

Declaration of Compliance

Order No. : CSTS-C1107-048
Test Report No. : CSTS-A11-FCC027
Applicant : EXELWAY Inc.
Address of Applicant : 1204 Ace Highend Tower 5 Cha, Geumcheon-gu, Seoul, Korea

Equipment Under Test (EUT)

Name : Mobile Speaker
Model No. : EXB100

Standards : FCC Part 15:2008, Subpart B Class B
ANSI C63.4:2003

Date of Receipt : 13 June, 2011
Date of Test : 28~29 July, 2011
Date of Issue : 05 Aug, 2011

Test Result :	PASS
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Kim Ji Hwan/ Testing By Engineer



Kim, Seung Nyon / EMC Manager

In the configuration tested, the EUT complied with the standards specified above.

Remarks :

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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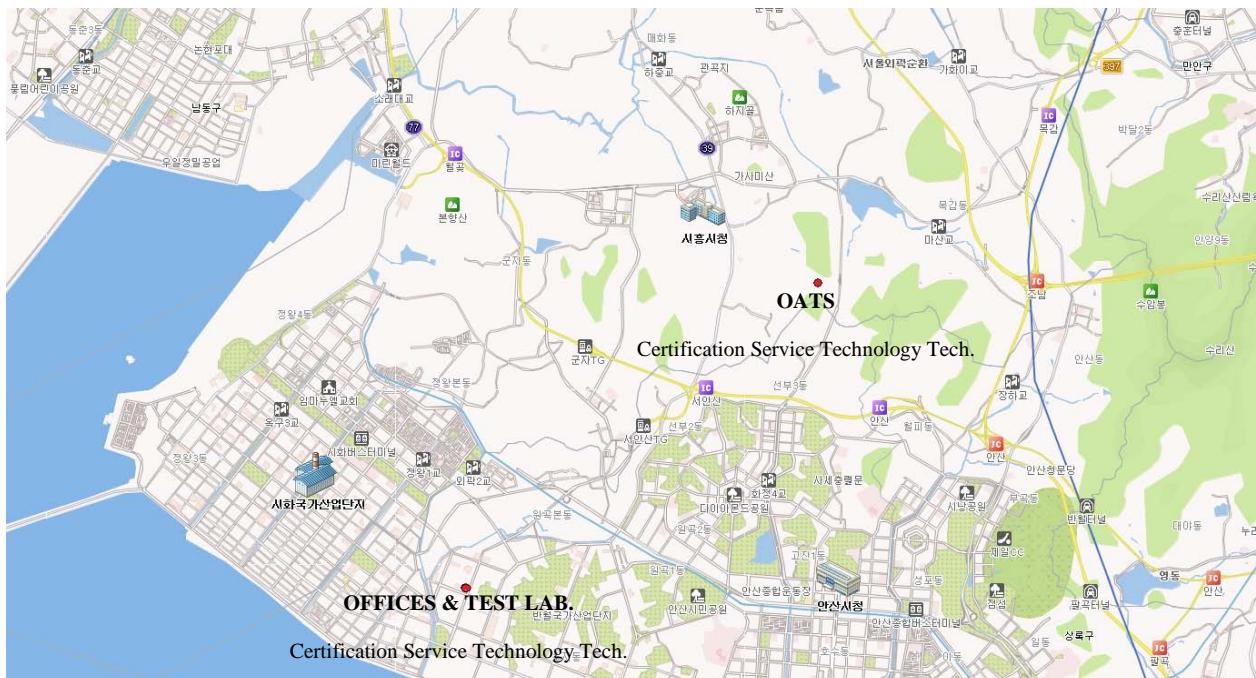
1. General Information

1.1 Information of Test Laboratory.

FCC E-Failing : Registration Number:289252

Name	:	Certification Service Technology Inc.
Address 3mFullChamber Conducted Emission	:	2F/1055, Shingil-Dong, Danwon-Gu, Ansan-City, Gyeonggi-Do Korea, 425-839
Radiated Emission (OATS)	:	456 Sanhyeun-Dong, Sihung-City, Gyeonggi-Do Korea
Tel/Fax	:	+82-31-493-2001 / +82-31-493-2055

