

U9510E Maintenance Guide

V1.0

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Change History

Date	Version	Change Reason	Changed Chapter	Change Description	Author
2012-09-18	V1.0	Image errors existed.	1.1	Changed the U9510E's appearance image.	Teng Zhihui (employee ID: t00104341)
2012-09-18	V1.0	A description error existed.	1.2	Changed the uplink rate to 5.76 Mbit/s.	Teng Zhihui (employee ID: t00104341)
2012-09-18	V1.0	A description error existed.	1.2	Deleted the sentence "Solder different components as required to combine frequency bands".	Teng Zhihui (employee ID: t00104341)

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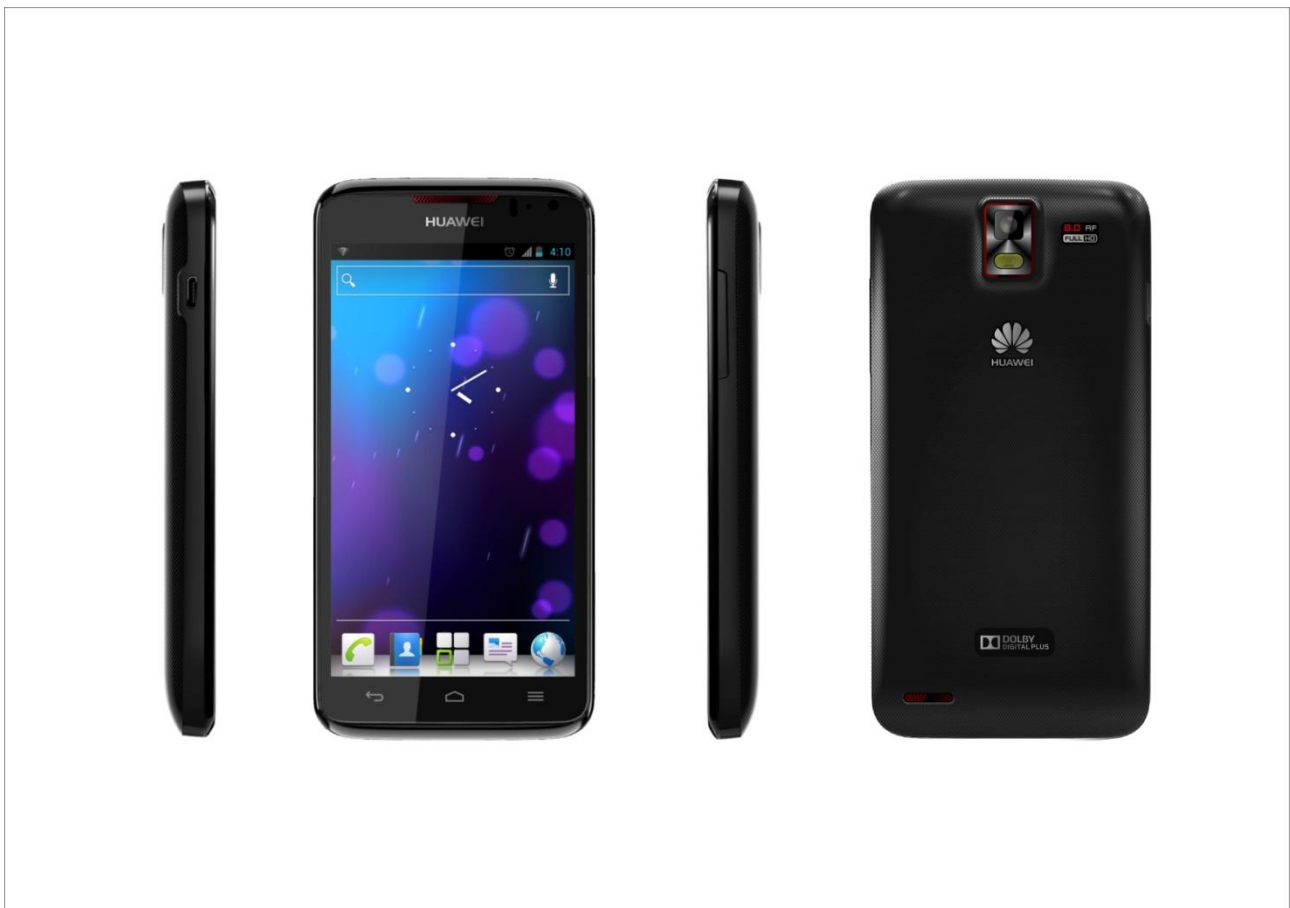
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1 Product Introduction

1.1 Appearance

Figure 1-1 错误！未指定书签。 shows the U9510E's appearance.

Figure 1-1 Appearance



1.2 Features

Table 1-1 Product features

Item	Description
Type	Bar-type touchscreen smartphone
Dimensions (H x W x D)	10.9 mm x 129.9 mm x 64.9 mm
Frequency bands	GSM/GPRS/EDGE: 850/900/1800/1900 MHz UMTS: 850/900/AWS/1900/2100 MHz HSPA+: downlink 21 Mbit/s, uplink 5.76 Mbit/s
Weight	About 145 g
Description	WCDMA/GSM dual-mode phone
System and platform	K3V200 + X-Gold626, Android 4.0 operating system (OS)
Memory	AP: 1 GB DDR RAM, 8 GB EMMC Modem: flashless, DDR
Ports	Micro USB (for charging and data connection); 3.5 mm headset jack; MHL port
Battery	2600 mAh lithium ion polymer battery
Display	4.5-inch HD 1280 x 720 pixels, connected to the AP through the MIPI port
microSD card	Support a microSD card of up to 32 GB
Antenna	Built-in antenna
Camera	Rear camera: 8 megapixels (MP), with dual LED flash; Front camera: 1.30 MP
Bluetooth	Bluetooth module of the Broadcom4330 (Bluetooth 4.0 + HS)
Wi-Fi	802.11b/g/n
GPS	GPS, AGPS
FM	FM module of the BCM4430, with an external antenna (headset)
Outstanding features	WCDMA/GSM dual-mode, Android 4.0 OS 4.5-inch HD In-Plane Switching (IPS) capacitive touchscreen 2600 mAh battery Rear camera of 8 MP, with dual LED flash and autofocus Front camera of 1.3 MP Gravity sensor, proximity sensor, light sensor, gyroscope, compass Bluetooth, FM, and GPS/AGPS High-speed WCDMA 3G/Wi-Fi Huawei's application store: Hispace

2

Applicable Scope and Precautions

2.1 How to Use this Document

This document provides repair instructions for technicians at service sites authorized by Huawei. This maintenance manual is confidential and accessible to authorized service centers (ASCs) and authorized service providers (ASPs) only. While every effort has been made to ensure the accuracy of this document, errors may still exist. If you find any mistake or have any suggestion, contact Huawei's customer service.

2.2 Precautions

- Only qualified technicians are allowed to perform repair and calibration.
- Perform all operations in electrostatic discharge (ESD) rooms and wear ESD wrist straps throughout the operations.
- Ensure that all components, screws, and insulators are installed properly after repair and calibration, and that all cables and wires are installed and connected correctly.
- Ensure that the soldering is lead-free and compliant with eco-friendly requirements.



Electrostatic discharge (ESD) is a major cause for damage to sensitive electronic components. Every service center must attach great importance to ESD protection and meet ESD protection requirements specified in this document.

2.3 How to Obtain Product and Repair Information

To obtain product and maintenance information, visit Huawei website at:
<http://www.huaweidevice.com/cn/technicalIndex.do>

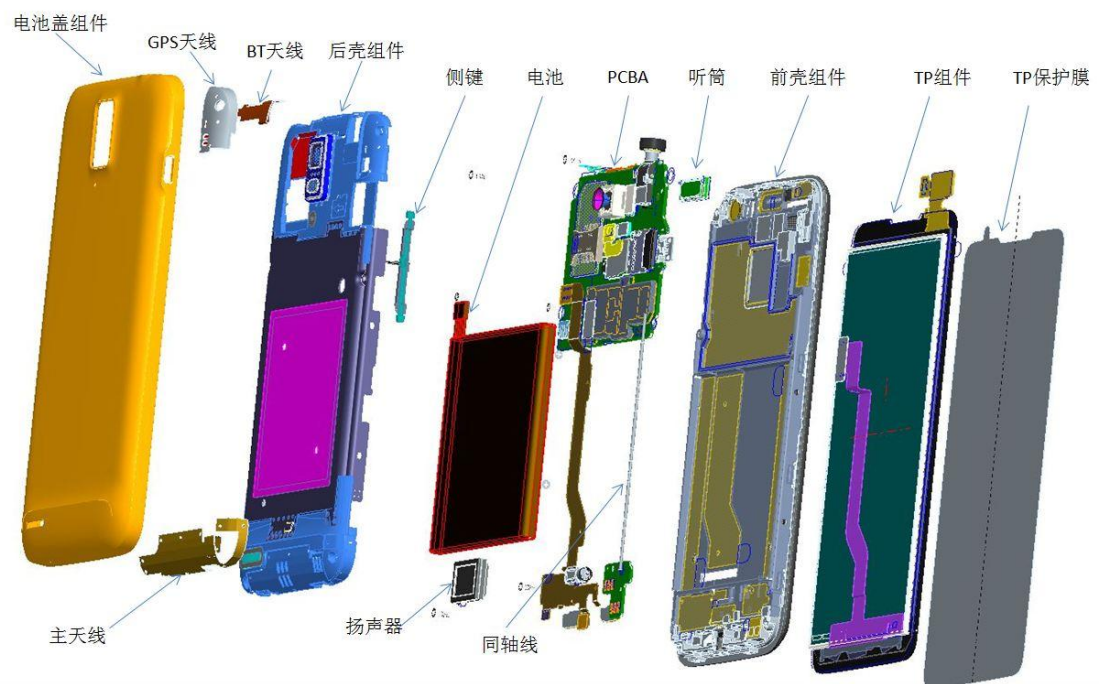
3 Exploded View

3.1 Exploded View

**NOTE**

Components in the following figure are structural parts of the phone, and cannot be used as reference when requesting spare parts.

Figure 3-1 Exploded view



3.2 Component List

Table 3-1 Component list

No.	Part Number	Description	Quantity
1	51151357	WCDMA Cellular Phone Host,HUAWEI U9510E ,WCDMA/GSM Handset,Black,8G ROM/Chinese General Version	
2	03021TXW	Manufactured Board,U9510E,HD1U9510EMA,U9510EHandset Main Board(8G ROM/FM/GSM 4 Band,W2100/W1900/W1700/W900/W850),Terminal Dedicated,2*2	1.0 PCS
3	03021KXY	Manufactured Board,U9500-1,HD1FRONTR,U9500 Receiver FPC(GSM 4 band,W2100/W1900/W1700/W850W/W900),1*1	1.0 PCS
4	03021KXW	Manufactured Board,U9500,HD1FRONTFL,U9500 flash light FPC(GSM 4 band,W2100/W1900/W1700/W850W/W900),1*1	1.0 PCS
5	03021TXY	Manufactured Board,U9510,HD1U9510L01,U9510 main FPC(GSM 4 band,W2100/W1900/W1700/W850W/W900),1*1	1.0 PCS
6	03021KXU	Manufactured Board,U9500-1,HD1FRONTA,U9500 antana board(GSM 4 band,W2100/W1900/W1700/W850W/W900),6*6	1.0 PCS
7	04050406	Out Sourcing Cable,RF Coaxing Cable,75.6mm,fit 14240433,0.0756,Terminal Dedicated	1.0 PCS
8	22020079	Speaker,8ohm,0.5w,11*15*3.5(Improved),Terminal Dedicated	1.0 PCS
9	22030044	Receiver,32ohm,6*15*2.0mm,wideband,Terminal Dedicated	1.0 PCS
10	23060074	Camera Module Group,CMOS,1.3M-FF-Front-HD-BTB	1.0 PCS
11	51669306	Rear Housing Assy,Black,No Painting-U9510E	1.0 PCS
12	51611378	Volume Key,Black,PC-DKBA8.001.1650-U9500	1.0 PCS
13	51633671	DKBA8.092.8353-Sensor Rubber	1.0 PCS
14	51667937	DKBA4.140.7419-Rcv Fpc Frame Assy	1.0 PCS
15	51623280	RF Shielding Cover Asm	1.0 PCS
16	51623437	Screw-M1.4*1.8	5.0 PCS
17	51621203	DKBA8.900.0510,T5 pan head tapping screw,ST1.4*4.0*D2.6*0.8,Plated with black zinc,,Unitary(priority)	4.0 PCS
18	51620751	DKBA8.900.0404,Cross recessed pan head mechanical screw,M1.4*2.5*D2.5*0.5,Plated with black zinc,Unitary(priority)	2.0 PCS
19	51633672	DKBA8.092.8485-Lens Film	1.0 PCS
20	51633673	DKBA8.092.8515-TP-BTB Sponge	1.0 PCS
21	51633674	DKBA8.092.8562-Camera Sponge	1.0 PCS

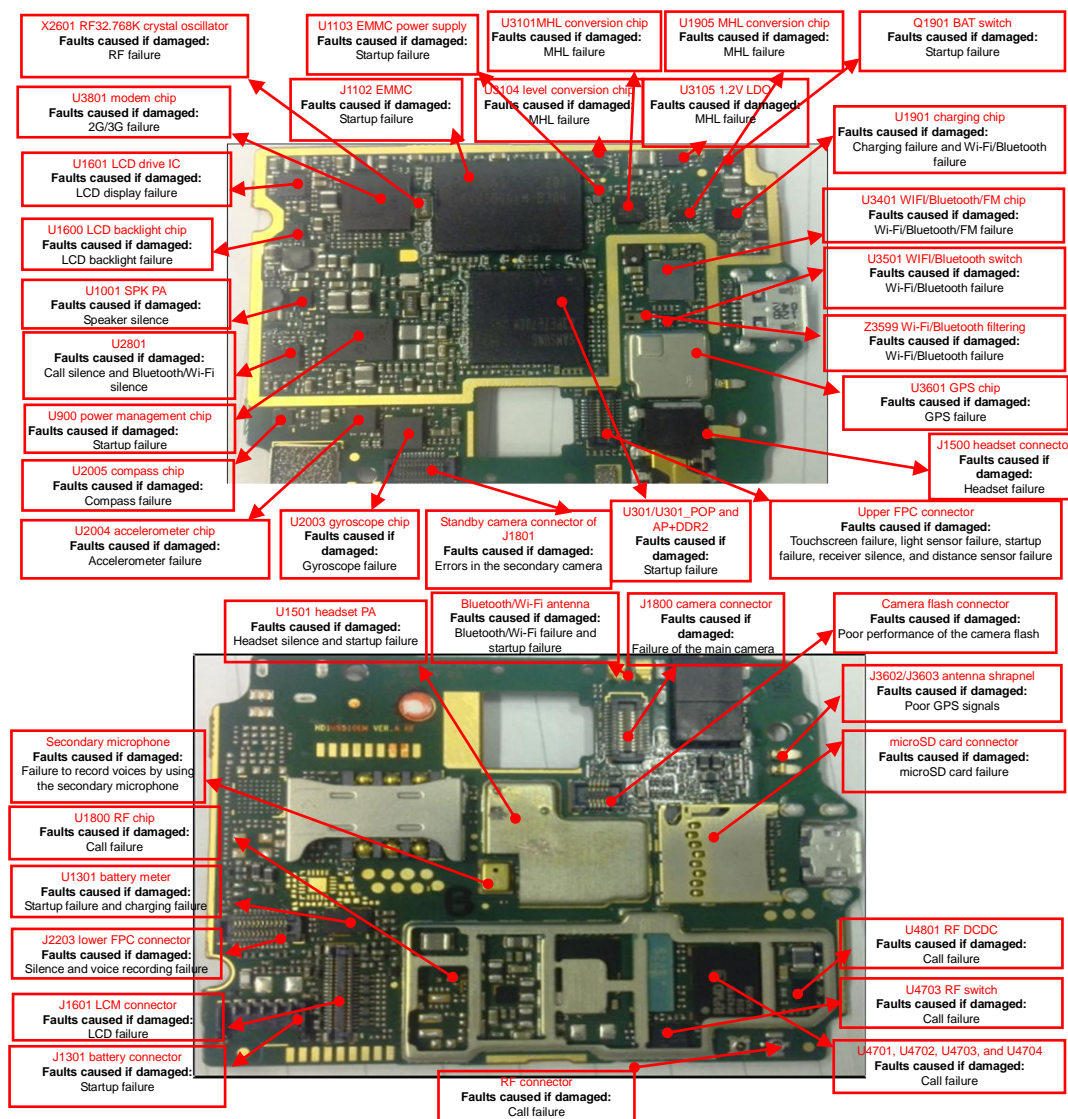
No.	Part Number	Description	Quantity
22	51633840	Tri-Colored-Mylar Tri-Colored-Mylar	1.0 PCS
23	51652322	DKBA8.818.2190-Waterproof Label-D3.0mm-Universal	1.0 PCS
24	51650888	DKBA8.817.7194,warranty label,2.5mm,General	1.0 PCS
25	24021105	Rechargeable Battery,Li-Polymer Battery,HB5Q1HV,3.75V,2.6Ah,Single Cell,Max 6.1*56.5*58.0mm,No Replaceable,4.30V High Voltage,Terminal Dedicated	1.0 PCS
26	27161024	Terminal Antenna,824MHz-960MHz/1710MHz-2170MHz,Better Than -3dBi/Better Than -3dBi,Isotropic,line polarization,better than 3,4W,U9510E Main Antenna Fpc SAA	1.0 PCS
27	51633937	DKBA80931314,Front Housing Protect Film,U9500	1.0 PCS
28	02230NFA	U9510E,Black A_Cover+LCD+TouchLens	1.0 PCS
29	23060091	Camera Module Group,CMOS,8M-MIPI 4 lane-AF-BTB+FPC-8.5*8.5*6.0-5P Lens	1.0 PCS

The preceding component list is provided for reference only. It is subject to changes without any notices. The latest component list is available in Huawei's ITEM information system. If you have any question, contact your local technical support center.

4 Components on the PCBA

4.1 Layout

Figure 4-1 Layout of PCBA components (without the shielding can and frame)



4.2 Component List

Table 4-1 List of components on the PCBA

No.	Part Number	Description	Quantity	Position
1	03021TXW	Manufactured Board,U9510E,HD1U9510EMA,U9510EHandset Main Board(8G ROM/FM/GSM 4 Band,W2100/W1900/W1700/W900/W850),Terminal Dedicated,2*2		
2	03010LFA	Manufactured Board,U9510,HD1U9510MT,U9510 Handset Main Board,2*2	1.0 PCS	
44	40020172	DDR2 DRAM,8Gb LPDDR2,533MHz,32bit,1.8V/1.2V,216BALL FBGA(POP),Terminal Dedicated	1.0 PCS	U300_POP
45	39080180	Operation Amplifier,Audio Power Amplifier,2.5V~5.5V,Differential,Micro SMD 16pin(WLCSP),Teminal Dedicated	1.0 PCS	U1001
46	40060331	MCP,8GB(8Gb*8) EMMC,52MHz,3.3/1.8V,FBGA169,512Mb(32Mb*16) LPDDR,Terminal Dedicated	1.0 PCS	U1102
47	38020065	Analog Switch,one input one output load switch,1.2V~4.0V,150mohm,WLCSP	3.0 PCS	U1103, U2201, U3207
48	39070073	-0.3~2.75V,Battery Gauge,SON,Terminal Dedicated	1.0 PCS	U1301
49	39080124	Operation Amplifier,Headphone Audio Power Amplifier,2.3 V to 5.5 V,differential AB Amplifier,QFN,Terminal Dedicated	1.0 PCS	U1501
50	39110626	Switching Regulators,Vin~38V,0.02A,QFN-2*2,SMT,2*2,10 LED Driver,Terminal Dedicated	1.0 PCS	U1600
51	39110636	SwitchingRegulators,0~5.5V0~-7V,1%,0.08A,ThinQFN, SMT,3mm*3mm,LCD Driver,Terminal Dedicated	1.0 PCS	U1601
52	39110620	Power Driver,1.5A LED flash driver IC,CSP,Terminal Dedicated	1.0 PCS	U1800
53	38020063	Analog Switch,triple throw (DP3T) multiplexer,2.5V~5.5V,Ron(max)<10ohm,1800MHz,QFN,2.0 x 1.7 x 0.5 mm	1.0 PCS	U1905
54	38140020	Semiconductor Sensor,three-axis gyroscope,SMT	1.0 PCS	U2003
55	38140064	Semiconductor Sensor,Accelerometer,LGA,3axis,Terminal Dedicated	1.0 PCS	U2004

No.	Part Number	Description	Quantity	Position
56	38140024	Semiconductor Sensor,E-Compass,WL-CSP(Pb-free),3axis,Terminal Dedicated	1.0 PCS	U2005
57	43110067	AUDIO Chip,BGA32,2 Digital Microphones Noise Cancelation/4 Digital Audio Ports (PCM/I2S)/Voice Equalization,Terminal Dedicated	1.0 PCS	U2801
58	43090124	VIDEO Chip,49 VFBGA,1.2V/1.8V/3.3V,HDMI&USB 2in1,1080p/30Hz, Terminal Dedicated	1.0 PCS	U3101
59	39110548	LDO,3.3V,2%,0.15A,SC70-5,Terminal Dedicated	1.0 PCS	U3104
60	39110566	Switching Regulators,1~4V,1.5A,SMT,Terminal Dedicated	1.0 PCS	U3105
61	39110670	Power Driver,BOOST DCDC,6-WCSP,OTG 5V Power Supply,Terminal Dedicated	1.0 PCS	U3220
62	39210010	Terminal Baseband process IC,Single Band 2.4GHz WLAN/Bluetooth 2.1/FM Single chip-BCM4330,2.3~5.5V,WLBGA133(Pb-free)	1.0 PCS	U3401
63	47140049	RF Switch,0.5~3.0 GHz,SP3T,0.45dB,1.22,20dB,TSON,200~260V(HBM),T erminal Dedicated	1.0 PCS	U3501
64	39210036	Terminal Baseband Peripheral IC,GPS Receiver,support GLONASS,2.3~5.5V-WLBGA42(Pb-free),Terminal Dedicated	1.0 PCS	U3601
65	47090053	RF LNA,1575MHz,14dB min.,1.6dB max.,SOT886,Terminal Dedicated	1.0 PCS	U3699
66	39200240	Terminal Baseband process IC,WCDMA/GSM Dual,mode Baseband Processor-XMM6260(PMB9811),3.05V-4.8V,PG-VF2B GA-221-1	1.0 PCS	U3801
67	39200241	Terminal Baseband process IC,WCDMA/GSM Dual Mode, RF Transceiver SMartUE2(PMB5712),2.5V/1.8V,PG-WFWLB-138-2,Te rminal Dedicated	1.0 PCS	U4701
68	13080147	Duplexer,RX:1805-1880MHz/TX :1920-1980MHz/RX:2 110-2170MHz/TX:1710-1755MHz/RX:2110-2155MHz/ TX:1850-1910MHz/RX:1930-1990MHz/TX:824-849MH z/869-894MHz/TX:880-915MHz/RX:925-960MHz,3dB., 3.95dB.,47dB,SMT,Terminal Dedicated	1.0 PCS	U4702
69	47140075	RF Switch,824~2170MHz-SP8T ASM,1.30dB(Max.),25dB,LGA,1000V,Terminal Dedicated	1.0 PCS	U4703

No.	Part Number	Description	Quantity	Position
70	47100541	RF Power Amplifying Module,1710~1785MHz/1850~1910MHz/1920~1980MHz/824~849MHz/880~915MHz,35.7dB max.,35dBm,MCM,Terminal Dedicated,New Version Part,47100455 is old version.	1.0 PCS	U4704
71	12070027	Temperature Compensated Oscillator,26MHz,+/-2.5ppm,1.8v-2.9v,+/-2.5ppm,30deg C,85degC,Terminal Dedicated	1.0 PCS	U4708
72	39070119	Power Management IC,2.9~5.1V,PUMP-BUCK DCDC 0-5V,auxiliary charge pump 4V 10mA,WLCSP,Terminal Dedicated	1.0 PCS	U4801
73	39070116	Power Management IC,2.9~5.1V,3bucks(1.2V 3A;1.8V 3A;2.85V 3A),1 LDO 2.65V,compatible with infineon transceiver PMB5712,16-BUMP WLCSP,Terminal Dedicated	1.0 PCS	U4802
76	13010264	SAW Filter,1590.16MHz,1.8dB,50V,1411,Terminal Dedicated	2.0 PCS	Z3601, Z3602
79	13030067	Ceramic Filter,2450MHz,1.8dB,20125,Terminal Dedicated	1.0 PCS	Z3599
81	39070150	Battery Management IC, 4.2V,18V,Charger with separate Power Path Control,WCSP,SMT,Terminal Dedicated	1.0 PCS	U1901

The preceding component list is provided for reference only. It is subject to changes without any notices. The latest component list is available in Huawei's ITEM information system. If you have any question, contact your local technical support center.

