

FCC TEST REPORT

REPORT NO. : RF940421L02

MODEL NO. : BSR202

RECEIVED : Apr. 20, 2005

TESTED : Apr. 29 ~ May 03, 2005

ISSUED : May 04, 2005

APPLICANT : AboCom Systems, Inc.

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TABLE OF CONTENTS

1	CERTIFICATION	5
2	SUMMARY OF TEST RESULTS	6
2.1	MEASUREMENT UNCERTAINTY	6
3	GENERAL INFORMATION	7
3.1	GENERAL DESCRIPTION OF EUT	7
3.2	DESCRIPTION OF TEST MODES	8
3.2.1	CONFIGURATION OF SYSTEM UNDER TEST	9
3.2.2	TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL	10
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS	11
3.4	DESCRIPTION OF SUPPORT UNITS	11
4	TEST PROCEDURES AND RESULTS	12
4.1	CONDUCTED EMISSION MEASUREMENT	12
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	12
4.1.2	TEST INSTRUMENTS	12
4.1.3	TEST PROCEDURES	13
4.1.4	DEVIATION FROM TEST STANDARD	13
4.1.5	TEST SETUP	14
4.1.6	EUT OPERATING CONDITIONS	14
4.1.7	TEST RESULTS	15
4.2	NUMBER OF HOPPING FREQUENCY USED	21
4.2.1	LIMIT OF HOPPING FREQUENCY USED	21
4.2.2	TEST INSTRUMENTS	21
4.2.3	TEST PROCEDURES	22
4.2.4	DEVIATION FROM TEST STANDARD	22
4.2.5	TEST SETUP	22
4.2.6	TEST RESULTS	22
4.3	DWELL TIME ON EACH CHANNEL	24
4.3.1	LIMIT OF DWELL TIME USED	24
4.3.2	TEST INSTRUMENTS	24
4.3.3	TEST PROCEDURES	25
4.3.4	DEVIATION FROM TEST STANDARD	25

4.3.5	TEST SETUP.....	25
4.3.6	TEST RESULTS	26
4.4	CHANNEL BANDWIDTH.....	30
4.4.1	LIMITS OF CHANNEL BANDWIDTH	30
4.4.2	TEST INSTRUMENTS.....	30
4.4.3	TEST PROCEDURE.....	31
4.4.4	DEVIATION FROM TEST STANDARD	31
4.4.5	TEST SETUP.....	31
4.4.6	EUT OPERATING CONDITION	31
4.4.7	TEST RESULTS	32
4.5	HOPPING CHANNEL SEPARATION	35
4.5.1	LIMIT OF HOPPING CHANNEL SEPARATION	35
4.5.2	TEST INSTRUMENTS.....	35
4.5.3	TEST PROCEDURES	36
4.5.4	DEVIATION FROM TEST STANDARD	36
4.5.5	TEST SETUP.....	36
4.5.6	TEST RESULTS	37
4.6	MAXIMUM PEAK OUTPUT POWER	40
4.6.1	LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT	40
4.6.2	INSTRUMENTS.....	40
4.6.3	TEST PROCEDURES	41
4.6.4	DEVIATION FROM TEST STANDARD	41
4.6.5	TEST SETUP.....	41
4.6.6	EUT OPERATING CONDITION	41
4.6.7	TEST RESULTS	42
4.7	RADIATED EMISSION MEASUREMENT	45
4.7.1	LIMITS OF RADIATED EMISSION MEASUREMENT	45
4.7.2	TEST INSTRUMENTS.....	46
4.7.3	TEST PROCEDURES	47
4.7.4	DEVIATION FROM TEST STANDARD	47
4.7.5	TEST SETUP.....	48
4.7.6	EUT OPERATING CONDITIONS	48

4.7.7	TEST RESULTS	49
4.8	BAND EDGES MEASUREMENT	54
4.8.1	LIMITS OF BAND EDGES MEASUREMENT.....	54
4.8.2	TEST INSTRUMENTS.....	54
4.8.3	TEST PROCEDURE.....	54
4.8.4	DEVIATION FROM TEST STANDARD	54
4.8.5	EUT OPERATING CONDITION	54
4.8.6	TEST RESULTS	55
4.9	ANTENNA REQUIREMENT	58
4.9.1	STANDARD APPLICABLE	58
4.9.2	ANTENNA CONNECTED CONSTRUCTION	58
5	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	59
6	INFORMATION ON THE TESTING LABORATORIES	62

1 CERTIFICATION

PRODUCT : Bluetooth Stereo Receiver
BRAND NAME : AboCom
MODEL NO. : BSR202
APPLICANT : AboCom Systems, Inc.
TESTED : Apr. 29 ~ May 03, 2005
TEST SAMPLE : ENGINEERING SAMPLE
STANDARDS : FCC Part 15, Subpart C (Section 15.247)
ANSI C63.4:2003

The above equipment (model: BSR202) has been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Suntee Liu , **DATE :** May 04, 2005
(Suntee Liu)

TECHNICAL
ACCEPTANCE : Gary Chang , **DATE :** May 04, 2005
Responsible for RF (Gary Chang)

APPROVED BY : Cody Chang , **DATE :** May 04, 2005
(Cody Chang / Deputy Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
Standard Section	Test Type and Limit	Result	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is -18.42dB at 0.216MHz
15.247(a)(1) (iii)	Number of Hopping Frequency Used Spec.: At least 15 channels	PASS	Meet the requirement of limit
15.247(a)(1) (iii)	Dwell Time on Each Channel Spec. : Max. 0.4 second within 31.6 second	PASS	Meet the requirement of limit
15.247(a)(1)	Hopping Channel Separation Spec. : Min. 25 kHz or 20 dB bandwidth, whichever is greater Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	PASS	Meet the requirement of limit
15.247(b)	Maximum Peak Output Power Spec.: max. 30dBm	PASS	Meet the requirement of limit
15.247(d)	Transmitter Radiated Emissions Spec.: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -5.17dB at 951.40MHz
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.55 dB
	200MHz ~1000MHz	3.58 dB
	1GHz ~ 18GHz	1.10 dB
	18GHz ~ 40GHz	0.91 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Bluetooth Stereo Receiver
MODEL NO.	BSR202
POWER SUPPLY	3.7Vdc from polymer lithium ion battery 5Vdc from host equipment
MODULATION TYPE	GFSK
MODULATION TECHNOLOGY	FHSS
FREQUENCY RANGE	2402 MHz ~ 2480 MHz
NUMBER OF CHANNEL	79
OUTPUT POWER	1.153mW
ANTENNA TYPE	PIFA antenna with antenna gain 1.93dBi
DATA CABLE	1.05 m shielded USB cable without core
I/O PORT	USB, audio output

NOTE:

1. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

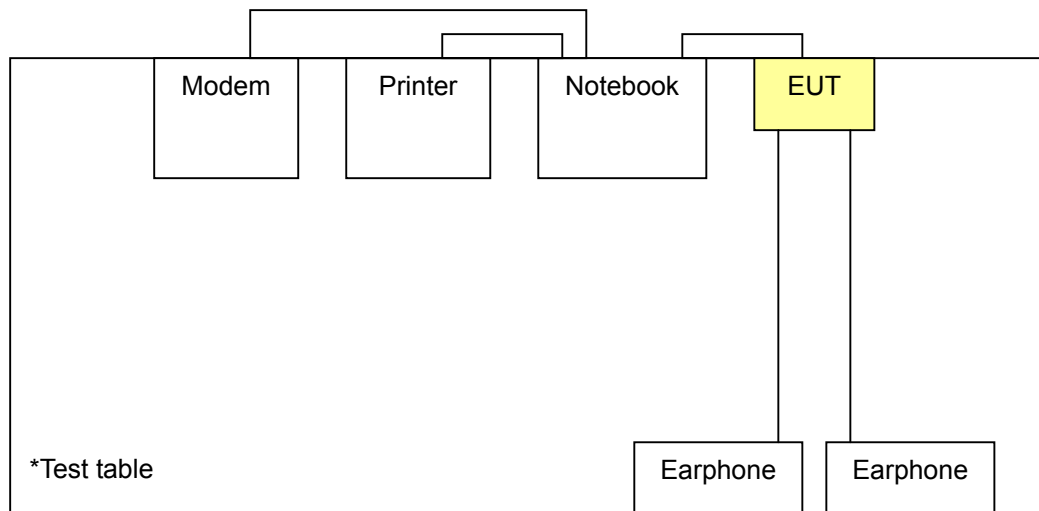
Operated in 2400 ~ 2483.5MHz Band:

79 channels are provided to this EUT.

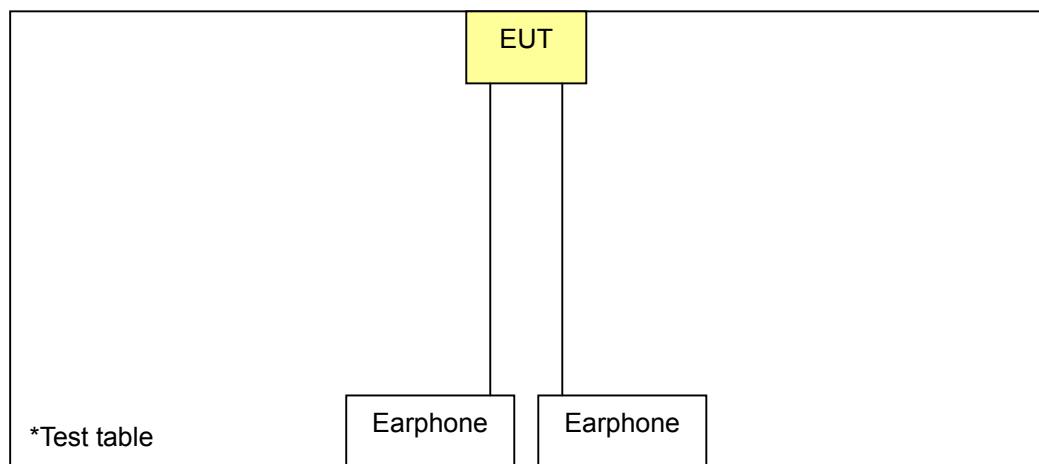
Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	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	2431	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		

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

For USB charging mode



For battery mode



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT Configure Mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
A	x	X	Note 1	Note 2	Battery mode
B	x	X	Note 1	Note 2	USB charging mode

Where PLC: Power Line Conducted Emission

RE<1G RE: Radiated Emission below 1GHz

RE≥1G: Radiated Emission above 1GHz

APCM: Antenna Port Conducted Measurement

Note 1: No effect on Radiated Emission above 1GHz.

Note 2: Conducted RF measurement is independent of USB cable.

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, packet types and XYZ axis.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type	Position
B	0 ~ 78	0, 39, 78	FHSS	GFSK	DH5	Z

Radiated Emission Test (Below 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, packet types and XYZ axis.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type	Position
A	0 ~ 78	0, 39, 78	FHSS	GFSK	DH5	Z
B	0 ~ 78	0, 39, 78	FHSS	GFSK	DH5	Z

Radiated Emission Test (Above 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, packet types and XYZ axis.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type	Position
B	0 ~ 78	0, 39, 78	FHSS	GFSK	DH5	Z

Bandedge Measurement:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, packet types and XYZ axis.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type	Position
0 ~ 78	0, 39, 78	FHSS	GFSK	DH5	Z

Antenna Port Conducted Measurement:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, packet types and XYZ axis.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type	Position
0 ~ 78	0, 39, 78	FHSS	GFSK	DH5	Z

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Bluetooth Stereo Receiver. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (Section 15.247)
ANSI C63.4:2003

All test items have been performed and recorded as per the above standards.

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

3.4 DESCRIPTION OF SUPPORT UNITS

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP05L	12130898320	E2K24CLNS
2	MODEM	ACEEX	1414V/3	0401008248	IFAXDM1414
3	PRINTER	EPSON	LQ-300+	DCGY047265	FCC DoC Approved
4	EARPHONE	PHILIPS	SBC HL125	H2-010073	NA
5	EARPHONE	PHILIPS	SBC HL125	H2-010074	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.2 shielded cable
3	1.2 shielded cable
4	1.2 shielded cable
5	1.2 shielded cable

NOTE: All power cords of the above support units are nonshielded (1.8m).

