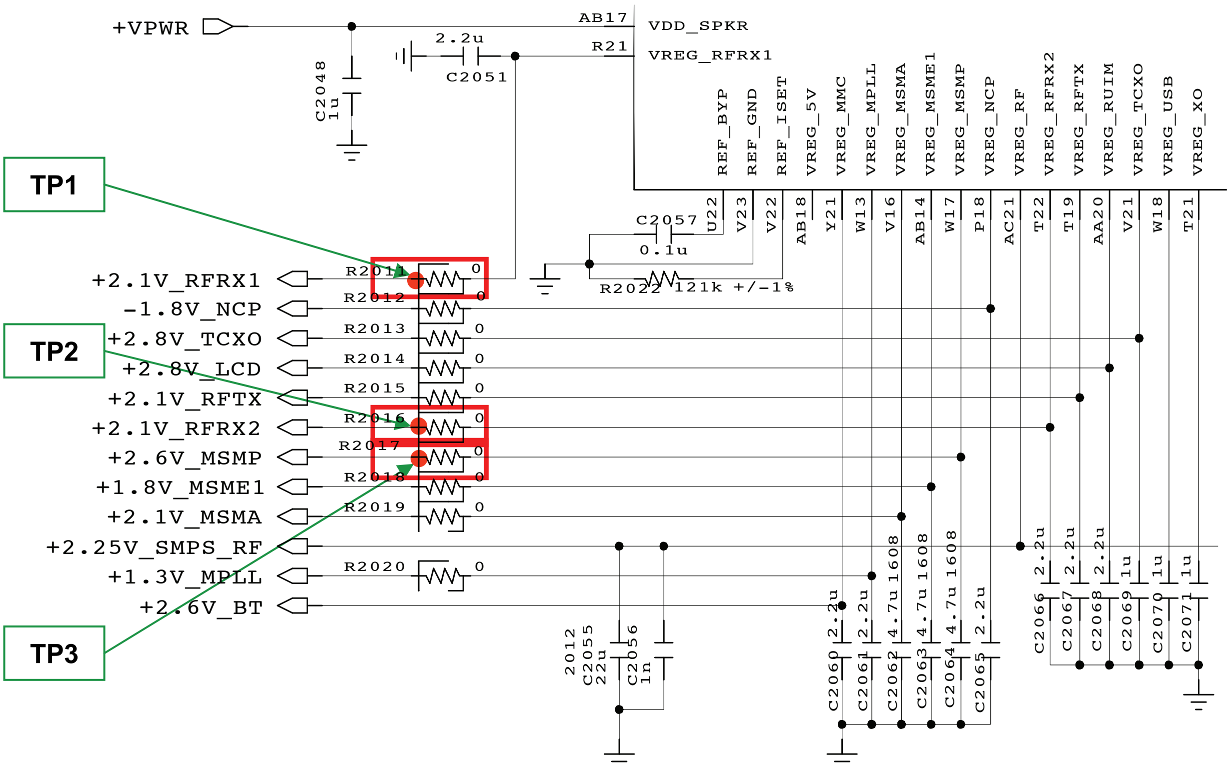


4.1.2.1 Checking DC Power supply circuit (PMIC)

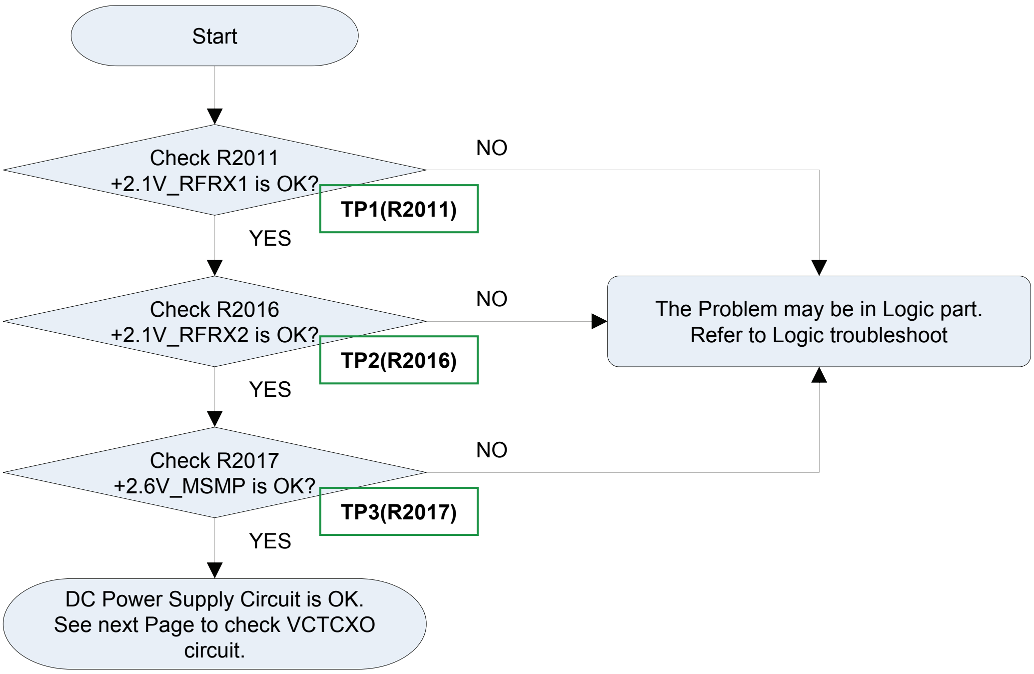
Test Point



Circuit Diagram

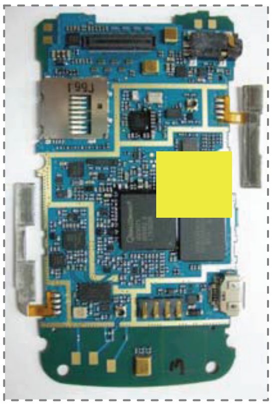


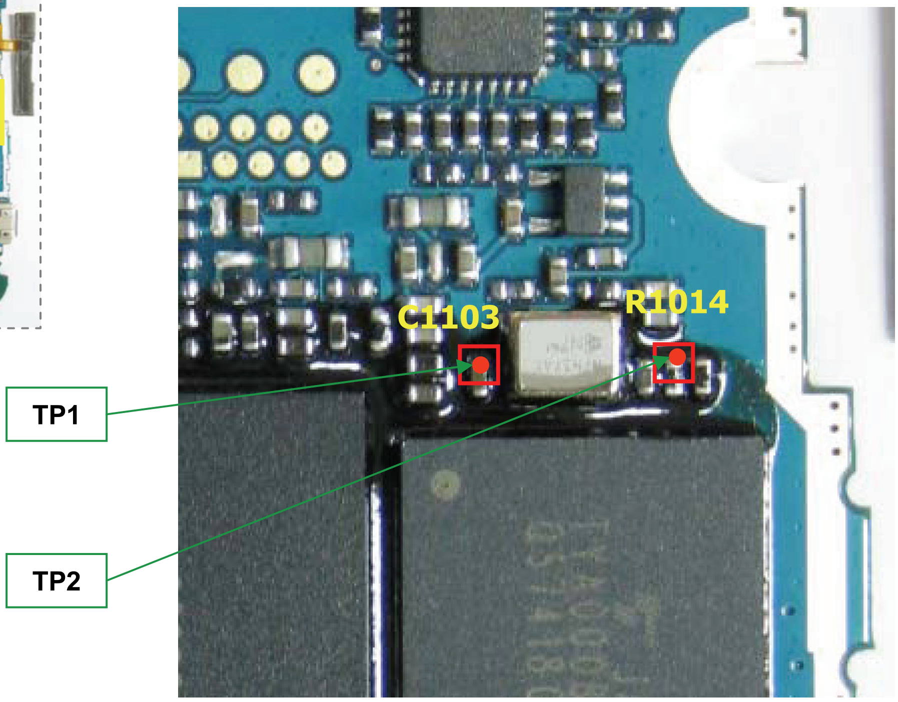
Checking Flow



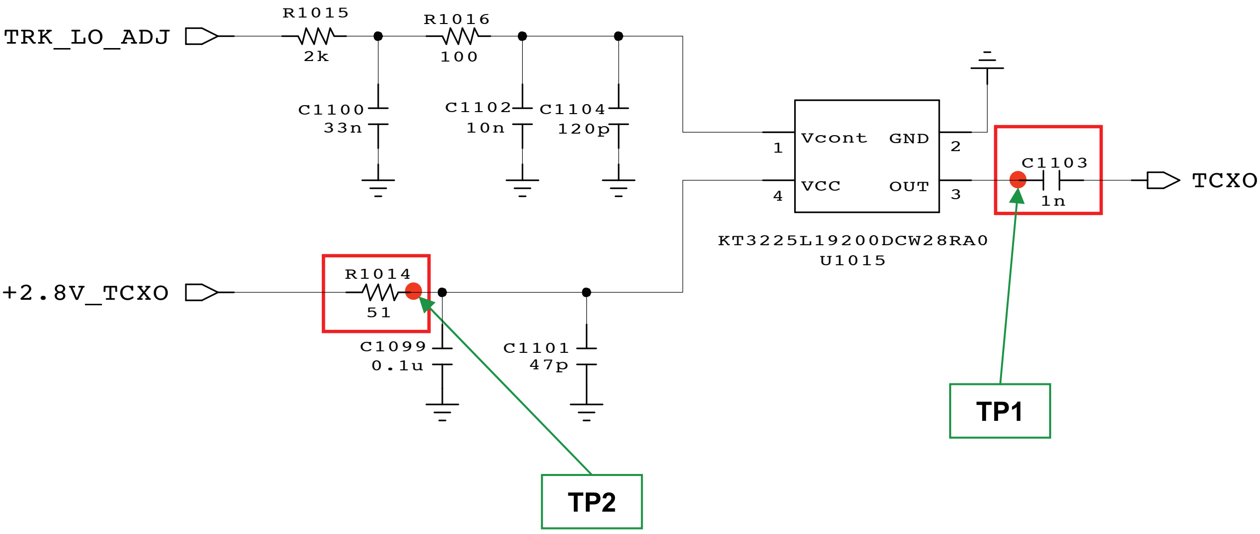
4.1.2.2 Checking VCTCXO circuit

Test Point

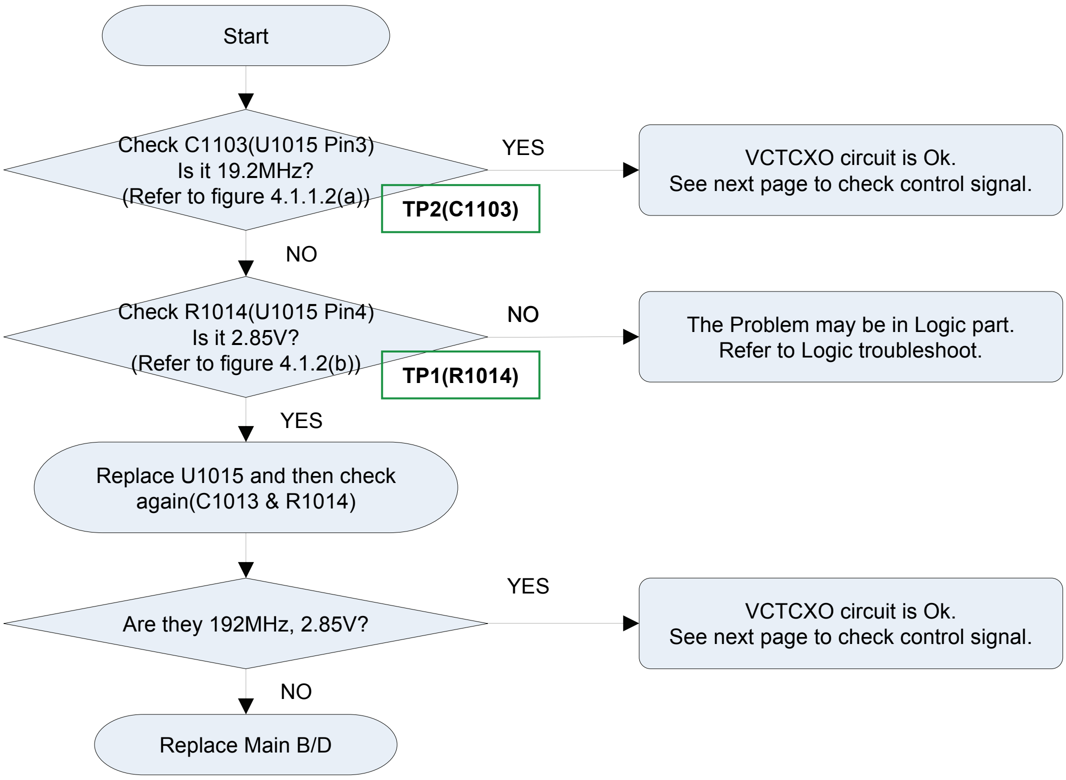




Circuit Diagram



Checking Flow



Waveform

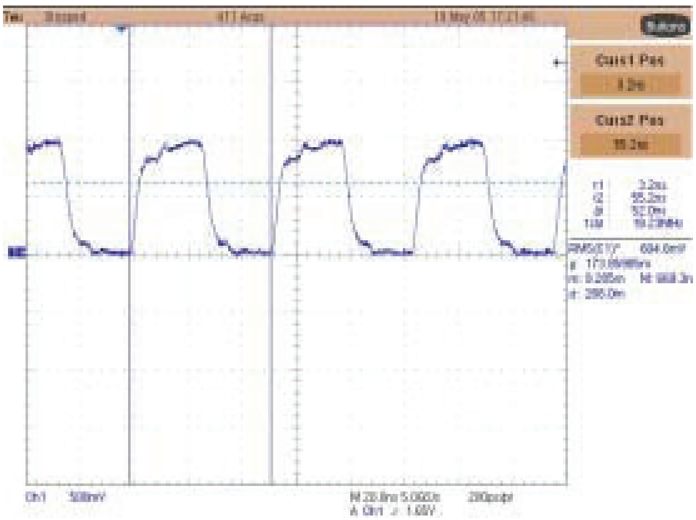


Figure 4.1.2 (a)

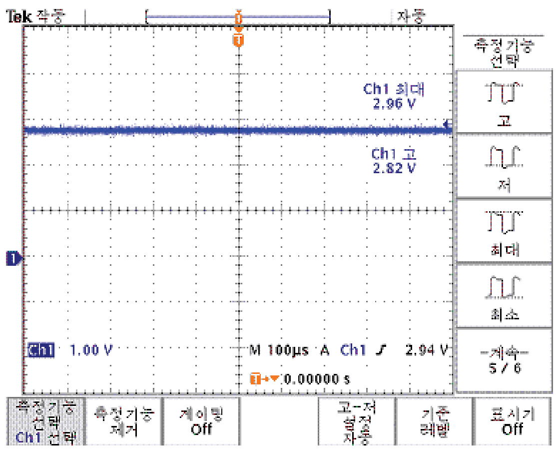
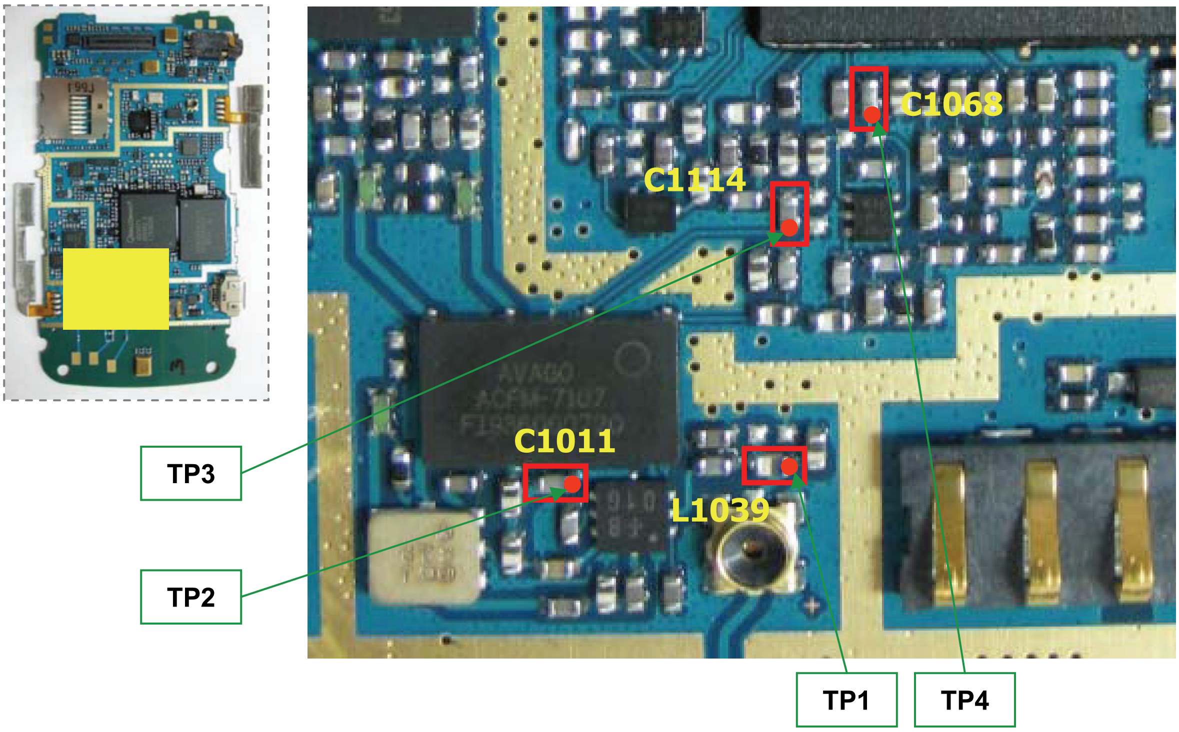


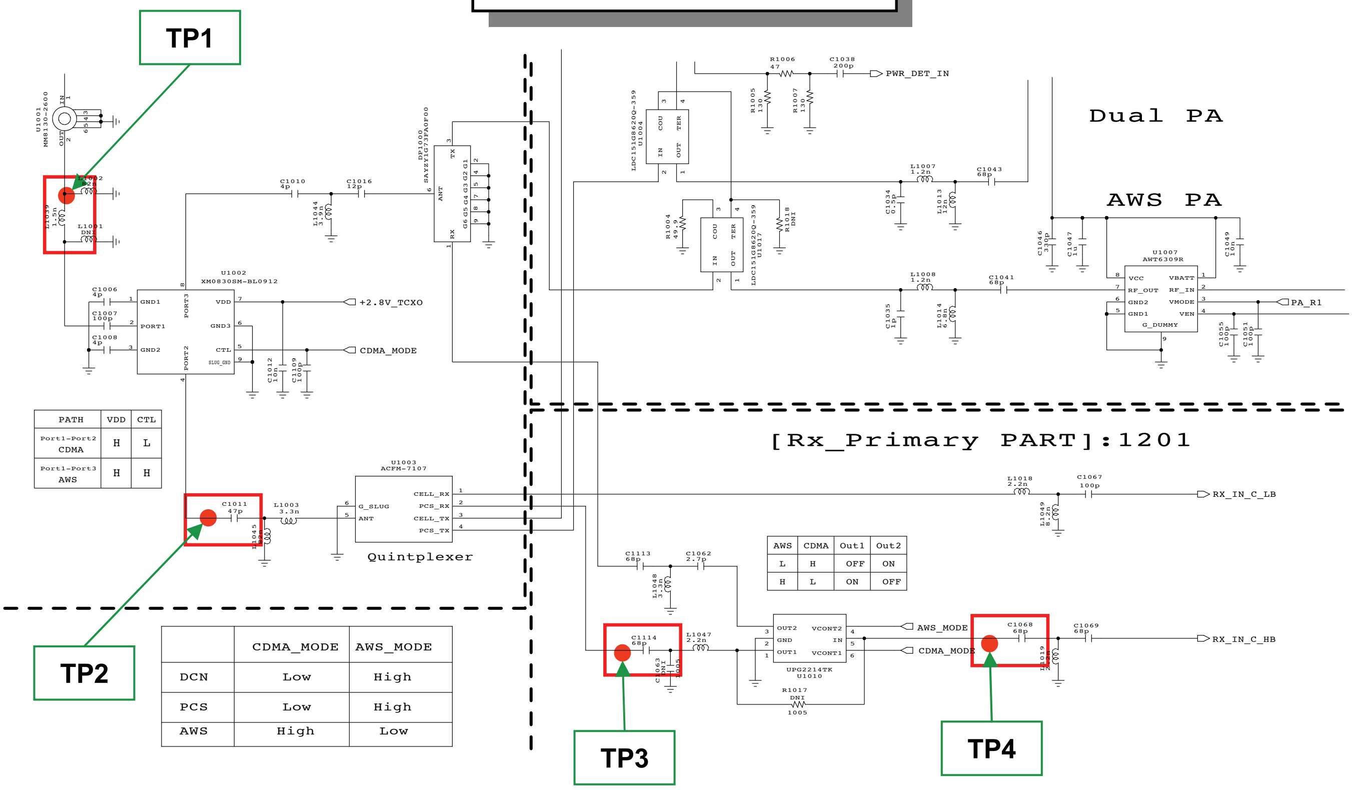
Figure 4.1.2 (b)

4.1.2.3 Checking RF signal path (Mobile S/W, Quintplexer)

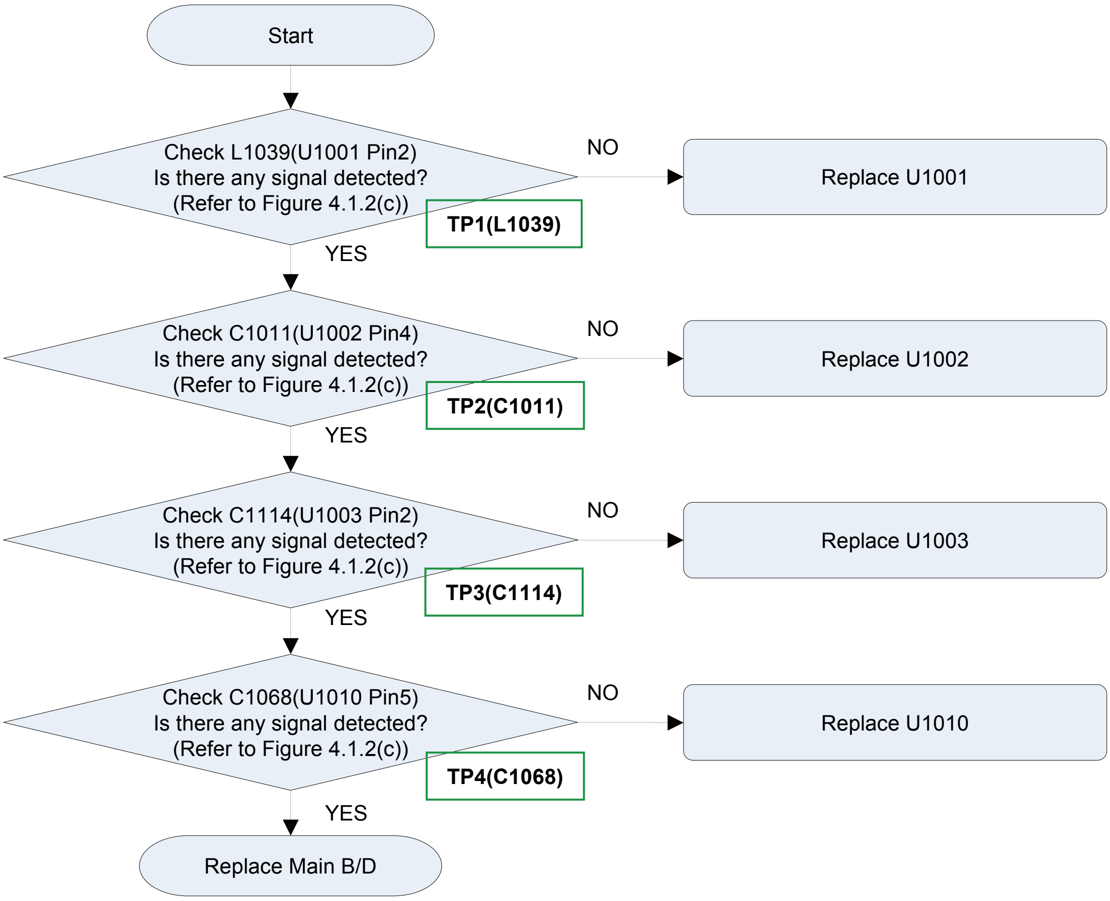
Test Point



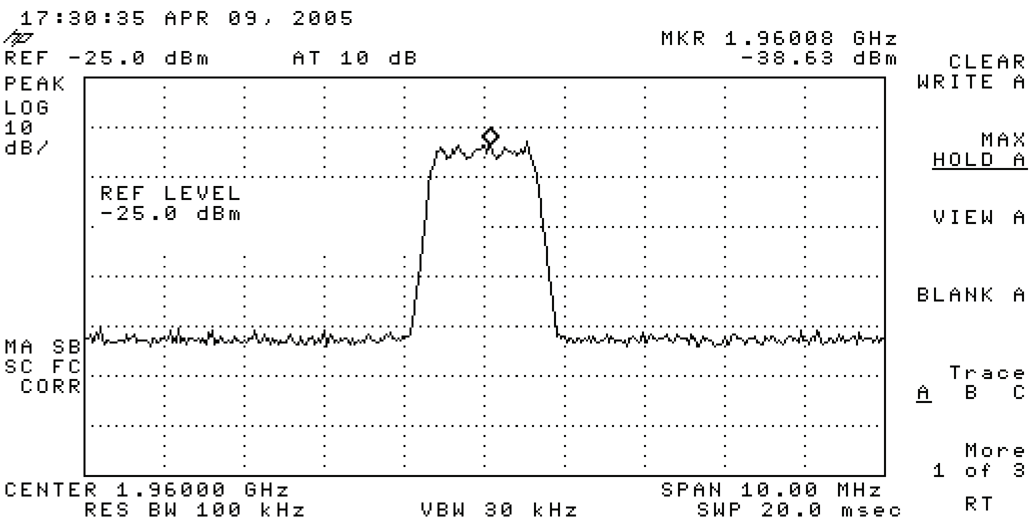
Circuit Diagram



Checking Flow



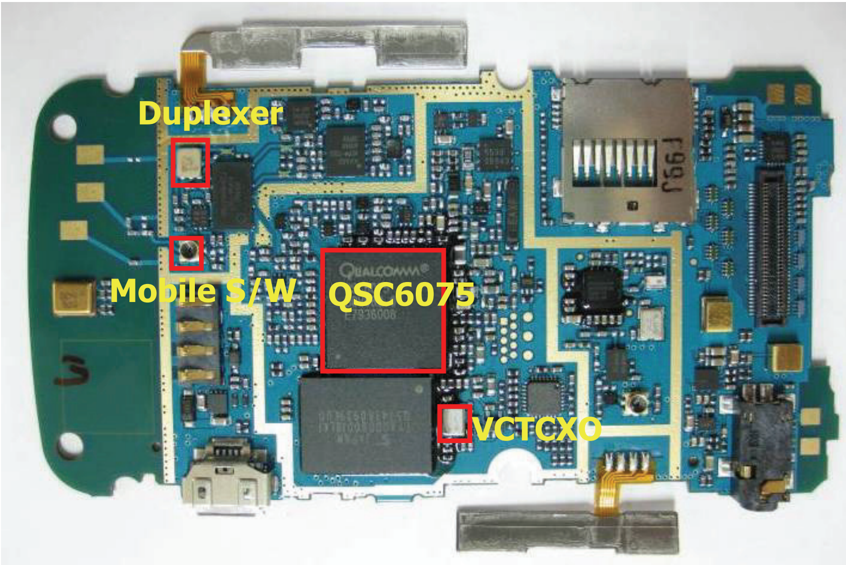
Waveform



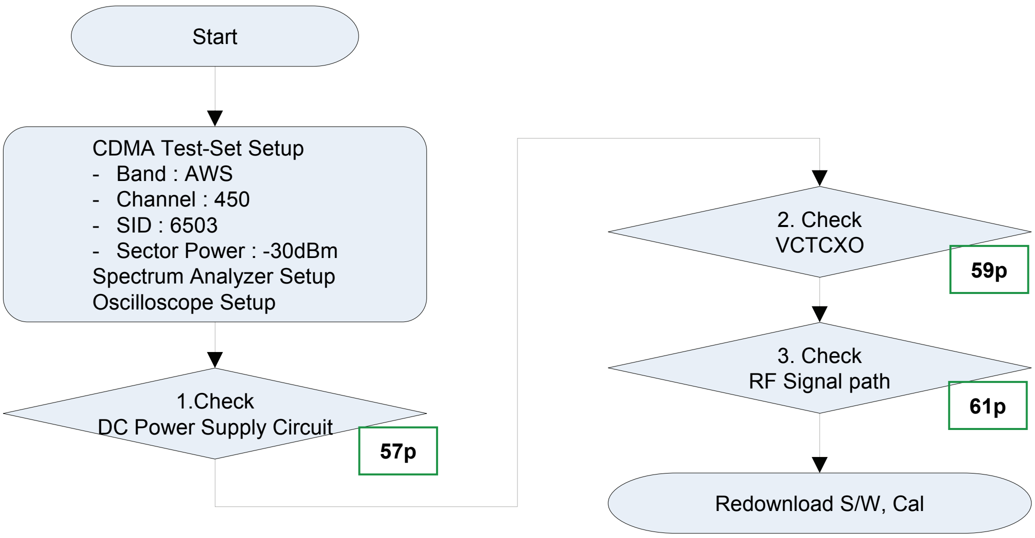
4.1.2 (c)

4.1.3 AWS Rx

Test Point

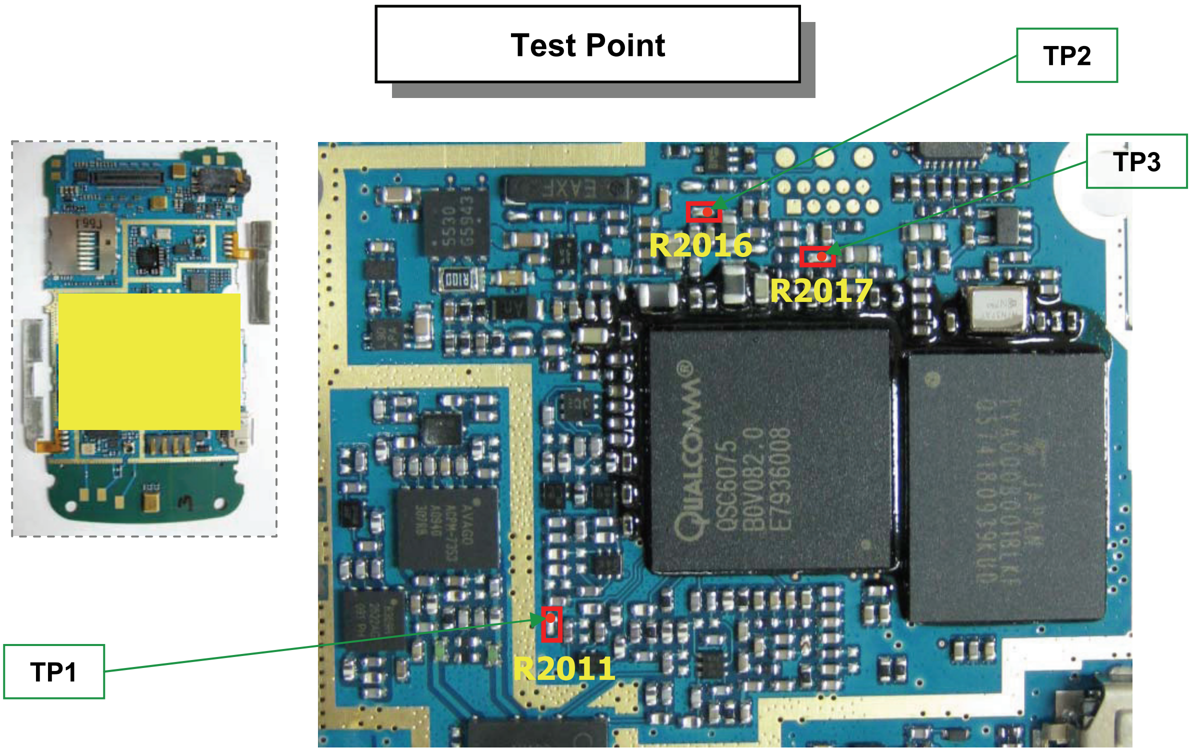


Check flow

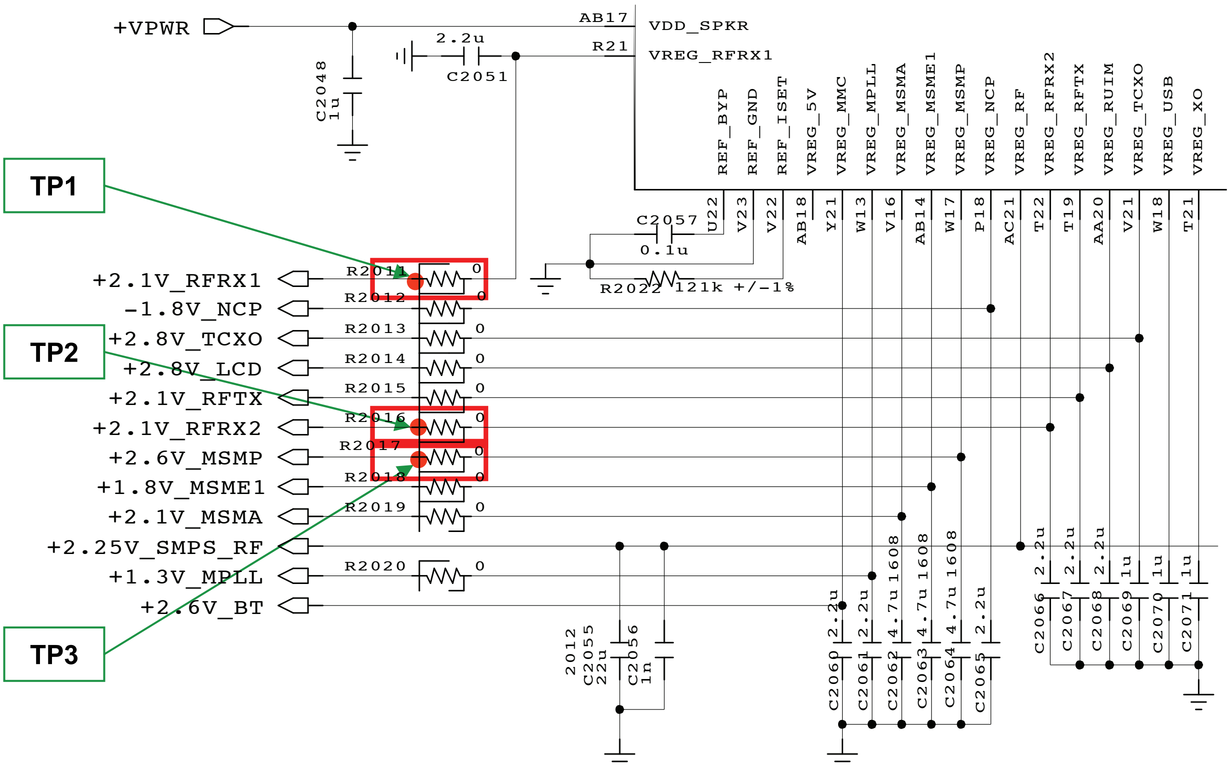


4.1.3.1 Checking DC Power supply circuit (PMIC)

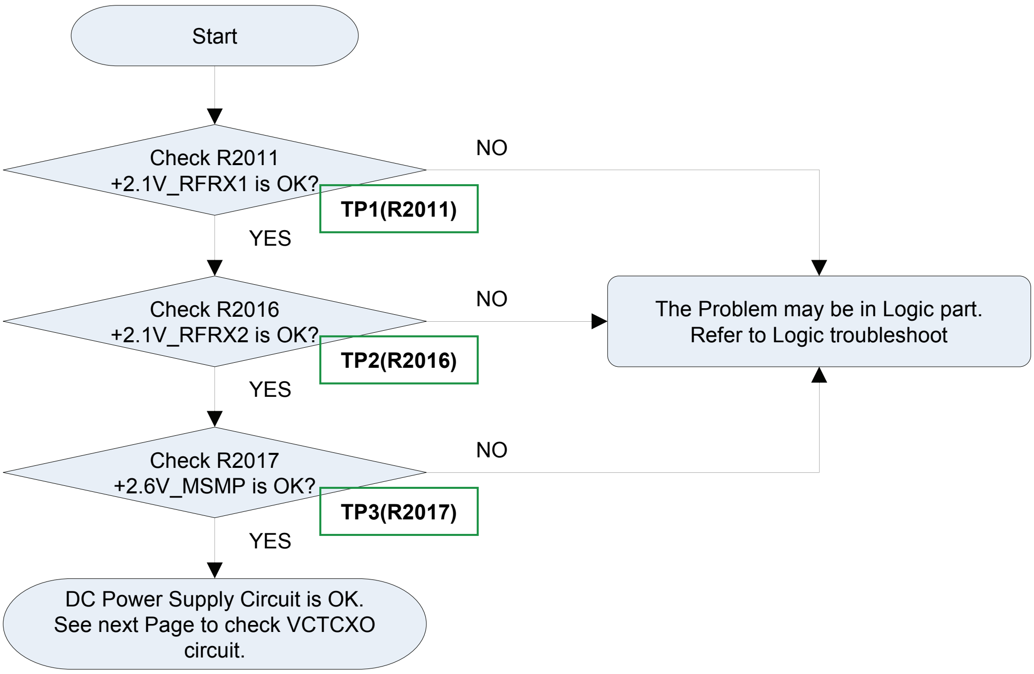
Test Point



Circuit Diagram

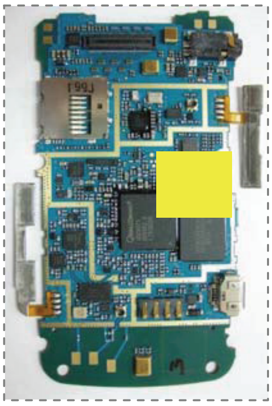


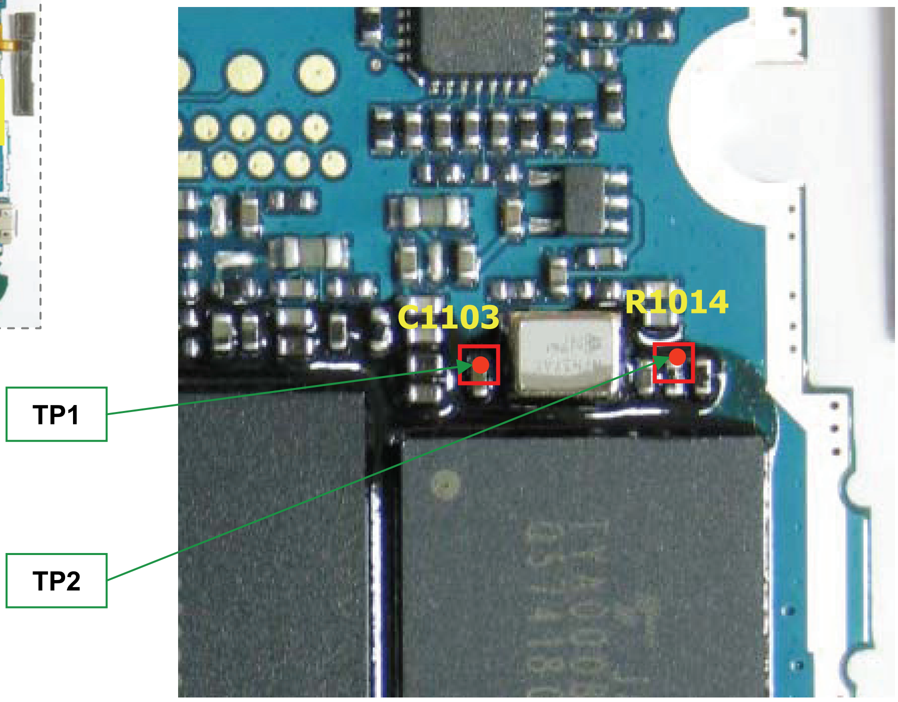
Checking Flow



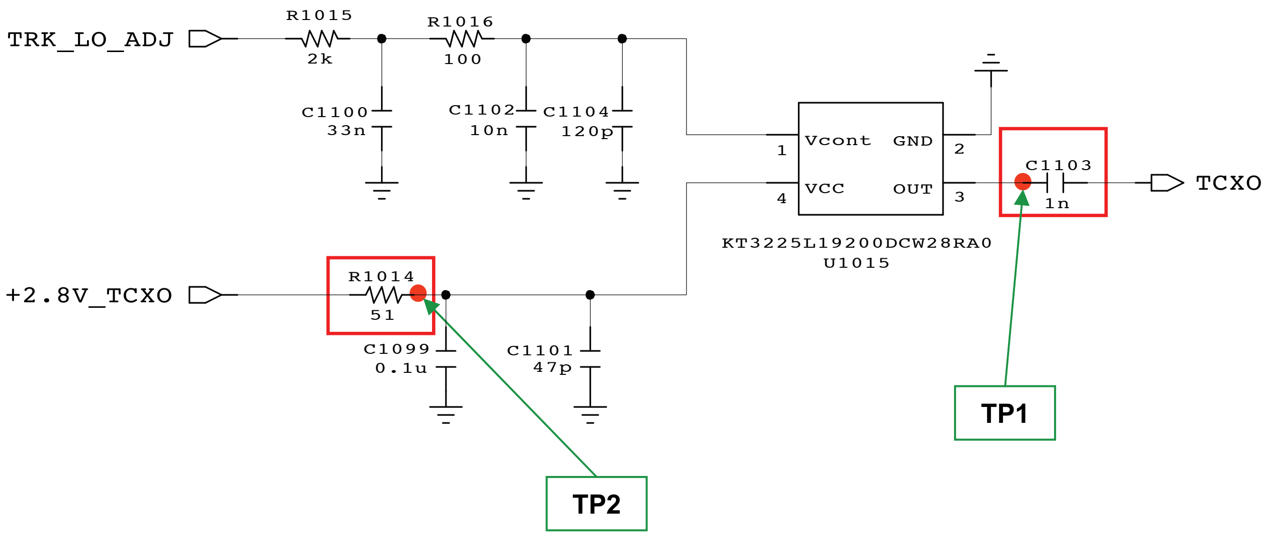
4.1.3.2 Checking VCTCXO circuit

Test Point

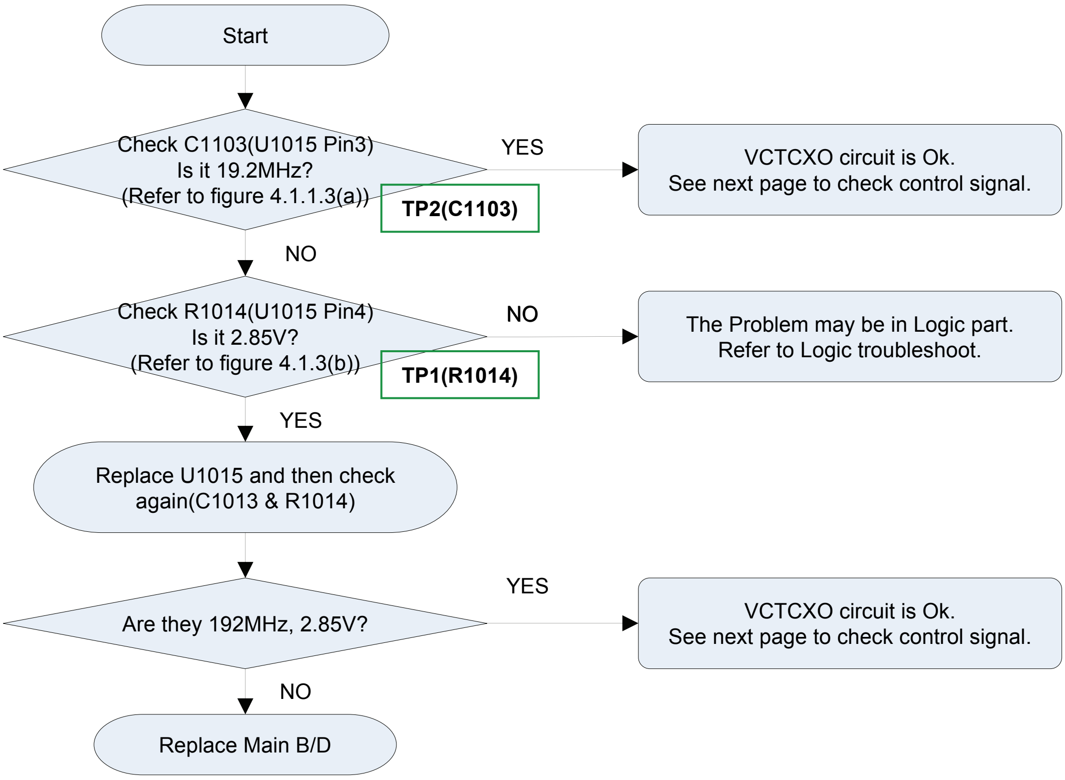




Circuit Diagram



Checking Flow



Waveform

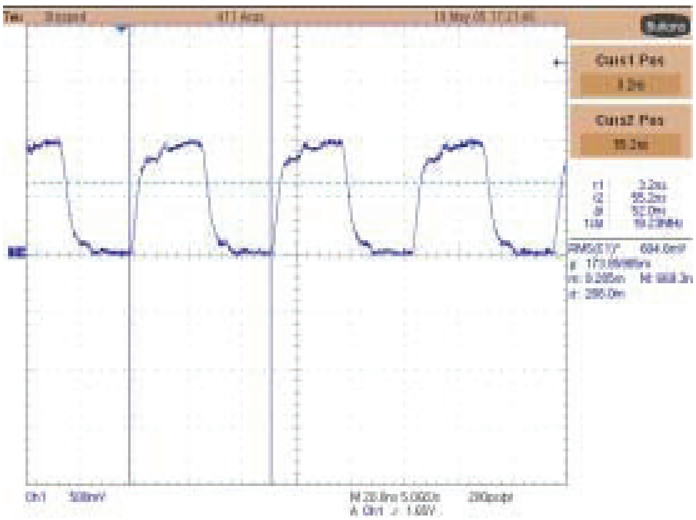


Figure 4.1.3 (a)

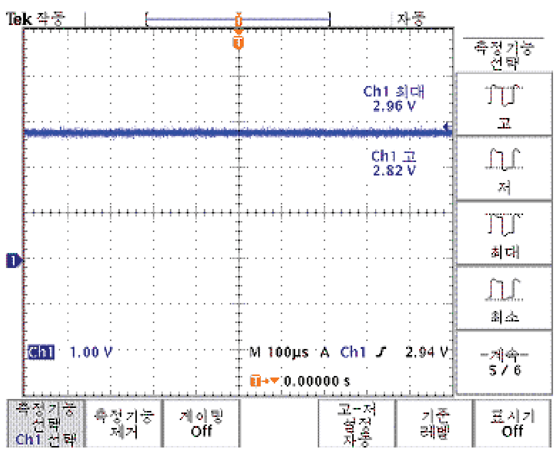
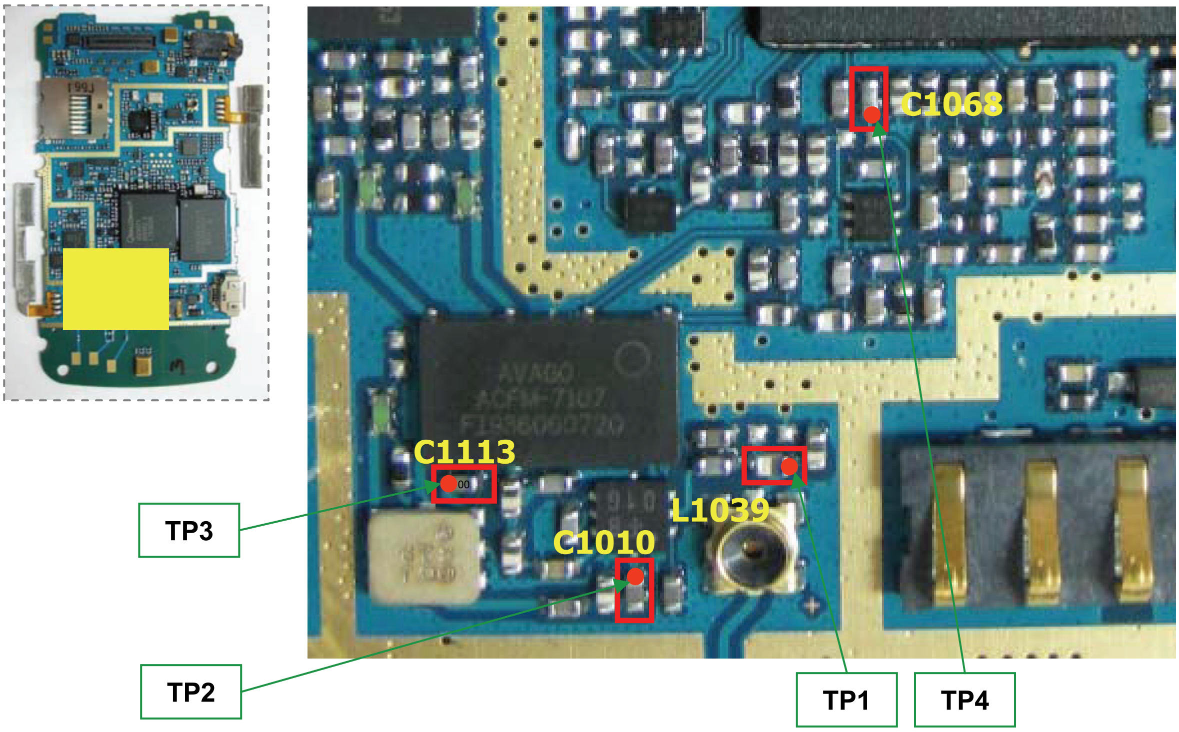


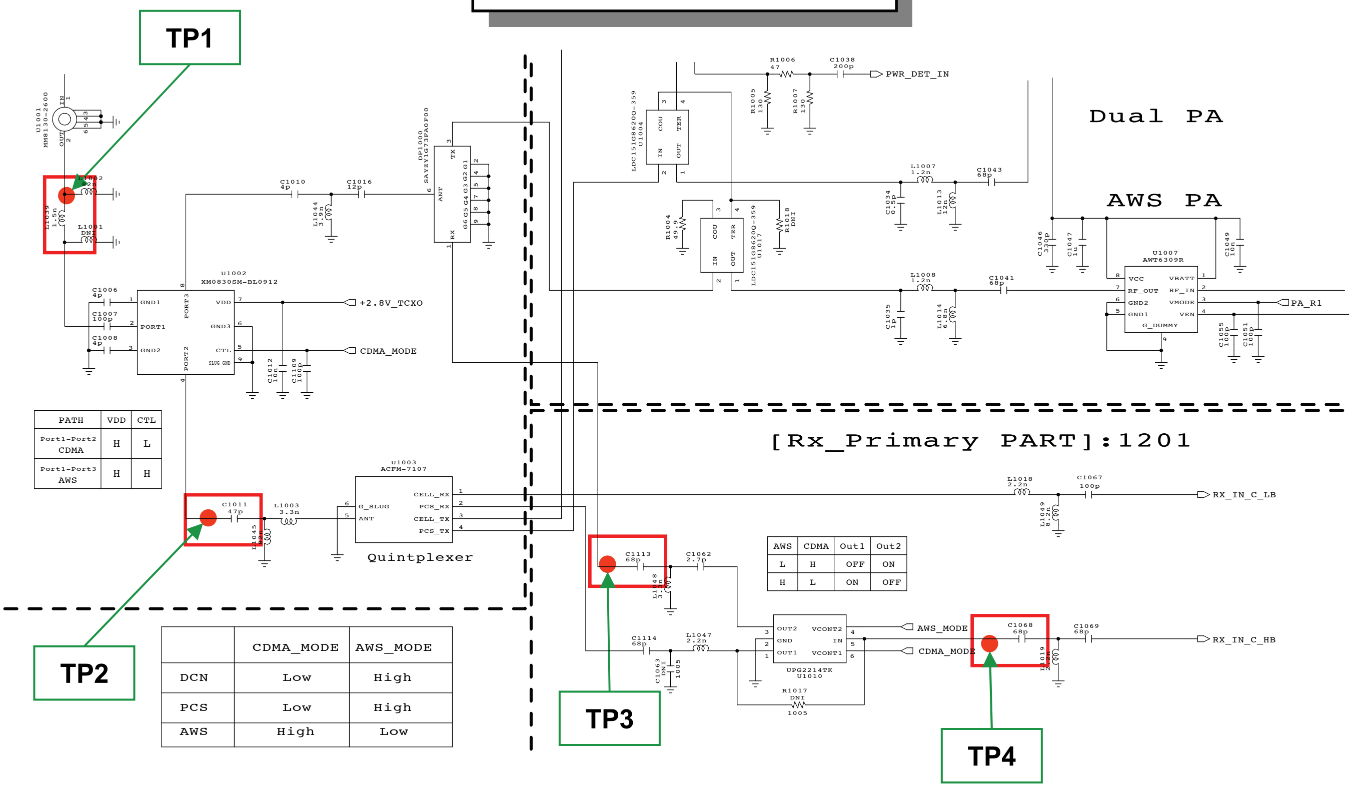
Figure 4.1.3 (b)

4.1.3.3 Checking RF signal path (Mobile S/W, Quintplexer)

Test Point



Circuit Diagram

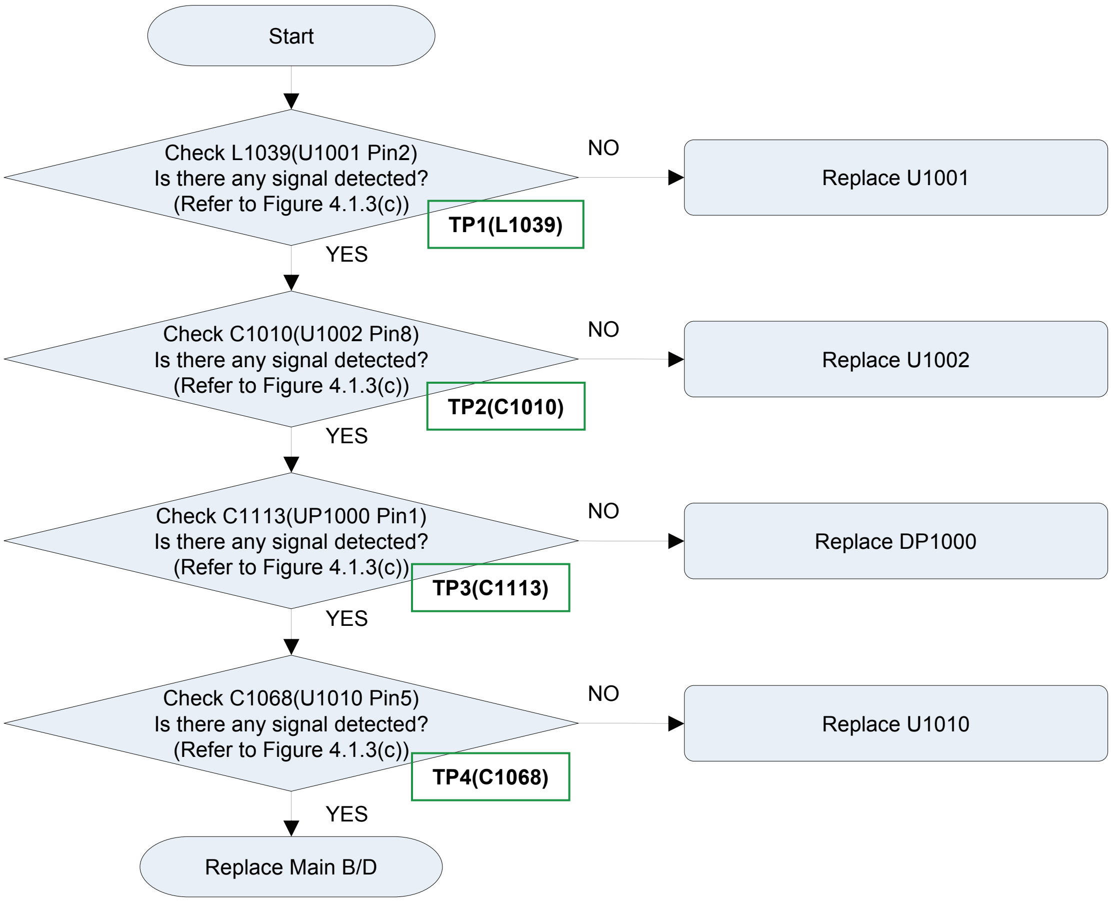


PATH	VDD	CTL
Port1-Port2 CDMA	H	L
Port1-Port3 AWS	H	H

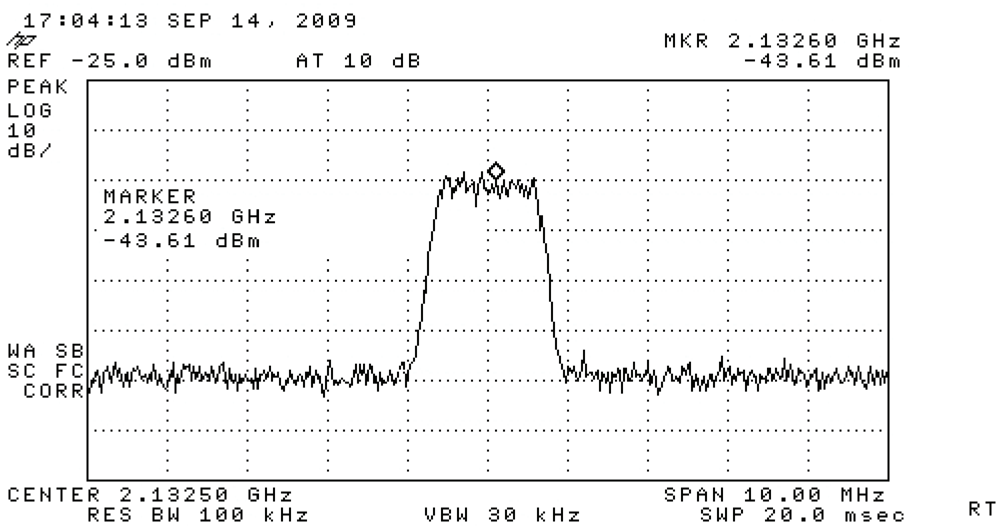
	CDMA_MODE	AWS_MODE
DCN	Low	High
PCS	Low	High
AWS	High	Low

AWS	CDMA	Out1	Out2
L	H	OFF	ON
H	L	ON	OFF

Checking Flow



Waveform

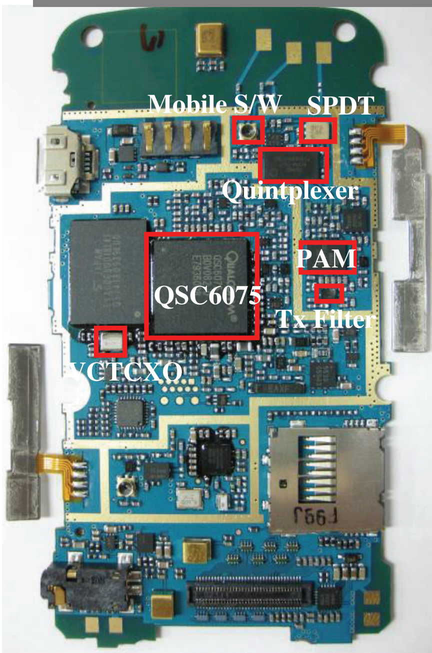


4.1.3 (c)

4.2 Tx Part Trouble

4.2.1 DCN Tx

Test Point



Checking Flow

Start

TO use joy-phone

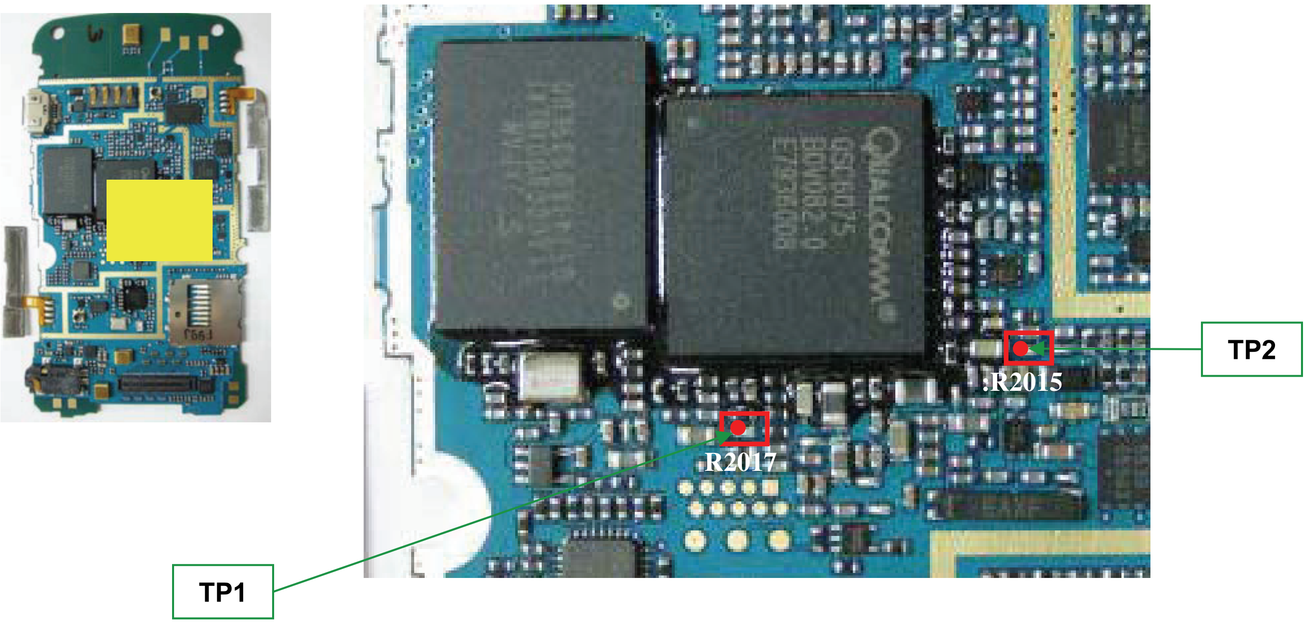
- Select DCN Band & CH 384
- SET High Power Mode
- Measure frequency domain waveform with Spectrum analyzer
- Measure time domain waveform with Oscilloscope

1. Check DC Power Supply circuit — 64p
2. Check VCTCXO — 66p
3. Check QSC6075 — 68p
4. Check TX SAW — 70p
5. Check DCN PAM — 71p
6. Check Quintplexer — 73p
7. Check SPDT — 76p
8. Check Mobile Switch — 78p

