FCC Test Report

Report No.: AGC02866150301FE07

FCC ID	:	2AEJ9FREEDOM
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	GSM/WCDMA Mobile Phone
BRAND NAME	:	N/A
MODEL NAME	:	Freedom
CLIENT	:	Digit Secure India Private Limited
DATE OF ISSUE	:	Apr.24, 2015
STANDARD(S)	:	FCC Part 15 Rules
REPORT VERSION	:	V1.0

Attestation of ***G***lobal ***C***ompliance (Shenzhen) Co., Ltd

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Apr.24, 2015	Valid	Original Report

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1. VERIFICATION OF CONFORMITY

Applicant	Digit Secure India Private Limited
Address	Plot No-1303&1304, 4th Floor, Khanamet, HiTech City, Ayappa Society, Madhapur, Hyderabad, Telangana, India
Manufacturer	SHENZHEN HSEM TECHNOLOGY CO., LTD.
Address	4TH FLOOR, 5 PLANTS, TONGFUYU INDUSTRIAL, TAOYUAN STREET, NANSHAN DISTRICT, SHENZHEN P.R. CHINA
Product Designation	GSM/WCDMA Mobile Phone
Brand Name	N/A
Test Model	Freedom
Measurement Procedure	ANSI C63.4: 2003
Date of test	Apr.17, 2015 to Apr.23, 2015
Deviation	None
Condition of Test Sample	Normal
Report Template	AGCRT-US-IT/AC

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, the measurement procedure according to ANSI C63.4:2003. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Prepared By	Bart Xie	Apr.24, 2015
Checked By	Kidd Yang	Apr.24, 2015
Authorized By	Solger Zhang	Apr.24, 2015

2. SYSTEM DESCRIPTION

EUT test procedure:

1. Connect EUT and peripheral devices (PC) through USB port.
2. Power on the EUT, use the software to transfer data between EUT and PC.
3. Make sure the EUT operates normally during the test.

Test Mode

TEST MODE DESCRIPTION		
NO.	**TEST MODE DESCRIPTION**	**WORST**
1	USB (connection for data transferring)	V
Note: 1.V means EMI worst mode 2 .Other modes have been verified through VOC mode.		

3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in Measurement” (GUM) published by ISO.

Conducted measurement: +/- 2.75dB

Radiated measurement: +/- 3.2Db

Summary Of Test Results

FCC Rules	Description Of Test	Result
§15.107	Conduction Emission	Compliant
§15.109	Radiated Emission	Compliant

4. PRODUCT INFORMATION

Housing Type	plastics
Adapter Input	AC100-240V, 50-60Hz, 350mA
Adapter Output	DC5V, 2000mA

I/O Port Information (☒Applicable ☐Not Applicable)

I/O Port of EUT			
I/O Port Type	**Q'TY**	**Cable**	**Tested with**
USB Port	1	1.0 m, unshielded	1
Earphone Port	1	1.0 m, unshielded	1

5. SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
Laptop	Dell	INSPIRON	--	1	1.5m unshielded

Note: All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

6. TEST FACILITY

Site	Compliance Certification Services (Shenzhen) Inc.
Location	No.10-1 Mingkeda Logistics park, No.18, Huanguan South Rd.,Guan Lan Town, Baoan District, Shenzhen, China
Description	Test Firm Registration Number: 441872

TEST EQUIPMENT LIST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	100694	07/25/2014	07/24/2015
LISN	R&S	ESH3-Z5	838979/009	07/25/2014	07/24/2015
SPECTRUM ANALYZER	AGILENT	E4440A	US41421290	02/17/2015	02/16/2016
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	VULB9168-494	08/16/2014	08/15/2015
HORN ANTENNA	EM	EM-AH-10180	67	02/17/2015	02/16/2016
AMPLIFIER	EM	EM30180	0607030	02/17/2015	02/16/2016
POSITIONING CONTROLLER	MF	MF-7802	1050034	07/25/2014	07/24/2015

Radiated Emission Test Site 966(2)					
Name of Equipment	**Manufacturer**	**Model Number**	**Serial Number**	**Last Calibration**	**Due Calibration**
PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	03/01/2015	03/01/2016
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	03/09/2015	03/08/2016
Amplifier	MITEQ	AM-1604-3000	1123808	03/18/2015	03/17/2016
High Noise Amplifier	Agilent	8449B	3008A01838	03/18/2015	03/17/2016
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	07/10/2014	07/09/2015
Bilog Antenna	SCHAFFNER	CBL6143	5082	03/01/2015	03/01/2016
Horn Antenna	SCHWARZBECK	BBHA9120	D286	03/01/2015	03/01/2016
Loop Antenna	COM-POWER	AL-130	121044	09/27/2014	09/26/2015
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Temp. / Humidity Meter	Anymetre	JR913	N/A	02/28/2015	02/27/2016
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

Conducted Emission Test Site					
Name of Equipment	**Manufacturer**	**Model Number**	**Serial Number**	**Last Calibration**	**Due Calibration**
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	03/09/2015	03/08/2016
LISN(EUT)	ROHDE&SCHWARZ	ENV216	101543-WX	03/09/2015	03/08/2016
LISN	EMCO	3825/2	8901-1459	03/09/2015	03/08/2016
Temp. / Humidity Meter	VICTOR	HTC-1	N/A	03/04/2015	03/03/2016
Test S/W	FARAD	EZ-EMC/ CCS-3A1-CE			

