



# FCC TEST REPORT

**REPORT NO.:** RF961002L02

**MODEL NO.:** F5D8231-4 v5000

**RECEIVED:** Oct. 02, 2007

**TESTED:** Oct. 04 ~ Dec. 24, 2007

**ISSUED:** Dec. 28, 2007

**APPLICANT:** Belkin International, Inc.

**ADDRESS:** 501 West Walnut Street, Compton, CA  
90220-5221

**ISSUED BY:** Advance Data Technology Corporation

**LAB ADDRESS:** 47 14<sup>th</sup> Lin, Chiapau Tsun, Linko, Taipei, Taiwan,  
R.O.C.

**TEST LOCATION:** No. 19, Hwa Ya 2<sup>nd</sup> Rd., Kueishan, Taoyuan,  
Taiwan, R.O.C.

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## 1. CERTIFICATION

**PRODUCT:** N1 Wireless Router

**MODEL:** F5D8231-4 v5000

**BRAND:** Belkin

**APPLICANT:** Belkin International, Inc.

**TESTED:** Oct. 04 ~ Dec. 24, 2007

**TEST SAMPLE:** ENGINEERING SAMPLE

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

ANSI C63.4-2003

The above equipment (model: F5D8231-4 v5000) 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** : Wendy Liao , **DATE:** Dec. 28, 2007  
Wendy Liao / Senior Specialist

**TECHNICAL ACCEPTANCE** : Long Chen , **DATE:** Dec. 28, 2007  
Responsible for RF Long Chen / Senior Engineer

**APPROVED BY** : Gary Chang , **DATE:** Dec. 28, 2007  
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 -10.61 dB at 0.330 MHz.
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)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -1.17 dB at 2386.00 MHz.
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	3.34 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

<b>PRODUCT</b>	N1 Wireless Router
<b>MODEL NO.</b>	F5D8231-4 v5000
<b>FCC ID</b>	K7SF5D8231-4E
<b>POWER SUPPLY</b>	12Vdc from AC adapter
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
<b>MODULATION TECHNOLOGY</b>	DSSS, OFDM
<b>TRANSFER RATE</b>	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps Draft 802.11n: up to 300Mbps
<b>FREQUENCY RANGE</b>	2412MHz ~ 2462MHz
<b>NUMBER OF CHANNEL</b>	11 for 802.11b, 802.11g, Draft 802.11n (20MHz) 7 for Draft 802.11n (40MHz)
<b>MAXIMUM OUTPUT POWER</b>	126.92mW
<b>ANTENNA TYPE</b>	Dipole antenna with 2dBi gain
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	RJ45
<b>ACCESSORY DEVICES</b>	Adapter

#### NOTE:

1. The EUT was powered by the following adapters:

<b>ADAPTER 1</b>	
<b>BRAND:</b>	DVE
<b>MODEL:</b>	DSA-12R-12 AUS 120120
<b>INPUT:</b>	100-120Vac, 50-60Hz, 0.3A
<b>OUTPUT:</b>	12Vdc, 1A
<b>POWER LINE:</b>	1.8m non-shielded cable without core

<b>ADAPTER 2</b>	
<b>BRAND:</b>	LEI
<b>MODEL:</b>	MT12-2120100-A1
<b>INPUT:</b>	100-120Vac, 60Hz, 0.5A
<b>OUTPUT:</b>	12Vdc, 1A
<b>POWER LINE:</b>	1.8m non-shielded cable without core

2. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and three receivers.
3. The EUT is 2 \* 3 spatial MIMO (2Tx & 3Rx) without beam forming function.



4. When the EUT operating in 802.11b/g is for single Tx.
5. When the EUT operating in draft 802.11n, the software operation, which is defined by manufacturer, only set 0 ~ 15 of "MCS" (MCS: Modulation and Coding Schemes) for dual Tx.
6. The EUT complies with draft 802.11n standards and backwards compatible with 802.11b, 802.11g products.
7. The EUT operates in the 2.4GHz frequency spectrum with throughput of up to 300Mbps.
8. 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 for 802.11b, 802.11g and draft 802.11n (20MHz):

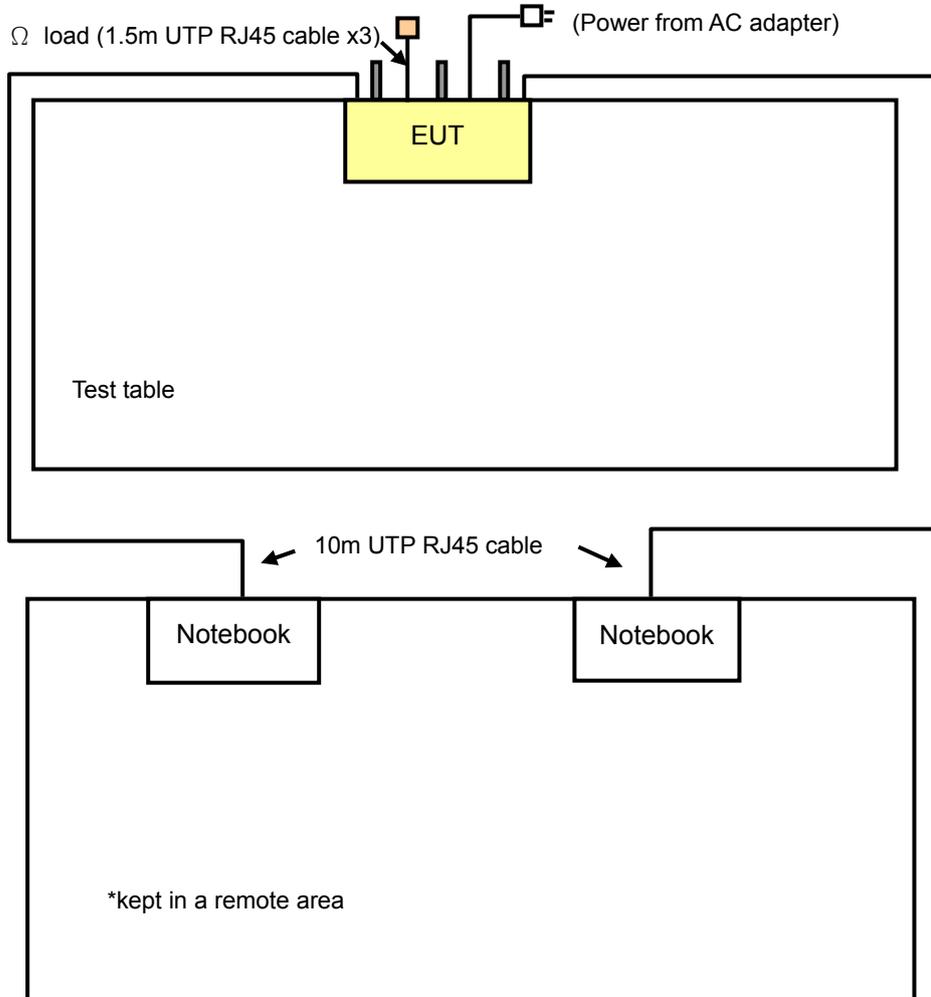
CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

Seven channels are provided for draft 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2422MHz	5	2442MHz
2	2427MHz	6	2447MHz
3	2432MHz	7	2452MHz
4	2437MHz		

### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

100  $\Omega$  load (1.5m UTP RJ45 cable x3) (Power from AC adapter)



### 3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE ≥ 1G	RE < 1G	PLC	APCM	
A	-	√	√	-	Adapter 1 (model no: DSA-12R-12 AUS 120120 )
B	√	√	√	√	Adapter 2 (model no: MT12-2120100-A1 )

Where **RE ≥ 1G**: Radiated Emission above 1GHz

**RE < 1G**: Radiated Emission below 1GHz

**PLC**: Power Line Conducted Emission

**APCM**: Antenna Port Conducted Measurement

"\_" means no effect.

#### **RADIATED EMISSION TEST (ABOVE 1 GHz):**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- 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)
B	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
B	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
B	Draft 802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
B	Draft 802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	15.0

#### **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 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)
A - B	Draft 802.11n (20MHz)	1 to 11	6	OFDM	BPSK	7.2



**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)
A - B	Draft 802.11n (20MHz)	1 to 11	6	OFDM	BPSK	7.2

**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)
B	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
B	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
B	Draft 802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	7.2
B	Draft 802.11n (40MHz)	1 to 7	1, 7	OFDM	BPSK	15.0

**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)
B	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
B	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
B	Draft 802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
B	Draft 802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	15.0



### 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	DELL	D600	CN-0G5152-4864 3-49C-8226	FCC DoC Approved
2	Notebook	DELL	D600	CN-0G5152-4864 3-49C-8221	FCC DoC Approved

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).
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	100041	Feb. 26, 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. 28, 2007
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

- 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.

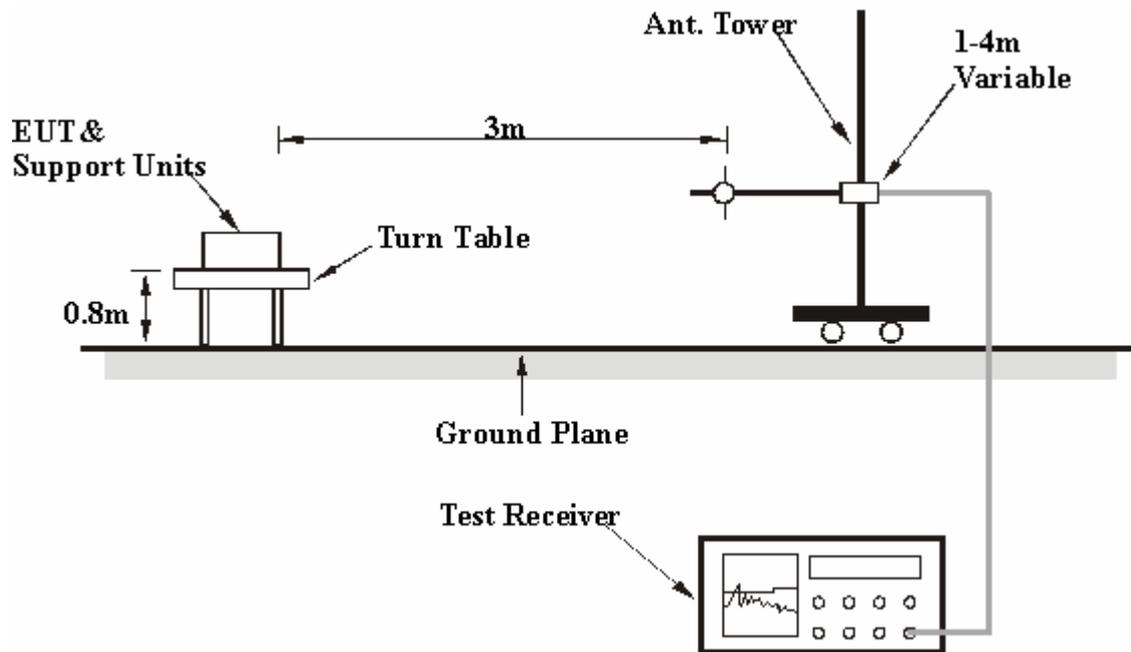
**NOTE:**

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

- Placed the EUT on the testing table.
- Prepared other notebook systems to act as a communication partners and placed them outside of testing area.
- The communication partners run a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency via an RJ45 cable.
- The communication partner sent data to EUT by command "PING".

#### 4.1.7 TEST RESULTS

#### ABOVE 1GHz WORST-CASE DATA 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 1020hPa	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	57.43 PK	74.00	-16.57	1.22 H	264	25.19	32.24
2	2390.00	45.51 AV	54.00	-8.49	1.22 H	264	13.27	32.24
3	*2412.00	101.47 PK			1.22 H	264	69.15	32.32
4	*2412.00	96.72 AV			1.22 H	264	64.40	32.32
5	4824.00	52.33 PK	74.00	-21.67	1.11 H	172	14.20	38.13
6	4824.00	45.31 AV	54.00	-8.69	1.11 H	172	7.18	38.13
7	6432.00	59.54 PK	81.47	-21.93	1.00 H	163	18.01	41.53
8	6432.00	57.28 AV	76.72	-19.44	1.00 H	163	15.75	41.53

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	2386.00	63.11 PK	74.00	-10.89	1.23 V	184	30.88	32.23
2	<b>2386.00</b>	<b>52.83 AV</b>	<b>54.00</b>	<b>-1.17</b>	<b>1.23 V</b>	<b>184</b>	<b>20.60</b>	<b>32.23</b>
3	*2412.00	111.46 PK			1.45 V	194	79.14	32.32
4	*2412.00	107.13 AV			1.45 V	194	74.81	32.32
5	4824.00	54.26 PK	74.00	-19.74	1.13 V	123	16.13	38.13
6	4824.00	48.79 AV	54.00	-5.21	1.13 V	123	10.66	38.13
7	6432.00	64.79 PK	91.46	-26.67	1.09 V	212	23.26	41.53
8	6432.00	63.43 AV	87.13	-23.70	1.09 V	212	21.90	41.53

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. The limit value is defined as per 15.247.
  6. “ \* ”: 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 1020hPa	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	101.25 PK			1.20 H	268	68.85	32.40
2	*2437.00	96.50 AV			1.20 H	268	64.10	32.40
3	4874.00	51.60 PK	74.00	-22.40	1.24 H	59	13.28	38.32
4	4874.00	44.58 AV	54.00	-9.42	1.24 H	59	6.26	38.32
5	6498.00	59.22 PK	81.25	-22.03	1.05 H	236	17.52	41.70
6	6498.00	56.91 AV	76.50	-19.59	1.05 H	236	15.21	41.70

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	111.08 PK			1.43 V	24	78.68	32.40
2	*2437.00	106.71 AV			1.43 V	24	74.31	32.40
3	4874.00	53.10 PK	74.00	-20.90	1.00 V	240	14.78	38.32
4	4874.00	47.20 AV	54.00	-6.80	1.00 V	240	8.88	38.32
5	6498.00	62.85 PK	91.08	-28.23	1.02 V	240	21.15	41.70
6	6498.00	61.24 AV	86.71	-25.47	1.02 V	240	19.54	41.70

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. The limit value is defined as per 15.247.
  6. “ \* ”: 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 1020hPa	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	101.21 PK			1.23 H	268	68.73	32.48
2	*2462.00	96.50 AV			1.23 H	268	64.02	32.48
3	2483.50	57.21 PK	74.00	-16.79	1.23 H	268	24.65	32.56
4	2483.50	45.30 AV	54.00	-8.70	1.23 H	268	12.74	32.56
5	4924.00	52.12 PK	74.00	-21.88	1.06 H	245	13.66	38.46
6	4924.00	45.10 AV	54.00	-8.90	1.06 H	245	6.64	38.46
7	6565.00	59.23 PK	81.21	-21.98	1.04 H	191	17.21	42.02
8	6565.00	56.92 AV	76.50	-19.58	1.04 H	191	14.90	42.02

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	111.19 PK			1.46 V	200	78.71	32.48
2	*2462.00	106.84 AV			1.46 V	200	74.36	32.48
3	2487.00	62.84 PK	74.00	-11.16	1.15 V	8	30.27	32.57
4	2487.00	52.41 AV	54.00	-1.59	1.15 V	8	19.84	32.57
5	4924.00	53.32 PK	74.00	-20.68	1.10 V	2	14.86	38.46
6	4924.00	47.64 AV	54.00	-6.36	1.10 V	2	9.18	38.46
7	6565.00	62.77 PK	91.19	-28.42	1.40 V	210	20.75	42.02
8	6565.00	60.58 AV	86.84	-26.26	1.40 V	210	18.56	42.02

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. The limit value is defined as per 15.247.
  6. “ \* ”: 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 1020hPa	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	59.19 PK	74.00	-14.81	1.37 H	65	26.95	32.24
2	2390.00	46.79 AV	54.00	-7.21	1.37 H	65	14.55	32.24
3	*2412.00	101.64 PK			1.37 H	65	69.32	32.32
4	*2412.00	91.58 AV			1.37 H	65	59.26	32.32
5	4824.00	51.09 PK	74.00	-22.91	1.29 H	341	12.96	38.13
6	4824.00	38.02 AV	54.00	-15.98	1.29 H	341	-0.11	38.13
7	6432.00	59.36 PK	81.64	-22.28	1.02 H	158	17.83	41.53
8	6432.00	57.11 AV	71.58	-14.47	1.02 H	158	15.58	41.53

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	66.88 PK	74.00	-7.12	1.02 V	138	34.64	32.24
2	2390.00	52.52 AV	54.00	-1.48	1.02 V	138	20.28	32.24
3	*2412.00	112.75 PK			1.02 V	138	80.43	32.32
4	*2412.00	102.73 AV			1.02 V	138	70.41	32.32
5	4824.00	52.19 PK	74.00	-21.81	1.15 V	256	14.06	38.13
6	4824.00	38.18 AV	54.00	-15.82	1.15 V	256	0.05	38.13
7	6432.00	64.21 PK	92.75	-28.54	1.03 V	218	22.68	41.53
8	6432.00	62.96 AV	82.73	-19.77	1.03 V	218	21.43	41.53

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. The limit value is defined as per 15.247.
  6. “ \* ”: 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 1020hPa	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	103.82 PK			1.36 H	66	71.42	32.40
2	*2437.00	93.69 AV			1.36 H	66	61.29	32.40
3	4874.00	51.26 PK	74.00	-22.74	1.30 H	352	12.94	38.32
4	4874.00	38.22 AV	54.00	-15.78	1.30 H	352	-0.10	38.32
5	6498.00	59.21 PK	83.82	-24.61	1.08 H	263	17.51	41.70
6	6498.00	57.03 AV	73.69	-16.66	1.08 H	263	15.33	41.70

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	114.86 PK			1.02 V	128	82.46	32.40
2	*2437.00	104.81 AV			1.02 V	128	72.41	32.40
3	2490.00	64.28 PK	74.00	-9.72	1.02 V	128	31.70	32.58
4	2490.00	52.76 AV	54.00	-1.24	1.02 V	128	20.18	32.58
5	4874.00	52.02 PK	74.00	-21.98	1.16 V	261	13.70	38.32
6	4874.00	37.96 AV	54.00	-16.04	1.16 V	261	-0.36	38.32
7	6498.00	62.61 PK	94.86	-32.25	1.06 V	268	20.91	41.70
8	6498.00	61.03 AV	84.81	-23.78	1.06 V	268	19.33	41.70

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. The limit value is defined as per 15.247.
  6. “ \* ”: 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 1020hPa	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	101.13 PK			1.36 H	68	68.65	32.48
2	*2462.00	91.02 AV			1.36 H	68	58.54	32.48
3	2483.50	59.04 PK	74.00	-14.96	1.36 H	68	26.48	32.56
4	2483.50	46.61 AV	54.00	-7.39	1.36 H	68	14.05	32.56
5	4924.00	51.43 PK	74.00	-22.57	1.05 H	258	12.97	38.46
6	4924.00	38.36 AV	54.00	-15.64	1.05 H	258	-0.10	38.46
7	6565.00	59.22 PK	81.13	-21.91	1.18 H	169	17.20	42.02
8	6565.00	56.94 AV	71.02	-14.08	1.18 H	169	14.92	42.02

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	112.16 PK			1.05 V	140	79.68	32.48
2	*2462.00	102.10 AV			1.05 V	140	69.62	32.48
3	2483.50	66.95 PK	74.00	-7.05	1.05 V	140	34.39	32.56
4	2483.50	52.68 AV	54.00	-1.32	1.05 V	140	20.12	32.56
5	4924.00	52.46 PK	74.00	-21.54	1.10 V	193	14.00	38.46
6	4924.00	38.41 AV	54.00	-15.59	1.10 V	193	-0.05	38.46
7	6565.00	62.58 PK	92.16	-29.58	1.29 V	202	20.56	42.02
8	6565.00	60.31 AV	82.10	-21.69	1.29 V	202	18.29	42.02

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. The limit value is defined as per 15.247.
  6. “ \* ”: Fundamental frequency.

**DRAFT 802.11n (20MHz) 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 1020hPa	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	59.08 PK	74.00	-14.92	1.40 H	352	26.84	32.24
2	2390.00	46.49 AV	54.00	-7.51	1.40 H	352	14.25	32.24
3	*2412.00	103.04 PK			1.40 H	352	70.72	32.32
4	*2412.00	92.70 AV			1.40 H	352	60.38	32.32
5	4824.00	51.26 PK	74.00	-22.74	1.05 H	281	13.13	38.13
6	4824.00	38.16 AV	54.00	-15.84	1.05 H	281	0.03	38.13
7	6432.00	59.25 PK	83.04	-23.79	1.08 H	169	17.72	41.53
8	6432.00	57.03 AV	72.70	-15.67	1.08 H	169	15.50	41.53

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	72.06 PK	74.00	-1.94	1.00 V	188	39.82	32.24
2	2390.00	52.74 AV	54.00	-1.26	1.00 V	188	20.50	32.24
3	*2412.00	113.19 PK			1.00 V	180	80.87	32.32
4	*2412.00	102.71 AV			1.00 V	180	70.39	32.32
5	4824.00	52.02 PK	74.00	-21.98	1.19 V	285	13.89	38.13
6	4824.00	37.96 AV	54.00	-16.04	1.19 V	285	-0.17	38.13
7	6432.00	64.02 PK	93.19	-29.17	1.12 V	203	22.49	41.53
8	6432.00	62.81 AV	82.71	-19.90	1.12 V	203	21.28	41.53

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. The limit value is defined as per 15.247.
  6. “ \* ”: 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 1020hPa	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	105.16 PK			1.39 H	348	72.76	32.40
2	*2437.00	94.83 AV			1.39 H	348	62.43	32.40
3	4874.00	51.46 PK	74.00	-22.54	1.25 H	36	13.14	38.32
4	4874.00	38.44 AV	54.00	-15.56	1.25 H	36	0.12	38.32
5	6498.00	58.69 PK	85.16	-26.47	1.20 H	189	16.99	41.70
6	6498.00	56.47 AV	74.83	-18.36	1.20 H	189	14.77	41.70

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	115.24 PK			1.01 V	182	82.84	32.40
2	*2437.00	104.86 AV			1.01 V	182	72.46	32.40
3	2490.00	64.19 PK	74.00	-9.81	1.02 V	191	31.61	32.58
4	2490.00	52.51 AV	54.00	-1.49	1.02 V	191	19.93	32.58
5	4874.00	52.32 PK	74.00	-21.68	1.18 V	54	14.00	38.32
6	4874.00	38.26 AV	54.00	-15.74	1.18 V	54	-0.06	38.32
7	6498.00	63.51 PK	95.24	-31.73	1.18 V	229	21.81	41.70
8	6498.00	62.22 AV	84.86	-22.64	1.18 V	229	20.52	41.70

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. The limit value is defined as per 15.247.
  6. “ \* ”: 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 1020hPa	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	103.26 PK			1.38 H	356	70.78	32.48
2	*2462.00	92.94 AV			1.38 H	356	60.46	32.48
3	2483.50	59.13 PK	74.00	-14.87	1.38 H	356	26.57	32.56
4	2483.50	46.62 AV	54.00	-7.38	1.38 H	356	14.06	32.56
5	4924.00	51.48 PK	74.00	-22.52	1.08 H	24	13.02	38.46
6	4924.00	38.40 AV	54.00	-15.60	1.08 H	24	-0.06	38.46
7	6565.00	59.64 PK	83.26	-23.62	1.10 H	174	17.62	42.02
8	6565.00	57.48 AV	72.94	-15.46	1.10 H	174	15.46	42.02

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	113.43 PK			1.00 V	178	80.95	32.48
2	*2462.00	103.08 AV			1.00 V	178	70.60	32.48
3	2483.50	66.61 PK	74.00	-7.39	1.00 V	180	34.05	32.56
4	2483.50	52.60 AV	54.00	-1.40	1.00 V	180	20.04	32.56
5	4924.00	52.68 PK	74.00	-21.32	1.05 V	127	14.22	38.46
6	4924.00	38.62 AV	54.00	-15.38	1.05 V	127	0.16	38.46
7	6565.00	62.84 PK	93.43	-30.59	1.23 V	189	20.82	42.02
8	6565.00	60.51 AV	83.08	-22.57	1.23 V	189	18.49	42.02

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. The limit value is defined as per 15.247.
  6. “ \* ”: Fundamental frequency.

### DRAFT 802.11n (40MHz) 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	23deg. C, 61%RH 1020hPa	TESTED BY	Kevin Liang

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	60.91 PK	74.00	-13.09	1.04 H	26	29.52	31.38
2	2390.00	47.16 AV	54.00	-6.84	1.04 H	26	15.78	31.38
3	*2422.00	100.32 PK			1.04 H	26	68.82	31.50
4	*2422.00	90.10 AV			1.04 H	26	58.60	31.50
5	4844.00	46.71 PK	74.00	-27.29	1.10 H	141	9.00	37.71
6	4844.00	33.66 AV	54.00	-20.34	1.10 H	141	-4.05	37.71
7	6458.00	58.12 PK	80.32	-22.20	1.29 H	178	16.60	41.52
8	6458.00	55.42 AV	70.10	-14.68	1.29 H	178	13.90	41.52

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	64.98 PK	74.00	-9.02	1.18 V	346	33.60	31.38
2	2390.00	52.58 AV	54.00	-1.42	1.18 V	346	21.19	31.38
3	*2422.00	107.27 PK			1.18 V	346	75.77	31.50
4	*2422.00	96.75 AV			1.18 V	346	65.25	31.50
5	4844.00	48.38 PK	74.00	-25.62	1.28 V	226	10.67	37.71
6	4844.00	34.82 AV	54.00	-19.18	1.28 V	226	-2.89	37.71
7	6458.00	63.62 PK	87.27	-23.65	1.25 V	238	22.10	41.52
8	6458.00	62.57 AV	76.75	-14.18	1.25 V	238	21.05	41.52

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. The limit value is defined as per 15.247.
  6. “ \* ”: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 61%RH 1020hPa	TESTED BY	Kevin Liang

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	102.49 PK			1.04 H	24	70.94	31.55
2	*2437.00	92.61 AV			1.04 H	24	61.06	31.55
3	4874.00	46.68 PK	74.00	-27.32	1.20 H	68	8.89	37.79
4	4874.00	34.69 AV	54.00	-19.31	1.20 H	68	-3.10	37.79
5	6499.00	58.62 PK	82.49	-23.87	1.20 H	162	16.91	41.71
6	6499.00	55.57 AV	72.61	-17.04	1.20 H	162	13.86	41.71

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	109.83 PK			1.35 V	162	78.28	31.55
2	*2437.00	99.58 AV			1.35 V	162	68.03	31.55
3	4874.00	46.74 PK	74.00	-27.26	1.12 V	163	8.95	37.79
4	4874.00	34.06 AV	54.00	-19.94	1.12 V	163	-3.73	37.79
5	6499.00	59.94 PK	89.83	-29.89	1.19 V	283	18.23	41.71
6	6499.00	57.48 AV	79.58	-22.10	1.19 V	283	15.77	41.71

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. The limit value is defined as per 15.247.
  6. “ \* ”: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 61%RH 1020hPa	TESTED BY	Kevin Liang

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	*2452.00	96.81 PK			1.06 H	189	65.21	31.60
2	*2452.00	86.61 AV			1.06 H	189	55.01	31.60
3	2483.50	57.40 PK	74.00	-16.60	1.06 H	189	25.69	31.71
4	2483.50	45.93 AV	54.00	-8.07	1.06 H	189	14.22	31.71
5	4904.00	46.14 PK	74.00	-27.86	1.17 H	166	8.27	37.87
6	4904.00	33.64 AV	54.00	-20.36	1.17 H	166	-4.23	37.87
7	6538.00	57.40 PK	76.81	-19.41	1.00 H	322	15.57	41.83
8	6538.00	54.03 AV	66.61	-12.58	1.00 H	322	12.20	41.83

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	*2452.00	106.49 PK			1.36 V	160	74.89	31.60
2	*2452.00	96.09 AV			1.36 V	160	64.49	31.60
3	2483.50	65.10 PK	74.00	-8.90	1.36 V	161	33.39	31.71
4	2483.50	52.23 AV	54.00	-1.77	1.36 V	161	20.52	31.71
5	4904.00	48.14 PK	74.00	-25.86	1.21 V	125	10.27	37.87
6	4904.00	34.97 AV	54.00	-19.03	1.21 V	125	-2.90	37.87
7	6538.00	59.21 PK	86.49	-27.28	1.35 V	230	17.38	41.83
8	6538.00	56.16 AV	76.09	-19.93	1.35 V	230	14.33	41.83

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. The limit value is defined as per 15.247.
  6. “ \* ”: Fundamental frequency.

