

# **Service Manual of Lenovo A516 Mobile Phone**

**LENOVO**

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| <b>Document name</b> | <b>Service Manual of Lenovo A516 Mobile Phone</b> |
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| <b>Status:</b>       |   |

## **Preface**

This manual is intended for online repair guidance and after-sale repair guidance of Lenovo A516 mobile phone produced by the Company

The content of this manual will be upgraded according to the needs of technology development.

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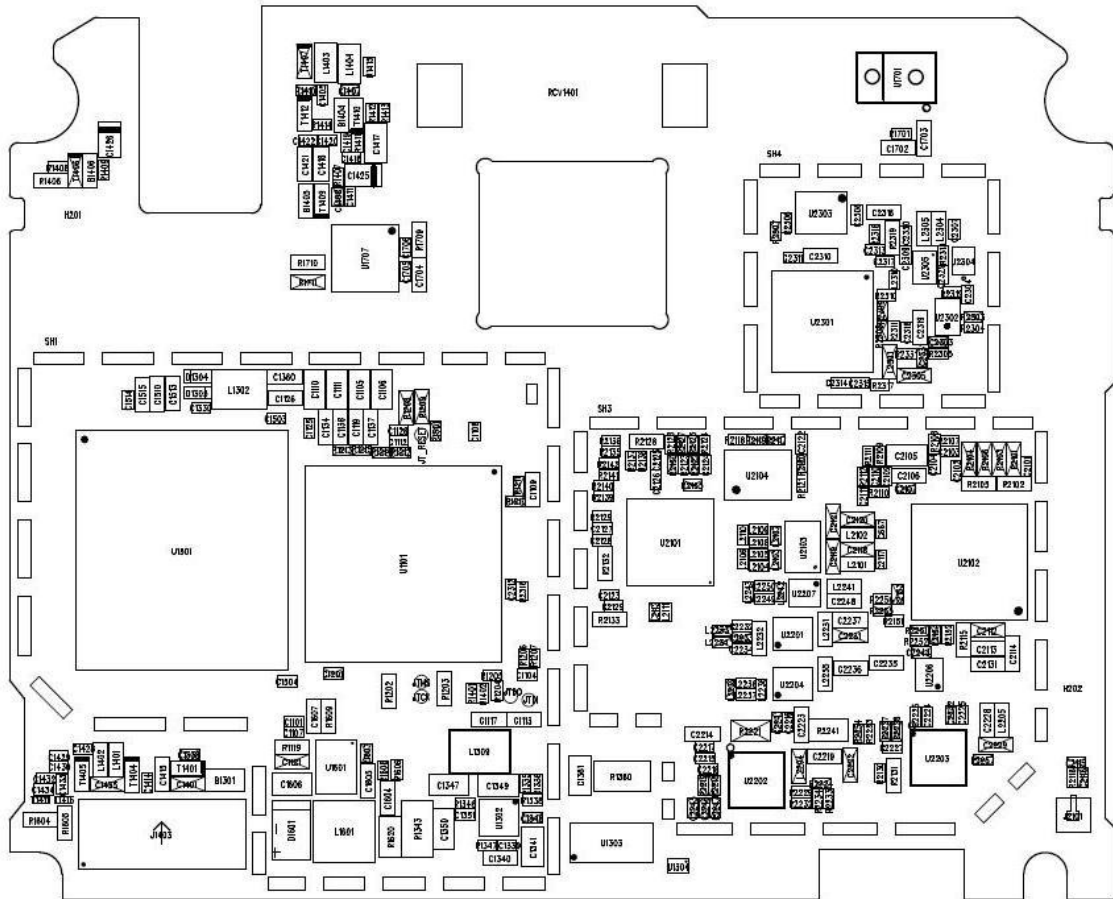
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| Version No. | Prepared by/<br>Modified by | Prepared/<br>Modified<br>on | Reason for<br>change | Main changes |
|-------------|-----------------------------|-----------------------------|----------------------|--------------|
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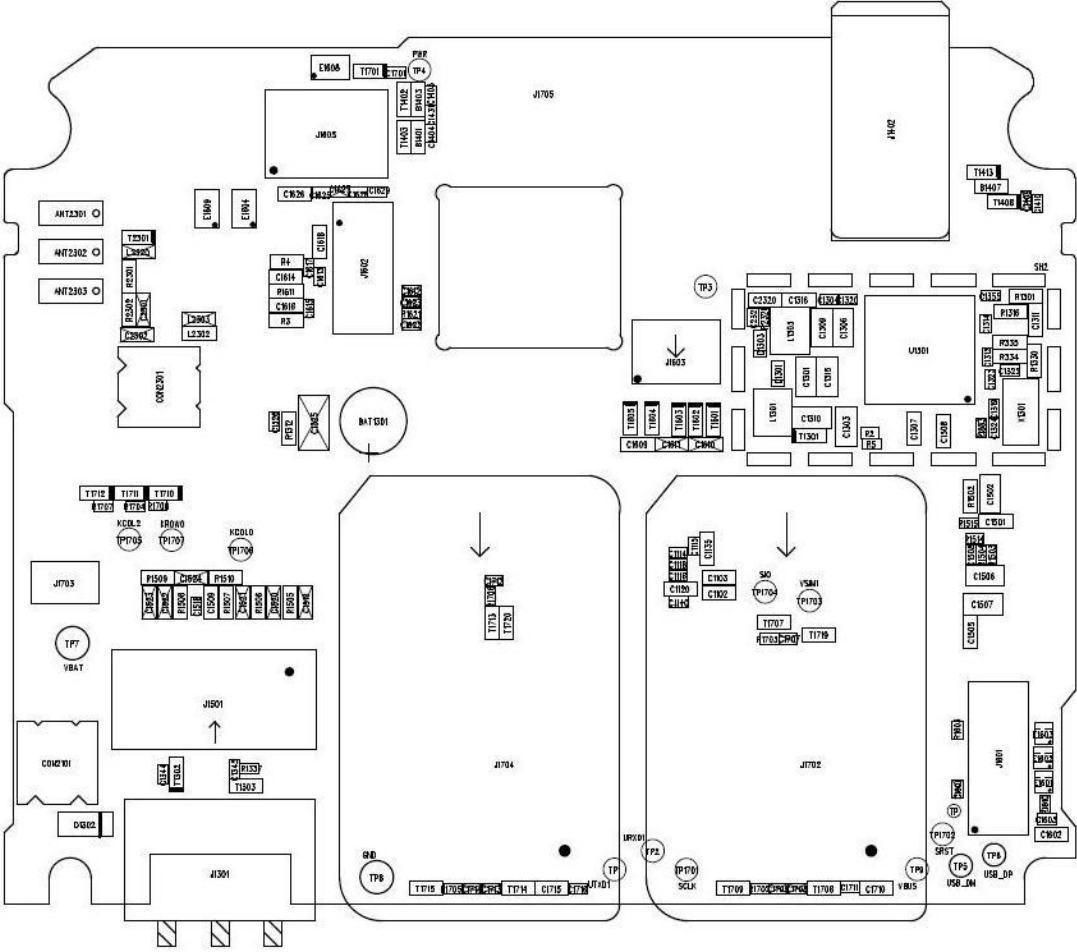
# **1. Appearance**

