



# FCC TEST REPORT (15.247)

**REPORT NO.:** RF970227L09

**MODEL NO.:** DIR-628

**RECEIVED:** Feb. 27, 2008

**TESTED:** Feb. 28 ~ Mar. 04, 2008

**ISSUED:** Mar. 17, 2008

**APPLICANT:** D-Link Corporation

**ADDRESS:** 17595 Mt. Herrmann, Fountain Valley, CA  
92708, U.S.A.

**ISSUED BY:** Advance Data Technology Corporation

**LAB ADDRESS:** No.47, 14<sup>th</sup> Ling, Chia Pau Tsuen, Linko Hsiang  
244, Taipei Hsien, Taiwan, R.O.C.

**TEST LOCATION:** No. 19, Hwa Ya 2<sup>nd</sup> Rd, Wen Hwa Tsuen, Kwei  
Shan Hsiang, Taoyuan Hsien 333, Taiwan,  
R.O.C.

This test report consists of 149 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by TAF, A2LA or any government agencies. The test results in the report only apply to the tested sample.





## TABLE OF CONTENTS

1.	CERTIFICATION.....	5
2.	SUMMARY OF TEST RESULTS .....	6
2.1	MEASUREMENT UNCERTAINTY.....	6
3.	GENERAL INFORMATION.....	7
3.1	GENERAL DESCRIPTION OF EUT .....	7
3.2	DESCRIPTION OF TEST MODES.....	9
3.2.1	CONFIGURATION OF SYSTEM UNDER TEST .....	10
3.2.2	TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL .....	11
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS .....	15
3.4	DESCRIPTION OF SUPPORT UNITS .....	15
4.	TEST TYPES AND RESULTS (FOR 2.4GHz BAND) .....	16
4.1	RADIATED EMISSION MEASUREMENT .....	16
4.1.1	LIMITS OF RADIATED EMISSION MEASUREMENT.....	16
4.1.2	TEST INSTRUMENTS.....	17
4.1.3	TEST PROCEDURES .....	18
4.1.4	DEVIATION FROM TEST STANDARD.....	18
4.1.5	TEST SETUP.....	19
4.1.6	EUT OPERATING CONDITIONS .....	19
4.1.7	TEST RESULTS .....	20
4.2	CONDUCTED EMISSION MEASUREMENT .....	33
4.2.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT.....	33
4.2.2	TEST INSTRUMENTS.....	33
4.2.3	TEST PROCEDURES .....	34
4.2.4	DEVIATION FROM TEST STANDARD.....	34
4.2.5	TEST SETUP.....	35
4.2.6	EUT OPERATING CONDITIONS .....	35
4.2.7	TEST RESULTS .....	36
4.3	6dB BANDWIDTH MEASUREMENT.....	38
4.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT.....	38
4.3.2	TEST INSTRUMENTS.....	38
4.3.3	TEST PROCEDURE.....	38
4.3.4	DEVIATION FROM TEST STANDARD.....	38
4.3.5	TEST SETUP.....	39
4.3.6	EUT OPERATING CONDITIONS .....	39
4.3.7	TEST RESULTS .....	40
4.4	MAXIMUM PEAK OUTPUT POWER.....	52
4.4.1	LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT.....	52
4.4.2	INSTRUMENTS.....	52
4.4.3	TEST PROCEDURES .....	52
4.4.4	DEVIATION FROM TEST STANDARD.....	53
4.4.5	TEST SETUP.....	53
4.4.6	EUT OPERATING CONDITIONS .....	53



4.4.7	TEST RESULTS .....	54
4.5	POWER SPECTRAL DENSITY MEASUREMENT .....	56
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	56
4.5.2	TEST INSTRUMENTS.....	56
4.5.3	TEST PROCEDURE.....	56
4.5.4	DEVIATION FROM TEST STANDARD.....	57
4.5.5	TEST SETUP.....	57
4.5.6	EUT OPERATING CONDITION.....	57
4.5.7	TEST RESULTS .....	58
4.6	BAND EDGES MEASUREMENT .....	70
4.6.1	LIMITS OF BAND EDGES MEASUREMENT.....	70
4.6.2	TEST INSTRUMENTS.....	70
4.6.3	TEST PROCEDURE.....	71
4.6.4	DEVIATION FROM TEST STANDARD.....	72
4.6.5	EUT OPERATING CONDITION.....	72
4.6.6	TEST RESULTS .....	73
4.7	ANTENNA REQUIREMENT .....	89
4.7.1	STANDARD APPLICABLE .....	89
4.7.2	ANTENNA CONNECTED CONSTRUCTION .....	89
5.	TEST TYPES AND RESULTS (FOR 5.0GHz BAND).....	90
5.1	RADIATED EMISSION MEASUREMENT .....	90
5.1.1	LIMITS OF RADIATED EMISSION MEASUREMENT.....	90
5.1.2	TEST INSTRUMENTS.....	91
5.1.3	TEST PROCEDURES .....	92
5.1.4	DEVIATION FROM TEST STANDARD.....	92
5.1.5	TEST SETUP.....	93
5.1.6	EUT OPERATING CONDITIONS .....	93
5.1.7	TEST RESULTS .....	94
5.2	CONDUCTED EMISSION MEASUREMENT .....	103
5.2.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT.....	103
5.2.2	TEST INSTRUMENTS.....	103
5.2.3	TEST PROCEDURES .....	104
5.2.4	DEVIATION FROM TEST STANDARD.....	104
5.2.5	TEST SETUP.....	105
5.2.6	EUT OPERATING CONDITIONS .....	105
5.2.7	TEST RESULTS .....	106
5.3	6dB BANDWIDTH MEASUREMENT.....	108
5.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT .....	108
5.3.2	TEST INSTRUMENTS.....	108
5.3.3	TEST PROCEDURE.....	108
5.3.4	DEVIATION FROM TEST STANDARD.....	109
5.3.5	TEST SETUP.....	109
5.3.6	EUT OPERATING CONDITIONS .....	109
5.3.7	TEST RESULTS .....	110
5.4	MAXIMUM PEAK OUTPUT POWER.....	119



5.4.1	LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT .....	119
5.4.2	INSTRUMENTS .....	119
5.4.3	TEST PROCEDURES .....	119
5.4.4	DEVIATION FROM TEST STANDARD.....	120
5.4.5	TEST SETUP .....	120
5.4.6	EUT OPERATING CONDITIONS .....	120
5.4.7	TEST RESULTS .....	121
5.5	POWER SPECTRAL DENSITY MEASUREMENT .....	123
5.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	123
5.5.2	TEST INSTRUMENTS.....	123
5.5.3	TEST PROCEDURE.....	123
5.5.4	DEVIATION FROM TEST STANDARD.....	124
5.5.5	TEST SETUP .....	124
5.5.6	EUT OPERATING CONDITION.....	124
5.5.7	TEST RESULTS .....	125
5.6	BAND EDGES MEASUREMENT .....	134
5.6.1	LIMITS OF BAND EDGES MEASUREMENT .....	134
5.6.2	TEST INSTRUMENTS.....	134
5.6.3	TEST PROCEDURE.....	135
5.6.4	DEVIATION FROM TEST STANDARD.....	136
5.6.5	EUT OPERATING CONDITION.....	136
5.6.6	TEST RESULTS .....	136
5.7	ANTENNA REQUIREMENT .....	146
5.7.1	STANDARD APPLICABLE .....	146
5.7.2	ANTENNA CONNECTED CONSTRUCTION .....	146
6.	PHOTOGRAPHS OF THE TEST CONFIGURATION .....	147
7.	INFORMATION ON THE TESTING LABORATORIES .....	148
8.	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	149



## 1. CERTIFICATION

**PRODUCT:** RangeBooster N Dual Band Router

**MODEL:** DIR-628

**BRAND:** D-Link

**APPLICANT:** D-Link Corporation

**TEST SAMPLE:** ENGINEERING SAMPLE

**TESTED:** Feb. 28 ~ Mar. 04, 2008

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

ANSI C63.4-2003

The above equipment (Model: DIR-628) 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:** Mar. 17, 2008  
Rennie Wang / Senior Specialist

**TECHNICAL ACCEPTANCE** : Long Chen , **DATE:** Mar. 17, 2008  
Responsible for RF Long Chen / Senior Engineer

**APPROVED BY** : Gary Chang , **DATE:** Mar. 17, 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 -6.74dB at 0.201MHz
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 -0.92dB at 7726.00MHz
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.

### 2.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz ~ 30MHz	2.44dB
Radiated emissions	30MHz ~ 200MHz	2.93dB
	200MHz ~ 1000MHz	2.95dB
	1GHz ~ 18GHz	2.26dB
	18GHz ~ 40GHz	1.94dB

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>EUT</b>	RangeBooster N Dual Band Router
<b>MODEL NO.</b>	DIR-628
<b>FCC ID</b>	KA2DIR628A1
<b>POWER SUPPLY</b>	5Vdc 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 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps Draft 802.11n: up to 300.0Mbps
<b>FREQUENCY RANGE</b>	2.4GHz: 2400.0 ~ 2483.5MHz 5.0GHz: 5150.0 ~ 5250.0MHz, 5725.0 ~ 5850.0MHz
<b>NUMBER OF CHANNEL</b>	2.4GHz: 11 for 802.11b, 802.11g, draft 802.11n (20MHz) 7 for draft 802.11n (40MHz) 5.0GHz: 9 for 802.11a, draft 802.11n (20MHz) 4 for draft 802.11n (40MHz)
<b>OUTPUT POWER</b>	108.525mW for 2400.0 ~ 2483.5MHz 46.989mW for 5150.0 ~ 5250.0MHz 102.489mW for 5725.0 ~ 5850.0MHz
<b>ANTENNA TYPE</b>	2.4GHz: Dipole antenna with 2.0dBi gain 5.0GHz: Dipole antenna with 2.0dBi gain
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	RJ45, USB
<b>ASSOCIATED DEVICES</b>	Adapter

**NOTE:**

1. The EUT is a RangeBooster N Dual Band Router. The functions of EUT listed as below:

	<b>TEST STANDARD</b>	<b>REFERENCE REPORT</b>
<b>WLAN 802.11b/g, draft 802.11n</b>	FCC Part 15, Subpart C (Section 15.247)	RF970227L09
<b>WLAN 802.11a, draft 802.11n (5725~5850 MHz)</b>		
<b>WLAN 802.11a, draft 802.11n (5150~ 5250MHz)</b>	FCC Part 15, Subpart E (Section 15.407)	RF970227L09-1

2. The frequency bands used in this EUT are listed as follows:

Frequency Band (MHz)	2400~2483.5	5150~5250	5725~5850
802.11b	√		
802.11g	√		
802.11a		√	√
Draft 802.11n (20MHz)	√	√	√
Draft 802.11n (40MHz)	√	√	√

3. The EUT was powered by the following adapter:

<b>BRAND:</b>	JENTEC TECHNOLOGY CO., LTD.
<b>MODEL:</b>	AF1805-A
<b>INPUT:</b>	100-120Vac, 50-60Hz, 0.4A
<b>OUTPUT:</b>	5Vdc, 2.5A
<b>POWER LINE:</b>	1.8m non-shielded cable without core

4. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

	1TX	2TX
802.11b	√	-
802.11g	√	-
802.11a	√	-
Draft 802.11n (20MHz)	-	√
Draft 802.11n (40MHz)	-	√

5. 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

#### FOR 2.4GHz:

11 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		

7 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		

#### FOR 5.0GHz (5725 ~ 5850MHz):

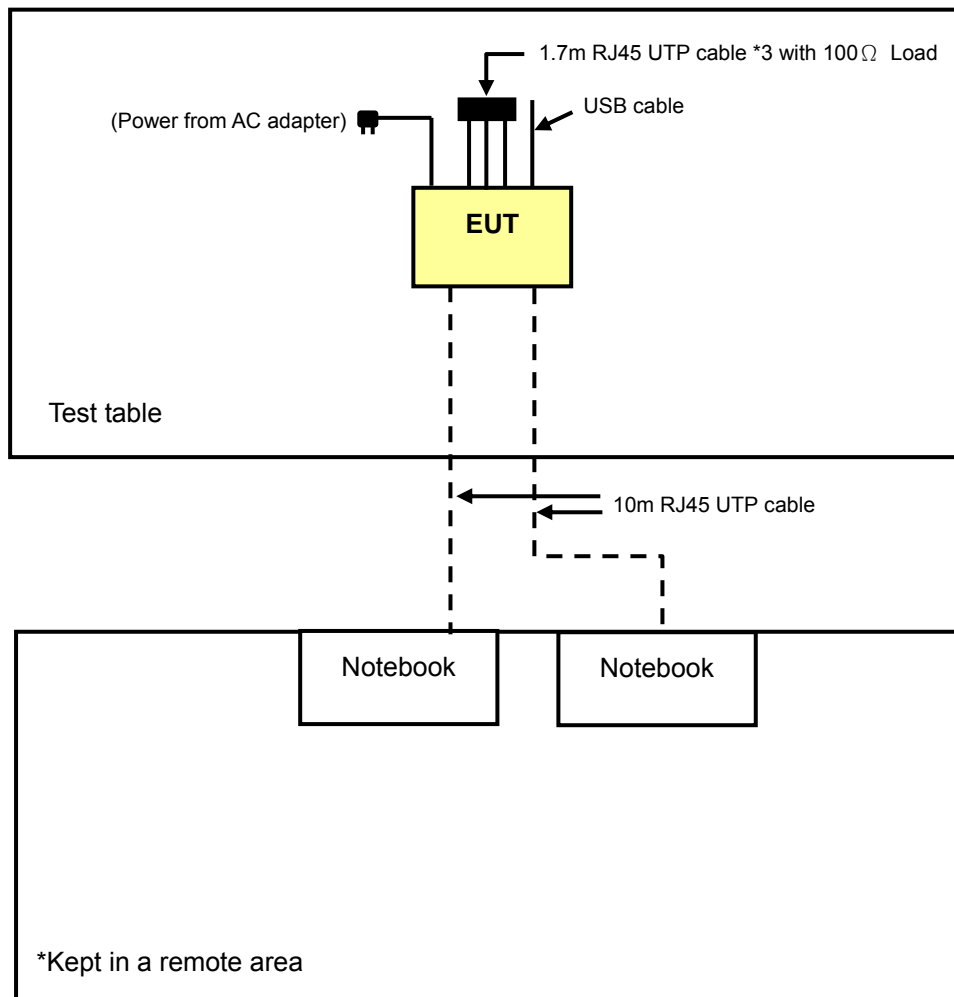
5 channels are provided for 802.11a, draft 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



### 3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

#### FOR 2.4GHz:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE<1G	RE≥1G	APCM	
-	√	√	√	√	-

Where **PLC**: Power Line Conducted Emission      **RE<1G**: Radiated Emission below 1GHz  
**RE≥1G**: Radiated Emission above 1GHz      **APCM**: Antenna Port Conducted Measurement

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
Draft 802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
Draft 802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	15.0

#### **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 and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
Draft 802.11n (20MHz)	1 to 11	1	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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
Draft 802.11n (20MHz)	1 to 11	1	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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
Draft 802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	7.2
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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
Draft 802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
Draft 802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	15.0

### FOR 5.0GHz:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE<1G	RE≥1G	APCM	
-	√	√	√	√	-

Where **PLC**: Power Line Conducted Emission      **RE<1G**: Radiated Emission below 1GHz  
**RE≥1G**: Radiated Emission above 1GHz      **APCM**: Antenna Port Conducted Measurement

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
Draft 802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
Draft 802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

### 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 and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
Draft 802.11n (20MHz)	149 to 165	157	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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
Draft 802.11n (20MHz)	149 to 165	157	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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	149 to 165	149, 165	OFDM	BPSK	6.0
Draft 802.11n (20MHz)	149 to 165	149, 165	OFDM	BPSK	7.2
Draft 802.11n (40MHz)	151 to 159	151, 159	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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
Draft 802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
Draft 802.11n (40MHz)	151 to 159	151, 159	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 COMPUTER	DELL	PP05L	16484462992	E2K24CLNS
2	NOTEBOOK COMPUTER	DELL	PP05L	12130898320	E2K24CLNS

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10m UTP RJ 45 cable
2	10m UTP RJ 45 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 (FOR 2.4GHz BAND)

### 4.1 RADIATED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Jul. 27, 2008
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Aug. 05, 2008
BILOG Antenna SCHWARZBECK	VULB9168	9168-153	Jan. 03, 2009
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Jul. 30, 2008
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Jan. 06, 2009
Preamplifier Agilent	8449B	3008A01910	Sep. 19, 2008
Preamplifier Agilent	8447D	2944A10638	Dec. 19, 2008
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	274039/223650	Nov. 07, 2008
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 09, 2008
Software	ADT_Radiated_V7.6	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA
Turn Table EMCO	2087-2.03	NA	NA
Antenna Tower & Turn Table Controller EMCO	2090	NA	NA

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. The test was performed in HwaYa Chamber 9.
  3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
  4. The IC Site Registration No. is IC3789B-9.

#### 4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

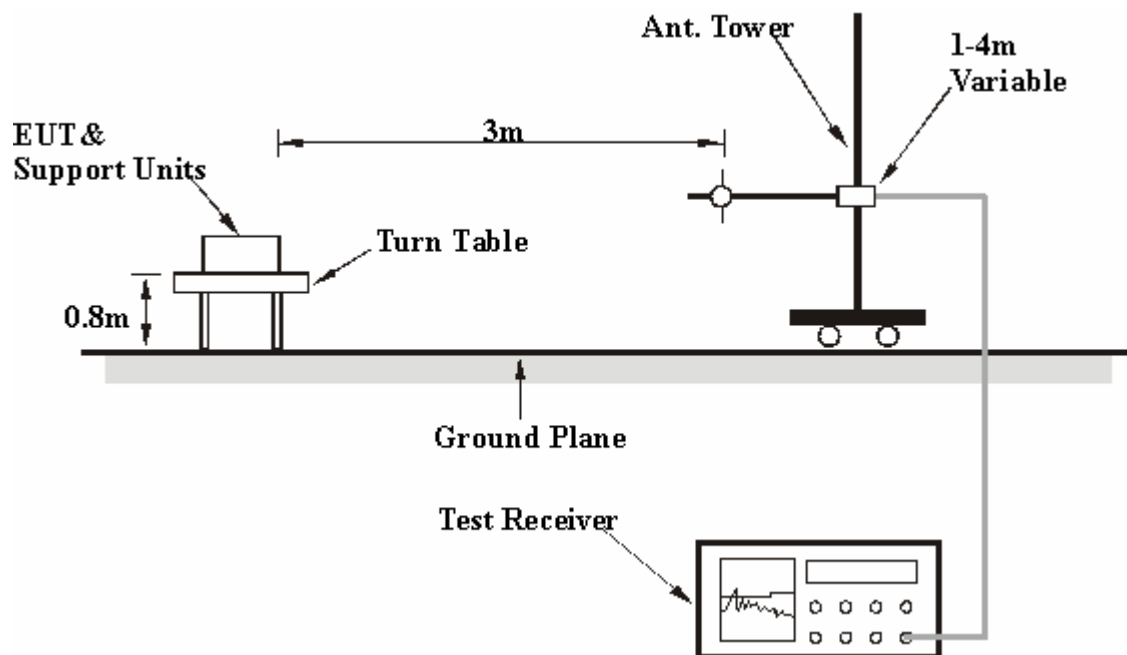
**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 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

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

#### 4.1.7 TEST RESULTS

##### 802.11b DSSS MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2386.00	58.46 PK	74.00	-15.54	1.06 H	355	26.14	32.32
2	2386.00	47.34 AV	54.00	-6.66	1.06 H	355	15.02	32.32
3	*2412.00	102.42 PK			1.04 H	350	70.10	32.32
4	*2412.00	97.97 AV			1.04 H	350	65.65	32.32
5	4824.00	47.81 PK	74.00	-26.19	1.03 H	60	9.81	38.00
6	4824.00	40.10 AV	54.00	-13.90	1.03 H	60	2.10	38.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2386.00	62.40 PK	74.00	-11.60	1.18 V	162	30.08	32.32
2	2386.00	52.16 AV	54.00	-1.84	1.18 V	162	19.84	32.32
3	*2412.00	111.22 PK			1.13 V	147	78.90	32.32
4	*2412.00	106.59 AV			1.13 V	147	74.27	32.32
5	3216.00	48.67 PK	91.22	-42.55	1.10 V	254	15.10	33.57
6	3216.00	41.54 AV	86.59	-45.05	1.10 V	254	7.97	33.57
7	4824.00	49.02 PK	74.00	-24.98	1.02 V	150	11.02	38.00
8	4824.00	43.77 AV	54.00	-10.23	1.02 V	150	5.77	38.00

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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	102.41 PK			1.03 H	28	70.07	32.34
2	*2437.00	97.95 AV			1.03 H	28	65.61	32.34
3	4874.00	47.58 PK	74.00	-26.42	1.00 H	345	9.46	38.12
4	4874.00	40.22 AV	54.00	-13.78	1.00 H	345	2.10	38.12
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	111.27 PK			1.20 V	268	78.93	32.34
2	*2437.00	106.64 AV			1.20 V	268	74.30	32.34
3	3248.00	47.86 PK	91.27	-43.41	1.00 V	136	14.40	33.46
4	3248.00	42.71 AV	86.64	-43.93	1.00 V	136	9.25	33.46
5	4874.00	49.38 PK	74.00	-24.62	1.24 V	146	11.26	38.12
6	4874.00	43.62 AV	54.00	-10.38	1.24 V	146	5.50	38.12

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	102.45 PK			1.10 H	135	70.08	32.37
2	*2462.00	97.98 AV			1.10 H	135	65.61	32.37
3	2487.00	57.43 PK	74.00	-16.57	1.10 H	135	25.04	32.39
4	2487.00	46.97 AV	54.00	-7.03	1.10 H	135	14.58	32.39
5	4924.00	49.13 PK	74.00	-24.87	1.43 H	285	10.90	38.23
6	4924.00	41.56 AV	54.00	-12.44	1.43 H	285	3.33	38.23
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	111.33 PK			1.09 V	289	78.96	32.37
2	*2462.00	106.87 AV			1.09 V	289	74.50	32.37
3	2487.00	58.83 PK	74.00	-15.17	1.09 V	146	26.44	32.39
4	2487.00	48.89 AV	54.00	-5.11	1.09 V	146	16.50	32.39
5	3282.00	47.51 PK	91.33	-43.82	1.02 V	224	14.17	33.34
6	3282.00	43.82 AV	86.87	-43.05	1.02 V	224	10.48	33.34
7	4924.00	50.59 PK	74.00	-23.41	1.30 V	151	12.36	38.23
8	4924.00	44.41 AV	54.00	-9.59	1.30 V	151	6.18	38.23

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

### 802.11g OFDM MODULATION

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, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.08 PK	74.00	-12.92	1.09 H	347	28.76	32.32
2	2390.00	47.22 AV	54.00	-6.78	1.09 H	347	14.90	32.32
3	*2412.00	101.19 PK			1.09 H	347	68.87	32.32
4	*2412.00	90.87 AV			1.09 H	347	58.55	32.32
5	4824.00	45.84 PK	74.00	-28.16	1.00 H	316	7.84	38.00
6	4824.00	32.67 AV	54.00	-21.33	1.00 H	316	-5.33	38.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.34 PK	74.00	-4.66	1.15 V	158	37.02	32.32
2	2390.00	52.27 AV	54.00	-1.73	1.15 V	158	19.95	32.32
3	*2412.00	109.95 PK			1.14 V	147	77.63	32.32
4	*2412.00	99.93 AV			1.14 V	147	67.61	32.32
5	3216.00	48.52 PK	89.95	-41.43	1.05 V	289	14.95	33.57
6	3216.00	41.67 AV	79.93	-38.26	1.05 V	289	8.10	33.57
7	4824.00	45.92 PK	74.00	-28.08	1.11 V	33	7.92	38.00
8	4824.00	32.91 AV	54.00	-21.09	1.11 V	33	-5.09	38.00

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	102.43 PK			1.06 H	37	70.09	32.34
2	*2437.00	92.07 AV			1.06 H	37	59.73	32.34
3	4874.00	46.18 PK	74.00	-27.82	1.42 H	101	8.06	38.12
4	4874.00	33.25 AV	54.00	-20.75	1.42 H	101	-4.87	38.12
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	110.98 PK			1.10 V	206	78.64	32.34
2	*2437.00	101.08 AV			1.10 V	206	68.74	32.34
3	3248.00	48.46 PK	90.98	-42.52	1.15 V	264	15.00	33.46
4	3248.00	42.58 AV	81.08	-38.50	1.15 V	264	9.12	33.46
5	4874.00	46.82 PK	74.00	-27.18	1.01 V	275	8.70	38.12
6	4874.00	33.88 AV	54.00	-20.12	1.01 V	275	-4.24	38.12

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.64 PK	74.00	-15.36	1.04 H	348	26.32	32.32
2	2390.00	46.80 AV	54.00	-7.20	1.04 H	348	14.48	32.32
3	*2462.00	102.65 PK			1.04 H	348	70.28	32.37
4	*2462.00	92.34 AV			1.04 H	348	59.97	32.37
5	2483.50	61.38 PK	74.00	-12.62	1.04 H	348	28.99	32.39
6	2483.50	48.18 AV	54.00	-5.82	1.04 H	348	15.79	32.39
7	4924.00	46.52 PK	74.00	-27.48	1.00 H	65	8.29	38.23
8	4924.00	33.49 AV	54.00	-20.51	1.00 H	65	-4.74	38.23

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.90 PK	74.00	-9.10	1.11 V	161	32.58	32.32
2	2390.00	51.60 AV	54.00	-2.40	1.11 V	161	19.28	32.32
3	*2462.00	111.01 PK			1.09 V	291	78.64	32.37
4	*2462.00	101.14 AV			1.09 V	291	68.77	32.37
5	2483.50	70.57 PK	74.00	-3.43	1.11 V	146	38.18	32.39
6	2483.50	51.73 AV	54.00	-2.27	1.11 V	146	19.34	32.39
7	3282.00	47.38 PK	91.01	-43.63	1.26 V	187	14.04	33.34
8	3282.00	43.62 AV	81.14	-37.52	1.26 V	187	10.28	33.34
9	4924.00	46.86 PK	74.00	-27.14	1.15 V	208	8.63	38.23
10	4924.00	33.97 AV	54.00	-20.03	1.15 V	208	-4.26	38.23

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



**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	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.53 PK	74.00	-16.47	1.06 H	349	25.21	32.32
2	2390.00	47.62 AV	54.00	-6.38	1.06 H	349	15.30	32.32
3	*2412.00	105.14 PK			1.06 H	349	72.82	32.32
4	*2412.00	95.19 AV			1.06 H	349	62.87	32.32
5	4824.00	46.21 PK	74.00	-27.79	1.10 H	169	8.21	38.00
6	4824.00	33.16 AV	54.00	-20.84	1.10 H	169	-4.84	38.00

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.71 PK	74.00	-3.29	1.12 V	158	38.39	32.32
2	2390.00	52.38 AV	54.00	-1.62	1.12 V	158	20.06	32.32
3	*2412.00	114.55 PK			1.12 V	150	82.23	32.32
4	*2412.00	104.28 AV			1.12 V	150	71.96	32.32
5	3216.00	48.37 PK	94.55	-46.18	1.13 V	261	14.80	33.57
6	3216.00	41.56 AV	84.28	-42.72	1.13 V	261	7.99	33.57
7	4824.00	46.64 PK	74.00	-27.36	1.10 V	189	8.64	38.00
8	4824.00	33.30 AV	54.00	-20.70	1.10 V	189	-4.70	38.00

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	105.63 PK			1.08 H	116	73.29	32.34
2	*2437.00	95.75 AV			1.08 H	116	63.41	32.34
3	4874.00	47.11 PK	74.00	-26.89	1.00 H	6	8.99	38.12
4	4874.00	34.32 AV	54.00	-19.68	1.00 H	6	-3.80	38.12
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	115.12 PK			1.08 V	158	82.78	32.34
2	*2437.00	104.70 AV			1.08 V	158	72.36	32.34
3	3248.00	48.51 PK	95.12	-46.61	1.07 V	234	15.05	33.46
4	3248.00	41.60 AV	84.70	-43.10	1.07 V	234	8.14	33.46
5	4874.00	47.58 PK	74.00	-26.42	1.10 V	35	9.46	38.12
6	4874.00	34.64 AV	54.00	-19.36	1.10 V	35	-3.48	38.12

