

SAMSUNG

Mobile Device
SM- A015F/M/V/A/B/W
Common

SERVICE

Manual

Mobile Device

CONTENTS



1. Safety Precautions
2. Specification
3. Product Function
4. Level 2 Repair
5. Level 3 Repair

Notice: All functionality, features, specifications, and other product information provided in this document, including but not limited to, benefits, design, pricing, components, performance, availability, and capabilities of the product are subject to change without notice. Samsung reserves the right to alter this document or the product described herein at anytime, without obligation to provide notification of such changes.

2. Specification

2-1. GSM General Specification

Item		GSM 850	EGSM 900	DCS1800	PCS1900
Freq. Band[MHz] Uplink/Downlink		824~849 869~894	880~915 925~960	1710~1785 1805~1880	1850~1910 1930~1990
ARFCN range		128~251	0~124 & 975~1023	512~885	512~810
Tx/Rx spacing		45MHz	45MHz	95MHz	80MHz
Mod. Bit rate/ Bit Period		270.833kbps 3.692us	270.833kbps 3.692us	270.833kbps 3.692us	270.833kbps 3.692us
Time Slot Period/ Frame Period		576.9us 4.615ms	576.9us 4.615ms	576.9us 4.615ms	576.9us 4.615ms
Modulation	GSM/ EGPRS	GMSK/ 8PSK	GMSK/ 8PSK	GMSK/ 8PSK	GMSK/ 8PSK
MS Power		33dBm~5dBm	33dBm~5dBm	30dBm~0dBm	30dBm~0dBm
Power Class		4(GMSK) E2(8PSK)	4(GMSK) E2(8PSK)	1(GMSK) E2(8PSK)	1(GMSK) E2(8PSK)
Sensitivity		-102dBm	-102dBm	-100dBm	-100dBm
TDMA Mux		8	8	8	8

2. Specification

2-2. GSM Tx Power Class

TX Power control level	GSM850	TX Power control level	EGSM900	TX Power control level	DCS1800	TX Power control level	PCS1900
5	33±2 dBm	5	33±2 dBm	0	30±3 dBm	0	30±3 dBm
6	31±2 dBm	6	31±2 dBm	1	28±3 dBm	1	28±3 dBm
7	29±2 dBm	7	29±2 dBm	2	26±3 dBm	2	26±3 dBm
8	27±2 dBm	8	27±2 dBm	3	24±3 dBm	3	24±3 dBm
9	25±2 dBm	9	25±2 dBm	4	22±3 dBm	4	22±3 dBm
10	23±2 dBm	10	23±2 dBm	5	20±3 dBm	5	20±3 dBm
11	21±2 dBm	11	21±2 dBm	6	18±3 dBm	6	18±3 dBm
12	19±2 dBm	12	19±2 dBm	7	16±3 dBm	7	16±3 dBm
13	17±2 dBm	13	17±2 dBm	8	14±3 dBm	8	14±3 dBm
14	15±2 dBm	14	15±2 dBm	9	12±4 dBm	9	12±4 dBm
15	13±2 dBm	15	13±2 dBm	10	10±4 dBm	10	10±4 dBm
16	11±3 dBm	16	11±3 dBm	11	8±4 dBm	11	8±4 dBm
17	9±3 dBm	17	9±3 dBm	12	6±4 dBm	12	6±4 dBm
18	7±3 dBm	18	7±3 dBm	13	4±4 dBm	13	4±4 dBm
19	5±3 dBm	19	5±3 dBm	14	2±5 dBm	14	2±5 dBm
-	-	-	-	15	0±5 dBm	15	0±5 dBm

2. Specification

2-3. WCDMA General Specification

	WCDMA2100(B1)	WCDMA1900(B2)	WCDMA1700(B4)	WCDMA850(B5)	WCDMA900(B8)
Freq. Band[MHz] Uplink/Downlink	1920~1980 2110~2170	1850~1910 1930~1990	1710~1750 2110~2150	824~849 869~894	880~915 925~960
ARFCN range	UL: 9612~9888 DL: 10562~10838	UL: 9262~9538 DL: 9662~9938	UL: 1312~1513 DL: 1537~1738	UL: 4132~4233 DL: 4357~4458	UL: 2712~2868 DL: 2937~3088
Tx/Rx spacing	190MHz	80MHz	400MHz	45MHz	45MHz
Mod. Bit rate/ Bit Period	42.2Mbps(DL) 5.42Mbps(UL)	42.2Mbps(DL) 5.42Mbps(UL)	42.2Mbps(DL) 5.42Mbps(UL)	42.2Mbps(DL) 5.42Mbps(UL)	42.2Mbps(DL) 5.42Mbps(UL)
Time Slot Period/ Frame Period	WCDMA 10ms/0.667ms HSPA 2ms/0.667ms	WCDMA 10ms/0.667ms HSPA 2ms/0.667ms	WCDMA 10ms/0.667ms HSPA 2ms/0.667ms	WCDMA 10ms/0.667ms HSPA 2ms/0.667ms	WCDMA 10ms/0.667ms HSPA 2ms/0.667ms
Modulation	QPSK 16QAM 64QAM	QPSK 16QAM 64QAM	QPSK 16QAM 64QAM	QPSK 16QAM 64QAM	QPSK 16QAM 64QAM
MS Power (dBm)	25.7 ~ -49(↓)	25.7 ~ -49(↓)	25.7 ~ -49(↓)	25.7 ~ -49(↓)	25.7 ~ -49(↓)
Power Class	3(max+24dBm)	3(max+24dBm)	3(max+24dBm)	3(max+24dBm)	3(max+24dBm)
Sensitivity	-106.7dBm	-104.7dBm	-106.7dBm	-104.7dBm	-103.7dBm

2. Specification

2-4. LTE General Specification

	LTE Band1	LTE Band3	LTE Band5	LTE Band7	LTE Band8
Freq. Band[MHz] Uplink/Downlink	1920~1980 2110~2170	1710~1785 1805~1880	824~849 869~894	2500~2570 2620~2690	880~915 925~960
ARFCN range	UL:18000~18599 DL:0~599	UL:19200~19949 DL:1200~1949	UL:20400~20649 DL:2400~2649	UL:20750~21449 DL:2750~3449	UL:21450~21799 DL:3450~3799
Tx/Rx spacing (MHz)	190	95	45	120	45
Channel Bandwidth (MHz)	5/10/15/20	1.4/3/5/10/15/20	1.4/3/5/10	5/10/15/20	1.4/3/5/10
Modulation	QPSK,16/64QAM	QPSK,16/64QAM	QPSK,16/64QAM	QPSK,16/64QAM	QPSK,16/64QAM
MS Power (dBm)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)
Sensitivity (QPSK, BW 10MHz) (dBm)	-97	-94	-95	-95	-94

2. Specification

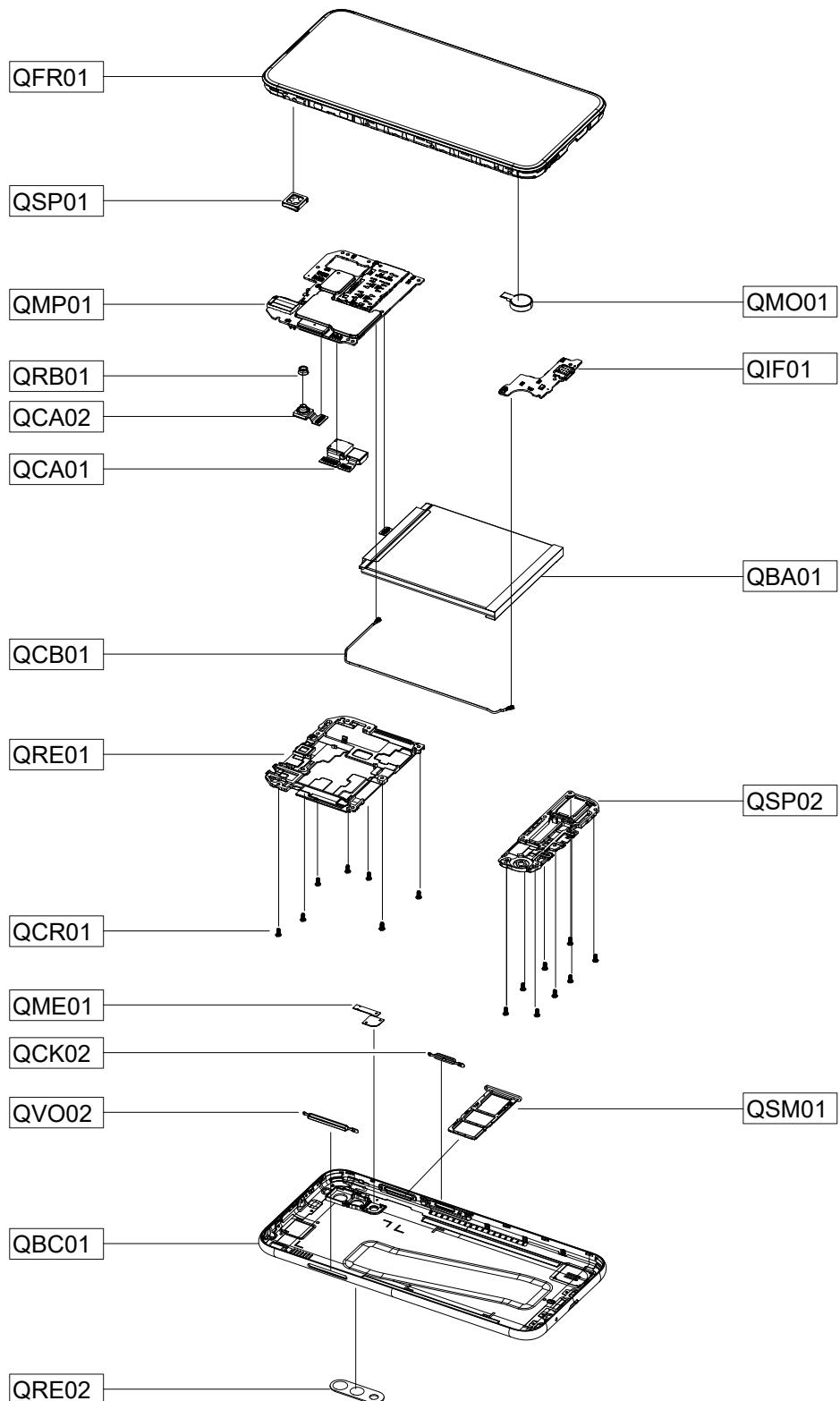
	LTE Band2	LTE Band4	LTE Band12	LTE Band17	LTE Band20
Freq. Band[MHz] Uplink/Downlink	1850~1910 1930~1990	1710~1755 2110~2155	699~716 729~746	704~716 734~746	832~862 791~821
ARFCN range	UL:18600~19199 DL:600~1199	UL:19950~20399 DL:1950~2399	UL:23010~23179 DL:5010~5179	UL:23730~23849 DL:5730~5849	UL:21450-24449 DL:6150-6449
Tx/Rx spacing (MHz)	80	400	30	30	41
Channel Bandwidth (MHz)	1.4/3/5/10/15/20	3/5/10/15/20	1.4/3/5/10	5/10	5/10/15/20
Modulation	QPSK,16/64QAM	QPSK,16/64QAM	QPSK,16/64QAM	QPSK,16/64QAM	QPSK,16/64QAM
MS Power (dBm)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)
Sensitivity (QPSK, BW 10MHz) (dBm)	-95	-97	-94	-94	-94
	LTE Band28		LTE Band38	LTE Band40	LTE Band41
Freq. Band[MHz] Uplink/Downlink	703~748 758~803		2570~2620	2300~2400	2535~2655
ARFCN range	UL:27210-27695 DL:9210-9659		UL/DL:37750 ~ 38249	UL/DL:38650 ~ 39649	UL/DL:40040 ~ 41240
Tx/Rx spacing (MHz)	55		0	0	0
Channel Bandwidth (MHz)	3/5/10/15/20		5/10/15/20	5/10/15/20	5/10/15/20
Modulation	QPSK,16/64QAM		QPSK,16/64QAM	QPSK,16/64QAM	QPSK,16/64QAM
MS Power (dBm)	25.7~-39(↓)		25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)
Sensitivity (QPSK, BW 10MHz) (dBm))	-95.5		-97	-97	-95

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4. Exploded View and Parts List

