FCC TEST REPORT

REPORT NO.: RF940420L04
MODEL NO.: BSM202
RECEIVED: Apr. 20, 2005
TESTED: Apr. 29 ~ May 03, 2005
ISSUED: May 05, 2005

APPLICANT: AboCom Systems, Inc.

ADDRESS: 1F, No. 21, Yanfa 2nd Rd., SBIP, Hsinchu City 300, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang 244, Taipei Hsien, Taiwan, R.O.C.

TEST LOCATION: No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

ACCREDITED
No. 2177-01

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1 CERTIFICATION

PRODUCT :	Bluetooth Audio Adapter
BRAND NAME :	AboCom
MODEL NO. :	BSM202
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 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 : Andrea Hsia , **DATE:** May 05, 2005
(Andrea Hsia)

TECHNICAL ACCEPTANCE : Gary Chang , **DATE:** May 05, 2005
Responsible for RF (Gary Chang)

APPROVED BY : , **DATE:** May 05, 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 -18.03dB at 0.245 MHz
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)	1. Hopping Channel Separation Spec. : Min. 25 kHz or 20 dB bandwidth, whichever is greater 2. 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 -2.60 dB at 6004.00 MHz
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	3.63 dB
	200MHz ~1000MHz	3.65 dB
	1GHz ~ 18GHz	2.20 dB
	18GHz ~ 40GHz	1.88 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Bluetooth Audio Adapter
MODEL NO.	BSM202
POWER SUPPLY	3.7Vdc from Battery (for battery mode) 5.0Vdc from host equipment (for charging mode)
MODULATION TYPE	GFSK
MODULATION TECHNOLOGY	FHSS
FREQUENCY RANGE	2402 MHz ~ 2480 MHz
NUMBER OF CHANNEL	79
OUTPUT POWER	0.948mW
ANTENNA TYPE	PIFA antenna with 1.93dBi gain
DATA CABLE	1.05m shielded USB cable without core
I/O PORTS	Audio in, USB

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

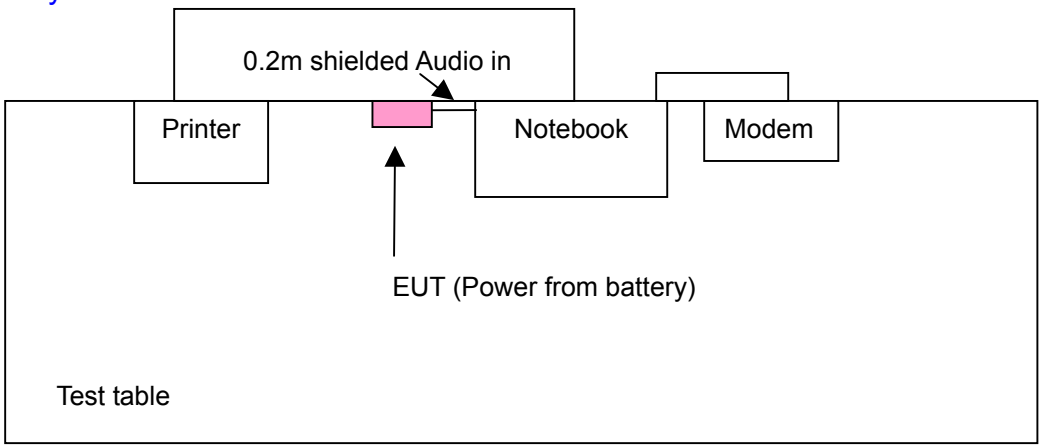
Operated in 2400 ~ 2483.5MHz Band:

79 channels are provided to this EUT.

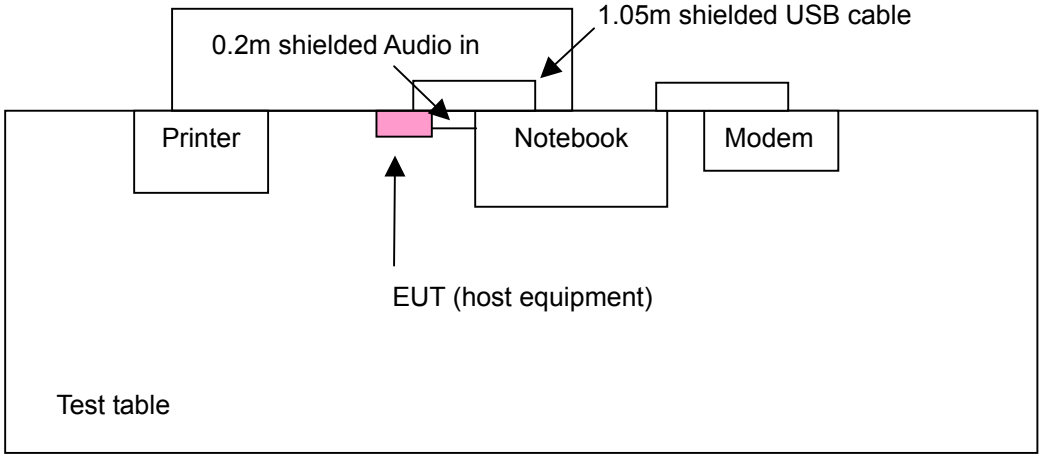
Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409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



For charging mode:



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
1	Note 1	x	Note 2	Note 3	For battery mode (power from battery)
2	x	x	Note 2	Note 3	For charging mode (power from host equipment)

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 need to concern of Conducted Emission due to the EUT is powered by battery.

Note 2: No effect on Radiated Emission above 1GHz.

Note 3: No effect on Conducted RF measurement.

Power Line Conducted Emission Test:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.

☒ 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
2	0 to 78	0, 39, 78	FHSS	GFSK	DH5

Radiated Emission Test (Below 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, V and H Axis and packet types

☒ 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	Axis
1	0 to 78	78	FHSS	GFSK	DH5	H
2	0 to 78	78	FHSS	GFSK	DH5	H

Radiated Emission Test (Above 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, V and H Axis and packet types.

☒ 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	Axis
2	0 to 78	0, 39, 78	FHSS	GFSK	DH5	H

Bandedge Measurement:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.

☒ Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
0 to 78	0, 78	FHSS	GFSK	DH5

Antenna Port Conducted Measurement:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.

☒ Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
0 to 78	0, 39, 78	FHSS	GFSK	DH5

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C. (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	20838027664	E2K24CLNS
2	MODEM	ACEEX	1414V/3	0401008248	IFAXDM1414
3	PRINTER	EPSON	LQ-300+	DCGY047265	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.2m shielded cable without core.
3	1.2m shielded cable without core.

NOTE: All power cords of the above support units are non shielded (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 (dBμV)	
	Quasi-peak	Average
0.15-0.5 0.5-5 5-30	66 to 56 56 60	56 to 46 46 50

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. 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.

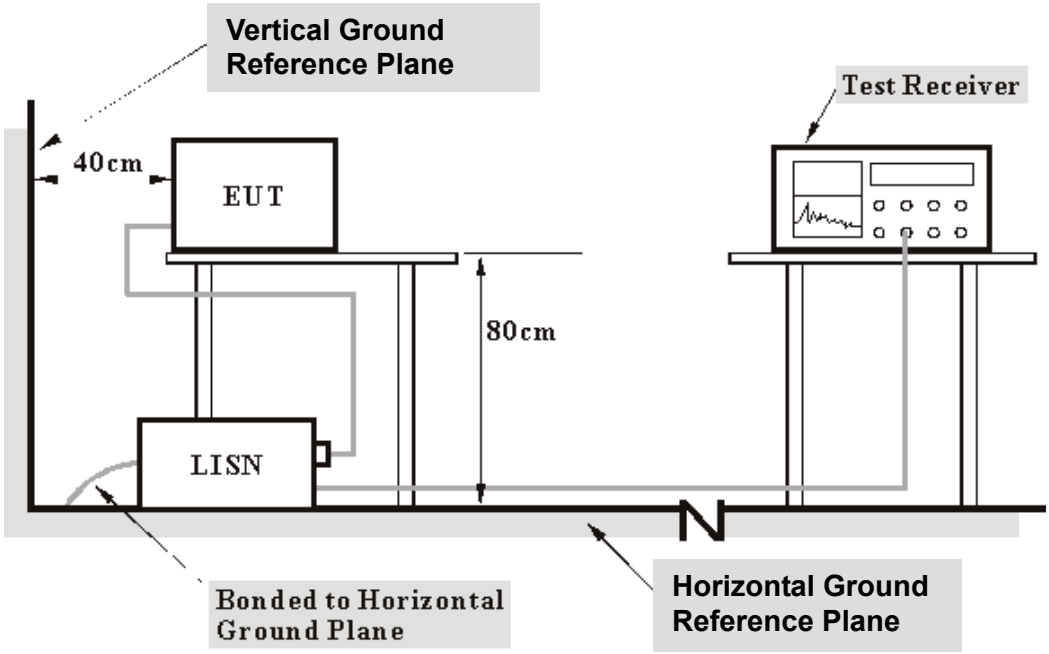
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

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) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

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

4.1.6 EUT OPERATING CONDITIONS

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

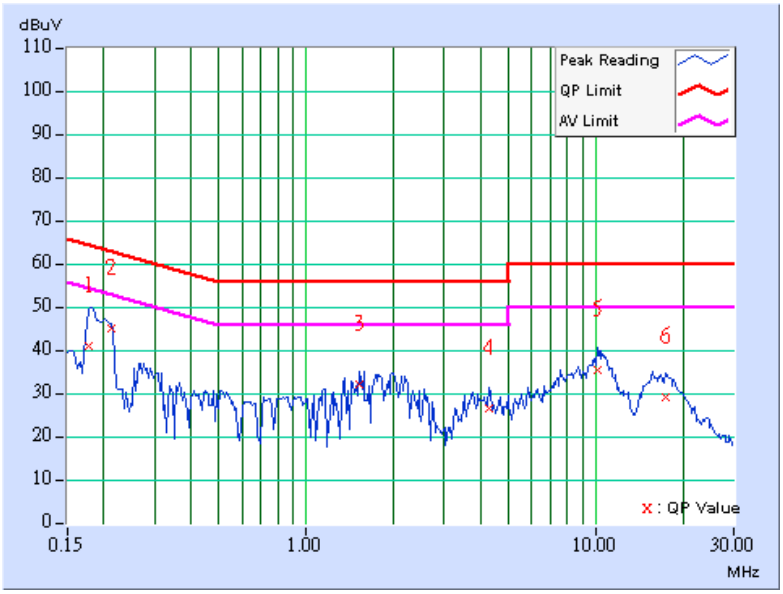
4.1.7 TEST RESULTS

Conducted Worst-Case Data

EUT	Bluetooth Audio Adapter	**MODEL**	BSM202
CHANNEL	Channel 0	**6dB BANDWIDTH**	9 kHz
MODULATION TYPE	GFSK	**PHASE**	Line 1
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	22deg. C, 62%RH, 991hPa
TESTED BY	Brad Wu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.177	0.10	40.44	-	40.54	-	64.61	54.61	-24.07	-
2	0.213	0.10	44.56	-	44.66	-	63.11	53.11	-18.45	-
3	1.535	0.20	31.70	-	31.90	-	56.00	46.00	-24.10	-
4	4.285	0.20	26.03	-	26.23	-	56.00	46.00	-29.77	-
5	10.188	0.30	34.81	-	35.11	-	60.00	50.00	-24.89	-
6	17.563	0.61	28.76	-	29.37	-	60.00	50.00	-30.63	-

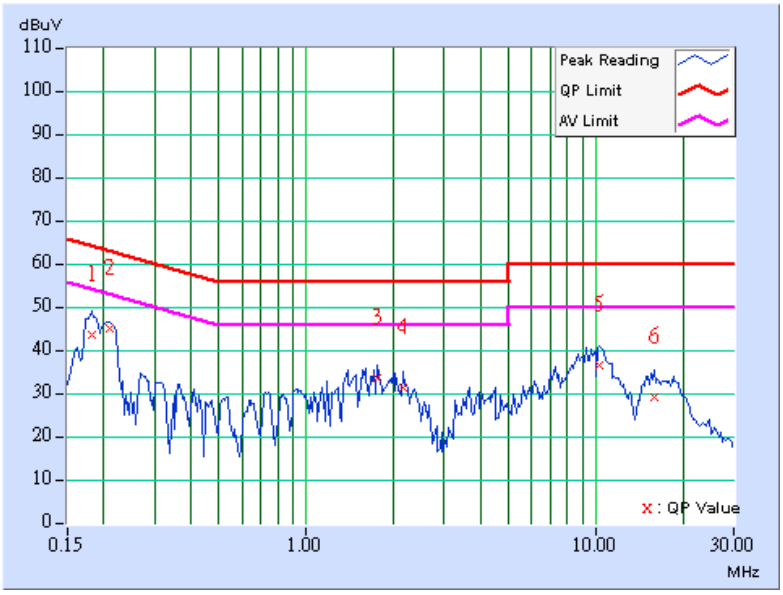
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Bluetooth Audio Adapter	**MODEL**	BSM202
CHANNEL	Channel 0	**6dB BANDWIDTH**	9 kHz
MODULATION TYPE	GFSK	**PHASE**	Line 2
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	22deg. C, 62%RH, 991hPa
TESTED BY	Brad Wu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(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	0.209	0.10	44.69	-	44.79	-	63.26	53.26	-18.47	-
3	1.750	0.20	33.20	-	33.40	-	56.00	46.00	-22.60	-
4	2.156	0.20	30.77	-	30.97	-	56.00	46.00	-25.03	-
5	10.336	0.41	35.96	-	36.37	-	60.00	50.00	-23.63	-
6	15.938	0.56	28.84	-	29.40	-	60.00	50.00	-30.60	-

