Mediapad Maintenance Manual (Basic Version V2.1)

Huawei Technologies Co., Ltd.

Contents

1 Product Introduction

1.1 Appearance

1.2 S7 PRO Models

The following table lists the S7-PRO models and related descriptions.

The MediaPad has several models. The following table lists the differences between these models.

Model	Specification	Standard and Frequency Band
S7-301u	UMTS 900	UMTS 900 MHz/2100 MHz
S7-302u	UMTS 850	UMTS 850 MHz/1900 MHz/2100 MHz
S7-303u	UMTS AWS	UMTS 1900 MHz/2100 MHz/AWS

1.3 Product Specifications

Item	Description
Dimensions (H x W x D)	190 mm x 124 mm x 10.5 mm
Weight	About 390 g

Item	Description
Power supply	Input: 100–240 V AC, 50 Hz/60 Hz
	Output: 5 V DC, 2.0 A
Antenna	Built-in antenna
Technical standards	3GPP FDD Release 6
	WCDMA 900/2100 MHz & HSDPA 14.4 Mbit/s & GSM/GPRS/EDGE
	850/900/1800/1900 MHz
S7-PRO-301u frequency band	850 MHz (CLR): 824 MHz-849 MHz/869 MHz-894 MHz (uplink/downlink)
	900 MHz (GSM): 880 MHz-915 MHz/925 MHz-960 MHz (uplink/downlink)
	1900 MHz (PCS): 1850–1910 MHz/1930–1990 MHz (uplink/downlink)
	2100 MHz (IMT): 1920–1980 MHz/2110–2170 MHz (uplink/downlink)
	AWS: 1710–1755 MHz/2110–2155 MHz (uplink/downlink)
Battery	Li-ion battery
	3.7 V, 4100 mAh
	Video playback time: about 6 hours
	Standby time: about 369 hours
Interface	3.5 mm TRRS stereo headset interface
	MicroSD card slot: compatible with an SDHC card of a maximum capacity of 32 GB
	USB port: Micro USB 2.0
	HDMI: HDMI 1.3b type D
	SIM card slot
Display screen	Type: IPS LCD, Glare
	Size: 7 inches
	Resolution: WXGA (1280x800 pixels), 217 ppi
	Visual angles: upward 89 °downward 89 °leftward 89 °rightward 89 °
	Colors: 16,000,000 colors
	Contrast: 800:1
	Brightness: 400 cd/m^2 (maximum)
Touchscreen	7-inch captive touchscreen
Camera	Front camera: 1.3 megapixels, rear camera: 5 megapixels, autofocus

Item	Description
GPS	Qualcomm GPS
Bluetooth (BT)	Standard: 2.1 + EDR
	Configuration: A2DP, HFP, HSP, and PBAP
Wi-Fi	Standards: IEEE 802.11b/g/n, WEP, WPA, and WPA2
	Working frequency band: 2.4 GHz
Working environment	Working temperature: –10 ℃ to +45 ℃ (14 ℉ to 113 ℉)
	Storage temperature: –40 ℃ to +70 ℃ (–40 ℉ to 158 ℉)
	Humidity: 5% to 95% RH (non-condensing)

2 Maintenance Instructions

2.1 Application Scope

This document provides instructions for the maintenance of Huawei products by technical personnel at service sites authorized by Huawei. This manual is Huawei proprietary and is only permitted to be used by authorized service sites or companies. Although every effort has been made to ensure the accuracy, mistakes may still be found. If you find any error or have any suggestions, contact our customer service personnel.

2.2 Maintenance Precautions

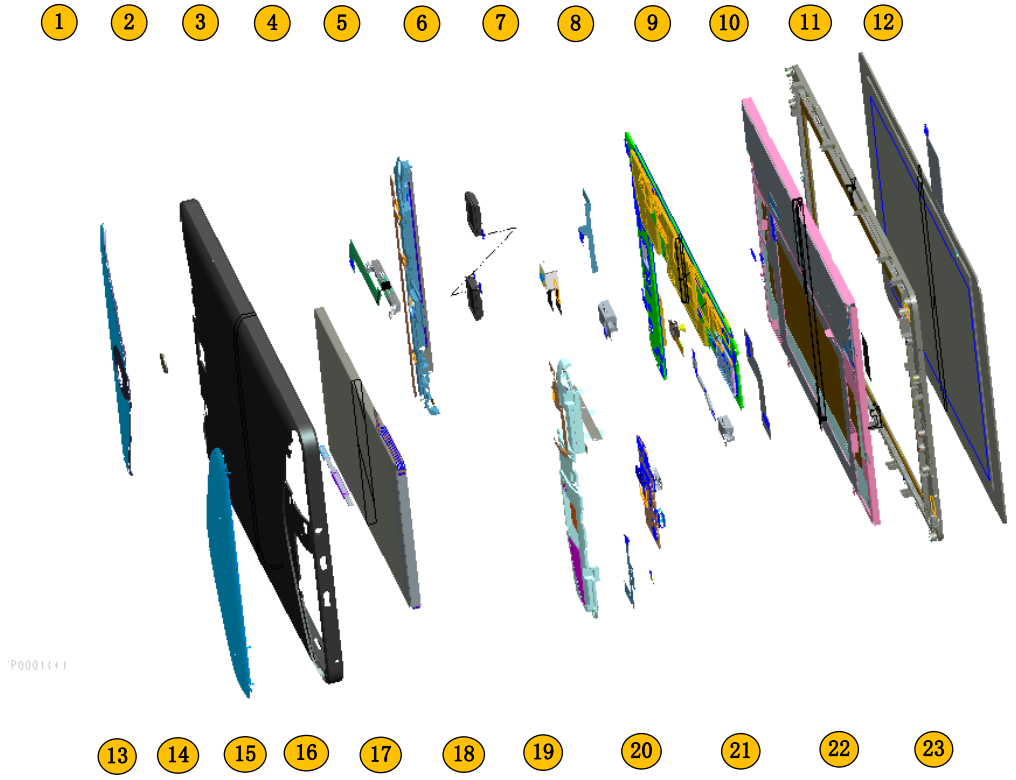
- Only qualified technicians are allowed to perform maintenance and calibration.
- Always wear ESD wrist straps during operation and conduct the maintenance in an ESD room.
- Ensure that all components, screws, and insulators are properly installed after maintenance and calibration. Ensure that all cables are properly connected.
- Ensure that the soldering complies with environmental requirements and is lead-free.

Electrostatic discharging is the major cause for the damage of sensitive electronic components. Each service site should attach great importance to the electrostatic discharging and strictly observe the antistatic measures described in this manual.

2.3 Maintenance Information

To obtain related product and maintenance information, visit
http://www.huaweidevice.com/cn/technicaIndex.do

3 Exploded View Drawing



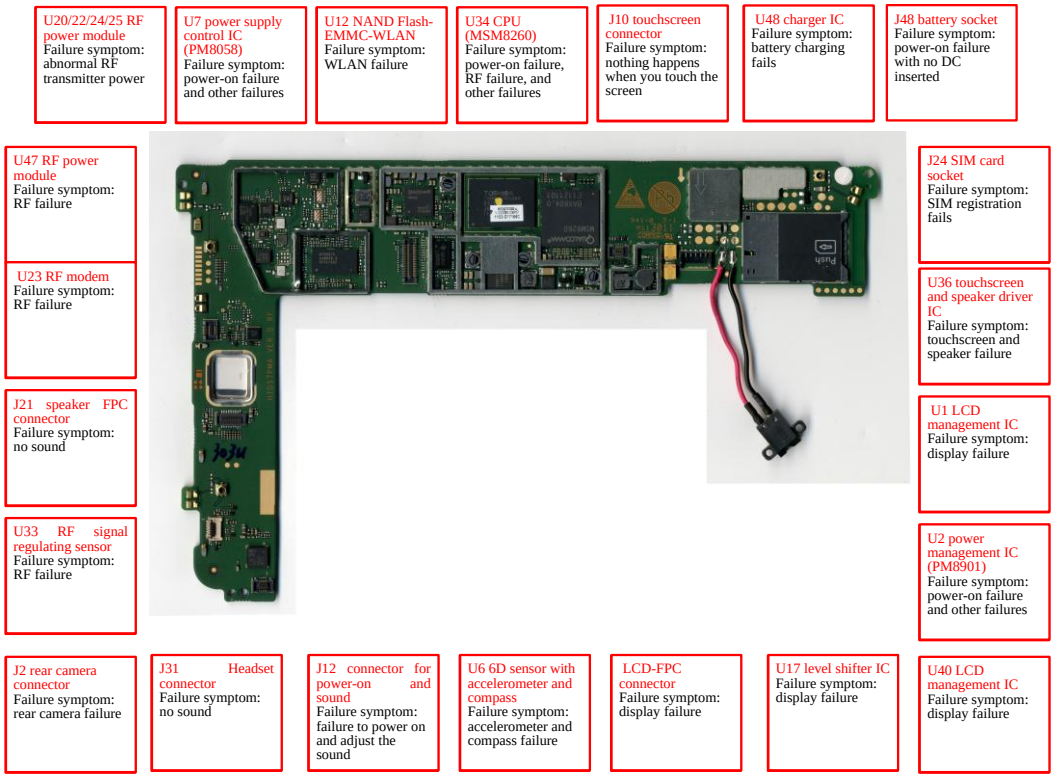
The exploded view shows the phone structure only and cannot be regarded as a reference for applying for spare parts.

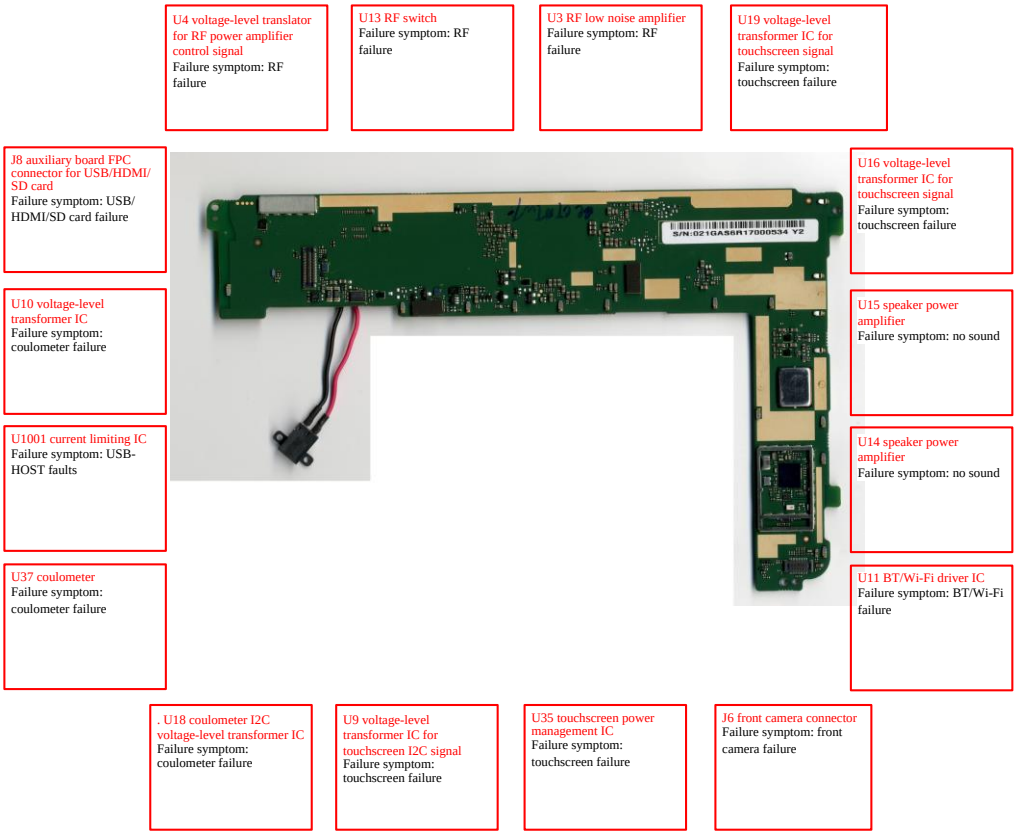
No.	Description	Quantity
1	Rear camera lens	1
2	Cover B assembly	1
3	POGO PIN	1
4	Diversity antenna support	1
5	Speaker	1
6	Rear camera	1
7	Headset connector	1
8	Speaker FPC	1
9	Main board	1
10	LCD	1
11	Cover A assembly	1
12	TP	1

No.	Description	Quantity
13	Left decorative cover	1
14	Right decorative cover	1
15	Side buttons	1
16	Battery	1
17	Wi-Fi antenna support	1
18	MIC-FPC	1
19	MIC	1
20	SUB FPC	1
21	Front camera	1
22	DC-JACK	1
23	SUB-PCB-FPC	1

4 Components on the Main Board

4.1 Diagram of Components on the Mediapad Main Board





4.2 BOM List

The following table is provided for reference only and is subject to change without notice. The latest component list is available on corresponding Huawei system. If you have any questions, contact the local technical personnel

BOM	Description	Location
15010248	Schottky diode-30 V-0.2 A-0.5 V	D1
15040238	Transient voltage suppression diode-6 V-14 V-10 W-12 A	D10, D1002, D1003, D1004, D1005, D1006, D1007, D1100, D13, D17, D18, D19, D2, D23, D24, D25, D26, D27, D3, D5, D6, D9
15010235	Schottky diode-40 V-0.5 A-0.425 V	D12
14240309	IO connector-female-5pin-WTB connector-SMT	J1
14240181	BTB connector-female-24-0.4 mm-1 mm-SMT	J2, J6

BOM	Description	Location
14240004	RF connector-straight-female-SMT	J19, J3, J4
51621274	Main antenna SMT spring	J13, J14, J15, J20, J23, J27, J30, J32, J5
14240210	BTB connector-female-40Pin-0.4 mm-0.9 mm	J8, J9
14240199	BTB connector-female-10pin-0.4 mm-0.9 mm	J10, J12, J21
51621023	Ground spring	J11, J25, J26, J28, J29, J33, J34, J35, J36, J37, J38, J39, J40, J41, J42, J43, J44, J45, J46, J48
14240301	Card connector-SIM card socket	J24
14240283	FPC connector-11-0.3 mm-0.1 mm-0.6 mm	J31
15060228	MOSFET-P-channel	Q1, Q17, Q2, Q9
15050014	NPN transistor	Q22, Q5
15060153	MOSFET-N-channel	Q1000, Q1001, Q1101, Q1102, Q1103, Q1104, Q1105, Q1206, Q19
39110582	Power Driver-Boost DCDC	U1
39200270	Power management IC-PM8901	U2
47090034	RF low noise amplifier-869-894/1930-1990/2110-2170 MHz	U3
36020366	CMOS-4BIT bidirectional voltage-level translator with auto direction sensing	U17, U19, U4
38140016	Semiconductor sensor-6-axis sensor with accelerometer and compass	U6
39200177	Dedicated power management chip of Qualcomm MSM7x30 series (PM8058)	U7
40020131	DDR2 DRAM-8Gb LPDDR2-800 MHz-32 bit	U8
36020395	CMOS-4BIT bidirectional voltage-level translator with auto direction sensing-I2C bus	U10, U16, U18, U9
39200222	Chip with the combination of single band 2.4GHz WLAN, Bluetooth 2.1, and FM-BCM4329	U11

BOM	Description	Location
47140045	RF switch-0.5–2.5 GHz	U13
39080077	Audio power amplifier	U14, U15
13080038	Duplexer-RX: 2110–2170 MHz/TX: 1920–1980 MHz	U20
13080060	Duplexer-TX: 824–849 MHz/RX: 869–894 MHz	U21
47100280	Power module-1920–1980 MHz	U22
39200249	WCMDA/GSM radio transceiver (QTR8615)	U23
47100289	Power module-1850-1910 MHz	U24
47100360	RF power module-1710-1785 MHz	U25
13080072	Duplexer-RX: 2110–2155 MHz/TX: 1710–1755 MHz	U31
38140022	Semiconductor-capacitive sensor	U33
39200289	Digital base band processor-1.2 GHz-MSM8260	U34
39110548	LDO-3.3 V	U35
39110567	Switching regulators-2.0–5.5 V	U36
39070073	Power management IC-0.3–2.75 V-battery coulometer	U37
43140104	Connector controller-LCD Drive IC	U40
13080082	Duplexer-RX: 1930–1990 MHz/TX: 1850–1910 MHz	U41
47090042	RF low noise amplifier-0.5–3 GHz	U42
47140049	RF switch-0.5–3.0 GHz	U43
47140054	RF switch-600–2700 M	U46
47100307	RF power module-824–849 MHz, 880–915 MHz, 1710–1785 MHz, 1850–1910 MHz	U47
39070085	Battery management IC-4.1–16 V-DC-DC charging chip	U48
39070055	Battery management IC-2.5–6.5 V-average current limiting-percentage (10%)-DRV	U1001
12020141	Crystal oscillator-19.2 MHz	X1

BOM	Description	Location
12020171	Crystal oscillator-27 MHz	X2
12020125	Crystal oscillator-0.032768 MHz	X3
12020168	Crystal oscillator-37.4 MHz	X4
13010262	SAW filter-2140 MHz	Z1
13010177	SAW filter-1960 MHz	Z3
13010175	SAW filter-1732.5 MHz	Z4
13010265	SAW filter-1574.42 MHz/1605.89 MHz	Z5
07040064	Varistor-8 V-4 V-30 V-SMT-0405-ESD+EMI noise filter	Z10, Z9
13030052	Ceramics filter-2450 MHz	Z11
07040072	ESD_EMI Filter-14 V-30 pF-800–3000 MHz	Z12
13010131	Sound filter-1960 MHz	Z16
13010148	Sound filter-2140 MHz	Z17
13080106	Duplexer-1565–1607 MHz/2400–2500 MHz	Z18
13010264	SAW filter-1590.16 MHz	Z22
40060318	NAND flash-16 GB eMMC V4.4-52 MHz	U12
03021CNP	Interface board-MediaPad-HIDS7PIA-with TF slot, type D HDMI, and micro USB connector	
15040238	Transient voltage suppression diode-6 V-14 V-10 W-12 A	D21, D5, D9
15040264	Transient voltage suppression diode-5.5 V-15 V-1 A	D10, D7
15040293	Transient voltage suppression diode-6 V-15 V-15 W-1.5 A	D19, D20
14240243	Card connector-micro SD receptacle	J2
14240272	IO connector-micro_B-female-5pin-bend-SMT	J3
14240268	IO connector-micro HDMI-19-D type	J4
14240199	BTB connector-female-10pin-0.4 mm-0.9 mm	J6

BOM	Description	Location
14240210	BTB connector-female-40Pin-0.4 mm-0.9 mm	J8
10040059	Common mode EMI filter-20 V DC/280 mA-0805	T1
07040064	Varistor-8 V-4 V-30 V-SMT-0405-ESD+EMI noise filter	Z1
03021CNQ	Speaker board-MediaPad-HIDS7PSK-1x1	
14240200	BTB connector-male-10Pin-0.4 mm-0.9 mm	J1
03021CNW	LED board-MediaPad-HIDS7PFR-1x1	
14240200	BTB connector-male-10Pin-0.4 mm-0.9 mm	J3
03021CPB	Key board-S7-301u-HIDS7PKA-1x1	
14240200	BTB connector-male-10Pin-0.4 mm-0.9 mm	J1
38140014	Semiconductor sensor-ambient light sensor	U1
03021CPF	BTB board-MediaPad-HIDS7PFI	
14240221	BTB connector-male-40Pin-0.4 mm-0.9 mm	J1, J5
03021DTK	BTB to ZIF FPC bridge board-MediaPad-HIDS7PFL	
14240221	BTB connector-male-40Pin-0.4 mm-0.9 mm	J1
32050018	Vibrator-column	
22020058	Speaker	
22050048	Microphone	
23040205	LCD module-single display	
23060061	Camera module group-CMOS-1.3 M-FF	
23060062	Camera module group-CMOS-5 M-AF	
14240276	IO connector-DC JACK	
14240340	Headset connector	
27160803	Main antenna-S7-303u-(sensor FPC) SAA	

BOM	Description	Location
23070113	Touchscreen-S7 PRO CTP with AF	
27160802	Main antenna S7-303 u-1710–2170 MHz/824–894 MHz	
27160804	GPS WIFI antenna S7-30 3u-1565–1620 MHz/2400–2500 MHz	
27160805	Diversity antenna-S7-303 u-1910–2170 MHz	

5 Software Upgrade

5.1 Preparation

Item	Contents	Remarks
Preparation	Battery	At least two bars on the battery level indicator
	Micro SD card	More than 512 M
	USB cable	BOM: 97065432
	PC	Windows 2000, Windows XP
File	S7-30Xu V100R001C002B027T01 (not the final version)	This version is only for reference. Download the latest version for upgrade (the upgrade using USB).
Tool	eMMC Software Download	For upgrade using the USB
Upgrade method	Using the Micro SD card	
	Using the USB	

5.2 Upgrade Using the Micro SD Card

5.2.1 Upgrade Process

Step 1 Delete the information in the Micro SD card or format the SD card.

Step 2 Create a folder named **dload** in the root directory of the Micro SD card, and copy the upgrade file to **dload**.

Step 3 Ensure that the board is powered off, and that the battery is fully charged or connected to a charger. Insert the Micro SD card into the board, and the upgrade will be performed automatically after the board is powered on.

Upgrade State	Upgrade of the Device	Upgrade of the Board
Upgrading.		The LED indicator blinks at the frequency of 1 Hz.
Upgrade succeeded.		The LED indicator stays on.
Upgrade failed.		The LED indicator blinks at the frequency of 4 Hz.

Step 4 When the upgrade is completed, remove the SD card and press and hold the **POWER** button to restart the device.

5.2.2 Troubleshooting

During the update using the SD card, if the device presents a flash screen indicating the upgrade failure, check for any mis-operation or incorrect upgrade version. You can remove the SD card and try it again or change the SD card.

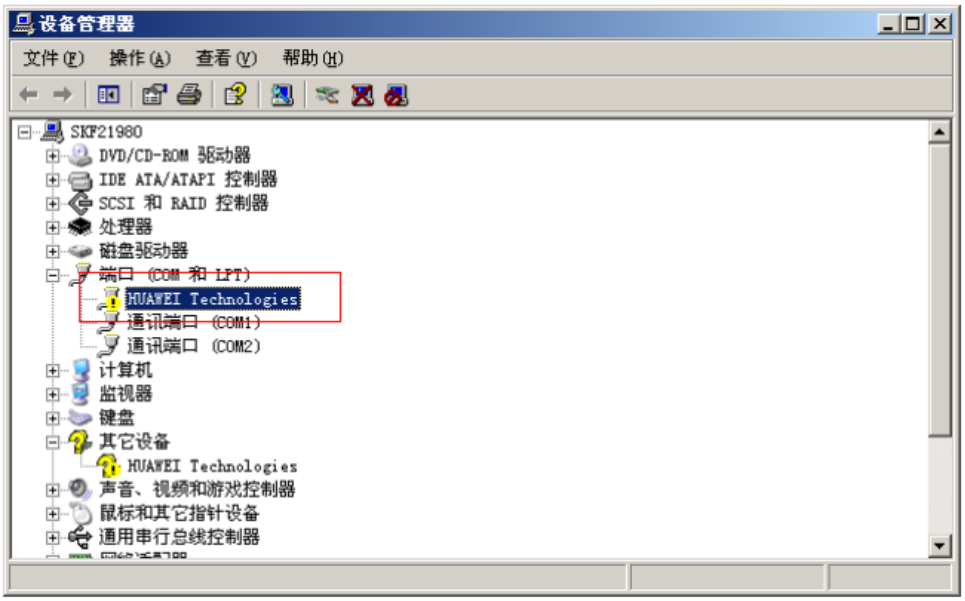
Method to check whether the SD card is damaged:

Because the size of the upgrade package of some version is large, try to open the compressed upgrade package that is copied to the SD card to check for damage. Remove and plug the SD card before you open the compressed upgrade package. If you open the compressed upgrade package directly, the opened package may be a cache on the PC. Alternatively, you can check the reliable storage capacity of the SD card with the MyDiskTest (an SD card check tool) to ensure that the size of the upgrade package does not exceed the storage capacity of the SD card. For more information, see the appendix of this chapter.

5.3 Upgrade Using the USB

5.3.1 Entering the USB Upgrade Mode

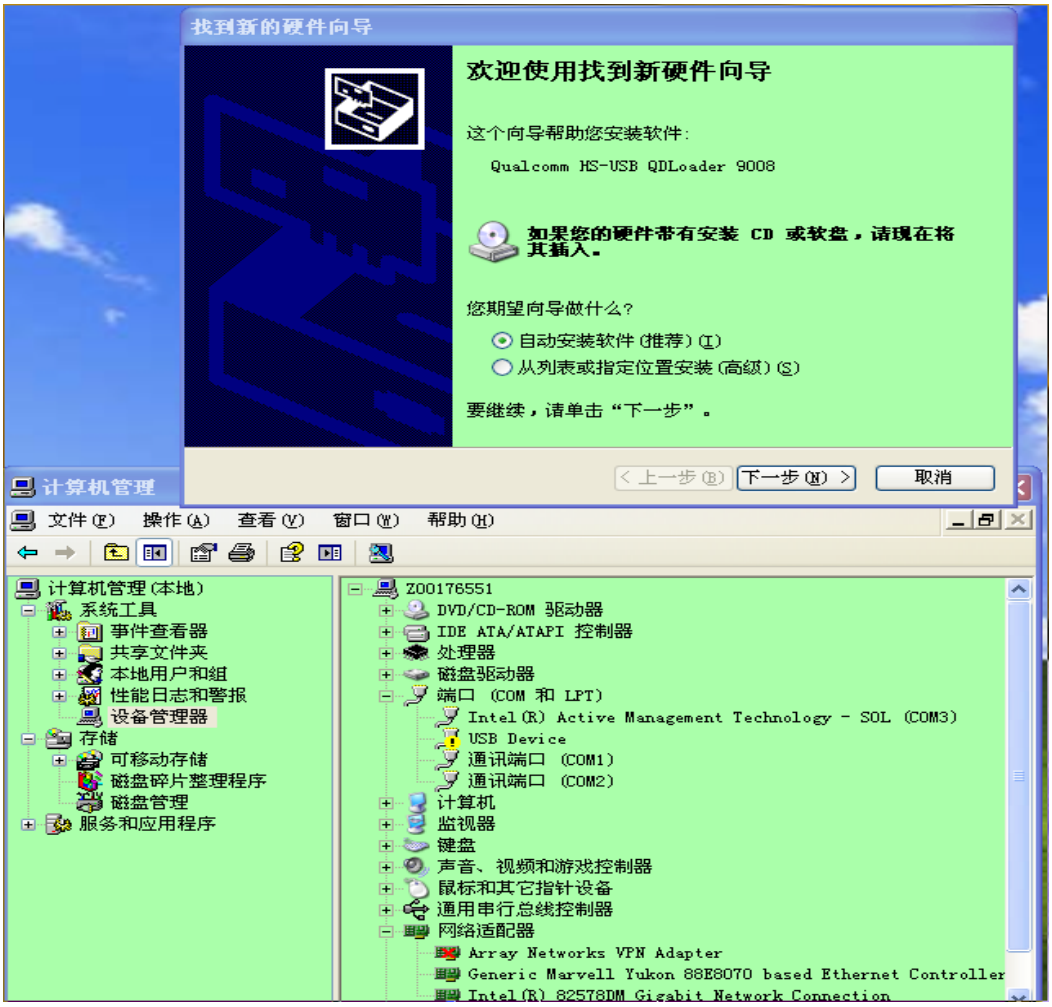
When the system is powered on, quickly press the **VOLUME_UP** button and the **VOLUME_DOWN** button. If it is the first time for your PC to connect the USB, the message "Found New Hardware" will be displayed, which indicates that the system has entered the USB upgrade mode successfully, as shown in the following figure.



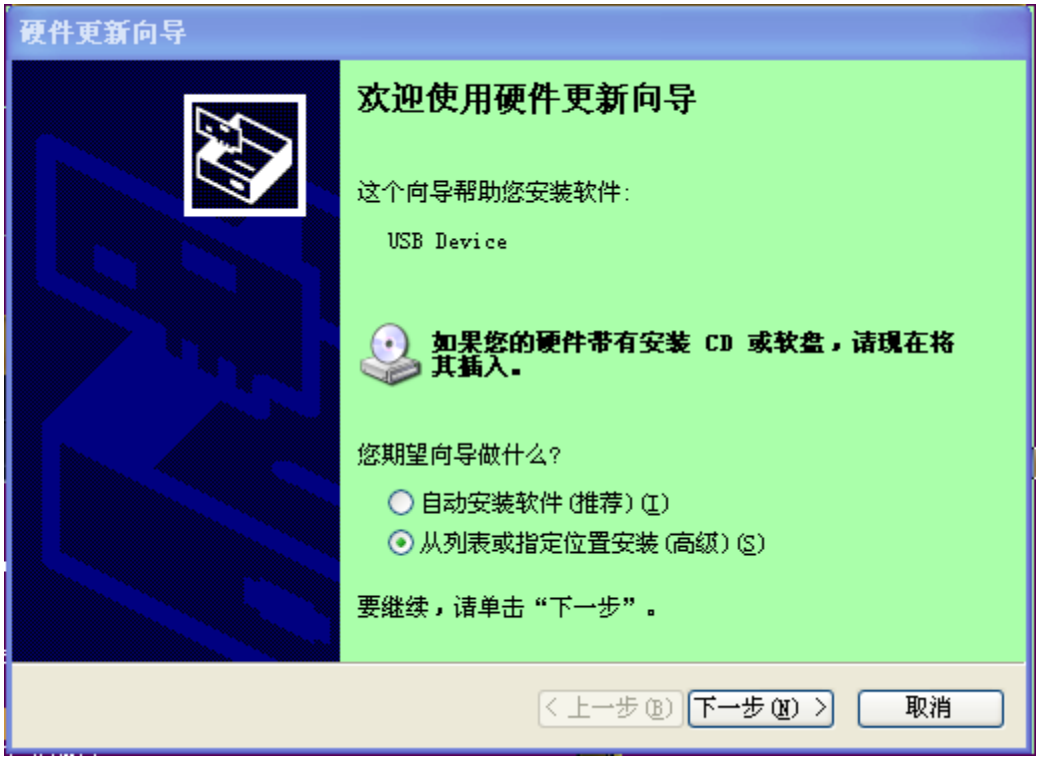
5.3.2 Installing the USB Device Driver

If the driver has not been installed before, you must install the driver on the PC before the update using the USB.

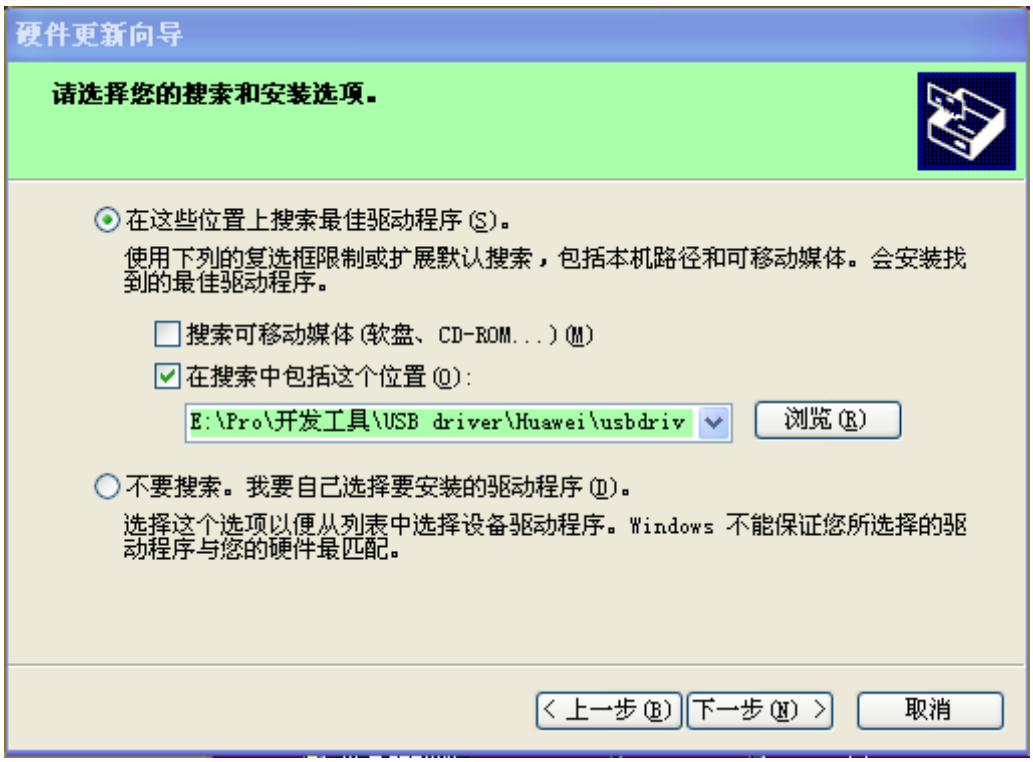
Step 1 When the MediaPad is connected, it enters into the Emergency Download mode, and a window is displayed, showing the port Qualcomm HS-USB QDLoader 9008. If the port driver has not been installed before, a message for installing the driver will be displayed.



