



# FCC TEST REPORT

**REPORT NO.:** RF991015E03

**MODEL NO.:** WBMR-HP-G300H

**FCC ID:** RAXAR7516VW

**RECEIVED:** Oct. 15, 2010

**TESTED:** Nov. 02 to 10, 2010

**ISSUED:** Nov. 16, 2010

**APPLICANT:** Arcadyan Technology Corporation

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**ISSUED BY:** Bureau Veritas Consumer Products Services (H.K.)  
Ltd., Taoyuan Branch Hsin Chu Laboratory

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## 1. CERTIFICATION

**PRODUCT:** Broad Band Router  
**BRAND NAME:** Buffalo Inc.  
**MODEL NO.:** WBMR-HP-G300H  
**TEST SAMPLE:** R&D SAMPLE  
**TESTED:** Nov. 02 to 10, 2010  
**APPLICANT:** Arcadyan Technology Corporation  
**STANDARDS:** FCC Part 15, Subpart C (Section 15.247)  
ANSI C63.4-2003

The above equipment (Model: WBMR-HP-G300H) 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:** Nov. 16, 2010  
( Midoli Peng, Specialist )

**TECHNICAL ACCEPTANCE** : Hank Chung , **DATE:** Nov.16, 2010  
( Hank Chung, Deputy Manager )

**APPROVED BY** : May Chen , **DATE:** Nov. 16, 2010  
( 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 C			
Standard Section	Test Type and Limit	Result	Remark
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -16.78dB at 0.396MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -0.5dB at 4924.0MHz
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Conducted Out-Band Emission Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is SMA Plug Reverse not a standard connector.

## 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)	3.94 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>	Broad Band Router
<b>MODEL NO.</b>	WBMR-HP-G300H
<b>FCC ID</b>	RAXAR7516VW
<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>	802.11b: 11 / 5.5 / 2 / 1Mbps 802.11g: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps 802.11n (20MHz, 400ns GI): 144.4 / 130 / 115.6 / 86.7 / 57.8 / 43.3 / 28.9 / 14.4 / 7.2Mbps 802.11n (40MHz, 400ns GI): 300 / 270 / 240 / 180 / 120 / 90 / 60 / 30 / 150 / 135 / 120 / 90 / 60 / 45 / 30 / 15Mbps 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>FREQUENCY RANGE</b>	2412MHz ~ 2462MHz
<b>NUMBER OF CHANNEL</b>	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
<b>MAXIMUM OUTPUT POWER</b>	802.11b: 114.4mW 802.11g: 433.9mW 802.11n (20MHz): 415.3mW 802.11n (40MHz): 150.1mW
<b>ANTENNA TYPE</b>	Please see note 1
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	RJ-45 port (Ethernet (LAN)) x 4 RJ-11 port(DSL) x 1 USB port (USB 2.0) 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:

Chain	Gain (dBi)	Type	Connector
Chain (0)	2	Dipole	SMA Plug Reverse
Chain (1)	2	Dipole	SMA Plug Reverse

2. The EUT must be supplied with a power adapter and following two different models could be chosen:

<b>Adapter 1</b>	
<b>Brand:</b>	APD
<b>Model No.:</b>	WA-24E12FU
<b>Input power :</b>	AC 100-240V, 50-60Hz, 0.65A
<b>Output power :</b>	DC 12V, 2A 1.6m unshielded without core.
<b>Adapter 2</b>	
<b>Brand:</b>	APD
<b>Model No.:</b>	WA-24C12U
<b>Input power :</b>	AC 100-240V, 50-60Hz, 0.55A
<b>Output power :</b>	DC 12V, 2A 1.6m unshielded without core.

3. The EUT was pre-tested under the following test modes:

Test Mode	Description
Mode A	Level-set + adapter 1
<b>Mode B</b>	<b>Tower-set + adapter 1</b>
Mode D	Level-set + adapter 2

For radiated test, the worst case was found in **Mode B**. Therefore only the test data of the modes were recorded in this report individually.

4. The EUT incorporates a MIMO function with 802.11n
5. The EUT is 2 \* 2 spatial MIMO (2Tx & 2Rx) without beam forming function.
6. The EUT complies with 802.11n standards and backwards compatible with 802.11b, 802.11g products.
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.





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### 3.2 DESCRIPTION OF TEST MODES

Eleven channels are provided for 802.11b, 802.11g, 802.11n (20MHz):

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

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

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



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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

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	CHAIN(0) (TX)	CHAIN(1) (TX)
A	802.11b	√	√
B	802.11g	√	√
C	802.11n (20MHz) for MCS 0~15	√	√
D	802.11n (40MHz) for MCS 0~15	√	√

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.

#### 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
802.11g	Worst channel	-	-	-	-	-



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**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
802.11g	1 to 11	6	OFDM	BPSK	6	B

**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
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1	A
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6	B
802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	C
802.11n (40MHz)	1 to 7	1, 4, 7	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)	TX COMBINATION
802.11b	1 to 11	1, 11	DSSS	DBPSK	1	A
802.11g	1 to 11	1, 11	OFDM	BPSK	6	B
802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	6.5	C
802.11n (40MHz)	1 to 7	1, 7	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.
- The EUT have MIMO power save mode, one transmitter may be active (chain 0) while other is inactive (chain 1). Output power is no different compared to operation when both transmitter chains are active. Transmitter power is not increased or decreased for chain 0 when in single chain mode, compared to dual chain active mode.
- 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
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1	A
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6	B
802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	C
802.11n (40MHz)	1 to 7	1, 4, 7	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	20deg. C, 61%RH, 1013 hPa	120Vac, 60Hz	Kent Liu
RE<1G	20deg. C, 61%RH, 1013 hPa	120Vac, 60Hz	Kent Liu
PLC	26deg. C, 75%RH, 1013 hPa	120Vac, 60Hz	Anderson Chen
APCM	25deg. C, 60%RH, 1013 hPa	120Vac, 60Hz	Wen Yu



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

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart C. (15.247)**

**ANSI C63.4-2003**

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

**NOTE:** The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



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### 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.

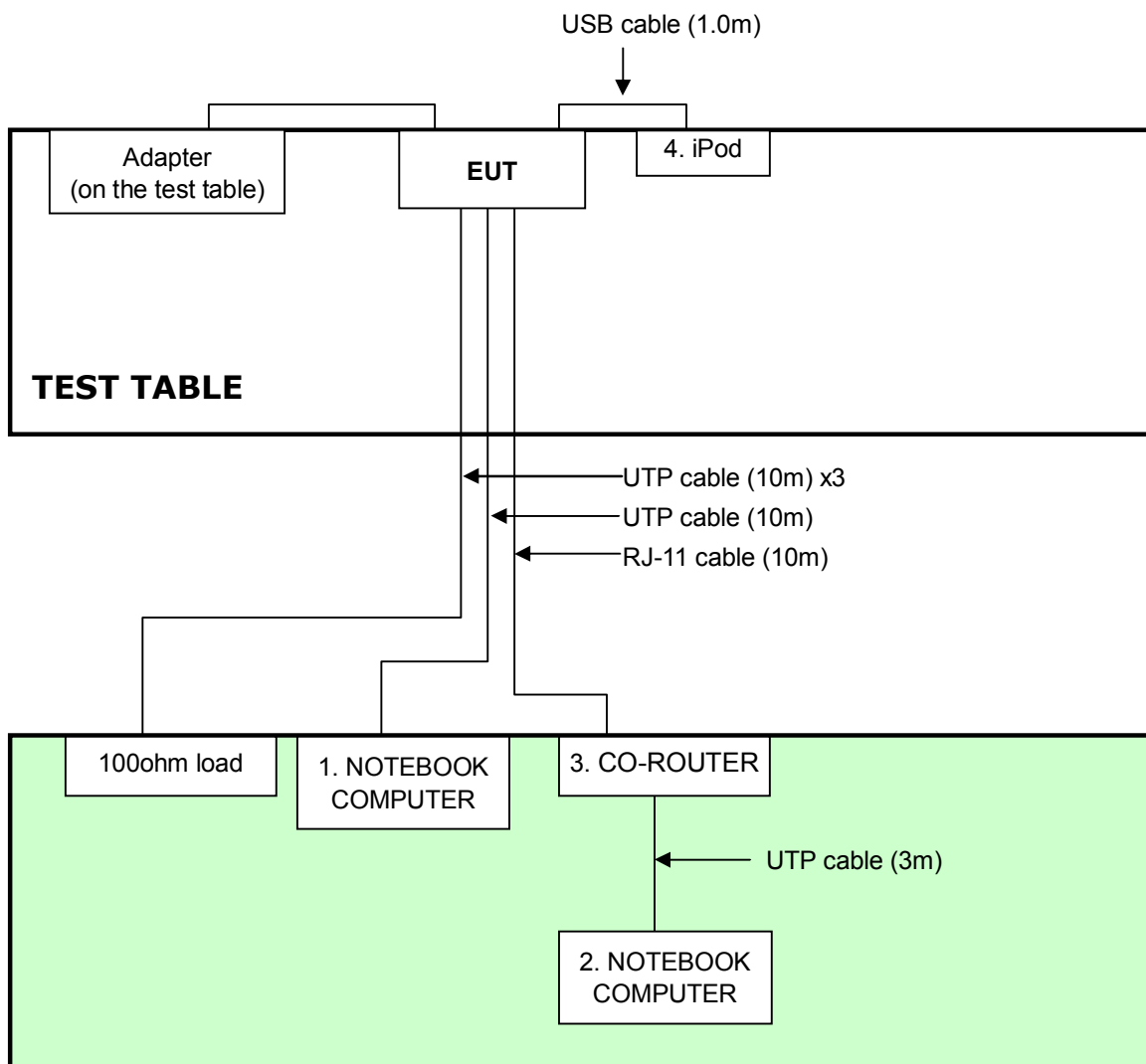
For conducted test					
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP18L	12252644560	FCC DoC
2	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC
3	CO-ROUTER	ZyXel	IES-1000	S08024701597	FCC DoC
4	iPod	APPLE	A1199	YM712NHFVQ5	FCC DoC
For other test items					
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	D531	CN-0XM006-48643-86L-4472	QDS-BRCM1019
2	NOTEBOOK COMPUTER	DELL	E6400	D814C A00 APCC	FCC DoC
3	CO-ROUTER	ZyXel	IES-1000	S08024701597	FCC DoC
4	iPod	APPLE	A1199	YM712NHFVQ5	FCC DoC
5	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC

For conducted test	
NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10m UTP cable
2	3m UTP cable
3	10m RJ-11 cable
4	1m USB(shielded) cable
For other test items	
NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10m UTP cable
2	3m UTP cable
3	10m RJ-11 cable
4	0.8m USB(shielded) cable
5	10m UTP cable

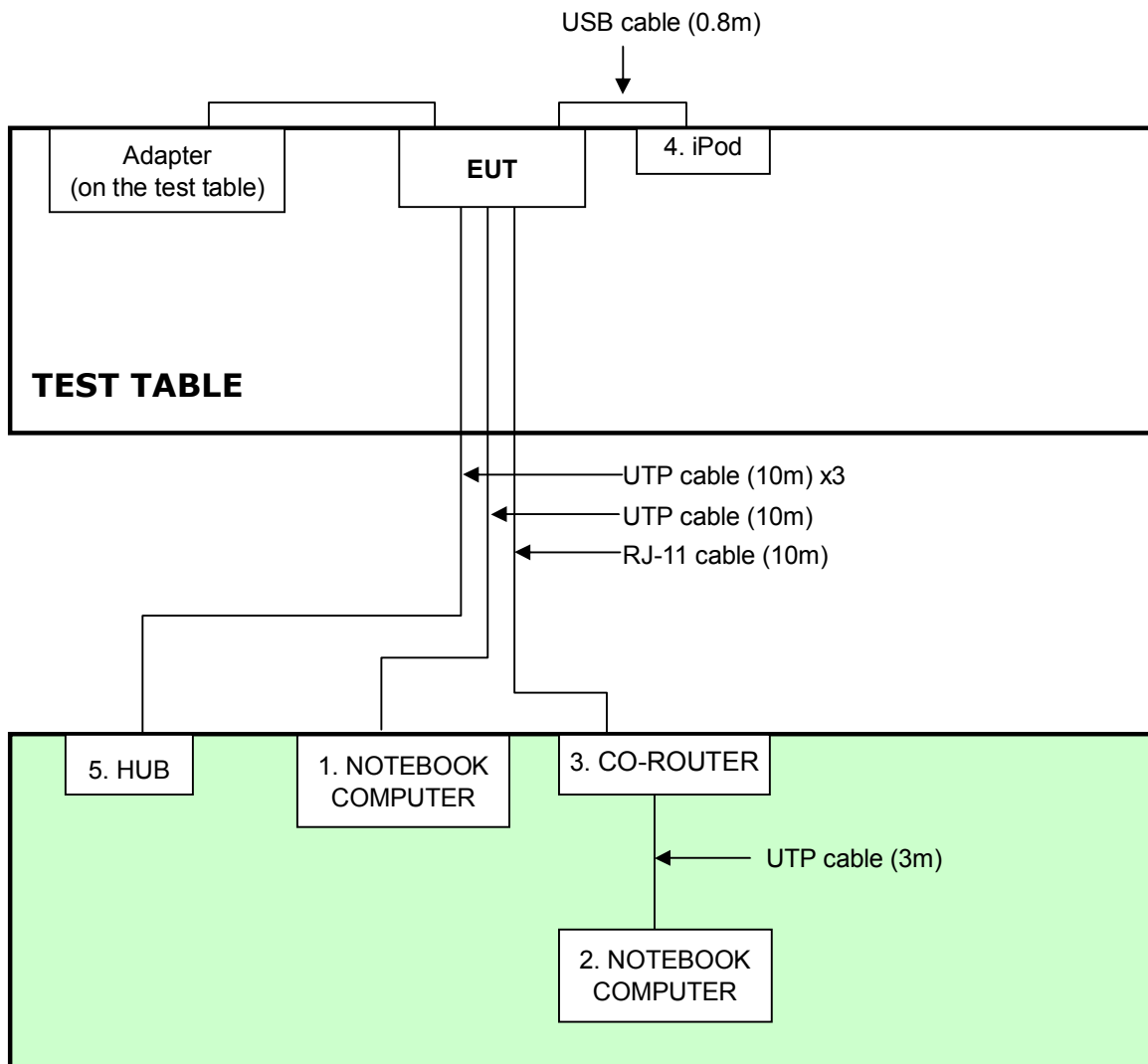
**NOTE:** 1. All power cords of the above support units are non shielded (1.8m).

### 3.5 CONFIGURATION OF SYSTEM UNDER TEST

For conducted test:



**For other test items:**





## 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)	
0.15-0.5	Quasi-peak	Average
0.5-5	66 to 56	56 to 46
5-30	56	46
	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 (JYBAO)	5DFB	COACAB-001	Dec. 14, 2009	Dec. 13, 2010
50 ohms Terminator	50	3	Oct. 28, 2010	Oct. 27, 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.

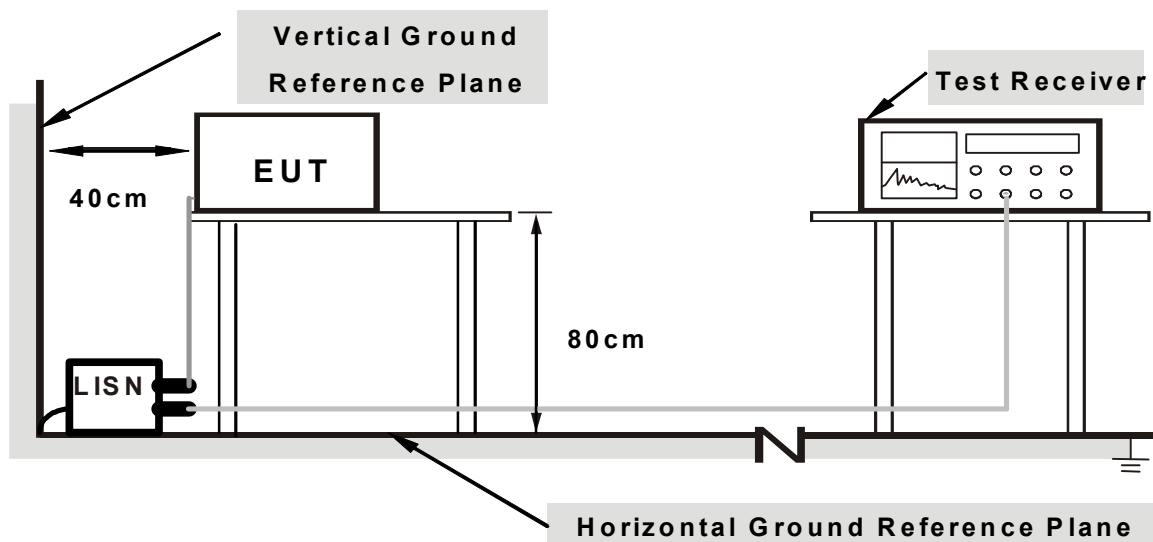
#### 4.1.3 TEST PROCEDURES

- 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 provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were 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

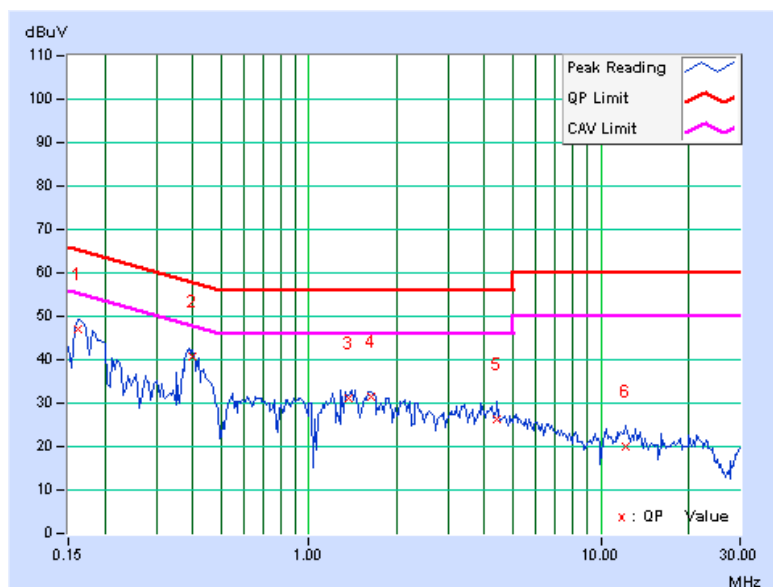
1. Turned on the power of all equipment.
2. Prepared other computer systems (support units 1~2) to act as communication partners and placed them outside of testing area.
3. The communication partners ran test program “Revision 0.9 BUILD #27 ART 11n” to enable EUT under transmission/receiving condition continuously via UTP cables.

### 4.1.7 TEST RESULTS

<b>PHASE</b>	Line (L)	<b>6dB BANDWIDTH</b>	9 kHz
<b>TEST MODE</b>	With adapter 1		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.162	0.36	46.55	-	46.91	-	65.38	55.38	-18.46	-
2	0.400	0.36	40.38	-	40.74	-	57.86	47.86	-17.12	-
3	1.368	0.43	30.72	-	31.15	-	56.00	46.00	-24.85	-
4	1.629	0.44	31.07	-	31.51	-	56.00	46.00	-24.49	-
5	4.410	0.52	25.60	-	26.12	-	56.00	46.00	-29.88	-
6	12.180	0.83	19.22	-	20.05	-	60.00	50.00	-39.95	-

- 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.