4 TEST PROCEDURES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Nov. 06, 2005
RF signal cable Woken	5D-FB	Cable-HyC02-01	Jan. 09, 2006
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Jan. 20, 2006
LISN ROHDE & SCHWARZ	ESH3-Z5	100311	Jan. 20, 2006
Software ADT	ADT_Cond_V3	NA	NA

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 3.
 3. The VCCI Site Registration No. is C-2047.

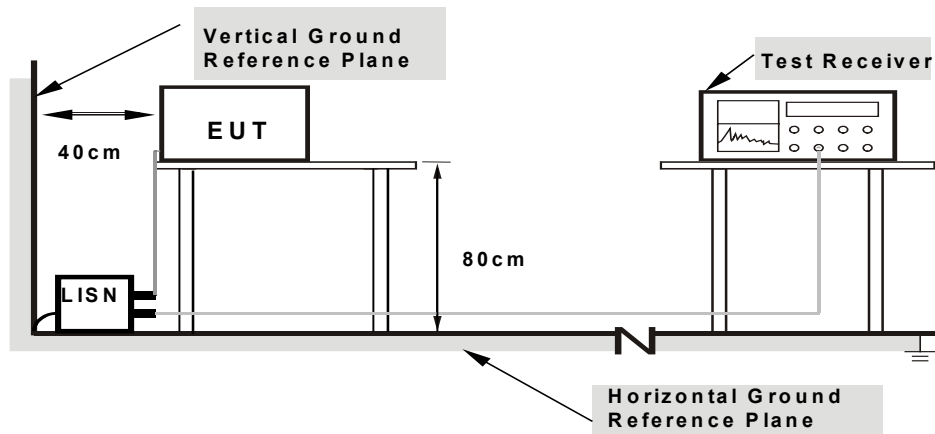
4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

- Connected the EUT to the notebook and powered by USB interface.
- The notebook ran a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- The notebook sent "H" messages to its screen.
- The notebook sent "H" messages to the printer and the printer printed them out.
- The notebook sent "H" messages to the modem.
- The EUT sent audio messages to the earphones.
- Steps c ~ f were repeated.

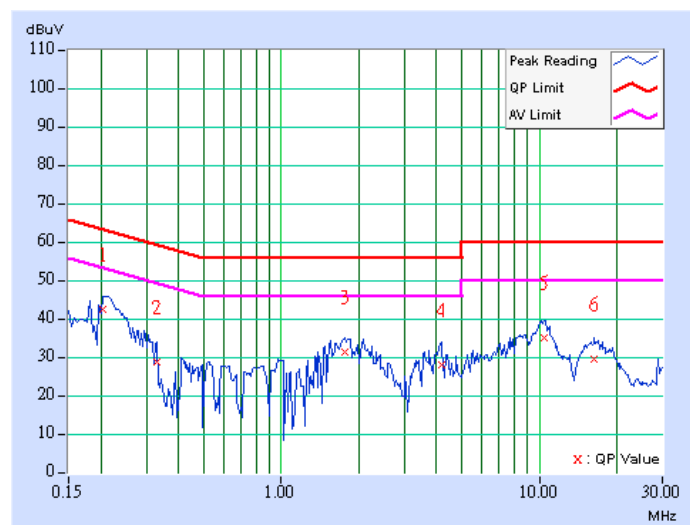
4.1.7 TEST RESULTS

Conducted Worst-Case Data

EUT	Bluetooth Stereo Receiver	MODEL	BSR202
CHANNEL	0	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	PHASE	Line 1
ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Brad Wu		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.205	0.10	41.97	-	42.07	-	63.42	53.42	-21.35	-
2	0.330	0.10	28.31	-	28.41	-	59.46	49.46	-31.05	-
3	1.754	0.20	31.03	-	31.23	-	56.00	46.00	-24.77	-
4	4.164	0.20	27.68	-	27.88	-	56.00	46.00	-28.12	-
5	10.512	0.31	34.62	-	34.93	-	60.00	50.00	-25.07	-
6	16.348	0.51	29.02	-	29.53	-	60.00	50.00	-30.47	-

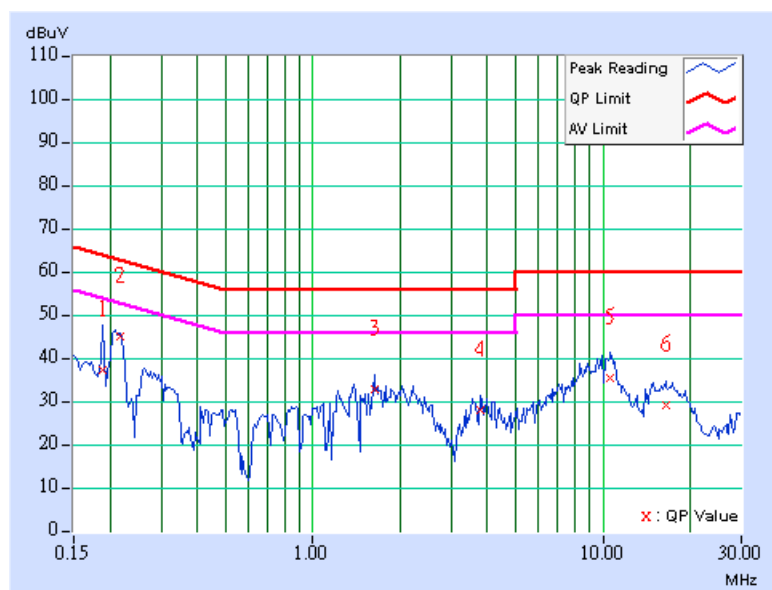
- REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	Bluetooth Stereo Receiver	MODEL	BSR202
CHANNEL	0	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	PHASE	Line 2
ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Brad Wu		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.189	0.10	36.77	-	36.87	-	64.08	54.08	-27.21	-
2	0.216	0.10	44.44	-	44.54	-	62.96	52.96	-18.42	-
3	1.625	0.20	32.46	-	32.66	-	56.00	46.00	-23.34	-
4	3.793	0.20	27.63	-	27.83	-	56.00	46.00	-28.17	-
5	10.578	0.41	35.08	-	35.49	-	60.00	50.00	-24.51	-
6	16.445	0.59	28.63	-	29.22	-	60.00	50.00	-30.78	-

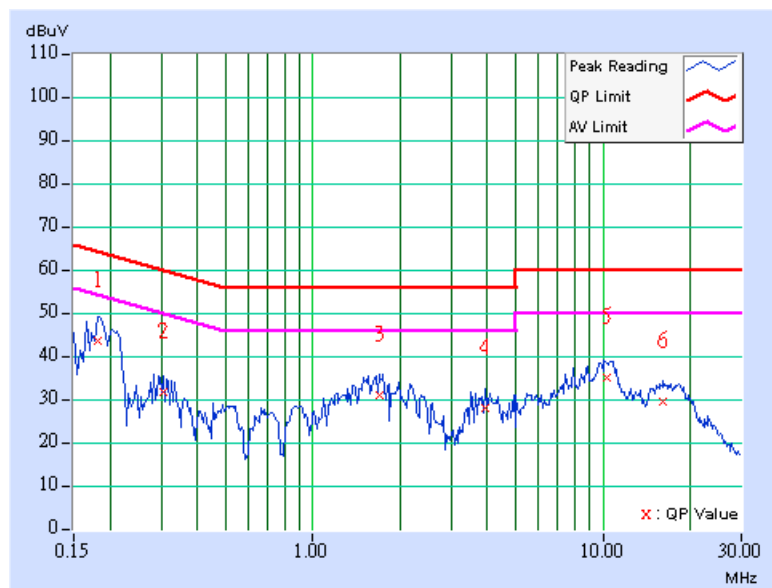
- REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT	Bluetooth Stereo Receiver	MODEL	BSR202
CHANNEL	39	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	PHASE	Line 1
ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Brad Wu		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.10	43.18	-	43.28	-	64.43	54.43	-21.15	-
2	0.306	0.10	31.40	-	31.50	-	60.07	50.07	-28.57	-
3	1.691	0.20	30.68	-	30.88	-	56.00	46.00	-25.12	-
4	3.930	0.20	27.63	-	27.83	-	56.00	46.00	-28.17	-
5	10.309	0.31	34.69	-	35.00	-	60.00	50.00	-25.00	-
6	16.105	0.49	28.98	-	29.47	-	60.00	50.00	-30.53	-

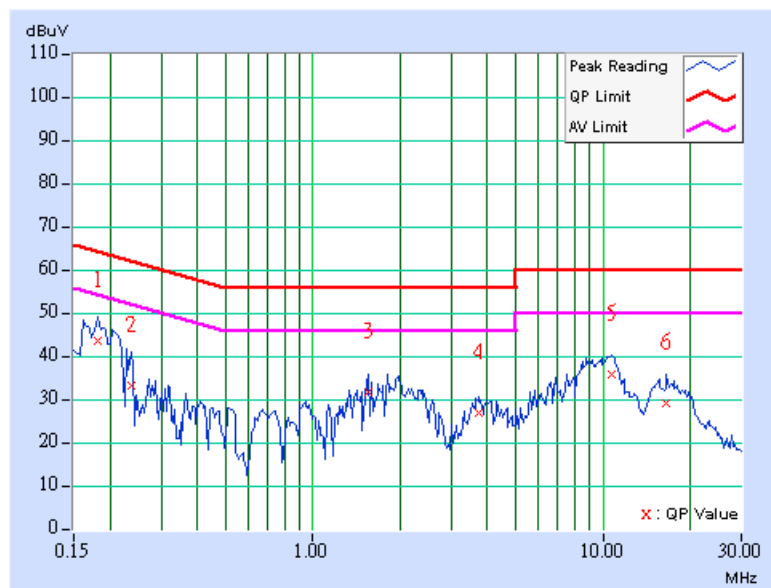
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	Bluetooth Stereo Receiver	MODEL	BSR202
CHANNEL	39	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	PHASE	Line 2
ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Brad Wu		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.10	43.18	-	43.28	-	64.43	54.43	-21.15	-
2	0.236	0.10	32.88	-	32.98	-	62.24	52.24	-29.26	-
3	1.555	0.20	31.26	-	31.46	-	56.00	46.00	-24.54	-
4	3.754	0.20	26.56	-	26.76	-	56.00	46.00	-29.24	-
5	10.738	0.41	35.17	-	35.58	-	60.00	50.00	-24.42	-
6	16.566	0.59	28.65	-	29.24	-	60.00	50.00	-30.76	-

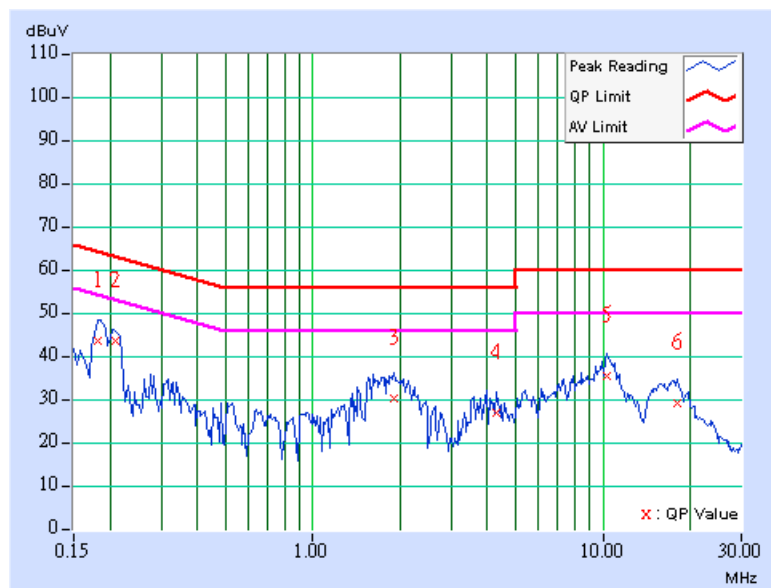
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	Bluetooth Stereo Receiver	MODEL	BSR202
CHANNEL	78	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	PHASE	Line 1
ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Brad Wu		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.10	43.00	-	43.10	-	64.43	54.43	-21.33	-
2	0.209	0.10	42.95	-	43.05	-	63.26	53.26	-20.21	-
3	1.898	0.20	29.73	-	29.93	-	56.00	46.00	-26.07	-
4	4.285	0.20	26.51	-	26.71	-	56.00	46.00	-29.29	-
5	10.262	0.31	35.03	-	35.34	-	60.00	50.00	-24.66	-
6	17.969	0.64	28.51	-	29.15	-	60.00	50.00	-30.85	-

