



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234

Rev	Author	Date	Description
1		11/4/2020	Initial draft
2	Leven liang	16/11/2023	First version
3	Leven liang	19/6/2024	Update model and content



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234

Table of Contents

1. Product Specification Overview	3
2. System Block Diagram	8
2.1. System Connection	9
2.2. Wiring Schematic	10
2.3. Current Software/FW list	11
2.4. Scaler, EDID, FW Programming Procedures	11
2.5. FW Programming	
2.6. EDID Programming	19
2.7. Other Custom Programming (Payment, Non-Payment procedures)	20
3. Mechanical Replacement Parts List (B.O.M)	20
4. Packaging Specifications and Pallet Loading	24
5. Trouble Shooting Guide	25
6. Function Test for after repair	31
7. Disassembly / Assembly Procedure	35



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234

1. Product Specification Overview

M51 Mobile Computer:

Model	ELO P/N	Description	Part Spec Document
EMC-M51	E446755	EMC-M51-NS-A14-GMS-8G-12E-G-BK	
EMC-M51	E449855	EMC-M51-S-A14-GMS-8G-12E-G-BK	
EMC-M51C	E450425	EMC-M51C-NS-A14-GMS-8G-12E-NA-BK	
EMC-M51C	E450619	EMC-M51C-S-A14-GMS-8G-12E-NA-BK	
EMC-M51C	E450052	EMC-M51C-NS-A14-GMS-8G-12E-EU-BK	
EMC-M51C	E450234	EMC-M51C-S-A14-GMS-8G-12E-EU-BK	

Model	Elo P/N	Elo Description	Part Spec Document
Accessory	E534089	ELO-KIT-M51-1-DEVICE-DOCK	
Accessory	E526176	ELO-KIT-M51-4-DEVICE-CHARGER	
Accessory	E526745	ELO-KIT-M51-4-AUX-BATTERY-CHARGER	
Accessory	E533892	ELO-KIT-M51-BATTERY-SPARE	
Accessory	E527331	ELO-KIT-M51-SCAN-HANDLE	
Accessory	E527713	ELO-KIT-M51-USBC PTT HEADSET	
Accessory	E118460	ELO-KIT-M51-HANDSTRAP	
Accessory	E527515	ELO-KIT-M51-LANYARD	
Accessory	E527141	ELO-KIT-M51-HOLSTER	
Accessory	E525977	ELO-KIT-M51-RUBBER BOOT	
Accessory	E367373	ELO-KIT-M51-1-DEVICE-DOCK-USBC	



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234

ID&MD Model	Itemized	Description
		

Air Interface	Itemized	Description
	Technical Standard	3GPP R15
	Frequency	3G/4G/5G
	WIFI	WiFi-2.4G/5G/6E
Hardware Description	Itemized	Description
	Platform	QCM6490/QCS6490
	Memory	128GB+8GB
	Battery	4500mA
	OS	Android14
	SIM	Nano-SIM / e-SIM
	T-flash	Micro SD, up to 128GB
	R-Camera	13M, OV13B10-GA5A, AF With a white-LED.
	F-Camera	8M, S5K4H7YX03-FGX9, FF
	Flash-LED	Yes
	Torch light	Flash-LED
	LED	1 x Power LED (Green/Amber dual color)



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL, E446755/E449855/E450425/E450619/E450052/E450234

		1 x Status LED (Red/Blue dual color)
TP		5.96" Multi-touch 1080*2160 · GGV glass
LCM		5.96" 1080*12160 450nits typ. / 400nits min 80 degree +/- viewing angle horizontal and vertical. 16.7M colors minimum.
Antenna		LDS+FPC
Side key		2xVOL+/- 1xPPT 2xPFB
Mainkey		Power
Touch Key		Meun / Home / Back
Vibrator		Yes, ≥0.5g force
Audio Jack		NA
GPS		GPS, GLONASS, Galileo and BeiDou
Wifi		IEEE 802.11a/b/g/n/ac + IEEE 802.11ax/Wi-Fi 6E 2x2 MiMo,DBS
BT		BT5.2, BLE
FM		NA
RTC		NA
Backup Battery		90mA, 0.5C charge, LiPO /SuperCap, 20 seconds Backup should support RTC
Mic		2xAMIC M51: -44±3dB (0dB = 1V/Pa, 1kHz)



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL, E446755/E449855/E450425/E450619/E450052/E450234

Reference only	Reciever	Earpiece & speaker 1206
	Spker	1W RMS Stereo speaker 85db SPL at 0.1-meter distance
	NFC	NXP SN110T from Qualcomm AVL ISO 14443 TypeA/B ISO 15693 ISO 18092 R/W MIFARE Peer-to-peer Mode
	USB interface	Type-C3.0 (QC4.0-3A)
	Other interface	1x 2pin POGO on the back to facilitate triggering a scanner 1x 2pin POGO near USBC for charging(support 3A current)
	HALL	NA
	G-sensor	Yes, +/- 15 degrees accuracy
	Gyroscope-sensor	Yes
	E-compass	Yes
	Scanner	SE4100
	Adapter	Input: 100-240V ~0.5A, 50/60Hz Output: 5V/3.0A, 9V/2.0A, PPS 3.3V-5.9V/3.0A, 3.3V-11.0V/2.0A Wattage: 45W Max, connector can be change US/EU/UK/HK/China
	Cable	Power cables shall be 1.8±0.05meters long for US and EU variation. Type-c to Type-c Cable, 18W Charge, support DP
	/Proximity sensor/Light-sensor	Yes, 5k Lux
	SoftwareDescription	
Itemized		Description



EMC-M51/EMC-51C

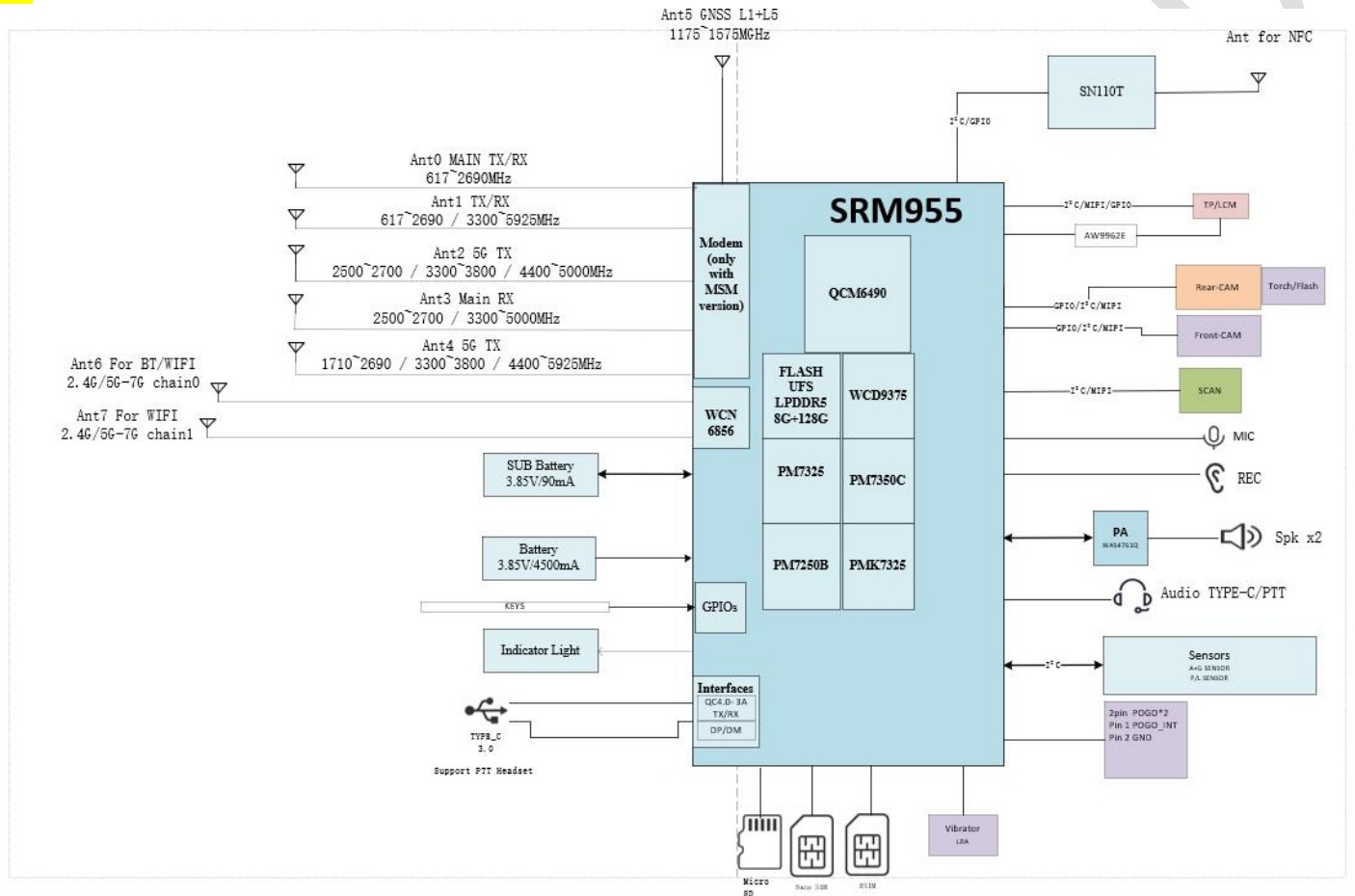
ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234

	UI	Android14 UI
	LED	Display effect
	SW Update	SD-Card & OTA
	SW Release	双方软件编译和发布 (Debug, User, 熔丝)
	Charging status	QC4.0