Web site : <http://www.cstlab.co.kr> E-mail : snkim@cstlab.co.kr



We , Certification Service Technology Inc. are an independent EMC and RF consultancy that was established the whole facility in our laboratories. The test facility has been accredited by the following accreditation Bodies in compliance with ISO 17025:

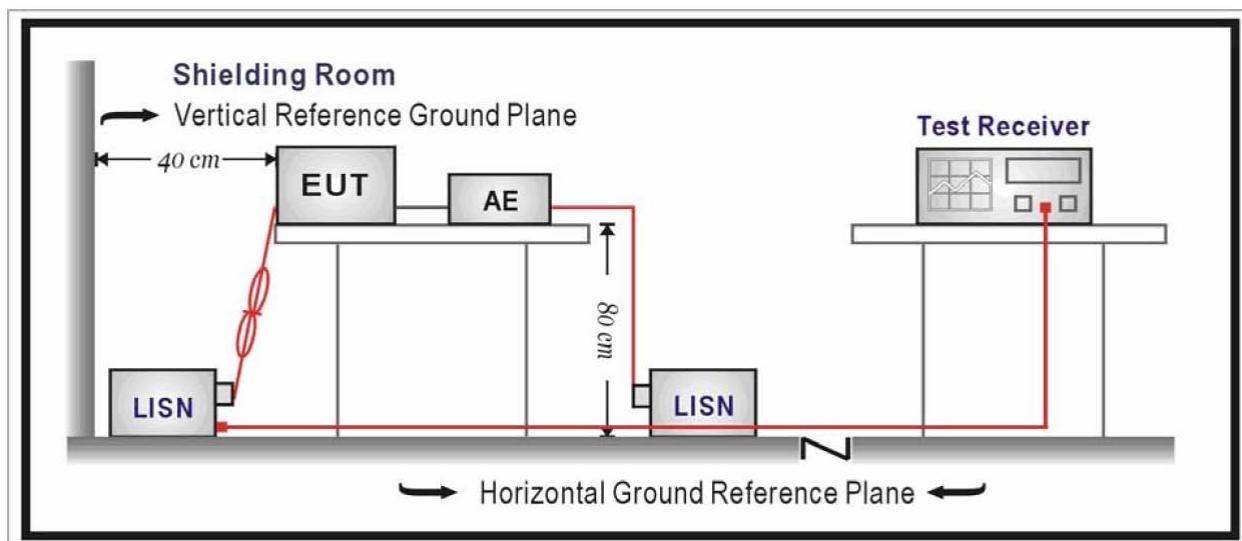
1.2 Description of Test

Conducted Emissions:

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50 uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm/50 uH coupling impedance with 50 ohm termination.(Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15 MHz to 30 MHz using a receiver bandwidth of 9 kHz.



Limit Of Conducted Emission Of FCC Part 15

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 – 56	56 - 46
0.5 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Radiated Emissions:

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated on radiated measurement.

Radiated emissions were invested over the frequency range from 30 MHz to 1 GHz using a receiver bandwidth of 120 kHz.

For an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
30-88	30
1.705 - 108	1000
108 - 500	2000
500 - 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

On any frequency or frequencies below or equal to 1000 MHz, the radiated limits shown are based on measuring equipment employing a quasi-peak detector function and above 1000 MHz, the radiated limits shown are based measuring equipment employing an average detector function.

When average radiated emission measurement are included emission measurement Above 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

For class A, the measurement distance between the EUT and antenna is 10 meters for under 1 GHz and above 1 GHz.

For class B, the measurement distance between the EUT and antenna is 10 meters for under 1GHz and 3 meters for above 1GHz.

The bandwidth below 1 GHz setting on the field strength meter (LIG Test Receiver ER-265) is 120 kHz and above 1 GHz is 1MHz.