7. FCCLINE CONDUCTED EMISSION TEST

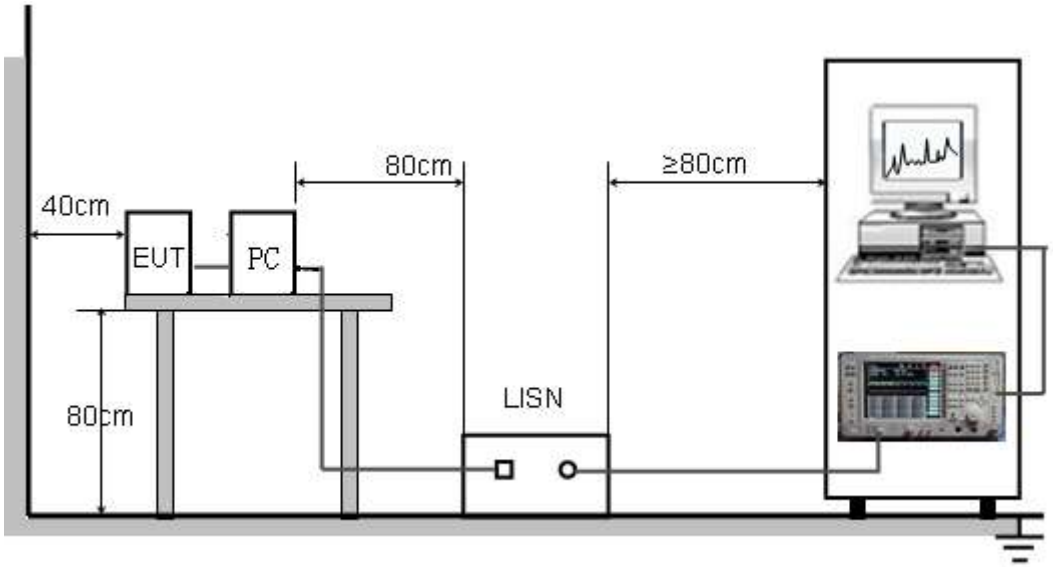
7.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

7.2. BLOCK DIAGRAM OF TEST SETUP



7.3. PROCEDURE OF LINE CONDUCTED EMISSION TEST

(1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.

(2) Support equipment, if needed, was placed as per ANSI C63.4.

(3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

(4) The EUT received DC5V power from PC with receive AC120V/60Hz power from a LISN.

(5) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.

(6) Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

(7) During the above scans, the emissions were maximized by cable manipulation.

(8) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions.

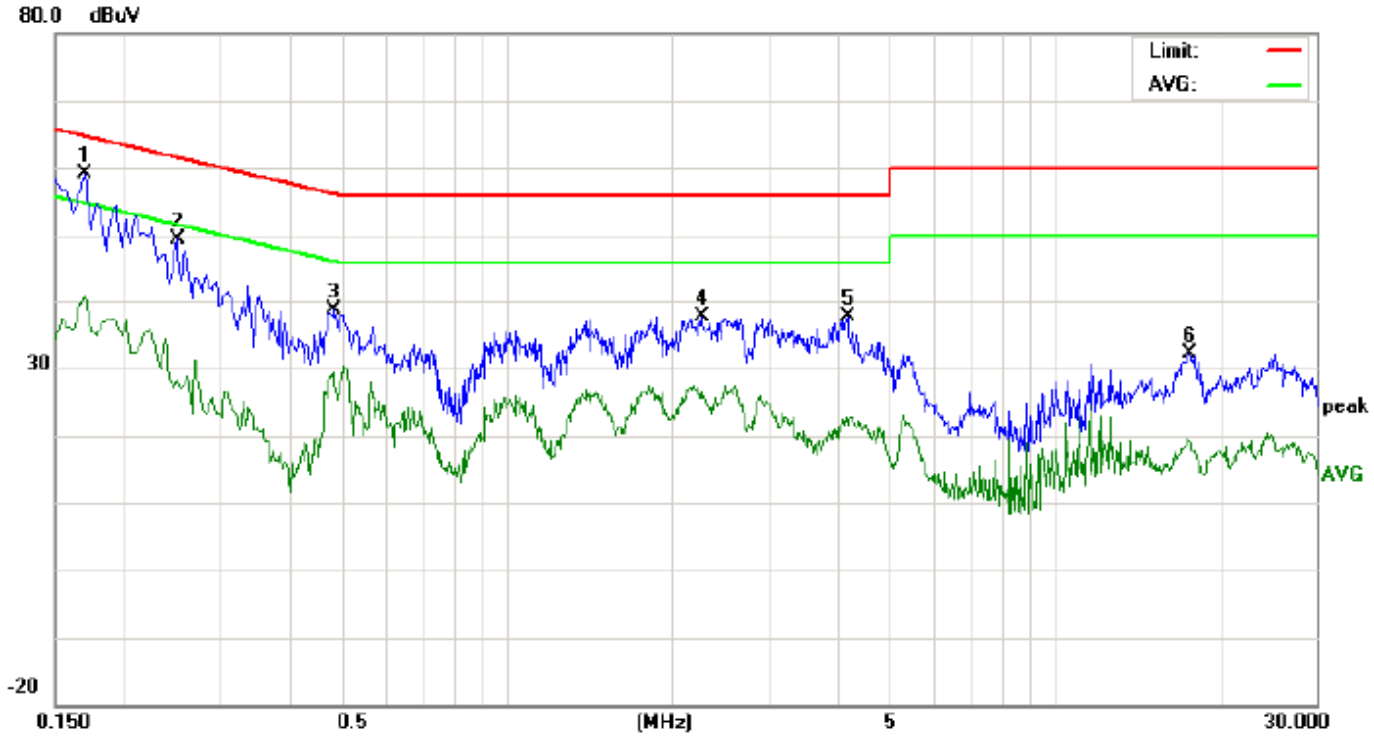
(9) Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

The test data of the worst case condition (mode 1) was reported on the Summary Data page.