4-1. Cellular phone Exploded View



※ SVC REPAIR TAPE
QRT01, QRT02, QRT03
QRT05, QRT11, QRT12

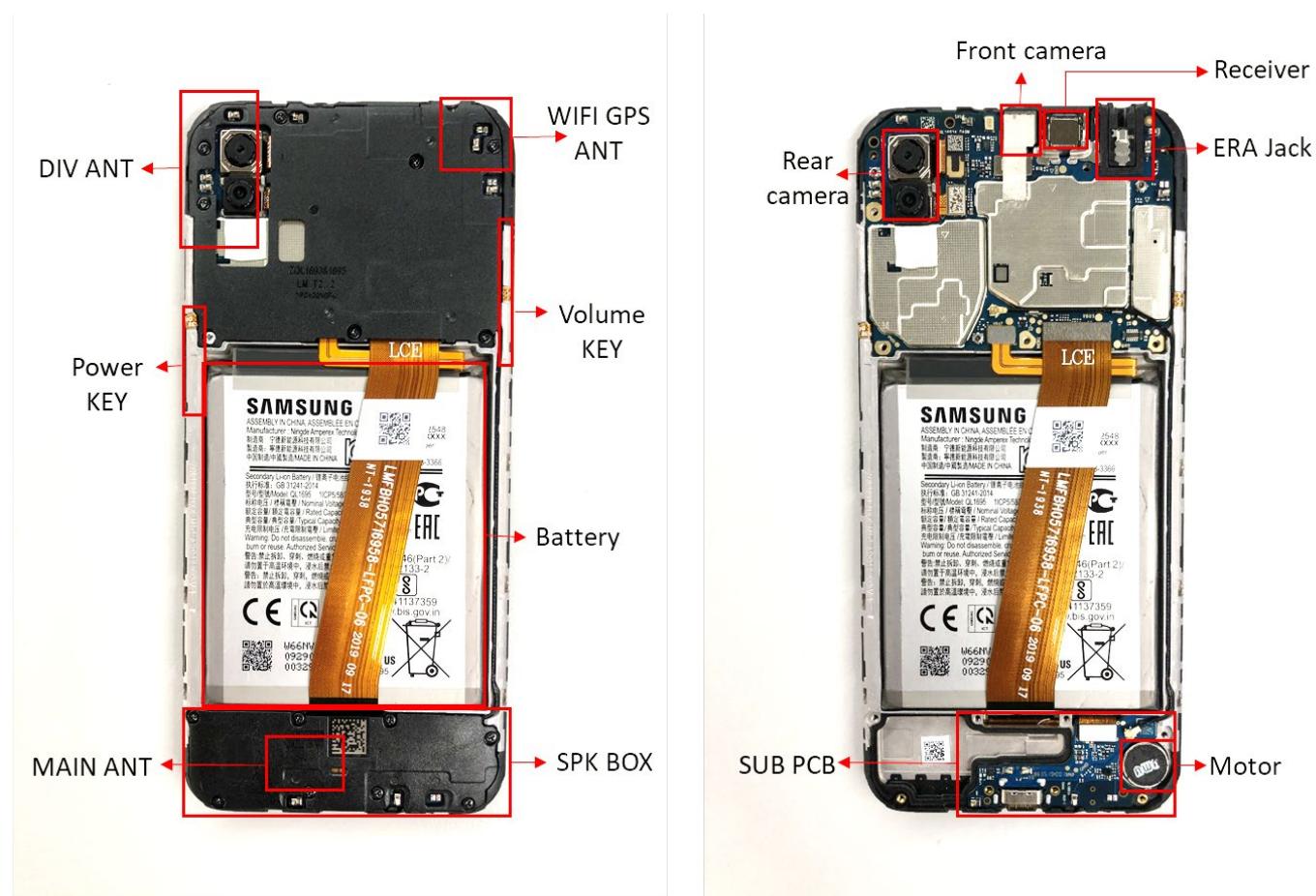
4. Exploded View and Parts List

4-2. Cellular phone Parts list

Design LOC	Description	SEC CODE
QBA01	A/S JDM BATT-ATL_ZQL1695_SM-A015F	GH81-18183A
QMP01	A/S JDM-MAIN PBA(COMM/ROW)_A015F/16_2	GH81-18197A
QRE02	A/S JDM-COVER_CAMERA_LENS_SM-A015F	GH81-18206A
QME01	A/S JDM-ETC_FPC_REAR_FLASH_SM-A015F	GH81-18207A
QIF01	A/S JDM-ASSY SUB PBA_KB_ASSY_SM-A015F	GH81-18208A
QFR01	A/S JDM-ASSY OCTA(E/BLK)_SM-A015F	GH81-18209A
QSP01	A/S JDM-SPEAKER_RCV_SM-A015F	GH81-18211A
QMO01	A/S JDM-MOTOR_SM-A015F	GH81-18212A
QCK02	A/S JDM-ETC_POWER_KEY_SM-A015F	GH81-18213A
QVO02	A/S JDM-ETC_VOLUME_7KEY_SM-A015F	GH81-18214A
QCA01	A/S JDM-CAMERA_REAR_MAIN/SUB_ASSY1_A015F	GH81-18219A
QRE01	A/S JDM-COVER_REAR_TOP_SM-A015F	GH81-18221A
QRB01	A/S JDM-ETC_RUBBER_FRONT_CAMERA_SM-A015F	GH81-18222A
QSM01	A/S JDM-ETC_SIM_TRAY_DUAL_BLUE_SM-A015F	GH81-18224A
QSP02	A/S JDM-SPEAKER_GLOBAL_SM-A015F	GH81-18231A
QCA02	A/S JDM-CAMERA_FRONT_SM-A015F_W-GC5035	GH81-18232A
QCB01	A/S JDM-CABLE_COAXIAL_SM-A015F	GH81-18233A
QCR01	A/S JDM-ETC_SCREW_COMMON_SM-A015F	GH81-18241A
QBC01	A/S JDM-BATT COVER_BLUE_CIS ONLY_SM-A015	GH81-18504A
QR0T1	A/S JDM-SHEET_THERMAL_CONDUCTIVE_A015F	GH81-18200A
QRT02	A/S JDM-TAPE_HEADSET FOAM_SM-A015F	GH81-18201A
QRT03	A/S JDM-SHEET_WATERPROOF_LABEL_A015F	GH81-18217A
QRT05	A/S JDM-TAPE_FRONT_CAM_CONDUCTIVE_A015F	GH81-18234A
QRT11	A/S JDM-TAPE_REAR_CAM_WINDOW_SM-A015F	GH81-18478A
QRT12	A/S JDM-SHEET_SEAL_LABEL_SM-A015F	GH81-18240A

7. Level 2 Repair

7-1. Components on the Rear Case



7. Level 2 Repair

7-2. Pre-requisite

	
Tweezers / Disass'y Stick / Screw Driver	Anti-static Gloves
	
Anti-static Mat	Disassemble stick
	
Ethyl Alcohol	Cotton Swab

7. Level 2 Repair

7-3. Disassembly

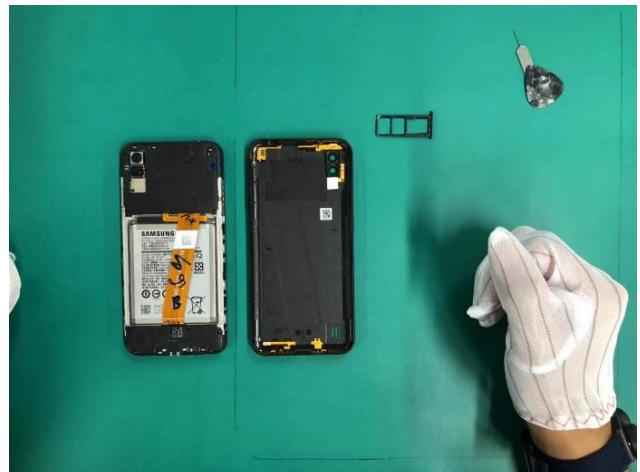
1

- 1) Turn off the phone and remove the SIM tray.
- 2) Separate the rear housing phone along the edge with a disassembly stick.



2

Separate the rear cover from the phone slowly.

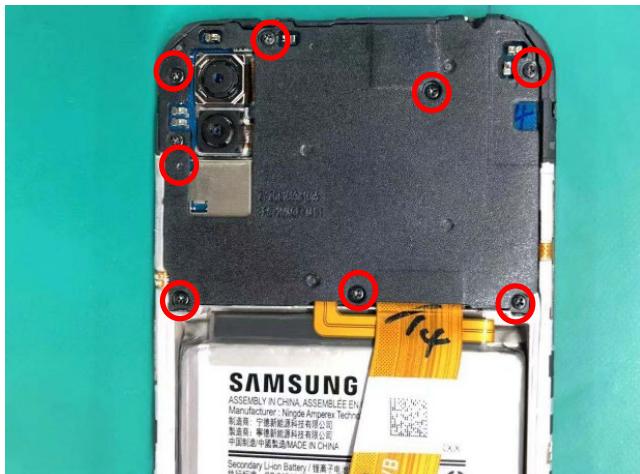


※ Caution

- 1) Be care of scratch

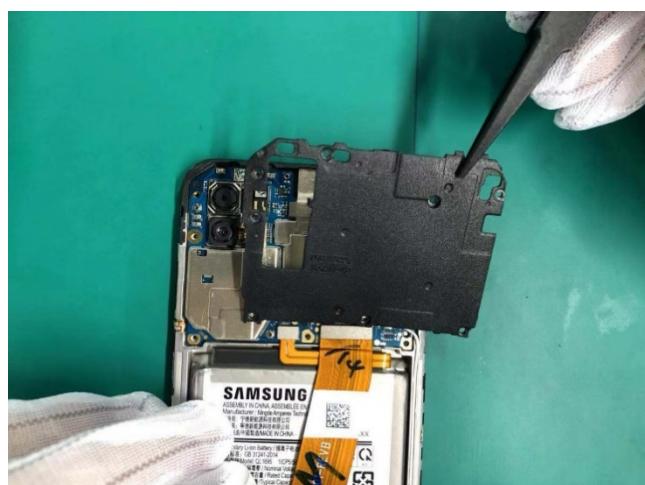
3

Disassemble 8pcs screws.



4

Remove the MB bracket slowly.



※ Caution

- 1) Be care of Rear damage

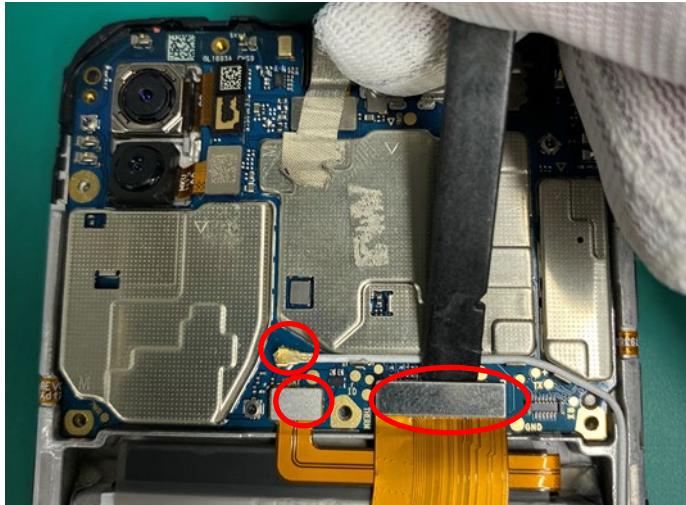
※ Caution

- 1) Be care of scratch
- 2) Be care of Rear and connector damage

7. Level 2 Repair

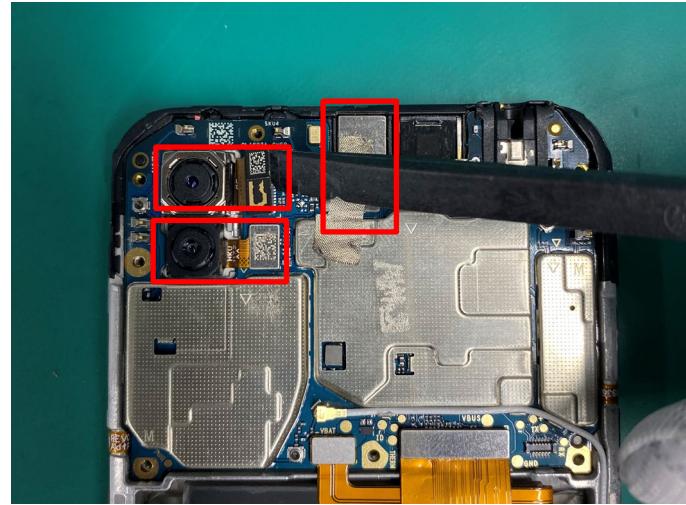
5

Disconnect the battery FPC by pry bar at first, and then disconnect the LCD FPC and the RF cable on MB.



6

Tear off all of the conductive cloth, Then Disassemble the front camera and 2 rear cameras.



※ Caution

- 1) Be care of scratch
- 2) Be care of Rear and connector damage
- 3) Be careful not to damage the MB

※ Caution

- 1) Be careful not to damage the PBA
- 2) Be care of scratch

7

Pry up the MB and remove it with the tweezer.



8

Disassemble 8cs screws and remove the KB bracket



※ Caution

- 1) Be care of scratch
- 2) Be care of connector/cable damage

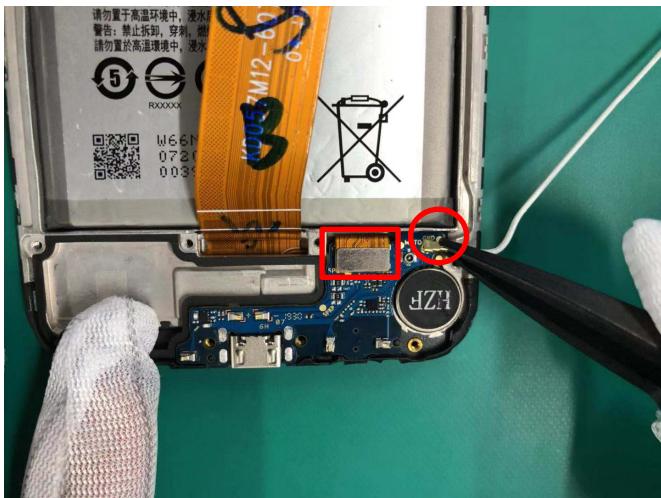
※ Caution

- 1) Be care of FPCB scratch

7. Level 2 Repair

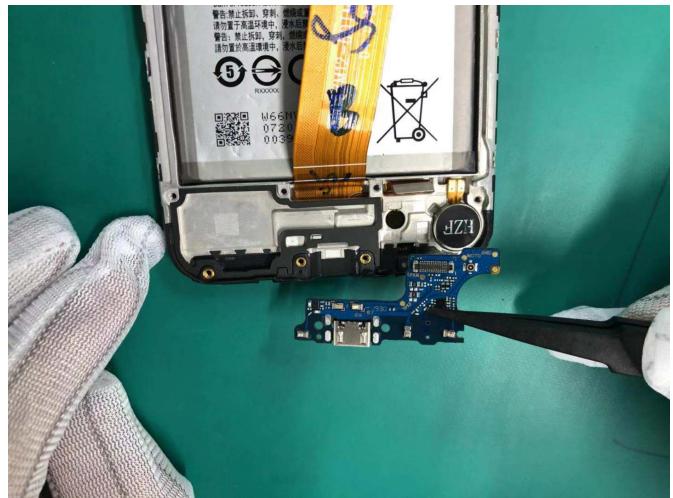
9

Disconnect the link FPC and the RF cable on KB



10

Pry up the KB by pry bar and remove the KB by tweezer



※ Caution

1) Be care of several kinds of damage

※ Caution

1) Be careful not to damage the KB

11

End of disassembly.

