Lenovo S930

Service Manual

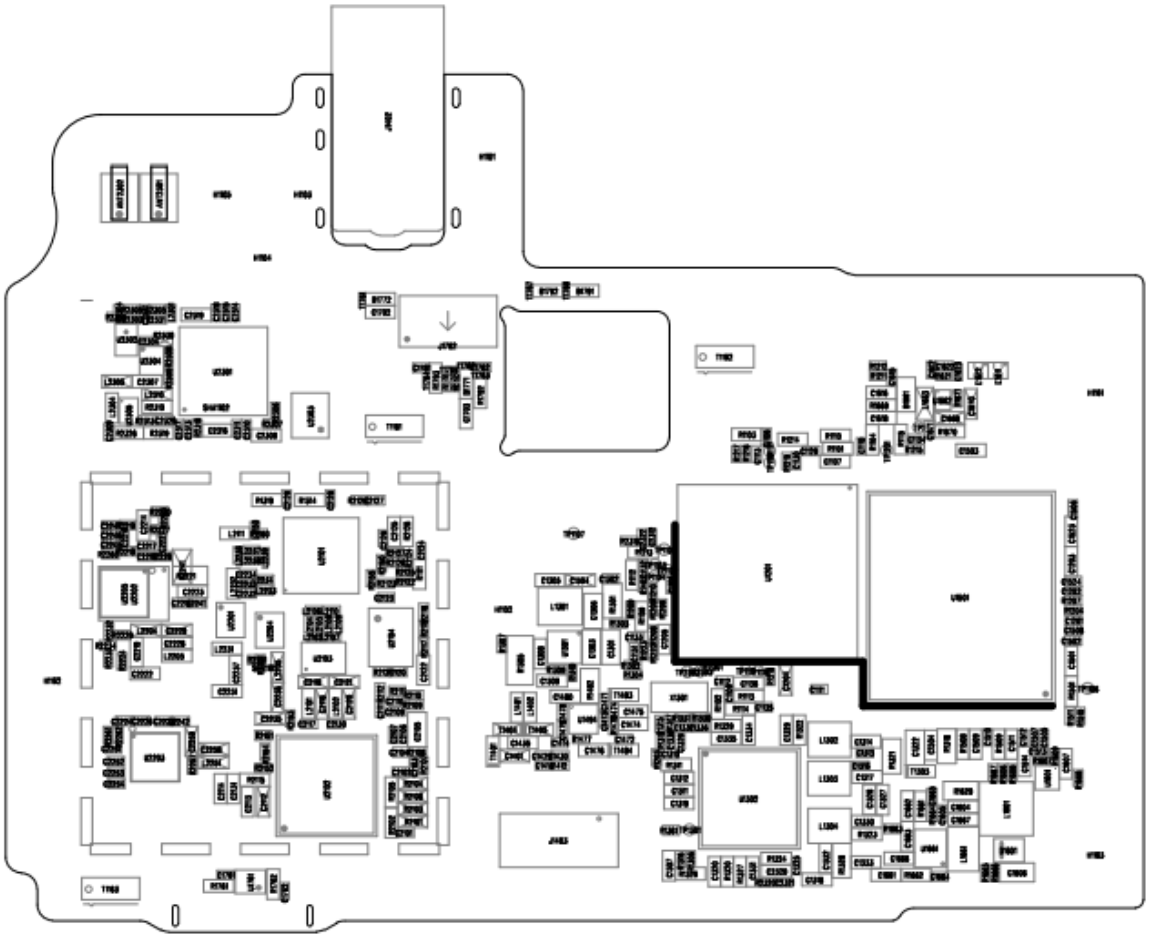
LENOVO

Content

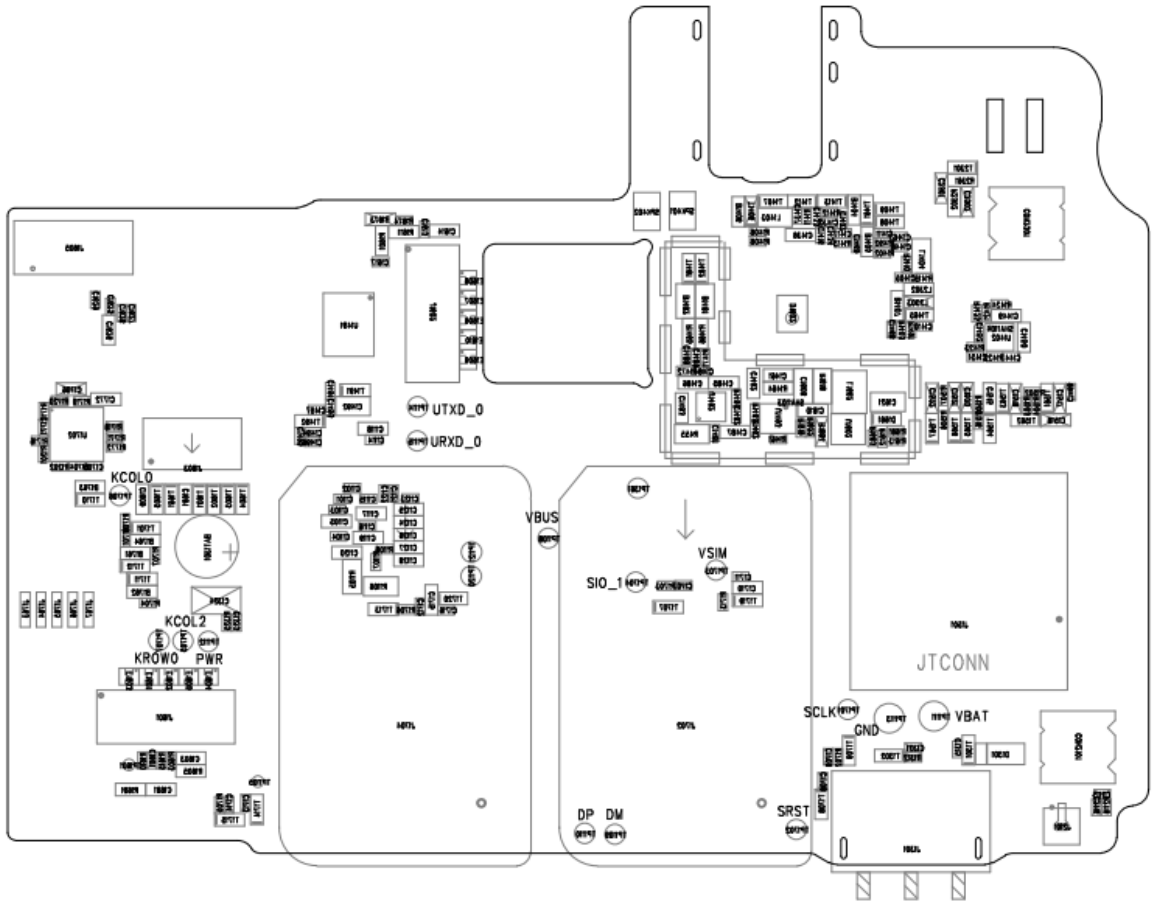
1 Cellphone appearance

2 Layout of motherboard

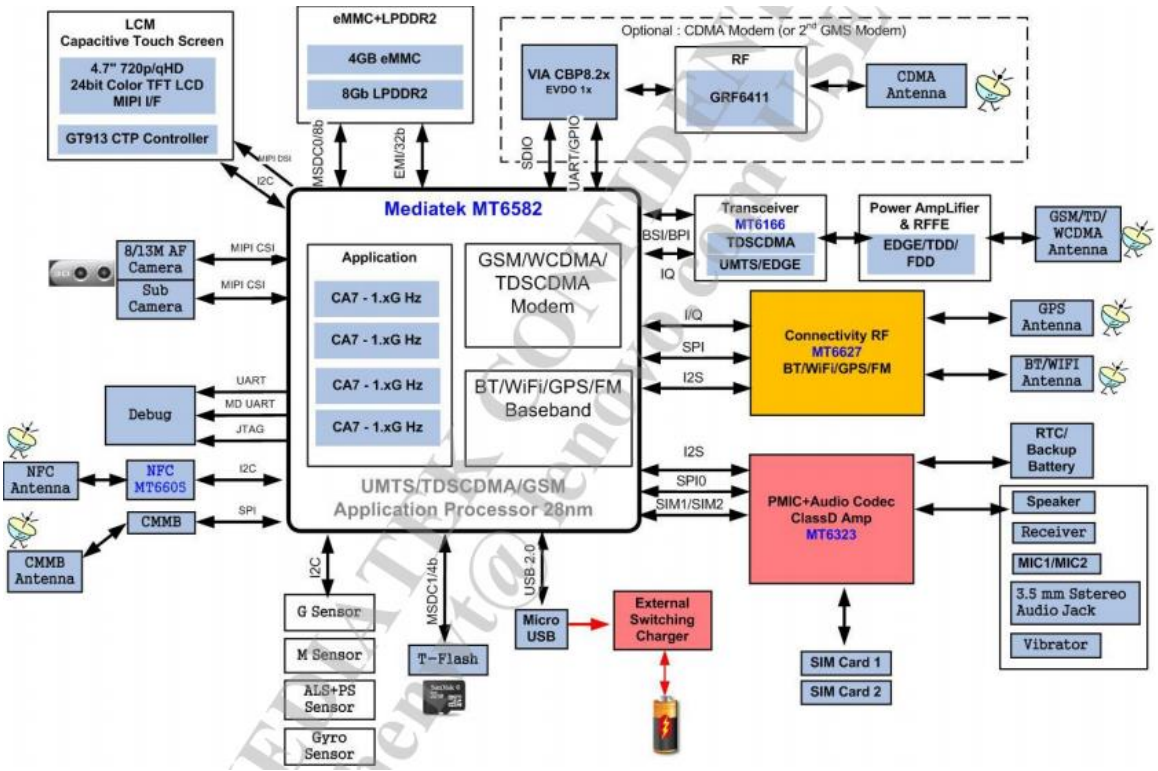
Front of motherboard:



Back of motherboard:


UTXD_0
URXD_0
KCOL0
KCOL2
KROW0
PWR
VBUS
VSIM
SIO_1
JTCONN
SCLK
GND
VBAT
DP
DM
SRST

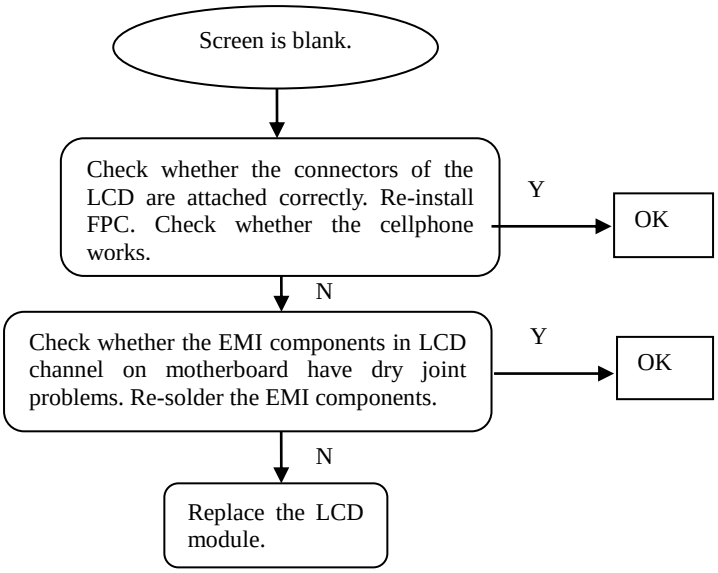
3 Baseband


LCM
Capacitive Touch Screen
4.7" 720p/qHD
24bit Color TFT LCD
MIPI I/F
GT913 CTP Controller
eMMC+LPDDR2
4GB eMMC
8Gb LPDDR2
Optional : CDMA Modem (or 2nd GMS Modem)
VIA CBP8.2x
EVDO 1x
RF
GRF6411
CDMA Antenna
MIPI DSI
I2C
MSDC0/8b
EMI/32b
SDIO
UART/GPIO
Mediatek MT6582
Application
CA7 - 1.xG Hz
CA7 - 1.xG Hz
CA7 - 1.xG Hz
CA7 - 1.xG Hz
GSM/WCDMA/
TDSCDMA
Modem
BT/WiFi/GPS/FM
Baseband
UMTS/TDSCDMA/GSM
Application Processor 28nm
Transceiver
MT6166
TDSCDMA
UMTS/EDGE
BSI/BPI
IQ
Power AmpLifier
& RFFE
EDGE/TDD/
FDD
GSM/TD/
WCDMA
Antenna
8/13M AF
Camera
Sub
Camera
MIPI CSI
MIPI CSI
I/Q
SPI
I2S
Connectivity RF
MT6627
BT/WiFi/GPS/FM
GPS
Antenna
BT/WIFI
Antenna
Debug
UART
MD UART
JTAG
NFC
Antenna
NFC
MT6605
I2C
CMMB
SPI
CMMB
Antenna
I2S
SPI0
SIM1/SIM2
PMIC+Audio Codec
ClassD Amp
MT6323
RTC/
Backup
Battery
Speaker
Receiver
MIC1/MIC2
3.5 mm Sstereo
Audio Jack
Vibrator
I2C
G Sensor
M Sensor
ALS+PS
Sensor
Gyro
Sensor
MSDC1/4b
T-Flash
USB 2.0
Micro
USB
External
Switching
Charger
SIM Card 1
SIM Card 2