7.4. TEST RESULT OF LINE CONDUCTED EMISSION TEST

LINE CONDUCTED EMISSION TEST-L

Job No.:	20150422	Date: 2015-4-22	
Company:		Time: 18:36:50	
Standard:	FCC Class B Conduction(QP)	Temp.(C)/Hum.(%):	26(C) / 60 %
Test item:	Conduction Test	EUT:	
Line :	L1	Test Voltage	AC 120V/60Hz
Model:	Freedom	Test By :	
Description:	USB		



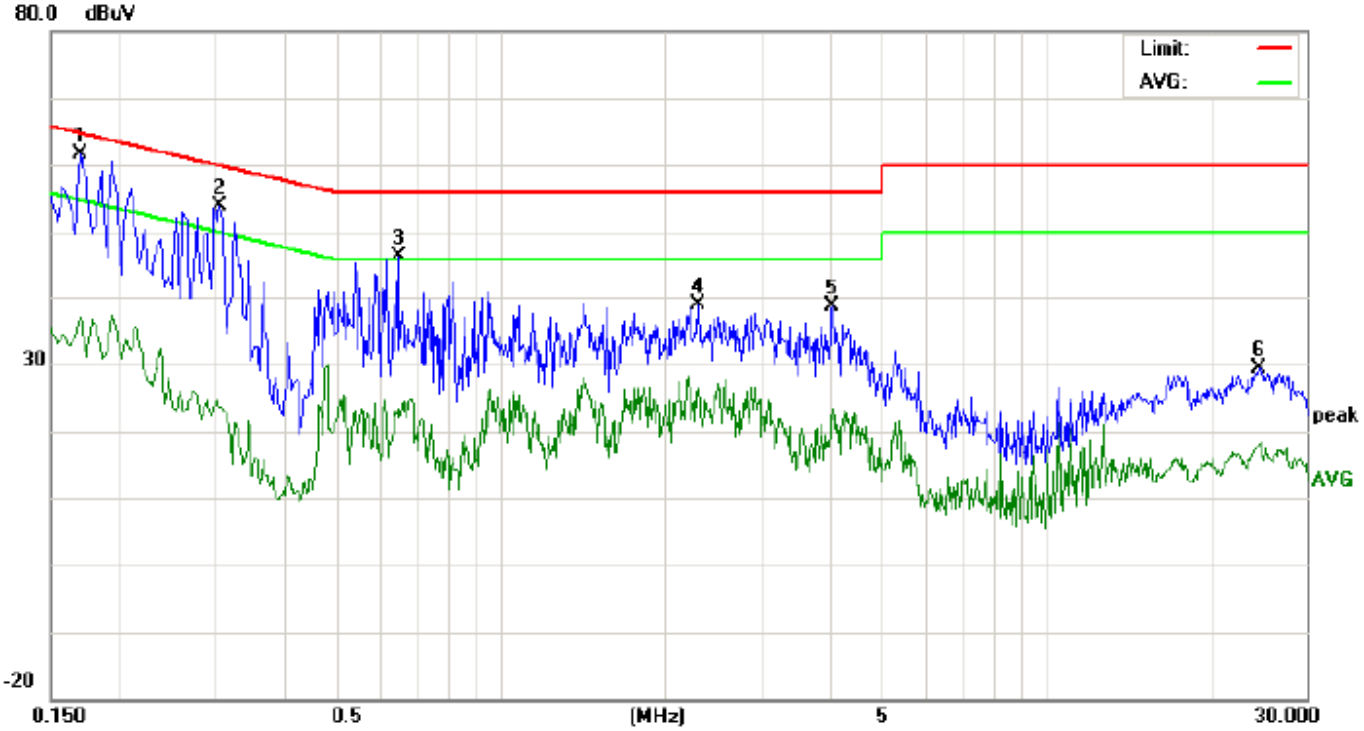
No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1700	48.83		30.44	10.18	59.01		40.62	64.96	54.96	-5.95	-14.34	P	
2	0.2500	39.14		17.73	10.27	49.41		28.00	61.75	51.75	-12.34	-23.75	P	
3	0.4860	28.31		16.88	10.39	38.70		27.27	56.24	46.24	-17.54	-18.97	P	
4	2.2620	27.37		16.24	10.33	37.70		26.57	56.00	46.00	-18.30	-19.43	P	
5	4.1940	27.30		11.37	10.34	37.64		21.71	56.00	46.00	-18.36	-24.29	P	
6	17.6180	22.13		9.02	10.12	32.25		19.14	60.00	50.00	-27.75	-30.86	P	

RESULT: PASS

LINE CONDUCTED EMISSION TEST-N

Job No.:	20150422	Date: 2015-4-22	
Company:		Time: 18:33:38	
Standard:	FCC Class B Conduction(QP)	Temp.(C)/Hum.(%):	26(C) / 60 %
Test item:	Conduction Test	EUT:	
Line :	N	Test Voltage	AC 120V/60Hz
Model:	Freedom	Test By :	

Description: USB



No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1700	51.37		26.63	10.18	61.55		36.81	64.96	54.96	-3.41	-18.15	P	
2	0.3060	43.64		13.45	10.29	53.93		23.74	60.08	50.08	-6.15	-26.34	P	
3	0.6500	36.14		12.96	10.33	46.47		23.29	56.00	46.00	-9.53	-22.71	P	
4	2.3020	28.46		15.92	10.35	38.81		26.27	56.00	46.00	-17.19	-19.73	P	
5	4.0660	28.34		12.97	10.40	38.74		23.37	56.00	46.00	-17.26	-22.63	P	
6	24.6180	19.17		7.68	10.12	29.29		17.80	60.00	50.00	-30.71	-32.20	P	