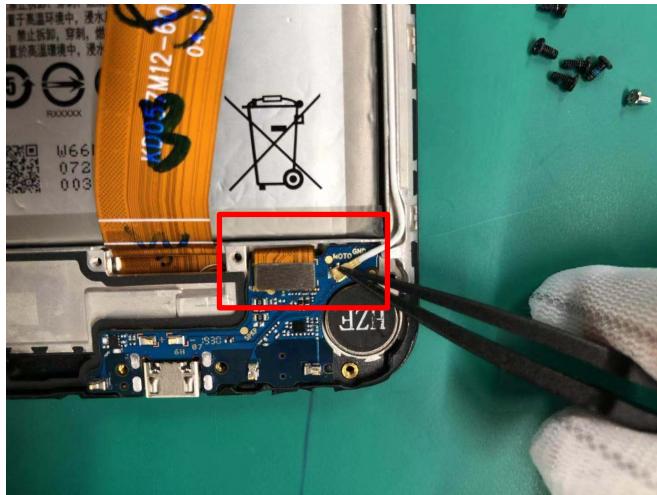


7. Level 2 Repair

7-4. Assembly

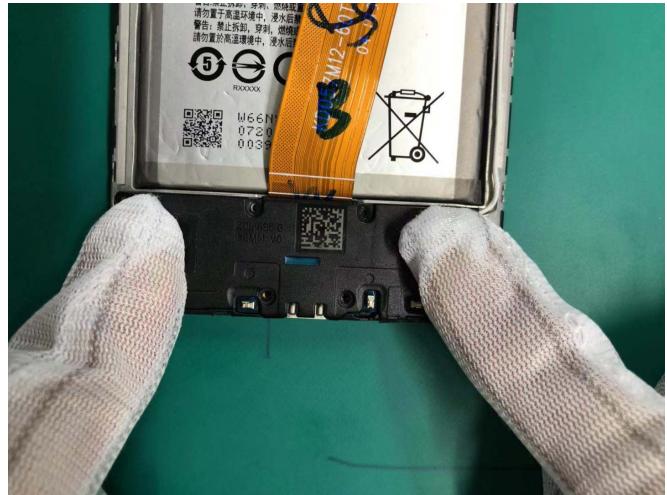
1

Put the battery back , Attach KB on the bracket and connect the link FPC, Assemble the RF cable on KB.



2

Assemble the bracket, and press the bracket by hand.



※ Caution

- 1) Be care of coaxial cable damage

3

Screw the 8pics screws.
Torque force : $0.7 \pm 0.05\text{kgf} \pm 0.05\text{kgf}$

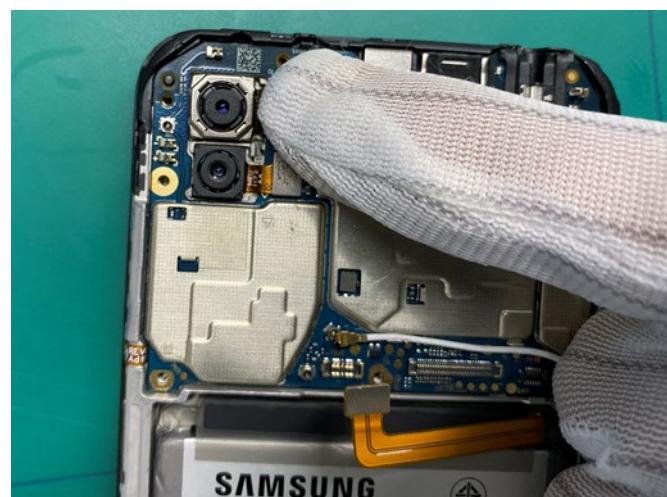


※ Caution

- 1) Be care of press power/time

4

- 1) Attach the MB on the phone
- 2) Assemble the 2 rear cameras and the front camera
- 3) Attach conductive cloth



※ Caution

- 1) Be care of chip damage nearby screw point.

※ Caution

- 1) Be care of Push SUB PBA connector.
- 2) Be care of components FPCB.

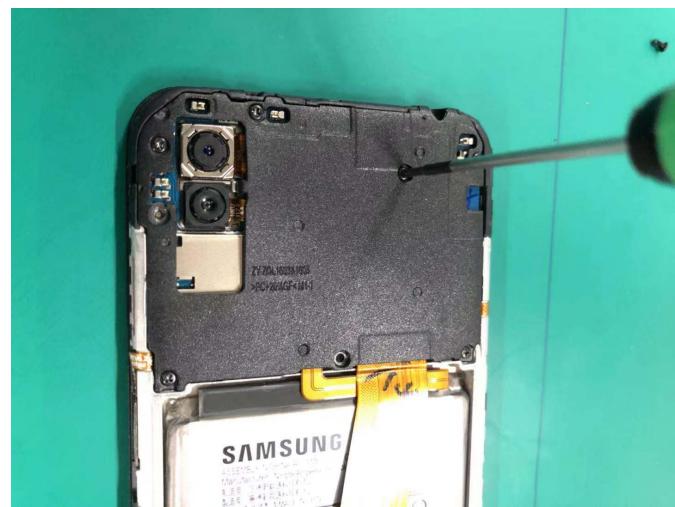
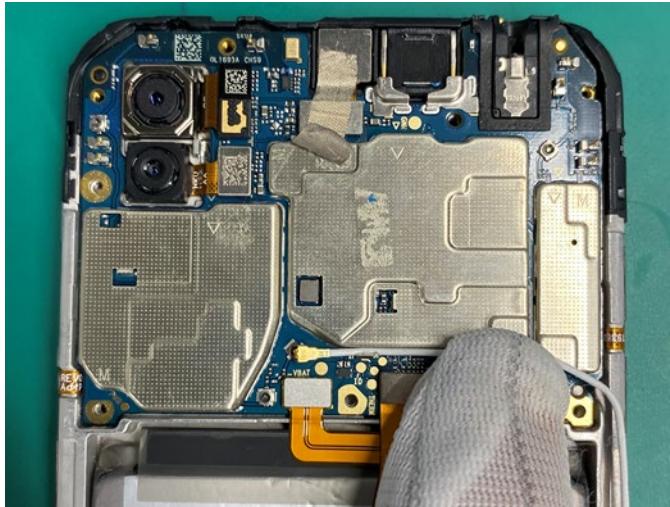
7. Level 2 Repair

5

Connect the LCD FPC and the battery FPC, and Assemble the RF cable on KB

6

Assemble the MB bracket and assemble the 8pics screws.
. Torque force : $0.7\pm0.05\text{kgf}\pm0.05\text{kgf}$



※ Caution

- 1) Be care of Push SUB PBA connector.
- 2) Be care of components FPCB

※ Caution

- 1) Be care of scrach

7

Assemble the rear cover.

8

Assemble the SIM tray.



