FCC TEST REPORT

REPORT NO.:	RF941115L10C
MODEL NO.:	MARS-1030
RECEIVED:	Jan. 23, 2006
TESTED:	Feb. 08 ~ Feb. 25, 2006
ISSUED:	Sep. 27, 2006

APPLICANT:	ADVANTECH CO., LTD
ADDRESS:	No.1, Alley 20, Lane 26, Rueiguang Rd, Neihu District, Taipei 114, Taiwan, R.O.C.

ISSUED BY:	Advance Data Technology Corporation
LAB ADDRESS:	No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang 244, Taipei Hsien, Taiwan, R.O.C.
TEST LOCATION:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

ACCREDITED
No. 2177-01

0528

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1. CERTIFICATION

PRODUCT:	Portable Data Terminal
MODEL:	MARS-1030
APPLICANT:	ADVANTECH CO., LTD
TEST SAMPLE:	ENGINEERING SAMPLE
TESTED:	Feb. 08 ~ Feb. 25, 2006
STANDARDS:	FCC Part 15, Subpart C (Section 15.247), ANSI C63.4-2003

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

PREPARED BY : Andrea Hsia , **DATE:** Sep. 27, 2006
Andrea Hsia

TECHNICAL ACCEPTANCE : Long Chen , **DATE:** Sep. 27, 2006
Responsible for RF
Long Chen

APPROVED BY : Gary Chang , **DATE:** Sep. 27, 2006
Gary Chang / Supervisor

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

FOR WIRELESS LAN FUNCTION:

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.247)			
Standard Section	**Test Type and Limit**	**Result**	**Remark**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is –7.78dB at 0.193MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is –8.78dB at 933.91MHz
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.

FOR BLUETOOTH FUNCTION:

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 –10.19dB at 0.970MHz
15.247 (a) (1) (iii)	Number of Hopping Frequency Used Spec.: At least 15 channels	PASS	Meet the requirement of limit
15.247 (a) (1) (iii)	Dwell Time on Each Channel Spec.: Max. 0.4 second within 31.6 second	PASS	Meet the requirement of limit
15.247 (a) (1)	Hopping Channel Separation Spec. : Min. 25 kHz or 20 dB bandwidth, which ever is greater	PASS	Meet the requirement of limit
15.247 (a) (1)	Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	NA	NA
15.247 (b)	Maximum Peak Output Power Spec.: max. 30dBm	PASS	Meet the requirement of limit
15.247 (d)	Transmitter Radiated Emissions Spec.: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is –9.48dB at 2104.00MHz
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

EUT	Portable Data Terminal
MODEL NO.	MARS-1030
FCC ID	M82-MARS-1030
POWER SUPPLY	5.0Vdc from AC adapter 3.7Vdc from Battery
MODULATION TYPE	Wireless LAN: CCK, DQPSK,DBPSK for DSSS Bluetooth: GFSK for FHSS
MODULATION TECHNOLOGY	DSSS, FHSS
TRANSFER RATE	Wireless LAN: 11/5.5/2/1Mbps Bluetooth: 723Kbps
FREQUENCY RANGE	Wireless LAN:2.412 ~ 2.462GHz Bluetooth: 2.402 ~ 2.480GHz
NUMBER OF CHANNEL	Wireless LAN:11 Bluetooth: 79
CHANNEL SPACING	Wireless LAN: 5MHz Bluetooth: 1MHz
OUTPUT POWER	Wireless LAN: 20.324mW Bluetooth: 0.270mW
ANTENNA TYPE	Wireless LAN: PIFA antenna with –0.48dBi gain Bluetooth: PIFA antenna with –1.74dBi gain
DATA CABLE	1.9 m shielded USB cable with 1 core 1.2m non-shielded earphone cable
I/O PORTS	USB
ASSOCIATED DEVICES	NA

NOTE:

1. This is a duplicate report of RF941115L10, the differences are changing the applicant and FCC ID.
2. The EUT is a Portable Data Terminal with wireless LAN and bluetooth functions.
3. The EUT operates in the 2.4GHz frequency spectrum with throughput of up to 1Mbps.
4. The EUT have lithium battery listed as below:

STANDARD BATTERY:	
MODEL:	BP05-000500
RATING:	3.7Vdc, 3150mAh

5. The EUT is powered by the following adapter.

BRAND	ENG
MODEL	3A-161DN05
INPUT POWER	100-240Vac, 50-60Hz, 0.6A
OUTPUT POWER	5Vdc, 2.6A
POWER CORD	AC 1.6 m non-shielded cable without core DC 1.8 m non-shielded cable with one core

6. The above EUT information was declared by the 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:

11 channels are provided to the EUT for wireless LAN function:

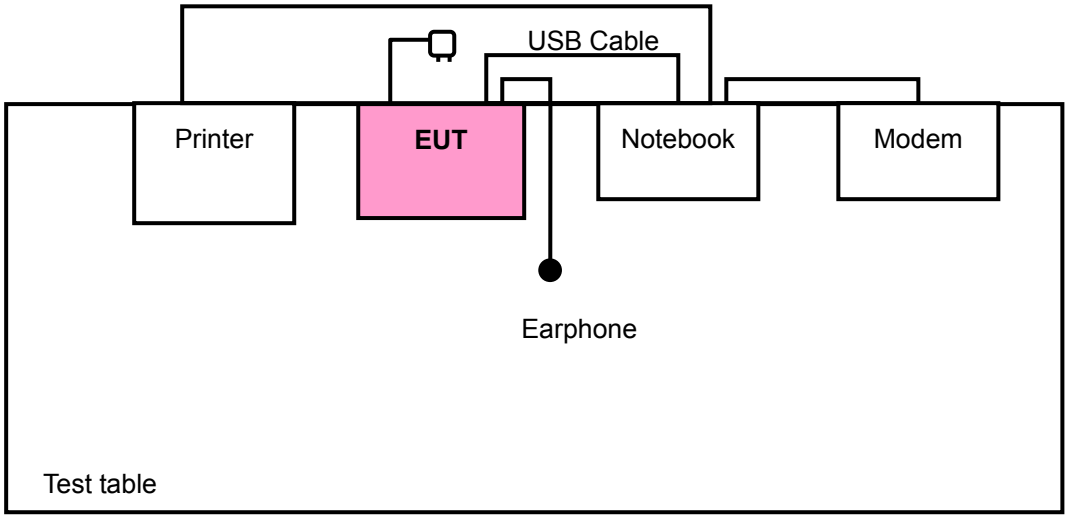
CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

79 channels are provided to this EUT for bluetooth function:

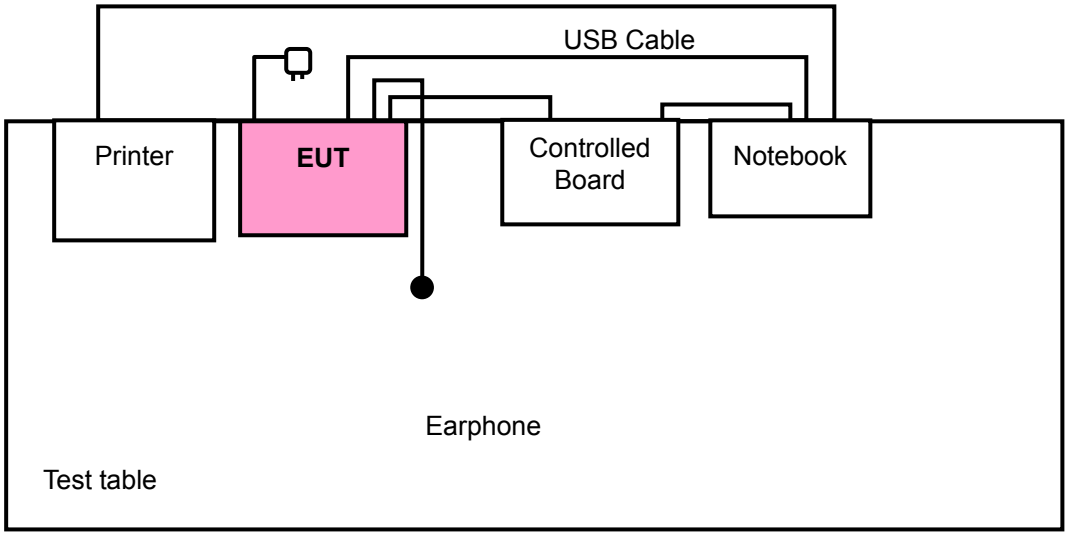
CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409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

TEST MODE1: FOR WLAN MODE



TEST MODE2: FOR BLUETOOTH MODE



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

FOR WIRELESS LAN FUNCTION:

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
-	√	√	√	√	-

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, data rates and antenna ports (if EUT with antenna diversity architecture).

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

Mode	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1

Radiated Emission Test (Below 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, antenna ports (if EUT with antenna diversity architecture), and X, Y and Z Axis.

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
802.11b	1 to 11	11	DSSS	DBPSK	1	Z

Radiated Emission Test (Above 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture), and X, Y and Z Axis.

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1	Z

Bandedge Measurement:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture), and X, Y and Z Axis.

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
802.11b	1 to 11	1, 11	DSSS	DBPSK	1	Z

Antenna Port Conducted Measurement:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1

FOR BLUETOOTH FUNCTION:

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
-	√	√	√	√	-

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, data rates and antenna ports (if EUT with antenna diversity architecture), 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

Radiated Emission Test (Below 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, antenna ports (if EUT with antenna diversity architecture), and X, Y and Z Axis.

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE	AXIS
0 to 78	78	FHSS	GFSK	DH5	Z

Radiated Emission Test (Above 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture), and X, Y and Z Axis.

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE	AXIS
0 to 78	0, 39, 78	FHSS	GFSK	DH5	Z

Bandedge Measurement:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture), and X, Y and Z Axis.

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE	AXIS
0 to 78	0, 78	FHSS	GFSK	DH5	Z

Antenna Port Conducted Measurement:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
0 to 78	0, 39, 78	FHSS	GFSK	DH5

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a 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.

3.4 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	16484462992	E2K24CLNS
2	PRINTER	EPSON	LQ-300+	DCGY054147	FCC DoC Approved
3	MODEM	ACEEX	1414V/3	0401008269	IFAXDM1414

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

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

4. TEST TYPES AND RESULTS (FOR WIRELESS LAN FUNCTION)

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

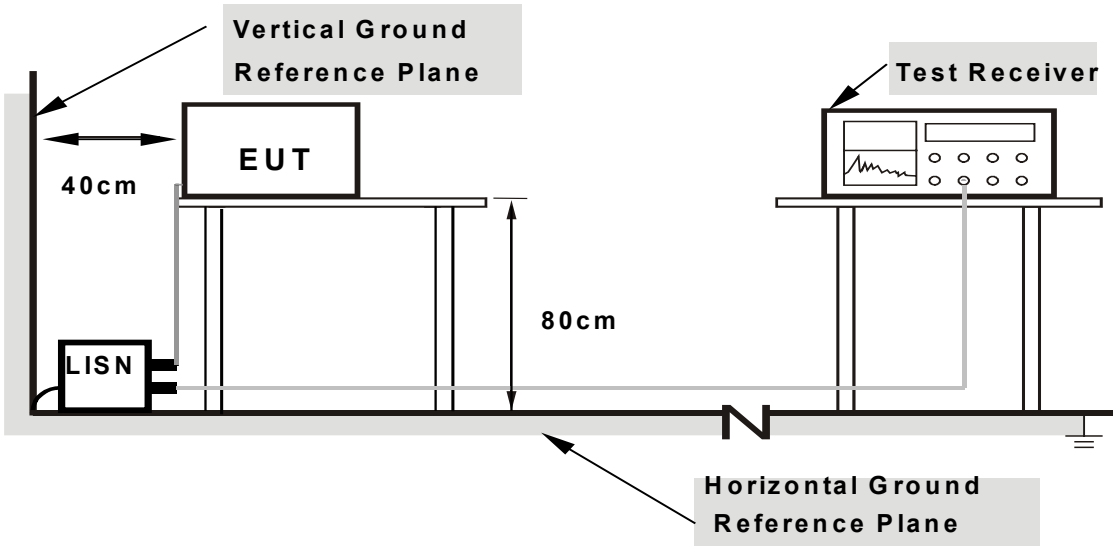
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

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) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.1.6 EUT OPERATING CONDITIONS

a. Connected the EUT into Notebook placed on a testing table.
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 modem.
e. The notebook system sent "H" messages to printer, and the printer printed them on paper.
f. Steps c ~ e were repeated.

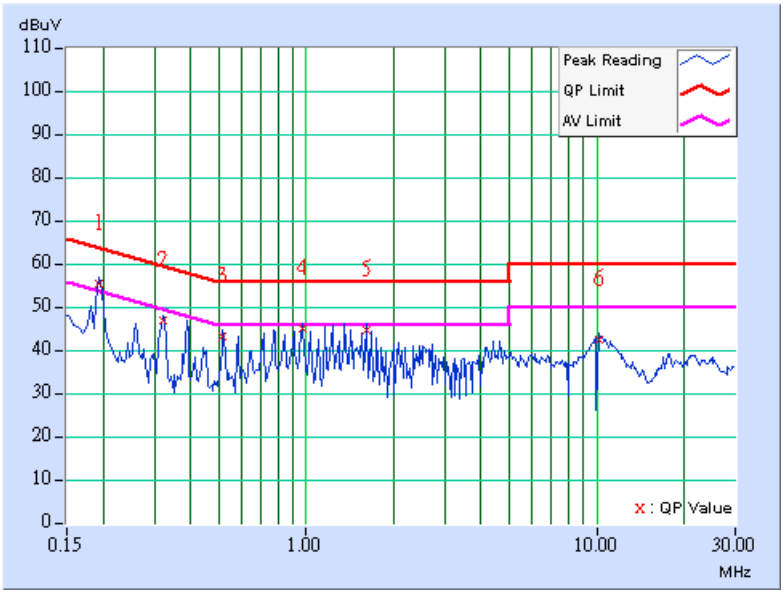
4.1.7 TEST RESULTS

Conducted Worst-Case Data

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

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	55.33	47.18	55.43	47.28	63.91	53.91	-8.48	-6.63
2	0.322	0.10	46.48	-	46.58	-	59.66	49.66	-13.08	-
3	0.517	0.10	43.13	-	43.23	-	56.00	46.00	-12.77	-
4	0.970	0.10	44.66	-	44.76	-	56.00	46.00	-11.24	-
5	1.617	0.16	44.29	-	44.45	-	56.00	46.00	-11.55	-
6	10.227	0.37	42.34	-	42.71	-	60.00	50.00	-17.29	-

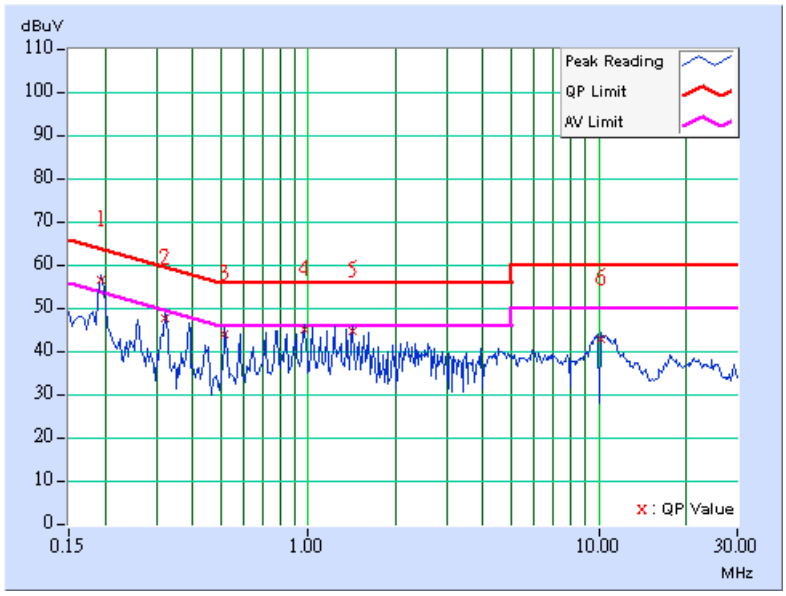
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 2
MODULATION TYPE	DBPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	1Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.193**	**0.10**	**56.03**	**47.78**	**56.13**	**47.88**	**63.91**	**53.91**	**-7.78**	**-6.03**
2	0.322	0.10	47.16	-	47.26	-	59.66	49.66	-12.40	-
3	0.517	0.12	43.48	-	43.60	-	56.00	46.00	-12.40	-
4	0.970	0.20	44.78	-	44.98	-	56.00	46.00	-11.02	-
5	1.422	0.20	44.17	-	44.37	-	56.00	46.00	-11.63	-
6	10.164	0.47	42.68	-	43.15	-	60.00	50.00	-16.85	-

