# XP3plus 5G (X320)
# SERVICE MANUAL


## Sonim Technologies

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|---|---|---|---|
| | **XP3plus 5G(X320) SERVICE MANUAL** | | **Classification: external** |
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| **Effective date:** | **Prepared By:** | **Reviewed By:** | **Approved By:** |
| **05 - 06 - 2024** | **Mark** | **Grace Li** | **Xizong Luo** |

| Updated Ver. | Effective date | Prepared by | Brief of Amendments |
|---|---|---|---|
| 1.0 | 05 - 06 - 2024 | Mark | Initial version |
| | | | |
| | | | |
| | | | |

# CAUTIONS

I. Upgrading & Servicing must be undertaken by qualified personnel only.

II. Ensure all work is carried out at an anti-static workstation and that an anti-static wrist strap is worn.

III.Use only approved Tools & components as specified in the parts list.

IV. Ensure all components, modules, screws, and insulators are correctly re-fitted after servicing and alignment

V. Ensure all cables and wires are repositioned correctly if Handset disassembled

VI. Electrostatic discharge can easily damage the sensitive components of electronic products. Therefore, Service Center must adhere the precautions which mentioned above.

# TABLE OF CONTENTS

# 1.0 INTRODUCTION

## 1. PURPOSE

This manual provides the standardized operating instructions for L2 repairs.

## 2. REGULATORY INFORMATION

### A. SECURITY

This wireless device, (the "Device") contains software owned by Sonim Technologies, Inc. ("Sonim") and its third party suppliers and licensors (collectively, the "Software"). As user of this Device, Sonim grants you a non-exclusive, non-transferable, non-assignable license to use the software & hardware solely in conjunction with the Device on which it is installed and/or delivered with. Nothing herein shall be construed as a sale of the Software & hardware to any third party.

You shall not reproduce, modify, distribute, reverse engineer, decompile, otherwise alter or use any other means to discover the source code of the Software, hardware or any component of the Software/hardware. For avoidance of doubt, you are at all times entitled to transfer all rights and obligations to the Software to a third party, solely together with the Device with which you received the Software, provided always that such third party agrees in writing to be bound by these rules. The validity, construction and performance of the license shall be governed by the laws of Delaware, United States & the manufacturer will not be responsible for any charges that result from unauthorized use.

### B. PHONE CARE

Each Sonim phone has a designated IP class for dust and water protection, according to the IEC Ingress Protection (IP) Standard. This means that the phone is dust protected and can be submerged into 2 m deep water for up to 60 minutes. Immersion in deeper water can damage it and must be avoided.

Sonim phones are solid and built for heavy duty use. Its design protects against disassembly or mechanical damage when subjected to forces equal to free fall from the height of 2 meters. Subjecting the phone to stronger impact and forces can damage it and must be avoided.

### C. MAINTAINENCE LIMITATIONS

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

### D. ELECTROSTATIC SENSITIVE DEVICES

**ATTENTION**
Boards which contain Electrostatic Sensitive Devices (ESD) are indicated by the sign.

**Following has to be taken while handling the ESD boards**

1. Service personnel should ground themselves by using a wrist strap while working on the boards
2. When repairs are made to a system board, they should spread the floor with anti-static mat which is also grounded.
3. Use a suitable, grounded soldering iron.
4. Keep sensitive parts in protective packages until these are used.

# 2.0 REQUIREMENTS

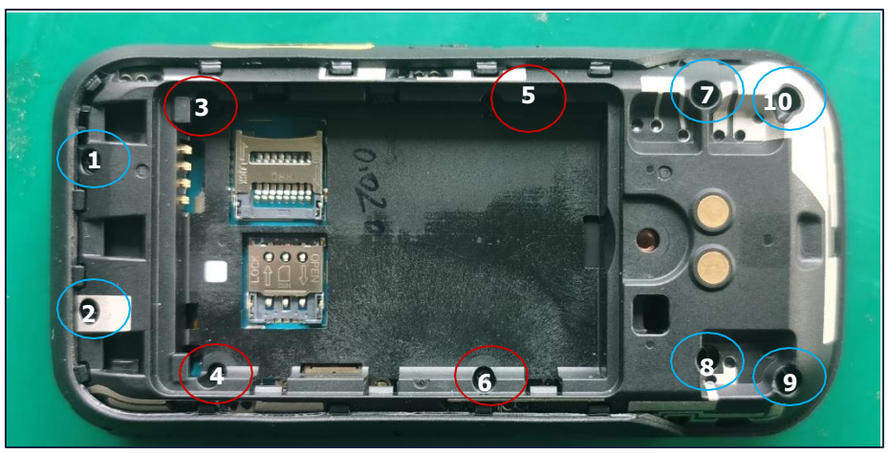
| REQUIREMENTS TO PERFORM THE ASSEMBLY & DISASSEMBLY OF HANDSETS | |
|---|---|
| Sales pack or Spare parts of the handset. | |
| Tools | Tweezers, Electric or Torque Screw driver |
| ESD Gloves, shoes, Aprons, Wrist band | |
| Clean sol or Isopropyl Alcohol [IPA] | |
| Hot air blower | |
| Soldering Iron | |

# 3.0 HANDSET DISASSEMBLY

1. Remove the back cover screw marked in the picture through a screw driver.

2. Remove the battery from the marked position by hand.

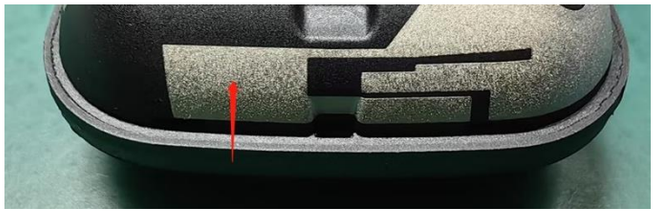
3. Remove 10 screws to disassemble rear and front housing. Screw Torque value: (1.4±0.1) kgf.cm.

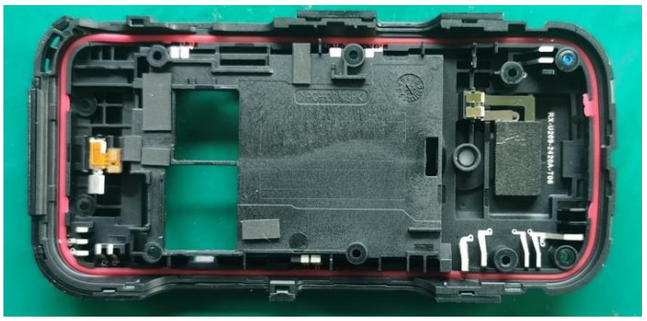



a.  Screw length of 1, 2, 7, 8, 9 & 10 screws are M1.6*L5.0. Screws are assembled with metal & waterproof cushion.

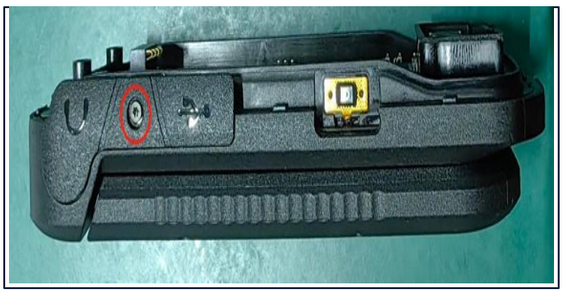
b.  Screw length of 3, 4, 5, 6 screws are M1.6*L3.0 . Screws are without any cushions.

4. After removing all the screws, disassemble front & rear housing as shown below.

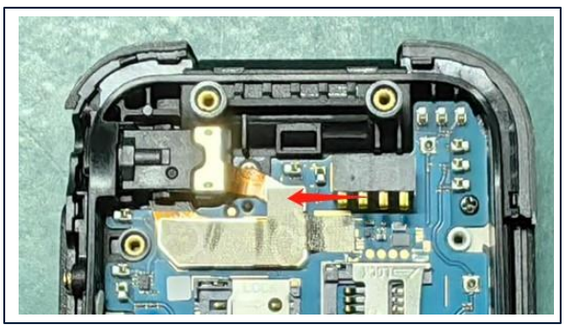




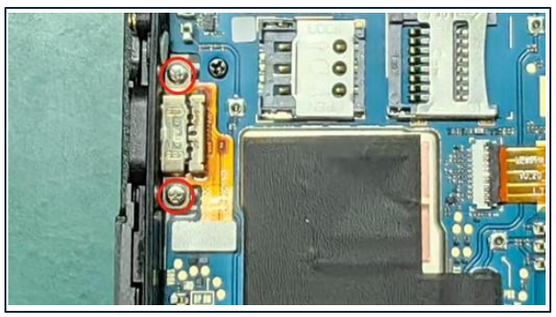
5. Unscrew the below shown screw of length M1.6*L3. Screw torque value of (0.4±0.1) kgf.cm. then remove the USB silicone plug

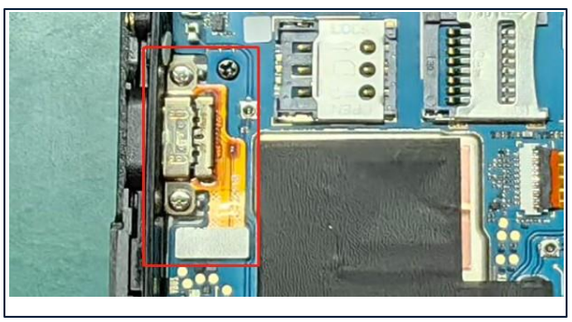


6. Lift the earphone FPC connected to the connector carefully. then remove the earphone connector.

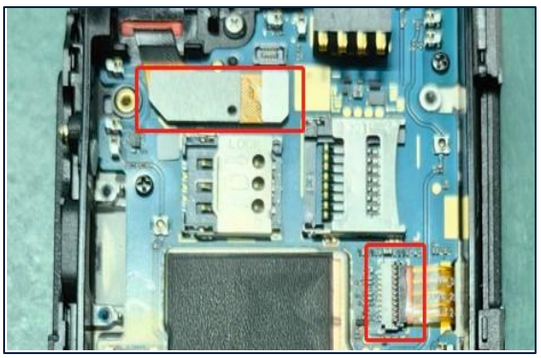
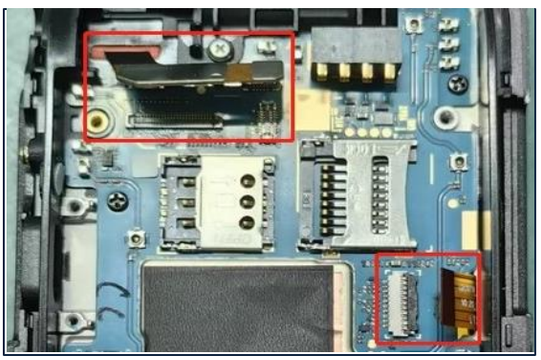


7. Unscrew the below shown screw of length M1.4*0.3*3.0L. Screw torque value of (0.4±0.1) kgf.cm, Lift the USB connector FPC, pull the USB connector downwards.

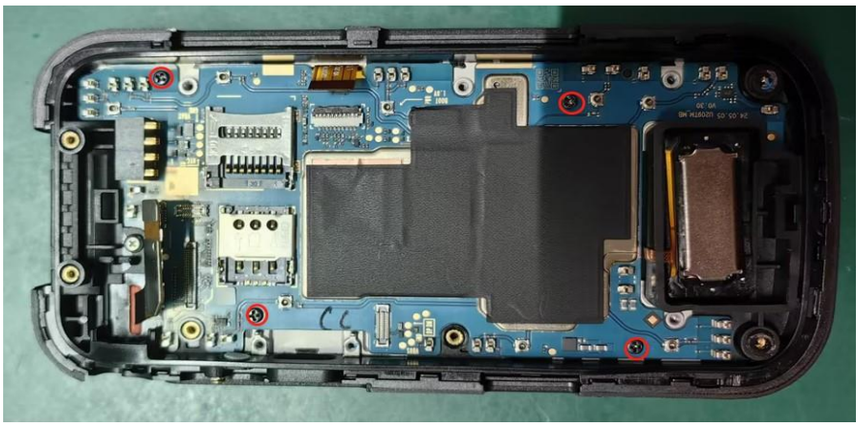




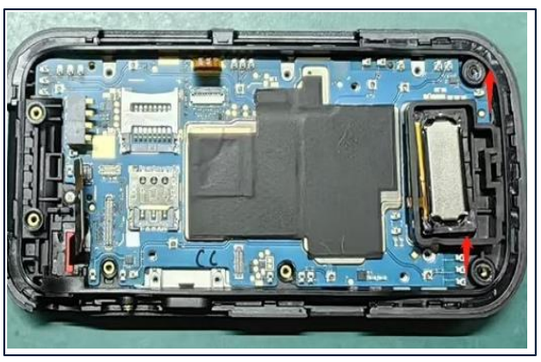
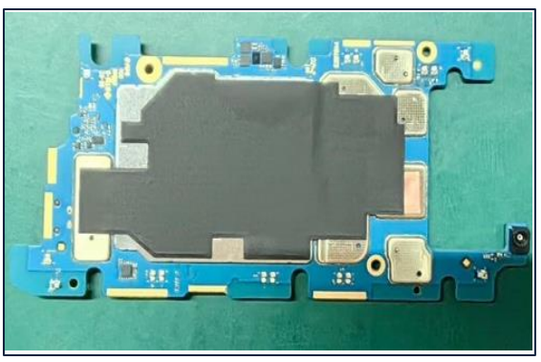
8. Lift the Lcd/camera FPC connected and the keyboard FPC to the connector

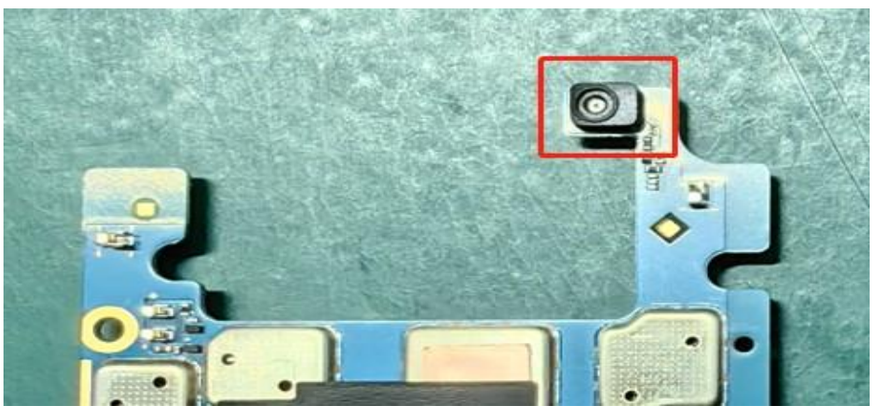
9. Unscrew the 4 screws of length M1.6*L3.0 and torque value: (0.8±0.1) kgf.cm.



