TEST REPORT

1. Applicant

Name : Dasan Electron Co., Ltd.
Address : 307, P1-dong, Kyunggi Techono Park, 1271-11, Sa-dong, Ansan-si, Kyunggi-Do, Korea

2. Products

Name : Wireless Headset (Fixed Part)
Model : DW-770B
Manufacturer : Dasan Electron Co., Ltd.

3. Test Standard/Method : FCC Part 15 Subpart B / ANSI C63.4-2009

4. Test Results : Positive

5. Use of Report : -

6. Date of Application : July 07, 2010

7. Date of Issue : October 19, 2010

Tested by
Sung-kyu Cho
Sung-kyu Cho
Telecommunication Center Engineer

Approved by
Jeong-min Kim
Jeong-min Kim
Telecommunication Center Manager

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1. GENERAL INFORMATIONS

1.1. Applicant (Client)

Name	Dasan Electron Co., Ltd.
Address	307, P1-dong, Kyunggi Techono Park, 1271-11, Sa-dong, Ansan-si, Kyunggi-Do, Korea
Contact Person	kyung-ryong Hong
Telephone No.	+82 31 500 3423
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E-mail address	krhong63@empal.com
Manufacturer	Dasan Electron Co., Ltd.
Manufacturer Address	307, P1-dong, Kyunggi Techono Park, 1271-11, Sa-dong, Ansan-si, Kyunggi-Do, Korea

1.2. Equipment (EUT)

Name	Wireless Headset (Fixed Part)
Description	DECT
Model Name	DW-770B
FCC ID	WF2DW-770B
FCC Classification	JBP (Part 15 Class B Computing Device Peripheral)
Operating Frequency	1921.536 ~ 1928.448 MHz
Number of channels	5
Type of Modulation	GFSK
Hardware Version	DW770-HW1.0
Software Version	DW770-SW1.0
Serial No.	Prototype

1.3. Testing Laboratory

Testing Place	Korea Testing Labortory (KTL) 693, Haean-ro, Sangnok-Gu, Ansan-si, Gyunggi-Do , Korea (426-901)
FCC registration number	408324
Industry Canada filing number	6298
Test Engineer	Sung-kyu Cho
Telephone number	+82 31 5000 132
Facsimile number	+82 31 5000 149
E-mail address	skcho@ktl.re.kr
Other Comments	-

2. SUMMARY OF TEST RESULTS

Testing performed for : Dasan Electron Co., Ltd.

Equipment Under Test : DW-770B

The following table represents the list of measurements required under the FCC CFR47 Part 15.107 and 15.109

FCC Rules	Test Requirements	Result	Comments
15.107	AC conducted Emission	Pass	See Data sheets
15.109(a)	Radiated Emission	Pass	See Data sheets

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.

3. Measurement & Results

3.1. AC Conducted Emissions

3.1.1. Test Procedure

Conducted emission measurements on the EUT were performed by "AC Power Line Conducted Emissions Testing" procedure as per ANSI C63.4. The EUT was set up on a wooden table 0.8 meters height, 1.0 by 1.5 meters in size, placed in the shielded enclosed with a side of wall of which constituted a vertical conducting surface of 2.2 m x 3.1 m in size to maintain 40 cm from the rear of EUT

LISN(Line Impedance Stabilization Network, ROHDE & SCHWARZ, ESH3-Z5, 50 ohm / 50 μH) was installed and electrically boned to the conducting ground plane. The EUT was connected to the LISN using a typical power adapter.

One of two 50 ohm output terminals of the LISN was connected to the EMI Receiver (ROHDE & SCHWARZ, ESCI, 9 kHz to 3 GHz) and the other was terminated in 50 ohms. Measurements were again performed after interchanging such a connection oppositely.

The frequency range from 150 kHz to 30 MHz was examined and the remarkable frequencies were measured with Quasi-peak and Average values using the EMI receiver instrument (ROHDE & SCHWARZ, ESIB, 9 kHz to 26.5 GHz ; Detector Function ; CISPR Quasi-Peak & Average). The 6 dB bandwidth of the Receiver was set to 9 kHz

The position of connecting cables of the EUT was changed to find the worst case configuration during measurements. The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.

3.1.2. Limits

Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (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 50 μH/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 boundary between the frequency ranges.

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.