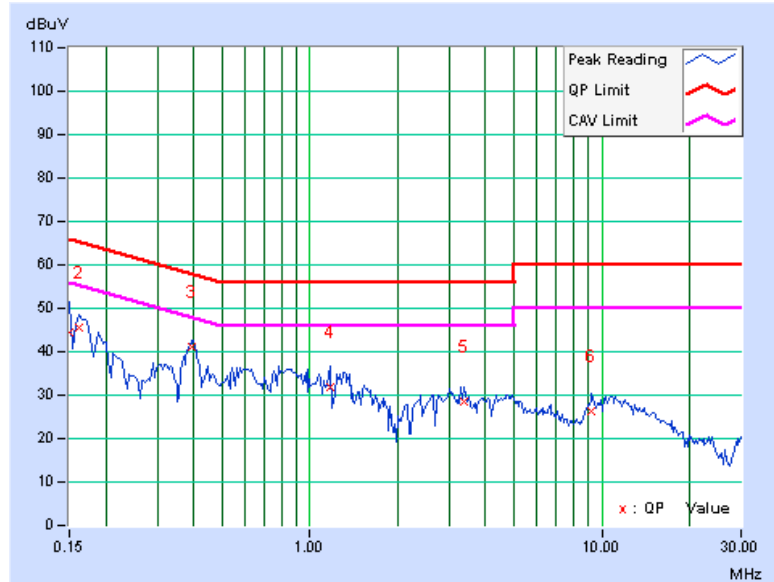


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PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz
TEST MODE	With adapter 1		

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	0.10	44.37	-	44.47	-	66.00	56.00	-21.53	-
2	0.162	0.10	45.49	-	45.59	-	65.38	55.38	-19.79	-
<b>3</b>	<b>0.396</b>	<b>0.11</b>	<b>41.05</b>	-	<b>41.16</b>	-	<b>57.93</b>	<b>47.93</b>	<b>-16.78</b>	-
4	1.168	0.17	31.64	-	31.81	-	56.00	46.00	-24.19	-
5	3.375	0.23	28.29	-	28.52	-	56.00	46.00	-27.48	-
6	9.246	0.45	25.80	-	26.25	-	60.00	50.00	-33.75	-

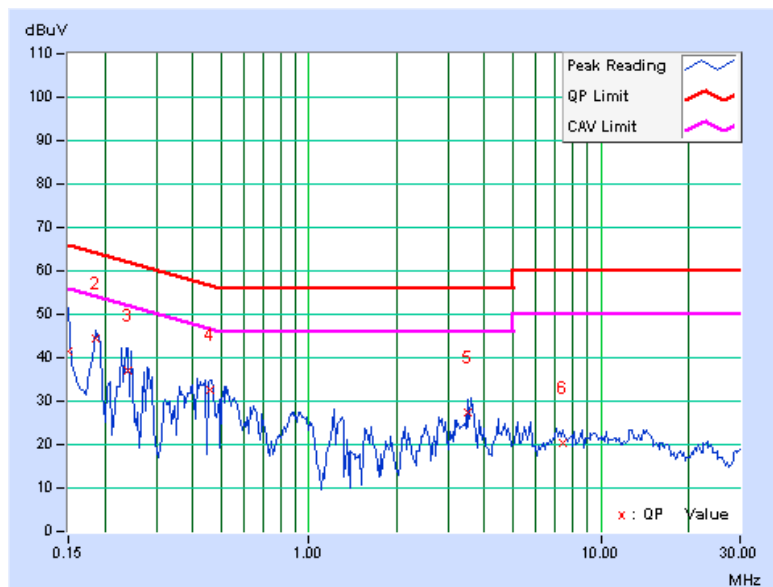
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>PHASE</b>	Line (L)	<b>6dB BANDWIDTH</b>	9 kHz
<b>TEST MODE</b>	With adapter 2		

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	0.37	41.22	-	41.59	-	66.00
2	0.185	0.36	44.19	-	44.55	-	64.25	54.25	-19.70	-
3	0.240	0.36	36.57	-	36.93	-	62.10	52.10	-25.17	-
4	0.459	0.36	32.34	-	32.70	-	56.72	46.72	-24.01	-
5	3.500	0.50	26.84	-	27.34	-	56.00	46.00	-28.66	-
6	7.434	0.61	19.75	-	20.36	-	60.00	50.00	-39.64	-

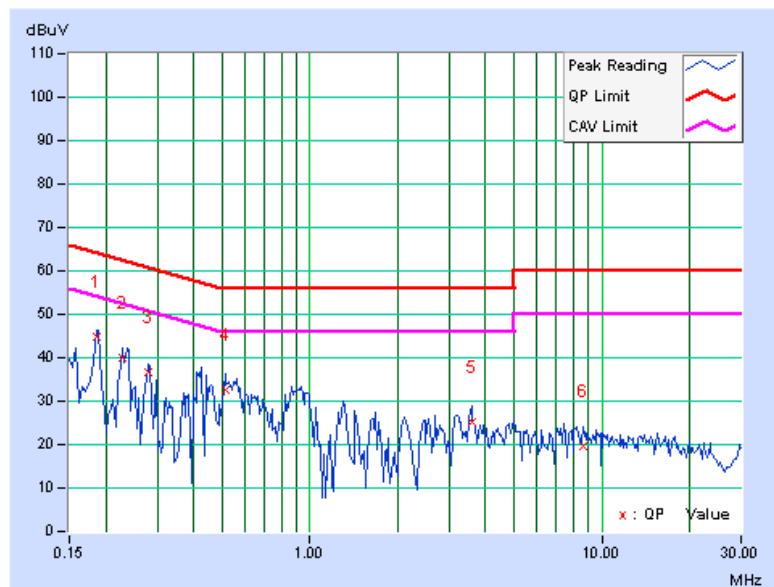
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = 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
<b>TEST MODE</b>	With adapter 2		

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	0.185	0.10	44.86	-	44.96	-	64.25
2	0.228	0.10	39.81	-	39.91	-	62.52	52.52	-22.61	-
3	0.279	0.10	36.60	-	36.70	-	60.85	50.85	-24.14	-
4	0.513	0.12	32.38	-	32.50	-	56.00	46.00	-23.50	-
5	3.594	0.23	25.13	-	25.36	-	56.00	46.00	-30.64	-
6	8.641	0.43	19.11	-	19.54	-	60.00	50.00	-40.46	-

- 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 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100036	Dec. 18, 2009	Dec. 17, 2010
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. 18, 2009	Dec. 17, 2010
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 22, 2010	Jan. 21, 2011
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.

#### 4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 10 meters open site. 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 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.

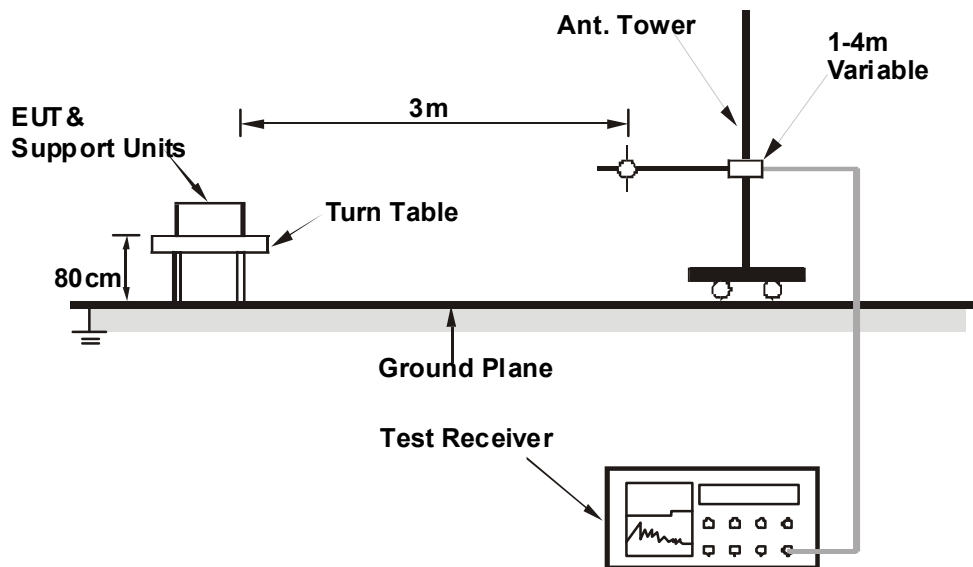
**NOTE:**

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 video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.2.5 TEST SETUP



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

#### 4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

## 4.2.7 TEST RESULTS

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	20deg. C, 61%RH 1013 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	166.66	38.1 QP	43.5	-5.4	1.58 H	25	23.50	14.60
2	250.00	36.9 QP	46.0	-9.1	1.34 H	236	23.30	13.60
3	333.33	37.2 QP	46.0	-8.8	1.42 H	157	20.70	16.50
4	480.00	39.5 QP	46.0	-6.5	1.52 H	144	19.30	20.20
5	500.00	42.5 QP	46.0	-3.5	1.25 H	177	21.70	20.80
6	625.00	42.6 QP	46.0	-3.4	1.25 H	114	19.00	23.60
7	720.00	38.4 QP	46.0	-7.6	1.18 H	259	13.60	24.80
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	166.66	38.6 QP	43.5	-4.9	1.03 V	251	24.00	14.60
2	212.79	33.5 QP	43.5	-10.0	1.00 V	248	21.90	11.60
3	480.00	39.7 QP	46.0	-6.3	1.00 V	263	19.50	20.20
4	500.00	42.6 QP	46.0	-3.4	1.25 V	111	21.80	20.80
5	625.00	42.5 QP	46.0	-3.5	1.26 V	174	18.90	23.60
6	1000.00	41.9 QP	54.0	-12.1	1.25 V	118	13.30	28.60

- 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**

**802.11b DSSS MODULATION**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 61%RH 1013 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	2390.00	54.6 PK	74.0	-19.4	1.40 H	223	23.63	30.97
2	2390.00	41.4 AV	54.0	-12.6	1.40 H	223	10.43	30.97
3	*2412.00	101.8 PK			1.40 H	220	70.73	31.07
4	*2412.00	98.4 AV			1.40 H	220	67.33	31.07
5	4824.00	50.2 PK	74.0	-23.8	1.03 H	255	13.09	37.11
6	4824.00	46.8 AV	54.0	-7.2	1.03 H	255	9.69	37.11

**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	2390.00	57.0 PK	74.0	-17.0	1.24 V	267	26.03	30.97
2	2390.00	49.2 AV	54.0	-4.8	1.24 V	267	18.23	30.97
3	*2412.00	111.3 PK			1.27 V	224	80.23	31.07
4	*2412.00	108.5 AV			1.27 V	224	77.43	31.07
5	4824.00	55.8 PK	74.0	-18.2	1.00 V	185	18.69	37.11
6	4824.00	53.2 AV	54.0	-0.8	1.00 V	185	16.09	37.11

- 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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 61%RH 1013 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	*2437.00	101.3 PK			1.43 H	225	70.13	31.17
2	*2437.00	98.2 AV			1.43 H	225	67.03	31.17
3	4874.00	50.9 PK	74.0	-23.1	1.04 H	258	13.67	37.23
4	4874.00	46.9 AV	54.0	-7.1	1.04 H	258	9.67	37.23
5	7311.00	53.2 PK	74.0	-20.8	1.09 H	264	8.84	44.36
6	7311.00	44.3 AV	54.0	-9.7	1.09 H	264	-0.06	44.36
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	*2437.00	110.9 PK			1.20 V	214	79.73	31.17
2	*2437.00	108.1 AV			1.20 V	214	76.93	31.17
3	4874.00	55.5 PK	74.0	-18.5	1.00 V	188	18.27	37.23
4	4874.00	53.1 AV	54.0	-0.9	1.00 V	188	15.87	37.23
5	7311.00	52.8 PK	74.0	-21.2	1.03 V	55	8.44	44.36
6	7311.00	44.1 AV	54.0	-9.9	1.03 V	55	-0.26	44.36

- 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.
  5. “ \* “: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 61%RH 1013 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	*2462.00	101.6 PK			1.41 H	225	70.32	31.28
2	*2462.00	98.8 AV			1.41 H	225	67.52	31.28
3	2483.91	56.6 PK	74.0	-17.4	1.42 H	215	25.23	31.37
4	2483.91	44.0 AV	54.0	-10.0	1.42 H	215	12.63	31.37
5	4924.00	50.7 PK	74.0	-23.3	1.03 H	265	13.36	37.34
6	4924.00	46.7 AV	54.0	-7.3	1.03 H	265	9.36	37.34
7	7386.00	53.6 PK	74.0	-20.4	1.08 H	284	9.01	44.59
8	7386.00	43.4 AV	54.0	-10.6	1.08 H	284	-1.19	44.59

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

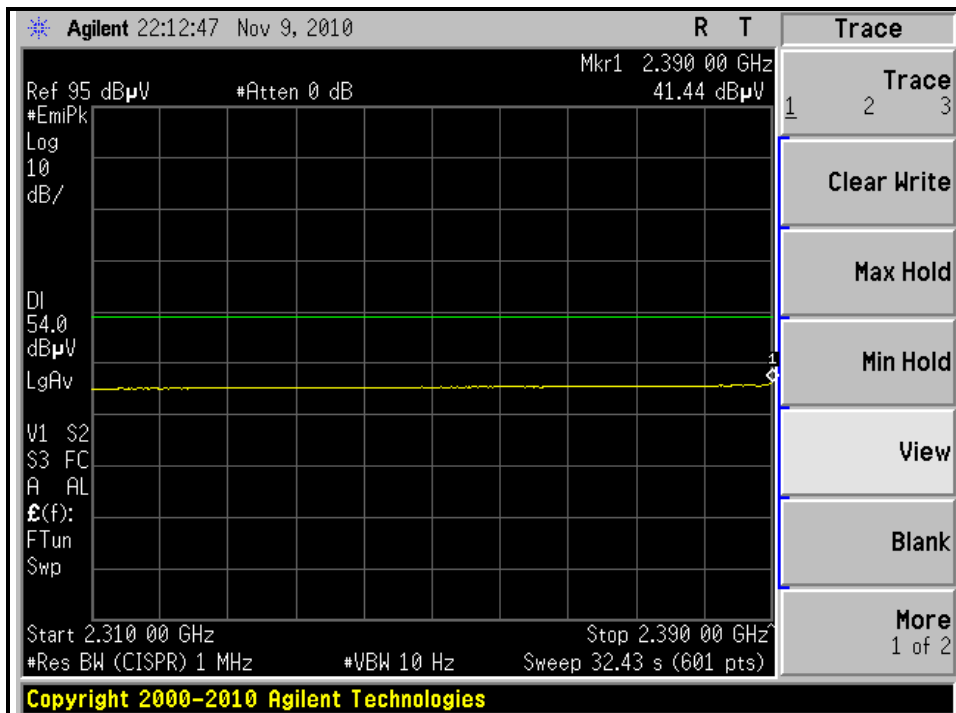
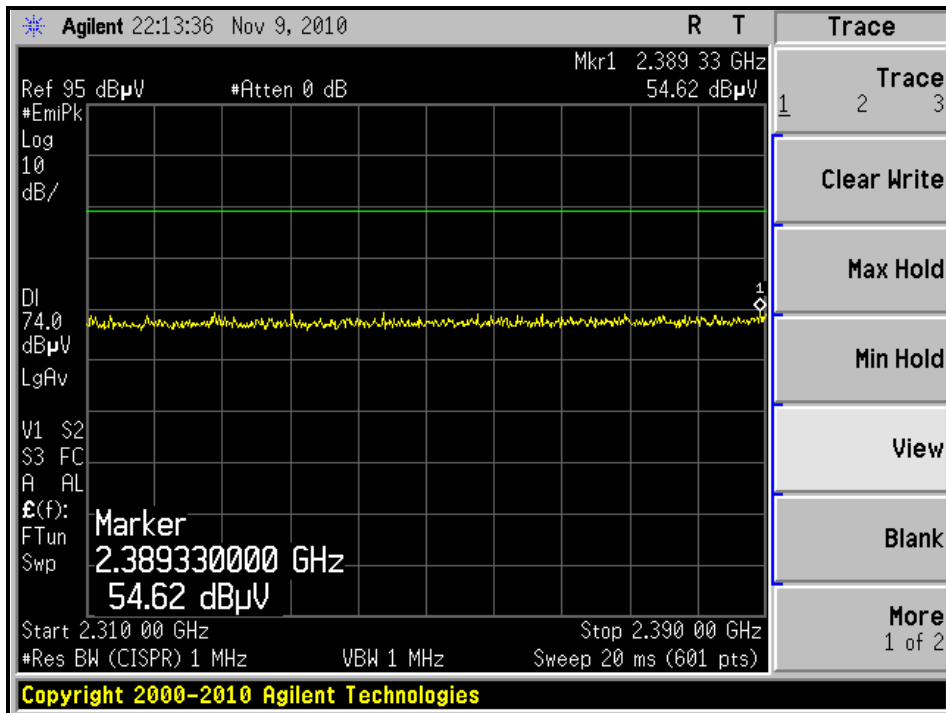
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.4 PK			1.29 V	177	79.12	31.28
2	*2462.00	107.6 AV			1.29 V	177	76.32	31.28
3	2484.02	60.0 PK	74.0	-14.0	1.27 V	226	28.63	31.37
4	2484.02	51.9 AV	54.0	-2.1	1.27 V	226	20.53	31.37
5	4924.00	55.8 PK	74.0	-18.2	1.00 V	195	18.46	37.34
<b>6</b>	<b>4924.00</b>	<b>53.5 AV</b>	<b>54.0</b>	<b>-0.5</b>	<b>1.00 V</b>	<b>195</b>	<b>16.16</b>	<b>37.34</b>
7	7386.00	51.9 PK	74.0	-22.1	1.05 V	48	7.31	44.59
8	7386.00	43.4 AV	54.0	-10.6	1.05 V	48	-1.19	44.59

- 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.