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	104.98 PK			1.33 H	268	72.61	32.37
2	*2462.00	94.67 AV			1.33 H	268	62.30	32.37
3	2483.50	57.76 PK	74.00	-16.24	1.33 H	268	25.37	32.39
4	2483.50	47.67 AV	54.00	-6.33	1.33 H	268	15.28	32.39
5	4924.00	46.21 PK	74.00	-27.79	1.00 H	182	7.98	38.23
6	4924.00	33.00 AV	54.00	-21.00	1.00 H	182	-5.23	38.23
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	113.76 PK			1.09 V	155	81.39	32.37
2	*2462.00	103.68 AV			1.09 V	155	71.31	32.37
3	2483.50	70.23 PK	74.00	-3.77	1.06 V	145	37.84	32.39
4	2483.50	52.82 AV	54.00	-1.18	1.06 V	145	20.43	32.39
5	3282.00	47.88 PK	93.76	-45.88	1.05 V	341	14.54	33.34
6	3282.00	43.74 AV	83.68	-39.94	1.05 V	341	10.40	33.34
7	4924.00	46.37 PK	74.00	-27.63	1.14 V	5	8.14	38.23
8	4924.00	33.08 AV	54.00	-20.92	1.14 V	5	-5.15	38.23

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

### 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, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.06 PK	74.00	-11.94	1.07 H	349	29.74	32.32
2	2390.00	47.78 AV	54.00	-6.22	1.07 H	349	15.46	32.32
3	*2422.00	100.18 PK			1.07 H	349	67.85	32.33
4	*2422.00	90.06 AV			1.07 H	349	57.73	32.33
5	4824.00	45.98 PK	74.00	-28.02	1.11 H	250	7.98	38.00
6	4824.00	33.02 AV	54.00	-20.98	1.11 H	250	-4.98	38.00

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.55 PK	74.00	-3.45	1.06 V	260	38.23	32.32
2	2390.00	52.86 AV	54.00	-1.14	1.06 V	260	20.54	32.32
3	*2422.00	108.71 PK			1.11 V	163	76.38	32.33
4	*2422.00	98.26 AV			1.11 V	163	65.93	32.33
5	3229.00	47.39 PK	88.71	-41.32	1.20 V	221	13.87	33.52
6	3229.00	40.92 AV	78.26	-37.34	1.20 V	221	7.40	33.52
7	4844.00	46.09 PK	74.00	-27.91	1.05 V	82	8.05	38.05
8	4844.00	33.15 AV	54.00	-20.85	1.05 V	82	-4.89	38.05

- 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 4	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.94 PK	74.00	-14.06	1.33 H	282	27.62	32.32
2	2390.00	47.17 AV	54.00	-6.83	1.33 H	282	14.85	32.32
3	*2437.00	101.72 PK			1.33 H	282	69.38	32.34
4	*2437.00	91.68 AV			1.33 H	282	59.34	32.34
5	4874.00	46.00 PK	74.00	-28.00	1.01 H	16	7.88	38.12
6	4874.00	33.25 AV	54.00	-20.75	1.01 H	16	-4.87	38.12
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.72 PK	74.00	-7.28	1.15 V	160	34.40	32.32
2	2390.00	52.31 AV	54.00	-1.69	1.15 V	160	19.99	32.32
3	*2437.00	110.00 PK			1.10 V	156	77.66	32.34
4	*2437.00	100.31 AV			1.10 V	156	67.97	32.34
5	3248.00	48.57 PK	90.00	-41.43	1.08 V	329	15.11	33.46
6	3248.00	43.61 AV	80.31	-36.70	1.08 V	329	10.15	33.46
7	4874.00	46.18 PK	74.00	-27.82	1.04 V	257	8.06	38.12
8	4874.00	33.37 AV	54.00	-20.63	1.04 V	257	-4.75	38.12

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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	101.25 PK			1.10 H	258	68.89	32.36
2	*2452.00	91.37 AV			1.10 H	258	59.01	32.36
3	2483.50	61.36 PK	74.00	-12.64	1.10 H	258	28.97	32.39
4	2483.50	48.09 AV	54.00	-5.91	1.10 H	258	15.70	32.39
5	4904.00	46.01 PK	74.00	-27.99	1.26 H	318	7.82	38.19
6	4904.00	33.28 AV	54.00	-20.72	1.26 H	318	-4.91	38.19
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	109.84 PK			1.10 V	154	77.48	32.36
2	*2452.00	100.28 AV			1.10 V	154	67.92	32.36
3	2483.50	68.05 PK	74.00	-5.95	1.07 V	172	35.66	32.39
4	2483.50	52.11 AV	54.00	-1.89	1.07 V	172	19.72	32.39
5	3269.00	49.17 PK	89.84	-40.67	1.04 V	344	15.78	33.39
6	3269.00	45.14 AV	80.28	-35.14	1.04 V	344	11.75	33.39
7	4904.00	46.25 PK	74.00	-27.75	1.01 V	97	8.06	38.19
8	4904.00	33.40 AV	54.00	-20.60	1.01 V	97	-4.79	38.19

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	107.67	34.28 QP	43.50	-9.22	1.50 H	229	24.03	10.25
2	166.00	33.65 QP	43.50	-9.85	1.50 H	70	20.40	13.24
3	500.42	43.23 QP	46.00	-2.77	1.50 H	211	24.12	19.12
4	566.52	43.46 QP	46.00	-2.54	1.50 H	223	22.74	20.71
5	599.58	38.80 QP	46.00	-7.20	1.50 H	235	17.30	21.50
6	634.57	36.12 QP	46.00	-9.88	2.00 H	130	14.28	21.84
7	700.68	39.10 QP	46.00	-6.90	1.00 H	202	16.60	22.50
8	766.79	36.34 QP	46.00	-9.66	1.00 H	220	12.21	24.13
9	811.50	38.23 QP	46.00	-7.77	1.00 H	166	13.20	25.03
10	933.99	36.92 QP	46.00	-9.08	2.00 H	166	10.75	26.17

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	32.18 QP	40.00	-7.82	1.00 V	241	18.79	13.39
2	111.56	40.47 QP	43.50	-3.03	1.00 V	307	29.75	10.72
3	166.00	34.75 QP	43.50	-8.75	1.00 V	187	21.50	13.24
4	500.42	37.28 QP	46.00	-8.72	1.00 V	169	18.17	19.12
5	566.52	39.60 QP	46.00	-6.40	1.00 V	115	18.89	20.71
6	766.79	38.16 QP	46.00	-7.84	2.00 V	31	14.03	24.13
7	799.84	37.93 QP	46.00	-8.07	1.50 V	25	13.01	24.92
8	933.99	41.99 QP	46.00	-4.01	1.00 V	199	15.82	26.17

- 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 0.50MHz.
  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

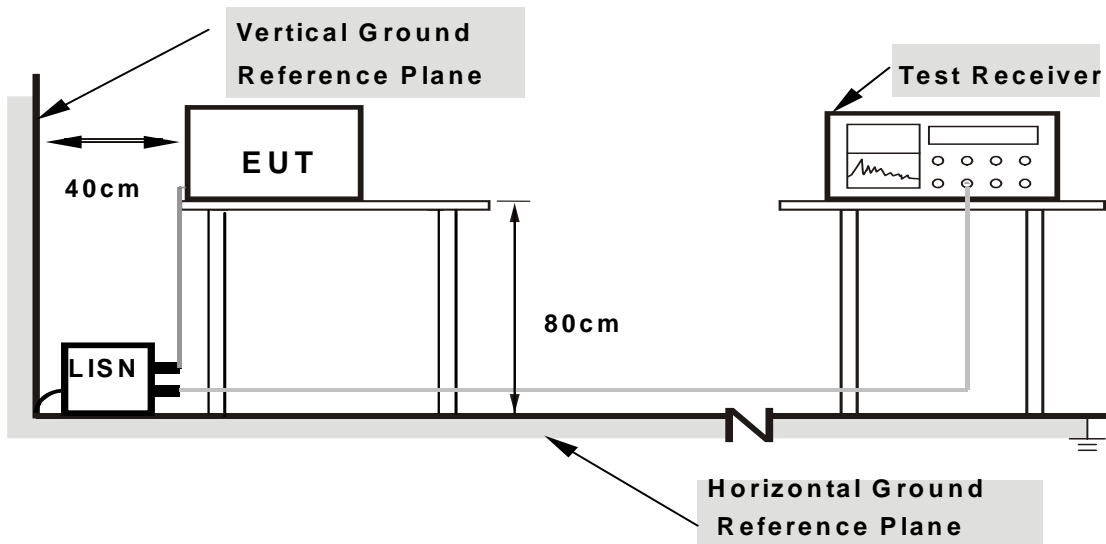
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

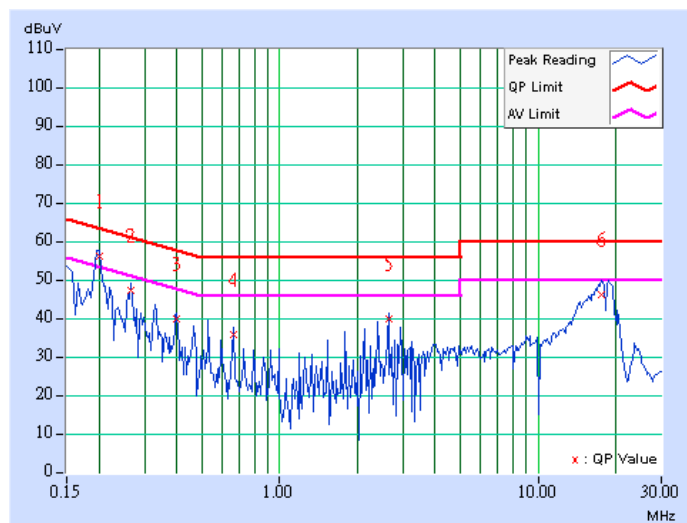
#### 4.2.7 TEST RESULTS

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 1
MODULATION TYPE	BPSK	INPUT POWER (SYSTEM)	120Vac, 60Hz
TRANSFER RATE	7.2Mbps	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 982hPa	TESTED BY	Match Tsui

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.201	0.10	55.69	46.74	55.79	46.84	63.58	53.58	-7.79	-6.74
2	0.267	0.10	46.82	-	46.92	-	61.20	51.20	-14.28	-
3	0.400	0.10	39.35	-	39.45	-	57.85	47.85	-18.40	-
4	0.662	0.10	35.29	-	35.39	-	56.00	46.00	-20.61	-
5	2.655	0.24	39.49	-	39.73	-	56.00	46.00	-16.27	-
6	17.512	0.53	45.73	-	46.26	-	60.00	50.00	-13.74	-

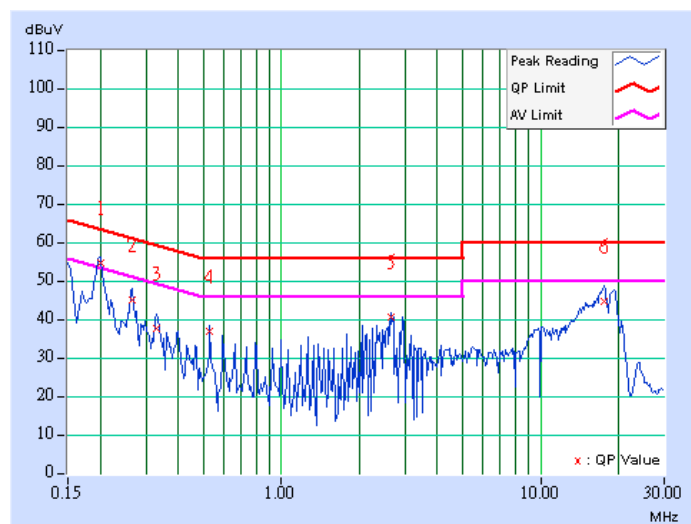
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 2
MODULATION TYPE	BPSK	INPUT POWER (SYSTEM)	120Vac, 60Hz
TRANSFER RATE	7.2Mbps	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 982hPa	TESTED BY	Match Tsui

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	0.201	0.10	54.27	44.15	54.37	44.25	63.58	53.58	-9.21	-9.33
2	0.267	0.10	44.79	-	44.89	-	61.20	51.20	-16.31	-
3	0.330	0.10	37.43	-	37.53	-	59.46	49.46	-21.93	-
4	0.529	0.12	36.34	-	36.46	-	56.00	46.00	-19.54	-
5	2.656	0.24	40.27	-	40.51	-	56.00	46.00	-15.49	-
6	17.582	0.53	44.40	-	44.93	-	60.00	50.00	-15.07	-

- 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.

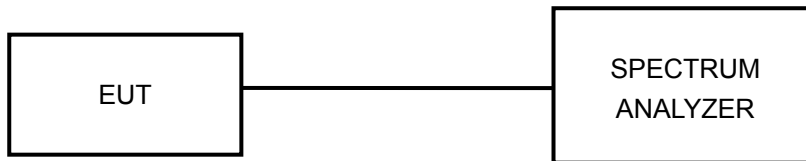
#### 4.3.3 TEST PROCEDURE

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.



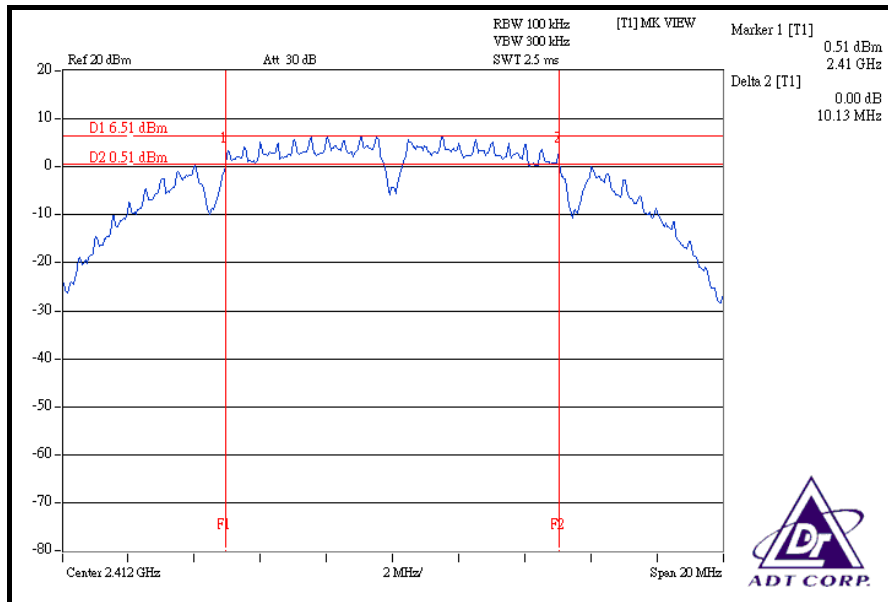
### 4.3.7 TEST RESULTS

#### 802.11b DSSS MODULATION

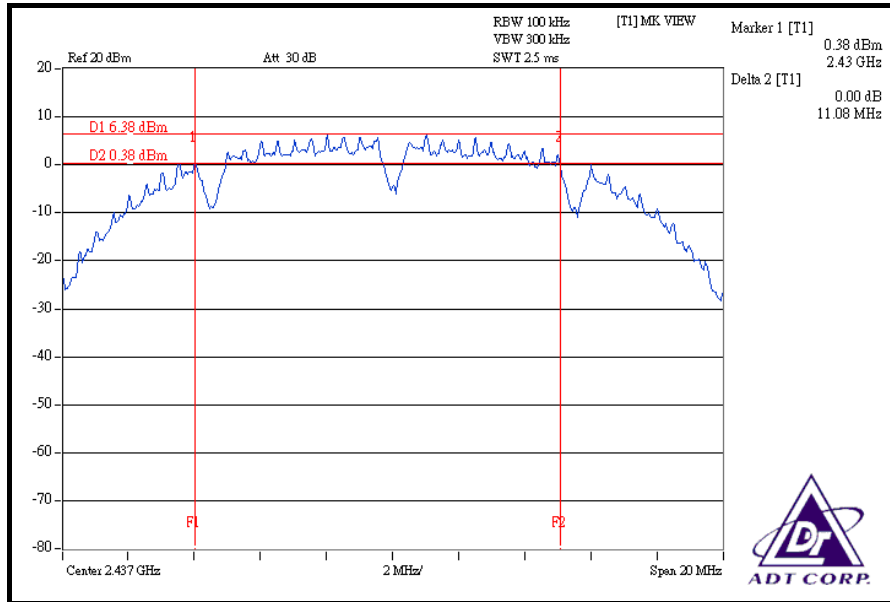
<b>MODULATION TYPE</b>	DBPSK	<b>TRANSFER RATE</b>	1.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg.C, 65 %RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.13	0.5	PASS
6	2437	11.08	0.5	PASS
11	2462	11.14	0.5	PASS

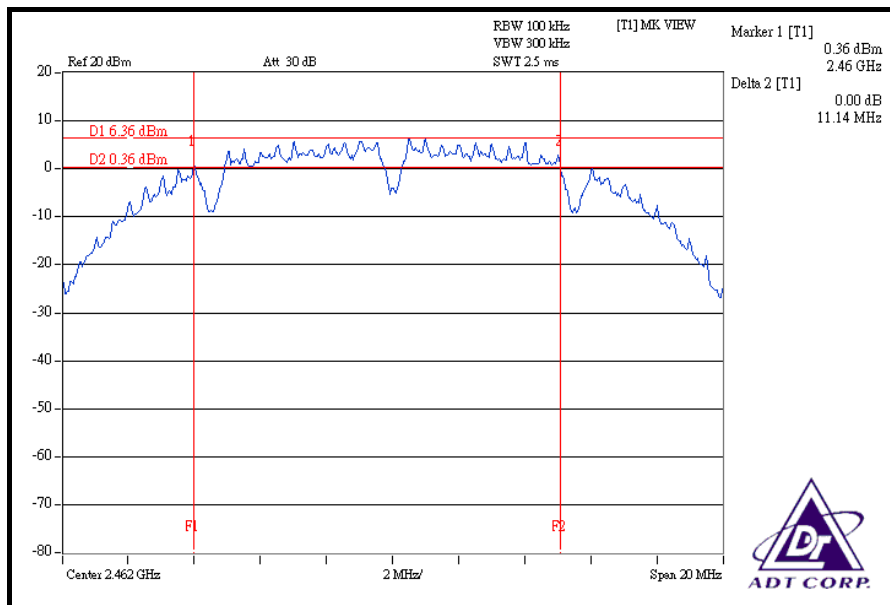
CH 1



### CH 6



### CH 11



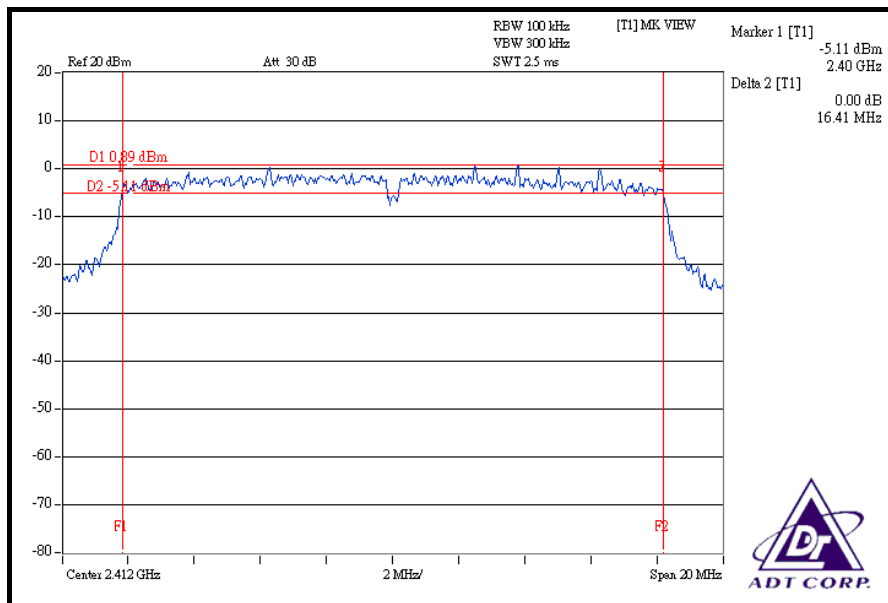


### 802.11g OFDM MODULATION

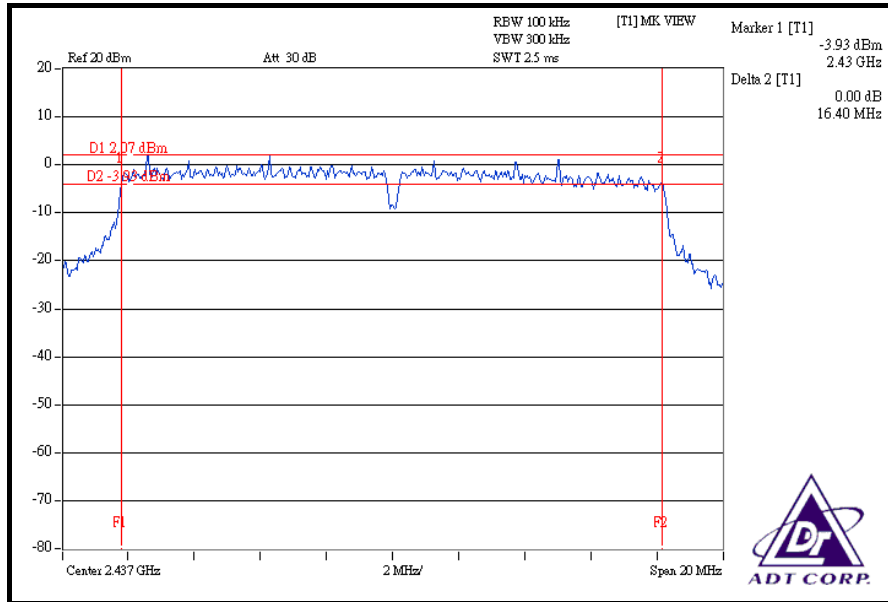
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg.C, 65 %RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.41	0.5	PASS
6	2437	16.40	0.5	PASS
11	2462	16.42	0.5	PASS

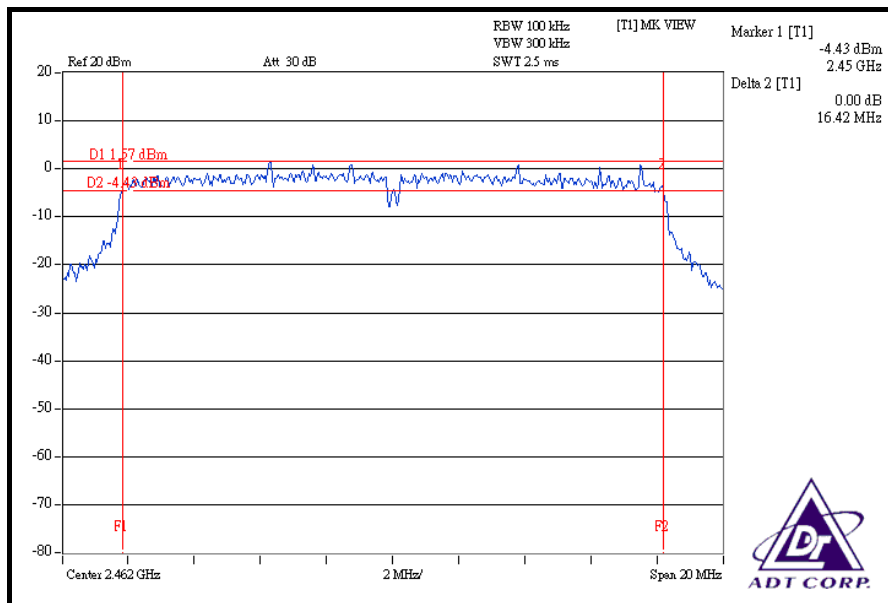
### CH 1



### CH 6



### CH 11



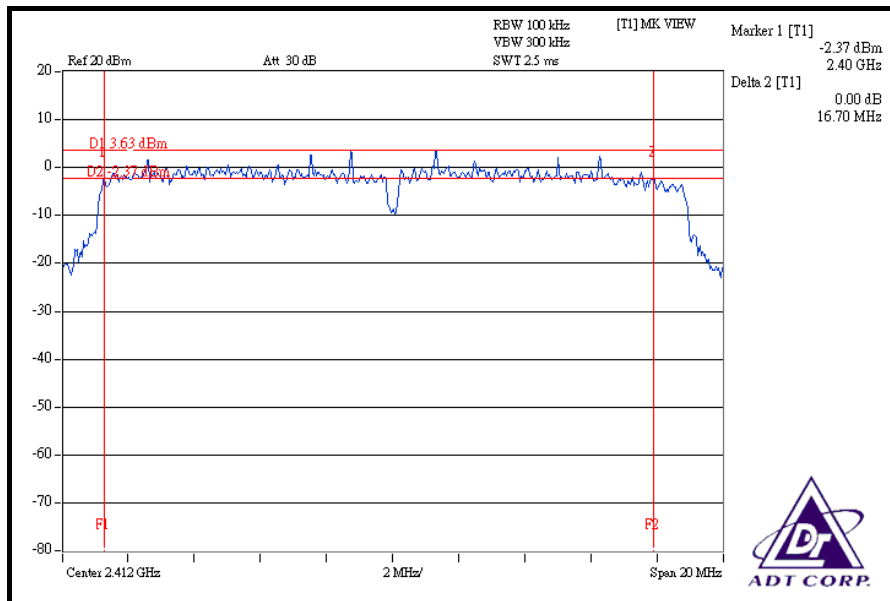


**DRAFT 802.11n (20MHz) OFDM MODULATION**

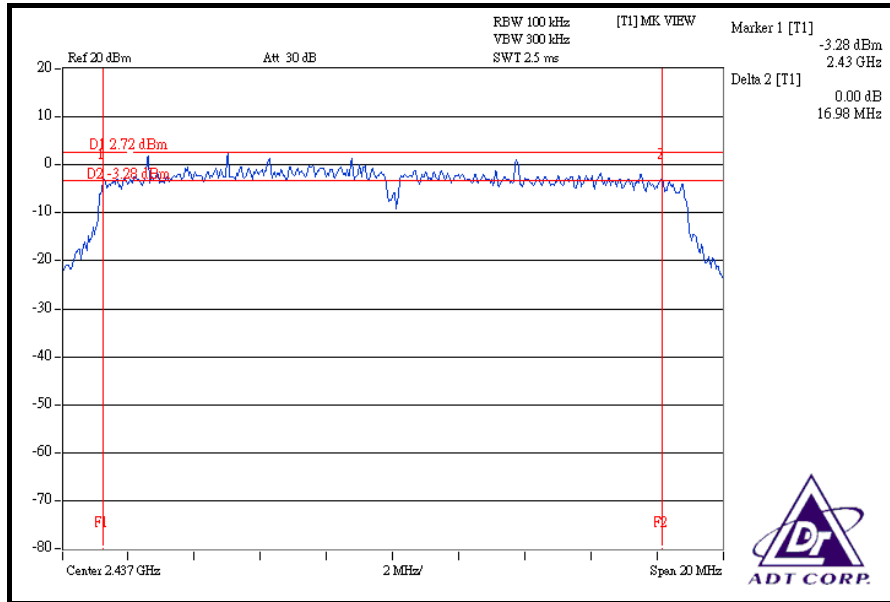
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	7.2Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg.C, 65 %RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	16.70	17.57	0.5	PASS
6	2437	16.98	17.63	0.5	PASS
11	2462	17.38	17.32	0.5	PASS