Step 2 Select **Choose the install from a list or specific location (Advanced)**. Then click **Next**.

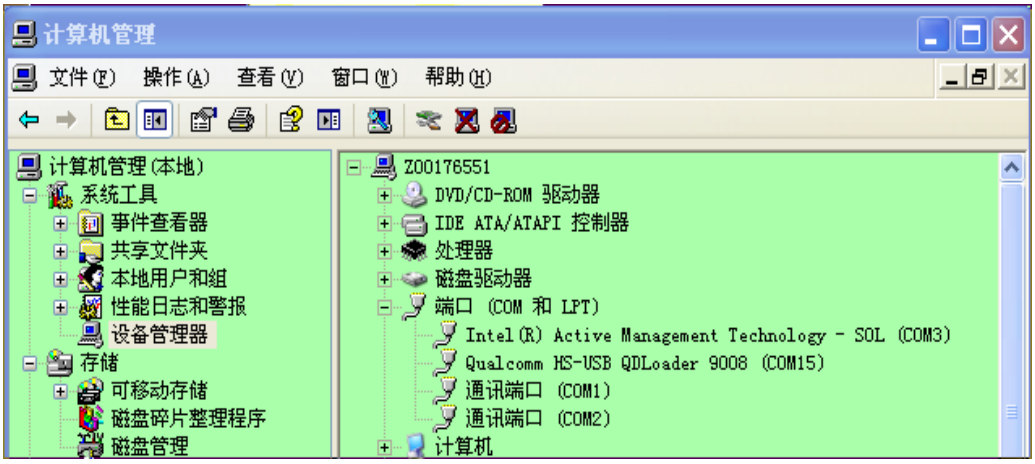


Step 3 Click **Browse** in the window displayed to select the USB driver to be installed, as shown in the following figure. Then click **Next**.



Step 4 If the corresponding file is found, the window indicating successful installation will be displayed, as shown in the following figure.

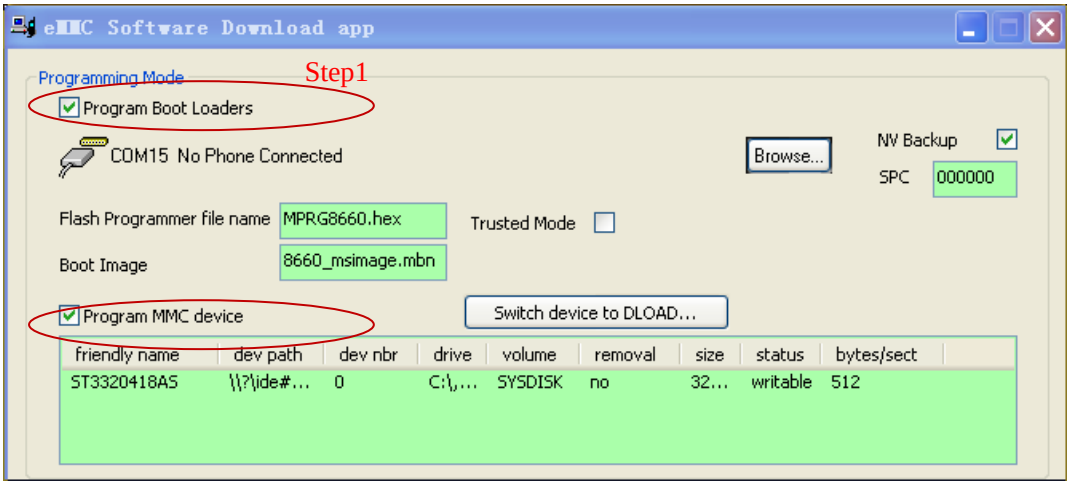
Step 5 The USB port (COM15) is shown in the **Device Manager** window.



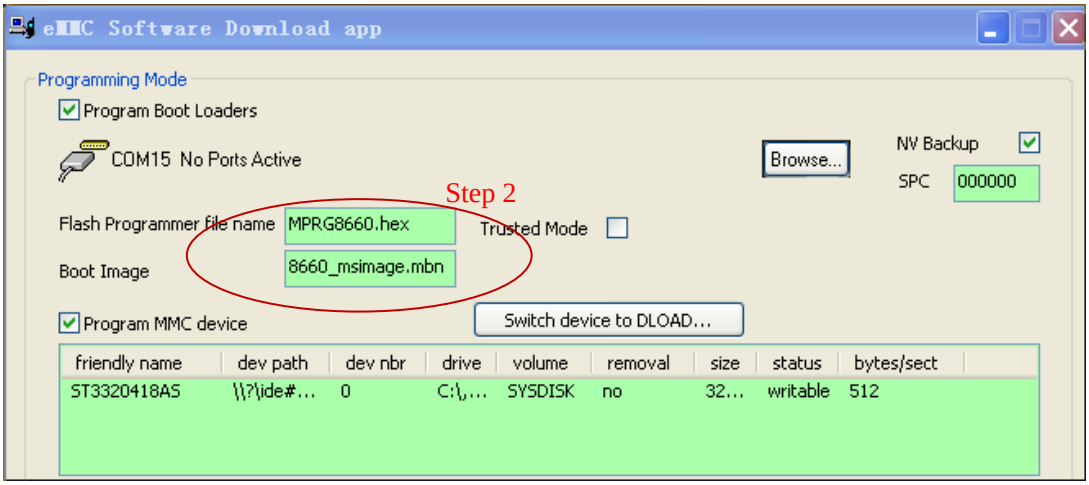
5.3.3 Programming Using the QPST Software

If the QPST software has been installed, run the eMMC Software Download tool and do as follows:

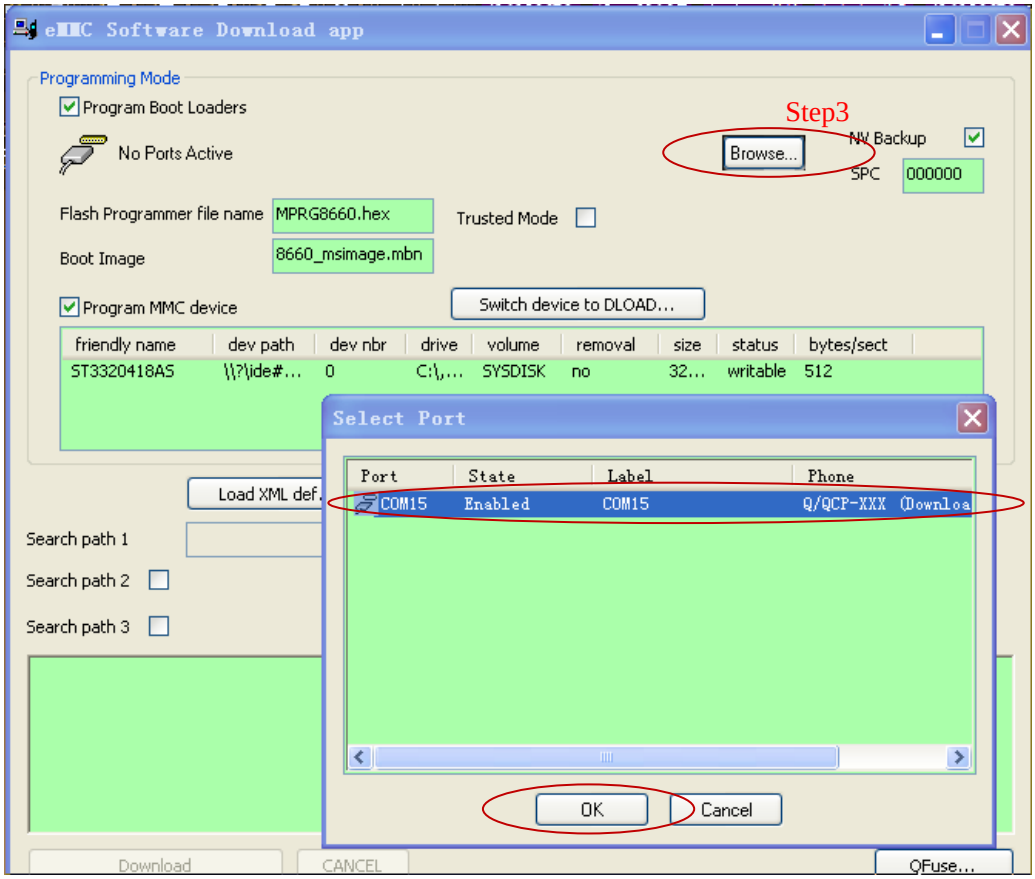
Step 1 Ensure that you select **Program Boot Loaders** and **Program MMC device**.



Step 2 Set **Flash Programmer file name** to **MPRG8660.hex**, and set **Boot Image** to **8660_msimage.mbn**.

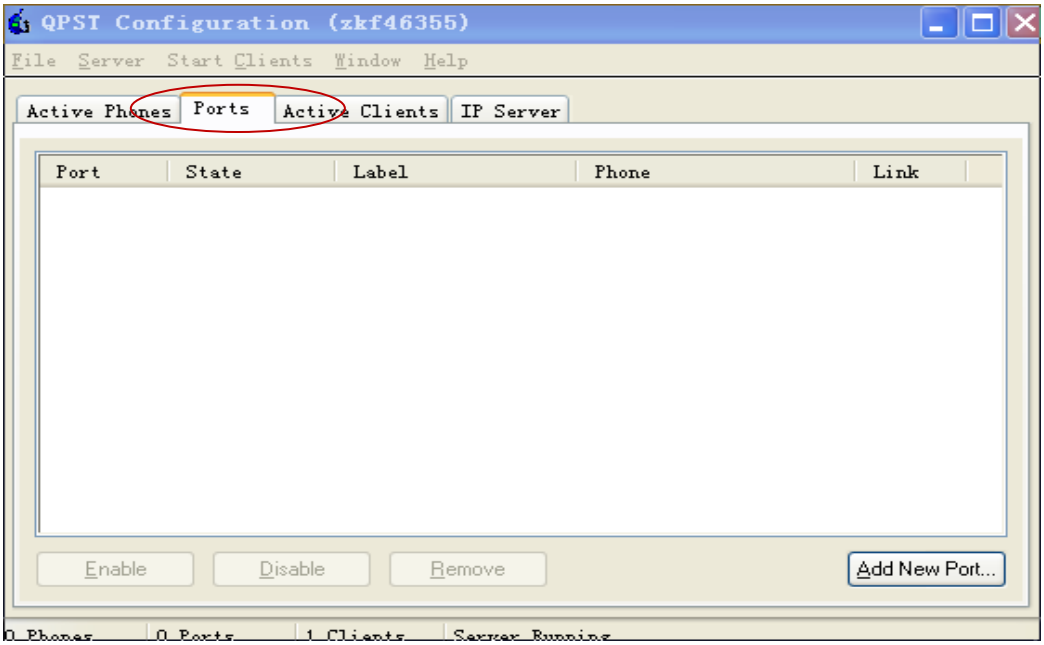


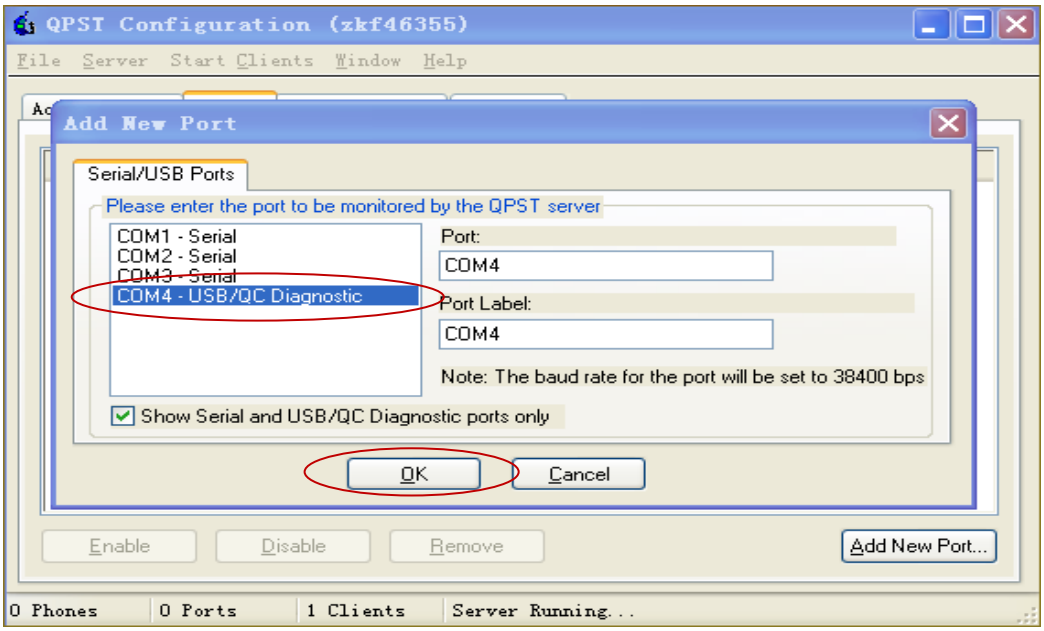
Step 3 Click **Browse**. In the **Select Port** window, check whether the value of Phone is **Q/QCP-XXX (Download)** (COM15), and whether the port is consistent with that shown in the **Device Manager** window. Then click **OK**.



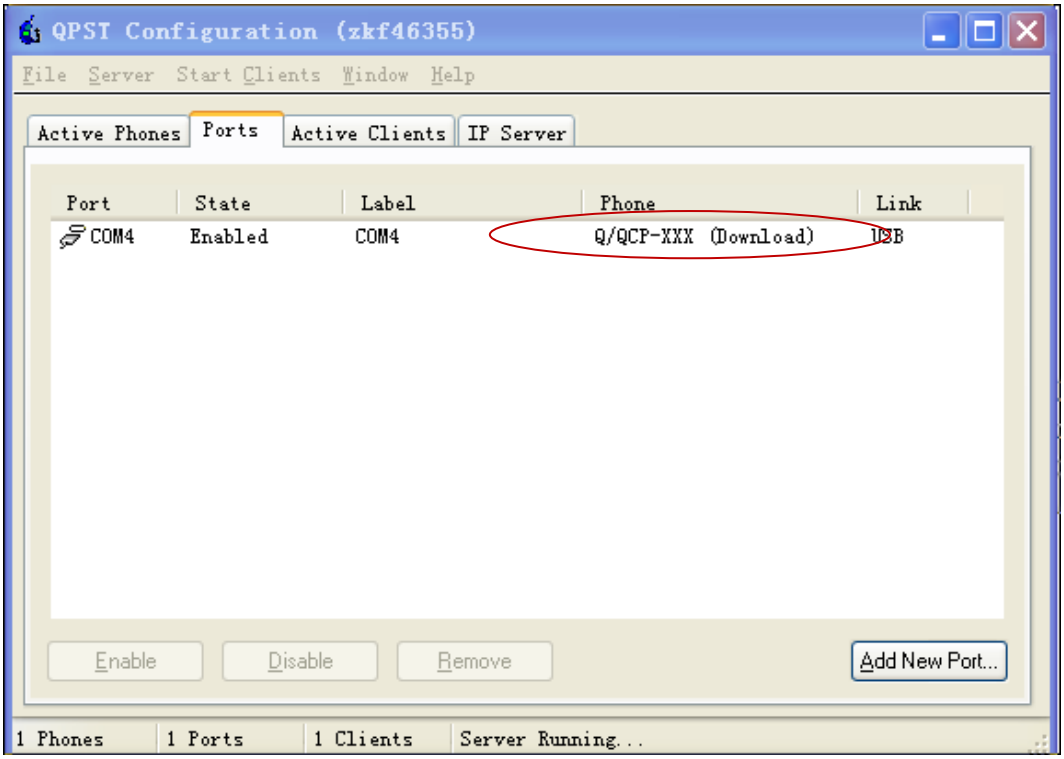
NOTE

If the **Q/QCP-XXX (Download)** port is not found in the **Select Port** window, right-click the  icon in the taskbar on the lower right corner to display the **QPST Configuration** window. In the displayed window, click **Ports**, and click **Add New Por**t. In the **Add New Port** window displayed, select corresponding USB/QC Diagnostic port. Double-click the selected port to add it to **Port** on the right. Then click **OK**.





The following window is displayed (if the port is available, the **Q/QCP-XXX (Download)** is displayed).

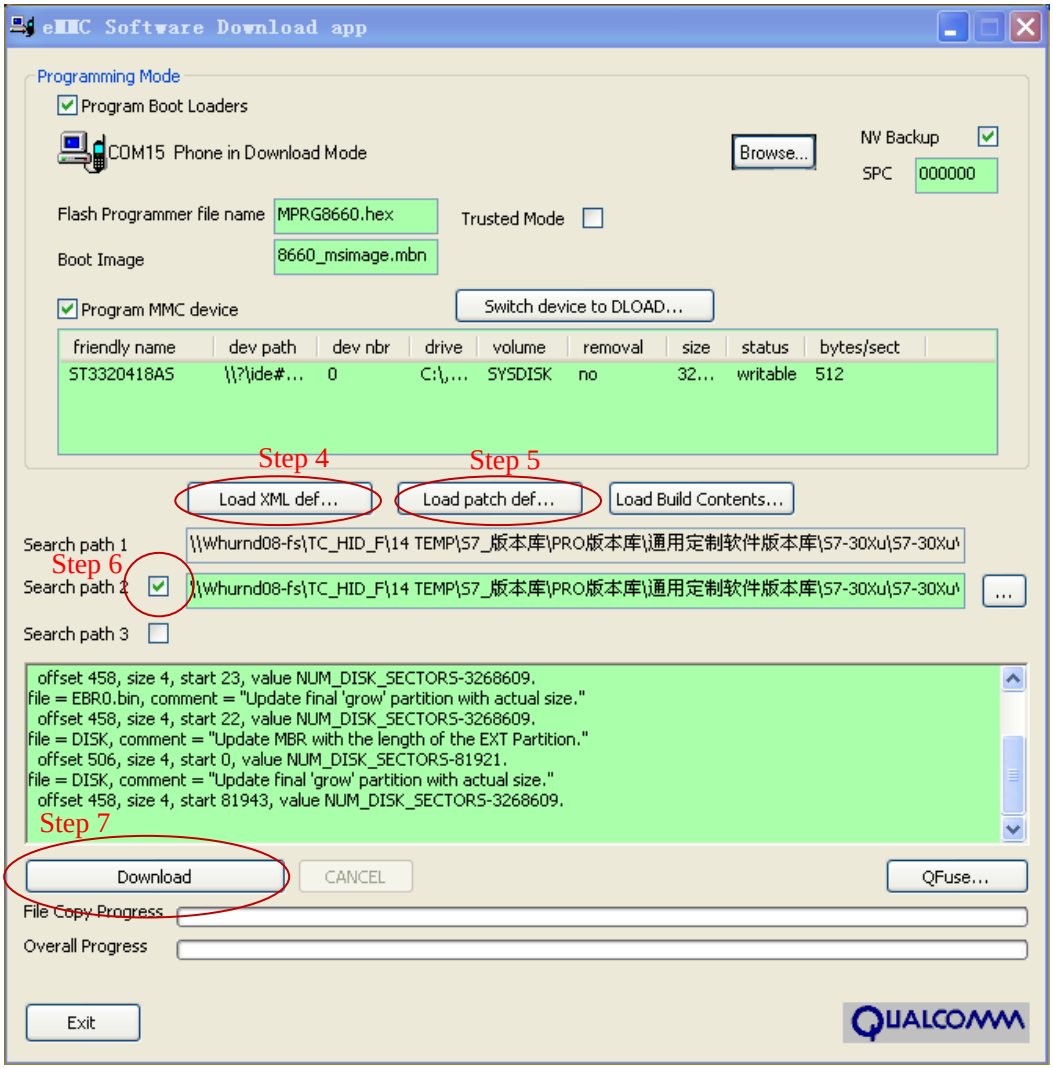


Step 4 Click **Load XML def**, and open the **modem** folder in the upgrade package in the displayed box. Then select **rawprogram0.xml** in the **modem** folder. If the file is successfully opened, the save path of **rawprogram0.xml** will be displayed in **Seach path1**.

Step 5 Click **Load patch def**, and open the **modem** folder in the upgrade package in the displayed box. Then select **patch0.xml** in the **modem** folder (this step is mandatory; otherwise, the MediaPad startup will fail).

Step 6 Select **Search path2**, and click the icon for browsing. Then select the **apps** folder in the upgrade package in the **Seach Path Folder** window.

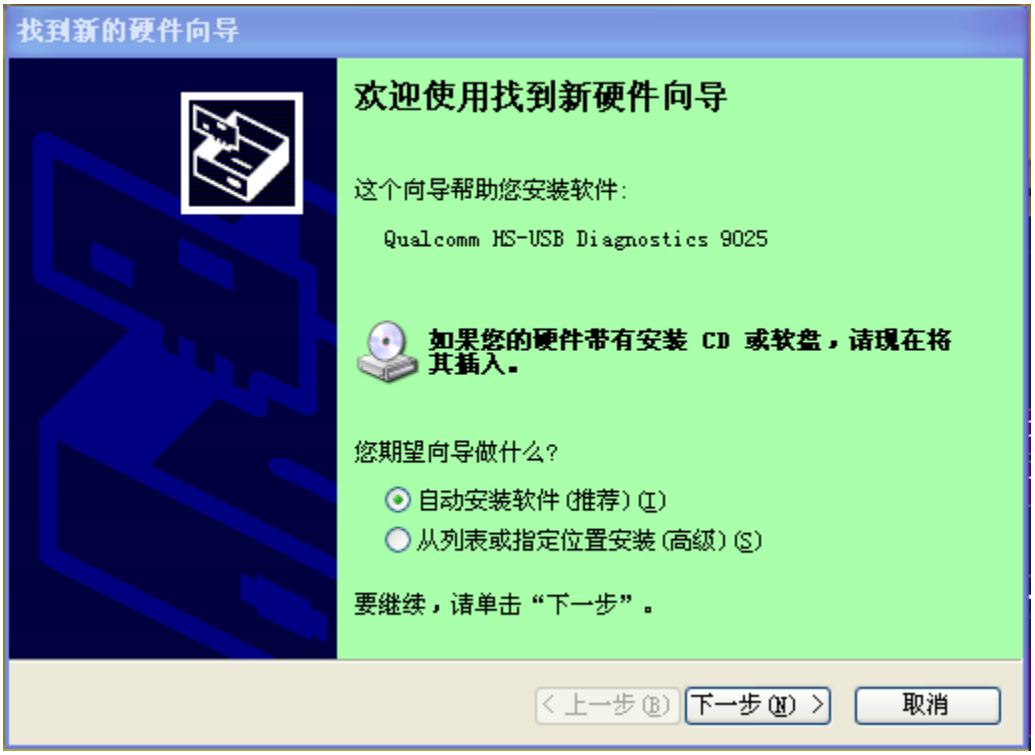
Step 7 When all preceding steps are completed, the **Download** button will become clickable. Then click **Download**.



Step 8 After the upgrade is completed, press and hold the **Power** button for more than 10 seconds to re-start the MediaPad.

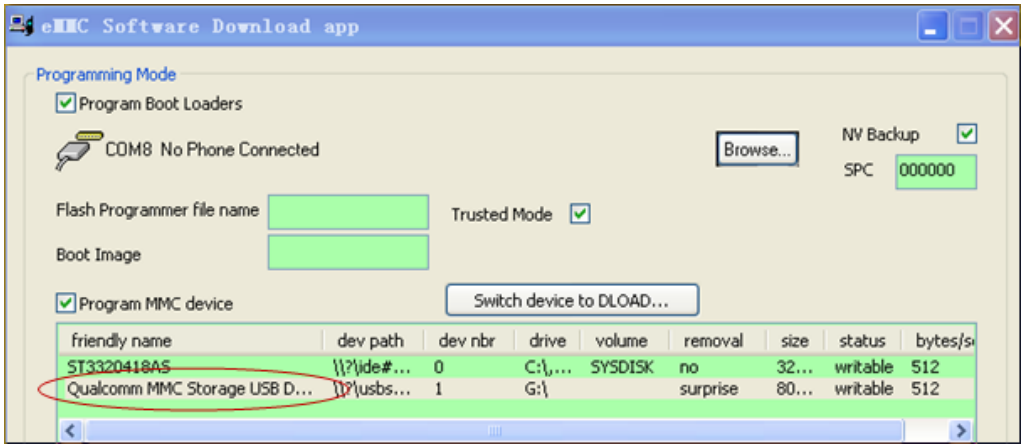
5.3.4 Troubleshooting

Click **Download**, if the following dialog box for installing the driver is displayed, as shown in the following figure. You can ignore it, because you may enter the trusted mode that requires no driver (USB MassStorage port is used in the trusted mode).

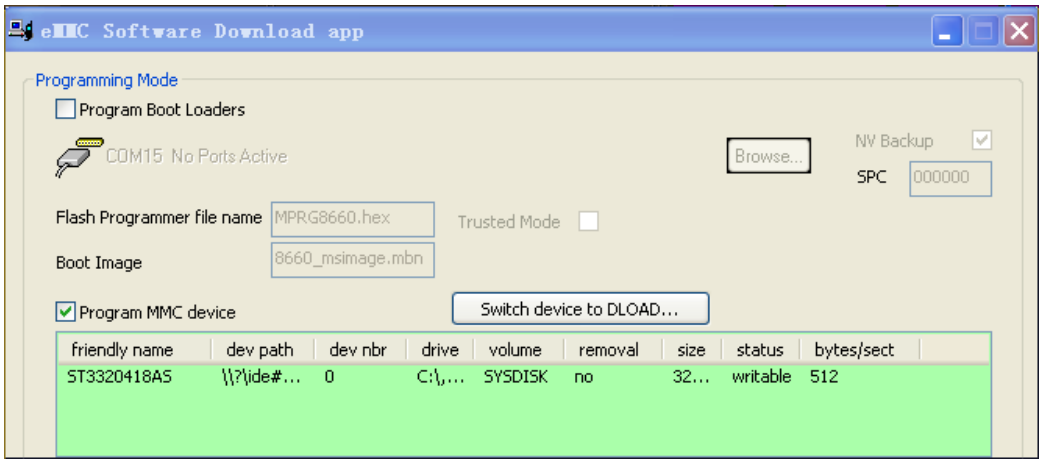


Step 1 In this mode, the message "Remote devices wait for time out" will be displayed occasionally, or the message "Image Download Failed. Cookie (if present) not received" will be displayed during restart.

In these cases, you may repeat the preceding steps. If the download fails, restart the MediaPad and connect it to the PC to check whether the upgrade is conducted in the trusted mode using the QPST software (that is, the **Qualcomm MMC Storage USB Device** is displayed). Then perform the upgrade using the USB according to the steps for upgrade in the trusted mode.



Step 2 If the message "Phone is not in download mode" is displayed, you may not uncheck **Program Boot Loaders** (mandatory for upgrade in the trusted mode). Then uncheck **Program Boot Loaders** as shown in the following figure.



Click **Scan&&Download**, if the message "port open" is displayed, check whether the driver is properly installed, and whether **DBAdapter Reserved Interface** port functions well.

5.4 Viewing the Software Version

In the standby state, choose **Settings** > **About phone** to view the information about the software version.

6 Maintenance Tools

	Name: constant-temperature hot air gun Purpose: heat components

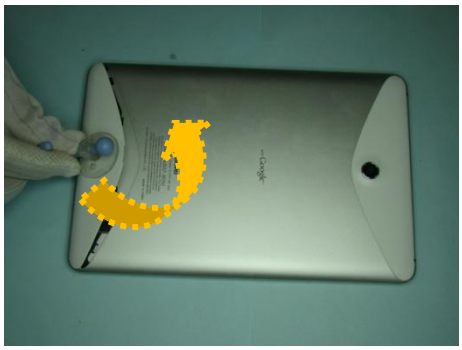
	Name: constant-temperature hot air gun Purpose: heat components
	Name: soldering iron Purpose: soldering during maintenance
	Name: DC power Purpose: supply power
	Name: soldering Purpose: secure the main board.
	Name: lead-free solder wire Purpose: soldering
	Name: digital multimeter Purpose: measurement during maintenance
	Name: tool kit Purpose: assemble and disassemble the device

	Name: electric screwdriver Purpose: fasten and remove screws.
	Name: small sucker (diameter: about 25 mm) Purpose: remove the upper decorative cover.

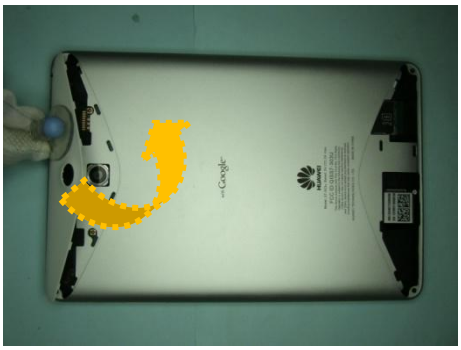
7 Disassembly Procedures

1. Ensure that the ESD wrist strap is properly grounded.

2. Disassembly procedures are as shown below.



3. Remove the lower decorative cover with the sucker.



4. Remove the upper decorative cover with the sucker.

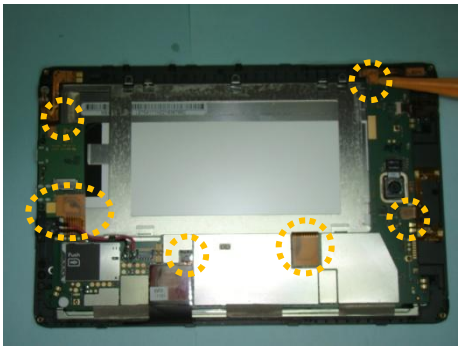
5. Remove the six screws on the rear cover.

6. Unlock the rear cover.

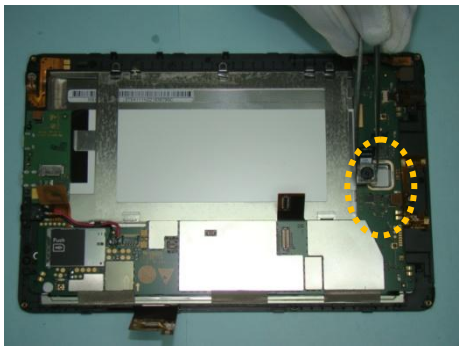
7. Disassemble the rear cover.

8. Loosen the BTB connector of the battery.

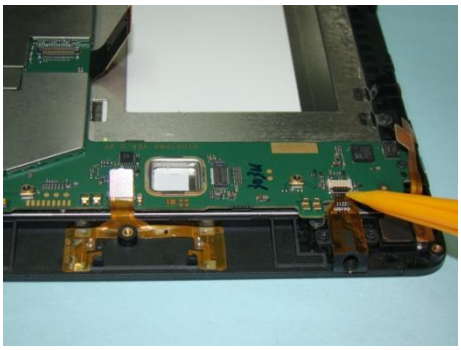
9. Take out the glued battery.



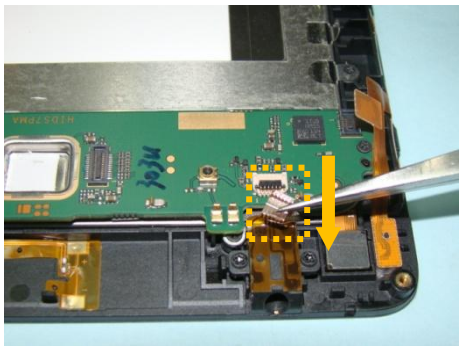
10. Loosen the BTB connector marked in the picture.



