



# FCC TEST REPORT (15.407)

**REPORT NO.:** RF110117E06-1

**MODEL NO.:** E2500

**FCC ID:** Q87-E2500

**RECEIVED:** Jan. 17, 2011

**TESTED:** Jan. 24 to Feb. 08, 2011

**ISSUED:** Feb. 24, 2011

**APPLICANT:** Cisco Consumer Products LLC

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**ISSUED BY:** Bureau Veritas Consumer Products Services  
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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	NA	Feb. 24, 2011



## 1. CERTIFICATION

**PRODUCT:** Linksys E2500 Advanced Dual-Band N Router  
**BRAND NAME:** Cisco  
**MODEL NO.:** E2500  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**APPLICANT:** Cisco Consumer Products LLC  
**TESTED:** Jan. 24 to Feb. 08, 2011  
**STANDARDS:** FCC Part 15, Subpart E (Section 15.407)  
ANSI C63.4-2003  
ANSI C63.10-2009

The above equipment (Model: E2500) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, 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** : Midoli Peng , **DATE:** Feb. 24, 2011  
(Midoli Peng, Specialist)

**APPROVED BY** : May Chen , **DATE:** Feb. 24, 2011  
(May Chen, Deputy Manager )

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

For 802.11a

<b>APPLIED STANDARD: FCC Part 15, Subpart E (Section 15.407)</b>			
<b>Standard Section</b>	<b>Test Type</b>	<b>Result</b>	<b>Remark</b>
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -4.17dB at 0.150MHz
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 -1.0dB at 10400.0MHz, 15600.0MHz, 10480.0MHz & 15720.0MHz
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.
15.203	Antenna Requirement	PASS	No antenna connector is used.

**NOTE:**

1. The EUT was operating in 2400 ~ 2483.5MHz, 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 2400 ~ 2483.5MHz 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 16-4-2:

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

Measurement	Value
Conducted emissions	2.45 dB
Radiated emissions (30MHz-1GHz)	3.76 dB
Radiated emissions (1GHz -18GHz)	2.49 dB
Radiated emissions (18GHz -40GHz)	2.70 dB



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### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Linksys E2500 Advanced Dual-Band N Router
<b>MODEL NO.</b>	E2500
<b>FCC ID</b>	Q87-E2500
<b>POWER SUPPLY</b>	DC 12V from power 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>	802.11a/g : 54/48/36/24/18/12/9/6Mbps 802.11b :11/5.5/2/1Mbps 802.11n (20MHz, 800ns GI): 130 / 117 / 104 / 78 / 52 / 39 / 26/ 13 / 65 / 58.5 / 52 / 39 / 26 / 19.5 /13 / 6.5Mbps 802.11n (40MHz, 800ns GI): 270 / 243 / 216 / 162 / 108 /81 / 54 / 27 /135 / 121.5 / 108 / 81 /54 / 40.5 / 27 / 13.5Mbps
<b>OPERATING FREQUENCY</b>	<b>For 15.407</b> 802.11a: 5.18 ~ 5.24GHz <b>For 15.247</b> 802.11b & 802.11g: 2.412 ~ 2.462GHz 802.11a: 5.745 ~ 5.825GHz
<b>NUMBER OF CHANNEL</b>	<b>For 15.407</b> 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) <b>For 15.247(2.4GHz)</b> 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz) <b>For 15.247(5GHz)</b> 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)





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<b>MAXIMUM OUTPUT POWER</b>	<b>For 15.407</b> 802.11a: 21.9mW 802.11n (20MHz): 24.5mW 802.11n (40MHz): 44.9mW <b>For 15.247(2.4GHz)</b> 802.11b: 109.6mW 802.11g: 204.2mW 802.11n (20MHz): 437.6mW 802.11n (40MHz): 329.9mW <b>For 15.247(5GHz)</b> 802.11a: 229.1mW 802.11n (20MHz): 372.5mW 802.11n (40MHz): 390.1mW
<b>ANTENNA TYPE</b>	Please see note 1
<b>DATA CABLE</b>	RJ-45 Cable(unshielded, 1.8m)
<b>I/O PORTS</b>	LAN port (10,100,1000Mbps) x 4 WAN port x 1
<b>ASSOCIATED DEVICES</b>	Adapter x 1

**NOTE:**

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

Transmitter Circuit	Antenna Type	Connector	2.4GHz Gain (dBi)	5 GHz Gain (dBi)
Chain (0)	PIFA	NA	3.5	5
Chain (1)	PIFA	NA	3.5	5

2. The EUT must be supplied with a power adapter and following three different model names could be chosen:

<b>Adapter 1</b>	
<b>BRAND</b>	Bestec
<b>MODEL</b>	EA0121WAA
<b>INPUT POWER</b>	AC 100-240V, 50/60Hz, 0.5A
<b>OUTPUT POWER</b>	DC 12V, 1A DC Cable: 1.5m unshielded
<b>Adapter 2</b>	
<b>BRAND</b>	Leader
<b>MODEL</b>	MU12-G120100-A1
<b>INPUT POWER</b>	AC 100-240V, 50/60Hz, 0.5A
<b>OUTPUT POWER</b>	DC 12V, 1A DC Cable: 1.5m unshielded
<b>Adapter 3</b>	
<b>BRAND</b>	Leader
<b>MODEL</b>	IU18-2120100-WP
<b>INPUT POWER</b>	AC 100-240V, 50/60Hz, 0.5A
<b>OUTPUT POWER</b>	DC 12V, 1A DC Cable: 1.5m unshielded

For radiated test, the EUT was pre-tested with above adapters, the worse case was found in adapter 3. Therefore only the test data of the adapter was recorded in this report.

3. Conducted emission and Radiated emission of the simultaneous operation has been evaluated and no non-compliance found.
4. The EUT incorporates a MIMO function with 802.11n.
5. The EUT is 2 \* 2 spatial MIMO (2Tx & 2Rx) without beam forming function. The 11a/b/g legacy mode is limited to single transmitter only.
6. When the EUT operating in 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 15.
7. The EUT complies with 802.11n standards and backwards compatible with 802.11a, 802.11b, 802.11g products.
8. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.



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### 3.2 DESCRIPTION OF TEST MODES

#### Operated in 5150MHz ~ 5250MHz bands:

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

CHANNEL	FREQUENCY
36	5180 MHz
40	5200 MHz
44	5220 MHz
48	5240 MHz

Two channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY
38	5190 MHz
46	5230 MHz



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

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE < 1G	RE ≥ 1G	APCM	
1	√	-	-	-	With Adapter 1
2	√	-	-	-	With Adapter 2
3	√	√	√	√	With Adapter 3

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

### ANTENNA COMBINATION MODE:

COMBINATION MODE	OPERATION MODE	TX CHAIN(0)	TX CHAIN(1)
A	802.11 a	√	-
B	802.11 a	-	√
C	802.11n(20MHz) for MCS0~15	√	√
D	802.11n(40MHz) for MCS0~15	√	√

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. 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)	COMBINATION MODE
802.11n (20MHz)	36 to 48	36	OFDM	BPSK	6.5	C

**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)	COMBINATION MODE
802.11n (20MHz)	36 to 48	36	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)	COMBINATION MODE
802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6	A
802.11n (20MHz)	36 to 48	36, 40, 48	OFDM	BPSK	6.5	C
802.11n (40MHz)	38 to 46	38, 46	OFDM	BPSK	13.5	D

**CONDUCTED OUT-BAND EMISSION 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)	COMBINATION MODE
802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6	A
802.11n (20MHz)	36 to 48	36, 40, 48	OFDM	BPSK	6.5	C
802.11n (40MHz)	38 to 46	38, 46	OFDM	BPSK	13.5	D

- ✧ After verification, conducted out band emission as show worst chain in report by investigations.



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**ANTENNA PORT CONDUCTED MEASUREMENT:**

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- 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)	COMBINATION MODE
802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6	A
802.11n (20MHz)	36 to 48	36, 40, 48	OFDM	BPSK	6.5	C
802.11n (40MHz)	38 to 46	38, 46	OFDM	BPSK	13.5	D

※ After verification, bandwidth as show worst chain in report by investigations.

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	16deg. C, 67%RH, 1025 hPa	120Vac, 60Hz	Kent Liu
RE<1G	20deg. C, 70%RH, 1025 hPa	120Vac, 60Hz	Eric Lee
PLC	21deg. C, 59%RH, 1025 hPa	120Vac, 60Hz	Scott Chen
APCM	25deg. C, 60%RH, 1025 hPa	120Vac, 60Hz	Rex Huang



### **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 E (15.407)**

**ANSI C63.4-2003**

**ANSI C63.10-2009**

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

**NOTE:** The EUT 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.

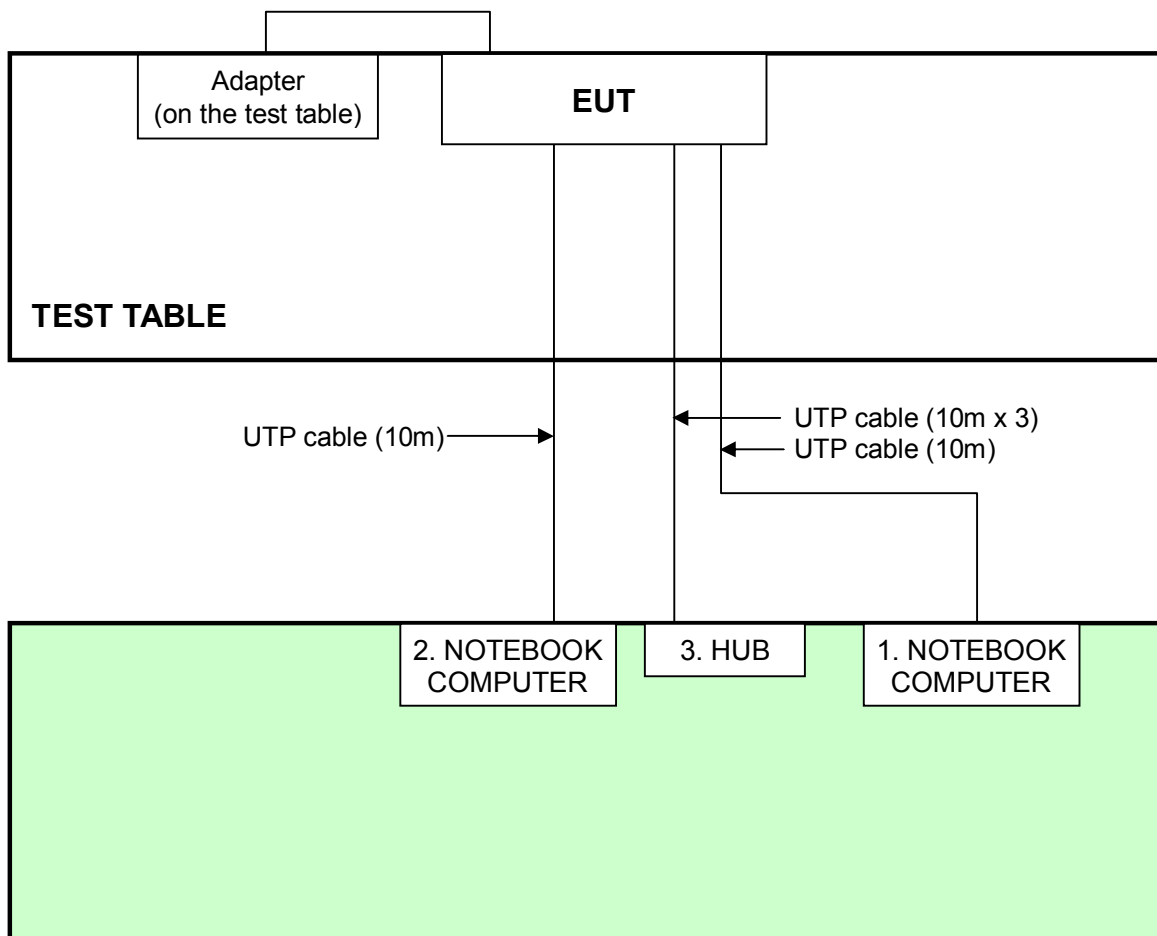
No.	Product	Brand	Model No.	Serial No.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP17L	CN-ONF743-48643- 7AV-0124	FCC DoC
2	NOTEBOOK COMPUTER	DELL	D531	CN-0XM006-48643- 86L-4472	QDS-BRCM1019
3	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC

No.	Signal cable description
1	UTP Cable (10m)
2	UTP Cable (10m)
3	UTP Cable (10m)

Note: The power cords of the above support units were unshielded (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 DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	100287	Mar. 01, 2010	Feb. 28, 2011
Line-Impedance Stabilization Network (for EUT)	NSLK 8127	8127-523	Sep. 17, 2010	Sep. 16, 2011
Line-Impedance Stabilization Network (for Peripheral)	ENV-216	100072	June 11, 2010	June 10, 2011
RF Cable (JYEBAO)	5DFB	CONCAB-003	Aug. 06, 2010	Aug. 05, 2011
50 ohms Terminator	50	3	Nov. 03, 2010	Nov. 02, 2011
Software	BV ADT_Cond_V7.3.7	NA	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 Shielded Room No. A.
3. The VCCI Con A Registration No. is C-817.

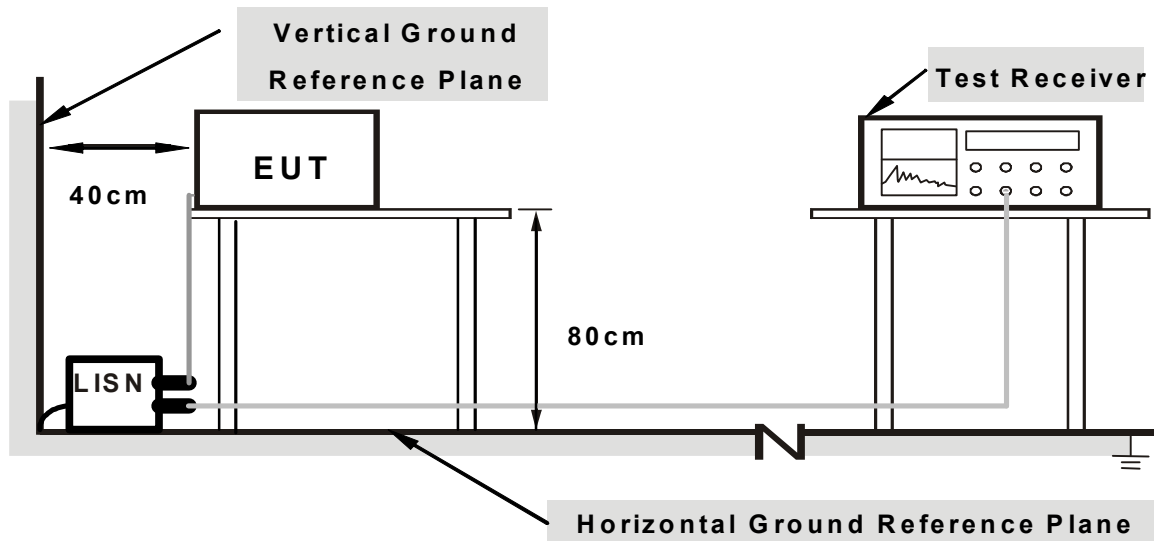
#### 4.1.3 TEST PROCEDURES

- 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

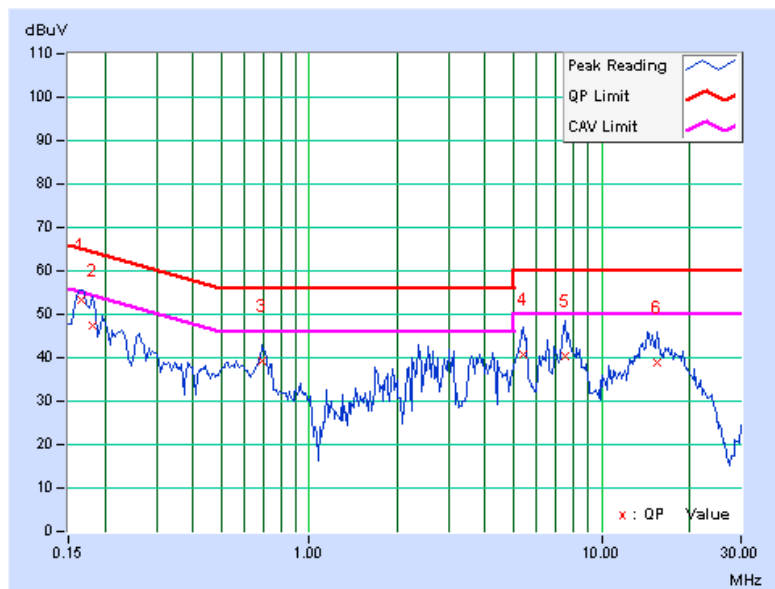
1. Placed the EUT on testing table.
2. Prepared other computer systems (support units 1~2) to act as communication partners and placed them outside of testing area.
3. The communication partners ran test program “E2500 command.txt” to enable EUT under transmission/receiving condition continuously via UTP cables transmission.

### 4.1.7 TEST RESULTS (With adapter 1)

<b>PHASE</b>	Line (L)	<b>6dB BANDWIDTH</b>	9 kHz
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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	0.36	53.10	-	53.46	-	65.18	55.18	-11.71	-
2	0.181	0.36	46.90	-	47.26	-	64.43	54.43	-17.17	-
3	0.689	0.38	38.93	-	39.31	-	56.00	46.00	-16.69	-
4	5.367	0.55	40.15	-	40.70	-	60.00	50.00	-19.30	-
5	7.512	0.62	39.88	-	40.50	-	60.00	50.00	-19.50	-
6	15.527	1.00	37.96	-	38.96	-	60.00	50.00	-21.04	-

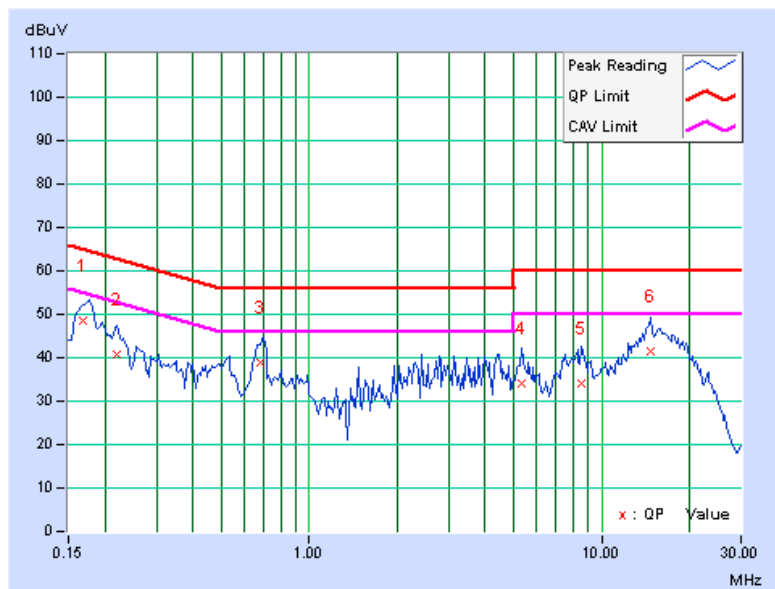
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>PHASE</b>	Neutral (N)	<b>6dB BANDWIDTH</b>	9 kHz
--------------	-------------	----------------------	-------

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	0.168	0.10	48.38	-	48.48	-	65.04	55.04	-16.56	-
2	0.220	0.10	40.77	-	40.87	-	62.81	52.81	-21.93	-
3	0.681	0.13	38.67	-	38.80	-	56.00	46.00	-17.20	-
4	5.301	0.29	33.91	-	34.20	-	60.00	50.00	-25.80	-
5	8.531	0.42	33.52	-	33.94	-	60.00	50.00	-26.06	-
6	14.809	0.92	40.57	-	41.49	-	60.00	50.00	-18.51	-

- 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.

