FCC TEST REPORT

REPORT NO.:   RF940721L10D

MODEL NO.:   GBU321

RECEIVED: NA

TESTED: Jul. 27 ~ Aug. 10, 2005

ISSUED: Nov. 23, 2005

APPLICANT: IOGEAR, Inc.

ADDRESS: 23 Hubble, Irvine, CA 92618, USA.

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.

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NO. 2177-01

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1. CERTIFICATION

PRODUCT:	Bluetooth 2.0 USB Adapter, Class 1
MODEL NO.:	GBU321
BRAND NAME:	IOGEAR
APPLICANT:	IOGEAR, Inc.
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	FCC Part 15, Subpart C (Section 15.247), ANSI C63.4-2003

The above equipment (model: GBU321) is identical to model described in RF940721L10, which has been tested by **Advance Data Technology Corporation** from Jul. 27 ~ Aug. 10, 2005, 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 : _Jessie Wang_ , **DATE:** Nov. 23, 2005
Jessie Wang

TECHNICAL ACCEPTANCE : _Gary Chang_ , **DATE:** Nov. 23, 2005
Responsible for RF
Gary Chang

APPROVED BY : _Cody Chang_ , **DATE:** Nov. 23, 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 –8.99dB at 0.830MHz.
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 (see Note 1) 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 (see Note 1)	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 –4.32 dB at 115.15MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.

NOTE: If The Frequency Hopping System operating in 2400-2483.5MHz band and the output power less than 125mW. The hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of hopping channel whichever is greater.

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	3.73 dB
	200MHz ~1000MHz	3.74 dB
	1GHz ~ 18GHz	2.20 dB
	18GHz ~ 40GHz	1.88 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Bluetooth 2.0 USB Adapter, Class 1
MODEL NO.	GBU321
POWER SUPPLY	5Vdc from host equipment
MODULATION TYPE	GFSK, π/4-DQPSK, 8DPSK
RADIO TECHNOLOGY	FHSS
TRANSFER RATE	1/2/3Mbps
FREQUENCY RANGE	2400 ~ 2483.5 MHz
NUMBER OF CHANNEL	79
OUTPUT POWER	15.417mW
ANTENNA TYPE	Chip antenna with 1.77dBi gain
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	NA

NOTE:

1. This is a duplicate report of RF940721L10, the difference is changing the applicant, model name, brand name, product name and outer appearance.

2. 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

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

EUT (Power from host equipment)

| Printer | Notebook | Modem |

*Test table
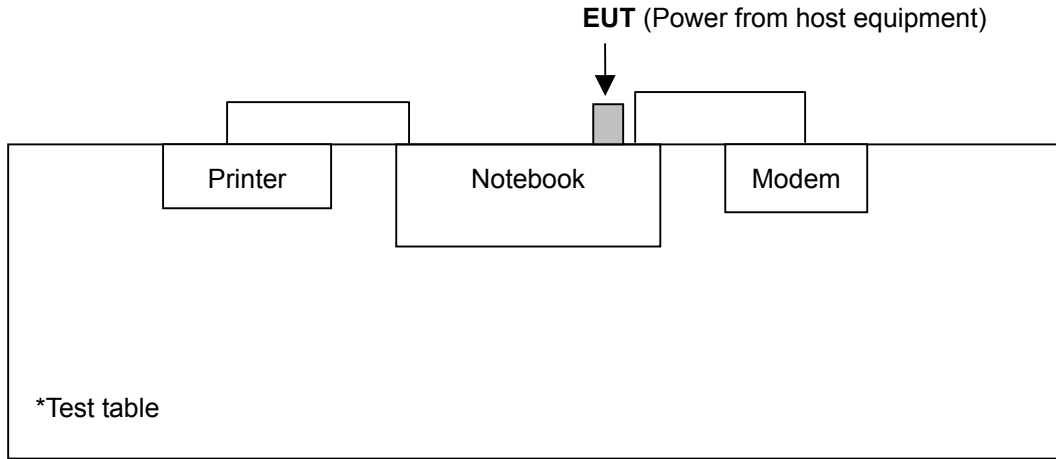
3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
A	√	√	√	√	GFSK Modulation
B	√	√	√	√	8DPSK Modulation

Where   **PLC:** Power Line Conducted Emission   **RE<1G:** Radiated Emission below 1GHz

RE≥1G: Radiated Emission above 1GHz   **APCM:** Antenna Port Conducted 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	DATE RATE
A	0 to 78	0, 39, 78	FHSS	GFSK	1
B	0 to 78	0, 39, 78	FHSS	8DPSK	3

RADIATED EMISSION TEST (BELOW 1 GHz):

☒   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	DATE RATE
A	0 to 78	78	FHSS	GFSK	1
B	0 to 78	78	FHSS	8DPSK	3

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ 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	DATE RATE
A	0 to 78	0, 39, 78	FHSS	GFSK	1
B	0 to 78	0, 39, 78	FHSS	8DPSK	3

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.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATE RATE
A	0 to 78	0, 78	FHSS	GFSK	1
B	0 to 78	0, 78	FHSS	8DPSK	3

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.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATE RATE
A	0 to 78	0, 39, 78	FHSS	GFSK	1
B	0 to 78	0, 39, 78	FHSS	8DPSK	3

3.3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. 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.

3.3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP05L	12130898320	E2K24CLNS
2	PRINTER	EPSON	LQ-300+	DCGY047265	FCC DoC Approved
3	MODEM	ACEEX	1414V/3	0401008248	IFAXDM1414

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

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

4. TEST TYPES 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	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.

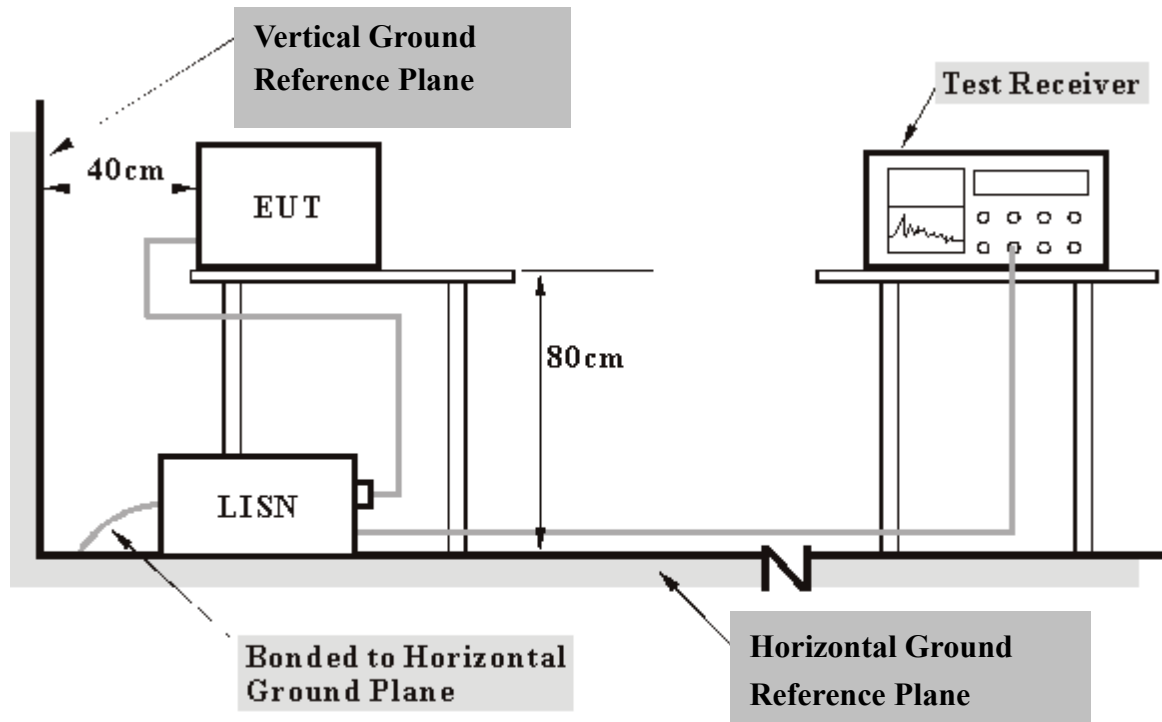3. The VCCI Site Registration No. is C-2047.

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

Vertical Ground Reference Plane

40cm

EUT

Test Receiver

80cm

LISN

Bonded to Horizontal Ground Plane

Horizontal Ground Reference Plane

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 a notebook system and placed on a testing table.

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 modem.

e. The notebook system sent "H" messages to printer, and the printer printed them on paper.
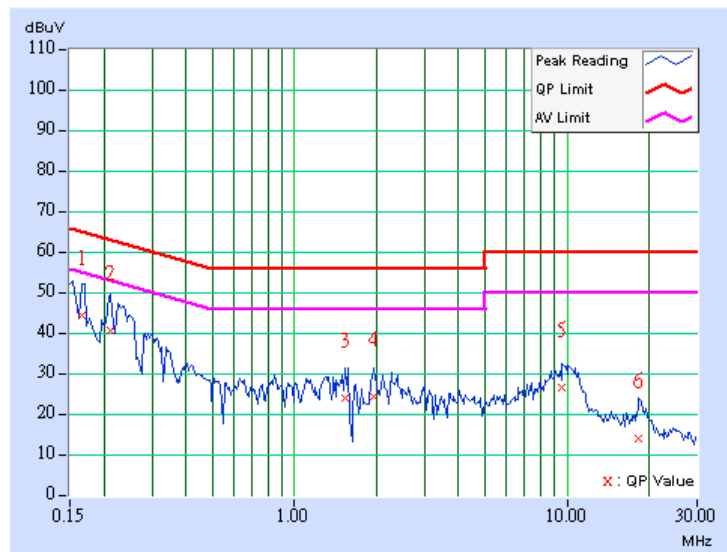
f. Steps c ~ e were repeated.

4.1.7 TEST RESULTS

CONDUCTED WORST CASE DATA: MODE A FOR GFSK

EUT	Bluetooth 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	PHASE	Line 1
CHANNEL	Channel 0	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa
TEST MODE	A	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	William Chien		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)] Q.P.	Reading Value [dB (uV)] AV.	Emission Level [dB (uV)] Q.P.	Emission Level [dB (uV)] AV.	Limit [dB (uV)] Q.P.	Limit [dB (uV)] AV.	Margin (dB) Q.P.	Margin (dB) AV.
1	0.166	0.10	43.87	-	43.97	-	65.18	55.18	-21.21	-
2	0.213	0.10	39.97	-	40.07	-	63.11	53.11	-23.04	-
3	1.531	0.20	23.51	-	23.71	-	56.00	46.00	-32.29	-
4	1.965	0.20	23.77	-	23.97	-	56.00	46.00	-32.03	-
5	9.605	0.29	25.94	-	26.23	-	60.00	50.00	-33.77	-
6	18.383	0.67	13.31	-	13.98	-	60.00	50.00	-46.02	-

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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

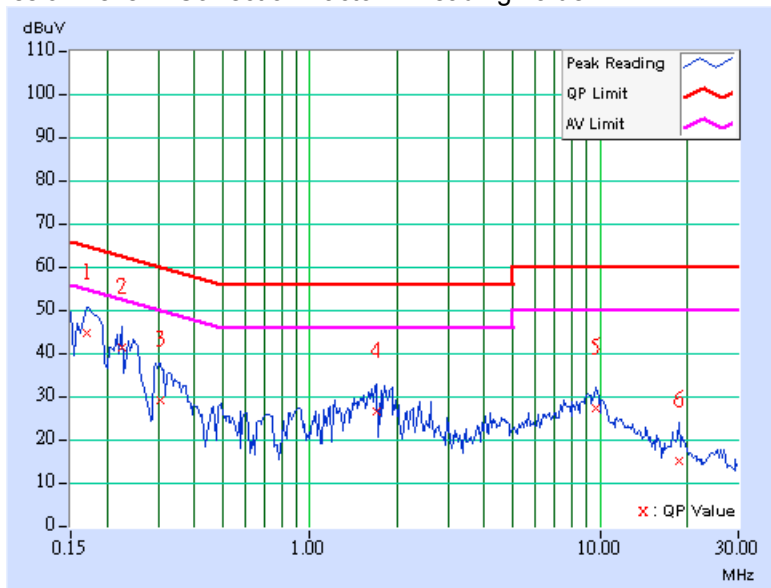6. Emission Level = Correction Factor + Reading Value.

EUT	Bluetooth 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	**PHASE**	Line 2
CHANNEL	Channel 0	**6dB BANDWIDTH**	9 kHz
MODULATION TYPE	GFSK	**ENVIRONMENTAL CONDITIONS**	25deg. C, 70%RH, 991hPa
TEST MODE	A	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY	William Chien		

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.170	0.10	43.97	-	44.07	-	64.98	54.98	-20.91	-
2	0.224	0.10	40.71	-	40.81	-	62.66	52.66	-21.85	-
3	0.306	0.10	28.63	-	28.73	-	60.07	50.07	-31.34	-
4	1.695	0.20	25.91	-	26.11	-	56.00	46.00	-29.89	-
5	9.680	0.39	26.53	-	26.92	-	60.00	50.00	-33.08	-
6	18.789	0.73	14.62	-	15.35	-	60.00	50.00	-44.65	-

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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

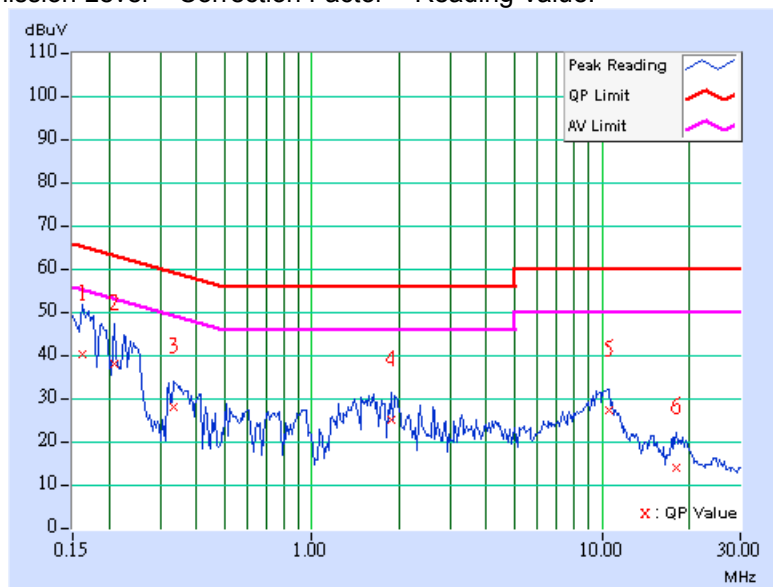6. Emission Level = Correction Factor + Reading Value.

EUT	Bluetooth 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	PHASE	Line 1
CHANNEL	Channel 39	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa
TEST MODE	A	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	William Chien		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)] Q.P.	Reading Value [dB (uV)] AV.	Emission Level [dB (uV)] Q.P.	Emission Level [dB (uV)] AV.	Limit [dB (uV)] Q.P.	Limit [dB (uV)] AV.	Margin (dB) Q.P.	Margin (dB) AV.
1	0.162	0.10	39.77	-	39.87	-	65.38	55.38	-25.51	-
2	0.209	0.10	37.48	-	37.58	-	63.26	53.26	-25.68	-
3	0.334	0.10	27.61	-	27.71	-	59.36	49.36	-31.65	-
4	1.875	0.20	24.72	-	24.92	-	56.00	46.00	-31.08	-
5	10.527	0.31	26.64	-	26.95	-	60.00	50.00	-33.05	-
6	17.996	0.64	13.31	-	13.95	-	60.00	50.00	-46.05	-

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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
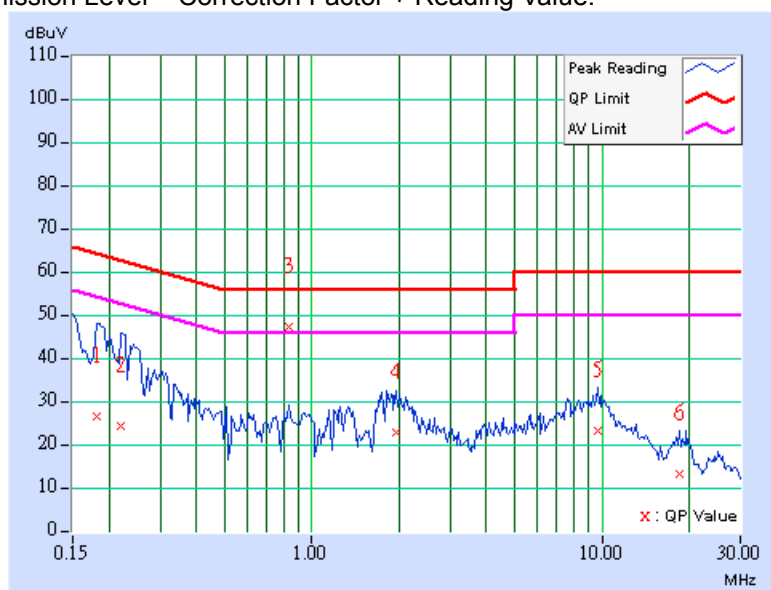6. Emission Level = Correction Factor + Reading Value.

EUT	Bluetooth 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	PHASE	Line 2
CHANNEL	Channel 39	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa
TEST MODE	A	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	William Chien		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)] Q.P.	Reading Value [dB (uV)] AV.	Emission Level [dB (uV)] Q.P.	Emission Level [dB (uV)] AV.	Limit [dB (uV)] Q.P.	Limit [dB (uV)] AV.	Margin (dB) Q.P.	Margin (dB) AV.
1	0.181	0.10	25.90	-	26.00	-	64.43	54.43	-38.43	-
2	0.220	0.10	23.56	-	23.66	-	62.81	52.81	-39.15	-
3	**0.830**	**0.17**	**46.84**	**23.31**	**47.01**	**23.48**	**56.00**	**46.00**	**-8.99**	**-22.52**
4	1.941	0.20	22.31	-	22.51	-	56.00	46.00	-33.49	-
5	9.652	0.39	22.67	-	23.06	-	60.00	50.00	-36.94	-
6	18.590	0.72	12.54	-	13.26	-	60.00	50.00	-46.74	-

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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
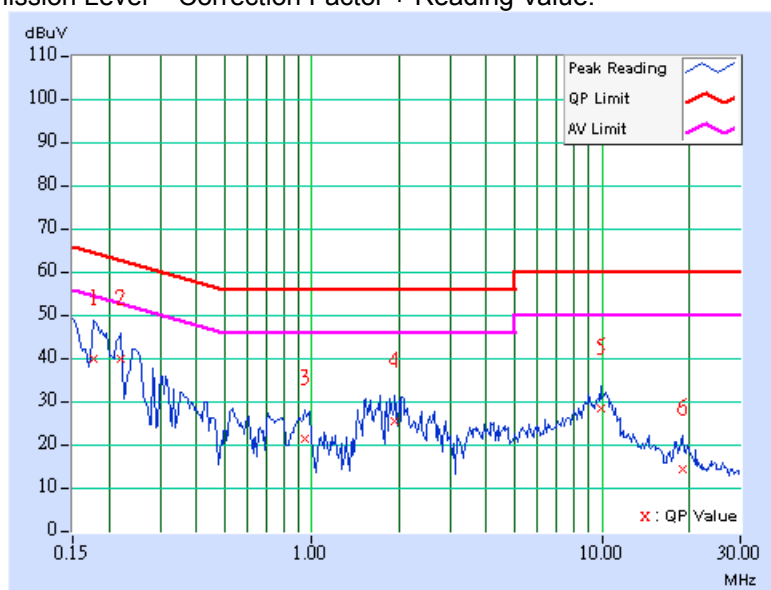6. Emission Level = Correction Factor + Reading Value.