**BELOW 1GHz WORST-CASE DATA**  
**Draft 802.11n (20MHz) 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	23deg. C, 62%RH 1020hPa	TEST MODE	A
TESTED BY	Kevin Liang		

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	132.95	42.13 QP	43.50	-1.37	2.00 H	280	29.13	13.00
2	148.50	39.03 QP	43.50	-4.47	2.00 H	115	24.37	14.66
3	199.05	36.97 QP	43.50	-6.53	1.00 H	280	25.57	11.40
4	267.10	37.94 QP	46.00	-8.06	1.00 H	136	23.88	14.06
5	533.47	37.85 QP	46.00	-8.15	1.50 H	223	16.46	21.39
6	799.84	41.40 QP	46.00	-4.60	1.00 H	163	14.97	26.43
7	960.00	37.73 QP	46.00	-8.27	1.50 H	199	9.08	28.65

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	37.68	34.56 QP	40.00	-5.44	1.00 V	121	22.02	12.54
2	84.34	34.52 QP	40.00	-5.48	1.50 V	277	24.44	10.08
3	148.50	35.49 QP	43.50	-8.01	1.00 V	46	20.83	14.66
4	199.05	36.03 QP	43.50	-7.47	1.00 V	106	24.63	11.40
5	533.47	39.74 QP	46.00	-6.26	1.00 V	169	18.36	21.39
6	799.84	38.66 QP	46.00	-7.34	2.00 V	187	12.23	26.43
7	902.89	35.81 QP	46.00	-10.19	1.50 V	169	7.82	27.99

- 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 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 1020hPa	TEST MODE	B
TESTED BY	Kevin Liang		

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	132.95	41.43 QP	43.50	-2.07	2.00 H	106	28.42	13.00
2	202.94	41.14 QP	43.50	-2.36	1.00 H	268	29.67	11.47
3	300.16	40.08 QP	46.00	-5.92	1.00 H	259	25.33	14.74
4	533.47	39.44 QP	46.00	-6.56	1.50 H	160	18.05	21.39
5	640.41	34.30 QP	46.00	-11.70	1.25 H	151	10.25	24.05
6	799.84	39.54 QP	46.00	-6.46	1.00 H	169	13.11	26.43
7	959.99	39.39 QP	46.00	-6.61	1.50 H	202	10.74	28.65

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	61.01	38.14 QP	40.00	-1.86	1.00 V	10	24.43	13.71
2	132.95	39.62 QP	43.50	-3.88	1.00 V	55	26.62	13.00
3	199.05	37.56 QP	43.50	-5.94	1.00 V	13	26.16	11.40
4	300.16	37.77 QP	46.00	-8.23	1.50 V	136	23.03	14.74
5	533.47	40.22 QP	46.00	-5.78	1.00 V	169	18.83	21.39
6	799.84	38.46 QP	46.00	-7.54	1.25 V	184	12.03	26.43
7	900.94	44.58 QP	46.00	-1.42	1.25 V	22	16.61	27.97

- 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 $\mu$ 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, 2008
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Jan. 08, 2008
LISN ROHDE & SCHWARZ	ESH3-Z5	100311	Jan. 16, 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.

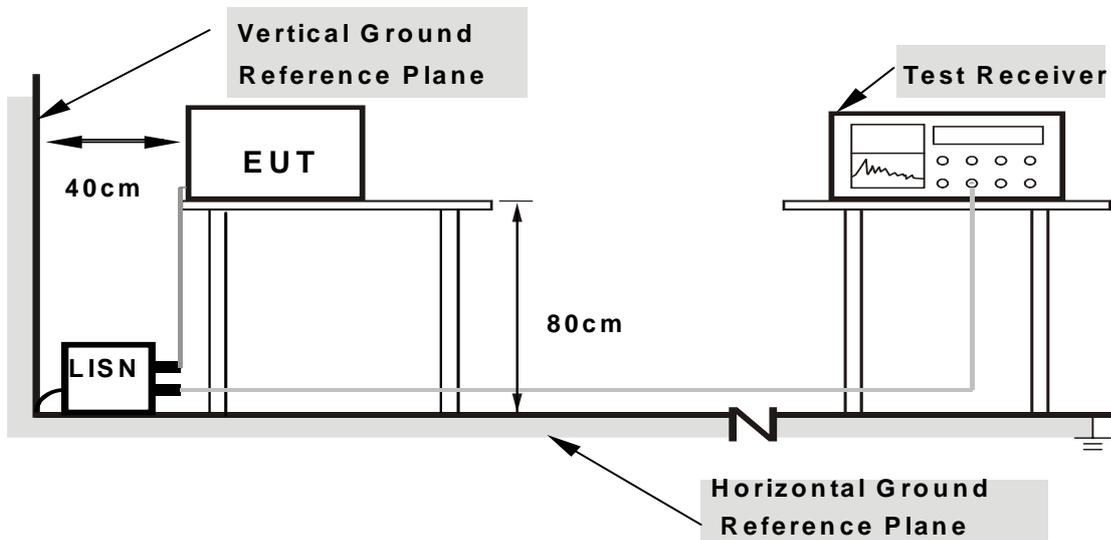
#### 4.2.3 TEST PROCEDURES

- 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

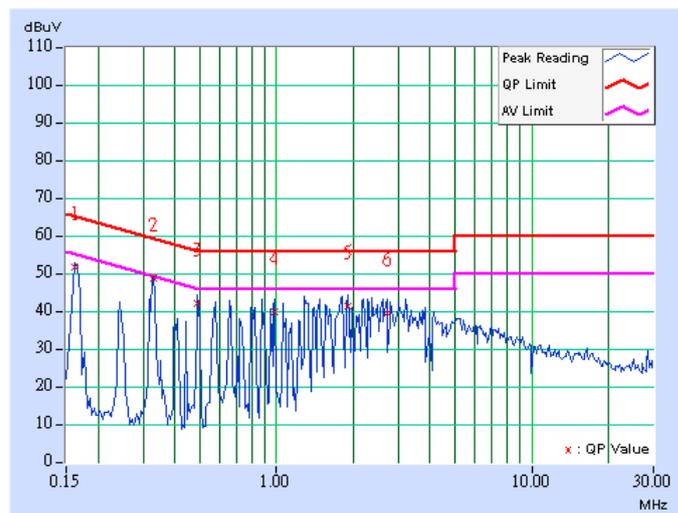
#### 4.2.7 TEST RESULTS

##### CONDUCTED WORST-CASE DATA DRAFT 802.11n (20MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	7.2Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	20deg. C, 60% RH, 991hPa	TEST MODE	A
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	0.162	0.10	51.66	-	51.76	-	65.38	55.38	-13.62	-
2	<b>0.330</b>	<b>0.10</b>	<b>48.75</b>	-	<b>48.85</b>	-	<b>59.46</b>	<b>49.46</b>	<b>-10.61</b>	-
3	0.490	0.10	41.92	-	42.02	-	56.17	46.17	-14.15	-
4	0.986	0.11	39.94	-	40.05	-	56.00	46.00	-15.95	-
5	1.895	0.21	41.12	-	41.33	-	56.00	46.00	-14.67	-
6	2.719	0.24	39.53	-	39.77	-	56.00	46.00	-16.23	-

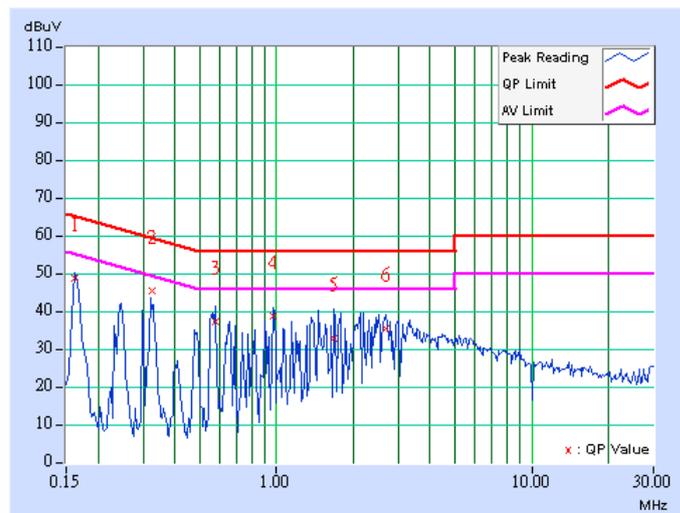
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = 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	7.2Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	20deg. C, 60% RH, 991hPa	TEST MODE	A
TESTED BY	Match Tsui		

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.162	0.10	48.69	-	48.79	-	65.38	55.38	-16.59	-
2	0.324	0.10	45.15	-	45.25	-	59.59	49.59	-14.34	-
3	0.576	0.13	37.28	-	37.41	-	56.00	46.00	-18.59	-
4	0.970	0.20	38.71	-	38.91	-	56.00	46.00	-17.09	-
5	1.676	0.22	32.80	-	33.02	-	56.00	46.00	-22.98	-
6	2.676	0.24	35.45	-	35.69	-	56.00	46.00	-20.31	-

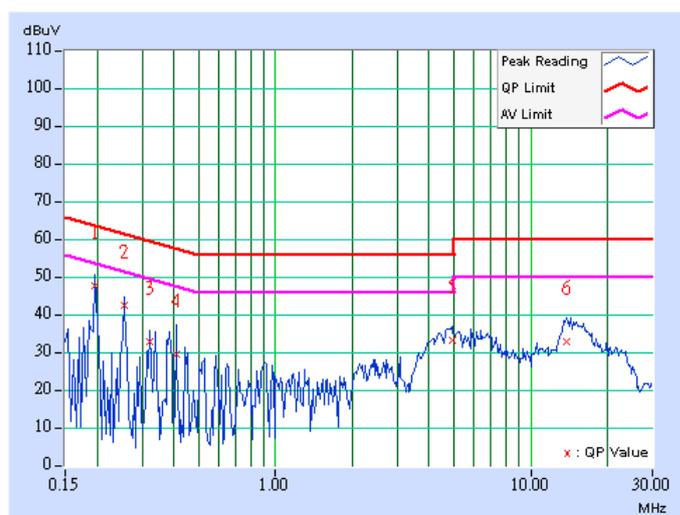
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	7.2Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 65% RH, 991hPa	TEST MODE	B
TESTED BY	Lori Chiu		

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.10	47.16	-	47.26	-	63.74	53.74	-16.48	-
2	0.255	0.10	42.22	-	42.32	-	61.58	51.58	-19.26	-
3	0.322	0.10	32.52	-	32.62	-	59.66	49.66	-27.04	-
4	0.408	0.10	29.10	-	29.20	-	57.69	47.69	-28.49	-
5	4.918	0.29	32.95	-	33.24	-	56.00	46.00	-22.76	-
6	13.902	0.45	32.65	-	33.10	-	60.00	50.00	-26.90	-

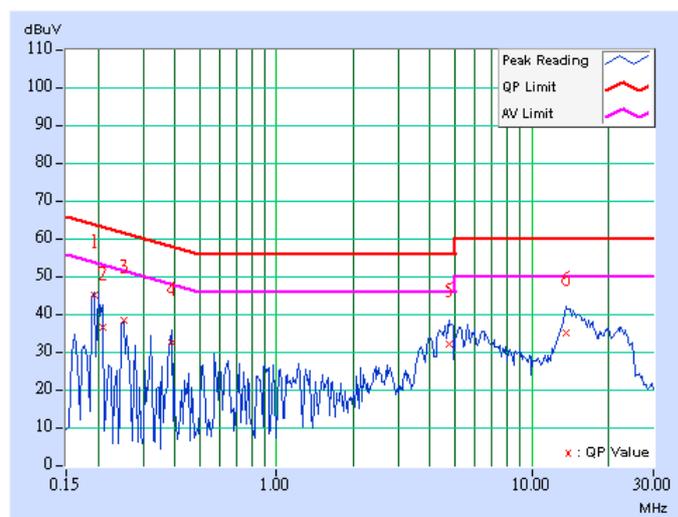
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	7.2Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 65% RH, 991hPa	TEST MODE	B
TESTED BY	Lori Chiu		

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	0.193	0.10	44.84	-	44.94	-	63.91
2	0.209	0.10	36.23	-	36.33	-	63.26	53.26	-26.93	-
3	0.252	0.10	38.08	-	38.18	-	61.71	51.71	-23.53	-
4	0.388	0.10	31.96	-	32.06	-	58.10	48.10	-26.04	-
5	4.758	0.30	31.74	-	32.04	-	56.00	46.00	-23.96	-
6	13.563	0.47	34.62	-	35.09	-	60.00	50.00	-24.91	-

- 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	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.

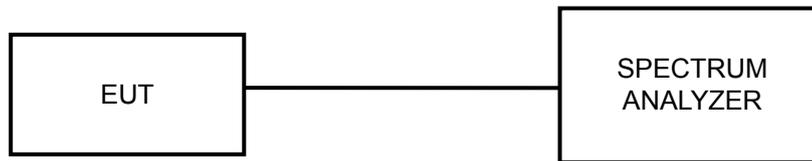
#### 4.3.3 TEST PROCEDURE

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

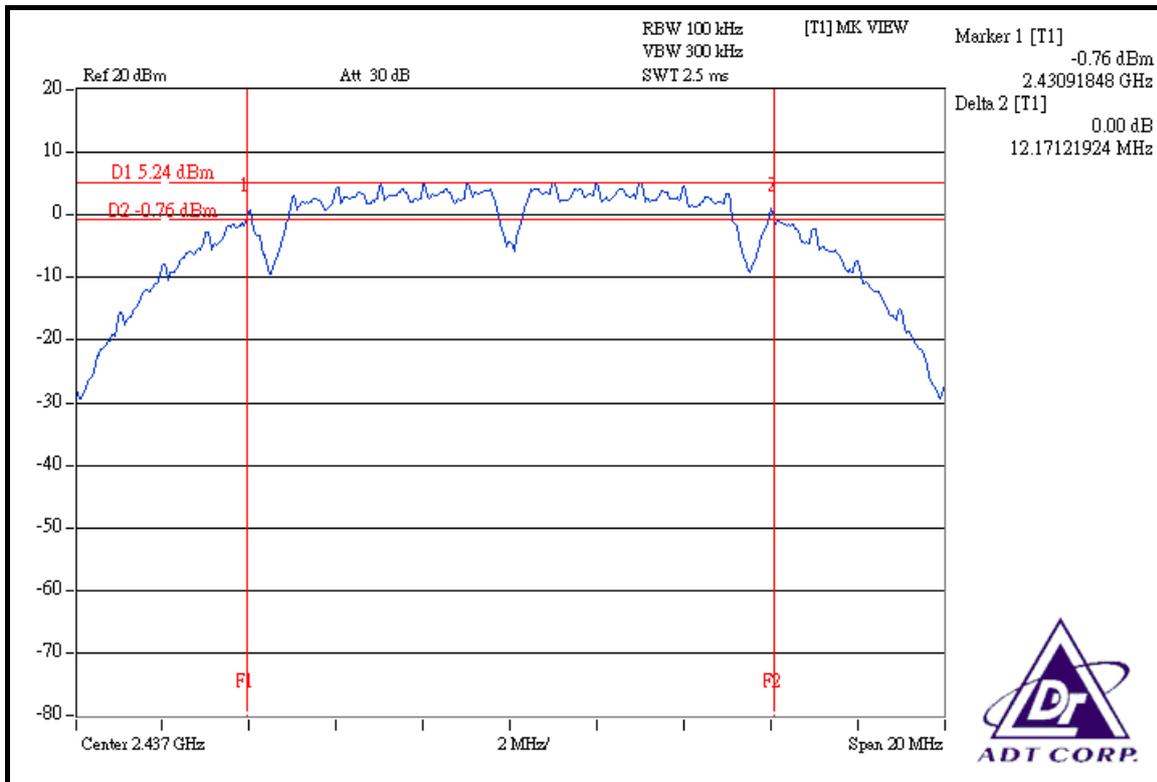


#### 4.3.6 EUT OPERATING CONDITIONS

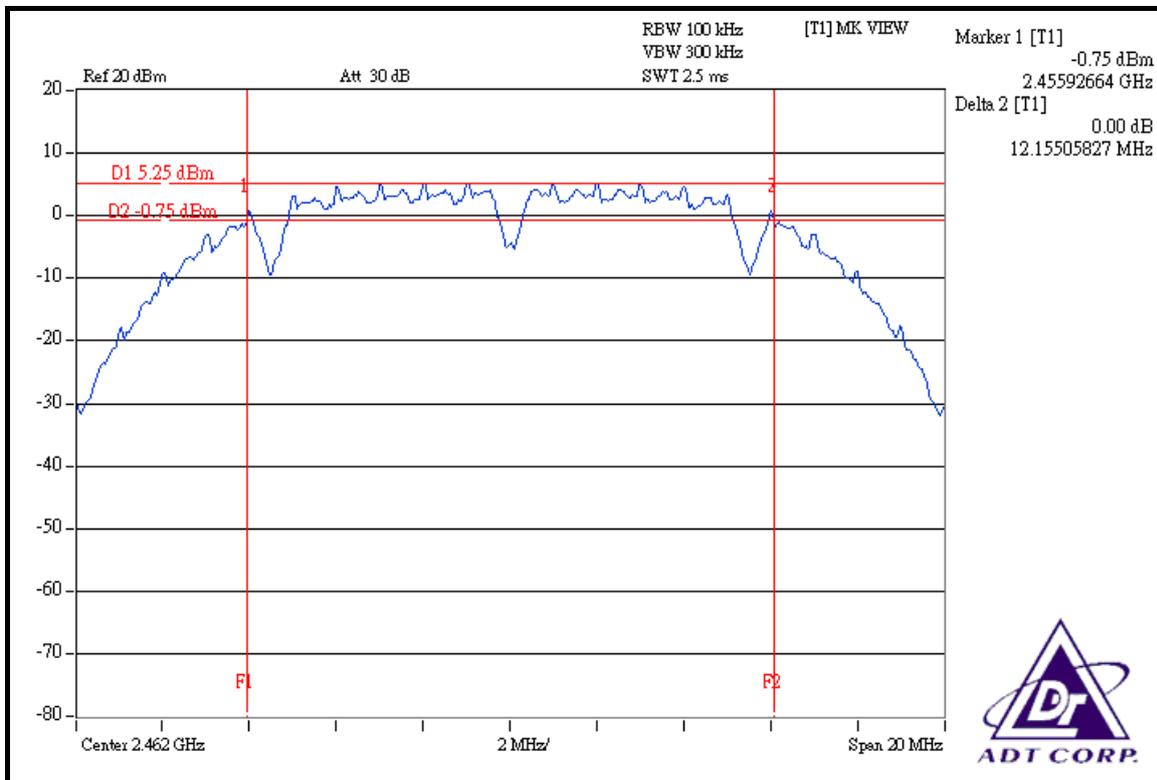
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



### CH 6



### CH 11



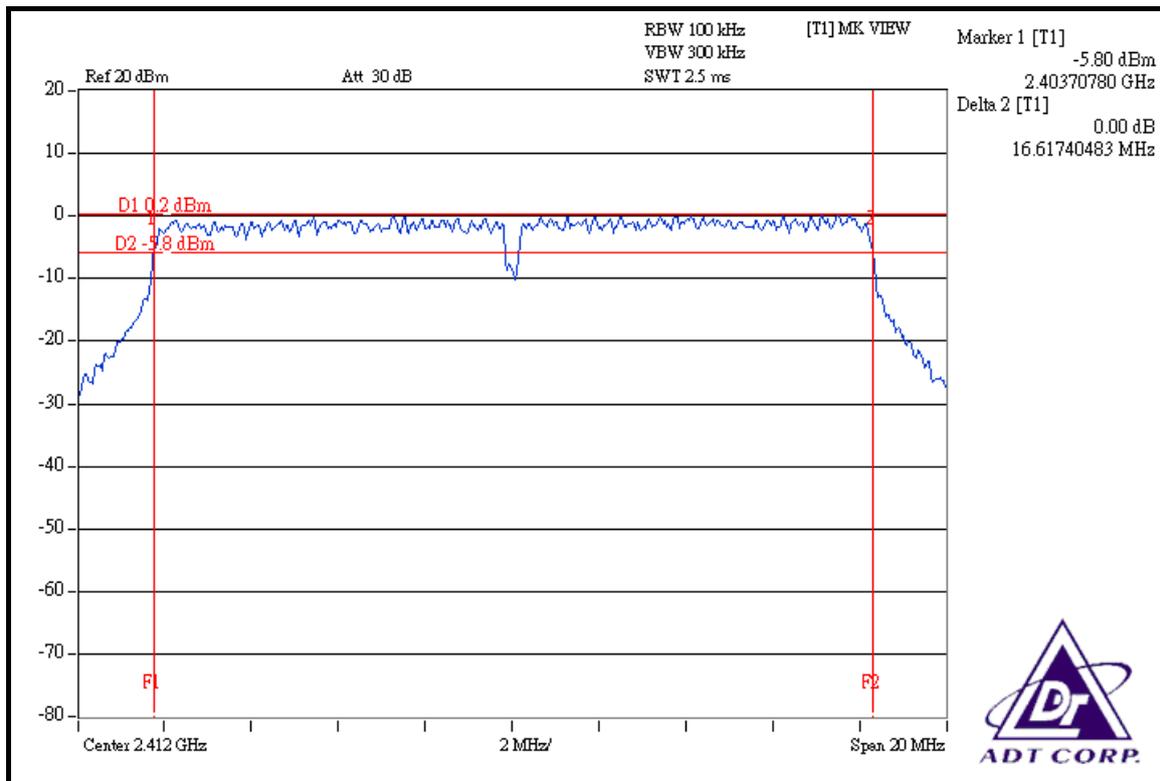


### 802.11g OFDM MODULATION

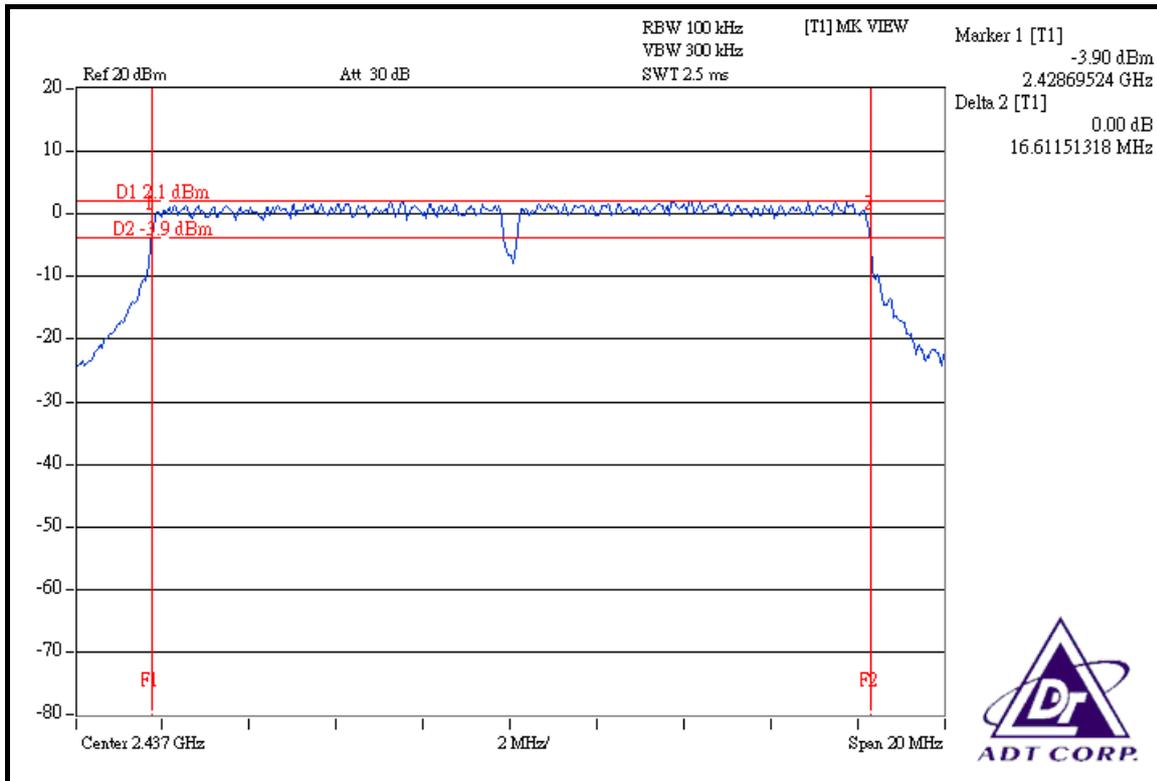
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg.C, 65% RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.62	0.5	PASS
6	2437	16.61	0.5	PASS
11	2462	16.63	0.5	PASS

