

FCC TEST REPORT (WIRELESS LAN)

REPORT NO.: RF970326L05-1

MODEL NO. : SC800
(refer to item 3.1 for more details)

RECEIVED : Apr. 03, 2008

TESTED : Apr. 03 ~ Apr. 28, 2008

ISSUED : May 02, 2008

APPLICANT : Shin Chuan Computer Co., Ltd.

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1. CERTIFICATION

PRODUCT: Portable Data Terminal

MODEL: SC800 (refer to item 3.1 for more details)

BRAND: SCC

APPLICANT: Shin Chuan Computer Co., Ltd.

TESTED: Apr. 03 ~ Apr. 28, 2008

TEST SAMPLE: ENGINEERING SAMPLE

STANDARDS: FCC Part 15, Subpart C (Section 15.247)

ANSI C63.4-2003

The above equipment (Model: SC800) has been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Rennie Wang , **DATE:** May 02, 2008
Rennie Wang / Senior Specialist

TECHNICAL
ACCEPTANCE : Long Chen , **DATE:** May 02, 2008
Responsible for RF Long Chen / Senior Engineer

APPROVED BY : Gary Chang , **DATE:** May 02, 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 (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 -1.42dB at 2.335MHz.
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 -2.46dB at 199.05MHz.
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 30dB 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	3.34 dB
	200MHz ~1000MHz	3.35 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

EUT	Portable Data Terminal
MODEL NO.	SC800 (refer to NOTE for more details)
FCC ID	TQ2-SC800PDT-BW
POWER SUPPLY	3.7Vdc from rechargeable lithium battery 5.0Vdc from power adapter
MODULATION TYPE	Wireless LAN: CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM Bluetooth: GFSK, $\pi/4$ -DQPSK, 8-DPSK for FHSS
MODULATION TECHNOLOGY	DSSS, OFDM, FHSS
TRANSFER RATE	Wireless LAN: 802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps Bluetooth: 1/2/3Mbps
FREQUENCY RANGE	2400 ~ 2483.5MHz
NUMBER OF CHANNEL	Wireless LAN: 11 Bluetooth: 79
OUTPUT POWER	Wireless LAN: 13.002mW Bluetooth: 1.406mW
ANTENNA TYPE(S)	Wireless LAN: PIFA antenna with 2.2dBi gain Bluetooth: Chip antenna with 0.5dBi gain
DATA CABLE	1.85m shielded USB cable with one core 1.00m shielded USB cable with one core (for cradle use)
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Battery, Adapter, Earphone (1.25m), Cradle (model: SC800-SD)

NOTE:

1. The models as below are identical to each other except for their model name and outer appearance due to marketing requirement.

MODEL NAME	DESCRIPTION
SC800	26-key button board
SC820	41-key button board

2. The EUT is a Portable Data Terminal. The functions of EUT listed as below:

	TEST STANDARD	REFERENCE REPORT
WLAN 802.11b/g	FCC Part 15	RF970326L05-1
BLUETOOTH		RF970326L05-2

3. The EUT have a lithium battery listed as below:

BATTERY A: THICK	
MODEL:	ETI CA
RATING:	3.7Vdc, 2200mAh

BATTERY B: HEAVY	
MODEL:	ETI CA
RATING:	3.7Vdc, 4000mAh

**After pre-tested both batteries, found batter B is worse, therefore all the test results came out from this.

4. The EUT was operated with following power adapter:

BRAND:	ENG
MODEL:	3A-161DN05
INPUT:	100-240Vac, 50-60Hz, 0.6A
OUTPUT:	5.0Vdc, 2.6A
POWER LINE:	AC 1.80m non-shielded cable without core DC 1.05m non-shielded cable with one core

5. 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.

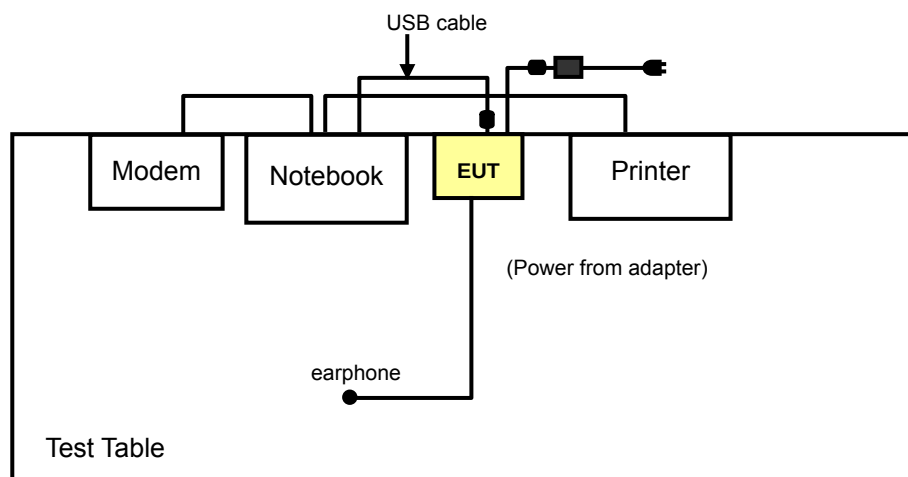
3.2 DESCRIPTION OF TEST MODES

11 channels are provided for 802.11b, 802.11g:

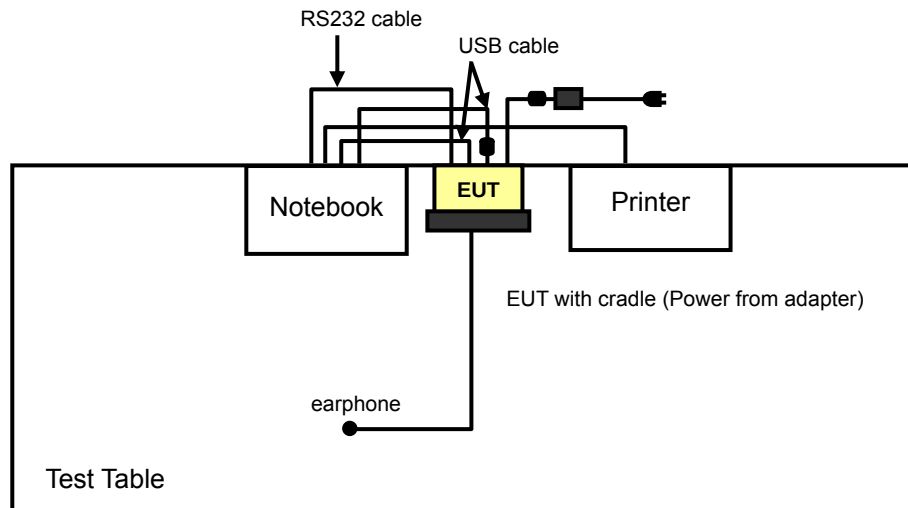
CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

TEST MODE A



TEST MODE B



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
A1	√	√	√	√	For model SC800, without cradle
A2	-	√	√	-	For model SC800, with cradle
B1	-	√	√	-	For model SC820, without cradle
B2	-	√	√	-	For model SC820, with cradle

Where **RE≥1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement
NOTE: “-“ means no effect.

RADIATED EMISSION TEST (ABOVE 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
A1	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	X
A1	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	X

RADIATED EMISSION TEST (BELOW 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
A1 ; A2	802.11g	1 to 11	11	OFDM	BPSK	6.0	X
B1 ; B2	802.11g	1 to 11	11	OFDM	BPSK	6.0	X

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A1 ; A2	802.11g	1 to 11	11	OFDM	BPSK	6.0
B1 ; B2	802.11g	1 to 11	11	OFDM	BPSK	6.0

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A1	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
A1	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A1	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A1	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0

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	1.8m braid shielded wire , DB25 connector , w/o core.
3	1.2m braid shielded wire , DB25 & DB9 connector , w/o core.

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

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 Agilent	E4446A	MY44360128	Dec. 06, 2008
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	May 31, 2008
HORN Antenna SCHWARZBECK	9120D	9120D-209	Jun. 28, 2008
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 24, 2008
Preamplifier Agilent	8447D	2944A10633	Oct. 28, 2008
Preamplifier Agilent	8449B	3008A01964	Oct. 23, 2008
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	283402/4	Dec. 06, 2008
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	251644/4	Dec. 06, 2008
Software ADT.	ADT_Radiated_V7.6	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA
Turn Table ADT.	TT100.	TT93021703	NA
Turn Table Controller ADT.	SC100.	SC93021703	NA

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 3.
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The VCCI Site Registration No. is R-237.
 5. The IC Site Registration No. is IC3789B-3.

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

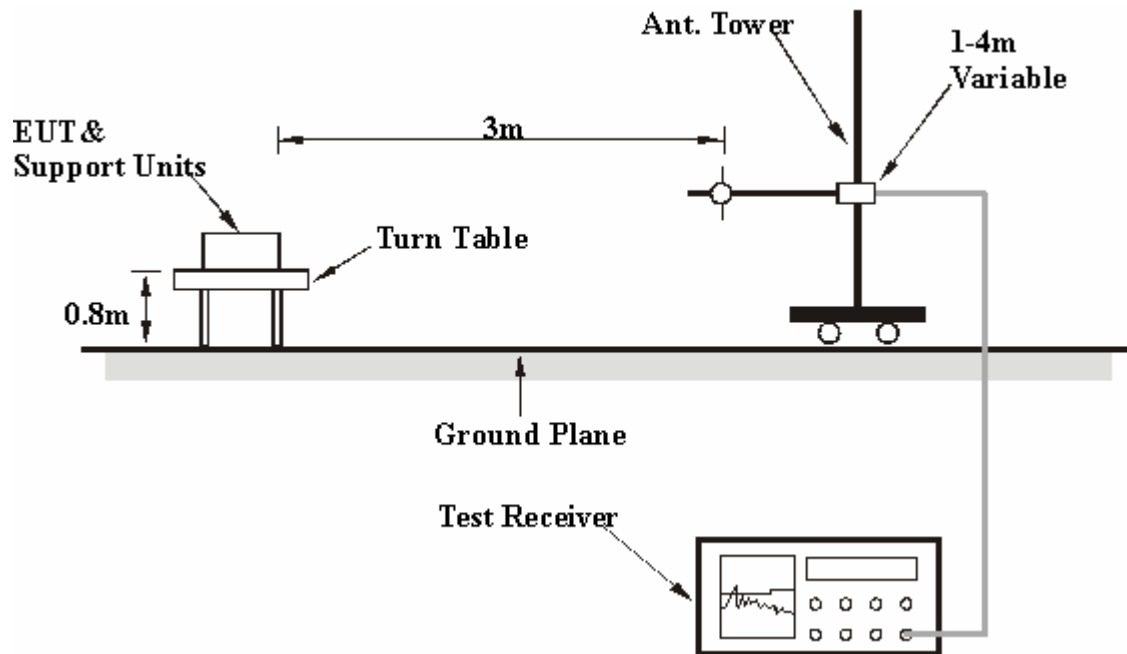
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz 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

