TEST REPORT

1. Applicant

Name : POINTMOBILE CO.,LTD

Address : Gasan-dong, B-9F Kabul Great Valley 32, Digital-ro9-gil, Geumcheon gu, Seoul, Korea 153-709

2. Products

Name : Mobile Computer

Model : PM40

Manufacturer : POINTMOBILE CO.,LTD

3. Test Standard : FCC CFR 47 Part 15B

4. Test Method : ANSI C63.4-2009

5. Test Results : Positive

6. Date of Application : October 15, 2013

7. Date of Issue : November 29, 2013

Tested by

Jong-gon Ban
Telecommunication Center
Senior Engineer

Approved by

Jeong-min Kim
Telecommunication Center
Manager

Korea Testing Laboratory

Test Report revision History

Revision	Date	Comments
00	2013-11-29	Initial Version
01	2013-01-21	Test Setup photos added

TABLE OF CONTENTS

1. Administrative Information

1.1 Applicant (Client)

Company Name	POINTMOBILE CO.,LTD
Address	Gasan-dong, B-9F Kabul Great Valley 32, Digital-ro9-gil, Geumcheon-gu, Seoul, Korea 153-709
Contact Person	
Name	Jinny Cho
E-mail	jinny.cho@pointmobile.co.kr
Phone	+82-2-7090-2676

1.2 Manufacturer Data (only if different from Applicant)

Company Name	
Address	
Contact Person	
Name	
E-mail	
Phone	

1.3 Testing Laboratory Data

The following list shows all places and laboratories involved for test result generation.

Company Name	Korea Testing Laboratory
Address	723 Haean-ro, Sangnok-Gu, Ansan-Si, Gyeounggi-Do, 426-901 KOREA
Contact Person	
Name	Jong-gon Ban
E-mail	banjg@ktl.re.kr
Phone	+82-31-500-0133
Fax	+82-31-500-0149

2. EUT Information

2.1 General Description of the EUT

The following section lists all specifications of EUT (Equipment Under Test) involved in test. Additionally, KTL has received sufficient documentation from the client and/or manufacturer to perform the tests

General Information	
FCC Classification	JBP (Part 15 B – Class B Computing Device Peripheral)
FCC ID	V2X-PM40
Model Number	PM40
GSM Specification	GSM/GPRS/EDGE850/1900, Multi-Slot Class 12
WCDMA Specification	UMTS850/1900
Antenna Type	Internal Antenna
WLAN Specification	802.11 a/b/g/n (HT20)
Bluetooth Specification	V2.1+EDR
Battery options	Li-ion, 3.7 V (standard:1800mAh, extended: 3600mAh)
AC Adapter	Manufacturer : KUANTECH Model : KSAS0120500180D5 INPUT: 100-240V, 50/60Hz 0.4A OUTPUT: 5.0 V 1.8A
Device Dimension	Overall (Length x width) : 135.5 mm x 67 mm Overall Diagonal :138mm Display Diagonal : 73 mm

3 SUMMARY OF TEST RESULTS

FCC Rules	Test Items	Result	Remarks
15.107(a)	AC line Conducted Emission	Pass	-
15.109(a)	Radiated Emission	Pass	-

Note 1 : Test results reported in this document relate only to the items tested
Note 2 : The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria
Note 3 : Test results apply only to the item(s) tested

*** Modifications required for compliance**
No modifications were implemented by KTL.
All results in this report pertain to the un-modified sample provided to KTL.

4 TEST METHOLDODGY

3.1 DECISION OF FINAL TEST MODE

1.The following test mode was scanned during the preliminary test:

Pre-Test Mode
Mode 1: Operating (EUT+Adapter+Scanner)
Mode 2: Operating (EUT+USB+Scanner)

2.After the preliminary scan, the following test mode was found to produce the highest emission level.

Pre-Test Mode		
Emission	Conducted Emission	Mode 1
	Radiated Emission	Mode 1

Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items

3.2 Ancillary Equipment

The equipment under test has following AE.

■ AC/DC Adaptor(with EuT) Model : KSAS0100500180D5

■ Laptop AC adapter Model : Lenovo (Model: 74170 92P1107

5 TEST RESULTS

4.1 Conducted Emission

4.1.1 Test limit - FCC 15.107

(a) Except for Class A digital devices, for equipment that is designed to be conducted back onto the (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency (MHz)	Conducted Limits (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