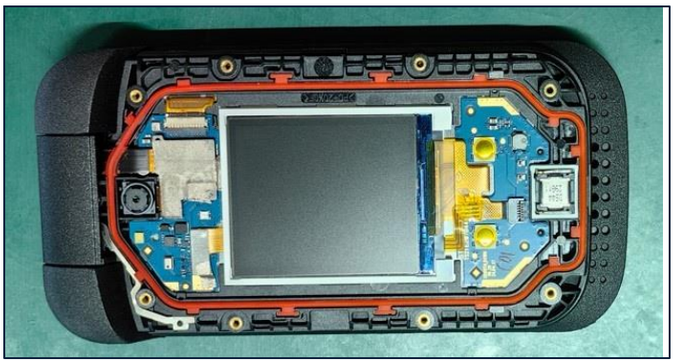
10. Lift the PCBA carefully to disassemble the PCBA from front housing

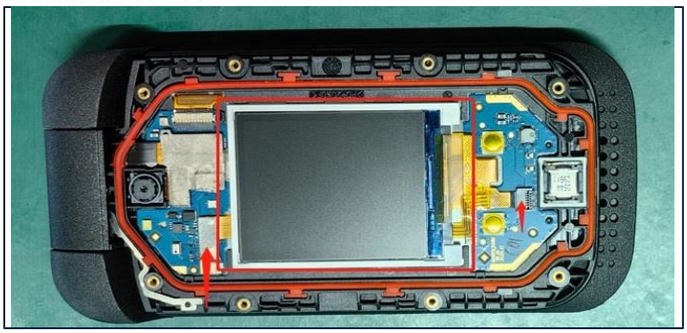
11. Remove the MIC silicone sleeve.



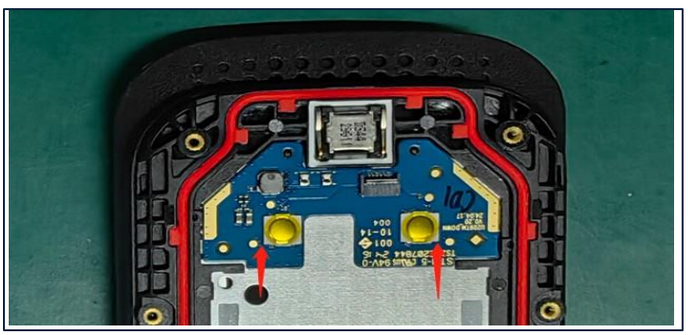
12. Remove the 8 screws (M1.6*L3) to disassemble the A housing. Screw Torque value: (0.8±0.1) kgf.cm.



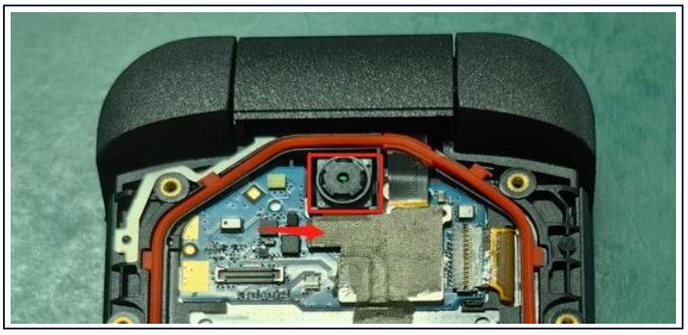
13. Lift the LCD FPC and sub-board FPC connected carefully. then remove the LCD.



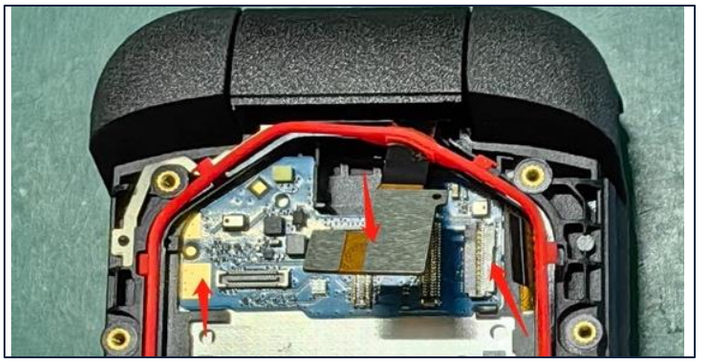
14. Carefully remove the sub-board.



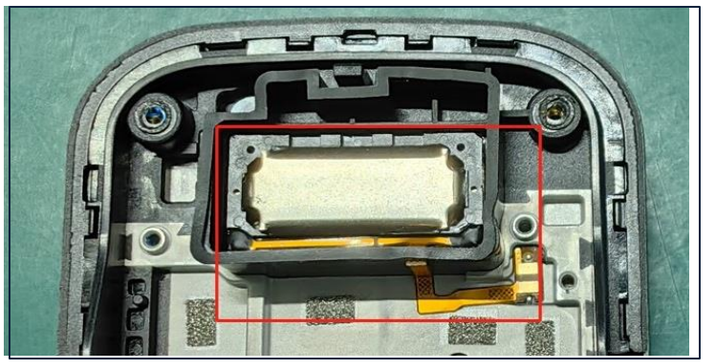
15. Remove the conductive cloth and remove the camera.



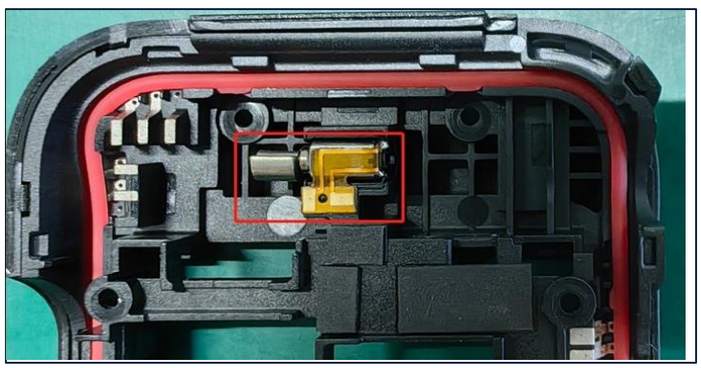
16. Lift the main FPC and keyboard FPC connected carefully. then remove the sub-board.



17. Carefully remove the speaker.



18. Remove the vibrator.



# Finished

# 4.0 MAT TEST OPERATING INSTRUCTIONS

MAT test is performed to test the functionality of mobile parameters. MAT test failure on particular parameter will allow you to decide which part needs to be replaced.

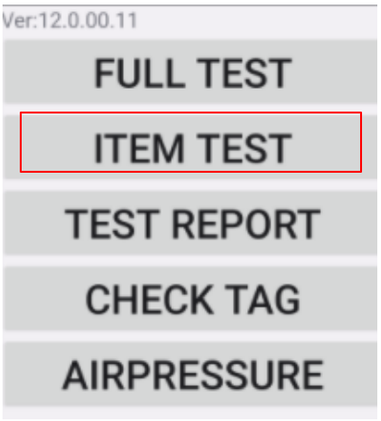
# REQUIREMENTS:

1. Gloves
2. Distilled Water droplet bottle
3. Lint-free cloth
4. One (1) Active and One (1) Inactive Nano SIM Card
5. Clean SD Card
6. Wi-Fi Access
7. Samsung NFC Tech Tiles (Part #: GH81-12810B)
8. Samsung Wireless Fast Charging pad (Model : EP-NG930)
9. Sonim-Adapter-B (Klein headset adapter 3.5mm audio port) or Klein Curl wired PTT headset
10. Headset (if using adapter)
11. Sonim Screwdriver Tool (You may also use a flathead screwdriver)
12. Model-Specific Travel Charger
13. Type-C Cable
14. Model-Specific Back Cover
15. Model-Specific Battery
16. 2nd Phone

Insert the two SIM cards and SD card into the device prior to MAT test to check and verify its functionality.

**MANUAL AUTOMATION TEST [MAT] PROCEDURE:**

Enter "***#*#8#*#***" on the phone dialer to get into Test mode. Select ITEM TEST.



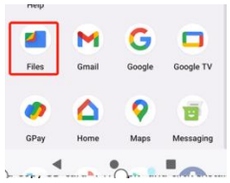

**Note:**

**A. For ATT software, you cannot enter *#*#8#*#* to enter the test mode. You need to install the test apk to enter the test mode.**

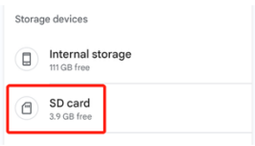
**B. After the test tool"FTM.apk" is installed,Enter "*#*#8#*#*" on the phone dialer to get into Test mode. Select ITEM TEST.**

### Steps for installing the"FTM apk" from sd card:

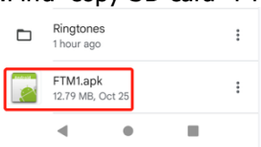

1.Copy FTM.APK to the SD card.
2.Insert your SD card into your phone.
3.Turn on your phone,Find "Files "in the mobile app and click to open it.



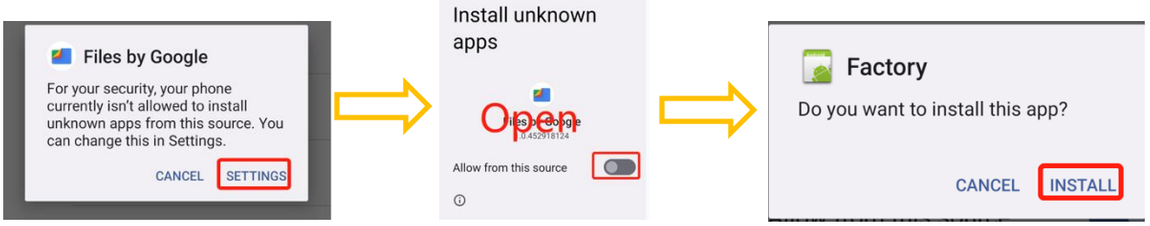

4.Find the "SD card "and click to open it.




5.Find copy SD card "FTM apk" and click Install it.



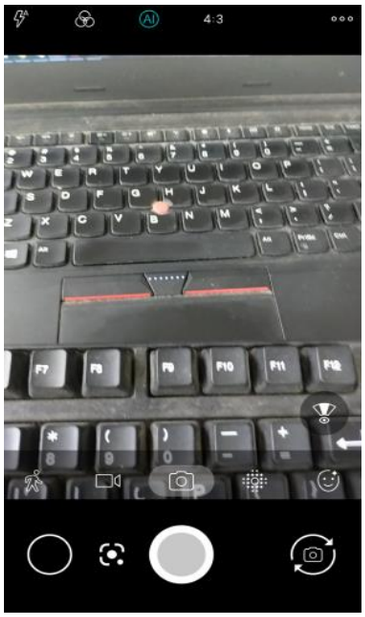

6.Click "SETTINGS" "Allow from this source" "INSTALL" to install the apk.

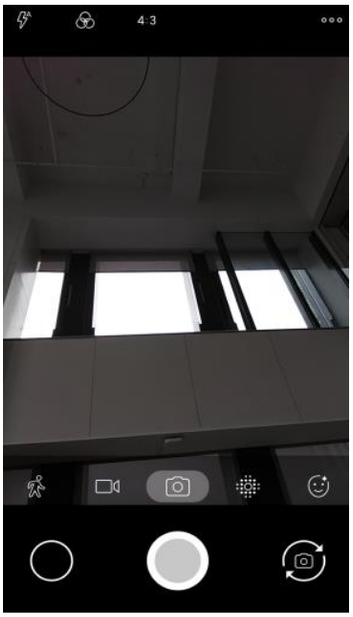


## General Test:

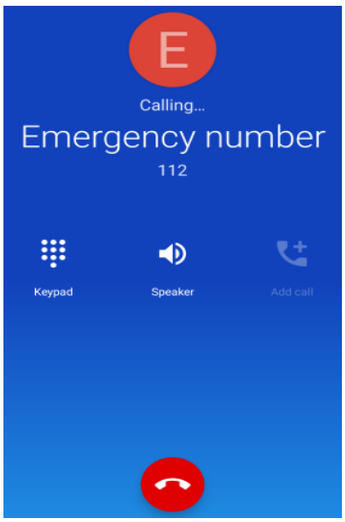
**1. Camera -** Back Camera preview will be enabled, select "TAKE PHOTO" and use back camera to capture the image. If the image is captured, switch to front camera. Front camera preview will be enabled, select "TAKE PHOTO" and use front camera to capture the image. If the image is captured, then back "PASS" or else tap "Fail".