- Connected the EUT to a notebook and placed on a testing table.
- The notebook system run a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The necessary accessories enable the system 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	25deg. C, 65%RH 993hPa	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.16 PK	74.00	-16.84	1.07 H	190	24.92	32.24
2	2390.00	46.87 AV	54.00	-7.13	1.07 H	190	14.63	32.24
3	*2412.00	95.18 PK			1.07 H	190	62.86	32.32
4	*2412.00	91.12 AV			1.07 H	190	58.80	32.32
5	4824.00	50.55 PK	74.00	-23.45	1.01 H	173	12.42	38.13
6	4824.00	43.00 AV	54.00	-11.00	1.01 H	173	4.87	38.13
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	57.57 PK	74.00	-16.43	1.11 V	262	25.33	32.24
2	2390.00	45.83 AV	54.00	-8.17	1.11 V	262	13.59	32.24
3	*2412.00	86.75 PK			1.11 V	262	54.43	32.32
4	*2412.00	82.87 AV			1.11 V	262	50.55	32.32
5	4824.00	49.55 PK	74.00	-24.45	1.08 V	355	11.42	38.13
6	4824.00	40.48 AV	54.00	-13.52	1.08 V	355	2.35	38.13

- 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	25deg. C, 65%RH 993hPa	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	*2437.00	94.77 PK			1.06 H	196	62.37	32.40
2	*2437.00	90.69 AV			1.06 H	196	58.29	32.40
3	4874.00	49.13 PK	74.00	-24.87	1.00 H	227	10.81	38.32
4	4874.00	41.98 AV	54.00	-12.02	1.00 H	227	3.66	38.32
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	*2437.00	86.34 PK			1.08 V	259	53.94	32.40
2	*2437.00	82.41 AV			1.08 V	259	50.01	32.40
3	4874.00	47.89 PK	74.00	-26.11	1.05 V	296	9.57	38.32
4	4874.00	40.76 AV	54.00	-13.24	1.05 V	296	2.44	38.32

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	25deg. C, 65%RH 993hPa	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	*2462.00	94.98 PK			1.00 H	224	62.50	32.48
2	*2462.00	90.92 AV			1.00 H	224	58.44	32.48
3	2483.50	59.93 PK	74.00	-14.07	1.00 H	224	27.37	32.56
4	2483.50	48.52 AV	54.00	-5.48	1.00 H	224	15.96	32.56
5	4924.00	47.87 PK	74.00	-26.13	1.01 H	161	9.41	38.46
6	4924.00	38.28 AV	54.00	-15.72	1.01 H	161	-0.18	38.46
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	86.54 PK			1.08 V	271	54.06	32.48
2	*2462.00	82.59 AV			1.08 V	271	50.11	32.48
3	2483.50	58.67 PK	74.00	-15.33	1.08 V	271	26.11	32.56
4	2483.50	47.24 AV	54.00	-6.76	1.08 V	271	14.68	32.56
5	4924.00	46.74 PK	74.00	-27.26	1.06 V	337	8.28	38.46
6	4924.00	37.19 AV	54.00	-16.81	1.06 V	337	-1.27	38.46

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

802.11g OFDM 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	25deg. C, 65%RH 993hPa	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.80 PK	74.00	-16.20	1.03 H	199	25.56	32.24
2	2390.00	46.64 AV	54.00	-7.36	1.03 H	199	14.40	32.24
3	*2412.00	95.26 PK			1.03 H	199	62.94	32.32
4	*2412.00	84.86 AV			1.03 H	199	52.54	32.32
5	4824.00	48.84 PK	74.00	-25.16	1.00 H	21	10.71	38.13
6	4824.00	35.02 AV	54.00	-18.98	1.00 H	21	-3.11	38.13
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	57.12 PK	74.00	-16.88	1.09 V	262	24.88	32.24
2	2390.00	45.91 AV	54.00	-8.09	1.09 V	262	13.67	32.24
3	*2412.00	87.32 PK			1.09 V	262	55.00	32.32
4	*2412.00	77.65 AV			1.09 V	262	45.33	32.32
5	4824.00	48.72 PK	74.00	-25.28	1.00 V	15	10.59	38.13
6	4824.00	35.36 AV	54.00	-18.64	1.00 V	15	-2.77	38.13

- 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	25deg. C, 65%RH 993hPa	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	*2437.00	94.98 PK			1.00 H	206	62.58	32.40
2	*2437.00	84.63 AV			1.00 H	206	52.23	32.40
3	4874.00	48.63 PK	74.00	-25.37	1.02 H	39	10.31	38.32
4	4874.00	34.98 AV	54.00	-19.02	1.02 H	39	-3.34	38.32
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	*2437.00	86.95 PK			1.08 V	267	54.55	32.40
2	*2437.00	77.18 AV			1.08 V	267	44.78	32.40
3	4874.00	48.39 PK	74.00	-25.61	1.05 V	232	10.07	38.32
4	4874.00	34.72 AV	54.00	-19.28	1.05 V	232	-3.60	38.32

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	25deg. C, 65%RH 993hPa	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	*2462.00	95.02 PK			1.05 H	221	62.54	32.48
2	*2462.00	84.63 AV			1.05 H	221	52.15	32.48
3	2483.50	58.52 PK	74.00	-15.48	1.04 H	205	25.96	32.56
4	2483.50	47.64 AV	54.00	-6.36	1.04 H	205	15.08	32.56
5	4924.00	49.35 PK	74.00	-24.65	1.00 H	116	10.89	38.46
6	4924.00	35.59 AV	54.00	-18.41	1.00 H	116	-2.87	38.46
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	87.03 PK			1.06 V	257	54.55	32.48
2	*2462.00	77.31 AV			1.06 V	257	44.83	32.48
3	2483.50	57.29 PK	74.00	-16.71	1.06 V	257	24.73	32.56
4	2483.50	46.56 AV	54.00	-7.44	1.06 V	257	14.00	32.56
5	4924.00	49.16 PK	74.00	-24.84	1.00 V	227	10.70	38.46
6	4924.00	35.45 AV	54.00	-18.55	1.00 V	227	-3.01	38.46

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

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 993hPa	TESTED BY	Mark Liao
TEST MODE	A1		

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	115.45	34.88 QP	43.50	-8.62	1.50 H	88	22.80	12.08
2	199.05	41.04 QP	43.50	-2.46	1.50 H	61	29.70	11.34
3	451.81	30.64 QP	46.00	-15.36	1.00 H	277	11.21	19.43
4	599.58	30.89 QP	46.00	-15.11	1.00 H	58	8.44	22.45
5	665.68	33.99 QP	46.00	-12.01	2.00 H	64	10.21	23.78
6	908.72	34.48 QP	46.00	-11.52	1.50 H	262	6.76	27.72
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	61.01	31.01 QP	40.00	-8.99	1.00 V	208	17.17	13.84
2	74.62	35.02 QP	40.00	-4.98	1.00 V	4	23.31	11.71
3	96.01	36.14 QP	43.50	-7.36	1.00 V	157	26.46	9.68
4	199.05	38.06 QP	43.50	-5.44	2.00 V	85	26.72	11.34
5	265.16	39.77 QP	46.00	-6.23	2.00 V	154	25.76	14.01
6	302.10	41.04 QP	46.00	-4.96	1.25 V	328	25.84	15.20

- 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 11	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 993hPa	TESTED BY	Mark Liao
TEST MODE	A2		

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	80.45	29.44 QP	40.00	-10.56	2.00 H	10	18.97	10.48
2	113.50	32.60 QP	43.50	-10.90	1.50 H	73	20.75	11.84
3	166.00	37.08 QP	43.50	-6.42	2.00 H	64	23.03	14.06
4	488.75	32.12 QP	46.00	-13.88	1.50 H	142	12.04	20.09
5	533.47	32.44 QP	46.00	-13.56	1.50 H	349	11.50	20.93
6	776.51	33.12 QP	46.00	-12.88	1.00 H	133	7.35	25.77
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	78.51	35.49 QP	40.00	-4.51	1.50 V	352	24.62	10.87
2	105.73	35.94 QP	43.50	-7.56	1.25 V	298	25.05	10.89
3	166.00	38.54 QP	43.50	-4.96	1.00 V	223	24.48	14.06
4	399.31	31.80 QP	46.00	-14.20	1.25 V	10	14.18	17.62
5	665.68	36.50 QP	46.00	-9.50	1.00 V	148	12.72	23.78
6	819.28	37.00 QP	46.00	-9.00	1.50 V	181	10.70	26.30

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 993hPa	TESTED BY	Mark Liao
TEST MODE	B1		

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	115.45	35.39 QP	43.50	-8.11	1.50 H	127	23.31	12.08
2	199.05	39.50 QP	43.50	-4.00	1.50 H	58	28.15	11.34
3	249.60	30.79 QP	46.00	-15.21	1.00 H	91	17.32	13.47
4	541.25	31.28 QP	46.00	-14.72	1.50 H	283	10.20	21.08
5	665.68	32.76 QP	46.00	-13.24	1.00 H	10	8.98	23.78
6	702.62	37.48 QP	46.00	-8.52	1.50 H	10	13.21	24.27
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	59.06	32.53 QP	40.00	-7.47	1.00 V	244	18.48	14.06
2	132.95	32.24 QP	43.50	-11.26	1.00 V	10	18.88	13.36
3	162.11	31.74 QP	43.50	-11.76	1.00 V	313	17.39	14.35
4	199.05	32.59 QP	43.50	-10.91	2.00 V	148	21.25	11.34
5	449.87	35.58 QP	46.00	-10.42	1.00 V	10	16.18	19.40
6	910.66	33.84 QP	46.00	-12.16	1.50 V	4	6.09	27.75

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 11	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 993hPa	TESTED BY	Mark Liao
TEST MODE	B2		

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	78.51	27.29 QP	40.00	-12.71	2.00 H	25	16.42	10.87
2	199.05	38.21 QP	43.50	-5.29	1.50 H	61	26.87	11.34
3	403.20	36.11 QP	46.00	-9.89	1.00 H	139	18.36	17.75
4	601.52	33.07 QP	46.00	-12.93	1.00 H	79	10.58	22.49
5	702.62	33.78 QP	46.00	-12.22	2.00 H	349	9.50	24.27
6	935.94	35.13 QP	46.00	-10.87	1.00 H	268	7.02	28.12
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	74.62	37.41 QP	40.00	-2.59	1.00 V	10	25.70	11.71
2	121.28	32.74 QP	43.50	-10.76	1.00 V	85	20.02	12.71
3	164.06	30.64 QP	43.50	-12.86	1.50 V	304	16.44	14.20
4	199.05	32.44 QP	43.50	-11.06	1.50 V	151	21.10	11.34
5	455.70	36.69 QP	46.00	-9.31	1.00 V	343	17.19	19.50
6	935.94	41.87 QP	46.00	-4.13	1.00 V	358	13.75	28.12

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.