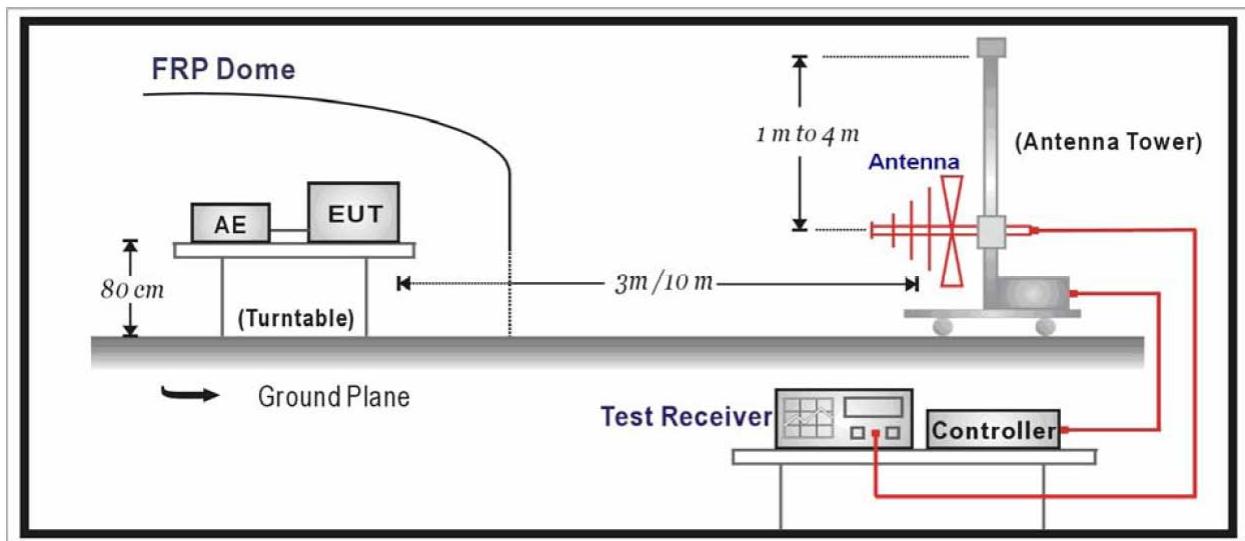
Limit Of Radiated Emission Of FCC Part 15

FREQUENCY (MHz)	Class A		Class B	
	uV/meter (at 10 m)	dBuV/meter (at 10 m)	uV/meter (at 3 m)	dBuV/meter (at 3 m)
30-88	90	39.1*	100	40*
88-216	150	43.5*	150	43.5*
216-960	210	46.4*	200	46*
960-1000	300	49.5*	500	54*

Note) (1) *Detector Function : Quasi-Peak, (2) ** Detector Function : Peak

(3) $uV \rightarrow dBuV : 20 \log(uV) = dBuV$

Below 1GHz Test Setup:



1.3 Measurement Uncertainty Calculations

Conducted Emissions

TYPE	Contribution	Probability Distribution	Uncertainty	Remark
B	LISN Impedance Voltage Division Factor	normal(k = 2) normal(k = 2)	± 1.3 ± 0.12	CAL. CAL.
	cable	normal (k = 2)	± 0.2	NONCAL.
	Receiver Input Impedance QP Sine-Wave Voltage Accuracy	normal(k = 1.64) normal(k = 2)	± 0.0070 ± 0.20 dB	CAL.
	QP-Pulse Amplitude Sensibility	normal(k = 2)	± 0.40 dB	
	QP-Pulse Frequency Response	normal(k = 2)	± 0.57 dB	
	Random Noise	normal(k = 2)	± 0.35 dB	
	Mismatch AMN to Receiver	U-Shaped	+ 0.7 / - 0.8	CISPR Theory
	A System Repeatability	Std deviation	± 0.0721	
	Combined Standard Uncertainty	Normal	± 1.1155 [dB]	
	Expanded Uncertainty U	normal(k = 2)	± 2.23	95.45 %