EUT	Bluetooth 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	PHASE	Line 1
CHANNEL	Channel 78	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa
TEST MODE	A	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	William Chien		

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	39.11	-	39.21	-	64.61	54.61	-25.40	-
2	0.220	0.10	39.46	-	39.56	-	62.81	52.81	-23.25	-
3	0.947	0.19	20.91	-	21.10	-	56.00	46.00	-34.90	-
4	1.938	0.20	24.80	-	25.00	-	56.00	46.00	-31.00	-
5	9.934	0.30	27.88	-	28.18	-	60.00	50.00	-31.82	-
6	18.918	0.71	13.68	-	14.39	-	60.00	50.00	-45.61	-

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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
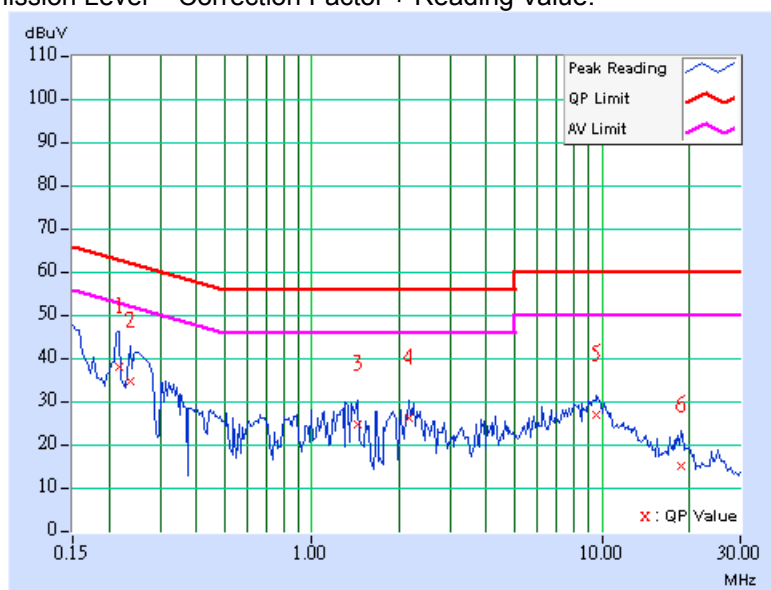   6. Emission Level = Correction Factor + Reading Value.

EUT	Bluetooth 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	PHASE	Line 2
CHANNEL	Channel 78	6dB BANDWIDTH	9 kHz
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa
TEST MODE	A	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	William Chien		

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	0.216	0.10	37.59	-	37.69	-	62.96	52.96	-25.27	-
2	0.236	0.10	34.15	-	34.25	-	62.24	52.24	-27.99	-
3	1.441	0.20	24.02	-	24.22	-	56.00	46.00	-31.78	-
4	2.164	0.20	25.41	-	25.61	-	56.00	46.00	-30.39	-
5	9.613	0.39	26.42	-	26.81	-	60.00	50.00	-33.19	-
6	18.785	0.73	14.52	-	15.25	-	60.00	50.00	-44.75	-

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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

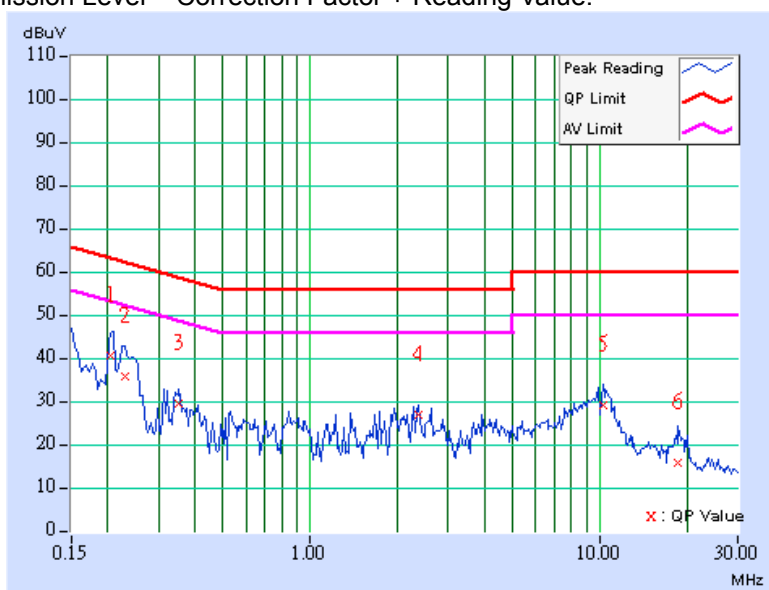6. Emission Level = Correction Factor + Reading Value.

CONDUCTED WORST CASE DATA: MODE B FOR 8DPSK

EUT	Bluetooth 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	PHASE	Line 1
CHANNEL	Channel 0	6dB BANDWIDTH	9 kHz
MODULATION TYPE	8DPSK	ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa
TEST MODE	B	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	William Chien		

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.205	0.10	40.05	-	40.15	-	63.42	53.42	-23.27	-
2	0.228	0.10	35.39	-	35.49	-	62.52	52.52	-27.03	-
3	0.353	0.10	28.99	-	29.09	-	58.89	48.89	-29.80	-
4	2.375	0.20	26.48	-	26.68	-	56.00	46.00	-29.32	-
5	10.227	0.30	28.48	-	28.78	-	60.00	50.00	-31.22	-
6	18.648	0.69	15.35	-	16.04	-	60.00	50.00	-43.96	-

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	PHASE	Line 2
CHANNEL	Channel 0	6dB BANDWIDTH	9 kHz
MODULATION TYPE	8DPSK	ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa
TEST MODE	B	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	William Chien		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)] Q.P.	Reading Value [dB (uV)] AV.	Emission Level [dB (uV)] Q.P.	Emission Level [dB (uV)] AV.	Limit [dB (uV)] Q.P.	Limit [dB (uV)] AV.	Margin (dB) Q.P.	Margin (dB) AV.
1	0.209	0.10	40.92	-	41.02	-	63.26	53.26	-22.24	-
2	0.244	0.10	36.96	-	37.06	-	61.97	51.97	-24.91	-
3	0.357	0.10	27.68	-	27.78	-	58.80	48.80	-31.02	-
4	2.270	0.20	25.72	-	25.92	-	56.00	46.00	-30.08	-
5	9.918	0.40	26.99	-	27.39	-	60.00	50.00	-32.61	-
6	18.906	0.73	15.23	-	15.96	-	60.00	50.00	-44.04	-

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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

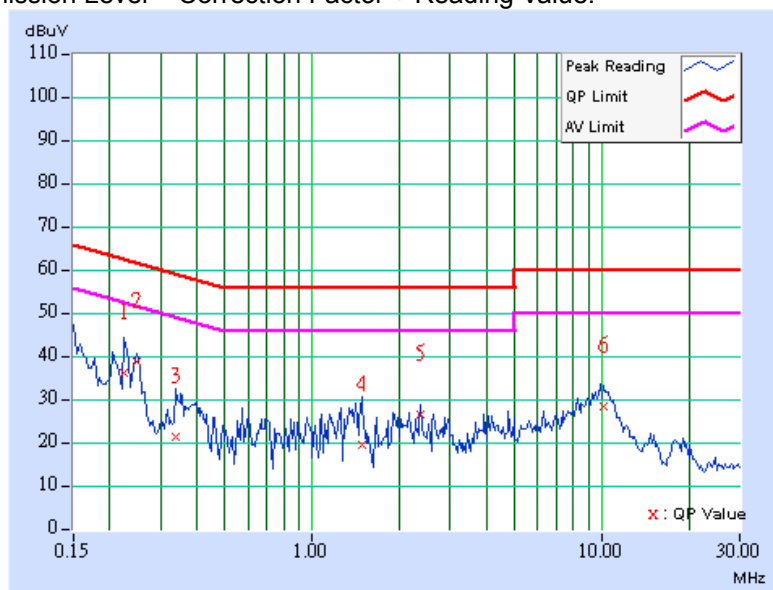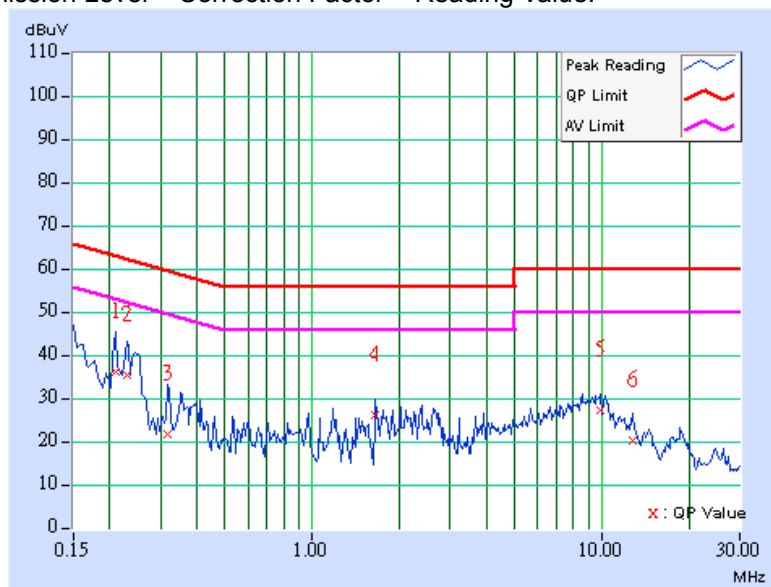6. Emission Level = Correction Factor + Reading Value.

EUT	Bluetooth 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	PHASE	Line 1
CHANNEL	Channel 39	6dB BANDWIDTH	9 kHz
MODULATION TYPE	8DPSK	ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa
TEST MODE	B	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	William Chien		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)] Q.P.	Reading Value [dB (uV)] AV.	Emission Level [dB (uV)] Q.P.	Emission Level [dB (uV)] AV.	Limit [dB (uV)] Q.P.	Limit [dB (uV)] AV.	Margin (dB) Q.P.	Margin (dB) AV.
1	0.224	0.10	35.84	-	35.94	-	62.66	52.66	-26.72	-
2	0.248	0.10	38.68	-	38.78	-	61.84	51.84	-23.06	-
3	0.338	0.10	21.10	-	21.20	-	59.26	49.26	-38.06	-
4	1.480	0.20	19.15	-	19.35	-	56.00	46.00	-36.65	-
5	2.379	0.20	26.24	-	26.44	-	56.00	46.00	-29.56	-
6	10.219	0.30	28.39	-	28.69	-	60.00	50.00	-31.31	-

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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
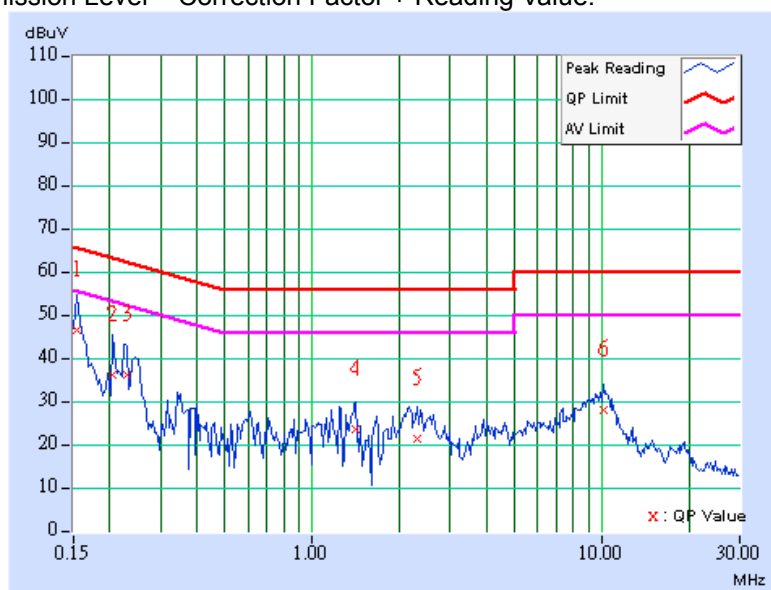6. Emission Level = Correction Factor + Reading Value.

EUT	Bluetooth 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	PHASE	Line 2
CHANNEL	Channel 39	6dB BANDWIDTH	9 kHz
MODULATION TYPE	8DPSK	ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa
TEST MODE	B	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	William Chien		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)] Q.P.	Reading Value [dB (uV)] AV.	Emission Level [dB (uV)] Q.P.	Emission Level [dB (uV)] AV.	Limit [dB (uV)] Q.P.	Limit [dB (uV)] AV.	Margin (dB) Q.P.	Margin (dB) AV.
1	0.209	0.10	35.85	-	35.95	-	63.26	53.26	-27.31	-
2	0.228	0.10	35.01	-	35.11	-	62.52	52.52	-27.41	-
3	0.318	0.10	21.42	-	21.52	-	59.76	49.76	-38.24	-
4	1.656	0.20	25.68	-	25.88	-	56.00	46.00	-30.12	-
5	9.902	0.40	26.84	-	27.24	-	60.00	50.00	-32.76	-
6	12.801	0.46	19.90	-	20.36	-	60.00	50.00	-39.64	-

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	PHASE	Line 1
CHANNEL	Channel 78	6dB BANDWIDTH	9 kHz
MODULATION TYPE	8DPSK	ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa
TEST MODE	B	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	William Chien		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)] Q.P.	Reading Value [dB (uV)] AV.	Emission Level [dB (uV)] Q.P.	Emission Level [dB (uV)] AV.	Limit [dB (uV)] Q.P.	Limit [dB (uV)] AV.	Margin (dB) Q.P.	Margin (dB) AV.
1	0.154	0.10	46.43	-	46.53	-	65.79	55.79	-19.26	-
2	0.205	0.10	35.87	-	35.97	-	63.42	53.42	-27.45	-
3	0.228	0.10	35.99	-	36.09	-	62.52	52.52	-26.43	-
4	1.418	0.20	23.31	-	23.51	-	56.00	46.00	-32.49	-
5	2.316	0.20	21.14	-	21.34	-	56.00	46.00	-34.66	-
6	10.168	0.30	27.78	-	28.08	-	60.00	50.00	-31.92	-

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	PHASE	Line 2
CHANNEL	Channel 78	6dB BANDWIDTH	9 kHz
MODULATION TYPE	8DPSK	ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa
TEST MODE	B	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	William Chien		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)] Q.P.	Reading Value [dB (uV)] AV.	Emission Level [dB (uV)] Q.P.	Emission Level [dB (uV)] AV.	Limit [dB (uV)] Q.P.	Limit [dB (uV)] AV.	Margin (dB) Q.P.	Margin (dB) AV.
1	0.205	0.10	34.62	-	34.72	-	63.42	53.42	-28.70	-
2	0.224	0.10	37.61	-	37.71	-	62.66	52.66	-24.95	-
3	0.314	0.10	26.53	-	26.63	-	59.86	49.86	-33.23	-
4	1.664	0.20	27.41	-	27.61	-	56.00	46.00	-28.39	-
5	9.559	0.39	26.55	-	26.94	-	60.00	50.00	-33.06	-
6	17.652	0.66	15.12	-	15.78	-	60.00	50.00	-44.22	-

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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.
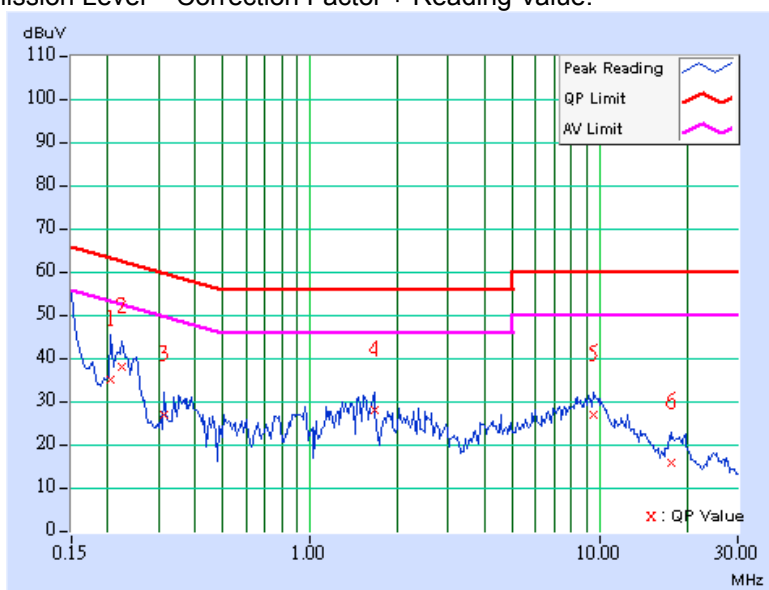
4.2 RADIATED EMISSION MEASUREMENT

4.2.1 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:

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

2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

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.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESI7	100033	May. 19, 2006
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Nov. 21, 2006
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Jun. 01, 2006
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.

4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter 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 lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions 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 Quasi-peak detection at frequency below 1GHz.