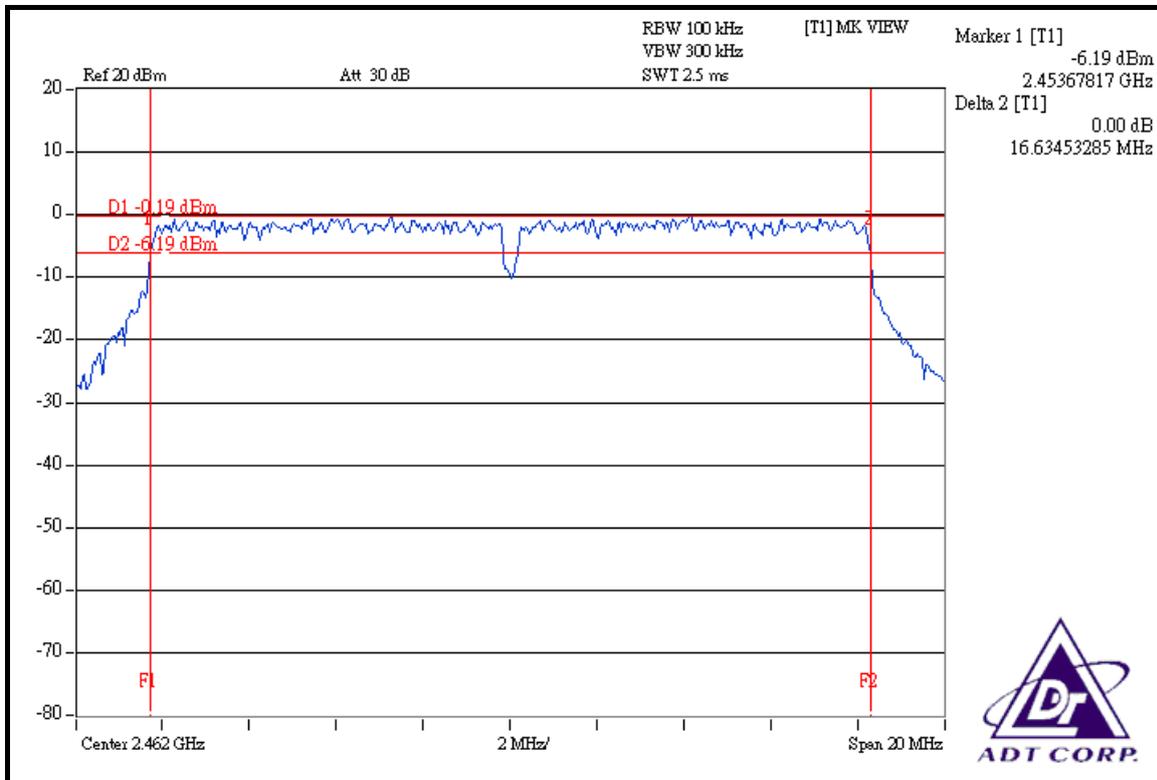
### CH 1



### CH 6



### CH 11



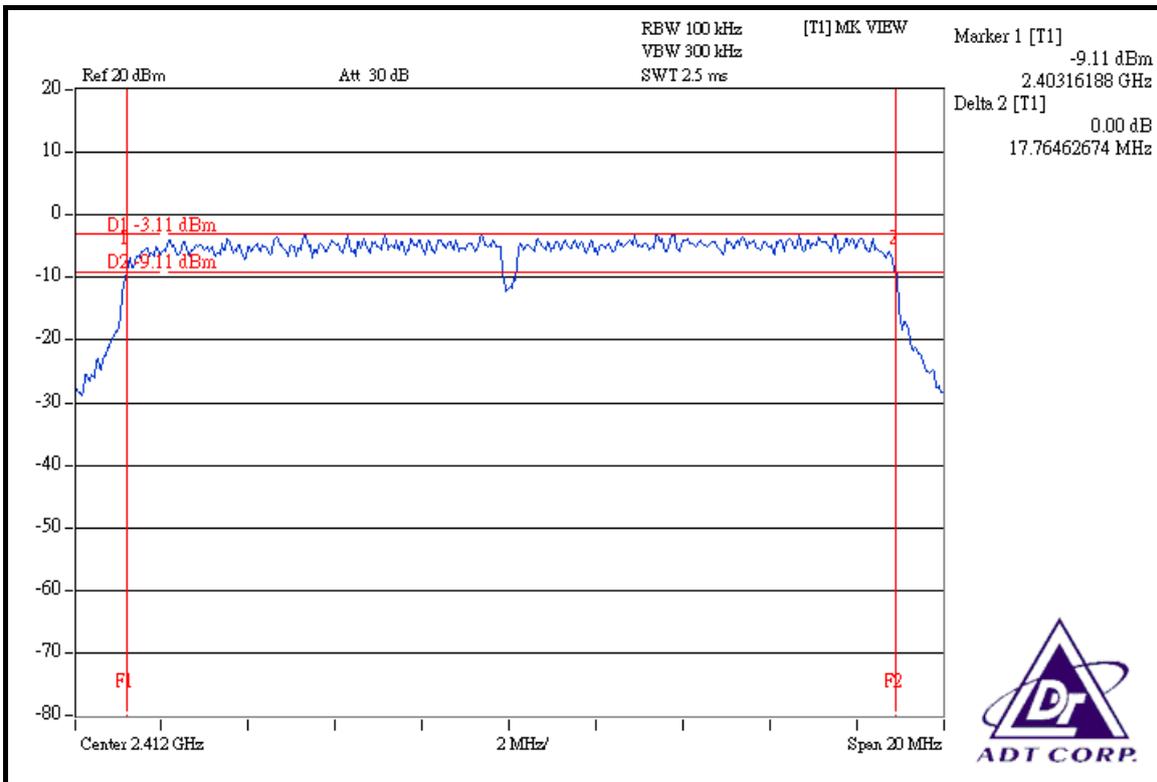


**DRAFT 802.11n (20MHz) OFDM MODULATION**

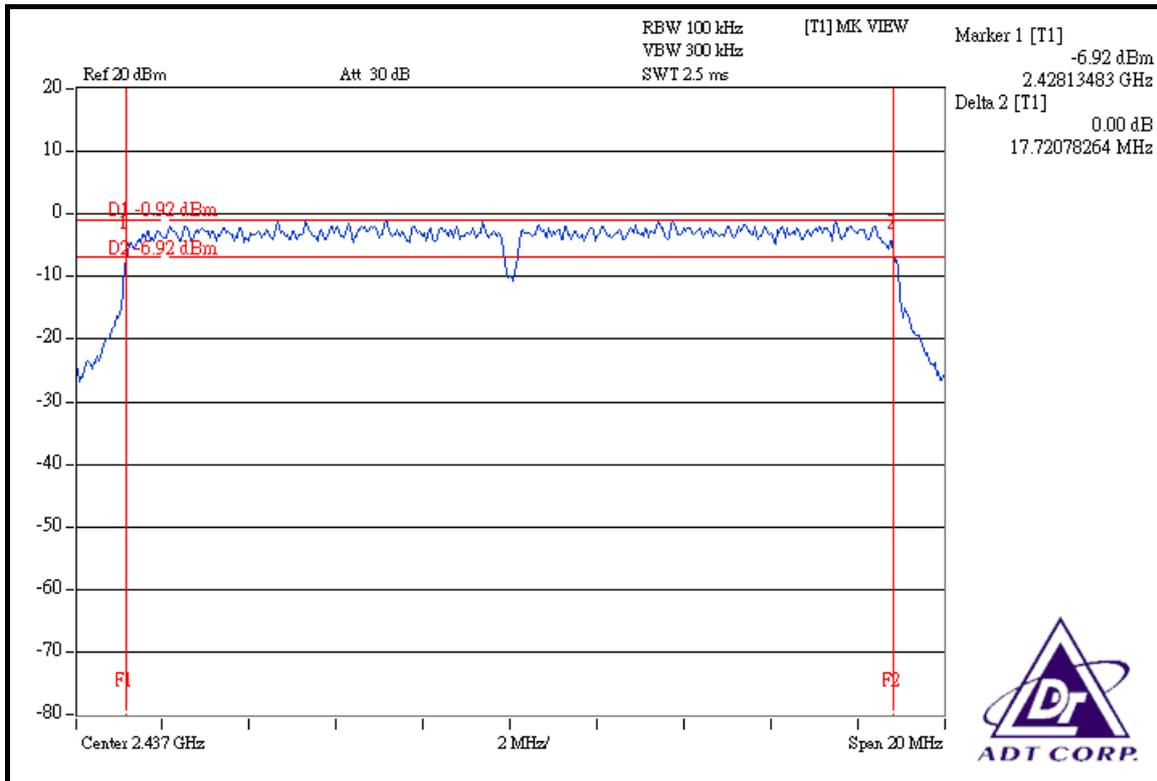
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	7.2Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg.C, 65% RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	17.76	17.76	0.5	PASS
6	2437	17.72	17.71	0.5	PASS
11	2462	17.76	17.77	0.5	PASS

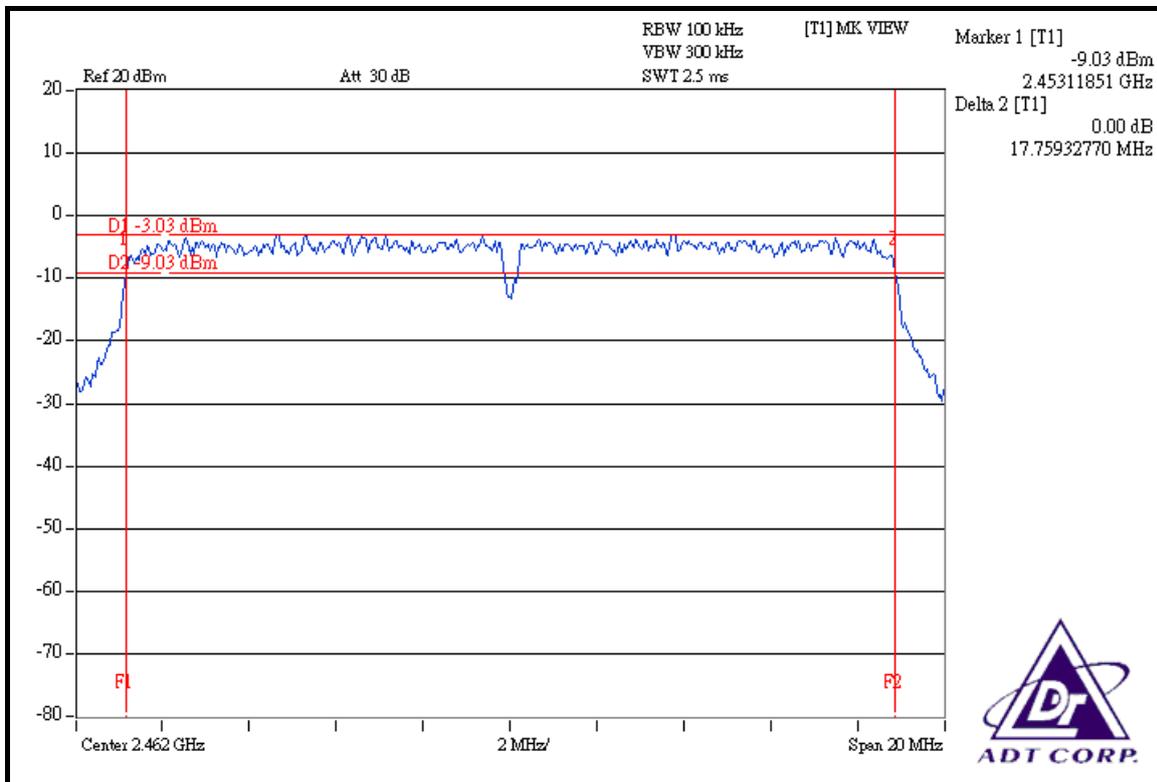
**FOR CHAIN 0: CH 1**



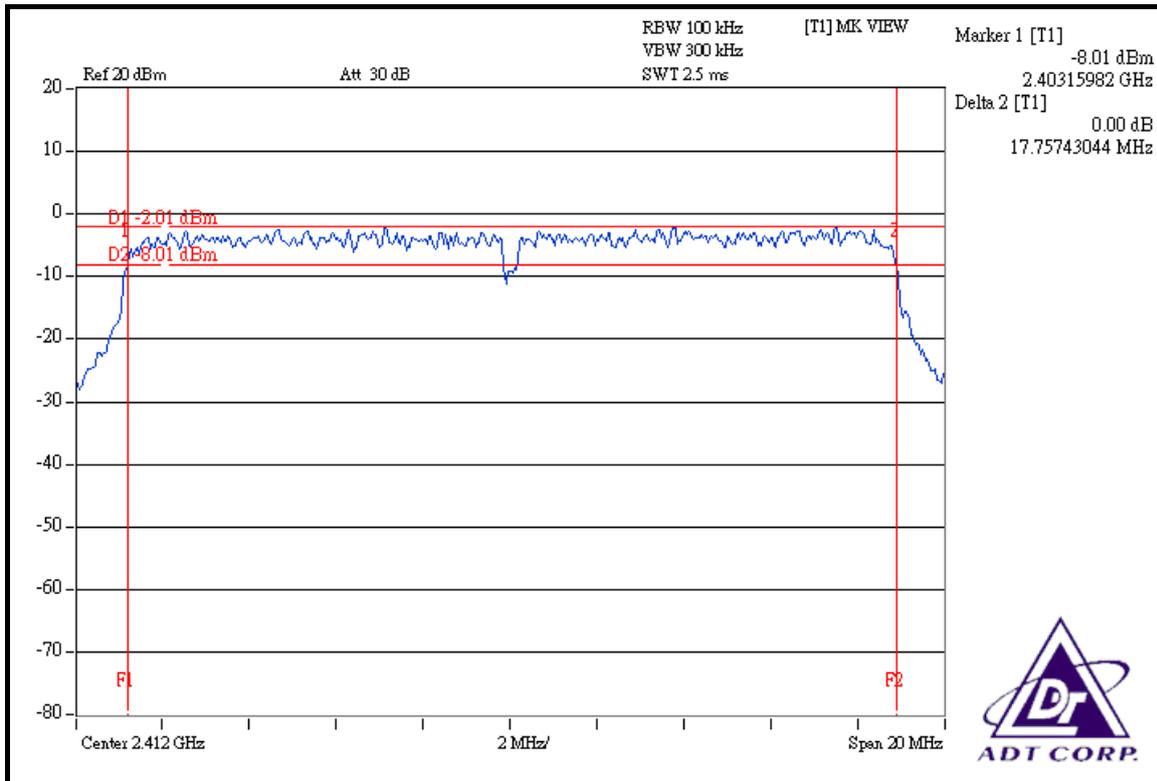
### CH 6



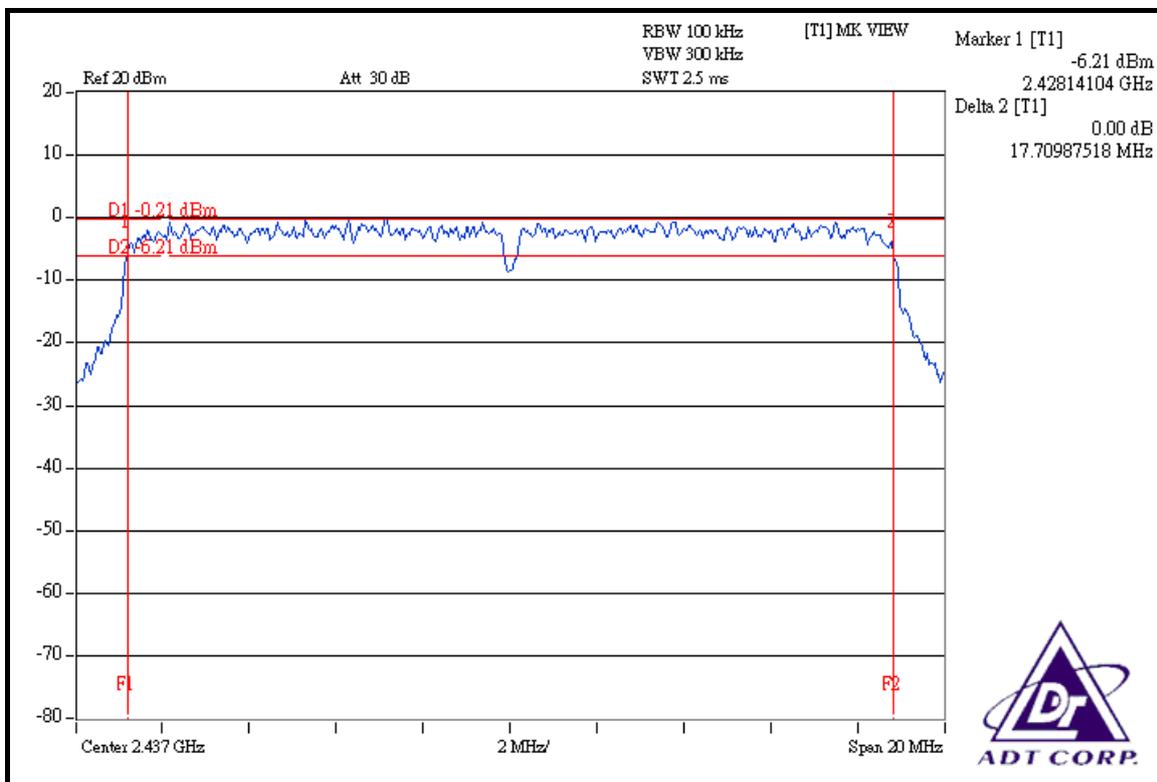
### CH 11



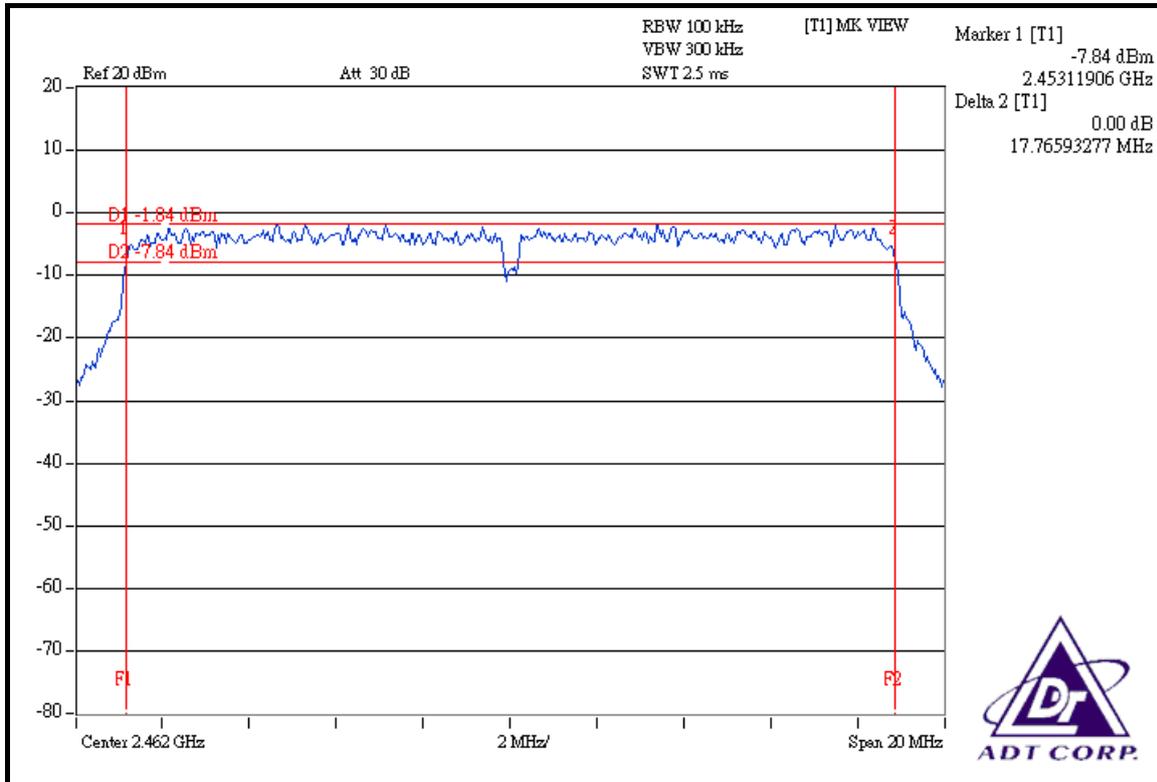
**FOR CHAIN 1: CH 1**



**CH 6**



CH 11



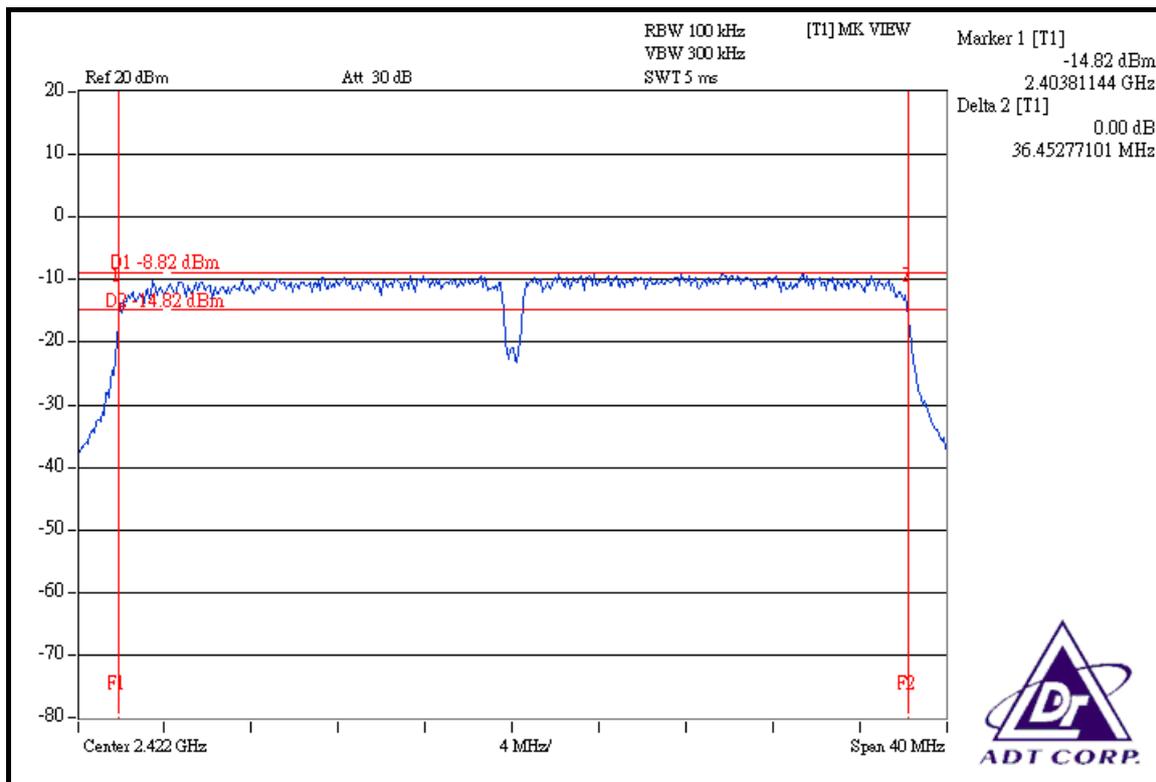


**DRAFT 802.11n (40MHz) OFDM MODULATION**

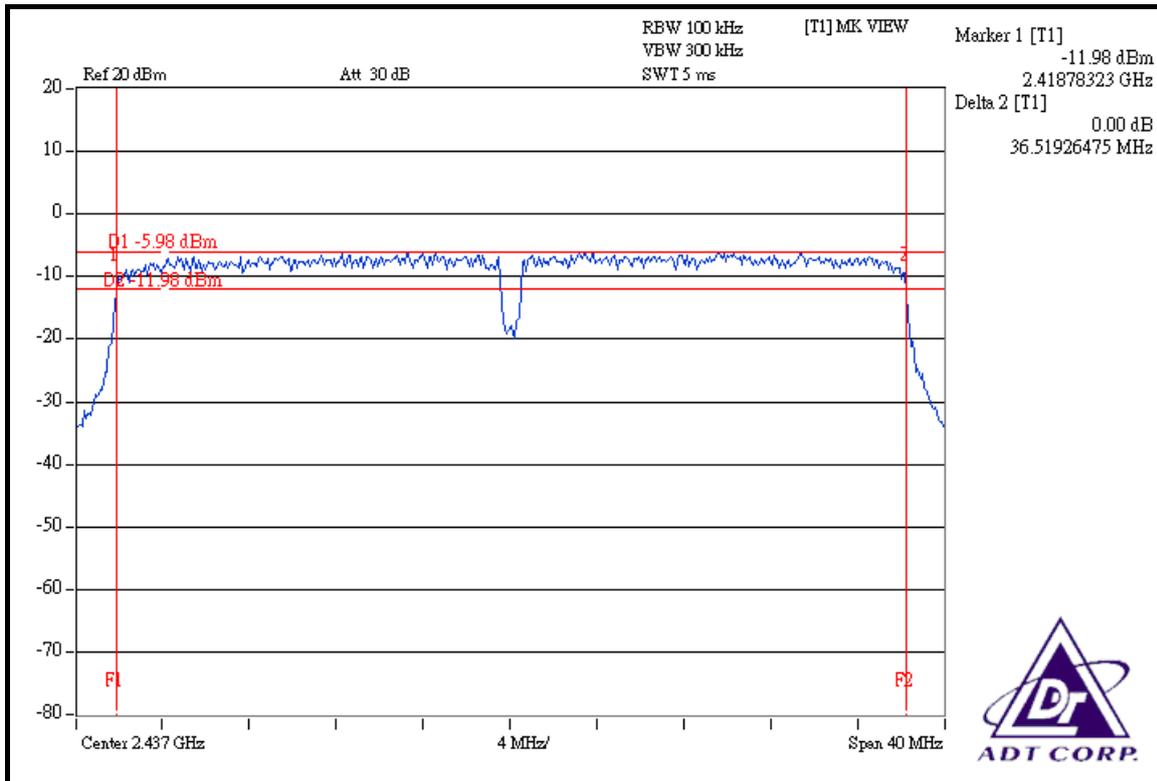
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	15.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg.C, 65% RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2422	36.45	36.45	0.5	PASS
4	2437	36.52	36.49	0.5	PASS
7	2452	36.56	36.54	0.5	PASS