Radiated Emission

TYPE	Contribution	Probability Distribution	Uncertainty 3/10m	Remark
B	Antenna factor frequency interpolation height variation directivity difference phase center location	normal(k = 2) rectangular rectangular rectangular	± 0.5 dB ± 0.1039 dB + 1.5/-2.6 dB + 0/-1.0 dB ± 1.0 dB	NPL NAMAS NAMAS
	Cable loss	normal(k = 2)	± 0.5 dB	
	Receiver Input Impedance QP Sine-Wave Voltage Accuracy	normal(k = 1.64) normal(k = 2)	± 0.0070 ± 0.20 dB	
	QP-Pulse Amplitude Sensibility	normal(k = 2)	± 0.40 dB	
	QP-Pulse Frequency Response	normal(k = 2)	± 0.57 dB	
	Random Noise	normal(k = 2)	± 0.35 dB	
	Mismatch : AMN – receiver $ \Gamma_{\text{antenna}} = 0.33$ $ \Gamma_{\text{receiver}} = 0.33$	U-Shaped	+ 0.9 / - 1.0 dB	CISPR
	A System repeatability	Std deviation	± 0.1149 dB	
	Combined standard Uncertainty	normal	± 1.3193 dB	
	Expanded Uncertainty U	normal(k = 2)	± 2.63	95.45 %

1.4 Manufacturer Information

Manufacturer	:	EXELWAY Inc.
Address	:	1204 Ace Highend Tower 5 Cha, Geumcheon-gu, Seoul, Korea

1.5 General Description of EUT

Name : Mobile Speaker
Model No. : EXB100
Alt. Name : N/A
Serial No. : N/A

1.6 Details of EUT

Section	Specification
Operating Frequency	2 402 MHz ~ 2 480 MHz
The Number of Channels	79 Channels
Antenna	Chip Antenna
Interface	USB (Only Charging Mode) Aux (Stereo Jack)
Power Source	DC 3.7 V / 1 100 mAh (Rechargeable Lithium Battery)
Charging Power Source	DC 5.0 V (USB Type)
Output Power	RMS 5W / CH×2 Stereo
Impedance	4 ohms
Frequency Response	250 Hz ~ 15 kHz
Dimension	121 mm (W) × 69 mm (H) × 18 mm (D)
Weight	120 g
Running Time	8 Hours
Wireless	Bluetooth 2.1 + EDR
Operating Temperature.	-10 °C ~ +50 °C
Modulation Method	FHSS (Frequency Hopping Spread Spectrum)
Modulation Type	GFSK, 8-DQPSK
Communication Mode	Duplex

- Please refer to user's manual.

1.7 Description of Support Units

Product	Model No.	Serial No.	Manufacturer	Certification
Mobile Speaker	EXB100	N/A	EXELWAY Inc.	EUT
LCD Monitor	B522WS	NFB5HMCZ900215V	SAMSUNG Electronics INC.	DoC
AC/DC Adapter (LCD Monitor)	AD-3014	N/A	SAMSUNG Electronics INC.	CoC
Personal Computer	DM-V189	ZW7C97AZC90312H	SAMSUNG Electronics INC.	DoC
USB Mouse	M-BP82	LZ01523	Logitech	DoC
USB Keyboard	Y-BP62a	820-000254	Logitech	DoC