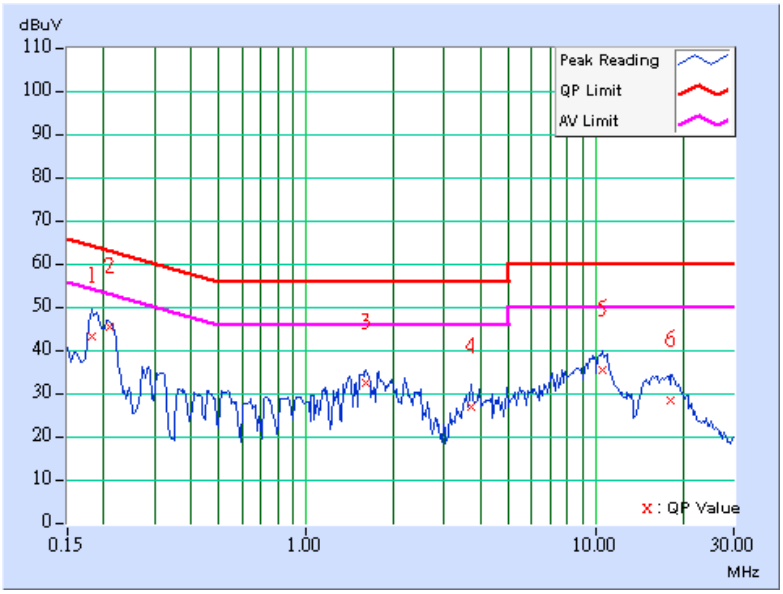
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Bluetooth Audio Adapter	MODEL	BSM202
CHANNEL	Channel 39	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	PHASE	Line 1
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa
TESTED BY	Brad Wu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.10	42.80	-	42.90	-	64.43	54.43	-21.53	-
2	0.209	0.10	44.85	-	44.95	-	63.26	53.26	-18.31	-
3	1.613	0.20	32.00	-	32.20	-	56.00	46.00	-23.80	-
4	3.703	0.20	26.53	-	26.73	-	56.00	46.00	-29.27	-
5	10.617	0.31	34.77	-	35.08	-	60.00	50.00	-24.92	-
6	18.219	0.66	27.91	-	28.57	-	60.00	50.00	-31.43	-

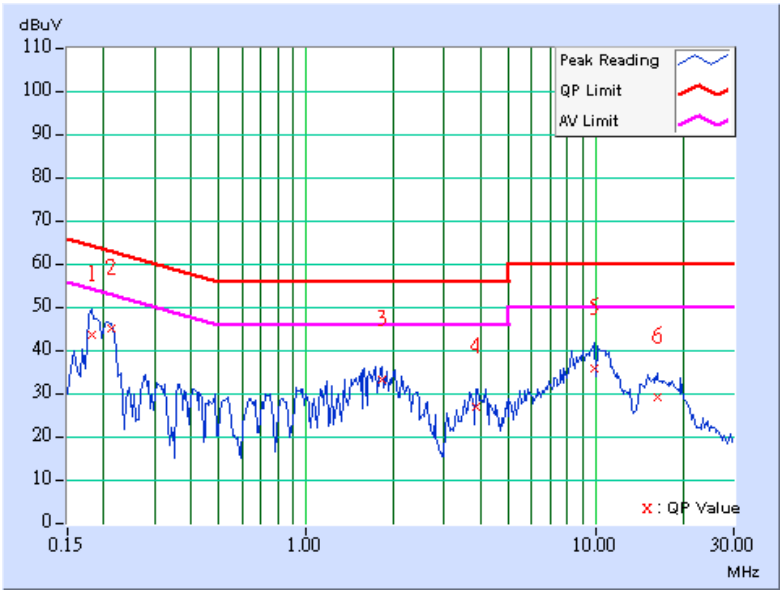
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Bluetooth Audio Adapter	MODEL	BSM202
CHANNEL	Channel 39	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	PHASE	Line 2
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa
TESTED BY	Brad Wu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.10	43.20	-	43.30	-	64.43	54.43	-21.13	-
2	0.213	0.10	44.50	-	44.60	-	63.11	53.11	-18.51	-
3	1.820	0.20	32.87	-	33.07	-	56.00	46.00	-22.93	-
4	3.887	0.20	26.52	-	26.72	-	56.00	46.00	-29.28	-
5	9.957	0.40	35.48	-	35.88	-	60.00	50.00	-24.12	-
6	16.305	0.58	28.72	-	29.30	-	60.00	50.00	-30.70	-

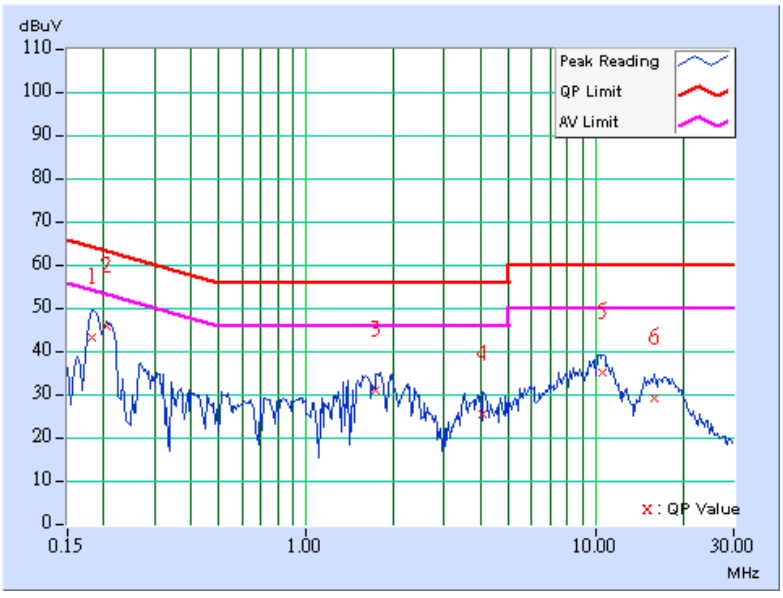
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Bluetooth Audio Adapter	MODEL	BSM202
CHANNEL	Channel 78	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	PHASE	Line 1
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa
TESTED BY	Brad Wu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.10	42.78	-	42.88	-	64.43	54.43	-21.55	-
2	**0.205**	**0.10**	**45.29**	**-**	**45.39**	**-**	**63.42**	**53.42**	**-18.03**	**-**
3	1.746	0.20	30.81	-	31.01	-	56.00	46.00	-24.99	-
4	4.078	0.20	25.10	-	25.30	-	56.00	46.00	-30.70	-
5	10.605	0.31	34.81	-	35.12	-	60.00	50.00	-24.88	-
6	16.012	0.48	28.78	-	29.26	-	60.00	50.00	-30.74	-

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 Audio Adapter	MODEL	BSM202
CHANNEL	Channel 78	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	PHASE	Line 2
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa
TESTED BY	Brad Wu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.189	0.10	42.67	-	42.77	-	64.08	54.08	-21.31	-
2	0.213	0.10	43.32	-	43.42	-	63.11	53.11	-19.69	-
3	1.746	0.20	33.12	-	33.32	-	56.00	46.00	-22.68	-
4	3.957	0.20	27.09	-	27.29	-	56.00	46.00	-28.71	-
5	10.191	0.40	35.92	-	36.32	-	60.00	50.00	-23.68	-
6	17.598	0.66	28.56	-	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
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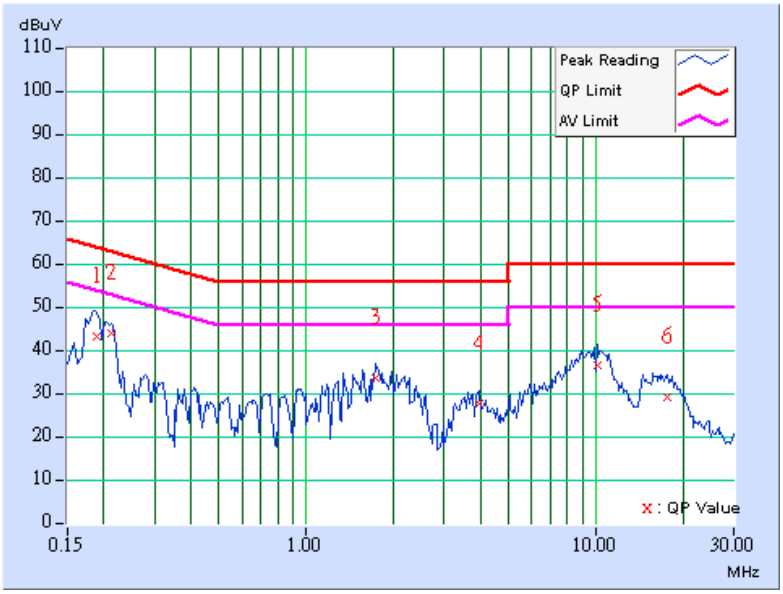
6. Emission Level = Correction Factor + Reading Value.



4.2 NUMBER OF HOPPING FREQUENCY USED

4.2.1 LIMIT OF HOPPING FREQUENCY USED

At least 15 channels 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.

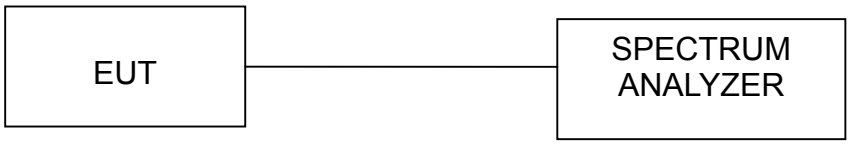
4.2.3 TEST PROCEDURES

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

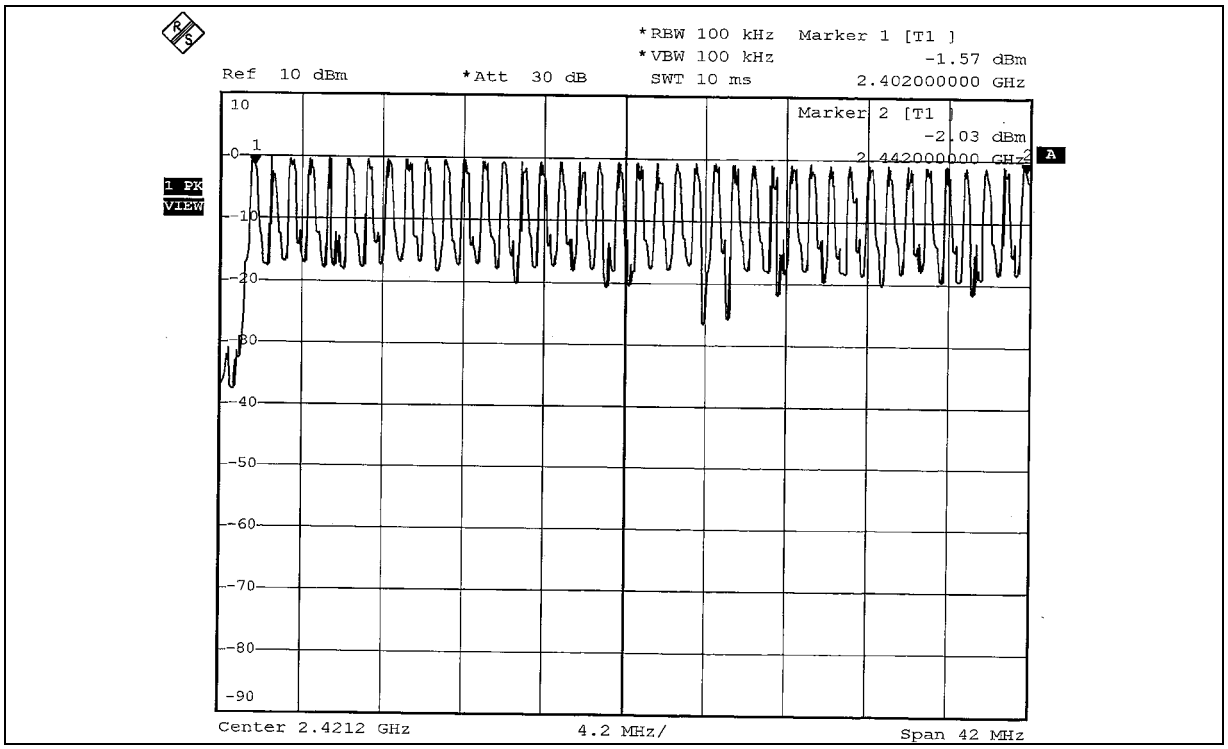
No deviation.