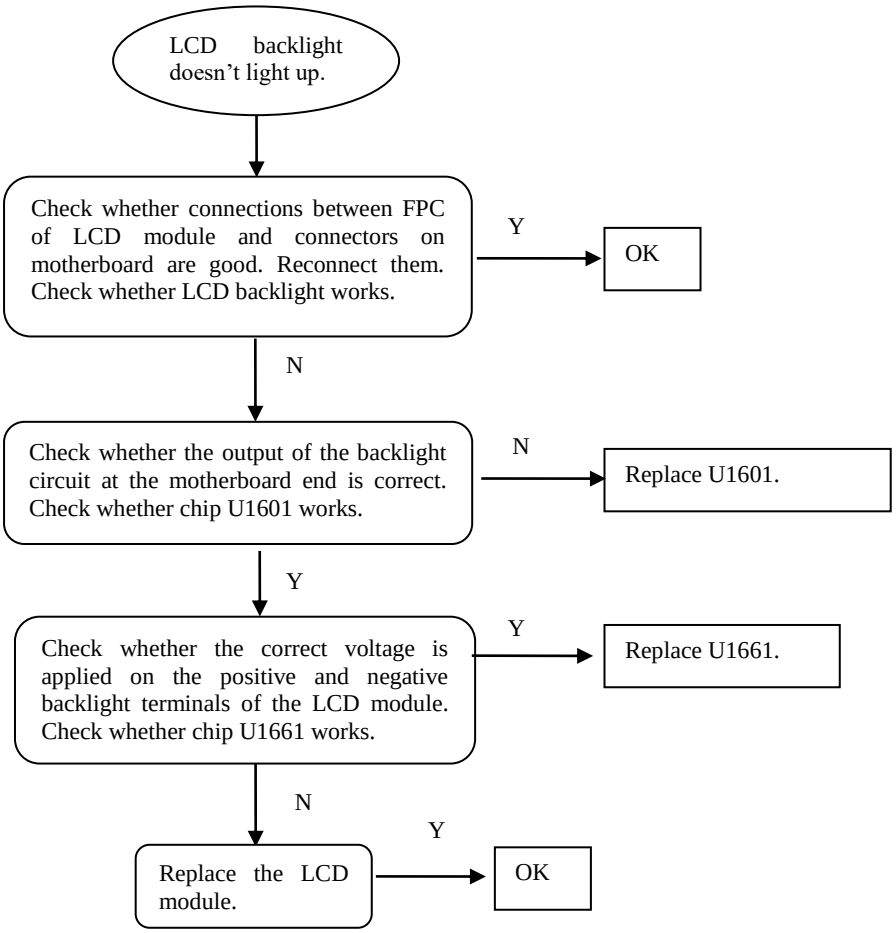
Electronic circuit diagram

3.1 LCD display

3.1.1 When the device is turned on there's nothing on screen

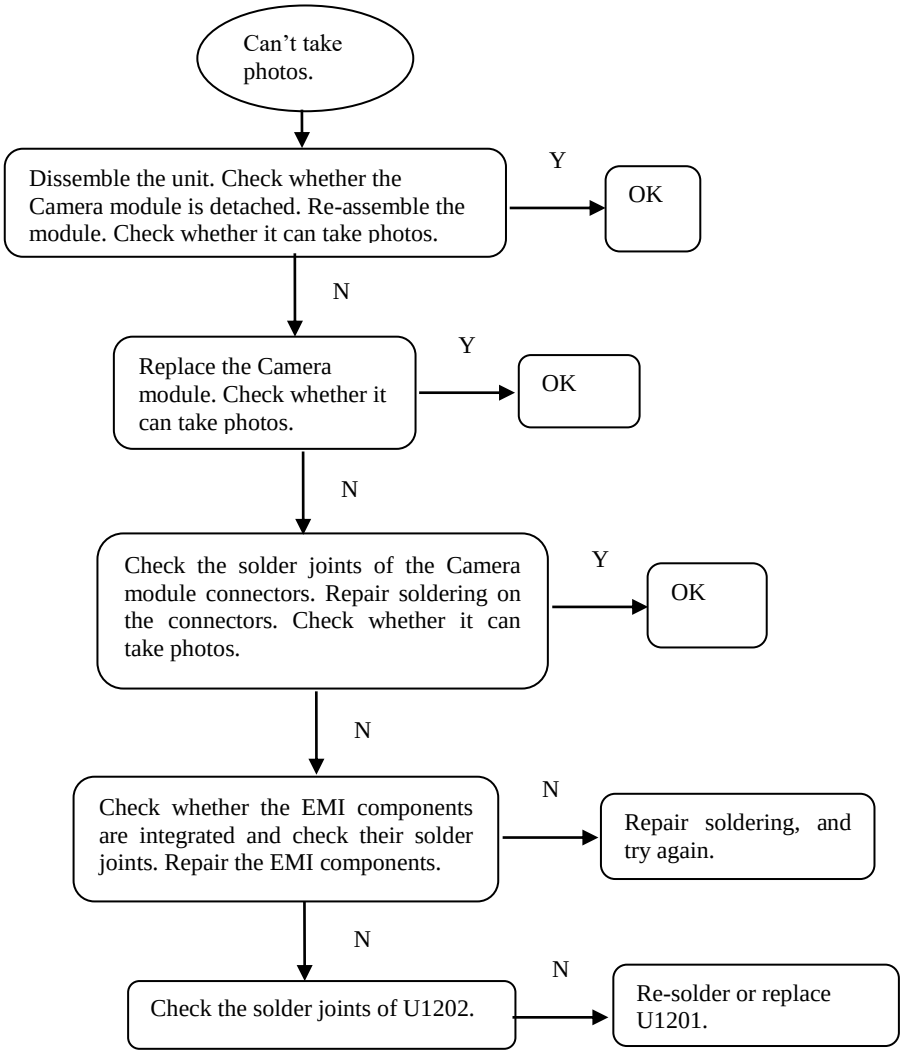


3.1.2 LCD backlight doesn’t light up.

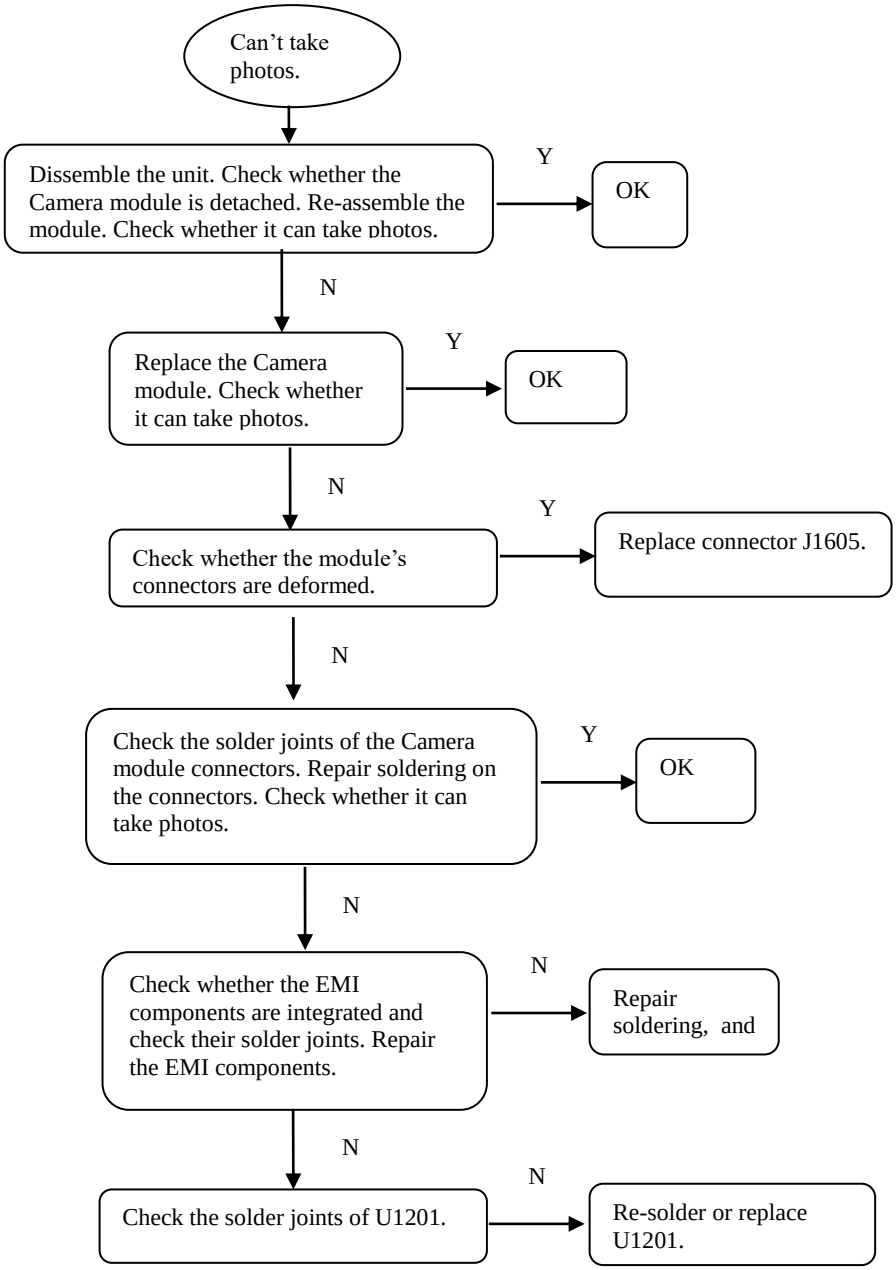


3.2 Cameras do not work properly.

3.2.1 Back camera does not work properly.

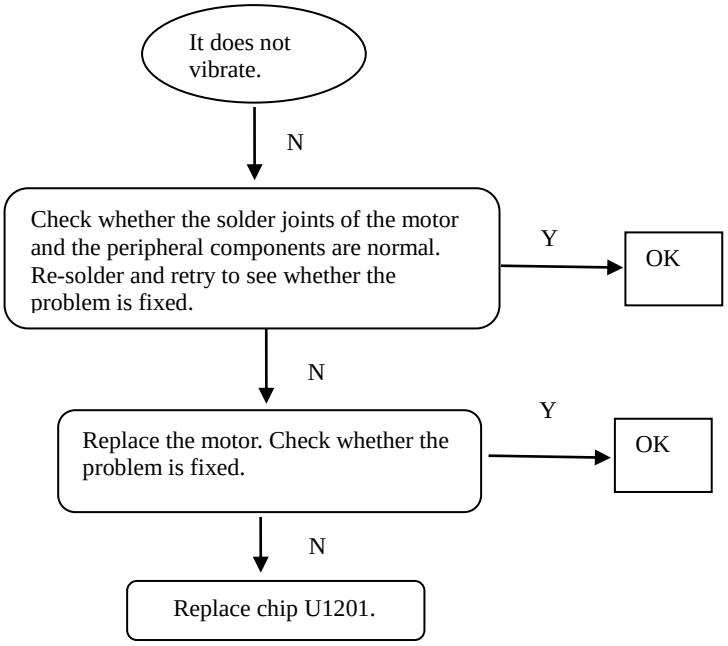

Can't take photos.
Dissemble the unit. Check whether the Camera module is detached. Re-assemble the module. Check whether it can take photos.
Y
OK
N
Replace the Camera module. Check whether it can take photos.
Y
OK
N
Check the solder joints of the Camera module connectors. Repair soldering on the connectors. Check whether it can take photos.
Y
OK
N
Check whether the EMI components are integrated and check their solder joints. Repair the EMI components.
N
Repair soldering, and try again.
N
Check the solder joints of U1202.
N
Re-solder or replace U1201.