5 Software Upgrade

5.1 Upgrade Preparation

Table 5-1 Software upgrade method

Category	Item	Remarks
Upgrade environment	Computer	OS: Windows 2000, Windows XP, or Windows 7
	microSD card	Available space > 512 MB
	Battery	Remaining power > 20%
Upgrade file	update.app	This version is provided for reference only. Please download the latest version when upgrading the software.
	Using the microSD card	Normal upgrade
		Forcible upgrade

5.2 Upgrade Using the microSD card

5.2.1 Performing a Normal Upgrade

1. Create a **dload** folder under the microSD card's root directory.
2. Copy the **update.app** file to the **dload** folder.
3. Install the microSD card to the phone and power the phone on.
4. Enter *****2846579***** on the dial pad.
5. Choose **ProjectMenu > Upgrade > SD card upgrade**, and click **Confirm**.
6. The upgrade progress is displayed on the LCD.
7. After the upgrade is complete, the phone automatically restarts.
8. If the upgrade fails, the upgrade page remains to be displayed, and an upgrade failure message is displayed.

5.2.2 Performing a Forcible Upgrade

If your phone cannot be properly powered on, perform a forcible upgrade as follows:


1. Create a **dload** folder under the microSD card's root directory.
2. Copy the **update.app** file to the **dload** folder.
3. Install the microSD card to the phone.
4. When the phone is powered off, press the volume up, volume down, and power keys together for at least 3 seconds.
5. The phone enters the upgrade state. The upgrade progress is displayed on the screen.
6. After the upgrade is complete, the phone automatically restarts.
7. If the upgrade fails, the upgrade page remains to be displayed, and an upgrade failure message is displayed.




5.3 Troubleshooting

Table 5-2 Troubleshooting process

Failure	Solution
Fail to upgrade the phone using the microSD card.	<ol style="list-style-type: none">1. Check that the upgrade file is correct.2. Check that the upgrade file is stored in the right directory.3. Check that the upgrade method is correct.4. Check that the microSD card functions properly.5. Perform the upgrade again.

6 Maintenance Tools

	<p>Name: constant-temperature heat gun Usage: to heat components</p>
	<p>Name: soldering iron Usage: to maintain and solder components</p>
	<p>Name: DC power supply Usage: to supply DC current</p>
	<p>Name: soldering table Usage: to secure the PCBA</p>
	<p>Name: lead-free solder wire Usage: for soldering</p>

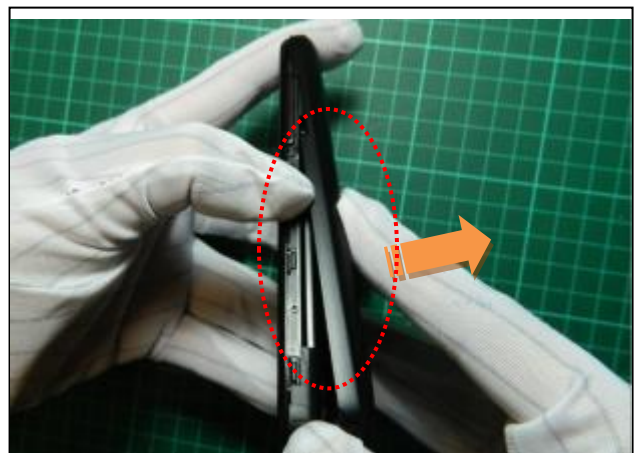
	<p>Name: digital multimeter</p> <p>Usage: to measure during repair</p>
	<p>Name: toolkit</p> <p>Usage: to assemble and disassemble components</p>
	<p>Name: electric screwdriver</p> <p>Usage: to fasten and remove screws</p>

7

Disassembly Procedure



1. Prepare for the disassembly.



2. Remove the battery cover.



3. Remove the hexagon screws from the four corners.



4. Remove the square screws from the middle.



5. Remove the two square screws from one side.



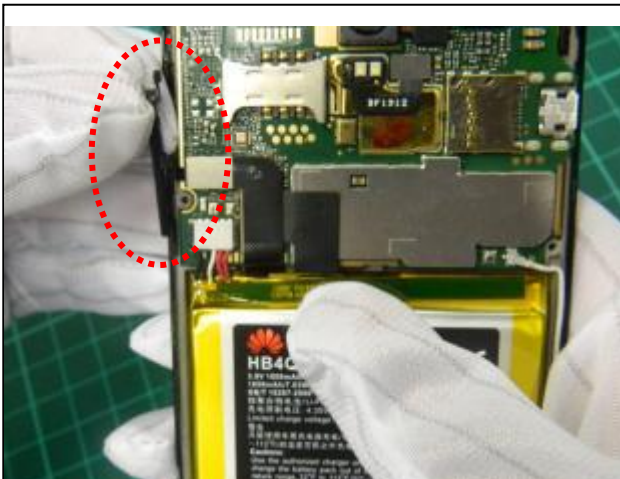
6. Remove the two square screws from the other side.



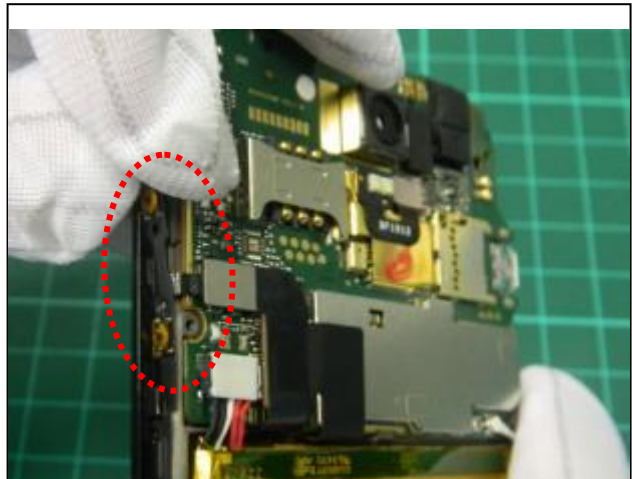
7. Stick the pry bar into the bottom of the rear cover to pry up the rear cover.



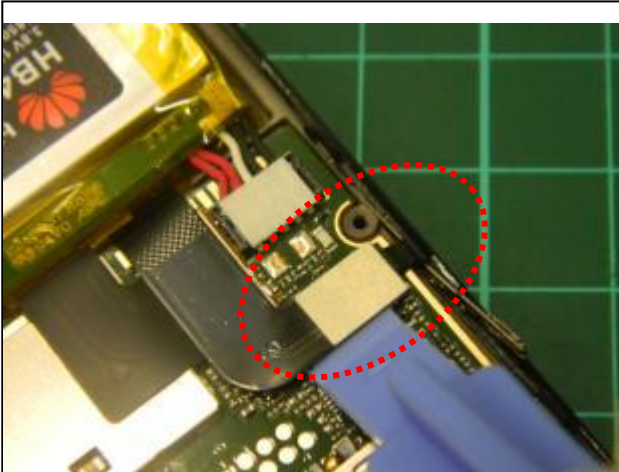
8. Remove the rear cover.



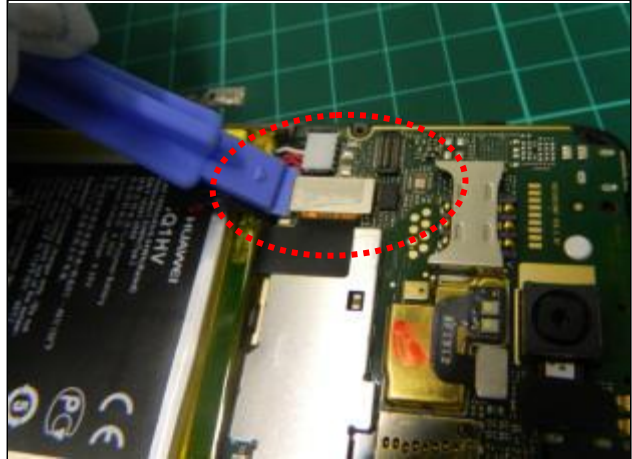
9. Remove the volume key.



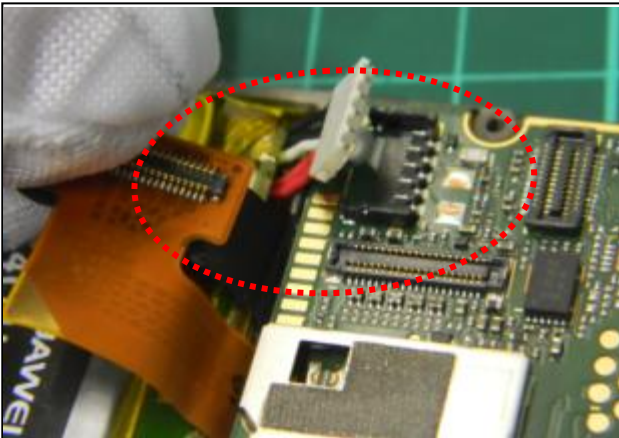
10. Remove the dome.



11. Remove the main FPC BTB.



12. Remove the LCD FPC BTB.



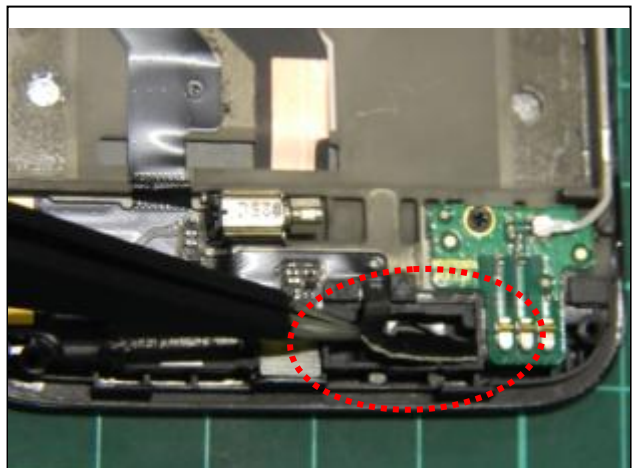
13. Remove the battery connector.



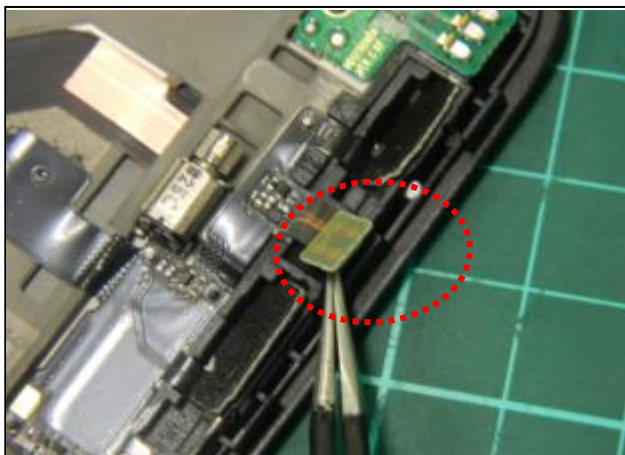
14. Remove the battery with caution. Do not poke the double-sided tapes attached between front cover brackets. The battery backside is covered by aluminum. The battery cannot be reused after being removed.



15. The battery is removed.



16. Remove the key backlight.



17. Remove the main microphone.



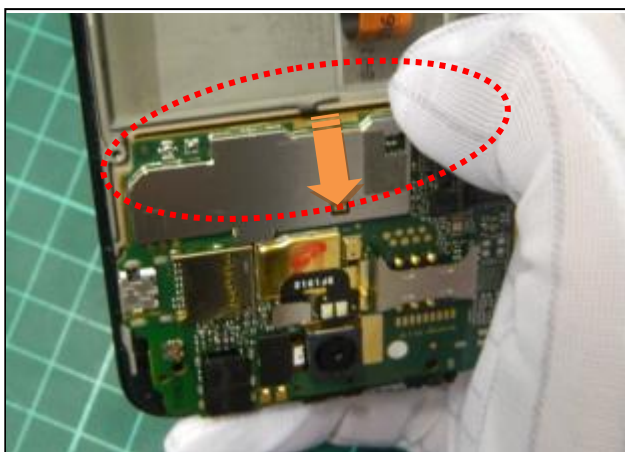
18. Remove the main FPC.



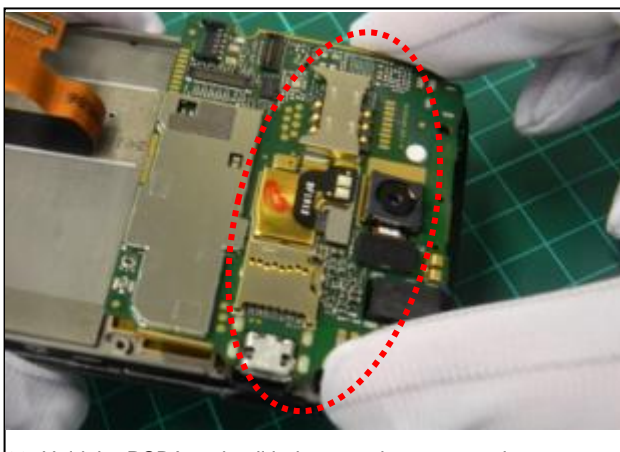
19. Remove the coaxial cable.



20. Remove the screws from the antenna panel and then remove the antenna panel.



21. Remove the bracket BTB from the magnesium alloy card hook on the PCBA.



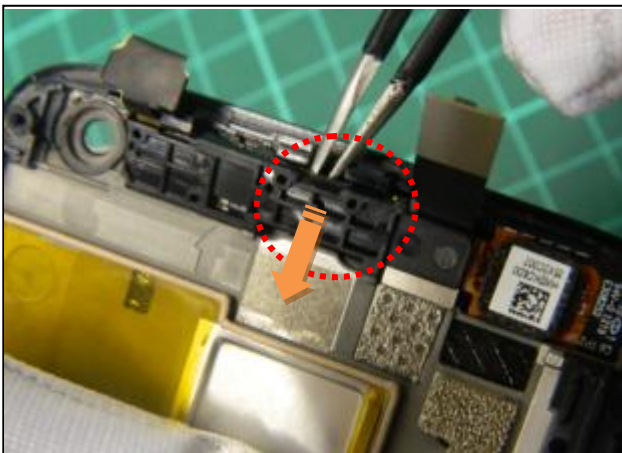
22. Hold the PCBA and pull it downwards to remove it.



23. Remove the receiver FPC BTB.



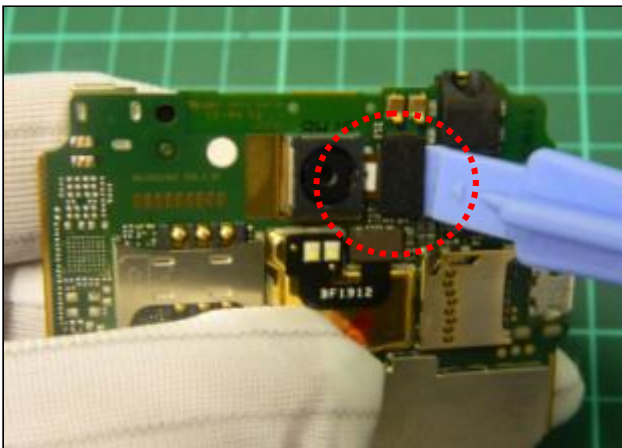
24. Use tweezers to pry up the dome of the power key.



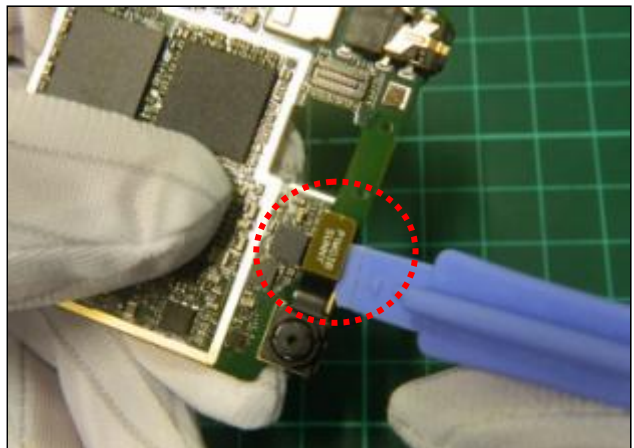
25. Use tweezers to pry up the receiver bracket.



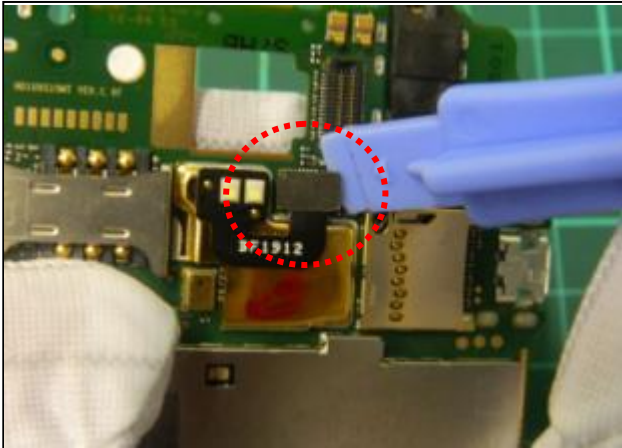
26. Take out the receiver bracket.



27. Remove the main camera.



28. Remove the secondary camera.



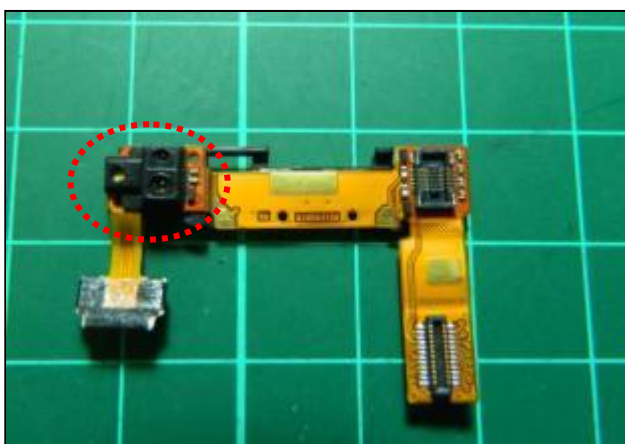
39. Remove the FPC of the camera flash.



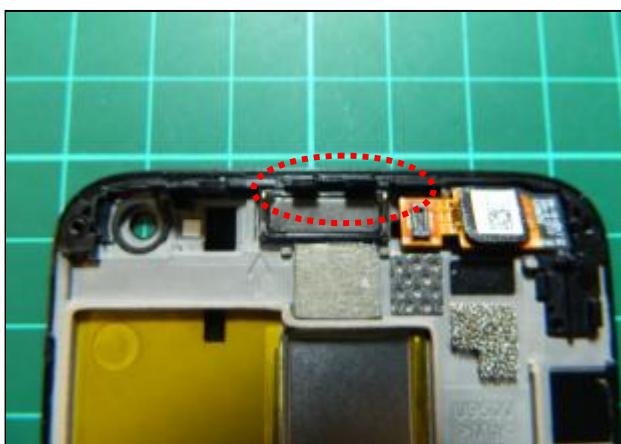
30. The disassembly is complete.

8

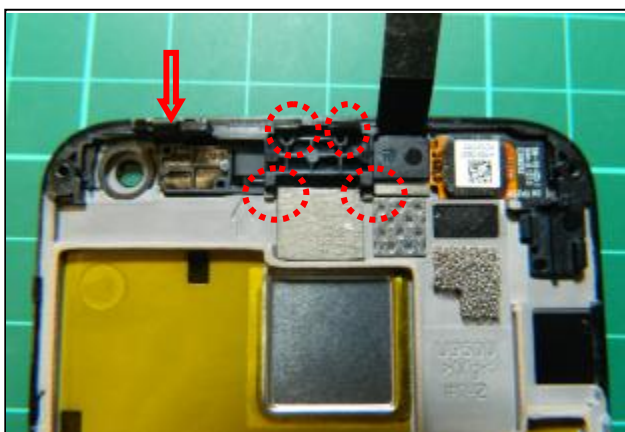
Assembly Procedure



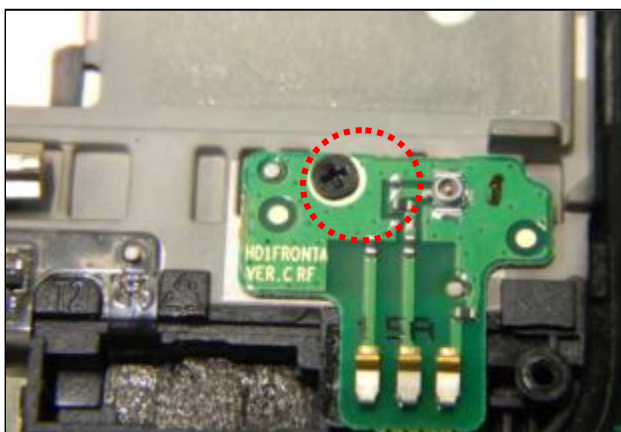
1. Install the proximate light rubber jacket on the receiver bracket.



