

FCC TEST REPORT

REPORT NO.: RF950125L10

MODEL NO.: BHP-210

RECEIVED: Jan. 26, 2006

TESTED: Feb. 09 ~ Feb. 20, 2006

ISSUED: Feb. 23, 2006

APPLICANT: U-MEDIA Communications, Inc.

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NO. 2177-01



0528

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1. CERTIFICATION

PRODUCT: Bluetooth Internet Telephony Handset
MODEL NO.: BHP-210
BRAND NAME: U-MEDIA
APPLICANT: U-MEDIA Communications, Inc.
TESTED: Feb. 09 ~ Feb. 20, 2006
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 : Rennie Wang , **DATE:** Feb. 23, 2006
Rennie Wang

TECHNICAL
ACCEPTANCE : Long Chen , **DATE:** Feb. 23, 2006
Responsible for RF Long Chen

APPROVED BY : Gary Chang , **DATE:** Feb. 23, 2006
Gary Chang / Supervisor

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 -4.93dB at 0.474MHz.
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 -1.59 dB at 2496.00MHz.
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	3.55 dB
	200MHz ~ 1000MHz	3.58 dB
	1GHz ~ 18GHz	1.10 dB
	18GHz ~ 40GHz	0.91 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 Internet Telephony Handset
MODEL NO.	BHP-210
FCC ID	SI5BHP210
POWER SUPPLY	3.7Vdc from lithium battery 5Vdc from AC adapter 5Vdc from host equipment
MODULATION TYPE	GFSK, $\pi/4$ -DQPSK, 8DPSK
RADIO TECHNOLOGY	FHSS
TRANSFER RATE	1/2/3Mbps
FREQUENCY RANGE	2400 ~ 2483.5 MHz
NUMBER OF CHANNEL	79
OUTPUT POWER	65.464mW
ANTENNA TYPE	PIFA antenna with 1dBi gain
DATA CABLE	1m shielded USB cable without core 1.9m non-shielded cable without core for earphone
I/O PORTS	USB
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT was powered by the following adapter:

Brand:	DVE
Model:	DSA-5P-05-FUS 050100
Input:	100-240Vac, 50-60Hz, 0.2A
Output:	5.0Vdc, 1A
Power Line:	DC1.5m, non-shield, without core

2. The EUT was powered by the following battery:

Model:	MOTO-V-170
Output:	3.7V, 700mAh

3. Bluetooth technology is used for the EUT.

4. 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

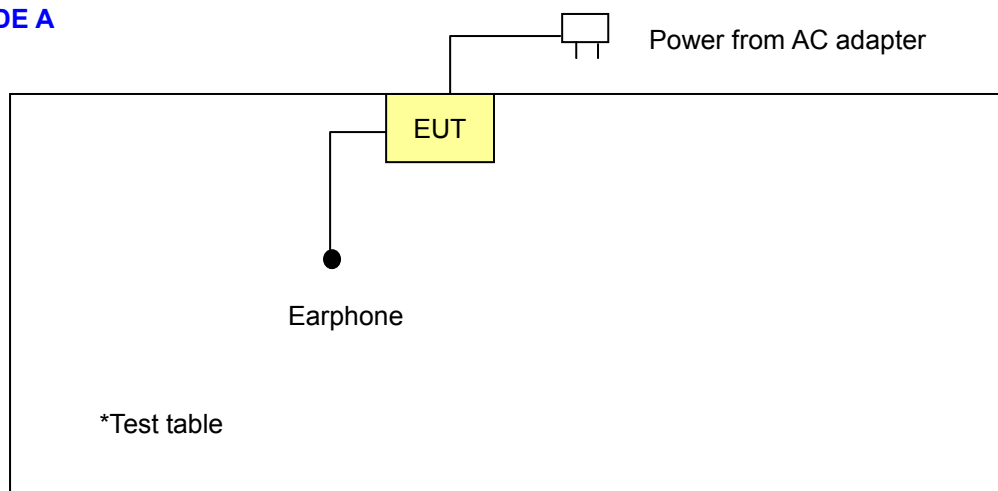
Operated in 2400 ~ 2483.5MHz Band:

79 channels are provided to this EUT:

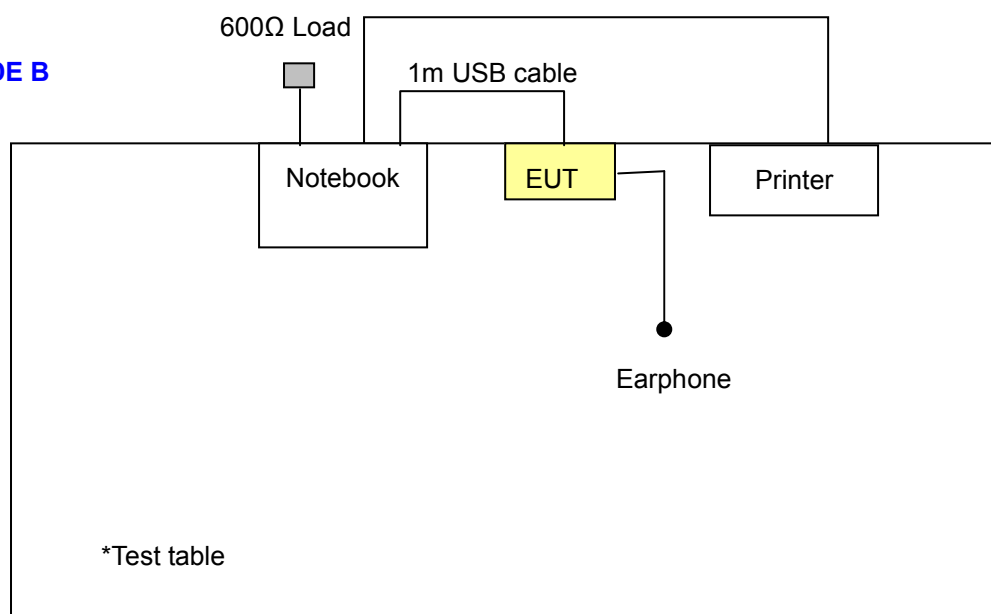
CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409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

MODE A



MODE B



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
A	√	√	-	-	Powered by AC adapter
B	√	√	√	√	Powered by host equipment via USB cable

Where **PLC**: Power Line Conducted Emission

RE<1G: Radiated Emission below 1GHz

RE≥1G: Radiated Emission above 1GHz

APCM: Antenna Port Conducted Measurement

NOTE: “-” means no effect

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
A	0 to 78	0, 39, 78	FHSS	GFSK	DH5
B	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, packet types and XYZ axis.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE	AXIS
A	0 to 78	78	FHSS	8DPSK	DH5	X
B	0 to 78	78	FHSS	8DPSK	DH5	X

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE	AXIS
B	0 to 78	0, 39, 78	FHSS	GFSK	DH5	X
B	0 to 78	0, 39, 78	FHSS	8DPSK	DH5	X

BANDEDGE MEASUREMENT:

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	AXIS	PACKET TYPE
B	0 to 78	0, 78	FHSS	GFSK	X	DH5
B	0 to 78	0, 78	FHSS	8DPSK	X	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
0 to 78	0, 39, 78	FHSS	8DPSK	DH5

3.2.3 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.

3.2.4 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	Compaq	N800C	470048-515	FCC DoC Approved
2	PRINTER	EPSON	LQ-300+	DCGY054146	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	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 (dB μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Nov. 02, 2006
RF signal cable Woken	5D-FB	Cable-HyC02-01	Jan. 06, 2007
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Jan. 09, 2007
LISN ROHDE & SCHWARZ	ESH3-Z5	100311	Jan. 22, 2007
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.

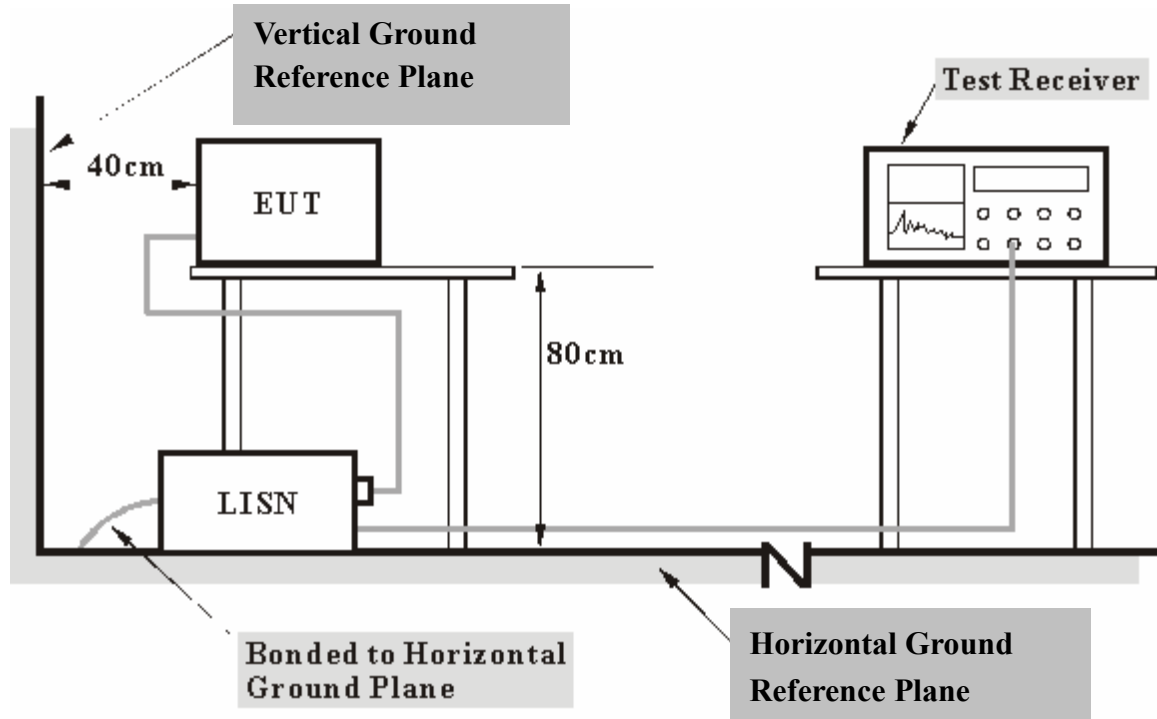
4.1.3 TEST PROCEDURES

- 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

Mode A:

Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.

Mode B:

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

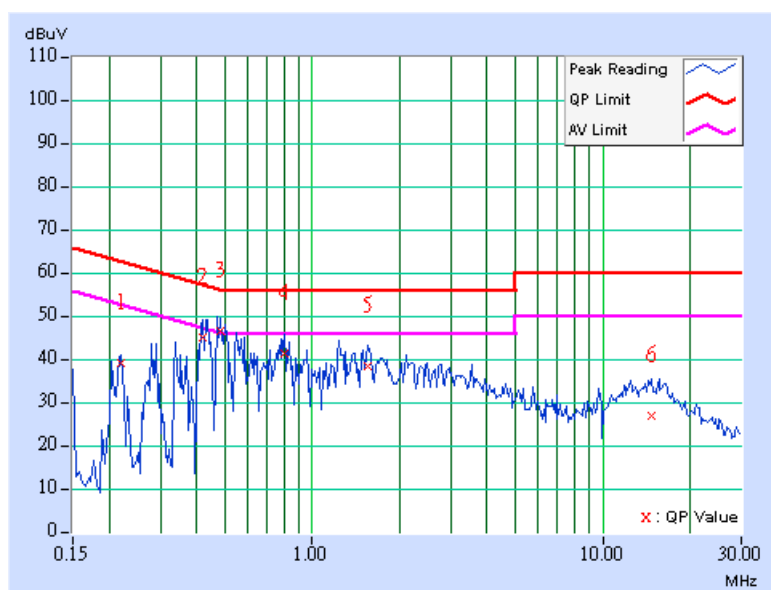
4.1.7 TEST RESULTS

CONDUCTED WORST CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	PHASE	Line 1
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
TEST MODE	A	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa
TESTED BY	Match Tsui	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.220	0.10	38.57	-	38.67	-	62.81	52.81	-24.14	-
2	0.420	0.10	44.70	-	44.80	-	57.46	47.46	-12.66	-
3	0.482	0.10	46.23	32.78	46.33	32.88	56.30	46.30	-9.97	-13.42
4	0.802	0.10	40.97	-	41.07	-	56.00	46.00	-14.93	-
5	1.547	0.15	37.74	-	37.89	-	56.00	46.00	-18.11	-
6	14.816	0.62	26.41	-	27.03	-	60.00	50.00	-32.97	-

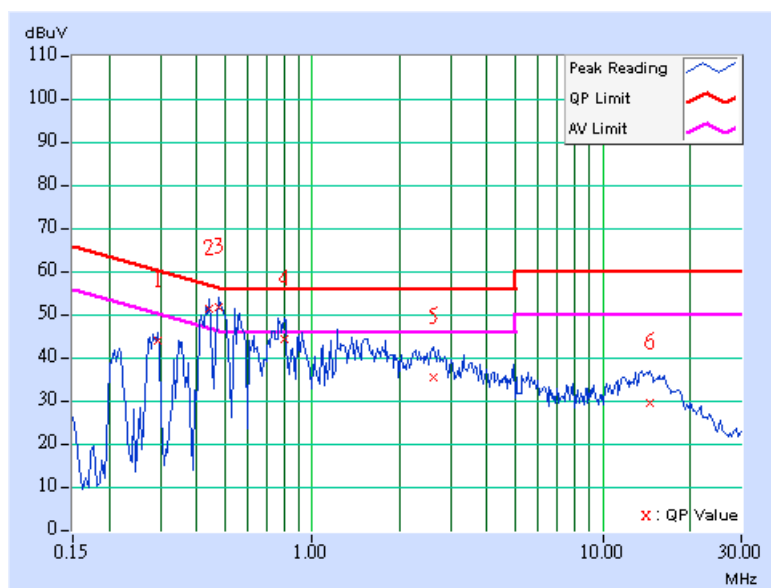
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	PHASE	Line 2
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
TEST MODE	A	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa
TESTED BY	Match Tsui	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.295	0.10	43.59	-	43.69	-	60.40	50.40	-16.71	-
2	0.439	0.11	51.00	36.94	51.11	37.05	57.08	47.08	-5.97	-10.03
3	0.474	0.11	51.40	37.51	51.51	37.62	56.44	46.44	-4.93	-8.82
4	0.806	0.17	43.74	-	43.91	-	56.00	46.00	-12.09	-
5	2.613	0.25	34.84	-	35.09	-	56.00	46.00	-20.91	-
6	14.484	0.61	29.09	-	29.70	-	60.00	50.00	-30.30	-

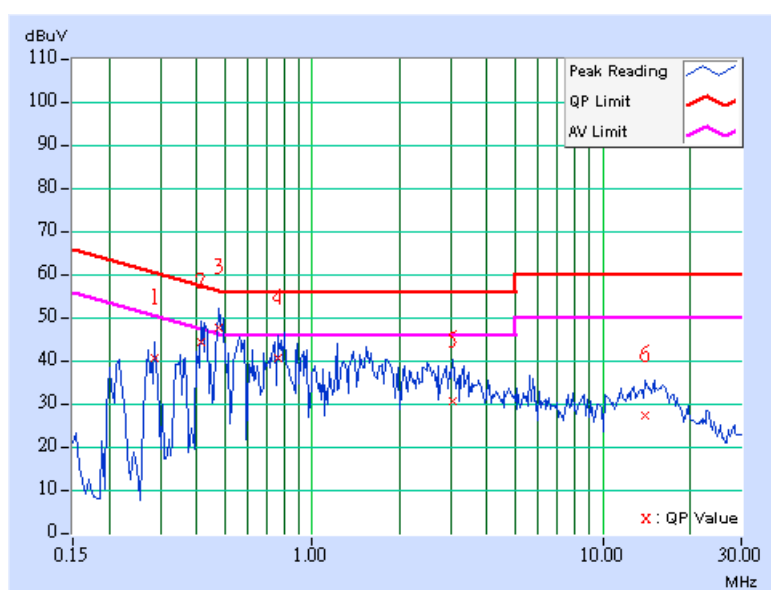
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	PHASE	Line 1
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
TEST MODE	A	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa
TESTED BY	Match Tsui	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.287	0.10	39.98	-	40.08	-	60.62	50.62	-20.54	-
2	0.416	0.10	43.97	-	44.07	-	57.54	47.54	-13.47	-
3	0.478	0.10	47.20	33.00	47.30	33.10	56.37	46.37	-9.07	-13.27
4	0.759	0.10	40.15	-	40.25	-	56.00	46.00	-15.75	-
5	3.039	0.29	30.07	-	30.36	-	56.00	46.00	-25.64	-
6	14.051	0.58	26.97	-	27.55	-	60.00	50.00	-32.45	-

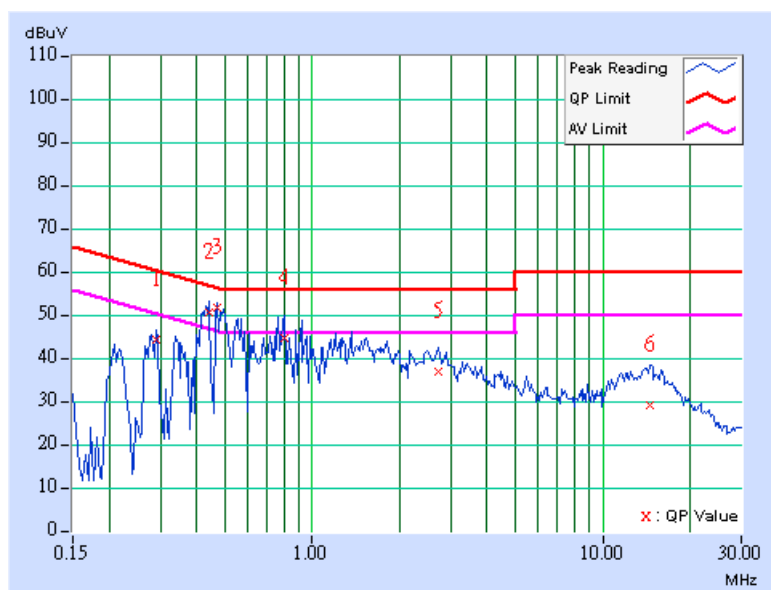
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	PHASE	Line 2
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
TEST MODE	A	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa
TESTED BY	Match Tsui	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.291	0.10	43.65	-	43.75	-	60.51	50.51	-16.76	-
2	0.443	0.11	50.09	33.97	50.20	34.08	57.01	47.01	-6.81	-12.93
3	0.470	0.11	51.30	35.66	51.41	35.77	56.51	46.51	-5.10	-10.74
4	0.798	0.17	44.11	-	44.28	-	56.00	46.00	-11.72	-
5	2.727	0.26	36.58	-	36.84	-	56.00	46.00	-19.16	-
6	14.520	0.61	28.47	-	29.08	-	60.00	50.00	-30.92	-

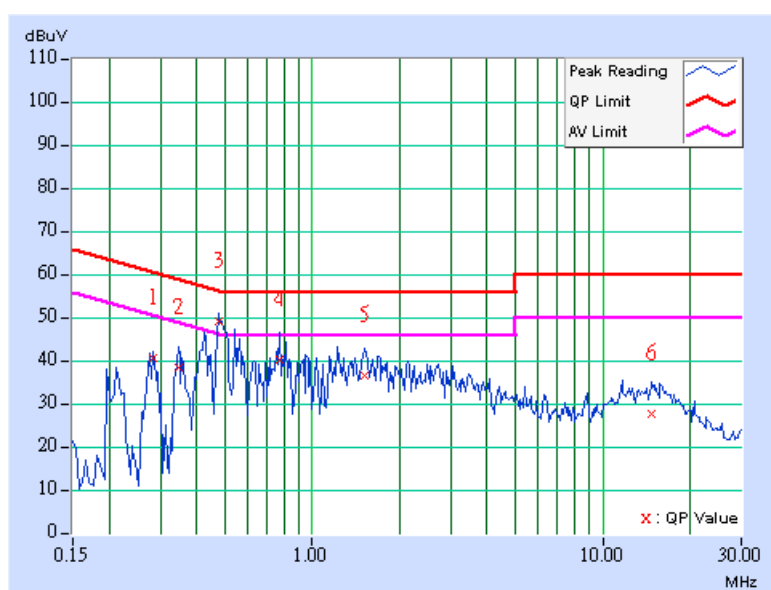
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	PHASE	Line 1
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
TEST MODE	A	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa
TESTED BY	Match Tsui	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.283	0.10	40.10	-	40.20	-	60.73	50.73	-20.53	-
2	0.345	0.10	38.00	-	38.10	-	59.07	49.07	-20.97	-
3	0.474	0.10	48.47	33.77	48.57	33.87	56.44	46.44	-7.87	-12.57
4	0.771	0.10	39.87	-	39.97	-	56.00	46.00	-16.03	-
5	1.516	0.15	35.91	-	36.06	-	56.00	46.00	-19.94	-
6	14.734	0.62	26.99	-	27.61	-	60.00	50.00	-32.39	-