3.2.2 Front camera doesn’t work properly.

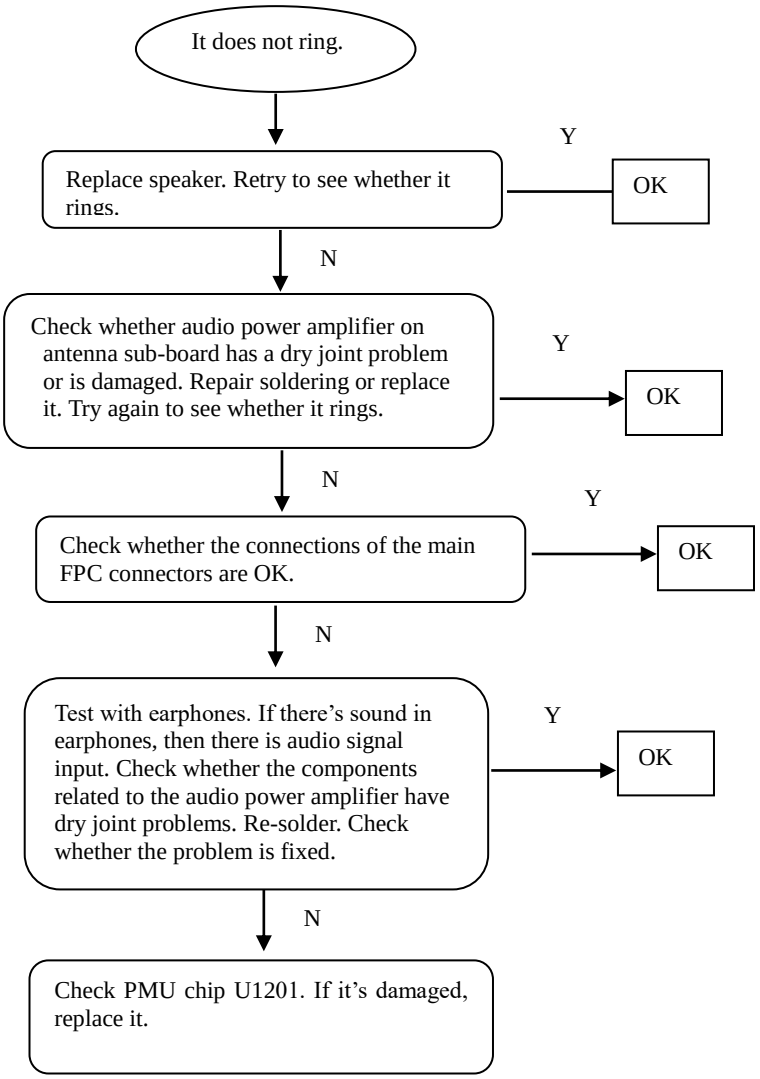


3.3 Ring and Vibration

3.3.1 It does not vibrate.

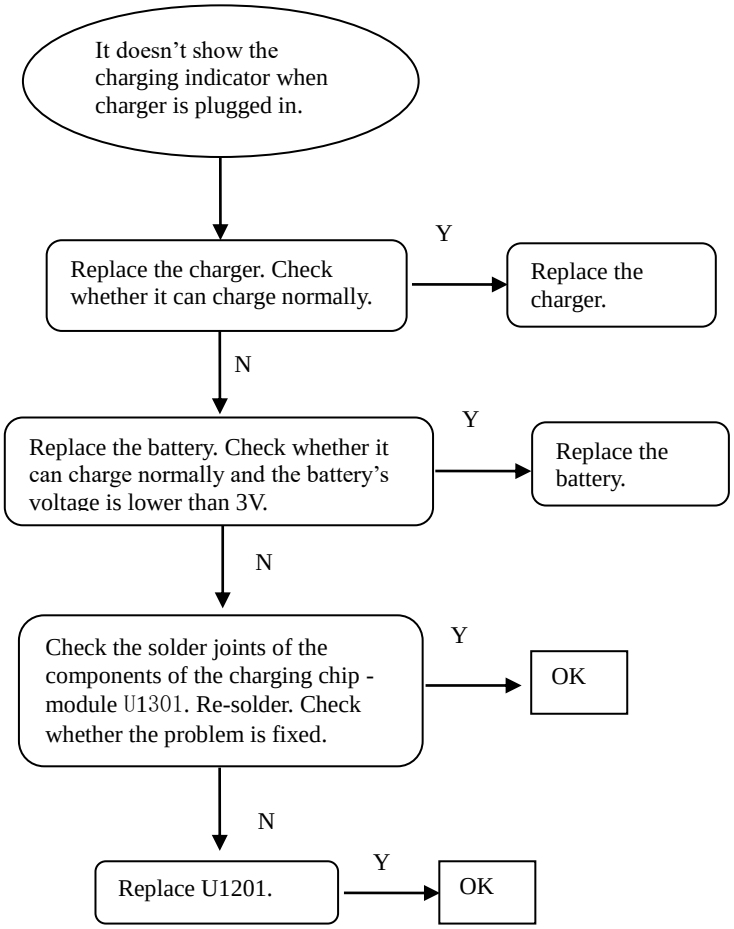


3.3.2 It does not ring.

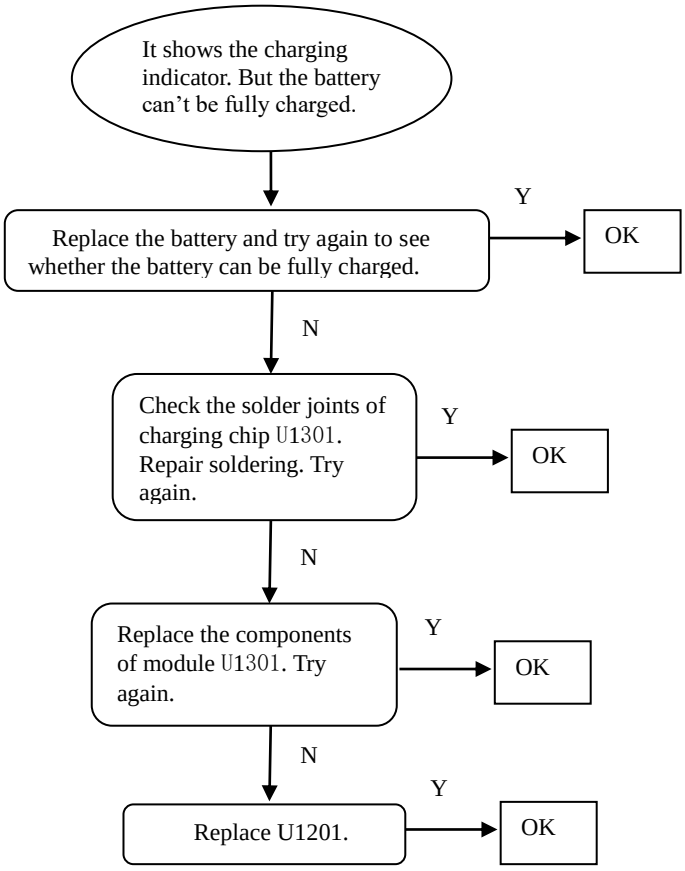

It does not ring.
Replace speaker. Retry to see whether it rings.
Y
OK
N
Check whether audio power amplifier on antenna sub-board has a dry joint problem or is damaged. Repair soldering or replace it. Try again to see whether it rings.
Y
OK
N
Check whether the connections of the main FPC connectors are OK.
Y
OK
N
Test with earphones. If there's sound in earphones, then there is audio signal input. Check whether the components related to the audio power amplifier have dry joint problems. Re-solder. Check whether the problem is fixed.
Y
OK
N
Check PMU chip U1201. If it's damaged, replace it.

3.4 Charging

3.4.1 It doesn’t show the charging indicator when charger is plugged in.

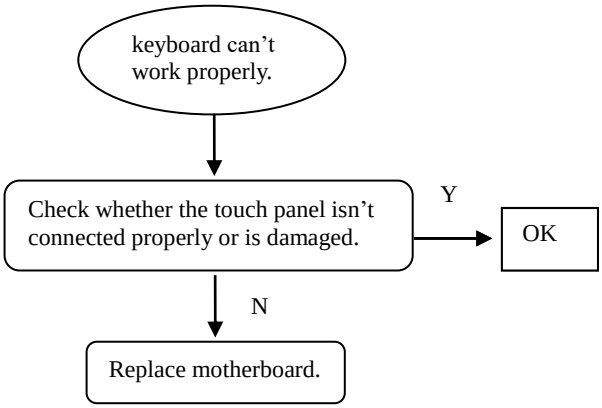

It doesn't show the charging indicator when charger is plugged in.
Replace the charger. Check whether it can charge normally.
Y
Replace the charger.
N
Replace the battery. Check whether it can charge normally and the battery's voltage is lower than 3V.
Y
Replace the battery.
N
Check the solder joints of the components of the charging chip - module U1301. Re-solder. Check whether the problem is fixed.
Y
OK
N
Replace U1201.
Y
OK