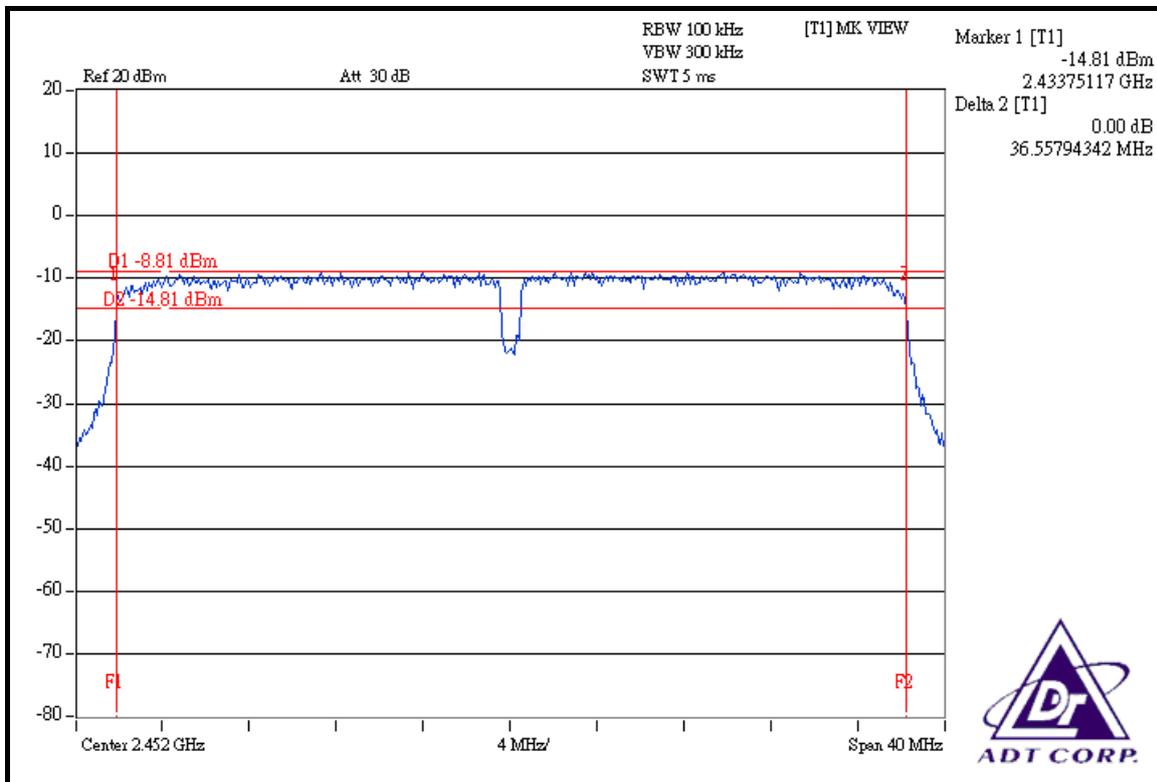
**FOR CHAIN 0: CH 1**



### CH 4

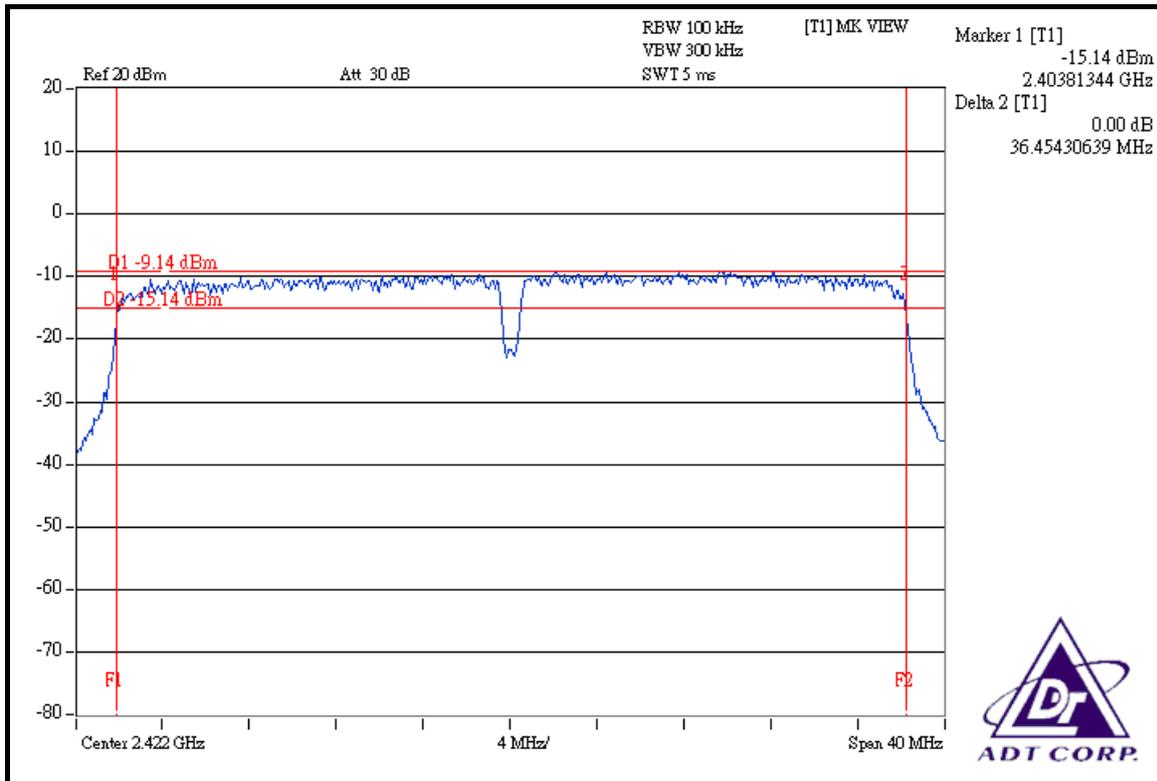


### CH 7

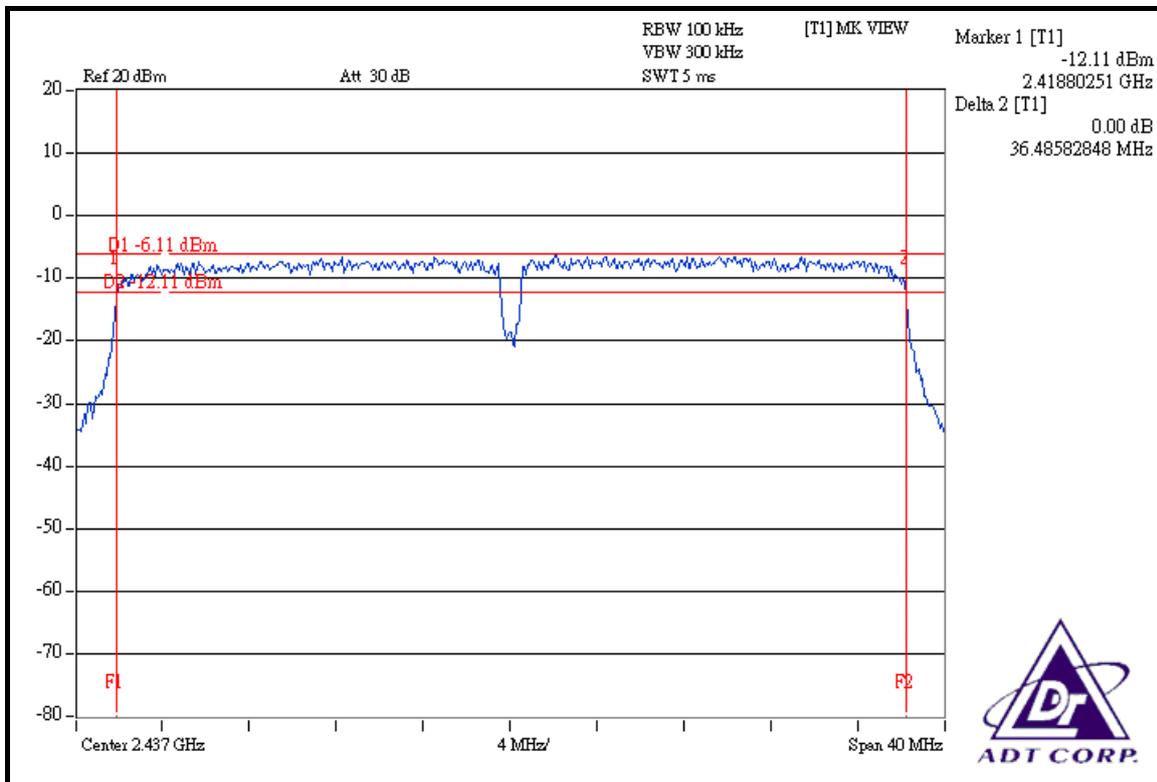




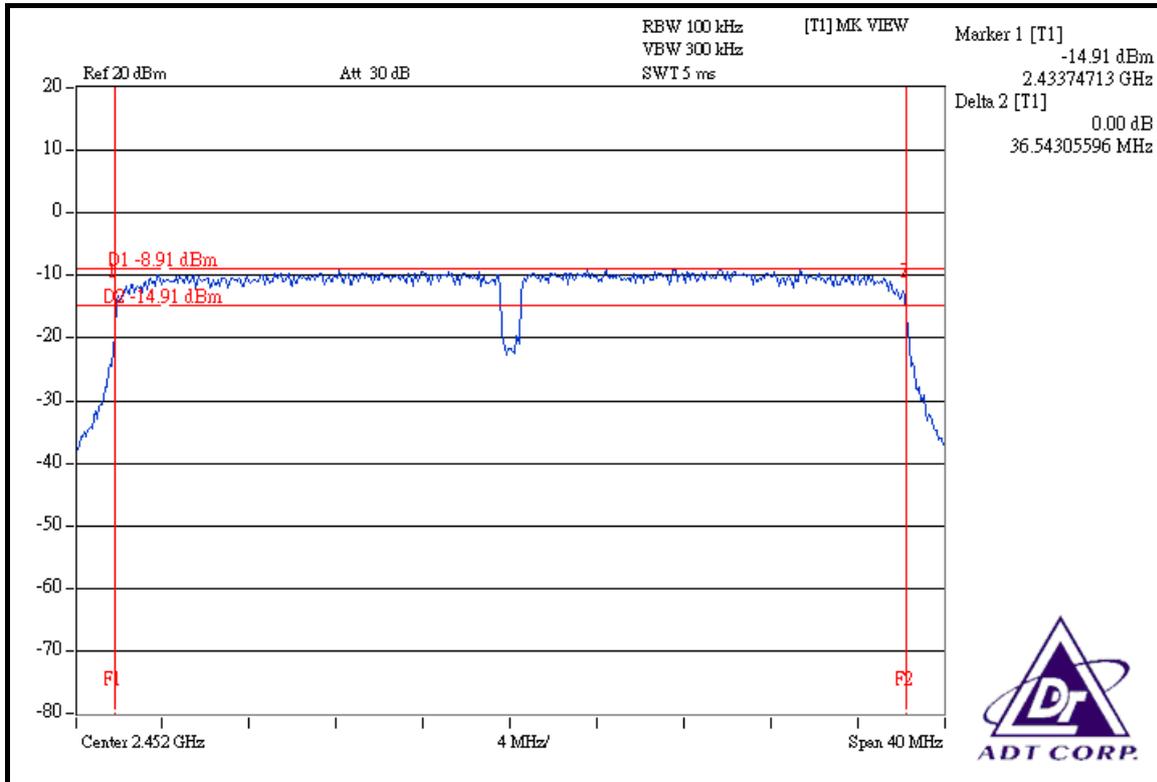
FOR CHAIN 1: CH 1



CH 4



CH 7





#### 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. 28, 2007
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. A detector was used on the output port of the EUT. An oscilloscope was used to read 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 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

<b>MODULATION TYPE</b>	DBPSK	<b>TRANSFER RATE</b>	1.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg.C, 65% RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	71.121	18.52	30	PASS
6	2437	71.285	18.53	30	PASS
11	2462	71.945	18.57	30	PASS

##### 802.11g OFDM MODULATION

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg.C, 65% RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	63.387	18.02	30	PASS
6	2437	100.231	20.01	30	PASS
11	2462	57.016	17.56	30	PASS



**DRAFT 802.11n (20MHz) OFDM MODULATION**

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	7.2Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg.C, 65% RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHAN.	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)		PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	40.926	39.994	16.12	16.02	80.920	19.08	30	PASS
6	2437	63.533	63.387	18.03	18.02	126.920	21.04	30	PASS
11	2462	39.902	40.365	16.01	16.06	80.267	19.05	30	PASS

**DRAFT 802.11n (40MHz) OFDM MODULATION**

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	15.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg.C, 65% RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHAN.	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)		PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2422	22.542	25.177	13.53	14.01	47.719	16.79	30	PASS
4	2437	44.771	50.466	16.51	17.03	95.237	19.79	30	PASS
7	2452	25.704	25.468	14.10	14.06	51.172	17.09	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

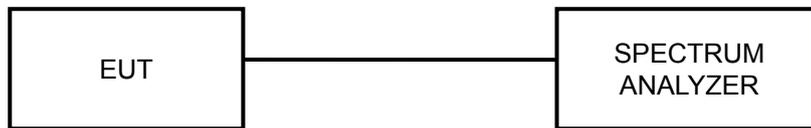
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

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



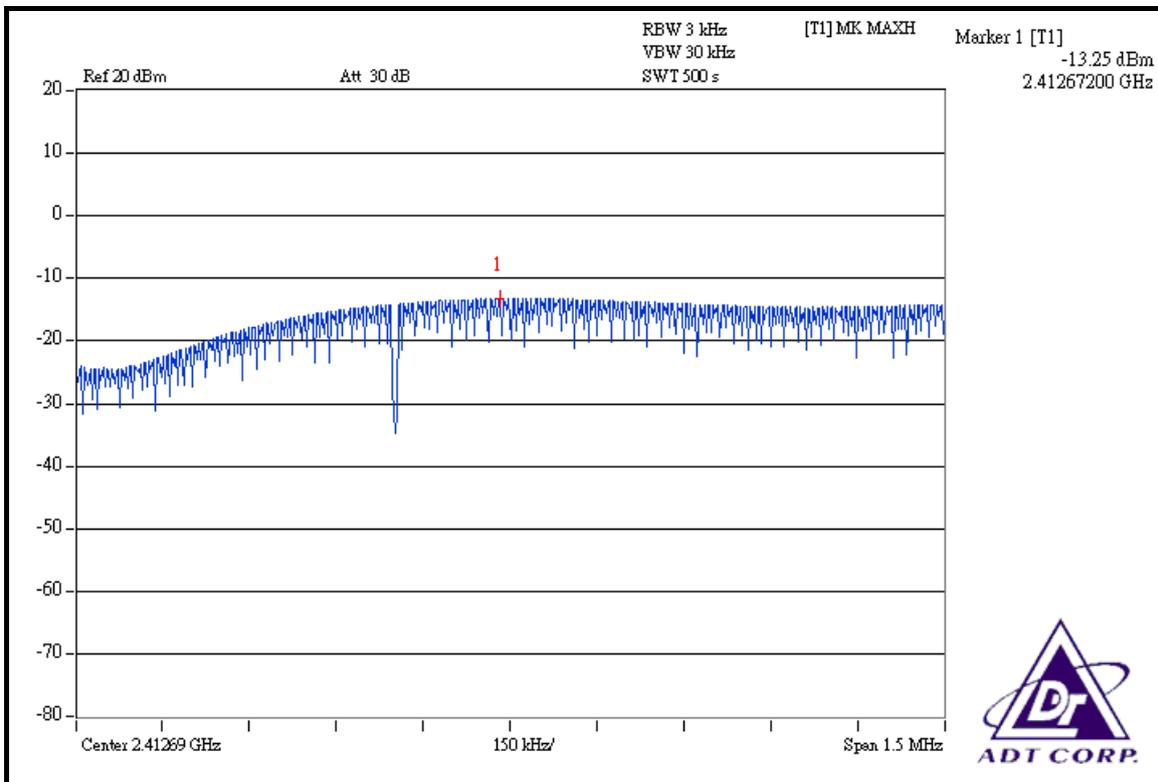
### 4.5.7 TEST RESULTS

#### 802.11b DSSS MODULATION

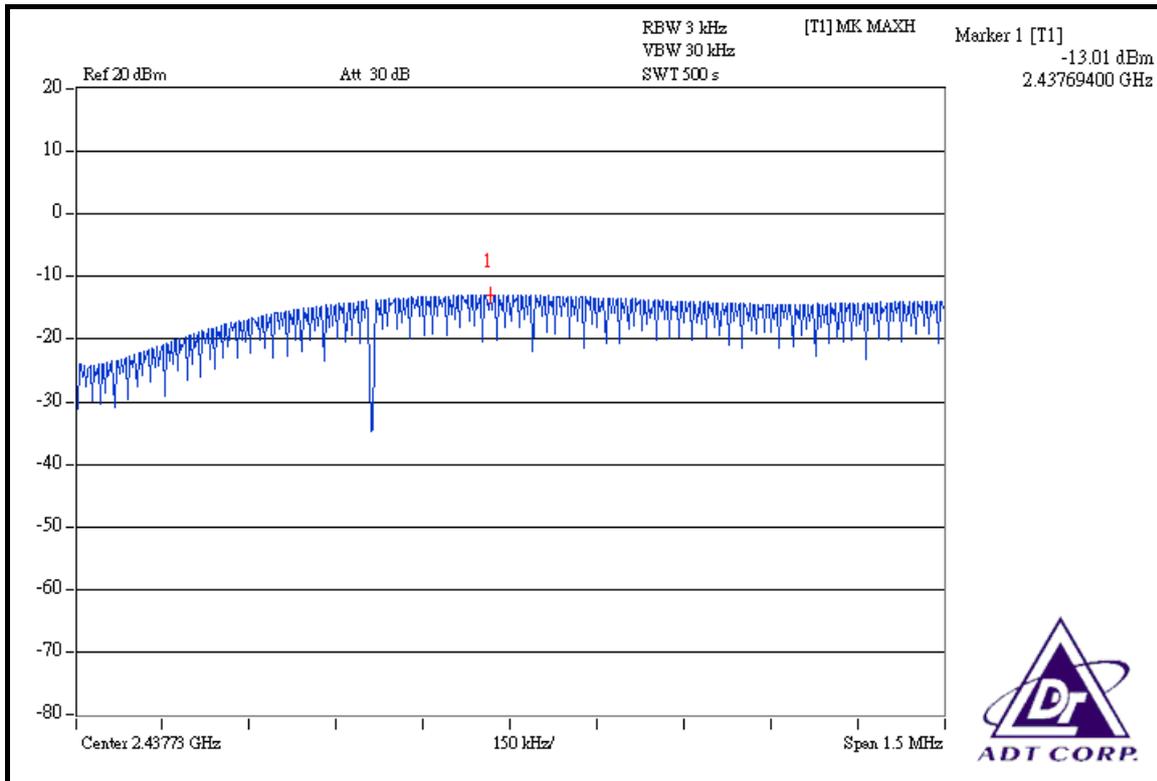
<b>MODULATION TYPE</b>	DBPSK	<b>TRANSFER RATE</b>	1.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg.C, 65% RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	2412	-13.25	8	PASS
6	2437	-13.01	8	PASS
11	2462	-13.04	8	PASS

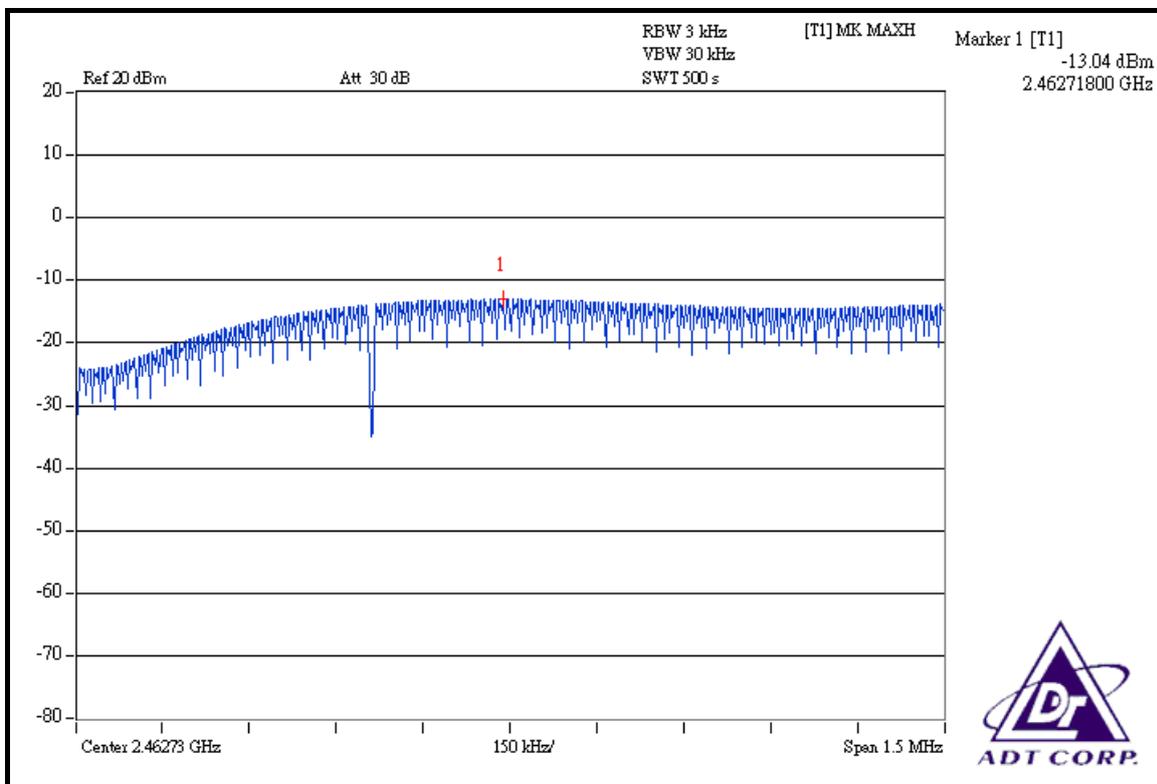
#### CH 1



CH 6



CH 11



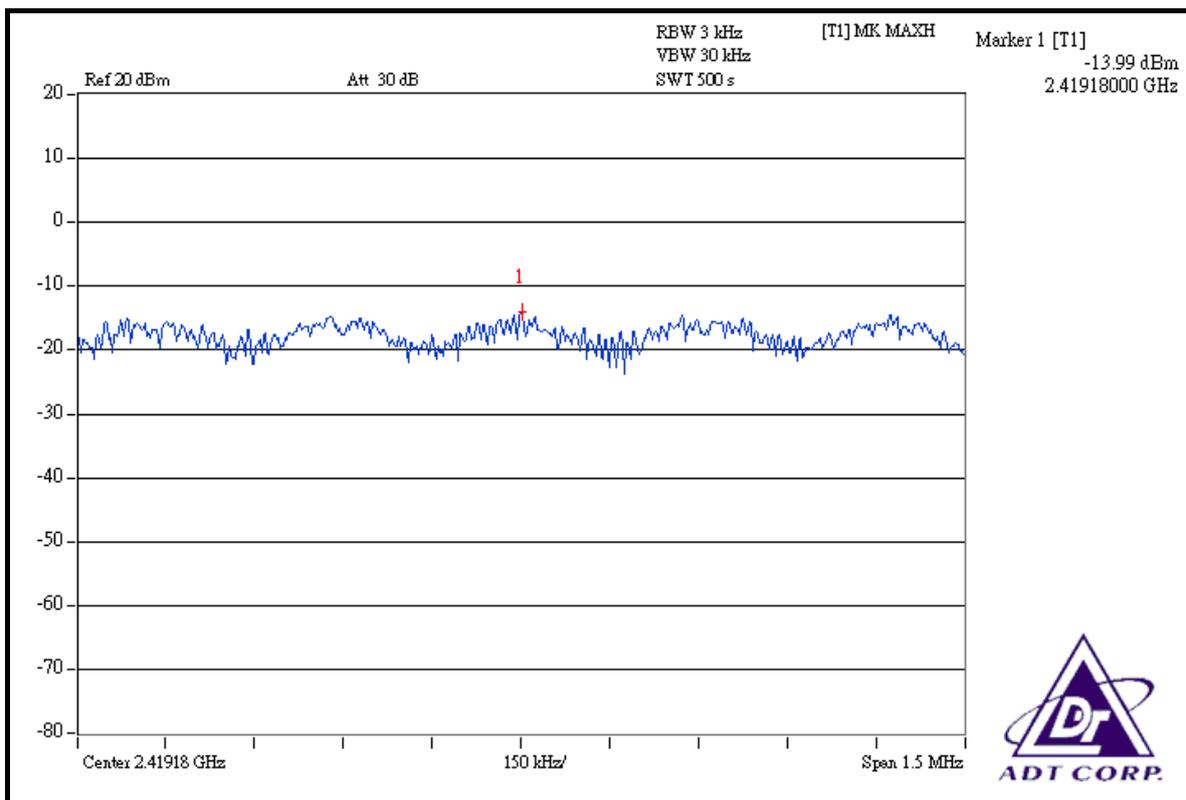


### 802.11g OFDM MODULATION

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg.C, 65% RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

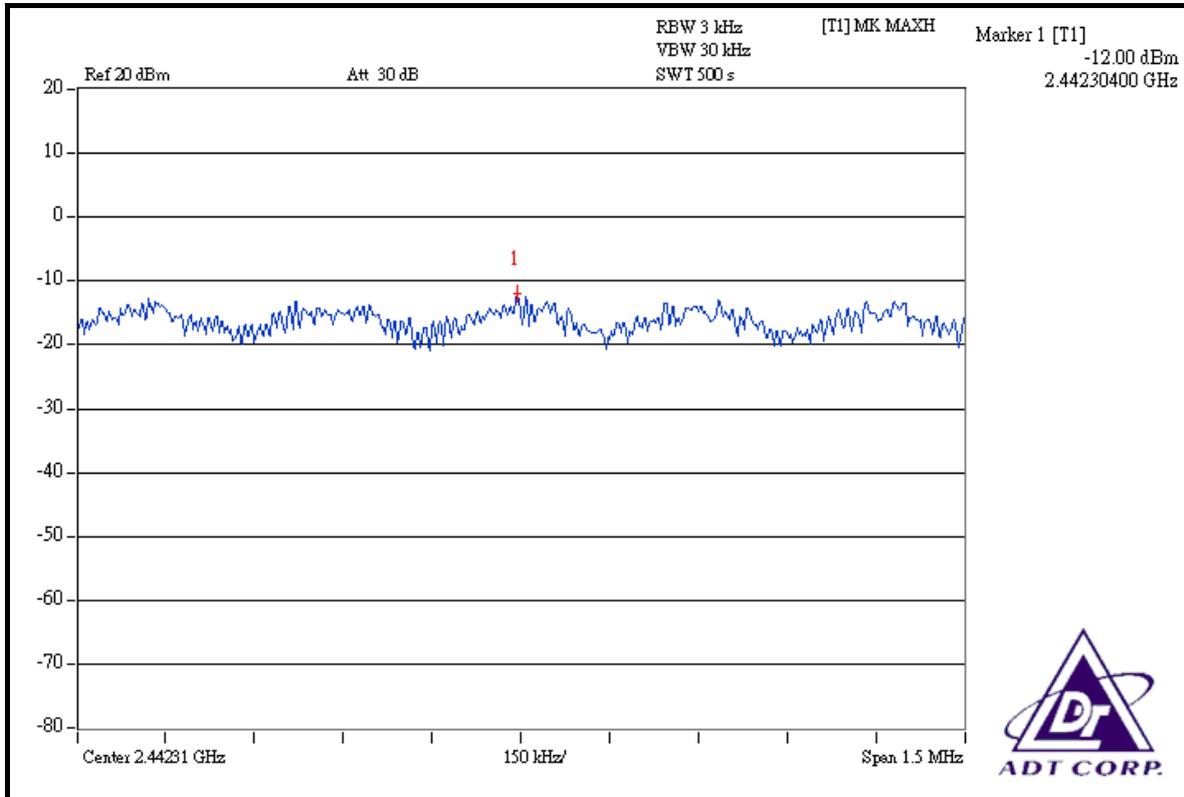
CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	2412	-13.99	8	PASS
6	2437	-12.00	8	PASS
11	2462	-14.66	8	PASS