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 0.50MHz.
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

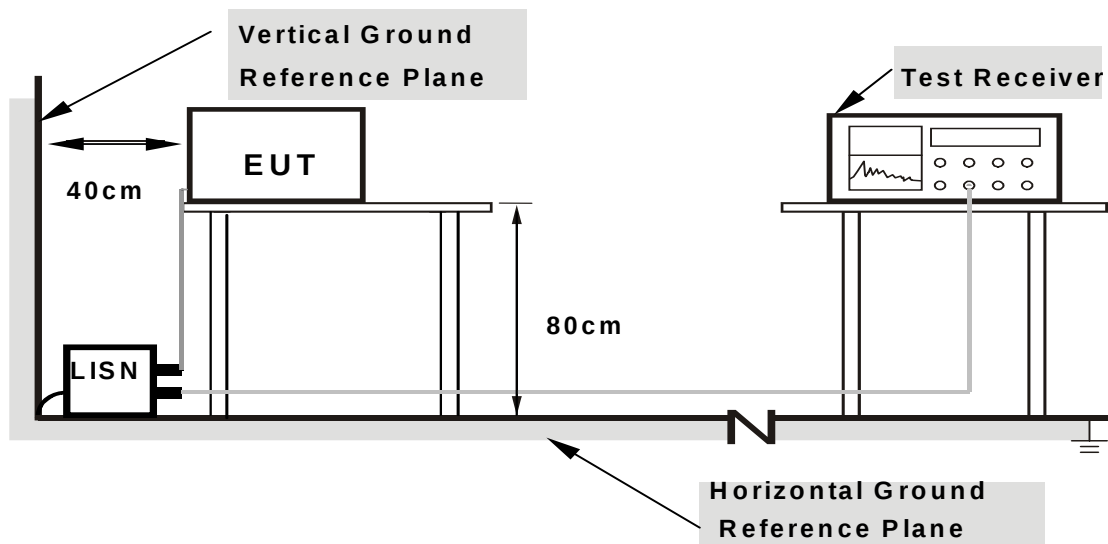
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

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

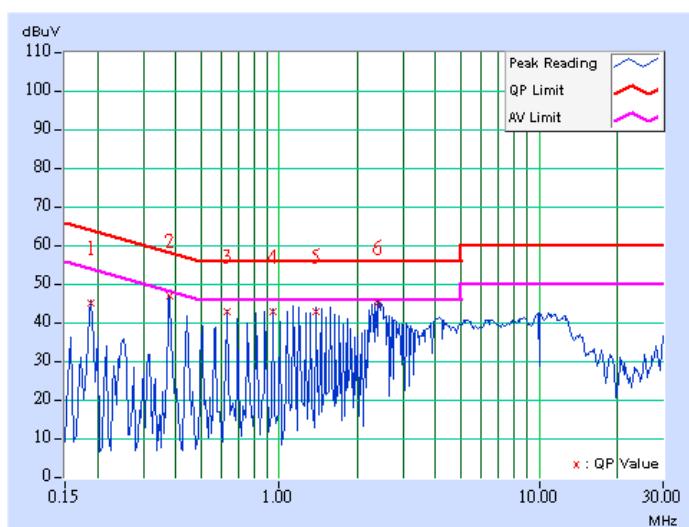
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA: 802.11g OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	PHASE	Line 1
INPUT POWER	120Vac, 60 Hz	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	20deg. C, 70%RH, 991hPa	TESTED BY	Mark Liao
TEST MODE	A1		

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.188	0.10	44.77	-	44.87	-	64.13	54.13	-19.26	-
2	0.378	0.10	46.80	-	46.90	-	58.32	48.32	-11.42	-
3	0.629	0.10	42.59	-	42.69	-	56.00	46.00	-13.31	-
4	0.944	0.11	42.74	-	42.85	-	56.00	46.00	-13.15	-
5	1.385	0.15	42.62	-	42.77	-	56.00	46.00	-13.23	-
6	2.393	0.23	44.80	-	45.03	-	56.00	46.00	-10.97	-

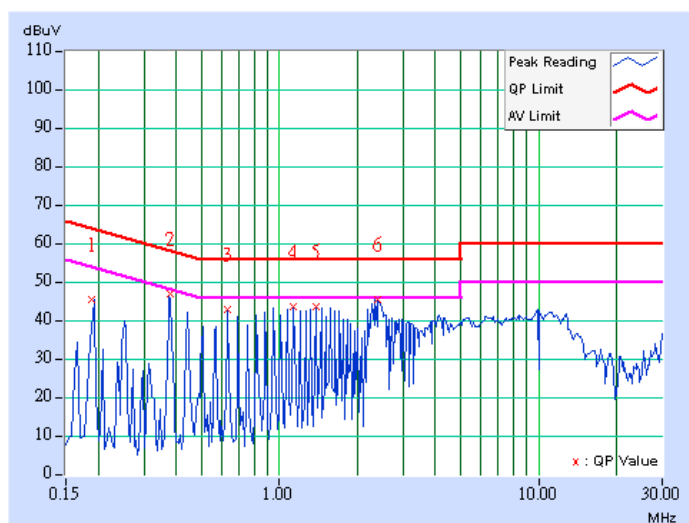
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	PHASE	Line 2
INPUT POWER	120Vac, 60 Hz	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	20deg. C, 70%RH, 991hPa	TESTED BY	Mark Liao
TEST MODE	A1		

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.188	0.10	45.45	-	45.55	-	64.10	54.10	-18.55	-
2	0.378	0.10	46.90	-	47.00	-	58.33	48.33	-11.33	-
3	0.629	0.14	42.85	-	42.99	-	56.00	46.00	-13.01	-
4	1.133	0.21	43.38	-	43.59	-	56.00	46.00	-12.41	-
5	1.385	0.21	43.37	-	43.58	-	56.00	46.00	-12.42	-
6	2.393	0.23	45.34	-	45.57	-	56.00	46.00	-10.43	-

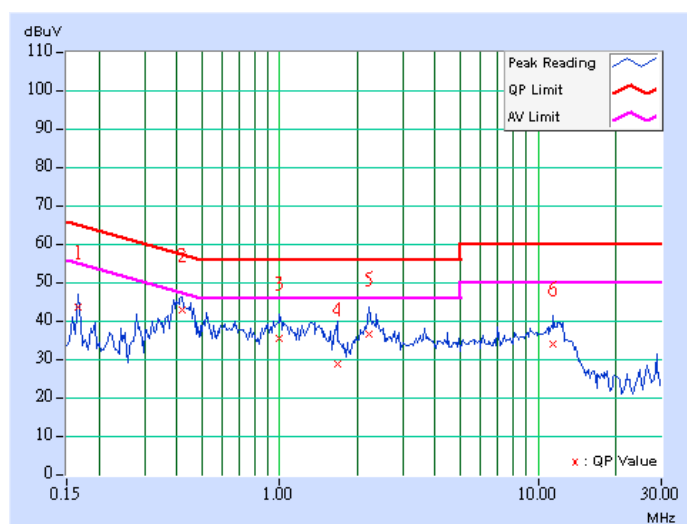
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	PHASE	Line 1
INPUT POWER	120Vac, 60 Hz	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	20deg. C, 70%RH, 991hPa	TESTED BY	Mark Liao
TEST MODE	A2		

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.166	0.10	43.42	-	43.52	-	65.18	55.18	-21.66	-
2	0.420	0.10	42.49	-	42.59	-	57.46	47.46	-14.87	-
3	0.998	0.11	35.16	-	35.27	-	56.00	46.00	-20.73	-
4	1.668	0.18	28.44	-	28.62	-	56.00	46.00	-27.38	-
5	2.227	0.23	36.20	-	36.43	-	56.00	46.00	-19.57	-
6	11.481	0.37	33.86	-	34.23	-	60.00	50.00	-25.77	-

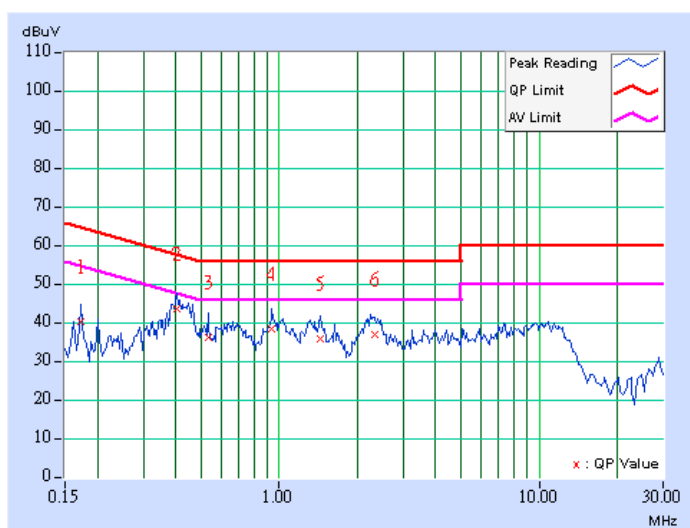
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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
INPUT POWER	120Vac, 60 Hz	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	20deg. C, 70%RH, 991hPa	TESTED BY	Mark Liao
TEST MODE	A2		

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.173	0.10	40.07	-	40.17	-	64.79	54.79	-24.62	-
2	0.404	0.10	43.64	-	43.74	-	57.77	47.77	-14.03	-
3	0.533	0.12	35.89	-	36.01	-	56.00	46.00	-19.99	-
4	0.939	0.20	38.23	-	38.43	-	56.00	46.00	-17.57	-
5	1.434	0.21	35.52	-	35.73	-	56.00	46.00	-20.27	-
6	2.348	0.23	36.79	-	37.02	-	56.00	46.00	-18.98	-

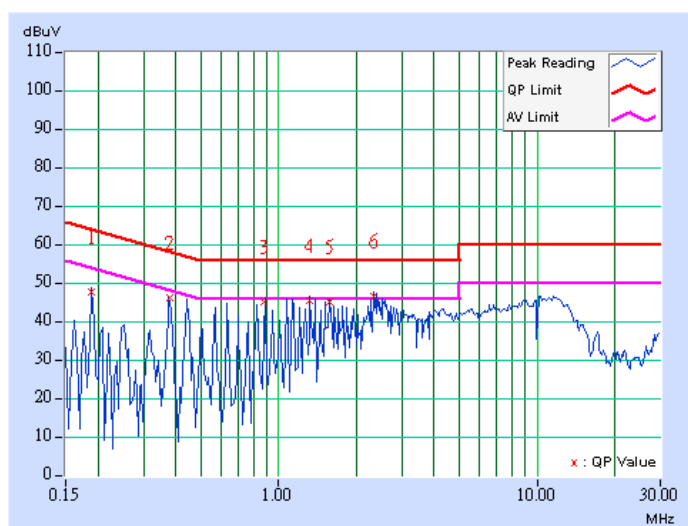
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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
INPUT POWER	120Vac, 60 Hz	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	20deg. C, 70%RH, 991hPa	TESTED BY	Mark Liao
TEST MODE	B1		

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.189	0.10	47.40	-	47.50	-	64.08	54.08	-16.58	-
2	0.378	0.10	45.89	-	45.99	-	58.33	48.33	-12.34	-
3	0.882	0.11	44.77	-	44.88	-	56.00	46.00	-11.12	-
4	1.324	0.15	45.38	-	45.53	-	56.00	46.00	-10.47	-
5	1.578	0.17	44.86	-	45.03	-	56.00	46.00	-10.97	-
6	2.335	0.23	46.35	44.35	46.58	44.58	56.00	46.00	-9.42	-1.42