2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection (PK) at frequency above 1GHz.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

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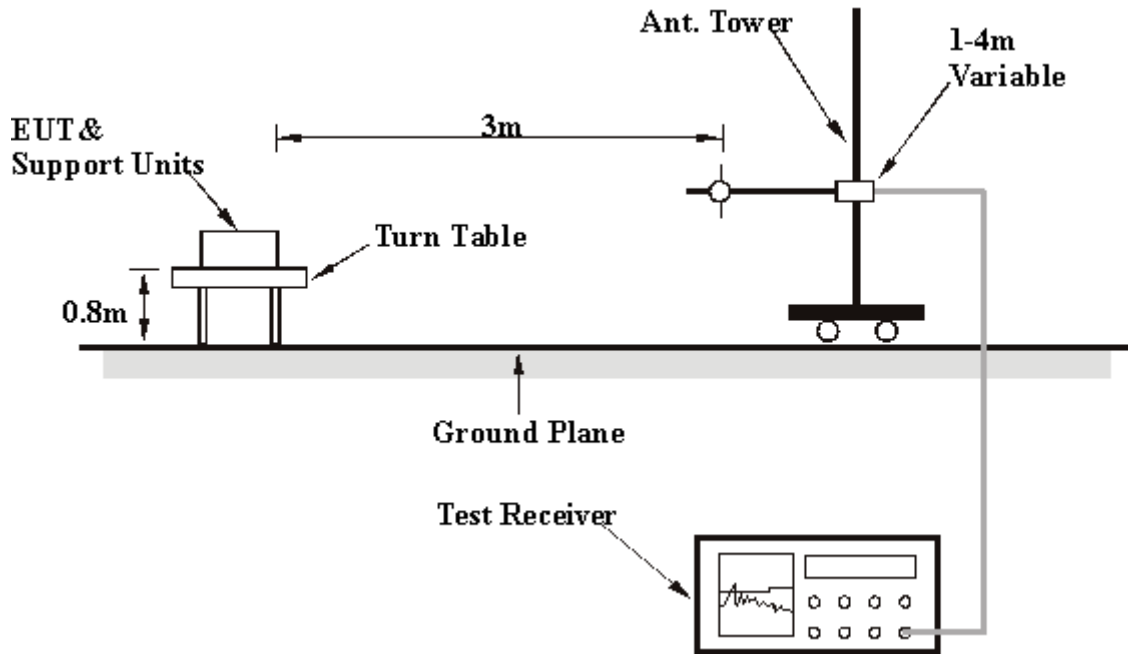
For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

RADIATED WORST CASE DATA: BELOW 1GHz

Mode A for GFSK

EUT	Bluetooth 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	FREQUENCY RANGE	Below 1000MHz
CHANNEL	Channel 78	DETECTOR FUNCTION	Quasi-Peak
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa
TEST MODE	A	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Morgan Chen		

No.	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
	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	**115.15**	**39.18 QP**	**43.50**	**-4.32**	**1.25 H**	**262**	**28.45**	**10.73**
2	566.51	33.86 QP	46.00	-12.14	1.50 H	1	12.12	21.74
3	601.50	33.57 QP	46.00	-12.43	1.25 H	226	10.65	22.92
4	735.63	35.51 QP	46.00	-10.49	1.00 H	148	10.19	25.32
5	799.78	33.70 QP	46.00	-12.30	1.75 H	91	7.42	26.27
6	863.93	34.25 QP	46.00	-11.75	1.50 H	52	7.39	26.86

No.	ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
	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	35.83	23.42 QP	40.00	-16.58	1.00 V	19	9.88	13.54
2	113.59	32.62 QP	43.50	-10.88	1.00 V	250	22.02	10.59
3	449.88	34.48 QP	46.00	-11.52	1.00 V	328	15.45	19.03
4	731.74	30.14 QP	46.00	-15.86	1.50 V	37	4.98	25.16
5	799.78	31.14 QP	46.00	-14.86	1.25 V	145	4.86	26.27
6	863.93	31.47 QP	46.00	-14.53	1.25 V	322	4.61	26.86

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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.

Mode B for 8DPSK

EUT	Bluetooth 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	FREQUENCY RANGE	Below 1000MHz
CHANNEL	Channel 78	DETECTOR FUNCTION	Quasi-Peak
MODULATION TYPE	8DPSK	ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa
TEST MODE	B	INPUT POWER (SYSTEM)	120Vac, 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	115.53	34.28 QP	43.50	-9.22	1.50 H	262	23.51	10.77
2	457.66	32.75 QP	46.00	-13.25	1.75 H	136	13.53	19.23
3	603.45	33.73 QP	46.00	-12.27	1.50 H	286	10.79	22.93
4	735.63	31.03 QP	46.00	-14.97	1.00 H	118	5.72	25.32
5	801.72	31.96 QP	46.00	-14.04	1.75 H	130	5.67	26.29
6	865.87	31.30 QP	46.00	-14.70	1.50 H	58	4.43	26.87

	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	115.53	27.13 QP	43.50	-16.37	1.00 V	244	16.36	10.77
2	449.88	34.80 QP	46.00	-11.20	1.00 V	349	15.76	19.03
3	731.74	30.29 QP	46.00	-15.71	1.00 V	58	5.13	25.16
4	801.72	31.26 QP	46.00	-14.74	1.25 V	136	4.96	26.29
5	863.93	30.70 QP	46.00	-15.30	1.00 V	223	3.84	26.86
6	931.96	31.05 QP	46.00	-14.95	1.00 V	127	3.44	27.61

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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.

Mode A for GFSK

EUT	Bluetooth 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	FREQUENCY RANGE	1 ~ 25GHz
CHANNEL	Channel 0	DETECTOR FUNCTION	Peak (PK) Average (AV)
MODULATION TYPE	GFSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa	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	1601.00	39.71 PK	74.00	-34.29	1.00 H	214	10.96	28.75
1	1601.00	29.64 AV	54.00	-24.36	1.00 H	214	0.89	28.75
2	2390.00	40.34 PK	74.00	-33.66	1.17 H	312	8.94	31.40
2	2390.00	30.34 AV	54.00	-23.66	1.17 H	312	-1.06	31.40
3	*2402.00	106.34 PK			1.17 H	312	74.87	31.47
3	*2402.00	76.34 AV			1.17 H	312	44.87	31.47
4	4804.00	61.82 PK	74.00	-12.18	1.04 H	19	25.06	36.76
4	4804.00	31.82 AV	54.00	-22.18	1.04 H	19	-4.94	36.76
5	7206.00	55.31 PK	74.00	-18.69	1.16 H	25	12.41	42.90
5	7206.00	25.31 AV	54.00	-28.69	1.16 H	25	-17.59	42.90
6	9608.00	56.52 PK	74.00	-17.48	1.00 H	351	9.95	46.57
6	9608.00	26.52 AV	54.00	-27.48	1.00 H	351	-20.05	46.57

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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 296.25 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 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	FREQUENCY RANGE	1 ~ 25GHz
CHANNEL	Channel 0	DETECTOR FUNCTION	Peak (PK) Average (AV)
MODULATION TYPE	GFSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa	TEST MODE	A
TESTED BY	Morgan Chen		

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	1601.00	39.91 PK	74.00	-34.09	1.13 V	94	11.16	28.75
1	1601.00	27.48 AV	54.00	-26.52	1.13 V	94	-1.27	28.75
2	2390.00	49.66 PK	74.00	-24.34	1.00 V	98	18.26	31.40
2	2390.00	39.66 AV	54.00	-14.34	1.00 V	98	8.26	31.40
3	*2402.00	105.66 PK			1.00 V	98	74.19	31.47
3	*2402.00	75.66 AV			1.00 V	98	44.19	31.47
4	4804.00	61.64 PK	74.00	-12.36	1.00 V	359	24.88	36.76
4	4804.00	31.64 AV	54.00	-22.36	1.00 V	359	-5.12	36.76
5	7206.00	54.73 PK	74.00	-19.27	1.08 V	342	11.83	42.90
5	7206.00	24.73 AV	54.00	-29.27	1.08 V	342	-18.17	42.90
6	9608.00	56.02 PK	74.00	-17.98	1.05 V	351	9.45	46.57
6	9608.00	26.02 AV	54.00	-27.98	1.05 V	351	-20.55	46.57

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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 296.25 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 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	FREQUENCY RANGE	1 ~ 25GHz
CHANNEL	Channel 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
MODULATION TYPE	GFSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa	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	1627.00	39.72 PK	74.00	-34.28	1.00 H	240	10.94	28.78
2	*2441.00	106.52 PK			1.16 H	322	74.80	31.72
2	*2441.00	76.52 AV			1.16 H	322	44.80	31.72
3	4882.00	63.52 PK	74.00	-10.48	1.06 H	23	26.74	36.78
3	4882.00	33.52 AV	54.00	-20.48	1.06 H	23	-3.26	36.78
4	7323.00	57.85 PK	74.00	-16.15	1.10 H	32	14.87	42.98
4	7323.00	27.85 AV	54.00	-26.15	1.10 H	32	-15.13	42.98

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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 296.25 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 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	FREQUENCY RANGE	1 ~ 25GHz
CHANNEL	Channel 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
MODULATION TYPE	GFSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa	TEST MODE	A
TESTED BY	Morgan Chen		

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	1627.00	39.85 PK	74.00	-34.15	1.16 V	34	11.07	28.78
2	*2441.00	105.45 PK			1.11 V	99	73.73	31.72
2	*2441.00	75.45 AV			1.11 V	99	43.73	31.72
3	4882.00	62.64 PK	74.00	-11.36	1.07 V	6	25.86	36.78
3	4882.00	32.64 AV	54.00	-21.36	1.07 V	6	-4.14	36.78
4	7323.00	57.03 PK	74.00	-16.97	1.08 V	315	14.05	42.98
4	7323.00	27.03 AV	54.00	-26.97	1.08 V	315	-15.95	42.98
5	9764.00	56.95 PK	74.00	-17.05	1.04 V	324	10.03	46.92
5	9764.00	26.95 AV	54.00	-27.05	1.04 V	324	-19.97	46.92

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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 296.25 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 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	**FREQUENCY RANGE**	1 ~ 25GHz
CHANNEL	Channel 78	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
MODULATION TYPE	GFSK	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa	**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	1653.00	39.82 PK	74.00	-34.18	1.00 H	245	11.02	28.80
2	*2480.00	106.40 PK			1.14 H	316	74.44	31.96
2	*2480.00	76.40 AV			1.14 H	316	44.44	31.96
3	2483.50	50.40 PK	74.00	-23.60	1.14 H	316	18.41	31.99
3	2483.50	40.40 AV	54.00	-13.60	1.14 H	316	8.41	31.99
4	4960.00	62.42 PK	74.00	-11.58	1.11 H	12	25.60	36.82
4	4960.00	32.42 AV	54.00	-21.58	1.11 H	12	-4.40	36.82
5	7440.00	56.83 PK	74.00	-17.17	1.47 H	24	13.82	43.01
5	7440.00	26.83 AV	54.00	-27.17	1.47 H	24	-16.18	43.01
6	9920.00	57.18 PK	74.00	-16.82	1.07 H	4	9.96	47.22
6	9920.00	27.18 AV	54.00	-26.82	1.07 H	4	-20.04	47.22

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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 296.25 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 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	FREQUENCY RANGE	1 ~ 25GHz
CHANNEL	Channel 78	DETECTOR FUNCTION	Peak (PK) Average (AV)
MODULATION TYPE	GFSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa	TEST MODE	A
TESTED BY	Morgan Chen		

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	1653.00	39.98 PK	74.00	-34.02	1.15 V	54	11.18	28.80
2	*2480.00	105.24 PK			1.12 V	95	73.28	31.96
2	*2480.00	75.24 AV			1.12 V	95	43.28	31.96
3	2483.50	49.24 PK	74.00	-24.76	1.12 V	95	17.25	31.99
3	2483.50	39.24 AV	54.00	-14.76	1.12 V	95	7.25	31.99
4	4960.00	61.85 PK	74.00	-12.15	1.25 V	311	25.03	36.82
4	4960.00	31.85 AV	54.00	-22.15	1.25 V	311	-4.97	36.82
5	7440.00	56.02 PK	74.00	-17.98	1.21 V	322	13.01	43.01
5	7440.00	26.02 AV	54.00	-27.98	1.21 V	322	-16.99	43.01
6	9920.00	56.84 PK	74.00	-17.16	1.04 V	358	9.62	47.22
6	9920.00	26.84 AV	54.00	-27.16	1.04 V	358	-20.38	47.22

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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 296.25 ms per channel. Therefore, the duty cycle be equal to: 20log(3.125/100)= -30 dB.

6. Average value = peak reading –20log(duty cycle).

Mode B for 8DPSK

EUT	Bluetooth 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	FREQUENCY RANGE	1 ~ 25GHz
CHANNEL	Channel 0	DETECTOR FUNCTION	Peak (PK) Average (AV)
MODULATION TYPE	8DPSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa	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	1601.00	40.11 PK	74.00	-33.89	1.00 H	219	11.36	28.75
2	2390.00	54.84 PK	74.00	-19.16	1.00 H	219	23.44	31.40
2	2390.00	44.84 AV	54.00	-9.16	1.00 H	219	13.44	31.40
3	*2402.00	110.84 PK			1.29 H	45	79.36	31.47
3	*2402.00	80.84 AV			1.29 H	45	49.37	31.47
4	4804.00	63.25 PK	74.00	-10.75	1.15 H	315	26.49	36.76
4	4804.00	33.25 AV	54.00	-20.75	1.15 H	315	-3.51	36.76
5	7206.00	58.58 PK	74.00	-15.42	1.02 H	325	15.68	42.90
5	7206.00	28.58 AV	54.00	-25.42	1.02 H	325	-14.32	42.90
6	9608.00	58.96 PK	74.00	-15.04	1.08 H	315	12.39	46.57
6	9608.00	28.96 AV	54.00	-25.04	1.08 H	315	-17.61	46.57

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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 296.25 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 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	FREQUENCY RANGE	1 ~ 25GHz
CHANNEL	Channel 0	DETECTOR FUNCTION	Peak (PK) Average (AV)
MODULATION TYPE	8DPSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa	TEST MODE	B
TESTED BY	Morgan Chen		

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	1601.00	40.05 PK	74.00	-33.95	1.02 V	315	11.30	28.75
2	2390.00	53.80 PK	74.00	-20.20	1.15 V	345	22.40	31.40
2	2390.00	43.80 AV	54.00	-10.20	1.15 V	345	12.40	31.40
3	*2402.00	109.80 PK			1.15 V	345	78.33	31.47
3	*2402.00	79.80 AV			1.15 V	345	48.33	31.47
4	4804.00	63.12 PK	74.00	-10.88	1.12 V	312	26.36	36.76
4	4804.00	33.12 AV	54.00	-20.88	1.12 V	312	-3.64	36.76
5	7206.00	58.45 PK	74.00	-15.55	1.02 V	319	15.55	42.90
5	7206.00	28.45 AV	54.00	-25.55	1.02 V	319	-14.45	42.90
6	9608.00	55.98 PK	74.00	-18.02	1.09 V	311	9.41	46.57
6	9608.00	25.98 AV	54.00	-28.02	1.09 V	311	-20.59	46.57

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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 296.25 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 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	FREQUENCY RANGE	1 ~ 25GHz
CHANNEL	Channel 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
MODULATION TYPE	8DPSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa	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	1627.00	40.12 PK	74.00	-33.88	1.00 H	251	11.34	28.78
2	*2441.00	110.57 PK			1.00 H	210	78.85	31.72
2	*2441.00	80.57 AV			1.00 H	210	48.85	31.72
3	4882.00	64.85 PK	74.00	-9.15	1.22 H	315	28.07	36.78
3	4882.00	34.82 AV	54.00	-19.18	1.22 H	315	-1.96	36.78
4	7323.00	58.91 PK	74.00	-15.09	1.02 H	30	15.93	42.98
4	7323.00	28.91 AV	54.00	-25.09	1.02 H	30	-14.07	42.98

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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 296.25 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 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	FREQUENCY RANGE	1 ~ 25GHz
CHANNEL	Channel 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
MODULATION TYPE	8DPSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa	TEST MODE	B
TESTED BY	Morgan Chen		

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	1627.00	40.25 PK	74.00	-33.75	1.05 V	311	11.47	28.78
2	*2441.00	109.45 PK			1.13 V	321	77.73	31.72
2	*2441.00	79.45 AV			1.13 V	321	47.73	31.72
3	4882.00	64.12 PK	74.00	-9.88	1.09 V	325	27.34	36.78
3	4882.00	34.12 AV	54.00	-19.88	1.09 V	325	-2.66	36.78
4	7323.00	58.75 PK	74.00	-15.25	1.08 V	308	15.77	42.98
4	7323.00	28.75 AV	54.00	-25.25	1.08 V	308	-14.23	42.98

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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 296.25 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 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	FREQUENCY RANGE	1 ~ 25GHz
CHANNEL	Channel 78	DETECTOR FUNCTION	Peak (PK) Average (AV)
MODULATION TYPE	8DPSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa	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	1653.00	40.12 PK	74.00	-33.88	1.02 H	321	11.32	28.80
2	*2480.00	110.85 PK			1.12 H	307	78.89	31.96
2	*2480.00	80.85 AV			1.12 H	307	48.89	31.96
3	2483.50	54.85 PK	74.00	-19.15	1.12 H	307	22.86	31.99
3	2483.50	44.85 AV	54.00	-9.15	1.12 H	307	12.86	31.99
4	4960.00	63.88 PK	74.00	-10.12	1.16 H	324	27.06	36.82
4	4960.00	33.88 AV	54.00	-20.12	1.16 H	324	-2.94	36.82
5	7440.00	58.58 PK	74.00	-15.42	1.18 H	315	15.57	43.01
5	7440.00	28.58 AV	54.00	-25.42	1.18 H	315	-14.43	43.01
6	9920.00	58.99 PK	74.00	-15.01	1.08 H	305	11.77	47.22
6	9920.00	28.99 AV	54.00	-25.01	1.08 H	305	-18.23	47.22

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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 296.25 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 2.0 USB Adapter, Class 1	MEASUREMENT DETAIL	
MODEL	GBU321	FREQUENCY RANGE	1 ~ 25GHz
CHANNEL	Channel 78	DETECTOR FUNCTION	Peak (PK) Average (AV)
MODULATION TYPE	8DPSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 991hPa	TEST MODE	B
TESTED BY	Morgan Chen		

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	1653.00	40.08 PK	74.00	-33.92	1.04 V	308	11.28	28.80
2	*2480.00	109.91 PK			1.17 V	335	77.95	31.96
2	*2480.00	79.91 AV			1.17 V	335	47.95	31.96
3	2483.50	53.91 PK	74.00	-20.09	1.17 V	335	21.92	31.99
3	2483.50	43.91 AV	54.00	-10.09	1.17 V	335	11.92	31.99
4	4960.00	63.02 PK	74.00	-10.98	1.21 V	331	26.20	36.82
4	4960.00	33.02 AV	54.00	-20.98	1.21 V	331	-3.80	36.82
5	7440.00	58.02 PK	74.00	-15.98	1.16 V	305	15.01	43.01
5	7440.00	28.02 AV	54.00	-25.98	1.16 V	305	-14.99	43.01
6	9920.00	58.12 PK	74.00	-15.88	1.16 V	348	10.90	47.22
6	9920.00	28.12 AV	54.00	-25.88	1.16 V	348	-19.10	47.22

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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 296.25 ms per channel. Therefore, the duty cycle be equal to: 20log(3.125/100)= -30 dB.

6. Average value = peak reading –20log(duty cycle).

4.3 NUMBER OF HOPPING FREQUENCY USED

4.3.1 LIMIT OF HOPPING FREQUENCY USED

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

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
SPECTRUM ANALYZER	FSEK30	100049	Aug. 14, 2006

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

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.

b. 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.

c. 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.

d. Set the SA on View mode and then plot the result on SA screen.

e. Repeat above procedures until all frequencies measured were complete.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 TEST SETUP

```
┌─────────────┐              ┌─────────────────┐
│             │              │    SPECTRUM     │
│     EUT     │──────────────│    ANALYZER     │
│             │              │                 │
└─────────────┘              └─────────────────┘
```

4.3.6 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.