1.8 Cable List

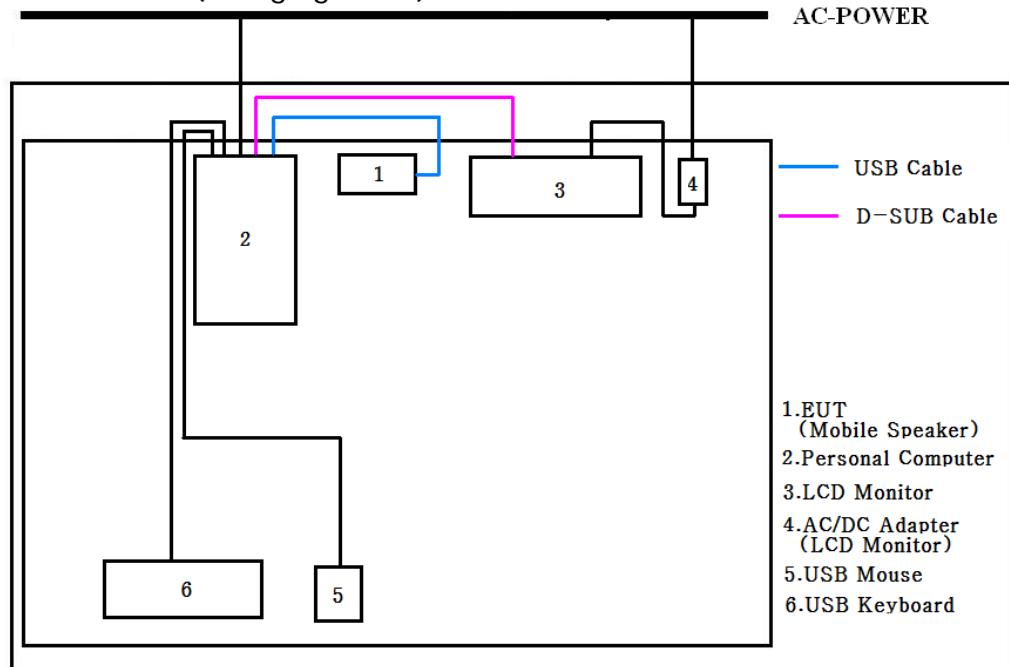
Start		END		Cable Spec	
Name	I/O Port	Name	I/O Port	Lenth	Shield
EUT	USB	Personal Computer	USB	1.2	Shield
LCD Monitor	DC-IN	AC/DC Adapter (LCD Monitor)	DC-OUT	1.5	Unshielded
AC/DC Adapter (LCD Monitor)	AC-IN	POWER	AC-POWER	1.0	Unshielded
Personal Computer	AC IN	POWER	AC POWER	2.0	Unshielded
	D-SUB	LCD Monitor	D-SUB	1.8	Shield
	USB	Mouse	-	1.8	Shield
	USB	KeyBoard	-	1.8	Shield

1.9 System Configuration

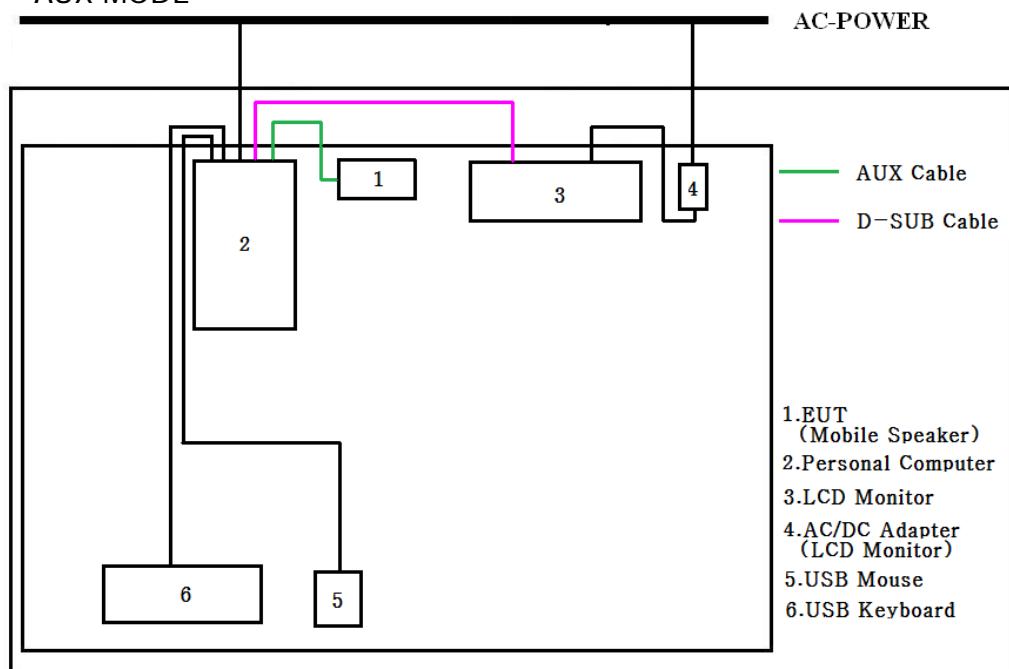
Description	Model	Serial No.	Manufacturer
-	-	-	-