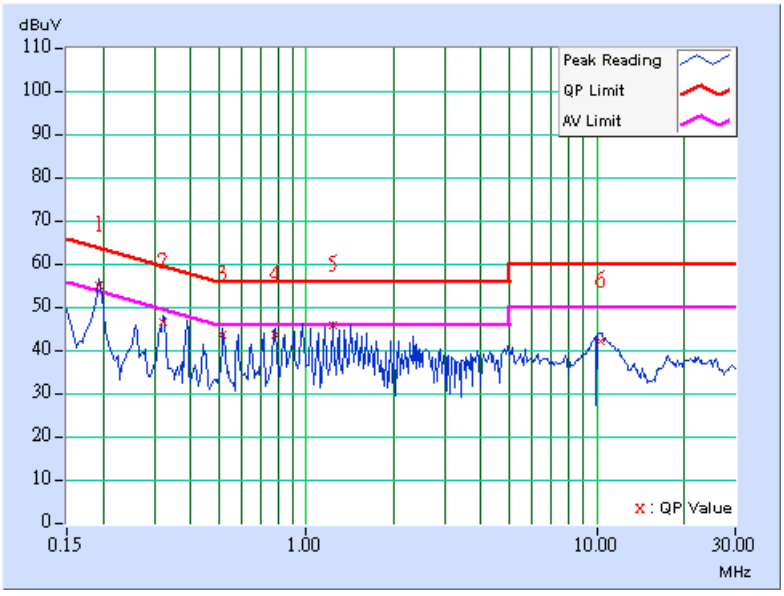
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



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

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	54.91	46.79	55.01	46.89	63.91	53.91	-8.90	-7.02
2	0.322	0.10	46.35	-	46.45	-	59.66	49.66	-13.21	-
3	0.517	0.10	43.38	-	43.48	-	56.00	46.00	-12.52	-
4	0.779	0.10	43.32	-	43.42	-	56.00	46.00	-12.58	-
5	1.230	0.12	45.49	-	45.61	-	56.00	46.00	-10.39	-
6	10.355	0.38	42.01	-	42.39	-	60.00	50.00	-17.61	-

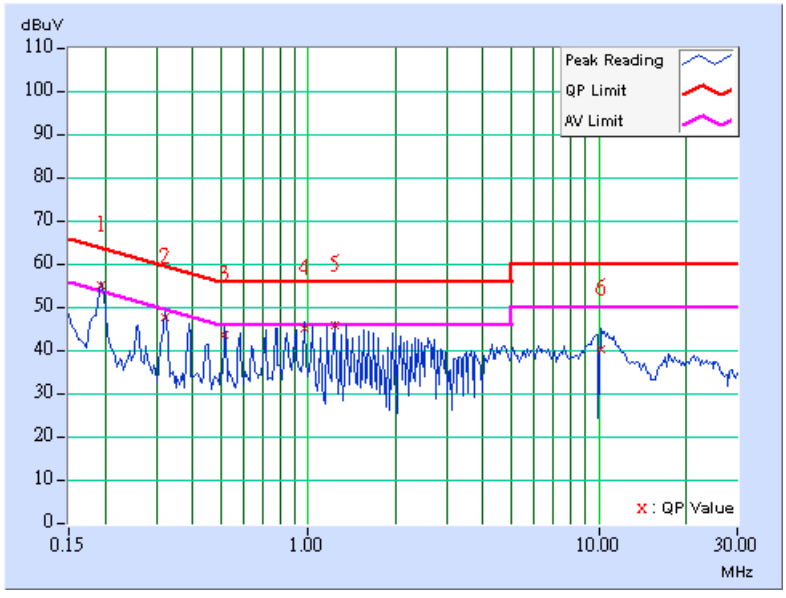
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	PHASE	Line 2
MODULATION TYPE	DBPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	1Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	54.65	46.70	54.75	46.80	63.91	53.91	-9.16	-7.11
2	0.322	0.10	47.14	-	47.24	-	59.66	49.66	-12.42	-
3	0.517	0.12	43.11	-	43.23	-	56.00	46.00	-12.77	-
4	0.970	0.20	44.70	-	44.90	-	56.00	46.00	-11.10	-
5	1.230	0.20	45.33	-	45.53	-	56.00	46.00	-10.47	-
6	10.160	0.47	40.00	-	40.47	-	60.00	50.00	-19.53	-

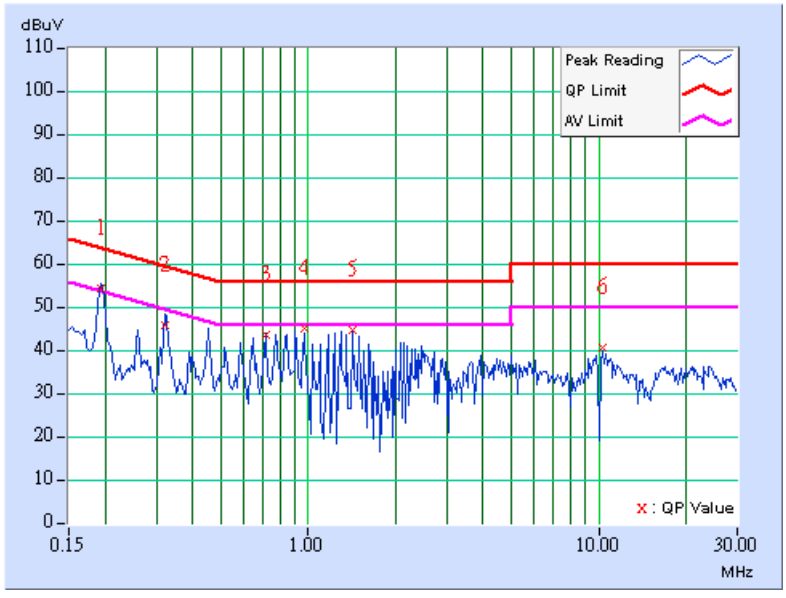
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	PHASE	Line 1
MODULATION TYPE	DBPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	1Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	54.15	46.45	54.25	46.55	63.91	53.91	-9.66	-7.36
2	0.322	0.10	45.53	-	45.63	-	59.66	49.66	-14.03	-
3	0.713	0.10	43.35	-	43.45	-	56.00	46.00	-12.55	-
4	0.970	0.10	44.78	-	44.88	-	56.00	46.00	-11.12	-
5	1.422	0.14	44.55	-	44.69	-	56.00	46.00	-11.31	-
6	10.289	0.38	40.52	-	40.90	-	60.00	50.00	-19.10	-

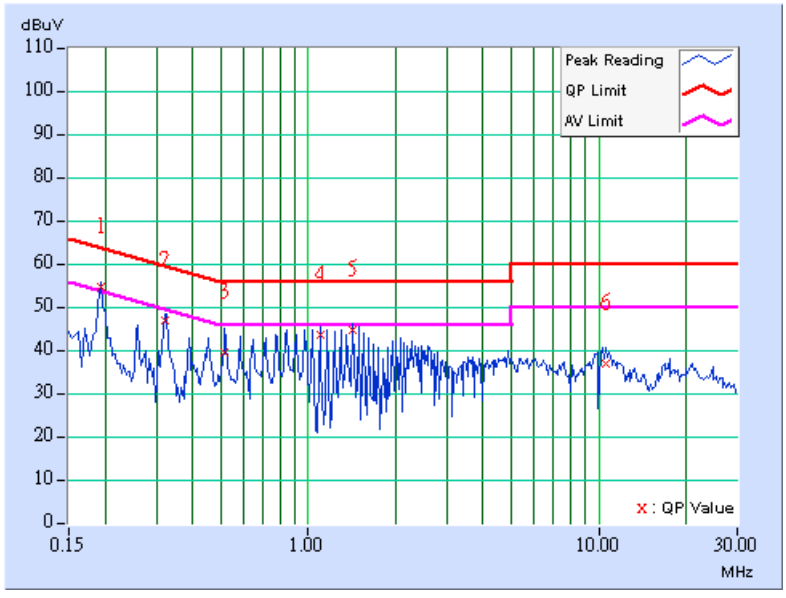
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	PHASE	Line 2
MODULATION TYPE	DBPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	1Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	54.51	46.70	54.61	46.80	63.91	53.91	-9.30	-7.11
2	0.322	0.10	46.56	-	46.66	-	59.66	49.66	-13.00	-
3	0.517	0.12	39.10	-	39.22	-	56.00	46.00	-16.78	-
4	1.102	0.20	43.39	-	43.59	-	56.00	46.00	-12.41	-
5	1.422	0.20	44.33	-	44.53	-	56.00	46.00	-11.47	-
6	10.617	0.48	36.56	-	37.04	-	60.00	50.00	-22.96	-

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 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 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.

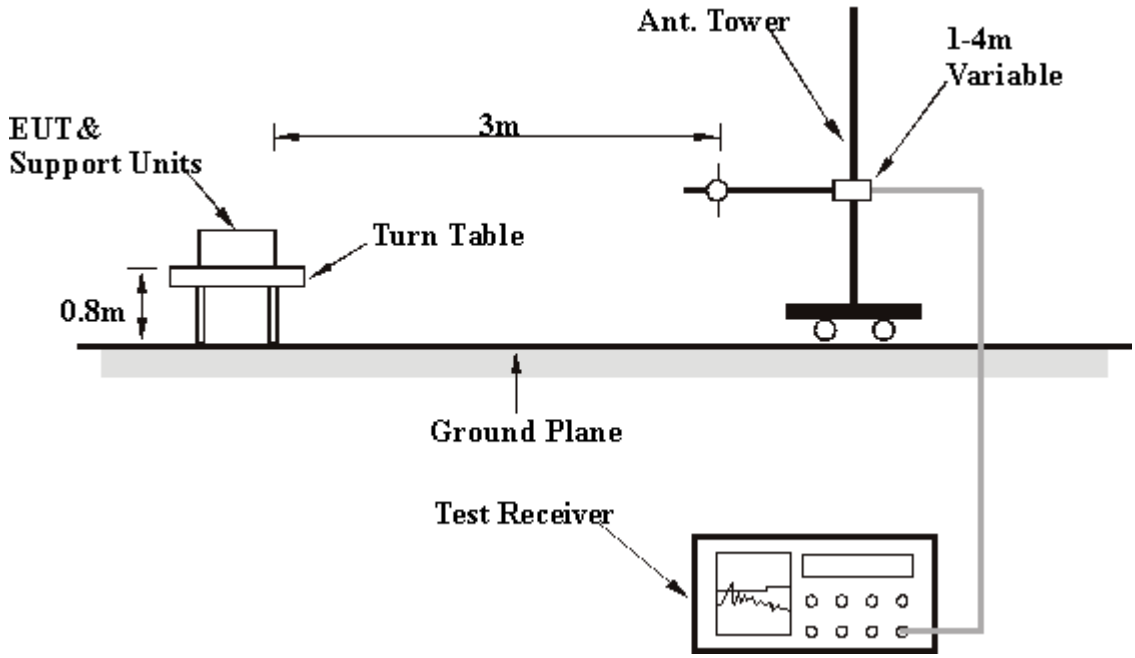
NOTE:

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 of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1kHz for Average detection (AV) 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

Below 1GHz Worst-Case Data

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	**FREQUENCY RANGE**	Below 1000MHz
MODULATION TYPE	DBPSK	**DETECTOR FUNCTION**	Quasi-Peak
TRANSFER RATE	1Mbps	**ENVIRONMENTAL CONDITIONS**	22deg. C, 66%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	115.53	34.31 QP	43.50	-9.19	1.75 H	79	23.91	10.40
2	133.03	33.33 QP	43.50	-10.17	2.00 H	127	20.80	12.53
3	613.17	32.96 QP	46.00	-13.04	2.00 H	10	10.33	22.63
4	636.49	32.24 QP	46.00	-13.76	1.75 H	253	9.36	22.88
5	667.60	31.05 QP	46.00	-14.95	2.00 H	52	7.63	23.42
6	720.08	32.51 QP	46.00	-13.49	1.25 H	151	7.71	24.80
7	745.35	32.49 QP	46.00	-13.51	2.00 H	16	6.86	25.63
8	768.68	31.20 QP	46.00	-14.80	1.75 H	160	5.34	25.86
9	933.91	31.66 QP	46.00	-14.34	1.75 H	109	2.99	28.66

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	57.21	26.27 QP	40.00	-13.73	1.00 V	55	12.50	13.77
2	70.82	26.67 QP	40.00	-13.33	1.00 V	349	14.96	11.71
3	115.53	34.63 QP	43.50	-8.87	1.00 V	328	24.23	10.40
4	140.80	27.63 QP	43.50	-15.87	1.00 V	310	14.18	13.45
5	613.17	31.58 QP	46.00	-14.42	1.00 V	202	8.95	22.63
6	636.49	31.11 QP	46.00	-14.89	1.00 V	310	8.23	22.88
7	667.60	31.01 QP	46.00	-14.99	1.00 V	337	7.59	23.42
8	720.08	30.39 QP	46.00	-15.61	1.00 V	112	5.59	24.80
9	**933.91**	**37.22 QP**	**46.00**	**-8.78**	**1.00 V**	**73**	**8.55**	**28.66**

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.

802.11b DSSS modulation

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	DBPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	1Mbps	ENVIRONMENTAL CONDITIONS	22deg. C, 66%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	2037.00	44.59 PK	77.15	-32.56	1.24 H	19	14.90	29.69
1	2037.00	41.02 AV	72.67	-31.65	1.24 H	19	11.33	29.69
2	2390.00	53.79 PK	74.00	-20.21	1.17 H	5	22.57	31.22
2	2390.00	43.57 AV	54.00	-10.43	1.17 H	5	12.35	31.22
3	*2412.00	97.15 PK			1.17 H	5	65.84	31.31
3	*2412.00	92.67 AV			1.17 H	5	61.36	31.31
4	4824.00	48.37 PK	74.00	-25.63	1.07 H	17	11.37	37.00
4	4824.00	39.84 AV	54.00	-14.16	1.07 H	17	2.84	37.00

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	2037.00	46.78 PK	80.10	-33.32	1.00 V	360	17.09	29.69
1	2037.00	44.66 AV	74.63	-29.97	1.00 V	360	14.97	29.69
2	2390.00	53.07 PK	74.00	-20.93	1.21 V	232	21.85	31.22
2	2390.00	43.74 AV	54.00	-10.26	1.21 V	232	12.52	31.22
3	*2412.00	100.10 PK			1.21 V	232	68.79	31.31
3	*2412.00	94.63 AV			1.21 V	232	63.32	31.31
4	4824.00	47.40 PK	74.00	-26.60	1.00 V	316	10.40	37.00
4	4824.00	38.63 AV	54.00	-15.37	1.00 V	316	1.63	37.00

REMARKS: 1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	DBPSK	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
TRANSFER RATE	1Mbps	**ENVIRONMENTAL CONDITIONS**	22deg. C, 66%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	2062.00	44.90 PK	77.80	-32.90	1.25 H	355	15.09	29.81
1	2062.00	41.30 AV	72.87	-31.59	1.25 H	355	11.49	29.81
2	*2437.00	97.50 PK			1.21 H	360	66.10	31.40
2	*2437.00	92.87 AV			1.21 H	360	61.47	31.40
3	4874.00	48.69 PK	74.00	-25.31	1.11 H	347	11.55	37.14
3	4874.00	40.10 AV	54.00	-13.90	1.11 H	347	2.96	37.14

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	2062.00	46.98 PK	80.05	-33.07	1.01 V	1	17.17	29.81
1	2062.00	44.98 AV	74.89	-29.91	1.01 V	1	15.17	29.81
2	*2437.00	100.05 PK			1.14 V	256	68.65	31.40
2	*2437.00	94.89 AV			1.14 V	256	63.49	31.40
3	4874.00	47.69 PK	74.00	-26.31	1.05 V	333	10.55	37.14
3	4874.00	39.08 AV	54.00	-14.92	1.05 V	333	1.94	37.14

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	DBPSK	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
TRANSFER RATE	1Mbps	**ENVIRONMENTAL CONDITIONS**	22deg. C, 66%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	2087.00	44.98 PK	77.23	-32.25	1.21 H	25	15.05	29.93
1	2087.00	41.30 AV	72.87	-31.57	1.21 H	25	11.37	29.93
2	*2462.00	97.23 PK			1.21 H	355	65.73	31.50
2	*2462.00	92.87 AV			1.21 H	355	61.37	31.50
3	2483.50	54.21 PK	74.00	-19.79	1.21 H	355	22.62	31.59
3	2483.50	43.69 AV	54.00	-10.31	1.21 H	355	12.10	31.59
4	4924.00	48.43 PK	74.00	-25.57	1.10 H	20	11.16	37.27
4	4924.00	39.89 AV	54.00	-14.11	1.10 H	20	2.62	37.27

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	2087.00	47.15 PK	80.12	-32.97	1.00 V	359	17.22	29.93
1	2087.00	44.96 AV	74.57	-29.61	1.00 V	359	15.03	29.93
2	*2462.00	100.12 PK			1.20 V	240	68.62	31.50
2	*2462.00	94.57 AV			1.20 V	240	63.07	31.50
3	2483.50	53.57 PK	74.00	-20.43	1.20 V	240	21.98	31.59
3	2483.50	44.26 AV	54.00	-9.74	1.20 V	240	12.67	31.59
4	4924.00	47.45 PK	74.00	-26.55	1.04 V	296	10.18	37.27
4	4924.00	38.66 AV	54.00	-15.34	1.04 V	296	1.39	37.27

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

4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK 30	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.