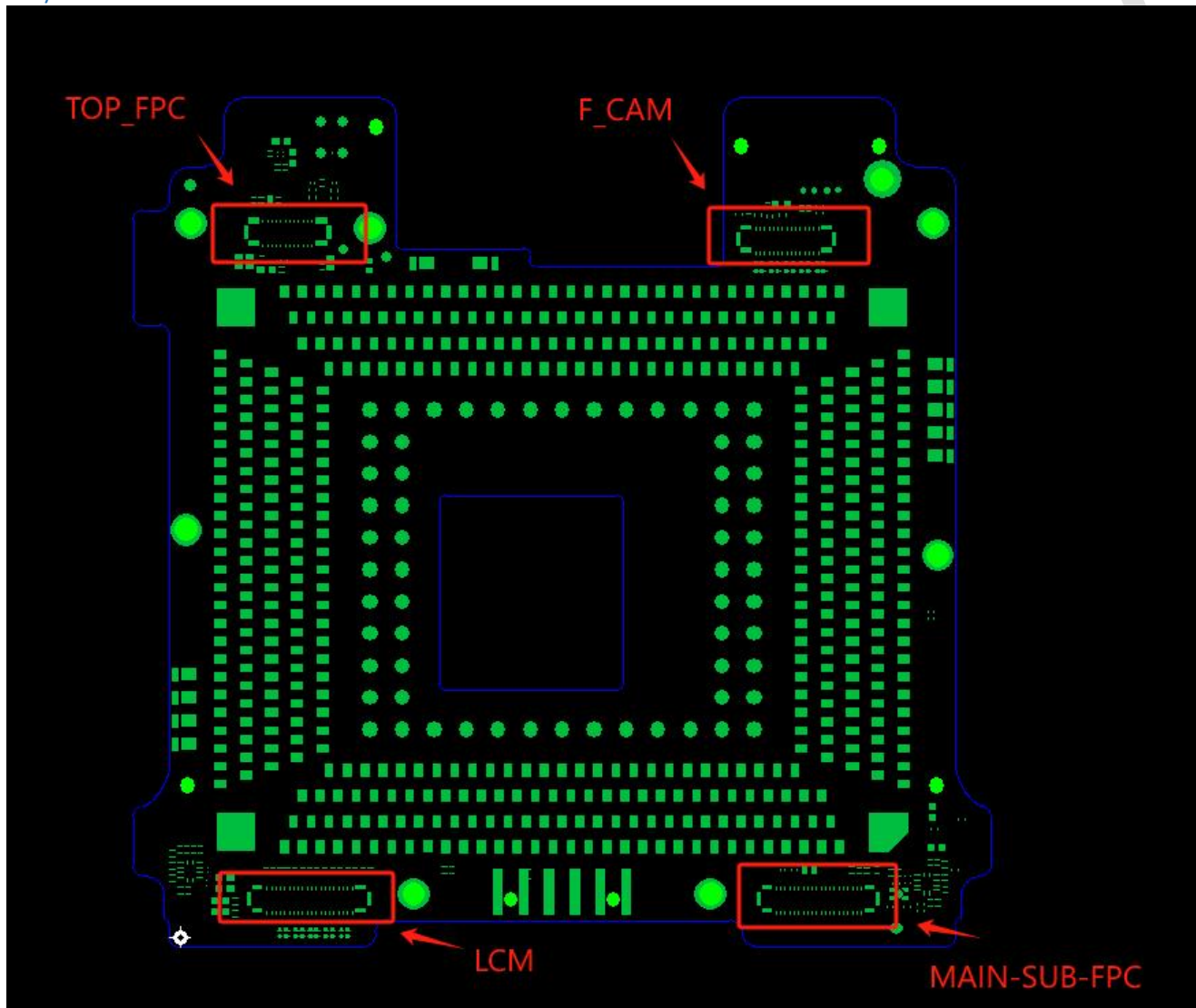
Environment	Itemized	Description
	Operating Temperature	-20℃ to 50℃ (-10℃ to 50℃ as a reference)
	Storage Temperature	-30℃ to 60℃
	Humidity	Operating (non-condensing): 10% to 90% (38.7° max wet bulb temperature). Non-Operating: 5% to 95% (38.7° max wet bulb temperature).
Reliability	Itemized	Description
		MIL-STD-810G standard 50,000 MTBF Packing meet to ISTA-2A standards

Package/Accessory	Itemized	Description
	Carton	Support
	Quick install guide	Support
	Adaptor	UES45LCP-SPC, Max power 45W
	Plug	US/UK/EU AC plug, Used with adaptor UES45LCP-SPC, black
	USB (Type A to Type B)	1.8M Type C

2. System Block Diagram



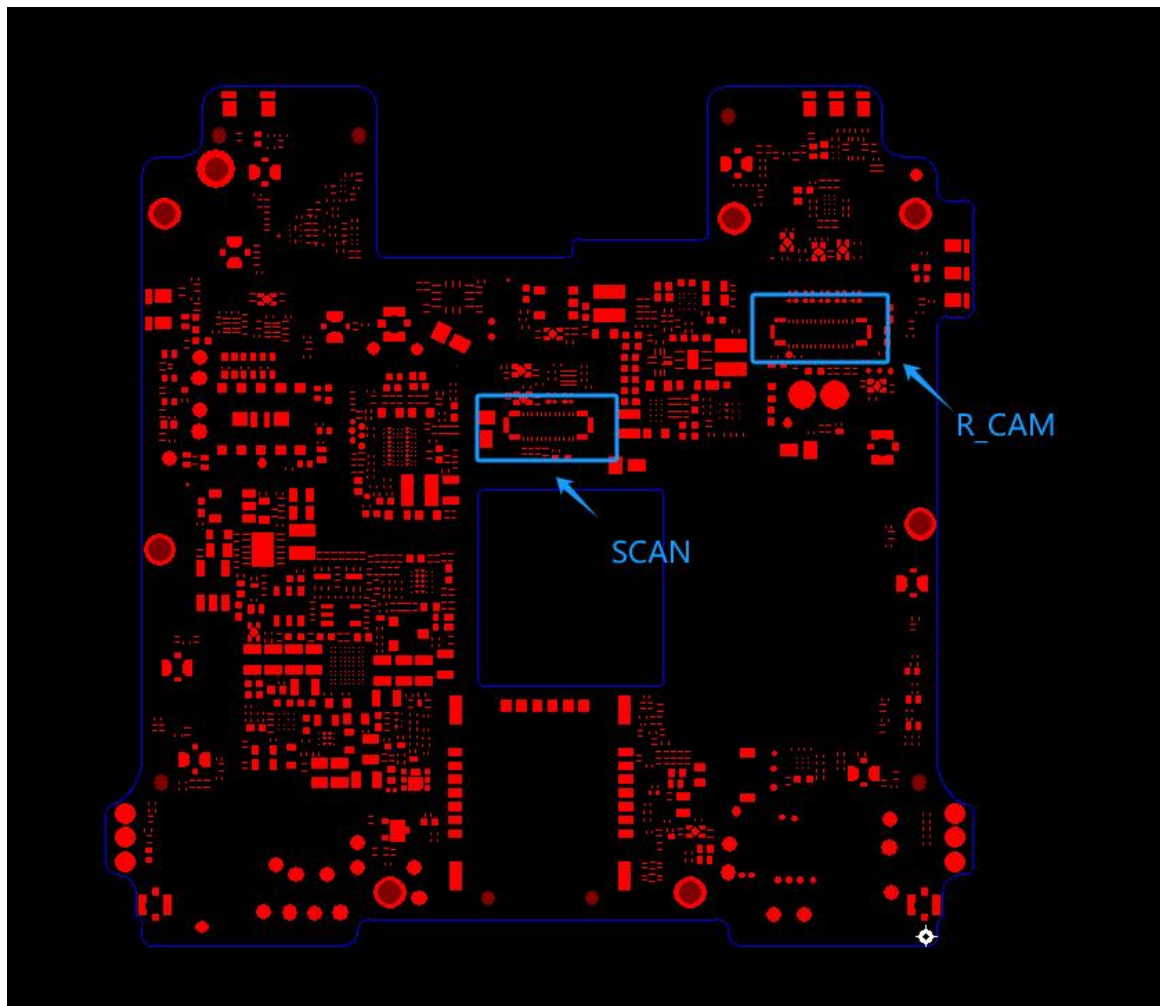
2.1. System Connection



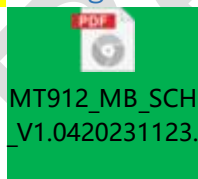


EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234



2.2. Wiring Schematic





EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234

(Embed wiring diagram)

2.3. Current Software/FW list

SW :

Software Utility name	CM PN	Used on which PN	Tool Version Information	SW PN	Description	Update date
OS Image	E142942	E142942	NA	603111	m51-rigel-fastboot-user-20240703	2024.07.03
SW						

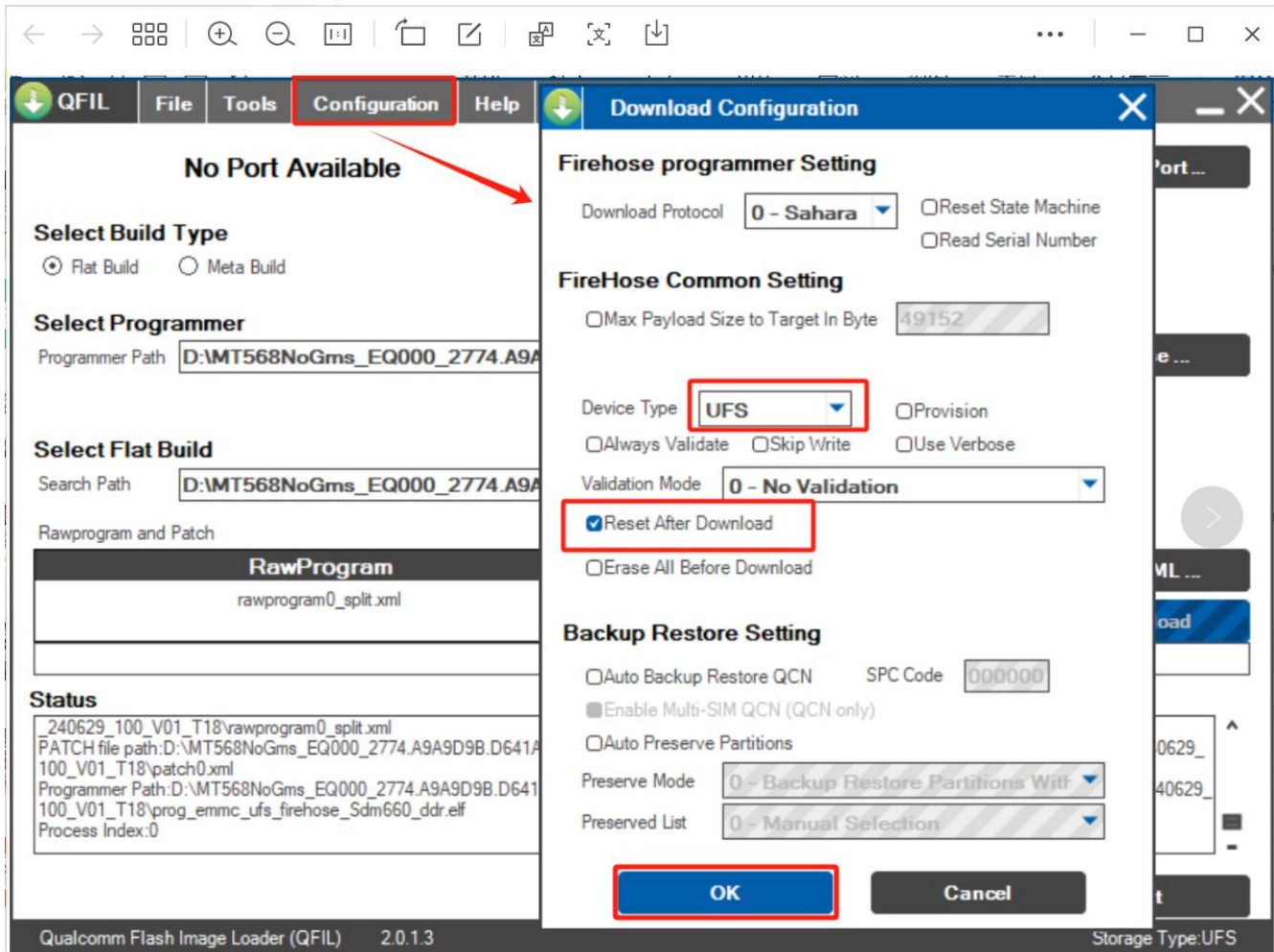
2.4. OS Image Programming Procedures

Download preparation: device, USB cable, computer, version package to be downloaded, download tool.

