



FCC TEST REPORT

REPORT NO.: RF970324L10
MODEL NO.: WBR-2310
(refer to item 3.1 for more detail)
RECEIVED: Mar. 24, 2008
TESTED: Mar. 25 ~ Apr. 03, 2008
ISSUED: Apr. 09, 2008

APPLICANT : D-Link Corporation

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Table of Contents

1	CERTIFICATION	4
2	SUMMARY OF TEST RESULTS	5
2.1	MEASUREMENT UNCERTAINTY	5
3	GENERAL INFORMATION	6
3.1	GENERAL DESCRIPTION OF EUT	6
3.2	DESCRIPTION OF TEST MODES	7
3.2.1	CONFIGURATION OF SYSTEM UNDER TEST	7
3.2.2	TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL	8
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS	10
3.4	DESCRIPTION OF SUPPORT UNITS	10
4	TEST TYPES AND RESULTS	11
4.1	RADIATED EMISSION MEASUREMENT	11
4.1.1	LIMITS OF RADIATED EMISSION MEASUREMENT	11
4.1.2	TEST INSTRUMENTS	12
4.1.3	TEST PROCEDURES	13
4.1.4	DEVIATION FROM TEST STANDARD	13
4.1.5	TEST SETUP	14
4.1.6	EUT OPERATING CONDITIONS	14
4.1.7	TEST RESULTS	15
4.2	CONDUCTED EMISSION MEASUREMENT	23
4.2.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	23
4.2.2	TEST INSTRUMENTS	23
4.2.3	TEST PROCEDURES	24
4.2.4	DEVIATION FROM TEST STANDARD	24
4.2.5	TEST SETUP	25
4.2.6	EUT OPERATING CONDITIONS	25
4.2.7	TEST RESULTS	26
4.3	6dB BANDWIDTH MEASUREMENT	28
4.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT	28
4.3.2	TEST INSTRUMENTS	28
4.3.3	TEST PROCEDURE	28
4.3.4	DEVIATION FROM TEST STANDARD	28
4.3.5	TEST SETUP	29
4.3.6	EUT OPERATING CONDITIONS	29
4.3.7	TEST RESULTS	30
4.4	MAXIMUM PEAK OUTPUT POWER	35
4.4.1	LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT	35
4.4.2	TEST INSTRUMENTS	35
4.4.3	TEST PROCEDURES	36
4.4.4	DEVIATION FROM TEST STANDARD	36
4.4.5	TEST SETUP	36
4.4.6	EUT OPERATING CONDITIONS	36
4.4.7	TEST RESULTS	37
4.5	POWER SPECTRAL DENSITY MEASUREMENT	38
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	38
4.5.2	TEST INSTRUMENTS	38
4.5.3	TEST PROCEDURE	38



4.5.4	DEVIATION FROM TEST STANDARD.....	38
4.5.5	TEST SETUP	38
4.5.6	EUT OPERATING CONDITIONS.....	38
4.5.7	TEST RESULTS.....	39
4.6	BAND EDGES MEASUREMENT	44
4.6.1	LIMITS OF BAND EDGES MEASUREMENT	44
4.6.2	TEST INSTRUMENTS	44
4.6.3	TEST PROCEDURE	44
4.6.4	DEVIATION FROM TEST STANDARD.....	44
4.6.5	EUT OPERATING CONDITION	44
4.6.6	TEST RESULTS.....	45
4.7	ANTENNA REQUIREMENT	57
4.7.1	STANDARD APPLICABLE.....	57
4.7.2	ANTENNA CONNECTED CONSTRUCTION.....	57
5	PHOTOGRAPHS OF THE TEST CONFIGURATION	58
6	INFORMATION ON THE TESTING LABORATORIES	59
7	APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	60



1 CERTIFICATION

PRODUCT: WIRELESS Xtreme G router
MODEL NO.: WBR-2310 (refer to item 3.1 for more detail)
BRAND: D-Link
APPLICANT: D-Link Corporation
TESTED: Mar. 25 ~ Apr. 03, 2008
TEST SAMPLE: ENGINEERING SAMPLE
STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
ANSI C63.4-2003

The above equipment (model: WBR-2310) 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:** Apr. 09, 2008
Andrea Hsia / Specialist

TECHNICAL ACCEPTANCE : Long Chen , **DATE:** Apr. 09, 2008
Responsible for RF Long Chen / Senior Engineer

APPROVED BY : Gary Chang , **DATE:** Apr. 09, 2008
Gary Chang / Assistant Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
Standard Section	Test Type and Limit	Result	Remark
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -17.53dB at 0.177MHz
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 -1.19dB at 4874.00MHz
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.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.19 dB
	200MHz ~1000MHz	3.21 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	WIRELESS Xtreme G router
MODEL NO.	WBR-2310
FCC ID	KA2WBR2310B1
POWER SUPPLY	5.0Vdc from AC Adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps (up to 108Mbps for turbo mode)
FREQUENCY RANGE	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11 for Normal mode/ 1 for Turbo mode
MAXIMUM OUTPUT POWER	56.624mW
ANTENNA TYPE	Dipole antenna with 2dBi gain
DATA CABLE	NA
I/O PORTS	RJ45
ACCESSORY DEVICES	Adapter

NOTE:

- The details of model no. listed as below:

BRAND	MODEL	REMARK
D-Link	WBR-2310	Due to marking request
	WBR-1310	

- The EUT was powered by the following adapter:

BRAND:	D-Link
MODEL:	AF1805-A
INPUT:	100-240Vac, 50~60Hz, 0.4A
OUTPUT:	5Vdc, 2.5A
POWER LINE:	DC 1.8m non-shielded cable without core

- The EUT, operates in the 2.4GHz frequency range, lets you connect IEEE 802.11g or IEEE 802.11b devices to the network. With its high-speed data transmissions of up to 54Mbps.
- The EUT is capable of providing data rates of up to 108Mbps in Turbo Mode depending upon reception quality.
- The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

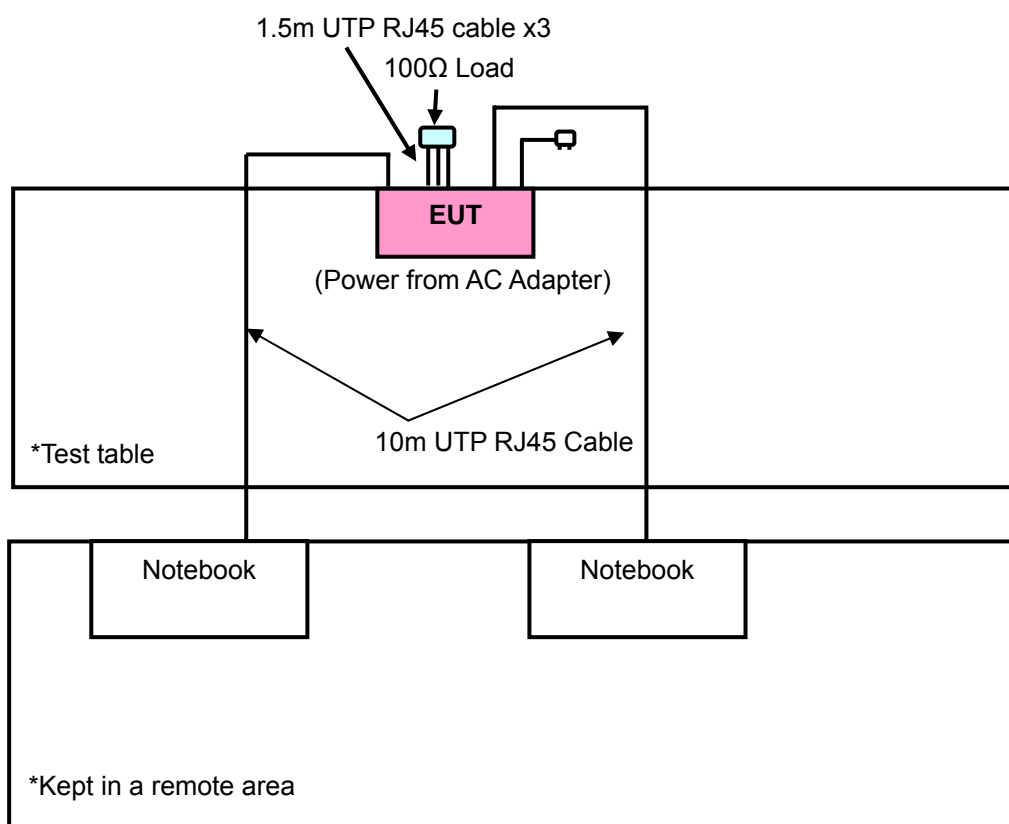
Eleven channels are provided to this EUT.

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		

For 802.11g: One channel is provided to this EUT for turbo mode.

CHANNEL	FREQUENCY
6	2437 MHz

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

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, antenna ports (if EUT with antenna diversity architecture) and packet type.
- 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
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11g Turbo	6	6	OFDM	QPSK	12

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 packet type.
- 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)
802.11g	1 to 11	6	OFDM	BPSK	6

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)
802.11g	1 to 11	6	OFDM	BPSK	6

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).
- 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, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 11	OFDM	BPSK	6
802.11g Turbo	6	6	OFDM	QPSK	12

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
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11g Turbo	6	6	OFDM	QPSK	12

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	DELL	D600	CN-0G5152-48643-4 7H-7666	NA
2	NOTEBOOK COMPUTER	DELL	PP05L	9954115984	E2K24CLNS

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10m UTP RJ45 cable
2	10m UTP RJ45 cable

NOTE 1: All power cords of the above support units are non shielded (1.8m).

NOTE 2: Item 1 ~ 2 acted as communication partners to transfer data.

4 TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 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.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Jul. 27, 2008
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Aug. 05, 2008
BILOG Antenna SCHWARZBECK	VULB9168	9168-153	Jan. 03, 2009
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Jul. 30, 2008
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Jan. 06, 2009
Preamplifier Agilent	8449B	3008A01910	Sep. 19, 2008
Preamplifier Agilent	8447D	2944A10638	Dec. 19, 2008
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	274039/223650	Nov. 07, 2008
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 09, 2008
Software	ADT_Radiated_V7.6	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA
Turn Table EMCO	2087-2.03	NA	NA
Antenna Tower & Turn Table Controller EMCO	2090	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 Chamber 9.
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Site Registration No. is 215374.
 5. The IC Site Registration No. is IC3789B-9.

4.1.3 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 method or average method as specified and then reported in data sheet.

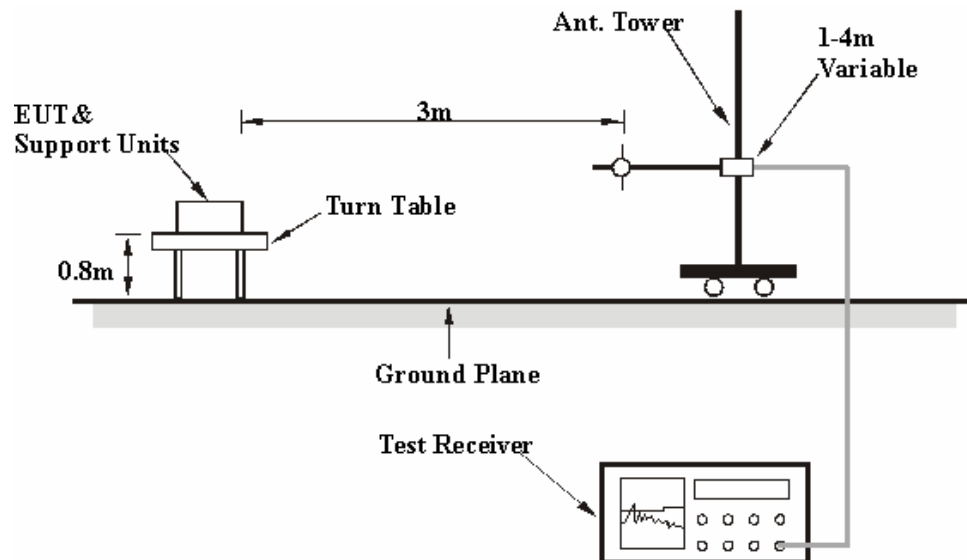
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 100kHz and video bandwidth is 300kHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on a testing table.
- b. Prepared notebook computer and placed it outside of testing area to act as communication partner for EUT.
- c. The EUT ran a test program (provided by manufacturer) to enable all functions under transmission condition continuously at specific channel frequency.
- d. The necessary accessories enable the EUT in full functions.