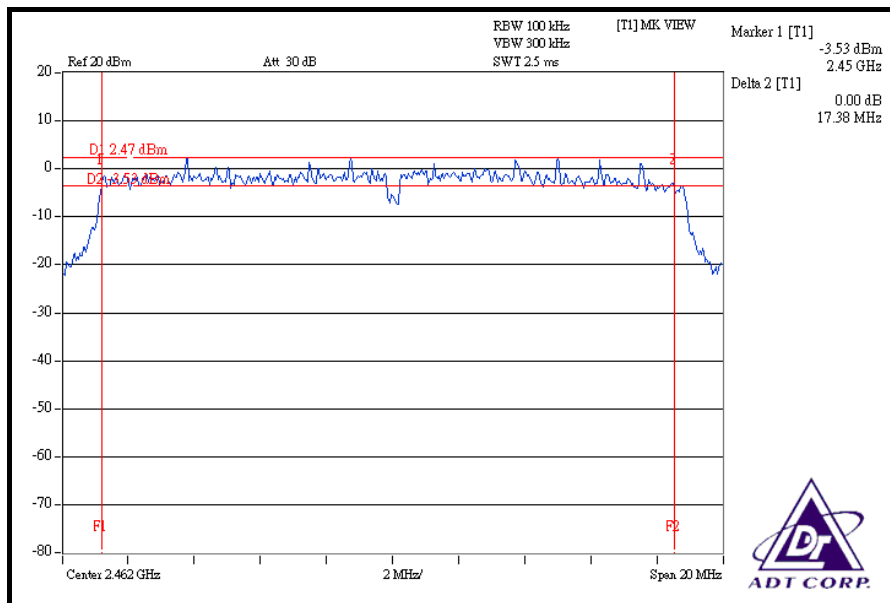
**FOR CHAIN 0: CH 1**



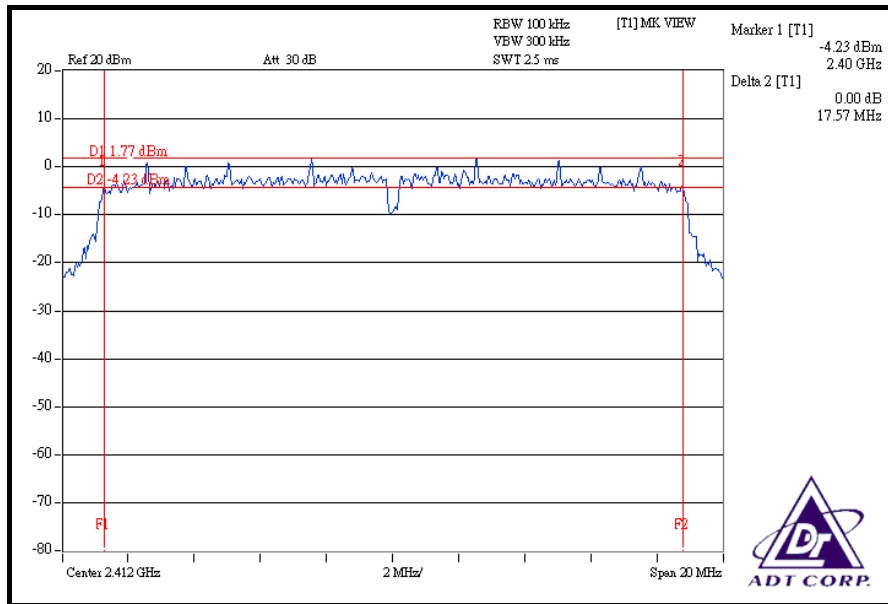
### CH 6



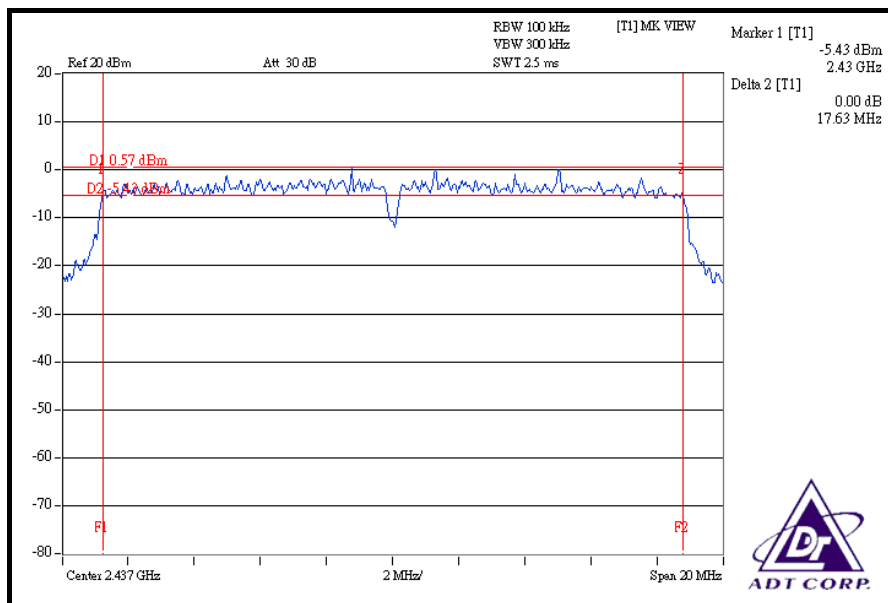
### CH 11



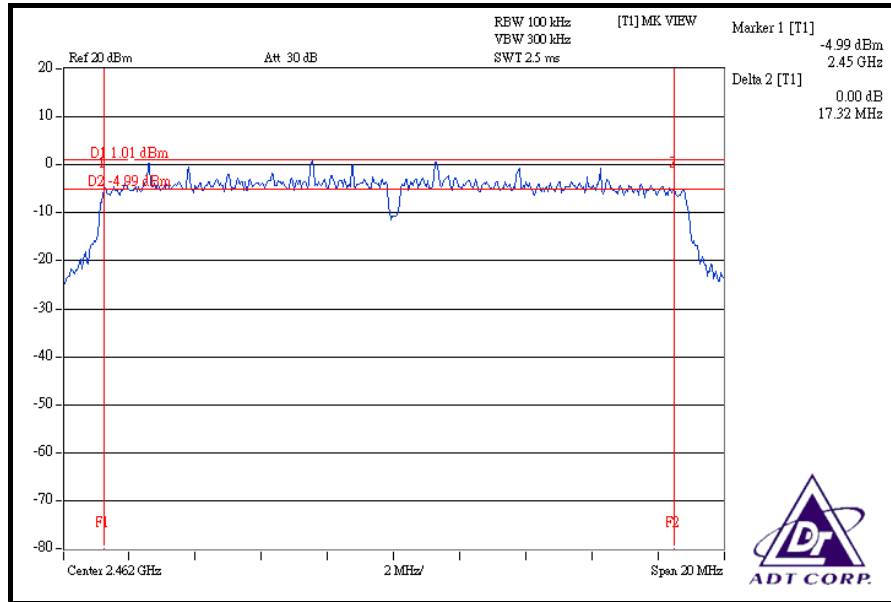
FOR CHAIN 1: CH 1



CH 6



CH 11



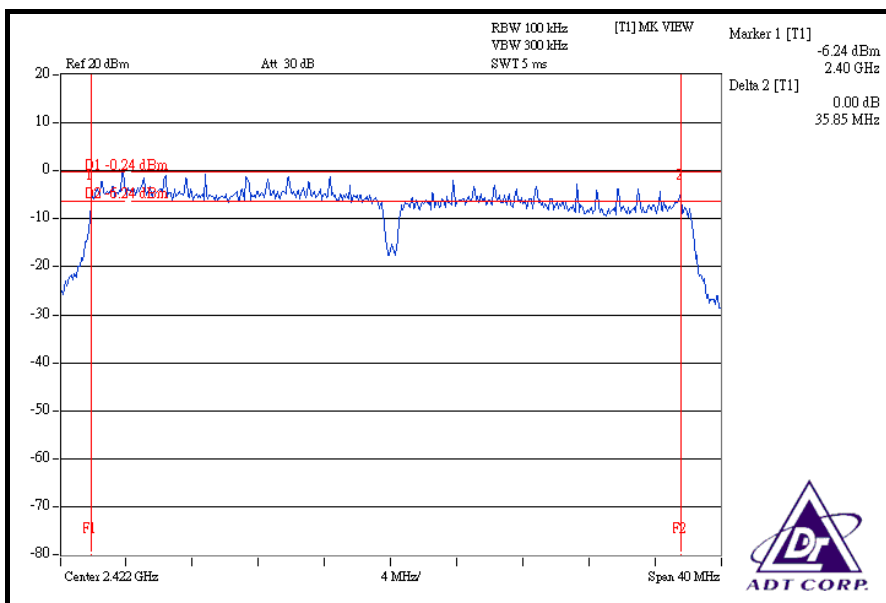


**DRAFT 802.11n (40MHz) OFDM MODULATION**

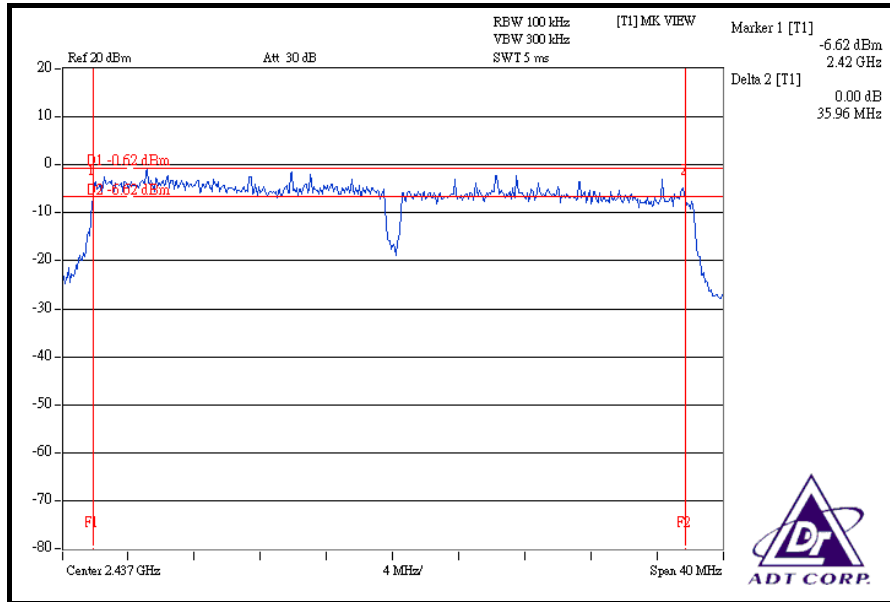
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	15.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg.C, 65 %RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2422	35.85	36.36	0.5	PASS
4	2437	35.96	36.48	0.5	PASS
7	2452	35.88	36.45	0.5	PASS

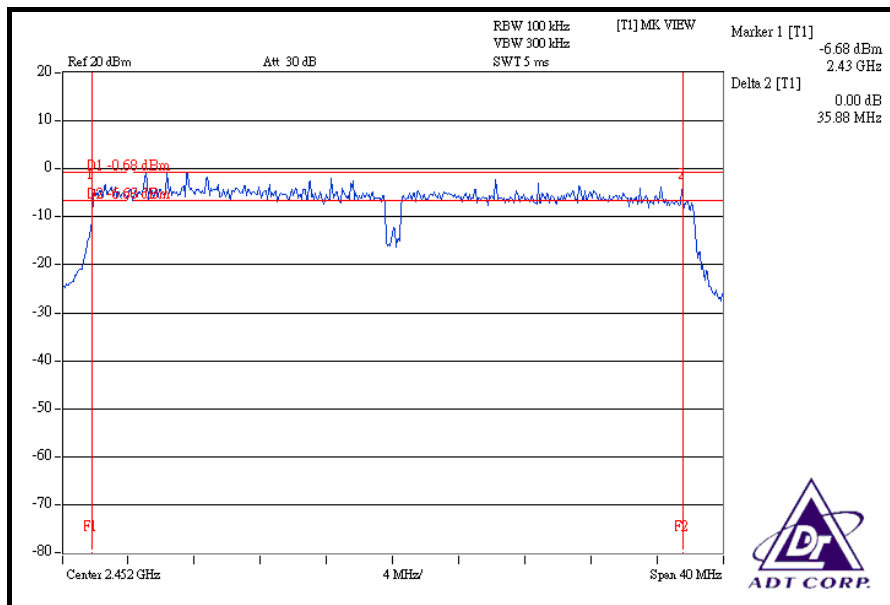
**FOR CHAIN 0: CH 1**



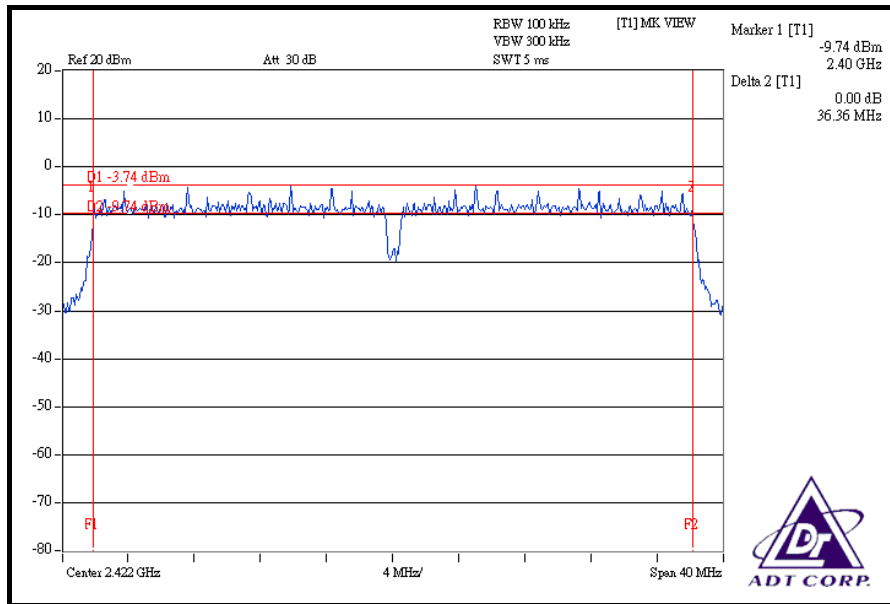
### CH 4



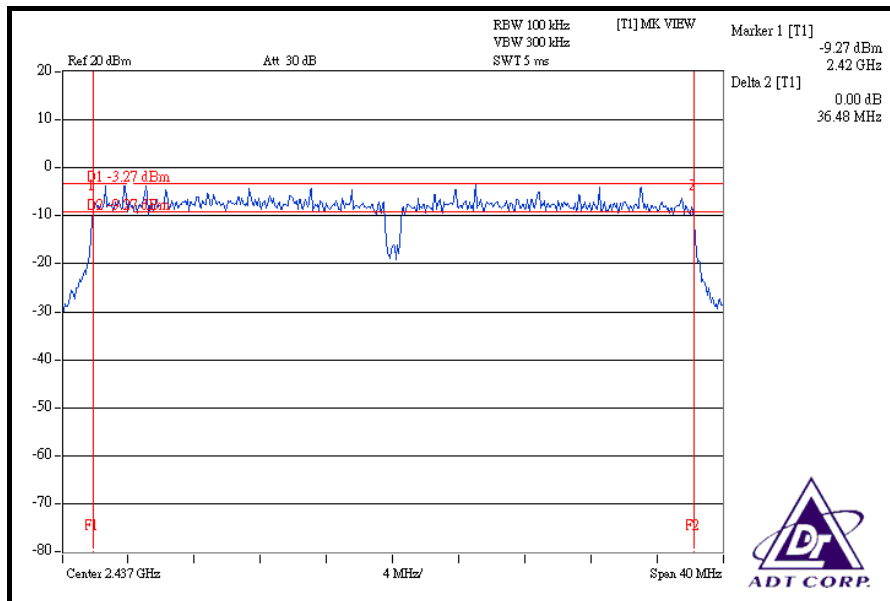
### CH 7



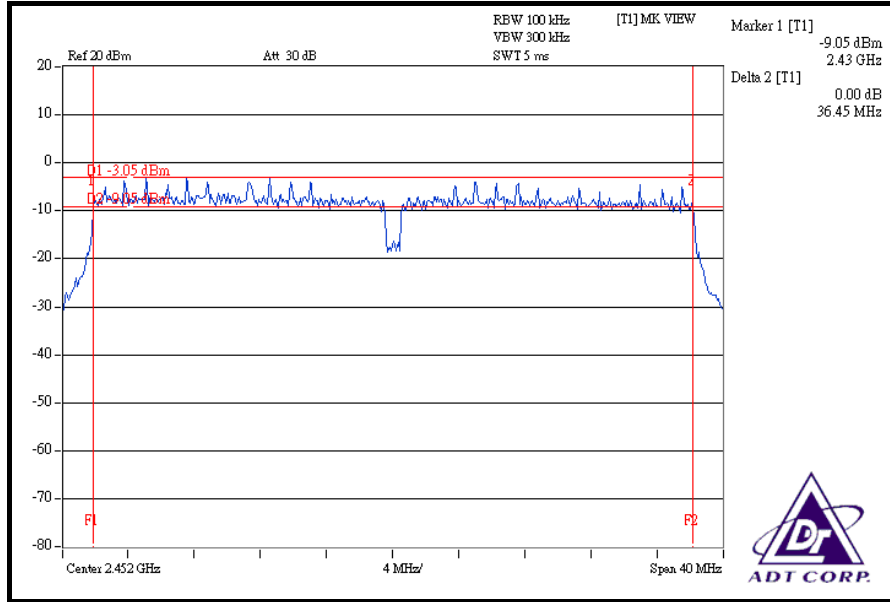
### FOR CHAIN 1: CH 1



### 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. 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. 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, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg.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	72.111	18.58	30	PASS
11	2462	71.450	18.54	30	PASS

##### 802.11g OFDM MODULATION

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg.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	50.350	17.02	30	PASS
6	2437	63.826	18.05	30	PASS
11	2462	56.754	17.54	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, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg.C, 65 %RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	17.63	17.04	108.525	20.36	30	PASS
6	2437	17.59	16.04	97.591	19.89	30	PASS
11	2462	16.57	16.06	85.759	19.33	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, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg.C, 65 %RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2422	15.53	14.02	60.962	17.85	30	PASS
4	2437	16.08	14.58	69.259	18.40	30	PASS
7	2452	15.05	14.56	60.565	17.82	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

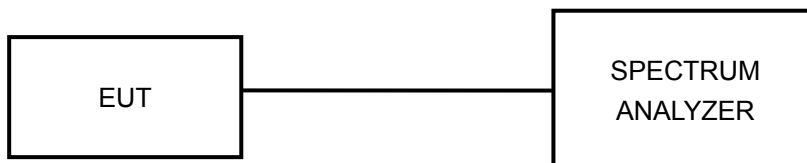
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

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

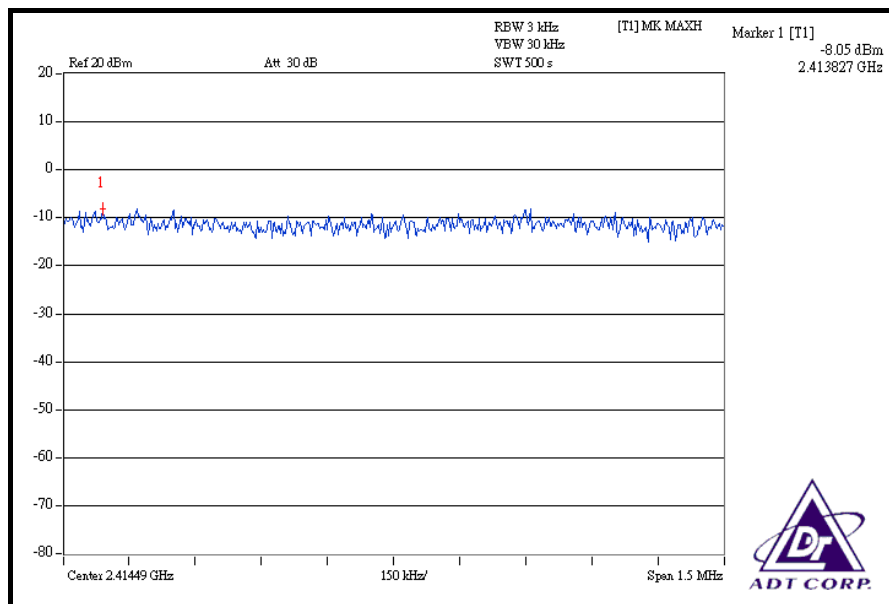
## 4.5.7 TEST RESULTS

### 802.11b DSSS MODULATION

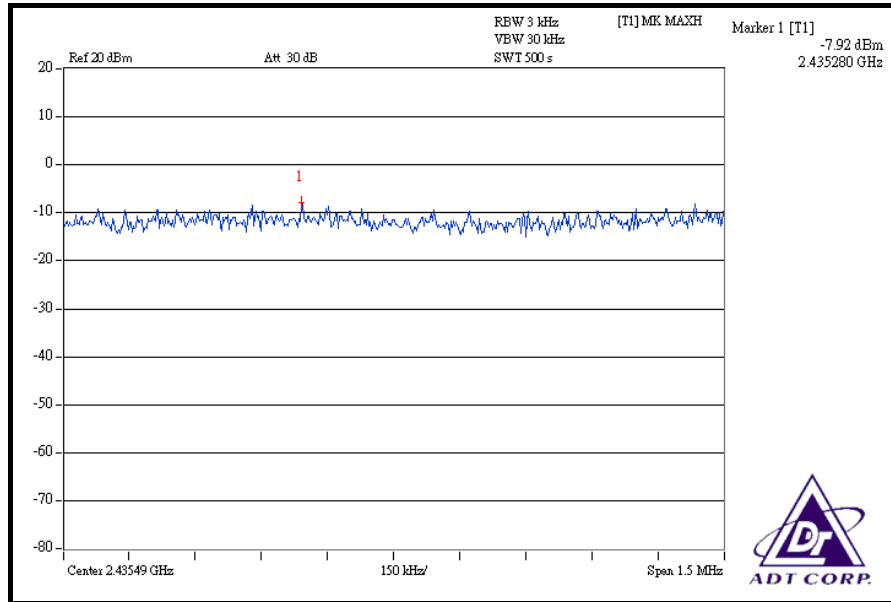
<b>MODULATION TYPE</b>	DBPSK	<b>TRANSFER RATE</b>	1.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg.C, 65 %RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	2412	-8.05	8	PASS
6	2437	-7.92	8	PASS
11	2462	-8.09	8	PASS

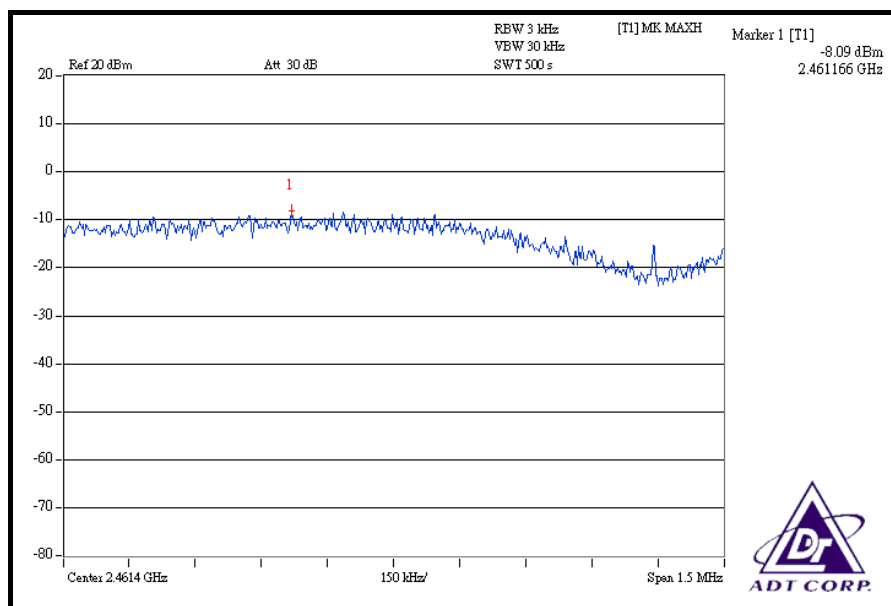
### CH 1



### CH 6



### CH 11

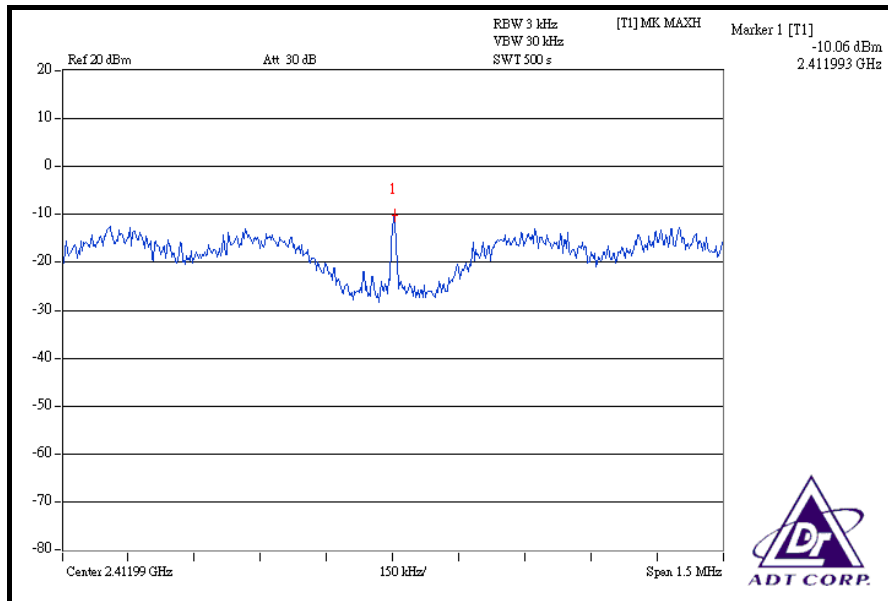


### 802.11g OFDM MODULATION

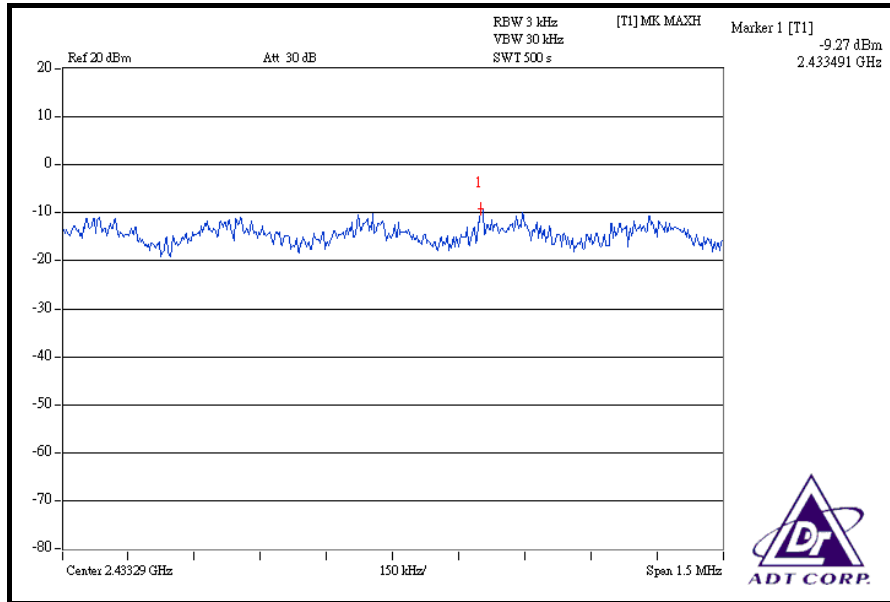
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg.C, 65%RH, 991hPa
<b>TESTED BY</b>	Long Chen		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	2412	-10.06	8	PASS
6	2437	-9.27	8	PASS
11	2462	-9.73	8	PASS