3.4.2 It shows the charging indicator. But the battery can't be fully charged.

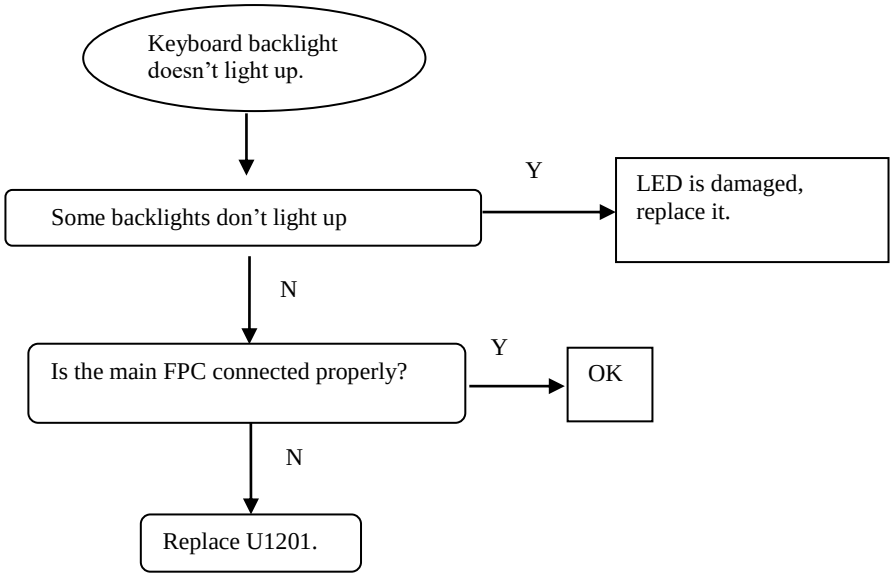


3.5 Keyboard and keyboard backlight

3.5.1 Keyboard can’t work properly.

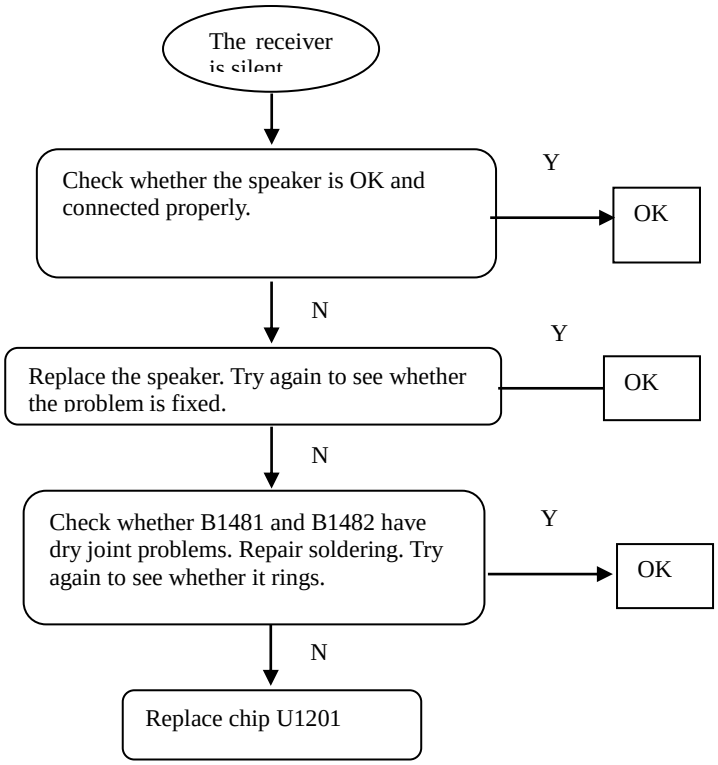


3.5.2 Keyboard backlight doesn’t light up.

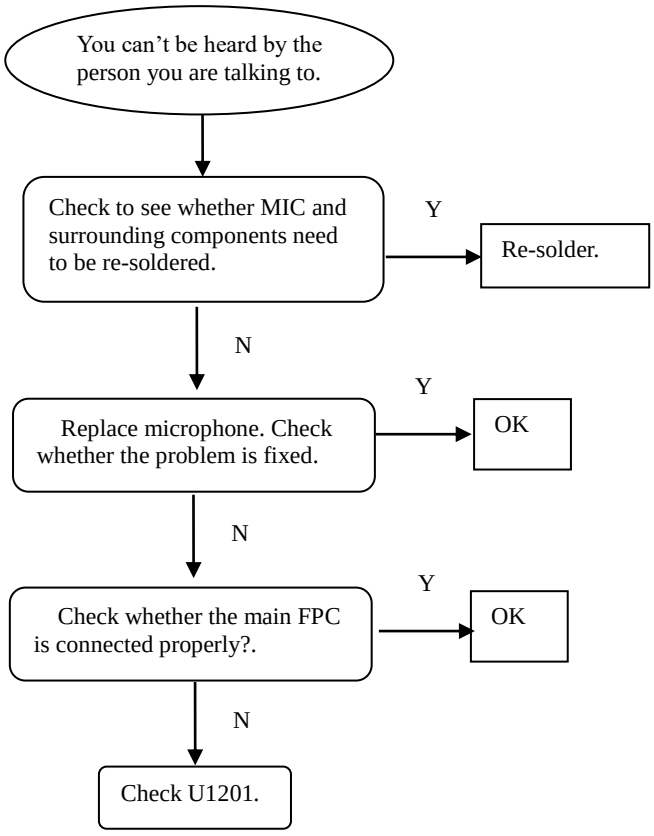


3.6 Audio problems during phone calls

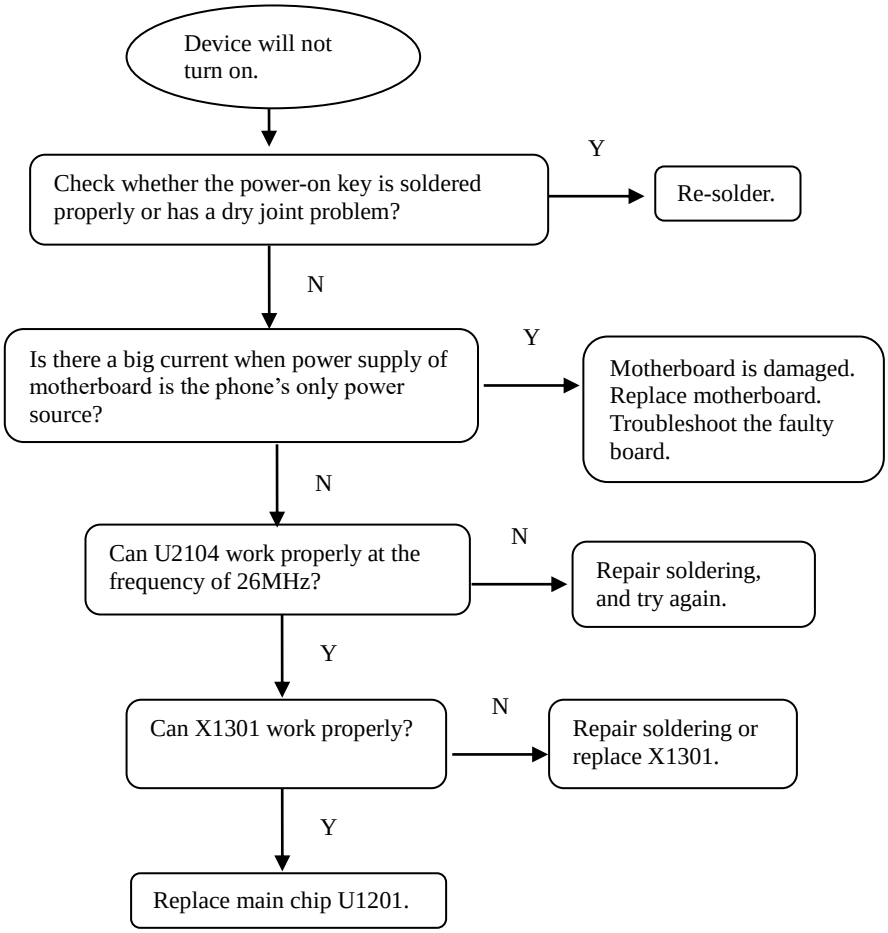
3.6.1 You can't hear the person you are talking to during a phone call.



3.6.2 You can’t be heard by the person you are talking to during a phone call.



3.7 Device will not turn on.

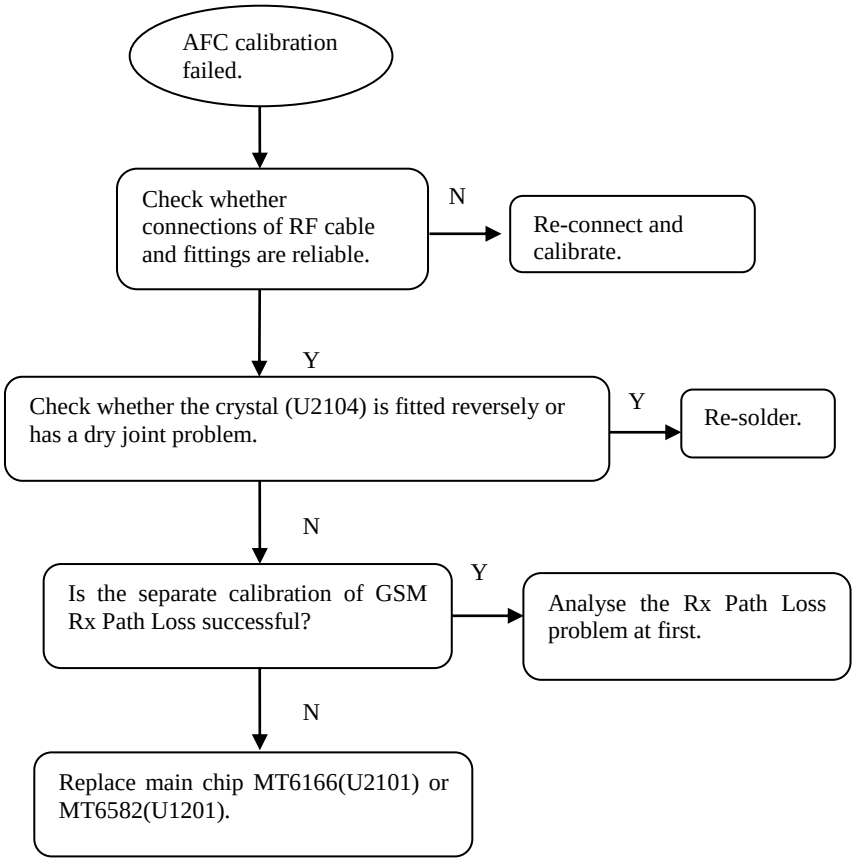


4 Radio frequency

4.1 GSM calibration during production

4.1.1 GSM AFC calibration

- Problem: AFC calibration failed.
- Reason: Connections of RF test cable are not reliable during the calibration. TCXO is fitted reversely or has a dry joint problem. Receiving channel is open.
- Troubleshooting:



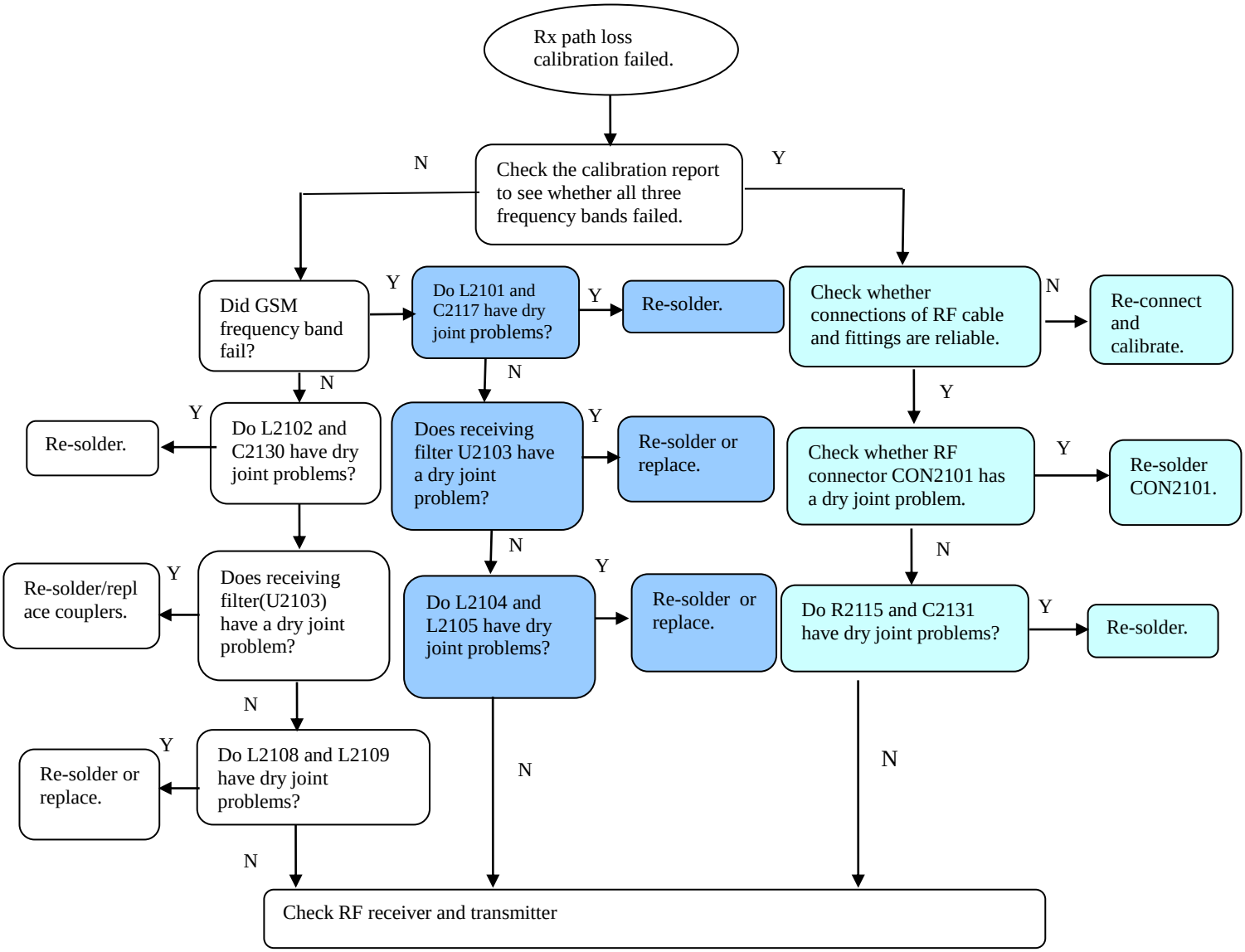
- Note: Normally you need to re-calibrate the corresponding components after the replacement.