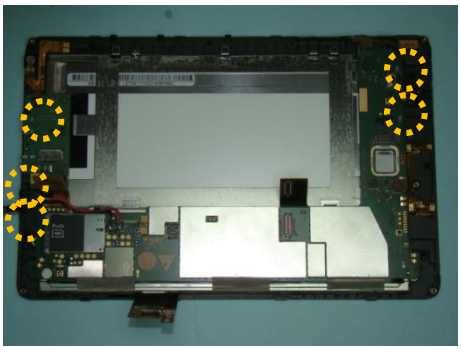
11. Remove the 5-megapixel camera.



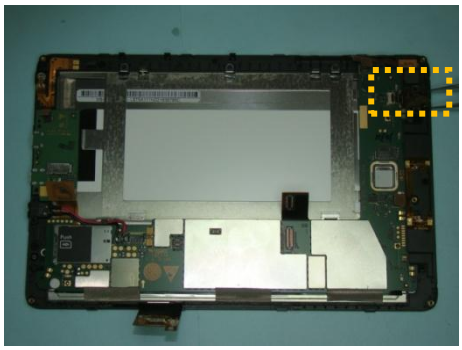
12. Loosen the BTB connector of the headset.



13. Remove the JACK FPC of the headset.

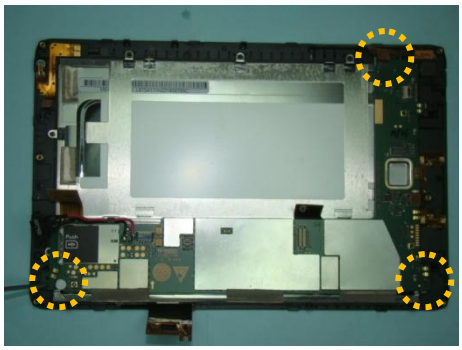


14. Remove the screws marked in the picture.

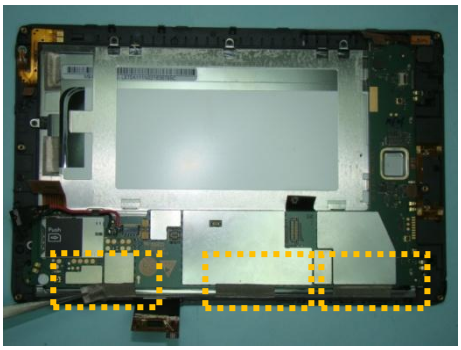


15. Remove the connector of the headset.

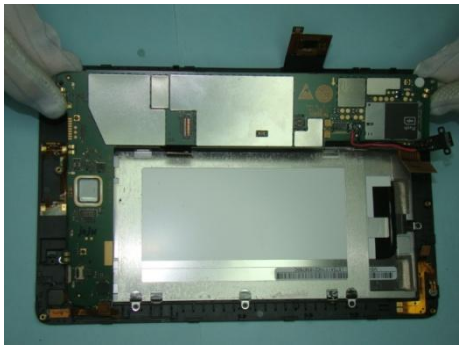
16. Remove the auxiliary board.



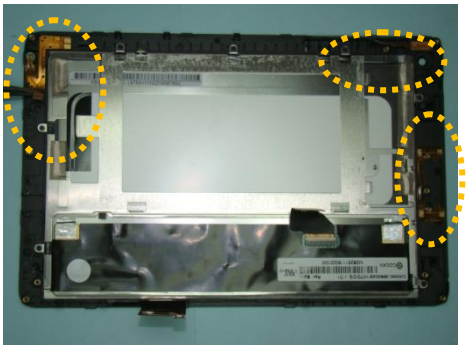
17. Remove the three screws on the main board.



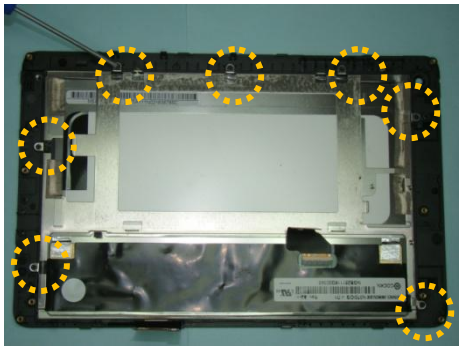
18. Remove the conductive fabric between the main board and the LCD support.



19. Remove the main board.



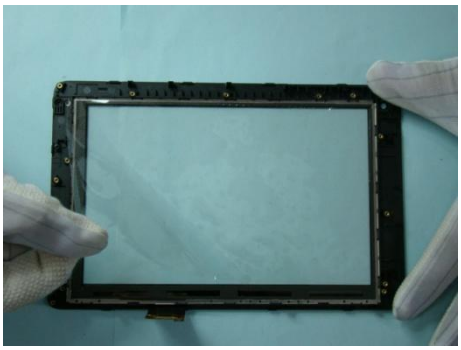
20. Remove the FPCs marked in the picture.



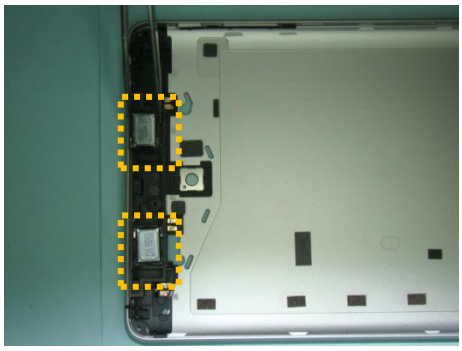
21. Remove the seven screws securing the LCD.

22. Remove the LCD from other cover A assembly.

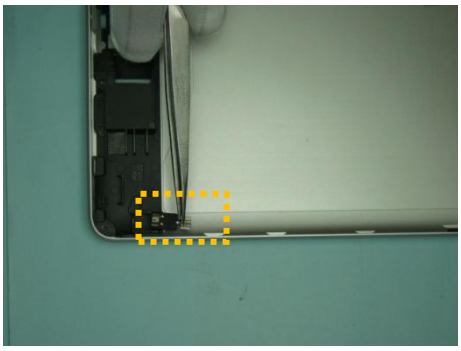
23. Place the protective film on the LCD.



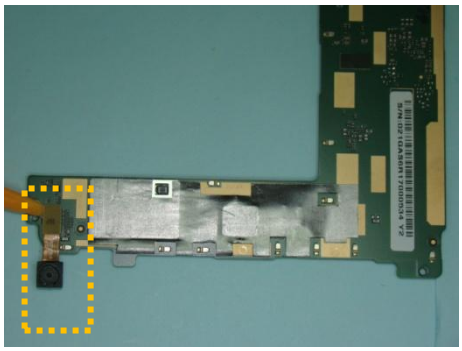
24. Place the protective film on the lens.



25. Remove the speaker on the rear cover.



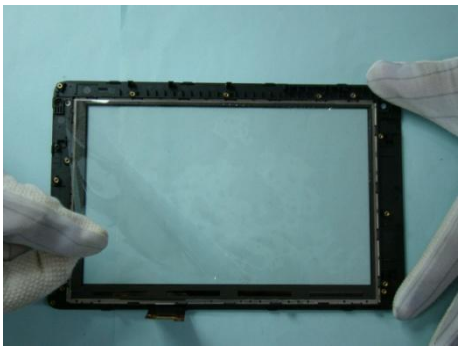
26. Remove the vibrator on the rear cover.



27. Remove the front camera.

8 Assembly Procedures

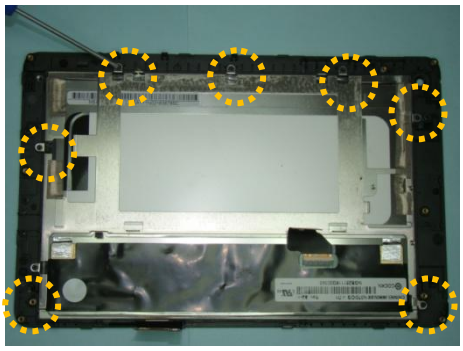
1. Ensure that the ESD wrist strap is properly grounded.



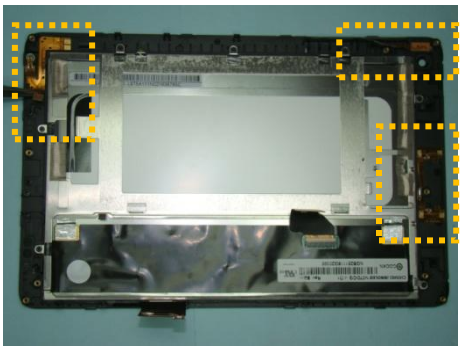
2. Remove the protective film on the lens.

3. Remove the protective film on the LCD.

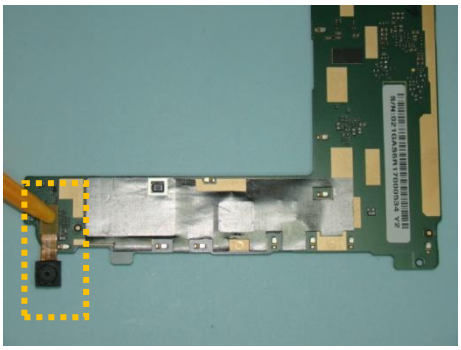
4. Install the LCD.



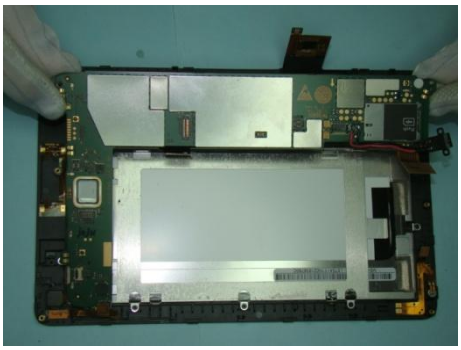
5. Tighten the screws marked in the picture to secure the LCD.



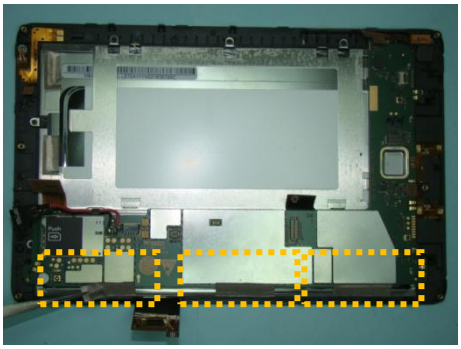
6. Place FPCs at the positions marked in the picture.



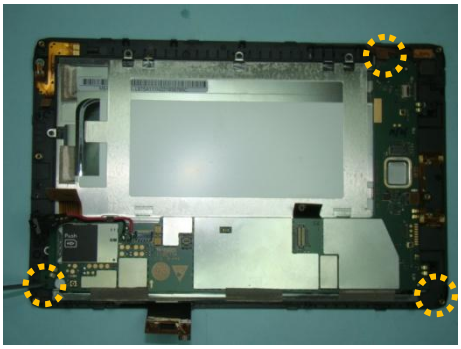
7. Install the front camera to the main board.



8. Install the main board.

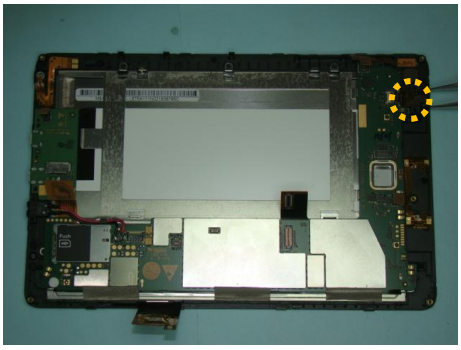


9. Place the conductive fabric at the position marked in the picture.



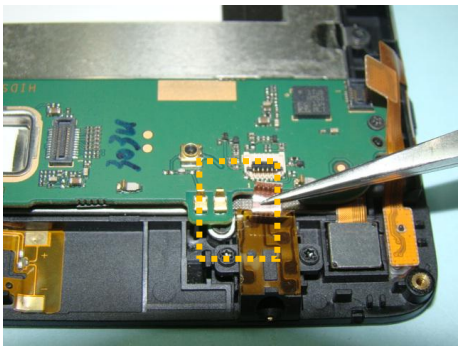
10. Tighten the screws marked in the picture to secure the main board.

11. Install the auxiliary board.

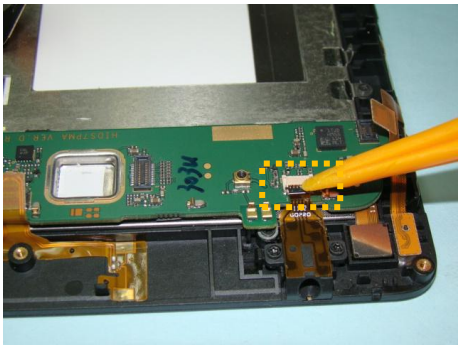


12. Install the connector of the headset.

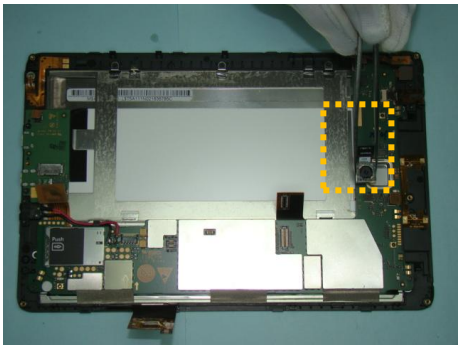
13. Tighten the screws marked in the picture.



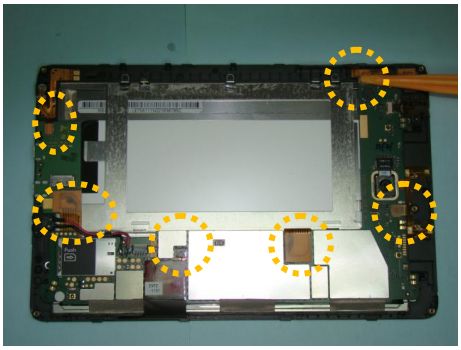
14. Install the FPC for the connector of the headset.



15. Secure the BTB connector of the headset.



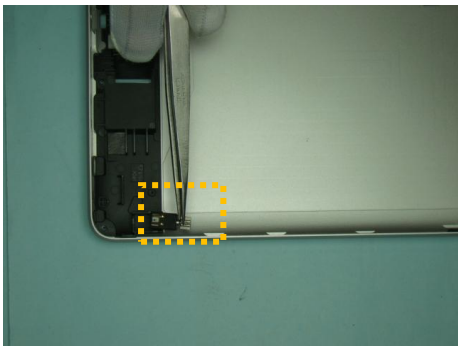
16. Install the rear camera.



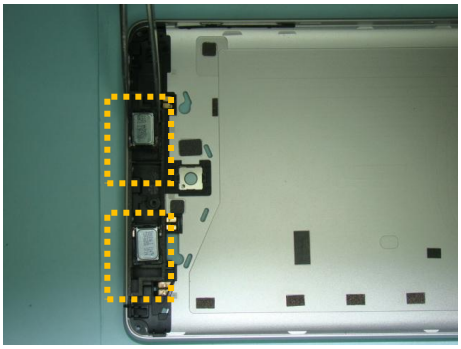
17. Secure the BTB connectors marked in the picture.

18. Install the battery.

19. Secure the connector of the battery.



20. Install the vibrator.



21. Install the speakers.

Note:

The springs of them must face each other.

22. Install the rear cover.

23. Secure the front cover and rear cover.

24. Tighten the screws on the rear cover.

25. Install the lower decorative cover.

26. Install the upper decorative cover.

9 Troubleshooting for Common Failures

9.1 Principle

The S7 Pro, customized for home and mobile users, provides high-speed radio interface (WCDMA, WIFI) for access to the Broadband Metropolitan Area Network (BMAN), and HDMI to support various multimedia formats. The S7 Pro supports multimedia, games, GPS, IM, audio, and data communication to provide satisfactory entertainment and communication services to home and mobile users. The S7 Pro uses a single board to control the device, and process the graph, image, and baseband signal.

The key components of Mediapad include: processor MSM8260, RF transceiver QTR8615, PMU PM8058 and PM8901, power management IC MAX8903, WLAN/BT module BCM4329, and RGB to LVDS 8-bit transceiver.

The MSM8260 is Qualcomm's new generation processor, and mainly includes the following sub-processors:

Apps processing: two Scorpion cores, with combined L2 (512 kB) cache running at up to 1.2 GHz

Applications DSP: QDSP6 processor (565 MHz)

Modem µP: ARM1136™ + L2 cache (256 kB) at up to 384 MHz

Modem DSP: QDSP4 processor (to 147 MHz)

Resource power manager: ARM7 (54 MHz)

Sensor peripheral subsystem (SPSS): ARM7 (64 MHz)

Characteristics of the chip:

For baseband processing, it supports the UMTS (WCDMA), HSPA+, and GSM/GPRS/EDGE.

The AP processing speed o is up to 1.2 GHz; the 256 MHz ARM1136 P modem processor and the 122 MHz QDSP4 DSP are used.

For storage, it supports the LPDDR2 SDRAM (Pro Via EBI1), NAND flash, OneNAND, and NOR flash.

ISM — 32-bit LPDDR2 SDRAM up to 333 MHz (64 MB) for multimedia

EBI1 support — 32-bit LPDDR2 SDRAM up to 266 MHz (512 MB as a minimum)

SD support — eMMC NAND flash (The versions of eMMC BOOT and eMMC on the board must be version 4.4 or later versions).

Camera connectors: Qcamera™ Feature

Rear camera (via 4-lane MIPI_CSI) — support the CMOS and CCD sensors; 16 megapixel as a maximum.

Front camera (via 2-lane MIPI_CSI) — support the CMOS and CCD sensors; 12 megapixel as a maximum; maximum resolution: WSXGA 1440 x 900; supports up to three displays.

Primary: 4-lane MIPI_DSI – up to 24-bit WSXGA (1440 x 900); refresh rate up to 60 Hz

Secondary: RGB interface – up to WSXGA (1440 x 900); refresh rate up to 60 Hz

Tertiary: EBI2 interface – up to 400 x 240, non-active refresh

Color depth: 24 bits per pixel (bpp)

Audio/video (A/V) output

---»Composite video plus line audio for NTSC/PAL TVs

---»S-video plus line audio for NTSC/PAL TVs

---»High Definition Multimedia Interface (HDMI) Ver. 1.3

---»Integrated HDMI Tx core and HDMI PHY

---»1080p with a refresh rate of 60 Hz; 24-bit RGB color

---» Up to 8-channel audio for 7.1 surround sound

--»Dolby® Digital Plus, Dolby True-HD, and DTS-HD Master

- Video decoding (Windows Mobile and Linux) supports the following:

  Program source: 30 fps at 1080p (H.264/MPEG2/MPEG4/DivX/VC-1), 30 fps at D1 (H.263)

  Video source: 30 fps at 1080p (H.264/MPEG2/MPEG4/DivX/VC-1), 30 fps at D1 (H.263)

  Video calling: 15 fps at QCIF (MPEG4/H.263)
- Audio codec via the QTR8615 or QTR9215 device
- External interfaces:

  ---»UART ports, UIM ports, I2C ports, and SPI ports (master only);

  ---»USB interfaces: HS USB 2.0 OTG with built-in USB PHY, FS USB (without built-in USB PHY), and USB-UICC

---»Secure digital interfaces: up to five ports, MMC and SD cards, eMMC NAND flash, UBM and WLAN, and SD/eMMC boot

---»I2S interfaces: up to 18 multiple I2S channels over five interfaces

---»PCM: for Bluetooth

---»TSIF: up to two ports

---»NFC: with external NFC device

The MSM8260 functional block diagram is shown in the following figures.

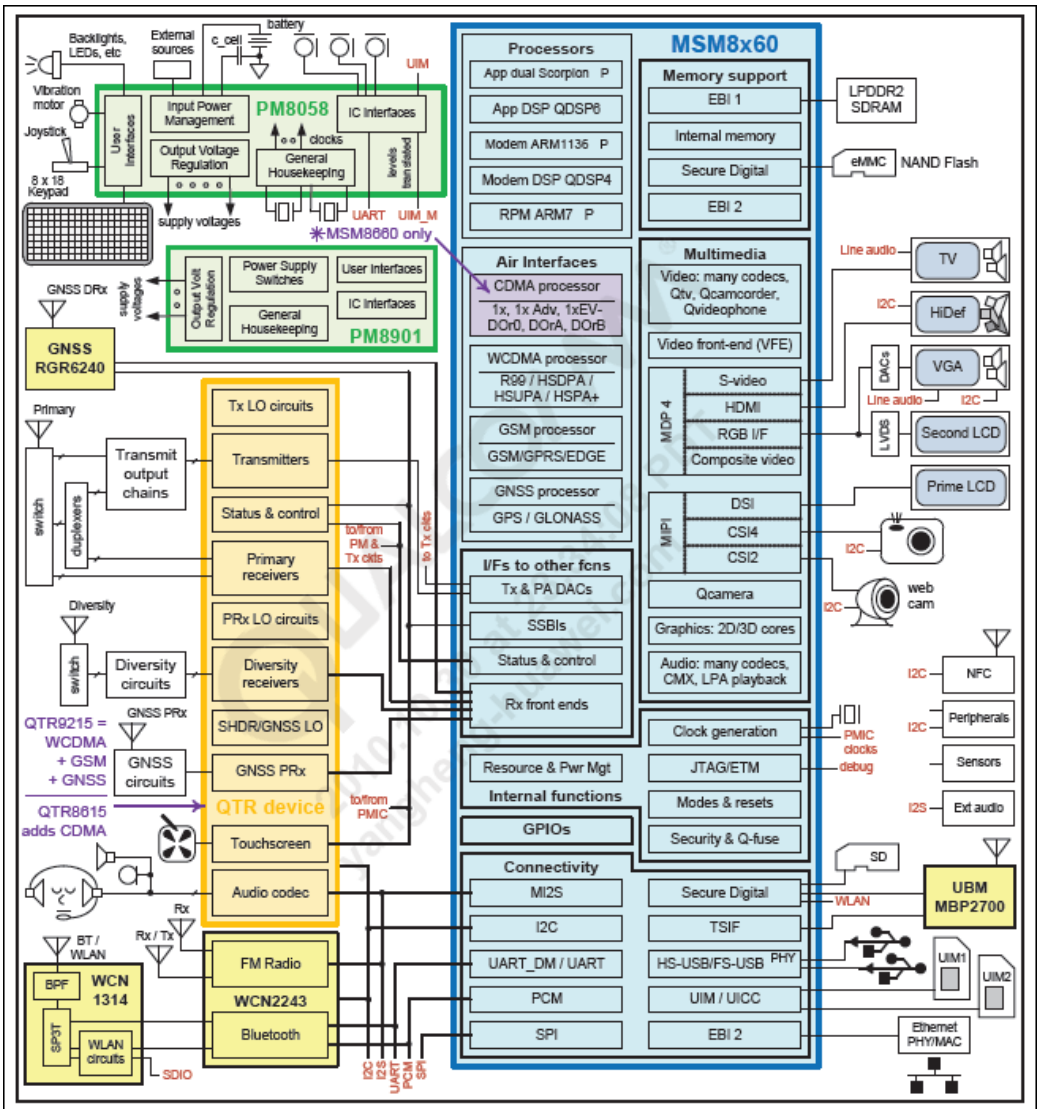
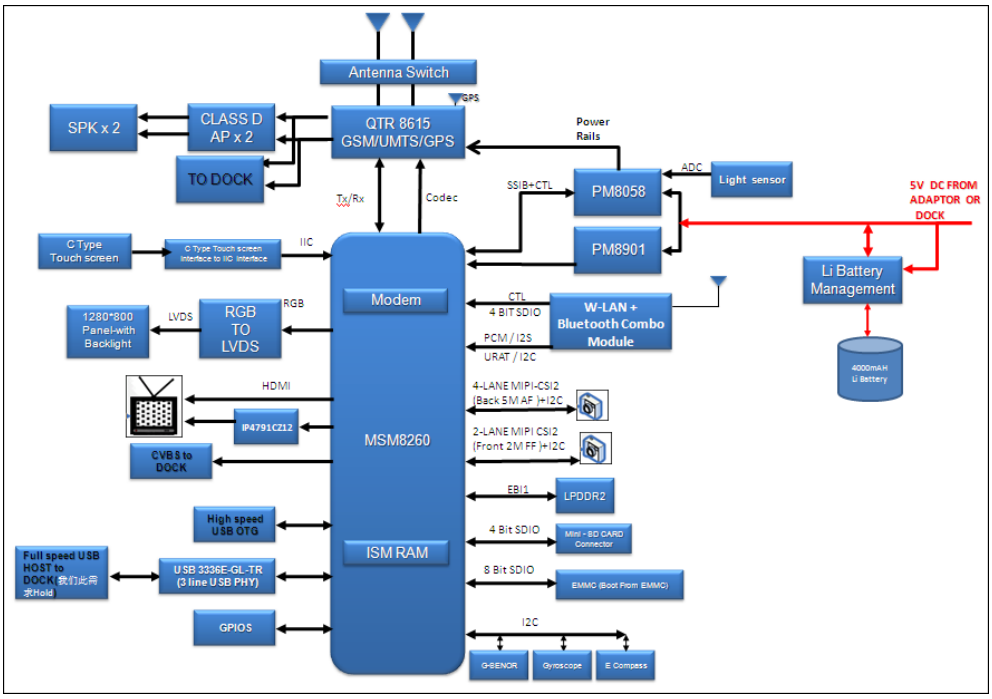


Figure 1-1 MSM8x60 functional block diagram in a typical application



9.2 Power-on Failure

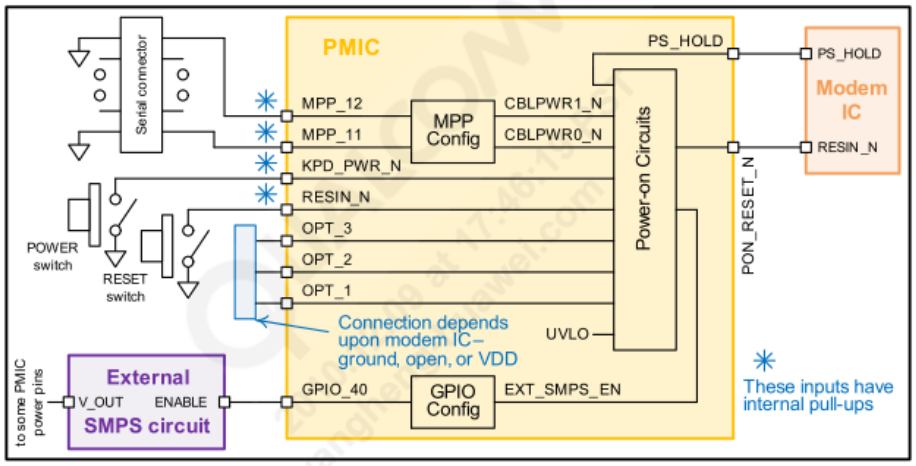
The following three conditions must be met to power the PRO on:

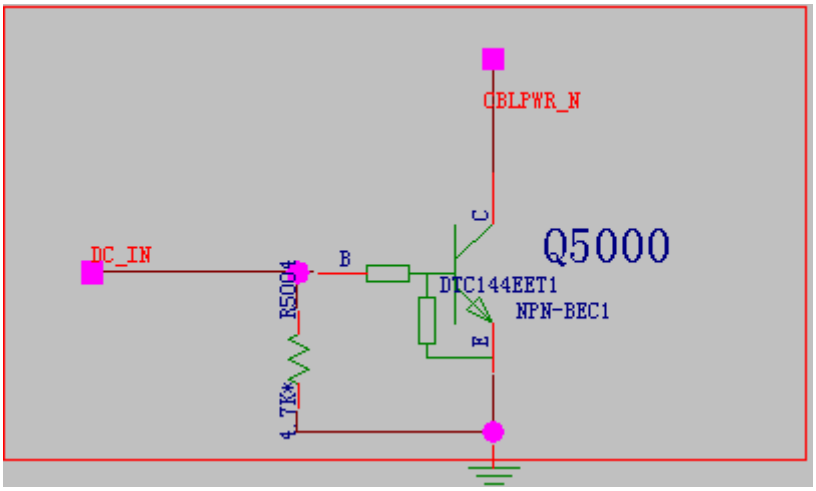
1. Press and hold the **Power** button for two seconds with the battery in place.
2. Connect the 5 V DC regulated power supply to the DC power interface with the battery in place. The device is powered on, and charging begins.
3. Connect the 5 V DC regulated power supply to the DC power interface with the battery not in place. The device is powered on and starts to run.

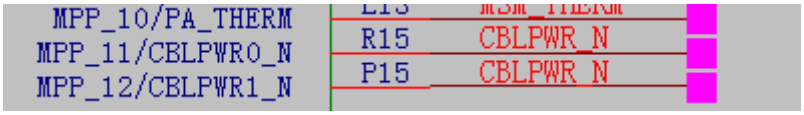
Connect the DC adapter to the power-on circuits.

7.1.1 Poweron circuits

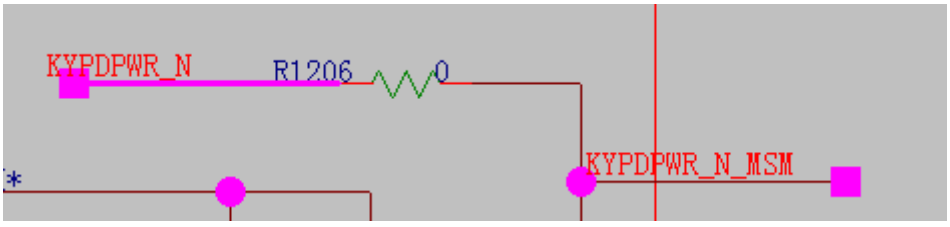
Dedicated circuits (Figure 7-2) continuously monitor five events that might trigger a poweron sequence. If any of the five events occur, these circuits poweron the IC, determine the handset's available power sources, enable the correct source, and take the MSM or QSC device out of reset.







Power_key circuit:



Mediapad power-on sequence:

Standard sequence:
VREG_S0A--->VREG_S1A--->VREG_S3A--->VREG_S2A--->VREG_L0A--->VREG_L21A--->VREG_L7A--->VREG_L13A--->VREG_L16A--->VREG_L5A--->VREG_L6A--->VREG_S0B--->VREG_S3B--->VREG_L3B--->VREG_L11A--->--->TP_3V3--->VREG_L4B

1. VDD_MEM (internal memory)

2. VDD_C1 (digital core circuits)

3. VDD_ISM1 and VDD_P3 (ISM 1.8 V power and most pad circuits/peripheral I/Os respectively)

4. VDD_A3 (1.3 V RF, GPS ADC)

5. VDD_A2 (MIPI-DSI display)

6. VDD_A1, VDD_PXO, and VDD_MXO (PLLs, PXO, and MXO crystal power respectively)

7. VDD_USBPHY_1P8 (1.8 V USB supply)

8. VDD_A5 (DACs and BBRx)

9. VDD_A4; VDD_A4_GPLL and VDD_A4_HFPLL (HDMI and MIPI-CSI; PLLs)

10. VDD_P2 (2.85 V SD card)

11. VDD_USBPHY_3P3 (3.3 V USB supply)

12. VDD_SC1 (1.1 V Scorpion core 1 – optional)

NOTE

1. The core voltage (VDD_C1) needs to be powered up before the pad circuits (VDD_PX) are powered up, so that internal circuits can take control of the I/Os and pads.
2. If pad voltages are powered up first, the output drivers may be stuck in unknown states, and may cause high leakage current until VDD_C1 is powered on.
3. The pad voltages must precede the analog voltages (VDD_AX), because the SSBIs are initialized to the default state before VDD_AX is powered up (analog circuits are controlled by SSBI).
4. VDD_QDSP, VDD_SC1, and VDD_SC2 (QDSP and Scorpion core circuits) can be powered up by the software after the MSM device has completed the boot process.
5. Other non-critical supplies are included in the power-up sequence. Any other desired supplies can be powered up by software after the sequence is completed.
6. Each domain needs to reach the 90% value before the next domain starts ramping up. For example, when VDD_C1 reaches 90% of the specified value, the VDD_P3 supply can start ramping up.

NOTE

VDD_QFUSE_PRG must be powered down before any of the pad power supplies are powered down

NOTE

The VDD_QFUSE_PRG pin should be connected to a 1.8 V power supply only for blowing fuses; otherwise, this pin must be grounded and never be left floating.

The kernel system power-on waveform is shown in the following figure.