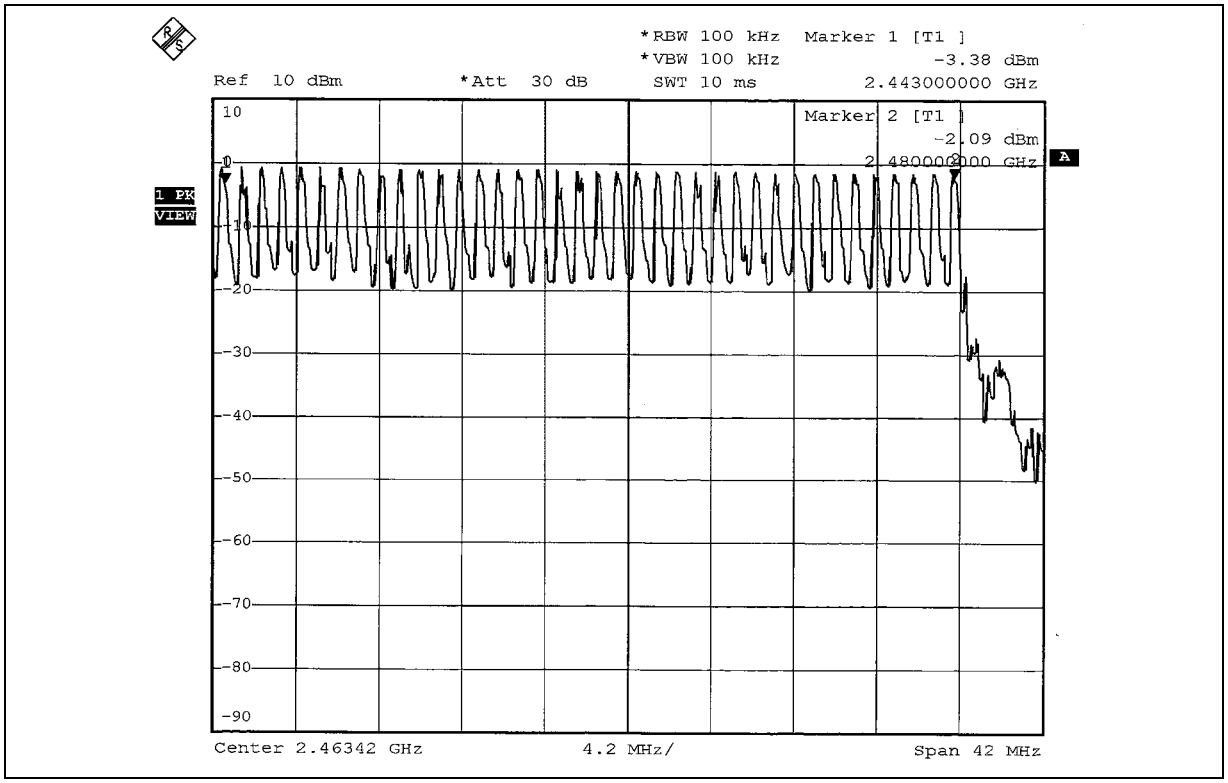
4.2.5 TEST SETUP



4.2.6 TEST RESULTS

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


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1]
-1.57 dBm
2.402000000 GHz
Ref 10 dBm
*Att 30 dB
Marker 2 [T1]
-2.03 dBm
2.442000000 GHz
1 PK
VIEW
A
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.4212 GHz
4.2 MHz/
Span 42 MHz


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1]
-3.38 dBm
2.443000000 GHz
Ref 10 dBm
*Att 30 dB
Marker 2 [T1]
-2.09 dBm
2.480000000 GHz
1 PK
VIEW
A
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.46342 GHz
4.2 MHz/
Span 42 MHz

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

NOTES:

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

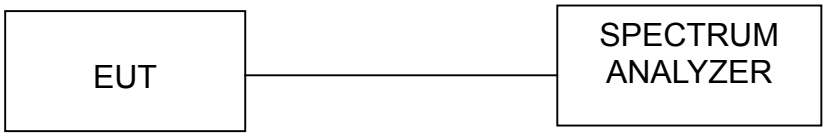
4.3.3 TEST PROCEDURES

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

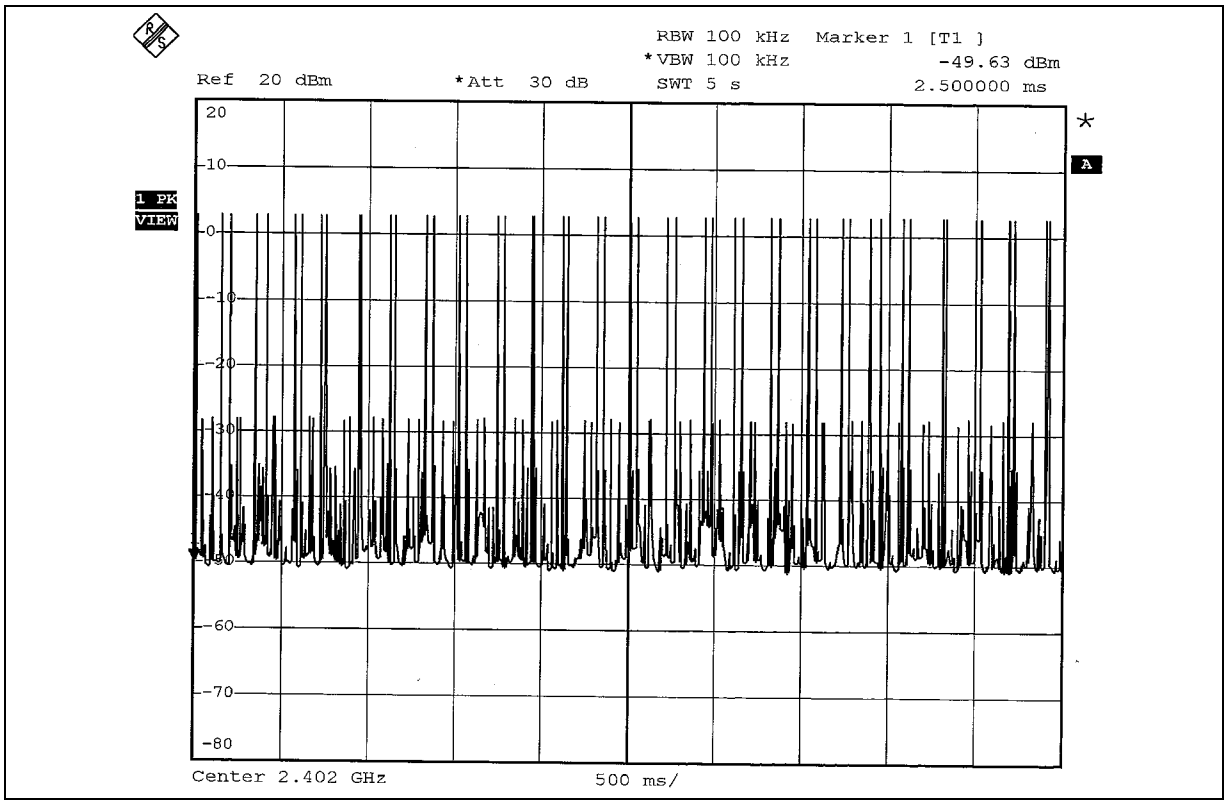


4.3.6 TEST RESULTS

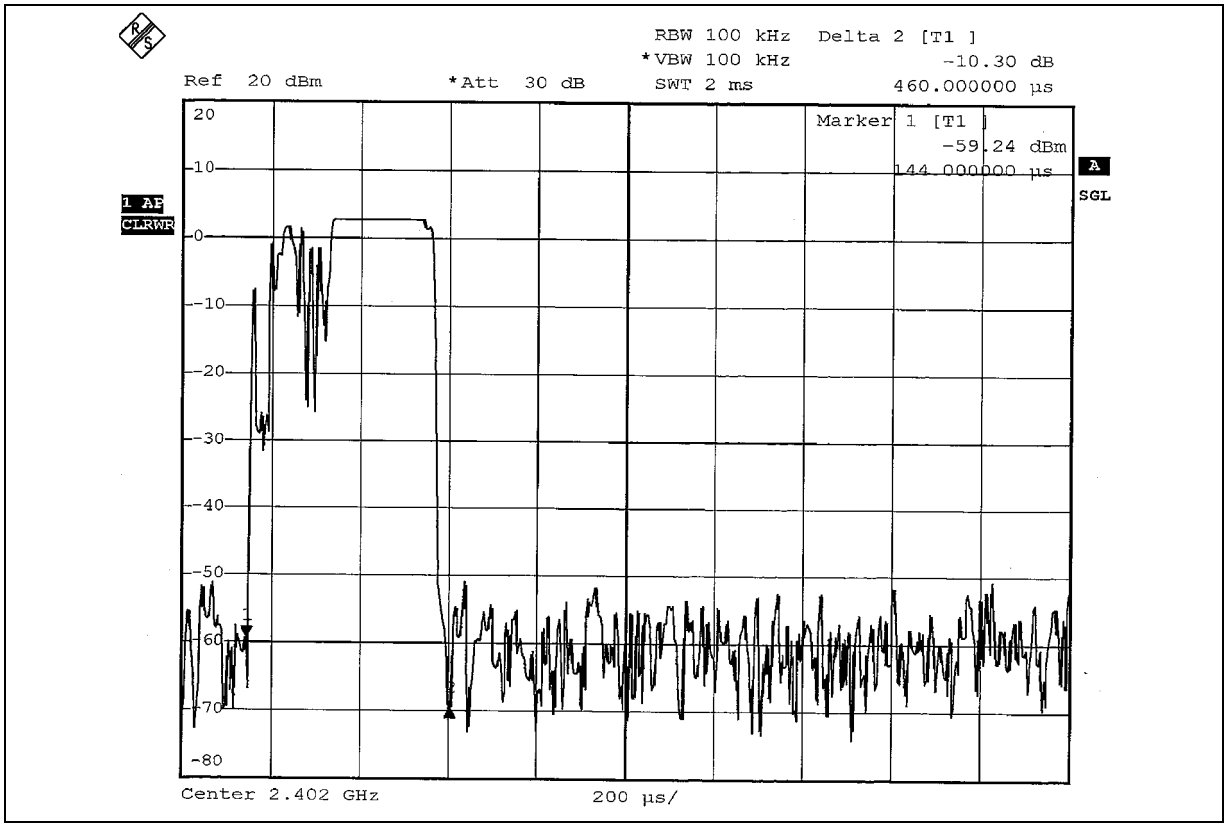
Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	51 (times / 5 sec) *6.32=322.32 times	0.460	148.27	400
DH3	23 (times / 5 sec) *6.32=145.36 times	1.744	253.51	400
DH5	19 (times / 5 sec) *6.32=120.08 times	3.040	365.04	400

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

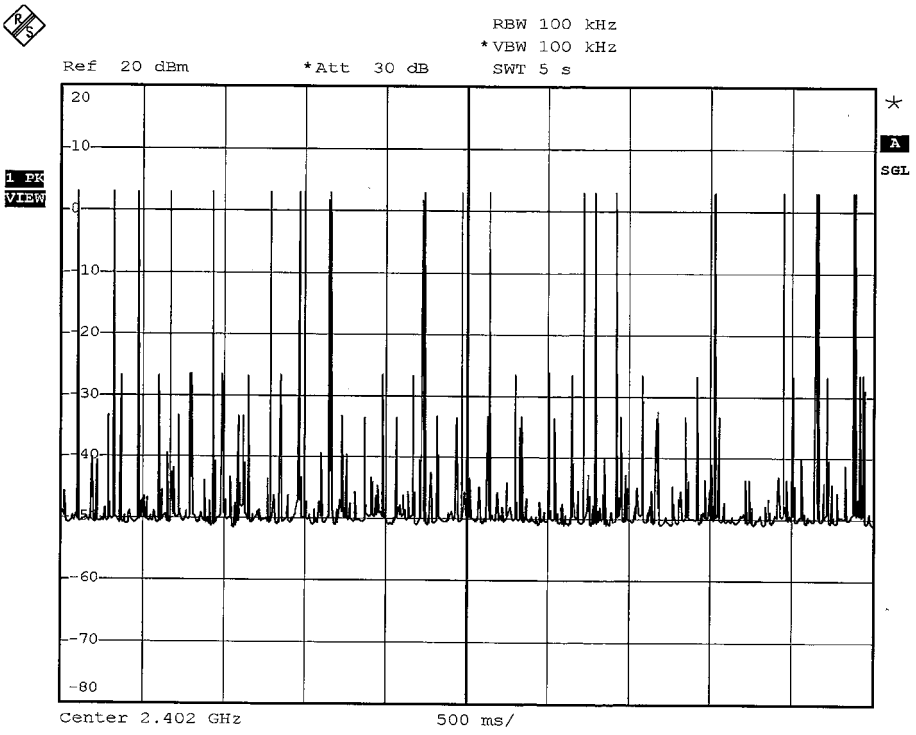
DH1


RBW 100 kHz
*VBW 100 kHz
SWT 5 s
Marker 1 [T1]
-49.63 dBm
2.500000 ms
Ref 20 dBm
*Att 30 dB
1 PK
VIEW
A
Center 2.402 GHz
500 ms/

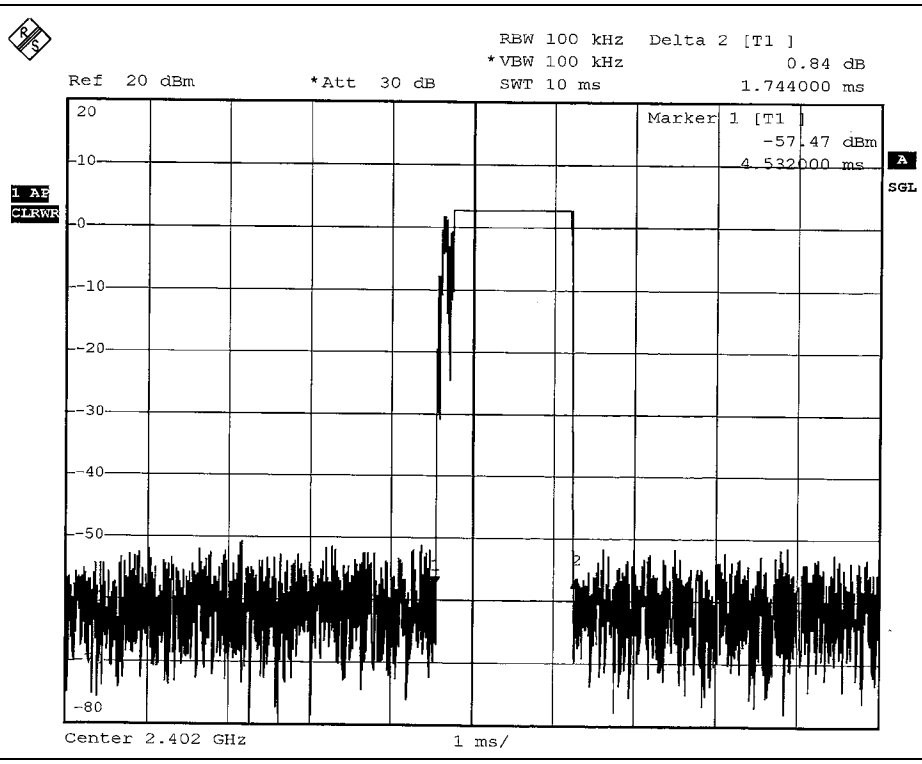
DH1


RBW 100 kHz
*VBW 100 kHz
SWT 2 ms
Delta 2 [T1]
-10.30 dB
460.000000 µs
Marker 1 [T1]
-59.24 dBm
144.000000 µs
Ref 20 dBm
*Att 30 dB
1 AP
CLRWR
A
SGL
Center 2.402 GHz
200 µs/