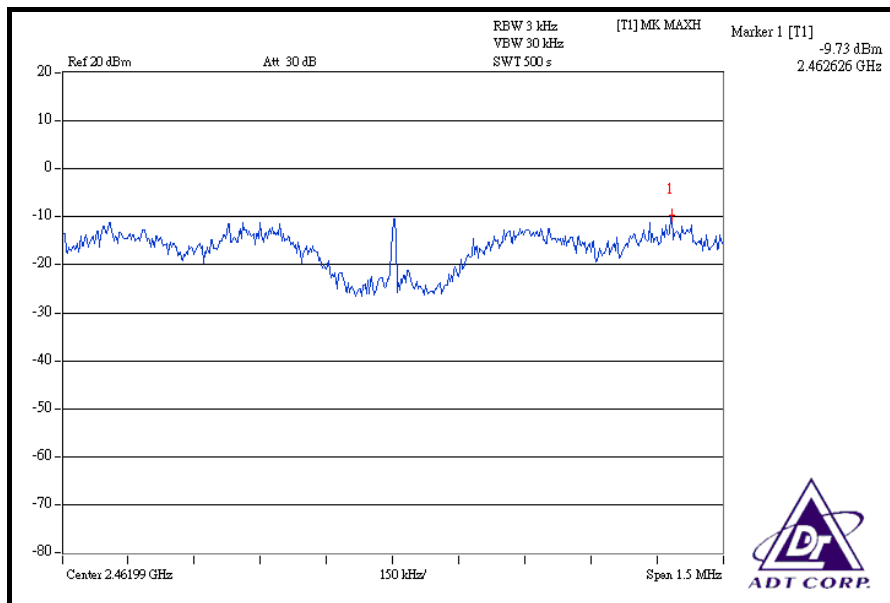
### CH 1



### CH 6



### CH 11



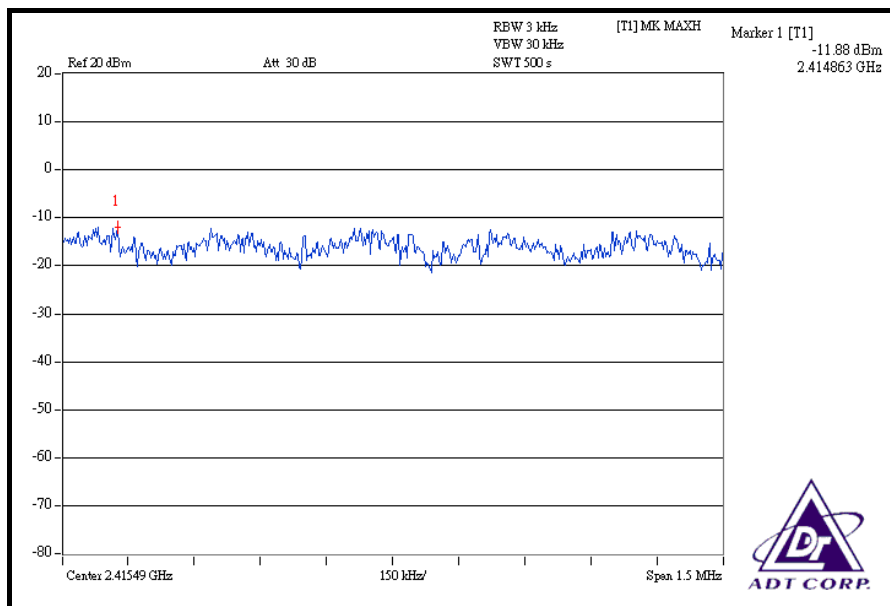


**DRAFT 802.11n (20MHz) OFDM MODULATION**

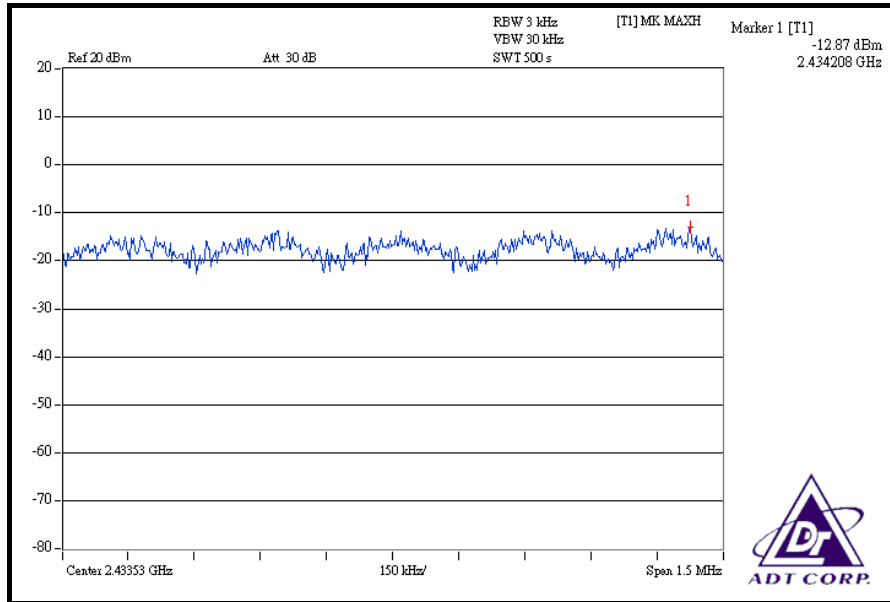
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	7.2Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg.C, 65 %RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHAN.	CHAN. FREQ. (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	-11.88	-11.46	0.136	-8.65	8	PASS
6	2437	-12.87	-12.68	0.106	-9.76	8	PASS
11	2462	-12.71	-12.50	0.110	-9.59	8	PASS

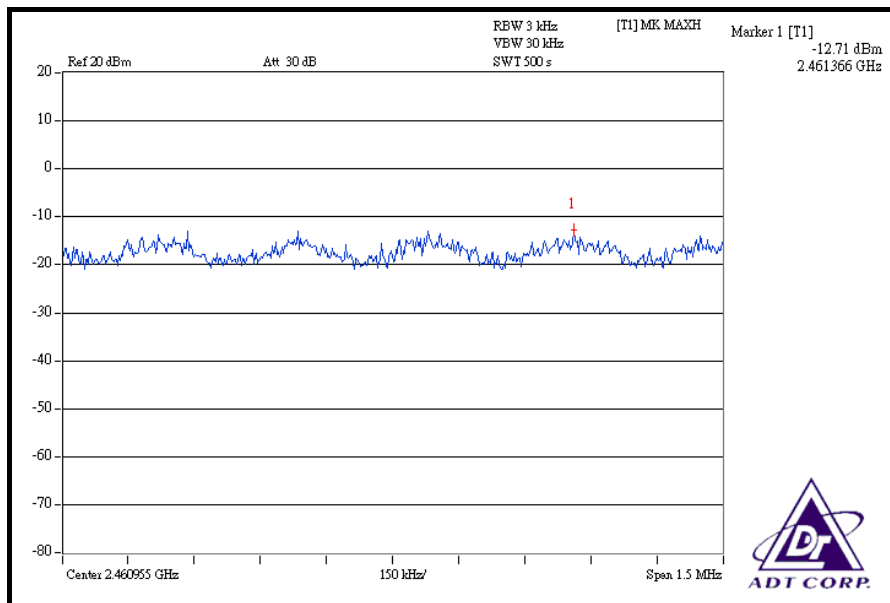
**FOR CHAIN 0: CH 1**



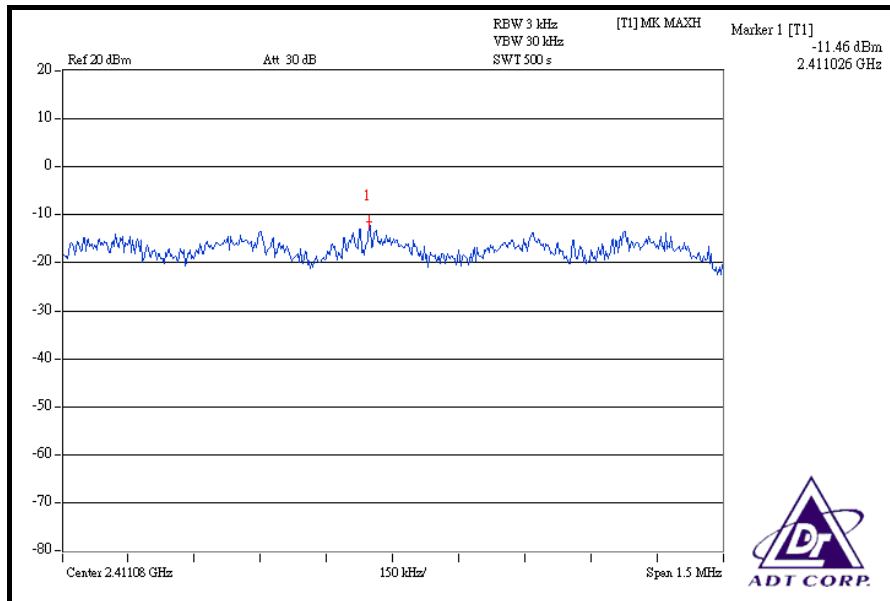
### CH 6



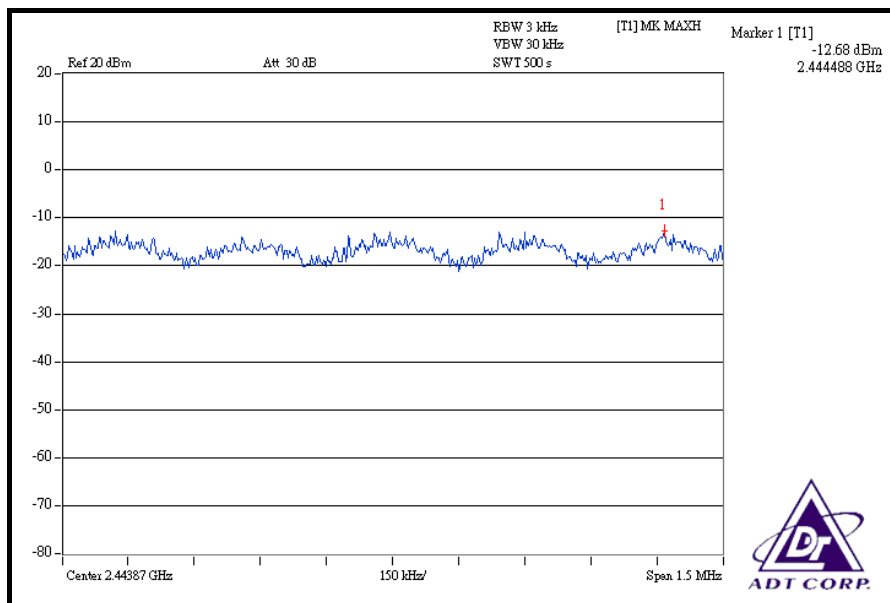
### CH 11



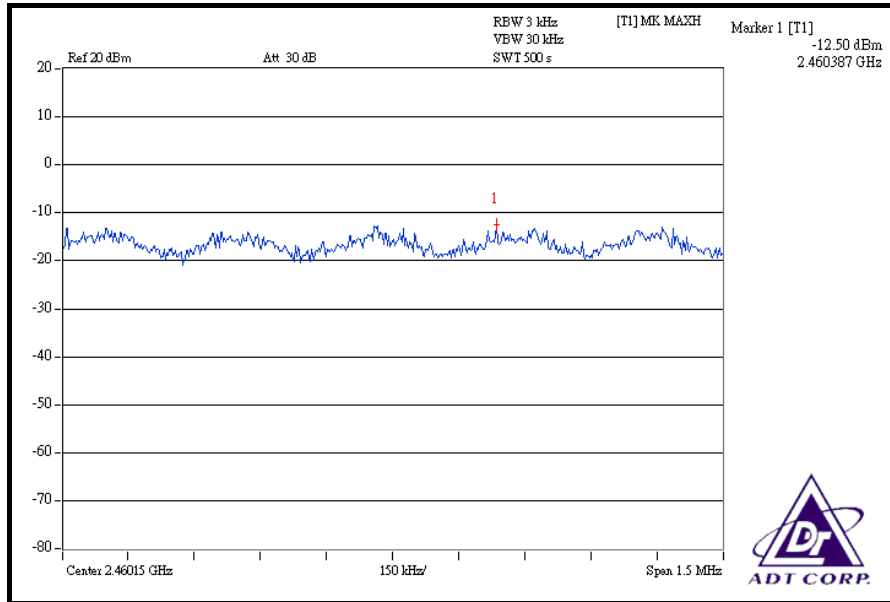
**FOR CHAIN 1: CH 1**



**CH 6**



### CH 11



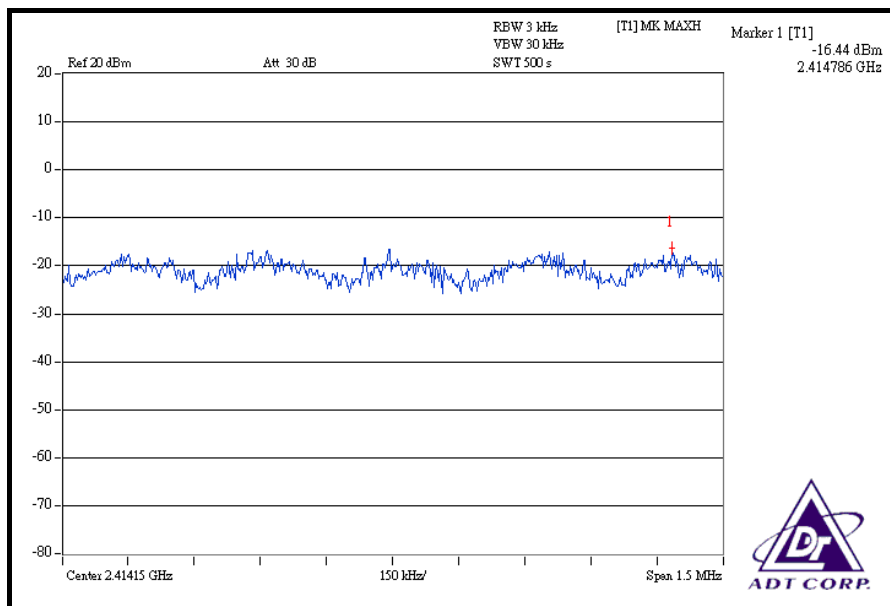


**DRAFT 802.11n (40MHz) OFDM MODULATION**

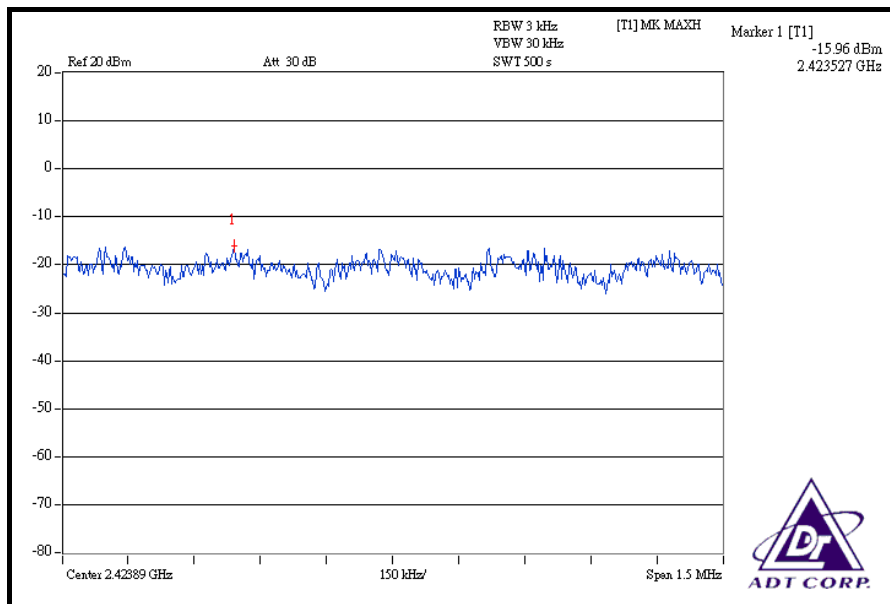
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	15.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg.C, 65 %RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHAN.	CHAN. FREQ. (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2422	-16.44	-18.98	0.035	-14.52	8	PASS
4	2437	-15.96	-18.50	0.039	-14.04	8	PASS
7	2452	-16.94	-18.32	0.035	-14.57	8	PASS

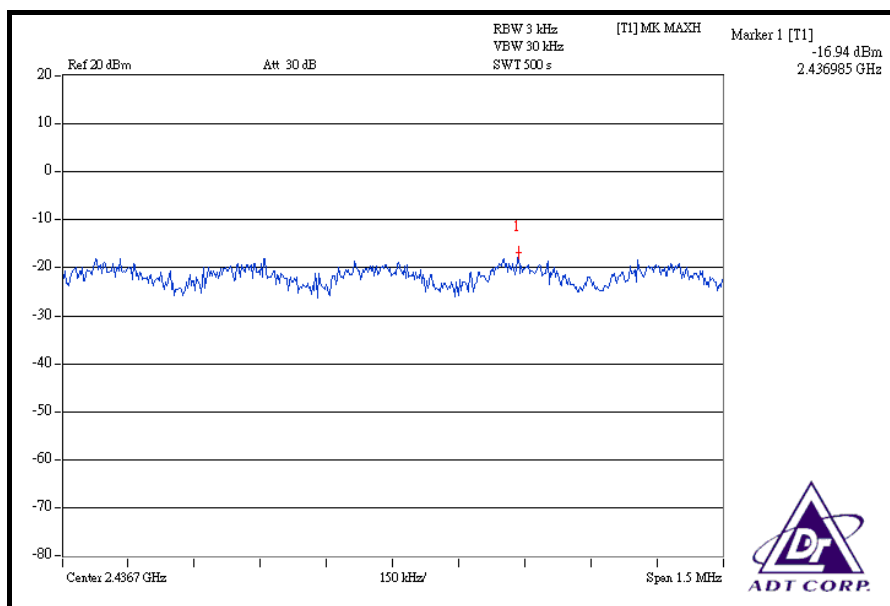
**FOR CHAIN 0: CH 1**



### CH 4

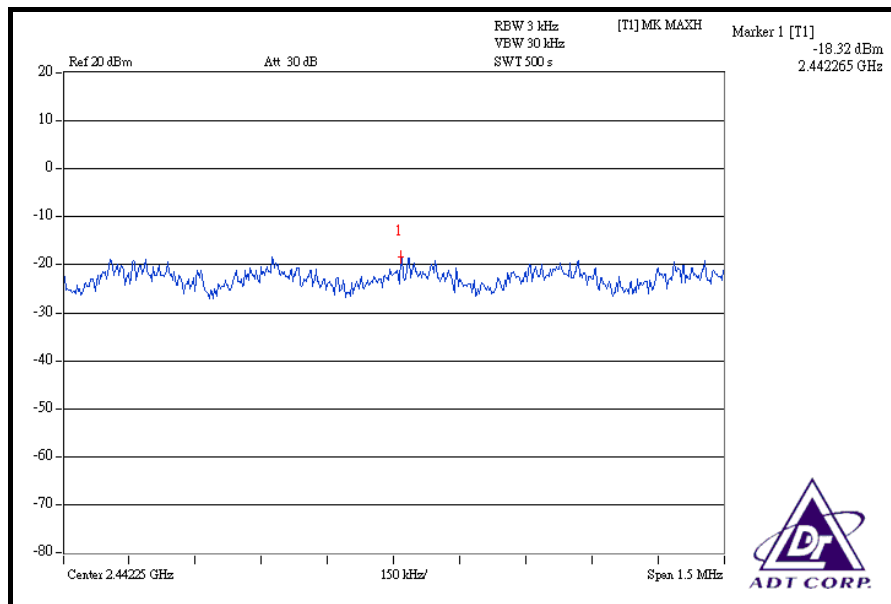


### CH 7





### 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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
<b>FOR CONDUCTED MEASUREMENT:</b>			
R&S SPECTRUM ANALYZER	FSP40	100040	Jun. 28, 2008
<b>FOR RADIATED MEASUREMENT:</b>			
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Jul. 27, 2008
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Aug. 05, 2008
BILOG Antenna SCHWARZBECK	VULB9168	9168-153	Jan. 03, 2009
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Jul. 30, 2008
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Jan. 06, 2009
Preamplifier Agilent	8449B	3008A01910	Sep. 19, 2008
Preamplifier Agilent	8447D	2944A10638	Dec. 19, 2008
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	274039/223650	Nov. 07, 2008
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 09, 2008
Software	ADT_Radiated_V7.6	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA
Turn Table EMCO	2087-2.03	NA	NA
Antenna Tower & Turn Table Controller EMCO	2090	NA	NA

**NOTE:** 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 CONDUCTED MEASUREMENT:

The transmitter output was connected to the spectrum analyzer via a low loss 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) are attached on the following pages.

#### FOR RADIATED MEASUREMENT:

- 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 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) are attached on the following pages.

**NOTE:** The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.

#### 4.6.4 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).

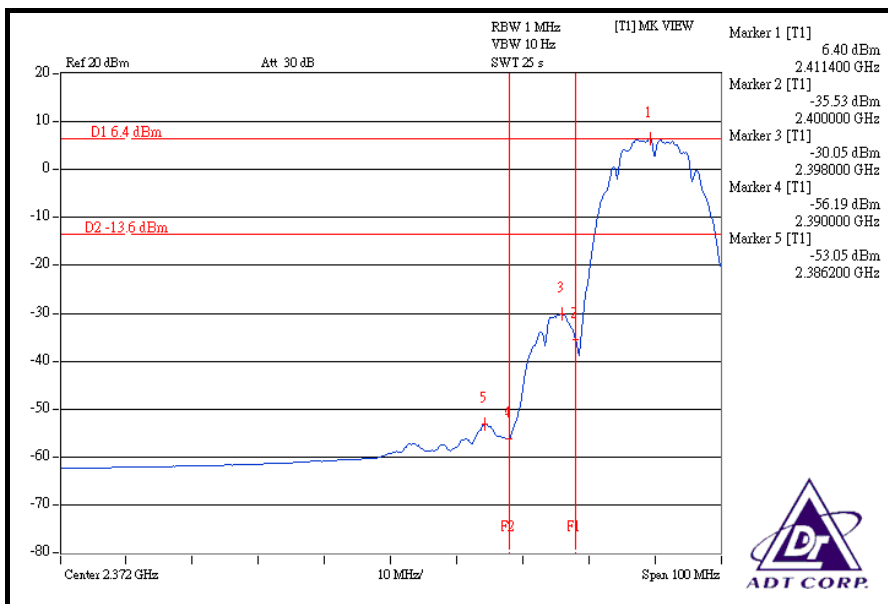
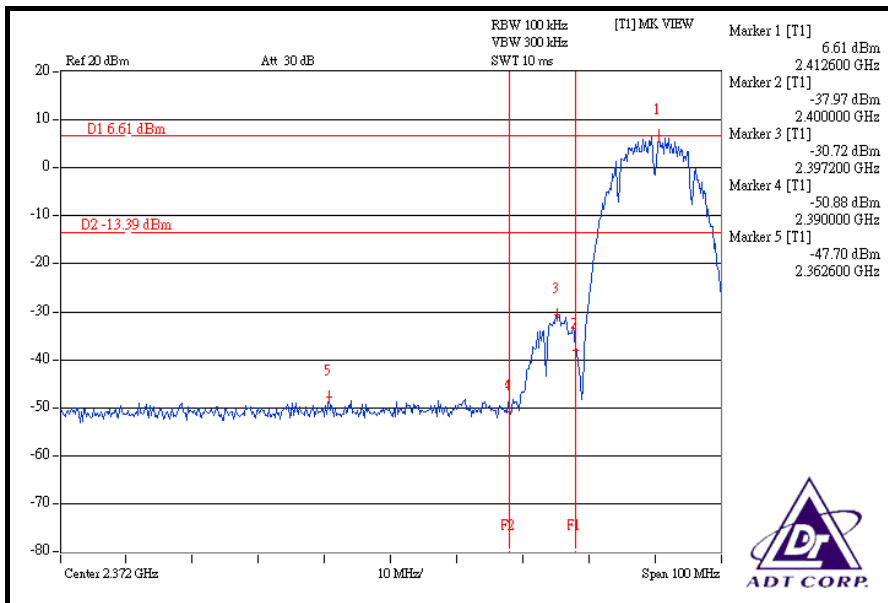
#### 802.11b DSSS MODULATION

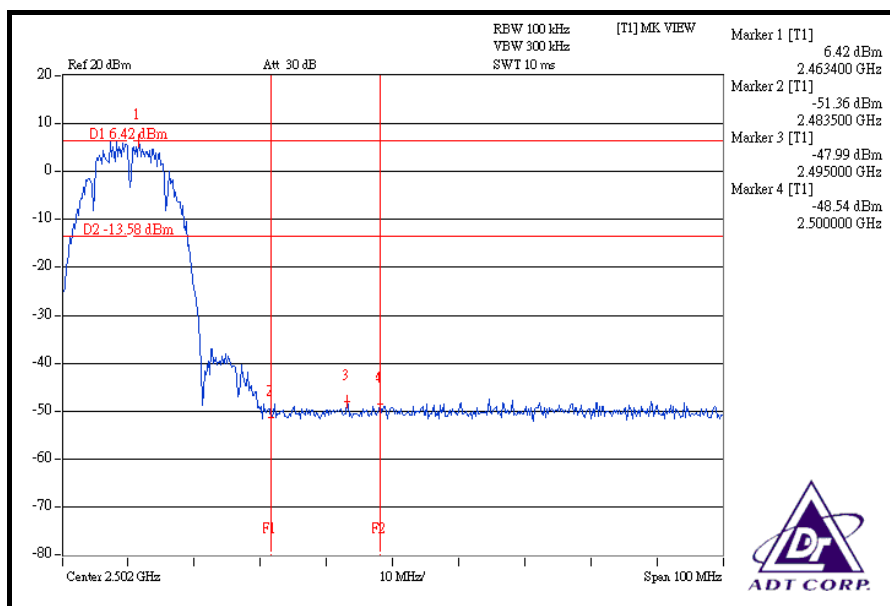
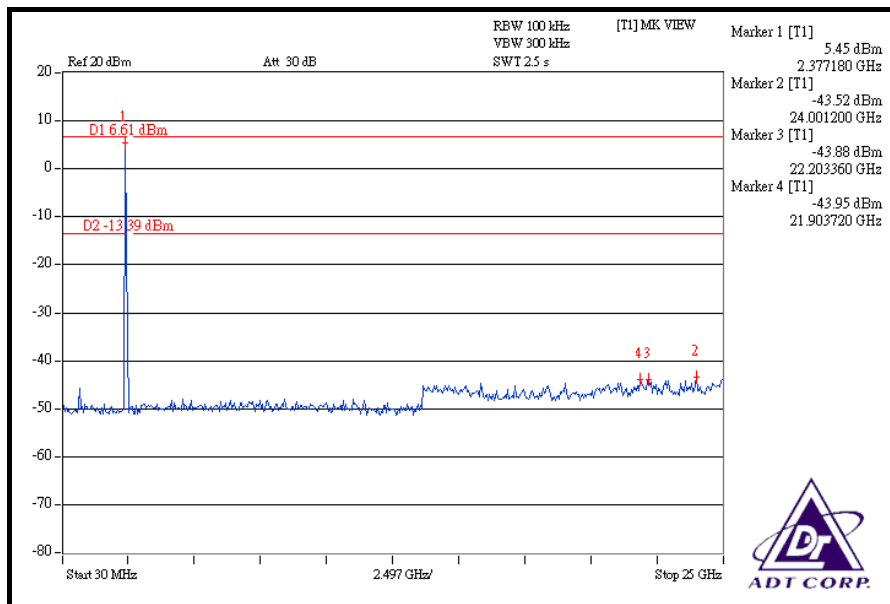
**NOTE 1:** The band edge emission plot on the next page shows 54.31dBc between carrier maximum power and local maximum emission in restrict band (2.36260GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 111.22dBuV/m (Peak), so the maximum field strength in restrict band is  $111.22 - 54.31 = 56.91$ dBuV/m which is under 74dBuV/m limit.

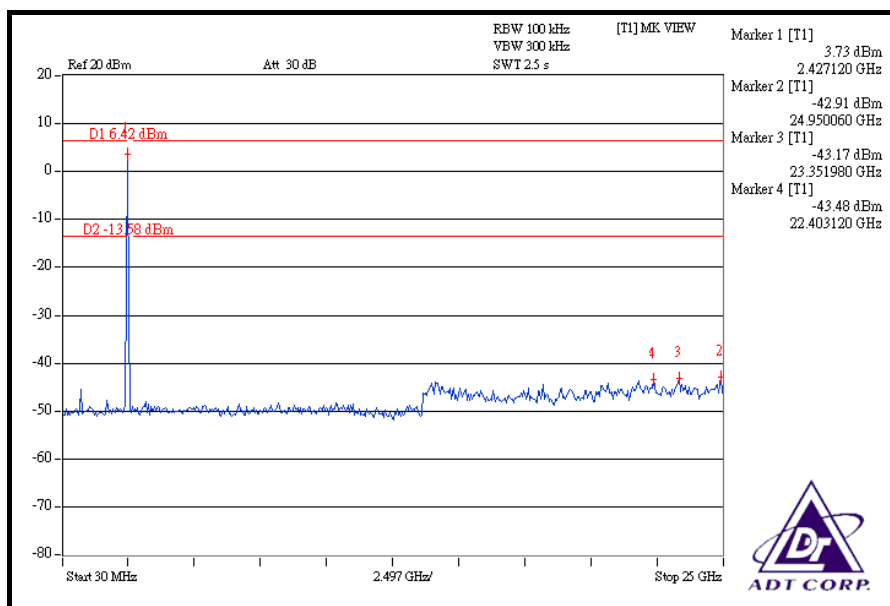
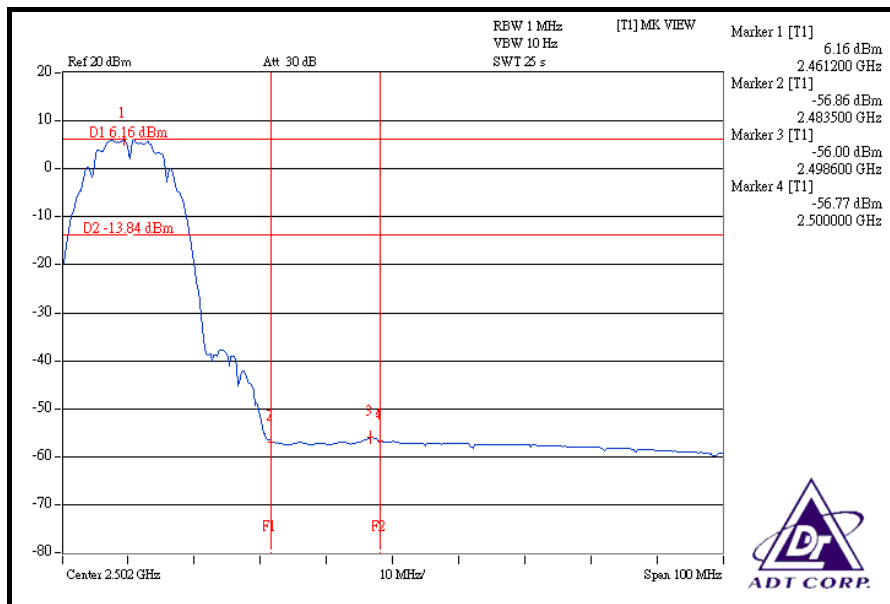
The band edge emission plot of on the next page shows 59.45dBc between carrier maximum power and local maximum emission in restrict band (2.38620GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 106.59dBuV/m (Average), so the maximum field strength in restrict band is  $106.59 - 59.45 = 47.14$ dBuV/m which is under 54dBuV/m limit.