1.10 Test Set-Up Configuration

- USB MODE(Charging Mode)



- AUX MODE



1.11 Test Methodology And Configuration

1. USB Mode(Charging Mode)
2. AUX Mode

1.12 Standards Applicable for Testing

Table of tests to be carried out under FCC Part 15, Subpart B

Test Standards	Status
FCC Part 15, Subpart B, Class B	A
Deviation from Standard	No Deviation
Conducetd Emission	A
Radiated Emission	A

Note) N/A : Indicates that the test is not applicable

A : Indicates that the test is applicable

Radio Disturbance

2. Radio Disturbance

2.1 Test Results

	Results
Conducted Emission	PASS
Radiated Emission	PASS

Note : The EUT Power supplied Car's battery, So Conducted Emission was don't TEST.

2.2 Frequency Range

Conducted Emission : 150 kHz - 30 MHz
Radiated Emission : 30 MHz - 1000 MHz

2.3 Limits Of Conducted And Radiated Emission

2.3.1 Limit Of Conducted Emission Of FCC Part 15, Subpart B

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 – 56	56 - 46
0.5 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

2.3.2 Limit Of Radiated Emission Of FCC Part 15, Subpart B

FREQUENCY (MHz)	Class A (at 10m)	Class A (at 3m) ***	Class B (at 3m)
	dBuV/m	dBuV/m	dBuV/m
30-88	39.1*	49.5*	40*
88-216	43.5*	54.0*	43.5*
216-960	46.4*	56.9*	46*
960- 1000	49.5*	60.0*	54*

Note) (1) *Detector Function : Quasi-Peak
(2) ** Detector Function : Peak
(3) ***Conversion for at 3m : $20\log(10/3)$

2.4. Test of Conducted Emission**2.4.1 Test Instruments**

Description	Manufacturer	Model No.	Serial No.	Next of Calibration	Use
Test Receiver	LIG NEX1	ER-30	L0804A003	Sep. 17, 2011	■
LISN	EMCO	3825/2	9006-1666	Mar. 2012	■
LISN	EMCIS	LN2-16	LN10010	Mar. 2012	■
Transient Limiter	HAMEG	HZ560	N/A	Sep. 20, 2011	■
Shielded Room	BRADEN	N/A	DAC-60-005	-	■

2.4.2 Test Site

Name and address : Certification Service Technology Inc.
2F/1055, Shingil-Dong, Danwon-Gu, Ansan-City, Gyeonggi-Do
Korea, 425-839

2.4.3 Operation of EUT**Operating Environment**

Temperature : 21.0 °C
Humidity : 45 %R.H.
Atmospheric Pressure : 990 mBar

2.4.4 Measurement Data

Measurment Bandwidth: 9 kHz

Data of Test: 28 July, 2011

Note : USB Mode(Charging Mode)

FREQ. (MHz)	FACTOR(dB)		LINE (L/N)	Quasi-Peak			Average		
	LISN	CABLE		Limit (dBuV)	Reading (dBuV)	Reault (dBuV)	Limit (dBuV)	Reading (dBuV)	Reault (dBuV)
0.200	0.13	0.08	N	63.63	42.55	42.76	53.63	32.94	33.15
0.330	0.10	0.06	L	59.45	37.45	37.61	49.45	28.81	28.97
0.798	0.04	0.09	N	56.00	41.04	41.17	46.00	34.97	35.10
2.787	0.04	0.15	L	56.00	40.21	40.40	46.00	32.22	32.41
13.605	0.23	0.23	L	60.00	38.37	38.83	50.00	31.04	31.50
17.786	0.28	0.36	L	60.00	36.99	37.63	50.00	29.40	30.04