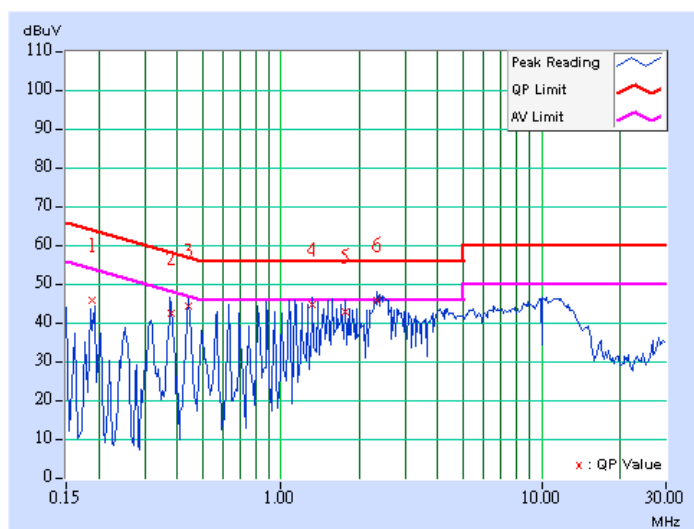
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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
INPUT POWER	120Vac, 60 Hz	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	20deg. C, 70%RH, 991hPa	TESTED BY	Mark Liao
TEST MODE	B1		

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.189	0.10	45.81	-	45.91	-	64.09	54.09	-18.18	-
2	0.378	0.10	42.38	-	42.48	-	58.33	48.33	-15.85	-
3	0.441	0.11	44.04	-	44.15	-	57.04	47.04	-12.90	-
4	1.323	0.21	44.49	-	44.70	-	56.00	46.00	-11.30	-
5	1.763	0.22	42.57	-	42.79	-	56.00	46.00	-13.21	-
6	2.330	0.23	45.62	-	45.85	-	56.00	46.00	-10.15	-

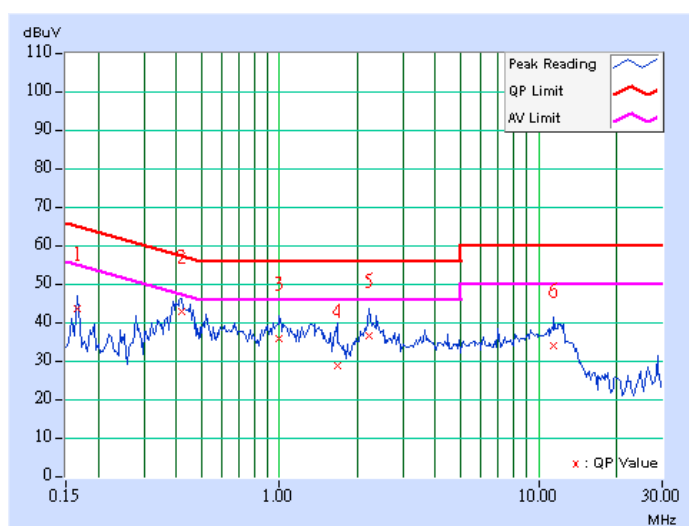
- REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = 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
INPUT POWER	120Vac, 60 Hz	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	20deg. C, 70%RH, 991hPa	TESTED BY	Mark Liao
TEST MODE	B2		

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.166	0.10	43.38	-	43.48	-	65.18	55.18	-21.70	-
2	0.420	0.10	42.43	-	42.53	-	57.46	47.46	-14.93	-
3	0.998	0.11	35.55	-	35.66	-	56.00	46.00	-20.34	-
4	1.668	0.18	28.35	-	28.53	-	56.00	46.00	-27.47	-
5	2.227	0.23	36.19	-	36.42	-	56.00	46.00	-19.58	-
6	11.480	0.37	33.78	-	34.15	-	60.00	50.00	-25.85	-

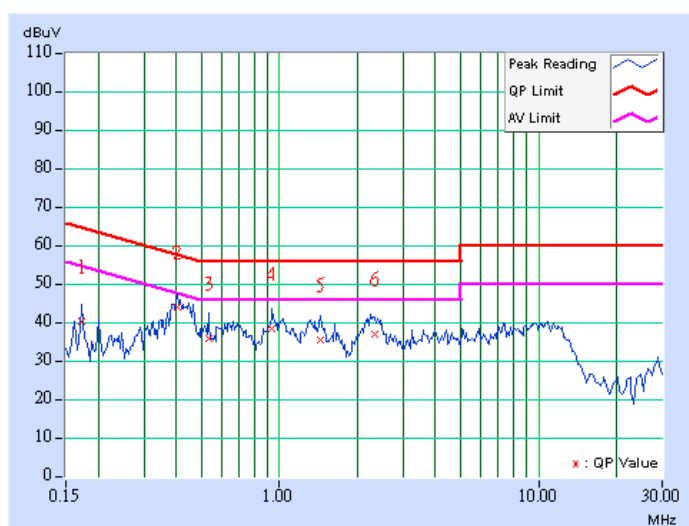
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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 11	PHASE	Line 2
INPUT POWER	120Vac, 60 Hz	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	20deg. C, 70%RH, 991hPa	TESTED BY	Mark Liao
TEST MODE	B2		

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.173	0.10	40.07	-	40.17	-	64.79	54.79	-24.62	-
2	0.404	0.10	43.70	-	43.80	-	57.77	47.77	-13.97	-
3	0.533	0.12	35.81	-	35.93	-	56.00	46.00	-20.07	-
4	0.939	0.20	38.19	-	38.39	-	56.00	46.00	-17.61	-
5	1.434	0.21	35.46	-	35.67	-	56.00	46.00	-20.33	-
6	2.348	0.23	36.98	-	37.21	-	56.00	46.00	-18.79	-

- 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
R&S SPECTRUM ANALYZER	FSP40	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.

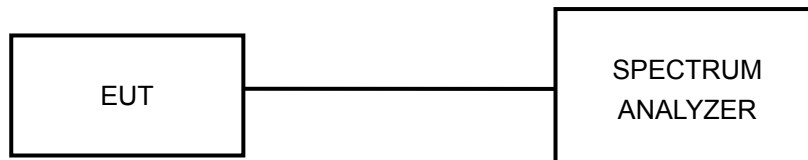
4.3.3 TEST PROCEDURE

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



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.

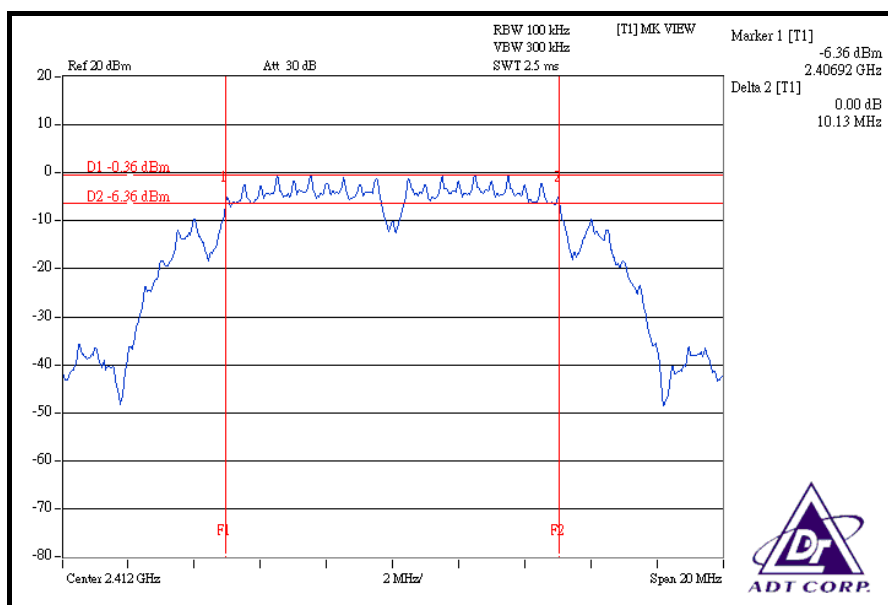
4.3.7 TEST RESULTS

802.11b DSSS MODULATION

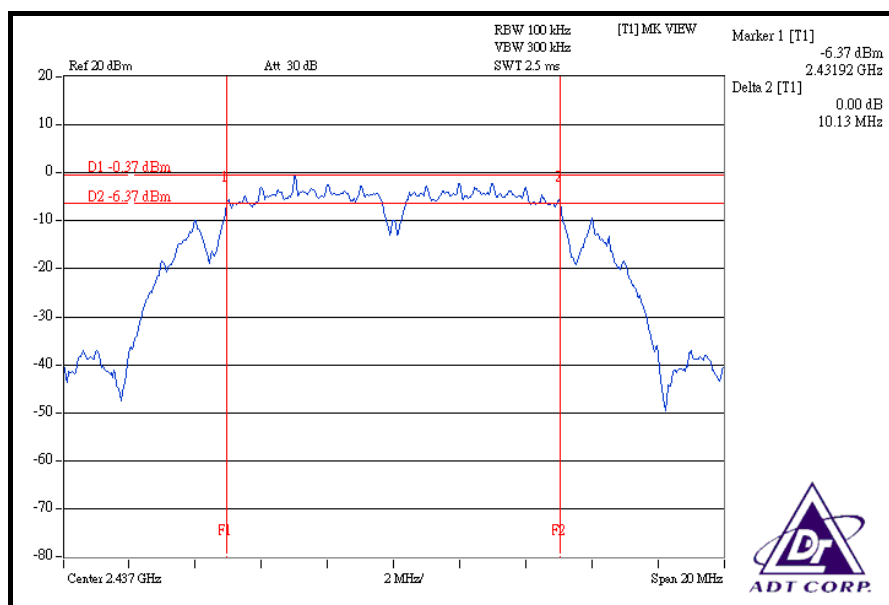
MODULATION TYPE	DBPSK	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60Hz	TESTED BY	Brad Wu

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.13	0.5	PASS
6	2437	10.13	0.5	PASS
11	2462	10.10	0.5	PASS