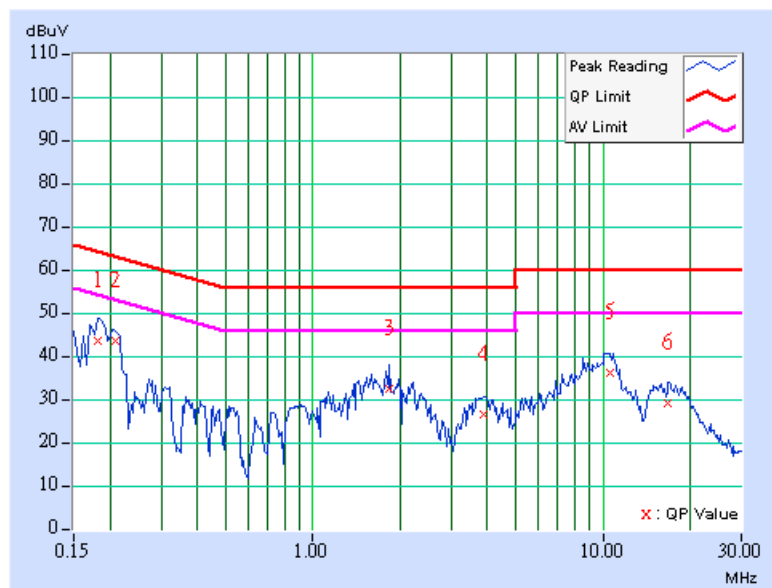
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	Bluetooth Stereo Receiver	MODEL	BSR202
CHANNEL	78	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	PHASE	Line 2
ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Brad Wu		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.10	43.14	-	43.24	-	64.43	54.43	-21.19	-
2	0.209	0.10	43.03	-	43.13	-	63.26	53.26	-20.13	-
3	1.836	0.20	31.95	-	32.15	-	56.00	46.00	-23.85	-
4	3.859	0.20	26.15	-	26.35	-	56.00	46.00	-29.65	-
5	10.531	0.41	35.85	-	36.26	-	60.00	50.00	-23.74	-
6	16.762	0.61	28.52	-	29.13	-	60.00	50.00	-30.87	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



4.2 NUMBER OF HOPPING FREQUENCY USED

4.2.1 LIMIT OF HOPPING FREQUENCY USED

At least 15 channel frequencies, and should be equally spaced.

4.2.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE:

The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

4.2.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
4. Set the SA on View mode and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

4.2.4 DEVIATION FROM TEST STANDARD

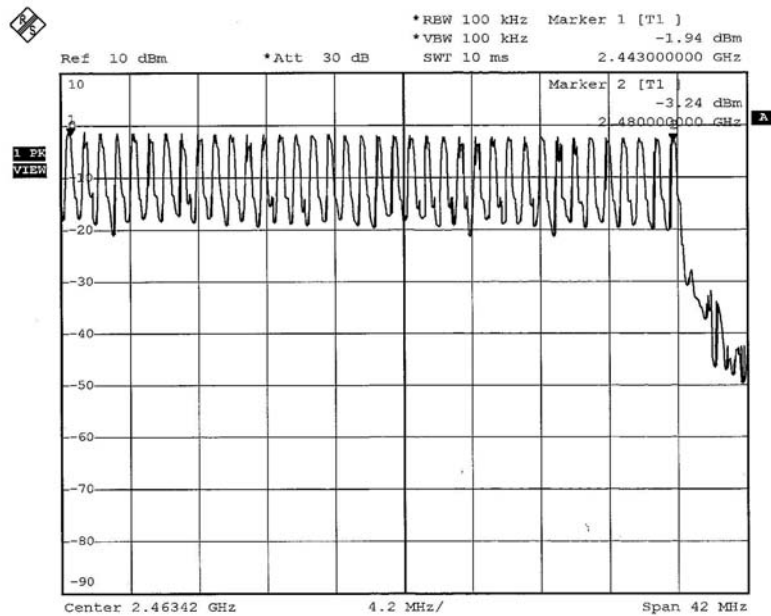
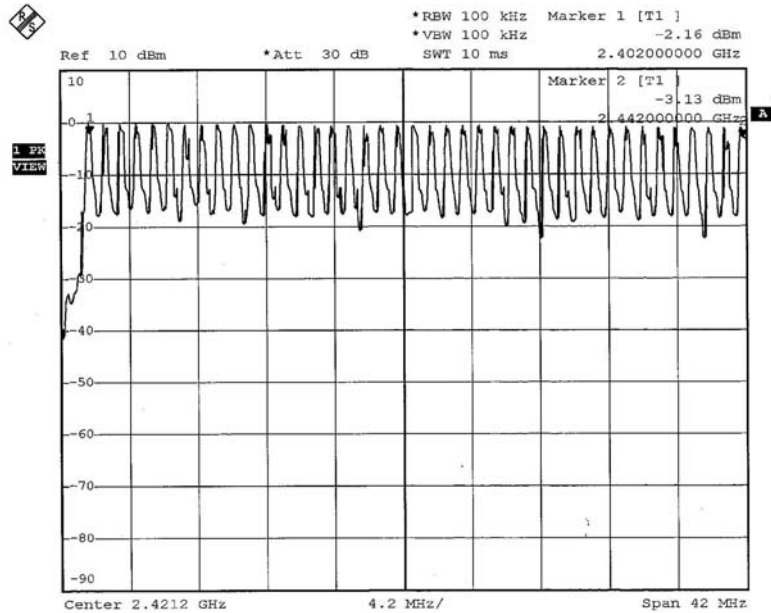
No deviation

4.2.5 TEST SETUP



4.2.6 TEST RESULTS

There are 79 hopping frequencies in the hopping mode. Please refer to next page for the test result. On the plots, it shows that the hopping frequencies are equally spaced.



4.3 DWELL TIME ON EACH CHANNEL

4.3.1 LIMIT OF DWELL TIME USED

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE:

The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

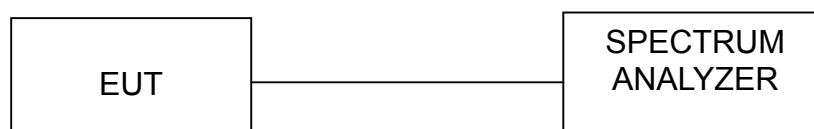
4.3.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
5. Repeat above procedures until all frequencies measured were complete.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 TEST SETUP

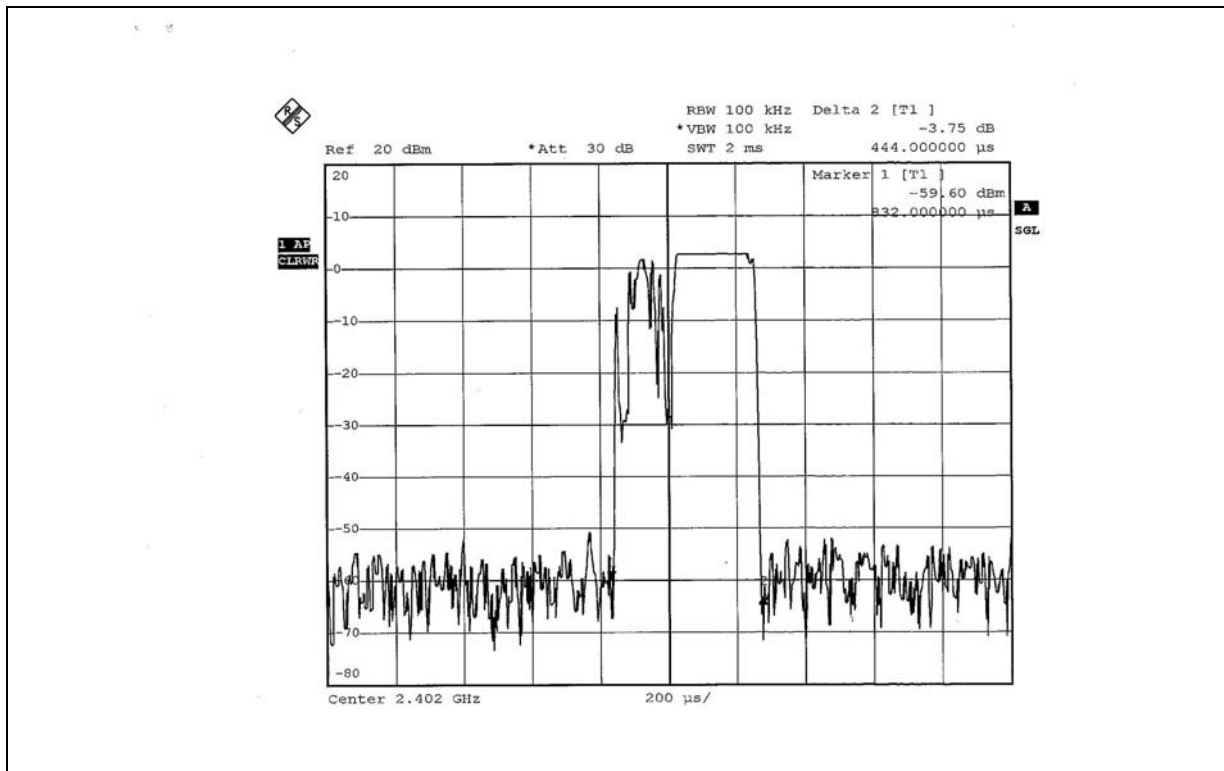
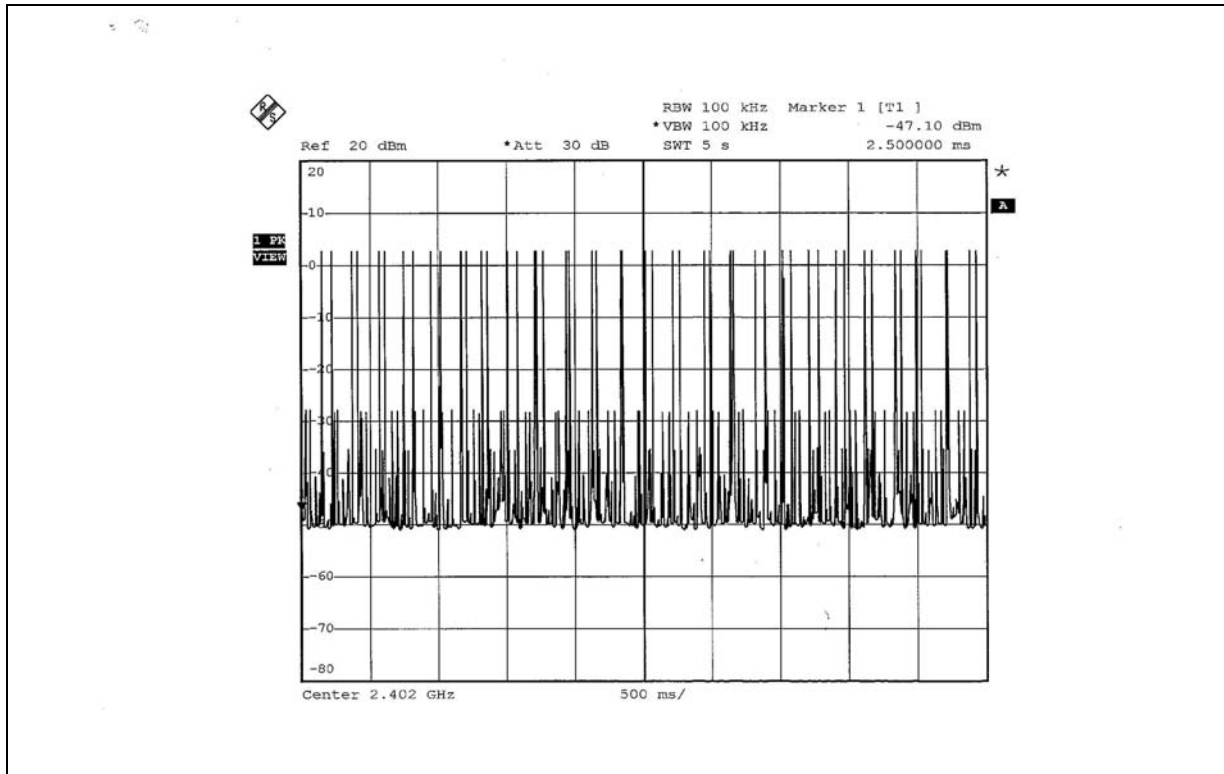


