

# FCC TEST REPORT (15.407)

**REPORT NO.:** RF960524H05

**MODEL NO.:** U98H038

**RECEIVED:** May 24, 2007

**TESTED:** June 04 to 07, 2007

**ISSUED:** June 07, 2007

**APPLICANT:** Hon Hai PRECISION IND.CO.,LTD

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**ISSUED BY:** Advance Data Technology Corporation

**TEST LOCATION:** No. 81-1, Lu Liao Keng, 9 Ling, Wu Lung  
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No. 2177-01

## Table of Contents

1.	CERTIFICATION.....	4
2.	SUMMARY OF TEST RESULTS.....	5
2.1	MEASUREMENT UNCERTAINTY .....	6
3.	GENERAL INFORMATION .....	7
3.1	GENERAL DESCRIPTION OF EUT .....	7
3.2	DESCRIPTION OF TEST MODES .....	10
3.2.1	TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:.....	11
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS.....	14
3.4	DESCRIPTION OF SUPPORT UNITS .....	15
3.5	CONFIGURATION OF SYSTEM UNDER TEST .....	15
4.	TEST TYPES AND RESULTS.....	16
4.1	CONDUCTED EMISSION MEASUREMENT .....	16
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	16
4.1.2	TEST INSTRUMENTS.....	16
4.1.3	TEST PROCEDURES.....	17
4.1.4	DEVIATION FROM TEST STANDARD .....	17
4.1.5	TEST SETUP.....	18
4.1.6	EUT OPERATING CONDITIONS.....	18
4.1.7	TEST RESULTS .....	19
4.2	RADIATED EMISSION MEASUREMENT .....	25
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT .....	25
4.2.2	LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS.....	26
4.2.3	TEST INSTRUMENTS.....	27
4.2.4	TEST PROCEDURES.....	28
4.2.5	DEVIATION FROM TEST STANDARD .....	28
4.2.6	TEST SETUP.....	29
4.2.7	EUT OPERATING CONDITION .....	29
	<a href="#">Below 1GHz Test Data</a> .....	30
4.2.8	TEST RESULTS .....	30
	<a href="#">Above 1GHz Test Data</a> .....	31
4.2.9	TEST RESULTS .....	31
4.3	PEAK TRANSMIT POWER MEASUREMENT .....	49
4.3.1	LIMITS OF PEAK TRANSMIT POWER MEASUREMENT .....	49
4.3.2	TEST INSTRUMENTS.....	49
4.3.3	TEST PROCEDURE.....	50

4.3.4	DEVIATION FROM TEST STANDARD .....	50
4.3.5	TEST SETUP .....	50
4.3.6	EUT OPERATING CONDITIONS .....	50
4.3.7	TEST RESULTS .....	51
4.4	PEAK POWER EXCURSION MEASUREMENT .....	64
4.4.1	LIMITS OF PEAK POWER EXCURSION MEASUREMENT .....	64
4.4.2	TEST INSTRUMENTS .....	64
4.4.3	TEST PROCEDURE .....	65
4.4.4	DEVIATION FROM TEST STANDARD .....	65
4.4.5	TEST SETUP .....	65
4.4.6	EUT OPERATING CONDITIONS .....	65
4.4.7	TEST RESULTS .....	66
4.5	PEAK POWER SPECTRAL DENSITY MEASUREMENT .....	74
4.5.1	LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT .....	74
4.5.2	TEST INSTRUMENTS .....	74
4.5.3	TEST PROCEDURES .....	75
4.5.4	DEVIATION FROM TEST STANDARD .....	75
4.5.5	TEST SETUP .....	75
4.5.6	EUT OPERATING CONDITIONS .....	75
4.5.7	TEST RESULTS .....	76
4.6	FREQUENCY STABILITY .....	84
4.6.1	LIMITS OF FREQUENCY STABILITY MEASUREMENT .....	84
4.6.2	TEST INSTRUMENTS .....	84
4.6.3	TEST PROCEDURE .....	84
4.6.4	DEVIATION FROM TEST STANDARD .....	85
4.6.5	TEST SETUP .....	85
4.6.6	EUT OPERATING CONDITION .....	85
4.6.7	TEST RESULTS .....	86
4.7	BAND EDGES MEASUREMENT .....	87
4.7.1	TEST INSTRUMENTS .....	87
4.7.2	TEST PROCEDURE .....	87
4.7.3	EUT OPERATING CONDITION .....	87
4.7.4	TEST RESULTS .....	88
4.8	ANTENNA REQUIREMENT .....	99
4.8.1	STANDARD APPLICABLE .....	99
4.8.2	ANTENNA CONNECTED CONSTRUCTION .....	99
5.	INFORMATION ON THE TESTING LABORATORIES .....	100
	APPENDIX-A .....	A-1

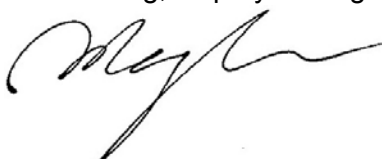
## 1. CERTIFICATION

**PRODUCT:** Wireless LAN 802.11a/b/g/n Device  
**BRAND NAME:** Foxconn  
**MODEL NO.:** U98H038  
**TEST SAMPLE:** R&D SAMPLE  
**TESTED:** June 04 to 07, 2007  
**APPLICANT:** Hon Hai PRECISION IND.CO.,LTD  
**STANDARDS:** FCC Part 15, Subpart E (Section 15.407)  
ANSI C63.4-2003

The above equipment (Model: U98H038) 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** :  , **DATE:** June 07, 2007  
( Midoli Peng, Specialist )

**TECHNICAL ACCEPTANCE** :  , **DATE:** June 07, 2007  
Responsible for RF ( Hank Chung, Deputy Manager )

**APPROVED BY** :  , **DATE:** June 07, 2007  
(May Chen, Deputy Manager )

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart E (Section 15.407)			
Standard Section	Test Type	Result	Remark
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -14.92dB at 0.189MHz
15.407(b/1/2/3) (b)(5)	Electric Field Strength Spurious Emissions, 30MHz ~ 40000MHz	PASS	Meet the requirement of limit. Minimum passing margin is -0.3dB at 5150.00MHz
15.407(a/1/2/3)	Peak Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.

### NOTE:

1. The EUT was operating in 2.412 ~ 2.462GHz, 5.15~5.25GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 5.15~5.25GHz. For the 2.412 ~ 2.462GHz and 5.725 ~ 5.850GHz RF parameters was recorded in another test report.

## 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:

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

Measurement	Value
Conducted emissions	2.41 dB
Radiated emissions (30MHz-1GHz)	3.89 dB
Radiated emissions (1GHz -18GHz)	2.21 dB
Radiated emissions (18GHz -40GHz)	1.88 dB

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Wireless LAN 802.11a/b/g/n Device
<b>MODEL NO.</b>	U98H038
<b>FCC ID</b>	MCLU98H038
<b>POWER SUPPLY</b>	DC 3.3V from host equipment
<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 / 5.5 / 2 / 1Mbps 802.11g: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps 802.11a: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps Draft 802.11n (20MHz): 130 / 117 / 104 / 78 / 65 / 58.5 / 52 / 39 / 26 / 19.5 / 13 / 6.5Mbps Draft 802.11n (40MHz): 270 / 243 / 216 / 162 / 135 / 121.5 / 108 / 81 / 54 / 40.5 / 27 / 13.5Mbps
<b>FREQUENCY RANGE</b>	For 15.407 802.11a: 5.18 ~ 5.24GHz
	For 15.247 802.11b & 802.11g: 2412 ~ 2462MHz 802.11a: 5.745 ~ 5.825GHz
<b>NUMBER OF CHANNEL</b>	<b>For 15.407</b> 4 for 802.11a (5.18 ~ 5.24GHz) , draft 802.11n (20MHz) 3 for draft 802.11n (40MHz)
	<b>For 15.247(2.4GHz)</b> 11 for 802.11b, 802.11g, draft 802.11n (20MHz) 7 for draft 802.11n (40MHz) <b>For 15.247(5GHz)</b> 5 for 802.11a(5.725~5.825GHz), draft 802.11n (20MHz) 3 for draft 802.11n (40MHz)

<b>MAXIMUM OUTPUT POWER</b>	<b>For 15.407</b> 802.11a: 23.281mW draft 802.11n (20MHz): 27.673mW draft 802.11n (40MHz): 49.908mW <b>For 15.247(2.4GHz)</b> 802.11b: 80.910mW 802.11g: 128.825mW draft 802.11n (20MHz): 176.208mW draft 802.11n (40MHz): 53.827mW <b>For 15.247(5GHz)</b> 802.11a: 100.0mW draft 802.11n (20MHz): 164.120mW draft 802.11n (40MHz): 193.223mW
<b>ANTENNA TYPE</b>	Please see note 1
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	NA

**NOTE:**

1. There are three antennas provided to this EUT, please refer to the following table:

Transmitter Circuit	Antenna Type	Antenna Connector	Gain(dBi)		
			2412~2462 (MHz)	5150~5250 (MHz)	5725~5850 (MHz)
Chain(0)	Printed	Reverse SMA	1.5	0.5	-0.86
Chain(1)			-2.5	-11.4	-7.31
Chain(2)			1.28	1.09	-0.43

2. The EUT incorporates a MIMO function with 802.11a, 802.11b, 802.11g, draft 802.11n. Physically, the card provides two completed transmit and three completed receivers.
3. The EUT is 2 \* 3 spatial MIMO (2Tx & 3Rx) without beam forming function. The antenna configurations are two transmitter antennas and three receiver antennas, as there are 3 printed antennas. Spatial multiplexing modes for simultaneous transmission using 2 antennas, and for simultaneous receiver using 3 antennas.
4. When the EUT operating in draft 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 15.



5. The EUT complies with draft 802.11n standards and backwards compatible with 802.11a, 802.11b, 802.11g products.
6. For radiated test (Below 1 GHz) the EUT was pre-tested under following test mode, and the test data was recorded in this report:

Pre-test Mode	Description
Mode A	802.11a
<b>Mode B</b>	<b>Draft 802.11n (20MHz)</b>
Mode C	Draft 802.11n (40MHz)

The worst emission level was found in Mode B. The final test was executed under test mode with highest emission and recorded in this report individually.

7. 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

### Operated in 5150 ~ 5250MHz band:

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

CHANNEL	FREQUENCY
1	5180 MHz
2	5200 MHz
3	5220 MHz
4	5240 MHz

Three channels are provided for 802.11a, draft 802.11n (40MHz):

CHANNEL	FREQUENCY
1	5190 MHz
2	5210 MHz
3	5230 MHz

### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

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

Where **PLC**: Power Line Conducted Emission

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

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

**APCM**: Antenna Port Conducted Measurement

### COMBINATION MODE:

COMBINATION MODE	OPERATION MODE	TX CHAIN(0)	TX CHAIN(1)	TX CHAIN(2)
A	802.11 a	√		
B	802.11 a			√
C	DRAFT 802.11n(20MHz)	√		√
D	DRAFT 802.11n(40MHz)	√		√

COMBINATION MODE	OPERATION MODE	RX CHAIN(0)	RX CHAIN(1)	RX CHAIN(2)
E	802.11 a	√		
F	802.11 a			√
G	802.11 a		√	
H	DRAFT 802.11n(20MHz)	√	√	√
I	DRAFT 802.11n(40MHz)	√	√	√

#### Note:

1. The above information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.
2. From above mode, the different modes were chosen for pretest.
3. Mode A, C & D the worst modes, was selected as representative mode for the report.

### **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)	TX COMBINATION
802.11a	1 to 4	1	OFDM	BPSK	6	A
For 5 GHz Draft 802.11n (20MHz)	1 to 4	1	OFDM	BPSK	6.5	C
For 5 GHz Draft 802.11n (40MHz)	1 to 3	1	OFDM	BPSK	13.5	D

### **Radiated Emission Test (Below 1 GHz):**

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	TX COMBINATION
For 5 GHz Draft 802.11n (20MHz)	1 to 4	4	OFDM	BPSK	6.5	C

### **Radiated Emission Test (Above 1 GHz):**

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	TX COMBINATION
802.11a	1 to 4	1,4	OFDM	BPSK	6	A
For 5 GHz Draft 802.11n (20MHz)	1 to 4	1, 4	OFDM	BPSK	6.5	C
For 5 GHz Draft 802.11n (40MHz)	1 to 3	1, 3	OFDM	BPSK	13.5	D

### **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)	TX COMBINATION
802.11a	1 to 4	1,4	OFDM	BPSK	6	A
For 5 GHz Draft 802.11n (20MHz)	1 to 4	1, 4	OFDM	BPSK	6.5	C
For 5 GHz Draft 802.11n (40MHz)	1 to 3	1, 3	OFDM	BPSK	13.5	D

### **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)	TX COMBINATION
802.11a	1 to 4	1, 4	OFDM	BPSK	6	A
For 5 GHz Draft 802.11n (20MHz)	1 to 4	1, 4	OFDM	BPSK	6.5	C
For 5 GHz Draft 802.11n (40MHz)	1 to 3	1, 3	OFDM	BPSK	13.5	D

### **3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS**

The EUT is a Wireless LAN 802.11a/b/g/n Device. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart E (15.407)**

**ANSI C63.4-2003**

All test items have been performed and recorded as per the above standards.

### 3.4 DESCRIPTION OF SUPPORT UNITS

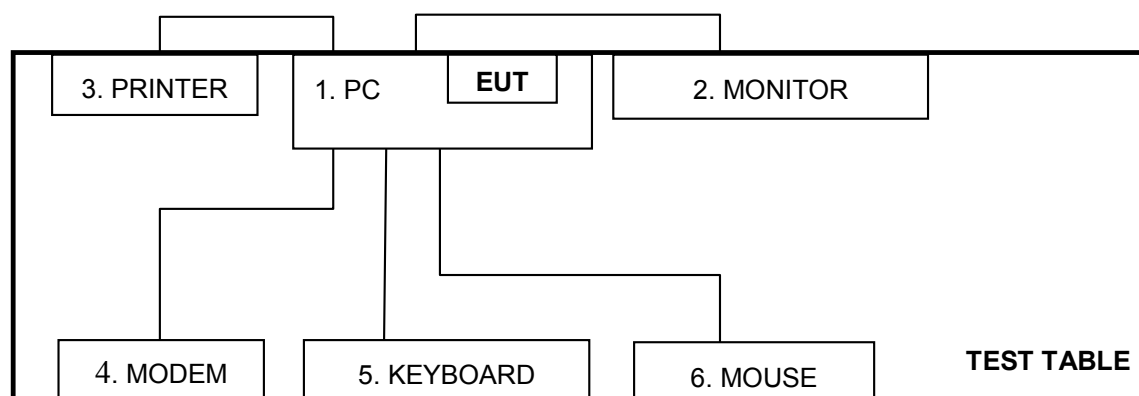
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	PC	DELL	DCSM	F84QL1S	FCC DoC
2	MONITOR	ADI	G1000	240058T00100081	NA
3	PRINTER	HP	C2642A	MY79J1D00G	B94C2642X
4	MODEM	ACEEX	1414	0206026776	IFAXDM1414
5	Keyboard	DELL	SK-8115	MY-0J4635-71619-67V-0113	FCC DoC
6	Mouse	DELL	M056UOA	FOROOSWW	FCC DoC

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.4 m braid shielded wire, terminated with VGA connector via metallic frame, w/o cores
3	1.8m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core.
4	1.0 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
5	1.7m foil shielded wire, terminated with PS/2 connector via metallic frame, w/o core.
6	1.5m foil shielded wire, terminated with PS/2 connector via drain wire, w/o core.

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

### 3.5 CONFIGURATION OF SYSTEM UNDER TEST



## 4. TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver	ESCS 30	847124/029	Mar. 01, 2008
Line-Impedance Stabilization Network(for EUT)	ENV-216	100071	Nov. 26, 2007
Line-Impedance Stabilization Network(for Peripheral)	ESH3-Z5	848773/004	Oct. 26, 2007
RF Cable (JETBAO)	RG233/U	Cable_CB_01	Dec. 09, 2007
Terminator	50	2	Oct. 30, 2007
Software	ADT_Cond_V7.3.2	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 ADT Shielded Room No. B.
  3. The VCCI Con B Registration No. is C-2193.