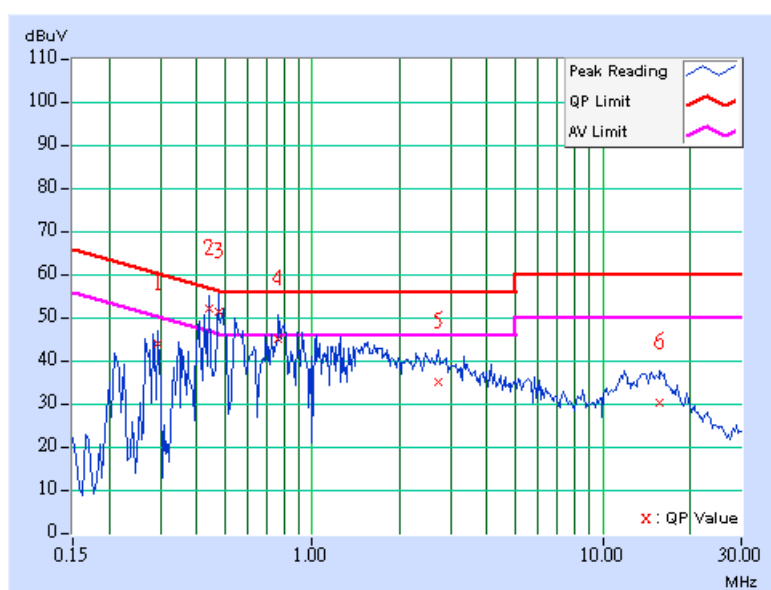
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	PHASE	Line 2
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
TEST MODE	A	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa
TESTED BY	Match Tsui	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.295	0.10	43.47	-	43.57	-	60.40	50.40	-16.83	-
2	0.439	0.11	51.66	36.48	51.77	36.59	57.08	47.08	-5.31	-10.49
3	0.474	0.11	51.04	35.28	51.15	35.39	56.44	46.44	-5.29	-11.05
4	0.767	0.16	44.67	-	44.83	-	56.00	46.00	-11.17	-
5	2.711	0.26	34.64	-	34.90	-	56.00	46.00	-21.10	-
6	15.738	0.62	29.71	-	30.33	-	60.00	50.00	-29.67	-

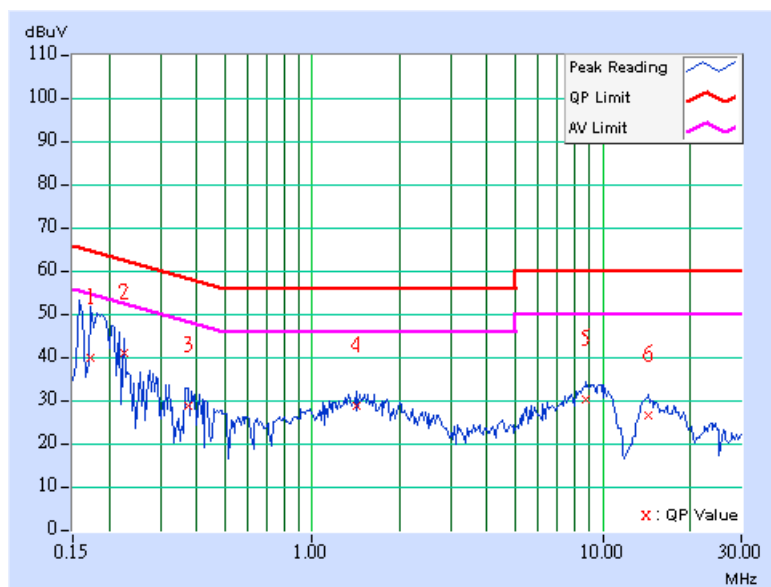
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	PHASE	Line 1
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
TEST MODE	B	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.173	0.10	39.38	-	39.48	-	64.79	54.79	-25.31	-
2	0.224	0.10	40.68	-	40.78	-	62.66	52.66	-21.88	-
3	0.373	0.10	28.47	-	28.57	-	58.44	48.44	-29.87	-
4	1.418	0.14	28.19	-	28.33	-	56.00	46.00	-27.67	-
5	8.781	0.36	29.80	-	30.16	-	60.00	50.00	-29.84	-
6	14.398	0.60	26.20	-	26.80	-	60.00	50.00	-33.20	-

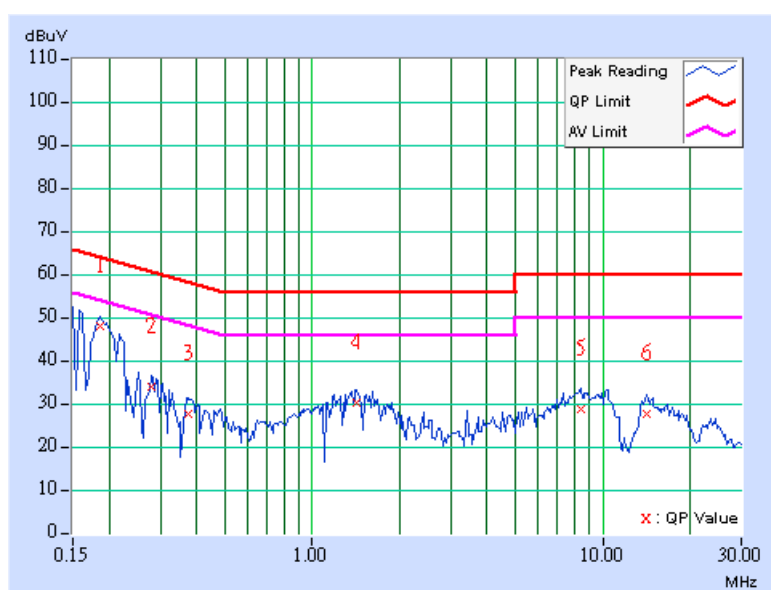
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	PHASE	Line 2
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
TEST MODE	B	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.185	0.10	47.71	-	47.81	-	64.25	54.25	-16.44	-
2	0.279	0.10	33.39	-	33.49	-	60.85	50.85	-27.36	-
3	0.377	0.10	27.01	-	27.11	-	58.35	48.35	-31.24	-
4	1.430	0.20	29.62	-	29.82	-	56.00	46.00	-26.18	-
5	8.391	0.44	28.40	-	28.84	-	60.00	50.00	-31.16	-
6	14.250	0.60	26.99	-	27.59	-	60.00	50.00	-32.41	-

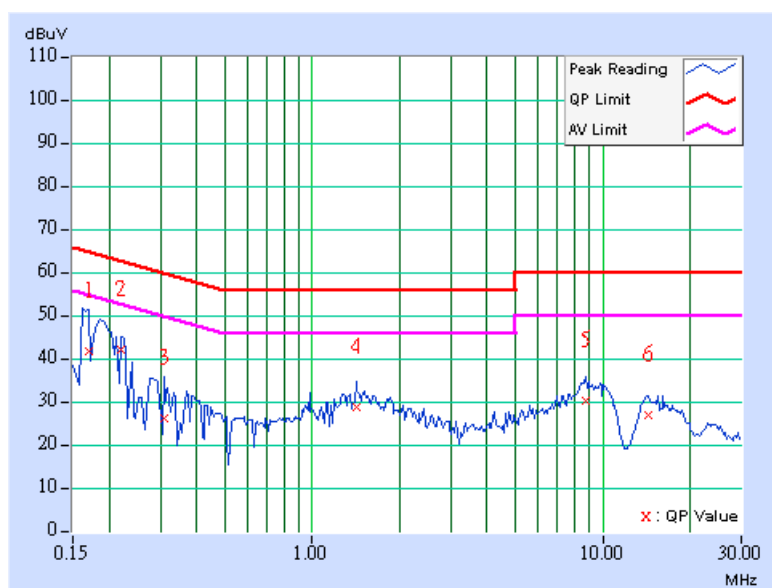
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	PHASE	Line 1
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
TEST MODE	B	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.170	0.10	41.08	-	41.18	-	64.98	54.98	-23.80	-
2	0.220	0.10	41.68	-	41.78	-	62.81	52.81	-21.03	-
3	0.310	0.10	25.67	-	25.77	-	59.97	49.97	-34.20	-
4	1.414	0.14	28.34	-	28.48	-	56.00	46.00	-27.52	-
5	8.723	0.36	29.95	-	30.31	-	60.00	50.00	-29.69	-
6	14.293	0.59	26.51	-	27.10	-	60.00	50.00	-32.90	-

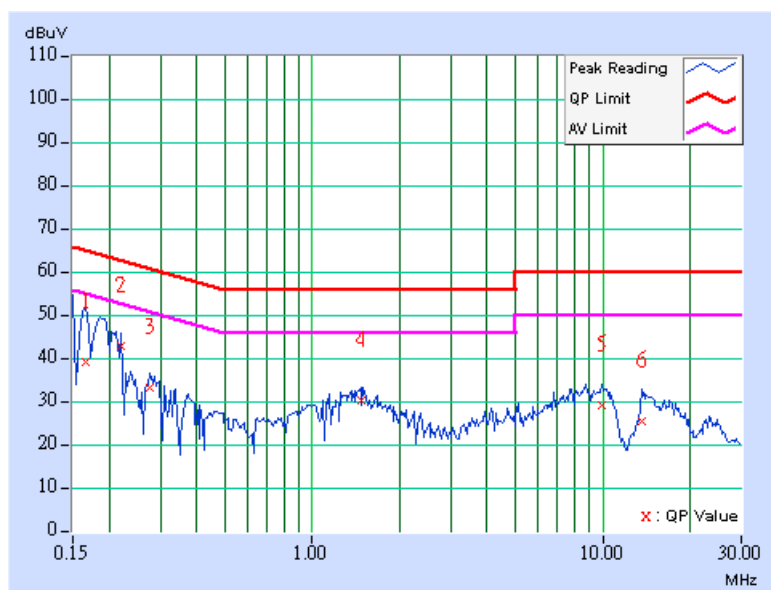
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	PHASE	Line 2
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
TEST MODE	B	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.166	0.10	38.66	-	38.76	-	65.18	55.18	-26.42	-
2	0.220	0.10	42.30	-	42.40	-	62.81	52.81	-20.41	-
3	0.275	0.10	32.76	-	32.86	-	60.97	50.97	-28.11	-
4	1.477	0.20	29.64	-	29.84	-	56.00	46.00	-26.16	-
5	9.930	0.46	28.76	-	29.22	-	60.00	50.00	-30.78	-
6	13.629	0.58	25.12	-	25.70	-	60.00	50.00	-34.30	-

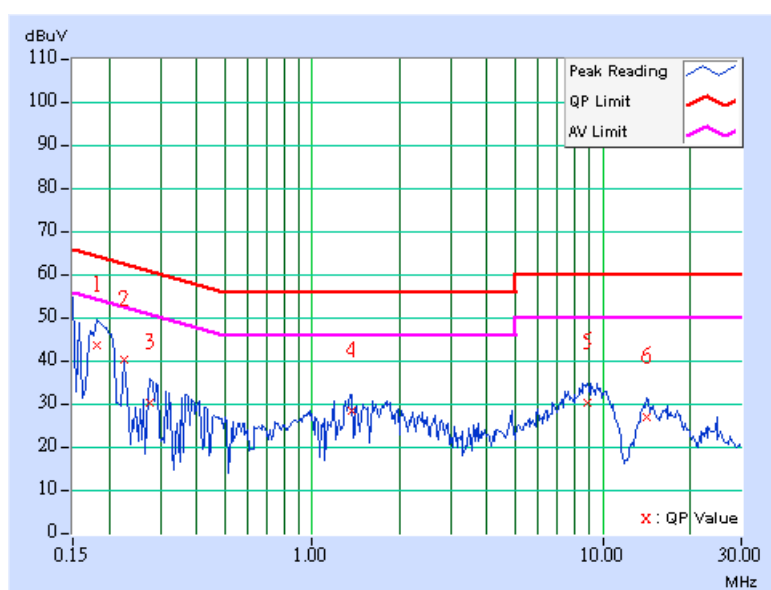
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	PHASE	Line 1
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
TEST MODE	B	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.10	43.22	-	43.32	-	64.43	54.43	-21.11	-
2	0.224	0.10	39.75	-	39.85	-	62.66	52.66	-22.81	-
3	0.275	0.10	29.60	-	29.70	-	60.97	50.97	-31.27	-
4	1.363	0.14	27.96	-	28.10	-	56.00	46.00	-27.90	-
5	8.805	0.36	29.94	-	30.30	-	60.00	50.00	-29.70	-
6	14.180	0.59	26.60	-	27.19	-	60.00	50.00	-32.81	-

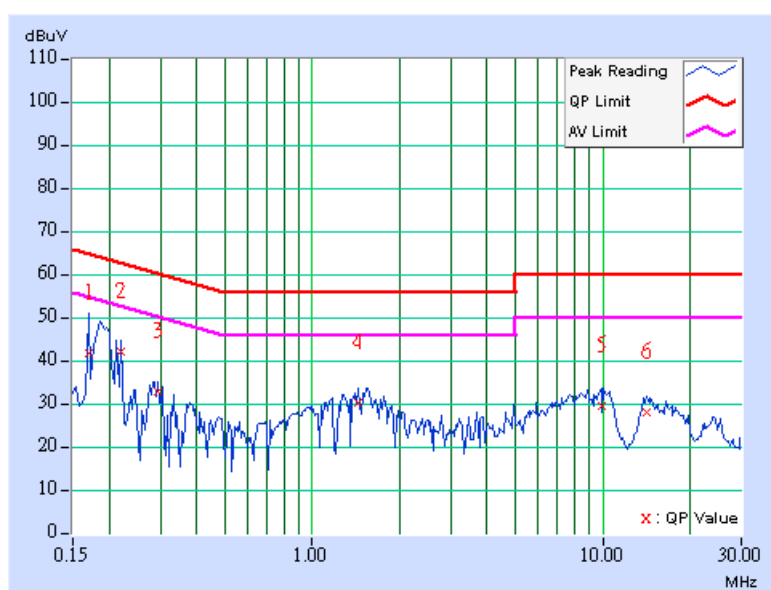
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	PHASE	Line 2
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
TEST MODE	B	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.170	0.10	41.32	-	41.42	-	64.98	54.98	-23.56	-
2	0.220	0.10	41.50	-	41.60	-	62.81	52.81	-21.21	-
3	0.295	0.10	32.22	-	32.32	-	60.40	50.40	-28.08	-
4	1.441	0.20	29.88	-	30.08	-	56.00	46.00	-25.92	-
5	9.941	0.46	28.99	-	29.45	-	60.00	50.00	-30.55	-
6	14.191	0.60	27.40	-	28.00	-	60.00	50.00	-32.00	-

- 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	ESIB7	100188	Dec. 20, 2006
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Nov. 27, 2006
BILOG Antenna SCHWARZBECK	VULB9168	9168-157	Jan. 15, 2007
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-407	Jan. 22, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170147	Jan. 26, 2007
Preamplifier Agilent	8449B	3008A01961	Oct. 23, 2006
Preamplifier Agilent	8447D	2944A10629	Oct. 27, 2006
RF signal cable HUBER+SUHNER	SUCOFLEX 104	214380/4	Jan. 16, 2007
RF signal cable HUBER+SUHNER	SUCOFLEX 104	219266/4	Jan. 16, 2007
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower ADT.	AT100	AT93021702	NA
Turn Table ADT.	TT100.	TT93021702	NA
Controller ADT.	SC100.	SC93021702	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 1.
 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 IC4924-2.

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.

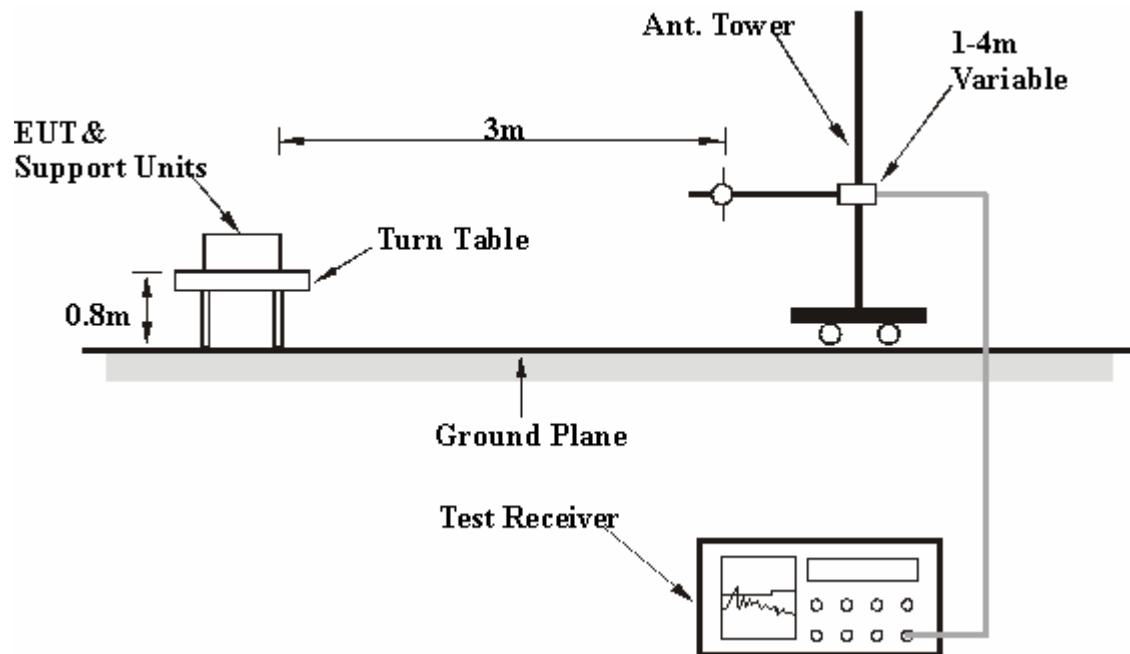
NOTE:

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	8DPSK	DETECTOR FUNCTION	Quasi-Peak
TEST MODE	A	ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH, 991hPa
TESTED BY	Match Tsui	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	109.70	28.20 QP	43.50	-15.30	2.00 H	142	18.33	9.87
2	131.08	30.13 QP	43.50	-13.37	1.00 H	64	17.86	12.27
3	175.79	32.25 QP	43.50	-11.25	2.00 H	142	19.81	12.43
4	220.50	35.89 QP	46.00	-10.11	2.00 H	145	24.39	11.50
5	265.21	34.35 QP	46.00	-11.65	1.00 H	73	21.01	13.34
6	309.92	31.72 QP	46.00	-14.28	1.50 H	139	15.97	15.75
7	352.69	36.15 QP	46.00	-9.85	2.00 H	145	19.78	16.37
8	376.01	30.98 QP	46.00	-15.02	1.50 H	139	13.84	17.14
9	467.37	30.70 QP	46.00	-15.30	2.00 H	79	11.36	19.34

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	35.83	24.44 QP	40.00	-15.56	1.00 V	46	11.20	13.24
2	76.65	27.43 QP	40.00	-12.57	1.00 V	40	16.47	10.96
3	160.24	26.89 QP	43.50	-16.61	1.00 V	193	13.50	13.39
4	175.79	31.69 QP	43.50	-11.81	1.00 V	40	19.25	12.43
5	199.12	32.66 QP	43.50	-10.84	1.00 V	97	21.76	10.89
6	352.69	29.14 QP	46.00	-16.86	2.50 V	19	12.77	16.37

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	8DPSK	DETECTOR FUNCTION	Quasi-Peak
TEST MODE	B	ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	113.59	31.62 QP	43.50	-11.88	1.50 H	280	21.40	10.23
2	175.79	33.99 QP	43.50	-9.51	1.50 H	76	21.56	12.43
3	265.21	33.92 QP	46.00	-12.08	1.00 H	202	20.58	13.34
4	309.92	37.19 QP	46.00	-8.81	1.00 H	205	21.45	15.75
5	508.20	25.25 QP	46.00	-20.75	1.00 H	10	5.01	20.24
6	731.74	30.43 QP	46.00	-15.57	1.00 H	166	5.25	25.18

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	32.75 QP	43.50	-10.75	1.00 V	187	22.35	10.40
2	175.79	36.34 QP	43.50	-7.16	1.00 V	52	23.91	12.43
3	220.50	31.27 QP	46.00	-14.73	1.00 V	172	19.77	11.50
4	309.92	27.89 QP	46.00	-18.11	1.50 V	172	12.14	15.75
5	712.30	31.68 QP	46.00	-14.32	1.50 V	172	7.14	24.54
6	904.75	38.03 QP	46.00	-7.97	1.50 V	22	10.73	27.30

- 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.