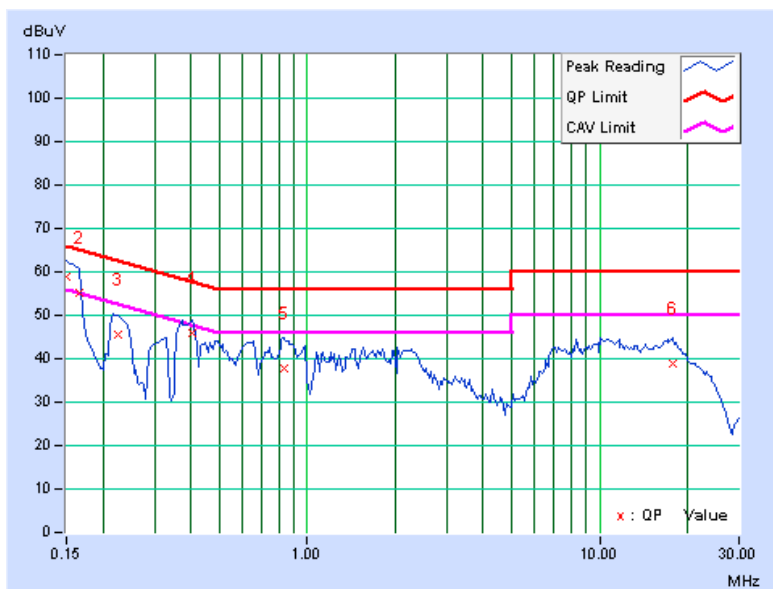


#### 4.1.8 TEST RESULTS (With adapter 2)

<b>PHASE</b>	Line (L)	<b>6dB BANDWIDTH</b>	9 kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.150	0.36	58.71	47.88	59.07	48.24	66.00
2	0.166	0.36	54.76	-	55.12	-	65.18	55.18	-10.06	-
3	0.225	0.36	45.23	-	45.59	-	62.64	52.64	-17.05	-
4	0.404	0.36	45.46	-	45.82	-	57.77	47.77	-11.95	-
5	0.838	0.40	37.28	-	37.68	-	56.00	46.00	-18.32	-
6	17.824	1.02	37.99	-	39.01	-	60.00	50.00	-20.99	-

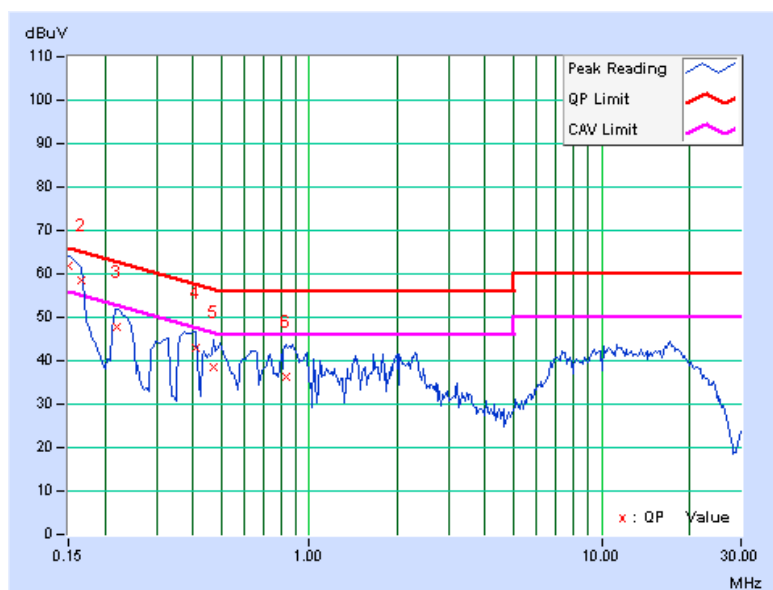
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>PHASE</b>	Neutral (N)	<b>6dB BANDWIDTH</b>	9 kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.10	61.73	48.69	61.83	48.79	65.99	55.99	-4.17	-7.21
2	0.166	0.10	58.34	40.34	58.44	40.44	65.17	55.17	-6.74	-14.74
3	0.220	0.10	47.79	-	47.89	-	62.81	52.81	-14.91	-
4	0.408	0.11	42.91	-	43.02	-	57.69	47.69	-14.67	-
5	0.470	0.12	38.23	-	38.35	-	56.51	46.51	-18.16	-
6	0.830	0.15	36.17	-	36.32	-	56.00	46.00	-19.68	-

- 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.



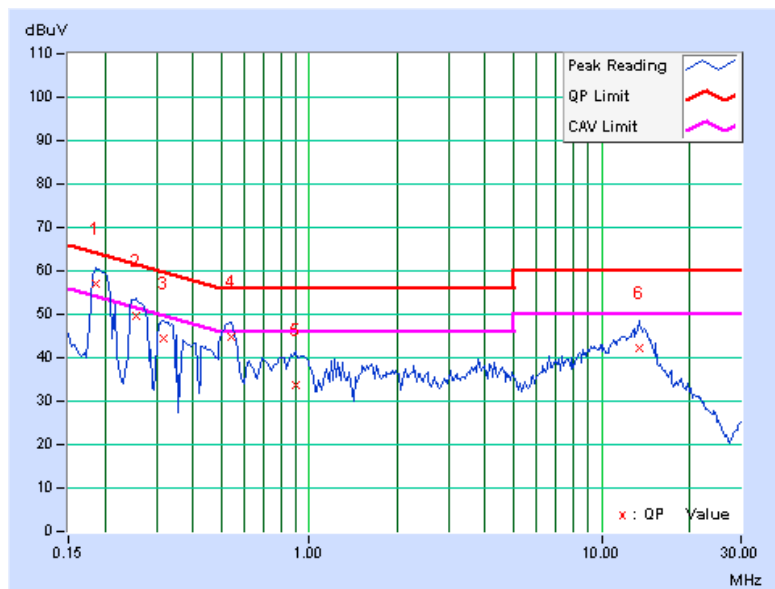


### 4.1.9 TEST RESULTS (With adapter 3)

<b>PHASE</b>	Line (L)	<b>6dB BANDWIDTH</b>	9 kHz
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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	0.185	0.36	56.57	40.68	56.93	41.04	64.25	54.25	-7.32	-13.21
2	0.256	0.36	49.38	-	49.74	-	61.57	51.57	-11.83	-
3	0.318	0.36	44.26	-	44.62	-	59.76	49.76	-15.14	-
4	0.541	0.37	44.39	-	44.76	-	56.00	46.00	-11.24	-
5	0.900	0.40	33.18	-	33.58	-	56.00	46.00	-22.42	-
6	13.434	0.90	41.35	-	42.25	-	60.00	50.00	-17.75	-

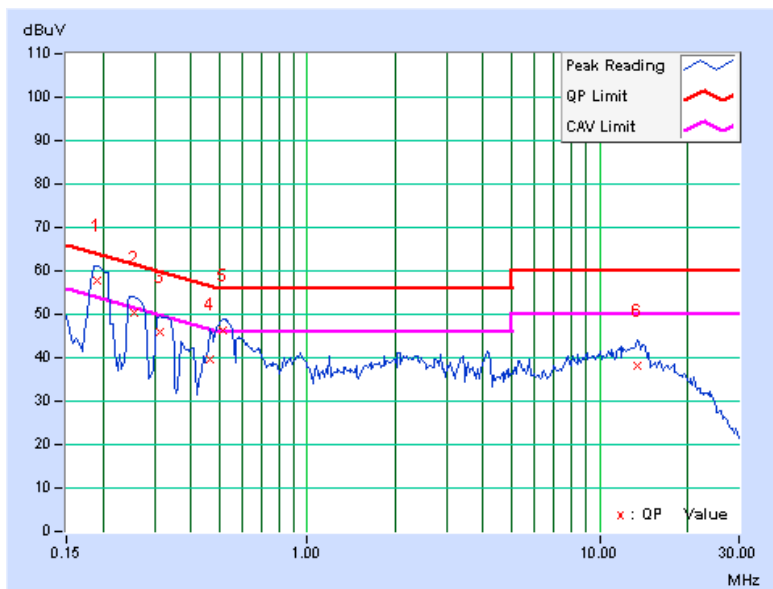
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>PHASE</b>	Neutral (N)	<b>6dB BANDWIDTH</b>	9 kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.191	0.10	57.77	45.69	57.87	45.79	64.00
2	0.256	0.10	50.15	-	50.25	-	61.57	51.57	-11.32	-
3	0.314	0.11	45.66	-	45.77	-	59.86	49.86	-14.10	-
4	0.466	0.12	39.65	-	39.77	-	56.58	46.58	-16.81	-
5	0.517	0.12	46.15	34.25	46.27	34.37	56.00	46.00	-9.73	-11.63
6	13.480	0.80	37.45	-	38.25	-	60.00	50.00	-21.75	-

- 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. Section 15.205 restricted bands of operation shall compliance with the limits in Section 15.209.



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

Frequencies (MHz)	EIRP Limit (dBm)	Equivalent Field Strength at 3m (dB $\mu$ V/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

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



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#### 4.2.3 TEST INSTRUMENTS

**Below 1GHz test:**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY48250253	Aug. 23, 2010	Aug. 22, 2011
Agilent Pre-Selector	N9039A	MY46520310	Aug. 23, 2010	Aug. 22, 2011
Agilent Signal Generator	N5181A	MY49060347	July 30, 2010	July 29, 2011
LIG NEX1 Test Receiver	ER-265	L09068005	Oct. 25, 2010	Oct. 24, 2011
Mini-Circuits Pre-Amplifier	ZFL-1000VH2B	AMP-ZFL-04	Nov. 16, 2010	Nov. 15, 2011
Agilent Pre-Amplifier	8449B	3008A02465	Mar. 01, 2010	Feb. 28, 2011
Miteq Pre-Amplifier	AFS33-1800265 0-30-8P-44	881786	NA	NA
SCHWARZBECK Trilog Broadband Antenna	VULB 9168	9168-361	Apr. 28, 2010	Apr. 27, 2011
AISI Horn_Antenna	AIH.8018	0000220091110	Nov. 22, 2010	Nov. 21, 2011
SCHWARZBECK Horn_Antenna	BBHA 9170	9170-424	Oct. 08, 2010	Oct. 07, 2011
RF CABLE	NA	RF104-205 RF104-207 RF104-202	Dec. 28, 2010	Dec. 27, 2011
RF Cable	NA	CHHCAB_001	NA	NA
Software	ADT_Radiated_V8.7.05	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.  
3. The test was performed in 966 Chamber No. H.  
4. The FCC Site Registration No. is 797305.  
5. The CANADA Site Registration No. is IC 7450H-3.



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**Above 1GHz test:**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100036	Dec. 08, 2010	Dec. 07, 2011
Agilent PSA Spectrum Analyzer	E4446A	MY46180622	May 12 , 2010	May 11 , 2011
HP Pre_Amplifier	8449B	300801923	Nov. 01, 2010	Oct. 31, 2011
ROHDE & SCHWARZ Test Receiver	ESCS30	847124/029	Sep. 03, 2010	Sep. 02, 2011
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	Apr. 28, 2010	Apr. 27, 2011
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 17, 2010	Dec. 16, 2011
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 17, 2011	Jan. 16, 2012
R&S Loop Antenna	HFH2-Z2	100070	Feb. 03, 2010	Feb. 02, 2012
RF Switches	EMH-011	1001	NA	NA
RF CABLE (Chaintek)	Sucoflex 104+ Sucoflex 106	RF104-101+R F106-101	Aug. 24, 2010	Aug. 23, 2011
RF Cable	8DFB	STCCAB-30M- 1GHz	NA	NA
Software	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	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 horn antenna, preamplifier (model: 8449B) and Spectrum Analyzer (model: FSP40) are used only for the measurement of emission frequency above 1GHz if tested.  
3. The test was performed in 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 7450G-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 chamber room for below 1GHz and 10 meter open site for above 1GHz. 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 height of antenna 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

**NOTE:**

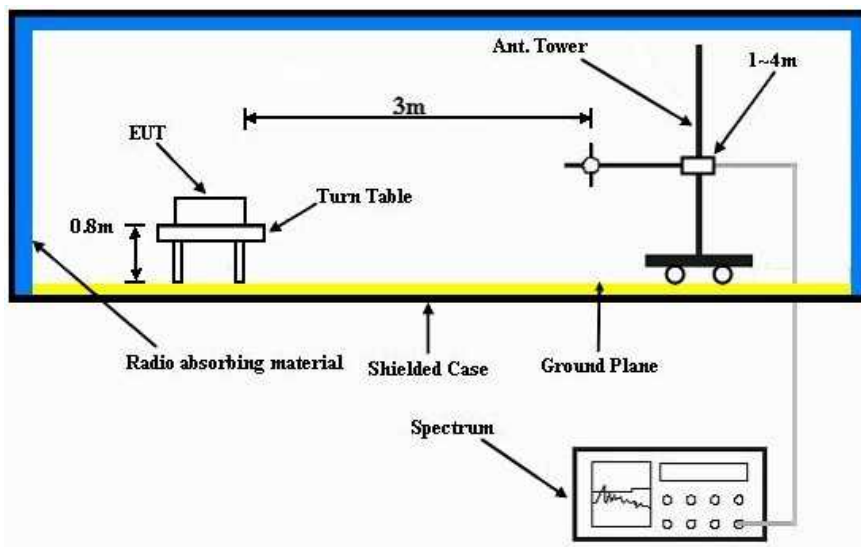
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

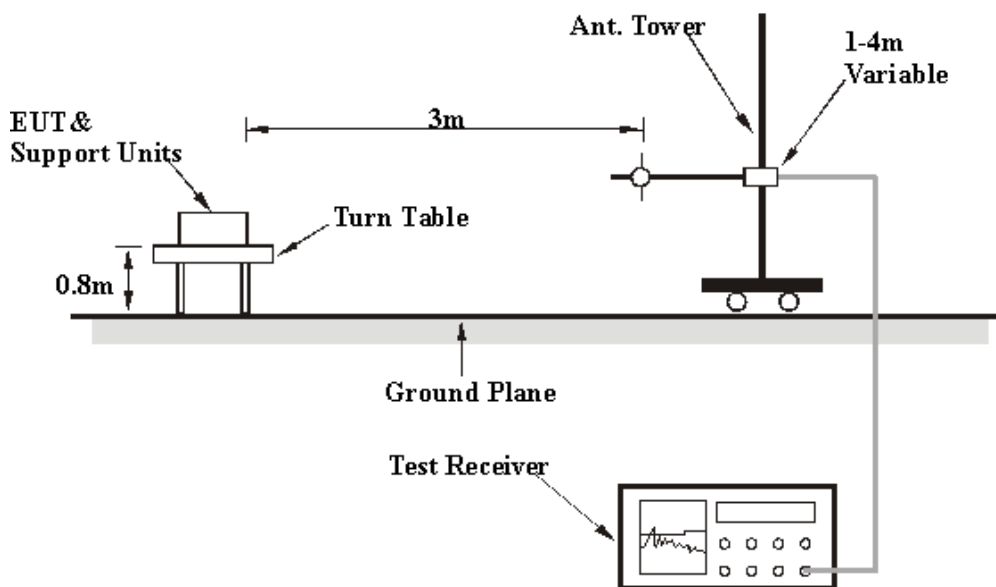
No deviation

## 4.2.6 TEST SETUP

### Below 1GHz test:



### Above 1GHz test:



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



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## 4.2.8 TEST RESULTS

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	20deg. C, 70%RH 1025 hPa	TESTED BY	Eric Lee

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	51.09	28.4 QP	40.0	-11.6	1.00 H	274	14.36	14.02
2	106.57	30.0 QP	43.5	-13.5	1.50 H	142	19.23	10.81
3	148.00	30.4 QP	43.5	-13.1	1.50 H	53	16.14	14.23
4	173.43	26.7 QP	43.5	-16.8	1.25 H	304	12.99	13.69
5	249.96	28.4 QP	46.0	-17.6	1.25 H	297	15.53	12.90
6	500.00	37.2 QP	46.0	-8.8	1.75 H	312	17.25	19.96
7	600.09	38.5 QP	46.0	-7.5	1.50 H	318	16.13	22.36
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	34.50	34.0 QP	40.0	-6.0	1.00 V	234	20.38	13.58
2	51.09	38.1 QP	40.0	-1.9	1.00 V	4	24.10	14.02
3	103.20	31.1 QP	43.5	-12.4	1.25 V	96	20.79	10.33
4	131.85	30.6 QP	43.5	-12.9	1.50 V	352	17.10	13.54
5	149.26	31.7 QP	43.5	-11.8	1.25 V	279	17.43	14.25
6	450.02	30.2 QP	46.0	-15.8	1.00 V	241	11.27	18.96
7	500.00	33.1 QP	46.0	-12.9	1.00 V	64	13.10	19.96
8	600.03	35.3 QP	46.0	-10.7	1.00 V	342	12.92	22.36

- 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.



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### ABOVE 1GHz WORST-CASE DATA

#### 802.11a OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	16deg. C, 67%RH 1025 hPa	TESTED BY	Kent Liu

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	71.1 PK	74.0	-2.9	1.58 H	176	34.39	36.71
2	5150.00	52.8 AV	54.0	-1.2	1.58 H	176	16.09	36.71
3	*5180.00	107.7 PK			1.58 H	176	70.94	36.76
4	*5180.00	97.3 AV			1.58 H	176	60.54	36.76
5	#10360.00	66.8 PK	68.3	-1.5	1.35 H	202	20.44	46.36
6	15540.00	57.1 PK	74.0	-16.9	1.31 H	20	8.95	48.15
7	15540.00	46.3 AV	54.0	-7.7	1.31 H	20	-1.85	48.15
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	68.4 PK	74.0	-5.6	1.73 V	96	31.69	36.71
2	5150.00	52.4 AV	54.0	-1.6	1.73 V	96	15.69	36.71
3	*5180.00	106.5 PK			1.39 V	96	69.74	36.76
4	*5180.00	96.6 AV			1.39 V	96	59.84	36.76
5	#10360.00	65.4 PK	68.3	-2.9	1.52 V	100	19.04	46.36
6	15540.00	65.8 PK	74.0	-8.2	1.66 V	110	17.65	48.15
7	15540.00	52.1 AV	54.0	-1.9	1.66 V	110	3.95	48.15

- 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 is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	16deg. C, 67%RH 1025 hPa	TESTED BY	Kent Liu

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	*5200.00	111.3 PK			1.58 H	146	74.51	36.79
2	*5200.00	100.3 AV			1.58 H	146	63.51	36.79
3	#10400.00	67.3 PK	68.3	-1.0	1.49 H	180	20.81	46.49
4	15600.00	57.4 PK	74.0	-16.6	1.32 H	27	9.55	47.85
5	15600.00	46.7 AV	54.0	-7.3	1.32 H	27	-1.15	47.85
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	*5200.00	106.6 PK			1.61 V	90	69.81	36.79
2	*5200.00	96.7 AV			1.61 V	90	59.91	36.79
3	#10400.00	66.0 PK	68.3	-2.3	1.74 V	90	19.51	46.49
4	15600.00	66.5 PK	74.0	-7.5	1.66 V	108	18.65	47.85
5	15600.00	52.5 AV	54.0	-1.5	1.66 V	108	4.65	47.85

- 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 is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	16deg. C, 67%RH 1025 hPa	TESTED BY	Kent Liu

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	110.7 PK			1.58 H	175	73.83	36.87
2	*5240.00	100.7 AV			1.58 H	175	63.83	36.87
3	5370.00	54.2 PK	74.0	-19.8	1.58 H	175	17.19	37.01
4	5370.00	41.6 AV	54.0	-12.4	1.58 H	175	4.59	37.01
5	#10480.00	67.2 PK	68.3	-1.1	1.48 H	181	20.76	46.44
6	15720.00	57.8 PK	74.0	-16.2	1.31 H	29	9.74	48.06
7	15720.00	46.9 AV	54.0	-7.1	1.31 H	29	-1.16	48.06