Voltage:

Type/Name	Default Conditions	Programmable Range	Operating Range	Intended Use
SMPS – Buck	On, 1.100 V	0.375 to 3.05 V	0.500 to 1.350 V	Processor core #1
S0 (1.5 A) 2 3	On, 1.100 V	0.375 to 3.05 V	0.500 to 1.350 V	Processor core #2 (if available)
S1 (1.5 A)	Off, 1.350 V	0.375 to 3.05 V	0.500 to 1.500 V	Low-voltage RF circuits
S2 (1.5 A)	On, 1.800 V	0.375 to 3.05 V	1.700 to 1.900 V	Digital pads and EBI
S3 (1.5 A)	Off, 2.200 V	0.375 to 3.05 V	2.100 to 2.400 V	High-voltage RF circuits
S4 (1.5 A)				
Linear – 300 mA	On, 1.350 V	0.75 to 1.525 V	1.100 to 1.450 V	DDR2 core (EBI1), HSIC, digital I/Os
L1 (NMOS)	Off	1.5 to 3.3 V	2.500 to 3.3 V	Digital pads; Tx DAC; XO digital outputs
L2 (PMOS)	On, 2.850 V	1.5 to 3.3 V	2.750 to 3.3 V	SDIO
L5 (PMOS)	Off, 2.200 V	1.5 to 3.3 V	1.500 to 3.3 V	Analog and RF circuits; S-video; combo DAC
L8 (PMOS)	Off, 2.100 V	1.5 to 3.3 V	1.500 to 3.3 V	Analog baseband circuits; S-video DAC
L9 (PMOS)	Off, 2.600 V	1.5 to 3.3 V	1.500 to 3.3 V	UBM analog; MDDI; NCP
L10 (PMOS)	Off, 2.900 V	1.5 to 3.3 V	1.500 to 3.3 V	WLAN PA
L13 (PMOS)	Off, 2.850 V	1.5 to 3.3 V	1.500 to 3.3 V	RF front-end circuits
L14 (PMOS)	Off, 2.850 V	1.5 to 3.3 V	1.500 to 3.3 V	LCD
L15 (PMOS)	Off, 1.800 V	1.5 to 3.3 V	1.500 to 3.3 V	Multimedia controls
L16 (PMOS)	Off, 1.200 V	0.75 to 1.525 V	1.000 to 1.400 V	General-purpose
L22 (NMOS)	Off, 1.200 V	0.75 to 1.525 V	1.000 to 1.400 V	General-purpose
L23 (NMOS)				
Linear – 150 mA	On, 1.200 V	0.75 to 1.525 V	1.100 to 1.300 V	DDR2; digital I/Os; HDMI; UBM digital
L0 (NMOS)	Off	1.5 to 3.3 V	1.700 to 3.3 V	UIM/UICC
L3 (PMOS)	Off, 2.800 V	1.5 to 3.3 V	1.500 to 3.3 V	Camera analog
L11 (PMOS)	Off, 2.900 V	1.5 to 3.3 V	1.500 to 3.3 V	NFC; RF front-end circuits
L12 (PMOS)	Off, 2.200 V	1.5 to 3.3 V	1.500 to 3.3 V	General-purpose
L17 (PMOS)	Off, 2.200 V	1.5 to 3.3 V	2.100 to 3.3 V	ADCs (XO, HK, TS, UBM)
L18 (PMOS)	Off, 2.500 V	1.5 to 3.3 V	1.500 to 3.3 V	WLAN analog
L19 (PMOS)	Off, 1.500 V	1.5 to 3.3 V	1.500 to 3.3 V	MDDI; multimedia controls
L20 (PMOS)	On, 1.100 V	0.75 to 1.525 V	1.000 to 1.400 V	MPLL circuits
L21 (NMOS)	Off, 1.300 V	0.75 to 1.525 V	1.000 to 1.400 V	General-purpose
L24 (NMOS)	Off, 1.300 V	0.75 to 1.525 V	1.000 to 1.400 V	General-purpose
L25 (NMOS)				
Linear – 50 mA	On, 2.850 V	1.5 to 3.3 V	2.750 to 3.3 V	XO circuits and sine wave output buffers
L4 (PMOS)4	On, 3.075 V	1.5 to 3.6 V	2.950 to 3.6 V	USB PHY; HDMI
L6 (PMOS)	On, 1.800 V	1.5 to 3.3 V	1.750 to 3.3 V	USB PHY; RF XO circuits; PA DAC; Q-fuse
L7 (PMOS)				

Type/Name	Default Conditions	Programmable Range	Operating Range	Intended Use
Low-voltage Switches LVS0 (100 mA) LVS1 (100 mA)	Off, 1.800 V Off, 1.800 V	Not applicable Not applicable	Not applicable Not applicable	Camera Sensors, HDMI
NCP (200 mA)	Off, –1.800 V	–1.700 to –1.900 V	–1.700 to –1.900 V	Headset circuits

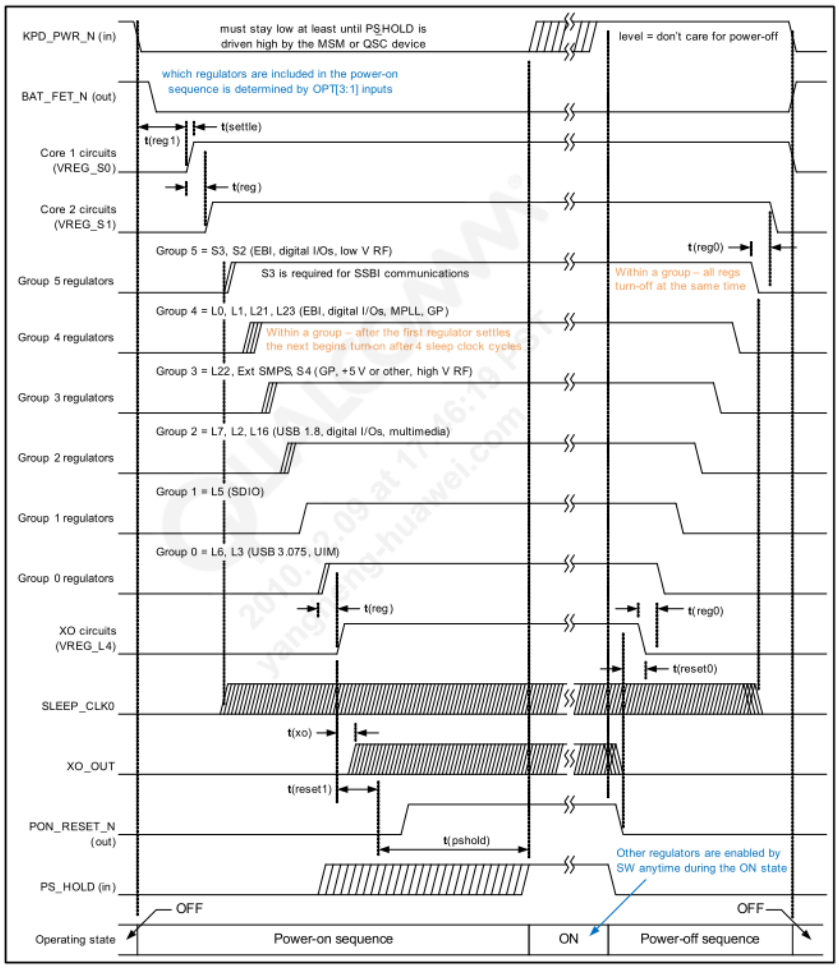


Figure 7-3 Example power sequence (set #2)

9.2.1 Power-on Failure — High Current

Analysis: Adjust the DC regulated power supply to 5 V/3 A, and connect it to the PRO_DC interface for power-on. When the device is powered on, the current exceeds 500 mA. In this case, the power-on failure is usually caused by improper SMT or IC damage. For the maintenance procedures, see Figure 9-1, Figure 9-2, and Figure 9-3.

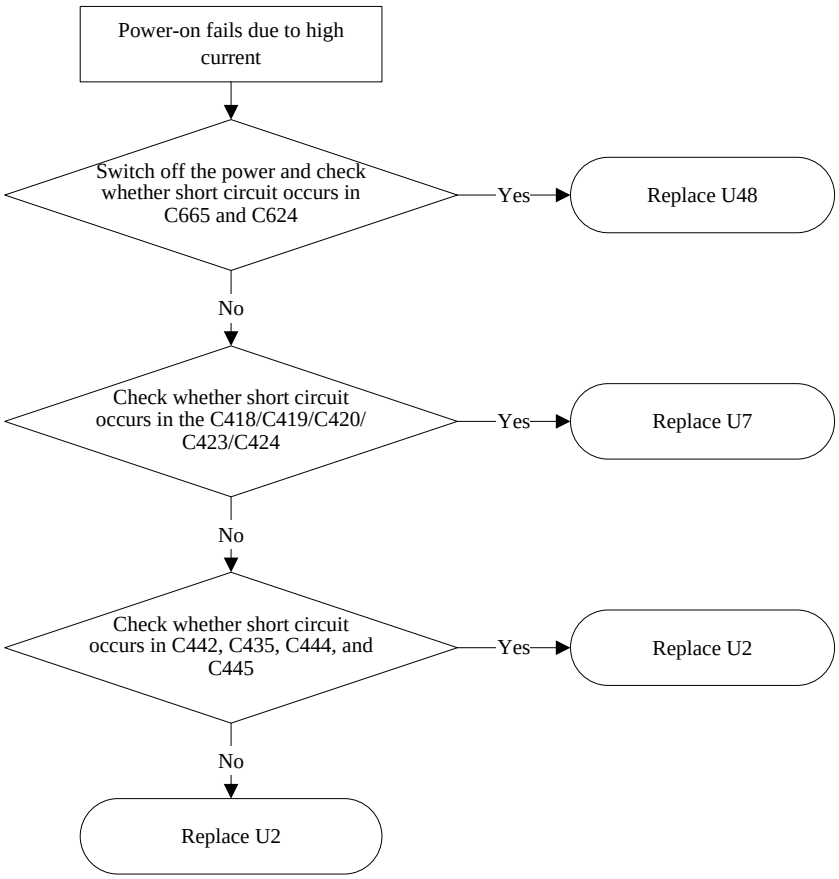


Figure 9-1

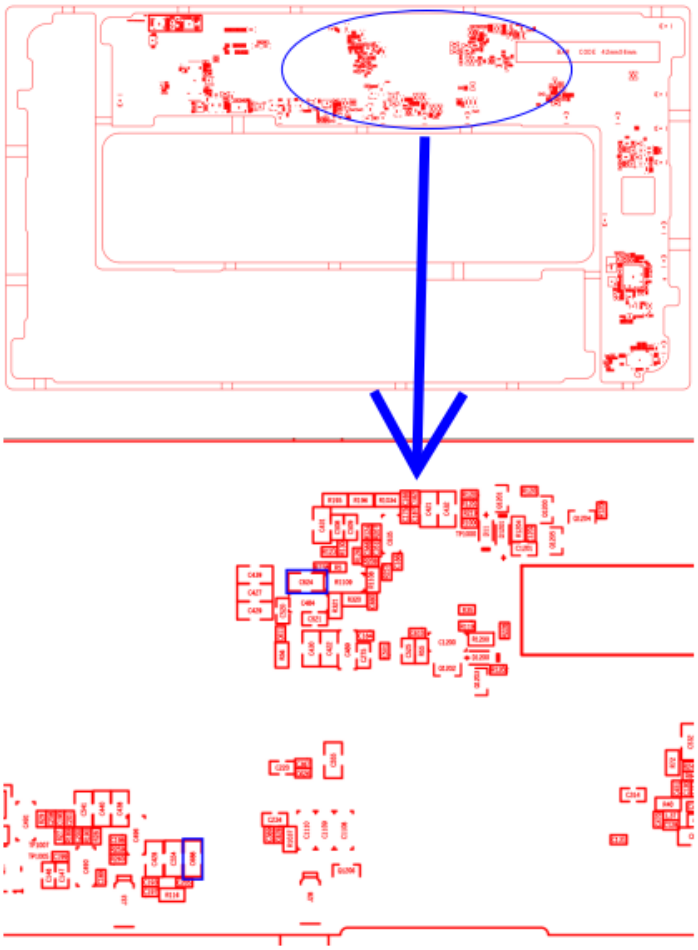
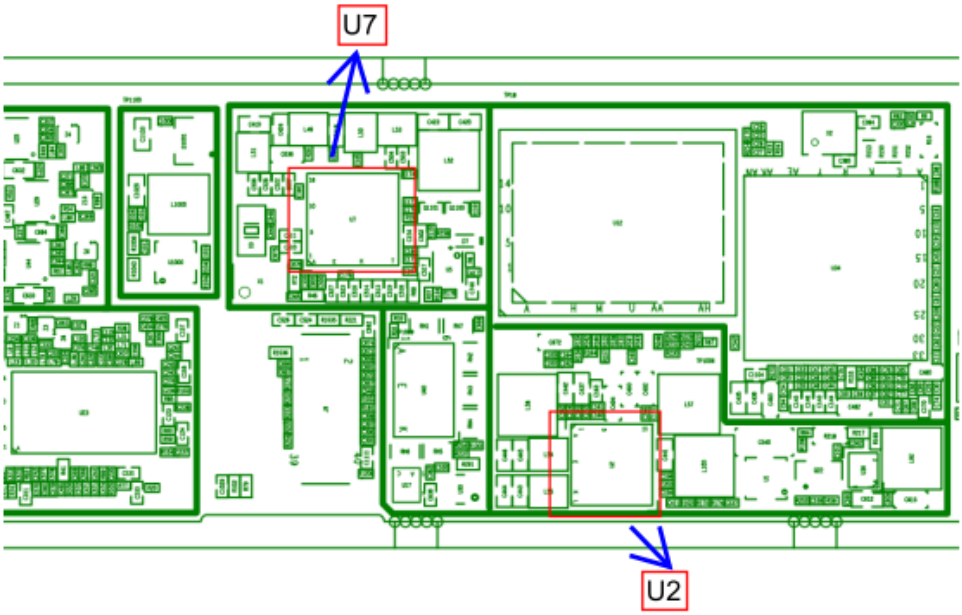


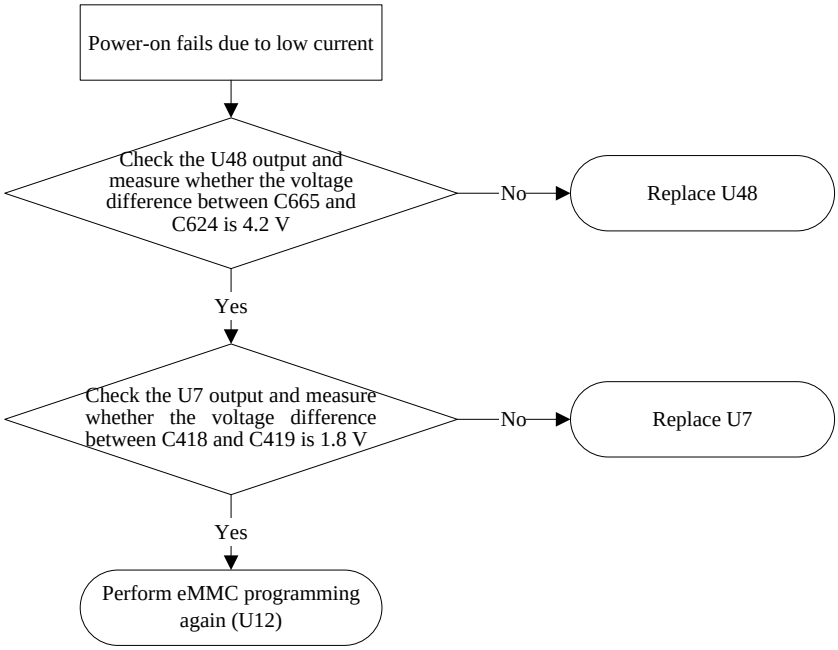
Figure 9-2

Figure 9-3



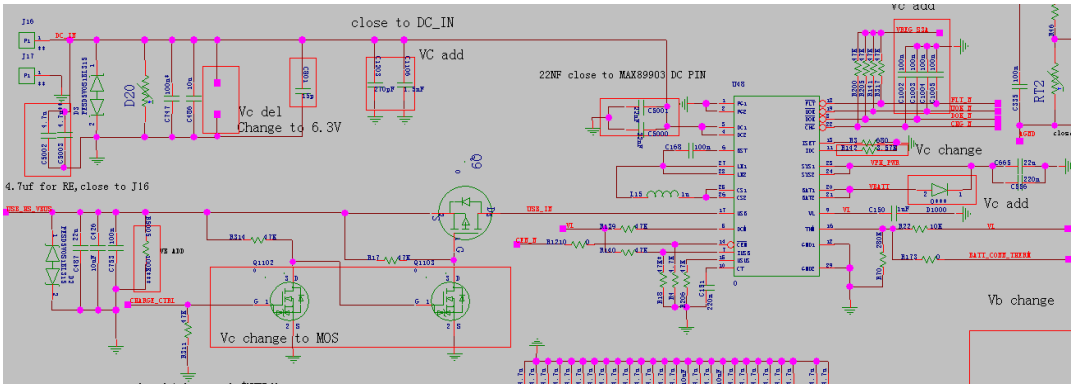
9.2.2 Power-on Failure – Low Current

Analysis: Adjust the DC regulated power supply to 5 V/3 A, and connect it to the PRO_DC interface for power-on. When the device is powered on, the current is below 70 mA. In this case, the power-on failure is usually caused by improper eMMC programming or SMT. For the maintenance procedures, see Figure 9-1, Figure 9-2, and Figure 9-3.



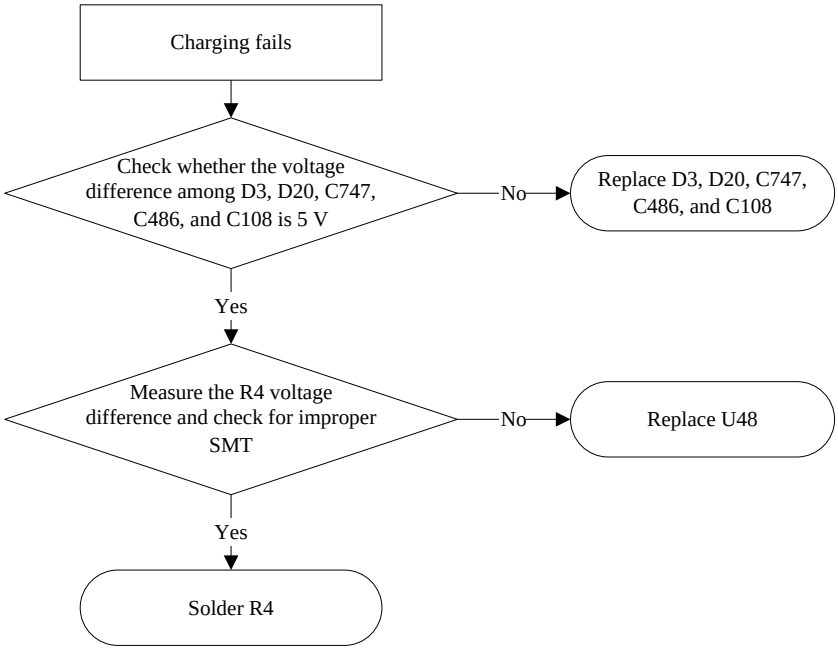
9.3 Charge Failure

The Mediapad charging management circuits are shown in the following figure.



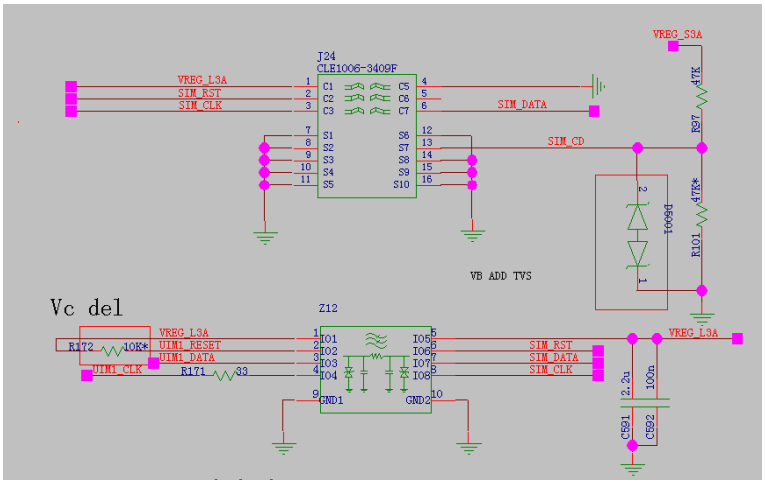
Principle: The DC regulated power supply provides the 5 V/3 A power supply to the DC-DC circuits in the MAX8903, and MAX8903 and the power is output through VBAT and VPH_PWR respectively.

Analysis: The U48 manages the charging of S7 Pro. For the maintenance procedures upon charge failure, see the Appendix 1 (diagram of PRO components).



9.4 Failure to Identify SIM Card

Diagram of the circuits:

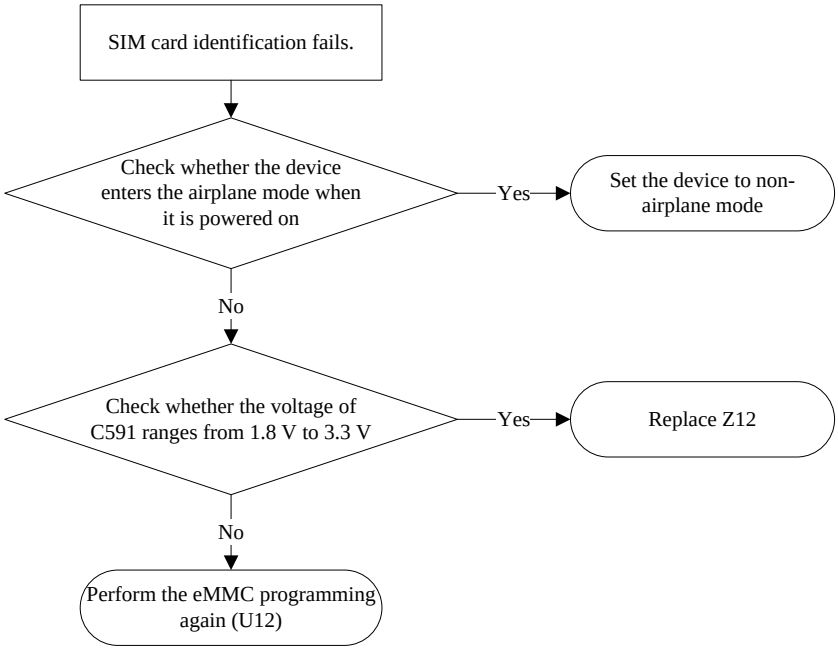


The SIM_CD indicates the PIN of the SIM card and is used for identifying the SIM card.

When the SIM card is inserted, the voltage of SIM_CD changes from a high level to a low level.

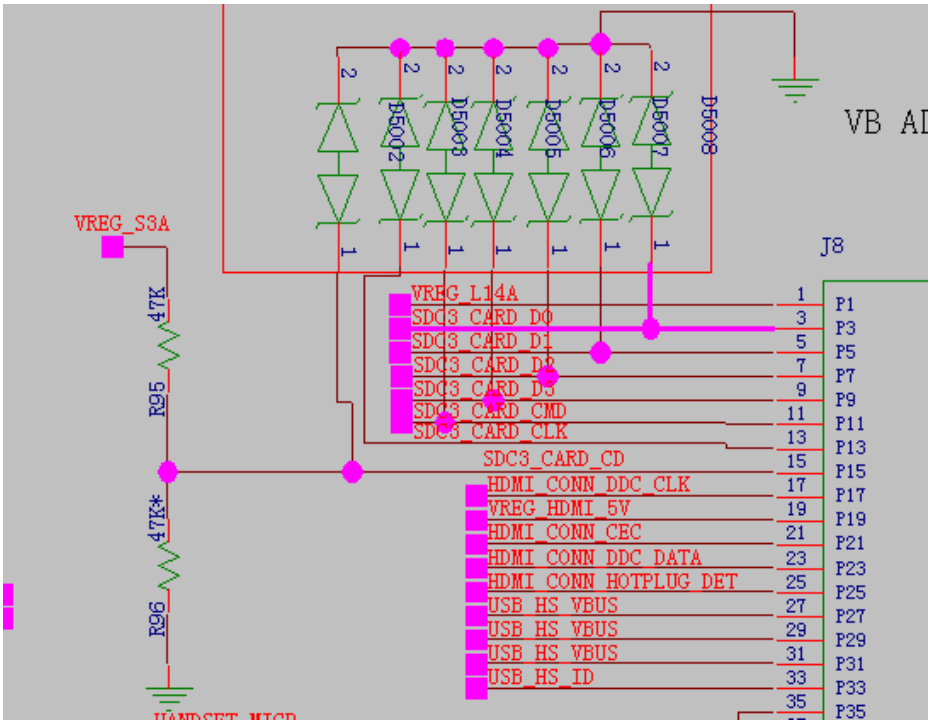
Remark: For the maintenance procedures, see Appendix 1 (diagram of PRO components).

Perform the eMMC programming again (U12).



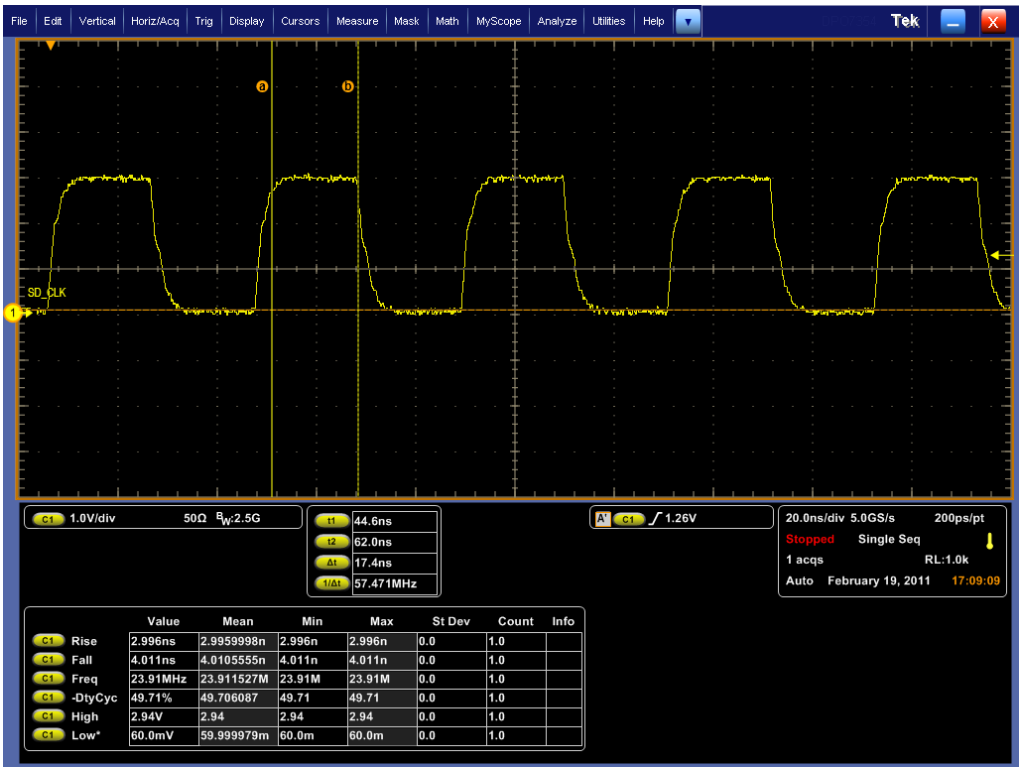
9.5 Failure to Identify SD Card

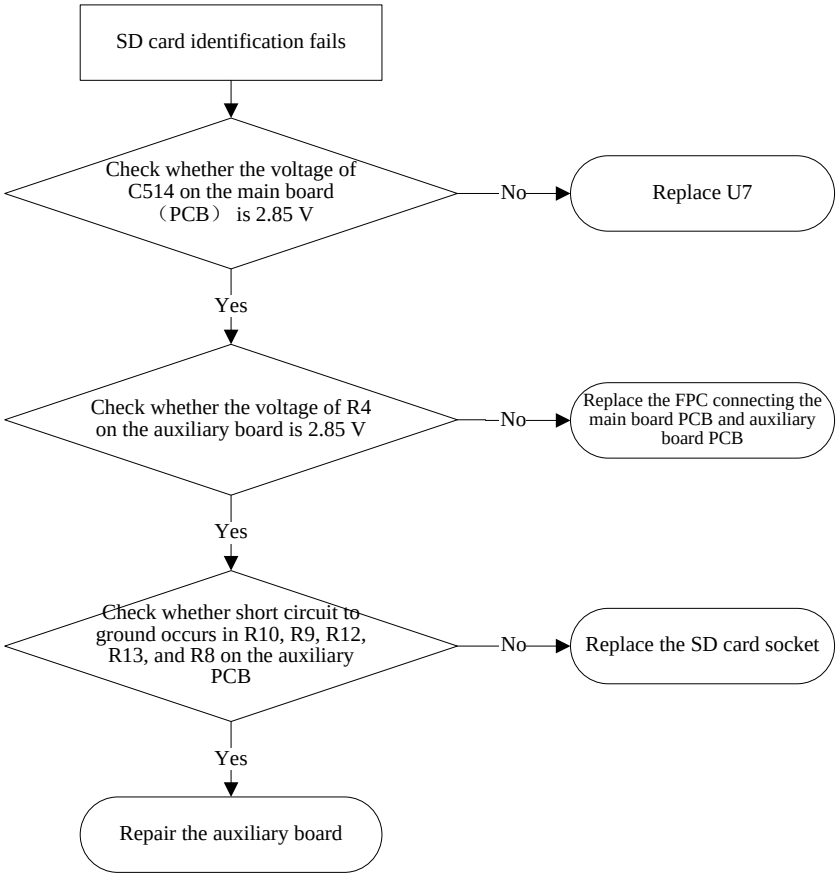
Diagram of the circuits:



The SDC3_CARA_CD indicates PIN of the SD card and is used for identifying the SD card.

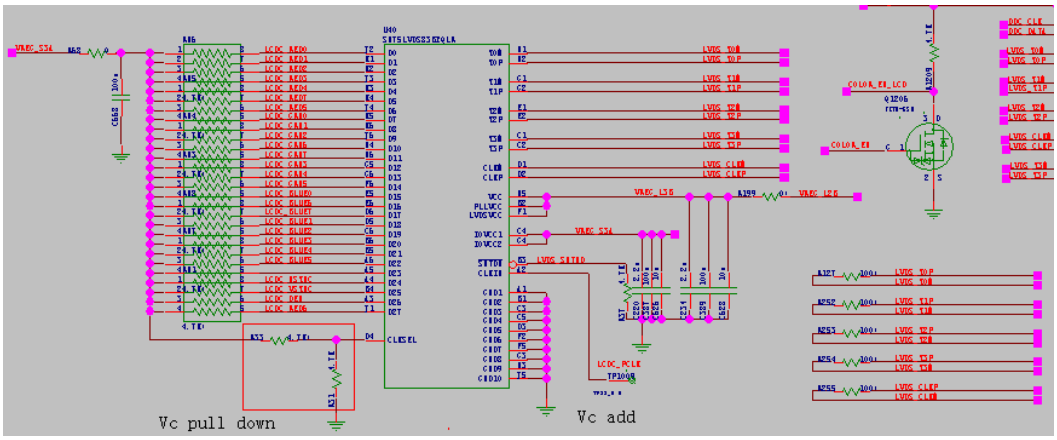
When the SD card is inserted, the voltage of SDC3_CARA_CD changes from a high level to a low level. The MSM8260 determines that the SD card is available. Then call the SD card driver to access the SD card.