4.1.2 GSM Rx Path Loss calibration

- Problem: Rx Path Loss calibration failed.
- Reason: During the calibration, connections of RF test cable are not reliable; components in receiving channel (such as RF connectors), PA module, saw filter and peripheral capacitors have

dry joint problems.

- Troubleshooting:



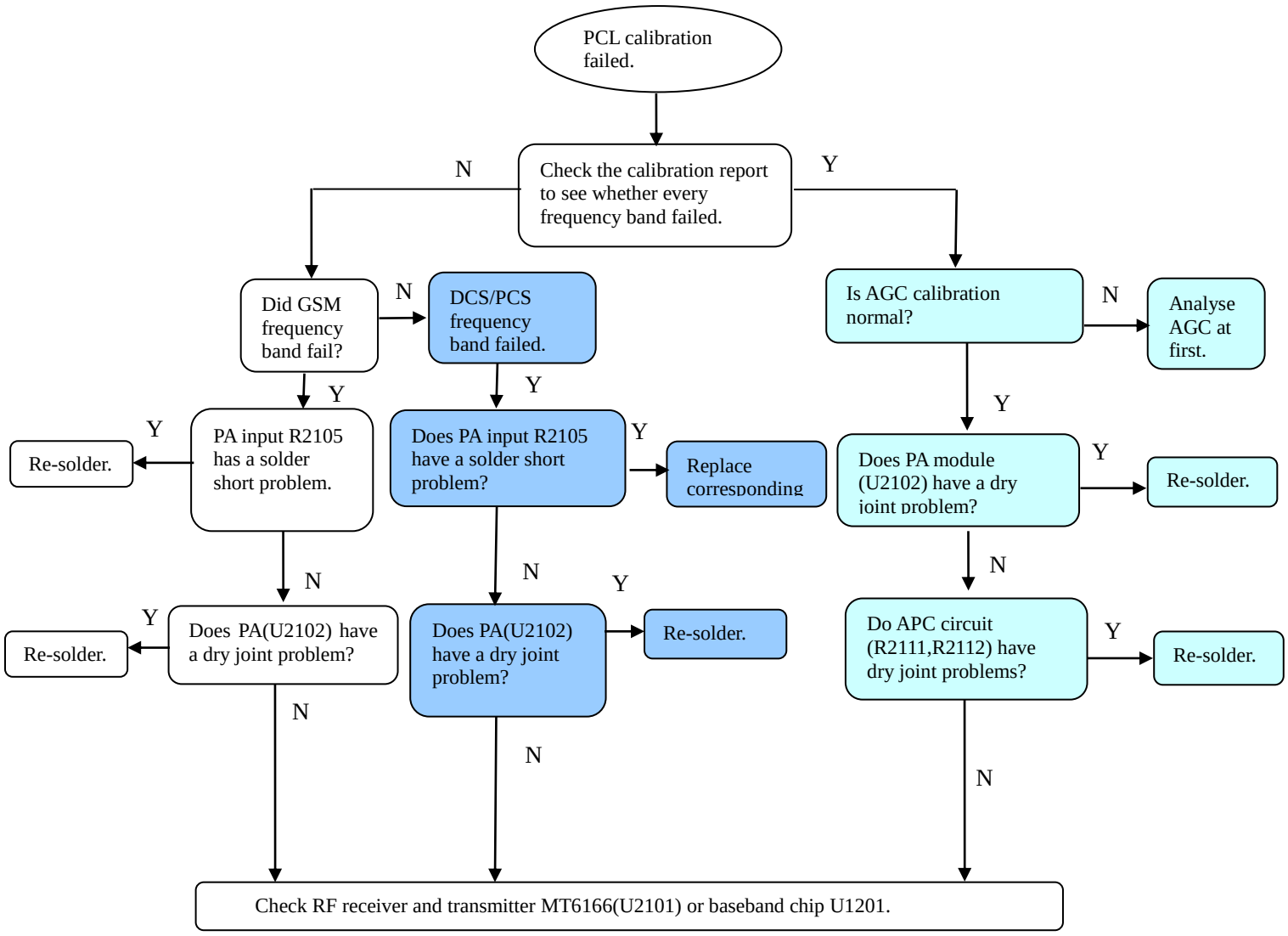
- Note: Normally you need to re-calibrate the corresponding components after the replacement.

4.1.3 GSM AFC calibration

- Problem: APC calibration failed.
- Reason: During the calibration, connections of RF test cable are not reliable; PA module (U2102) is fitted reversely; PA module and peripheral circuits have dry joint problems; the patches of PA

module's RF input circuits are shifted, and shield bracket is short circuit.

- Troubleshooting:

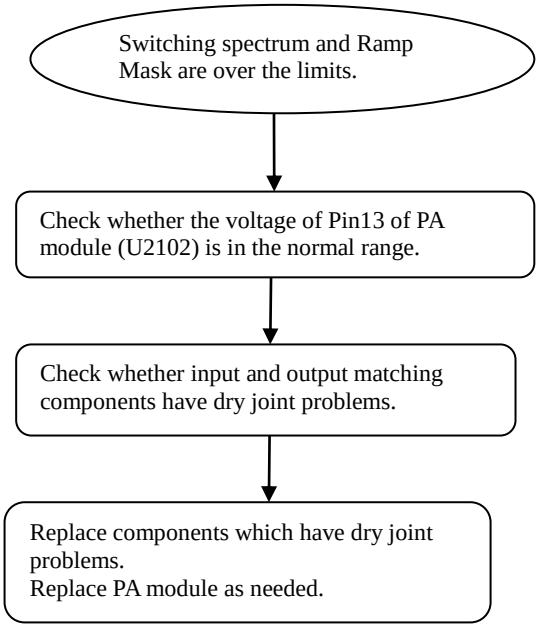


- Note: Normally you need to re-calibrate the corresponding components after the replacement.

4.2 GSM comprehensive test

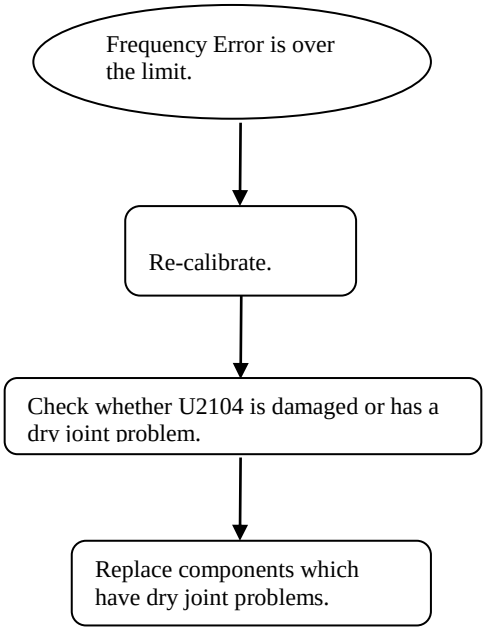
4.2.1 Switching spectrum and PVT template are over the limits.

- Switching spectrum and PVT template of three frequency bands (GSM, DCS and PCS) are over the limits.
- If C2111 on PA's V_ramp signal cable is damaged or has a dry joint problem, switching spectrum may become over the limits.
- Troubleshooting:



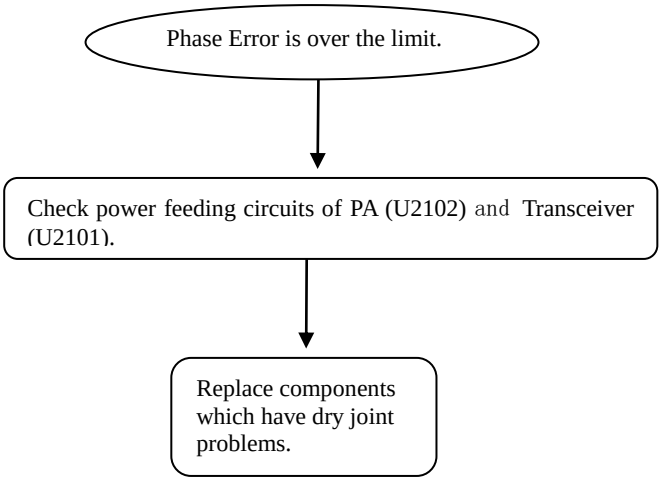
4.2.2 Frequency Error is too big.