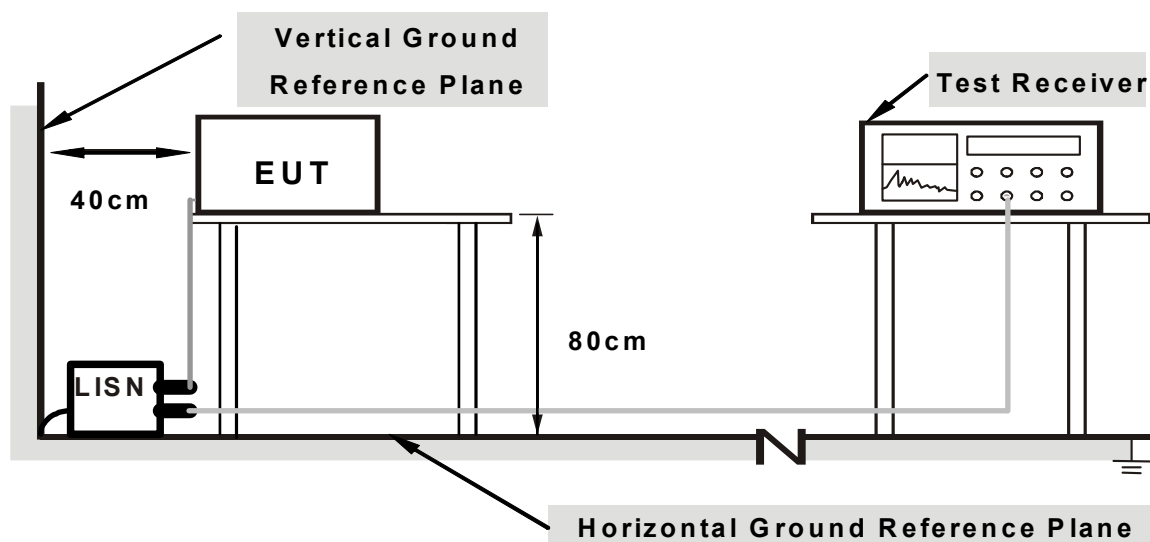
#### 4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs
- b. provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- c. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- d. The frequency range from 150kHz to 30MHz was searched. Emission level under (Limit – 20dB) was not recorded.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.5 TEST SETUP



**Note: 1.Support units were connected to second LISN.**

**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

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

#### 4.1.6 EUT OPERATING CONDITIONS

1. Plug the EUT into the support unit 1 (Personal computer) which placed on a testing table.
2. The support unit 1 (Personal computer) ran a test program “ART V0\_5\_B6\_01\_ALL” to enable EUT under transmission condition continuously.

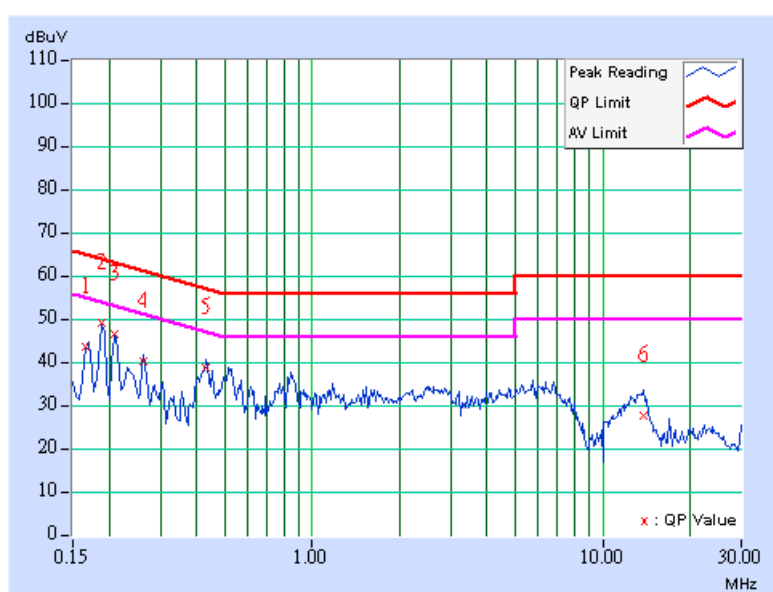
#### 4.1.7 TEST RESULTS

##### 802.11a OFDM MODULATION:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line (L)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 971hPa	TESTED BY	Phoenix Huang

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	0.166	0.40	42.73	-	43.13	-	65.18	55.18	-22.05	-
2	0.189	0.40	48.19	-	48.59	-	64.08	54.08	-15.49	-
3	0.209	0.40	45.60	-	46.00	-	63.26	53.26	-17.26	-
4	0.263	0.40	39.22	-	39.62	-	61.33	51.33	-21.71	-
5	0.431	0.40	37.76	-	38.16	-	57.23	47.23	-19.07	-
6	13.754	1.03	26.87	-	27.90	-	60.00	50.00	-32.10	-

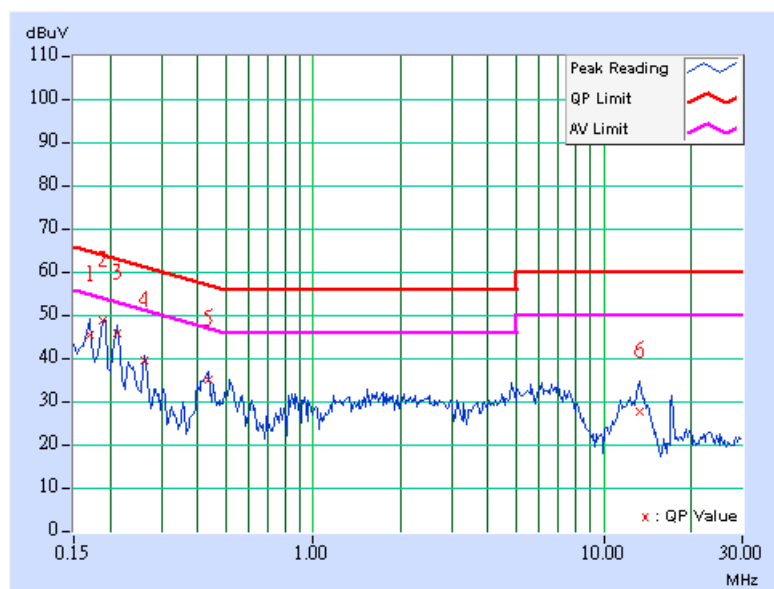
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Neutral (N)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 971hPa	TESTED BY	Phoenix Huang

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	0.170	0.20	44.59	-	44.79	-	64.98	54.98	-20.19	-
2	0.189	0.20	47.73	-	47.93	-	64.08	54.08	-16.15	-
3	0.213	0.20	44.65	-	44.85	-	63.11	53.11	-18.26	-
4	0.263	0.20	38.63	-	38.83	-	61.33	51.33	-22.50	-
5	0.435	0.21	33.93	-	34.14	-	57.15	47.15	-23.02	-
6	13.324	1.10	26.72	-	27.82	-	60.00	50.00	-32.18	-

- 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.

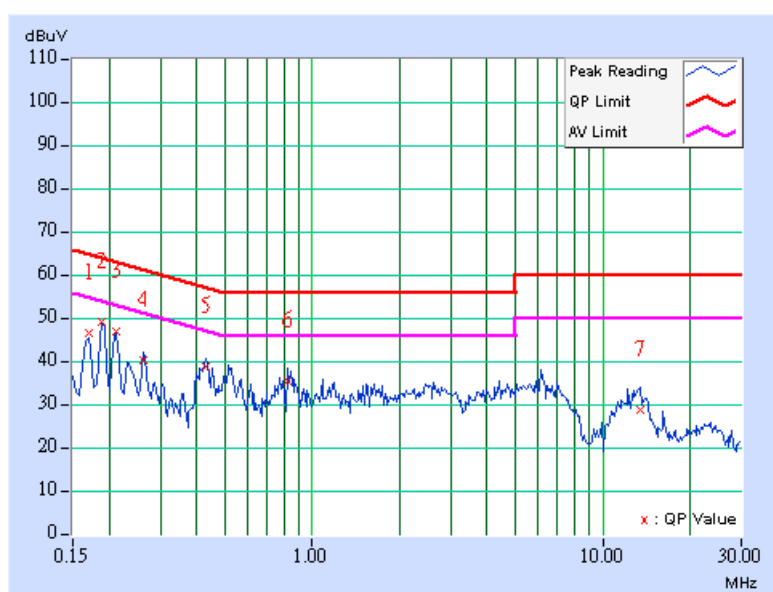


# DRAFT 802.11n (20MHz) OFDM MODULATION:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line (L)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6.5Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 971hPa	TESTED BY	Phoenix Huang

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	0.170	0.40	45.58	-	45.98	-	64.98	54.98	-19.00	-
2	0.189	0.40	48.41	-	48.81	-	64.08	54.08	-15.27	-
3	0.213	0.40	45.95	-	46.35	-	63.11	53.11	-16.76	-
4	0.263	0.40	39.20	-	39.60	-	61.33	51.33	-21.73	-
5	0.431	0.40	37.92	-	38.32	-	57.23	47.23	-18.91	-
6	0.822	0.40	34.44	-	34.84	-	56.00	46.00	-21.16	-
7	13.527	1.01	28.03	-	29.04	-	60.00	50.00	-30.96	-

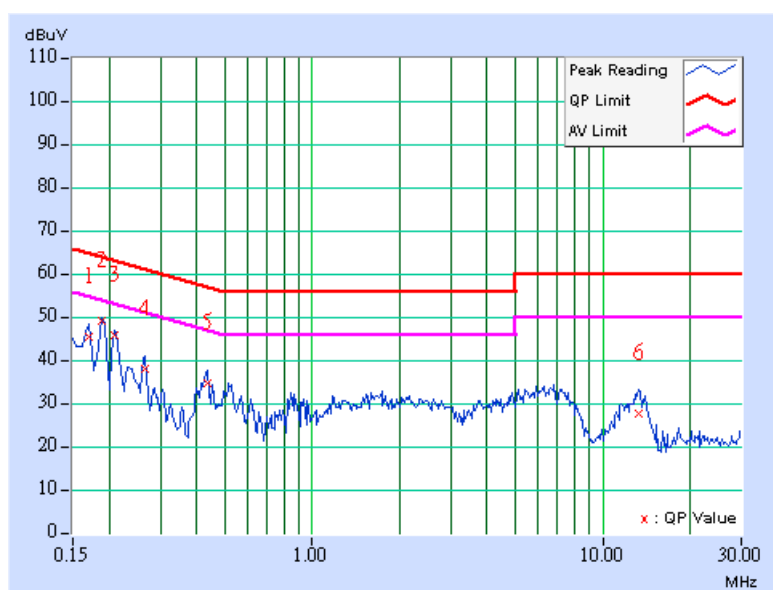
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Neutral (N)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6.5Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 971hPa	TESTED BY	Phoenix Huang

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	0.170	0.20	44.59	-	44.79	-	64.98	54.98	-20.19	-
2	0.189	0.20	48.16	-	48.36	-	64.08	54.08	-15.72	-
3	0.209	0.20	45.01	-	45.21	-	63.26	53.26	-18.05	-
4	0.267	0.20	37.11	-	37.31	-	61.20	51.20	-23.89	-
5	0.435	0.21	33.83	-	34.04	-	57.15	47.15	-23.12	-
6	13.309	1.10	26.69	-	27.79	-	60.00	50.00	-32.21	-

- 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.

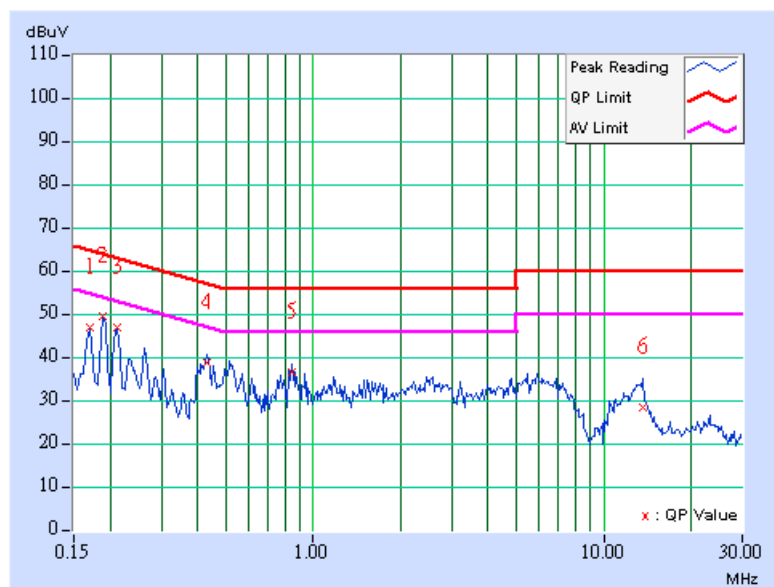


# DRAFT 802.11n (40MHz) OFDM MODULATION:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line (L)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	13.5Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 971hPa	TESTED BY	Phoenix Huang

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	0.170	0.40	45.86	-	46.26	-	64.98	54.98	-18.72	-
2	0.189	0.40	48.76	-	49.16	-	64.08	54.08	-14.92	-
3	0.213	0.40	45.90	-	46.30	-	63.11	53.11	-16.81	-
4	0.431	0.40	37.97	-	38.37	-	57.23	47.23	-18.86	-
5	0.845	0.40	35.50	-	35.90	-	56.00	46.00	-20.10	-
6	13.707	1.02	27.44	-	28.46	-	60.00	50.00	-31.54	-

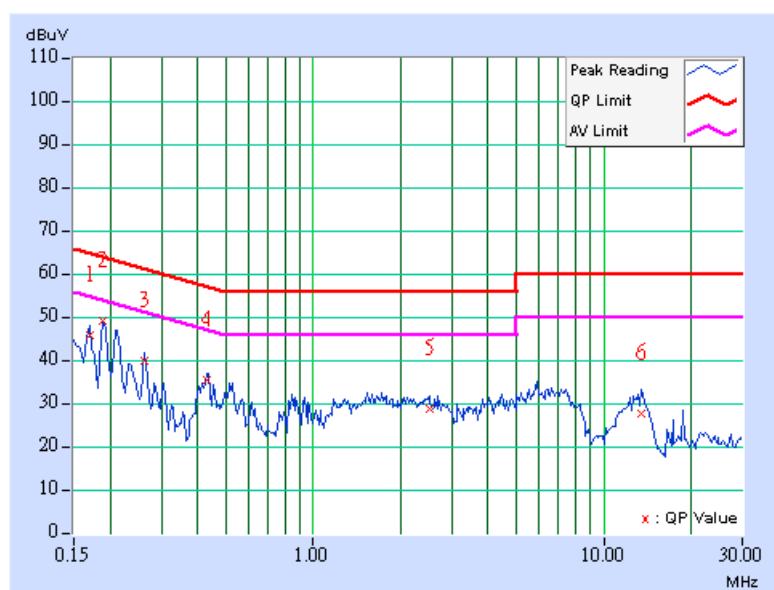
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Neutral (N)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	13.5Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 971hPa	TESTED BY	Phoenix Huang

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	0.170	0.20	44.93	-	45.13	-	64.98	54.98	-19.85	-
2	0.189	0.20	48.04	-	48.24	-	64.08	54.08	-15.84	-
3	0.263	0.20	38.79	-	38.99	-	61.33	51.33	-22.34	-
4	0.431	0.21	34.45	-	34.66	-	57.23	47.23	-22.57	-
5	2.513	0.43	27.79	-	28.22	-	56.00	46.00	-27.78	-
6	13.500	1.11	26.60	-	27.71	-	60.00	50.00	-32.29	-

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





## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

**NOTE:**

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

#### 4.2.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

Frequencies (MHz)	EIRP Limit (dBm)	Equivalent Field Strength at 3m (dBμV/m) *note 3
5150~5250	-27	68.3
5250~5350	-27	68.3
5470~5725	-27	68.3
5725~5825	-27 *note 1	68.3
	-17 *note 2	78.3

**NOTE:**

1. For frequencies 10MHz or greater above or below the band edge.
2. All emissions within the frequency range from the band edge to 10MHz above or below the band edge.
3. The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts)}$$

#### 4.2.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 03, 2007
HP Pre_Amplifier	8449B	3008A01922	Sep. 18, 2007
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Sep. 20, 2007
CHASE Broadband Antenna	VULB 9168	138	July 17, 2007
Schwarzbeck Horn_Antenna	BBHA9120	D124	Jan. 01, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 05, 2008
SCHWARZBECK Biconical Antenna	VHBA9123	459	Jun. 08, 2009
SCHWARZBECK Periodic Antenna	UPA6108	1148	Jun. 08, 2009
RF Switches (ARNITSU)	CS-201	1565157	NA
RF CABLE (Chaintek)	SF102	22054-2	Nov. 14, 2007
RF Cable(RICHTEC)	9913-30M N-N Cable	STCCAB-30M-1 GHz	Jul. 15, 2007
Software	ADT_Radiated_V 7.6.15.7	NA	NA
CHANCE MOST Antenna Tower	AT-100	0203	NA
CHANCE MOST Turn Table	TT-100	0203	NA

- Note: 1. The calibration interval of the above test instruments is 12 months (36 months for Biconical and Periodic Antenna) and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: R3271A) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in ADT Open Site No. C.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 4824A-3.

