FCC EMC TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

FOR

GSM digital mobile phone

ISSUED TO
Power Idea Technology Limited.

4th Floor, A Section , Languang Science & technology Xinxi RD, Hi-Tech Industrial Park North, Nanshan, ShenZhen, China.

Prepared by: Cao Shaodong (Reporting Specialist)
Date 2014.5.24

Approved by: Wei Yanquan (Chief Engineer)
Date 2014.5.24

Report No.:	BL-SZ1440058-401
EUT Type:	GSM digital mobile phone
Model Name:	RG100, RG150, MARINER PRO
Brand Name:	N/A
Test Standard:	47 CFR Part 15 Subpart B
FCC ID:	ZLE-RG100RG150
Test conclusion:	PASS
Test Date:	May 4, 2014 ~ May 20, 2014
Date of Issue:	May 24, 2014

Block B, 1st FL,Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong, P. R. China 518055
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Revision History

Version	Issue Date	Revisions
Rev. 01	May 24,2014	Initial Issue

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1 GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6683 3402
Fax Number	+86 755 6182 4271

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory has been listed by US Federal Communications Commission to perform electromagnetic emission measurements. The recognition numbers of test site are 832625. The laboratory has met the requirements of the IAS Accreditation Criteria for Testing Laboratories (AC89), has demonstrated compliance with ISO/IEC Standard 17025:2005. The accreditation certificate number is TL-588. The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Test Environment Condition

Ambient Temperature	15 to 35℃
Ambient Relative Humidity	30 to 60%
Ambient Pressure	86 to 106kPa

1.4 Announce

(1) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.

(2) The test report is invalid if there is any evidence and/or falsification.

(3) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.

(4) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.

(5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant

Applicant	Power Idea Technology Limited.
Address	4th Floor, A Section , Languang Science & technology Xinxi RD, Hi-Tech Industrial Park North, Nanshan, ShenZhen, China.

2.2 Manufacturer

Manufacturer	Power Idea Technology Limited.
Address	4th Floor, A Section , Languang Science & technology Xinxi RD, Hi-Tech Industrial Park North, Nanshan, ShenZhen, China.

2.3 General Description for Equipment under Test (EUT)

EUT Type	GSM digital mobile phone
Model Name	RG100
Series Model Name	RG100, RG150, MARINER PRO
Description of Model name differentiation	The equipment model RG100, RG150 and MARINER PRO are GSM digital mobile phone, the electrical parameters and internal structure of circuit are same, only the model is different.
Hardware Version	RG126_V2.1
Software Version	N/A
Network and Wireless connectivity	2G Network GSM 850/900/1800/1900
About the Product	The equipment is Mobile Phone, intended for used with information technology equipment.

2.4 Technical Information

The requirement for the following technical information of the EUT was tested in this report:

Frequency Bands	GSM/GPRS/EDGE: 900/1800 MHz Bluetooth: ISM 2.4GHz
Modulation Type	GSM/GPRS: GMSK EDGE: 8PSK BT: FHSS

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	N/A
	Model No	RG100 lithium-ion battery
	Serial No	N/A
	Capacitance	2400mAh
	Rated Voltage	3.7V
	Extreme Voltage	Low: 3.5V / High:4.2V
Ancillary Equipment 2	TRAVEL CHARGER	
	Brand Name	N/A
	Model No	RD0501000-USBA-BMG
	Serial No	N/A
	Rated Input	~ 100-240V, 250mA, 50/60Hz
	Rated Output	⎓ 5V, 1000mA
Ancillary Equipment 3	Stereo Headset	
Ancillary Equipment 4	USB Data Cable	

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	FCC 47 CFR Part 15 Subpart B (10-1-09 Edition)	Radio Frequency Devices

3.2 Verdict

No.	Description	FCC Rule	Test Verdict	Result
1	Radiated Emission	15.109	PASS	Annex A .1
2	Conducted Emission, AC Ports	15.107	PASS	Annex A .2

Note: The tests were performed according to the method of measurements prescribed in ANSI C63.4 2009.

3.3 Test Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Conducted emissions (9KHz-30MHz)	1.12dB
Radiated emissions (30MHz-1GHz)	2.11dB
Radiated emissions (1GHz-18GHz)	3.31dB

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

Environment Parameter	Selected Values During Tests		
	Temperature	Voltage	Relative Humidity
Normal Temperature, Normal Voltage (NTNV)	23°C~25°C	AC 110V/60Hz	50%-55%

4.2 Test Equipment List

Radiated Emission Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2013.06.04	2014.06.03	☒
Test Antenna-Loop(9kHz-30MHz)	SCHWARZBECK	FMZB 1519	1519-037	2013.07.02	2014.07.01	☒
Test Antenna-Bi-Log(30MHz -3GHz)	SCHWARZBECK	VULB 9163	9163-624	2013.07.03	2014.07.02	☒
Test Antenna-Horn(1-18GHz)	SCHWARZBECK	BBHA 9120D	9120D-1148	2013.07.02	2014.07.01	☒
Test Antenna-Horn(15-26.5GHz)	SCHWARZBECK	BBHA 9170	9170-305	2013.07.02	2014.07.01	☐
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2013.10.07	2014.10.06	☒

Conducted disturbance Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2013.06.04	2014.06.03	☒
LISN	SCHWARZBECK	NSLK 8127	8127-687	2013.06.04	2014.06.03	☒
AMN	SCHWARZBECK	NNBM8124	8124-509	2013.06.29	2014.06.28	☐
AMN	SCHWARZBECK	NNBM8124	8124-510	2013.06.29	2014.06.28	☐
ISN	TESEQ	ISN T800	34449	2013.06.29	2014.06.28	☐

4.3 Test Enclosure list

Description	Manufacturer	Model	Serial No.	Length	Description	Use
PC	N/A	N/A	N/A	N/A	Special Handled	☒
Printer	HP	DESKJET 1000	N/A	N/A	N/A	☒
Keyboard	logitech	Y-BP62a	N/A	N/A	N/A	☒
Mouse	logitech	M100	N/A	N/A	N/A	☒
USB disk	Kingston	N/A	N/A	N/A	N/A	☐
TF Card	Kingston	N/A	N/A	N/A	N/A	☒
VGA Cable	N/A	N/A	N/A	1.5m	Shielded with core	☐
HDMI Cable	N/A	N/A	N/A	1.5m	Shielded with core	☐
DVI Cable	N/A	N/A	N/A	1.5m	Shielded with core	☐
Coaxial video cable	N/A	N/A	N/A	2m	Shielded with core	☐
Phone	BBK	HCD007TSD	N/A	N/A	N/A	☐
laptop	LENOVO	K29	N/A	N/A	N/A	☐