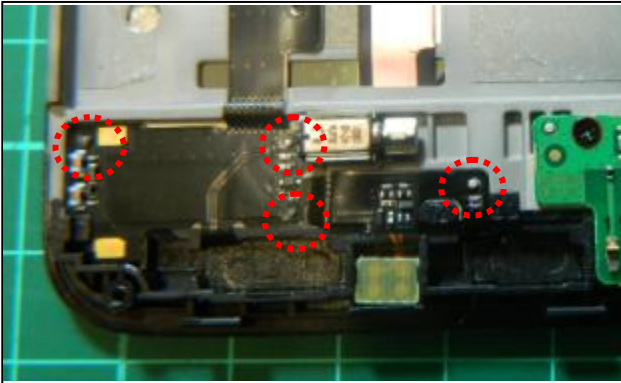
2. Install the receiver with the shrapnel upwards.



3. Secure receiver bracket component into latches (lower latches first) of the front cover and close the dome of the power key.



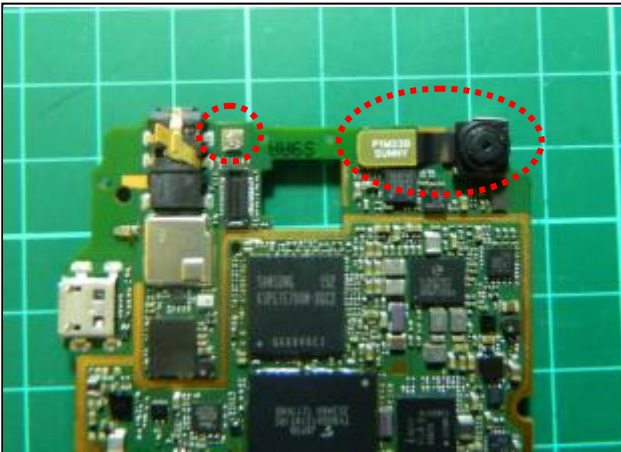
4. Install the antenna panel.



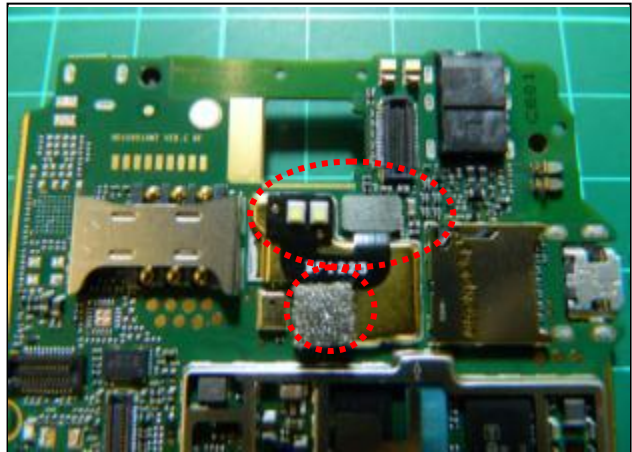
5. Target the positioning holes of the main FPC at the positioning columns of the front cover, install two LED lights to the positioning slot of the front cover, and secure the enhanced board of the main microphone into the latch of the front cover.



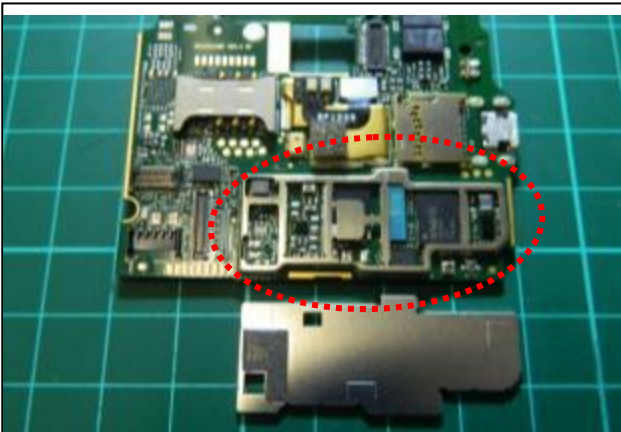
6. Target the positioning holes of the main FPC at the positioning holes of the front cover and attach the main FPC.



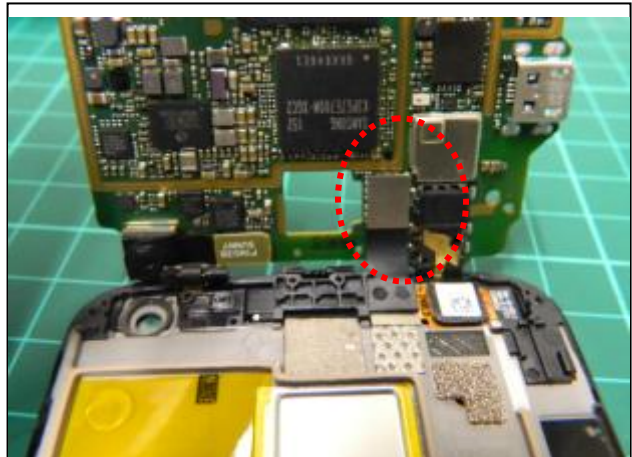
7. Install the front camera and attach the conductive foam.



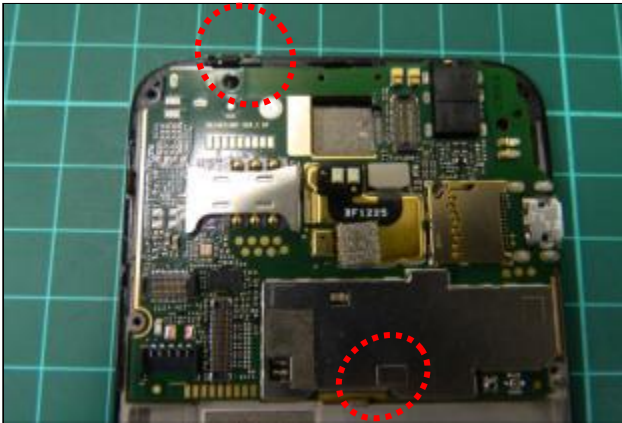
8. Attach the camera flash and conductive foam.



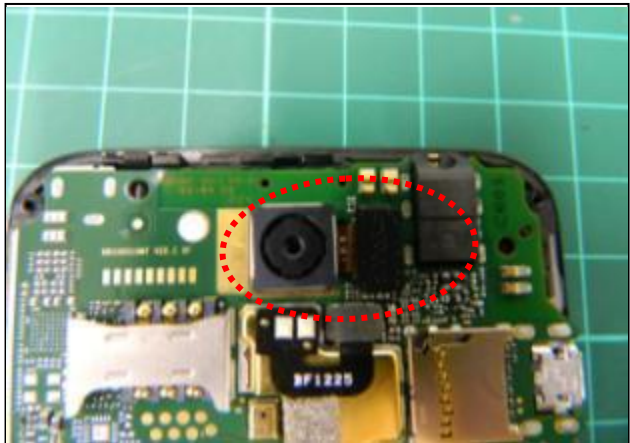
9. Press the edges of the shielding cover and install the shielding cover on the PCBA.



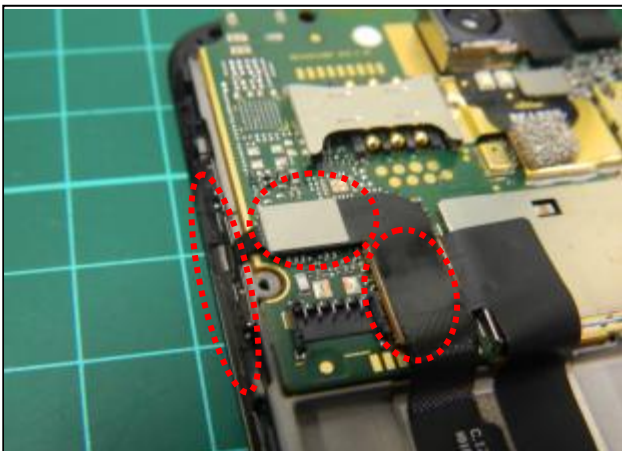
10. Engage the receiver FPC BTB with the PCBA BTB.



11. Install the PCBA. Target the PCBA positioning hole at the positioning column of the front cover and secure the PCBA tightly.



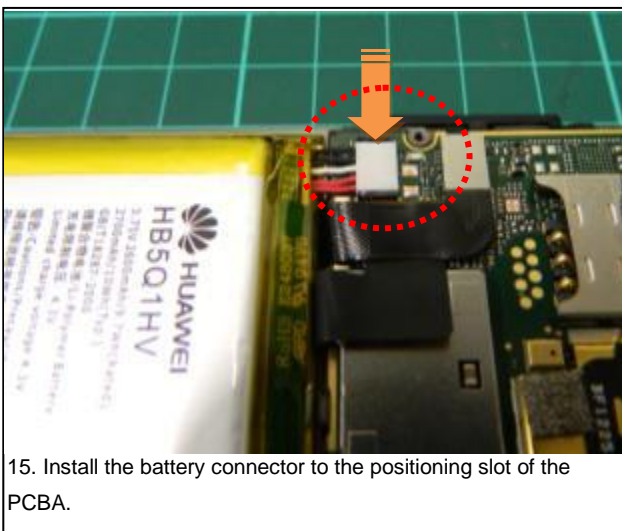
12. Install the main camera.



13. Engage the LCD FPC BTB with the main FPC BTB, and then attach the side key.



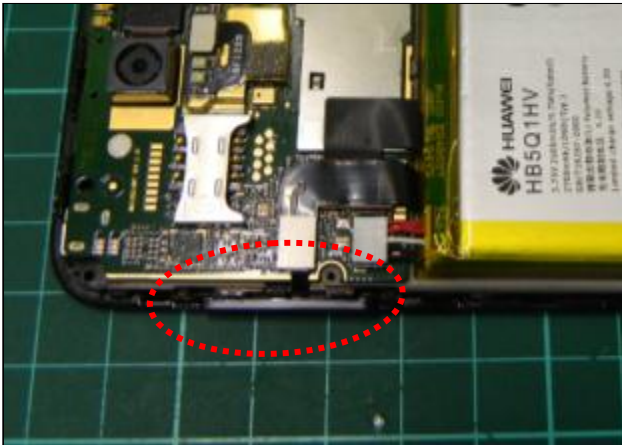
14. Install the battery.



15. Install the battery connector to the positioning slot of the PCBA.



16. Install the coaxial cable. Secure the header of the coaxial cable into the battery connector, install the coaxial cable along the positioning slot, and then secure the tail of the coaxial cable into the latch.



17. Install the side key.



18. Install the speaker without the shrapnel outward.



19. Install the rear cover.



20. Secure all screws in sequence and attach the warranty label at position 9.



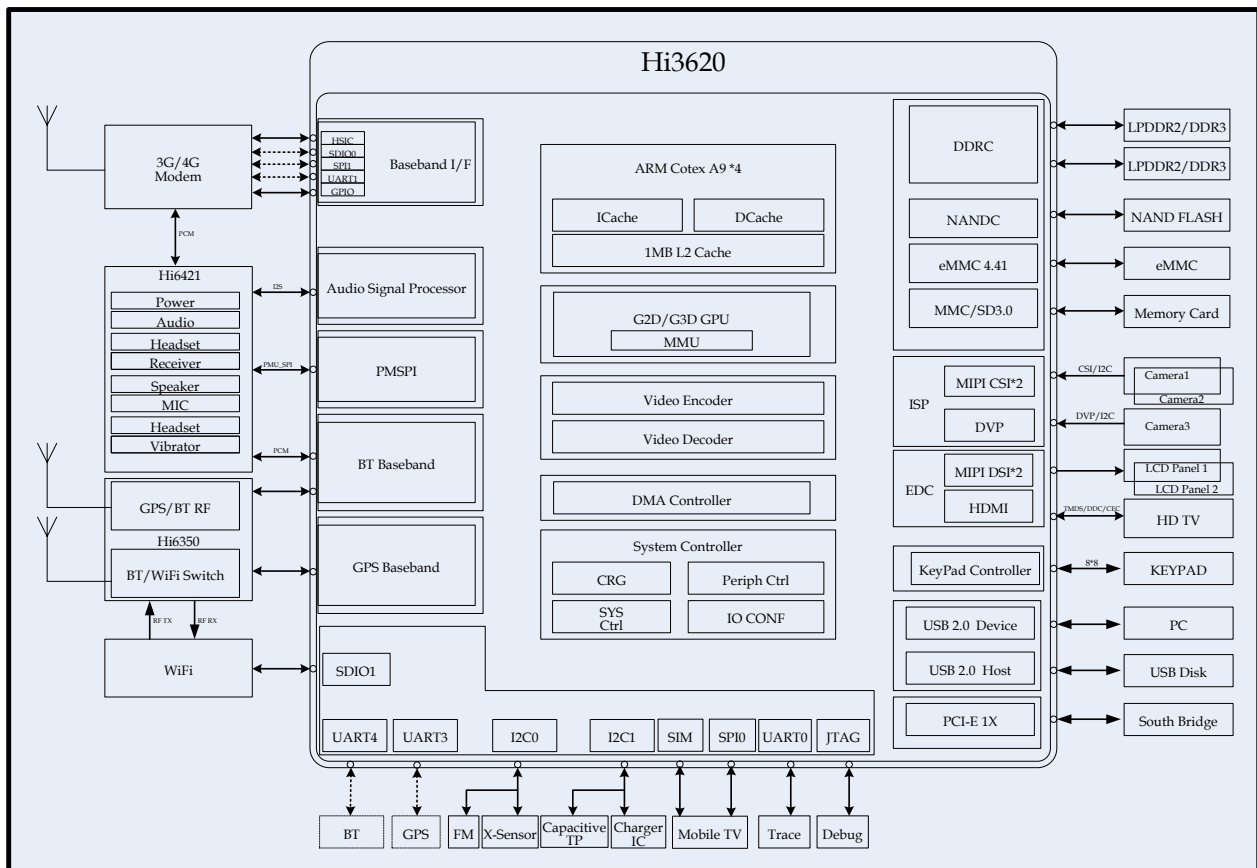
21. Install the battery cover.

9 Troubleshooting Common Faults

Before repairing a phone, ensure that the failure of the phone is not caused by environmental factors or incorrect functional settings, and it is recommended that you restore the fixed station to its default settings.

9.1 Principle

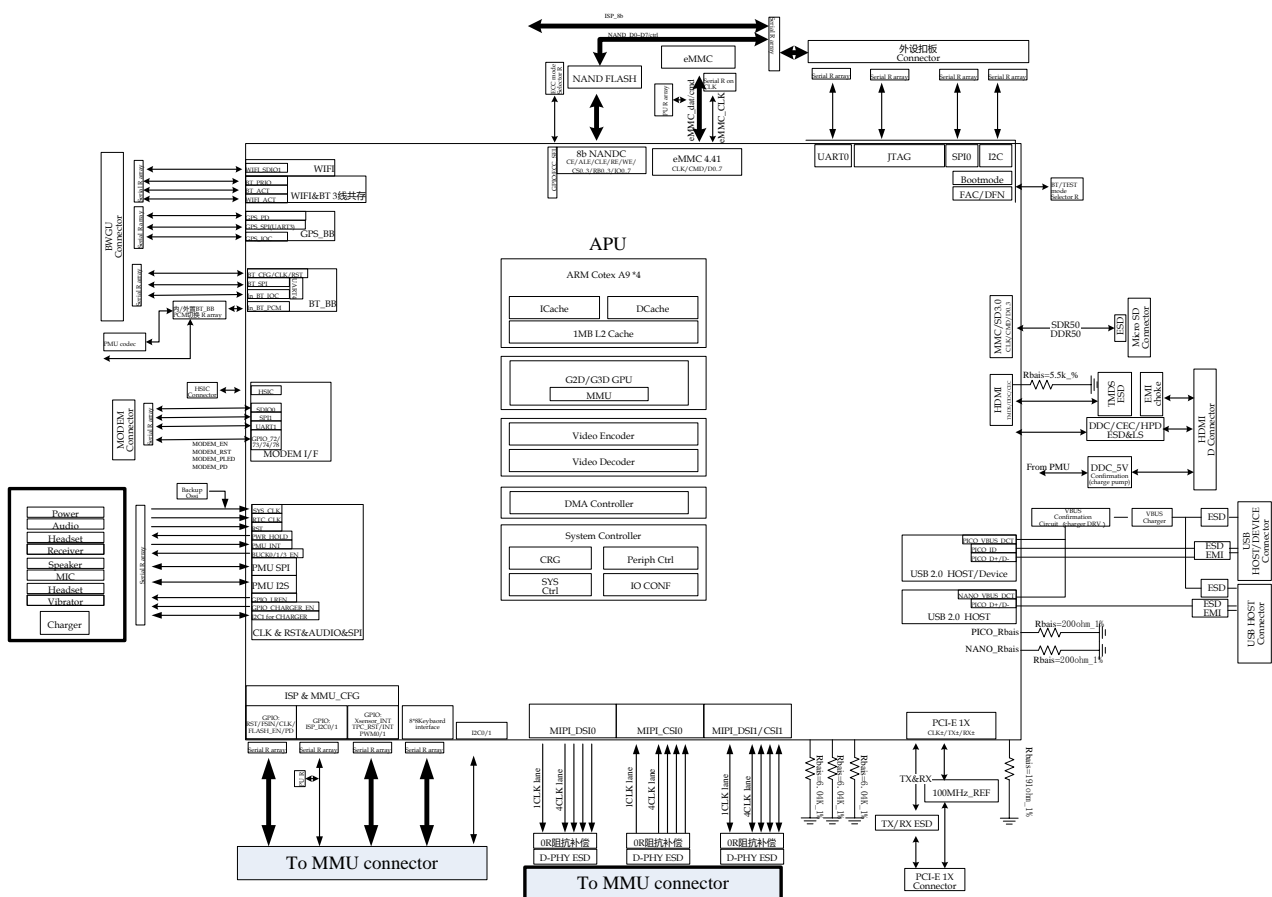
Figure 9-1 Phone circuit principle



As a bar-type smartphone in the AP+modem structure, the U9510E uses the K3 platform, four 1.4 GHz ARM Cortex-A9 cores, and two LPDDR2 ports to provide dual-channel services, improving the system performance. The U9510E's hardware structure can be divided into two parts: the AP subsystem, modem subsystem, and RF module. The K3 platform processes input and output of image, video, and connectivity signals and provides ports for keypads, LCDs, microSD cards, Bluetooth, and cameras. The HI6421 is the audio codec and PMU. The XGOLD626 is the modem that provides RF interfaces. The RF engine acts as the RF transceiver. The BCM4330 is a chip that transmits and receives Bluetooth, Wi-Fi, and FM signals. The BCM4751 is a chip that receives and processes GPS signals. The entire system consists of boards, phone components, and a built-in battery. Boards include the PCBA, upper FPC (HD1U9510LS), lower FPC (HD1U9510L), LCD module, 1 MB HD/8 MB camera module, motor, microphone, speaker, and receiver. Phone components include the Touch Lens, B cover, C cover, sound chamber, main antenna, GPS antenna, and Wi-Fi/Bluetooth antenna.

Figure 9-2 shows the hardware structure of the U9510E.

Figure 9-2 U9510E structure



By function, the PCBA can be divided into four subsystems: baseband (consisting of the AP, modem, and BB), RF, power, and user interfaces. The following table describes the subsystems' modules and units, as well as their functions.

Table 9-1 PCBA subsystems' modules, units, and their functions

Subsystem	Module	Unit	Function
Baseband subsystem	K3	AP subsystem	45 nm fabrication, dual ARM9 processors, supports the microSD card and UART/USIM card, incorporates functional modules, such as the I2C, HIS, MIPI, GPIO, HDMI, Smart reflex 2, and clocks
		User interface processing unit	Provides camera, PCM, broadband codec, RF, HKADC, LCD, microSD card, USB, UART, USIM card, HSI, MIPI, GPIO, JTAG/ETM, and keypad interfaces.
		Multimedia and game engine	The multimedia and game engine of the MSM7227 runs MPEG/JPEG hardware engine and game engine, JAVA accelerator, and provides MP3/MMS/MIDI functions
	X-GOLD626	Modem BB	40 nm digital baseband module with low-consumption SIP technology; modulates and demodulates WCDMA, GPS, and GSM signals; consists of the ARM processor, modem DSP, interrupt controller, and sleep controller.
		Modem PMU	65 nm fabrication; provides power supply for the modem BB; supports the reset function; two SMPS signals and eight LDO signals.
		Modem memory	MCP (1 GB + 256 MB)
	EMMC	EMMC feature, power consumption, file system support	Stores programs and NV items. Capacity: 8 GB or 4 GB
	DDR RAM	Power consumption	Provide storage space for running applications. Capacity: 512 GB.
RF subsystem	Transmission and receiving of WCDMA and GSM/DCS	Smartti-UE2	Performs the RF function of WCDMA signal reception and transmission, mainly including the RFMD RF chip, PMU, and the peripheral circuit.
	GPS	GPS receiving	Receives and processes GPS signals, mainly including Broadcom4751 chip and its peripheral circuit.
	Bluetooth interface	Bluetooth module	Transmits and receives the Bluetooth baseband function and RF signals, mainly including Broadcom4330 Bluetooth and peripheral circuit.
	Wi-Fi interface	Wi-Fi module	Transmits and receives the WIFI baseband and RF, mainly including Wi-Fi of Broadcom4330 chip and the peripheral circuit.
	Oscillator and frequency synthesizer	26 MHz TCVCXO and control circuit	Generates the highly accurate, 26 MHz local reference clock TCVCXO.

Subsystem	Module	Unit	Function
	Antenna	External antenna, internal interface component, antenna protection	The phone provides internal antenna for signal transmission and supports WCDMA high and low frequency bands. The VIVA phone antenna includes the main antenna, Wi-Fi/Bluetooth antenna, and GPS antenna.
User interface subsystem	UART interface		In the AP subsystem, interface UART1 is used for the modem subsystem, interface UART2 is used for Bluetooth and GPS functions, interface UART3 is used for commissioning, and interface UART4 is used for the audio noise reduction chip ES305.
	USB interface	Driver, protection circuit, output interface component	Indicating the peripheral circuit of USB interface in the AP, modem, and MHL subsystems, and unit circuits such as protection circuit and interface connectors. The major data service channel for the engineering sample, and can be used to debug and test devices during R&D.
	USIM card interface	Power supply, protection circuit, USIM card holder	Mainly includes the USIM card holder and related connection circuits.
	Keypad and backlight	Keypad driver circuit, external keypad, backlight LED control circuit	Performs interruption monitoring on volume keys using GPIO and provides a side backlight LED. The backlight is on when a key is pressed.
	Color LCD and backlight	LCD driver, interface mode, and backlight control	Main screen, 16,000,000 colors
	microSD card	Power supply, protection circuit, connector	Mainly includes microSD card connector and related interface circuit.
	Speaker	Driver mode, connection mode, speaker component	The power of the speaker that plays polyphonic ringtones when there is an incoming call can be 500 mW. It has a sound frequency function that can play 20 Hz to 20 kHz ringtones. It can also play mono-audio MP3 files.
	receiver	Driver mode, connection mode, receiver component	The power of the receiver for calls must be less than 30 mW.
	Microphone	Interface circuit, connection mode, microphone component	Built-in microphone, with dual silicon microphone noise reduction.
	Earphone	Earphone, headset interface circuit, microphone interface circuit	The phone provides a headset jack to output audio or MP3 files. The microphone on the headset cable picks up audio.