4.1.2 Test Results Sample Calculation

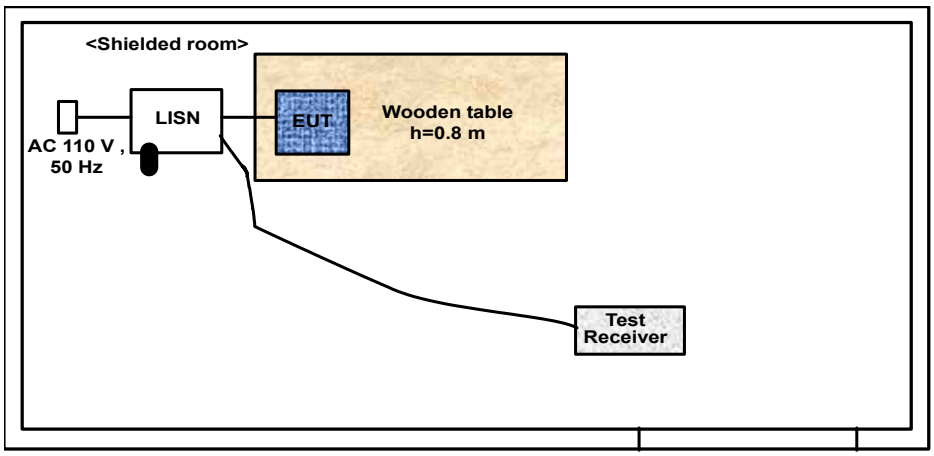
The emission level measured in decibels above one microvolt (dB μV) was converted into microvolt (μV) as shown in following sample calculation.

For example :

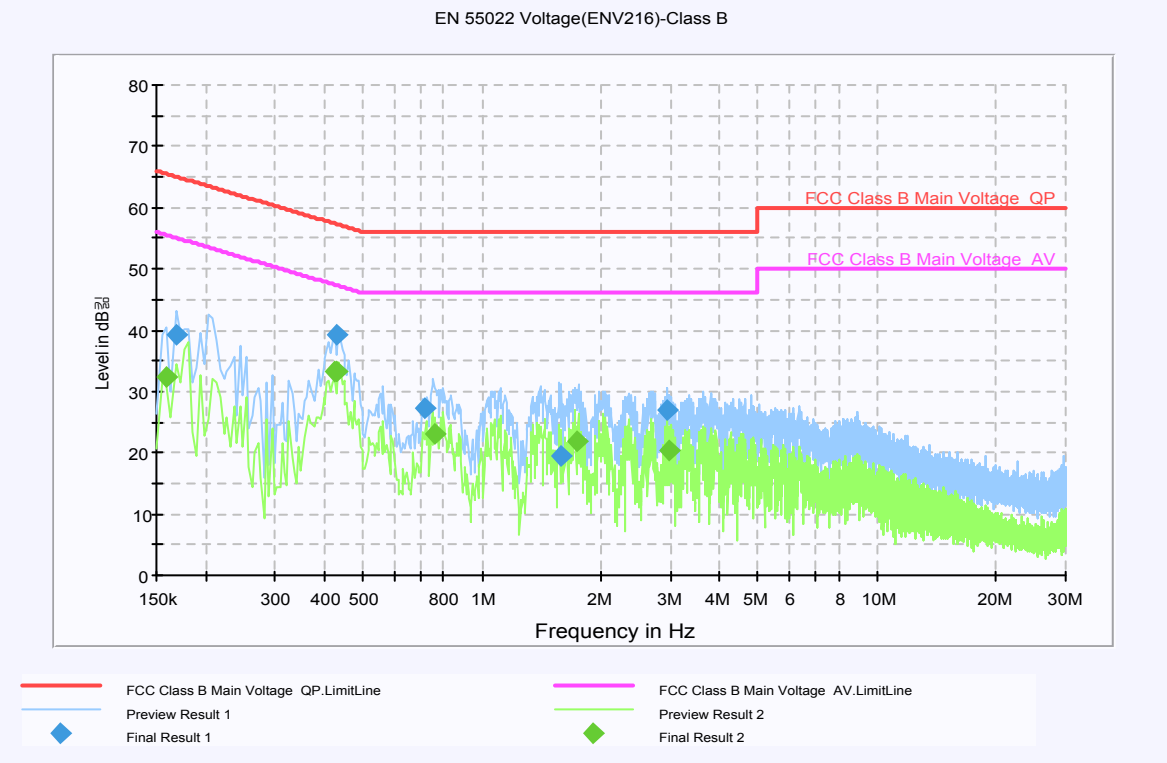
Measured Value at	0.1680 MHz	25.7 dB μV @ Q-Peak mode
+ Correct factor *		9.9 dB
= Conducted Emission		39.4dB μV

* Correct factor is adding RF cable loss and Attenuation

4.1.3 Test Configuration



4.1.4 Test Results



Final Measurement - QuasiPeak

Frequency (MHz)	QuasiPeak (dBµ V)	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)
0.168000	39.4	L1	9.9	25.7	65.1
0.429000	39.2	N	9.7	18.1	57.3
0.712500	27.2	N	9.7	28.8	56.0
1.585500	19.5	L1	9.9	36.5	56.0
2.935500	26.8	N	9.8	29.2	56.0
0.168000	39.4	L1	9.9	25.7	65.1

Final Measurement - Average

Frequency (MHz)	Average (dBµ V)	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)
0.159000	32.3	L1	9.9	23.2	55.5
0.424500	33.2	N	9.7	14.2	47.4
0.429000	33.2	N	9.7	14.1	47.3
0.762000	23.1	N	9.7	22.9	46.0
1.729500	21.8	N	9.8	24.2	46.0
2.971500	20.5	N	9.8	25.5	46.0

Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. Trace shown in plot are made using a peak detector.