- Problem: Frequency Error is over the limit in whole-unit test.
- Reason: TCXO's VAFC input circuit has a problem.
- Troubleshooting:



4.2.3 Phase Error is too big.

- Problem: Phase Error is over the limit in whole-unit test.
- Reason: Capacitors in power feeding circuits of PA module and transceiver have dry joint problems. Or there's short circuit between these capacitors and other resistors.
- Troubleshooting:



4.2.4 Power output related problems

- Problem: The device can turn on and receive signals normally. But there's no power output or power output is very low, when it is trying to output power of double frequency bands or single frequency band.

- Reason: Many factors can cause no or low power output, such as when Transceiver output circuit, PA module input/output circuit, antenna connectors and antenna switch control signals or power feeding circuits have a problem. In particular:

  - **RF connector (CON2101)**

Check whether connections between RF connector CON2101 and test probes of RF test cable are reliable; patches are fixed in the correct direction; or antenna connectors are damaged.

Solution: Replace antenna connectors and ensure patches are in the correct direction.

  - **RF power amplifier (U2102)**

A. Whether PA's control signal PA_ENABLE (Pin17) is at high level (about 2.8V); If it is at low level, PA will have no output;
B. PA's power feeding pins Pin13, pin14; check whether power feeding voltage falls into normal range (normally 3.6V～4.2V);
C. Check whether PA's RF input C2101, R2102, C2102 and R2105 have dry joint problems;
D. Whether PA's RF input R2115 and C2131 have dry joint problems;
E. PA's V_ramp control signal circuit: If C2111, R2111 and R2112 have dry joint or circuit break problems, PA's output power will be abnormal.

  - **Transceiver (U2101)**

A. Check whether power feeding voltage of Transceiver (U2101) falls into the normal range. You can check power feeding voltage at the place where power feeding filter capacitor and U2101 are connected. Then check whether peripheral circuits have dry joint problems.
B. Whether dry joint or short circuit problems exist on Transceiver (U2101) and its RF output matching circuits.

If it's permitted by whole-unit service terms and conditions, you can put the cell phone into constant-emission status of maximum power. Then detect power output of each module in the emission channel with probes from a spectrum analyzer. In normal circumstances,

A. you can detect a power output about GSM 33dBm or DCS/PCS 30dBm at the output end of the RF connector;
B. you can detect a power output about 32dBm or 29dBm at the place where PA output end pin26 is connected;
C.

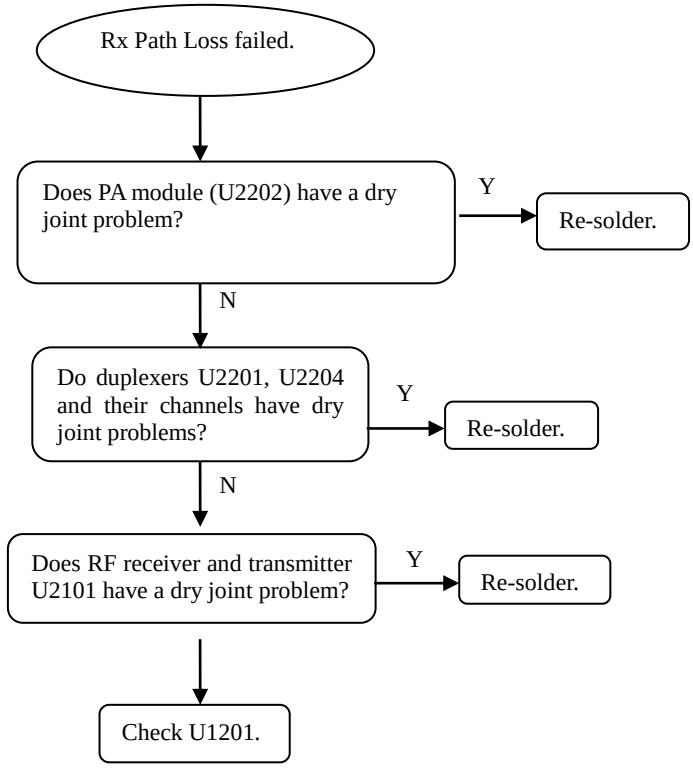
4.3 WCDMA calibration during production

4.3.1 WCDMA Rx Path Loss calibration

Problem: Item Rx Path Loss failed.

Reason: Receiving channel has a problem.

Troubleshooting:

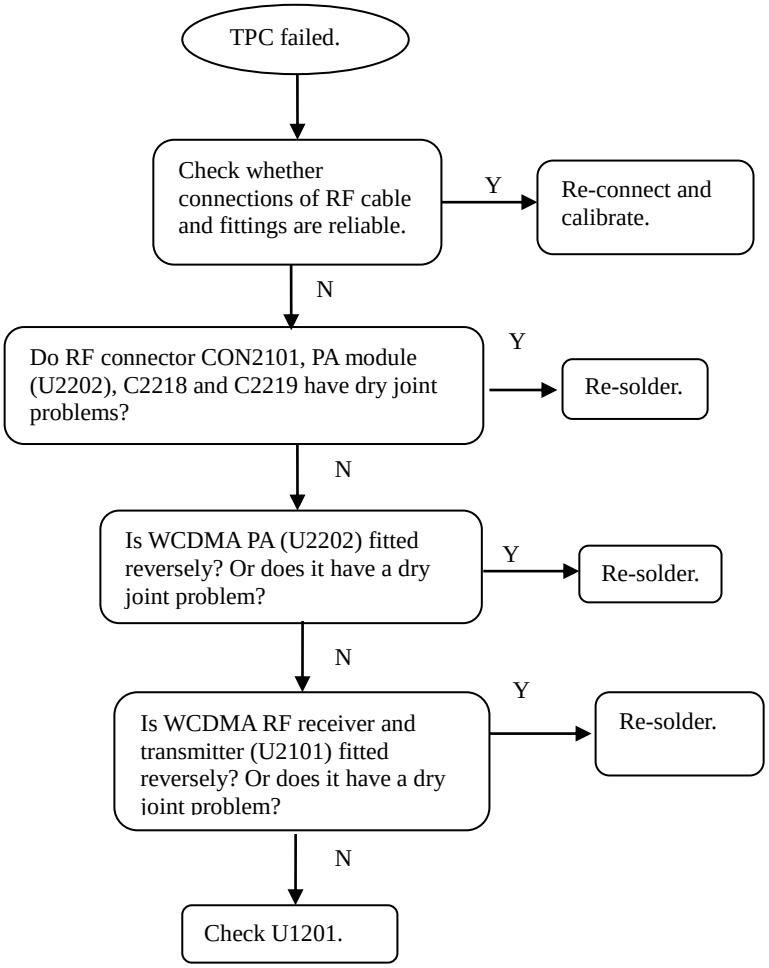


4.3.2 WCDMA TPC calibration

Problem: Item TPC failed.

Reason: Emission channel has a problem.

Troubleshooting:



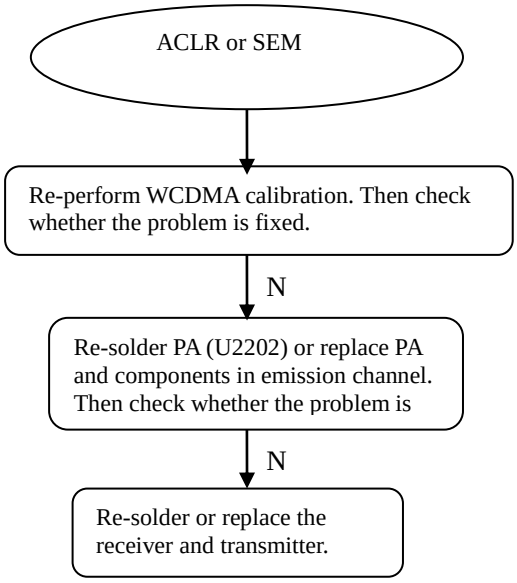
4.4 WCDMA comprehensive test

4.4.1 ACLR or SEM

Problem: ACLR or SEM.

Reason: It's not calibrated; or WCDMA PA (U2202) has a dry joint problem; or RF receiver and transmitter (U2101) is faulty.

Troubleshooting:



4.4.2 The results of PowerControl comprehensive test are not good.

Problem: PowerControl

Reason: It's not calibrated; or just passed the critical point of calibration.

Troubleshooting: Re-calibrate.

4.4.3 FrequencyErr

Problem: FrequencyErr

Reason: It's not calibrated; or there's outside interference.