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. Measurement Level(Result) = Reading Level + Correct Factor(Factor)



Kim Ji Hwan/ Test Engineer

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Measurment Bandwidth: 9 kHz

Data of Test: 28 July, 2011

Note : AUX Mode

FREQ. (MHz)	FACTOR(dB)		LINE (L/N)	Quasi-Peak			Average		
	LISN	CABLE		Limit (dBuV)	Reading (dBuV)	Reault (dBuV)	Limit (dBuV)	Reading (dBuV)	Reault (dBuV)
0.200	0.18	0.08	L	63.63	44.18	44.44	53.63	31.57	31.83
0.398	0.07	0.06	N	57.91	37.59	37.72	47.91	32.53	32.66
0.596	0.05	0.08	N	56.00	40.90	41.03	46.00	34.61	34.74
2.787	0.04	0.15	L	56.00	40.25	40.44	46.00	32.23	32.42
13.601	0.26	0.23	N	60.00	38.10	38.59	50.00	27.21	27.70
13.601	0.23	0.23	L	60.00	38.97	39.43	50.00	31.39	31.85

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. Measurement Level(Result) = Reading Level + Correct Factor(Factor)

*Kim Ji Hwan/ Test Engineer*

2.5 Test of Radiated Emission**2.5.1 Test Instruments**

Description	Manufacturer	Model No.	Serial No.	Next of Calibration	Use
Test Receiver	LIG NEX1	ER-265	L0804B002	Jul. 14, 2012	<input checked="" type="checkbox"/>
BICONILOG ANT.	EMCO	3142	9701-1128	Apr. 27, 2012	<input checked="" type="checkbox"/>
HORN ANT.	SCHWARZBECK	BBHA9120D233	0501	Sep. 10, 2012	<input type="checkbox"/>
HORN ANT.	SCHWARZBECK	BBHA9170	BBHA9170152	Sep. 16, 2012	<input type="checkbox"/>
BICONICAL ANT.	EMCO	3104C	9012-4380	May. 26, 2012	<input type="checkbox"/>
LOGPERIODIC ANT.	EMCO	3146	91071232	May. 26, 2012	<input type="checkbox"/>
Turn Table	EMCO	D-TT 06	N/A	-	<input checked="" type="checkbox"/>
Ant. Mast	EMCO	D-AM 06	N/A	-	<input checked="" type="checkbox"/>
Controller	EMCO	D-CTR 06	N/A	-	<input checked="" type="checkbox"/>
T-TABLE CONTROLLER	EMCO	1060-1.511	9101-1517	N/A	<input checked="" type="checkbox"/>
CHAMBER	BRADEN	RF Shielded door Assembly	DAC-60-004	N/A	<input checked="" type="checkbox"/>

2.5.2 Test Site**Name and address : Certification Service Technology Inc.**3m Full Chamber : 2F/1055, Shingil-Dong, Danwon-Gu,
Ansan-City, Gyeonggi-Do, Korea, 425-839**2.5.3 Operation of EUT**

Operating Environment

Temperature : 21.0 °C

Humidity : 45 %R.H.