RADIATED WORST CASE DATA: ABOVE 1GHz

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Peak (PK) Average (AV)
TEST MODE	B	ENVIRONMENTAL CONDITIONS	22deg. C, 63%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	1602.00	50.14 PK	74.00	-23.86	1.02 H	159	20.55	29.59
1	1602.00	46.51 AV	54.00	-7.49	1.02 H	159	16.92	29.59
2	2386.00	29.43 PK	74.00	-44.57	1.00 H	146	-2.67	32.10
2	2386.00	18.69 AV	54.00	-35.31	1.00 H	146	-13.41	32.10
3	*2402.00	113.87 PK			1.00 H	146	81.71	32.16
3	*2402.00	83.87 AV			1.00 H	146	51.71	32.16
4	4804.00	58.74 PK	74.00	-15.26	1.01 H	193	20.15	38.59
4	4804.00	28.74 AV	54.00	-25.26	1.01 H	193	-9.85	38.59
5	7206.00	61.87 PK	74.00	-12.13	1.01 H	225	16.74	45.13
5	7206.00	31.87 AV	54.00	-22.13	1.01 H	225	-13.26	45.13
6	9608.00	63.59 PK	74.00	-10.41	1.04 H	198	15.13	48.46
6	9608.00	33.59 AV	54.00	-20.41	1.04 H	198	-14.87	48.46

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	1602.00	51.89 PK	74.00	-22.11	1.05 V	198	22.30	29.59
1	1602.00	49.17 AV	54.00	-4.83	1.05 V	198	19.58	29.59
2	2386.00	58.44 PK	74.00	-15.56	1.05 V	187	26.34	32.10
2	2386.00	47.28 AV	54.00	-6.72	1.05 V	187	15.18	32.10
3	*2402.00	112.39 PK			1.05 V	187	80.23	32.16
3	*2402.00	82.39 AV			1.05 V	187	50.23	32.16
4	4804.00	63.81 PK	74.00	-10.19	1.01 V	153	25.22	38.59
4	4804.00	33.81 AV	54.00	-20.19	1.01 V	153	-4.78	38.59
5	7206.00	62.49 PK	74.00	-11.51	1.06 V	164	17.36	45.13
5	7206.00	32.49 AV	54.00	-21.51	1.06 V	164	-12.64	45.13
6	9608.00	66.58 PK	74.00	-7.42	1.04 V	202	18.12	48.46
6	9608.00	36.58 AV	54.00	-17.42	1.04 V	202	-11.88	48.46

- 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: $20\log(3.125/100) = -30$ dB.
 6. Average value = peak reading $-20\log(\text{duty cycle})$.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Peak (PK) Average (AV)
TEST MODE	B	ENVIRONMENTAL CONDITIONS	22deg. C, 63%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	1628.00	49.53 PK	74.00	-24.47	1.01 H	139	19.88	29.65
1	1628.00	46.07 AV	54.00	-7.93	1.01 H	139	16.42	29.65
2	*2441.00	114.25 PK			1.01 H	149	81.95	32.30
2	*2441.00	84.25 AV			1.01 H	149	51.95	32.30
3	4882.00	58.71 PK	74.00	-15.29	1.06 H	271	19.90	38.81
3	4882.00	28.71 AV	54.00	-25.29	1.06 H	271	-10.10	38.81
4	7323.00	61.79 PK	74.00	-12.21	1.05 H	243	16.35	45.44
4	7323.00	31.79 AV	54.00	-22.21	1.05 H	243	-13.65	45.44
5	9764.00	63.25 PK	74.00	-10.75	1.01 H	131	14.48	48.77
5	9764.00	33.25 AV	54.00	-20.75	1.01 H	131	-15.52	48.77

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	1628.00	51.94 PK	74.00	-22.06	1.04 V	172	22.29	29.65
1	1628.00	49.25 AV	54.00	-4.75	1.04 V	172	19.60	29.65
2	*2441.00	113.58 PK			1.05 V	188	81.28	32.30
2	*2441.00	83.58 AV			1.05 V	188	51.28	32.30
3	4882.00	63.51 PK	74.00	-10.49	1.04 V	151	24.70	38.81
3	4882.00	33.51 AV	54.00	-20.49	1.04 V	151	-5.30	38.81
4	7323.00	62.49 PK	74.00	-11.51	1.05 V	146	17.05	45.44
4	7323.00	32.49 AV	54.00	-21.51	1.05 V	146	-12.95	45.44
5	9764.00	66.48 PK	74.00	-7.52	1.07 V	245	17.71	48.77
5	9764.00	36.48 AV	54.00	-17.52	1.07 V	245	-12.29	48.77

- 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: $20\log(3.125/100) = -30$ dB.
 6. Average value = peak reading $-20\log(\text{duty cycle})$.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Peak (PK) Average (AV)
TEST MODE	B	ENVIRONMENTAL CONDITIONS	22deg. C, 63%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	1654.00	49.77 PK	74.00	-24.23	1.03 H	287	20.05	29.72
1	1654.00	46.28 AV	54.00	-7.72	1.03 H	287	16.56	29.72
2	*2480.00	114.53 PK			1.03 H	151	82.08	32.45
2	*2480.00	84.53 AV			1.03 H	151	52.08	32.45
3	2496.00	61.75 PK	74.00	-12.25	1.03 H	151	29.24	32.51
3	2496.00	52.41 AV	54.00	-1.59	1.03 H	151	19.90	32.51
4	4960.00	59.71 PK	74.00	-14.29	1.02 H	189	20.69	39.02
4	4960.00	29.71 AV	54.00	-24.29	1.02 H	189	-9.31	39.02
5	7440.00	61.54 PK	74.00	-12.46	1.03 H	244	15.82	45.72
5	7440.00	31.54 AV	54.00	-22.46	1.03 H	244	-14.18	45.72
6	9920.00	63.56 PK	74.00	-10.44	1.04 H	217	14.54	49.02
6	9920.00	33.56 AV	54.00	-20.44	1.04 H	217	-15.46	49.02

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	1654.00	51.92 PK	74.00	-22.08	1.01 V	297	22.20	29.72
1	1654.00	49.23 AV	54.00	-4.77	1.01 V	297	19.51	29.72
2	*2480.00	113.67 PK			1.03 V	181	81.22	32.45
2	*2480.00	83.67 AV			1.03 V	181	51.22	32.45
3	2496.00	59.05 PK	74.00	-14.95	1.03 V	181	26.54	32.51
3	2496.00	49.01 AV	54.00	-4.99	1.03 V	181	16.50	32.51
4	4960.00	63.87 PK	74.00	-10.13	1.04 V	306	24.85	39.02
4	4960.00	33.87 AV	54.00	-20.13	1.04 V	306	-5.15	39.02
5	7440.00	62.59 PK	74.00	-11.41	1.05 V	217	16.87	45.72
5	7440.00	32.59 AV	54.00	-21.41	1.05 V	217	-13.13	45.72
6	9920.00	66.57 PK	74.00	-7.43	1.04 V	198	17.55	49.02
6	9920.00	36.57 AV	54.00	-17.43	1.04 V	198	-12.45	49.02

- 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: $20\log(3.125/100) = -30$ dB.
 6. Average value = peak reading $-20\log(\text{duty cycle})$.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	8DPSK	DETECTOR FUNCTION	Peak (PK) Average (AV)
TEST MODE	B	ENVIRONMENTAL CONDITIONS	22deg. C, 63%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	1602.00	49.87 PK	74.00	-24.13	1.07 H	211	20.28	29.59
1	1602.00	46.35 AV	54.00	-7.65	1.07 H	211	16.76	29.59
2	2386.00	64.79 PK	74.00	-9.21	1.04 H	212	32.69	32.10
2	2386.00	52.39 AV	54.00	-1.61	1.04 H	212	20.29	32.10
3	*2402.00	115.34 PK			1.01 H	175	83.18	32.16
3	*2402.00	85.34 AV			1.01 H	175	53.18	32.16
4	4804.00	58.45 PK	74.00	-15.55	1.05 H	216	19.86	38.59
4	4804.00	28.45 AV	54.00	-25.55	1.05 H	216	-10.14	38.59
5	7206.00	61.69 PK	74.00	-12.31	1.05 H	284	16.56	45.13
5	7206.00	31.69 AV	54.00	-22.31	1.05 H	284	-13.44	45.13
6	9608.00	63.14 PK	74.00	-10.86	1.02 H	215	14.68	48.46
6	9608.00	33.14 AV	54.00	-20.86	1.02 H	215	-15.32	48.46

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	1602.00	51.63 PK	74.00	-22.37	1.03 V	172	22.04	29.59
1	1602.00	48.85 AV	54.00	-5.15	1.03 V	172	19.26	29.59
2	2386.00	60.45 PK	74.00	-13.55	1.01 V	192	28.35	32.10
2	2386.00	49.24 AV	54.00	-4.76	1.01 V	192	17.14	32.10
3	*2402.00	113.04 PK			1.01 V	192	80.88	32.16
3	*2402.00	83.04 AV			1.01 V	192	50.88	32.16
4	4804.00	63.12 PK	74.00	-10.88	1.09 V	237	24.53	38.59
4	4804.00	33.12 AV	54.00	-20.88	1.09 V	237	-5.47	38.59
5	7206.00	62.48 PK	74.00	-11.52	1.05 V	134	17.35	45.13
5	7206.00	32.48 AV	54.00	-21.52	1.05 V	134	-12.65	45.13
6	9608.00	66.47 PK	74.00	-7.53	1.04 V	219	18.01	48.46
6	9608.00	36.47 AV	54.00	-17.53	1.04 V	219	-11.99	48.46

- 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: $20\log(3.125/100) = -30$ dB.
 6. Average value = peak reading $-20\log(\text{duty cycle})$.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	8DPSK	DETECTOR FUNCTION	Peak (PK) Average (AV)
TEST MODE	B	ENVIRONMENTAL CONDITIONS	22deg. C, 63%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	1628.00	49.62 PK	74.00	-24.38	1.02 H	135	19.97	29.65
1	1628.00	46.17 AV	54.00	-7.83	1.02 H	135	16.52	29.65
2	*2441.00	115.87 PK			1.00 H	146	83.57	32.30
2	*2441.00	85.87 AV			1.00 H	146	53.57	32.30
3	4882.00	58.67 PK	74.00	-15.33	1.03 H	235	19.86	38.81
3	4882.00	28.67 AV	54.00	-25.33	1.03 H	235	-10.14	38.81
4	7323.00	61.49 PK	74.00	-12.51	1.02 H	215	16.05	45.44
4	7323.00	31.49 AV	54.00	-22.51	1.02 H	215	-13.95	45.44
5	9764.00	63.06 PK	74.00	-10.94	1.02 H	125	14.29	48.77
5	9764.00	33.06 AV	54.00	-20.94	1.02 H	125	-15.71	48.77

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	1628.00	51.72 PK	74.00	-22.28	1.01 V	164	22.07	29.65
1	1628.00	49.02 AV	54.00	-4.98	1.01 V	164	19.37	29.65
2	*2441.00	113.39 PK			1.06 V	187	81.09	32.30
2	*2441.00	83.39 AV			1.06 V	187	51.09	32.30
3	4882.00	63.26 PK	74.00	-10.74	1.05 V	146	24.45	38.81
3	4882.00	33.26 AV	54.00	-20.74	1.05 V	146	-5.55	38.81
4	7323.00	62.17 PK	74.00	-11.83	1.01 V	129	16.73	45.44
4	7323.00	32.17 AV	54.00	-21.83	1.01 V	129	-13.27	45.44
5	9764.00	66.22 PK	74.00	-7.78	1.01 V	193	17.45	48.77
5	9764.00	36.22 AV	54.00	-17.78	1.01 V	193	-12.55	48.77

- 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: $20\log(3.125/100) = -30$ dB.
 6. Average value = peak reading $-20\log(\text{duty cycle})$.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	8DPSK	DETECTOR FUNCTION	Peak (PK) Average (AV)
TEST MODE	B	ENVIRONMENTAL CONDITIONS	22deg. C, 63%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	1654.00	49.80 PK	74.00	-24.20	1.00 H	114	20.08	29.72
1	1654.00	46.33 AV	54.00	-7.67	1.00 H	114	16.61	29.72
2	*2480.00	115.99 PK			1.00 H	210	83.54	32.45
2	*2480.00	85.99 AV			1.00 H	210	53.54	32.45
3	2483.50	67.61 PK	74.00	-6.39	1.00 H	210	35.15	32.46
3	2483.50	37.61 AV	54.00	-16.39	1.00 H	210	5.15	32.46
4	4960.00	59.08 PK	74.00	-14.92	1.07 H	201	20.06	39.02
4	4960.00	29.08 AV	54.00	-24.92	1.07 H	201	-9.94	39.02
5	7440.00	61.60 PK	74.00	-12.40	1.00 H	207	15.88	45.72
5	7440.00	31.60 AV	54.00	-22.40	1.00 H	207	-14.12	45.72
6	9920.00	63.18 PK	74.00	-10.82	1.01 H	128	14.16	49.02
6	9920.00	33.18 AV	54.00	-20.82	1.01 H	128	-15.84	49.02

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	1654.00	51.78 PK	74.00	-22.22	1.00 V	150	22.06	29.72
1	1654.00	49.04 AV	54.00	-4.96	1.00 V	150	19.32	29.72
2	*2480.00	113.87 PK			1.02 V	185	81.42	32.45
2	*2480.00	83.87 AV			1.02 V	185	51.42	32.45
3	2483.50	65.49 PK	74.00	-8.51	1.02 V	185	33.03	32.46
3	2483.50	35.49 AV	54.00	-18.51	1.02 V	185	3.03	32.46
4	4960.00	63.45 PK	74.00	-10.55	1.07 V	168	24.43	39.02
4	4960.00	33.45 AV	54.00	-20.55	1.07 V	168	-5.57	39.02
5	7440.00	62.48 PK	74.00	-11.52	1.00 V	132	16.76	45.72
5	7440.00	32.48 AV	54.00	-21.52	1.00 V	132	-13.24	45.72
6	9920.00	66.43 PK	74.00	-7.57	1.02 V	227	17.41	49.02
6	9920.00	36.43 AV	54.00	-17.57	1.02 V	227	-12.59	49.02

- 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: $20\log(3.125/100) = -30$ dB.
 6. Average value = peak reading $-20\log(\text{duty cycle})$.

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

- Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- 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.
- 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.
- Set the SA on View mode and then plot the result on SA screen.
- Repeat above procedures until all frequencies measured were complete.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

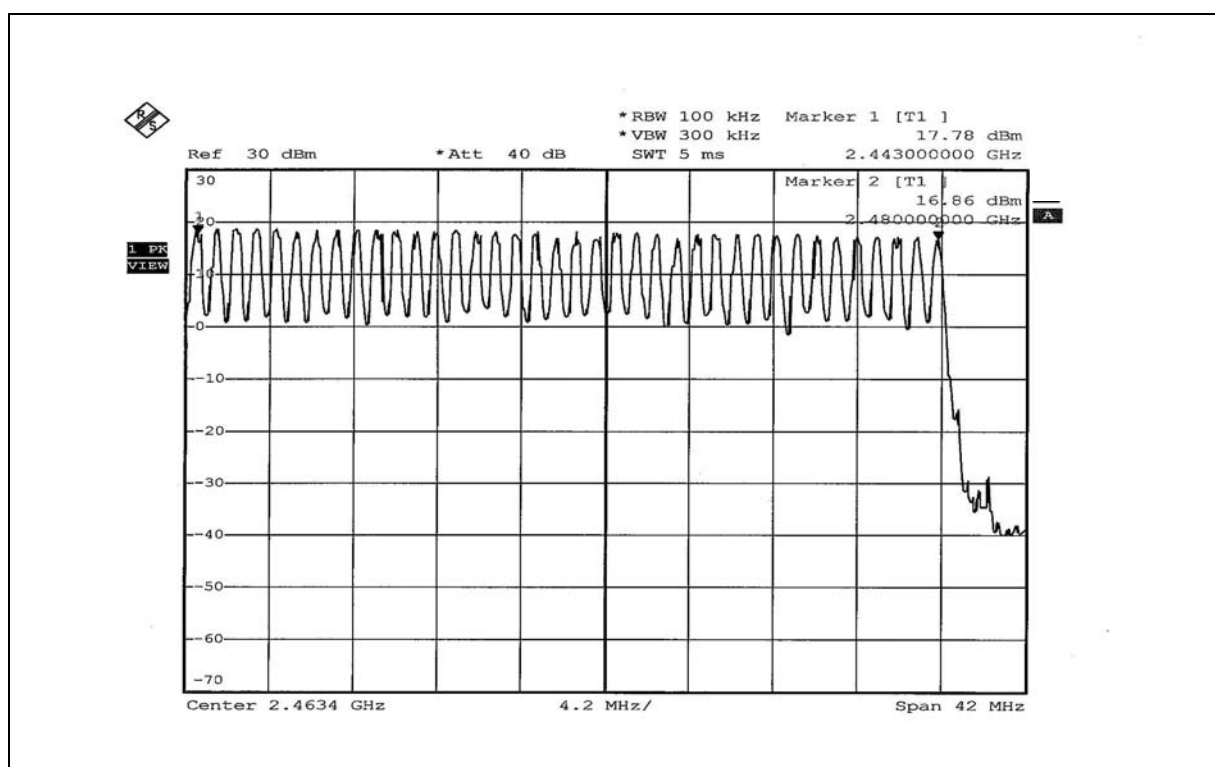
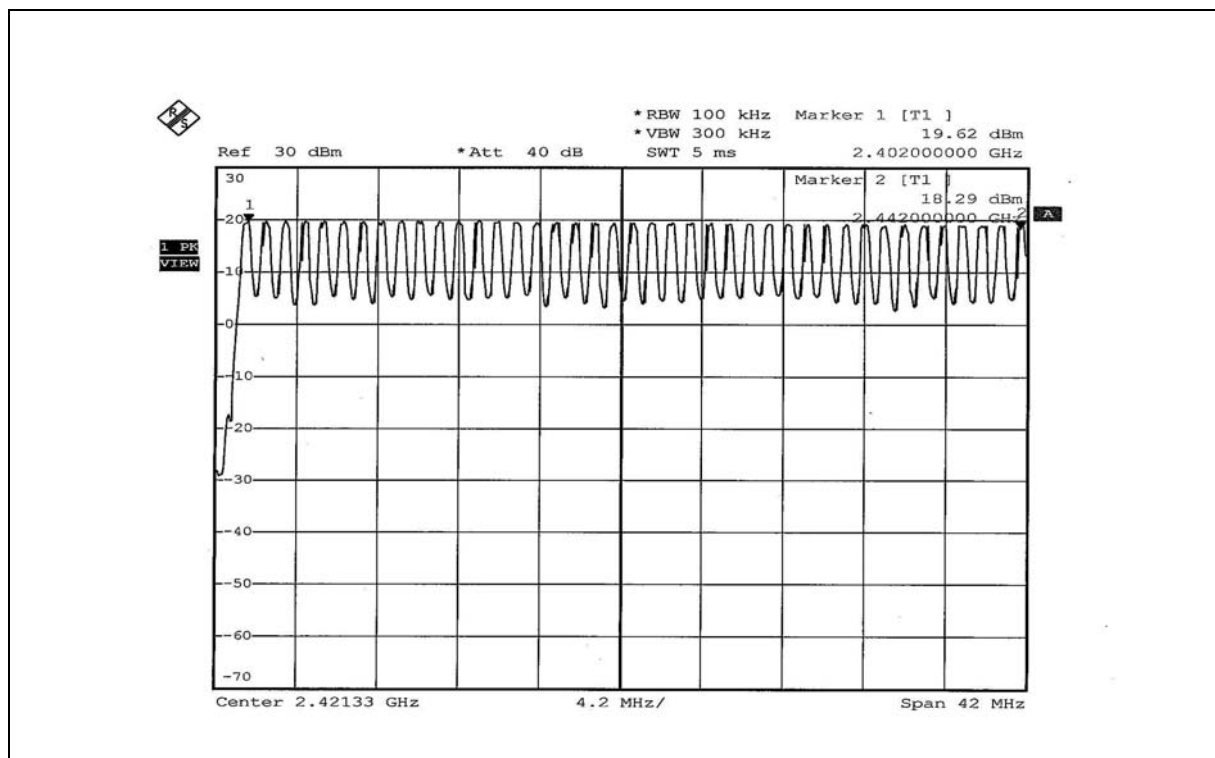
4.3.5 TEST SETUP

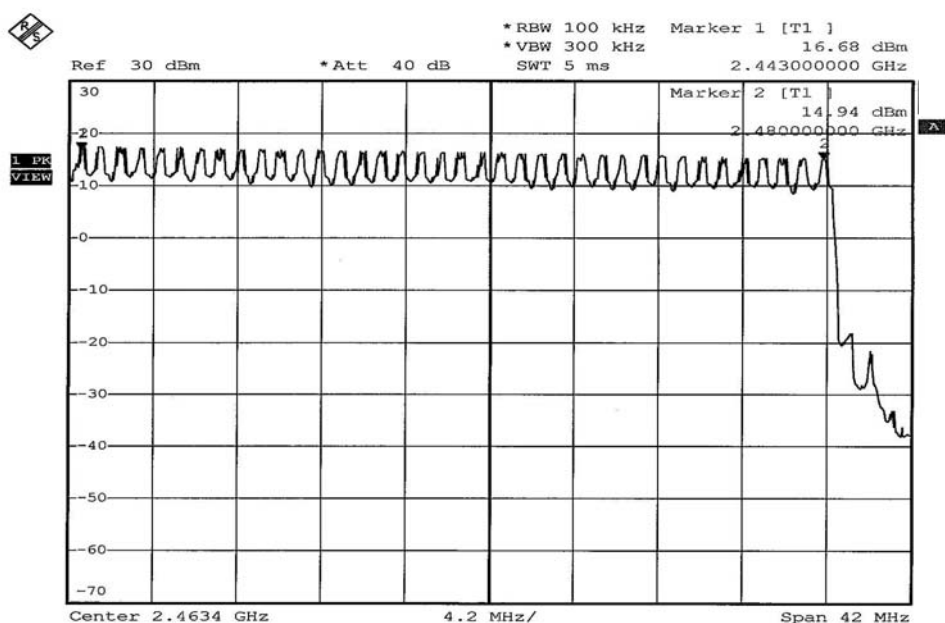
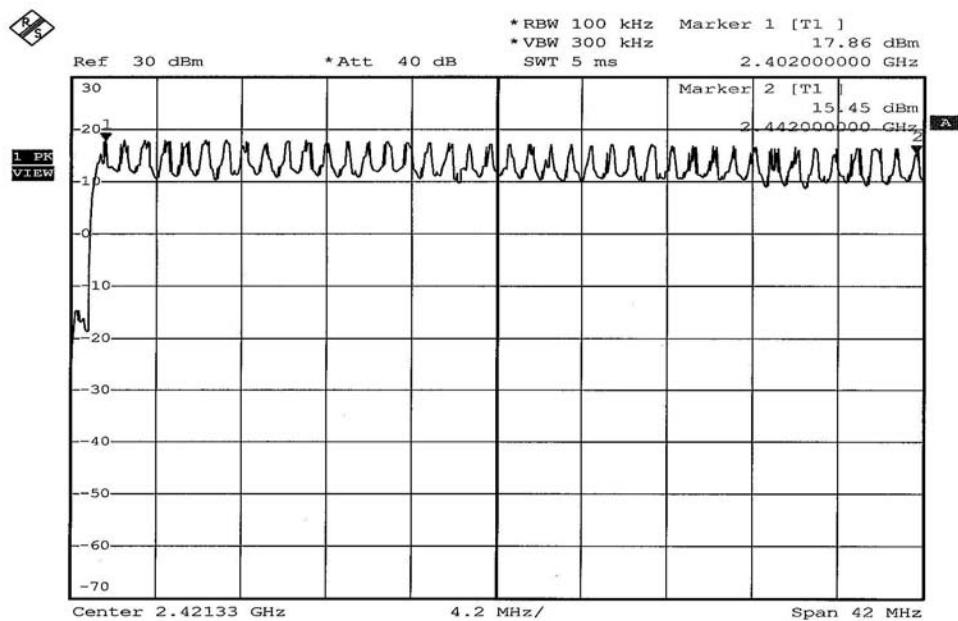


4.3.6 TEST RESULTS

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.