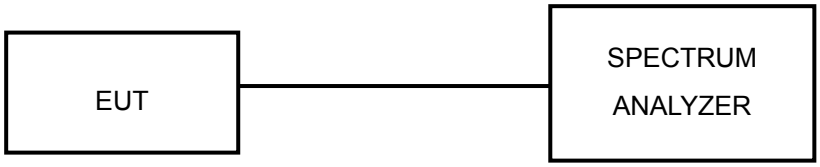
4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

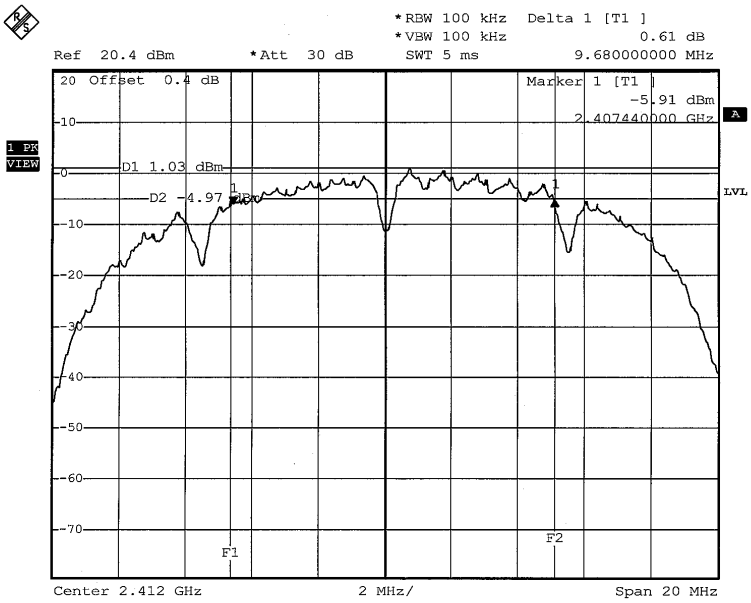
4.3.7 TEST RESULTS

802.11b DSSS modulation

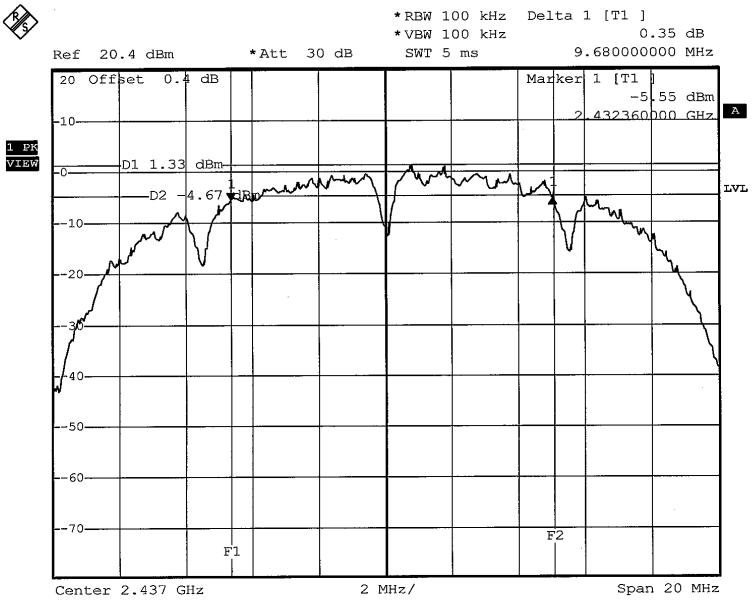
MODULATION TYPE	DBPSK	**TRANSFER RATE**	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	26deg.C, 66%RH, 991hPa
TESTED BY	Match Tsui		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	9.68	0.5	PASS
6	2437	9.68	0.5	PASS
11	2462	9.60	0.5	PASS

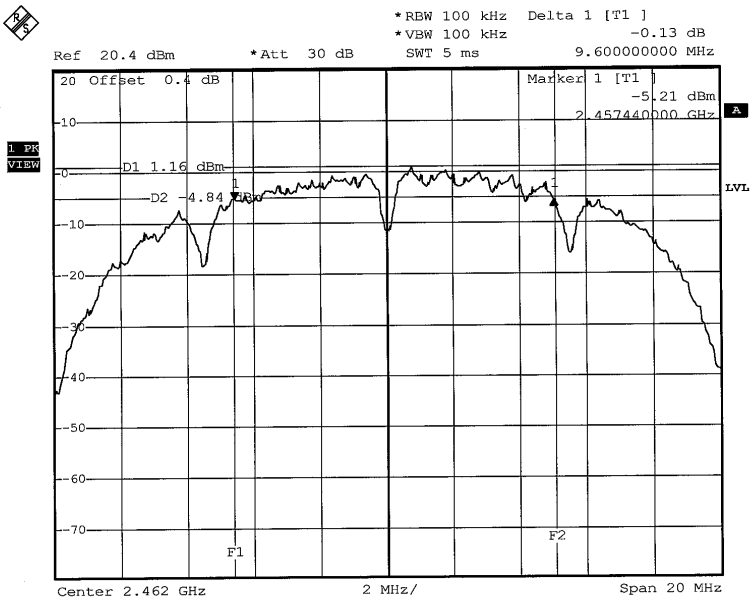
CH 1


*RBW 100 kHz
*VBW 100 kHz
SWT 5 ms
Delta 1 [T1]
0.61 dB
9.680000000 MHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 1 [T1]
-5.91 dBm
2.407440000 GHz
1 PK
VIEW
D1 1.03 dBm
D2 -4.97 dBm
LVL
F1
F2
Center 2.412 GHz
2 MHz/
Span 20 MHz

CH 6


*RBW 100 kHz
*VBW 100 kHz
SWT 5 ms
Delta 1 [T1]
0.35 dB
9.680000000 MHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 1 [T1]
-5.55 dBm
2.432360000 GHz
1 PK
VIEW
D1 1.33 dBm
D2 -4.67 dBm
LVL
F1
F2
Center 2.437 GHz
2 MHz/
Span 20 MHz

CH 11


*RBW 100 kHz
*VBW 100 kHz
SWT 5 ms
Delta 1 [T1]
-0.13 dB
9.600000000 MHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 1 [T1]
-5.21 dBm
2.457440000 GHz
1 PK
VIEW
D1 1.16 dBm
D2 -4.84 dBm
LVL
F1
F2
Center 2.462 GHz
2 MHz/
Span 20 MHz

4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 14, 2006
AGILENT SIGNAL GENERATOR	E8257C	MY43320668	Dec. 30, 2006
TEKTRONIX OSCILLOSCOPE	TDS 1012	C019167	Jan. 16, 2007
NARDA DETECTOR	4503A	FSCM99899	NA

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

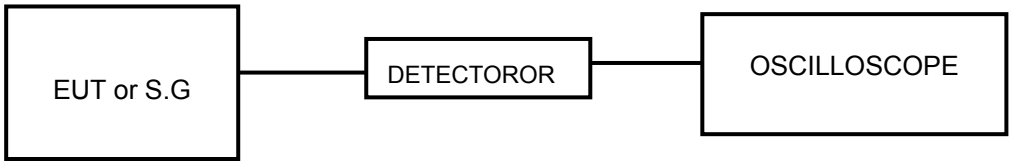
4.4.1 TEST PROCEDURES

1. A detector was used on the output port of the EUT. An oscilloscope was used to read the response of the detector.
2. Replaced the EUT by the signal generator. The center frequency of the S.G was adjusted to the center frequency of the measured channel.
3. Adjusted the power to have the same reading on oscilloscope. Record the power level.

4.4.2 DEVIATION FROM TEST STANDARD

No deviation

4.4.3 TEST SETUP



4.4.4 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.3 TEST RESULTS

802.11b DSSS modulation

MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 66%RH, 991hPa
TESTED BY	Match Tsui		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	20.091	13.03	30	PASS
6	2437	20.324	13.08	30	PASS
11	2462	20.230	13.06	30	PASS

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S 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.

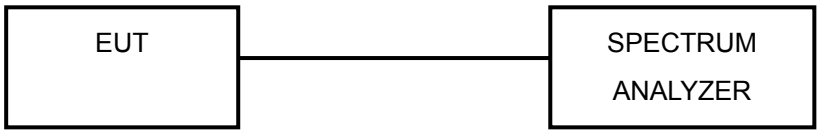
4.5.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.
The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

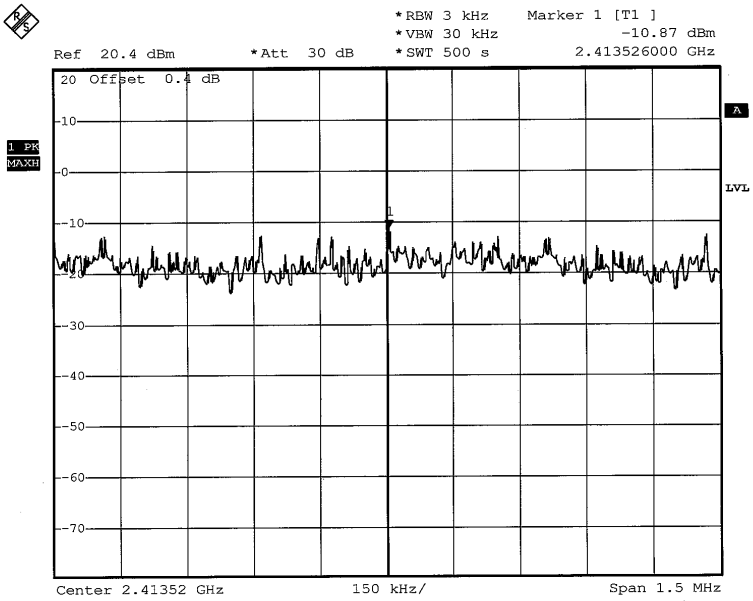
4.5.7 TEST RESULTS

802.11b DSSS modulation

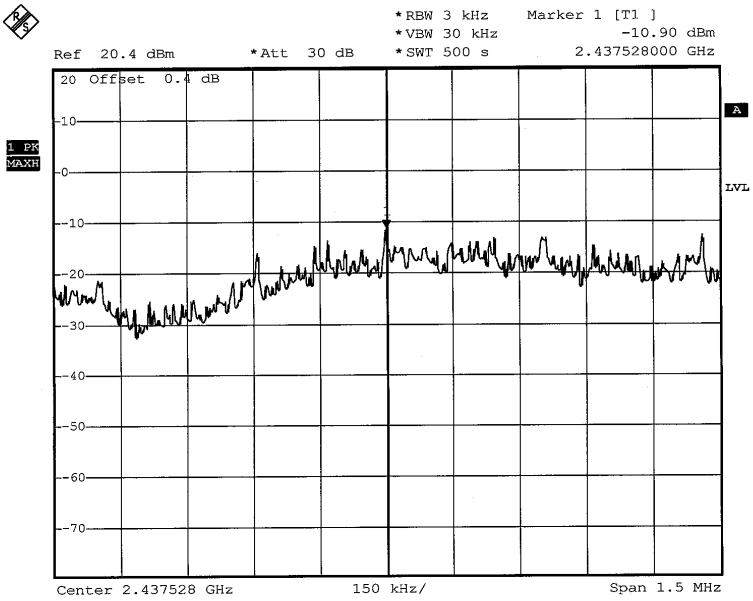
MODULATION TYPE	DBPSK	**TRANSFER RATE**	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	26deg.C, 66%RH, 991hPa
TESTED BY	Match Tsui		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-10.87	8	PASS
6	2437	-10.90	8	PASS
11	2462	-10.47	8	PASS

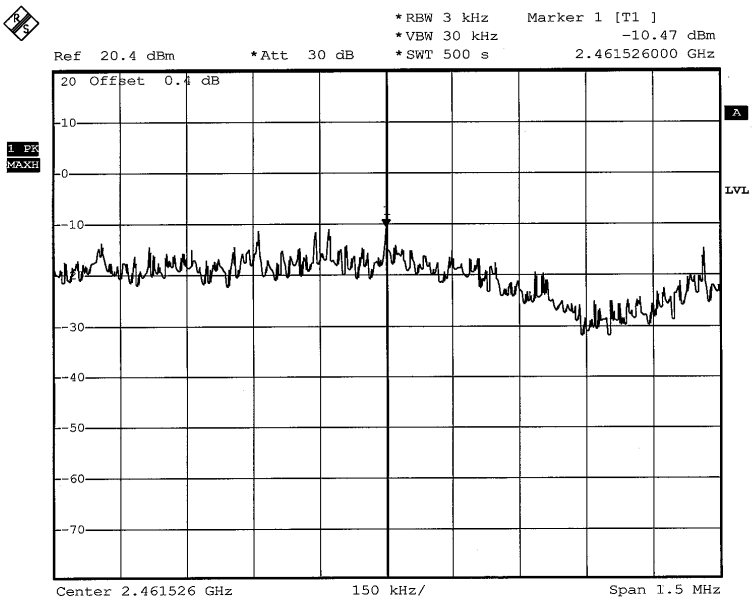
CH 1


*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1]
-10.87 dBm
2.413526000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
1 PK
MAXH
A
LVL
Center 2.41352 GHz
150 kHz/
Span 1.5 MHz

CH 6


*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1]
-10.90 dBm
2.437528000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
1 PK
MAXH
A
LVL
Center 2.437528 GHz
150 kHz/
Span 1.5 MHz

CH 11


*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1]
-10.47 dBm
2.461526000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
1 PK
MAXH
A
LVL
10
0
-10
-30
-40
-50
-60
-70
Center 2.461526 GHz
150 kHz/
Span 1.5 MHz

4.6 BAND EDGES MEASUREMENT

4.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S 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.