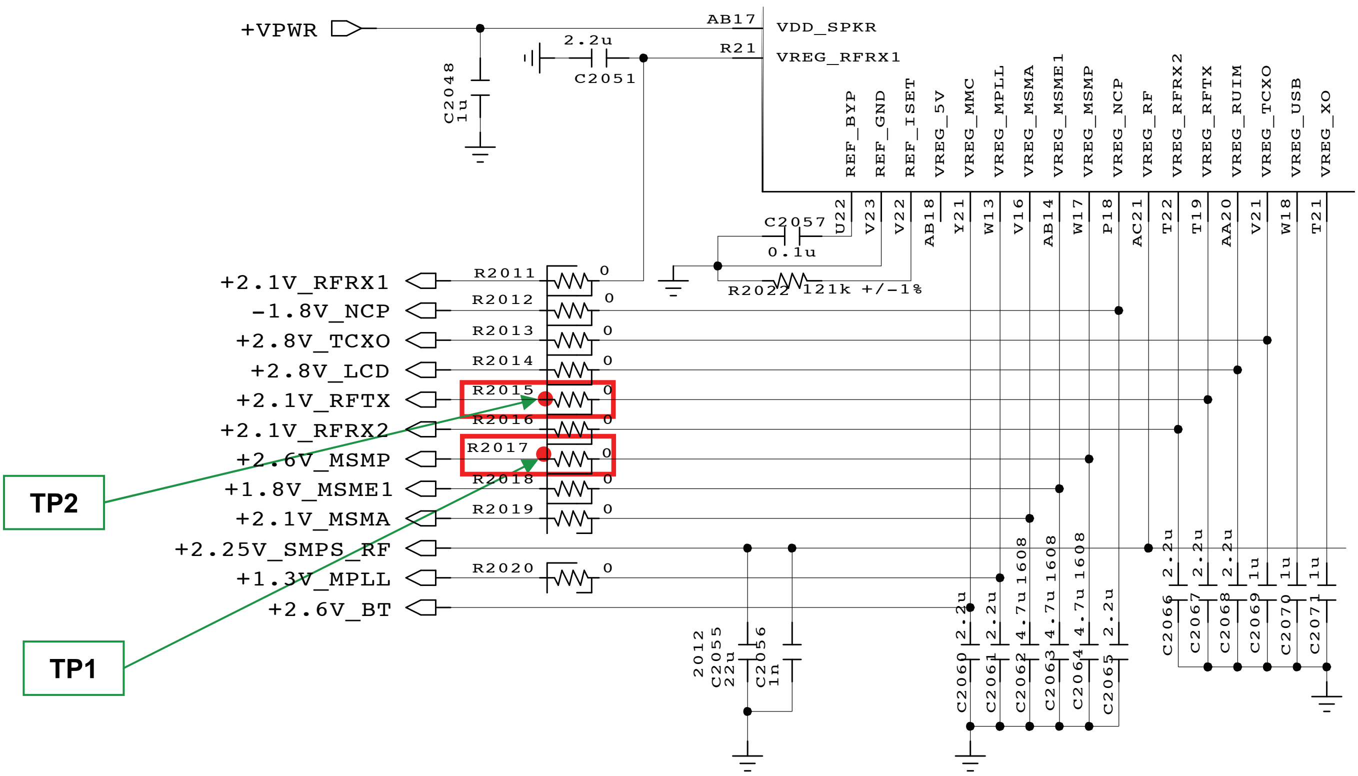
Redownload S/W, Cal

4.2.1.1 Checking DC Power supply circuit (PMIC)

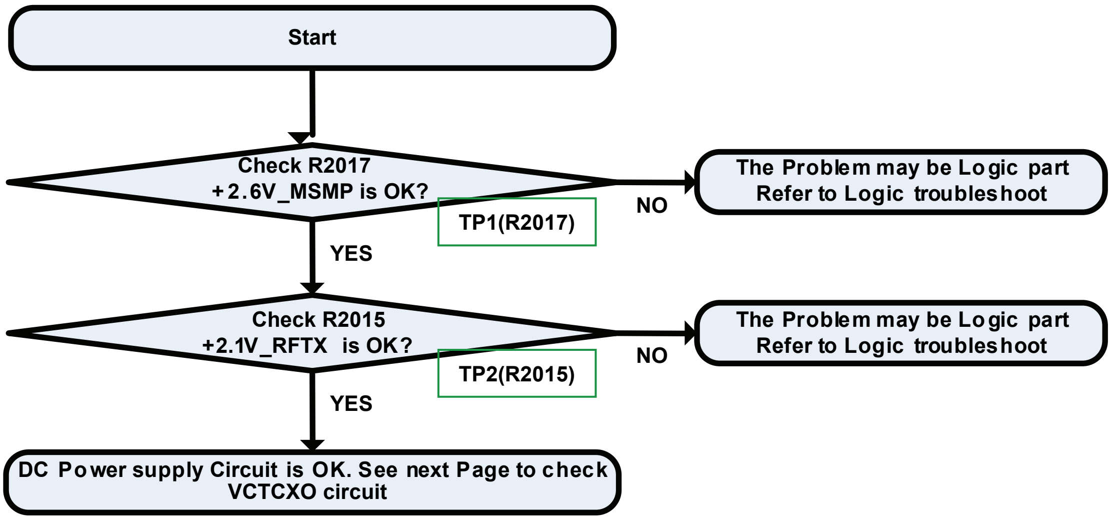
Test Point



Circuit Diagram

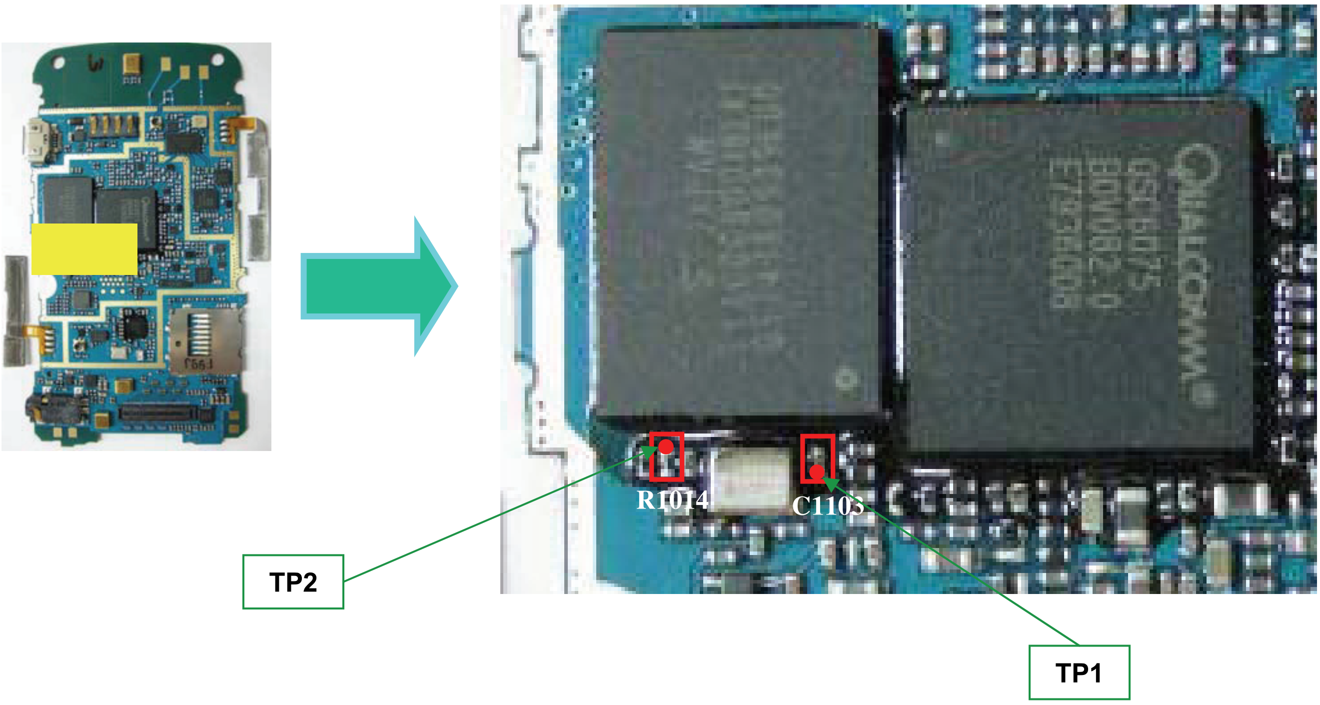


Checking Flow

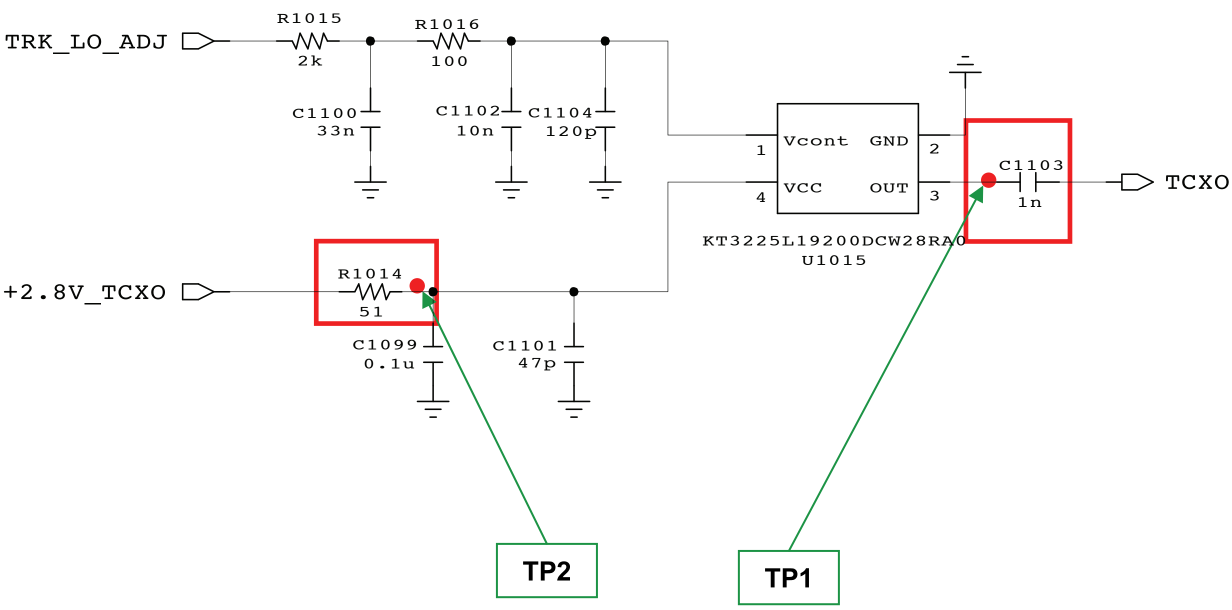


4.2.1.2 Checking VCTCXO circuit

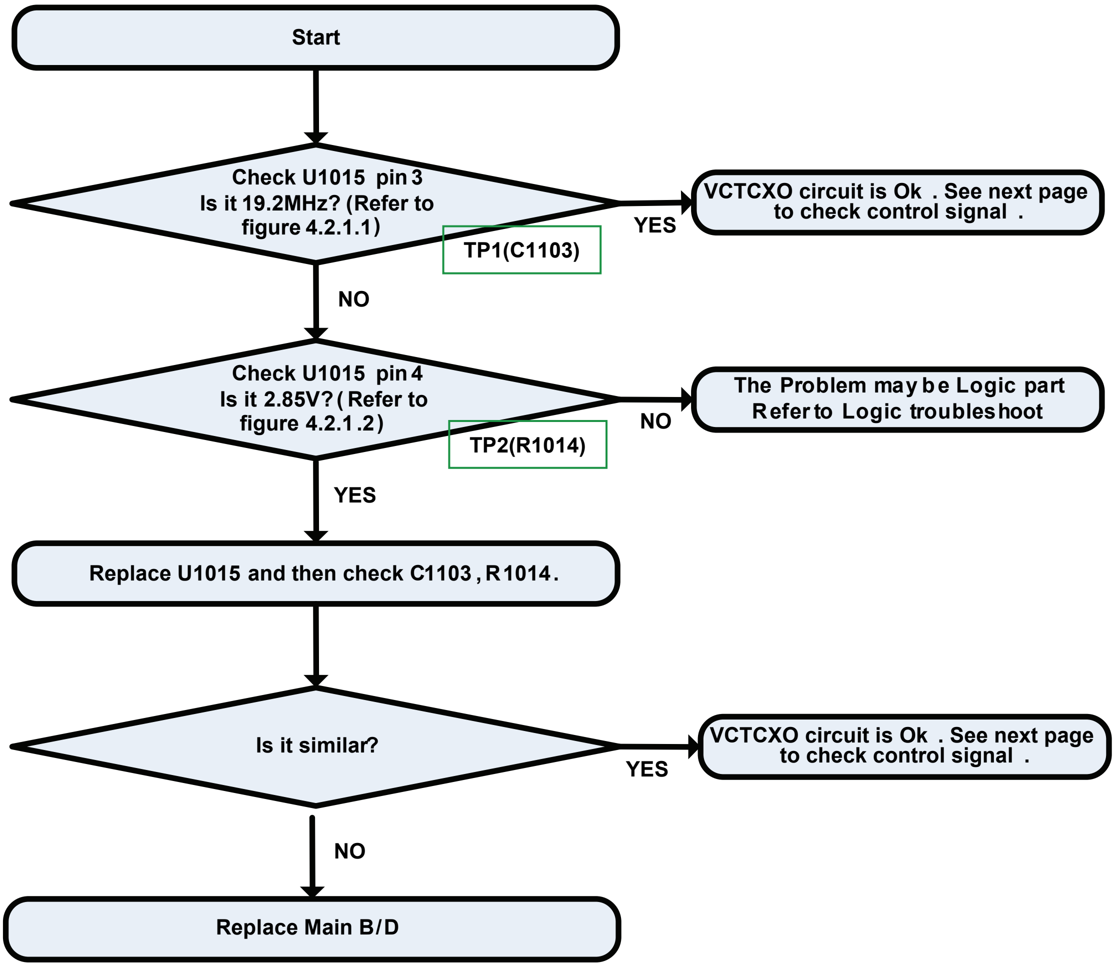
Test Point



Circuit Diagram



Checking Flow



Waveform

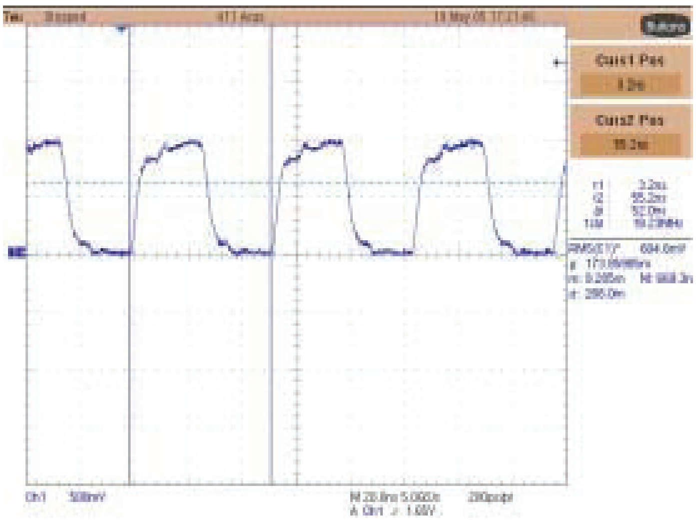


Figure 4.2.1.1

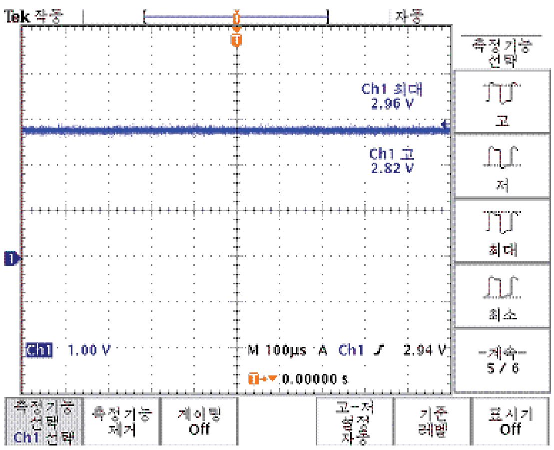
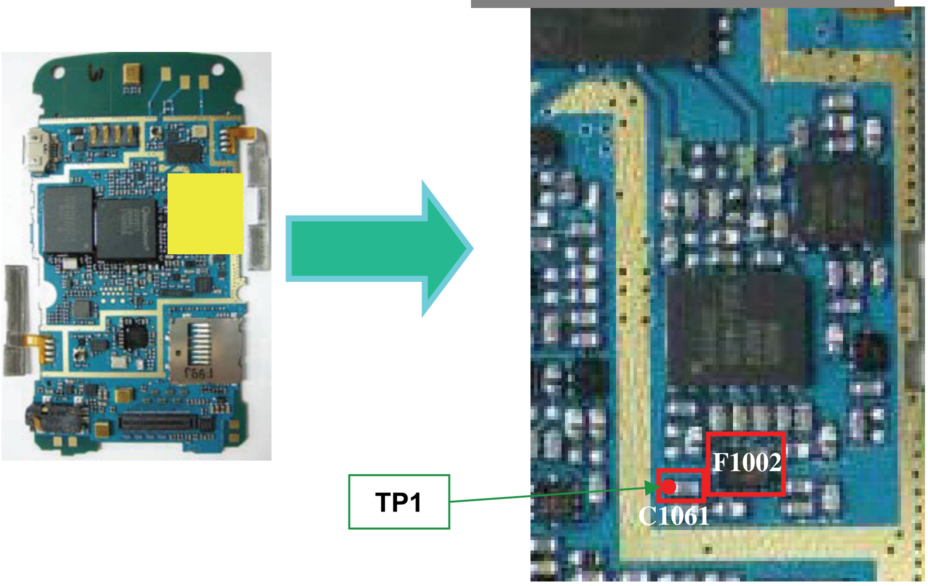


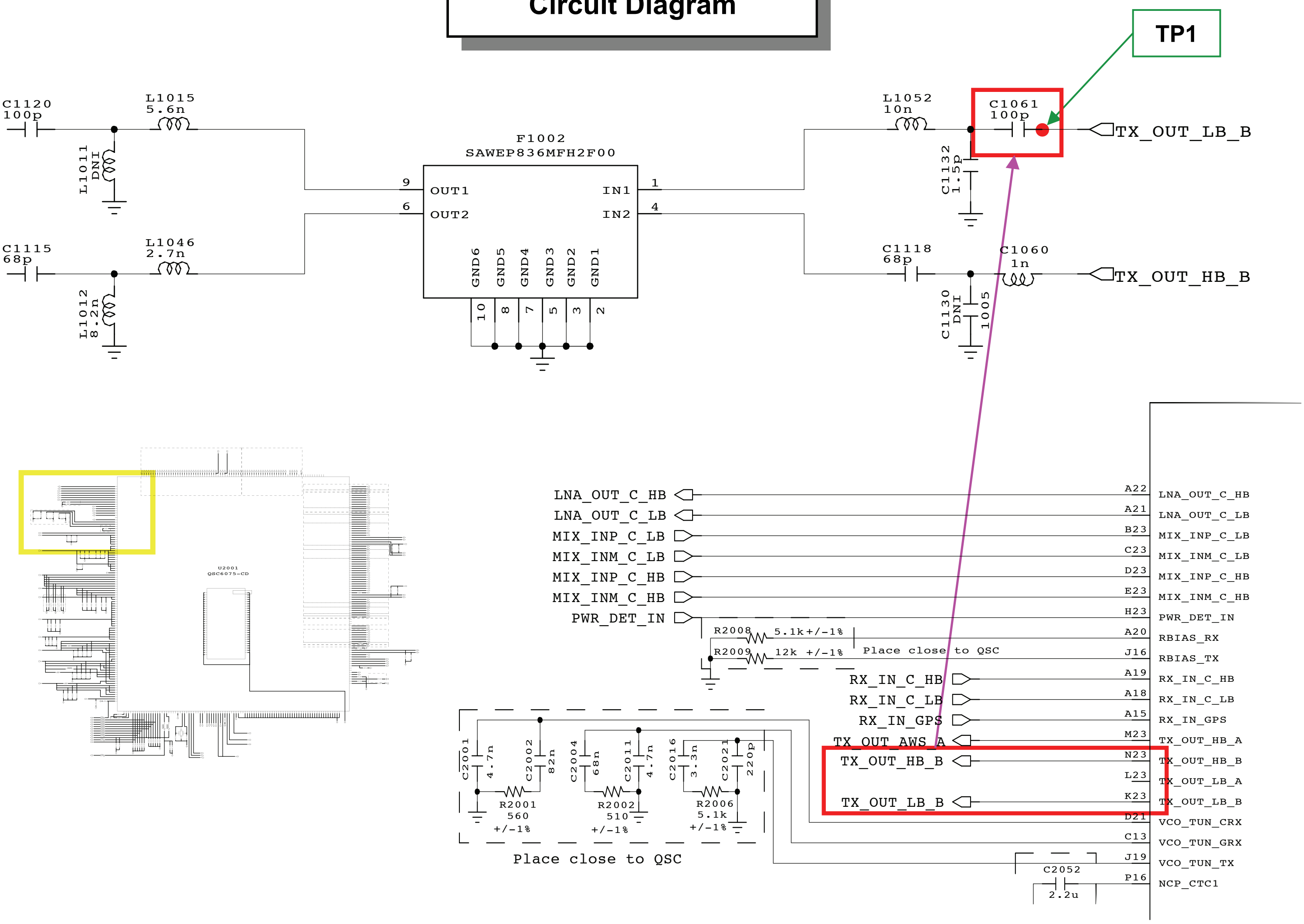
Figure 4.2.1.2

4.2.1.3 Checking QSC6075 circuit

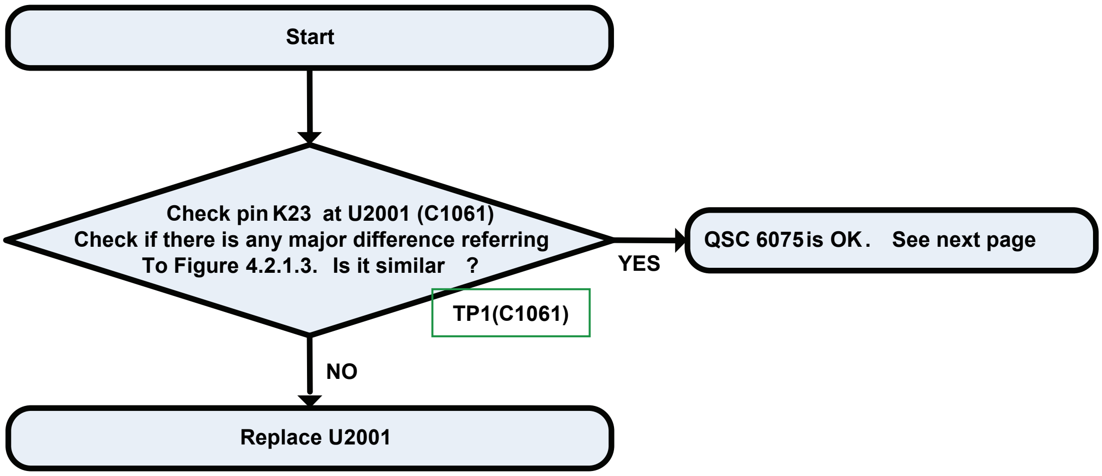
Test Point



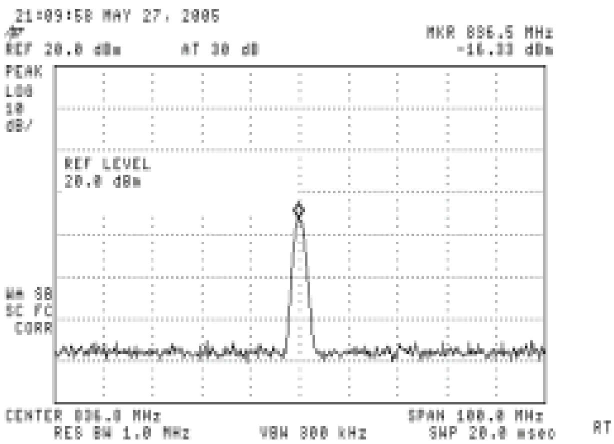
Circuit Diagram



Checking Flow



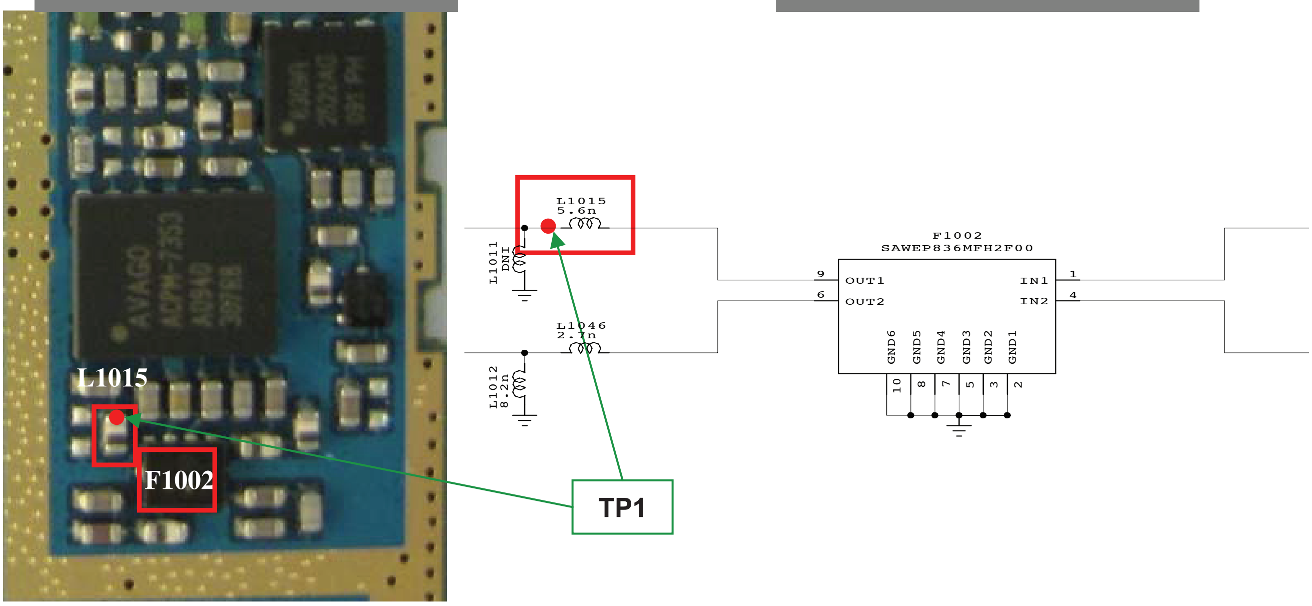
Waveform



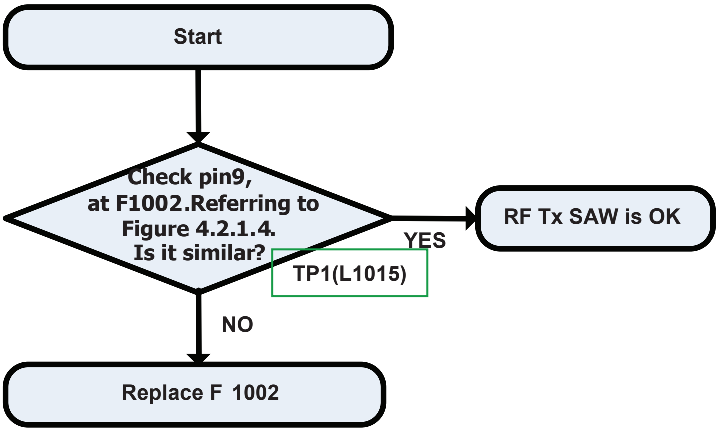
4.2.1.3

4.2.1.4 Check DCN RF Tx SAW

Test Point | **Circuit Diagram**



Checking Flow | **Waveform**



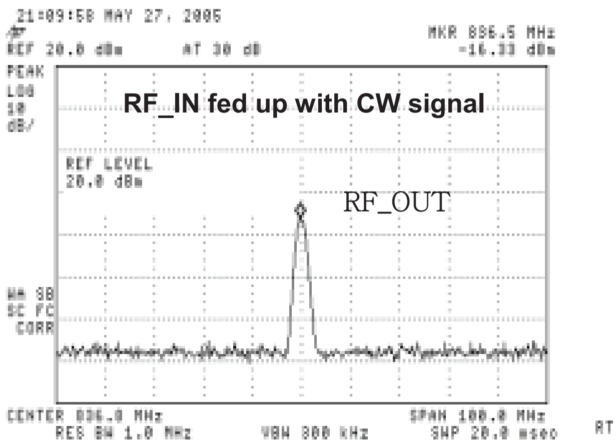
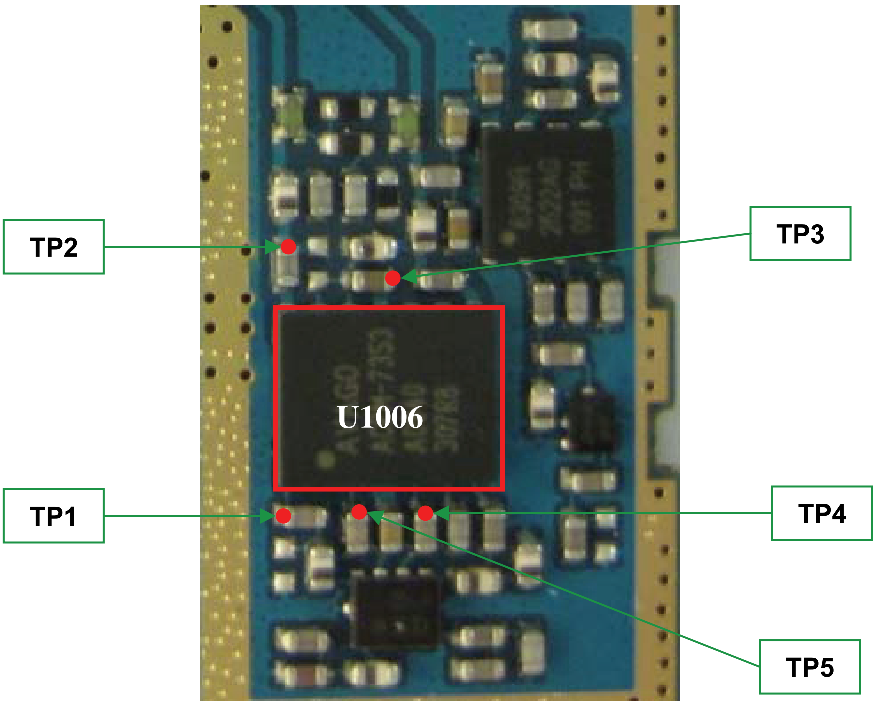
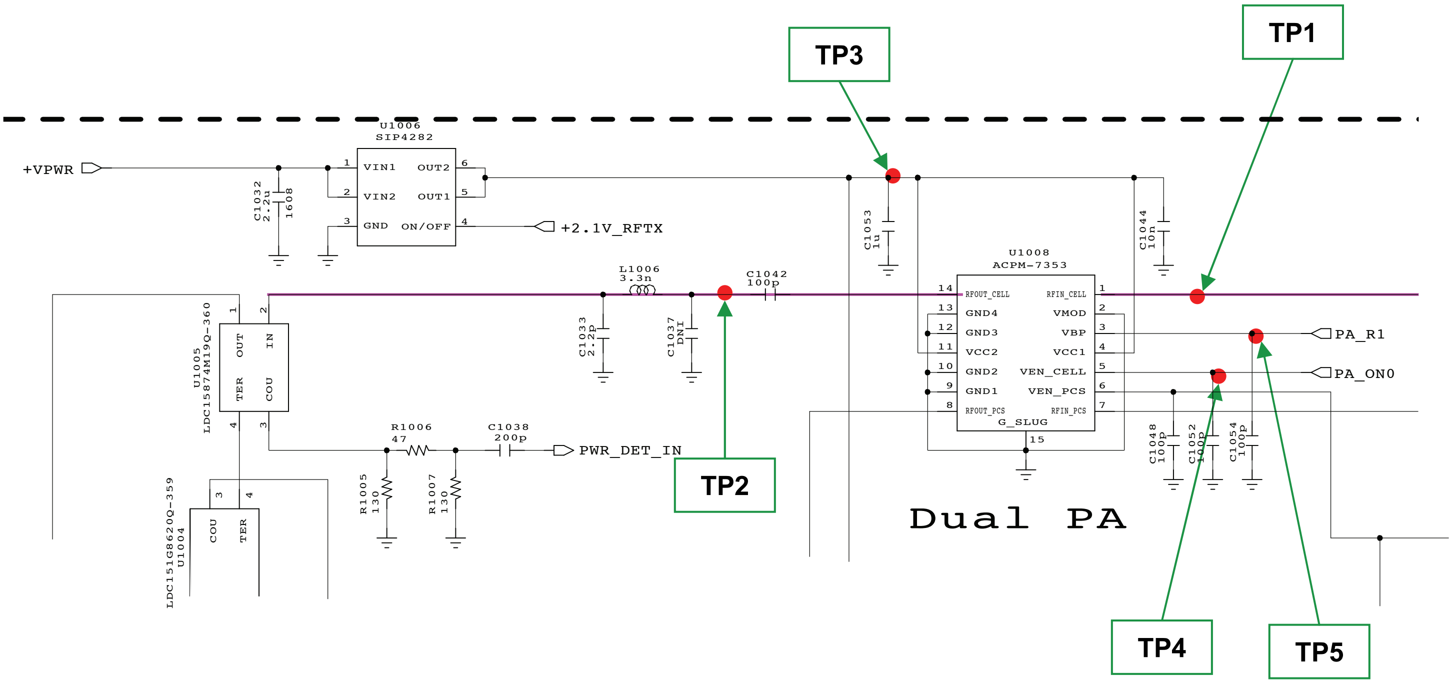


Figure 4.2.1.4

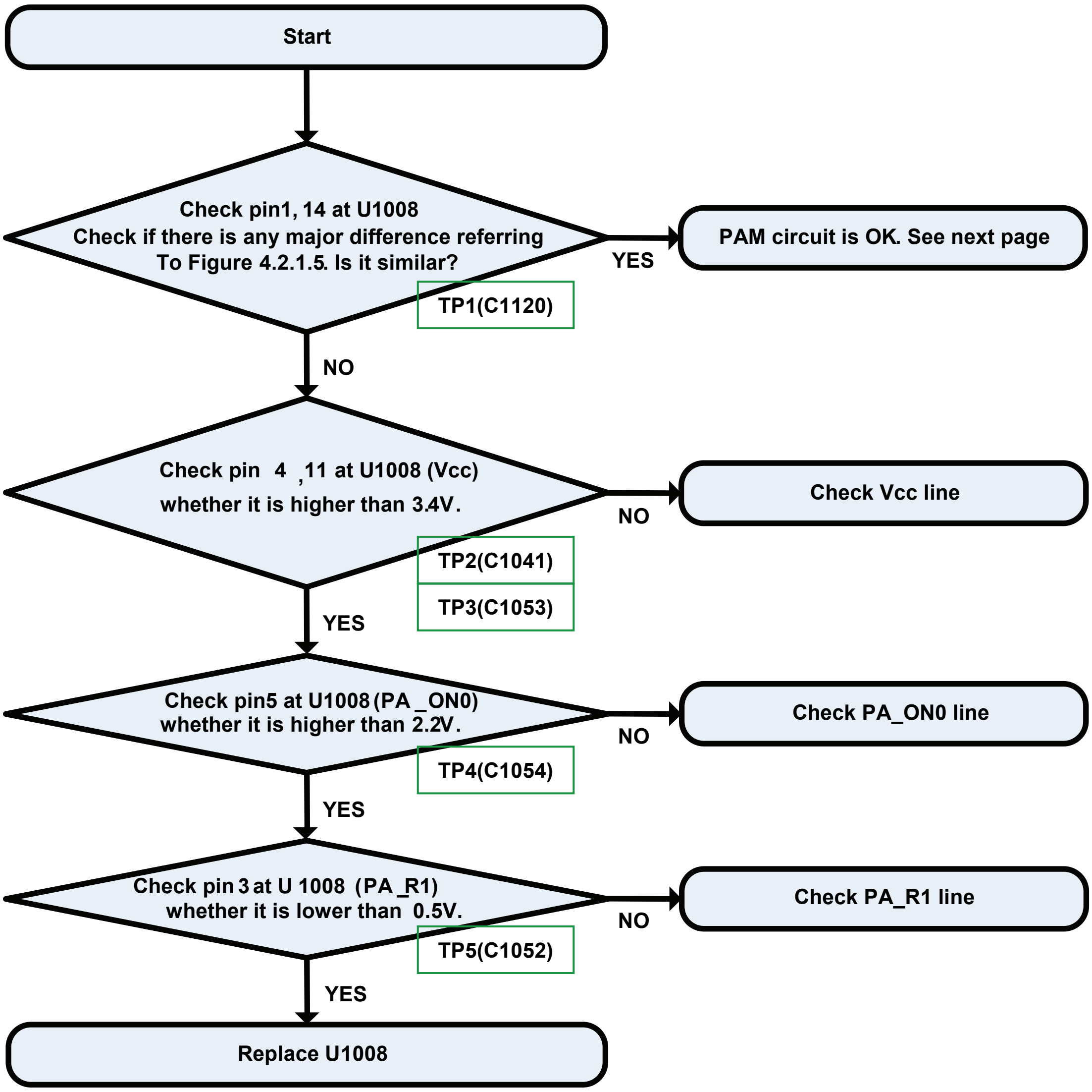
4.2.1.5 Check DCN PAM circuit

Test Point





Checking Flow



Waveform

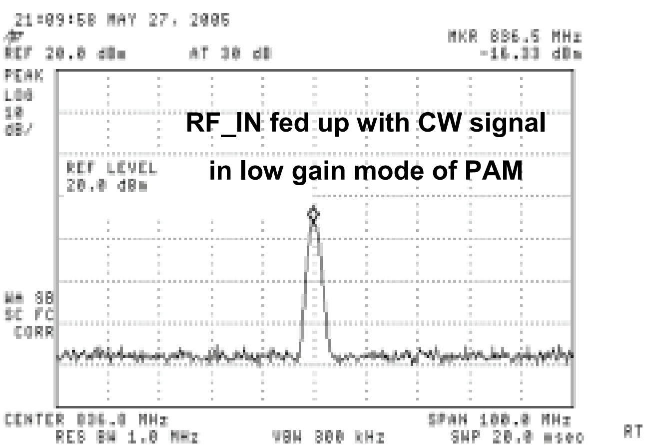
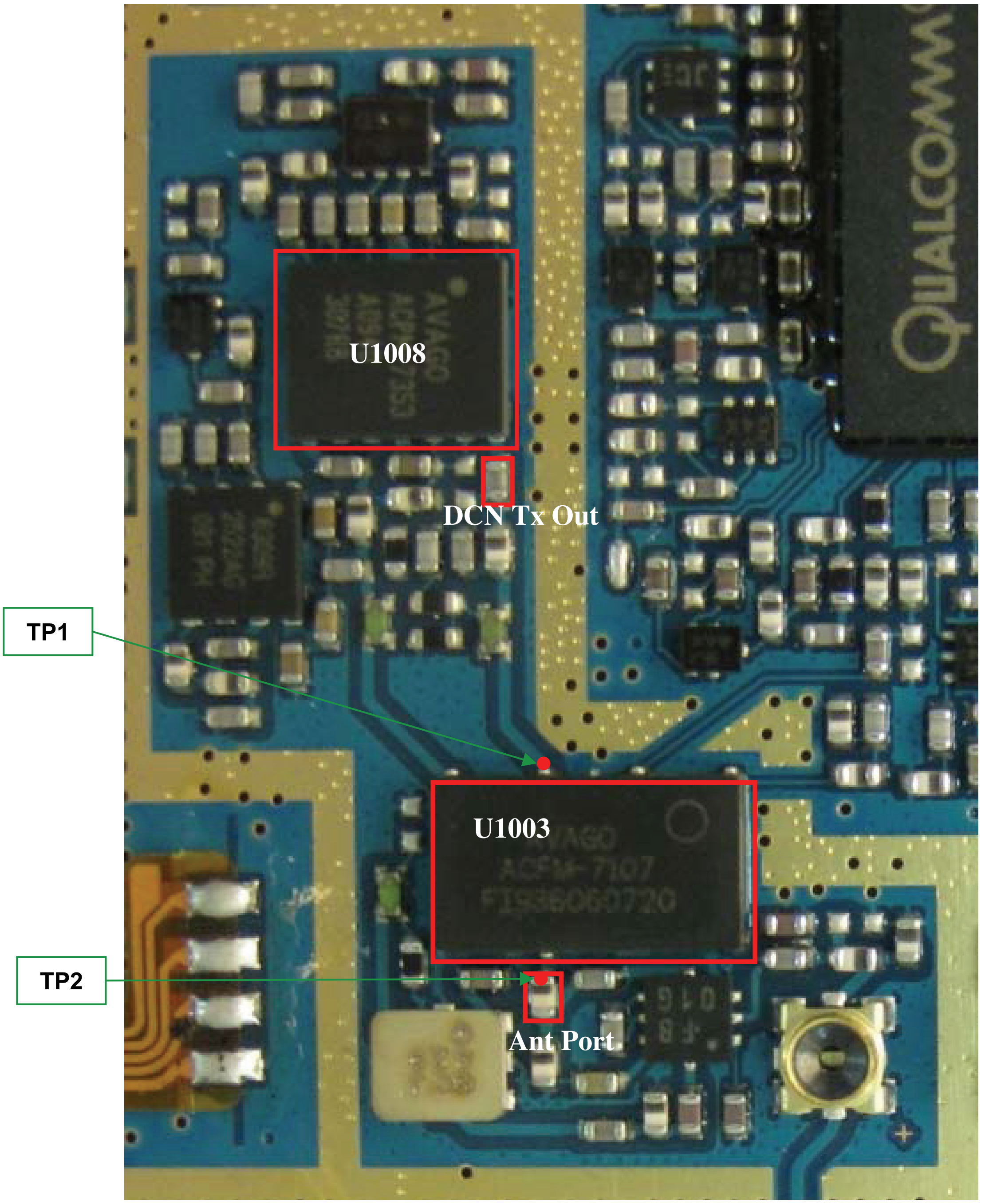


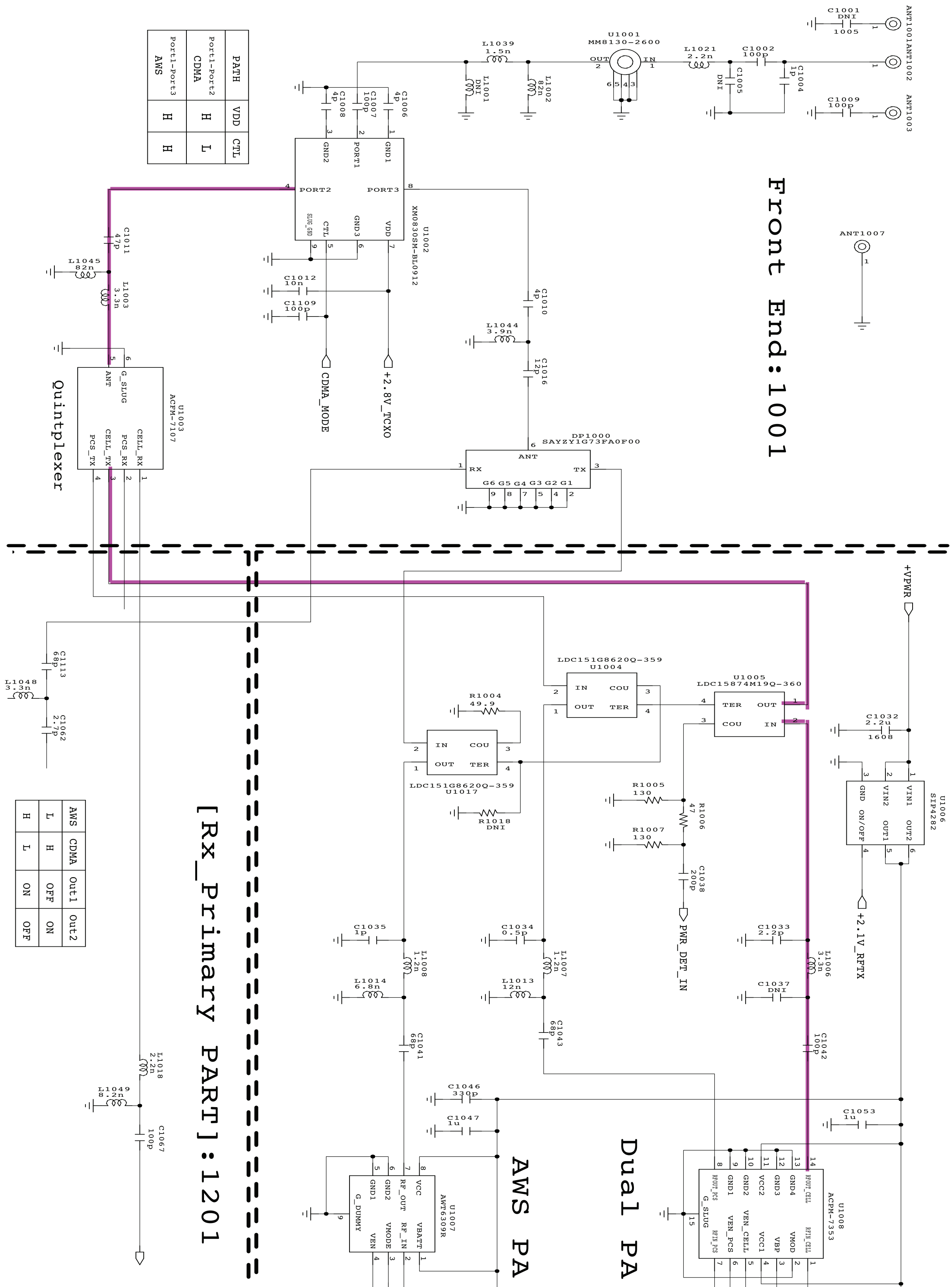
Figure 4.2.1.5

4.2.1.6 Check Quintplexer

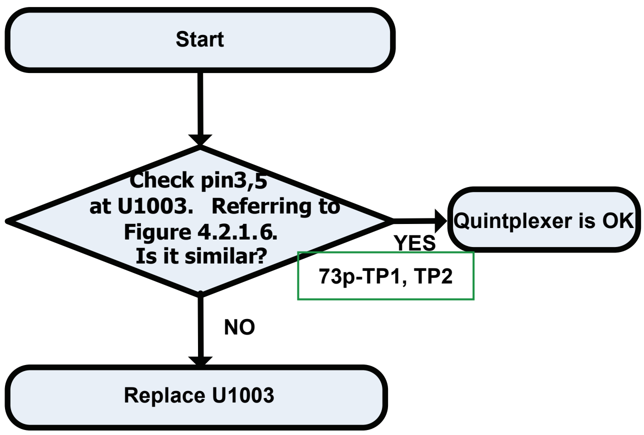
Test Point



Circuit Diagram



Checking Flow



Waveform

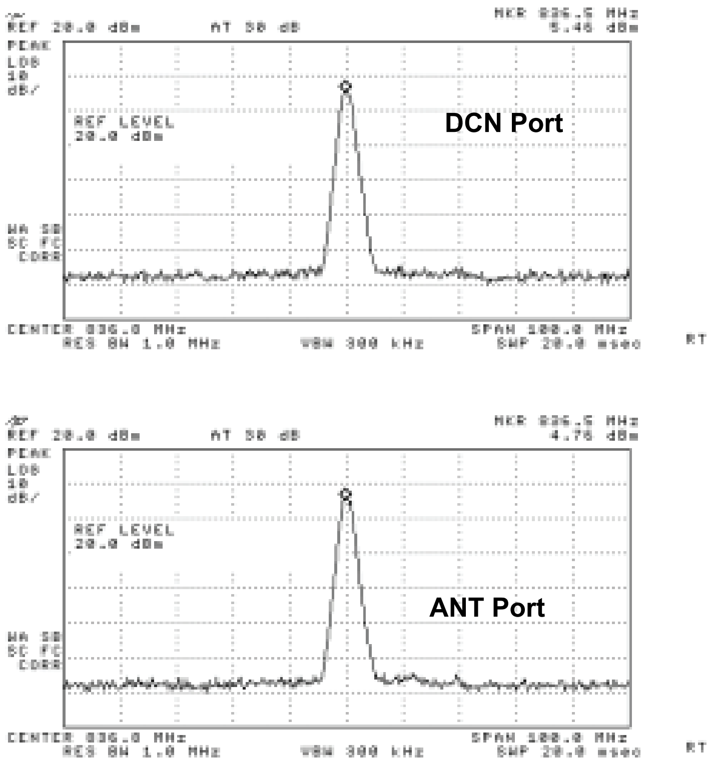
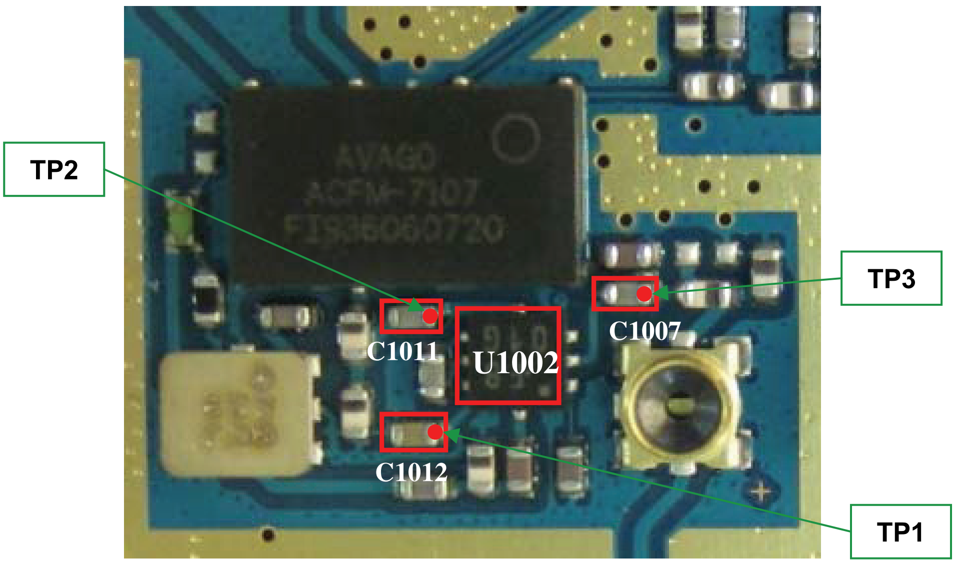


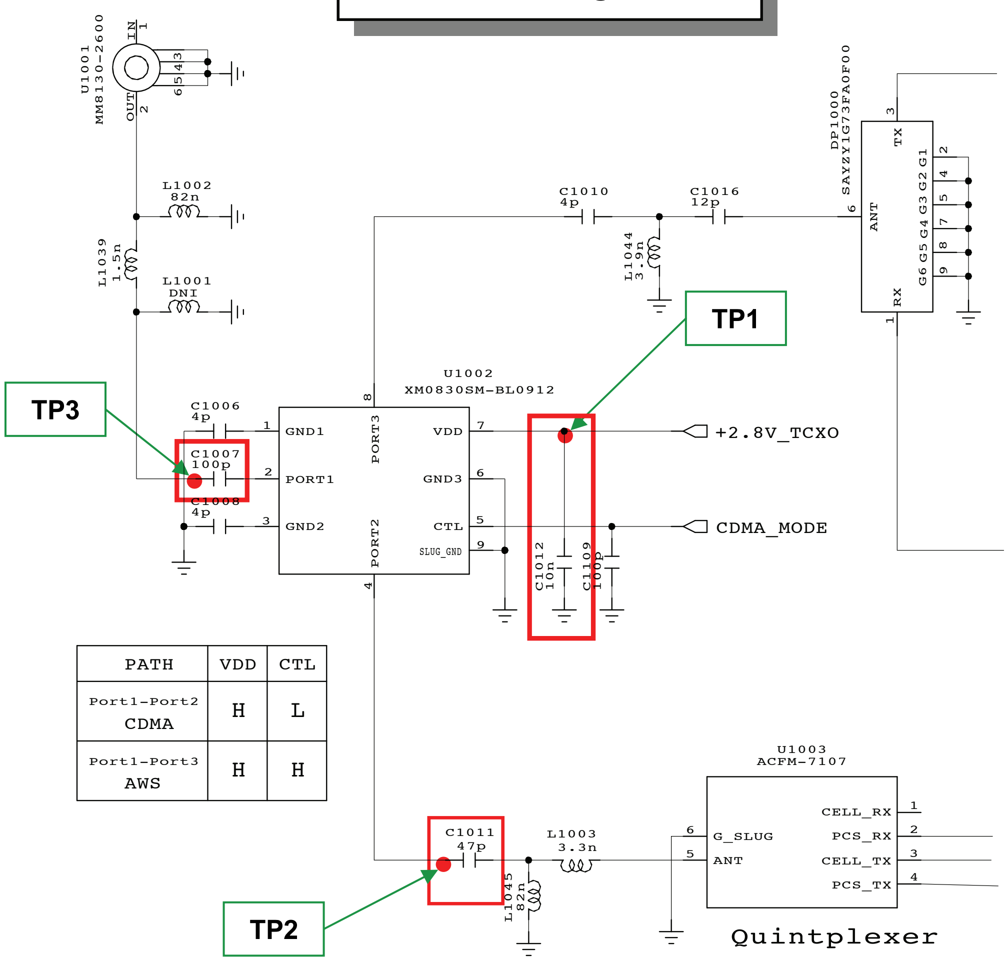
Figure 4.2.1.6

4.2.1.7 Check SPDT (U1002)

Test Point

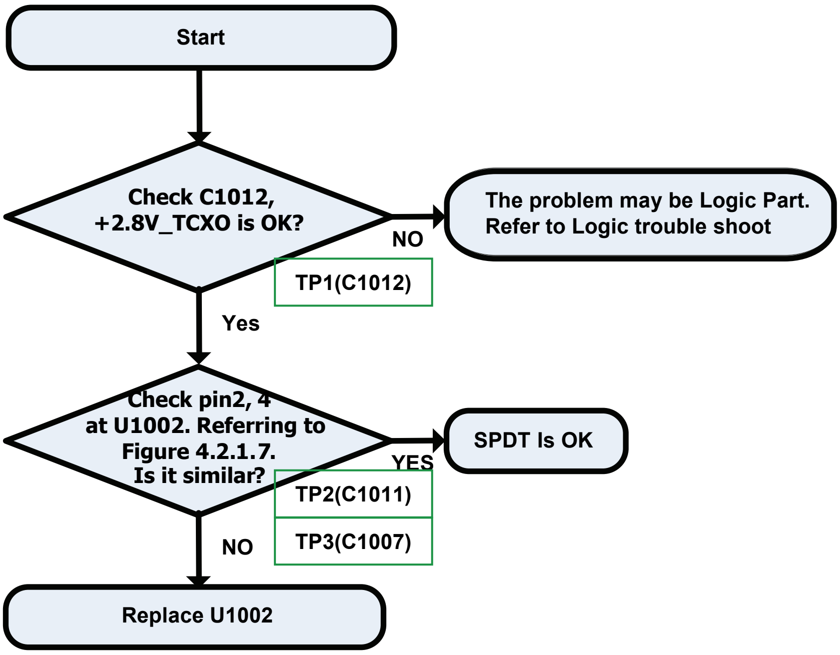


Circuit Diagram



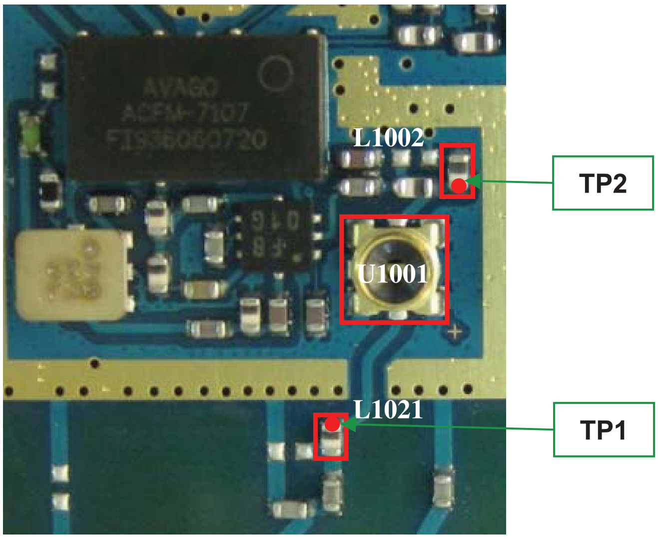
PATH	VDD	CTL
Port1-Port2 CDMA	H	L
Port1-Port3 AWS	H	H

Checking Flow

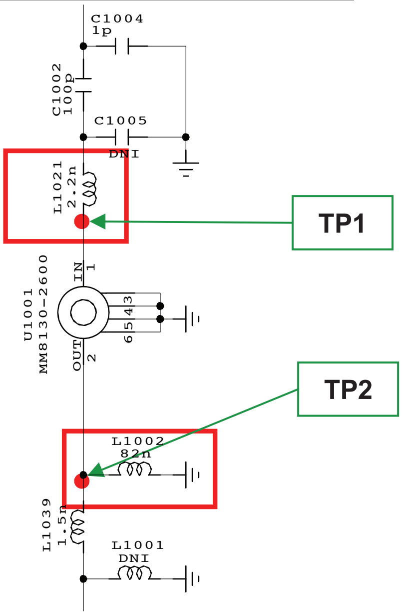


4.2.1.8 Check Mobile S/W

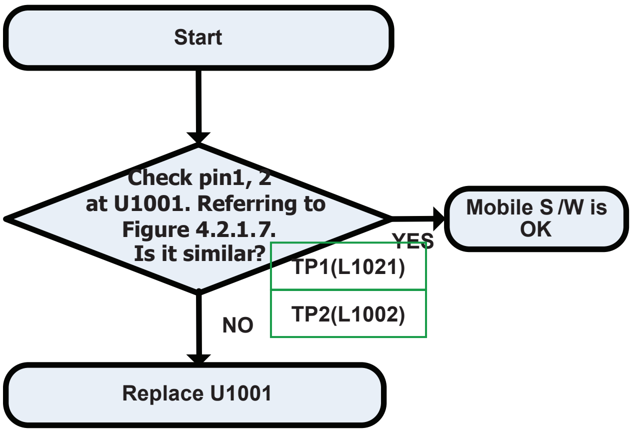
Test Point



Circuit Diagram



Checking Flow



Waveform

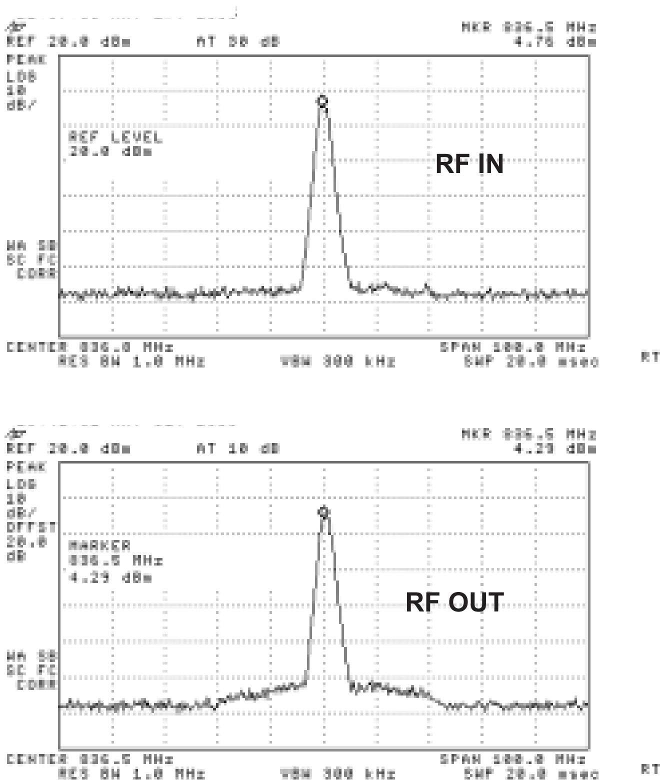
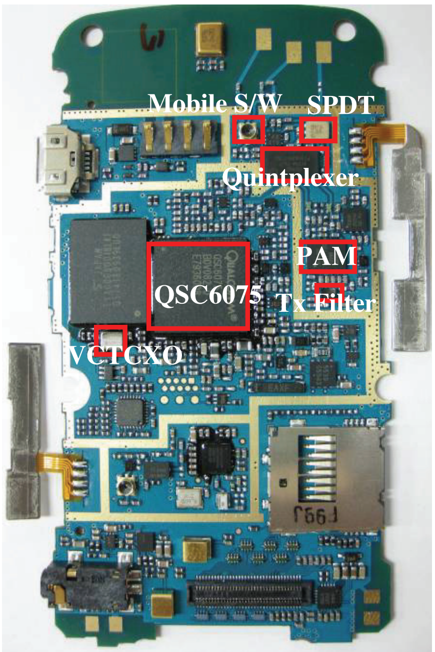


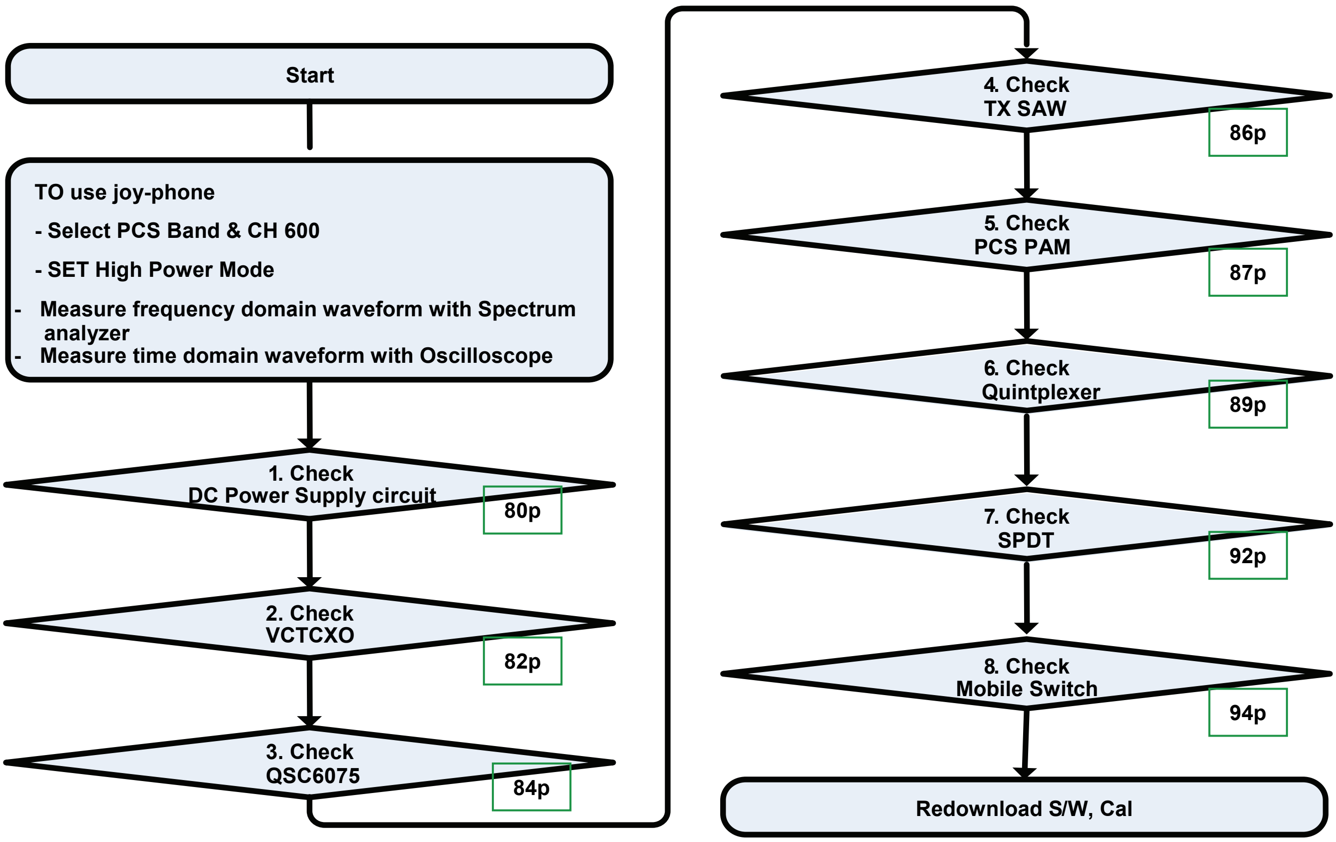
Figure 4.2.1.7

4.2.2 PCS Tx

Test Point

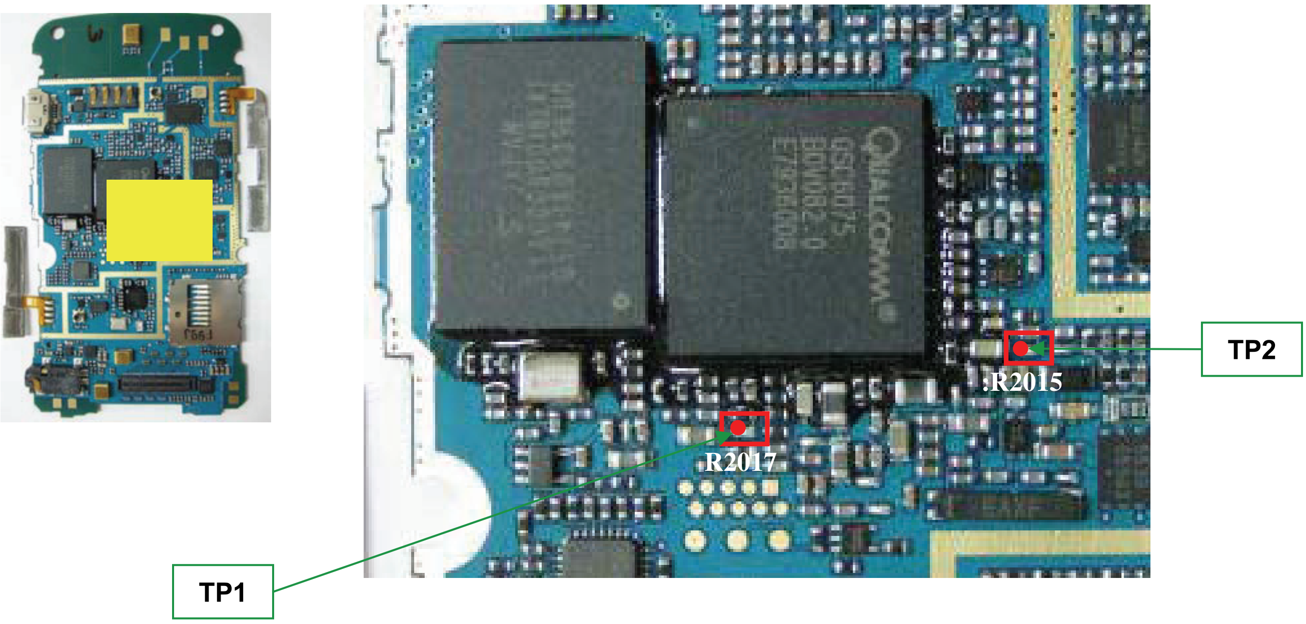


Checking Flow

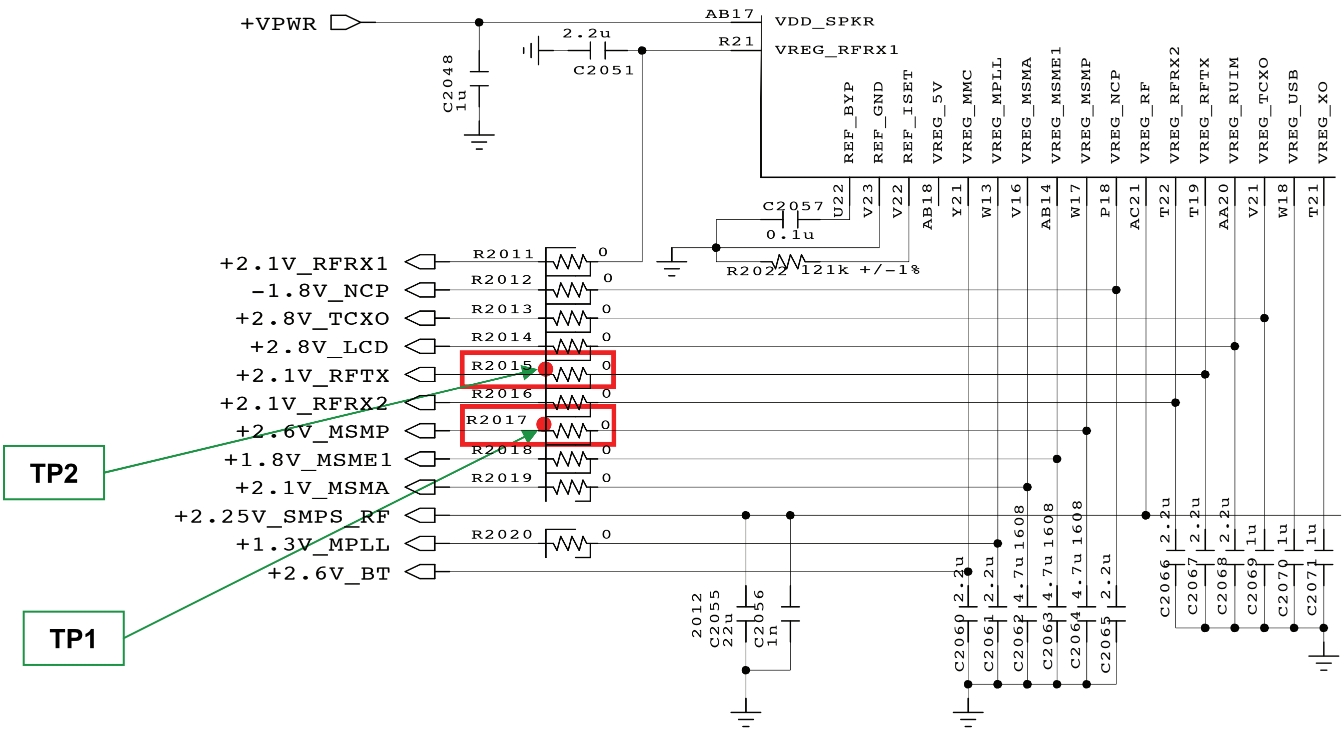


4.2.2.1 Checking DC Power supply circuit (PMIC)

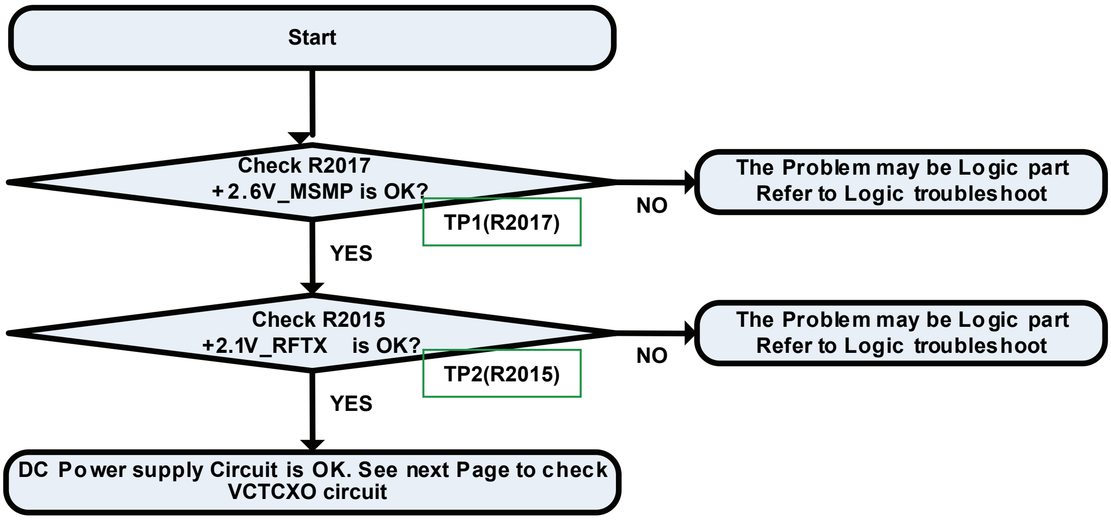
Test Point



Circuit Diagram

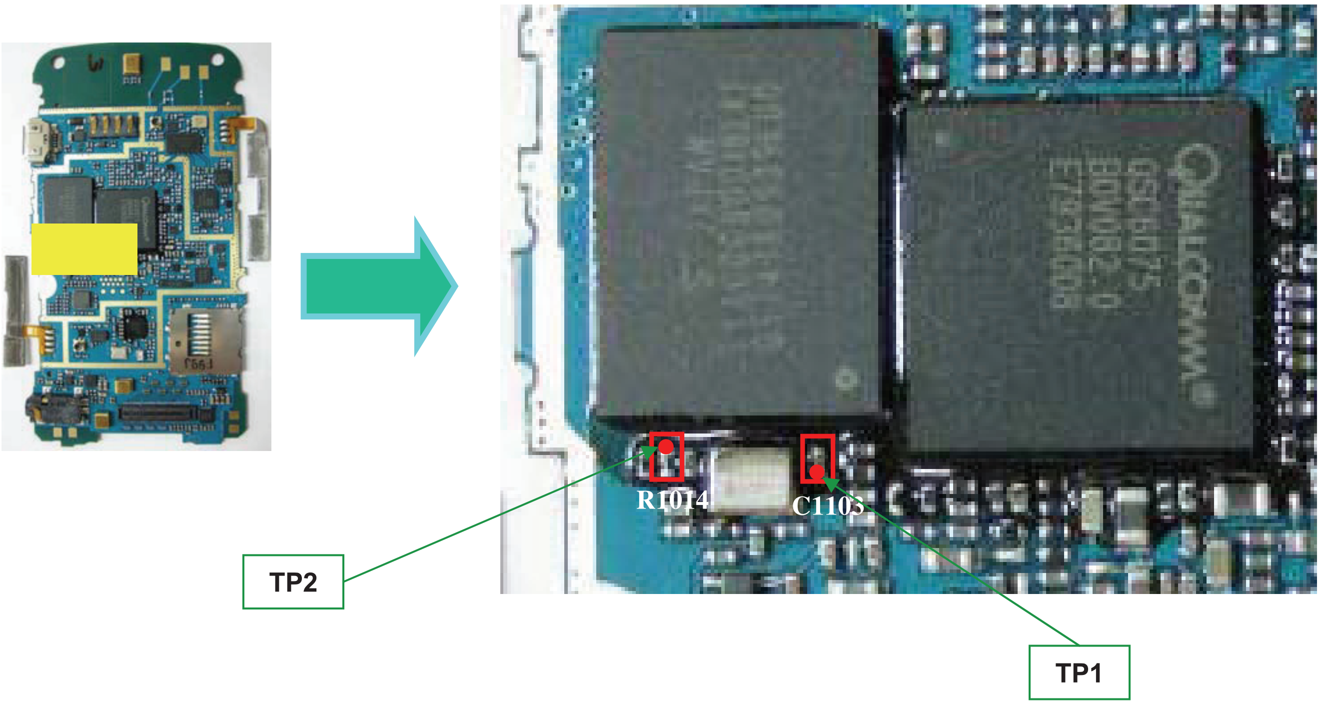


Checking Flow

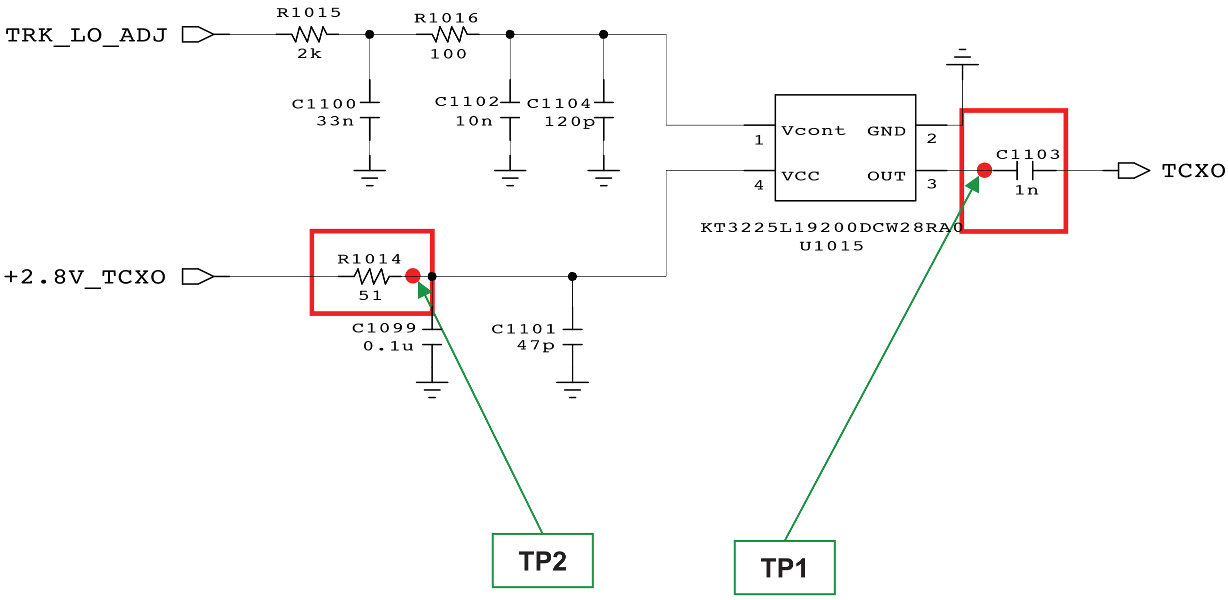


4.2.2.2 Checking VCTCXO circuit

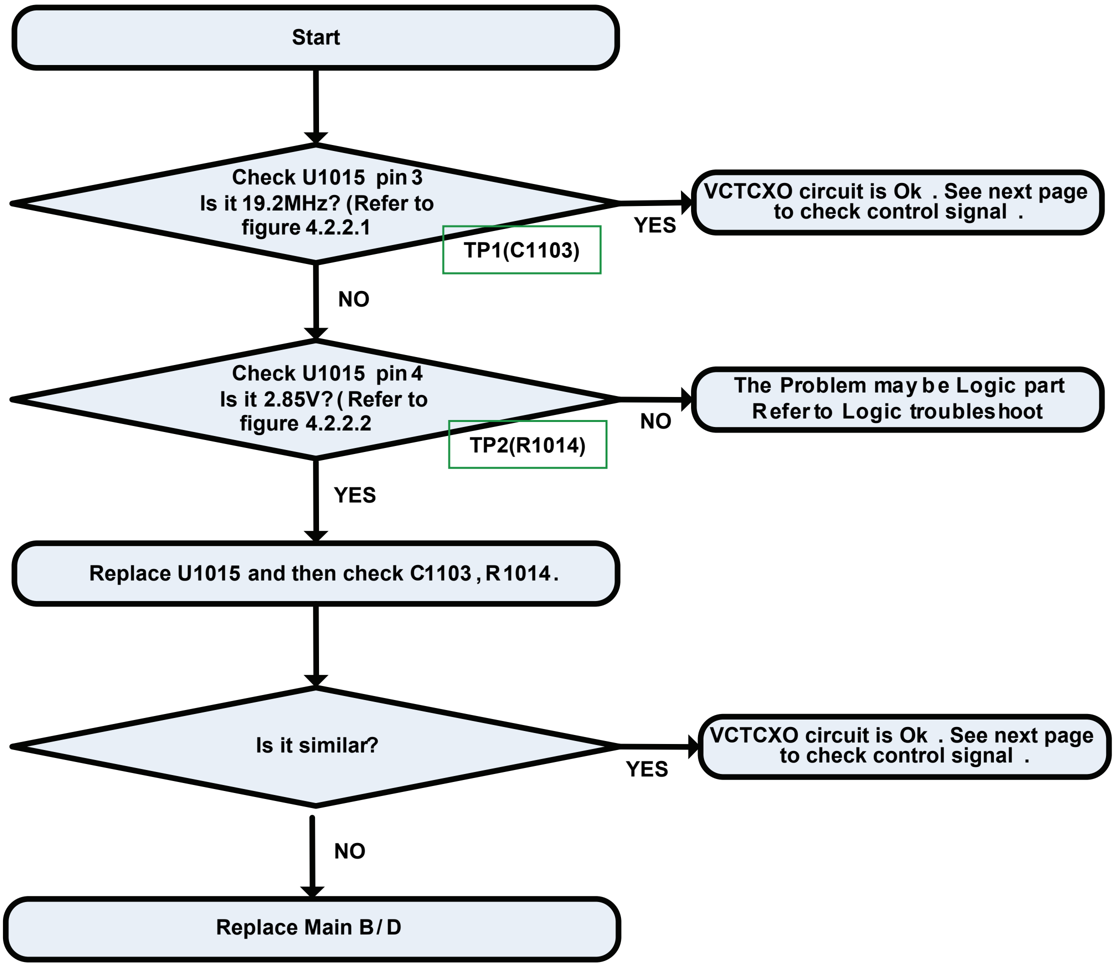
Test Point



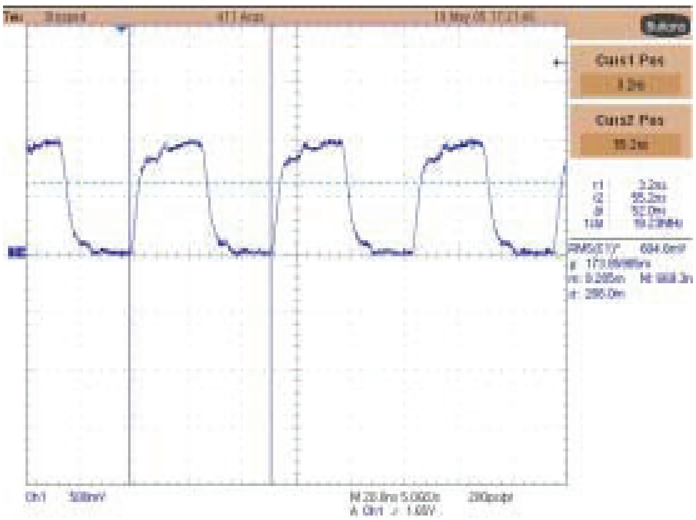
Circuit Diagram



Checking Flow



Waveform



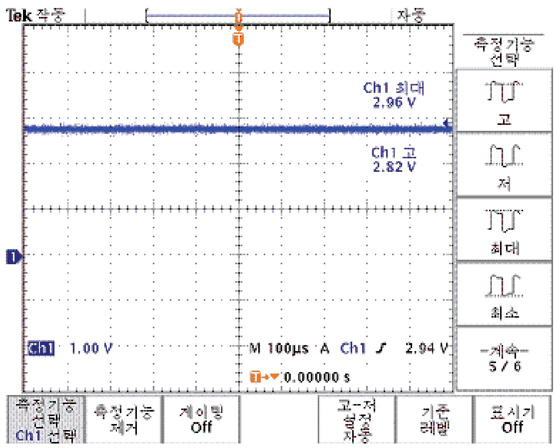
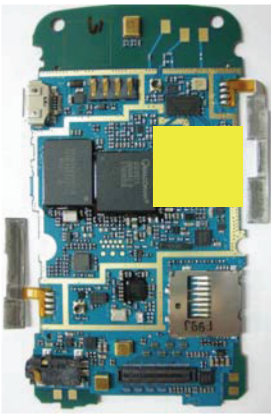