FOR GFSK





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

- Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- 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.
- 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.
- Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
- 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



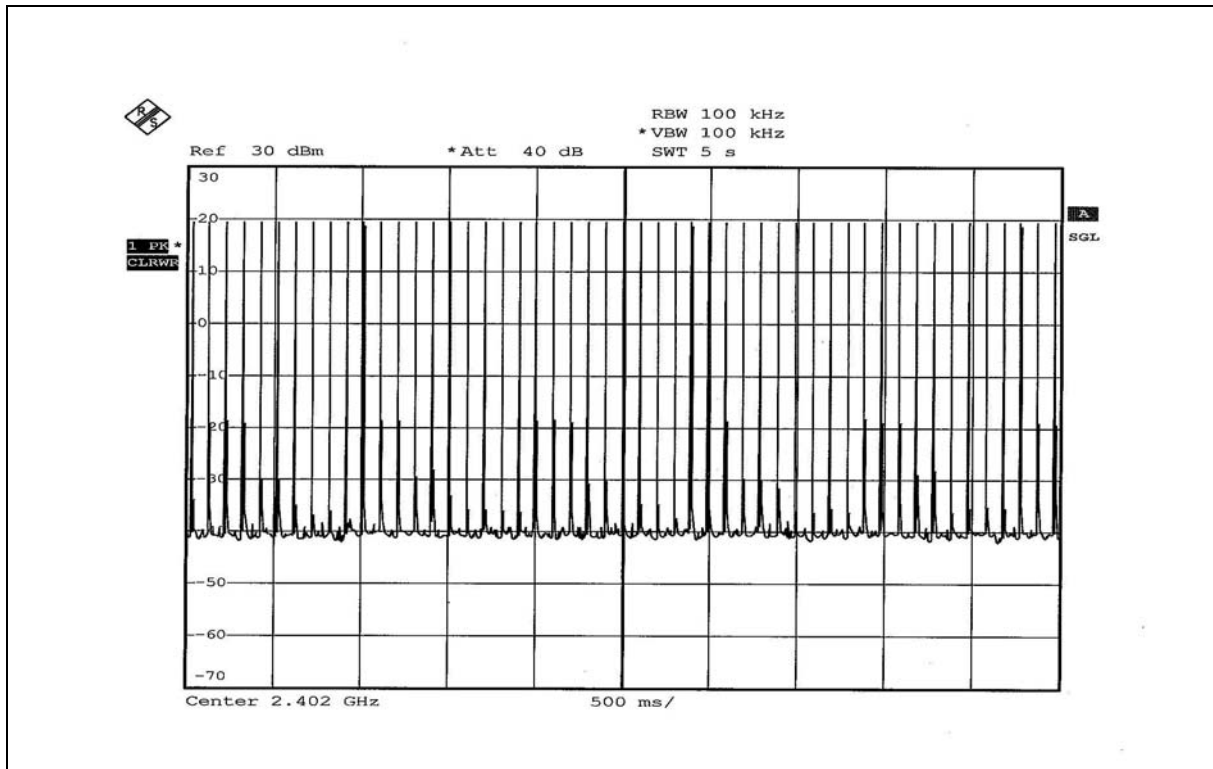
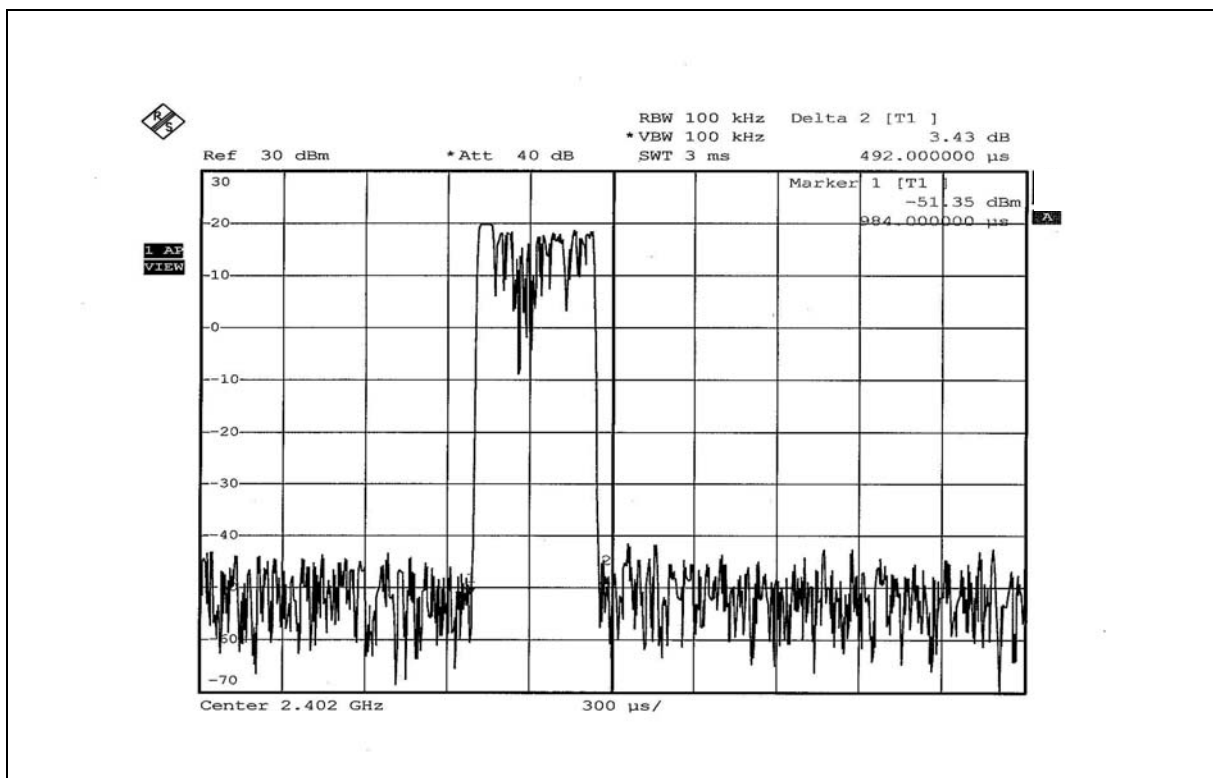
4.4.6 TEST RESULTS

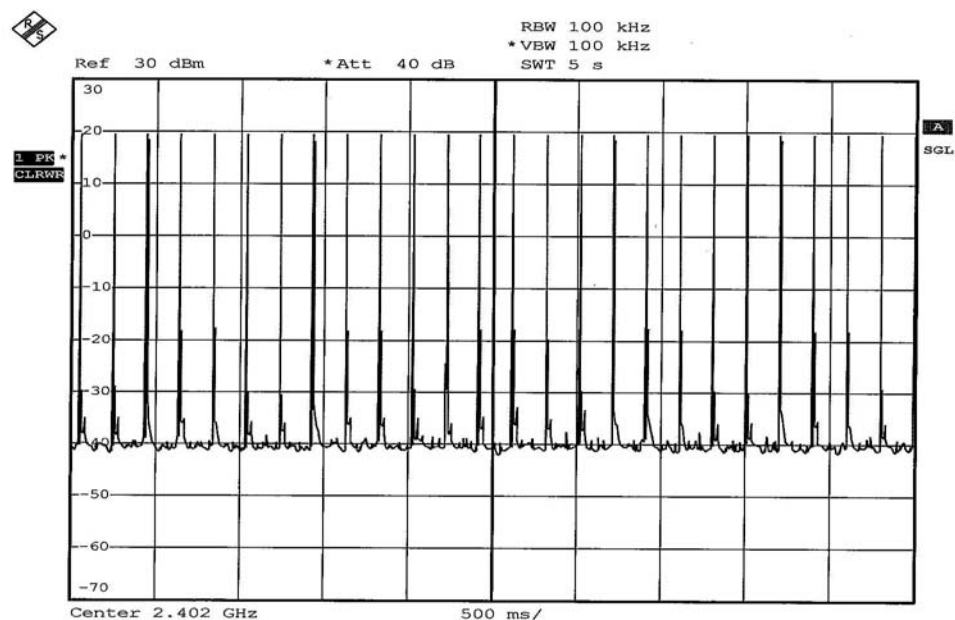
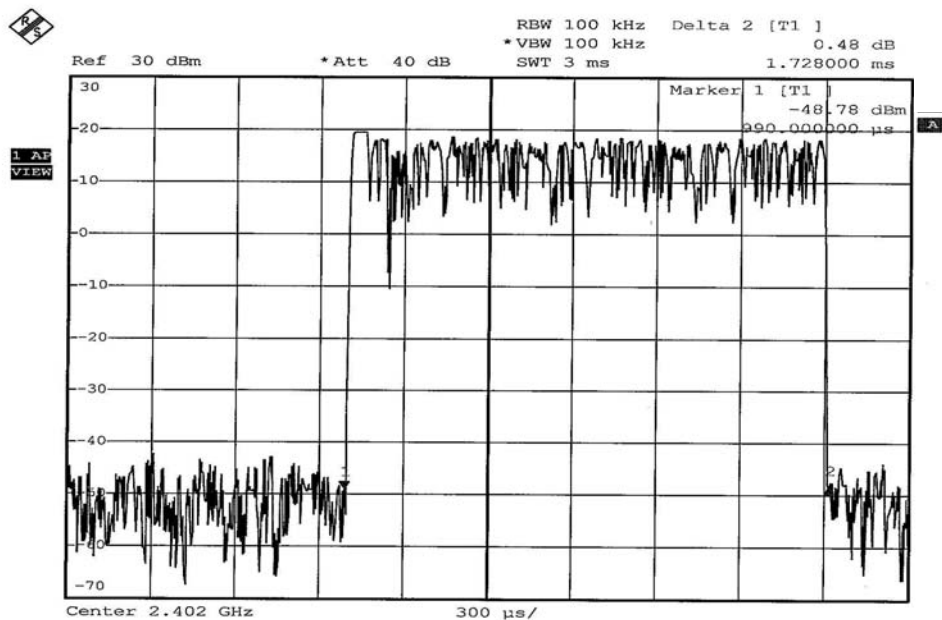
FOR GFSK

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	0.492	158.58	400
DH3	26 (times / 5 sec) *6.32=164.32 times	1.728	283.94	400
DH5	17 (times / 5 sec) *6.32=107.44 times	3.000	322.32	400

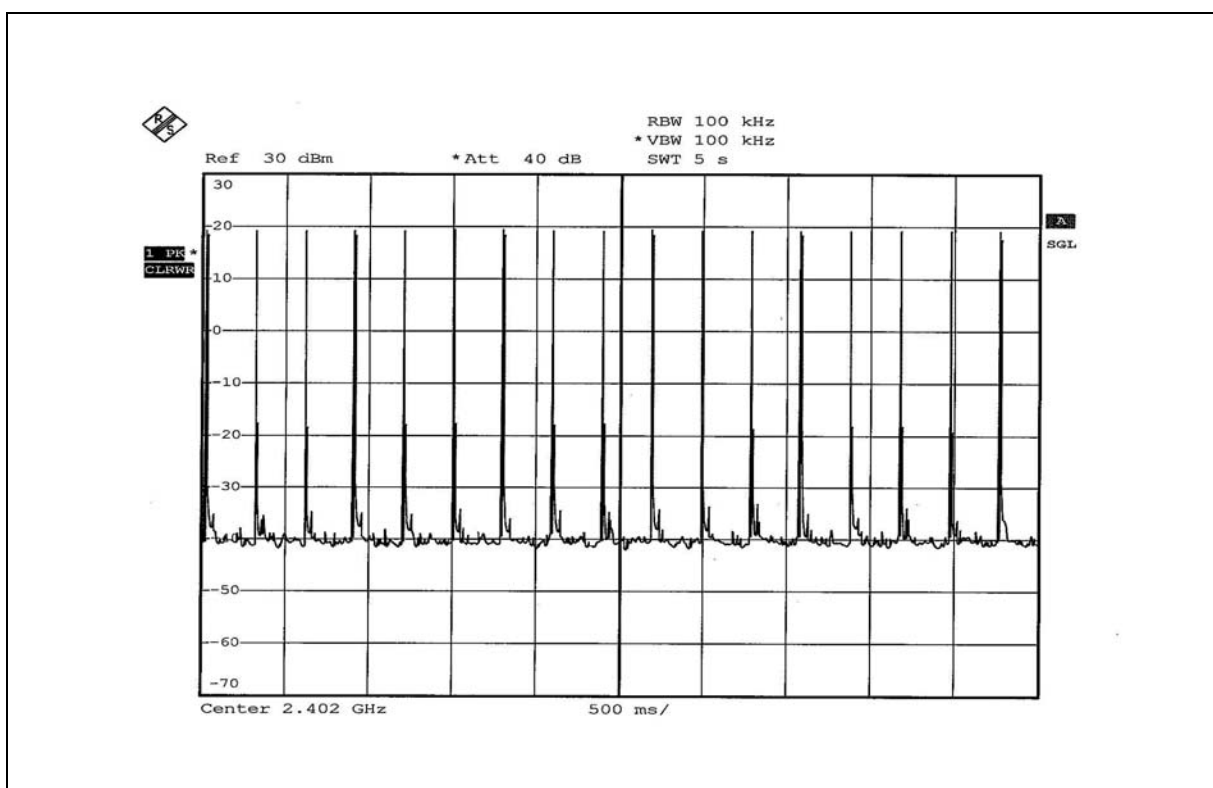
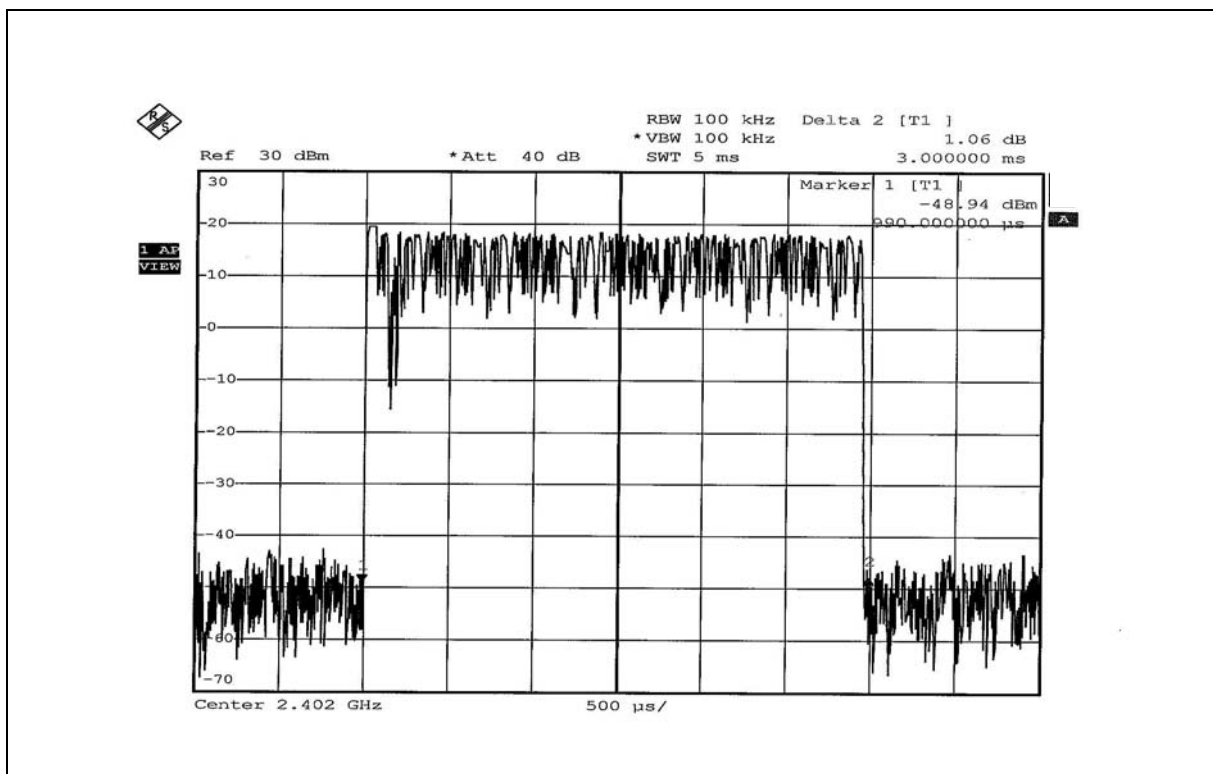
NOTE: Test plots of the transmitting time slot are shown on next 3 pages.