#### 4.2.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

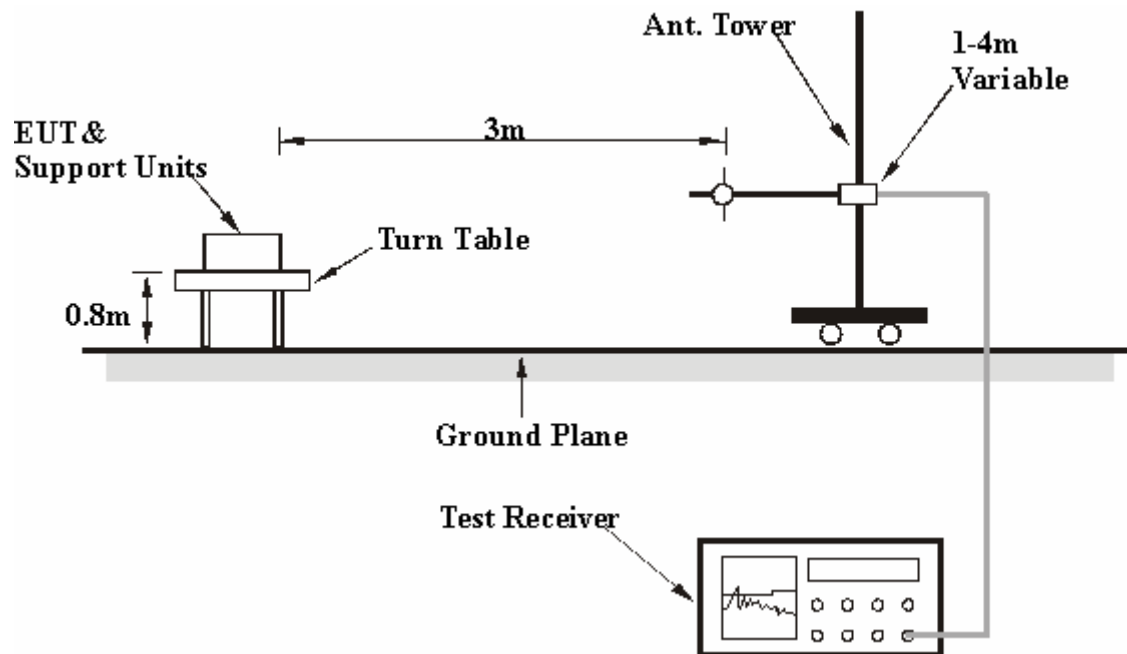
**NOTE:**

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

#### 4.2.5 DEVIATION FROM TEST STANDARD

No deviation

#### 4.2.6 TEST SETUP



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

#### 4.2.7 EUT OPERATING CONDITION

Same as 4.1.6

## Below 1GHz Test Data

### 4.2.8 TEST RESULTS

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK for draft 802.11n (20MHz)	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TRANSFER RATE	6.5Mbps	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH, 971hPa	TESTED BY	Phoenix Huang

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	62.18	28.64 QP	40.00	-11.36	1.21 H	49	15.19	13.45
2	200.23	30.10 QP	43.50	-13.40	1.04 H	226	18.49	11.61
3	500.51	31.67 QP	46.00	-14.33	1.34 H	325	9.89	21.78
4	566.54	43.06 QP	46.00	-2.94	1.37 H	249	19.41	23.65
5	600.21	32.64 QP	46.00	-13.36	1.31 H	284	8.16	24.48
6	800.36	34.58 QP	46.00	-11.42	1.21 H	143	7.01	27.57
7	959.96	35.12 QP	46.00	-10.88	1.02 H	168	5.23	29.89

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	67.52	31.40 QP	40.00	-8.60	1.00 V	213	18.55	12.85
2	200.11	27.34 QP	43.50	-16.16	1.00 V	307	15.74	11.60
3	500.26	33.84 QP	46.00	-12.16	1.00 V	94	12.07	21.77
4	566.67	42.91 QP	46.00	-3.09	1.12 V	315	19.26	23.65
5	802.69	36.10 QP	46.00	-9.90	1.34 V	216	8.49	27.61
6	960.02	37.82 QP	54.00	-16.18	1.28 V	120	7.93	29.89

- 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.

## Above 1GHz Test Data

### 4.2.9 TEST RESULTS

#### 802.11a OFDM MODULATION:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TRANSFER RATE	6Mbps	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	31 deg. C, 61%RH, 972hPa	TESTED BY	Phoenix Huang

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	#5150.00	55.80 PK	74.00	-18.20	1.41 H	309	19.56	36.24
1	#5150.00	42.30 AV	54.00	-11.70	1.41 H	309	6.06	36.24
2	*5180.00	92.50 PK			1.21 H	223	56.22	36.28
2	*5180.00	80.60 AV			1.21 H	223	44.32	36.28
3	6906.70	62.30 PK	88.30	-26.00	1.33 H	220	21.18	41.12
4	10360.00	57.20 PK	88.30	-31.10	1.42 H	156	11.30	45.90

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	#5150.00	59.40 PK	74.00	-14.60	1.29 V	300	23.16	36.24
1	#5150.00	44.60 AV	54.00	-9.40	1.29 V	300	8.36	36.24
2	*5180.00	110.10 PK			1.24 V	280	73.82	36.28
2	*5180.00	98.70 AV			1.24 V	280	62.42	36.28
3	6906.70	64.80 PK	88.30	-23.50	1.55 V	288	23.68	41.12
4	10360.00	57.70 PK	88.30	-30.60	1.31 V	223	11.80	45.90

- NOTE:**
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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TRANSFER RATE	6Mbps	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	31 deg. C, 61%RH, 972hPa	TESTED BY	Phoenix Huang

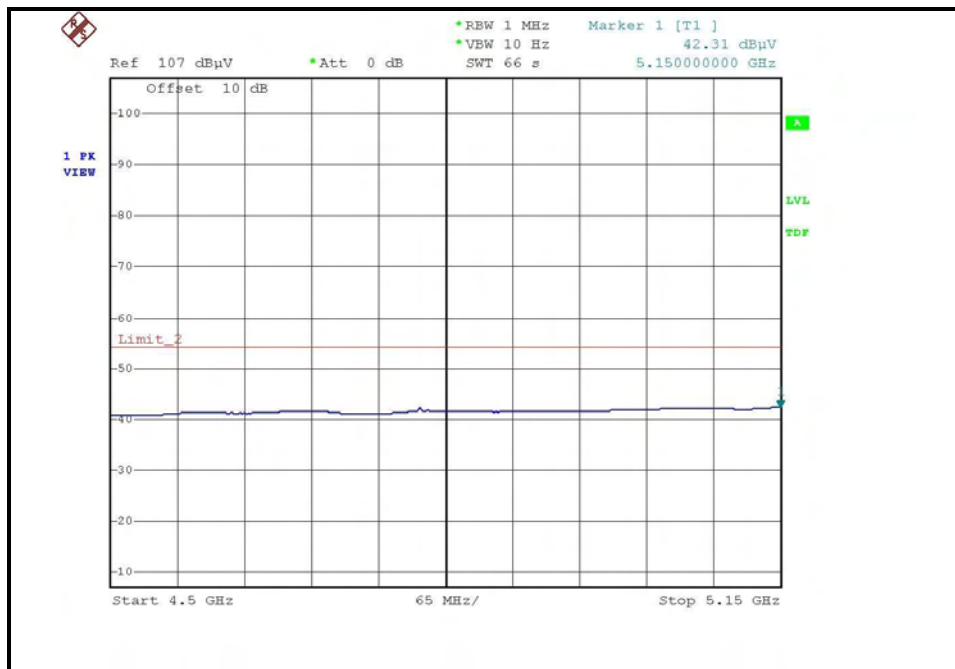
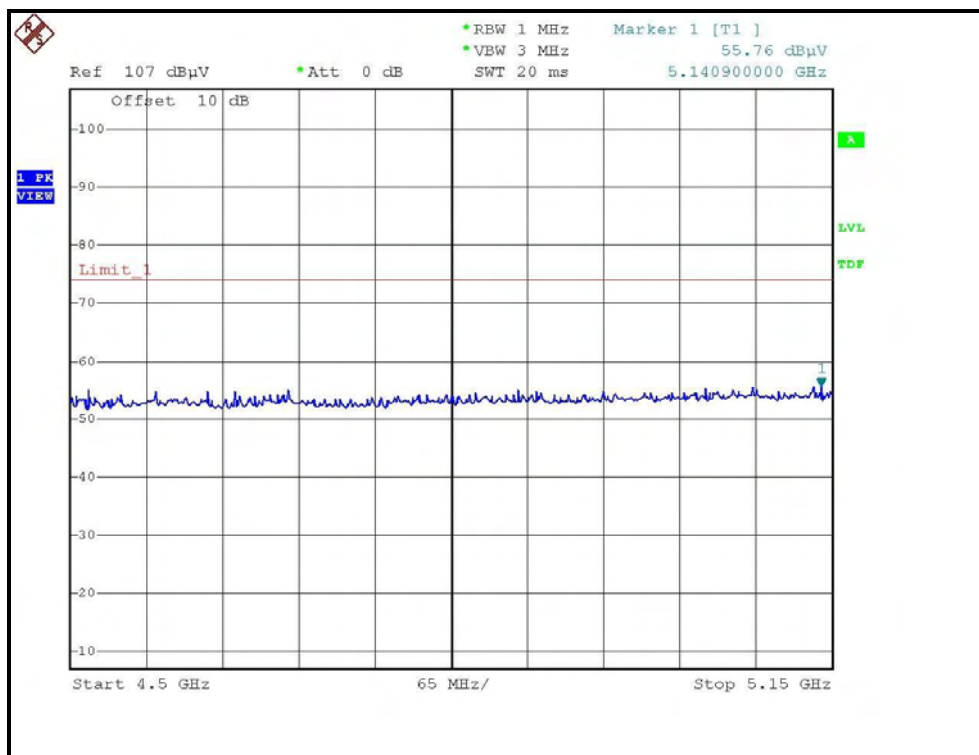
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	98.20 PK			1.34 H	258	61.85	36.35
1	*5240.00	86.80 AV			1.34 H	258	50.45	36.35
2	#5350.00	56.00 PK	74.00	-18.00	1.43 H	290	19.52	36.48
2	#5350.00	42.30 AV	54.00	-11.70	1.43 H	290	5.82	36.48
3	6986.70	63.10 PK	88.30	-25.20	1.14 H	211	21.77	41.33
4	10480.00	57.10 PK	88.30	-31.20	1.46 H	211	10.99	46.11

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	*5240.00	113.70 PK			1.52 V	288	77.35	36.35
1	*5240.00	102.90 AV			1.52 V	288	66.55	36.35
2	#5350.00	58.90 PK	74.00	-15.10	1.38 V	276	22.42	36.48
2	#5350.00	44.60 AV	54.00	-9.40	1.38 V	276	8.12	36.48
3	6986.70	65.60 PK	88.30	-22.70	1.31 V	180	24.27	41.33
4	10480.00	58.30 PK	88.30	-30.00	1.34 V	186	12.19	46.11

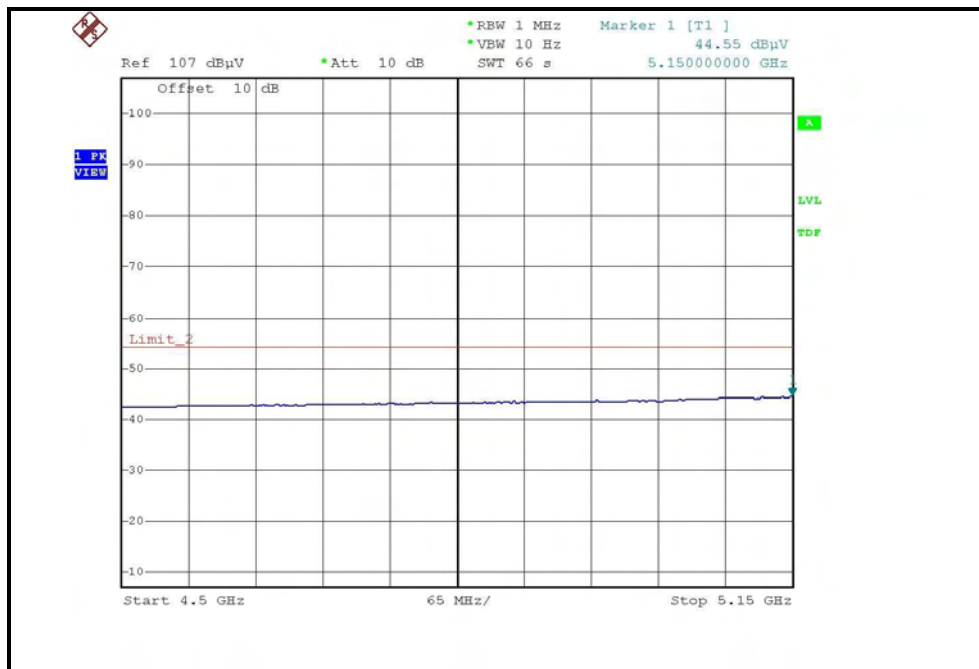
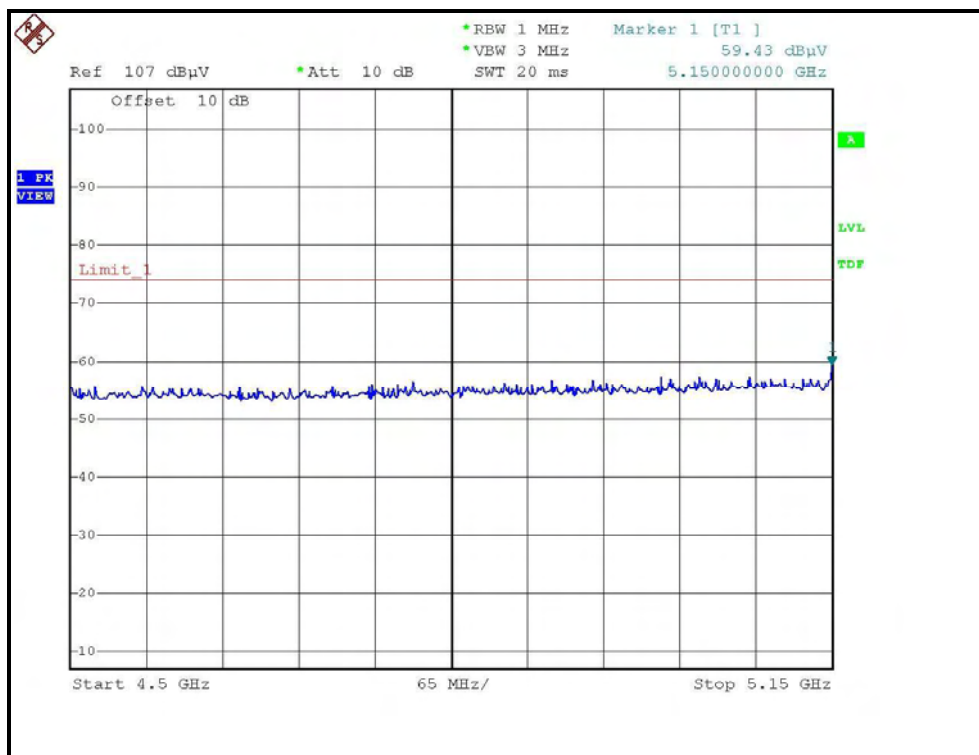
- NOTE:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value
  5. "\*" : Fundamental frequency
  6. "#"The radiated frequency falling in the restricted band.