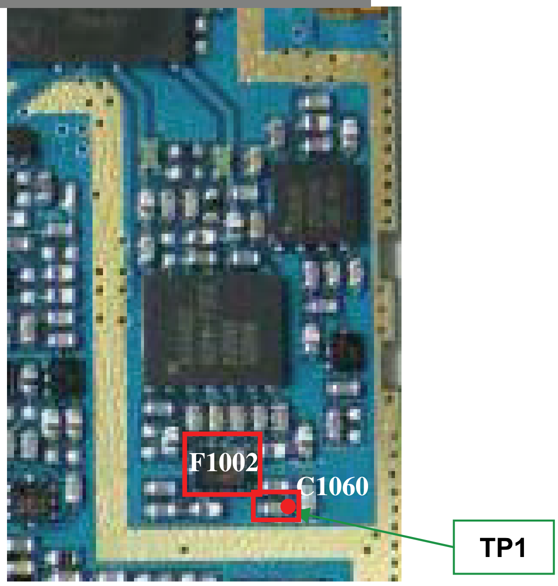
Figure 4.2.2.1

Figure 4.2.2.2

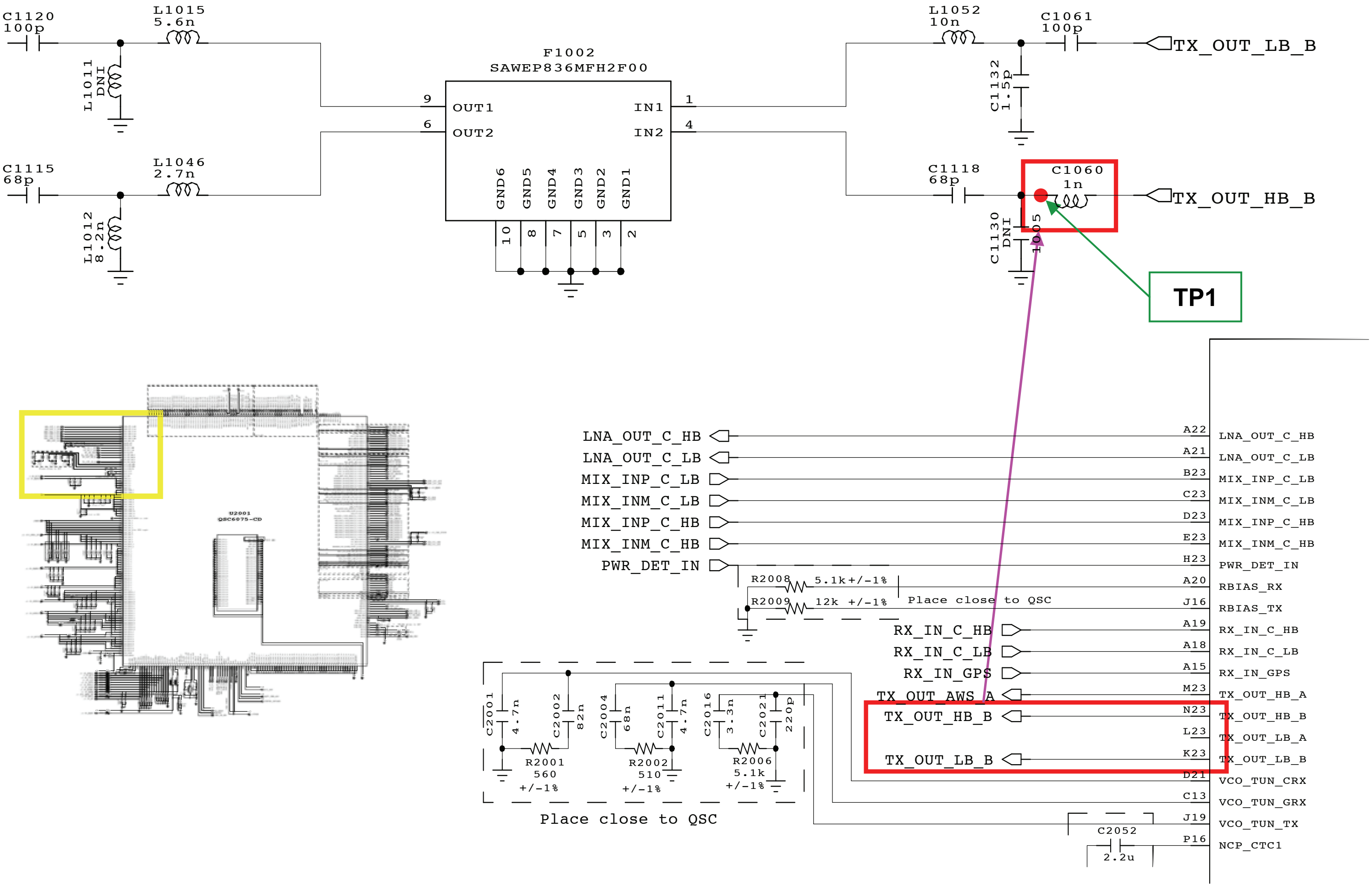
4.2.2.3 Checking QSC6075 circuit

Test Point

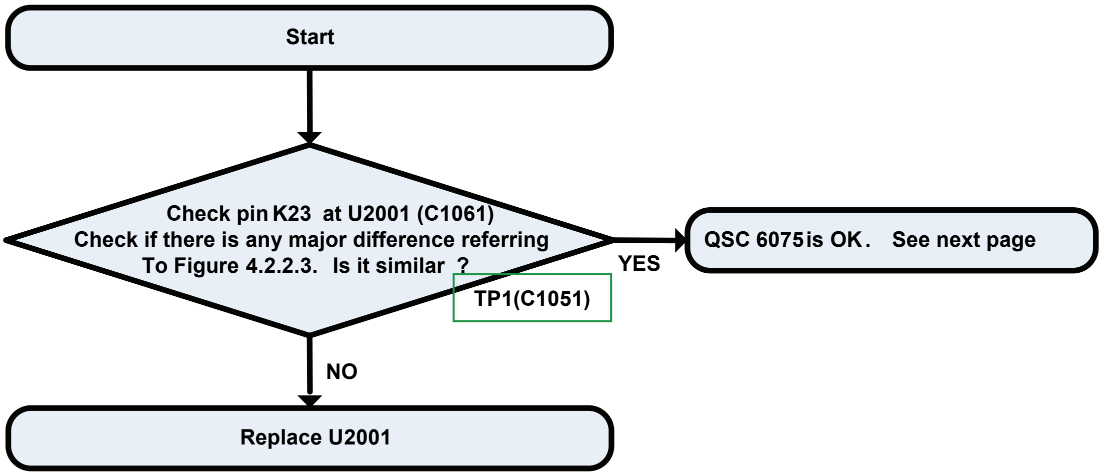




Circuit Diagram



Checking Flow



Waveform

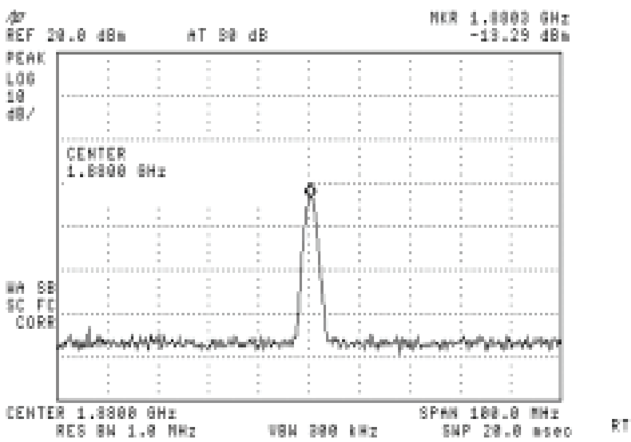
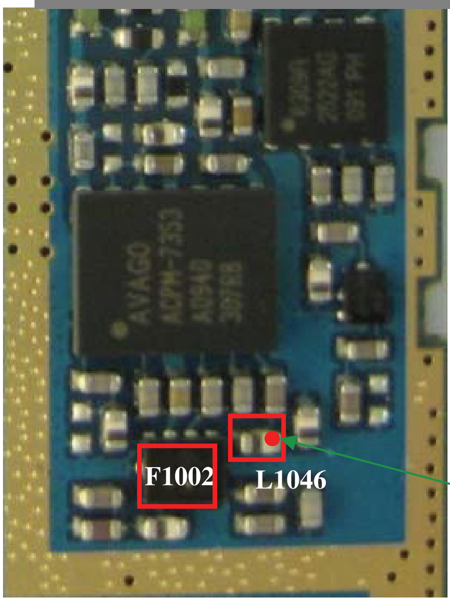


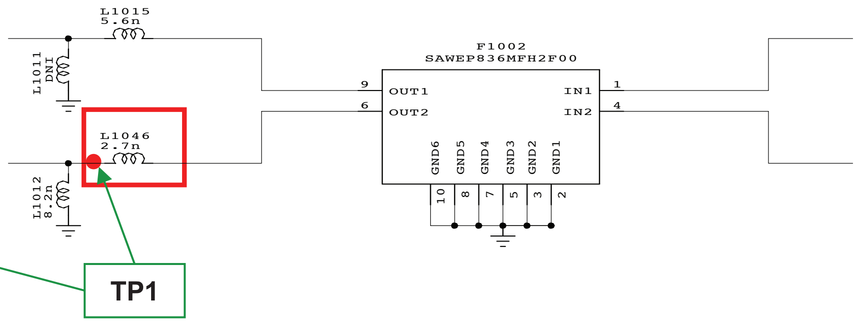
Figure 4.2.2.3

4.2.2.4 Check PCS RF Tx SAW

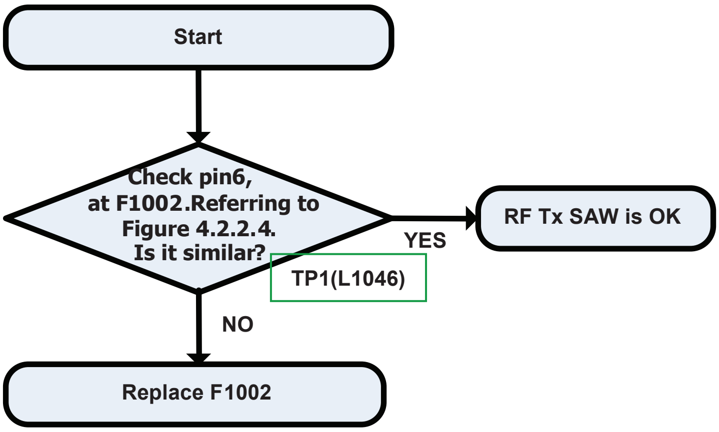
Test Point



Circuit Diagram



Checking Flow



Waveform

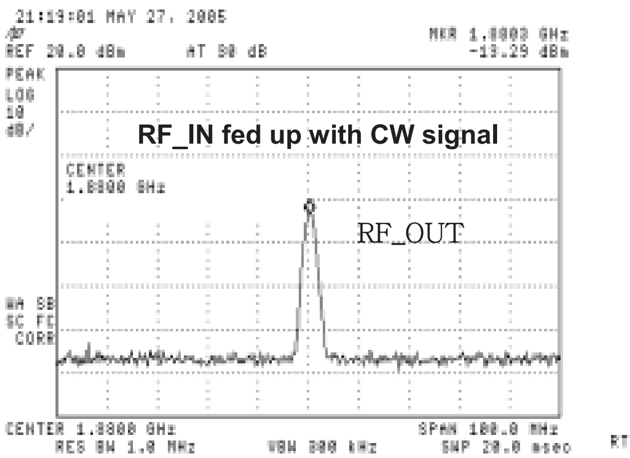
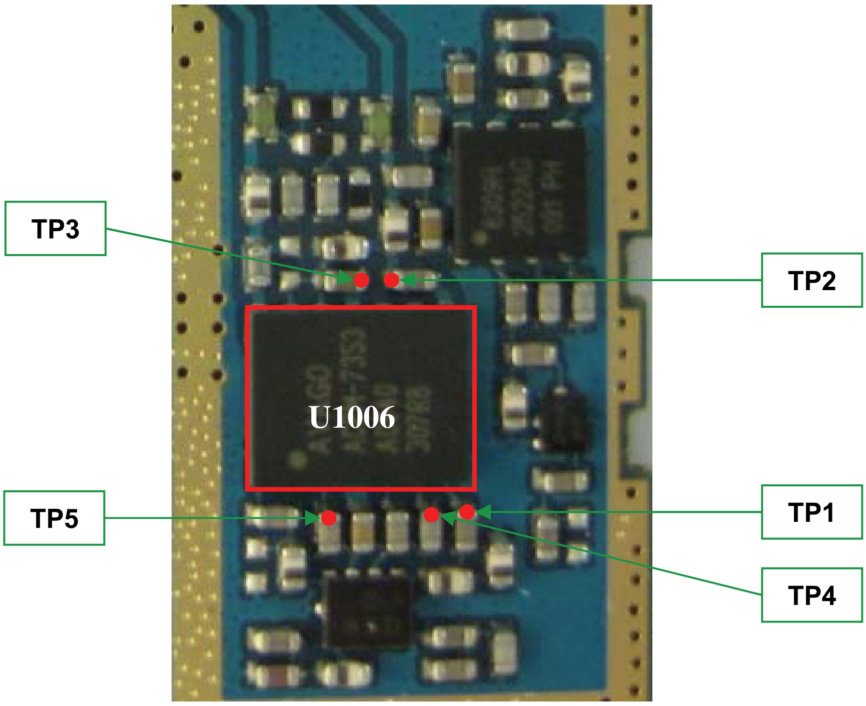
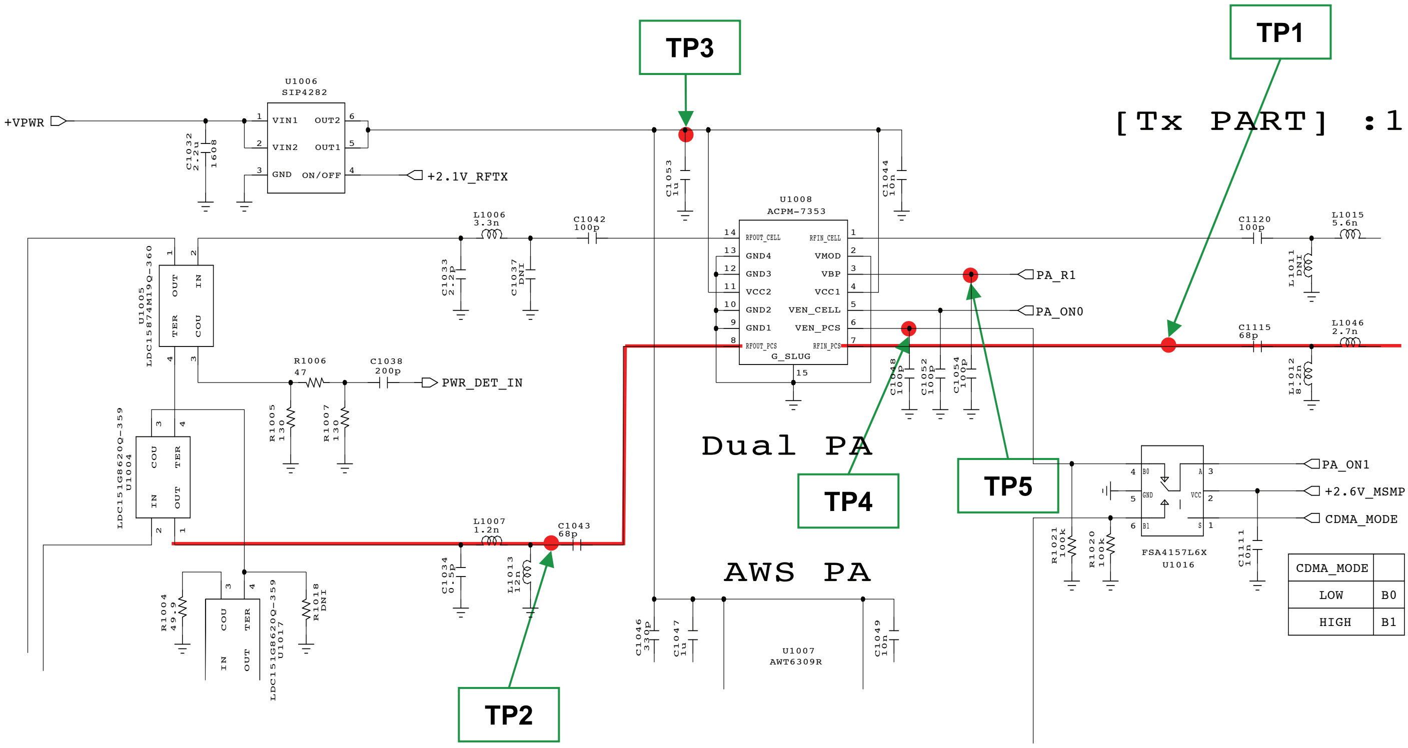


Figure 4.2.2.4

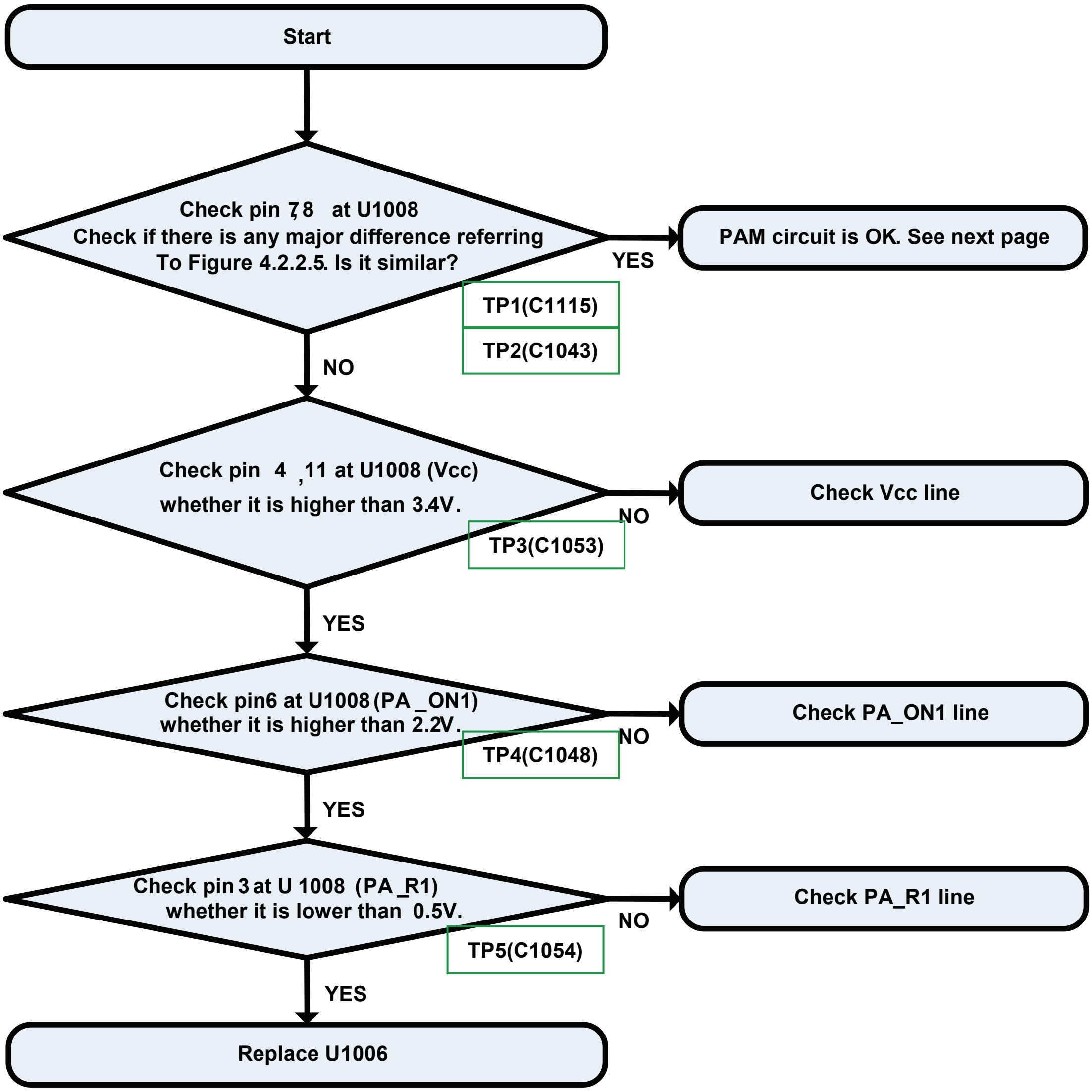
4.2.2.5 Check PCS PAM circuit

Test Point





Checking Flow



Waveform

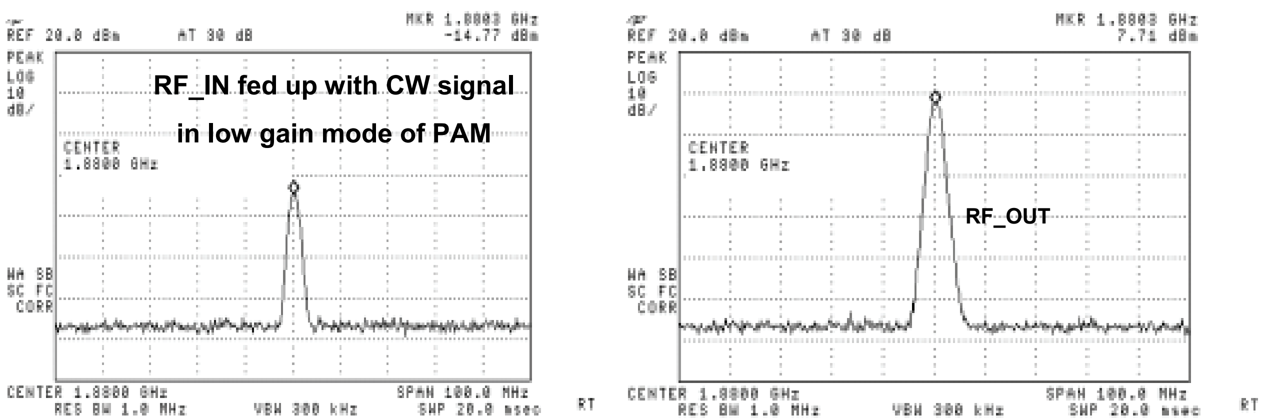
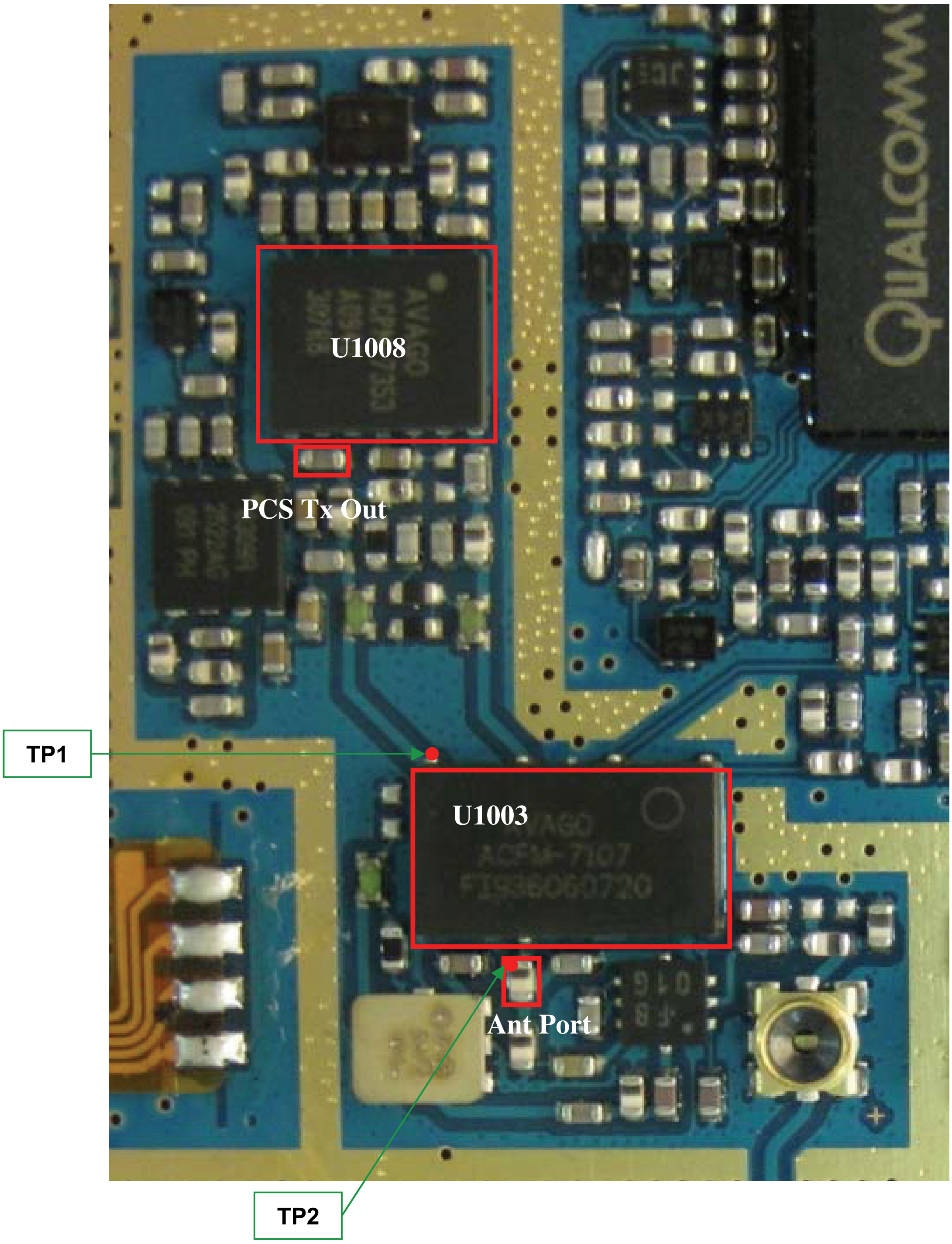


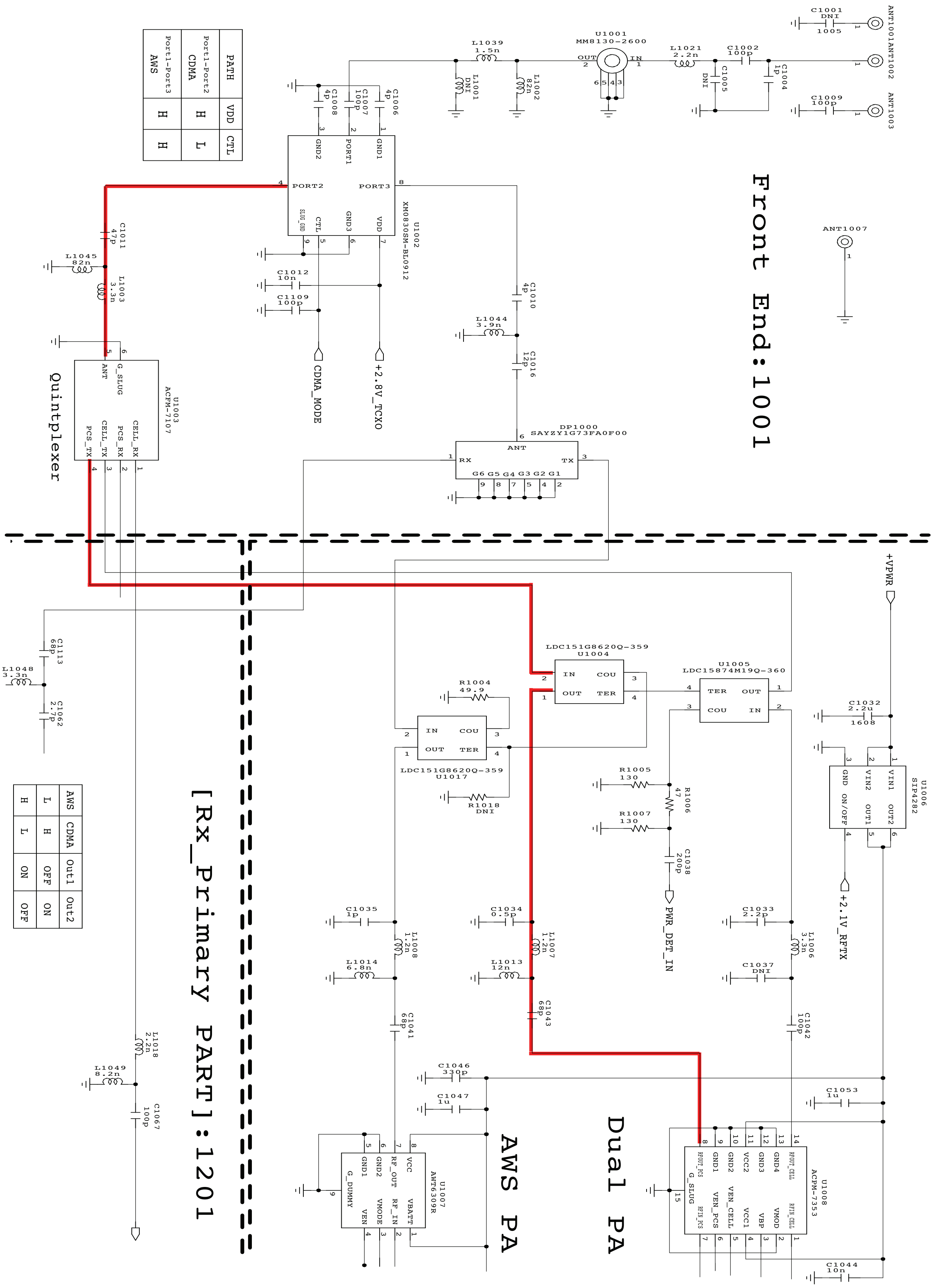
Figure 4.2.2.5

4.2.2.6 Check Quintplexer

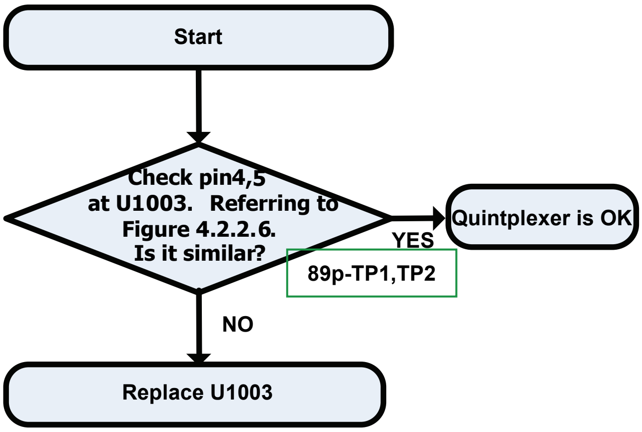
Test Point



Circuit Diagram



Checking Flow



Waveform

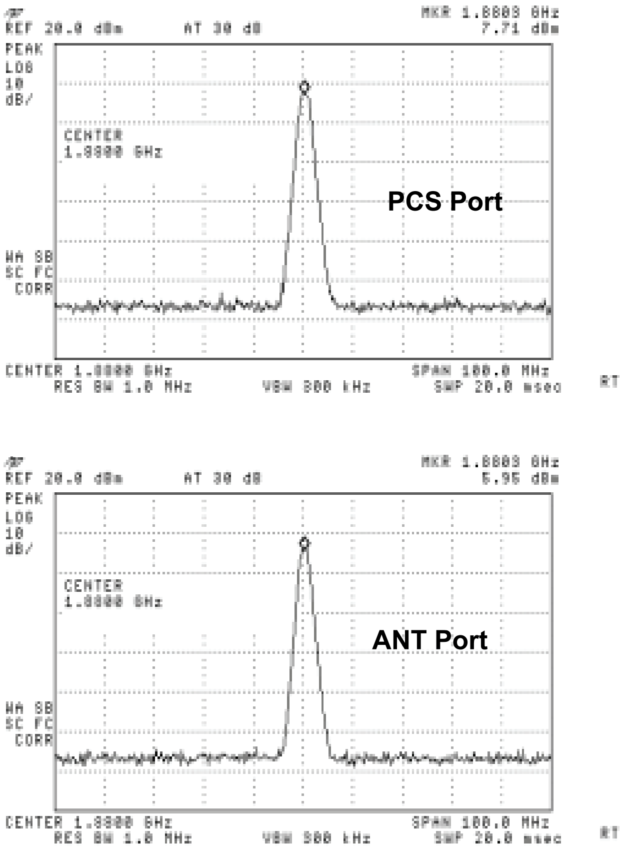
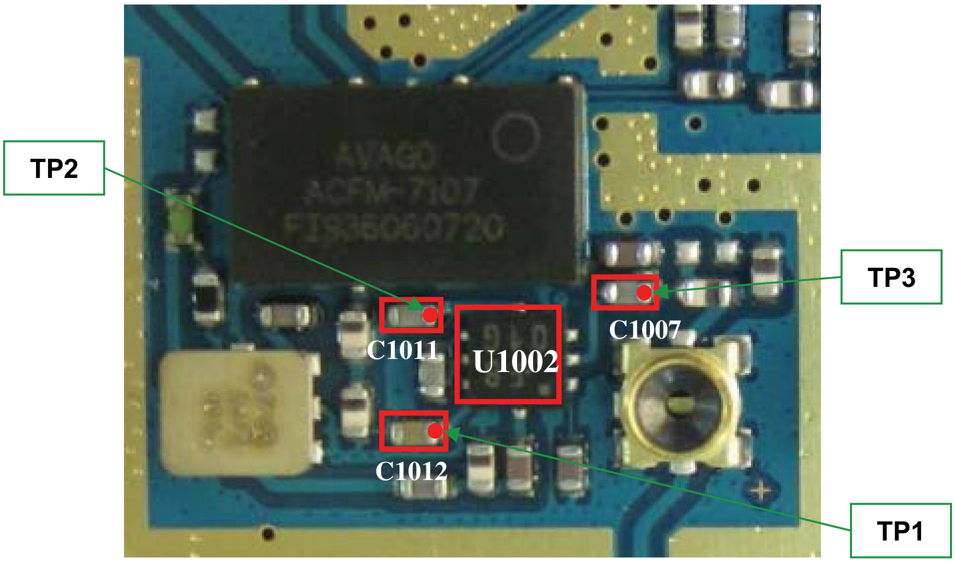


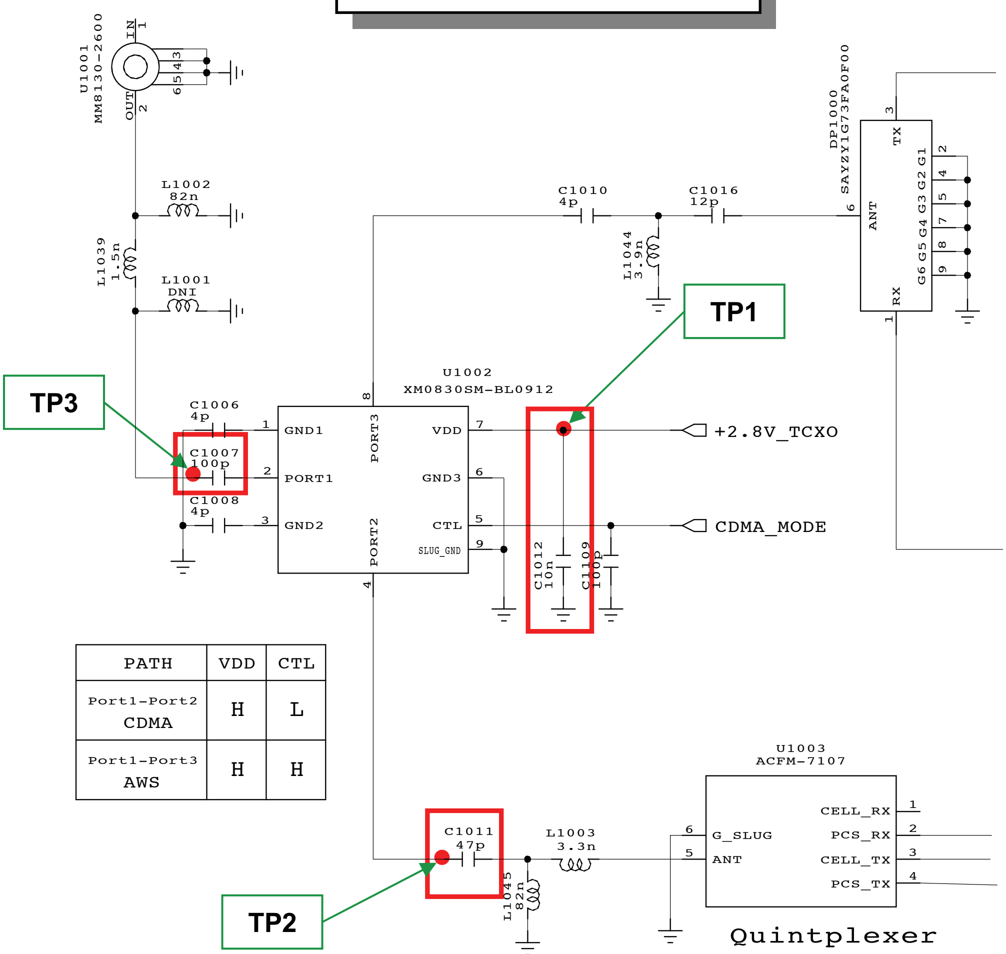
Figure 4.2.2.6

4.2.2.7 Check SPDT (U1002)

Test Point

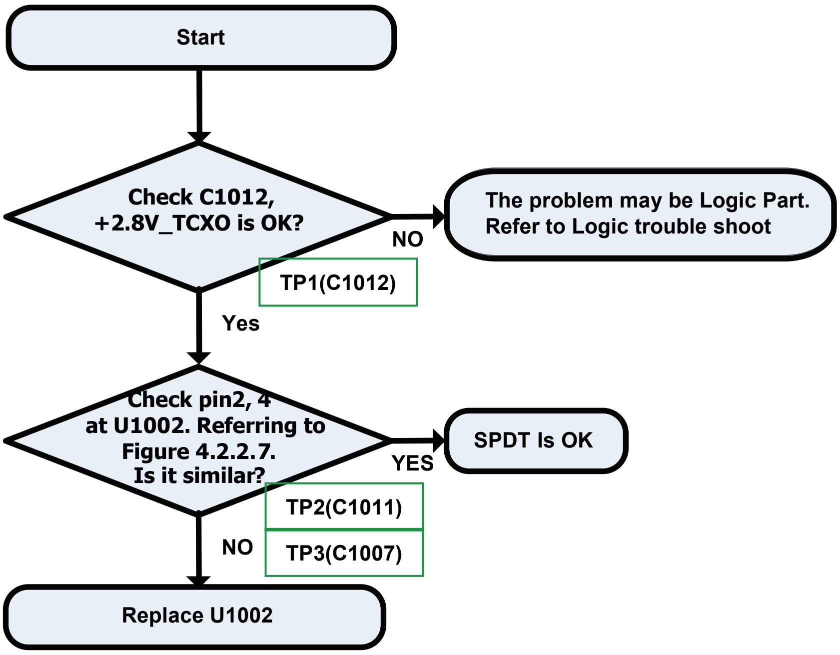


Circuit Diagram



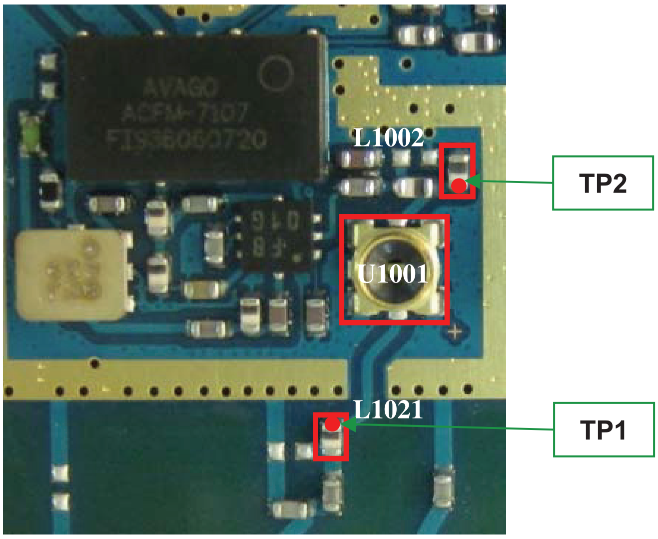
PATH	VDD	CTL
Port1-Port2 CDMA	H	L
Port1-Port3 AWS	H	H

Checking Flow

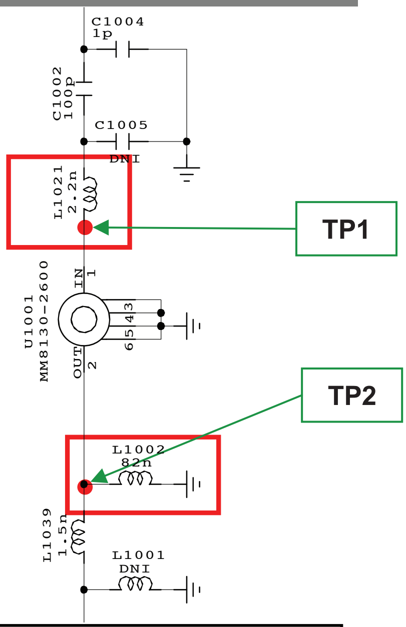


4.2.2.8 Check Mobile S/W

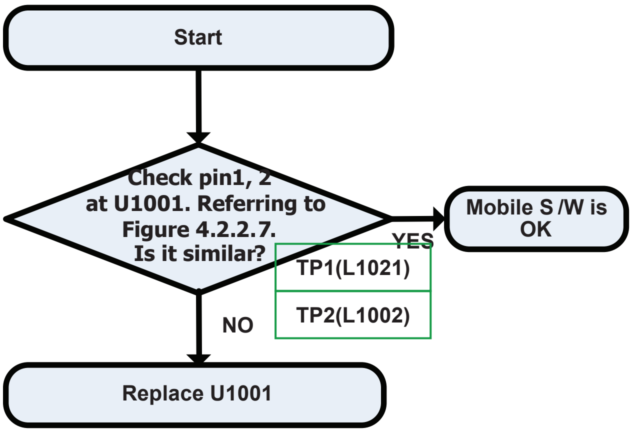
Test Point



Circuit Diagram



Checking Flow



Waveform

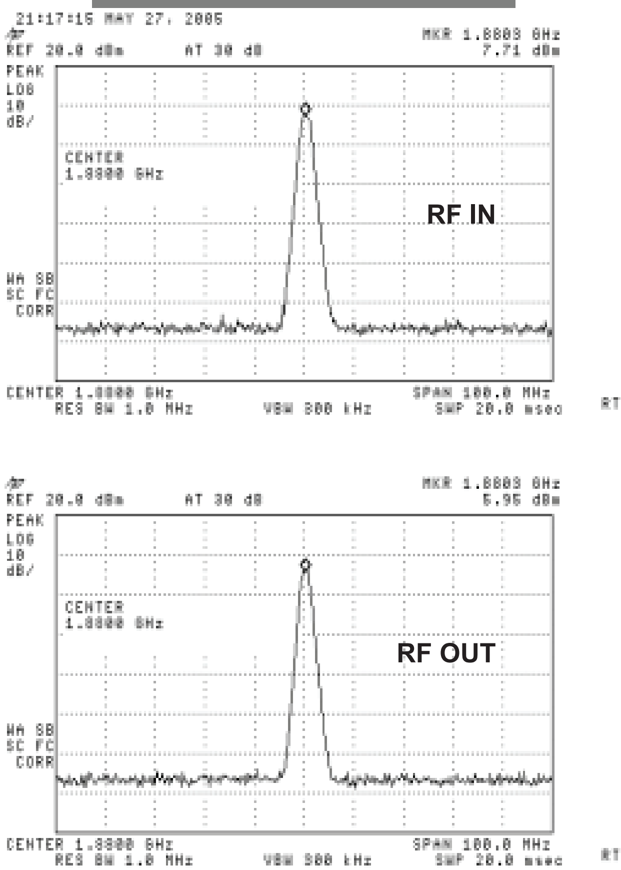
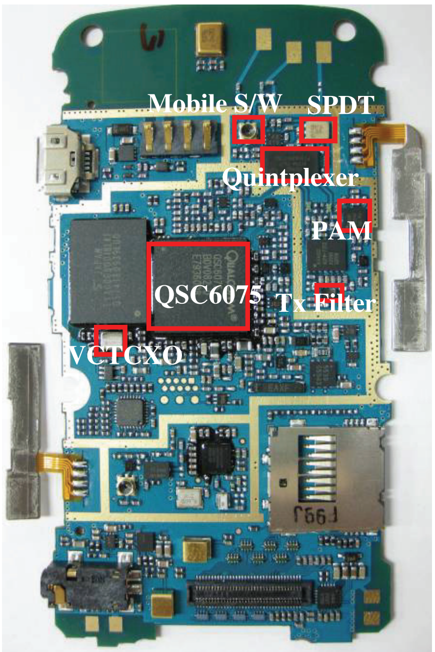


Figure 4.2.2.7

4.2.3 AWS Tx

Test Point



Checking Flow

Start

TO use joy-phone
- Select AWS Band & CH 450
- SET High Power Mode
- Measure frequency domain waveform with Spectrum analyser
- Measure time domain waveform with Oscilloscope

1. Check DC Power Supply circuit — 96p

2. Check VCTCXO — 98p

3. Check QSC6075 — 100p

4. Check TX SAW — 102p

5. Check AWS PAM — 103p

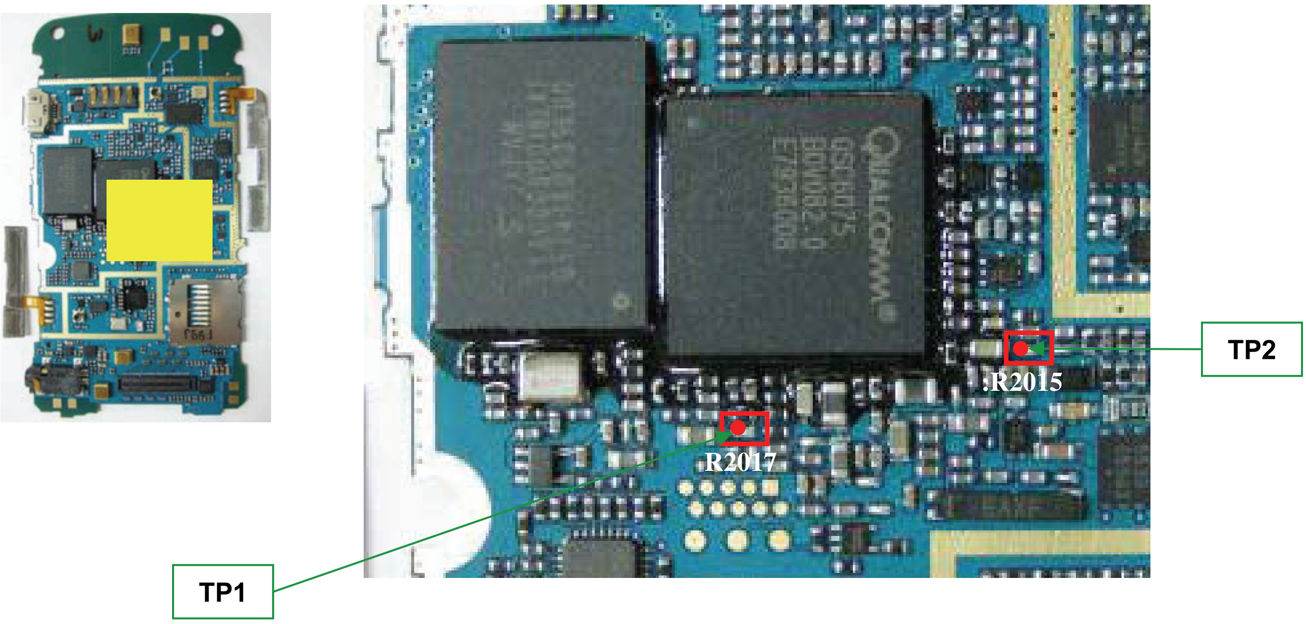
6. Check Duplexer — 105p

7. Check Mobile Switch — 110p

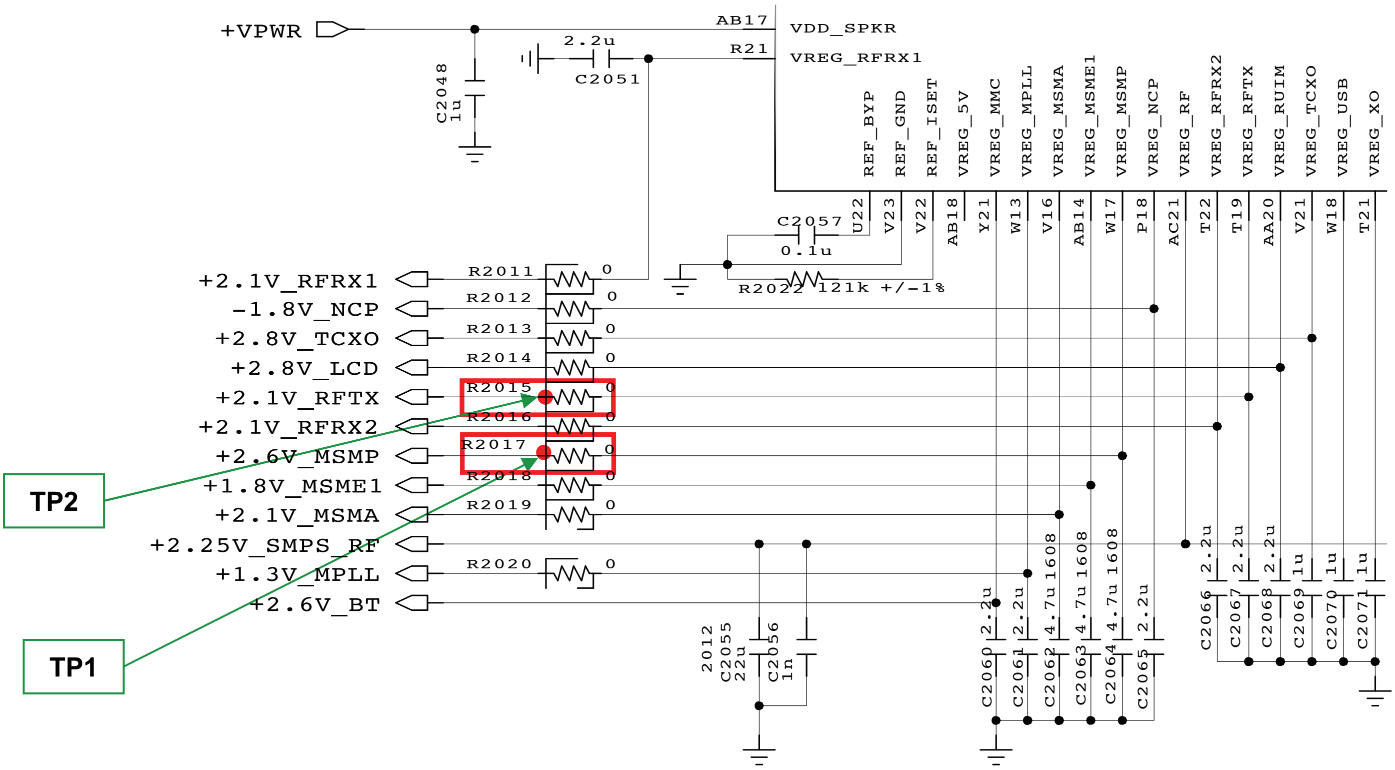
Redownload S/W, Cal

4.2.3.1 Checking DC Power supply circuit (PMIC)

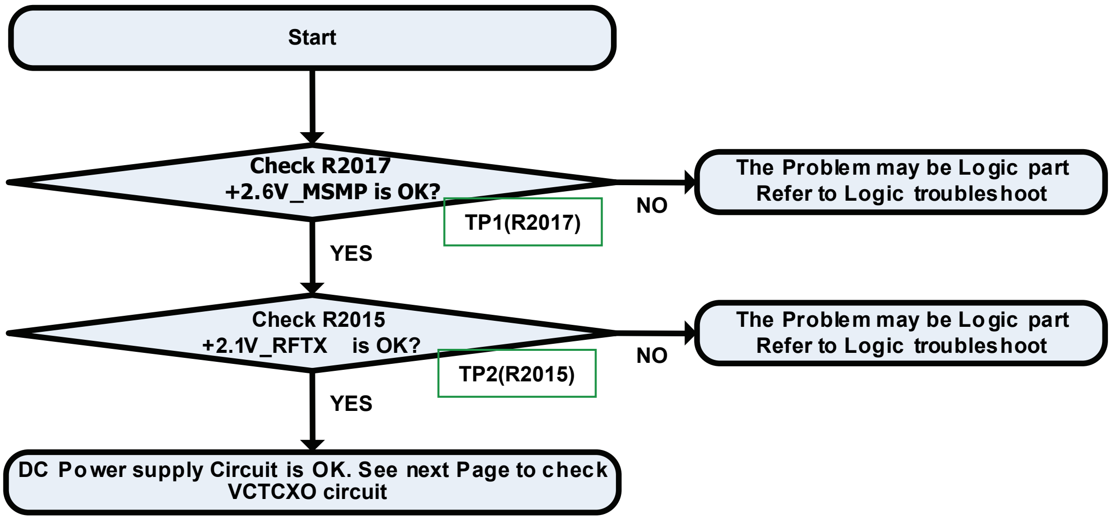
Test Point



Circuit Diagram



Checking Flow



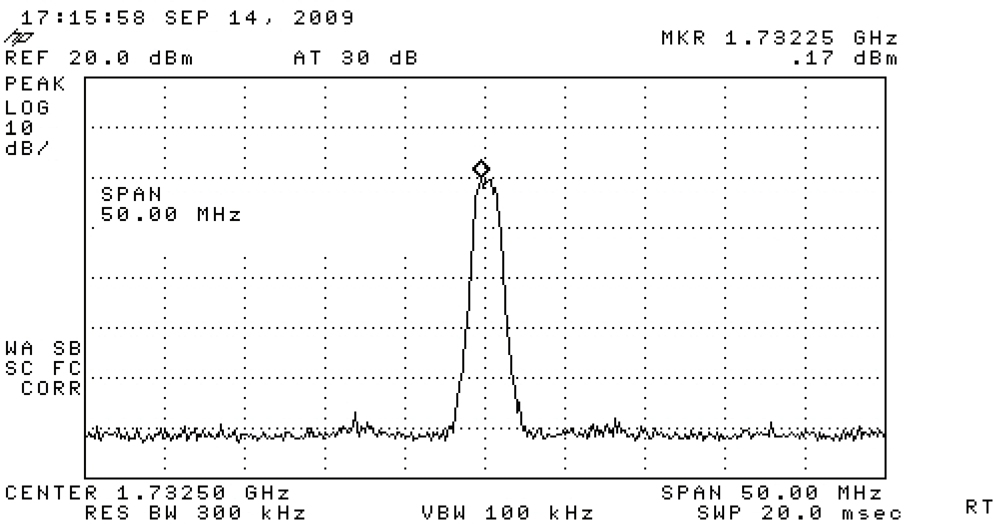
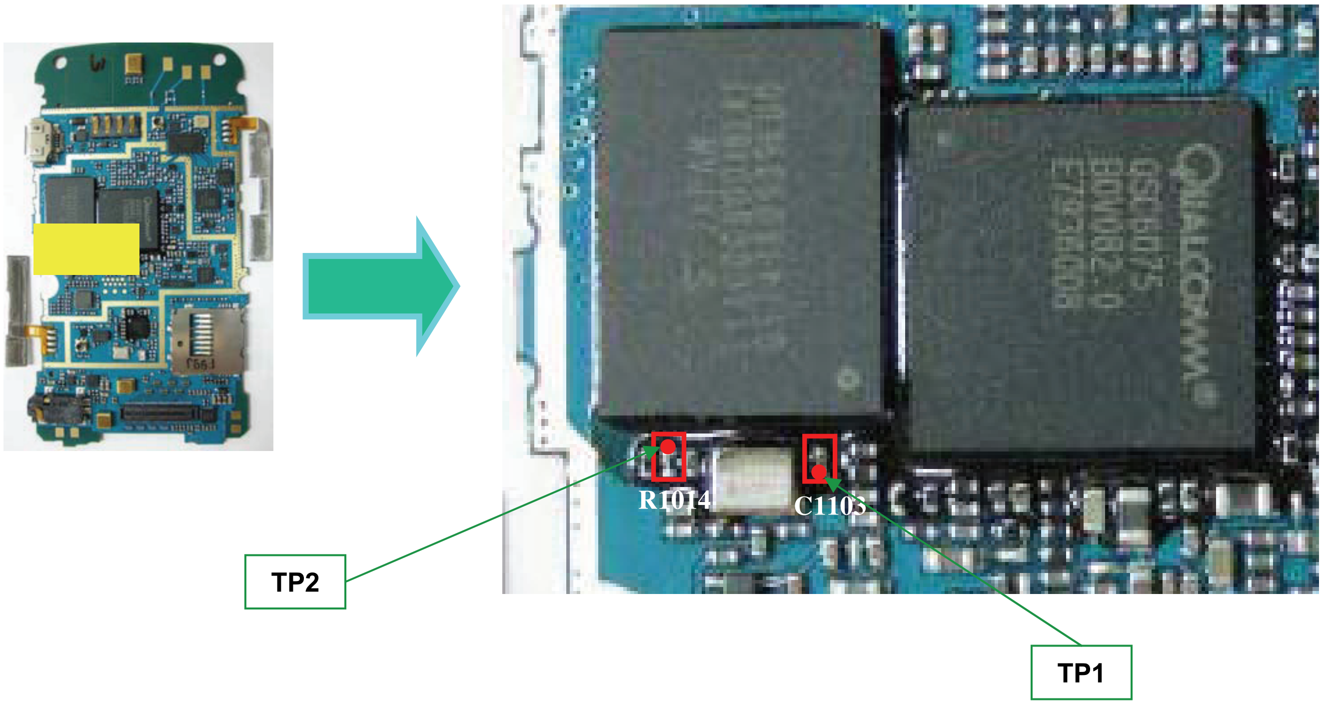


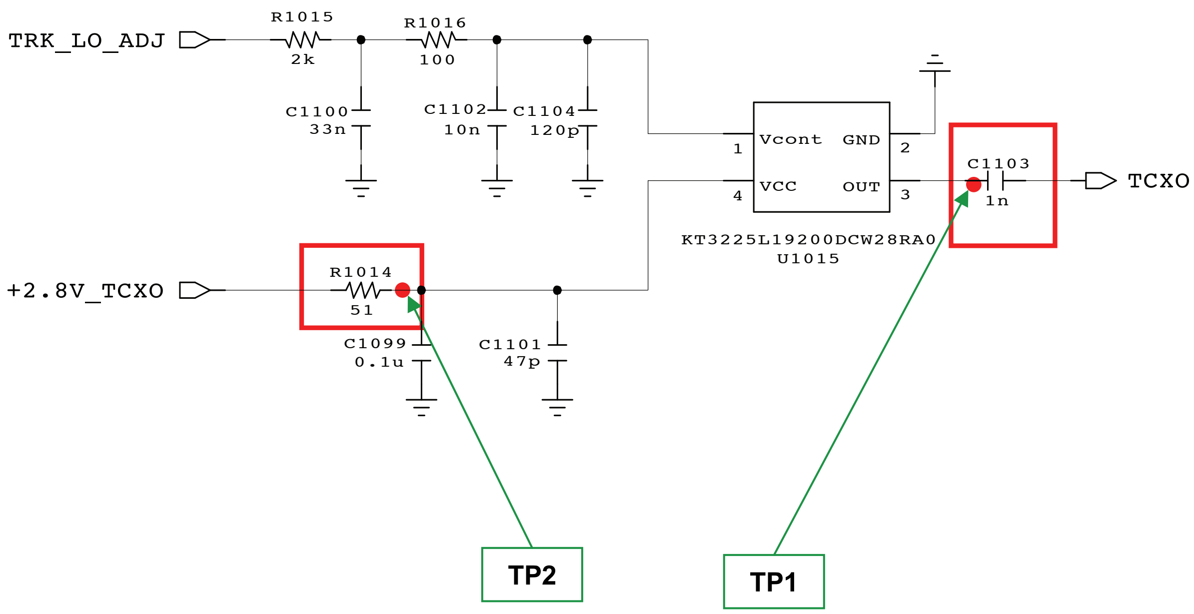
Figure 4.2.3.1

4.2.3.2 Checking VCTCXO circuit

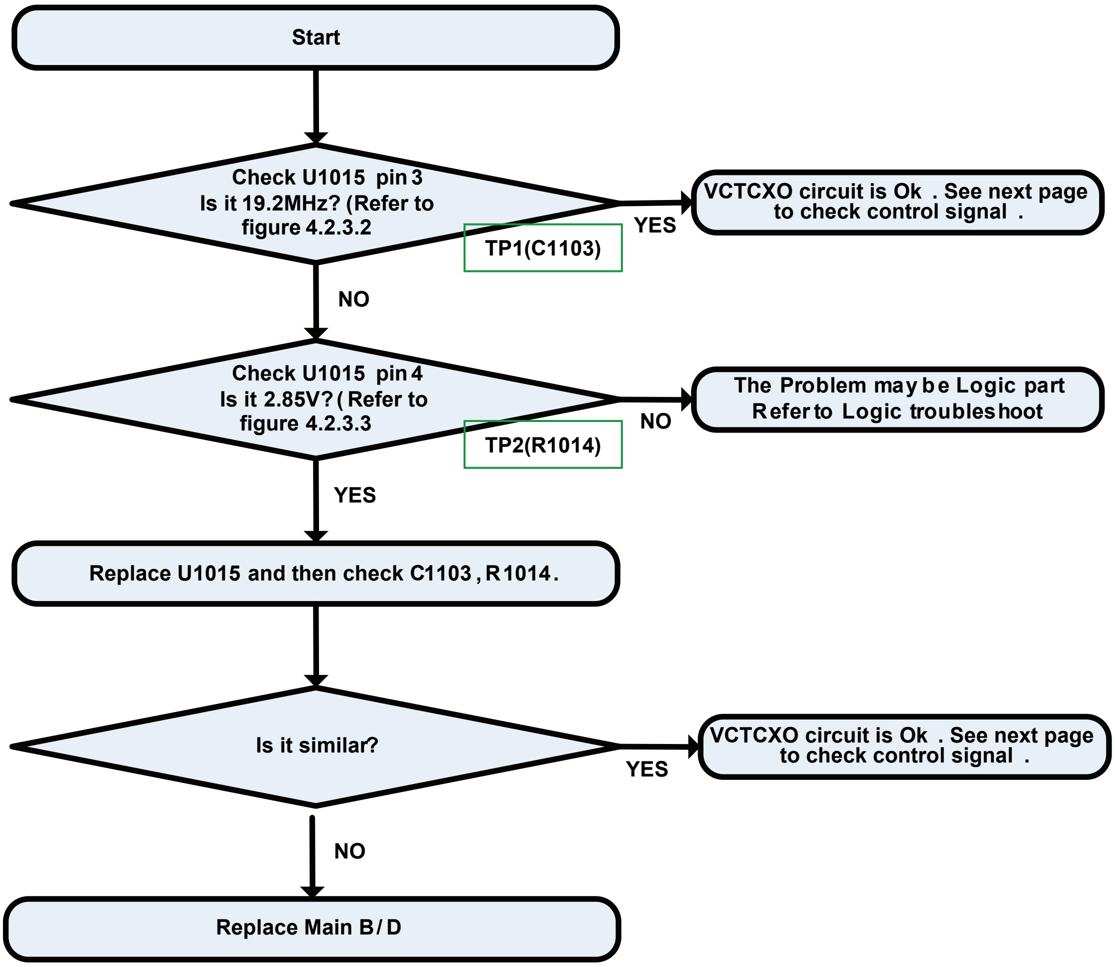
Test Point



Circuit Diagram



Checking Flow



Waveform

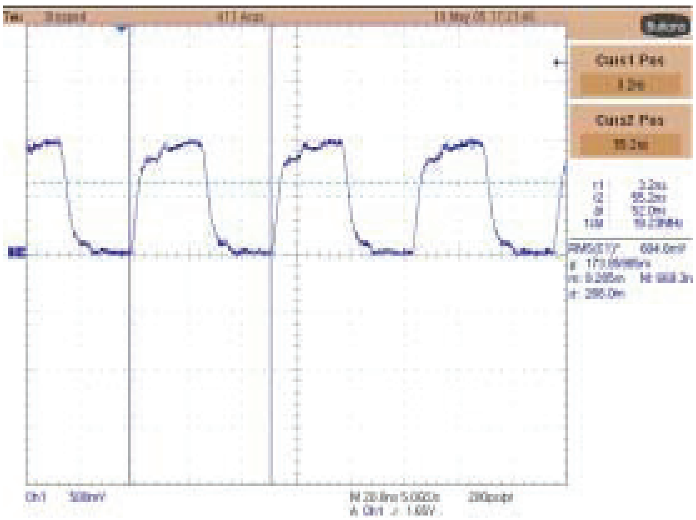


Figure 4.2.3.2

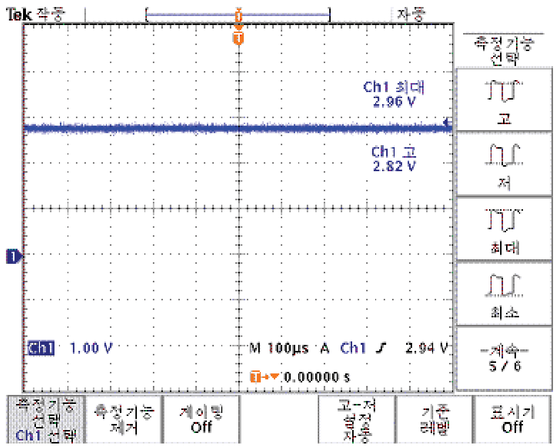
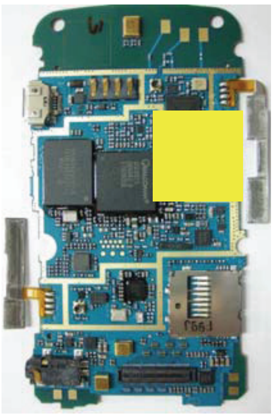
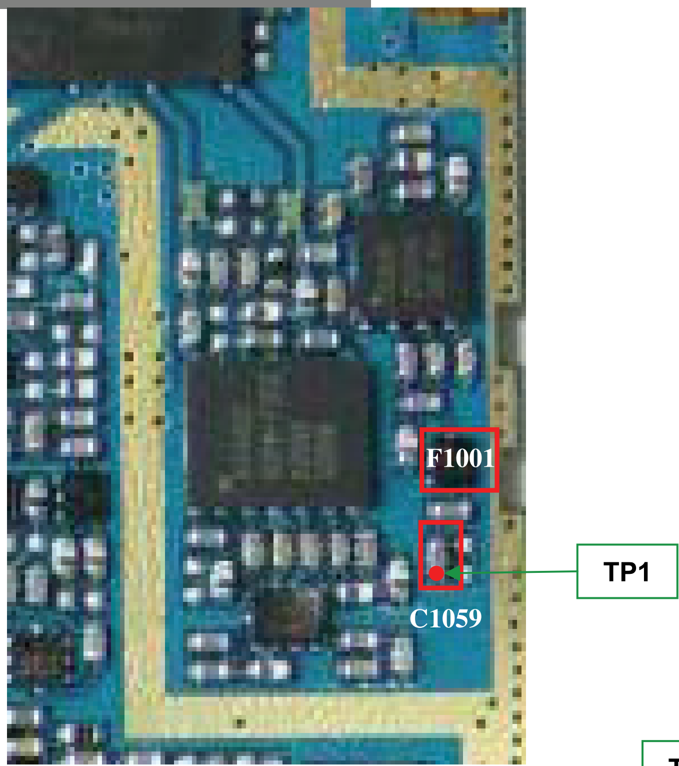


