

TEST REPORT

1. Applicant

Name : Seoultek valley.Co.,Ltd
Address : 51-1 Yujung Bldg 5F,Bang E-dong, Songpa-gu ,
Seoul South KOREA

2. Products

Name : Bluetooth Handsfree Carkit
Model/Type : ABT-C100
Manufacturer : Seoultek valley.Co.,Ltd

3. Test Standard : FCC CFR 47 Part 15, Subpart C section 15.239

4. Test Method : ANSI C63.4-2003

5. Test Result : Positive

6. Date of Application : July 25, 2008

7. Date of Issue : September 09, 2008

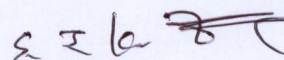
Tested by



Bum-Jong Kim

Telecommunication Team
Engineer

Approved by



Seok-Jin Kim

Telecommunication Team
Manager

The test results contained apply only to the test sample(s) supplied by the applicant, and this test report shall not be reproduced in full or in part without approval of the KTL in advance.

Korea Testing Laboratory

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1. GENERAL INFORMATIONS

1.1. Applicant (Client)

Name	Seoultek valley.Co.,Ltd
Address	51-1 Yujung Bldg 5F,Bang E-dong, Songpa-gu , Seoul South KOREA
Contact Person	S.H.Kang
Telephone No.	82-2-3401-6030
Facsimile No.	82-2-3401-6080
E-mail address	shkang@seoultek.com
Manufacturer Name	Seoultek valley.Co.,Ltd
Manufacturer Address	51-1 Yujung Bldg 5F,Bang E-dong, Songpa-gu , Seoul South KOREA

1.2. Equipment (EUT)

Type of equipment	Bluetooth Handsfree Carkit
Model Name	ABT-C100
FCC ID	WG4ABT-C100
Frequency Band	Bluetooth : 2402 ~ 2480 MHz, FM transmitter : 88.3 ~ 88.9 MHz
, Type of Modulation	Bluetooth : GFSK & DQPSK & 8DPSK, FM transmitter : FM
Moudlation technology	FHSS
Number of Channels	Bluetooth : 79 Channels, FM transmitter : 4 Channels
Antenna Gain	Bluetooth antenna Max 1.39 dB
Function Type	Transceiver
Power Source	5VDC USB cable

1.3. Testing Laboratory

Testing Place	Korea Testing Laboratory (KTL) 1271-12, Sa-Dong Sangnok-Gu, Ansan-si Gyunggi-Do, Korea
FCC registration number	408324
Industry Canada filing number	6298
Test Engineer	Bum-Jong KIM
Telephone number	+82 31 5000 131
Facsimile number	+82 31 5000 159
E-mail address	temple@ktl.re.kr
Other Comments	-

1.4. Description of Test Modes

RADIATED EMISSION MEASUREMENT:

Since the EUT is considered a portable unit, it was pre-tested on the position of each 3 axis. The worst case was found when positioned on Z-plane. Therefore only the test data of this Z-plane was used for radiated test. Following channel was selected for the final test as listed below

EUT	Tested channel	Modulation technology	Modulation Type	Packet type	AXIS
Bluetooth	0,39,78	FHSS	GFSK	DH5	Z
	0,39,78	FHSS	8DPSK	DH5	Z
FM transmitter	1,3,4	-	FM	-	Z

ANTENNA PORT CONDUCTED MEASUREMENT:

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports and packet types.

Following channel was selected for the final test as listed below

	Tested channel	Modulation technology	Modulation Type	Packet type	AXIS
Bluetooth	0,39,78	FHSS	GFSK	DH5	Z
	0,39,78	FHSS	8DPSK	DH5	Z
FM transmitter	1,3,4	-	FM	-	Z

1.5. Channel numbers and Frequencies

FMtransmitter

Channels	Frequency (MHz)
1	88.3
2	88.5
3	88.7
4	88.9

Bluetooth

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

2. SUMMARY OF TEST RESULTS

Testing performed for : Seoultek valley.Co.,Ltd

Equipment Under Test : ABT-C100

Receipt of Test Sample : July 25, 2008

Test Start Date : August 4 , 2008

Test End Date : September 04, 2008

The following table represents the list of measurements required under the FCC CFR47 Part 15.239 and 15.209

FCC Rules	Test Requirements	Result	Comments
15.239(a)	Occupied Bandwidth	Pass	See Data sheets
15.239(b)	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**