4.2 Radiated Emissions

4.2.1 Test Procedure

4.2.1.1 Preliminary Testing for Reference

Preliminary testing was performed in a KTL absorber-lined room to determine the emission characteristics of the EUT. The EUT was placed on the wooden table which has dimensions of 0.8 meters in height, 1 meter in length and 1.5 meters in width. Receiving antenna (Biconi-Log antenna : 30 to 1000 MHz or Horn Antenna : 1 to 40 GHz) was placed at the distance of 3 meter from the EUT.

An attempt was made to maximize the emission level with the various configurations of the EUT. Emission levels from the EUT with various configurations were examined on a spectrum analyzer connected with a RF amplifier and graphed.
The emission was within the illumination area of the 3 dB beam width of the antenna so that the maximum emission from the EUT is measured.

4.2.1.2 Final Radiated Emission Test at an Absorber-Lined Room

The final measurement of radiated field strength was carried out in a KTL Absorber-Lined Room that was listed up at FCC according to the "Radiated Emissions Testing" procedure specified by ANSI C63.4.

Based on the test results in preliminary test, measurement was made in same test set up and configuration which produced maximum emission level. Receiving antenna was installed at 3-meter distance from the EUT, and was connected to an EMI receiver.

Turntable was rotated through 360 degrees and receiving antenna height was varied from 1 to 4 meters above the ground plane to read maximum emission level. Receiving antenna polarization was changed vertical and horizontal. The worst value was recorded.

If necessary, the radiated emission measurements could be performed at a closer distance than specified distance to ensure higher accuracy and their results were extrapolated to the specified distance using an inverse linear distance extrapolation factor (20 dB/decade) as per Section 15.31(f).

The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.

Tested in EUT x, y, z axis and worst case results are reported

4.2.2 Limits

(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of Emission (MHz)	Field strength (Microvolts/meters)
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

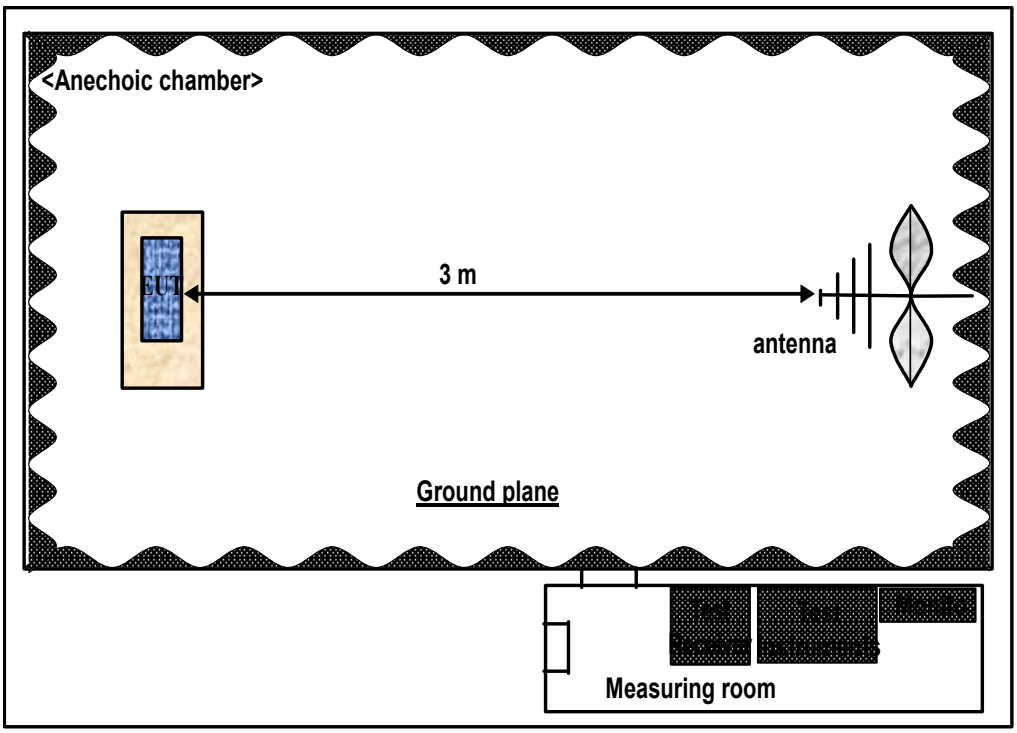
4.2.3 Sample Calculation

The emission level measured in decibels above one microvolt (dB μV) was following sample calculation.