RESULT: PASS

8. FCC RADIATED EMISSION TEST

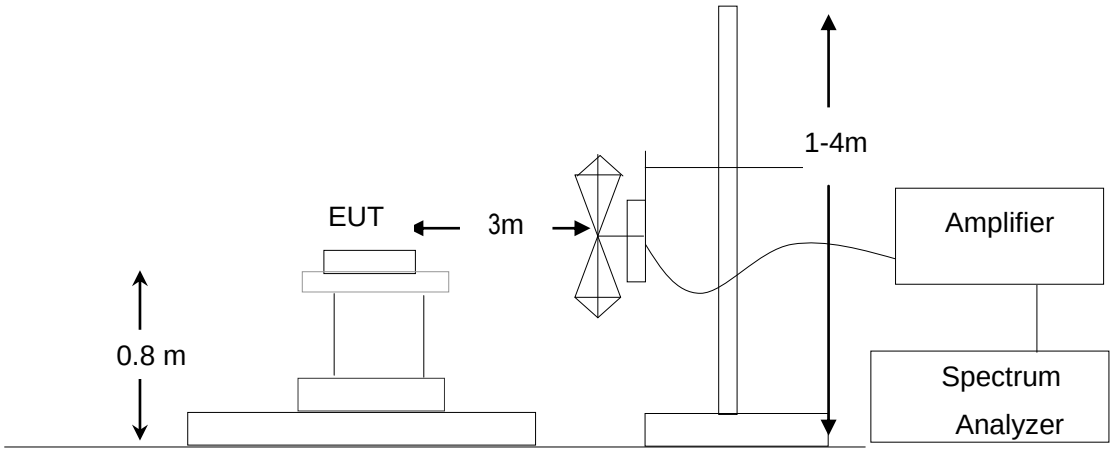
8.1. LIMITS OF RADIATED EMISSION TEST

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBuV/m/ Q.P.)
30~88	3	40.0
88~216	3	43.5
216~960	3	46.0
Above 960	3	54.0

Note: The lower limit shall apply at the transition frequency.

8.2. BLOCK DIAGRAM OF TEST SETUP

System Diagram of Connections between EUT and Simulators



8.3. PROCEDURE OF RADIATED EMISSION TEST

(1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.

(2) Support equipment, if needed, was placed as per ANSI C63.4.

(3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

(4) The EUT received DC 5V power from PC with receive AC120V/60Hz power from socket under the turntable through a LISN.

(5) The antenna was placed at 3 meter away from the EUT as stated in FCC Part 15. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.

(6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

(7) The test mode(s) were scanned during the test:

(8) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position,polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented.

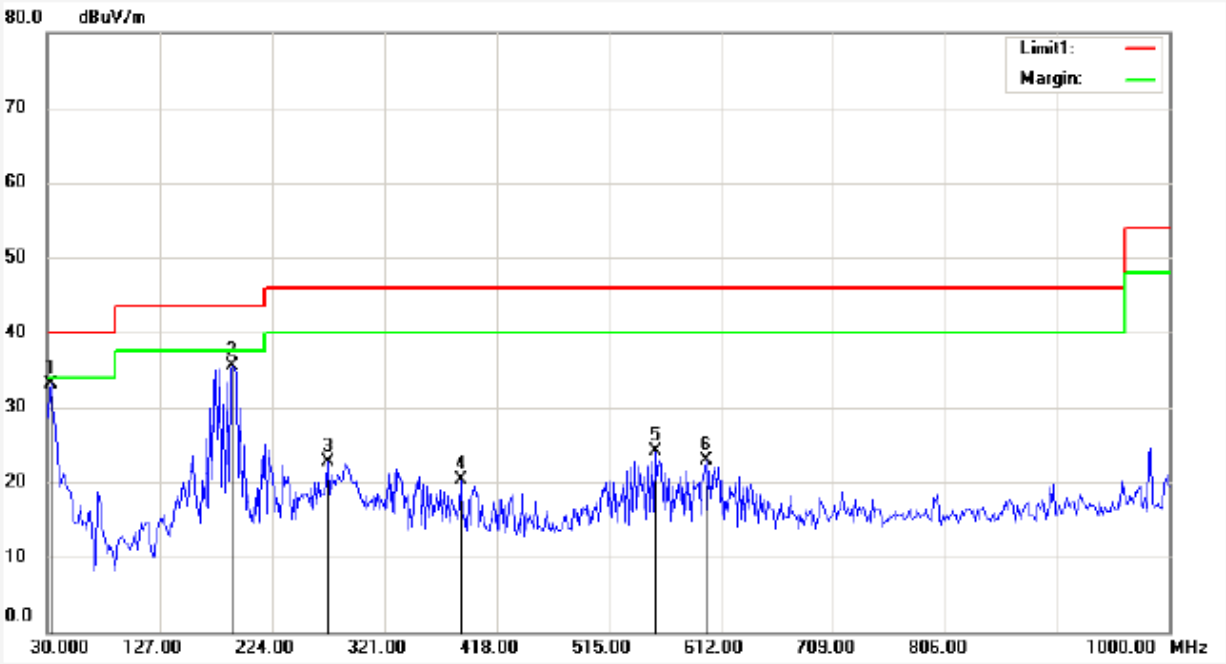
The test data of the worst case condition (mode 1) was reported on the Summary Data page.