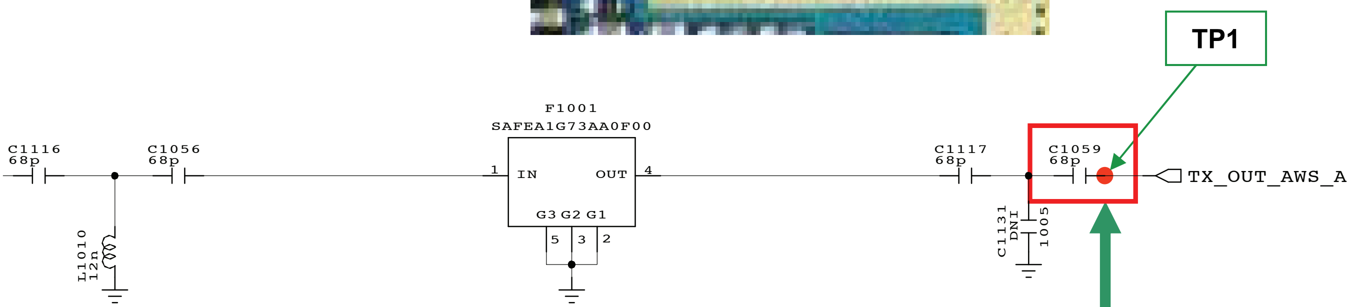
Figure 4.2.3.3

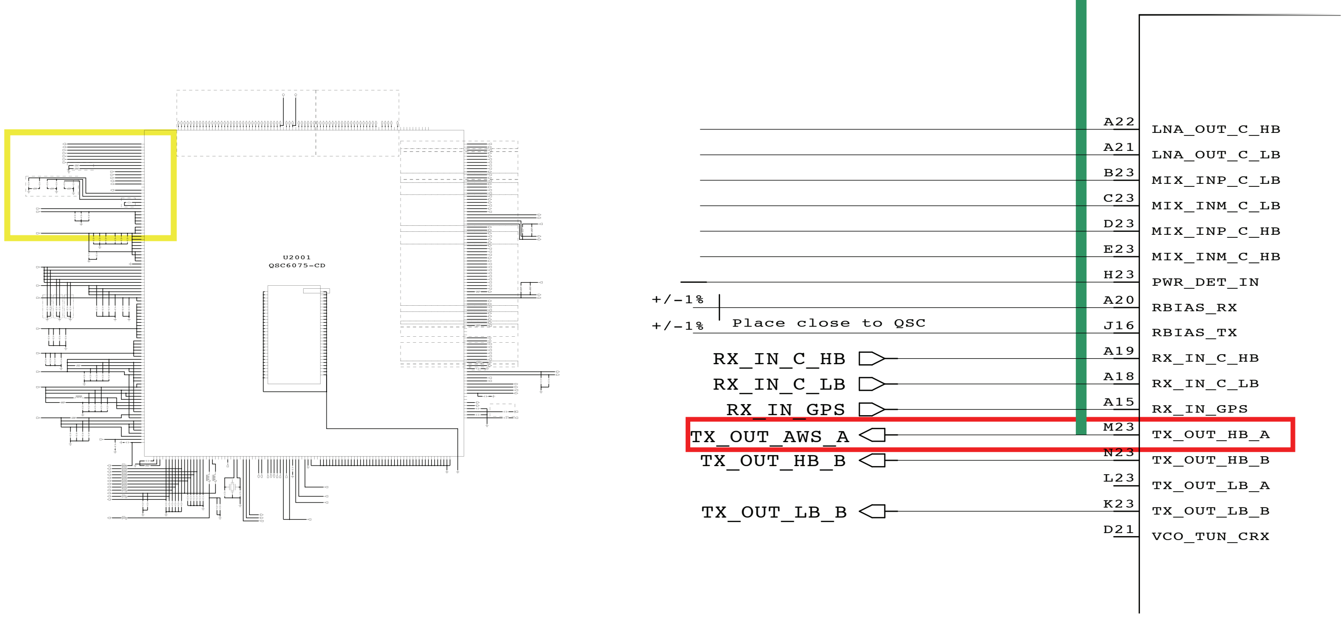
4.2.3.3 Checking QSC6075 circuit

Test Point

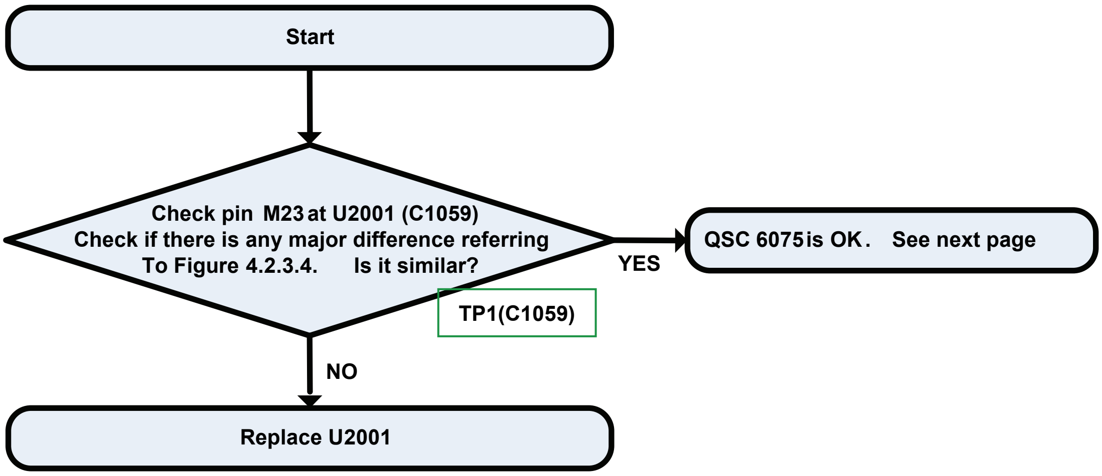








Checking Flow



Waveform

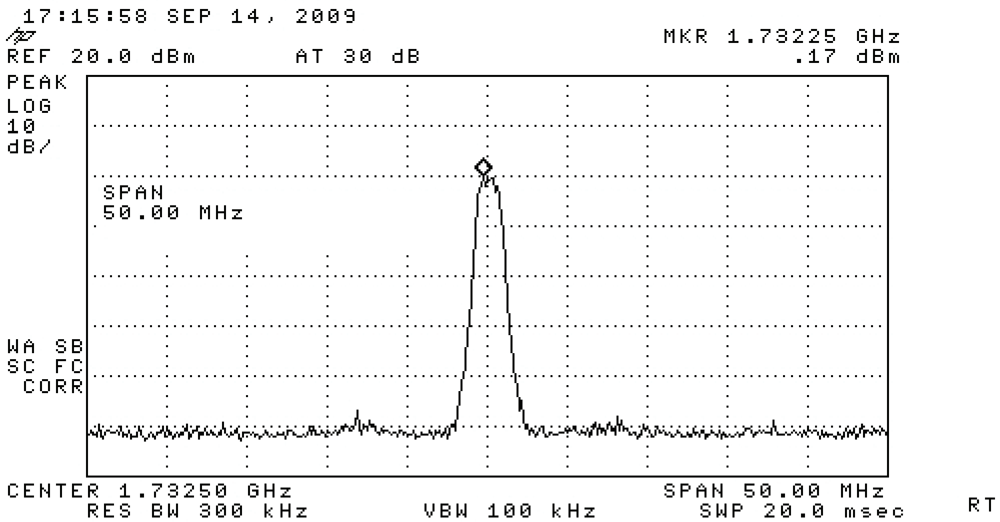
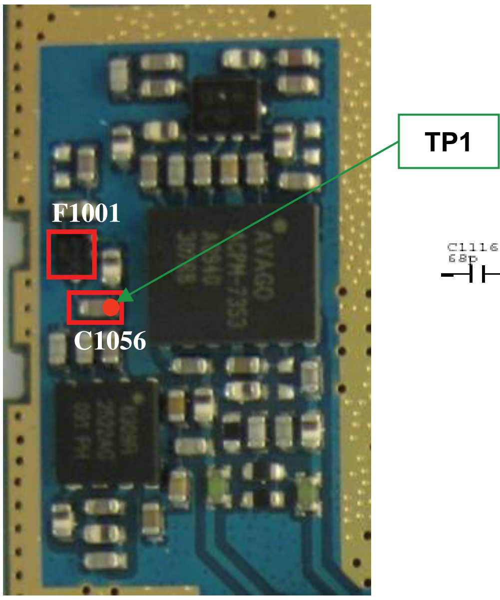


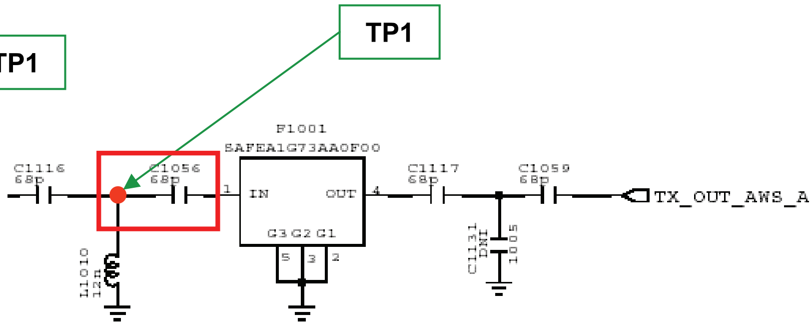
Figure 4.2.3.4

4.2.3.4 Check AWS RF Tx SAW

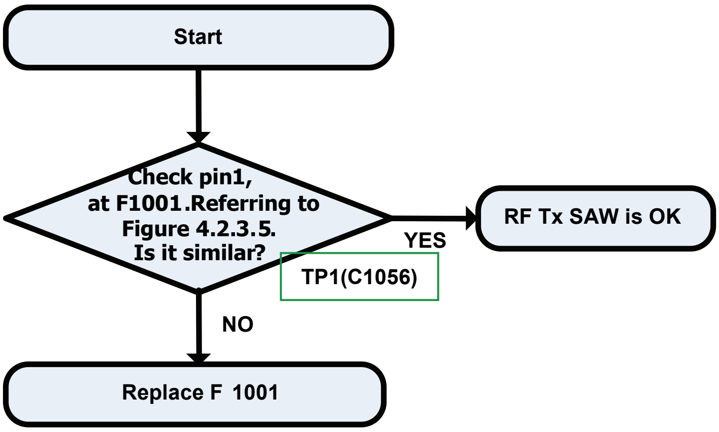
Test Point



Circuit Diagram



Checking Flow



Waveform

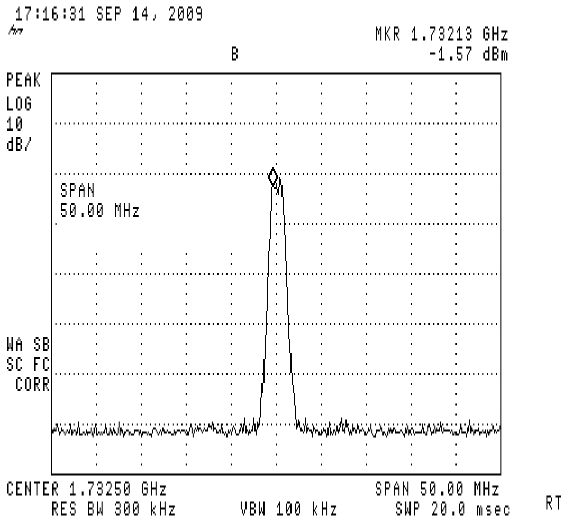
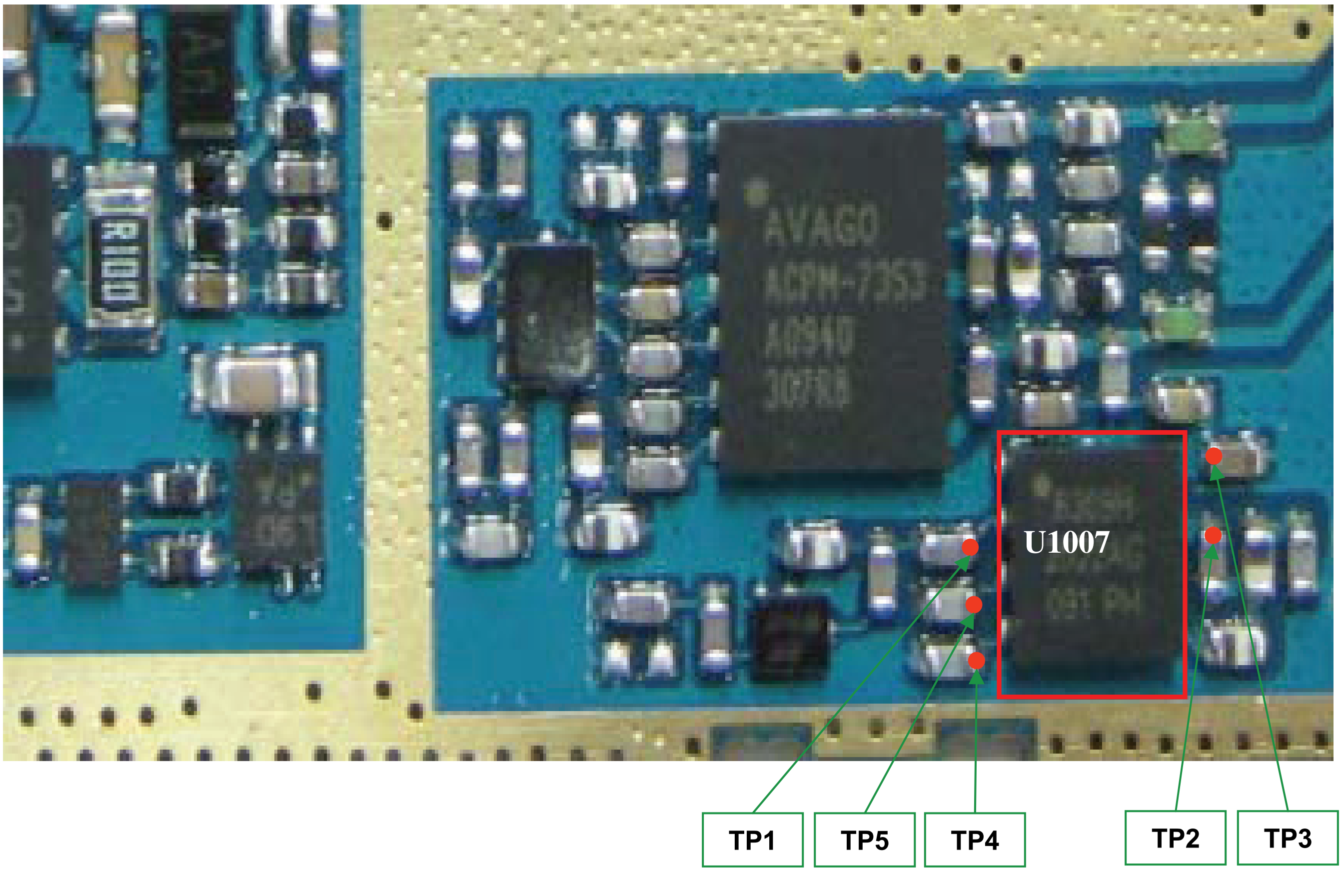
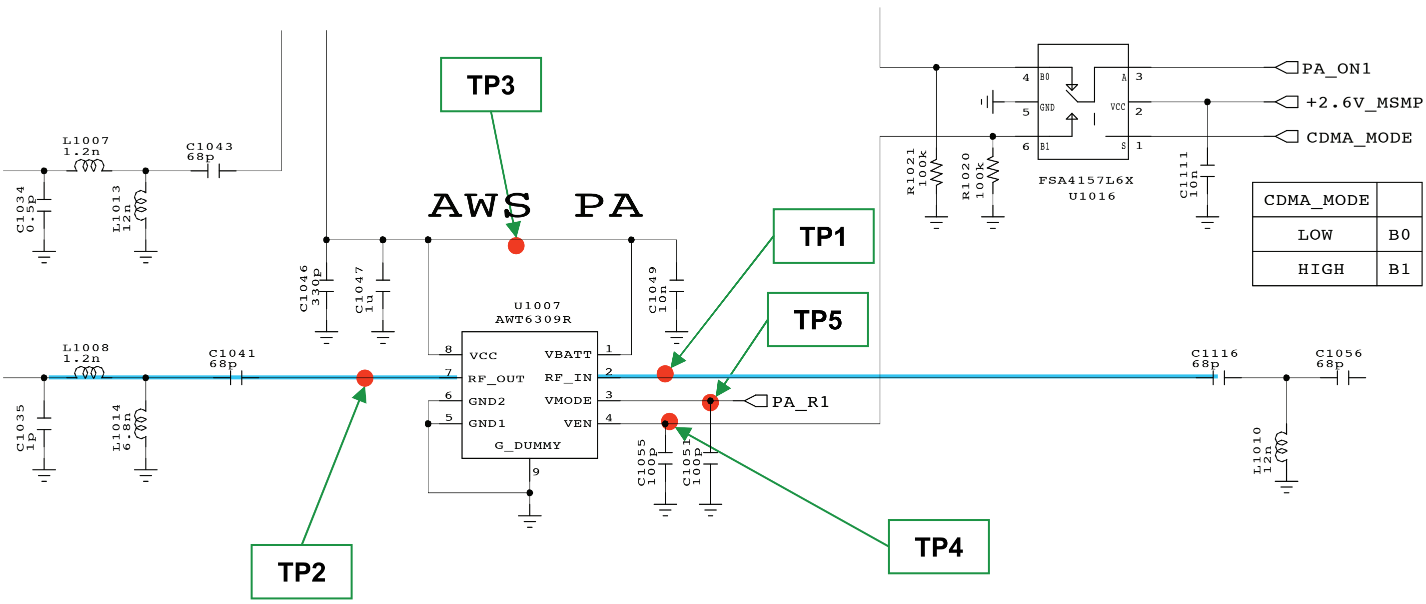


Figure 4.2.3.5

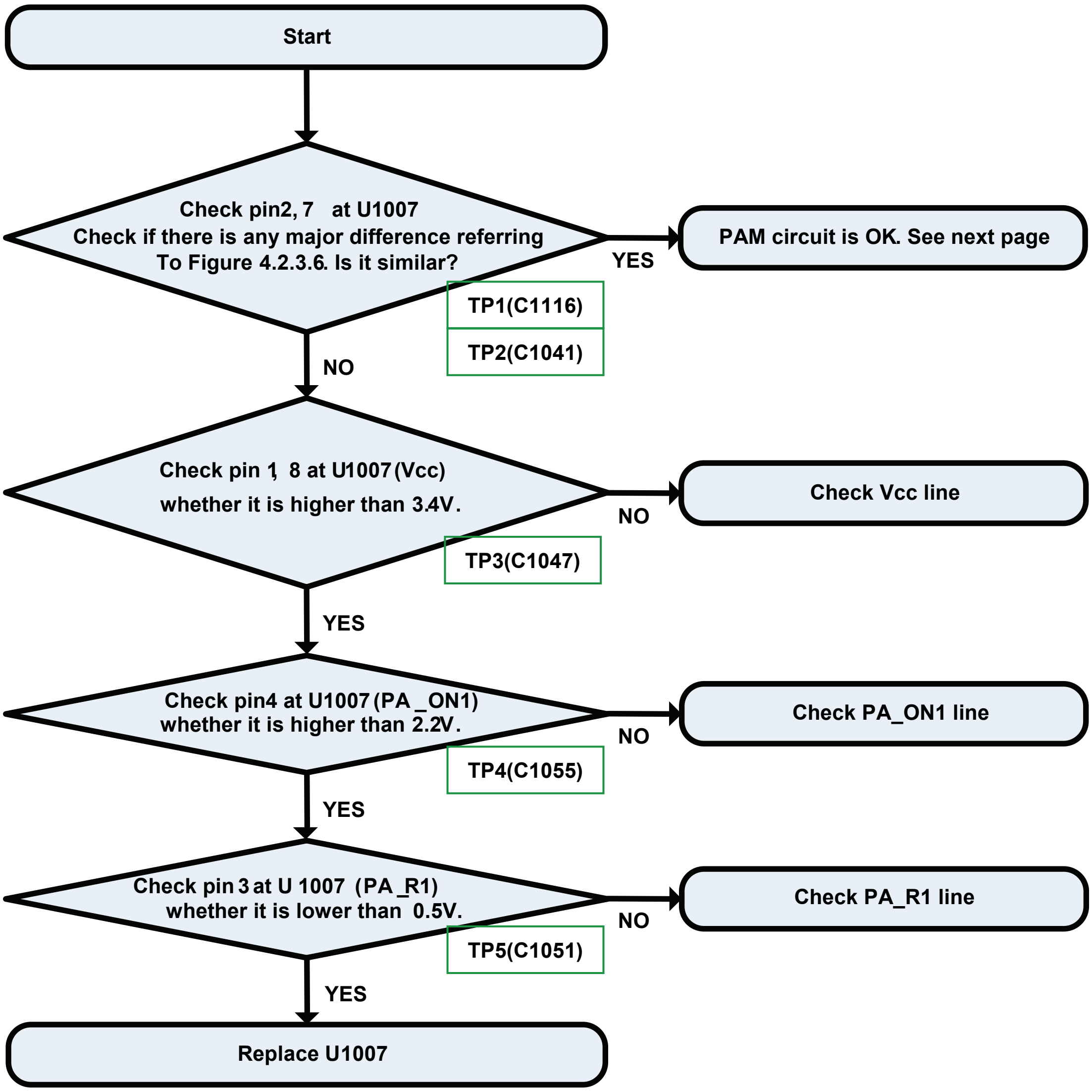
4.2.3.5 Check AWS PAM circuit

Test Point





Checking Flow



Waveform

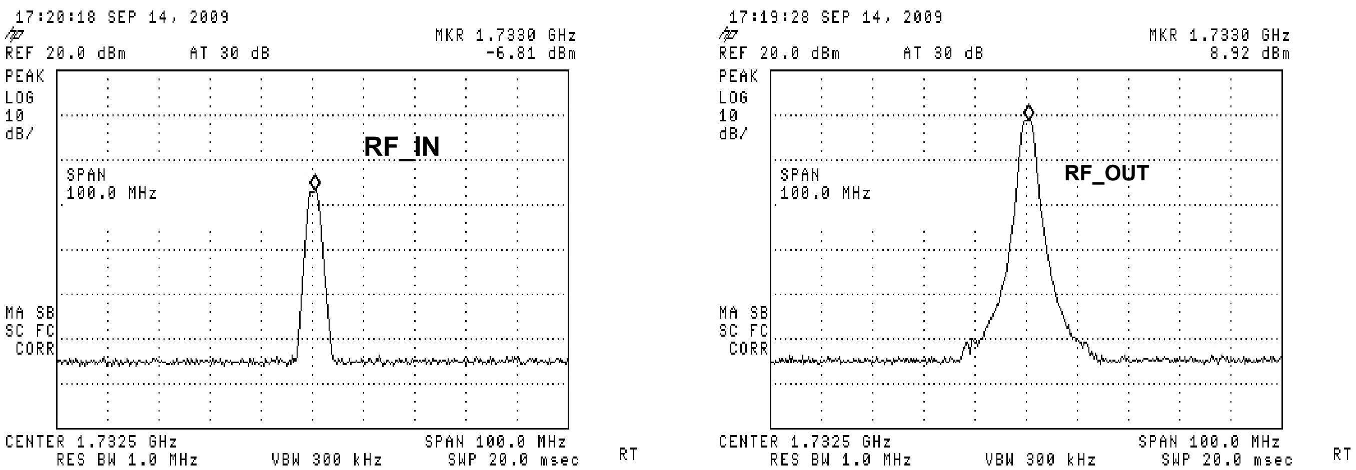
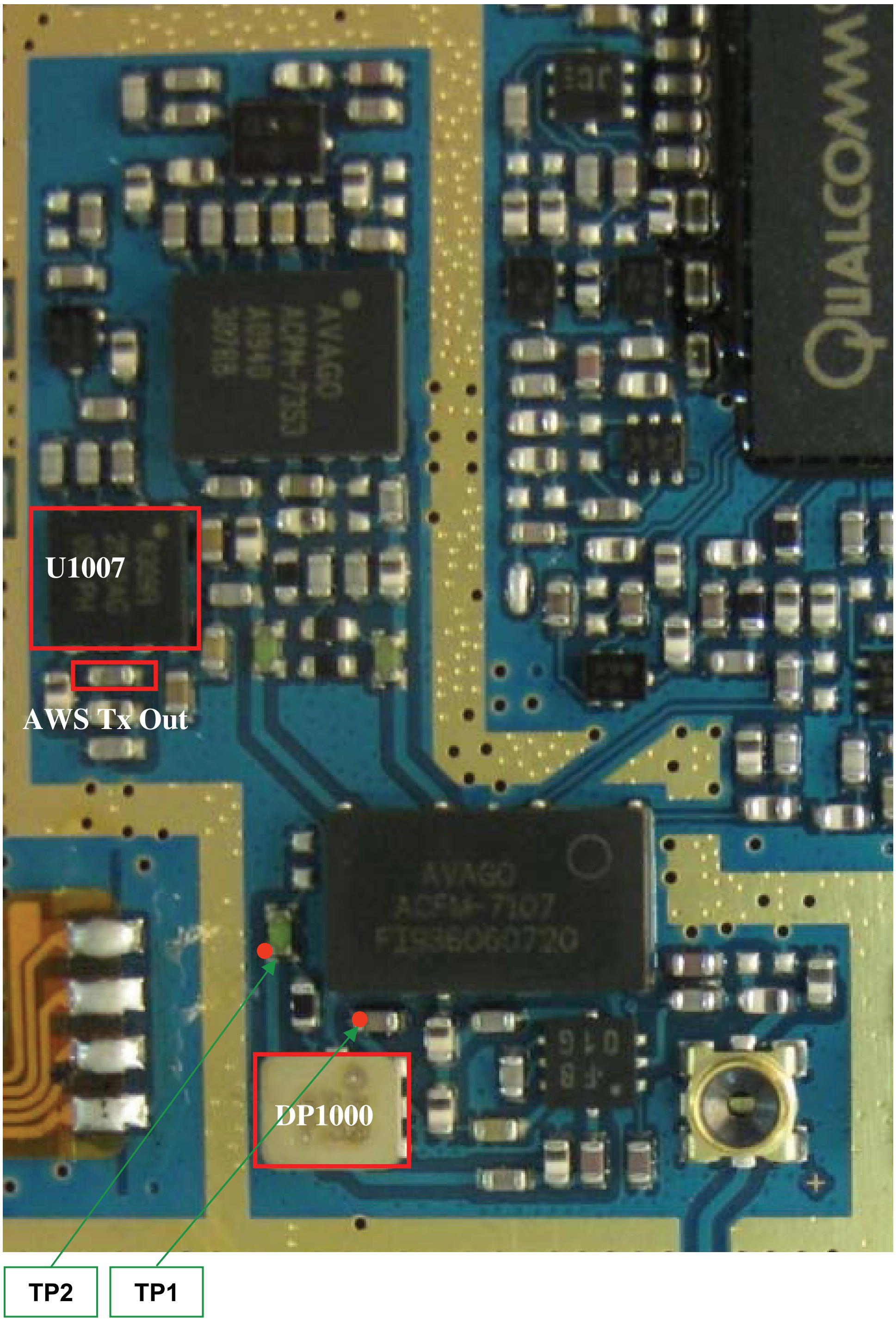


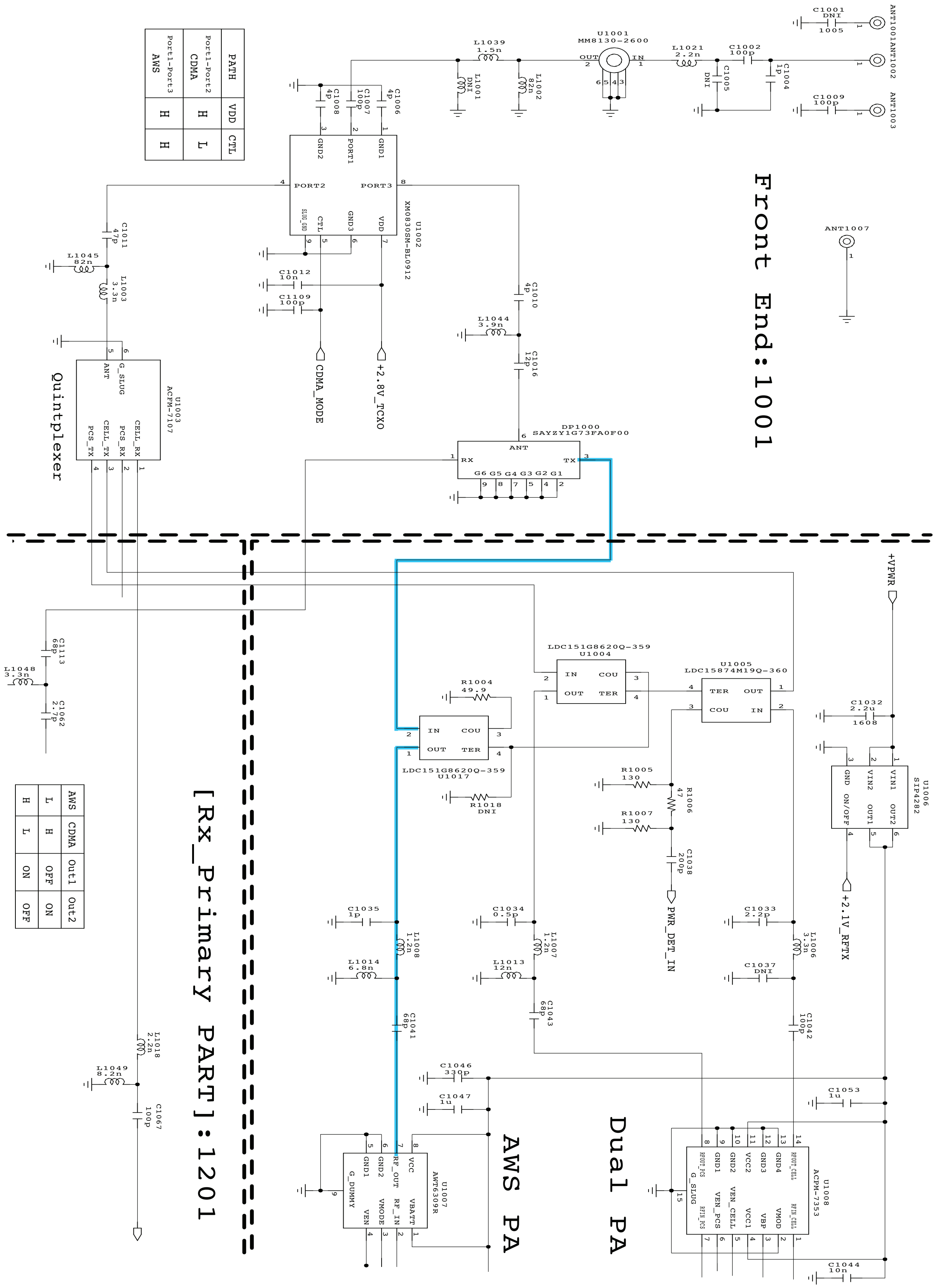
Figure 4.2.3.6

4.2.3.6 Check Duplexer

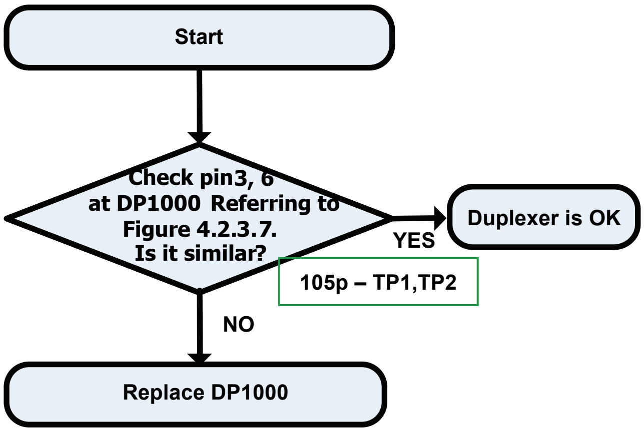
Test Point



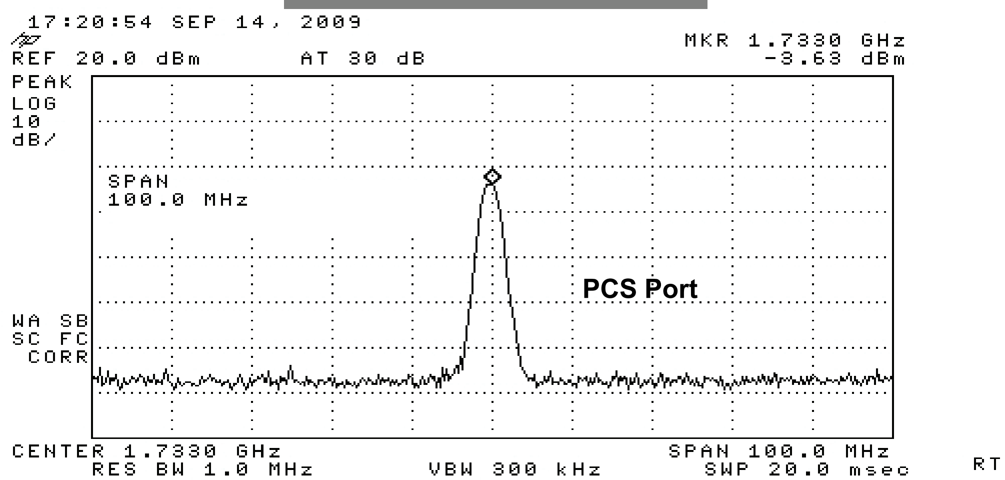
Circuit Diagram



Checking Flow



Waveform



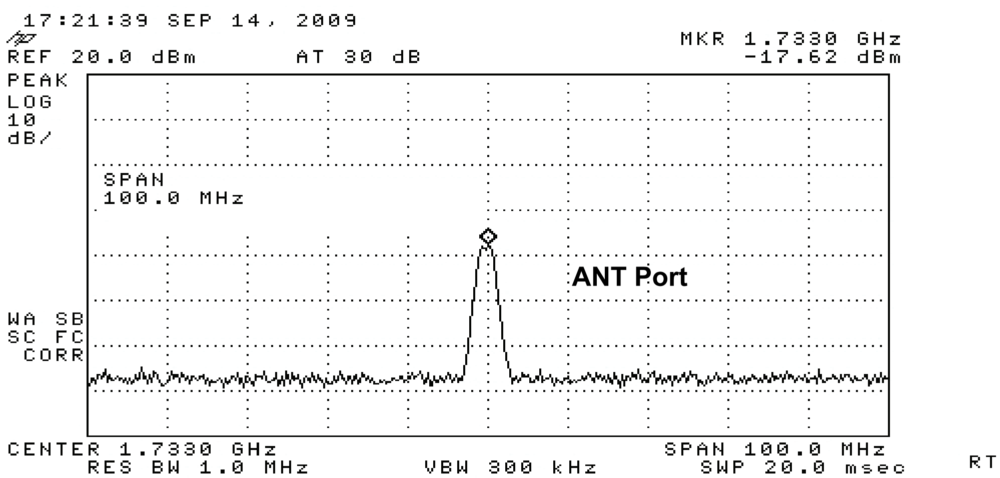
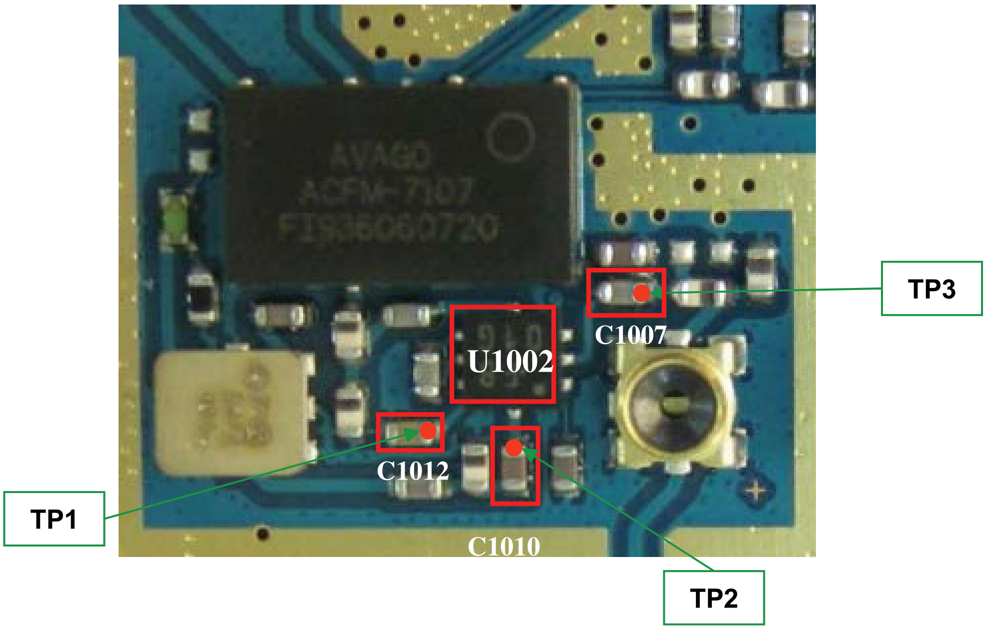


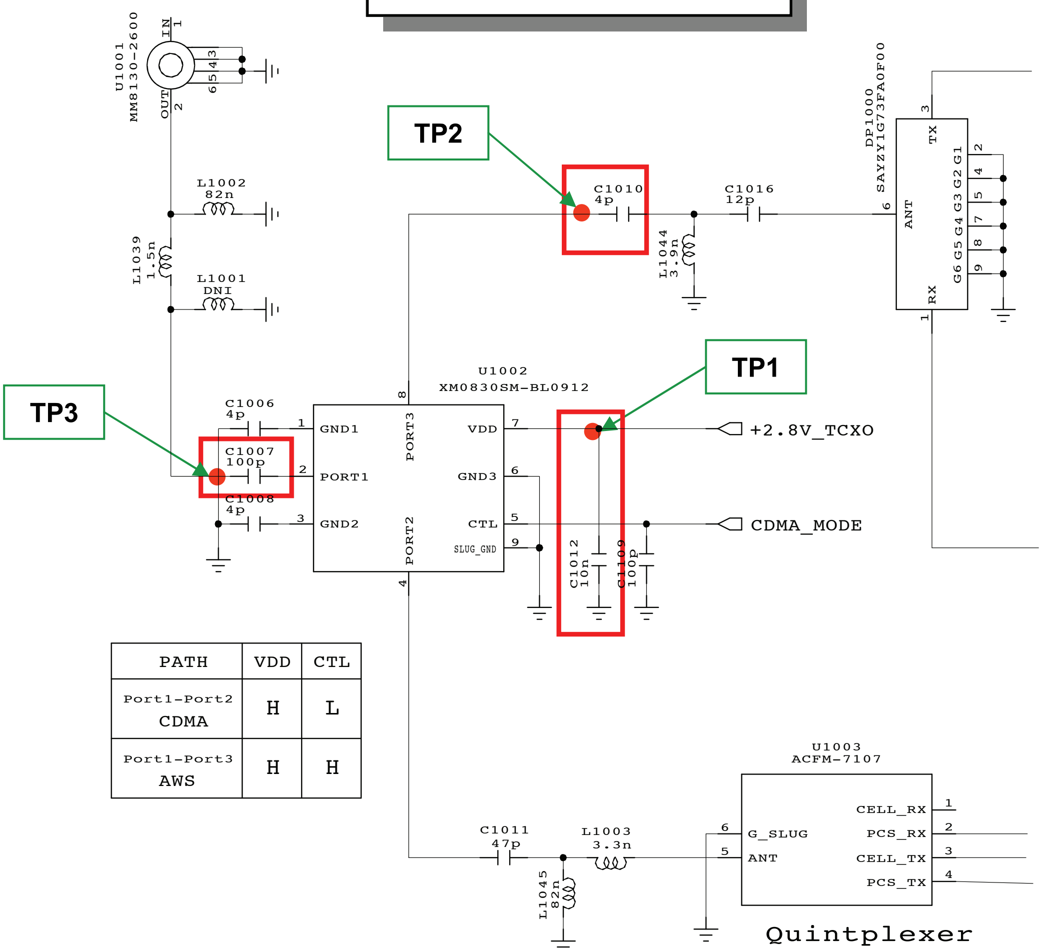
Figure 4.2.3.7

4.2.3.7 Check SPDT (U1002)

Test Point

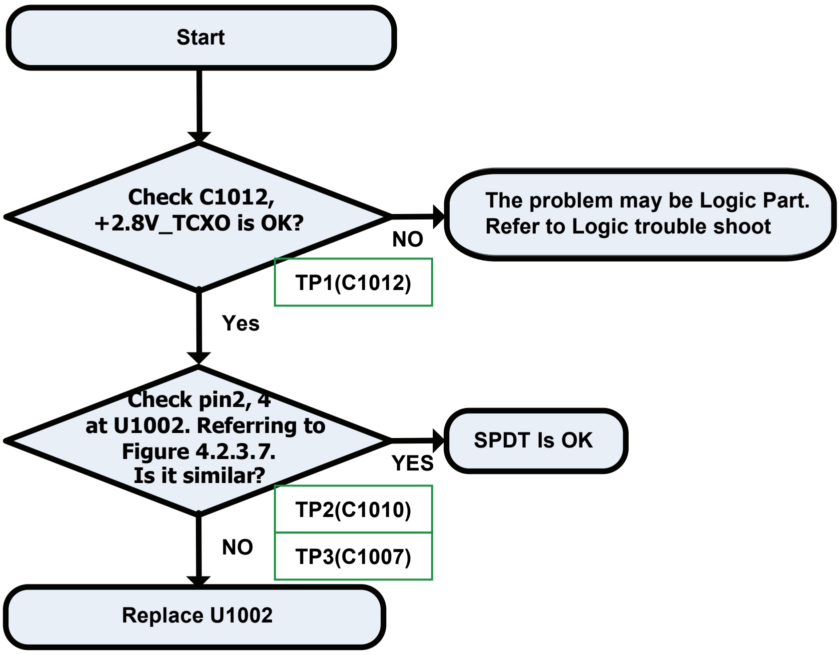


Circuit Diagram



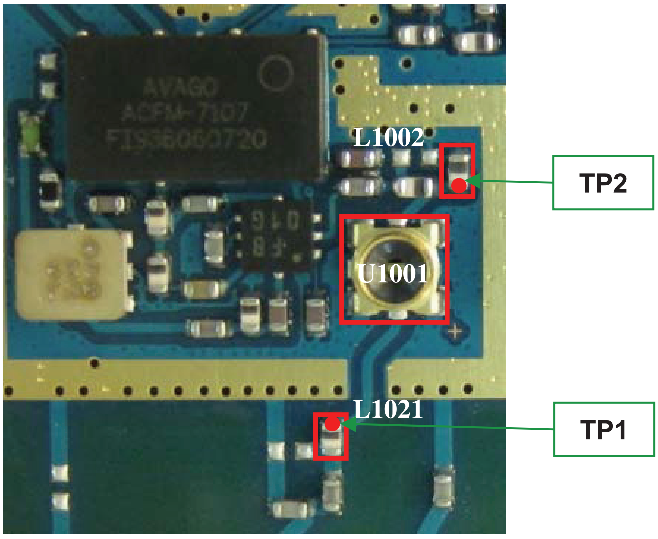
PATH	VDD	CTL
Port1-Port2 CDMA	H	L
Port1-Port3 AWS	H	H