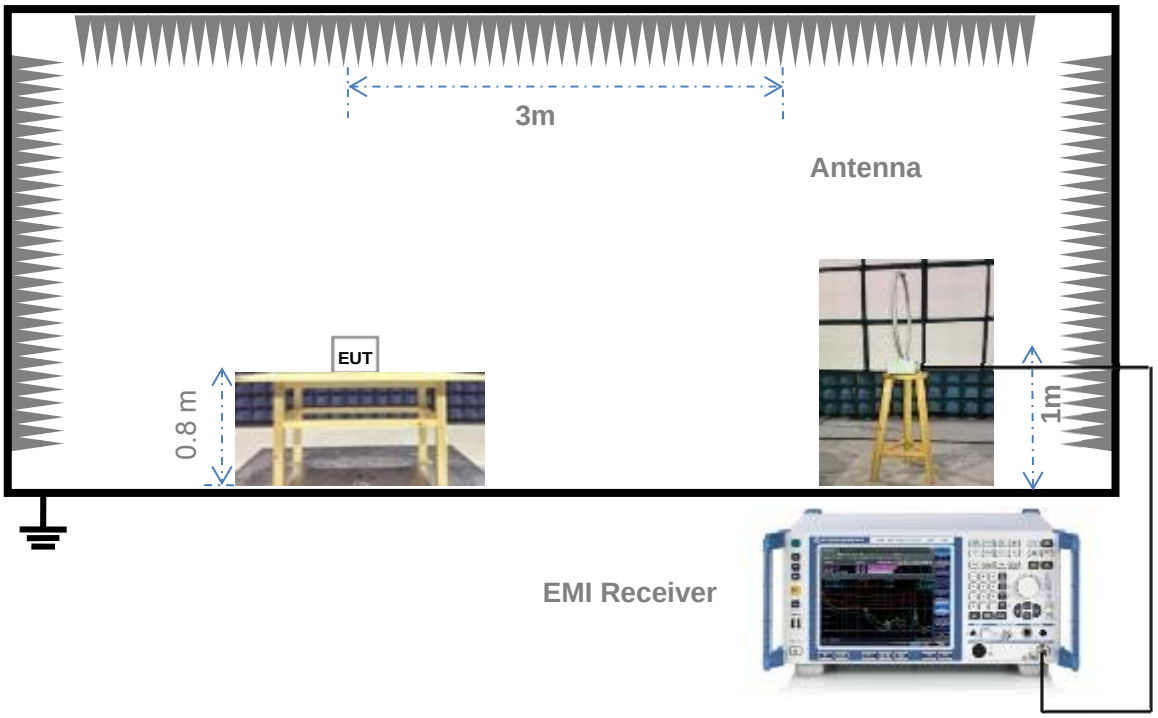
4.4 Test Configurations

Test Configurations (TC) No.	Description
TC01	The USB Test mode The EUT configuration of the emission tests is TransFlash Card + EUT + Battery + PC. In this test mode, the EUT with a TransFlash Card embedded is connected with a PC via a USB cable supplied by applicant. During the measurement, the data is transmitting between the PC and the TransFlash Card of the EUT.
TC02	The Camera test mode The EUT configuration of the emission tests is EUT + Battery + Charger. The EUT supports Camera function. During the measurement, the EUT working by way of the Camera.
TC03	The FM test mode The EUT configuration of the emission tests is EUT + Battery + Charger. During the test, the FM function was active.

Note: Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is reported by this report.

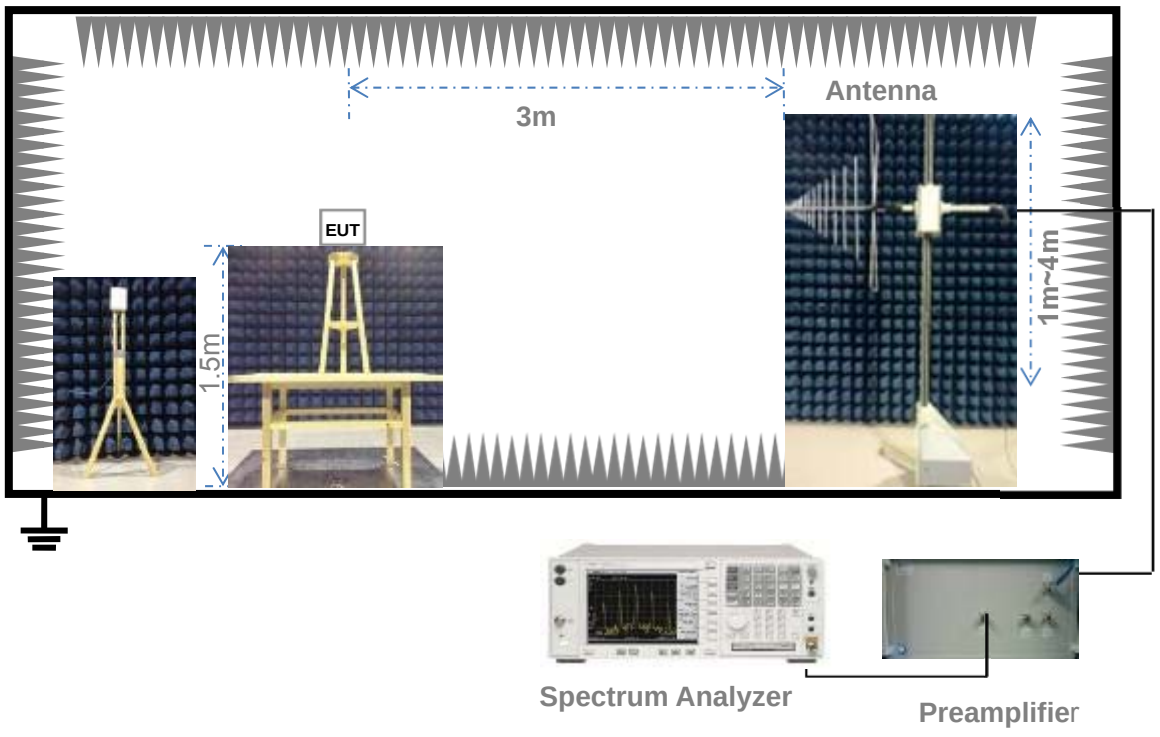
4.5 Test Setups

Test Setup 1



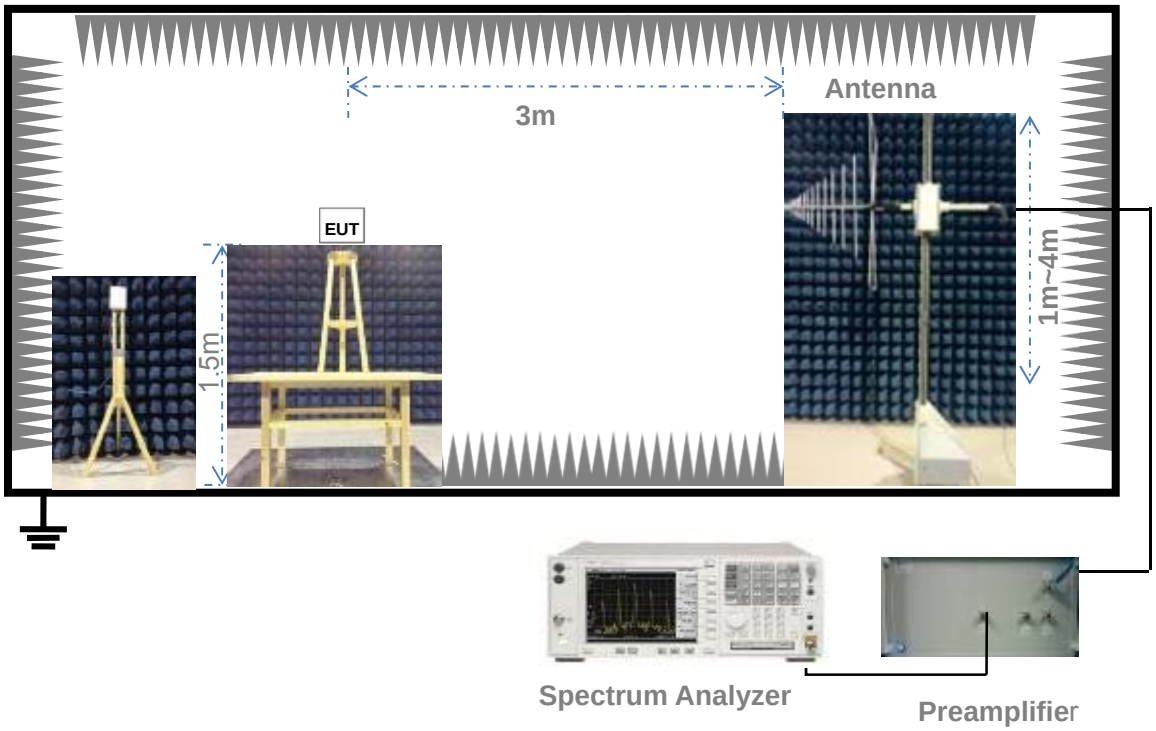
For Radiated Emission Test (Below 30MHz))