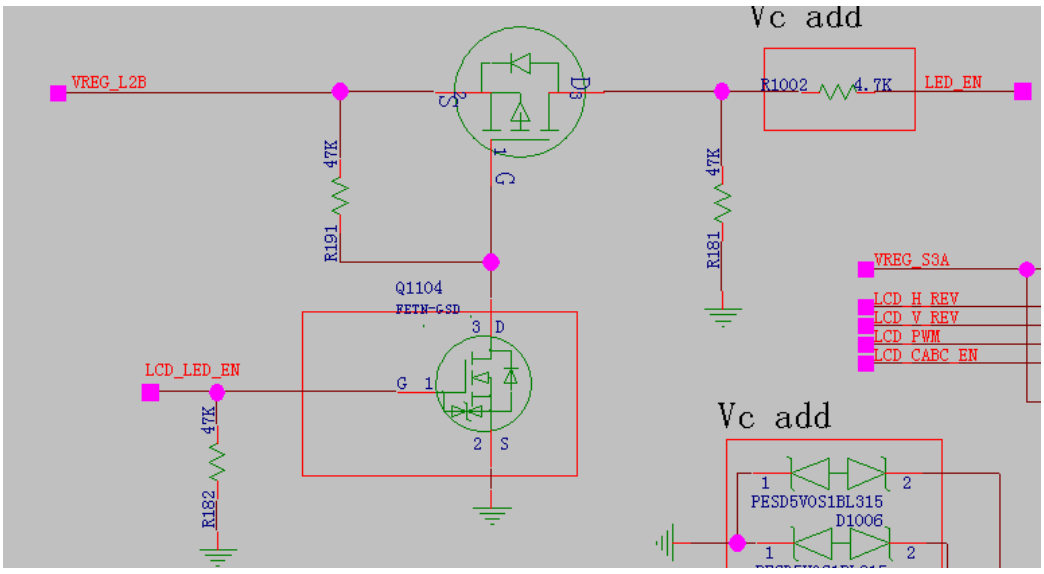


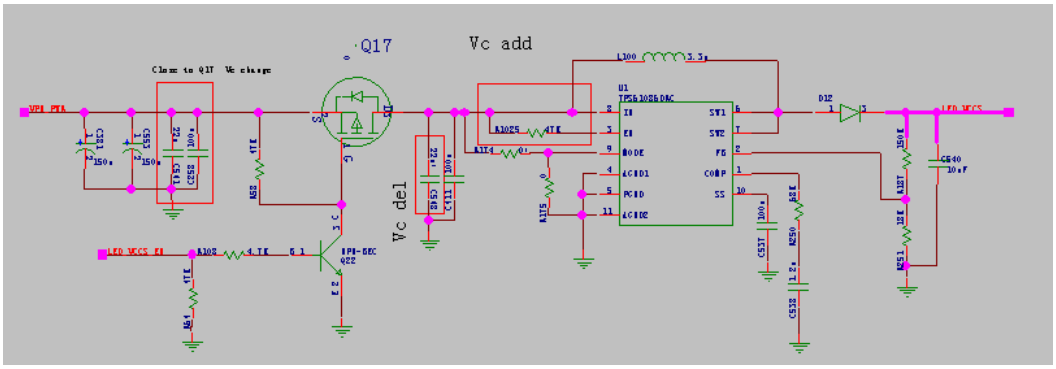
9.6 Display Failure

LCD driver circuits:



LCD backlight driver circuits:



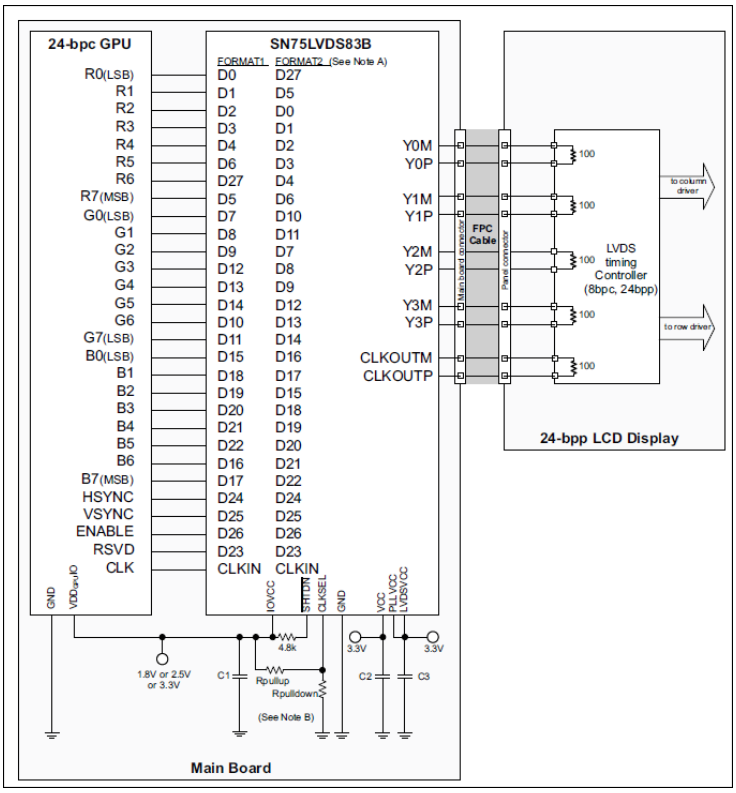


Principles:

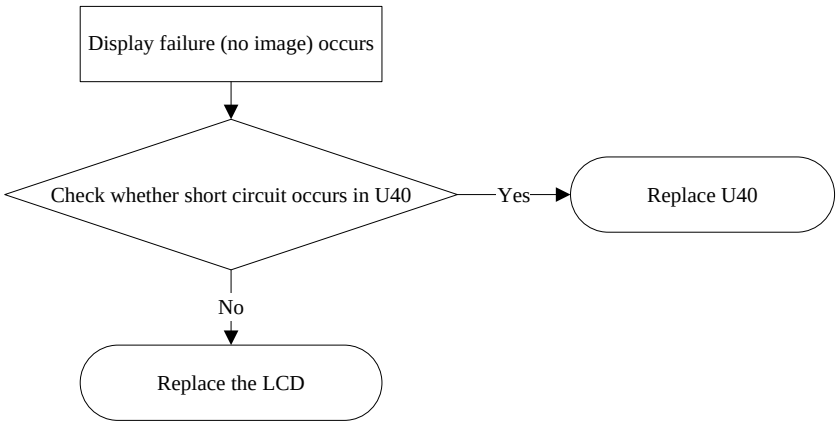
SN75LVDS83BZQLR is used as the RGB to LVDS transmitter for T1, having the following characteristics:

- LVDS display SerDes interfaces directly to LCD display panels with integrated LVDS
- 1.8 V up to 3.3 V tolerant data inputs to connect directly to low-power, low-voltage application and graphic processors
- Transfer rate up to 135 Mpps (mega pixel per second); pixel clock frequency range: 10 MHz to 135 MHz
- Operates from a single 3.3 V supply and 170 mW (typ.) at 75 MHz
- 28 data channels plus clock in low-voltage TTL to 4 data channels plus clock out low-voltage differential
- Consumes less than 1 mW when disabled

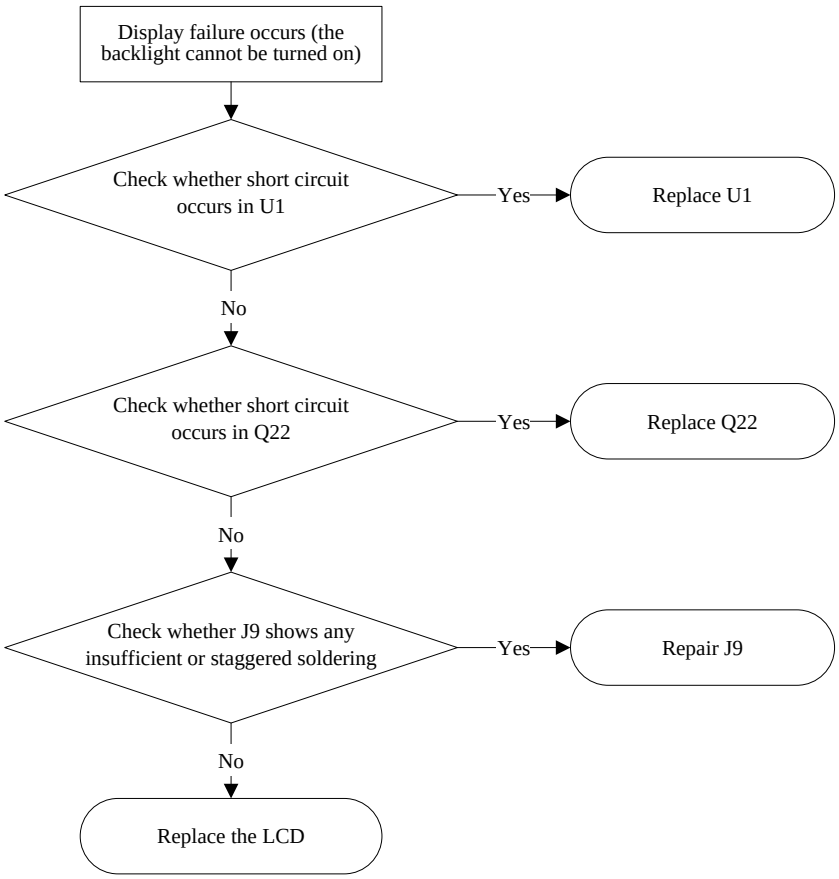
The block diagram of SN75LVDS83BZQLR is shown in the following figure.



Remark 1: Although the backlight can be turned on, no image is displayed. See the following chart for maintenance procedures.

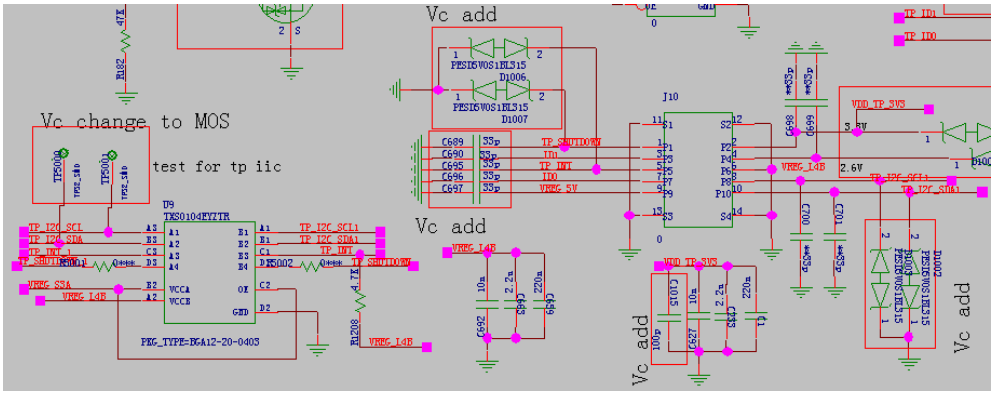


Remark 2: The backlight cannot be turned on. See the following chart for maintenance procedures.



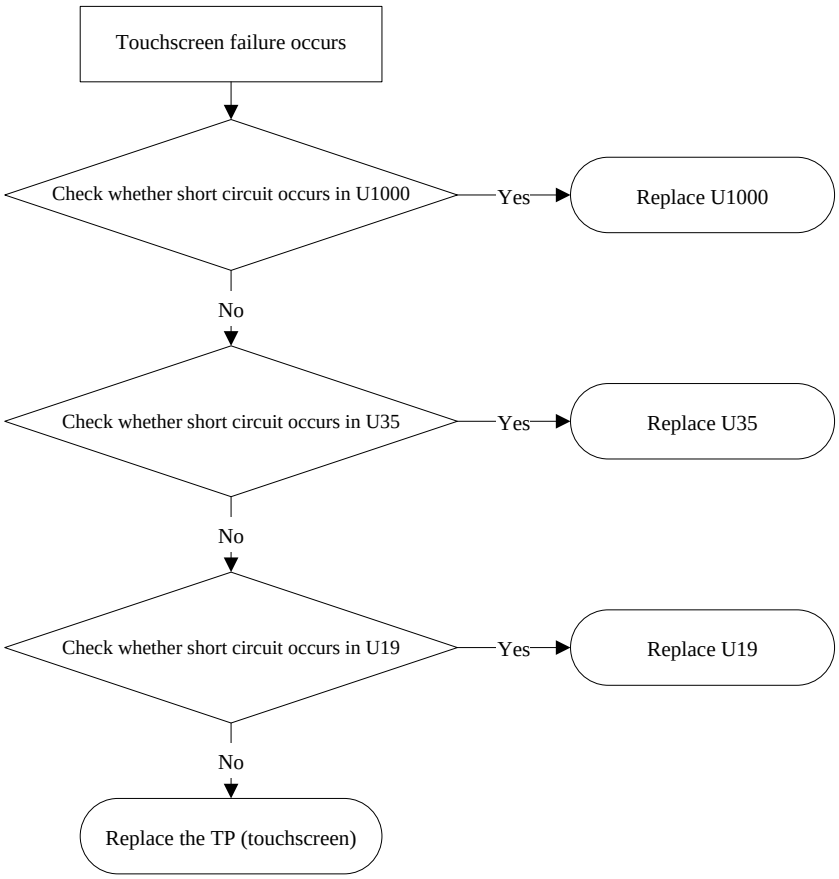
9.7 Touchscreen Failure

Diagram of circuits:



Principle: The Mediapad power-on system loads the touchscreen driver through the I2C port.

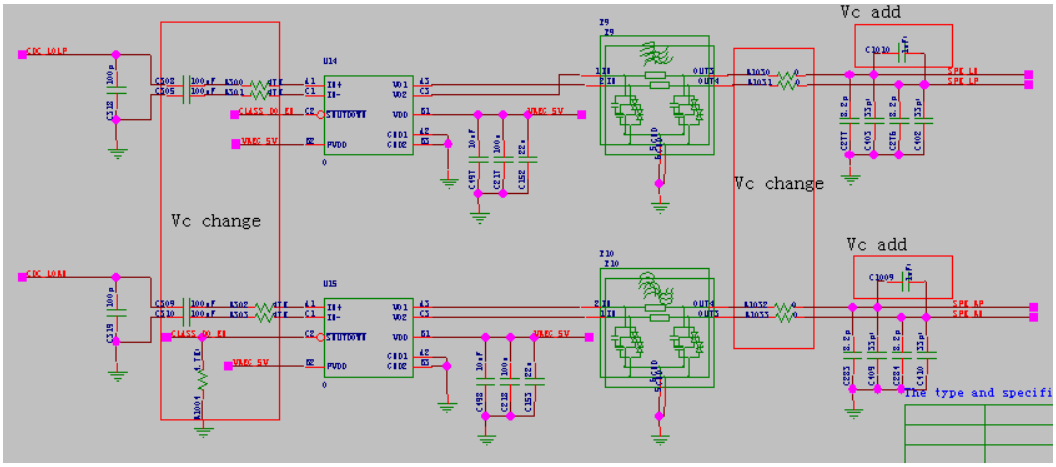
See the following chart for maintenance procedures.

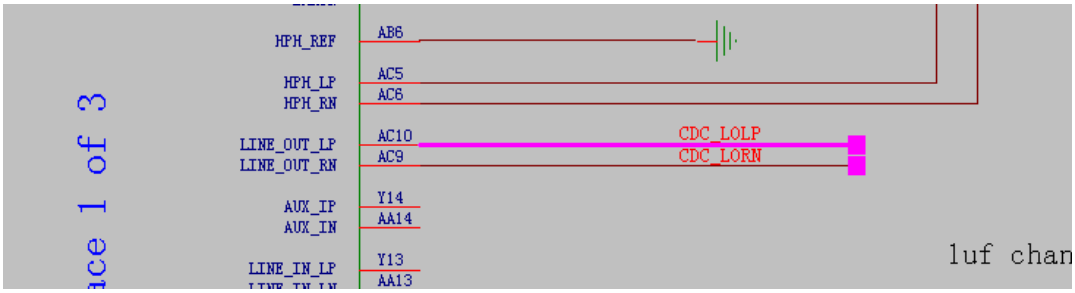


9.8 Audio Failure

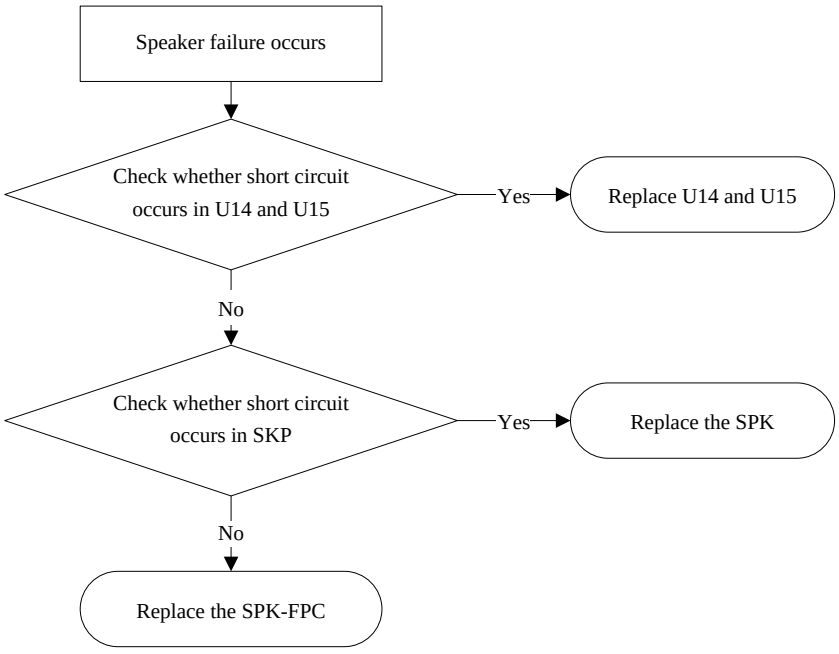
9.8.1 Speaker Failure

Diagram of circuits:



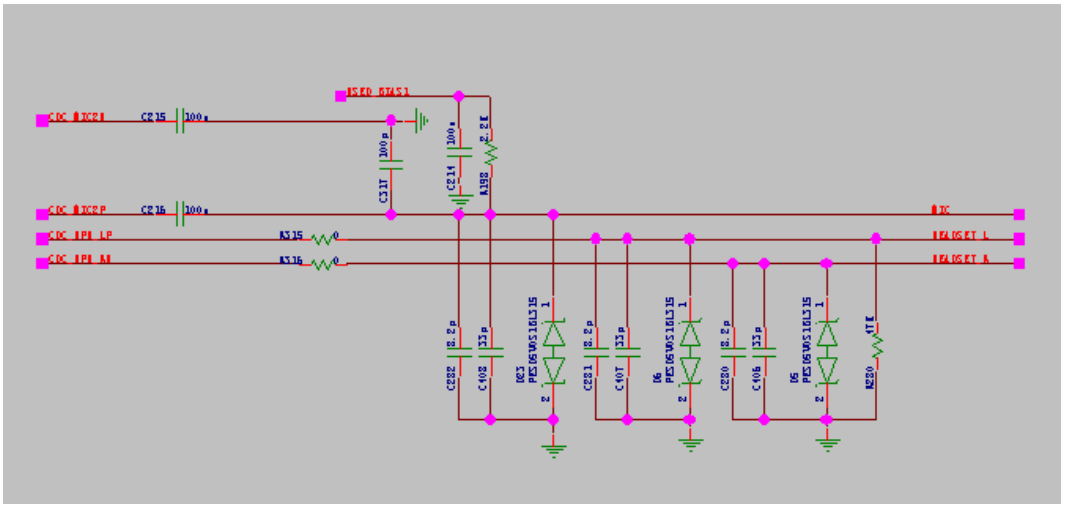


In the case of no sound from the speaker, check for sound output after the S7 Pro is connected to the TV through the HDMI. If there is sound, repair the device according to the following chart.



9.8.2 Headset Failure

Diagram of circuits:

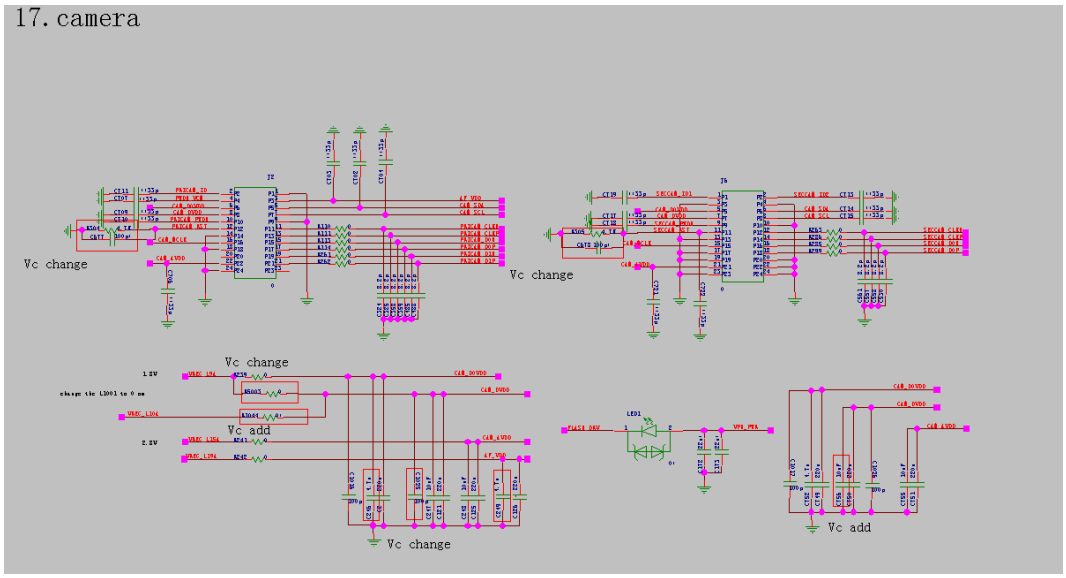


Upon a headset failure, check whether the headset interface is properly assembled. If the problem persists, replace the headset jack.

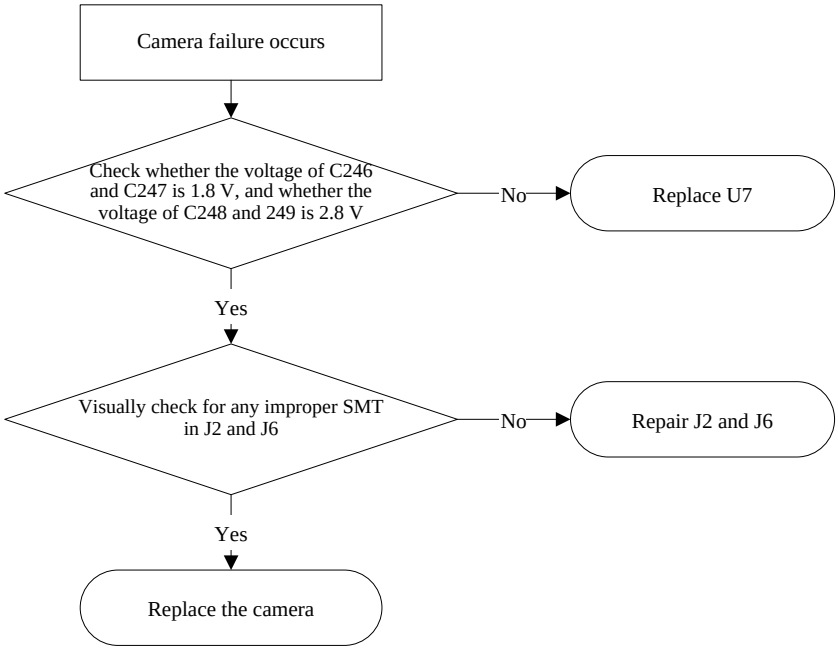
9.9 Camera Failure

Diagram of circuits:

The S7 Pro camera transmits signals through the MIPI. The red part indicates the power supply circuit of the camera.

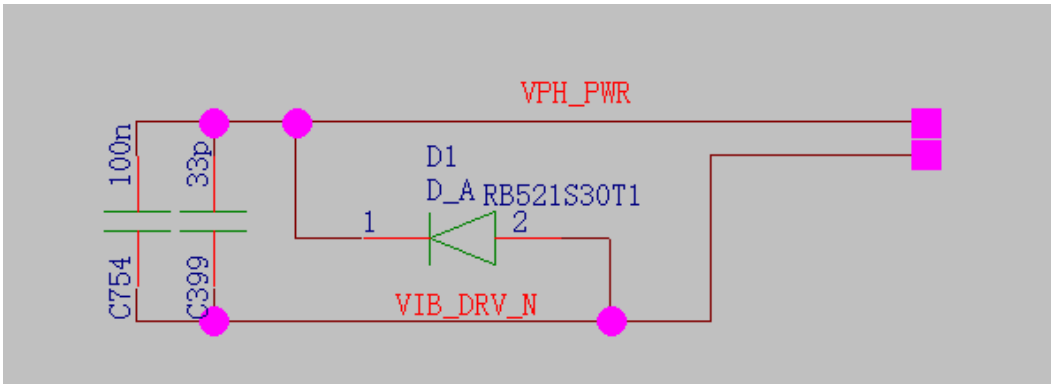


See the following chart for maintenance procedures.

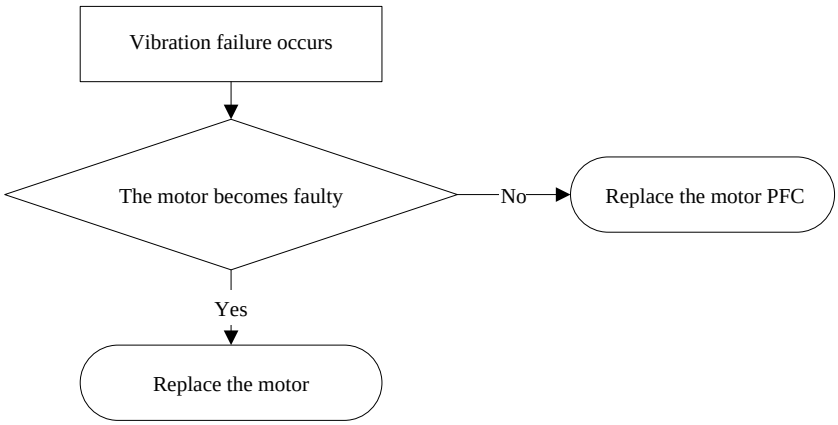


9.10 Vibration Failure

Diagram of circuits:

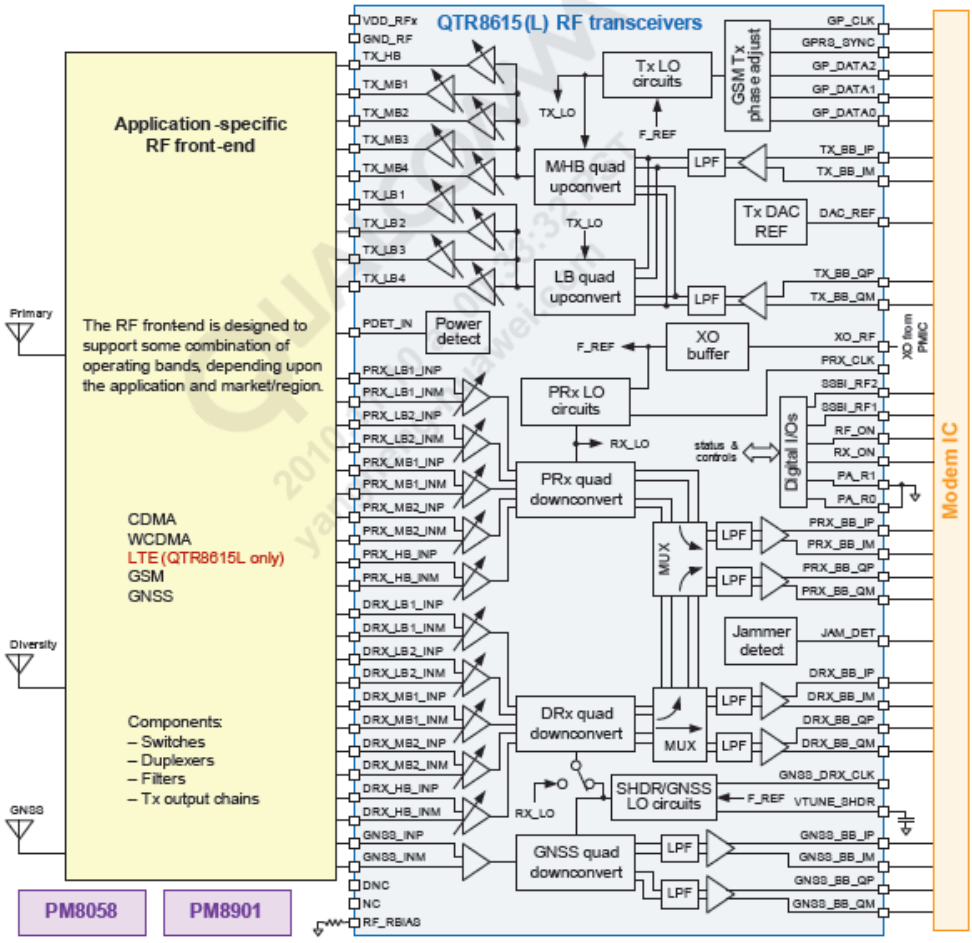


Principle: The motor controls the vibration based on the differential pressure of the input PIN.



9.11 RF Failure

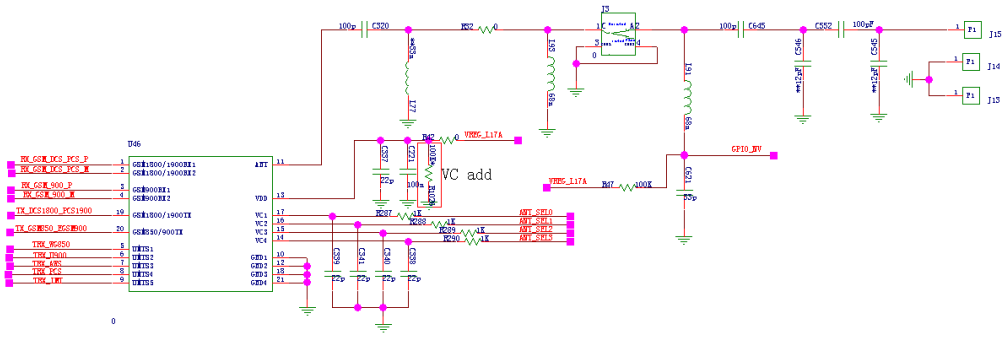
Figure 9-4 Block diagram of QTR8615 RF



As shown in the block diagram, the transmitter includes high frequency, intermediate frequency, and low frequency channels. The IQ signal is transmitted to the built-in power amplifier through the up-converter. The AGC is used to control the power output, and the AGC circuit includes a power detector to achieve a transmit power control range greater than 85 dB. The output radio frequency signal is sent to the front-end module, and transmitted by the antenna to QTR8615. After the signal is amplified in the internal LNA, it is down-converted to I/Q baseband signal.

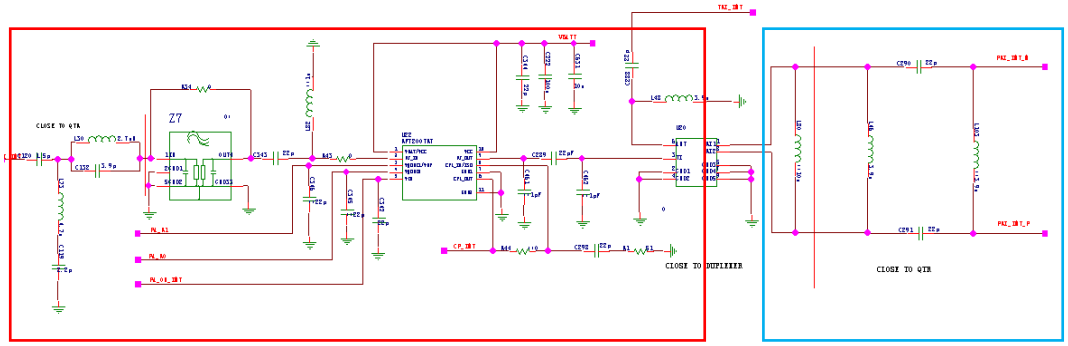
The device supports WCDMA that uses the frequency band of 5 MHz and GSM that uses the frequency band of 4 MHz.

Figure 9-5 Diagram of circuits of the RF antenna switch



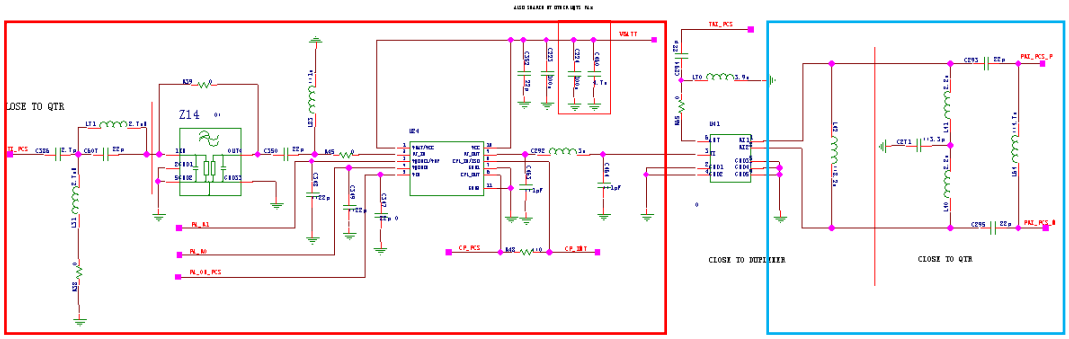
The red part indicates that the signal is transmitted into the antenna switch (U46) through the transmit channel, and the blue part indicates that the signal is transmitted out of U46 through the receive channel.