※ Caution

- 1) Be care of scratch and REAR damage

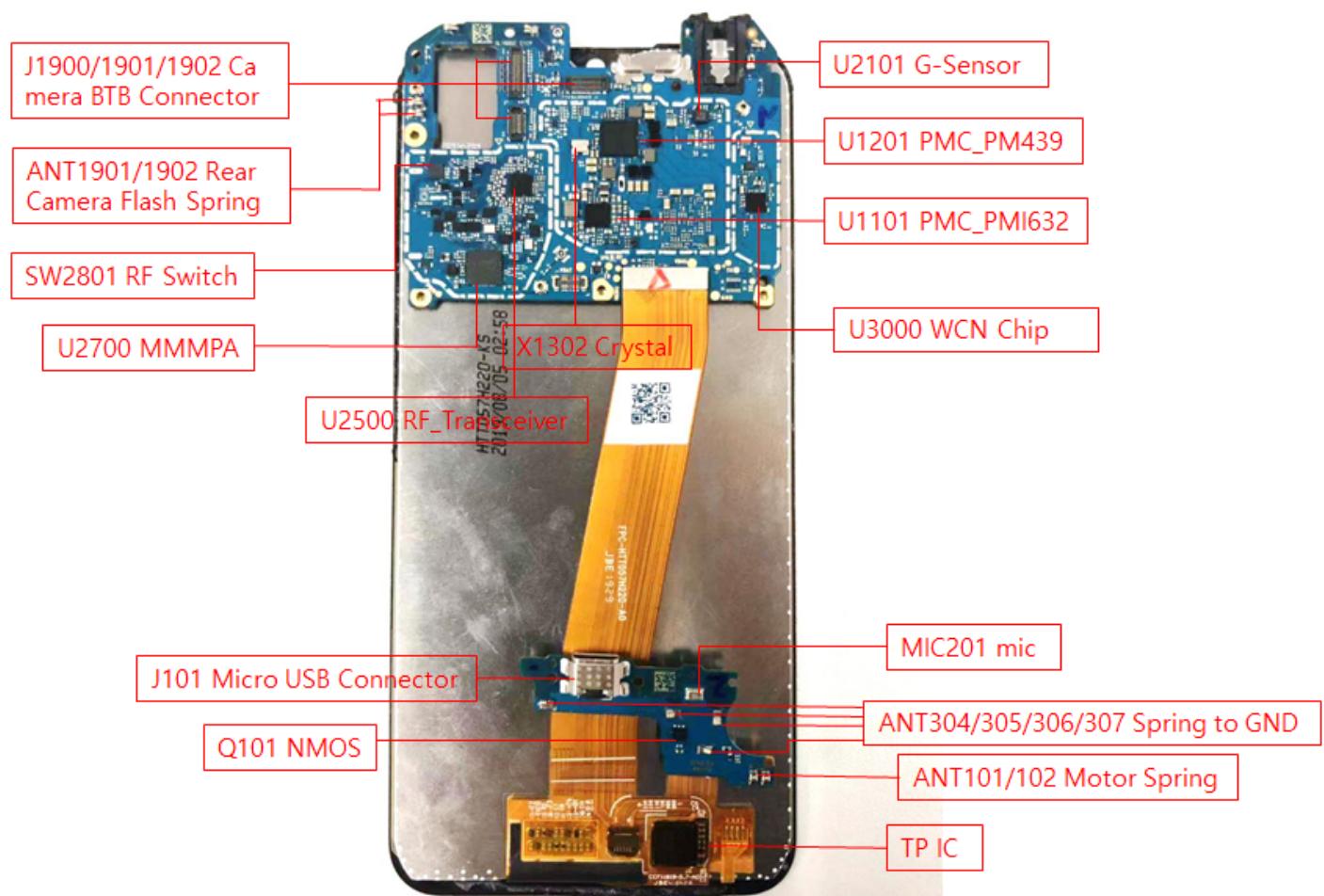
※ Caution

- 1) Be care of scratch and REAR damage

8. Level 3 Repair

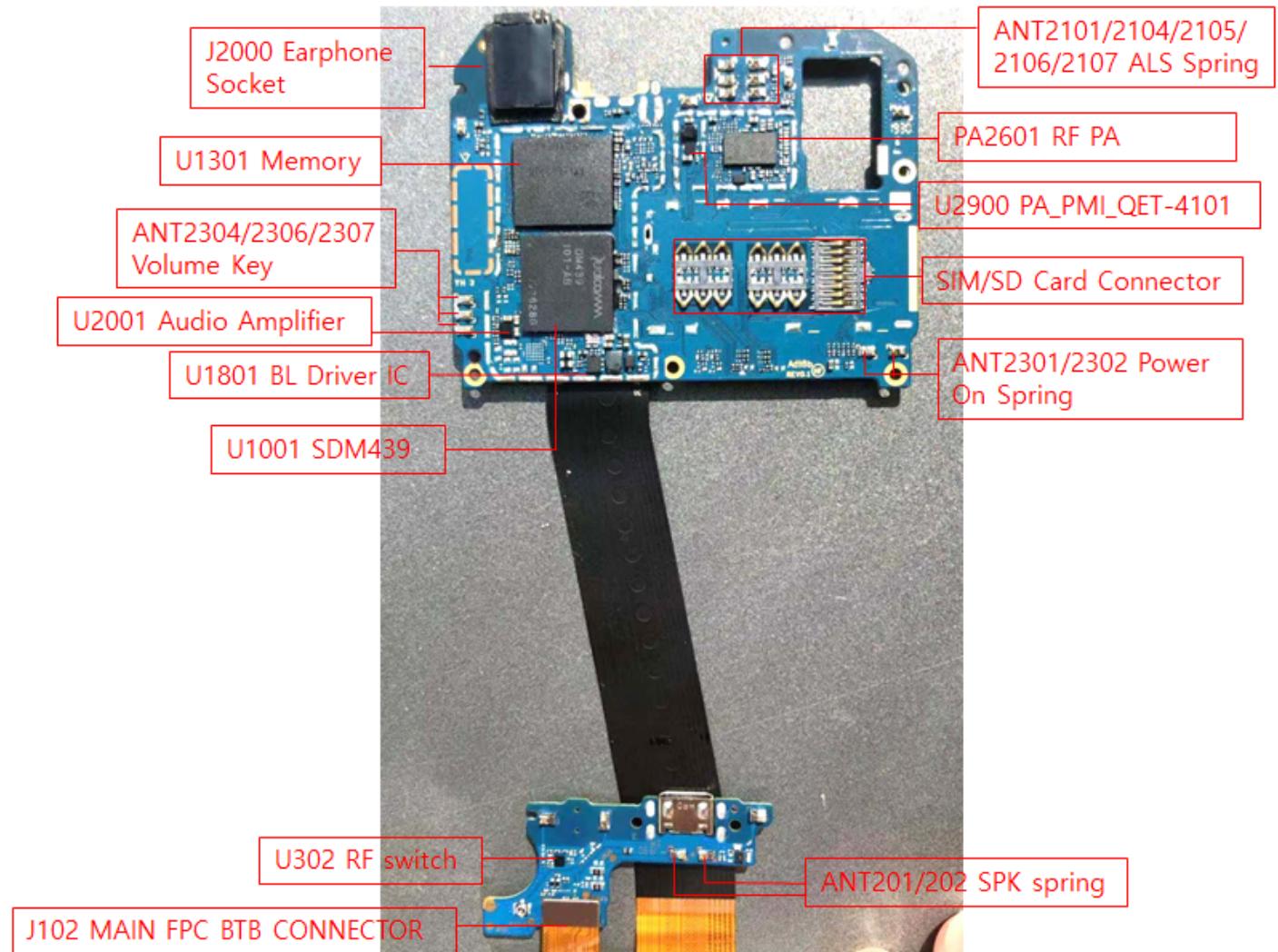
8-1. Components Layout

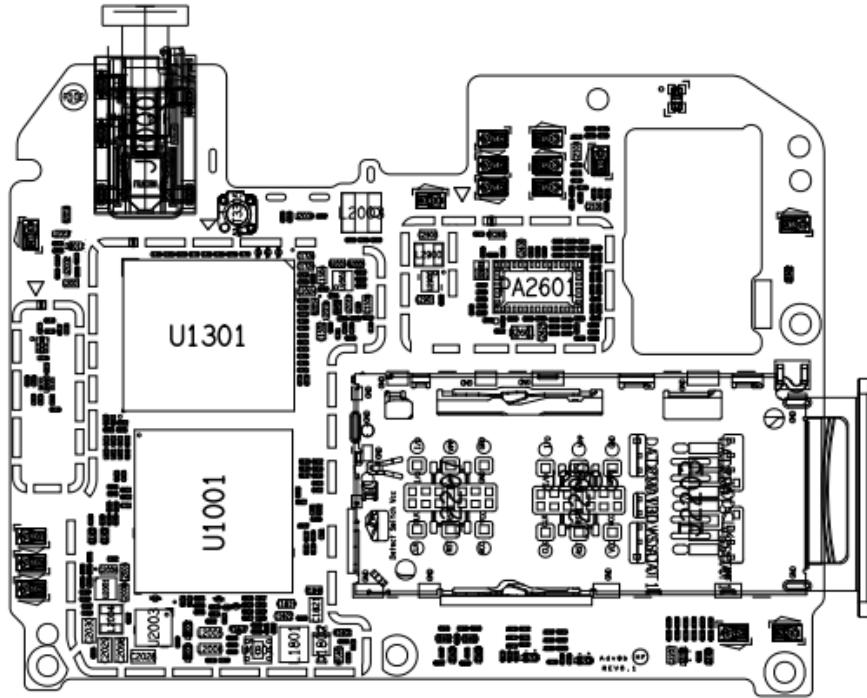
PBA TOP Side



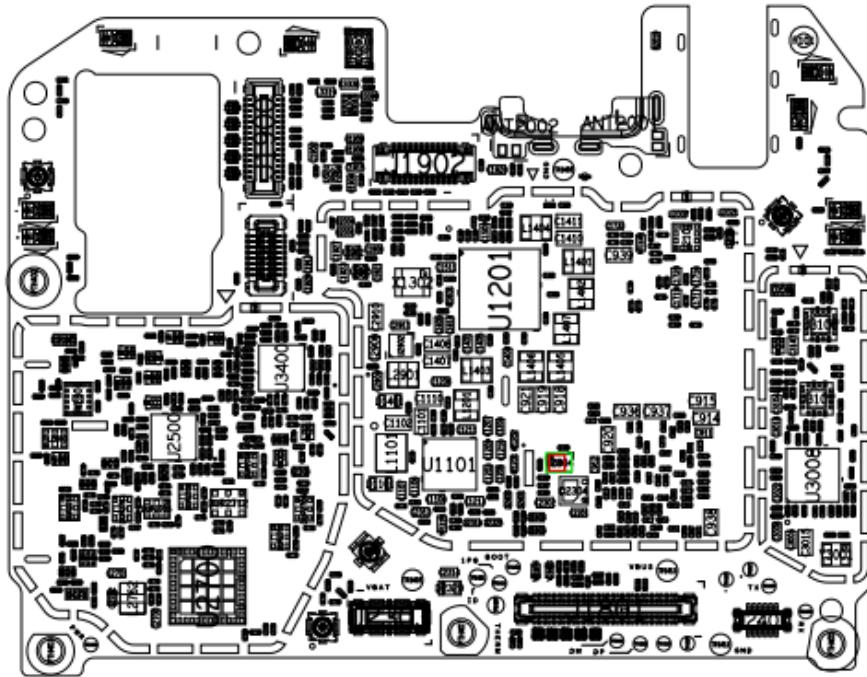
8. Level 3 Repair

PBA BOT Side



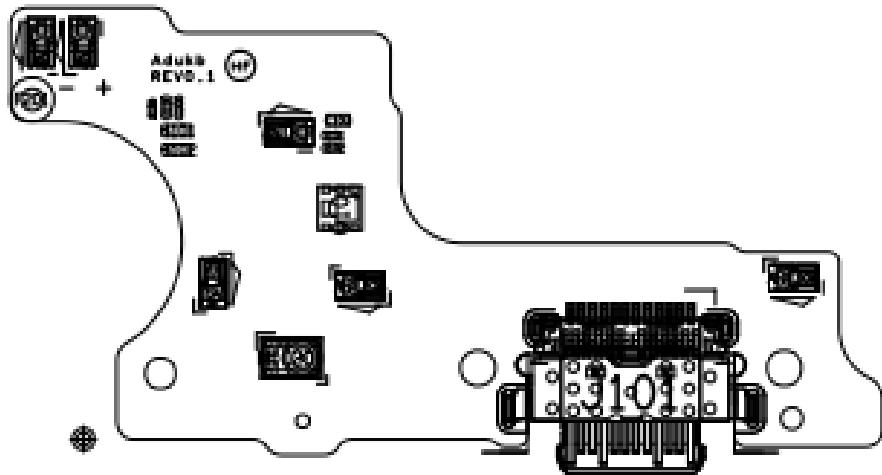


ART FILM - Assembly_Bottom



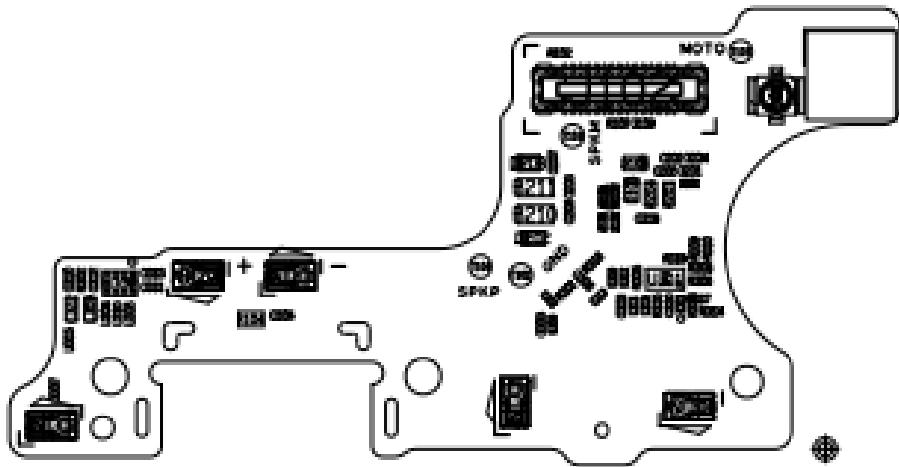
ART FILM - Assembly_Bottom

ART FILM - Assembly_Top



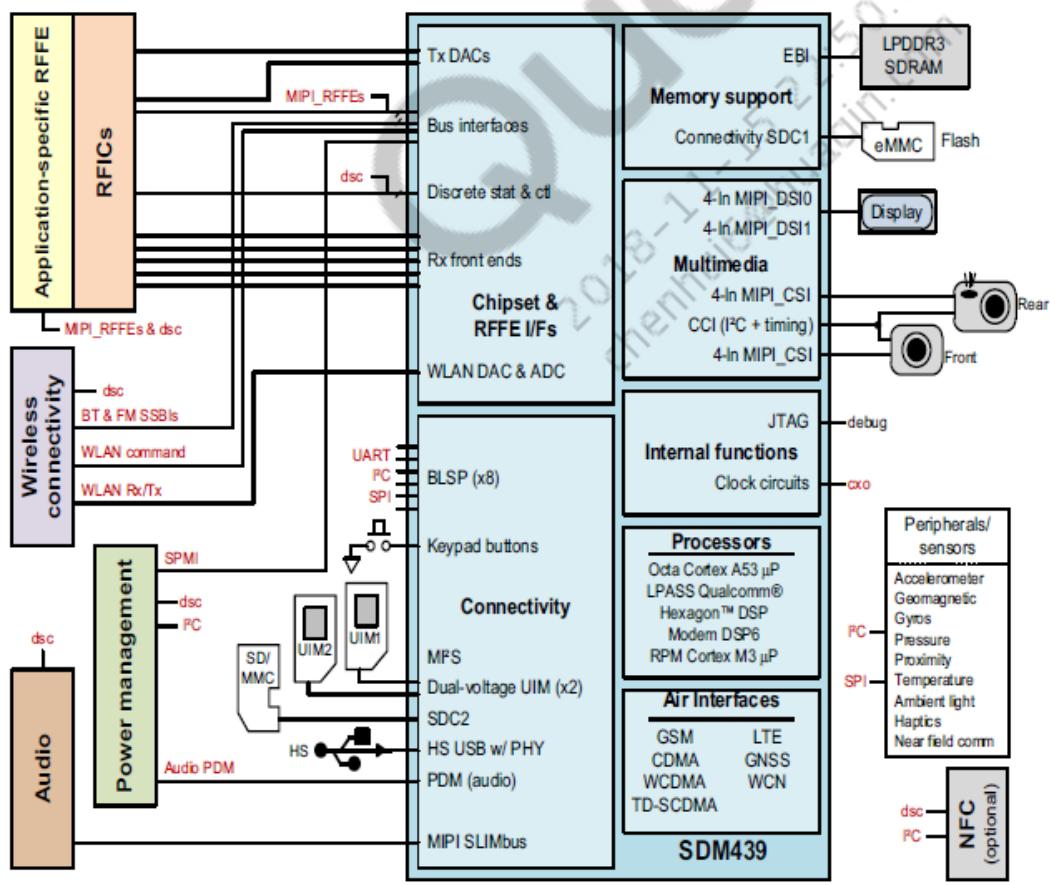
ART FILM - Assembly_Top

ART FILM - Assembly_Bottom

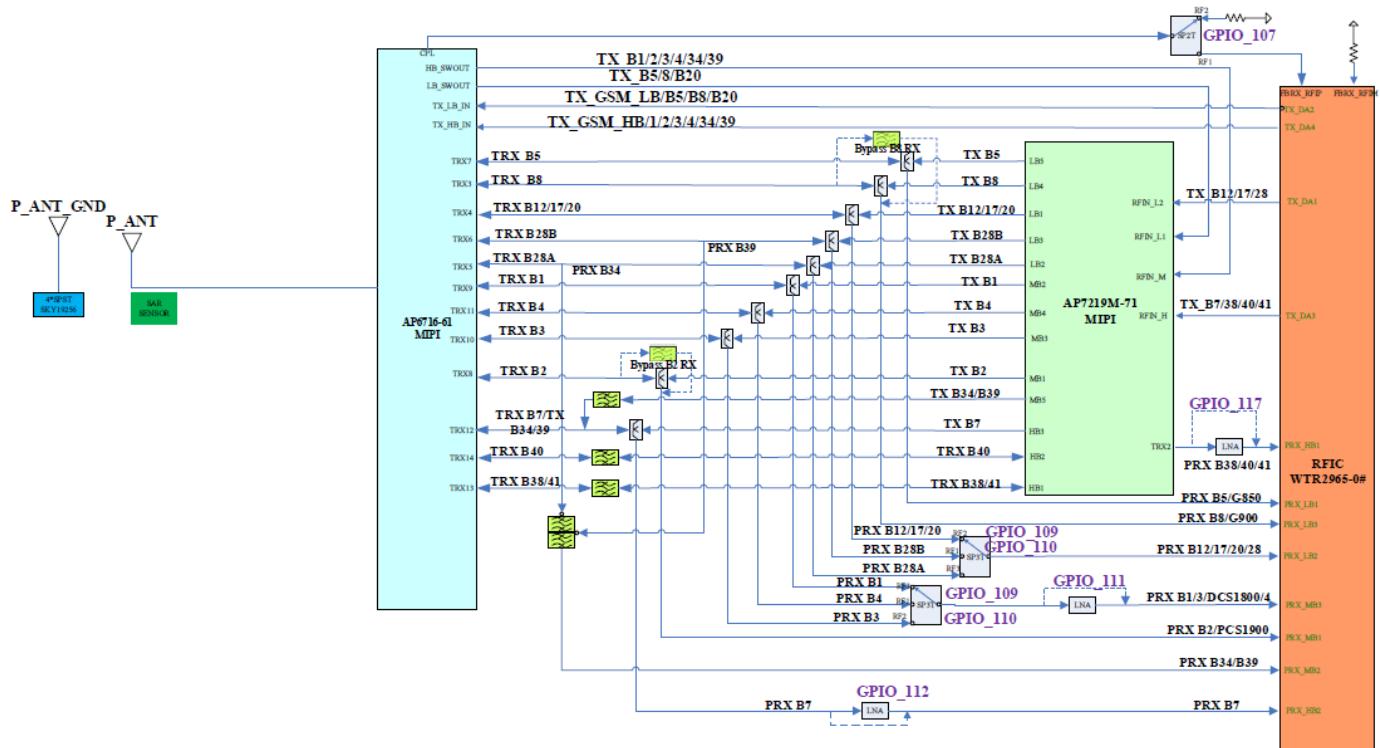


ART FILM - Assembly_Bottom

8. Level 3 Repair



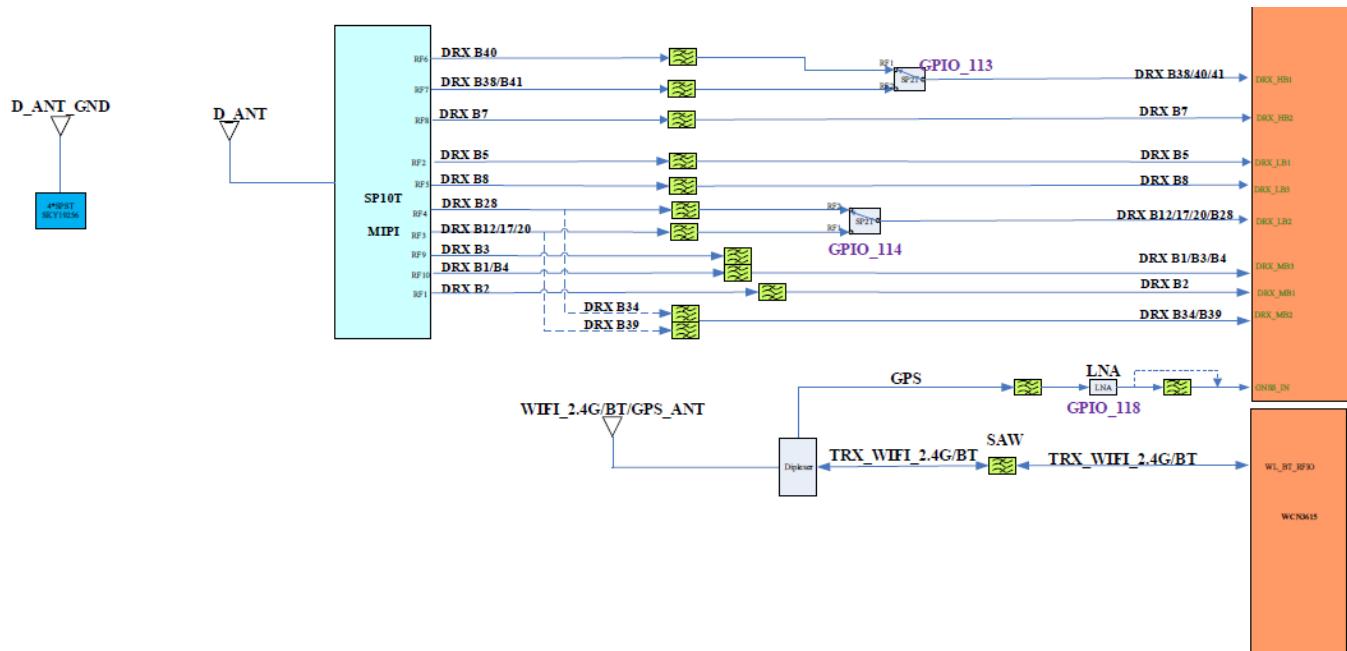
ZQL1695 RF Block Diagram



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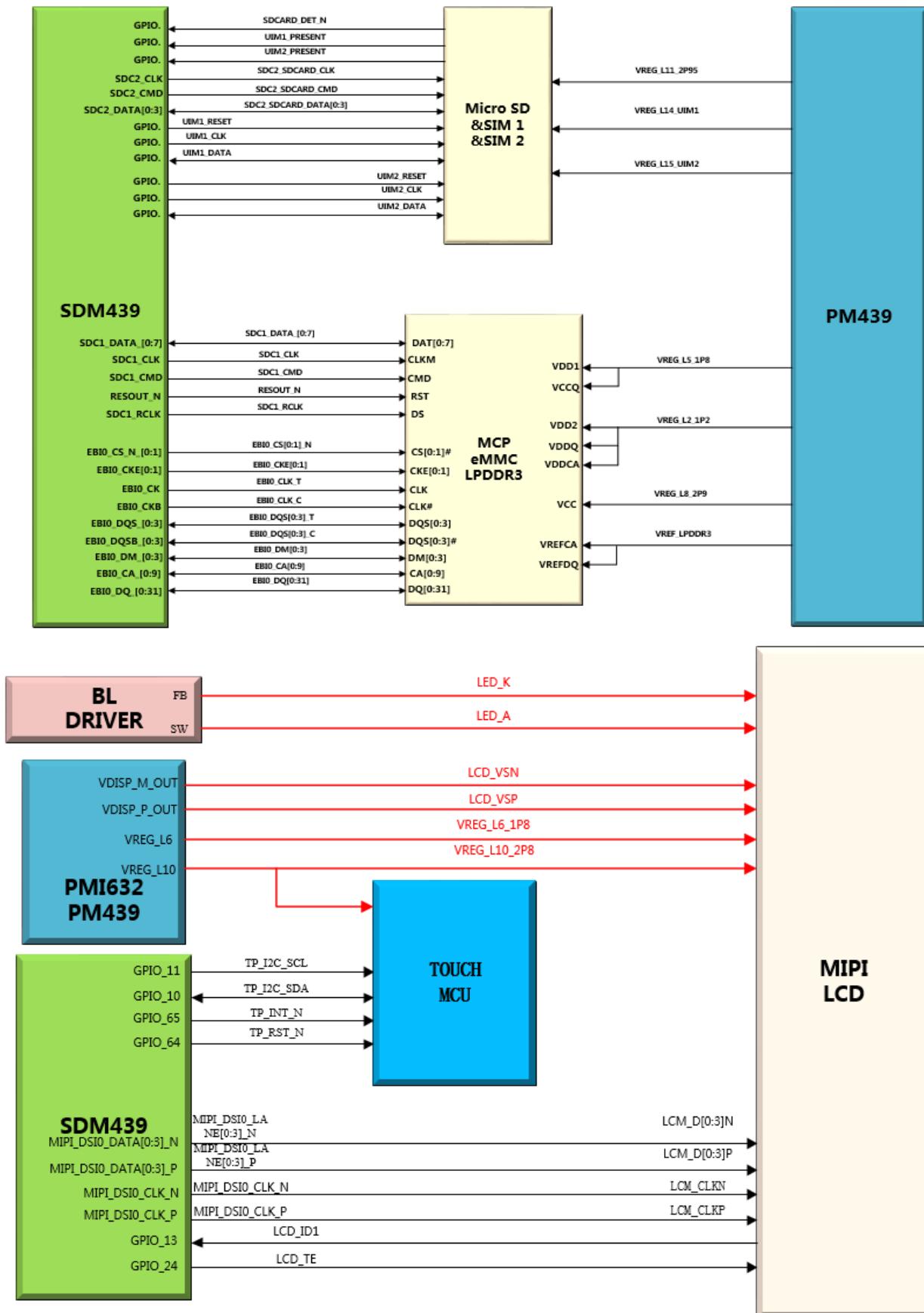
8. Level 3 Repair



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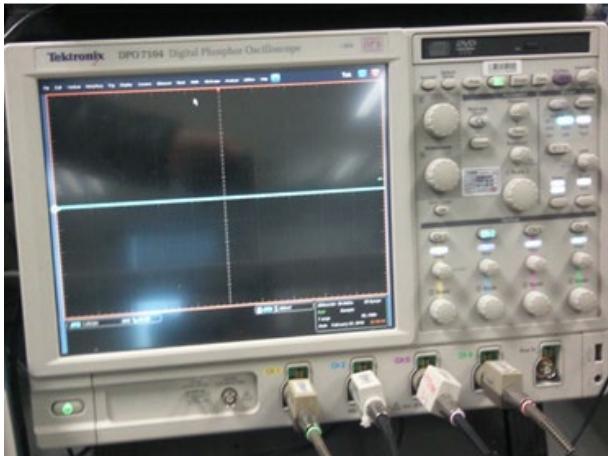
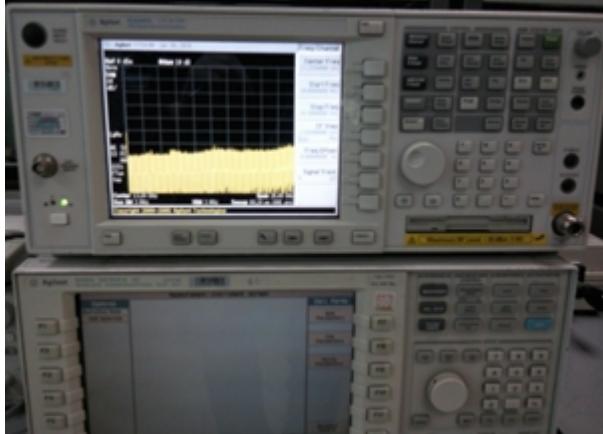
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8. Level 3 Repair



8. Level 3 Repair

8-3. Flow chart of Troubleshooting.

	
Oscilloscope	Digital Multimeter
	
Power Supply	+ driver, ESD Safe Tweezer
	