3.1.3. Sample calculation

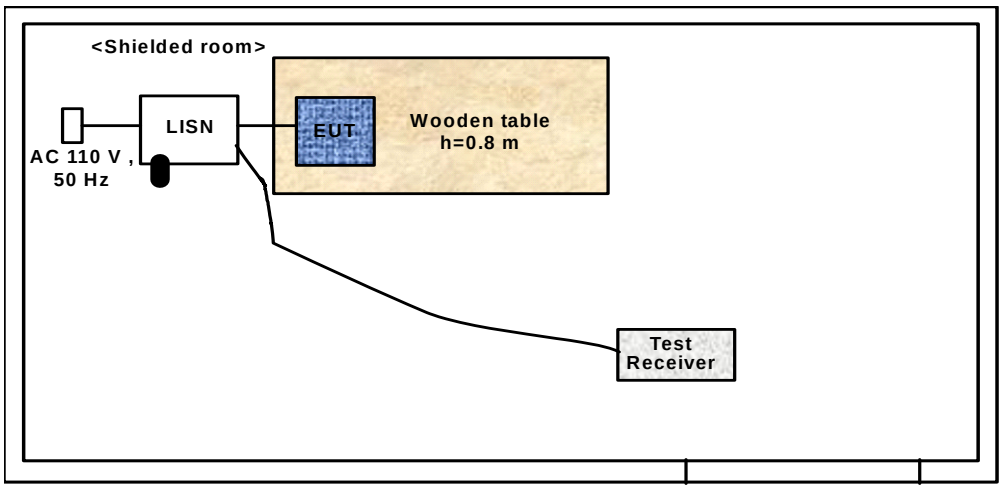
The emission level measured in decibels above one microvolt (dBμV) was converted into microvolt (μV) as shown in following sample calculation.

For example :

Measured Value at	0.32 MHz	36.7dBμV @ Q-Peak mode
+ Correct factor *		9.7 dB
= Conducted Emission		46.4dBμV

* Correct factor is adding RF cable loss and Attenuation

3.1.4. Photograph for the test configuration



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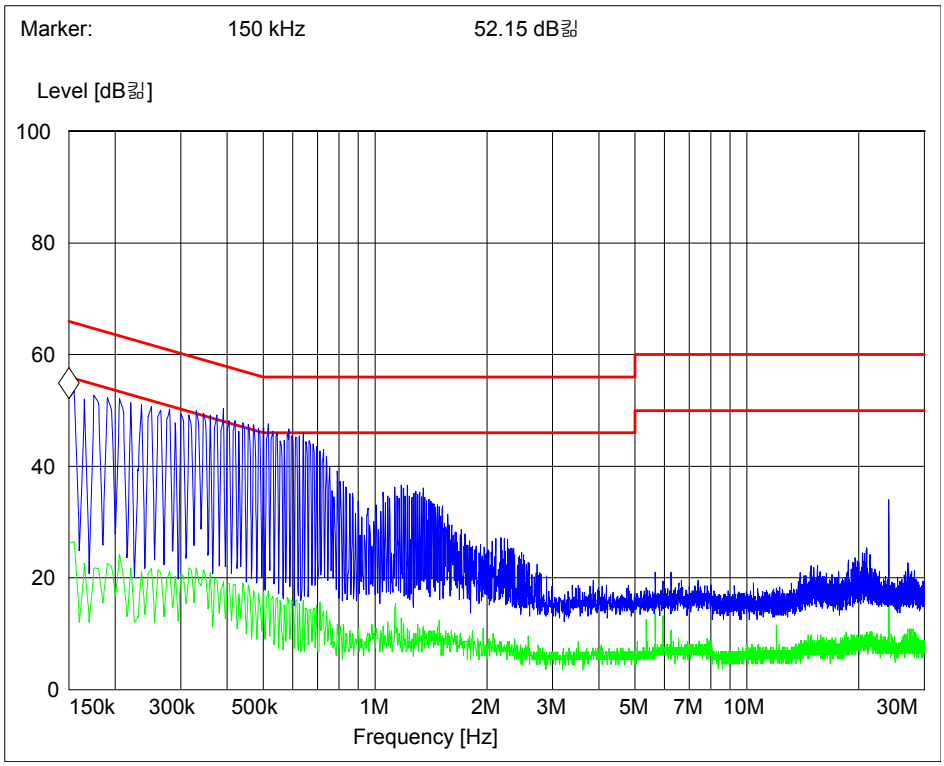
3.1.5. Test Results – Live