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RESTRICTED BANDEDGE (802.11b MODE, CH1, HORIZONTAL)

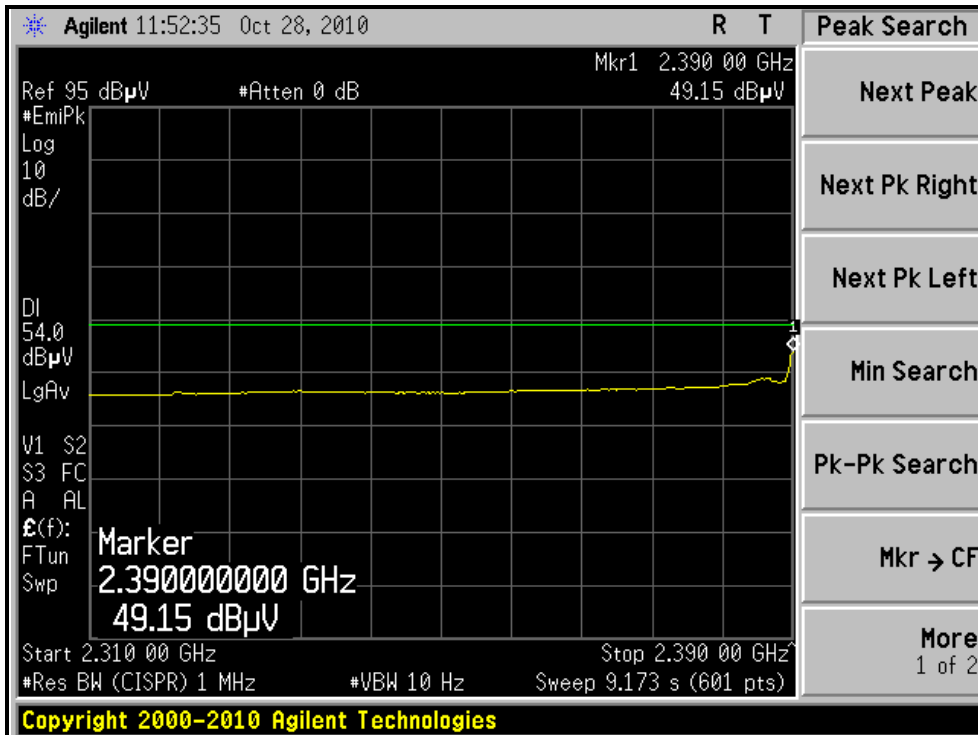
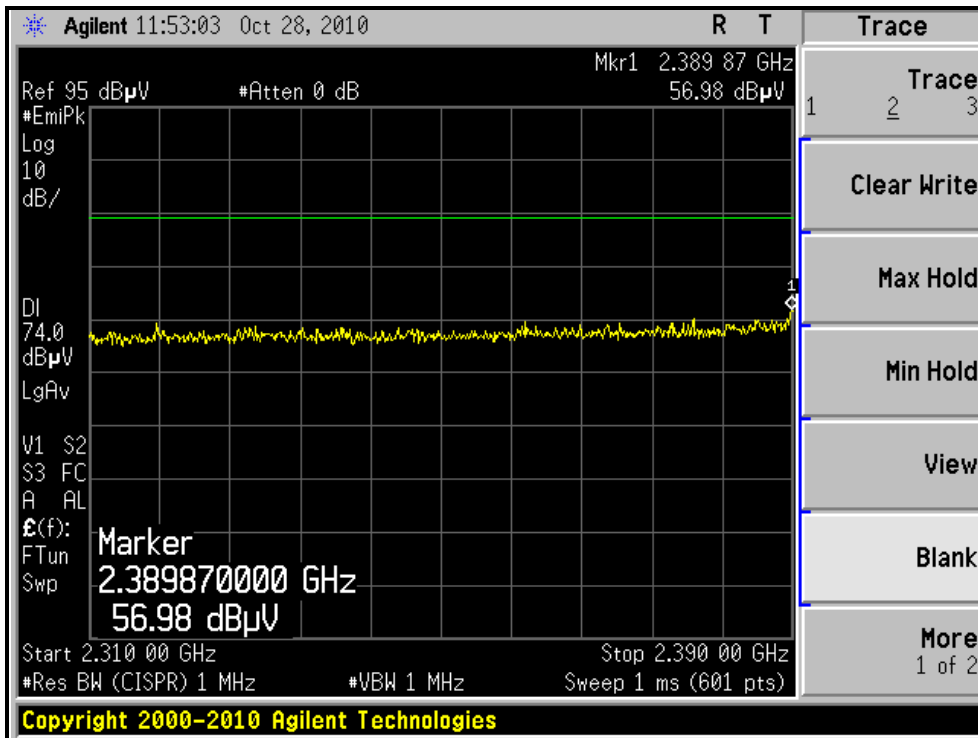






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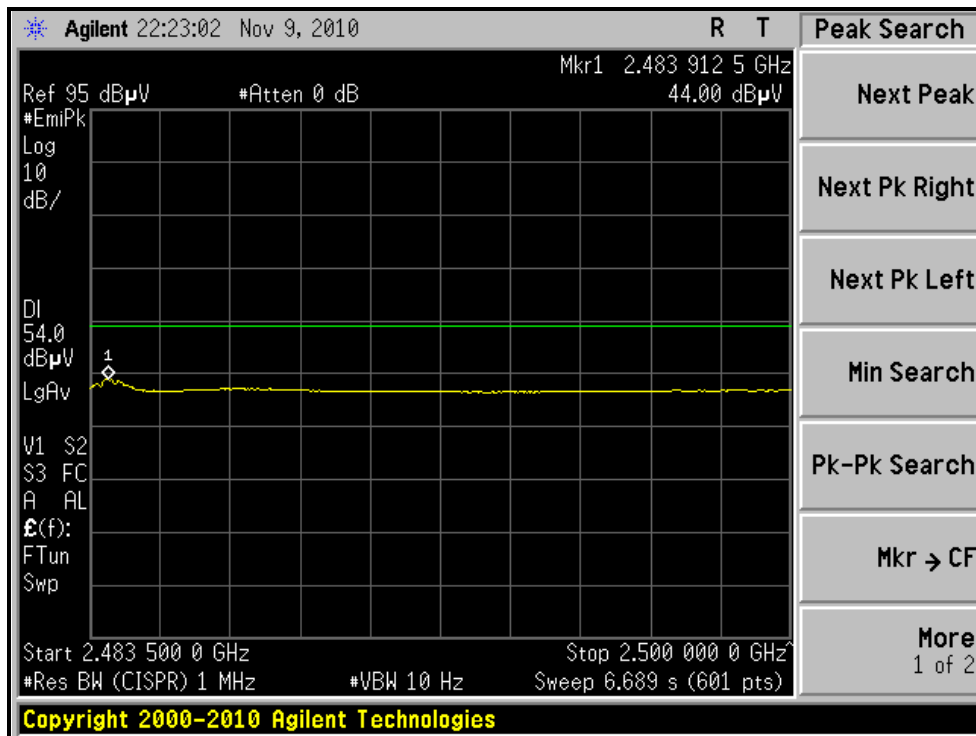
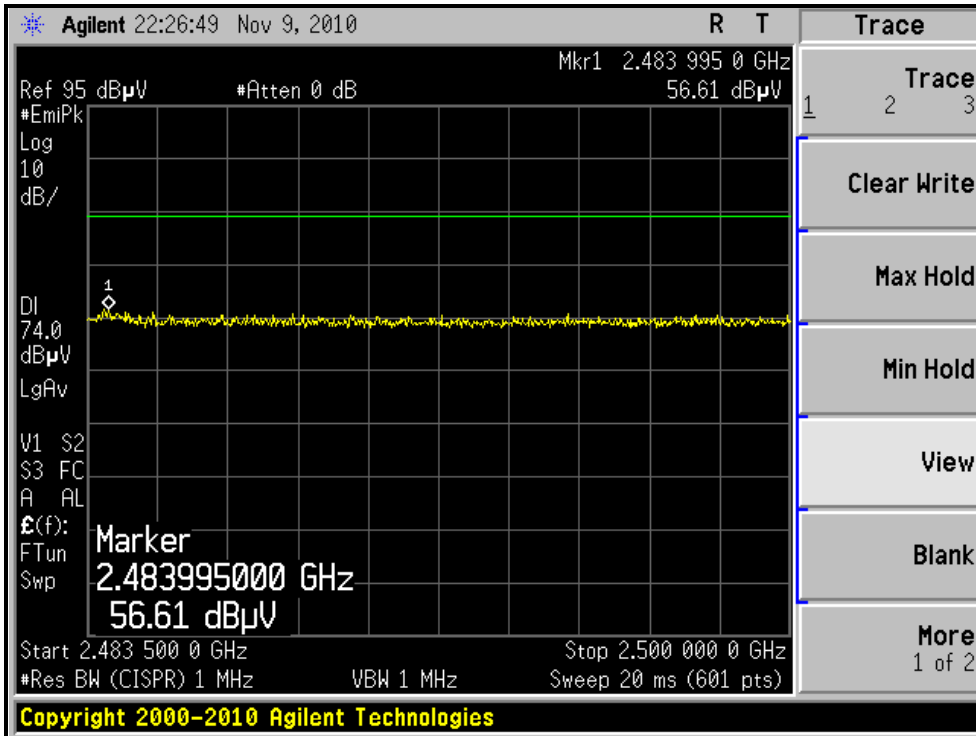
RESTRICTED BANDEDGE (802.11b MODE, CH1, VERTICAL )





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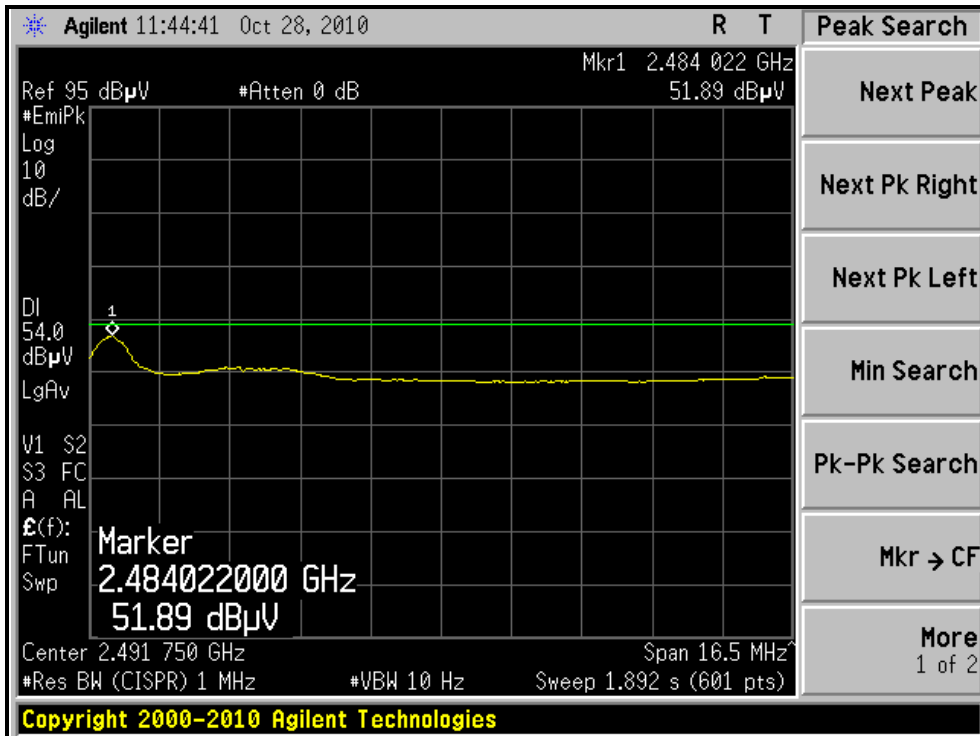
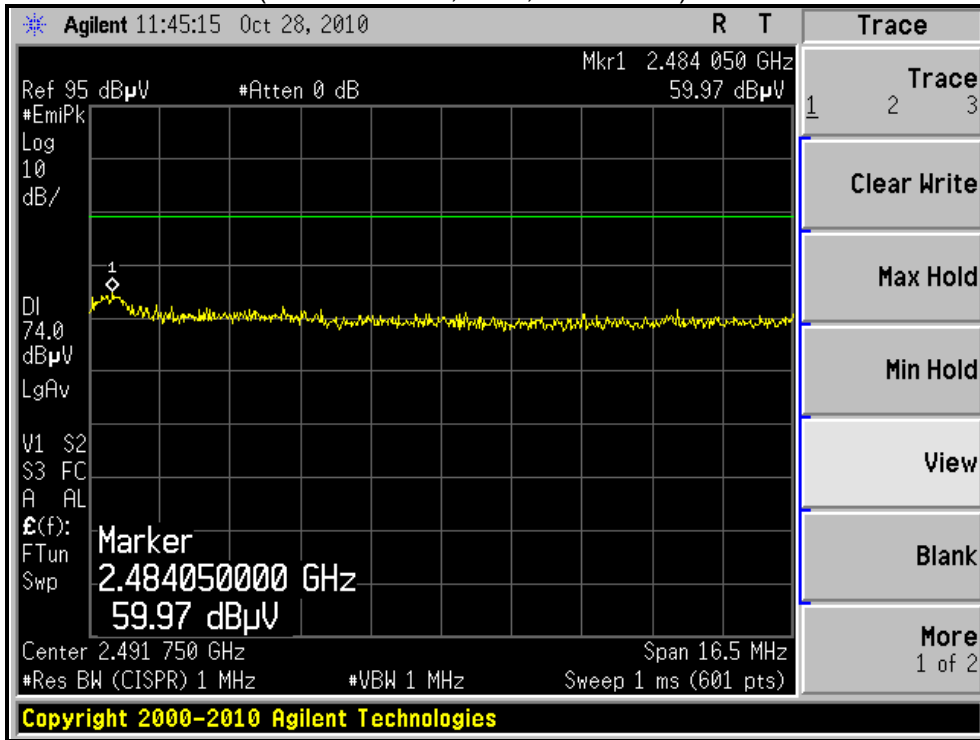
RESTRICTED BANDEDGE (802.11b MODE,CH11, HORIZONTAL )





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RESTRICTED BANDEDGE (802.11b MODE, CH11, VERTICAL )





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**802.11g OFDM MODULATION**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 61%RH 1013 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	2390.00	57.0 PK	74.0	-17.0	1.42 H	238	26.03	30.97
2	2390.00	43.3 AV	54.0	-10.7	1.42 H	238	12.33	30.97
3	*2412.00	105.3 PK			1.40 H	232	74.23	31.07
4	*2412.00	93.2 AV			1.40 H	232	62.13	31.07
5	4824.00	50.2 PK	74.0	-23.8	1.14 H	162	13.09	37.11
6	4824.00	35.8 AV	54.0	-18.2	1.14 H	162	-1.31	37.11

**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	2390.00	71.5 PK	74.0	-2.5	1.17 V	37	40.53	30.97
2	2390.00	53.3 AV	54.0	-0.7	1.17 V	37	22.33	30.97
3	*2412.00	115.2 PK			1.19 V	38	84.13	31.07
4	*2412.00	103.5 AV			1.19 V	38	72.43	31.07
5	4824.00	55.1 PK	74.0	-18.9	1.00 V	220	17.99	37.11
6	4824.00	40.6 AV	54.0	-13.4	1.00 V	220	3.49	37.11

- 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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 61%RH 1013 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	*2437.00	106.7 PK			1.40 H	231	75.53	31.17
2	*2437.00	94.9 AV			1.40 H	231	63.73	31.17
3	4874.00	51.3 PK	74.0	-22.7	1.13 H	180	14.07	37.23
4	4874.00	36.2 AV	54.0	-17.8	1.13 H	180	-1.03	37.23
5	7311.00	50.9 PK	74.0	-23.1	1.43 H	28	6.54	44.36
6	7311.00	37.5 AV	54.0	-16.5	1.43 H	28	-6.86	44.36
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	*2437.00	116.8 PK			1.16 V	31	85.63	31.17
2	*2437.00	105.5 AV			1.16 V	31	74.33	31.17
3	4874.00	55.8 PK	74.0	-18.2	1.00 V	241	18.57	37.23
4	4874.00	40.7 AV	54.0	-13.3	1.00 V	241	3.47	37.23
5	7311.00	58.9 PK	74.0	-15.1	1.42 V	28	14.54	44.36
6	7311.00	39.6 AV	54.0	-14.4	1.42 V	28	-4.76	44.36

- 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.
  5. “ \* “: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 61%RH 1013 hPa	TESTED BY	Kent Liu

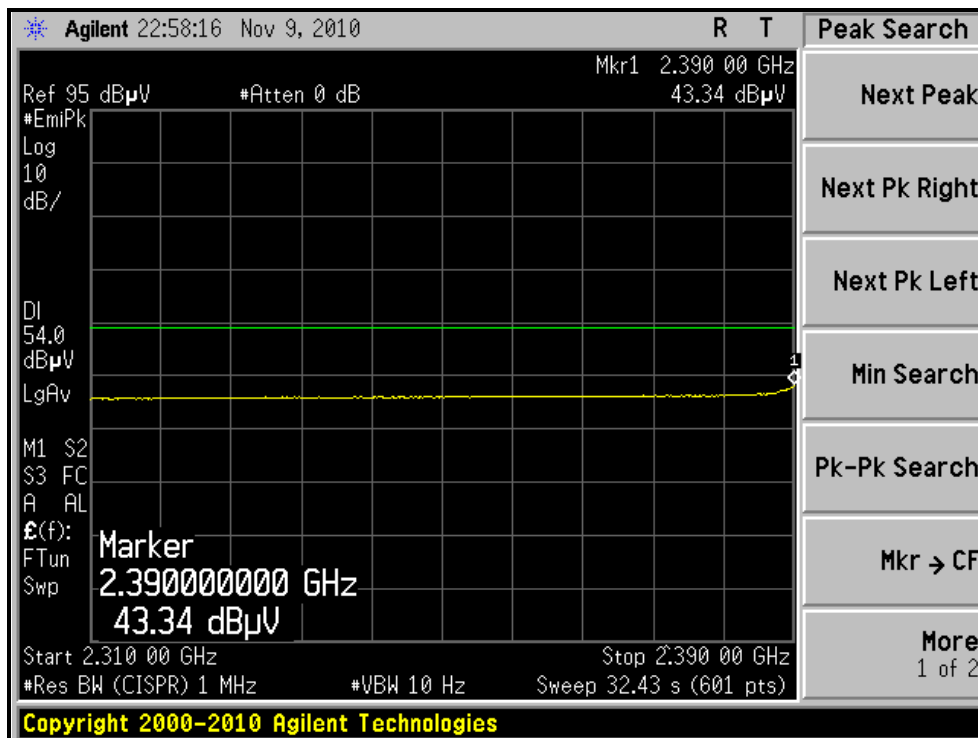
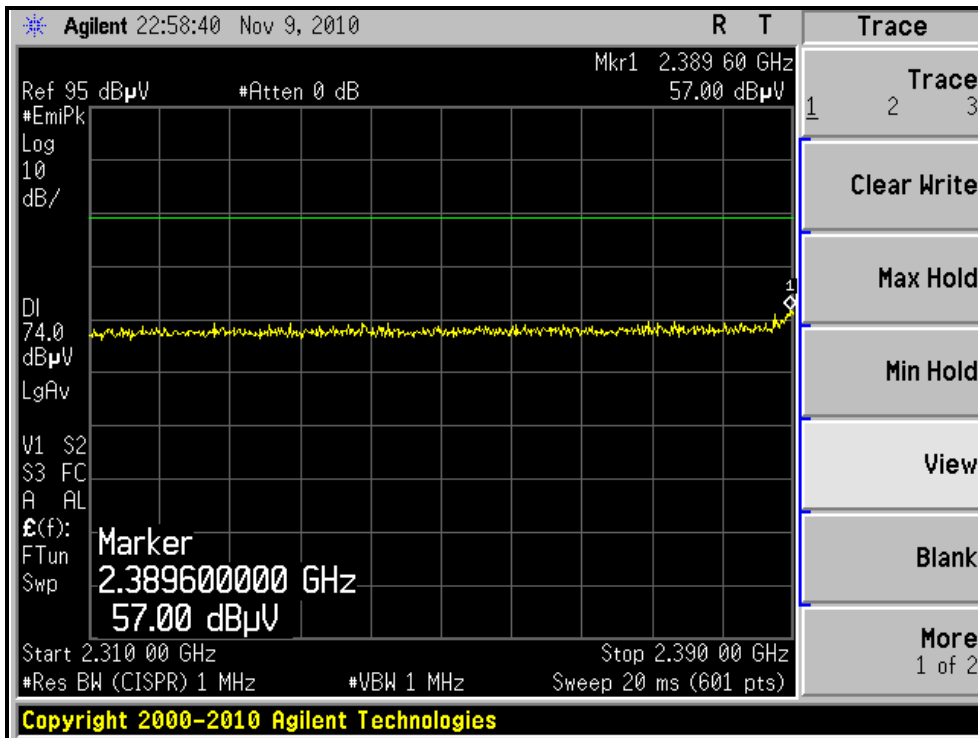
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	103.8 PK			1.42 H	230	72.52	31.28
2	*2462.00	91.4 AV			1.42 H	230	60.12	31.28
3	2483.63	67.9 PK	74.0	-6.1	1.40 H	240	36.53	31.37
4	2483.63	46.3 AV	54.0	-7.7	1.40 H	240	14.93	31.37
5	4924.00	46.8 PK	74.0	-27.2	1.01 H	147	9.46	37.34
6	4924.00	33.1 AV	54.0	-20.9	1.01 H	147	-4.24	37.34
7	7386.00	49.8 PK	74.0	-24.2	1.42 H	25	5.21	44.59
8	7386.00	36.0 AV	54.0	-18.0	1.42 H	25	-8.59	44.59
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	112.4 PK			1.17 V	40	81.12	31.28
2	*2462.00	102.1 AV			1.17 V	40	70.82	31.28
3	2483.63	72.9 PK	74.0	-1.1	1.16 V	0	41.53	31.37
4	2483.63	53.2 AV	54.0	-0.8	1.16 V	0	21.83	31.37
5	4924.00	50.5 PK	74.0	-23.5	1.00 V	223	13.16	37.34
6	4924.00	35.4 AV	54.0	-18.6	1.00 V	223	-1.94	37.34
7	7386.00	50.7 PK	74.0	-23.3	1.40 V	21	6.11	44.59
8	7386.00	36.8 AV	54.0	-17.2	1.40 V	21	-7.79	44.59

- 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.