For example :

Measured Value at	38.508 MHz	47.5 dB μV
Antenna Factor & Cable loss - Preamplifier		-18.8 dB
= Radiated Emission		28.7 dB μV/m

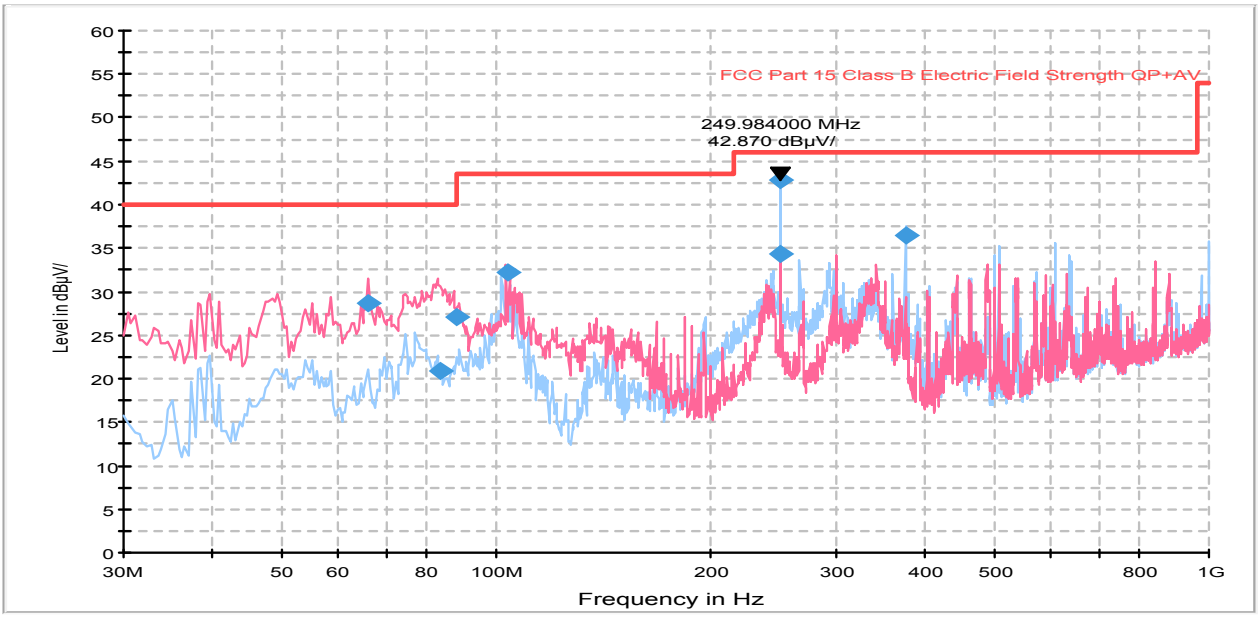
4.2.4 Test Configuration



4.2.5 Test Results

4.2.5.1 Radiated Emission Results

*Mode 1: Operating (EUT+Adapter+Scanner)



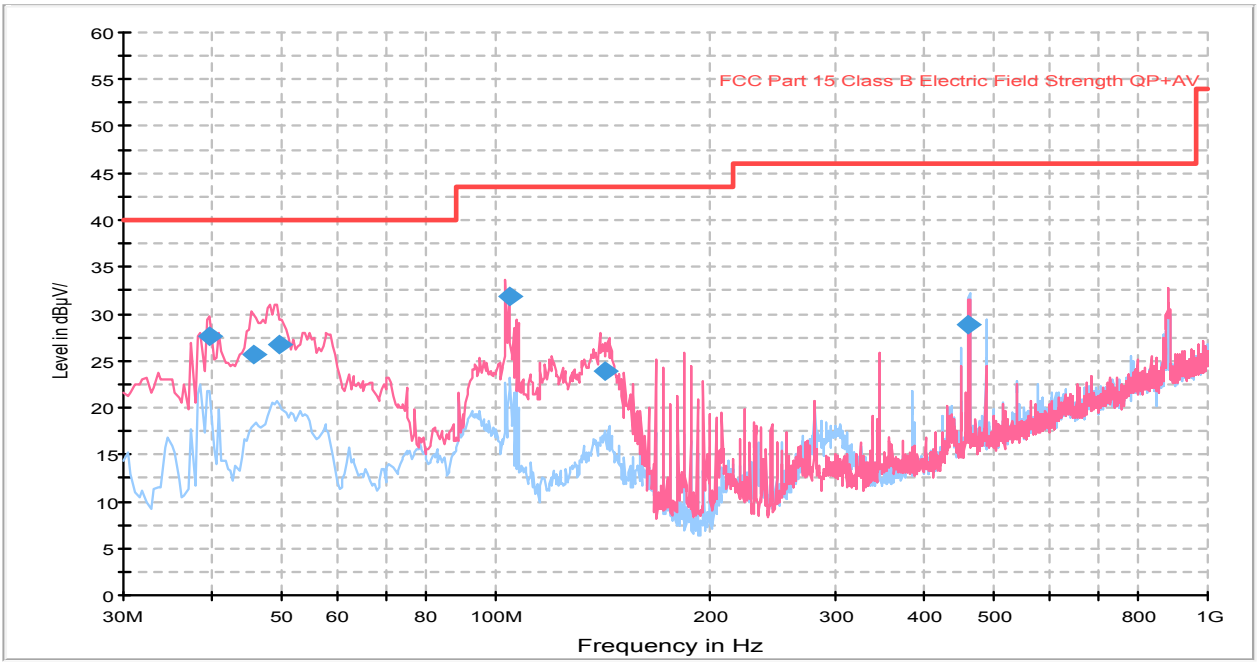
Frequncy (MHz)	Antenna Pol. (H/V)	Bandwidth (kHz) Detector	Reading Level (dBµV)	Correction Factor (dB)	Level Corrected (dBµV/m)	Limit (dBµV/m)	Margin (+/-)
66.27	V	120/Q-peak	47.5	-18.8	28.7	40.0	11.3
83.73	V	120/Q-peak	42.3	-21.4	20.9	40.0	19.1
87.84	V	120/Q-peak	49.1	-22.0	27.1	40.0	12.9
103.49	V	120/Q-peak	53.3	-21.2	32.1	43.5	11.4
249.98	H	120/Q-peak	60.2	-17.3	42.9	46.0	3.1
249.99	V	120/Q-peak	51.6	-17.3	34.3	46.0	11.7
375.01	H	120/Q-peak	49.5	-13.0	36.5	46.0	9.5