8960 & Spectrum Analyzer	Soldering iron

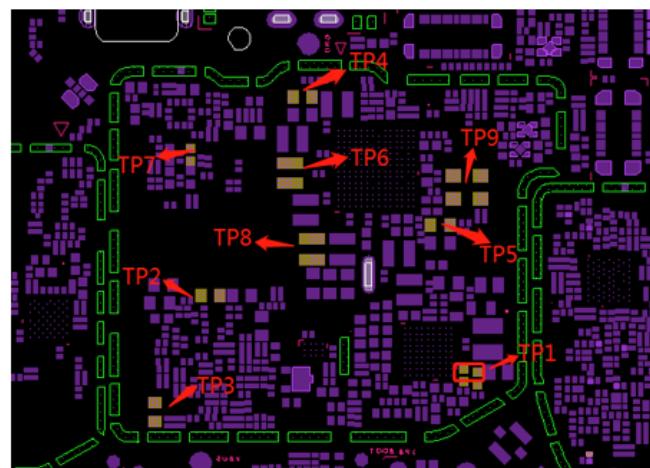
8. Level 3 Repair

8-4-1. Power On

■ Checking Power signal (Battery connector, PMU, Clock)

CHECKING FLOW	IMAGE
<pre> START ↓ {Battery voltage higher than 3.5V?} YES → Check test points NO → Change battery or charging the battery ↓ {Check test points} NO → Re-solder or change PMU YES → Check clock ↓ {Check clock} NO → Re-solder or change PMU YES → Device can power on ↓ Re-solder or change X1302、J101、U1301、U1001 </pre>	

Power on voltage check				
Power Domain	Configurable Voltage	Signal Name	Measurement Location	TP
VPH_PWR	3.0~5.25V	VPH_PWR	C1106/C1107	TP1
VDD_MEM	0.915V	VREG_S7_OP915	C937	TP2
VDD_CORE	0.8625V	VREG_S1_OP8625	C938	TP3
PM439_LDO	2.05V	VREG_S4_2P05	C1411	TP4
PM439_LDO	1.225V	VREG_S3_1P225	C1408	TP5
PM439_LDO	0.8625V	VREG_S2_OP8625	L1402	TP6
LP-DDR3	1.2V	VREG_L2_1P2	C1720	TP7
APC	0.862V	VREG_S5_S6_OP86 25	L1405	TP8



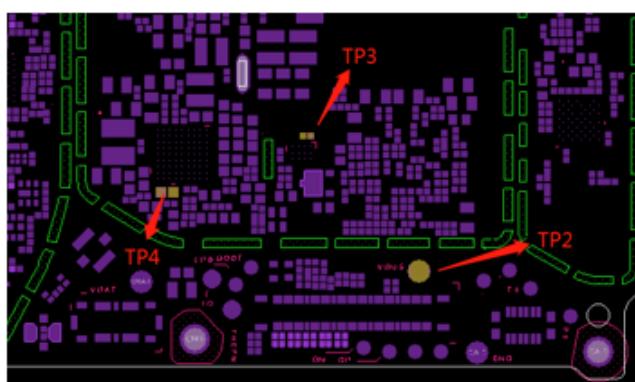
➤ Oscillate frequency measurement

Signal Name	Frequency MHz	Measurement Location	TP
XTAL_19M_IN	19.2M	X1302	TP9

8. Level 3 Repair

8-4-2. Charging

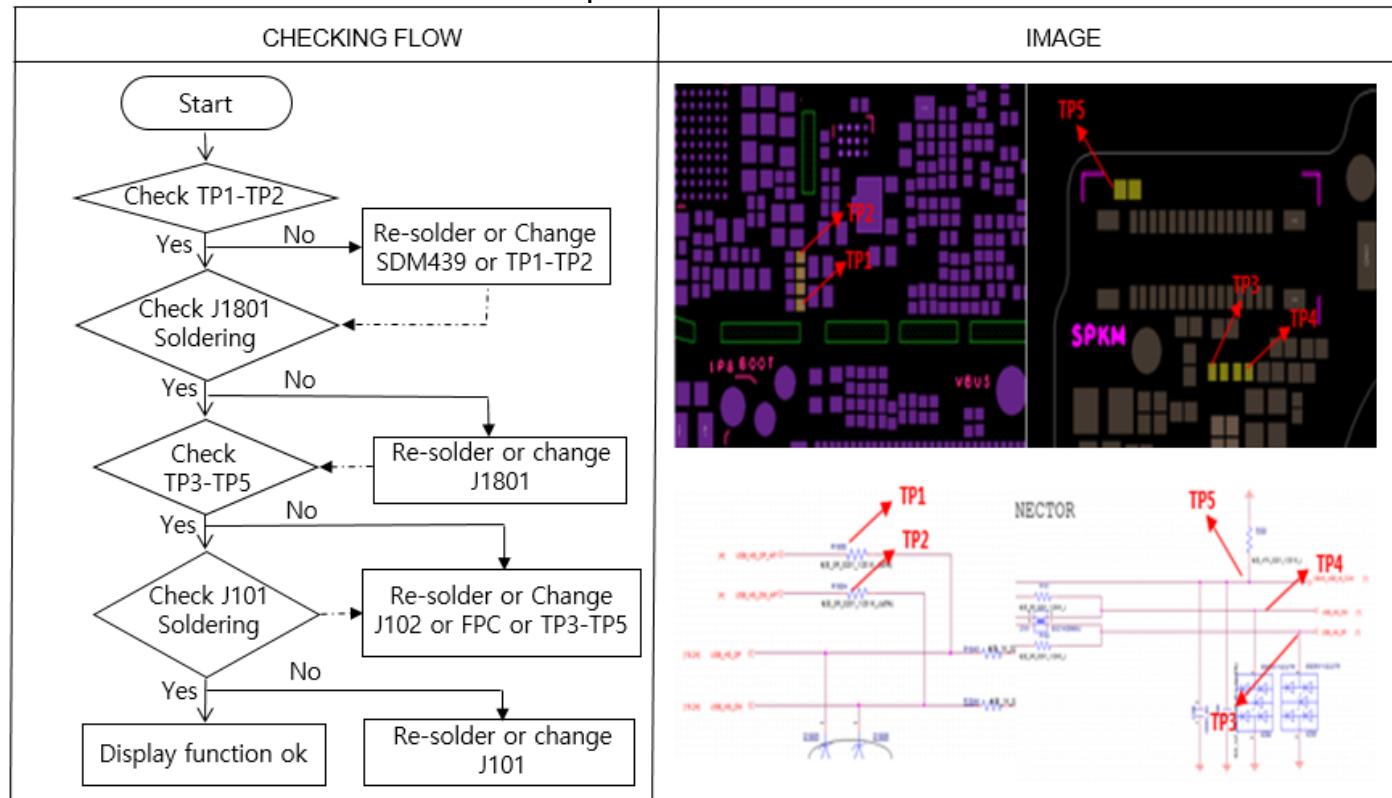
The charging controlled by PMU chip PM660 (U1501)