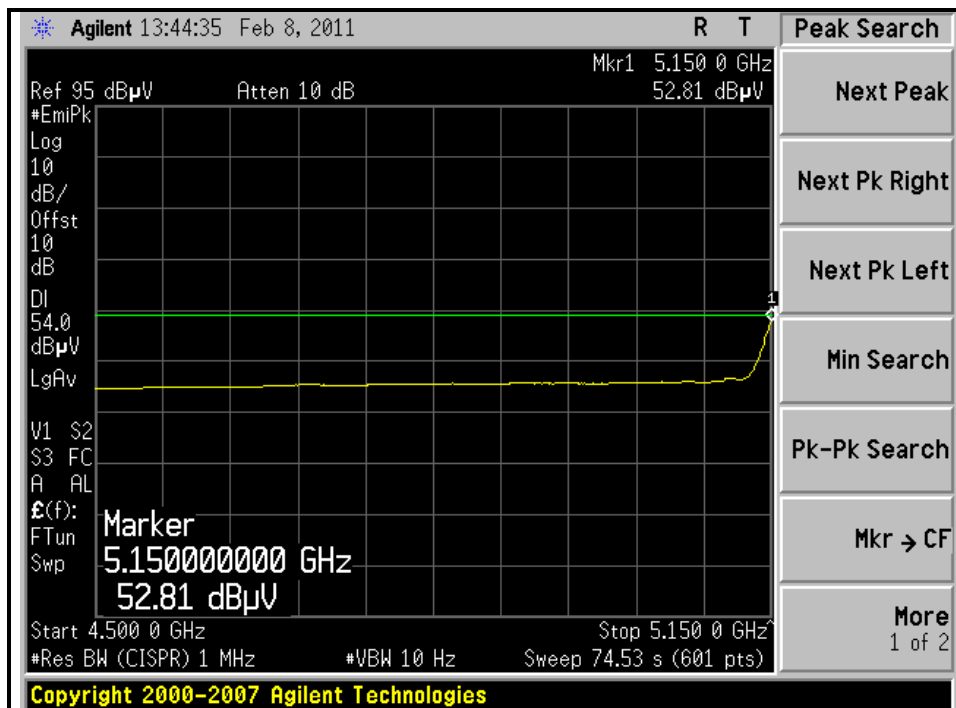
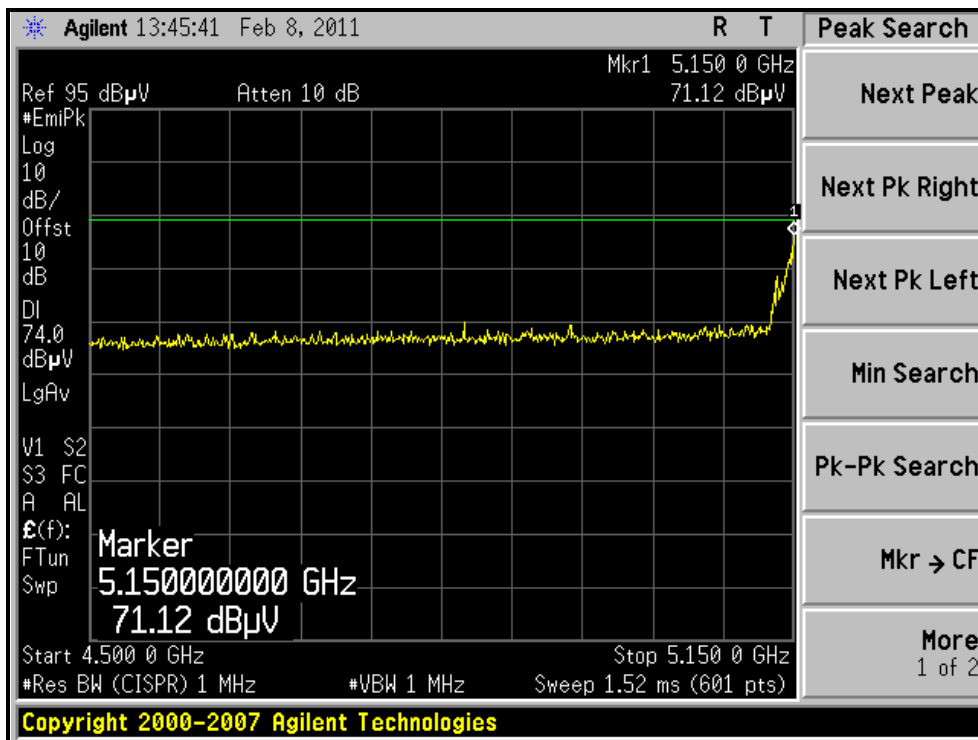
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	108.8 PK			1.49 V	90	71.93	36.87
2	*5240.00	98.5 AV			1.49 V	90	61.63	36.87
3	5352.00	55.6 PK	74.0	-18.4	1.64 V	112	18.60	37.00
4	5352.00	43.2 AV	54.0	-10.8	1.64 V	112	6.20	37.00
5	#10480.00	66.1 PK	68.3	-2.2	1.54 V	113	19.66	46.44
6	15720.00	66.9 PK	74.0	-7.1	1.66 V	100	18.84	48.06
7	15720.00	52.8 AV	54.0	-1.2	1.66 V	100	4.74	48.06

- 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 is out the restricted band.



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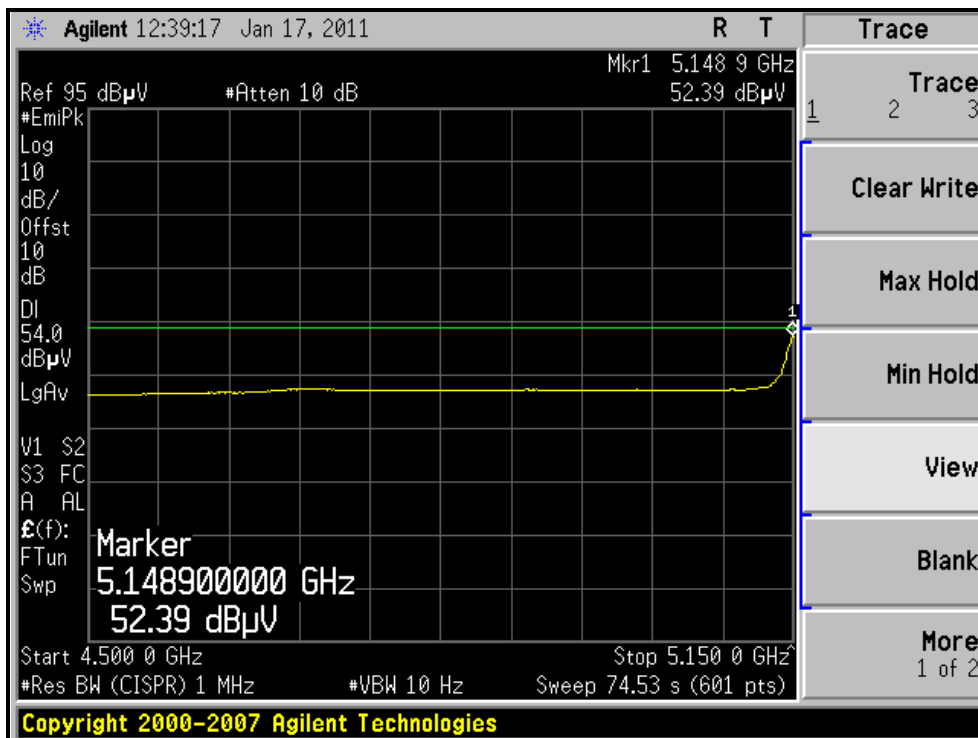
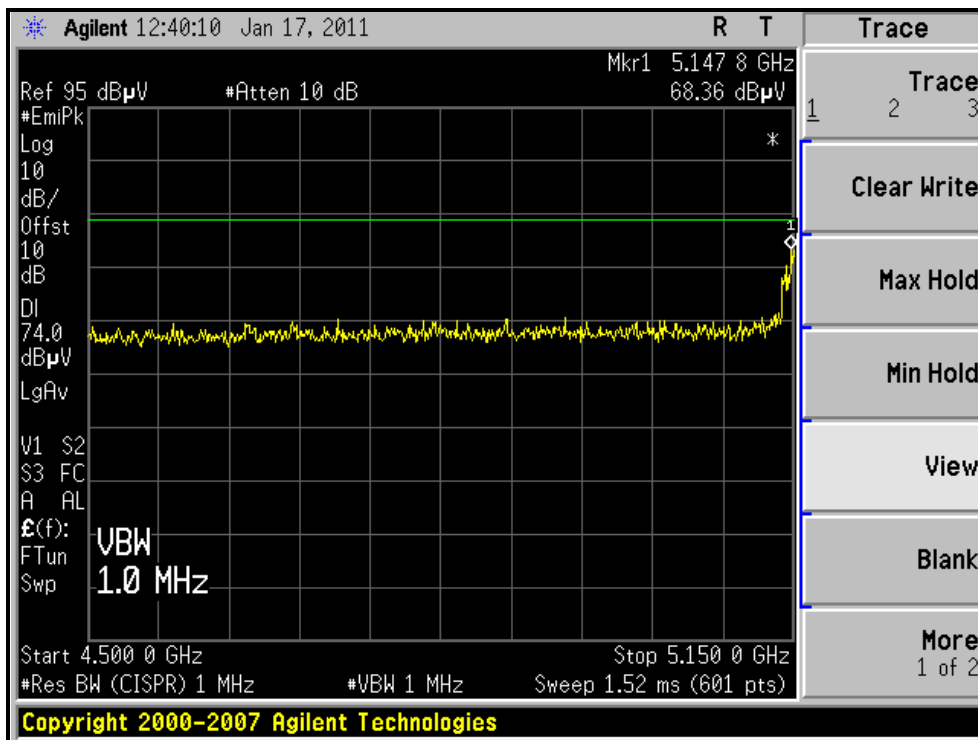
RESTRICTED BANDEDGE (802.11a MODE, CH36, HORIZONTAL)





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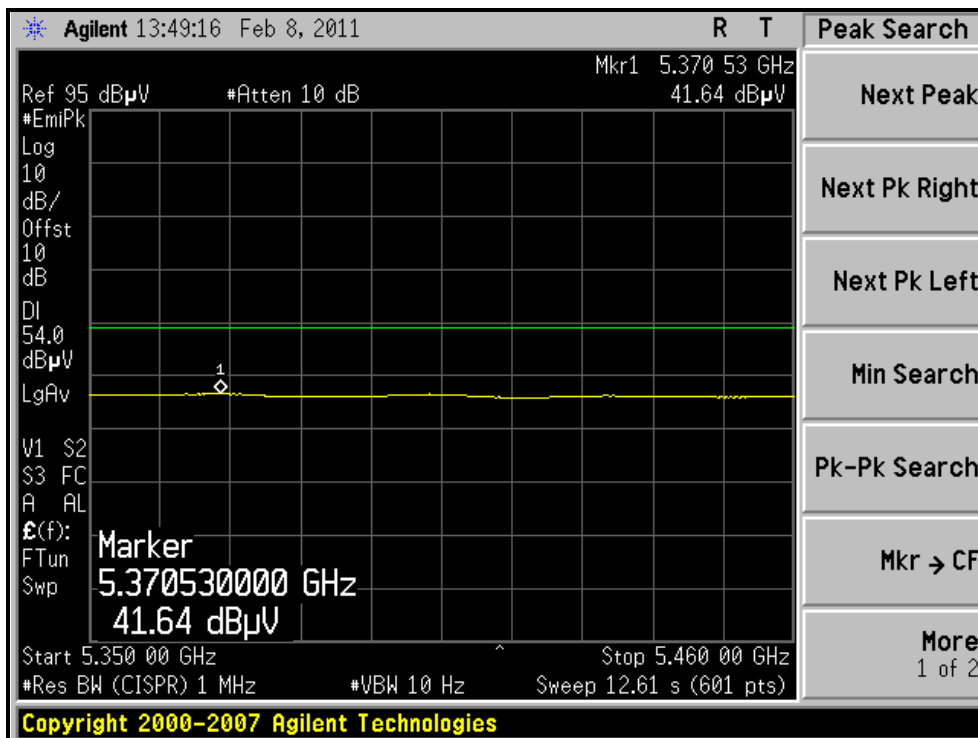
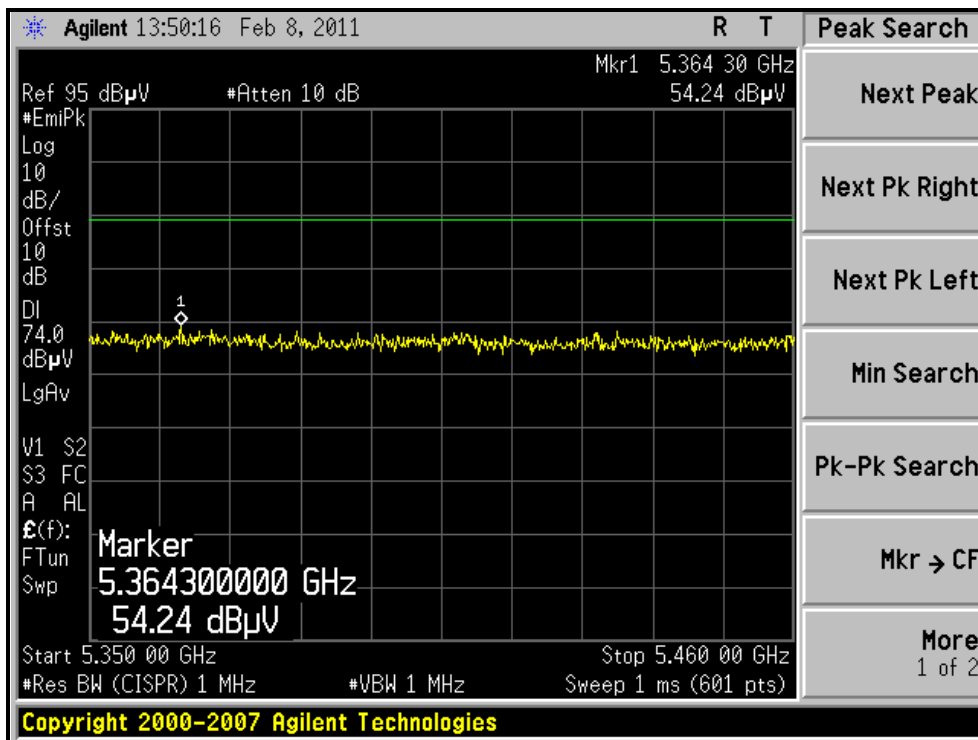
RESTRICTED BANDEDGE (802.11a MODE, CH36, VERTICAL)





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RESTRICTED BANDEDGE (802.11a MODE, CH48, HORIZONTAL)

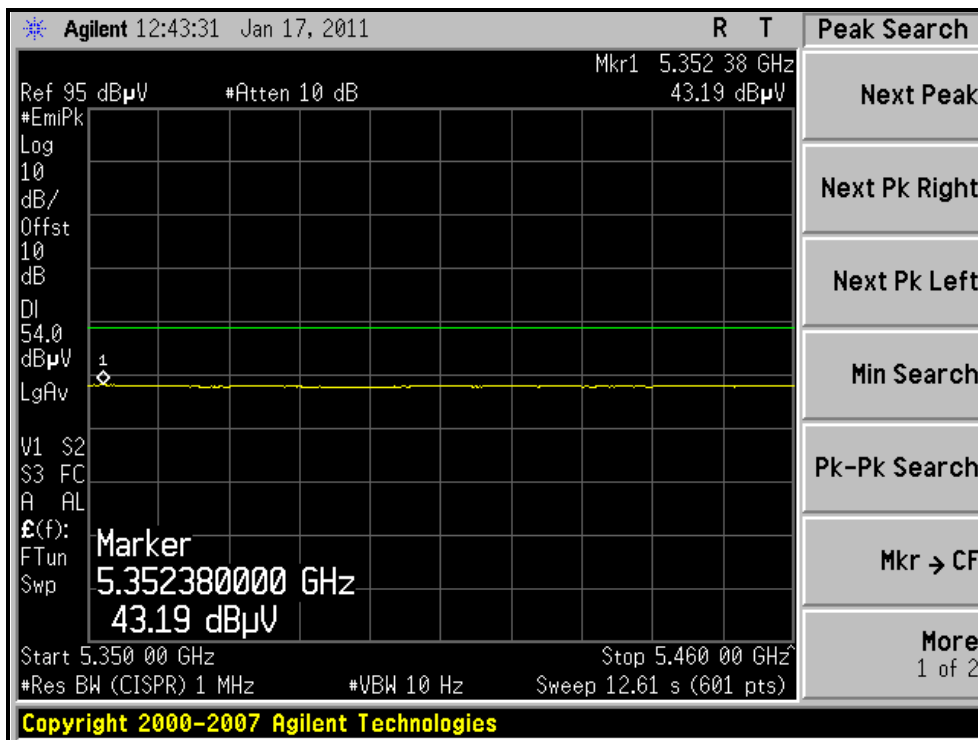
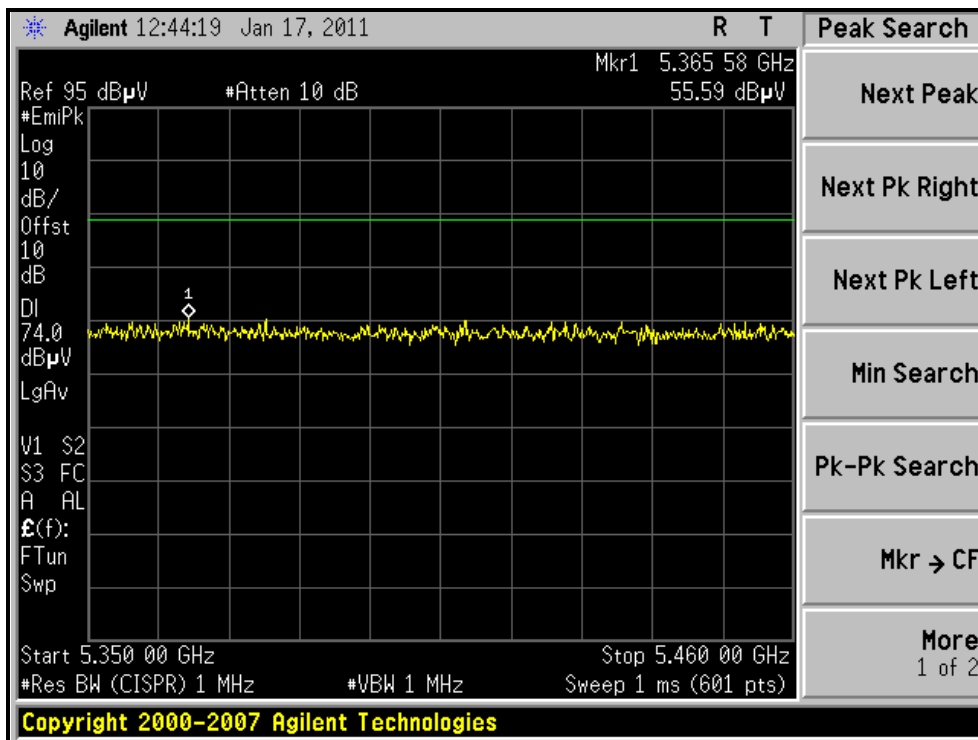






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### RESTRICTED BANDEDGE (802.11a MODE, CH48, VERTICAL)





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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	16deg. C, 67%RH 1025 hPa	TESTED BY	Kent Liu

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	65.1 PK	74.0	-8.9	1.80 H	169	28.39	36.71
2	5150.00	50.1 AV	54.0	-3.9	1.80 H	169	13.39	36.71
3	*5180.00	108.0 PK			1.80 H	172	71.24	36.76
4	*5180.00	97.2 AV			1.80 H	172	60.44	36.76
5	#10360.00	66.8 PK	68.3	-1.5	1.77 H	171	20.44	46.36
6	15540.00	51.3 PK	74.0	-22.7	1.03 H	129	3.15	48.15
7	15540.00	46.1 AV	54.0	-7.9	1.03 H	129	-2.05	48.15