2.4.1 Download tool settings:

Open the QFIL download tool, click Configuration--FireHose Configuration to enter the Download Configuration page, set the download type emmc or UFS, and select the download type setting according to the flash selection.

Check Reset After Download to indicate that the device will automatically restart after the download is completed.

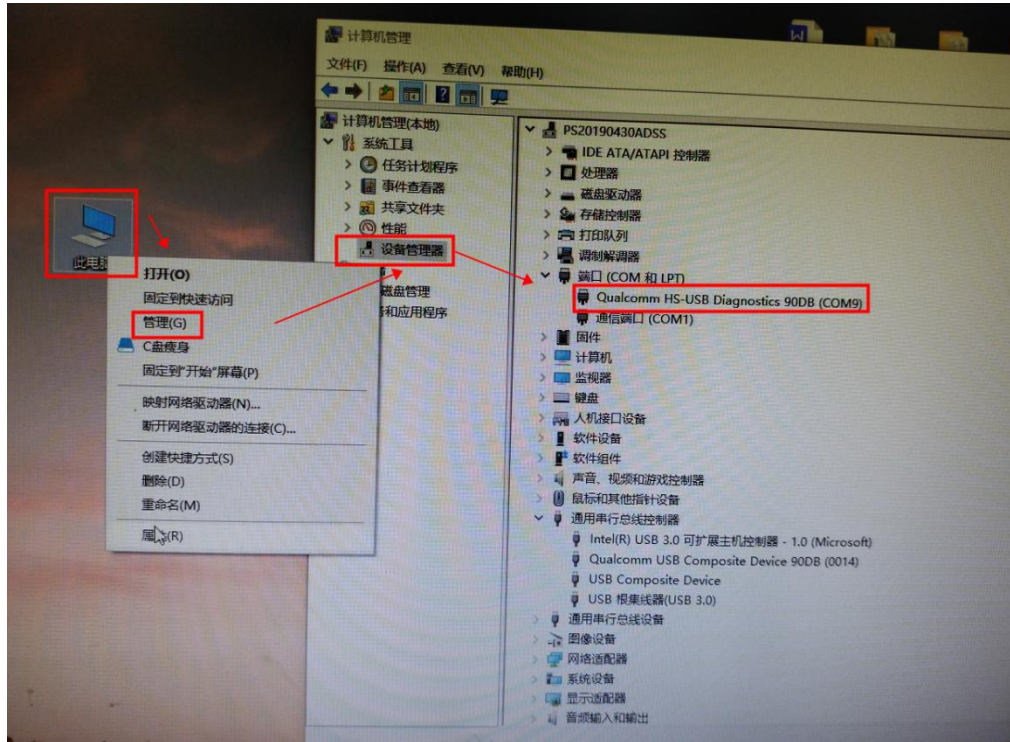


2.4.2 SW Version:

Unzip the version package.

2.4.3 Device port:

Connect the device to the PC. On the computer, right-click the mouse on the My Computer icon--click Management--Device Manager--the port displays the USB Diagnostic**COM* port to download, as shown in the screenshot below:



2.4.4 The QFIL tool recognizes the port, checks to see if the download type is correct, and selects the Build Type as Flat Build.



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234

QFIL File Tools Configuration Help

Qualcomm HS-USB Android DIAG 901D (COM3) Select Port ...

Select Build Type

☒ Flat Build ☐ Meta Build

Select Programmer

Programmer Path D:\MT568NoGms_EQ000_2774.A9A9D9B.D641A6B_240629_100_V01_T18\MT568N Browse ...

Select Flat Build

Search Path D:\MT568NoGms_EQ000_2774.A9A9D9B.D641A6B_240629_100_V01_T18\MT568N

Rawprogram and Patch

RawProgram	Patch
rawprogram0_split.xml	patch0.xml

Load XML ...

Download

Status

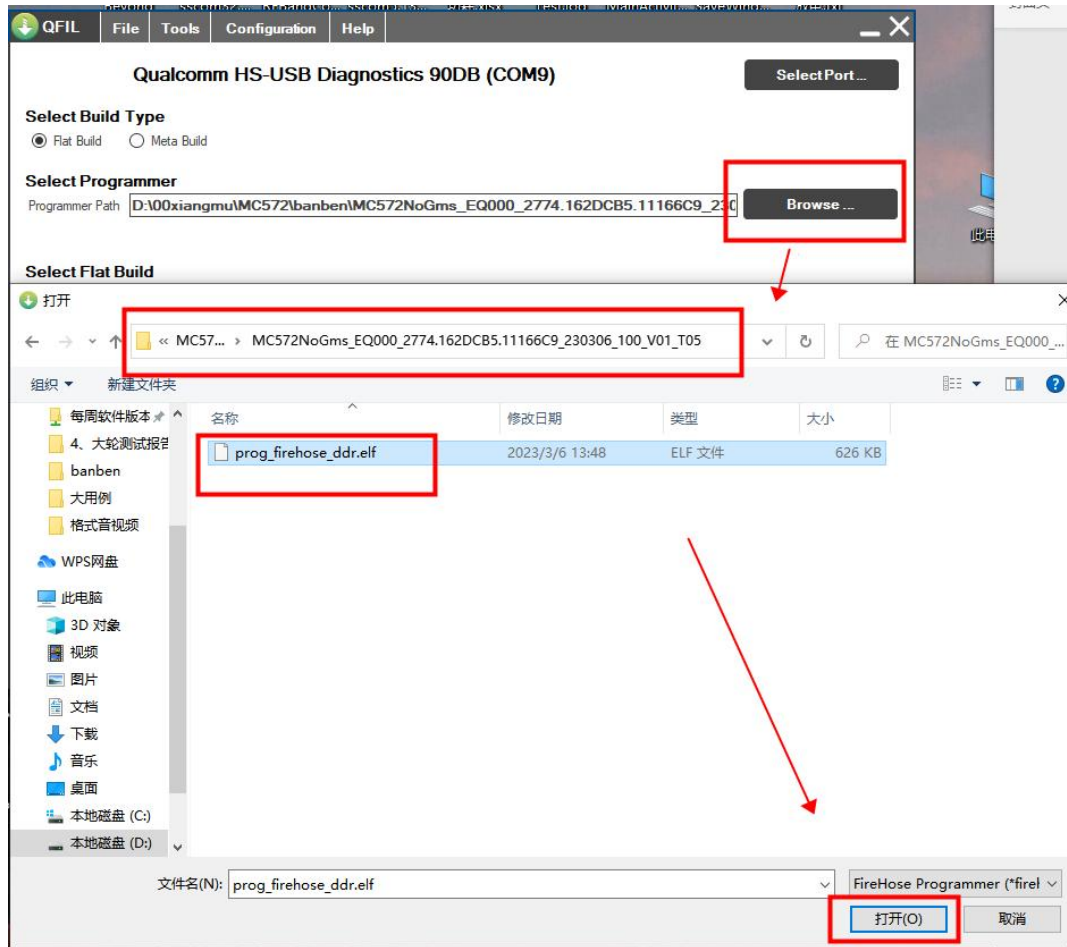
09:01:51: INFO: FILE ACCESS SLOW!! 0.00 B in 0.015 seconds (0.00 Bps) -- Overall to target 0.062 seconds (0.00 Bps)
Writing log to 'C:\Users\Administrator\AppData\Roaming\Qualcomm\QFIL\COMPORT_5\port_trace.txt', might take a minute
Log is 'C:\Users\Administrator\AppData\Roaming\Qualcomm\QFIL\COMPORT_5\port_trace.txt'
Waiting for reset done...
Download Succeeded
Finish Download

Exit

Qualcomm Flash Image Loader (QFIL) 2.0.1.3 Storage Type:UFS

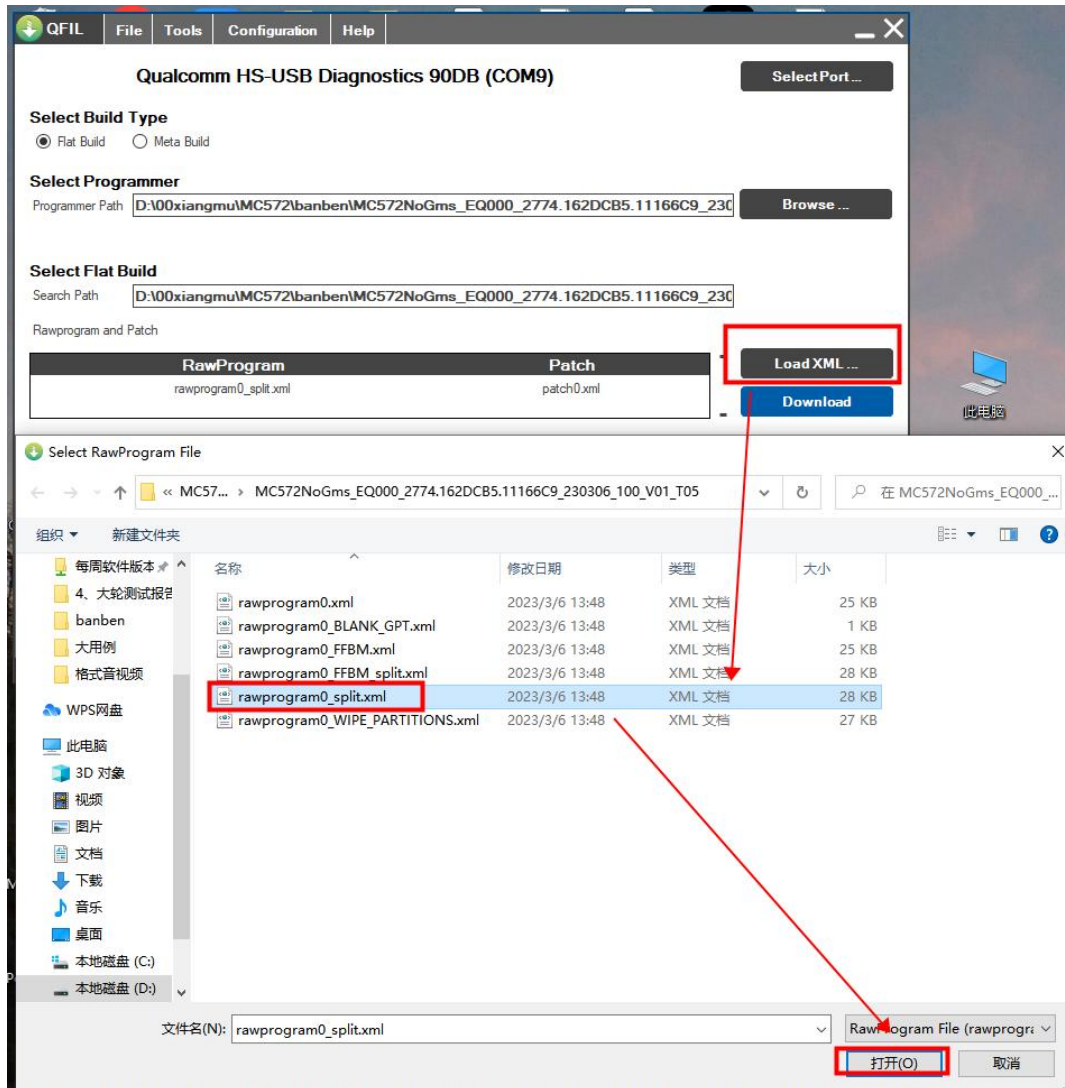
2.4.5 Load the version download file:

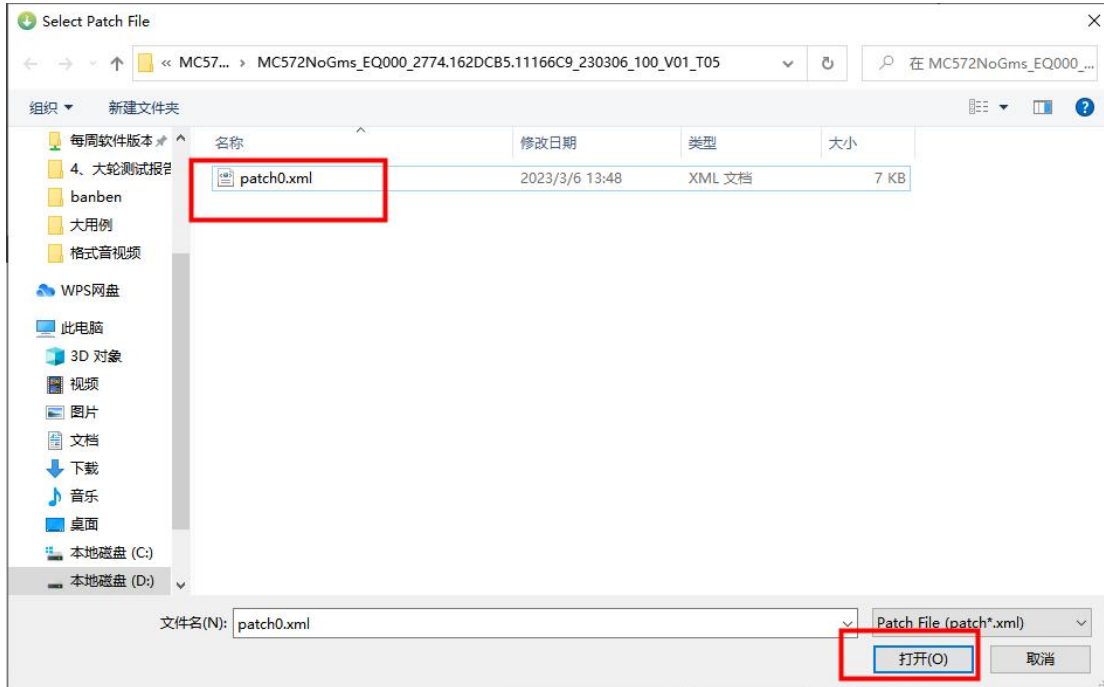
- 1) Click Browse... to select the path to the version file, click Version to enter, select the .elf file, and open it.



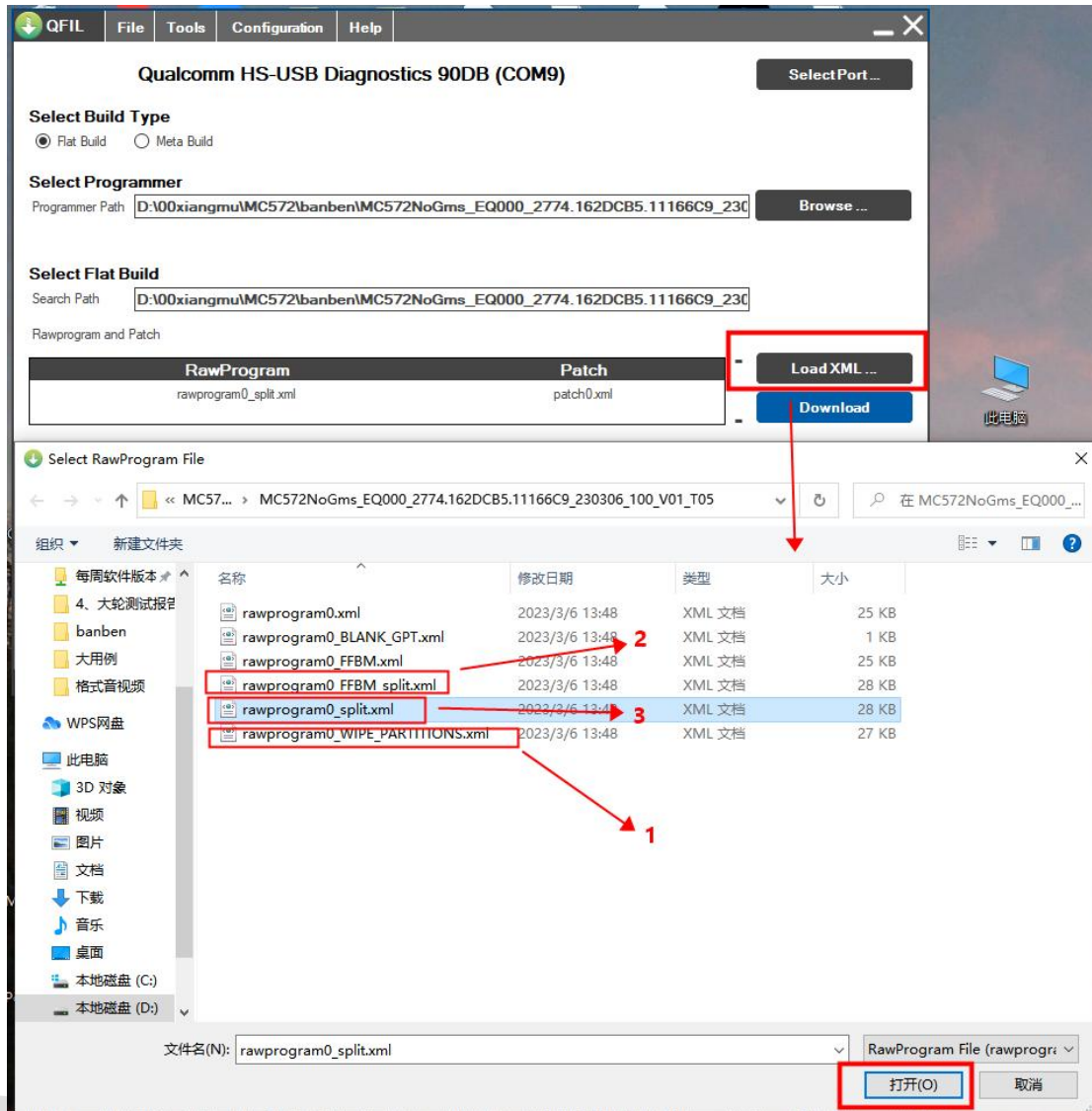
2) Click Load XML...--Enter the version download file and select the XML file. If you do not need to completely erase, directly select the rawprogram0_split.xml file to open, click patch0.xml to open (if you need to completely erase, please follow the steps of full erasure in 4) to download)

3) For the Debug version, clicking Download may switch the port to 9008. For the User version, please turn on USB debugging in the developer options, and then use the adb reboot edl command to enter the download port of the device.





4) If you need to completely erase the download (SN and all data will be cleared), the first step is to download the rawprogram0_WIPE_PARTITIONS.xml file. After the download is completed, the second step is to download the rawprogram0_FFBM_split.xml file. After the download is completed, the third step is to download the rawprogram0_split.xml file (if you do not need to completely erase this step, you can neglect)

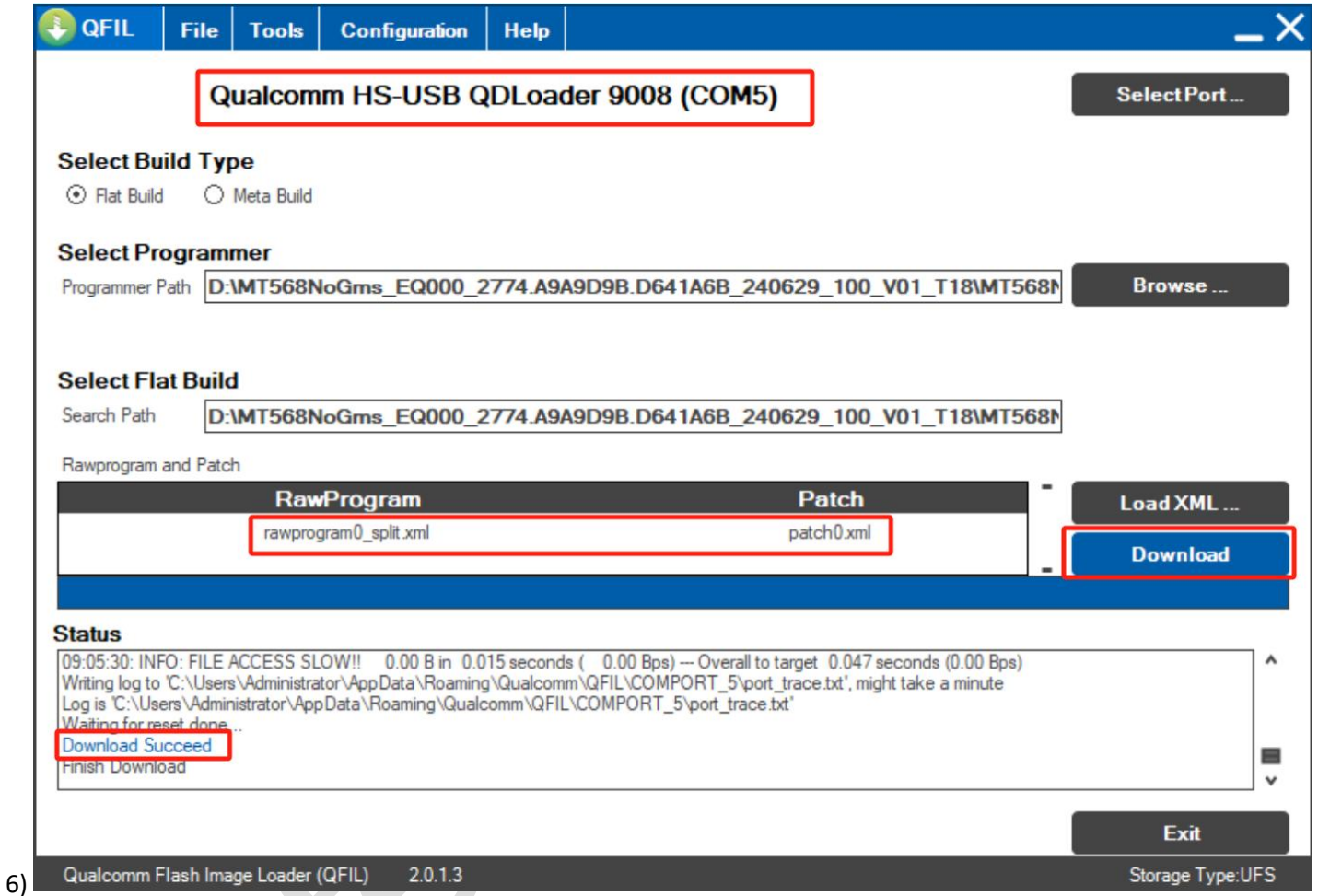


5) After the patch0.xml file is loaded, click Download to start downloading the file. At this time, the port will be automatically converted to the QD Loader port. When the download progress bar is completed and Download Succeed is prompted below, the download is completed.