**NOTE: IF camera testing passes, it means video testing also passes. Flashing test is shown in page 15.**

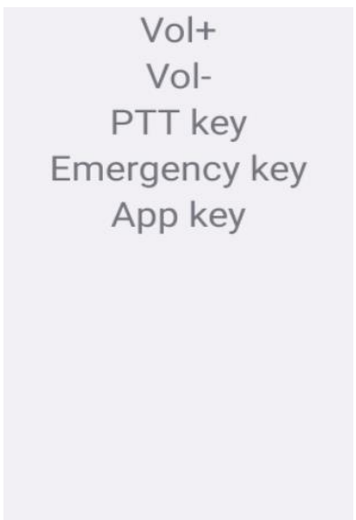




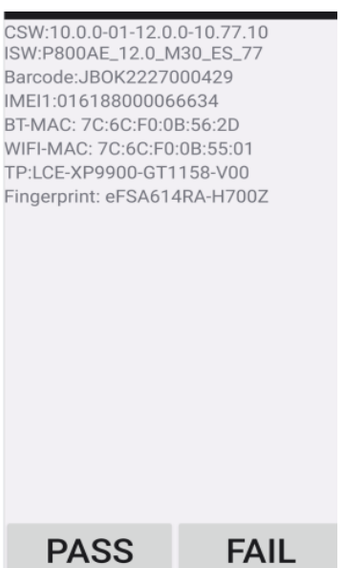
**2. Call -** machine dials out the call, and tests the quality of the call and check whether it is normal. If it's ok, then tap "PASS" or else tap "Fail".




**3. Keypad -** Press each button on the device to check if their functions are ok, the device will return to the main menu.

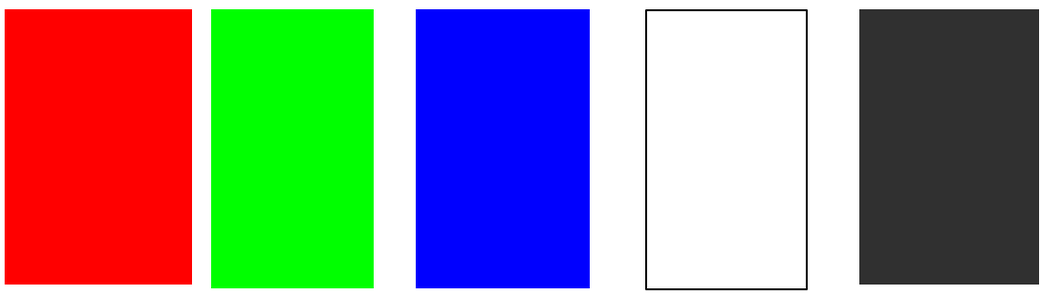



**4. Version -** Check the CSW, ISW version, IMEI, BT, WIFI. If it's ok, then tap "PASS" or else tap "Fail".



**5. Touch Panel Tes -** Select the "Touch Panel" item, swipe mode in TP. If the TP function is normal, the device will return to the main menu.

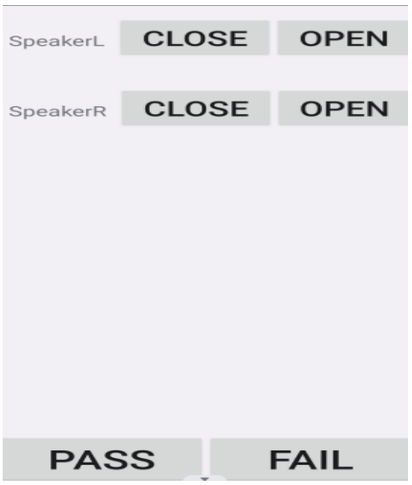
**6. LCD Color Test -** Use vol down key to change the display color (Red, Green, Blue, White, and Black). If it's ok, then tap "PASS" or else tap "Fail".



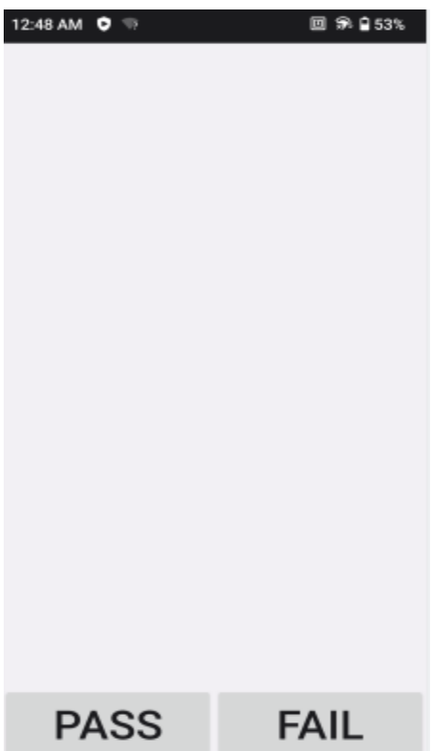
**7. LCD Contrast -** Whether LCD screen is blinking. If it is blinking, then tap "PASS" or else tap "Fail".

**8. Speaker SPL -** This helps to verify whether the speaker is working, check if you hear a beep sound. If it's ok then tap "PASS" or else tap "Fail".

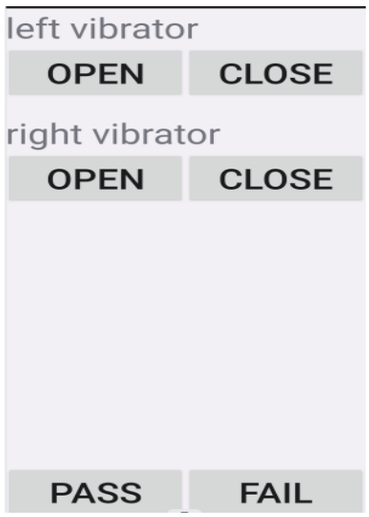
**Cannot choose the close and open option as both the speaker are working together when tested.**




**9. Receiver Test -** Verify if you hear a beep sound through receiver. If it's ok then tap "PASS" or else tap "Fail".

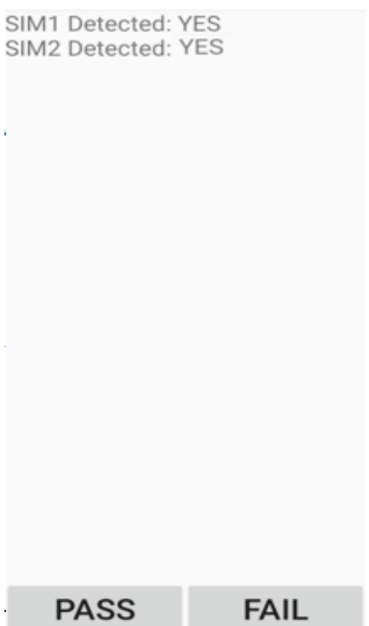


**10. Vibrator -** Check vibration is normal then tap "PASS" or else tap "Fail".

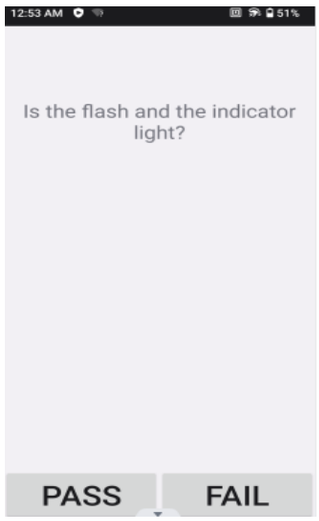



**11. MEMORY CARD -** Check the storage status of the memory card. If it's ok then tap "PASS" or else tap "Fail".

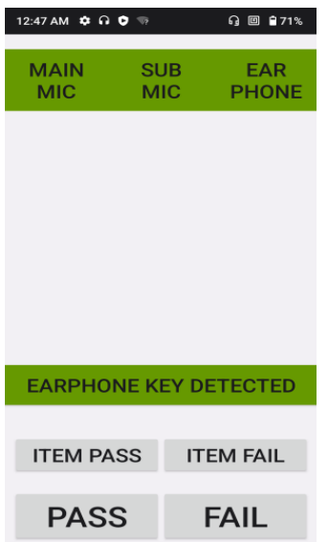

**12. SIM Detect -** To check if the SIM is recognized or not. If it's ok, then tap "PASS" or else tap "Fail".



**13. Flashlight -** Check if the flashlight is turned On. Whether the charging indicator above flashes alternately in red, yellow and green.If it's ok then tap "PASS" or else tap "Fail".

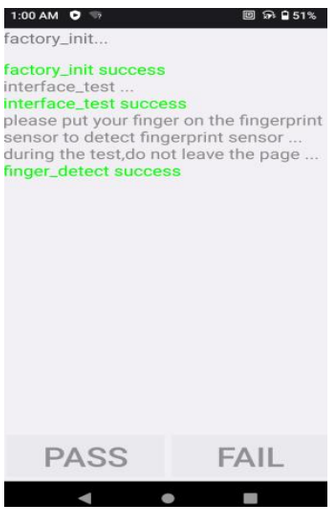



**14. Loopback -** Insert the earphones, click the blue option above to test the main microphone, sub microphone, and the headphone microphonen. Finally press the headset button. If it's ok then tap "PASS" or else tap "Fail".

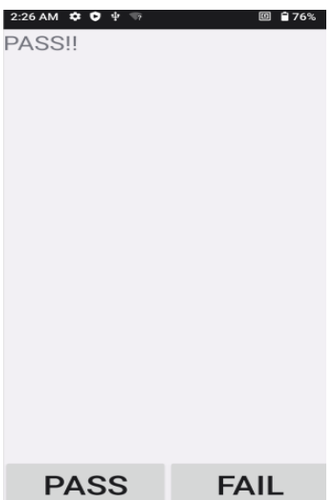


15. **Battery And Charge -** Connect the charger to see if the status is charging. If it's ok, then tap "PASS" or else tap "Fail".

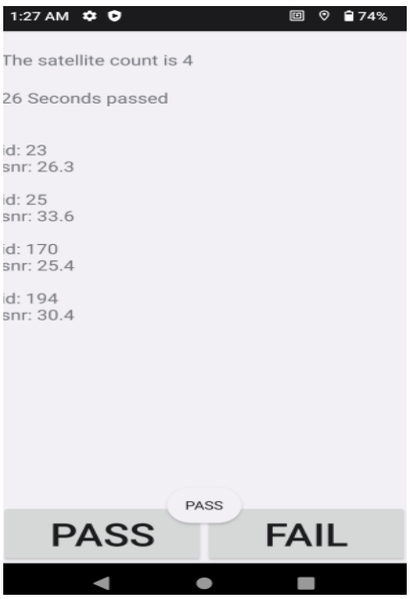

16. **Fingerprint Test -** Scan the finger on the sensor to check the fingerprint sensor. If it's ok, then tap "PASS" or else tap "Fail".




17. **OTG -** Use the USB flash drive of OTG line to connect the mobile phone and check whether the USB flash drive can be read. If it's ok, then tap "PASS" or else tap "Fail".



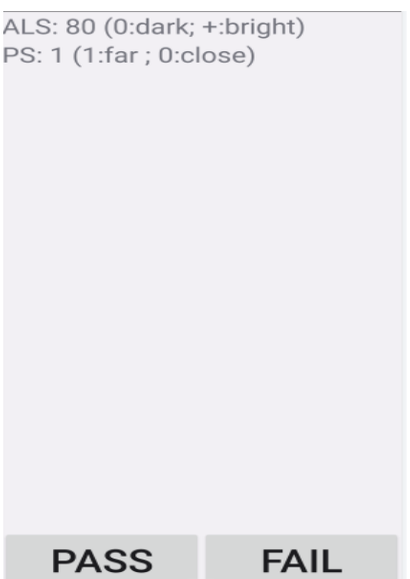
**18. GPS Location Test -** Check if the GPS location is shown accordingly. If it's ok, then tap "PASS" or else tap "Fail".



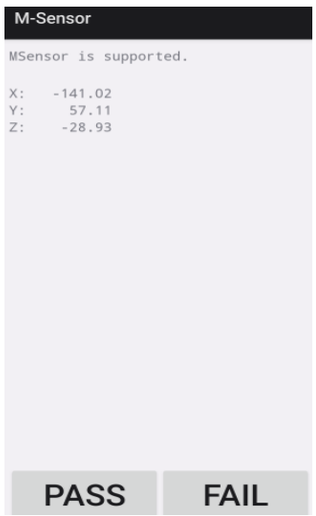

**Sensor tests:-**

**19. ALS/PS -** Cover the ambient sensor near the front camera for readings. If it's ok, then tap "PASS" or else tap "Fail"

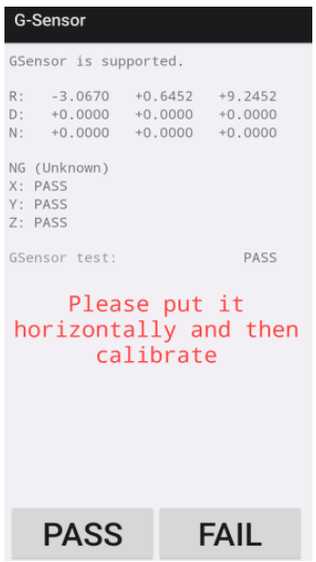
**NOTE: As second following picture shown, cover the proximity sensor with hand.**



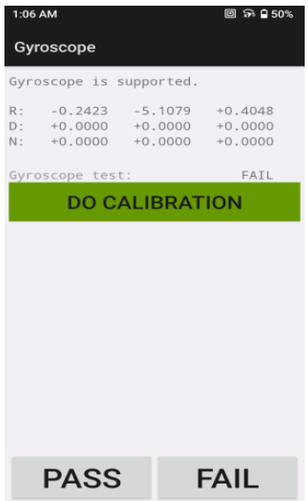
**20. M-Sensor -** Moblie device is all direction. X, Y & Z reads the values. If it's ok, then tap "PASS" or else tap "Fail".