Test Setup 2



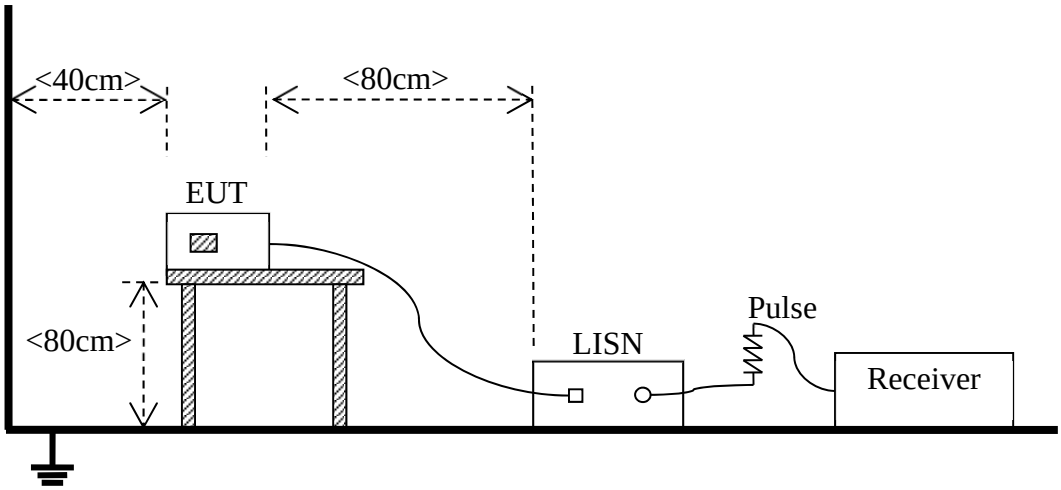
(For Radiated Emission Test (30MHz-1GHz))

Test Setup 3



(For Radiated Emission Test (above 1GHz))

Test Setup 4



(For Conducted Emission, AC Ports Test)

4.6 Test Conditions

Test Case	Test Conditions	
Radiated Emission	Test Env.	NTNV
	Test Setup	Test Setup 1&3
	Test Configuration	TC01~TC03
Conducted Emission, AC Ports	Test Env.	NTNV
	Test Setup	Test Setup 4
	Test Configuration	TC01~TC03

5 TEST ITEMS

5.1 Emission Tests

5.1.1 Radiated Emission

5.1.1.1 Limit

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

NOTE:

1) Field Strength (dBμV/m) = 20*log[Field Strength (μV/m)].
2) In the emission tables above, the tighter limit applies at the band edges.

5.1.1.2 Test Procedure

An initial pre-scan was performed in the chamber using the EMI Receiver in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by Bi-Log antenna with 2 orthogonal polarities.

5.1.2 Conducted Emission

5.1.2.1 Test Limit

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

1) The limit is applicable to Class B ITE.
2) The lower limit shall apply at the band edges.
3) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

5.1.2.2 Test Procedure

The EUT is connected to the power mains through a LISN which provides 50Ω/50μH of coupling impedance for the measuring instrument. The test frequency range is from 150kHz to 30MHz. The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels that are more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed.