DH1





DH5

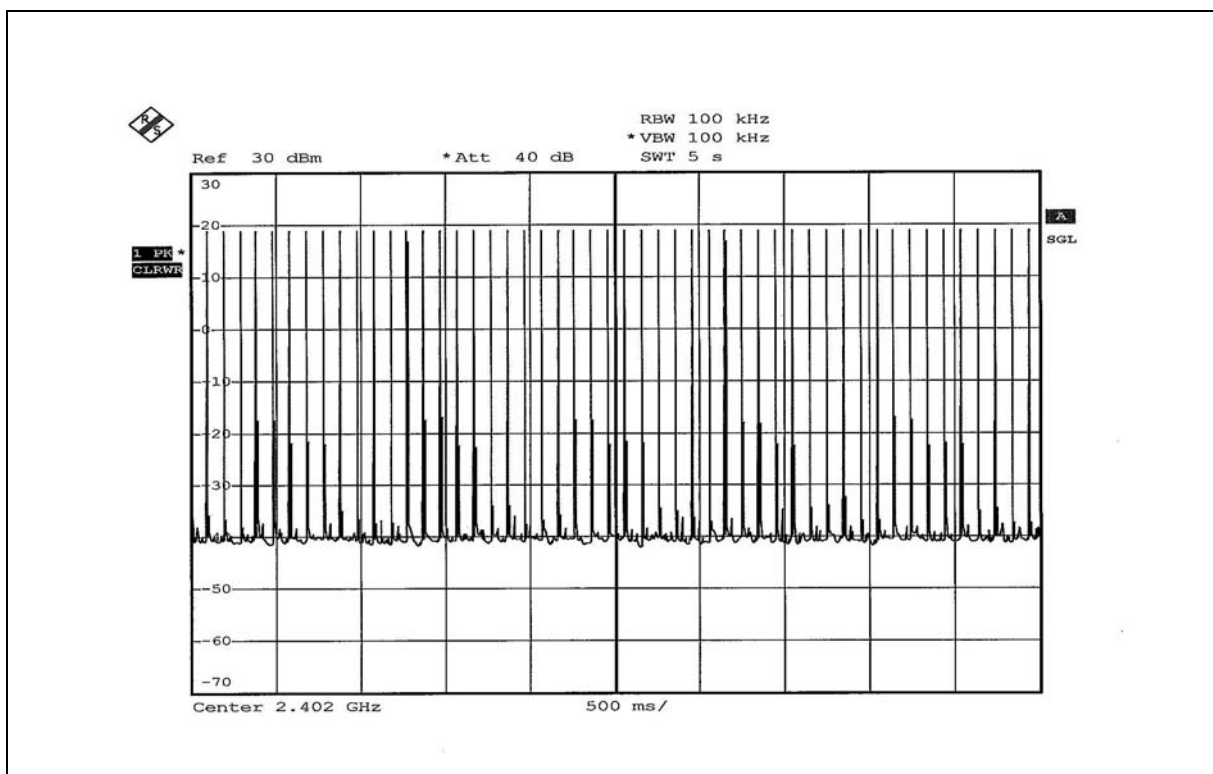
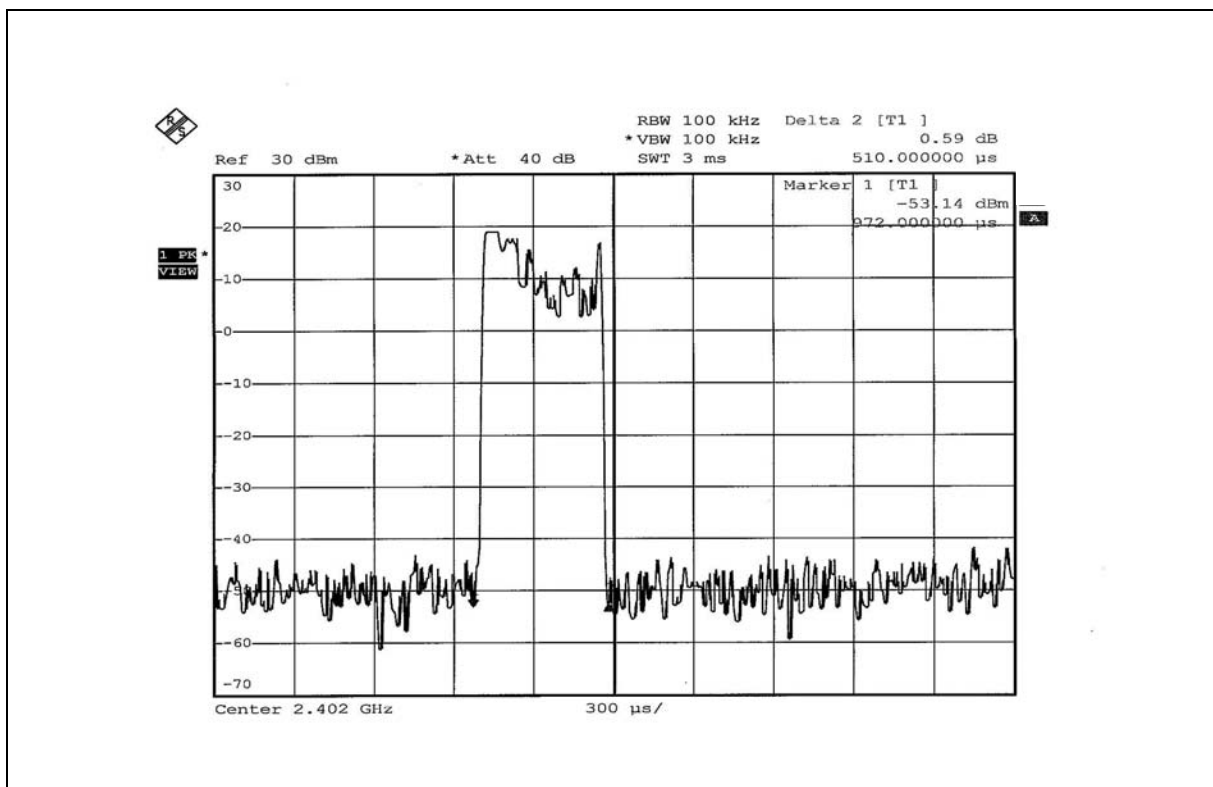


FOR 8DPSK

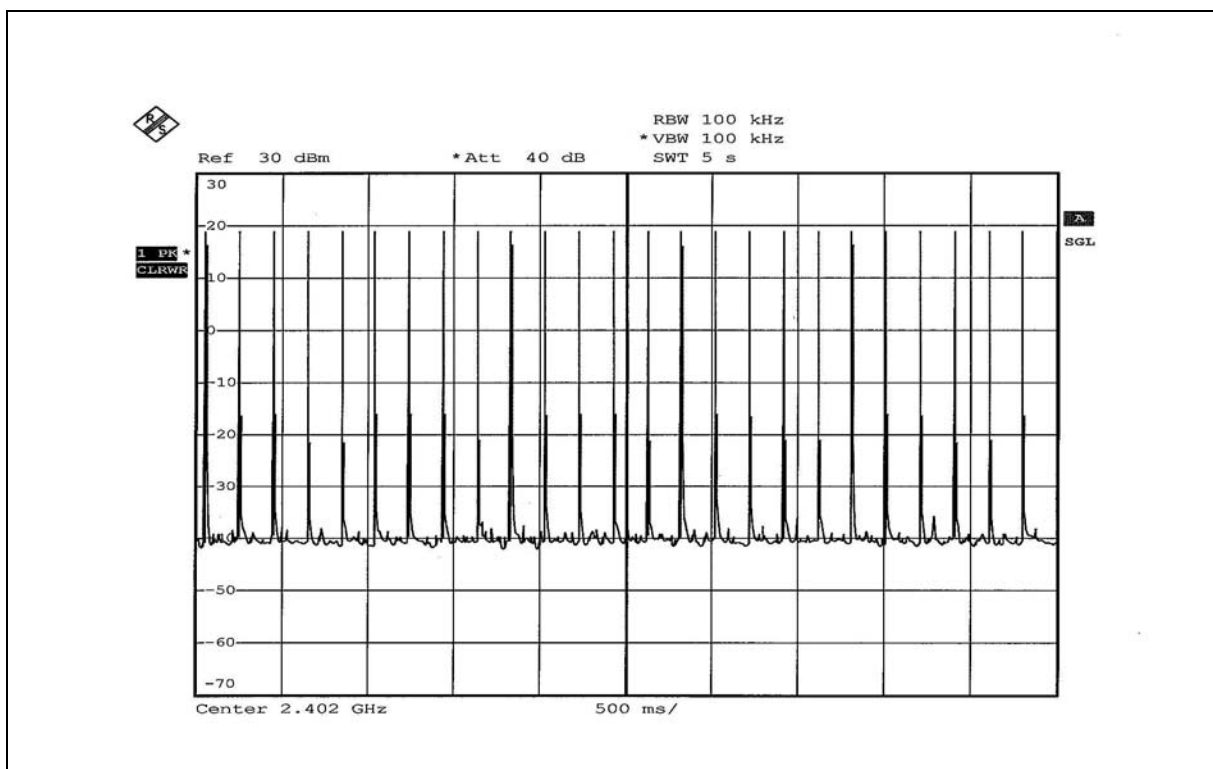
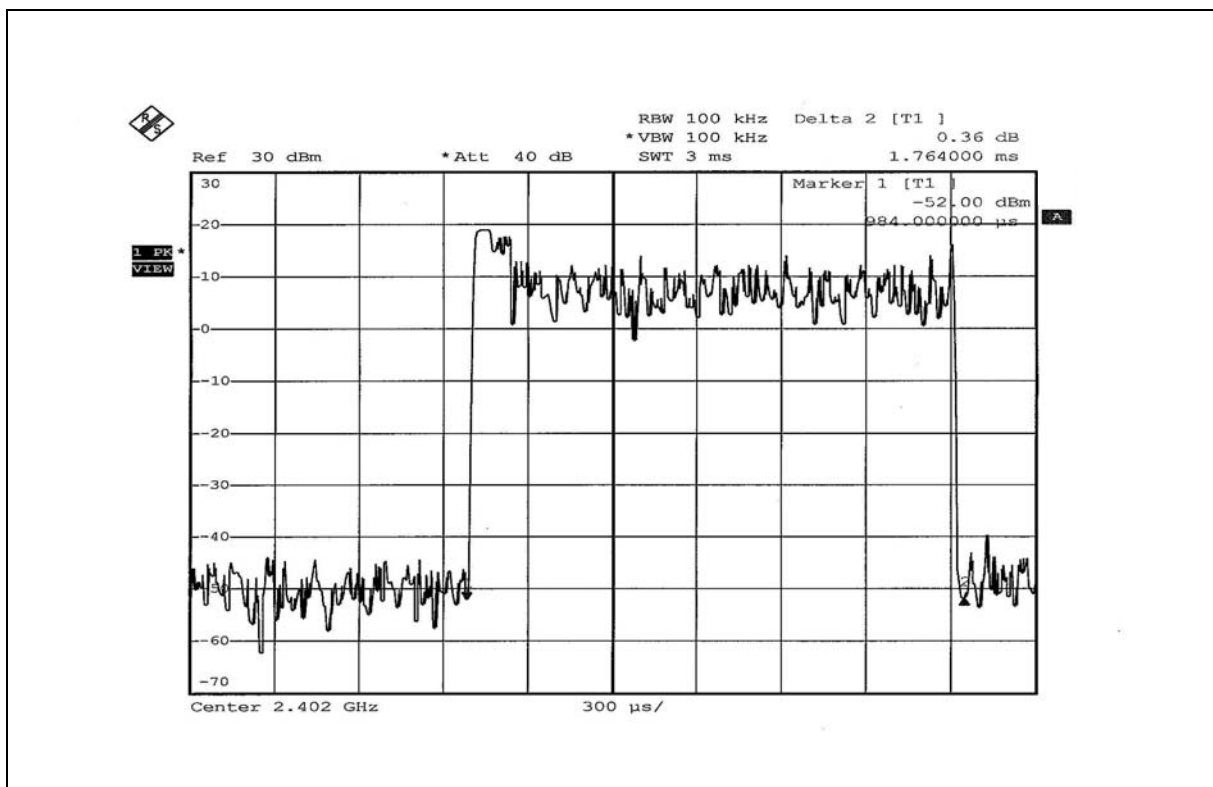
Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	50 (times / 5 sec) *6.32=316.00 times	0.510	161.16	400
DH3	26 (times / 5 sec) *6.32=164.32 times	1.764	289.86	400
DH5	17 (times / 5 sec) *6.32=107.44 times	3.030	325.54	400

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

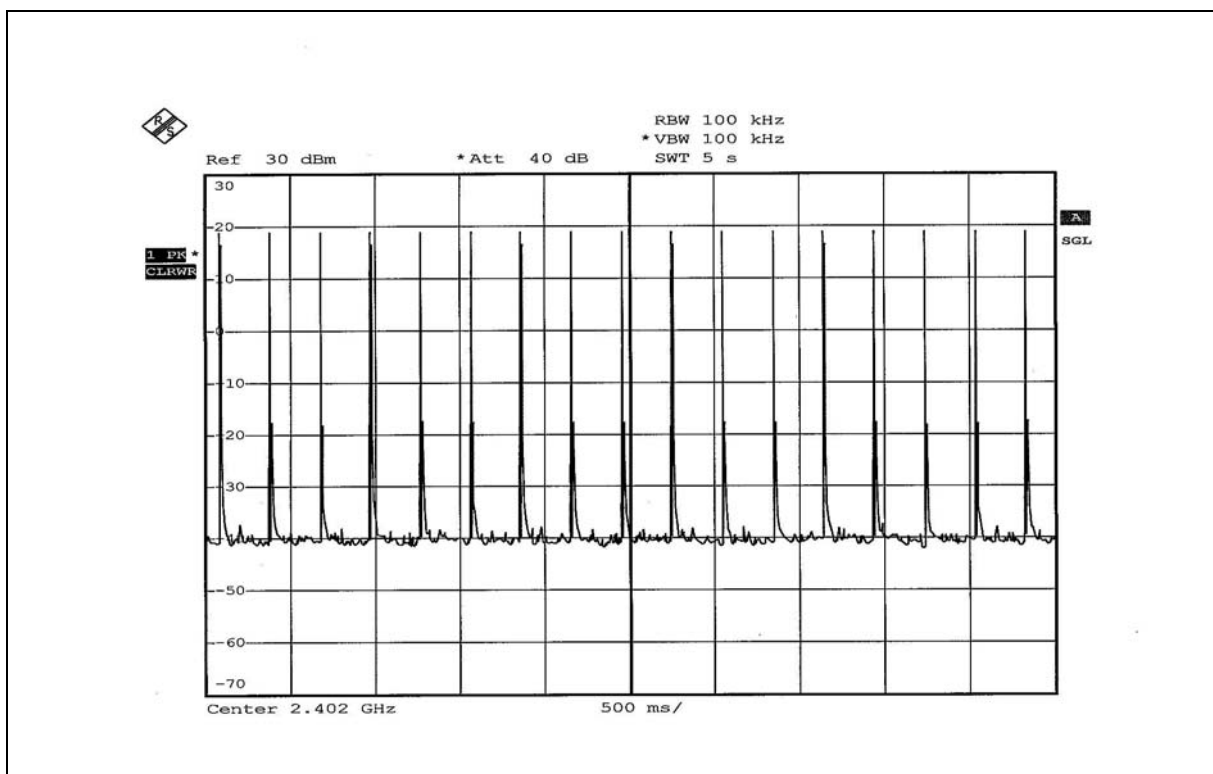
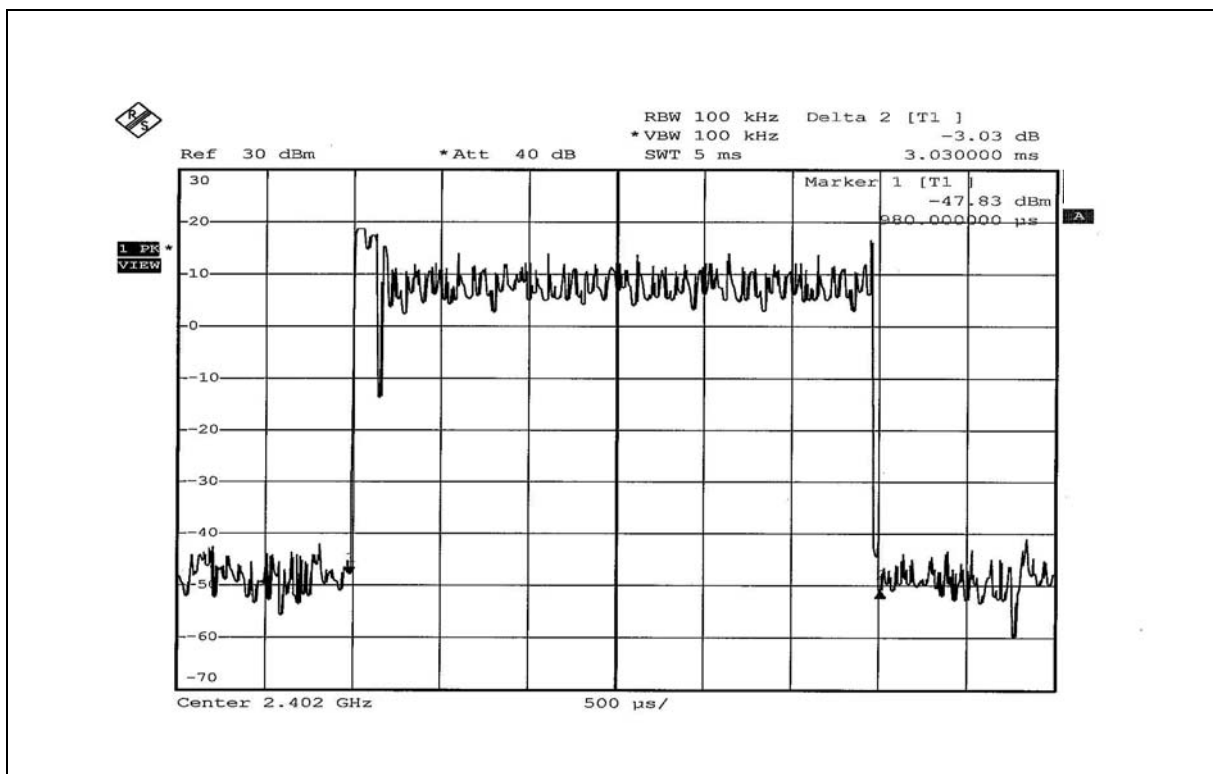
DH1



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 20dB bandwidth of hopping channel shall 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

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 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.
- Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- 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 EUT OPERATING CONDITION

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

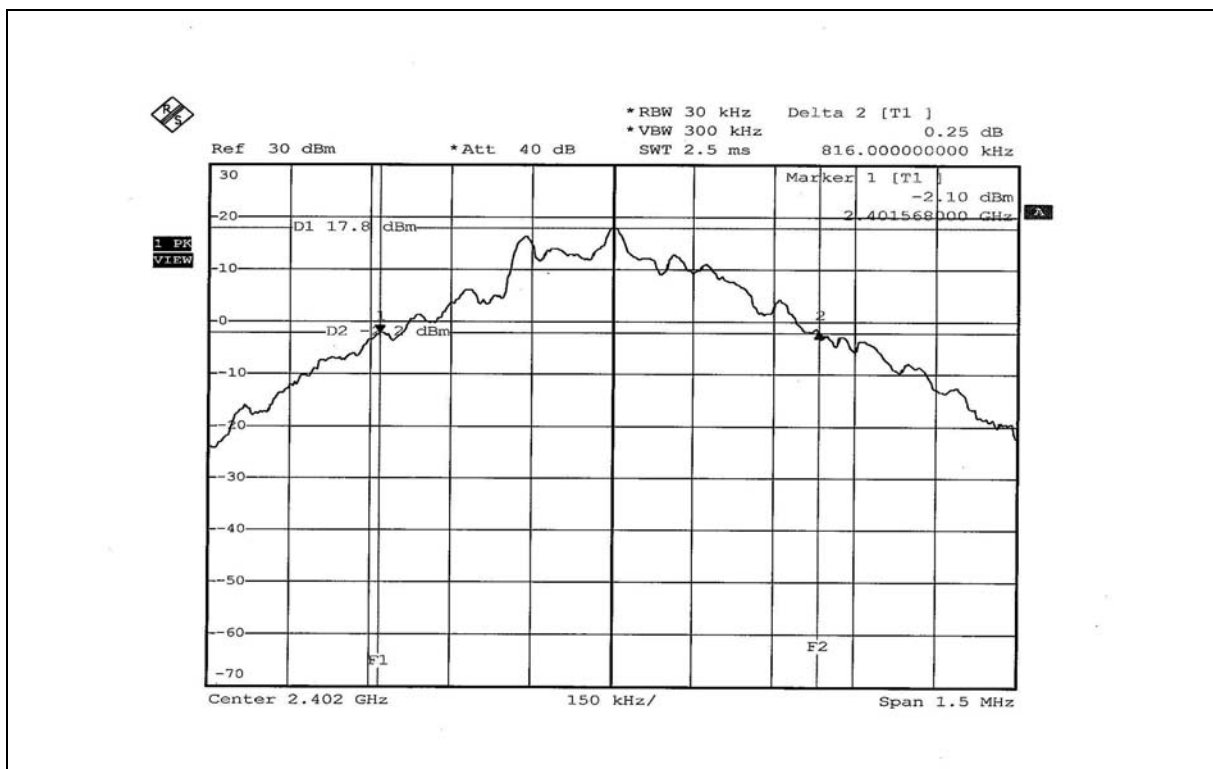
4.5.7 TEST RESULTS

FOR GFSK

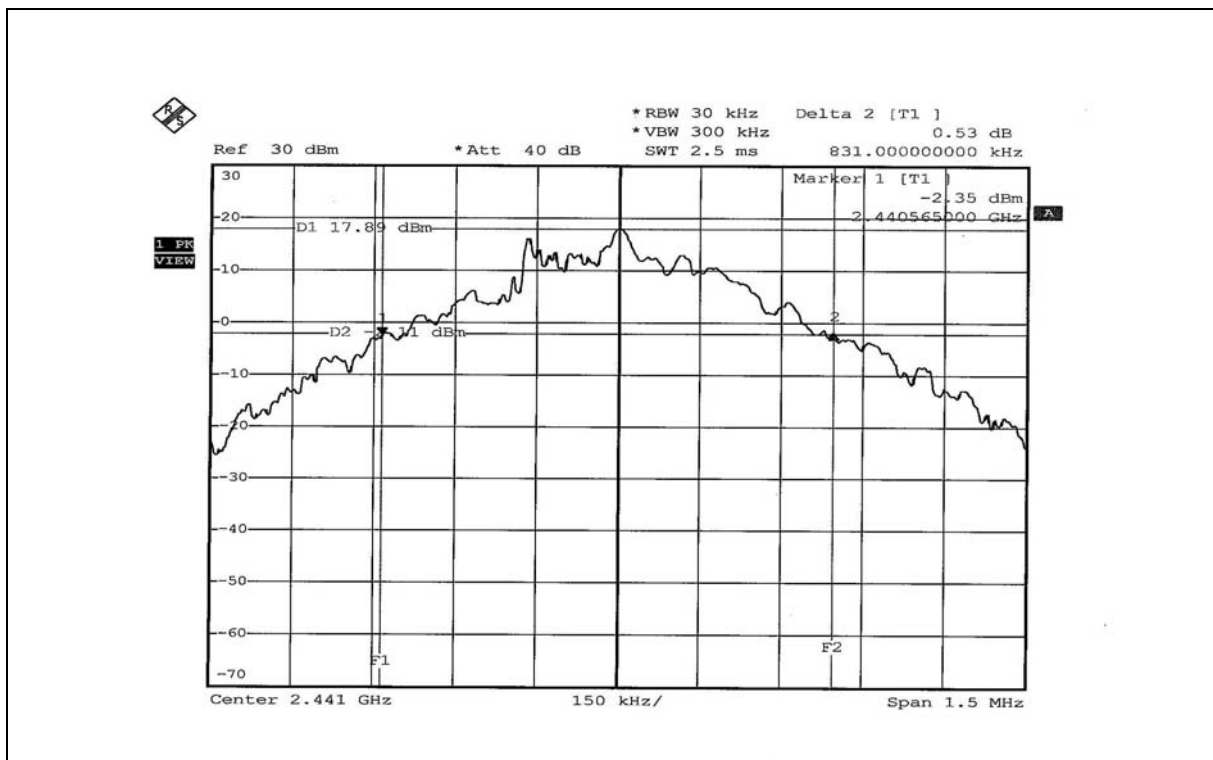
EUT TEST CONDITION		MEASUREMENT DETAIL	
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	27deg. C, 65%RH, 991hPa
TESTED BY	Long Chen	INPUT POWER (SYSTEM)	120Vac, 60 Hz