8.4. TEST RESULT OF RADIATED EMISSION TEST

Radiated Emission Test at 3m Distance-Horizontal

Job No.: 20150422	Probe : Horizontal
Standard: FCC Part15 Class B (30-1000MHz)	Tested Distance: 3m
Test item: Radiation Test	Power Source: DC 3V
Temp.(C)/Hum.(%RH): 24 (C) / 52 %RH	Date: 2015-4-22 Time: 17:50:45
Company:	EUT:
Model: Freedom	Test By : JIMMY

Test Mode: USB



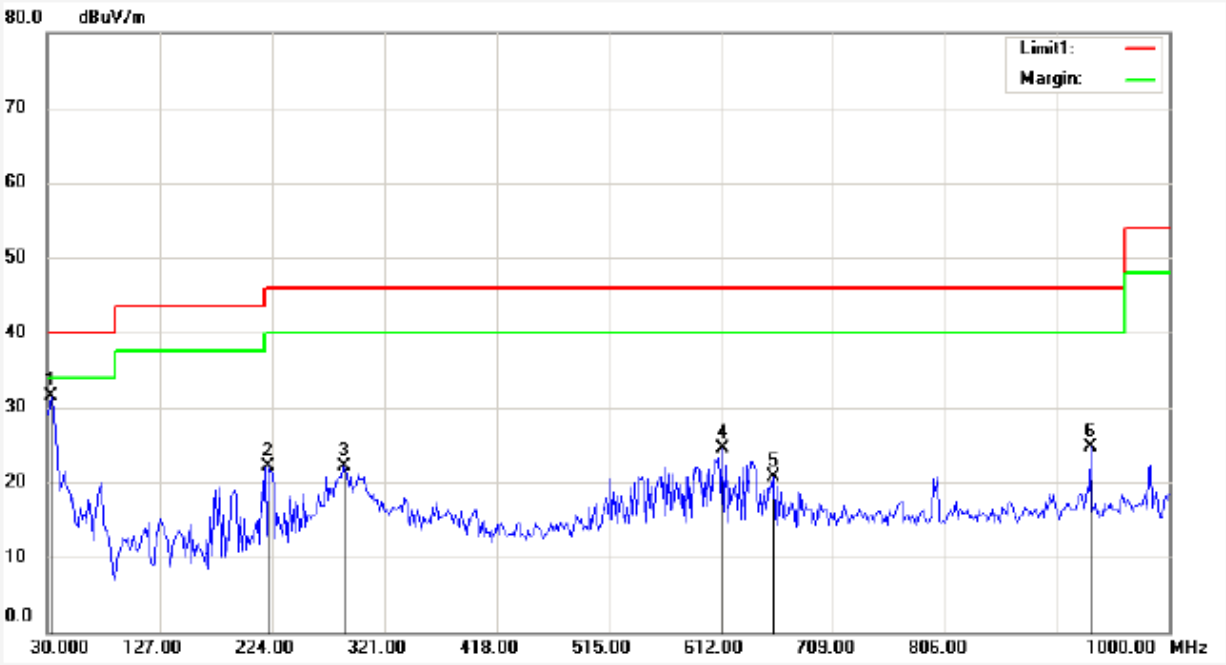
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1*	33.2333	46.71	-13.64	33.07	40.00	-6.93	---	---	peak
2	190.0500	58.30	-22.86	35.44	43.50	-8.06	---	---	peak
3	272.5000	43.09	-20.47	22.62	46.00	-23.38	---	---	peak
4	387.2833	36.80	-16.44	20.36	46.00	-25.64	---	---	peak
5	555.4167	37.37	-13.19	24.18	46.00	-21.82	---	---	peak
6	599.0667	35.85	-12.89	22.96	46.00	-23.04	---	---	peak

RESULT: PASS

Radiated Emission Test at 3m Distance-Vertical

Job No.:	20150422	Probe :	Vertical
Standard:	FCC Part15 Class B (30-1000MHz)	Tested Distance:	3m
Test item:	Radiation Test	Power Source:	DC 3V
Temp.(C)/Hum.(%RH):	24 (C) / 52 %RH	Date: 2015-4-22	Time: 17:51:18
Company:		EUT:	
Model:	Freedom	Test By :	JIMMY

Test Mode: USB



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1*	33.2333	45.23	-13.64	31.59	40.00	-8.41	---	---	peak
2	220.7667	42.55	-20.47	22.08	46.00	-23.92	---	---	peak
3	285.4333	42.50	-20.43	22.07	46.00	-23.93	---	---	peak
4	613.6167	37.16	-12.73	24.43	46.00	-21.57	---	---	peak
5	657.2667	33.07	-12.42	20.65	46.00	-25.35	---	---	peak
6	932.1000	34.47	-9.69	24.78	46.00	-21.22	---	---	peak

RESULT: PASS

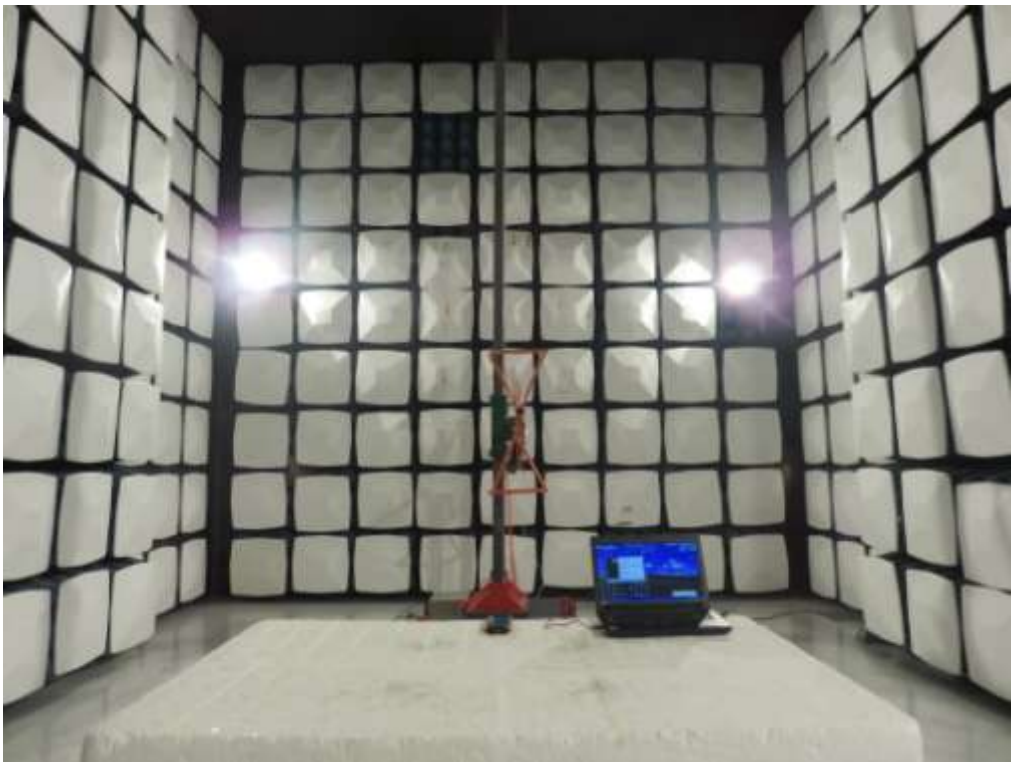
Note: All Other modes above 1GHz have more than 20db margin, no recording in the report