4.1.7 TEST RESULTS

802.11b DSSS MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH 999hPa	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	2288.00	58.68 PK	74.00	-15.32	1.10 H	103	26.29	32.39
2	2288.00	46.71 AV	54.00	-7.29	1.10 H	103	14.32	32.39
3	2390.00	57.04 PK	74.00	-16.96	1.03 H	206	24.72	32.32
4	2390.00	45.82 AV	54.00	-8.18	1.03 H	206	13.50	32.32
5	*2412.00	96.10 PK			1.03 H	206	63.78	32.32
6	*2412.00	91.79 AV			1.03 H	206	59.47	32.32
7	4824.00	54.27 PK	74.00	-19.73	1.11 H	113	16.27	38.00
8	4824.00	51.51 AV	54.00	-2.49	1.11 H	113	13.51	38.00
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	2288.00	59.18 PK	74.00	-14.82	1.19 V	157	26.79	32.39
2	2288.00	49.04 AV	54.00	-4.96	1.19 V	157	16.65	32.39
3	2390.00	56.16 PK	74.00	-17.84	1.13 V	84	23.84	32.32
4	2390.00	46.20 AV	54.00	-7.80	1.13 V	84	13.88	32.32
5	*2412.00	107.34 PK			1.13 V	84	75.02	32.32
6	*2412.00	102.72 AV			1.13 V	84	70.40	32.32
7	2576.00	61.26 PK	87.34	-26.08	1.10 V	25	28.68	32.58
8	2576.00	54.13 AV	82.72	-28.59	1.10 V	25	21.55	32.58
9	4824.00	55.09 PK	74.00	-18.91	1.28 V	334	17.09	38.00
10	4824.00	52.48 AV	54.00	-1.52	1.28 V	334	14.48	38.00

- 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
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH 999hPa	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	2288.00	58.76 PK	74.00	-15.24	1.00 H	200	26.37	32.39
2	2288.00	46.59 AV	54.00	-7.41	1.00 H	200	14.20	32.39
3	*2437.00	97.58 PK			1.09 H	197	65.24	32.34
4	*2437.00	92.34 AV			1.09 H	197	60.00	32.34
5	4874.00	54.87 PK	74.00	-19.13	1.00 H	159	16.75	38.12
6	4874.00	51.80 AV	54.00	-2.20	1.00 H	159	13.68	38.12
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	2288.00	59.91 PK	74.00	-14.09	1.13 V	116	27.52	32.39
2	2288.00	48.93 AV	54.00	-5.07	1.13 V	116	16.54	32.39
3	2392.00	62.61 PK	88.28	-25.67	1.12 V	227	30.29	32.32
4	2392.00	57.00 AV	83.55	-26.55	1.12 V	227	24.68	32.32
5	*2437.00	108.28 PK			1.10 V	231	75.94	32.34
6	*2437.00	103.55 AV			1.10 V	231	71.21	32.34
7	2576.00	61.77 PK	88.28	-26.51	1.08 V	220	29.19	32.58
8	2576.00	54.59 AV	83.55	-28.96	1.08 V	220	22.01	32.58
9	4874.00	54.71 PK	74.00	-19.29	1.06 V	30	16.59	38.12
10	4874.00	52.81 AV	54.00	-1.19	1.06 V	30	14.69	38.12

- 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
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH 999hPa	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	2288.00	58.39 PK	74.00	-15.61	1.02 H	220	26.00	32.39
2	2288.00	46.54 AV	54.00	-7.46	1.02 H	220	14.15	32.39
3	*2462.00	99.13 PK			1.22 H	213	66.76	32.37
4	*2462.00	93.61 AV			1.22 H	213	61.24	32.37
5	2483.50	55.88 PK	74.00	-18.12	1.22 H	213	23.49	32.39
6	2483.50	45.90 AV	54.00	-8.10	1.22 H	213	13.51	32.39
7	4924.00	53.75 PK	74.00	-20.25	1.06 H	151	15.52	38.23
8	4924.00	51.46 AV	54.00	-2.54	1.06 H	151	13.23	38.23
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2288.00	59.80 PK	74.00	-14.20	1.17 V	120	27.41	32.39
2	2288.00	49.31 AV	54.00	-4.69	1.17 V	120	16.92	32.39
3	2392.00	61.84 PK	88.63	-26.79	1.14 V	227	29.52	32.32
4	2392.00	55.59 AV	84.44	-28.85	1.14 V	227	23.27	32.32
5	*2462.00	108.63 PK			1.12 V	230	76.26	32.37
6	*2462.00	104.44 AV			1.12 V	230	72.07	32.37
7	2483.50	58.00 PK	74.00	-16.00	1.12 V	230	25.61	32.39
8	2483.50	46.73 AV	54.00	-7.27	1.12 V	230	14.34	32.39
9	2576.00	61.23 PK	88.63	-27.40	1.13 V	7	28.65	32.58
10	2576.00	53.11 AV	84.44	-31.33	1.13 V	7	20.53	32.58
11	4924.00	54.77 PK	74.00	-19.23	1.05 V	220	16.54	38.23
12	4924.00	52.35 AV	54.00	-1.65	1.05 V	220	14.12	38.23

- 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.

802.11g OFDM MODULATION (NORMAL MODE)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH 999hPa	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	2288.00	58.77 PK	74.00	-15.23	1.01 H	211	26.38	32.39
2	2288.00	46.89 AV	54.00	-7.11	1.01 H	211	14.50	32.39
3	2390.00	63.75 PK	74.00	-10.25	1.00 H	205	31.43	32.32
4	2390.00	48.09 AV	54.00	-5.91	1.00 H	205	15.77	32.32
5	*2412.00	101.82 PK			1.00 H	205	69.50	32.32
6	*2412.00	91.16 AV			1.00 H	205	58.84	32.32
7	4824.00	57.80 PK	74.00	-16.20	1.11 H	155	19.80	38.00
8	4824.00	42.53 AV	54.00	-11.47	1.11 H	155	4.53	38.00
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	2288.00	59.28 PK	74.00	-14.72	1.12 V	120	26.89	32.39
2	2288.00	49.16 AV	54.00	-4.84	1.12 V	120	16.77	32.39
3	2390.00	72.17 PK	74.00	-1.83	1.19 V	29	39.85	32.32
4	2390.00	52.57 AV	54.00	-1.43	1.19 V	29	20.25	32.32
5	*2412.00	109.30 PK			1.12 V	85	76.98	32.32
6	*2412.00	99.23 AV			1.12 V	85	66.91	32.32
7	2576.00	63.25 PK	89.30	-26.05	1.08 V	220	30.67	32.58
8	2576.00	57.05 AV	79.23	-22.18	1.08 V	220	24.47	32.58
9	4824.00	58.12 PK	74.00	-15.88	1.07 V	356	20.12	38.00
10	4824.00	43.18 AV	54.00	-10.82	1.07 V	356	5.18	38.00

- 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
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH 999hPa	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	2288.00	59.19 PK	74.00	-14.81	1.03 H	300	26.80	32.39
2	2288.00	47.10 AV	54.00	-6.90	1.03 H	300	14.71	32.39
3	*2437.00	102.34 PK			1.02 H	276	70.00	32.34
4	*2437.00	92.50 AV			1.02 H	276	60.16	32.34
5	4874.00	56.81 PK	74.00	-17.19	1.12 H	163	18.69	38.12
6	4874.00	41.35 AV	54.00	-12.65	1.12 H	163	3.23	38.12
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	2288.00	59.95 PK	74.00	-14.05	1.10 V	120	27.56	32.39
2	2288.00	49.60 AV	54.00	-4.40	1.10 V	120	17.21	32.39
3	2392.00	63.96 PK	90.58	-26.62	1.07 V	120	31.64	32.32
4	2392.00	59.14 AV	80.37	-21.23	1.07 V	120	26.82	32.32
5	*2437.00	110.58 PK			1.06 V	108	78.24	32.34
6	*2437.00	100.37 AV			1.06 V	108	68.03	32.34
7	2576.00	62.99 PK	90.58	-27.59	1.26 V	91	30.41	32.58
8	2576.00	57.51 AV	80.37	-22.86	1.26 V	91	24.93	32.58
9	4874.00	57.78 PK	74.00	-16.22	1.01 V	12	19.66	38.12
10	4874.00	42.90 AV	54.00	-11.10	1.01 V	12	4.78	38.12

- 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
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH 999hPa	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	2288.00	59.17 PK	74.00	-14.83	1.01 H	220	26.78	32.39
2	2288.00	47.02 AV	54.00	-6.98	1.01 H	220	14.63	32.39
3	*2462.00	101.79 PK			1.00 H	234	69.42	32.37
4	*2462.00	91.20 AV			1.00 H	234	58.83	32.37
5	2483.50	64.69 PK	74.00	-9.31	1.00 H	235	32.30	32.39
6	2483.50	48.06 AV	54.00	-5.94	1.00 H	235	15.67	32.39
7	4924.00	52.62 PK	74.00	-21.38	1.00 H	155	14.39	38.23
8	4924.00	37.54 AV	54.00	-16.46	1.00 H	155	-0.69	38.23
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2288.00	60.16 PK	74.00	-13.84	1.18 V	157	27.77	32.39
2	2288.00	50.16 AV	54.00	-3.84	1.18 V	157	17.77	32.39
3	2392.00	63.39 PK	89.20	-25.81	1.14 V	227	31.07	32.32
4	2392.00	58.16 AV	79.14	-20.98	1.14 V	227	25.84	32.32
5	*2462.00	109.20 PK			1.13 V	20	76.83	32.37
6	*2462.00	99.14 AV			1.13 V	20	66.77	32.37
7	2483.50	72.65 PK	74.00	-1.35	1.12 V	189	40.26	32.39
8	2483.50	52.79 AV	54.00	-1.21	1.12 V	189	20.40	32.39
9	2576.00	62.39 PK	89.20	-26.81	1.08 V	217	29.81	32.58
10	2576.00	55.53 AV	79.14	-23.61	1.08 V	217	22.95	32.58
11	4924.00	53.25 PK	74.00	-20.75	1.05 V	30	15.02	38.23
12	4924.00	38.56 AV	54.00	-15.44	1.05 V	30	0.33	38.23

- 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.

802.11g OFDM MODULATION (TURBO MODE)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH 999hPa	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	*2437.00	100.09 PK			1.00 H	206	67.75	32.34
2	*2437.00	91.06 AV			1.00 H	206	58.72	32.34
3	2483.50	58.19 PK	74.00	-15.81	1.00 H	206	25.80	32.39
4	2483.50	46.74 AV	54.00	-7.26	1.00 H	206	14.35	32.39
5	4874.00	42.12 PK	74.00	-31.88	1.00 H	345	4.00	38.12
6	4874.00	37.28 AV	54.00	-16.72	1.00 H	345	-0.84	38.12

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.48 PK	74.00	-12.52	1.06 V	104	29.16	32.32
2	2390.00	48.47 AV	54.00	-5.53	1.06 V	104	16.15	32.32
3	*2437.00	107.00 PK			1.06 V	106	74.66	32.34
4	*2437.00	97.39 AV			1.06 V	106	65.05	32.34
5	2483.50	63.45 PK	74.00	-10.55	1.06 V	104	31.06	32.39
6	2483.50	50.36 AV	54.00	-3.64	1.06 V	104	17.97	32.39
7	2576.00	62.19 PK	87.00	-24.81	1.00 V	99	29.61	32.58
8	2576.00	56.51 AV	77.39	-20.88	1.00 V	99	23.93	32.58
9	4874.00	43.50 PK	74.00	-30.50	1.01 V	43	5.38	38.12
10	4874.00	38.09 AV	54.00	-15.91	1.01 V	43	-0.03	38.12

- 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.

BELOW 1GHz WORST-CASE DATA : 802.11g OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 66%RH 999hPa	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	183.50	38.83 QP	43.50	-4.67	2.00 H	253	26.14	12.70
2	249.60	44.11 QP	46.00	-1.89	1.00 H	82	30.64	13.47
3	348.76	34.63 QP	46.00	-11.37	1.00 H	82	18.19	16.44
4	399.31	36.70 QP	46.00	-9.30	1.00 H	250	19.07	17.62
5	500.42	38.20 QP	46.00	-7.80	2.00 H	286	17.90	20.29
6	751.23	34.09 QP	46.00	-11.91	1.00 H	28	8.43	25.65
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	49.34	37.11 QP	40.00	-2.89	1.50 V	169	22.30	14.81
2	85.05	37.78 QP	40.00	-2.22	1.48 V	328	28.05	9.73
3	125.17	38.57 QP	43.50	-4.93	1.50 V	31	25.64	12.93
4	249.60	40.74 QP	46.00	-5.26	1.50 V	337	27.27	13.47
5	500.42	36.98 QP	46.00	-9.02	1.00 V	355	16.68	20.29
6	751.23	31.75 QP	46.00	-14.25	1.00 V	154	6.10	25.65

- 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.

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Sep. 21, 2008
RF signal cable Woken	5D-FB	Cable-HYCO3-01	Jan. 06, 2009
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Jan. 09, 2009
LISN SCHWARZBECK	NNBL 8226-2	8226-142	May 07, 2008
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 2.
 3. The VCCI Site Registration No. is C-2047.

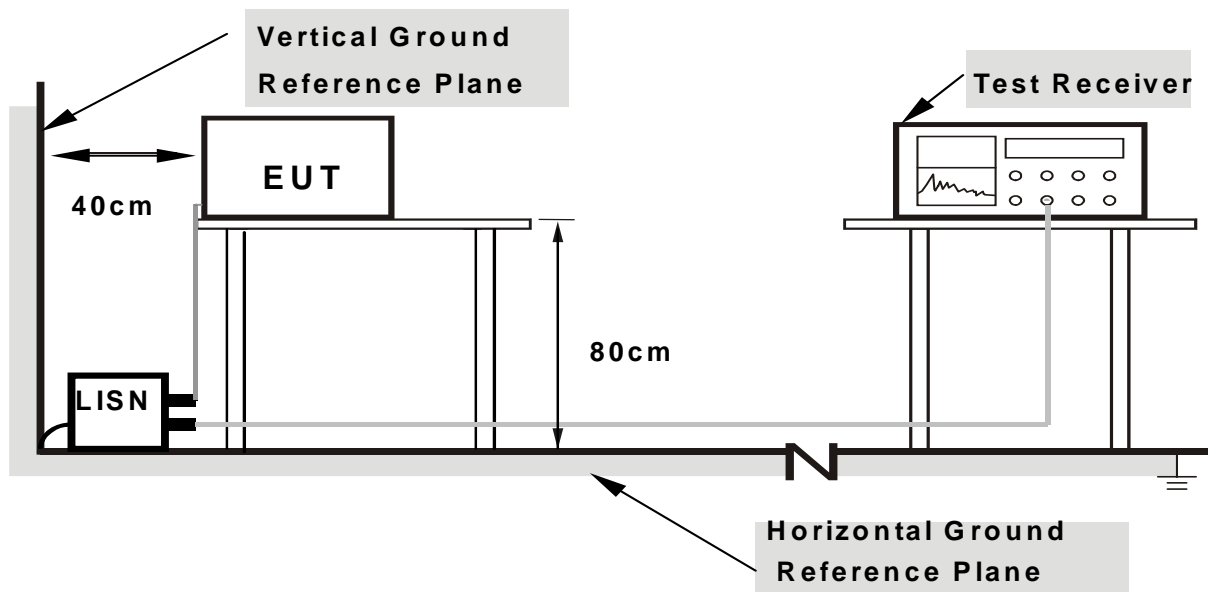
4.2.3 TEST PROCEDURES

- 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.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 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 attached file (Test Setup Photo).