### CH 1

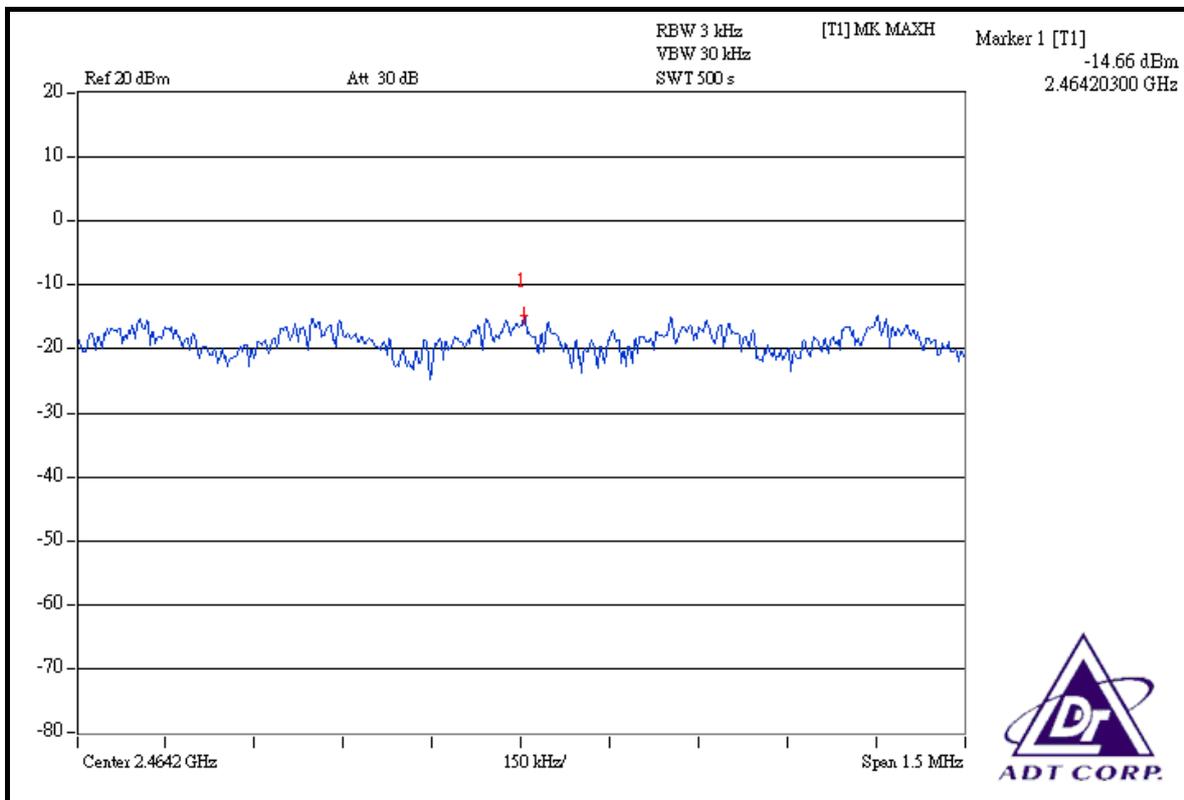




### CH 6



### CH 11



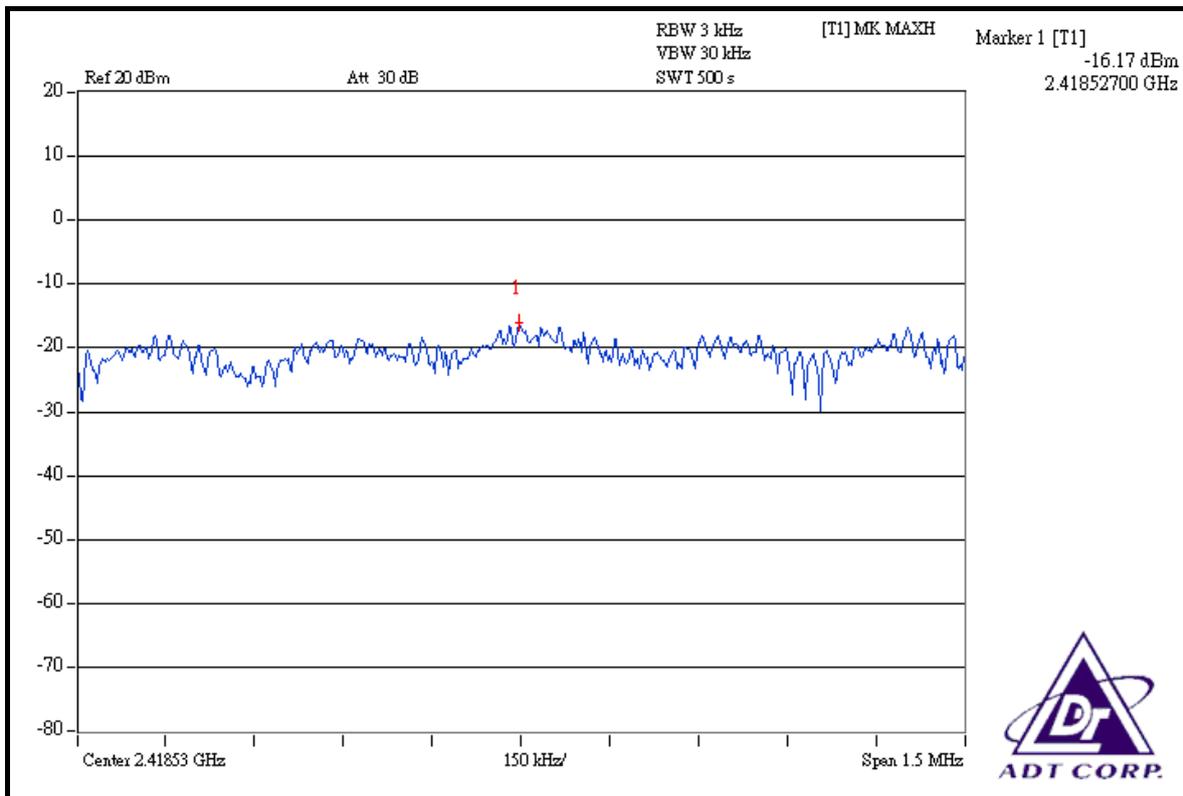


**DRAFT 802.11n (20MHz) OFDM MODULATION**

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	7.2Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg.C, 65% RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

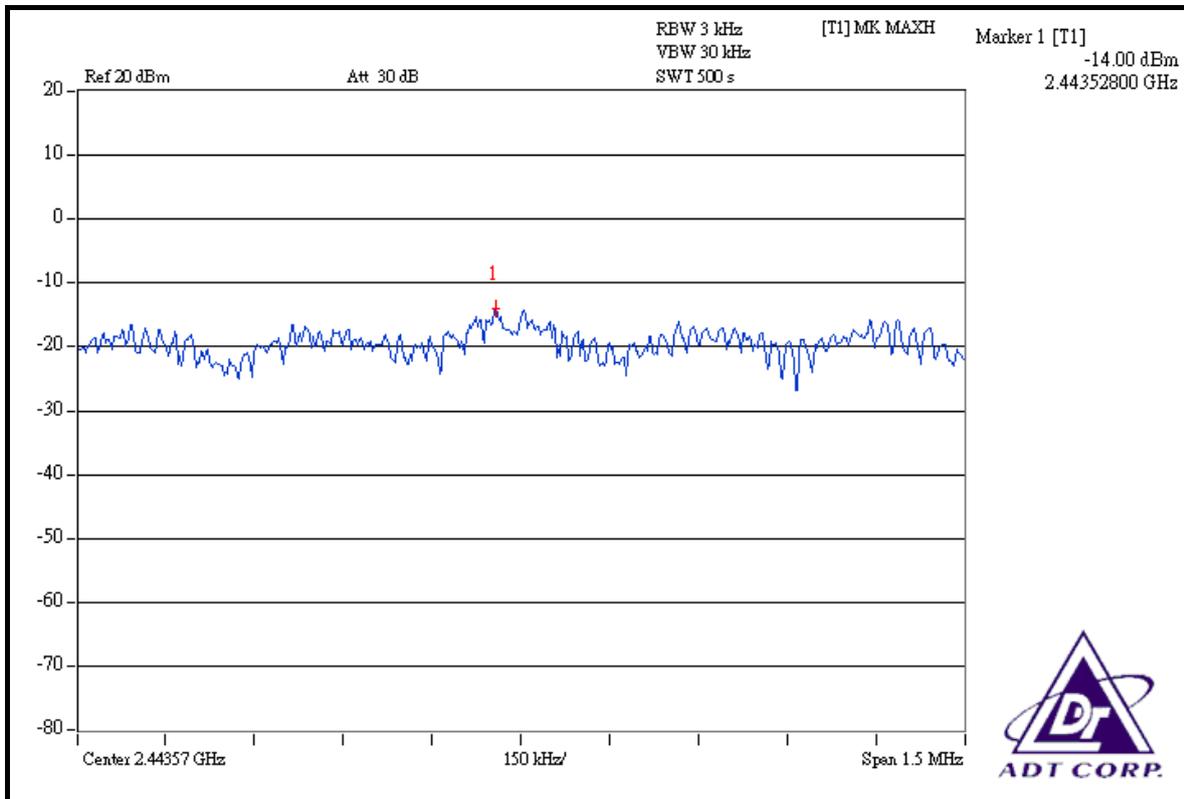
CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (mW)		RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	0.024	0.033	-16.17	-14.88	0.057	-12.44	8	PASS
6	2437	0.040	0.049	-14.00	-13.08	0.089	-10.51	8	PASS
11	2462	0.024	0.031	-16.27	-15.05	0.055	-12.60	8	PASS

**FOR CHAIN 0: CH 1**

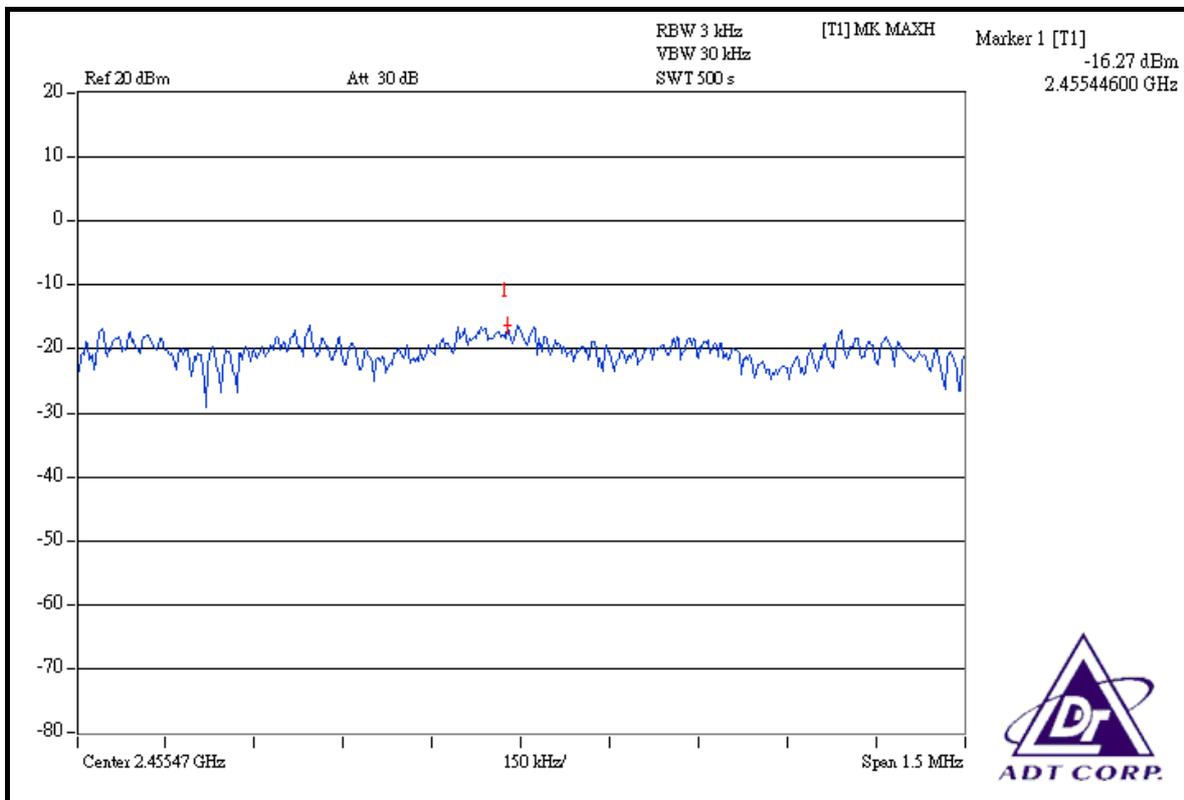




### CH 6

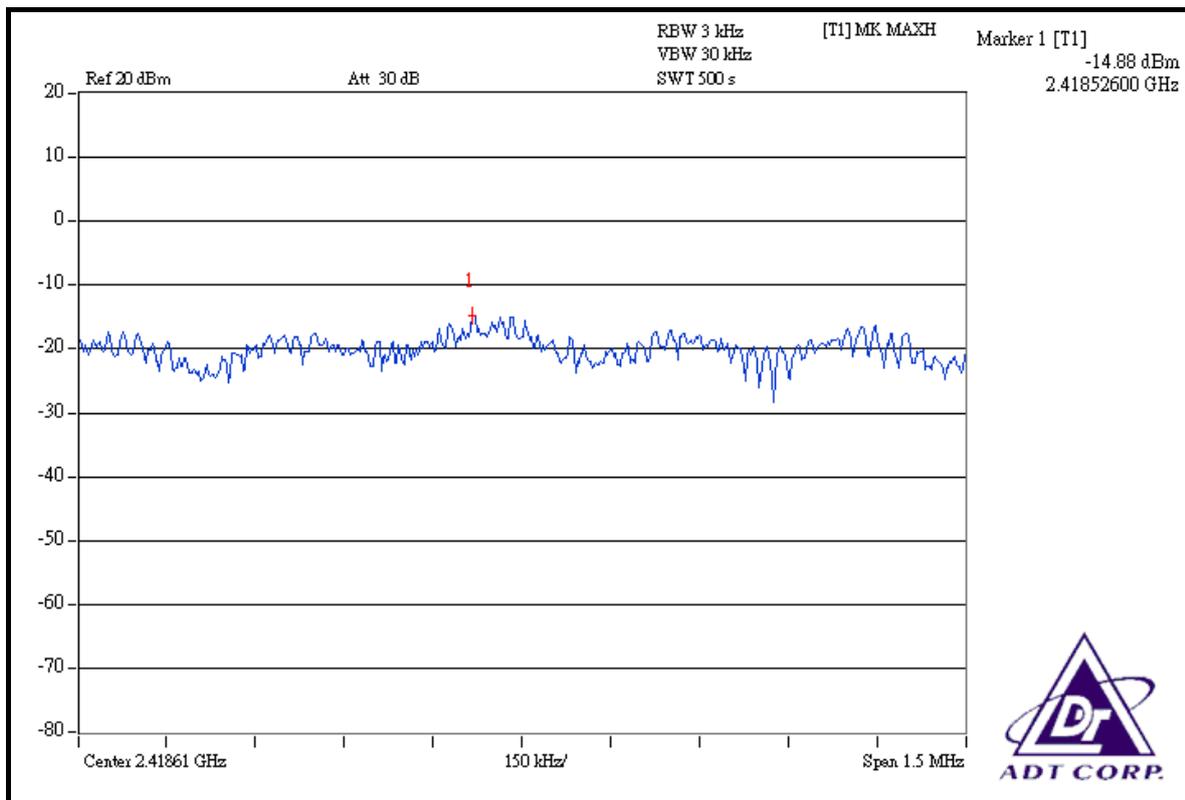


### CH 11

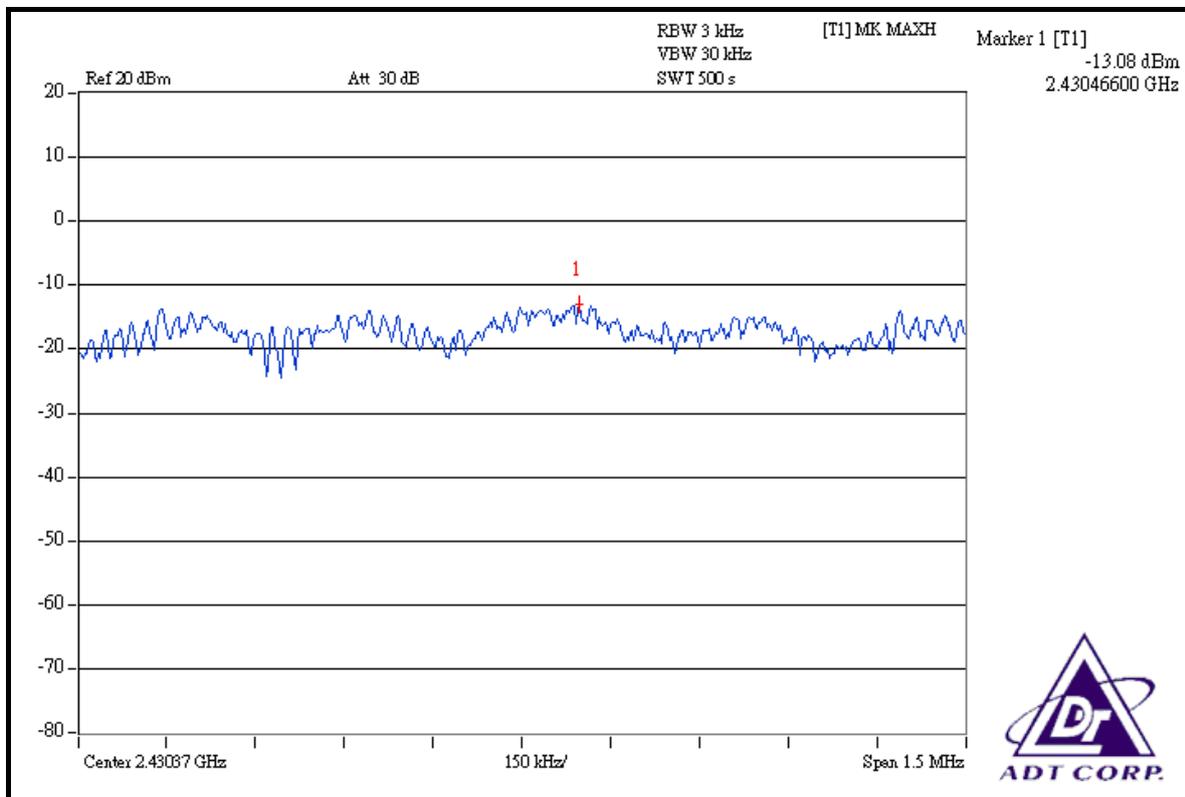




### FOR CHAIN 1: CH 1



### CH 6





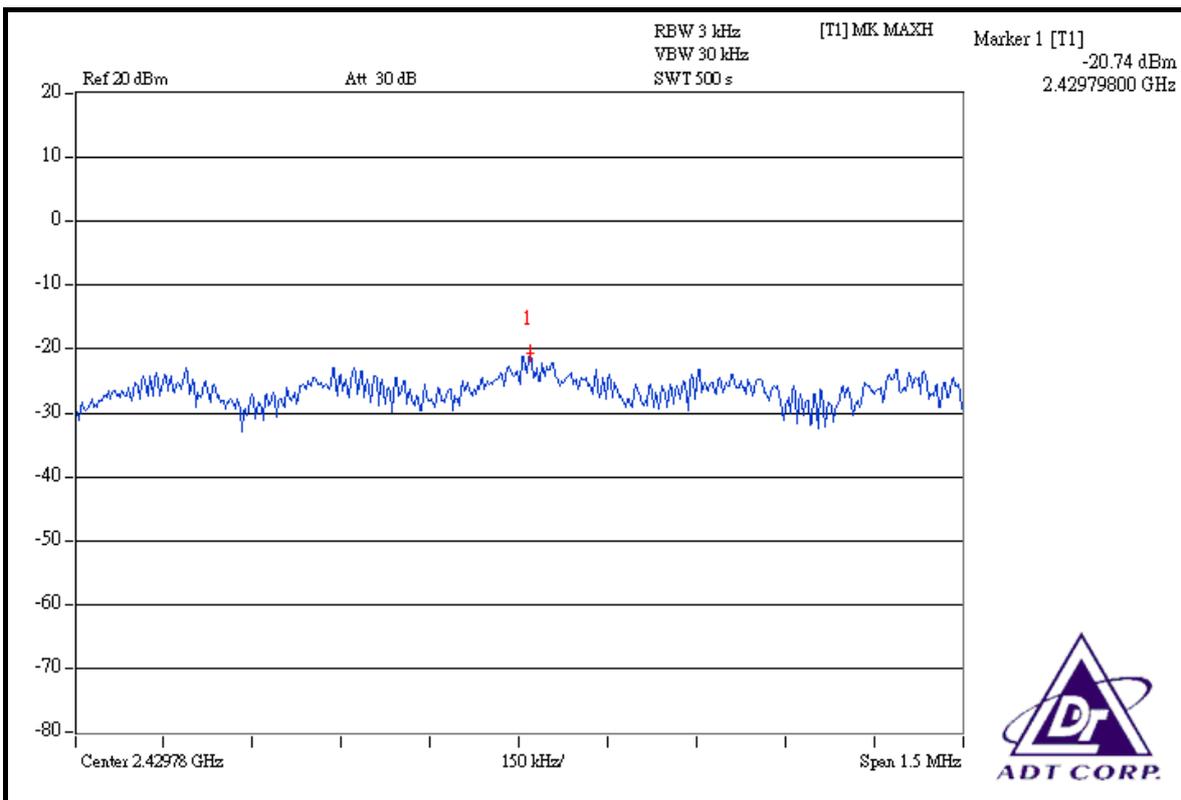


**DRAFT 802.11n (40MHz) OFDM MODULATION**

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	15.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg.C, 65% RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

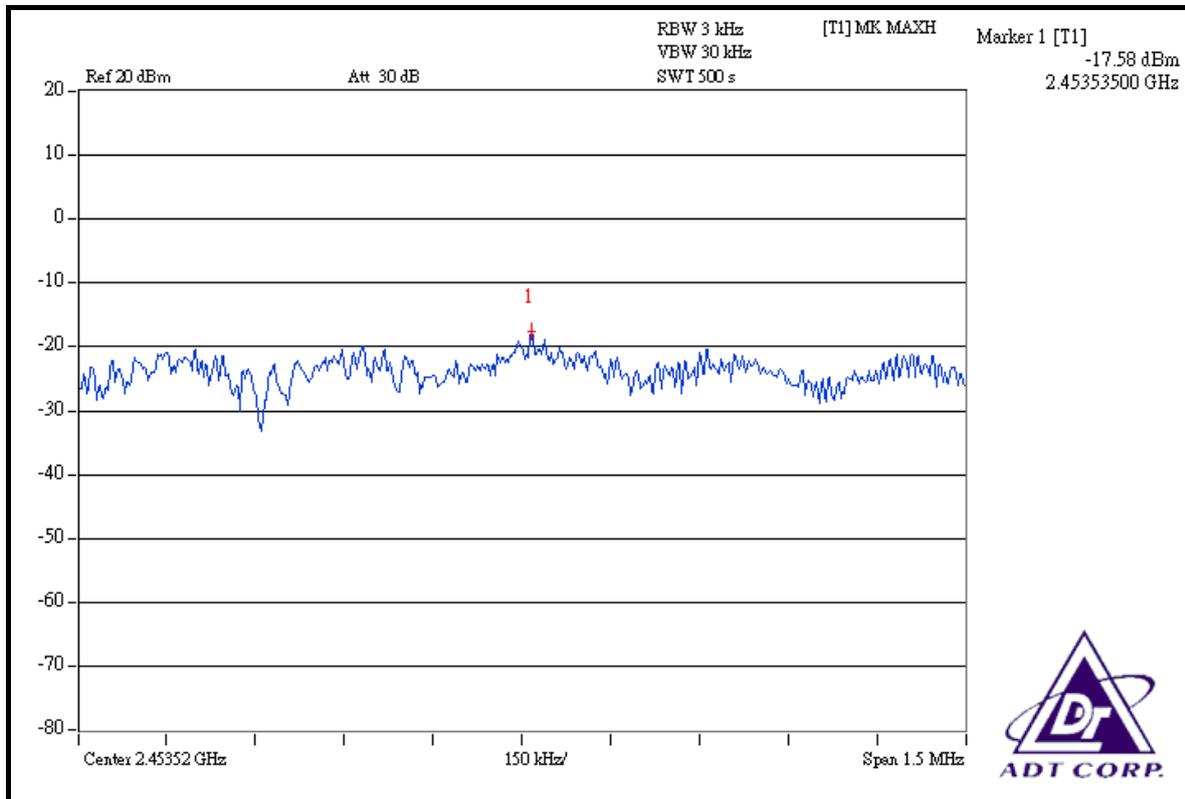
CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (mW)		RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2422	0.008	0.010	-20.74	-20.11	0.018	-17.45	8	PASS
4	2437	0.017	0.019	-17.58	-17.15	0.036	-14.44	8	PASS
7	2452	0.009	0.010	-20.55	-19.97	0.019	-17.21	8	PASS