Figure 9-6 Diagram of circuits of WCDMA2100 RF channels



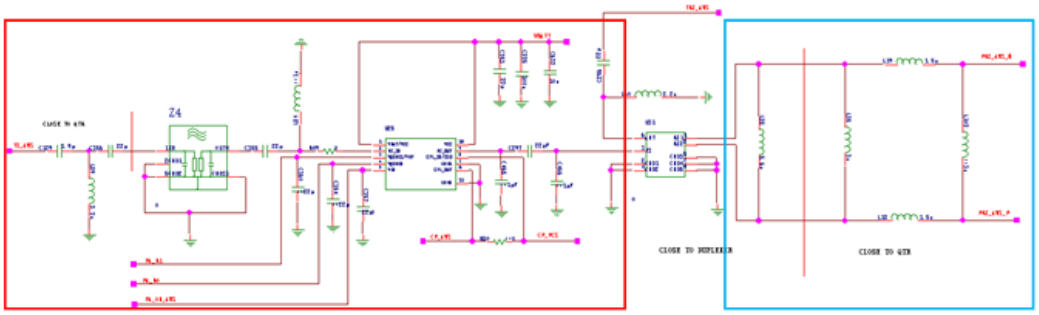
The red part indicates the transmit channel, and the blue part indicates the receive channel. Both the transmit channel and the receive channel are connected to the antenna switch through the duplexer (U20).

Figure 9-7 Diagram of circuits of WCDMA1900 RF channels



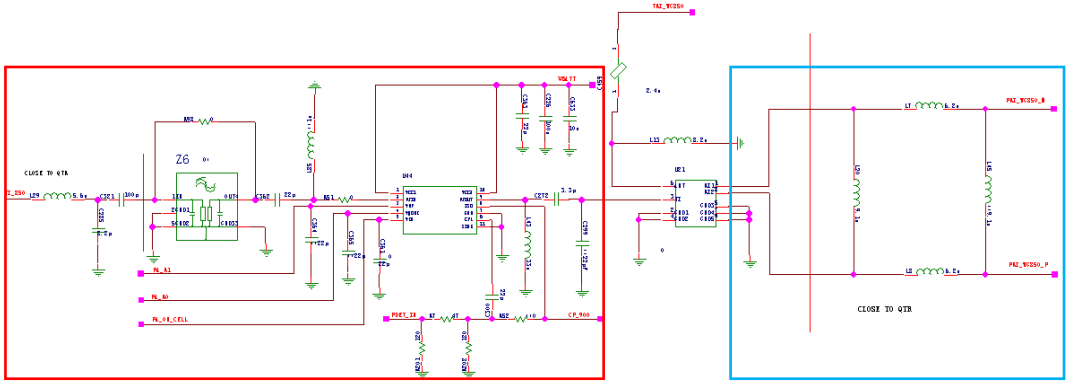
The red part indicates the transmit channel, and the blue part indicates the receive channel. Both the transmit channel and the receive channel are connected to the antenna switch through the duplexer (U41).

Figure 9-8 Diagram of circuits of WCDMA AWS RF channels



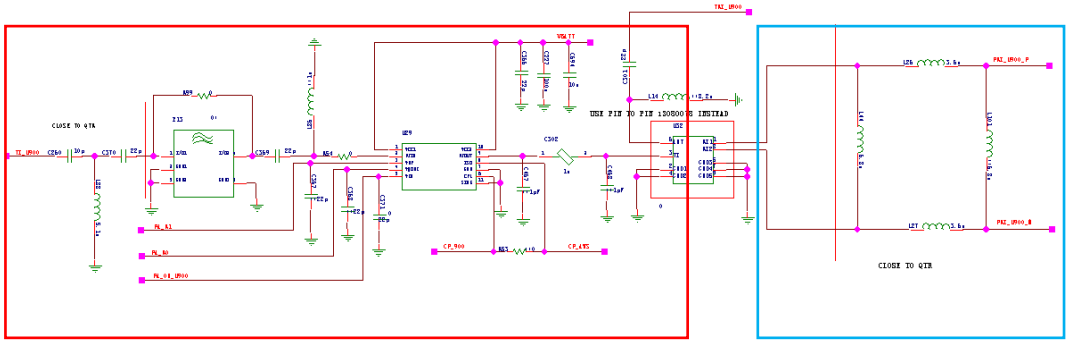
The red part indicates the transmit channel, and the blue part indicates the receive channel. Both the transmit channel and the receive channel are connected to the antenna switch through the duplexer (U31).

Figure 9-9 Diagram of circuits of WCDMA850 RF channels



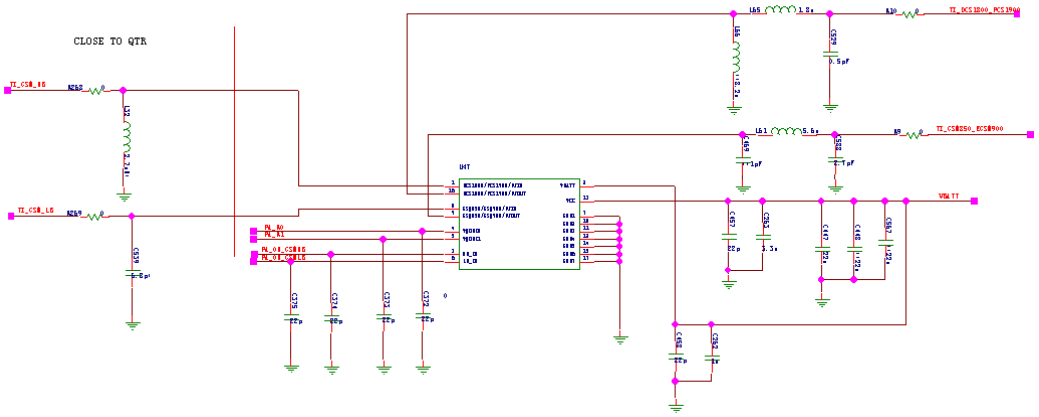
The red part indicates the transmit channel, and the blue part indicates the receive channel. Both the transmit channel and the receive channel are connected to the antenna switch through the duplexer (U21).

Figure 9-10 Diagram of circuits of WCDMA900 RF channels



The red part indicates the transmit channel, and the blue part indicates the receive channel. Both the transmit channel and the receive channel are connected to the antenna switch through the duplexer (U32).

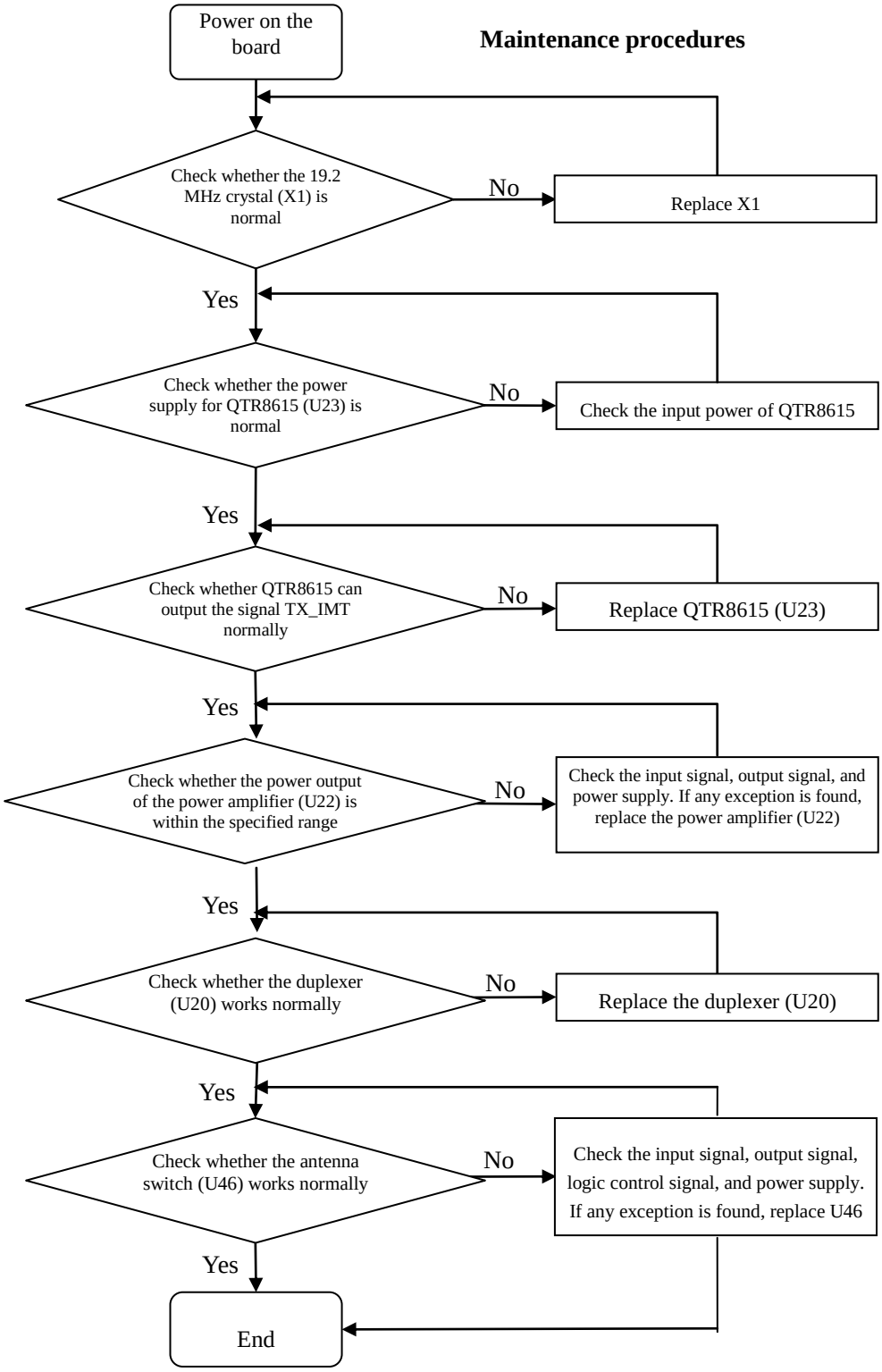
Figure 9-11 Diagram of circuits of GSM transmit channels



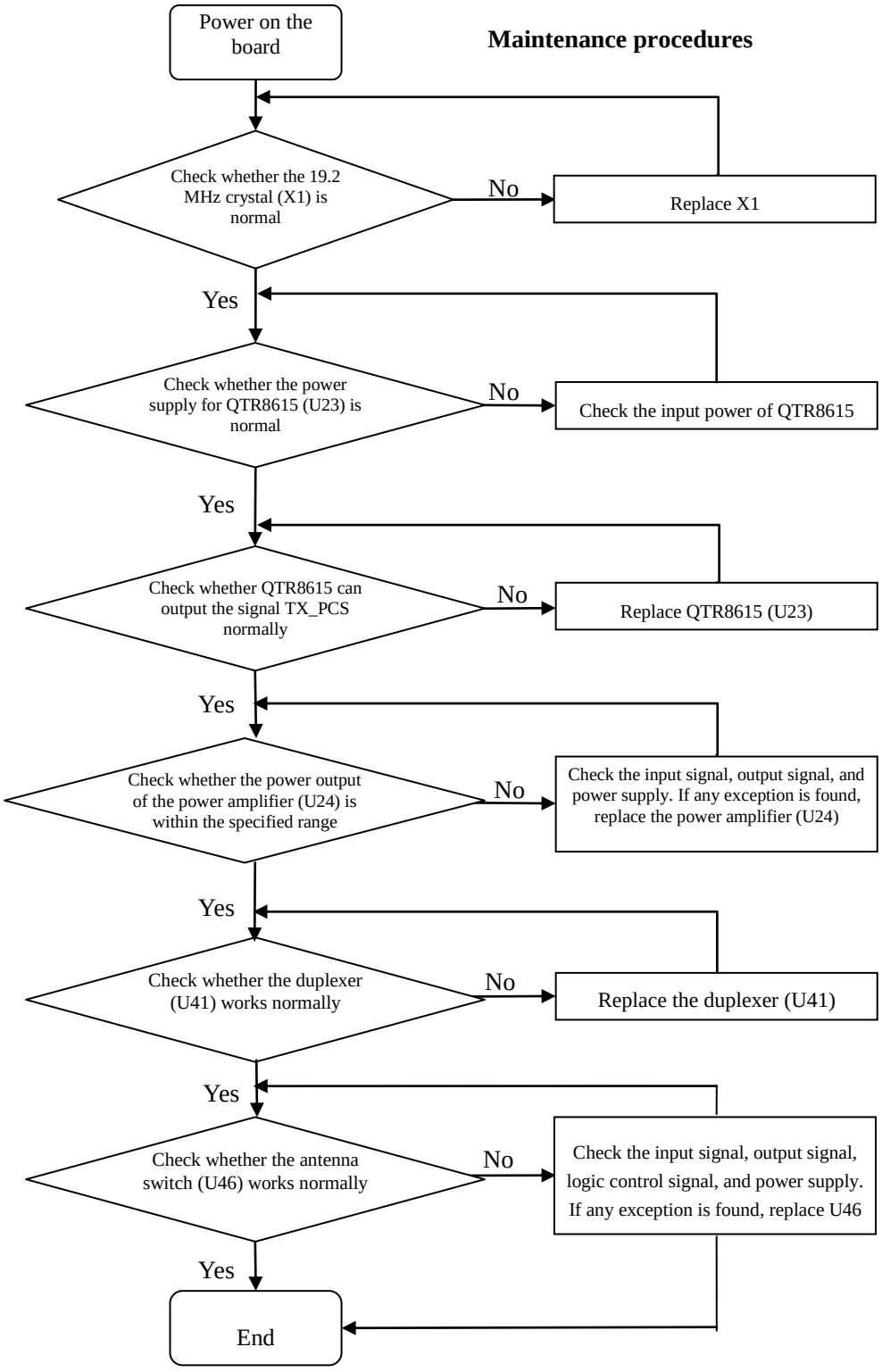
The green part indicates the GSM HB channel, and the blue part indicates the GSM LB channel.

9.12 Maintenance Procedures for Transmit Failure

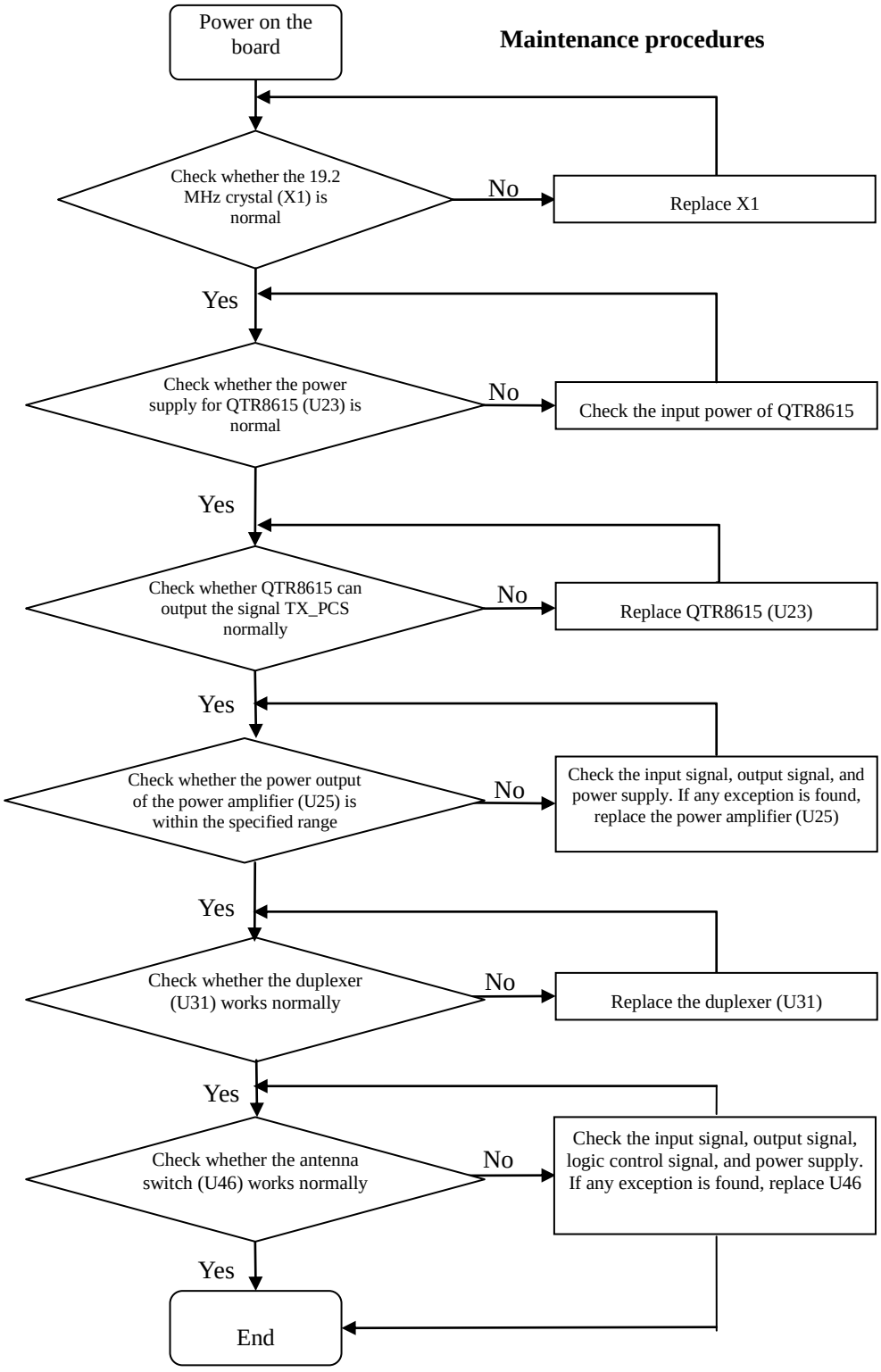
9.12.1 WCMDA2100 Transmit Calibration Failure



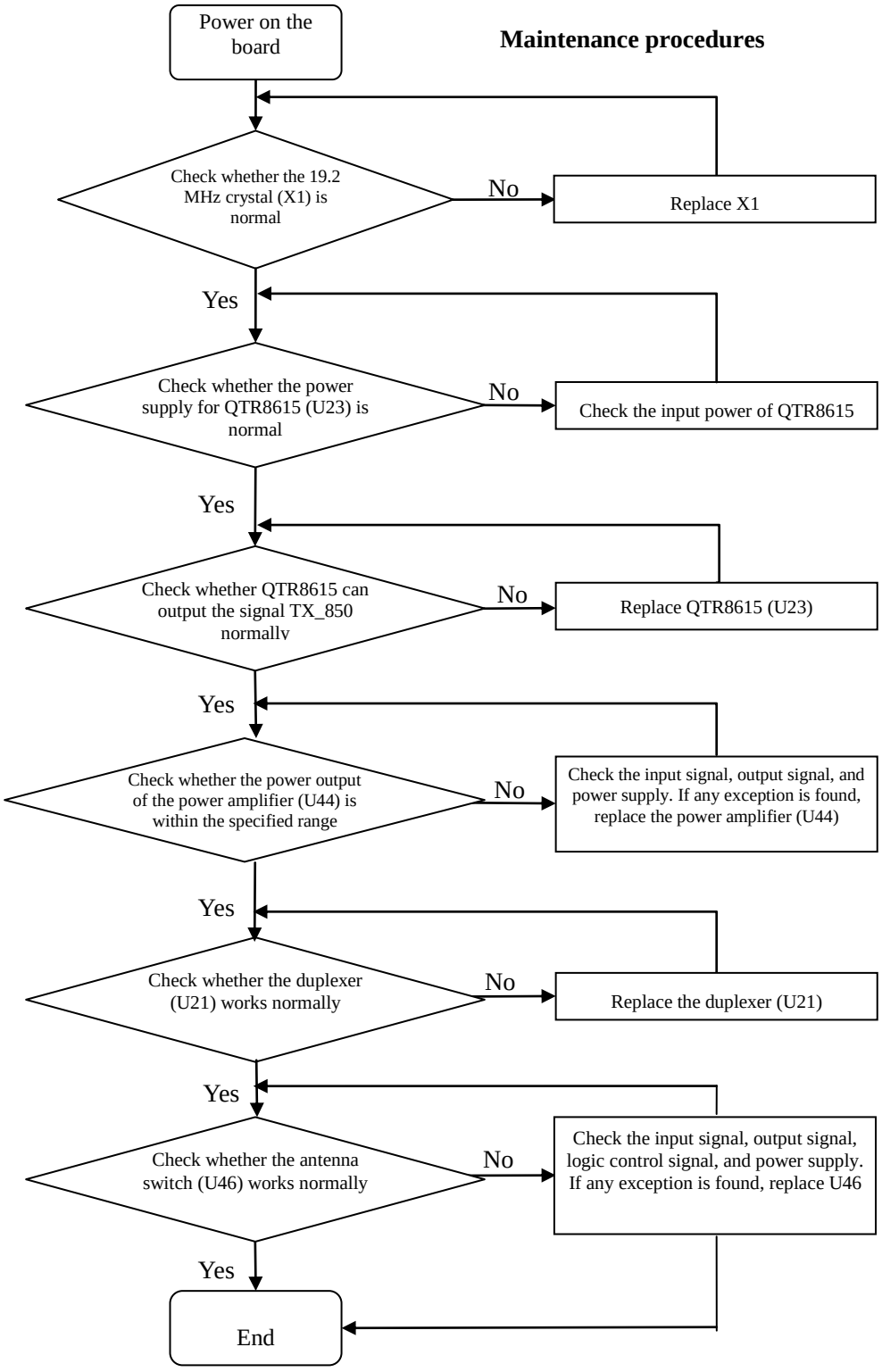
9.12.2 WCMDA1900 Transmit Calibration Failure



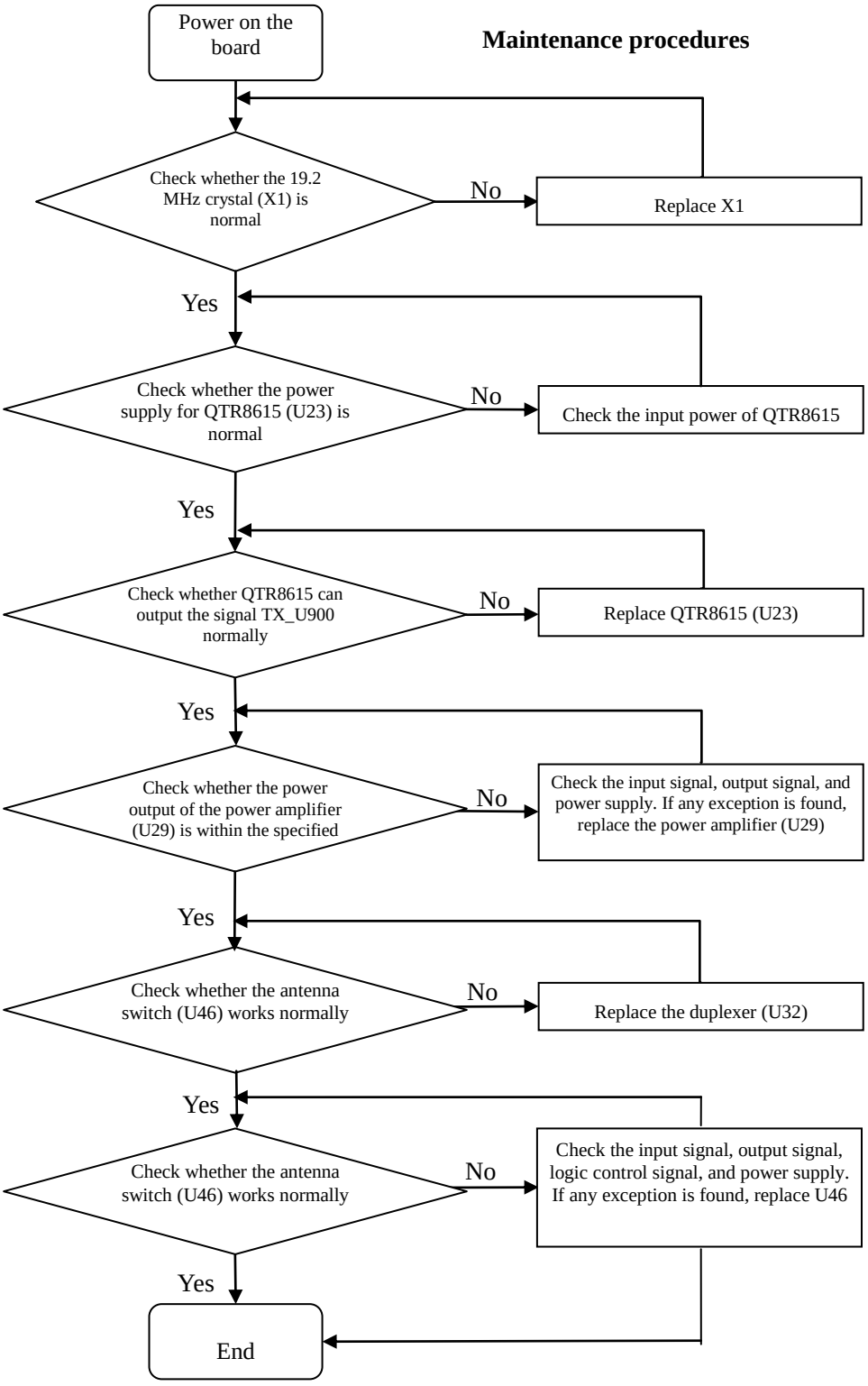
9.12.3 AWS Transmit Calibration Failure



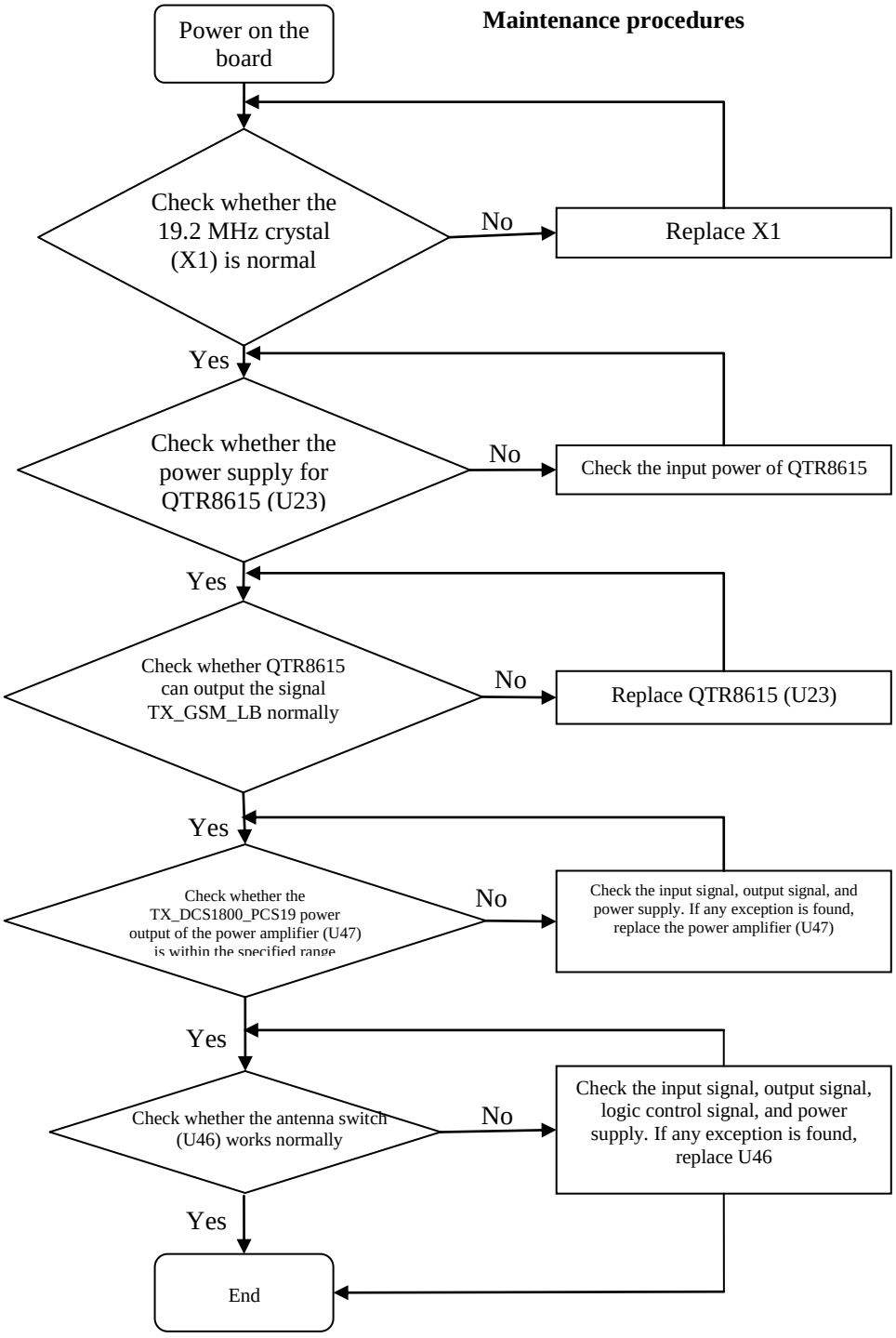
9.12.4 WCMDA850 Transmit Calibration Failure



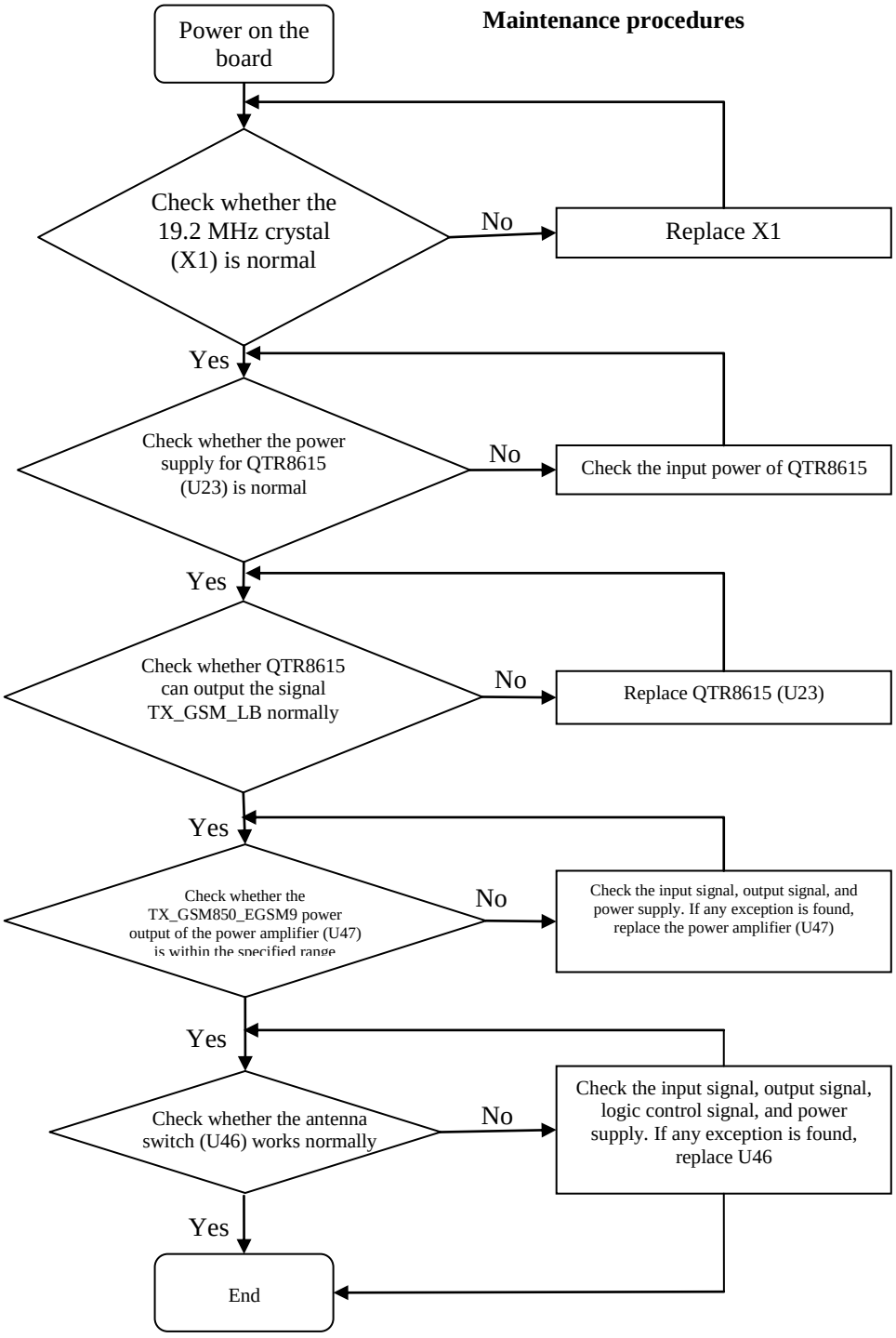
9.12.5 WCMDA900 Transmit Calibration Failure