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)
0	2402	0.816
39	2441	0.831
78	2480	0.828

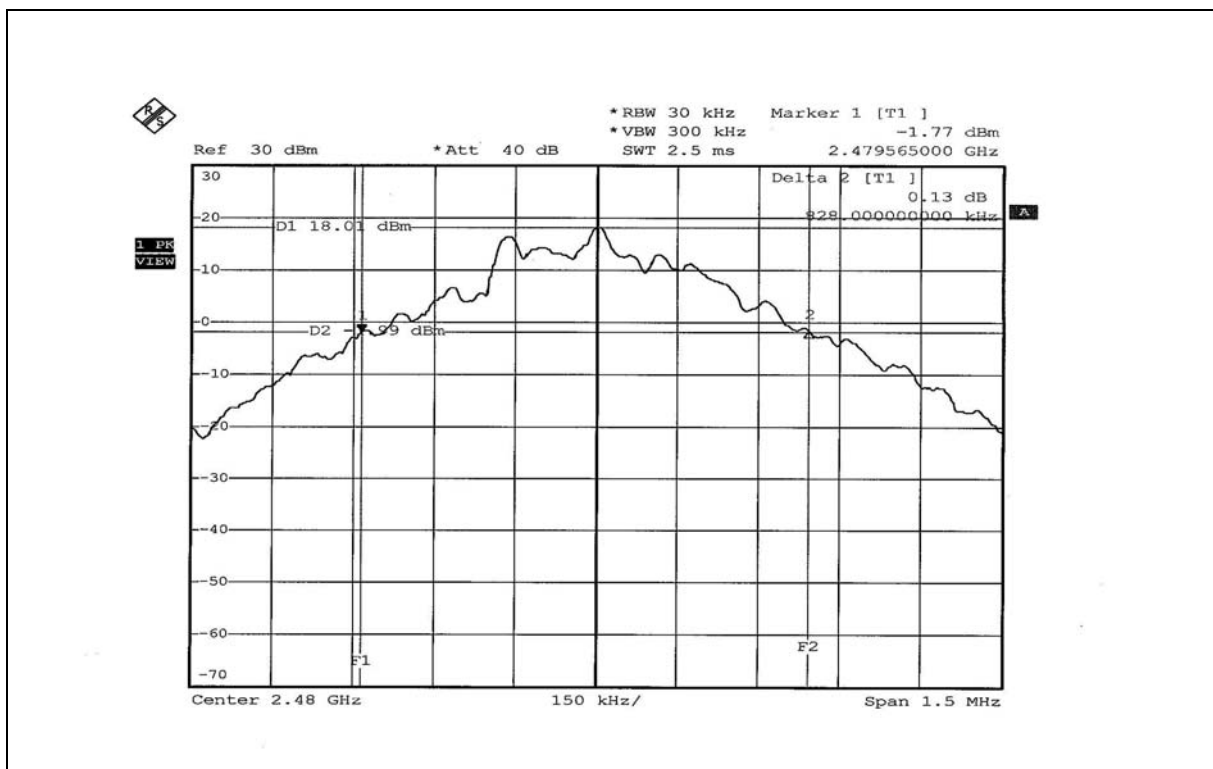
CH 0



CH 39



CH 78

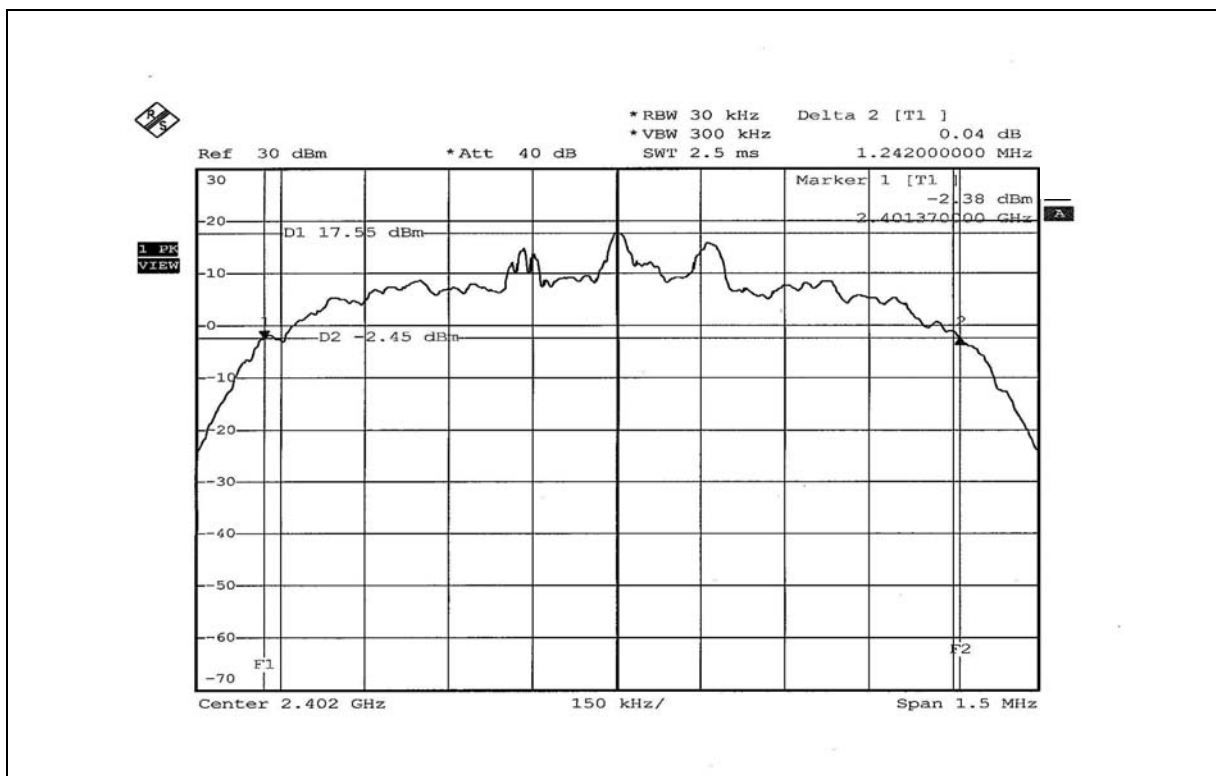


FOR 8DPSK

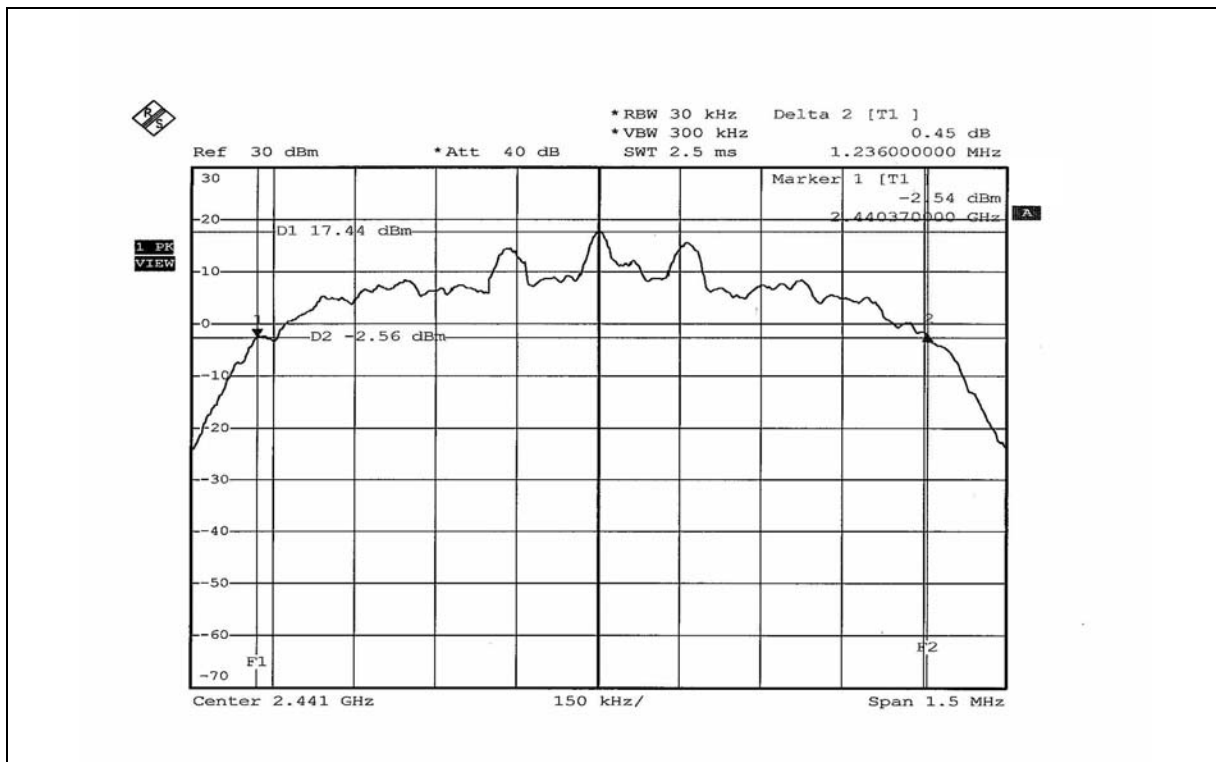
EUT TEST CONDITION		MEASUREMENT DETAIL	
MODULATION TYPE	8DPSK	ENVIRONMENTAL CONDITIONS	27deg. C, 65%RH, 991hPa
TESTED BY	Long Chen	INPUT POWER (SYSTEM)	120Vac, 60 Hz

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)
0	2402	1.242
39	2441	1.236
78	2480	1.233

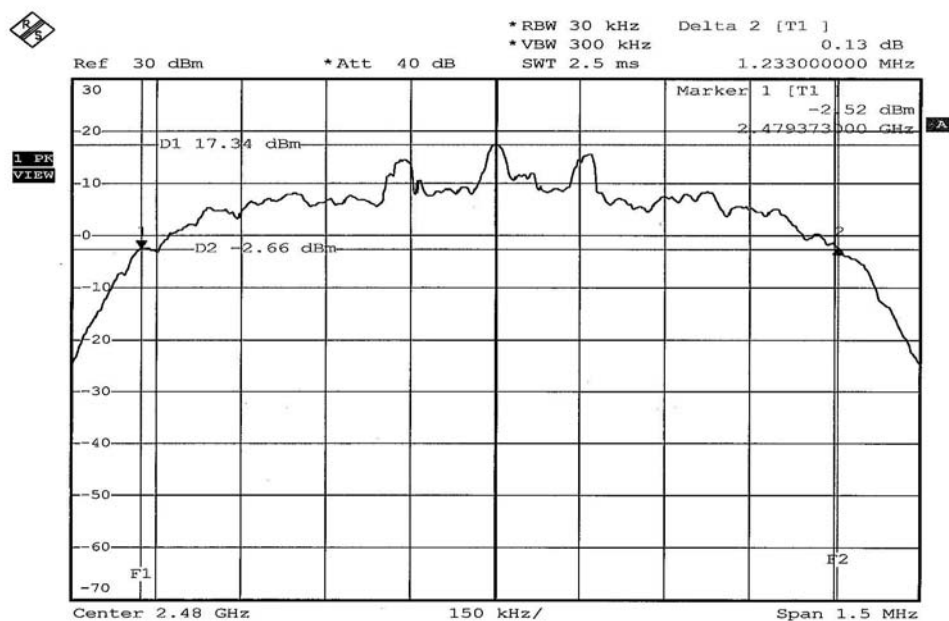
CH 0



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



4.6.6 TEST RESULTS

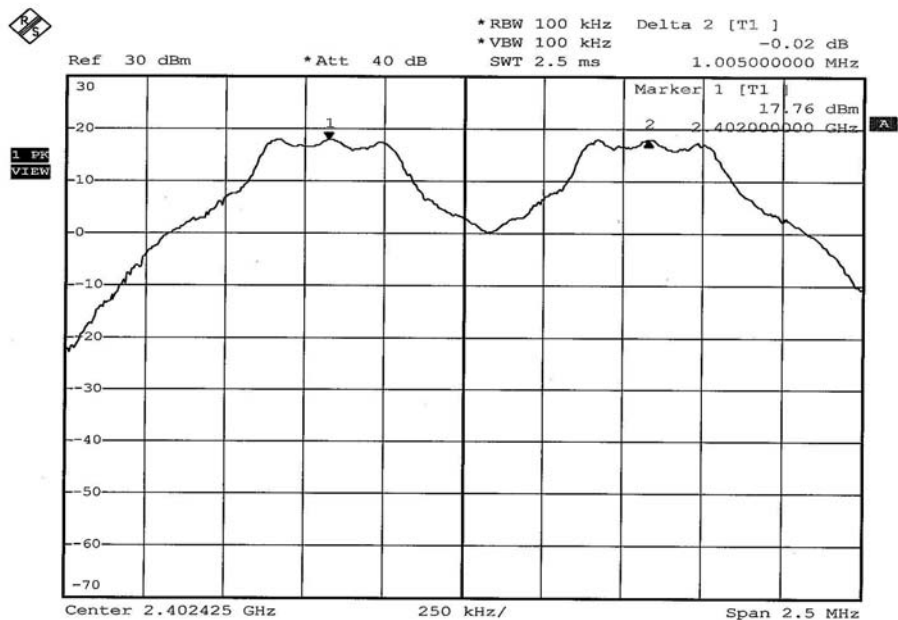
FOR GFSK

EUT TEST CONDITION		MEASUREMENT DETAIL	
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	27deg. C, 65%RH, 991hPa
TESTED BY	Long Chen	INPUT POWER (SYSTEM)	120Vac, 60 Hz

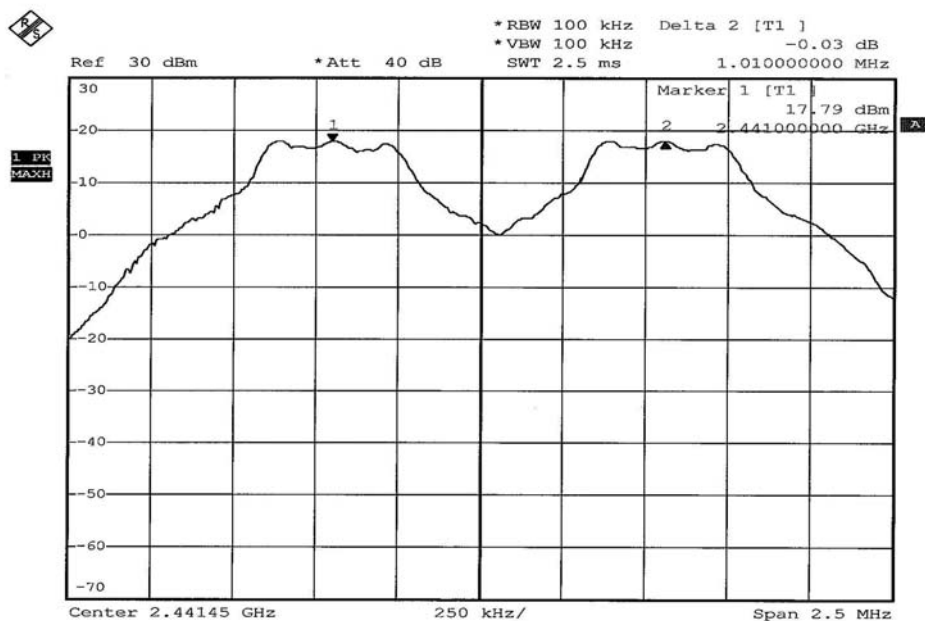
CHANNEL	FREQUENCY (MHz)	ADJACENT CHANNEL SEPARATION (MHz)	20dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	1.005	0.816	0.544	PASS
39	2441	1.010	0.831	0.554	PASS
78	2480	1.010	0.828	0.552	PASS

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

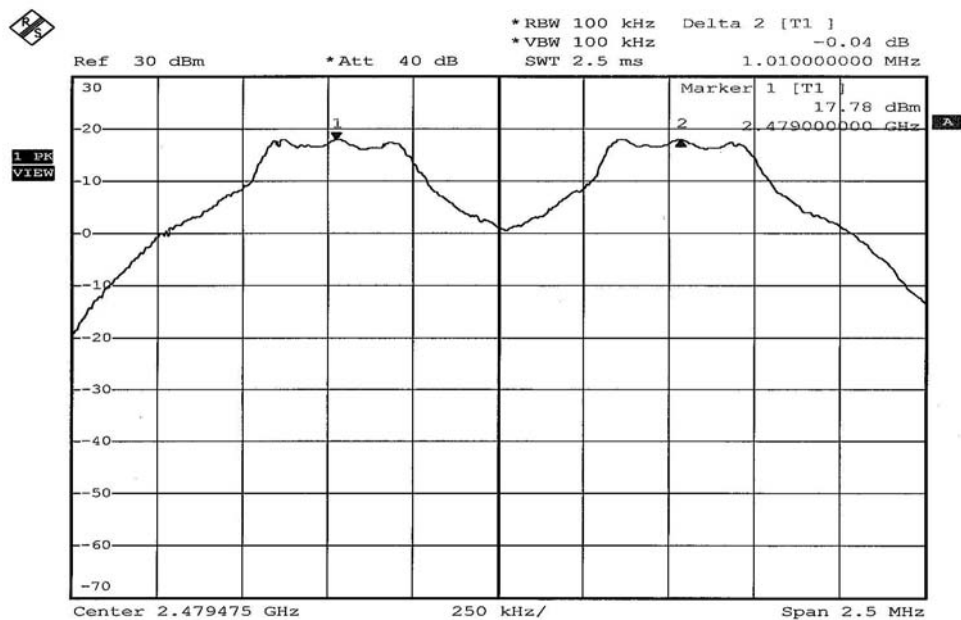
CH 0



CH 39



CH 78



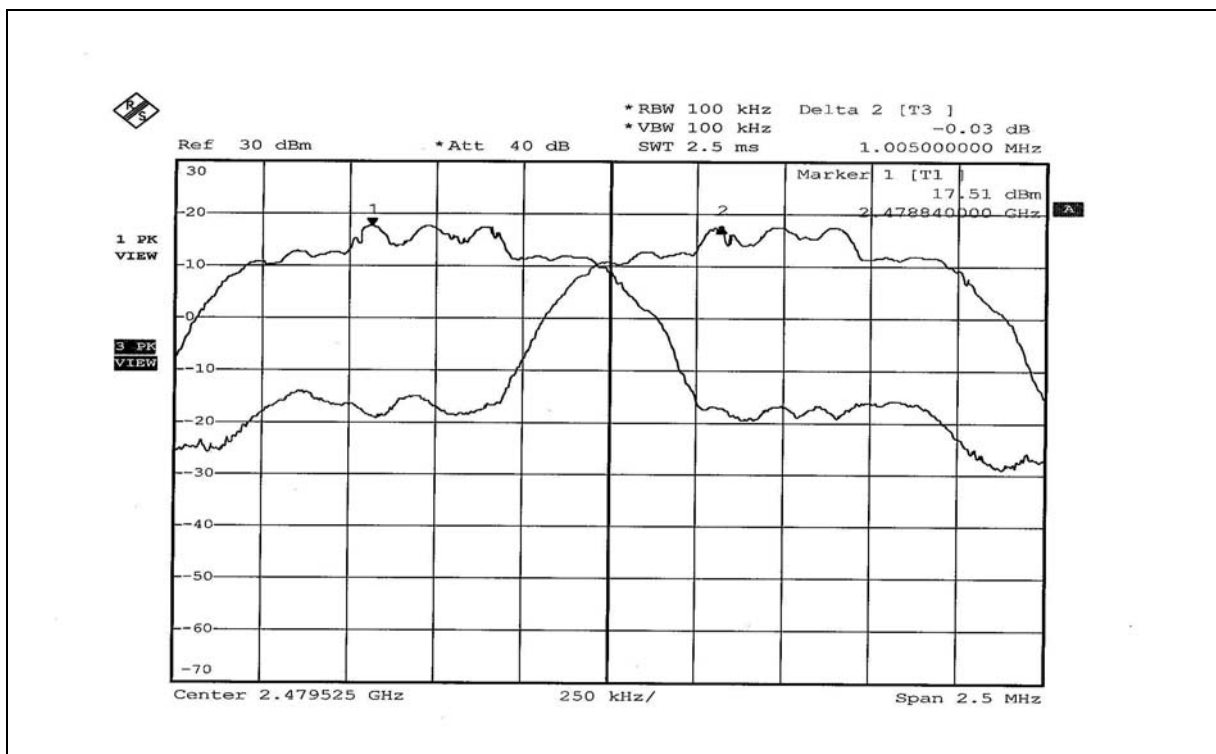
FOR 8DPSK

EUT TEST CONDITION		MEASUREMENT DETAIL	
MODULATION TYPE	8DPSK	ENVIRONMENTAL CONDITIONS	27deg. C, 65%RH, 991hPa
TESTED BY	Long Chen	INPUT POWER (SYSTEM)	120Vac, 60 Hz