ANNEX A TEST RESULTS

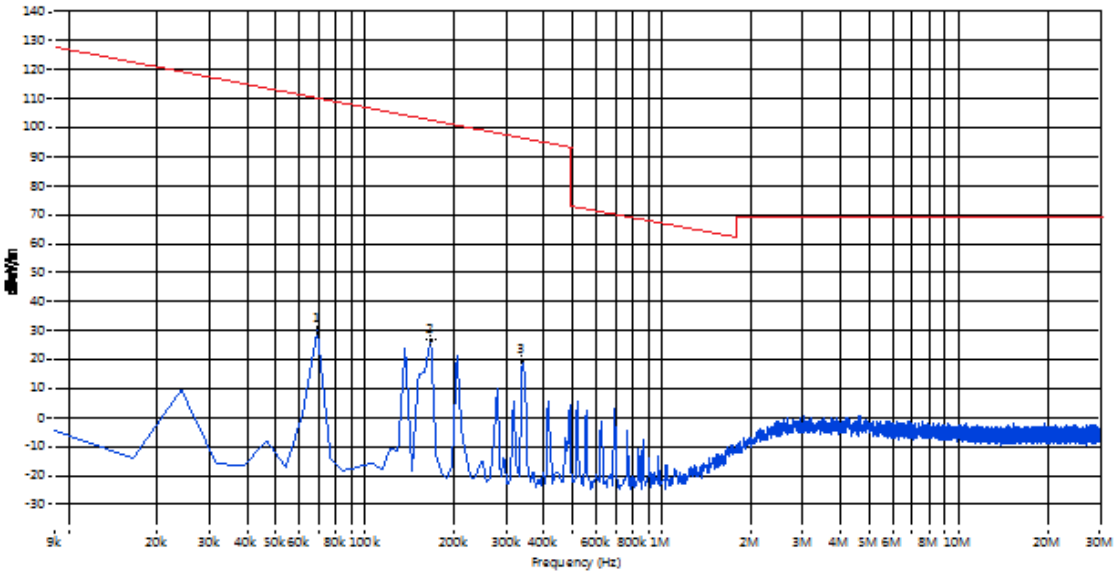
A.1 Radiated Emission

Test Data

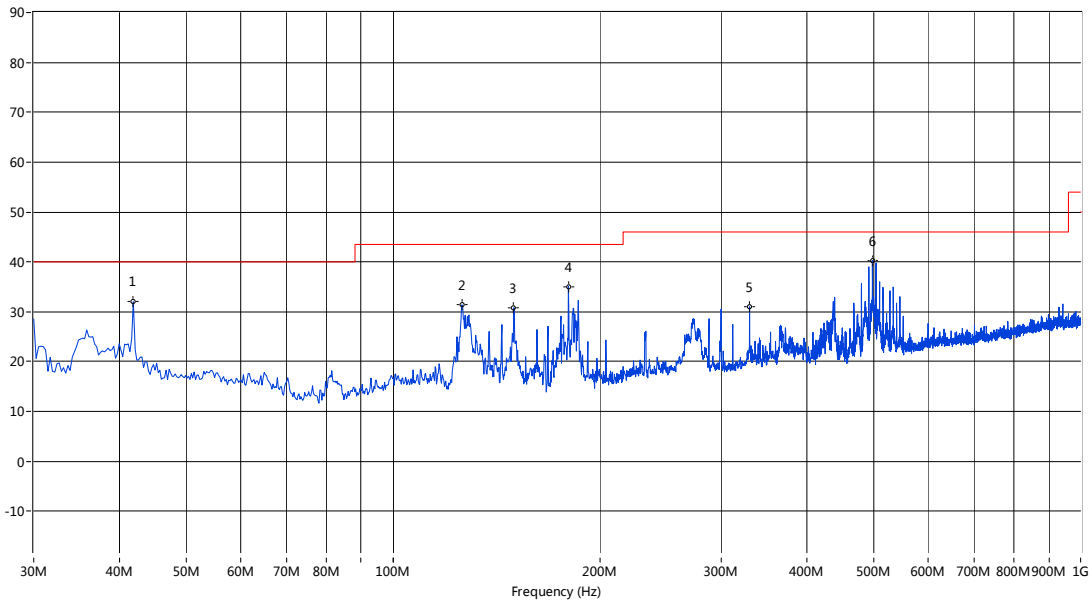
NO.	Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
1	0.069	29.93	--	--	--	110.8	--	N/A	PASS
2	0.166	26.73	--	--	--	103.2	--	N/A	PASS
3	0.339	19.60	--	--	--	97.0	--	N/A	PASS
4	41.880	32.01	--	--	--	40.0	--	Vertical	PASS
5	125.764	31.36	--	--	--	43.5	--	Vertical	PASS
6	149.765	30.83	--	--	--	43.5	--	Vertical	PASS
7	179.828	35.09	--	--	--	43.5	--	Vertical	PASS
8	329.898	31.02	--	--	--	46.0	--	Vertical	PASS
9	497.908	40.26	--	--	--	46.0	--	Vertical	PASS
10	1559.860	45.74	--	--	74.0	--	54.0	Vertical	PASS
11	2210.697	45.00	--	--	74.0	--	54.0	Vertical	PASS
12	2490.627	46.77	--	--	74.0	--	54.0	Vertical	PASS
13	3242.189	41.43	--	--	74.0	--	54.0	Vertical	PASS
14	5046.238	45.34	--	--	74.0	--	54.0	Vertical	PASS
15	5920.238	46.23	--	--	74.0	--	54.0	Vertical	PASS
16	41.880	27.08	--	--	--	40.0	--	Horizontal	PASS
17	126.006	34.08	--	--	--	43.5	--	Horizontal	PASS
18	150.007	34.74	--	--	--	43.5	--	Horizontal	PASS
19	185.889	36.47	--	--	--	43.5	--	Horizontal	PASS
20	273.652	36.89	--	--	--	46.0	--	Horizontal	PASS
21	455.966	37.55	--	--	--	46.0	--	Horizontal	PASS
22	1498.375	39.91	--	--	74.0	--	54.0	Horizontal	PASS
23	1652.837	40.80	--	--	74.0	--	54.0	Horizontal	PASS
24	2488.628	42.36	--	--	74.0	--	54.0	Horizontal	PASS
25	2933.017	42.12	--	--	74.0	--	54.0	Horizontal	PASS
26	3927.518	42.26	--	--	74.0	--	54.0	Horizontal	PASS
27	4941.265	45.40	--	--	74.0	--	54.0	Horizontal	PASS

Test Plots

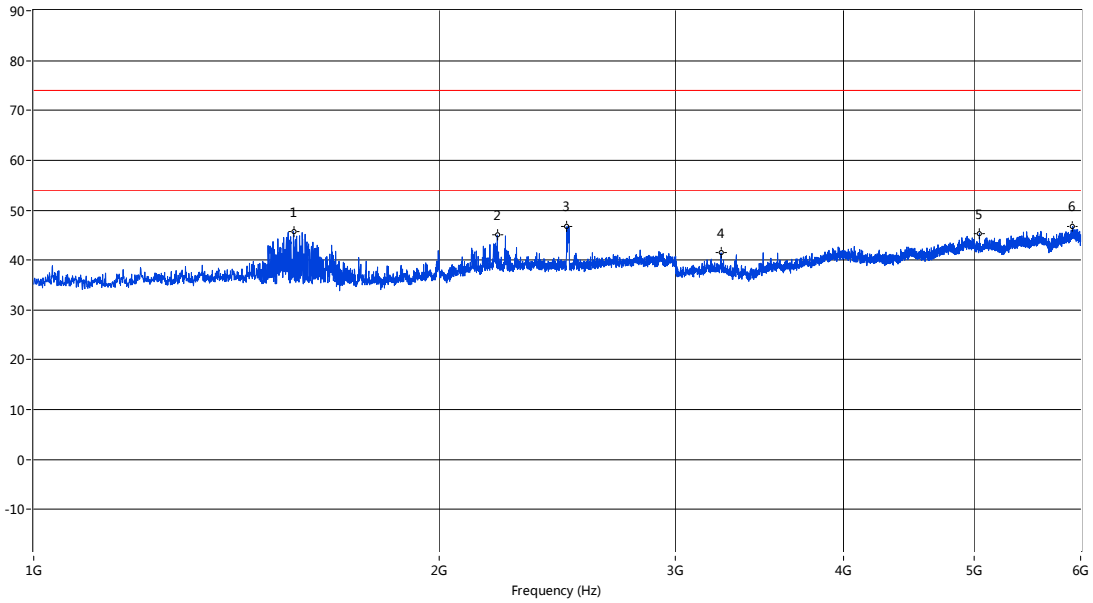
A.1.1 Below 30MHz



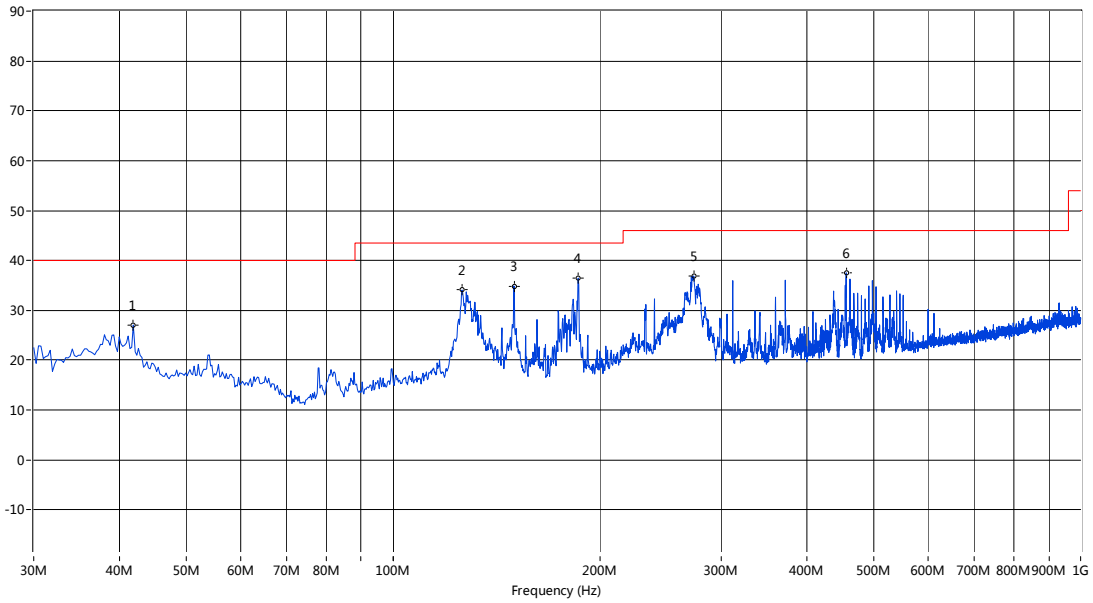
A.1.2 Test Antenna Vertical, 30MHz – 1GHz