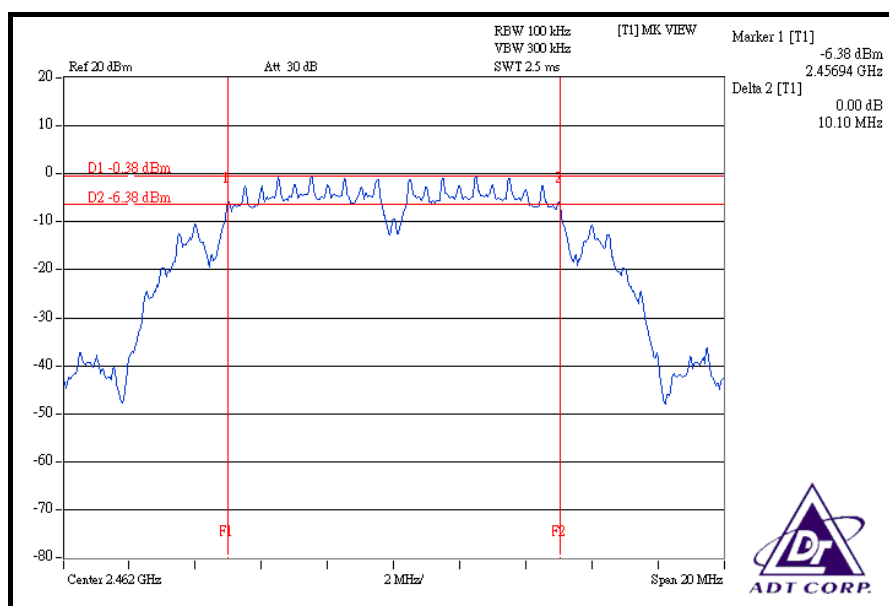
CH 1



CH 6



CH 11

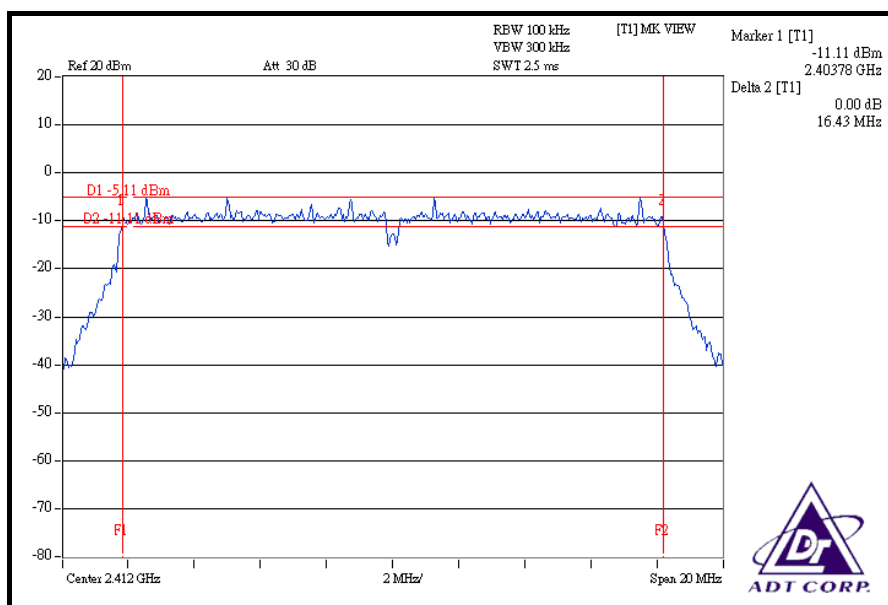


802.11g OFDM MODULATION

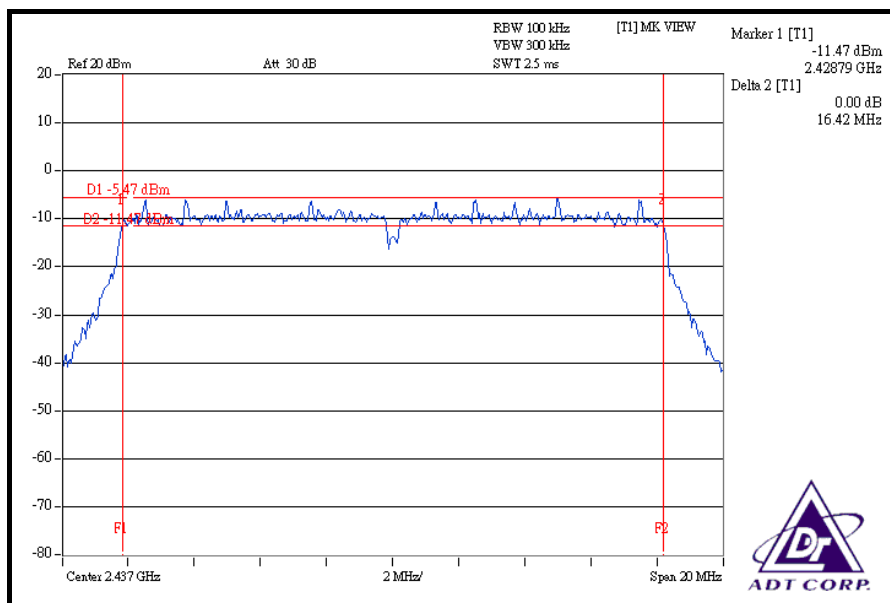
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60Hz	TESTED BY	Brad Wu

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.43	0.5	PASS
6	2437	16.42	0.5	PASS
11	2462	16.45	0.5	PASS

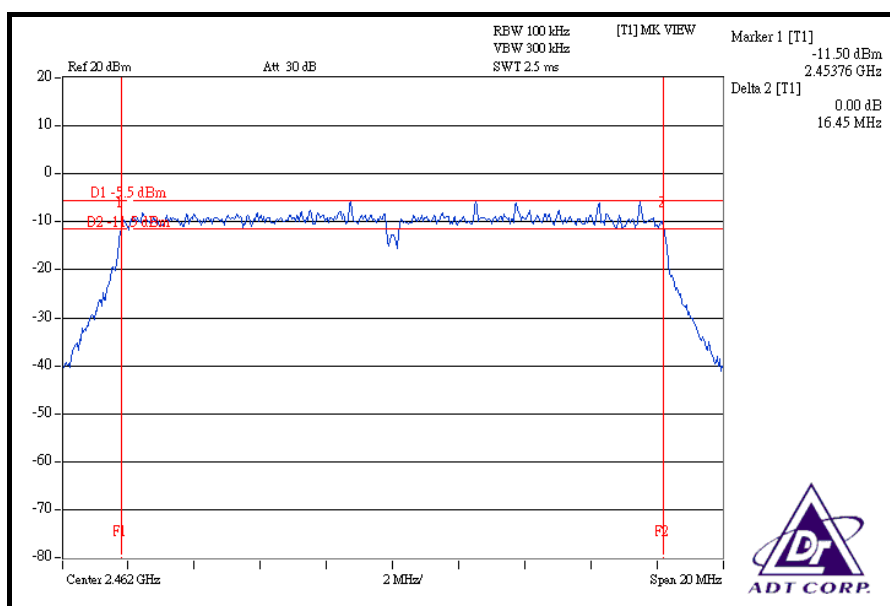
CH 1



CH 6



CH 11



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	FSP40	100040	Jun. 28, 2008
AGILENT SYNTHESIZED SIGNAL GENERATOR	E8257C	MY43320668	Dec. 25, 2008
DIGITAL RT 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 detector was used on the output port of the EUT. An oscilloscope was used to read the response of the detector.
- Replaced the EUT by the signal generator. The center frequency of the S.G was adjusted to the center frequency of the measured channel.
- Adjusted the power to have the same 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 Item 4.3.6

4.4.7 TEST RESULTS

802.11b DSSS MODULATION

MODULATION TYPE	DBPSK	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
INPUT POWER	120Vac, 60Hz	TESTED BY	Brad Wu

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	12.882	11.10	30	PASS
6	2437	12.942	11.12	30	PASS
11	2462	12.823	11.08	30	PASS

802.11g OFDM MODULATION

MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
INPUT POWER	120Vac, 60Hz	TESTED BY	Brad Wu

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	12.912	11.11	30	PASS
6	2437	12.794	11.07	30	PASS
11	2462	13.002	11.14	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	FSP40	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

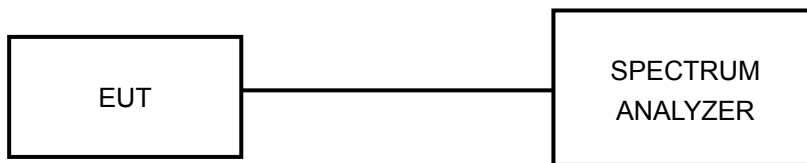
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

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 CONDITION

Same as Item 4.3.6

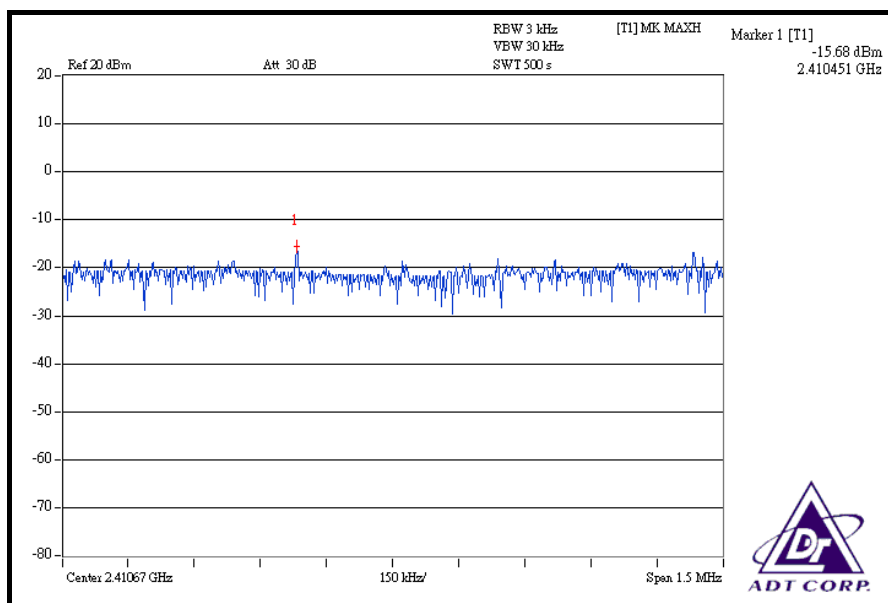
4.5.7 TEST RESULTS

802.11b DSSS MODULATION

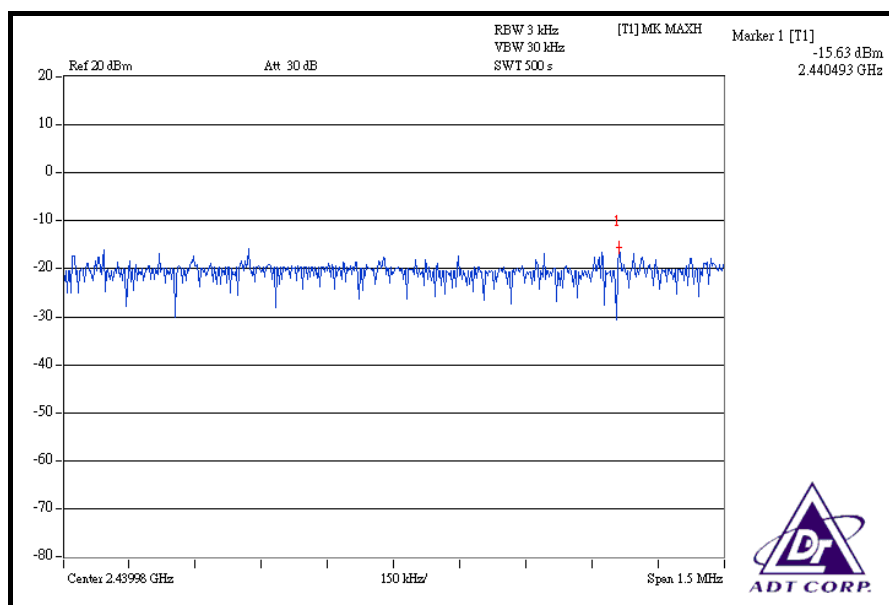
MODULATION TYPE	DBPSK	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60Hz	TESTED BY	Brad Wu

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	2412	-15.68	8	PASS
6	2437	-15.63	8	PASS
11	2462	-15.55	8	PASS