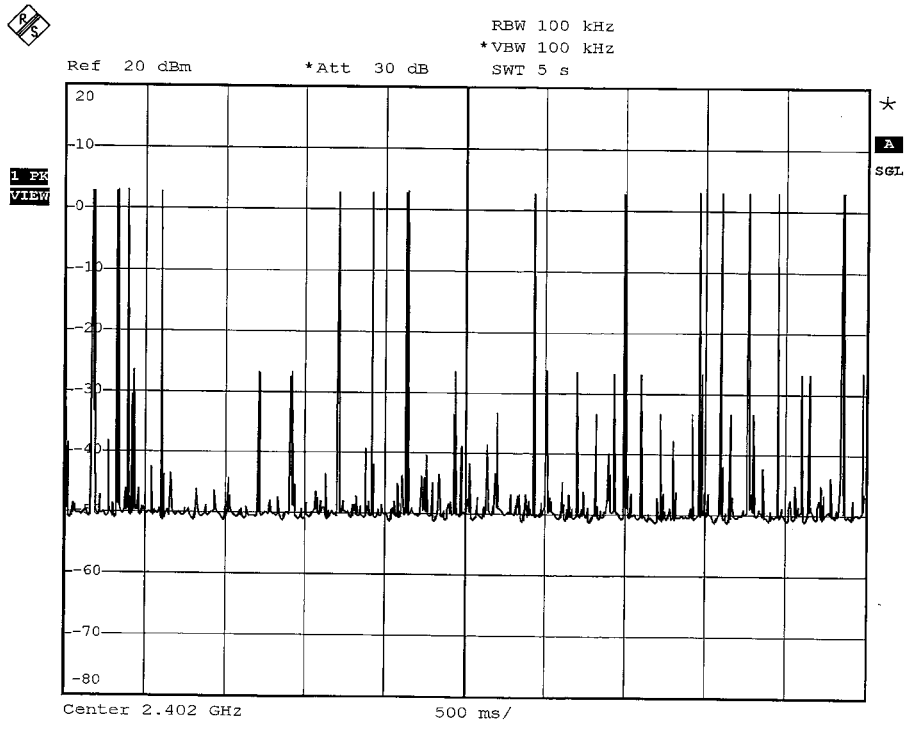
DH3


RBW 100 kHz
*VBW 100 kHz
Ref 20 dBm
*Att 30 dB
SWT 5 s
1 PK
VIEW
A
SGL
20
10
0
-10
-20
-30
-40
-60
-70
-80
Center 2.402 GHz
500 ms/

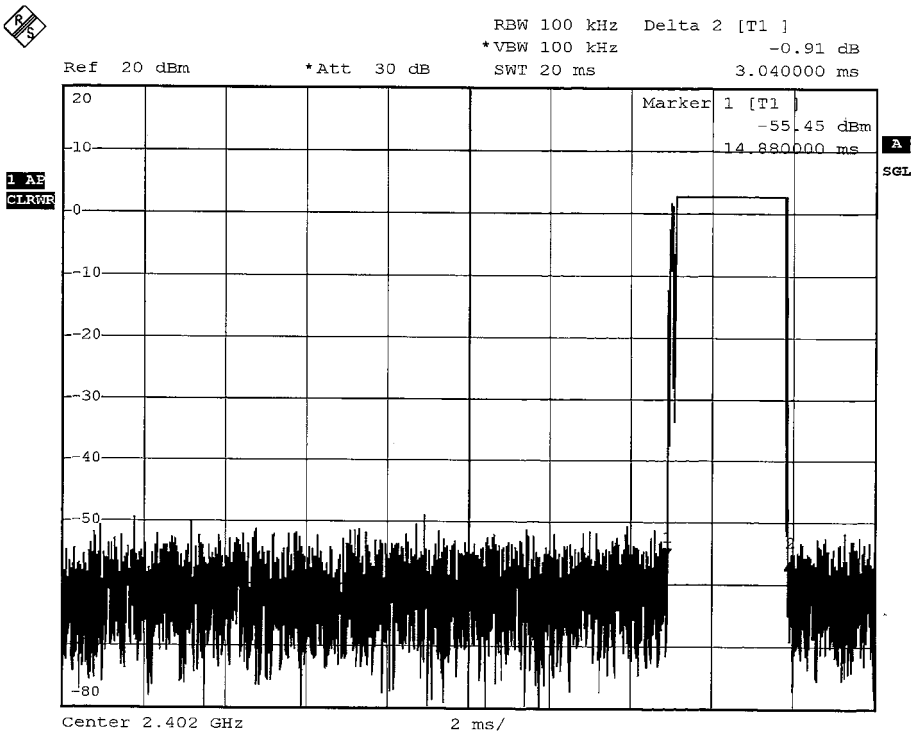
DH3


RBW 100 kHz
Delta 2 [T1]
*VBW 100 kHz
0.84 dB
Ref 20 dBm
*Att 30 dB
SWT 10 ms
1.744000 ms
Marker 1 [T1]
-57.47 dBm
4.532000 ms
1 AP
CLRWR
A
SGL
20
10
0
-10
-20
-30
-40
-50
-80
Center 2.402 GHz
1 ms/

DH5


RBW 100 kHz
*VBW 100 kHz
SWT 5 s
Ref 20 dBm
*Att 30 dB
1 PK
VIEW
A
SGL
20
-10
0
-10
-20
-30
-40
-60
-70
-80
Center 2.402 GHz
500 ms/

DH5


RBW 100 kHz
Delta 2 [T1]
*VBW 100 kHz
-0.91 dB
SWT 20 ms
3.040000 ms
Ref 20 dBm
*Att 30 dB
Marker 1 [T1]
-55.45 dBm
14.880000 ms
1 AP
CLRWR
A
SGL
20
-10
0
-10
-20
-30
-40
-50
-80
Center 2.402 GHz
2 ms/

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 20dBbandwidth of hopping channel shell 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.

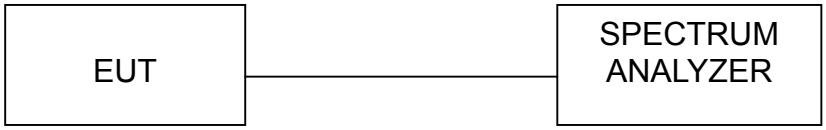
4.4.3 TEST PROCEDURE

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

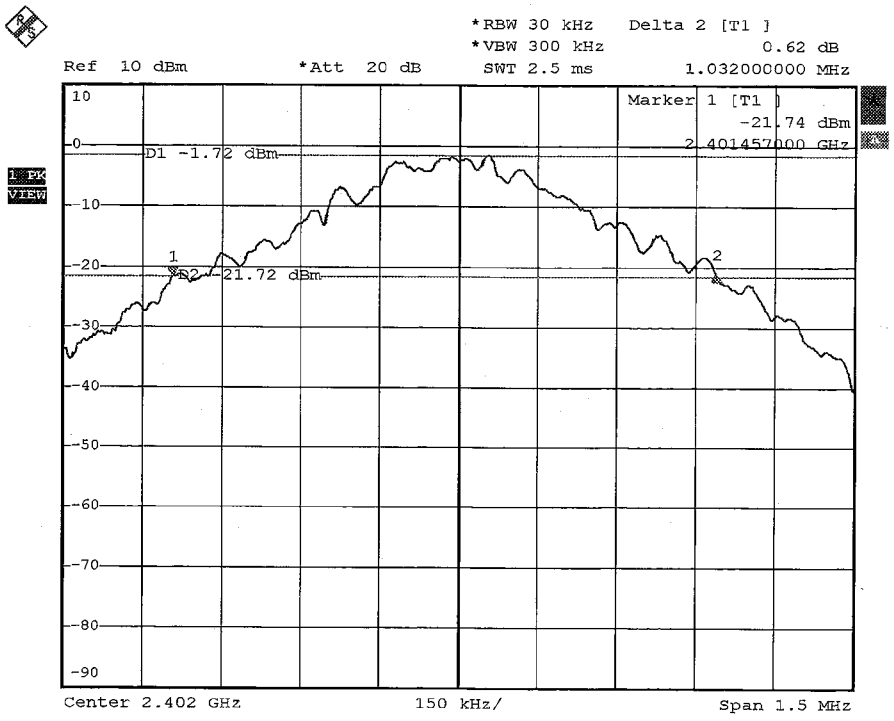
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.4.7 TEST RESULTS

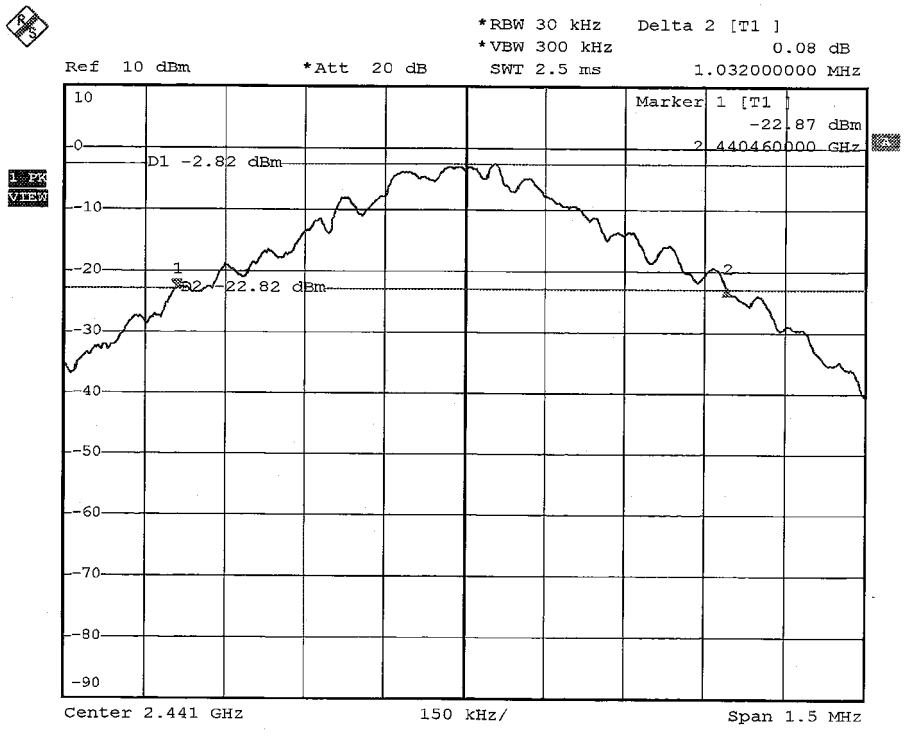
EUT	Bluetooth Audio Adapter	MODEL	BSM202
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	23deg. C, 54%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Gary Chang

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)	More Than 25kHz
0	2402	1.032	Yes
39	2441	1.032	Yes
78	2480	1.029	Yes

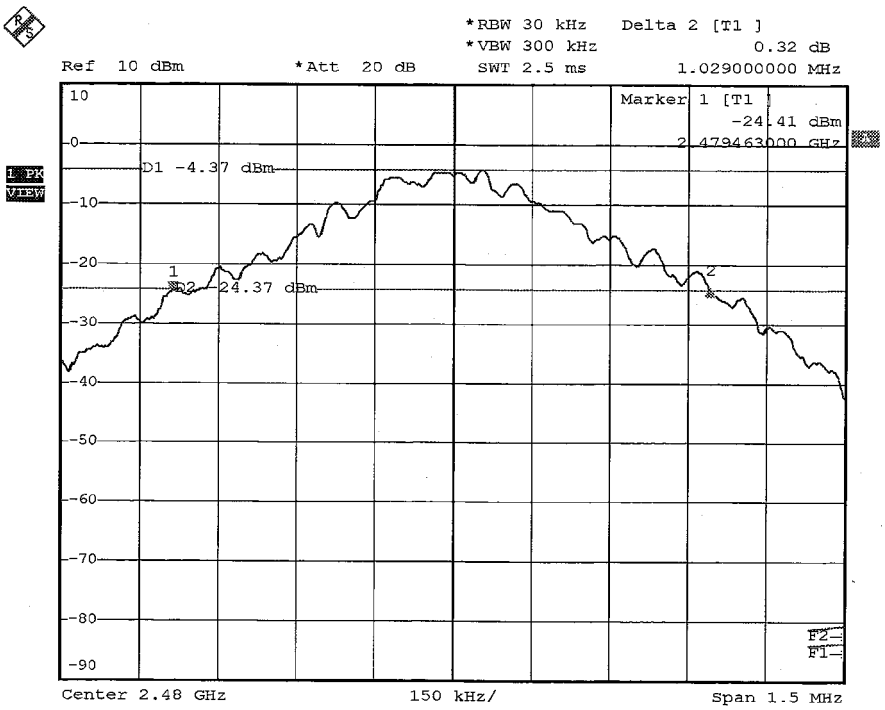
Channel 0



Channel 39



Channel 78


*RBW 30 kHz
*VBW 300 kHz
SWT 2.5 ms
Delta 2 [T1]
0.32 dB
1.029000000 MHz
Ref 10 dBm
*Att 20 dB
Marker 1 [T1]
-24.41 dBm
2.479463000 GHz
D1 -4.37 dBm
D2 -24.37 dBm
1 PK
VIEW
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
F2
F1
Center 2.48 GHz
150 kHz/
Span 1.5 MHz

4.5 HOPPING CHANNEL SEPARATION

4.5.1 LIMIT OF HOPPING CHANNEL SEPARATION

At least 25kHz or 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

NOTES:

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

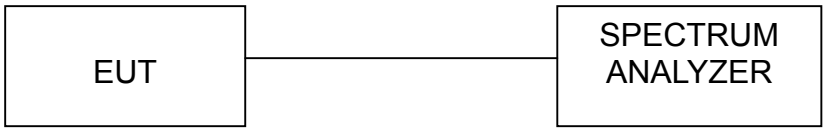
4.5.3 TEST PROCEDURES

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



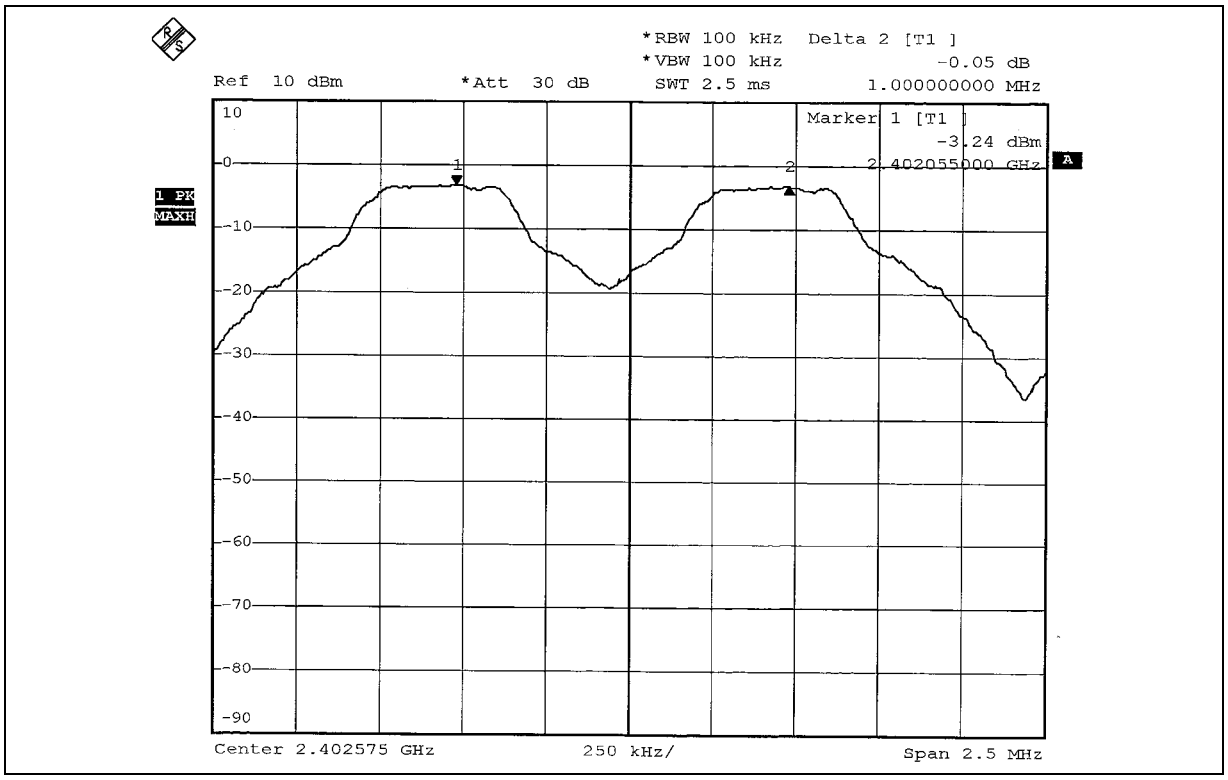
4.5.6 TEST RESULTS

EUT	Bluetooth Audio Adapter	MODEL	BSM202
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	21 deg. C, 62% RH, 991 hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Gary Chang

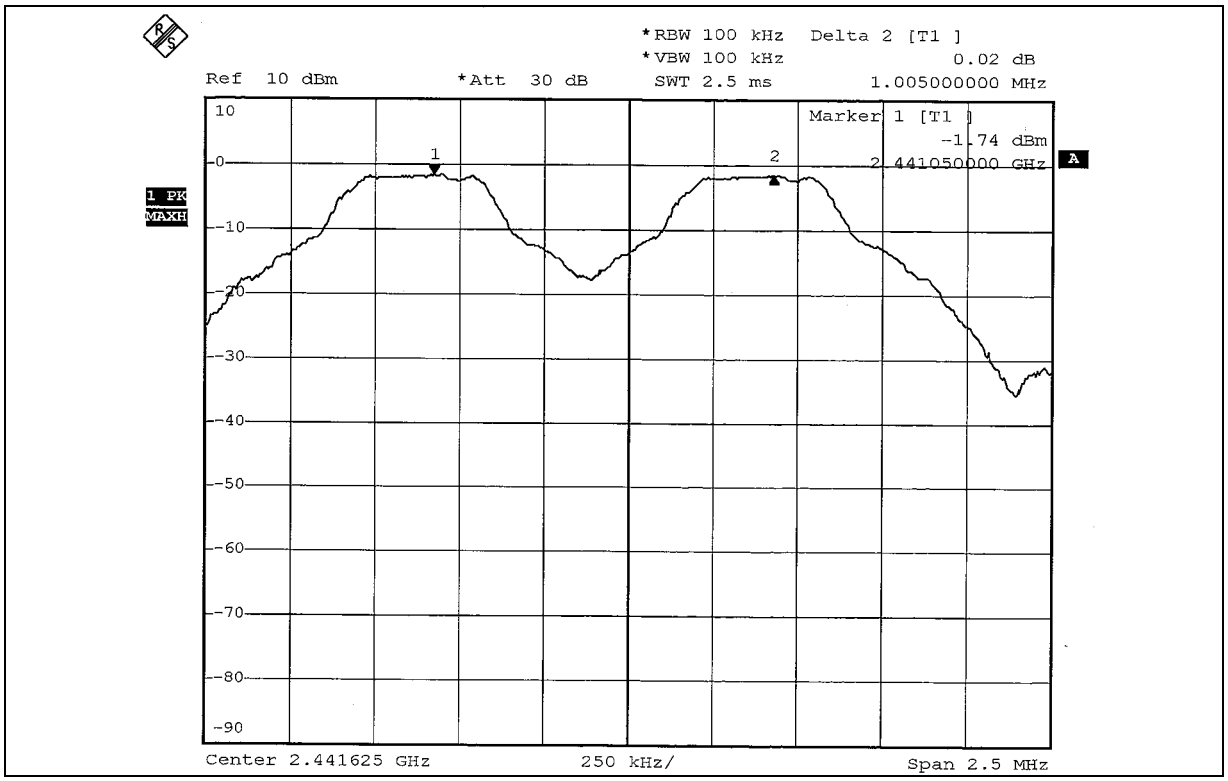
Channel	Frequency (MHz)	Adjacent Channel Separation (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	1.000	0.688	PASS
39	2441	1.005	0.688	PASS
78	2480	1.150	0.686	PASS

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

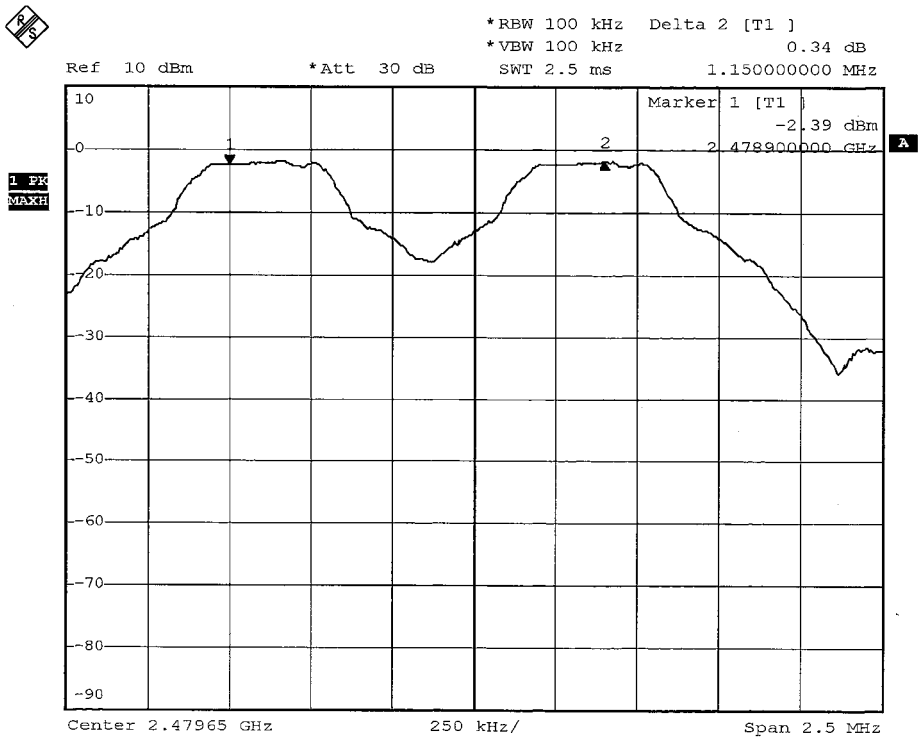
Channel 0



Channel 39



Channel 78


*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 ms
Delta 2 [T1]
0.34 dB
1.150000000 MHz
Ref 10 dBm
*Att 30 dB
Marker 1 [T1]
-2.39 dBm
2.478900000 GHz
1 PK
MAXH
A
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.47965 GHz
250 kHz/
Span 2.5 MHz

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 ANALYEER	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.

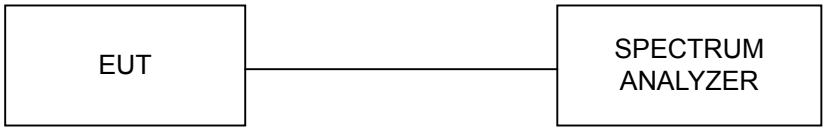
4.6.3 TEST PROCEDURES

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

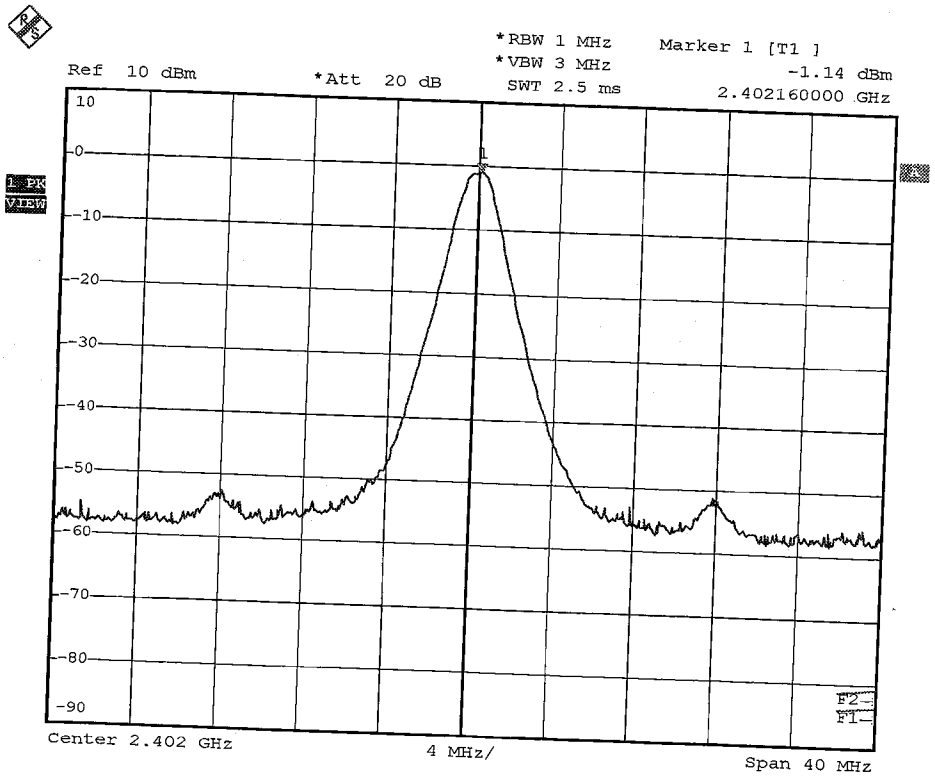
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.6.7 TEST RESULTS

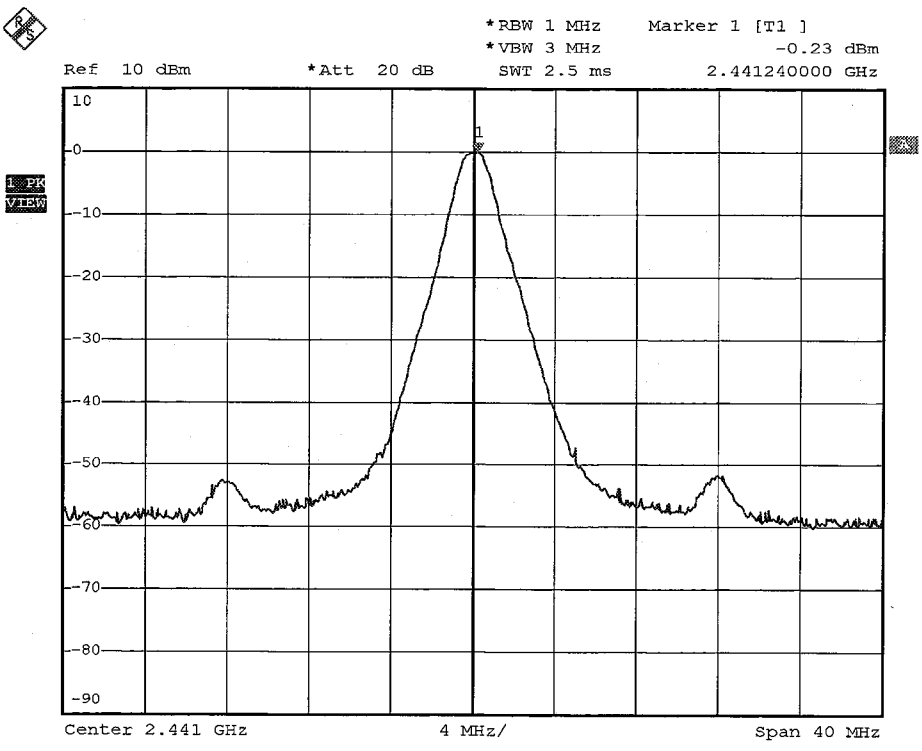
EUT	Bluetooth Audio Adapter	**MODEL**	BSM202
MODULATION TYPE	GFSK	**ENVIRONMENTAL CONDITIONS**	23deg. C, 54%RH, 991 hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**TESTED BY**	Gary Chang

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2402	0.769	-1.14	30	PASS
39	2441	0.948	-0.23	30	PASS
78	2480	0.662	-1.79	30	PASS