Checking Flow

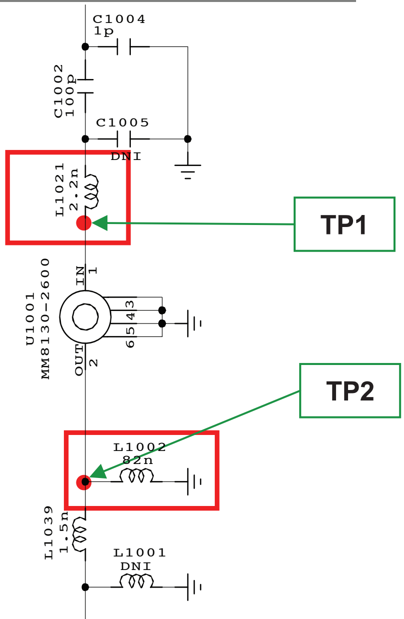


4.2.2.8 Check Mobile S/W

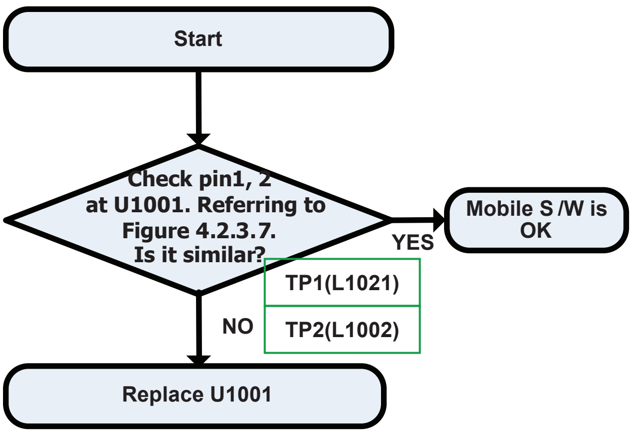
Test Point



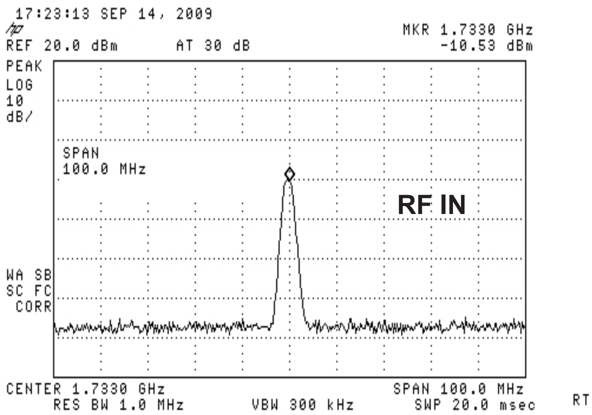
Circuit Diagram



Checking Flow



Waveform



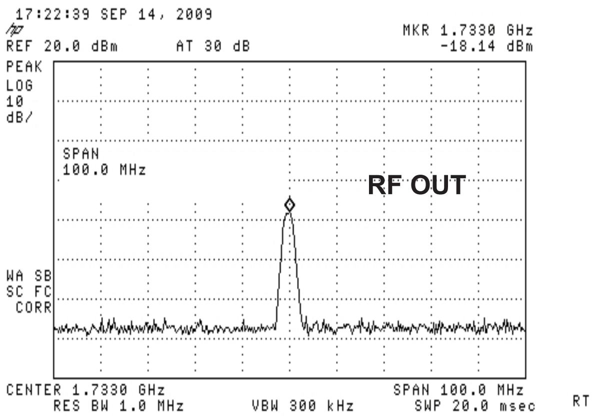


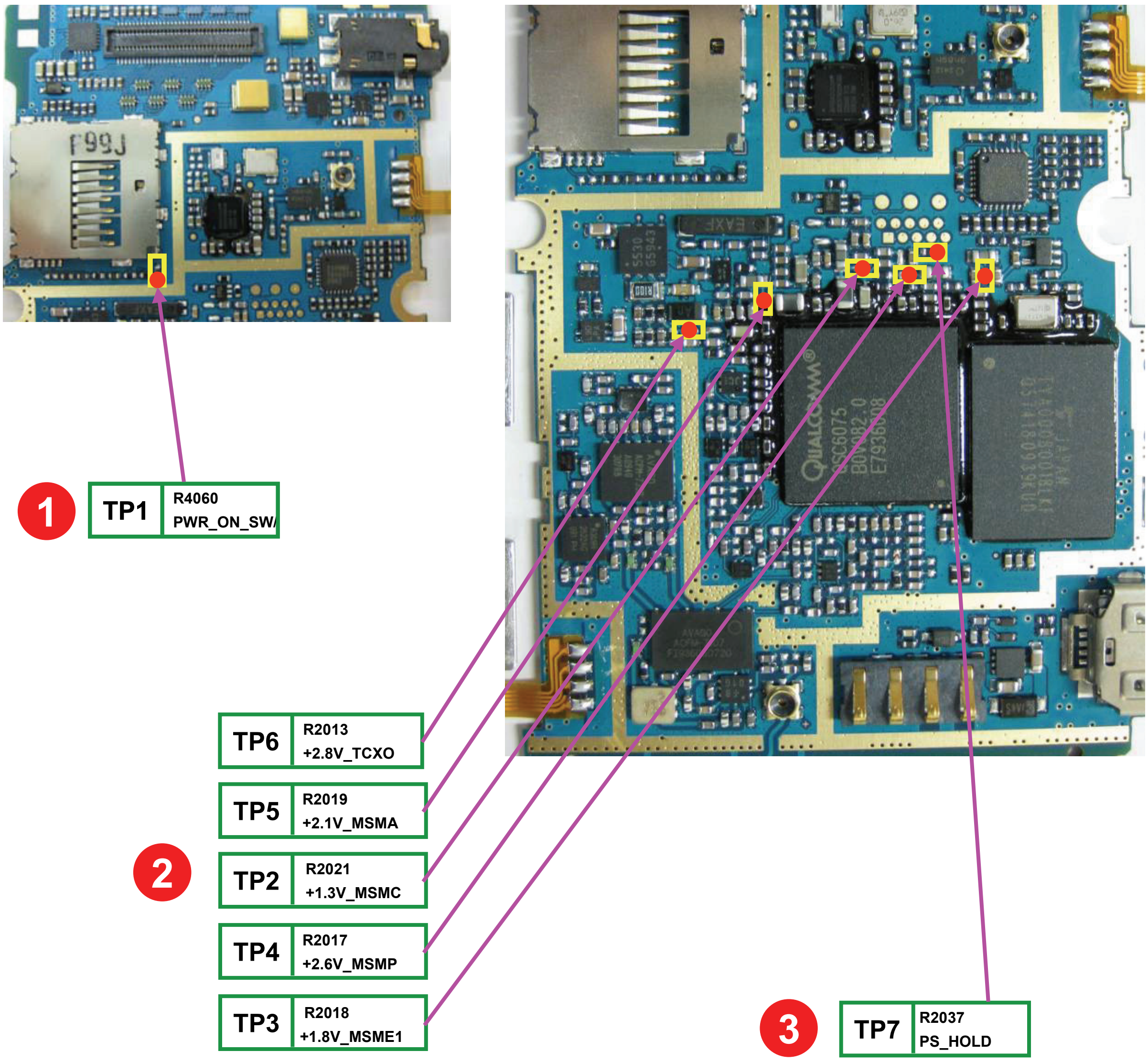
Figure 4.2.3.8

4.3 Logic Part Trouble

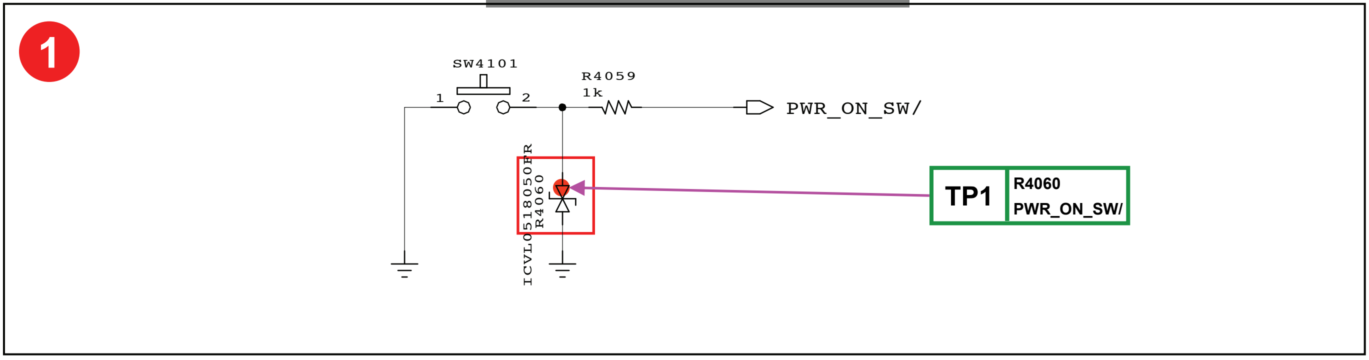
4.3.1 Power

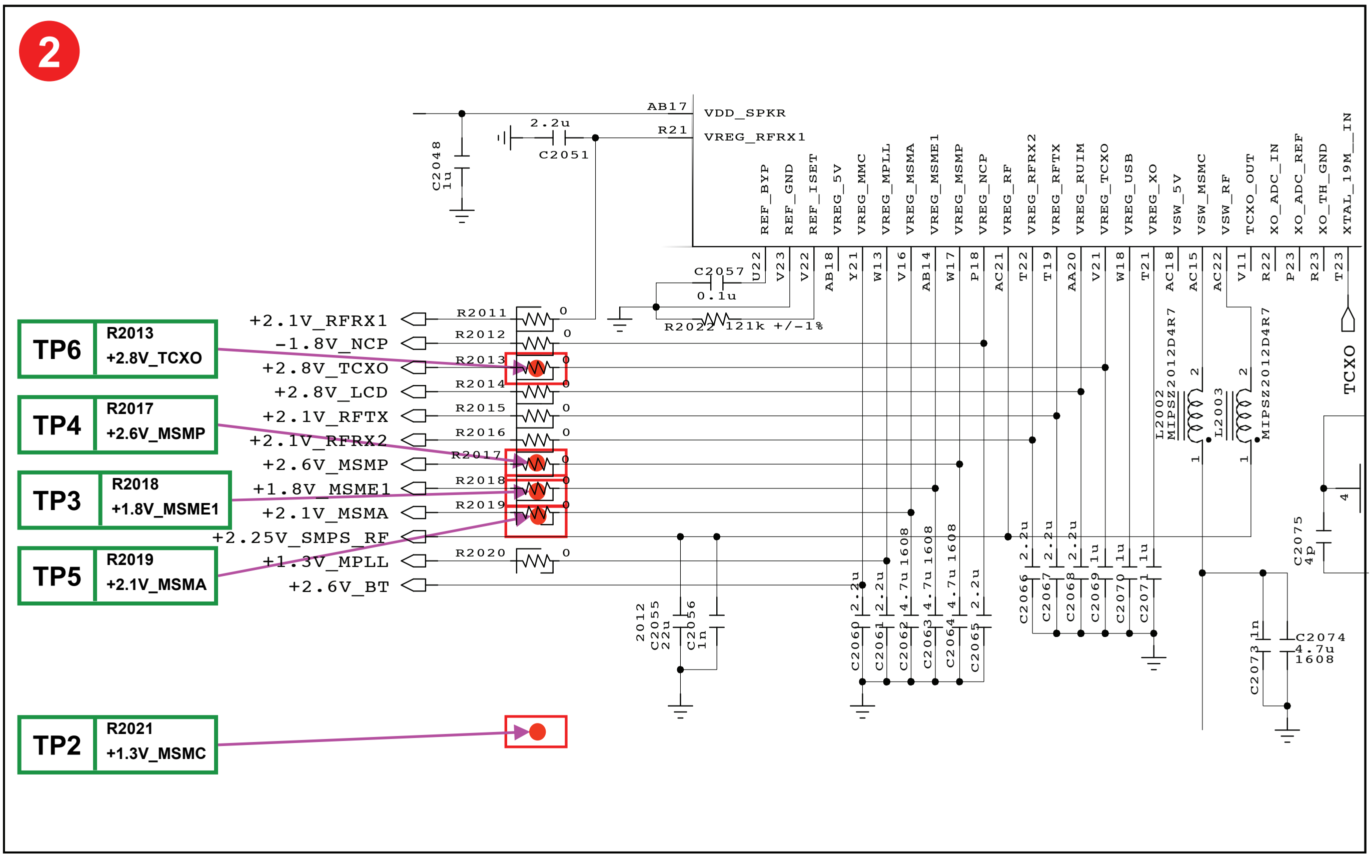
4.3.1.1 Power-On Trouble

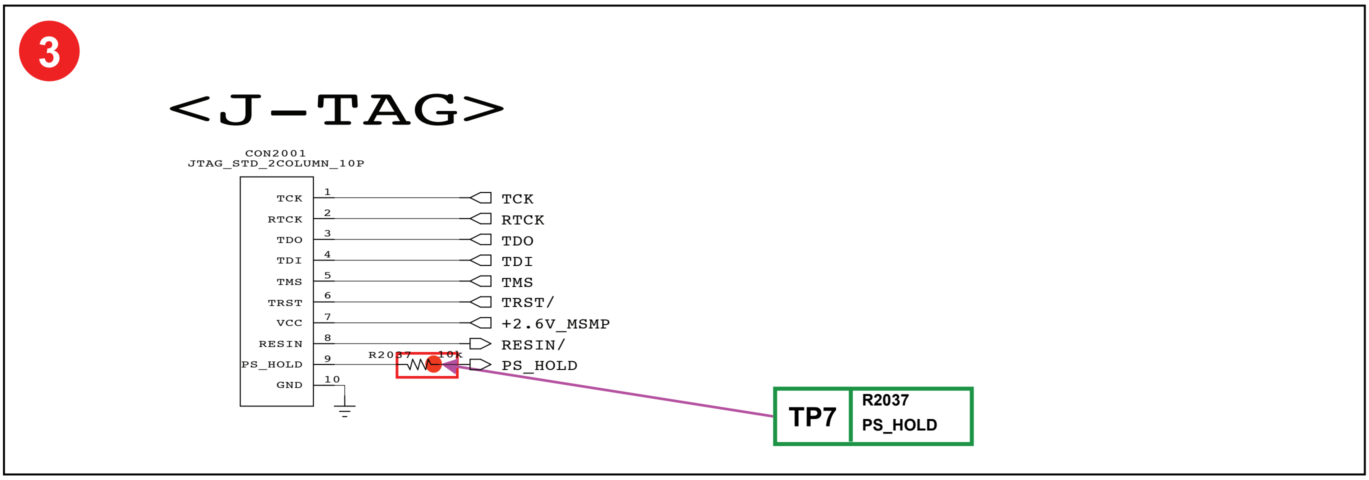
Test point



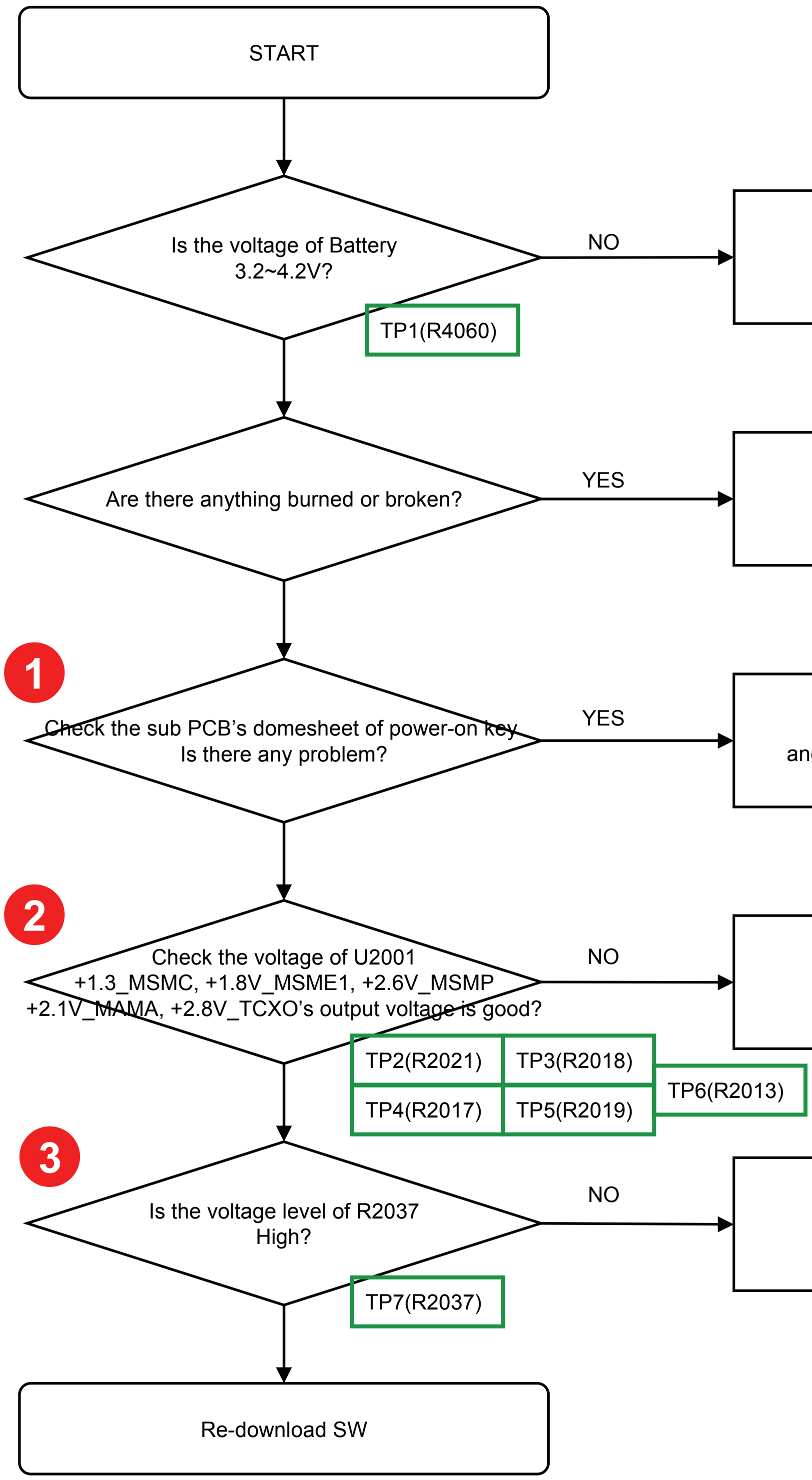
Circuit Diagram





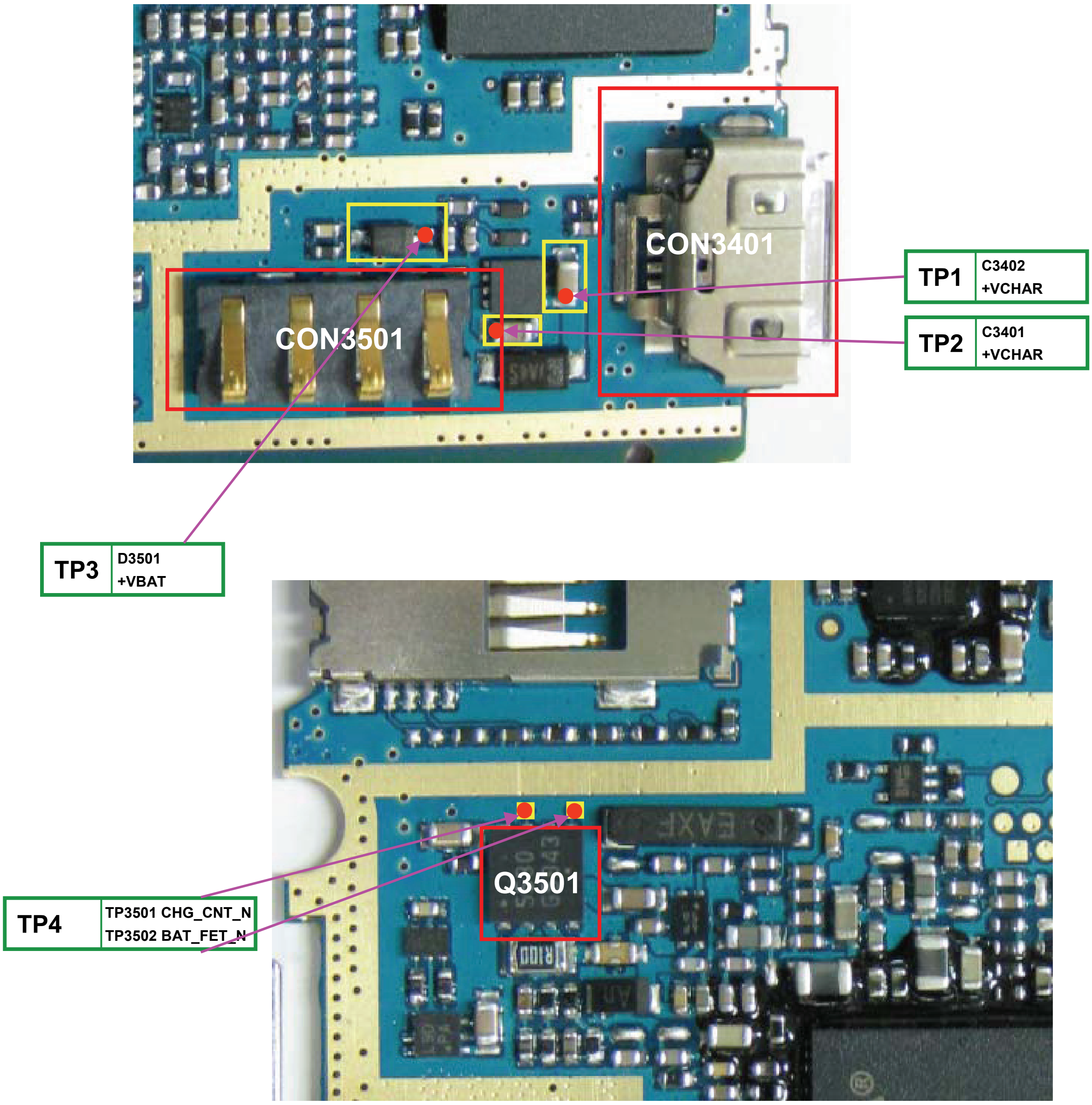


Checking Flow

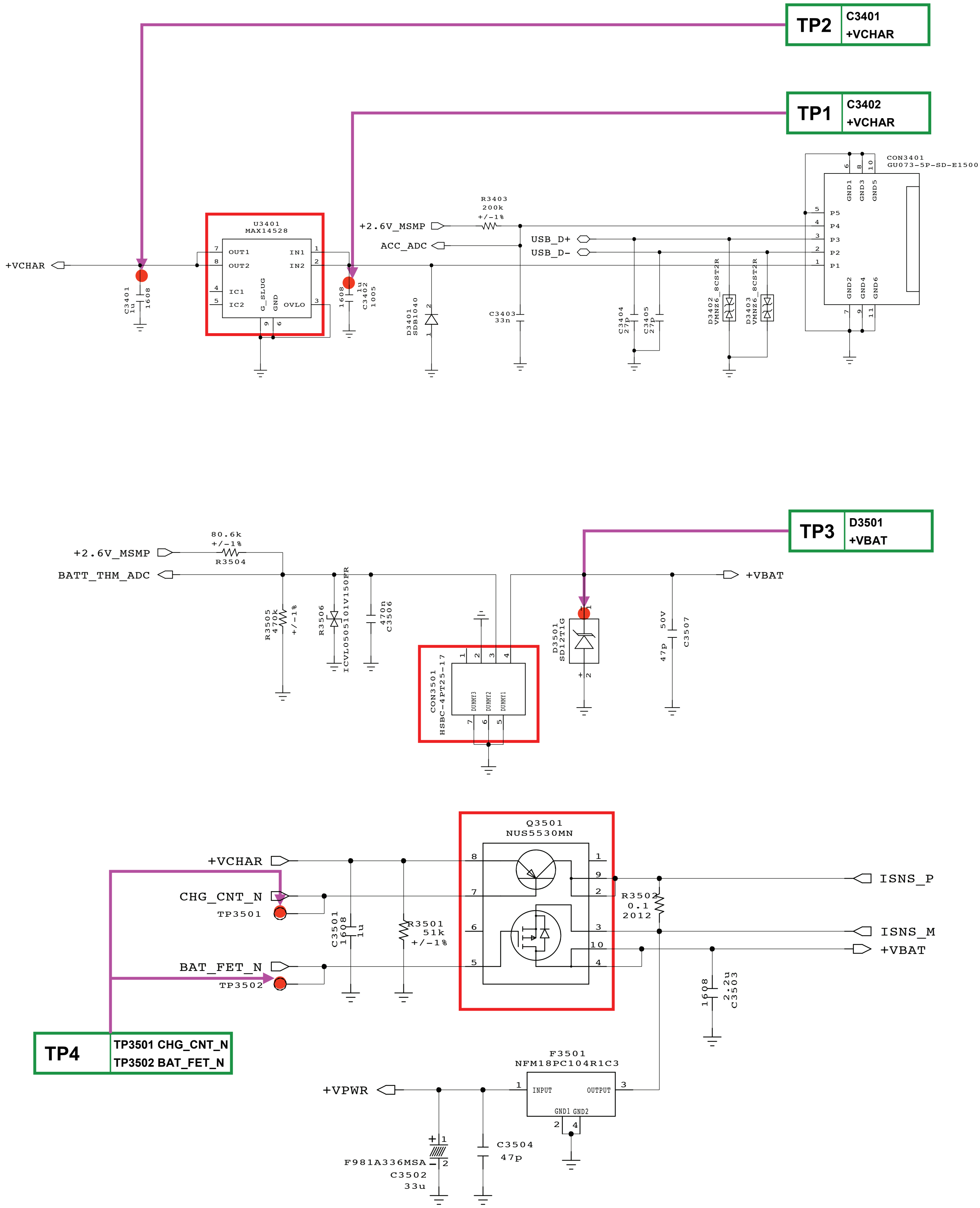


4.3.1.2 Charging Trouble

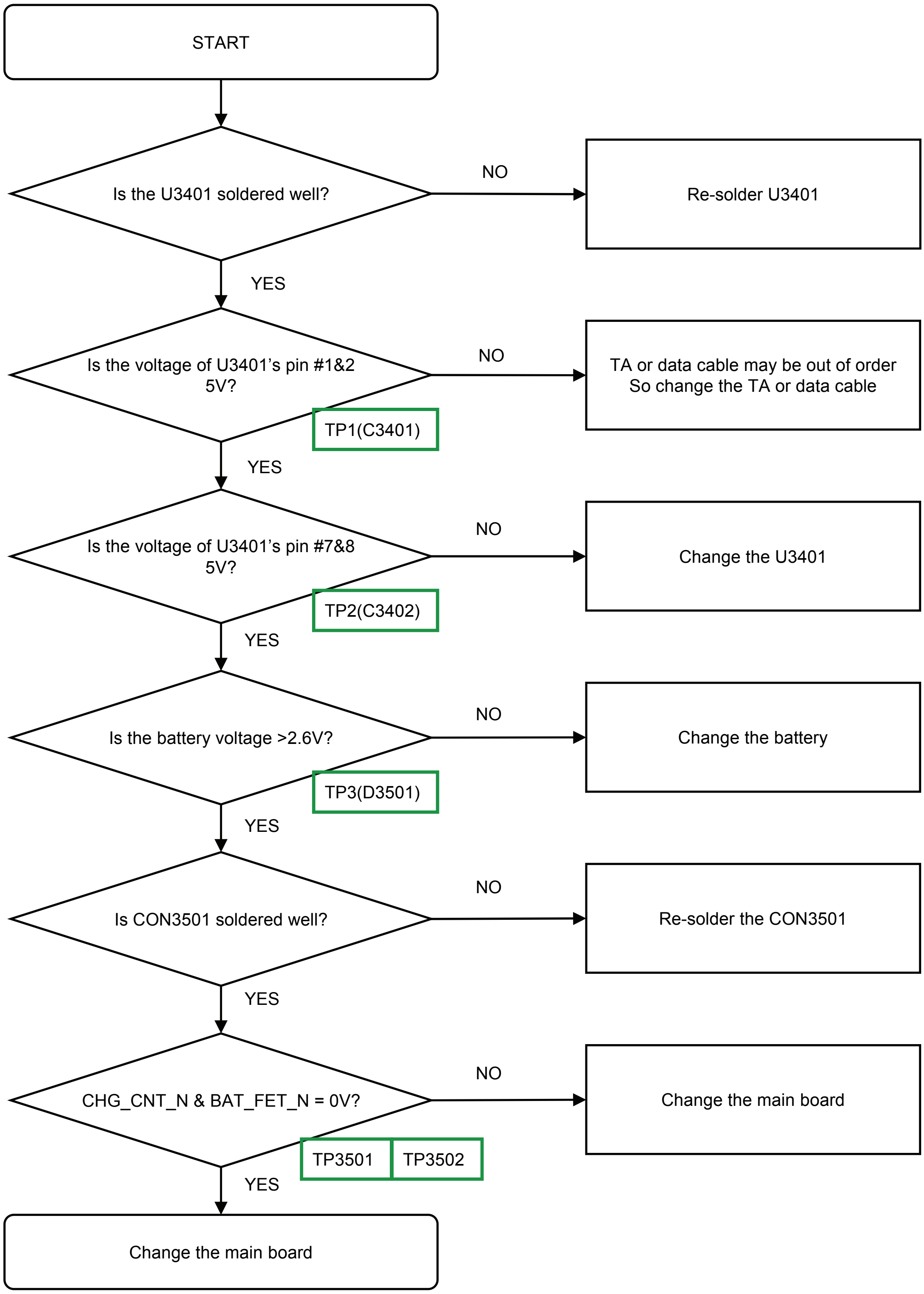
Test point



Circuit Diagram



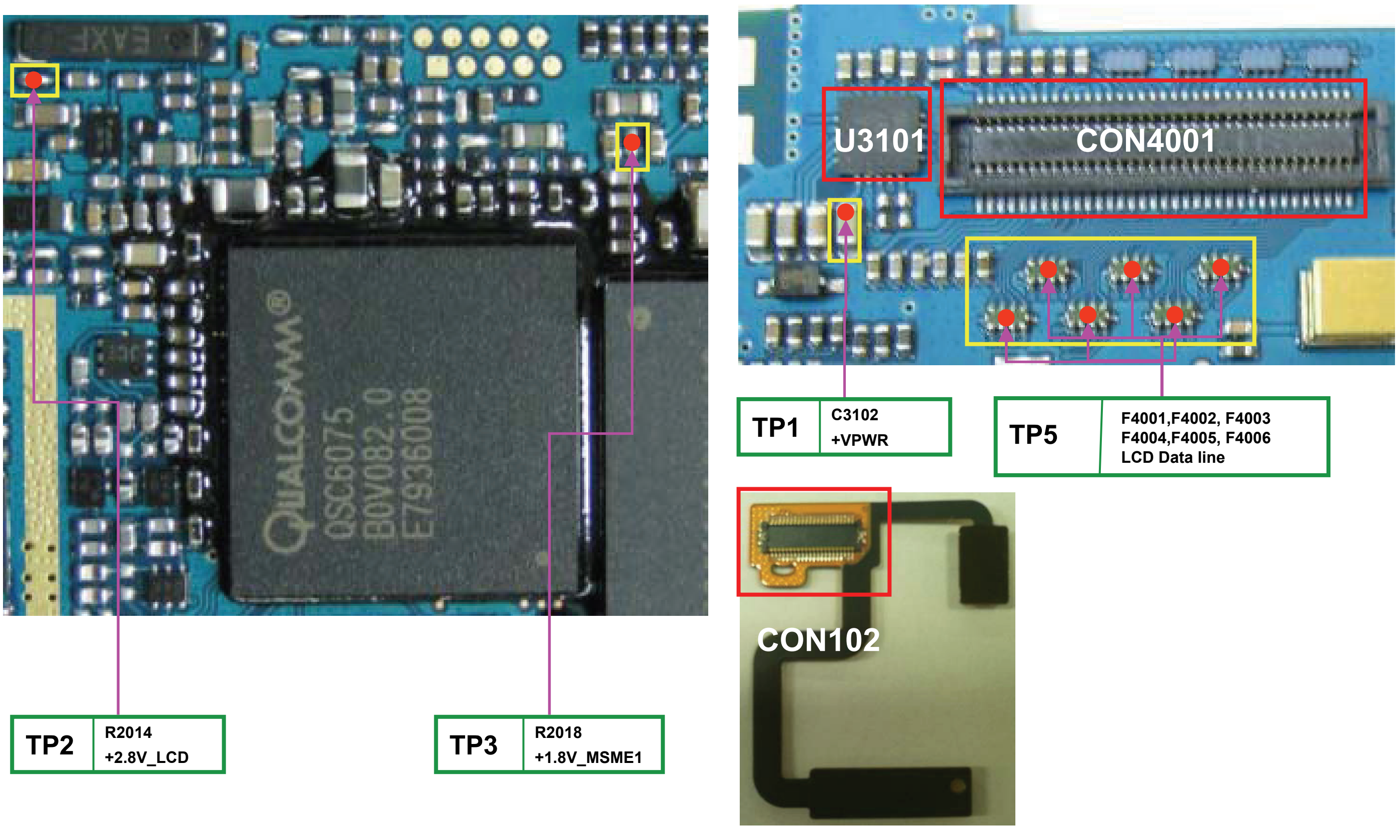
Checking Flow



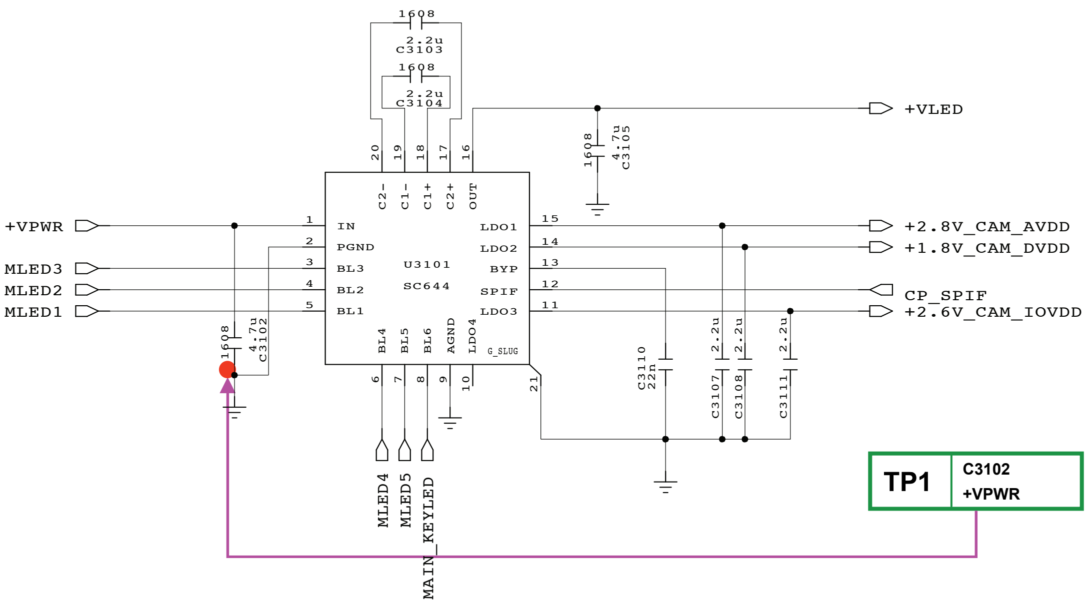
4.3.2 LCD

4.3.2.1 LCD Problem

Test point



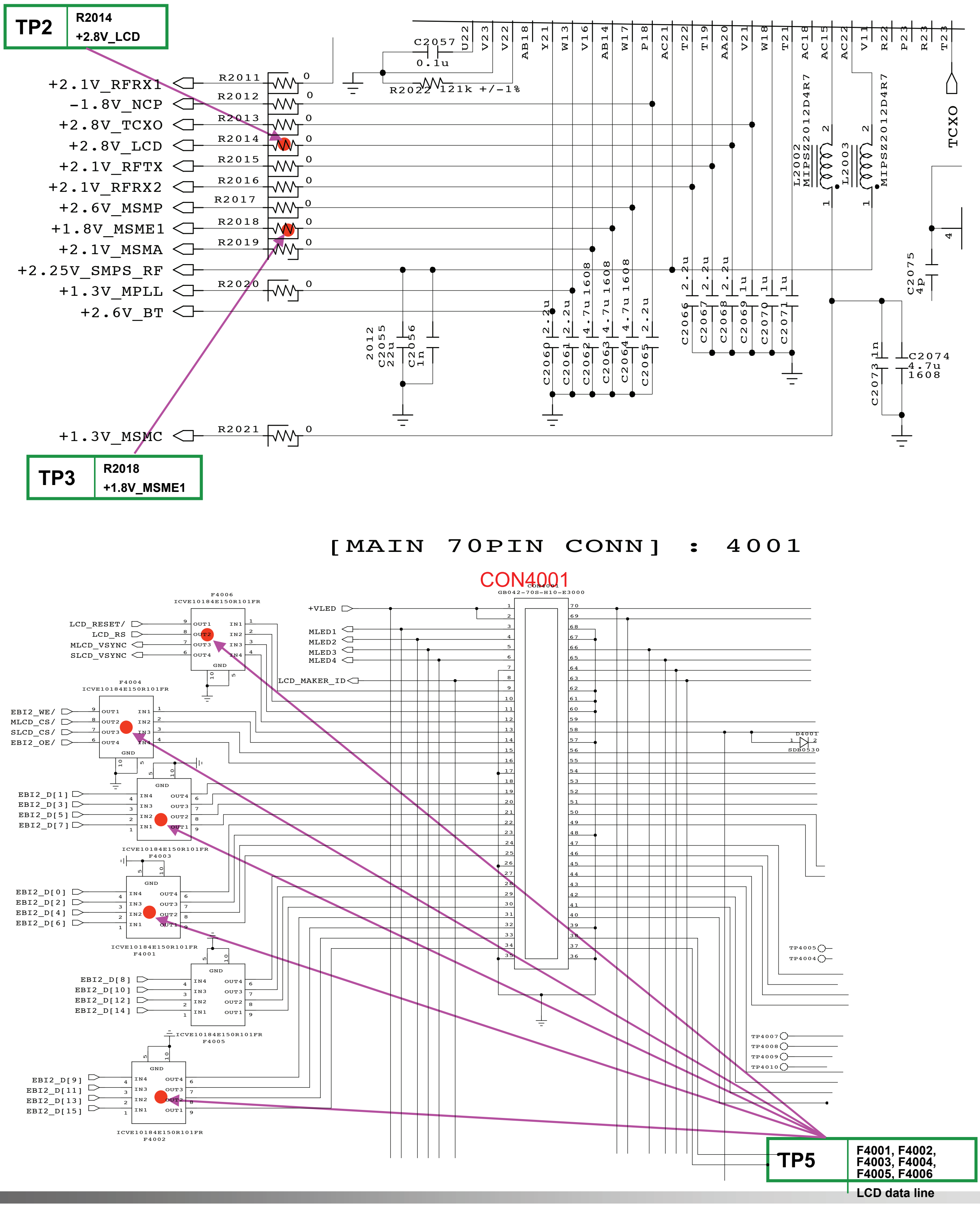
Circuit Diagram



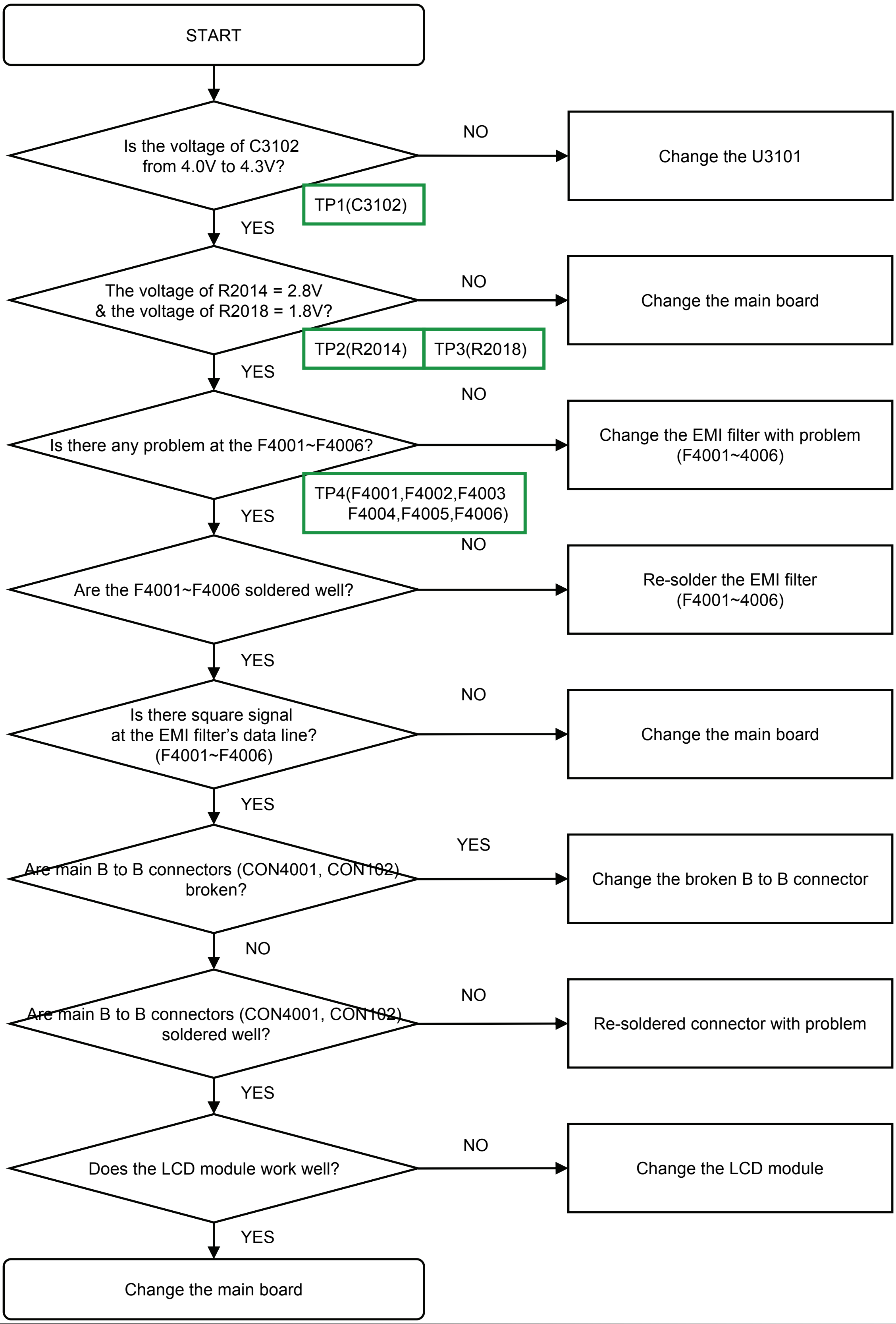
4.3.2 LCD

4.3.2.1 LCD Problem

Circuit Diagram



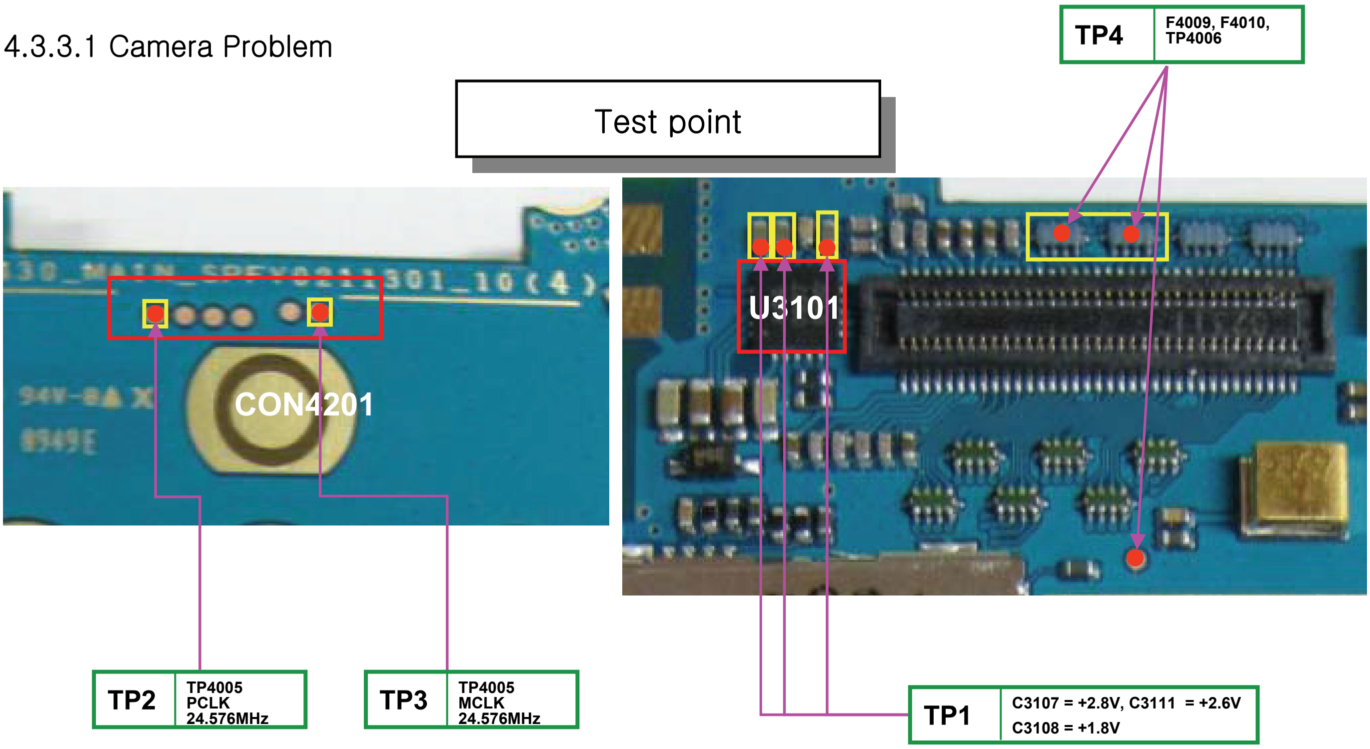
Checking Flow



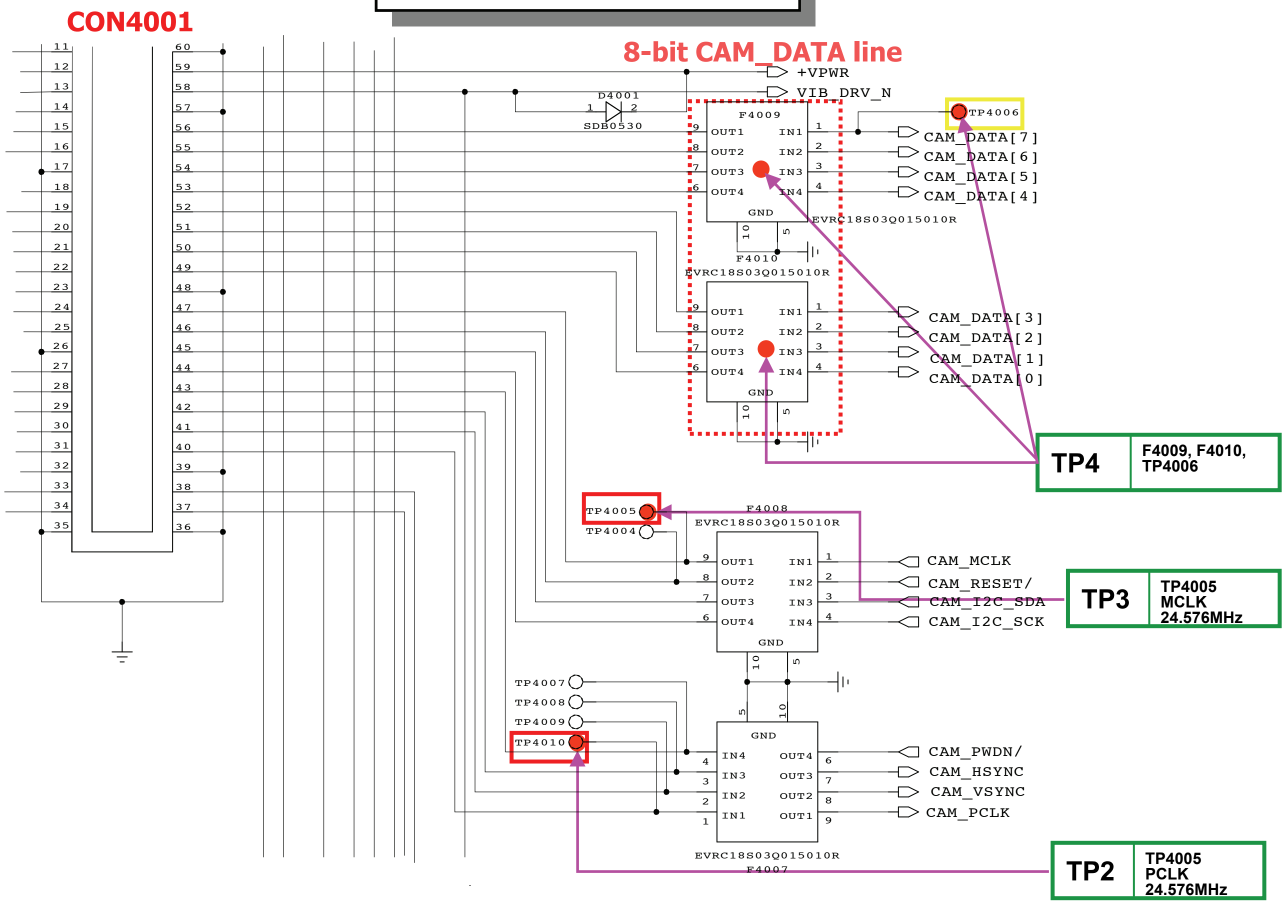
4.3.3 Camera

4.3.3.1 Camera Problem

Test point



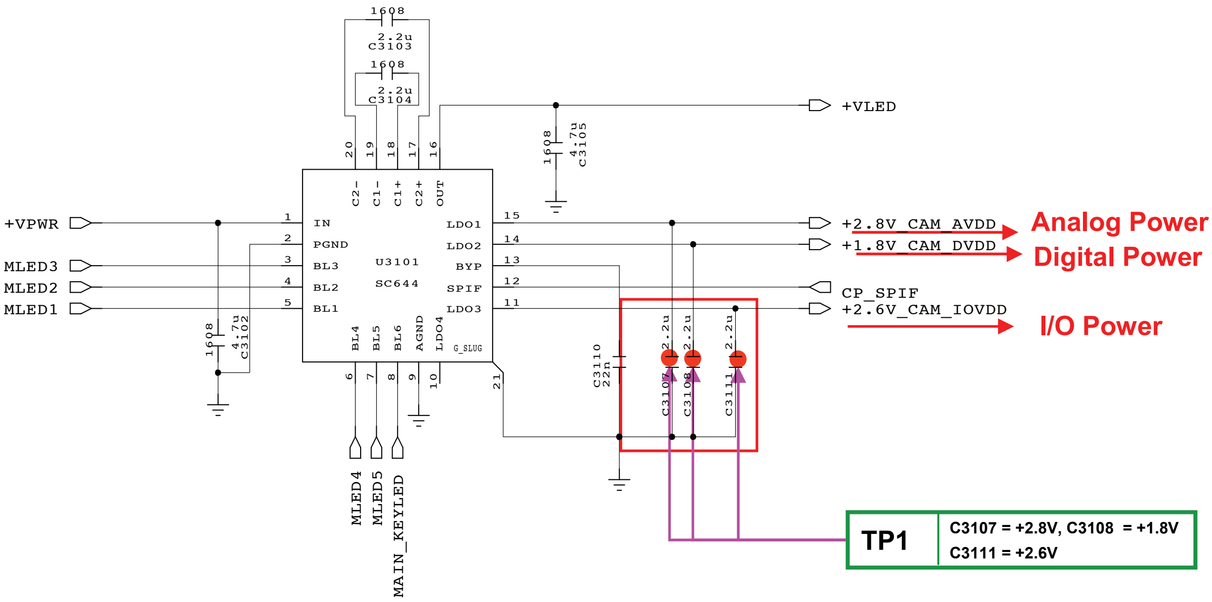
Circuit Diagram



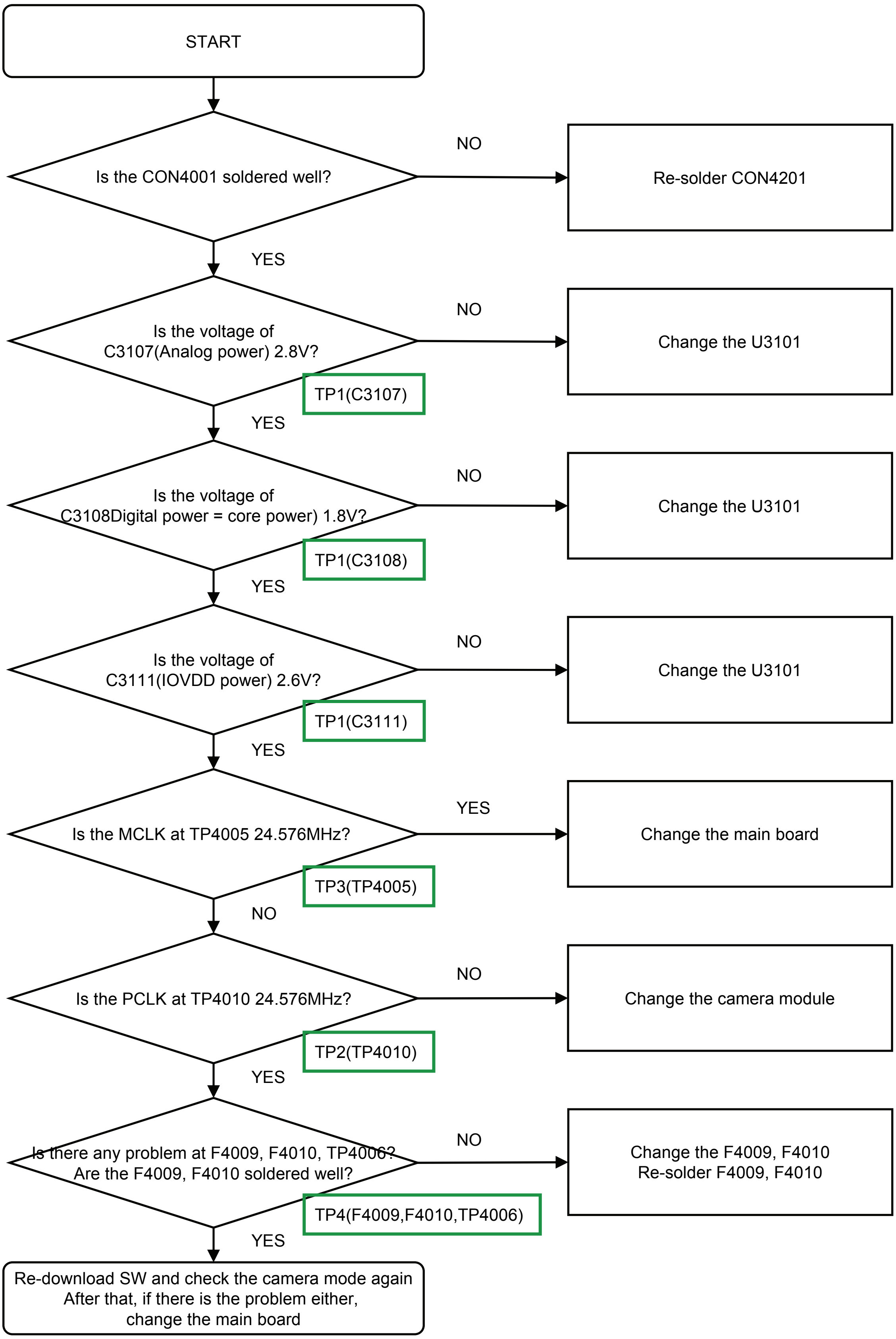
4.3.3 Camera

4.3.3.1 Camera Problem

Circuit Diagram



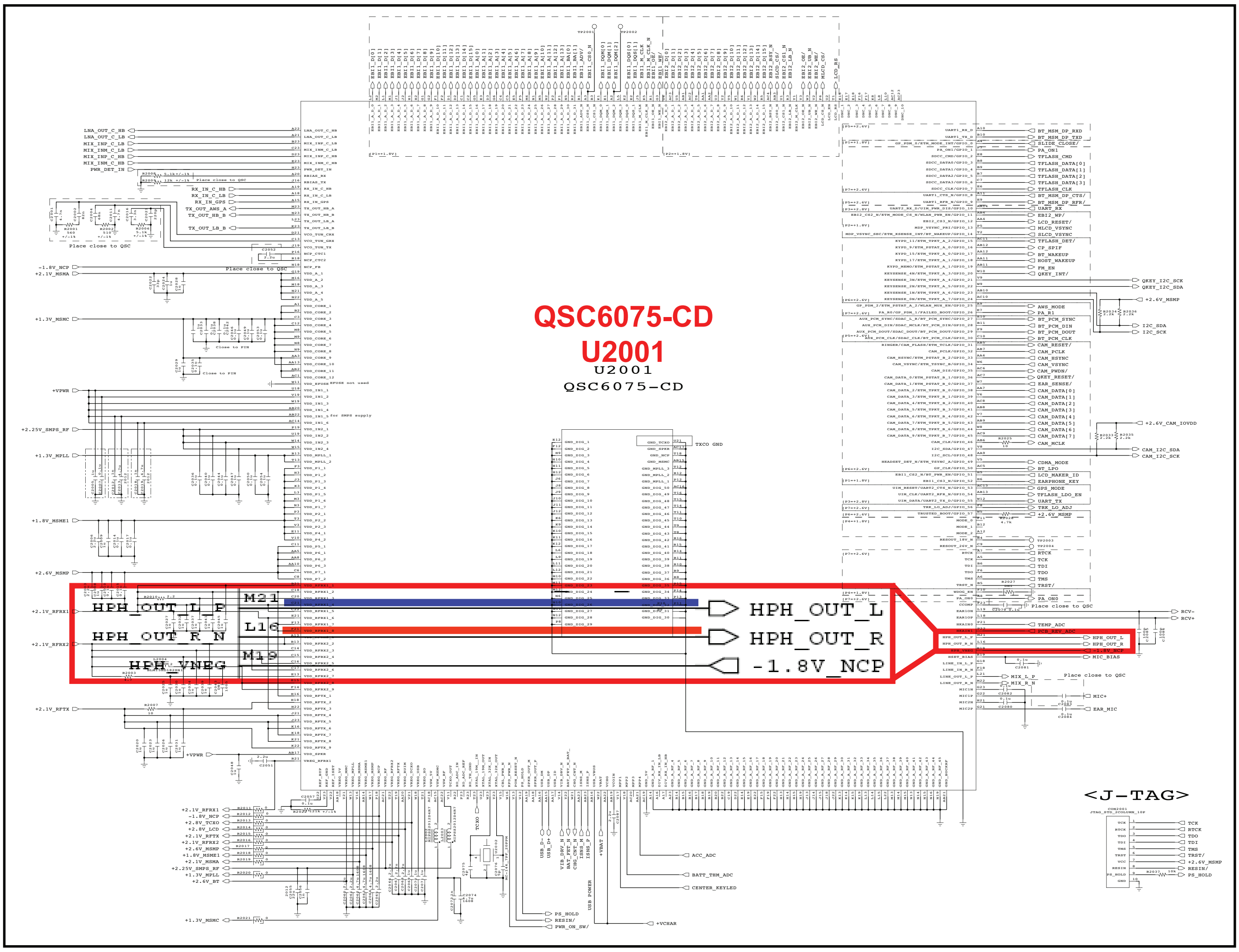
Checking Flow



4.3.4Audio

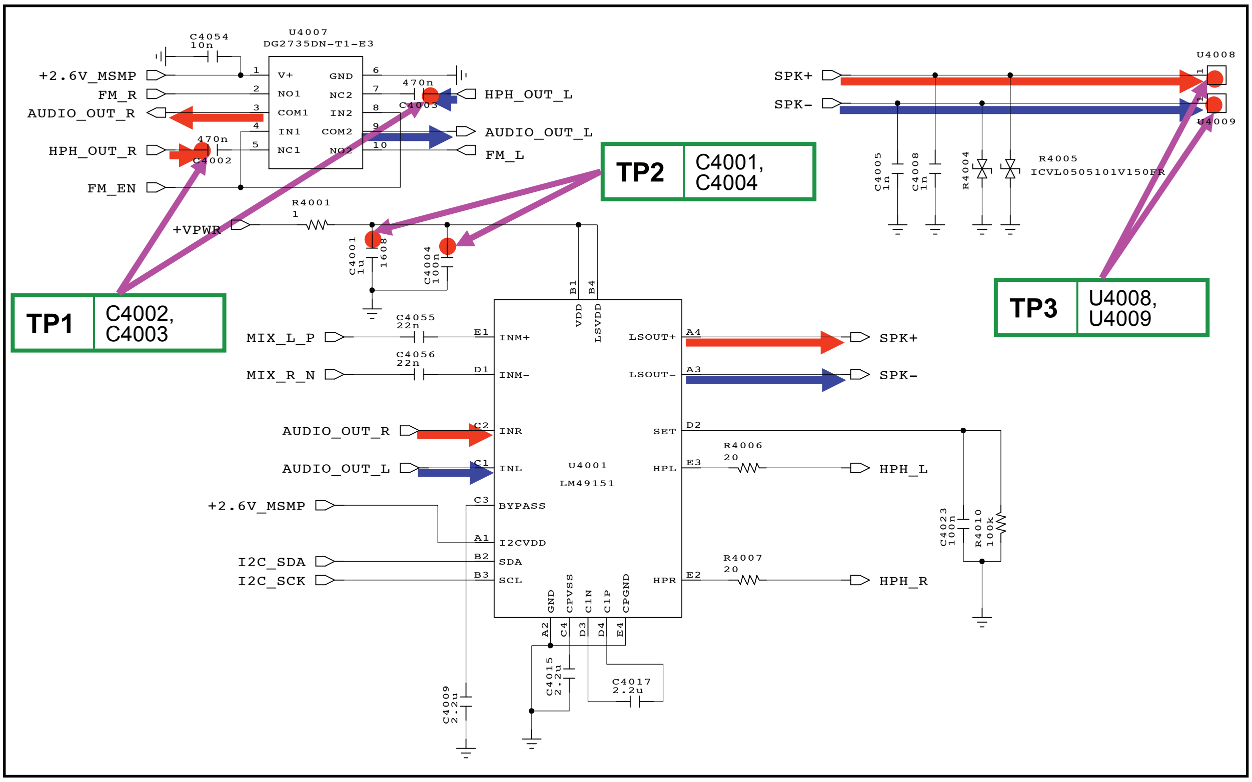
4.3.4.1 Speaker Trouble

Circuit Diagram

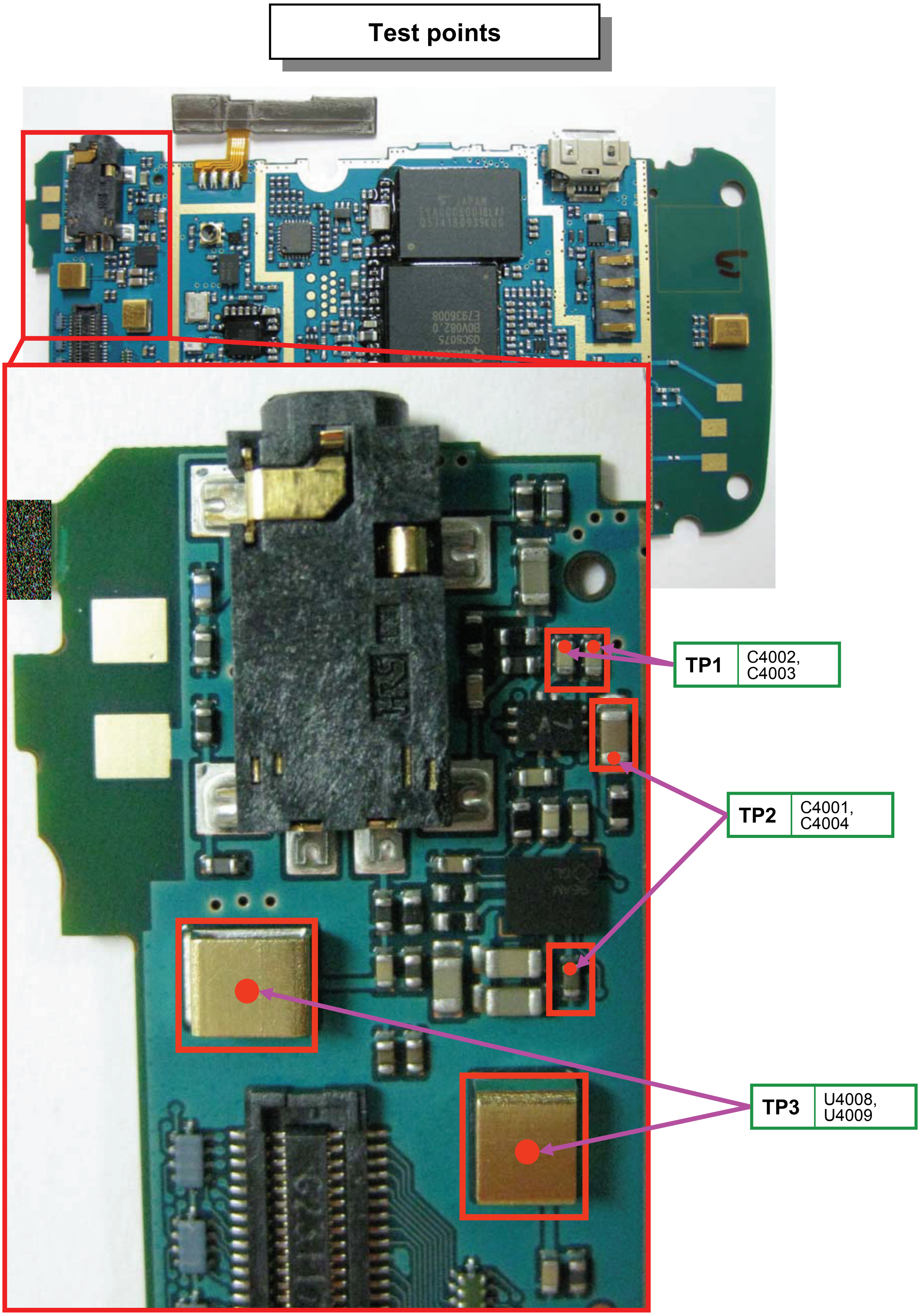


4.3.4.1 Speaker Trouble

Circuit Diagram



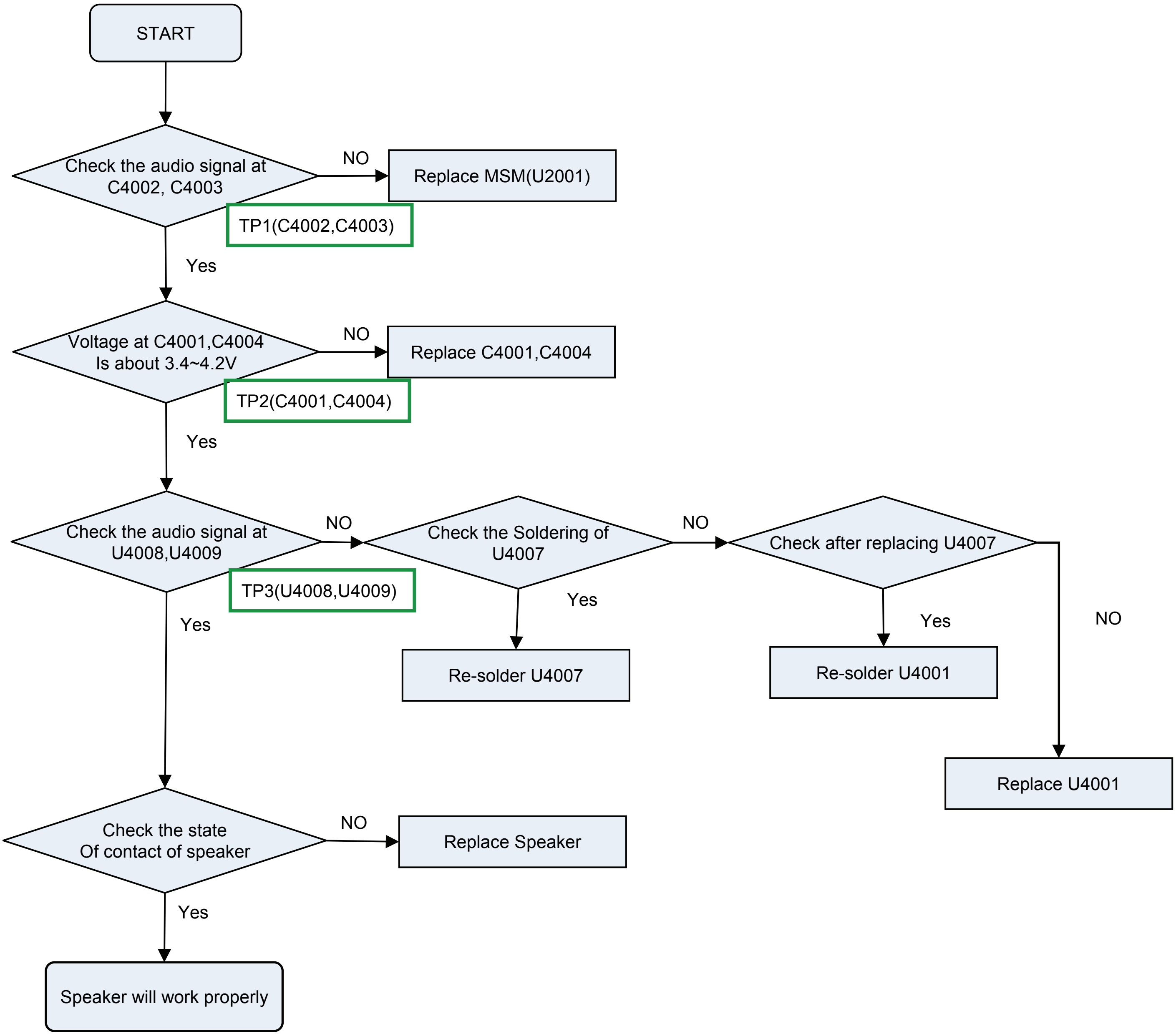
4.3.4.1 Speaker Trouble



4.3.4.1 Speaker Trouble

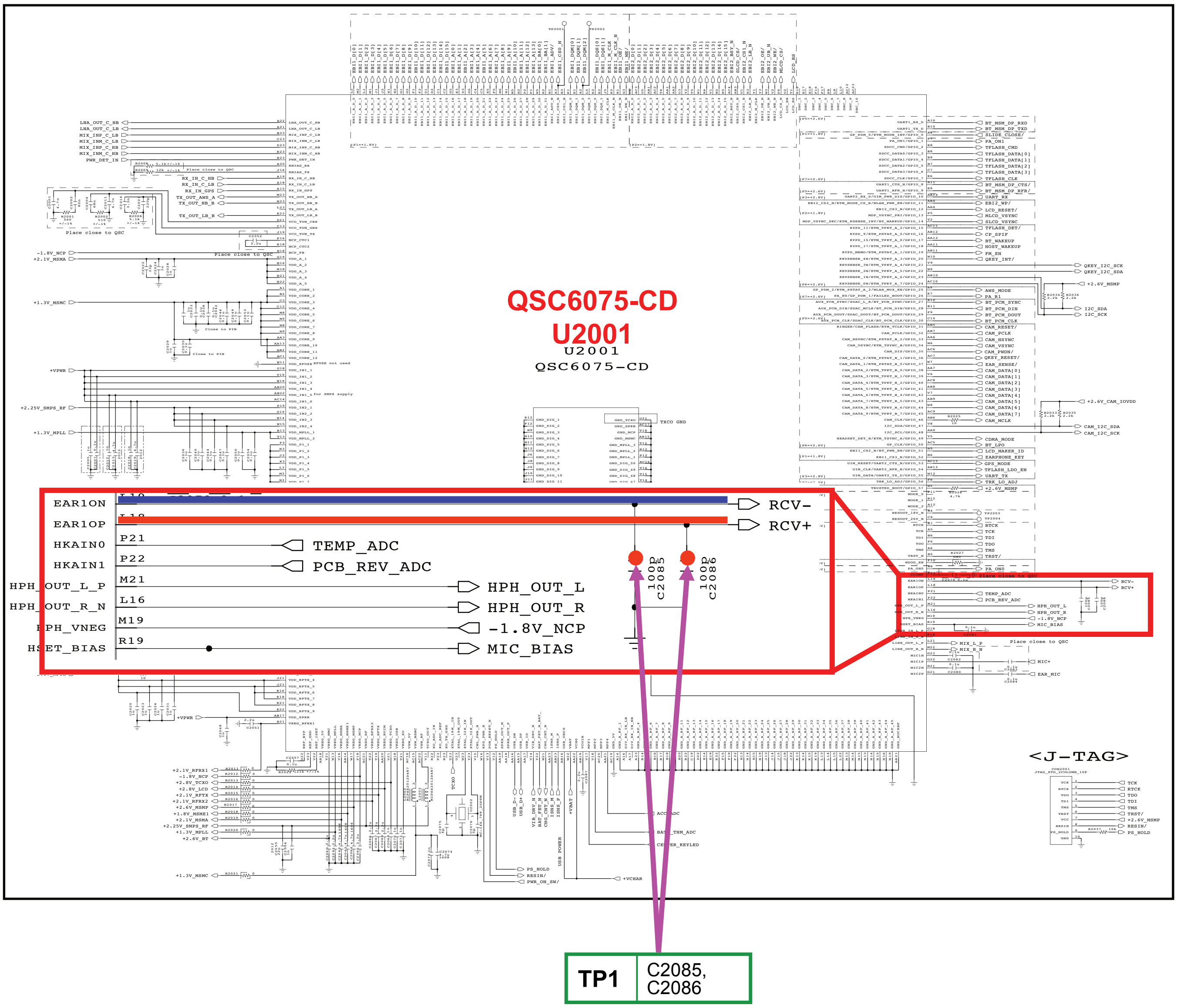
Checking Flow

SETTING : “Melody on” at sounds of test menu.



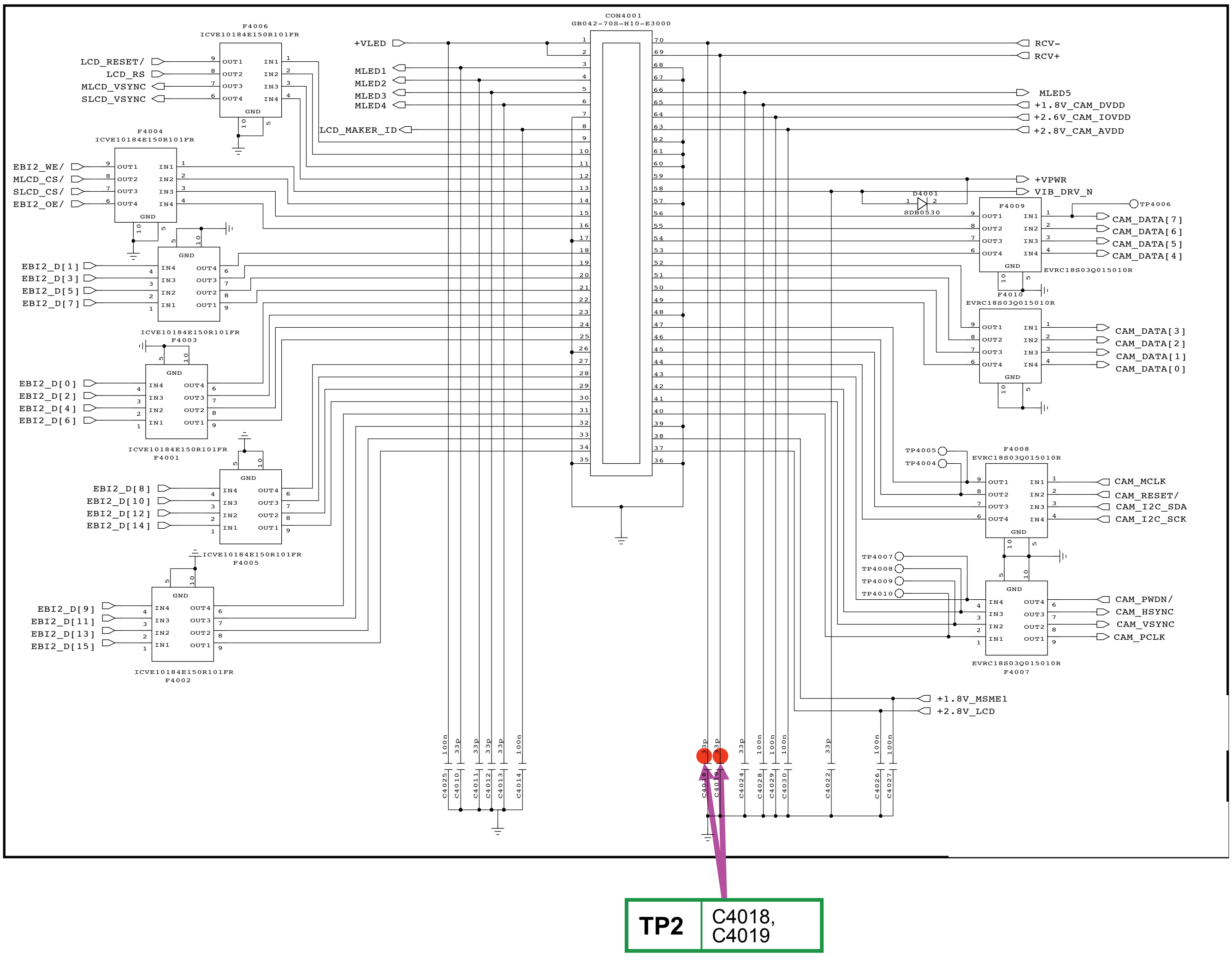
4.3.4.2 Receiver Trouble

Circuit Diagram



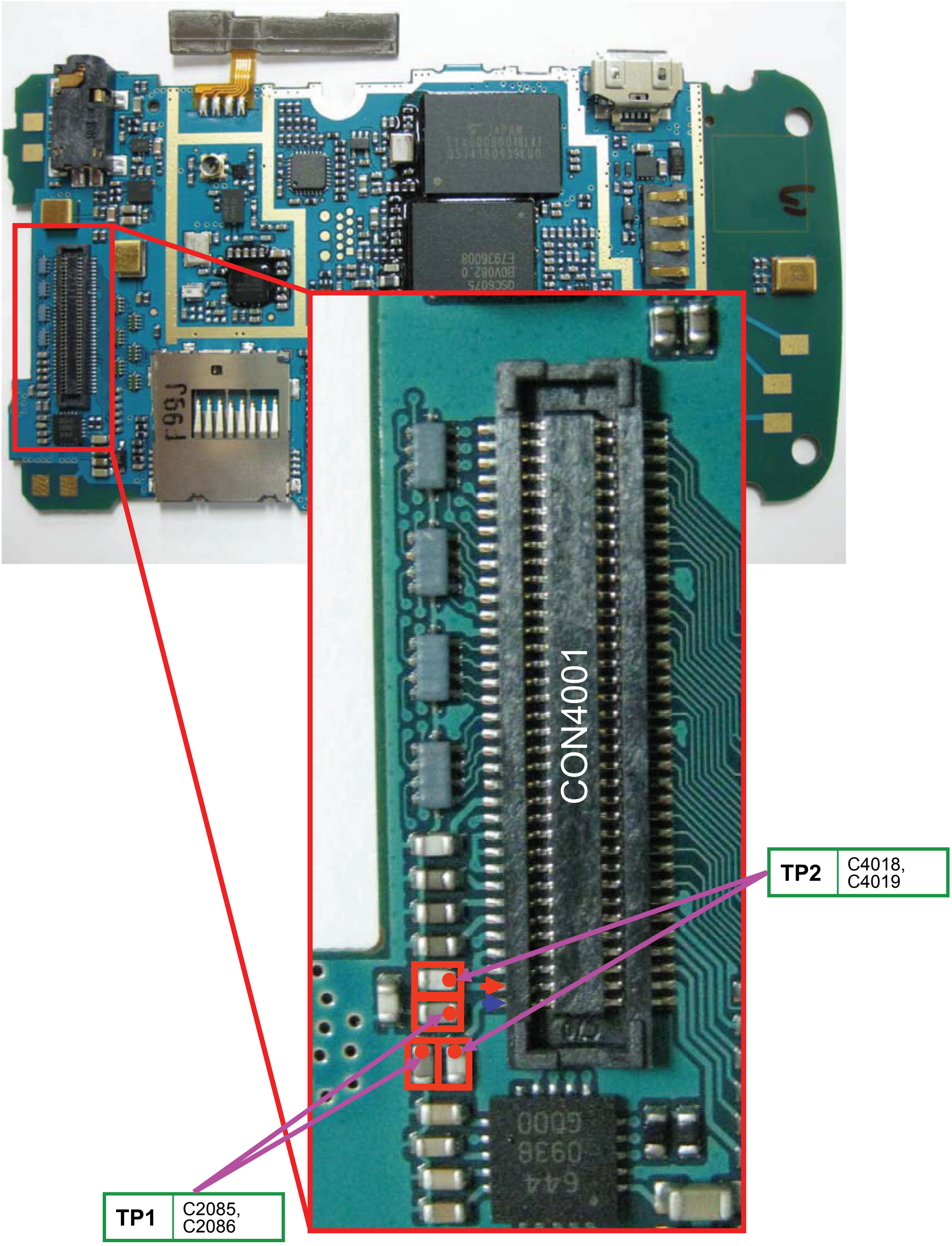
4.3.4.2 Receiver Trouble

Circuit Diagram



4.3.4.2 Receiver Trouble

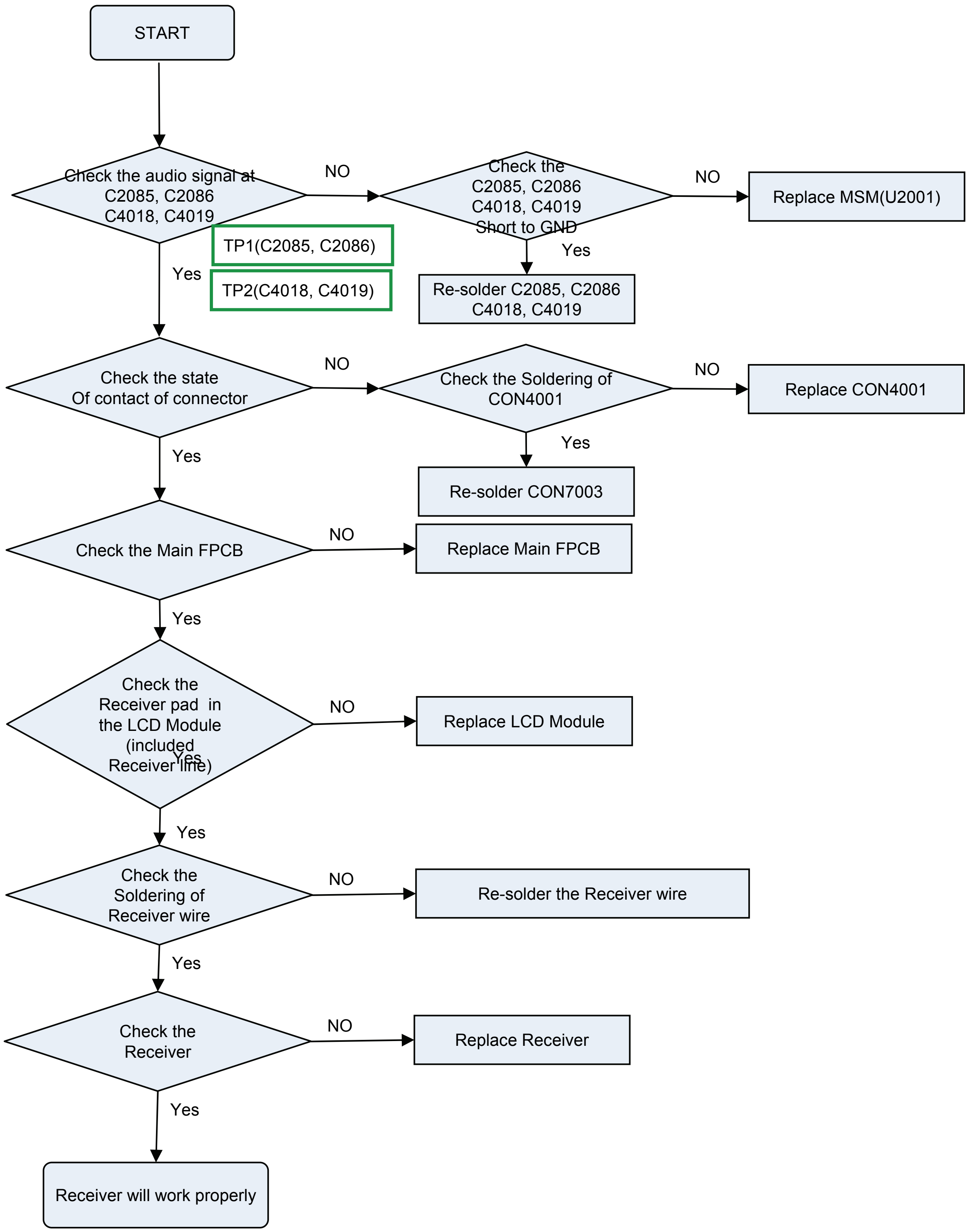
Test points



4.3.4.2 Receiver Trouble

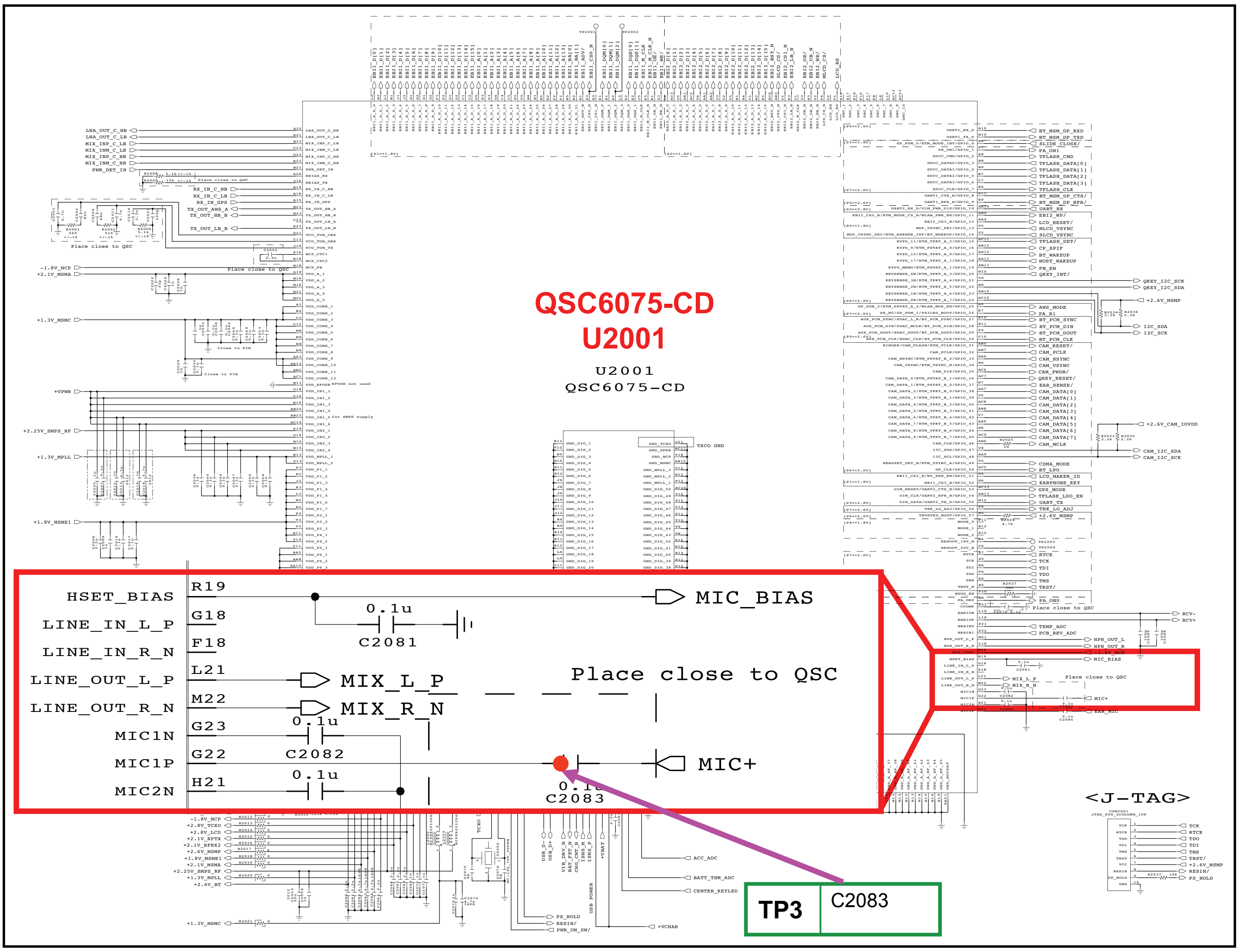
Checking Flow

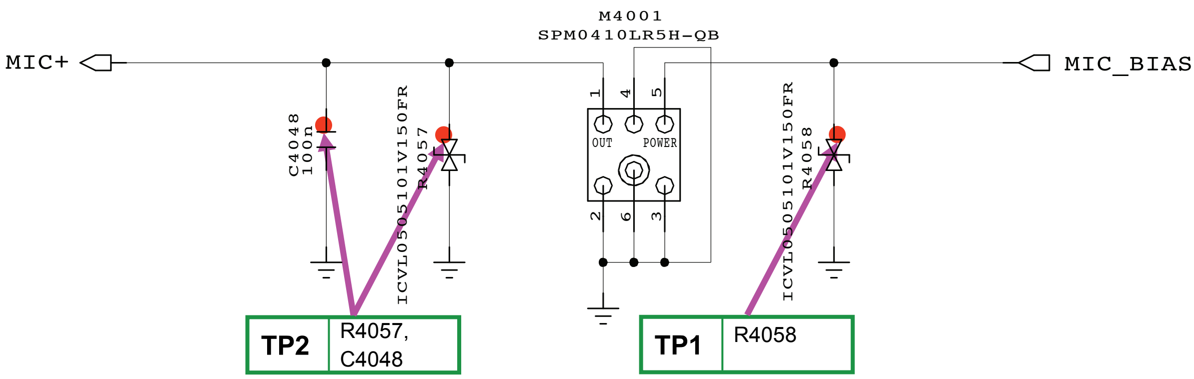
SETTING : Key tone playing



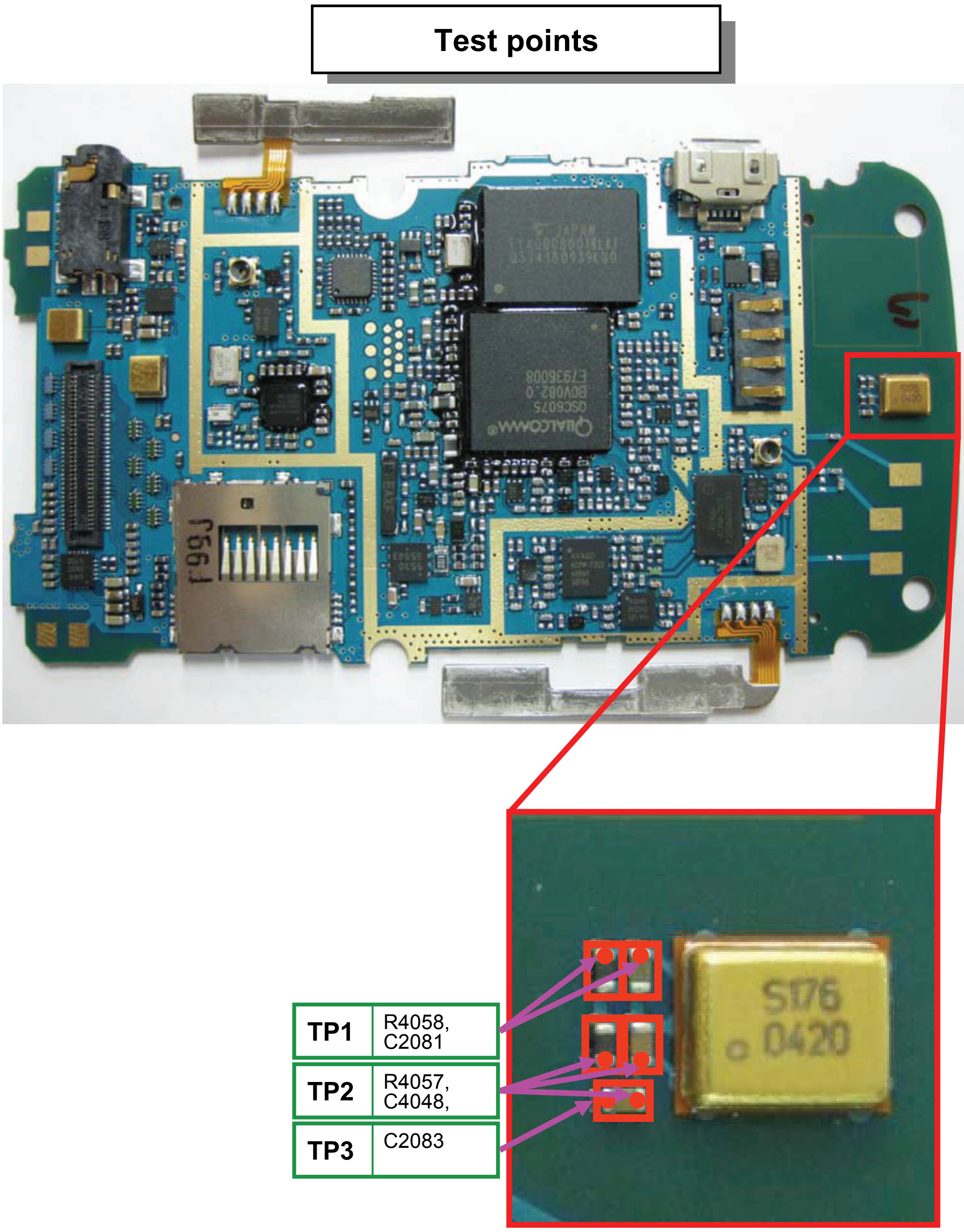
4.3.4.3 MIC Trouble

Circuit Diagram





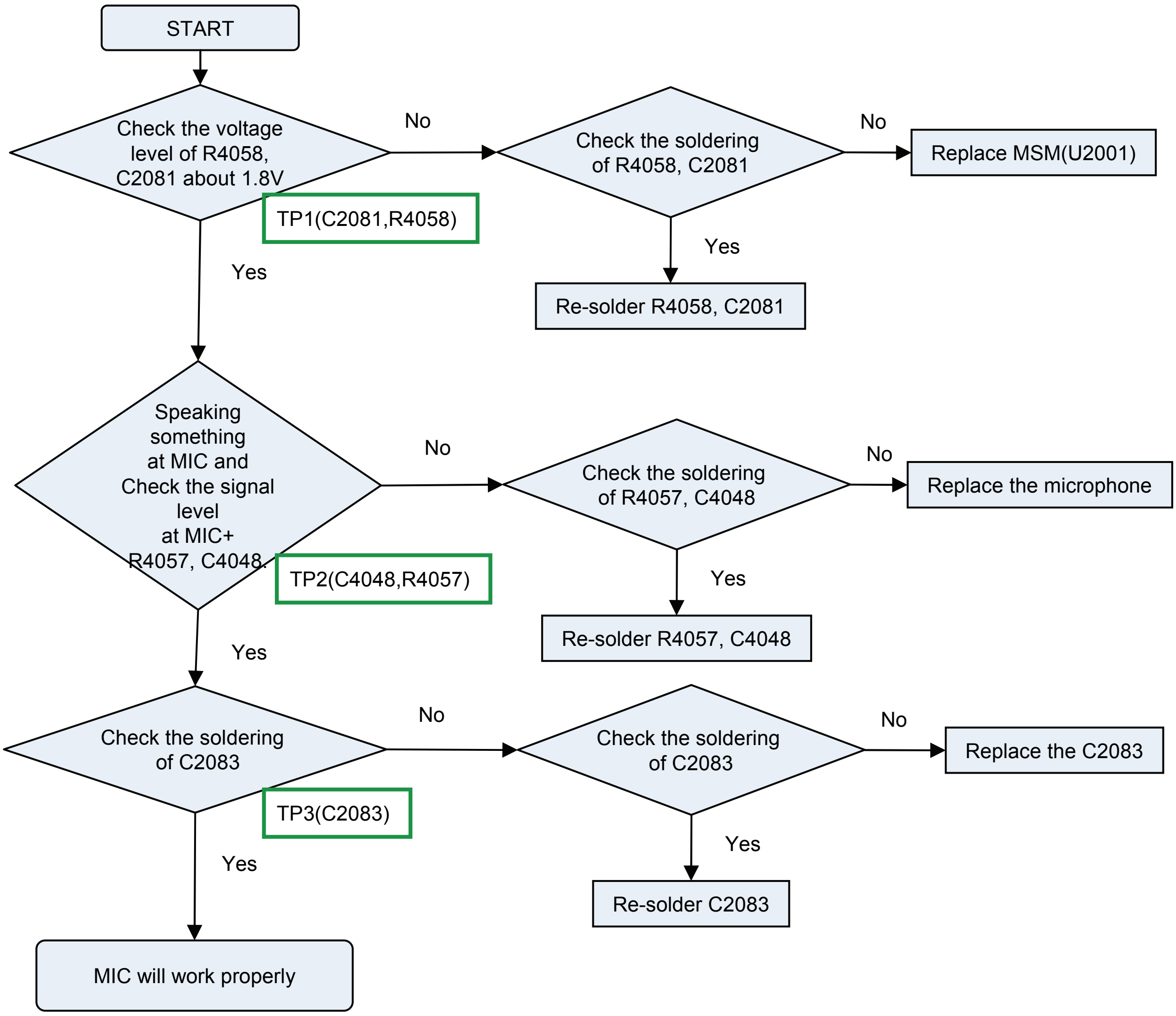
4.3.4.3 MIC Trouble



4.3.4.3 MIC Trouble

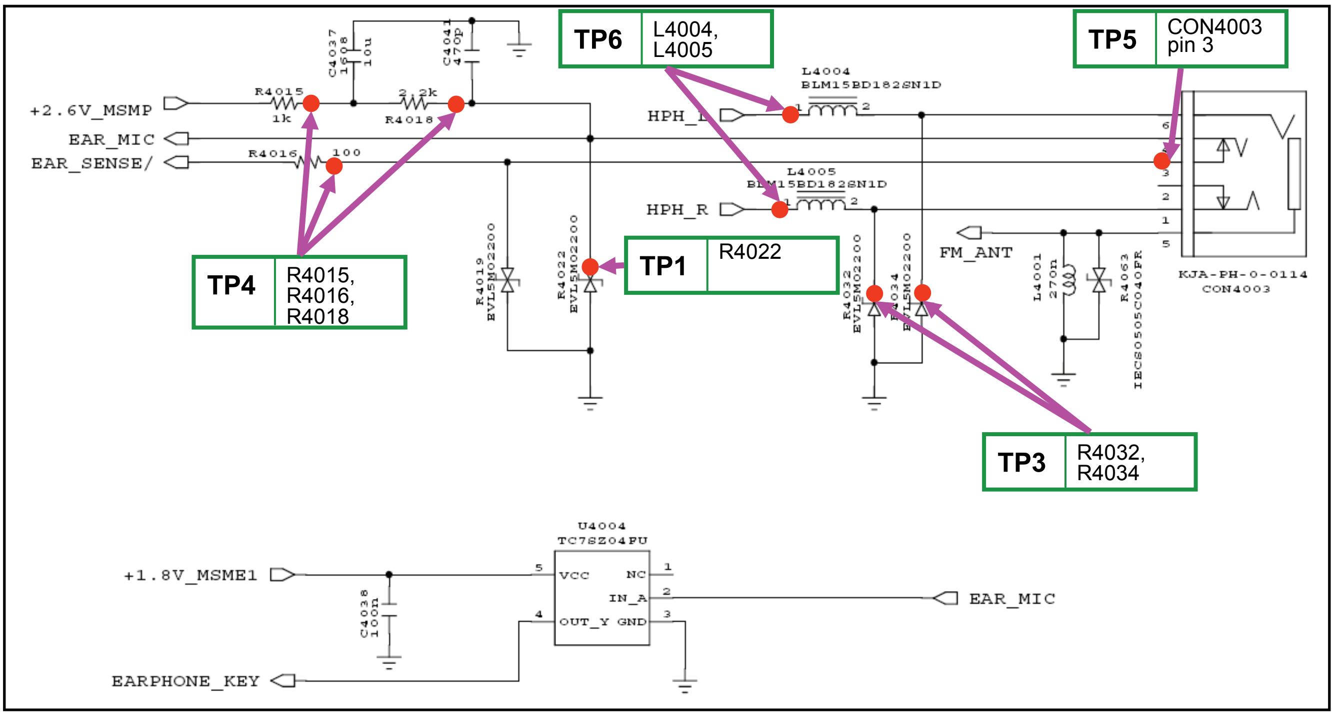
Checking Flow

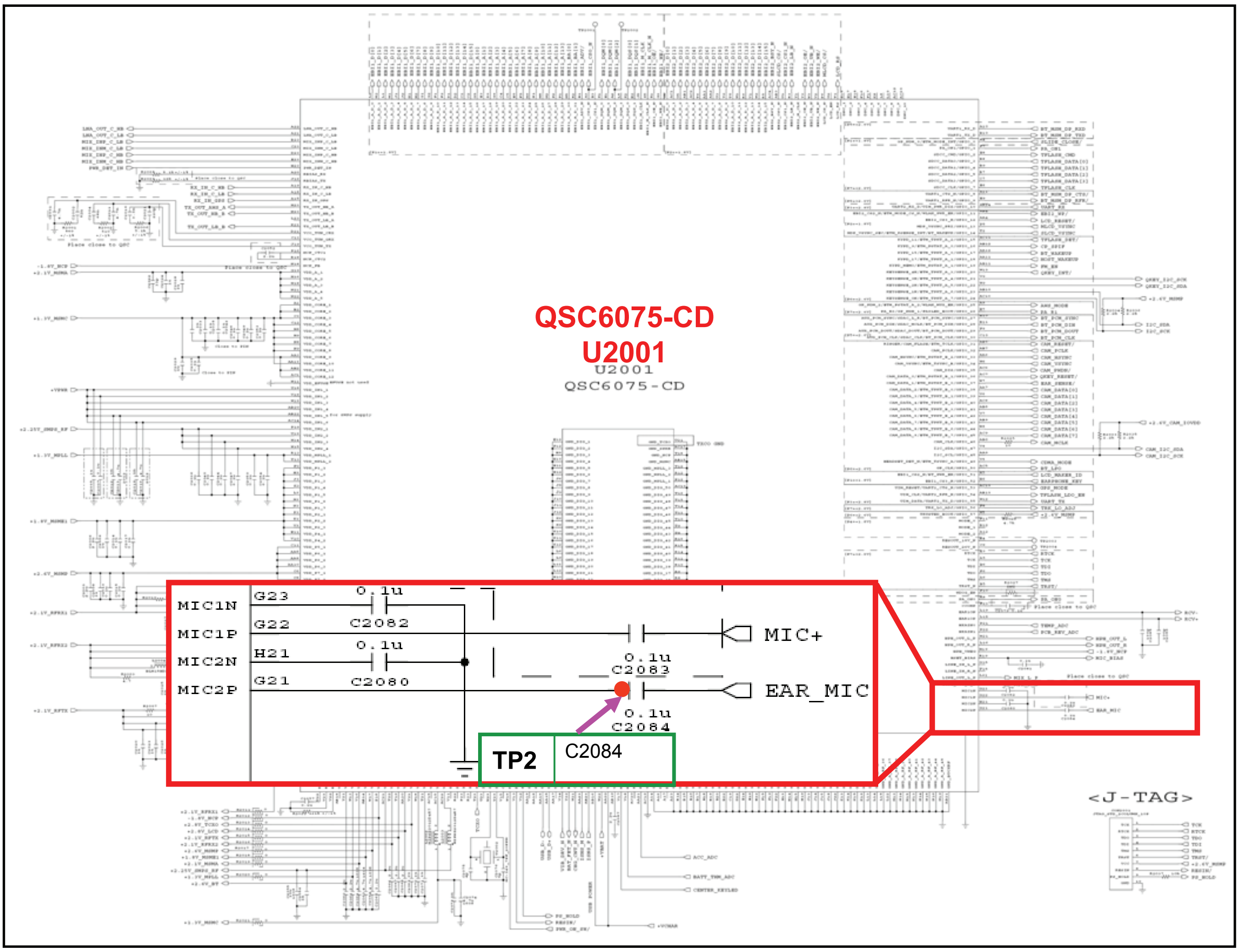
SETTING : Video recording or Voice recording start