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	70.4 PK	74.0	-3.6	1.53 V	106	33.69	36.71
2	5150.00	52.9 AV	54.0	-1.1	1.53 V	106	16.19	36.71
3	*5180.00	108.7 PK			1.53 V	106	71.94	36.76
4	*5180.00	98.6 AV			1.53 V	106	61.84	36.76
5	#10360.00	65.4 PK	68.3	-2.9	1.52 V	100	19.04	46.36
6	15540.00	67.2 PK	74.0	-6.8	1.66 V	100	19.05	48.15
7	15540.00	52.5 AV	54.0	-1.5	1.66 V	100	4.35	48.15

- 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 is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	16deg. C, 67%RH 1025 hPa	TESTED BY	Kent Liu

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	*5200.00	114.1 PK			1.89 H	171	77.31	36.79
2	*5200.00	103.8 AV			1.89 H	171	67.01	36.79
3	#10400.00	67.2 PK	68.3	-1.1	1.73 H	172	20.71	46.49
4	15600.00	51.6 PK	74.0	-22.4	1.07 H	124	3.75	47.85
5	15600.00	46.2 AV	54.0	-7.8	1.07 H	124	-1.65	47.85
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	*5200.00	114.5 PK			1.61 V	134	77.71	36.79
2	*5200.00	104.5 AV			1.61 V	134	67.71	36.79
3	#10400.00	66.8 PK	68.3	-1.5	1.56 V	117	20.31	46.49
4	15600.00	67.6 PK	74.0	-6.4	1.66 V	101	19.75	47.85
5	15600.00	53.0 AV	54.0	-1.0	1.66 V	101	5.15	47.85

- 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 is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	16deg. C, 67%RH 1025 hPa	TESTED BY	Kent Liu

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	114.2 PK			1.89 H	171	77.33	36.87
2	*5240.00	103.9 AV			1.89 H	171	67.03	36.87
3	5350.00	54.8 PK	74.0	-19.2	1.89 H	171	17.80	37.00
4	5350.00	42.5 AV	54.0	-11.5	1.89 H	171	5.50	37.00
5	#10480.00	67.3 PK	68.3	-1.0	1.72 H	177	20.86	46.44
6	15720.00	51.7 PK	74.0	-22.3	1.04 H	129	3.64	48.06
7	15720.00	46.4 AV	54.0	-7.6	1.04 H	129	-1.66	48.06

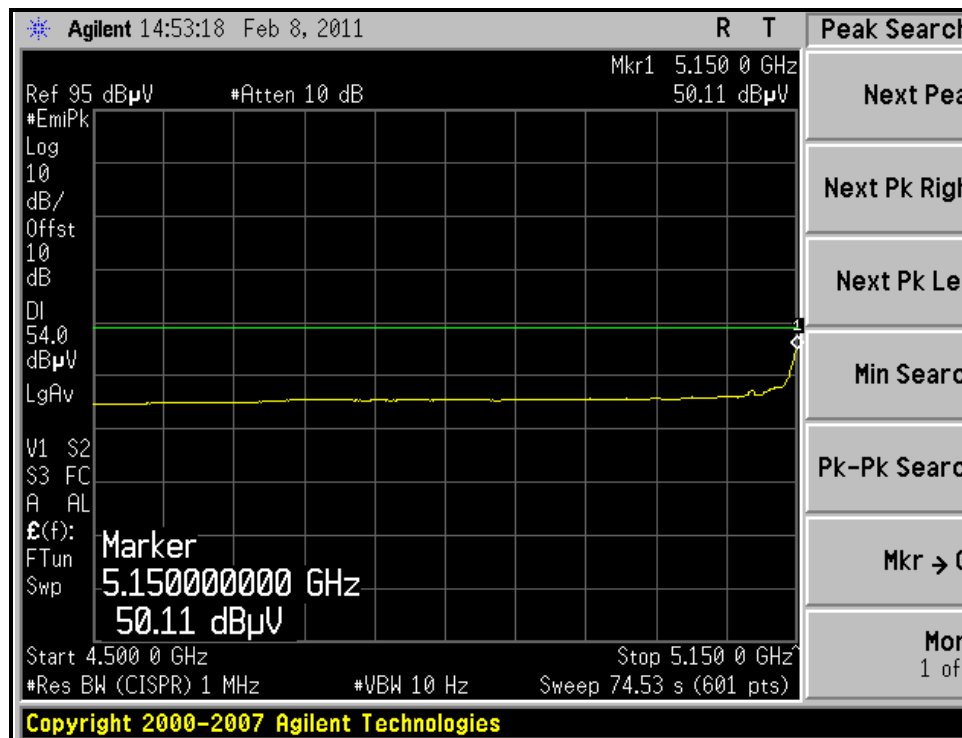
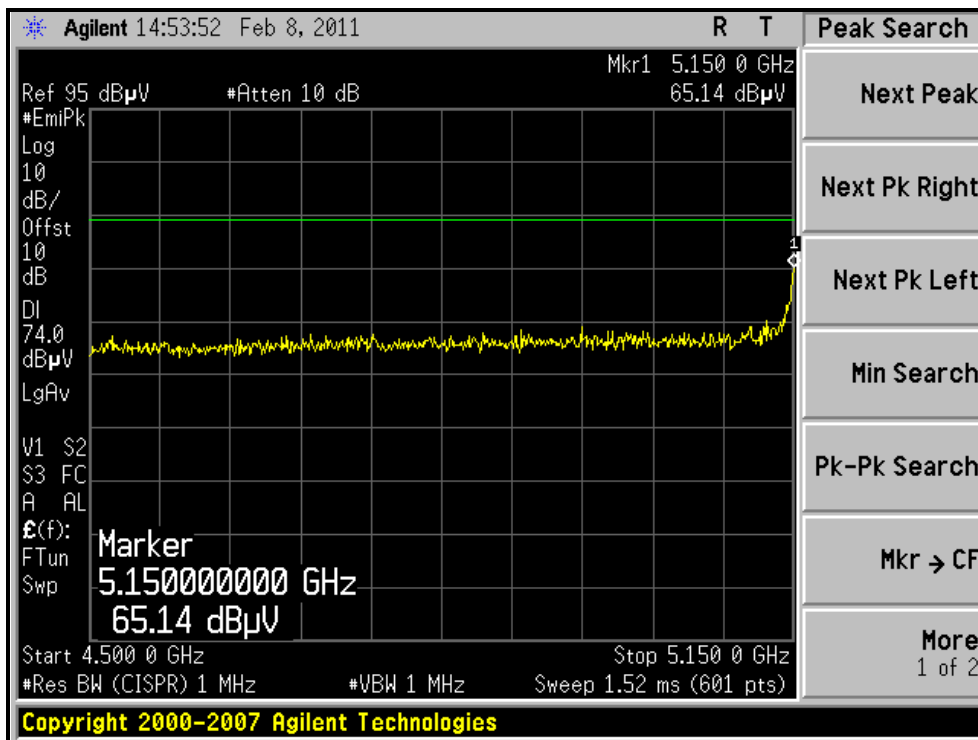
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	114.7 PK			1.60 V	133	77.83	36.87
2	*5240.00	104.6 AV			1.60 V	133	67.73	36.87
3	5351.00	56.9 PK	74.0	-17.1	1.54 V	137	19.90	37.00
4	5351.00	45.5 AV	54.0	-8.5	1.54 V	137	8.50	37.00
5	#10480.00	66.9 PK	68.3	-1.4	1.55 V	116	20.46	46.44
6	15720.00	67.7 PK	74.0	-6.3	1.63 V	100	19.64	48.06
7	15720.00	53.0 AV	54.0	-1.0	1.63 V	100	4.94	48.06

- 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 is out the restricted band.



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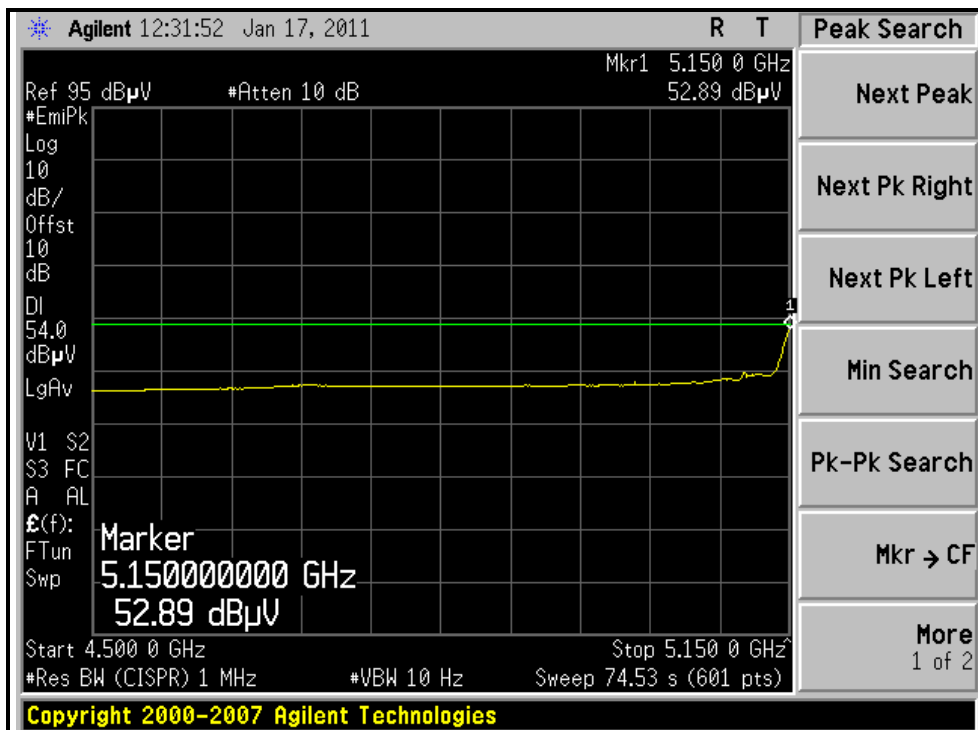
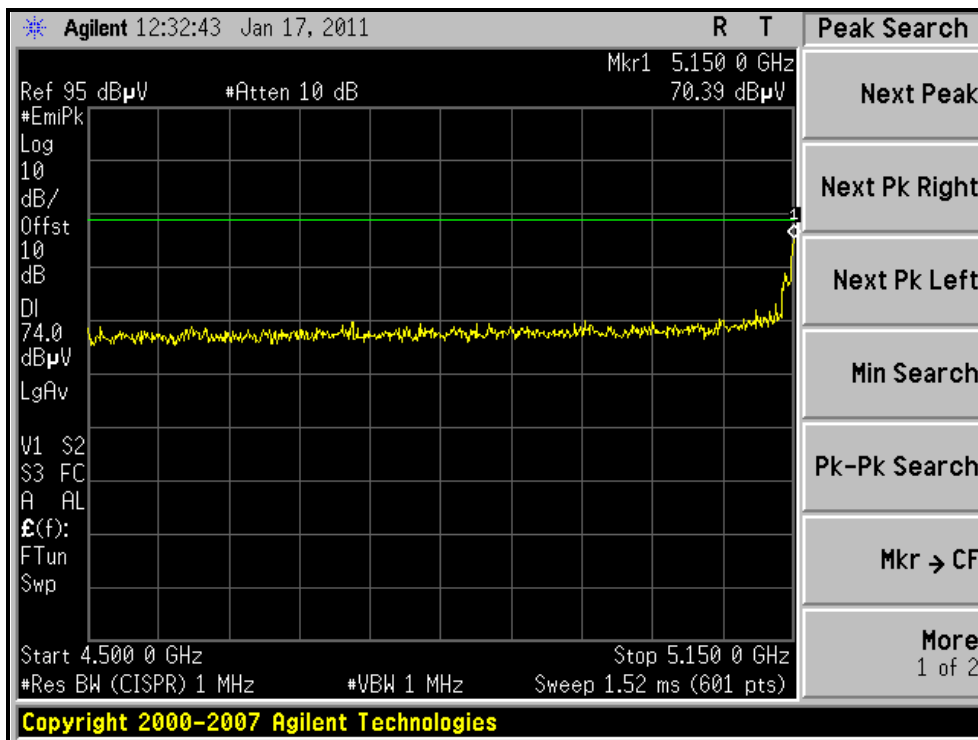
RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH36, HORIZONTAL )





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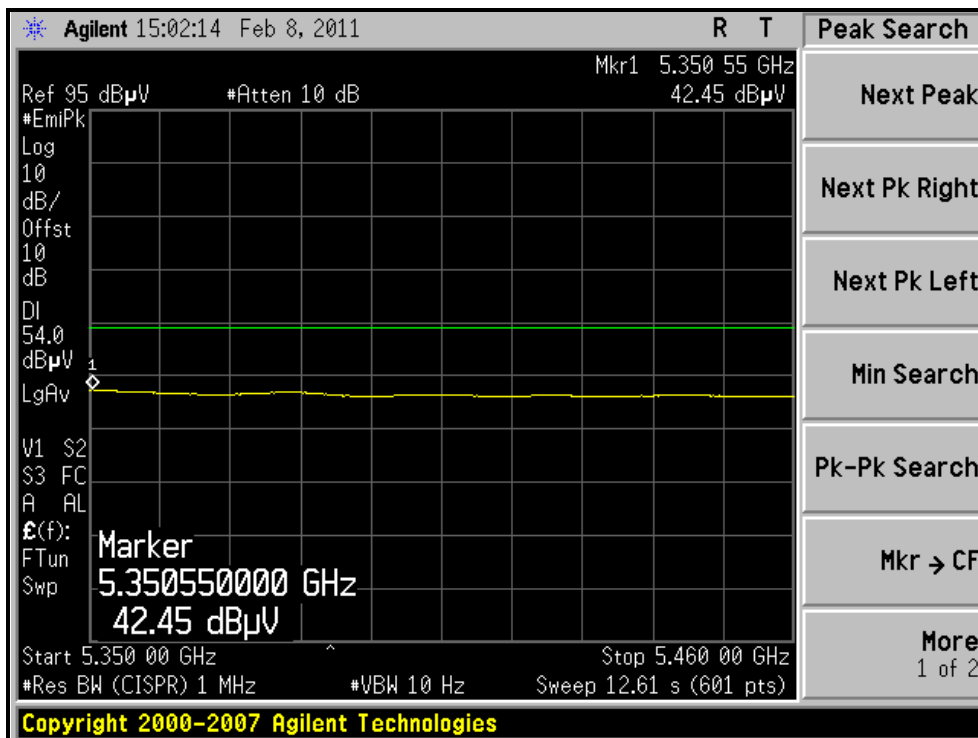
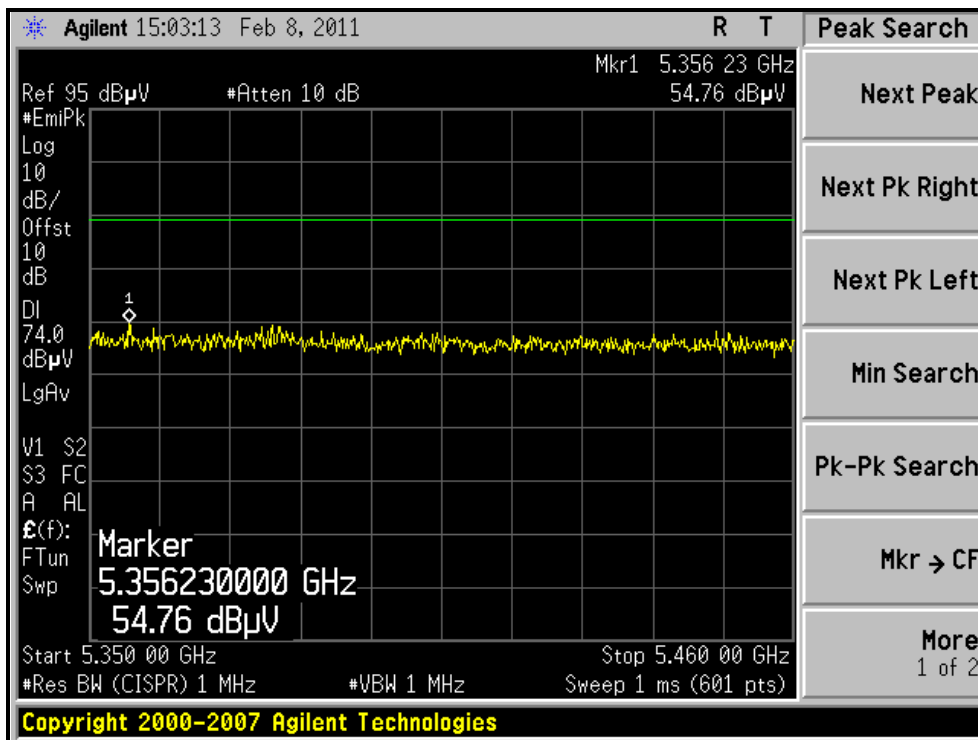
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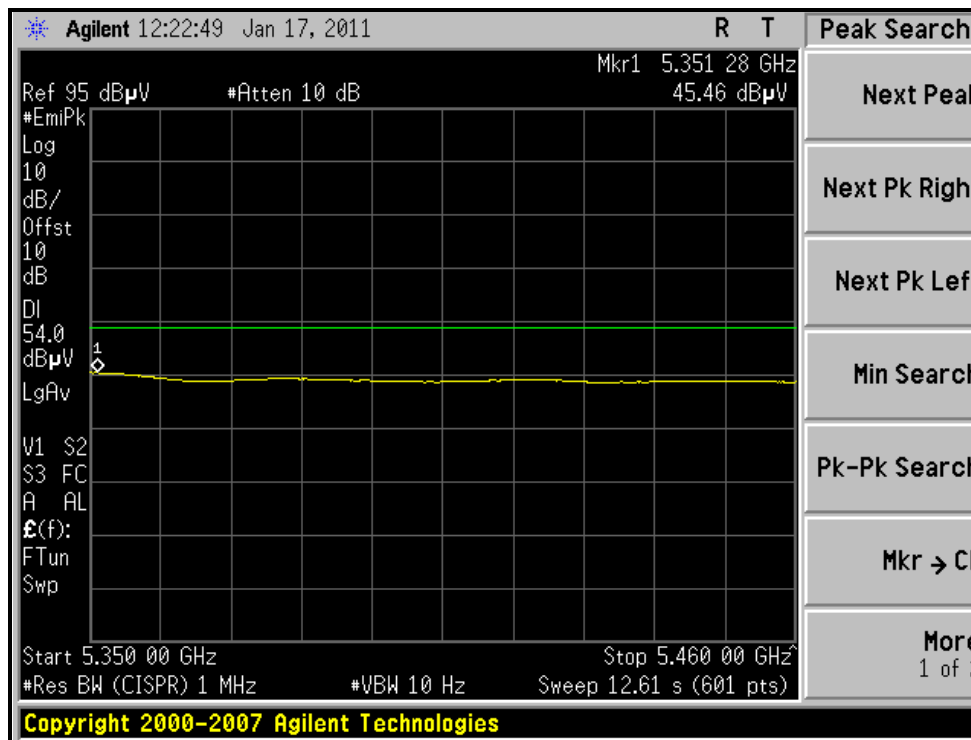
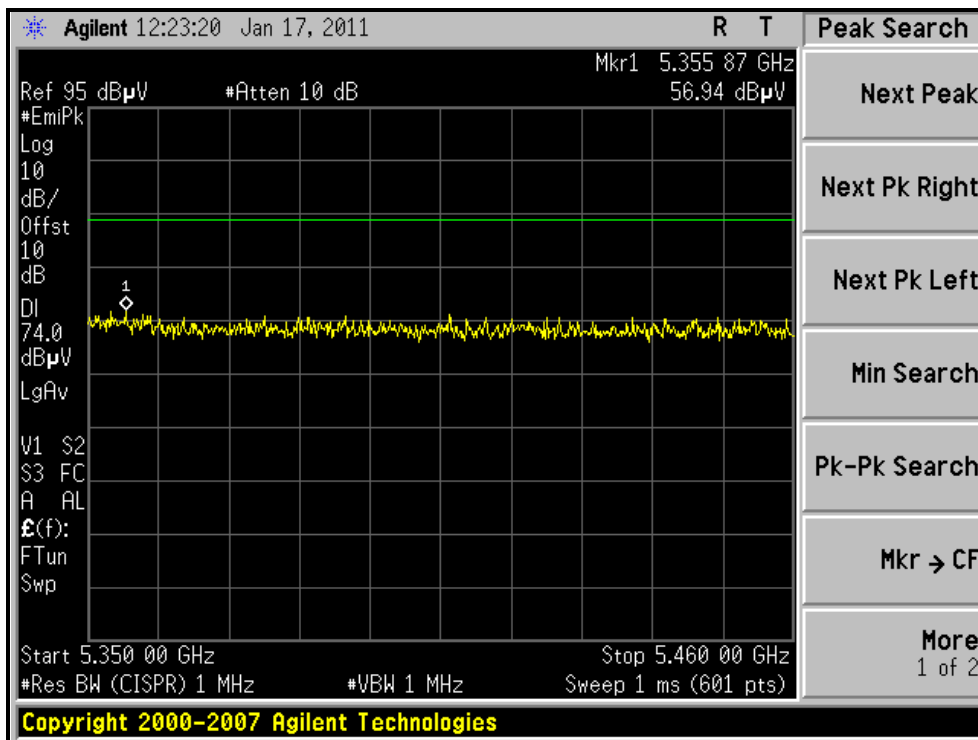
RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH48, HORIZONTAL )