**21. G-Sensor -** Check whether the self-test of G-Sensor "passes". If it's ok, then tap "PASS" or else tap "Fail".
**Test flow: firstly put it horizontally, then put it vertically, lastly side it down.**

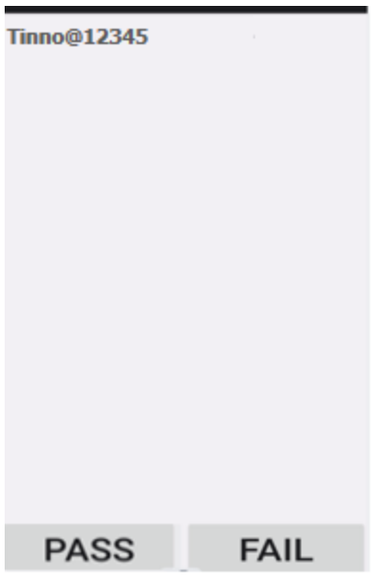



**22. Gyroscope -** It shows the X,Y & Z axis value when the phone moved in different direction. If it's ok, then tap "PASS" or else tap "Fail".

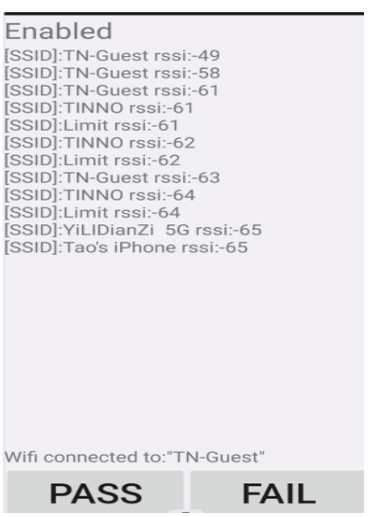


## Connectivity tests:-

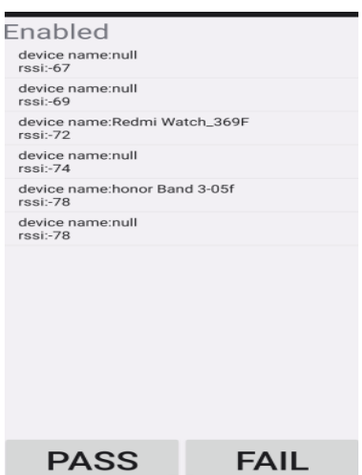
**23. NFC -** Try scanning with a NFC tag to check the NFC connectivity. If it's ok, then tap "PASS" or else tap "Fail".



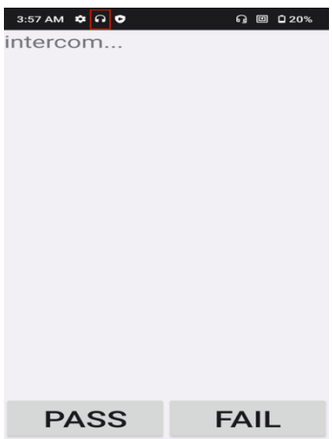

**24. WIFI -** Scan for WIFI connection and check if the SSID shows. If it's ok, then tap "PASS" or else tap "Fail".




**25. Bluetooth -** Check the Bluetooth connectivity. If it's ok, then tap "PASS" or else tap "Fail".

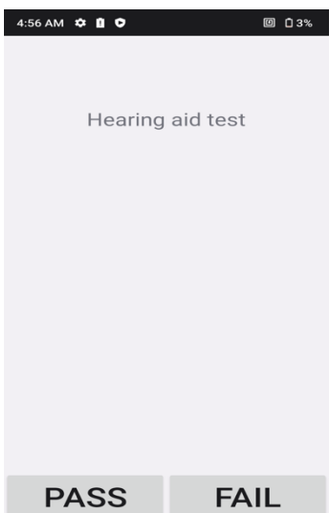


**26. Secure Audio -** The headset mode is displayed in LCD and see whether there is volume output from Secure Audio. If it's ok, then tap "PASS" or else tap "Fail".

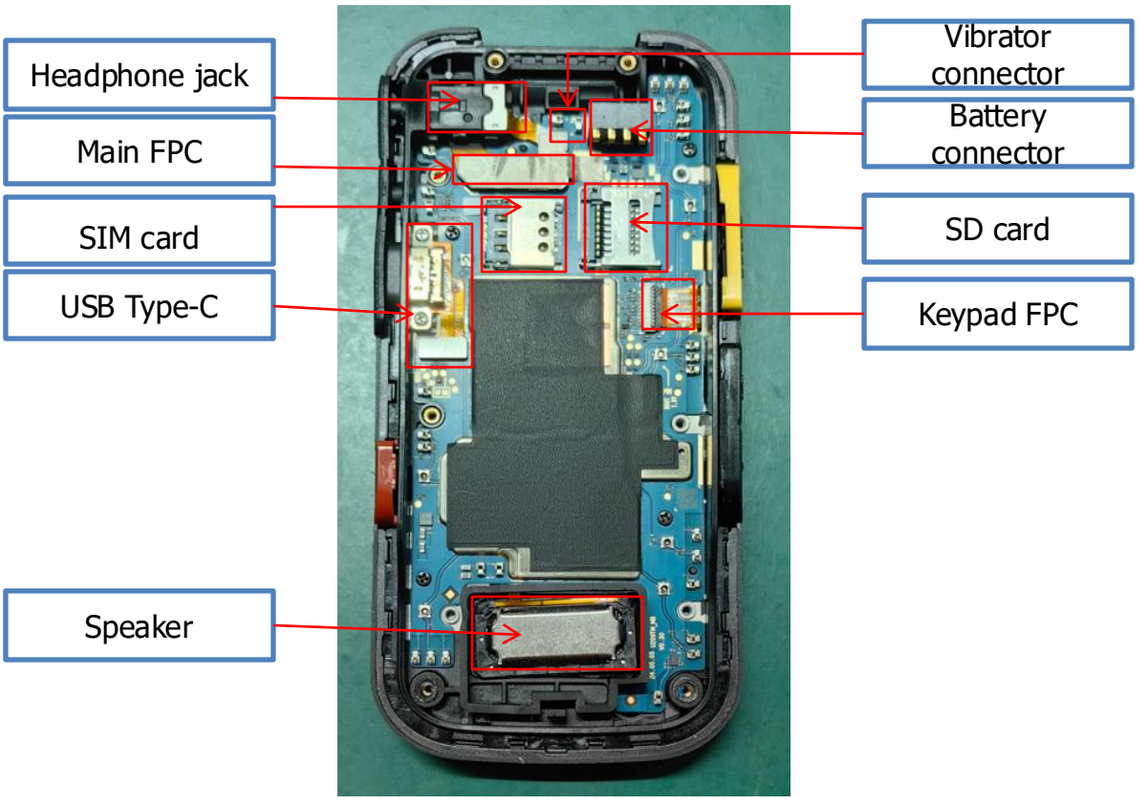


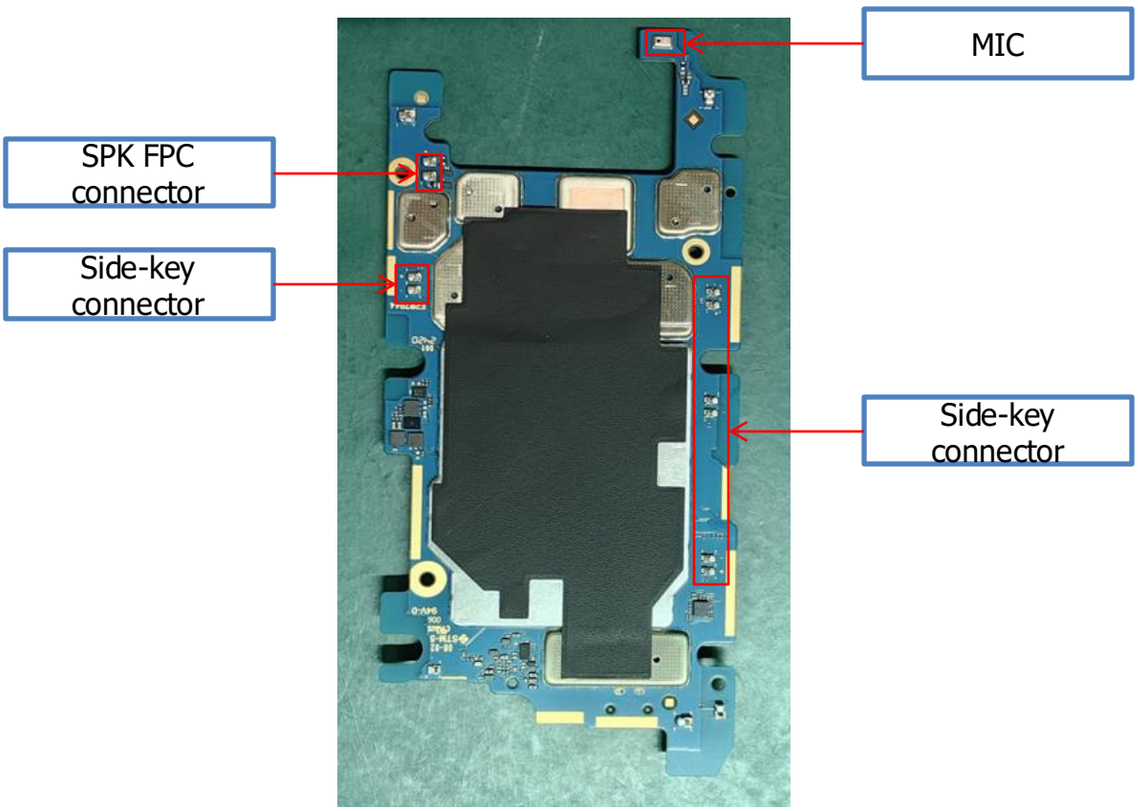

**27. Wireless charging -** Connect the charger to see if the status is charging. If it's ok, then tap "PASS" or else tap "Fail".

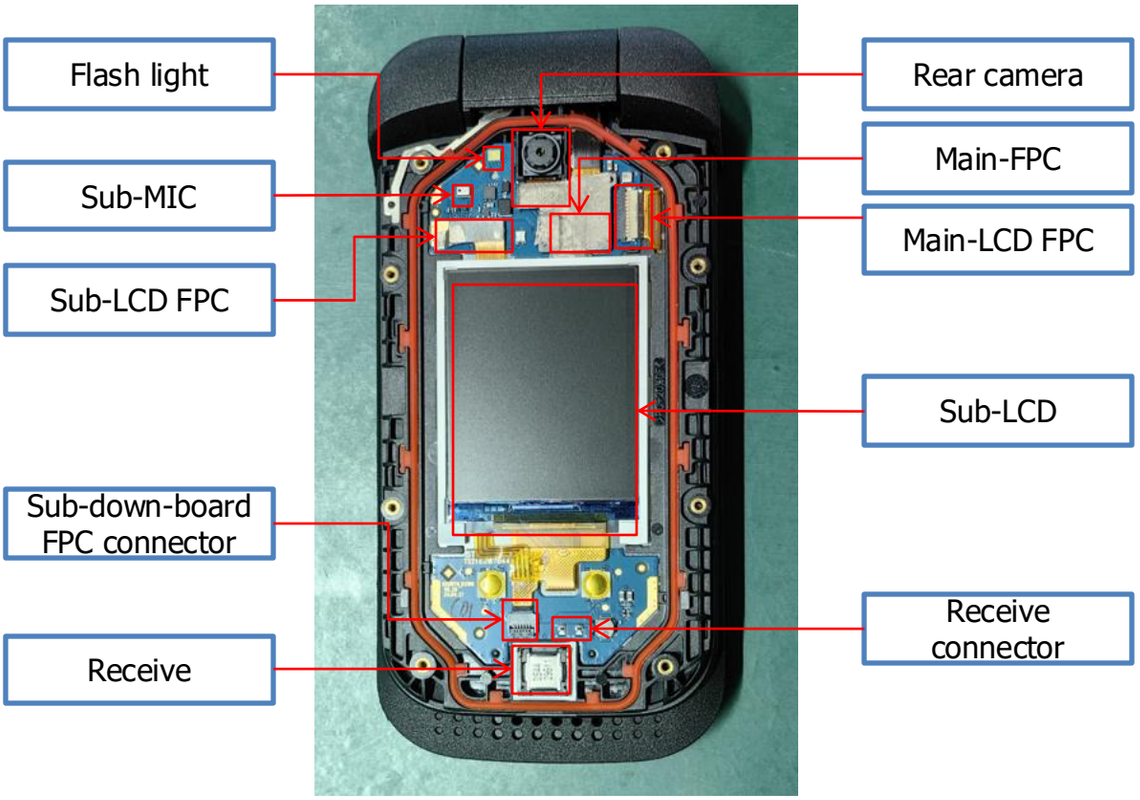

**28. HAC testing -** Enter the Lookback test on another phone, Select EAR PHONE TEST , Plug this phone into the HAC headset. Place the inductance of the HAC headset on the HAC part of the test phone, Check whether the HAC headset is clear and has no noise, If it's ok, then tap "PASS" or else tap "Fail".