Subsystem	Module	Unit	Function
	Vibration motor interface	Driver mode, connection mode, motor	When there is an incoming call, the motor can vibrate to notify the user of the call.
	Accelerometer	I2C interface control	Senses acceleration to help implement game functions
	Gyroscope	I2C interface control	Three-axial rate sensor
	Compass	I2C interface control	Geomagnetic sensor
	Proximity sensor	I2C interface control	Senses the ambient light and proximity light.
Power subsystem	Internal backup battery	Li-ion battery, interface component	Li-ion battery with standard output of 3.75 V/2600 mAh. It is required that the charge/discharge lifecycle is over 500 times. The battery should pass the following authentication: GB18287 safety requirements (Li-ion battery)
	External power supply (travel charger)	Adapter and interface component	The charger meets the requirements of China, Europe, the USA, and Australia: 90–240 V, 45–55 Hz, AC input. The model differs with different markets. The output voltage of the charger is 5 ± 0.25 V. The charger passes certification such as the CE certification, China Compulsive Certification, FCC, and A-tick certification. The charger's output current must be able to charge the battery and supply power to the phone for normal operation at the same time.
	Power distribution network and power management function	Power distribution network	Includes filter networks and PCB traces for the power supply
		Backup battery management, charge circuit, charge mode, charge protection	Manages battery charging and discharging, provides overcharging and over-discharging protection, and charges the battery that maintains RTC current
		Board circuit power management (power-on/off analysis)	Mainly indicates LDO, which manages power supply flexibly. Based on the service status and the requirements of the protocols and power-saving analysis, the board software manages the power supplies to the units on the board to reduce power consumption. A 32 KHz sleep clock is provided.
	Enhanced functions	RTC	The built-in RTC circuit uses a sleep clock of 32.768 kHz to provide precise time.
		HKADC	Supports the input of 17 10 bit/s analog signals.
		Dual I2C interfaces	Controls I2C and Smart reflex I2C.
		UVLO	Low-voltage power-off function. When the input voltage is lower than the threshold for a specific period, the phone powers off.

Subsystem	Module	Unit	Function
		WDT reset	Supports the WDT counter overflow reset function.
		Overheat protection	When the on-chip junction temperature exceeds 150 ℃, the phone powers off.
		Internal driver circuit	Provides four LED drivers, one vibrator driver, and one speaker driver.
		Interrupt management	The built-in interrupt manager handles related interrupt signals.
		USB driver	The U9510E's has a built-in OTG USB driver that supports USB 2.0 HS and /B interface. Its software supports the OTG function.

9.2 Startup Failure

Detect the faulty phone and locate the fault. The possible faults are as follows:

1. No voltage output caused by battery damage, protection with startup caused by low voltage, or installation defects of battery connection components.
2. Startup failure caused by PCBA faults.
3. Seeming startup failure caused by LCD damage.
4. Seeming startup failure caused by power key FPC faults. (The power key is disabled.)

Identification methods:

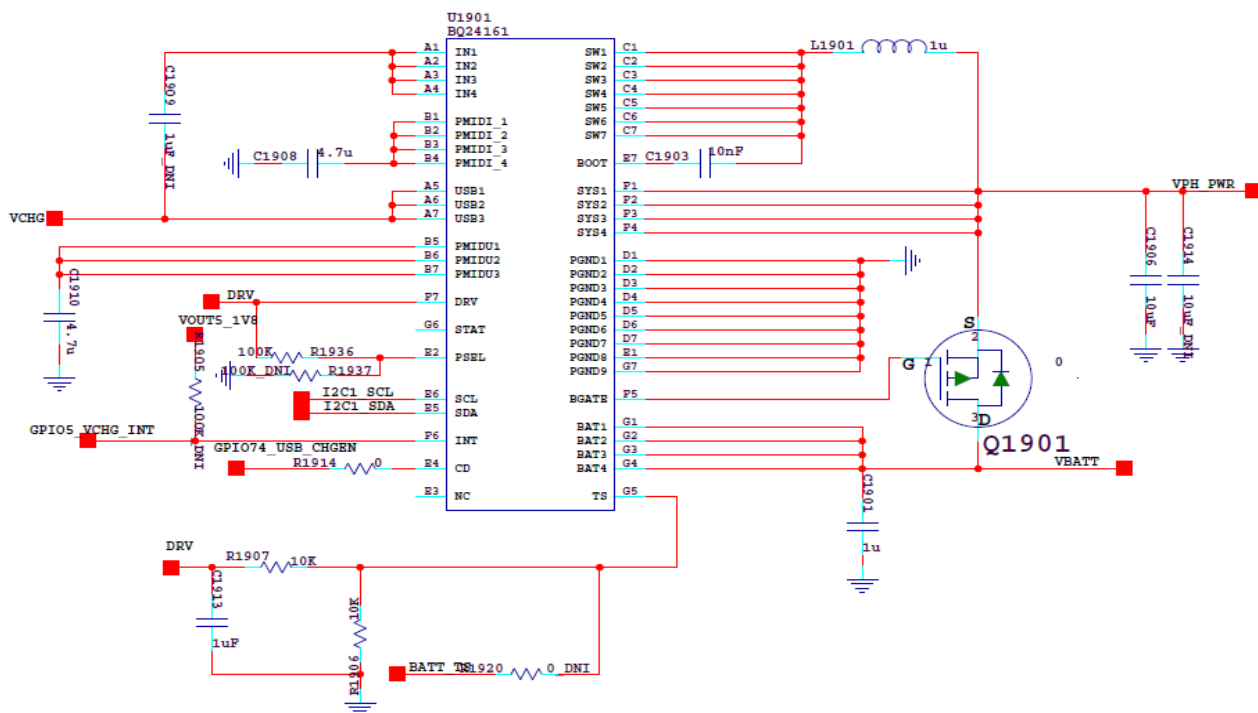
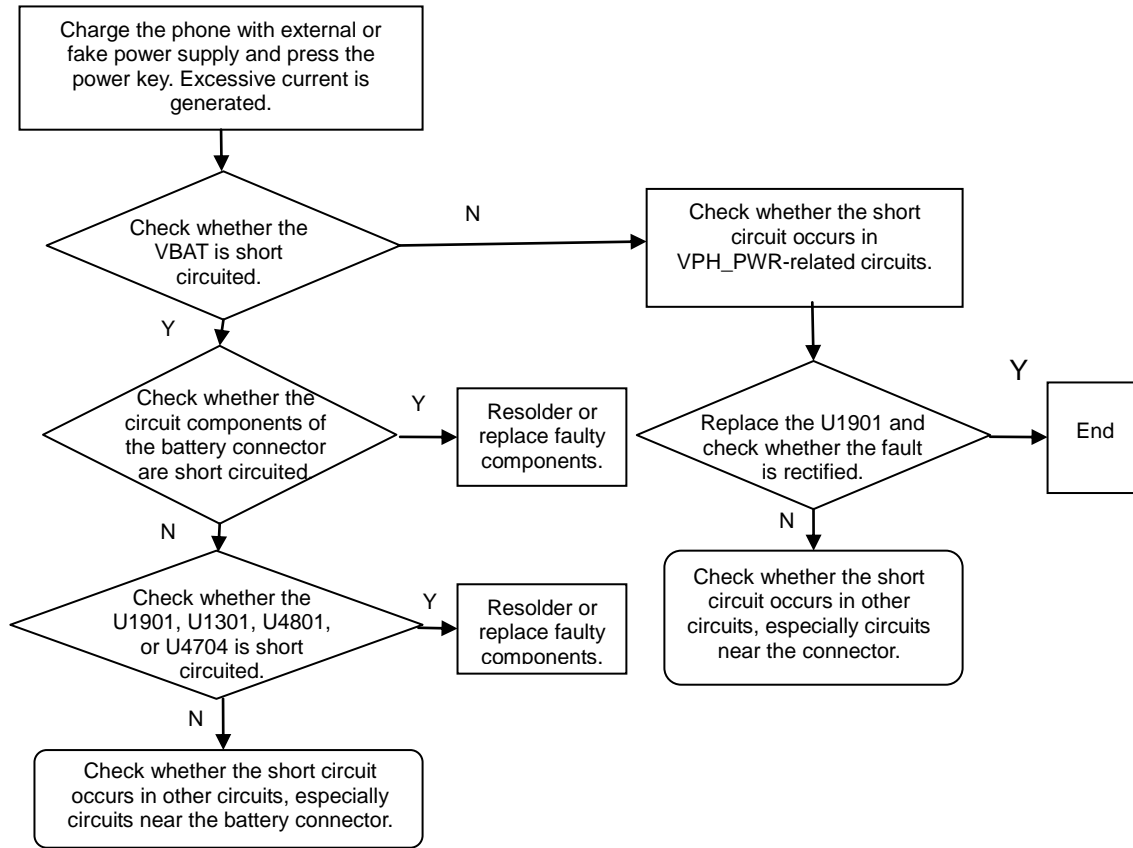
1. Check whether the motor vibrates after the power key is pressed. If it vibrates, the fault is LCD damage. Then replace the LCD to identify the fault.
2. Use a USB charger to charge the faulty phone and check whether the fault occurs in the power key FPC, battery, or PCBA. If it is power key FPC fault or battery fault, the charging interface will be displayed after the USB power is connected.
3. If no charging interface is displayed and the battery is not faulty, the fault may occur in the main board. Then disassemble the phone to detect it. After confirming that the battery and the power key FPC are normal, it is considered that the PCBA is damaged.

For PCBA damage, you can charge the phone with external power supply, and then power on the phone to detect current to identify the possible fault reason.

It is involved in any of the following three conditions: excessive current, weak current, and no current.

9.2.1 Excessive Current (DC Power Supply)

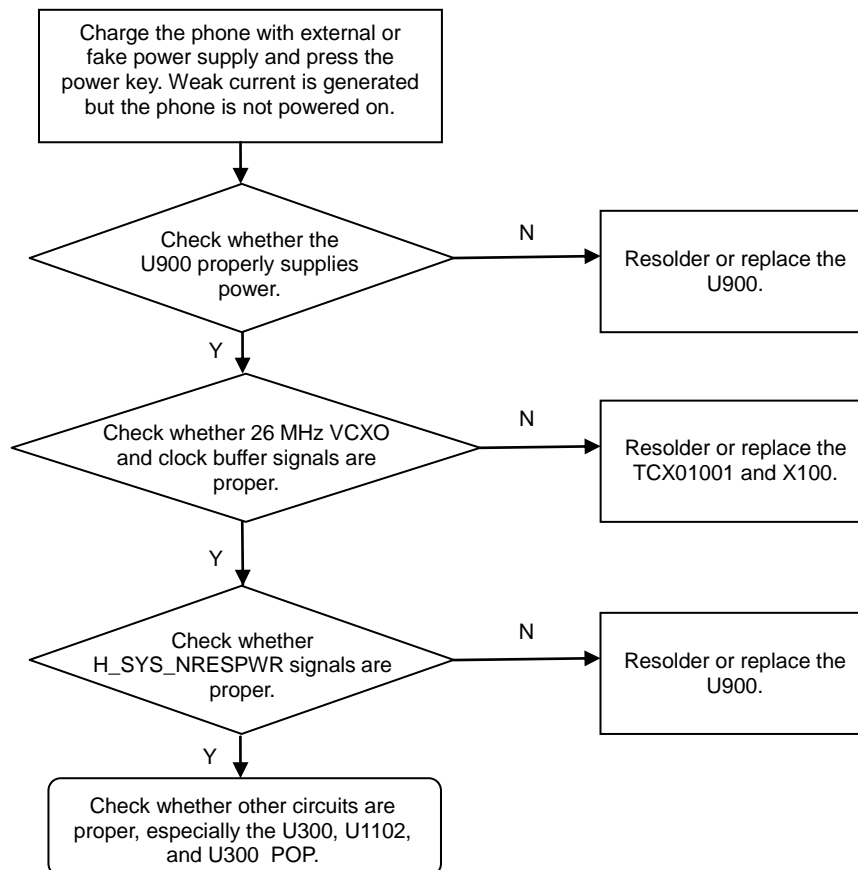
Excessive current is mainly caused by short circuits. When the phone is charged by DC power supply, the current is about or greater than 500 mA. (Generally, it can achieve the output protection value of the external power supply.) The main reason is ground short circuits of VBAT and VPH_PWR.

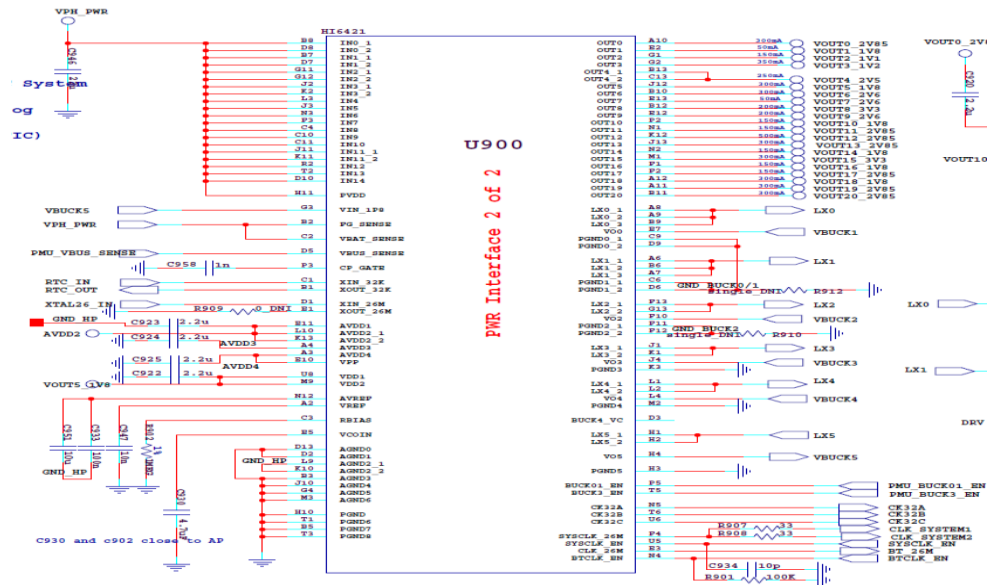
Figure 9-3 Troubleshooting procedure for excessive current


9.2.2 Weak Current (DC Power Supply)

After the phone is powered on, if weak current is generated, partial short circuits may exist on the PM. If the system does not start normally and reserve certain current, it may be caused by main chip or MEMORY fault that results in the system boot failure. The current is between 20 mA and several hundreds mA.

Figure 9-4 Troubleshooting procedure for weak current



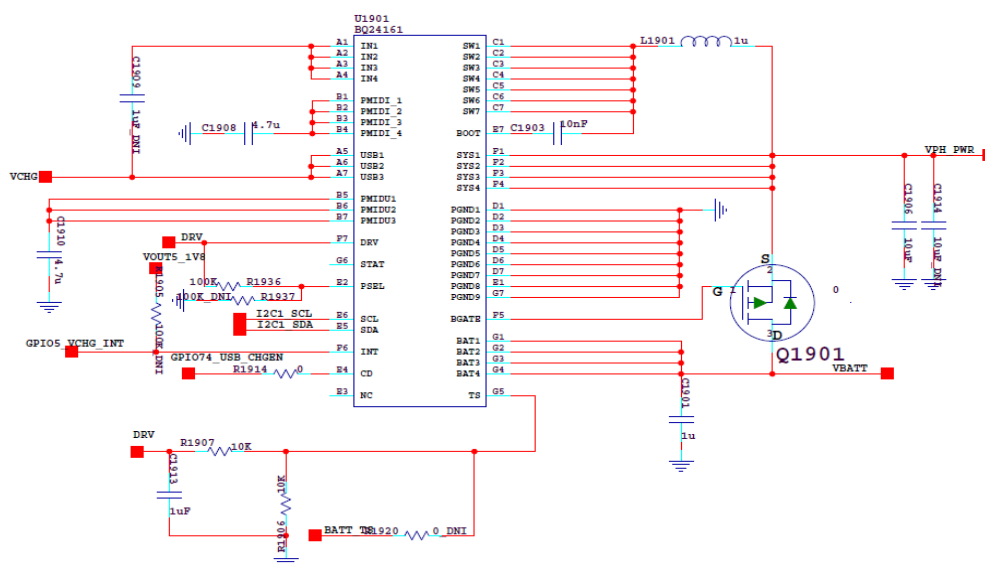
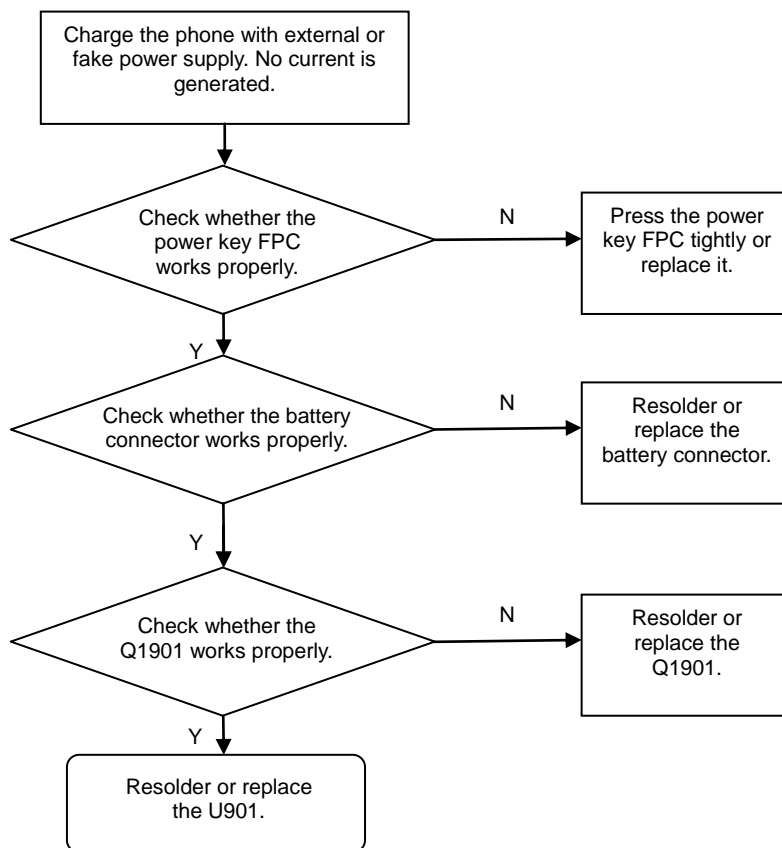


The common power supplies are as follows:

Name	Voltage	Current	Function
VOUT0	2.85V	300mA	MLC NAND/eMMC
VOUT1	1.8V	50mA	26M Oscillator
VOUT2	1.1V	150mA	
VOUT3	1.2V	350mA	SYS-PHY + HSIC-PHY + DIG.+SOC S
VOUT4	2.5V	250mA	MIPI+USB2.0+PCIe+PLL Analog
VOUT5	1.8V	300mA	Hi3620 1.8V I/O (BT&GPS RFIO
VOUT6	2.6V	300mA	Hi3620 2.6V I/O
VOUT7	2.6V	50mA	Hi3620 SD I/O
VOUT8	3.3V	200mA	USB PHY
VOUT9	2.6V	200mA	Efuse Power
VOUT10	1.8V	150mA	BT RF&PA
VOUT11	2.85V	150mA	GPS RF&PA
VOUT12	2.85V	500mA	SD Card
VOUT13	2.85V	300mA	CMMB
VOUT14	1.8V	150mA	WIFI I/O
VOUT15	3.3V	300mA	WIFI Core&PA
VOUT16	1.8V	150mA	LCD I/O
VOUT17	2.85V	150mA	LCD Analog
VOUT18	1.8V	300mA	Camera I/O
VOUT19	2.85V	300mA	LCD Camera Analog
VOUT20	2.85V	300mA	LCD Camera VCM
VBUCK1	1.1V	4000mA	A9 Core
VBUCK2	1.1V	1400mA	GPU
VBUCK3	1.1V	1100mA	Peripheral
VBUCK4	1.2/1	800mA	LPDDR2/AP IO
	1.8V	500mA	Low Voltage LDO

This fault is caused because the power supply channel is not established or poorly soldered, or circuits related to the power key are faulty.

Figure 9-5 Troubleshooting procedure for no current



9.3 No Charging

The U9510E employs dedicated charging chip BQ24161 for charging control. If the system is operating normally but fails to be charged, check circuits in the charging management module, or replace U1901 to check whether this fault is fixed. If not, replace U1301 and check again.