**FOR CHAIN 0: CH 1**

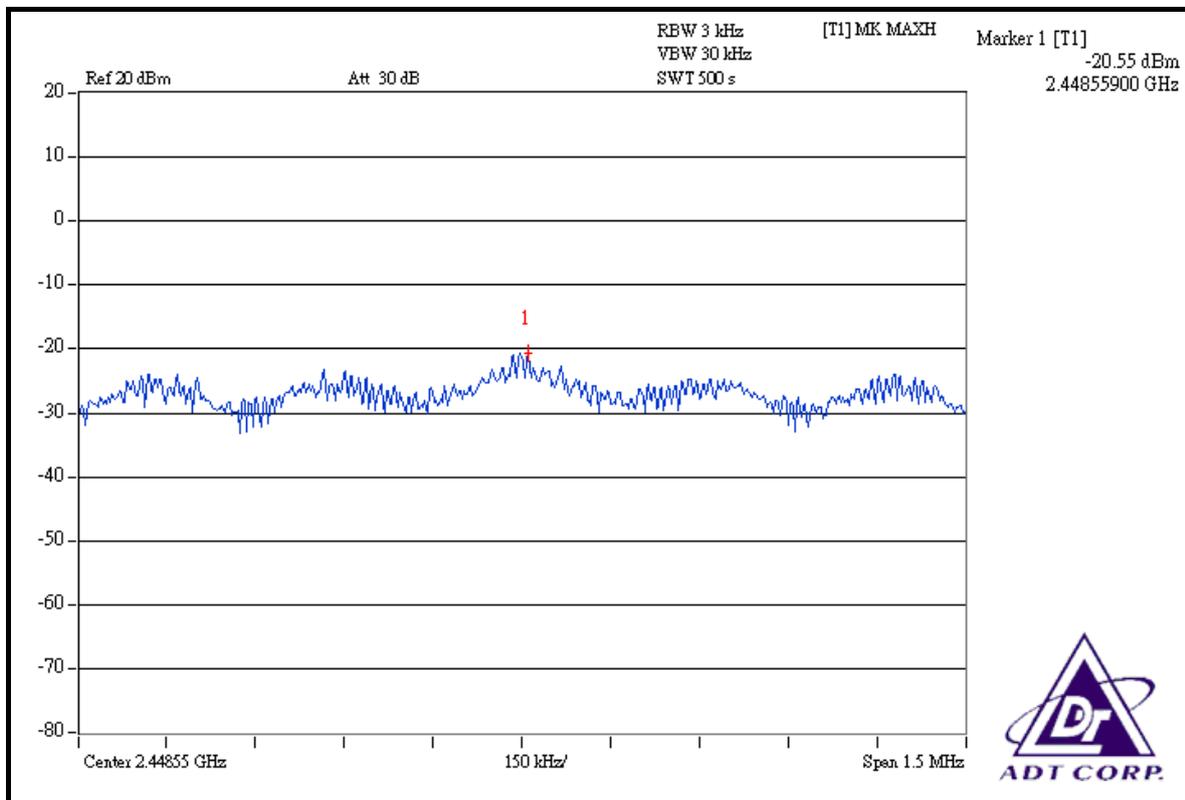




### CH 4

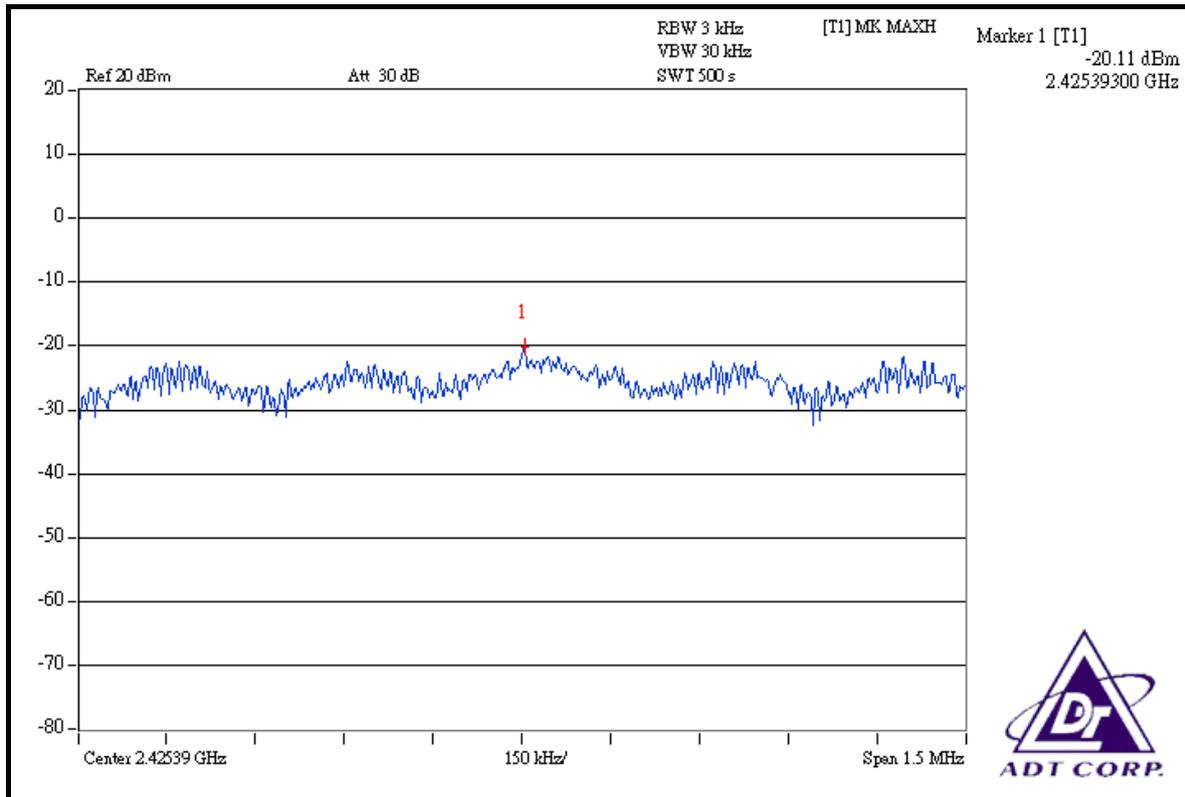


### CH 7

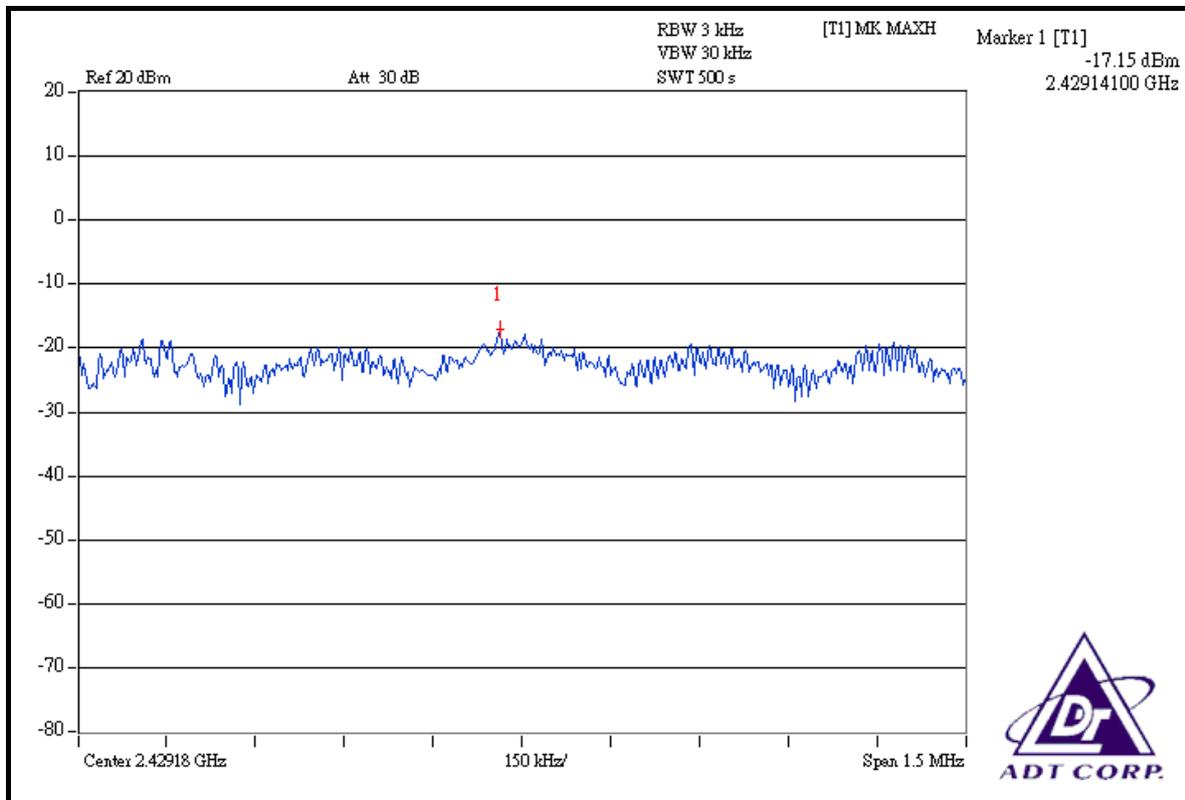




### FOR CHAIN 1: CH 1

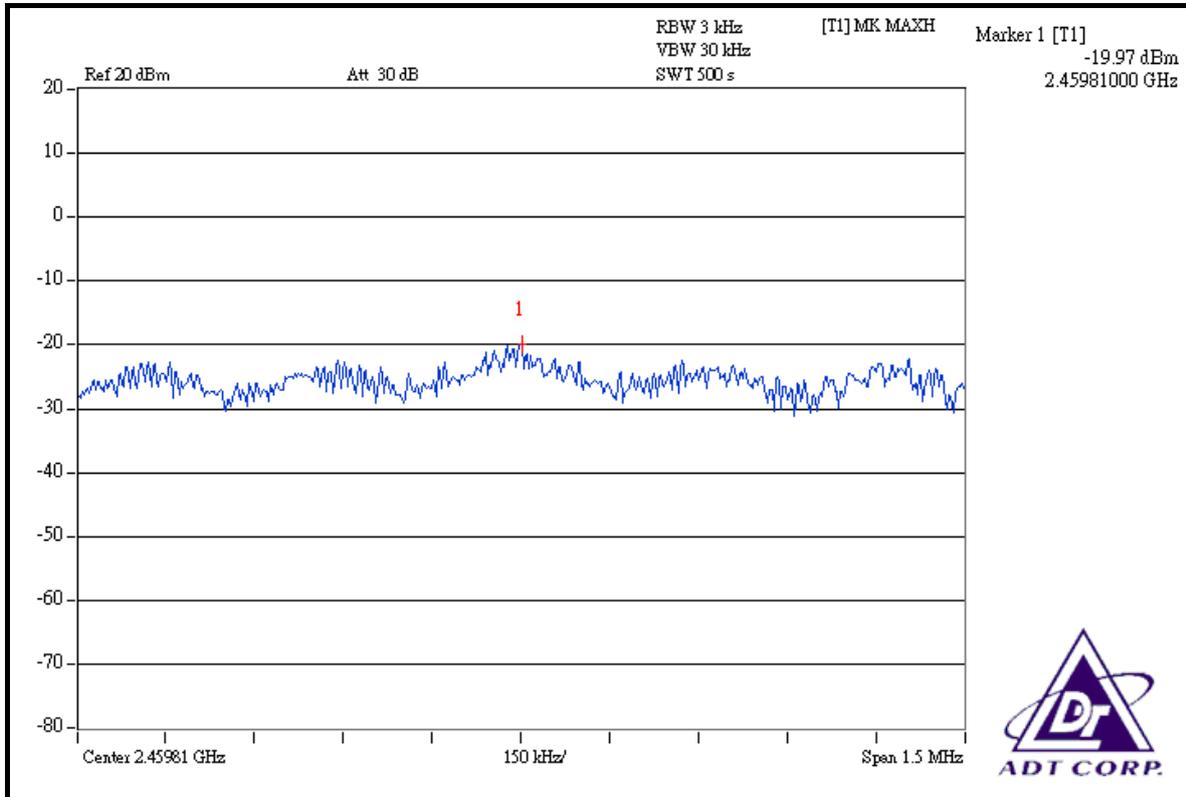


### CH 4





CH 7





## 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

#### For Single TX:

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.

#### For Dual TX:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Feb. 26, 2008
HORN Antenna SCHWARZBECK	9120D	9120D-209	Jun. 28, 2008
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 28, 2007
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:** 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

#### **For Single TX:**

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 10Hz bandwidth from band edge. The band edges was measured and recorded.

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

#### **For Dual TX:**

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. Set both RBW and VBW of spectrum analyzer to 100kHz 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)

### 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 24 images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

#### **802.11b DSSS MODULATION**

##### **NOTE 1:**

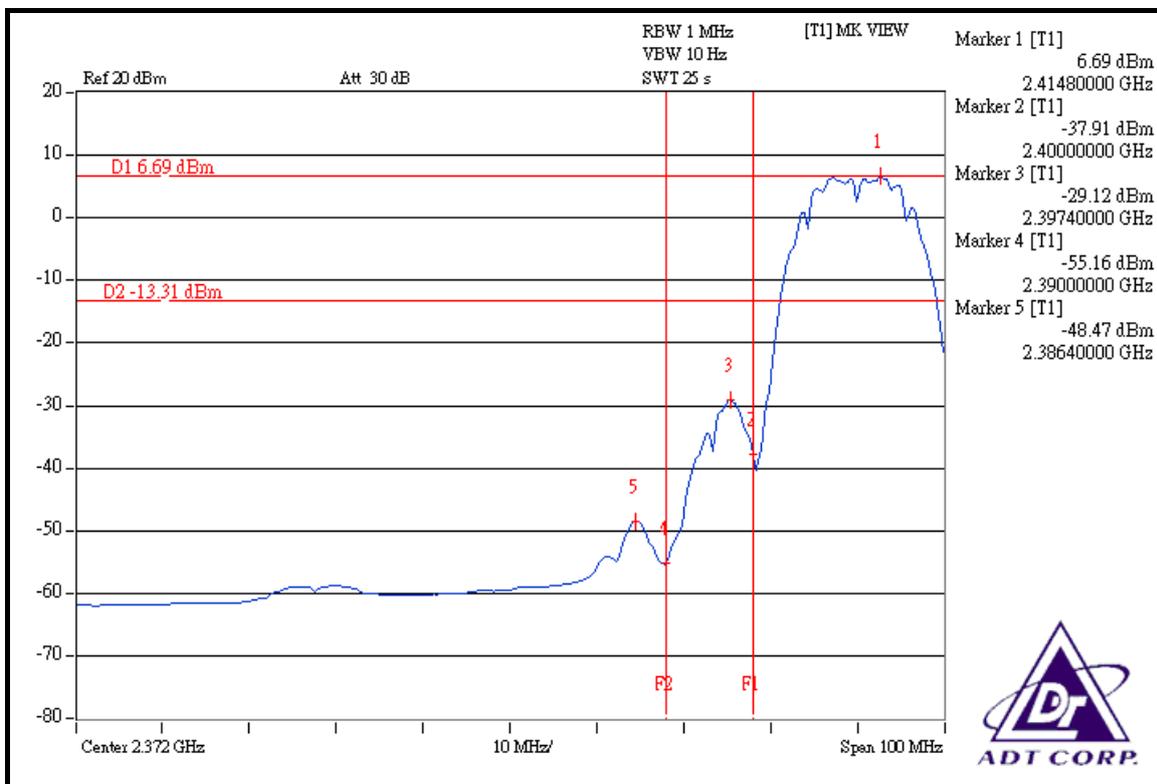
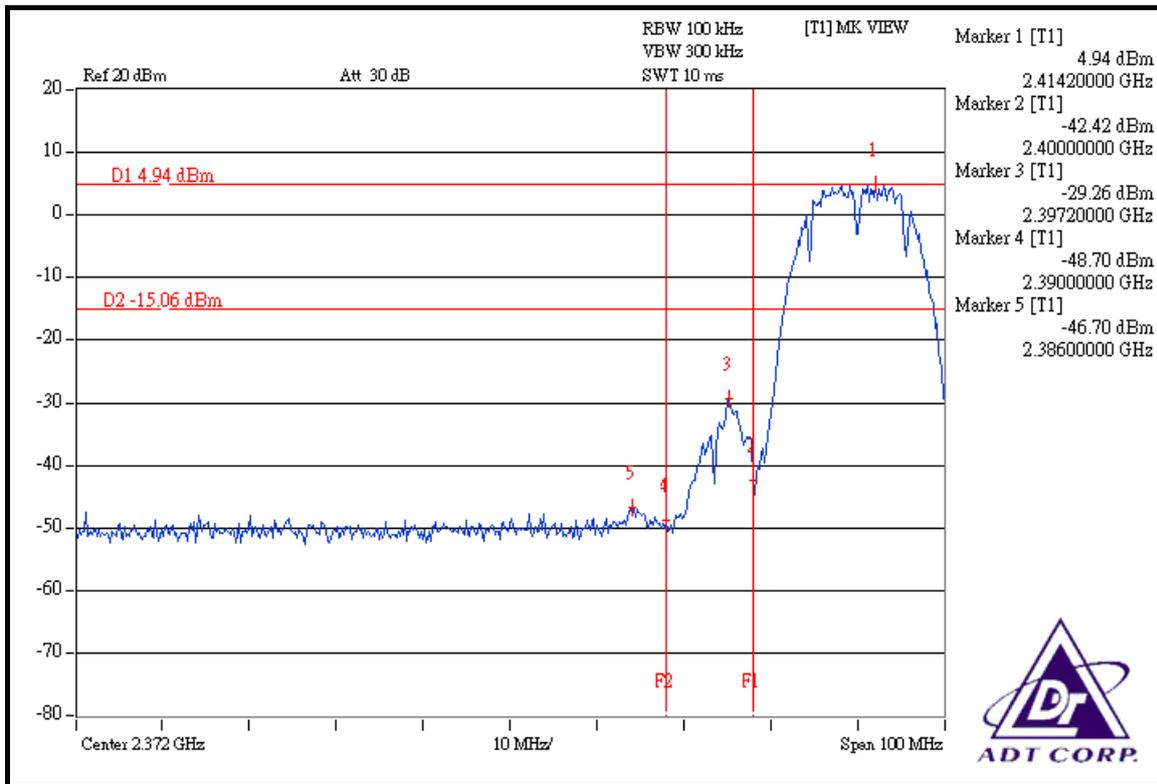
The band edge emission plot on the next page shows 51.64dBc between carrier maximum power and local maximum emission in restrict band (2.38600GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 111.46dBuV/m (Peak), so the maximum field strength in restrict band is  $111.46 - 51.64 = 59.82$ dBuV/m which is under 74dBuV/m limit.

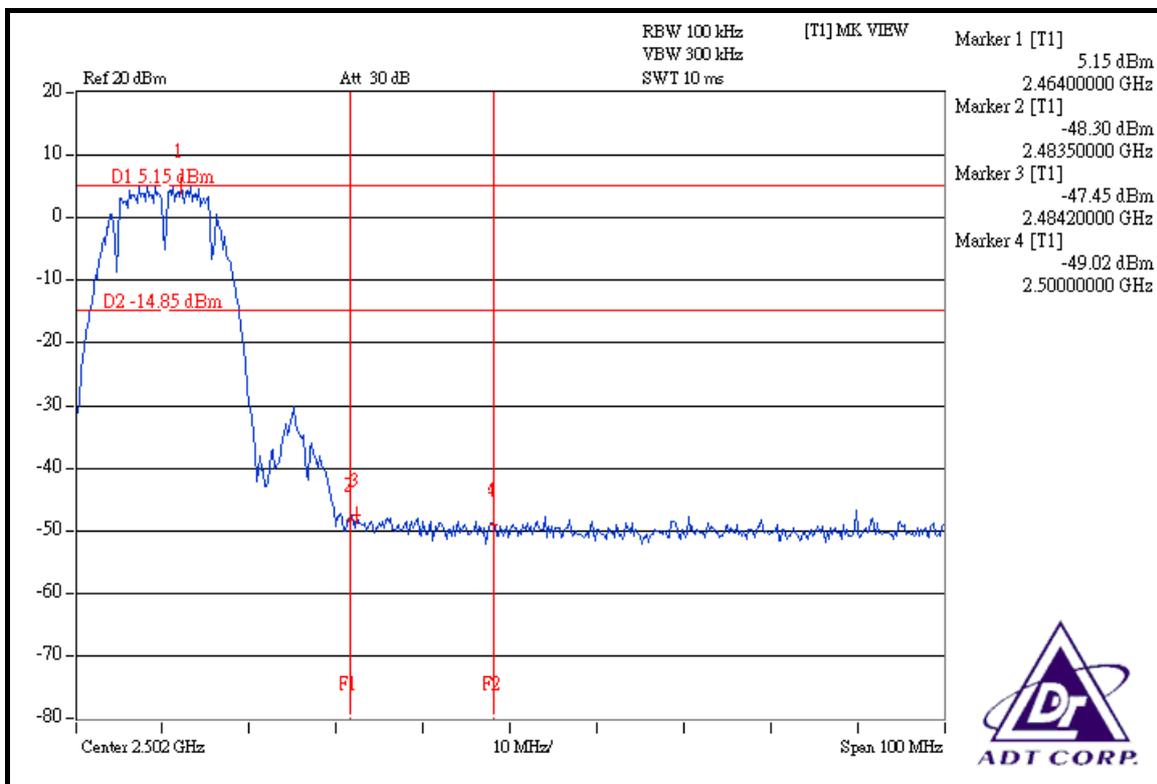
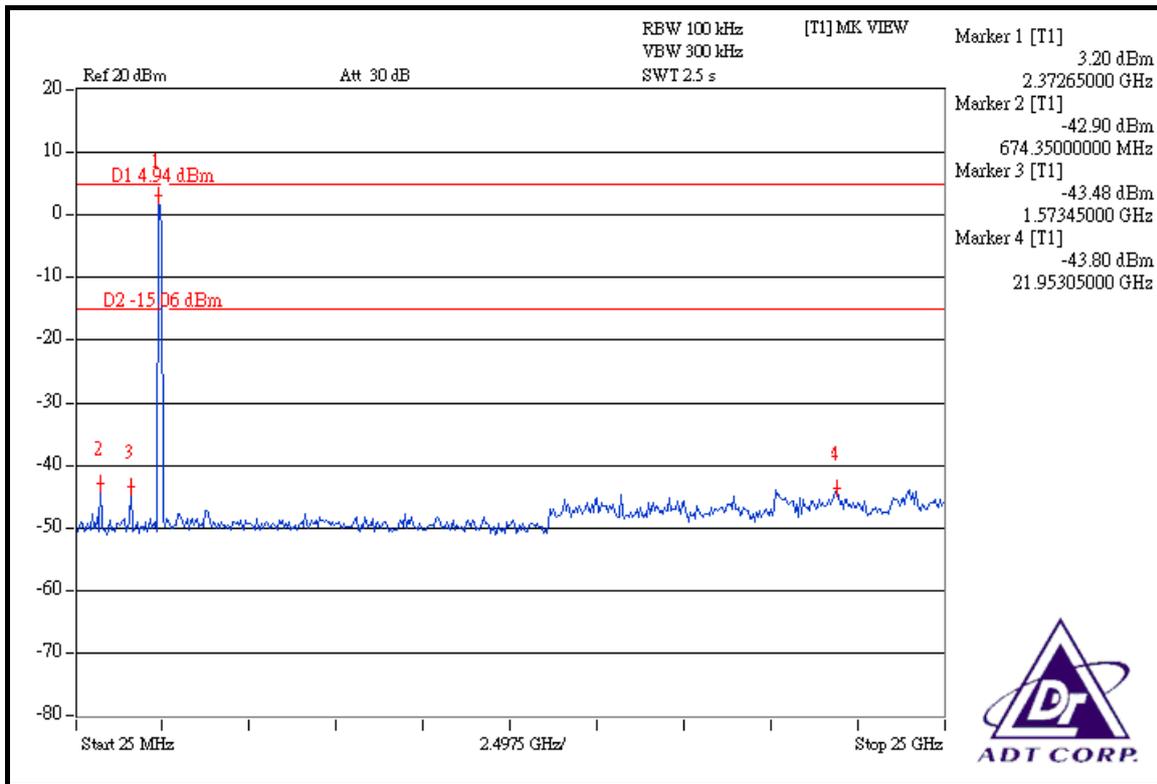
The band edge emission plot on the next page shows 55.16dBc between carrier maximum power and local maximum emission in restrict band (2.38640GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 107.13dBuV/m (Average), so the maximum field strength in restrict band is  $107.13 - 55.16 = 51.97$ dBuV/m which is under 54dBuV/m limit.

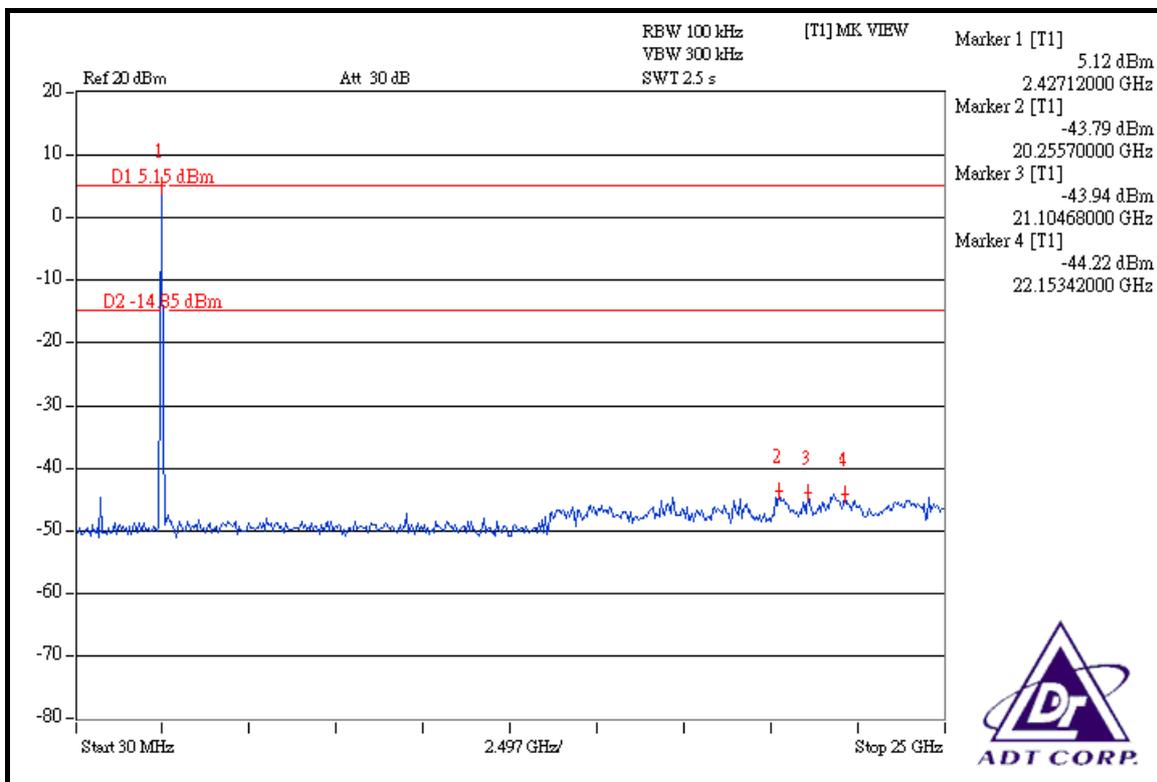
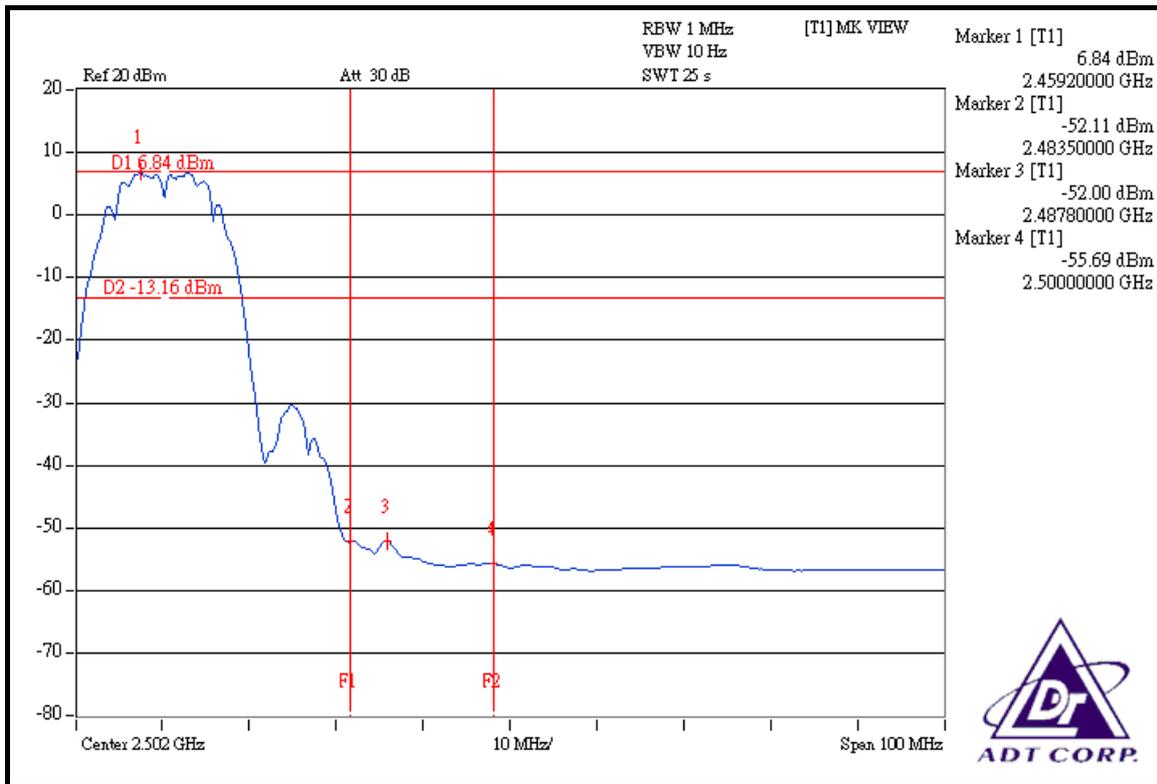
##### **NOTE 2:**

The band edge emission plot on the next second page shows 52.60dBc between carrier maximum power and local maximum emission in restrict band (2.48420GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 111.19dBuV/m (Peak), so the maximum field strength in restrict band is  $111.19 - 52.60 = 58.59$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 58.84dBc between carrier maximum power and local maximum emission in restrict band (2.48780GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 106.84dBuV/m (Average), so the maximum field strength in restrict band is  $106.84 - 58.84 = 48.00$ dBuV/m which is under 54dBuV/m limit.