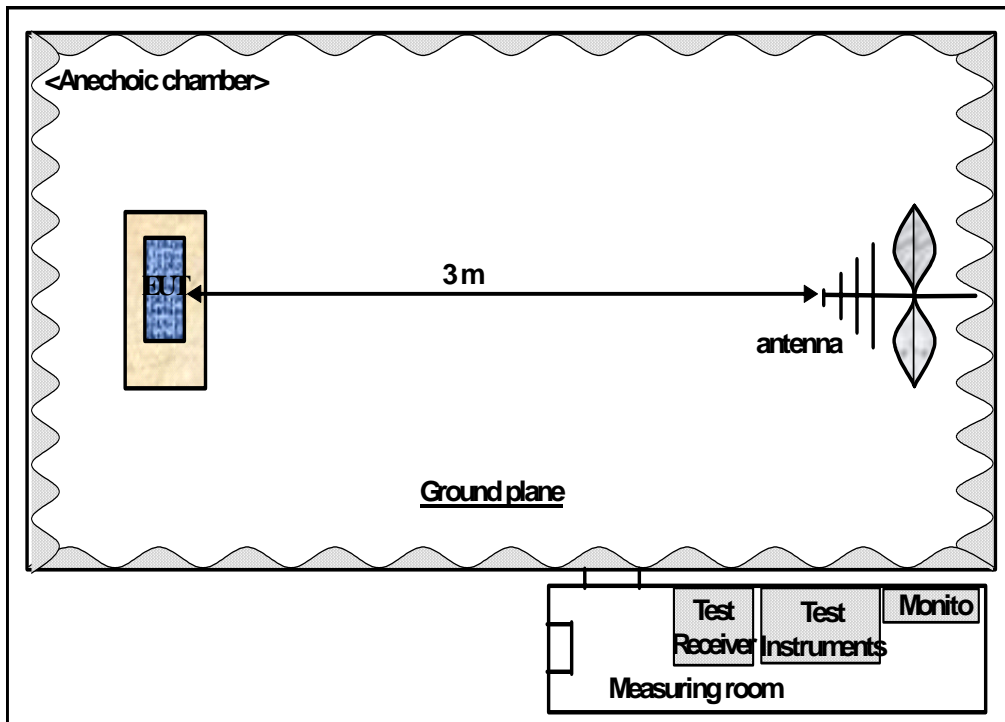
No modifications were implemented by KTL.

All results in this report pertain to the un-modified sample provided to KTL.