Result = Reading + Factor, Margin = Result – Limit.

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC LINE CONDUCTED EMISSION TEST SETUP

FCC RADIATED EMISSION TEST SETUP

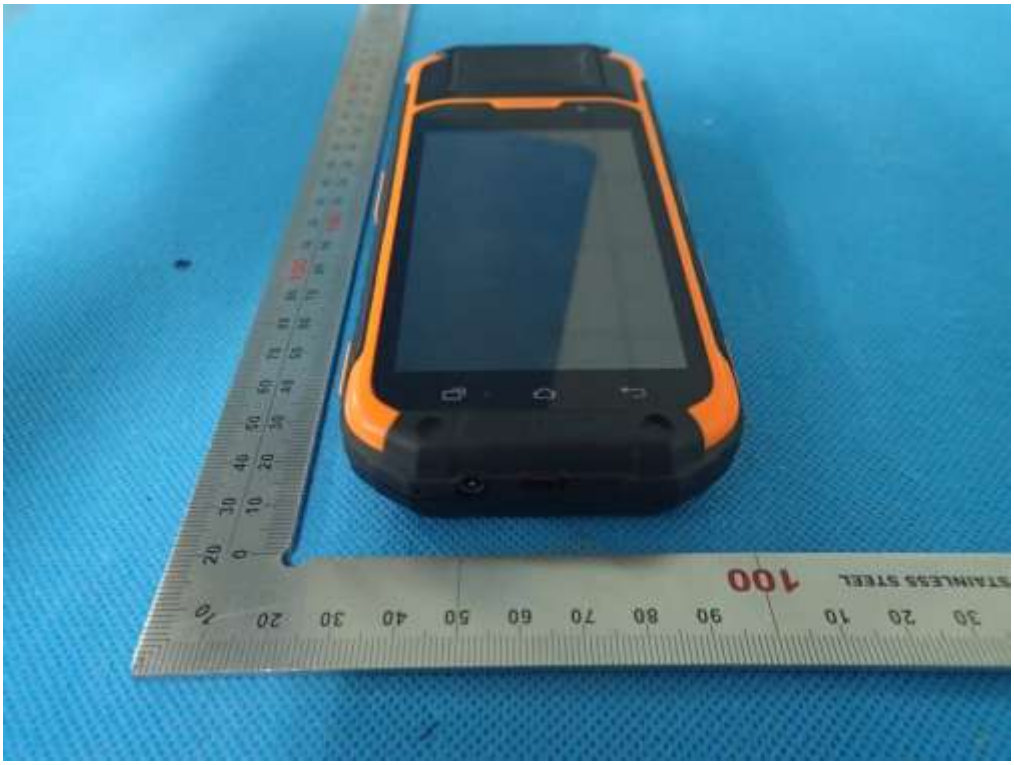


APPENDIX B: PHOTOGRAPHS OF EUT

TOTAL VIEW OF EUT