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234



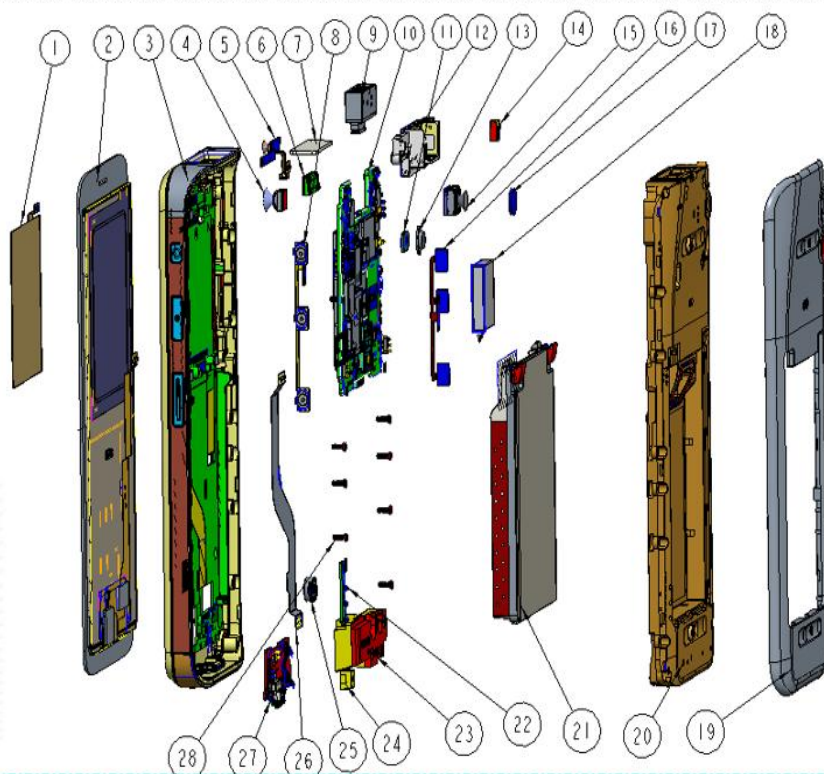
2.5. Firmware Programming Procedures

Refer to 2.4 upgrade steps

2.6. Android/Windows/Linux Programming

<Embed Work instructions for FW programming unit section>

3. Mechanical Replacement Parts List (B.O.M)



No.	Part Name	No.	Part Name
1	NFC Antenna	15	Rear camera
2	TP-LCM-ASM	16	Right button FPC
3	Front case	17	Back camera lens
4	Front camera	18	Sub battery
5	Receiver FPC	19	Rear shell
6	Receiver	20	Rear case
7	Scan lens	21	Battery Pack
8	Left button FPC	22	ANT PCBA
9	Scanner	23	SPK BOX
10	Main PCBA	24	Main MIC
11	Flash PCBA	25	Motor
12	Scan bracket	26	Main FPC
13	Flash Lens	27	Sub PCBA
14	Sub MIC	28	Screws

**EMC-M51/EMC-51C****ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234**

No.	Part Number	Description	Q'ty	Unit
1	MT912USC	MT912_MB_US_V1.06	1	
2	MT912SBB	MT912_SUB_V1.06	1	
3	MT912ABA	MT912_ANT2_V1.01	1	
4	MT912FBA	MT912_FLASH_PCBA_V1.02	1	
5	120100151	98-23060-7008A-H	1	
6	120200216	CMG8A2069-V5	1	
7	120200217	CMGCA2070-V4.2	1	
8	130100151	MT912 Small Battery	1	
9	120200163	SE4100-LM00R	1	
10	120600048	L0832F-023678999-0002	1	
11	3MT9120516	MT912_REC_FPC_V1.02	1	
12	3MT9120517	MT912_SCAN-SE4100_FPC_V1.02	1	
13	3MT9121105	MT912_MAIN_FPC_V1.06	1	
14	3MT9120117	MT912-FRONT-HOUSE-INSERT-ASM-BLACK-WITH-SCAN-V1.02	1	
15	3MT9120201	M912-REAR-COVER-BLACK-V1.02	1	
16	3MT9120106	MT912-BACK-FLASH-LENS	1	
17	3MT9120119	MT912-REAR-HOUSE-INSERT-ASM-BLACK-V1.02	1	
18	3MT9120301	MT912-BACK-CAM-LENS	1	
19	3MT9120302	MT912-SCAN-LENS	1	
20	3MT9120901	M912-MAIN-MIC-RUBBER-V1.00	1	
21	3MT9121005	MT912_ORING_RUBBER-V1.01	1	
22	3MT9121006	MT912-PS-RUBBER-V1.01	1	



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL, E446755/E449855/E450425/E450619/E450052/E450234

23	3MT9120904	MT912-UP-MIC-RUBBER-V1.01	1	
24	120300080	MT912-1609-SPK-BOX-V1.01	1	
25	3MT9120120	MT912_SCAN_SUPPORT_ASM_V1.01	1	
26	130100198	MT912 Main Battery	1	
27	5MT5370609	CM1.6*2 (5.0*0.8)	2	
28	5MT9120602	CM1.6*5.3 (2.8*5.3)	1	
29	5MT5350033	10160050020107B00	1	
30	5MT9120001	MT912-TP-TAPE	1	
31	5MT9120007	m912-rear-cover-tape-V1.01	1	
32	3MT9120510	mt912_NFC_fpc	1	
33	130400523	MT912_ANT2_CABLE_V1.01	1	
34	130400524	MT912_Main_ANT_CABLE_V1.01	1	
35	130400573	MT912_WIFI_CABLE_v1.00	1	
36	6MT5270022	MT527_Screw anti disassembly label	1	
37	USB800001	USB800_ATT_Waterproof label	1	
38	5MT9120003	mt912-Pressure relief-film	1	
39	5MT9122303	mt912-SUB-BATTERY-Heat shield-film-V1.01	1	
40	5MT9120005	mt912-REC-FPC-sponge	1	
41	5MT9120601	PM1.4x2.5	2	
42	6MT9120701	MT912_Label	1	
43	3MT9120903	MT912-MIC Silicone gasket	1	
44	5MT9122301	mt912-MIC Adhesive backing paper	2	
45	5MT9122302	MT912 Mian MIC Mylar	1	
46	5MT9121201	mt912_SRM955module_thermal_pad_V1.00	1	
47	5MT9120602	CM1.6*5.3 (2.8*5.3)	25	



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234

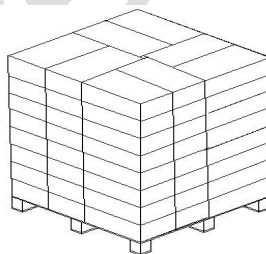
Payment Screw torque SPEC

Thread	No	PN / Description	SPEC					Torque (Kgf-cm)	Where use	Unit Q'ty
			Material	Type	Head	Length (mm)	Surface			
M1.6	1		AISI-1018	Self-Tapping	Flat Head	5.0	Electroplating Ni	1.2 ± 0.1		2
M1.4	2		AISI-1018	Machine screw	Flat Head	2.5	Electroplating Ni	1.2 ± 0.1		2
M1.6	3		AISI-1018	Machine screw	Flat Head	2.0	Electroplating Ni	1.2 ± 0.1		2
M1.6	4		AISI-1018	Machine screw	Flat Head	4.5	Electroplating Ni	1.2 ±0.1		25

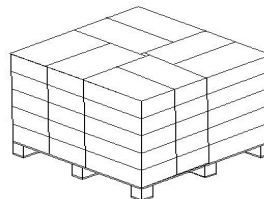
4. Packaging Specifications and Pallet Loading

(From a service perspective, what are the recommended shipping specifications)

1. design a paper cushion for device and separate the plug, the adapter and cabel using the paper pad
2. one device in a box and 8 pcs boxes in one big carton
3. added paper pad around inner carton to protect box
4. 8 cartons per layer on pallet
- 5 layers per one pallet , 320 pcs devices for air shipping
- 8 layers per one pallet , 512 pcs devices for sea shipping



海运摆板示意图
1100*1100mm



空运摆板示意图
1100*1100mm



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234

Trouble Shooting Guide

<Please show all failure modes and solutions>

ISSUE	POSSIBLE CAUSES	SOLUTION
NO DISPLAY OR TOUCH ACTIVITY	Unit is powered off	Press or toggle the power button to turn unit on
	Adapter is damaged	Replace Adapter
	Defective display	Replace display and reload display FW
	FPC not inserted in controller	Confirm FPC is installed correctly
	Connector structural damage or Main board damage	Replace the mainboard
	Problem with power source	Fix/replace outlet or power strip Disconnect and connect power cable(s)
	Power cable has damage	Replace cable
	Defective power board	Replace power board or associated internal cabling
	Defective video board	Replace video board and reload FW and EDID files
NO OR REDUCED RESPONSE TOUCH CAPABILITY	Driver not installed	Install driver
	Defective controller	Replace touch controller
	Touch Screen damaged	Replace screen. The screen and Bezel are a sub assembly.