## **2. Layout of main board**

**Front of main board:**

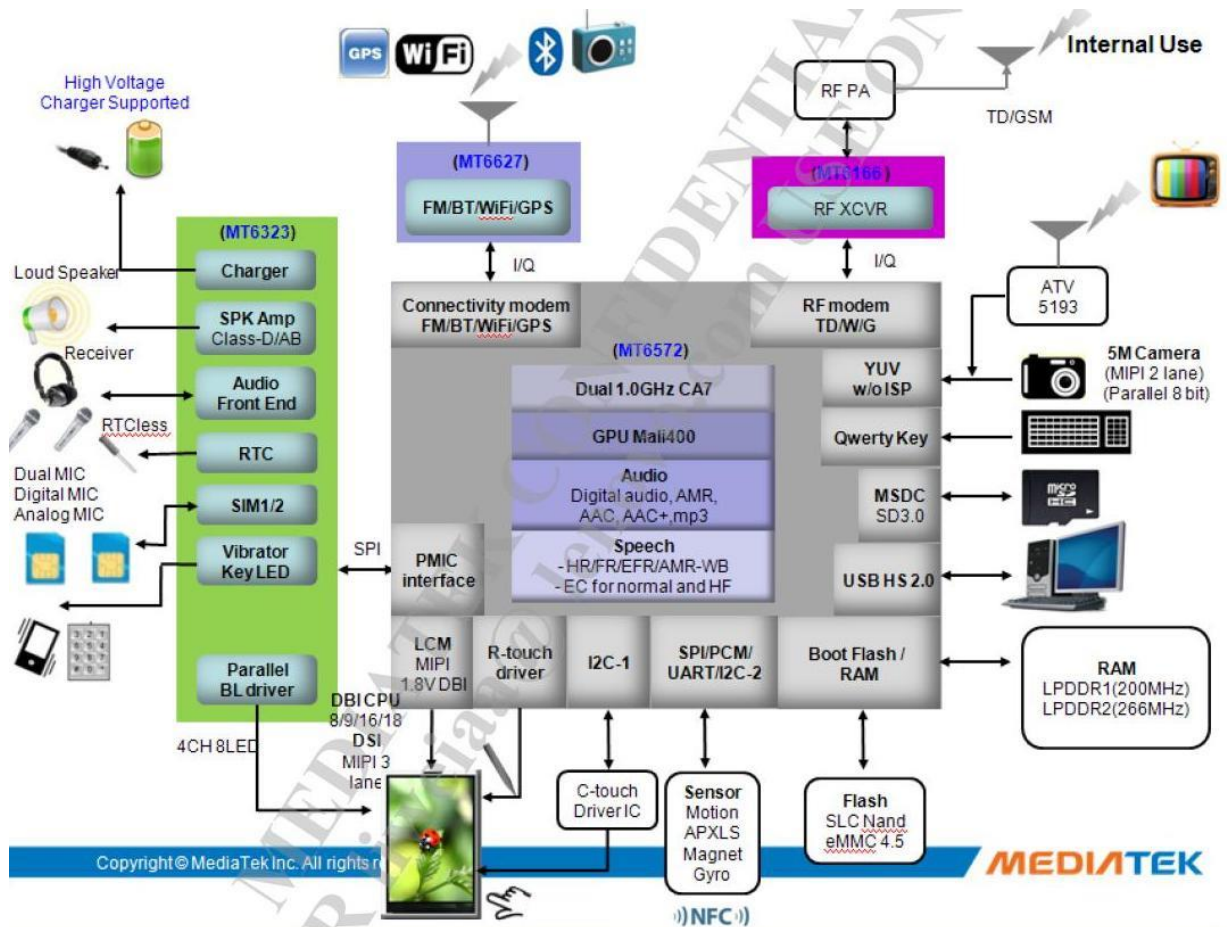


**Back of main board:**





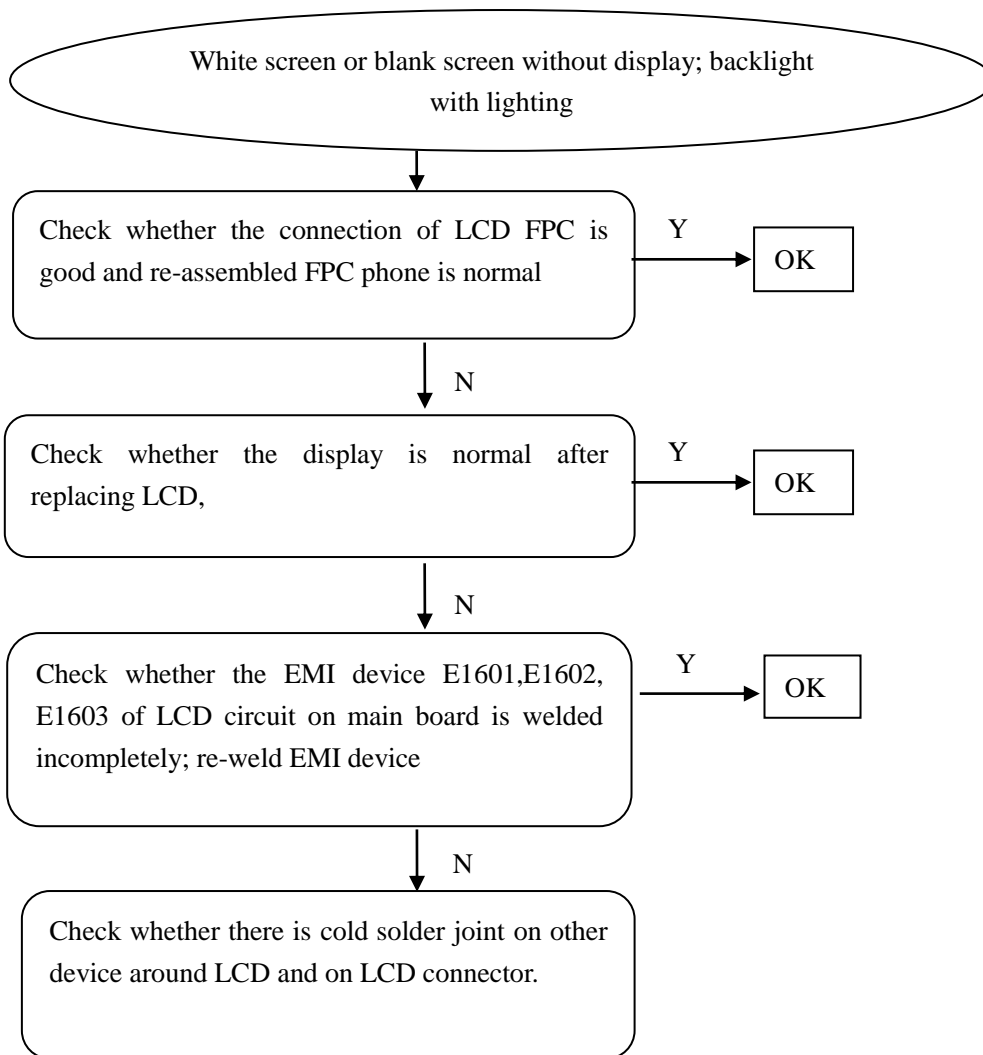
# 3. Baseband



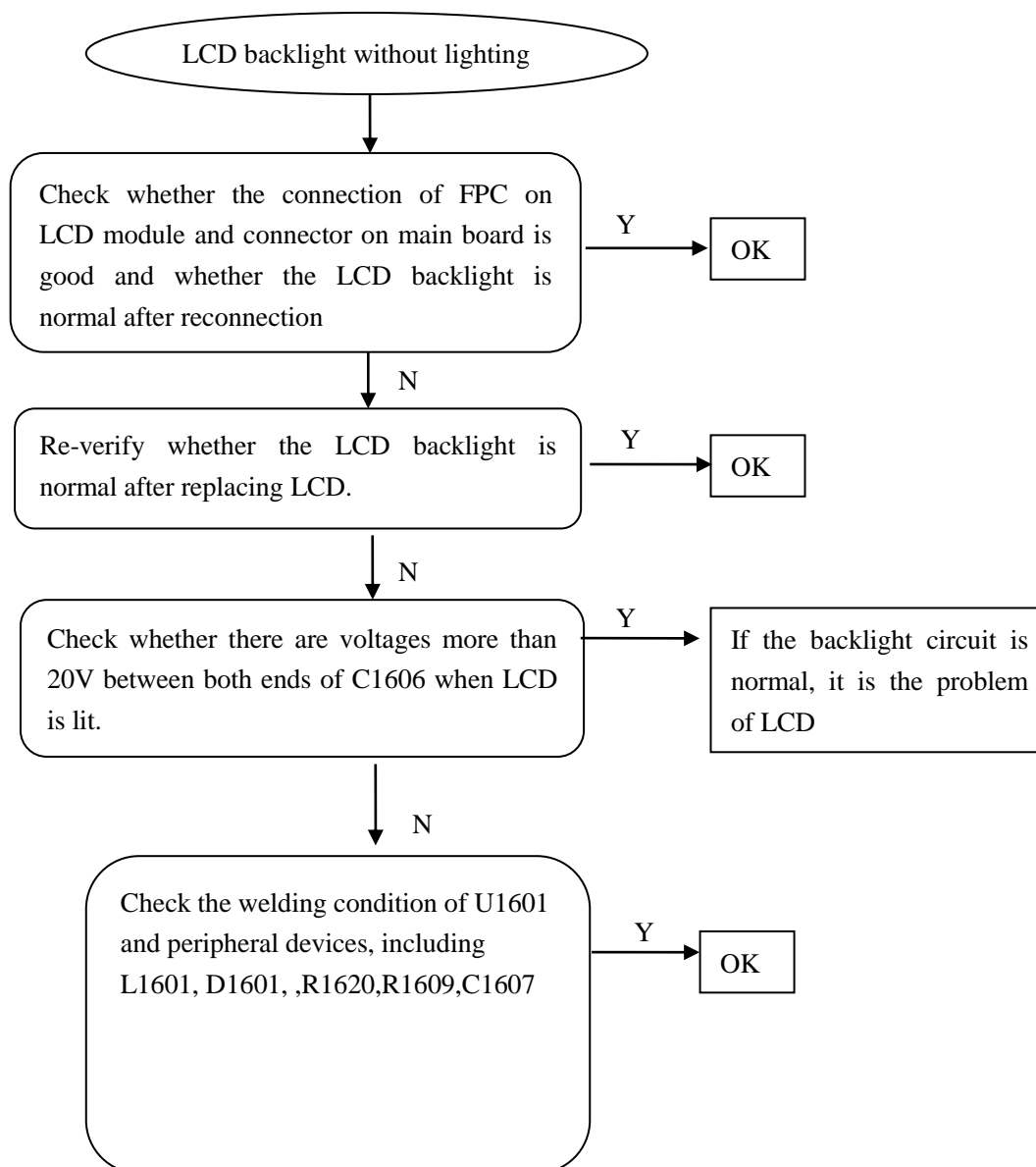
Block diagram of hardware system

### 3.1 LCD display

#### 3.1.1 No display on screen after power-on



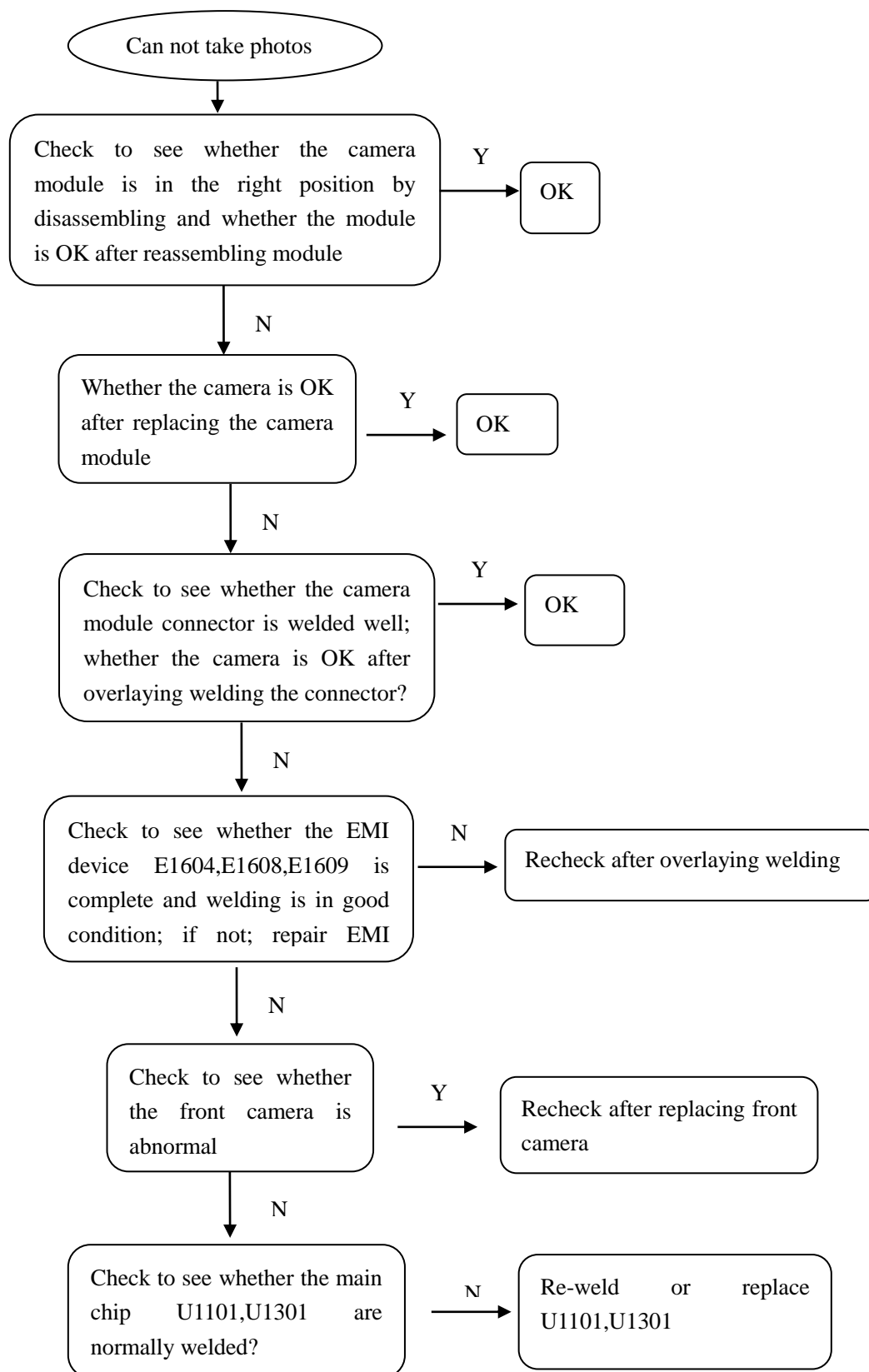
### 3.1.2 LCD backlight without lighting