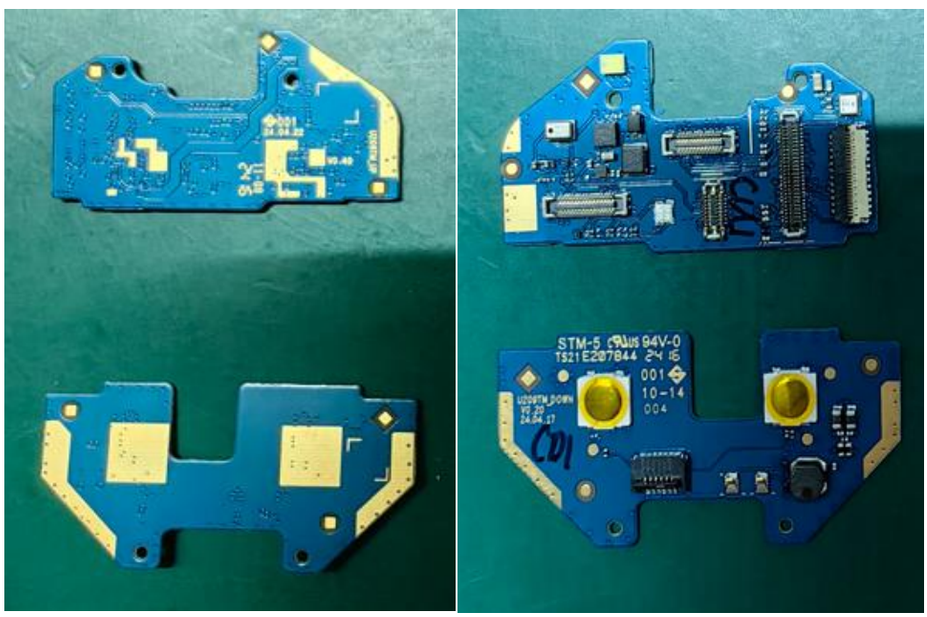


# 5.0 TROUBLESHOOTING




Flash light
Sub-MIC
Sub-LCD FPC
Sub-down-board FPC connector
Receive
Rear camera
Main-FPC
Main-LCD FPC
Sub-LCD
Receive connector



# 5.1 RECEIVER PROBLEM

**RECEIVER ASSEMBLY PART:**

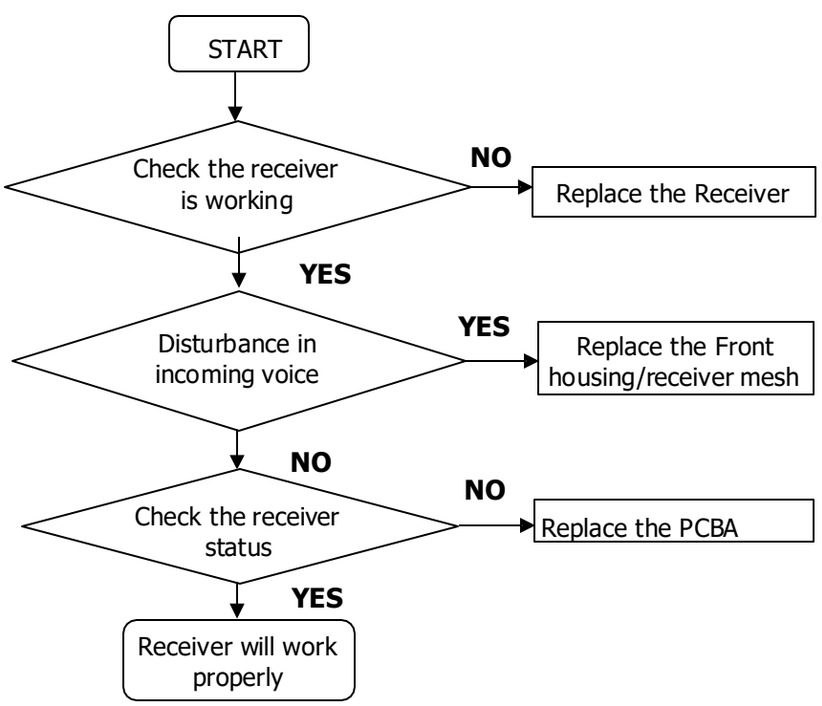
a. Assemble the receiver to front housing in the right direction.
b. Examine the receiver pin, replace the receiver if those pins are damaged or deformed.
c. Replace the receiver mesh (dustproof) if it's damaged, as it provides dust & waterproof protection.

# Clean the receiver golden pad and check the incoming voice.
# Ensure the receiver mesh is not damaged before replacement as it results in incoming voice distortion.
# Ensure the receiver hole in the front housing is not blocked as it reduces the incoming voice volume.
# Ensure the receiver FPC contacts are fixed properly & FPC cable inserted properly into the connector and locked.

**OBSERVED PROBLEMS:**

a. No/low incoming Voice
b. Distortion in incoming voice.

**TROUBLESHOOTING CHECKING FLOW:**



# 5.2 LOUD SPEAKER /RINGER/HF SPEAKER PROBLEM

**RINGER ASSEMBLY PART:**

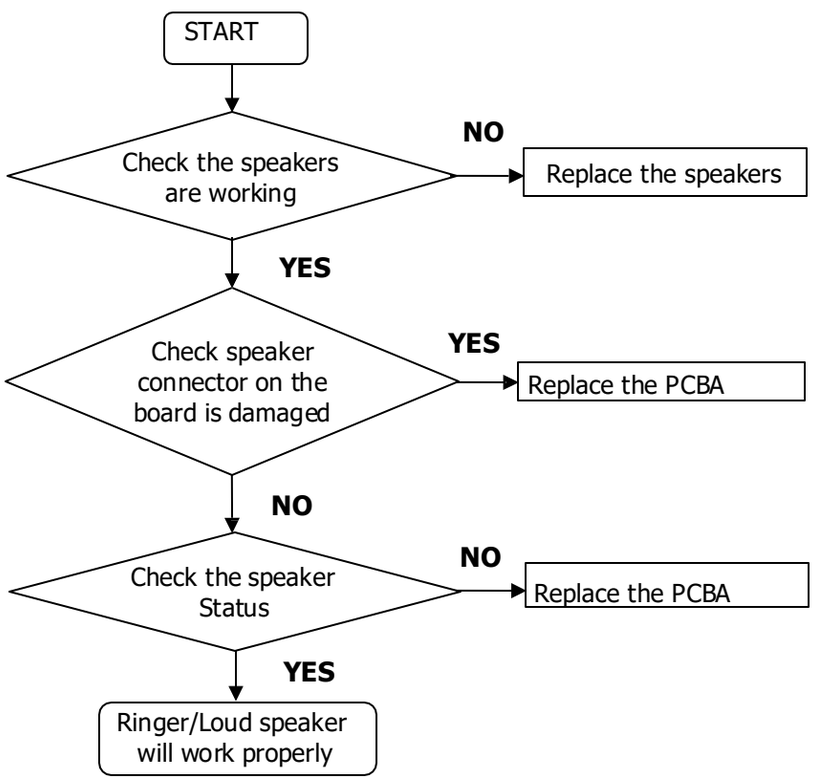
a. There are two speakers fixed to front housing and connected to PCBA.
b. Replace the speaker mesh if it's damaged as it's provided for dustproof protection.

**#** Ensure the speaker holes are not blocked as it reduces the speaker volume.

**OBSERVED PROBLEMS:**

a. Loud speaker do not work or noise distortion in loud speaker voice.
b. No ringing volume or noise or low ringing volume.

**TROUBLESHOOTING CHECKING FLOW:**



# 5.3 CHARGING PROBLEM

**CHARGING SECTION ASSEMBLY PART:**

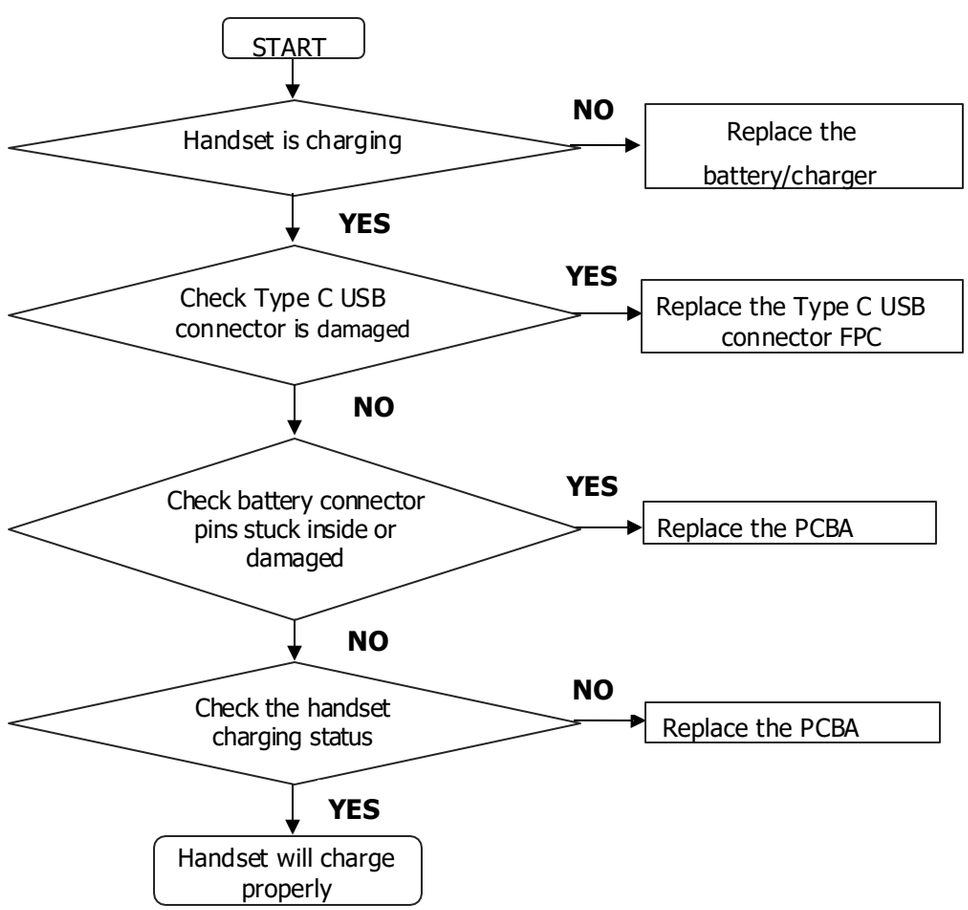
a. Type C USB/charging connector is screwed to front housing that can be easily replaced, battery connector is soldered to the PCBA.

# Replace the Type C USB charging connector, if it is damaged.
# Replace the PCBA, if the USB connector on PCBA is damaged.
# If charge indicating LED is damaged or defective then replace the charging LED.

**OBSERVED PROBLEMS:**

a. Handset not charging/charging intermittently

**TROUBLESHOOTING CHECKING FLOW:**



# 5.4 HEADSET OR EARPHONE PROBLEM

**EARPHONE ASSEMBLY PART:**

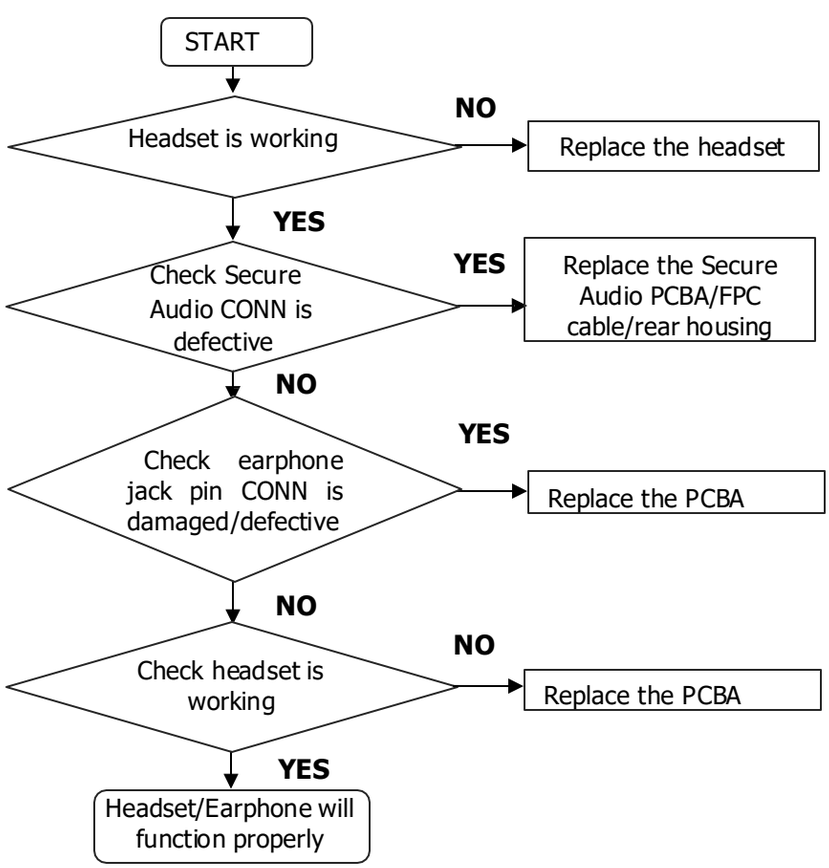
a. Secure Audio connector PCBA is assembled to FPC (Refer rear housing parts) and connected to rear housing.
b. External accessory - 3.5mm side connector is needed to use wired headset.
c. Ensure the FPC cable is assembled properly to PCBA pressing PIN connector.