TOP VIEW OF EUT

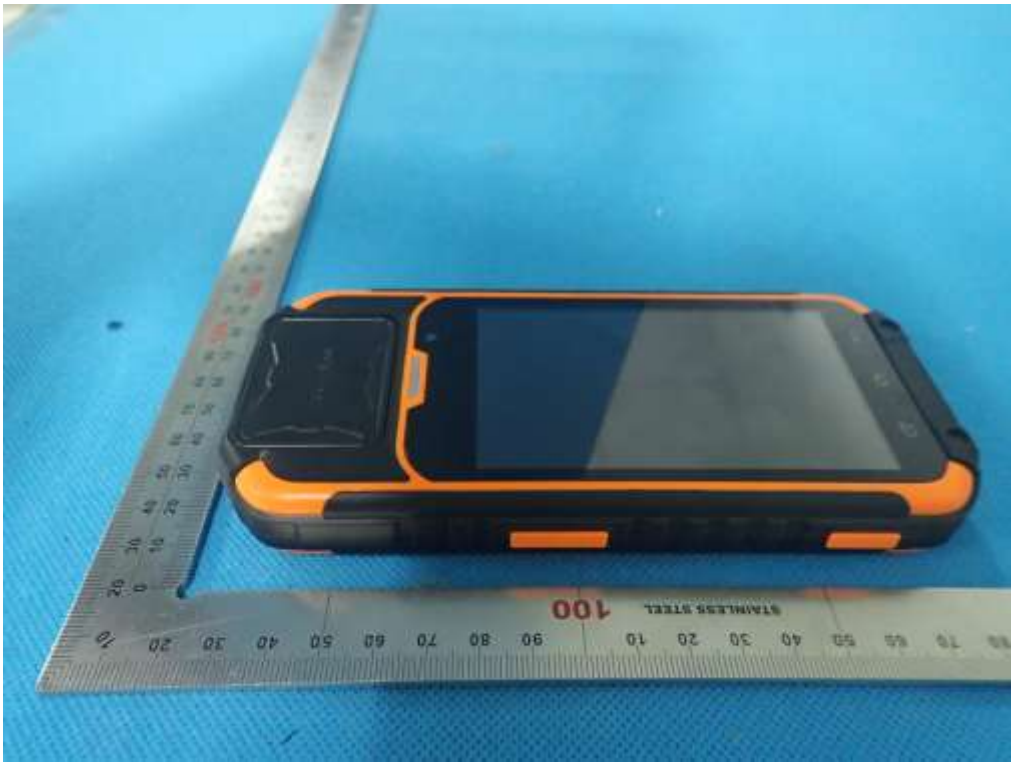
BOTTOM VIEW OF EUT



FRONT VIEW OF EUT

BACK VIEW OF EUT

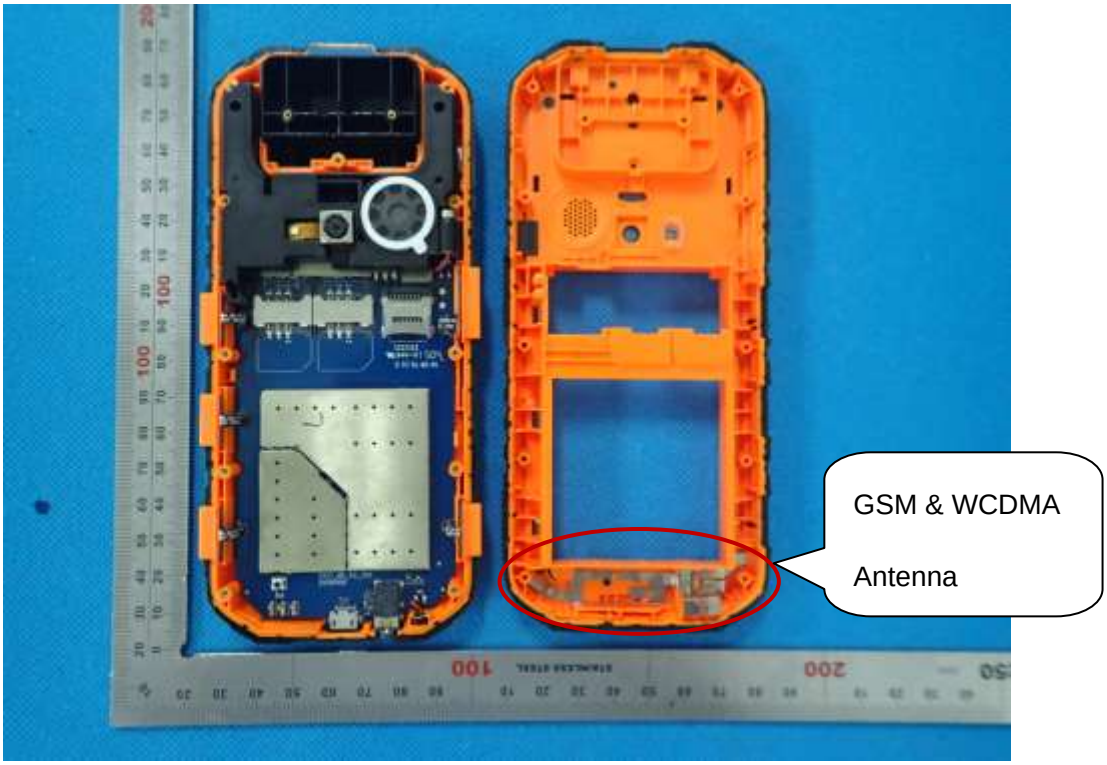
LEFT VIEW OF EUT



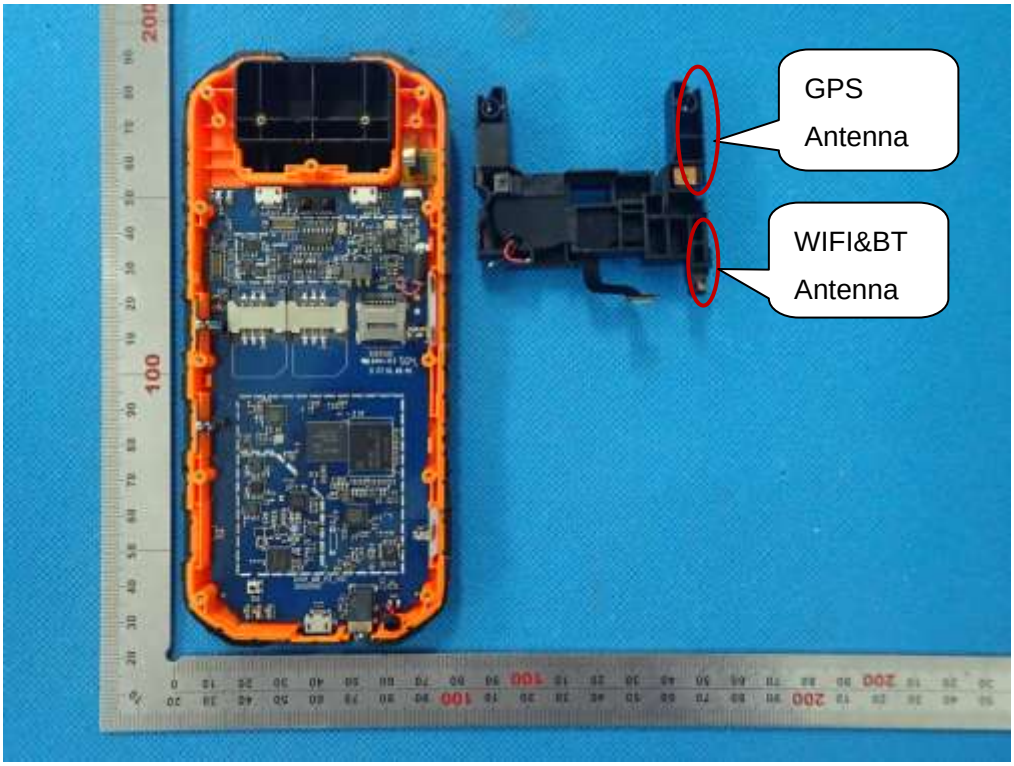
RIGHT VIEW OF EUT

OPEN VIEW OF EUT-1