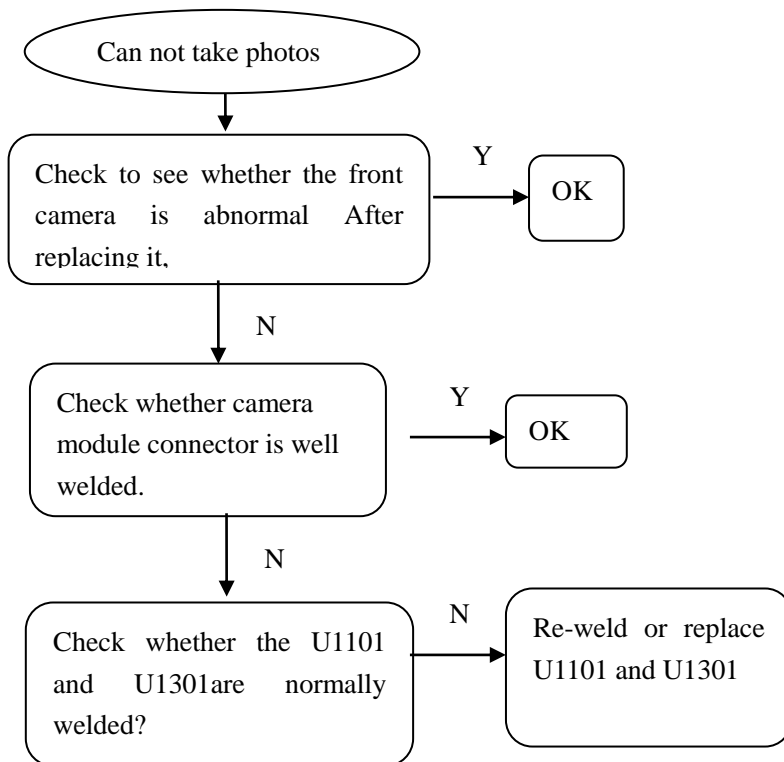


## 3.2 Camera defects

### 3.2.1 Rear camera defects

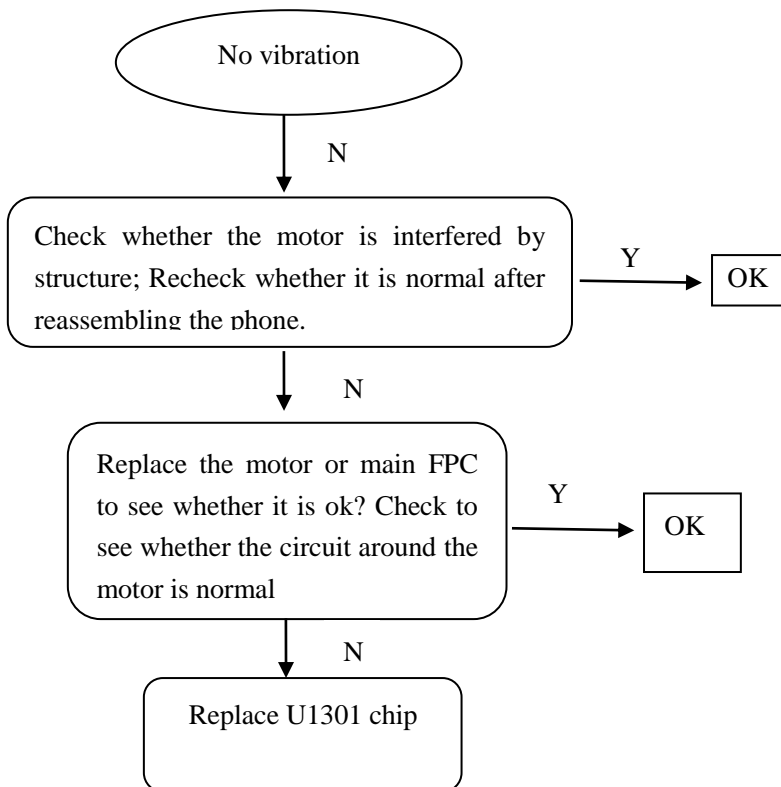


### 3.2.2 Front camera defects

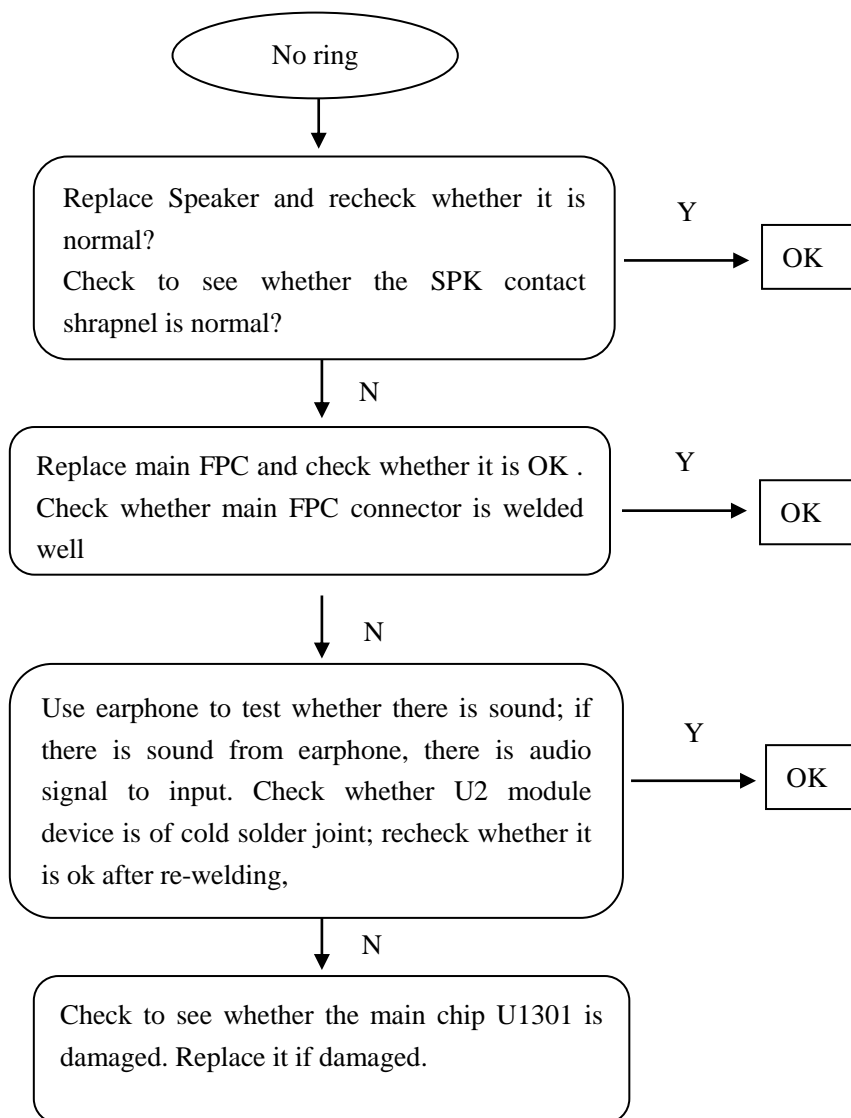


### 3.3 Ring and vibration

#### 3.3.1 No vibration



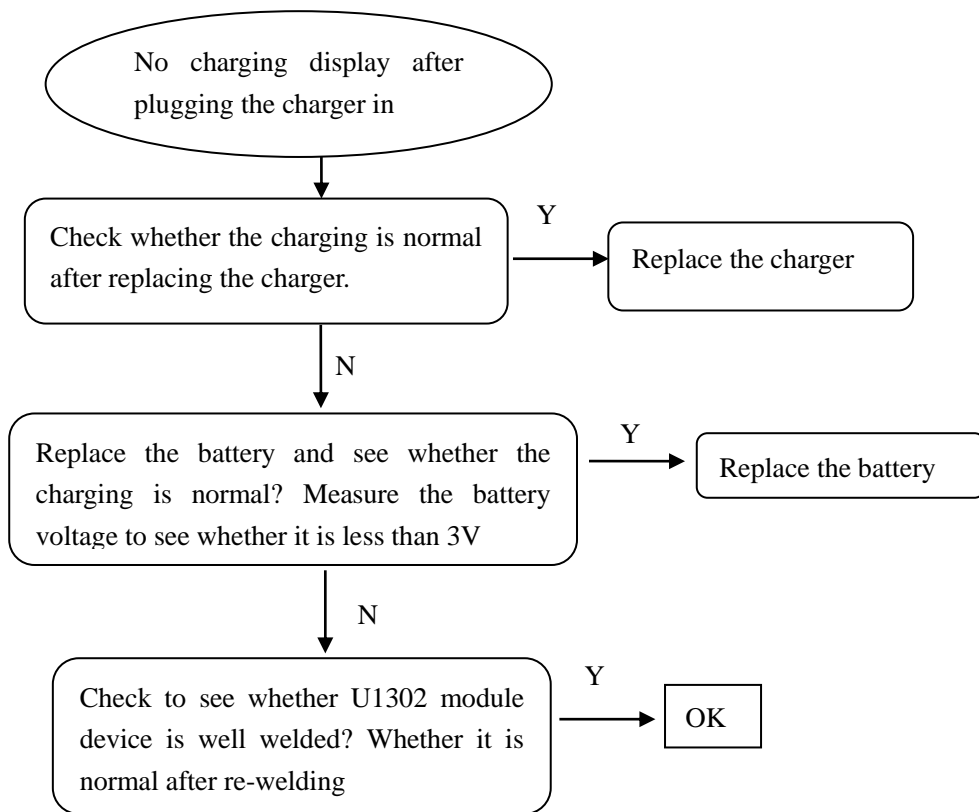
### 3.3.2 No ring



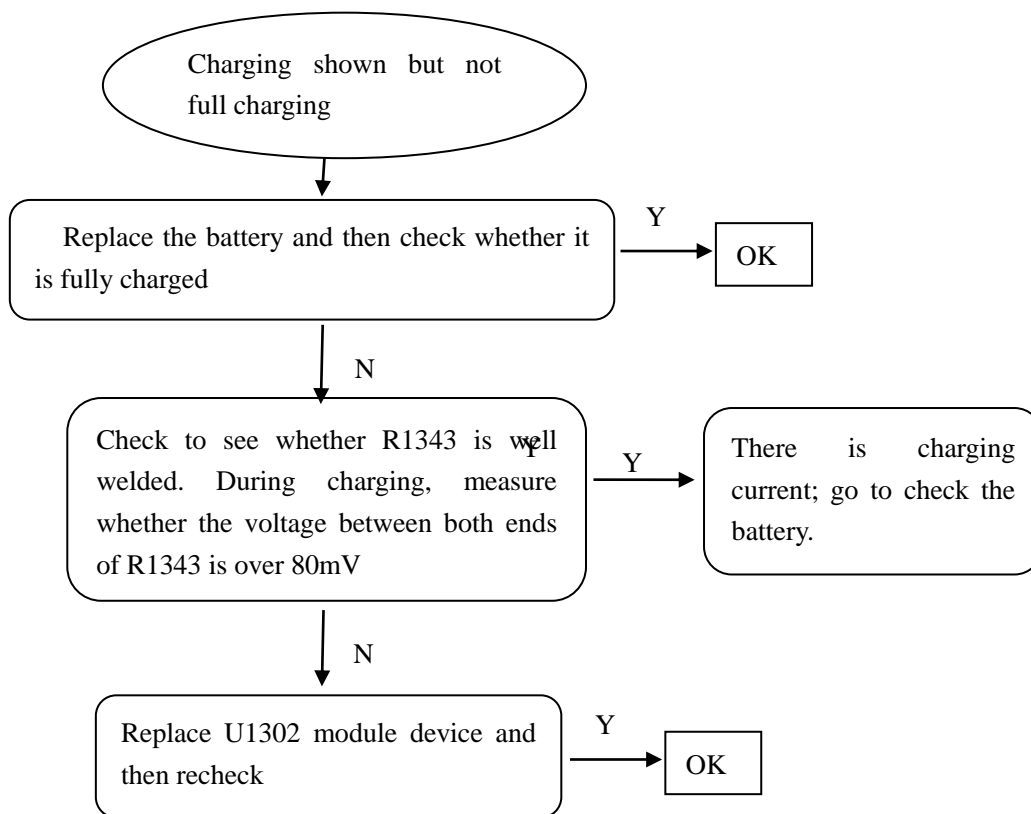