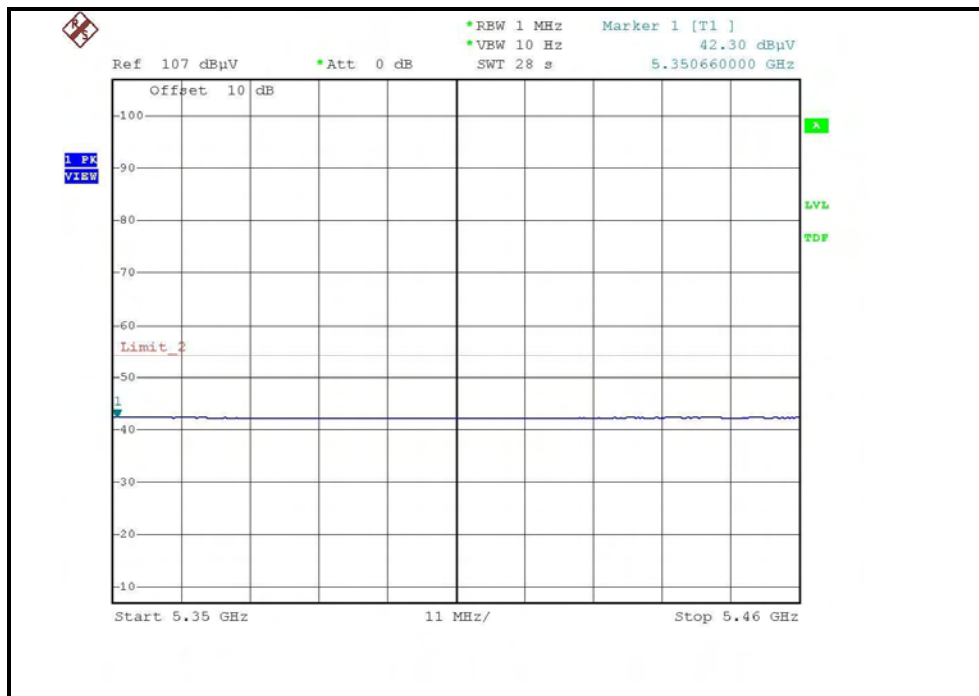
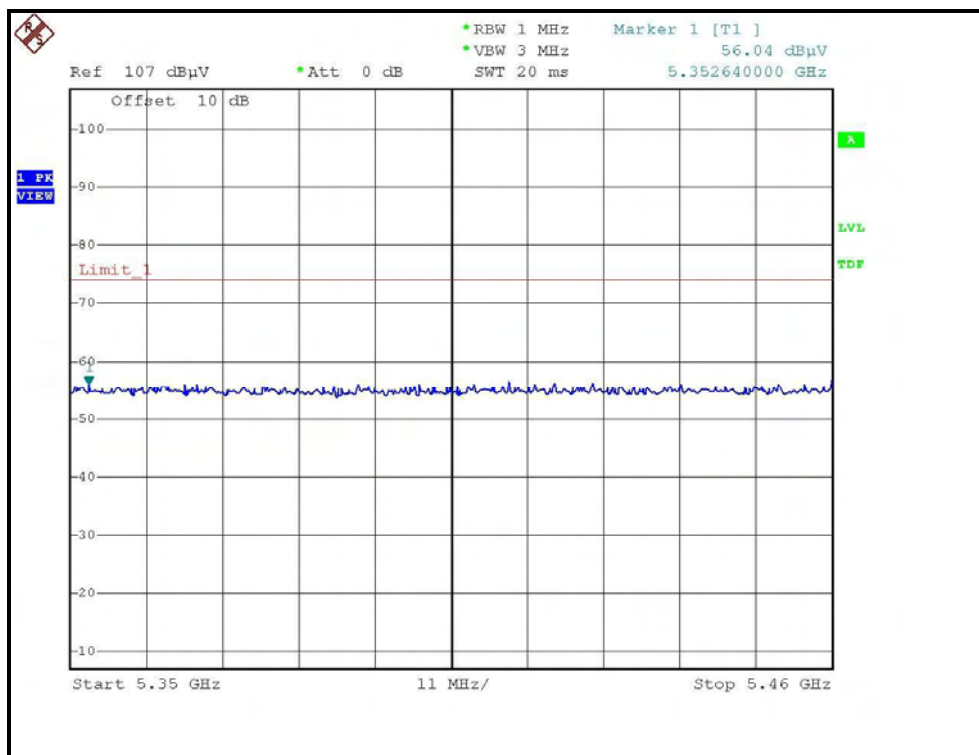
# RESTRICTED BANDEDGE (802.11a MODE, CH1, HORIZONTAL)



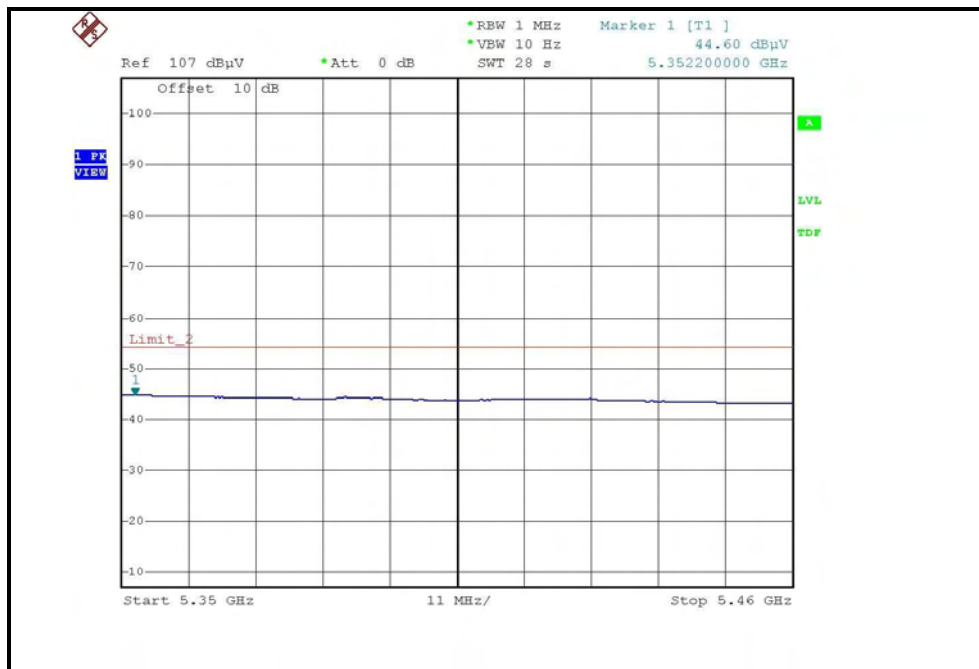
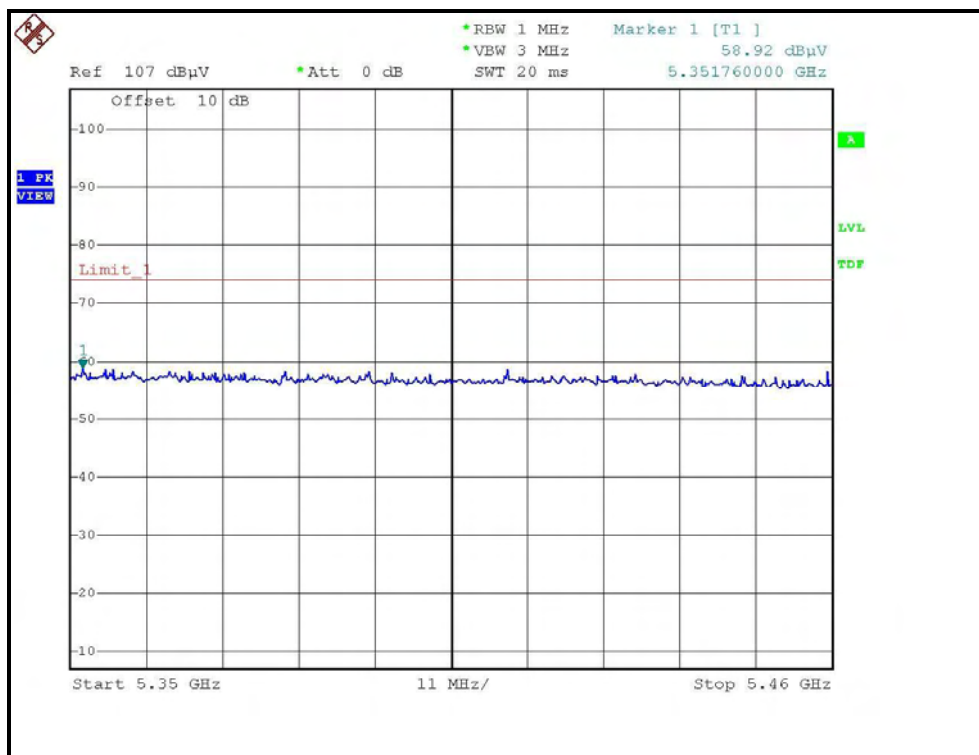
# RESTRICTED BANDEDGE (802.11a MODE, CH1, VERTICAL)



# RESTRICTED BANDEDGE (802.11a MODE, CH4, HORIZONTAL)



# RESTRICTED BANDEDGE (802.11a MODE, CH4, VERTICAL)



# DRAFT 802.11n (20MHz) OFDM MODULATION:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TRANSFER RATE	6.5Mbps	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	31 deg. C, 61%RH, 972hPa	TESTED BY	Phoenix Huang

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	#5150.00	55.20 PK	74.00	-18.80	1.23 H	234	18.96	36.24
1	#5150.00	42.20 AV	54.00	-11.80	1.23 H	234	5.96	36.24
2	*5180.00	96.70 PK			1.21 H	222	60.42	36.28
2	*5180.00	83.80 AV			1.21 H	222	47.52	36.28
3	6906.70	62.10 PK	88.30	-26.20	1.36 H	219	20.98	41.12
4	10360.00	55.40 PK	88.30	-32.90	1.26 H	355	9.50	45.90

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	#5150.00	66.70 PK	74.00	-7.30	1.40 V	289	30.46	36.24
1	#5150.00	47.80 AV	54.00	-6.20	1.40 V	289	11.56	36.24
2	*5180.00	112.40 PK			1.42 V	287	76.12	36.28
2	*5180.00	100.70 AV			1.42 V	287	64.42	36.28
3	6906.70	64.60 PK	88.30	-23.70	1.52 V	289	23.48	41.12
4	10360.00	56.30 PK	88.30	-32.00	1.44 V	222	10.40	45.90

- NOTE:**
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.

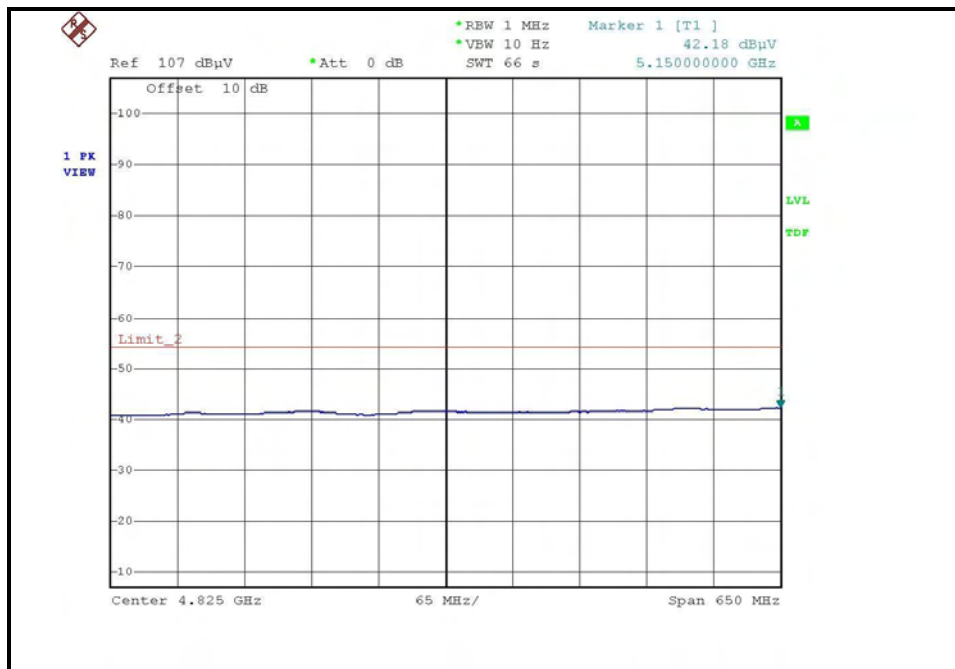
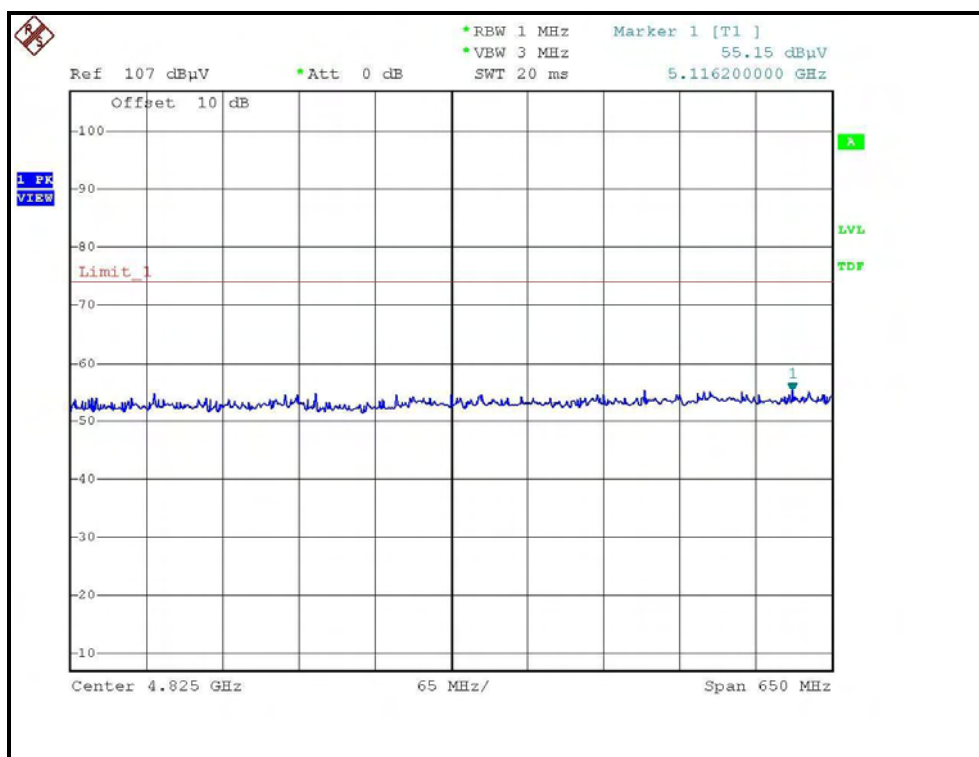
EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TRANSFER RATE	6.5Mbps	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	31 deg. C, 61%RH, 972hPa	TESTED BY	Phoenix Huang

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	*5240.00	99.70 PK			1.10 H	220	63.35	36.35
1	*5240.00	87.70 AV			1.10 H	220	51.35	36.35
2	#5350.00	56.40 PK	74.00	-17.60	1.17 H	223	19.92	36.48
2	#5350.00	42.30 AV	54.00	-11.70	1.17 H	223	5.82	36.48
3	6986.70	62.90 PK	88.30	-25.40	1.12 H	214	21.57	41.33
4	10480.00	58.40 PK	88.30	-29.90	1.61 H	35	12.29	46.11

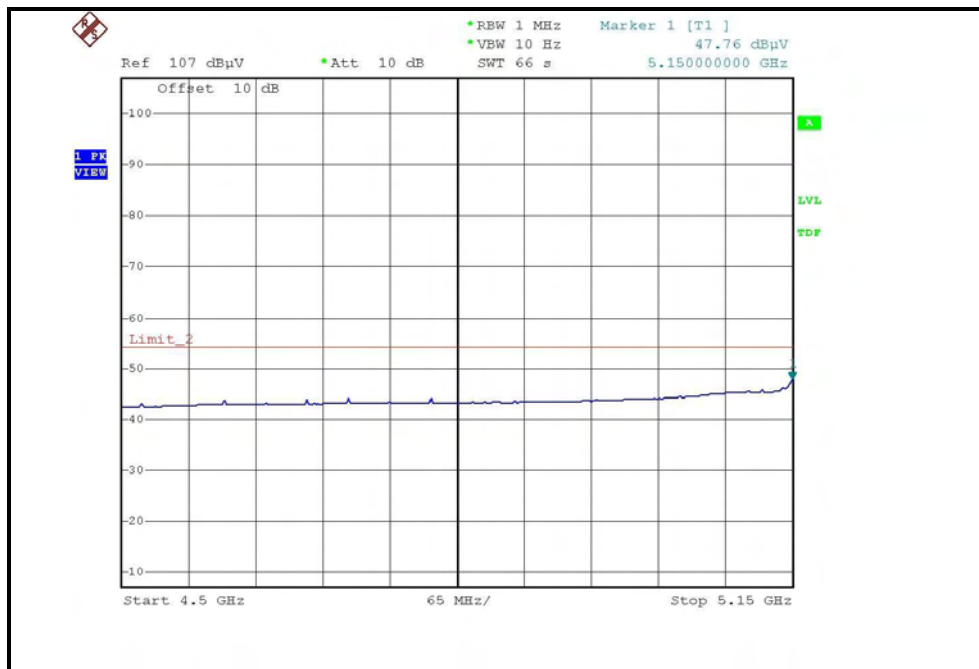
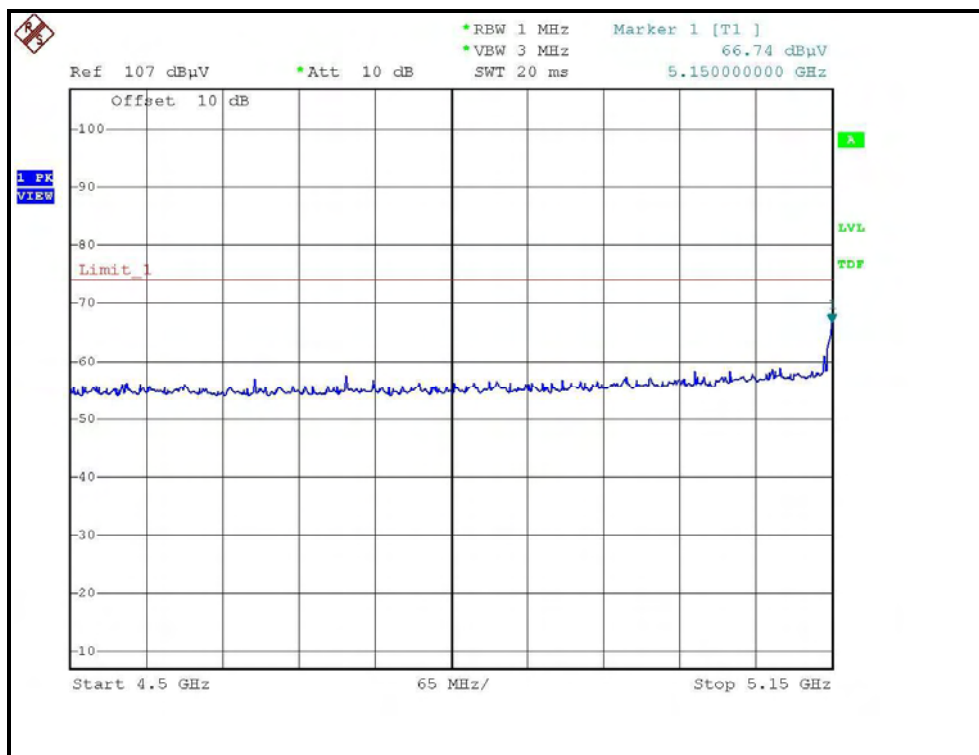
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	116.80 PK			1.23 V	252	80.45	36.35
1	*5240.00	105.00 AV			1.23 V	252	68.65	36.35
2	#5350.00	59.10 PK	74.00	-14.90	1.35 V	275	22.62	36.48
2	#5350.00	44.80 AV	54.00	-9.20	1.35 V	275	8.32	36.48
3	6986.70	65.40 PK	88.30	-22.90	1.30 V	197	24.07	41.33
4	10480.00	58.30 PK	88.30	-30.00	1.36 V	177	12.19	46.11

- NOTE:**
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.