**NOTE 2:** The band edge emission plot on the next second page shows 54.41dBc between carrier maximum power and local maximum emission in restrict band (2.49500GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 111.33dBuV/m (Peak), so the maximum field strength in restrict band is  $111.33 - 54.41 = 56.92$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 62.16dBc between carrier maximum power and local maximum emission in restrict band (2.49860GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 106.87dBuV/m (Average), so the maximum field strength in restrict band is  $106.87 - 62.16 = 44.71$ dBuV/m which is under 54dBuV/m limit.







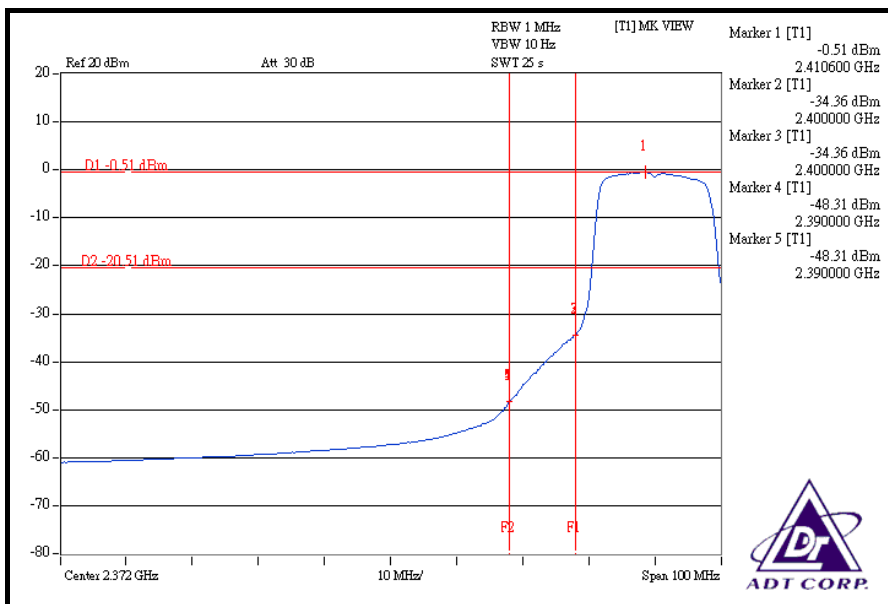
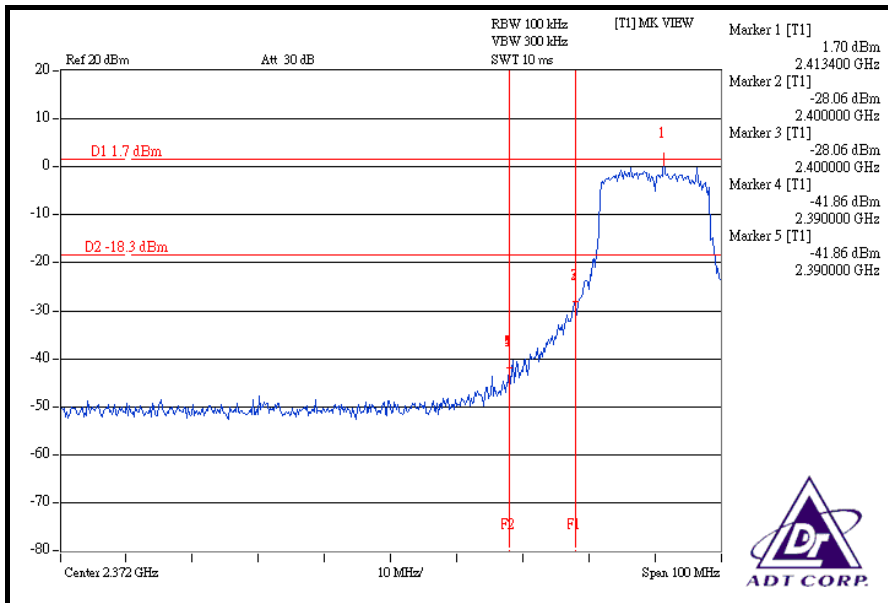
## 802.11g OFDM MODULATION

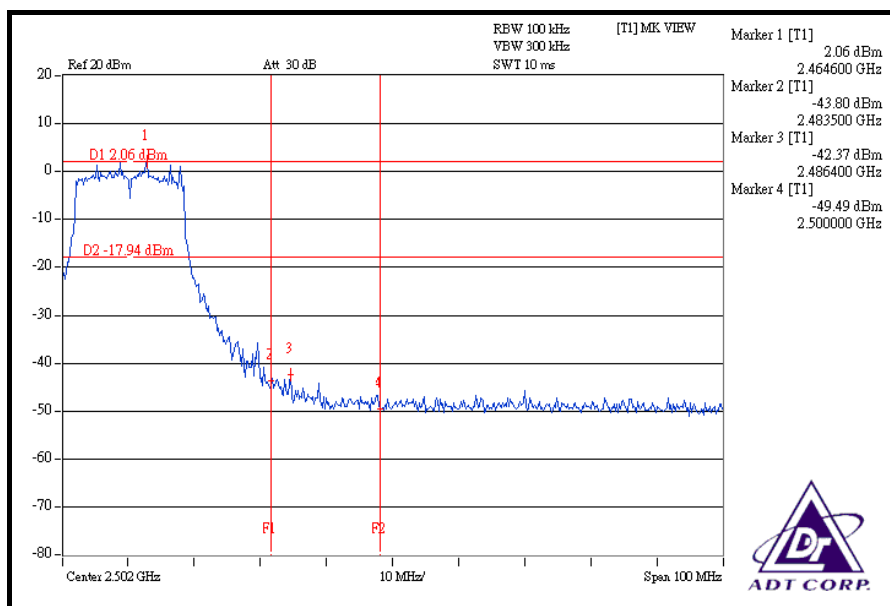
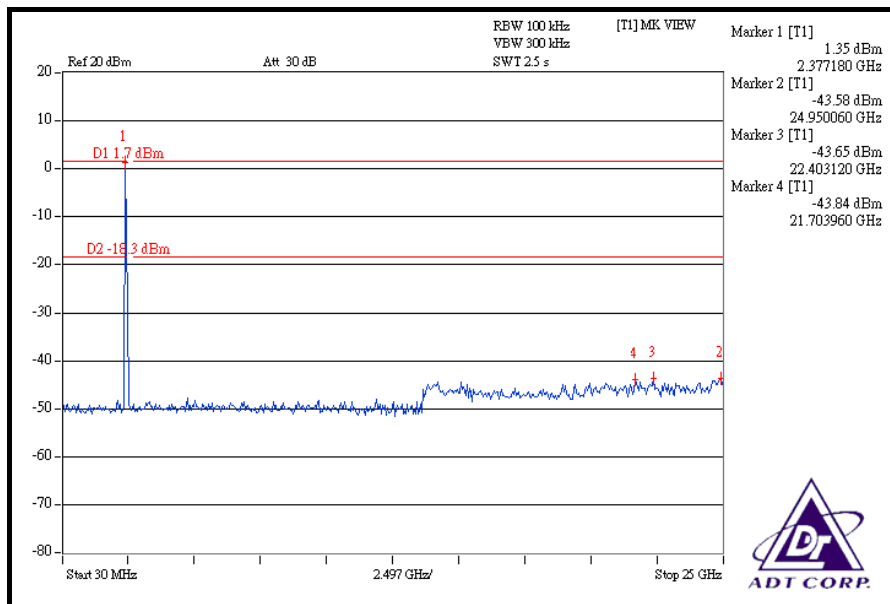
**NOTE 1:** The band edge emission plot on the next page shows 43.56dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 109.95dBuV/m (Peak), so the maximum field strength in restrict band is  $109.95 - 43.56 = 66.39$ dBuV/m which is under 74dBuV/m limit.

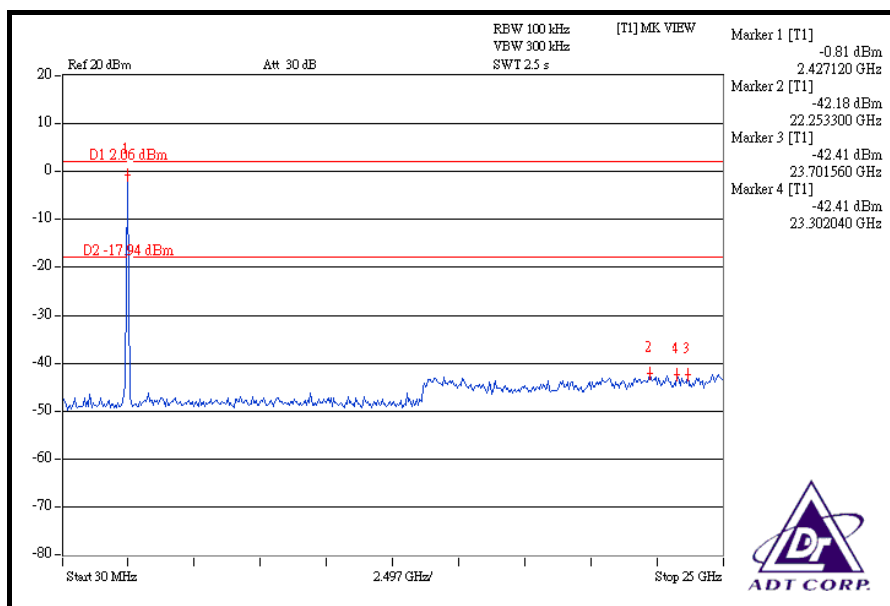
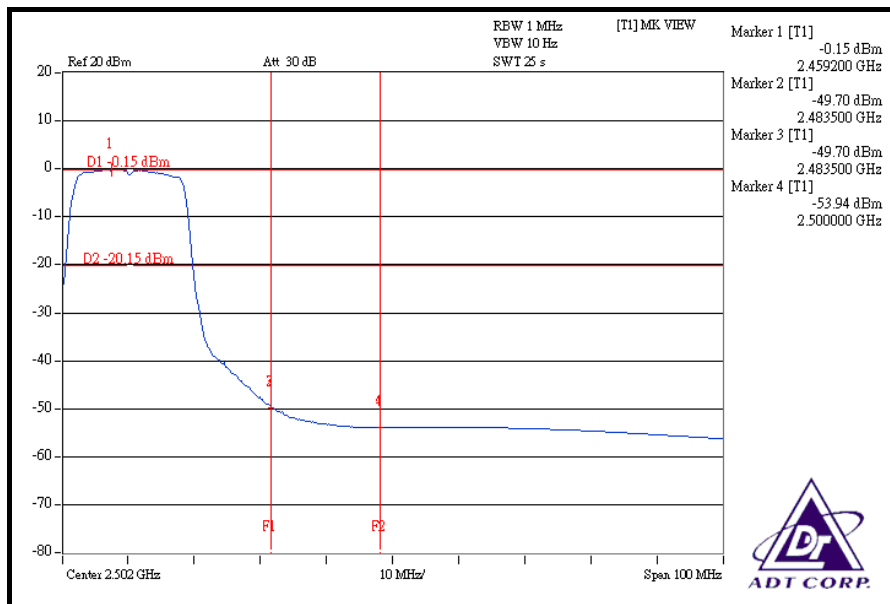
The band edge emission plot of on the next page shows 47.80dBc between carrier maximum power and local maximum emission in restrict band (2.39000GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 99.93dBuV/m (Average), so the maximum field strength in restrict band is  $99.93 - 47.80 = 52.13$ dBuV/m which is under 54dBuV/m limit.

**NOTE 2:** The band edge emission plot on the next second page shows 44.43dBc 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 111.01dBuV/m (Peak), so the maximum field strength in restrict band is  $111.01 - 44.43 = 66.58$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 49.55dBc 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 101.14dBuV/m (Average), so the maximum field strength in restrict band is  $101.14 - 49.55 = 51.59$ dBuV/m which is under 54dBuV/m limit.







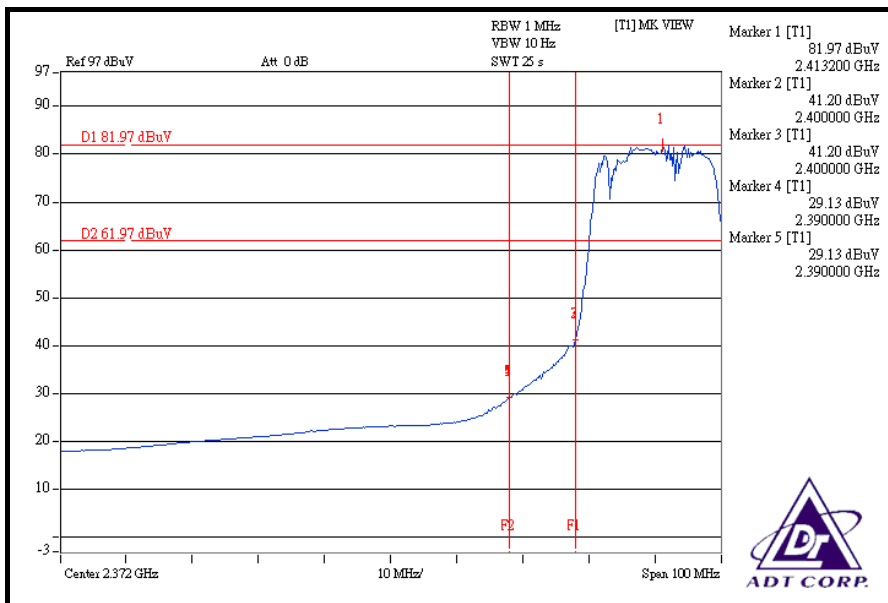
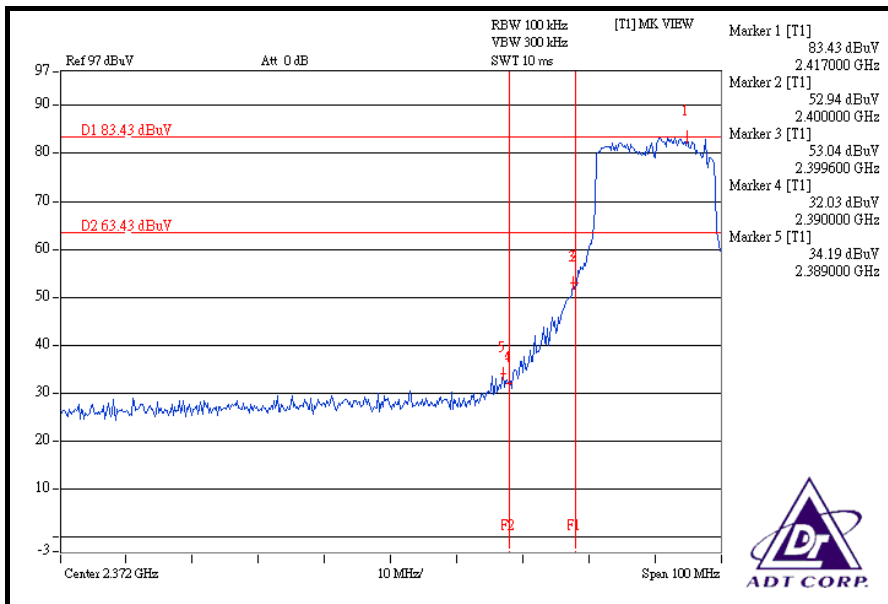
## DRAFT 802.11n (20MHz) OFDM MODULATION

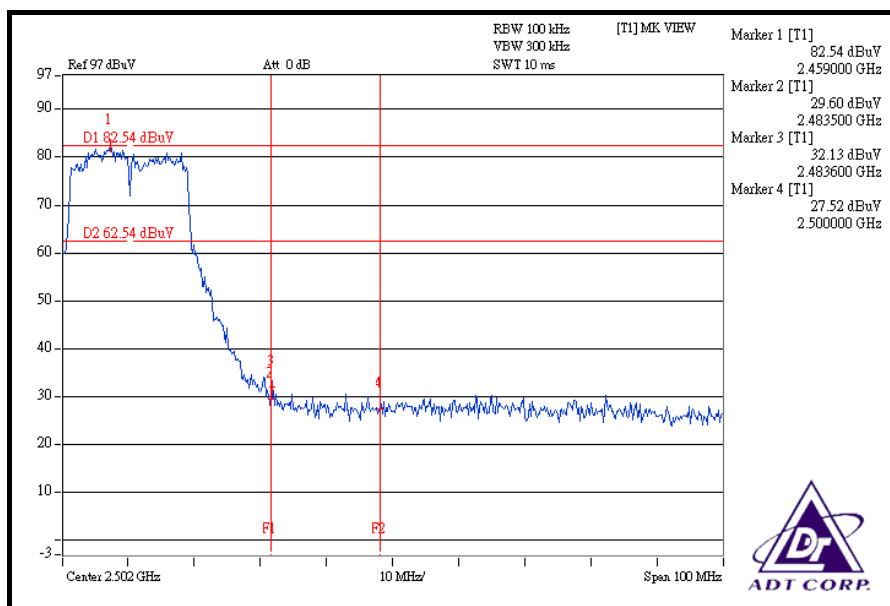
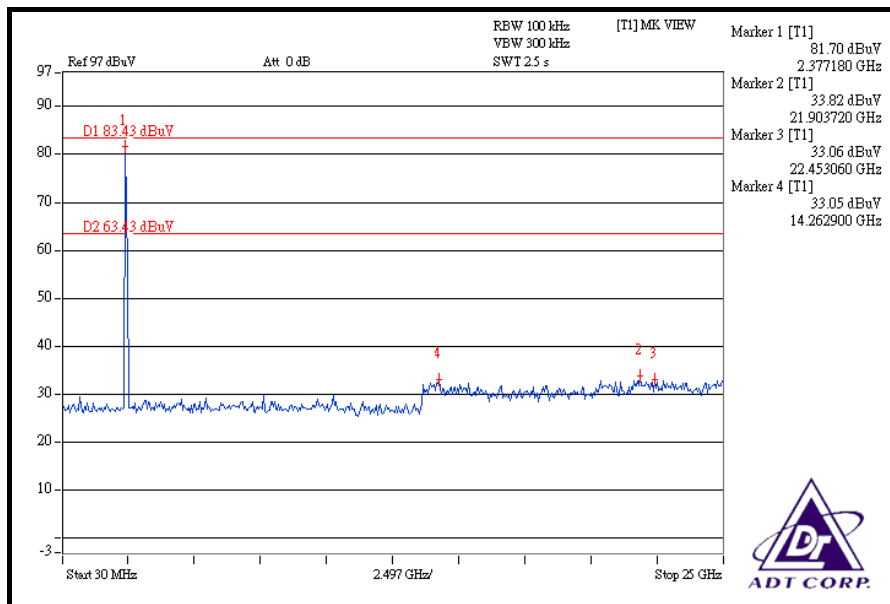
**NOTE 1:** The band edge emission plot on the next page shows 49.24dBc between carrier maximum power and local maximum emission in restrict band (2.38900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 114.55dBuV/m (Peak), so the maximum field strength in restrict band is  $114.55 - 49.24 = 65.31$ dBuV/m which is under 74dBuV/m limit.

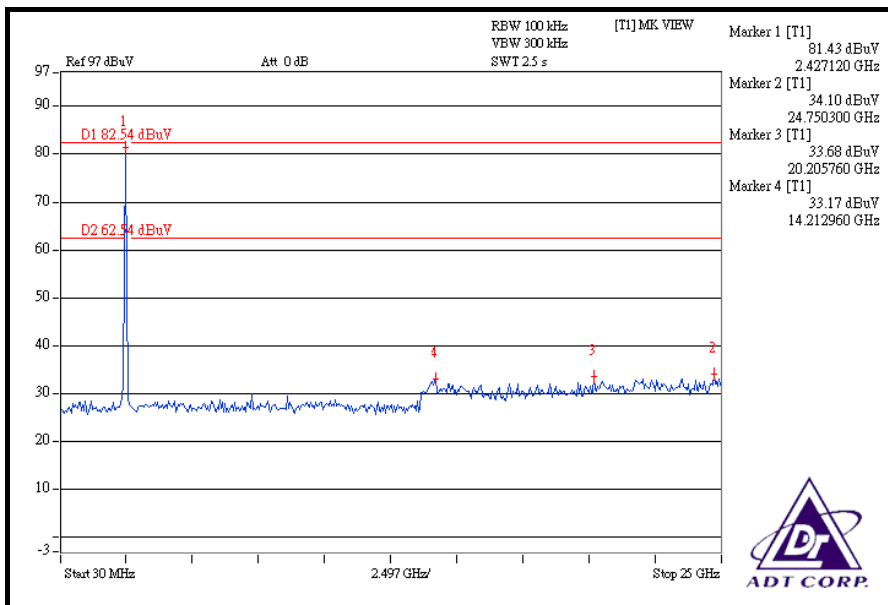
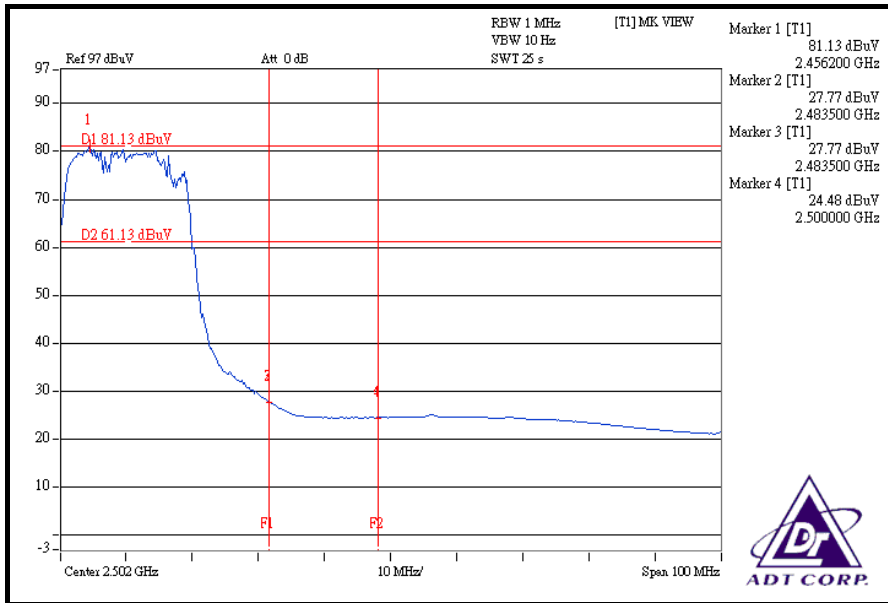
The band edge emission plot of on the next page shows 52.84dBc between carrier maximum power and local maximum emission in restrict band (2.39000GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 104.28dBuV/m (Average), so the maximum field strength in restrict band is  $104.28 - 52.84 = 51.44$ dBuV/m which is under 54dBuV/m limit.

**NOTE 2:** The band edge emission plot on the next second page shows 50.41dBc 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 113.76dBuV/m (Peak), so the maximum field strength in restrict band is  $113.76 - 50.41 = 63.35$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 53.36dBc 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 103.68dBuV/m (Average), so the maximum field strength in restrict band is  $103.68 - 53.36 = 50.32$ dBuV/m which is under 54dBuV/m limit.







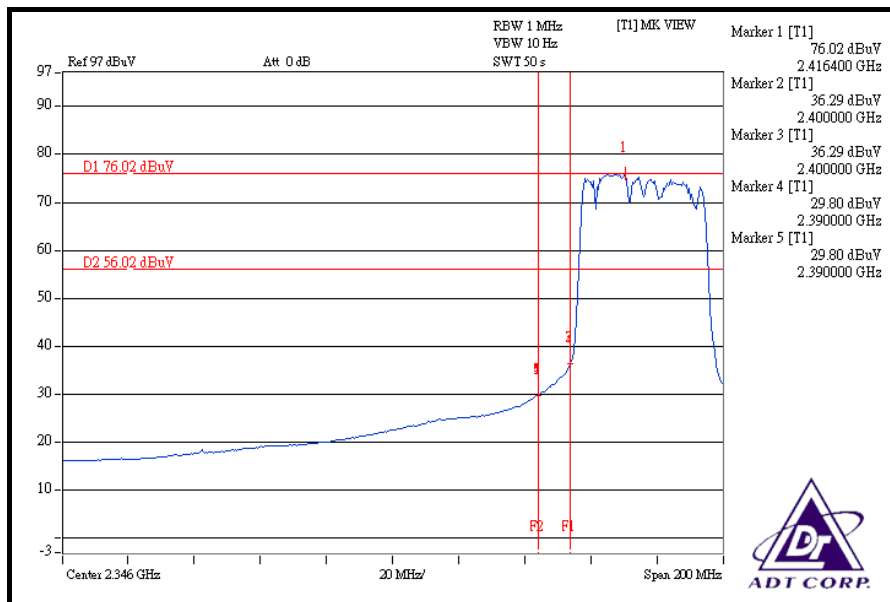
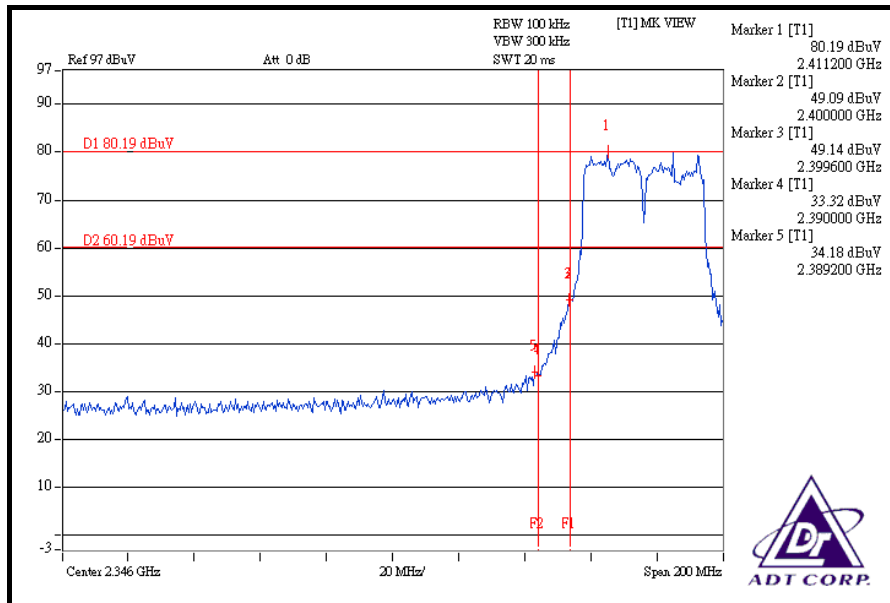
## DRAFT 802.11n (40MHz) OFDM MODULATION

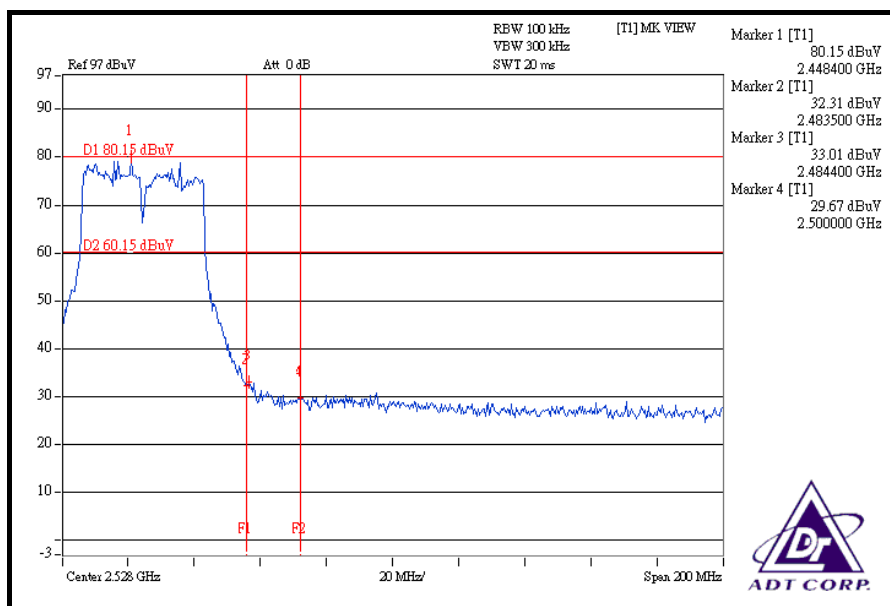
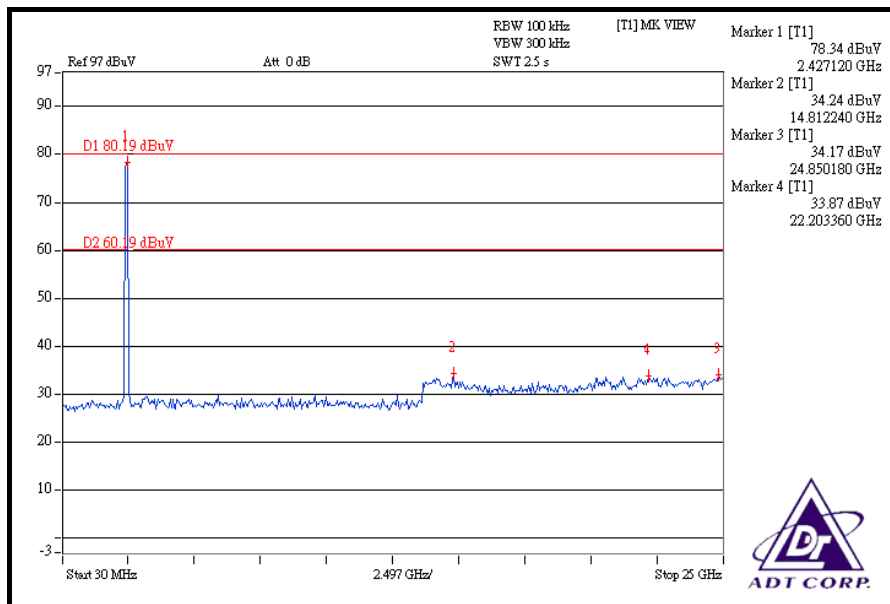
**NOTE 1:** The band edge emission plot on the next page shows 46.01dBc between carrier maximum power and local maximum emission in restrict band (2.38920GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 108.71dBuV/m (Peak), so the maximum field strength in restrict band is  $108.71 - 46.01 = 62.70$ dBuV/m which is under 74dBuV/m limit.