### 3.4 Charging

#### 3.4.1 No charging display after plugging the charger in

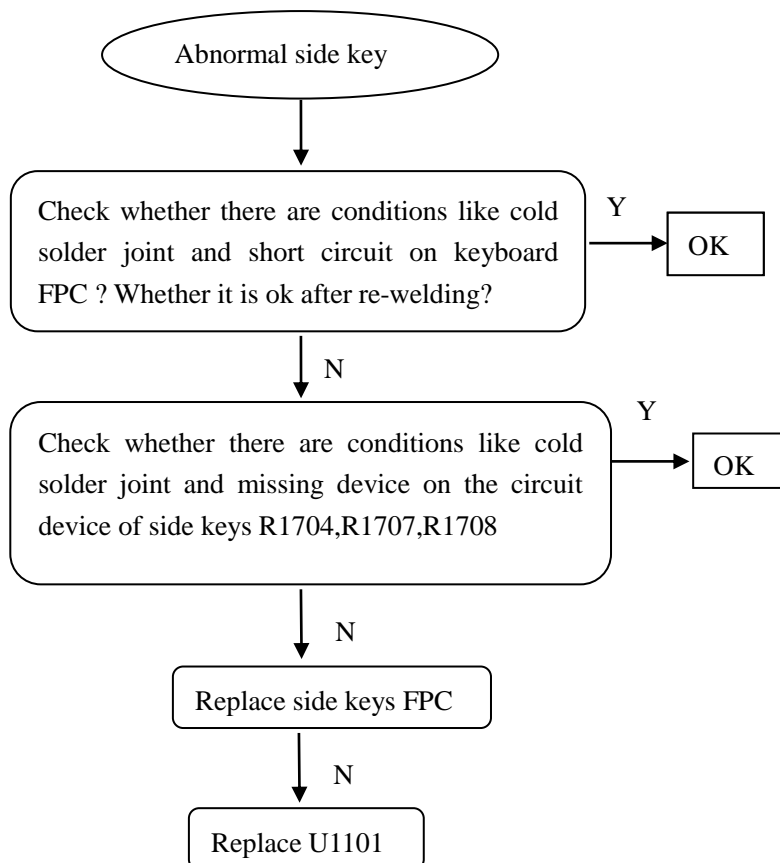


### 3.4.2 Charging shown but not full charging

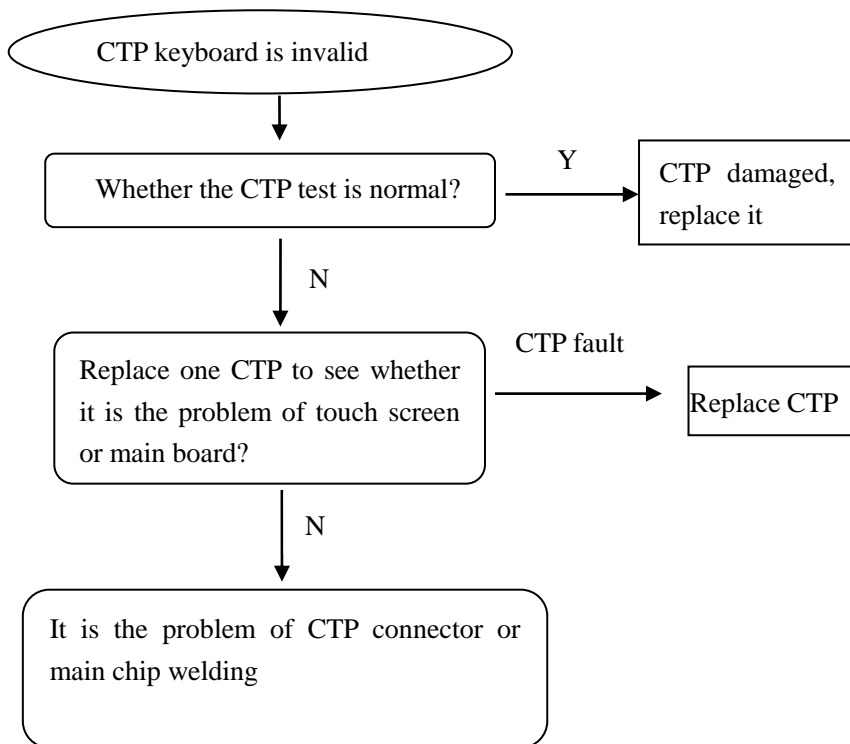


### 3.5 Keyboard and keyboard backlight

#### 3.5.1 Abnormal operation of side keys

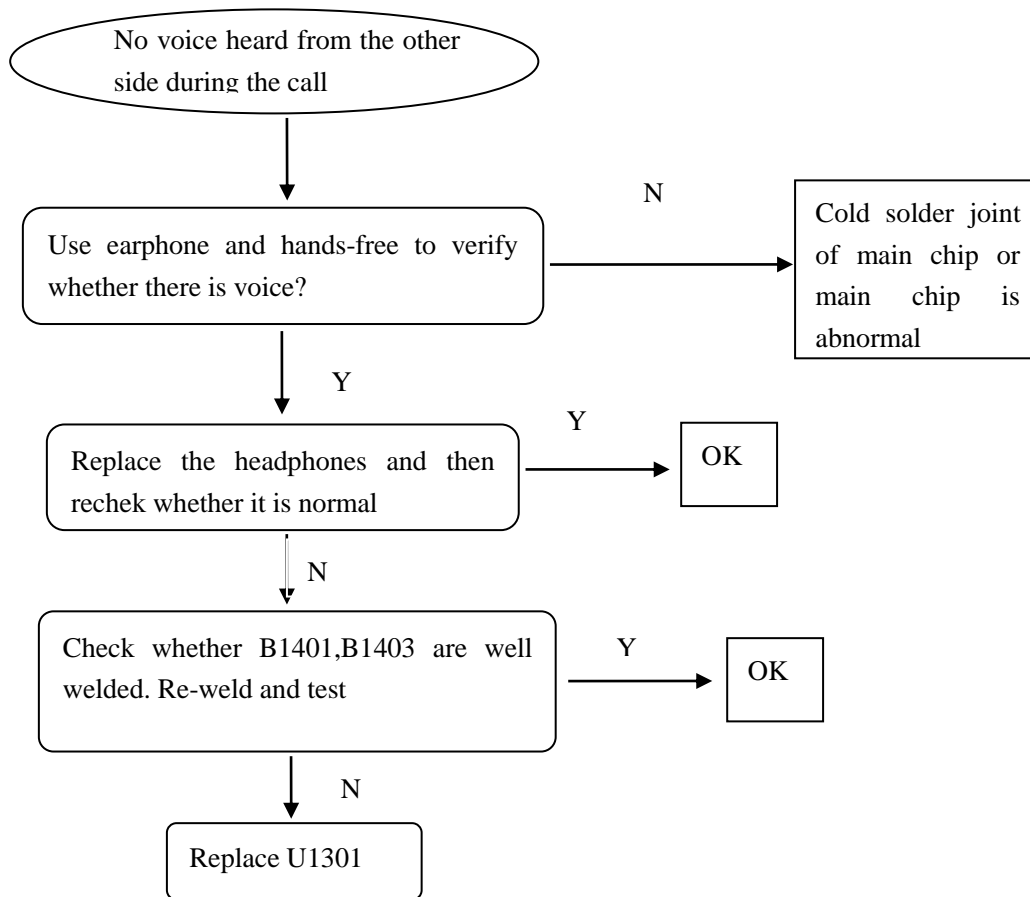


### 3.5.2 Abnormal operation of CTP keyboard

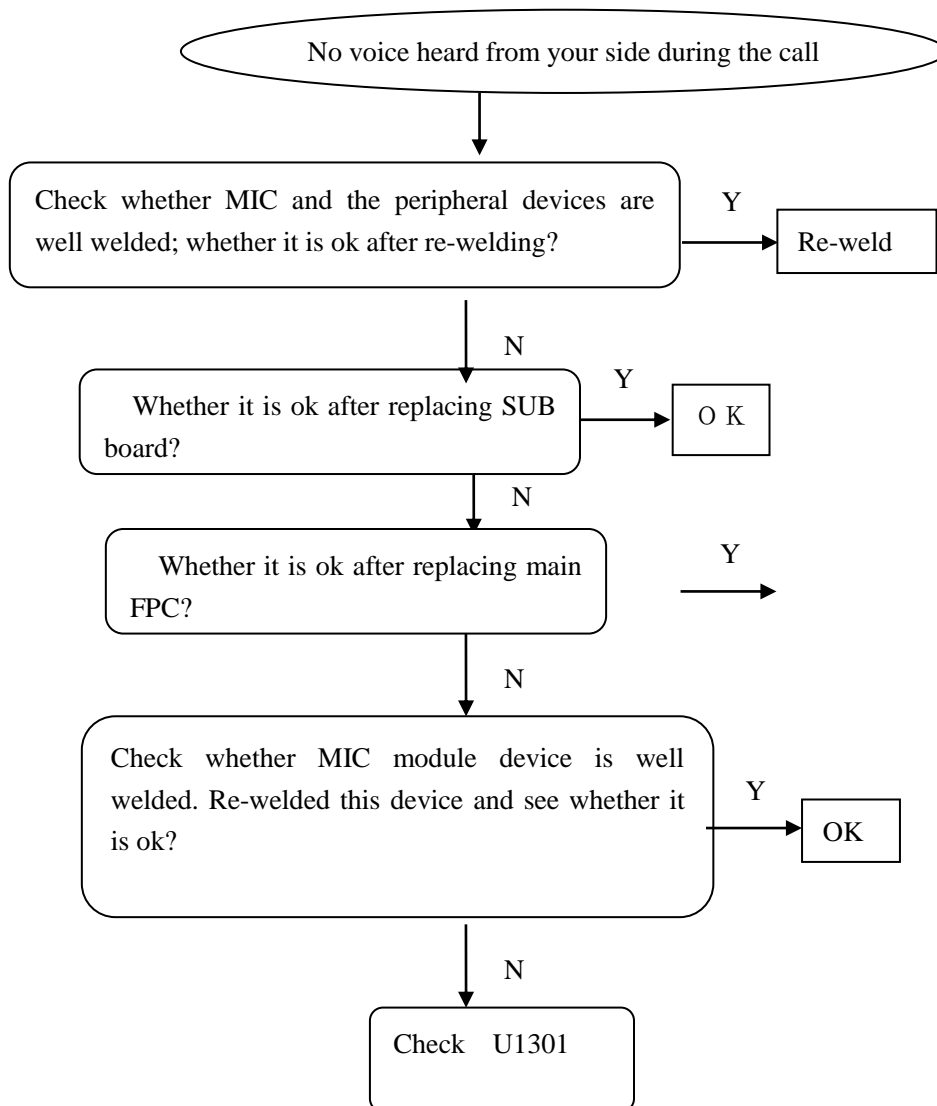


### 3.6 Calling

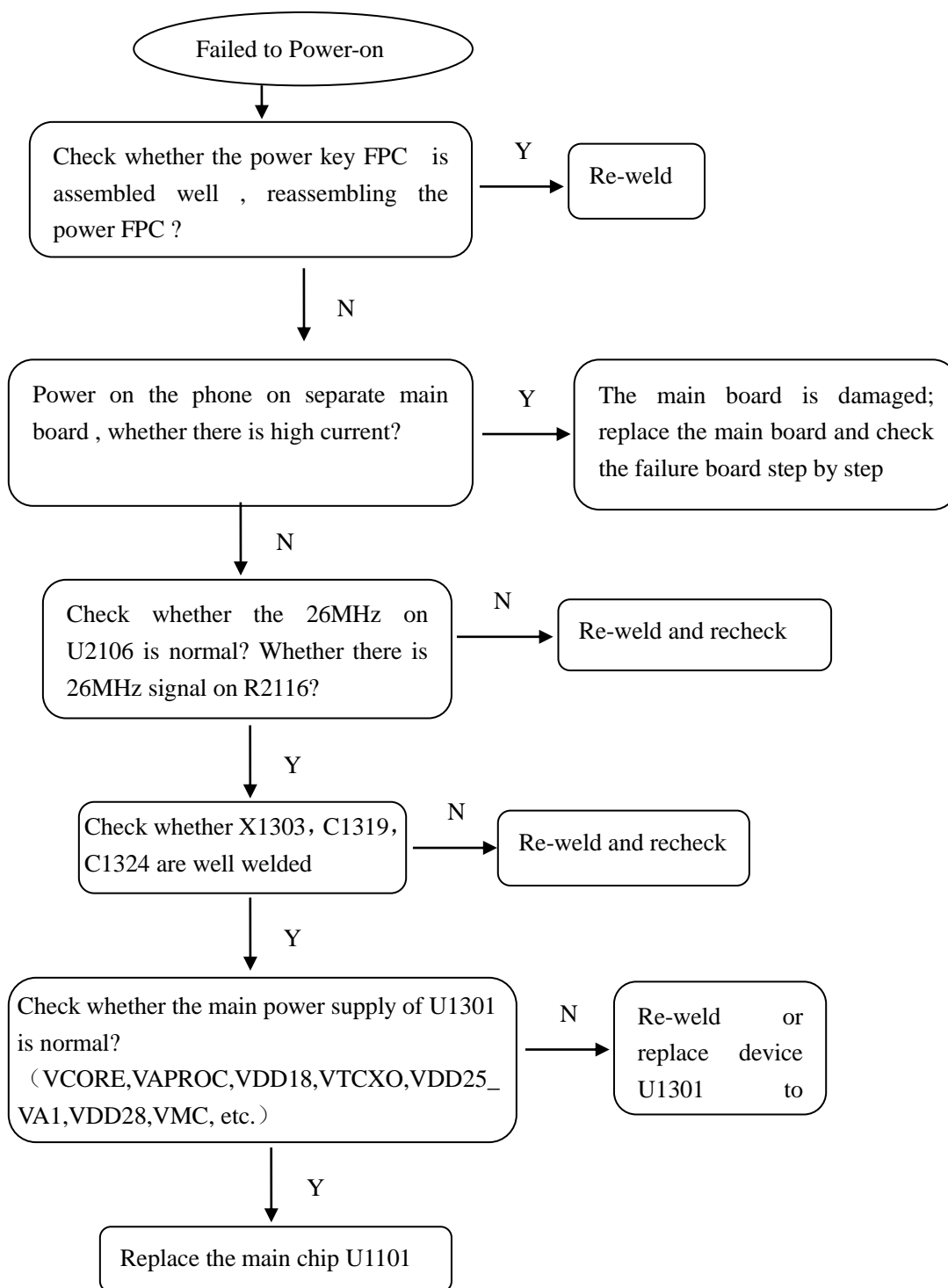