4.6.3 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 100kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (Peak RBW=VBW=100kHz; Average RBW=1MHz, VBW= 1kHz) are attached on the following pages.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6

4.6.6 TEST RESULTS

The spectrum plots are attached on the following 6 images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

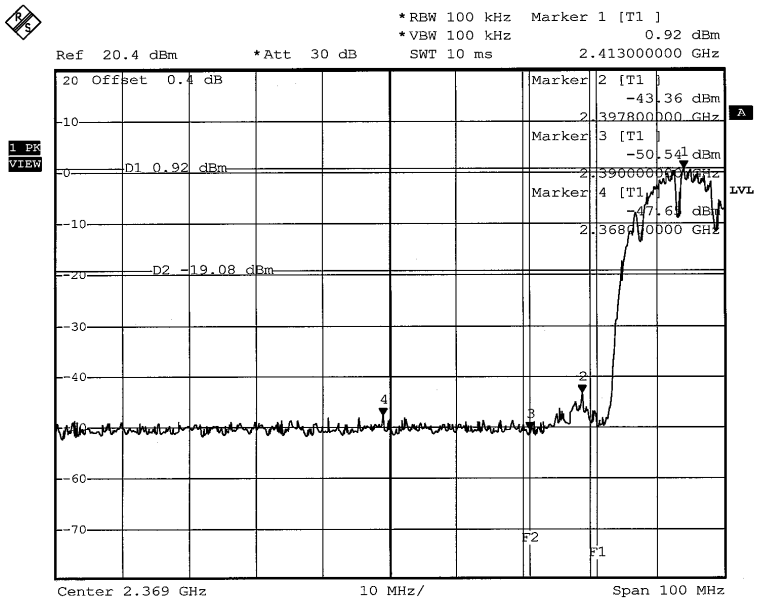
802.11b DSSS modulation

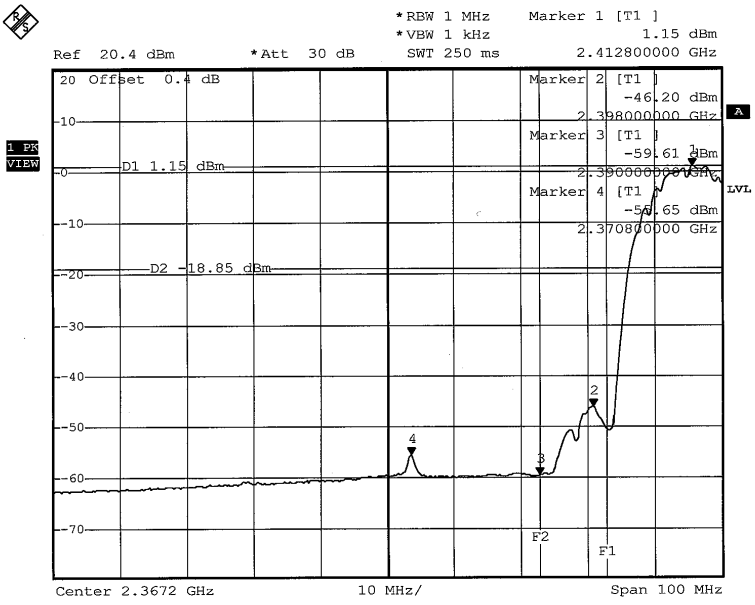
NOTE 1: The band edge emission plot on the next page shows 48.57dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 100.10dBuV/m (Peak), so the maximum field strength in restrict band is 100.10-48.57=51.53dBuV/m which is under 74dBuV/m limit.

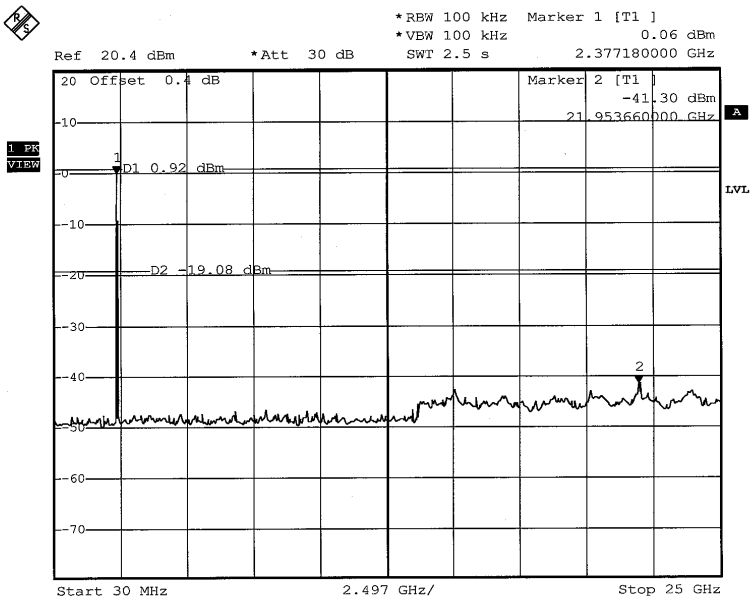
The band edge emission plot of on the next page shows 56.80dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 94.63dBuV/m (Average), so the maximum field strength in restrict band is 94.63-56.80=37.83dBuV/m which is under 54dBuV/m limit.

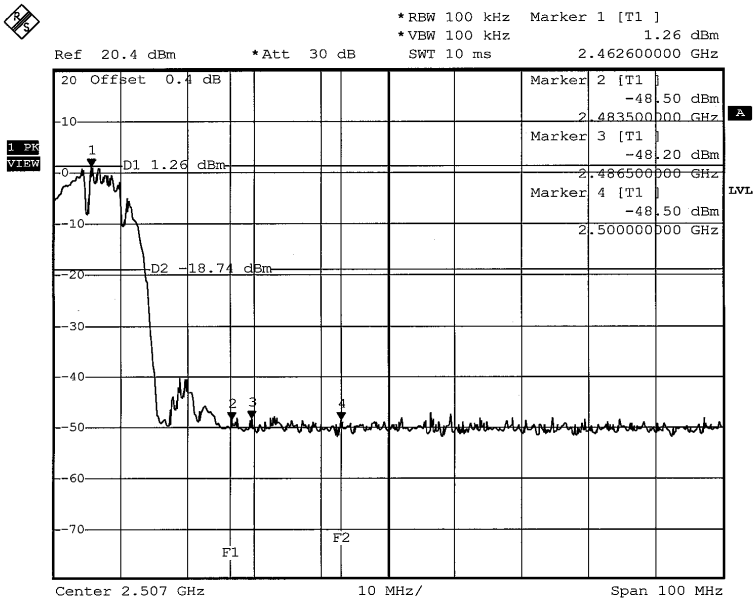
NOTE 2: The band edge emission plot on the next second page shows 49.46dBc between carrier maximum power and local maximum emission in restrict band (2.4865GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 100.12dBuV/m (Peak), so the maximum field strength in restrict band is 100.12-49.46=50.66dBuV/m which is under 74dBuV/m limit.

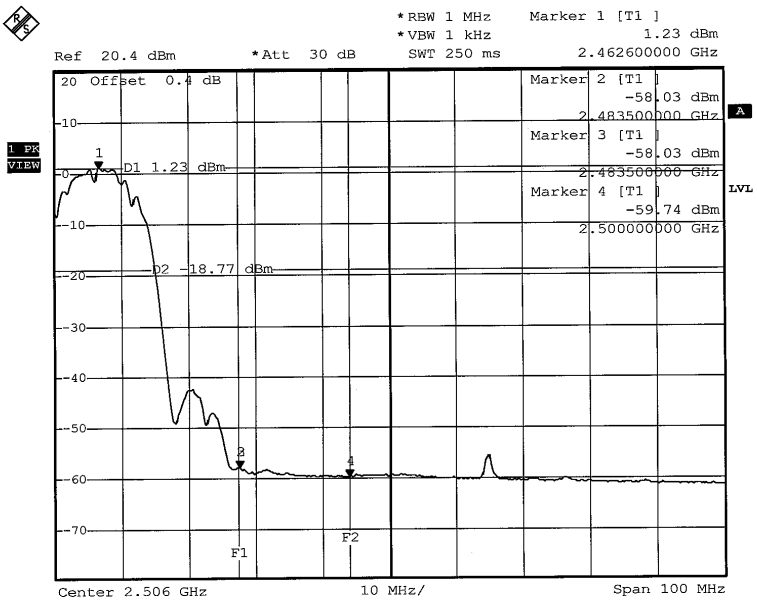
The band edge emission plot on the next third page shows 59.26dBc between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 94.57dBuV/m (Average), so the maximum field strength in restrict band is 94.57-59.26=35.31dBuV/m which is under 54dBuV/m limit.

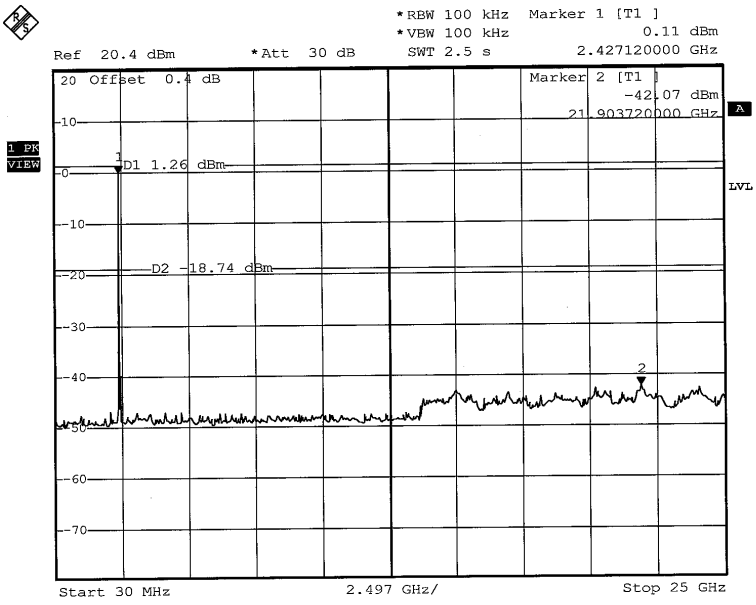

*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1]
0.92 dBm
2.413000000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-43.36 dBm
2.397800000 GHz
Marker 3 [T1]
-50.54 dBm
Marker 4 [T1]
-47.61 dBm
2.368800000 GHz
1 PK VIEW
D1 0.92 dBm
D2 -19.08 dBm
A
LVL
F2
F1
Center 2.369 GHz
10 MHz/
Span 100 MHz


*RBW 1 MHz
*VBW 1 kHz
SWT 250 ms
Marker 1 [T1]
1.15 dBm
2.412800000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-46.20 dBm
2.398000000 GHz
Marker 3 [T1]
-59.61 dBm
Marker 4 [T1]
-56.65 dBm
2.370800000 GHz
1 PK VIEW
D1 1.15 dBm
D2 -18.85 dBm
A
LVL
F2
F1
Center 2.3672 GHz
10 MHz/
Span 100 MHz


*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 s
Marker 1 [T1]
0.06 dBm
2.377180000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-41.30 dBm
21.953660000 GHz
1 PK
VIEW
D1 0.92 dBm
D2 -19.08 dBm
LVL
Start 30 MHz
2.497 GHz/
Stop 25 GHz


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1]
1.26 dBm
2.462600000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-48.50 dBm
2.483500000 GHz
Marker 3 [T1]
-48.20 dBm
2.486500000 GHz
Marker 4 [T1]
-48.50 dBm
2.500000000 GHz
1 PK
VIEW
D1 1.26 dBm
D2 -18.74 dBm
LVL
F1
F2
Center 2.507 GHz
10 MHz/
Span 100 MHz


*RBW 1 MHz
*VBW 1 kHz
SWT 250 ms
Marker 1 [T1]
1.23 dBm
2.462600000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-58.03 dBm
2.483500000 GHz
Marker 3 [T1]
-58.03 dBm
2.483500000 GHz
Marker 4 [T1]
-59.74 dBm
2.500000000 GHz
1 PK
VIEW
D1 1.23 dBm
D2 -18.77 dBm
F1
F2
LVL
Center 2.506 GHz
10 MHz/
Span 100 MHz


*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 s
Marker 1 [T1]
0.11 dBm
2.427120000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-42.07 dBm
21.903720000 GHz
1 PK
VIEW
D1 1.26 dBm
D2 -18.74 dBm
LVL
Start 30 MHz
2.497 GHz/
Stop 25 GHz

4.7 ANTENNA REQUIREMENT

4.7.1 STANDARD APPLICABLE

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

4.7.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is PIFA antenna with UFL connector. The maximum Gain of the antenna is –0.48dBi.

5. TEST TYPES AND RESULTS (FOR BLUETOOTH FUNCTION)

5.1.1 CONDUCTED EMISSION MEASUREMENT

5.1.2 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.

5.1.3 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.

5.1.4 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.

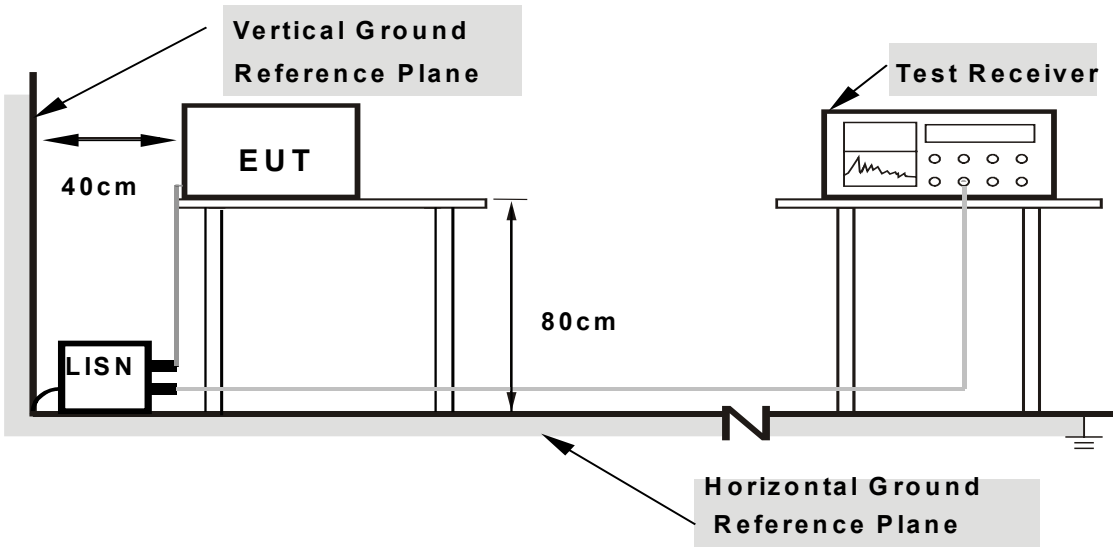
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

5.1.5 DEVIATION FROM TEST STANDARD

No deviation

5.1.6 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

5.1.7 EUT OPERATING CONDITIONS

Same as 4.1.6

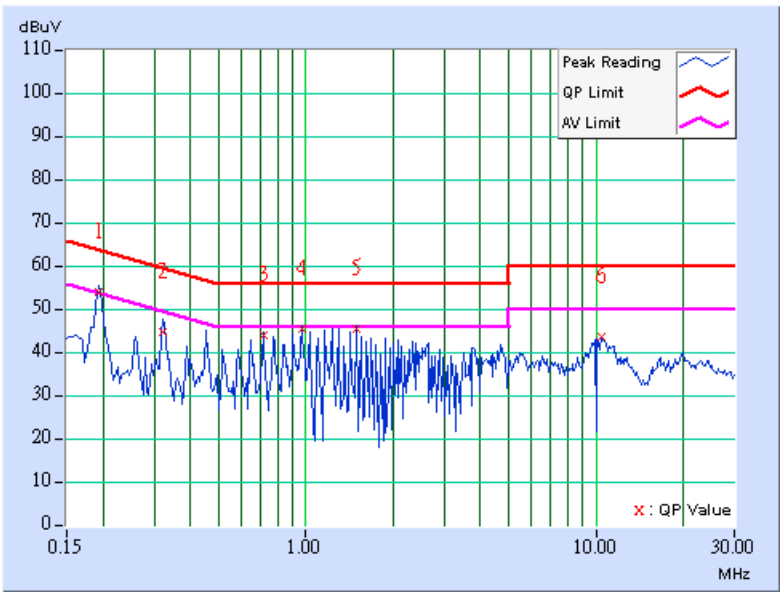
5.1.8 TEST RESULTS

Conducted Worst-Case Data

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

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	53.59	-	53.69	-	63.91	53.91	-10.22	-
2	0.322	0.10	44.37	-	44.47	-	59.66	49.66	-15.19	-
3	0.713	0.10	43.65	-	43.75	-	56.00	46.00	-12.25	-
4	0.970	0.10	45.31	-	45.41	-	56.00	46.00	-10.59	-
5	1.488	0.15	45.31	-	45.46	-	56.00	46.00	-10.54	-
6	10.414	0.38	43.25	-	43.63	-	60.00	50.00	-16.37	-

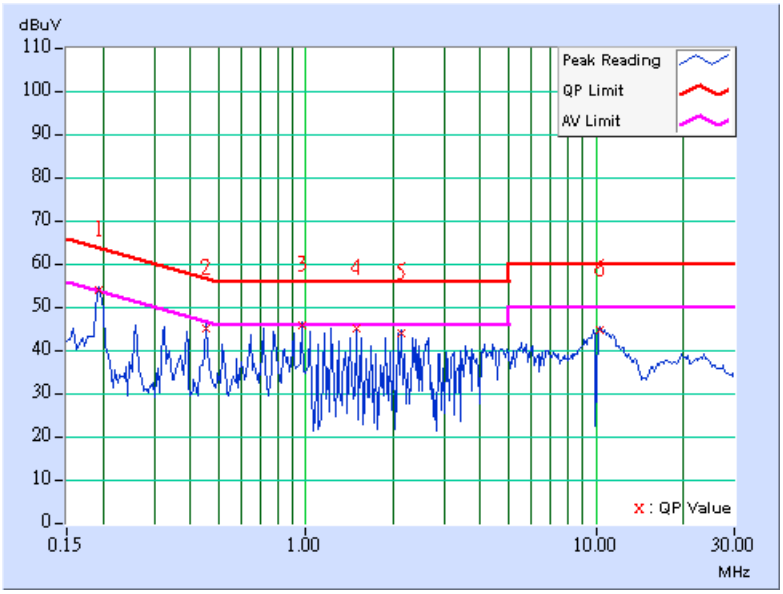
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission 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
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu		