CHECKING FLOW	IMAGE
<pre>graph TD; START([START]) --> CheckTP1{Check TP1}; CheckTP1 -- NO --> ReSolderJ101[Re-solder or change usb J101]; CheckTP1 -- YES --> CheckTP2{Check TP2(vbus)}; CheckTP2 -- NO --> ReSolderJ102[Re-solder or change J102/J1801/FPC]; CheckTP2 -- NO --> ReSolderU2304[Re-solder or change U2304]; CheckTP2 -- YES --> CheckTP3{Check TP3}; CheckTP3 -- NO --> ReSolderU1101[Re-solder or change U1101]; CheckTP3 -- YES --> CheckTP4{Check TP4}; CheckTP4 -- NO --> ReSolderU1101; CheckTP4 -- YES --> CheckBattery{Check battery}; CheckBattery -- NO --> ChangeBattery[Change battery]; CheckBattery -- YES --> ChargeFunctionOK[Charge function OK]</pre>	 

8. Level 3 Repair

8-4-3. USB

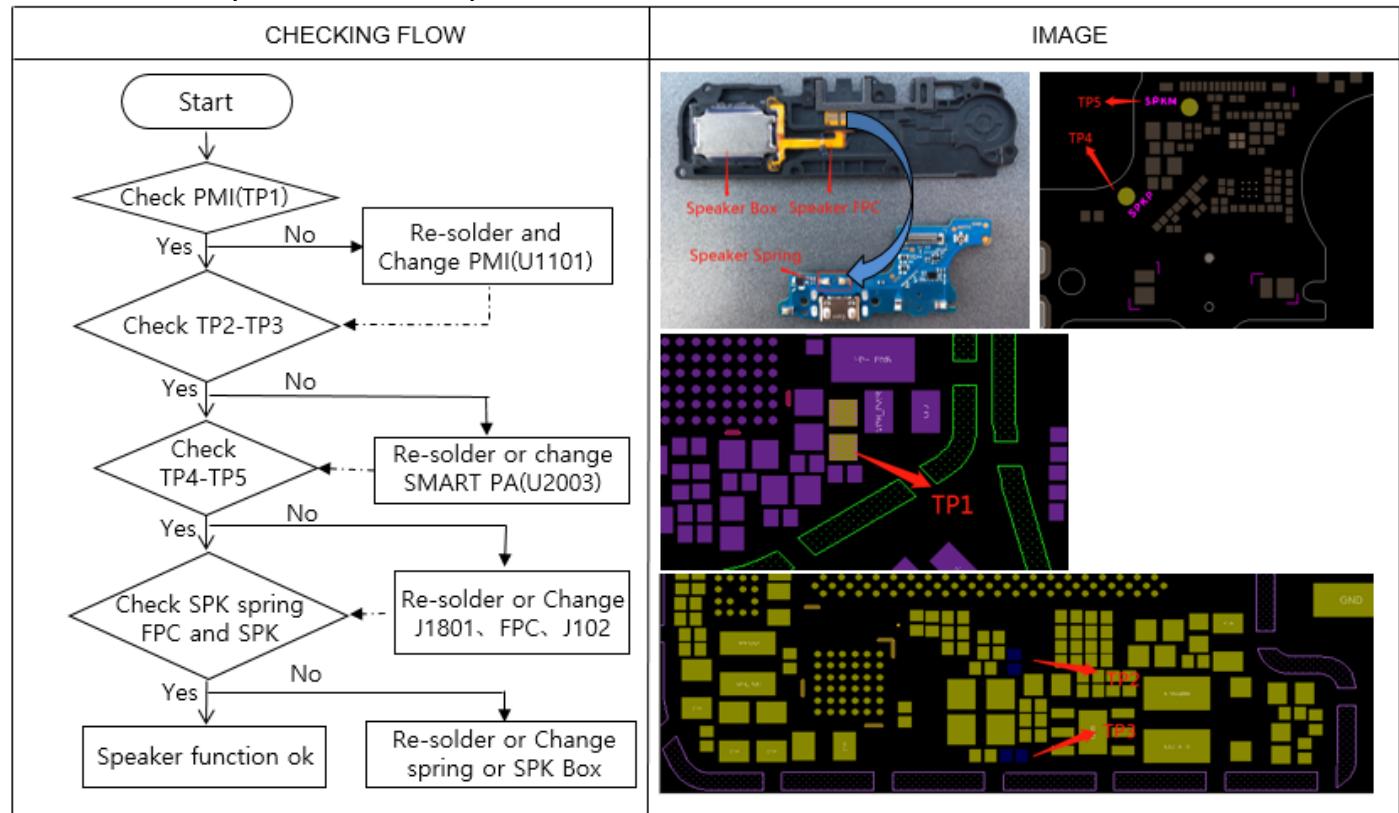
- I/O connector is used as the USB port.



8. Level 3 Repair

8-4-4. Audio speaker

- The Speaker control signals are generated by BB chip SDM439(U1001) and SMART PA, the chip, PA and the speaker are to be checked out.



8. Level 3 Repair

8-4-5. Audio_Main MIC

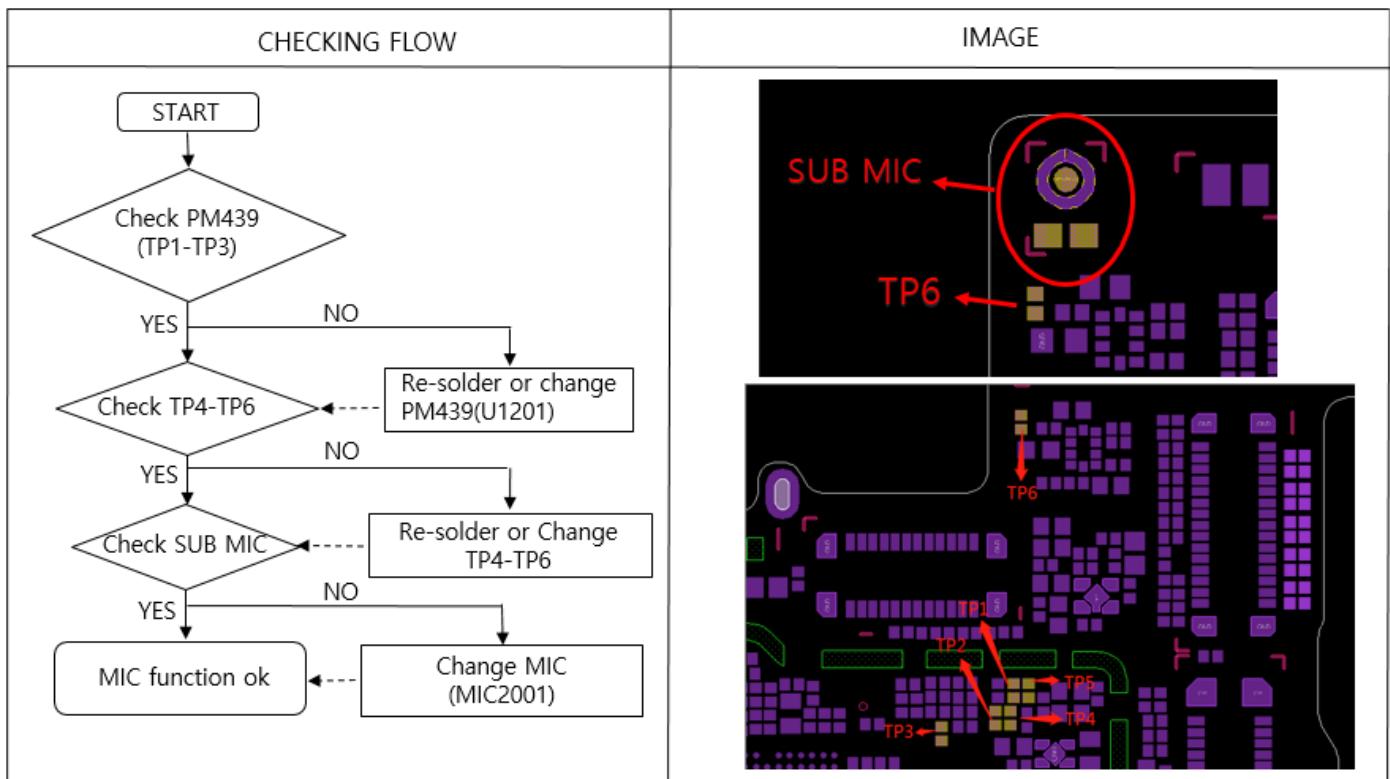
- The MIC control signals are generated by PMU chip PM439(U1201), the PMU chip and the MIC are to be checked out.

CHECKING FLOW	IMAGE
<pre>graph TD; START([START]) --> D1{Check PM439 TP1-TP3}; D1 -- YES --> D2{Check TP4-TP6}; D2 -- YES --> D3{Check MIC MIC201}; D3 -- YES --> OK([MIC function ok]); D3 -- NO --> R1[Re-solder or Change PM439(U1201)]; D2 -- NO --> R2[Re-solder or Change J1801, FPC, J102]; D1 -- NO --> R3[Re-solder or Change M IC]</pre>	

8. Level 3 Repair

8-4-6. Audio_Headset MIC

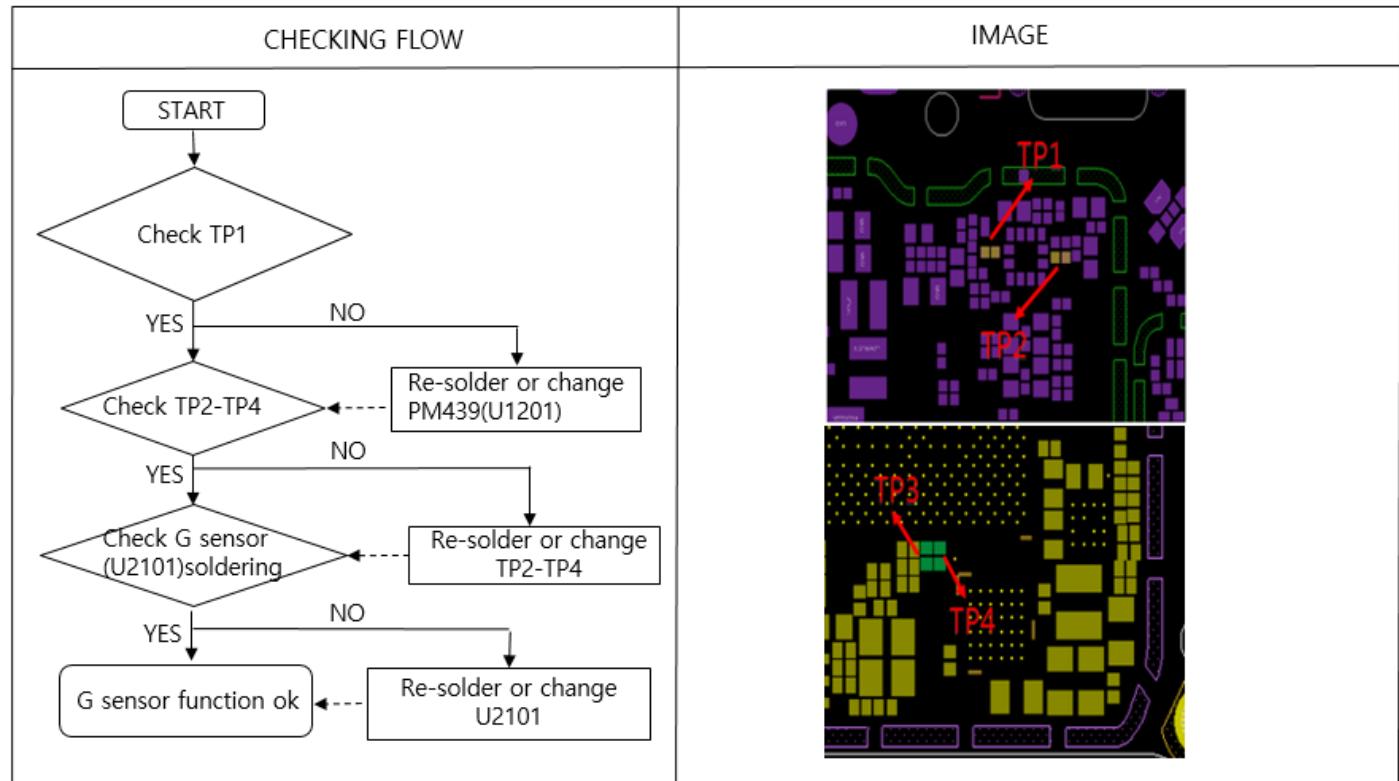
- The MIC control signals are generated by PM439 (U1201), the PMU chip and the MIC are to be checked out.