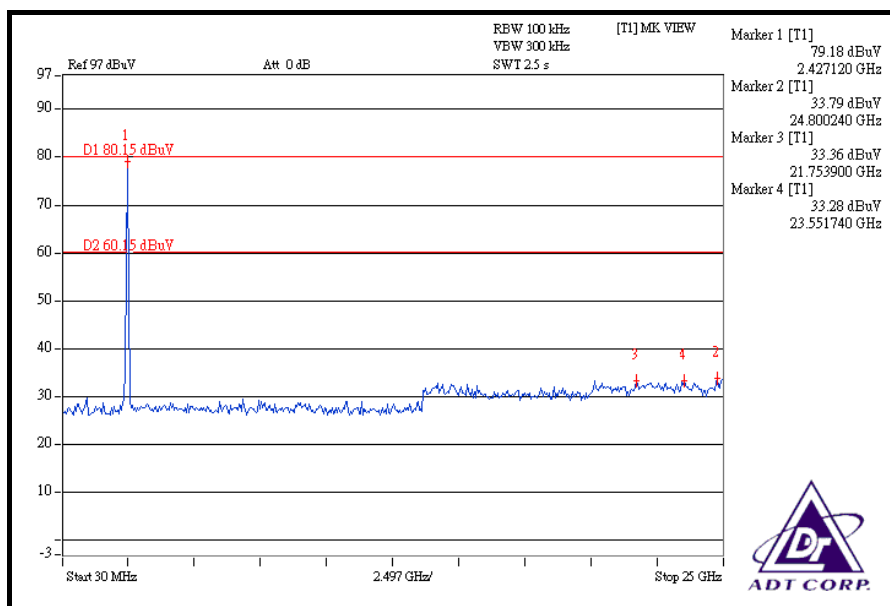
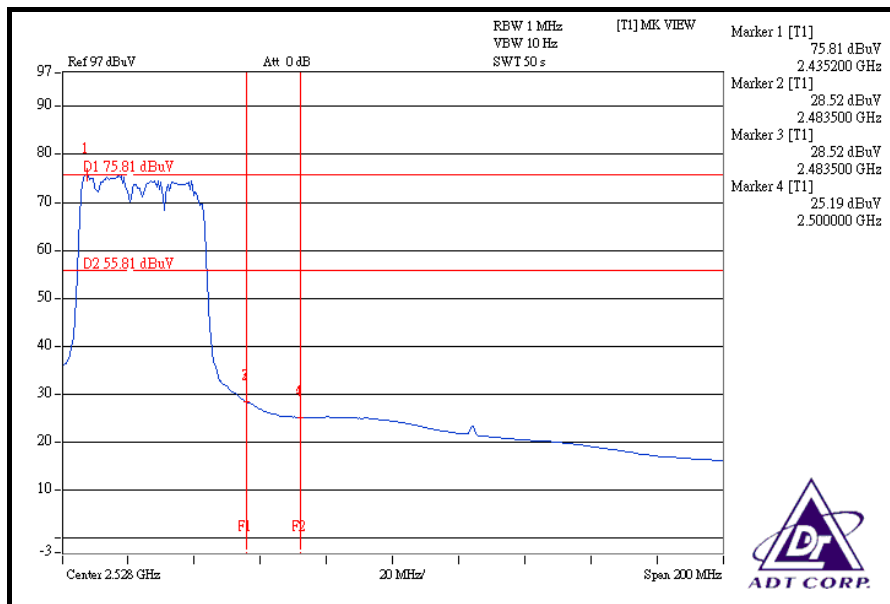
The band edge emission plot of on the next page shows 46.22dBc between carrier maximum power and local maximum emission in restrict band (2.39000GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 98.26dBuV/m (Average), so the maximum field strength in restrict band is  $98.26 - 46.22 = 52.04$ dBuV/m which is under 54dBuV/m limit.

**NOTE 2:** The band edge emission plot on the next second page shows 47.14dBc between carrier maximum power and local maximum emission in restrict band (2.48440GHz). The emission of carrier strength list in the test result of channel 7 at the item 4.2.7 is 109.84dBuV/m (Peak), so the maximum field strength in restrict band is  $109.84 - 47.14 = 62.70$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 47.29dBc 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 7 at the item 4.2.7 is 100.28dBuV/m (Average), so the maximum field strength in restrict band is  $100.28 - 47.29 = 52.99$ dBuV/m which is under 54dBuV/m limit.









## **4.7 ANTENNA REQUIREMENT**

### **4.7.1 STANDARD APPLICABLE**

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

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

### **4.7.2 ANTENNA CONNECTED CONSTRUCTION**

The antenna used in this product is Dipole antenna with R-SMA connector. The maximum Gain of the antenna is 2dBi.

## 5. TEST TYPES AND RESULTS (FOR 5.0GHz BAND)

### 5.1 RADIATED EMISSION MEASUREMENT

#### 5.1.1 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.

## 5.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Jul. 27, 2008
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Aug. 05, 2008
BILOG Antenna SCHWARZBECK	VULB9168	9168-153	Jan. 03, 2009
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Jul. 30, 2008
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Jan. 06, 2009
Preamplifier Agilent	8449B	3008A01910	Sep. 19, 2008
Preamplifier Agilent	8447D	2944A10638	Dec. 19, 2008
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	274039/223650	Nov. 07, 2008
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 09, 2008
Software	ADT_Radiated_V7.6	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA
Turn Table EMCO	2087-2.03	NA	NA
Antenna Tower & Turn Table Controller EMCO	2090	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	07026401	Apr. 23, 2008

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. The test was performed in HwaYa Chamber 9.
  3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
  4. The IC Site Registration No. is IC3789B-9.

### 5.1.3 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.

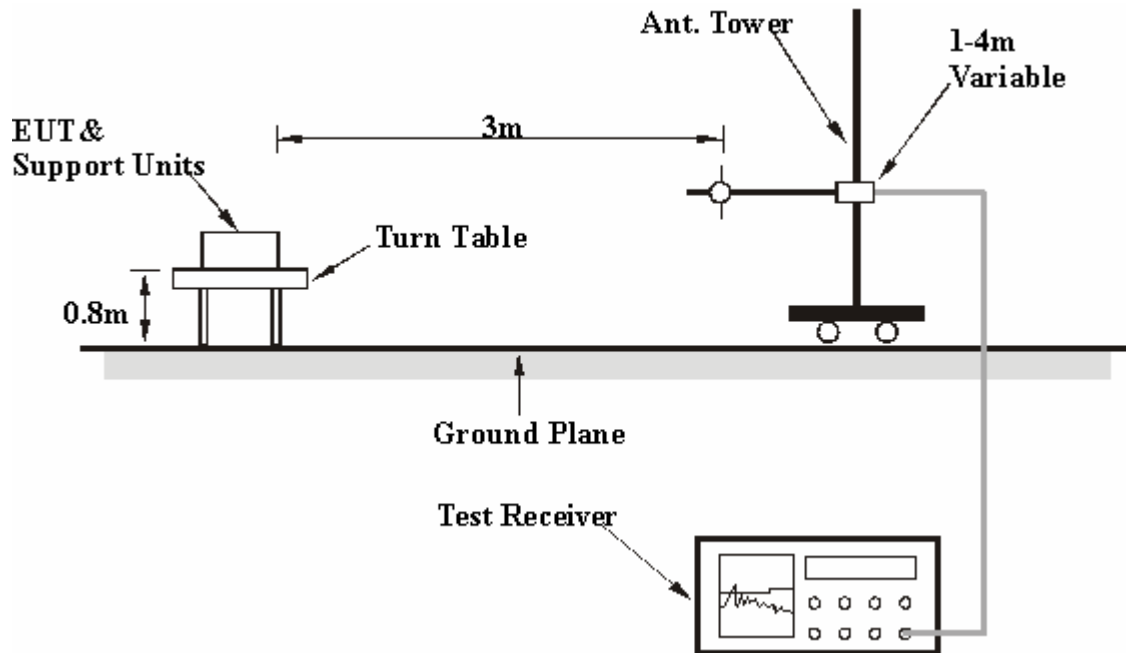
**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection 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.

### 5.1.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.1.5 TEST SETUP



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

### 5.1.6 EUT OPERATING CONDITIONS

Same as 4.1.6

## 5.1.7 TEST RESULTS

### 802.11a OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5725.00	56.20 PK	74.97	-18.77	1.15 H	48	16.59	39.61
2	5725.00	40.93 AV	64.10	-23.17	1.15 H	48	1.32	39.61
3	*5745.00	94.97 PK			1.15 H	48	55.31	39.66
4	*5745.00	84.10 AV			1.15 H	48	44.44	39.66
5	#11490.00	60.34 PK	74.00	-13.66	1.00 H	104	10.60	49.74
6	#11490.00	47.15 AV	54.00	-6.85	1.00 H	104	-2.59	49.74
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	5725.00	76.81 PK	87.45	-10.64	1.14 V	213	37.20	39.61
2	5725.00	58.00 AV	76.97	-18.97	1.14 V	213	18.39	39.61
3	*5745.00	107.45 PK			1.14 V	213	67.79	39.66
4	*5745.00	96.97 AV			1.14 V	213	57.31	39.66
5	#7660.00	54.23 PK	74.00	-19.77	1.01 V	130	9.18	45.05
6	#7660.00	45.38 AV	54.00	-8.62	1.01 V	130	0.33	45.05
7	#11490.00	60.56 PK	74.00	-13.44	1.14 V	20	10.81	49.74
8	#11490.00	47.32 AV	54.00	-6.68	1.14 V	20	-2.43	49.74

- 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.
  6. “ # ”: The radiated frequency falling in the restricted band.
  7. The limit value is defined as per 15.247.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	95.78 PK			1.20 H	166	56.03	39.75
2	*5785.00	85.63 AV			1.20 H	166	45.88	39.75
3	#11570.00	60.25 PK	74.00	-13.75	1.06 H	258	10.56	49.69
4	#11570.00	47.38 AV	54.00	-6.62	1.06 H	258	-2.31	49.69
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	*5785.00	108.42 PK			1.42 V	339	68.67	39.75
2	*5785.00	97.85 AV			1.42 V	339	58.10	39.75
3	#7712.00	54.32 PK	74.00	-19.68	1.00 V	67	9.17	45.15
4	#7712.00	45.68 AV	54.00	-8.32	1.00 V	67	0.53	45.15
5	#11570.00	60.75 PK	74.00	-13.25	1.05 V	357	11.06	49.69
6	#11570.00	47.51 AV	54.00	-6.49	1.05 V	357	-2.18	49.69

- 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.
  6. “ # ”: The radiated frequency falling in the restricted band.
  7. The limit value is defined as per 15.247.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	94.86 PK			1.01 H	129	55.01	39.85
2	*5825.00	84.27 AV			1.01 H	129	44.42	39.85
3	5850.00	53.84 PK	74.86	-21.02	1.01 H	129	13.92	39.91
4	5850.00	42.77 AV	64.27	-21.50	1.01 H	129	2.85	39.91
5	#11650.00	60.21 PK	74.00	-13.79	1.08 H	328	10.53	49.68
6	#11650.00	47.60 AV	54.00	-6.40	1.08 H	328	-2.08	49.68
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	*5825.00	107.37 PK			1.43 V	0	67.52	39.85
2	*5825.00	97.04 AV			1.43 V	0	57.19	39.85
3	5850.00	63.48 PK	87.37	-23.89	1.43 V	0	23.57	39.91
4	5850.00	46.98 AV	77.04	-30.06	1.43 V	0	7.07	39.91
5	7766.00	54.38 PK	87.37	-32.99	1.00 V	124	9.13	45.25
6	7766.00	45.67 AV	77.04	-31.37	1.00 V	124	0.42	45.25
7	#11650.00	60.57 PK	74.00	-13.43	1.00 V	266	10.89	49.68
8	#11650.00	47.85 AV	54.00	-6.15	1.00 V	266	-1.83	49.68

- 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.
  6. “ # “: The radiated frequency falling in the restricted band.
  7. The limit value is defined as per 15.247.

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5725.00	62.58 PK	77.86	-15.28	1.49 H	176	22.97	39.61
2	5725.00	44.27 AV	67.87	-23.60	1.49 H	176	4.66	39.61
3	*5745.00	97.86 PK			1.49 H	176	58.20	39.66
4	*5745.00	87.87 AV			1.49 H	176	48.21	39.66
5	#11490.00	61.43 PK	74.00	-12.57	1.11 H	250	11.69	49.74
6	#11490.00	48.90 AV	54.00	-5.10	1.11 H	250	-0.84	49.74

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	5725.00	73.13 PK	90.92	-17.79	1.33 V	19	33.52	39.61
2	5725.00	53.73 AV	80.65	-26.92	1.33 V	19	14.12	39.61
3	*5745.00	110.92 PK			1.33 V	19	71.26	39.66
4	*5745.00	100.65 AV			1.33 V	19	60.99	39.66
5	#7660.00	57.35 PK	74.00	-16.65	1.25 V	67	12.30	45.05
6	#7660.00	48.59 AV	54.00	-5.41	1.25 V	67	3.54	45.05
7	#11490.00	61.60 PK	74.00	-12.40	1.01 V	236	11.86	49.74
8	#11490.00	48.24 AV	54.00	-5.76	1.01 V	236	-1.50	49.74

- 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.
  6. “ # ”: The radiated frequency falling in the restricted band.
  7. The limit value is defined as per 15.247.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	97.02 PK			1.22 H	219	57.27	39.75
2	*5785.00	87.16 AV			1.22 H	219	47.41	39.75
3	#11570.00	61.32 PK	74.00	-12.68	1.06 H	348	11.63	49.69
4	#11570.00	47.88 AV	54.00	-6.12	1.06 H	348	-1.81	49.69
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	*5785.00	109.25 PK			1.47 V	313	69.50	39.75
2	*5785.00	99.60 AV			1.47 V	313	59.85	39.75
3	#7712.00	57.34 PK	74.00	-16.66	1.43 V	274	12.19	45.15
4	#7712.00	51.13 AV	54.00	-2.87	1.43 V	274	5.98	45.15
5	#11570.00	61.58 PK	74.00	-12.42	1.51 V	103	11.89	49.69
6	#11570.00	48.06 AV	54.00	-5.94	1.51 V	103	-1.63	49.69

- 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.
  6. “ # “: The radiated frequency falling in the restricted band.
  7. The limit value is defined as per 15.247.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	98.35 PK			1.23 H	33	58.50	39.85
2	*5825.00	88.28 AV			1.23 H	33	48.43	39.85
3	5850.00	50.19 PK	78.35	-28.16	1.23 H	33	10.27	39.91
4	5850.00	36.26 AV	68.28	-32.02	1.23 H	33	-3.66	39.91
5	#11650.00	61.42 PK	74.00	-12.58	1.00 H	82	11.74	49.68
6	#11650.00	48.28 AV	54.00	-5.72	1.00 H	82	-1.40	49.68
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	*5825.00	111.31 PK			1.30 V	359	71.46	39.85
2	*5825.00	101.09 AV			1.30 V	359	61.24	39.85
3	5850.00	64.25 PK	91.31	-27.06	1.30 V	359	24.33	39.91
4	5850.00	45.34 AV	81.09	-35.75	1.30 V	359	5.42	39.91
5	7766.00	57.13 PK	91.31	-34.18	1.22 V	275	11.88	45.25
6	7766.00	49.62 AV	81.09	-31.47	1.22 V	275	4.37	45.25
7	#11650.00	61.58 PK	74.00	-12.42	1.29 V	105	11.90	49.68
8	#11650.00	48.41 AV	54.00	-5.59	1.29 V	105	-1.27	49.68

- 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.
  6. “ # ”: The radiated frequency falling in the restricted band.
  7. The limit value is defined as per 15.247.

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 151	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5725.00	66.18 PK	77.26	-11.08	1.39 H	297	26.57	39.61
2	5725.00	42.15 AV	66.42	-24.27	1.39 H	297	2.54	39.61
3	*5755.00	97.26 PK			1.07 H	258	57.58	39.68
4	*5755.00	86.42 AV			1.07 H	258	46.74	39.68
5	#11510.00	59.27 PK	74.00	-14.73	1.09 H	350	9.55	49.72
6	#11510.00	46.35 AV	54.00	-7.65	1.09 H	350	-3.37	49.72
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	5725.00	79.25 PK	88.05	-8.80	1.31 V	18	39.64	39.61
2	5725.00	56.16 AV	77.32	-21.16	1.31 V	18	16.55	39.61
3	*5755.00	108.05 PK			1.31 V	18	68.37	39.68
4	*5755.00	97.32 AV			1.31 V	18	57.64	39.68
5	#7672.00	54.27 PK	74.00	-19.73	1.16 V	131	9.20	45.07
6	#7672.00	45.11 AV	54.00	-8.89	1.16 V	131	0.04	45.07
7	#11510.00	59.53 PK	74.00	-14.47	1.32 V	258	9.80	49.72
8	#11510.00	46.56 AV	54.00	-7.44	1.32 V	258	-3.17	49.72

- 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.
  6. “ # ”: The radiated frequency falling in the restricted band.
  7. The limit value is defined as per 15.247.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 159	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	97.33 PK			1.11 H	315	57.55	39.78
2	*5795.00	86.57 AV			1.11 H	315	46.79	39.78
3	5850.00	59.82 PK	77.33	-17.51	1.11 H	315	19.91	39.91
4	5850.00	43.67 AV	66.57	-22.90	1.11 H	315	3.76	39.91
5	#11590.00	59.76 PK	74.00	-14.24	1.00 H	16	10.08	49.68
6	#11590.00	46.43 AV	54.00	-7.57	1.00 H	16	-3.25	49.68
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	*5795.00	108.11 PK			1.32 V	349	68.33	39.78
2	*5795.00	97.83 AV			1.32 V	349	58.05	39.78
3	5850.00	61.23 PK	88.11	-26.88	1.32 V	349	21.32	39.91
4	5850.00	45.52 AV	77.83	-32.31	1.32 V	349	5.61	39.91
5	#7726.00	58.59 PK	74.00	-15.41	1.25 V	187	13.41	45.18
6	#7726.00	53.08 AV	54.00	-0.92	1.25 V	187	7.90	45.18
7	#11590.00	60.03 PK	74.00	-13.97	1.35 V	106	10.35	49.68
8	#11590.00	46.99 AV	54.00	-7.01	1.35 V	106	-2.69	49.68

- 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.
  6. “ # “: The radiated frequency falling in the restricted band.
  7. The limit value is defined as per 15.247.



**BELOW 1GHz WORST-CASE DATA : DRAFT 802.11n (20MHz) OFDM MODULATION**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH 993hPa	TESTED BY	Lori Chiu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	500.42	43.57 QP	46.00	-2.43	1.50 H	208	24.46	19.12
2	566.52	43.32 QP	46.00	-2.68	1.50 H	226	22.61	20.71
3	599.58	38.52 QP	46.00	-7.48	1.50 H	232	17.02	21.50
4	700.68	37.77 QP	46.00	-8.23	1.00 H	223	15.27	22.50
5	811.50	38.74 QP	46.00	-7.26	1.00 H	169	13.70	25.03
6	933.99	37.13 QP	46.00	-8.87	2.00 H	340	10.96	26.17
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	31.79 QP	40.00	-8.21	1.00 V	241	18.40	13.39
2	109.62	40.79 QP	43.50	-2.71	1.00 V	214	30.30	10.49
3	166.00	34.82 QP	43.50	-8.68	1.00 V	193	21.58	13.24
4	500.42	37.11 QP	46.00	-8.89	1.00 V	310	18.00	19.12
5	566.52	39.71 QP	46.00	-6.29	1.00 V	112	18.99	20.71
6	766.79	38.59 QP	46.00	-7.41	1.50 V	28	14.46	24.13
7	799.84	37.49 QP	46.00	-8.51	2.00 V	31	12.57	24.92
8	933.99	41.95 QP	46.00	-4.05	1.00 V	205	15.77	26.17

- 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.
  6. “ # “: The radiated frequency falling in the restricted band.
  7. The limit value is defined as per 15.247.

## 5.2 CONDUCTED EMISSION MEASUREMENT

### 5.2.1 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 0.50MHz.
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.

### 5.2.2 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.

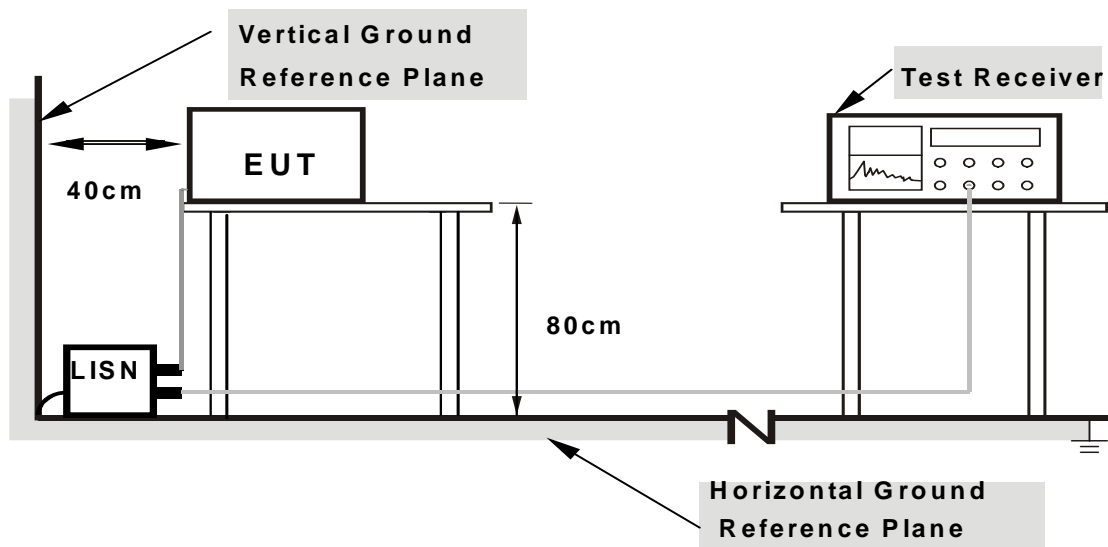
### 5.2.3 TEST PROCEDURES

- 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.

### 5.2.4 DEVIATION FROM TEST STANDARD

No deviation

## 5.2.5 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).

## 5.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

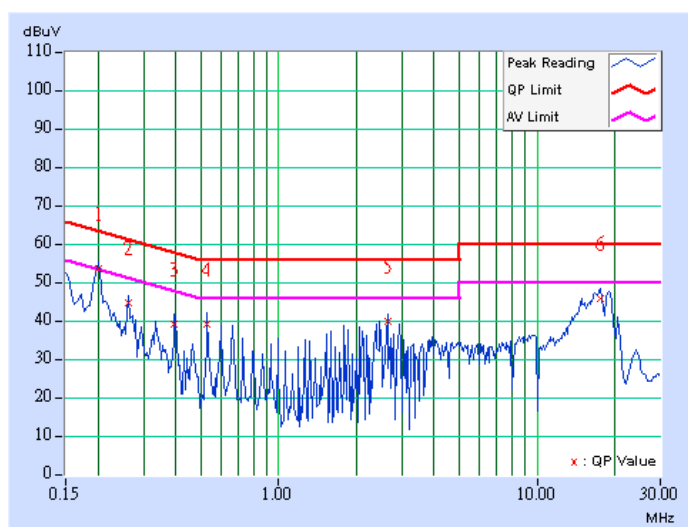
## 5.2.7 TEST RESULTS

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	PHASE	Line 1
MODULATION TYPE	BPSK	INPUT POWER (SYSTEM)	120Vac, 60Hz
TRANSFER RATE	7.2Mbps	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 988hPa	TESTED BY	Match Tsui

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.201	0.10	53.28	-	53.38	-	63.58	53.58	-10.20	-
2	0.263	0.10	44.47	-	44.57	-	61.33	51.33	-16.76	-
3	0.396	0.10	38.84	-	38.94	-	57.93	47.93	-18.99	-
4	0.529	0.10	38.73	-	38.83	-	56.00	46.00	-17.17	-
5	2.656	0.24	39.29	-	39.53	-	56.00	46.00	-16.47	-
6	17.703	0.53	45.43	-	45.96	-	60.00	50.00	-14.04	-

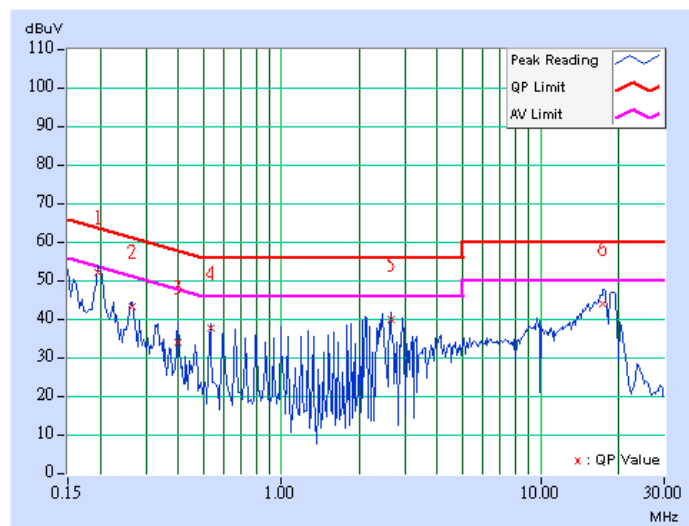
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = 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 157	PHASE	Line 2
MODULATION TYPE	BPSK	INPUT POWER (SYSTEM)	120Vac, 60Hz
TRANSFER RATE	7.2Mbps	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 988hPa	TESTED BY	Match Tsui

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.10	51.75	-	51.85	-	63.74	53.74	-11.89	-
2	0.267	0.10	42.78	-	42.88	-	61.20	51.20	-18.32	-
3	0.400	0.10	33.48	-	33.58	-	57.85	47.85	-24.27	-
4	0.533	0.12	37.34	-	37.46	-	56.00	46.00	-18.54	-
5	2.656	0.24	39.59	-	39.83	-	56.00	46.00	-16.17	-
6	17.434	0.52	43.49	-	44.01	-	60.00	50.00	-15.99	-

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





### 5.3 6dB BANDWIDTH MEASUREMENT

#### 5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

#### 5.3.2 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.

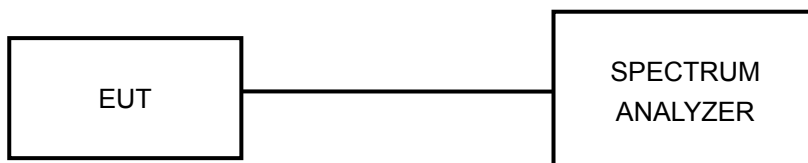
#### 5.3.3 TEST PROCEDURE

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.