4.3.6 TEST RESULTS

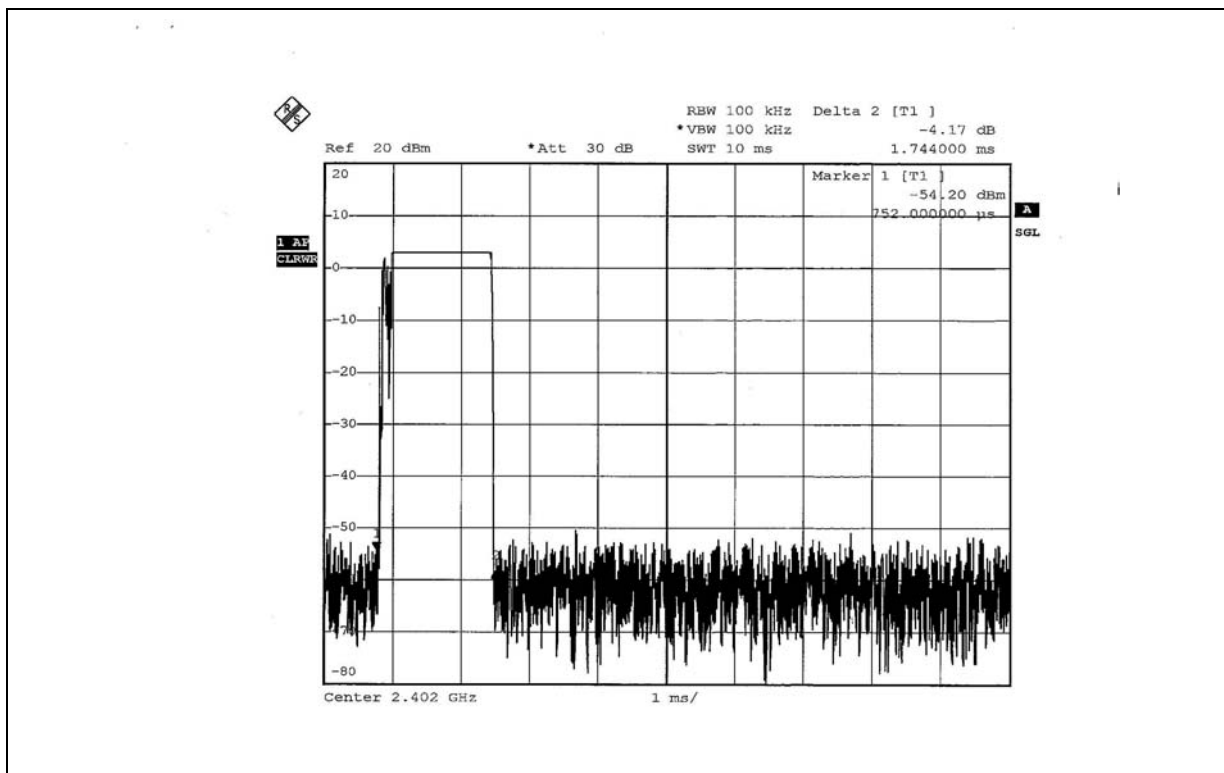
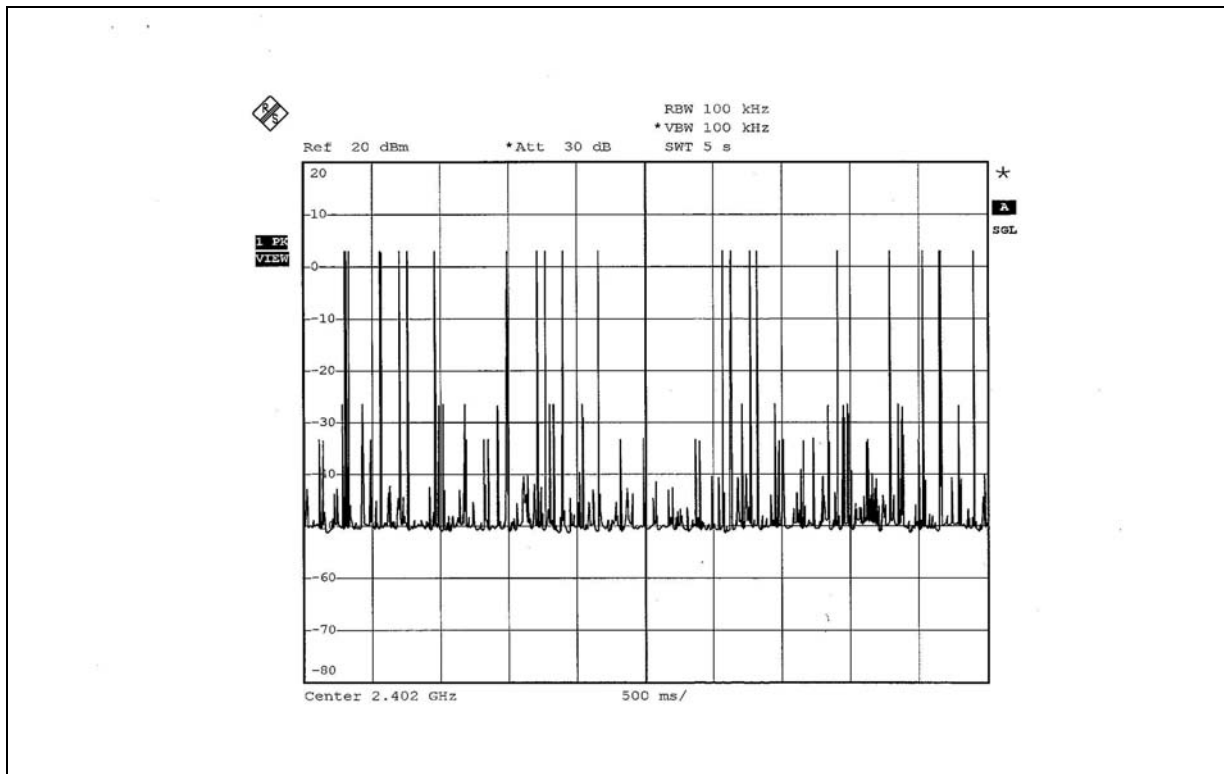
Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	50 (times / 5 sec) *6.32=316.00 times	0.444	140.30	400
DH3	22 (times / 5 sec) *6.32=139.04 times	1.744	242.49	400
DH5	17 (times / 5 sec) *6.32=107.44 times	3.080	330.92	400

Test plots of the transmitting time slot are shown on next 3 pages.

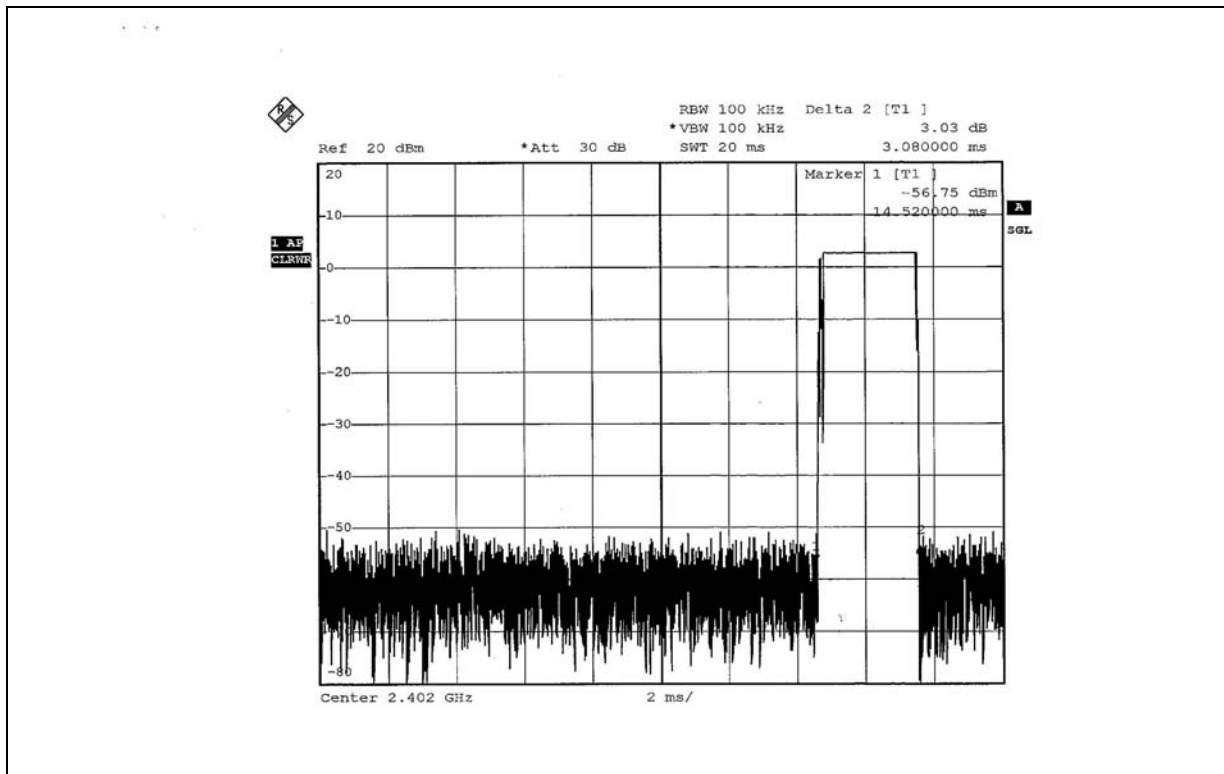
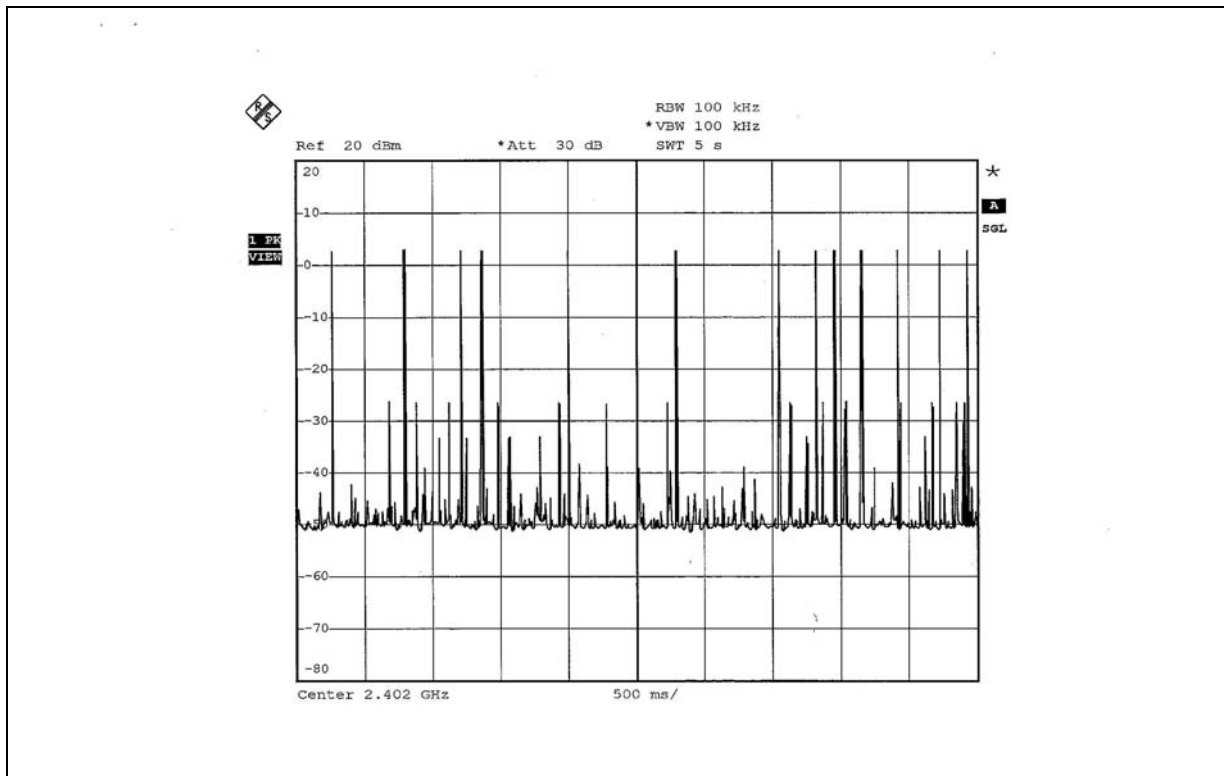
DH1



DH3



DH5



4.4 CHANNEL BANDWIDTH

4.4.1 LIMITS OF CHANNEL BANDWIDTH

For frequency hopping system operating in the 2400-2483.5MHz, If the 20dB bandwidth of hopping channel is greater than 25kHz, the 20dB bandwidth of hopping channel shall be a minimum limit for the hopping channel separation.