A D T

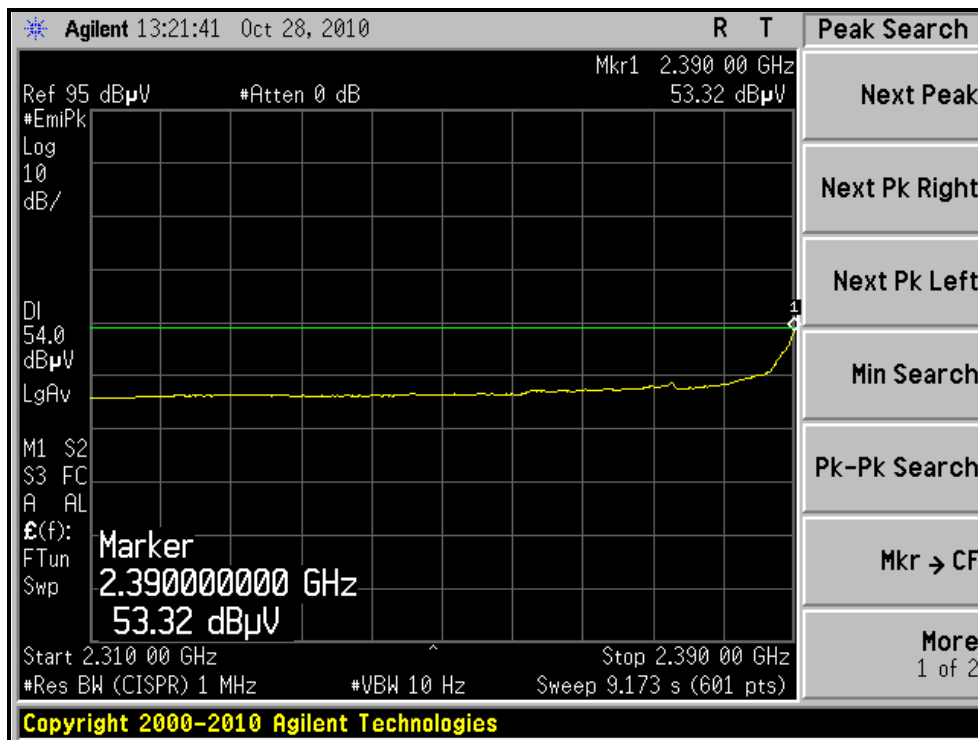
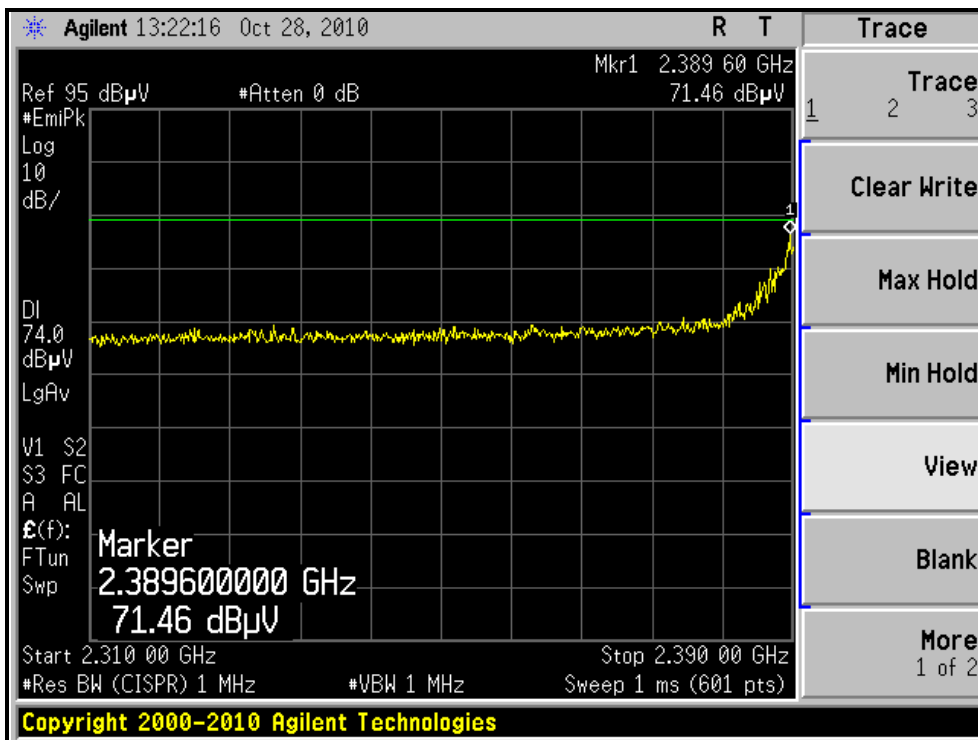
RESTRICTED BANDEDGE (802.11g MODE, CH1, HORIZONTAL )





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RESTRICTED BANDEDGE (802.11g MODE,CH1, VERTICAL )

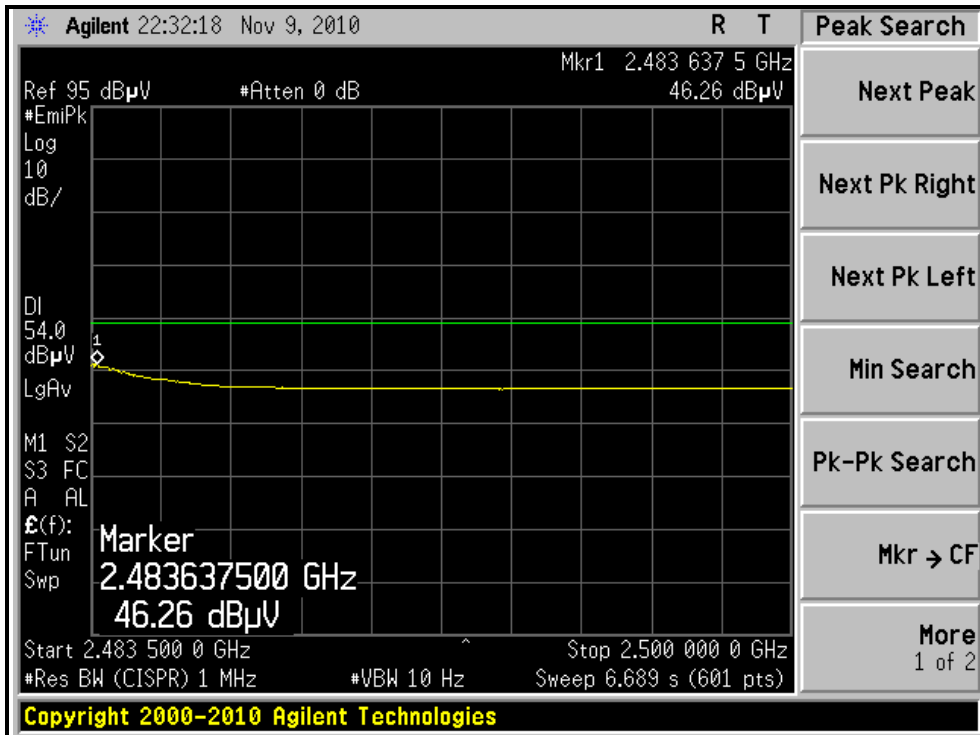
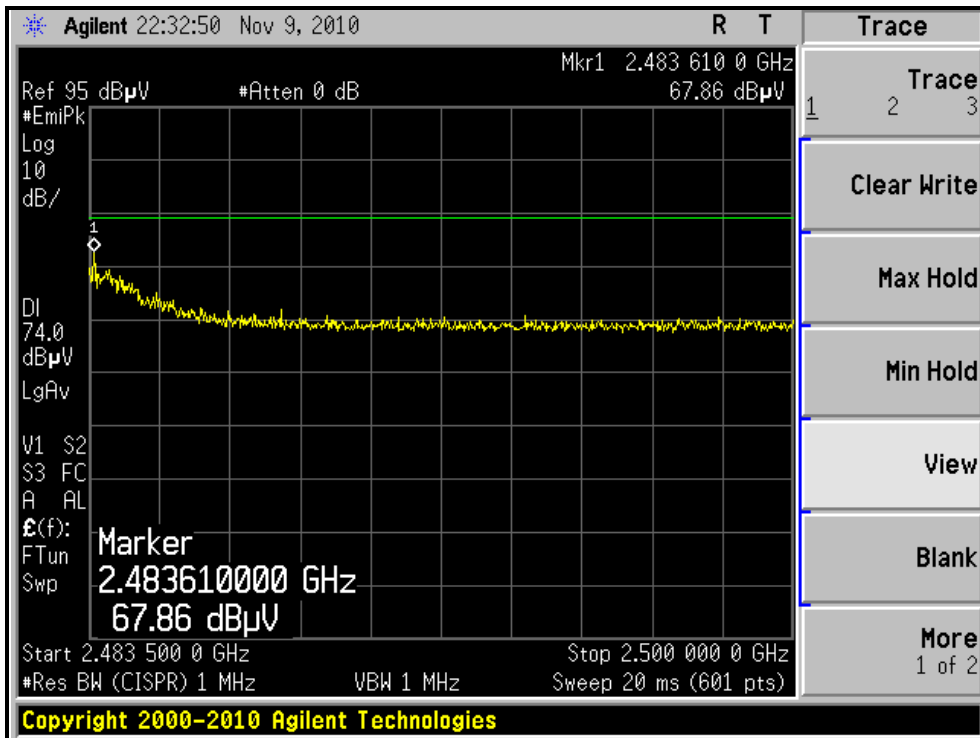






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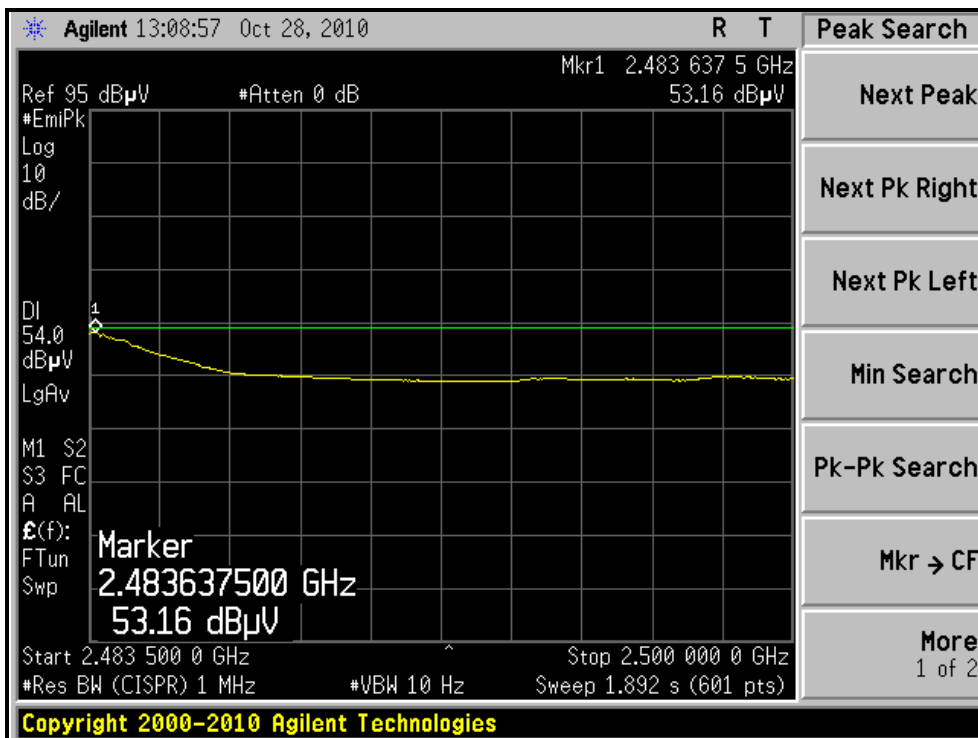
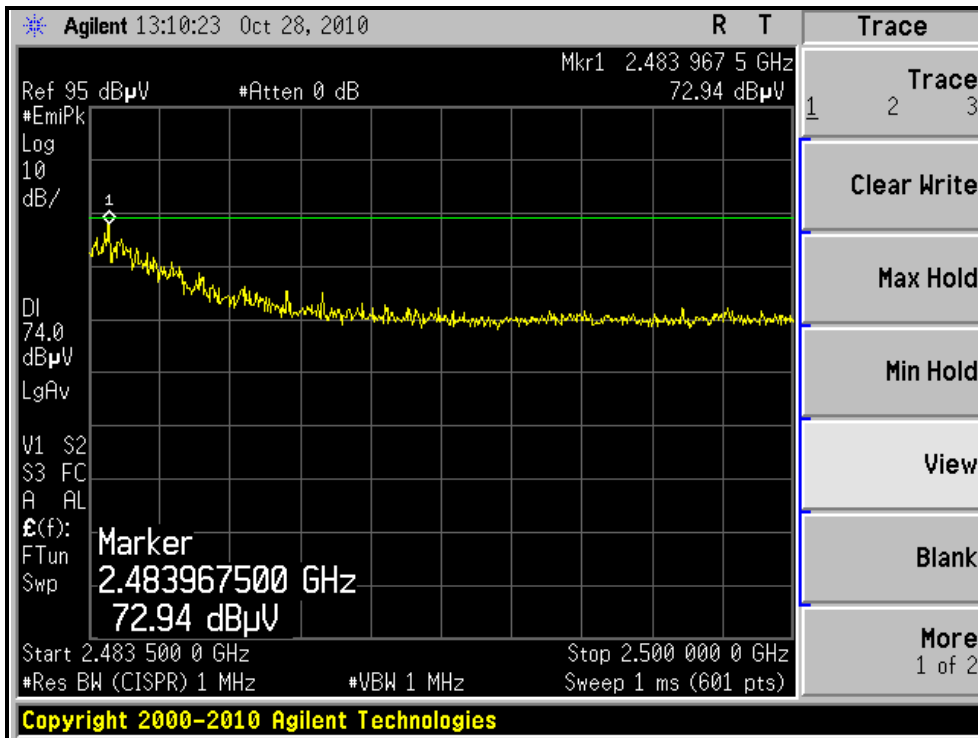
RESTRICTED BANDEDGE (802.11g MODE,CH11, HORIZONTAL )





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RESTRICTED BANDEDGE (802.11g MODE,CH11, VERTICAL )





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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 61%RH 1013 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	2390.00	58.9 PK	74.0	-15.1	1.40 H	232	27.93	30.97
2	2390.00	42.9 AV	54.0	-11.1	1.40 H	232	11.93	30.97
3	*2412.00	104.5 PK			1.40 H	235	73.43	31.07
4	*2412.00	92.8 AV			1.40 H	235	61.73	31.07
5	4824.00	50.2 PK	74.0	-23.8	1.12 H	188	13.09	37.11
6	4824.00	35.8 AV	54.0	-18.2	1.12 H	188	-1.31	37.11
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	2389.87	72.1 PK	74.0	-1.9	1.16 V	33	41.13	30.97
2	2389.87	53.1 AV	54.0	-0.9	1.16 V	33	22.13	30.97
3	*2412.00	114.7 PK			1.17 V	42	83.63	31.07
4	*2412.00	103.4 AV			1.17 V	42	72.33	31.07
5	4824.00	53.1 PK	74.0	-20.9	1.01 V	178	15.99	37.11
6	4824.00	38.6 AV	54.0	-15.4	1.01 V	178	1.49	37.11

- 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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 61%RH 1013 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	*2437.00	106.8 PK			1.40 H	250	75.63	31.17
2	*2437.00	94.7 AV			1.40 H	250	63.53	31.17
3	4874.00	51.2 PK	74.0	-22.8	1.13 H	184	13.97	37.23
4	4874.00	36.9 AV	54.0	-17.1	1.13 H	184	-0.33	37.23
5	7311.00	50.8 PK	74.0	-23.2	1.43 H	28	6.44	44.36
6	7311.00	37.2 AV	54.0	-16.8	1.43 H	28	-7.16	44.36
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	*2437.00	116.8 PK			1.14 V	55	85.63	31.17
2	*2437.00	105.2 AV			1.14 V	55	74.03	31.17
3	4874.00	53.7 PK	74.0	-20.3	1.00 V	177	16.47	37.23
4	4874.00	39.5 AV	54.0	-14.5	1.00 V	177	2.27	37.23
5	7311.00	53.8 PK	74.0	-20.2	1.00 V	252	9.44	44.36
6	7311.00	39.5 AV	54.0	-14.5	1.00 V	252	-4.86	44.36

- 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.
  5. “ \* “: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 61%RH 1013 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	*2462.00	101.9 PK			1.40 H	232	70.62	31.28
2	*2462.00	89.1 AV			1.40 H	232	57.82	31.28
3	2483.50	64.2 PK	74.0	-9.8	1.40 H	233	32.83	31.37
4	2483.50	45.4 AV	54.0	-8.6	1.40 H	233	14.03	31.37
5	4924.00	46.3 PK	74.0	-27.7	1.02 H	144	8.96	37.34
6	4924.00	32.6 AV	54.0	-21.4	1.02 H	144	-4.74	37.34
7	7386.00	49.7 PK	74.0	-24.3	1.45 H	28	5.11	44.59
8	7386.00	35.9 AV	54.0	-18.1	1.45 H	28	-8.69	44.59