Figure 9-6 Conceptual diagram of the charging circuit

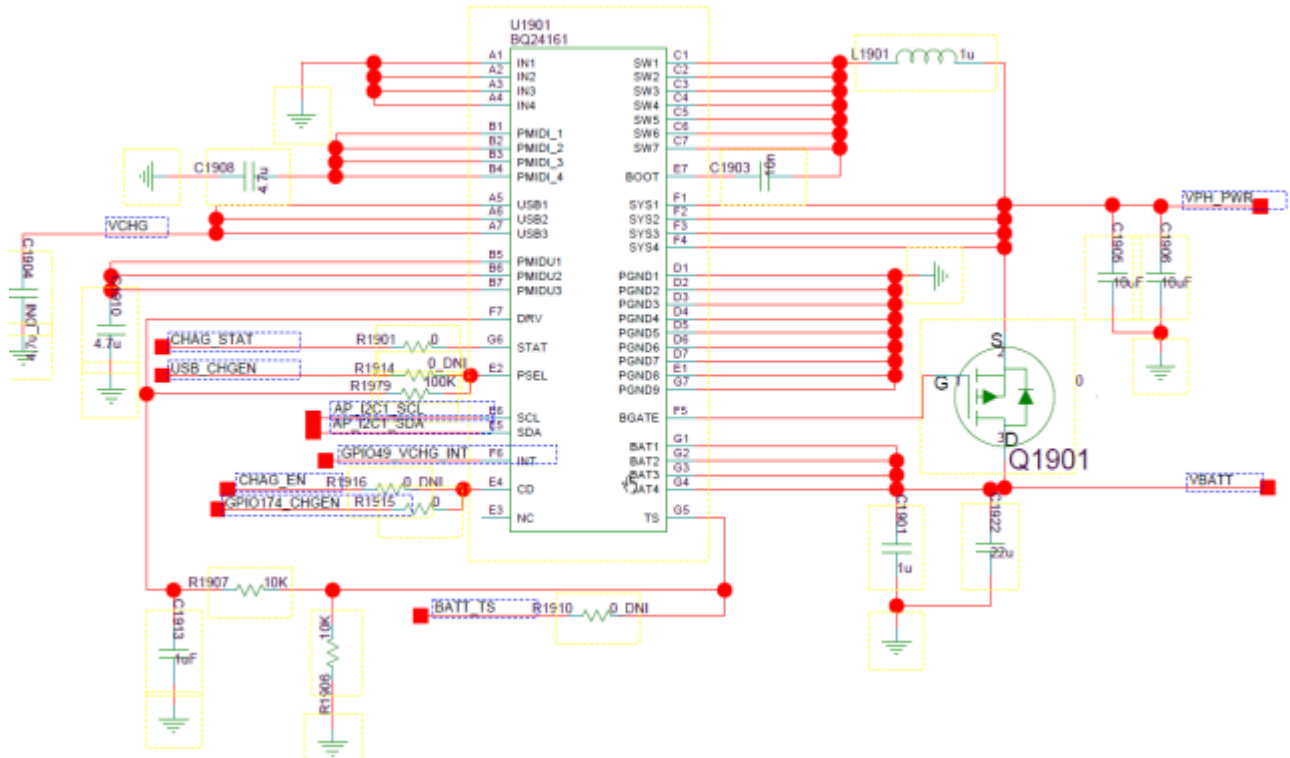
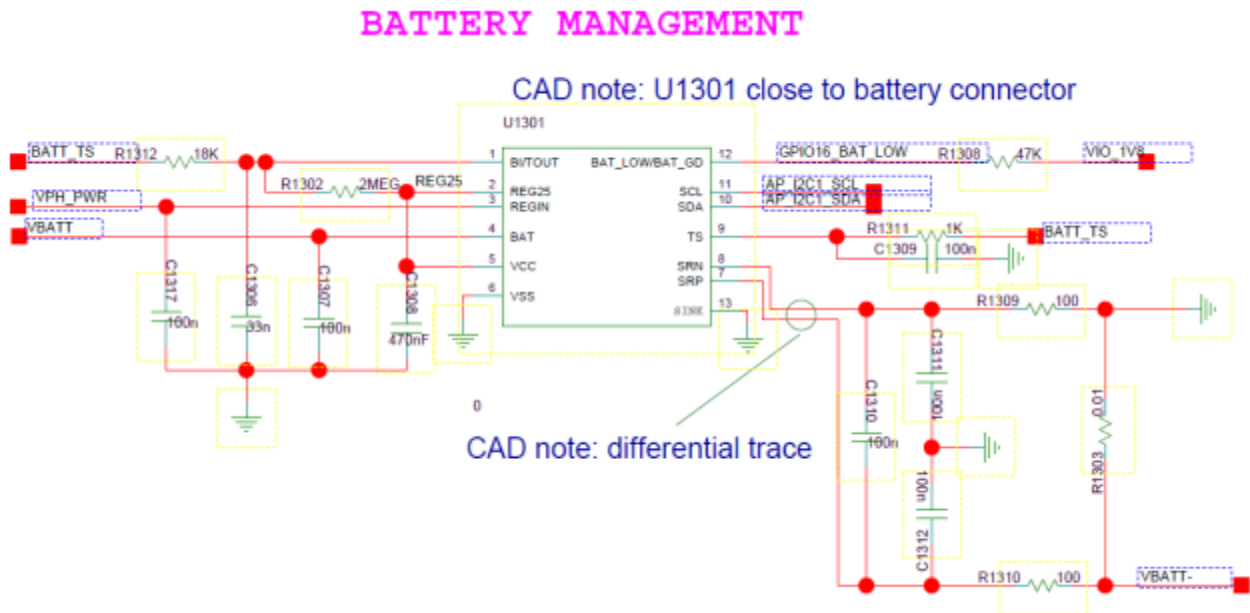
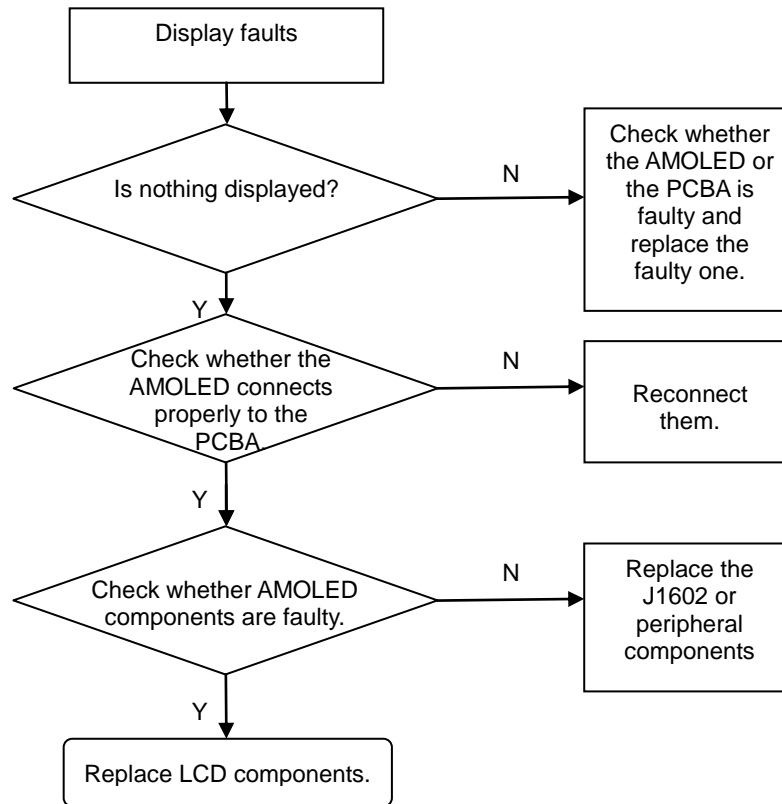


Figure 9-7 Conceptual diagram of the battery meter



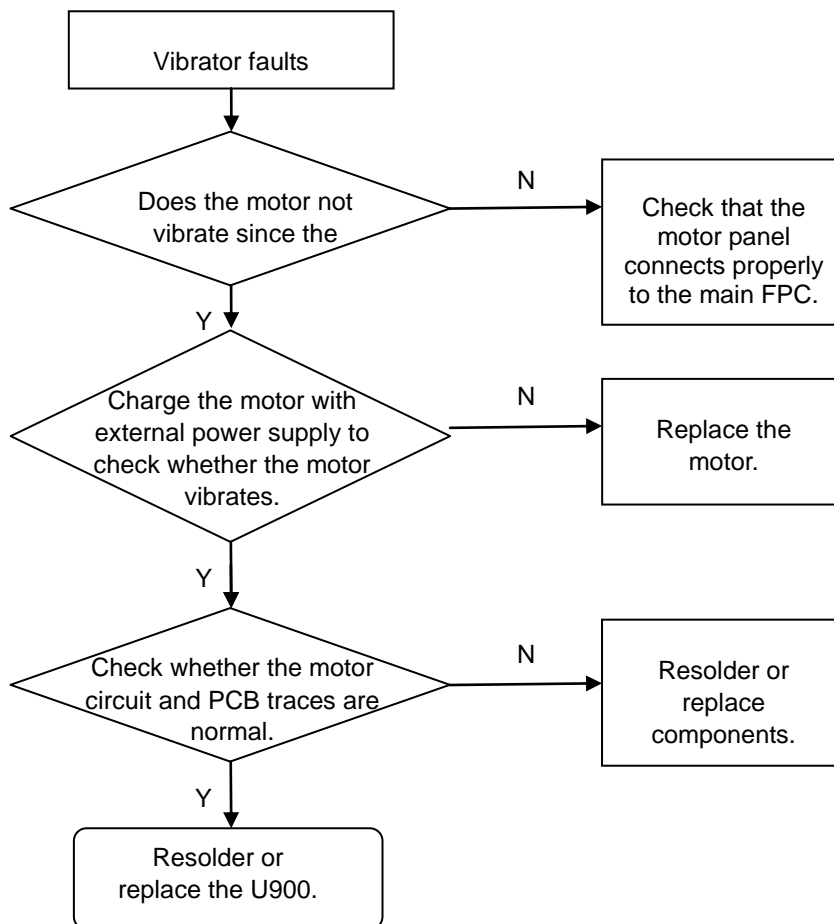
9.4 Display Faults

Figure 9-8 Troubleshooting procedure for display faults



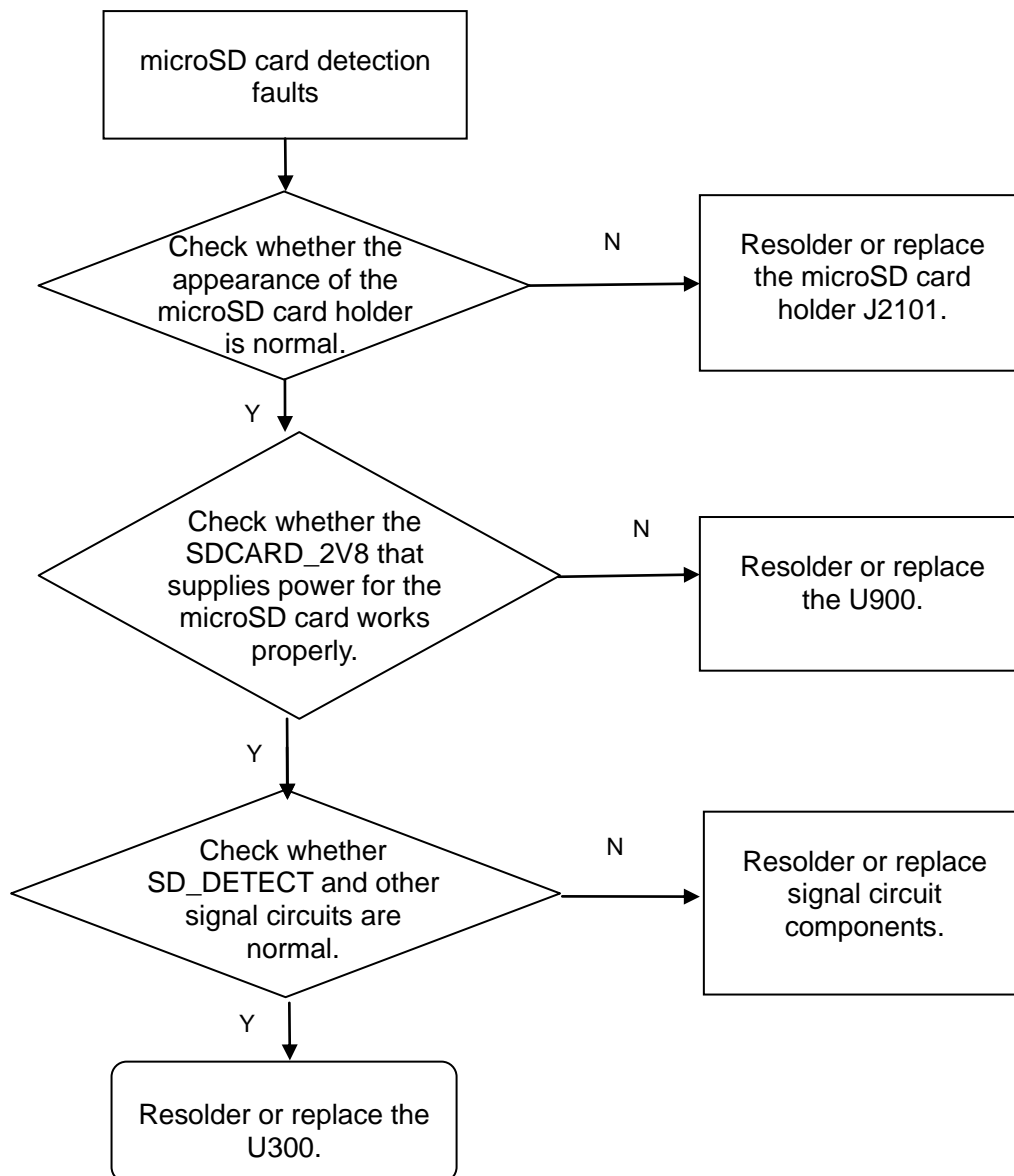
9.5 Vibrator Faults

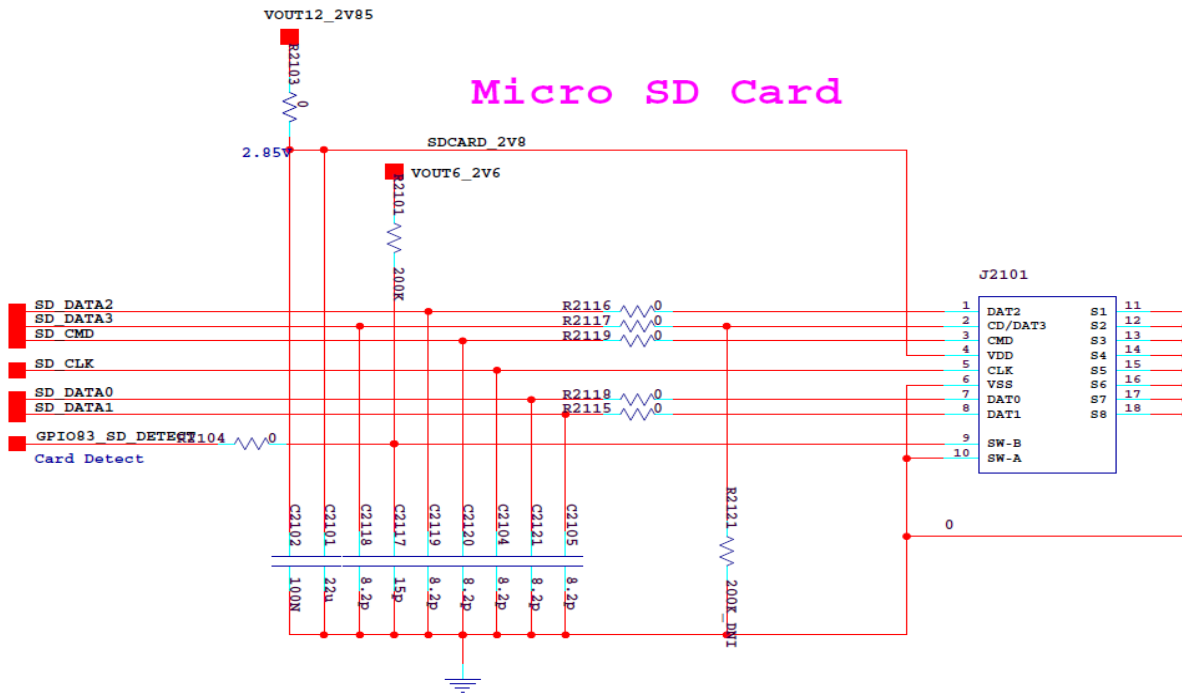
Figure 9-9 Troubleshooting procedure for vibrator faults



9.6 MicroSD Card Detection Faults

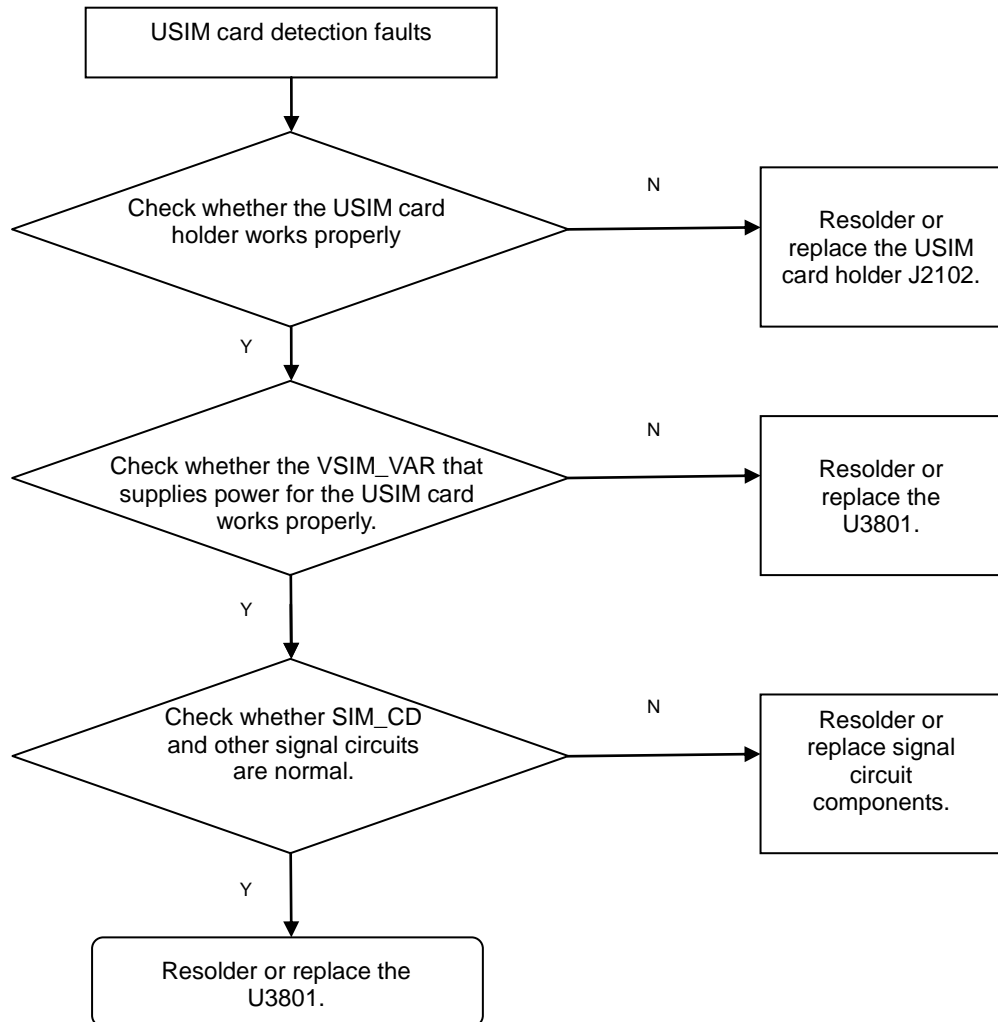
Figure 9-10 Troubleshooting procedure for microSD card detection faults





9.7 USIM Card Detection Faults

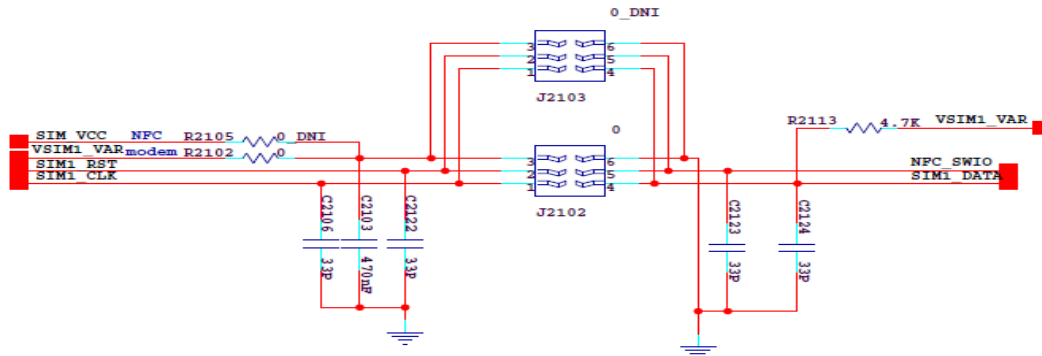
Figure 9-11 Troubleshooting procedure for USIM card detection faults



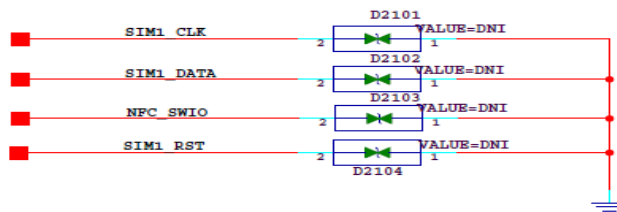
SIM Card

J2102's specifically for single SIM card project usage

J2103's specifically for dual SIM card project usage



SIM Card ESD Protect

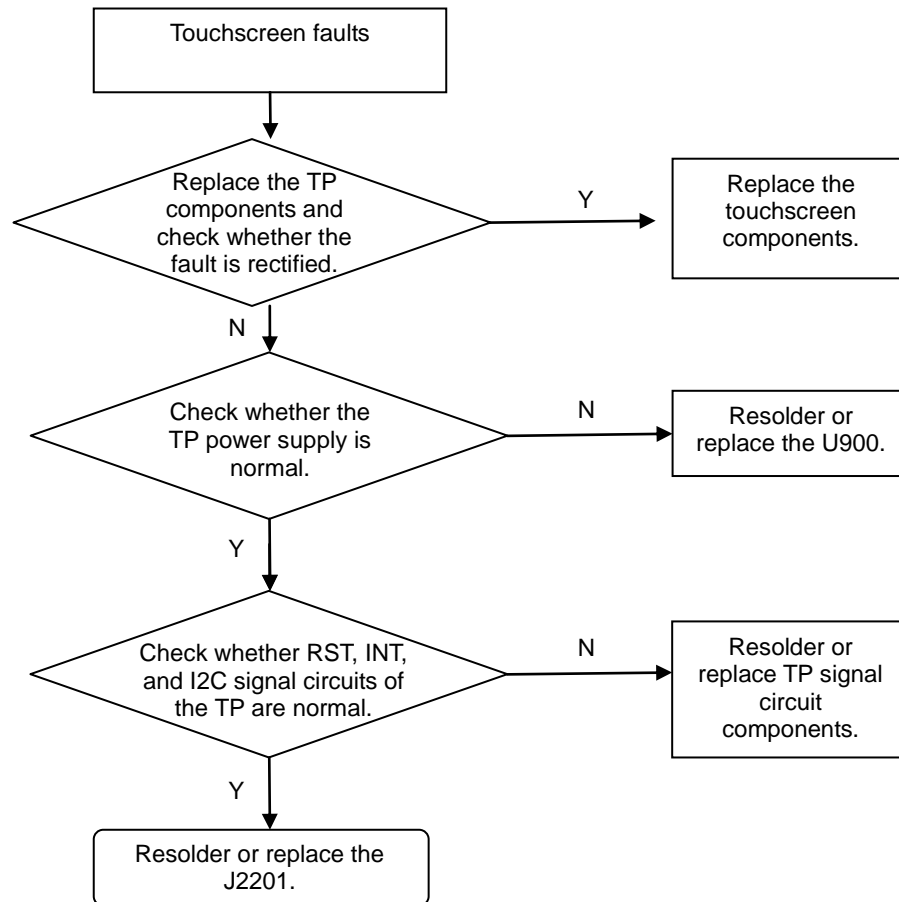


9.8 Touchscreen Faults

The touchscreen fault mainly be reflected as touchscreen unlocking failure while the LCD display is normal.