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

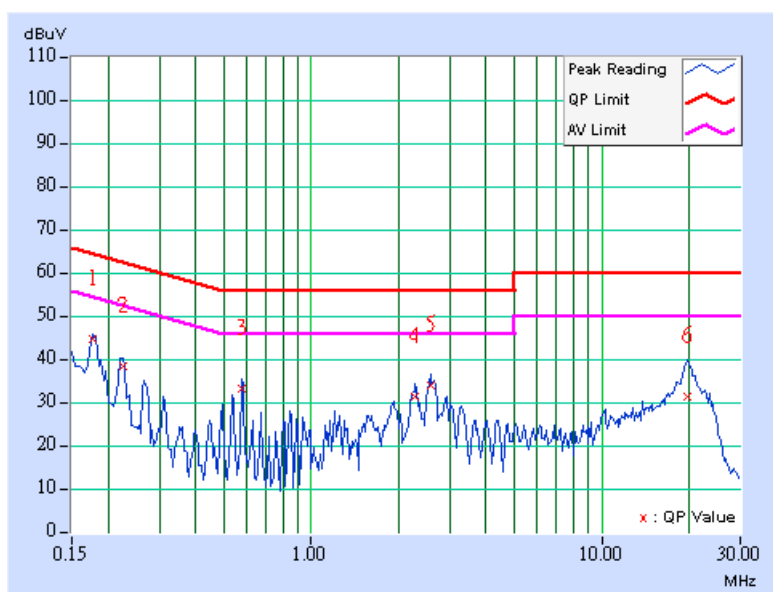
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 1026.0hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Match Tsui

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.177	0.10	44.23	-	44.33	-	64.61	54.61	-20.28	-
2	0.224	0.10	38.04	-	38.14	-	62.66	52.66	-24.52	-
3	0.576	0.10	32.60	-	32.70	-	56.00	46.00	-23.30	-
4	2.273	0.23	30.98	-	31.21	-	56.00	46.00	-24.79	-
5	2.586	0.24	33.47	-	33.71	-	56.00	46.00	-22.29	-
6	19.844	0.57	30.80	-	31.37	-	60.00	50.00	-28.63	-

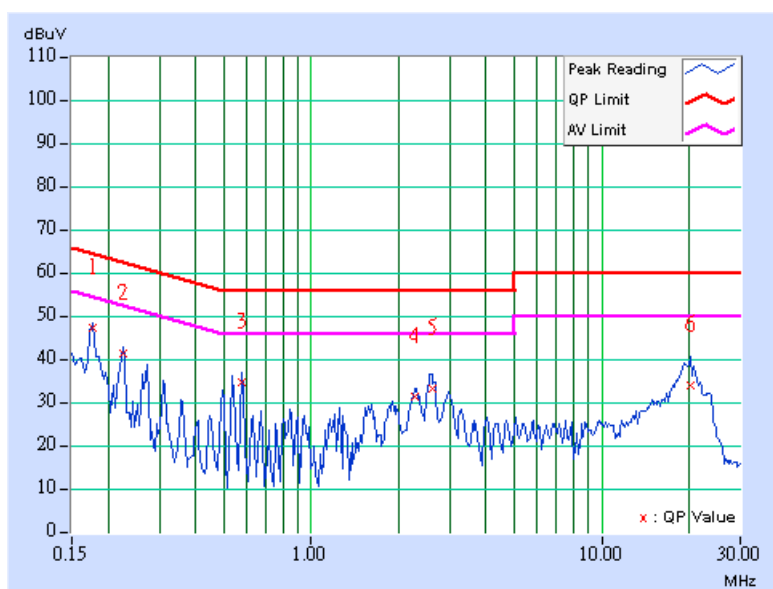
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 1026.0hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Match Tsui

No	Freq. [MHz]	Corr. Factor [dB]	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.177	0.10	46.98	-	47.08	-	64.61	54.61	-17.53	-
2	0.224	0.10	41.00	-	41.10	-	62.66	52.66	-21.56	-
3	0.576	0.13	34.18	-	34.31	-	56.00	46.00	-21.69	-
4	2.270	0.23	30.86	-	31.09	-	56.00	46.00	-24.91	-
5	2.625	0.24	32.90	-	33.14	-	56.00	46.00	-22.86	-
6	20.332	0.58	33.54	-	34.12	-	60.00	50.00	-25.88	-

- 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.



4.3 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	FSP 40	100040	Jun. 28, 2008

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

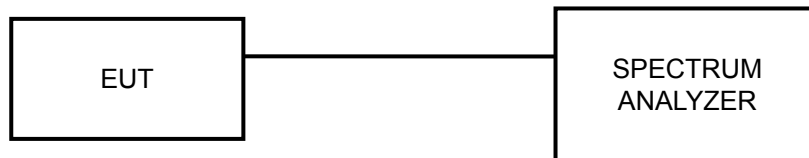
4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 kHz RBW and 300kHz 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



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

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.

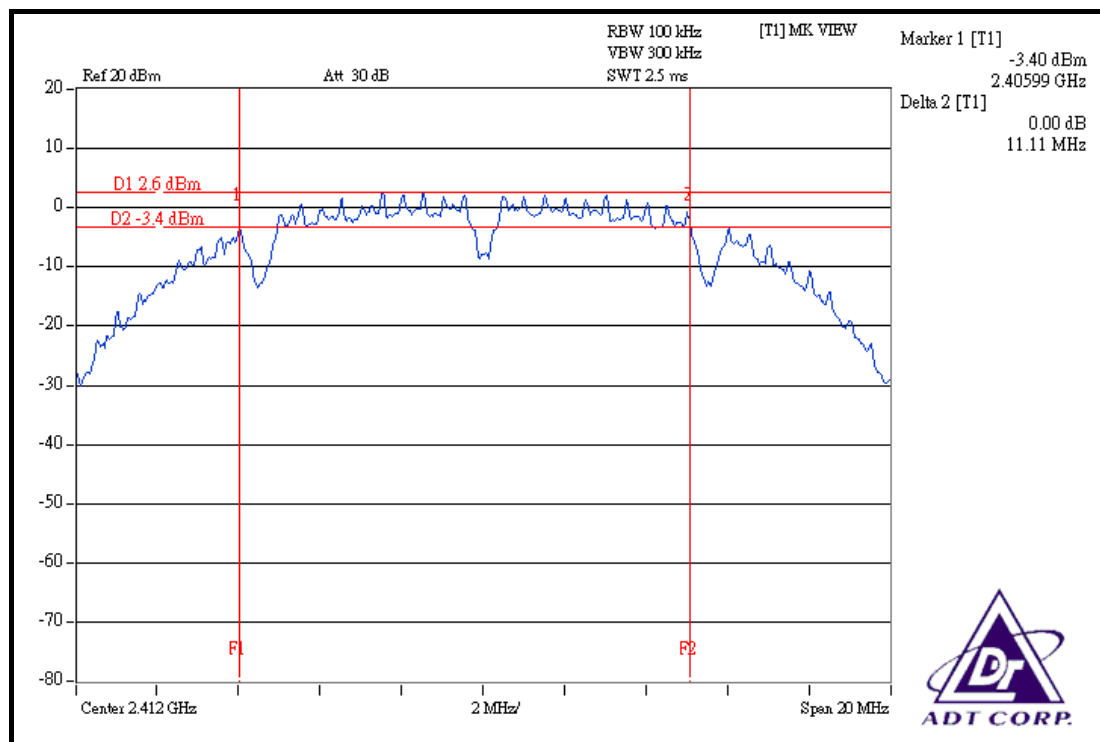
4.3.7 TEST RESULTS

802.11b DSSS MODULATION

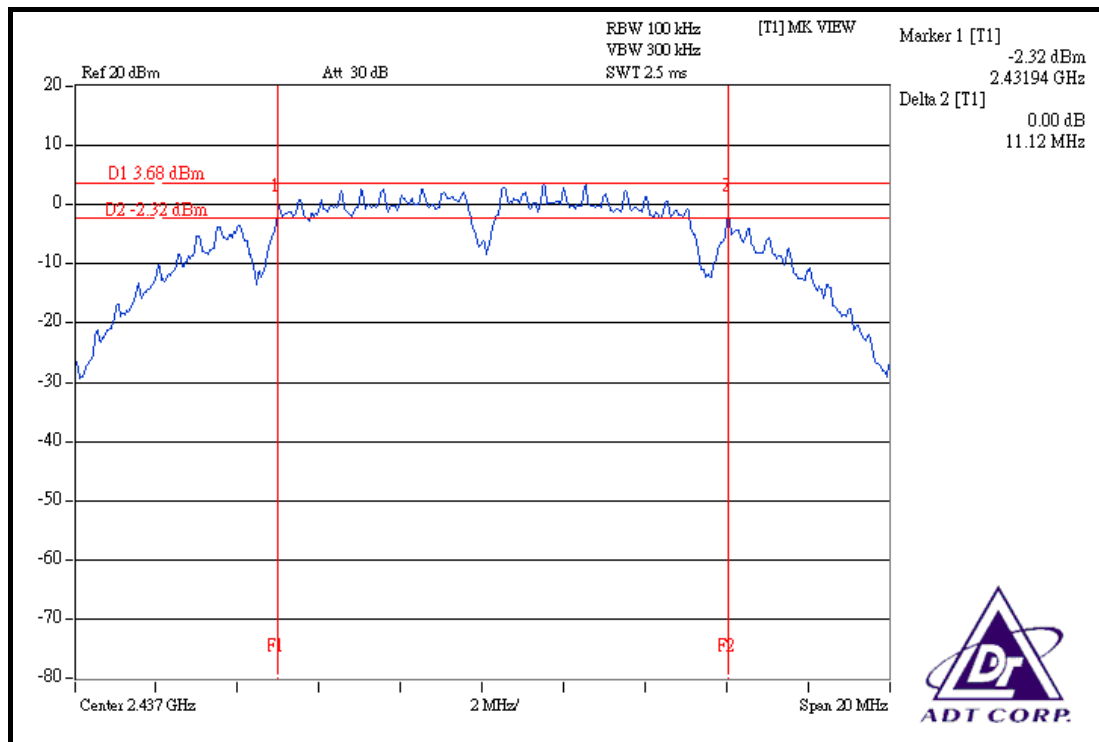
MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1032hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	11.11	0.5	PASS
6	2437	11.12	0.5	PASS
11	2462	12.13	0.5	PASS