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RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH48, VERTICAL )







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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 38	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	16deg. C, 67%RH 1025 hPa	TESTED BY	Kent Liu

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	63.7 PK	74.0	-10.3	1.87 H	154	26.99	36.71
2	5150.00	49.0 AV	54.0	-5.0	1.87 H	154	12.29	36.71
3	*5190.00	100.9 PK			1.88 H	172	64.13	36.77
4	*5190.00	90.5 AV			1.88 H	172	53.73	36.77
5	#10380.00	61.2 PK	68.3	-7.1	1.34 H	209	14.77	46.43
6	15570.00	51.6 PK	74.0	-22.4	1.04 H	132	3.60	48.00
7	15570.00	46.4 AV	54.0	-7.6	1.04 H	132	-1.60	48.00

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	5150.00	67.5 PK	74.0	-6.5	1.60 V	136	30.79	36.71
2	5150.00	52.9 AV	54.0	-1.1	1.60 V	136	16.19	36.71
3	*5190.00	102.1 PK			1.69 V	141	65.33	36.77
4	*5190.00	91.4 AV			1.69 V	141	54.63	36.77
5	#10380.00	61.4 PK	68.3	-6.9	1.42 V	219	14.97	46.43
6	15570.00	51.4 PK	74.0	-22.6	1.02 V	131	3.40	48.00
7	15570.00	46.2 AV	54.0	-7.8	1.02 V	131	-1.80	48.00

- 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.
  6. "#":The radiated frequency is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 46	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	16deg. C, 67%RH 1025 hPa	TESTED BY	Kent Liu

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	106.1 PK			1.97 H	141	69.25	36.85
2	*5230.00	96.2 AV			1.97 H	141	59.35	36.85
3	5353.12	65.8 PK	74.0	-8.2	1.51 H	2	28.80	37.00
4	5353.12	48.1 AV	54.0	-5.9	1.51 H	2	11.10	37.00
5	#10460.00	66.5 PK	68.3	-1.8	1.72 H	178	20.05	46.45
6	15690.00	60.2 PK	74.0	-13.8	1.32 H	147	12.16	48.04
7	15690.00	48.2 AV	54.0	-5.8	1.32 H	147	0.16	48.04

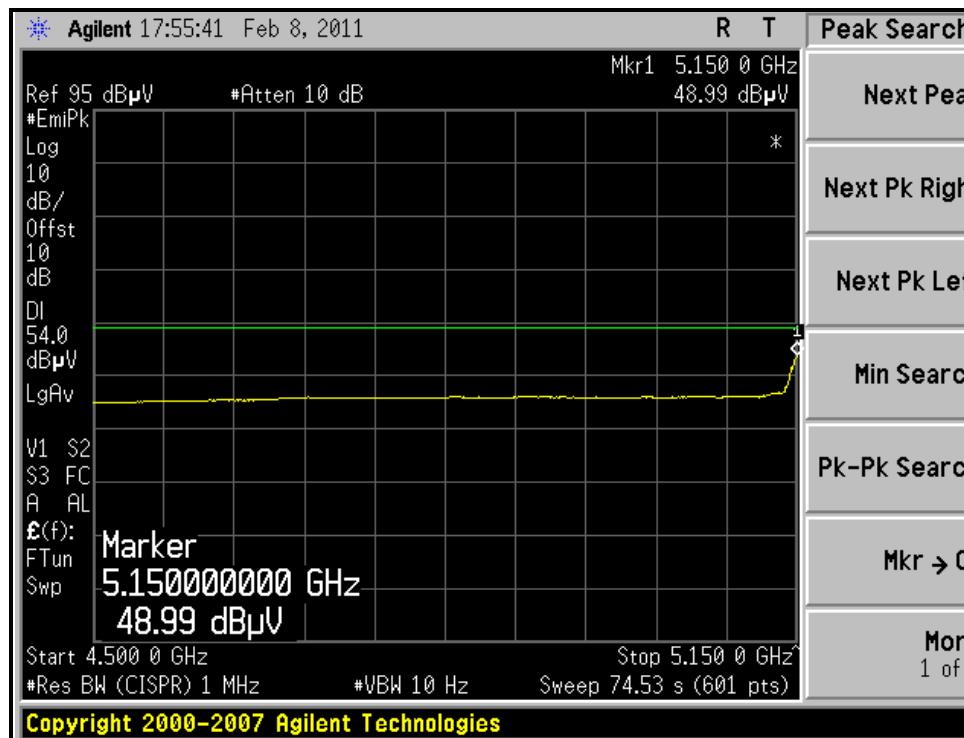
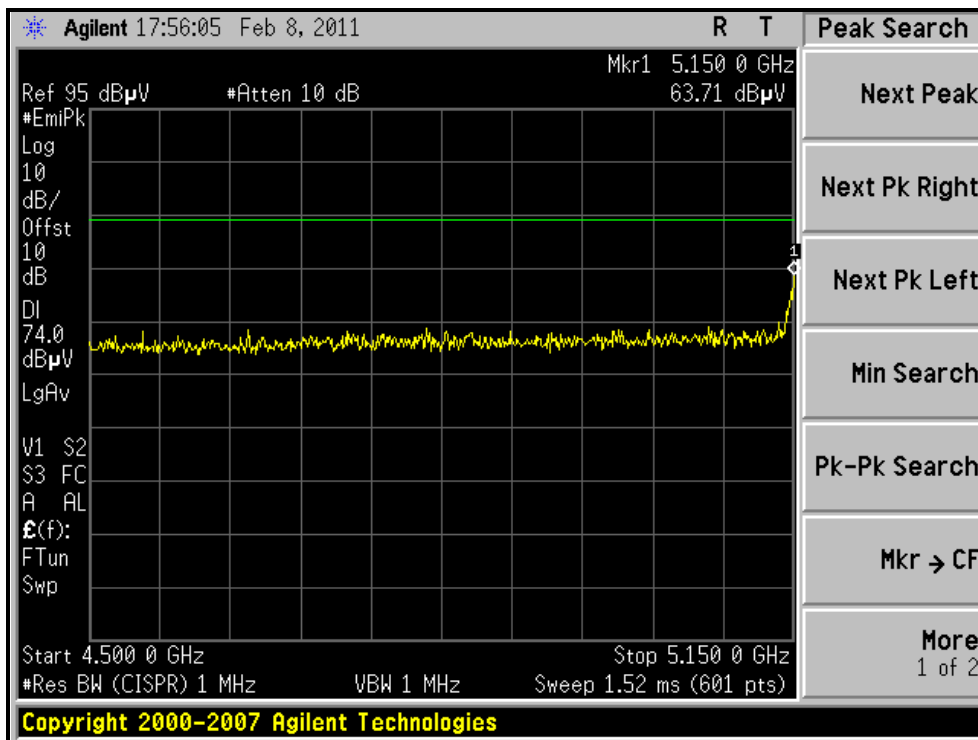
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NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	107.1 PK			1.63 V	142	70.25	36.85
2	*5230.00	97.5 AV			1.63 V	142	60.65	36.85
3	5350.00	67.4 PK	74.0	-6.6	1.64 V	136	30.40	37.00
4	5350.00	50.3 AV	54.0	-3.7	1.64 V	136	13.30	37.00
5	#10460.00	63.6 PK	68.3	-4.7	1.59 V	115	17.15	46.45
6	15690.00	64.9 PK	74.0	-9.1	1.93 V	110	16.86	48.04
7	15690.00	52.8 AV	54.0	-1.2	1.93 V	110	4.76	48.04

- 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 is out the restricted band.



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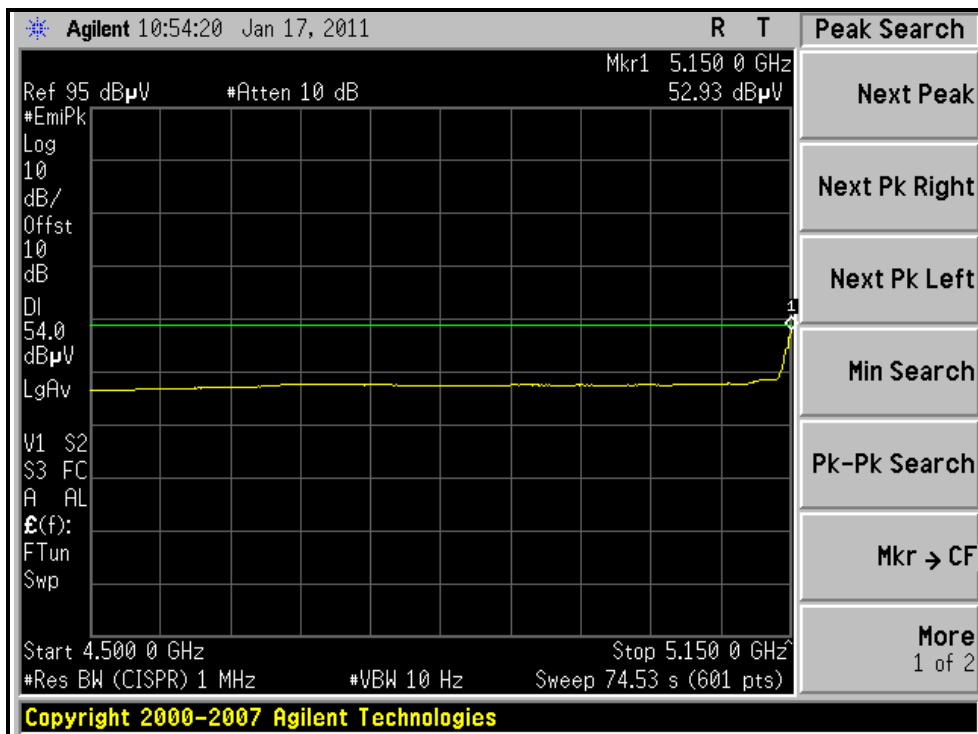
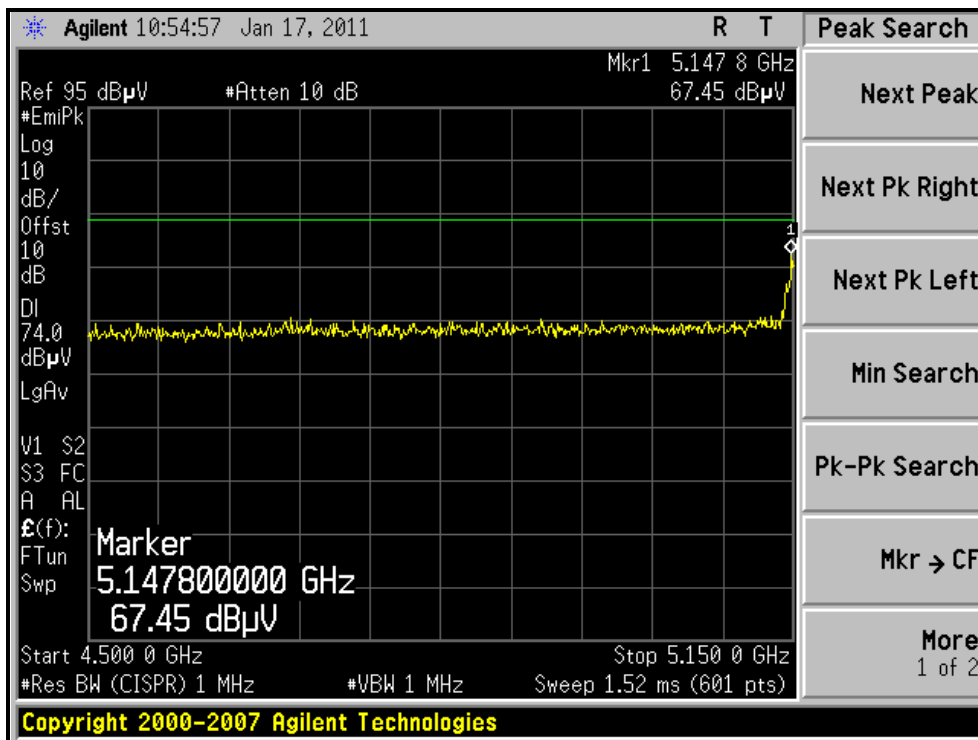
RESTRICTED BANDEDGE (802.11n (40MHz) MODE, CH38, HORIZONTAL)





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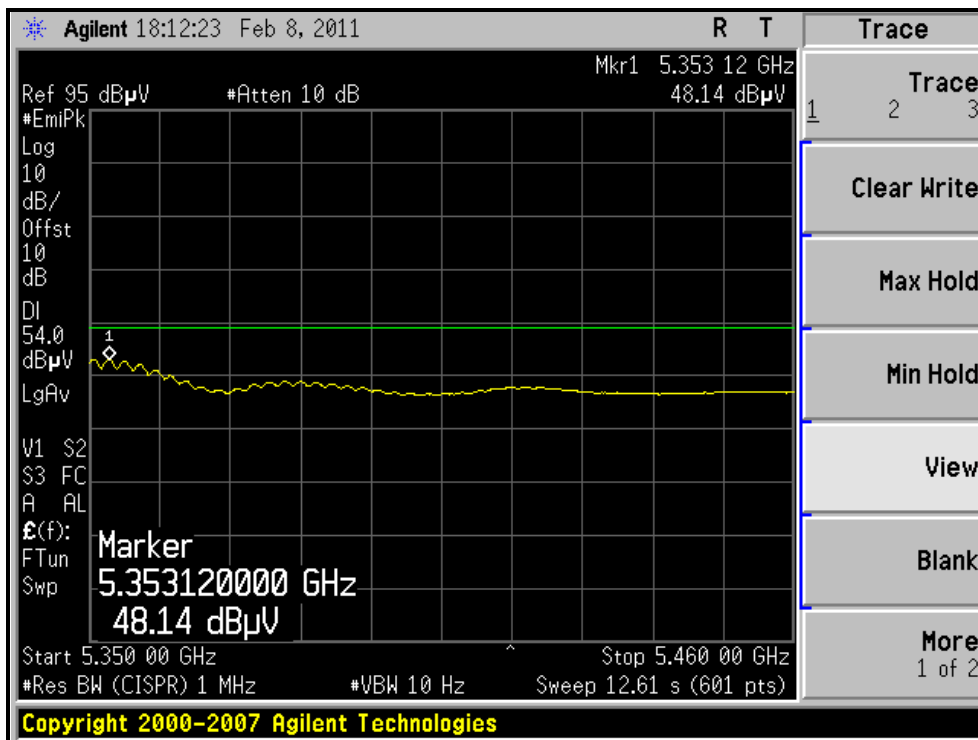
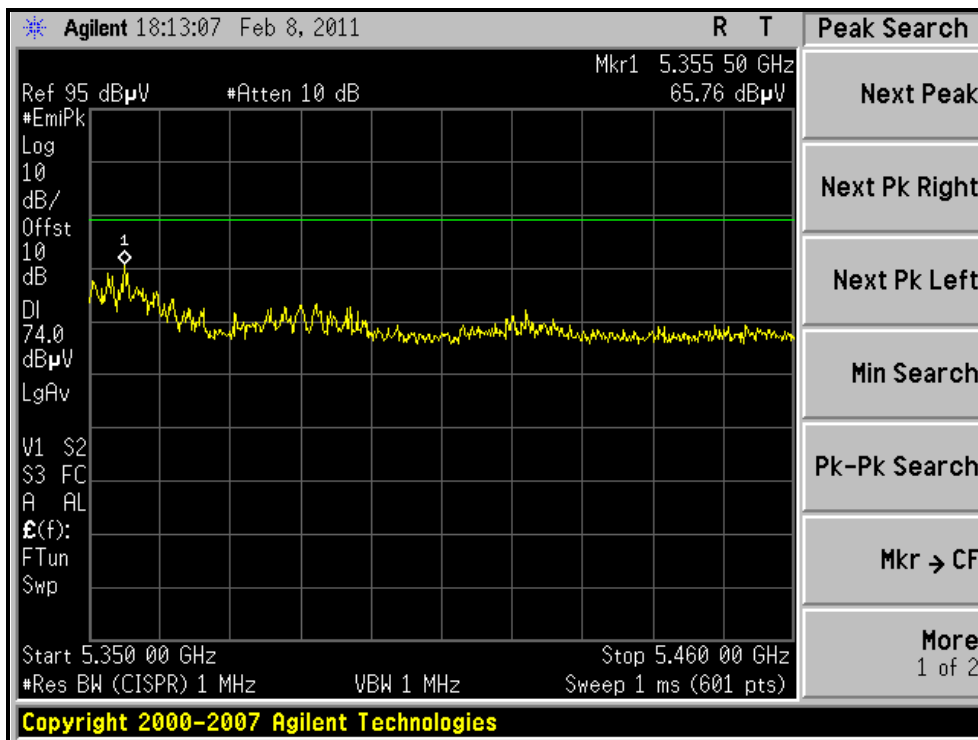
RESTRICTED BANDEDGE (802.11n (40MHz) MODE,CH38, VERTICAL )