#### 3.6.1 No voice heard from the other side during the call



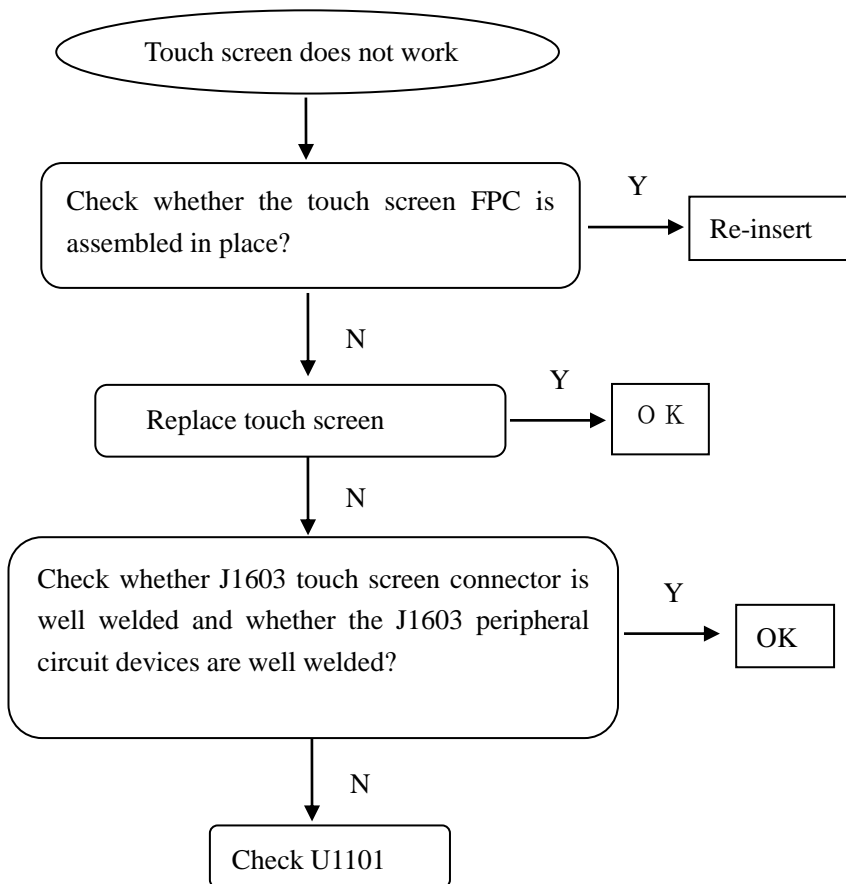
### 3.6.2 No voice heard from your side during the call



### 3.7 Power-on failure

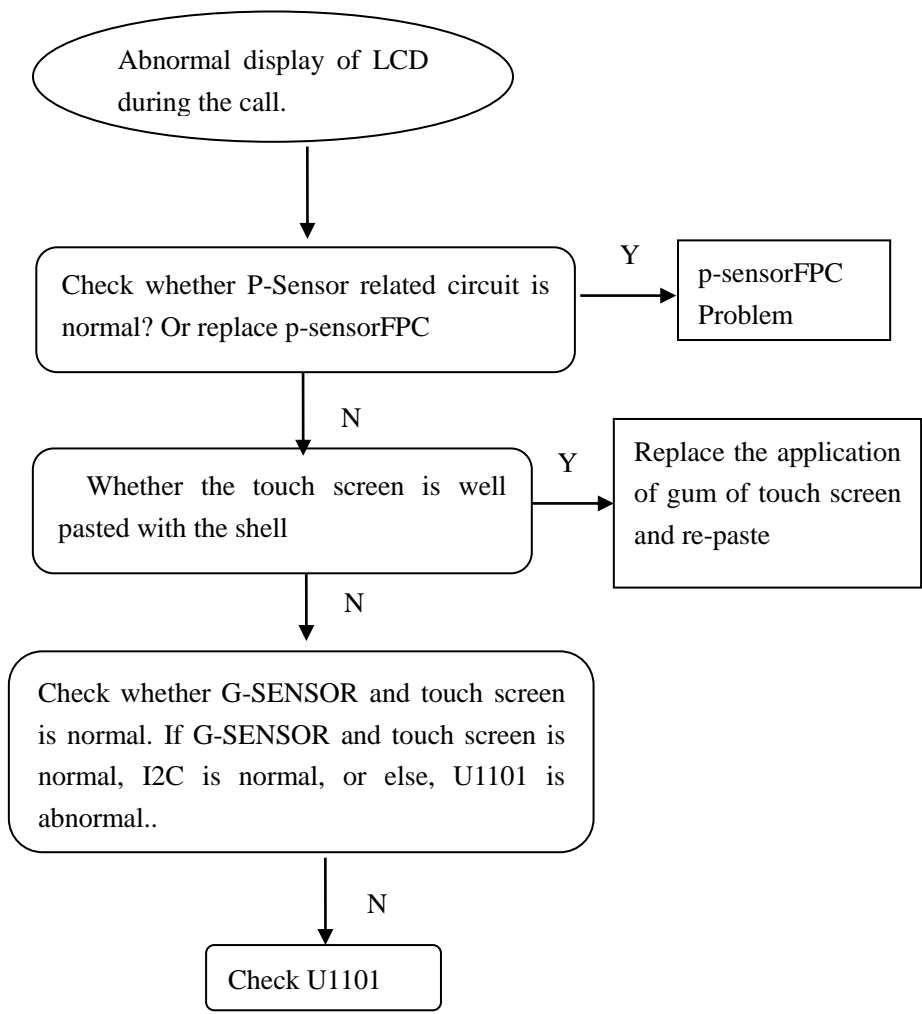


### 3.8 Touch screen failure





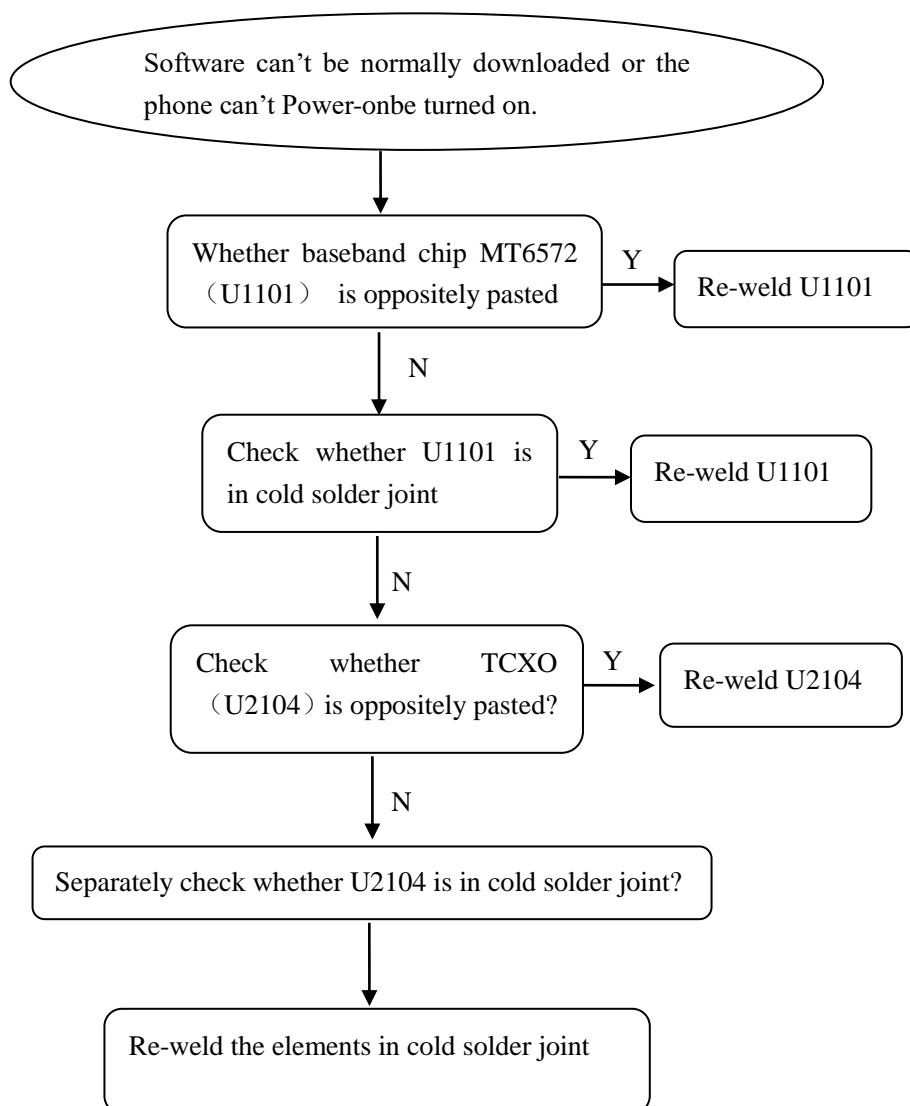
### 3.9 LCD on when close to the ear during the call; LCD off when away from the ear.