4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE:

The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

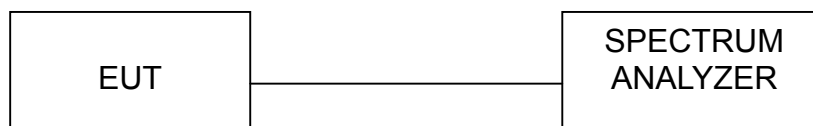
4.4.3 TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITION

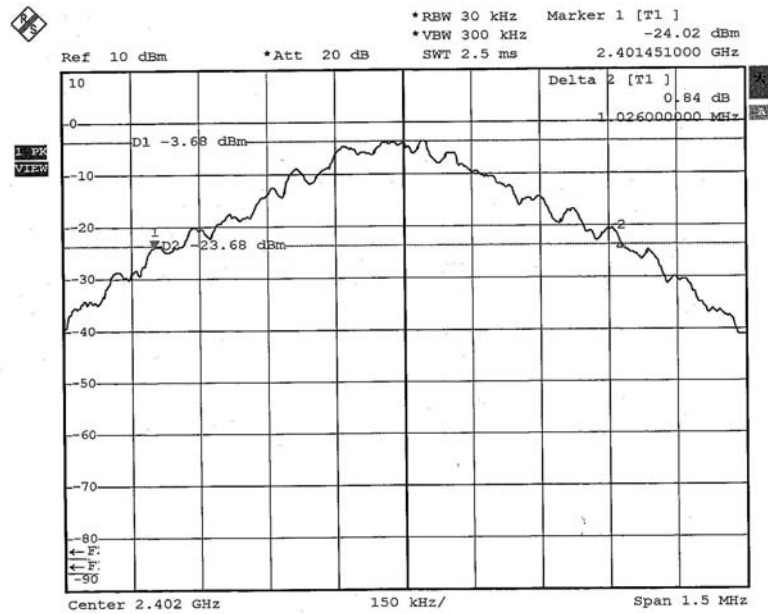
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.4.7 TEST RESULTS

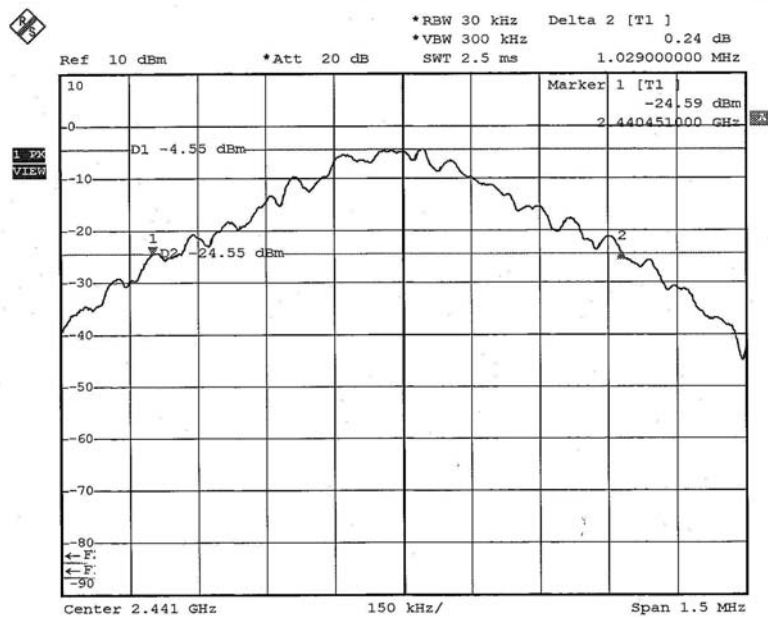
EUT	Bluetooth Stereo Receiver	MODEL	BSR202
MODULATION TYPE	GFSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	23 deg. C, 54% RH, 991 hPa	TESTED BY	Gary Chang

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)	More Than 25kHz
0	2402	1.026	Yes
39	2441	1.029	Yes
78	2480	1.029	Yes

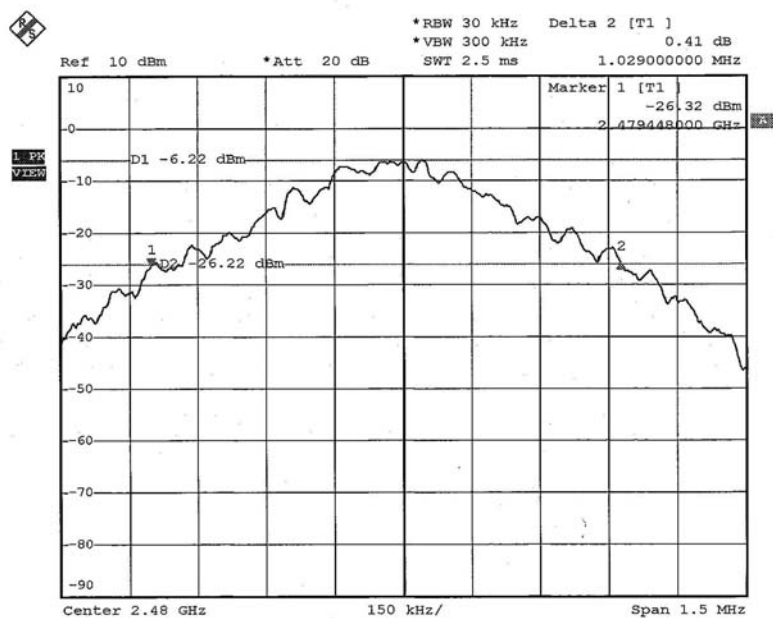
Channel 0



Channel 39



Channel 78



4.5 HOPPING CHANNEL SEPARATION

4.5.1 LIMIT OF HOPPING CHANNEL SEPARATION

At least 25kHz or two-thirds 20dB bandwidth (whichever is greater).

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE:

The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

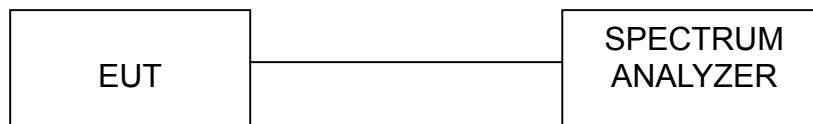
4.5.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
3. By using the MaxHold function record the separation of two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation.

4.5.5 TEST SETUP



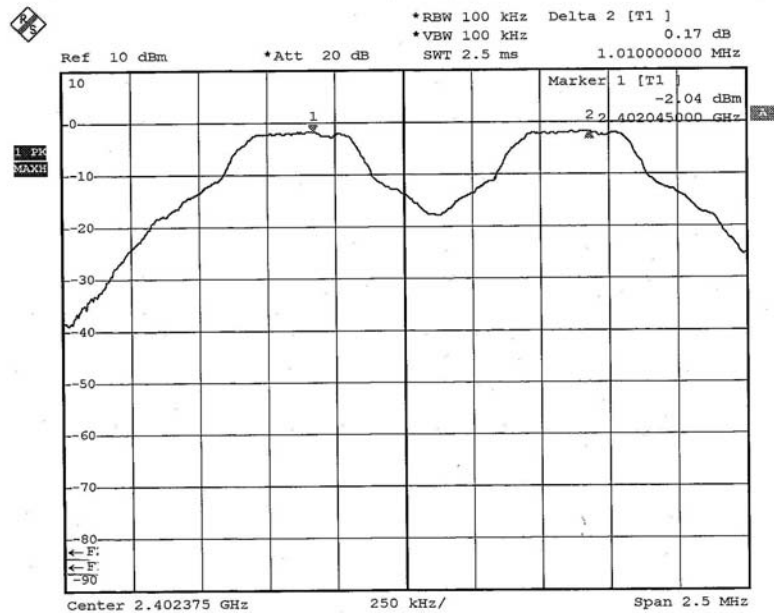
4.5.6 TEST RESULTS

EUT	Bluetooth Stereo Receiver	MODEL	BSR202
MODULATION TYPE	GFSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	22 deg. C, 57% RH, 991 hPa	TESTED BY	Brad Wu

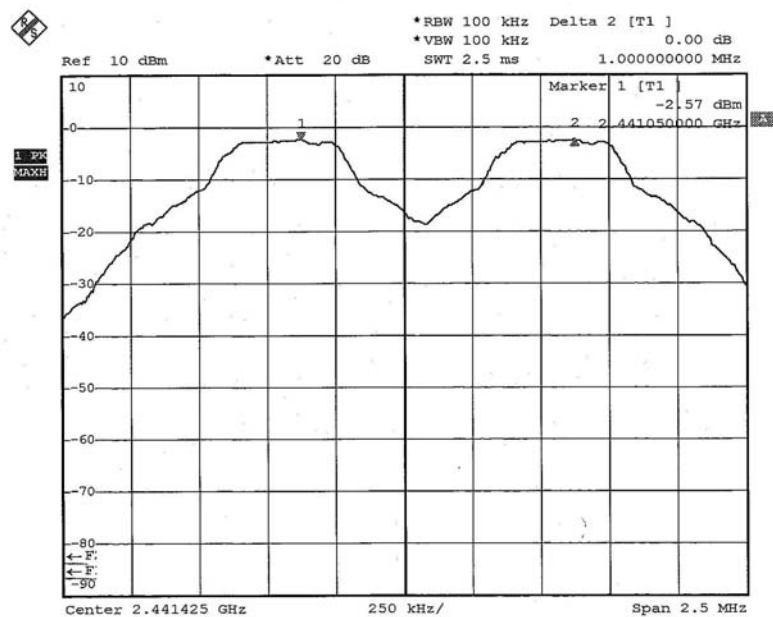
Channel	Frequency (MHz)	Adjacent Channel Separation (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	1.010	0.840	PASS
39	2441	1.000	0.860	PASS
78	2480	1.145	0.860	PASS

The minimum limit is 20dB bandwidth. Test results please refer to next 2 pages.

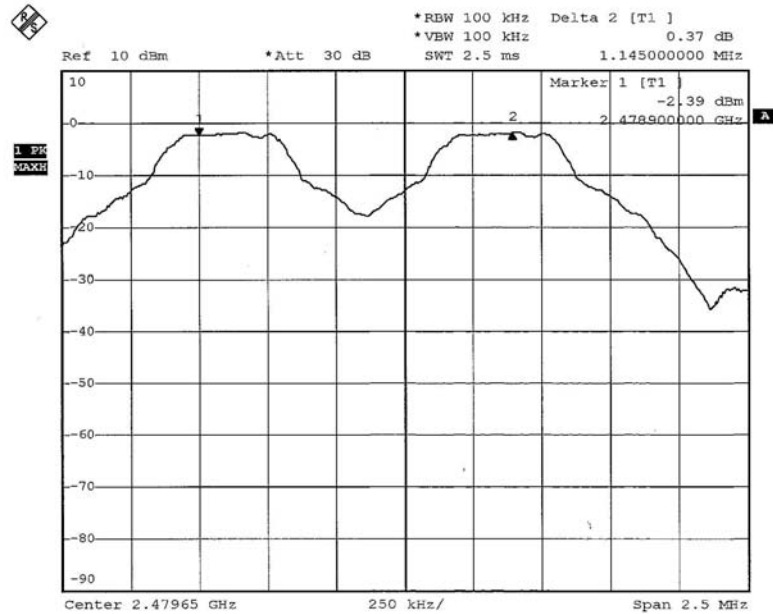
Channel 0



Channel 39



Channel 78



4.6 MAXIMUM PEAK OUTPUT POWER

4.6.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.6.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

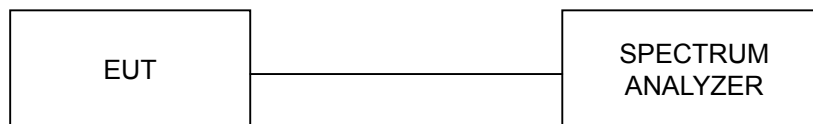
4.6.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 1 MHz RBW and 3 MHz VBW.
4. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
5. Repeat above procedures until all frequencies measured were complete.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation.