# RESTRICTED BANDEDGE (DRAFT 802.11n (20MHz) MODE,CH1, HORIZONTAL )

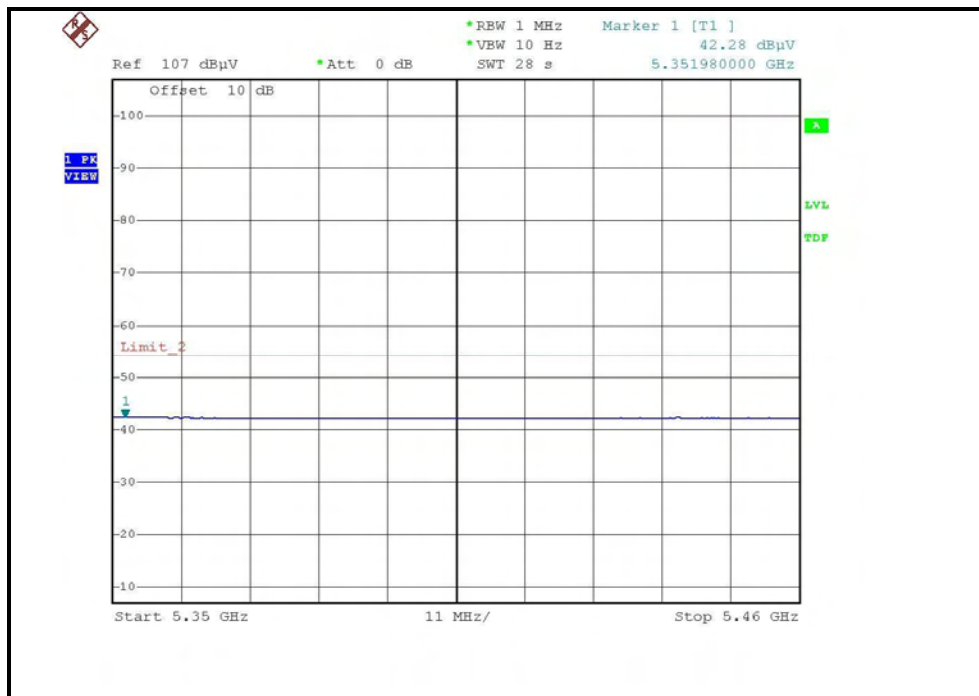
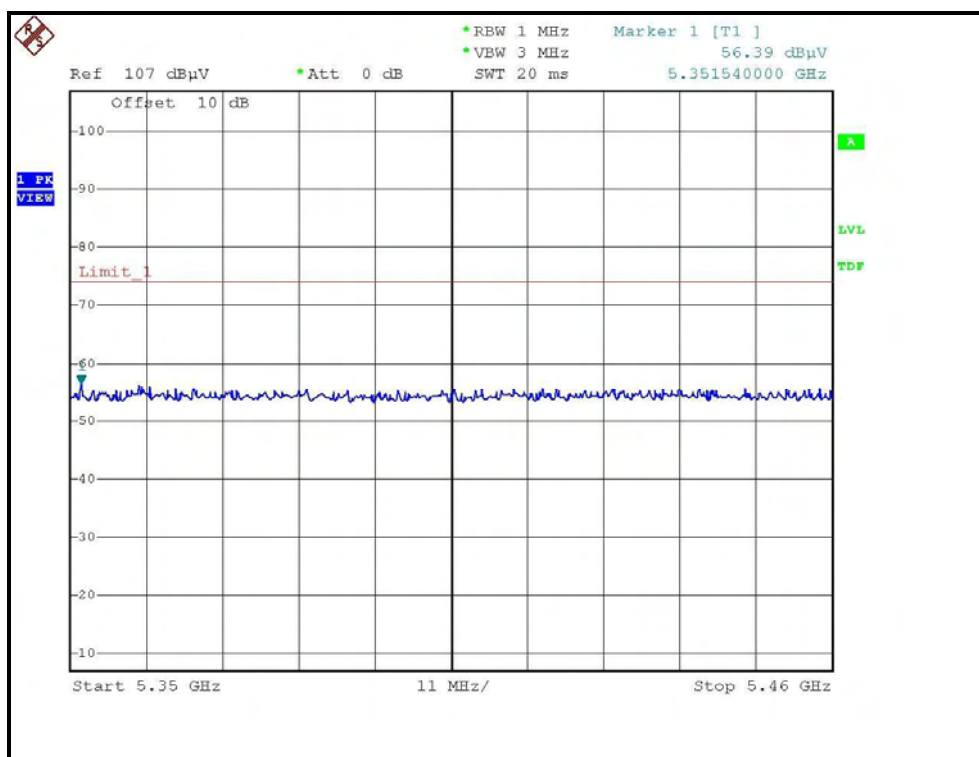


# RESTRICTED BANDEDGE (DRAFT 802.11n (20MHz) MODE,CH1, VERTICAL )

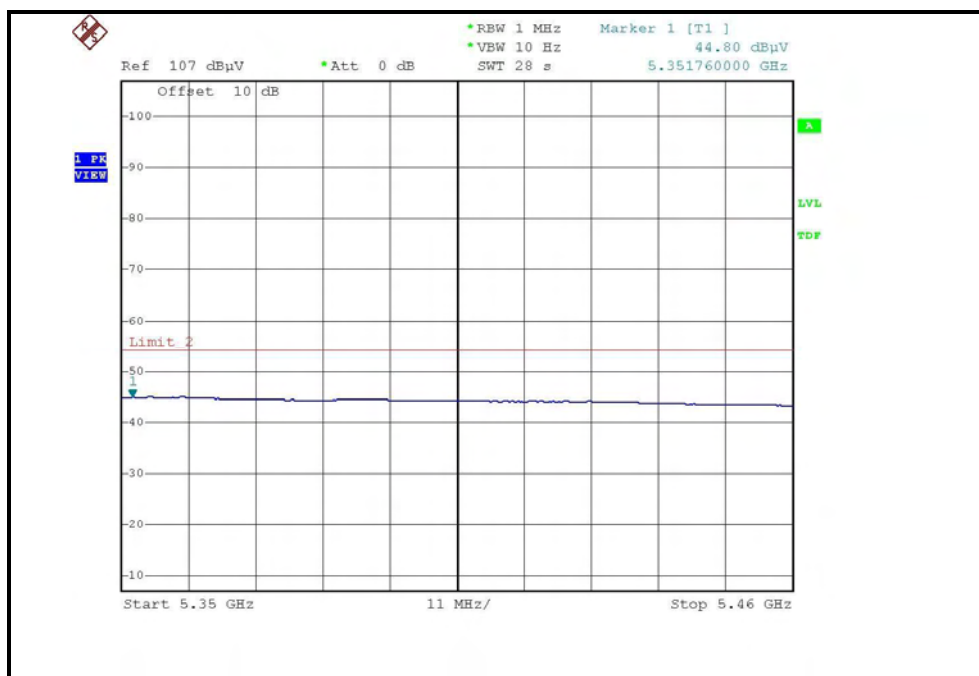
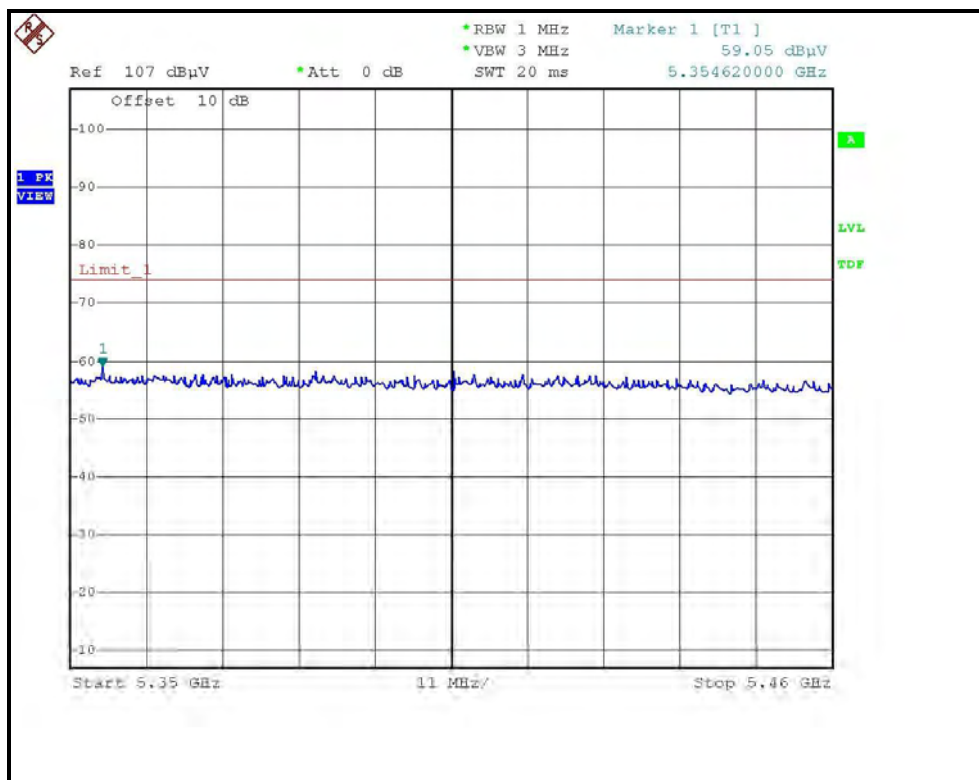




# RESTRICTED BANDEDGE (DRAFT 802.11n (20MHz) MODE, CH4, HORIZONTAL )



# RESTRICTED BANDEDGE (DRAFT 802.11n (20MHz) MODE,CH4, VERTICAL )



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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TRANSFER RATE	13.5Mbps	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	31 deg. C, 61%RH, 972hPa	TESTED BY	Phoenix Huang

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	#5150.00	54.60 PK	74.00	-19.40	1.57 H	133	18.36	36.24
1	#5150.00	42.10 AV	54.00	-11.90	1.57 H	133	5.86	36.24
2	*5190.00	93.50 PK			1.68 H	137	57.21	36.29
2	*5190.00	80.80 AV			1.68 H	137	44.51	36.29
3	6920.00	61.90 PK	88.30	-26.40	1.21 H	212	20.74	41.16
4	10380.00	56.80 PK	88.30	-31.50	1.33 H	26	10.87	45.93

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	#5150.00	70.90 PK	74.00	-3.10	1.27 V	257	34.66	36.24
1	#5150.00	53.70 AV	54.00	-0.30	1.27 V	257	17.46	36.24
2	*5190.00	109.80 PK			1.27 V	257	73.51	36.29
2	*5190.00	96.50 AV			1.27 V	257	60.21	36.29
3	6920.00	65.70 PK	88.30	-22.60	1.22 V	198	24.54	41.16
4	10380.00	57.20 PK	88.30	-31.10	1.33 V	319	11.27	45.93

- NOTE:**
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.

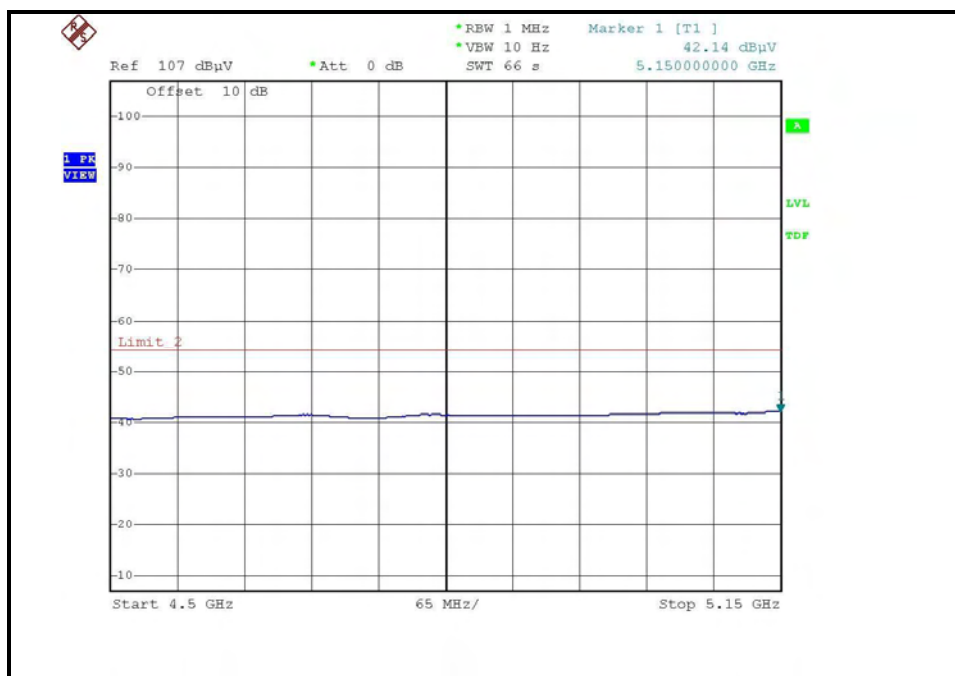
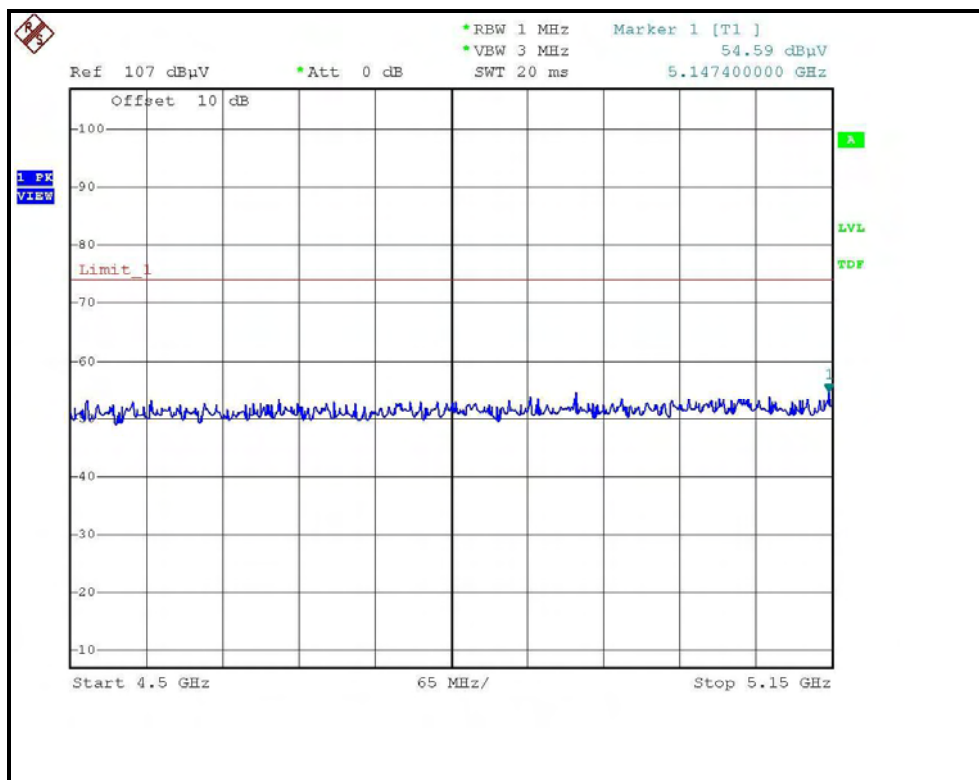
EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TRANSFER RATE	13.5Mbps	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	31 deg. C, 61%RH, 972hPa	TESTED BY	Phoenix Huang