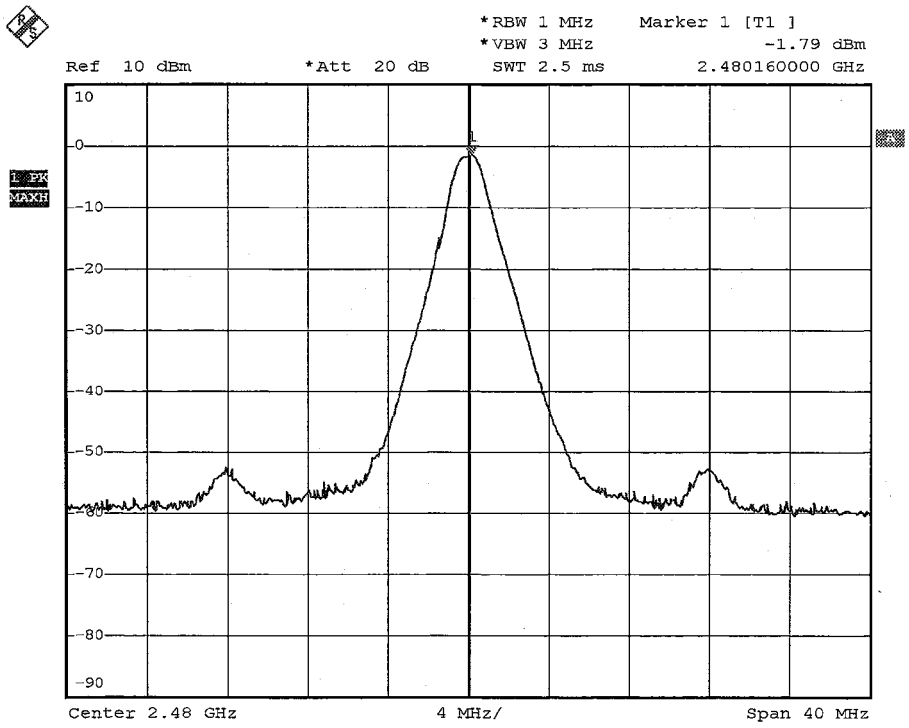
Channel 0



Channel 39



Channel 78


*RBW 1 MHz
*VBW 3 MHz
Marker 1 [T1]
-1.79 dBm
Ref 10 dBm
*Att 20 dB
SWT 2.5 ms
2.480160000 GHz
1 PK
MAXH
10
0
-10
-20
-30
-40
-50
-70
-80
-90
Center 2.48 GHz
4 MHz/
Span 40 MHz

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

NOTE: The limit for radiated test was performed according to CISPR 22: 1997, which was specified in FCC PART 15B 15.109(g). Also the limits of ICES-003: 2004 and CISPR 22: 1997 are same.

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Jan. 07, 2006
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Nov. 29, 2005
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Jan. 22, 2006
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Jan. 05, 2006
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA 9170242	Jan. 23, 2006
Preamplifier Agilent	8447D	2944A10631	Nov. 17, 2005
Preamplifier Agilent	8449B	3008A01960	Nov. 14, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	219272/4	Jan. 26, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	219275/4	Jan. 26, 2006
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA
Turn Table ADT.	TT100.	TT93021704	NA
Turn Table Controller ADT.	SC100.	SC93021704	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 3.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The IC Site Registration No. is IC4924-4.

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.

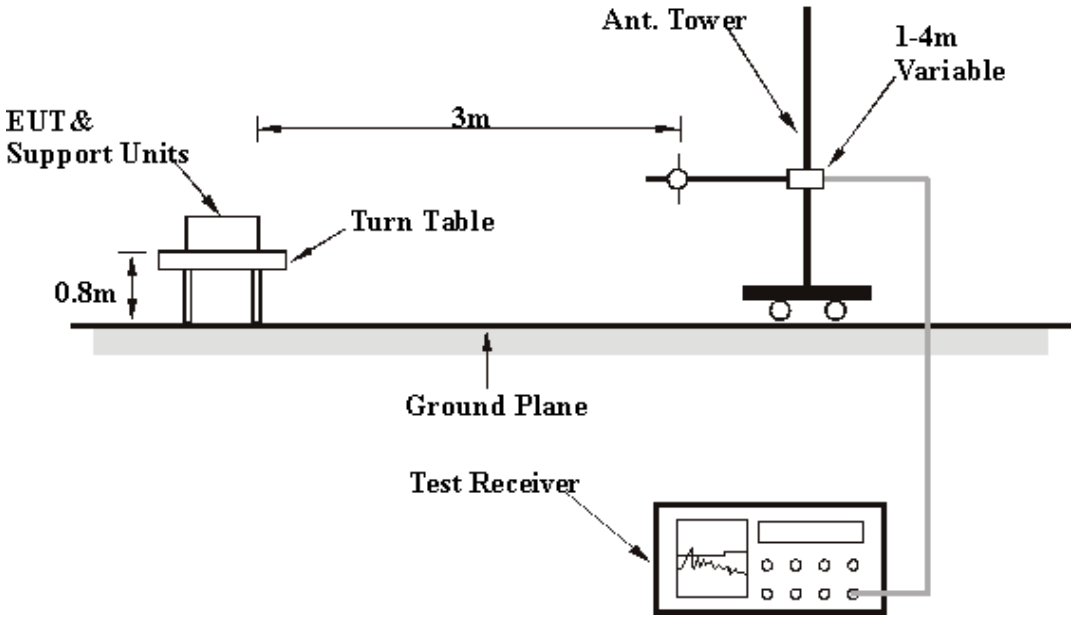
NOTE:

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

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 notebook.
g. Steps c ~ f were repeated.

4.7.7 TEST RESULTS

Below 1GHz Worst-Case Data

EUT	Bluetooth Audio Adapter	**MODEL**	BSM202
CHANNEL	Channel 78	**FREQUENCY RANGE**	Below 1 GHz
MODULATION TYPE	GFSK	**DETECTOR FUNCTION**	Quasi-Peak
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	24 deg. C, 55% RH, 991 hPa
TEST MODE	1	**TESTED BY**	Brad Wu

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	26.74 QP	43.50	-16.76	2.00 H	298	14.31	12.42
2	166.07	29.72 QP	43.50	-13.78	2.00 H	10	15.40	14.32
3	199.12	33.16 QP	43.50	-10.34	1.00 H	148	21.82	11.34
4	463.49	28.66 QP	46.00	-17.34	2.00 H	85	10.51	18.15
5	733.69	36.07 QP	46.00	-9.93	1.00 H	166	13.23	22.84
6	867.82	30.64 QP	46.00	-15.36	2.00 H	109	6.41	24.23

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	80.54	25.53 QP	40.00	-14.47	1.00 V	226	15.65	9.88
2	131.08	33.43 QP	43.50	-10.07	1.00 V	82	19.70	13.74
3	169.96	34.92 QP	43.50	-8.58	1.00 V	160	21.00	13.92
4	463.49	27.94 QP	46.00	-18.06	1.00 V	31	9.79	18.15
5	663.71	30.37 QP	46.00	-15.63	1.00 V	241	8.76	21.62
6	733.69	32.82 QP	46.00	-13.18	1.00 V	247	9.98	22.84

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.

EUT	Bluetooth Audio Adapter	MODEL	BSM202
CHANNEL	Channel 78	FREQUENCY RANGE	Below 1 GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Quasi-Peak
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24 deg. C, 55% RH, 991 hPa
TEST MODE	2	TESTED BY	Brad Wu

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	27.27 QP	43.50	-16.23	3.00 H	280	14.85	12.42
2	175.79	29.91 QP	43.50	-13.59	2.00 H	115	16.58	13.33
3	249.66	31.71 QP	46.00	-14.29	1.00 H	127	18.60	13.11
4	463.49	30.99 QP	46.00	-15.01	2.00 H	91	12.83	18.15
5	729.80	34.97 QP	46.00	-11.03	1.00 H	166	12.23	22.74
6	916.41	35.38 QP	46.00	-10.62	3.00 H	235	10.40	24.98

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	34.24 QP	43.50	-9.26	1.00 V	40	22.00	12.23
2	164.13	33.60 QP	43.50	-9.90	1.00 V	64	19.09	14.52
3	463.49	34.26 QP	46.00	-11.74	1.00 V	82	16.10	18.15
4	733.69	32.72 QP	46.00	-13.28	2.00 V	46	9.89	22.84
5	865.87	33.52 QP	46.00	-12.48	1.00 V	124	9.33	24.20
6	902.81	37.79 QP	46.00	-8.21	4.00 V	31	12.95	24.84

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 Audio Adapter	**MODEL**	BSM202
CHANNEL	0	**FREQUENCY RANGE**	1 ~ 25 GHz
MODULATION TYPE	GFSK	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	24 deg. C, 55% RH, 991 hPa
TESTED BY	Brad Wu		

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	2390.00	58.13 PK	74.00	-15.87	1.04 H	124	26.26	31.87
1	2390.00	48.13 AV	54.00	-5.87	1.04 H	124	16.26	31.87
2	*2402.00	102.81 PK			1.04 H	124	70.89	31.92
2	*2402.00	72.81 AV			1.04 H	124	40.89	31.92
3	4804.00	49.63 PK	74.00	-24.37	1.05 H	211	11.86	37.77
3	4804.00	19.63 AV	54.00	-34.37	1.05 H	211	-18.14	37.77
4	6004.00	56.86 PK	74.00	-17.14	1.17 H	171	17.08	39.78
4	**6004.00**	**51.40 AV**	**54.00**	**-2.60**	**1.17 H**	**171**	**11.62**	**39.78**
5	7206.00	54.26 PK	74.00	-19.74	1.04 H	215	10.07	44.19
5	7206.00	42.89 AV	54.00	-11.11	1.04 H	215	-1.30	44.19

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	2390.00	52.57 PK	74.00	-21.43	1.00 V	68	20.70	31.87
1	2390.00	42.57 AV	54.00	-11.43	1.00 V	68	10.70	31.87
2	*2402.00	97.25 PK			1.40 V	134	65.33	31.92
2	*2402.00	67.25 AV			1.40 V	134	35.33	31.92
3	4804.00	49.24 PK	74.00	-24.76	1.06 V	158	11.47	37.77
3	4804.00	19.24 AV	54.00	-34.76	1.06 V	158	-18.53	37.77
4	6004.00	54.79 PK	74.00	-19.21	1.00 V	76	15.01	39.78
4	6004.00	48.92 AV	54.00	-5.08	1.00 V	76	9.14	39.78
5	7206.00	53.91 PK	74.00	-20.09	1.15 V	226	9.72	44.19
5	7206.00	42.70 AV	54.00	-11.30	1.15 V	226	-1.49	44.19

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. 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: 20log(3.125/100)= -30 dB
6. Average value = peak reading –20log(duty cycle)

EUT	Bluetooth Audio Adapter	MODEL	BSM202
CHANNEL	39	FREQUENCY RANGE	1 ~ 25 GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24 deg. C, 55% RH, 991 hPa
TESTED BY	Brad Wu		

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	*2441.00	100.59 PK			1.00 H	132	68.52	32.07
1	*2441.00	70.59 AV			1.00 H	132	38.52	32.07
2	4882.00	51.23 PK	74.00	-22.77	1.12 H	109	13.22	38.01
2	4882.00	21.23 AV	54.00	-32.77	1.12 H	109	-16.78	38.01
3	6102.00	55.82 PK	74.00	-18.18	1.06 H	217	15.53	40.29
3	6102.00	49.93 AV	54.00	-4.07	1.06 H	217	9.64	40.29
4	7323.00	55.44 PK	74.00	-18.56	1.25 H	218	10.90	44.54
4	7323.00	45.26 AV	54.00	-8.74	1.25 H	218	0.72	44.54

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	*2441.00	100.40 PK			1.00 V	78	68.33	32.07
1	*2441.00	70.40 AV			1.00 V	78	38.33	32.07
2	4882.00	49.56 PK	74.00	-24.44	1.24 V	216	11.55	38.01
2	4882.00	19.56 AV	54.00	-34.44	1.24 V	216	-18.45	38.01
3	6102.00	55.68 PK	74.00	-18.32	1.06 V	89	15.39	40.29
3	6102.00	49.87 AV	54.00	-4.13	1.06 V	89	9.58	40.29
4	7323.00	56.24 PK	74.00	-17.76	1.35 V	128	11.70	44.54
4	7323.00	46.50 AV	54.00	-7.50	1.35 V	128	1.96	44.54

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. 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: 20log(3.125/100)= -30 dB
6. Average value = peak reading –20log(duty cycle)

EUT	Bluetooth Audio Adapter	MODEL	BSM202
CHANNEL	78	FREQUENCY RANGE	1 ~ 25 GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24 deg. C, 55% RH, 991 hPa
TESTED BY	Brad Wu		

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	*2480.00	99.89 PK			1.00 H	133	67.66	32.23
1	*2480.00	69.89 AV			1.00 H	133	37.66	32.23
2	2483.50	59.89 PK	74.00	-14.11	1.00 H	131	27.65	32.24
2	2483.50	49.89 AV	54.00	-4.11	1.00 H	131	17.65	32.24
3	4960.00	52.20 PK	74.00	-21.80	1.16 H	216	13.95	38.25
3	4960.00	22.20 AV	54.00	-31.80	1.16 H	216	-16.05	38.25
4	6200.00	56.23 PK	74.00	-17.77	1.06 H	211	15.42	40.81
4	6200.00	50.18 AV	54.00	-3.82	1.06 H	211	9.37	40.81
5	7440.00	56.28 PK	74.00	-17.72	1.20 H	196	11.46	44.82
5	7440.00	46.53 AV	54.00	-7.47	1.20 H	196	1.71	44.82

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	*2480.00	98.68 PK			1.00 V	73	66.45	32.23
1	*2480.00	68.68 AV			1.00 V	73	36.45	32.23
2	2483.50	58.68 PK	74.00	-15.32	1.00 V	73	26.44	32.24
2	2483.50	48.68 AV	54.00	-5.32	1.00 V	73	16.44	32.24
3	4960.00	50.13 PK	74.00	-23.87	1.25 V	200	11.88	38.25
3	4960.00	20.13 AV	54.00	-33.87	1.25 V	200	-18.12	38.25
4	6200.00	55.47 PK	74.00	-18.53	1.08 V	122	14.66	40.81
4	6200.00	49.63 AV	54.00	-4.37	1.08 V	122	8.82	40.81
5	7440.00	56.43 PK	74.00	-17.57	1.10 V	108	11.61	44.82
5	7440.00	46.68 AV	54.00	-7.32	1.10 V	108	1.86	44.82