## 802.11g OFDM MODULATION

### NOTE 1:

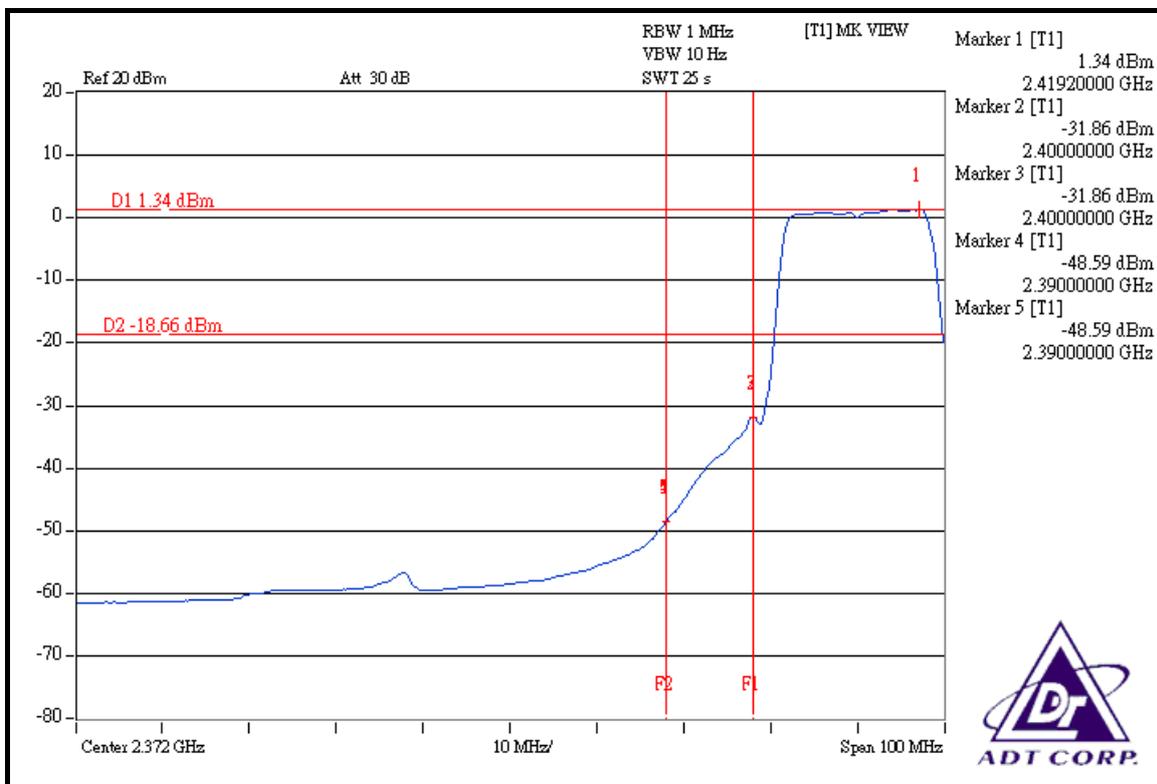
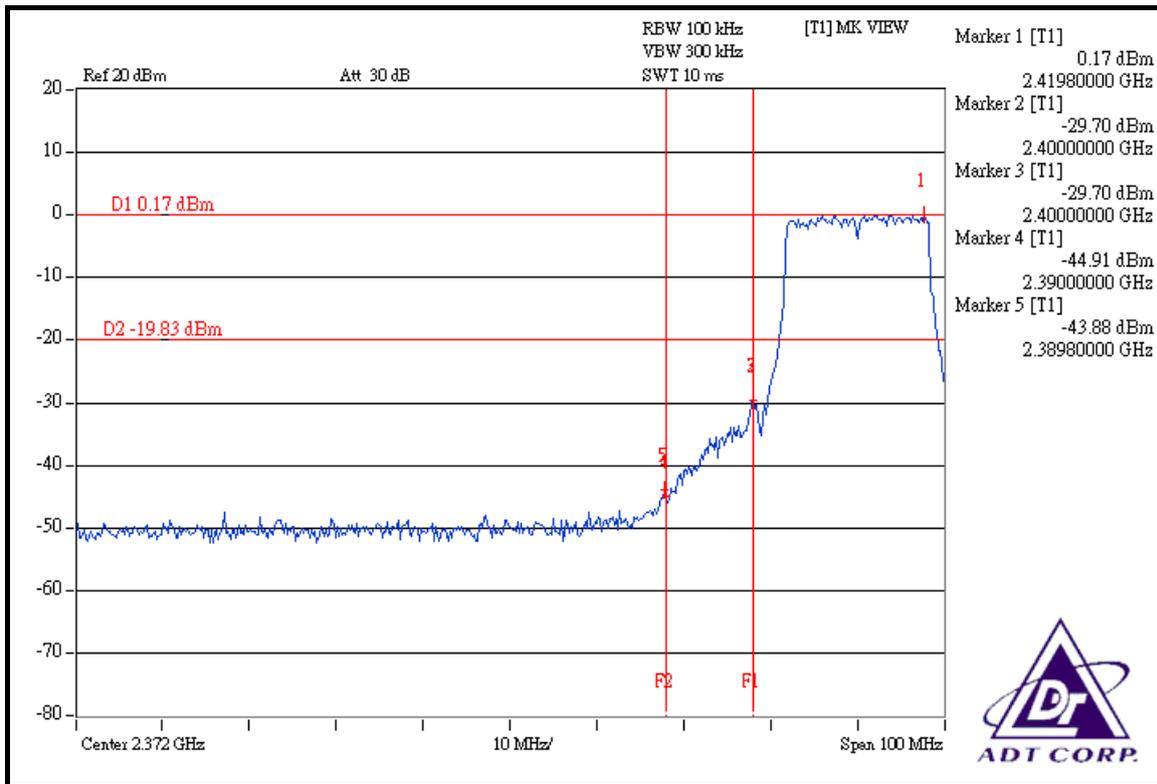
The band edge emission plot on the next page shows 44.05dBc between carrier maximum power and local maximum emission in restrict band (2.38980GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 112.75dBuV/m (Peak), so the maximum field strength in restrict band is  $112.75 - 44.05 = 68.70$ dBuV/m which is under 74dBuV/m limit.

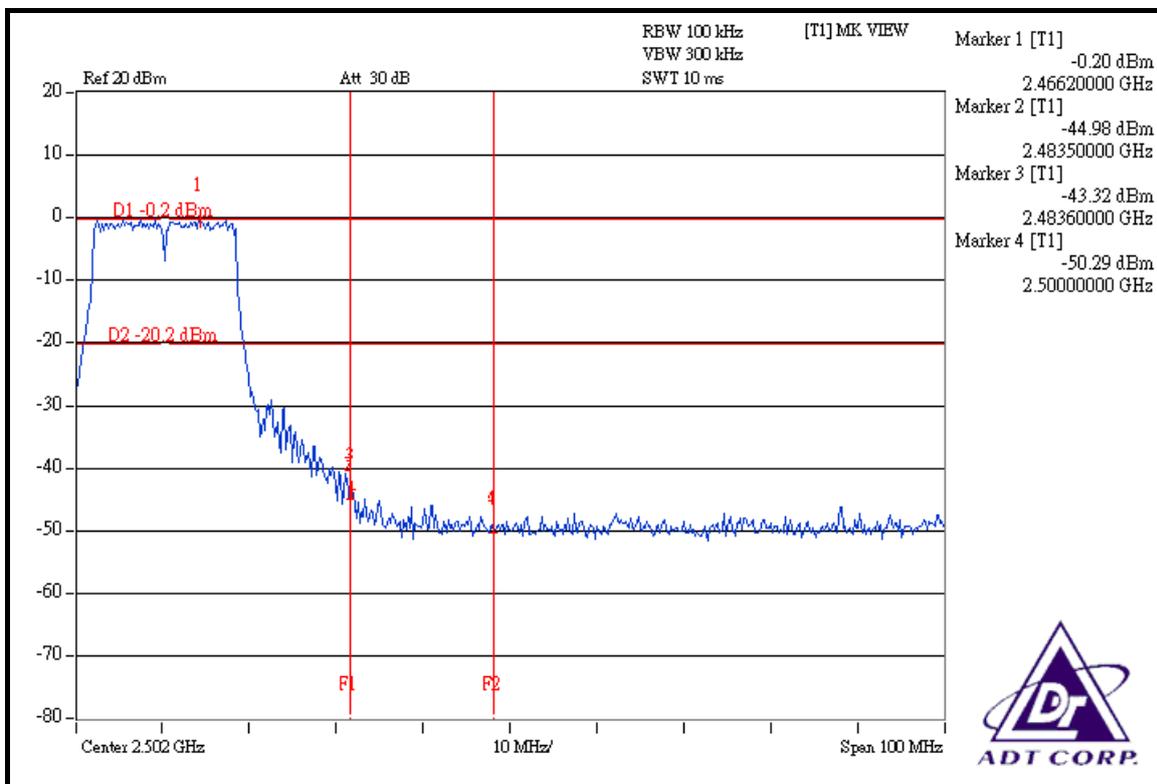
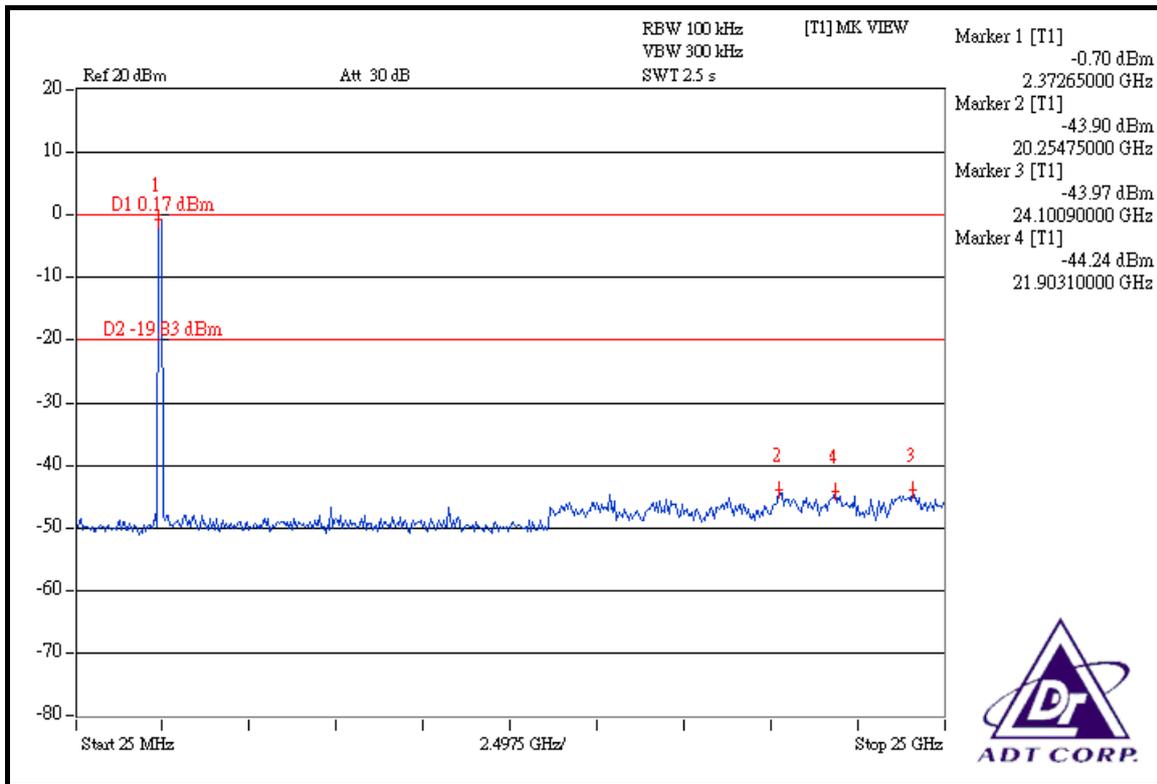
The band edge emission plot on the next page shows 49.93dBc between carrier maximum power and local maximum emission in restrict band (2.39000GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 102.73dBuV/m (Average), so the maximum field strength in restrict band is  $102.73 - 49.93 = 52.80$ dBuV/m which is under 54dBuV/m limit.

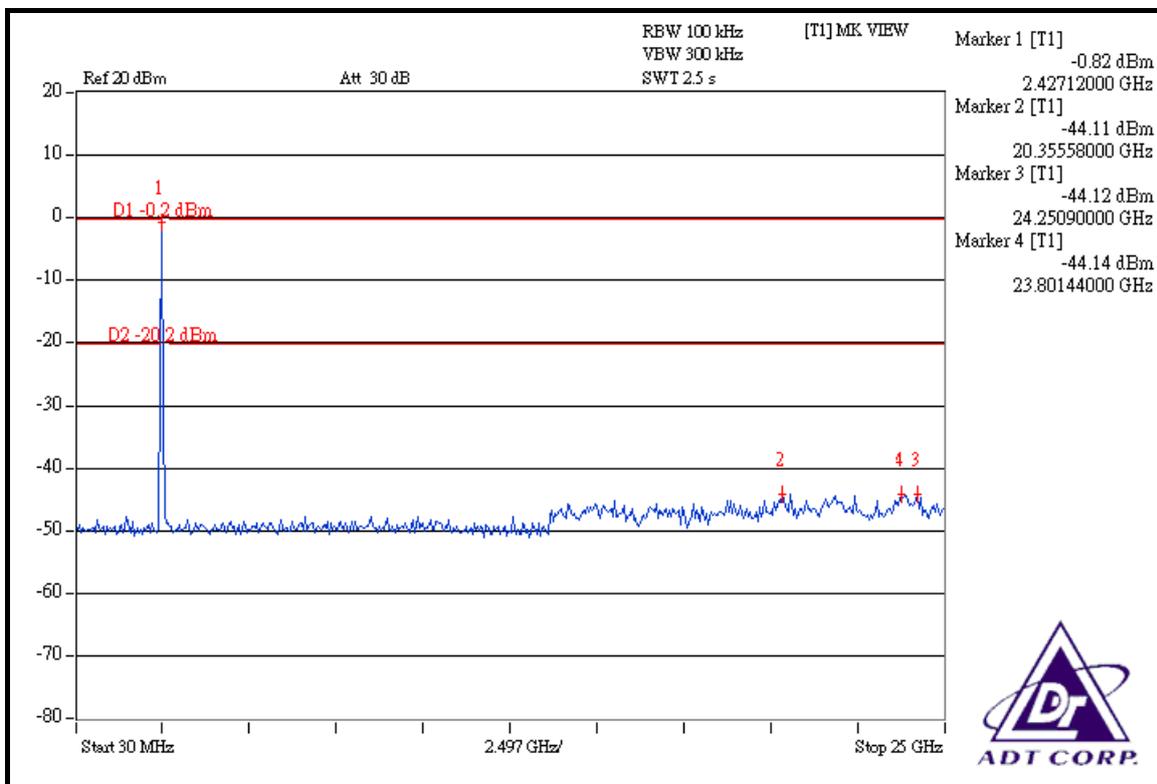
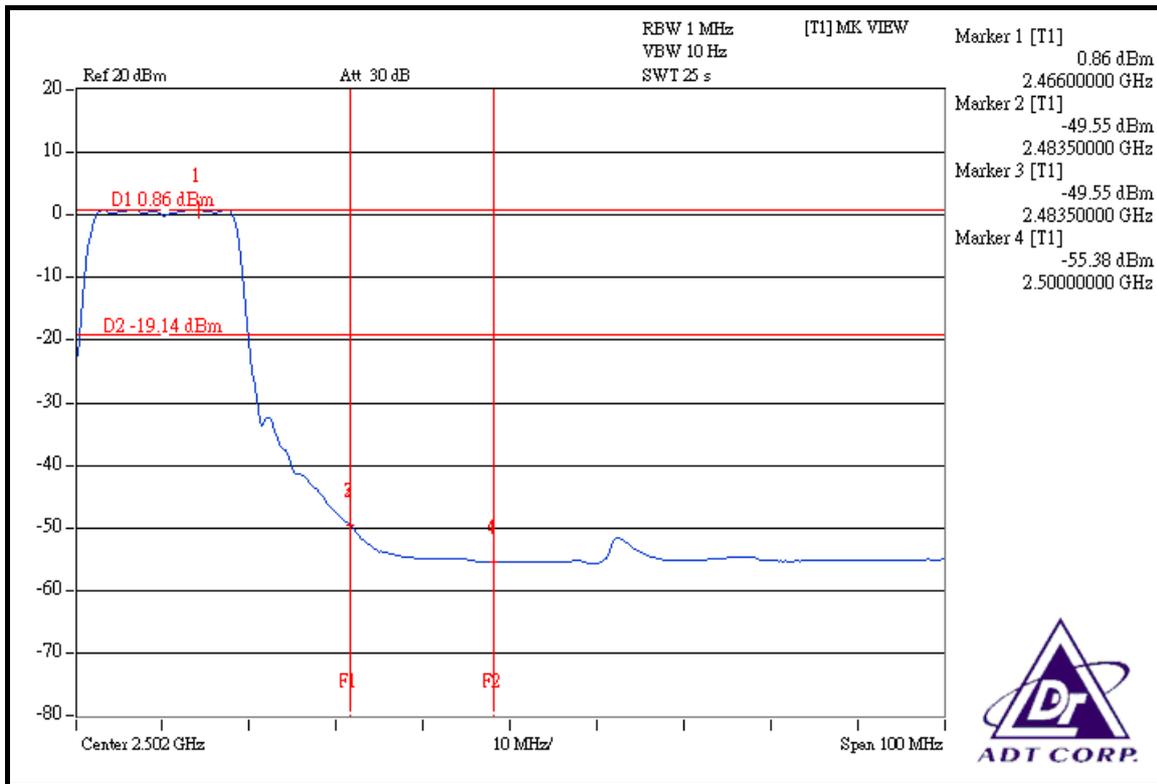
### NOTE 2:

The band edge emission plot on the next second page shows 43.12dBc between carrier maximum power and local maximum emission in restrict band (2.48360GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 112.16dBuV/m (Peak), so the maximum field strength in restrict band is  $112.16 - 43.12 = 69.04$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 50.41dBc 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 102.10dBuV/m (Average), so the maximum field strength in restrict band is  $102.10 - 50.41 = 51.69$ dBuV/m which is under 54dBuV/m limit.







## **DRAFT 802.11n (20MHz) OFDM MODULATION**

### **NOTE 1:**

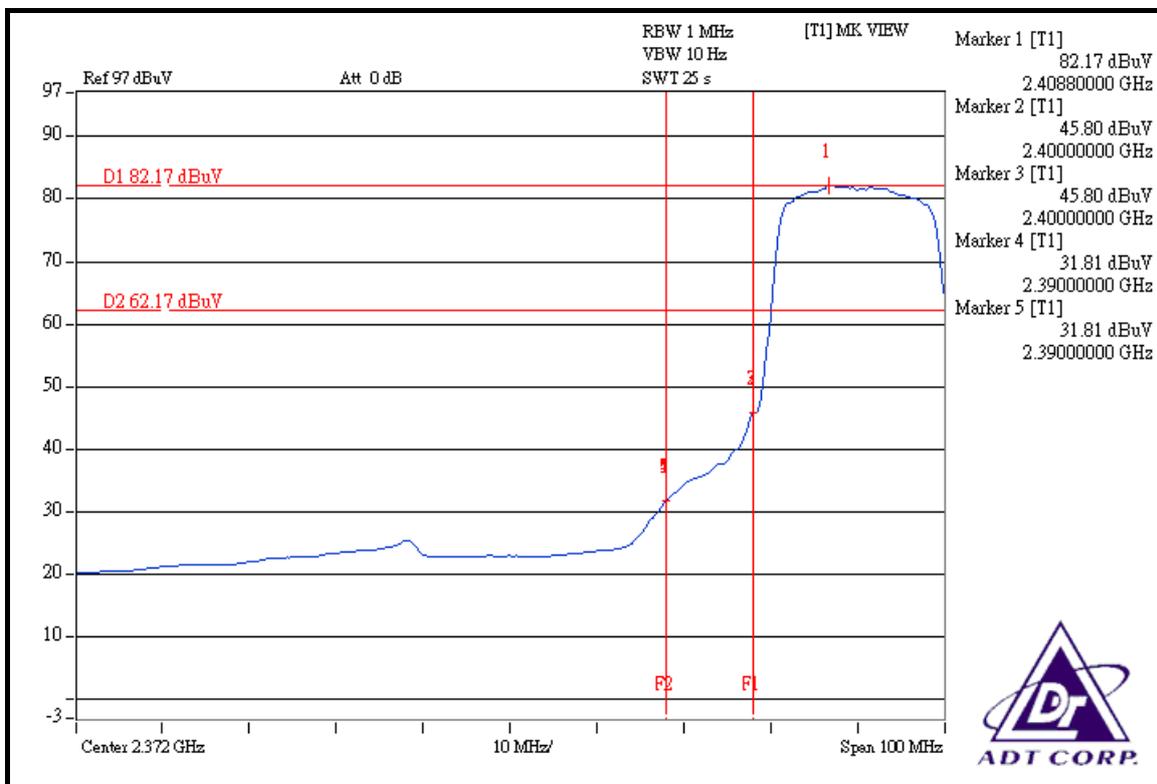
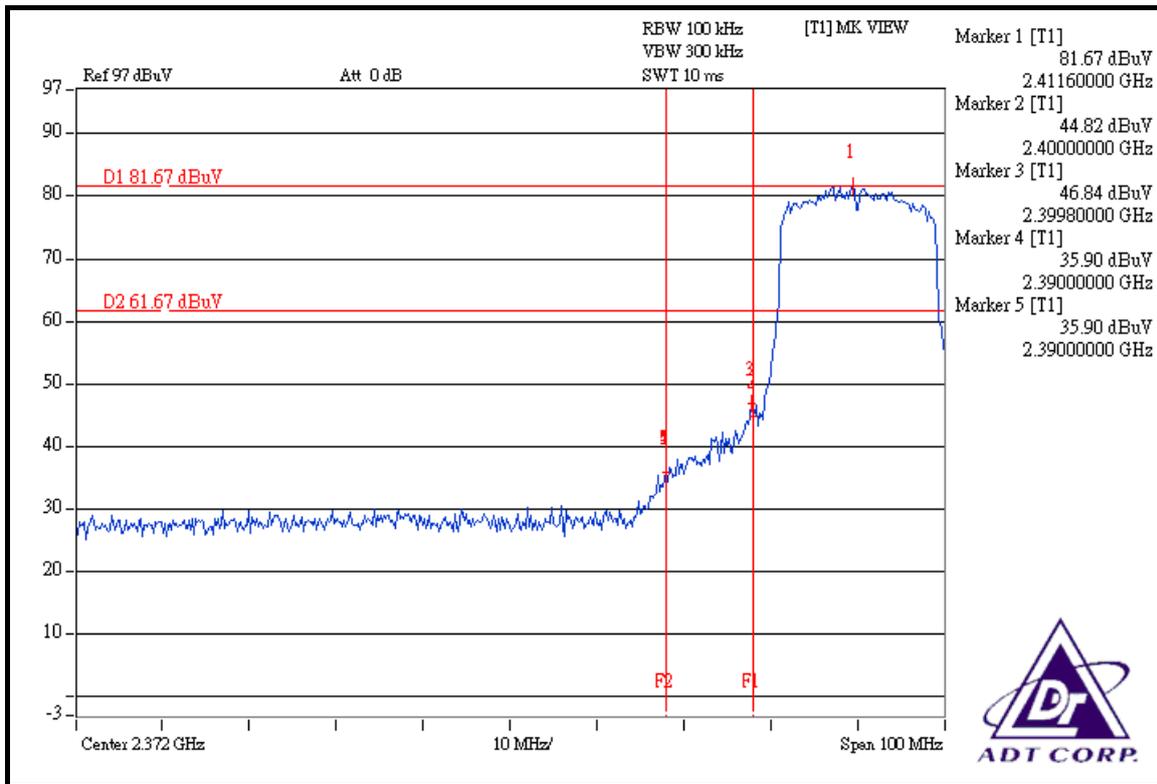
The band edge emission plot on the next page shows 45.77Bc between carrier maximum power and local maximum emission in restrict band (2.39000GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 113.19dBuV/m (Peak), so the maximum field strength in restrict band is  $113.19 - 45.77 = 67.42\text{dBuV/m}$  which is under 74dBuV/m limit.

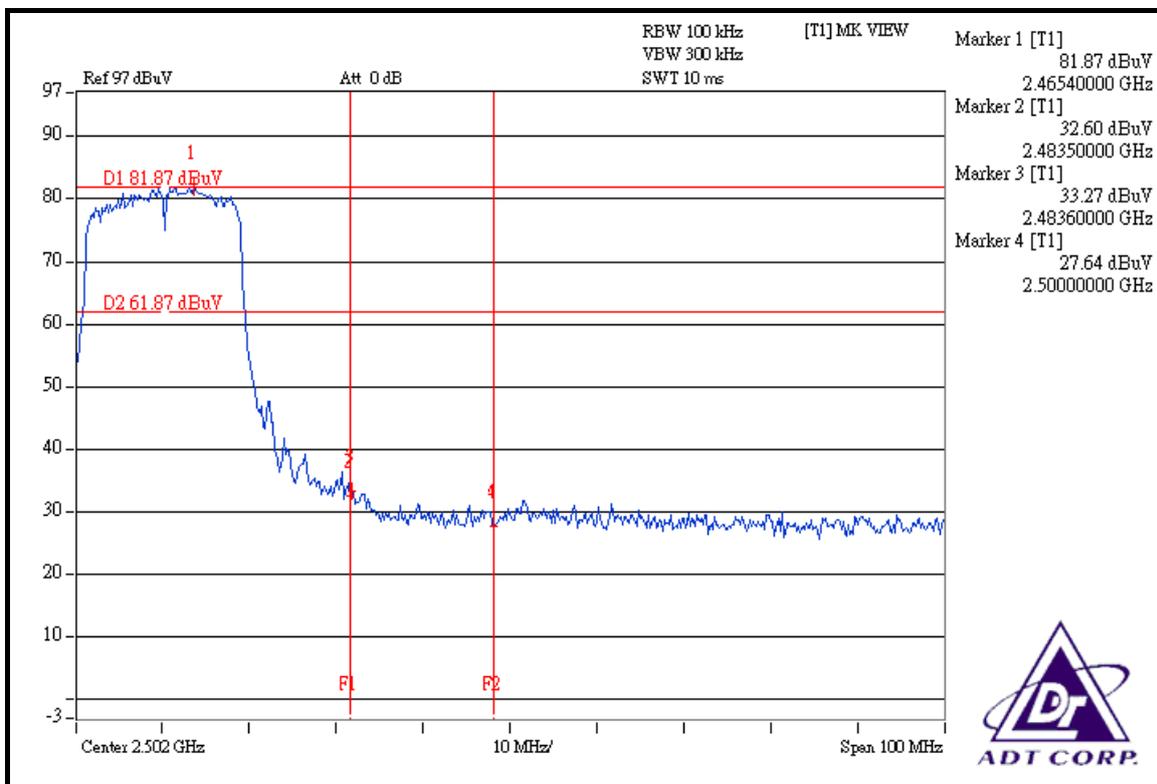
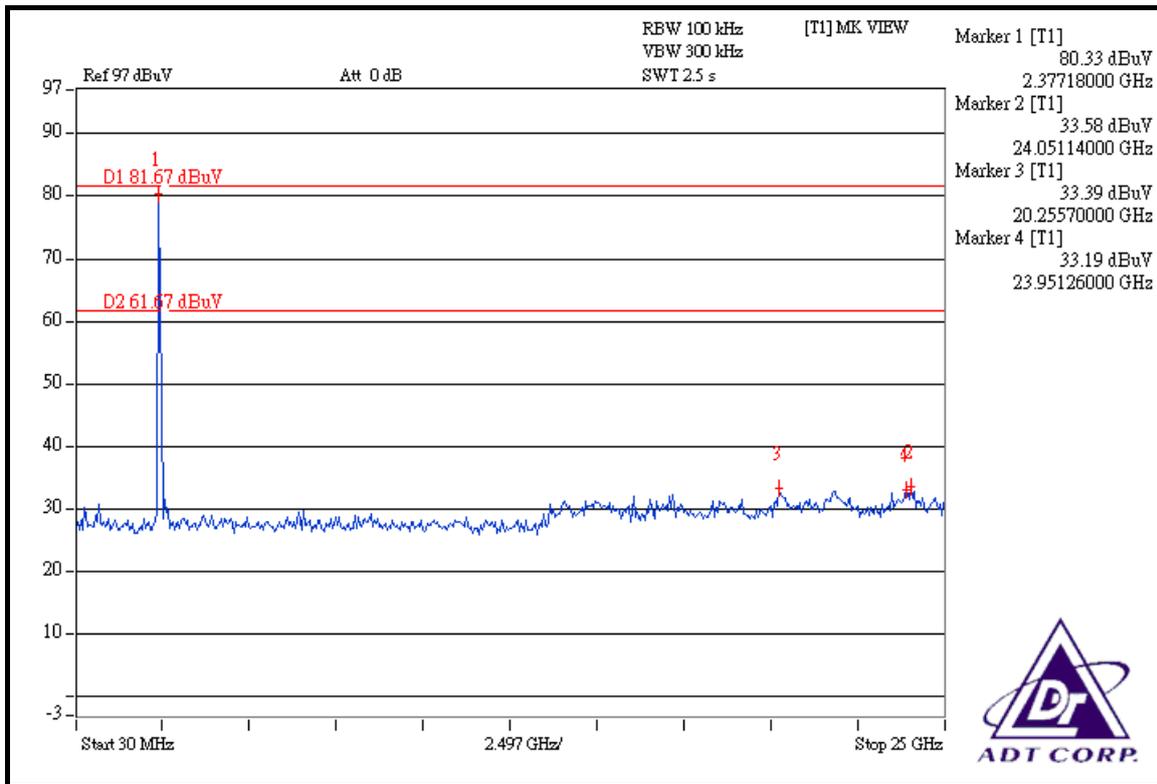
The band edge emission plot on the next page shows 50.36dBc between carrier maximum power and local maximum emission in restrict band (2.39000GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 102.71dBuV/m (Average), so the maximum field strength in restrict band is  $102.71 - 50.36 = 52.35\text{dBuV/m}$  which is under 54dBuV/m limit.