Final Measurement - QuasiPeak

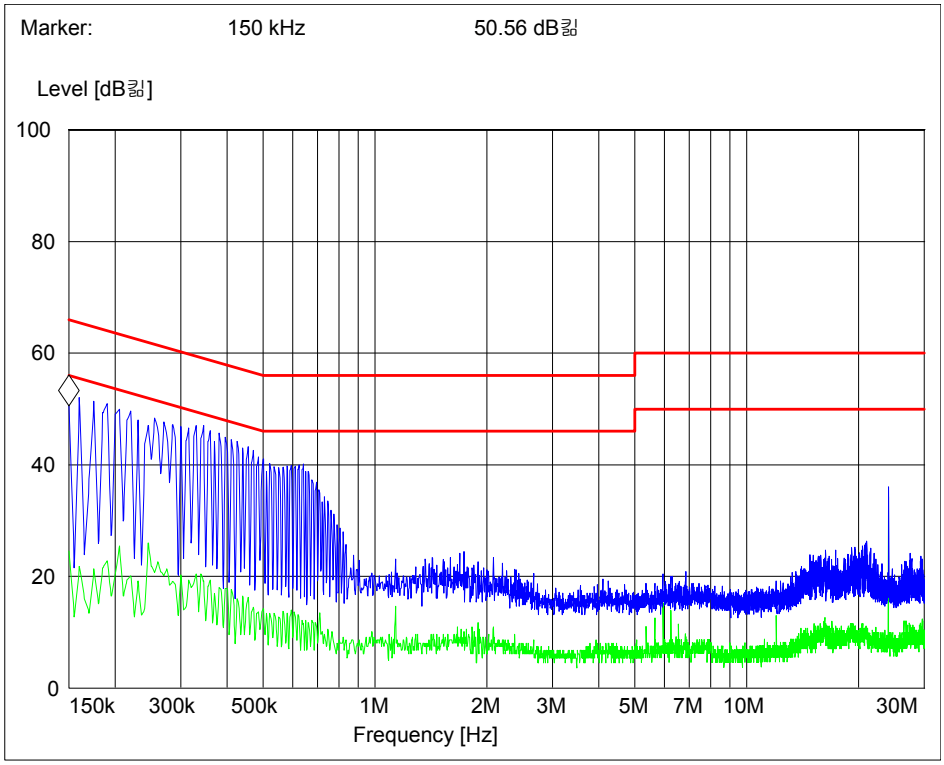
Frequency (MHz)	QuasiPeak (dB µ V)	Line	Margin (dB)	Limit (dB µ V)
0.155	51.5	L1	14.5	66.0
0.175	50.9	L1	14.1	65.0
0.190	50.4	L1	13.6	64.0
0.205	49.9	L1	13.7	63.6
0.220	49.5	L1	13.3	62.8
0.235	49.1	L1	13.3	62.4

Final Measurement - Average

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Margin (dB)	Limit (dB µ V)
0.155	20.1	L1	35.9	56.0
0.175	19.3	L1	35.7	55.0
0.190	21.4	L1	32.6	54.0
0.205	21.5	L1	32.1	53.6
0.220	19.1	L1	33.7	52.8
0.235	18.2	L1	34.2	52.4

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.

3.1.6. Test Results - Netural



Final Measurement - QuasiPeak

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Margin (dB)	Limit (dB µ V)
0.160	50.6	N	14.9	65.5
0.175	49.9	N	15.1	65.0
0.190	49.2	N	14.8	64.0
0.205	48.6	N	15.0	63.6
0.220	48.1	N	14.7	62.8
0.255	46.9	N	14.9	61.8

Final Measurement - Average

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Margin (dB)	Limit (dB µ V)
0.160	19.6	N	35.9	55.5
0.175	18.8	N	36.2	55.0
0.190	21.7	N	32.3	54.0
0.205	21.6	N	32	53.6
0.220	18.6	N	34.2	52.8
0.255	18.6	N	33.2	51.8

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

3.2. Radiated Spurious Emissions

3.2.1. Test Procedure

3.2.1.1 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.