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. 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: 20log(3.125/100)= -30 dB
6. Average value = peak reading –20log(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

NOTES:

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

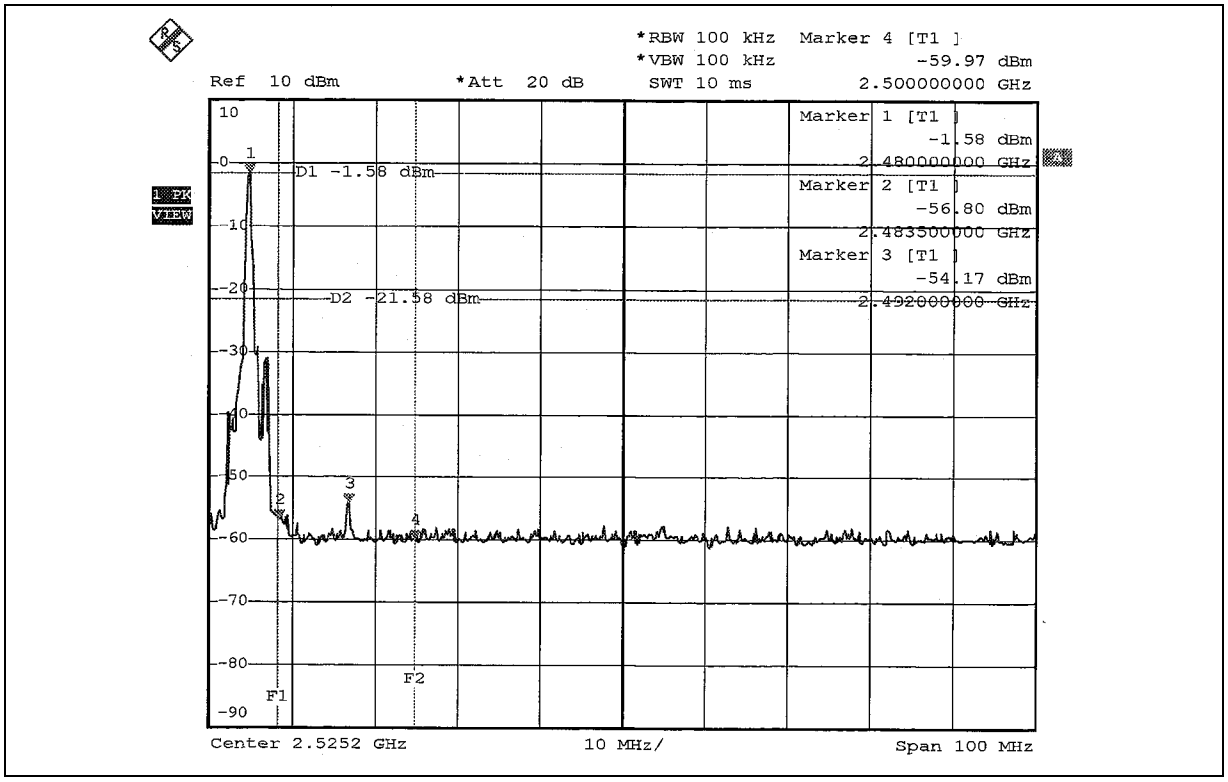
The spectrum plots are attached on the following 4 images. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(d).

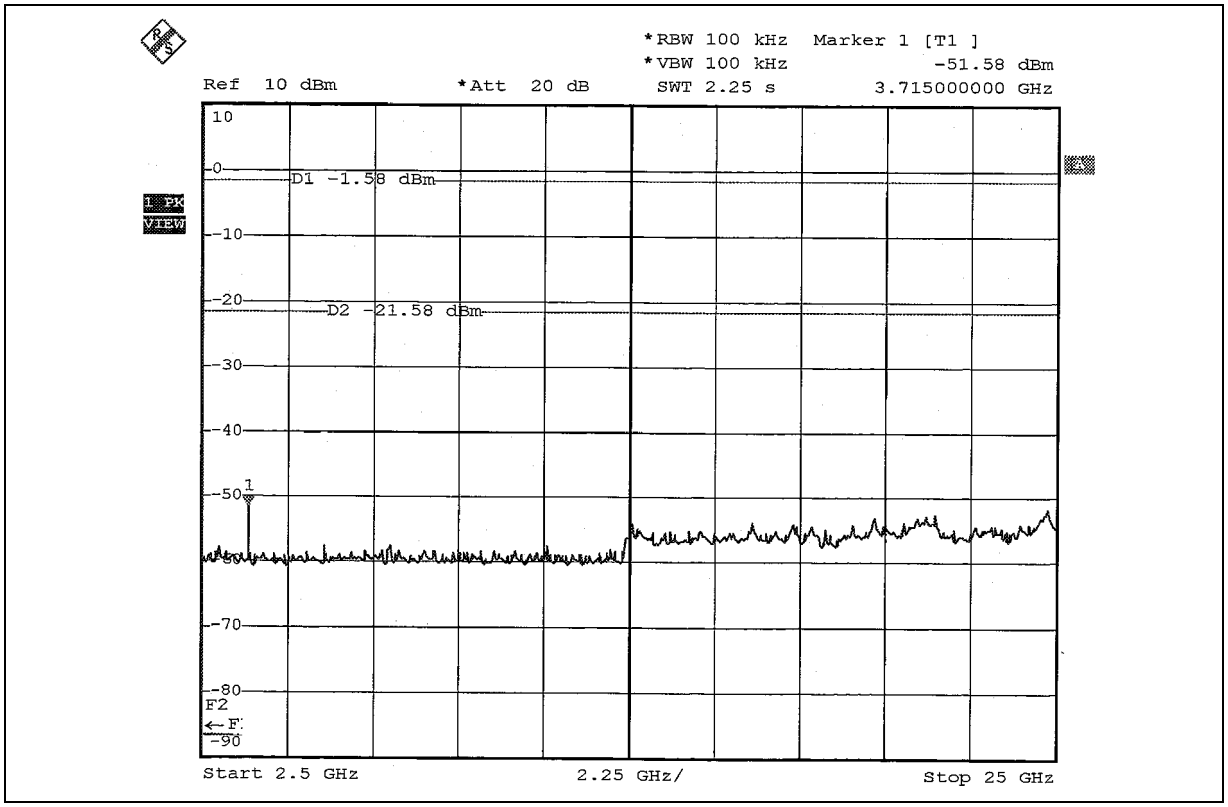
NOTE 1: The band edge emission plot on page 57 shows 56.37dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.7.7 is 102.81dBuV/m (Peak), so the maximum field strength in restrict band is 102.81-56.37=46.44dBuV/m which is under 74 dBuV/m limit.

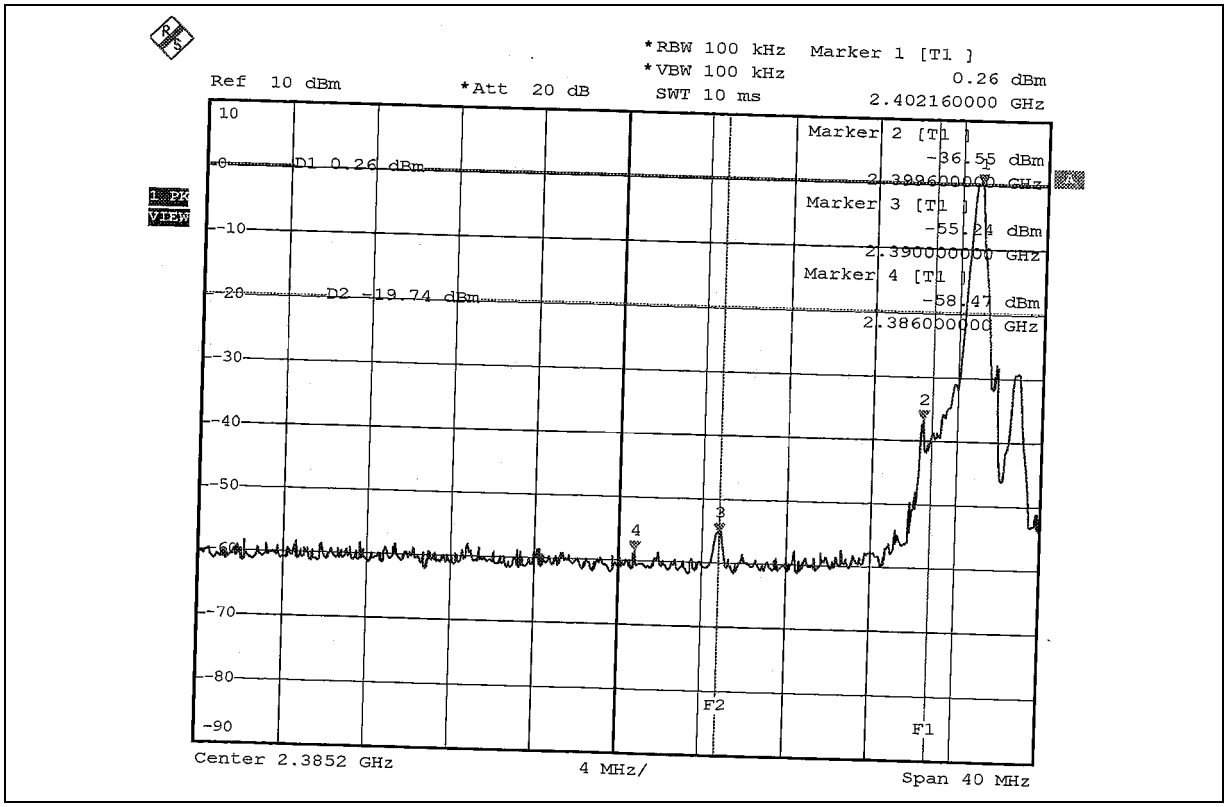
The band edge emission plot on page 57 shows 56.37dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.7.7 is 72.68dBuV/m (Average), so the maximum field strength in restrict band is 72.68-56.37=16.31dBuV/m which is under 54 dBuV/m limit.

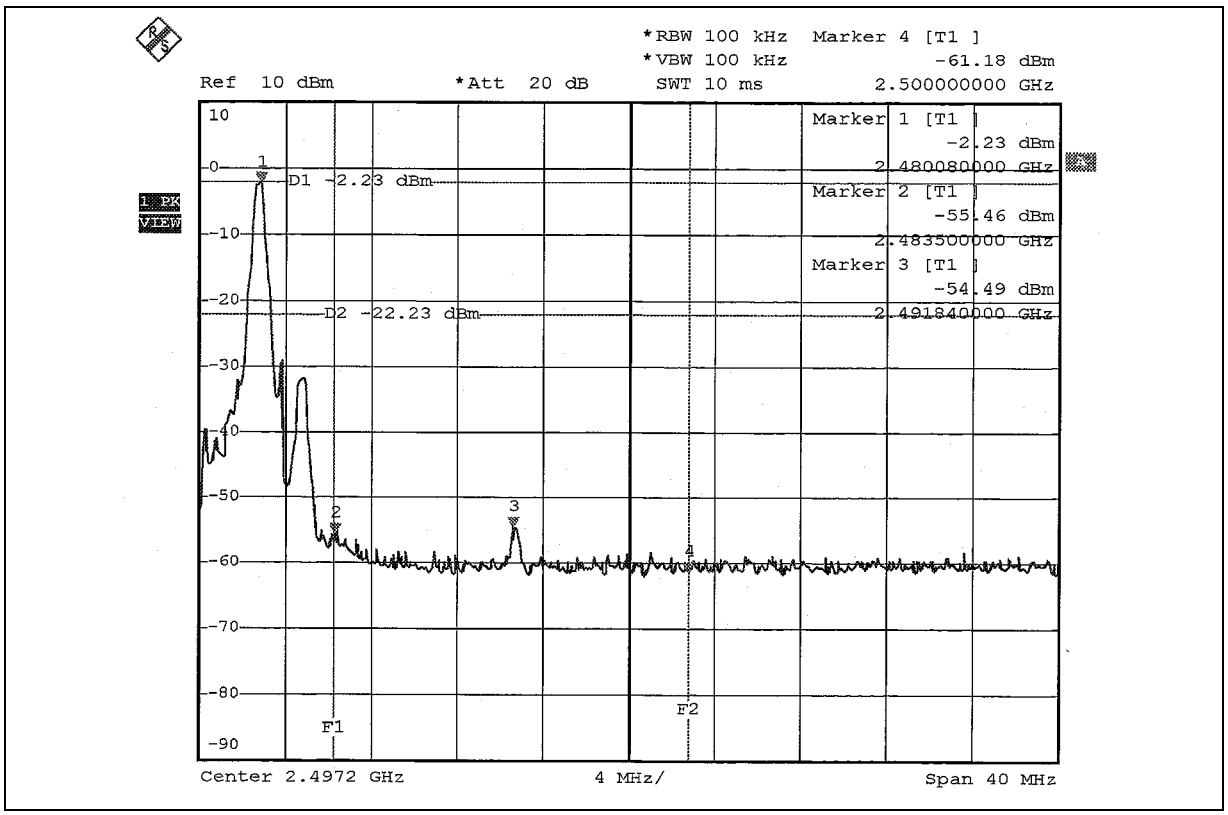
NOTE 2: The band edge emission plot on page 58 shows 52.59dBc between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.7.7 is 99.89dBuV/m (Peak), so the maximum field strength in restrict band is 99.89-52.59=47.30dBuV/m which is under 74 dBuV/m limit.

The band edge emission plot on page 58 shows 52.59dBc 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 69.89dBuV/m (Average), so the maximum field strength in restrict band is 69.89-52.59=17.30dBuV/m which is under 54 dBuV/m limit.