OPEN VIEW OF EUT-2

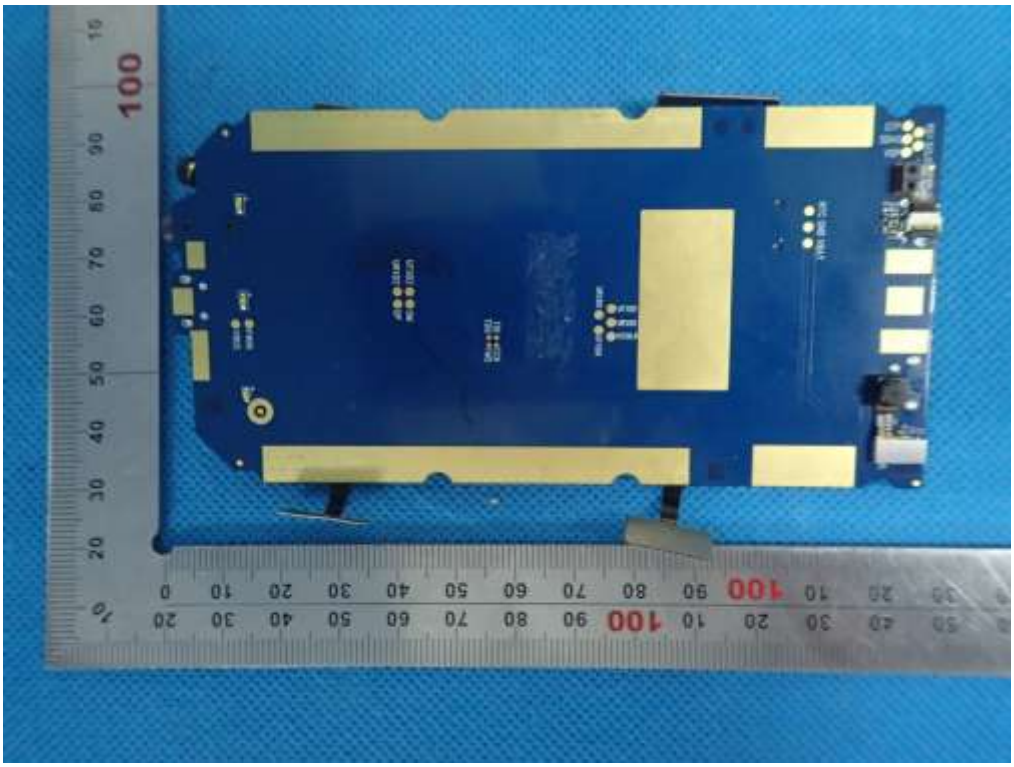


OPEN VIEW OF EUT-3

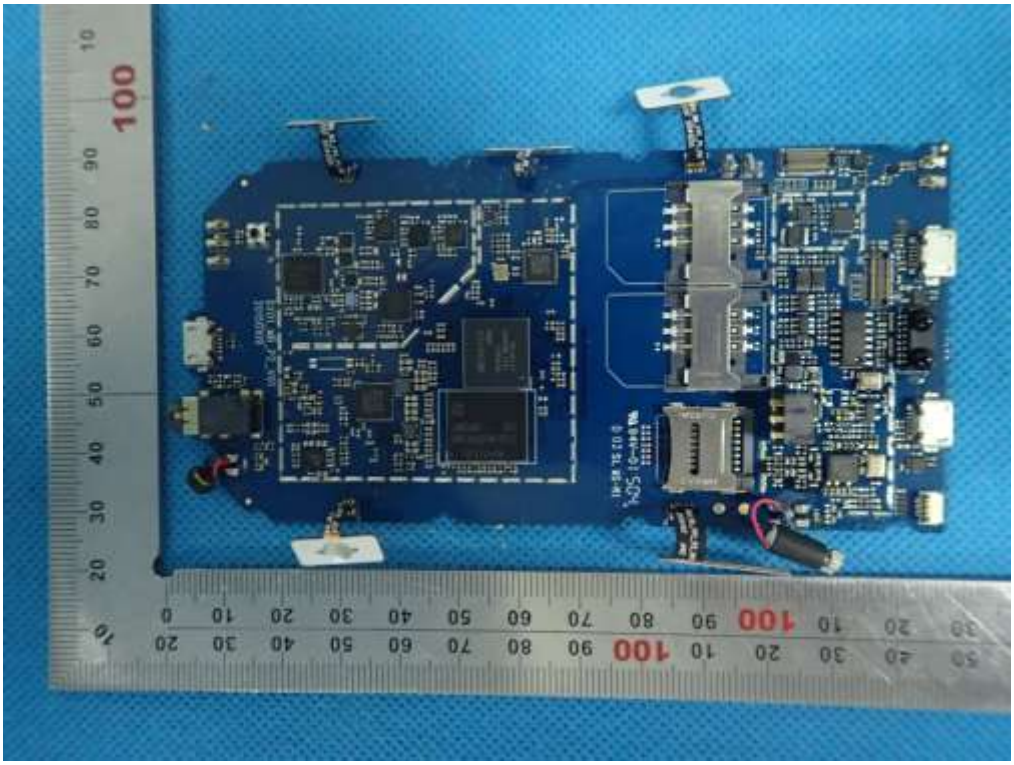


OPEN VIEW OF EUT-4

INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



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