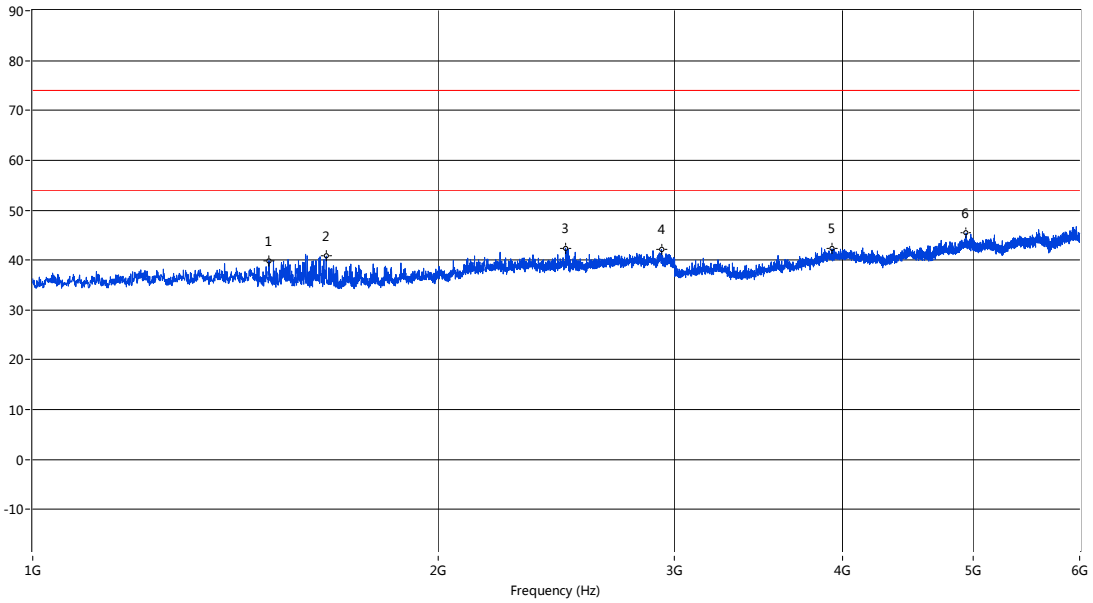
A.1.3 Test Antenna Vertical, 1GHz – 6GHz



A.1.4 Test Antenna Horizontal, 30MHz – 1GHz



A.1.5 Test Antenna Horizontal, 1GHz – 6GHz



A.2 Conducted Emission

Test Data

No.	Frequency (MHz)	Measurement Level (dBuV)	Limit (dBuV)	Margin (dB)	Phase	Detector	Result
1	0.182	46.53	65.09	-18.56	L	QP	PASS
2	0.190	47.99	64.86	-16.87	L	QP	PASS
3	0.190	36.23	54.86	-18.63	L	AV	PASS
4	0.250	29.61	53.14	-23.53	L	AV	PASS
5	2.434	26.57	46.00	-19.43	L	AV	PASS
6	4.002	41.76	56.00	-14.24	L	QP	PASS
7	4.022	25.67	46.00	-20.33	L	AV	PASS
8	4.106	40.17	56.00	-15.83	L	QP	PASS
9	13.122	36.92	60.00	-23.08	L	QP	PASS
10	13.138	25.3	50.00	-24.70	L	AV	PASS
11	13.262	36.06	60.00	-23.94	L	QP	PASS
12	15.846	23.17	50.00	-26.83	L	AV	PASS
13	0.158	30.53	55.77	-25.24	N	AV	PASS
14	0.182	47.74	65.09	-17.35	N	QP	PASS
15	0.190	46.86	64.86	-18.00	N	QP	PASS
16	0.194	33.95	54.74	-20.79	N	AV	PASS
17	2.542	25.63	46.00	-20.37	N	AV	PASS
18	3.982	41.62	56.00	-14.38	N	QP	PASS
19	3.982	24.93	46.00	-21.07	N	AV	PASS
20	4.018	41.51	56.00	-14.49	N	QP	PASS
21	13.106	39.72	60.00	-20.28	N	QP	PASS
22	13.106	27.93	50.00	-22.07	N	AV	PASS
23	15.618	27.86	50.00	-22.14	N	AV	PASS
24	15.758	38.37	60.00	-21.63	N	QP	PASS