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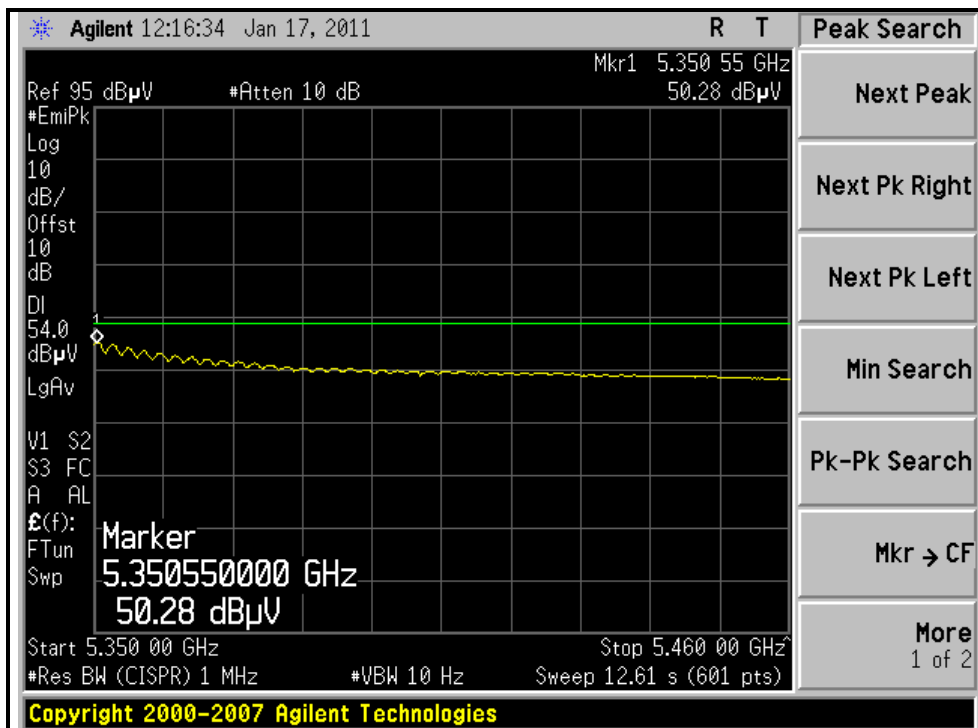
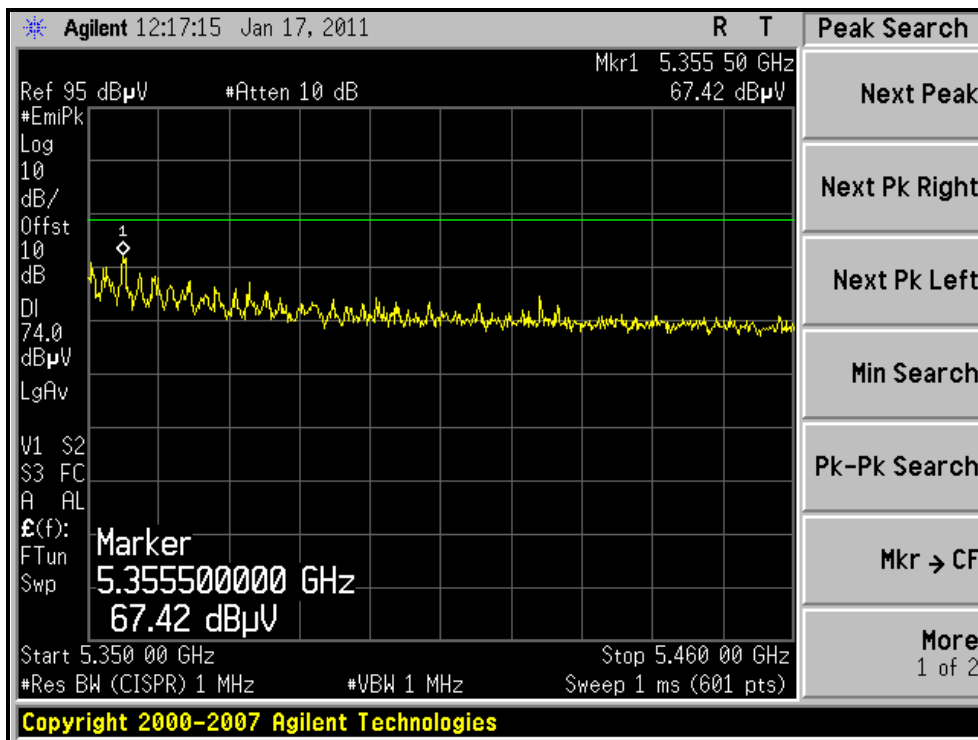
RESTRICTED BANDEDGE (802.11n (40MHz) MODE, CH46, HORIZONTAL)





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RESTRICTED BANDEDGE (802.11n (40MHz) MODE, CH46, 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 DATE	CALIBRATED UNTIL
Spectrum Analyzer	E4446A	MY48250254	July 14, 2010	July 13, 2011

**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

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:**

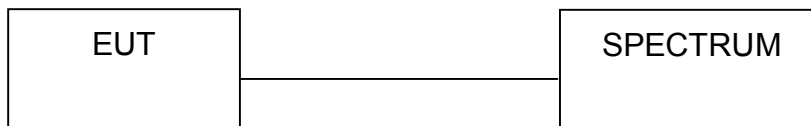
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

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.





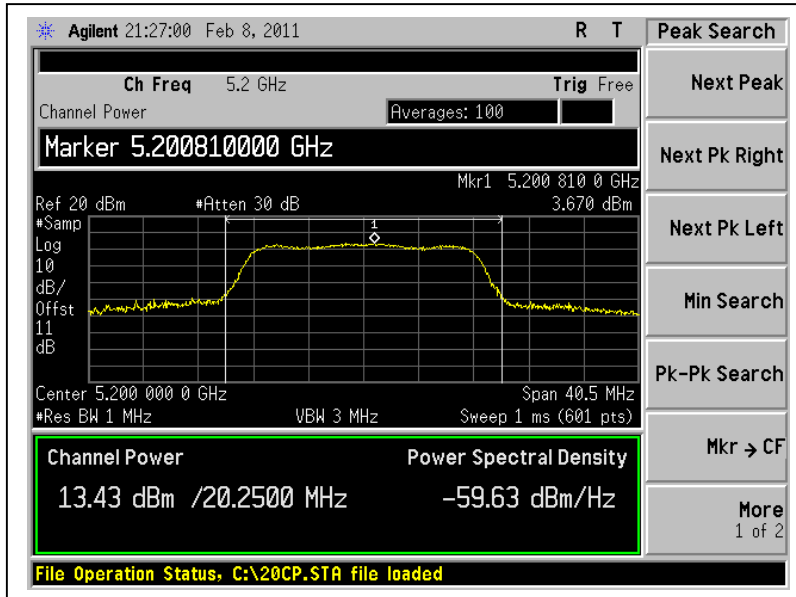
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#### 4.3.7 TEST RESULTS

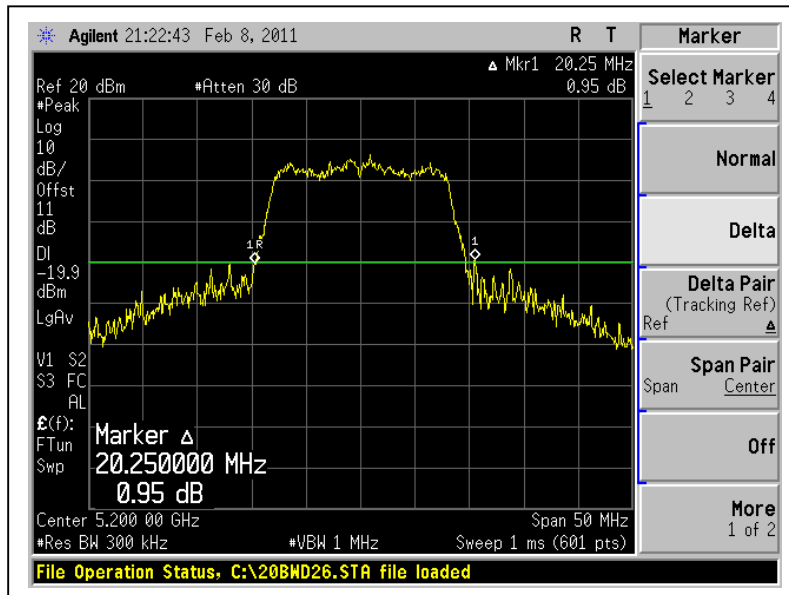
##### 802.11a OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS / FAIL
36	5180	21.4	13.3	17	19.50	PASS
40	5200	21.9	13.4	17	20.25	PASS
48	5240	21.4	13.3	17	19.83	PASS

Peak Power Output:  
CH40



26dB Occupied Bandwidth:  
CH40





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

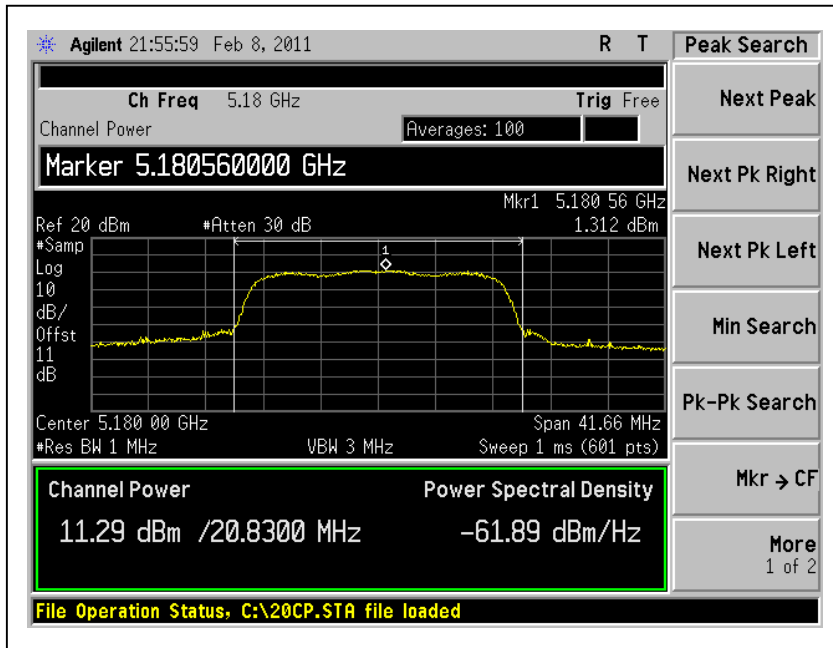
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS / FAIL
		CHAIN(0)	CHAIN(1)					
36	5180	10.4	11.3	24.5	13.9	17	20.83	PASS
40	5200	10.5	11.2	24.4	13.9	17	20.25	PASS
48	5240	10.4	11.0	23.6	13.7	17	21.42	PASS

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

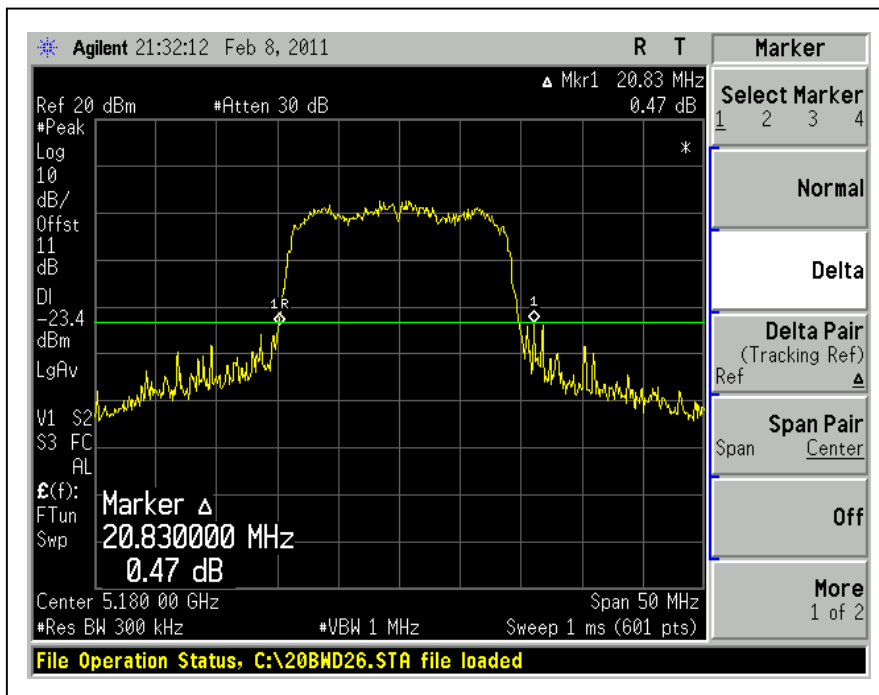


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### Peak Power Output: For Chain(1) : CH36



### 26dB Occupied Bandwidth: CH36





A D T

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

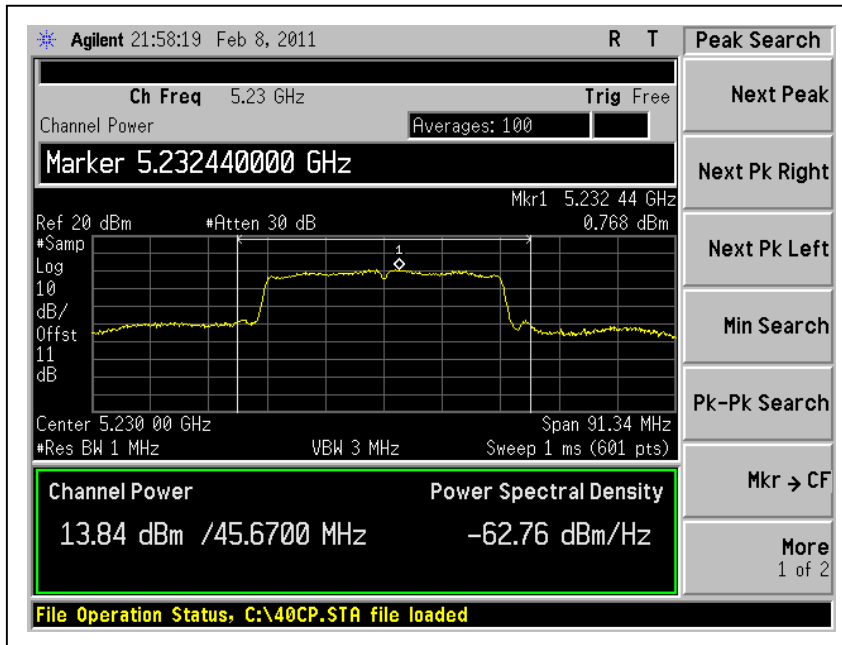
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS / FAIL
		CHAIN(0)	CHAIN(1)					
38	5190	8.3	8.6	14.0	11.5	17	38.83	PASS
46	5230	13.2	13.8	44.9	16.5	17	45.67	PASS

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

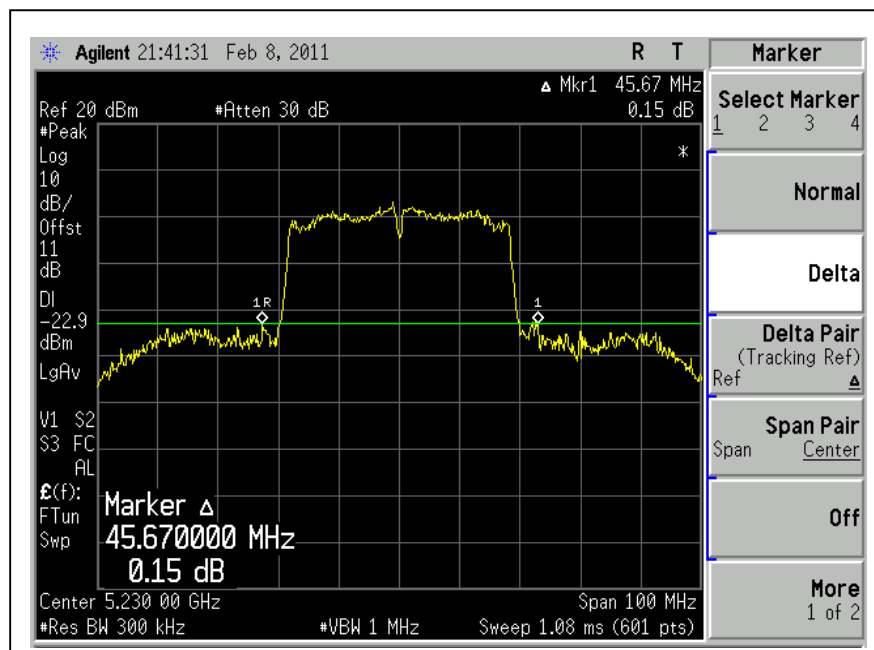


A D T

### Peak Power Output: For Chain(1) :CH46



### 26dB Occupied Bandwidth: CH46





## 4.4 PEAK POWER EXCURSION MEASUREMENT

### 4.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

Frequency Band	Limit
5.15 – 5.25 GHz	13dB
5.25 – 5.35 GHz	13dB
5.47 – 5.725GHz	13dB
5.725 – 5.825 GHz	13dB

### 4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer	E4446A	MY48250254	July 14, 2010	July 13, 2011

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

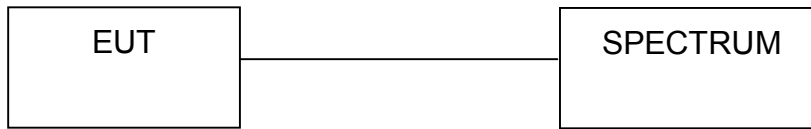
### 4.4.3 TEST PROCEDURE

1. Connect the cable from the spectrum analyzer to the EUT antenna port using an appropriate RF attenuator.
2. Verify the antenna port selected is the active one if the system has more than one antenna.
3. Verify the unlicensed wireless device is set to operate at 100 % duty cycle at the maximum allowed power for operation.
4. Testing shall be done on the center frequency of each U-NII band.
5. Set the spectrum analyzer span to view the entire emission bandwidth. The largest difference between the following two traces must be 13 dB for all frequencies across the emission bandwidth.
  - a. First trace: set RBW = 1 MHz, VBW = 3 MHz with peak detector and max hold settings.
  - b. Second trace: set RBW = 1 MHz, VBW = 3 MHz with sample detector and trace average across 100 traces in power averaging mode.

### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.4.5 TEST SETUP



#### 4.4.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

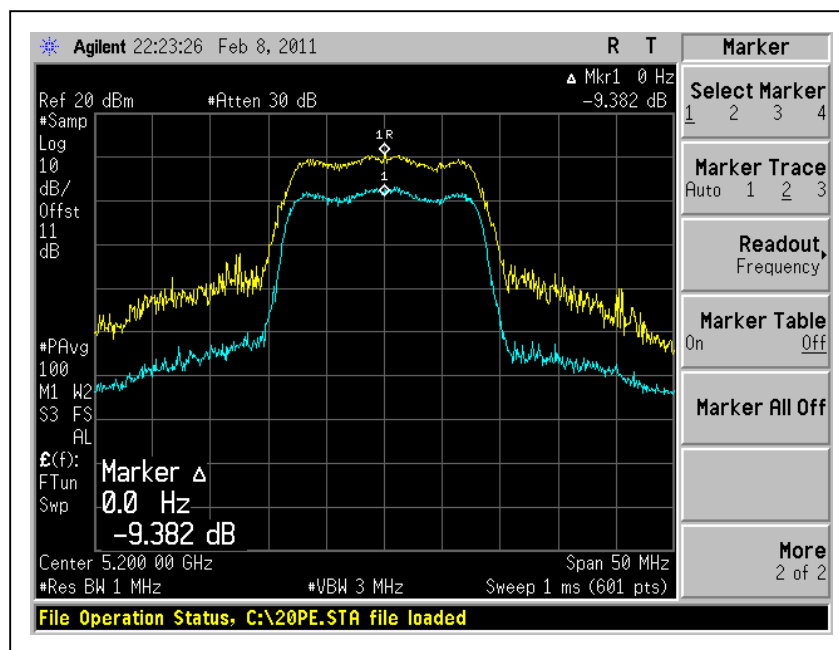


#### 4.4.7 TEST RESULTS

#### 802.11a OFDM MODULATION

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
36	5180	8.7	13	PASS
40	5200	9.4	13	PASS
48	5240	8.2	13	PASS

#### CH40



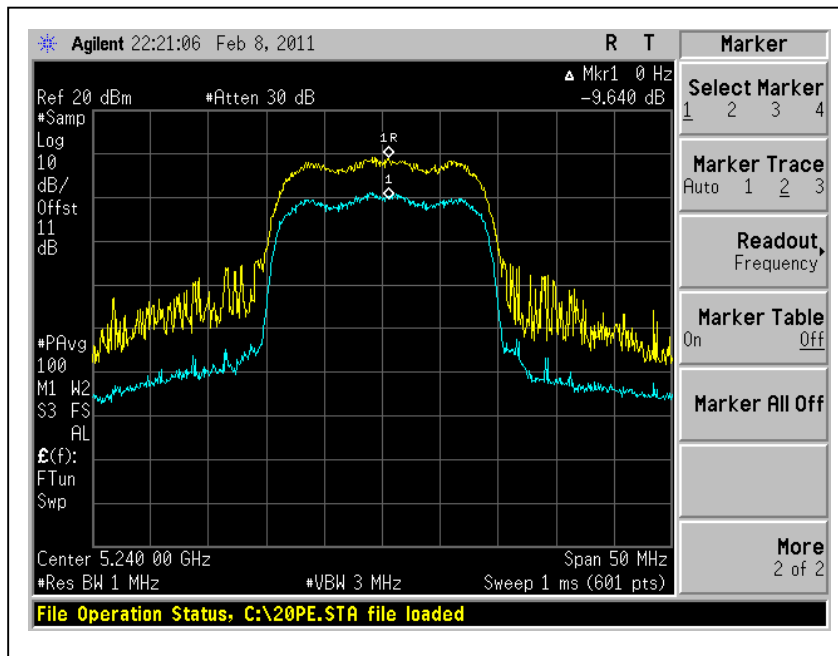


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**802.11n (20MHz) OFDM MODULATION:**

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
36	5180	9.5	13	PASS
40	5200	9.0	13	PASS
48	5240	9.6	13	PASS

CH48



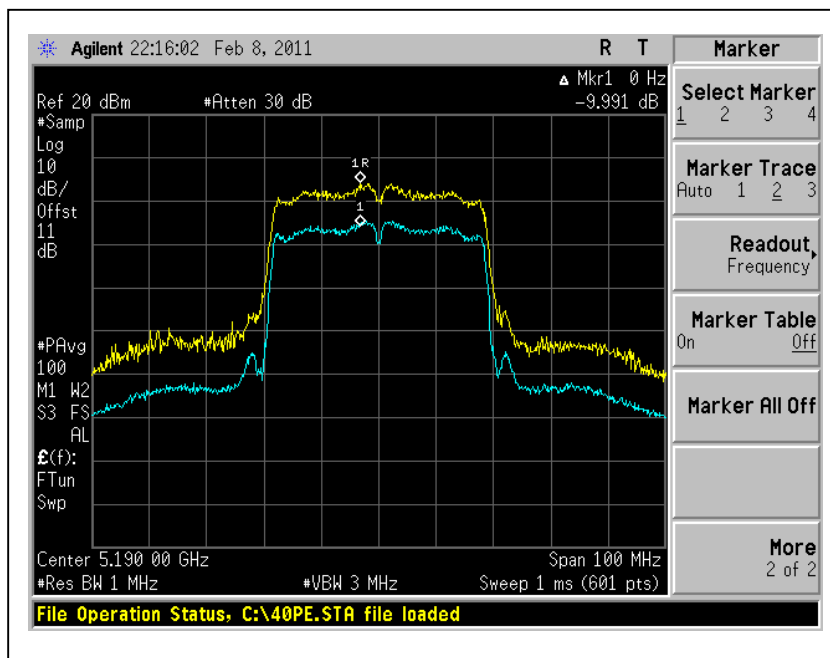


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### 802.11n (40MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
38	5190	10	13	PASS
46	5230	9	13	PASS

### CH38





## 4.5 PEAK POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Frequency Band	Limit
5.15 ~ 5.25GHz	4dBm
5.25 ~ 5.35GHz	11dBm
5.47 – 5.725GHz	11dBm
5.725 ~ 5.825GHz	17dBm

### 4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer	E4446A	MY48250254	July 14, 2010	July 13, 2011

**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 PROCEDURES

1. The transmitter output was connected to the spectrum analyzer.
2. Set RBW=1MHz, VBW=3MHz. The PPSD is the highest level found across the emission in any 1MHz band.

#### 4.5.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.5.5 TEST SETUP



#### 4.5.6 EUT OPERATING CONDITIONS

Same as 4.3.6



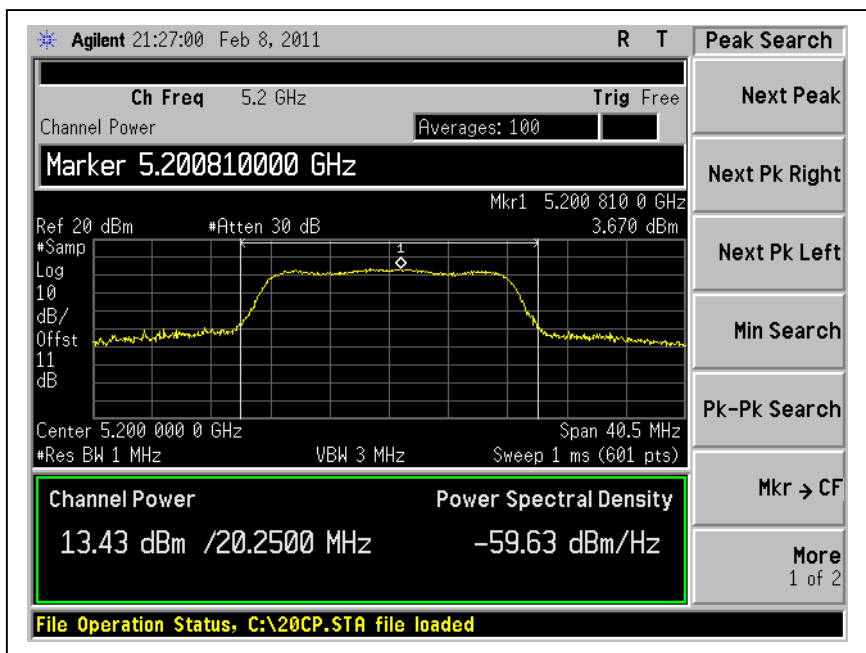
A D T

### 4.5.7 TEST RESULTS

#### 802.11a OFDM MODULATION

CHANNEL	CHANNEL FREQUENCY (MHz)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
36	5180	3.7	4	PASS
40	5200	3.7	4	PASS
48	5240	3.6	4	PASS

#### CH40



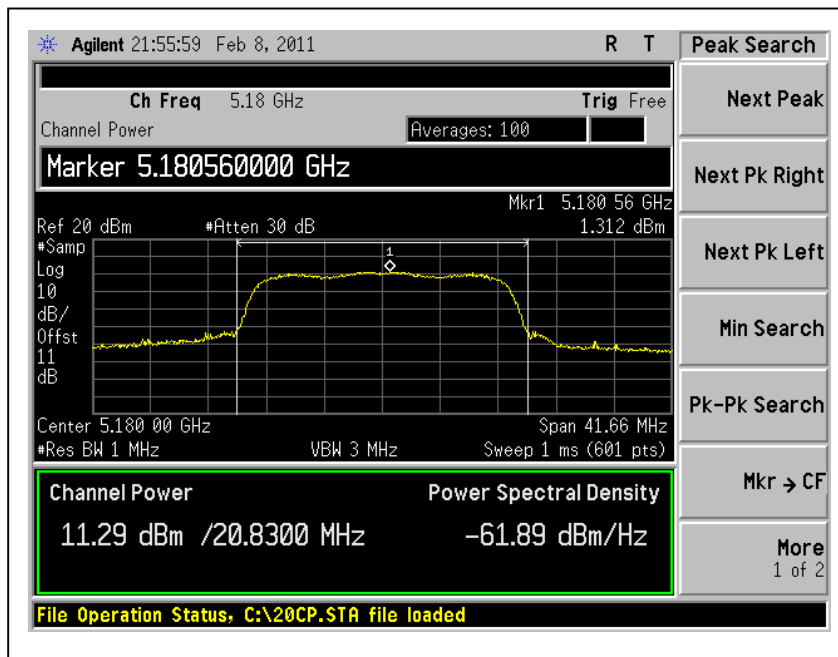


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**802.11n (20MHz) OFDM MODULATION:**

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)			
36	5180	0.4	1.3	3.9	4	PASS
40	5200	0.5	1.1	3.8	4	PASS
48	5240	0.6	0.8	3.7	4	PASS

For Chain (1) : CH36



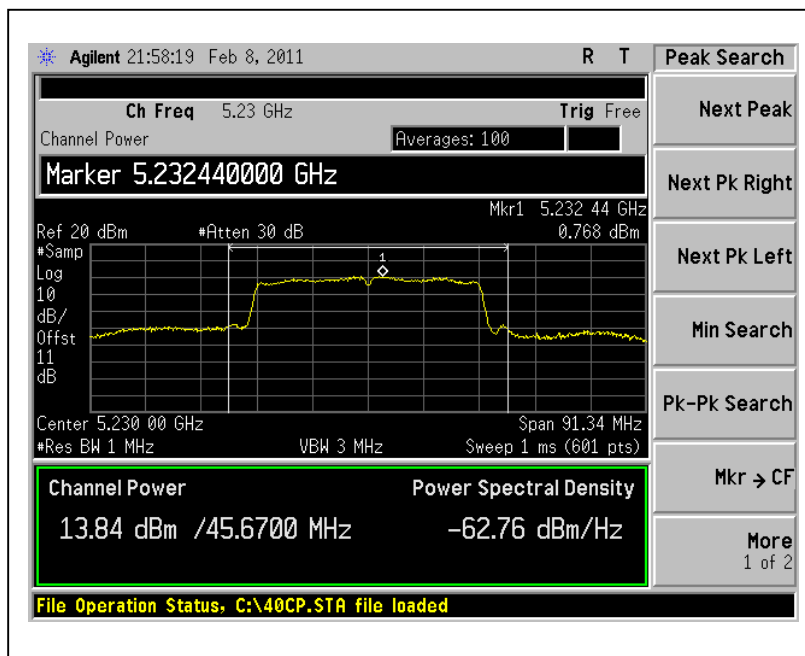


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**802.11n (40MHz) OFDM MODULATION:**

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)			
38	5190	-4.6	-4.2	-1.4	4	PASS
46	5230	0.1	0.8	3.5	4	PASS

For Chain (1) : CH46





## 4.6 FREQUENCY STABILITY

### 4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within of the operating frequency over a temperature variation of –30 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

### 4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer	FSP 40	100060	May 17, 2010	May 16, 2011

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

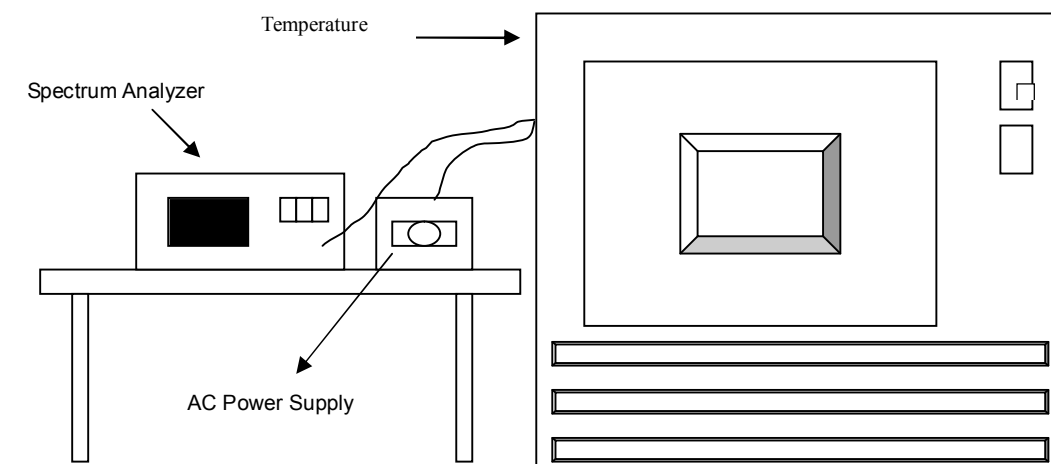
### 4.6.3 TEST PROCEDURE

1. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

#### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.6.5 TEST SETUP



#### 4.6.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.



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### 4.6.7 TEST RESULTS

Operating frequency: 5240MHz									
Temp. (°C)	Power supply (VAC)	0 minute		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	138	5239.9885	-2.1947	5239.9901	-1.8893	5239.988	-2.2901	5239.9878	-2.3282
	120	5239.9875	-2.3855	5239.9907	-1.7748	5239.9881	-2.2710	5239.9876	-2.3664
	102	5239.9882	-2.2519	5239.9891	-2.0802	5239.9883	-2.2328	5239.9871	-2.4618
40	138	5240.005	0.9542	5240.0043	0.8206	5240.0088	1.6794	5240.0123	2.3473
	120	5240.0048	0.9160	5240.0046	0.8779	5240.0091	1.7366	5240.0108	2.0611
	102	5240.0044	0.8397	5240.0041	0.7824	5240.0075	1.4313	5240.0123	2.3473
30	138	5239.9992	-0.1527	5240.0043	0.8206	5239.999	-0.1908	5240.0018	0.3435
	120	5239.9988	-0.2290	5240.0033	0.6298	5239.9993	-0.1336	5240.0024	0.4580
	102	5239.9997	-0.0573	5240.0046	0.8779	5239.9992	-0.1527	5240.0031	0.5916
20	138	5240.0031	0.5916	5240.0038	0.7252	5239.998	-0.3817	5239.9976	-0.4580
	120	5240.0021	0.4008	5240.0038	0.7252	5239.998	-0.3817	5239.9967	-0.6298
	102	5240.0018	0.3435	5240.0024	0.4580	5239.9986	-0.2672	5239.9975	-0.4771
10	138	5240.0167	3.1870	5240.0156	2.9771	5240.0116	2.2137	5240.0096	1.8321
	120	5240.0168	3.2061	5240.0166	3.1679	5240.0119	2.2710	5240.0105	2.0038
	102	5240.0171	3.2634	5240.0162	3.0916	5240.0114	2.1756	5240.0092	1.7557
0	138	5239.9861	-2.6527	5239.9826	-3.3206	5239.9869	-2.5000	5239.9893	-2.0420
	120	5239.9861	-2.6527	5239.9823	-3.3779	5239.9871	-2.4618	5239.9883	-2.2328
	102	5239.9849	-2.8817	5239.9841	-3.0344	5239.9886	-2.1756	5239.9889	-2.1183
-10	138	5240.0016	0.3053	5240.005	0.9542	5240.002	0.3817	5240.0074	1.4122
	120	5240.0009	0.1718	5240.005	0.9542	5240.0019	0.3626	5240.0061	1.1641
	102	5240.0006	0.1145	5240.0045	0.8588	5240.0013	0.2481	5240.0072	1.3740
-20	138	5239.994	-1.1450	5239.9976	-0.4580	5240.0003	0.0573	5240.0041	0.7824
	120	5239.9942	-1.1069	5239.9971	-0.5534	5239.9996	-0.0763	5240.0029	0.5534
	102	5239.9939	-1.1641	5239.9966	-0.6489	5240.0009	0.1718	5240.0038	0.7252
-30	138	5240.0129	2.4618	5240.0139	2.6527	5240.0158	3.0153	5240.0203	3.8740
	120	5240.0124	2.3664	5240.0147	2.8053	5240.0164	3.1298	5240.0204	3.8931
	102	5240.0128	2.4427	5240.0144	2.7481	5240.017	3.2443	5240.0218	4.1603

## 4.7 CONDUCTED OUT-BAND EMISSION MEASUREMENT

### 4.7.1 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer	FSP 40	100060	May 17, 2010	May 16, 2011

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

### 4.7.2 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low loss cable. Set RBW of spectrum analyzer to 1MHz with suitable frequency span including 100MHz or 200MHz bandwidth from band edge. The band edges was measured and recorded.

### 4.7.3 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

### 4.7.4 TEST RESULTS

For 5.15 to 5.25GHz band:

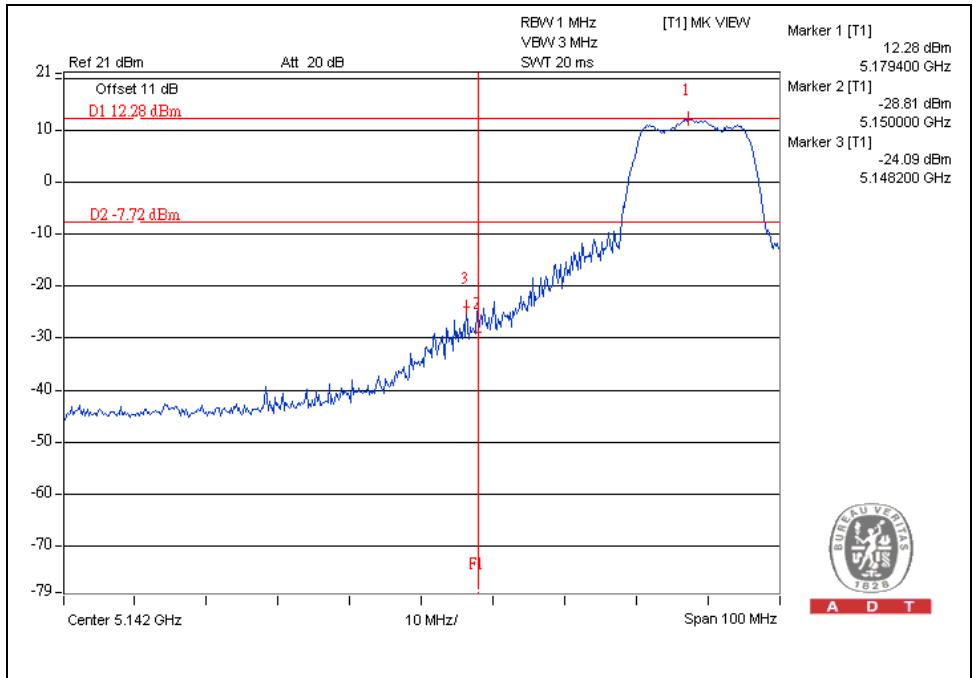
The spectrum plots (Peak RBW=1MHz, VBW=3MHz) are attached on the following pages.