2.5.4 Measurement Data (Below 1 GHz)

Measurment Bandwidth : 120 kHz

Data of Test : 29 July, 2011

Note : USB MODE(Charging Mode)

Frequency (MHz)	Reading (dBuV/m)	Pol. (H/V)	ANT. Height (m)	Correct Factor(dB)	Limit (dBuV/m)	Result (dBuV/m)
123.78	18.32	H	1.10	15.74	43.50	34.06
148.29	23.91	H	1.50	15.85	43.50	39.76
180.75	19.53	H	1.50	19.35	43.50	38.88
211.58	20.37	H	2.30	19.58	43.50	39.95
321.08	19.53	H	2.20	18.54	46.00	38.07

* Remark : H - Horizontal / V - Vertical

Note:

1. All Readings below 1 GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Correct Factor = Ant. Gain + Cable loss
3. Measurement Level(Result) = Reading Level + Correct Factor

Measurement Bandwidth : 120 kHz

Data of Test : 29 July, 2011

Note : AUX MODE

Frequency (MHz)	Reading (dBuV/m)	Pol. (H/V)	ANT. Height (m)	Gain	Limit (dBuV/m)	Result (dBuV/m)
				Correct Factor		
120.76	23.58	H	1.00	15.92	43.50	39.50
122.27	23.53	H	1.20	15.83	43.50	39.36
158.31	21.52	H	1.20	17.19	43.50	38.71
182.41	19.39	H	1.50	19.38	43.50	38.77
272.85	18.95	H	2.50	21.88	46.00	40.83

* Remark : H - Horizontal / V - Vertical

Note:

1. All Readings below 1 GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Correct Factor = Ant. Gain + Cable loss
3. Measurement Level(Result) = Reading Level + Correct Factor



*Kim Ji Hwan/ Test Engineer***3. Photographs of Test**

TEST MODE : Below 1 GHz

● **Front View (USB MODE(Charging Mode))**



● **Rear View (USB MODE(Charging Mode))**

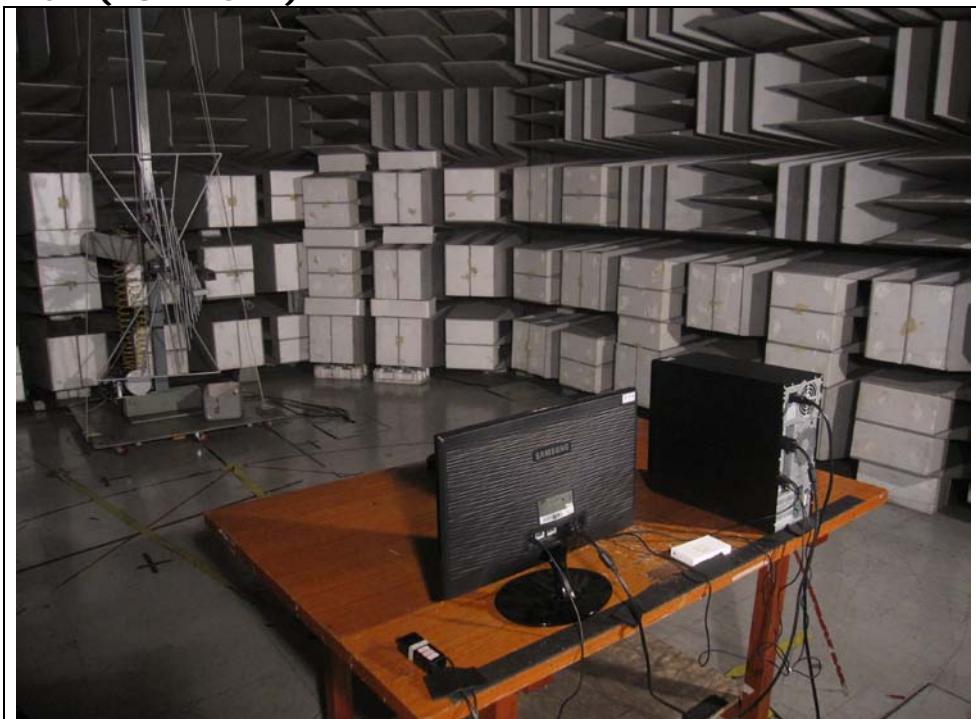


TEST MODE : Below 1 GHz

● **Front View (AUX MODE)**



● **Rear View (AUX MODE)**



4. Photographs of Product

Front View of EUT



Rear View of EUT



Inside View of EUT