4.3.4.4 Headset Trouble

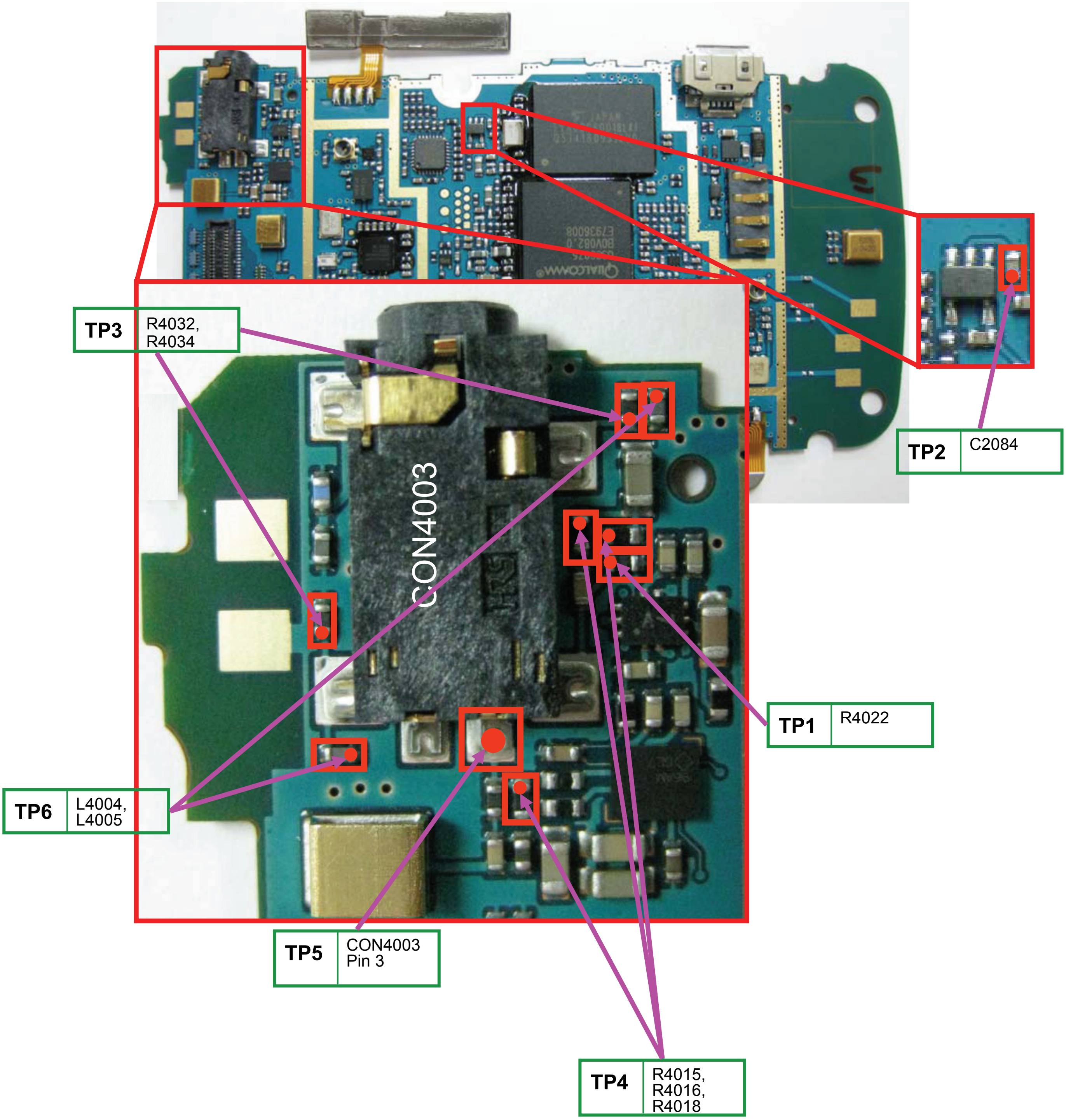
Circuit Diagram





4.3.4.4 Headset Trouble

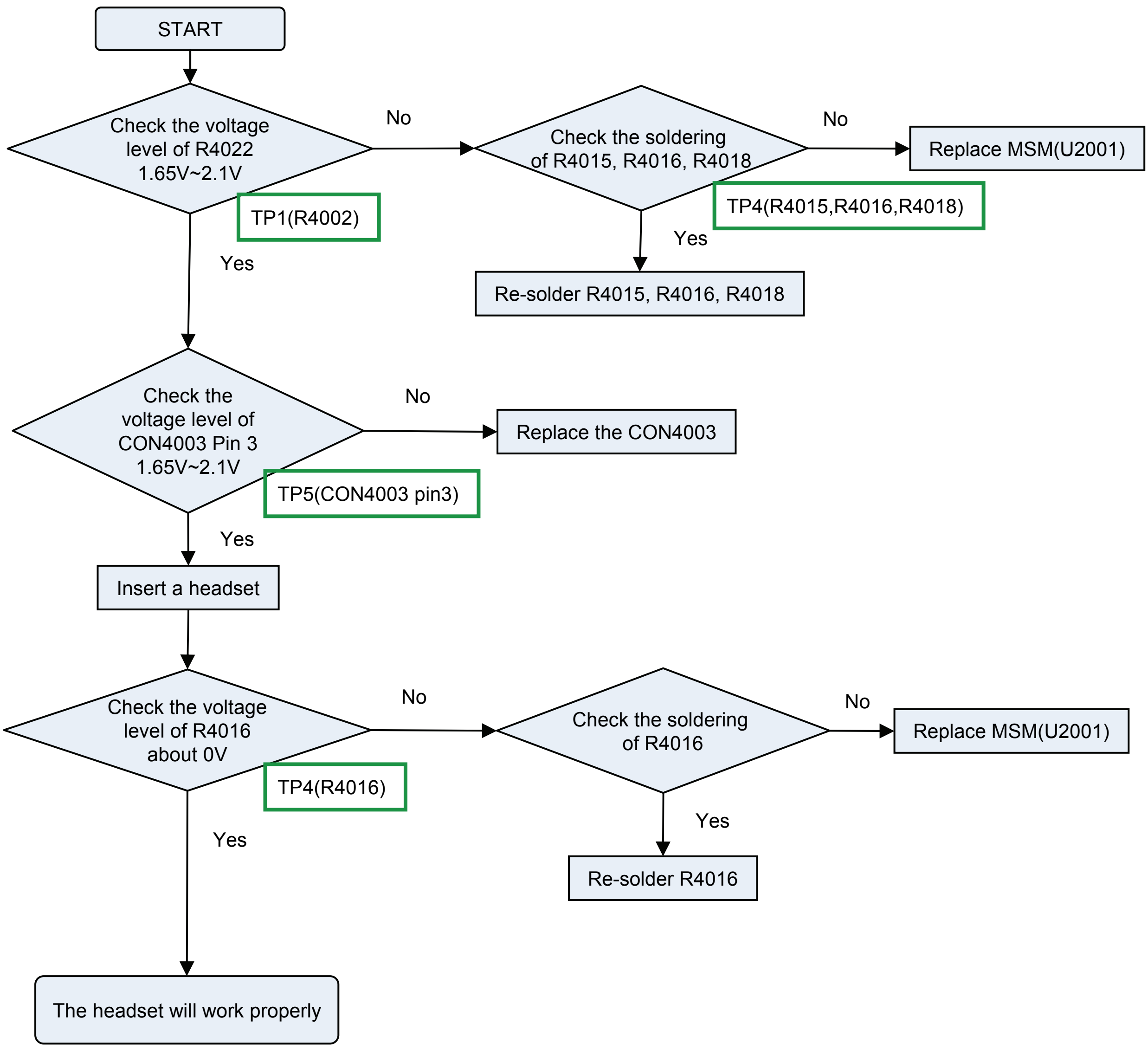
Test points



4.3.4.4 Headset Trouble

Checking Flow

Headset detect problem

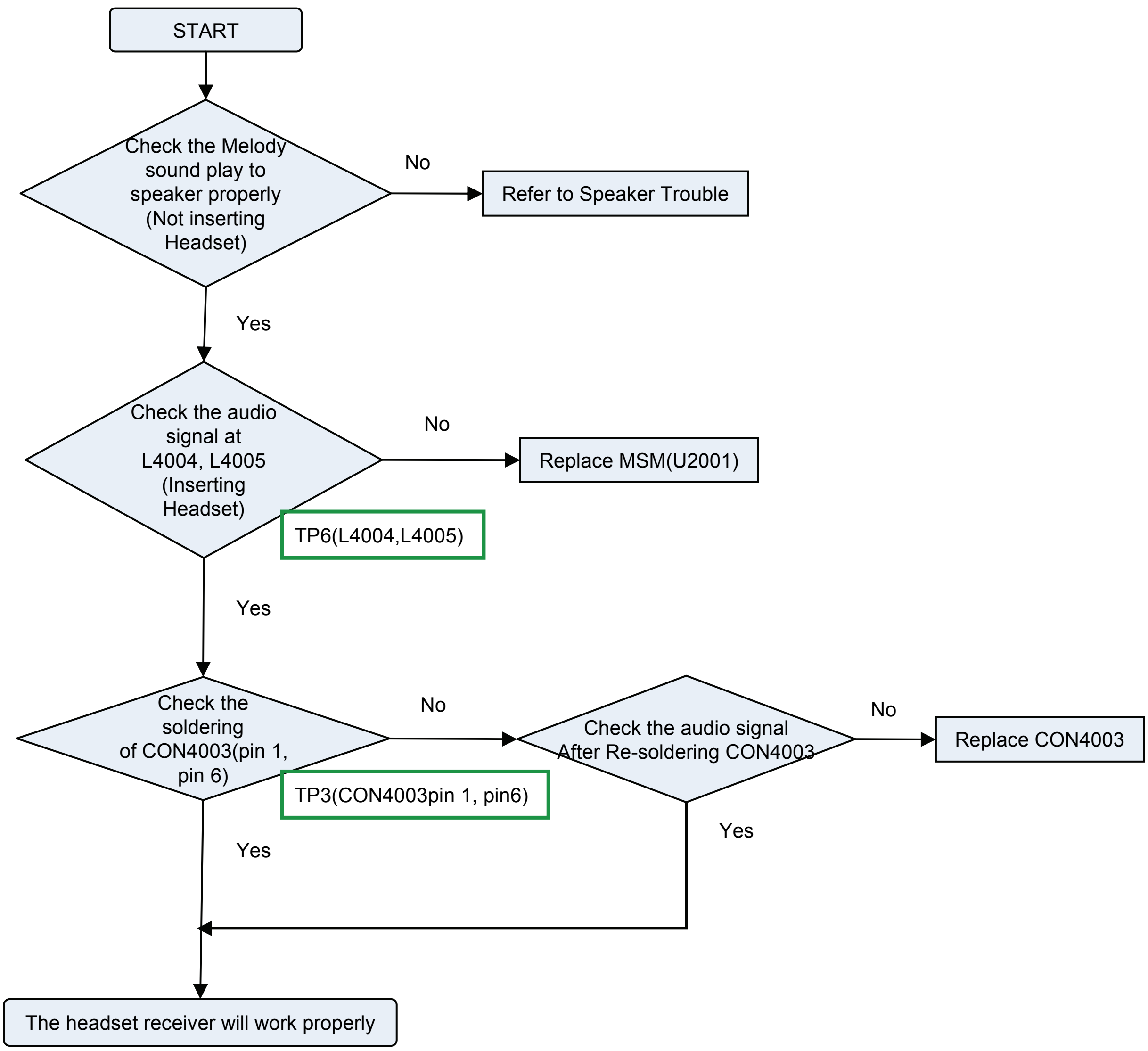


4.3.4.4 Headset Trouble

Checking Flow

Headset receiving path problem

SETTING : Menu ➔ 9.Setting ➔ 1. Sound ➔ 1. Ringers ➔ 1. All Calls ➔ Default (any ringer play)

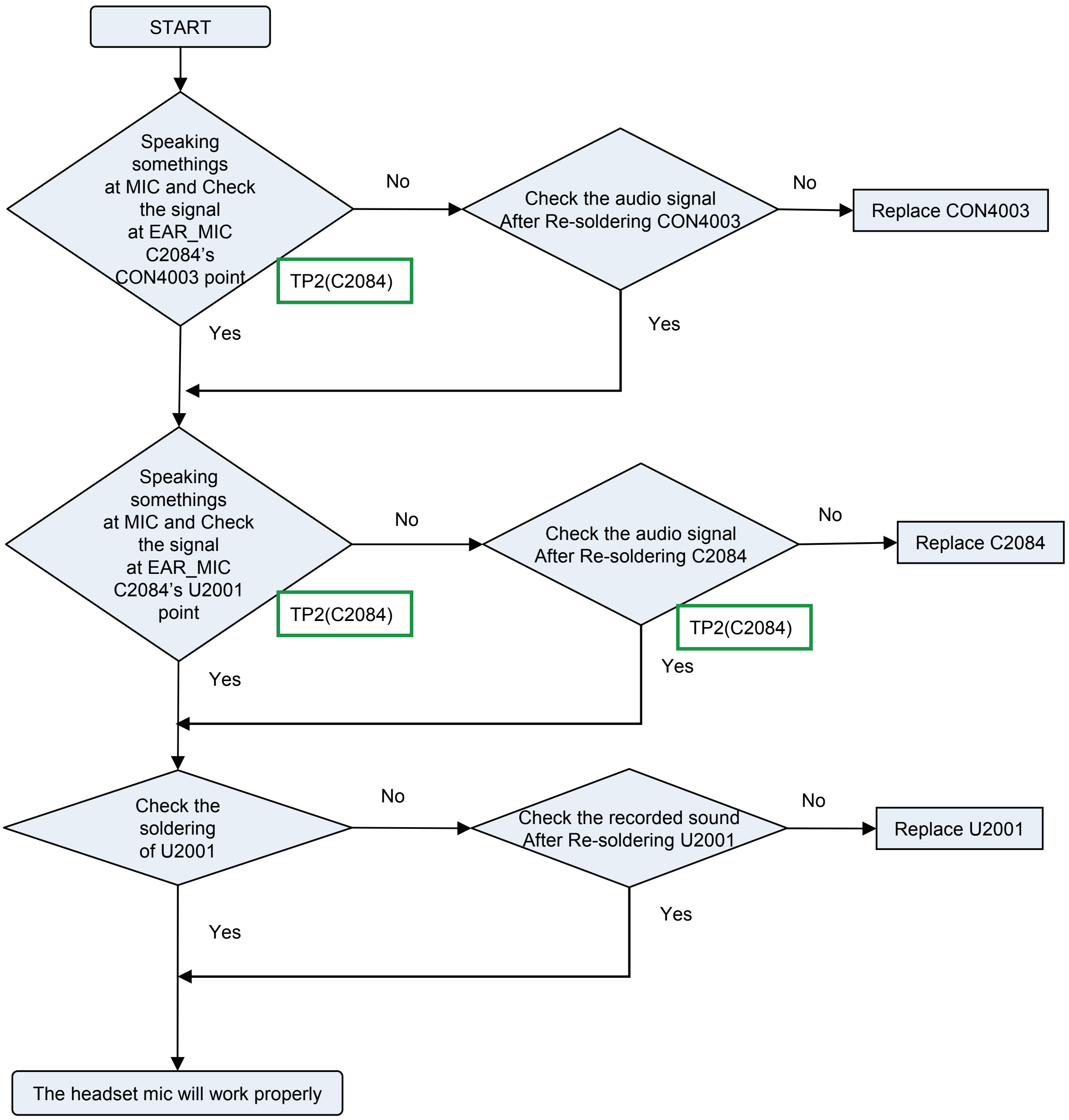


4.3.4.4 Headset Trouble

Checking Flow

Headset Sending path problem

SETTING : 4.Multimedia ➔ 2. Record Video Recording



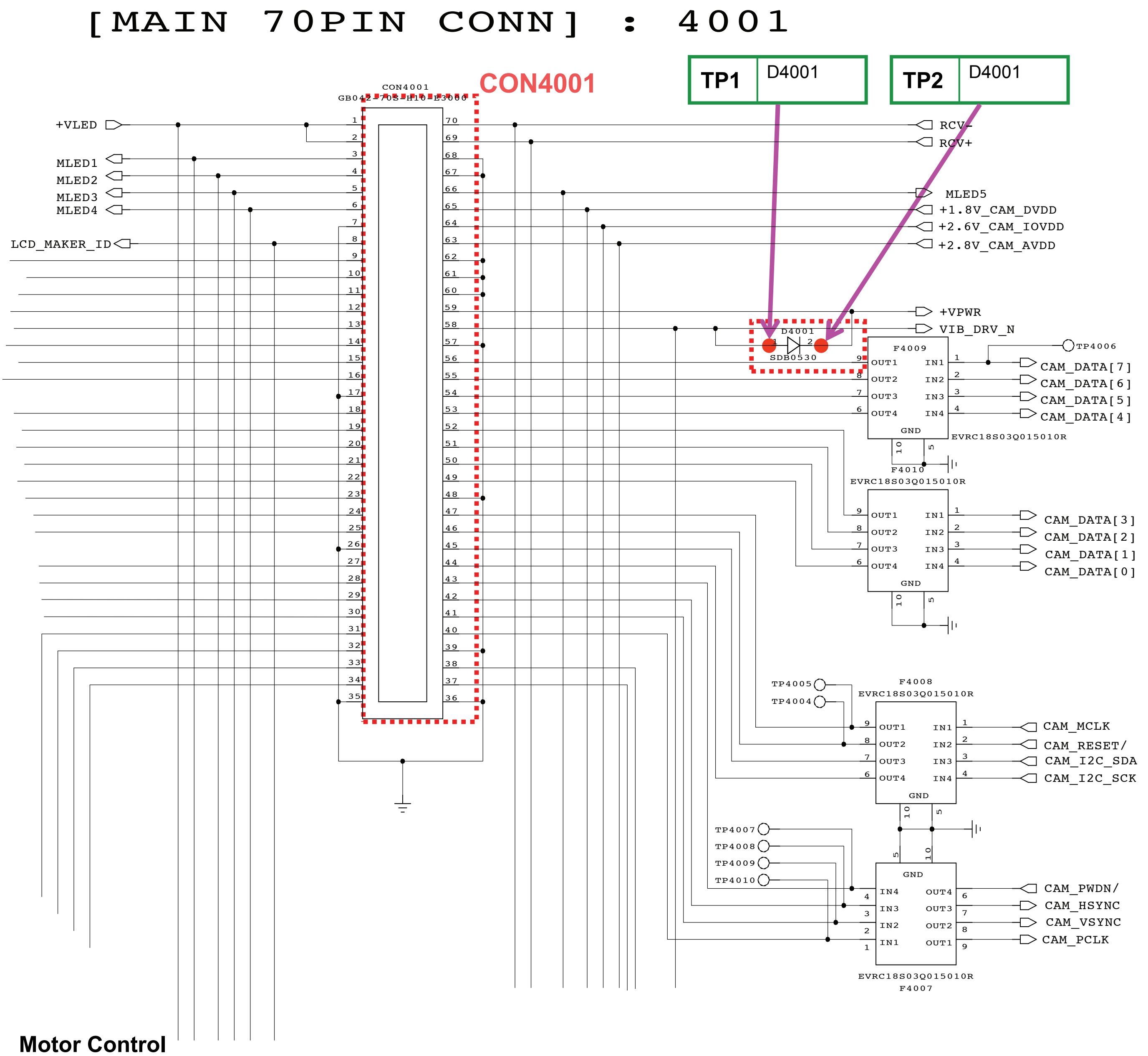
4.3.5 Vibrator

4.3.5.1 Vibrator Trouble

Circuit Diagram

Check point

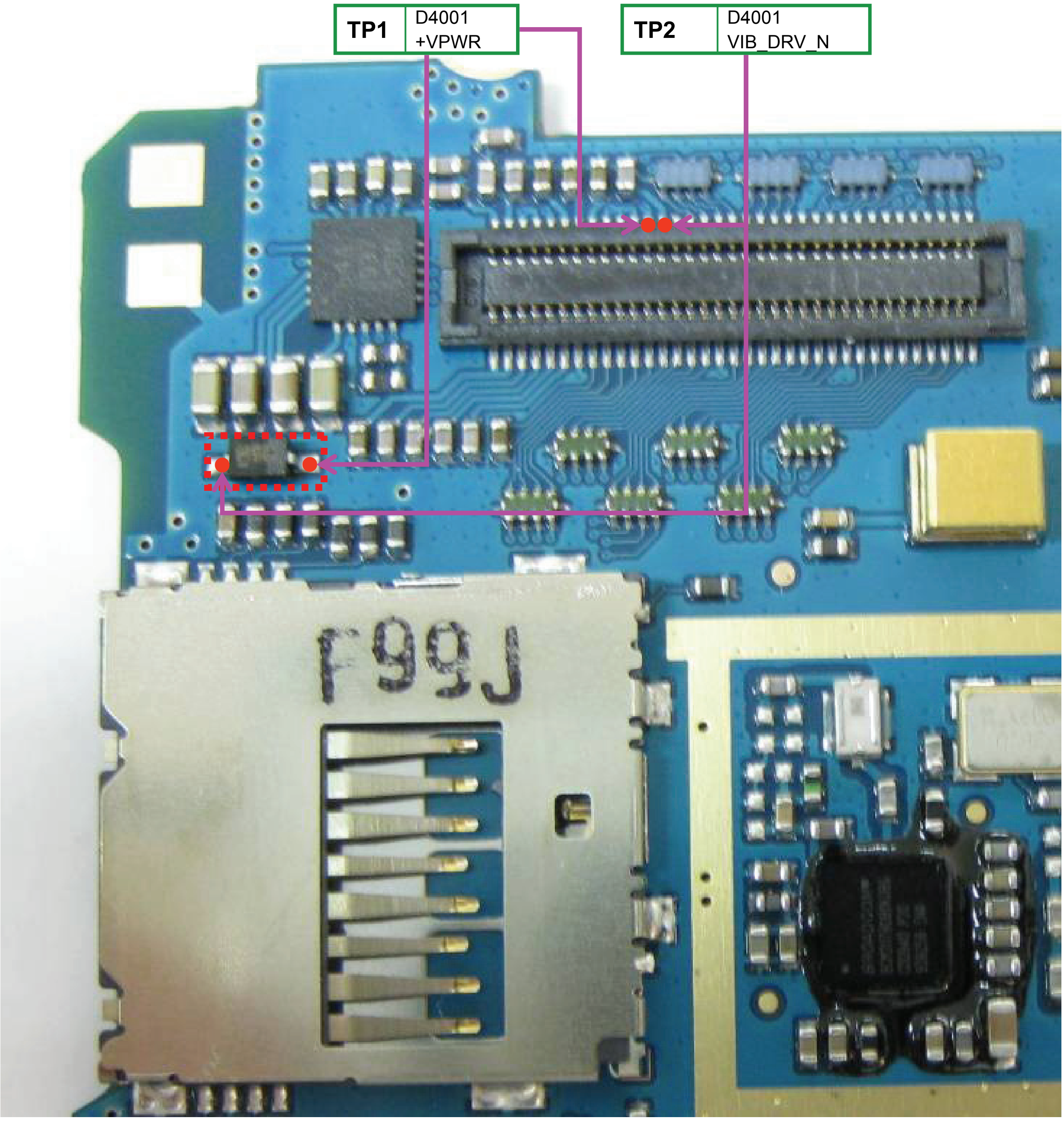
- The assembly status of the Vibrator
- The assembly status of the main 70 pin connector
- The Soldering of connector & Vibrator on the LCD Module



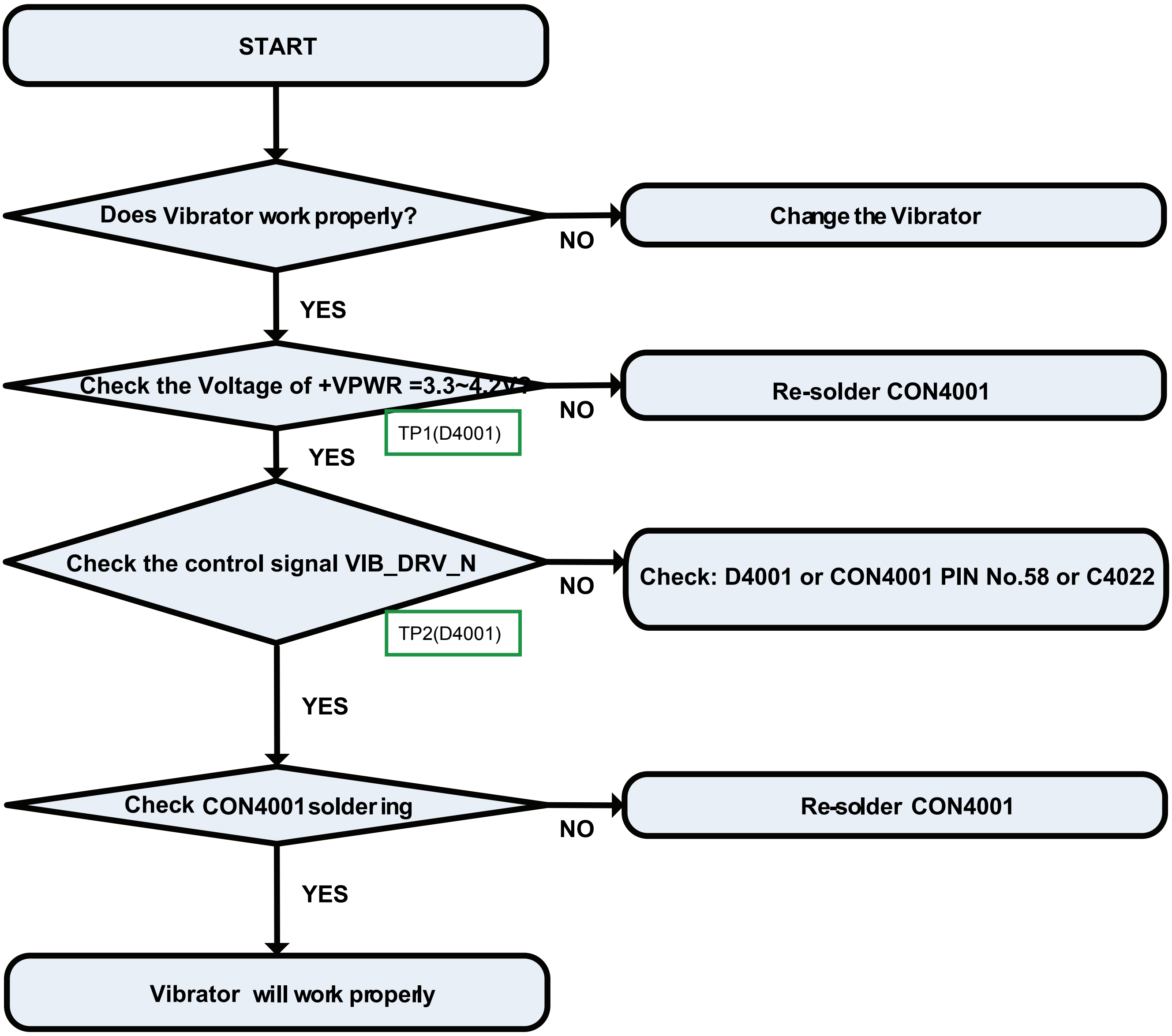
Motor Control

From MSM : VIB_DRV_N, +VPWR

Test point



Checking Flow



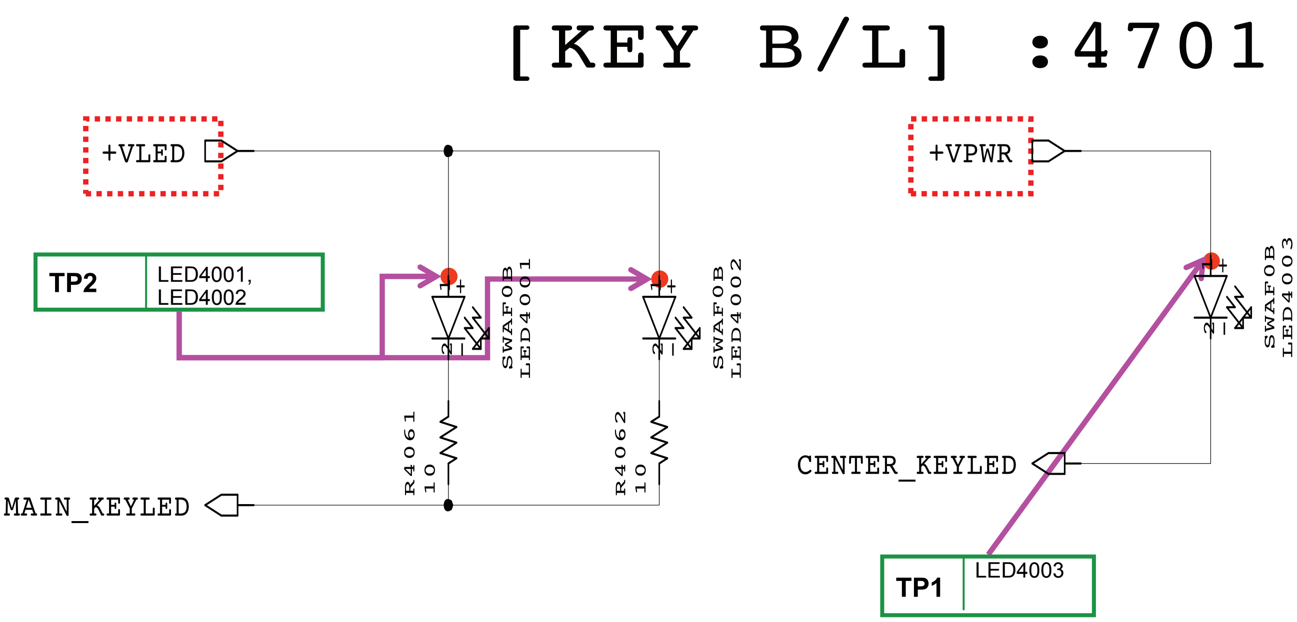
4.3.6 Backlight (BLU)

4.3.6.1 Key Backlight Trouble

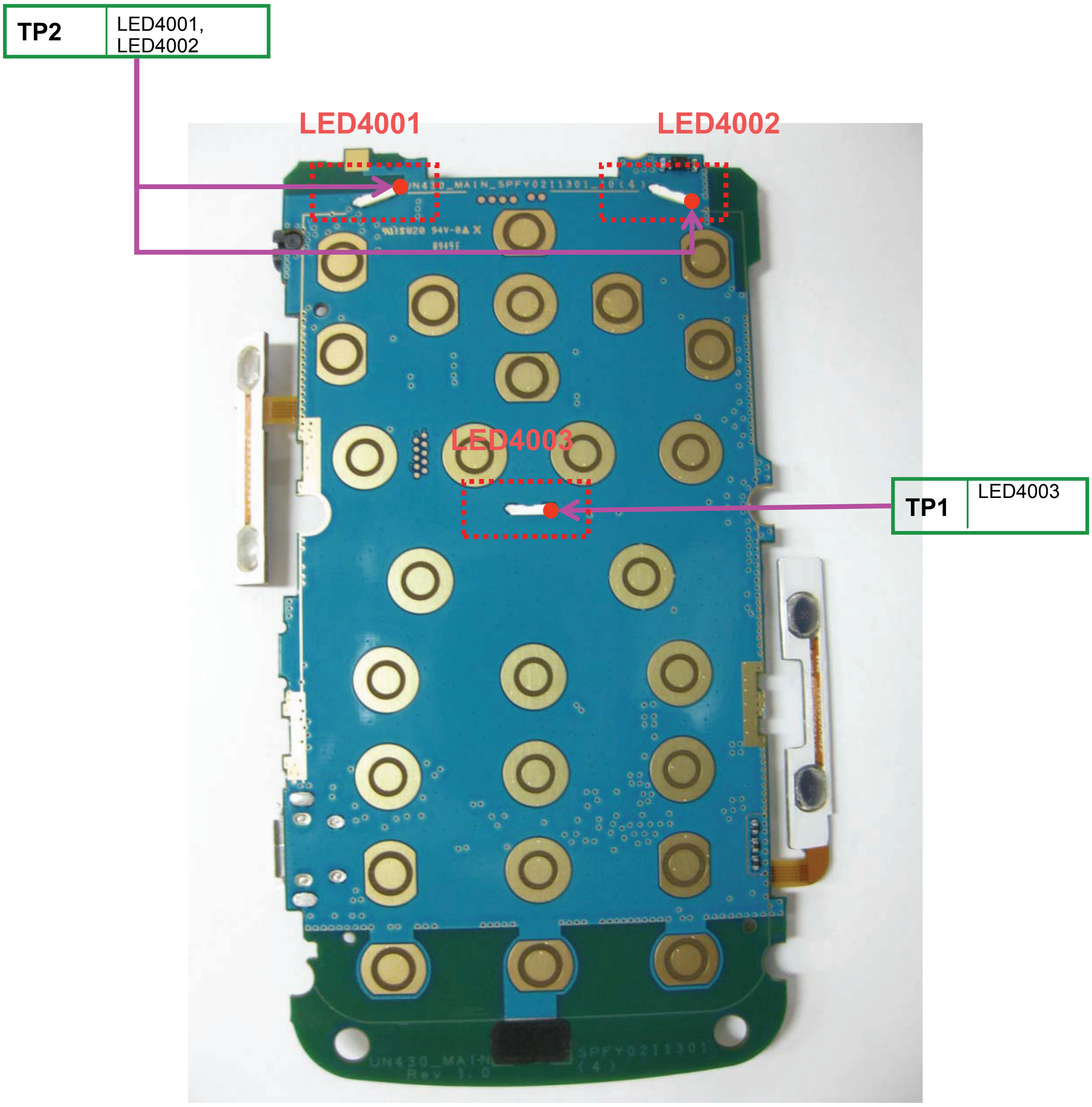
Circuit Diagram

Check point

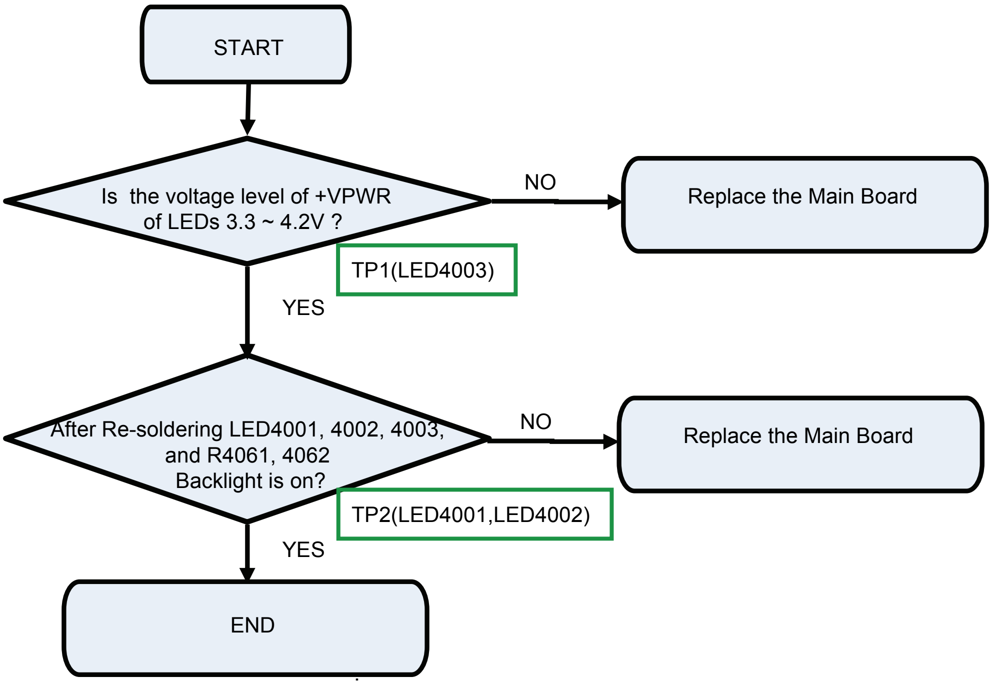
- The Soldering of LEDs
- Check the +VLED & +VPWR



Test point

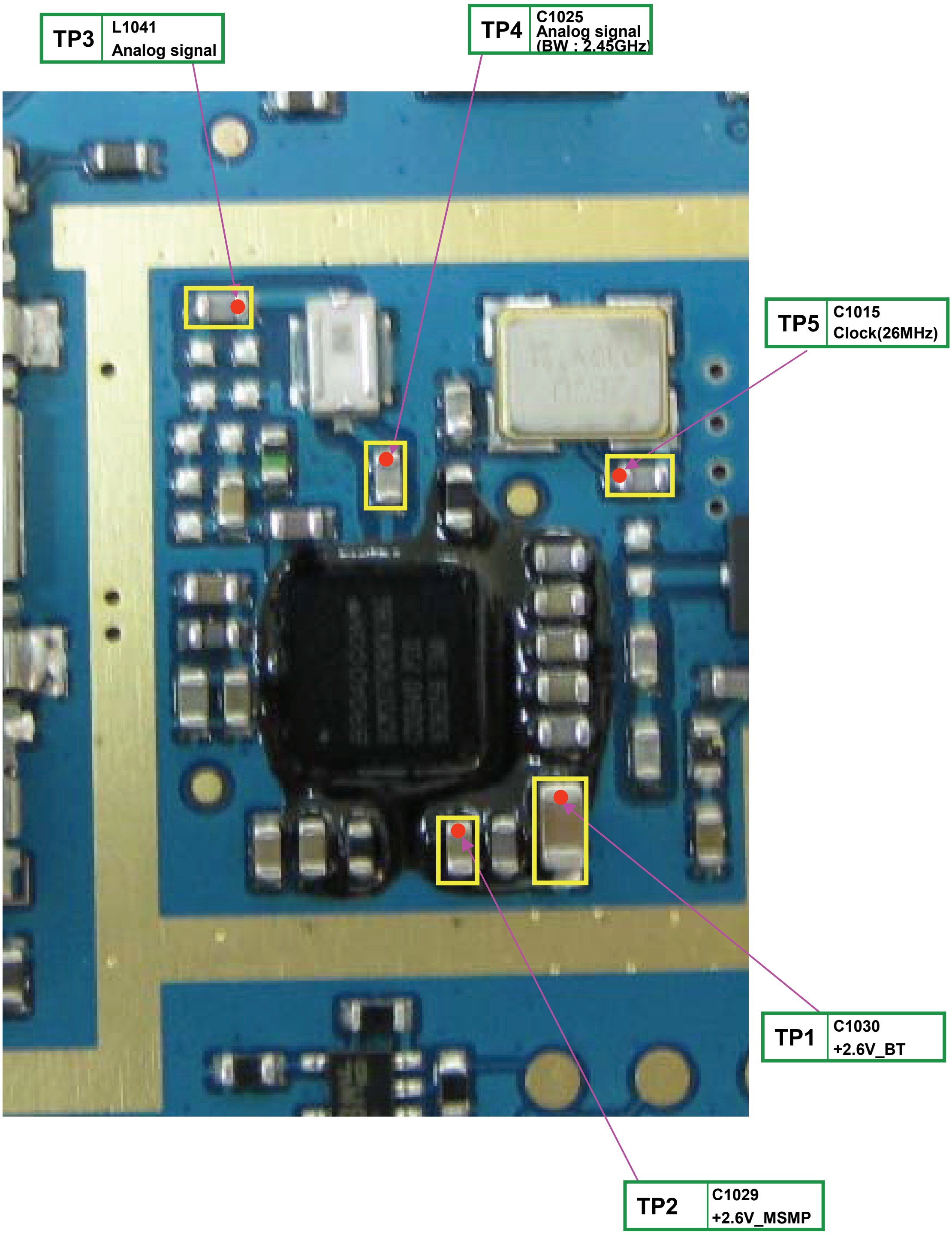


Keypad Backlight Checking Flow

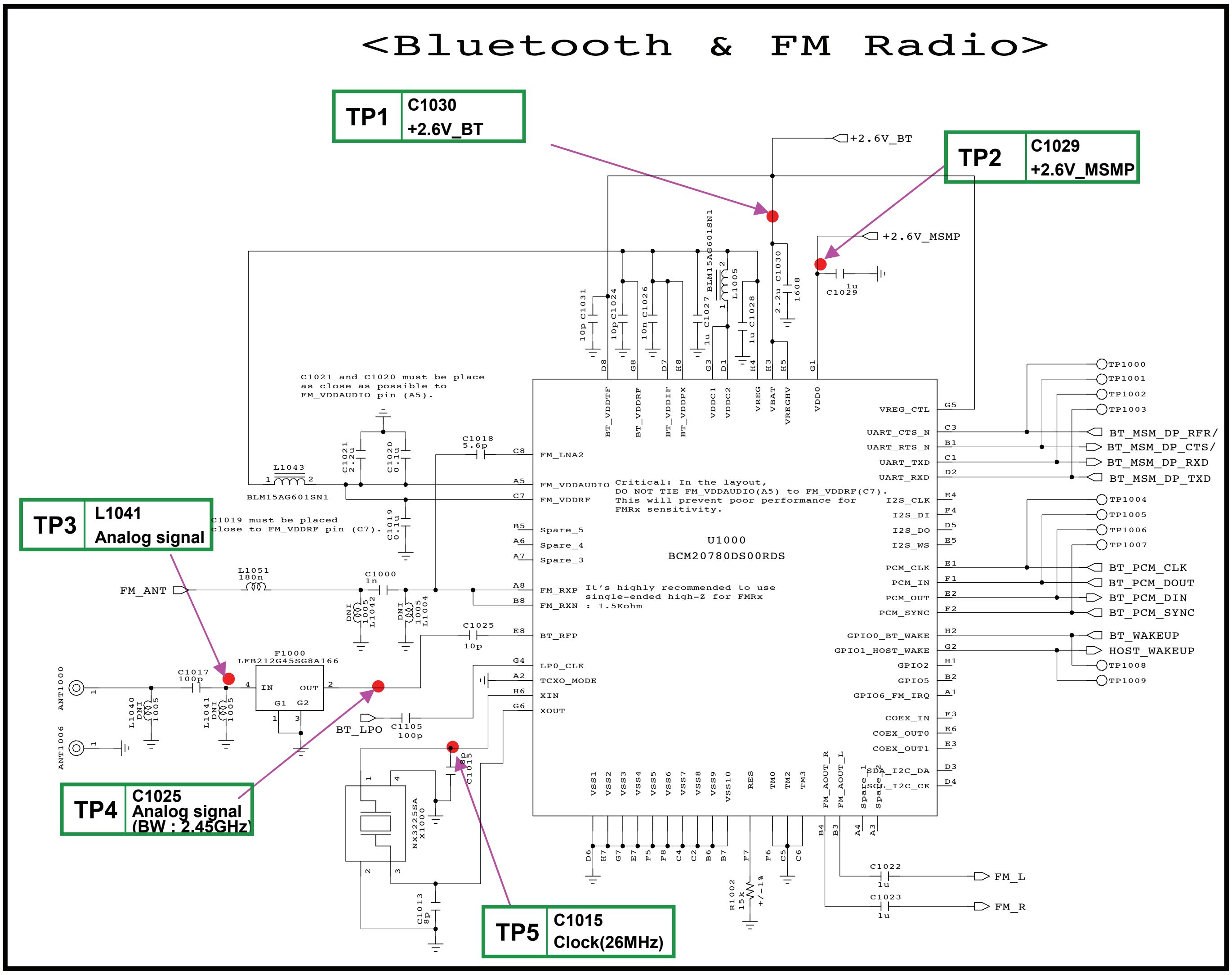


4.3.7 Bluetooth

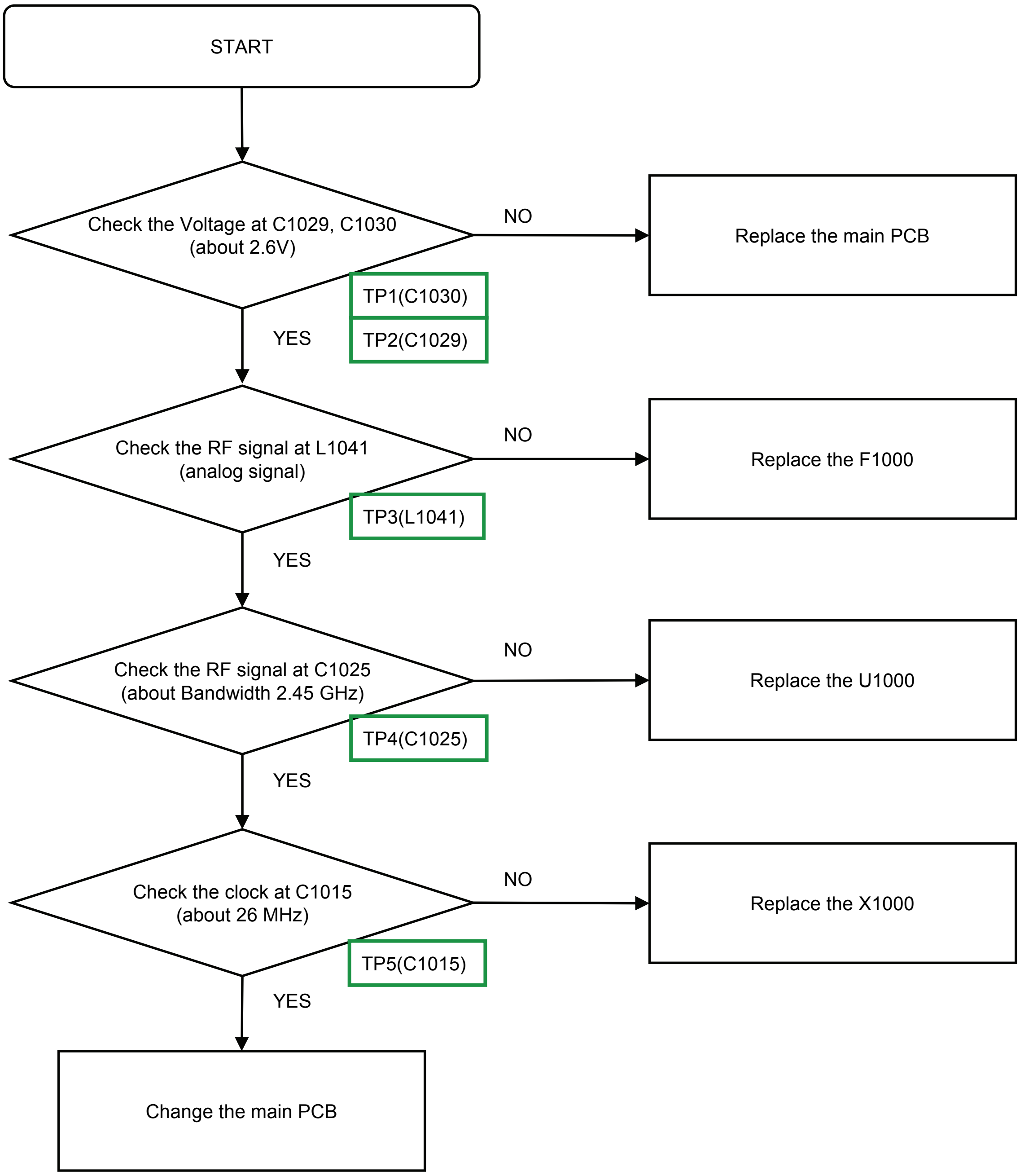
Test point



Circuit Diagram

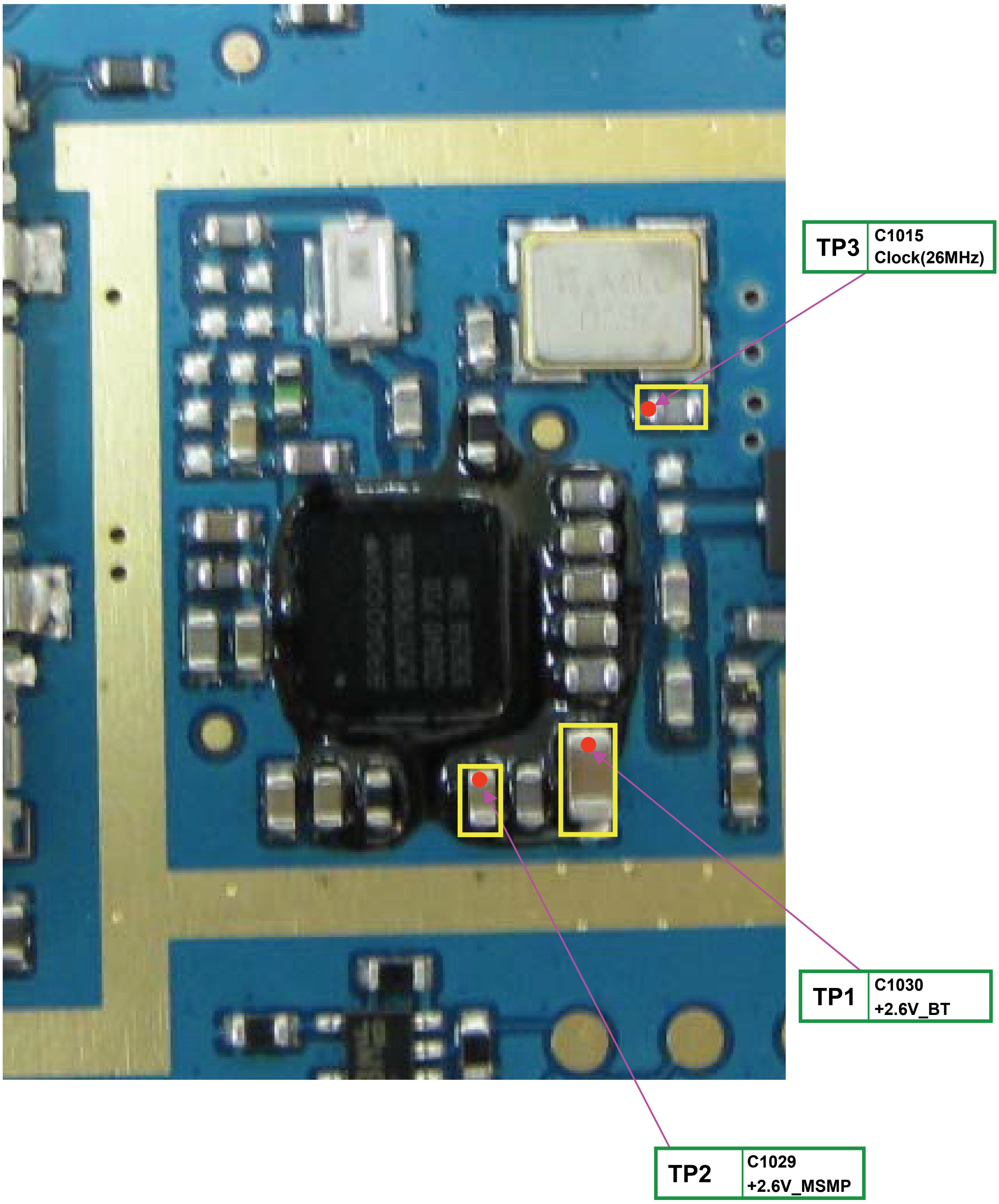


Checking Flow

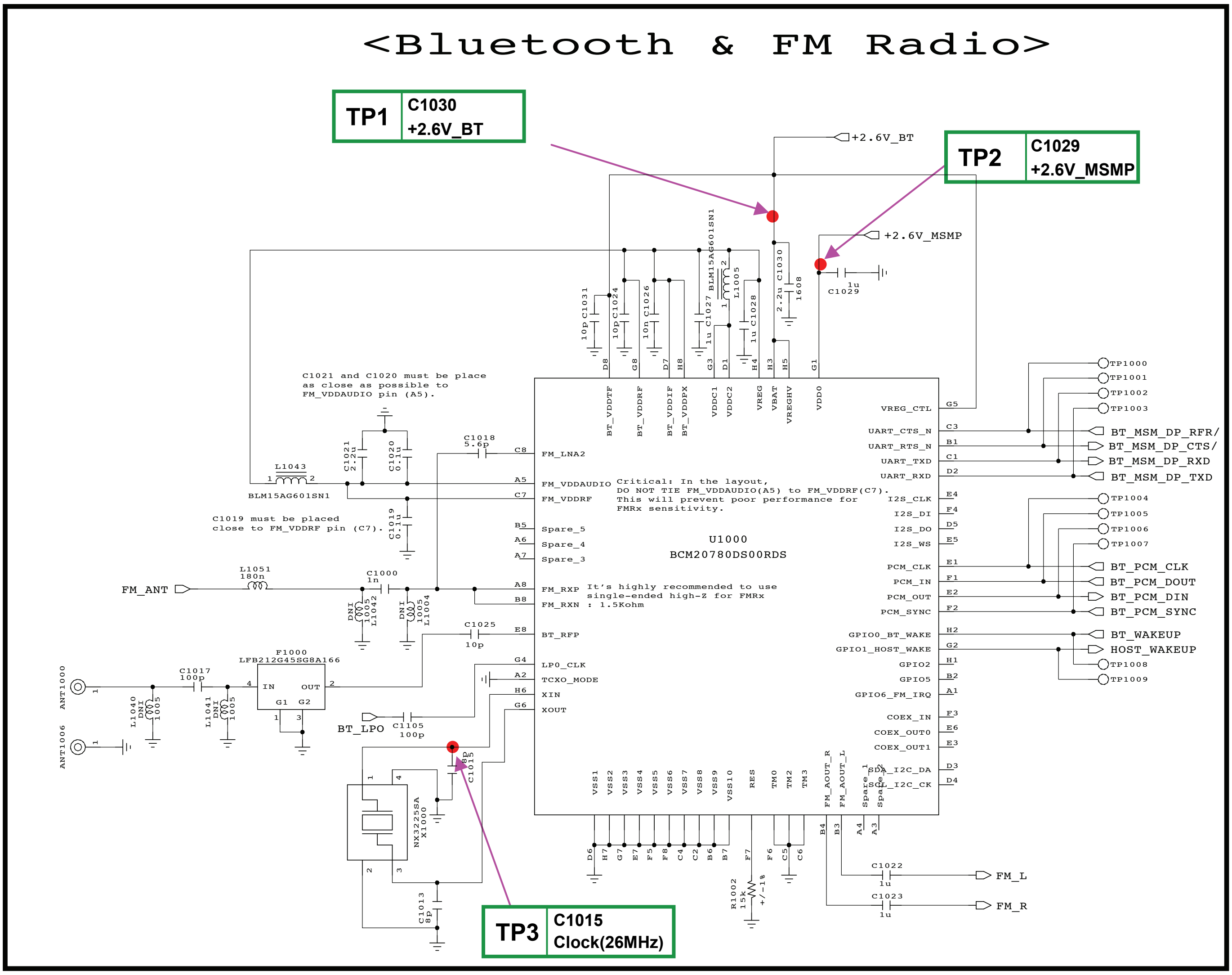


4.3.8 FM Radio

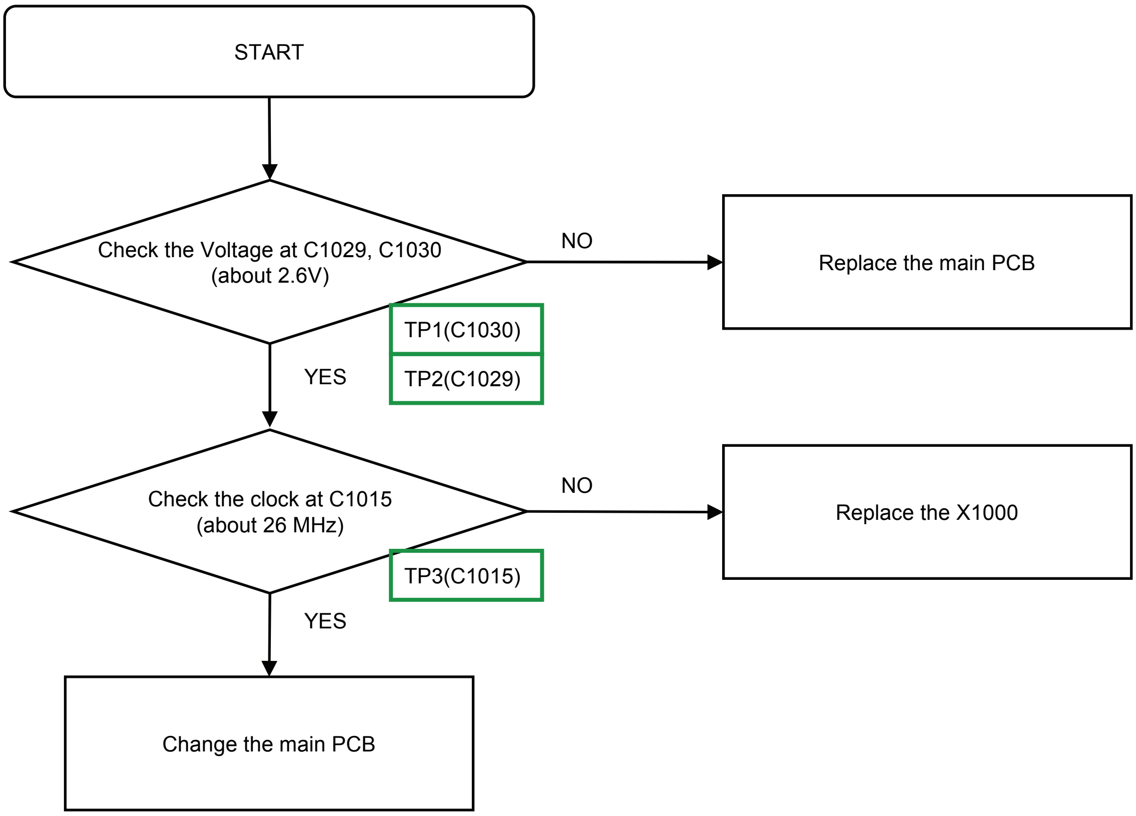
Test point



Circuit Diagram



Checking Flow



CHAPTER 5. Safety

◆ IMPORTANT

Read This Information Before Using Your Hand-Held Portable Cellular Telephone

First introduction in 1984, the hand-held portable Cellular telephone is one of the most exciting and innovative electronic products ever developed.

With it you can stay in contact with your office, your home, emergency service, and others. For the safe and efficient operation of your phone, observe these guidelines.

Your Cellular phone is a radio transmitter and receiver. When it is ON, it receives and also sends out radio frequency (RF) energy. The phone operates in the frequency range of 824 MHz to 894 MHz and employs commonly used frequency modulation (FM) techniques. When you use your phone, the Cellular system handling your calls controls the power level at which your phone transmits. The power level can range from 0.006 of a watt to .6 of a watt.

◆ Exposure to Radio Frequency Energy

In 1991 the Institute of Electrical and Electronics Engineers (IEEE), and in 1992 the American National Standards Institute (ANSI) updates the 1982 ANSI Standard for safety levels with respect to human exposure to RF energy. Over 120 scientists, engineers, and physicians from universities, government health agencies, and industry, after reviewing the available boy of research, developed this updated Standard. In March, 1993, the US Federal Communications Commission (FCC) proposed the adoption of this updated Standard.

The design of your phone complies with this updated Standard. Of course, if you want to limit RF exposure even further than the updated ANSI Standard, you may choose to control the duration of your calls and operation your phone in the most power efficient manner.

◆ Efficient Phone Operation

For your phone to operate at the lowest power level, consistent with satisfactory call quality, please observe the following guidelines:

If your phone has an extendable antenna, extend it fully. Some models allow you to place a call with the antenna retracted. However, your phone operates more efficiently with the antenna fully extended.

Hold the phone as you would any other telephone. While speaking directly into the mouthpiece, position the antenna up and over your shoulder.

Do not hold the antenna when the phone is “IN USE”. Holding the antenna affects call quality and may cause the phone to operated at a higher power level than needed.

◆ Antenna Care and Replacement

Do not use the phone with a damaged antenna. If a damaged antenna comes into contact with skin, a minor bum may result. Replace a damaged antenna immediately. Consult your manual to see if you may change your antenna yourself. If so, use only a manufacture approves antenna. Otherwise, take your phone to a qualifies service center for repair.

Use only the supplied or approved antenna. Non-approved antennas, modifications, or attachments, could impair call quality, damage the phone, and violate FCC regulations.

Driving

Check the laws and regulations on the use of Cellular telephones in the areas where you drive. Always obey them. Also, when using your phone while driving, please:
Give full attention to the driving. Use hands-free operation, if available, and pull off the road and park before making or answering a call if driving conditions require.

Electronic Devices

Most modem electronic equipment is shielded from RF energy. However, RF energy from Cellular telephones may affect inadequately shielded electronic equipment.
RF energy may effect improperly installed or inadequately shielded electronic operating and entertainment system in motor vehicles. Check with the manufacturer or its representative to determine if these systems are adequately shielded from external RF energy. You should check with the manufacturer of any equipment that has been added to your vehicle.
Consult the manufacturer of any personal medical devices (such as pacemakers, hearing aids, etc.) to determine if they are adequately shielded from external RF energy.
Turn your phone OFF in health care facilities. When any regulations posted in the areas instruct you to do so. Hospitals or health care facilities may be using equipment that could be sensitive to external RF energy.

Aircraft

Turn your phone OFF before boarding any aircraft.
Use it on the ground only with crew permission. Do not use it in the air.
To prevent possible interference with aircraft systems, US Federal Aviation Administration (FAA) regulations require you to have permission from a crew member to use your phone while the plane is on the ground. Using your phone while the plane is in the air.