Level Corrected = Reading level + Correction factor (dB/m)
Correction factor = Antenna factor + Cable loss – Pre-amplifier (when using a pre-amplifier)

Note 1. Measurement was done over the frequency range from 30 MHz to 1 GHz. The EUT was rotated and the antenna was changed to a range of height of from 1 m to 4 m above the ground plane for maximum response.
2. Testing is include the rotation of the EUT through three orthogonal axes to determine the maximum emission.
3. Any emission values below more than 20dB are not recorded.

Remark 1. Noise floor of 30 ~ 1000 MHz : <20 dBuV at 3m distance
2. Noise floor of 1000 ~ 5000 MHz : <40 dBuV at 3m distance
3. Noise floor of 5000 ~ 10000 MHz : <45 dBuV at 3m distance

*Mode 2: Operating (EUT+USB+Scanner)



Frequncy (MHz)	Antenna Pol. (H/V)	Bandwidth (kHz) Detector	Reading Level (dBµV)	Correction Factor (dB)	Level Corrected (dBµV/m)	Limit (dBµV/m)	Margin (+/-)
39.694283	V	120/Q-peak	45.7	-18.1	27.6	40.0	12.4
45.688291	V	120/Q-peak	43.1	-17.5	25.6	40.0	14.4
49.484178	V	120/Q-peak	44.1	-17.4	26.7	40.0	13.3
104.496360	V	120/Q-peak	52.9	-21.1	31.8	43.5	11.7
141.892612	V	120/Q-peak	40.8	-17.0	23.8	43.5	19.7
462.159217	H	120/Q-peak	39.7	-10.8	28.9	46.0	17.1

Level Corrected = Reading level + Correction factor (dB/m)
Correction factor = Antenna factor + Cable loss – Pre-amplifier (when using a pre-amplifier)