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	53.49	-	53.59	-	63.91	53.91	-10.32	-
2	0.451	0.11	44.88	-	44.99	-	56.86	46.86	-11.87	-
3	**0.970**	**0.20**	**45.61**	**-**	**45.81**	**-**	**56.00**	**46.00**	**-10.19**	**-**
4	1.488	0.20	44.74	-	44.94	-	56.00	46.00	-11.06	-
5	2.133	0.21	43.63	-	43.84	-	56.00	46.00	-12.16	-
6	10.285	0.47	44.39	-	44.86	-	60.00	50.00	-15.14	-

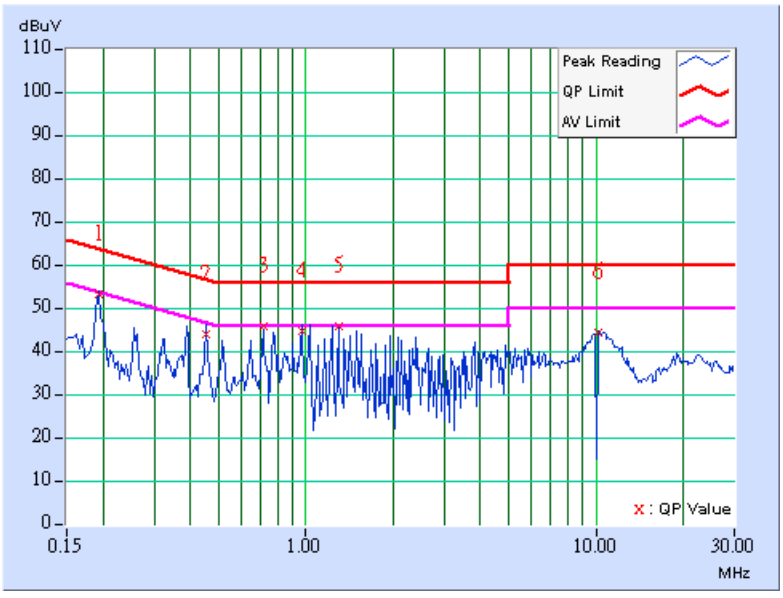
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission 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
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu		

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	53.00	-	53.10	-	63.91	53.91	-10.81	-
2	0.451	0.10	43.69	-	43.79	-	56.86	46.86	-13.07	-
3	0.713	0.10	45.57	-	45.67	-	56.00	46.00	-10.33	-
4	0.970	0.10	44.27	-	44.37	-	56.00	46.00	-11.63	-
5	1.293	0.13	45.58	-	45.71	-	56.00	46.00	-10.29	-
6	10.156	0.37	44.01	-	44.38	-	60.00	50.00	-15.62	-

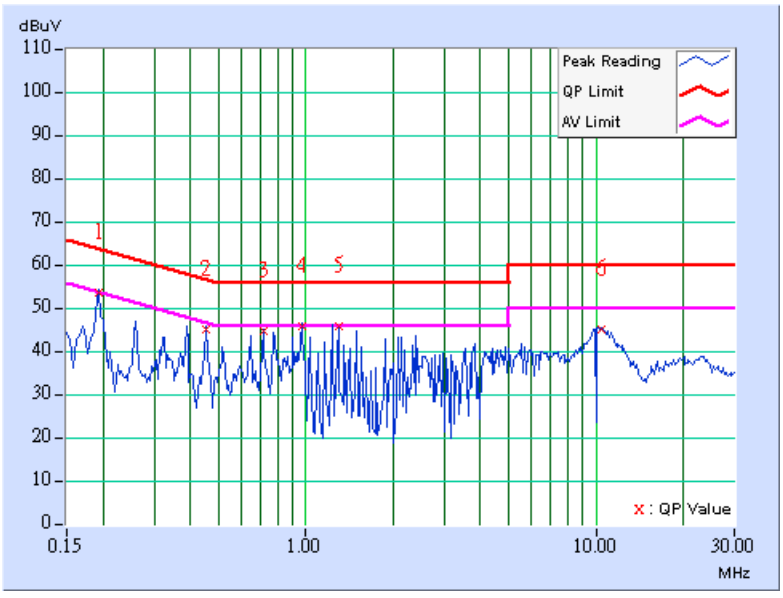
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission 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
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu		

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	53.08	-	53.18	-	63.91	53.91	-10.73	-
2	0.451	0.11	44.60	-	44.71	-	56.86	46.86	-12.15	-
3	0.713	0.15	44.31	-	44.46	-	56.00	46.00	-11.54	-
4	0.970	0.20	45.56	-	45.76	-	56.00	46.00	-10.24	-
5	1.293	0.20	45.38	-	45.58	-	56.00	46.00	-10.42	-
6	10.414	0.47	44.58	-	45.05	-	60.00	50.00	-14.95	-

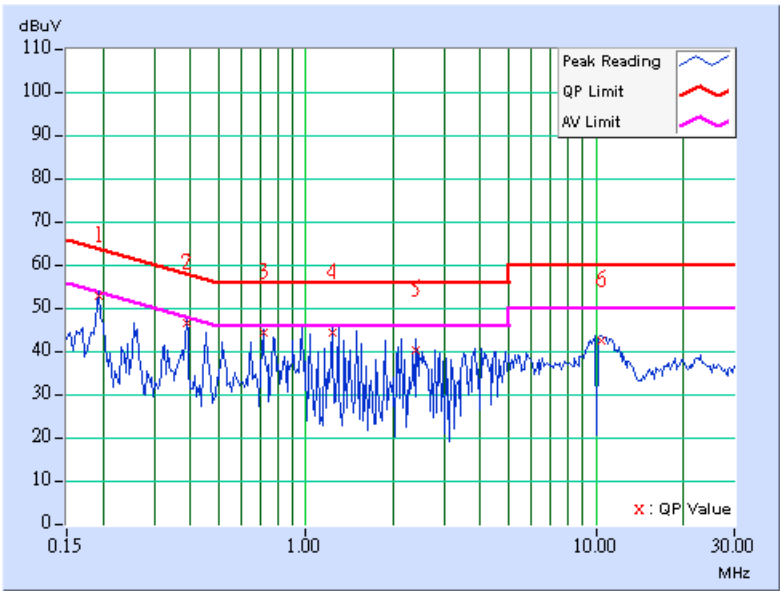
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission 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
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu		

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	52.46	-	52.56	-	63.91	53.91	-11.35	-
2	0.388	0.10	46.27	-	46.37	-	58.10	48.10	-11.73	-
3	0.713	0.10	44.02	-	44.12	-	56.00	46.00	-11.88	-
4	1.230	0.12	44.13	-	44.25	-	56.00	46.00	-11.75	-
5	2.395	0.23	40.08	-	40.31	-	56.00	46.00	-15.69	-
6	10.480	0.39	42.32	-	42.71	-	60.00	50.00	-17.29	-

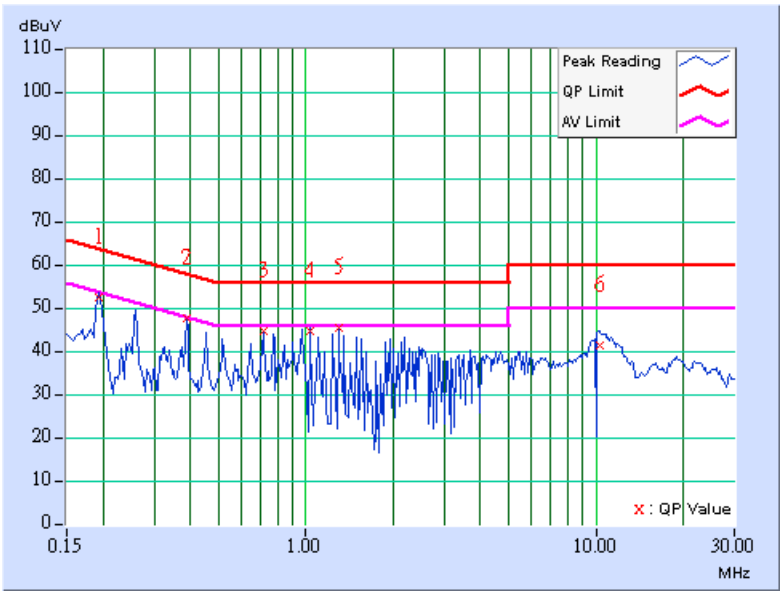
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission 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
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu		

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	52.28	-	52.38	-	63.91	53.91	-11.53	-
2	0.388	0.10	47.17	-	47.27	-	58.10	48.10	-10.83	-
3	0.713	0.15	44.52	-	44.67	-	56.00	46.00	-11.33	-
4	1.035	0.20	44.37	-	44.57	-	56.00	46.00	-11.43	-
5	1.293	0.20	45.01	-	45.21	-	56.00	46.00	-10.79	-
6	10.352	0.47	40.99	-	41.46	-	60.00	50.00	-18.54	-

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.



5.2 RADIATED EMISSION MEASUREMENT

5.2.1 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.

5.2.2 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.

5.2.3 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.

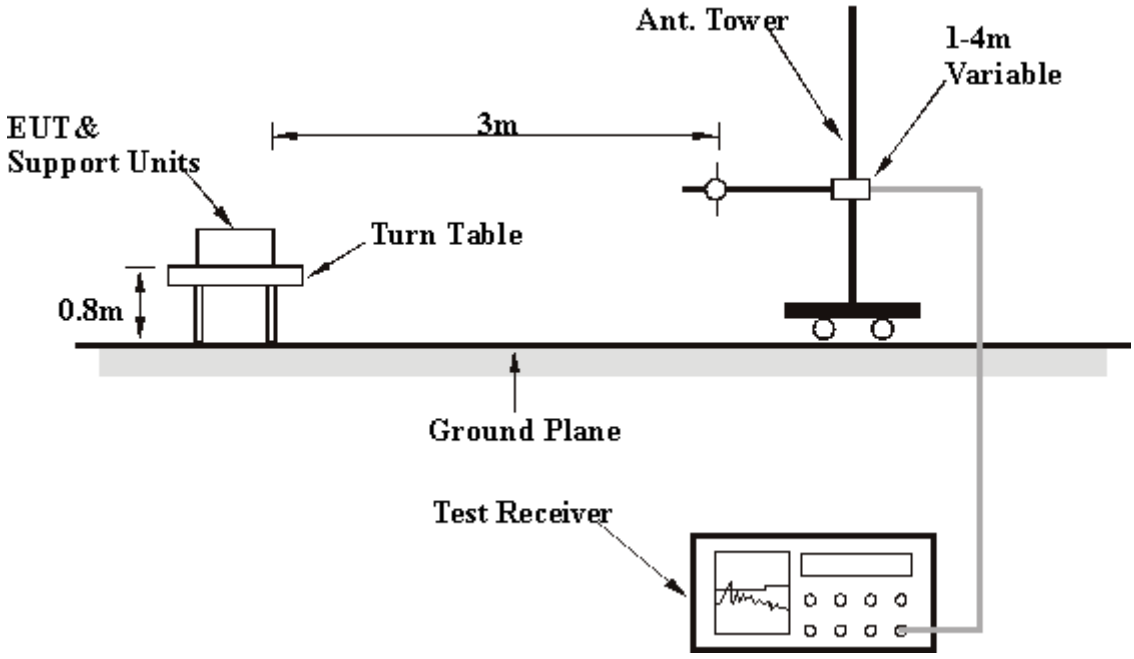
NOTE:

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 of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.

5.2.4 DEVIATION FROM TEST STANDARD

No deviation

5.2.5 TEST SETUP



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

5.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

5.2.7 TEST RESULTS

Radiated Worst Case Data

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	**FREQUENCY RANGE**	Below 1000MHz
MODULATION TYPE	GFSK	**DETECTOR FUNCTION**	Quasi-Peak
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	20deg. C, 60%RH, 991hPa
TESTED BY	Lori Chiu		

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	84.43	20.32 QP	40.00	-19.68	2.00 H	241	10.39	9.92
2	160.24	24.92 QP	43.50	-18.58	1.50 H	253	11.53	13.39
3	162.18	24.28 QP	43.50	-19.22	1.00 H	121	11.01	13.27
4	515.97	28.46 QP	46.00	-17.54	2.00 H	223	8.05	20.42
5	539.30	32.64 QP	46.00	-13.36	2.00 H	73	11.71	20.93
6	564.57	33.26 QP	46.00	-12.74	1.00 H	337	11.71	21.55
7	613.17	26.59 QP	46.00	-19.41	2.00 H	241	3.96	22.63
8	745.35	26.99 QP	46.00	-19.01	2.00 H	223	1.36	25.63
9	813.39	26.62 QP	46.00	-19.38	1.50 H	250	0.44	26.18
10	840.60	26.00 QP	46.00	-20.00	1.00 H	265	-0.55	26.55
11	904.75	26.92 QP	46.00	-19.08	1.50 H	256	-0.38	27.30
12	933.91	27.66 QP	46.00	-18.34	1.00 H	265	-1.01	28.66

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	39.72	27.85 QP	40.00	-12.15	1.00 V	316	13.48	14.37
2	80.54	27.16 QP	40.00	-12.84	1.00 V	241	16.70	10.46
3	98.04	28.11 QP	43.50	-15.39	1.00 V	181	19.08	9.02
4	539.30	27.16 QP	46.00	-18.84	1.00 V	19	6.23	20.93
5	564.57	26.28 QP	46.00	-19.72	1.00 V	331	4.74	21.55
6	879.48	26.72 QP	46.00	-19.28	1.00 V	181	-0.20	26.91
7	937.80	27.70 QP	46.00	-18.30	1.00 V	352	-1.15	28.85

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 0	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	GFSK	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 66%RH, 991hPa	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY	Lori Chiu		

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	2106.00	44.61 PK	74.00	-29.39	1.27 H	20	14.59	30.02
1	2106.00	41.26 AV	54.00	-12.74	1.27 H	20	11.24	30.02
2	2390.00	41.63 PK	74.00	-32.37	1.10 H	60	10.41	31.22
2	2390.00	32.23 AV	54.00	-21.77	1.10 H	60	1.01	31.22
3	*2402.00	86.45 PK			1.10 H	60	55.18	31.27
3	*2402.00	56.45 AV			1.10 H	60	25.15	31.27
4	4804.00	45.87 PK	74.00	-28.13	1.00 H	65	8.93	36.94
4	4804.00	15.87 AV	54.00	-38.13	1.00 H	65	-21.07	36.94

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	2104.00	47.43 PK	74.00	-26.57	1.24 V	81	17.42	30.01
1	**2104.00**	**44.52 AV**	**54.00**	**-9.48**	**1.24 V**	**81**	**14.51**	**30.01**
2	2390.00	42.10 PK	74.00	-31.90	1.01 V	211	10.88	31.22
2	2390.00	31.17 AV	54.00	-22.83	1.01 V	211	-0.05	31.22
3	*2402.00	86.92 PK			1.01 V	211	55.65	31.27
3	*2402.00	56.92 AV			1.01 V	211	25.65	31.27
4	4804.00	45.80 PK	74.00	-28.20	1.01 V	360	8.86	36.94
4	4804.00	15.80 AV	54.00	-38.20	1.01 V	360	-21.14	36.94

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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	GFSK	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 66%RH, 991hPa	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY	Lori Chiu		

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	2108.00	44.83 PK	74.00	-29.17	1.28 H	360	14.80	30.03
1	2108.00	41.12 AV	54.00	-12.88	1.28 H	360	11.09	30.03
2	*2441.00	86.19 PK			1.58 H	48	54.77	31.42
2	*2441.00	56.19 AV			1.58 H	48	24.77	31.42
3	4882.00	45.00 PK	74.00	-29.00	1.58 H	48	7.84	37.16
3	4882.00	15.00 AV	54.00	-39.00	1.58 H	48	-22.16	37.16

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	2108.00	46.51 PK	74.00	-27.49	1.21 V	84	16.48	30.03
1	2108.00	43.58 AV	54.00	-10.42	1.21 V	84	13.55	30.03
2	*2441.00	86.64 PK			1.01 V	239	55.22	31.42
2	*2441.00	56.64 AV			1.01 V	239	25.22	31.42
3	4882.00	44.76 PK	74.00	-29.24	1.01 V	229	7.60	37.16
3	4882.00	14.76 AV	54.00	-39.24	1.01 V	229	-22.40	37.16

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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	GFSK	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 66%RH, 991hPa	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY	Lori Chiu		

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	2108.00	44.78 PK	74.00	-29.22	1.30 H	357	14.75	30.03
1	2108.00	41.58 AV	54.00	-12.42	1.30 H	357	11.55	30.03
2	*2480.00	86.42 PK			1.29 H	55	54.85	31.57
2	*2480.00	57.42 AV			1.29 H	55	24.85	31.57
3	2483.50	45.19 PK	74.00	-28.81	1.29 H	55	13.60	31.59
3	2483.50	36.73 AV	54.00	-17.27	1.29 H	55	5.14	31.59
4	4960.00	45.28 PK	74.00	-28.72	1.30 H	288	7.93	37.35
4	4960.00	15.28 AV	54.00	-38.72	1.30 H	288	-22.07	37.35

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	2108.00	45.65 PK	74.00	-28.35	1.02 V	39	15.62	30.03
1	2108.00	41.95 AV	54.00	-12.05	1.02 V	39	11.92	30.03
2	*2480.00	86.79 PK			1.85 V	330	55.22	31.57
2	*2480.00	56.79 AV			1.85 V	330	25.22	31.57
3	2483.50	45.56 PK	74.00	-28.44	1.85 V	330	13.97	31.59
3	2483.50	36.60 AV	54.00	-17.40	1.85 V	330	5.01	31.59
4	4960.00	45.89 PK	74.00	-28.11	1.85 V	304	8.54	37.35
4	4960.00	15.89 AV	54.00	-38.11	1.85 V	304	-21.46	37.35

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).