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 4 [T1]
-59.97 dBm
2.500000000 GHz
Ref 10 dBm
*Att 20 dB
Marker 1 [T1]
-1.58 dBm
2.480000000 GHz
Marker 2 [T1]
-56.80 dBm
2.483500000 GHz
Marker 3 [T1]
-54.17 dBm
2.492000000 GHz
D1 -1.58 dBm
D2 -21.58 dBm
1 PK
VIEW
F1
F2
Center 2.5252 GHz
10 MHz/
Span 100 MHz


*RBW 100 kHz
*VBW 100 kHz
SWT 2.25 s
Marker 1 [T1]
-51.58 dBm
3.715000000 GHz
Ref 10 dBm
*Att 20 dB
D1 -1.58 dBm
D2 -21.58 dBm
1 PK
VIEW
F2
Start 2.5 GHz
2.25 GHz/
Stop 25 GHz


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1]
0.26 dBm
2.402160000 GHz
Ref 10 dBm
*Att 20 dB
Marker 2 [T1]
-36.55 dBm
2.398600000 GHz
Marker 3 [T1]
-55.24 dBm
2.390000000 GHz
Marker 4 [T1]
-58.47 dBm
2.386000000 GHz
D1 0.26 dBm
D2 -19.74 dBm
1 PK VIEW
Center 2.3852 GHz
4 MHz/
Span 40 MHz
F1
F2


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 4 [T1]
-61.18 dBm
2.500000000 GHz
Ref 10 dBm
*Att 20 dB
Marker 1 [T1]
-2.23 dBm
2.480080000 GHz
Marker 2 [T1]
-55.46 dBm
2.483500000 GHz
Marker 3 [T1]
-54.49 dBm
2.491840000 GHz
D1 -2.23 dBm
D2 -22.23 dBm
1 PK VIEW
Center 2.4972 GHz
4 MHz/
Span 40 MHz
F1
F2

4.9 ANTENNA REQUIREMENT

4.9.1 STANDARD APPLICABLE

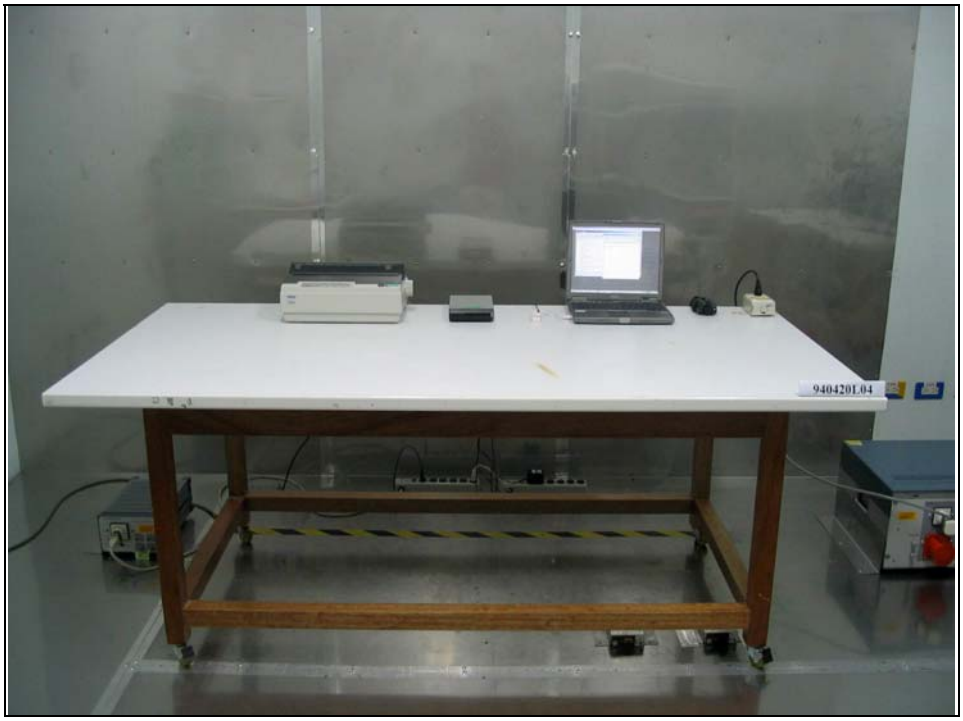
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi 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

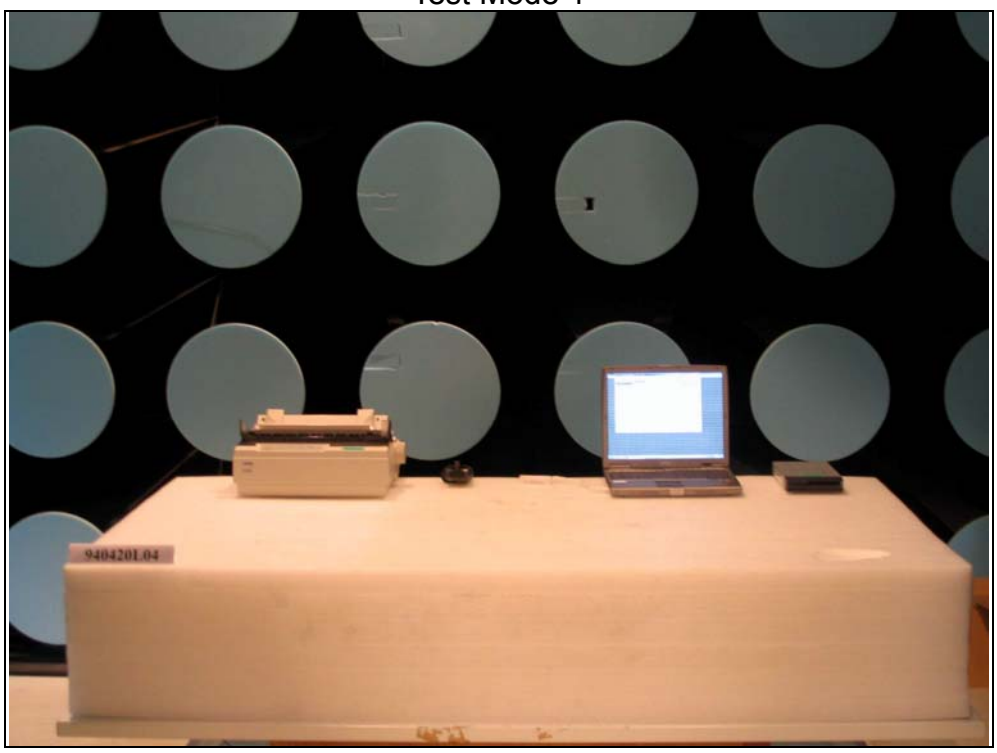
The antenna used in this product is PIFA antenna without antenna connector. The maximum gain of this antenna is 1.93dBi.

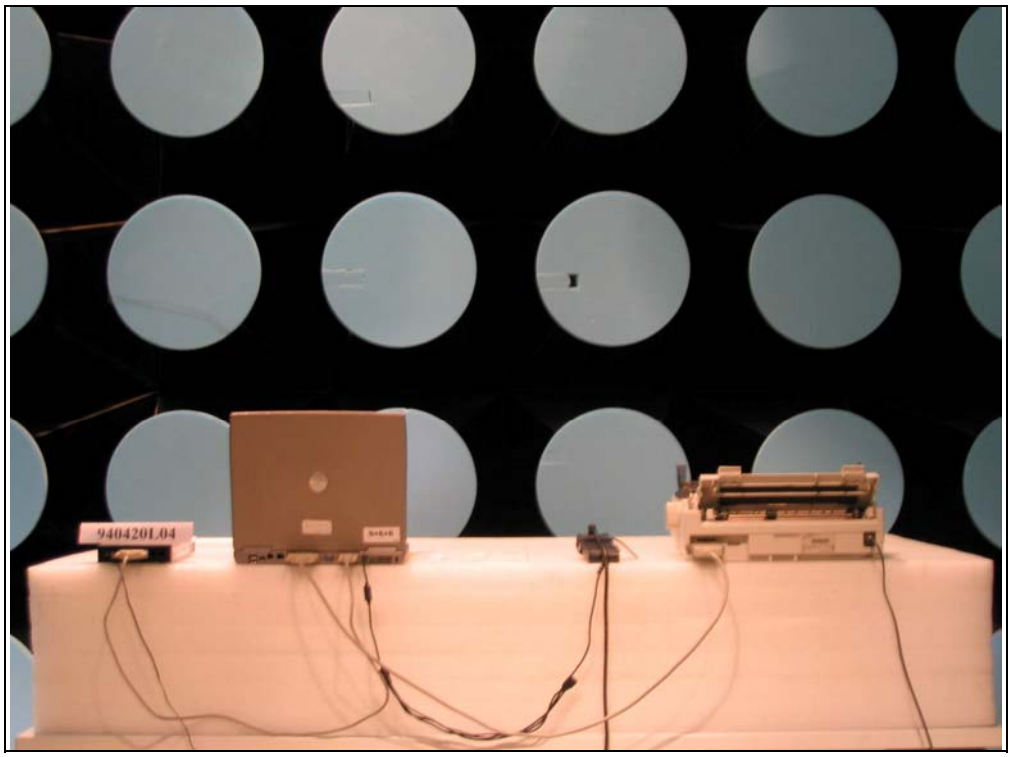
5 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST

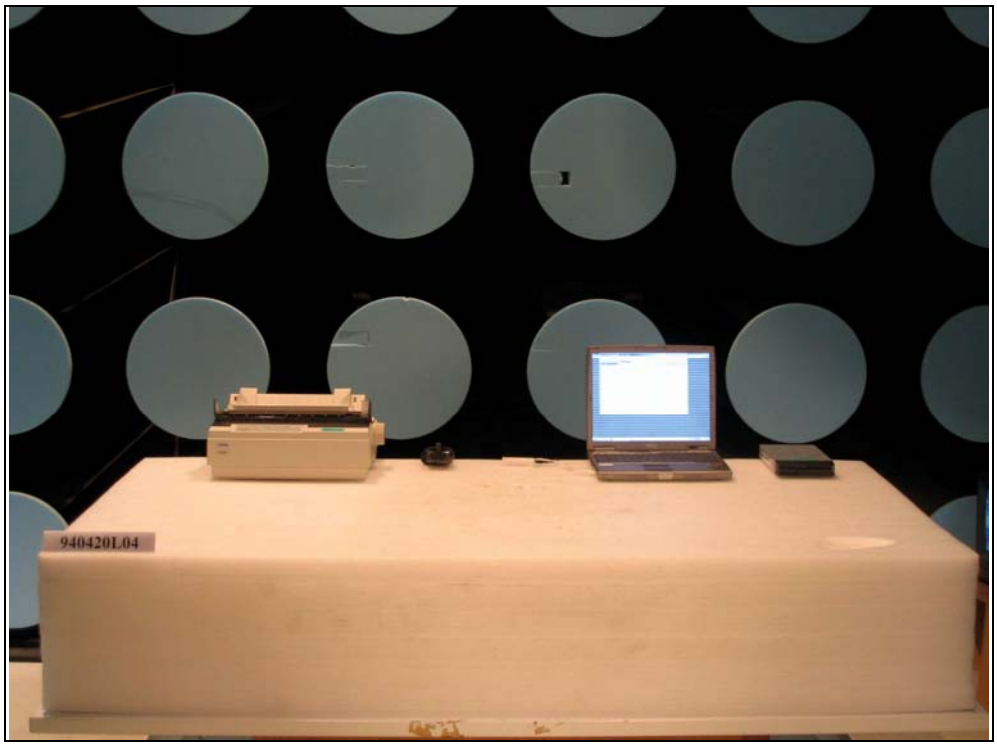


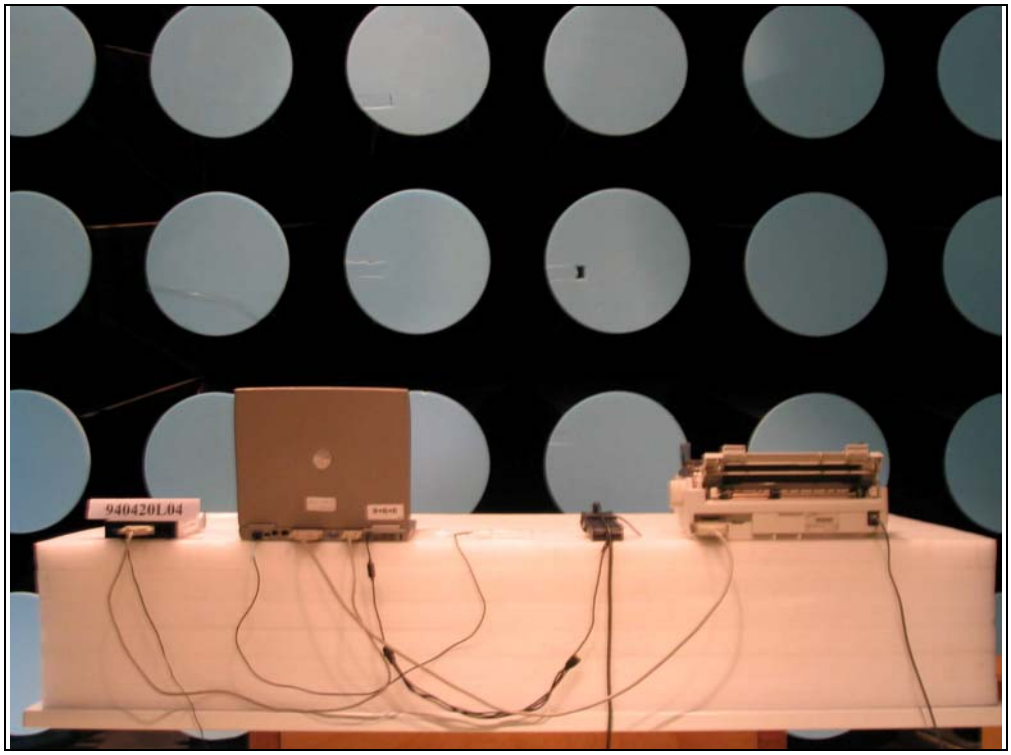
RADIATED EMISSION TEST
Test Mode 1





Test Mode 2





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:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050

Linko RF Lab.
Tel: 886-3-3270910
Fax: 886-3-3270892

Web Site: www.adt.com.tw

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