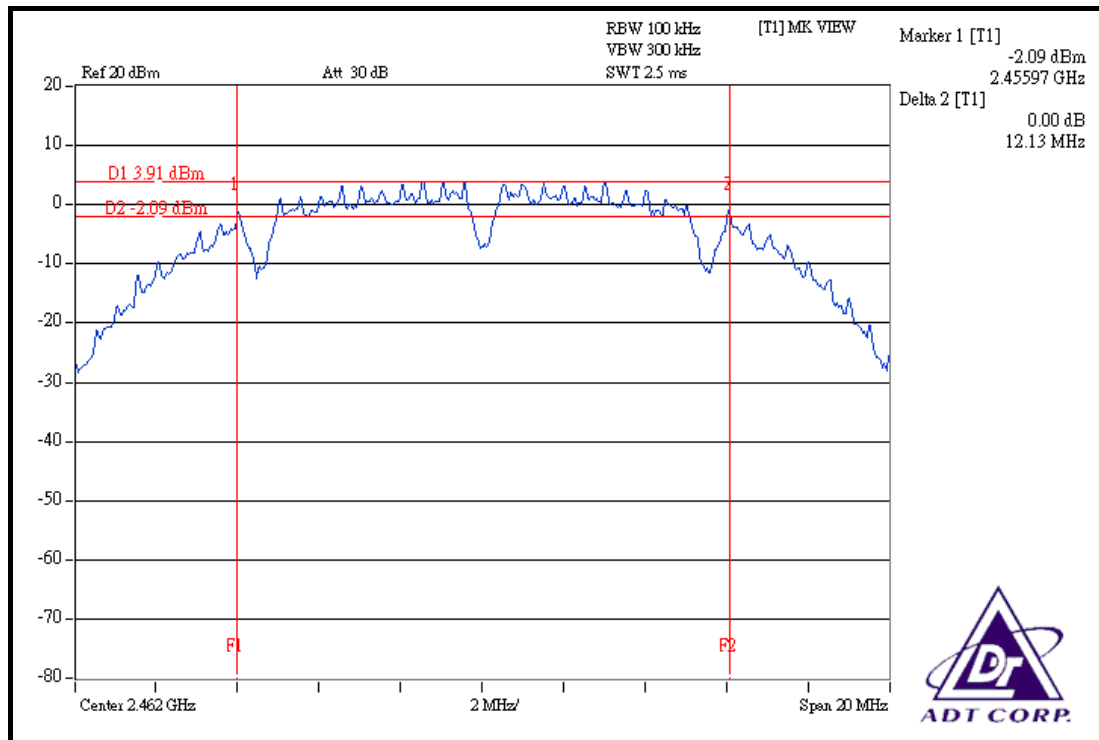
CH 1



CH 6



CH 11



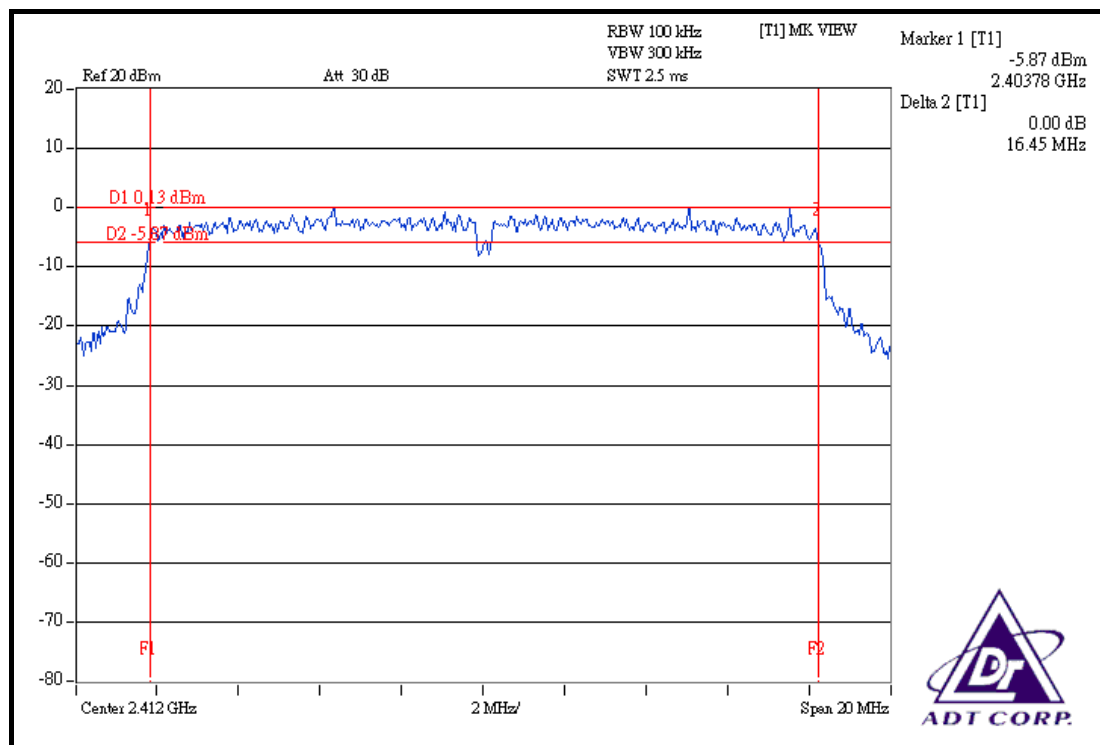


802.11g OFDM MODULATION_NORMAL MODE

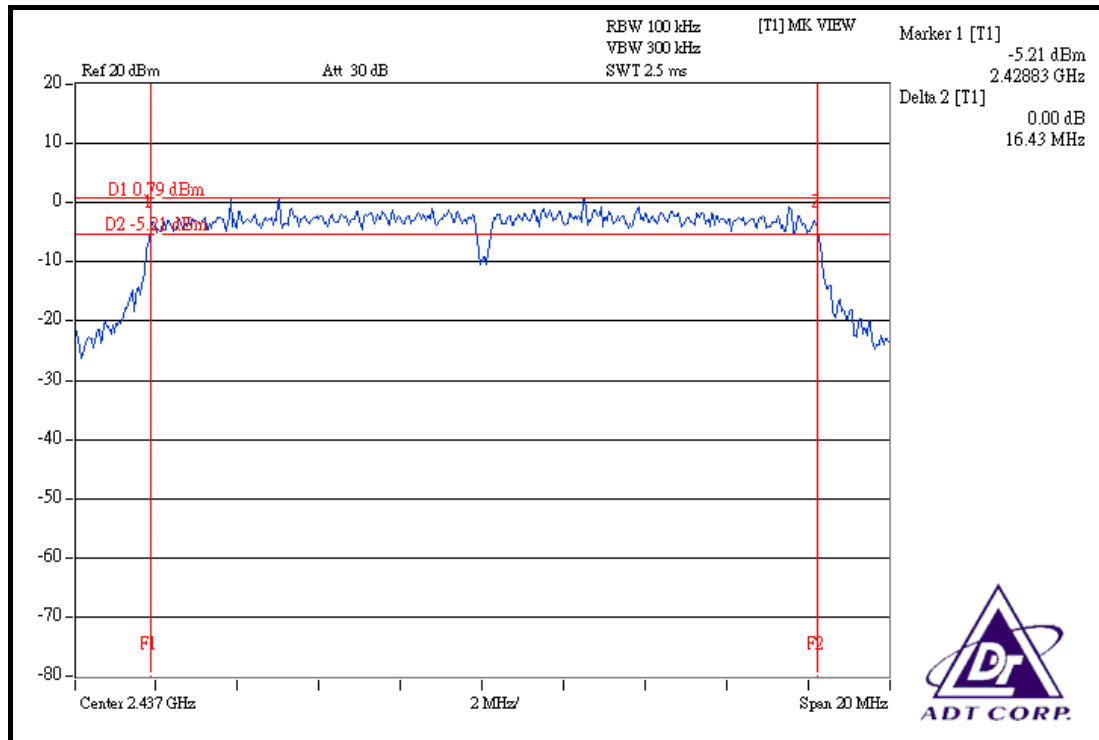
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1032hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	16.45	0.5	PASS
6	2437	16.43	0.5	PASS
11	2462	16.41	0.5	PASS

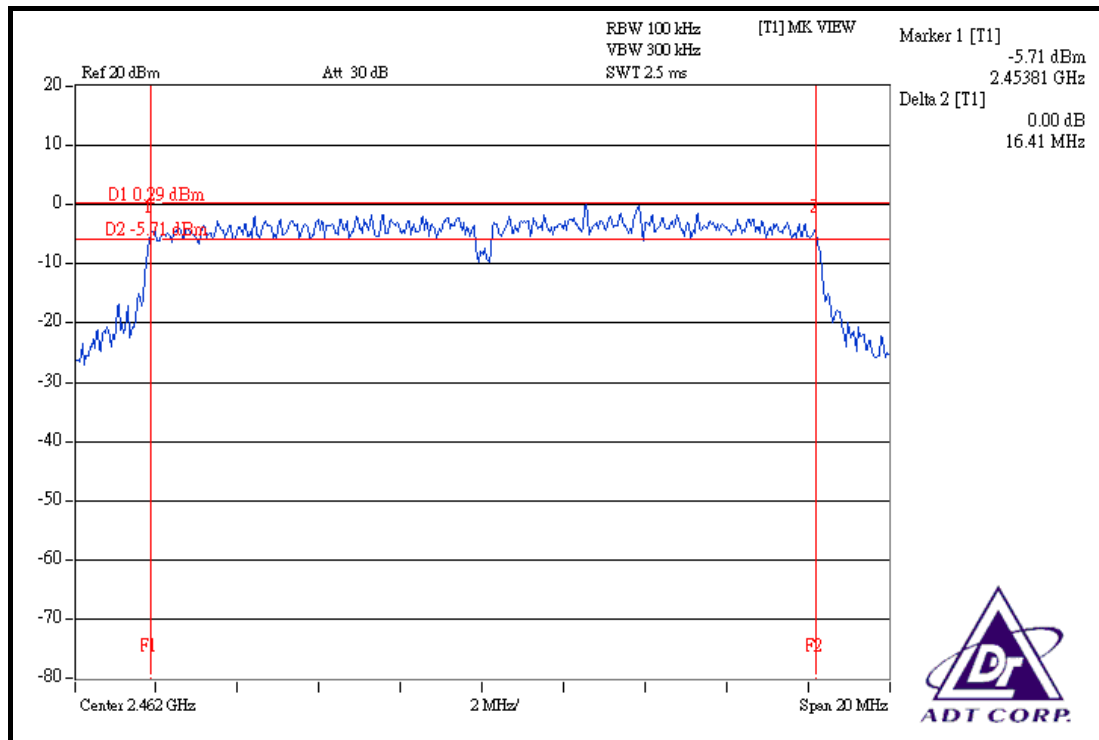
CH 1



CH 6



CH 11

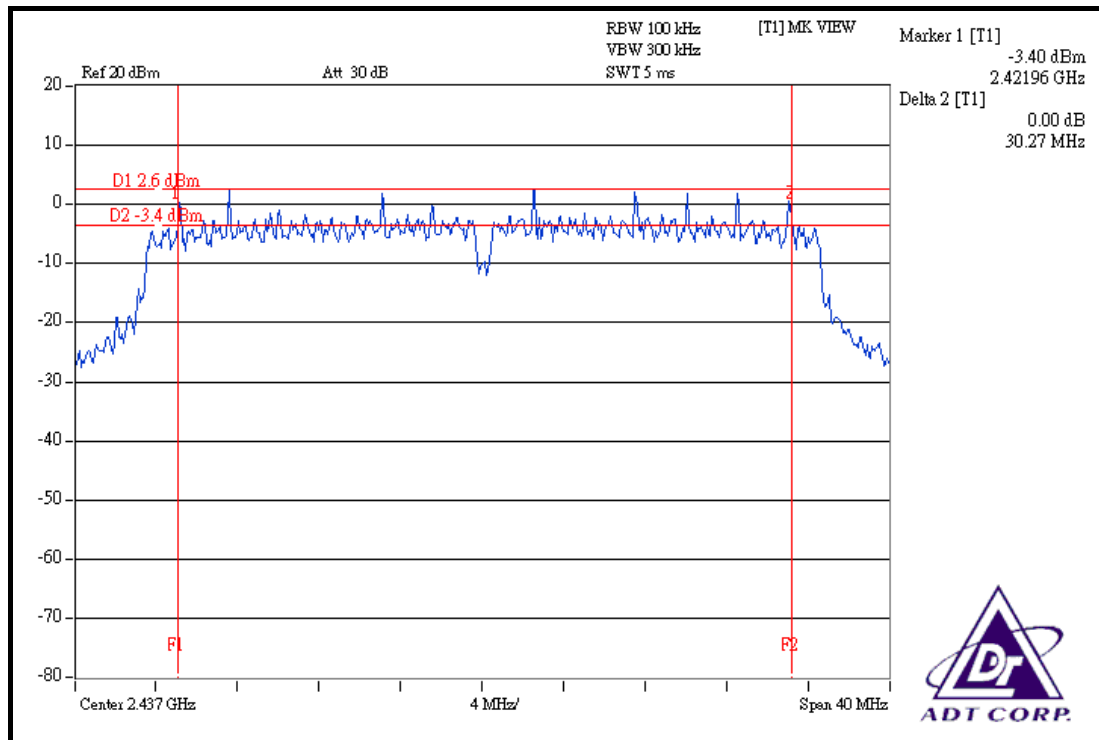


802.11g OFDM MODULATION_TURBO MODE

MODULATION TYPE	QPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1032hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
6	2437	30.27	0.5	PASS

CH 6





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 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100040	Jun. 28, 2008
AGILENT SIGNAL GENERATOR	E8257C	MY43320668	Dec. 25, 2008
TEKTRONIX OSCILLOSCOPE	TDS1012	C037299	Nov. 21, 2008
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.

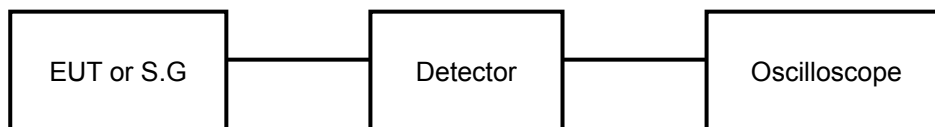
4.4.3 TEST PROCEDURES

- a. A detector was used on the output port of the EUT. An oscilloscope was used to peak the response of the detector.
- b. Replaced the EUT by the signal generator. The center frequency of the S.G was adjusted to the center frequency of the measured channel.
- c. Adjusted the power to have the same peak reading on oscilloscope. Record the power level.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6.

4.4.7 TEST RESULTS

802.11b DSSS MODULATION

MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1032hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	35.892	15.55	30	PASS
6	2437	44.875	16.52	30	PASS
11	2462	50.350	17.02	30	PASS

802.11g OFDM MODULATION_NORMAL MODE

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1032hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	50.699	17.05	30	PASS
6	2437	56.624	17.53	30	PASS
11	2462	50.119	17.00	30	PASS

802.11g OFDM MODULATION_TURBO MODE

MODULATION TYPE	QPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1032hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
6	2437	56.364	17.51	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	FSP 40	100040	Jun. 28, 2008

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

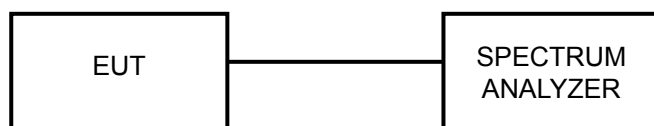
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

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 CONDITIONS

Same as 4.3.6.