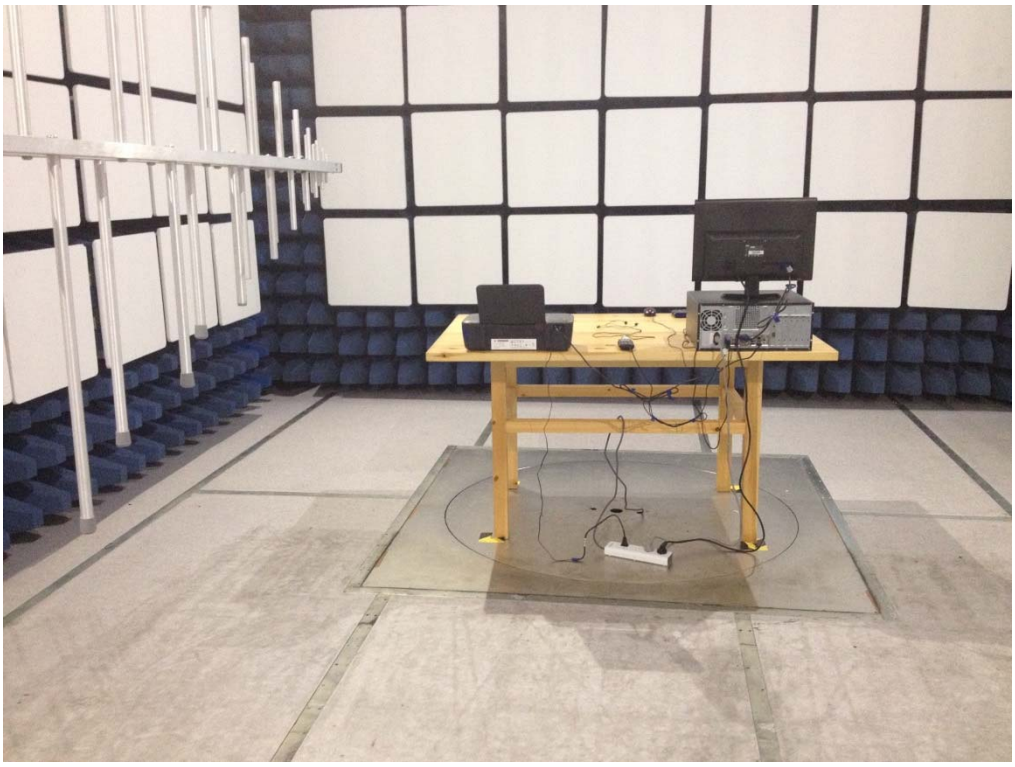
Test Plots

A.2.1 L Phase

A.2.2 N Phase

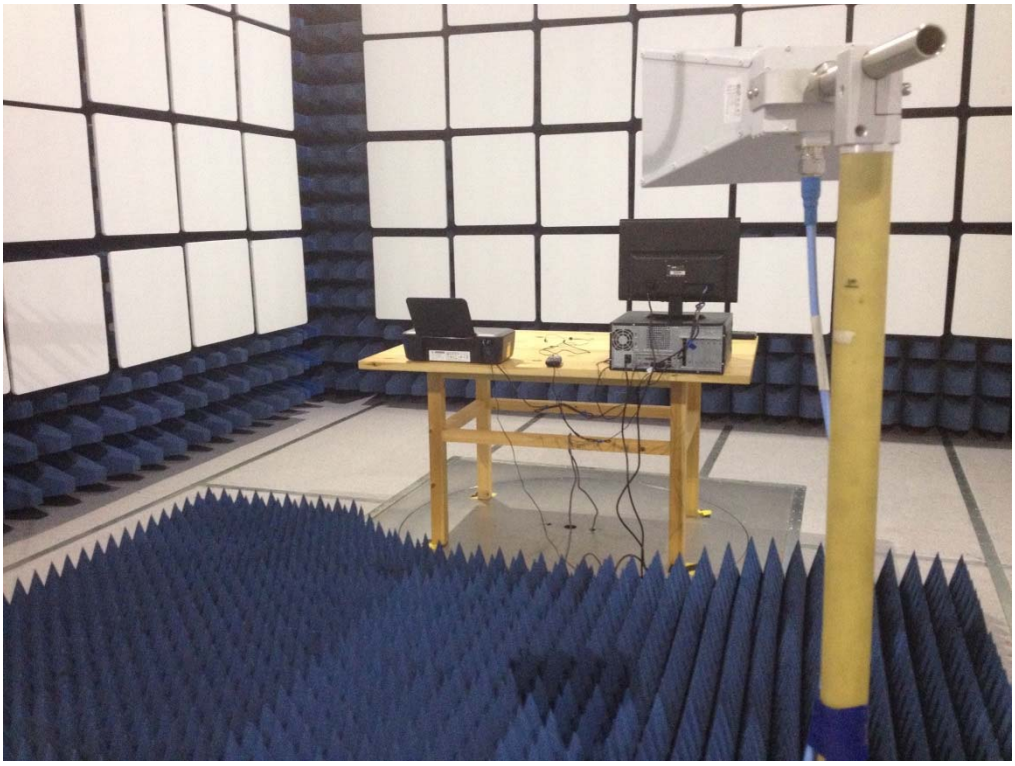
ANNEX B TEST SETUP PHOTOS

B.1 Radiated Field Strength Measurement

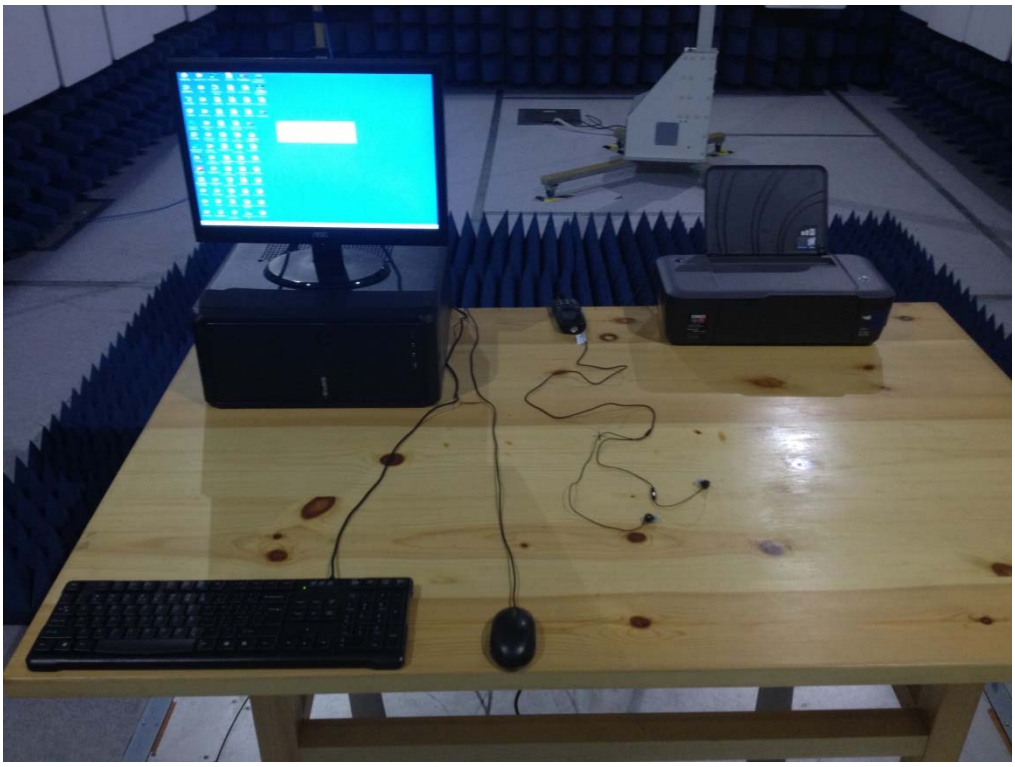


30MHz-1GHz (THE USB TEST MODE)

THE FRONT OF THE TEST PHOTO (THE USB TEST MODE)



Above 1GHz(THE USB TEST MODE)



THE FRONT OF TEST PHOTO (THE USB TEST MODE)

30MHz-1GHz (THE CAMERA TEST MODE)

Above 1GHz(THE CAMERA TEST MODE)

B.2 Conducted Emission

THE BACK OF TEST PHOTO (THE USB TEST MODE)

THE FRONT OF TEST PHOTO (THE USB TEST MODE)