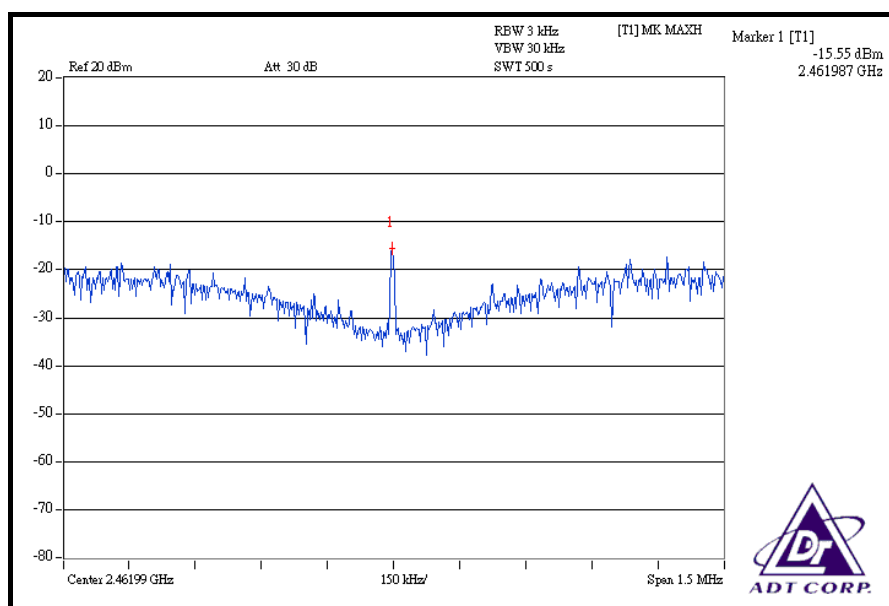
CH 1



CH 6



CH 11

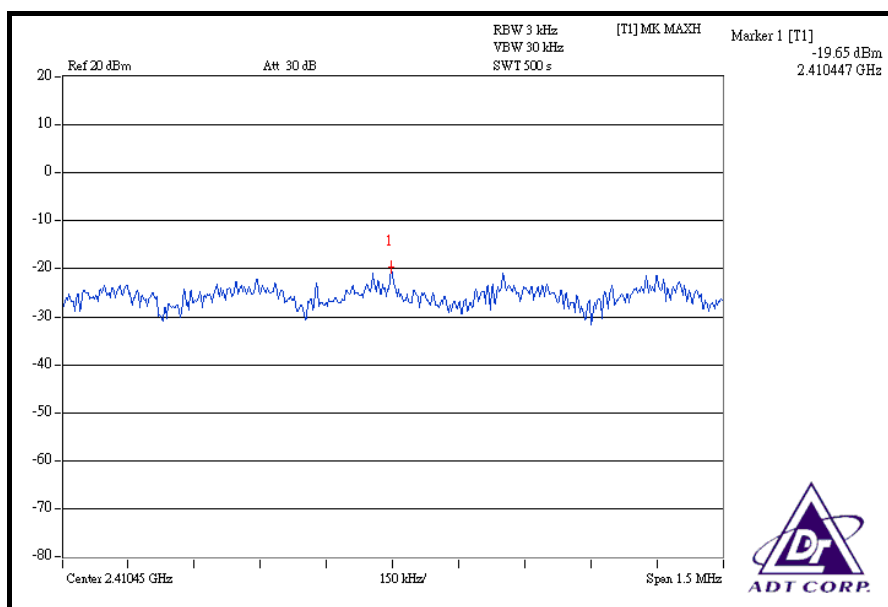


802.11g OFDM MODULATION

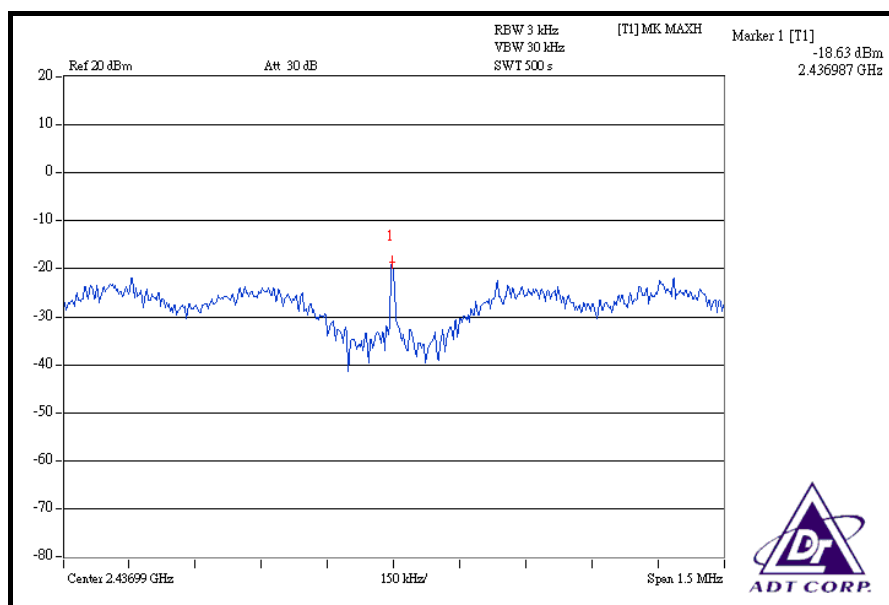
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60Hz	TESTED BY	Brad Wu

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	2412	-19.65	8	PASS
6	2437	-18.63	8	PASS
11	2462	-18.66	8	PASS

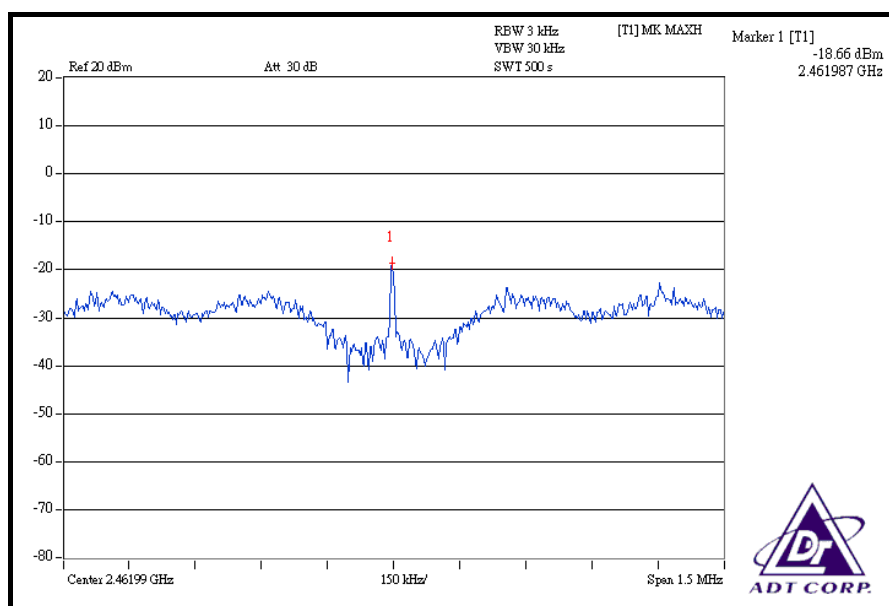
CH 1



CH 6



CH 11



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	FSP40	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 Item 4.3.6

4.6.6 TEST RESULTS

The spectrum plots are attached on the following pages. 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).

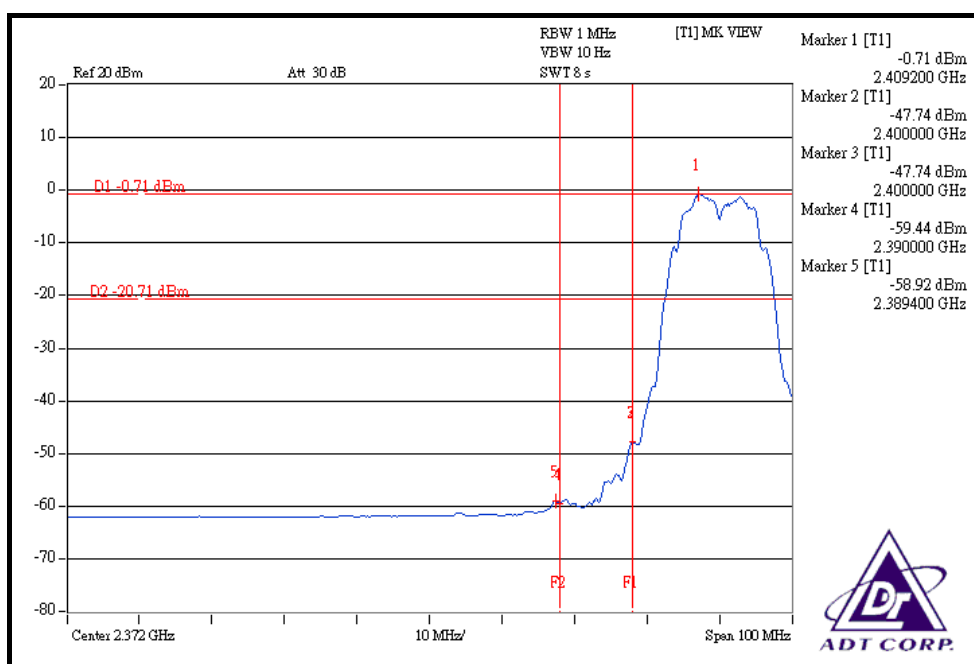
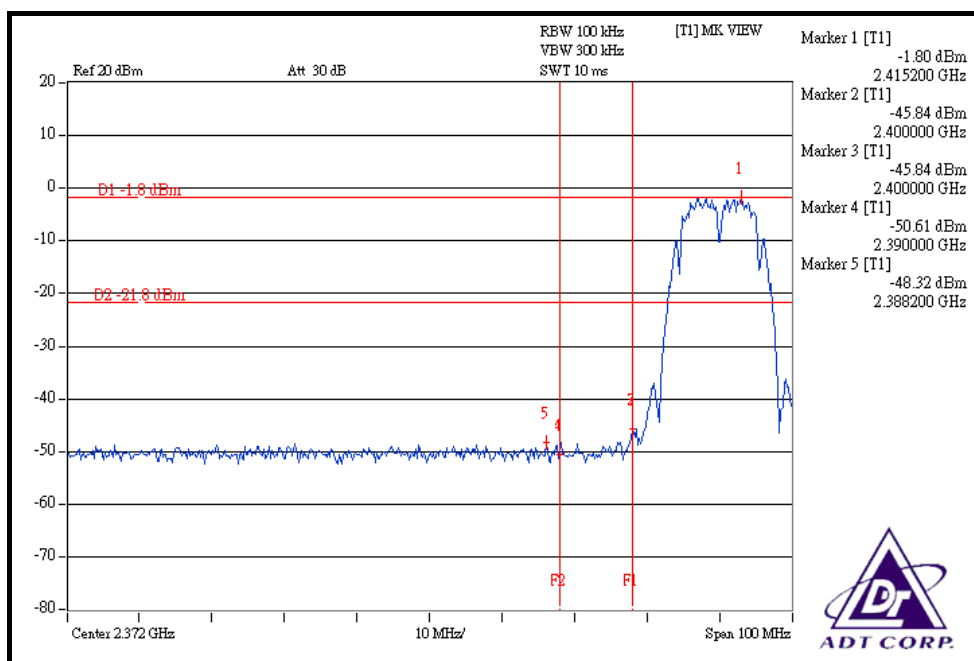
802.11b DSSS MODULATION