5.3 NUMBER OF HOPPING FREQUENCY USED

5.3.1 LIMIT OF HOPPING FREQUENCY USED

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

5.3.2 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.

5.3.3 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.

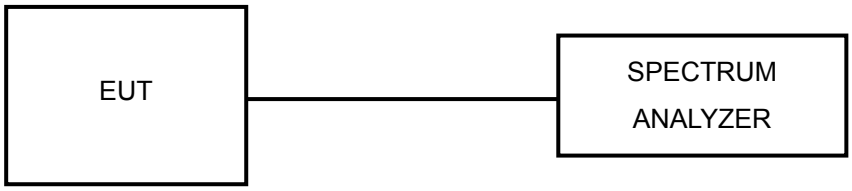
d. Set the SA on View mode and then plot the result on SA screen.

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

5.3.4 DEVIATION FROM TEST STANDARD

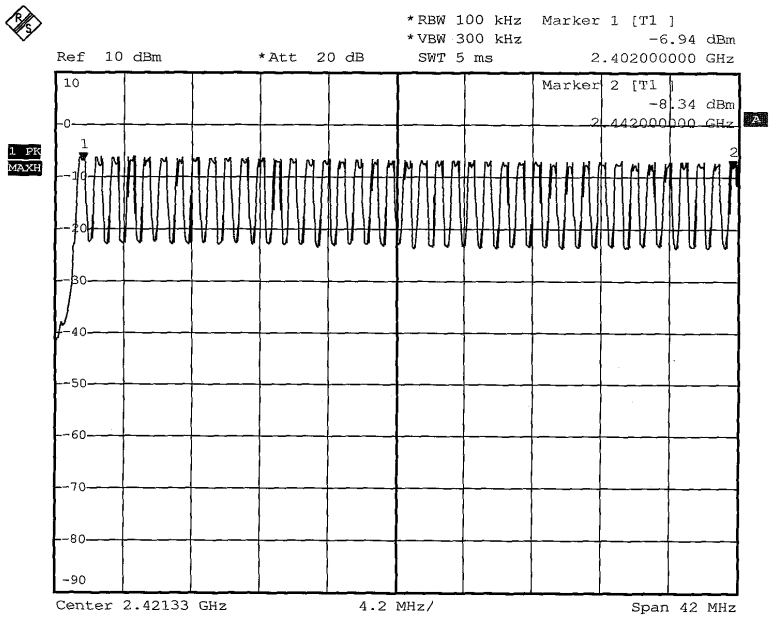
No deviation.

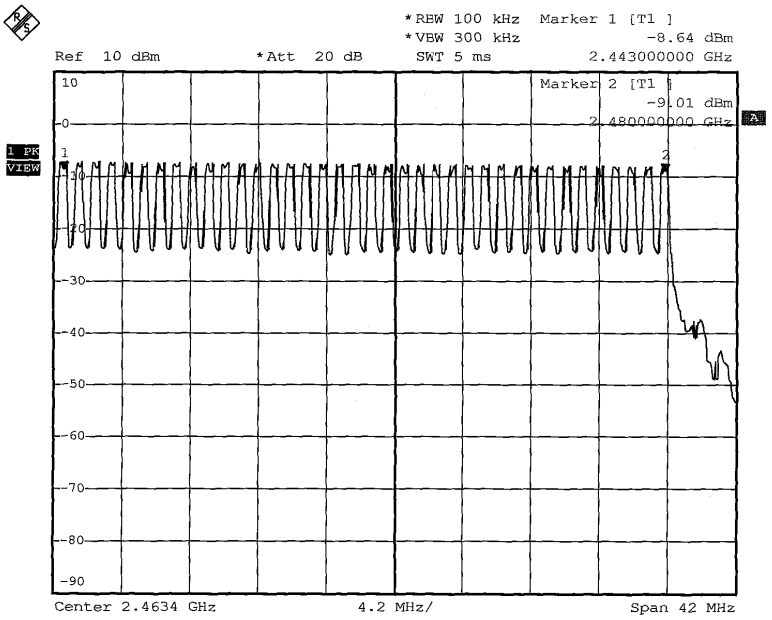
5.3.5 TEST SETUP



5.3.6 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.


*RBW 100 kHz
*VBW 300 kHz
SWT 5 ms
Marker 1 [T1]
-6.94 dBm
2.402000000 GHz
Ref 10 dBm
*Att 20 dB
Marker 2 [T1]
-8.34 dBm
2.442000000 GHz
1 PK
MAXH
Center 2.42133 GHz
4.2 MHz/
Span 42 MHz


*RBW 100 kHz
*VBW 300 kHz
SWT 5 ms
Marker 1 [T1]
-8.64 dBm
2.443000000 GHz
Ref 10 dBm
*Att 20 dB
Marker 2 [T1]
-9.01 dBm
2.480000000 GHz
1 PK
VIEW
Center 2.4634 GHz
4.2 MHz/
Span 42 MHz

5.4 DWELL TIME ON EACH CHANNEL

5.4.1 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.

5.4.2 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.

5.4.3 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.

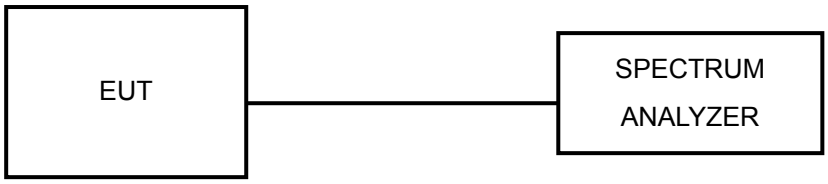
d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.

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

5.4.4 DEVIATION FROM TEST STANDARD

No deviation.

5.4.5 TEST SETUP

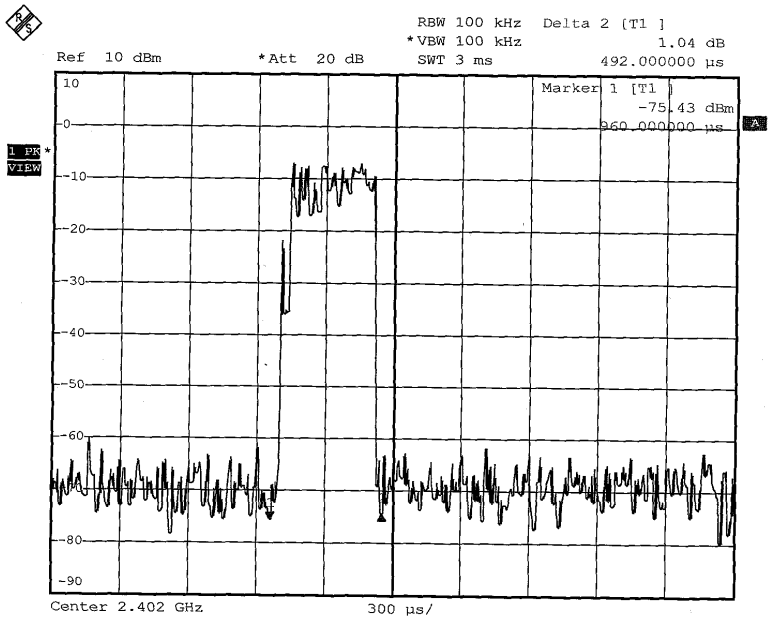


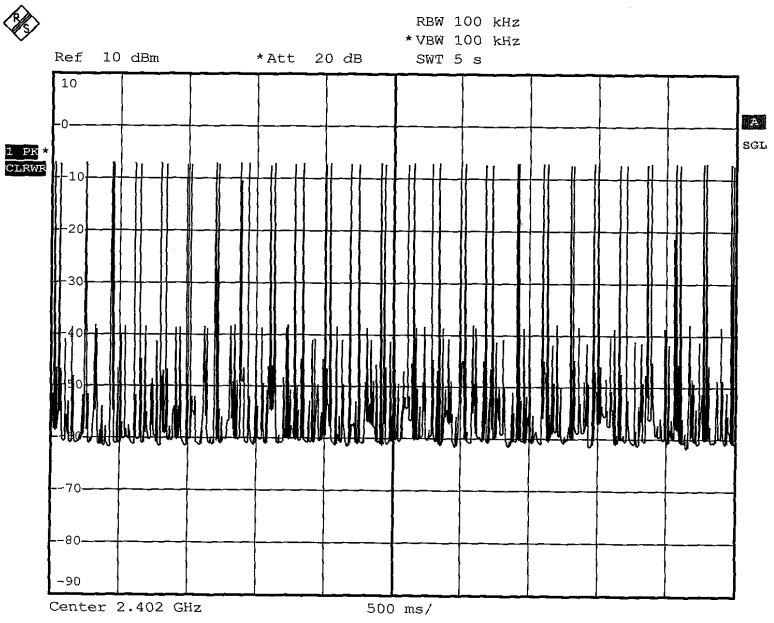
5.4.6 TEST RESULTS

MODE	NUMBER OF TRANSMISSION IN A 31.6 (79HOPPING * 0.4)	LENGTH OF TRANSMISSION TIME (msec)	RESULT (msec)	LIMIT (msec)
DH1	50 (times / 5 sec) * 6.32 = 316.00 times	0.492	155.472	400
DH3	25 (times / 5 sec) * 6.32 = 158.00 times	1.710	270.180	400
DH5	17 (times / 5 sec) * 6.32 = 107.44 times	2.960	318.022	400

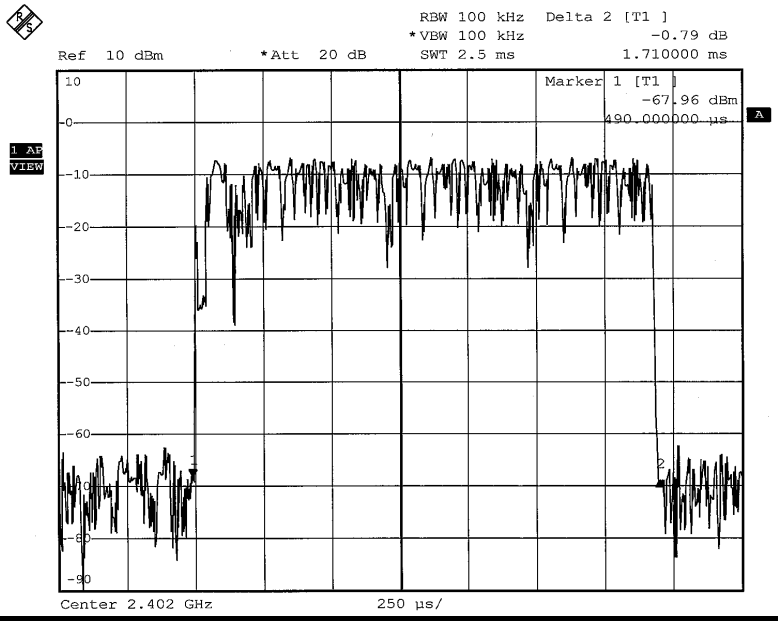
NOTE: Test plots of the transmitting time slot are shown on next 3 pages.

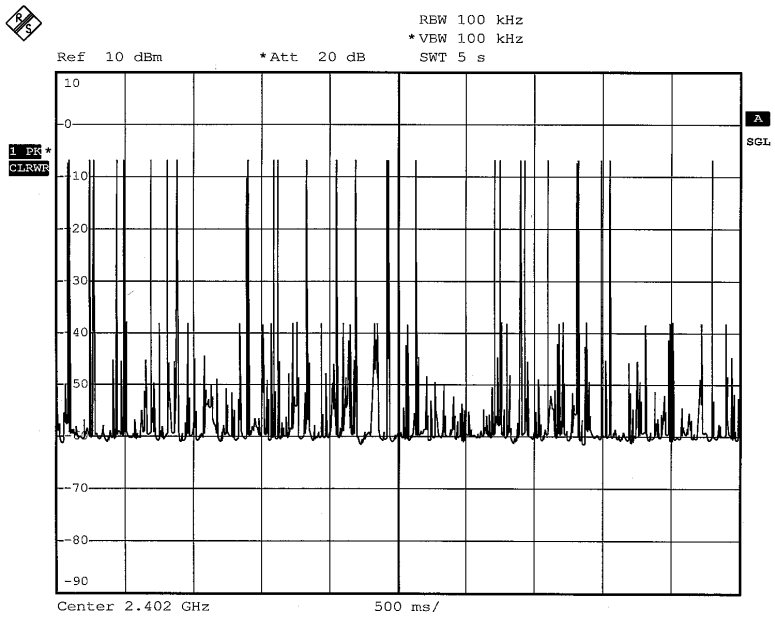
DH1


RBW 100 kHz
*VBW 100 kHz
SWT 3 ms
Delta 2 [T1]
1.04 dB
492.000000 µs
Ref 10 dBm
*Att 20 dB
Marker 1 [T1]
-75.43 dBm
960.000000 µs
1 PK*
VIEW
A
10
0
-10
-20
-30
-40
-50
-60
-80
-90
Center 2.402 GHz
300 µs/

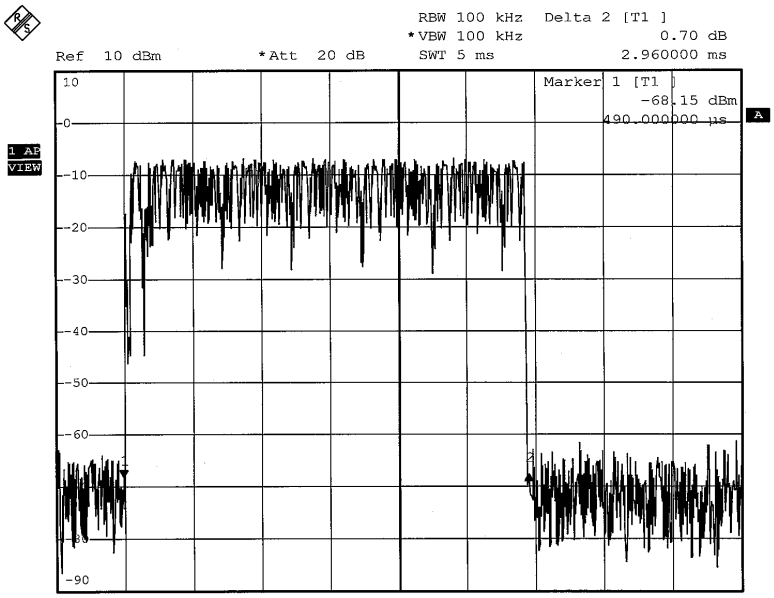

RBW 100 kHz
*VBW 100 kHz
SWT 5 s
Ref 10 dBm
*Att 20 dB
2 PK*
CLRWR
A
SGL
10
0
-10
-20
-30
-40
-50
-70
-80
-90
Center 2.402 GHz
500 ms/