**#** Change the Secure Audio connector & FPC for headset related audio problems.

**OBSERVED PROBLEMS:**

a. No/low Incoming & outgoing voice in Earphone
b. Headset symbol shown without inserting the Headset

**TROUBLESHOOTING CHECKING FLOW:**



# 5.5 FLASHLIGHT

**FLASHLIGHT ASSEMBLY PART:**

a. Flashlight is assembled to GPS/BT antenna, which in turn connected to PCBA through Pin connector.

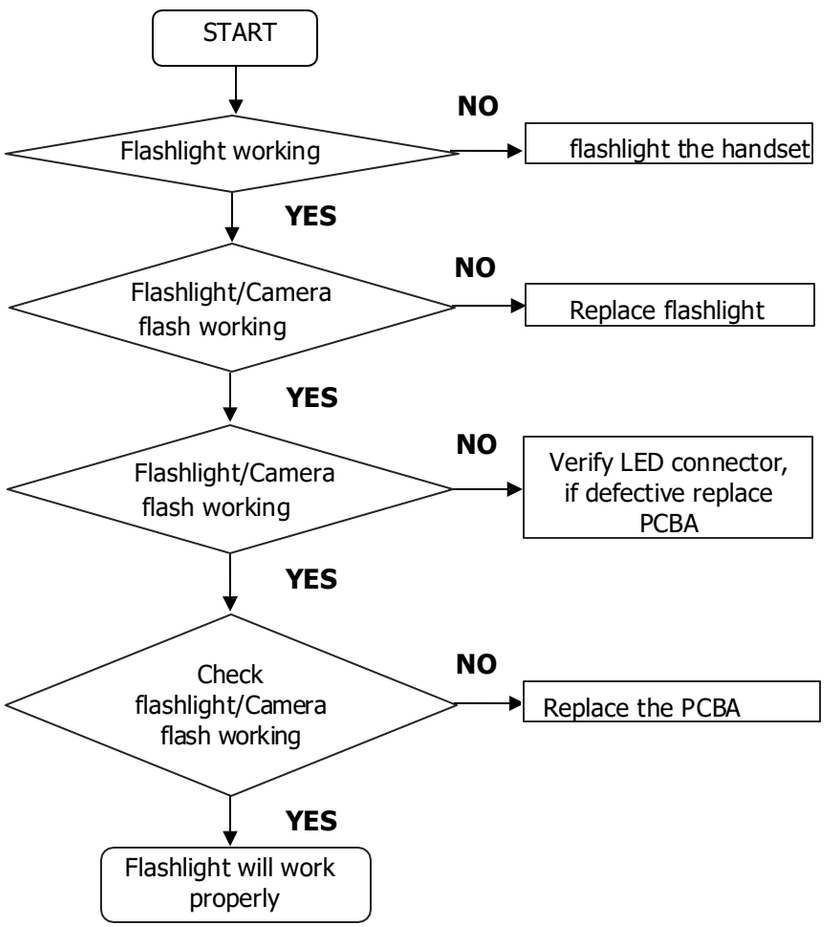
# Replace the flashlight FPC for torch related problems. Check the FPC cable is assembled properly to PCBA pin connector. Replace the PCBA if still the issue persists.

# Replace PCBA, if Pin connector is defective or any damages noticed on it.

**OBSERVED PROBLEMS:**

a. Flashlight not working
b. Camera flash not working.

**TROUBLESHOOTING CHECKING FLOW:**



## 5.6 DISPLAY PROBLEM

**LCD ASSEMBLY PART:**

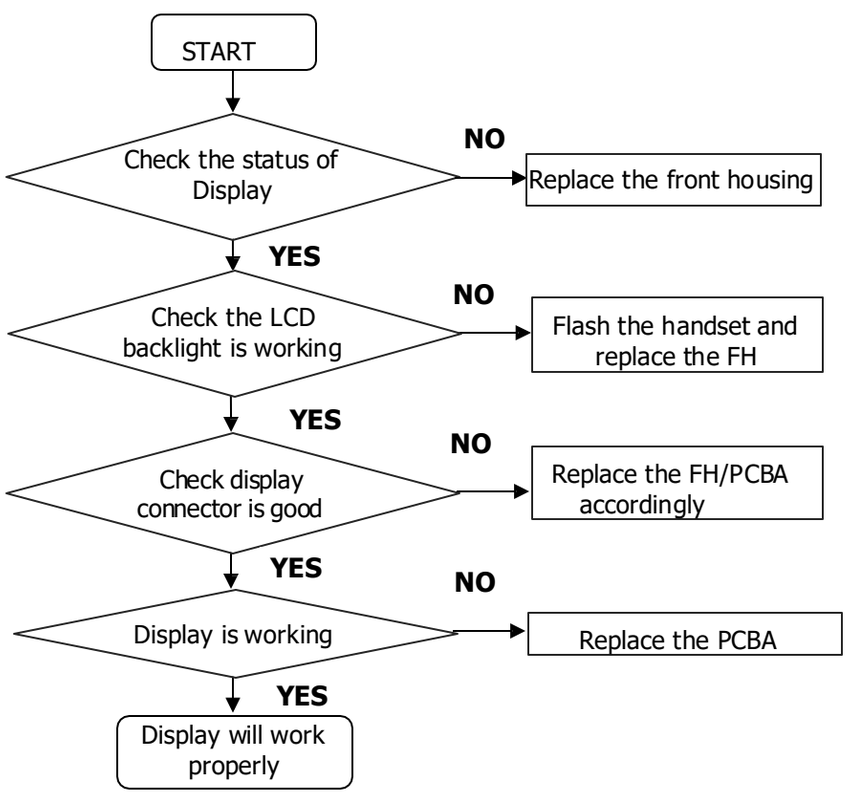
a. LCD & touch screen are glued to front housing.

# Replace the front housing if any dots or color patches are observed on the display as the LCD is glued to FH.
# Flash the handset for DIM/Blur display/white display. If issue persists, replace the front housing/PCBA.
# Replace the PCBA if the components around the display connector found missing or damaged.

**OBSERVED PROBLEMS:**

a. No or blur or dim or flickering display.
b. Dots or colored patches on the display.

**TROUBLESHOOTING CHECKING FLOW:**



# 5.7 SIM CARD PROBLEM

**SIM CARD ASSEMBLY PART:**

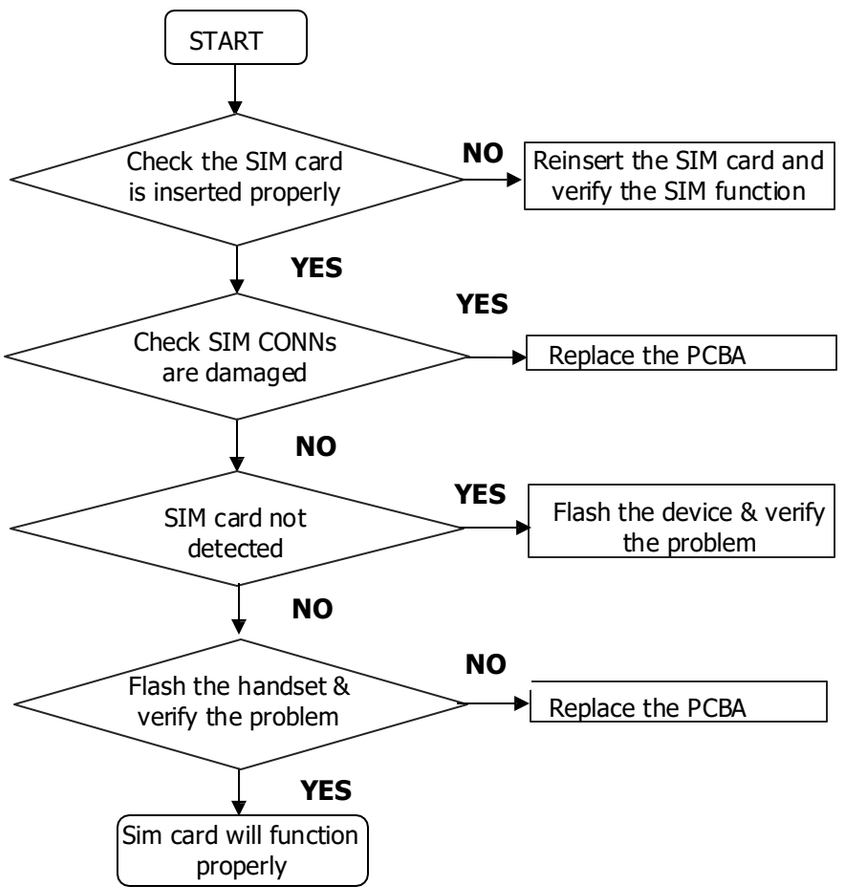
a. SIM Card connectors are soldered to PCBA.

**OBSERVED PROBLEMS:**

a. SIM card not detected or SIM errors.

**NOTE: Insert the SIM card into the metal plate of the SIM card holder, and then close the card holder.**

**TROUBLESHOOTING CHECKING FLOW:**



# 5.8 VIBRATOR PROBLEM

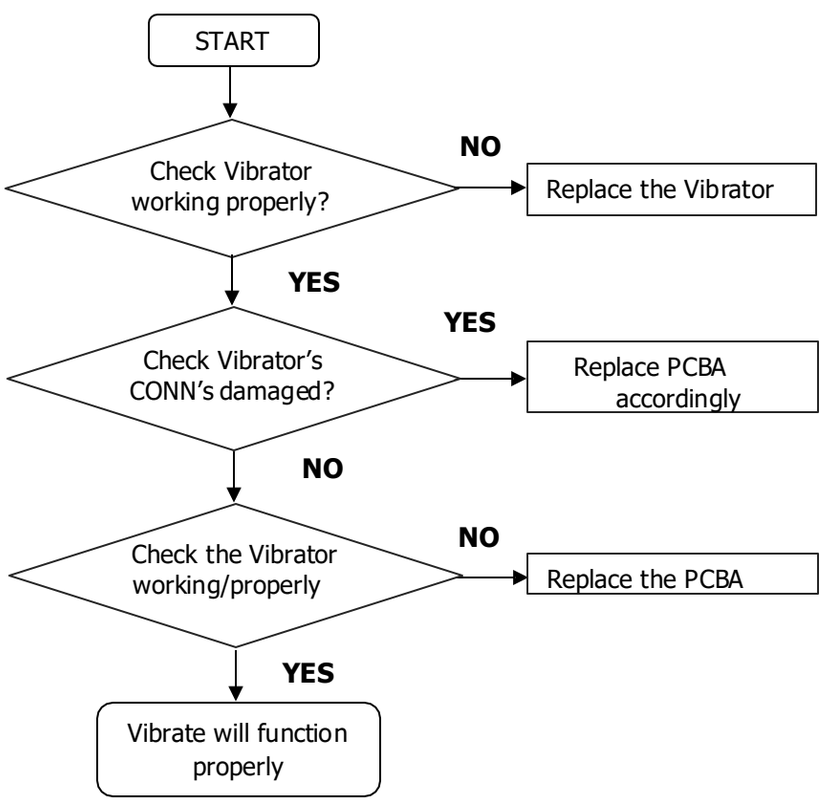
**VIBRATOR ASSEMBLY PART:**

a. Vibrators are assembled to rear housing.

**OBSERVED PROBLEMS:**

a. Vibrator not working.

**TROUBLESHOOTING CHECKING FLOW:**



# 5.9 CAMERA PROBLEM

**CAMERA ASSEMBLY PART:**

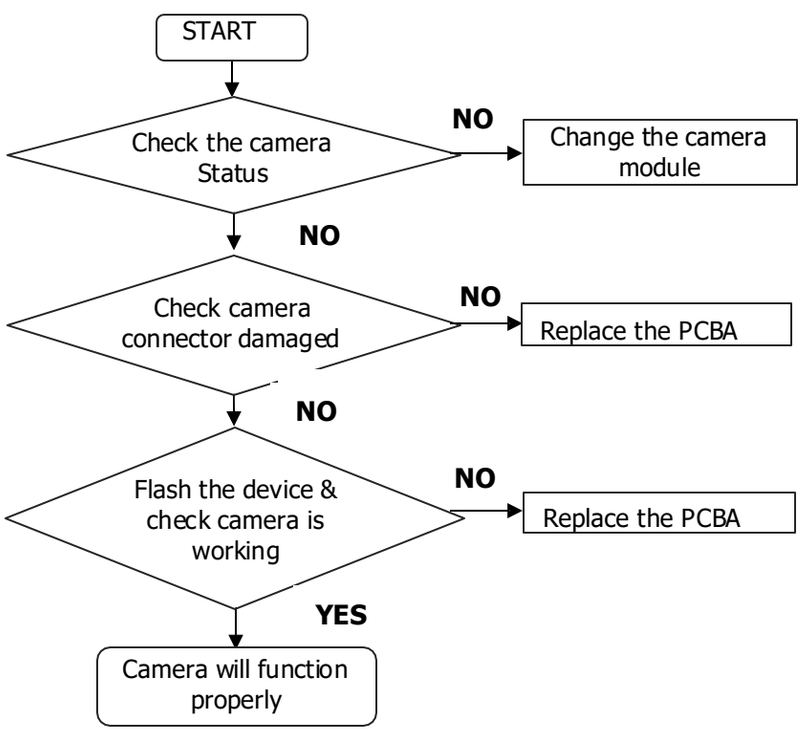
a. Main & front camera are assembled to the PCBA.