4.6.5 TEST SETUP



For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

4.6.6 EUT OPERATING CONDITION

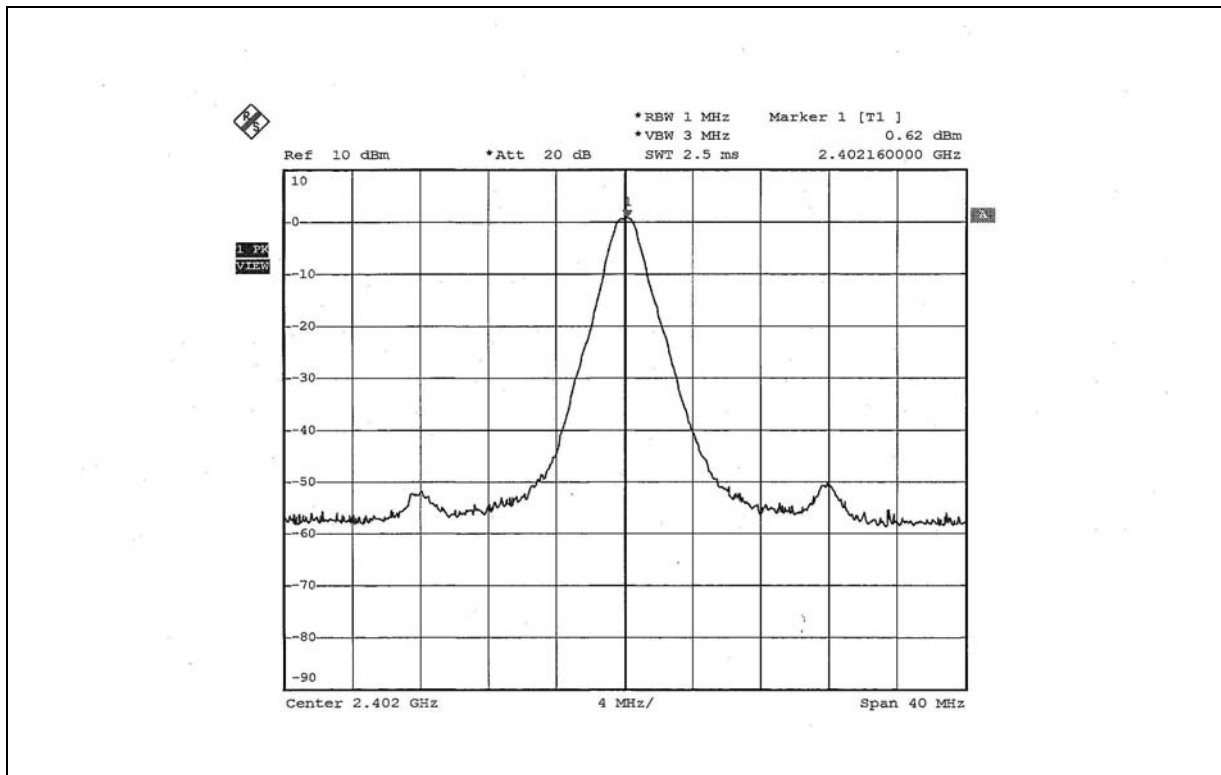
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.6.7 TEST RESULTS

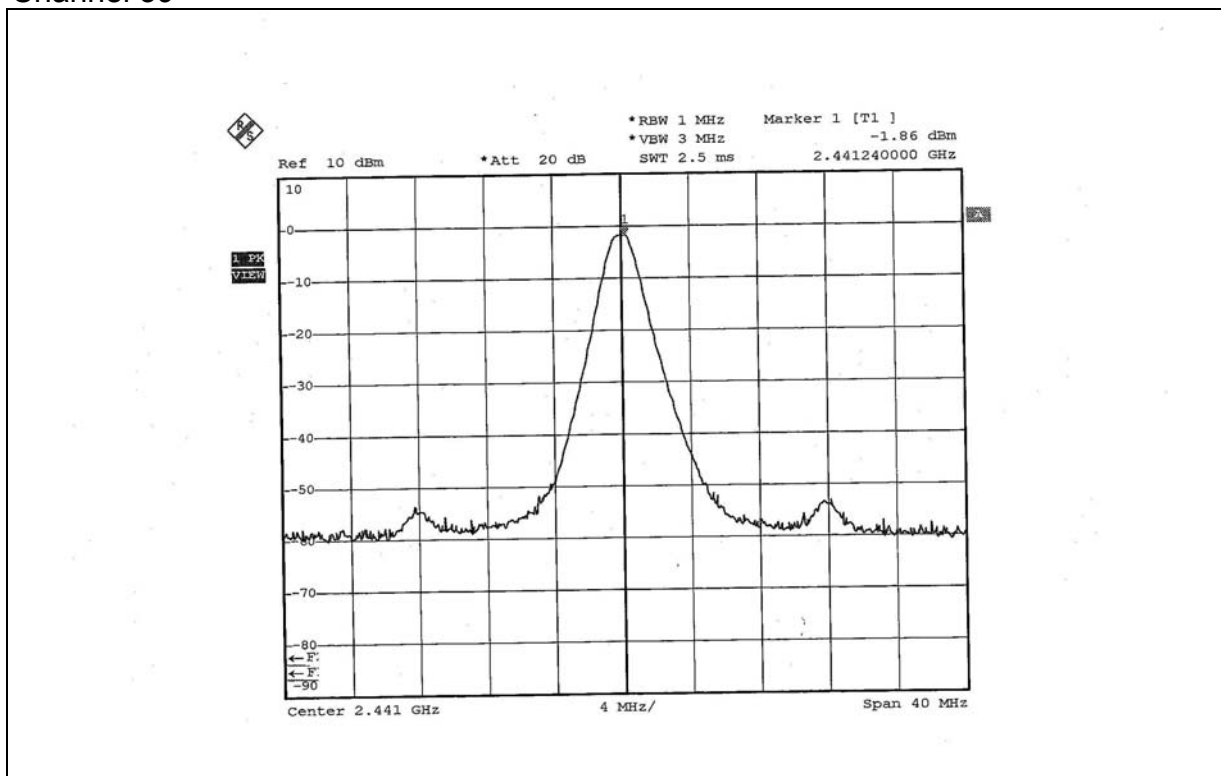
EUT	Bluetooth Stereo Receiver	MODEL	BSR202
MODULATION TYPE	GFSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	23 deg. C, 54% RH, 991 hPa	TESTED BY	Brad Wu

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2402	1.153	0.62	30	PASS
39	2441	0.652	-1.86	30	PASS
78	2480	0.450	-3.47	30	PASS

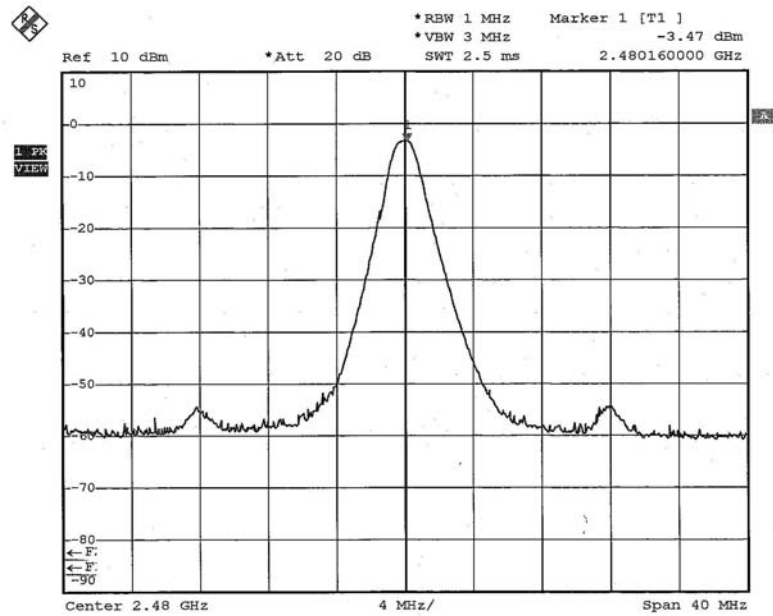
Channel 0



Channel 39



Channel 78



4.7 RADIATED EMISSION MEASUREMENT

4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
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

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESI7	100033	Jun. 08, 2005
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Jun. 03, 2005
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Jun. 01, 2005
HORN Antenna SCHWARZBECK	9120D	9120D-408	Jan. 17, 2006
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Jan. 23, 2006
Preamplifier Agilent	8447D	2944A10633	Nov. 09, 2005
Preamplifier Agilent	8449B	3008A01964	Nov. 06, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218183/4	Jan. 26, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218195/4	Jan. 26, 2006
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA
Turn Table ADT.	TT100.	TT93021703	NA
Turn Table Controller ADT.	SC100.	SC93021703	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 2.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The VCCI Site Registration No. is R-237.
5. The IC Site Registration No. is IC4924-3.

4.7.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

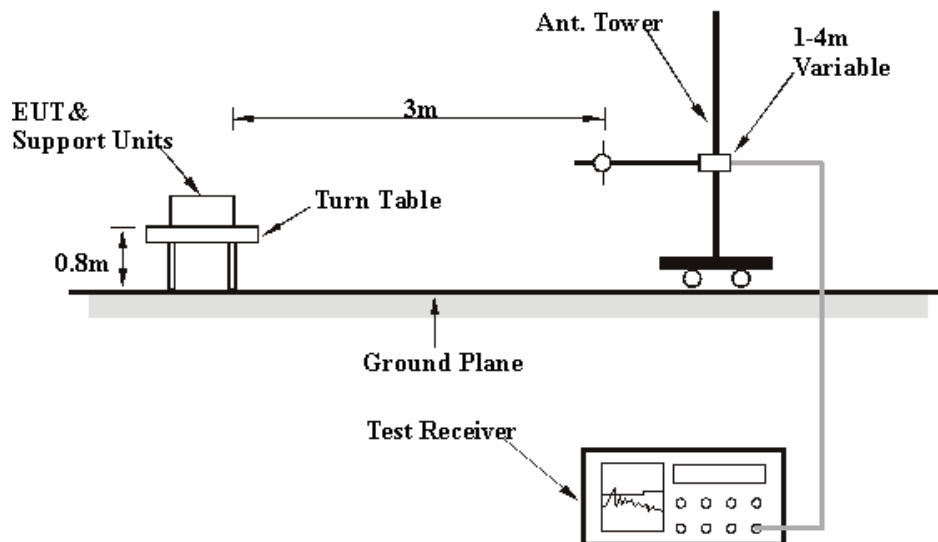
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation.

4.7.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.7.6 EUT OPERATING CONDITIONS

For battery mode:

- a. The EUT sent audio messages to the earphones.

For USB charging mode:

- a. Connected the EUT to the notebook and powered by USB interface.
- b. The notebook ran a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- c. The notebook sent "H" messages to its screen.
- d. The notebook sent "H" messages to the printer and the printer printed them out.
- e. The notebook sent "H" messages to the modem.
- f. The EUT sent audio messages to the earphones.
- g. Steps c ~ f were repeated.