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	*5230.00	97.50 PK			1.09 H	220	61.16	36.34
1	*5230.00	84.60 AV			1.09 H	220	48.26	36.34
2	#5350.00	56.50 PK	74.00	-17.50	1.11 H	216	20.02	36.48
2	#5350.00	42.30 AV	54.00	-11.70	1.11 H	216	5.82	36.48
3	6973.10	64.10 PK	88.30	-24.20	1.25 H	219	22.81	41.29
4	10460.00	56.20 PK	88.30	-32.10	1.20 H	311	10.12	46.08

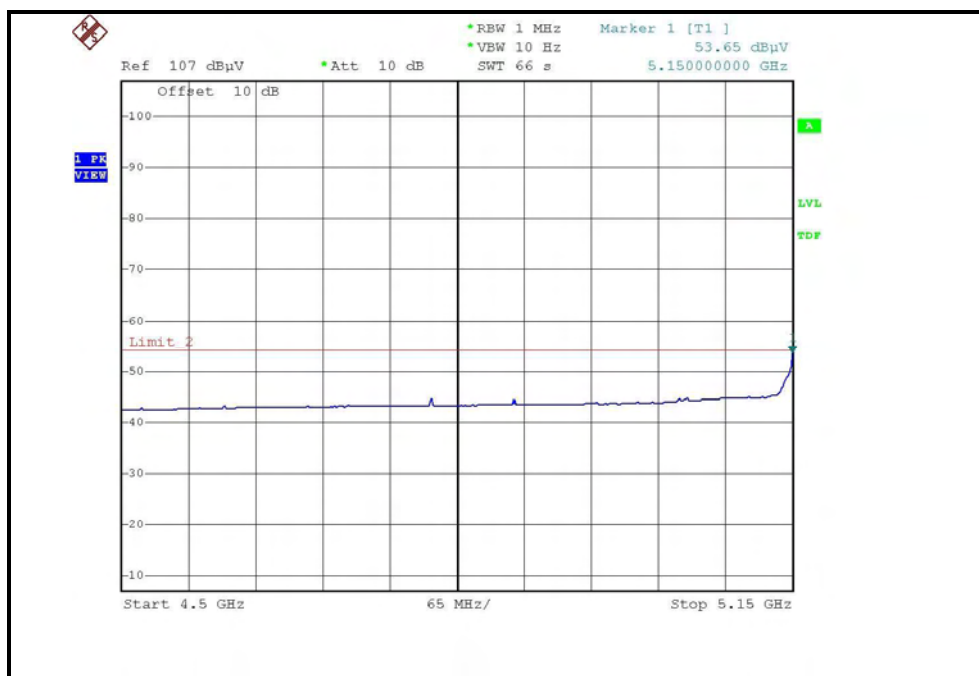
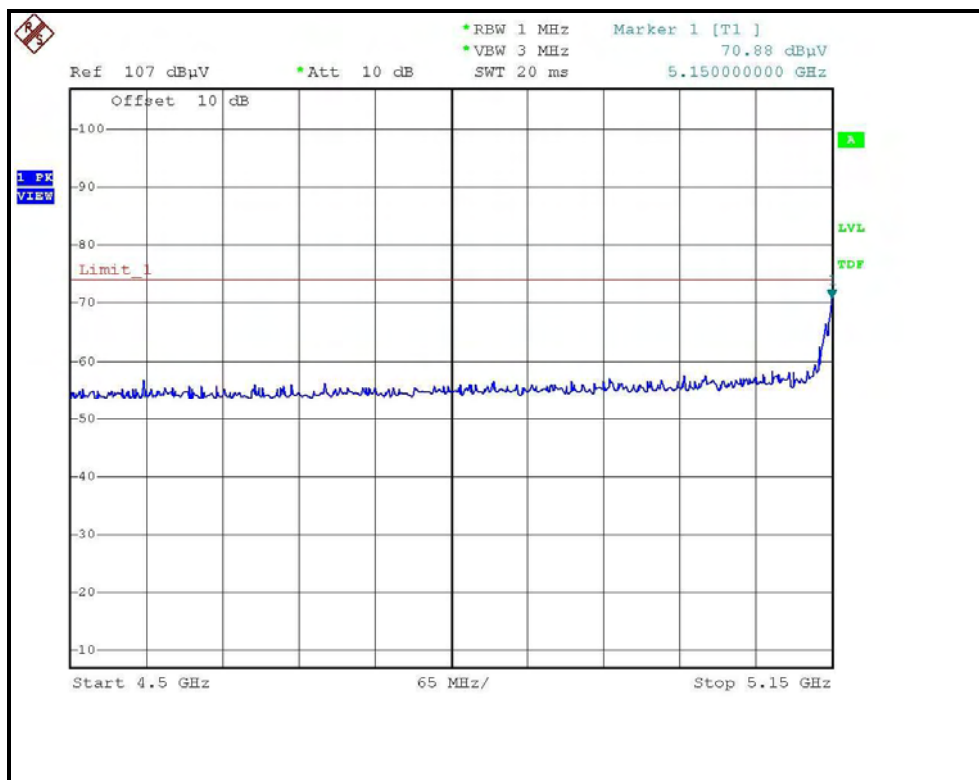
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	114.50 PK			1.36 V	292	78.16	36.34
1	*5230.00	102.30 AV			1.36 V	292	65.96	36.34
2	#5350.00	52.40 PK	74.00	-21.60	1.27 V	278	15.89	36.51
2	#5350.00	49.30 AV	54.00	-4.70	1.27 V	278	12.79	36.51
3	6973.10	56.90 PK	88.30	-31.40	1.32 V	227	15.61	41.29
4	10460.00	57.20 PK	88.30	-31.10	1.33 V	308	11.12	46.08

- NOTE:**
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.

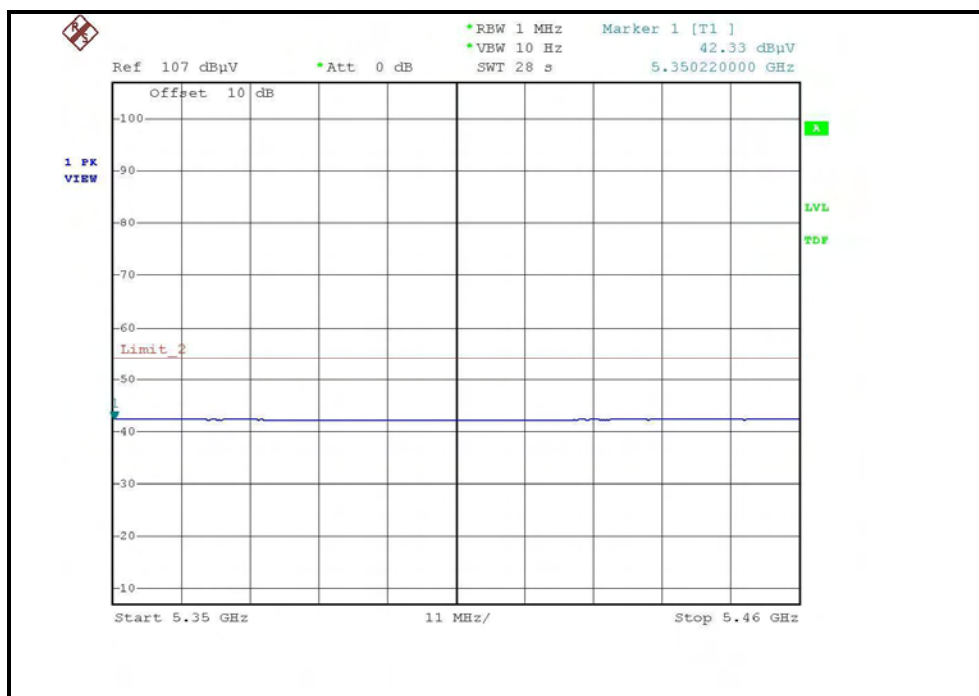
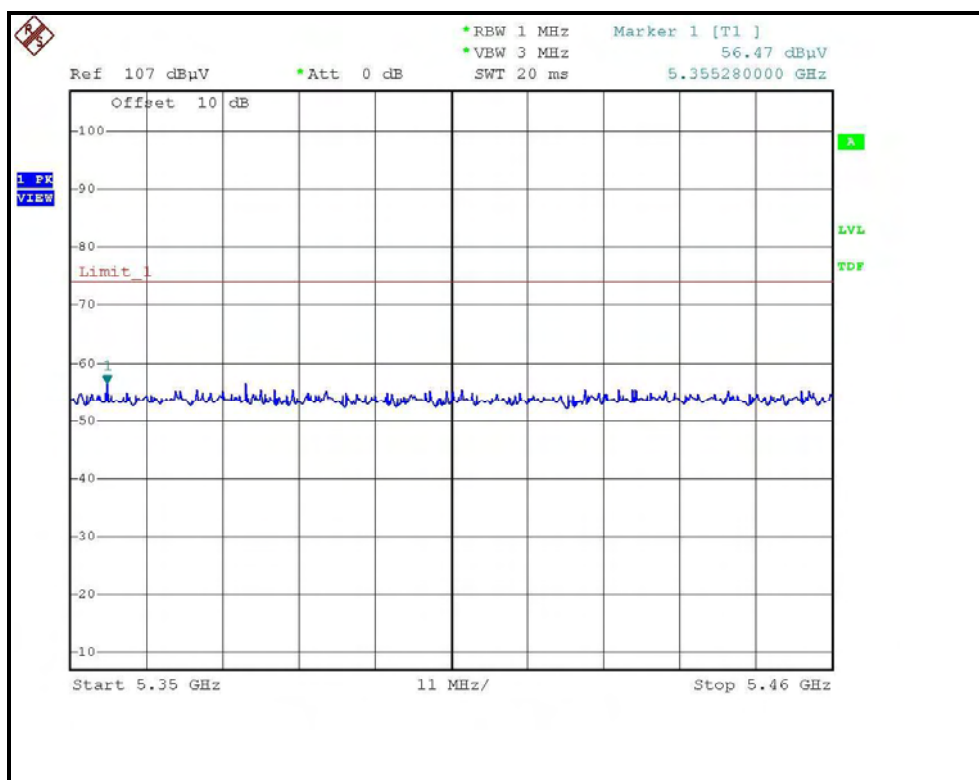
# RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE, CH1, HORIZONTAL)



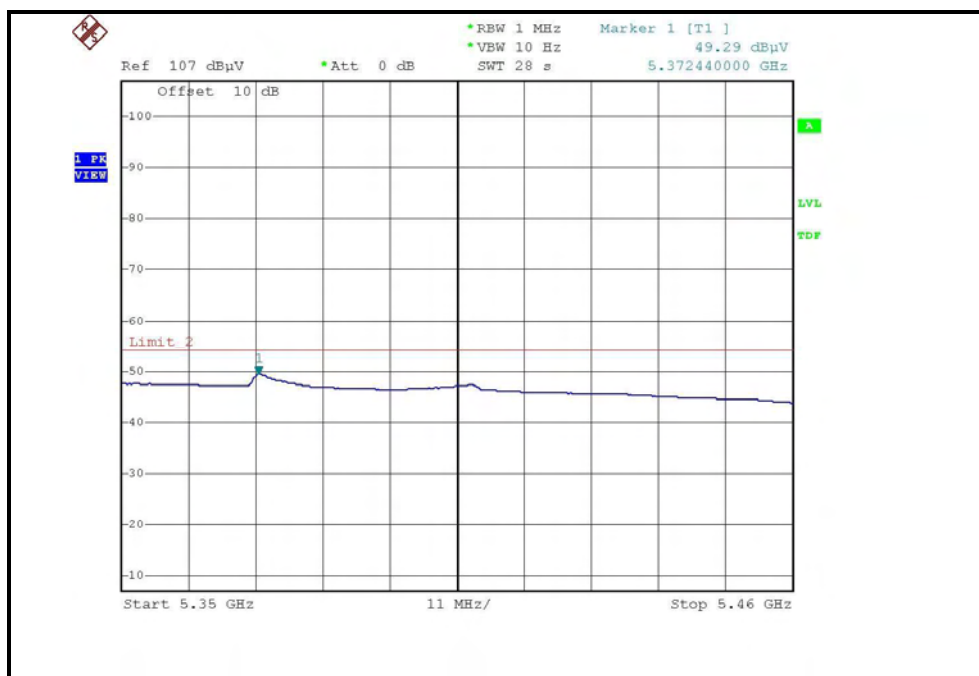
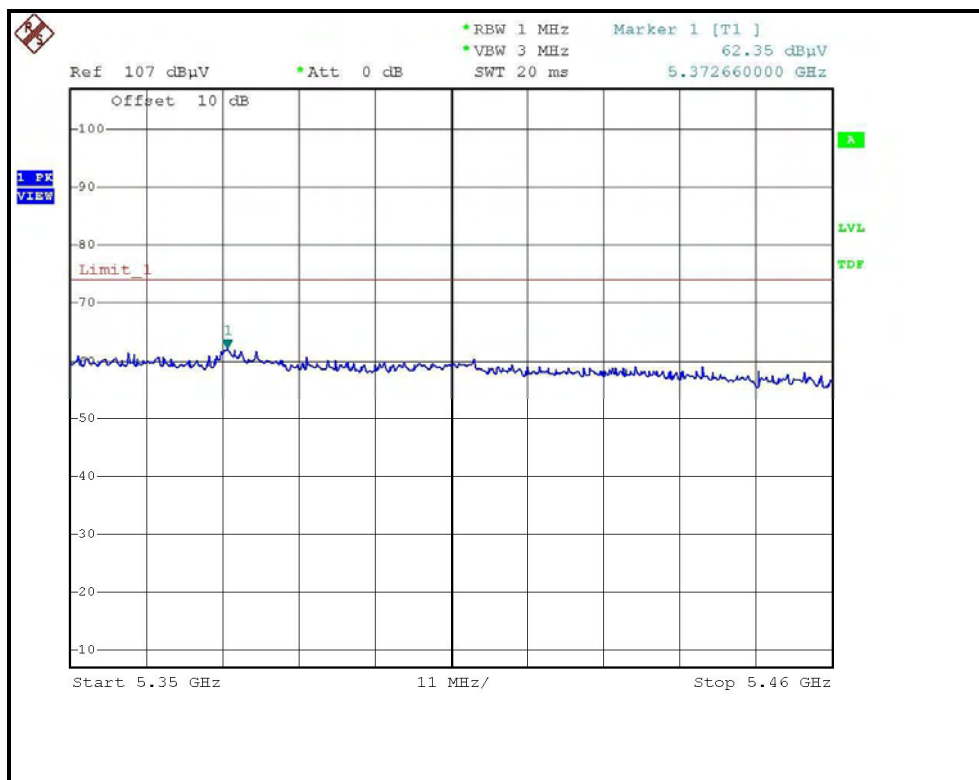
# RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE,CH1, VERTICAL )



# RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE, CH3, HORIZONTAL)



# RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE, CH3, VERTICAL)





### 4.3 PEAK TRANSMIT POWER MEASUREMENT

#### 4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

Frequency Band	Limit
5.15 – 5.25GHz	The lesser of 50mW (17dBm) or 4dBm + 10logB
5.25 – 5.35GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.47 – 5.725GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.725 – 5.825GHz	The lesser of 1W (30dBm) or 17dBm + 10logB

**NOTE:** Where B is the 26dB emission bandwidth in MHz.

#### 4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ADVANTEST SPECTRUM ANALYZER	U3772	160100280	April. 10.2008

**NOTE:**

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
- 2.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

1. The transmitter output was connected to the spectrum analyzer.
2. Set span to encompass the entire emission bandwidth of the signal.
3. Set RBW to 1MHz, VBW to 300kHz.
4. Using the spectrum analyzer's channel power measurement function to measure the output power.