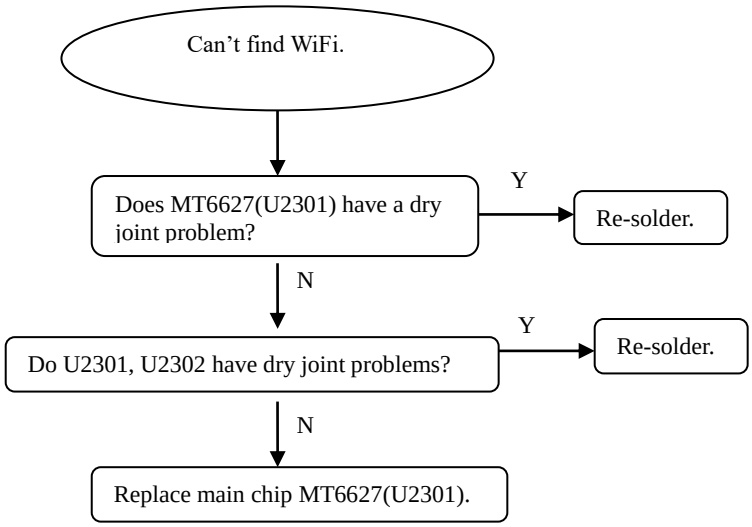
Troubleshooting: Re-calibrate.

4.5 WiFi test

Problem: Can’t find WiFi

Reason: WiFi/BT/GPS/FM four-in-one chip (U2301) and its surrounding circuits have soldering problems.

Troubleshooting:

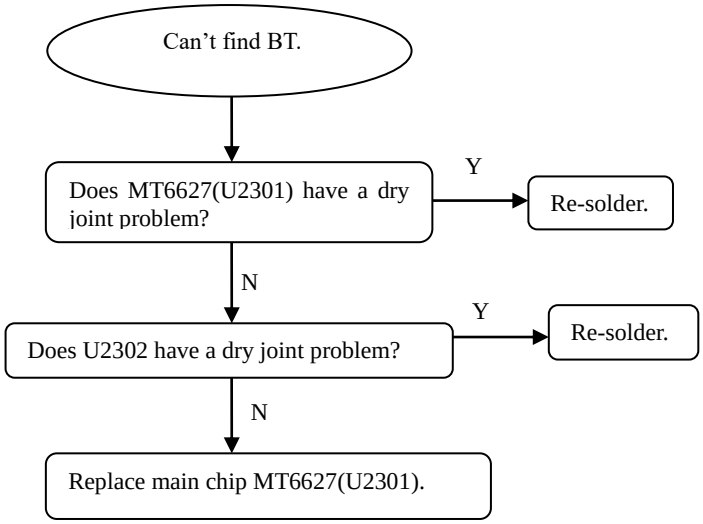


4.6 Use of Bluetooth

Problem: Can’t find Bluetooth.

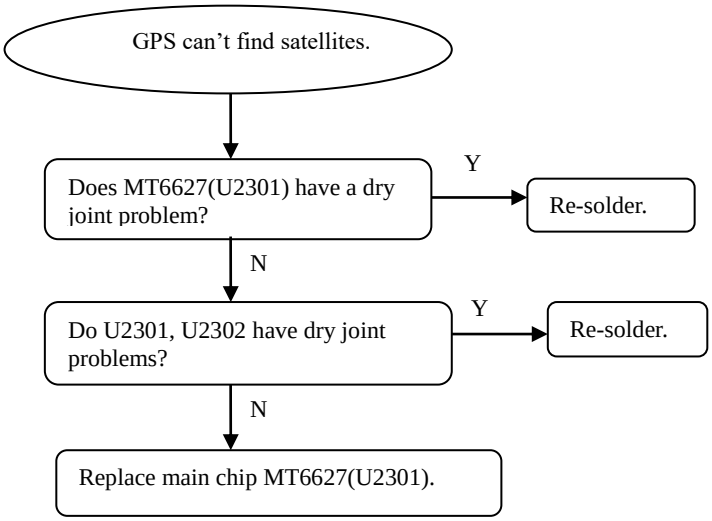
Reason: WiFi/BT/GPS/FM four-in-one chip and its surrounding circuits have soldering problems.

Troubleshooting:



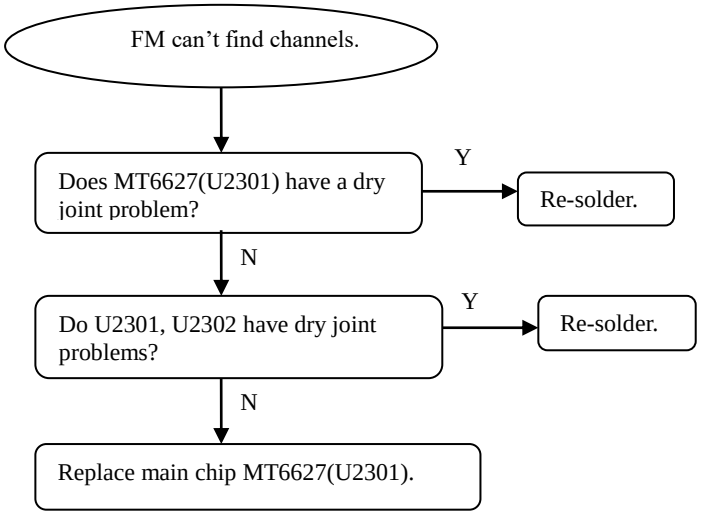
4.7 GPS - search satellites and locate

Problem: GPS can’t find satellites, and can’t locate.
Reason: WiFi/BT/GPS/FM four-in-one chip and its surrounding circuits have soldering problems.
Troubleshooting:



4.8 FM - search channels

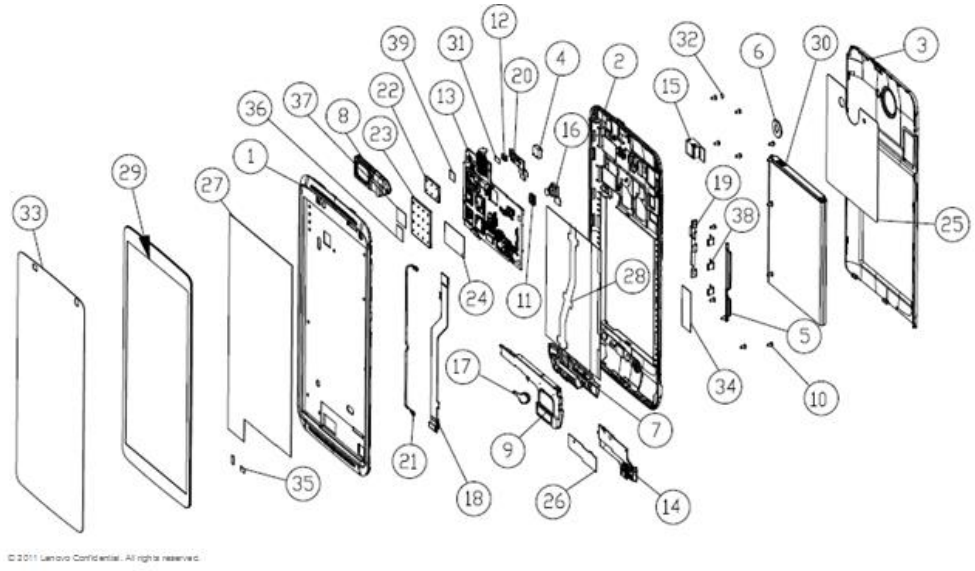
Problem: FM can’t find channels.
Reason: WiFi/BT/GPS/FM four-in-one chip and its surrounding circuits have soldering problems.
Troubleshooting:



5 How to assemble and dissemble LENOVO S930

5.1 Assembly sequence of LENOVO S930

Fig. 5-1 Main assembly exploded view of LENOVO S930



1. Front housing asm
2. WIFI antenna asm
3. Battery cover asm
4. PSensor frame asm
5. Side key asm
6. Main camera lens
7. Main antenna asm
8. Top speaker box moudle
9. Bottom speaker box moudle
10. Screw&*M1.4*2.5
11. Top MIC Sealing Cushion
12. PSensor Sealing Cushion
13. Main PCB asm
14. Sub PCB asm
15. Main camera
16. Front camera
17. Motor
18. Main FPC
19. Side key FPC
20. P-SENSOR FPC
21. RF CABLE
22. WIFI shielding case
23. RF shielding case
24. CPU thermal pad
25. Graphite thermal pad
26. Sub PCBA conductive tape
27. LCD cushion
28. Battery housing label
29 TP& LCD asm
30 Battery
31 Waterproof label
32 Lenovo pad sealing label
33 TP film
34 IMEI label
35 LCD FPC gasket
36 Shielding case conductive tape
37 Main camera conductive tape
38 Side key FPC mylar
39 Earjack label

5.2 Dos and don’ts when assembling LENOVO S930

(1) To avoid interference with the FPC of LCD itself, the LCD gasket should not be

assembled slant.

(2) Assemble fixture should be used to assemble TP to front housing.

(3) Before assembling motherboard to the front cover assembly, make sure that the silicone cushion on the P-sensor sensor is fitted properly.

(4) When welding volume key FPC to motherboard, make sure that FPC is in direction frame on motherboard and it should not to be slant.

(5) When attaching the volume key FPC to the front cover, align it with the aligning frame. The position must be exact.

(6) Soft part of volume key should be pressed to socket in back housing(WIFI antenna asm) and volume key position must be exact.

(7) There should be no gap between front housing and WIFI antenna asm when they are assembled together. All snaps should work. Check snaps near headset jack and bottom two corners.

(8) When assembling cables, make sure cables are well organized. To avoid interference with the case, all cables must be in their exact position.

(9) When assembling the main/sub camera, connectors should be fit after camera itself,and make sure the connectors are located correctly.

(10) When dissembling the motherboard, lift the speaker box module on the top at first to avoid any damage on the module.

(11)Lock TF connector cover after taking off TF card. Be sure that connector cover is in lock position when the phone is packed.

(12) Main camera conductive tape should be in exact position and not be out of socket or on socket wall.