Mode A for GFSK
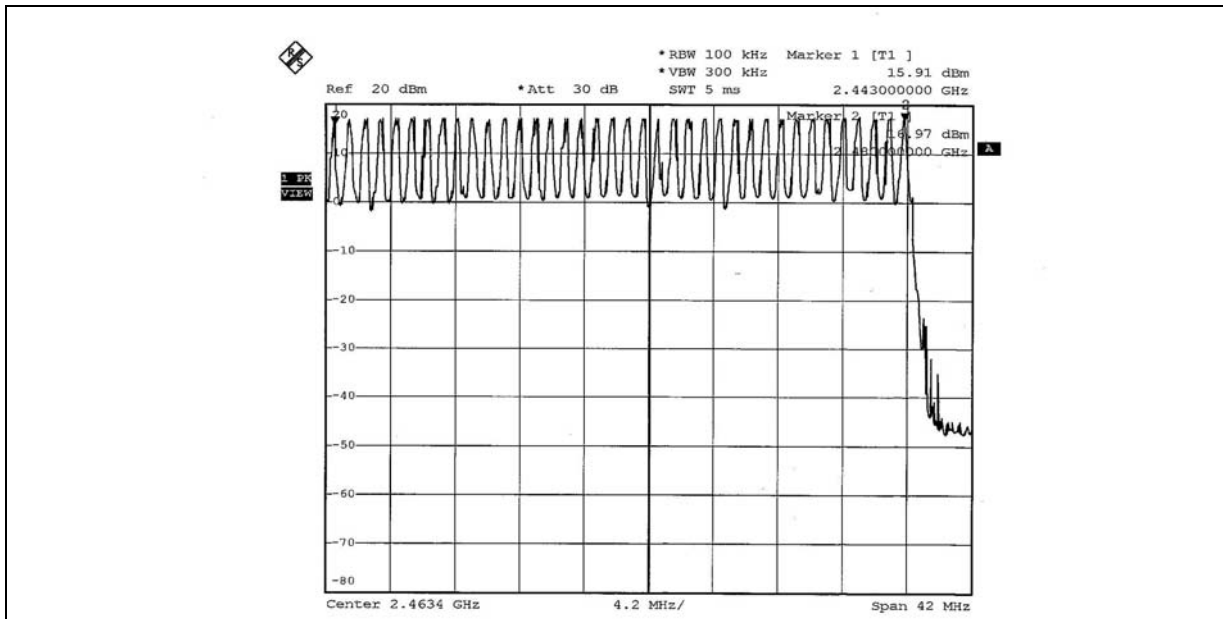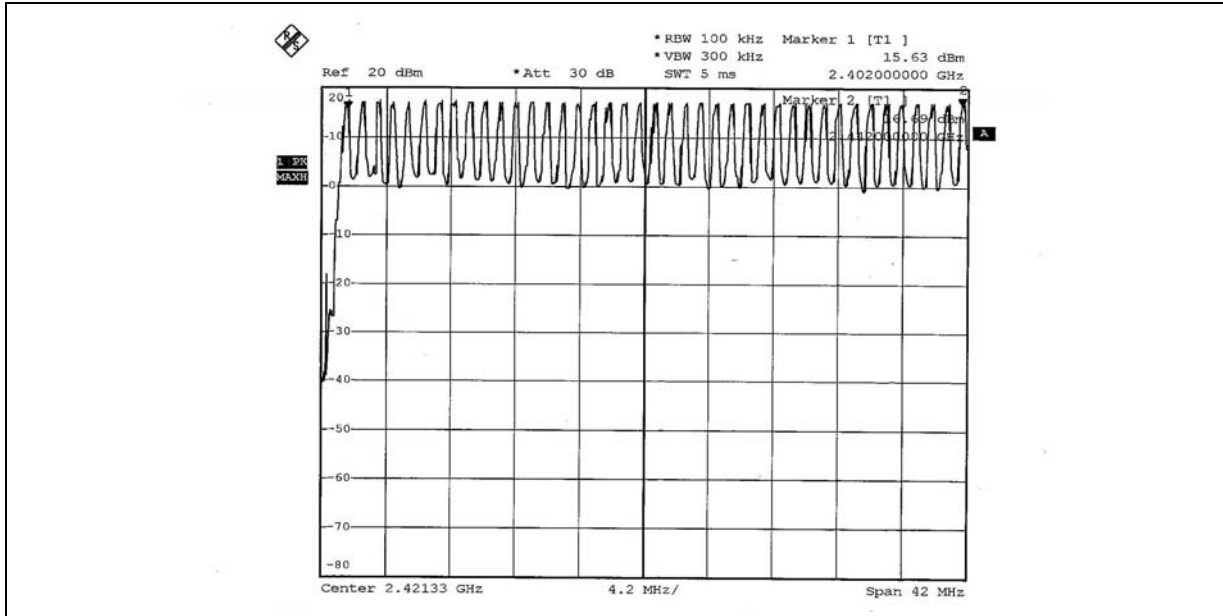
Mode B for 8DPSK
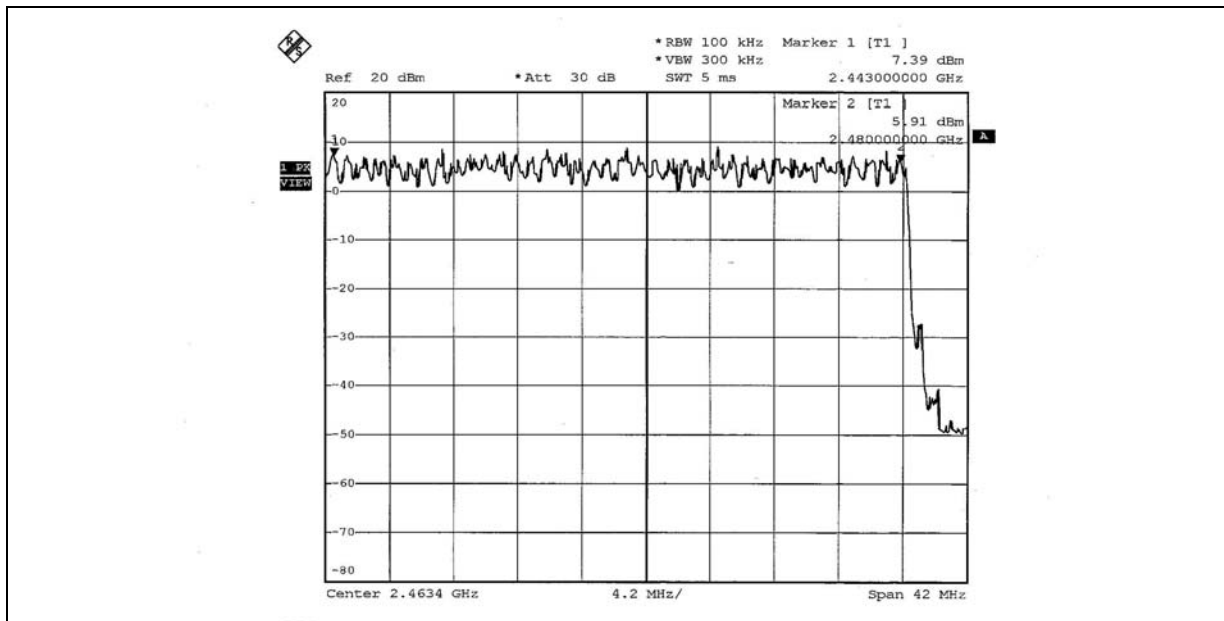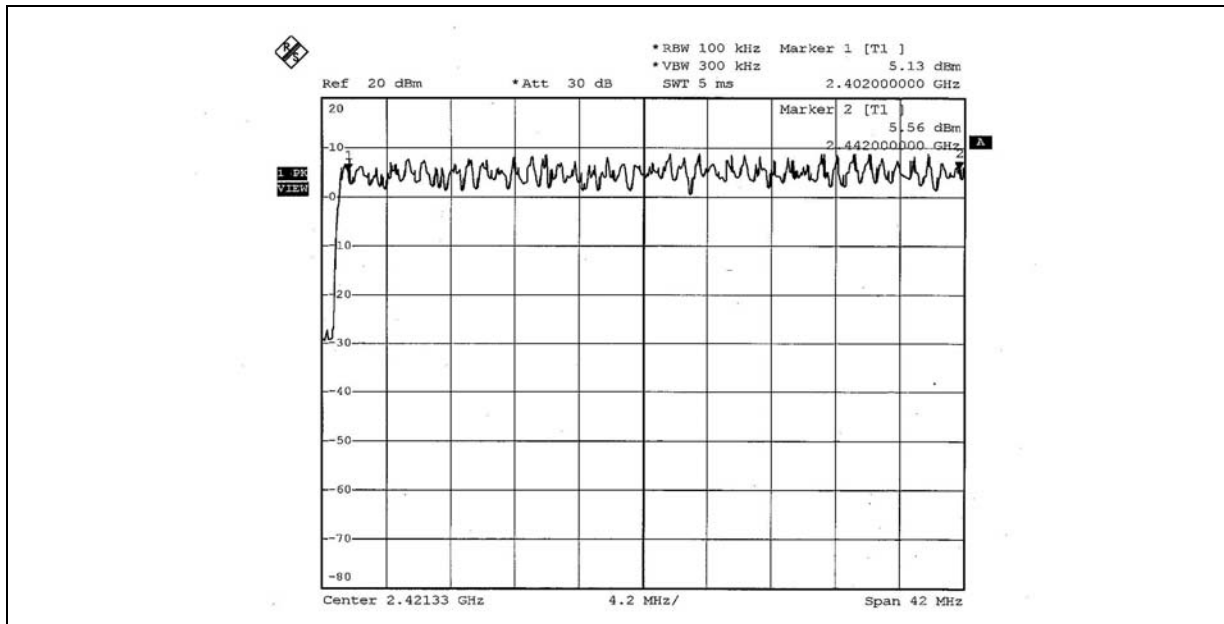
4.4 DWELL TIME ON EACH CHANNEL

4.4.1 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.

4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
SPECTRUM ANALYZER	FSEK30	100049	Aug. 14, 2006

NOTES: 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 PROCEDURES

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.

b. 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.

c. 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.

d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.

e. Repeat above procedures until all different time-slot modes have been completed.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP

```
┌─────────────┐            ┌─────────────┐
│             │            │  SPECTRUM   │
│     EUT     │────────────│  ANALYZER   │
│             │            │             │
└─────────────┘            └─────────────┘
```
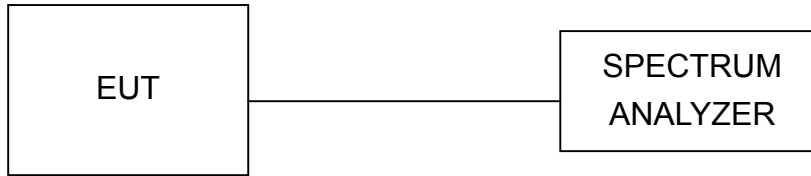
4.4.6 TEST RESULTS

Mode A for GFSK

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	0.524	168.900	400
DH3	26 (times / 5 sec) *6.32=164.32 times	1.782	292.820	400
DH5	15 (times / 5 sec) *6.32=94.80 times	3.110	294.828	400

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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

DH1
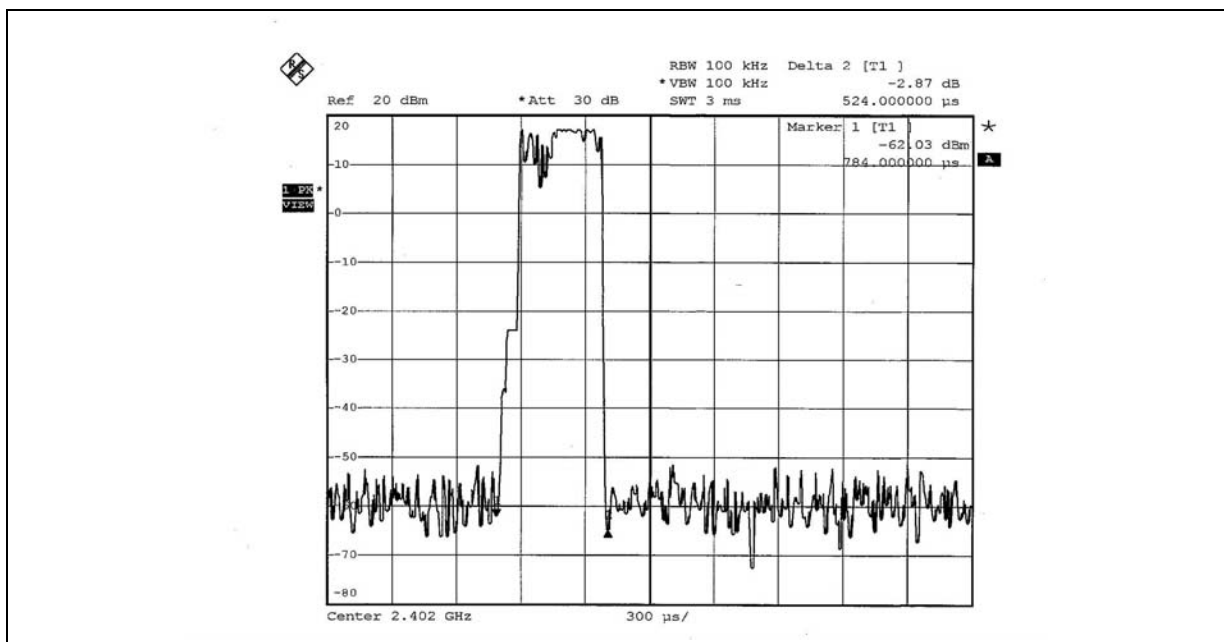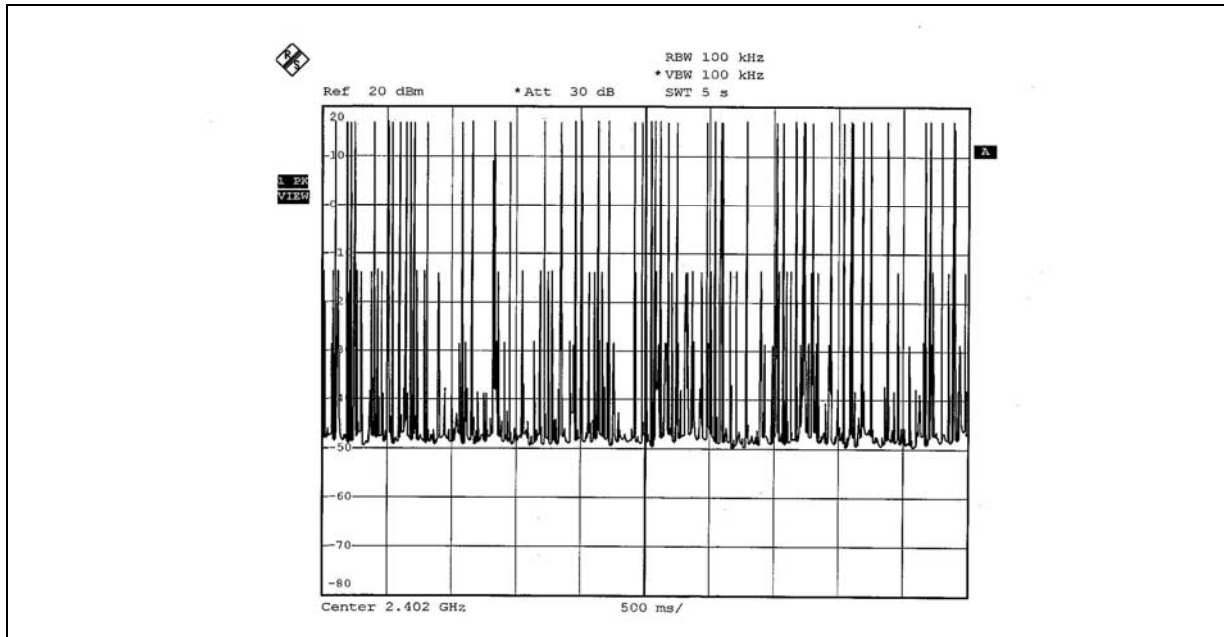
DH3
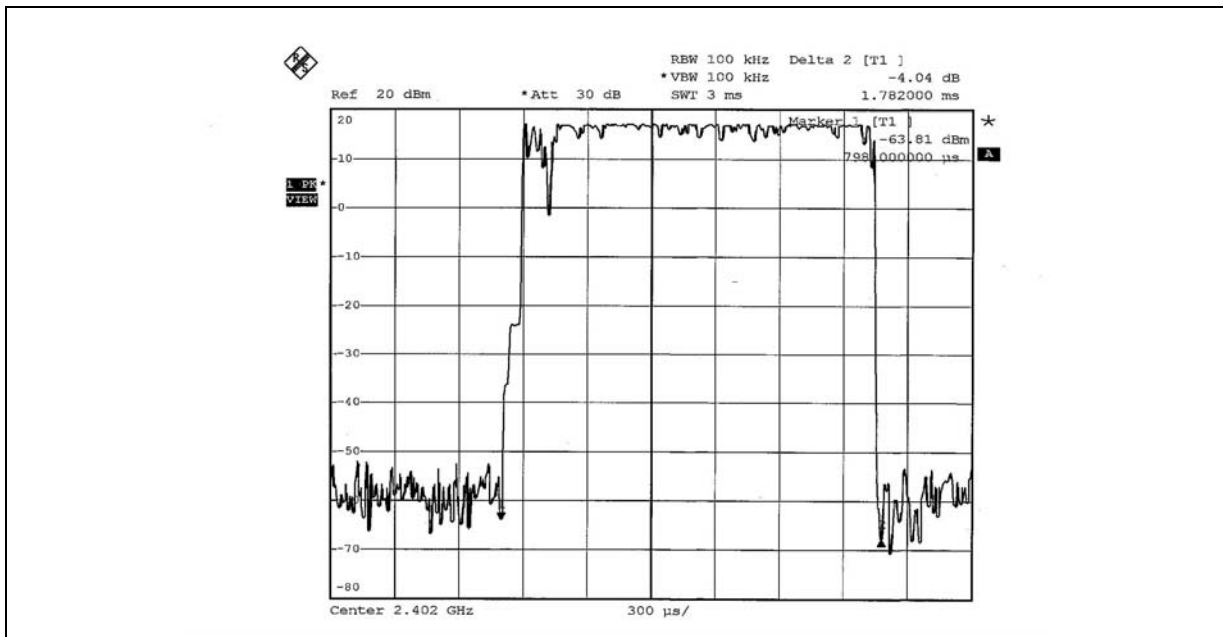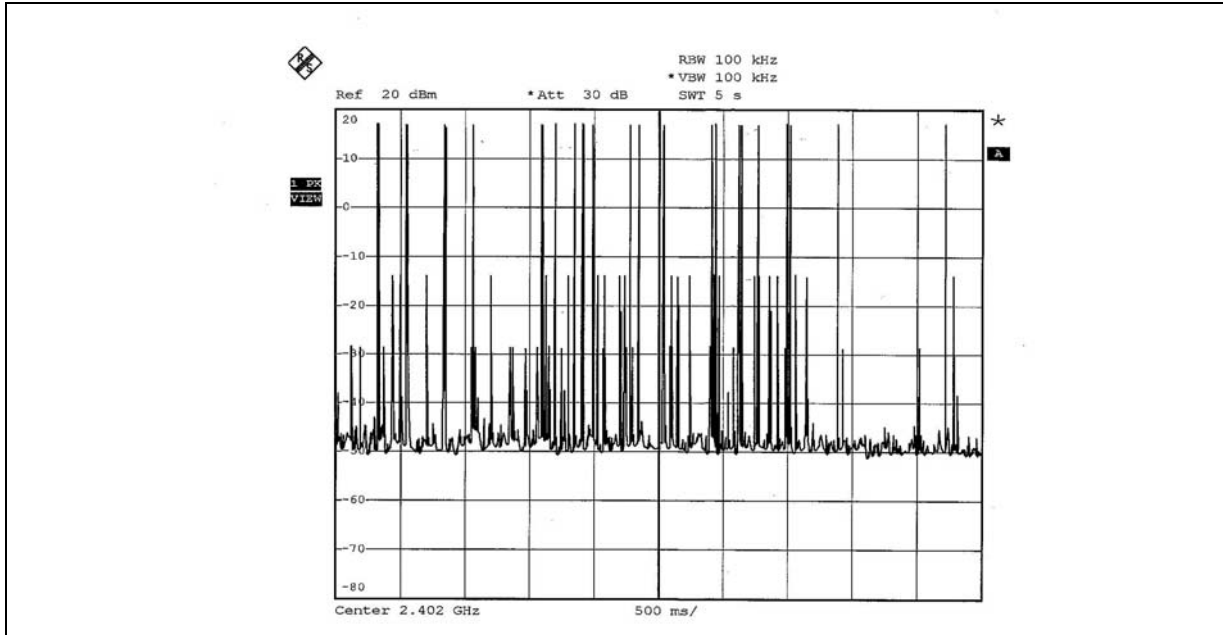
DH5
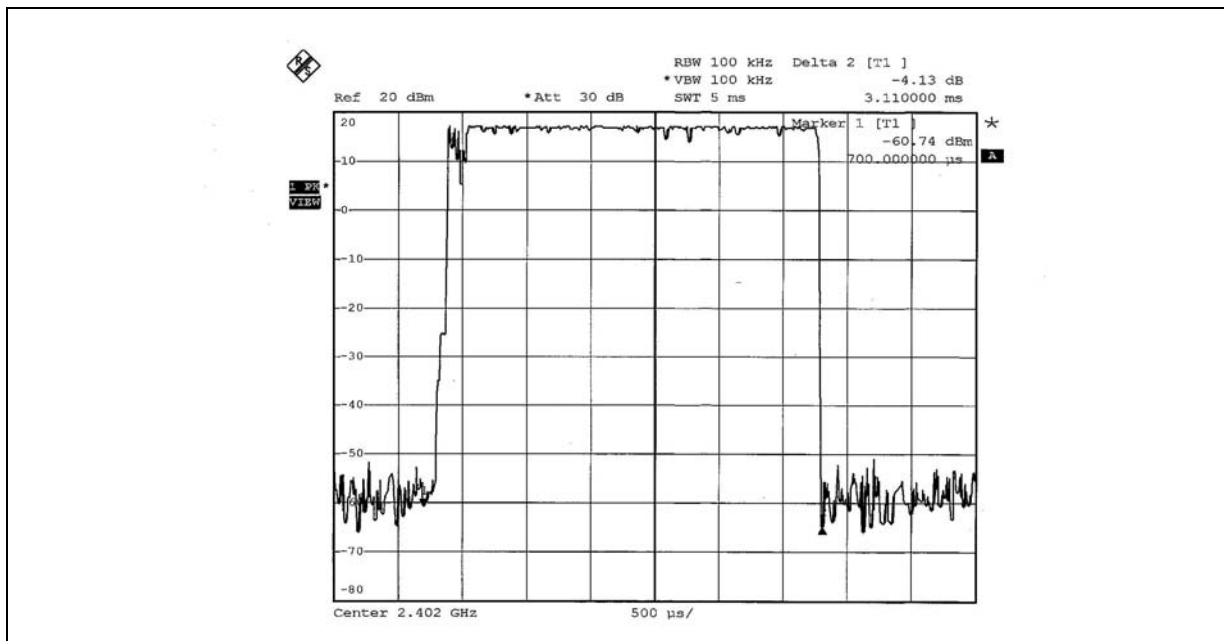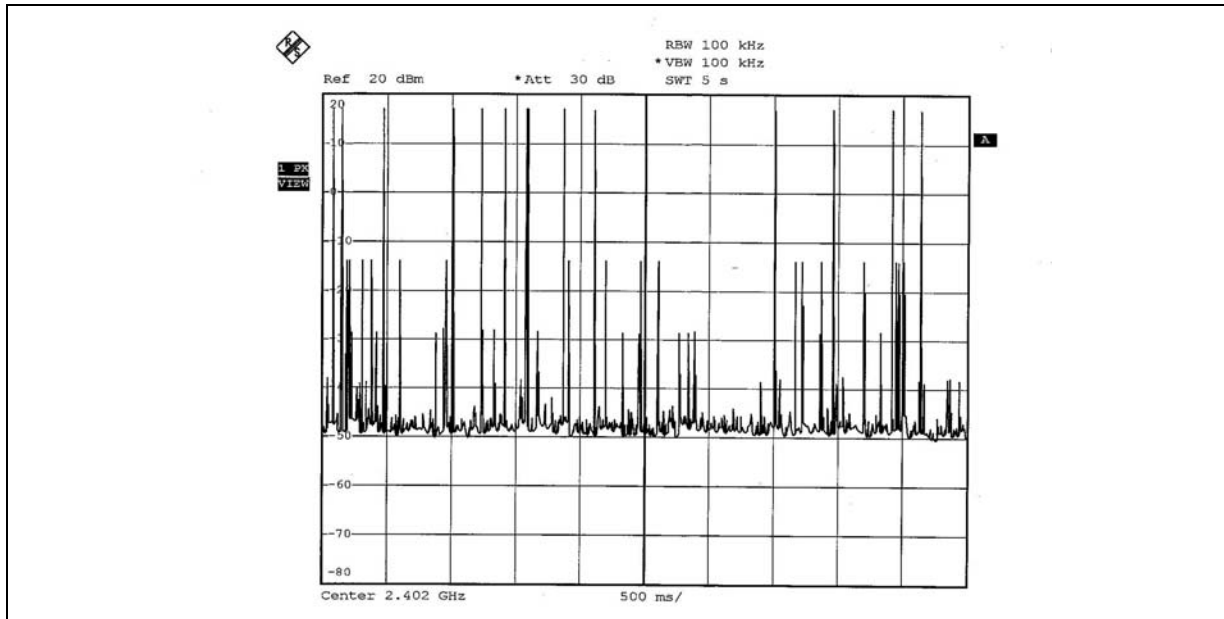
Mode B for 8DPSK

Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	49 (times / 5 sec) *6.32=309.68 times	0.528	163.51	400
DH3	27 (times / 5 sec) *6.32=170.64 times	1.782	304.08	400
DH5	17 (times / 5 sec) *6.32=107.44 times	3.050	327.69	400

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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

DH1
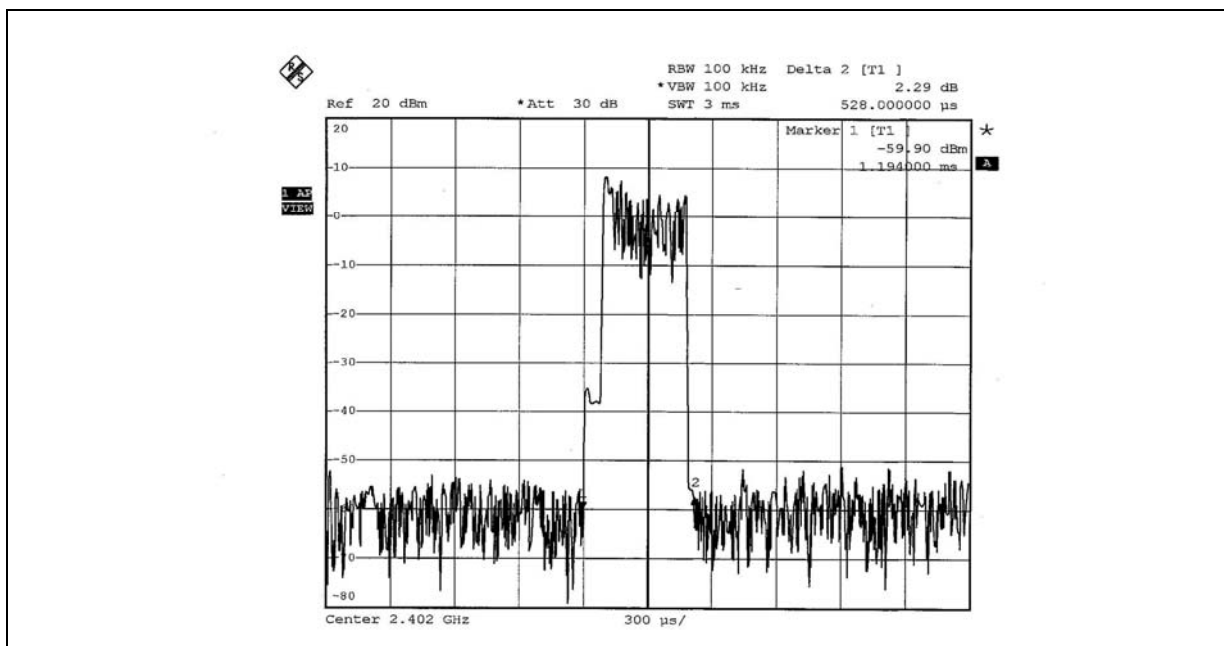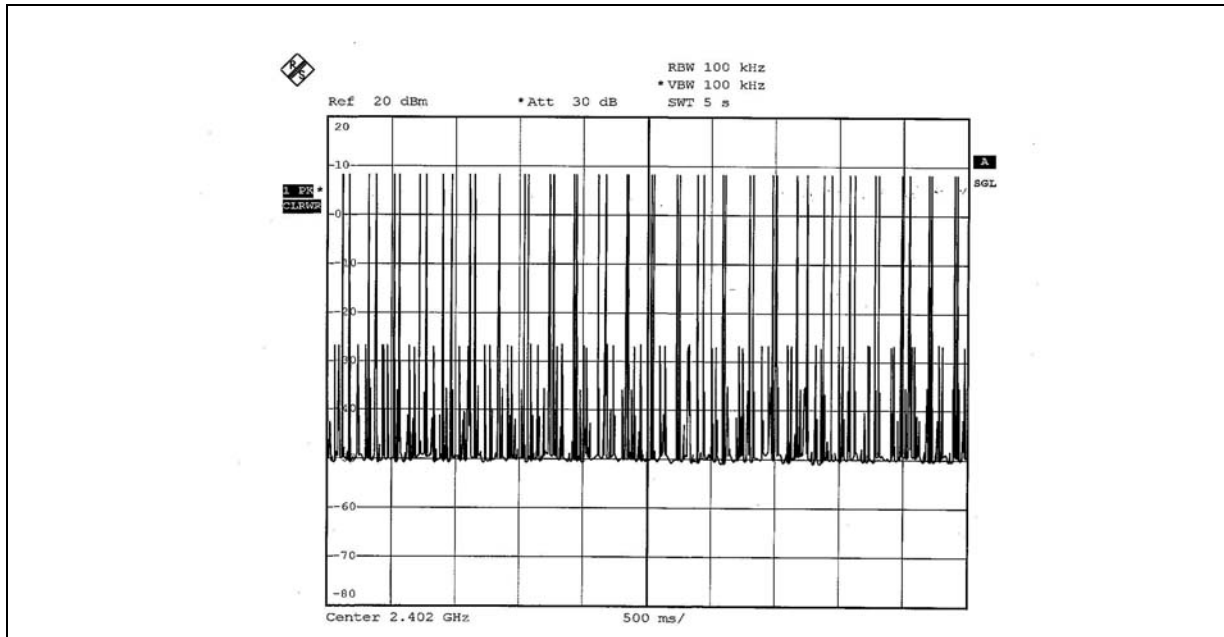
DH3
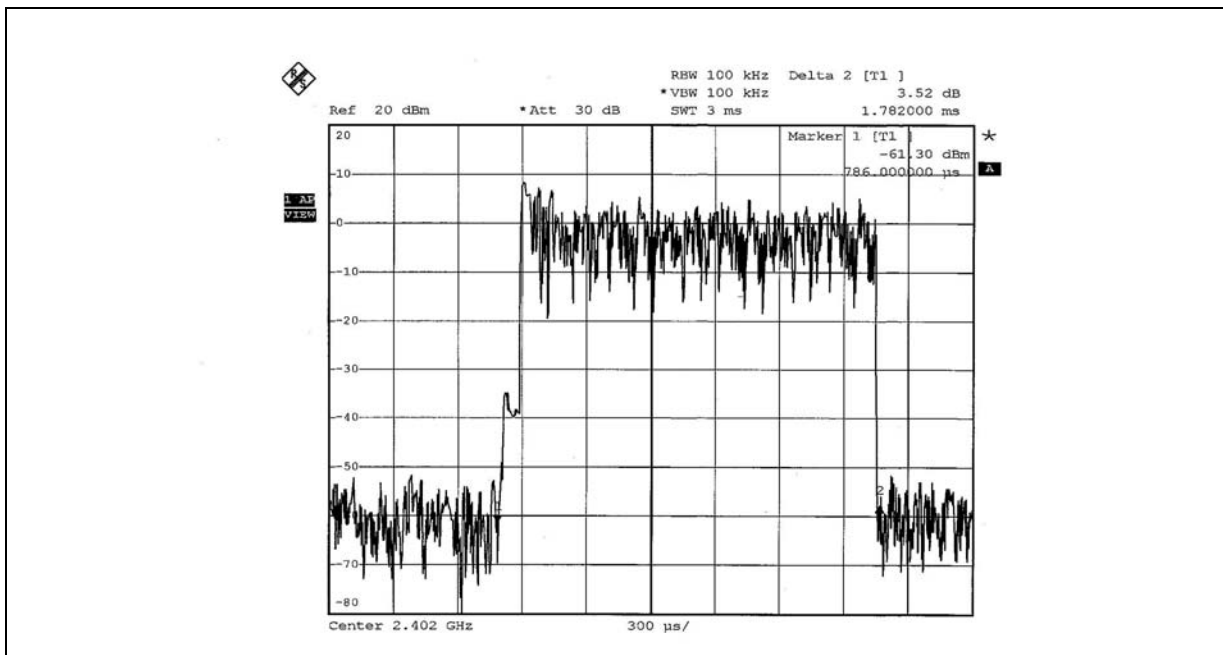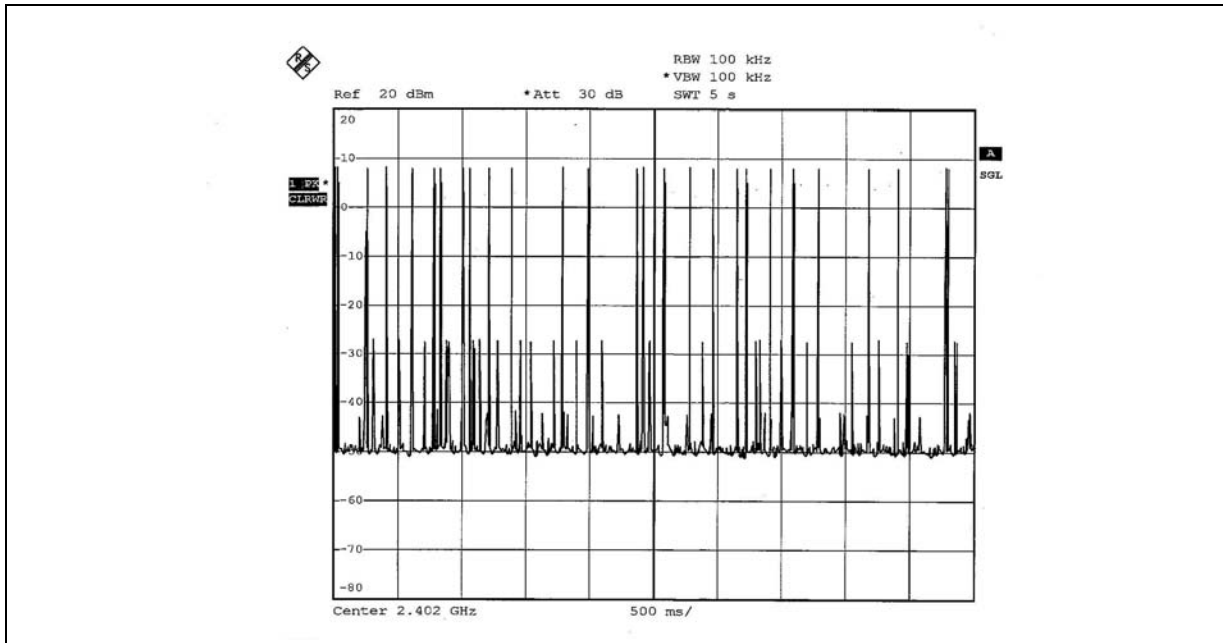
DH5
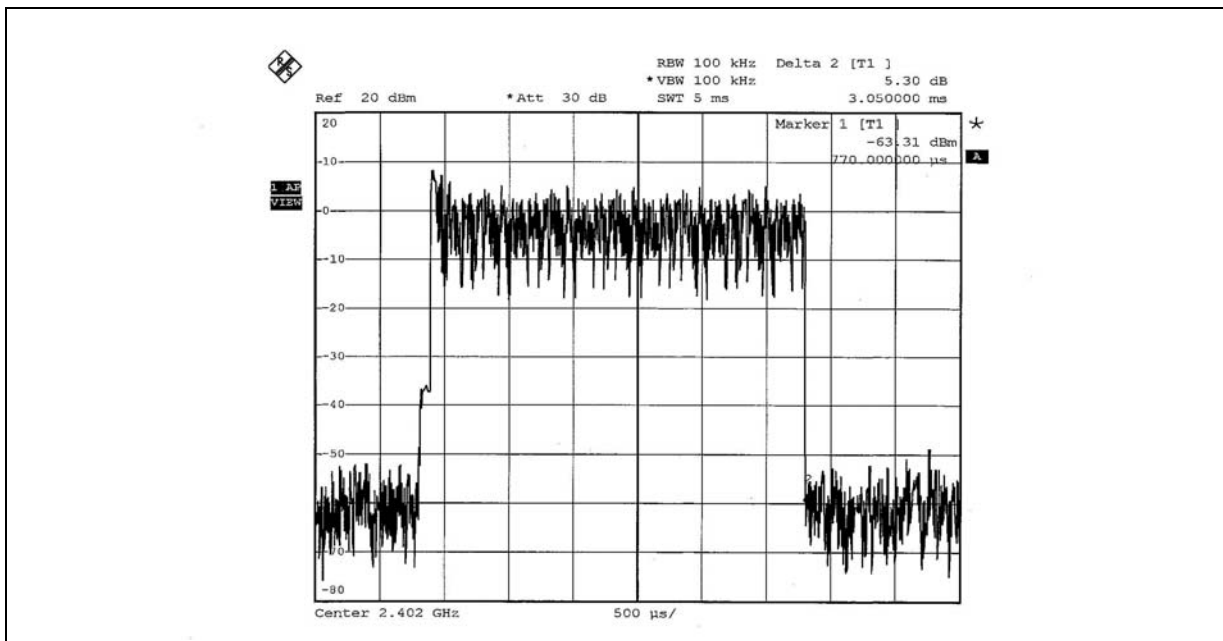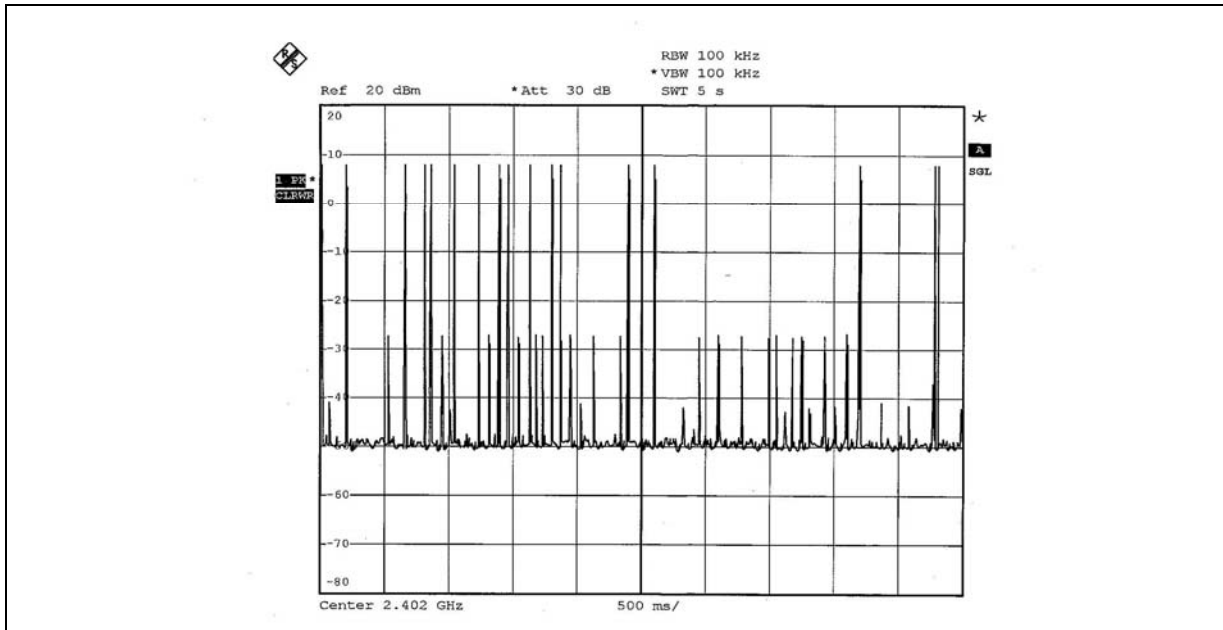
4.5 CHANNEL BANDWIDTH