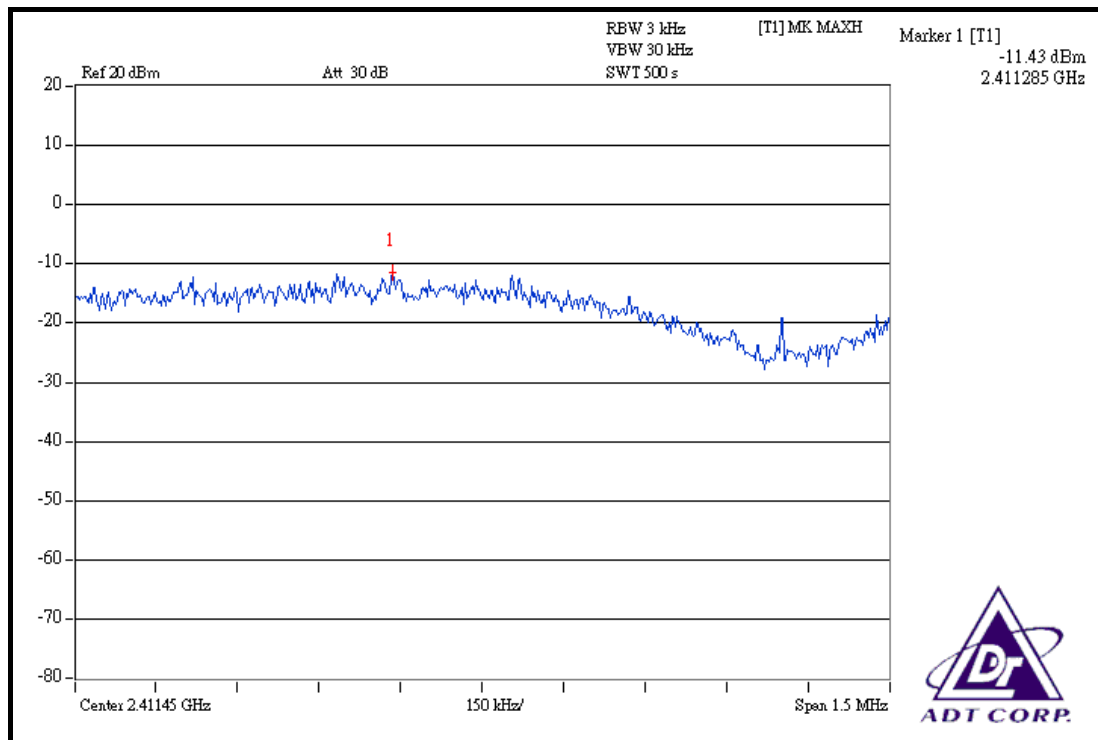
4.5.7 TEST RESULTS

802.11b DSSS MODULATION

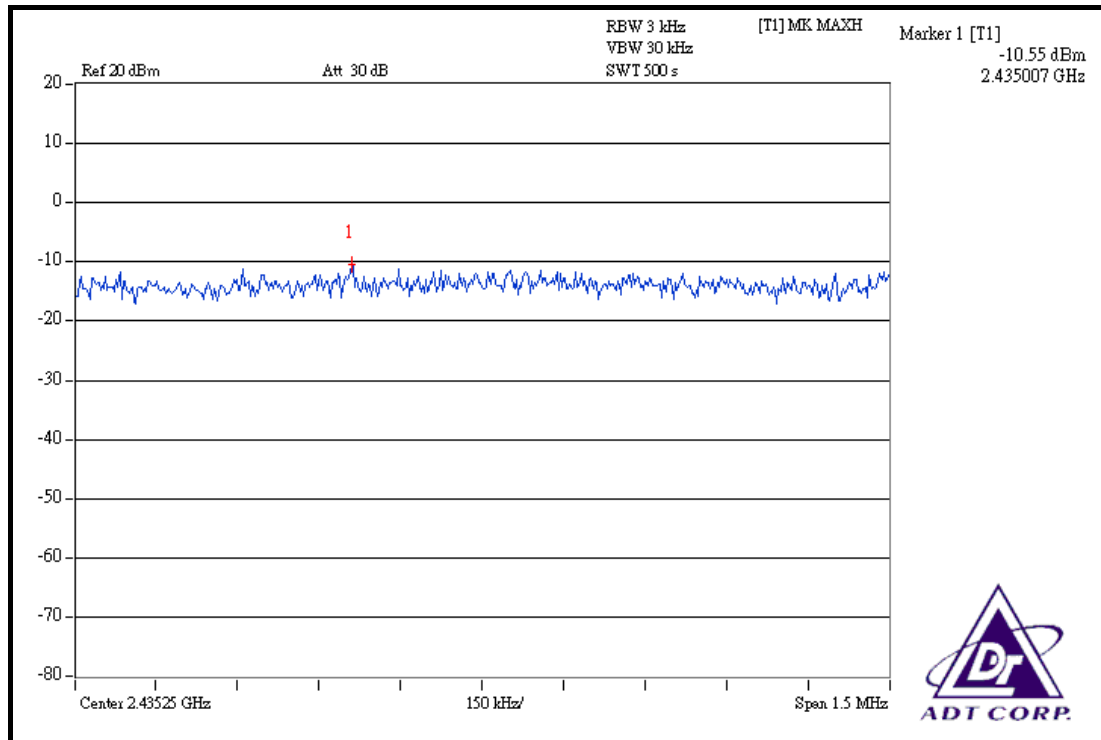
MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1032hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-11.43	8	PASS
6	2437	-10.55	8	PASS
11	2462	-9.86	8	PASS

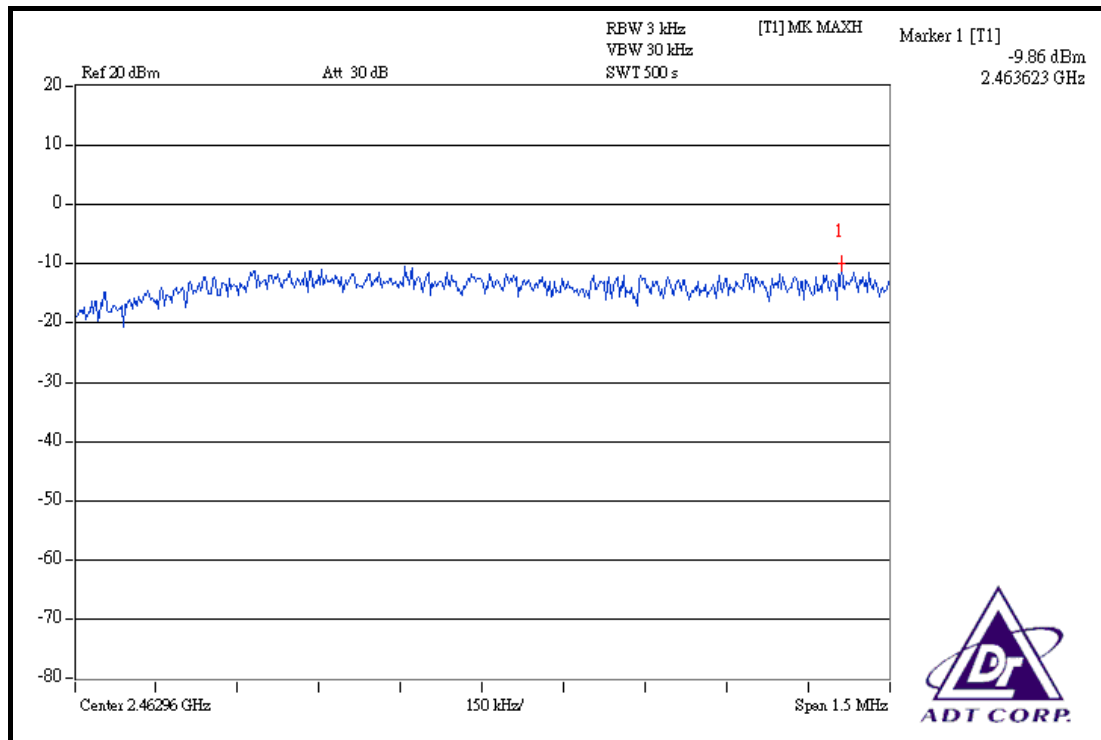
CH 1



CH 6



CH 11



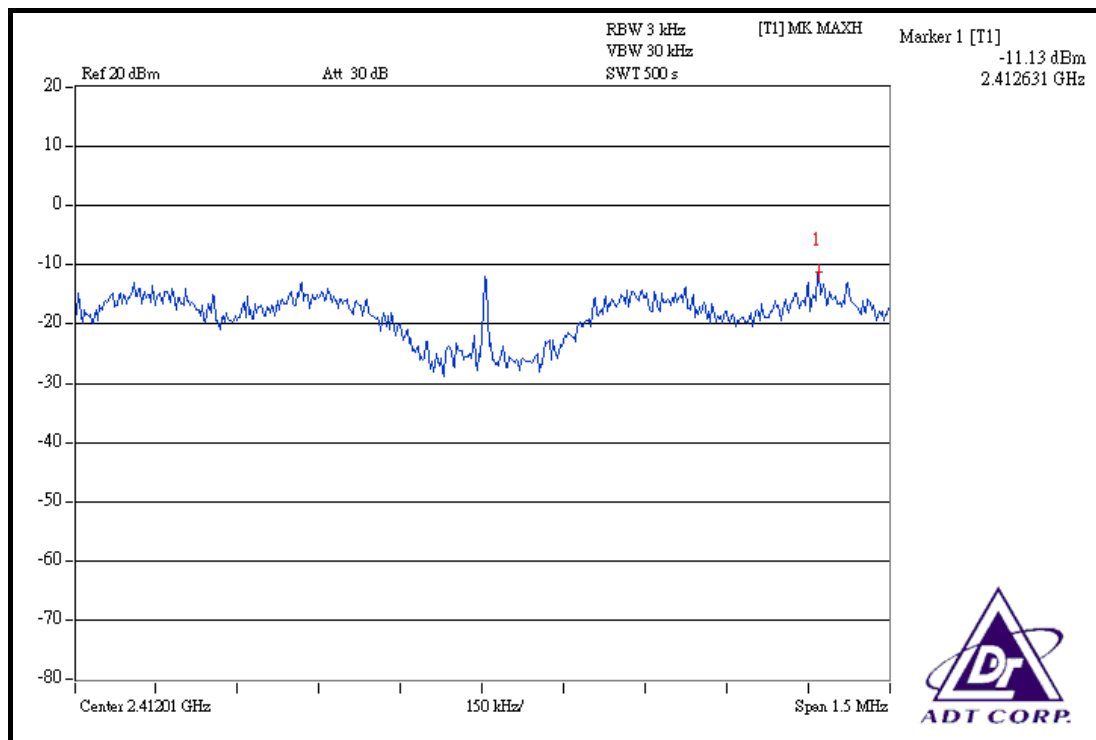


802.11g OFDM MODULATION_NORMAL MODE

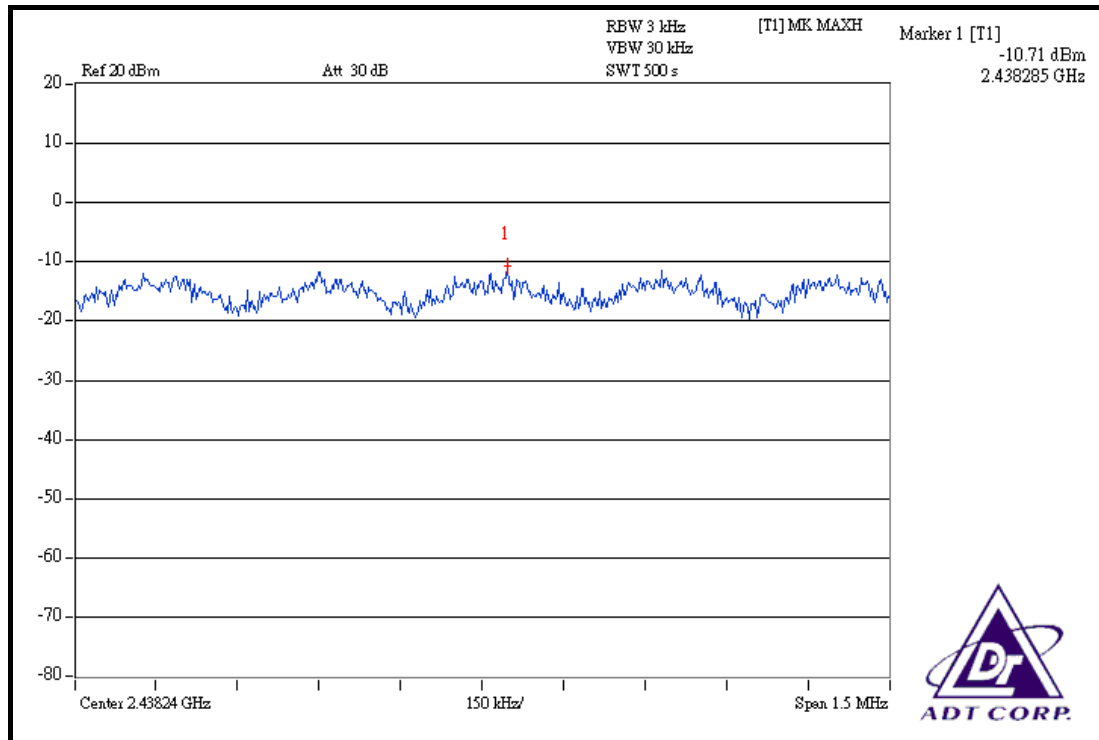
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1032hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-11.13	8	PASS
6	2437	-10.71	8	PASS
11	2462	-11.28	8	PASS

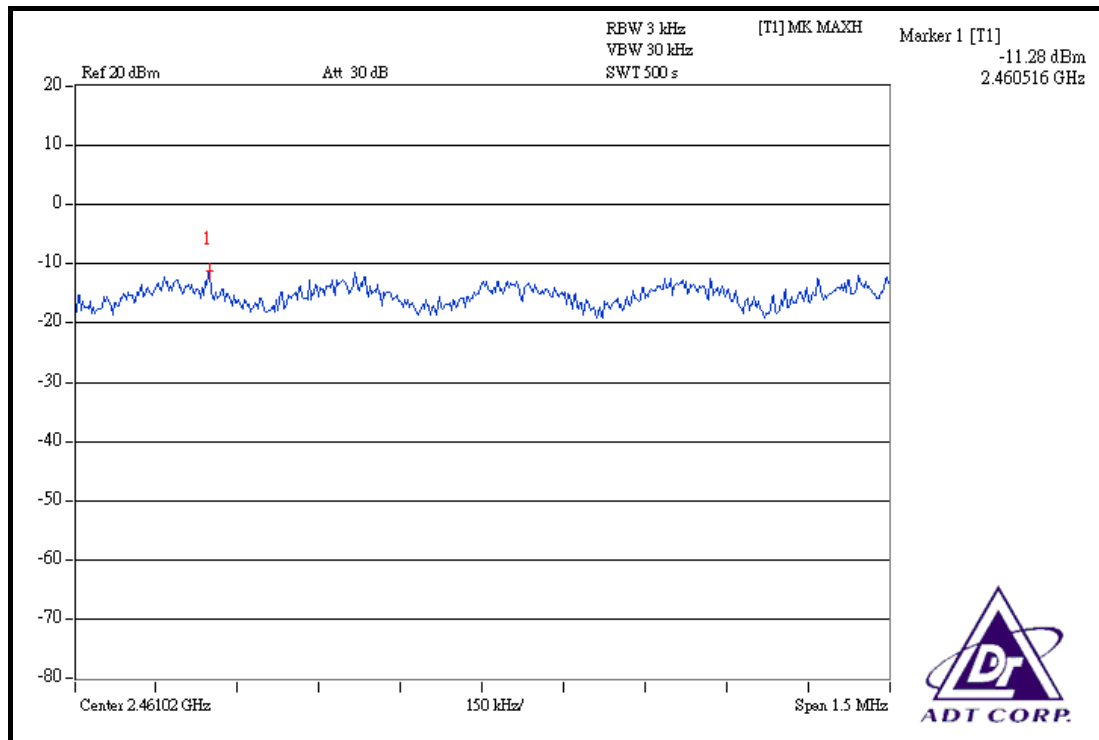
CH 1



CH 6



CH 11



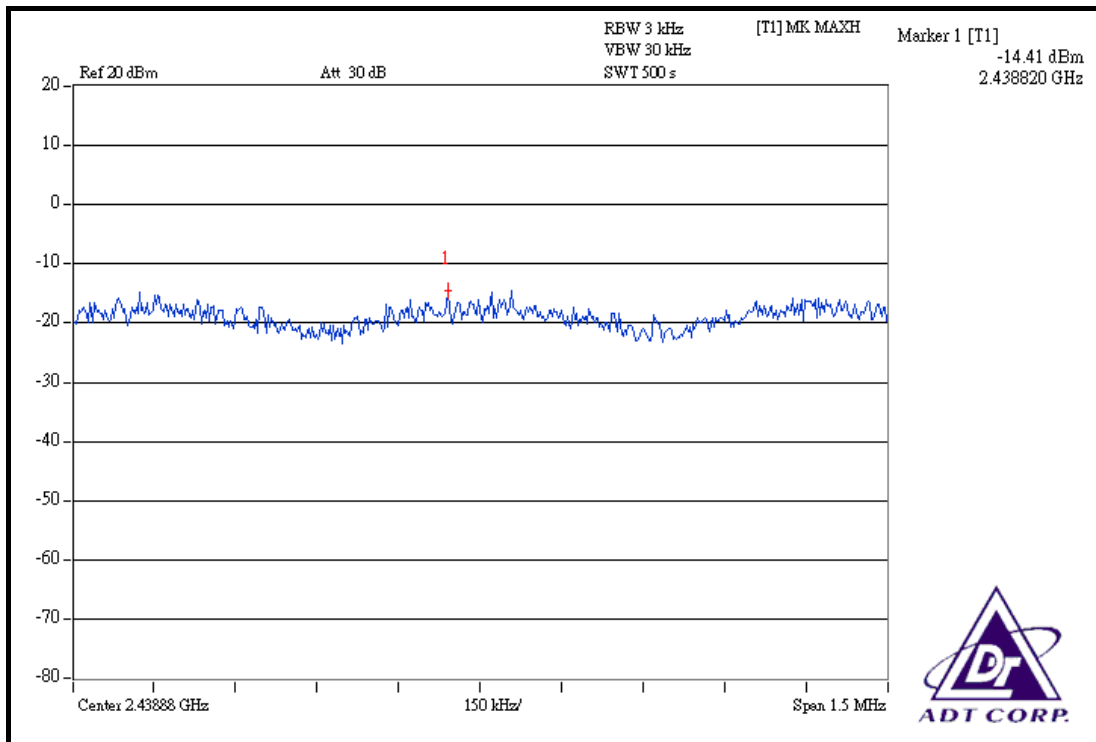


802.11g OFDM MODULATION_TURBO MODE

MODULATION TYPE	QPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 1032hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
6	2437	-14.41	8	PASS