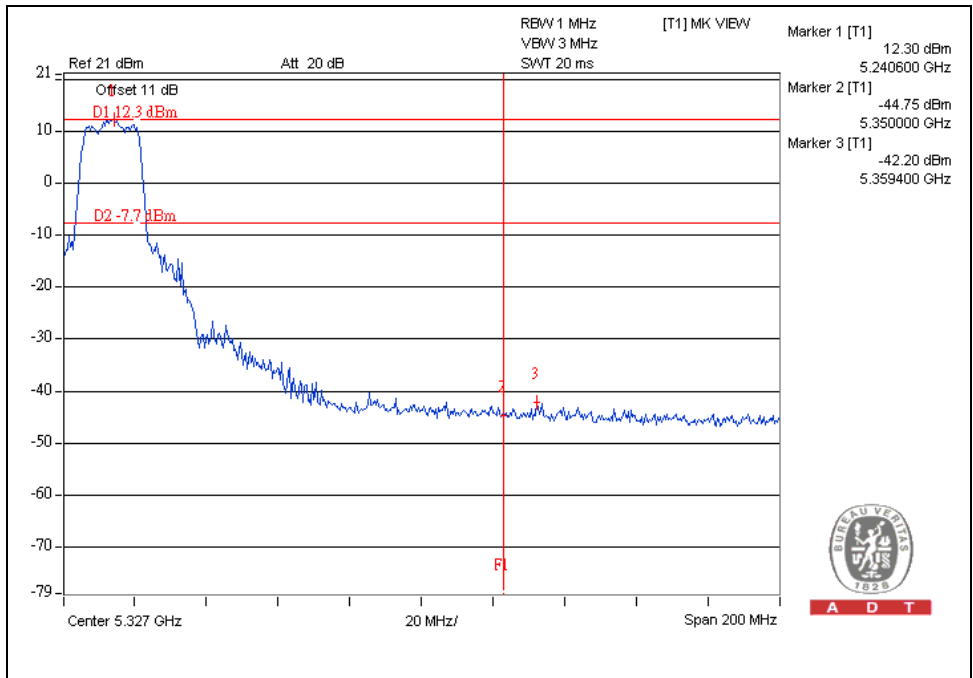
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### 802.11a OFDM modulation

#### CH 36



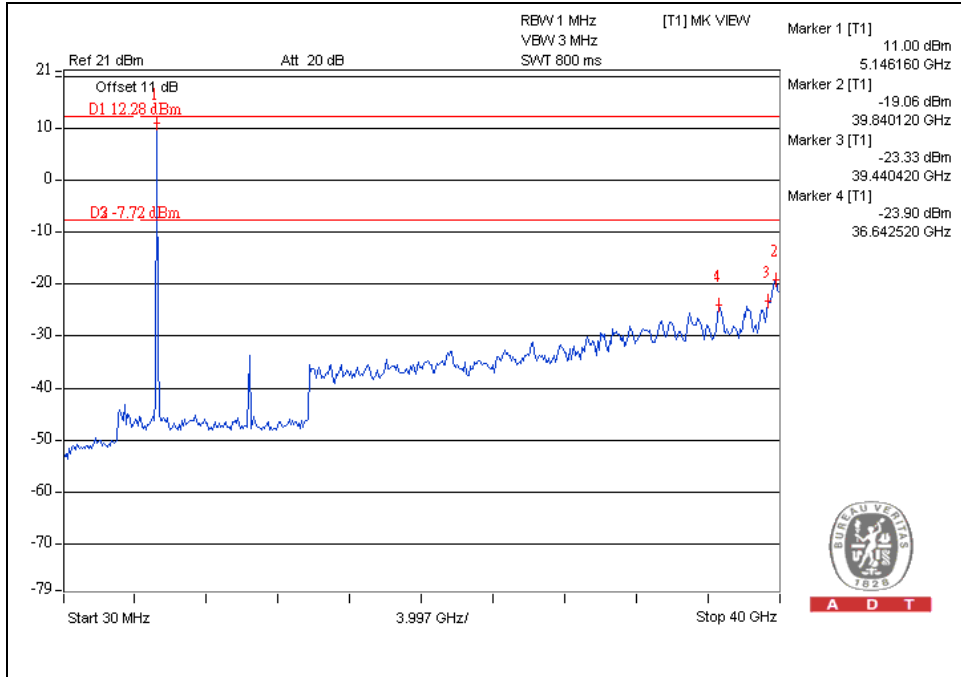
#### CH 48



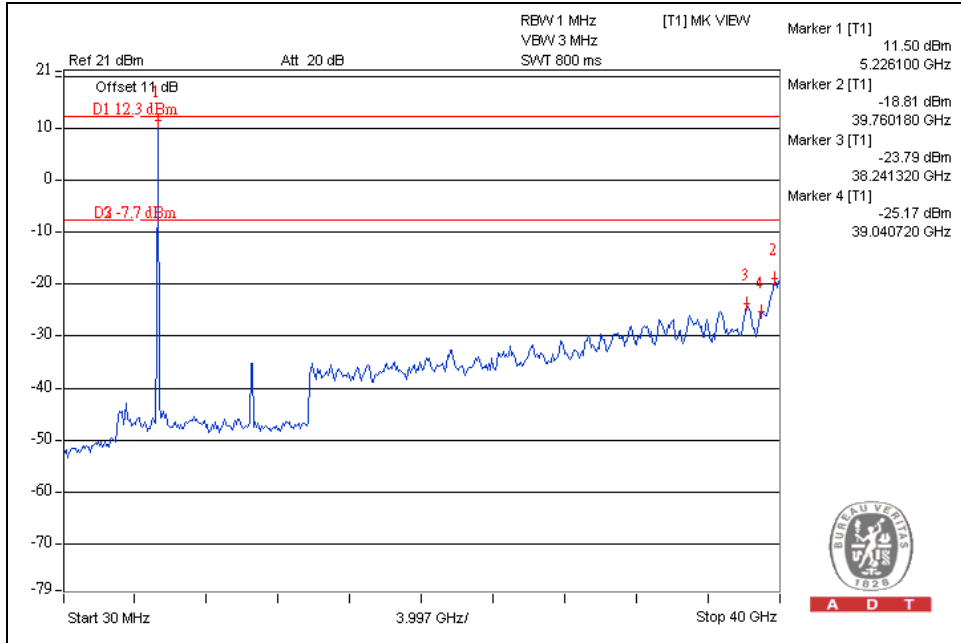


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### CH 36



### CH 48

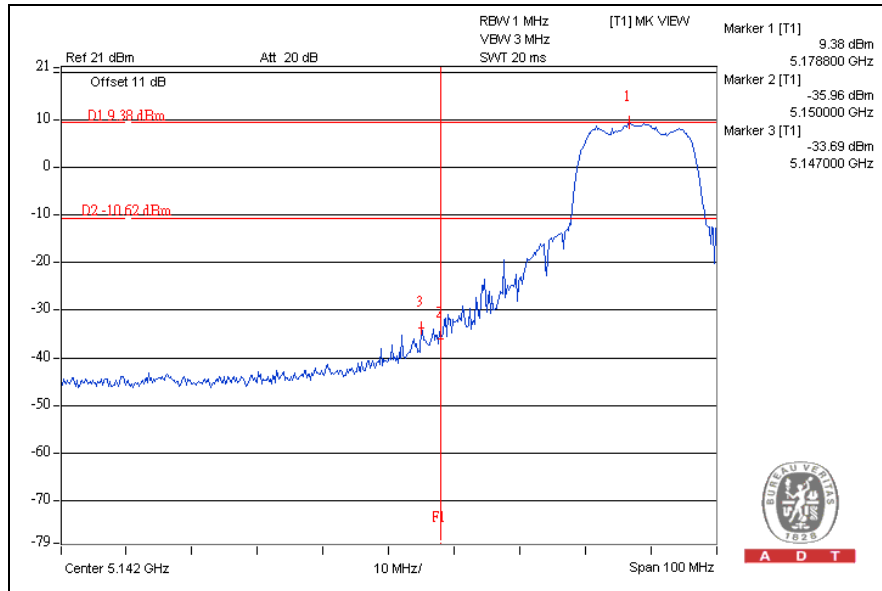




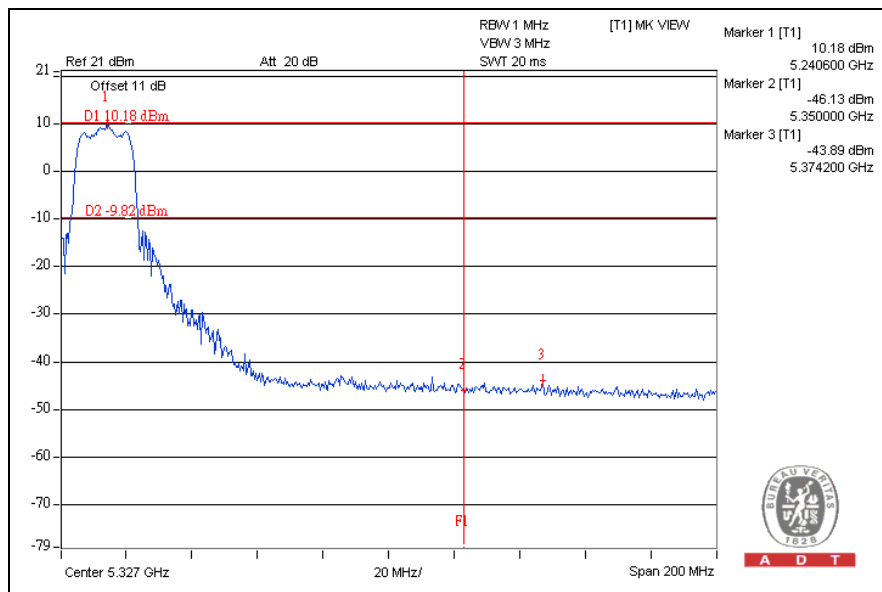
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## 802.11n (20MHz) OFDM MODULATION:

### CH36



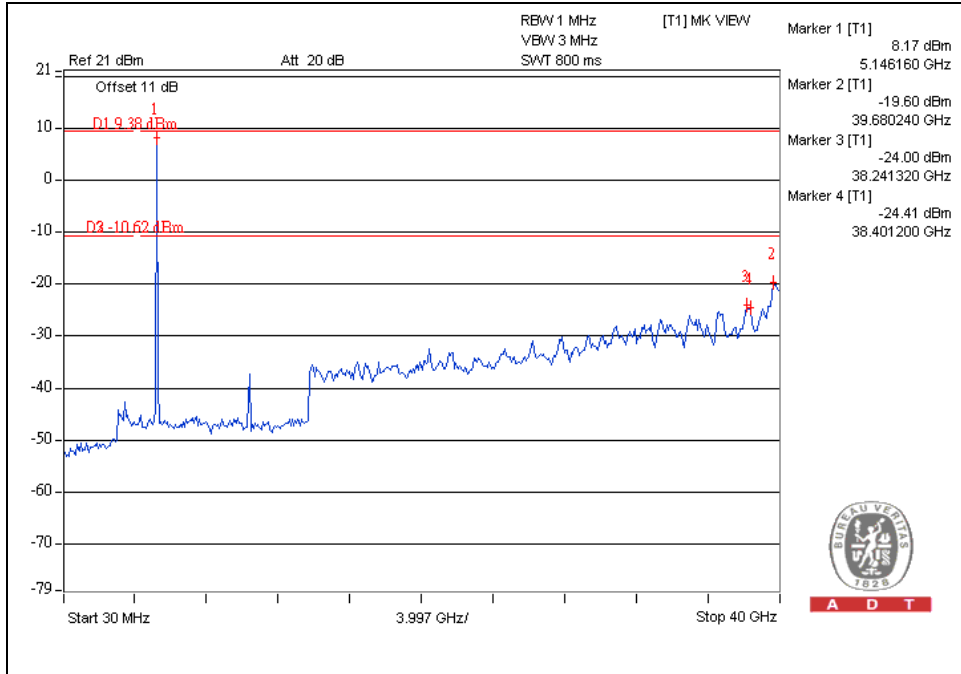
### CH48



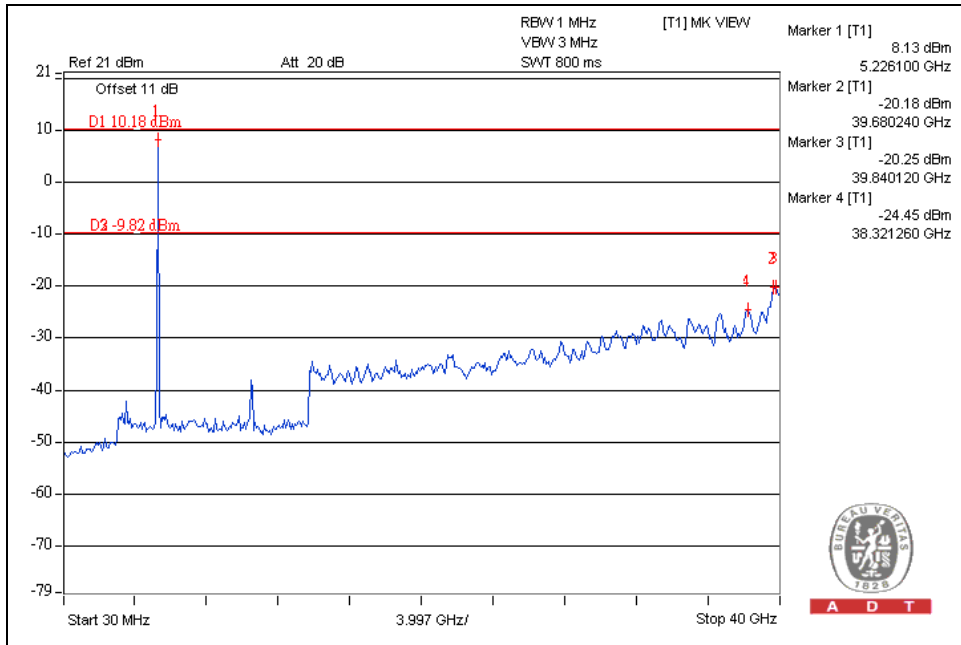


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### CH36



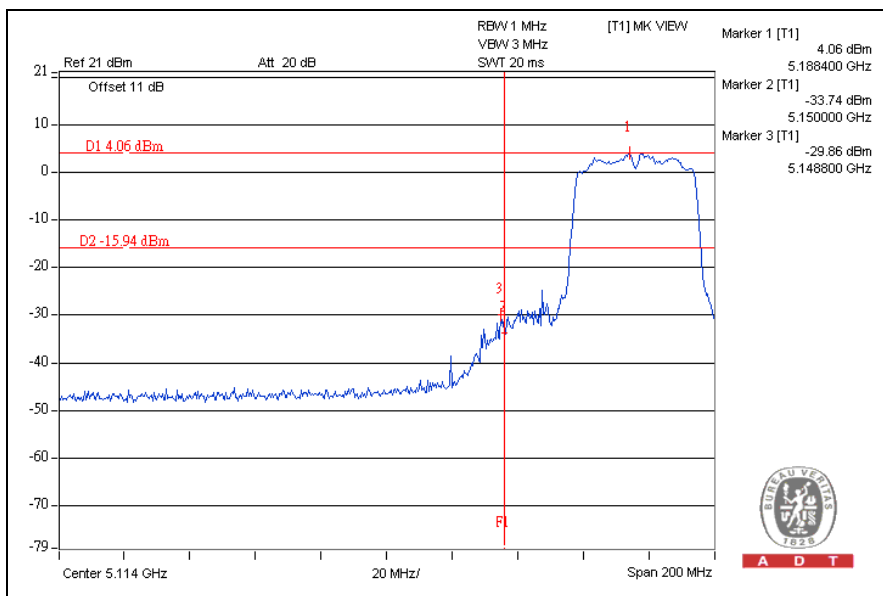
### CH48



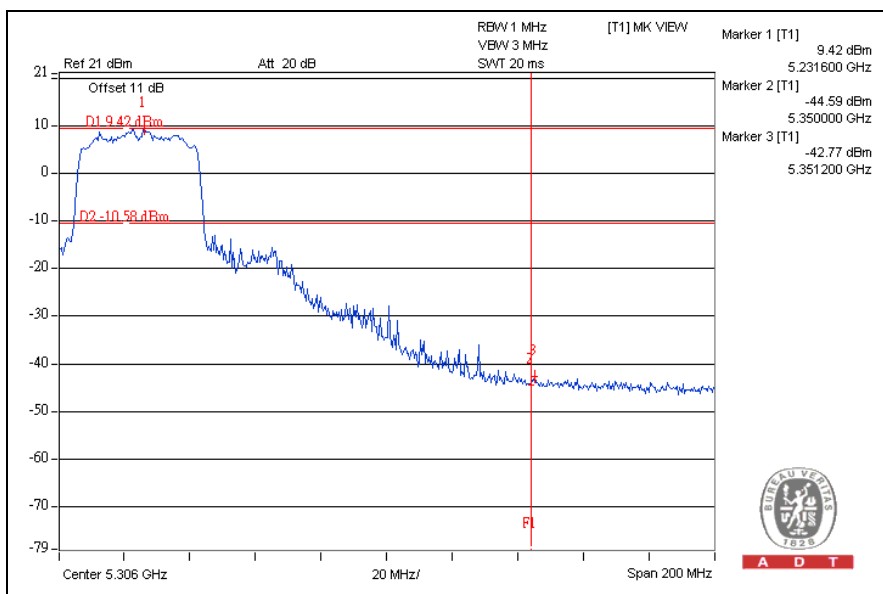


## 802.11n (40MHz) OFDM MODULATION:

### CH38



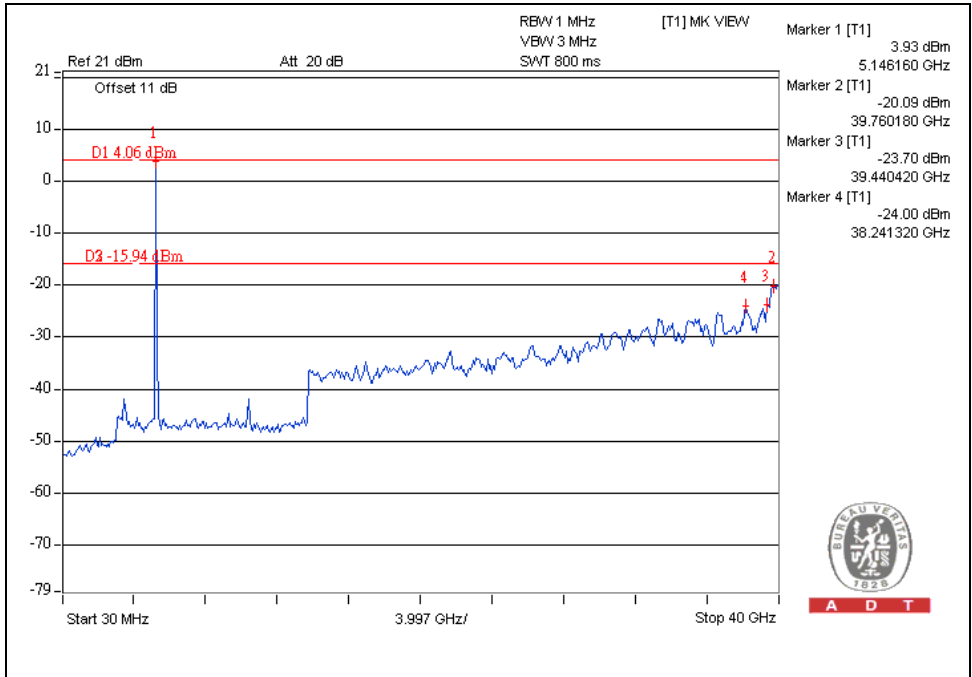
### CH46



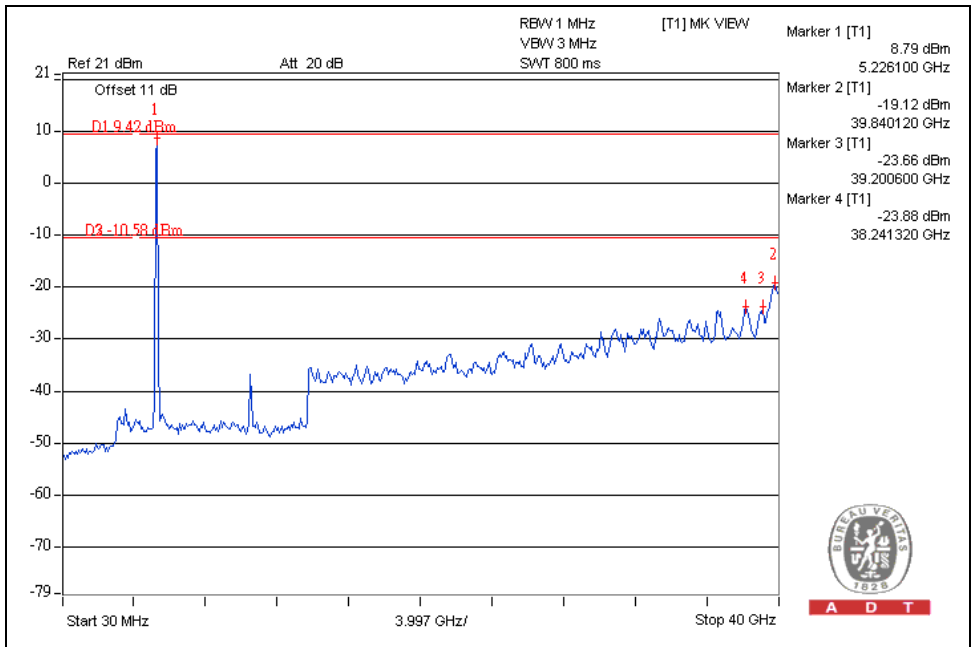


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### CH38



### CH46





## 5. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

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: 886-2-26052943

**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

**Email:** [service@adt.com.tw](mailto:service@adt.com.tw)

**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.



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## **6.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.