## 4. Radio frequency (RF)

## 4.1 Software Download Failure

- Faults: Software can't be normally downloaded.
- Reason: Baseband chip is oppositely pasted or is in cold solder joint; CRYSTAL is oppositely pasted (no clock signal) or is in cold solder joint.
- Shooting:

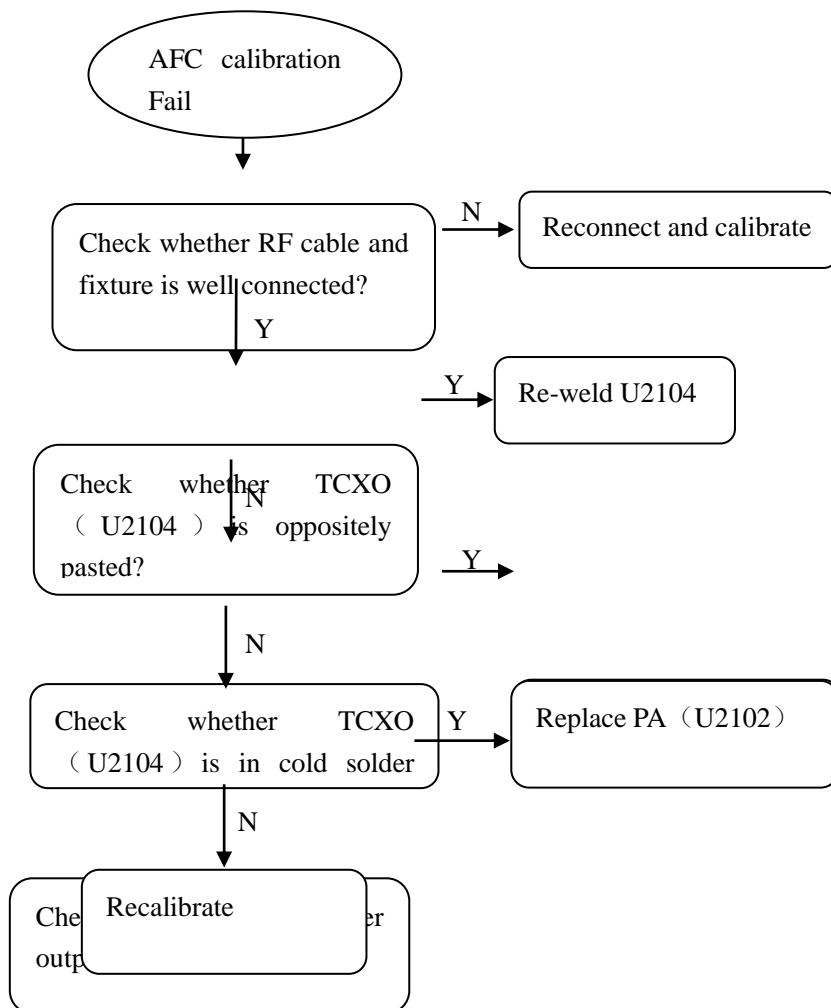


- Re-download software when it is normal after replacing elements,.

## 4.2 Production calibration

### 4.2.1 AFC calibration

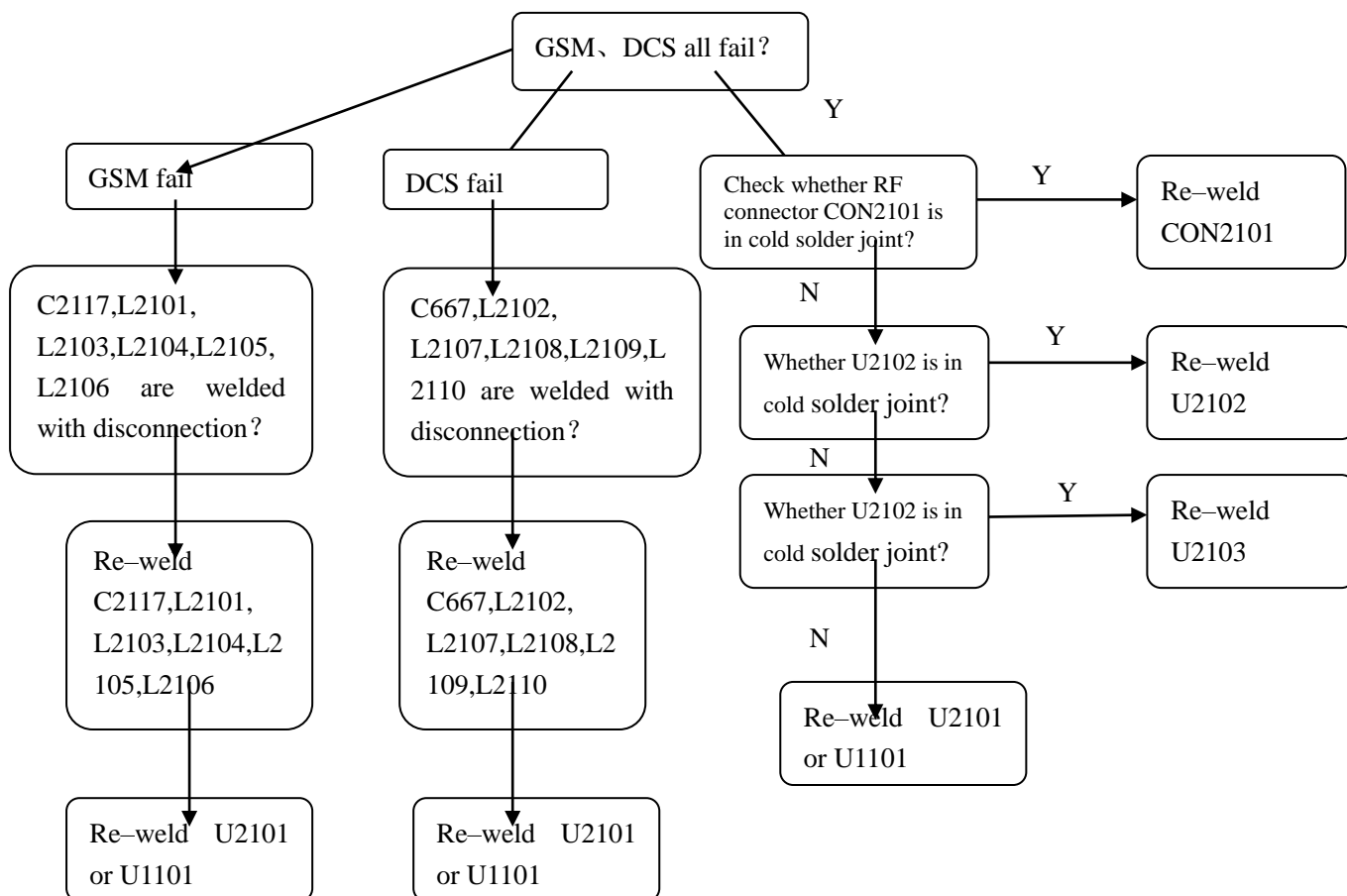
- Fault: AFC calibration Fail.
- Reason: RF test cable is not connected well during calibration; TCXO is oppositely pasted or in cold solder joint.
- Shooting:



- Notes: Remember to recalibrate after replacing elements.

### 4.2.2 AGC

- Fault: AGC calibration Fail.
- Reason: RF test cable is not connected well during calibration; the devices in receiving cable are in cold solder joint (such as RF connectors, antenna switch, saw the filter and the surrounding capacitance).
- Shooting:

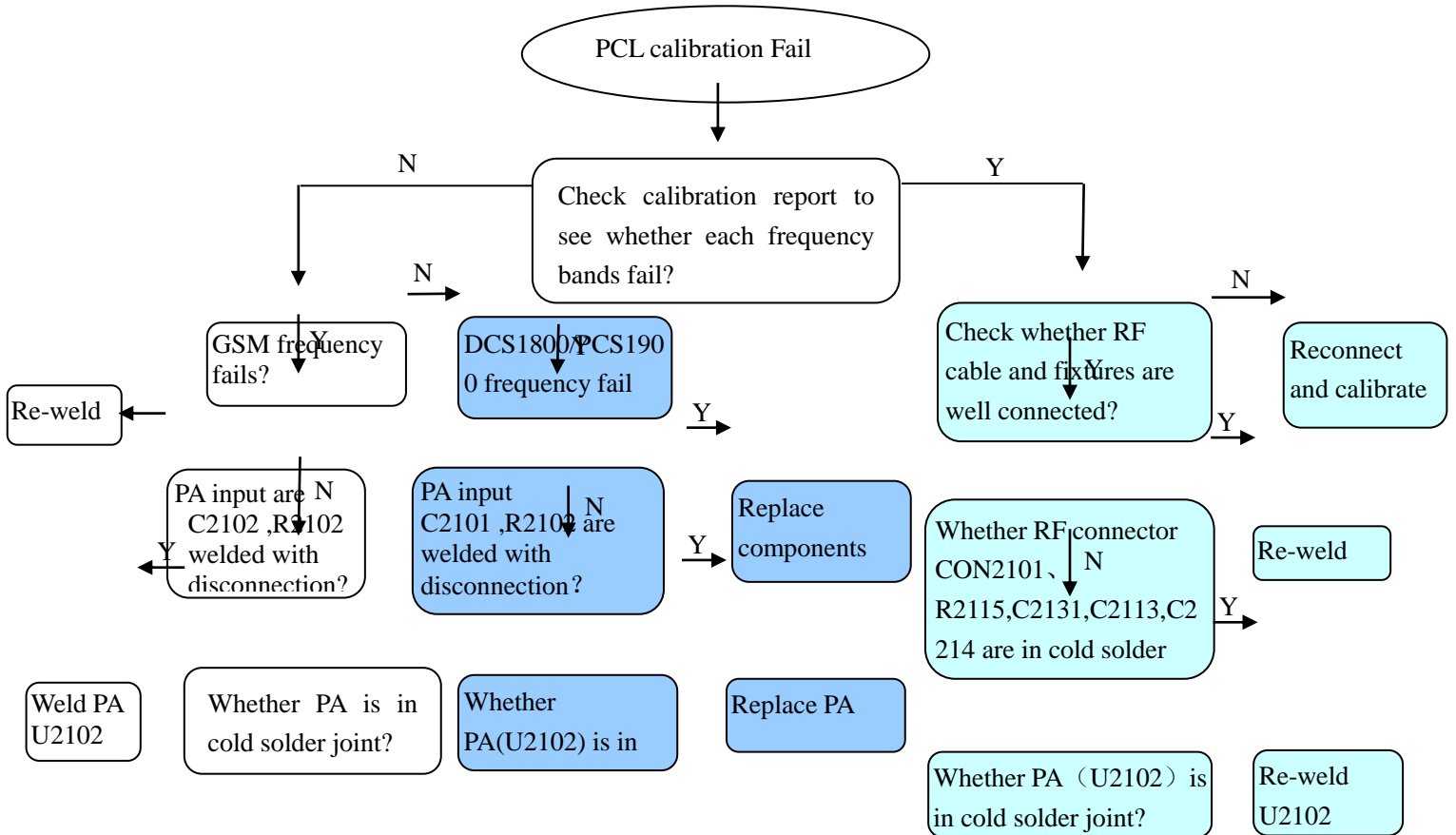


- Notes: Remember to recalibrate after replacing components.