**NOTE:**

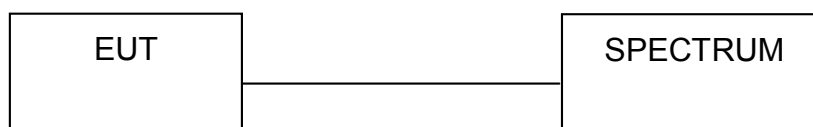
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

#### 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 specific channel frequencies individually.

#### 4.3.7 TEST RESULTS

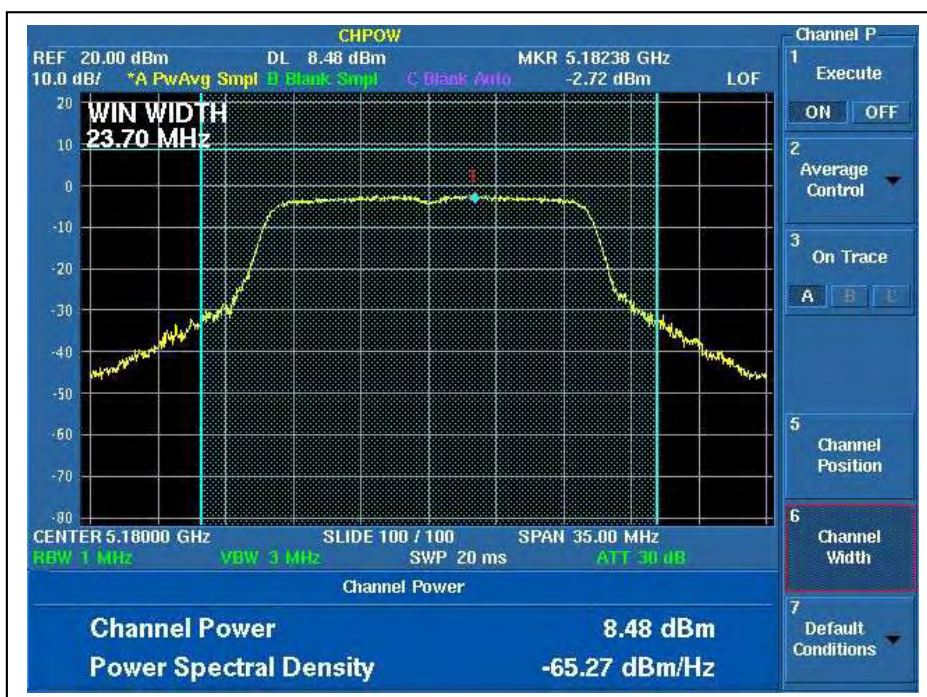
##### 802.11a OFDM MODULATION:

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	15deg.C, 65%RH, 972hPa
<b>TESTED BY</b>	Wen Yu		

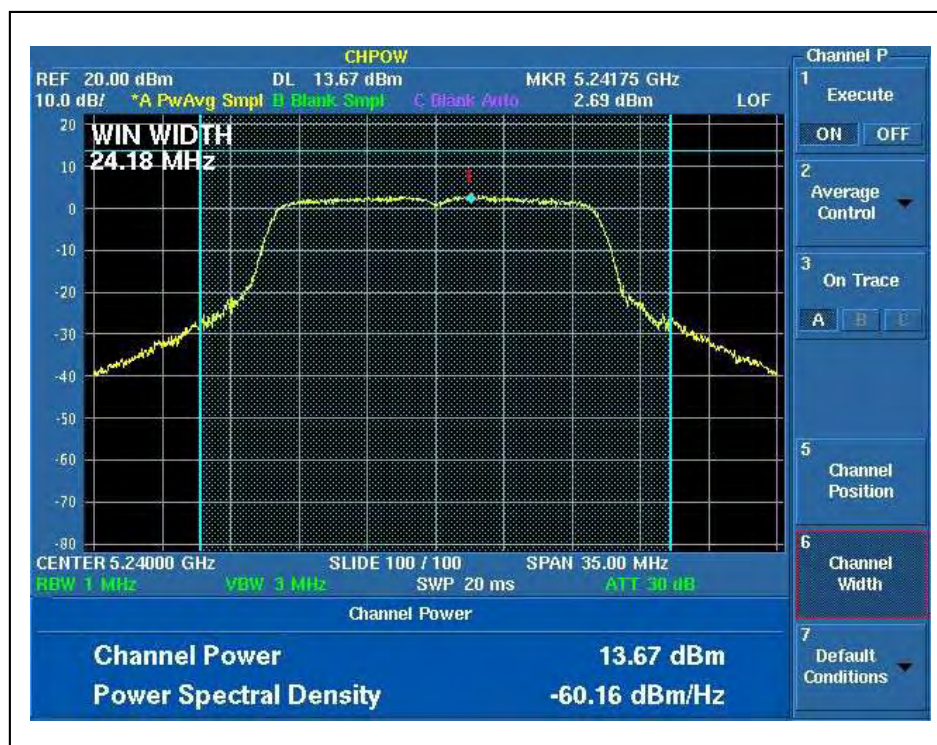
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER OUTPUT (mW)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5180	8.48	7.046	17	23.70	PASS
4	5240	13.67	23.281	17	24.18	PASS

**NOTE:** The 26dBc Occupied Bandwidth plot, please refer to the following pages.

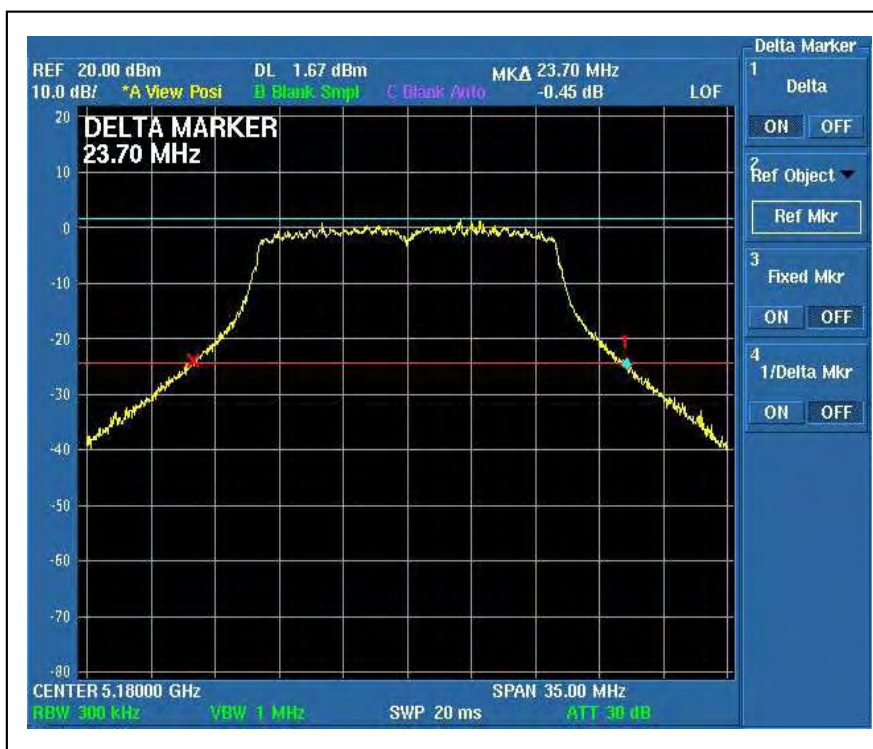
## Peak Power Output: CH1



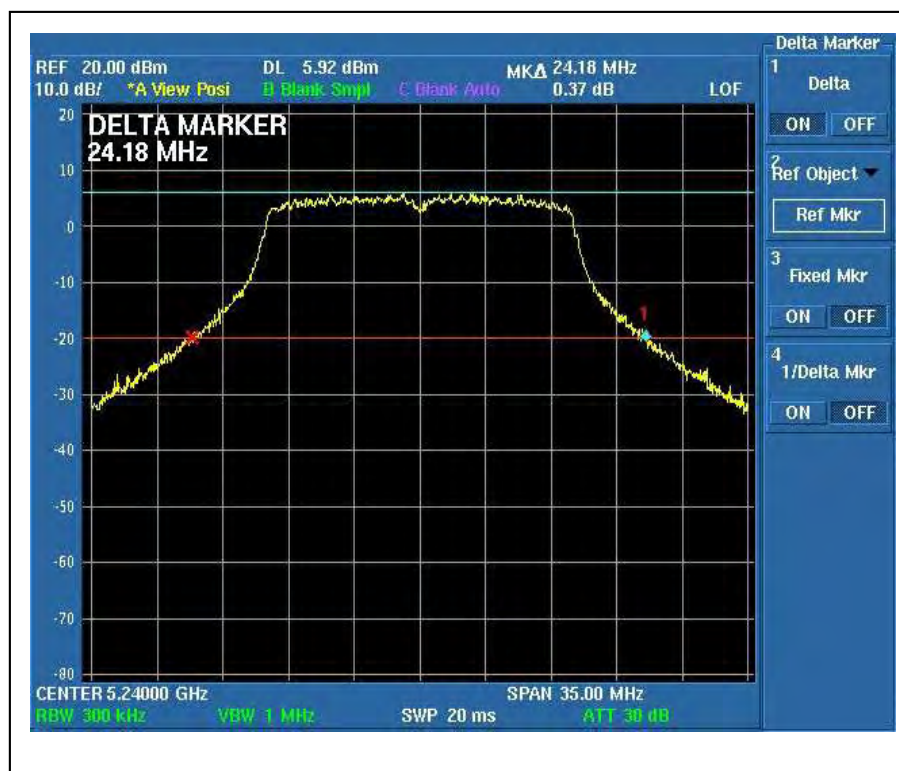
## CH4



26dB Occupied Bandwidth:  
CH1



CH4



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

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6.5Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	22deg.C, 65%RH, 972hPa
<b>TESTED BY</b>	Phoenix Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)		PEAK POWER OUTPUT (mW)		TOTAL PEAK POWER (dBm)	TOTAL PEAK POWER (mW)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)		PASS/FAIL
		Chain 0	Chain 2	Chain 0	Chain 2				Chain 0	Chain 2	
1	5180	9.56	9.86	9.04	9.68	12.70	18.719	17.00	24.95	25.62	PASS
4	5240	11.76	11.03	15.00	12.68	14.40	27.673	17.00	25.30	25.16	PASS

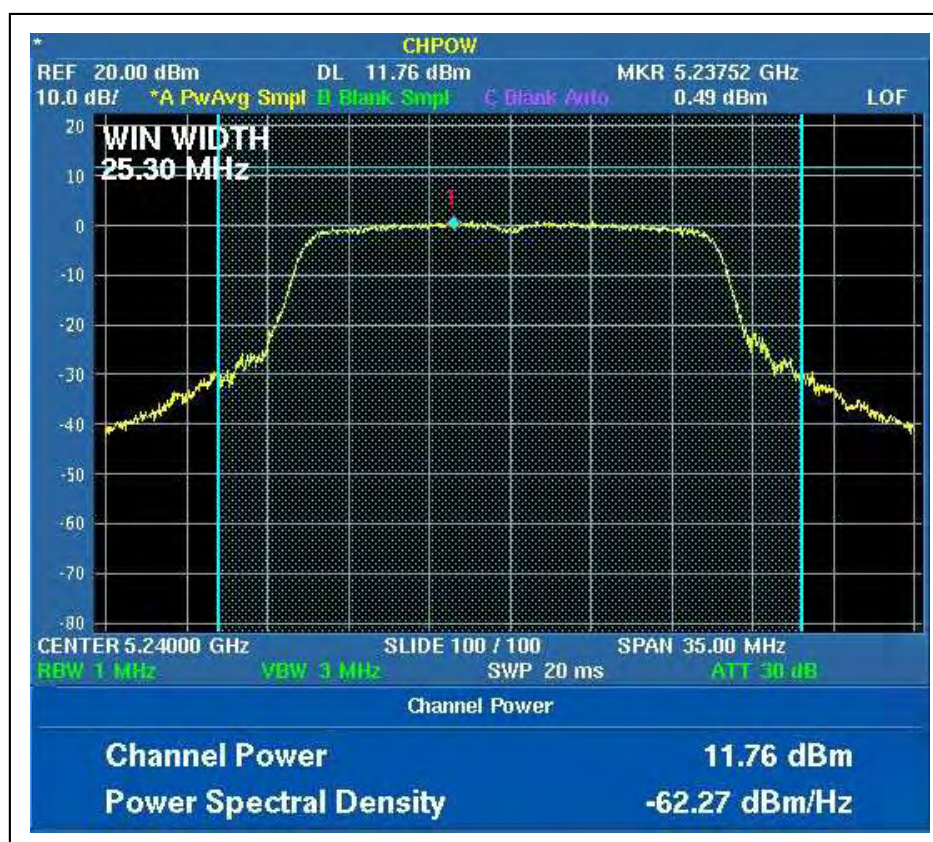
**NOTE:** The 26dBc Occupied Bandwidth plot, please refer to the following pages.



Peak Power Output:  
For Chain (0) :CH1



CH4

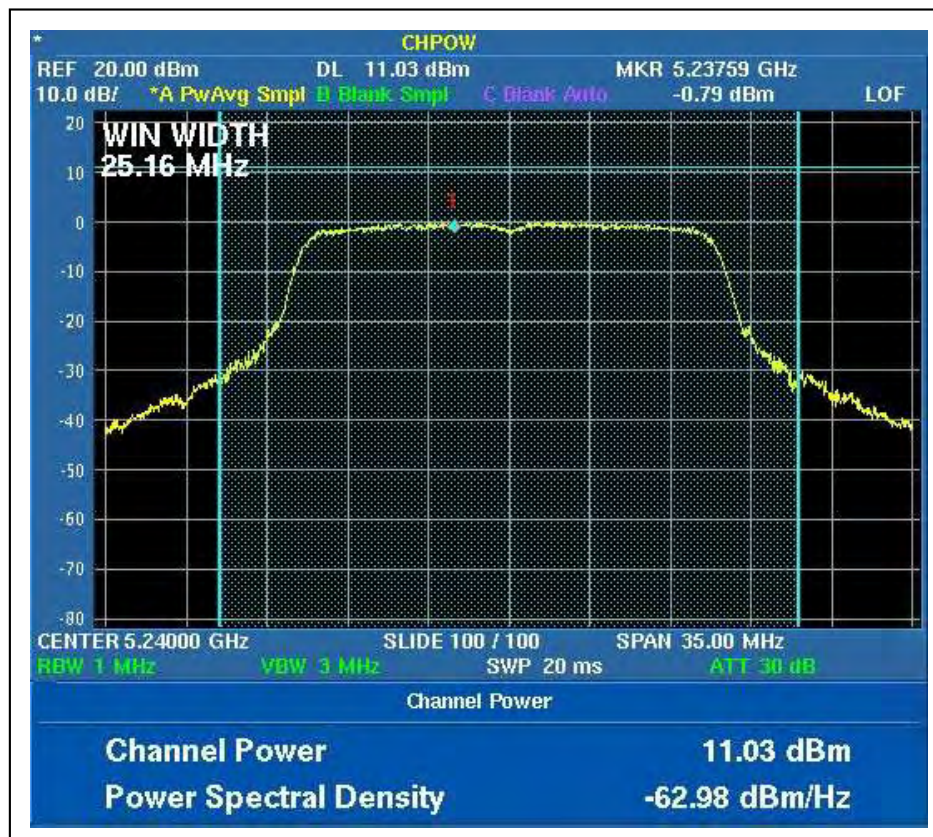




For Chain (2) :CH1

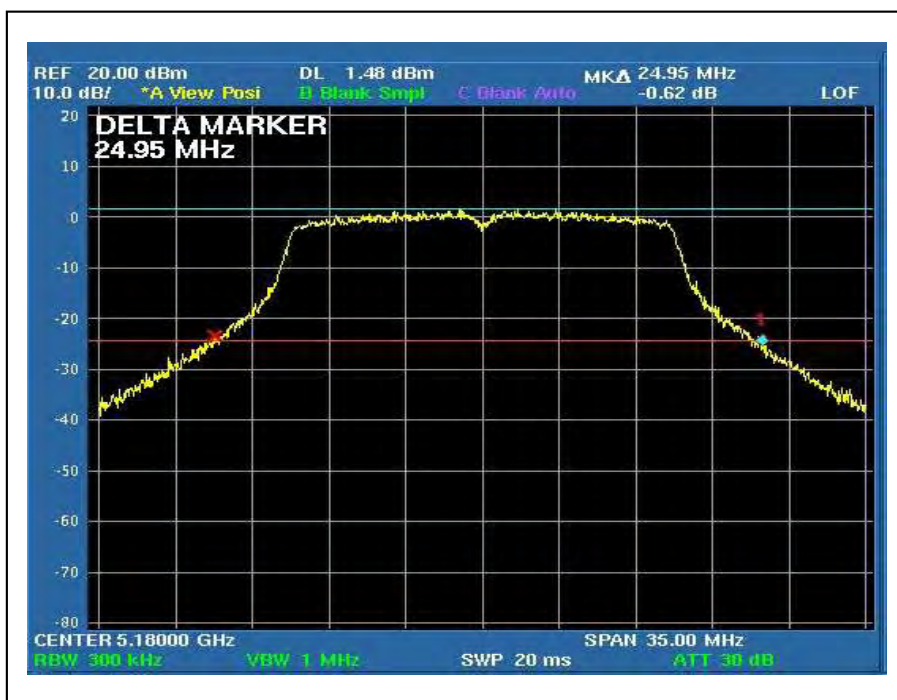


CH4





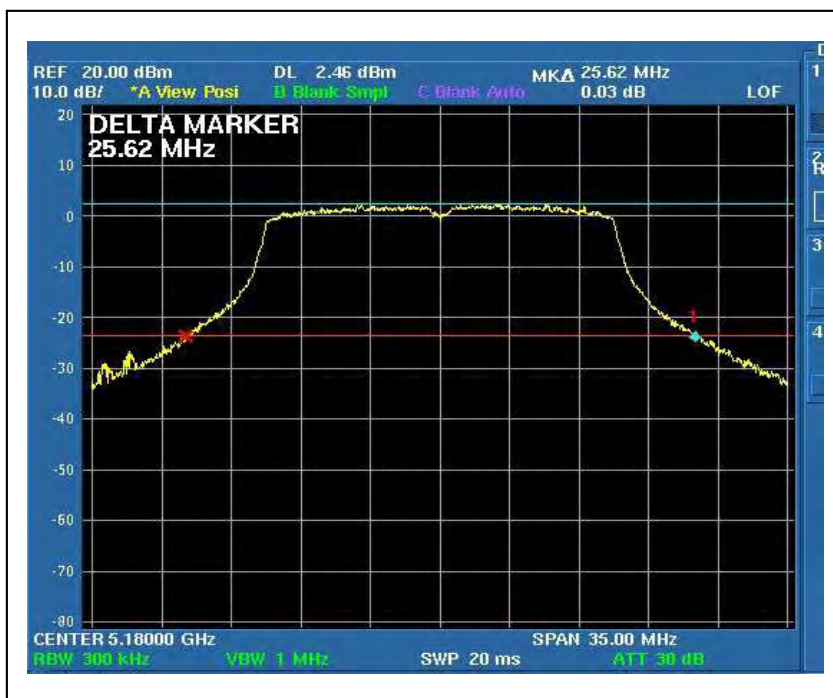
26dB Occupied Bandwidth:  
For Chain (0) :CH1