THE CAMERA TEST MODE

ANNEX C EUT PHOTOS

C.1 Appearance of the EUT

THE FRONT OF EUT

THE BACK OF EUT

THE LEFT OF EUT

THE RIGHT OF EUT

THE UP OF EUT

THE DOWN OF EUT

THE PHOTO OF USB CABLE

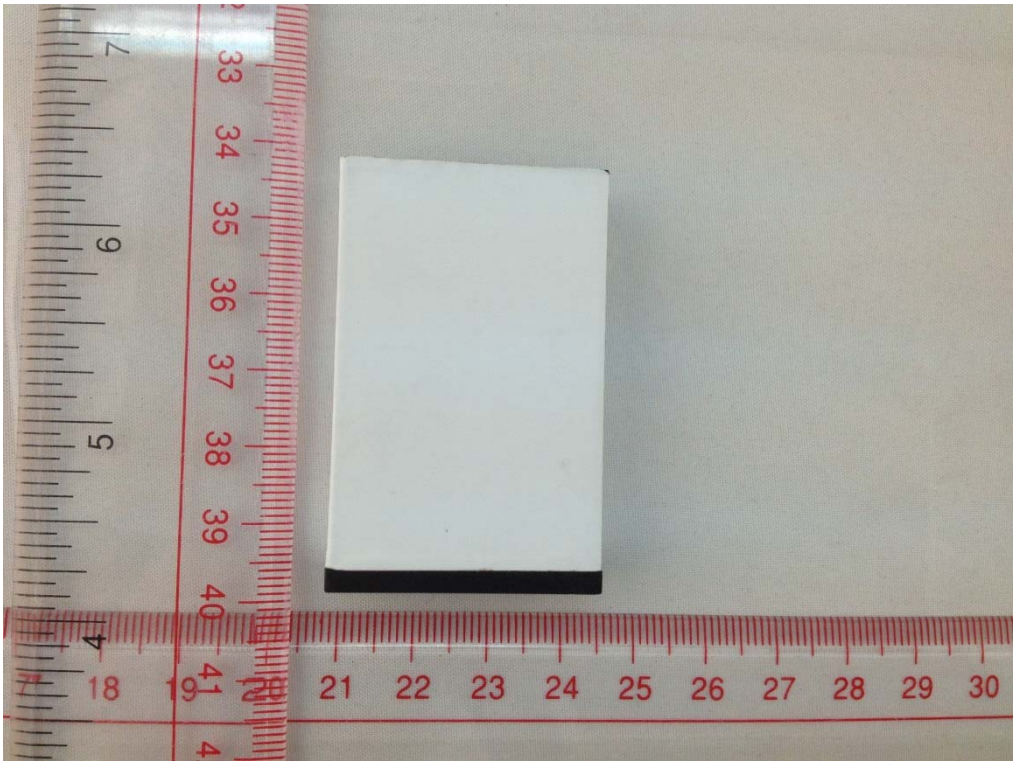
THE PHOTO OF AUDIO CABLE

THE PHOTO OF CHARGER

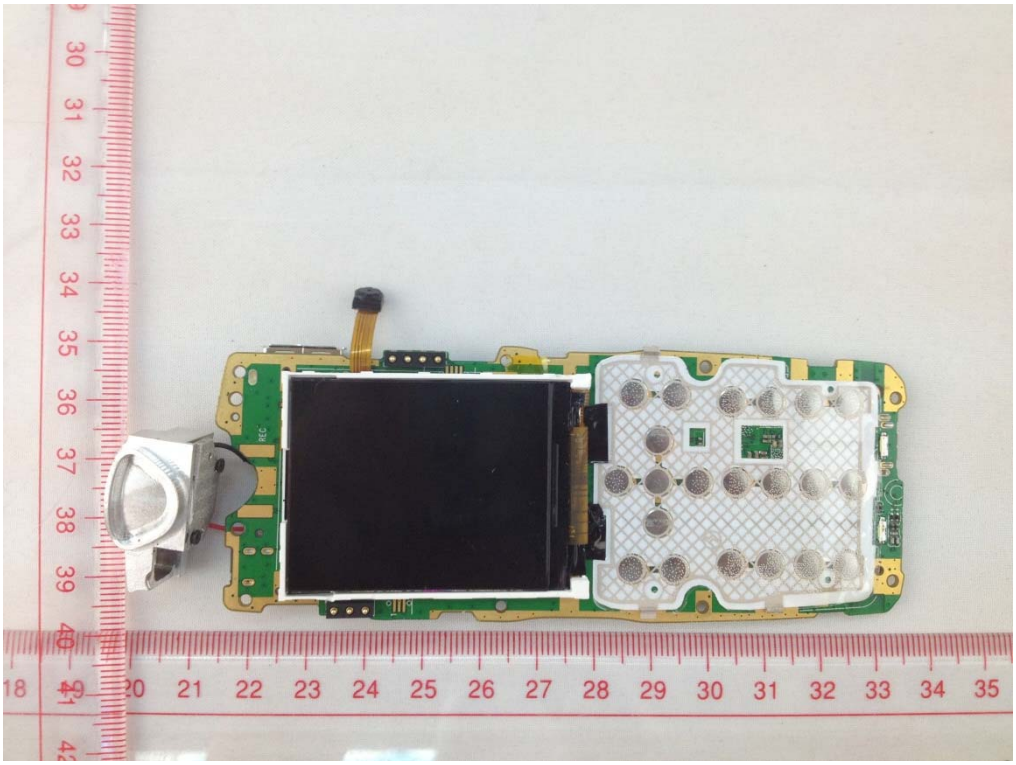
C.2 Inside of the EUT