**#** Handsets resets when camera is switched ON, check the camera connector is damaged or camera is defective. Replace the camera and flash the handset. If still issue persists, replace the PCBA.

**OBSERVED PROBLEMS:**

a. Camera blur or poor picture/video quality.
b. Handsets resets when camera is switched ON.
c. Camera flash light not working/Camera not working.

**TROUBLESHOOTING CHECKING FLOW:**



# 5.10 MEMORY CARD PROBLEM

**SD CARD ASSEMBLY PART:**

a. Memory Card connector is soldered to the PCBA.

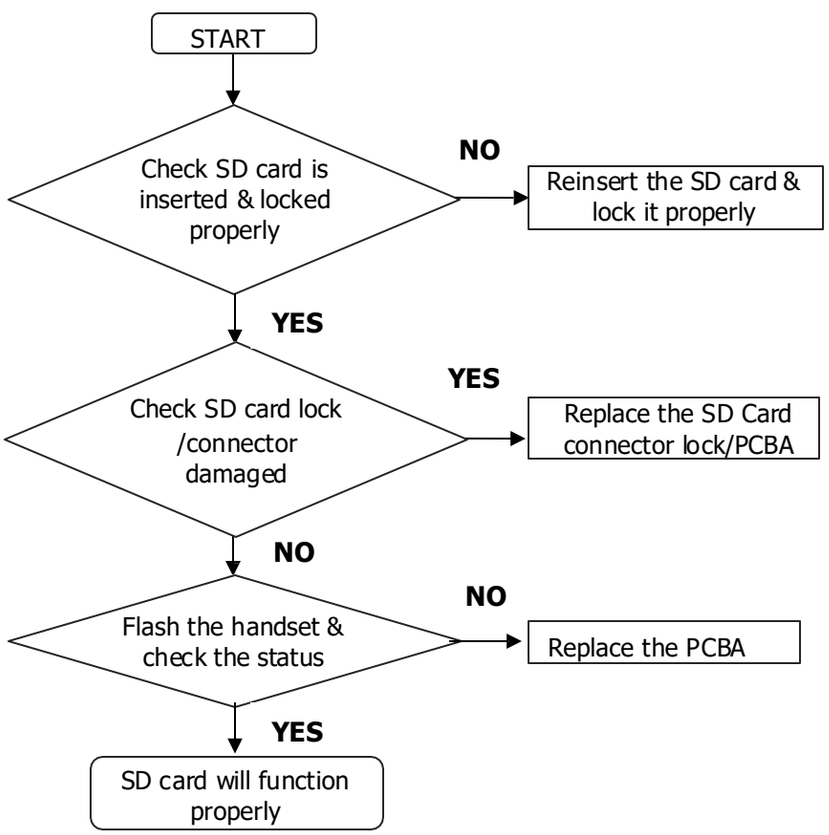
# Verify the defect with a good memory card, if it's working well then format the customer memory card.
# If none of memory/storage issues is noticed then flash the handset and verify the problem.

**Note: Insert the memory card into the metal plate of the SD card holder, and then close the card holder**

**OBSERVED PROBLEMS:**

a. Memory card could not detected.
b. Memory card could not be reading/writing.

**TROUBLESHOOTING CHECKING FLOW:**



# 5.11 NETWORK PROBLEM

**MAIN ANTENNA ASSEMBLY PART:**

a. Main antenna is fixed to PCBA through antenna contact pins & screw. Ensure the RF switch and main antenna pin contacts are not damaged before assembling the handset as it results in network issues.

**DIVERSITY ANTENNA ASSEMBLY PART:**

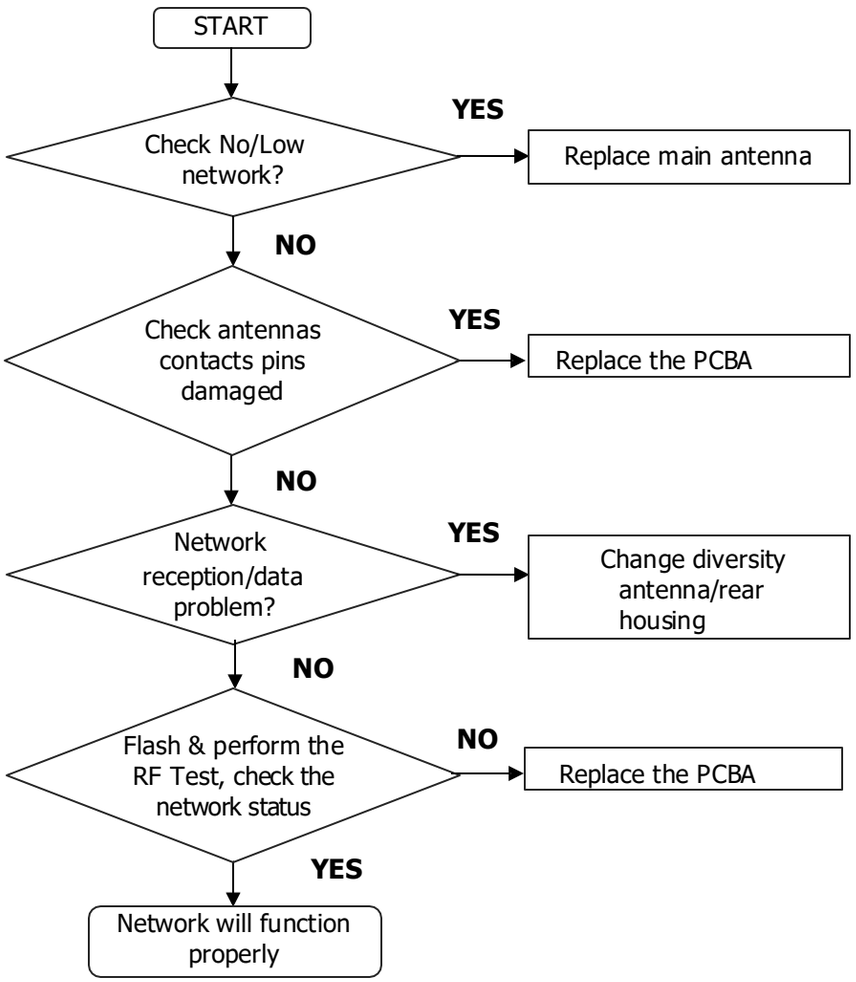
Two diversity antennas are implemented to improve the receiving ability of 4G LTE signals.

**#** Flash the device and verify the problem for intermittent network problems, low signal strength & call drop issues. If issue persists replace the rear housing as the antennas are glued to it.

**OBSERVED POBLEMS:**

a. No Network
b. Low signal strength
c. Call drop
d. Data downloading not happening/data downloading speed is low.

**TROUBLESHOOTING CHECKING FLOW:**



# 5.12 MICROPHONE [MIC] PROBLEM

**MIC ASSEMBLY PART:**

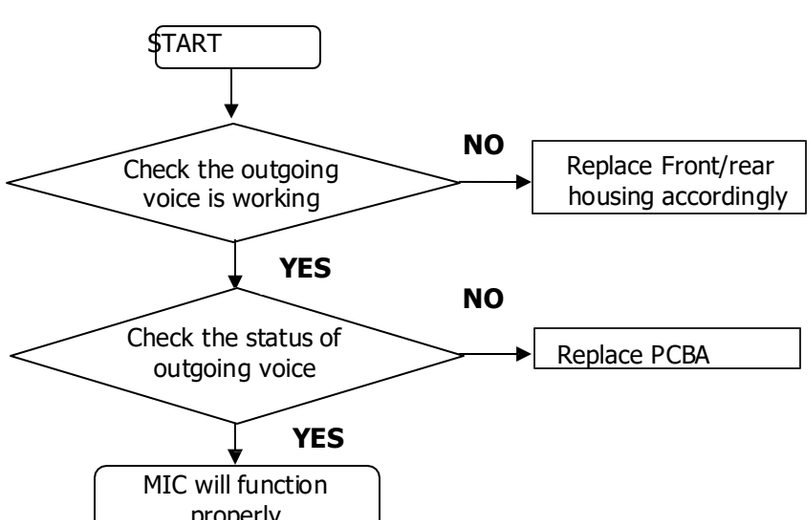
a. Supports two MICROPHONES M1, M2.
b. All the two MICs are glued to front and rear housing accordingly.

**#** Ensure the MIC holes and mesh not blocked in the front & rear housing as it results in outgoing voice problems like voice low, noise and echo problems.

**OBSERVED PROBLEMS:**

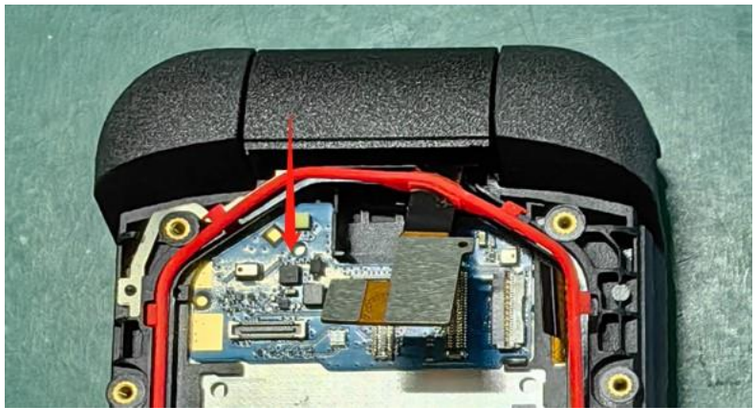
a. No/Low outgoing voice.
b. Distortion in outgoing voice.

**TROUBLESHOOTING CHECKING FLOW:**

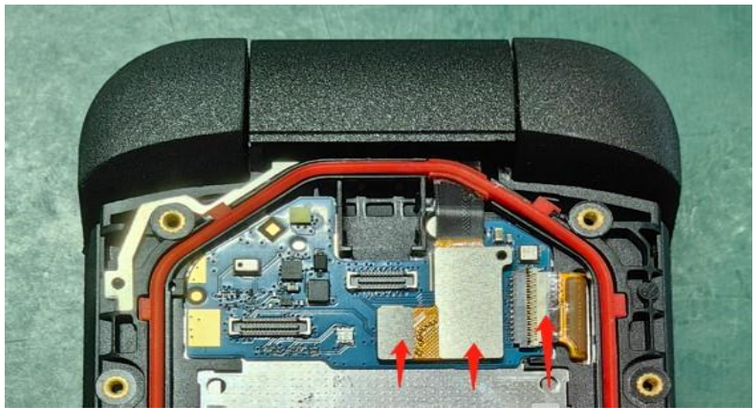


# 6.0 HANDSET ASSEMBLY

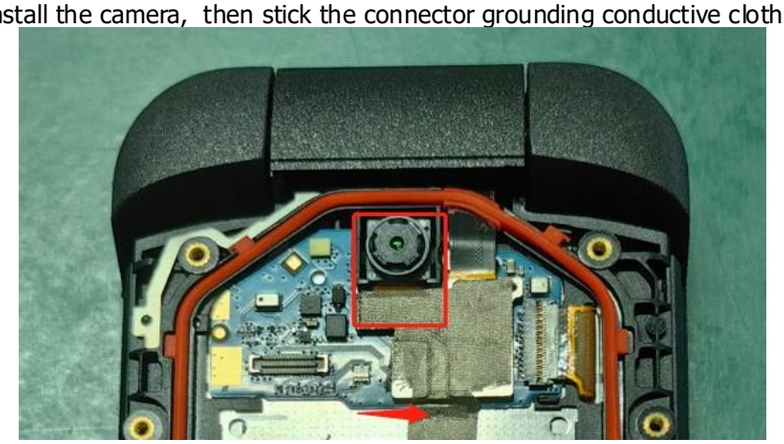
1. Install the sub-board 1



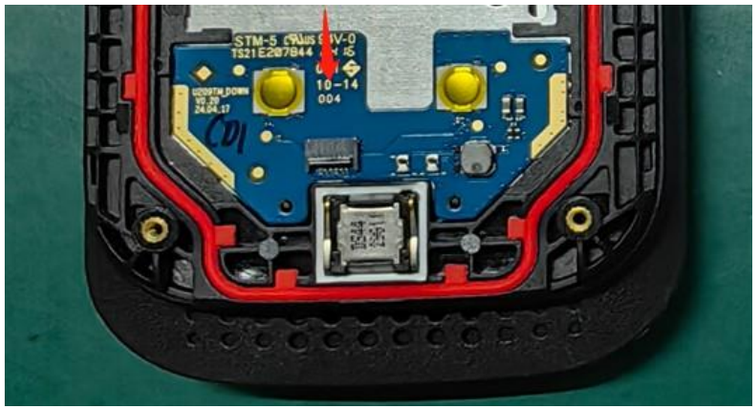
2. Fix the main FPC connector and the main screen FPC, ensure it's locked properly.