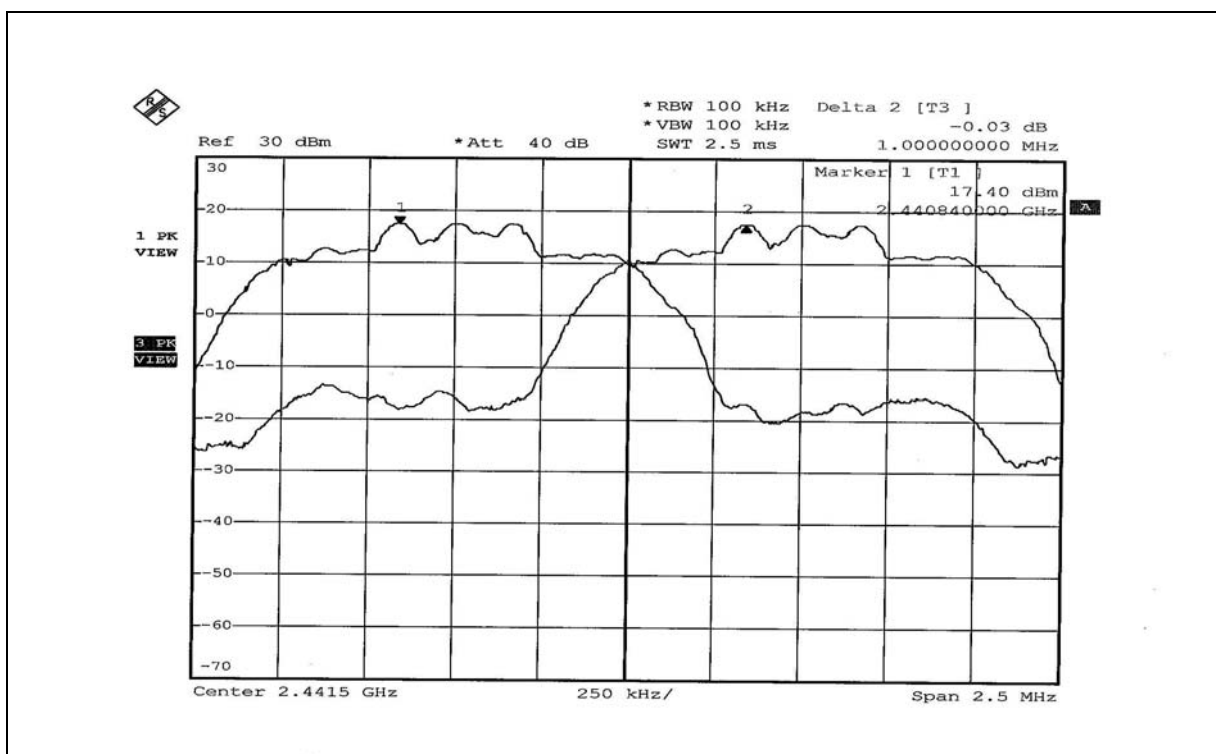
CHANNEL	FREQUENCY (MHz)	ADJACENT CHANNEL SEPARATION (MHz)	20dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	1.005	1.242	0.828	PASS
39	2441	1.000	1.236	0.824	PASS
78	2480	1.000	1.233	0.822	PASS

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

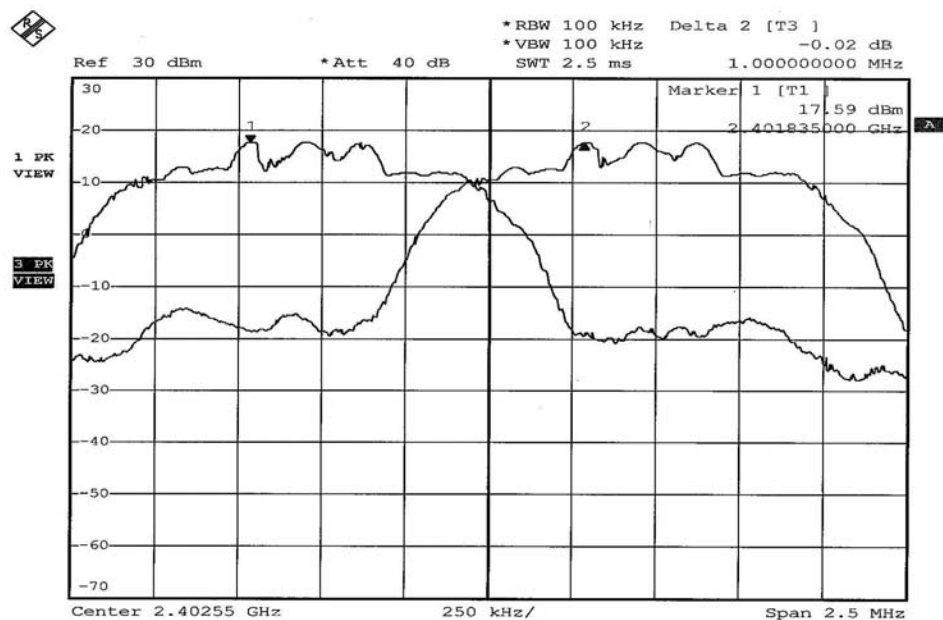
CH 0



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 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.

4.7.3 TEST PROCEDURES

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 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.
- The center frequency of the spectrum analyzer is set to the fundamental frequency and using 1 MHz RBW and 3 MHz VBW (GFSK), 3MHz RBW and 10 MHz VBW (8DPSK).
- Measure the captured power within the band and recording the plot.
- Repeat above procedures until all frequencies required were complete.

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 CONDITION

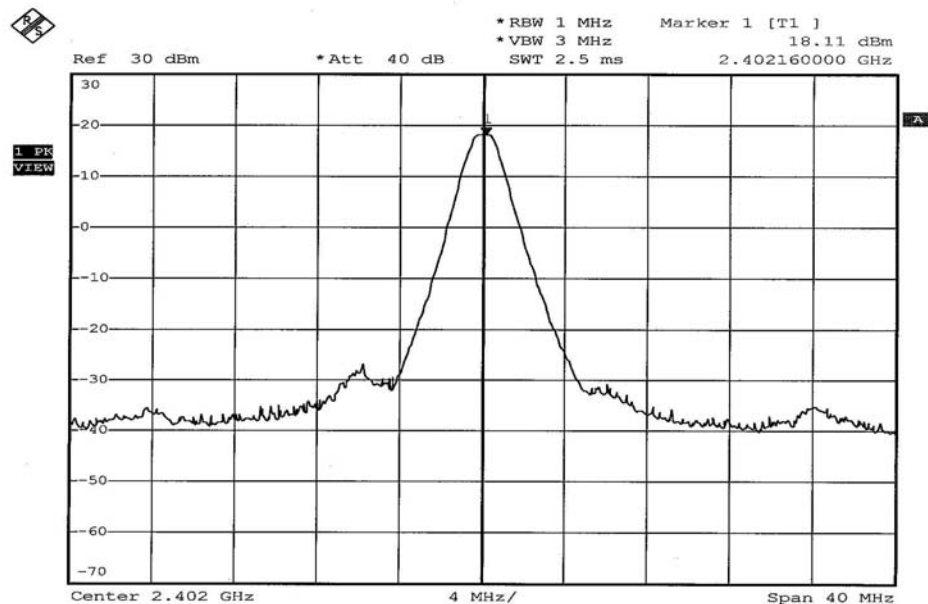
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.7.7 TEST RESULTS

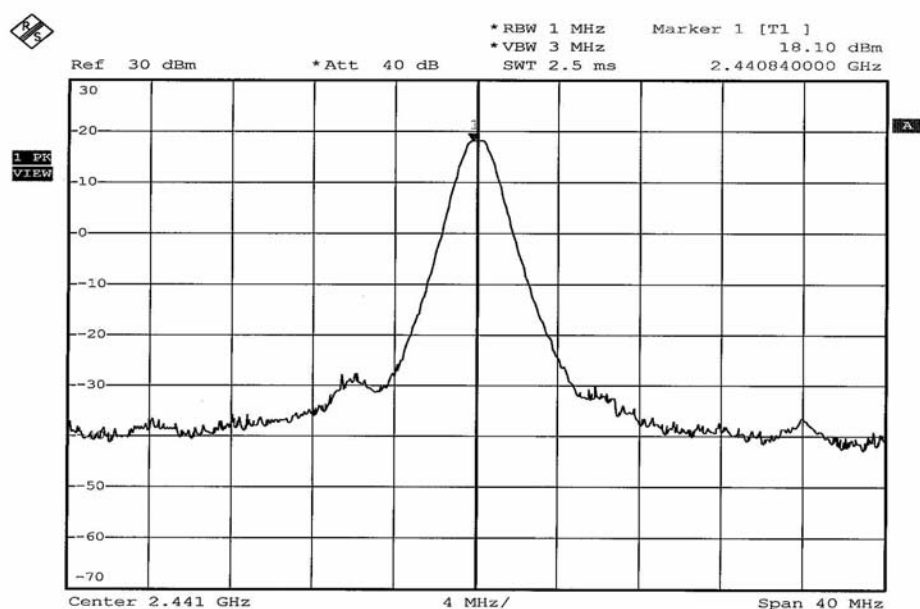
FOR GFSK

EUT TEST CONDITION		MEASUREMENT DETAIL	
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	27deg. C, 65%RH, 991hPa
TESTED BY	Long Chen	INPUT POWER (SYSTEM)	120Vac, 60 Hz

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (mW)	PASS/FAIL
0	2402	64.714	18.11	125	PASS
39	2441	64.565	18.10	125	PASS
78	2480	64.121	18.07	125	PASS



CH 39



FOR 8DPSK

EUT TEST CONDITION		MEASUREMENT DETAIL	
MODULATION TYPE	8DPSK	ENVIRONMENTAL CONDITIONS	27deg. C, 65%RH, 991hPa
TESTED BY	Long Chen	INPUT POWER (SYSTEM)	120Vac, 60 Hz

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (mW)	PASS/FAIL
0	2402	65.464	18.16	125	PASS
39	2441	63.680	18.04	125	PASS
78	2480	63.680	18.04	125	PASS

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 loss 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 were 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 B FOR GFSK

NOTE 1:

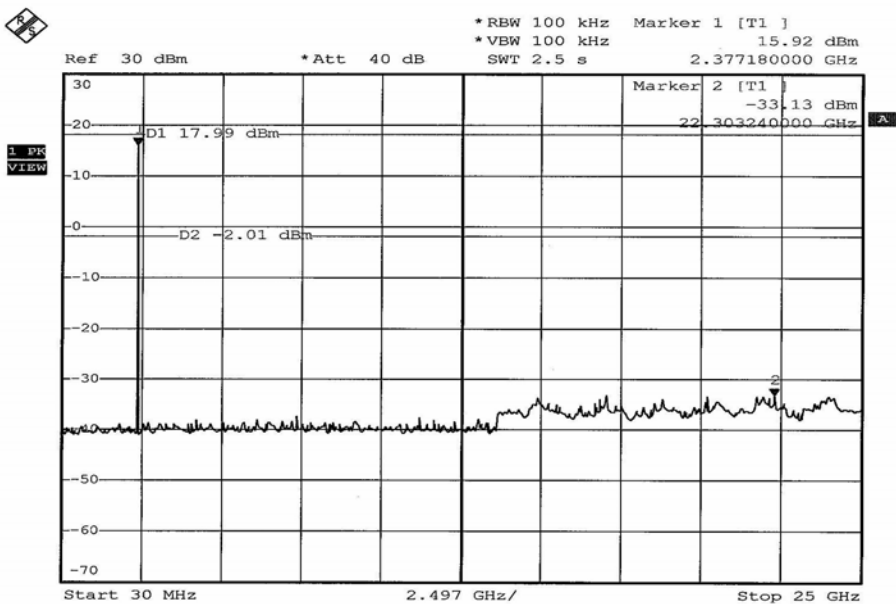
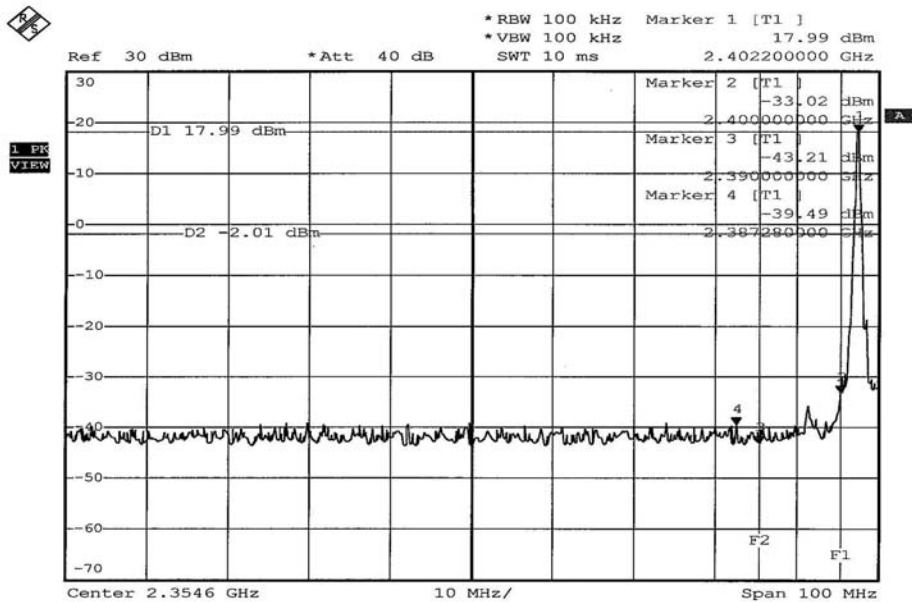
The band edge emission plot on the next page shows 57.48dBc between carrier maximum power and local maximum emission in restrict band (2.38728GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2.7 is 113.87dBuV/m (Peak), so the maximum field strength in restrict band is $113.87 - 57.48 = 56.39\text{dBuV/m}$, which is under 74 dBuV/m limit.

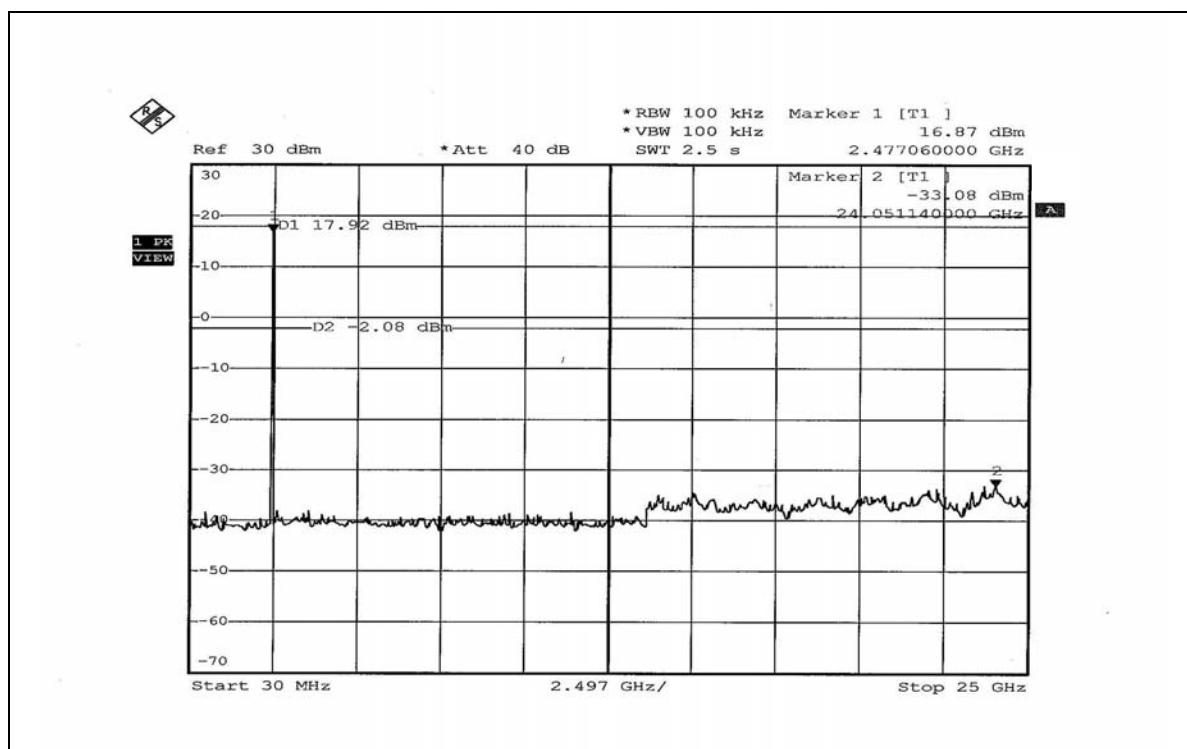
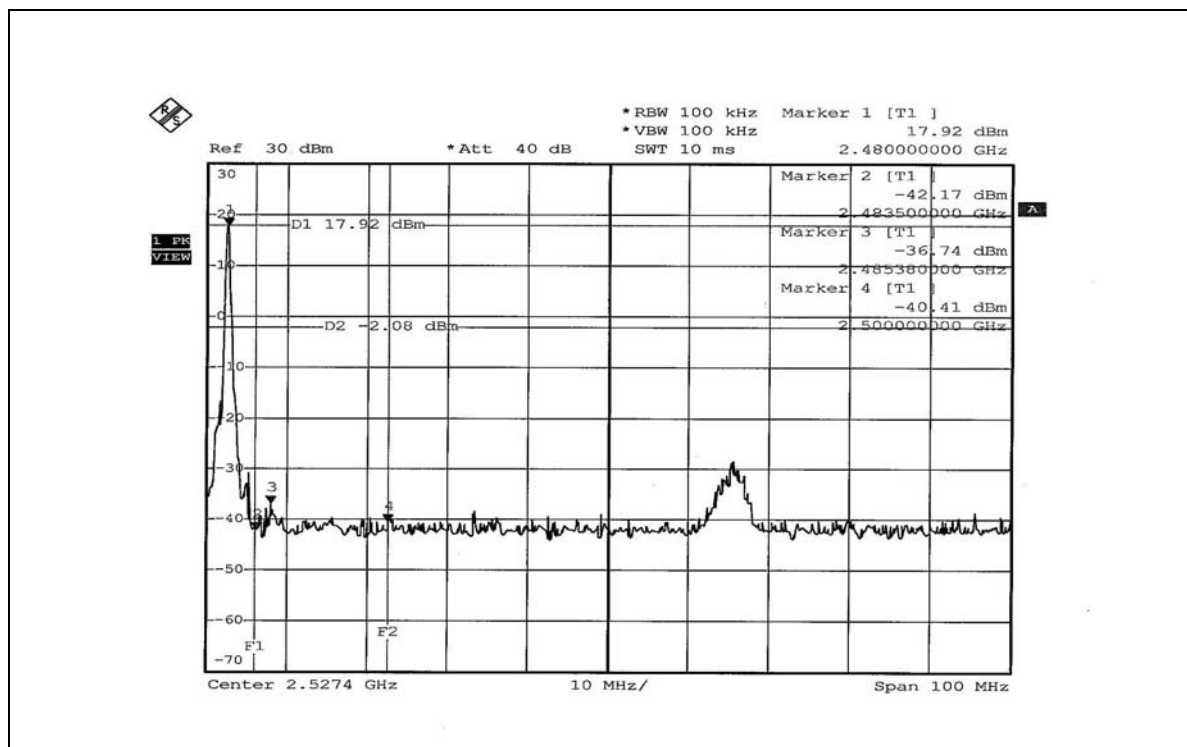
The band edge emission plot on the next page shows 57.48dBc between carrier maximum power and local maximum emission in restrict band (2.38728GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2.7 is 83.87dBuV/m (Average), so the maximum field strength in restrict band is $83.87 - 57.48 = 26.39\text{dBuV/m}$, which is under 54 dBuV/m limit.