3.2.1.2 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 x, y, z axis and worst case results are reported

The maximum frequency range measuring with the spectrum from 30 MHz to 1 GHz is investigated with the transmitter

3.2.2. 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

(b) The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following :

Frequency of Emission (MHz)	Field strength (Microvolts/meters)
30 – 88	90
88 – 216	150
216 – 960	210
Above 960	300

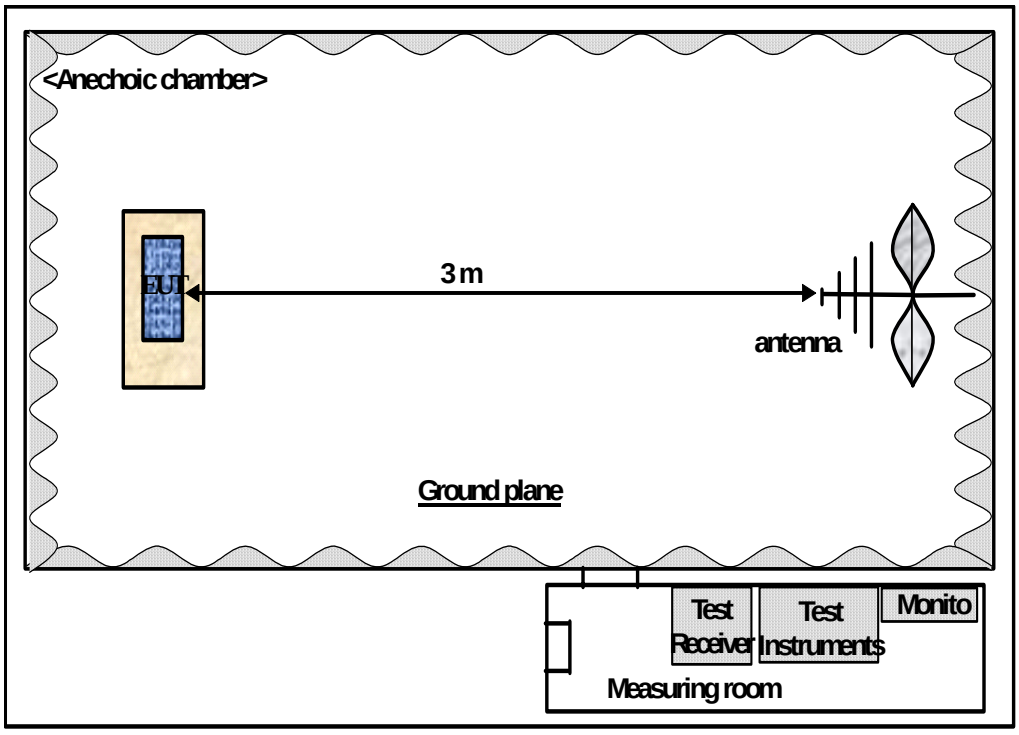
3.2.3. Sample Calculation

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

For example :

Measured Value at	48.2 MHz	17.6 dBμV
Antenna Factor & Cable loss		14.3 dB
− Preamplifier		0.0 dB
= Radiated Emission		31.9 dBμV/m

3.2.4. Photograph for the test configuration



3.2.5. Test Results

Model No. : DW-770B
Test distance : 3m
Test mode : PC Peripheral mode

Frequncy (MHz)	Antenna Pol	Bandwidth	Reading level	Correction factor	Level Corrected	Limit	Margin	Remark
47.88	V	120 kHz	23.43	13.90	37.33	40.0	2.67	Quasi-Peak
47.94	H	120 kHz	19.08	14.73	33.81	40.0	6.19	Quasi-Peak
139.86	V	120 kHz	21.33	14.78	36.11	40.0	3.89	Quasi-Peak
144.42	H	120 kHz	21.33	14.86	36.19	40.0	3.81	Quasi-Peak
312.36	H	120 kHz	18.76	16.36	35.12	46.0	10.88	Quasi-Peak
327.60	V	120 kHz	19.19	16.80	35.99	46.0	10.01	Quasi-Peak
433.24	H	120 kHz	19.39	19.89	39.28	46.0	6.72	Quasi-Peak
433.24	V	120 kHz	19.55	19.89	39.44	46.0	6.56	Quasi-Peak
635.28	V	120 kHz	20.21	24.52	44.73	46.0	1.27	Quasi-Peak
635.34	H	120 kHz	20.09	24.52	44.61	46.0	1.39	Quasi-Peak
702.06	V	120 kHz	19.61	25.29	44.90	46.0	1.10	Quasi-Peak

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

Note

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. Measurement was done over the frequency range from 30 MHz to 5th hramonic. 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.
3. Pre-amplifier was used in the range between 1 ~ 10 GHz.
4. Tesing is include the rotation of the EUT through three orthogonal axes to determine the maximum emission.