Children

Do not allow children to play with your phone. It is not a toy. Children could hurt themselves or others (by poking themselves or others in the eye with the antenna, for example). Children also could damage the phone, or make calls that increase your telephone bills.

Blasting Areas

To avoid interfering with blasting operations, turn you unit OFF when in a “blasting area” or in areas posted “Turn off two-way radio”. Construction crews often use remote control RF devices to set off explosives.

Potentially Explosive Atmospheres

Turn your phone OFF when in any area with a potentially explosive atmosphere. It is rare, but your phone or accessories could generate sparks. Sparks in such area could cause an explosion or fire resulting in bodily injury or even death.
Areas with a potentially explosive atmosphere are often, but not always, clearly marked. They include fueling areas such as gas station; below deck on boats; fuel or chemical transfer or storage facilities; areas where the air contains chemical or particles, such as grain, dust, or metal powders; and any other area where you would normally be advised to turn off your vehicle engine.

Do not transport or store flammable gas, liquid, or explosives in the compartment of your vehicle which contains your phone or accessories.
Vehicles using liquefied petroleum gas (such as propane or butane) must compl7y with the National Fire Protection Standard (NFPA-58). For a copy of this standard, contact the National Fire Protection Association, One Battery march Park, Quincy, MA 02269, Attn: Publication Sales Division.
Rule of Thumb: Using common sense at all times when handling, installing or using the phone. Any questions should be directed to you nearest Service Center or authorized service technician or electrician.

CHAPTER 6. Glossary

General Terms

Abbreviated Alert. An abbreviated alert is used to remind the mobile station user that previously selected alternative routing features are still active.

AC. See Authentication Center.

Access Attempt. A sequence of one or more access probe sequences on the Access Channel containing the same message. See also Access Probe and Access Probe Sequence.

Access Channel. A Reserve CDMA Channel used by mobile stations for communicating to the base station. The Access Channel is used for short signaling message exchanges such as call origination's, responses to pages, and registrations. The Access Channel is a slotted random access channel.

Access Channel Message. The information part of an access probe consisting of the message body, length field, and CRC.

Access Channel Message Capsule. An Access Channel message plus the padding.

Access Channel Preamble. The preamble of an access probe consisting of a sequence of all-zero frames that is sent at the 4800bps rate.

Access Channel Request Message. An Access Channel message that is autonomously generated by the mobile station. See also Access Channel Response Message.

Access Channel Response Message. A message on the Access Channel generated to reply to a message received from the base station.

Access Channel Slot. The assigned time interval for an access probe. An Access Channel slot consists of an integer number of frames. The transmission of an access probe is performed within the boundaries of an Access Channel slot.

Access Probe. One Access Channel transmission consisting of a preamble and a message. The transmission is an integer number of frames in length and transmits one Access Channel message. See also Access Probe Sequence and Access Attempt.

Access Probe Sequence. A sequence of one or more access probes on the Access Channel. The same Access Channel message is transmitted in every access probe of an access attempt. See also Access Probe and Access Attempt.

Acknowledgement. A Layer 2 response by the mobile station or the base station confirming that a signaling message was received correctly.

Action Time. The time at which the action implied by a message should take effect.

Active Set. The set of pilots associated with the CDMA Channels containing Forward Traffic Channels assigned to a particular mobile station.

Aging. A mechanism through which the mobile station maintains in its Neighbor Set the pilots that have been recently sent to it from the base station and the pilots whose handoff drop timers have recently expired.

A-key. A secret, 64-bit pattern stored in the mobile station. It is used to generate update the mobile station's Shared Secret Data. The A-key is used in the mobile station authentication process.

Analog Access Channel. An analog control channel used by a mobile station to access a system to obtain service.

Analog Color-Code. An analog signal (see Supervisory Audio Tone) transmitted by a base station on an analog voice channel and used to detect capture of a mobile station by an interfering base station or the capture of a base station by an interfering mobile station.

Analog Control Channel. An analog channel used for the transmission of digital control information from a base station to a mobile station or from a mobile station to a base station.

Analog Paging Channel. A forward analog control channel that is used to page mobile stations and send orders.

Analog Voice Channel. An analog channel on which a voice conversation occurs and on which brief digital messages may be sent from a base station to a mobile station or from a mobile station to a base station.

Authentication. A procedure used by a base station to validate a mobile station's identity.

Authentication Center (AC). An entity that manages the authentication information related to the mobile station.

Authentication Response (AUTHR). An 18-bit output of the authentication algorithm. It is used, for example, to validate mobile station registrations, origination and terminations. A method of registration in which the mobile station registers without an explicit command from the base station.

AWGN. Additive White Gaussian Noise.

Bad Frames. Frames classified as erasures (frame category 10) or9600bps frames, primary traffic only with bit errors (frame category 9). See also Good Frames.

Base Station. A station in the Domestic Public Cellular Radio Telecommunications Service, other than a mobile station, used for communicating with mobile stations. Depending upon the context, the term base station may refer to a cell, a sector within a cell, an MSC, or other part of the Cellular system. See also MSC.

Base Station Authentication Response (AUTHBS). An 18-bit pattern generated by the authentication algorithm. AUTHBS is used to confirm the validity of base station orders to update the Shared Secret Data.

Base Station Random Variable (RANDBS). A 32-bit random number generated by the mobile station for authenticating base station orders to update the Shared Secret Data.

BCH Code. See Bose-Chaudhuri-Hocquenghem Code.

Busy-Idle Bits. The portion of the data stream transmitted by a base station on a forward analog control channel that is used to indicate the current busy-idle status of the corresponding reverse analog control channel.

Call Disconnect. The process that releases the resources handling a particular call. The disconnect process beings either when the mobile station user indicates the end of the call by generating an on-hook condition or other call release mechanism, or when the base station initiates a release.

Call History Parameter (COUNT). A modulo-64 event counter maintained by the mobile station and Authentication Center that us used for clone detection.

Candidate Set. The set of pilots that have been received with sufficient strength by the mobile station to be successfully demodulated, but have not been placed in the Active Set by the base station. See also Active Set. Neighbor Set, and Remaining Set.

. See Code Division Multiple Access

CDMA Channel. The set of channels transmitted between the base station within a given CDMA frequency assignment. See also Forward CDMA Channel and Reverse CDMA Channel.

CDMA Channel Number. An 11-bit number corresponding to the center of the CDMA frequency assignment.

CDMA Frequency Assignment. A 1.23MHz segment of spectrum centered on one of the 30KHz channels of the existing analog system.

Code Channel. A subchannel of a Forward CDMA Channels. A Forward CDMA Channel contains 64 code channels. Code channel zero is assigned to the Pilot Channel. Code channels 1 through 7 may be assigned to the either Paging Channels or the Traffic Channels. Code Channel 32 may be assigned to either a Sync Channel or a Traffic Channel. The remaining code channels may be assigned to Traffic Channels.

Code Division Multiple Access (CDMA). A technique for spread-spectrum multiple-access digital communications that creates channels through the use of unique code sequences.

Code Symbol. The output of an error-correcting encoder. Information bits are input to the encoder and code symbols are output from the encoder. See Convolutional Code.

Continuous Transmission. A mode of operation in which Discontinuous Transmission is not permitted.

Control Mobile Attenuation Code (CMAC). A 3-bit field in the Control-Filler Message that specifies the maximum authorized power level for a mobile transmitting on an analog reverse control channels.

Convolution Code. A type of error-correcting code. A code symbol can be considered as the convolution of the input data sequence with the impulse response of a generator function.

CRC. See Cyclic Redundancy Code.

Cyclic Redundancy Code (CRC). A class of linear error detecting codes which generate parity check bits by finding the remainder of a polynomial division.

Data Burst Randomizer. The function that determines which power control groups within a frame are transmitted on the Reverse Traffic Channel when the data rate is lower than 9600 bps. The data burst randomizer determines, for each mobile station, the pseudo random position of the transmitted power control groups in the frame while guaranteeing that every modulation symbol is transmitted exactly once.

DBc. The ratio (in dB) of the sideband power of a signal, measured in a given bandwidth at a given frequency offset from the center frequency of the same signal, to the total inband power of the signal. For CDMA, the total inband power of the signal is measured in a 1.23MHz bandwidth around the center frequency of the CDMA signal.

DBm. A measure of power expressed in terms of its ration (in dB) to one milliwatt.

DBm/Hz. A measure of power spectral density. DBm/Hz is the power in one Hertz of bandwidth. Where power is expressed in units of dBm.

DBW. A measure of power expressed in terns of its ration (in dB) to one Watt.

Dedicated Control Channel. An analog control channel used for the transmission of digital control information from either a base station or a mobile station.

Deinterleaving. The process of unpermuting the symbols that were permuted by the interleaver..
Deinterleaving is performed on received symbols prior to decoding.

Digital Color Code (DCC). A digital signal transmitted by a base station on a forward analog control channel that is used to detect capture of a base station by an interfering mobile station.

Dim-and-Burst. A frame in which primary traffic is multiplexed with either secondary traffic or signaling traffic.

Discontinuous Transmission (DTX). A mode of operation in which a mobile station transmitter autonomously switches between two transmitter power levels while the mobile station is in the conversation state on an analog voice channel.

Distance-Based Registration. An autonomous registration method in which the mobile station registers whenever it enters a cell whose distance from the cell in which the mobile station last registered exceeds a given threshold.

DTMF. See Dual Tone Multifrequency.

Dual-Tone Multifrequency (DTMF). Signaling by the simultaneous transmission of two tones, one from a group of low frequencies and another from a group of high frequencies. Each group of frequencies consists of four frequencies.

Eb. The energy of an information bit.

Ec/I0. The ratio in (dB) between the pilot energy accumulated over one PN chip period (Ec) to the power spectral density in the received bandwidth (Io).

Effective Radiated Power (ERP). The transmitted power multiplied by the antenna gain referenced to a half wave dipole.

Electronic Serial Number (ESN). A 32-bit number assigned by the mobile station manufacturer, uniquely identifying the mobile station equipment.

Encoder Tail Bits. A fixed sequence of bits added to the end of a block of data to reset the convolutional encoder to a known state.

ERP. See Effective Radiated Power.

ESN. See Electronic Serial Number.

Extended Protocol. An optional expansion of the signaling message between the base station and mobile station to allow for the addition of new system features and operational capabilities.

Fade Timer. A timer kept by the mobile station as a measure of Forward Traffic Channel continuity. If the Fade timer expires, the mobile station drops the call.

Flash. An indication sent on an analog voice channel or CDMA Traffic Channel indicating that the user Directed the mobile station to invoke special processing.

Foreign NID Roamer. A mobile station operating in the same system (SID) but a different network (NID)Form the one in which service was subscribed. See also Foreign SID Roamer and Roamer.

Foreign SID Roamer. A mobile station operating in a system (SID) other than the one from which service was subscribed. See also Foreign NID Roamer and Roamer.

Forward Analog Control Channel (FOCC). An analog voice channel used from a base station to a mobile station.

Forward Analog Voice Channel (FVC). An analog voice channel used from a base station to a mobile station.

Forward CDMA Channel. A CDMA Channel form a base station to mobile stations. The Forward CDMA Channel contains one or more code channels that are transmitted on a CDMA frequency assignment using a Particular pilot PN offset. The code channels are associated with the Pilot Channel, Sync Channel, Paging Channels, and Traffic Channels. The Forward CDMA Channel always carries a Pilot Channel and may carry up to one Sync Channel, up to seven Paging Channels, and up to 63 Traffic Channels, as long as the total number of channels, including the Pilot Channel, is no greater than 64.

Forward Traffic Channel. A code channel used to transport user and signaling traffic from the base station to the mobile station.

A basic timing interval in the system. For the Access Channel, Paging Channel, and Traffic Channel, a frame is 20 ms long. For the Sync Channel, a frame is 26.666…ms long.

Frame Category. A classification of a received Traffic Channel frame based upon transmission data rate, the Frame contents (primary traffic, secondary traffic, or signaling traffic), and whether there are detected error in the frame.

Frame Offset. A time skewing of Traffic Channel frames from System Time in integer multiples of 1.25 ms. The maximum frame offset is 18..75 ms..

Frame Quality Indicator. The CRC check applied to 9600 bps and 4800 bps Traffic Channel frames.

Global Positioning System (GPS). A US government satellite system that provides location and time Information to users. See Navstar GPS Space segment / Navigation User interfaces ICD-GPS-200 for Specifications.

Half Frame. A 10 ms interval on the paging Channel. Two half frames comprise a frame, the first half frame begins at the same time as the frame.

Handoff. The of transferring communication with a station mobile station from one base station to another.

Hard Handoff. A handoff characterized by a temporary disconnection of the Traffic Channel. Hard handoffs Occur when the mobile station is transferred between disjoint Active Sets, the CDMA frequency assignment changes, the frame offset changes, or the mobile station is directed from a CDMA Traffic Channel to an analog voice channel, See also Soft Handoff.

Hash Function. A function used by the mobile station to select one out of N available resource. The hash function distributes the available resources uniformly among a random sample of mobile stations.

HLR. See Home Location Register.

Home Location Register (HLR). The location register to which a MIN is assigned for record purposes such as subscriber information.

Home System. The Cellular system in which the mobile station subscribes for service.

Idle Handoff. The act of transferring reception of the Paging Channel from one bass station to another, when the mobile station is in the ***Mobile Station Idle State.***

Implicit Registration. A registration achieved by a successful transmission of an origination or page response on the Access Channel.

Interleaving. The process of permuting a sequence of symbols.

kHz. Kilohertz (103 Hertz).

ksps. Kilo-symbols per second (103 symbols per second).

Layer 1. See Physical Layer.

Layer 2. Layer 2 provides for the correct transmission and reception of signaling messages, including partial duplicate detection. See also Layering and Layer 3.

Layer 3. Layer 3 provides the control of the Cellular telephone systems. Signaling messages originate and terminate at layer 3. See also Layering and Layer 2.

Local Control. An optional mobile station feature used to perform manufacturer-specific functions.

A PN sequence with period 242-1 that is used for scrambling on the Forward CDMA Channel and spreading on the Reverse CDMA Channel. The long code uniquely identifies a mobile station on both the Reverse Traffic Channel and the Forward Traffic Channel. The long code provides limited privacy. The long code also separates multiple Access Channels on the same CDMA channel. See also Public Long Code and Private Long Code.

Long Code Mask. A 42-bit binary number that creates the unique identity of the long code. See also Public Long Code, Private Long Code, Public Long Code Mask, and Private Long Code Mask.

LSB. Least significant bit.

Maximal Length Sequence (m-Sequence). A binary sequence of period 2n-1, n a positive integer, with no internal periodicities. A maximal length sequence can be generated by a tapped n-bit shift register with linear feedback.

Mcps. Megachips per second (106 chips per second).

Mean Input Power. The total received calorimetric power measured in a specified bandwidth at the antenna connector, including all internal and external signal and noise sources.

Mean Output Power. The total transmitted calorimetric power measured in a specified bandwidth at the antenna connector when the transmitter is active.

Message. A data structure that conveys control information or application information. A message consists of a length field (MSG_LENGTH), a message body (the part conveying the information), and a CRC.

Message Body. The part of the message contained between the length field (MSG_LENGTH) and the CRC field.

Message Capsule. A sequence of bits comprising a single message and padding. The padding always follows the message and may be of zero length.

Message CRC. The CRC associated with a message. See also Cyclic Redundancy Check.

Message Field. A basic named element in a message. A message field may consist of zero or more bits.

Message Record. An entry in a message consisting of one or more field that repeats in the message.

MHz. Megahertz.(106 Hertz)

MIN. See Mobile Station Identification Number.

Mobile Protocol Capability Indicator (MPCI). A 2-bit field used to indicate 슥 mobile station's capabilities.

Mobile Station. A station in the Domestic Public Cellular Radio Telecommunications Service intended to be used while in motion or during halts at unspecified points. Mobile station include portable units (e.g., handheld personal units) and units installed in vehicles.

Mobile Station Class. Mobile station classes define mobile station characteristics such as slotted operation and transmission power.

Mobile Station Identification Number (MIN). The 34-bit number that is a digital representation of the 10-digit directory telephone number assigned to a mobile station.

Mobile Station Originated Call. A call originating from a mobile station.

Mobile Station Terminated Call. A call received by a mobile station (not to be confused with a disconnect or call release).

Mobile Switching Center (MSC). A configuration of equipment that provides Cellular radiotelephone service. Also called the Mobile Telephone Switching Office (MTSO)

Modulation Symbol. The output of the data modulator before spreading. On the Reverse Traffic Channel, 64-ary orthogonal modulation is used and six code symbol (when the data rate is 9600bps) or each repeated code symbol (when the data rate is less than 9600bps) is one modulation symbol.

Ms. Millisecond.

MSB. Most significant bit.

MSC. See Mobile Switching Center.

Multiplex Option. The ability of the multiplex sublayer and lower layer to be tailored to provide special capabilities. A multiplex option defines such characteristics as the frame format and the rate decision rules. See also Multiplex Sublayer.

Multiplex Sublayer. One of the conceptual layers of the system that multiplexes and demultiplexes primary traffic, secondary traffic, and signaling traffic.

NAM. See Number Assignment Module.

Narrow Analog. A type of voice channel that uses 10kHz channel spacing and subaudible signaling.

Neighbor Set. The set of pilots associated with the CDMA Channel that are probable candidates for handoff. Normally, the Neighbor Set consists of the pilots associated with CDMA Channel that cover geographical areas near the mobile station. See also Active Set, Candidate Set, and Remaining Set.

A network is a subset of a Cellular system, such as an area-wide Cellular network, a private group of base stations, or a group of base stations set up to handle a special requirement. A network can be as small or as large as needed, as long as it is fully contained within a system. See also System.

Network Identification (NID). A number that uniquely identifies a network within a Cellular system. See also System Identification.

NID. See Network Identification.

Non-Autonomous Registration. A registration method in which the base station initiates registration. See also Autonomous Registration.

Non-Slotted Mode. An operation mode of the mobile station in which the mobile station continuously monitors the Paging Channel when in the Mobile Station Idle State.

Ns. Nanosecond.

NULL. Not having any value.

Null Traffic Channel Data. One or more frames of 16 ‘1’s followed by eight ‘0’s sent at the 1200bps rate. Null Traffic Channel data is sent when no service option is active and no signaling message is being sent. Null Traffic Channel data serves to maintain the connectivity between the mobile station and the base station.

Number Assignment Module (NAM). A set of MIN-related parameters stored in the mobile station.

Numeric Information. Numeric information consists of parameters that appear as numeric fields in message exchanged by the base station and the mobile station and information used to describe the operation of the mobile station.

OLC. See Overload Class (CDMA) or Overload Control (analog).

Optional Field. A field defined within a message structure that is optionally to the message recipient.

Order. A type of message that contains control codes for either the mobile station or the base station.

Ordered Registration. A registration method in which the base station orders the mobile station to send registration related parameters.

Overhead Message. A message sent by the base station on the Paging Channel to communicate base-station-specific and system-wide information to mobile station.

Overload Class. The means used to control system access by mobile stations, typically in emergency or other overload conditions. Mobile station are assigned one (or more) of sixteen overload classed, Access to the CDMA system can then be controlled on a per class basis by persistence values transmitted by the base station.

Overload Control (OLC). A means reverse analog control channel accesses by mobile stations. Mobile station are assigned one(or more) of sixteen control levels. Access is selectively restricted by a base station setting one or more OLC bits in the Overload Control Global Action Message.

Packet. The unit of information exchanged between the service option applications of the base station and the mobile station.

Padding. A sequence of bits used to fill from the end of a message to the end of a message capsule, typically to the end of the frame or half frame. All bits in the padding are '0'.

Paging. The act of seeking a mobile station when a call has been placed to that mobile station.

Paging Channel (Analog). See Analog Paging Channel.

Paging Channel (CDMA). A code channel in a Forward CDMA Channel used for transmission of control information and pages from a base station to a mobile station.

Paging Channel Slot. An 80ms interval on the Paging Channel. Mobile station operating in the slotted mode are assigned specific slots in which day monitor messages from the base station.

Parameter-Change Registration. A registration method in which the mobile station registers when certain of its stored parameters change.

Parity Check Bits. Bits added to a sequence of information bits to provide error detection, correction, or both.

Persistence. A probability measure used by the mobile station to determine if it should transmit in a given Access Channel Slot.

Physical Layer. The part of the communication protocol between the mobile station and the base station that is responsible for the transmission and reception of data. The physical layer in the transmitting station is presented a frame by the multiplex sublayer and transforms it into an over-the-air waveform. The physical layer in the receiving station transforms the waveform back into a frame and presents it to the multiplex sublayer above it.

Pilot Channel. An unmodulated, direct-sequence spread spectrum signal transmitted continuously by each CDMA base station. The Pilot Channel allows a mobile station to acquire the timing of the Forward CDMA Channel, provides a phase reference for coherent demodulation, and provides a means for signal strength comparisons between base station for determining when to handoff.

Pilot PN Sequence. A pair of modified maximal length PN sequences with period 215 used to spread the Forward CDMA Channel and the Reserve CDMA Channel. Different base station are identified by different pilot PN sequence offsets.

Pilot PN Sequence Offset Index. The PN offset in units of 64 PN chips of a pilot, relative to the zero offset pilot PN sequence.

PN Chip. One bit in the PN sequence.

PN Sequence. Pseudonoise sequence. A periodic binary sequence.

Power Control Bit. A bit sent in every 1.25ms interval on the Forward Traffic Channel to signal the mobile station to increase or decrease its transmit power.

Power Control Group. A 1.25ms interval on the Forward Traffic Channel and the Reverse Traffic Channel. See also Power Control Bit.

Power-Down Registration. Au autonomous registration method in which the mobile station registers on power up.

PPM. Parts per million.

Preamble. See Access Channel Preamble and Traffic Channel Preamble.

Primary CDMA Channel. A CDMA Channel at a pre-assigned frequency assignment used by the mobile station for initial acquisition. See also Secondary CDMA Channel.

Primary Paging Channel (CDMA). The default code channel (code channel 1) assigned for paging on a CDMA Channel.

Primary Traffic. The main traffic stream carried between the mobile station and the base station, supporting the active primary service option, on the Traffic Channel. See also Secondary Traffic, Signaling Traffic, and Servic3e Option.

Private Long Code. The long code characterized by the private long code mask. See also Long Code.

Private Long Code Mask. The long code mask used to form the private long code. See also Public Long Code Mask and Long Code.

Public Long Code. The long code characterized by the public long code mask.

Public Long Code Mask. The long code mask used to form the private long code. The mask contains the ESN of the mobile station. See also Private Long Code Mask and Long Code.

Punctured Code. An error-correcting code generated from another error-correcting code by deleting (i.e., puncturing) code symbols from the code output.

Quick Repeats. Additional transmissions of identical copies of a message within a short interval to increase the probability that the message is received correctly.

Receive Objective Loudness Rating (ROLR). A perceptually weighted transducer gain of telephone receivers relating electrical excitation from a reference generator to sound pressure at the earphone. The receive objective loudness tating is normally specified in dB relative to one Pascal per millivolt. See IEEE Standard 269-1992, IEEE Standard 661-1979, CCITT Recommendation P.76, and CCITT Recommendation P.79.

Registration. The process by which a mobile station identifies its location and parameters to a base station.

Registration Zone. A collection of one or more base stations treated as a unit when determining whether a mobile station should perform zone-based registration.

Release. A process that the mobile station and base station use to inform each other of call disconnect.

The set of all allowable pilot offsets as determined by PILOT_INC, excluding the pilot offsets of the pilots in the Active Set, Candidate Set, and Neighbor Set. See also Active Set, Candidate Set, and Neighbor Set.

Request. A layer 3 message generated by either the mobile station or the base station to retrieve information, ask for service, or command an action.

Response. A layer 3 message generated as a result of another message, typically a request.

Reverse Analog Control (RECC). The analog control channel used from a mobile station to a base station.

Reverse Analog Voice Channel (RVC). The analog voice channel used from a mobile station to a base station.

Reverse CDMA Channel. The CDMA Channel from the mobile station to the base station. From the base station's perspective, the Reverse CDMA Channel is the sum of all mobile station transmissions on a CDMA frequency assignment.

Reverse Traffic Channel. A Reverse CDMA Channel used to transport user and signaling traffic from a single mobile station to one or more base stations.

Roamer. A mobile station operating in a Cellular system (or network) other than the one from which service was subscribed. See also Foreign NID Roamer and Foreign SID Roamer.

ROLR. See Receive Objective Loudness Rating.

SAT. See Supervisory Audio Tone.

Scan of Channels. The procedure by which a mobile station examines the signal strength of each forward analog control channel.

SCI. Synchronized Capsule Indicator bit.

Search Window. The range of PN sequence offsets that a mobile station searches for a pilot.

Secondary CDMA Channel. A CDMA Channel at a preassigned frequency assignment used by the mobile station for initial acquisition. See also Primary CDMA Channel.

Secondary Traffic. An additional traffic stream that can be carried between the mobile station and the base station on the Traffic Channel. See also Primary Traffic and Signaling Traffic.

Seizure Precursor. The initial digital sequence transmitted by a mobile station to a base station on a reverse analog control channel.

Seizure Option. A service capability of the system. Service options may be applications such as voice, data, or facsimile.

Shard Secret Data (SSD). A 128-bit pattern stored in the mobile station (in semi-permanent memory) and known by the base station. SSD is a concatenation of two 64-bit subsets: SSD_A, which is used to support the authentication procedures and SSD_B, which serves as one of the inputs to the process generating the encryption mask and private long code.

Short Message Services (SMS). A suite of services which include SMS Text Delivery, Digital Paging (i.e., Call Back Number – CBN), and Voice Mail Notification (VMN).

SID. See System Identification.

Signaling Tone. A 10kHz tone transmitted by a mobile station on an analog voice channel to: 1) confirm orders, 2)signal flash requests, and 3) signal release requests.

Signal Traffic. Control message that are carried between the mobile station and base station on the Traffic Channel. See also Primary Traffic and Secondary Traffic.

Slot Cycle. A periodic interval at which a mobile station operating in the slotted monitors the Paging Channel.

Slotted Mode. An operation mode of the mobile station in which the mobile station monitors only selected slots on the Paging Channel when in the Mobile Station Idle State.

Soft Handoff. A handoff occurring while the mobile station is in the Mobile Station Control on the Traffic Channel State. This handoff is characterized by commencing communications with a new base station on the same CDMA frequency assignment before terminating communications with the old base station. See also Hard Handoff.

SOM. Start-of-Message Bit.

SPS. Symbols per second.

- An identification of certain characteristics of a mobile station. Classes are defined in Table 2.3.3-1.

Status Information. The following status information is used to describe mobile station operation when using the analog system.

■Serving-System Status. Indicates whether a mobile station is turned to channels associated with System A or System B.

■ First Registration ID Status. A status variable used by the mobile station in association with its processing of received Registration ID messages.

■ First Location Area ID Status. A status variable used by the mobile station in association with its processing of received Location Area ID messages.

■ Location Registration ID Status. A status variable used by the mobile station in association with its processing of power-up registration and location-based registration.

■ First Idle ID Status. A status variable used by the mobile station in association with its processing of the Idle Task.

■ Local Control Status. Indicates whether a mobile station must respond to local control messages.

■ Roam Status. Indicates whether a mobile station is in its home system.

■ Termination Status. Indicates whether a mobile station must terminate the call when it is on an analog voice channel.

Supervisory Audio Tone (SAT). One of three tones in the 6 kHz region that is transmitted on the forward analog voice channel by a base station and transponder on the reverse analog voice channel by as mobile station.

Supplementary Digital Color Code (SDCC1, SDCC2). Additional bits assigned to increase the number of color codes from four to sixty four, transmitted on the forward analog control channel.

Symbol. See Code Symbol and Modulation Symbol.

Sync Channel. Code channel 32 in the Forward CDMA Channel which transports the synchronization message to the mobile station.

Sync Channel Superframe. An 80ms interval consisting of three Sync Channel frames (each 26.666…ms in length).

System. A system is a Cellular telephone service that covers a geographic area such as a city. Metropolitan region, country, or group of countries. See also Network.

System Time. The time reference used by the system. System Time is synchronous to UTC time (except for leap seconds) and used the same time origin as GPS time. Offset by the propagation delay from the base station to the mobile station. See also Universal coordinated Time.

Timer-Based Registration. A registration method in which the mobile station registers whenever a counter reaches a predetermined value. The counter is incremented an average of once per 80 ms period.

Time Reference. A reference established by the mobile station that is synchronous with the earliest arriving multipath component used for demodulation.

TOLR. See Transmit Objective Loudness Rating.

Traffic Channel. A communication path between a mobile station and base station used for user and signaling traffic. The term Traffic Channel implies a Forward Traffic Channel and Reverse Traffic Channel pair. See also Forward Traffic Channel and Reverse Traffic Channel.

Traffic Channel Preamble. A sequence of all-zero frames that is sent at the 9600 bps rate by the mobile station on the Reverse Traffic Channel. The Traffic Channel preamble is sent during initialization of the Traffic Channel.

Transmit Objective Loudness Rating (TOLR). A perceptually weighted transducer gain of telephone transmitters relation sound pressure at the microphone to voltage at a reference electrical termination. It is normally specified in dB relative to one millivolt per Pascal. See IEEE Standard 269-1992, IEEE Standard 661-1979, CCITT Recommendation P.76 , and CCITT Recommendation. P.79

Unique Challenge-Response Procedure. An exchange of information between a mobile station and a base station for the purpose of confirming the mobile station's identity. The procedure is initiated by the base station and is characterized by the use of a challenge-specific random number (i.e., RANDU) instead of the random variable broadcast globally (RAND).

Unique Random Variable (RANDU). A 24-bit random number generated by the base station in support of the Unique Challenge-Response procedure.

Universal Coordinated Time (UTC). An internationally agreed-upon time scale maintained by the Bureau International de l'Heure (BIH) used as the time reference by nearly all commonly available time and frequency distribution systems i.e., WWW, WWVH, LORAN-C, Transit, Omega, and GPS.

UTC. Universal Temps Coordine. See Universal Coordinated Time.

Voice Channel. See Analog Voice Channel.

Voice Mobile Attenuation Code (VMAC). A 3-bit field in the Extended Address Word commanding the initial mobile power level when assigning a mobile station to an analog voice channel.

Voice Privacy. The process by which user voice transmitted over a CDMA Traffic Channel is a afforded a modest degree of protection against eavesdropping over the air.

Walsh Chip. The shortest identifiable component of a Walsh function. There are 2N Walsh chips in one Walsh function where N is the order of the Walsh function. On the Forward CDMA channel one Walsh chip equals 1/1.2288MHz, or 813.802…ns. On the Reverse CDMA Channel, one Walsh chip equals 4/1.2288MHz, or 3.255…µs.

Walsh Function. One of 2N time orthogonal binary functions (note that the functions are orthogonal after mapping '0' to 1 and '1' to –1).

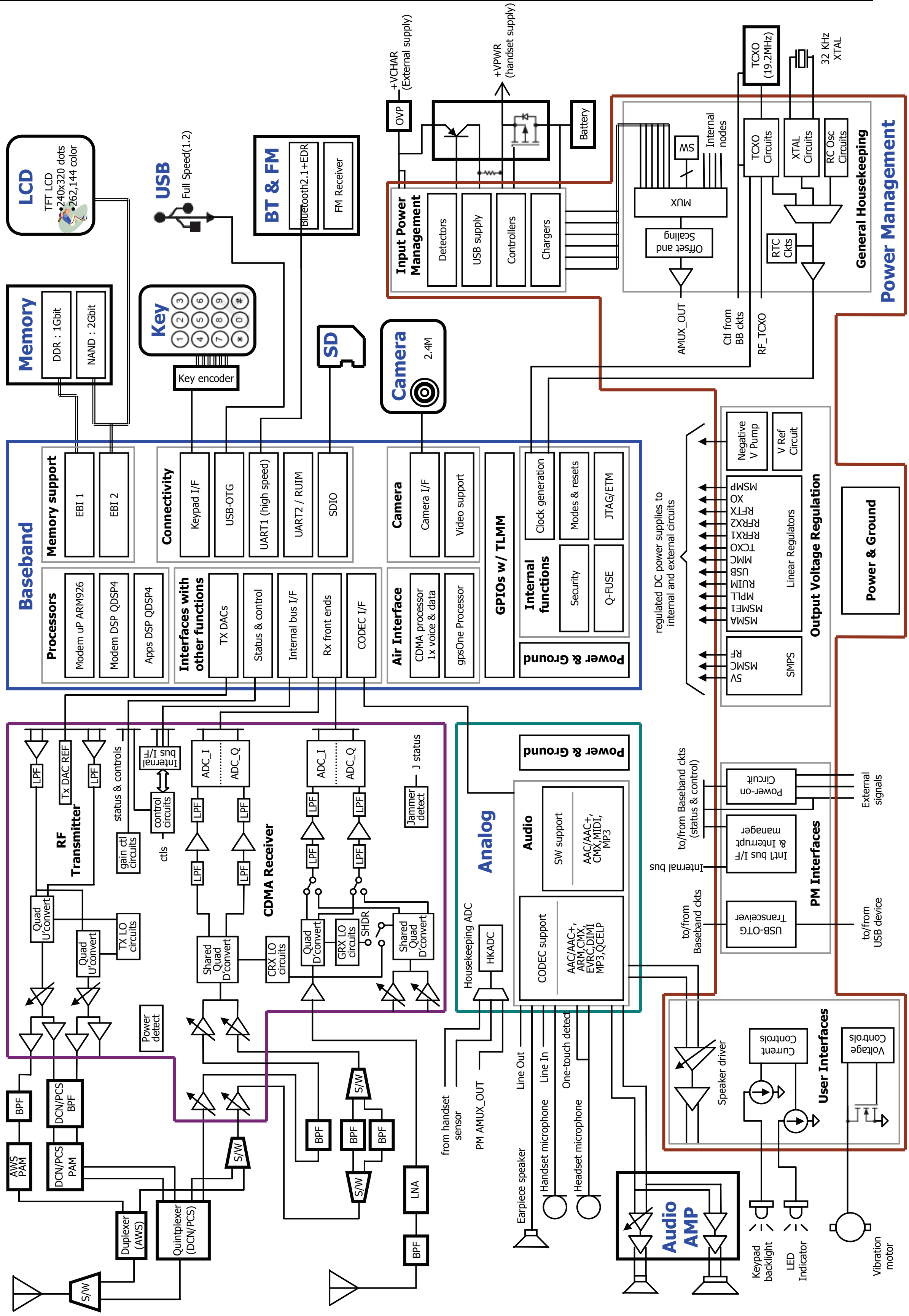
Zone-Based Registration. An autonomous registration method in which the mobile station registers whenever it enters a zone that is not in the mobile station's zone list.

µs. Microsecond

Appendix

1. Block Diagram
2. Circuit Diagram
3. BGA PIN MAP
4. Component Layout
5. Assembly and Disassembly diagram
6. Part List

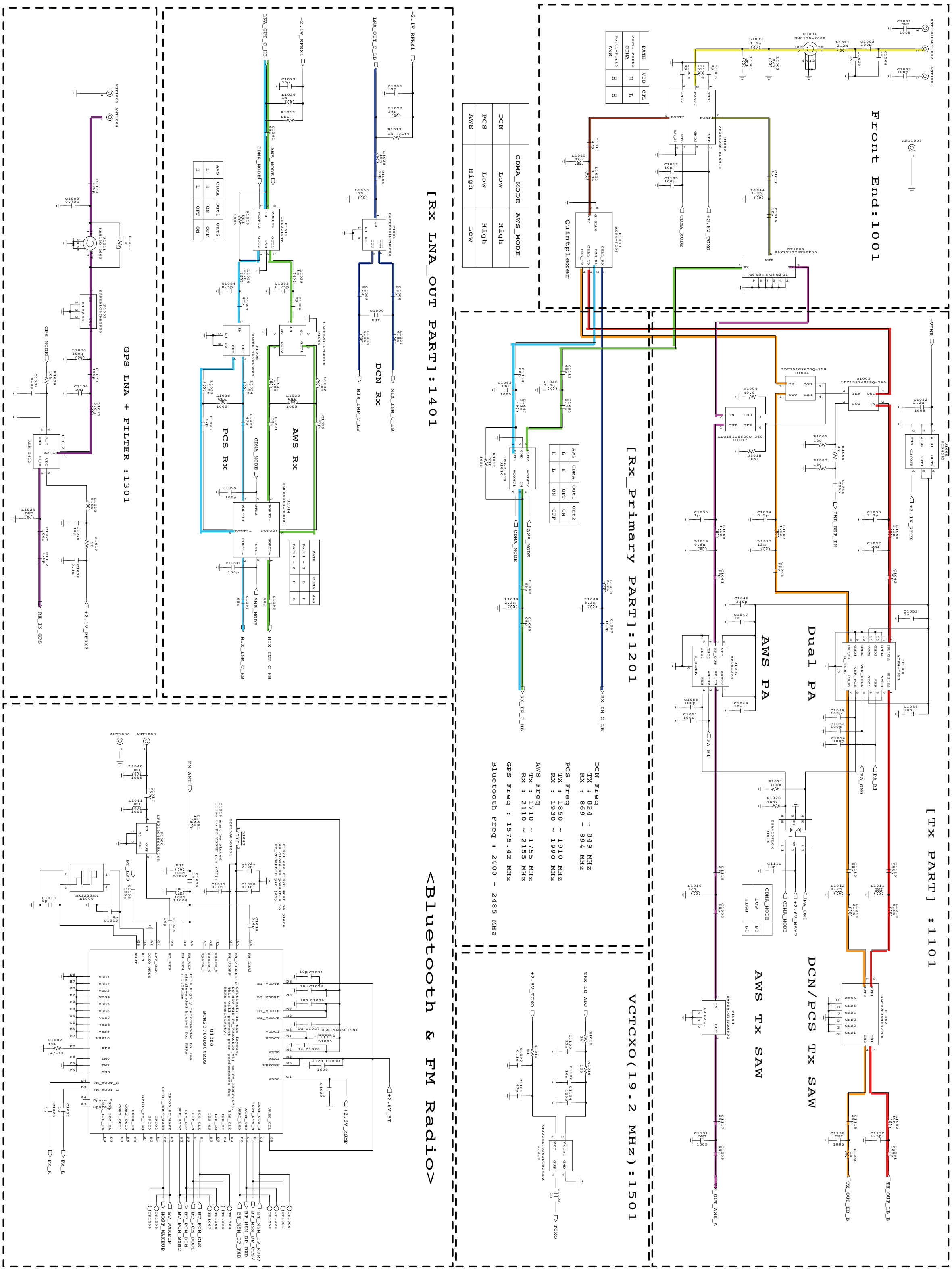
Appendix 1. Block Diagram

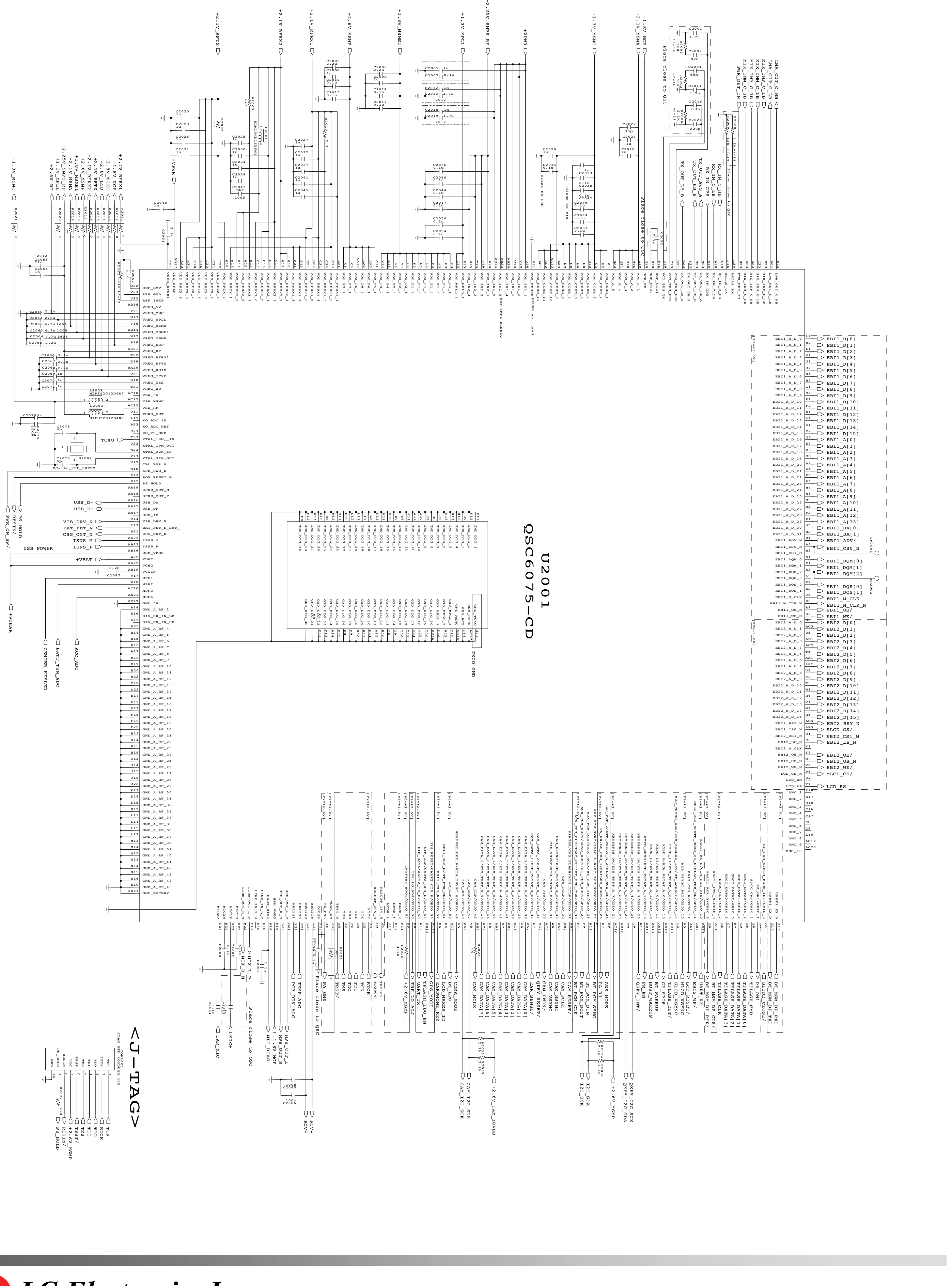


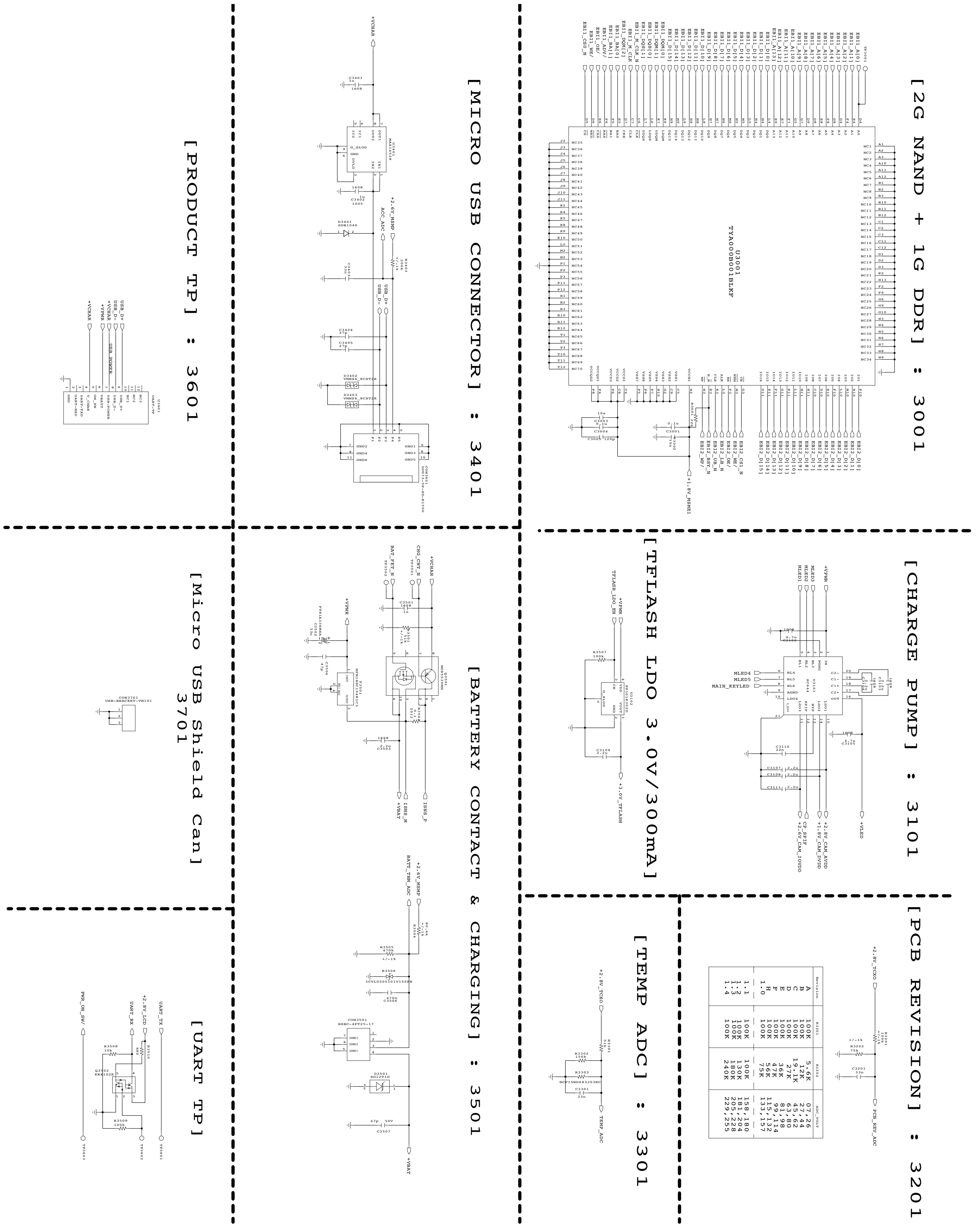
Appendix 2. Circuit diagram

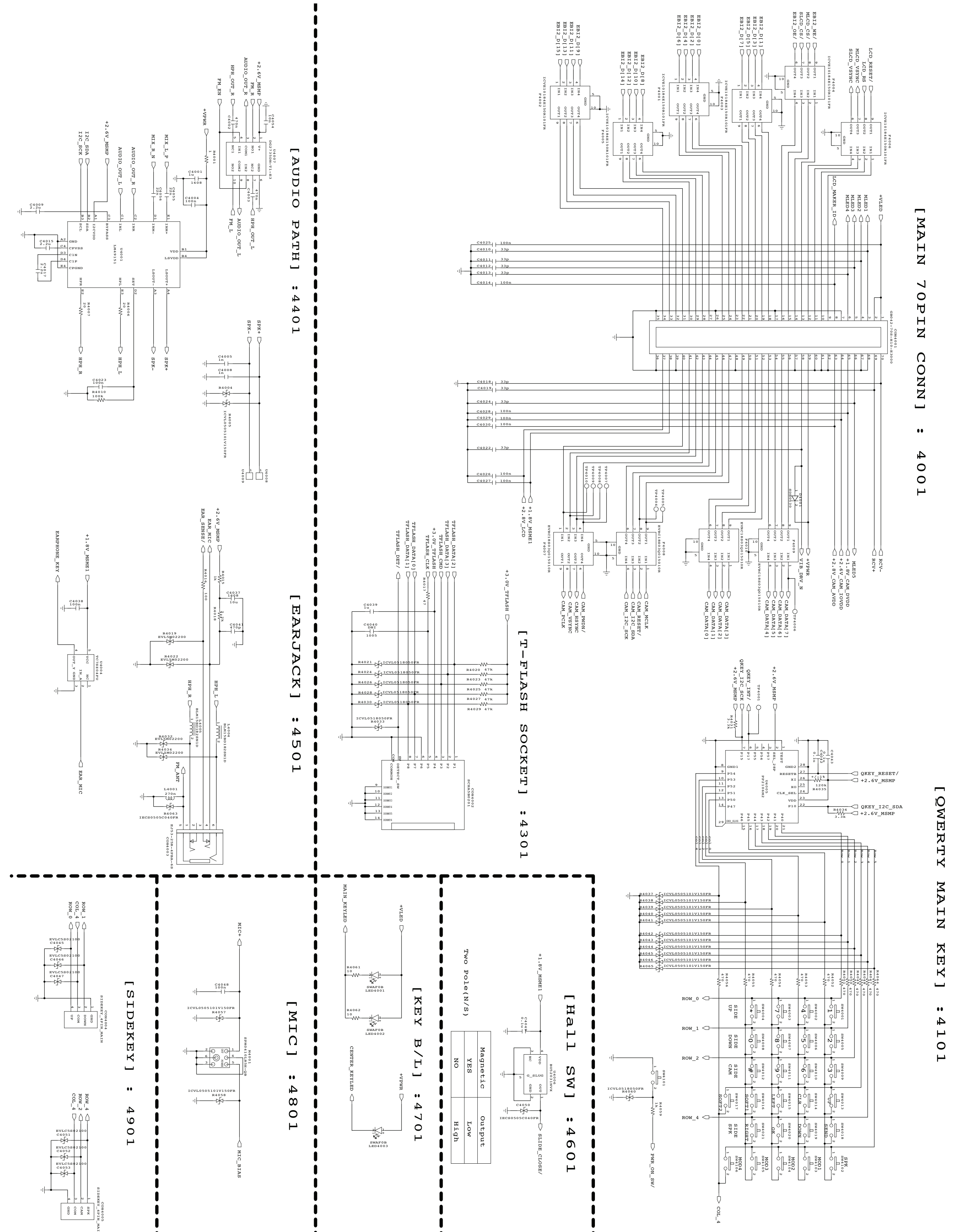
DCN + PCS ——— DCN Tx ——— PCS Tx ——— AWS Tx ———
AWS ——— Rx ——— Rx ——— Rx ———

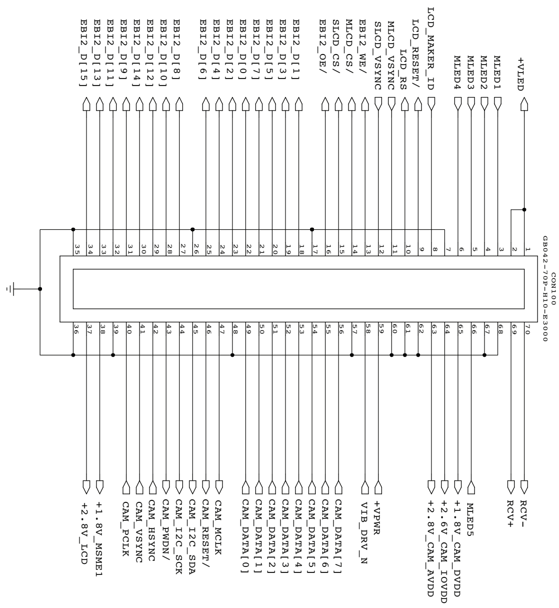
ANT ——— GPS ———



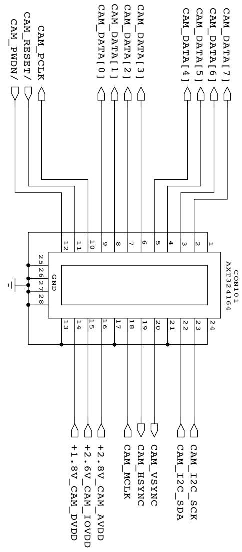

U2001
QSC6075-CD
<J-TAG>


[2G NAND + 1G DDR] : 3001
[MICRO USB CONNECTOR] : 3401
[PRODUCT TP] : 3601
[CHARGE PUMP] : 3101
[TFLASH LDO 3.0V/300mA]
[BATTERY CONTACT & CHARGING] : 3501
[Micro USB Shield Can] 3701
[PCB REVISION] : 3201
[TEMP ADC] : 3301
[UART TP]

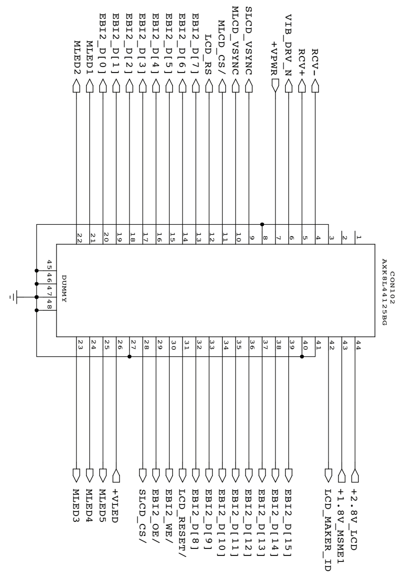

[MAIN 70PIN CONN] : 4001
[AUDIO PATH] :4401
[EARJACK] :4501
[T-FLASH SOCKET] :4301
[QWERTY MAIN KEY] :4101
[Hall SW] :4601
[KEY B/L] :4701
[MIC] :4801
[SIDEKEY] : 4901
Two Pole(N/S)
Magnetic
Output
YES
Low
NO
High



[70PIN LCD FPBC CONNECTOR]



[24PIN CAMERA CONNECTOR]



[44PIN LCD CONNECTOR]

Appendix 3. BGA Pin Map

3-1. U1000[BCM20780]
3-2. U2001 [QSC6075-CD]
3-3. U3001 [TYA000B001BLKF]
3-4. U4001 [LM49151]

3-1. U1000 [BCM20780]

○ USED PIN
● NOT USED PIN

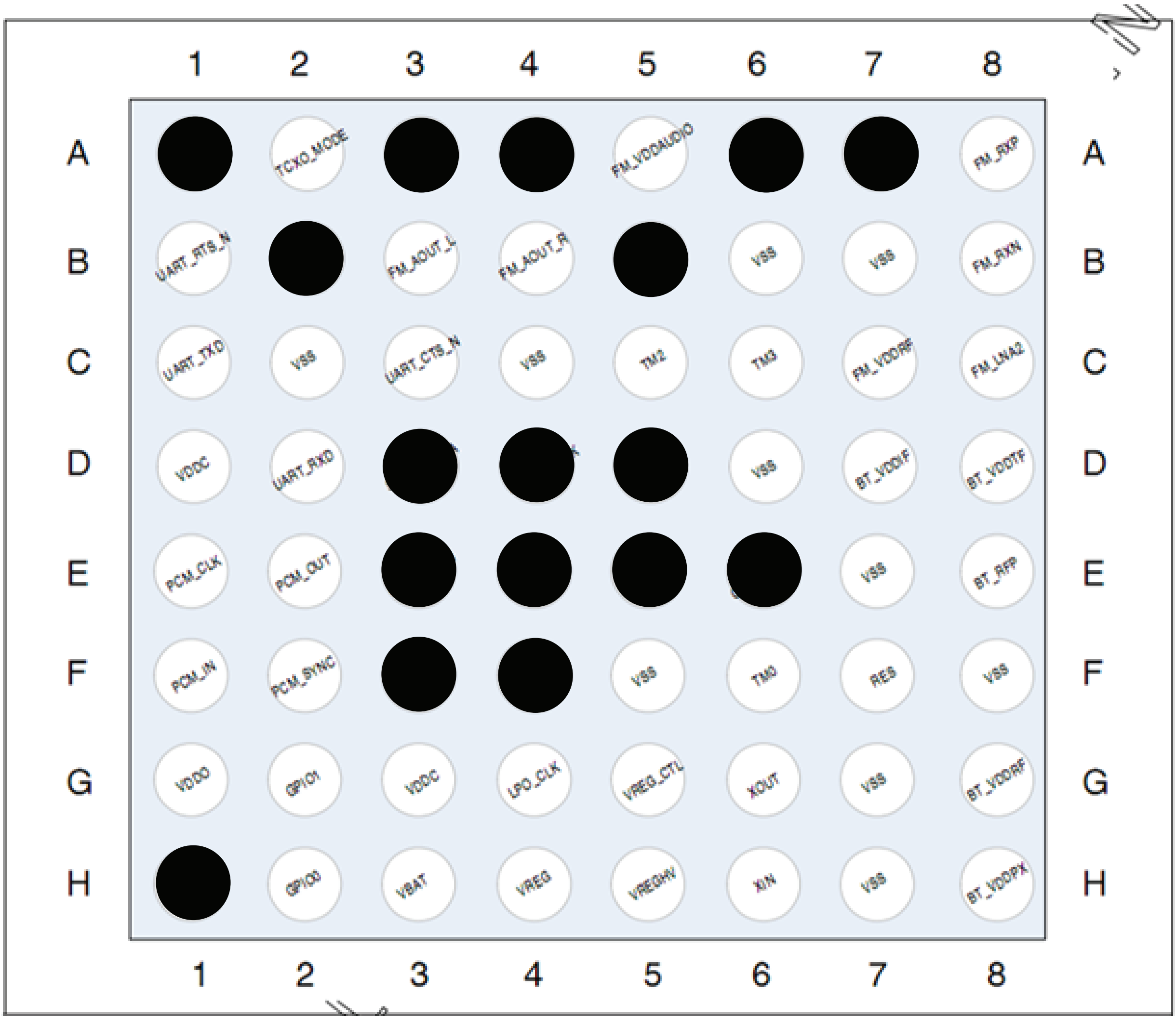
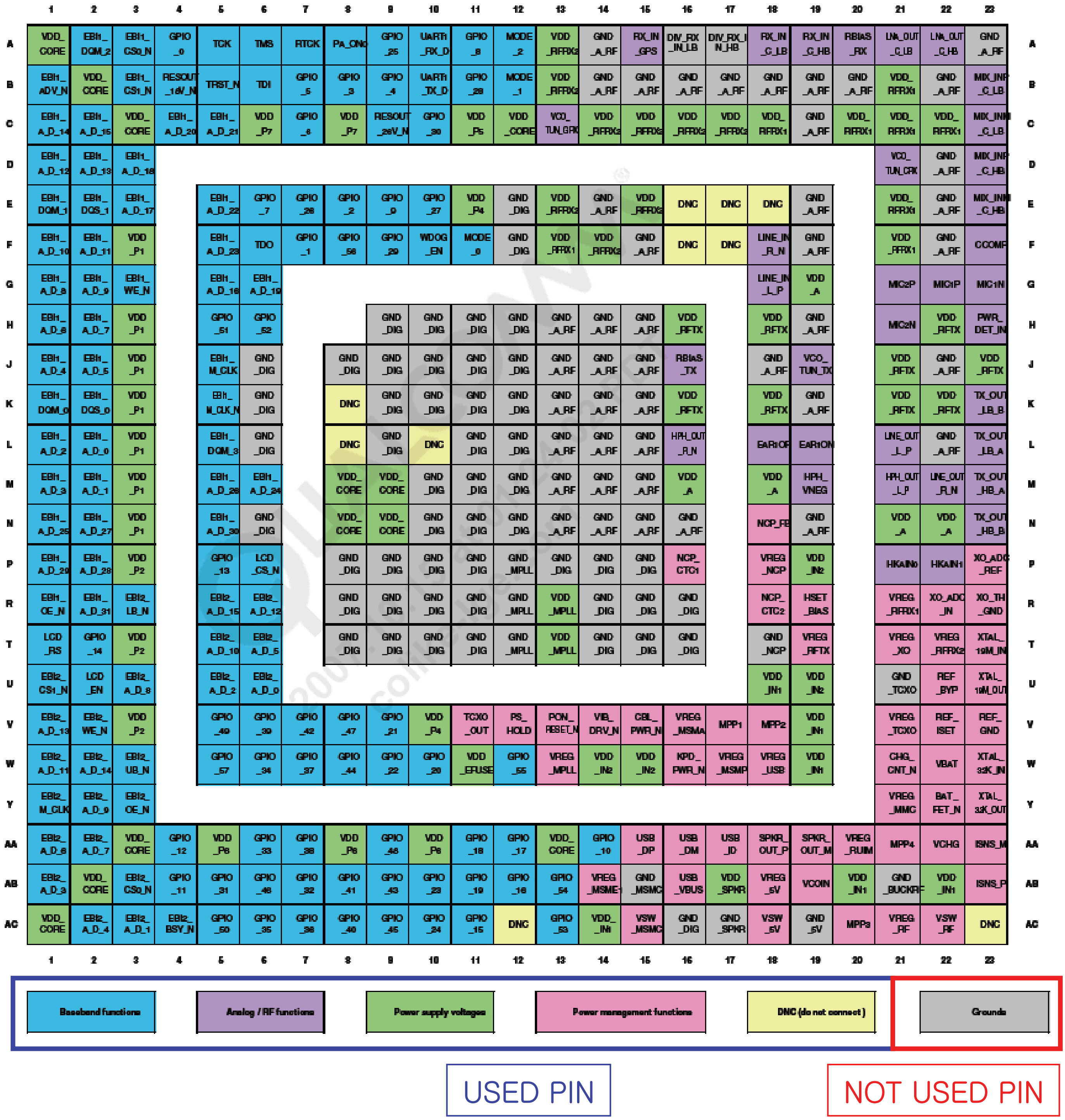


Figure 5: 64-Pin WLBGA Ballout Diagram (Ball-Down View)

3-2. U2001 [QSC6075-CD]

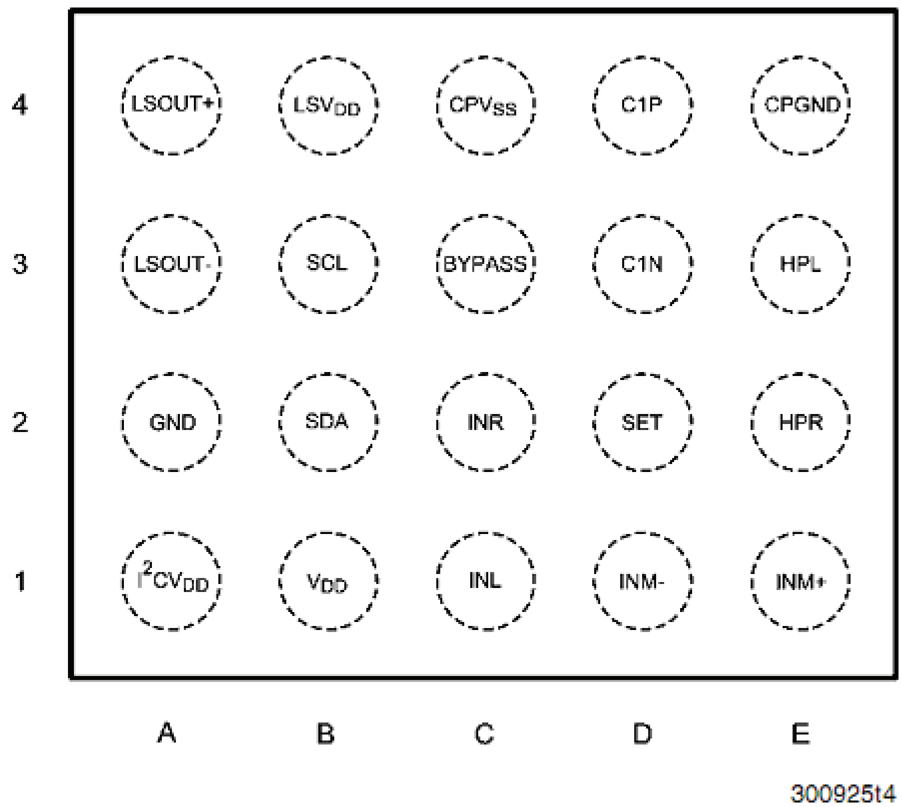


3-3. U3001 [TYA000B001BLKF]

	1	2	3	4	5	6	7	8	9	10	11	12
A	NC	NC	NC							NC	NC	NC
B	NC	NC	NC							NC	NC	NC
C	NC	NC	NC	V_{CCd}	V_{SS}	$\overline{CLK}$	CLK	V_{CCd}	V_{SS}	I/O8	NC	NC
D	NC	NC	NC	A0	$\overline{CS}$	$\overline{WEd}$	CKE	A7	A8	I/O7	I/O16	
E		NC	RY/$\overline{BY}$	A1	BA0	$\overline{CAS}$	A12	A6	A13	I/O6	I/O15	
F		NC	$\overline{RE}$	A2	BA1	$\overline{RAS}$	A11	A5	NC	I/O5	I/O14	
G		V_{SS}	$\overline{CE}$	A3	A10	NC	A9	A4	NC	NC	I/O13	
H		V_{CCn}	NC	NC	NC	NC	NC	NC	NC	V_{SS}	NC	
J		NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
K		NC	CLE	NC	NC	LDM	UDM	NC	NC	NC	I/O12	
L		NC	ALE	DQ0	DQ3	LDQS	UDQS	DQ10	DQ13	I/O4	I/O11	
M		NC	$\overline{WEn}$	DQ1	DQ4	DQ6	DQ8	DQ11	DQ14	I/O3	I/O10	
N		NC	$\overline{WP}$	DQ2	DQ5	DQ7	DQ9	DQ12	DQ15	I/O2	I/O9	
P	NC	NC	NC	V_{CCQd}	V_{SS}	V_{CCd}	V_{SS}	V_{CCQd}	V_{SS}	I/O1	NC	NC
R	NC	NC	NC							NC	NC	NC
T	NC	NC	NC							NC	NC	NC

3-4. U4001 [LM49151]

20 Bump micro SMD Package



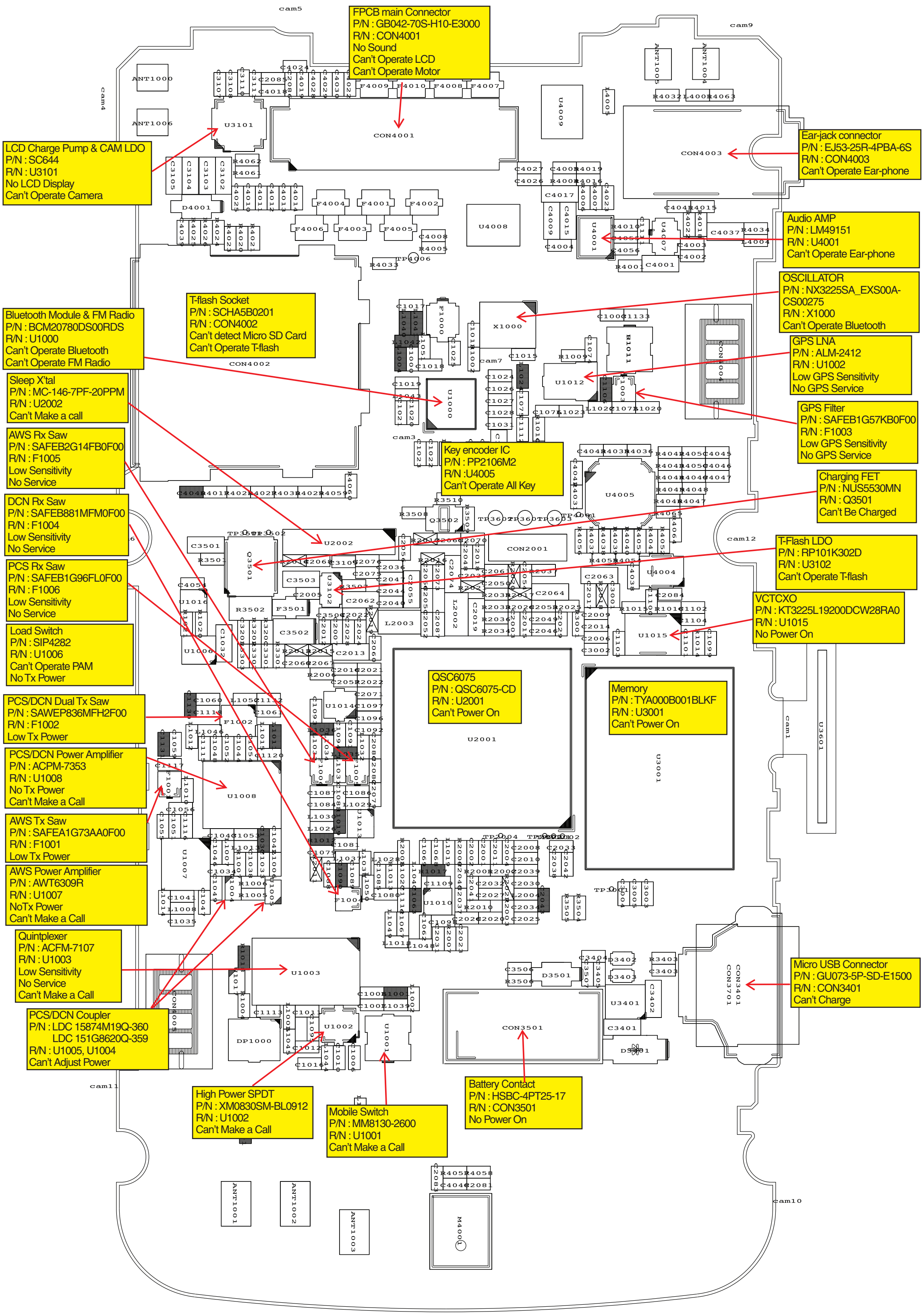
Top View
Order Number LM49151TL
(See NS Package Number TLA20GDA)