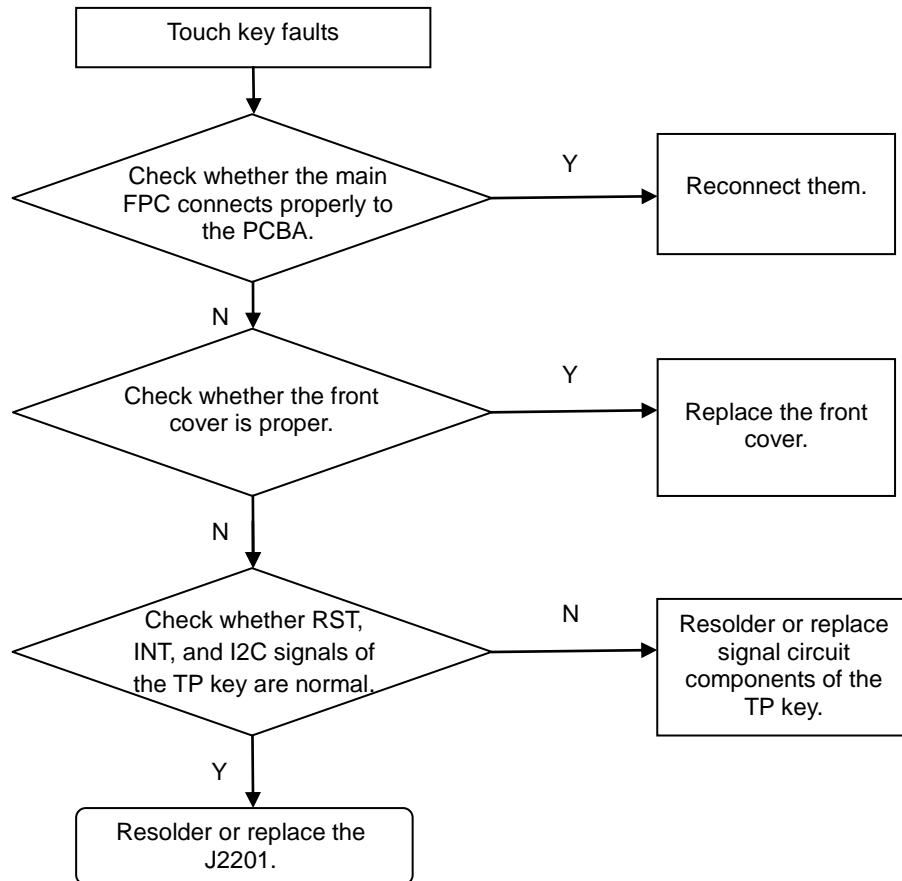
The TP components have great independence and multiplex power supply and communication interfaces with other circuits; therefore, you can replace the LCD and touchscreen module to identify that is touchscreen fault or PCBA-related circuit fault.

Figure 9-12 Troubleshooting procedure for touchscreen faults



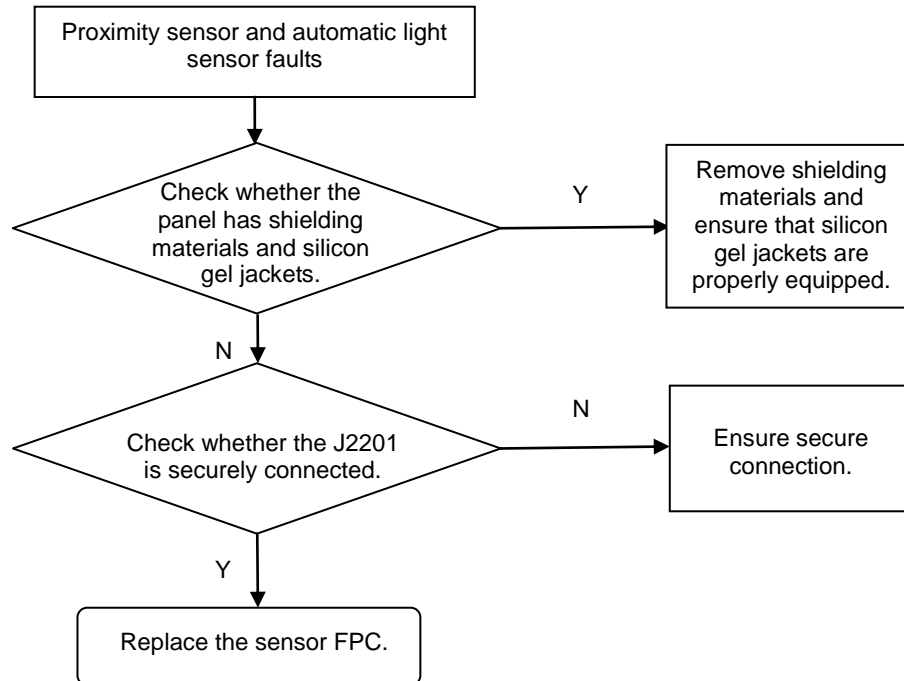
9.9 Touch Key Faults

Figure 9-13 Troubleshooting procedure for touch key faults



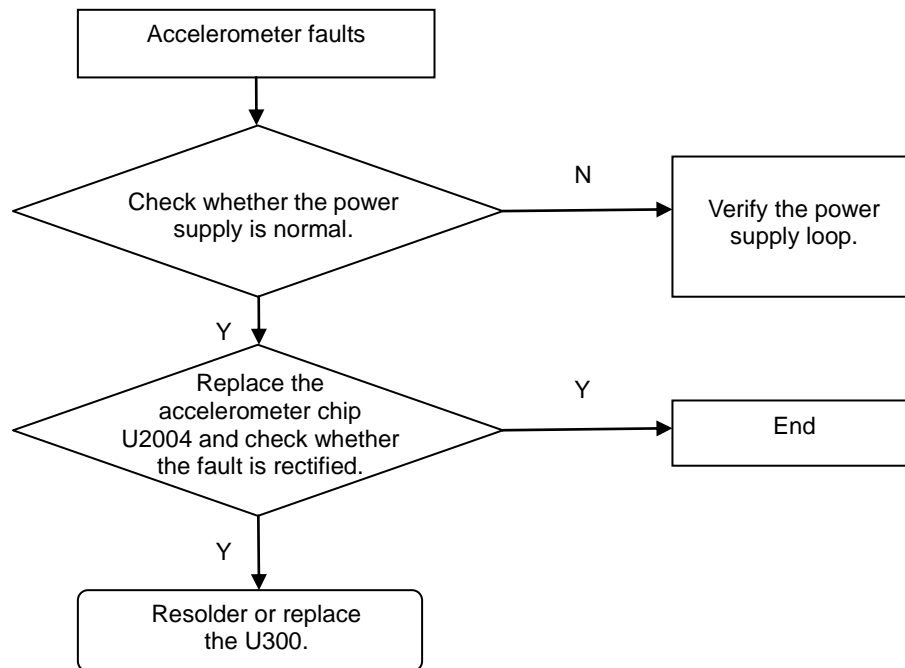
9.10 Proximity Sensor and Automatic Light Sensor Faults

Figure 9-14 Troubleshooting procedure for proximity sensor and automatic light sensor faults



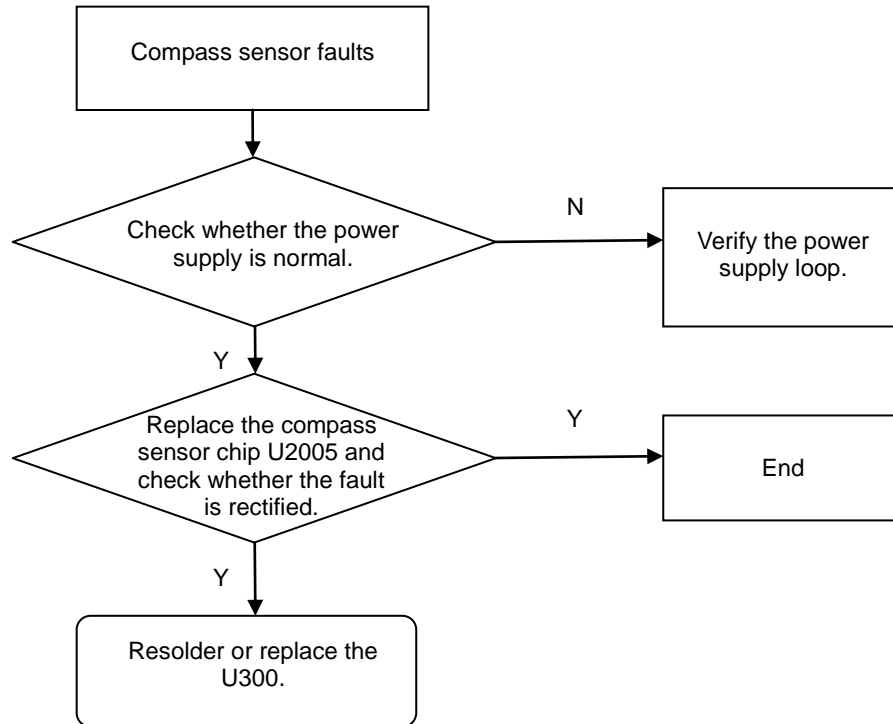
9.11 Accelerometer Faults

If the accelerometer is faulty, the compass sensor does not work either, because the compass sensor software operates depending on the accelerometer. This can be treated as an identification basis.

Figure 9-15 Troubleshooting procedure for accelerometer faults

9.12 Compass Sensor Faults

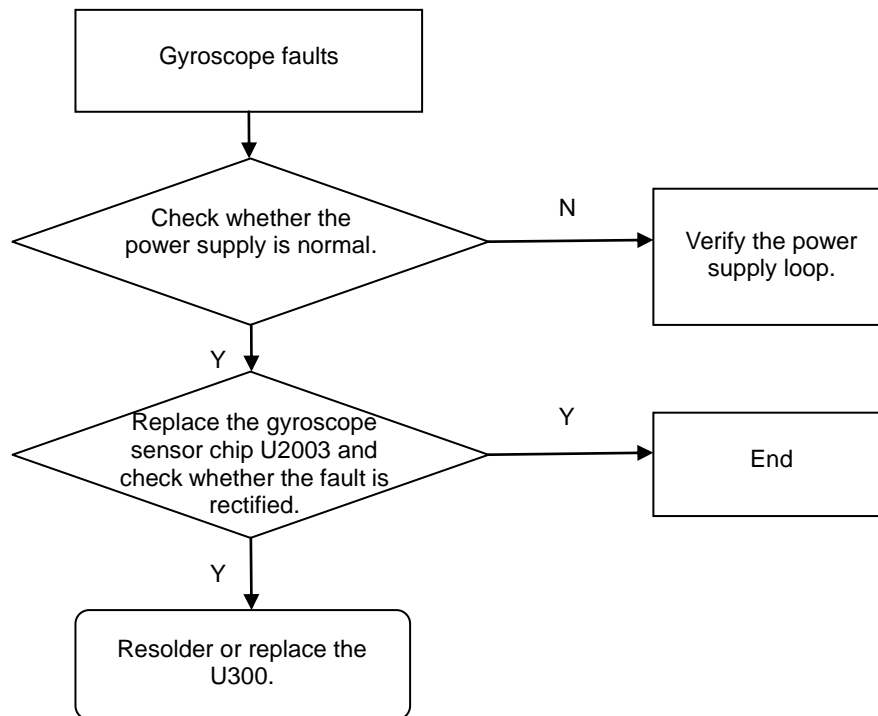
Figure 9-16 Troubleshooting procedure for compass sensor faults



9.13 Gyroscope Faults

The gyroscope is also called the angular rate sensor and mainly used to test the angular variation. If the gyroscope is faulty, users fail to take turns effectively when they are playing racing games. Therefore, you can determine whether the gyroscope is faulty by playing racing games.

Figure 9-17 Troubleshooting procedure for gyroscope faults



9.14 Camera Faults

First, use the software to identify it is a front camera fault or rear camera fault.

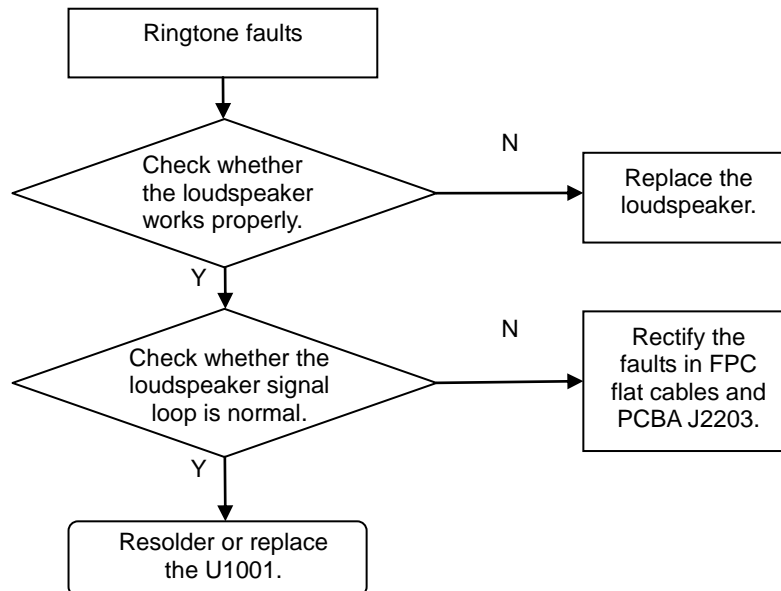
Currently, the camera components are connected in BTB mode. The front and rear cameras share a main cable. If only one camera is abnormal, it is considered as a single component fault, and you can detect the fault by replacing the camera.

If both the two cameras are not working, check whether the software is able to detect the camera and whether power is supplied normally. If the cameras are not detected or power is supplied abnormally, detect the relevant circuits of the PCBA.

9.15 Audio Faults

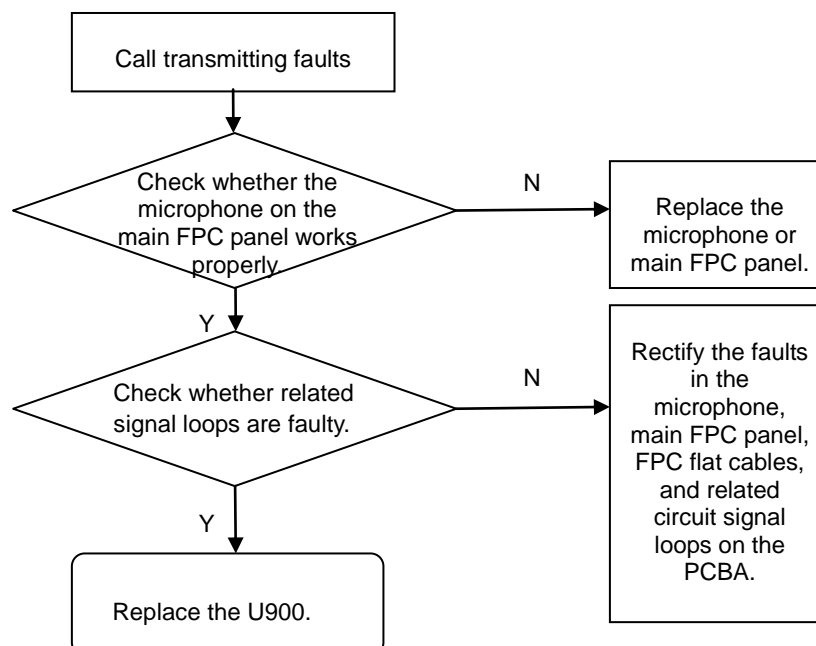
9.15.1 Ringtone Faults

Figure 9-18 Troubleshooting procedure for ringtone faults



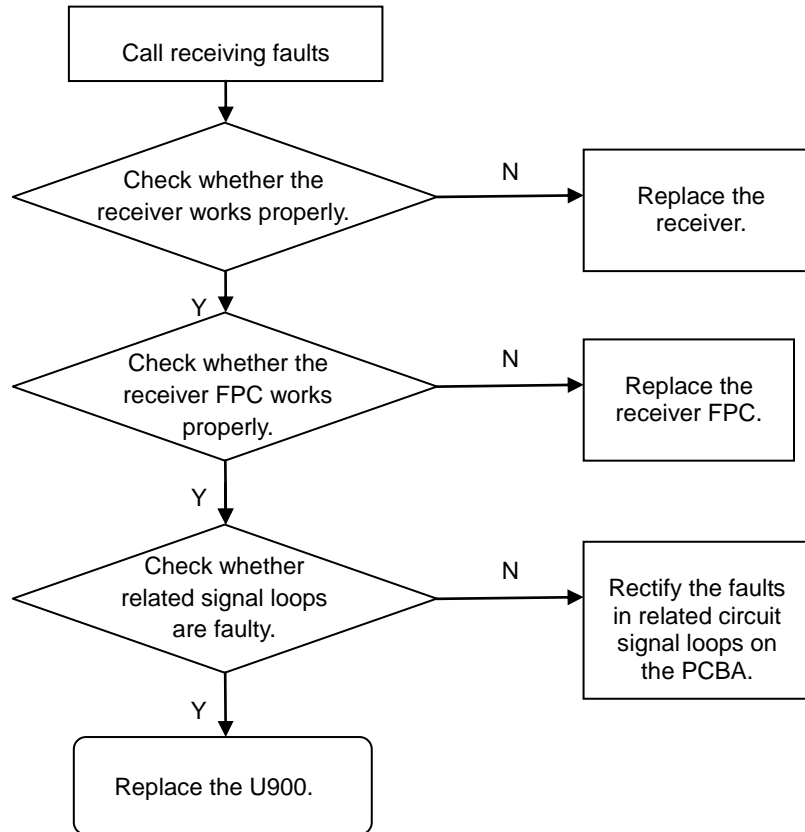
9.15.2 Call Transmitting Faults

Figure 9-19 Troubleshooting procedure for call transmitting faults



9.15.3 Call Receiving Faults

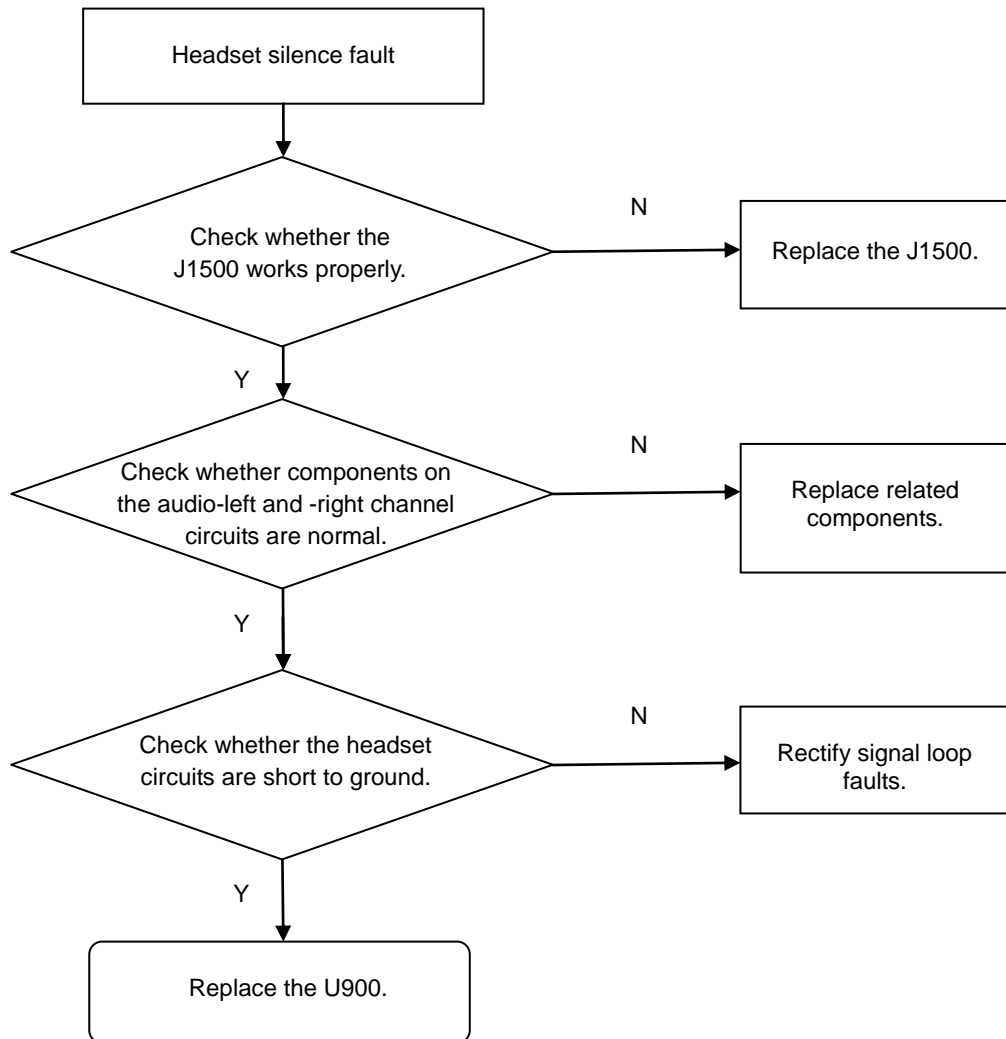
Figure 9-20 Troubleshooting procedure for call receiving faults