NOTE 2:

The band edge emission plot on the next second page shows 54.66dBc between carrier maximum power and local maximum emission in restrict band (2.48538GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.2.7 is 114.53dBuV/m (Peak), so the maximum field strength in restrict band is $114.53 - 54.66 = 59.87\text{dBuV/m}$, which is under 74 dBuV/m limit.

The band edge emission plot on the next second page shows 54.66dBc between carrier maximum power and local maximum emission in restrict band (2.48538GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.2.7 is 84.53dBuV/m (Average), so the maximum field strength in restrict band is $84.53 - 54.66 = 29.87\text{dBuV/m}$, which is under 54 dBuV/m limit.





MODE B FOR 8DPSK

NOTE 1:

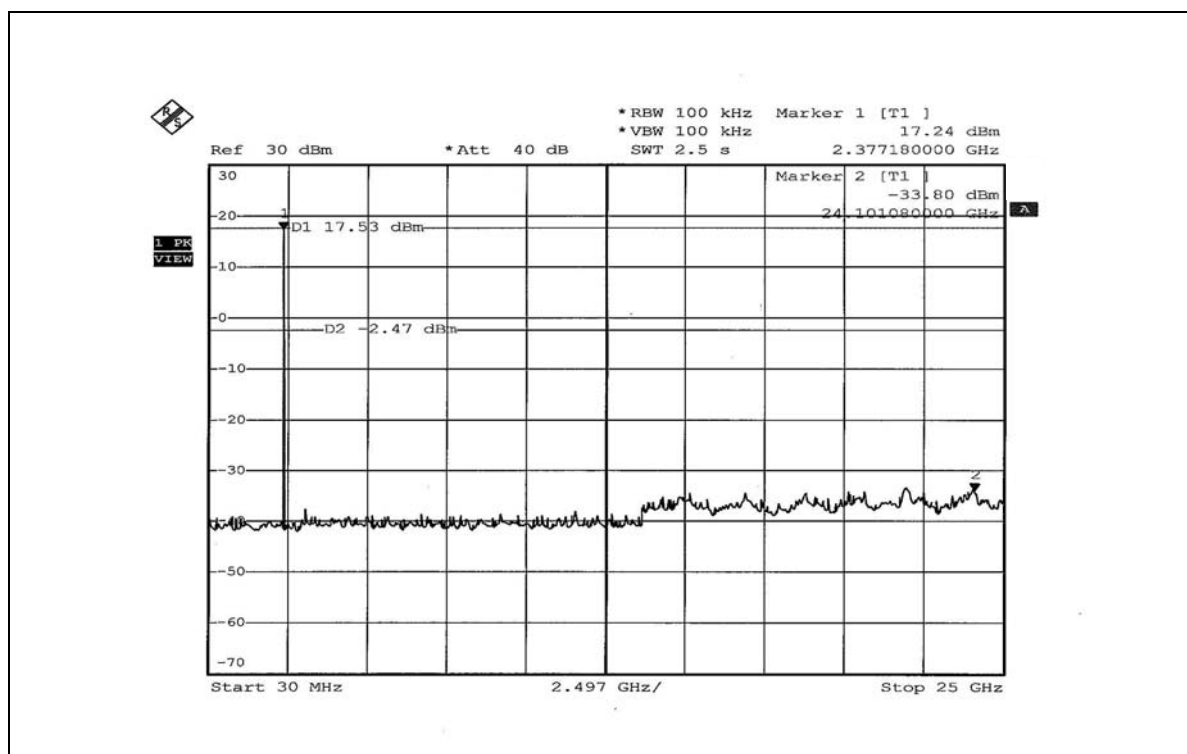
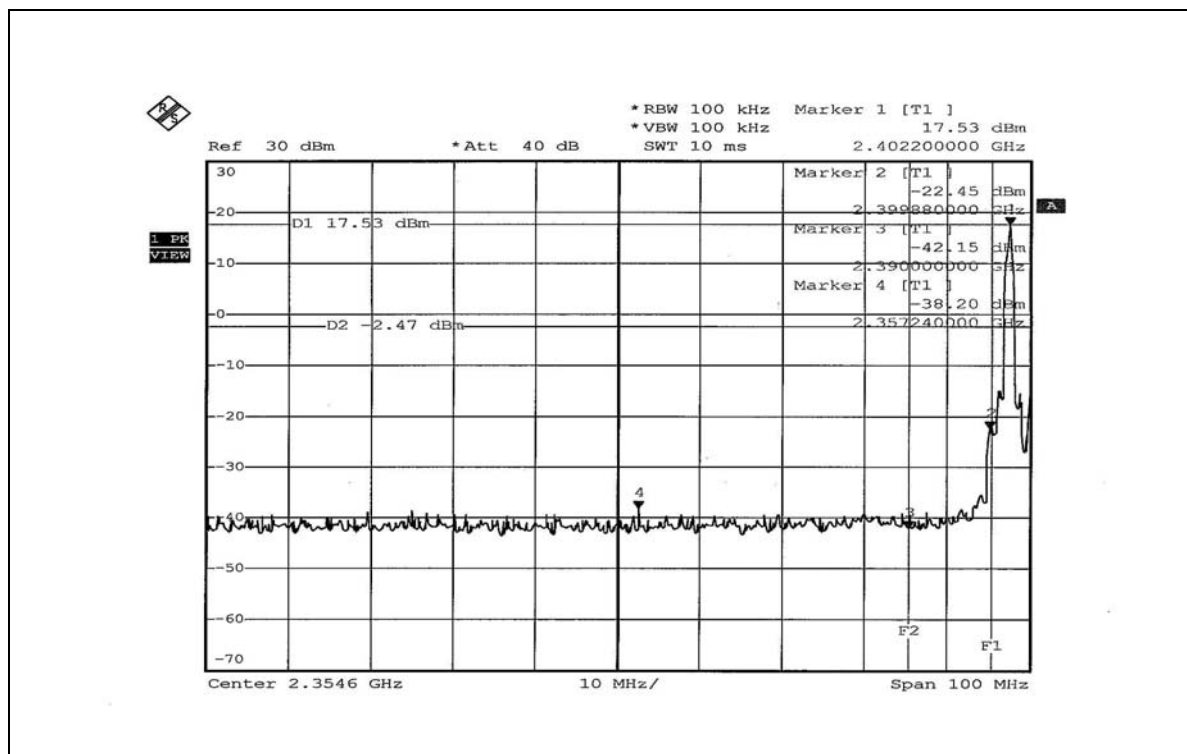
The band edge emission plot on the next page shows 55.73dBc between carrier maximum power and local maximum emission in restrict band (2.35724GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2.7 is 115.34dBuV/m (Peak), so the maximum field strength in restrict band is $115.34 - 55.73 = 59.61$ dBuV/m, which is under 74 dBuV/m limit.

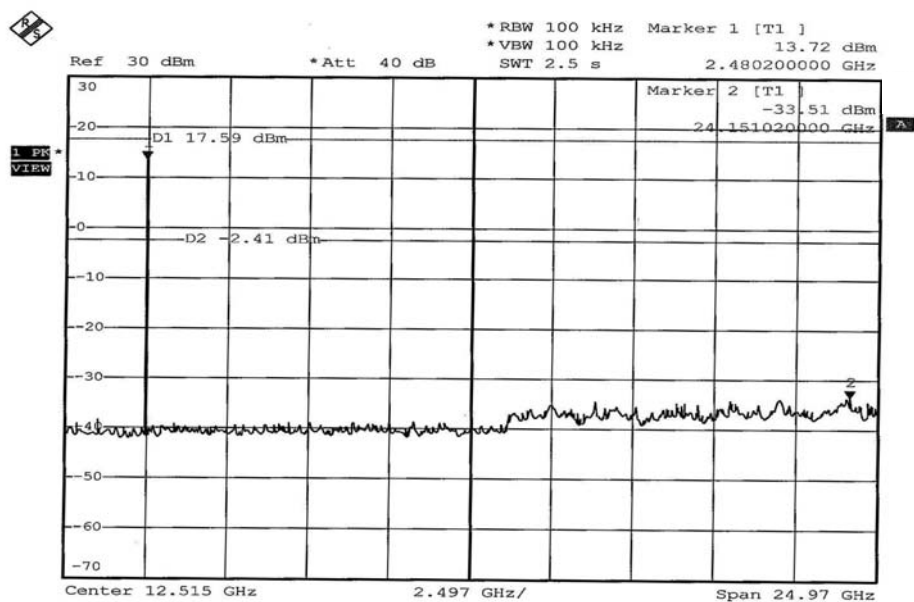
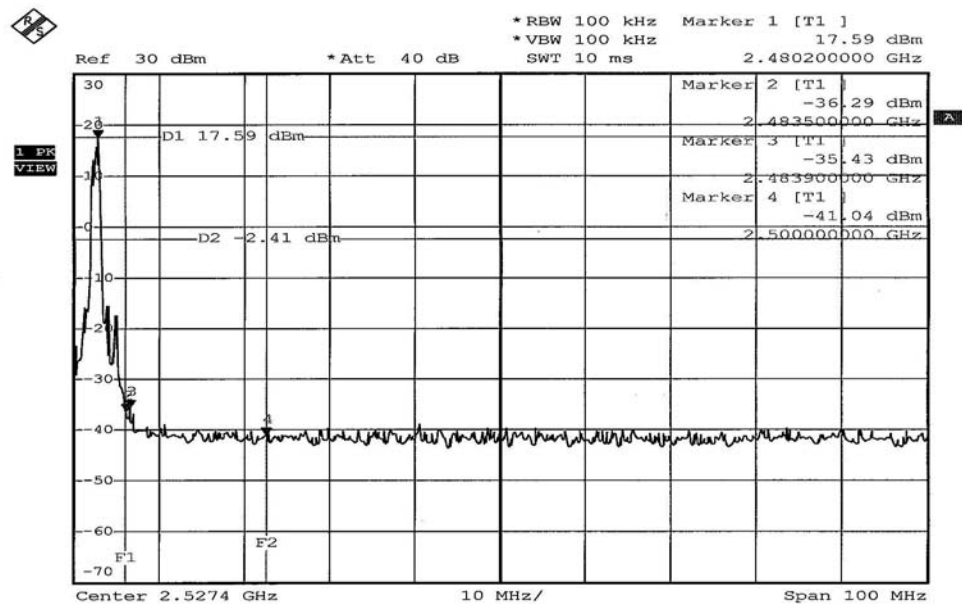
The band edge emission plot on the next page shows 55.73dBc between carrier maximum power and local maximum emission in restrict band (2.35724GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2.7 is 85.34dBuV/m (Average), so the maximum field strength in restrict band is $85.34 - 55.73 = 29.61$ dBuV/m, which is under 54 dBuV/m limit.

NOTE 2:

The band edge emission plot on the next second page shows 53.02dBc 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 115.99dBuV/m (Peak), so the maximum field strength in restrict band is $115.99 - 53.02 = 62.97$ dBuV/m, which is under 74 dBuV/m limit.

The band edge emission plot on on the next second page shows 53.02dBc 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 85.99dBuV/m (Average), so the maximum field strength in restrict band is $85.99 - 53.02 = 32.97$ dBuV/m, which is under 54 dBuV/m limit.





4.9 ANTENNA REQUIREMENT

4.9.1 STANDARD APPLICABLE

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

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

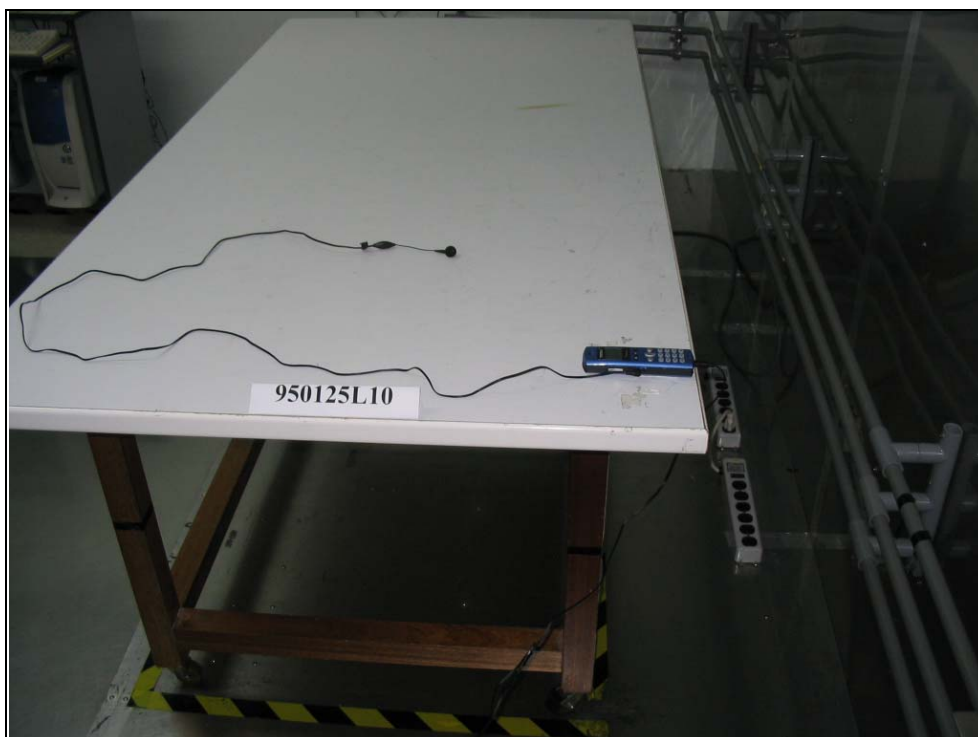
4.9.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is PIFA antenna without antenna connector. The maximum gain of this antenna is 1dBi.

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST

MODE A

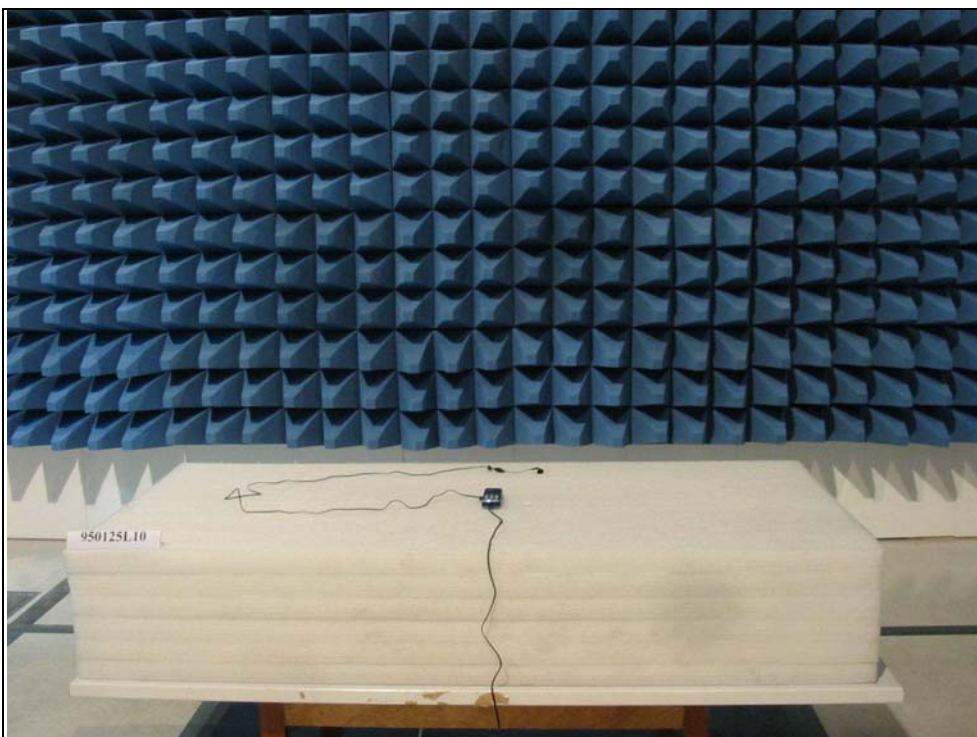


MODE B

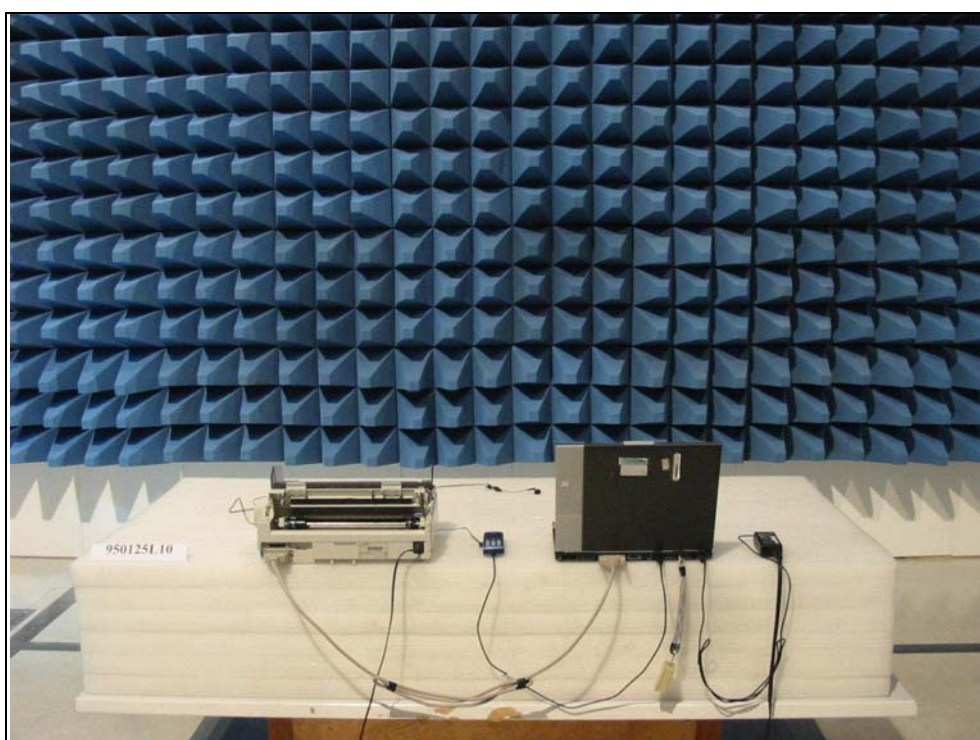
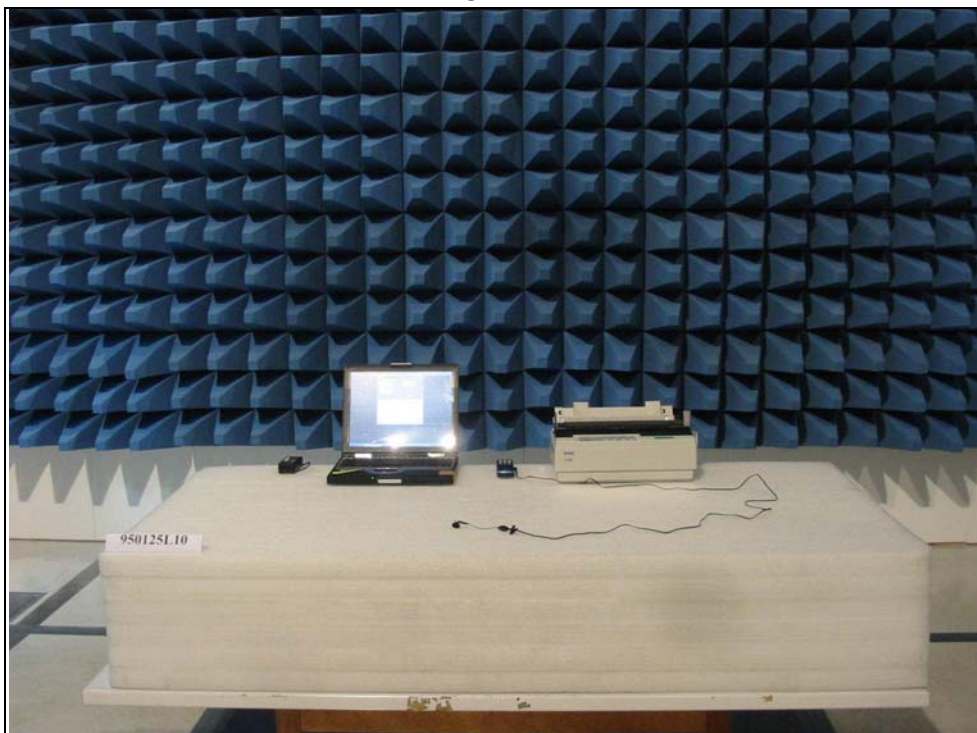


RADIATED EMISSION TEST

MODE A



MODE B



6. INFORMATION ON THE TESTING LABORATORIES

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

USA	FCC, 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

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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.