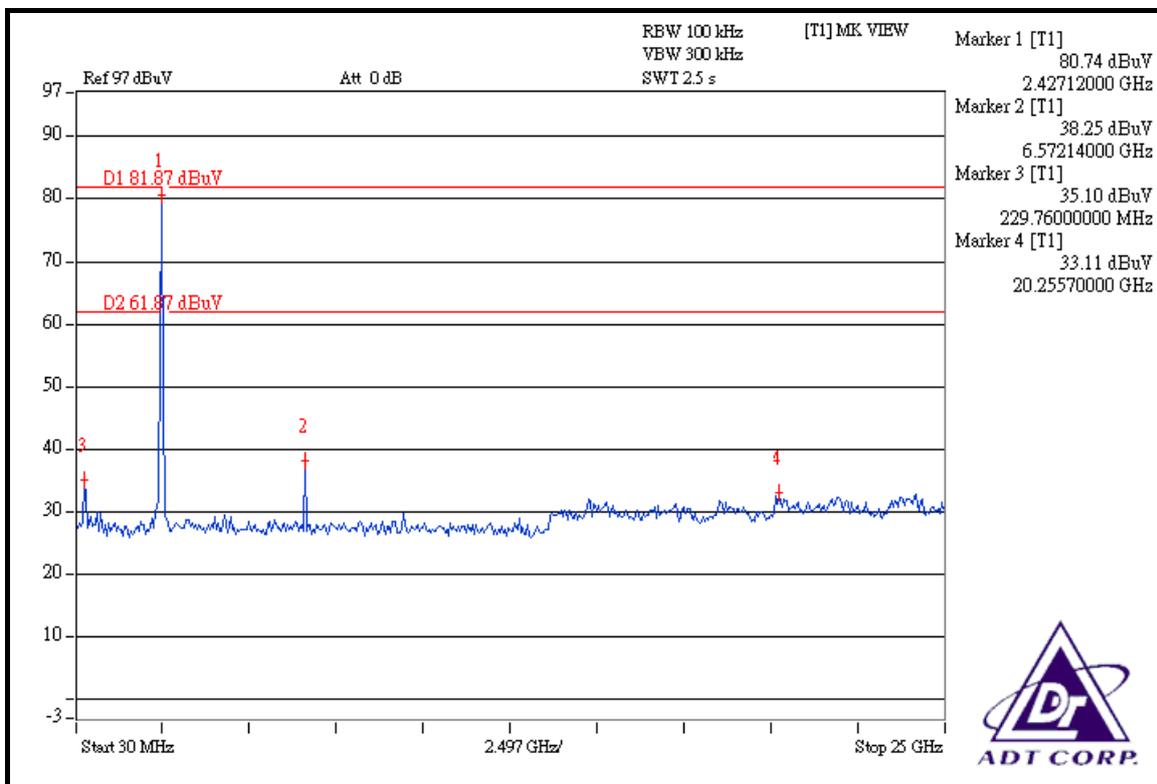
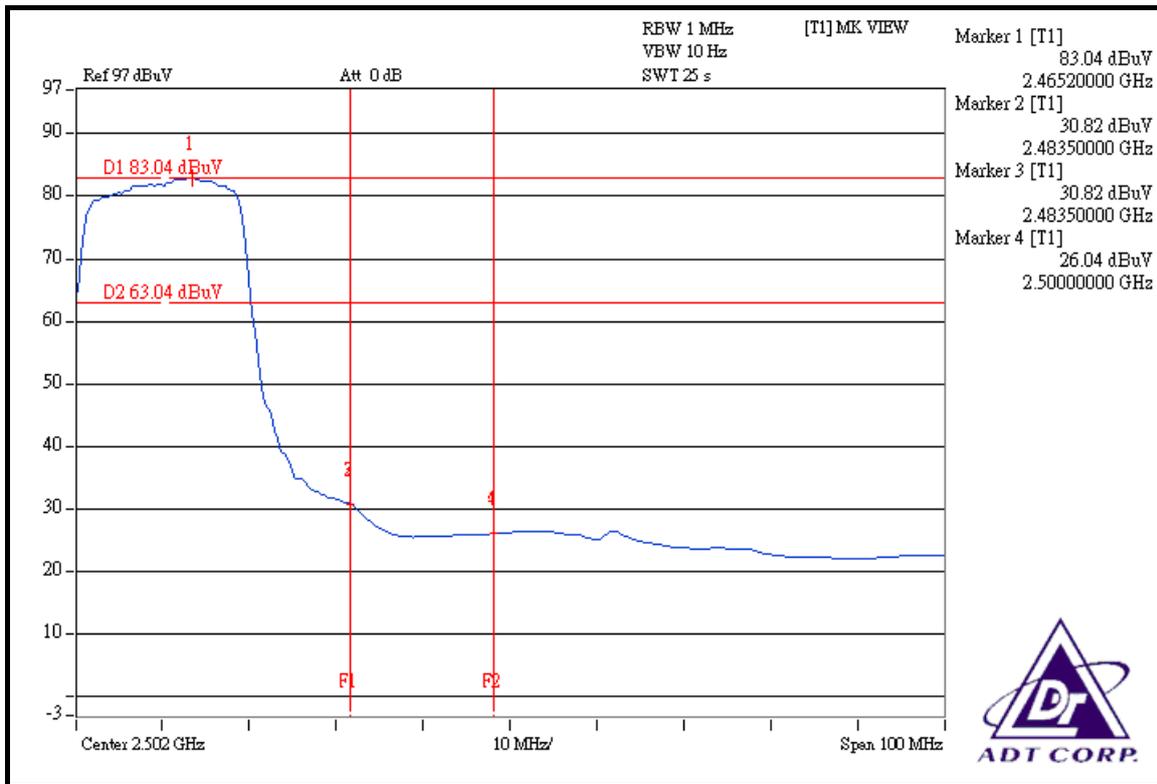
### **NOTE 2:**

The band edge emission plot on the next second page shows 48.60dBc between carrier maximum power and local maximum emission in restrict band (2.48360GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 113.43dBuV/m (Peak), so the maximum field strength in restrict band is  $113.43 - 48.60 = 64.83\text{dBuV/m}$  which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 52.22dBc 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 103.08dBuV/m (Average), so the maximum field strength in restrict band is  $103.08 - 52.22 = 50.86\text{dBuV/m}$  which is under 54dBuV/m limit.







## DRAFT 802.11n (40MHz) OFDM MODULATION

### NOTE 1:

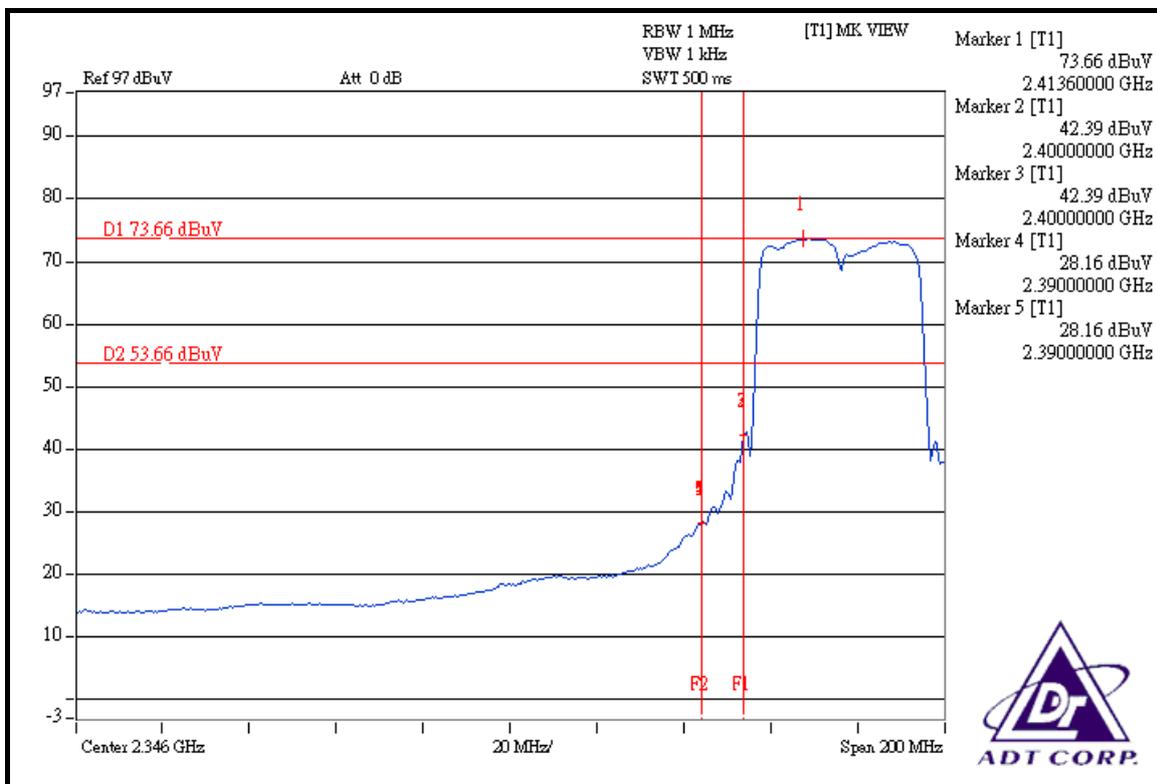
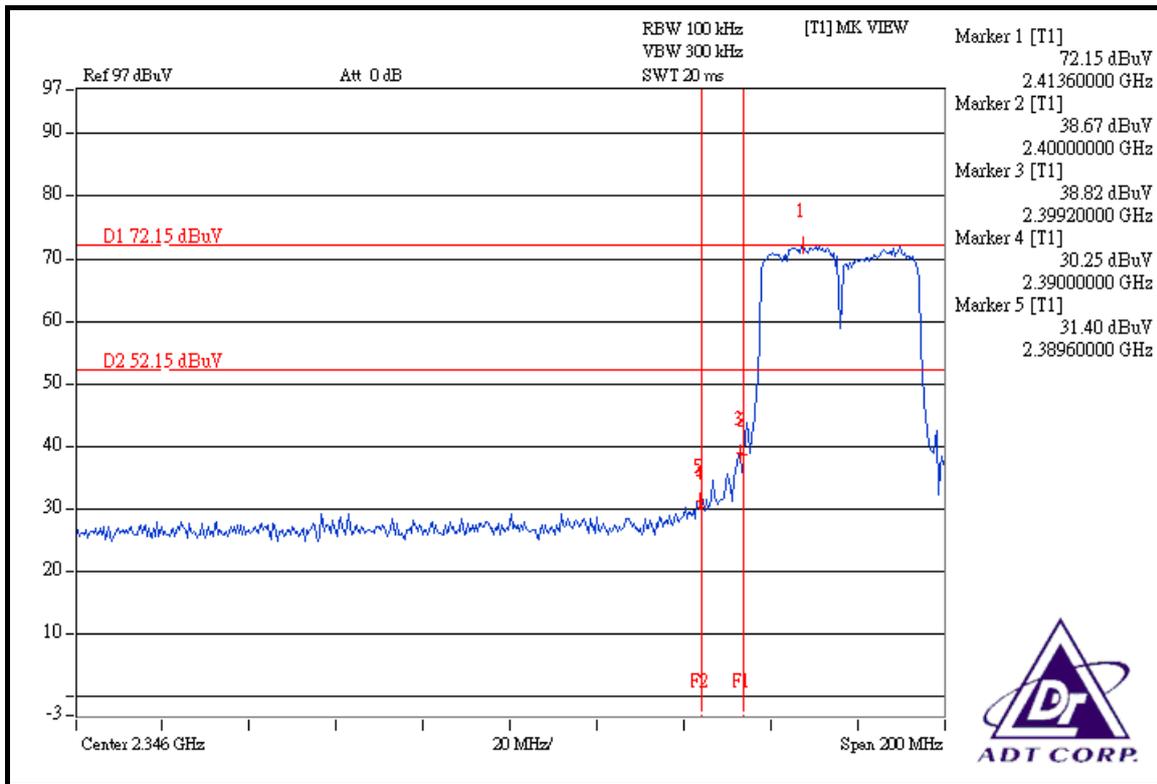
The band edge emission plot on the next page shows 40.75dBc between carrier maximum power and local maximum emission in restrict band (2.38960GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 107.27dBuV/m (Peak), so the maximum field strength in restrict band is  $107.27 - 40.75 = 66.52$ dBuV/m which is under 74dBuV/m limit.

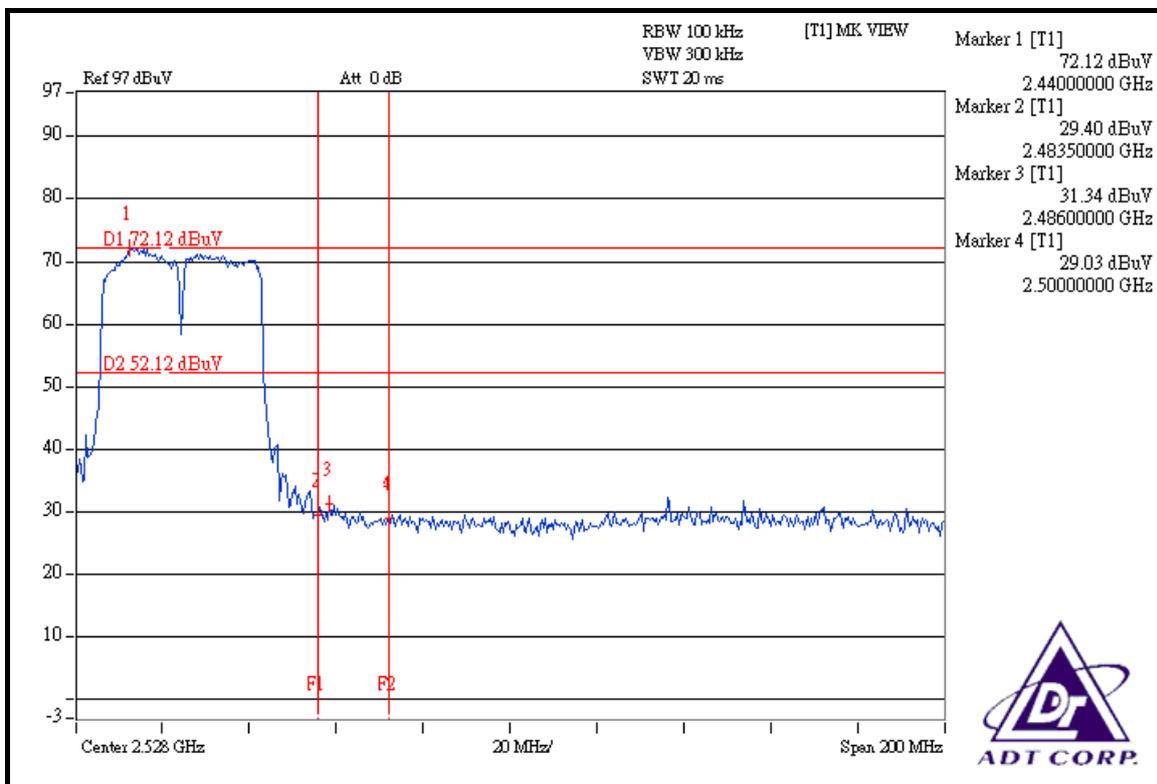
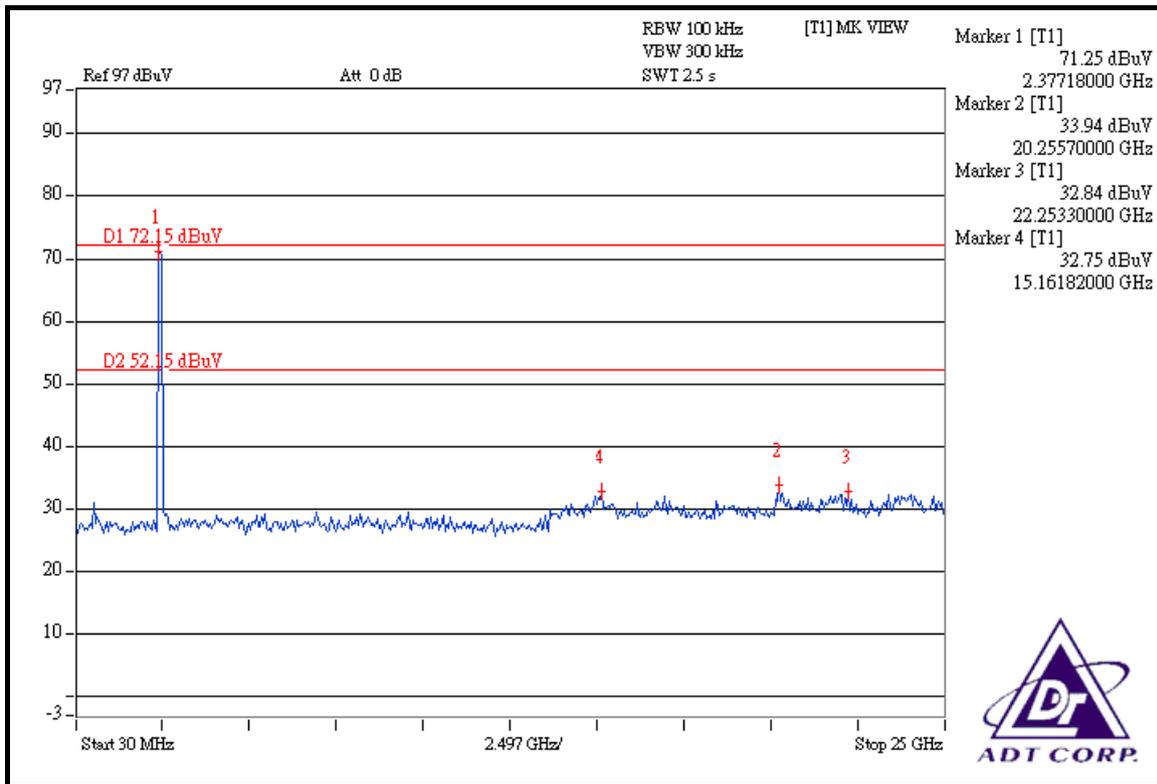
The band edge emission plot on the next page shows 45.50dBc between carrier maximum power and local maximum emission in restrict band (2.39000GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 96.75dBuV/m (Average), so the maximum field strength in restrict band is  $96.75 - 45.50 = 51.25$ dBuV/m which is under 54dBuV/m limit.

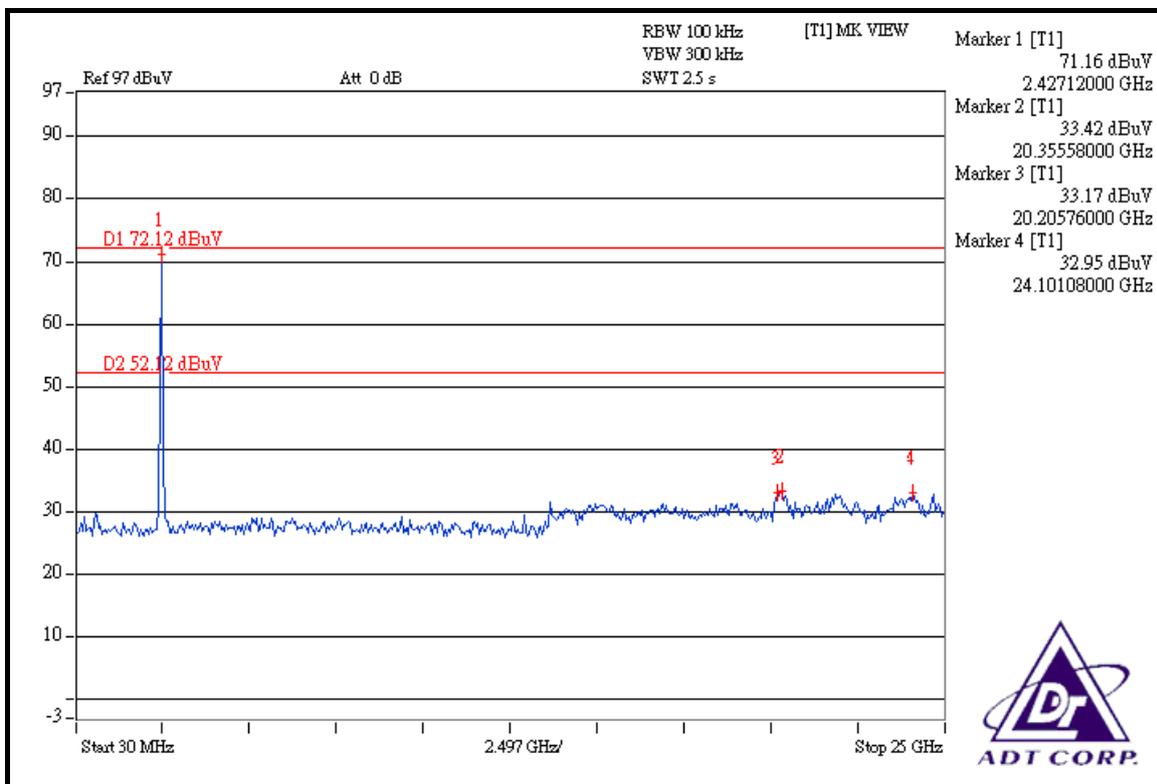
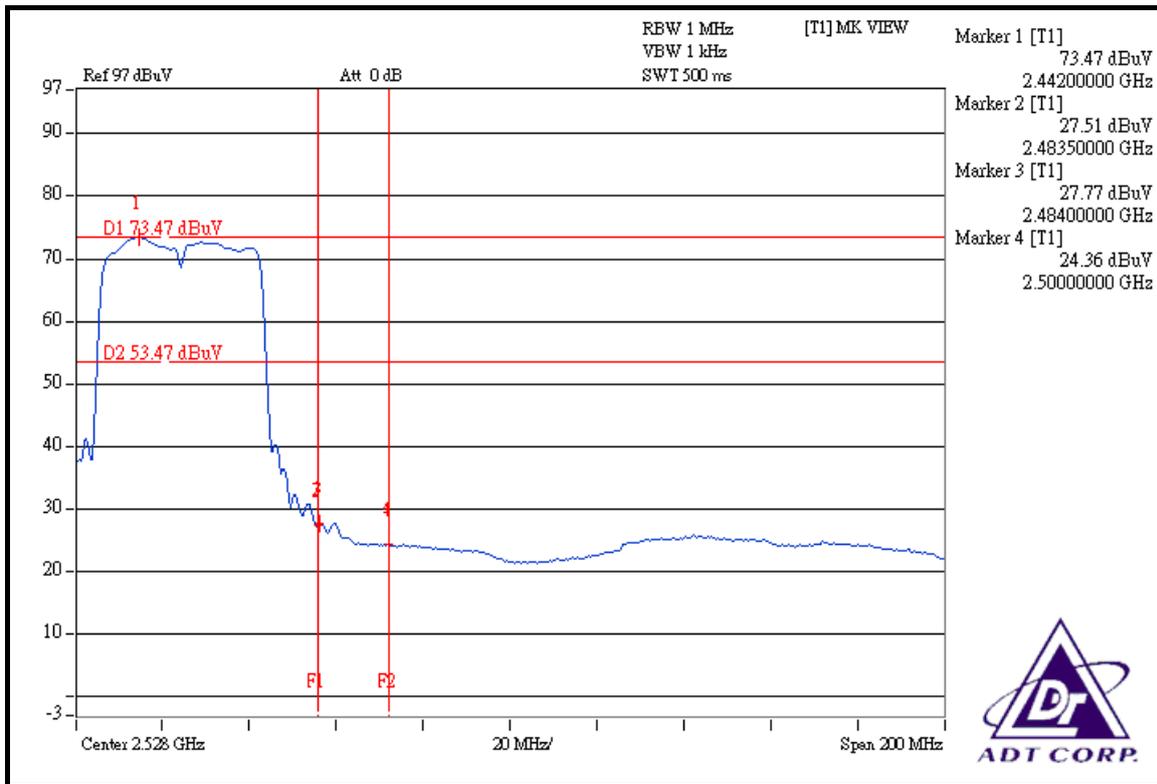
### NOTE 2:

The band edge emission plot on the next second page shows 40.78dBc between carrier maximum power and local maximum emission in restrict band (2.48600GHz). The emission of carrier strength list in the test result of channel 7 at the item 4.2.7 is 106.49dBuV/m (Peak), so the maximum field strength in restrict band is  $106.49 - 40.78 = 65.71$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 45.70dBc between carrier maximum power and local maximum emission in restrict band (2.48400GHz). The emission of carrier strength list in the test result of channel 7 at the item 4.2.7 is 96.09dBuV/m (Average), so the maximum field strength in restrict band is  $96.09 - 45.70 = 50.39$ 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 UFL 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.

<b>USA</b>	FCC, UL, A2LA
<b>Germany</b>	TUV Rheinland
<b>Japan</b>	VCCI
<b>Norway</b>	NEMKO
<b>Canada</b>	INDUSTRY CANADA, CSA
<b>R.O.C.</b>	TAF, BSMI, NCC
<b>Netherlands</b>	Telefication
<b>Singapore</b>	GOST-ASIA(MOU)
<b>Russia</b>	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](http://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](http://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.