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL, E446755/E449855/E450425/E450619/E450052/E450234

NO DISPLAY ACTIVITY	Incorrect Touch Firmware	Install correct firmware
	FPC not inserted in controller	Confirm FPC is installed correctly
	No FW loaded onto video board	Load/reload FW and EDID files onto video board
	Defective power board	Replace power board or associated internal cabling
	Defective video board	Replace video board (and reload FW and EDID files)
	Defective or disconnected cables (backlight control, LVDS video data) between video board and LCD panel	Disconnect and connect power cable(s)
NOT DISPLAYING FROM EXTERNAL VIDEO SOURCES (i.e. Splash screens, “no video found” messages still working, Status LED working, but not displaying PC video)	Defective LCD panel	Replace LCD-Touchscreen sub-assembly or associated cabling
	Video cable issues	Disconnect and connect video cable(s)
VIDEO ISSUES (IMAGE OVERLAP, COLOR NOT	Defective video board	Replace video board and reload FW and EDID files
	Incorrect settings	The unit will need to be reset to Factory Mode.



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234

OPIMAL, DIM, BLURRY, OR FLICKER)		(Insert link to instructions)
	If issue continues...	Readjust the phase and pixel clock in USER MODE. Please note: This will only apply for analog VGA video.
	If issue continues...	Ensure a tight cable connection between unit and PC.
	If issue continues...	Replace video board (insert PN) and reload FW and EDID files.
	If issue continues...	Replace panel (insert PN).
NO SOUND	Speaker is not installed properly	Reinstall speaker
	Headphone jack damaged or HDMI input damaged	Replace motherboard
	Speakers damaged	Replace speakers
Key failure	The mainboard software version is abnormal	Re-download the correct motherboard software version
	Keys damaged	Replace the mainboard
Mic failure	Secondary Mic fpc is not installed properly	Reinstall secondary Mic fpc



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL, E446755/E449855/E450425/E450619/E450052/E450234

	The mainboard software version is abnormal	The mainboard software version is abnormal
	The main Mic or secondary Mic is damaged	Replace secondary Mic or replace the mainboard
LED indicators are not functional	Fpcs are not installed properly	Confirm FPC is installed correctly
	The mainboard software version is abnormal	Upgrade software version
	SCR LEDs are damaged	Replacing the Sensor Module FPC
5G/4G/3G network cannot be registered or signal is weak	The main antenna is not properly fixed	Check whether the main antenna is fixed properly. If not, refix the main antenna
	Main antenna is damaged	Check whether the main antenna is damaged. If damaged , replace it with a new main antenna
	NR/LTE signal is weak	Re-download the software version
	Sub board main antenna spring is broken	Check whether the main antenna spring on the sub board is damaged. If damaged, replace the sub board
	The 5G/4G registration fails	Check whether the 4G/5G module is damaged. If damaged, replace the mainboard
	The main antenna sub board is damaged	Check whether the main sub board is damaged. If damaged , replace the main sub board



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234

	The sub board is not fixed correctly	Check whether the sub board is fixed correctly. If not, refix the sub board
	The main coaxial line is damaged	Check whether the main coaxial line is damaged, if damaged, please replace the main coaxial line
	The main coaxial line is incorrectly fixed	Check whether the main coaxial line is fixed correctly. If not, refix the main coaxial line
The WiFi connection is abnormal or the WiFi signal is weak	The WiFi antenna is not properly fixed	Check whether the WiFi antenna is fixed properly. If not, refix the WiFi antenna
	WiFi antenna is damaged	Check whether the WiFi antenna is damaged. If damaged , replace it with a new WiFi antenna
	WiFi signal is weak	Re-download the software version
	Mainboard WiFi antenna spring is broken	Check whether the WiFi antenna spring on the mainboard is damaged. If damaged, replace the mainboard
	The WiFi connection fails	Check whether the WiFi chip is damaged. If damaged, replace the mainboard
	The WiFi antenna sub board is damaged	Check whether the WiFi sub board is damaged. If damaged , replace the WiFi sub board
	The WiFi board is not fixed correctly	Check whether the WiFi board is fixed correctly. If not, refix the WiFi board
	The WiFi coaxial line is damaged	Check whether the WiFi coaxial line is damaged, if damaged, please replace the



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234

		WiFi coaxial line
	The WiFi coaxial line is incorrectly fixed	Check whether the WiFi coaxial line is fixed correctly. If not, refix the WiFi coaxial line
The NFC card cannot be recognized or the NFC card is too close	The NFC antenna is incorrectly fixed	Check whether the NFC antenna is correctly fixed. If not, refix the NFC antenna
	The NFC antenna is damaged	Check whether the NFC antenna is damaged. If damaged, replace the NFC antenna
	Identify NFC card close	Re-download the software version or NFC firmware
	NFC card cannot be recognized	Check whether the NFC chip is damaged. If damaged, replace the mainboard
		Check whether the NFC spring is damaged. If damaged, replace the mainboard
		Check whether the security chip is damaged. If damaged, replace the mainboard



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234

5. Function Test for after repair

No	Function	Required Accessory	For, Payment(WIFI)	For, Payment (EU/US)	Remark
1	SIM	SIM Card	N	Y	Enter CIT Test APK and select the corresponding "SIM Card Test" item to check.
2	ESIM	N/A	N	N	Enter CIT Test APK and select the corresponding "ESIM Test" item to check.
3	SD	SD Card	Y	Y	Enter CIT Test APK and select the corresponding "T Card Test" item to check.
4	Bluetooth	Bluetooth Device	Y	Y	Enter CIT Test APK and select the corresponding "Bluetooth Test" item to check.
5	GPS	N/A	Y	Y	Enter CIT Test APK and select the corresponding "GPS Test" item to check.
6	WiFi	Wi-Fi AP	Y	Y	Enter CIT Test APK and select the corresponding "WiFi Test" item to check.
7	LED	N/A	Y	Y	Enter CIT Test APK and select the corresponding "LED Test" item to check.
8	NFC	NFC card	Y	Y	Enter CIT Test APK and select the corresponding "NFC Test" item to check.
9	PTT Earphones	PTT Earphones	Y	Y	Enter CIT Test APK and select the corresponding "PTT Earphones Test"



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234

					item to check.
10	OTG	Mouse/USB drive/Key panel	Y	Y	Enter CIT Test APK and select the corresponding "TypeC USB OTG Test" item to check.
11	Main MIC	N/A	Y	Y	Enter CIT Test APK and select the corresponding "Main MIC Test" item to check.
12	Vice MIC	N/A	Y	Y	Enter CIT Test APK and select the corresponding "Vice MIC Test" item to check.
13	Speaker	N/A	Y	Y	Enter CIT Test APK and select the corresponding "Speaker Test" item to check.
14	REC	N/A	Y	Y	Enter CIT Test APK and select the corresponding "REC Test" item to check.
15	Front CAM	N/A	Y	Y	Enter CIT Test APK and select the corresponding "Front CAM Test" item to check.
16	Rear CAM	N/A	Y	Y	Enter CIT Test APK and select the corresponding "Rear CAM Test" item to check.
17	Motor	N/A	Y	Y	Enter CIT Test APK and select the corresponding "Montor Test" item to check.
18	Flashlight	N/A	Y	Y	Enter CIT Test APK and select the corresponding "Flashlight Test" item to check.
19	Pogopin Charge	Pogopin Base	Y	Y	Enter CIT Test APK and select the corresponding "Pogopin Test" item to



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL, E446755/E449855/E450425/E450619/E450052/E450234

					check.
20	Small Battery Charge	N/A	Y	Y	Enter CIT Test APK and select the corresponding "Small Battery Charge Test" item to check.
21	Battery temperature detection	N/A	Y	Y	Enter CIT Test APK and select the corresponding "Battery temperature detection Test" item to check.
22	RTC	N/A	Y	Y	Enter CIT Test APK and select the corresponding "RTC Test" item to check.
23	Battery Swap	N/A	Y	Y	Enter CIT Test APK and select the corresponding "Battery Swap Test" item to check.
24	G-sensor	N/A	Y	Y	Enter CIT Test APK and select the corresponding "G-sensor Test" item to check.
25	L-sensor	N/A	Y	Y	Enter CIT Test APK and select the corresponding "L-sensor Test" item to check.
26	P-sensor	N/A	Y	Y	Enter CIT Test APK and select the corresponding "P-sensor Test" item to check.
27	SAR	N/A	Y	Y	Enter CIT Test APK and select the corresponding "SAR sensor Test" item to check.
28	Compass	N/A	Y	Y	Enter CIT Test APK and select the corresponding "Compass Test" item to check.



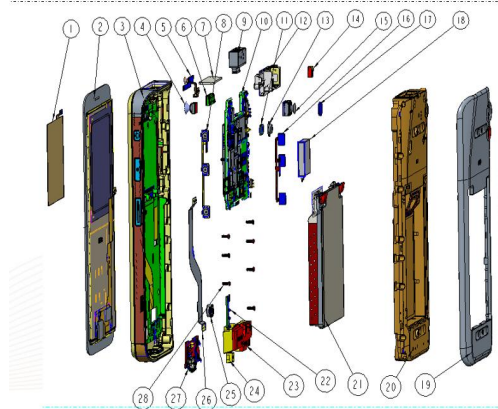
EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL, E446755/E449855/E450425/E450619/E450052/E450234

29	Touch	N/A	Y	Y	Enter CIT Test APK and select the corresponding "Touch Test" item to check.
30	LCM	N/A	Y	Y	Enter CIT Test APK and select the corresponding "LCM Test" item to check.
31	Display	Display screen+Cable	Y	Y	Enter CIT Test APK and select the corresponding "Display Test" item to check.
32	Scanner	QR code	E446755 N E449855 Y	E450619 N E450425 Y E450052 N E450234 Y	Enter CIT Test APK and select the corresponding "Scanner Test" item to check.
33	2-pin scan code	Scan handle	Y	Y	Enter CIT Test APK and select the corresponding "2-pin scan code Test" item to check.
34	Main Battery Charge	Adapter+Cable	Y	Y	Enter CIT Test APK and select the corresponding "Charge Test" item to check.
35	Check the Software Image version	N/A	Y	Y	Enter CIT Test APK and select the corresponding "SW Version Test" item to check.