9.12.6 GSM HB Transmit Calibration Failure

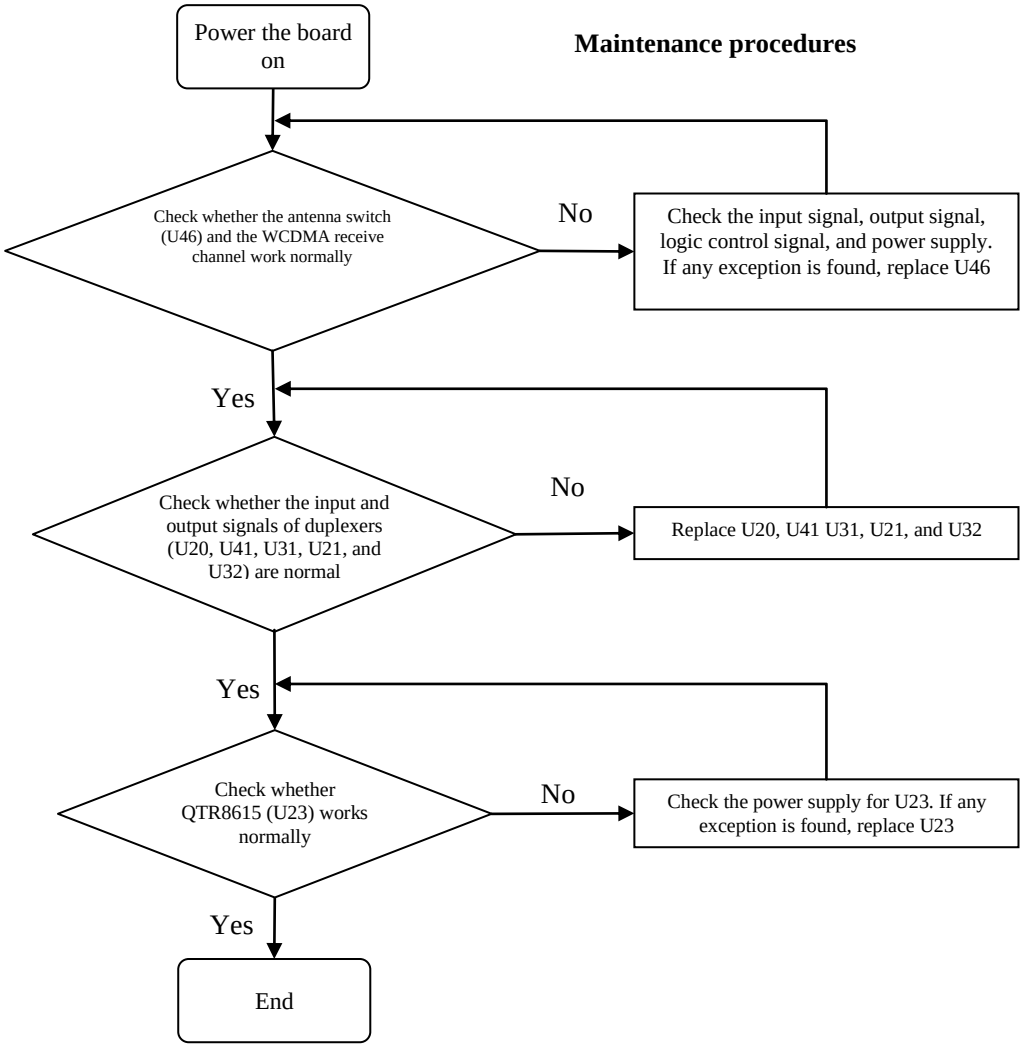


9.12.7 GSM LB Transmit Calibration Failure

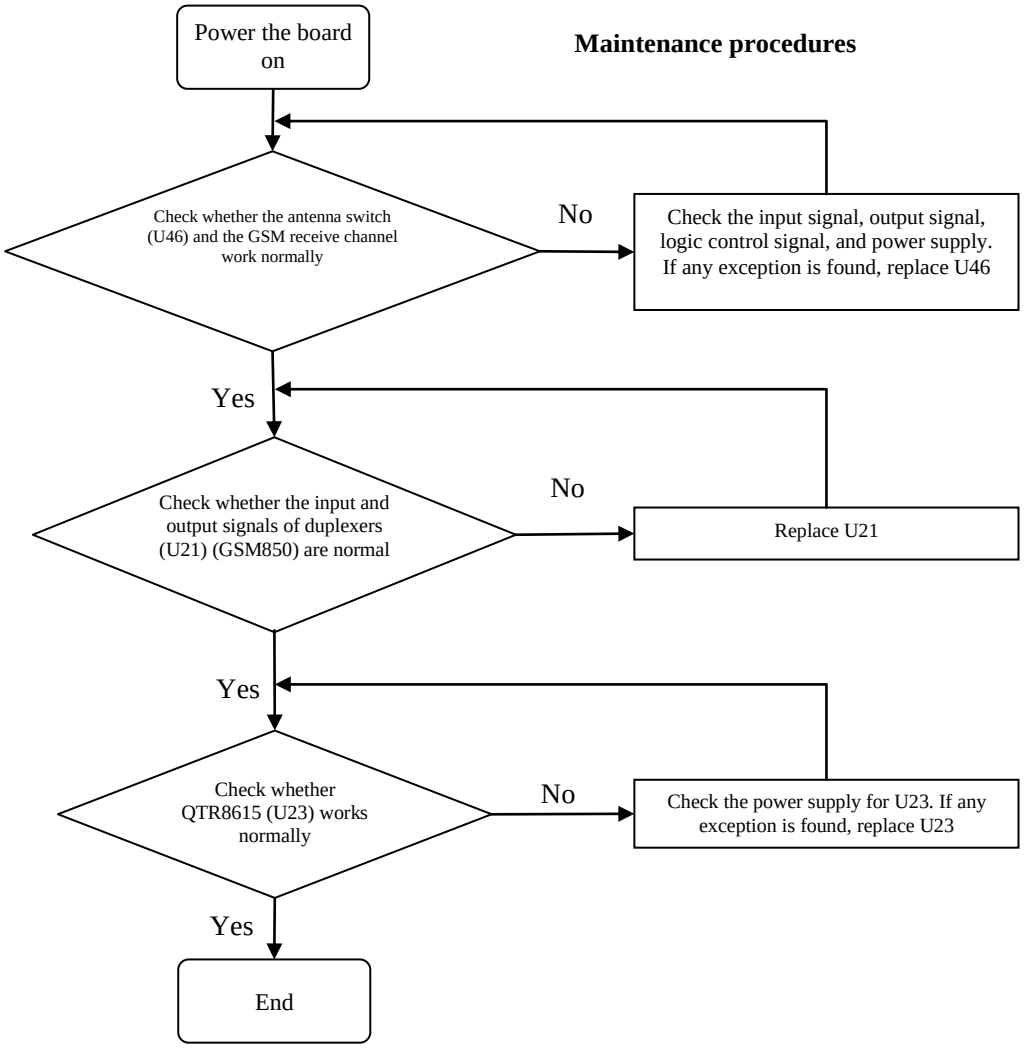


9.13 Maintenance Procedures for Receiving Failure

9.13.1 Maintenance Procedures for WCDMA Receiving Failure

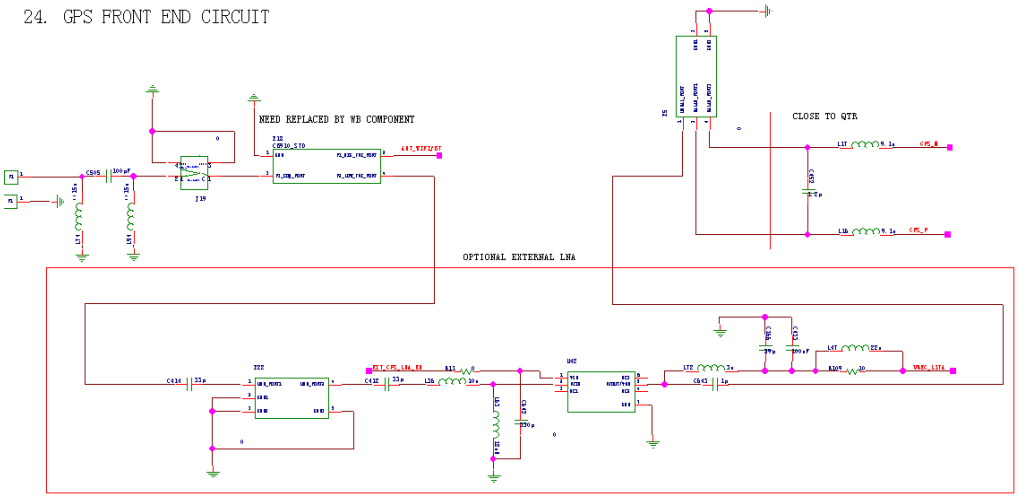


9.13.2 Maintenance Procedures for GSM Receive Failure

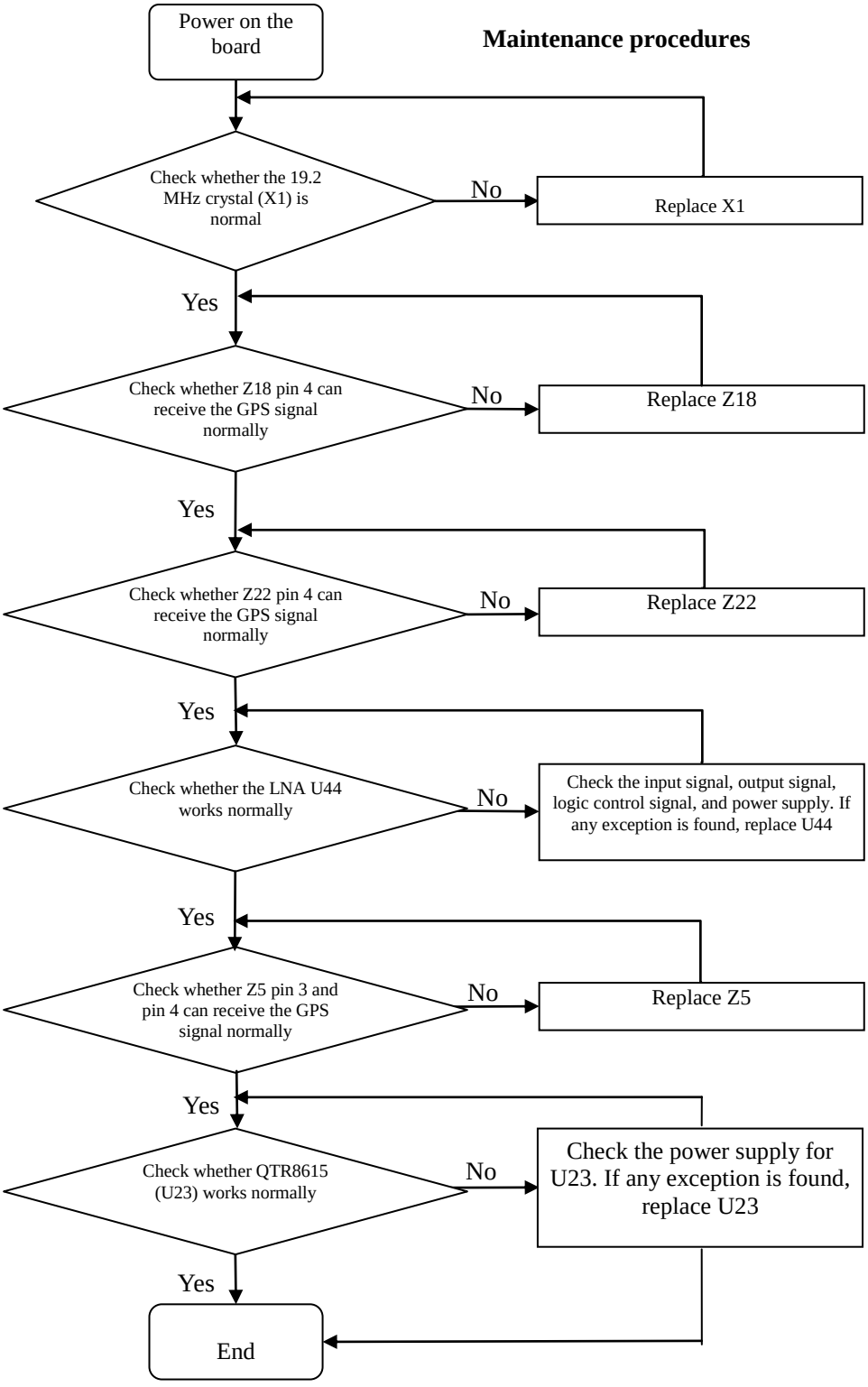


9.14 GPS Failure

Figure 9-12 Diagram of GPS front end circuit

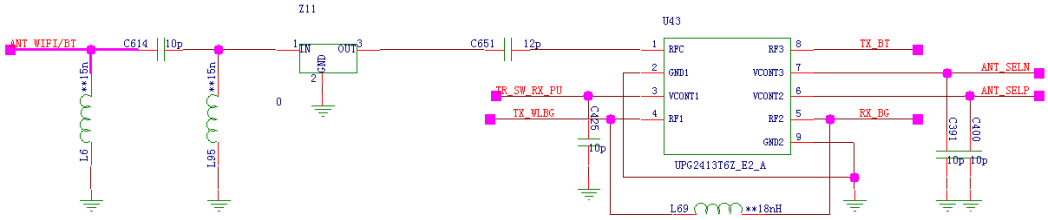


The area in red indicates the SAW filter and LANchannel, and the area in blue indicates the commonly used duplexer for Wi-Fi.



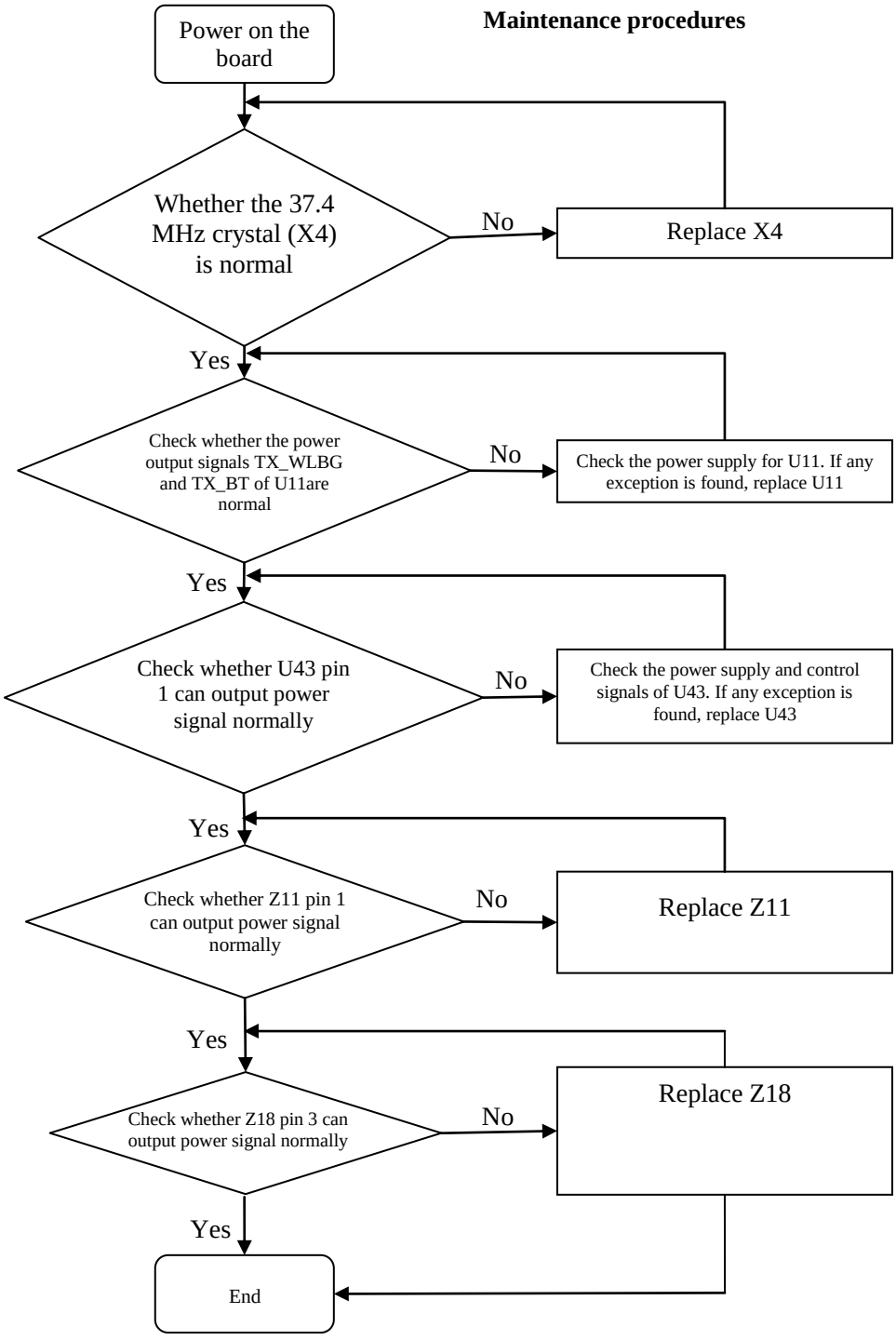
9.15 Wi-Fi/BT Failure

Figure 9-13 Diagram of circuits channel



Use the 1P3T switch to choose the channel for Wi-Fi and BT channel. The Broadcom BCM4329 chip is used.

Maintenance procedures

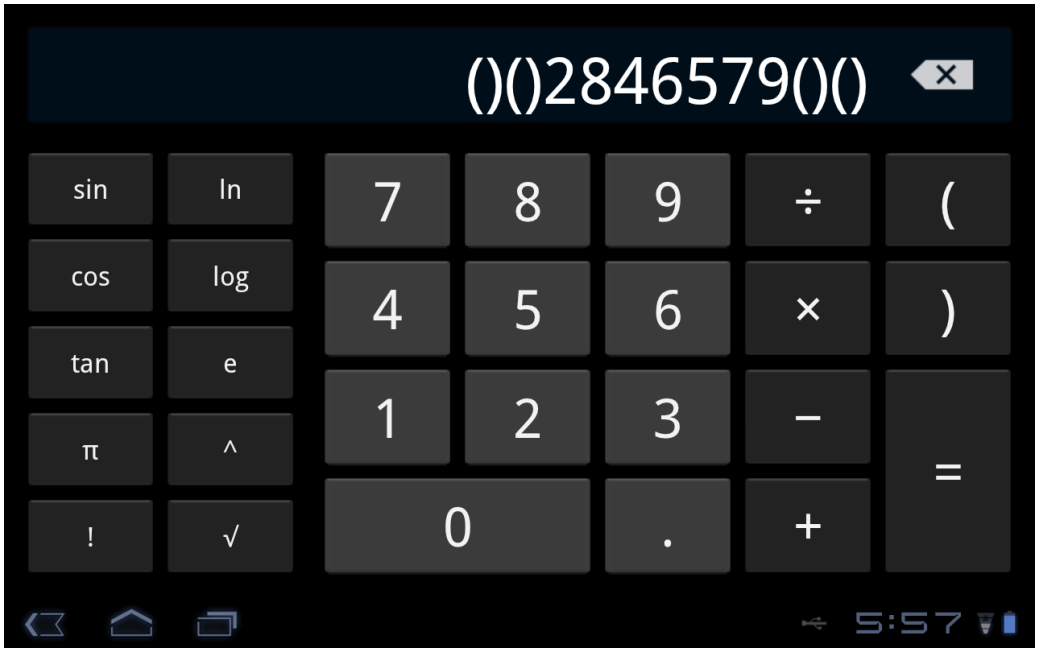


10 Diagram of Soldered Connections on PCB and BGA Chip

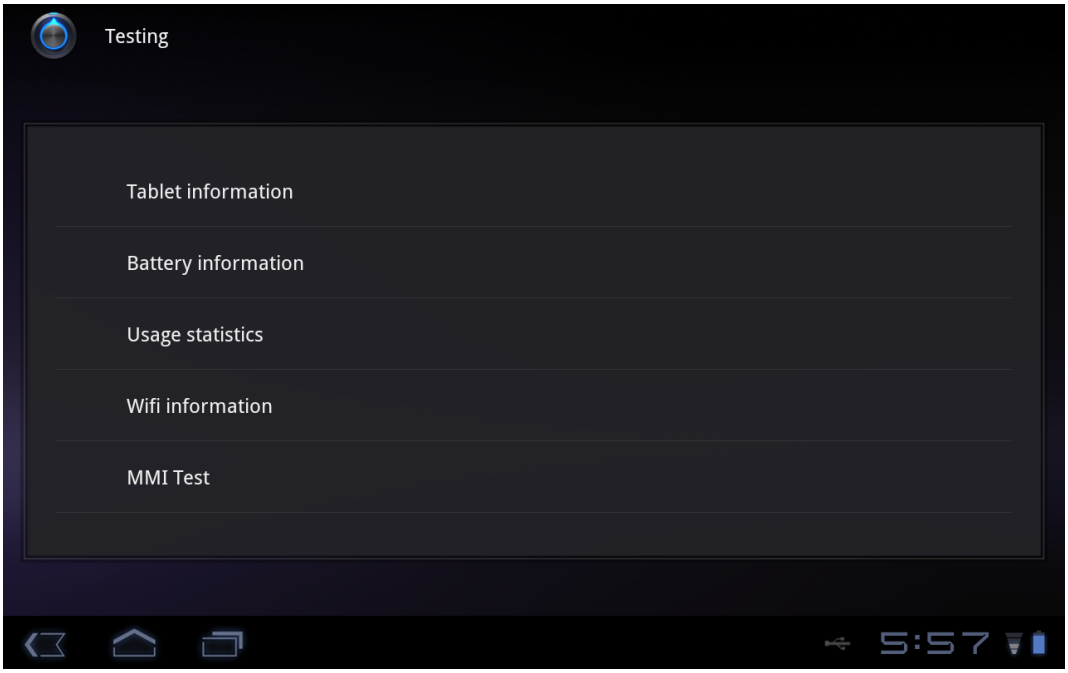
11 Function Test

11.1 MMI Test

Run the **Calculator** application, enter **()()2846579()()**, and select **Testing.**



Click **MMI Test** to start the MMI test.



Step 1 SD card test

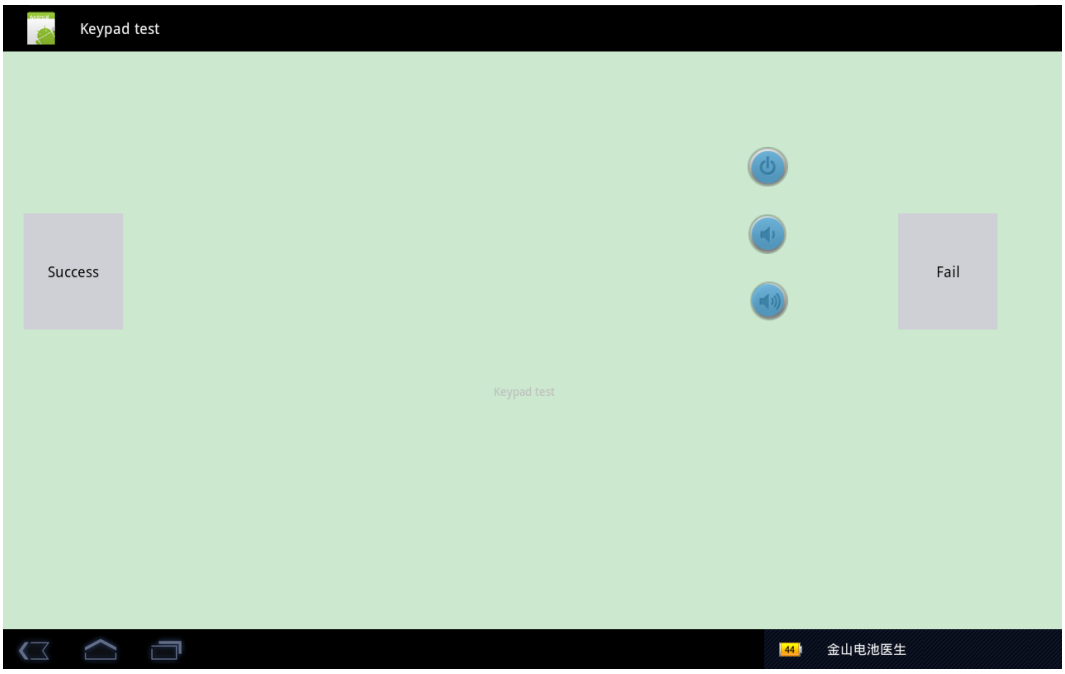
Test the Micro-SD card: If the Micro-SD card is inserted, the message "SD card exists" is displayed; otherwise, the message "No SD card" is displayed. Click **Success** to proceed.

Step 2 SIM card test

Test the SIM card: If the SIM card is inserted, the message "SIM card exists" is displayed; otherwise, the message "No SIM card" is displayed. Click **Success** to proceed.

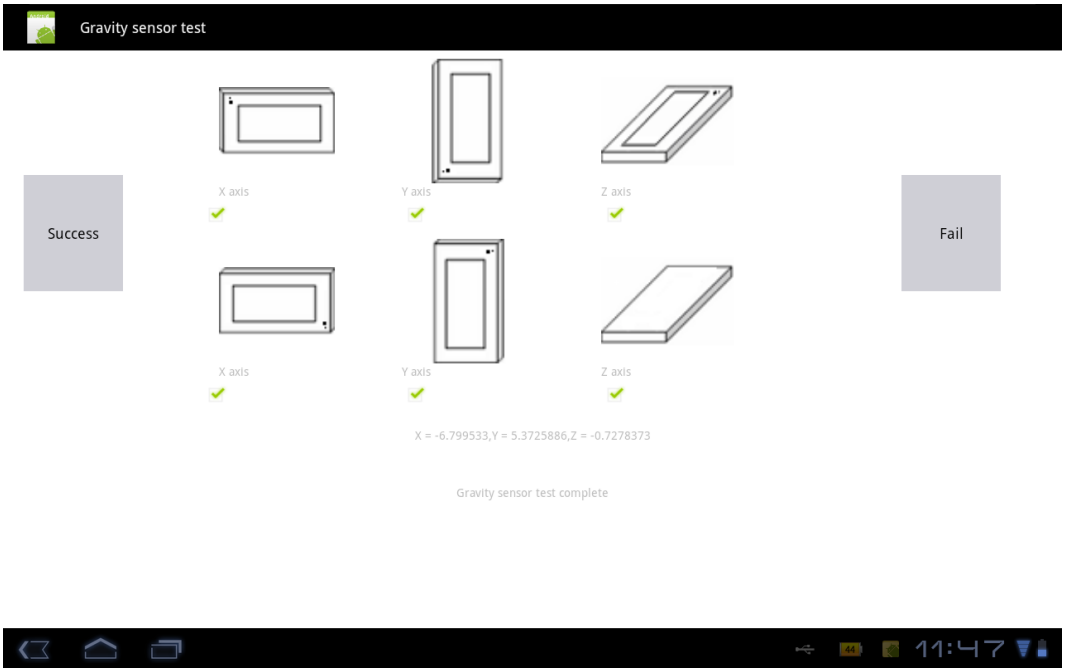
Step 3 Keypad test

Press a key. If the keypad is functional, the icon will turn gray. Click **Success** to proceed.



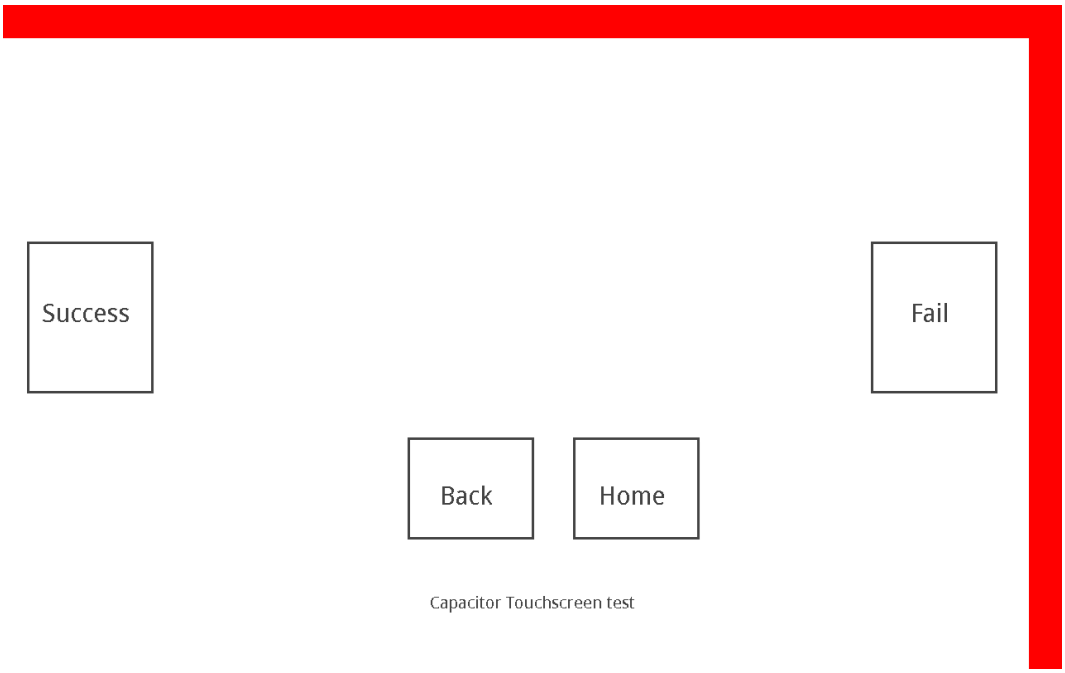
Step 4 Gravity sensor test

According to the icons on the screen, tilt the device in different directions. After a few seconds, the symbol "√" is displayed, indicating that the test succeeded. Click **Success** to proceed.