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

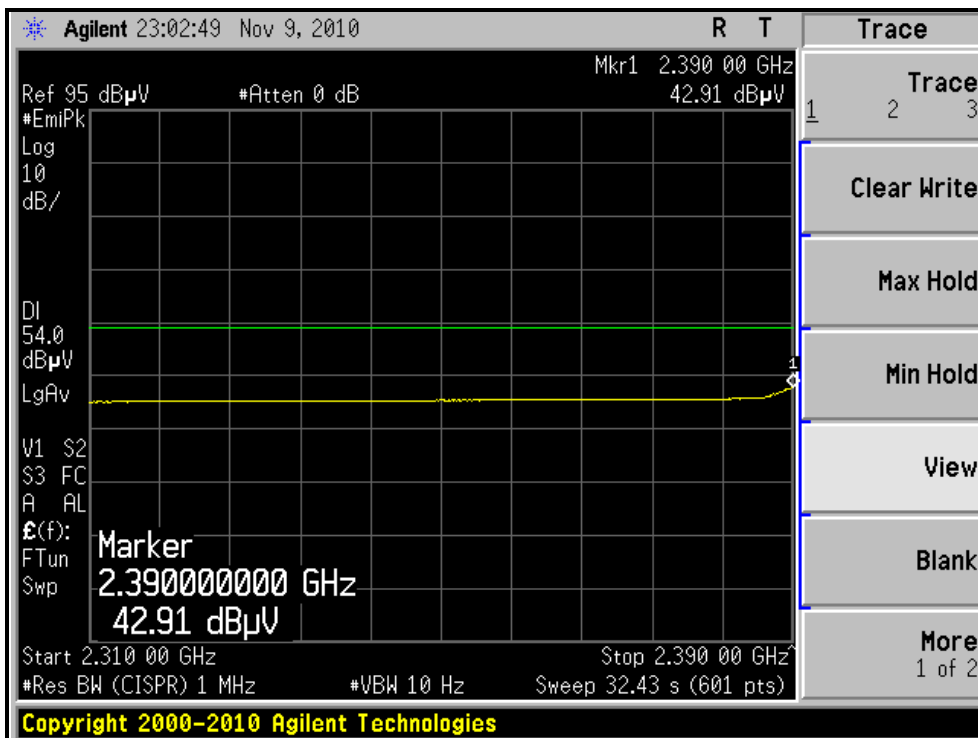
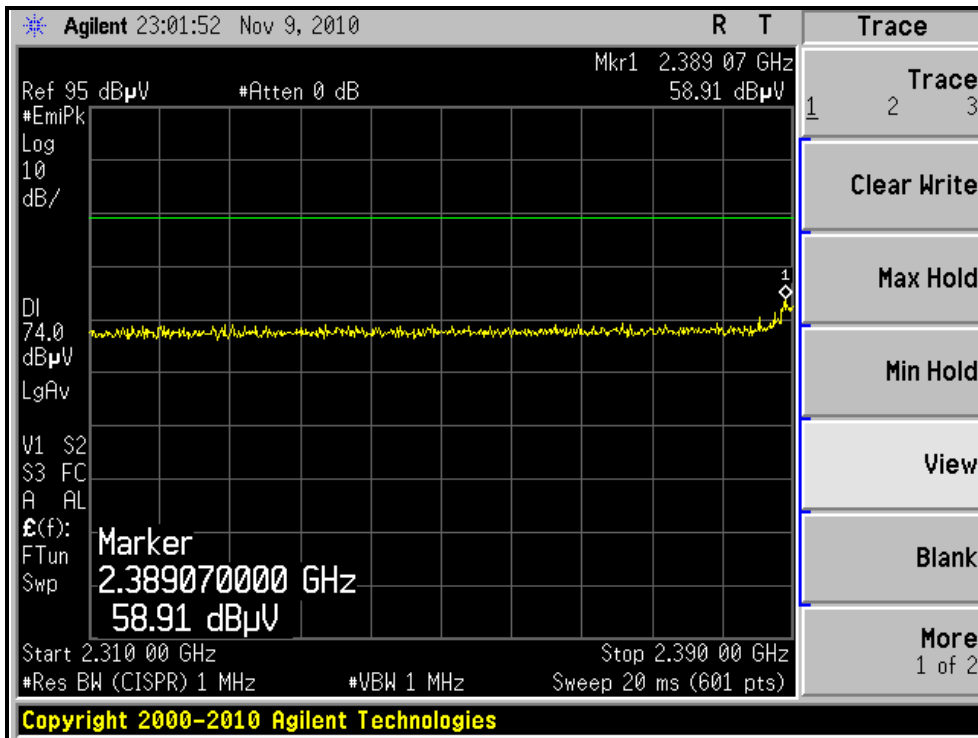
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	111.1 PK			1.13 V	58	79.82	31.28
2	*2462.00	99.3 AV			1.13 V	58	68.02	31.28
3	2483.58	72.7 PK	74.0	-1.3	1.15 V	14	41.33	31.37
4	2483.58	53.0 AV	54.0	-1.0	1.15 V	14	21.63	31.37
5	4924.00	49.6 PK	74.0	-24.4	1.00 V	224	12.26	37.34
6	4924.00	34.2 AV	54.0	-19.8	1.00 V	224	-3.14	37.34
7	7386.00	50.2 PK	74.0	-23.8	1.31 V	22	5.61	44.59
8	7386.00	35.9 AV	54.0	-18.1	1.31 V	22	-8.69	44.59

- 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.



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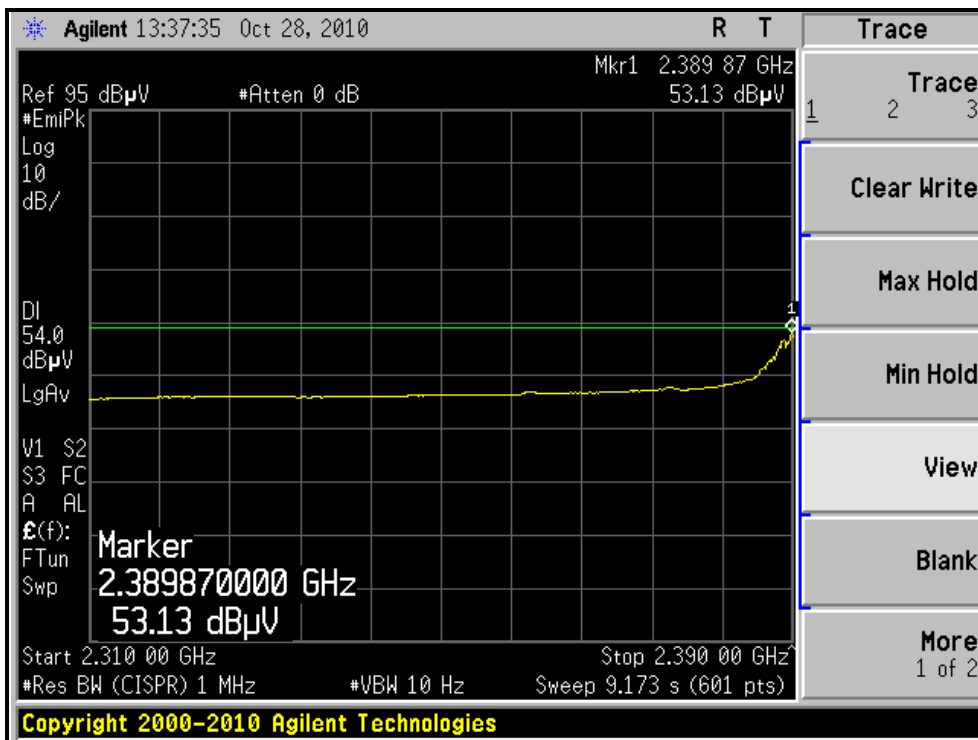
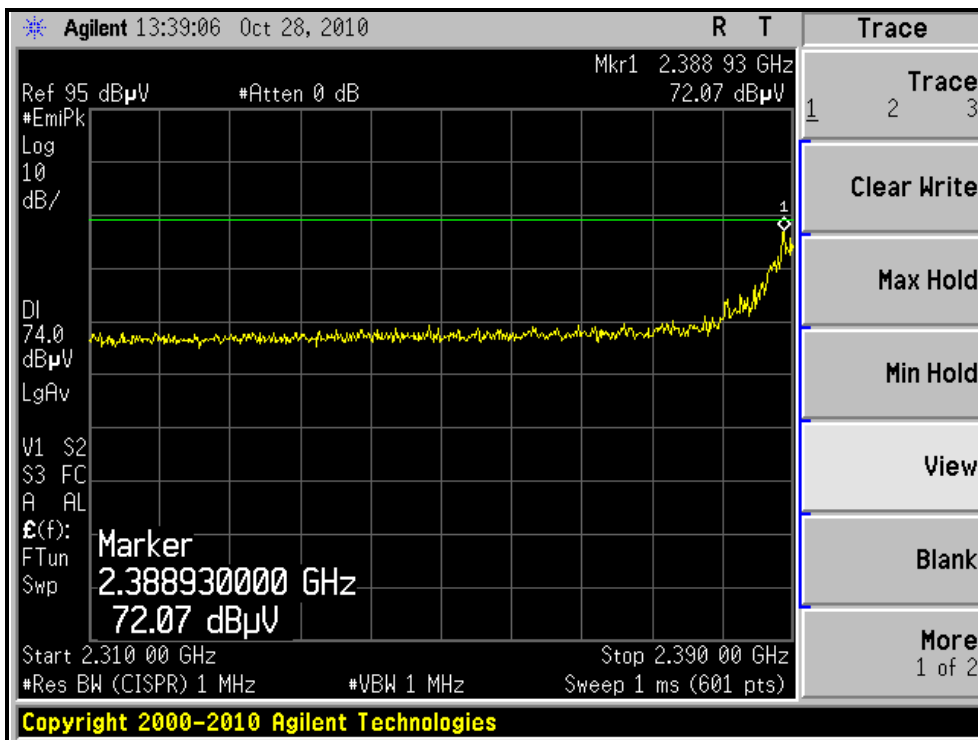
RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH1, HORIZONTAL )





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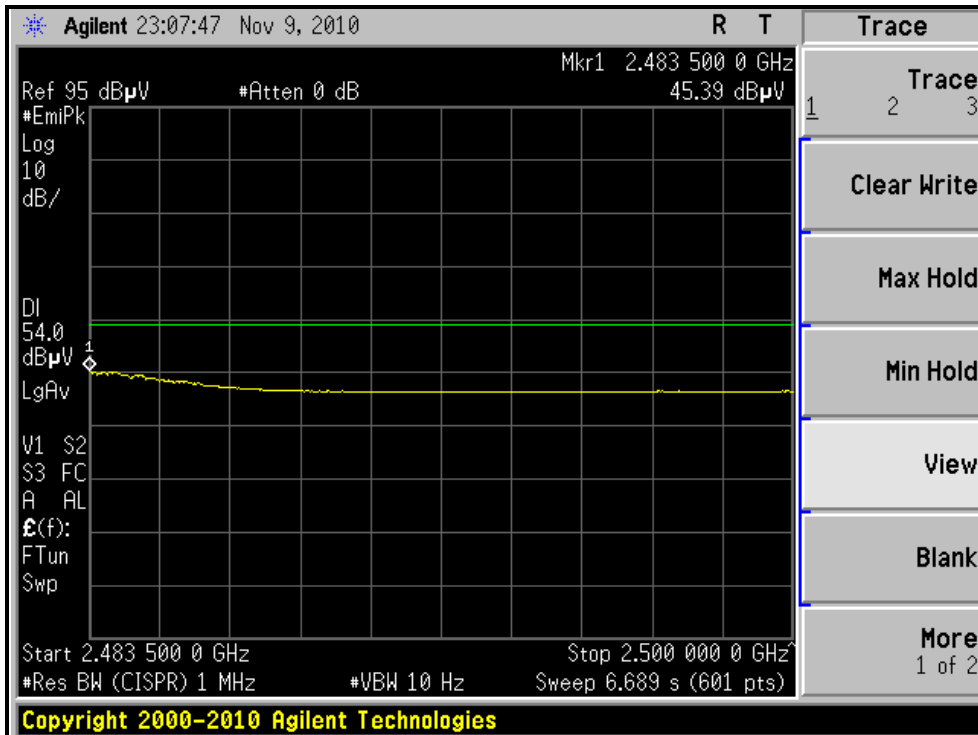
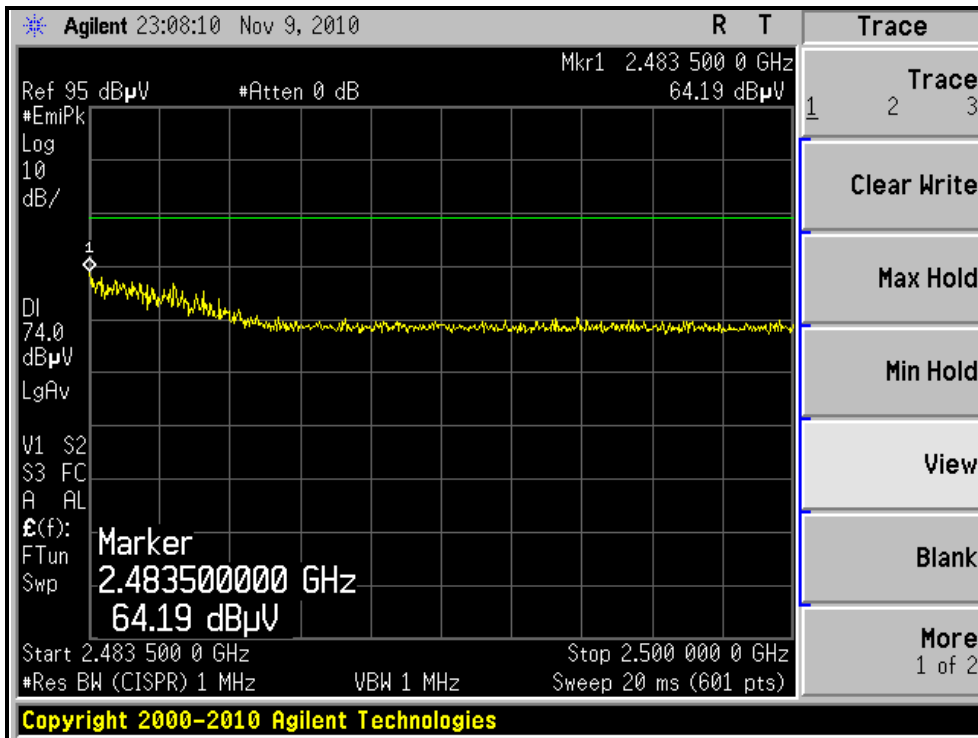
RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH1, VERTICAL )





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RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH11, HORIZONTAL )

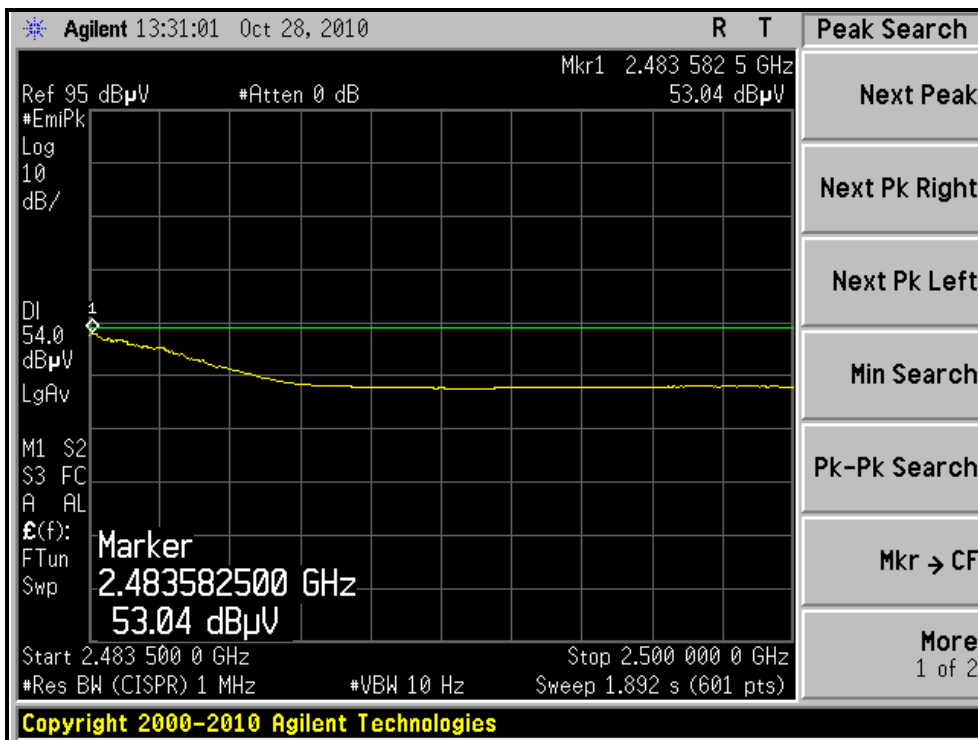
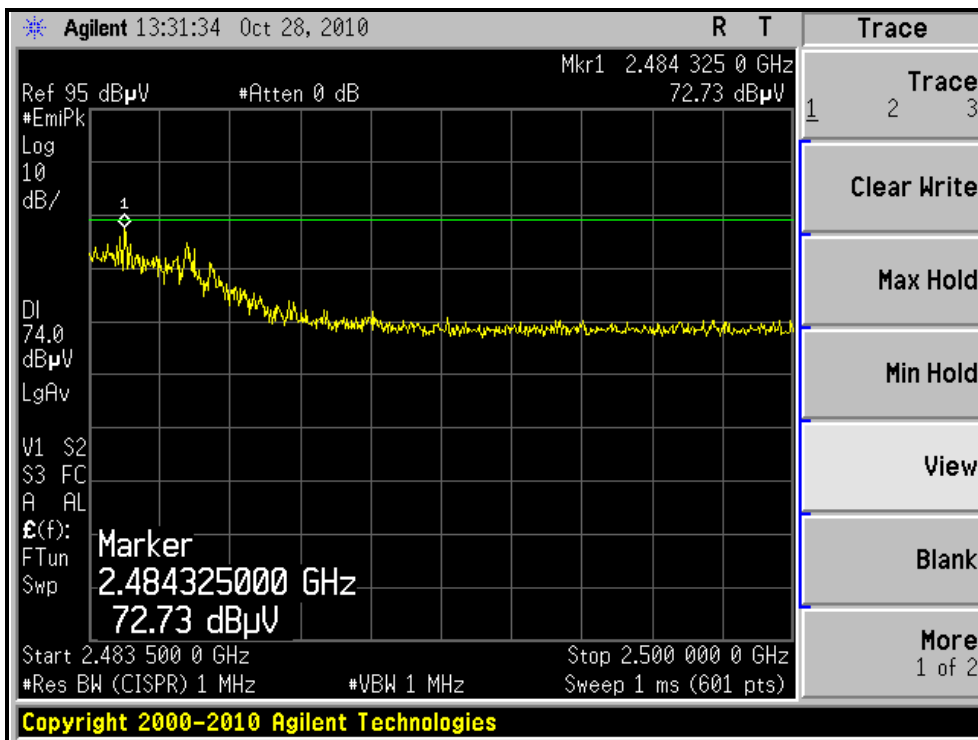






A D T

RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH11, VERTICAL )





A D T

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 61%RH 1013 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	2390.00	59.7 PK	74.0	-14.3	1.42 H	227	28.73	30.97
2	2390.00	42.8 AV	54.0	-11.2	1.42 H	227	11.83	30.97
3	*2422.00	98.3 PK			1.41 H	232	67.19	31.11
4	*2422.00	84.8 AV			1.41 H	232	53.69	31.11
5	4844.00	42.5 PK	74.0	-31.5	1.28 H	112	5.34	37.16
6	4844.00	30.1 AV	54.0	-23.9	1.28 H	112	-7.06	37.16
7	7266.00	49.3 PK	74.0	-24.7	1.20 H	341	5.08	44.22
8	7266.00	36.1 AV	54.0	-17.9	1.20 H	341	-8.12	44.22

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	73.2 PK	74.0	-0.8	1.00 V	30	42.23	30.97
2	2390.00	52.9 AV	54.0	-1.1	1.00 V	30	21.93	30.97
3	*2422.00	108.2 PK			1.00 V	38	77.09	31.11
4	*2422.00	94.5 AV			1.00 V	38	63.39	31.11
5	4844.00	42.7 PK	74.0	-31.3	1.30 V	52	5.54	37.16
6	4844.00	30.1 AV	54.0	-23.9	1.30 V	52	-7.06	37.16
7	7266.00	48.9 PK	74.0	-25.1	1.25 V	147	4.68	44.22
8	7266.00	36.2 AV	54.0	-17.8	1.25 V	147	-8.02	44.22