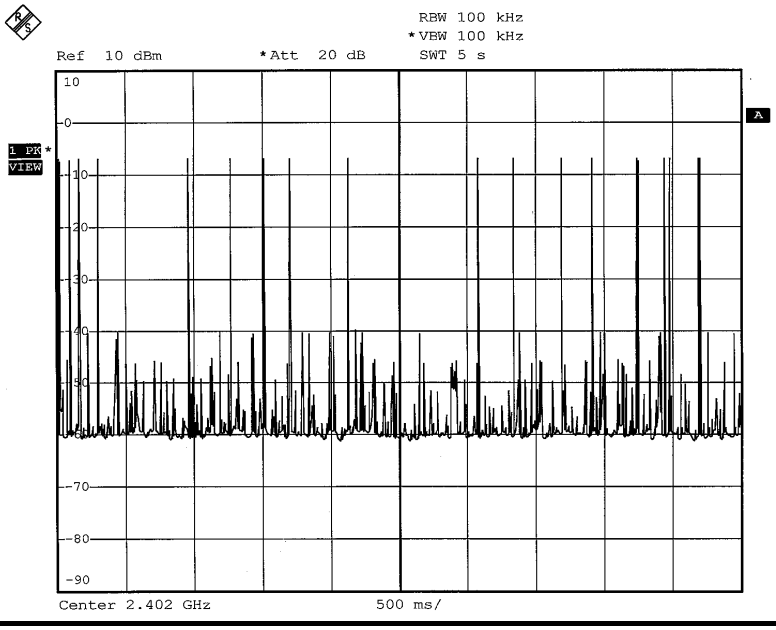
DH3


RBW 100 kHz
Delta 2 [T1]
*VBW 100 kHz
-0.79 dB
Ref 10 dBm
*Att 20 dB
SWT 2.5 ms
1.710000 ms
Marker 1 [T1]
-67.96 dBm
490.000000 µs
1 AP
VIEW
A
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.402 GHz
250 µs/


RBW 100 kHz
*VBW 100 kHz
Ref 10 dBm
*Att 20 dB
SWT 5 s
1 PK*
CLRWR
A
SGL
10
0
-10
-20
-30
-40
-50
-70
-80
-90
Center 2.402 GHz
500 ms/

DH5


RBW 100 kHz
*VBW 100 kHz
SWT 5 ms
Delta 2 [T1]
0.70 dB
2.960000 ms
Ref 10 dBm
*Att 20 dB
Marker 1 [T1]
-68.15 dBm
490.000000 µs
1 AP
VIEW
A
10
0
-10
-20
-30
-40
-50
-60
-90
Center 2.402 GHz
500 µs/


RBW 100 kHz
*VBW 100 kHz
SWT 5 s
Ref 10 dBm
*Att 20 dB
1 PK*
VIEW
A
10
0
-10
-20
-30
-40
-50
-70
-80
-90
Center 2.402 GHz
500 ms/

5.5 CHANNEL BANDWIDTH

5.5.1 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, the 20dBbandwidth of hopping channel shell be a minimum limit for the hopping channel separation.

5.5.2 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.

5.5.3 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.

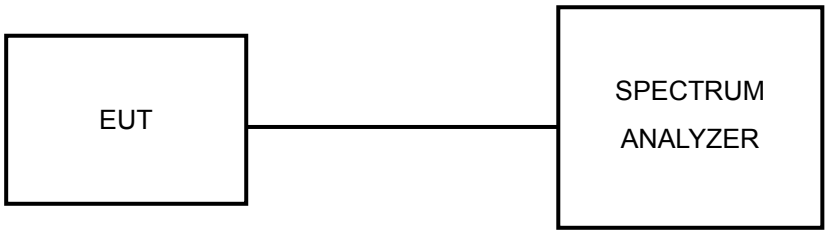
c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.

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

5.5.4 DEVIATION FROM TEST STANDARD

No deviation.

5.5.5 TEST SETUP



5.5.6 EUT OPERATING CONDITION

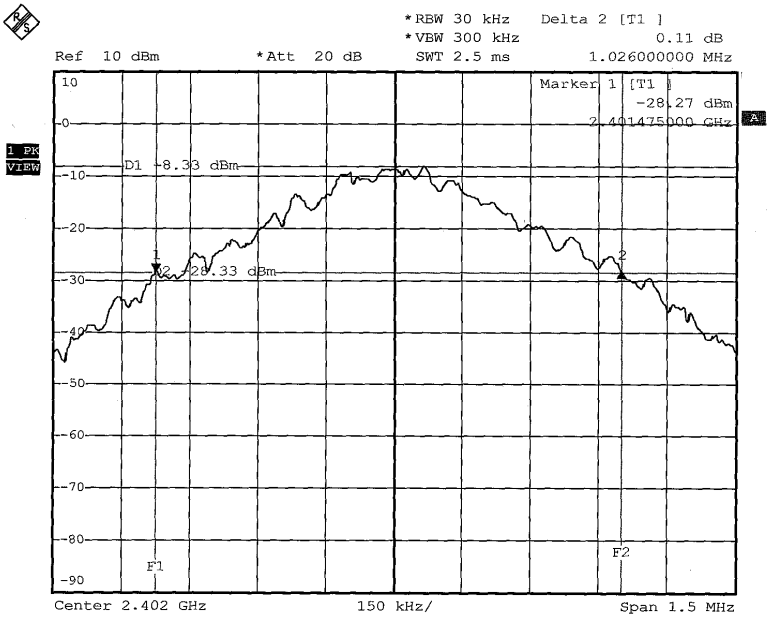
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

5.5.7 TEST RESULTS

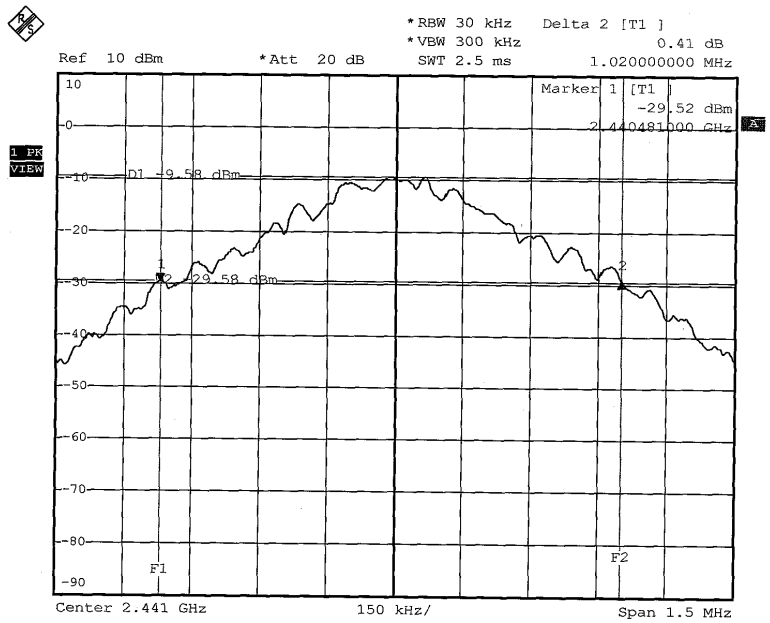
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	23deg. C, 54%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Long Chen

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)
0	2402	1.026
39	2441	1.020
78	2480	1.017

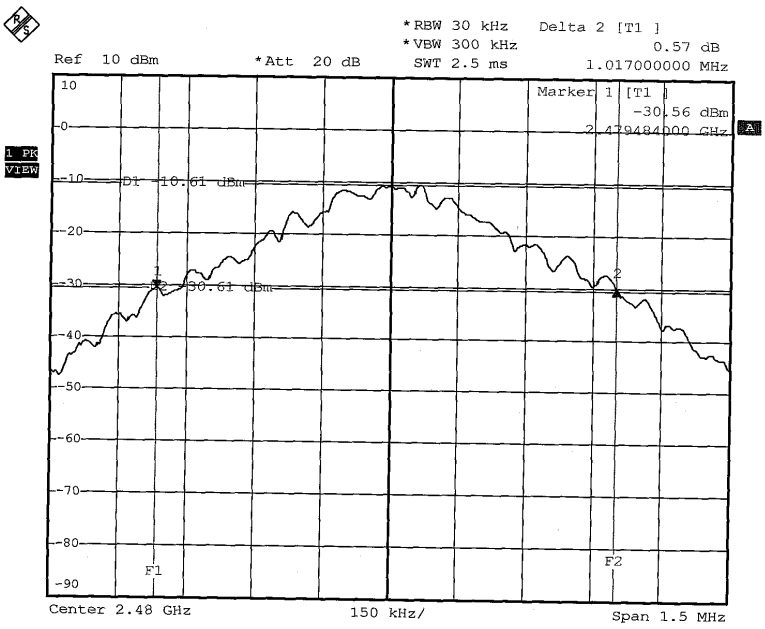
CH 0


*RBW 30 kHz
*VBW 300 kHz
SWT 2.5 ms
Delta 2 [T1]
0.11 dB
1.026000000 MHz
Ref 10 dBm
*Att 20 dB
Marker 1 [T1]
-28.27 dBm
2.401475000 GHz
1 PK VIEW
D1 -8.33 dBm
D2 -28.33 dBm
F1
F2
Center 2.402 GHz
150 kHz/
Span 1.5 MHz

CH 39


*RBW 30 kHz
*VBW 300 kHz
SWT 2.5 ms
Delta 2 [T1]
0.41 dB
1.020000000 MHz
Ref 10 dBm
*Att 20 dB
Marker 1 [T1]
-29.52 dBm
2.440481000 GHz
1 PK VIEW
D1 -9.58 dBm
D2 -29.58 dBm
F1
F2
Center 2.441 GHz
150 kHz/
Span 1.5 MHz

CH 78


*RBW 30 kHz
*VBW 300 kHz
SWT 2.5 ms
Delta 2 [T1]
0.57 dB
1.017000000 MHz
Ref 10 dBm
*Att 20 dB
Marker 1 [T1]
-30.56 dBm
2.479484000 GHz
1 PK
VIEW
D1 10.61 dBm
D2 -30.61 dBm
F1
F2
Center 2.48 GHz
150 kHz/
Span 1.5 MHz

5.6 HOPPING CHANNEL SEPARATION

5.6.1 LIMIT OF HOPPING CHANNEL SEPARATION

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

5.6.2 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.

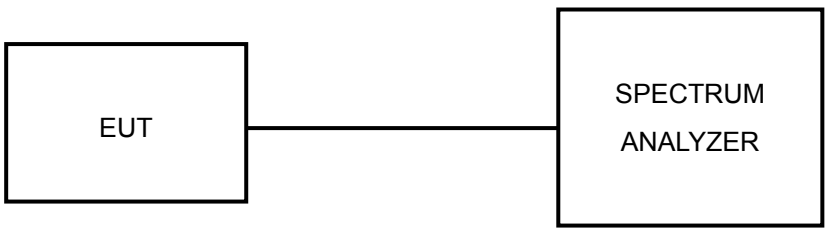
5.6.3 TEST PROCEDURES

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.

5.6.4 DEVIATION FROM TEST STANDARD

No deviation.

5.6.5 TEST SETUP



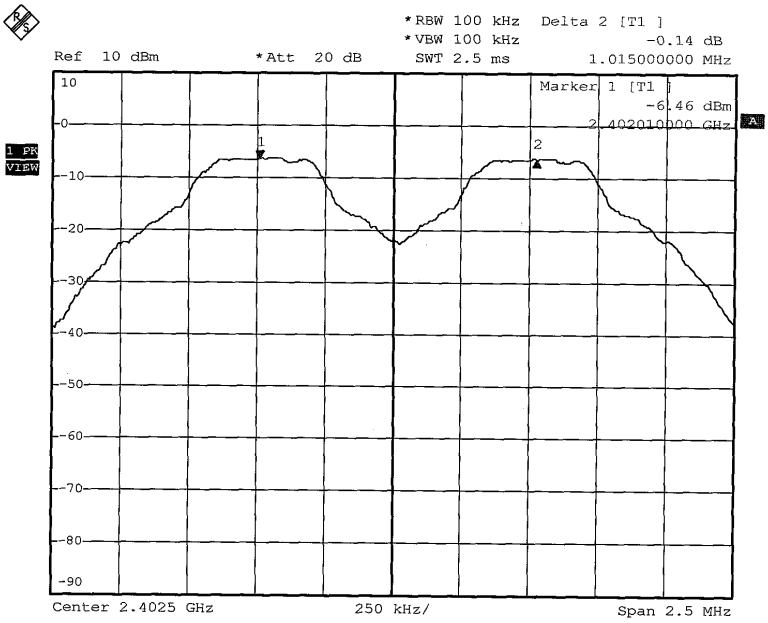
5.6.6 TEST RESULTS

MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	23deg. C, 54%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Long Chen

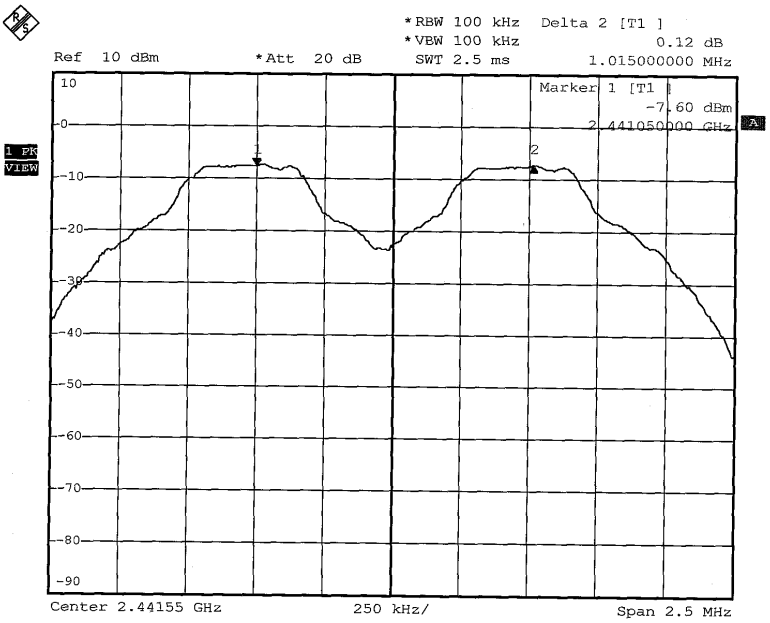
CHANNEL	FREQUENCY (MHz)	ADJACENT CHANNEL SEPARATION (MHz)	20DB BANDWIDTH (MHZ)	MINIMUM LIMIT (MHZ)	PASS / FAIL
0	2402	1.015	1.026	0.684	PASS
39	2441	1.015	1.020	0.680	PASS
78	2480	1.005	1.017	0.678	PASS

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

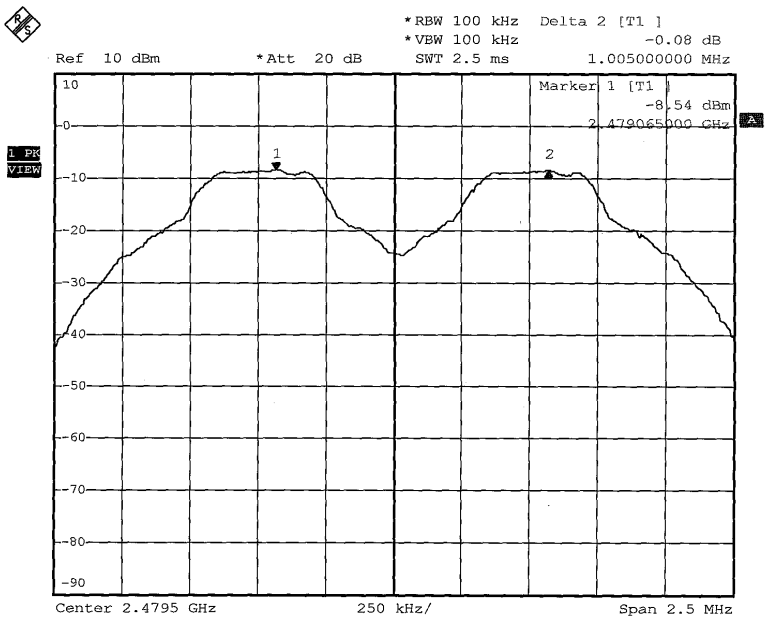
CH 0


*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 ms
Delta 2 [T1]
-0.14 dB
1.015000000 MHz
Ref 10 dBm
*Att 20 dB
Marker 1 [T1]
-6.46 dBm
2.402010000 GHz
1 PK VIEW
Center 2.4025 GHz
250 kHz/
Span 2.5 MHz

CH 39


*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 ms
Delta 2 [T1]
0.12 dB
1.015000000 MHz
Ref 10 dBm
*Att 20 dB
Marker 1 [T1]
-7.60 dBm
2.441050000 GHz
1 PK VIEW
Center 2.44155 GHz
250 kHz/
Span 2.5 MHz

CH 78


*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 ms
Delta 2 [T1]
-0.08 dB
1.005000000 MHz
Ref 10 dBm
*Att 20 dB
Marker 1 [T1]
-8.54 dBm
2.479065000 GHz
1 PK
VIEW
A
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.4795 GHz
250 kHz/
Span 2.5 MHz

5.7 MAXIMUM PEAK OUTPUT POWER

5.7.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 120mW.