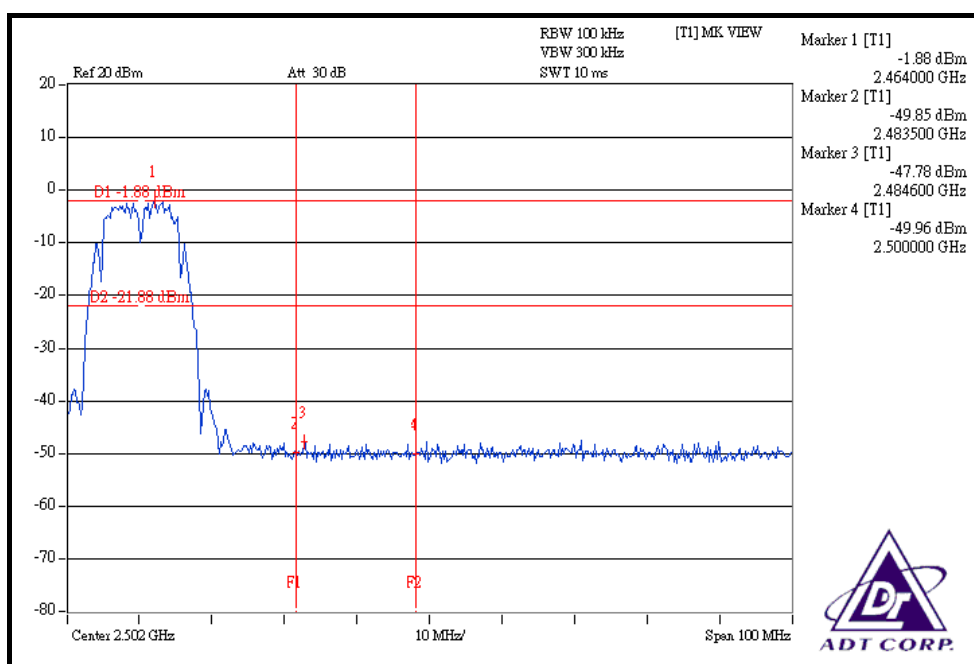
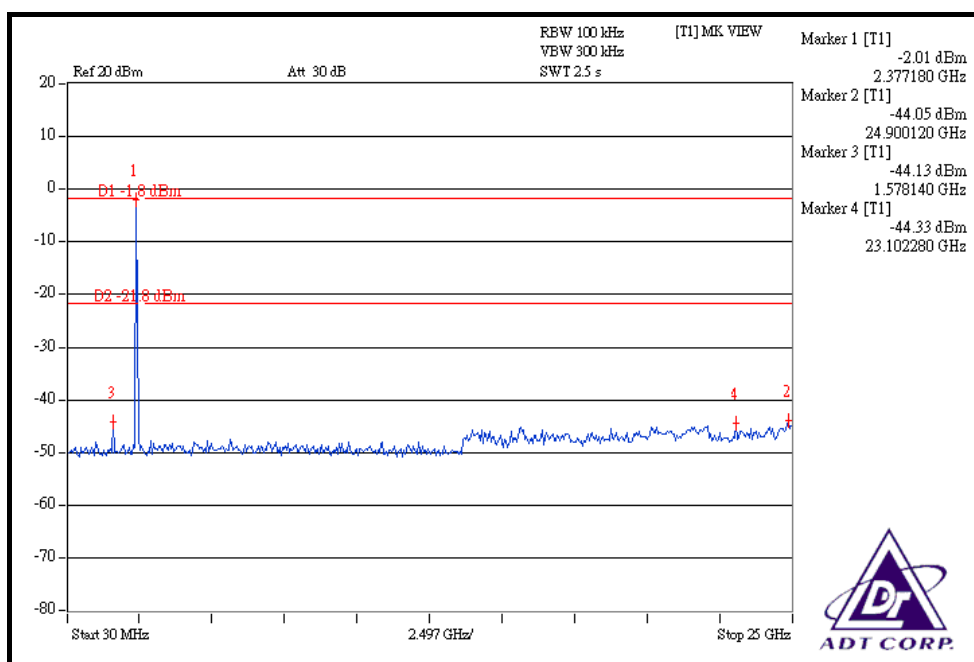
NOTE 1: The band edge emission plot on the next page shows 46.52dBc between carrier maximum power and local maximum emission in restrict band (2.38820GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 95.18dBuV/m (Peak), so the maximum field strength in restrict band is $95.18 - 46.52 = 48.66\text{dBuV/m}$ which is under 74dBuV/m limit.

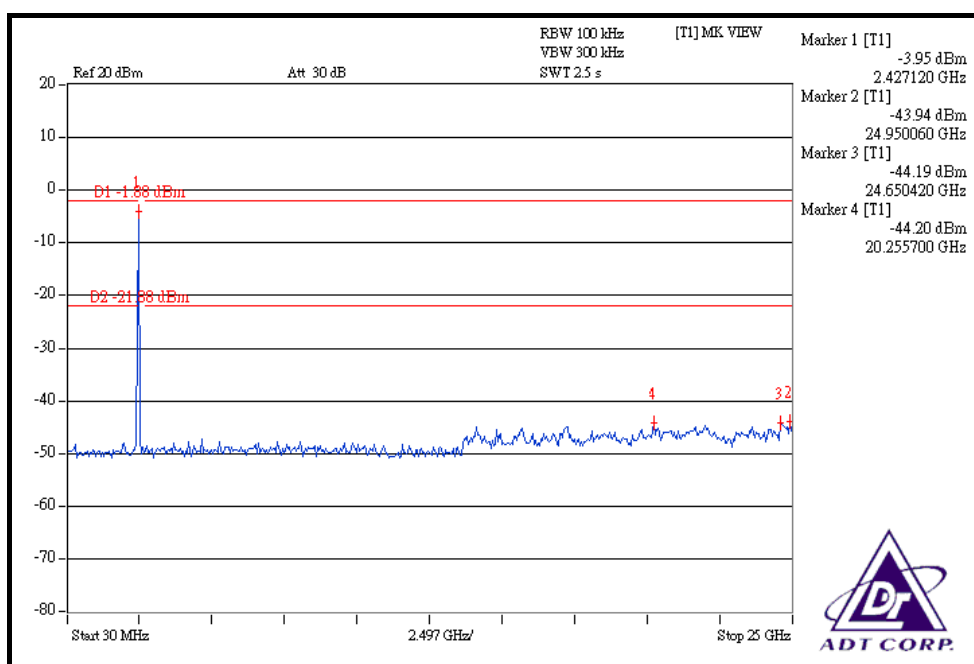
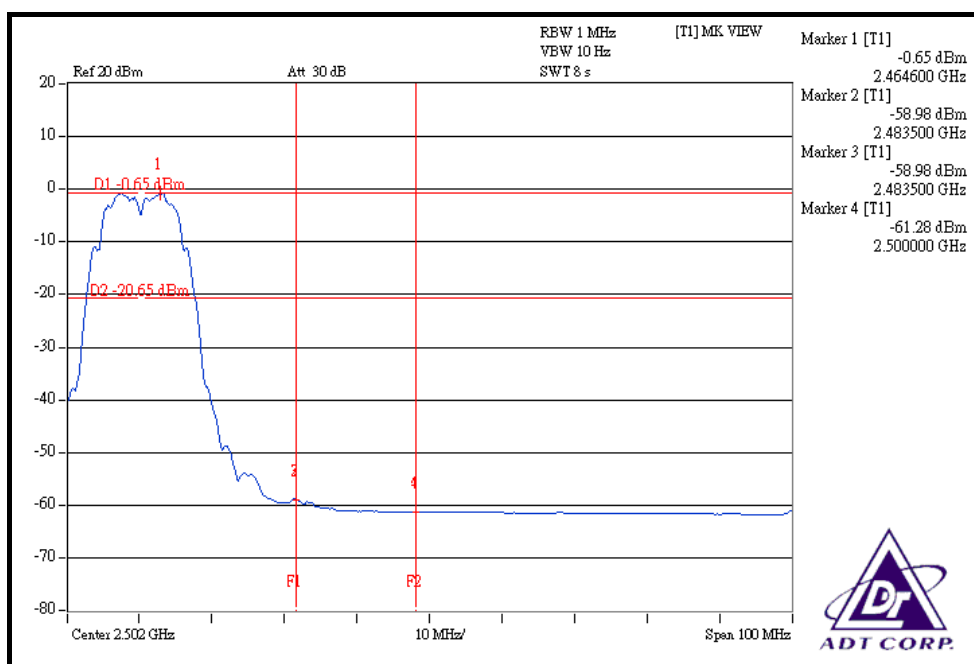
The band edge emission plot on the next page shows 58.21dBc between carrier maximum power and local maximum emission in restrict band (2.38940GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 91.12dBuV/m (Peak), so the maximum field strength in restrict band is $91.12 - 58.21 = 32.91\text{dBuV/m}$ which is under 54dBuV/m limit.

NOTE 2: The band edge emission plot on the next second page shows 45.90dBc between carrier maximum power and local maximum emission in restrict band (2.48460GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 94.98dBuV/m (Peak), so the maximum field strength in restrict band is $94.98 - 45.90 = 49.08\text{dBuV/m}$ which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 58.33dBc between carrier maximum power and local maximum emission in restrict band (2.48350GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 90.92dBuV/m (Peak), so the maximum field strength in restrict band is $90.92 - 58.33 = 32.59\text{dBuV/m}$ which is under 54dBuV/m limit.