#### 5.3.4 DEVIATION FROM TEST STANDARD

No deviation

#### 5.3.5 TEST SETUP



#### 5.3.6 EUT OPERATING CONDITIONS

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

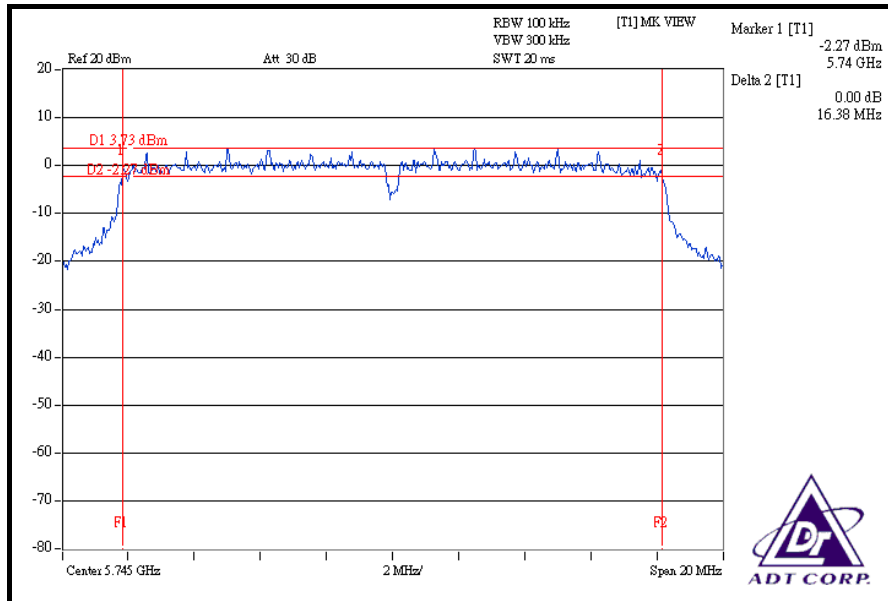
### 5.3.7 TEST RESULTS

#### 802.11a OFDM MODULATION

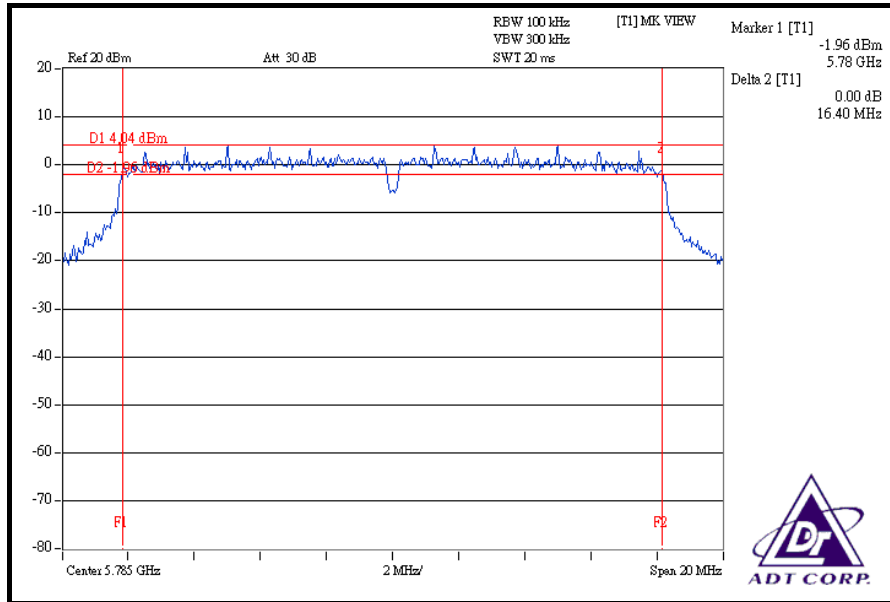
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg.C, 65 %RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	16.38	0.5	PASS
157	5785	16.40	0.5	PASS
165	5825	16.39	0.5	PASS

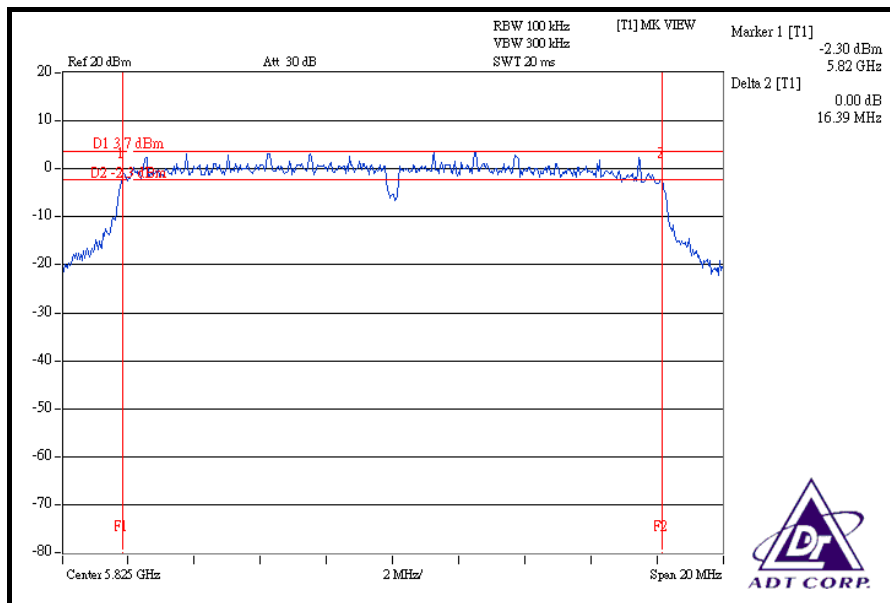
#### CH 149



### CH 157



### CH 165



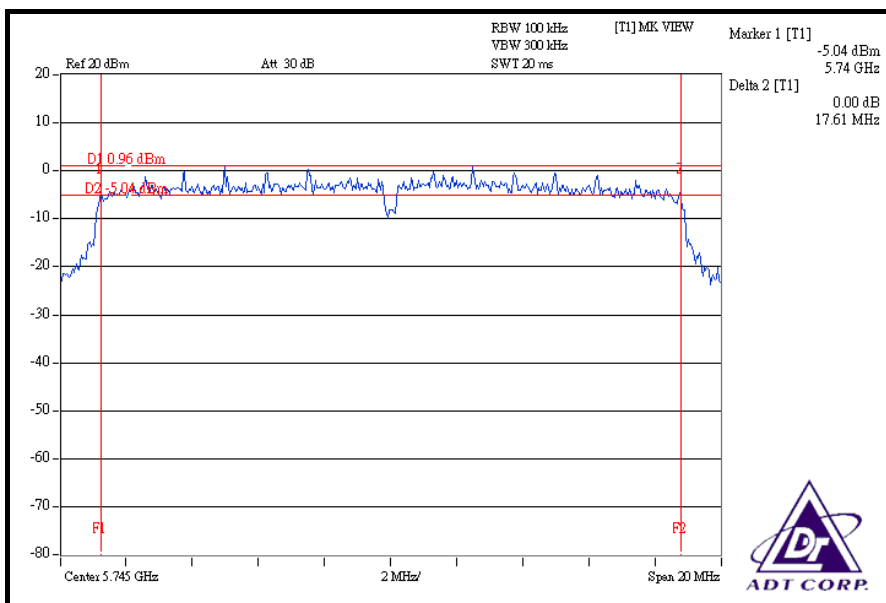


**DRAFT 802.11n (20MHz) OFDM MODULATION**

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

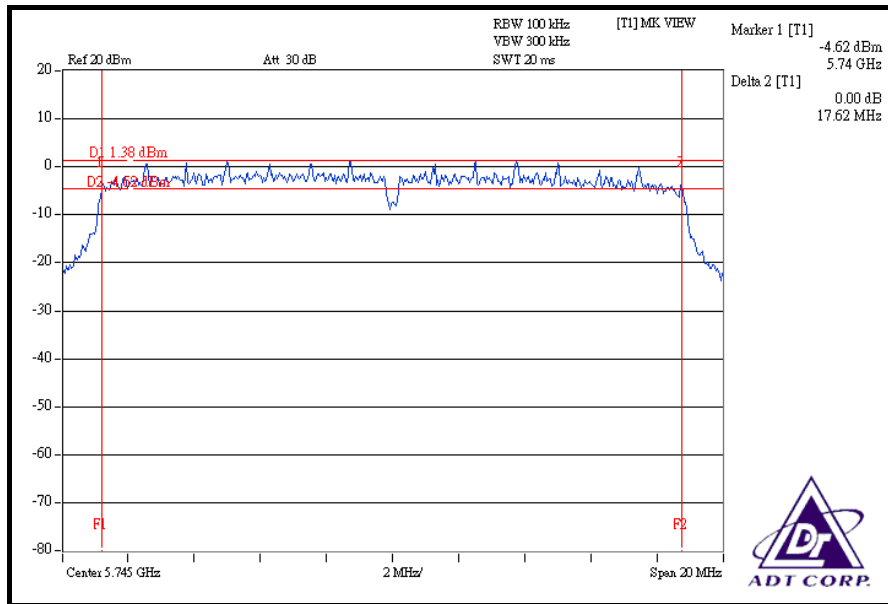
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	17.61	17.62	0.5	PASS
157	5785	17.37	17.59	0.5	PASS
165	5825	17.35	17.60	0.5	PASS

**FOR CHAIN 0: CH 149**

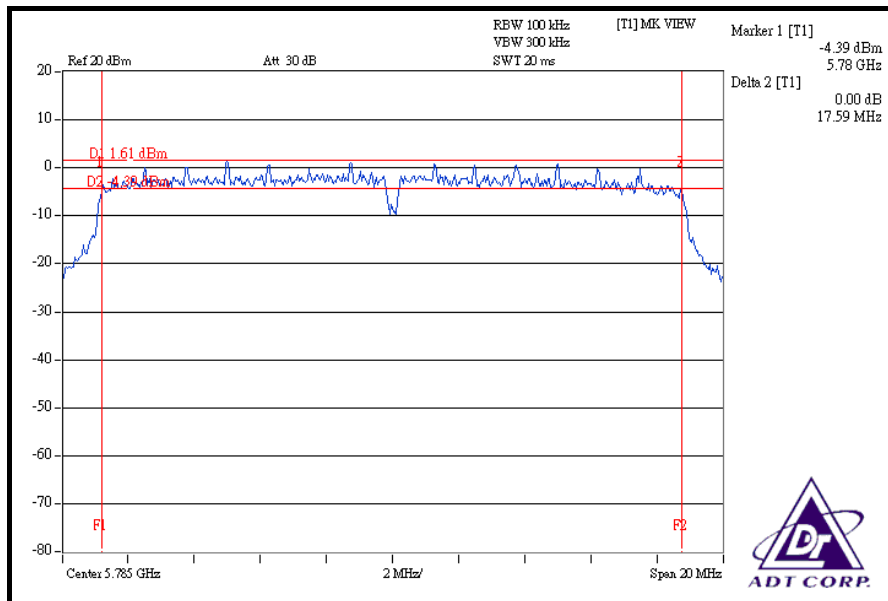




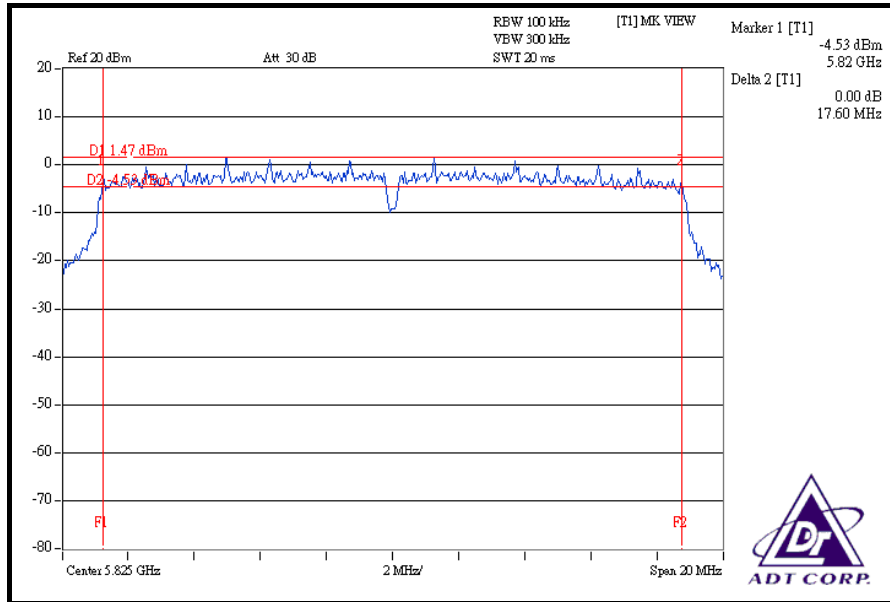
### FOR CHAIN 1: CH 149



### CH 157



### CH 165



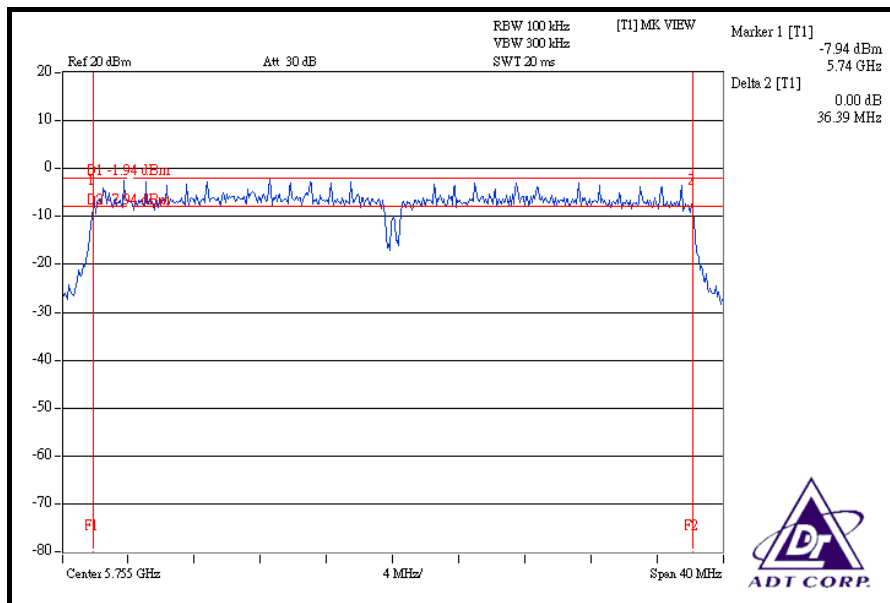


**DRAFT 802.11n (40MHz) OFDM MODULATION**

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

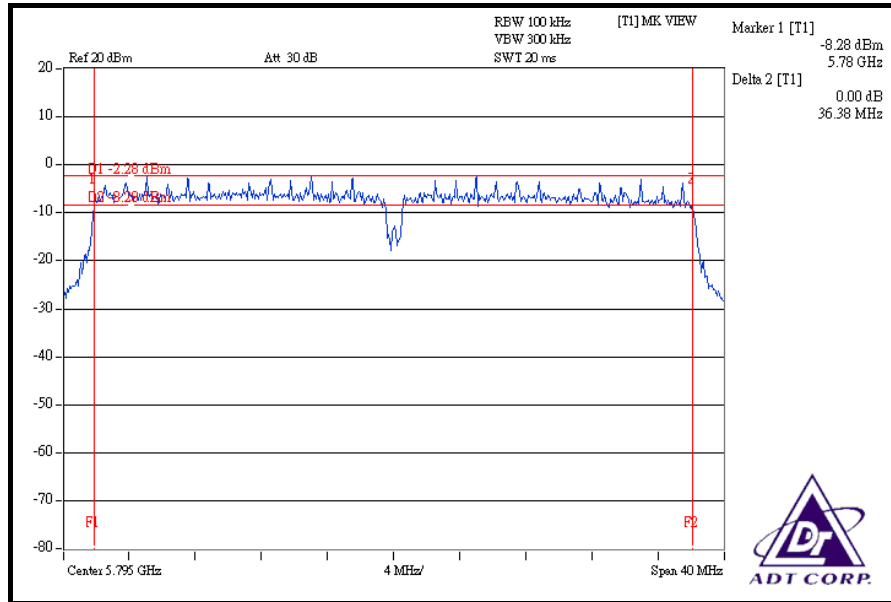
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
151	5755	36.39	36.41	0.5	PASS
159	5795	36.27	36.38	0.5	PASS

**FOR CHAIN 0: CH 151**





### CH 159





## 5.4 MAXIMUM PEAK OUTPUT POWER

### 5.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

### 5.4.2 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.

### 5.4.3 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.

#### 5.4.4 DEVIATION FROM TEST STANDARD

No deviation

#### 5.4.5 TEST SETUP



#### 5.4.6 EUT OPERATING CONDITIONS

Same as Item 5.3.6



## 5.4.7 TEST RESULTS

### 802.11a OFDM MODULATION

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg.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
149	5745	79.983	19.03	30	PASS
157	5785	90.365	19.56	30	PASS
165	5825	79.799	19.02	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, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg.C, 65 %RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
149	5745	16.03	17.53	96.711	19.85	30	PASS
157	5785	16.59	17.55	102.489	20.11	30	PASS
165	5825	16.51	17.52	101.265	20.05	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, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg.C, 65 %RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
151	5755	16.57	16.14	86.509	19.37	30	PASS
159	5795	16.55	16.00	84.996	19.29	30	PASS



## 5.5 POWER SPECTRAL DENSITY MEASUREMENT

### 5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 5.5.2 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.

### 5.5.3 TEST PROCEDURE

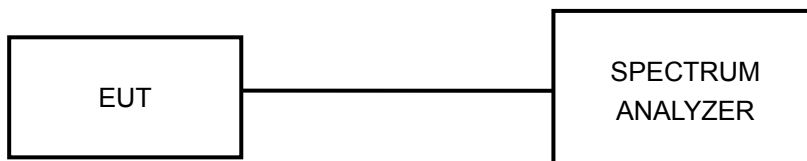
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

#### 5.5.4 DEVIATION FROM TEST STANDARD

No deviation

#### 5.5.5 TEST SETUP



#### 5.5.6 EUT OPERATING CONDITION

Same as Item 5.3.6

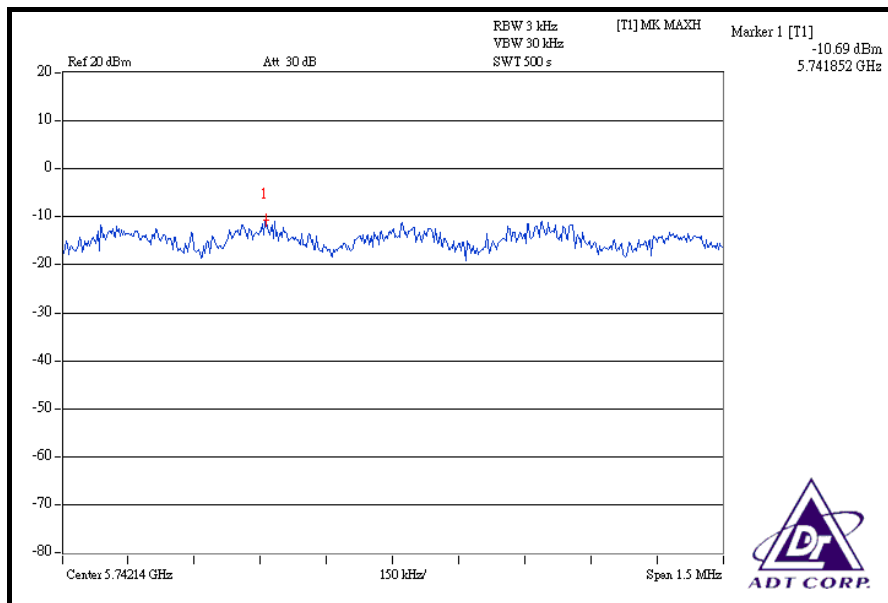
## 5.5.7 TEST RESULTS

### 802.11a OFDM MODULATION

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6.0Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg.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
149	5745	-10.69	8	PASS
157	5785	-10.08	8	PASS
165	5825	-10.85	8	PASS

### CH 149





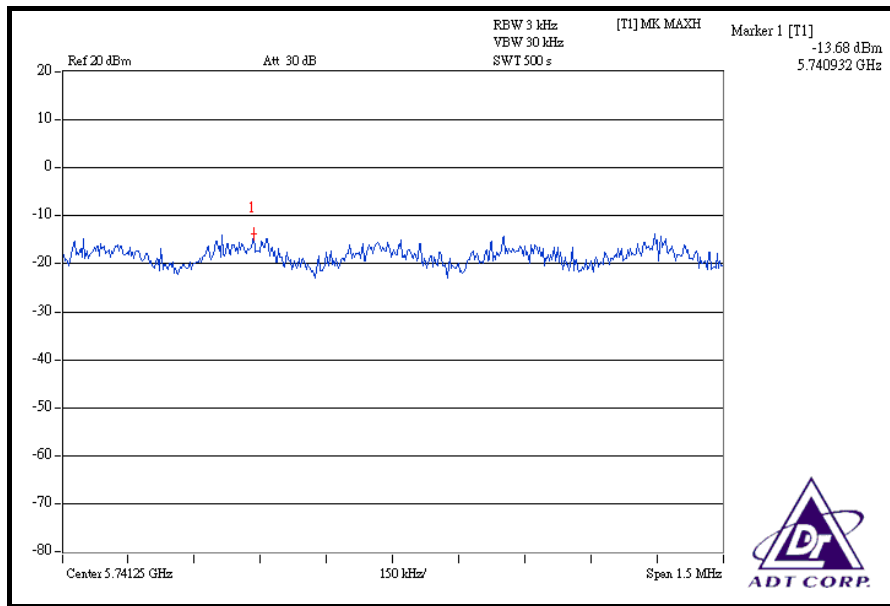


**DRAFT 802.11n (20MHz) OFDM MODULATION**

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

CHAN.	CHAN. FREQ. (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
149	5745	-13.68	-11.14	0.120	-9.22	8	PASS
157	5785	-13.60	-11.38	0.116	-9.34	8	PASS
165	5825	-13.49	-11.38	0.118	-9.30	8	PASS

**FOR CHAIN 0: CH 149**





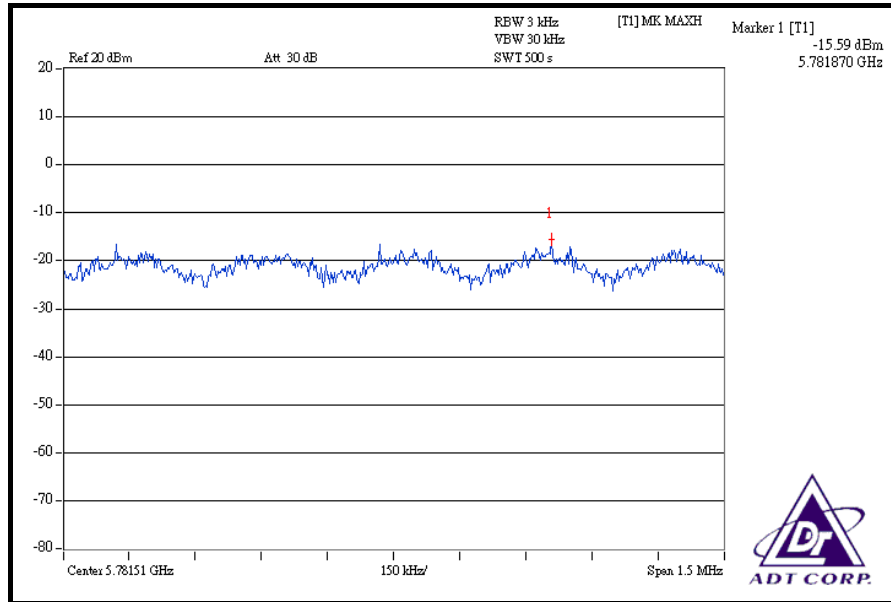








### CH 159





## 5.6 BAND EDGES MEASUREMENT

### 5.6.1 LIMITS OF BAND EDGES MEASUREMENT

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

### 5.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
<b>FOR CONDUCTED MEASUREMENT:</b>			
R&S SPECTRUM ANALYZER	FSP40	100040	Jun. 28, 2008
<b>FOR RADIATED MEASUREMENT:</b>			
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Jul. 27, 2008
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Aug. 05, 2008
BILOG Antenna SCHWARZBECK	VULB9168	9168-153	Jan. 03, 2009
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Jul. 30, 2008
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Jan. 06, 2009
Preamplifier Agilent	8449B	3008A01910	Sep. 19, 2008
Preamplifier Agilent	8447D	2944A10638	Dec. 19, 2008
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	274039/223650	Nov. 07, 2008
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 09, 2008
Software	ADT_Radiated_V7.6	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA
Turn Table EMCO	2087-2.03	NA	NA
Antenna Tower & Turn Table Controller EMCO	2090	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	07026401	Apr. 23, 2008

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

### 5.6.3 TEST PROCEDURE

#### FOR CONDUCTED MEASUREMENT:

The transmitter output was connected to the spectrum analyzer via a low loss 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.