3. Measurement & Results

3.1. Occupied Bandwidth

3.1.1. Test Setup Layout

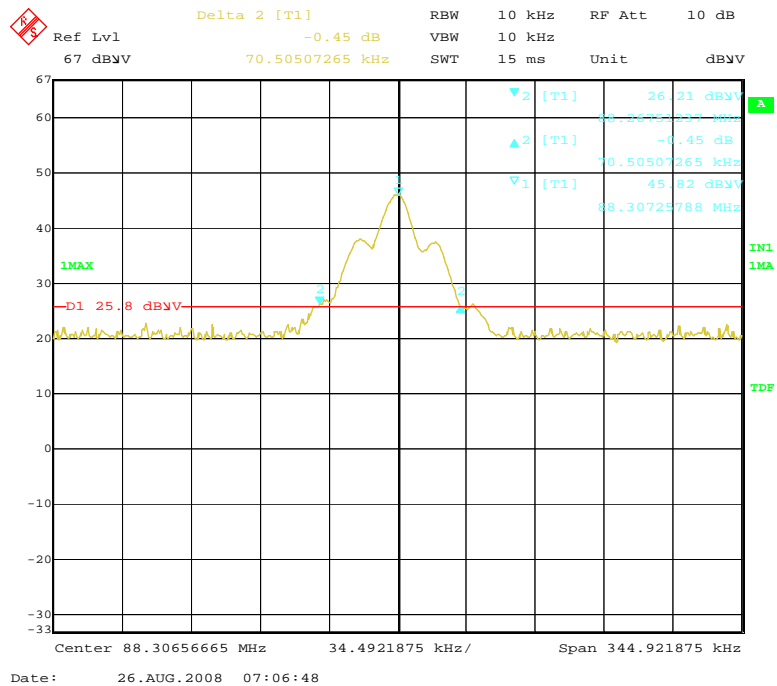


3.1.2. Test Condition

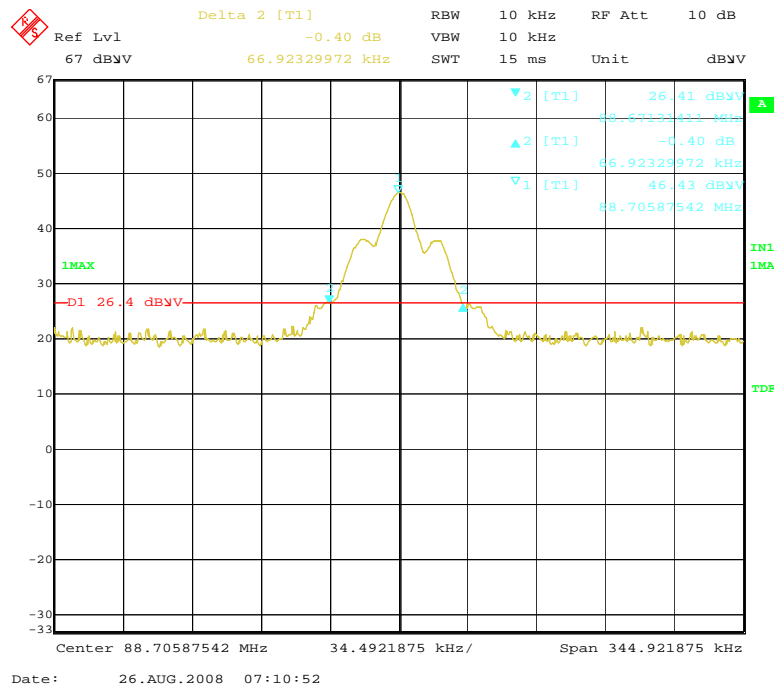
The 20dB Bandwidth measurement testing was performed with the FM for Bluetooth handsfree carkit - model ABT-C100 set up on a wooden table above the turntable at a distance of 3 meters from biconilog antenna within the semi-anechoic chamber. FM for Bluetooth handsfree carkit -model ABT-C100 was configured to operate in the normal mode of operation at the low, middle and high transmit frequencies.

3.1.3. Test result

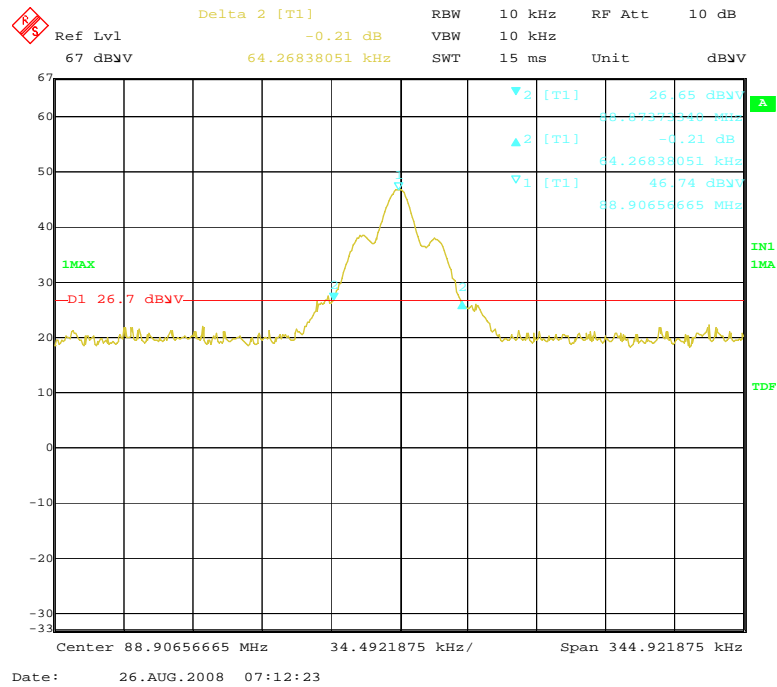
Channels	Frequency (MHz)	Result (kHz)	Verdict
1	88.3	70.5	Pass
2	88.7	66.9	Pass
4	88.9	64.3	Pass



- Frequency 88.3 CH 1 -



- Frequency 88.7 CH 2 -



- Frequency 88.9 CH 4 -

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 as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	MHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(2)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency Field Strength Measurement Distance (MHz) (microvolts/meter) (meters)

30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200**	3
above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

15.239 (b) The field strength of any emissions within the permitted 200 kHz band shall not exceed 250 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in section 15.35 for limiting peak emissions apply.