CH 6



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	FSP 40	100040	Jun. 28, 2008

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 and 300kHz with suitable frequency span including 100MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (Peak RBW=100kHz, VBW=300kHz; Average RBW=1MHz, VBW= 10Hz are attached on the following pages.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation.

4.6.5 EUT OPERATING CONDITION

Same as 4.3.6.

4.6.6 TEST RESULTS

The spectrum plots are attached on the following 18 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).

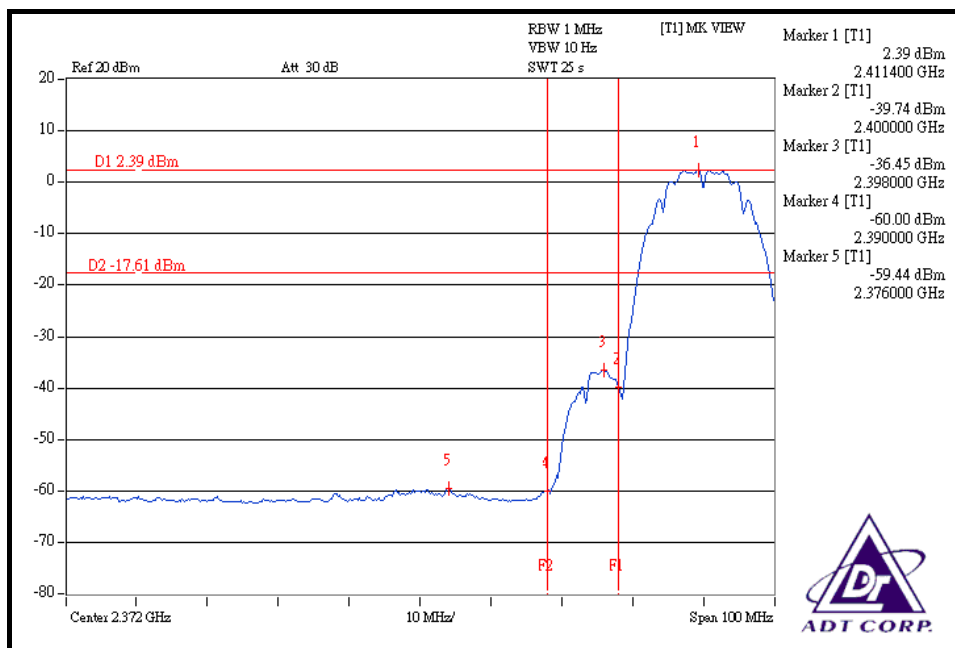
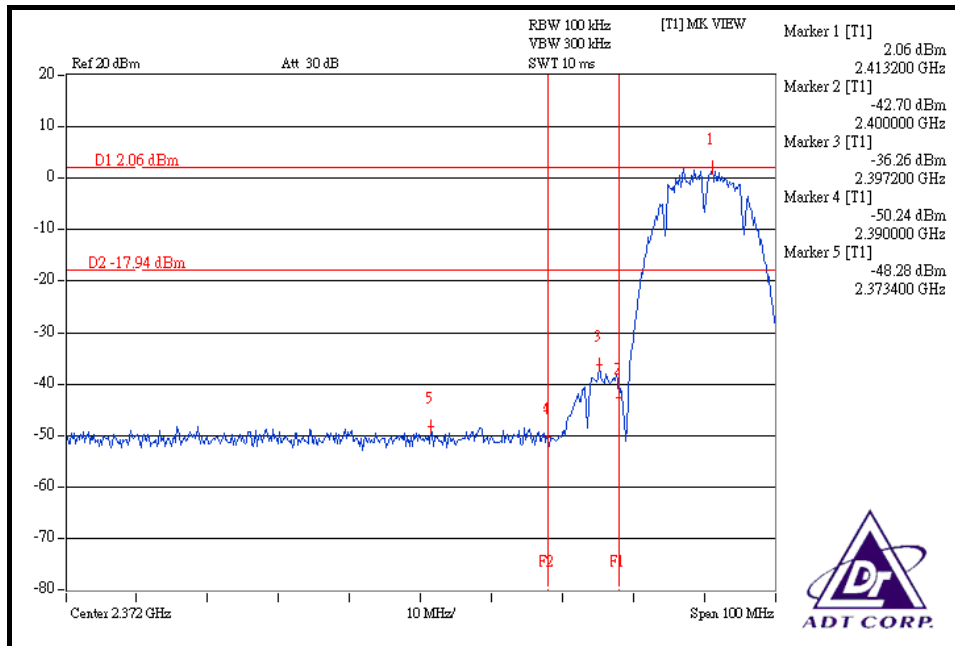
802.11b DSSS MODULATION

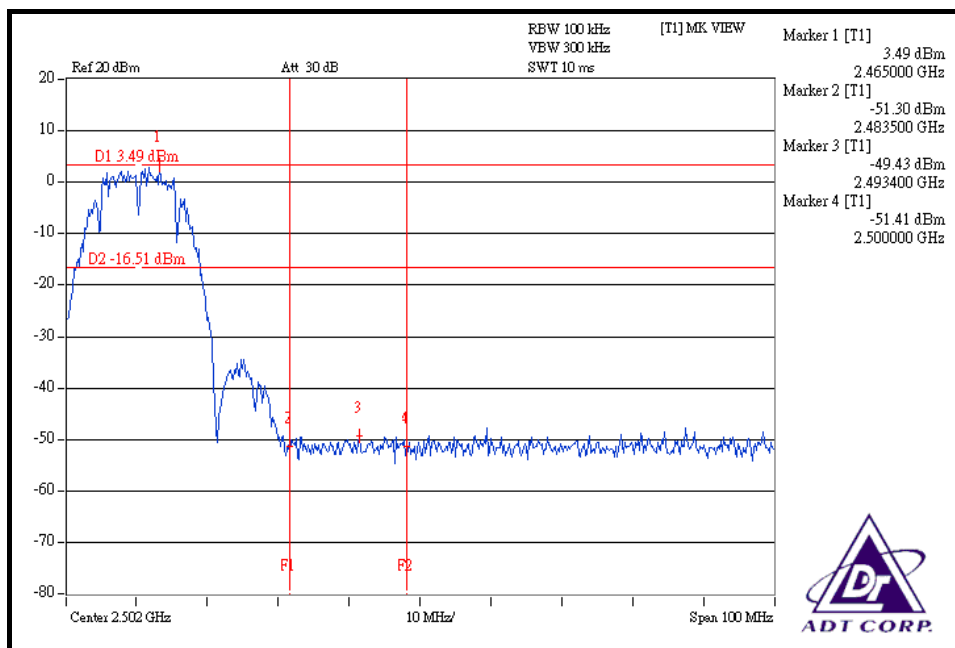
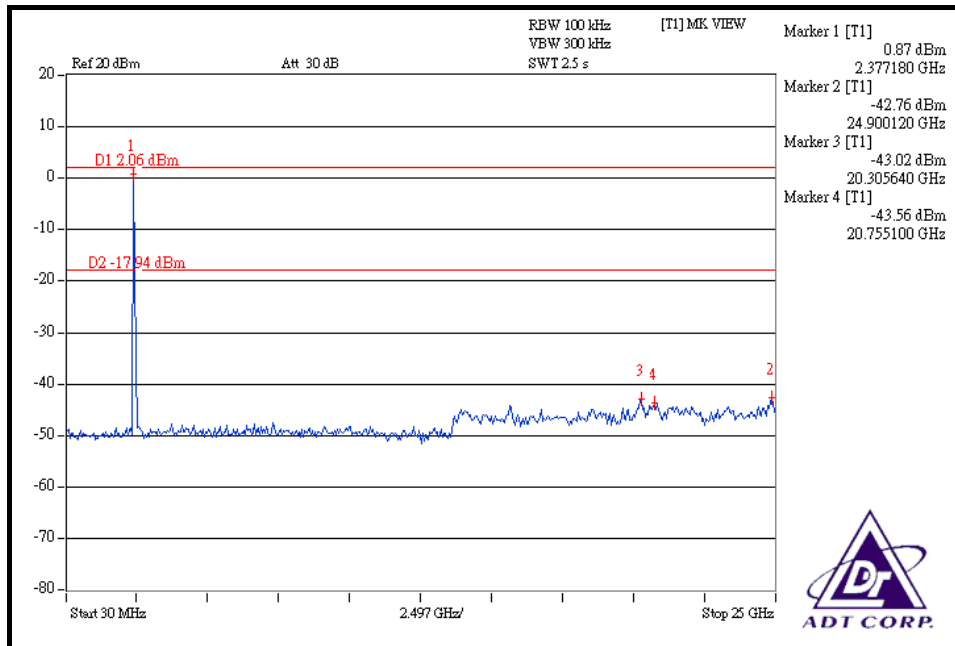
NOTE 1: The band edge emission plot on the next second page shows 50.34dBc between carrier maximum power and local maximum emission in restrict band (2.3734GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 107.34dBuV/m (Peak), so the maximum field strength in restrict band is $107.34 - 50.34 = 57.00$ dBuV/m which is under 74dBuV/m limit.

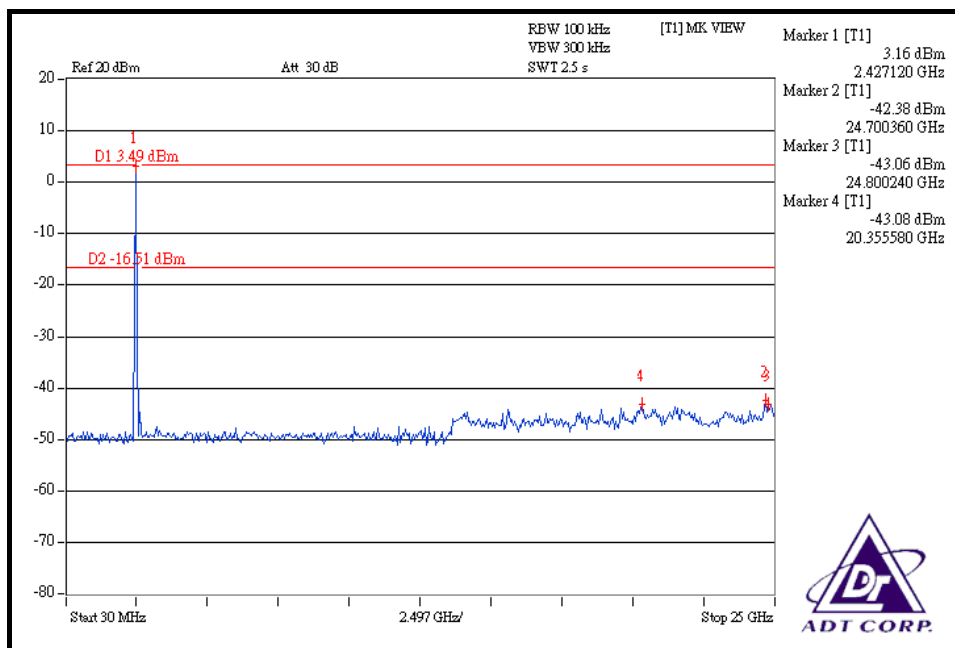
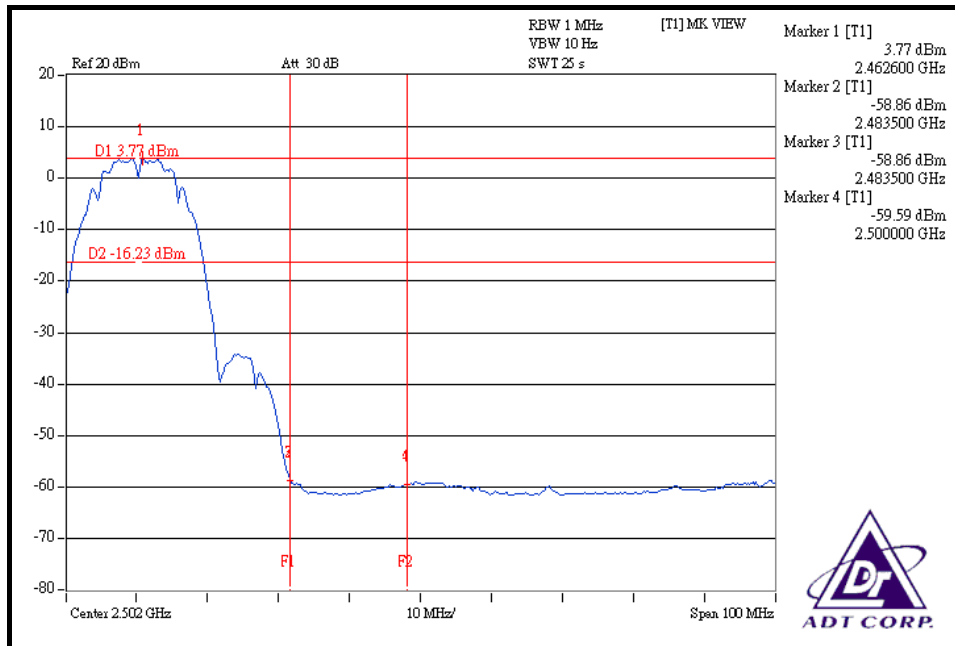
The band edge emission plot on the next second page shows 61.83dBc between carrier maximum power and local maximum emission in restrict band (2.3760GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 102.72dBuV/m (Peak), so the maximum field strength in restrict band is $102.72 - 61.83 = 40.89$ dBuV/m which is under 54dBuV/m limit.