EUT UNCOVER VIEW 1

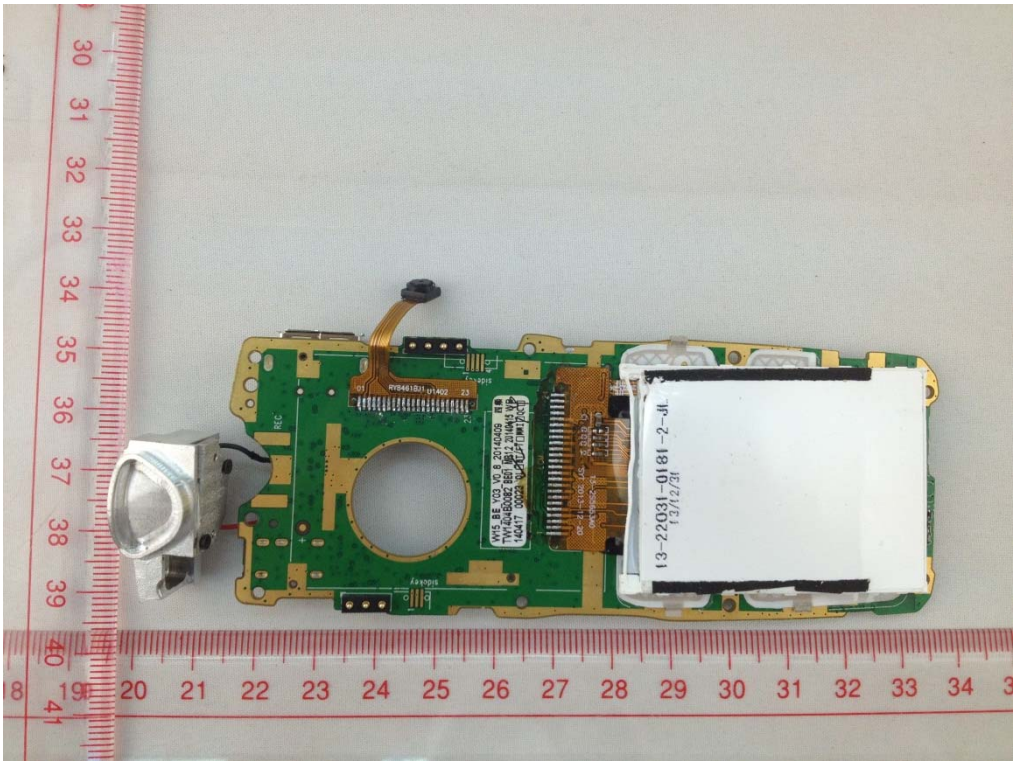
EUT UNCOVER VIEW 2



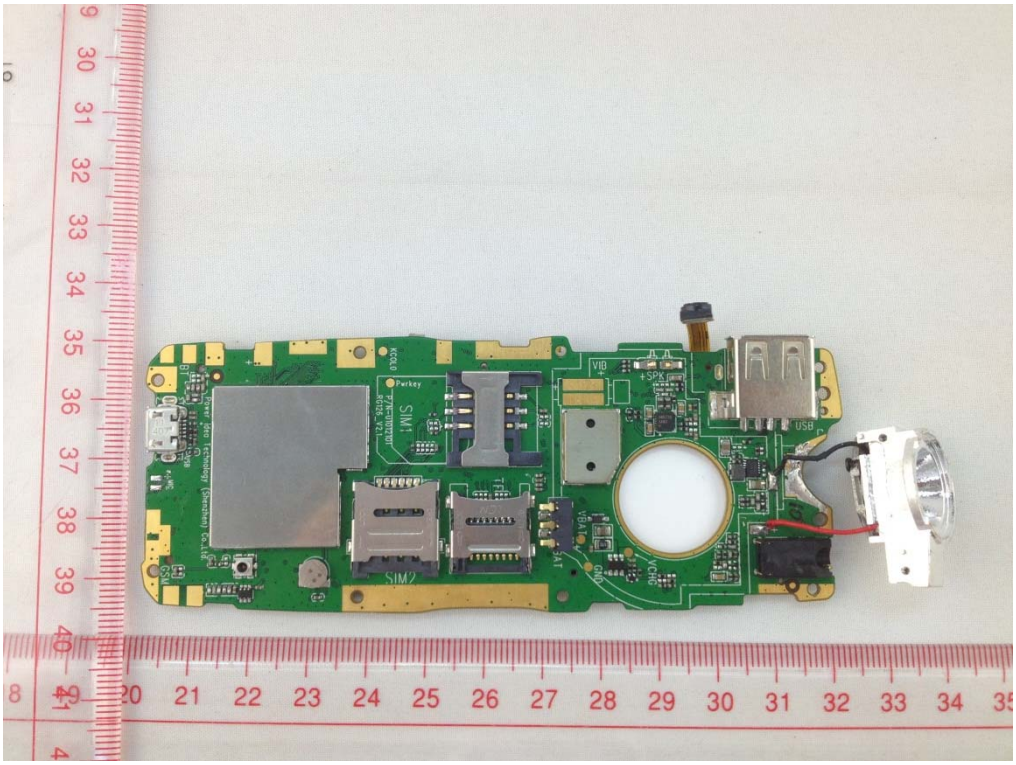
THE BATTERY



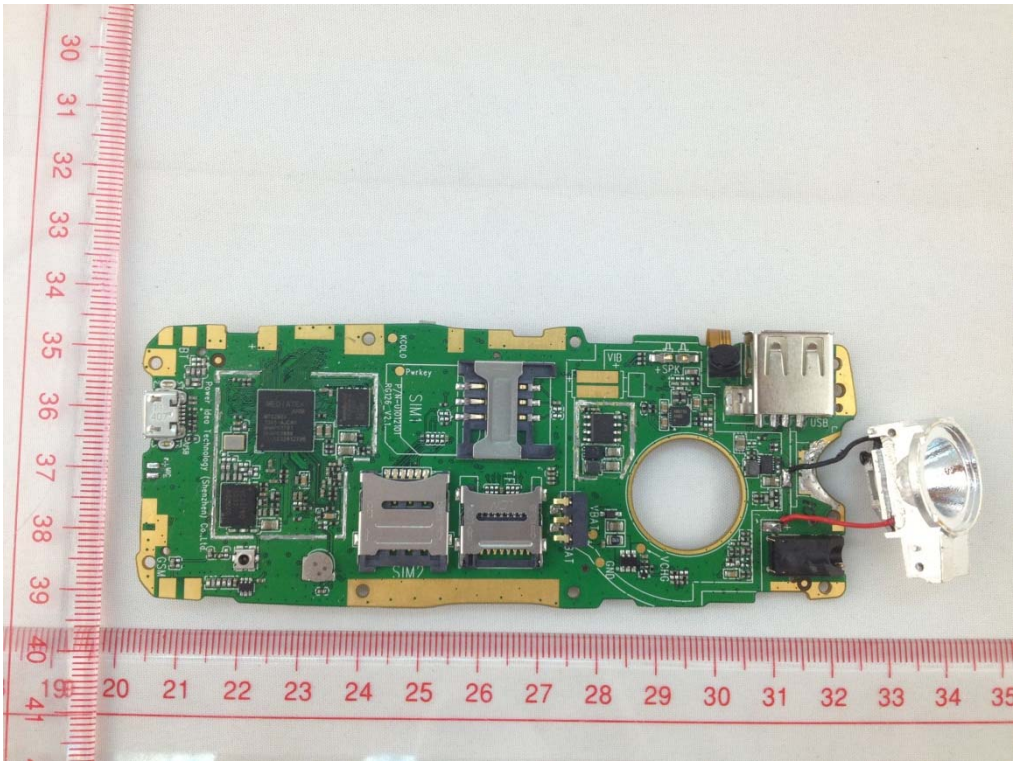
MAIN BOARD TOP VIEW 1



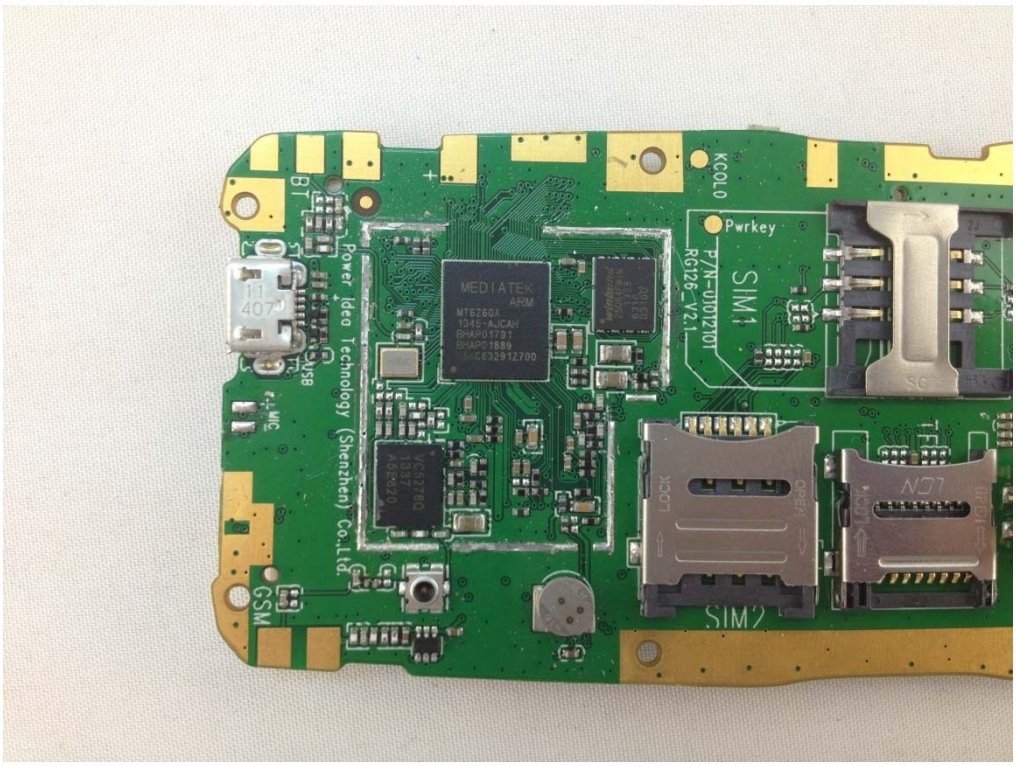
MAIN BOARD BACK VIEW 1



MAIN BOARD BACK VIEW 2



MAIN BOARD TOP VIEW 2



RF BOARD

--END OF REPORT--