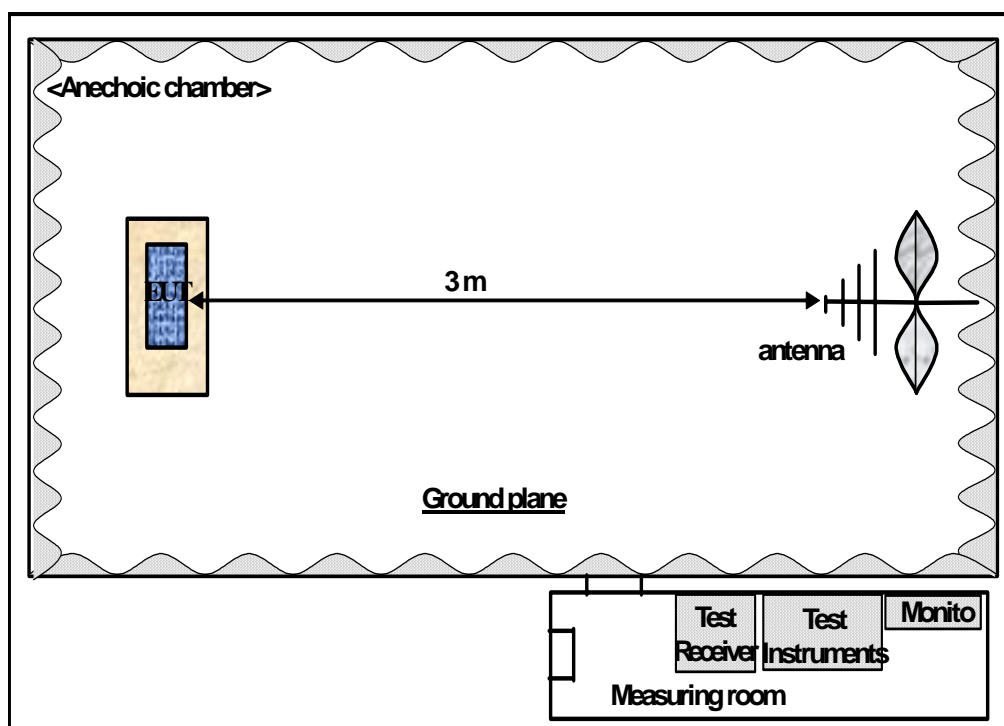
3.2.3. Sample Calculation

The emission level measured in decibels above one microvolt ($\text{dB}\mu\text{V}$) was following sample calculation.

For example ;

Measured Value at <u>88.3 MHz</u>	36.6 $\text{dB}\mu\text{V}$
Antenna Factor	9.2 dB
- Preamplifier& Cable loss	0.0 dB
<hr/>	
= Radiated Emission	45.8 $\text{dB}\mu\text{V/m}$

3.2.4. Photograph for the test configuration



3.2.5. Test Results

3.2.5.1 Radiated Emission

Measurement mode	Radiated Emission Measurement continuous TX								
Channel	Ch 1 (88.3 MHz) / Ch 3(88.7 MHz) / Ch 4 (88.9 MHz)								
Resolution Bandwidth	<input checked="" type="checkbox"/> Peak & Average (3dB Bandwidth : 1MHz for above 1GHz) <input type="checkbox"/> Quasi-Peak (6dB Bandwidth : 120kHz for below 1GHz)								
The worst case	Z axes								

Frequency (MHz)	* D.M.	* A.P.	Measured Value (dB μ V)	* A.F. (dB)	* A.G. + C.L. (dB)	* D.C.F. (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	** Margin (dB)
88.3	P	H	36.6	9.2	0.0	0	45.8	67.95	-22.1
	A	H	35.8	9.2	0.0	0	45.0	47.95	-3.0
88.7	P	H	37.2	9.2	0.0	0	46.4	67.95	-21.6
	A	H	36.5	9.2	0.0	0	45.7	47.95	-2.3
88.9	P	H	37.5	9.2	0.0	0	46.7	67.95	-21.3
	A	H	36.7	9.2	0.0	0	45.9	47.95	-2.1

Note

The observed EMI receiver (ESIB) & Spectrum Analyer(E4448A) noise floor level was 2.0 dB μ V. And all other emissions not reported on data were more than 25 dB below the permitted level.