9.16 Headset Audio Faults

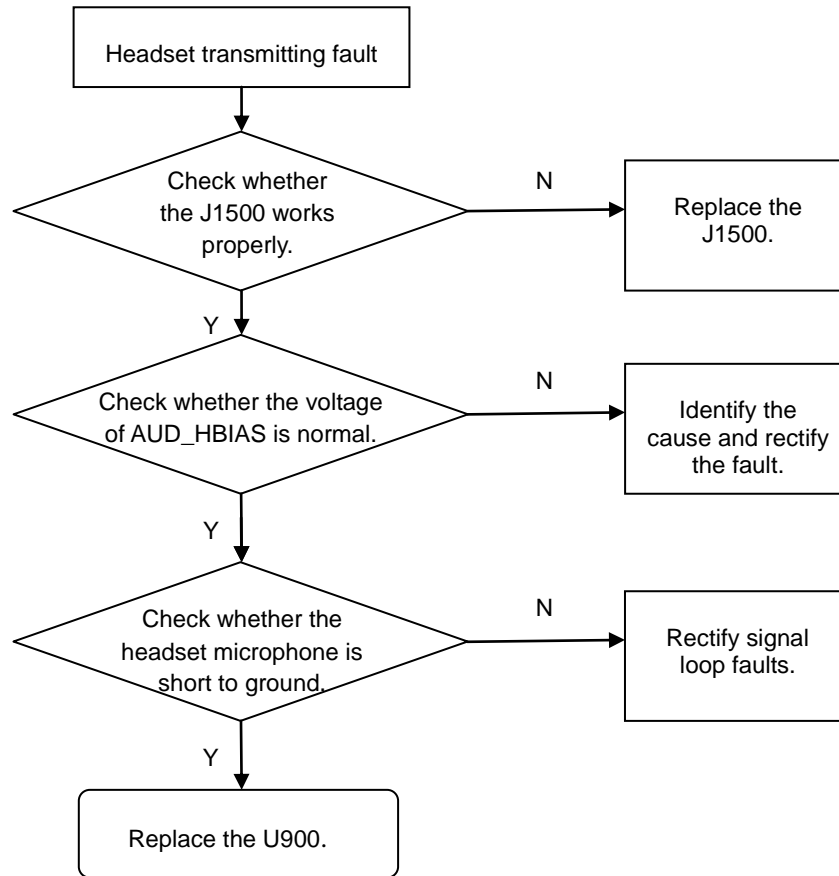
9.16.1 Headset silence fault

Figure 9-21 Troubleshooting procedure for the headset silence fault



9.16.2 Headset Transmitting Fault

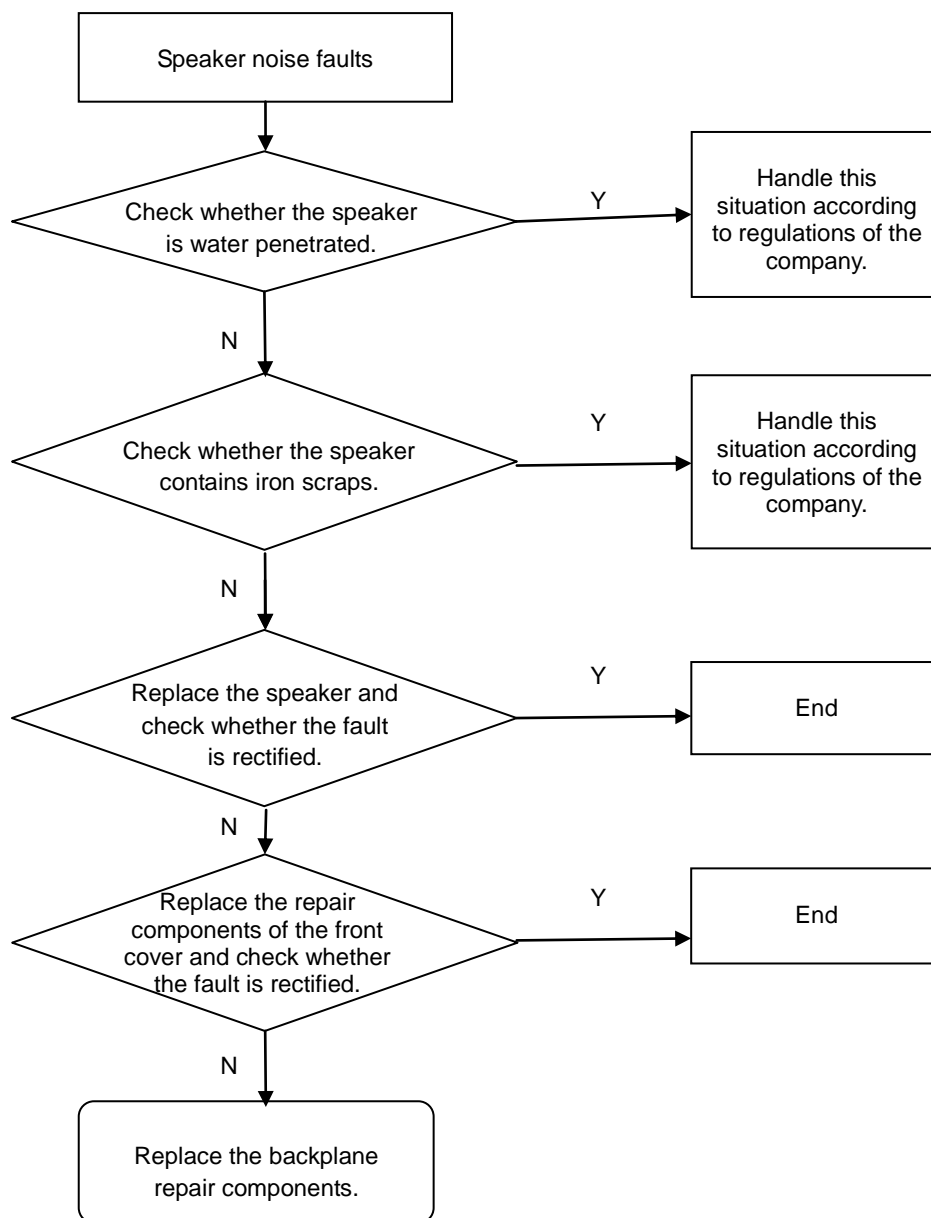
Figure 9-22 Troubleshooting procedure for the headset transmitting fault



9.17 Speaker Noise Faults

If the speaker is water penetrated or contains impurities such as iron scraps, noise may occur on the speaker.

Figure 9-23 Troubleshooting procedure for speaker noise faults



9.18 Wi-Fi/Bluetooth Faults

Figure 9-24 Troubleshooting procedure for Wi-Fi/Bluetooth faults

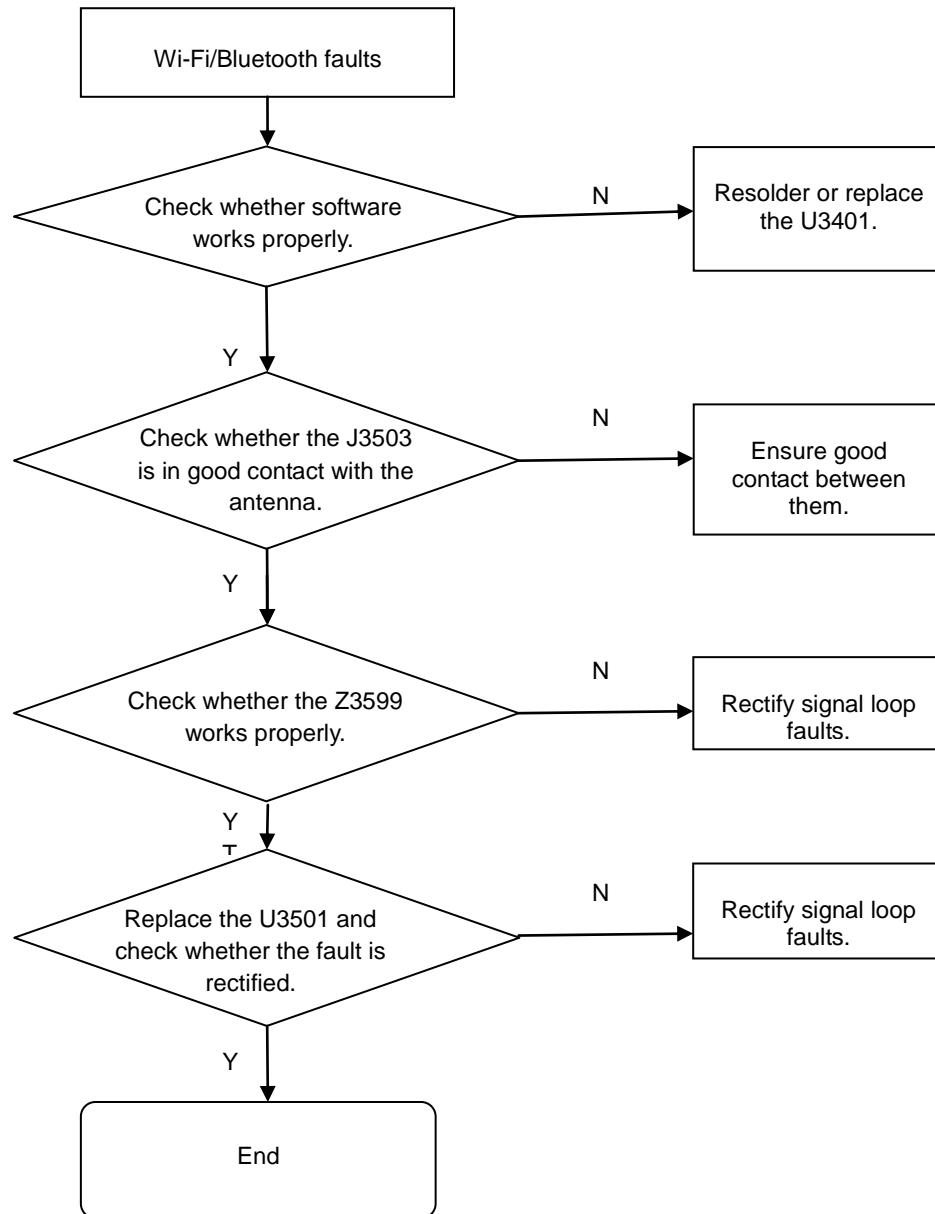
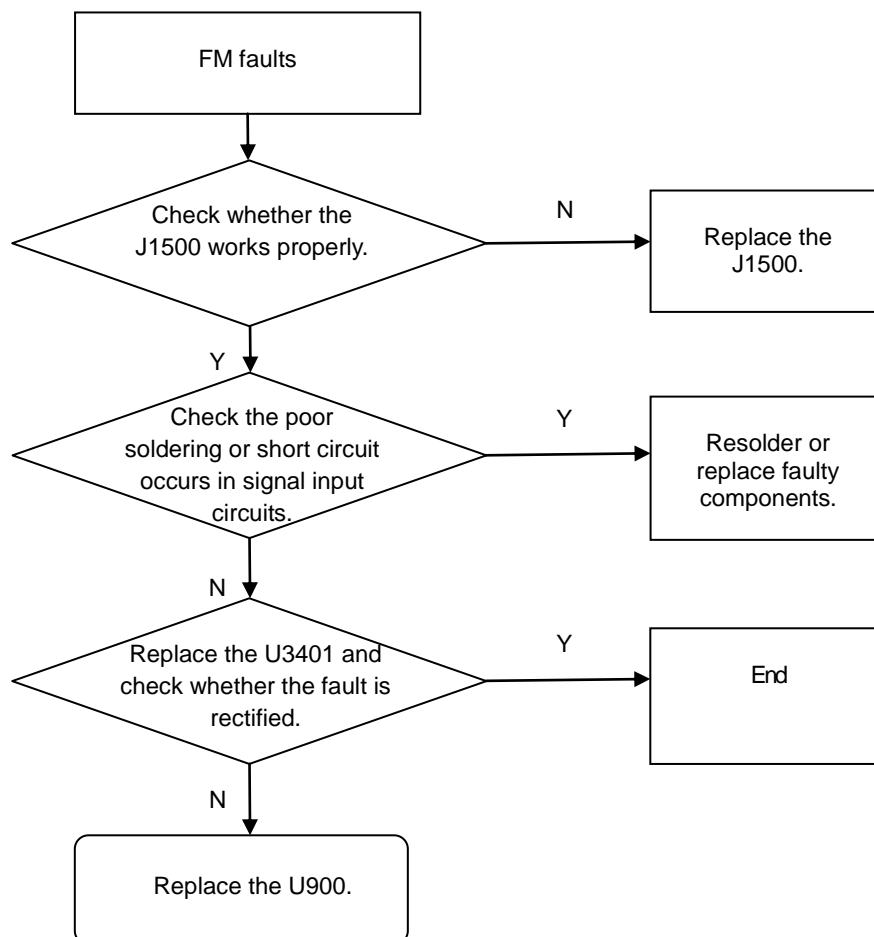


Figure 9-26 Troubleshooting procedure for FM faults



9.20 GPS Faults

Figure 9-27 Troubleshooting procedure for GPS faults

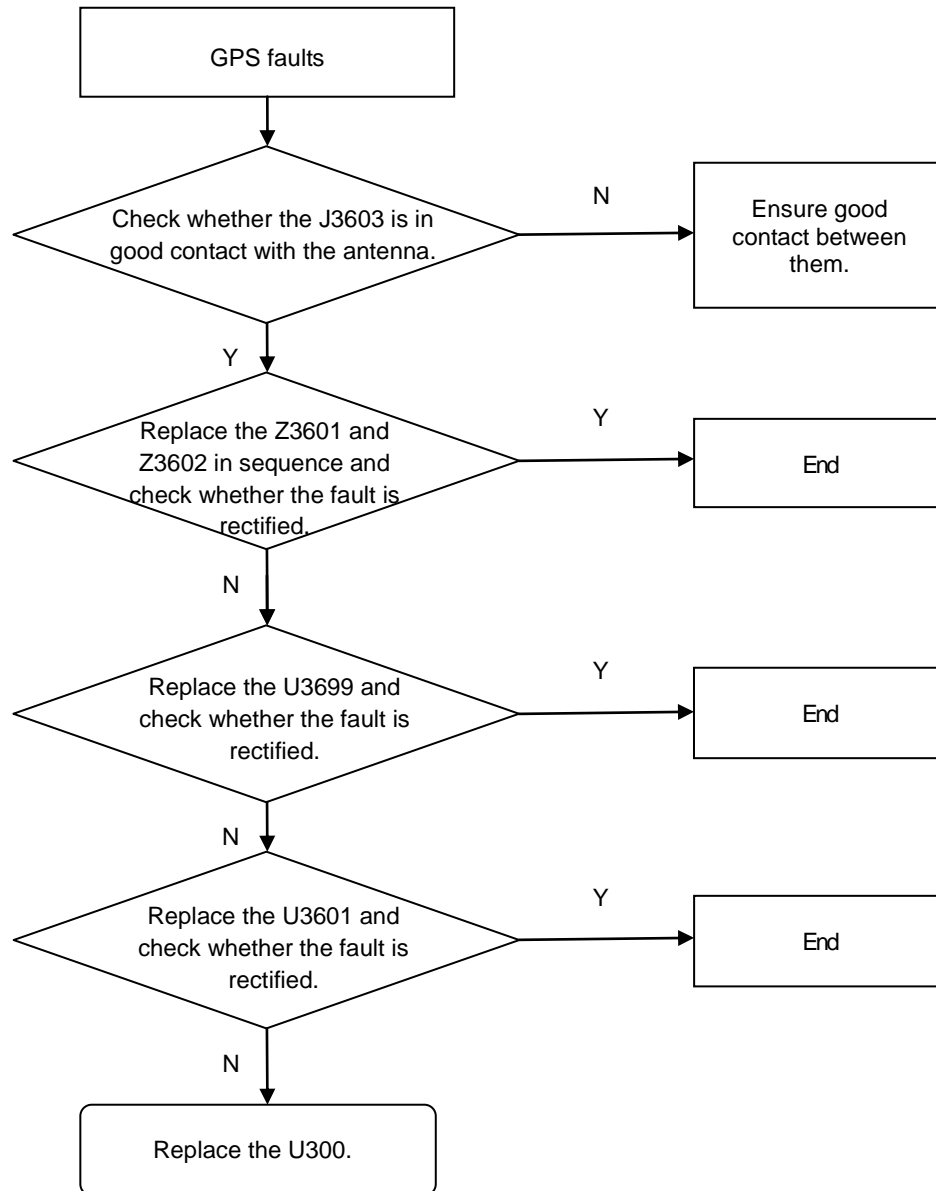
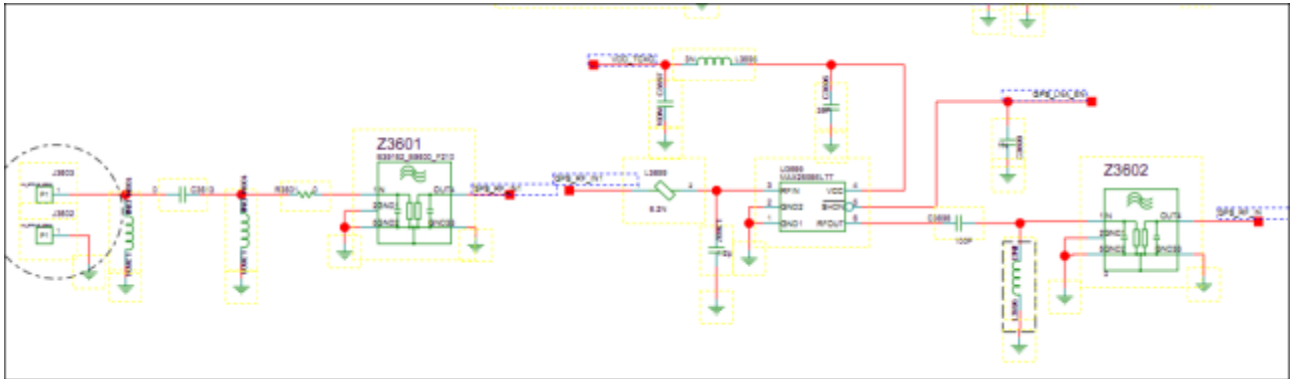
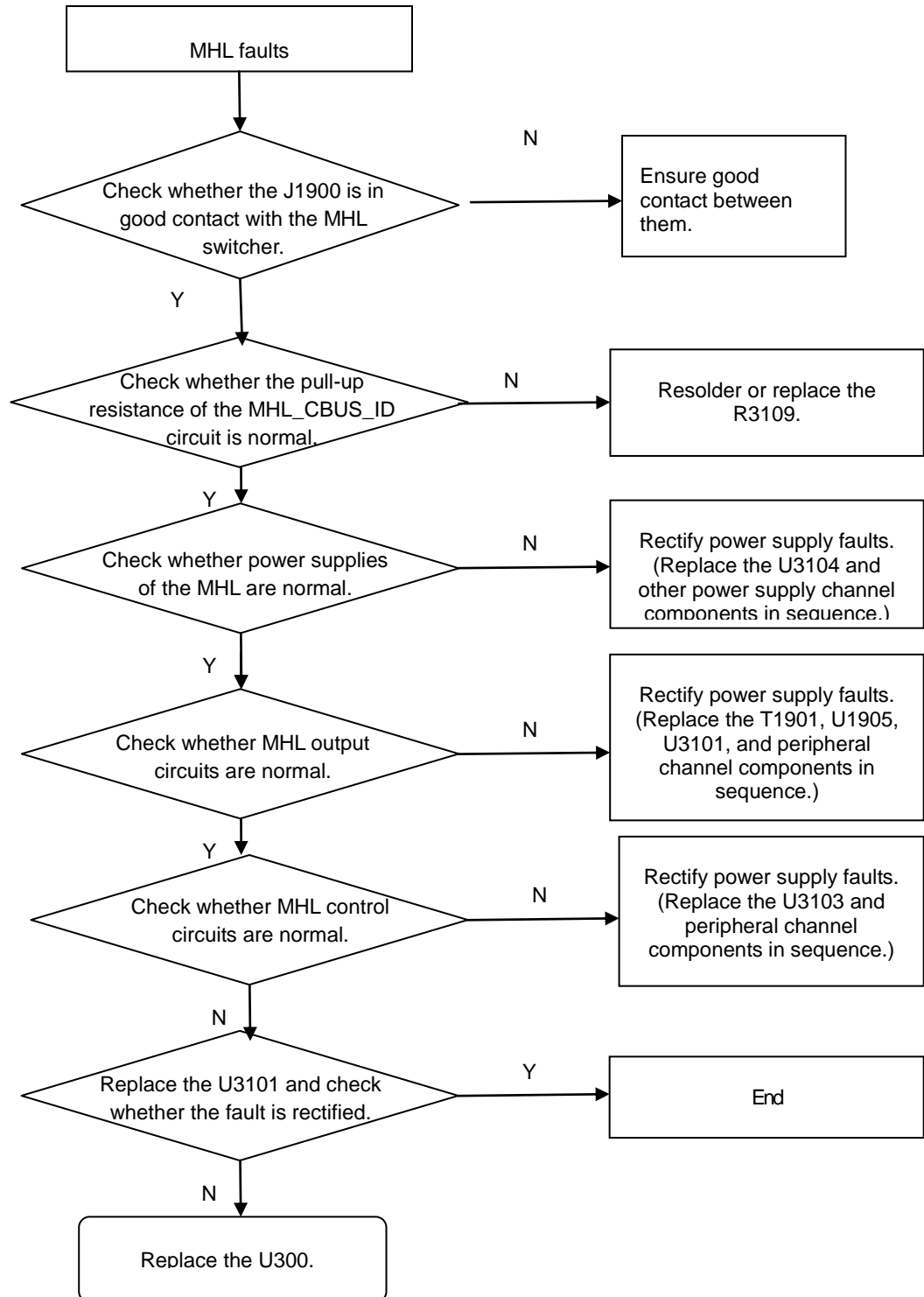