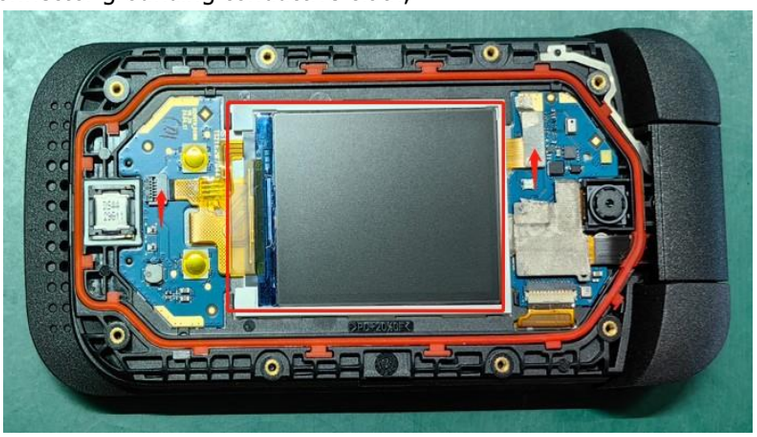
3. Install the camera, then stick the connector grounding conductive cloth



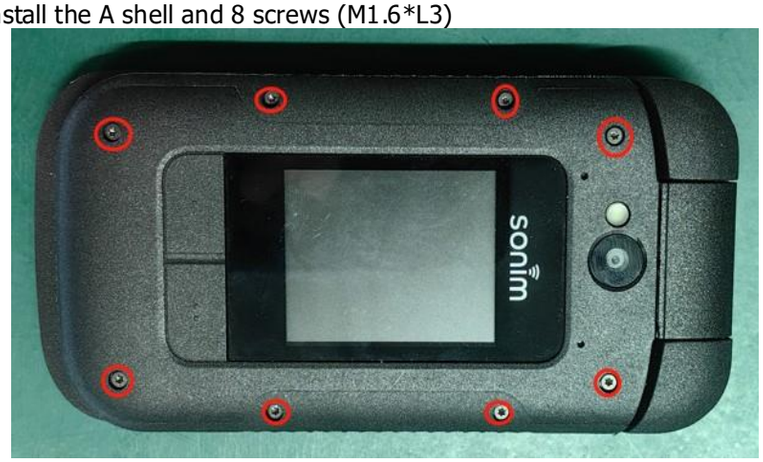
4. Install the sub-board 2



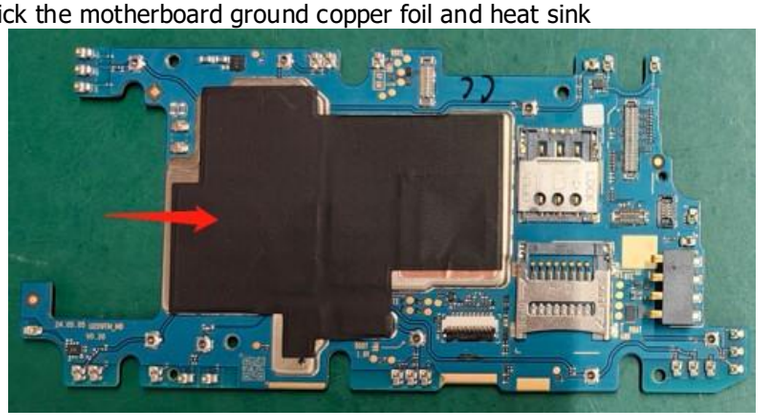
5. Install the sub-LCD, Fix the sub-LCD connector and the sub-board 2 FPC, ensure it's locked properly. Then stick the connector grounding conductive cloth,

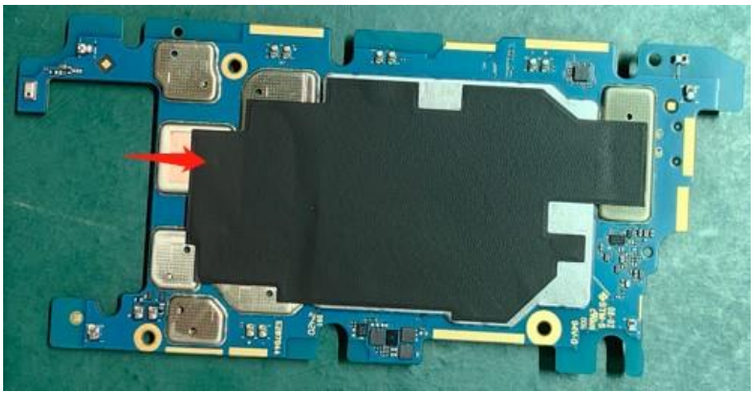


6. Install the A shell and 8 screws (M1.6*L3)

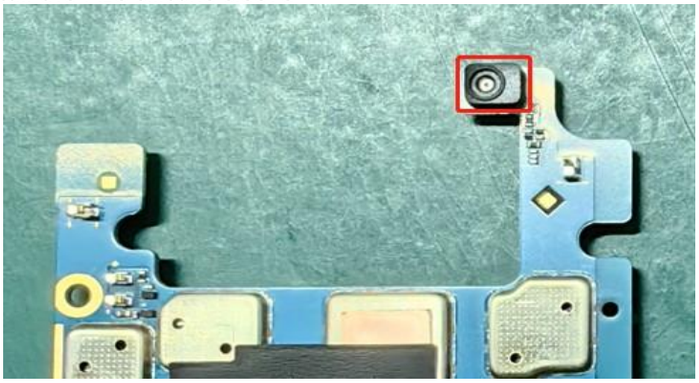



7. Stick the motherboard ground copper foil and heat sink

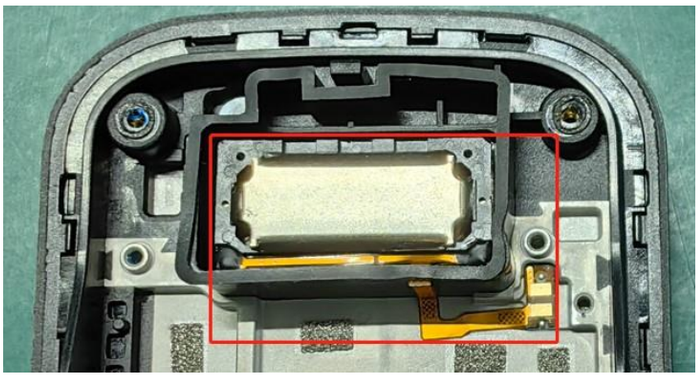




8. Install the MIC silicone sleeve

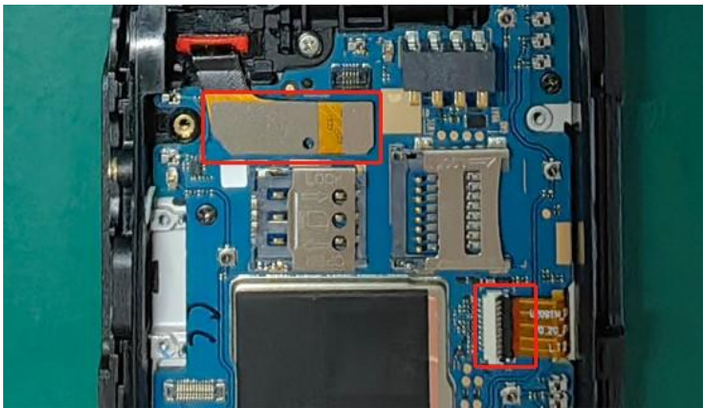


9. Install the speaker

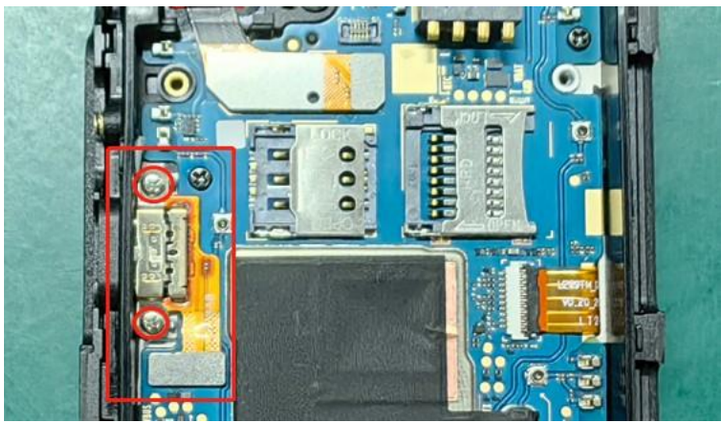


10. Install the mainboard and 4 screws (M1.6*L3.0) with torque value: (0.8±0.1) kgf.cm.

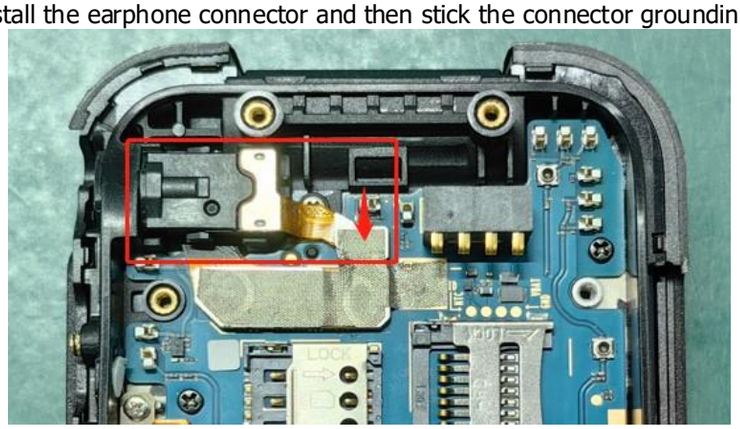
11. Fix the mainboard FPC commector and the keyboard FPC, ensure it's locked properly.



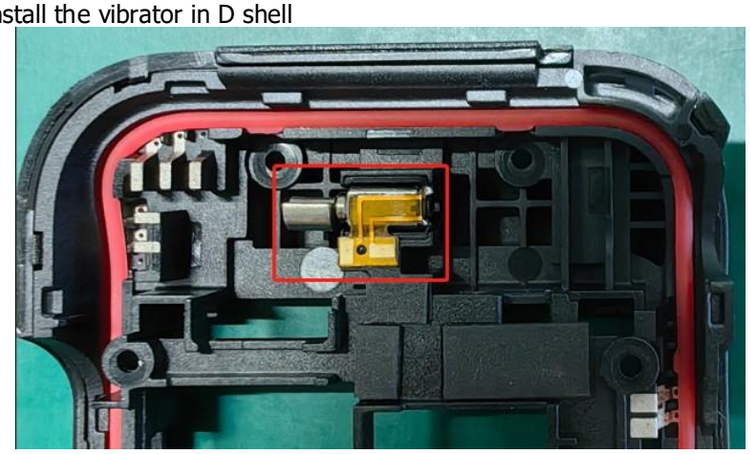
12. Install the USB connector and 2 screens (M1.4*0.3*3.0L), screw torque value of (1.2±0.1) kgf. cm



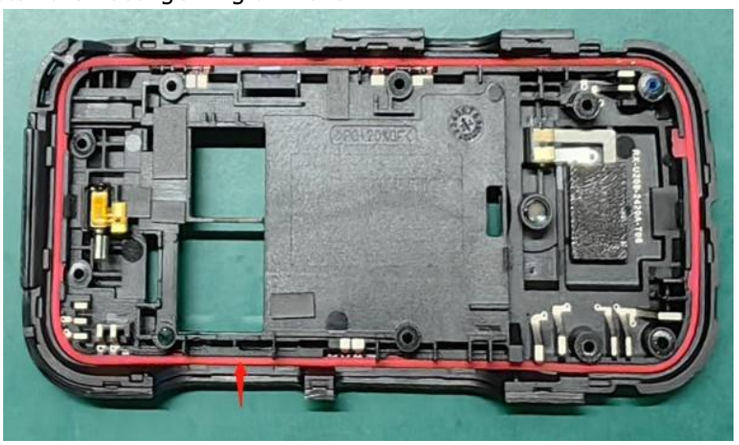
13. Install the earphone connector and then stick the connector grounding conductive cloth



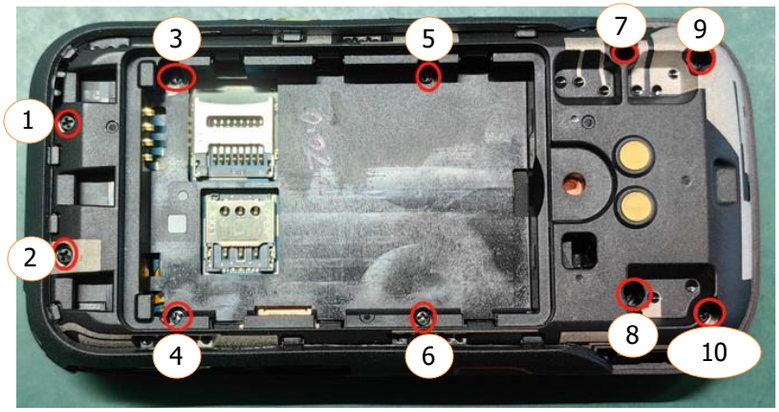
14. Install the vibrator in D shell



15. Install the water gel ring of D shell



16. Install the D shell and 10 screens




Screw length of 1, 2, 7, 8, 9 & 10 screws are M1.6*L5.0. Screws are assembled with metal & waterproof cushion.

Screw length of 3, 4, 5, 6 screws are M1.6*L3.0. Screws are without any cushions.

17. Fix USB silicone plugs and screw (M1.6*L3)

18. Install the battery

19. Install the battery shell and lock the screen


Finished

Thanks!