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

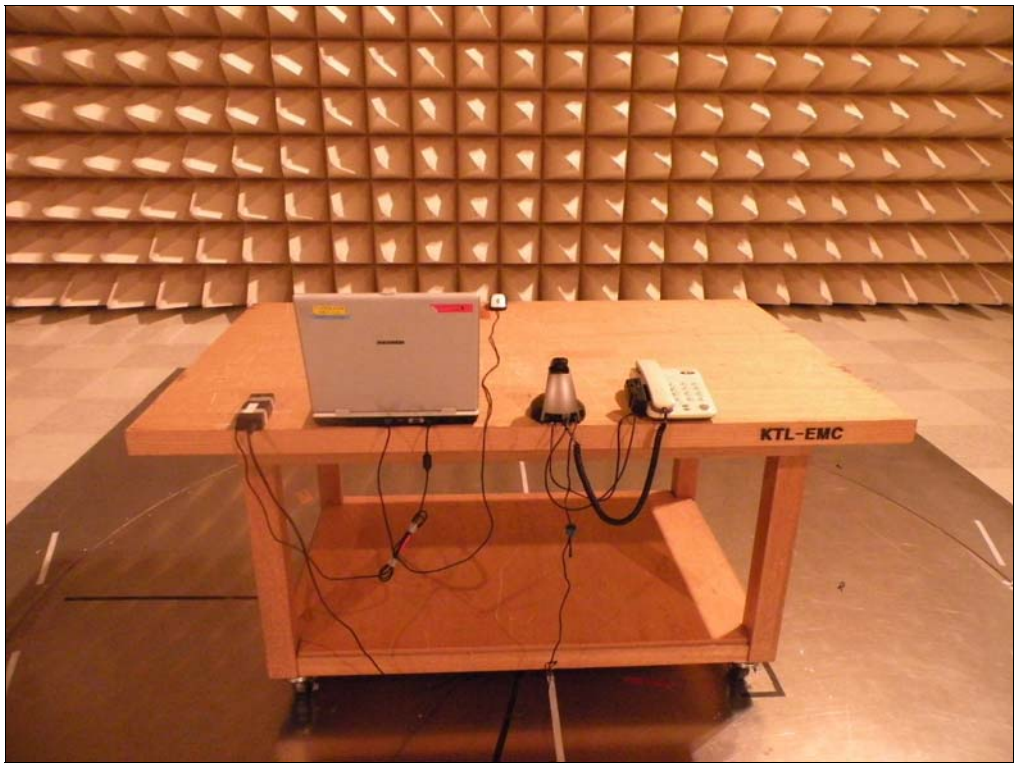
4. TEST EQUIPMENTS

No.	Equipment	Manufacturer	Model	S/N	Effective Cal.Duration
1	EMI Receiver (20 Hz ~ 26.5 GHz)	R&S	ESIB	100280	08/17/2010 ~ 08/17/2011
2	Spectrum Analyzer (100 Hz ~ 26.5 GHz)	Agilent	E4407B	US41443316	12/01/2009 ~ 12/01/2010
3	Spectrum Analyzer (3 Hz ~ 50 GHz)	Agilent	E4448A	MY43360322	08/30/2010 ~ 08/30/2011
4	Pre-Amplifier (100 kHz ~ 1 GHz)	SONOMA.	310N	186270	08/25/2010 ~ 08/25/2011
5	Pre-Amplifier (0.5 GHz ~ 26.5 GHz)	Agilent	83017A	MY39500982	04/02/2010 ~ 04/02/2011
6	LISN(50 Ω , 50 μH) (10 kHz ~ 100 MHz)	R&S	ESH3-Z5	826789009	07/05/2010 ~ 07/05/2011
7	Biconi-Log Ant. (30 MHz ~ 1000 MHz)	Schwarzbeck	VULB9168	9168-180	08/24/2010 ~ 08/24/2011
8	Horn Ant. (1 GHz ~ 18 GHz)	EMCO	3115	9012-3595	03/26/2010 ~ 03/26/2011
9	Horn Ant. (18 GHz ~ 40 GHz)	EMCO	3116	2664	03/26/2010 ~ 03/26/2011
10	Active Loop Ant. (9 kHz ~ 30 MHz)	EMCO	6502	2532	06/08/2010 ~ 06/08/2011
11	DC Power Supply	Agilent	E4356A	MY41000296	10/01/2010 ~ 10/01/2011

*** Test Support Equipment**

No.	Equipment	Manufacturer	Model	S/N
1	Notebook PC	Samsung	SP28	225CP3BY500506A
2	Notebook AC Adaptor	Samsung	AP1AD02	CNBA4400162A13J6F54D1796
3	USB Mouse	Dong-Kwan Elec	GP-M3000UE	75016144

Appendix.1 Test setup photo



<Radiated Emission>

<AC Conducted Emission>