#### FOR RADIATED MEASUREMENT:

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

**NOTE:** The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.

#### 5.6.4 DEVIATION FROM TEST STANDARD

No deviation

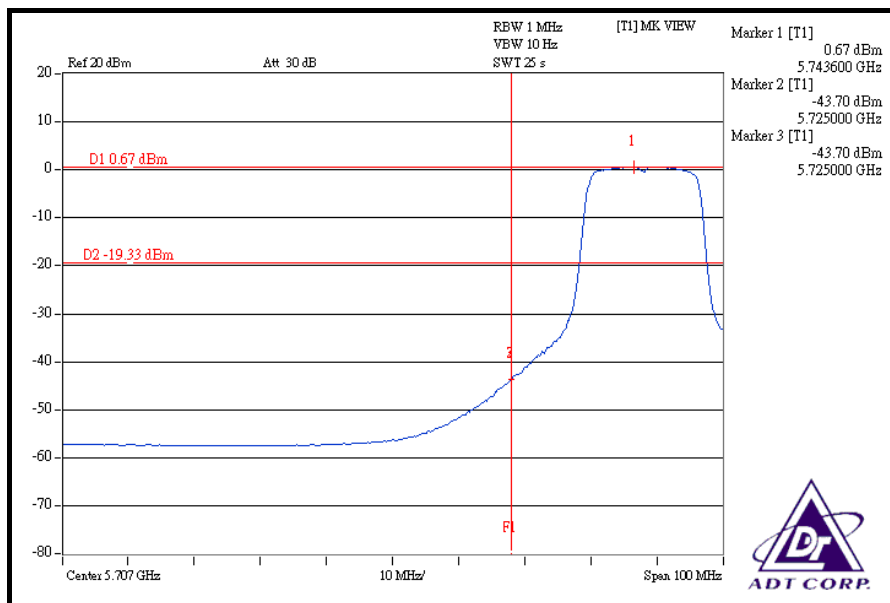
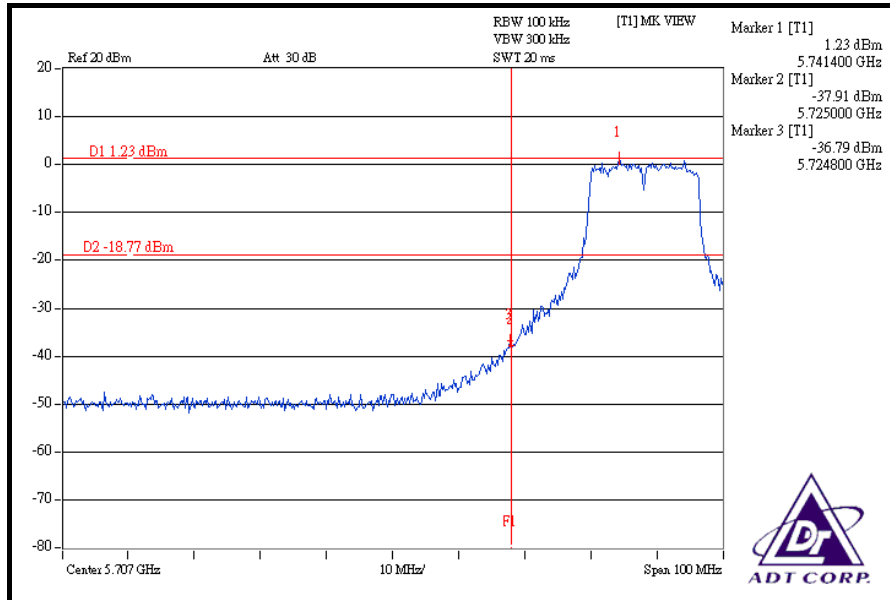
#### 5.6.5 EUT OPERATING CONDITION

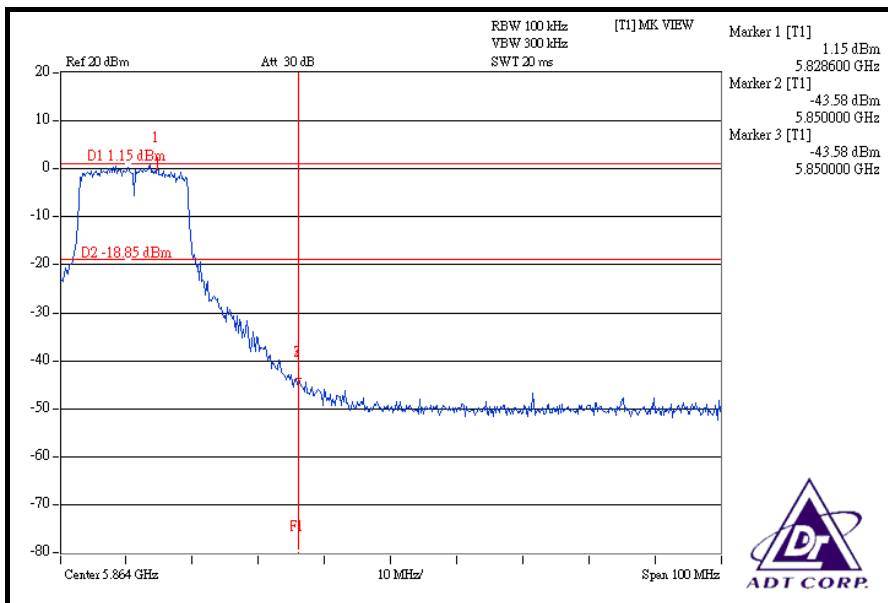
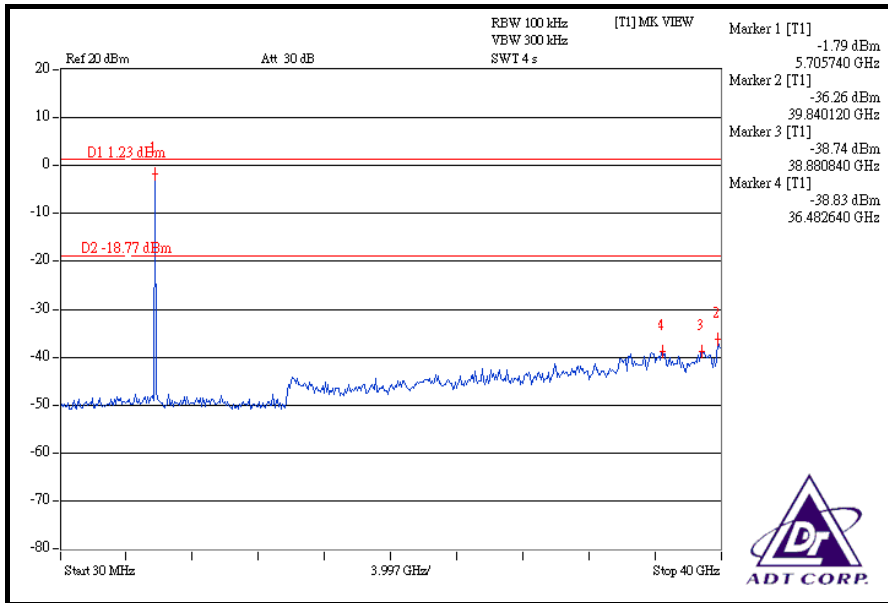
Same as Item 5.3.6

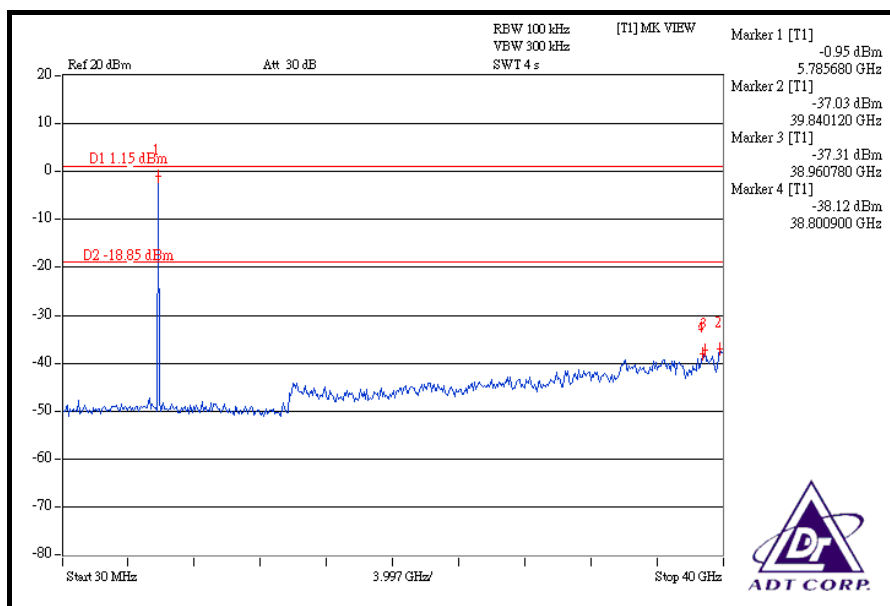
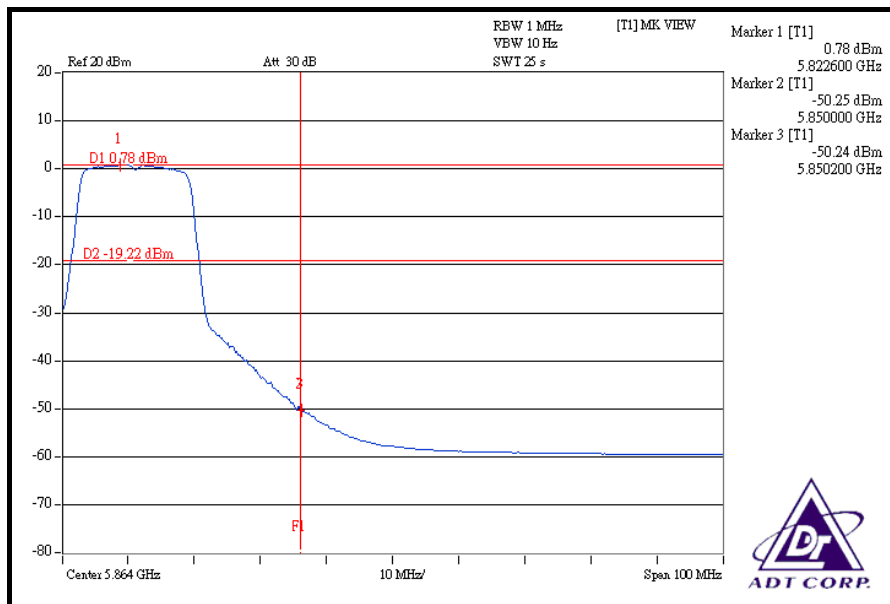
#### 5.6.6 TEST RESULTS

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

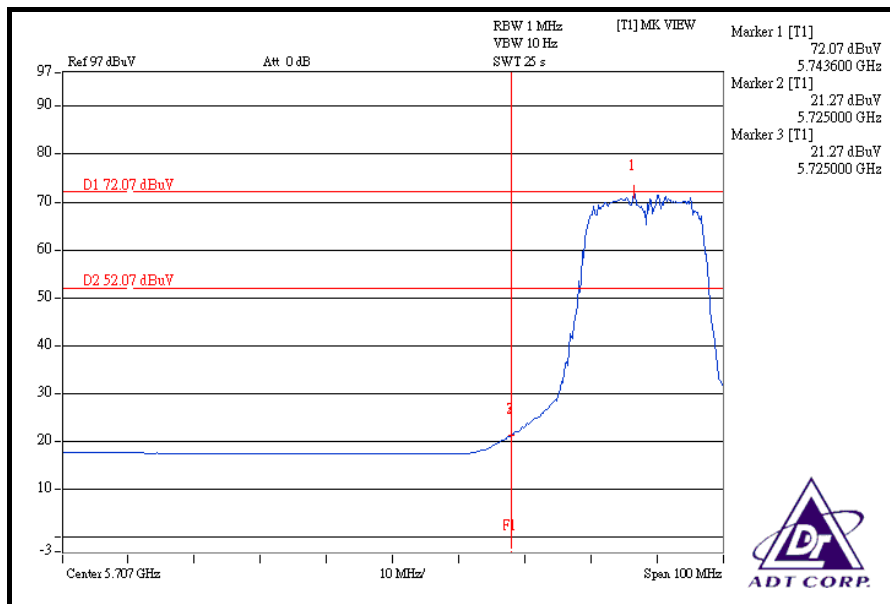
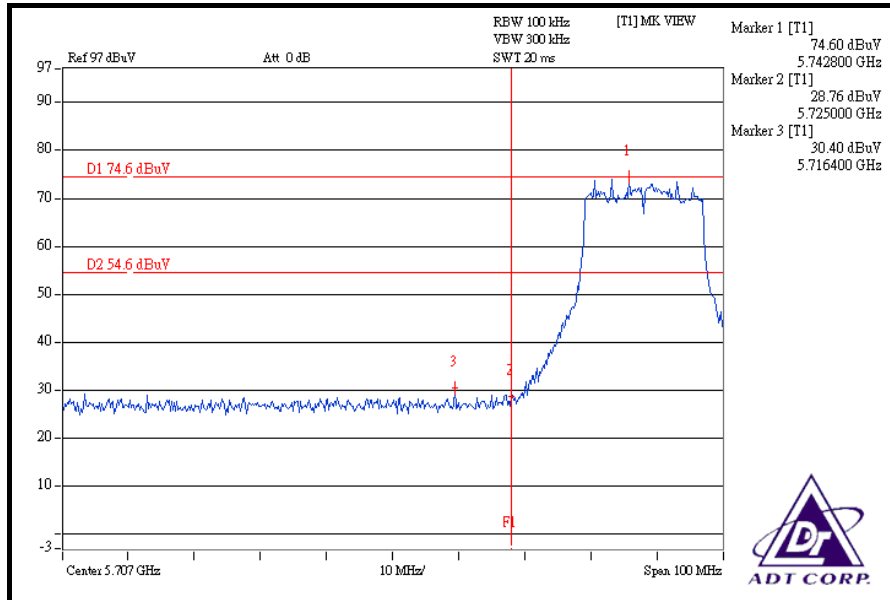
### 802.11a OFDM MODULATION

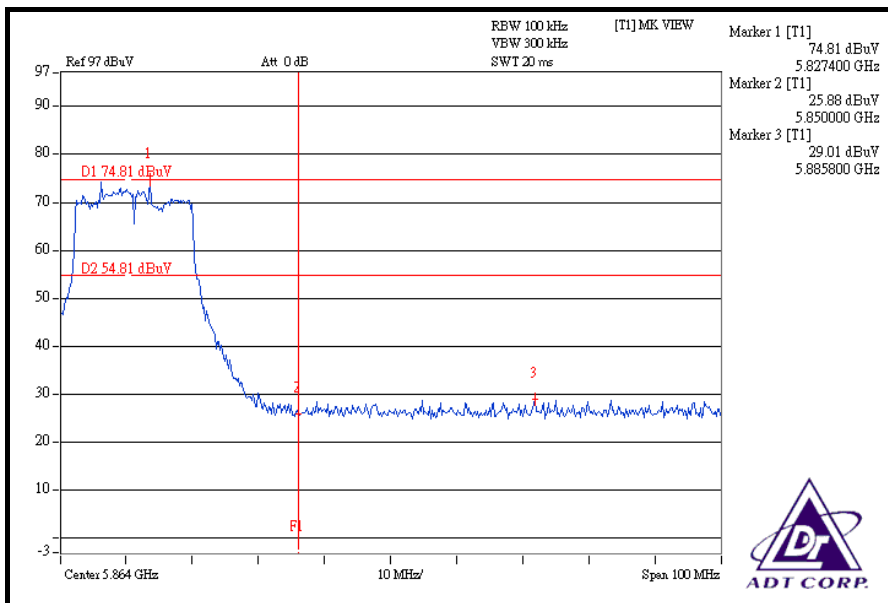
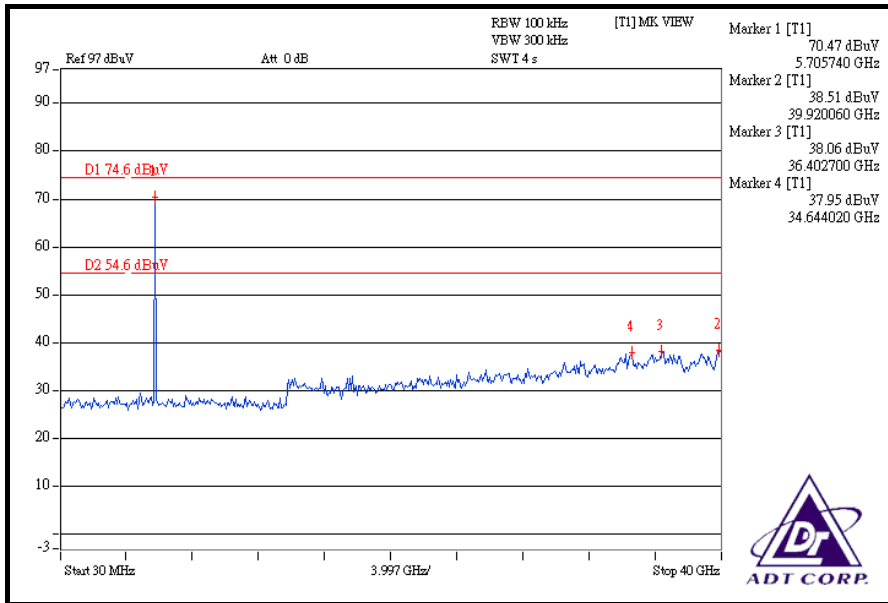


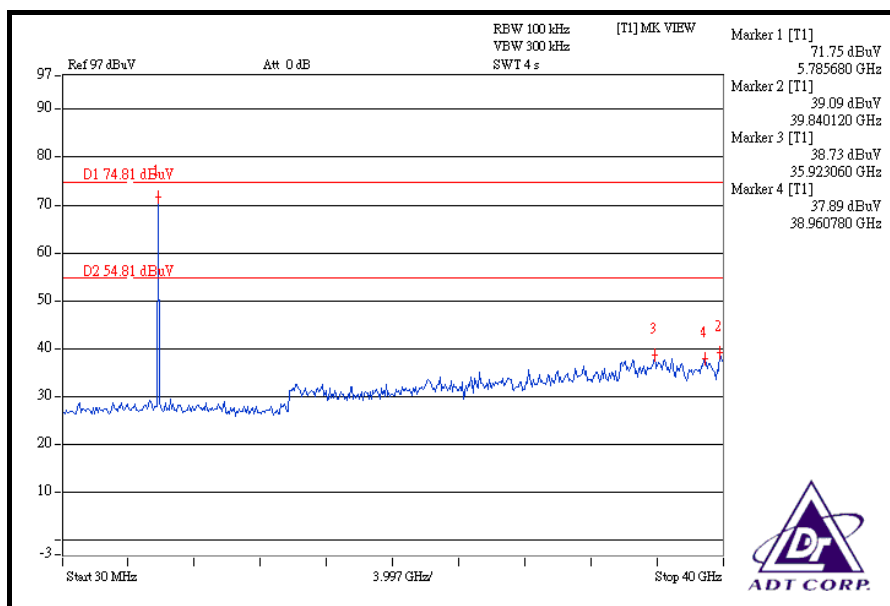
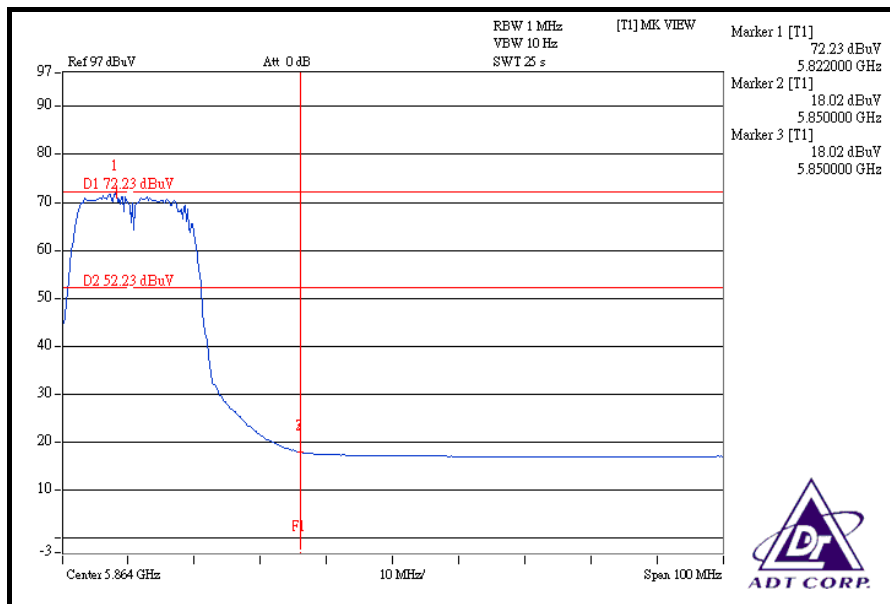




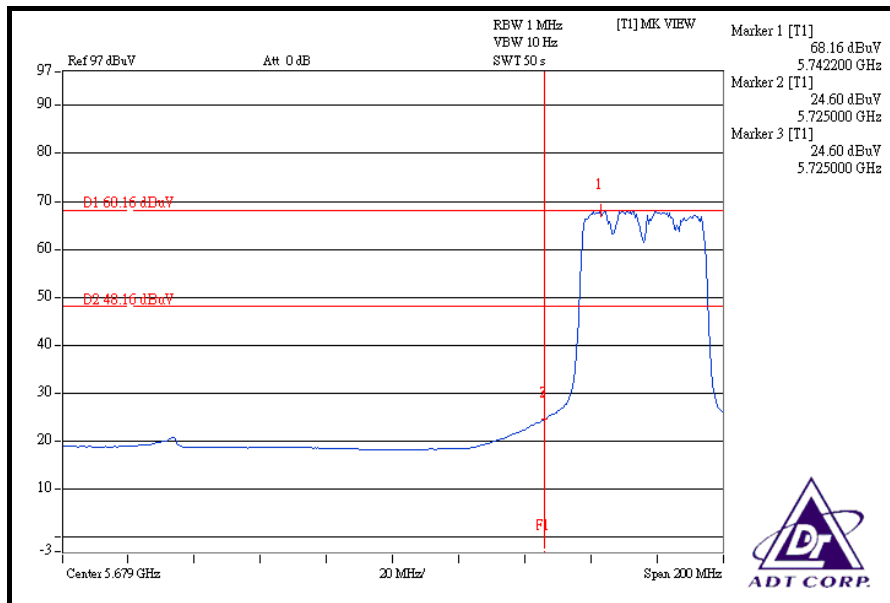
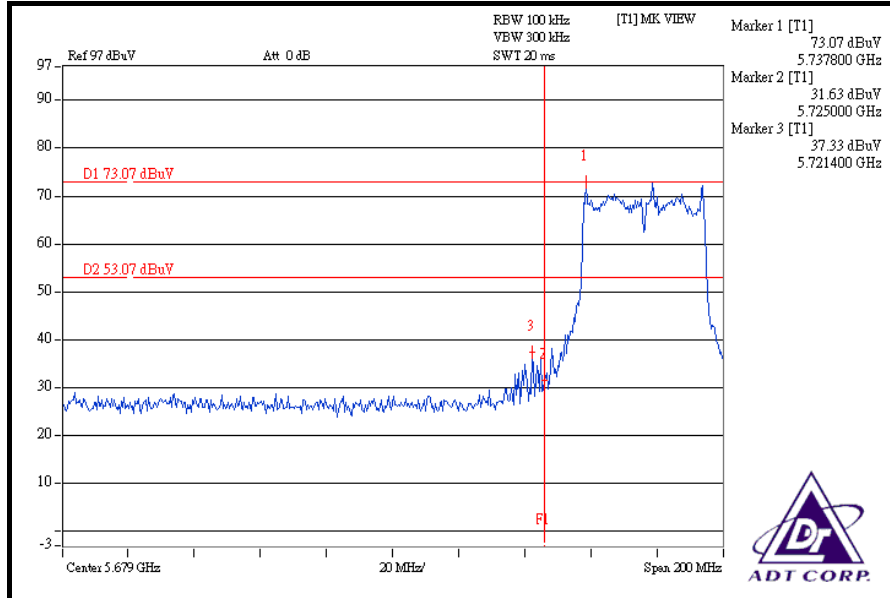
### DRAFT 802.11n (20MHz) OFDM MODULATION

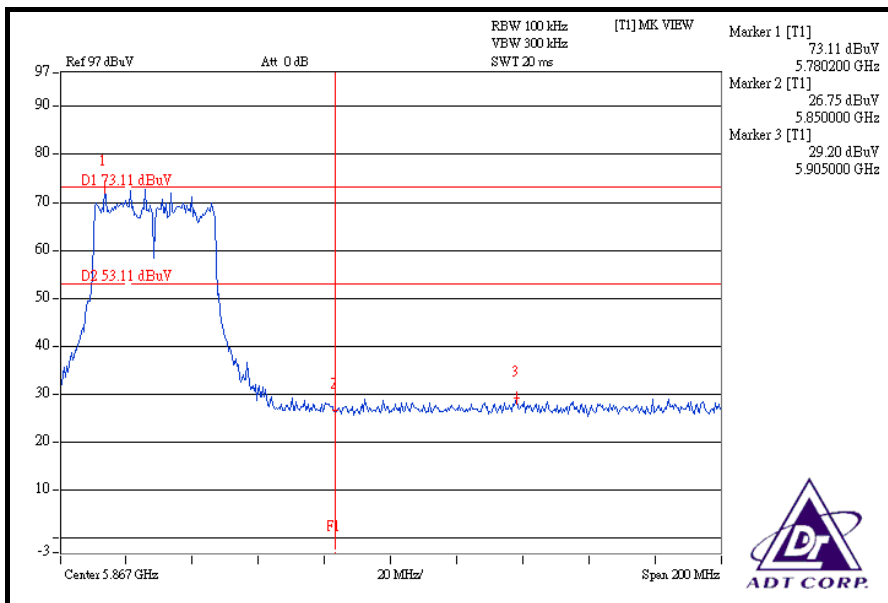
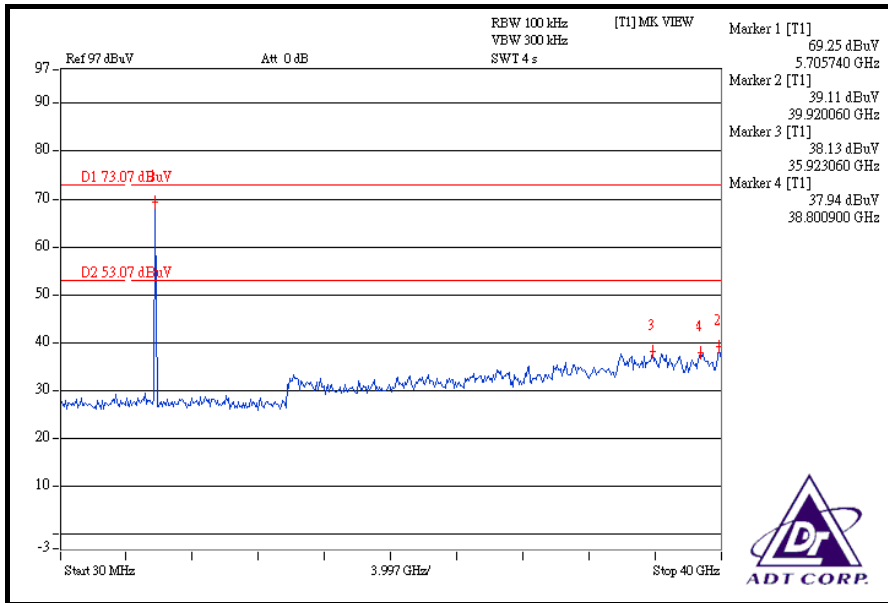


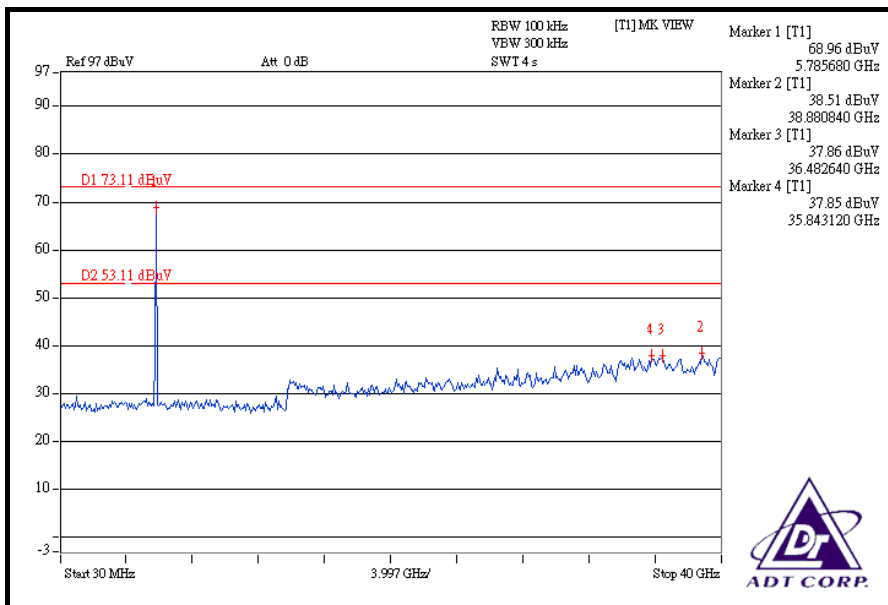
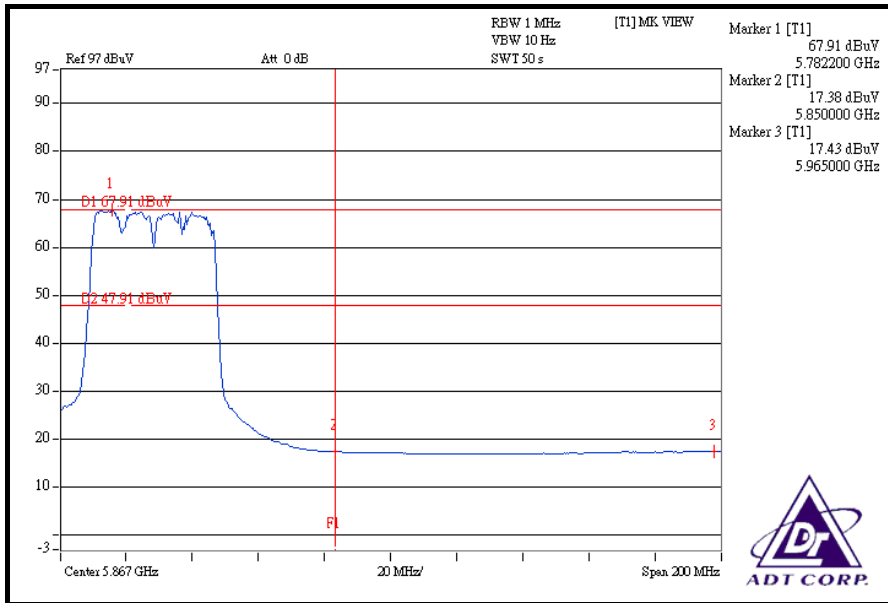




### DRAFT 802.11n (40MHz) OFDM MODULATION









## **5.7 ANTENNA REQUIREMENT**

### **5.7.1 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(a), 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.

### **5.7.2 ANTENNA CONNECTED CONSTRUCTION**

The antenna used in this product is Dipole antenna with R-SMA connector. The maximum Gain of the antenna is 2dBi.

## 6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



## 7. 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.

## **8. 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.