4.5.1 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, two-thirds 20dBbandwidth of hopping channel shell be a minimum limit for the hopping channel separation.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
SPECTRUM ANALYZER	FSEK30	100049	Aug. 14, 2006

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 PROCEDURE

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

b. 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.

c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.

d. Repeat above procedures until all frequencies measured were complete.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation.

4.5.5 TEST SETUP

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┌─────────────┐              ┌─────────────┐
│             │              │  SPECTRUM   │
│     EUT     │──────────────│  ANALYZER   │
│             │              │             │
└─────────────┘              └─────────────┘
```

4.5.6 EUT OPERATING CONDITION

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

4.5.7 TEST RESULTS

Mode A for GFSK

EUT	Bluetooth 2.0 USB Adapter, Class 1	MODEL	GBU321
MODULATION TYPE	GFSK	**ENVIRONMENTAL CONDITIONS**	27deg. C, 65%RH, 991Hpa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**TESTED BY**	Long Chen

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)
0	2402	0.948
39	2441	0.954
78	2480	0.954

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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Mode B for 8DPSK

| EUT	Bluetooth 2.0 USB Adapter, Class 1	MODEL	GBU321
MODULATION TYPE	8DPSK	ENVIRONMENTAL CONDITIONS	27deg. C, 65%RH, 991Hpa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Long Chen

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)
0	2402	1.440
39	2441	1.440
78	2480	1.430

*(The test data is in accordance with ADT Report No.: RF940721L10.)

CH 0
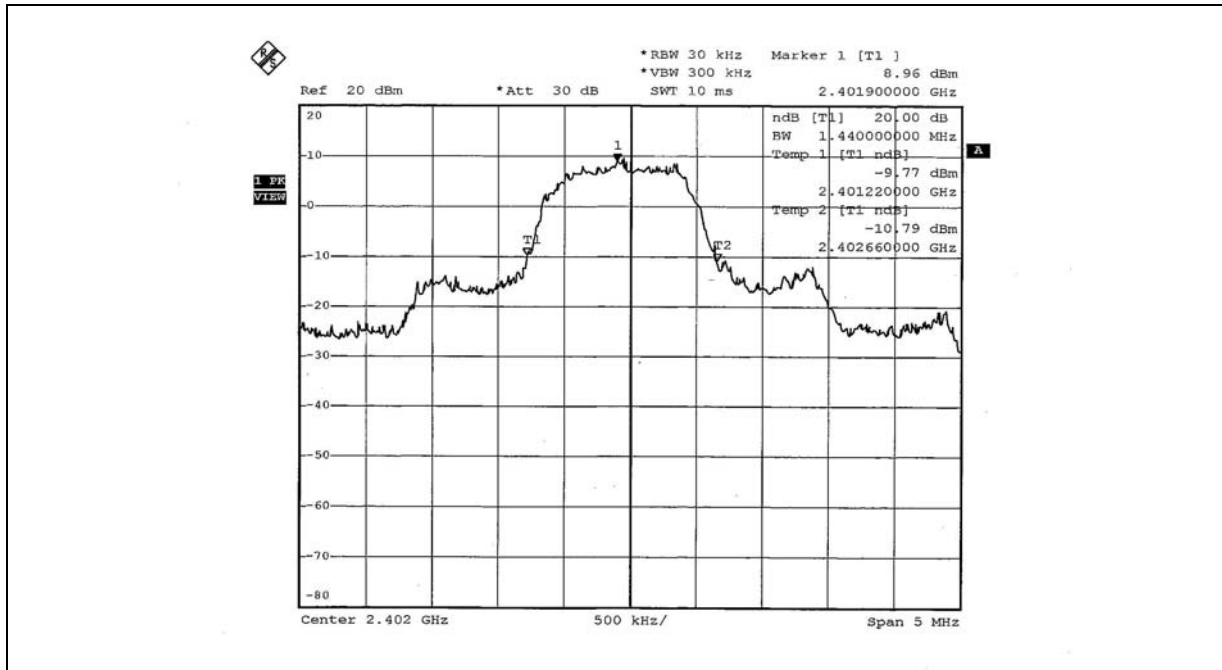
CH 39
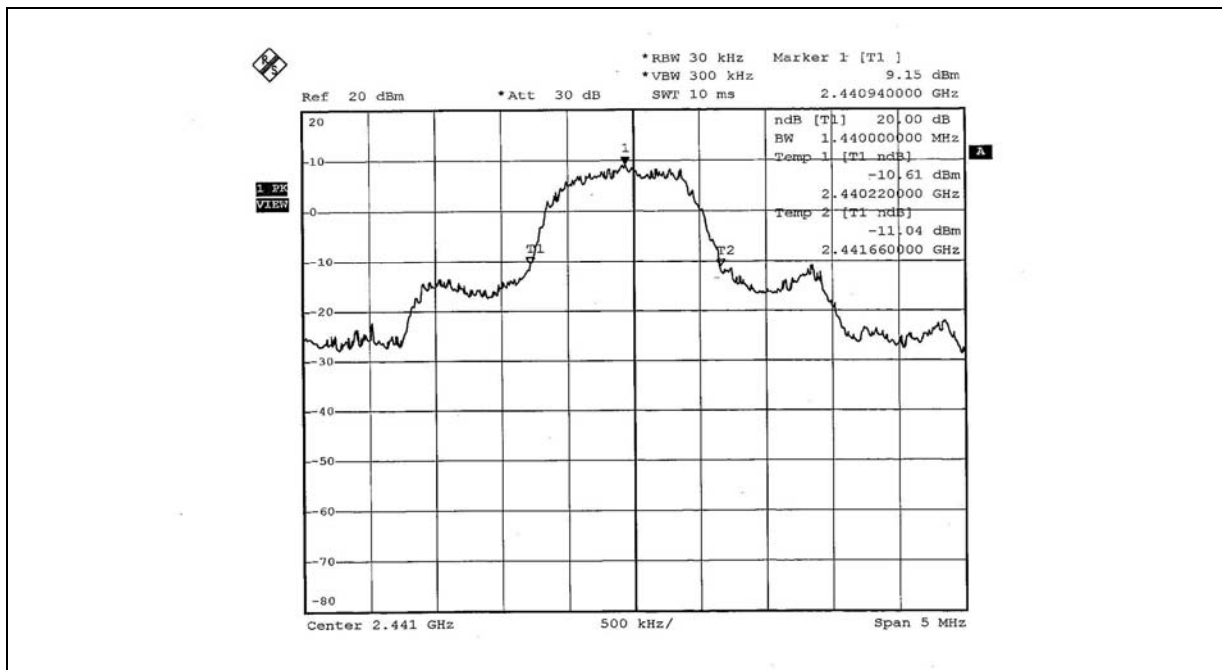
CH 78
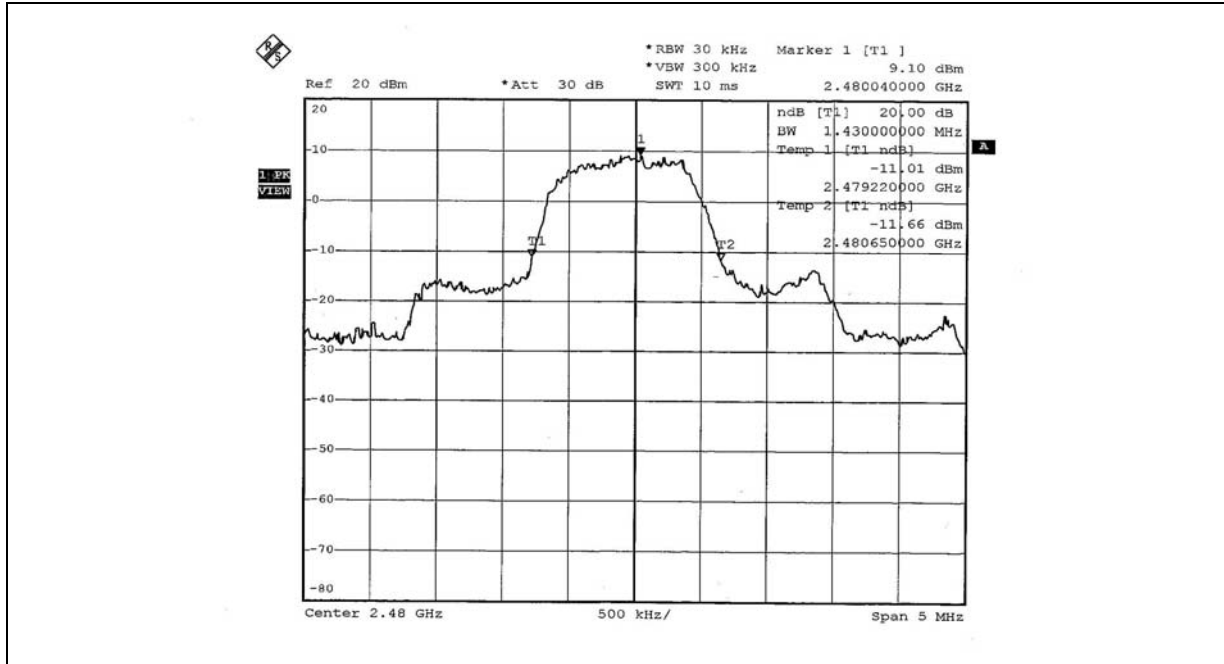
4.6 HOPPING CHANNEL SEPARATION

4.6.1 LIMIT OF HOPPING CHANNEL SEPARATION

At least 25kHz or two-third of 20dB hopping channel bandwidth (whichever is greater).

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
SPECTRUM ANALYZER	FSEK30	100049	Aug. 14, 2006

NOTES: 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.

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.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation.

4.6.5 TEST SETUP

```
┌─────────────┐              ┌─────────────┐
│             │              │             │
│     EUT     │──────────────│  SPECTRUM   │
│             │              │  ANALYZER   │
│             │              │             │
└─────────────┘              └─────────────┘
```

4.6.6 TEST RESULTS

Mode A for GFSK

EUT	Bluetooth 2.0 USB Adapter, Class 1	MODEL	GBU321
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	27deg. C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Long Chen

CHANNEL	FREQUENCY (MHz)	ADJACENT CHANNEL SEPARATION (MHz)	20dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	1.015	0.948	0.632	PASS
39	2441	1.045	0.954	0.636	PASS
78	2480	1.025	0.954	0.636	PASS

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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

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```
                                          *RBW 100 kHz  Delta 2 [T1 ]
                                          *VBW 100 kHz              0.01 dB
        Ref  20 dBm        *Att  30 dB    SWT 2.5 ms     1.025000000 MHz
```

Center 2.47955 GHz   250 kHz/   Span 2.5 MHz

Mode B for 8DPSK

EUT	Bluetooth 2.0 USB Adapter, Class 1	MODEL	GBU321
MODULATION TYPE	8DPSK	ENVIRONMENTAL CONDITIONS	27deg. C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Long Chen

CHANNEL	FREQUENCY (MHz)	ADJACENT CHANNEL SEPARATION (MHz)	20dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	1.010	1.440	0.960	PASS
39	2441	1.010	1.440	0.960	PASS
78	2480	1.030	1.430	0.953	PASS

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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

CH 0
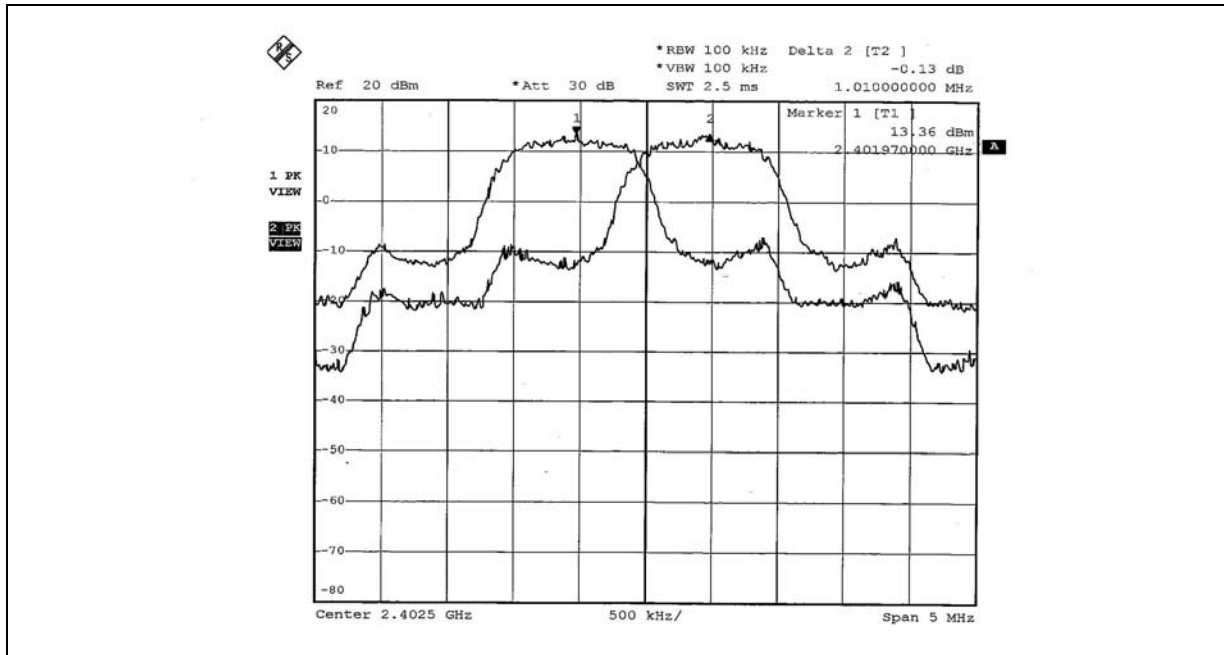
CH 39
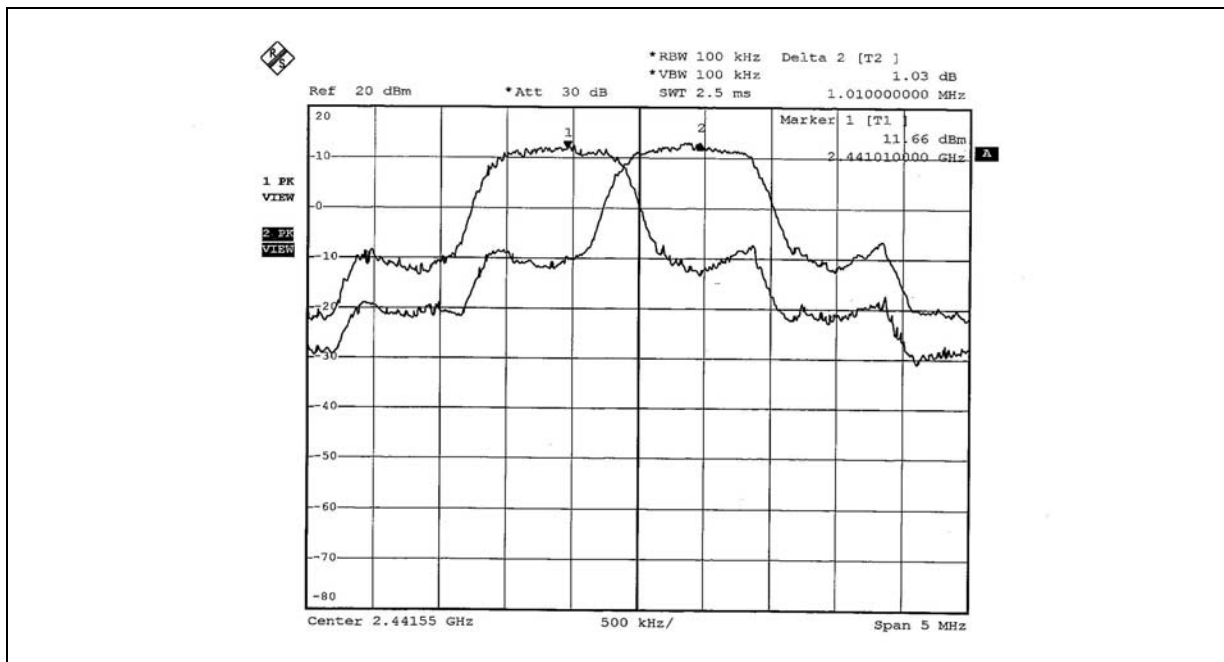
CH 78
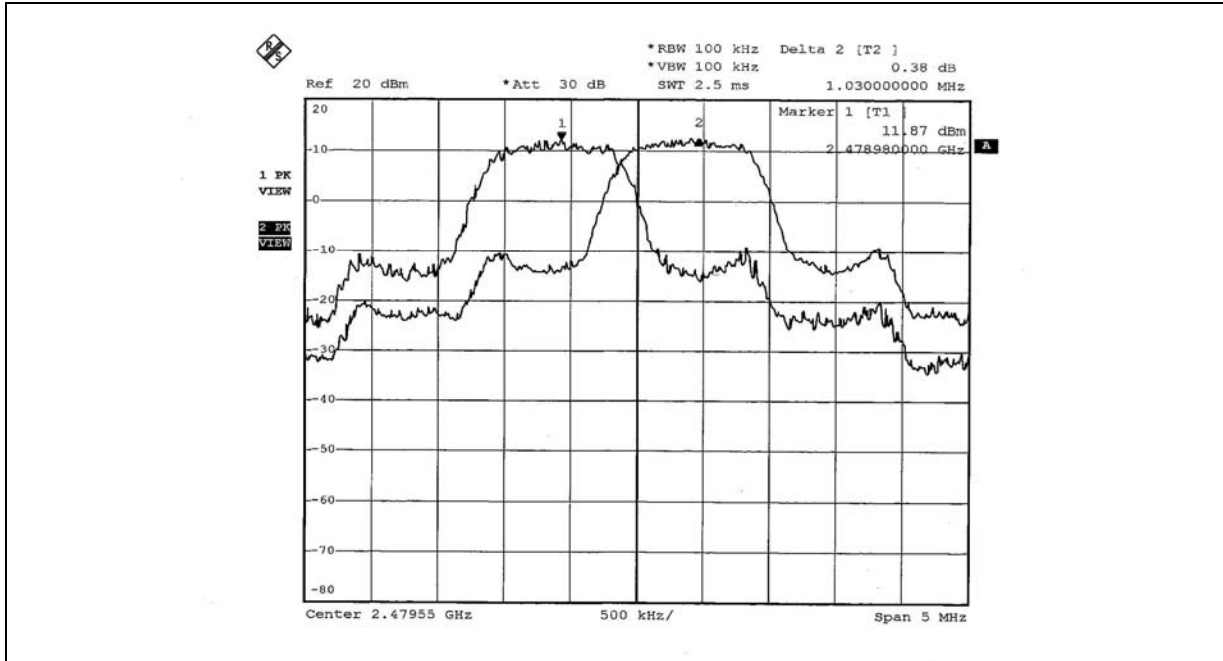
4.7 MAXIMUM PEAK OUTPUT POWER