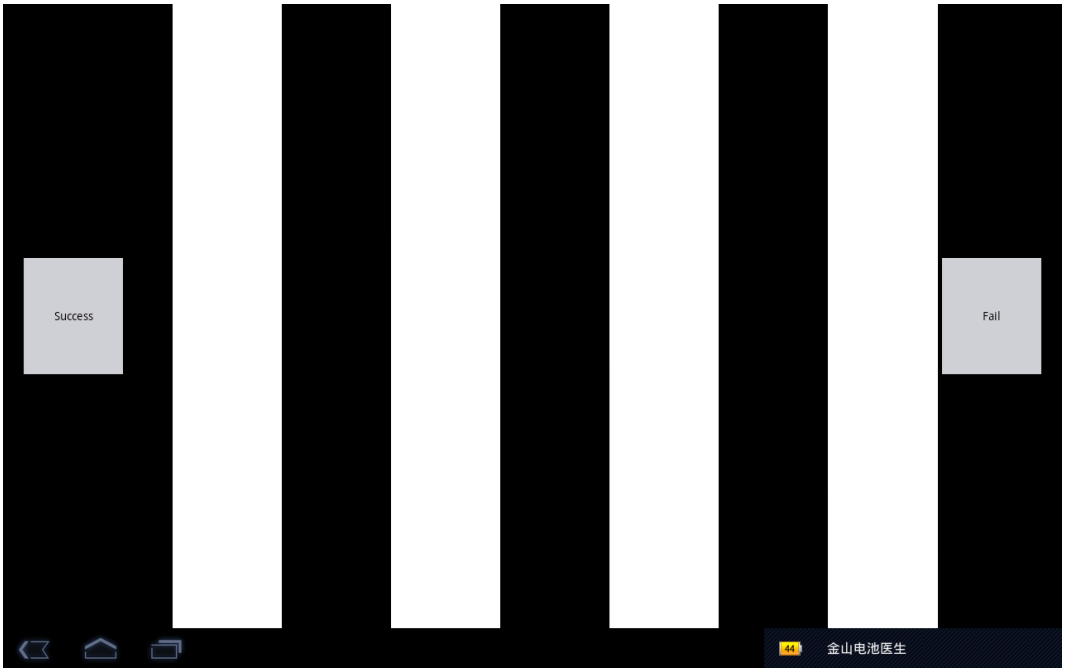
Step 5 Touchscreen test

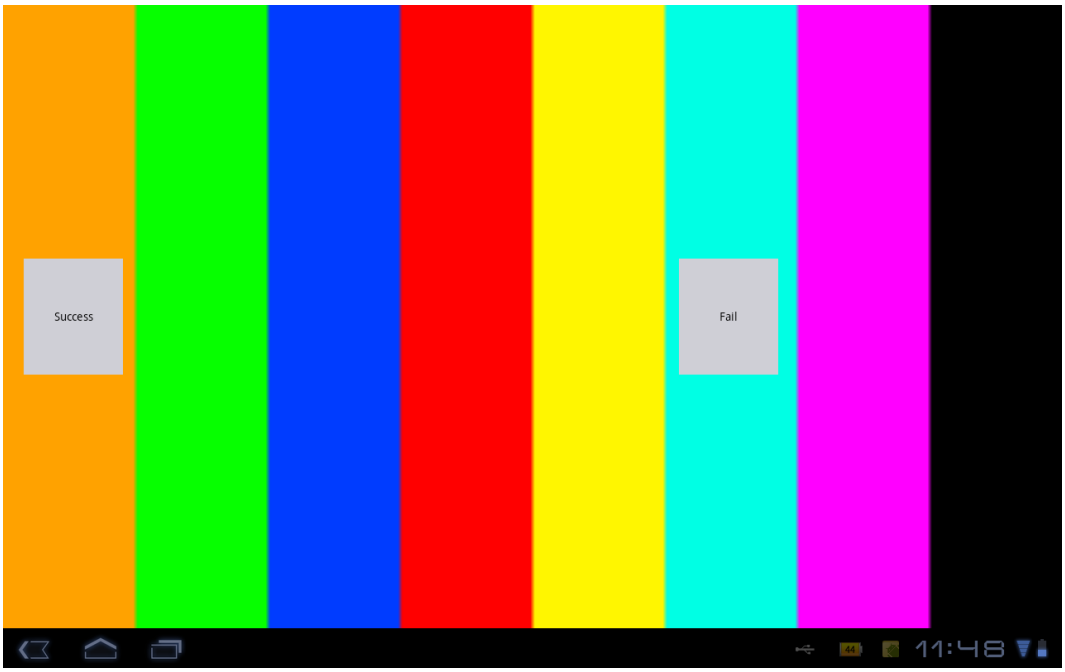
Touch blue parts on the screen. If the blue parts turn red, the test succeeded. Click **Success** to proceed.



Step 6 LCD test

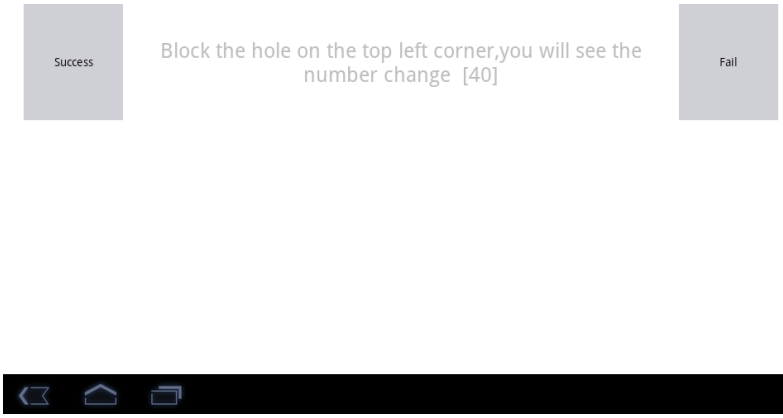
If the device displays white, black, black-white strips, and colorful strips in sequence, the test succeeded. Click **Success** to proceed.





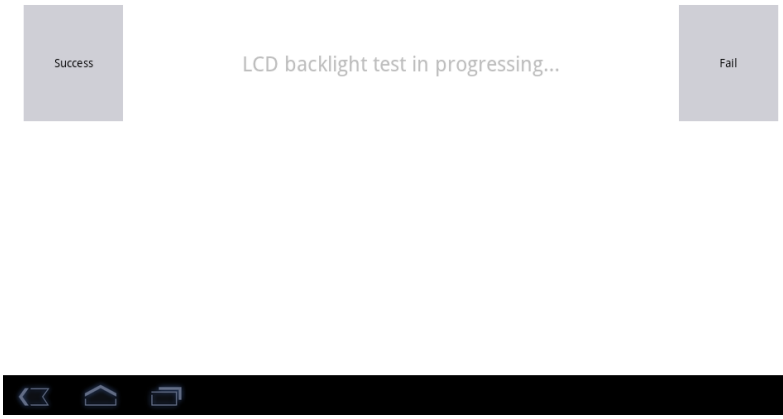
Step 7 Number test

The device will complete the test automatically. Click **Success** to proceed.



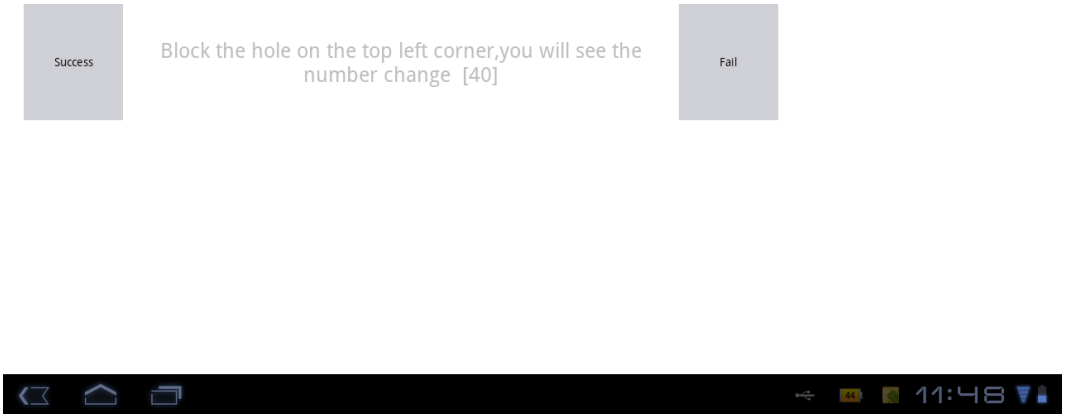
Step 8 LCD backlight test

The device will complete the backlight test automatically. Click **Success** to proceed.



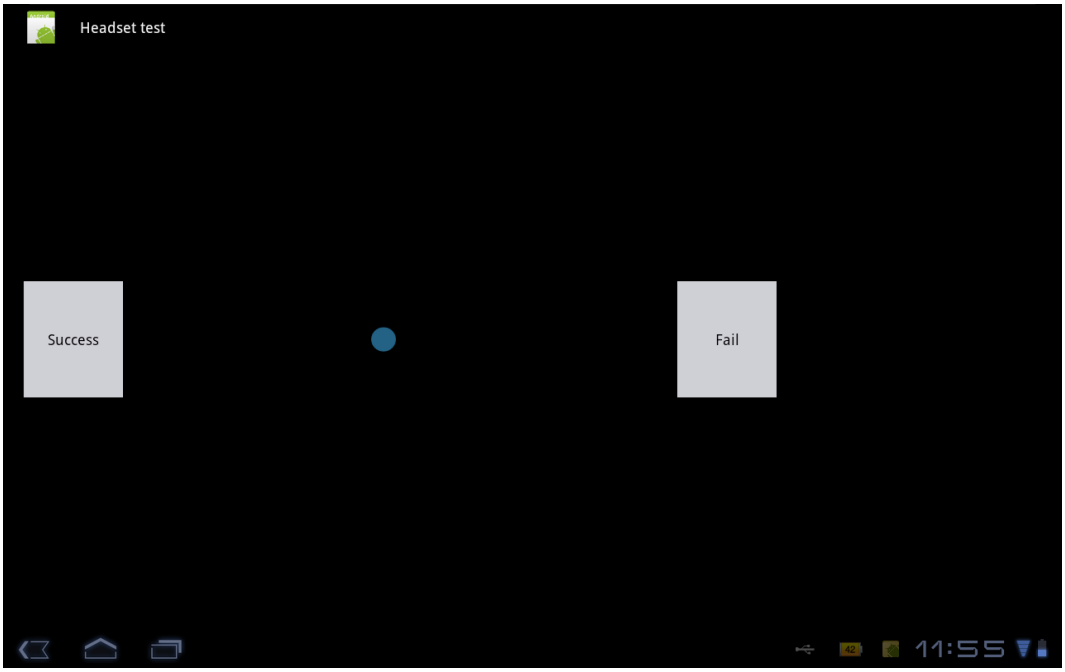
Step 9 Speaker test

If you can hear sound from the top and bottom speakers, the test succeeded. Click **Success** to proceed.



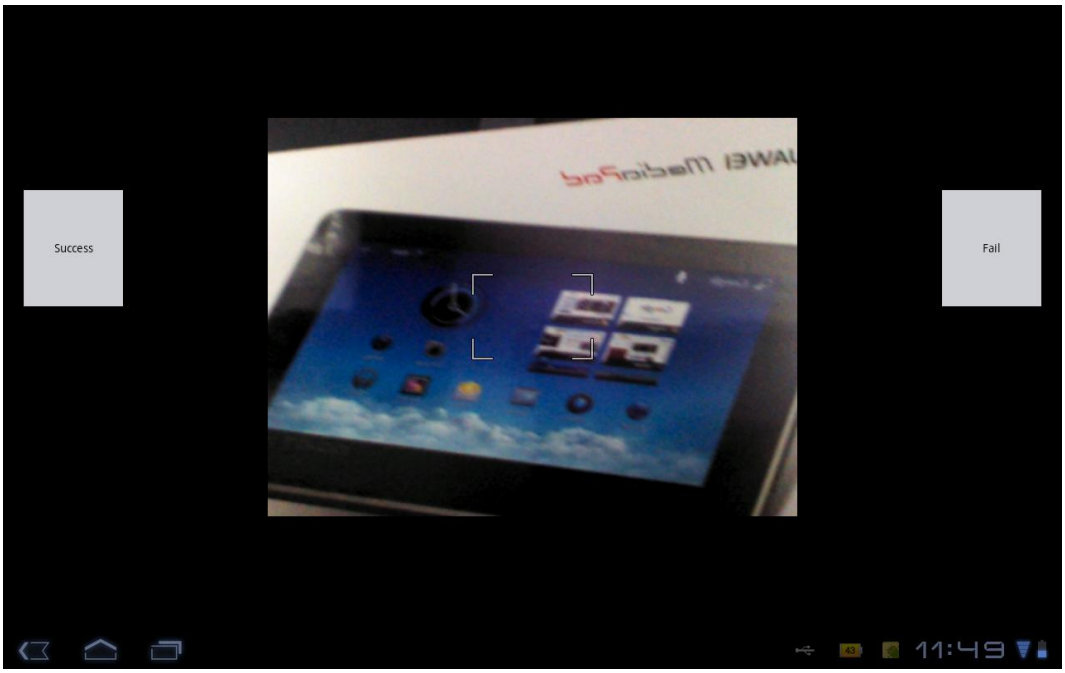
Step 10 Headset test

Plug in or pull out the headset. If the color of the icon changes, the test succeeded. Click **Success** to proceed.



Step 11 Camera test

After the test is started, the device displays the real scene to be captured by camera, indicating that the test succeeded. Click **Success** to proceed.

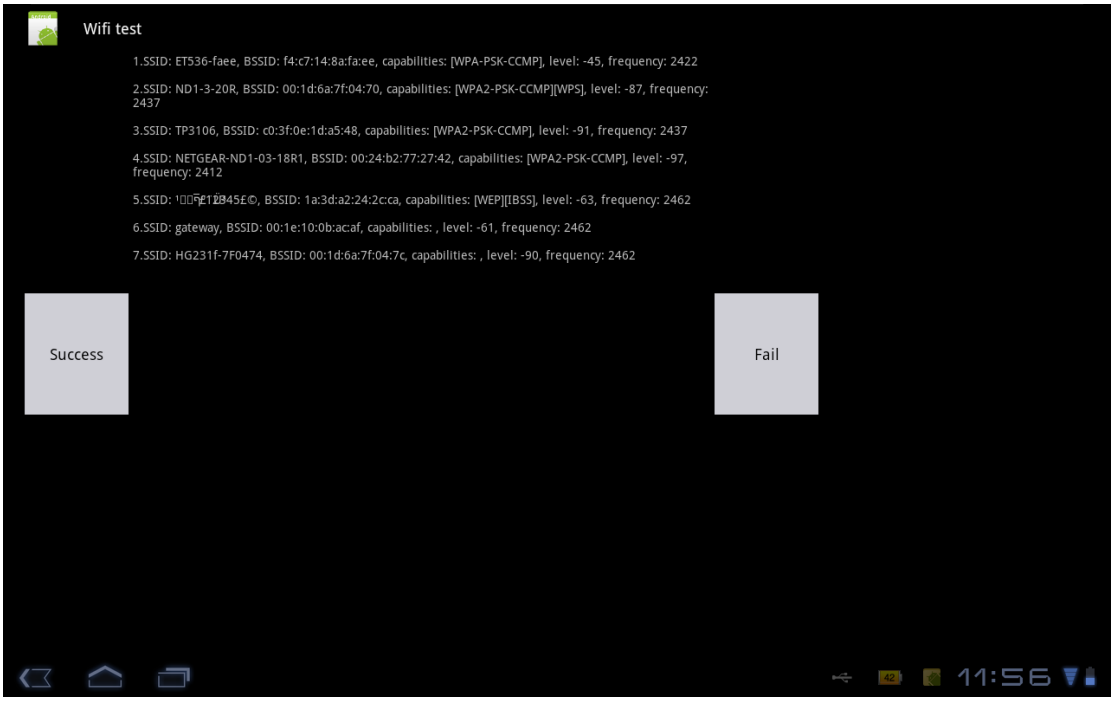


Step 12 Bluetooth test

When nearby Bluetooth devices searched after the Bluetooth function is activated are displayed on the screen, the test succeeded. Click **Success** to proceed.

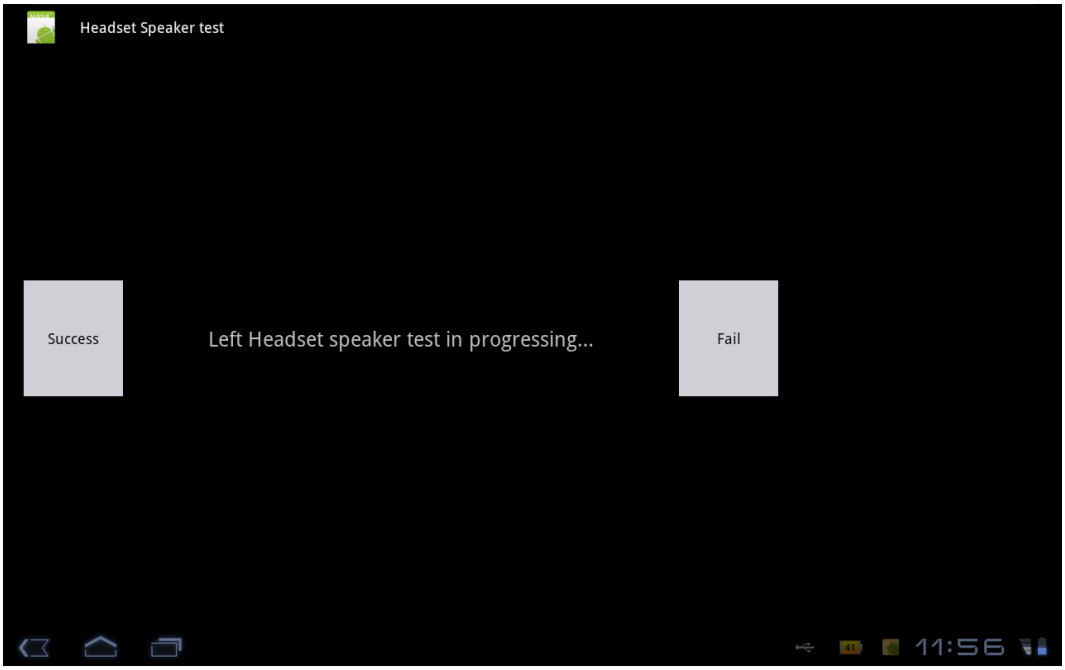
Step 13 Wi-Fi test

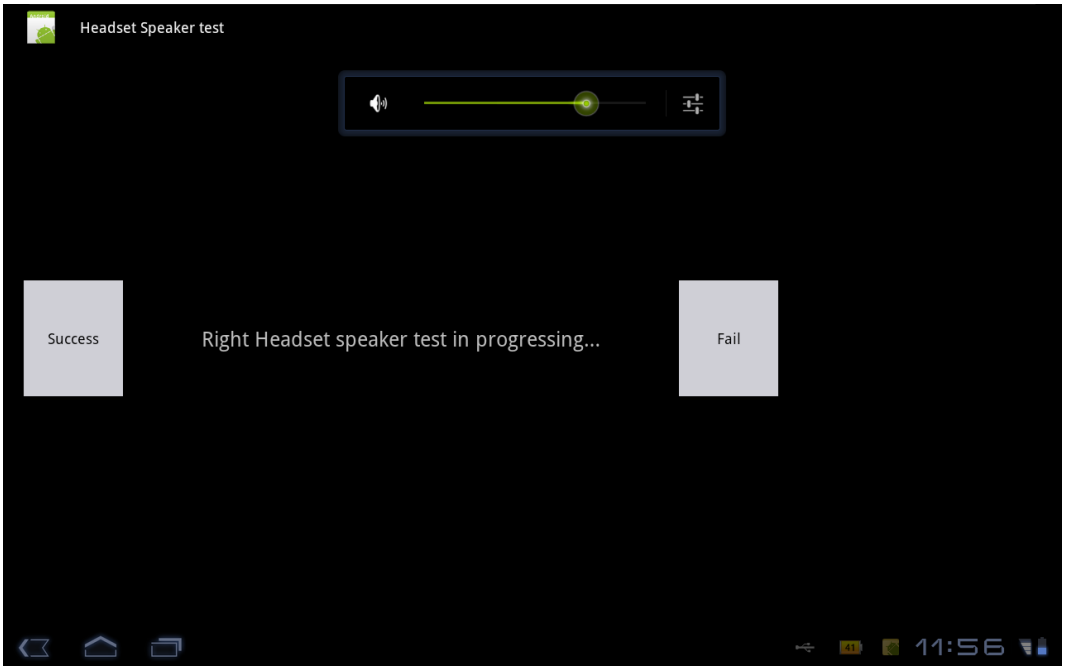
When nearby Wi-Fi signals found after the Wi-Fi function is enabled are displayed on the screen, the test succeeded. Click **Success** to proceed.



Step 14 Headset speaker test

If you can hear sound from both the left channel and the right channel, the test succeeded. Click **Success** to proceed.



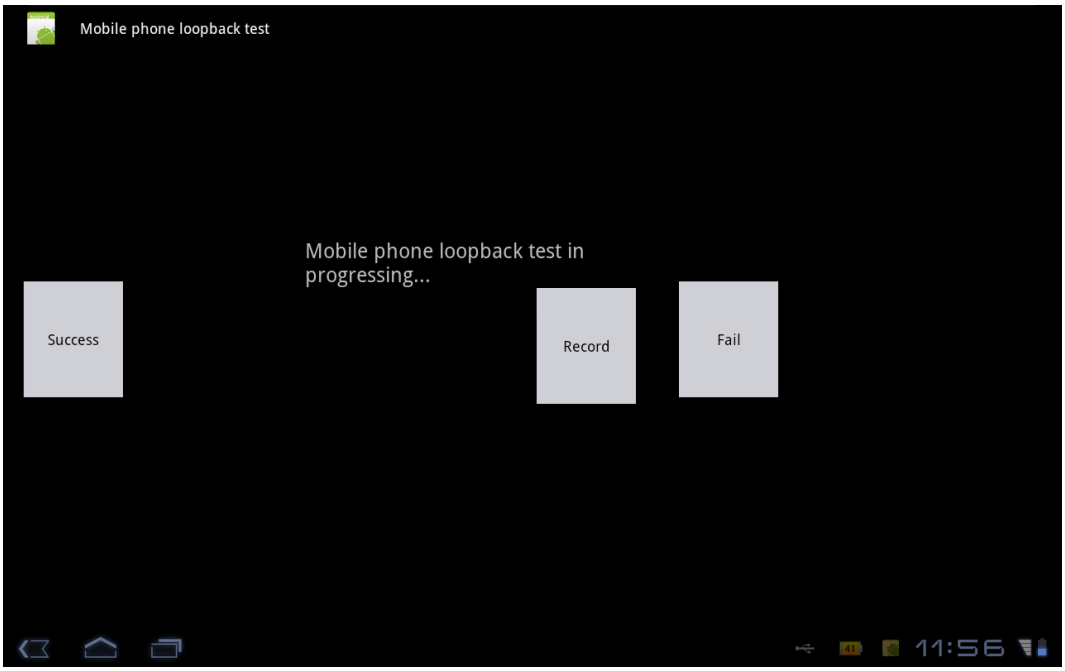


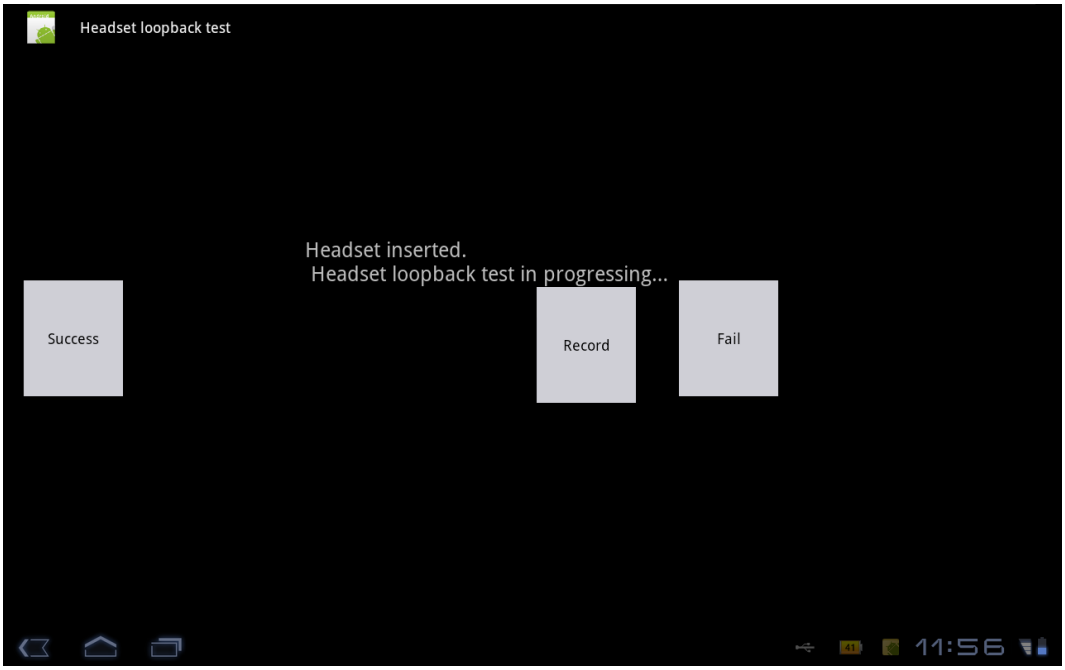
Step 15 Compass test

The device will complete the compass test automatically. Click **Success** to proceed.

Step 16 Built-in microphone test

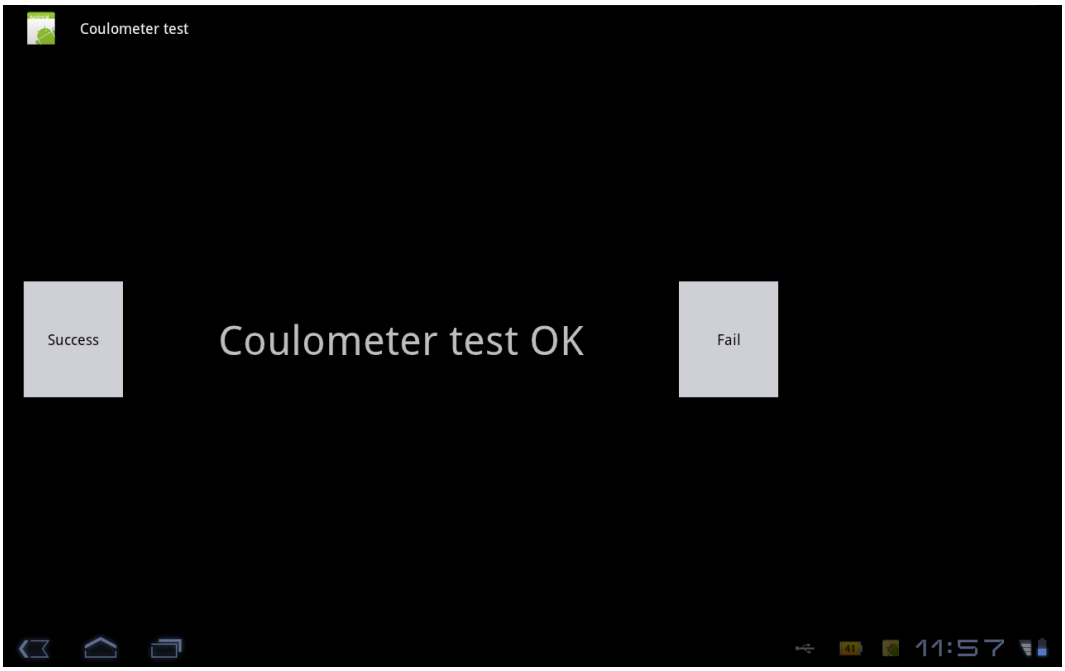
Switch between **Record** and **Play**. The sound will enter into the microphone and travel out from the speaker. Click **Success** to proceed.





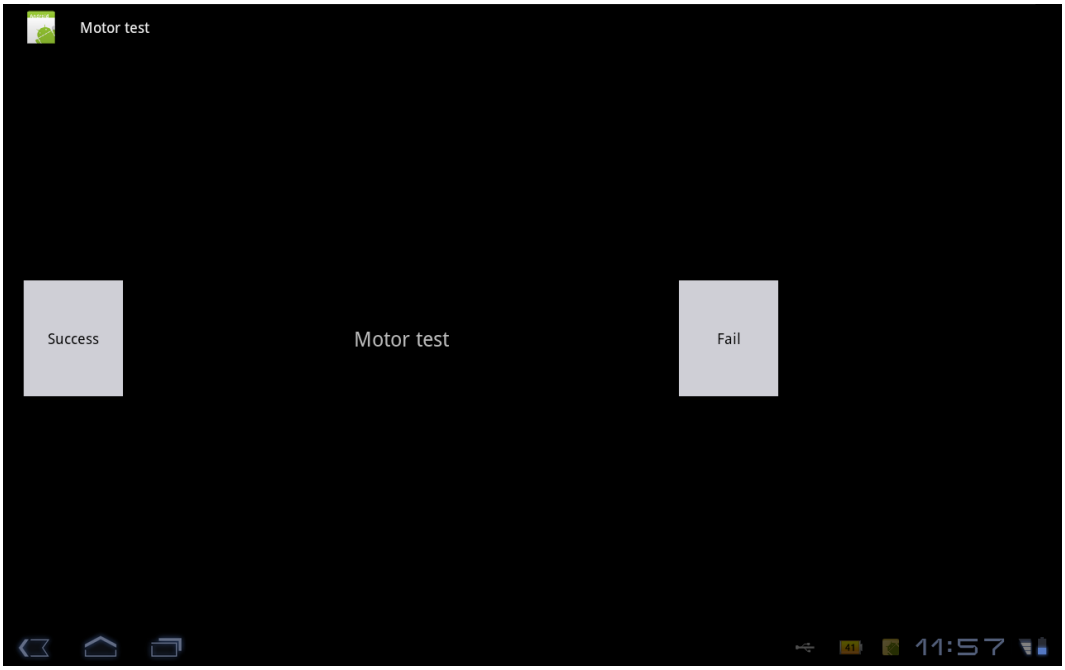
Step 17 Coulometer test

The device will complete the coulometer test automatically. Click **Success** to proceed.



Step 18 Motor test

After the test is started, the motor will vibrate automatically. Click **Success** to proceed.



Step 19 USB-HOST test

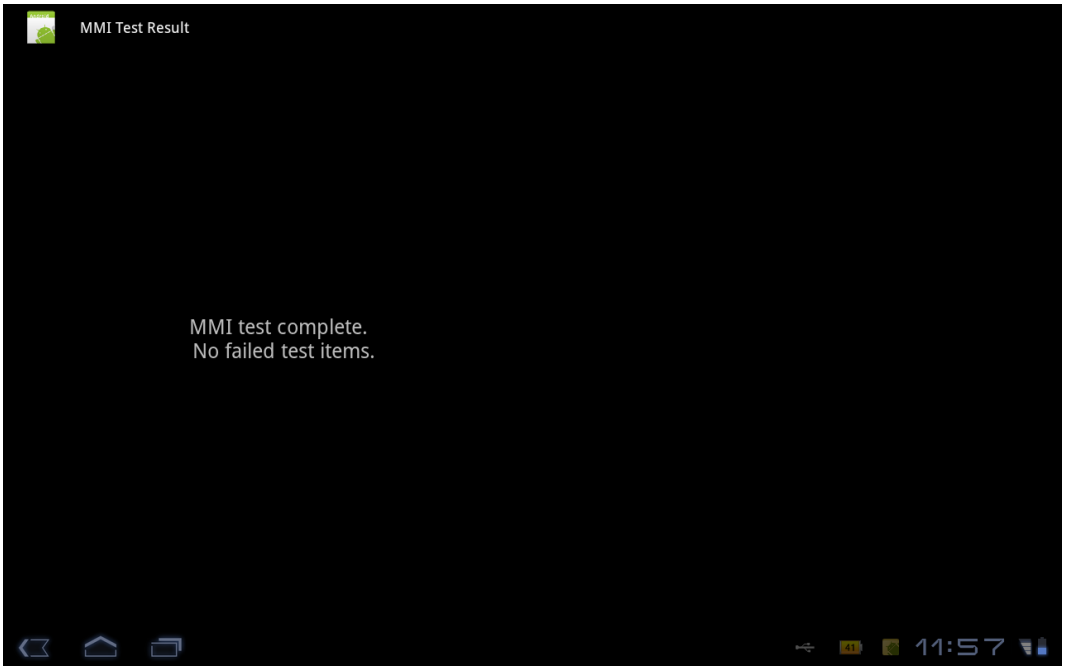
The device will complete the USB-HOST test automatically. The message "USB-HOST test success" is displayed when the test is completed. Click **Success** to proceed.

Step 20 HDMI test

The device will complete the HDMI test automatically. If there is image and sound from the TV, the test succeeded. Click **Success**.

Step 21 Displaying test results

When all tests are completed, the results are displayed on the screen. Press the **Home** key to exit.



11.2 Voice Call Test

Step 1 Insert a functional SIM card, and press and hold the **Power** button to power on the device.

Step 2 Check the signal strength after the device is connected to the local network. You can compare it with a functional phone.

Step 3 Call a fixed-line number to test the voice quality during the call.

Step 4 If no problem is found during the test, end the test.