### 4.2.3 APC

**Fault 1**

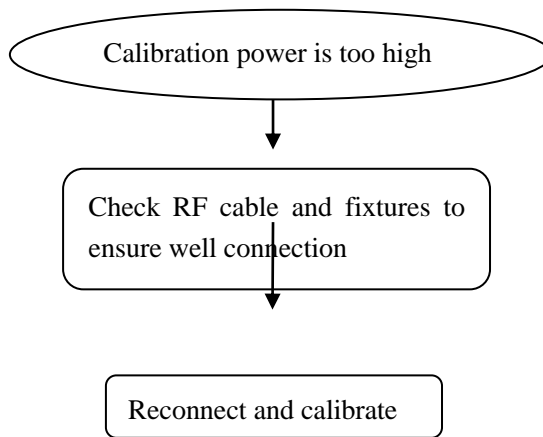
- Fault: APC calibration Fail.
- Cause: RF test cable is not connected well during calibration; PA is oppositely pasted; PA and peripheral circuit are in cold solder joint; The patch of RF input circuit of PA is deviated with short-circuit shield box.
- Shooting:



- Notes: Remeber to recalibrate after replacing compements; the problem analysis of PCS TX APC is the same as DCS.

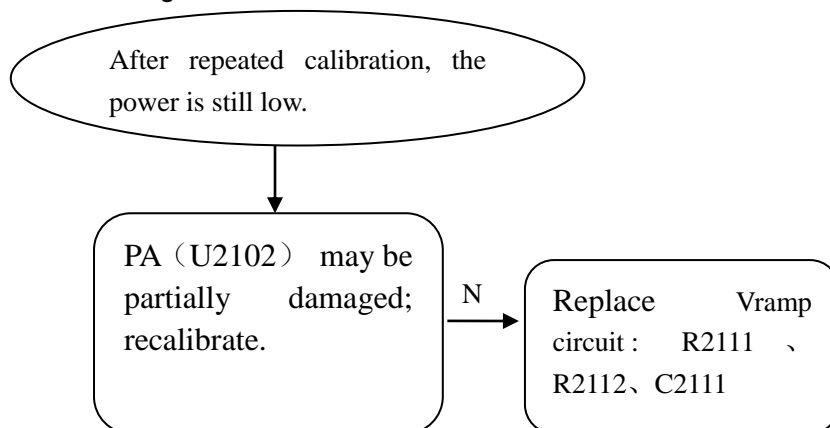
**Fault 2:**

- Fault: The output power of the mobile phone is too high.
- Cause: The cable isn't well connected in calibration.
- Shooting:



**Fault 3:**

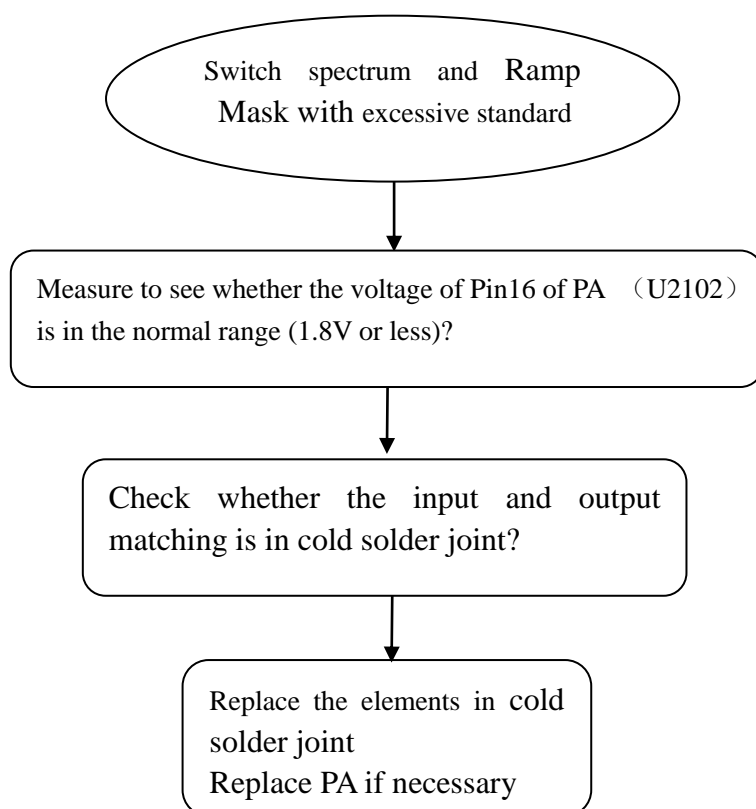
- Fault: After repeated calibration, the power is still low.
- Cause: Some element patches of PA and surrounding VAPC input are displaced or PA is damaged.
- Shooting:



## 4.3 Fault in complete set test/ rework

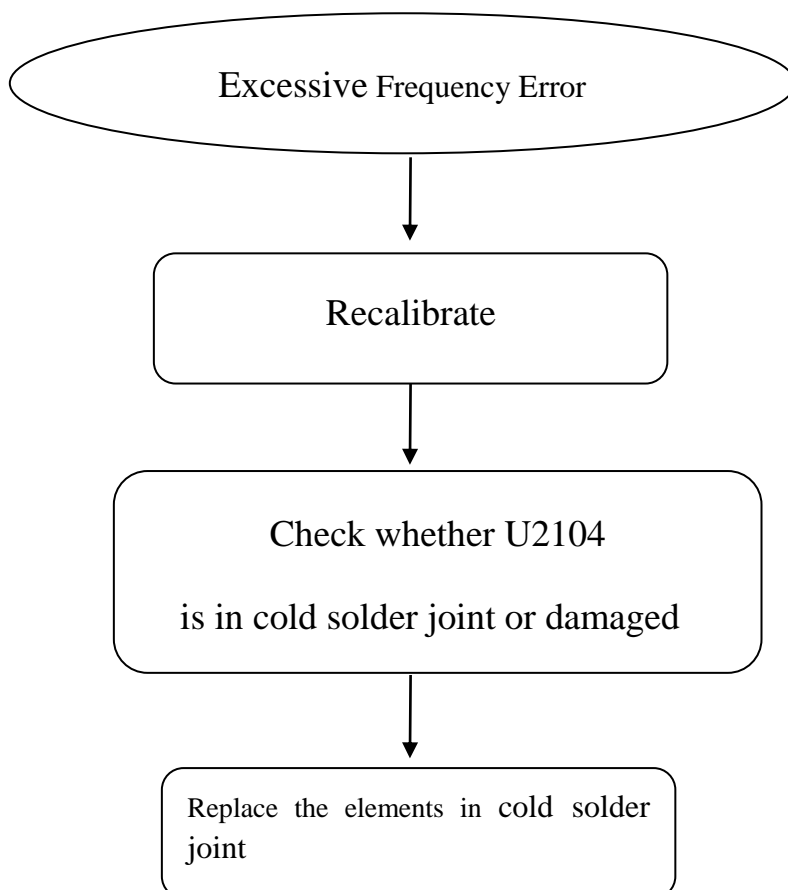
### 4.3.1 Switch spectrum & PVT template with excessive standard

- Fault: The switch spectrum and PVT template of GSM and DCS frequency bands are excessive.
- Cause: The cold solder joint or damage to R2204,R2210 in V\_ramp of PV may result in the excessive switch spectrum.
- Shooting:



### 4.3.2 High Frequency Error

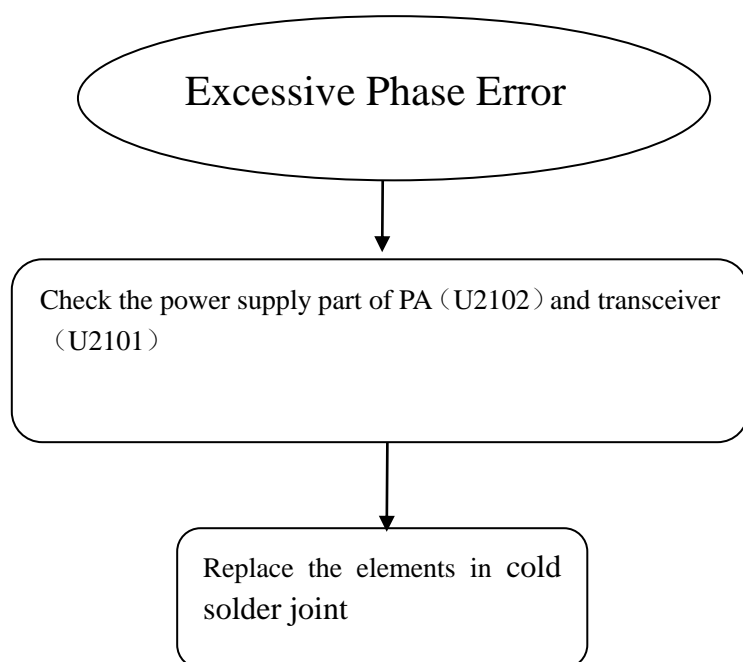
- Fault: Frequency Error exceeds standard in complete set test.
- Cause: There is problem in VAFC input circuit of TCXO.
- Shooting:



### 4.3.3 High Phase Error

- Fault: Phase Error exceeds standard in complete set test.
- Cause: The capacitors of power supply part of PA and transceiver are in cold solder joint or in short circuit with other resistance.
- Shooting:





### 4.3.4 Power output problems

- Fault: Normally power-on and receive, but when outputting two frequency bands or single frequency band power, there is no input power or the input power is very low.
- Cause: There are many reasons for no output power or very low power, which may be the results of faults of Transceiver output part, PA input and output circuit, antenna connector and antenna switch control signal or power supply circuit. Specific circumstances are:

#### ■ RF connector (CON2101)

Checking: Whether RF connector CON701 and the test probe of RF test cable are well connected or the patch is oppositely pasted or the antenna connector is damaged.

Shooting: Replace antenna connector and ensure right direction of patch.

#### ■ RF power amplifier (PA)

- Whether the control signal PA\_ENABLE (Pin17) of PA is high level (about 2.8V); if it is low level, there is no output of PA;
- Check the Pin3 Pin4 of PA power supply part to see whether the power supply voltage is in the normal range (typically 3.6V ~ 4.2V);
- Whether the RF input parts of PA(C2101,R2102,C2102,R2105) are in cold solder joint;
- Whether the RF output (R2115,C2113,C2131,C2114) of PA is in cold solder joint;
- Part circuit of V\_ramp control signal of PA(R2111,R21123,C2111): if it is in old solder joint or in interruption of circuit, PA also has no output power.

#### ■ Transceiver (U2101)

- Whether the power supply voltage of Transceiver (U2101) is within normal range; check the power supply voltage between power supply filtration capacitor and U2101 connection and then check whether the surrounding circuit is in cold solder joint.
- Whether there is cold solder joint or short circuit in Transceiver (U2101) .

If it is possible to repair the complete set, the output power of each module on transmission channel can be detected through spectrum analyzer probes when keeping the phone in the constant state of maximum power. Under normal circumstances,

- A. About GSM 33dBm and DCS/PCS 30dBm output power can be detected on the output end of RF connector.
- B. About 3dBm output power can be detected on matching circuit C2101 and C2102 of PA input end;
- C. About 32dBm or 29dBm output power can be respectively detected on pin14 connection of PA output end;
- D. About 3dBm output power can be detected on pinA11 and pinB8 of Transceiver (U2101) output end.