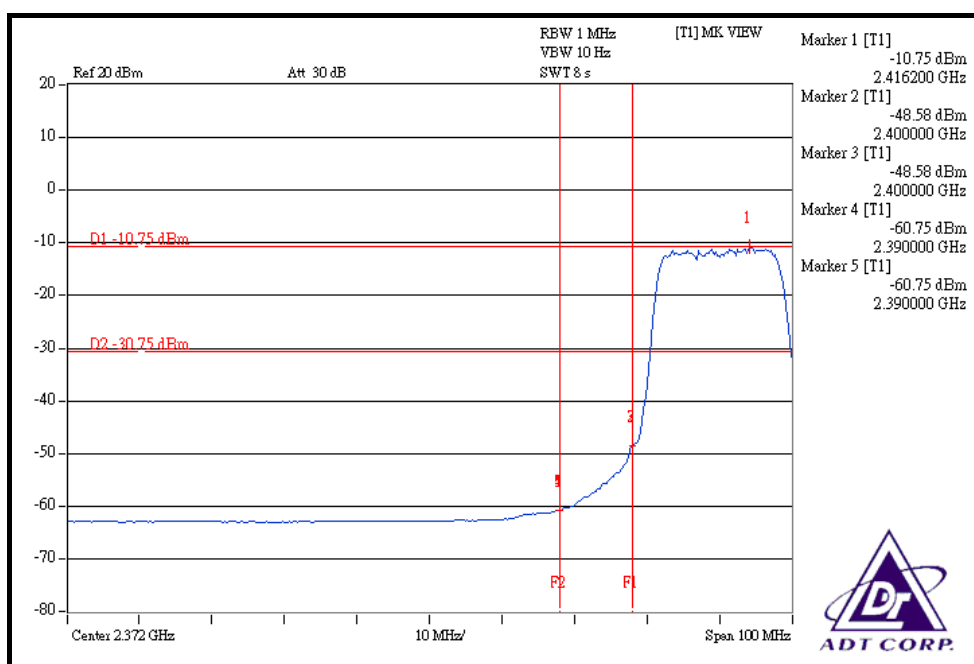
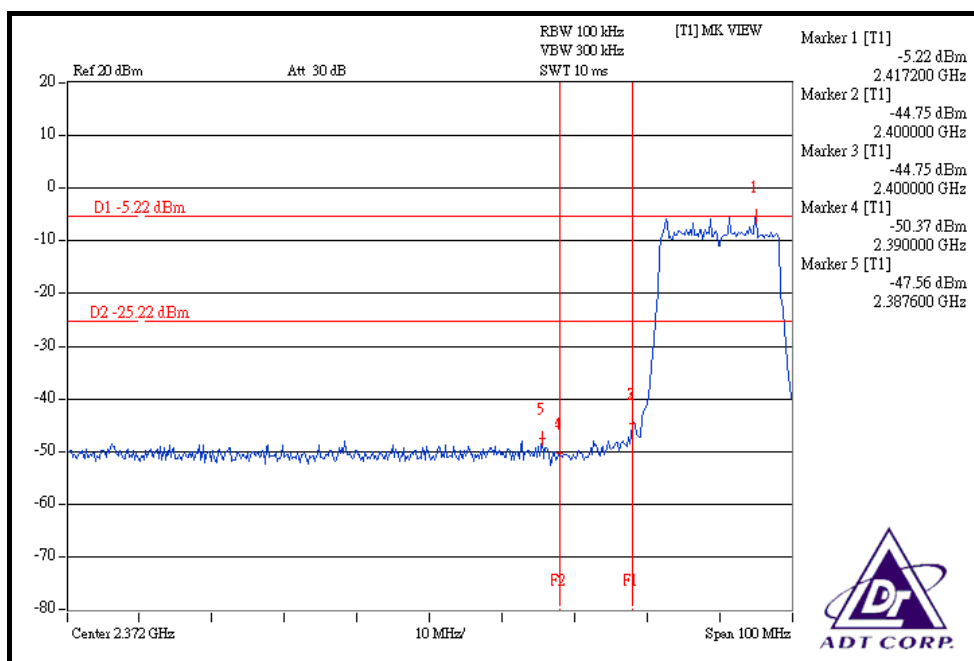
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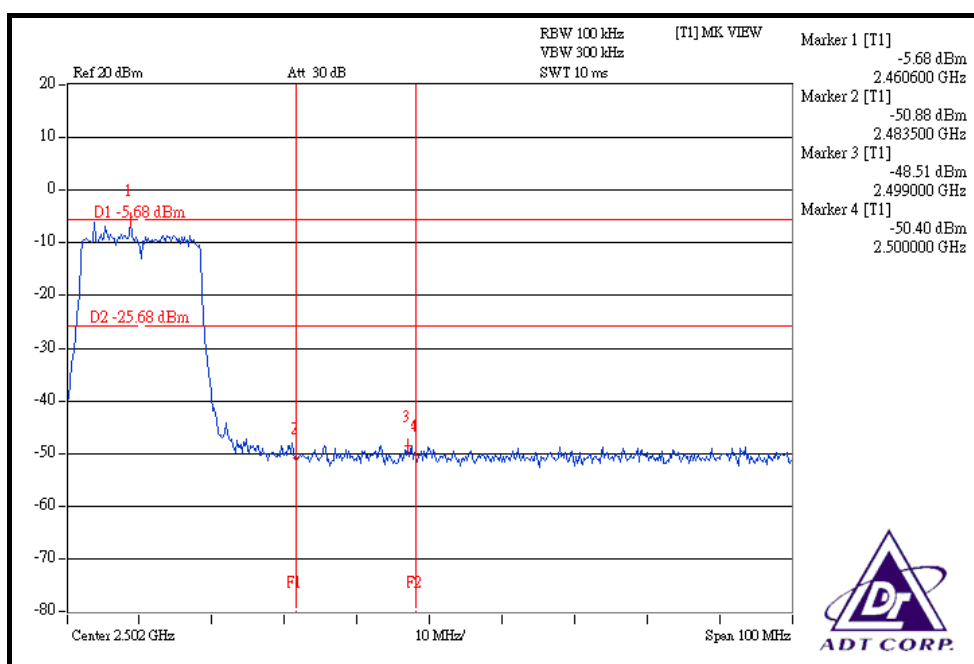
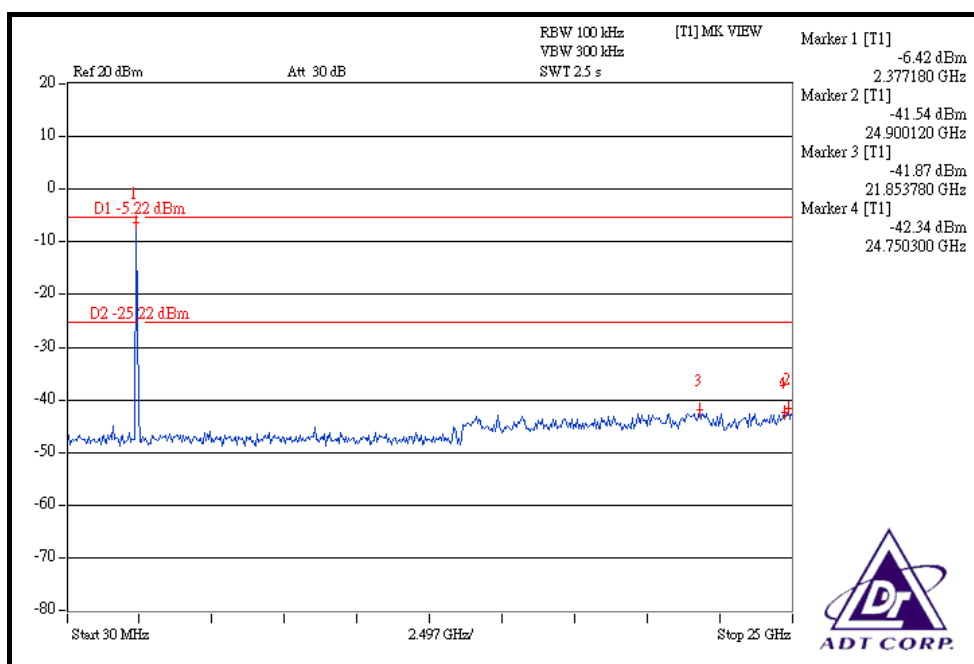
NOTE 1: The band edge emission plot on the next page shows 42.34dBc between carrier maximum power and local maximum emission in restrict band (2.38760GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 95.26dBuV/m (Peak), so the maximum field strength in restrict band is $95.26 - 42.34 = 52.92\text{dBuV/m}$ which is under 74dBuV/m limit.

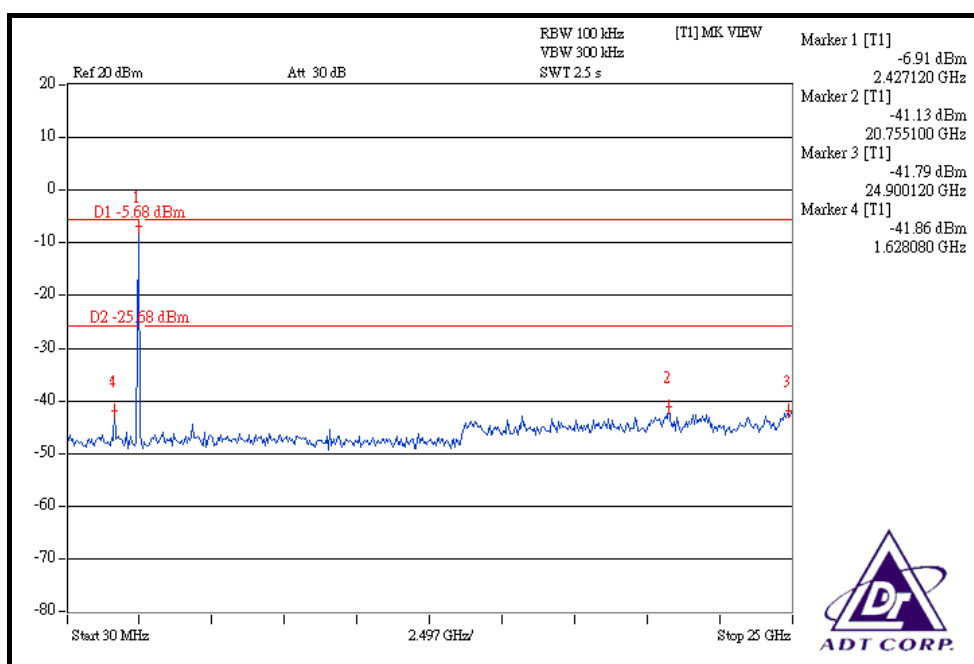
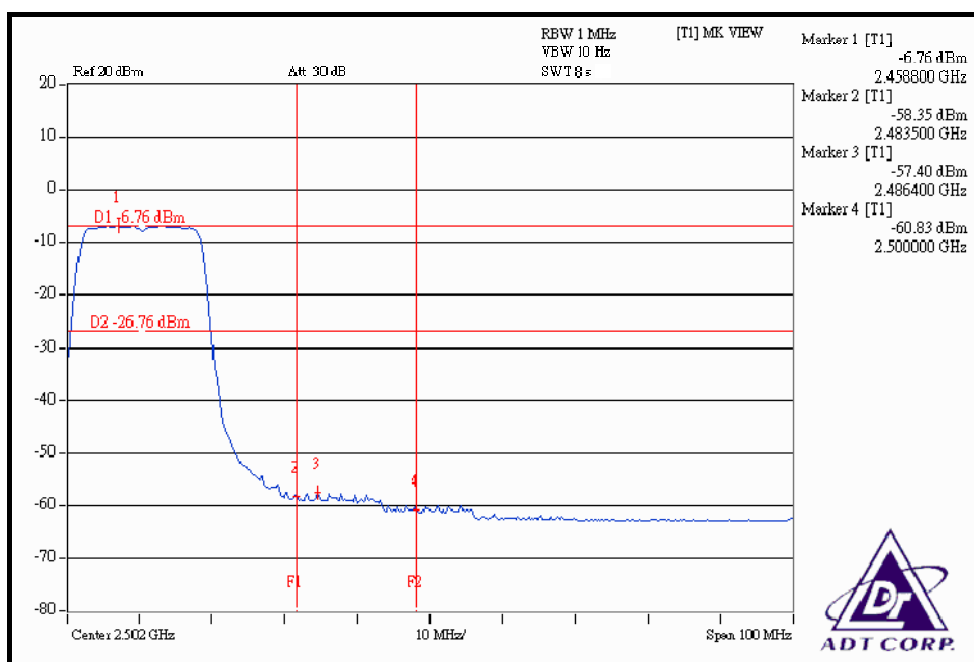
The band edge emission plot on the next page shows 50.00dBc between carrier maximum power and local maximum emission in restrict band (2.39000GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 84.86dBuV/m (Peak), so the maximum field strength in restrict band is $84.86 - 50.00 = 34.86\text{dBuV/m}$ which is under 54dBuV/m limit.

NOTE 2: The band edge emission plot on the next second page shows 42.83dBc between carrier maximum power and local maximum emission in restrict band (2.49900GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 95.02dBuV/m (Peak), so the maximum field strength in restrict band is $95.02 - 42.83 = 52.19\text{dBuV/m}$ which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 50.64dBc between carrier maximum power and local maximum emission in restrict band (2.48640GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 84.63dBuV/m (Peak), so the maximum field strength in restrict band is $84.63 - 50.64 = 33.99\text{dBuV/m}$ 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 PIFA antenna with UFL antenna connector. The maximum gain of the antenna is 2.2dBi.

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.