4.7.7 TEST RESULTS

Below 1GHz Worst-Case Data (Battery mode)

EUT	Bluetooth Stereo Receiver	MODEL	BSR202
CHANNEL	78	FREQUENCY RANGE	Below 1 GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23 deg. C, 69% RH, 991 hPa	INPUT POWER (SYSTEM)	120 Vac, 60 Hz
TEST MODE	A	TESTED BY	Morgan Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	101.92	18.63 QP	43.50	-24.87	1.50 H	25	7.13	11.49
2	226.33	28.07 QP	46.00	-17.93	1.25 H	94	15.40	12.68
3	255.49	22.00 QP	46.00	-24.00	1.25 H	115	8.30	13.71
4	290.48	26.99 QP	46.00	-19.01	1.00 H	100	12.14	14.86
5	319.64	23.21 QP	46.00	-22.79	1.00 H	91	7.74	15.47
6	515.97	24.63 QP	46.00	-21.37	1.50 H	97	5.03	19.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	150.52	15.49 QP	43.50	-28.01	1.50 V	334	0.49	15.00
2	222.44	19.61 QP	46.00	-26.39	1.25 V	58	7.17	12.44
3	298.26	19.00 QP	46.00	-27.00	1.00 V	61	4.00	15.00
4	514.03	20.57 QP	46.00	-25.43	1.50 V	49	1.01	19.56
5	739.52	23.69 QP	46.00	-22.31	1.25 V	328	-0.32	24.00
6	774.51	24.66 QP	46.00	-21.34	1.00 V	337	0.24	24.43

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.

Below 1GHz Worst-Case Data (USB charging mode)

EUT	Bluetooth Stereo Receiver	MODEL	BSR202
CHANNEL	78	FREQUENCY RANGE	Below 1 GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23 deg. C, 69% RH, 991 hPa	INPUT POWER (SYSTEM)	120 Vac, 60 Hz
TEST MODE	B	TESTED BY	Morgan Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	115.53	29.02 QP	43.50	-14.48	1.25 H	61	16.12	12.91
2	177.74	27.97 QP	43.50	-15.53	1.00 H	85	14.40	13.57
3	210.78	25.60 QP	43.50	-17.90	1.25 H	31	13.50	12.09
4	576.23	29.72 QP	46.00	-16.28	1.25 H	94	8.69	21.03
5	731.74	34.03 QP	46.00	-11.97	1.00 H	259	10.23	23.79
6	865.87	27.80 QP	46.00	-18.20	1.00 H	358	2.51	25.29

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	113.59	23.16 QP	43.50	-20.34	1.00 V	166	10.45	12.70
2	566.51	28.14 QP	46.00	-17.86	1.00 V	124	7.38	20.76
3	599.56	26.98 QP	46.00	-19.02	1.00 V	97	5.30	21.68
4	731.74	28.94 QP	46.00	-17.06	1.00 V	142	5.14	23.79
5	865.87	31.08 QP	46.00	-14.92	1.00 V	265	5.79	25.29
6	951.40	40.83 QP	46.00	-5.17	1.25 V	10	14.34	26.49

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.

1 ~ 25GHz Worst-Case Data

EUT	Bluetooth Stereo Receiver	MODEL	BSR202
CHANNEL	0	FREQUENCY RANGE	1 ~ 25 GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23 deg. C, 69% RH, 991 hPa	INPUT POWER (SYSTEM)	120 Vac, 60 Hz
TESTED BY	Morgan Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1201.00	38.25 PK	74.00	-35.75	1.00 H	325	10.68	27.57
2	2390.00	40.88 PK	74.00	-33.12	1.22 H	5	9.56	31.32
3	*2402.00	89.88 PK	-	-	1.22 H	5	58.51	31.37
3	*2402.00	59.88 AV	-	-	1.22 H	5	28.51	31.37
4	4804.00	45.78 PK	74.00	-28.22	1.00 H	256	9.03	36.75
5	7206.00	51.58 PK	74.00	-22.42	1.45 H	360	9.06	42.52
5	7206.00	21.58 AV	54.00	-32.42	1.45 H	360	-20.94	42.52

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1201.00	37.99 PK	74.00	-36.01	1.00 V	36	10.42	27.57
2	2390.00	37.53 PK	74.00	-36.47	1.24 V	324	6.21	31.32
3	*2402.00	93.53 PK	-	-	1.23 V	4	62.16	31.37
3	*2402.00	63.53 AV	-	-	1.23 V	4	32.16	31.37
4	4804.00	44.95 PK	74.00	-29.05	1.35 V	355	8.20	36.75
5	7206.00	50.98 PK	74.00	-23.02	1.42 V	296	8.46	42.52
5	7206.00	20.98 AV	54.00	-33.02	1.42 V	296	-21.54	42.52

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ” : Fundamental frequency
 6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 247 ms per channel. Therefore, the duty cycle be equal to: $20\log(3.125/100) = -30$ dB
 7. Average value = peak reading $-20\log(\text{duty cycle})$

EUT	Bluetooth Stereo Receiver	MODEL	BSR202
CHANNEL	39	FREQUENCY RANGE	1 ~ 25 GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23 deg. C, 69% RH, 991 hPa	INPUT POWER (SYSTEM)	120 Vac, 60 Hz
TESTED BY	Morgan Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1220.00	38.07 PK	74.00	-35.93	1.00 H	340	10.46	27.62
2	*2441.00	97.34 PK	-	-	1.00 H	3	65.80	31.54
2	*2441.00	67.34 AV	-	-	1.00 H	3	35.80	31.54
3	4882.00	46.54 PK	74.00	-27.46	1.22 H	0	9.57	36.98
4	7323.00	52.58 PK	74.00	-21.42	1.21 H	290	9.76	42.83
4	7323.00	22.58 AV	54.00	-31.42	1.21 H	290	-20.25	42.83

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1220.00	38.01 PK	74.00	-35.99	1.00 V	25	10.39	27.62
2	*2441.00	92.87 PK	-	-	1.32 V	136	61.33	31.54
2	*2441.00	62.87 AV	-	-	1.32 V	136	31.33	31.54
3	4882.00	45.12 PK	74.00	-28.88	1.45 V	325	8.14	36.98
4	7323.00	51.34 PK	74.00	-22.66	1.59 V	360	8.51	42.83
4	7323.00	21.34 AV	54.00	-32.66	1.59 V	360	-21.49	42.83

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ” : Fundamental frequency
 6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 247 ms per channel. Therefore, the duty cycle be equal to: $20\log(3.125/100) = -30$ dB
 7. Average value = peak reading $-20\log(\text{duty cycle})$

EUT	Bluetooth Stereo Receiver	MODEL	BSR202
CHANNEL	78	FREQUENCY RANGE	1 ~ 25 GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23 deg. C, 69% RH, 991 hPa	INPUT POWER (SYSTEM)	120 Vac, 60 Hz
TESTED BY	Morgan Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1240.00	37.03 PK	74.00	-36.97	1.30 H	358	9.36	27.67
2	2480.00	96.39 PK	74.00	22.39	1.15 H	5	64.69	31.70
2	*2480.00	66.39 AV	-	-	1.15 H	5	34.69	31.70
3	*2483.50	41.39 PK	-	-	1.15 H	5	9.67	31.72
4	4960.00	45.25 PK	74.00	-28.75	1.05 H	324	8.03	37.22
5	7440.00	51.12 PK	74.00	-22.88	1.14 H	341	8.03	43.09
5	7440.00	21.12 AV	54.00	-32.88	1.14 H	341	-21.97	43.09

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1240.00	35.85 PK	74.00	-38.15	1.02 V	356	8.18	27.67
2	*2480.00	91.89 PK	-	-	1.32 V	6	60.19	31.70
2	*2480.00	61.89 AV	-	-	1.32 V	6	30.19	31.70
3	2483.50	38.89 PK	74.00	-35.11	1.32 V	6	7.17	31.72
4	4960.00	44.12 PK	74.00	-29.88	1.12 V	347	6.90	37.22
5	7440.00	49.25 PK	74.00	-24.75	1.08 V	325	6.16	43.09

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ” : Fundamental frequency
 6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 247 ms per channel. Therefore, the duty cycle be equal to: $20\log(3.125/100) = -30$ dB
 7. Average value = peak reading $-20\log(\text{duty cycle})$

4.8 BAND EDGES MEASUREMENT

4.8.1 LIMITS OF BAND EDGES MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100KHz RBW).

4.8.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE:

The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

4.8.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

4.8.4 DEVIATION FROM TEST STANDARD

No deviation.

4.8.5 EUT OPERATING CONDITION

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.8.6 TEST RESULTS

The spectrum plots are attached on the following 4 images. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(d).

NOTE 1:

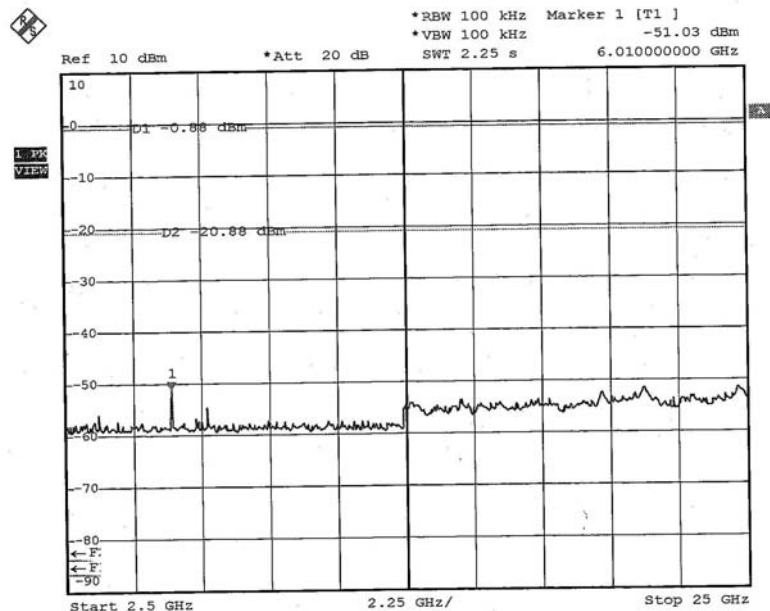
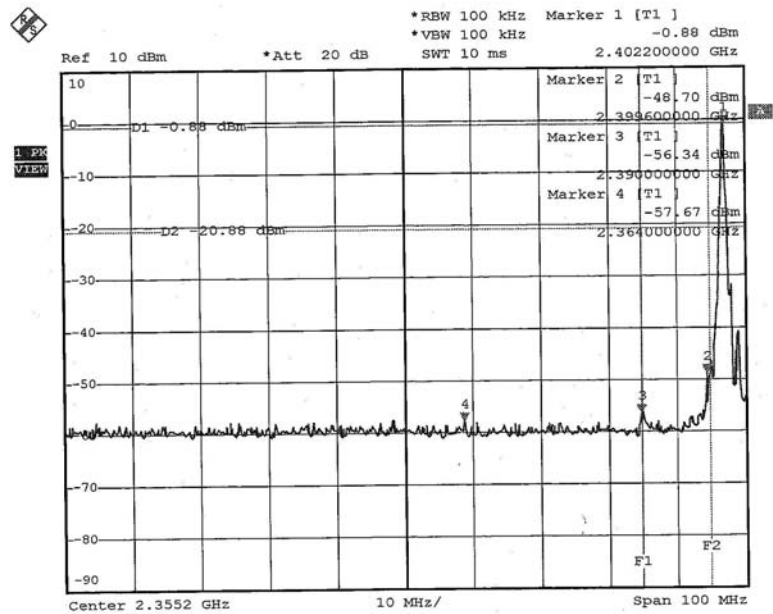
The band edge emission plot on page 55 shows 47.82dBc between carrier maximum power and local maximum emission in restrict band (2.3996GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.7.7 is 93.53dBuV/m (Peak), so the maximum field strength in restrict band is $93.53 - 47.82 = 45.71$ dBuV/m which is under 74 dBuV/m limit.