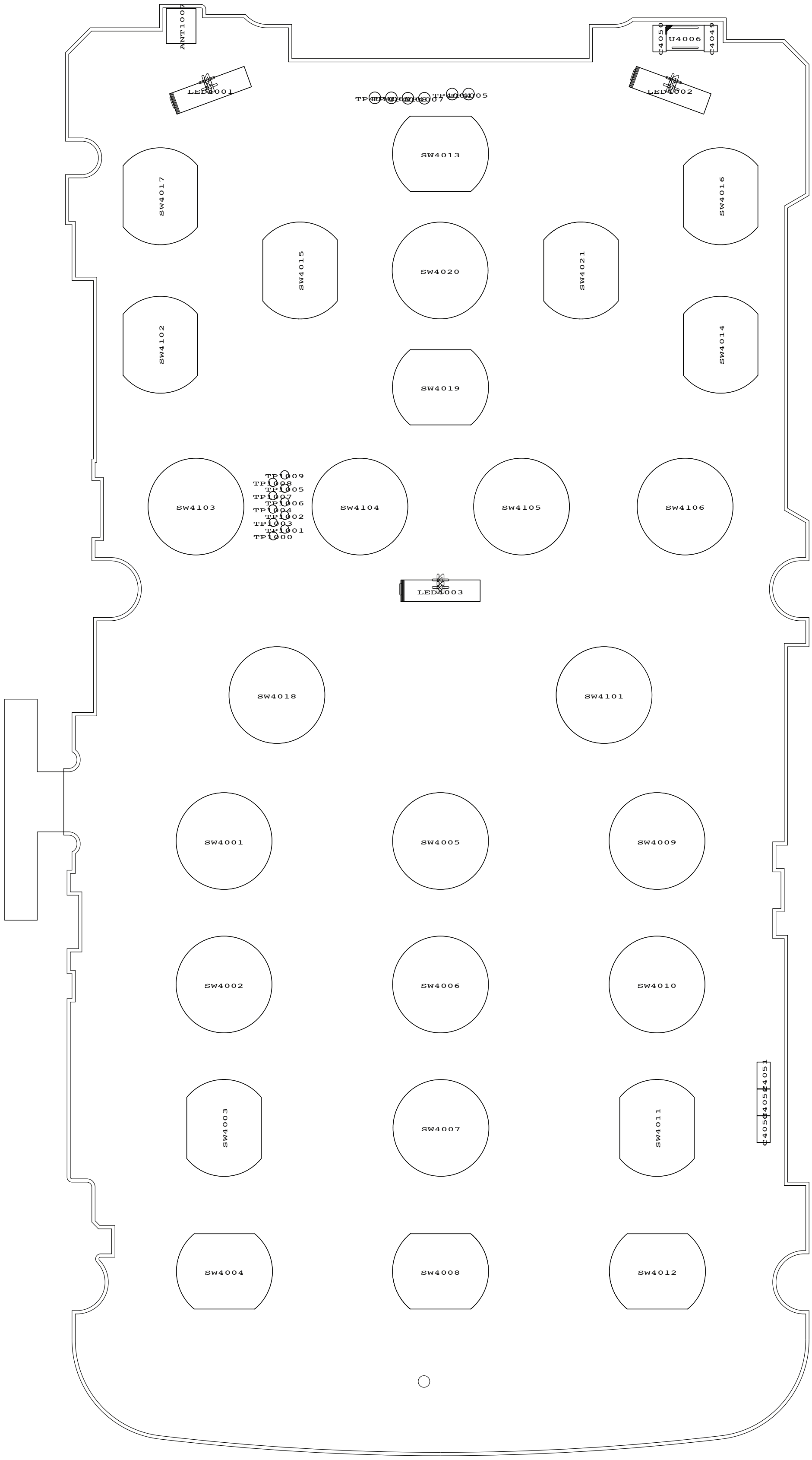
Appendix 4. Component Layout

4-1. Main PCB Component Layout

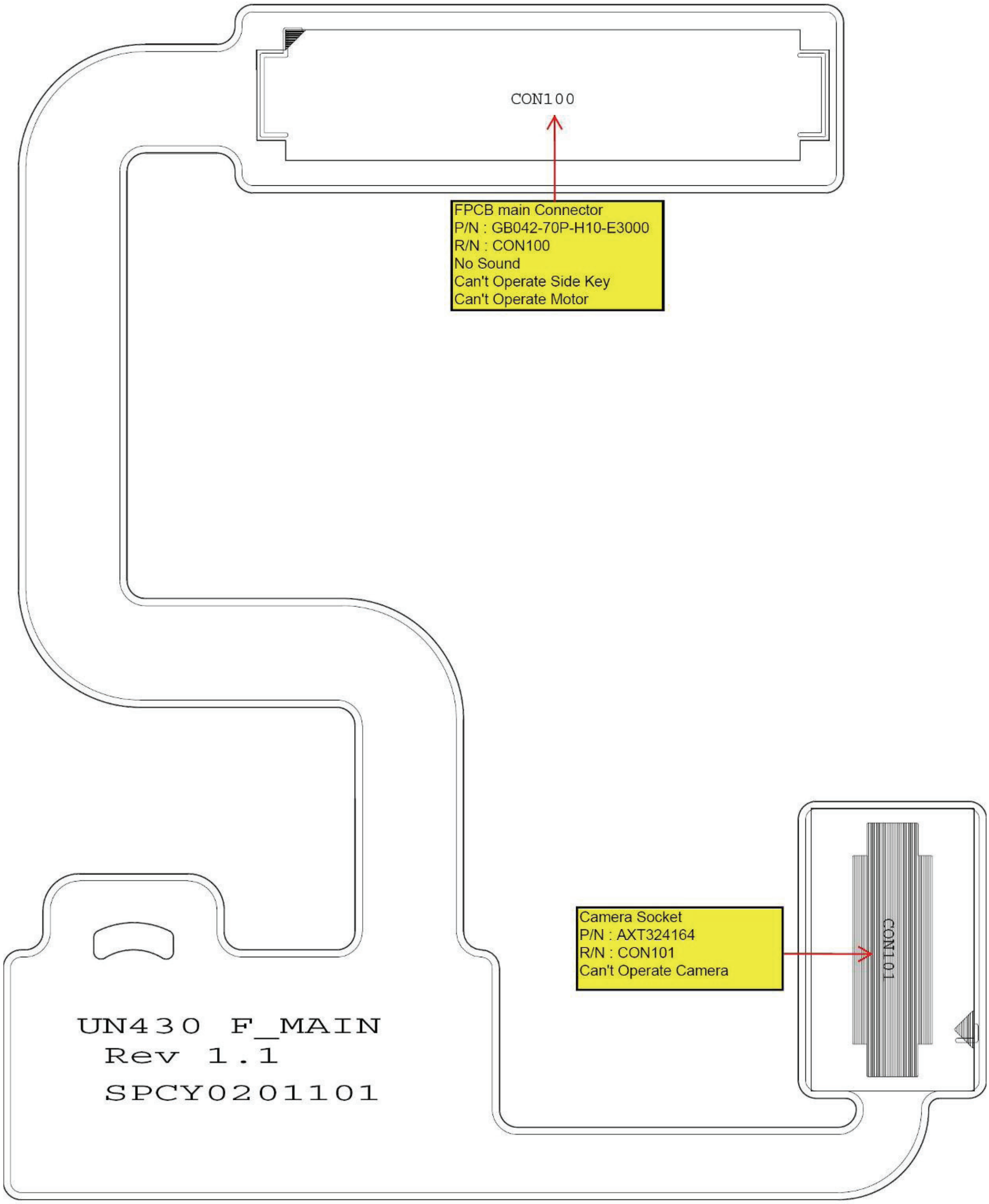
4-2. FPCB Component Layout

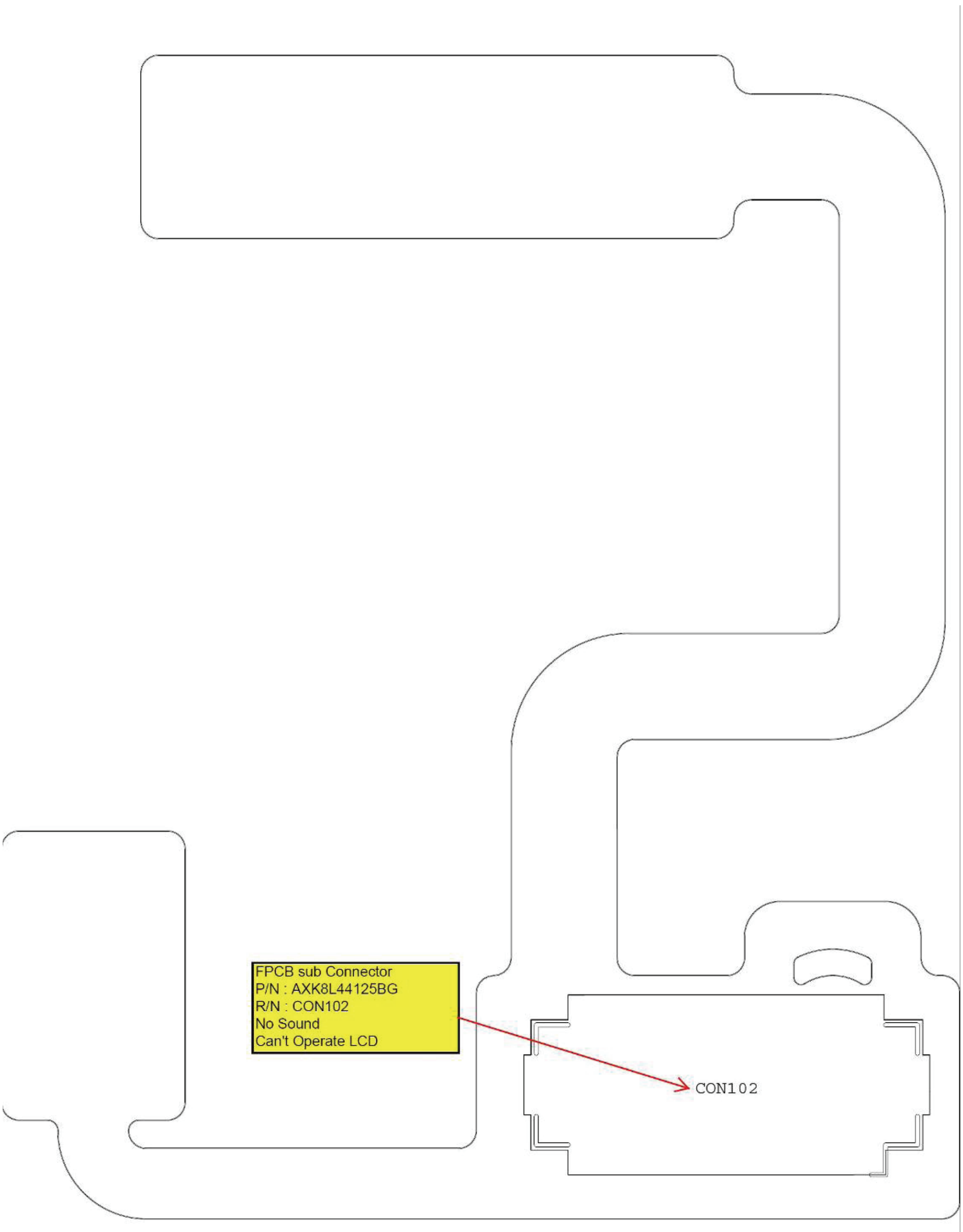
4-1. Main PCB Component Layout




ANT1001
U4006
LED4001
LED4002
SW4013
SW4017
SW4016
SW4015
SW4020
SW4021
SW4102
SW4014
SW4019
SW4103
SW4104
SW4105
SW4106
LED4003
SW4018
SW4101
SW4001
SW4005
SW4009
SW4002
SW4006
SW4010
SW4003
SW4007
SW4011
SW4004
SW4008
SW4012

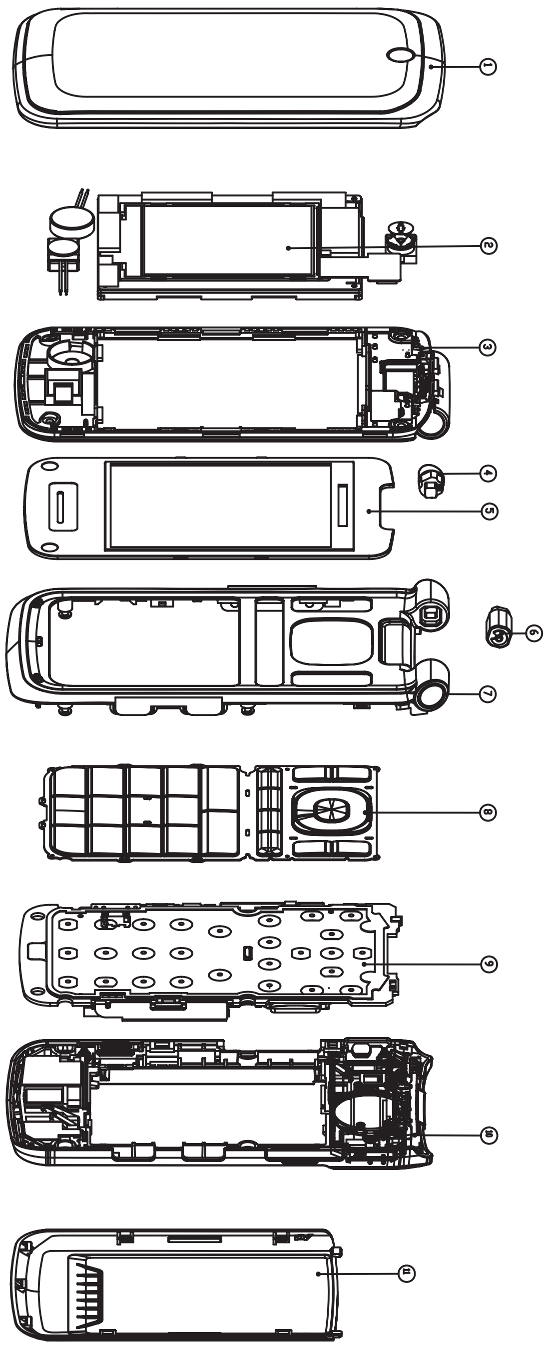
4-2. FPCB Component Layout




FPCB sub Connector
P/N : AXK8L44125BG
R/N : CON102
No Sound
Can't Operate LCD
CON102

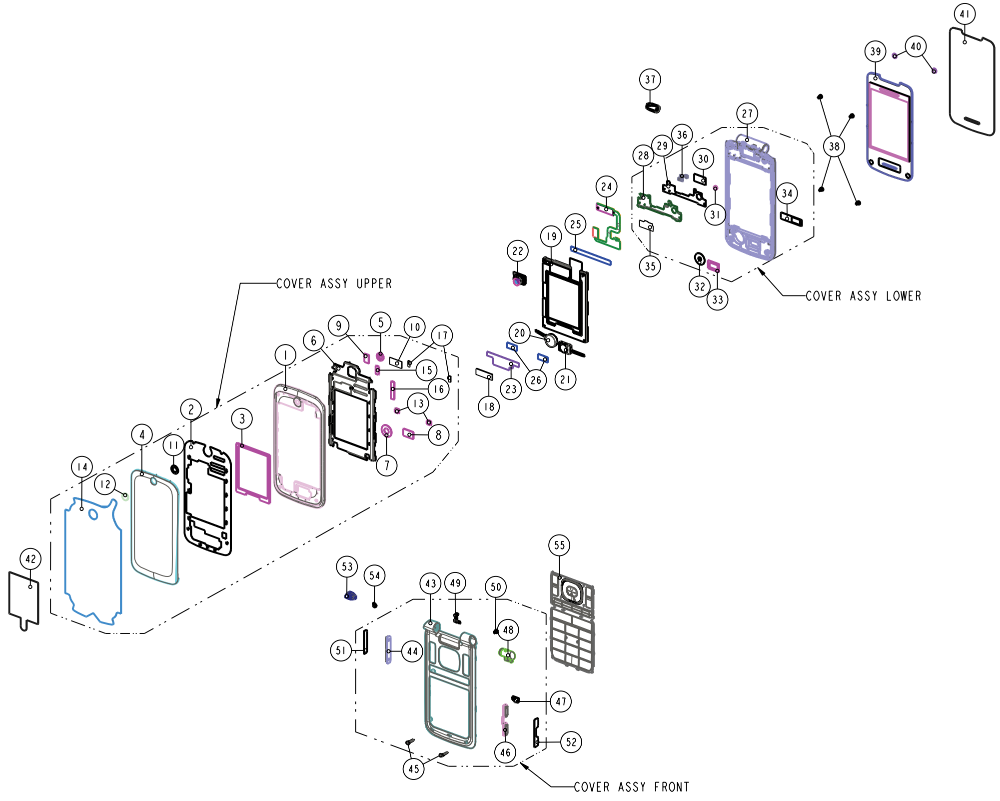
Appendix 5. Assembly and Disassembly diagram

Assy Exploded View



No	Part Name	Part Number	Q'ty	Remark
1	COVER ASSY UPPER	ACGT0002701	1	
2	LCD MODULE	SVLM0035401	1	
3	COVER ASSY LOWER	ACGU0002801	1	
4	DECO (HINGE RIGHT)	MDAY0048901	1	
5	ASSY WINDOW MAIN	AWAB0040501	1	
6	HINGE	MHFD0014603	1	
7	COVER ASSY FRONT	ACGK0149001	1	
8	KEYPAD ASSY	AKAC0005401	1	
9	PCB ASSY MAIN	SPFY0211301	1	
10	COVER ASSY REAR	ACGM0146901	1	
11	COVER BATTERY	MCJA0101801	1	

Full Exploded View



1	COVER UPPER	MCJX0004701	1	
2	TAPE WINDOW SUB	MTAD0117601	1	
3	PAD LCD SUB	MPBG0102601	1	
4	WINDOW SUB	MWAC0132101	1	
5	PAD CAMERA	MPBT0086801	1	
6	BRACKET LCD UPPER	MBFZ0040801	1	
7	PAD VIBRATOR	MPBN0081301	1	
8	PAD RECEIVER 2	MPBZ0270601	1	
9	PAD CAMERA CONN	MPBU0091801	1	
10	GASKET SHIELD LCD CONN	MGAZ0089501	1	
11	TAPE WINDOW CAMERA	MTAD0124801	1	
12	WINDOW CAMERA	MWAE0059601	1	
13	PAD SOLDERING POINT	MPBZ0297501	2	
14	TAPE PROTECTION UPPER	MTAB0395601	1	
15	PAD BRACKET LCD UPPER 1	MPBZ0302501	1	
16	PAD BRACKET LCD UPPER 2	MPBZ0302601	1	
17	GASKET SHIELD	MGAZ0077801	2	
18	GASKET SHIELD 2	MGAZ0086401	1	
19	LCD MODULE	SVLM0035401	1	
20	VIBRATOR	SJMY0007108	1	
21	RECEIVER	SURY0010111	1	
22	CAMERA MODULE	SVCY0024601	1	
23	TAPE GASKET LCD SUB	MGAZ0086501	1	
24	SMT FPCB MAIN	SPCY0201101	1	
25	INSULATOR LCD MAIN	MIDZ0244401	1	
26	INSULATOR SOLDERING POINT	MIDZ0258901	2	
27	COVER LOWER	MCJY0004201	1	
28	BRACKET LCD LOWER	MBFZ0040901	1	
29	TAPE BRACKET LCD LOWER	MTAZ0262201	1	
30	TAPE CAMERA	MTAK0033001	1	
31	MAGNET	MMAA0009601	1	
32	TAPE VIBRATOR	MTAZ0269501	1	
33	PAD RECEIVER	MPBN0081301	1	
34	FILTER RECEIVER	MFBZ0006901	1	
35	TAPE GASKET LCD CONN	MGAZ0086601	1	
36	CONTACT HINGE LOWER	MCIZ0002501	1	
37	HINGE	MHFD0014603	1	
38	SCREW	GMEY0010601	4	M1.4X2.5(BLACK)
39	ASSY WINDOW MAIN	AWAB0040501	1	
40	CAP SCREW	MCCH0156301	2	
41	TAPE PROTECTION WINDOW MAIN	MTAB0395901	1	
42	TAPE PROTECTION WINDOW SUB	MTAB0396001	1	
43	COVER FRONT	MCJK0118201	1	
44	BUTTON SIDE VOLUME	MBJZ0016501	1	
45	DAMPER	MSGY0025901	2	
46	BUTTON SIDE CAM	MBJZ0016601	1	
47	PAD MIKE	MPBZ0251601	1	
48	DUMMY HINGE	MBIZ0003601	1	
49	CONTACT HINGE FRONT	MCIZ0001001	1	
50	SCREW	GMEY0010601	1	M1.4X2.5(BLACK)
51	TAPE PROTECTION VOL	MTAB0373601	1	
52	TAPE PROTECTION CAM	MTAB0373701	1	
53	DECO HINGE R	MDAY0048901	1	
54	SCREW	GMZZ0017701	1	M1.4X3.0(SILVER)
55	KEYPAD ASSY	AKAC0005401	1	

Appendix 6. Part List

6-1. Main PCB Part List

6-2. FPCB Part List

6-1. Main PCB Part List

Bottom

Ref No	Part Name	Part Number	QTY	Unit	Spec
C1000	CAP,CERAMIC,CHIP	ECCH0000143	1	EACH	1 nF,50V,K,X7R,HD,1005,R/TP
C1002	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1003	CAP,CERAMIC,CHIP	ECCH0000196	1	EACH	0.75 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP
C1004	CAP,CHIP,MAKER	ECZH0000802	1	EACH	1 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP
C1006	CAP,CERAMIC,CHIP	ECCH0000105	1	EACH	4 pF,50V,C,NP0,TC,1005,R/TP
C1007	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1008	CAP,CERAMIC,CHIP	ECCH0000105	1	EACH	4 pF,50V,C,NP0,TC,1005,R/TP
C1009	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1010	CAP,CERAMIC,CHIP	ECCH0000105	1	EACH	4 pF,50V,C,NP0,TC,1005,R/TP
C1011	CAP,CERAMIC,CHIP	ECCH0000122	1	EACH	47 pF,50V,J,NP0,TC,1005,R/TP
C1012	CAP,CERAMIC,CHIP	ECCH0000155	1	EACH	10 nF,16V,K,X7R,HD,1005,R/TP
C1013	CAP,CERAMIC,CHIP	ECCH0000109	1	EACH	8 pF,50V,D,NP0,TC,1005,R/TP
C1015	CAP,CERAMIC,CHIP	ECCH0000109	1	EACH	8 pF,50V,D,NP0,TC,1005,R/TP
C1016	CAP,CHIP,MAKER	ECZH0000816	1	EACH	12 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1017	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1018	CAP,CERAMIC,CHIP	ECCH0000185	1	EACH	5.6 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP
C1019	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C1020	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C1021	CAP,CERAMIC,CHIP	ECCH0000198	1	EACH	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP
C1022	CAP,CHIP,MAKER	ECZH0001215	1	EACH	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP
C1023	CAP,CHIP,MAKER	ECZH0001215	1	EACH	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP
C1024	CAP,CERAMIC,CHIP	ECCH0000110	1	EACH	10 pF,50V,D,NP0,TC,1005,R/TP
C1025	CAP,CERAMIC,CHIP	ECCH0000110	1	EACH	10 pF,50V,D,NP0,TC,1005,R/TP
C1026	CAP,CERAMIC,CHIP	ECCH0000155	1	EACH	10 nF,16V,K,X7R,HD,1005,R/TP
C1027	CAP,CHIP,MAKER	ECZH0001215	1	EACH	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP
C1028	CAP,CHIP,MAKER	ECZH0001215	1	EACH	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP
C1029	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C1030	CAP,CERAMIC,CHIP	ECCH0005603	1	EACH	2.2 uF,10V ,K ,X5R ,TC ,1608 ,R/TP
C1031	CAP,CERAMIC,CHIP	ECCH0000110	1	EACH	10 pF,50V,D,NP0,TC,1005,R/TP
C1032	CAP,CERAMIC,CHIP	ECCH0005603	1	EACH	2.2 uF,10V ,K ,X5R ,TC ,1608 ,R/TP
C1033	CAP,CERAMIC,CHIP	ECCH0000901	1	EACH	2.2 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP
C1034	CAP,CHIP,MAKER	ECZH0001002	1	EACH	0.5 pF,50V ,B ,NP0 ,TC ,1005 ,R/TP
C1035	CAP,CHIP,MAKER	ECZH0000802	1	EACH	1 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP
C1038	CAP,CHIP,MAKER	ECZH0000849	1	EACH	200 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1041	CAP,CHIP,MAKER	ECZH0000844	1	EACH	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1042	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1043	CAP,CHIP,MAKER	ECZH0000844	1	EACH	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1044	CAP,CERAMIC,CHIP	ECCH0000155	1	EACH	10 nF,16V,K,X7R,HD,1005,R/TP
C1046	CAP,CERAMIC,CHIP	ECCH0000137	1	EACH	330 pF,50V ,K ,X7R ,HD ,1005 ,R/TP
C1047	CAP,CHIP,MAKER	ECZH0001215	1	EACH	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP
C1048	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1049	CAP,CERAMIC,CHIP	ECCH0000155	1	EACH	10 nF,16V,K,X7R,HD,1005,R/TP
C1051	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1052	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1053	CAP,CHIP,MAKER	ECZH0001215	1	EACH	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP
C1054	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1055	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP

C1056	CAP,CHIP,MAKER	ECZH0000844	1	EACH	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1059	CAP,CHIP,MAKER	ECZH0000844	1	EACH	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1060	INDUCTOR,CHIP	ELCH0004703	1	EACH	1 nH,S ,1005 ,R/TP ,
C1061	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1062	CAP,CERAMIC,CHIP	ECCH0000175	1	EACH	2.7 pF,50V ,B ,NP0 ,TC ,1005 ,R/TP
C1067	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1068	CAP,CHIP,MAKER	ECZH0000844	1	EACH	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1069	CAP,CHIP,MAKER	ECZH0000844	1	EACH	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1073	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1074	CAP,CERAMIC,CHIP	ECCH0001001	1	EACH	6.8 pF,50V ,D ,NP0 ,TC ,1005 ,R/TP
C1075	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1076	CAP,CERAMIC,CHIP	ECCH0000110	1	EACH	10 pF,50V,D,NP0,TC,1005,R/TP
C1078	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C1079	CAP,CHIP,MAKER	ECZH0000830	1	EACH	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1080	CAP,CERAMIC,CHIP	ECCH0000120	1	EACH	39 pF,50V,J,NP0,TC,1005,R/TP
C1081	CAP,CHIP,MAKER	ECZH0000844	1	EACH	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1083	CAP,CERAMIC,CHIP	ECCH0000196	1	EACH	0.75 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP
C1084	CAP,CHIP,MAKER	ECZH0001002	1	EACH	0.5 pF,50V ,B ,NP0 ,TC ,1005 ,R/TP
C1085	CAP,CERAMIC,CHIP	ECCH0000127	1	EACH	82 pF,50V,J,NP0,TC,1005,R/TP
C1086	CAP,CERAMIC,CHIP	ECCH0000109	1	EACH	8 pF,50V,D,NP0,TC,1005,R/TP
C1087	CAP,CERAMIC,CHIP	ECCH0000122	1	EACH	47 pF,50V,J,NP0,TC,1005,R/TP
C1088	CAP,CERAMIC,CHIP	ECCH0000127	1	EACH	82 pF,50V,J,NP0,TC,1005,R/TP
C1089	CAP,CERAMIC,CHIP	ECCH0000127	1	EACH	82 pF,50V,J,NP0,TC,1005,R/TP
C1091	CAP,CHIP,MAKER	ECZH0000830	1	EACH	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1092	CAP,CHIP,MAKER	ECZH0000830	1	EACH	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1093	CAP,CERAMIC,CHIP	ECCH0000122	1	EACH	47 pF,50V,J,NP0,TC,1005,R/TP
C1094	CAP,CERAMIC,CHIP	ECCH0000122	1	EACH	47 pF,50V,J,NP0,TC,1005,R/TP
C1095	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1096	CAP,CHIP,MAKER	ECZH0000844	1	EACH	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1097	CAP,CHIP,MAKER	ECZH0000844	1	EACH	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1098	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1099	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C1100	CAP,CERAMIC,CHIP	ECCH0000161	1	EACH	33 nF,16V,K,X7R,HD,1005,R/TP
C1101	CAP,CERAMIC,CHIP	ECCH0000122	1	EACH	47 pF,50V,J,NP0,TC,1005,R/TP
C1102	CAP,CERAMIC,CHIP	ECCH0000155	1	EACH	10 nF,16V,K,X7R,HD,1005,R/TP
C1103	CAP,CERAMIC,CHIP	ECCH0000143	1	EACH	1 nF,50V,K,X7R,HD,1005,R/TP
C1104	CAP,CERAMIC,CHIP	ECCH0000129	1	EACH	120 pF,50V,J,NP0,TC,1005,R/TP
C1105	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1109	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1111	CAP,CERAMIC,CHIP	ECCH0000155	1	EACH	10 nF,16V,K,X7R,HD,1005,R/TP
C1112	CAP,CERAMIC,CHIP	ECCH0000183	1	EACH	1.8 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP
C1113	CAP,CHIP,MAKER	ECZH0000844	1	EACH	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1114	CAP,CHIP,MAKER	ECZH0000844	1	EACH	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1115	CAP,CHIP,MAKER	ECZH0000844	1	EACH	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1116	CAP,CHIP,MAKER	ECZH0000844	1	EACH	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1117	CAP,CHIP,MAKER	ECZH0000844	1	EACH	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1118	CAP,CHIP,MAKER	ECZH0000844	1	EACH	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C1120	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP

C1132	CAP,CHIP,MAKER	ECZH0000822	1	EACH	1.5 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP
C1133	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C2001	CAP,CERAMIC,CHIP	ECCH0000151	1	EACH	4.7 nF,25V,K,X7R,HD,1005,R/TP
C2002	CAP,CHIP,MAKER	ECZH0003125	1	EACH	82 nF,16V ,K ,X7R ,HD ,1005 ,R/TP
C2003	CAP,CERAMIC,CHIP	ECCH0000198	1	EACH	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP
C2004	CAP,CHIP,MAKER	ECZH0003124	1	EACH	68 nF,16V ,K ,X7R ,HD ,1005 ,R/TP
C2005	CAP,CHIP,MAKER	ECZH0001215	1	EACH	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP
C2006	CAP,CERAMIC,CHIP	ECCH0000198	1	EACH	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP
C2007	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2008	CAP,CHIP,MAKER	ECZH0001215	1	EACH	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP
C2009	CAP,CHIP,MAKER	ECZH0001215	1	EACH	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP
C2010	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2011	CAP,CERAMIC,CHIP	ECCH0000151	1	EACH	4.7 nF,25V,K,X7R,HD,1005,R/TP
C2012	CAP,CERAMIC,CHIP	ECCH0000143	1	EACH	1 nF,50V,K,X7R,HD,1005,R/TP
C2013	CAP,CERAMIC,CHIP	ECCH0007802	1	EACH	4.7 uF,10V ,M ,X5R ,TC ,1608 ,R/TP
C2014	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2015	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2016	CAP,CERAMIC,CHIP	ECCH0000149	1	EACH	3.3 nF,50V,K,X7R,HD,1005,R/TP
C2017	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2018	CAP,CERAMIC,CHIP	ECCH0000143	1	EACH	1 nF,50V,K,X7R,HD,1005,R/TP
C2019	CAP,CERAMIC,CHIP	ECCH0007802	1	EACH	4.7 uF,10V ,M ,X5R ,TC ,1608 ,R/TP
C2020	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2021	CAP,CHIP,MAKER	ECZH0000801	1	EACH	220 pF,16V ,J ,NP0 ,TC ,1005 ,R/TP
C2022	CAP,CHIP,MAKER	ECZH0000830	1	EACH	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C2023	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2024	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2025	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2026	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2027	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2028	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2029	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2030	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2031	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2032	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2033	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2034	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2035	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2036	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2037	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2038	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2039	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2040	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2041	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2042	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2044	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2045	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2046	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2047	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP

C2048	CAP,CHIP,MAKER	ECZH0001215	1	EACH	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP
C2049	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2050	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2051	CAP,CERAMIC,CHIP	ECCH0000198	1	EACH	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP
C2052	CAP,CERAMIC,CHIP	ECCH0000198	1	EACH	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP
C2053	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2054	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2055	CAP,CERAMIC,CHIP	ECCH0017501	1	EACH	22 uF,6.3V ,M ,X5R ,HD ,1608 ,R/TP
C2056	CAP,CERAMIC,CHIP	ECCH0000143	1	EACH	1 nF,50V,K,X7R,HD,1005,R/TP
C2057	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2060	CAP,CERAMIC,CHIP	ECCH0000198	1	EACH	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP
C2061	CAP,CERAMIC,CHIP	ECCH0000198	1	EACH	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP
C2062	CAP,CERAMIC,CHIP	ECCH0006201	1	EACH	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP
C2063	CAP,CERAMIC,CHIP	ECCH0006201	1	EACH	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP
C2064	CAP,CERAMIC,CHIP	ECCH0006201	1	EACH	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP
C2065	CAP,CERAMIC,CHIP	ECCH0000198	1	EACH	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP
C2066	CAP,CERAMIC,CHIP	ECCH0000198	1	EACH	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP
C2067	CAP,CERAMIC,CHIP	ECCH0000198	1	EACH	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP
C2068	CAP,CERAMIC,CHIP	ECCH0000198	1	EACH	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP
C2069	CAP,CERAMIC,CHIP	ECCH0004904	1	EACH	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C2070	CAP,CHIP,MAKER	ECZH0001215	1	EACH	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP
C2071	CAP,CHIP,MAKER	ECZH0001215	1	EACH	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP
C2073	CAP,CERAMIC,CHIP	ECCH0000143	1	EACH	1 nF,50V,K,X7R,HD,1005,R/TP
C2074	CAP,CERAMIC,CHIP	ECCH0006201	1	EACH	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP
C2075	CAP,CERAMIC,CHIP	ECCH0000105	1	EACH	4 pF,50V,C,NP0,TC,1005,R/TP
C2076	CAP,CHIP,MAKER	ECZH0000806	1	EACH	5 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP
C2079	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2080	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2081	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2082	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2083	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2084	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C2085	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C2086	CAP,CHIP,MAKER	ECZH0000813	1	EACH	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C2087	CAP,CERAMIC,CHIP	ECCH0000198	1	EACH	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP
C3001	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C3002	CAP,CERAMIC,CHIP	ECCH0000155	1	EACH	10 nF,16V,K,X7R,HD,1005,R/TP
C3003	CAP,CERAMIC,CHIP	ECCH0000155	1	EACH	10 nF,16V,K,X7R,HD,1005,R/TP
C3004	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C3005	CAP,CERAMIC,CHIP	ECCH0000129	1	EACH	120 pF,50V,J,NP0,TC,1005,R/TP
C3102	CAP,CERAMIC,CHIP	ECCH0007802	1	EACH	4.7 uF,10V ,M ,X5R ,TC ,1608 ,R/TP
C3103	CAP,CHIP,MAKER	ECZH0001511	1	EACH	2.2 uF,10V ,Z ,Y5V ,HD ,1608 ,R/TP
C3104	CAP,CHIP,MAKER	ECZH0001511	1	EACH	2.2 uF,10V ,Z ,Y5V ,HD ,1608 ,R/TP
C3105	CAP,CERAMIC,CHIP	ECCH0007802	1	EACH	4.7 uF,10V ,M ,X5R ,TC ,1608 ,R/TP
C3107	CAP,CERAMIC,CHIP	ECCH0000198	1	EACH	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP
C3108	CAP,CERAMIC,CHIP	ECCH0000198	1	EACH	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP
C3109	CAP,CERAMIC,CHIP	ECCH0000198	1	EACH	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP
C3110	CAP,CERAMIC,CHIP	ECCH0000179	1	EACH	22 nF,16V ,K ,X5R ,HD ,1005 ,R/TP

C3111	CAP,CERAMIC,CHIP	ECCH0000198	1	EACH	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP
C3201	CAP,CERAMIC,CHIP	ECCH0000161	1	EACH	33 nF,16V,K,X7R,HD,1005,R/TP
C3301	CAP,CERAMIC,CHIP	ECCH0000161	1	EACH	33 nF,16V,K,X7R,HD,1005,R/TP
C3401	CAP,CHIP,MAKER	ECZH0003503	1	EACH	1 uF,25V ,K ,X5R ,HD ,1608 ,R/TP
C3402	CAP,CHIP,MAKER	ECZH0003503	1	EACH	1 uF,25V ,K ,X5R ,HD ,1608 ,R/TP
C3403	CAP,CERAMIC,CHIP	ECCH0000161	1	EACH	33 nF,16V,K,X7R,HD,1005,R/TP
C3404	CAP,CERAMIC,CHIP	ECCH0000117	1	EACH	27 pF,50V,J,NP0,TC,1005,R/TP
C3405	CAP,CERAMIC,CHIP	ECCH0000117	1	EACH	27 pF,50V,J,NP0,TC,1005,R/TP
C3501	CAP,CHIP,MAKER	ECZH0003503	1	EACH	1 uF,25V ,K ,X5R ,HD ,1608 ,R/TP
C3502	CAP,TANTAL,CHIP	ECTH0002002	1	EACH	33 uF,10V ,M ,L_ESR ,2012 ,R/TP
C3503	CAP,CHIP,MAKER	ECZH0001511	1	EACH	2.2 uF,10V ,Z ,Y5V ,HD ,1608 ,R/TP
C3504	CAP,CERAMIC,CHIP	ECCH0000122	1	EACH	47 pF,50V,J,NP0,TC,1005,R/TP
C3506	CAP,CHIP,MAKER	ECZH0001217	1	EACH	470 nF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C3507	CAP,CERAMIC,CHIP	ECCH0000122	1	EACH	47 pF,50V,J,NP0,TC,1005,R/TP
C4001	CAP,CHIP,MAKER	ECZH0001420	1	EACH	1 uF,10V ,K ,X5R ,HD ,1608 ,R/TP
C4002	CAP,CHIP,MAKER	ECZH0001217	1	EACH	470 nF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C4003	CAP,CHIP,MAKER	ECZH0001217	1	EACH	470 nF,6.3V ,K ,X5R ,TC ,1005 ,R/TP
C4004	CAP,CHIP,MAKER	ECZH0004402	1	EACH	0.1 uF,16V ,Z ,X7R ,TC ,1005 ,R/TP
C4005	CAP,CERAMIC,CHIP	ECCH0000143	1	EACH	1 nF,50V,K,X7R,HD,1005,R/TP
C4008	CAP,CERAMIC,CHIP	ECCH0000143	1	EACH	1 nF,50V,K,X7R,HD,1005,R/TP
C4009	CAP,CERAMIC,CHIP	ECCH0005603	1	EACH	2.2 uF,10V ,K ,X5R ,TC ,1608 ,R/TP
C4010	CAP,CHIP,MAKER	ECZH0000830	1	EACH	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C4011	CAP,CHIP,MAKER	ECZH0000830	1	EACH	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C4012	CAP,CHIP,MAKER	ECZH0000830	1	EACH	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C4013	CAP,CHIP,MAKER	ECZH0000830	1	EACH	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C4014	CAP,CHIP,MAKER	ECZH0004402	1	EACH	0.1 uF,16V ,Z ,X7R ,TC ,1005 ,R/TP
C4015	CAP,CERAMIC,CHIP	ECCH0005603	1	EACH	2.2 uF,10V ,K ,X5R ,TC ,1608 ,R/TP
C4017	CAP,CERAMIC,CHIP	ECCH0005603	1	EACH	2.2 uF,10V ,K ,X5R ,TC ,1608 ,R/TP
C4018	CAP,CHIP,MAKER	ECZH0000830	1	EACH	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C4019	CAP,CHIP,MAKER	ECZH0000830	1	EACH	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C4022	CAP,CHIP,MAKER	ECZH0000830	1	EACH	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C4023	CAP,CERAMIC,CHIP	ECCH0002001	1	EACH	0.1 uF,6.3V ,K ,B ,HD ,1005 ,R/TP
C4024	CAP,CHIP,MAKER	ECZH0000830	1	EACH	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP
C4025	CAP,CHIP,MAKER	ECZH0004402	1	EACH	0.1 uF,16V ,Z ,X7R ,TC ,1005 ,R/TP
C4026	CAP,CHIP,MAKER	ECZH0004402	1	EACH	0.1 uF,16V ,Z ,X7R ,TC ,1005 ,R/TP
C4027	CAP,CHIP,MAKER	ECZH0004402	1	EACH	0.1 uF,16V ,Z ,X7R ,TC ,1005 ,R/TP
C4028	CAP,CHIP,MAKER	ECZH0004402	1	EACH	0.1 uF,16V ,Z ,X7R ,TC ,1005 ,R/TP
C4029	CAP,CHIP,MAKER	ECZH0004402	1	EACH	0.1 uF,16V ,Z ,X7R ,TC ,1005 ,R/TP
C4030	CAP,CHIP,MAKER	ECZH0004402	1	EACH	0.1 uF,16V ,Z ,X7R ,TC ,1005 ,R/TP
C4037	CAP,CERAMIC,CHIP	ECCH0005604	1	EACH	10000000 pF,6.3V ,M ,X5R ,TC ,1608 ,R/TP
C4038	CAP,CERAMIC,CHIP	ECCH0002001	1	EACH	0.1 uF,6.3V ,K ,B ,HD ,1005 ,R/TP
C4039	CAP,CHIP,MAKER	ECZH0001215	1	EACH	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP
C4041	CAP,CHIP,MAKER	ECZH0001121	1	EACH	470 pF,50V ,K ,X7R ,HD ,1005 ,R/TP
C4042	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C4043	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C4045	VARISTOR	SEVY0005202	1	EACH	5.5 V,+-30 ,SMD ,1005, 100 pF, Pb free
C4046	VARISTOR	SEVY0005202	1	EACH	5.5 V,+-30 ,SMD ,1005, 100 pF, Pb free
C4047	VARISTOR	SEVY0005202	1	EACH	5.5 V,+-30 ,SMD ,1005, 100 pF, Pb free

C4048	CAP,CERAMIC,CHIP	ECCH0002001	1	EACH	0.1 uF,6.3V ,K ,B ,HD ,1005 ,R/TP
C4054	CAP,CERAMIC,CHIP	ECCH0000155	1	EACH	10 nF,16V,K,X7R,HD,1005,R/TP
C4055	CAP,CERAMIC,CHIP	ECCH0000179	1	EACH	22 nF,16V ,K ,X5R ,HD ,1005 ,R/TP
C4056	CAP,CERAMIC,CHIP	ECCH0000179	1	EACH	22 nF,16V ,K ,X5R ,HD ,1005 ,R/TP
CON340	CONNECTOR,I/O	ENRY0008801	1	EACH	5 , mm,ANGLE , , ,; , ,0.64MM ,ANGLE
CON350	CONNECTOR,ETC	ENZY0021001	1	EACH	4 PIN,2.5 mm,STRAIGHT , ,
CON370	BRACKET	MBFZ0041401	1	EACH	PRESS, STS, , , , ,
CON400	CONNECTOR,BOARD	ENBY0041501	1	EACH	PIN, mm,ETC , , , ,; ,70 ,0.40MM
CON400	CONN,SOCKET	ENSY0023301	1	EACH	8 ,ETC , ,0.7 mm,H=1.52,(15*15)
CON400	CONN,JACK/PLUG,EA	ENJE0005302	1	EACH	,6 ,11.6x5.6x3.0t
D3401	DIODE,SWITCHING	EDSY0017701	1	EACH	SOD-123 ,40 V,1 A,R/TP
D3402	DIODE,TVS	EDTY0009401	1	EACH	VMN2 ,5 V,10 W,R/TP ,1.0*0.6*0.4
D3403	DIODE,TVS	EDTY0009401	1	EACH	VMN2 ,5 V,10 W,R/TP ,1.0*0.6*0.4
D3501	DIODE,TVS	EDTY0007401	1	EACH	SMD ,12 V,350 W,R/TP ,
D4001	DIODE,SWITCHING	EDSY0017702	1	EACH	SOD-323 ,30 V,0.5 A,R/TP
DP1000	DUPLEXER,IMT	SDMY0002301	1	EACH	1732.5 MHz,2132.5 MHz
F1000	FILTER,CERAMIC	SFCY0000901	1	EACH	2450 MHz,2.00*1.25*0.95
F1001	FILTER,SAW	SFSY0034401	1	EACH	1732.5 MHz,1.4*1.1*0.5
F1002	FILTER,SAW,DUAL	SFSB0002201	1	EACH	836.5 MHz,25 MHz,2.5 dB,40 dB
F1003	FILTER,SAW	SFSY0038901	1	EACH	1575.42 MHz,1.4*1.1*0.6
F1004	FILTER,SAW	SFSY0030001	1	EACH	881.5 MHz,1.35*1.05*0.6
F1005	FILTER,SAW	SFSY0028201	1	EACH	2140 MHz,1.4*1.1*0.6
F1006	FILTER,SAW	SFSY0034601	1	EACH	1960 MHz,1.4*1.1*0.6
F3501	FILTER,EMI/POWER	SFEY0015301	1	EACH	SMD ,Pb-free_Bais ,; ,Filter,LCR
F4001	FILTER,EMI/POWER	SFEY0010501	1	EACH	SMD ,SMD ,18 V,4ch. EMI_ESD Filter
F4002	FILTER,EMI/POWER	SFEY0010501	1	EACH	SMD ,SMD ,18 V,4ch. EMI_ESD Filter
F4003	FILTER,EMI/POWER	SFEY0010501	1	EACH	SMD ,SMD ,18 V,4ch. EMI_ESD Filter
F4004	FILTER,EMI/POWER	SFEY0010501	1	EACH	SMD ,SMD ,18 V,4ch. EMI_ESD Filter
F4005	FILTER,EMI/POWER	SFEY0010501	1	EACH	SMD ,SMD ,18 V,4ch. EMI_ESD Filter
F4006	FILTER,EMI/POWER	SFEY0010501	1	EACH	SMD ,SMD ,18 V,4ch. EMI_ESD Filter
F4007	FILTER,EMI/POWER	SFEY0013501	1	EACH	SMD ,18V,4ch. EMI_ESD Filter
F4008	FILTER,EMI/POWER	SFEY0013501	1	EACH	SMD ,18V,4ch. EMI_ESD Filter
F4009	FILTER,EMI/POWER	SFEY0013501	1	EACH	SMD ,18V,4ch. EMI_ESD Filter
F4010	FILTER,EMI/POWER	SFEY0013501	1	EACH	SMD ,18V,4ch. EMI_ESD Filter
L1002	INDUCTOR,CHIP	ELCH0004717	1	EACH	82 nH,J ,1005 ,R/TP ,
L1003	INDUCTOR,CHIP	ELCH0004709	1	EACH	3.3 nH,S ,1005 ,R/TP ,
L1005	FILTER,BEAD,CHIP	SFBH0008101	1	EACH	600 ohm,1005 ,
L1006	INDUCTOR,CHIP	ELCH0004709	1	EACH	3.3 nH,S ,1005 ,R/TP ,
L1007	INDUCTOR,CHIP	ELCH0004720	1	EACH	1.2 nH,S ,1005 ,R/TP ,
L1008	INDUCTOR,CHIP	ELCH0004720	1	EACH	1.2 nH,S ,1005 ,R/TP ,
L1010	INDUCTOR,CHIP	ELCH0004701	1	EACH	12 nH,J ,1005 ,R/TP ,
L1012	INDUCTOR,CHIP	ELCH0004705	1	EACH	8.2 nH,J ,1005 ,R/TP ,
L1013	INDUCTOR,CHIP	ELCH0004701	1	EACH	12 nH,J ,1005 ,R/TP ,
L1014	INDUCTOR,CHIP	ELCH0004713	1	EACH	6.8 nH,J ,1005 ,R/TP ,
L1015	INDUCTOR,CHIP	ELCH0004718	1	EACH	5.6 nH,S ,1005 ,R/TP ,
L1018	INDUCTOR,CHIP	ELCH0004721	1	EACH	2.2 nH,S ,1005 ,R/TP ,
L1019	INDUCTOR,CHIP	ELCH0004721	1	EACH	2.2 nH,S ,1005 ,R/TP ,
L1020	INDUCTOR,CHIP	ELCH0003842	1	EACH	100 nH,J ,1005 ,R/TP ,MLCI

L1021	INDUCTOR,CHIP	ELCH0004721	1	EACH	2.2 nH,S ,1005 ,R/TP ,
L1022	INDUCTOR,CHIP	ELCH0004718	1	EACH	5.6 nH,S ,1005 ,R/TP ,
L1023	INDUCTOR,CHIP	ELCH0004718	1	EACH	5.6 nH,S ,1005 ,R/TP ,
L1026	INDUCTOR,CHIP	ELCH0004703	1	EACH	1 nH,S ,1005 ,R/TP ,
L1027	INDUCTOR,CHIP	ELCH0004716	1	EACH	39 nH,J ,1005 ,R/TP ,
L1028	INDUCTOR,CHIP	ELCH0004710	1	EACH	15 nH,J ,1005 ,R/TP ,
L1029	INDUCTOR,CHIP	ELCH0004703	1	EACH	1 nH,S ,1005 ,R/TP ,
L1030	INDUCTOR,CHIP	ELCH0004708	1	EACH	2.7 nH,S ,1005 ,R/TP ,
L1031	INDUCTOR,CHIP	ELCH0001412	1	EACH	1.8 nH,S ,1005 ,R/TP ,PBFREE
L1032	INDUCTOR,CHIP	ELCH0001412	1	EACH	1.8 nH,S ,1005 ,R/TP ,PBFREE
L1033	INDUCTOR,CHIP	ELCH0004726	1	EACH	1.5 nH,J ,1005 ,R/TP ,
L1034	INDUCTOR,CHIP	ELCH0004726	1	EACH	1.5 nH,J ,1005 ,R/TP ,
L1037	INDUCTOR,CHIP	ELCH0004713	1	EACH	6.8 nH,J ,1005 ,R/TP ,
L1038	INDUCTOR,CHIP	ELCH0004713	1	EACH	6.8 nH,J ,1005 ,R/TP ,
L1039	INDUCTOR,CHIP	ELCH0004707	1	EACH	1.5 nH,S ,1005 ,R/TP ,
L1043	FILTER,BEAD,CHIP	SFBH0008101	1	EACH	600 ohm,1005 ,
L1044	INDUCTOR,CHIP	ELCH0004712	1	EACH	3.9 nH,S ,1005 ,R/TP ,
L1045	INDUCTOR,CHIP	ELCH0004717	1	EACH	82 nH,J ,1005 ,R/TP ,
L1046	INDUCTOR,CHIP	ELCH0004708	1	EACH	2.7 nH,S ,1005 ,R/TP ,
L1047	INDUCTOR,CHIP	ELCH0004721	1	EACH	2.2 nH,S ,1005 ,R/TP ,
L1048	INDUCTOR,CHIP	ELCH0004709	1	EACH	3.3 nH,S ,1005 ,R/TP ,
L1049	INDUCTOR,CHIP	ELCH0004705	1	EACH	8.2 nH,J ,1005 ,R/TP ,
L1050	INDUCTOR,CHIP	ELCH0004710	1	EACH	15 nH,J ,1005 ,R/TP ,
L1051	INDUCTOR,CHIP	ELCH0003830	1	EACH	180 nH,J ,1005 ,R/TP ,MLCI
L1052	INDUCTOR,CHIP	ELCH0004706	1	EACH	10 nH,J ,1005 ,R/TP ,
L2002	INDUCTOR,SMD,POW	ELCP0008014	1	EACH	4.7 uH,N ,2.0X1.2X1.0
L2003	INDUCTOR,SMD,POW	ELCP0008014	1	EACH	4.7 uH,N ,2.0X1.2X1.0
L2004	FILTER,BEAD,CHIP	SFBH0008102	1	EACH	1800 ohm,1005 ,Bead
L4001	INDUCTOR,CHIP	ELCH0010402	1	EACH	270 nH,M ,1005 ,R/TP ,CHIP
L4004	FILTER,BEAD,CHIP	SFBH0008105	1	EACH	1800 ohm,1005 ,Chip bead
L4005	FILTER,BEAD,CHIP	SFBH0008105	1	EACH	1800 ohm,1005 ,Chip bead
M4001	MICROPHONE	SUMY0010610	1	EACH	UNIT ,-42 dB,4.72*3.76*1.25
Q3501	TR,FET,P-CHANNEL	EQFP0008601	1	EACH	DFN8 ,1.3 W,-20 V,-3.9 A
Q3502	TR,BJT,ARRAY	EQBA0000602	1	EACH	TESV ,200 mW,R/TP
R1002	RES,CHIP,MAKER	ERHZ0000221	1	EACH	15 Kohm,1/16W ,F ,1005 ,R/TP
R1004	RES,CHIP,MAKER	ERHZ0000291	1	EACH	49.9 ohm,1/16W ,F ,1005 ,R/TP
R1005	RES,CHIP,MAKER	ERHZ0000415	1	EACH	130 ohm,1/16W ,J ,1005 ,R/TP
R1006	RES,CHIP,MAKER	ERHZ0000483	1	EACH	47 ohm,1/16W ,J ,1005 ,R/TP
R1007	RES,CHIP,MAKER	ERHZ0000415	1	EACH	130 ohm,1/16W ,J ,1005 ,R/TP
R1009	RES,CHIP,MAKER	ERHZ0000405	1	EACH	10 Kohm,1/16W ,J ,1005 ,R/TP
R1010	RES,CHIP,MAKER	ERHZ0000410	1	EACH	12 ohm,1/16W ,J ,1005 ,R/TP
R1011	PCB ASSY,MAIN,PAD	SAFP0000501	1	EACH	
R1013	RES,CHIP	ERHY0003201	1	EACH	1000 ohm,1/16W ,F ,1005 ,R/TP
R1014	RES,CHIP,MAKER	ERHZ0000490	1	EACH	51 ohm,1/16W ,J ,1005 ,R/TP
R1015	RES,CHIP,MAKER	ERHZ0000236	1	EACH	2000 ohm,1/16W ,F ,1005 ,R/TP
R1016	RES,CHIP	ERHY0003301	1	EACH	100 ohm,1/16W ,J ,1005 ,R/TP
R1020	RES,CHIP,MAKER	ERHZ0000406	1	EACH	100 Kohm,1/16W ,J ,1005 ,R/TP
R1021	RES,CHIP,MAKER	ERHZ0000406	1	EACH	100 Kohm,1/16W ,J ,1005 ,R/TP

R2001	RES,CHIP,MAKER	ERHZ0000298	1	EACH	560 ohm,1/16W ,F ,1005 ,R/TP
R2002	RES,CHIP,MAKER	ERHZ0000293	1	EACH	510 ohm,1/16W ,F ,1005 ,R/TP
R2003	RES,CHIP,MAKER	ERHZ0000488	1	EACH	4.7 ohm,1/16W ,J ,1005 ,R/TP
R2006	RES,CHIP,MAKER	ERHZ0000294	1	EACH	5100 ohm,1/16W ,F ,1005 ,R/TP
R2007	RES,CHIP,MAKER	ERHZ0000206	1	EACH	10 ohm,1/16W ,F ,1005 ,R/TP
R2008	RES,CHIP,MAKER	ERHZ0000294	1	EACH	5100 ohm,1/16W ,F ,1005 ,R/TP
R2009	RES,CHIP,MAKER	ERHZ0000212	1	EACH	12 Kohm,1/16W ,F ,1005 ,R/TP
R2010	RES,CHIP,MAKER	ERHZ0000456	1	EACH	2.2 ohm,1/16W ,J ,1005 ,R/TP
R2011	PCB ASSY,MAIN,PAD	SAFP0000501	1	EACH	
R2012	PCB ASSY,MAIN,PAD	SAFP0000501	1	EACH	
R2013	PCB ASSY,MAIN,PAD	SAFP0000501	1	EACH	
R2014	PCB ASSY,MAIN,PAD	SAFP0000501	1	EACH	
R2015	PCB ASSY,MAIN,PAD	SAFP0000501	1	EACH	
R2016	PCB ASSY,MAIN,PAD	SAFP0000501	1	EACH	
R2017	PCB ASSY,MAIN,PAD	SAFP0000501	1	EACH	
R2018	PCB ASSY,MAIN,PAD	SAFP0000501	1	EACH	
R2019	PCB ASSY,MAIN,PAD	SAFP0000501	1	EACH	
R2020	PCB ASSY,MAIN,PAD	SAFP0000501	1	EACH	
R2021	PCB ASSY,MAIN,PAD	SAFP0000501	1	EACH	
R2022	RES,CHIP,MAKER	ERHZ0004201	1	EACH	121000 ohm,1/16W ,F ,1005 ,R/TP
R2025	RES,CHIP,MAKER	ERHZ0000206	1	EACH	10 ohm,1/16W ,F ,1005 ,R/TP
R2026	RES,CHIP,MAKER	ERHZ0000485	1	EACH	4700 ohm,1/16W ,J ,1005 ,R/TP
R2027	PCB ASSY,MAIN,PAD	SAFO0000501	1	EACH	0OHM_1005_DNI
R2033	RES,CHIP,MAKER	ERHZ0000443	1	EACH	2200 ohm,1/16W ,J ,1005 ,R/TP
R2034	RES,CHIP,MAKER	ERHZ0000443	1	EACH	2200 ohm,1/16W ,J ,1005 ,R/TP
R2035	RES,CHIP,MAKER	ERHZ0000443	1	EACH	2200 ohm,1/16W ,J ,1005 ,R/TP
R2036	RES,CHIP,MAKER	ERHZ0000443	1	EACH	2200 ohm,1/16W ,J ,1005 ,R/TP
R2037	RES,CHIP,MAKER	ERHZ0000405	1	EACH	10 Kohm,1/16W ,J ,1005 ,R/TP
R3001	RES,CHIP,MAKER	ERHZ0000444	1	EACH	22 Kohm,1/16W ,J ,1005 ,R/TP
R3201	RES,CHIP,MAKER	ERHZ0000204	1	EACH	100 Kohm,1/16W ,F ,1005 ,R/TP
R3202	RES,CHIP,MAKER	ERHZ0000315	1	EACH	75 Kohm,1/16W ,F ,1005 ,R/TP
R3301	RES,CHIP,MAKER	ERHZ0000295	1	EACH	51 Kohm,1/16W ,F ,1005 ,R/TP
R3302	RES,CHIP,MAKER	ERHZ0000222	1	EACH	150 Kohm,1/16W ,F ,1005 ,R/TP
R3303	THERMISTOR	SETY0007001	1	EACH	NTC ,68000 ohm,SMD ,68kohm
R3403	RES,CHIP,MAKER	ERHZ0000238	1	EACH	200 Kohm,1/16W ,F ,1005 ,R/TP
R3501	RES,CHIP,MAKER	ERHZ0000295	1	EACH	51 Kohm,1/16W ,F ,1005 ,R/TP
R3502	RES,CHIP,MAKER	ERHZ0003901	1	EACH	0.1 ohm,1/4W ,F ,2012
R3504	RES,CHIP,MAKER	ERHZ0000318	1	EACH	80.6 Kohm,1/16W ,F ,1005 ,R/TP
R3505	RES,CHIP,MAKER	ERHZ0000288	1	EACH	470 Kohm,1/16W ,F ,1005 ,R/TP
R3506	VARISTOR	SEVY0003601	1	EACH	5.6 V, ,SMD ,100pF, 1005
R3507	RES,CHIP,MAKER	ERHZ0000406	1	EACH	100 Kohm,1/16W ,J ,1005 ,R/TP
R3508	RES,CHIP,MAKER	ERHZ0000405	1	EACH	10 Kohm,1/16W ,J ,1005 ,R/TP
R3509	RES,CHIP,MAKER	ERHZ0000406	1	EACH	100 Kohm,1/16W ,J ,1005 ,R/TP
R3510	RES,CHIP,MAKER	ERHZ0000505	1	EACH	680 ohm,1/16W ,J ,1005 ,R/TP
R4001	RES,CHIP,MAKER	ERHZ0000434	1	EACH	1 ohm,1/16W ,J ,1005 ,R/TP
R4004	VARISTOR	SEVY0003601	1	EACH	5.6 V, ,SMD ,100pF, 1005
R4005	VARISTOR	SEVY0003601	1	EACH	5.6 V, ,SMD ,100pF, 1005
R4006	RES,CHIP,MAKER	ERHZ0000435	1	EACH	20 ohm,1/16W ,J ,1005 ,R/TP

R4007	RES,CHIP,MAKER	ERHZ0000435	1	EACH	20 ohm,1/16W ,J ,1005 ,R/TP
R4010	RES,CHIP,MAKER	ERHZ0000406	1	EACH	100 Kohm,1/16W ,J ,1005 ,R/TP
R4015	RES,CHIP,MAKER	ERHZ0000404	1	EACH	1 Kohm,1/16W ,J ,1005 ,R/TP
R4016	RES,CHIP	ERHY0003301	1	EACH	100 ohm,1/16W ,J ,1005 ,R/TP
R4017	RES,CHIP,MAKER	ERHZ0000483	1	EACH	47 ohm,1/16W ,J ,1005 ,R/TP
R4018	RES,CHIP,MAKER	ERHZ0000443	1	EACH	2200 ohm,1/16W ,J ,1005 ,R/TP
R4019	VARISTOR	SEVY0003901	1	EACH	5.5 V, ,SMD ,Vdc 5.5, Vb 8
R4020	RES,CHIP,MAKER	ERHZ0000486	1	EACH	47 Kohm,1/16W ,J ,1005 ,R/TP
R4021	VARISTOR	SEVY0005101	1	EACH	18 V, ,SMD ,5pF, 1005
R4022	VARISTOR	SEVY0003901	1	EACH	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420
R4023	RES,CHIP,MAKER	ERHZ0000486	1	EACH	47 Kohm,1/16W ,J ,1005 ,R/TP
R4024	VARISTOR	SEVY0005101	1	EACH	18 V, ,SMD ,5pF, 1005
R4025	RES,CHIP,MAKER	ERHZ0000486	1	EACH	47 Kohm,1/16W ,J ,1005 ,R/TP
R4026	VARISTOR	SEVY0005101	1	EACH	18 V, ,SMD ,5pF, 1005
R4027	RES,CHIP,MAKER	ERHZ0000486	1	EACH	47 Kohm,1/16W ,J ,1005 ,R/TP
R4028	VARISTOR	SEVY0005101	1	EACH	18 V, ,SMD ,5pF, 1005
R4029	RES,CHIP,MAKER	ERHZ0000486	1	EACH	47 Kohm,1/16W ,J ,1005 ,R/TP
R4030	VARISTOR	SEVY0005101	1	EACH	18 V, ,SMD ,5pF, 1005
R4031	RES,CHIP,MAKER	ERHZ0000465	1	EACH	3300 ohm,1/16W ,J ,1005 ,R/TP
R4032	VARISTOR	SEVY0003901	1	EACH	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420
R4033	VARISTOR	SEVY0005101	1	EACH	18 V, ,SMD ,5pF, 1005
R4034	VARISTOR	SEVY0003901	1	EACH	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420
R4035	RES,CHIP,MAKER	ERHZ0000213	1	EACH	120 Kohm,1/16W ,F ,1005 ,R/TP
R4036	RES,CHIP,MAKER	ERHZ0000465	1	EACH	3300 ohm,1/16W ,J ,1005 ,R/TP
R4037	VARISTOR	SEVY0003601	1	EACH	5.6 V, ,SMD ,100pF, 1005
R4038	VARISTOR	SEVY0003601	1	EACH	5.6 V, ,SMD ,100pF, 1005
R4039	VARISTOR	SEVY0003601	1	EACH	5.6 V, ,SMD ,100pF, 1005
R4040	VARISTOR	SEVY0003601	1	EACH	5.6 V, ,SMD ,100pF, 1005
R4041	VARISTOR	SEVY0003601	1	EACH	5.6 V, ,SMD ,100pF, 1005
R4042	VARISTOR	SEVY0003601	1	EACH	5.6 V, ,SMD ,100pF, 1005
R4043	VARISTOR	SEVY0003601	1	EACH	5.6 V, ,SMD ,100pF, 1005
R4044	VARISTOR	SEVY0003601	1	EACH	5.6 V, ,SMD ,100pF, 1005
R4045	VARISTOR	SEVY0003601	1	EACH	5.6 V, ,SMD ,100pF, 1005
R4046	VARISTOR	SEVY0003601	1	EACH	5.6 V, ,SMD ,100pF, 1005
R4047	RES,CHIP,MAKER	ERHZ0000285	1	EACH	470 ohm,1/16W ,F ,1005 ,R/TP
R4048	RES,CHIP,MAKER	ERHZ0000285	1	EACH	470 ohm,1/16W ,F ,1005 ,R/TP
R4049	RES,CHIP,MAKER	ERHZ0000285	1	EACH	470 ohm,1/16W ,F ,1005 ,R/TP
R4050	RES,CHIP,MAKER	ERHZ0000285	1	EACH	470 ohm,1/16W ,F ,1005 ,R/TP
R4051	RES,CHIP,MAKER	ERHZ0000285	1	EACH	470 ohm,1/16W ,F ,1005 ,R/TP
R4052	RES,CHIP,MAKER	ERHZ0000285	1	EACH	470 ohm,1/16W ,F ,1005 ,R/TP
R4053	RES,CHIP,MAKER	ERHZ0000285	1	EACH	470 ohm,1/16W ,F ,1005 ,R/TP
R4054	RES,CHIP,MAKER	ERHZ0000285	1	EACH	470 ohm,1/16W ,F ,1005 ,R/TP
R4055	RES,CHIP,MAKER	ERHZ0000285	1	EACH	470 ohm,1/16W ,F ,1005 ,R/TP
R4056	RES,CHIP,MAKER	ERHZ0000285	1	EACH	470 ohm,1/16W ,F ,1005 ,R/TP
R4057	VARISTOR	SEVY0003601	1	EACH	5.6 V, ,SMD ,100pF, 1005
R4058	VARISTOR	SEVY0003601	1	EACH	5.6 V, ,SMD ,100pF, 1005
R4059	RES,CHIP,MAKER	ERHZ0000404	1	EACH	1 Kohm,1/16W ,J ,1005 ,R/TP
R4060	VARISTOR	SEVY0005101	1	EACH	18 V, ,SMD ,5pF, 1005

R4061	RES,CHIP,MAKER	ERHZ0000402	1	EACH	10 ohm,1/16W ,J ,1005 ,R/TP
R4062	RES,CHIP,MAKER	ERHZ0000402	1	EACH	10 ohm,1/16W ,J ,1005 ,R/TP
R4063	VARISTOR	SEVY0010501	1	EACH	5 V, ,SMD , ,; ,5 , ,0.4pF(typ)
R4064	RES,CHIP,MAKER	ERHZ0000285	1	EACH	470 ohm,1/16W ,F ,1005 ,R/TP
R4065	VARISTOR	SEVY0003601	1	EACH	5.6 V, ,SMD ,100pF, 1005
U1000	IC	EUSY0397601	1	EACH	WLBGA ,64 ,R/TP ,BT 2.1+FM Rx,
U1001	CONN,RF SWITCH	ENWY0006801	1	EACH	,SMD , dB, ,; ,0.40MM
U1002	FILTER,SEPERATOR,S	SFAC0002301	1	EACH	0 ,0 MHz,0.25 dB,29 dB,0 ,0 MHz
U1003	MODULE,ETC	SMZY0022401	1	EACH	Quadplexer, FBAR, DCN/US-PCS
U1004	COUPLER,RF DIRECT	SCDY0004301	1	EACH	20.5 dB,0.22 dB,34 dB,1.0*0.5*0.4
U1005	COUPLER,RF DIRECT	SCDY0004401	1	EACH	19.4 dB,0.25 dB,32 dB,1.0*0.5*0.4
U1006	TR,FET,P-CHANNEL	EQFP0009001	1	EACH	SC75-6 ,0.6 W, V,1 A,R/TP
U1007	PAM	SMPY0019401	1	EACH	dBm, %, A, dBc, dB,3x3x1.0 ,SMD
U1008	PAM	SMPY0017301	1	EACH	dBm, %, A, dBc, dB,4x5
U1010	FILTER,SEPERATOR,S	SFAC0002001	1	EACH	1GHz , MHz,0.25 dB,29 dB,2GHz
U1012	MODULE,ETC	SMZY0021701	1	EACH	GPS LNA Module integrated Filter
U1013	FILTER,SEPERATOR,S	SFAC0002001	1	EACH	1GHz , MHz,0.25 dB,29 dB,2GHz
U1014	FILTER,SEPERATOR	SFAY0012701	1	EACH	1GHz ,2GHz ,0.8 dB,0.8 dB,25 dB
U1015	VCTCXO	EXSK0008901	1	EACH	19.2 MHz,1.5 PPM,40 pF
U1016	IC	EUSY0186502	1	EACH	Micropak ,6 PIN,R/TP
U1017	COUPLER,RF DIRECT	SCDY0004301	1	EACH	20.5 dB,0.22 dB,34 dB,1.0*0.5*0.4
U2001	IC	EUSY0348602	1	EACH	CSP ,424 ,R/TP ,EVDO Onechip,
U2002	X-TAL	EXXY0004601	1	EACH	.032768 MHz,20 PPM,7 pF
U3001	IC	EUSY0362803	1	EACH	FBGA ,149
U3101	IC	EUSY0385101	1	EACH	MLPQ-UT ,20 ,R/TP ,6CH+4LDO
U3102	IC	EUSY0365101	1	EACH	PLP1612-4B ,4 ,R/TP ,LDO
U3401	IC	EUSY0374601	1	EACH	TDFN ,8 ,R/TP ,Programmable OVP
U4001	IC	EUSY0390501	1	EACH	WLCSP ,20 ,R/TP
U4004	IC	EUSY0140902	1	EACH	SSOP ,5 PIN,R/TP ,Inverter(2x2.1)
U4005	IC	EUSY0300004	1	EACH	QFN ,28 ,R/TP ,Keycoder ic, 28pin
U4007	IC	EUSY0347001	1	EACH	MiniQFN-10L ,10 PIN,R/TP
U4008	CONTACT	MCIZ0001301	1	EACH	PRESS, BeCu, , , , ,
U4009	CONTACT	MCIZ0001301	1	EACH	PRESS, BeCu, , , , ,
X1000	X-TAL	EXXY0018404	1	EACH	26 MHz,10 PPM,8 pF,40 ohm

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Ref No	Part Name	Part Number	QTY	Unit	Spec
C4049	CAP,CHIP,MAKER	ECZH0003103	1	EACH	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP
C4050	VARISTOR	SEVY0010501	1	EACH	5 V, ,SMD , ,; ,5 , ,0.4pF(typ) ,1005 ,[empty] ,[empty] ,R/TP
C4051	VARISTOR	SEVY0005202	1	EACH	5.5 V,+-30 ,SMD ,1005, 100 pF, Pb free
C4052	VARISTOR	SEVY0005202	1	EACH	5.5 V,+-30 ,SMD ,1005, 100 pF, Pb free
C4053	VARISTOR	SEVY0005202	1	EACH	5.5 V,+-30 ,SMD ,1005, 100 pF, Pb free
LED4001	DIODE,LED,CHIP	EDLH0014801	1	EACH	WHITE ,ETC ,R/TP ,0.4t
LED4002	DIODE,LED,CHIP	EDLH0014801	1	EACH	WHITE ,ETC ,R/TP ,0.4t
LED4003	DIODE,LED,CHIP	EDLH0014801	1	EACH	WHITE ,ETC ,R/TP ,0.4t
SPFY	PCB,MAIN	SPFY0211301	1	EACH	FR-4 ,0.8 mm,STAGGERED-8
U4006	IC	EUSY0362601	1	EACH	SSON004 ,4 ,R/TP ,Hall IC ,; ,IC,CMOS

6-2. FPCB Part List

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Ref No	Part Name	Part Number	QTY	Unit	Spec
CON102	CONNECTOR,BOARD	ENBY0023201	1	EACH	44 PIN,0.4 mm,ETC , ,H=0.9, Header

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Ref No	Part Name	Part Number	QTY	Unit	Spec
CON100	CONNECTOR,BOARD	ENBY0041401	1	EACH	PIN, mm,ETC ,70 ,0.40MM ,STRAIGHT ,MALE
CON101	CONNECTOR,BOARD	ENBY0034001	1	EACH	24 PIN,0.4 mm,ETC , ,P4S H=1.5, Socket