Note 1. Measurement was done over the frequency range from 30 MHz to 1 GHz. The EUT was rotated and the antenna was changed to a range of height of from 1 m to 4 m above the ground plane for maximum response.
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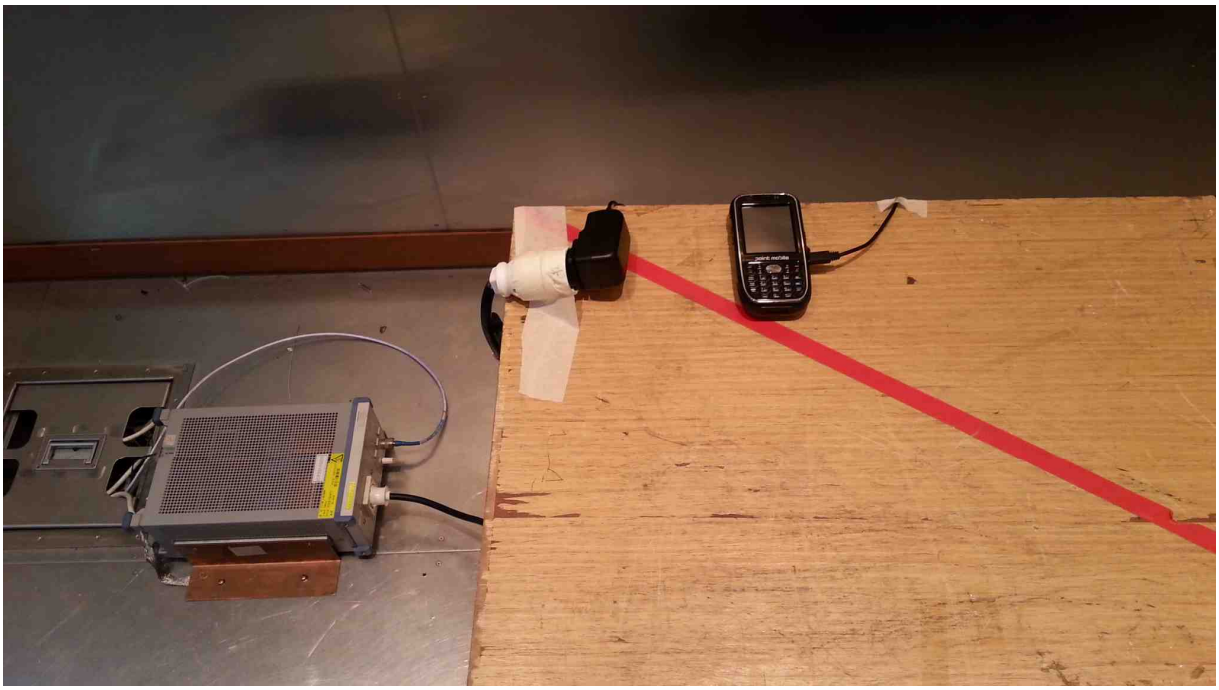
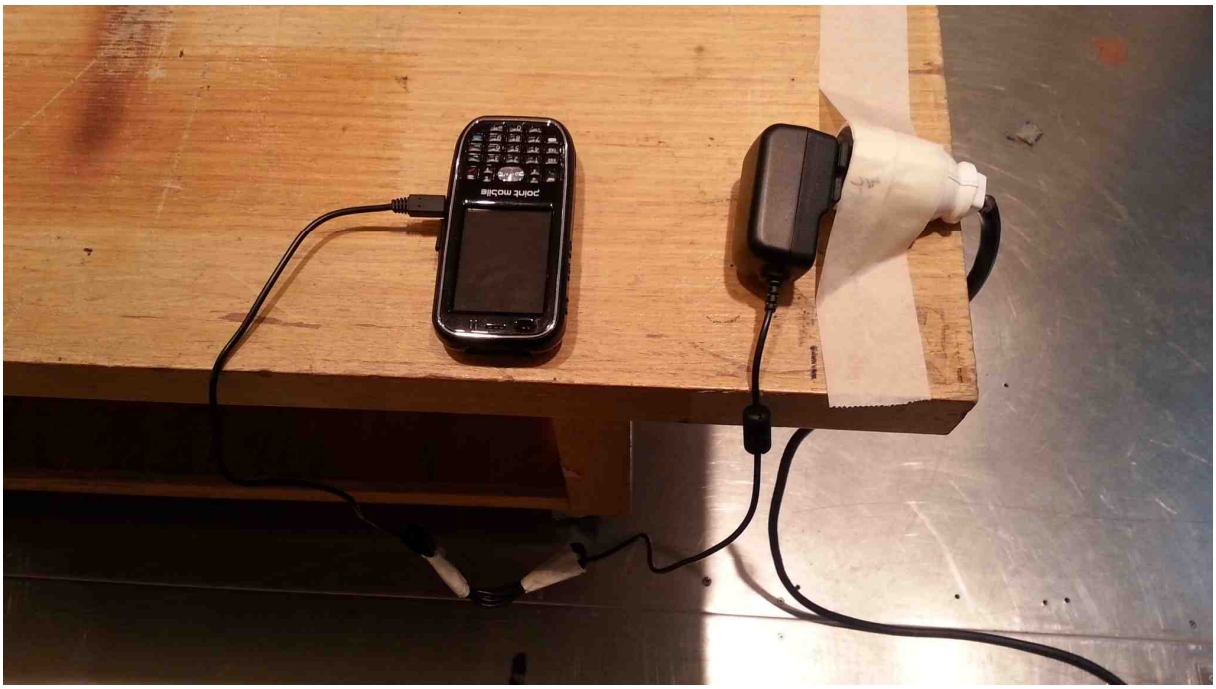
5. TEST EQUIPMENT

No.	Equipment	Manufacturer	Model	S/N	Calibration Due date
1	EMI Receiver	R&S	ESIB26	100280	02-06-2014
2	EMI Receiver	R&S	ESCI3	101006	01-31-2014
3	Pre-Amplifier	HP	83017A	MY39500982	03-18-2014
4	Pre-Amplifier	SONA INSTRUMENT	310	284609	01-29-2014
5	Biconi-Log Antenna	Schwarzbeck	VULB9168	9168-181	04-21-2014
6	Double Ridge Wave Guide	ETS-Lindgren	3115	9012-3595	10-21-2014
7	LISN	R&S	NDTV8160	9510	11-22-2014