4.7.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
SPECTRUM ANALYEER	FSEK30	100049	Aug. 14, 2006

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

4.7.3 TEST PROCEDURES

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

b. 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.

c. The center frequency of the spectrum analyzer is set to the fundamental frequency and using proper RBW and VBW setting.

d. Measure the captured power within the band and recording the plot.

e. Repeat above procedures until all frequencies required were complete.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP

```
┌─────────────┐                    ┌─────────────────┐
│             │                    │    SPECTRUM     │
│     EUT     │────────────────────│    ANALYZER     │
│             │                    │                 │
└─────────────┘                    └─────────────────┘
```

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

4.7.6 EUT OPERATING CONDITION

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

4.7.7 TEST RESULTS

Mode A for GFSK

EUT	Bluetooth 2.0 USB Adapter, Class 1	MODEL	GBU321
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	27deg. C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Long Chen

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (mW)	PASS/FAIL
0	2402	6.501	8.13	125	PASS
39	2441	7.396	8.69	125	PASS
78	2480	7.379	8.68	125	PASS

*(The test data is in accordance with ADT Report No.: RF940721L10.)

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Mode B for 8DPSK

EUT	Bluetooth 2.0 USB Adapter, Class 1	MODEL	GBU321
MODULATION TYPE	8DPSK	ENVIRONMENTAL CONDITIONS	27deg. C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Long Chen

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (mW)	PASS/FAIL
0	2402	15.417	11.88	125	PASS
39	2441	14.388	11.58	125	PASS
78	2480	14.588	11.64	125	PASS

*(The test data is in accordance with ADT Report No.: RF940721L10.)

CH 0
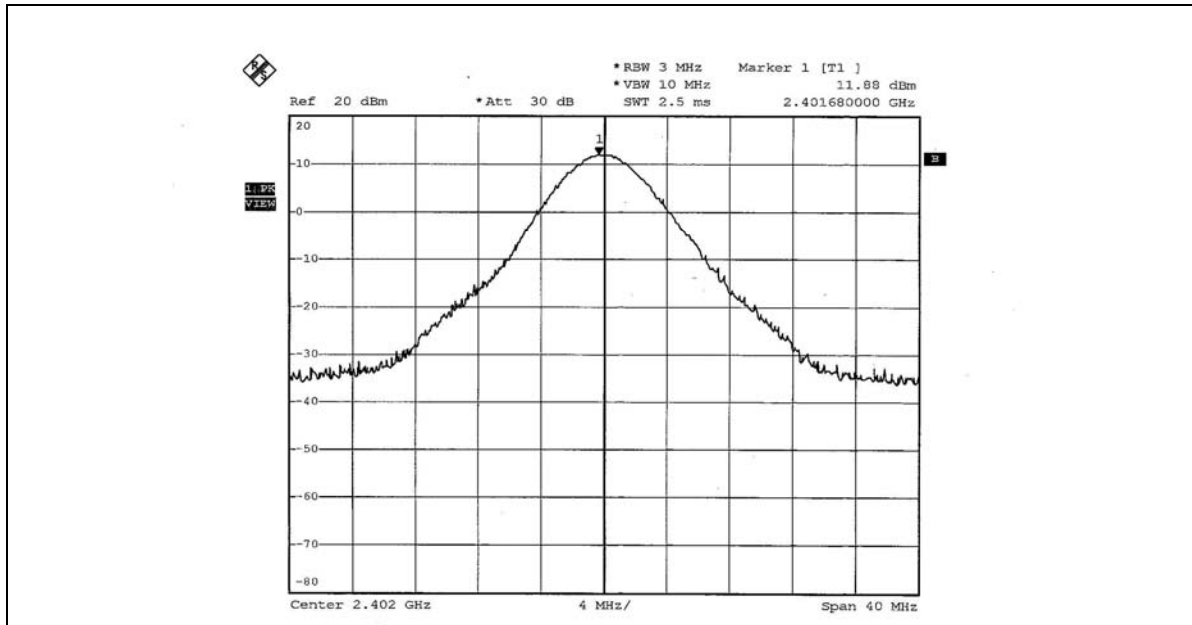
CH 39
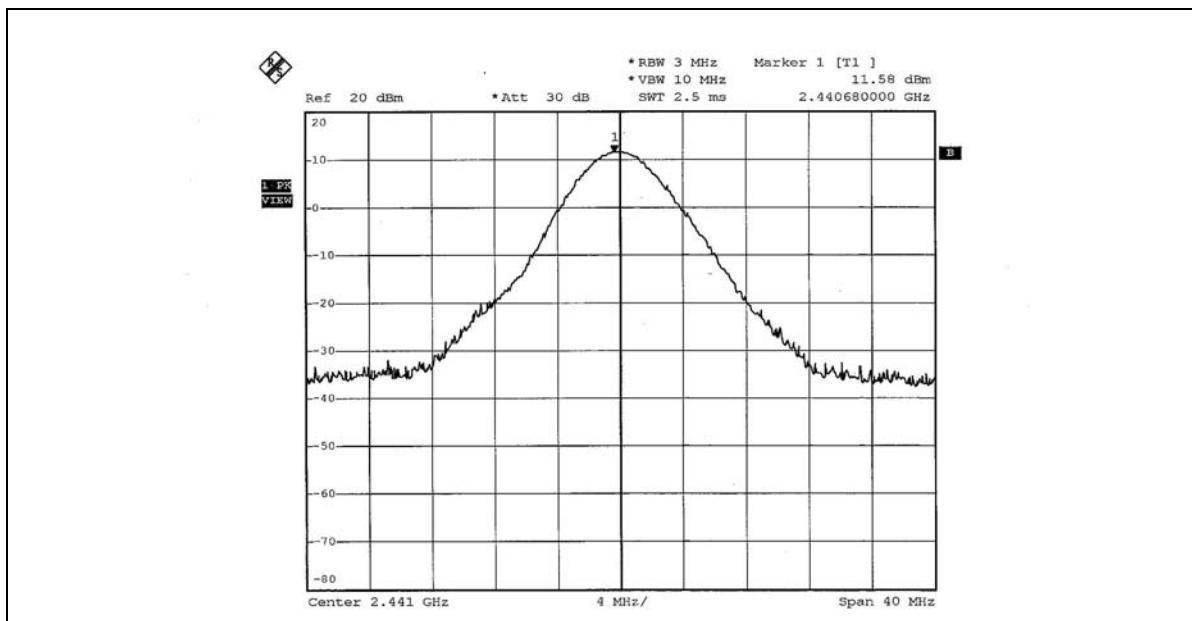
CH 78
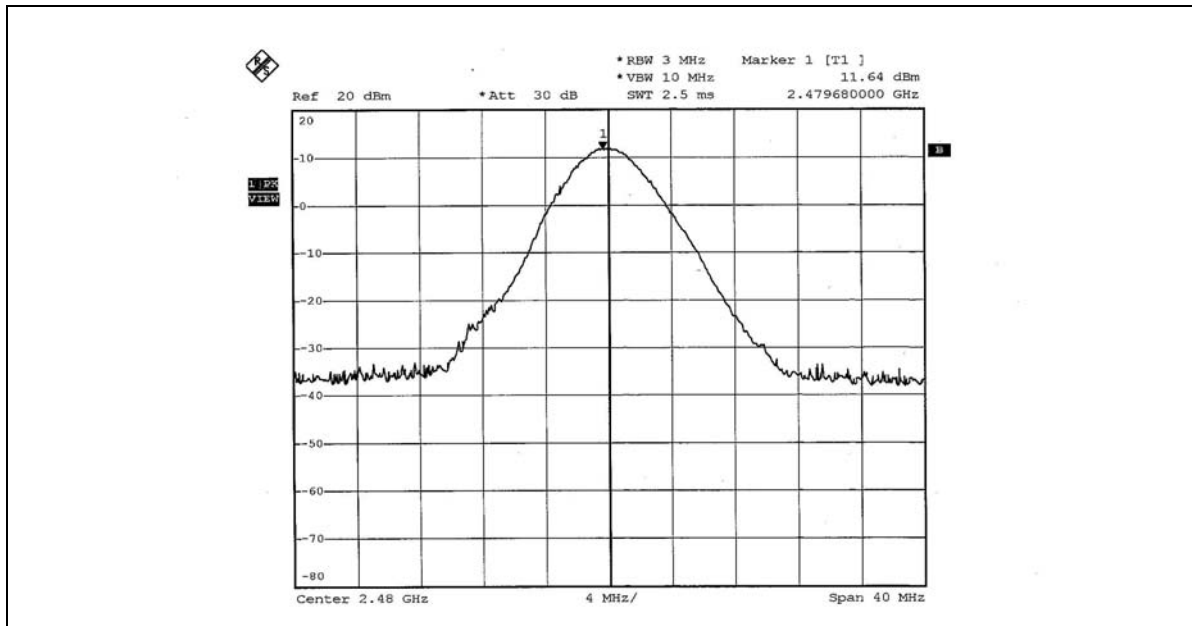
4.8 BAND EDGES MEASUREMENT

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. 14, 2006

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. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).
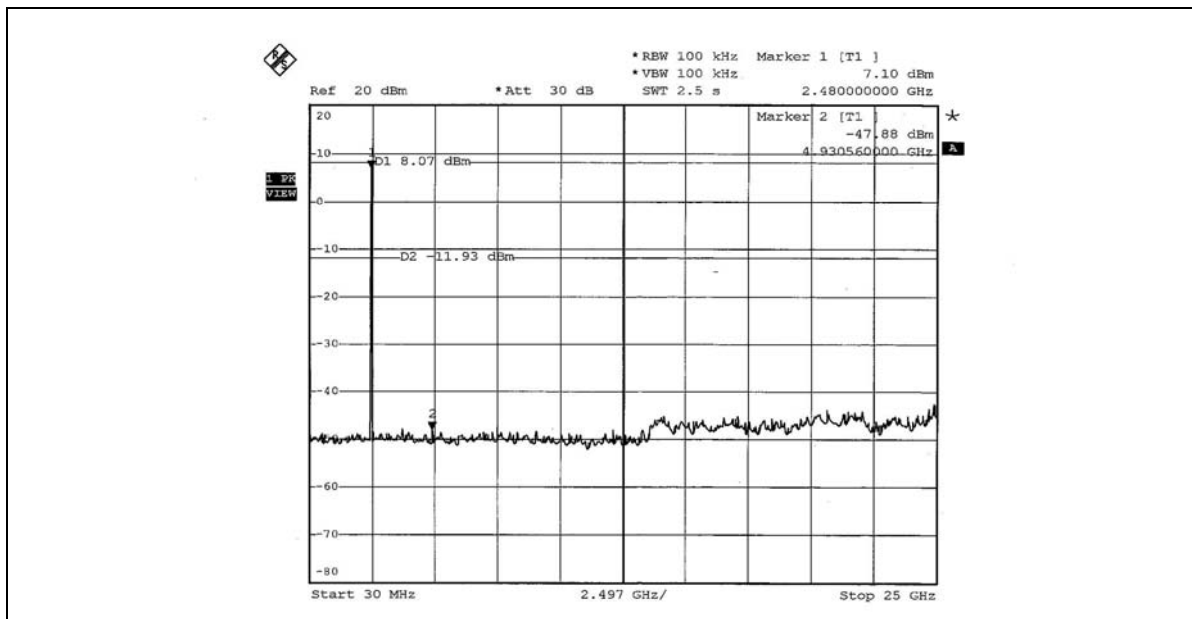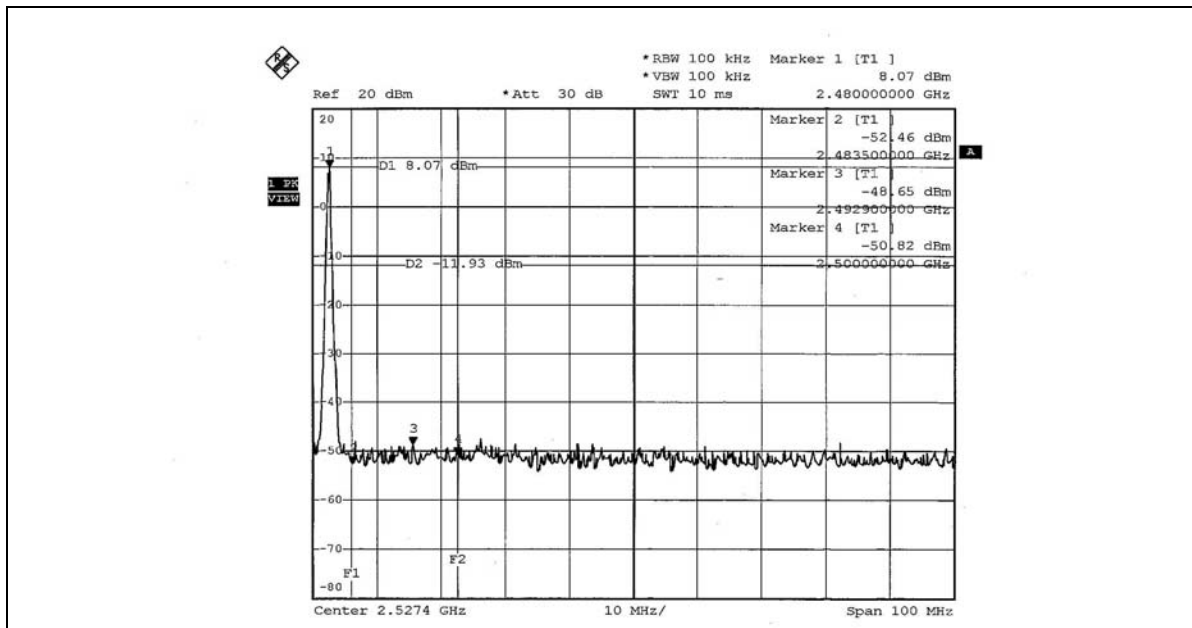
Mode A for GFSK

NOTE 1:
The band edge emission plot on page 83 shows 56.15dBc between carrier maximum power and local maximum emission in restrict band (2.3790GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2.7 is 106.34dBuV/m (Peak), so the maximum field strength in restrict band is 106.34 – 56.15 = 50.19dBuV/m, which is under 74 dBuV/m limit.

The band edge emission plot on page 83 shows 56.15dBc between carrier maximum power and local maximum emission in restrict band (2.3790GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2.7 is 76.343dBuV/m (Average), so the maximum field strength in restrict band is 76.34 – 56.15 = 20.19dBuV/m, which is under 54 dBuV/m limit.

NOTE 2:
The band edge emission plot on page 84 shows 56.72dBc between carrier maximum power and local maximum emission in restrict band (2.4929GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.2.7 is 106.40dBuV/m (Peak), so the maximum field strength in restrict band is 106.40 – 56.72 = 49.68dBuV/m, which is under 74 dBuV/m limit.