Figure 9-28 Conceptual diagram of GPS circuits



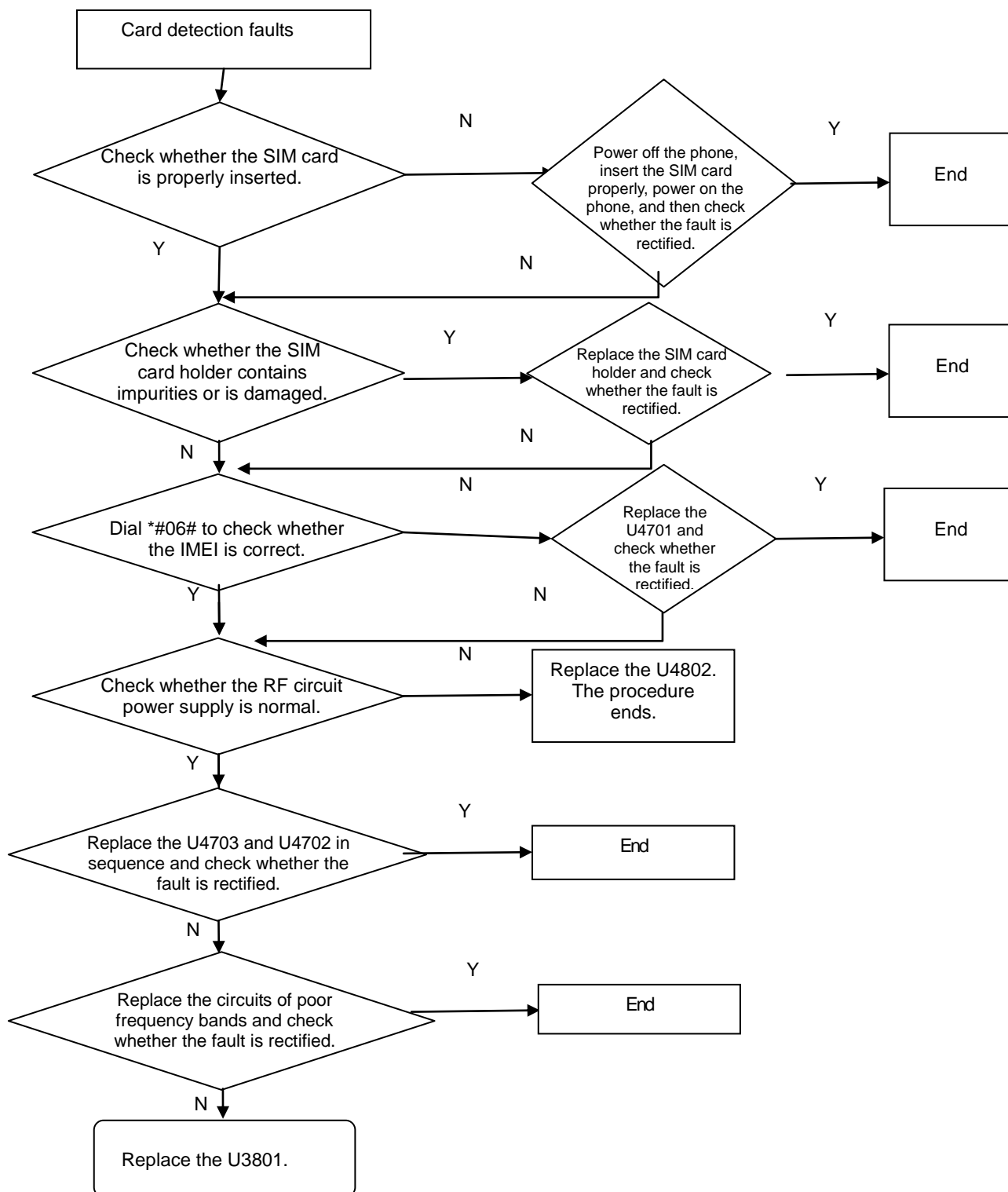
9.21 MHL Faults

Figure 9-29 Troubleshooting procedure for MHL faults



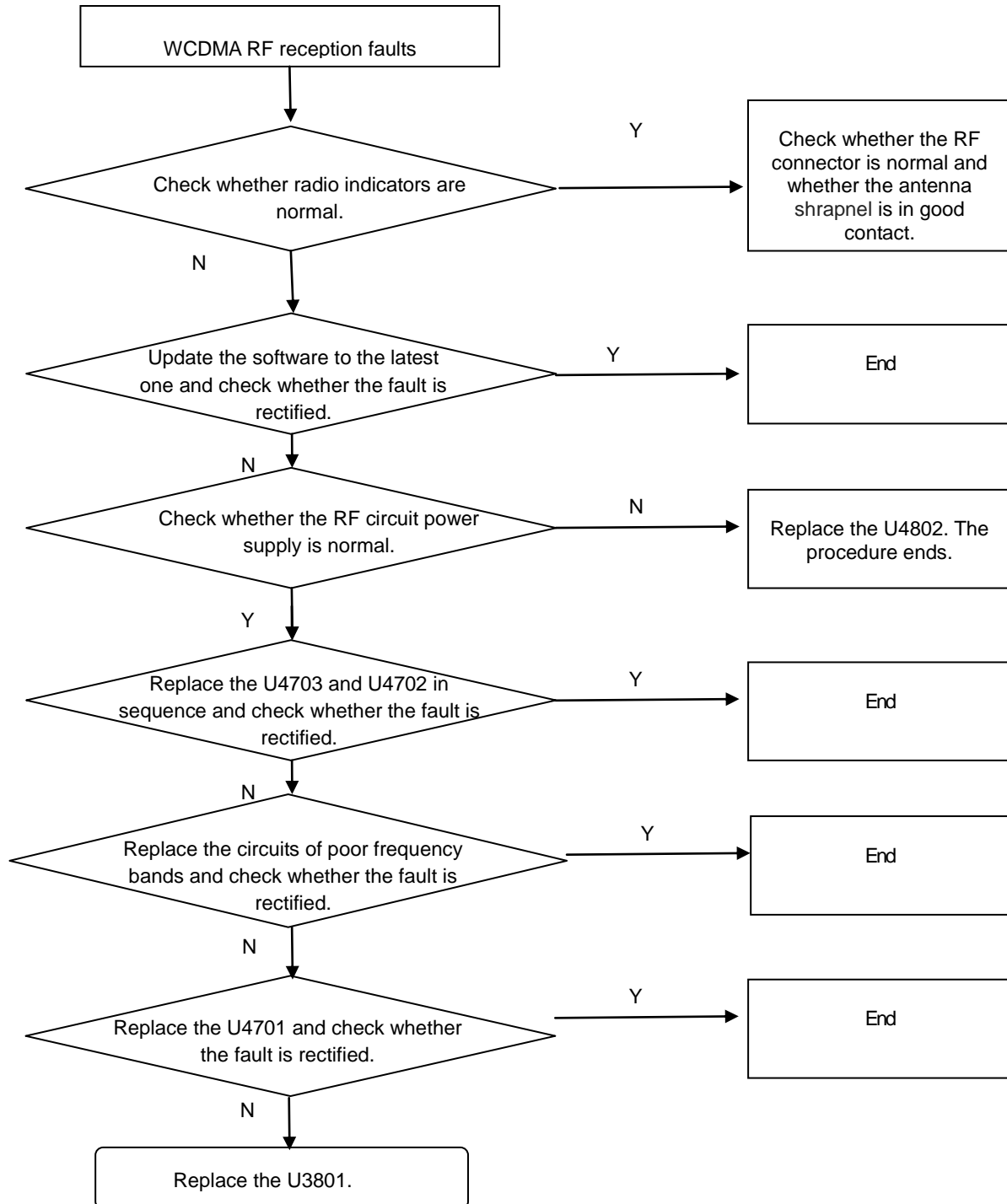
9.22 Card Detection Faults

Figure 9-30 Troubleshooting procedure for card detection faults



9.23 RF Reception Faults-WCDMA

Figure 9-31 Troubleshooting procedure for WCDMA RF reception faults

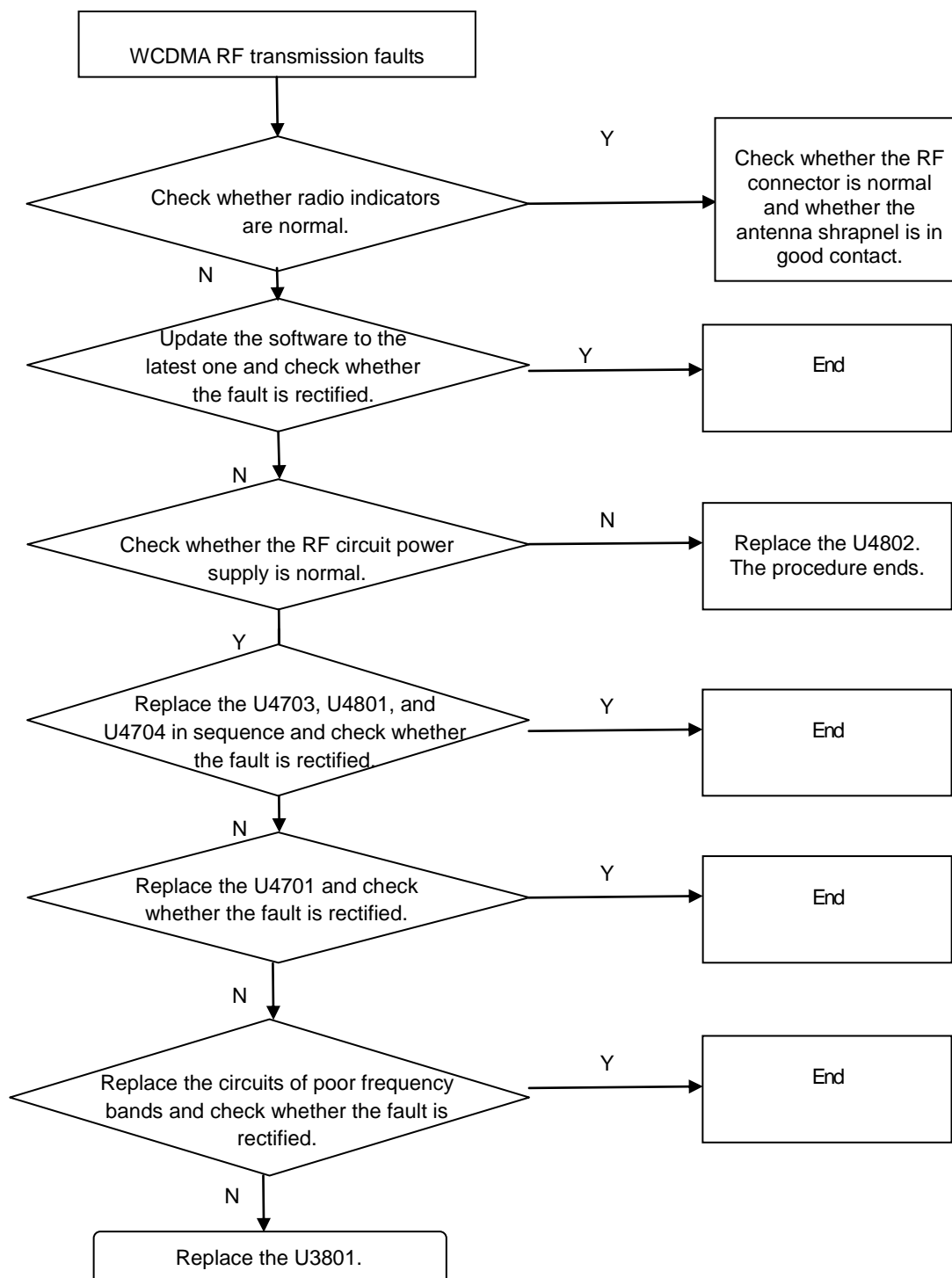


NOTE

If all RF signals are abnormal, especially inspect the circuits for the power supply, antenna feed point, antenna switch chip, antenna connector, and RF test base.

9.24 RF Transmission Faults-WCDMA

Figure 9-32 Troubleshooting procedure for WCDMA RF transmission faults

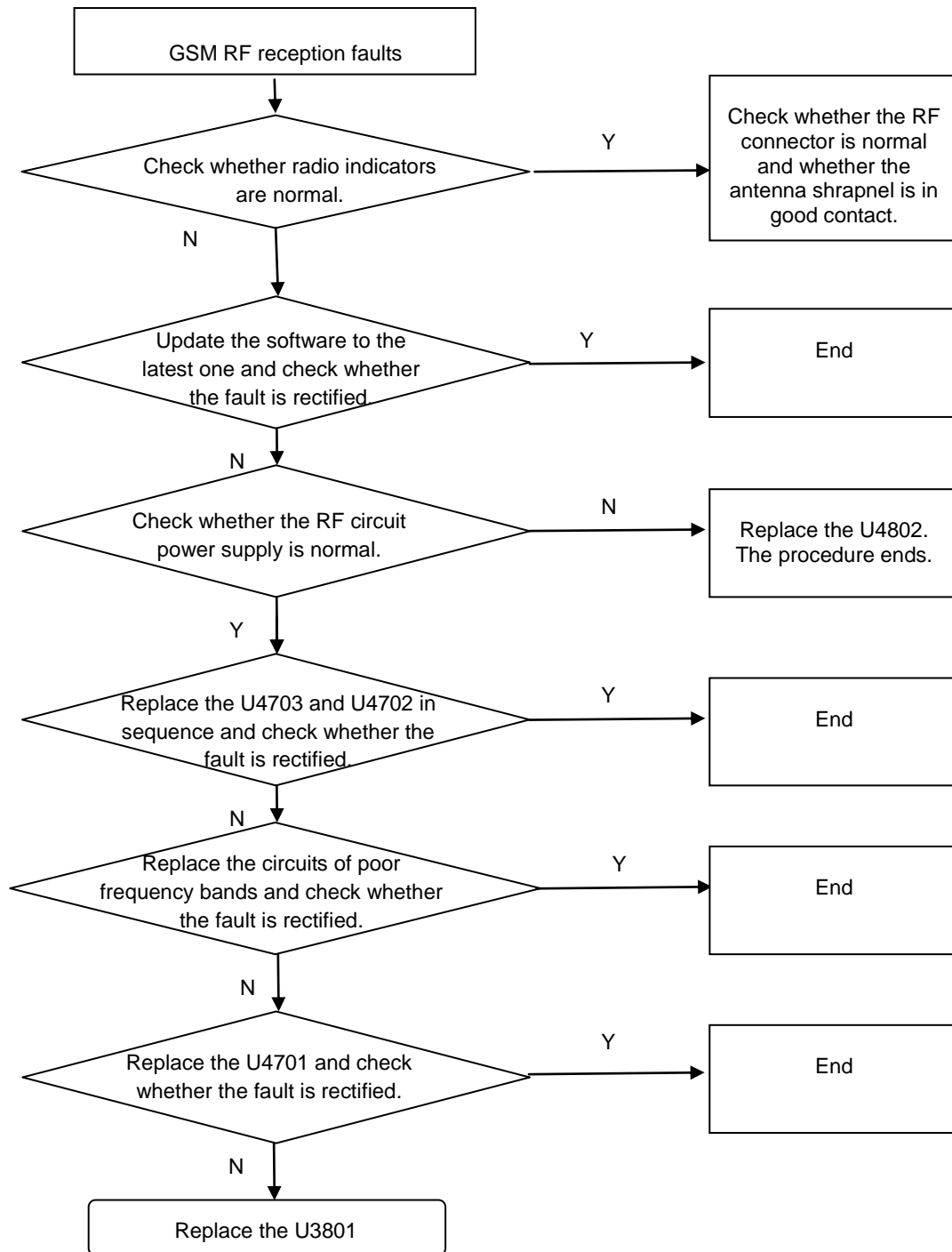


NOTE

If all RF signals are abnormal, focus on inspecting the circuits for the power supply, DCDC supplying power for the PA, antenna switch chip, RF connector, and main chip.

9.25 RF Signal Receiving Faults-GSM

Figure 9-33 Troubleshooting procedure for GSM RF reception faults

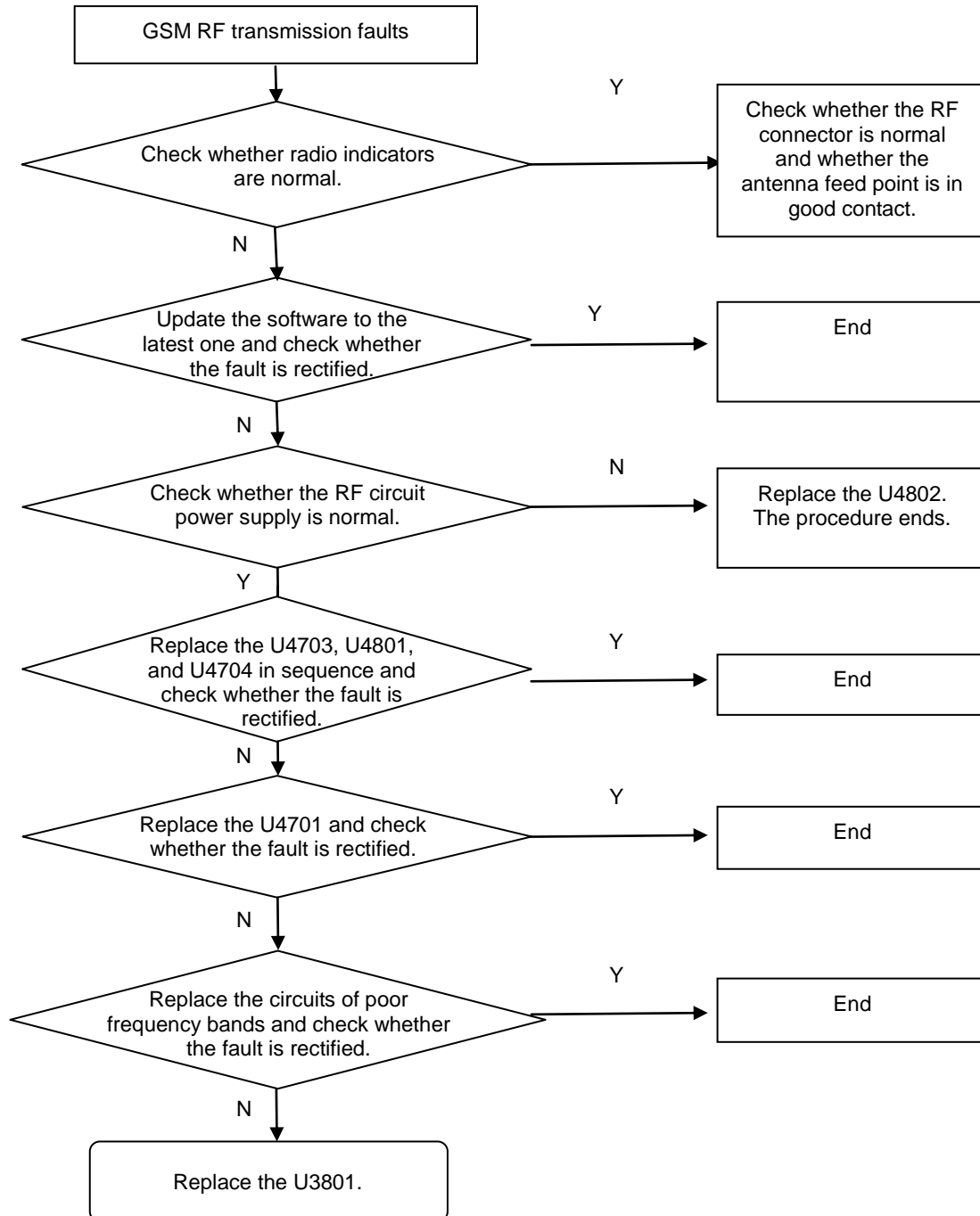


NOTE

If all RF signals are abnormal, especially inspect the circuits for the power supply, antenna feed point, antenna switch chip, antenna connector, and RF test base.

9.26 RF Signal Transmission Faults-GSM

Figure 9-34 Troubleshooting procedure for GSM RF transmission faults



NOTE

If all RF signals are abnormal, especially inspect the circuits for the power supply, antenna feed point, antenna switch chip, antenna connector, and RF test base.

10 Function Tests

10.1 Keys

Smartphone has few keys. The U9510E has six keys. The three keys on the panel are common keys for phones running an Android OS, the other three are respectively the power key, volume up key, and volume down key.

The U9510E's built-in battery is not user removable; therefore, the forcible power-off function is designed. The phone will be forcibly powered off after you press the power key for 10 seconds. The function applies to cases such as software upgrade.

Figure 10-1 U9510E keys



10.2 MMI Test

Enter *****2846579***** on the touchscreen to switch to the test mode. Select **MMI Test_II** and **start MMI test** is displayed on the LCD. Press the volume down key to start the test. During the test, you can touch the menu key to make the test fail, press the volume down key to enter the next test, touch the back key to return to the previous test. Figure 10-1 describes the test procedure.

Table 10-1 U9510E MMI test items

No.	Item	Test Method and Contents
1	Board information test	The board test item existed formerly. If the CBT was not tested on the product line, an alarm report would be generated. For common faulty phones, this item is not tested.
2	microSD card test	If the microSD card is detected and it functions normally, enter the next test directly; otherwise, No SD card available is displayed.
3	Battery test	If the battery level is lower than 3%, the voltage is higher than 4.2 V, or the battery temperature is out of the range from -200 to +700 degrees Fahrenheit, the test fails.
4	Keypad test	The keypad diagram is displayed on the LCD. If you press a key, it will turn purple. Press it again, it will turn to the original color.
5	LCD test	The LCD displays a white screen.
		The LCD displays a black screen.
		RGB triple-color bar is displayed on the LCD.
		The LCD backlight is increasingly bright and is varying in cycle.
		The charging indicator blinks in red, green, and blue successively.
6	Keypad LED test	The keypad LEDs lights up in cycle.
7	Rear camera test	Display the image captured by the camera in real time, and then observe the image quality and response speed to test the camera performance. Press the volume up key to test the LED flash, if the LED flash does not light up, it is abnormal.
8	Front camera test	Display the image captured by the camera in real time, and then observe the image quality and response speed to test the camera performance.
9	Touchscreen test	Touch round the touchscreen, if the area around the LCD turns red, the test is passed.
10	Proximate light sensing test	Put the shielding board about 4 cm above the proximity light loophole of the touchscreen. Assume that a phone image appears beside the portrait. When you take the shielding board away, the test is passed if the phone image disappears and fails if the phone image resists.
11	Ambient light sensing test	Check whether the phone can detect the ambient light and display data. When the ambient light changes, the data should change correspondingly.
12	Vibrator test	Check whether the motor is vibrating periodically. If yes, the test is passed.
13	Speaker test	When the speaker plays the ringtone, the ringtone is played through the headset receiver if you connect the headset to the phone.

No.	Item	Test Method and Contents
14	Receiver test	When the speaker plays the ringtone, the ringtone is played through the receiver.
13	Microphone loopback test	Main microphone: Touch the Record icon on the LCD, and speak at the main microphone. Then touch the Play icon, if the recorded voice is heard, the test is passed.
		Secondary microphone: Touch the Record icon on the LCD, and speak at the secondary microphone. Then touch the Play icon, if the recorded voice is heard, the test is passed.
		Dual microphone loopback: Touch the Record icon on the LCD, and speak at the main and secondary microphones. Then touch the Play icon, if the recorded voice is heard, the test is passed.
14	Headset loopback test	Connect the headset, touch the Record icon on the LCD, and speak at the headset's microphone. Then touch the Play icon, if the recorded voice is heard, the test is passed.
15	FM test	Connect the headset, and the channel information should be displayed on the LCD. Contents of frequency bands 8800, 9800, and 10700 will be played. You can touch the icon in the lower left to switch between channels. After that, check manually that the RM function works properly.
16	Headset's control-by-wire function test	Connect the headset, the in icon turns green. Press the answer key on the headset, then the big blue cycle in the middle of the LCD becomes a small brown one. Disconnect the headset, and the out icon turns green. Then the test is complete.
17	HDMI test	The screen shows in the center that the HDMI test starts. Connect the phone to the HD TV using a USB cable. The audio and video must be able to be switched to the TV. A technician is required to determine whether the test is passed. If the test fails, touch the menu key; if the test is passed, press the volume down key to proceed to the next test.
18	Bluetooth test	Start backend search, the discovered Bluetooth devices information (device name and MAC address) is displayed on the LCD. (Note: Another Bluetooth enabled device is required for the test.)
19	Gravity sensing test	Place the phone according to the icons in the LCD successively. If a check mark is displayed under each icon, the test is passed.
20	Gyroscope and compass test	The phone tests the gyroscope and compass in the background. If these two functions pass the test, the phone shows no message and enters the next test automatically. In other words, this test may be not under the watch of the tester. If the test fails, the LCD displays a message of failure.
21	Wi-Fi test	The system searches available Wi-Fi network automatically.
22	Detecting the SIM card	The phone automatically performs the SIM card detection in the background. If no SIM card is not detected, a message of failure is displayed. Press the volume down key to proceed to the next test. If a SIM card is detected, no message is displayed and the phone automatically enters the next test.
After the MMT test is complete, press the volume down key to display the test results. The failed items will be listed.		

10.3 Wi-Fi Test



NOTE

To ensure a normal network, place the phone within 15 meters away from the AP, and there must be no obstacle between the phone and AP.


1. Configure the AP properly. Power on the phone and place it within the AP's transmission range.
2. Tap **Set > Radio and Networks > WLAN Setting > Enable WLAN > Enable Network Notification**.
3. After the phone finds the AP's SSID automatically, touch the SSID and enter the password to establish a connection.
4. Change the distance between the phone and AP and check the change of the Wi-Fi signal strength.
5. In the normal network, launch a browser and access a website to test the network quality.

If no problems are found, finish the Wi-Fi test. If any problems are found, troubleshoot the phone or send it to an advanced service site for repair.

10.4 Voice Call Test

1. Install a USIM card on the phone.
2. Press and hold the power key to power on the phone.
3. Check whether the signal strength displayed on the LCD is normal.
4. Make a call to a fixed-line phone, and check the voice quality during the call.
5. If no problems are found during the test, finish the voice call test. If any problems are found, troubleshoot the phone or send it to an advanced service site for repair.

11 Solder Points on the PCB and BGA Chip

Red (R:255, G:0, B:0) : Solder point


Green (R:0, G:255, B:0) : Vacant point

Figure 11-1 Top solder point diagram