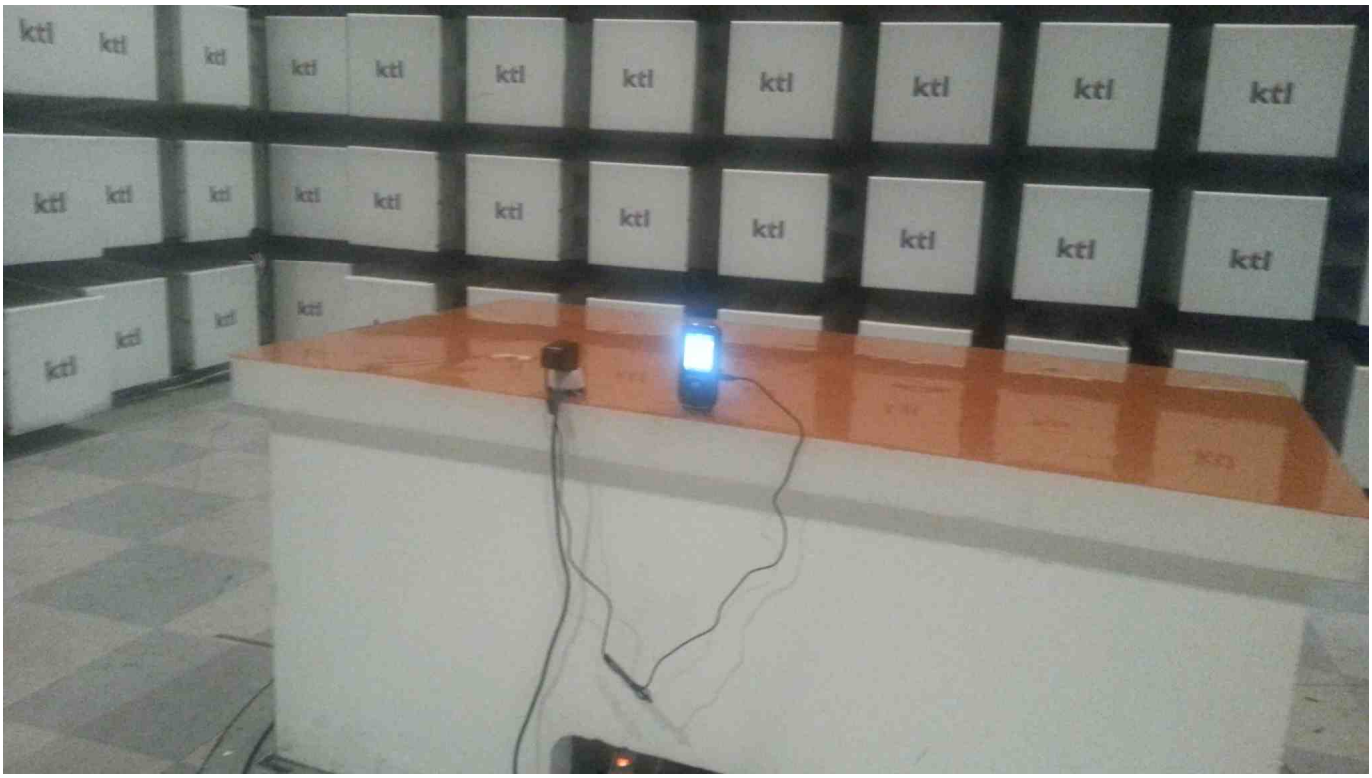
Appendix A Test setup-photos



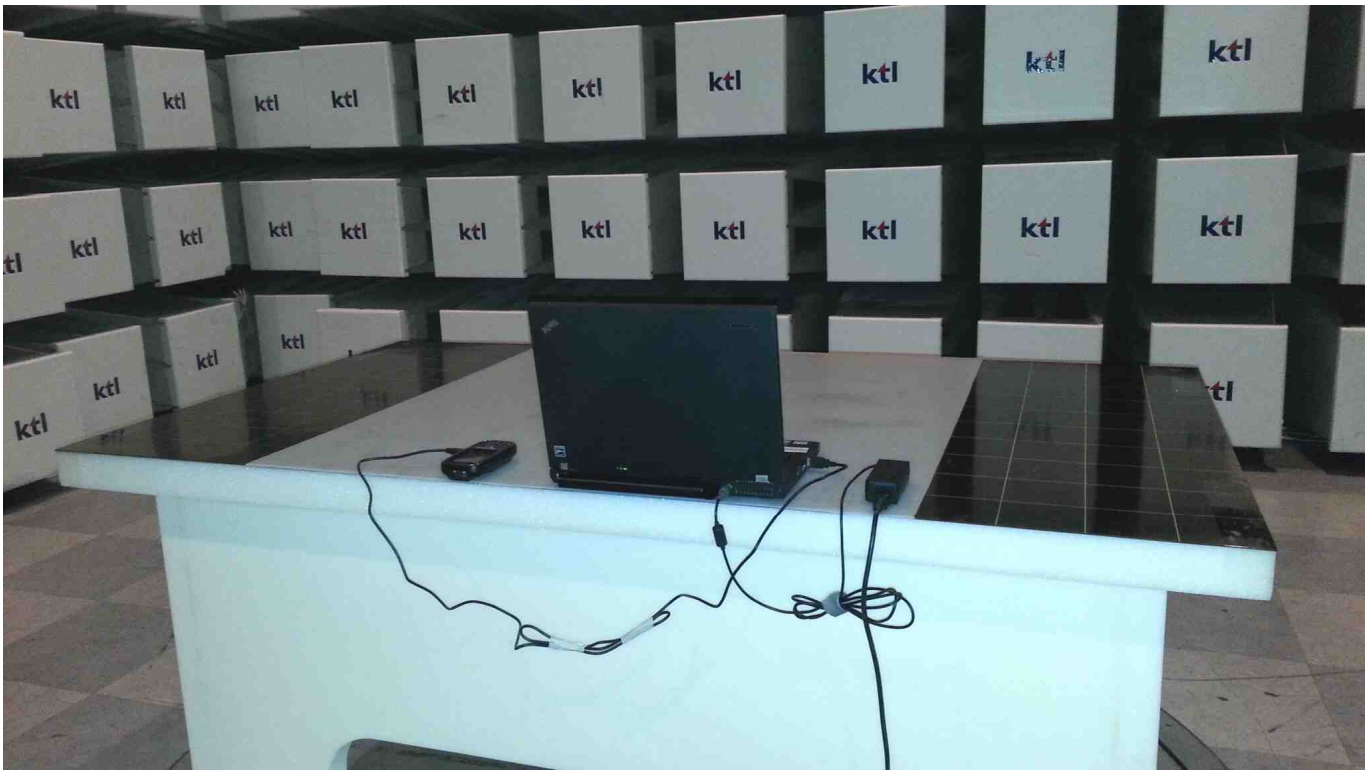
Conducted Emission