- 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.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 61%RH 1013 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	*2437.00	99.9 PK			1.42 H	230	68.73	31.17
2	*2437.00	85.9 AV			1.42 H	230	54.73	31.17
3	4874.00	43.5 PK	74.0	-30.5	1.23 H	121	6.27	37.23
4	4874.00	30.3 AV	54.0	-23.7	1.23 H	121	-6.93	37.23
5	7311.00	49.2 PK	74.0	-24.8	1.21 H	340	4.84	44.36
6	7311.00	36.2 AV	54.0	-17.8	1.21 H	340	-8.16	44.36
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	*2437.00	108.9 PK			1.00 V	39	77.73	31.17
2	*2437.00	95.7 AV			1.00 V	39	64.53	31.17
3	4874.00	43.6 PK	74.0	-30.4	1.30 V	55	6.37	37.23
4	4874.00	30.4 AV	54.0	-23.6	1.30 V	55	-6.83	37.23
5	7311.00	49.3 PK	74.0	-24.7	1.28 V	144	4.94	44.36
6	7311.00	36.3 AV	54.0	-17.7	1.28 V	144	-8.06	44.36

- 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.
  5. “ \* “: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 61%RH 1013 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	*2452.00	97.2 PK			1.43 H	225	65.96	31.24
2	*2452.00	83.4 AV			1.43 H	225	52.16	31.24
3	2483.50	64.2 PK	74.0	-9.8	1.42 H	225	32.83	31.37
4	2483.50	46.1 AV	54.0	-7.9	1.42 H	225	14.73	31.37
5	4904.00	42.8 PK	74.0	-31.2	1.29 H	129	5.50	37.30
6	4904.00	29.9 AV	54.0	-24.1	1.29 H	129	-7.40	37.30
7	7356.00	49.6 PK	74.0	-24.4	1.20 H	338	5.10	44.50
8	7356.00	36.2 AV	54.0	-17.8	1.20 H	338	-8.30	44.50

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

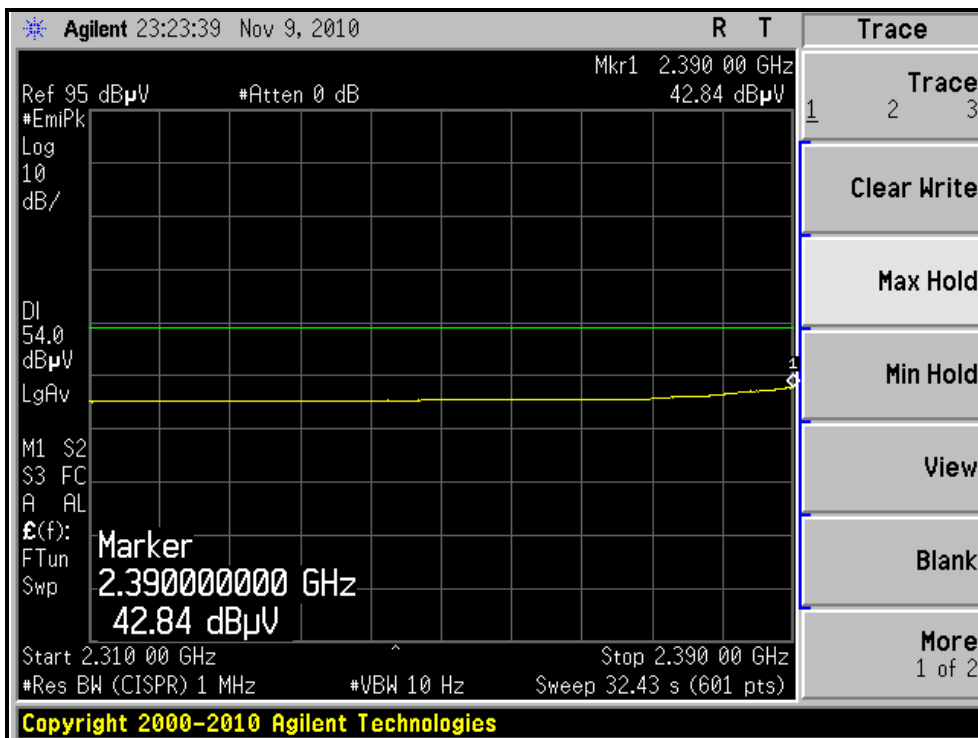
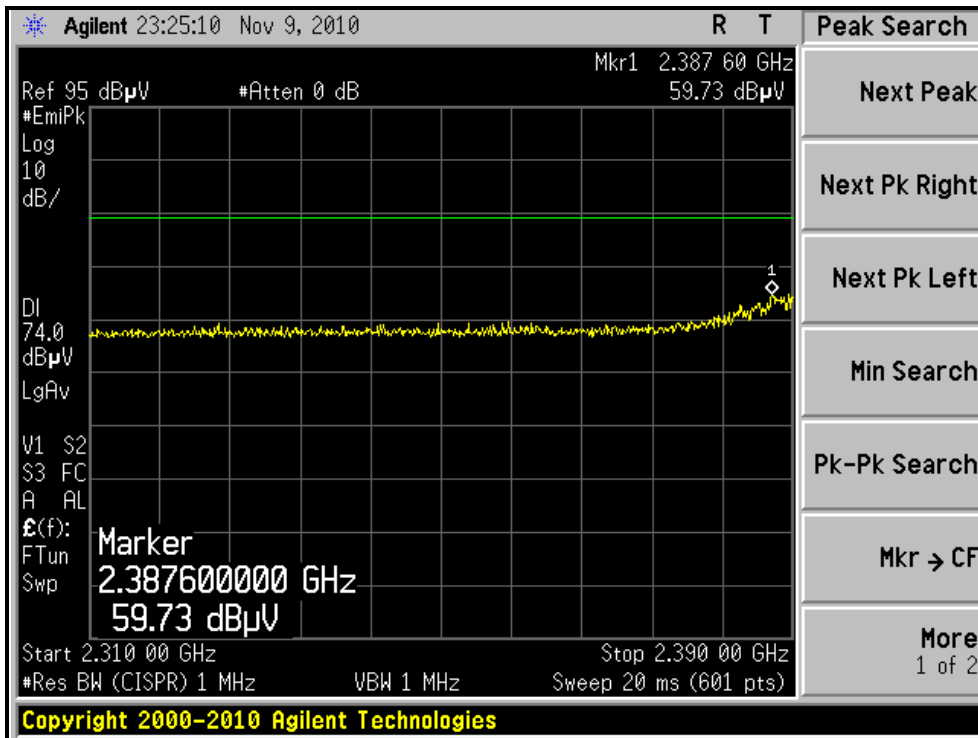
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	105.6 PK			1.16 V	187	74.36	31.24
2	*2452.00	93.7 AV			1.16 V	187	62.46	31.24
3	2483.69	71.3 PK	74.0	-2.7	1.15 V	149	39.93	31.37
4	2483.69	53.0 AV	54.0	-1.0	1.15 V	149	21.63	31.37
5	4904.00	43.0 PK	74.0	-31.0	1.31 V	57	5.70	37.30
6	4904.00	29.9 AV	54.0	-24.1	1.31 V	57	-7.40	37.30
7	7356.00	49.1 PK	74.0	-24.9	1.29 V	142	4.60	44.50
8	7356.00	36.1 AV	54.0	-17.9	1.29 V	142	-8.40	44.50

- 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.



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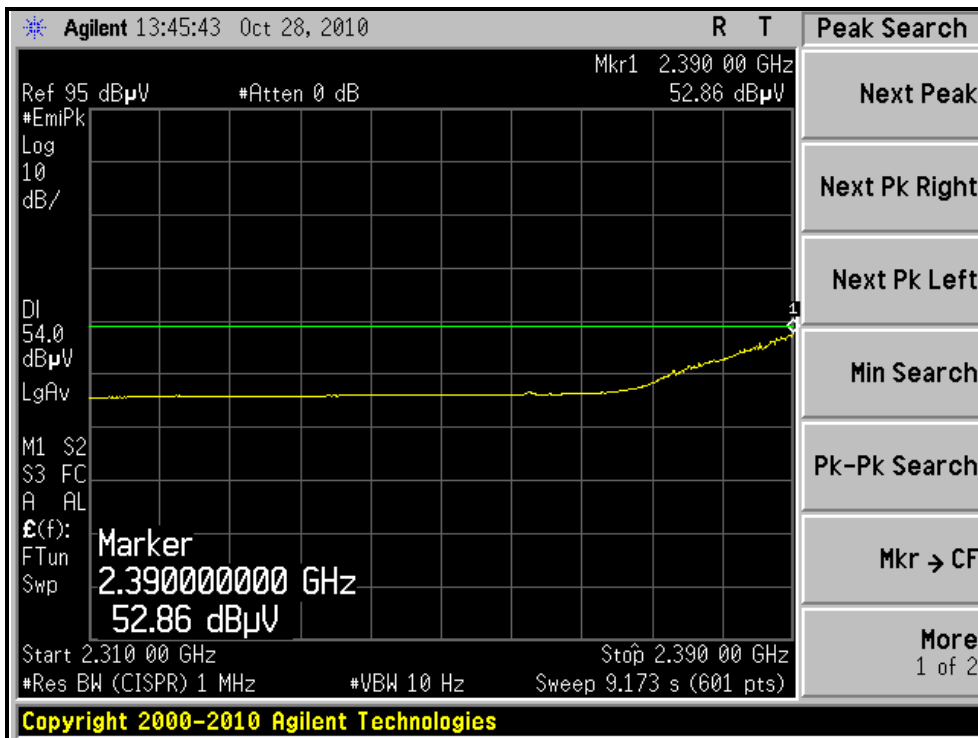
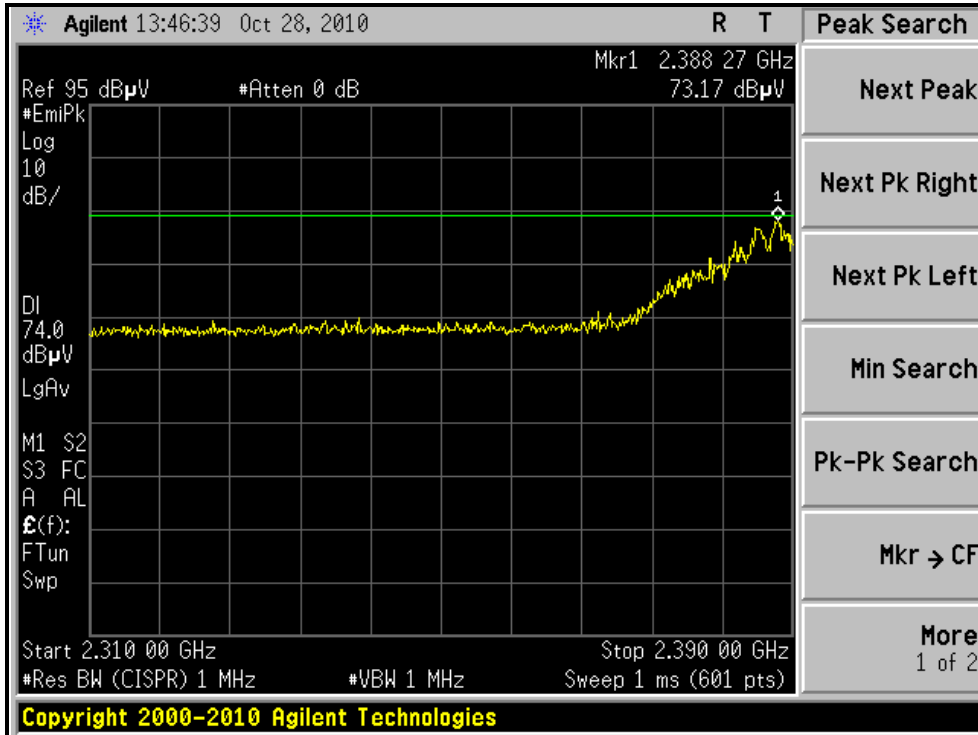
RESTRICTED BANDEDGE (802.11n (40MHz) MODE,CH1, HORIZONTAL )





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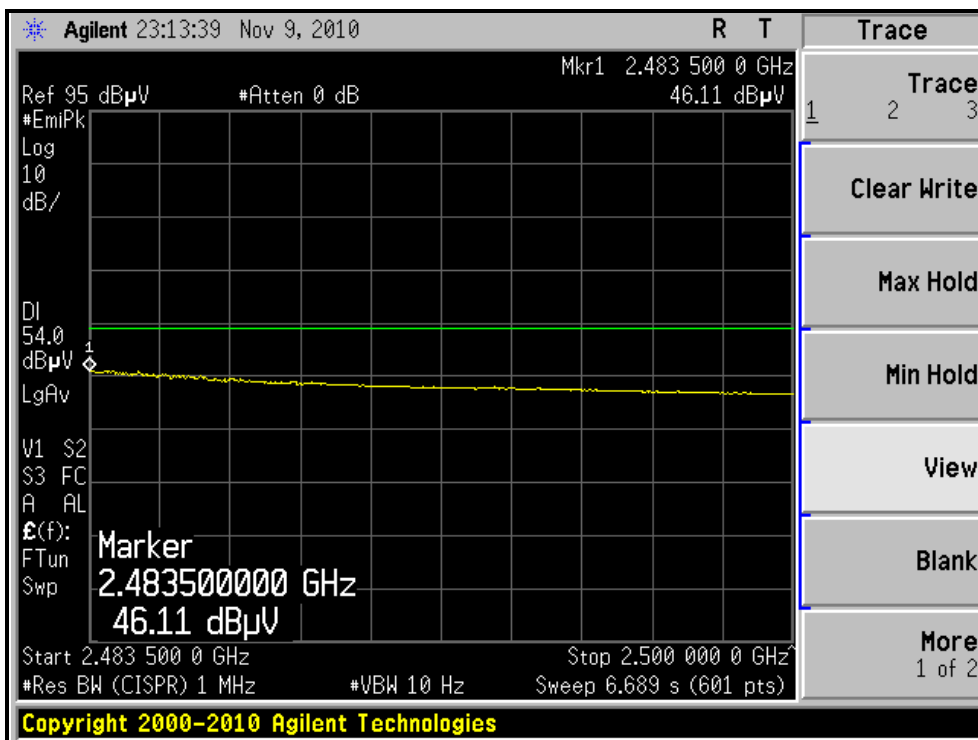
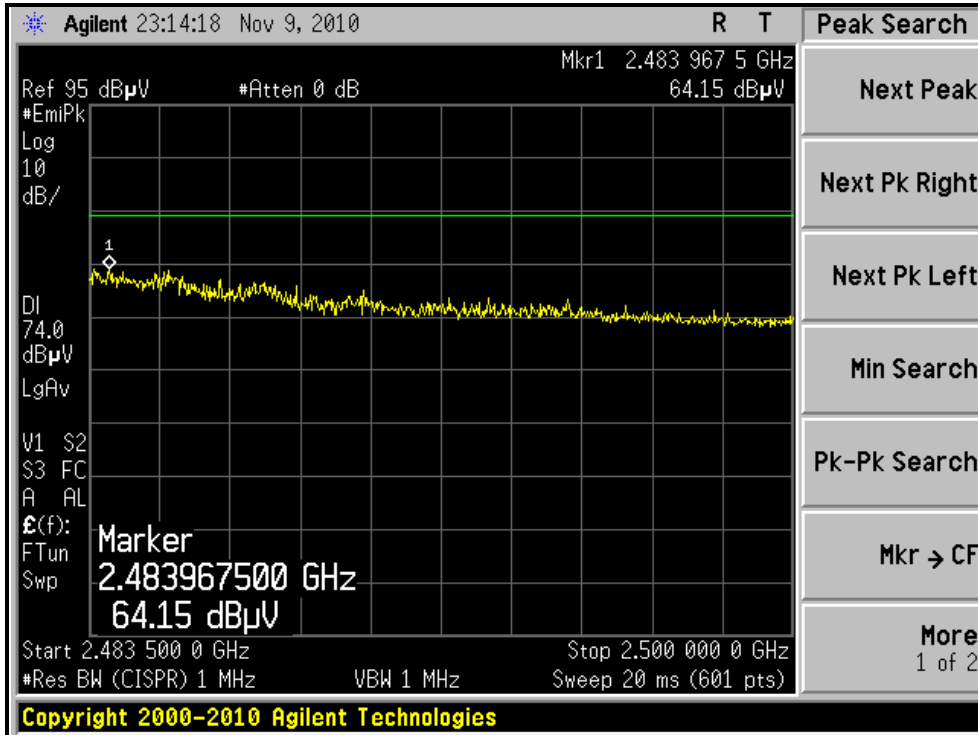
RESTRICTED BANDEDGE (802.11n (40MHz) MODE,CH1, VERTICAL )





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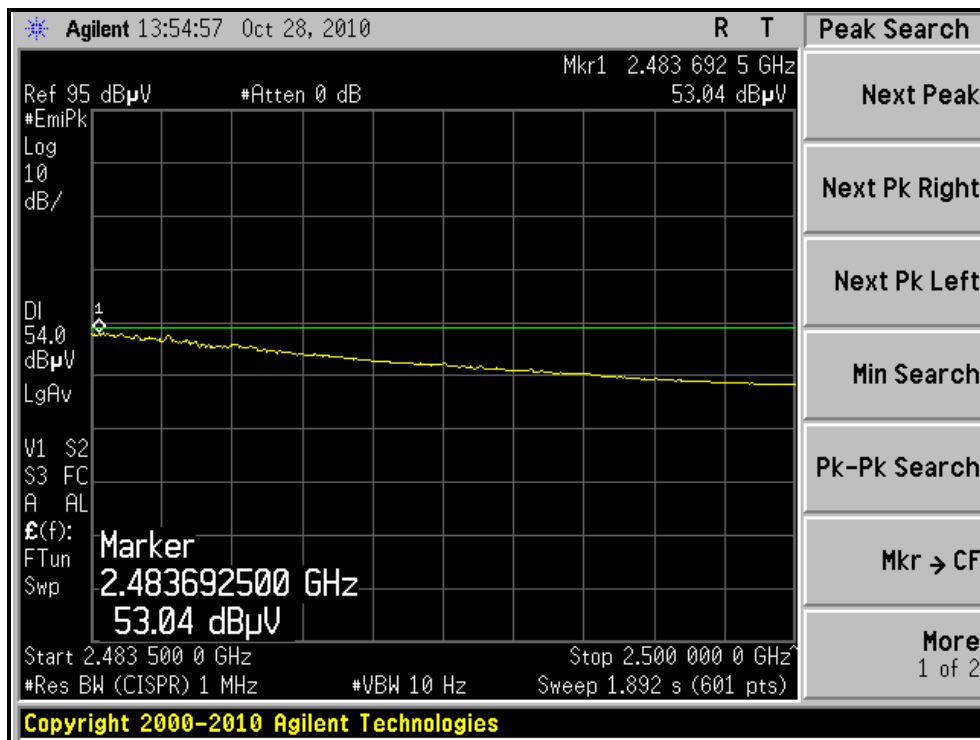
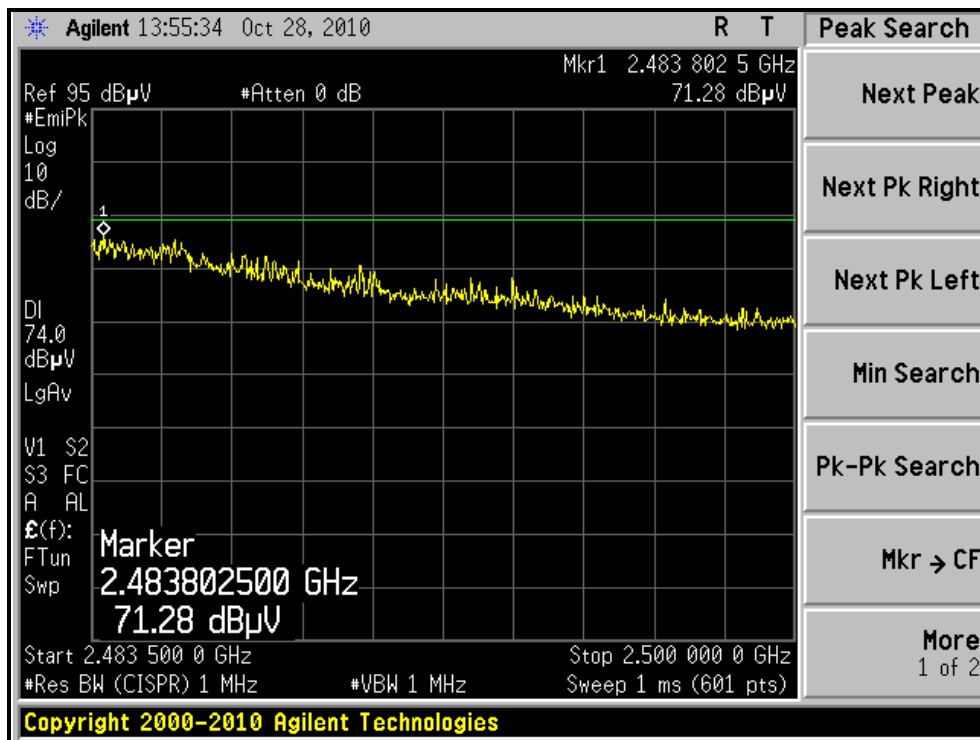
RESTRICTED BANDEDGE (802.11n (40MHz) MODE,CH7, HORIZONTAL )