NOTE 2: The band edge emission plot on the next third page shows 52.92dBc between carrier maximum power and local maximum emission in restrict band (2.4934GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 108.63dBuV/m (Peak), so the maximum field strength in restrict band is $108.63 - 52.92 = 55.71$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next fourth page shows 62.63dBc 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 104.44dBuV/m (Peak), so the maximum field strength in restrict band is $104.44 - 62.63 = 41.81$ dBuV/m which is under 54dBuV/m limit.







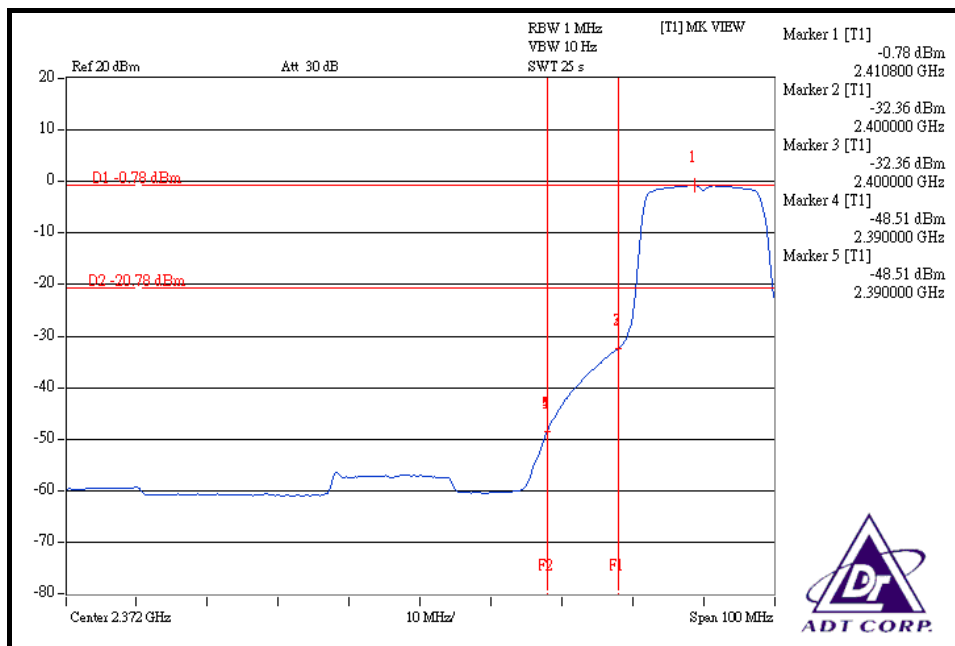
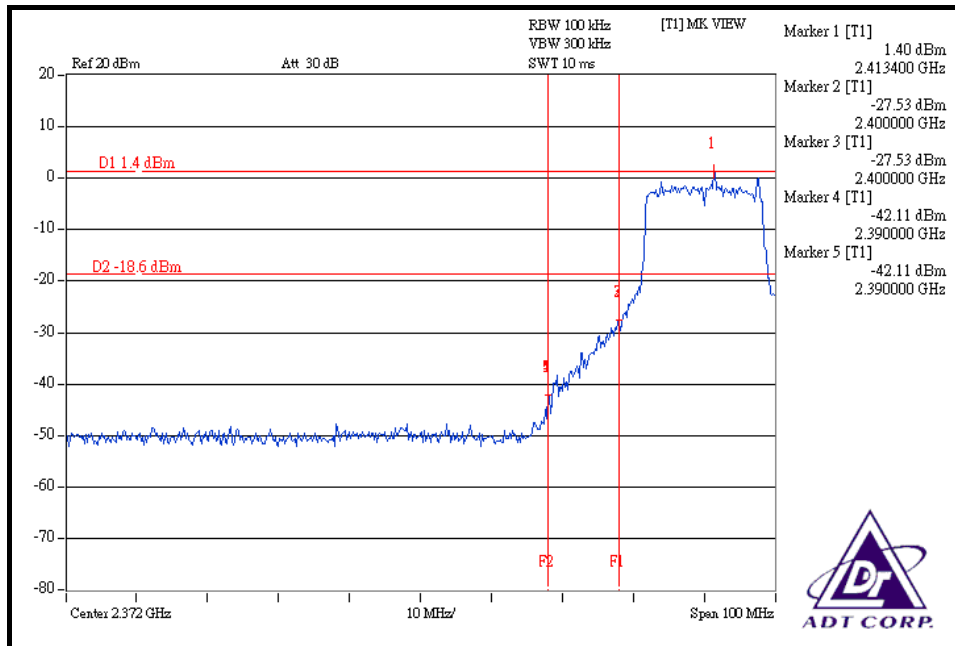
802.11g OFDM MODULATION _NORMAL MODE

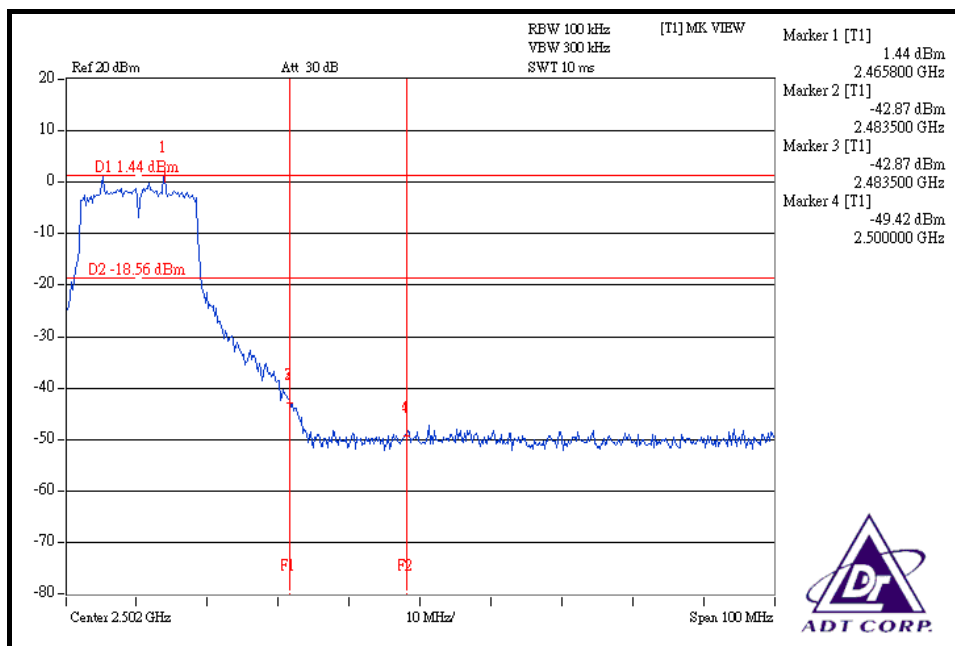
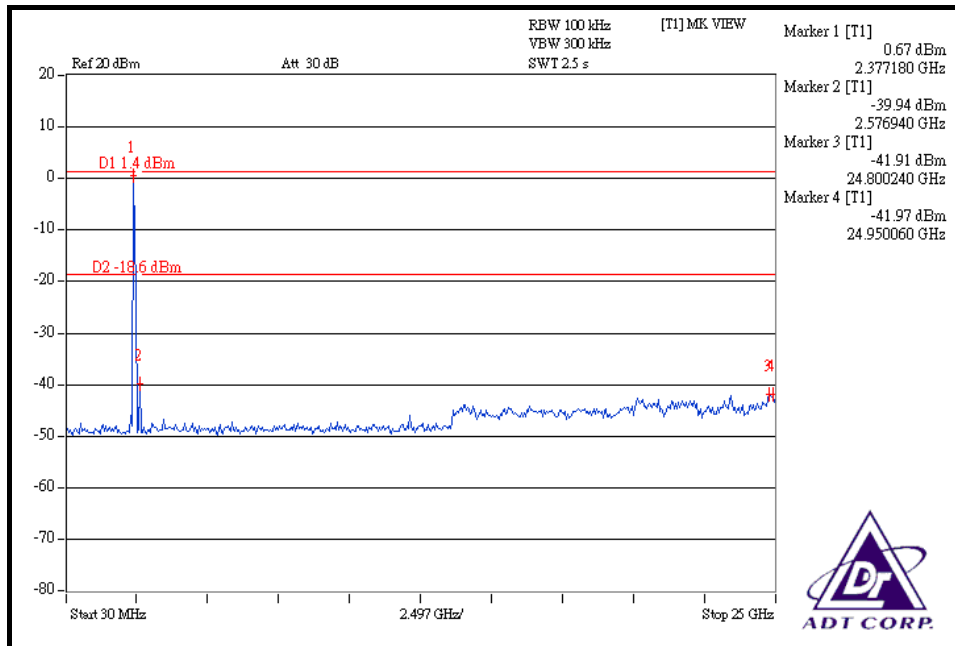
NOTE 1: The band edge emission plot on the next second page shows 43.51dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 109.30dBuV/m (Peak), so the maximum field strength in restrict band is $109.30 - 43.51 = 65.79$ dBuV/m which is under 74dBuV/m limit.

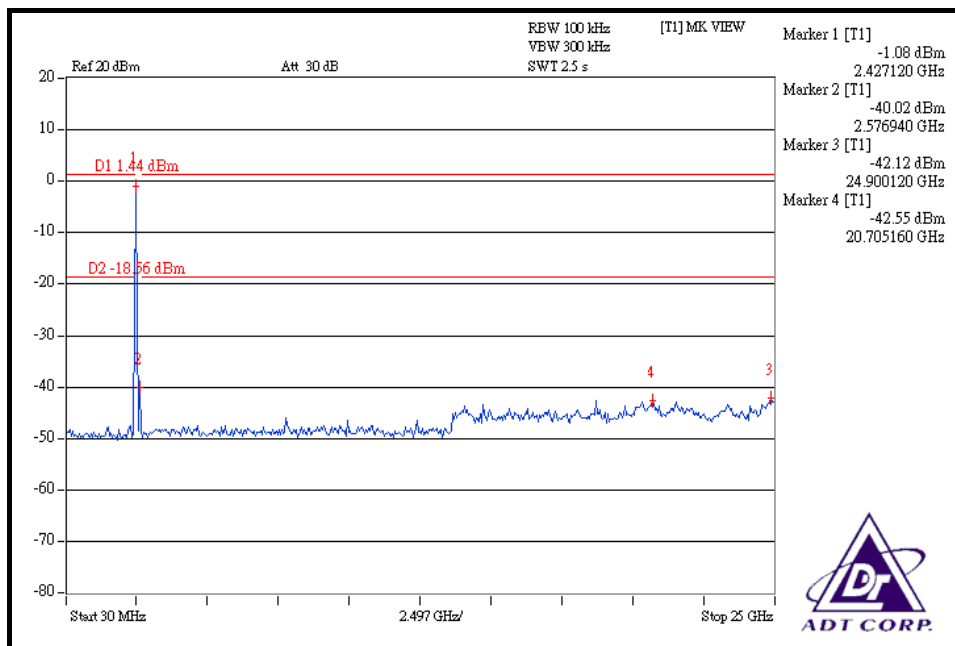
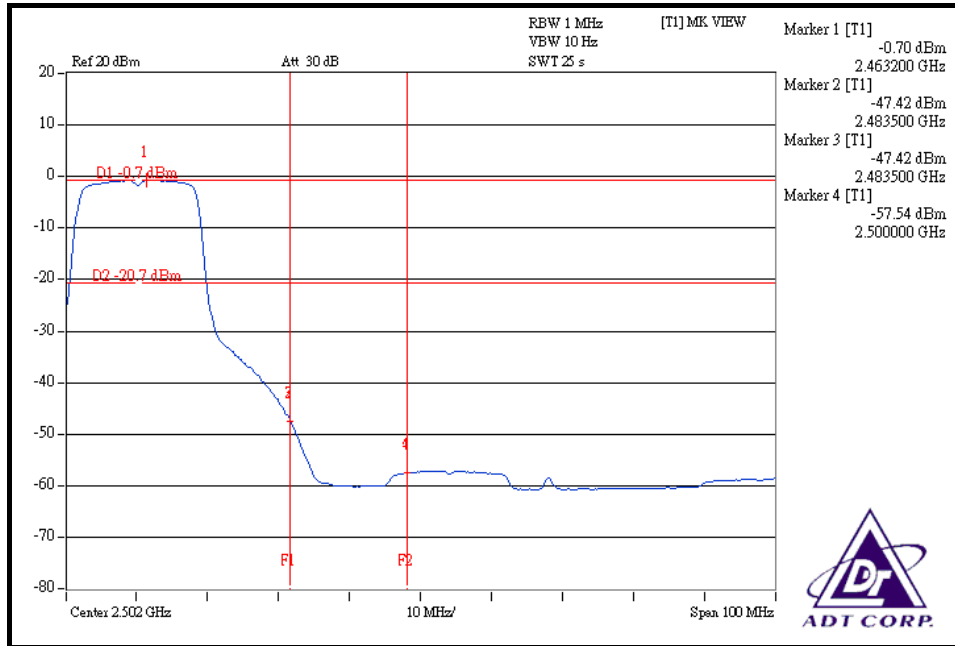
The band edge emission plot on the next second page shows 47.73dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 99.23dBuV/m (Peak), so the maximum field strength in restrict band is $99.23 - 47.73 = 51.50$ dBuV/m which is under 54dBuV/m limit.