6. Disassembly / Assembly Procedure

Breakdown Drawing

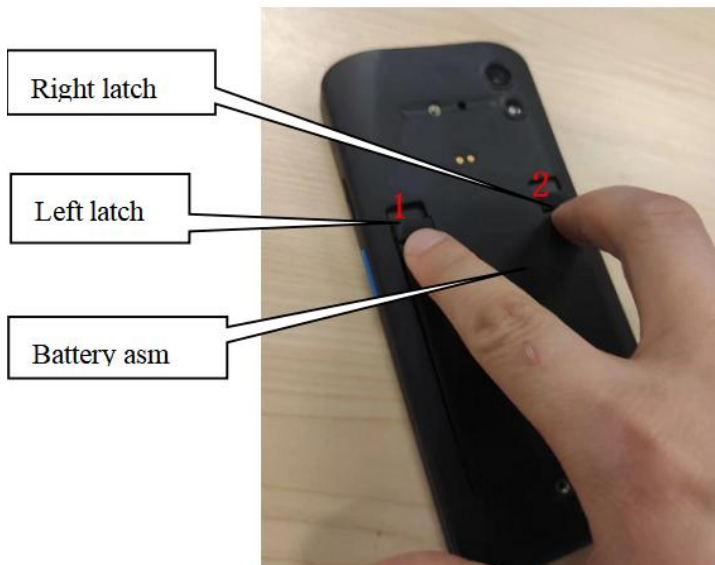


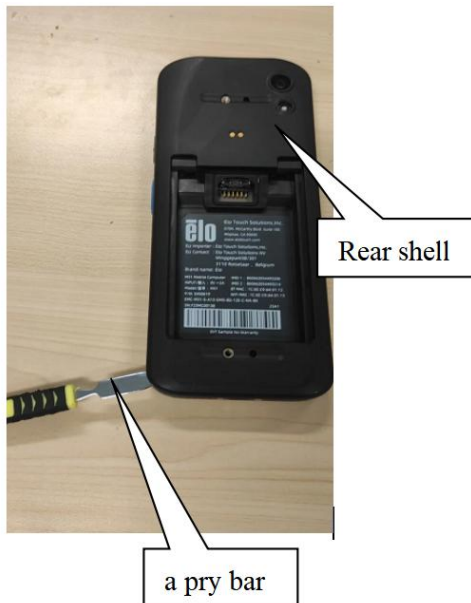
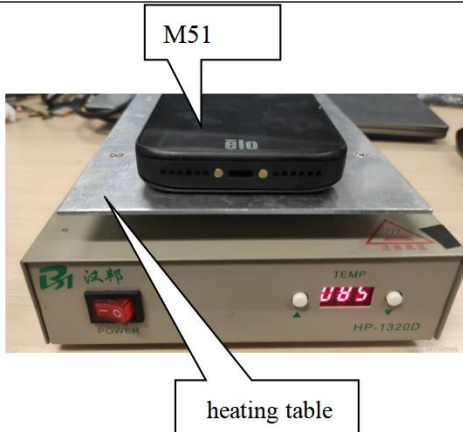
No.	Part Name	No.	Part Name
1	NFC Antenna	15	Rear camera
2	TP-LCM-ASM	16	Right button FPC
3	Front case	17	Back camera lens
4	Front camera	18	Sub battery
5	Receiver FPC	19	Rear shell
6	Receiver	20	Rear case
7	Scan lens	21	Battery Pack
8	Left button FPC	22	ANT PCBA
9	Scanner	23	SPK BOX
10	Main PCBA	24	Main MIC
11	Flash PCBA	25	Motor
12	Scan bracket	26	Main FPC
13	Flash Lens	27	Sub PCBA
14	Sub MIC	28	Screws

The main material
description of the device

Remove battery assembly

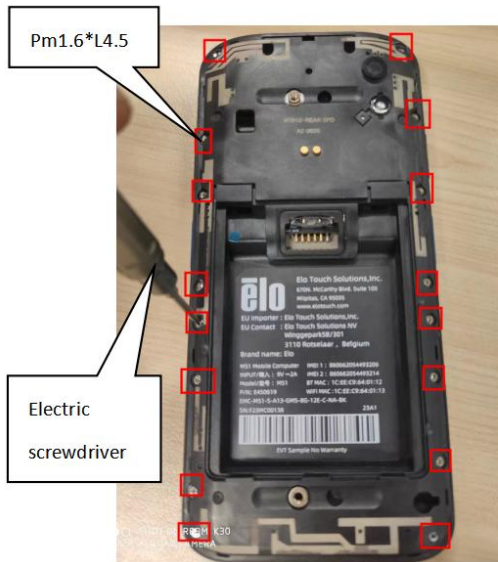
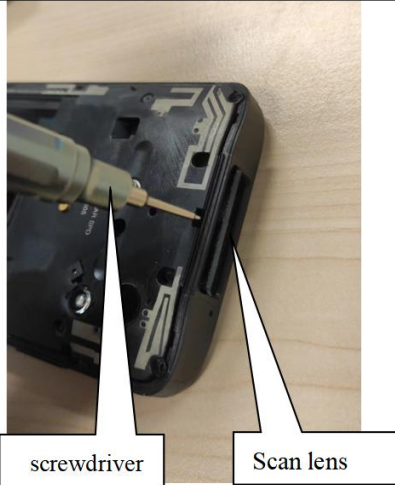
1. Flip the left and right latch (at 1 and 2)
2. Remove the battery assembly





Remove The rear shell

1. Rear shell trim heated, Put m51 on the heating table, adjust the temperature at 85 plus or minus 5 degrees, heat for 4 minutes.
2. Take off the head of the heating table, and use a pry bar to uncover the rear shell decoration, taking care not to damage the shell material



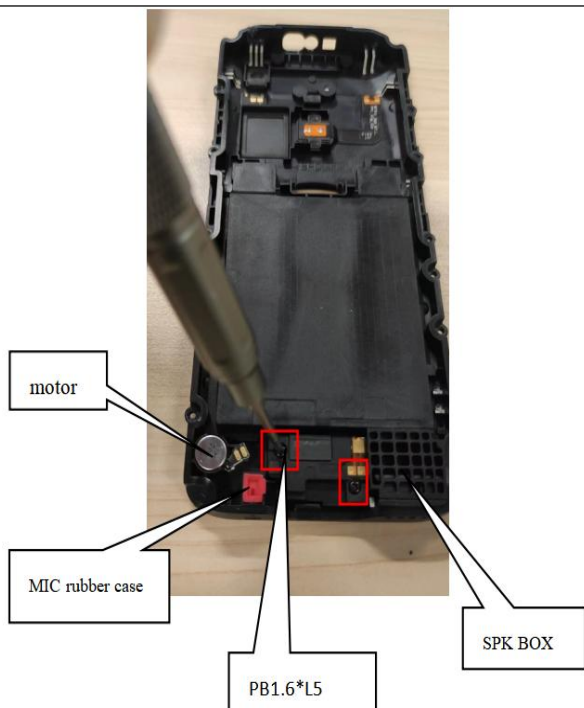
Remove The rear case

1. Use a flat-head screwdriver, Remove the scan lens.
2. Remove Pm1.6*L4.5 screws on the rear case. Electric screwdriver torsion is 1.2kgf-cm.
3. Remove PB1.6*L5 screws on SPK BOX, Electric screwdriver torsion is 1.2kgf-cm.
4. Remove MIC rubber case on Rear case.
5. Remove MOTOR on Rear case.

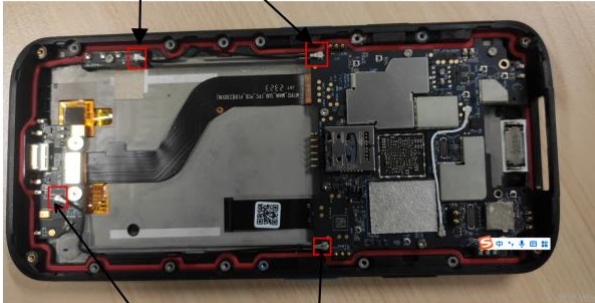


EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234



Plugs of RF Cable

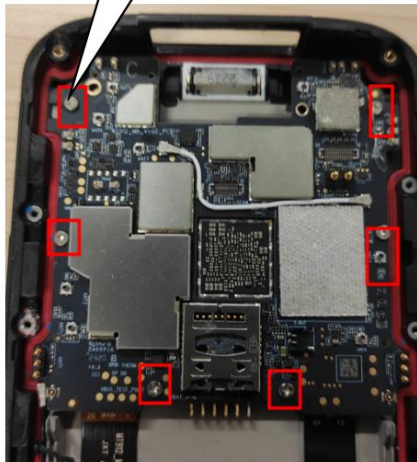


Plugs of RF Cable

Remove The Rf cable

1. Remove plugs of RF Cable by plastic tweezers.

Pm1.6*L4.5



Remove Main PCBA

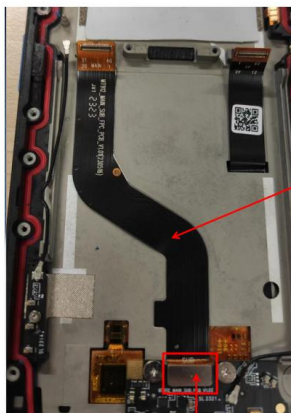
1. Remove Pm1.6*L4.5 screws on the Main PCBA. Electric screwdriver torsion is 1.2kgf·cm.



BTB connector

Remove BTB connector

1. Remove BTB connector by plastic tweezers.

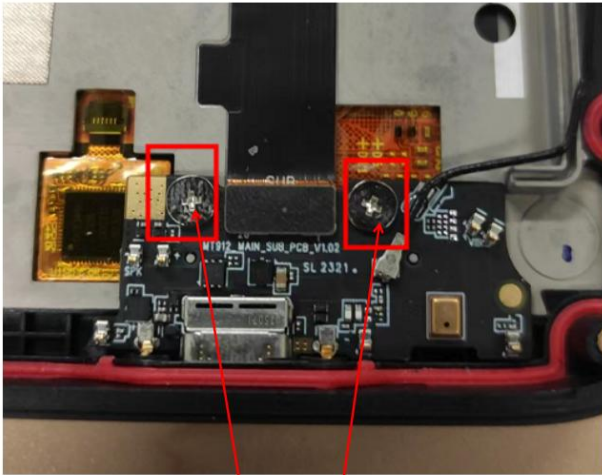


Main FPC

FPC BTB connector

Remove Main FPC

1. Remove BTB connector by plastic tweezers.
2. Remove main FPC on the Front case .

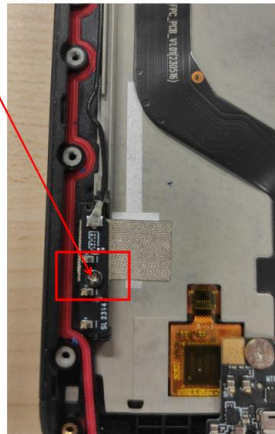


Pm1.6*L2.0

Remove SUB PCBA

1. Remove Pm1.6*L2.0 screws on the Front case. Electric screwdriver torsion is 1.2kgf·cm.
2. Remove The SUB PCBA.

Pm1.6*L4.5



Remove ANT PCBA

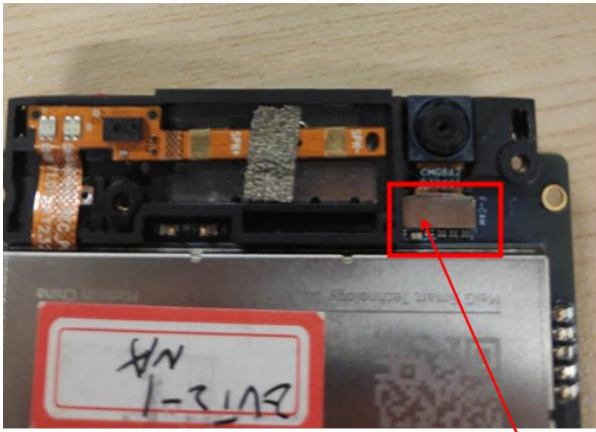
1. Remove Pm1.6*L4.5 screws on the Front case. Electric screwdriver torsion is 1.2kgf·cm.