8. Level 3 Repair

8-4-7. G sensor

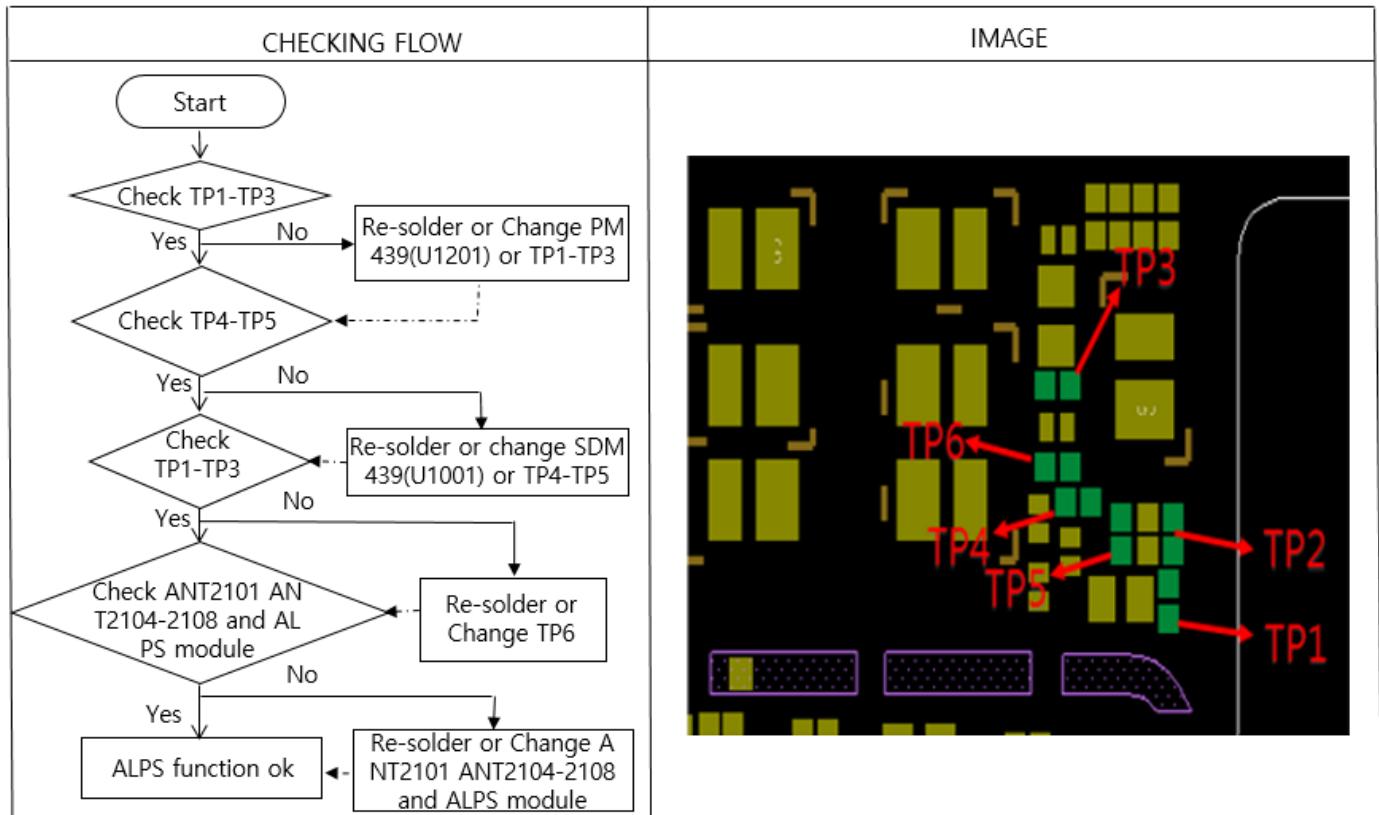
- The G sensor is calibrated by using SW algorithm.



8. Level 3 Repair

8-4-8. Proximity and light sensor

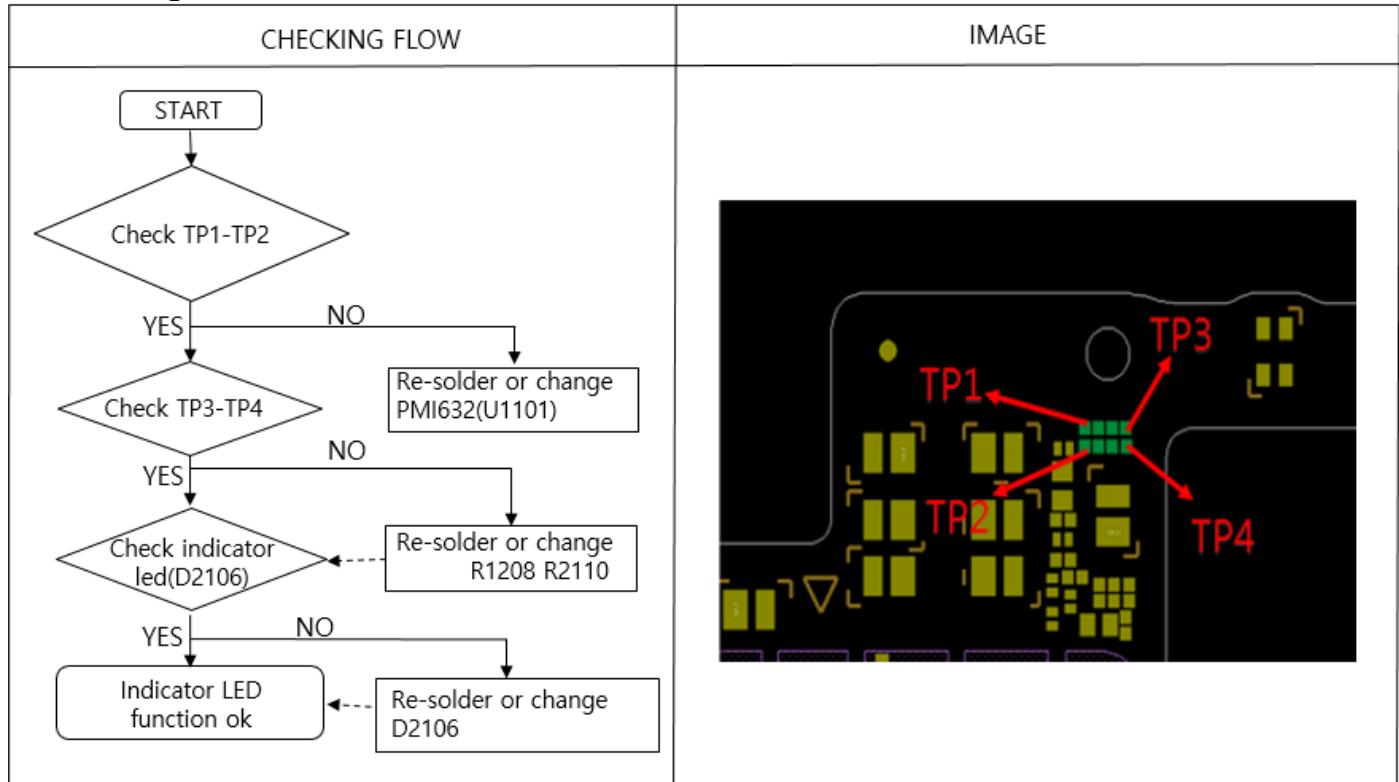
- Proximity and Light Sensor is worked as below: Control the screen's on/off operation automatically while making phone calls, and adjust the screen brightness according to ambient light.



8. Level 3 Repair

8-4-9. INDICATOR LED

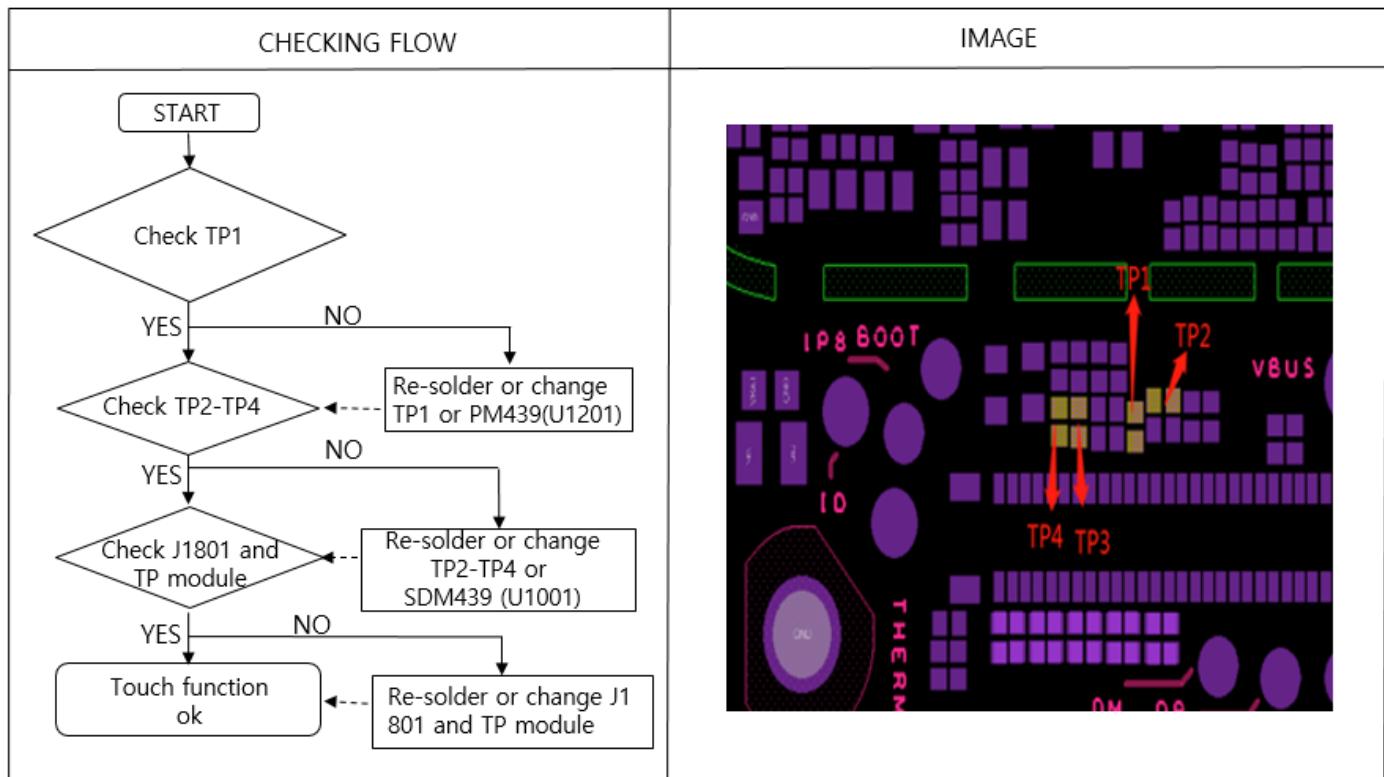
- INDICATOR LED is worked as below: Information cue for charging, phone call and message



8. Level 3 Repair

8-4-10. TOUCH SCREEN

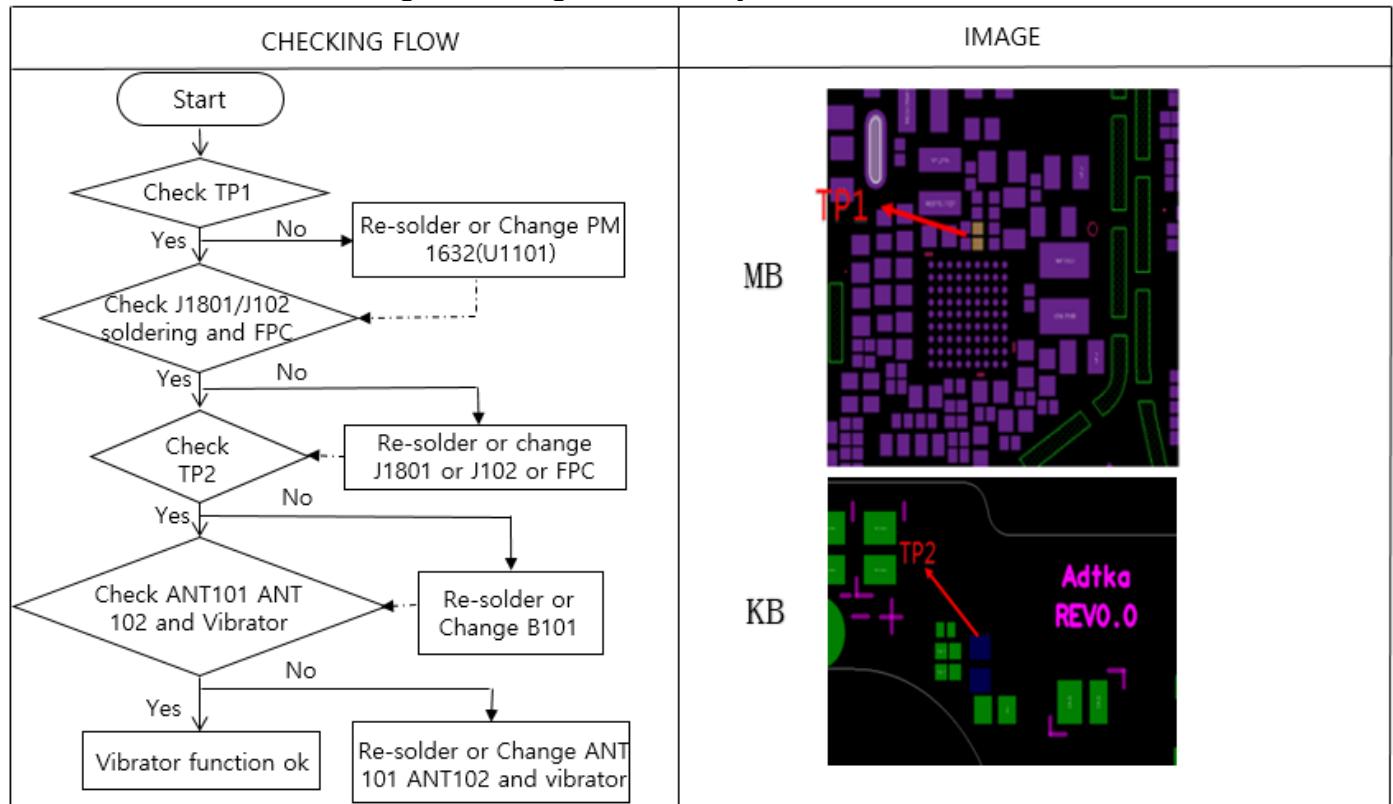
- The Touch control signals are generated by SDM439 and SDM439. It is assembled with LCD.