The band edge emission plot on page 85 shows 56.72dBc between carrier maximum power and local maximum emission in restrict band (2.4929GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.2.7 is 76.40dBuV/m (Average), so the maximum field strength in restrict band is 76.40 – 56.72 = 19.68dBuV/m, which is under 54 dBuV/m limit.
*(The test data is in accordance with ADT Report No.: RF940721L10.)
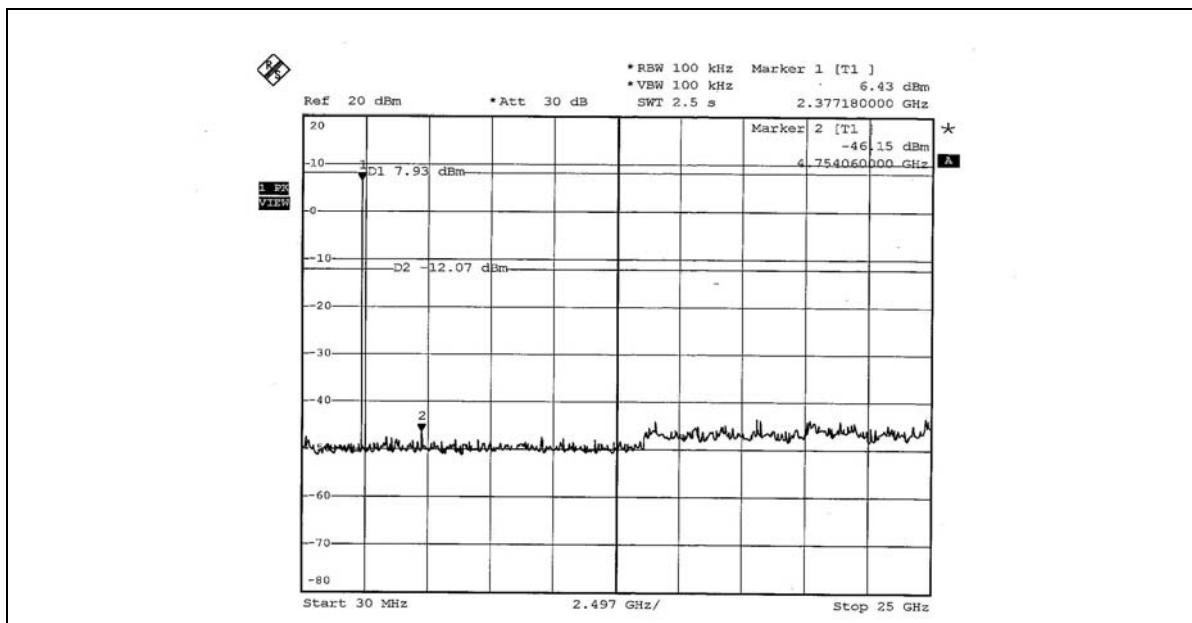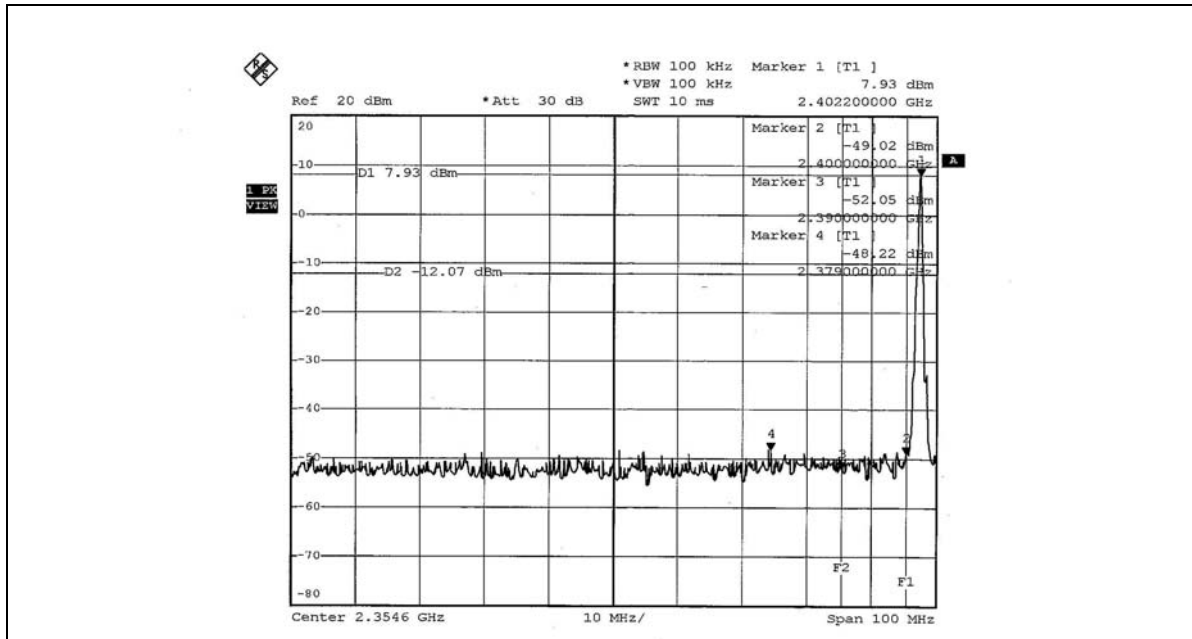
Mode B for 8DPSK

NOTE 1:

The band edge emission plot on page 86 shows 54.65dBc between carrier maximum power and local maximum emission in restrict band (2.3893GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2.7 is 110.84dBuV/m (Peak), so the maximum field strength in restrict band is 110.84 – 54.65 = 56.19dBuV/m, which is under 74 dBuV/m limit.

The band edge emission plot on page 86 shows 54.65dBc between carrier maximum power and local maximum emission in restrict band (2.3893GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2.7 is 76.34dBuV/m (Average), so the maximum field strength in restrict band is 80.84 – 54.65 = 26.19dBuV/m, which is under 54 dBuV/m limit.

**NOTE 2:**

The band edge emission plot on page 87 shows 54.58dBc between carrier maximum power and local maximum emission in restrict band (2.4839GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.2.7 is 110.85dBuV/m (Peak), so the maximum field strength in restrict band is 110.85 – 54.58 = 56.27dBuV/m, which is under 74 dBuV/m limit.

The band edge emission plot on page 87 shows 54.58dBc between carrier maximum power and local maximum emission in restrict band (2.4839GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.2.7 is 80.85dBuV/m (Average), so the maximum field strength in restrict band is 80.85 – 54.58 = 26.27dBuV/m, which is under 54 dBuV/m limit.

*(The test data is in accordance with ADT Report No.: RF940721L10.)
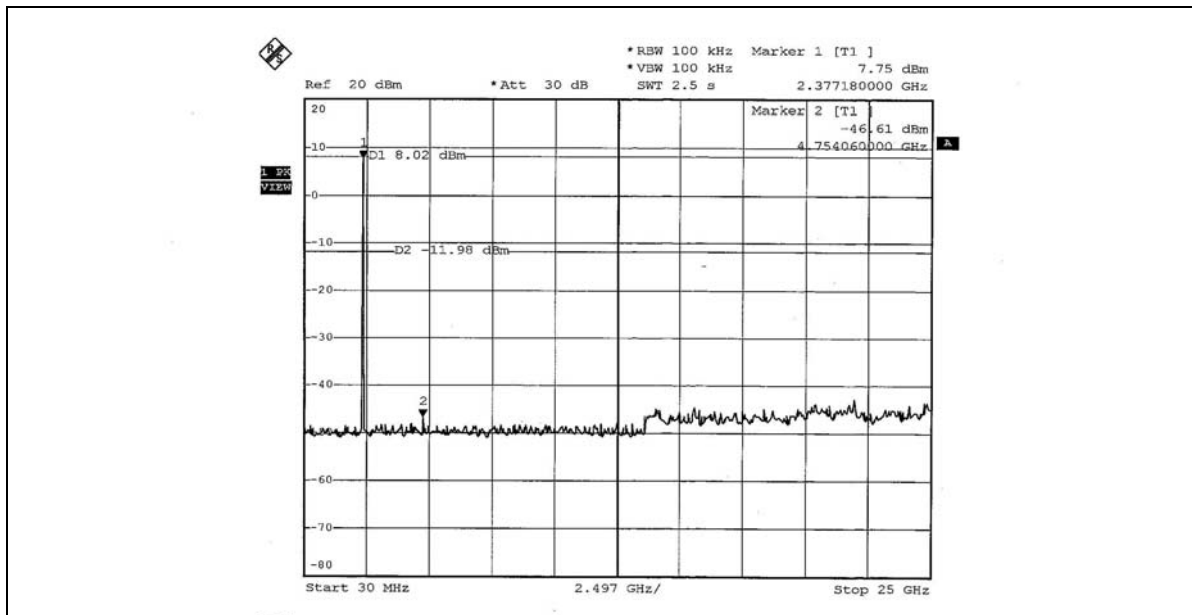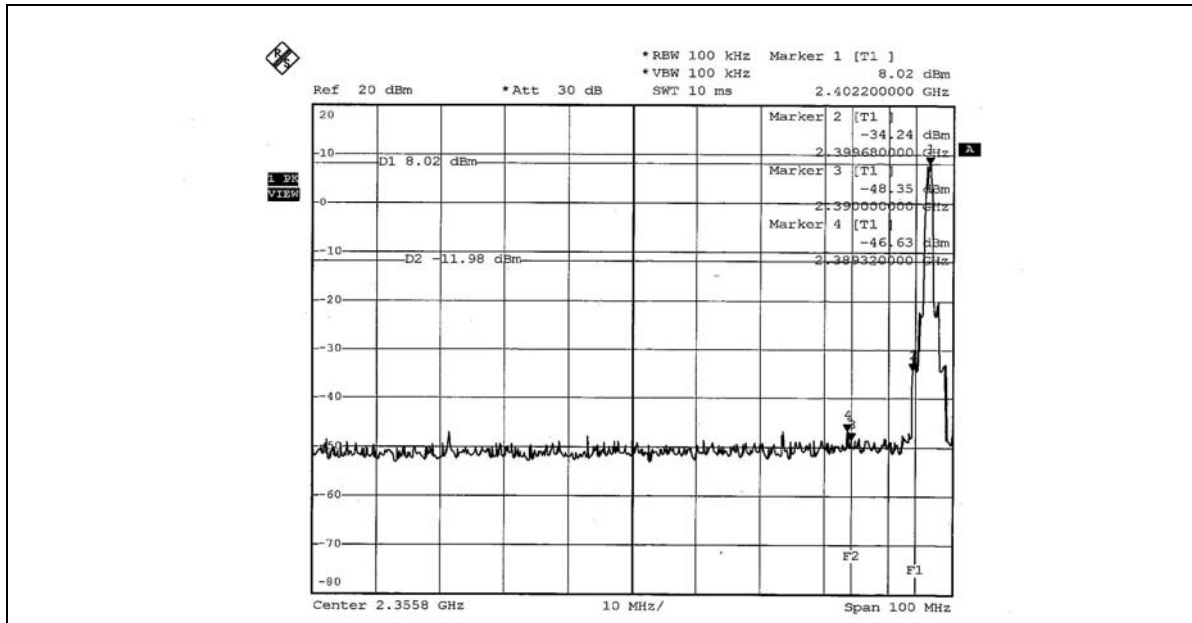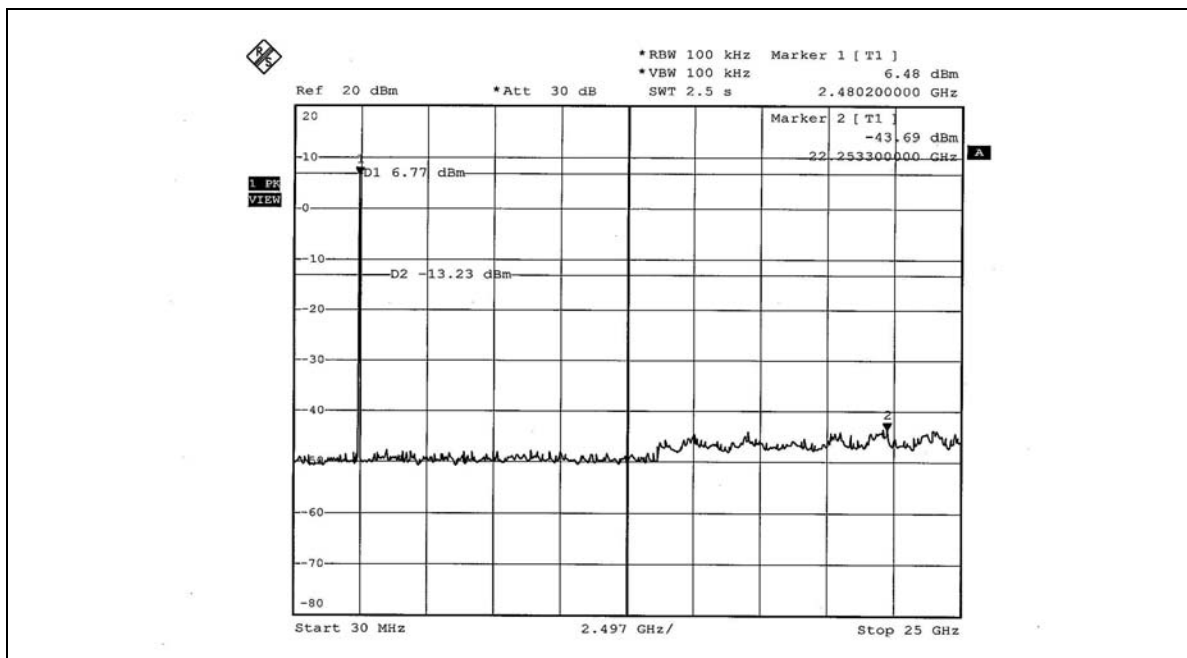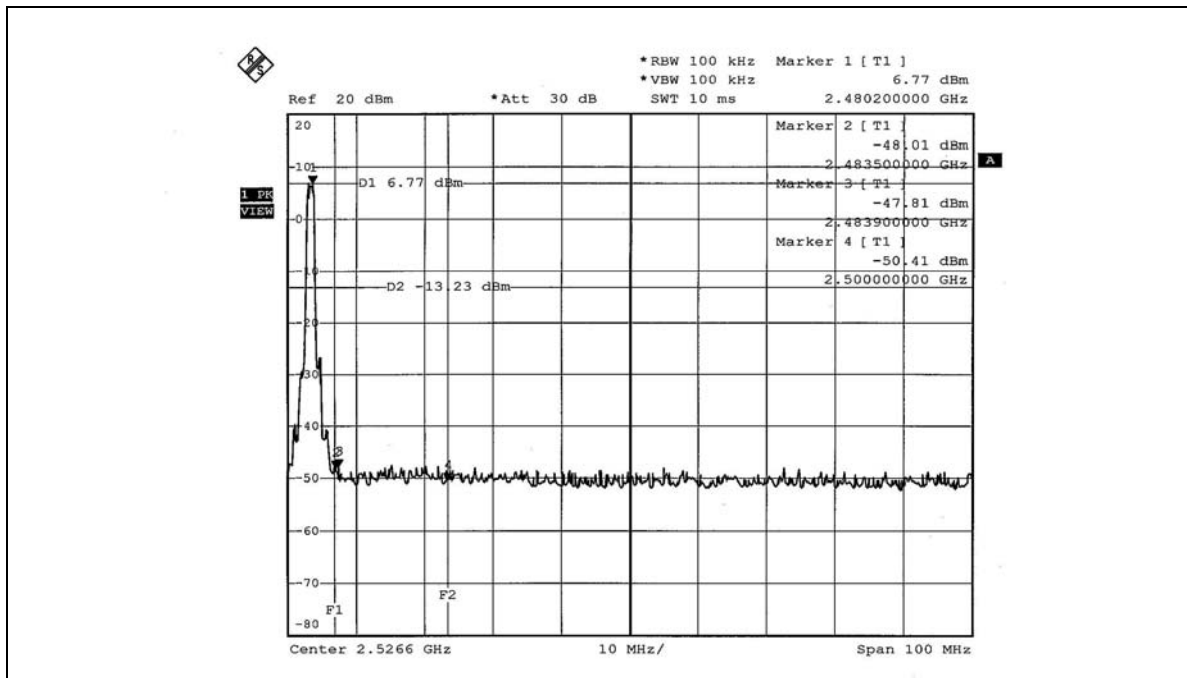
4.9 ANTENNA REQUIREMENT

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.

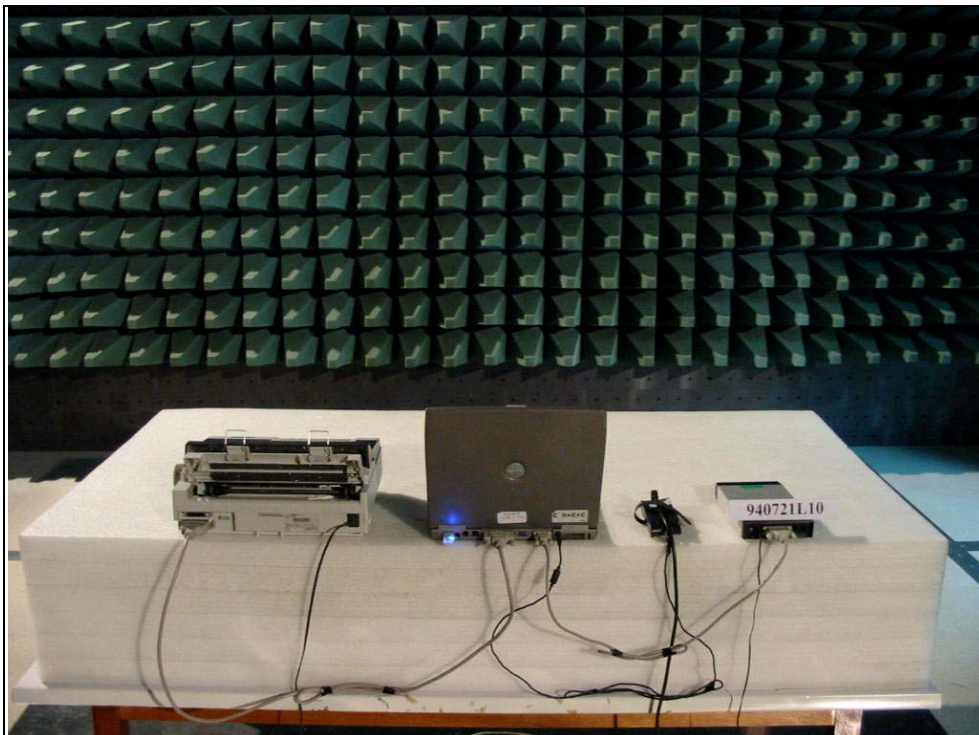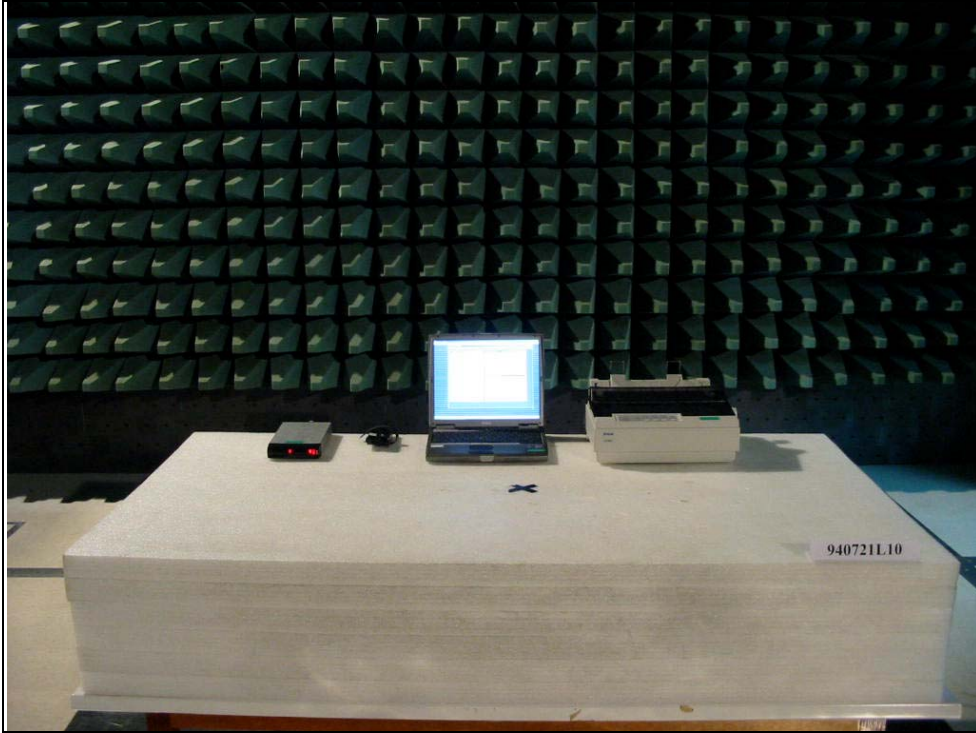4.9.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is Chip antenna without antenna connector. The maximum gain of this antenna is 1.77dBi.

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST

RADIATED EMISSION TEST

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.

APPENDIX-A

MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.