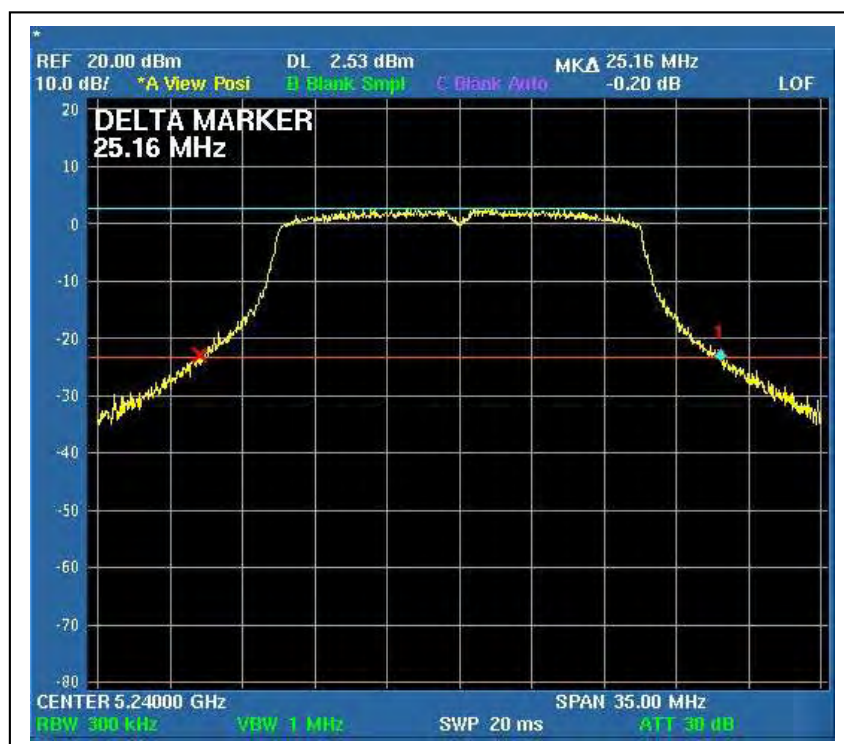
CH4



For Chain (2) :CH1



CH4



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

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	13.5Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	22deg.C, 65%RH, 972hPa
<b>TESTED BY</b>	Phoenix Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)		PEAK POWER OUTPUT (mW)		TOTAL PEAK POWER (dBm)	TOTAL PEAK POWER (mW)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)		PASS/FAIL
		Chain 0	Chain 2	Chain 0	Chain 2				Chain 0	Chain 2	
1	5190	9.64	9.29	9.20	8.49	12.50	17.696	17.00	46.09	45.76	PASS
3	5230	13.86	14.08	24.32	25.59	17.00	49.908	17.00	46.93	47.38	PASS

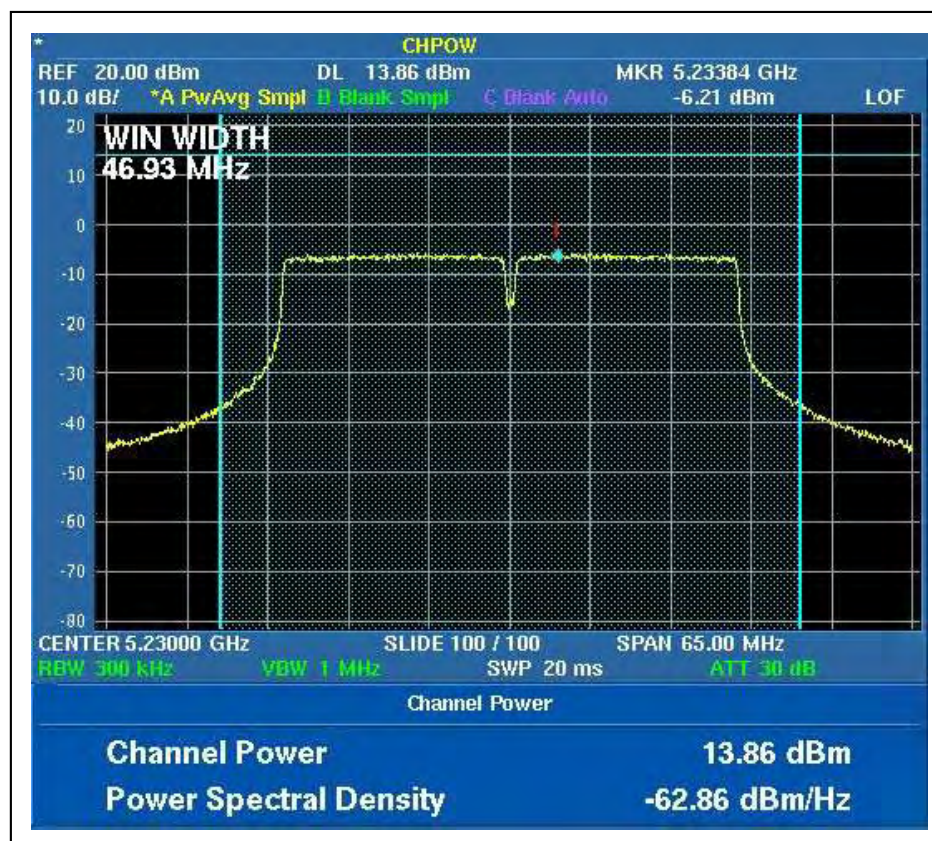
**NOTE:** The 26dBc Occupied Bandwidth plot, please refer to the following pages.



Peak Power Output:  
For Chain (0) :CH1

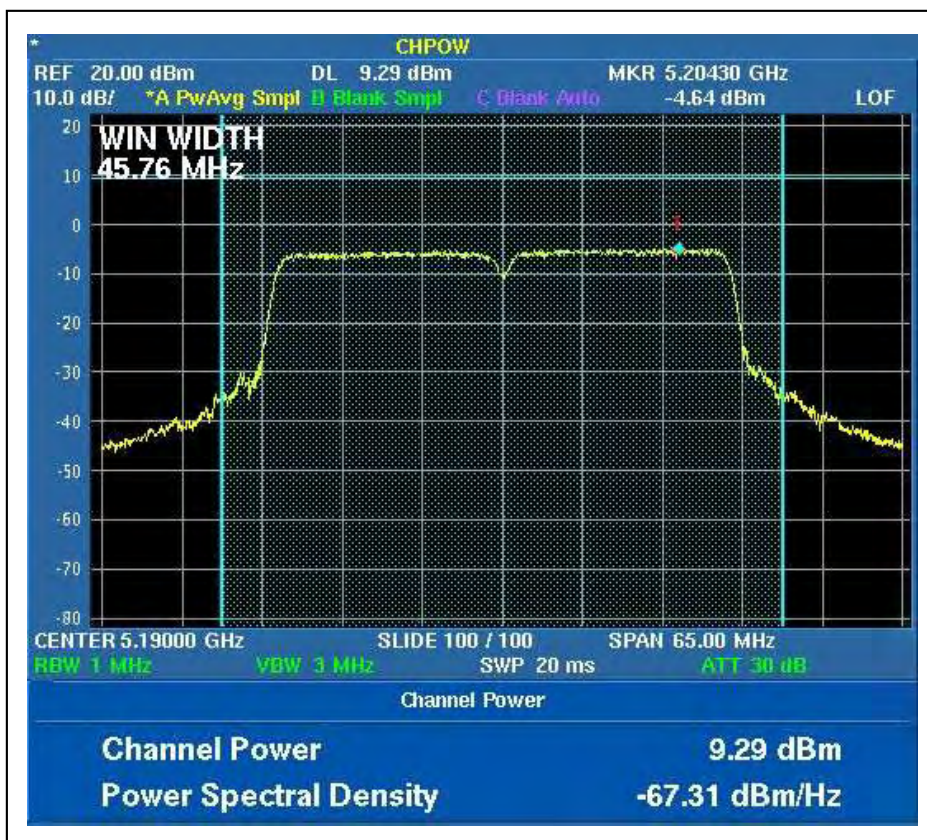


CH3

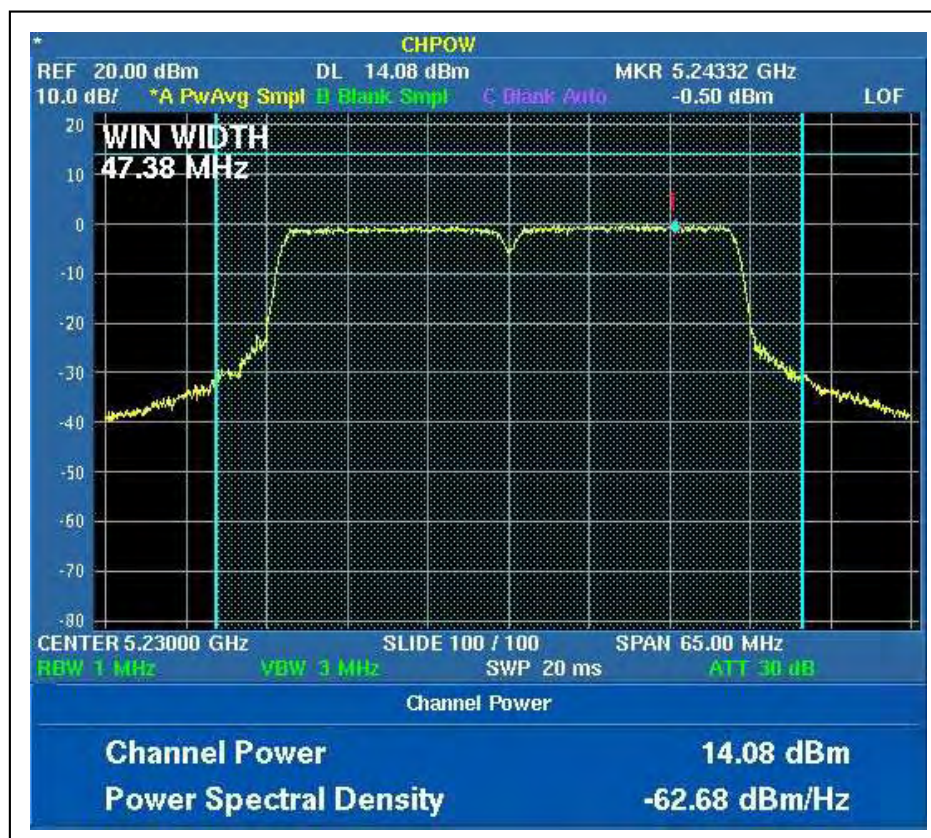




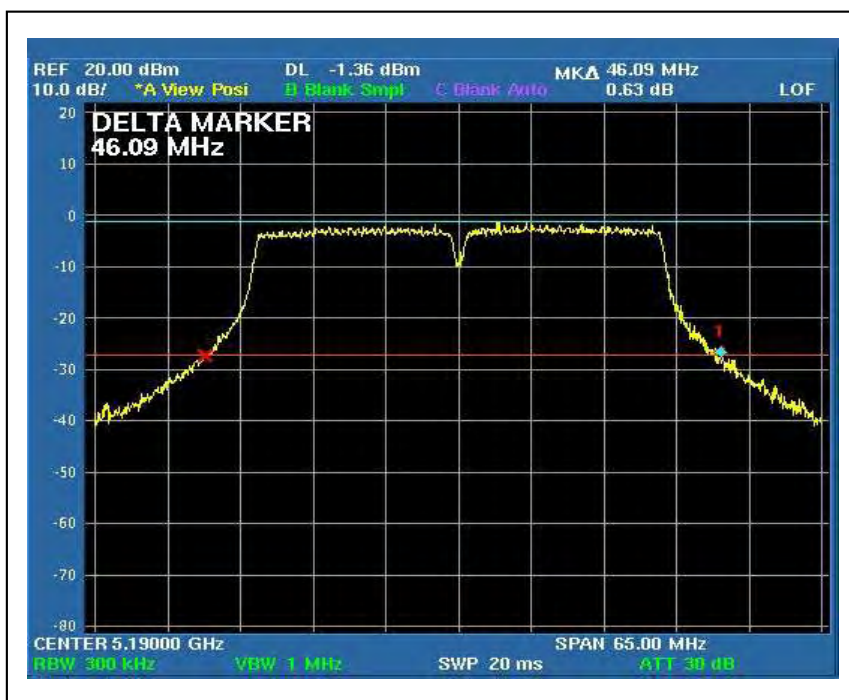
For Chain (2) :CH1



CH3



26dB Occupied Bandwidth:  
For Chain (0) :CH1

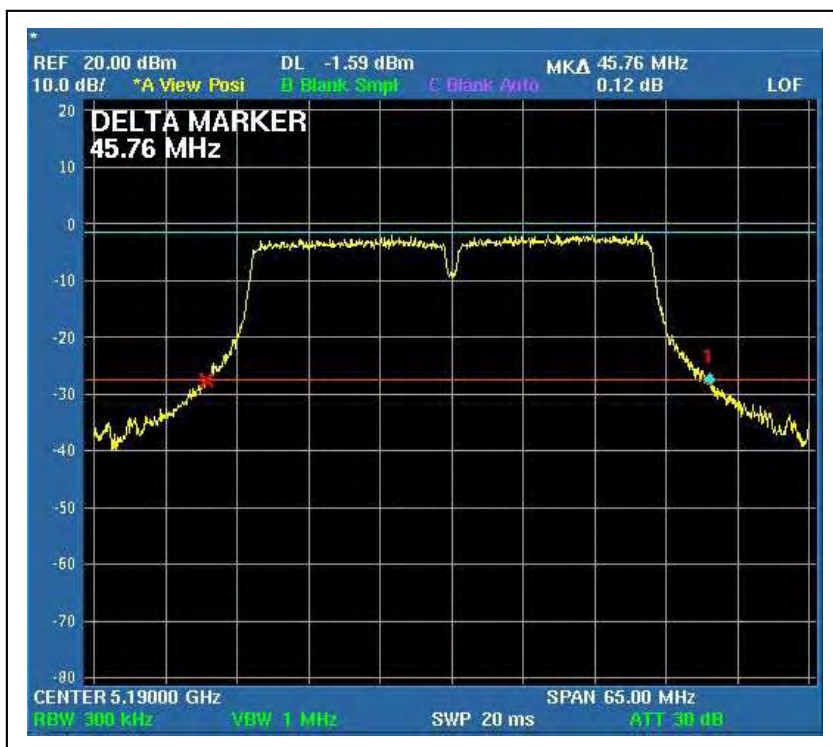


CH3





For Chain (2) :CH1



CH3