8. Level 3 Repair

8-4-11. Vibrator

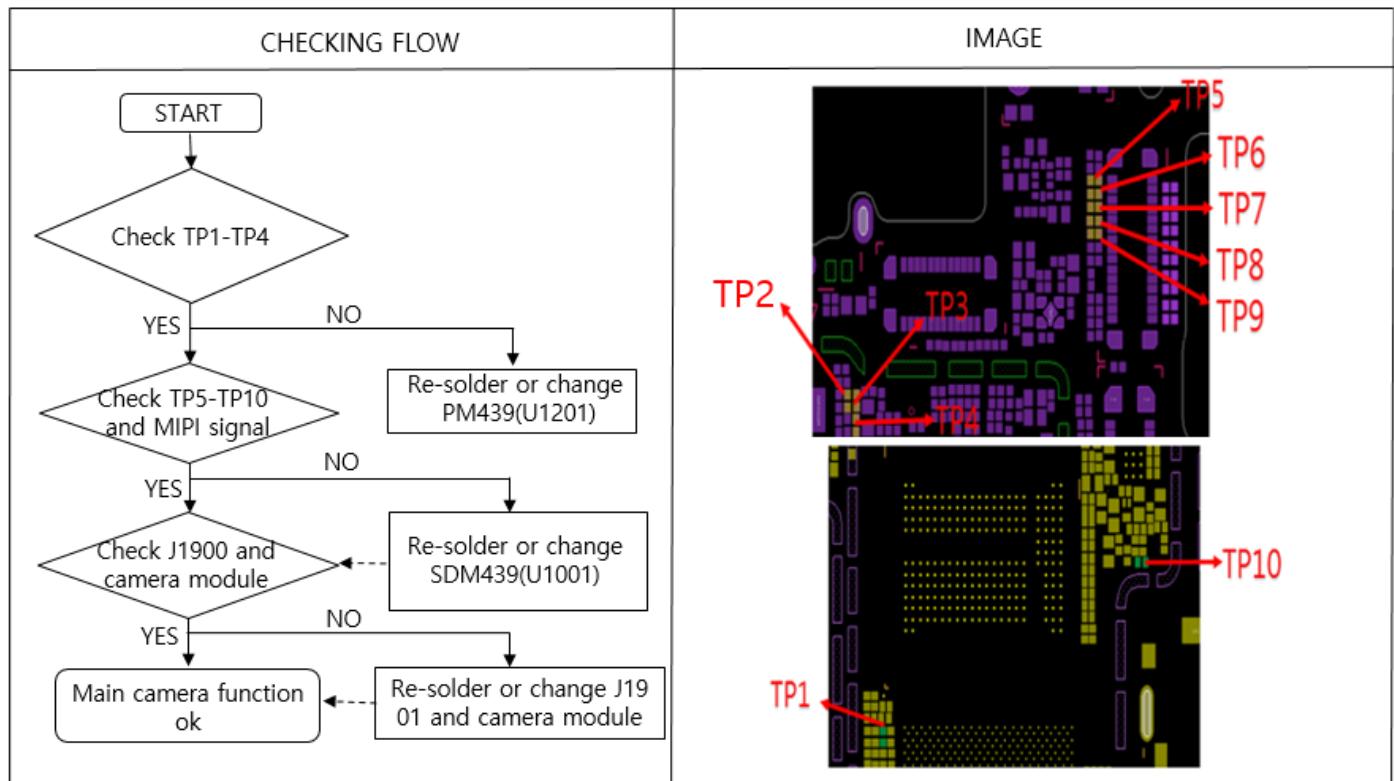
- The Vibrator control signals are generated by PMI632.



8. Level 3 Repair

8-4-12. Main Camera

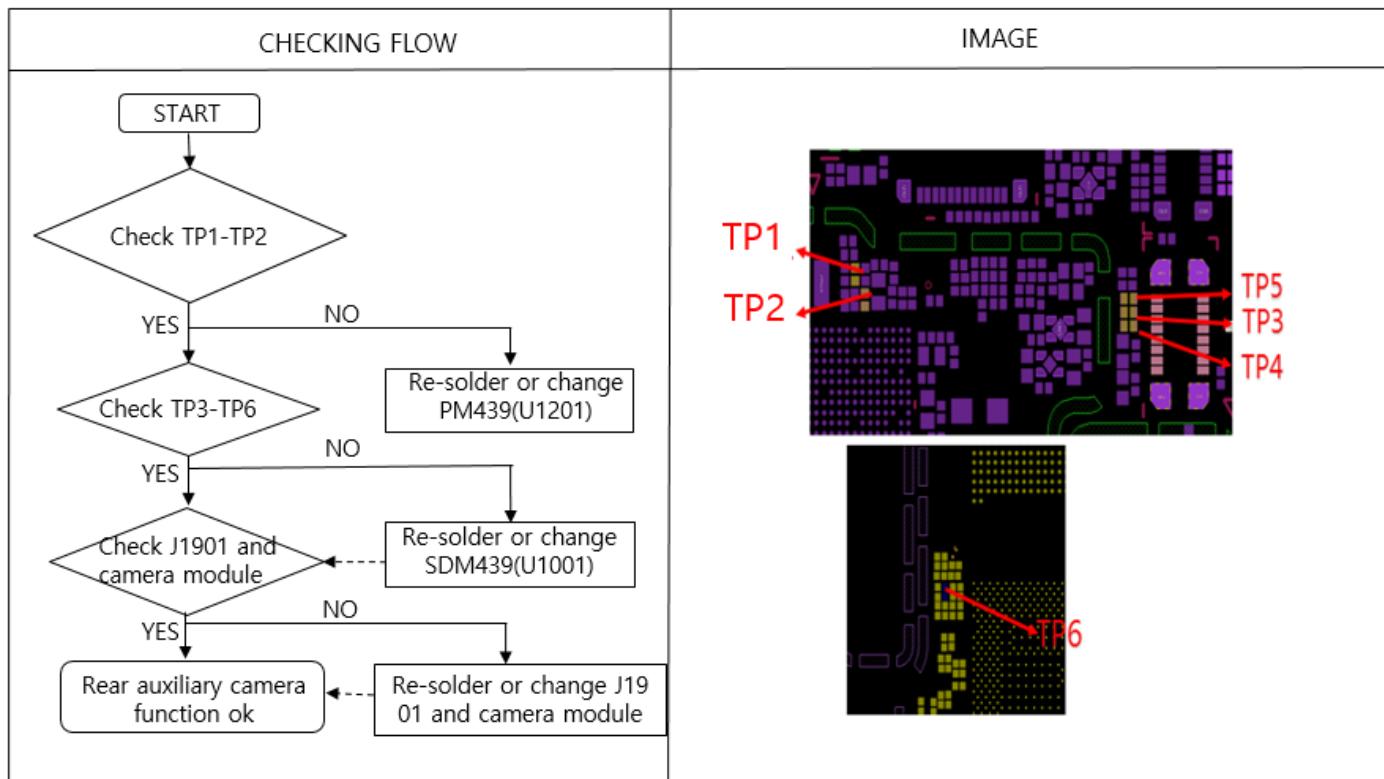
- The Camera control signals are generated by PM439 and SDM439.



8. Level 3 Repair

8-4-13. Rear auxiliary Camera

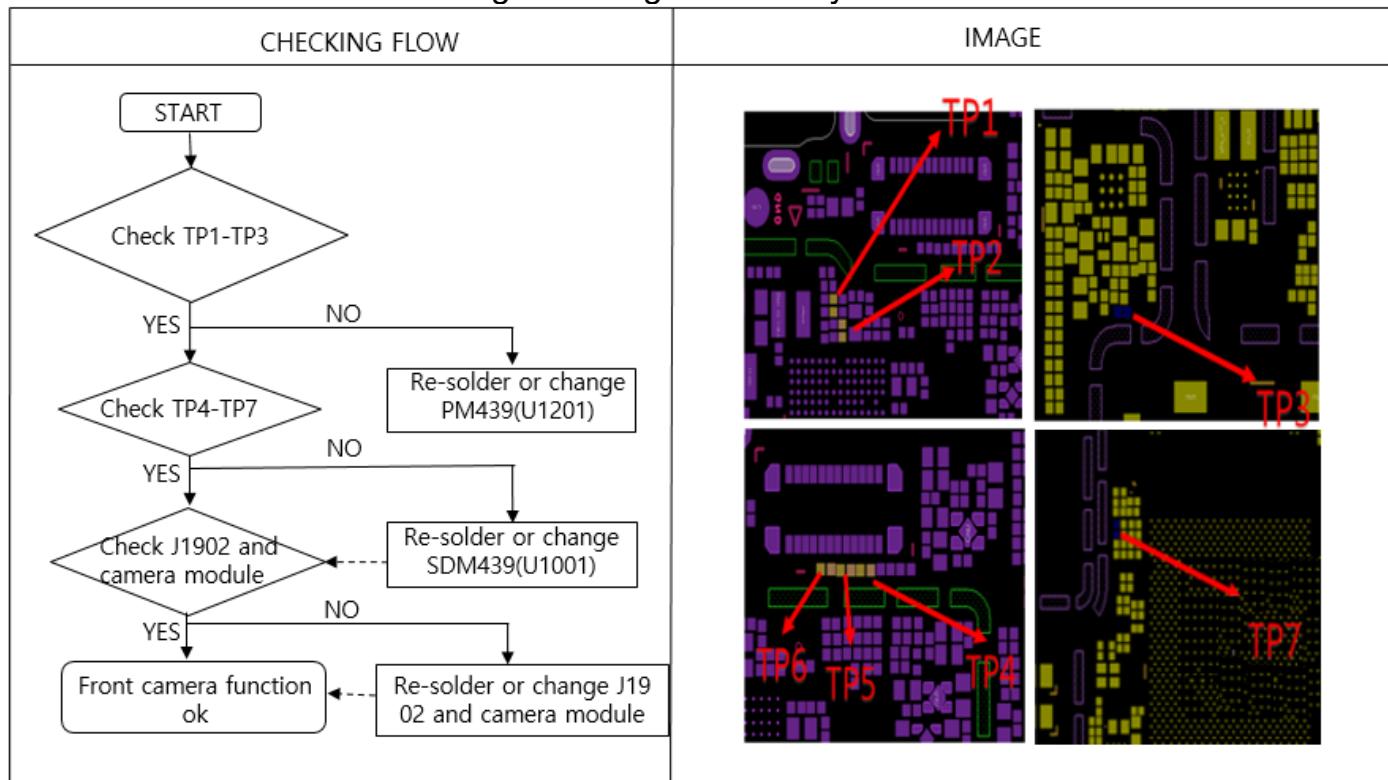
- The Camera control signals are generated by SDM439 and PM439.



8. Level 3 Repair

8-4-14. Front Camera

- The Front Camera control signals are generated by PM439.



8. Level 3 Repair

8-4-15. LCD

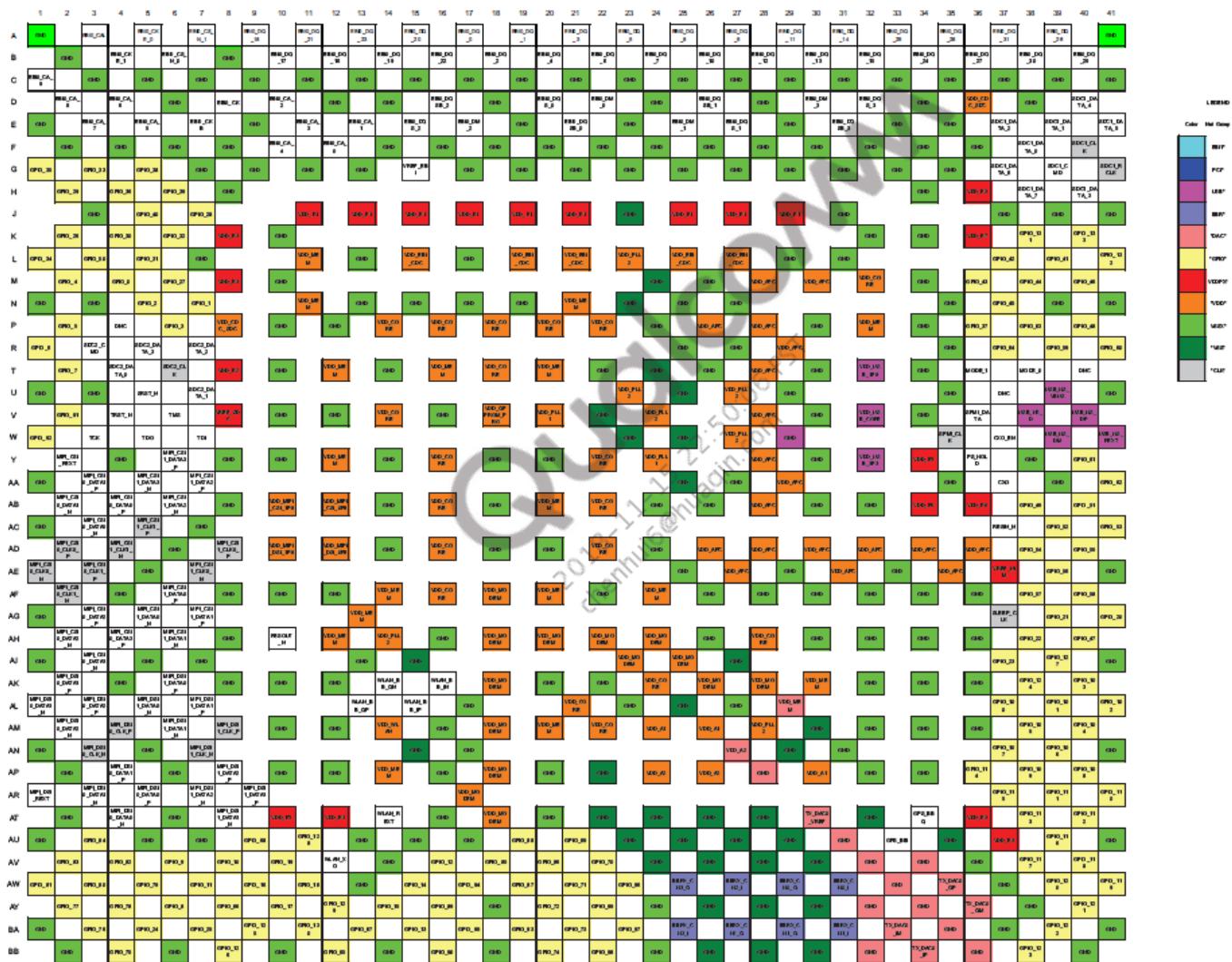
- The LCD control signals are generated by SDM439.

CHECKING FLOW	IMAGE
<pre>graph TD; START([START]) --> CheckTP1{Check TP1}; CheckTP1 -- YES --> CheckTP2TP3{Check TP2-TP3}; CheckTP1 -- NO --> ReSolder1[Re-solder or change TP1 or SDM439(U1001)]; CheckTP2TP3 -- YES --> CheckJ1801[Check J1801 and display module]; CheckTP2TP3 -- NO --> ReSolder2[Re-solder or change TP2/TP3 or PMI632]; CheckJ1801 -- YES --> DisplayOk[Display function ok]; CheckJ1801 -- NO --> ReSolder3[Re-solder or change J1801 and display module];</pre>	<p>The image shows a close-up of a printed circuit board (PCB) with various electronic components. Three specific points are labeled with red arrows and labeled TP1, TP2, and TP3. TP1 is located near the top center, TP2 is on the left side, and TP3 is on the right side. Other visible labels on the board include 'VBAT', 'IPS BOOT', 'ID', 'GND', and 'VBUS'.</p>

8. Level 3 Repair

8-5. Service Schematics

■ U1001_SDM439_BB chip IC , Digital Baseband Processor(Top)



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