* D.M. : Detect Mode (P : Peak, Q : Quasi-Peak, A : Average)
 A.P. : Antenna Polarization (H : Horizontal, V : Vertical)
 A.F. : Antenna Factor
 C.L. : Cable Loss
 A.G. : Amplifier Gain
 D.C.F. : Distance Correction Factor
 < : Less than

** Margin (dB) = Emission Level (dB) - Limit (dB)

4. TEST EQUIPMENTS

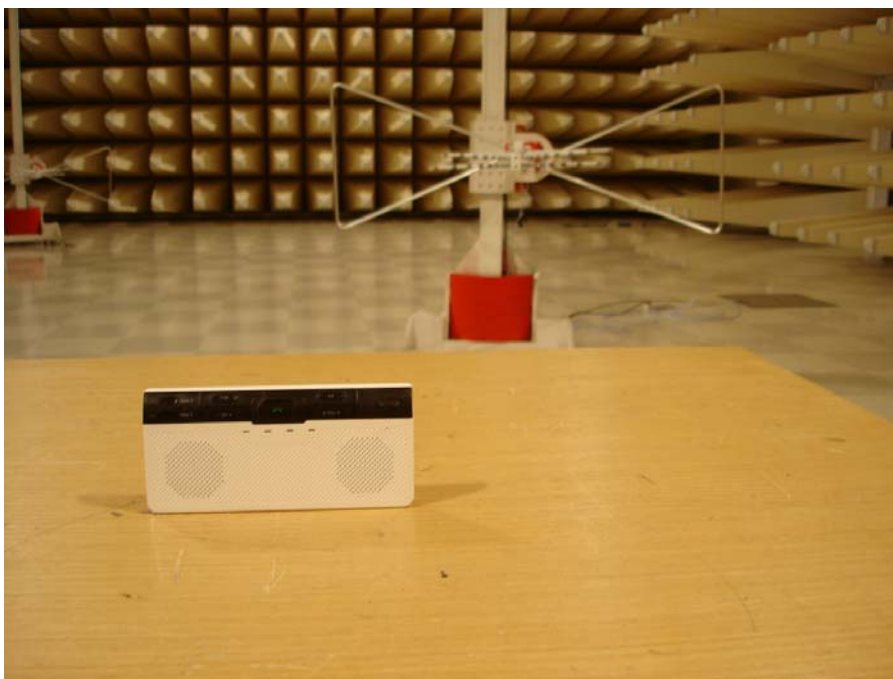
No.	Equipment	Manufacturer	Model	S/N	Effective Cal.Duration
1	EMI Receiver (20 Hz ~ 26.5 GHz)	R&S	ESIB	100280	08/18/2008 ~ 08/18/2009
2	Spectrum Analyzer (100 Hz ~ 26.5 GHz)	Agilent	E4407B	US41443316	12/01/2007 ~ 12/01/2008
3	Spectrum Analyzer (3 Hz ~ 50 GHz)	Agilent	E4448A	MY43360322	08/25/2008 ~ 08/25/2009
4	Pre-Amplifier (100 kHz ~ 1 GHz)	SONOMA.	310N	186270	08/25/2007 ~ 08/25/2008
5	Pre-Amplifier (0.5 GHz ~ 26.5 GHz)	Agilent	83017A	MY39500982	04/02/2008 ~ 04/02/2009
6	LISN(50 Ω , 50 μ H) (10 kHz ~ 100 MHz)	R&S	ESH3-Z5	100094	08/18/2008 ~ 08/18/2009
7	Biconi-Log Ant. (30 MHz ~ 1000 MHz)	Schwarzbeck	VULB9168	9168-181	04/21/2008 ~ 04/21/2009
8	Horn Ant. (1 GHz ~ 18 GHz)	EMCO	3115	9012-3595	03/26/2007 ~ 03/26/2009
9	Horn Ant. (18 GHz ~ 40 GHz)	EMCO	3116	2664	03/26/2007 ~ 03/26/2009
10	Active Loop Ant. (9 kHz ~ 30 MHz)	EMCO	6502	2532	06/08/2007 ~ 06/08/2009
11	DC Power Supply	Agilent	E4356A	MY41000296	10/01/2007 ~ 10/01/2008
12	Power Meter	Agilent	E4417A	GB4129075	09/17/2007 ~ 09/17/2008
13	Bluetooth tester	anrisu	MT8852B	6K00006994	03/03/2008 ~ 03/03/2009

Appendix.1 EUT photo



Front

Appendix.2 Test setup photo



<Radiated Emission>