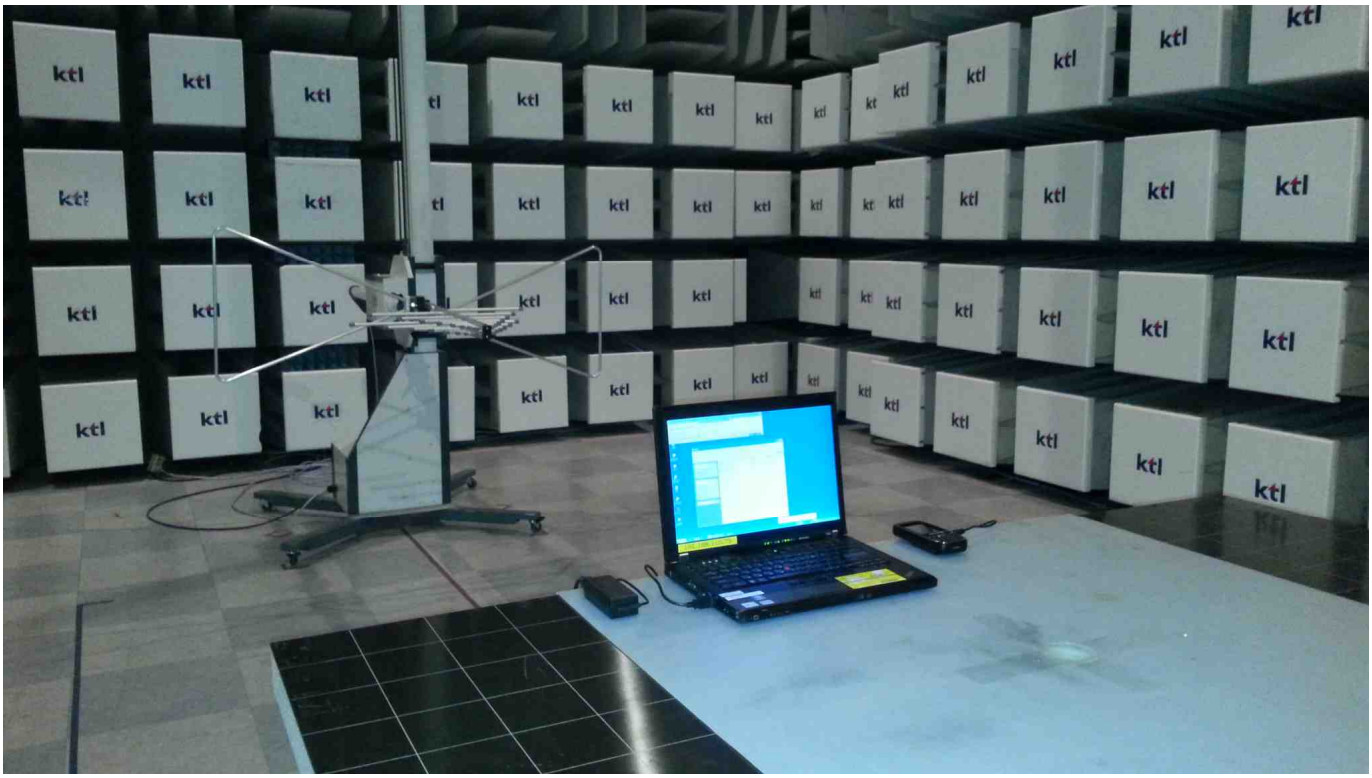
Conducted Emission



Radiated Emission



Radiated Emission



Radiated Emission