BTB connector of back camera

Remove back camera

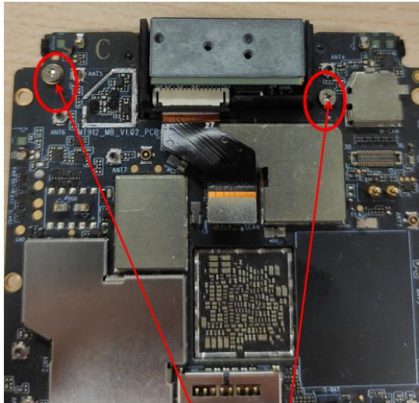
1.Remove BTB connector of back camera by plastic tweezers.



BTB connector of front camera

Remove front camera

1.Remove BTB connector of front camera by plastic tweezers.

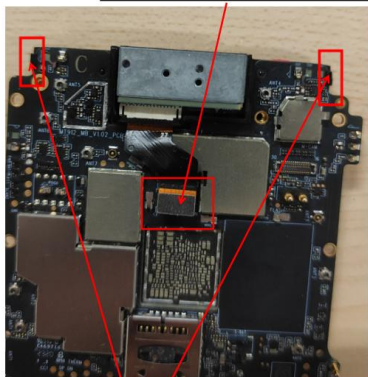


Pm1.6*L4.5

Remove scan frame

1. Remove Pm1.6*L4.5 screws on scan frame. Electric screwdriver torsion is 1.2kgf·cm.

SCAN FPC BTB connector



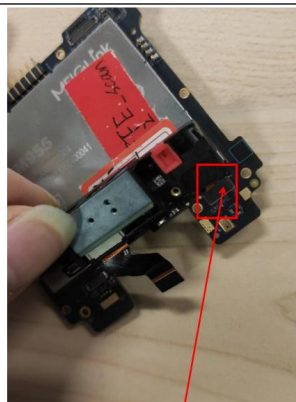
Frame hook

2. Remove BTB connector of scan FPC by plastic tweezers.

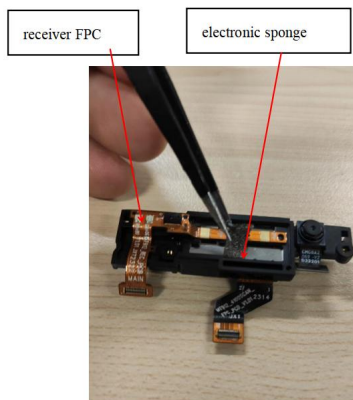
3. Remove The Frame hook by plastic tweezers.

4. Remove BTB connector of Receiver FPC by plastic tweezers.

5. Remove Receiver FPC, electronic sponge on scan frame.



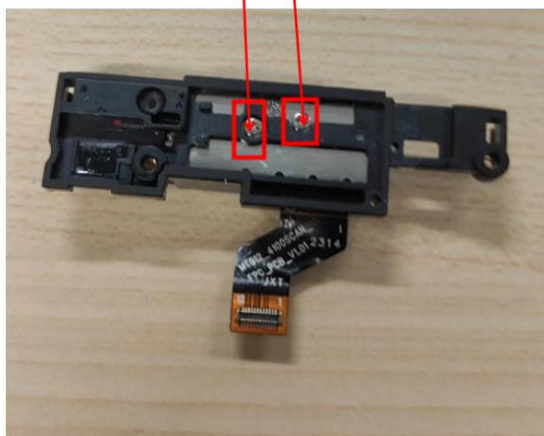
BTB connector of receiver FPC



receiver FPC

electronic sponge

Pm1.4*L2.5



Remove scan

Remove Pm1.4*L2.5 screws on scan frame. Electric screwdriver torsion is 1.2kgf·cm.



EMC-M51/EMC-51C

ENG SPEC, SERVICE MANUAL,
E446755/E449855/E450425/E450619/E450052/E450234

Declaration:

- 1.The product is used for POS function,not used for personal music player.
- 2.The panel of the product will not be used continuously touching.During each operation,only very short time needed to touch the panel.Touch time of product normal working <1 min.



Warning

FCC

§ 15.19 This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation of the

device.

§ 15.21 Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

§ 15.105 This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These

limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio

communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct

the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.— Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Notice to Users in Canada for IC compliance: This equipment complies with the Class B limits for radio noise emissions from digital apparatus as established by the Radio Interference Regulations of Industrial Canada.



RF Exposure Information (SAR)

This device meets the government's requirements for exposure to radio waves. This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy.

The exposure standard for wireless devices employs a unit of measurement known as Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6 W/Kg. For body-worn operation, this device has been tested and meets the FCC RF exposure guidelines for use with an accessory that contains no metal and positions the device a minimum of 15mm from the body. RF exposure compliance with any body-worn accessory that contains metal was not tested and certified and use of such body-worn accessory should be avoided. Any accessory used with this device for body-worn operation must keep the device a minimum of 15 mm away from the body.

The device for operation in the band 5150–5250 MHz and 5925–7125 MHz is only for indoor use

L'appareil utilisé dans la bande 5150-5250 MHz ,5925-7125 MHz est uniquement destiné à un usage intérieur

6XD:

Transmitters in the 5.925-7.125 GHz band are prohibited from operating to control or communicate with unmanned aircraft systems.

Indoor use only.

Note: The Wi-Fi 6E function of the product must be used with a low-power indoor access point. Do not connect to a standard power access point.



IC Radiation Exposure Statement

This EUT is compliance with SAR for general population/uncontrolled exposure limits in IC RSS-102 and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528 and IEC 62209. This equipment should be installed and operated with minimum distance 15mm between the radiator and your body. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet appareil est conforme aux limites d'exposition DAS incontrôlée pour la population générale de la norme CNR-102 d'Industrie Canada et a été

testé en conformité avec les méthodes de mesure et procédures spécifiées dans IEEE 1528 et IEC 62209. Cet appareil doit être installé et utilisé avec une distance minimale de 15mm entre l'émetteur et votre corps. Cet appareil et sa ou ses antennes ne doivent pas être co-localisés ou fonctionner en conjonction avec tout autre antenne ou transmetteur.

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions: (1) This device may not cause interference. (2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: 1. L'appareil ne doit pas produire de brouillage ; 2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

5600-5650MHz is restricted to be used in Canada

The device for operation in the band 3450-3900 MHz is only for indoor use .

6G WiFi:

Devices shall not be used for control of or communications with unmanned aircraft systems.

Devices shall not be used on oil platforms.

Devices shall not be used on aircraft, except for the low-power indoor access points, indoor subordinate devices, low-power client devices, and very low-power devices operating in the 5925-6425 MHz band, that may be used on large aircraft as defined in the Canadian Aviation Regulations, while flying above 3,048 metres (10,000 feet).

Operation shall be limited to indoor use only.



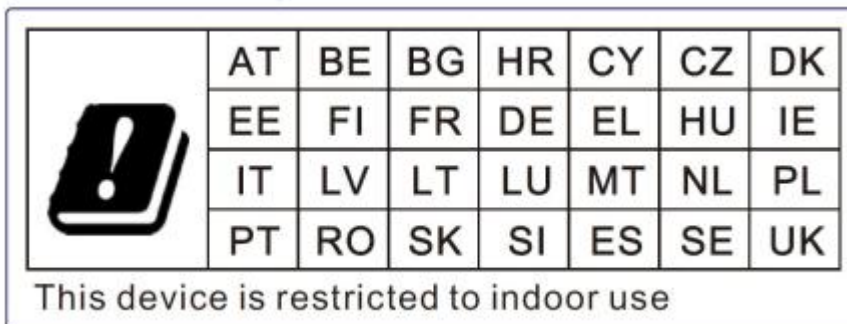
CE

RF Exposure Information (SAR)

The exposure standard for wireless devices employs a unit of measurement known as Specific Absorption Rate, or SAR. The SAR limit set by the CE is 10g 2.0 W/Kg. For body-worn operation, this device has been tested and meets the CE RF exposure guidelines for use with an accessory that contains no metal and positions the device a minimum of 15mm from the body. RF exposure compliance with any body-worn accessory that contains metal was not tested and certified and use of such body-worn accessory should be avoided. Any accessory used with this device for body-worn operation must keep the device a minimum of 15mm away from the body.

Elo hereby declares that the radio equipment type, Elo handheld Computer, is in compliance with Directive 2014/53/EU. The full text of the EU Declaration of Conformity is available at the following internet address: www.elotouch.com

This device is designed and intended for indoor use only.





	CE Frequency band [MHz]	CE Maximum transmit power
Bluetooth BR/EDR/LE	2400-2483.5	< 20 dBm
2.4G Wifi	2400-2483.5	< 20 dBm
5G Wifi	5150-5350 5470-5725	< 23 dBm
5.8GWifi	5725-5850	<13.98 dBm
RFID	13.56	NA
GNSS	1559-1610	NA
WCDMA	Uplink : Band 1: 1920 ~ 1980MHz Band 8: 880~ 915MHz Downlink: Band 1: 2110 ~ 2170MHz Band 8: 925 ~ 960MHz	20.3dBm ~25.7dBm
LTE	Uplink : Band 1: 1920 ~ 1980MHz Band 3: 1710 ~ 1785MHz	20.3dBm ~25.7dBm



	Band 28:703 ~ 748MHz Band 38:2570 ~ 2620MHz Band 7: 2500 ~ 2570MHz Band 8: 880 ~ 915MHz Band 20: 832 ~ 862MHz importer Band 40: 2300 ~ 2400MHz Downlink: Band 1: 2110 ~ 2170MHz Band 3: 1805 ~ 1880MHz Band 28: 758 ~ 803MHz Band 38: 2570 ~ 2620MHz Band 7: 2620 ~ 2690MHz Band 8: 925 ~ 960MHz Band 20: 791 ~ 821MHz Band 40: 2300 ~ 2400MHz	
--	---	--

5GNR N1	1920	1980	G7D,W7D	23.26dBm
5GNR N3	1710	1785	G7D,W7D	23.30dBm
5GNR N7	2500	2700	G7D,W7D	23.79dBm
5GNR N8	880	915	G7D,W7D	23.16dBm
5GNR N28	703	748	G7D,W7D	24.39dBm
5GNR N38	2570	2620	G7D,W7D	24.67dBm
5GNR N40	2300	2400	G7D,W7D	23.76dBm
5GNR N41	2496	2690	G7D,W7D	25.23dBm
5GNR N77	3300	4200	G7D,W7D	25.82dBm
5GNR N78	3300	3800	G7D,W7D	26.19dBm
5GNR N79	4400	5000	G7D,W7D	28.16dBm

Note: WCDMA and LTE NR are only applicable to models EMC-M51C. The remaining parts, models EMC-M51 and EMC-M51C are completely identical

Importer :
Address :