NOTE 2: The band edge emission plot on the next third page shows 44.31dBc 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 109.20 dBuV/m (Peak), so the maximum field strength in restrict band is $109.20 - 44.31 = 64.89$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next fourth page shows 46.72dBc 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 99.14dBuV/m (Peak), so the maximum field strength in restrict band is $99.14 - 46.72 = 52.42$ dBuV/m which is under 54dBuV/m limit.







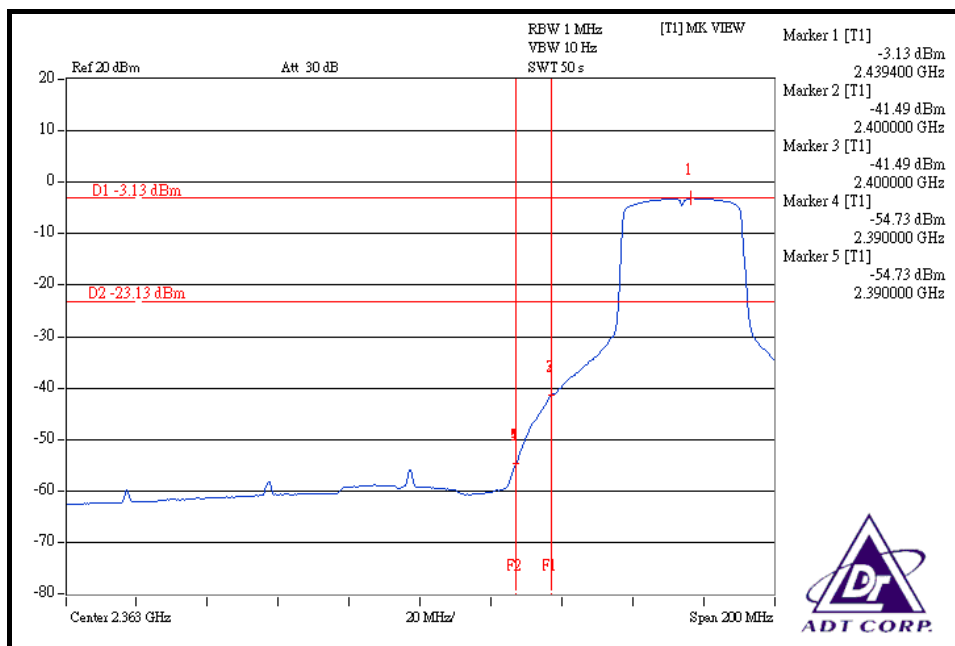
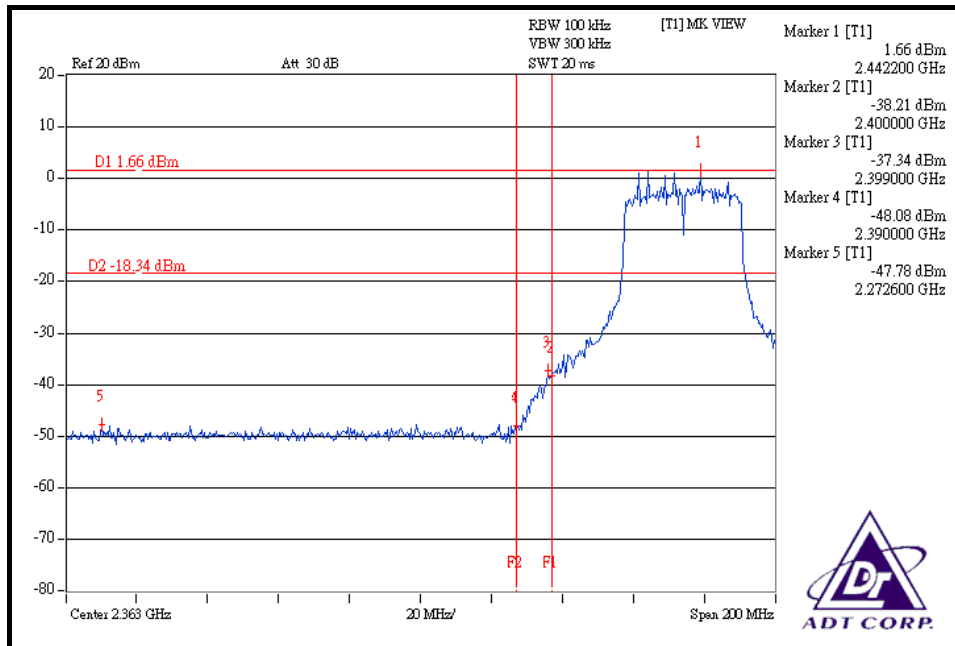
802.11g OFDM MODULATION _TURBO MODE

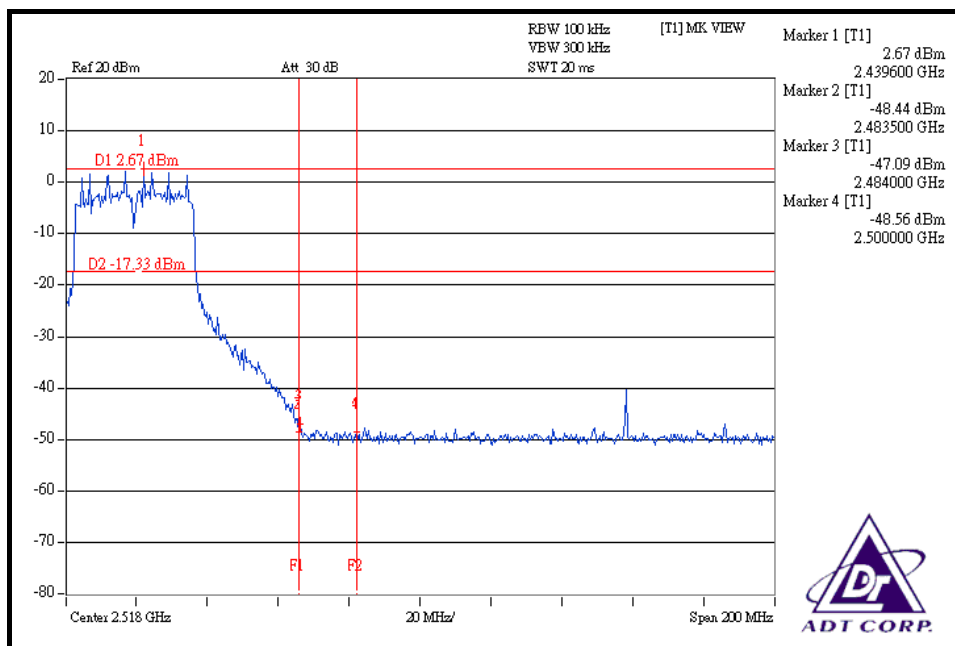
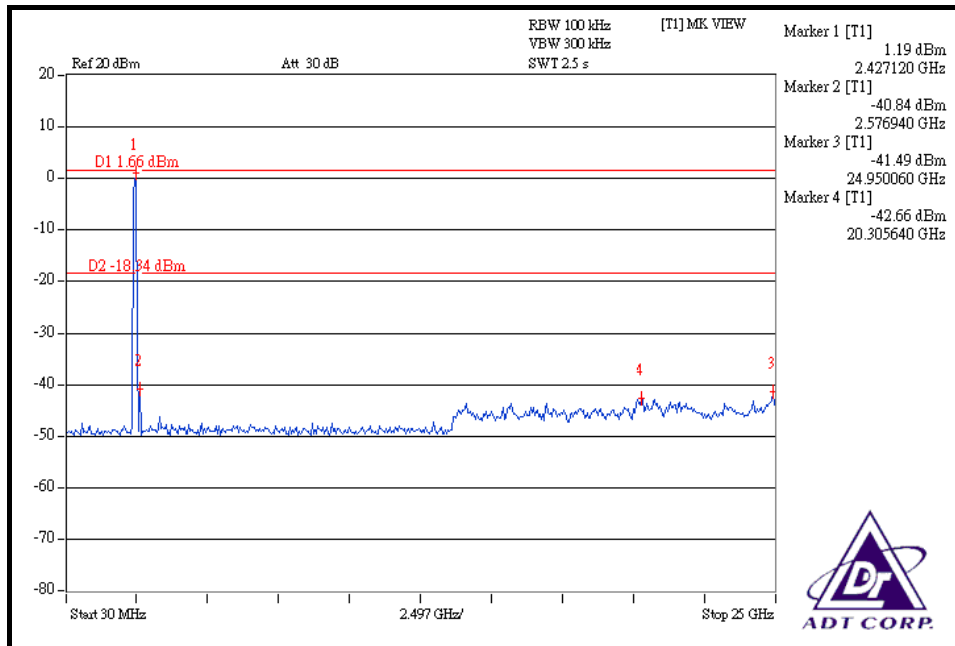
NOTE 1: The band edge emission plot on the next second page shows 49.44dBc between carrier maximum power and local maximum emission in restrict band (2.2726GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 107.00dBuV/m (Peak), so the maximum field strength in restrict band is $107.00 - 49.44 = 57.56$ dBuV/m which is under 74dBuV/m limit.

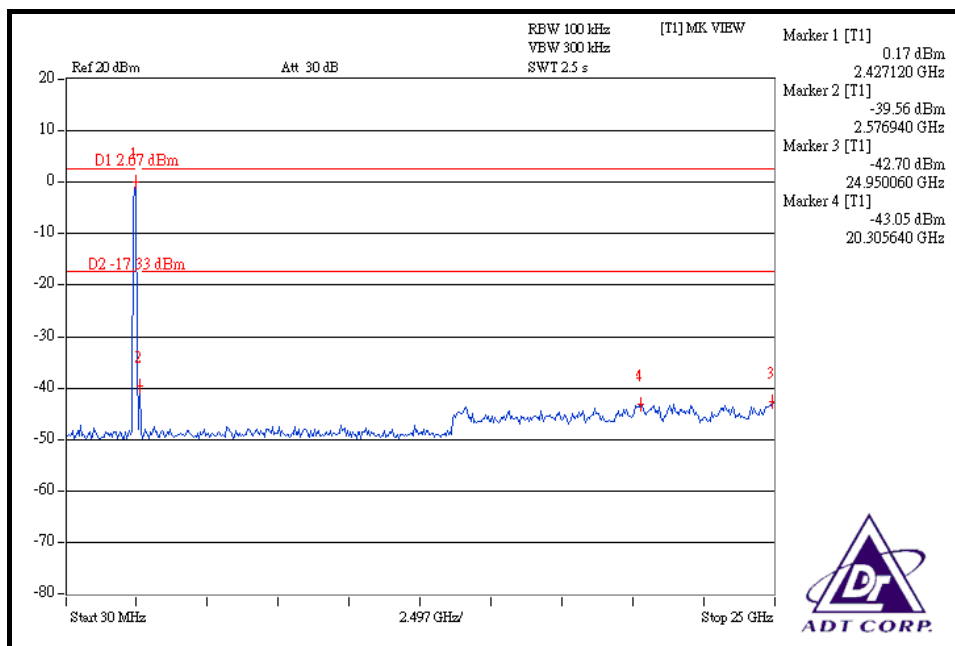
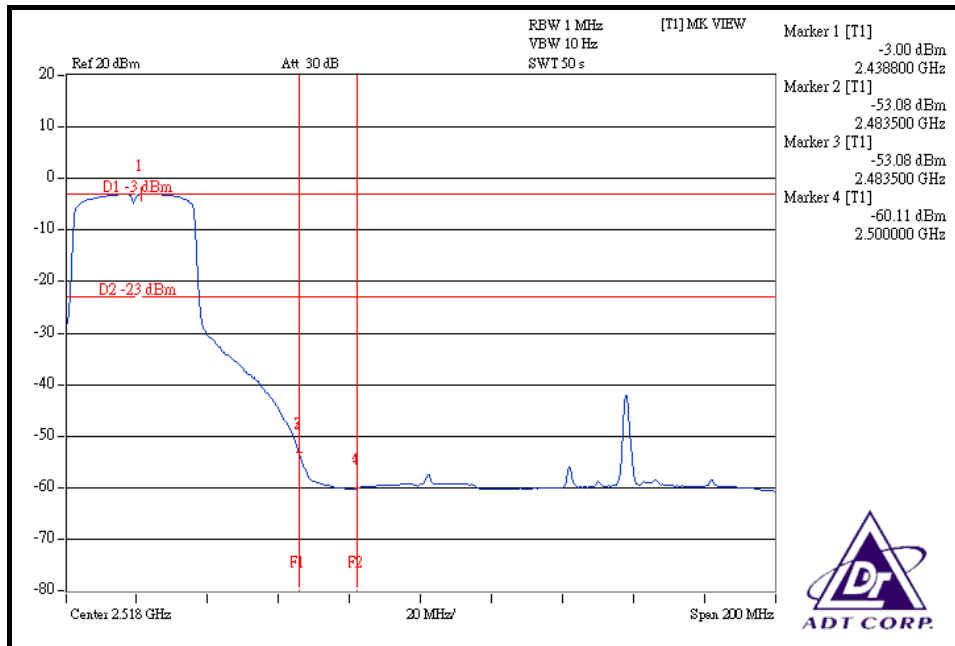
The band edge emission plot on the next second page shows 51.60dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 97.39dBuV/m (Peak), so the maximum field strength in restrict band is $97.39 - 51.60 = 45.79$ dBuV/m which is under 54dBuV/m limit.

NOTE 2: The band edge emission plot on the next third page shows 49.76dBc between carrier maximum power and local maximum emission in restrict band (2.4840GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 107.00 dBuV/m (Peak), so the maximum field strength in restrict band is $107.00 - 49.76 = 57.24$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next fourth page shows 50.08dBc 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 6 at the item 4.2.7 is 97.39dBuV/m (Peak), so the maximum field strength in restrict band is $97.39 - 50.08 = 47.31$ dBuV/m which is under 54dBuV/m limit.







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 dipole antenna with R-SMA connector. The maximum Gain of the antenna is 2dBi.

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

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.	TAF, BSMI, NCC
Netherlands	Telefication
Singapore	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: 886-2-26051924

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.

7 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.