5.7.2 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.

5.7.3 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 1 MHz RBW and 3 MHz VBW.

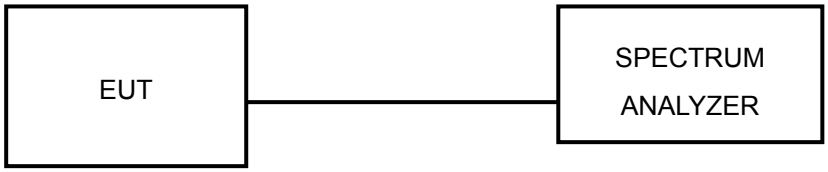
d. Measure the captured power within the band and recording the plot.

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

5.7.4 DEVIATION FROM TEST STANDARD

No deviation

5.7.5 TEST SETUP



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

5.7.6 EUT OPERATING CONDITION

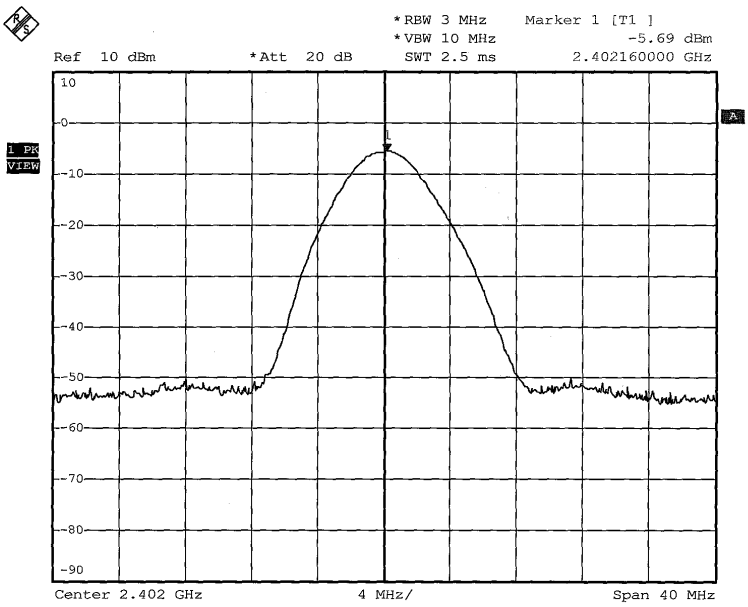
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

5.7.7 TEST RESULTS

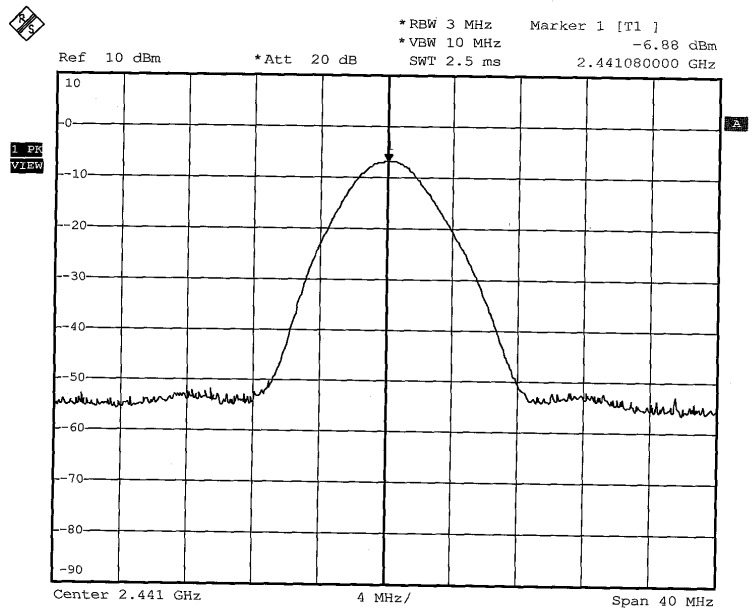
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	23deg. C, 54%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Long Chen

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (mW)	PASS/FAIL
0	2402	0.270	-5.69	125	PASS
39	2441	0.205	-6.88	125	PASS
78	2480	0.165	-7.82	125	PASS

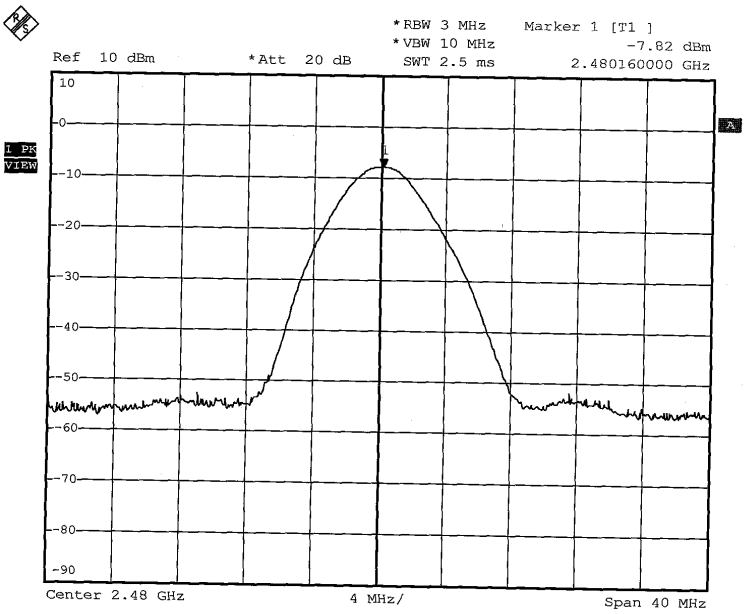
CH 0


*RBW 3 MHz
*VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
-5.69 dBm
2.402160000 GHz
Ref 10 dBm
*Att 20 dB
1 PK
VIEW
A
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.402 GHz
4 MHz/
Span 40 MHz

CH 39


*RBW 3 MHz
*VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
-6.88 dBm
2.441080000 GHz
Ref 10 dBm
*Att 20 dB
1 PK
VIEW
A
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.441 GHz
4 MHz/
Span 40 MHz

CH 78


*RBW 3 MHz
*VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
-7.82 dBm
2.480160000 GHz
Ref 10 dBm
*Att 20 dB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.48 GHz
4 MHz/
Span 40 MHz

5.8 BAND EDGES MEASUREMENT

5.8.1 LIMITS OF BAND EDGES MEASUREMENT

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

5.8.2 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.

5.8.3 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.

5.8.4 DEVIATION FROM TEST STANDARD

No deviation.

5.8.5 EUT OPERATING CONDITION

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

5.8.6 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).

NOTE 1:

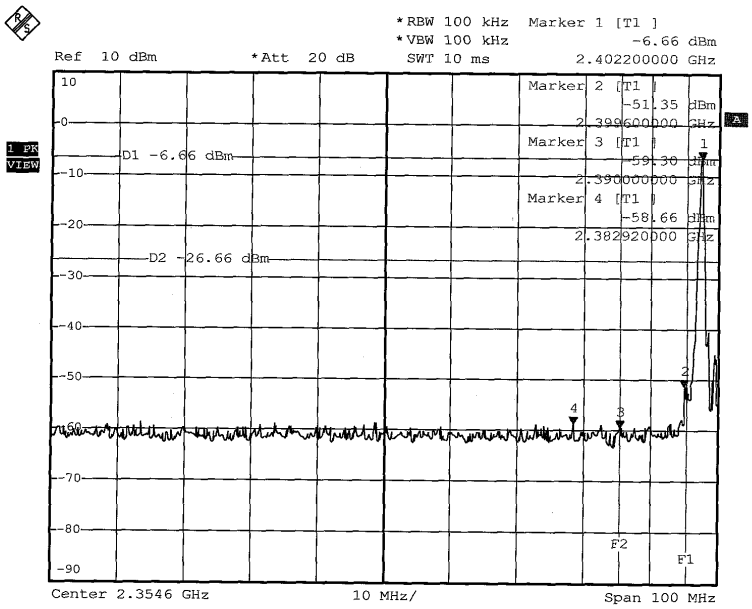
The band edge emission plot on the next page shows 52.00dBc between carrier maximum power and local maximum emission in restrict band (2.38292GHz). The emission of carrier strength list in the test result of channel 0 at the item 6.2.7 is 86.92dBuV/m (Peak), so the maximum field strength in restrict band is 86.92-52.00=34.92dBuV/m, which is under 74 dBuV/m limit.

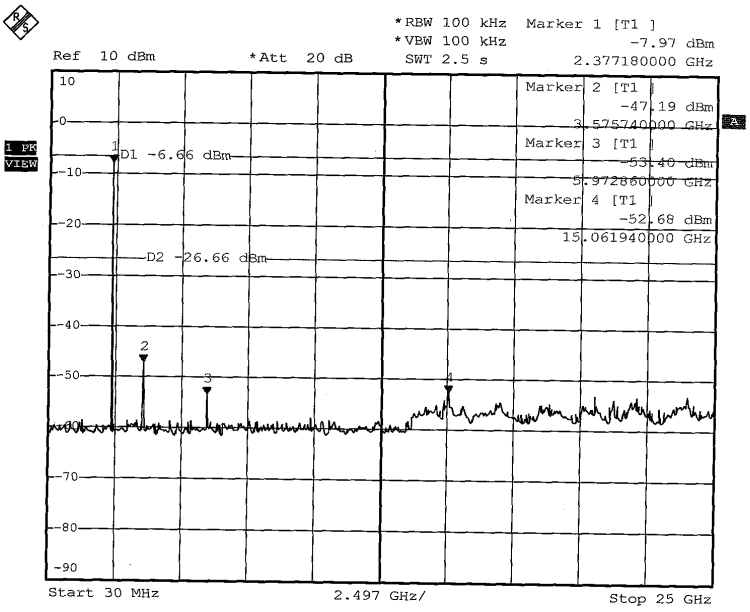
The band edge emission plot on the next page shows 52.00dBc between carrier maximum power and local maximum emission in restrict band (2.38292GHz). The emission of carrier strength list in the test result of channel 0 at the item 6.2.7 is 56.92dBuV/m (Average), so the maximum field strength in restrict band is 56.92-52.00=4.92dBuV/m, which is under 54 dBuV/m limit.

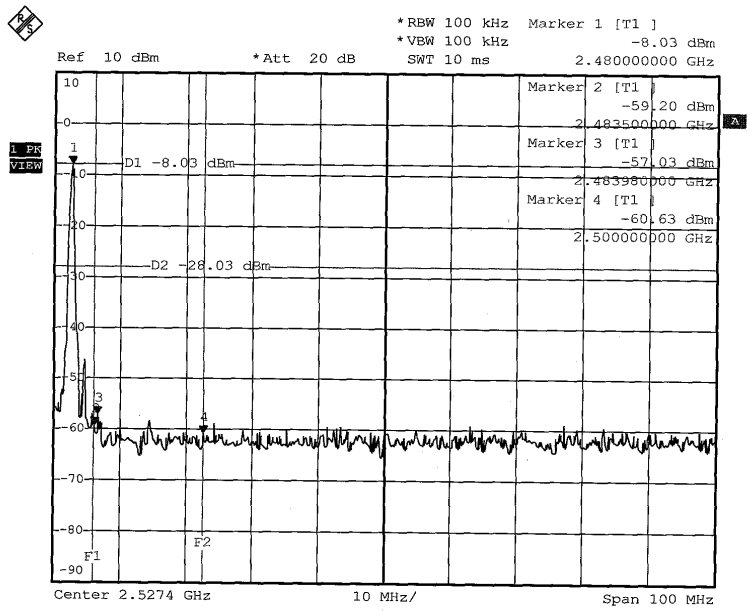
NOTE 2:

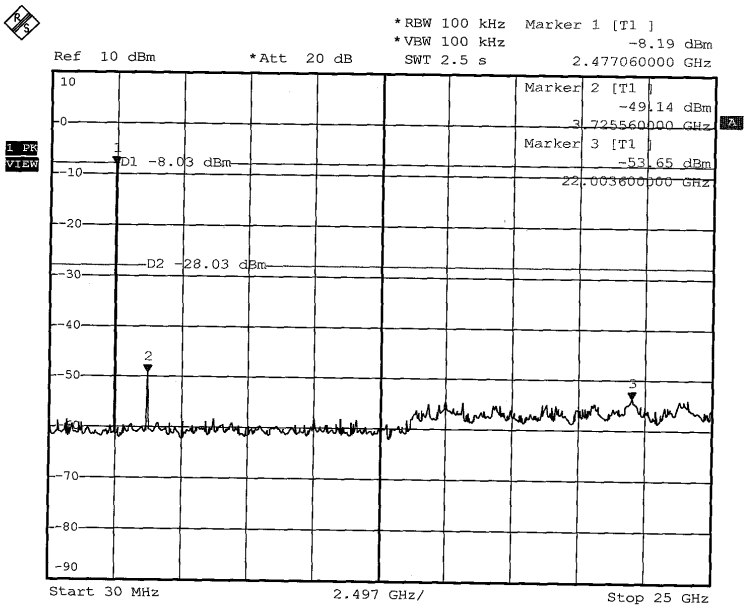
The band edge emission plot on the next second page shows 49.00dBc between carrier maximum power and local maximum emission in restrict band (2.48398GHz). The emission of carrier strength list in the test result of channel 78 at the item 6.2.7 is 86.79dBuV/m (Peak), so the maximum field strength in restrict band is 86.79-49.00=37.79dBuV/m, which is under 74 dBuV/m limit.

The band edge emission plot on the next second page shows 49.00dBc between carrier maximum power and local maximum emission in restrict band (2.48398GHz). The emission of carrier strength list in the test result of channel 78 at the item 6.2.7 is 56.79dBuV/m (Average), so the maximum field strength in restrict band is 56.79-49.00=7.79dBuV/m, which is under 54 dBuV/m limit.


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1]
-6.66 dBm
2.402200000 GHz
Ref 10 dBm
*Att 20 dB
Marker 2 [T1]
-51.35 dBm
2.399600000 GHz
Marker 3 [T1]
-59.30 dBm
2.390000000 GHz
Marker 4 [T1]
-58.66 dBm
2.382920000 GHz
1 PK
VIEW
D1 -6.66 dBm
D2 -26.66 dBm
F2
F1
Center 2.3546 GHz
10 MHz/
Span 100 MHz


*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 s
Marker 1 [T1]
-7.97 dBm
2.377180000 GHz
Ref 10 dBm
*Att 20 dB
Marker 2 [T1]
-47.19 dBm
3.575740000 GHz
Marker 3 [T1]
-53.40 dBm
5.972860000 GHz
Marker 4 [T1]
-52.68 dBm
15.061940000 GHz
1 PK
VIEW
D1 -6.66 dBm
D2 -26.66 dBm
Start 30 MHz
2.497 GHz/
Stop 25 GHz


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1]
-8.03 dBm
2.480000000 GHz
Ref 10 dBm
*Att 20 dB
Marker 2 [T1]
-59.20 dBm
2.483500000 GHz
Marker 3 [T1]
-57.03 dBm
2.483980000 GHz
Marker 4 [T1]
-60.63 dBm
2.500000000 GHz
1 PK
VIEW
D1 -8.03 dBm
D2 -28.03 dBm
F1
F2
Center 2.5274 GHz
10 MHz/
Span 100 MHz


*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 s
Marker 1 [T1]
-8.19 dBm
2.477060000 GHz
Ref 10 dBm
*Att 20 dB
Marker 2 [T1]
-49.14 dBm
3.725560000 GHz
Marker 3 [T1]
-53.65 dBm
22.003600000 GHz
1 PK
VIEW
D1 -8.03 dBm
D2 -28.03 dBm
Start 30 MHz
2.497 GHz/
Stop 25 GHz

5.9 ANTENNA REQUIREMENT

5.9.1 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.

5.9.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is PIFA antenna with UFL connector. The maximum gain of this antenna is –1.74dBi.

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

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

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.