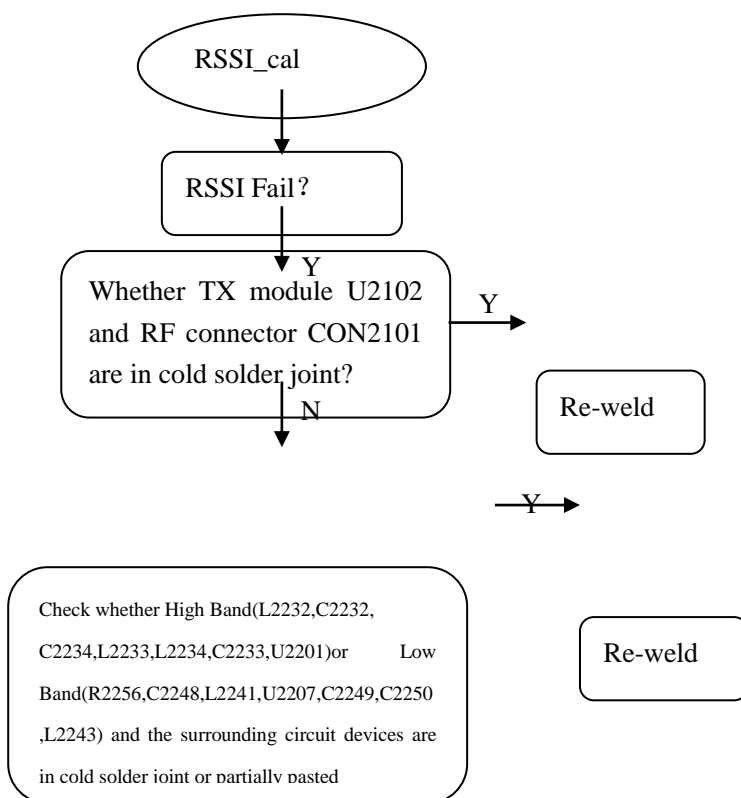
## 4.4 WCDMA forecast

### 4.4.1 RSSI\_Cal

Fault: RSSI fails

Cause: There are problems in receiving channel

Repair manner:

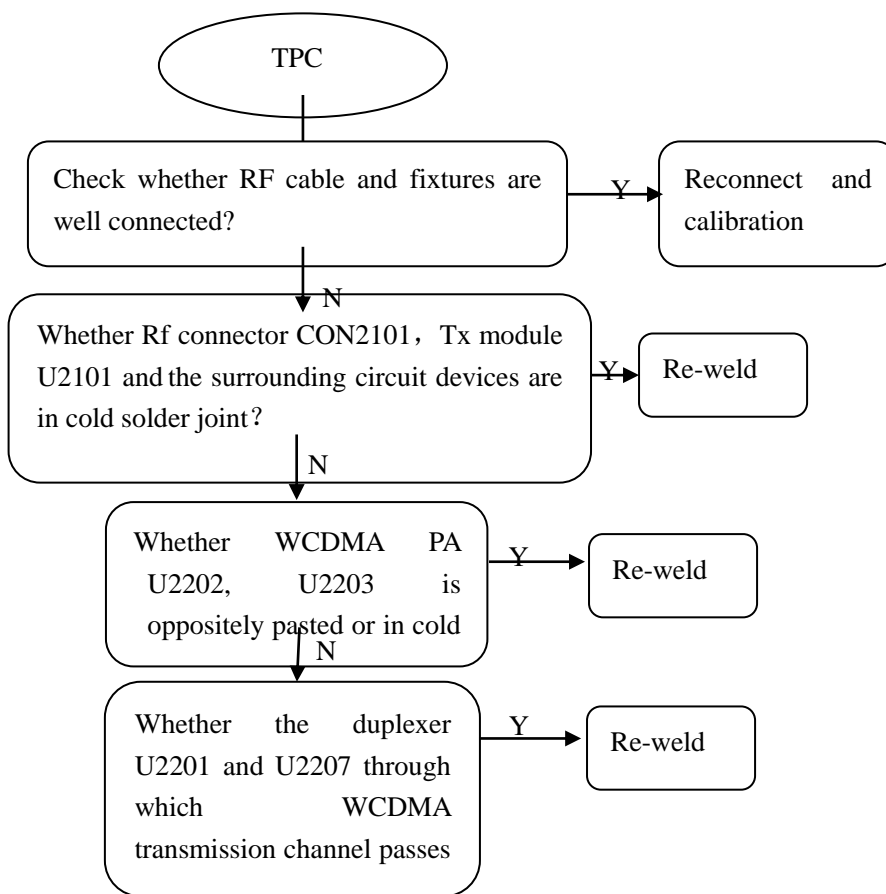


### 4.4.2 TPC\_Cal

Fault: TPC fails

Cause: There are problems in transmission channel

Repair manner:



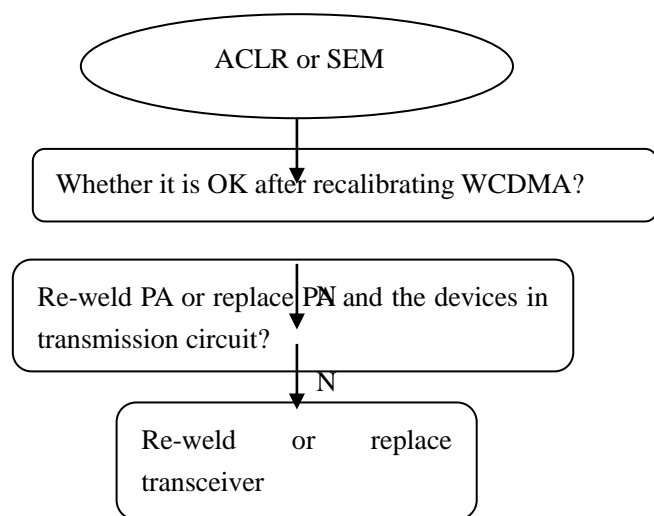
## 4.5 WCDMA comprehensive test

### 4.5.1 ACLR or SEM

Fault: ACLR or SEM

Cause: No calibration or WCDMA PA (U2202,U2203) is in cold solder joint; RF transceiver (U2105) doesn't work well.

Repair manner:



### 4.5.2 ILPC comprehensive test abnormal

Fault: ILPC

Cause: No calibration or just passing calibration.

Repair manner: The same as 4.5.1.

### 4.5.3 FrequencyErr

Fault: FrequencyErr

Cause: No calibration, or suffered outside interference

Repair manner: Recalibrate WCDMA and test; replace U2104.

## 5. Structure assembly

### a) 5.1 Assembly process sequence of Lenovo A516 main body

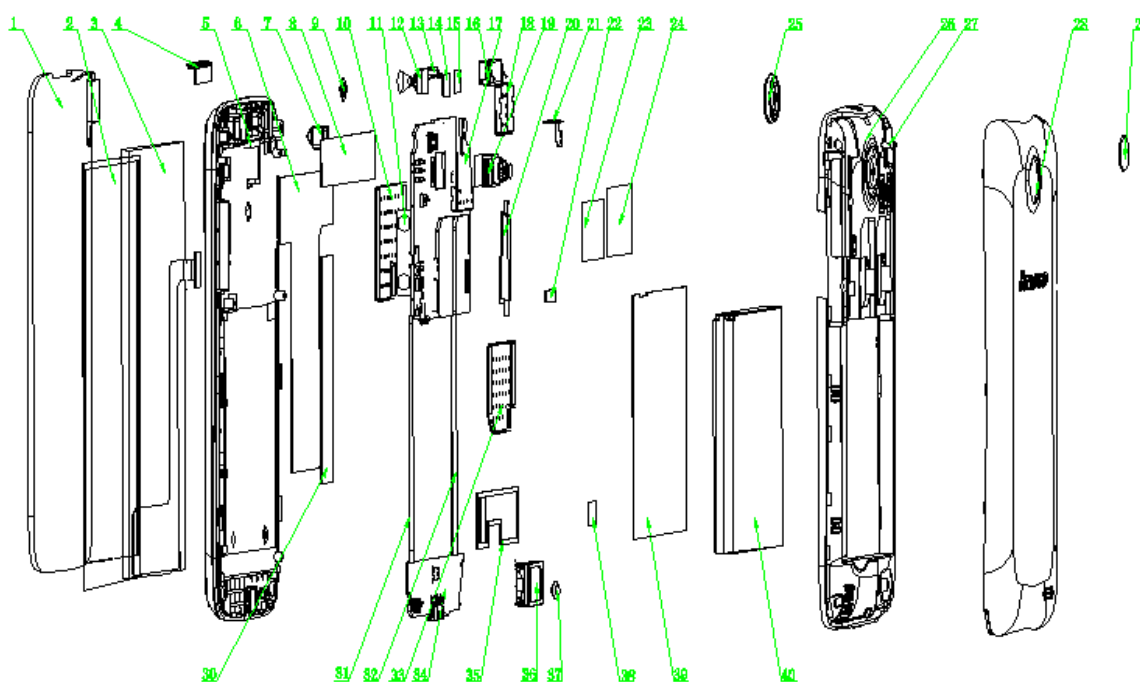


Figure 5-2 Exploded View of LENOVO A516 Main body Part Assembly

As the explode drawing 5-2

- 2) Assemble BB Shielding(10) to Main PCB(17) ;Assemble Conductive Adhesives of shielding(23/24) to BB Shielding and RF Shielding ;
- 3) Assemble Volume Key FPC(22) and Power Key FPC(21)to Main PCB(17);

REMARK: All units of the Front Housing Assembly have been assembled already.

- 4) Assemble Three LCD conductive adhesive(8/30) and LCD Thermal conductivity of graphite and LCD(3) to the Front Housing Assembly(5). Watch out the Location of the Position Line;
- 5) Assemble The LCD buffer foam (2) to the TP component(1) by the jig paste ;
- 6) The assembly hole of the sensor module TP through the front shell, the TP module (1) attached to the front housing corresponds to the position of the sinking platform;
- 7) Fix Receiver (16) and P-sensor silica gel(7) to the Front Housing Assembly too;

REMARK: All units of the Front Housing Assembly have been assembled already.

- 8) Fix Front camera to Front Housing; Fix Main FPC and Cable Line to Main PCB; Assemble Main PCB(5) to the Front Housing Assembly, and fasten them by five PCS Screws(27);Fix TP FPC and LCD FPC and Front Camera and Back Camera to Main PCB;
- 9) Fix Main FPC to Front Housing Assemble;
- 10)Fix Loudspeaker Seal Foam(35) and Sub PCB Conductive Adhesives and Speaker Conductive to Sub PCB Assembly; Fix MIC Silicone Case to MIC;
- 11) Fix Main PFC(32) to Sub PCB Assembly, Fix Assemble PCB to the Front Housing Assembly;

12) organized Main PFC and Cable

13) Assemble Battery Compartment Stickers (39) to Stainless Steel Frame for Cell;

REMARK: All units of Front Housing Assembly have been assembled already.

14) Assemble Volume Key(20) and Power Key (13) to the Back Housing Assembly;

15) Assemble Loudspeaker (36) to the Back Housing Assembly(26);

16) Assemble the Assembled Back Housing Assembly to Front Housing Assembly, Assemble Battery Compartment Stickers and Network Card and Main Label to Stainless Steel Frame for Cell;

17) Fasten them by Six Screws (27);

18) Assemble Camera Lens (29) to the Back Housing Assembly(26);

19) Assemble Battery Cell(40) to the assembly;

20) Assemble Battery Cover(28) to the assembly, Open the phone.

That is the process of A516 mobile assembly

## **5.2 Precautions in Lenovo A516 main body assembly**

1) Fastening the Screws needs appropriate strength, after fastening must check up that the up and down cover is locked in place, and without looseness;

2) Pressure shall be ensured when assembling CTP components to

make it fully paste with front shell;

- 3) When Assembling the TP FPC, it must make sure Connector fasten in place;
- 4) When Assembling the LCD FPC and Back Placed Camera, it must make sure Connector fasten in place
- 5) When Assembling Cable, it must make sure that the Cable is very tidy, lest Cable offsets and interfere with shell.

### **5.3 Precautions in disassembly of Lenovo A516 main body for repairing**

- 1) Disassemble the board connector of LCD, CTP and FPC before disassembling main board;
- 2) The PCB is thinner, Be careful when disassembling the PCB;
- 3) Be careful when disassembling CTP to prevent FPC from being pulled apart.