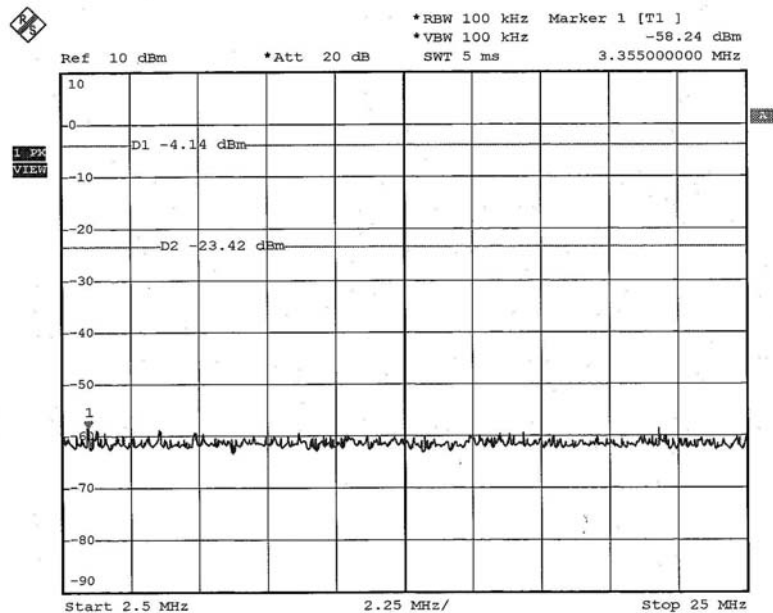
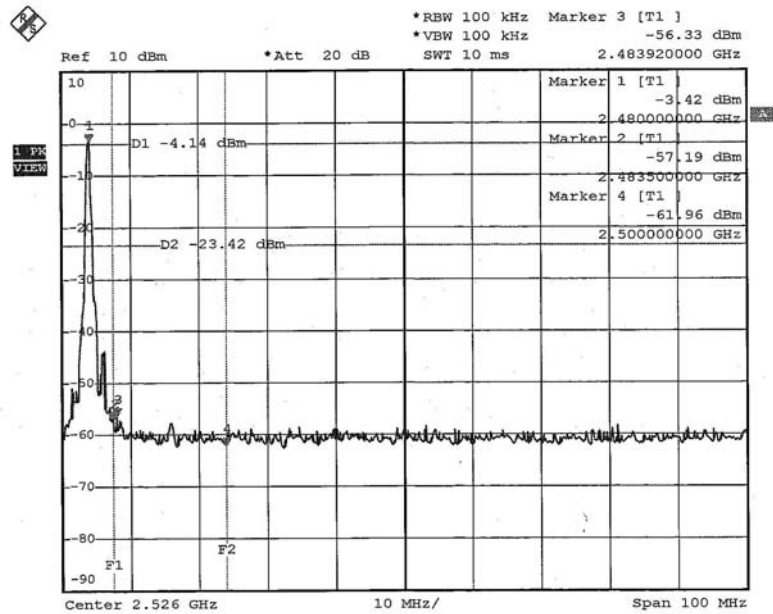
The band edge emission plot on page 55 shows 47.82dBc between carrier maximum power and local maximum emission in restrict band (2.3996GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.7.7 is 63.53dBuV/m (Average), so the maximum field strength in restrict band is $63.53 - 47.82 = 15.71$ dBuV/m which is under 54 dBuV/m limit.

NOTE 2:

The band edge emission plot on page 56 shows 53.77dBc between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.7.7 is 96.39dBuV/m (Peak), so the maximum field strength in restrict band is $96.39 - 53.77 = 42.62$ dBuV/m which is under 74 dBuV/m limit.

The band edge emission plot on page 56 shows 53.77dBc between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.7.7 is 66.39dBuV/m (Average), so the maximum field strength in restrict band is $66.39 - 53.77 = 12.62$ dBuV/m which is under 54 dBuV/m limit.





4.9 ANTENNA REQUIREMENT

4.9.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

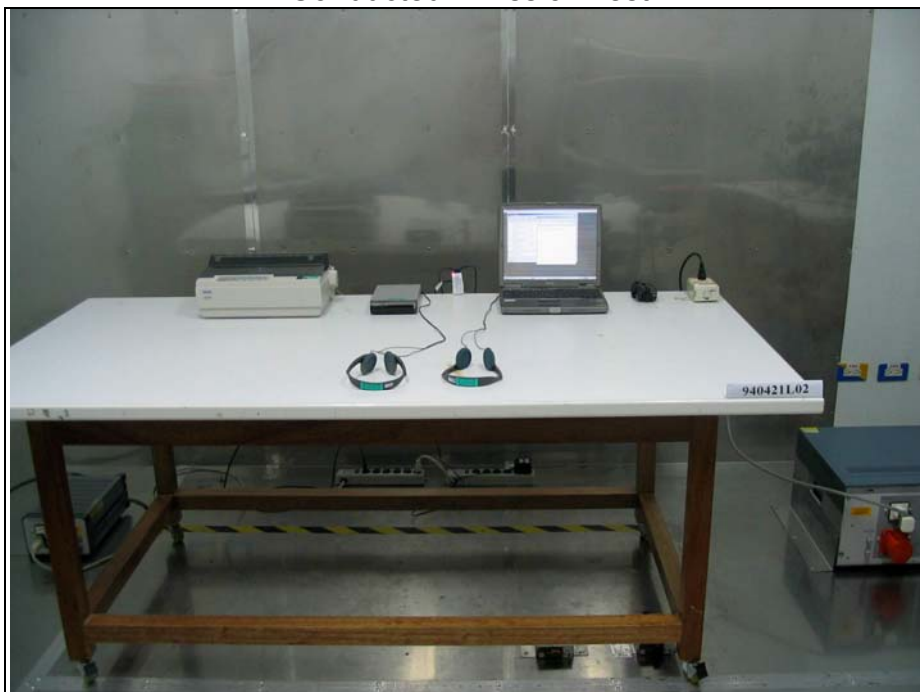
And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.9.2 ANTENNA CONNECTED CONSTRUCTION

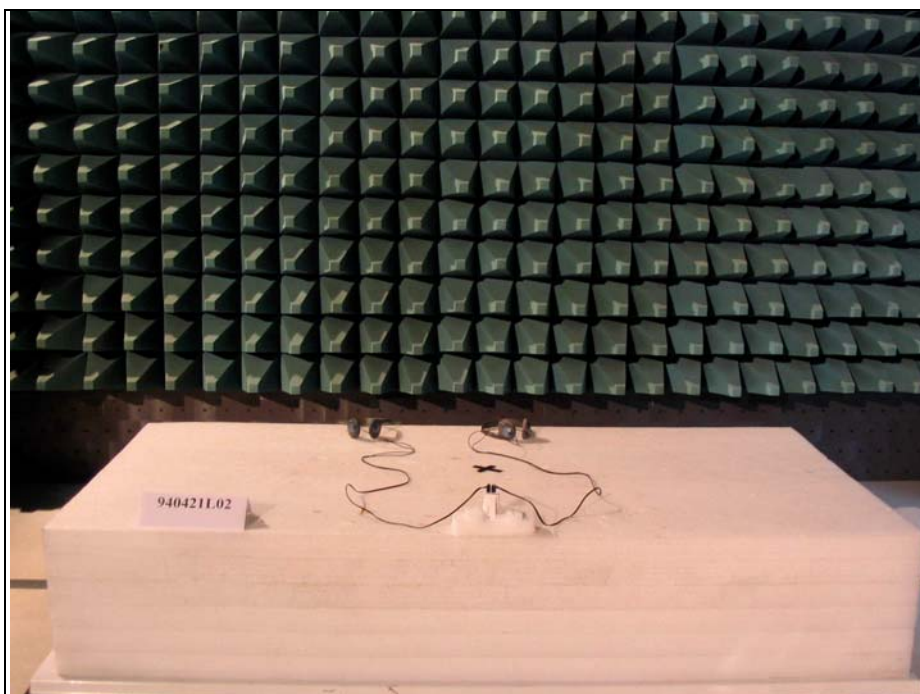
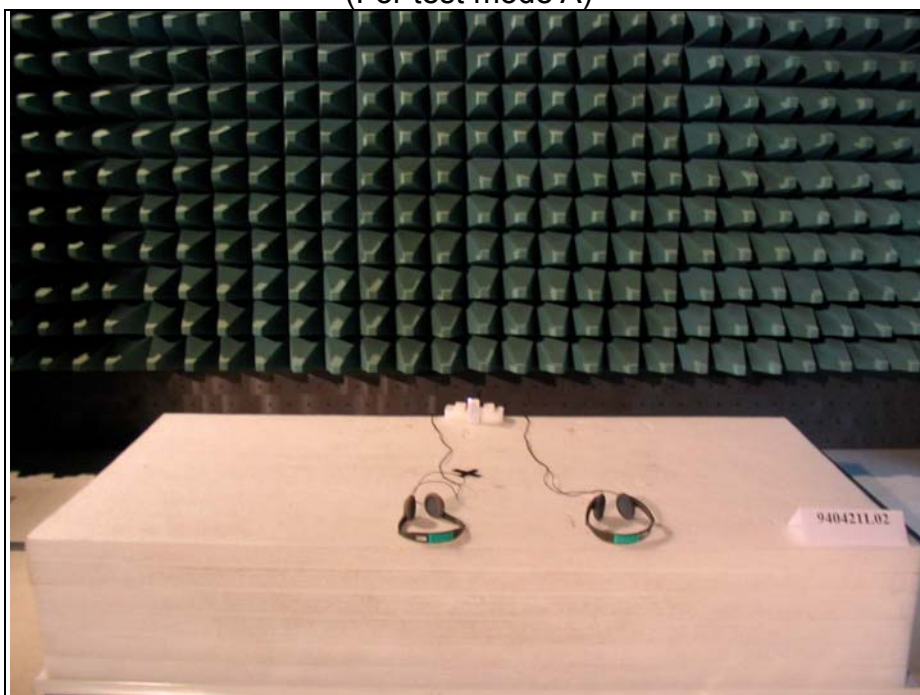
The antenna used in this product is PIFA antenna without antenna connector. The maximum gain of this antenna is 1.93dBi.

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

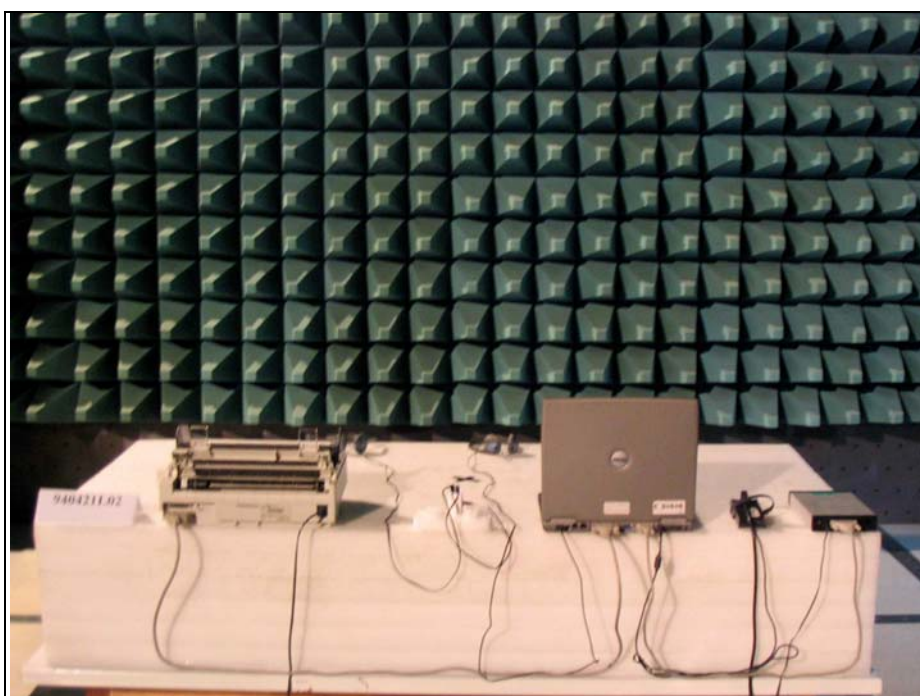
Conducted Emission Test



Radiated Emission Test
(For test mode A)



Radiated Emission Test
(For test mode B)



6 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025:

USA	FCC, NVLAP, UL, A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	CNLA, BSMI, DGT
Netherlands	Telefication
Singapore	PSB , GOST-ASIA(MOU)
Russia	CERTIS(MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml. If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.