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RESTRICTED BANDEDGE (802.11n (40MHz) MODE,CH7, VERTICAL )





### 4.3 6dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 18, 2009	Dec. 17, 2010

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

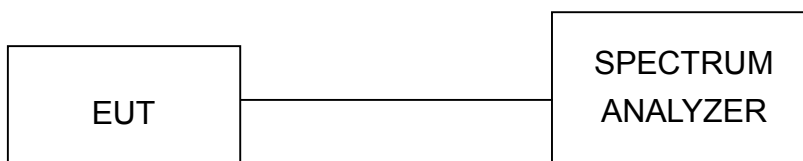
#### 4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

#### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.3.5 TEST SETUP



#### 4.3.6 EUT OPERATING CONDITIONS

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



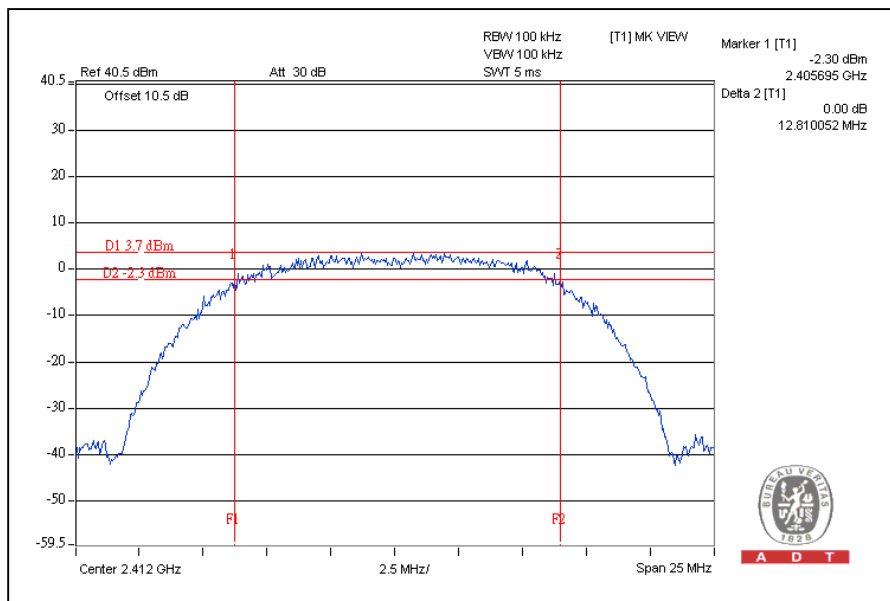
A D T

### 4.3.7 TEST RESULTS

#### 802.11b DSSS MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	12.81	0.5	PASS
6	2437	11.87	0.5	PASS
11	2462	12.22	0.5	PASS

CH1



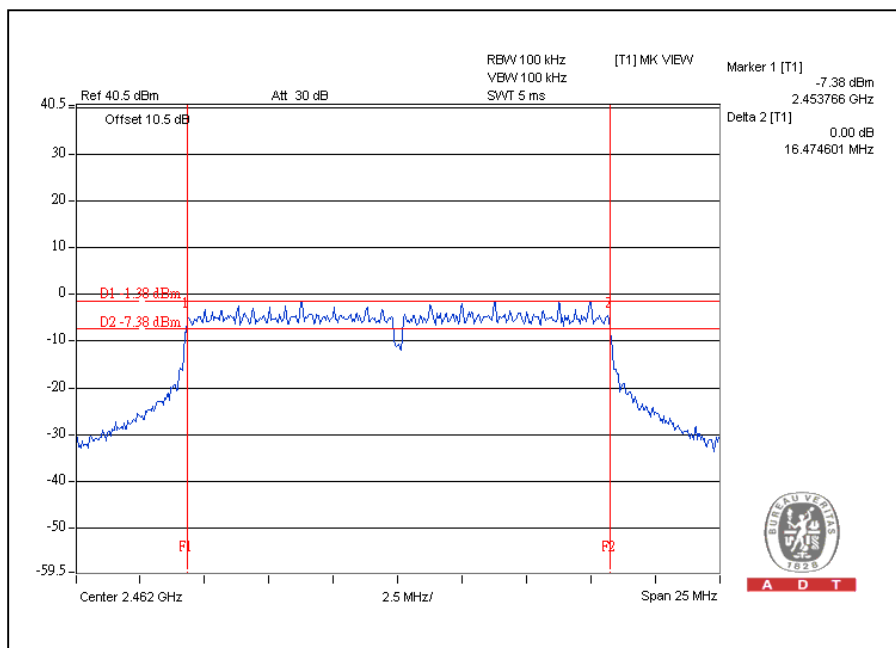


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### 802.11g OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.40	0.5	PASS
6	2437	16.46	0.5	PASS
11	2462	16.47	0.5	PASS

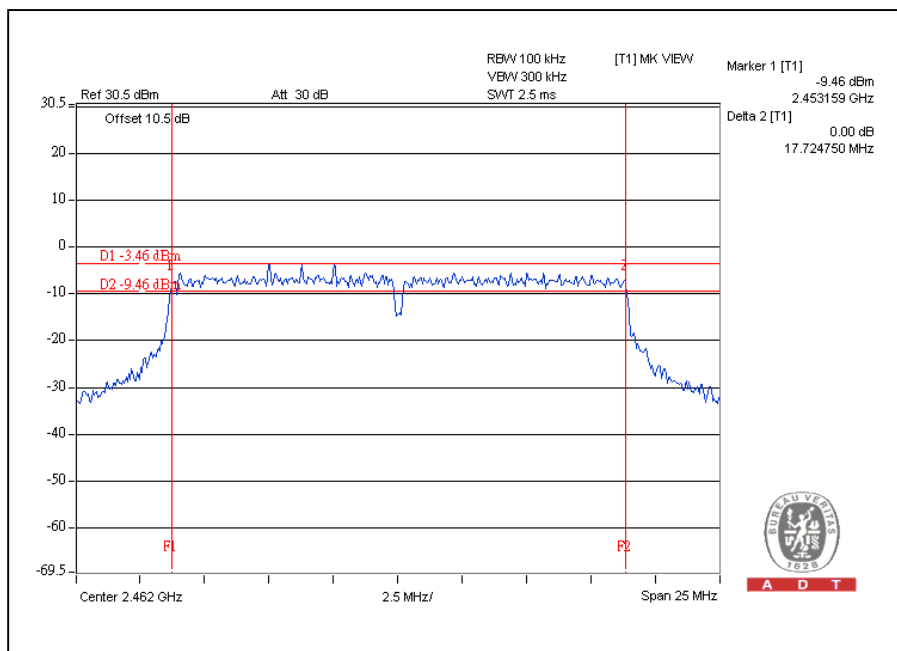
### CH11



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

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.69	0.5	PASS
6	2437	17.69	0.5	PASS
11	2462	17.72	0.5	PASS

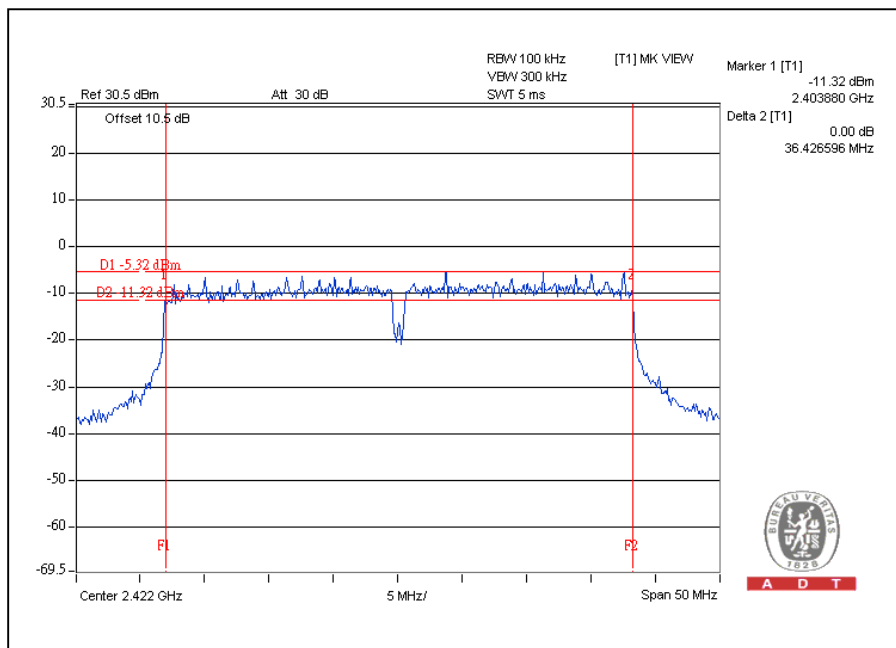
CH11



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

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2422	36.42	0.5	PASS
4	2437	36.15	0.5	PASS
7	2452	36.40	0.5	PASS

CH1



#### 4.4 MAXIMUM PEAK OUTPUT POWER

##### 4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

##### 4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Peak Power Meter	ML2495A	0824006	May 04, 2010	May 03, 2011
Power Sensor	MA2411B	0738172	May 04, 2010	May 03, 2011

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

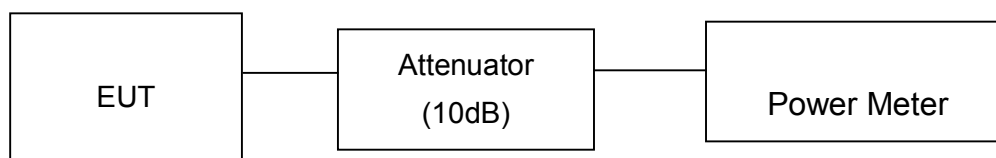
##### 4.4.3 TEST PROCEDURES

1. The transmitter output was connected to the power meter through an attenuator; the bandwidth of the fundamental frequency was measured with the power meter.
2. Record the power level.

##### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation

##### 4.4.5 TEST SETUP



##### 4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6



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### 4.4.7 TEST RESULTS

#### 802.11b DSSS MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
1	2412	16.7	17.6	104.3	20.2	30	PASS
6	2437	17.1	18.0	114.4	20.6	30	PASS
11	2462	17.7	17.1	110.2	20.4	30	PASS

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

Effective Legacy Gain (dBi)= 5.01

The effective legacy gain is 5.01dBi, therefore the limit need to reduce.

#### 802.11g OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
1	2412	22.5	23.5	401.7	26.0	30	PASS
6	2437	23.0	23.7	433.9	26.4	30	PASS
11	2462	20.7	20.2	222.2	23.5	30	PASS

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

Effective Legacy Gain (dBi)=5.01

The effective legacy gain is 5.01dBi, therefore the limit need to reduce.

#### 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)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
1	2412	21.8	23.0	350.9	25.5	30	PASS
6	2437	22.7	23.6	415.3	26.2	30	PASS
11	2462	19.7	18.2	159.4	22.0	30	PASS



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### 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)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
1	2422	18.2	17.7	125.0	21.0	30	PASS
4	2437	18.9	18.6	150.1	21.8	30	PASS
7	2452	16.7	14.9	77.7	18.9	30	PASS



## 4.5 POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 18, 2009	Dec. 17, 2010

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

### 4.5.3 TEST PROCEDURE

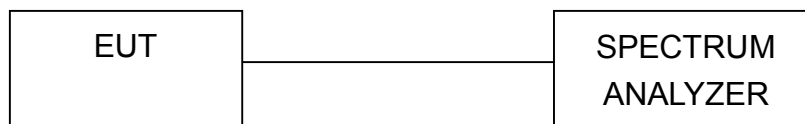
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

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

### 4.5.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.5.5 TEST SETUP



### 4.5.6 EUT OPERATING CONDITION

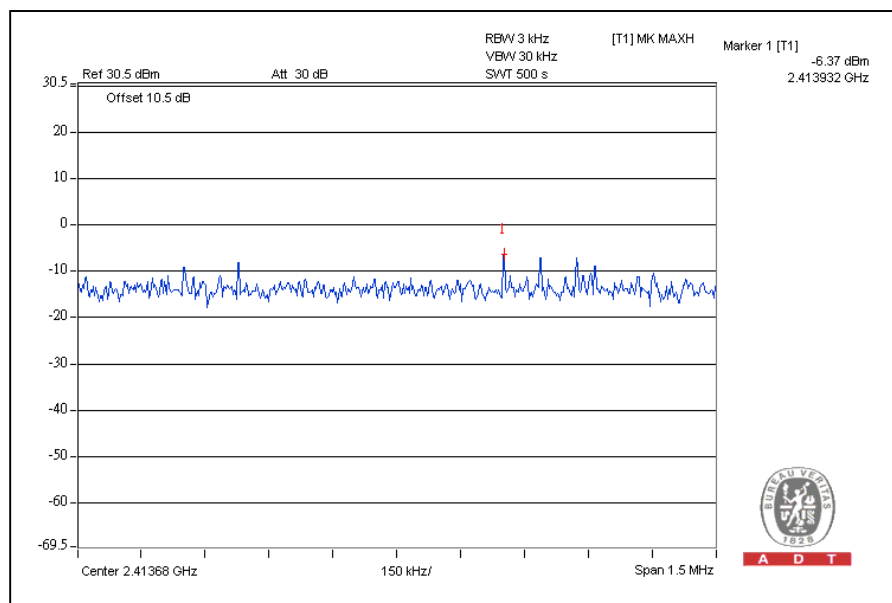
Same as Item 4.3.6

### 4.5.7 TEST RESULTS

#### 802.11b DSSS MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)			
1	2412	-6.4	-8.5	-4.3	8	PASS
6	2437	-8.8	-7.2	-4.9	8	PASS
11	2462	-8.6	-9.3	-5.9	8	PASS

For Chain(0): CH1



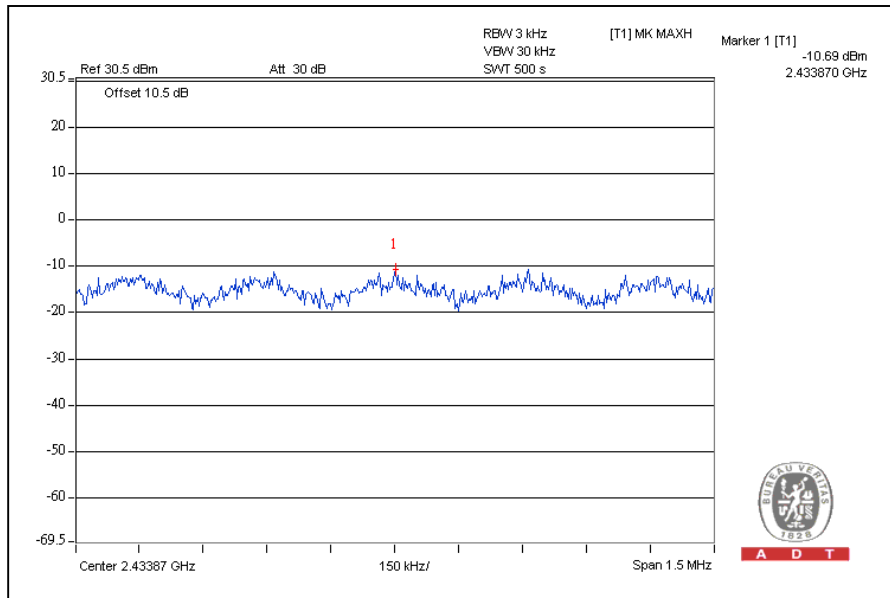


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### 802.11g OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)			
1	2412	-10.8	-11.8	-8.3	8	PASS
6	2437	-10.7	-11.1	-7.9	8	PASS
11	2462	-14.4	-13.8	-11.1	8	PASS

For Chain(0): CH6



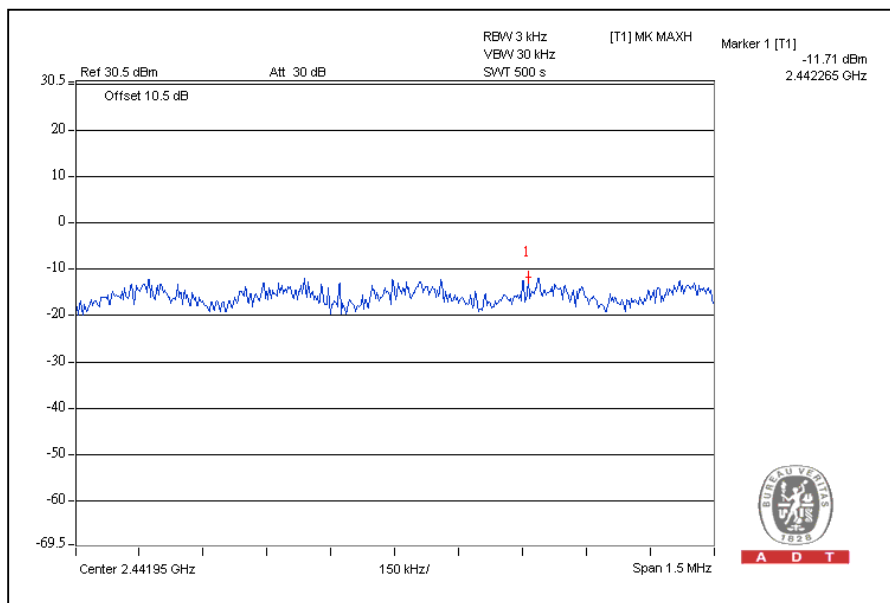


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### 802.11n (20MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)			
1	2412	-12.0	-12.3	-9.1	8	PASS
6	2437	-11.7	-11.7	-8.7	8	PASS
11	2462	-17.2	-14.3	-12.5	8	PASS

For Chain(1): CH6



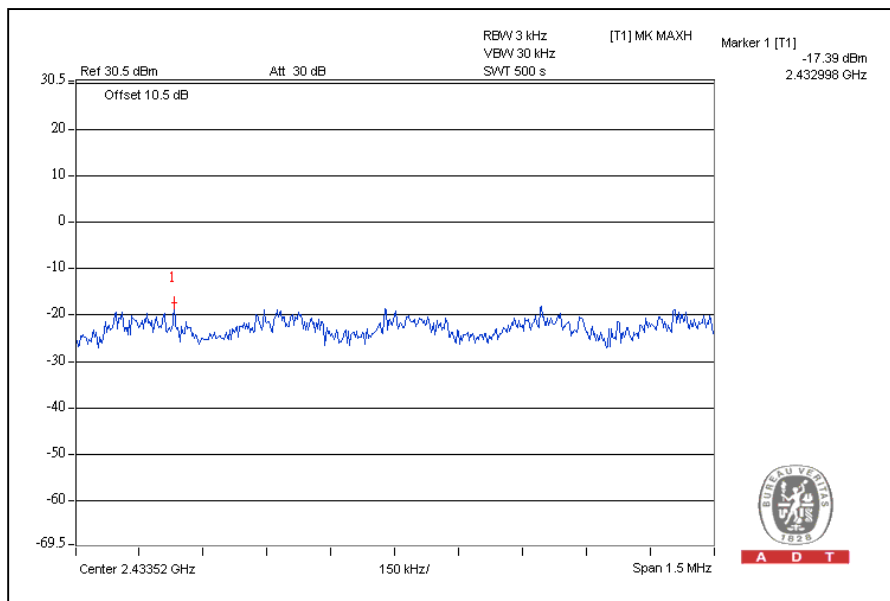


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### 802.11n (40MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)			
1	2422	-19.8	-17.4	-15.4	8	PASS
4	2437	-18.2	-18.4	-15.3	8	PASS
7	2452	-23.3	-19.7	-18.1	8	PASS

For Chain (1): CH1



## 4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

### 4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 18, 2009	Dec. 17, 2010

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

### 4.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low loss cable. Set RBW of spectrum analyzer to 100kHz and VBW of spectrum analyzer to 300kHz with suitable frequency span including 100 MHz or 200 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (RBW = 100kHz, VBW = 300kHz) are attached on the following pages.

### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.6.5 EUT OPERATING CONDITION

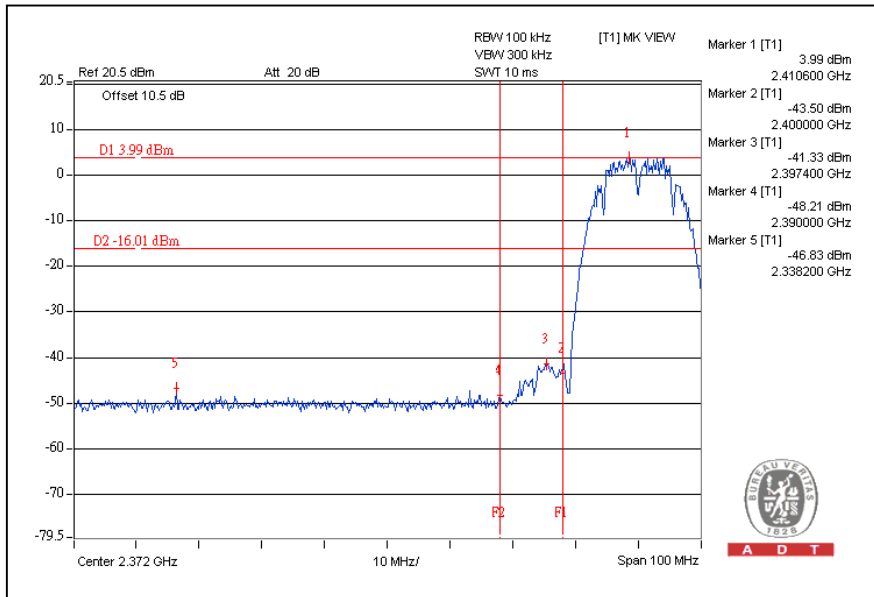
Same as Item 4.3.6

### 4.6.6 TEST RESULTS

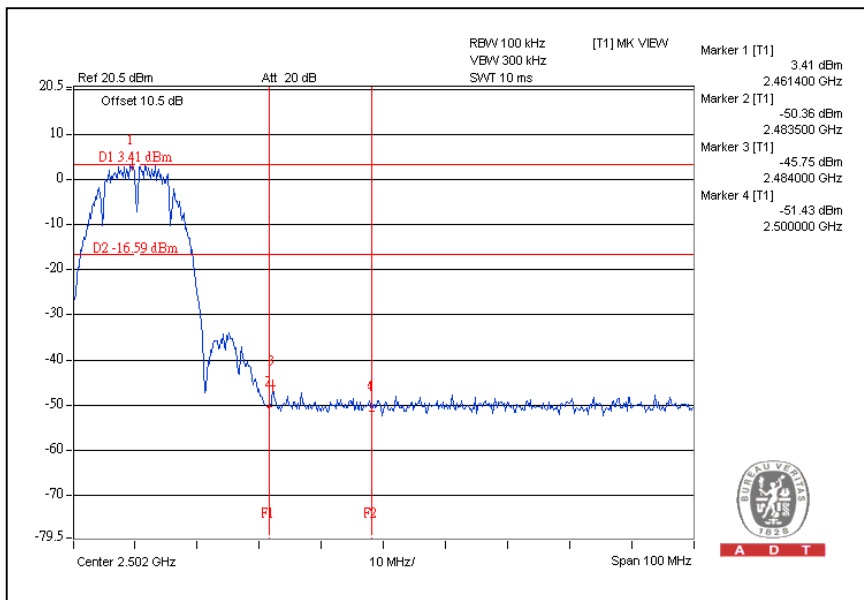
The spectrum plots are attached on the following images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

## 802.11b DSSS MODULATION:

### CH1



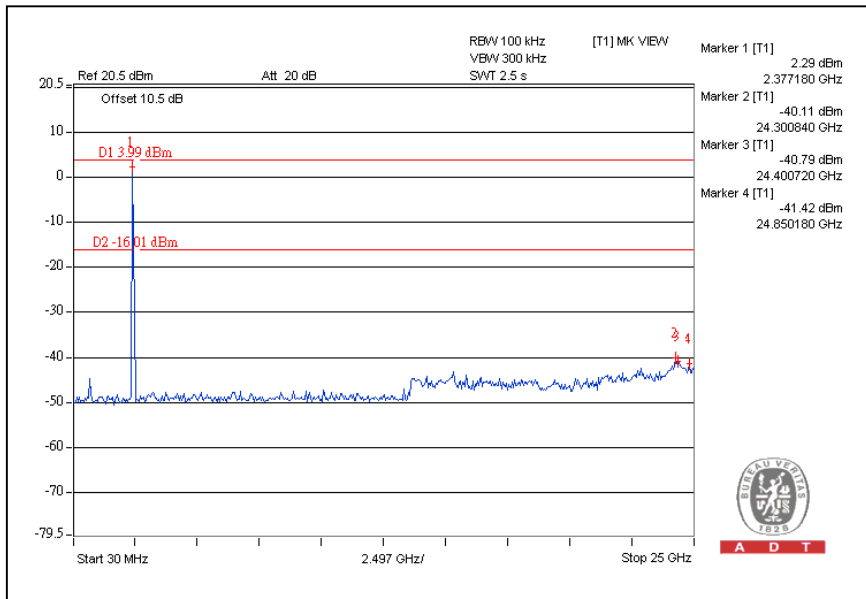
### CH11



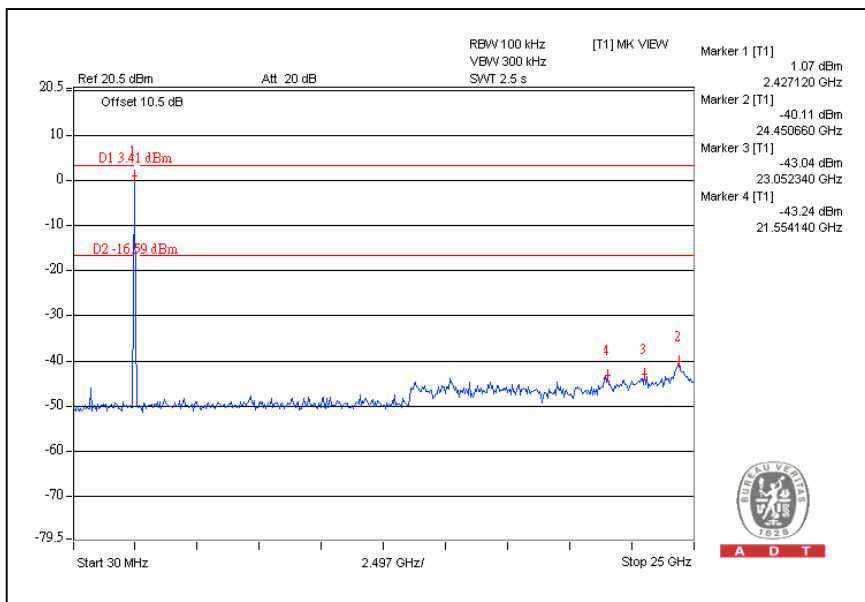


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### CH1



### CH11



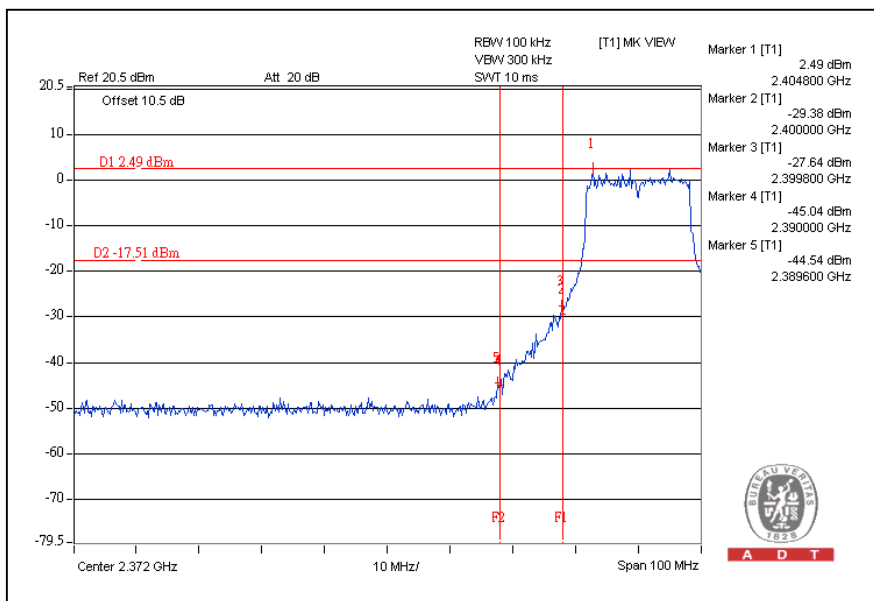




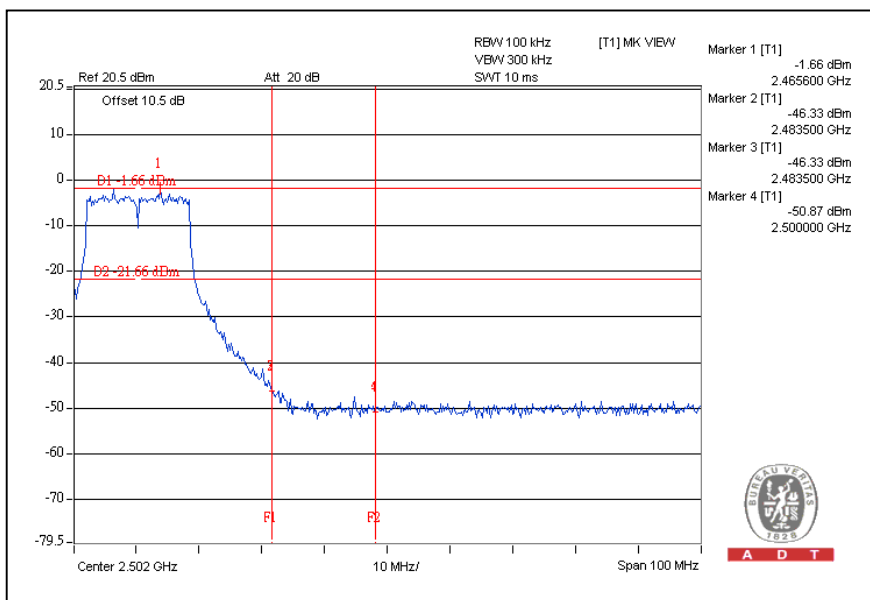
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## 802.11g OFDM MODULATION:

### CH1



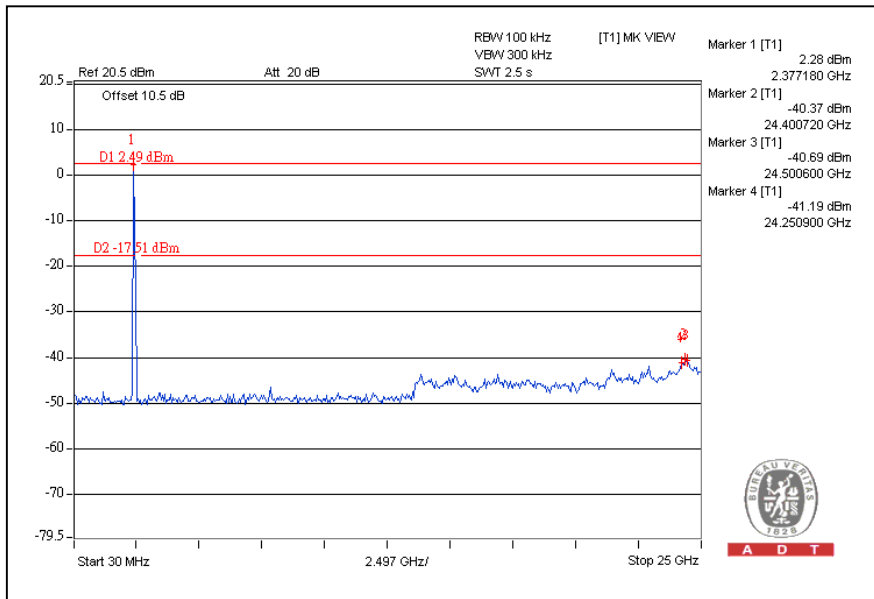
### CH11



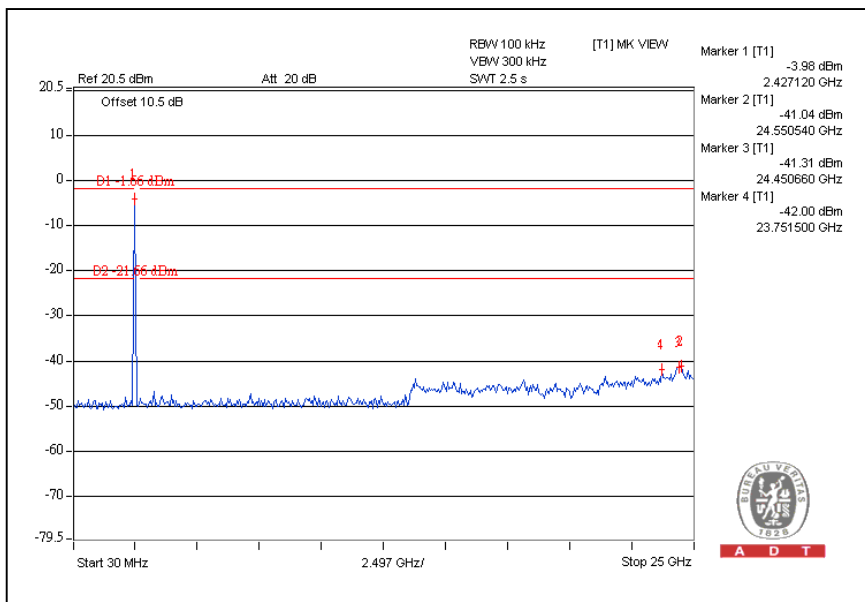


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### CH1

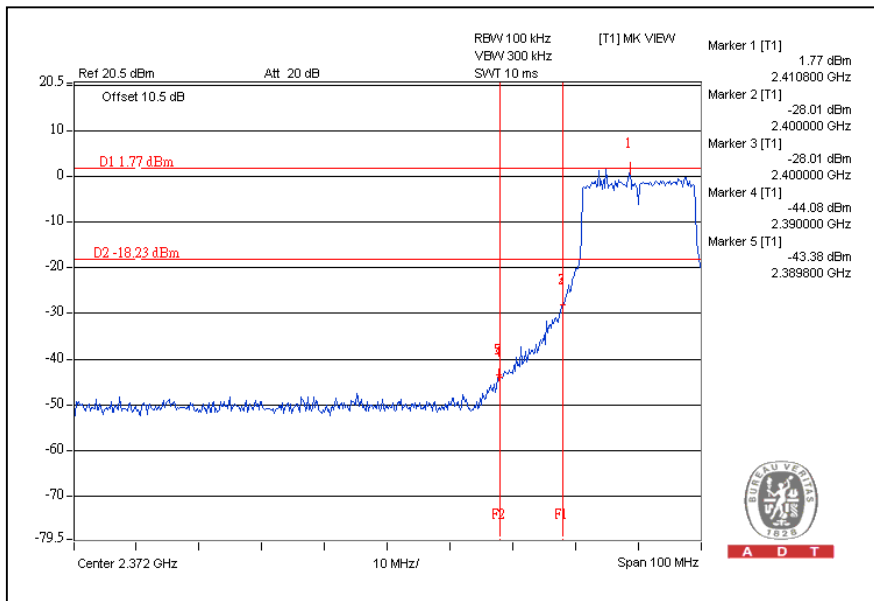


### CH11

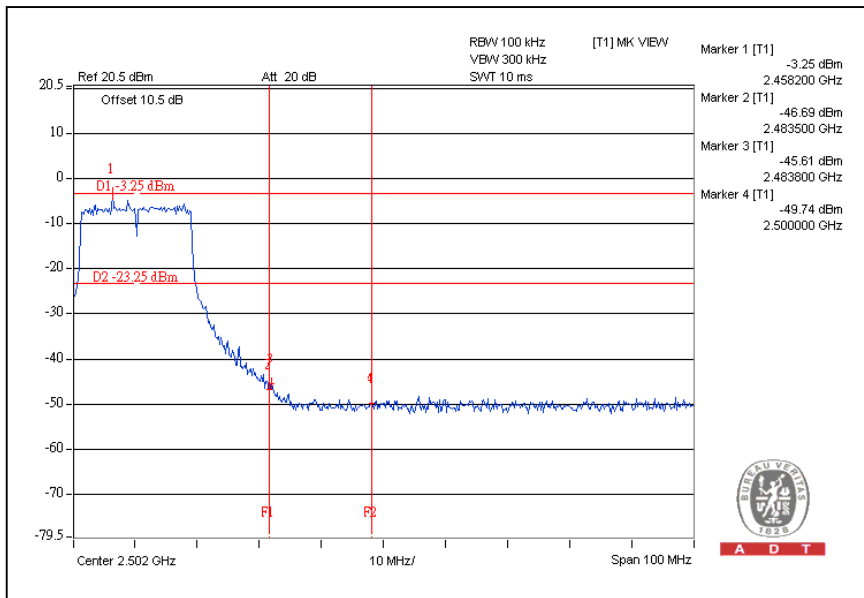


## 802.11n (20MHz) OFDM MODULATION:

CH1



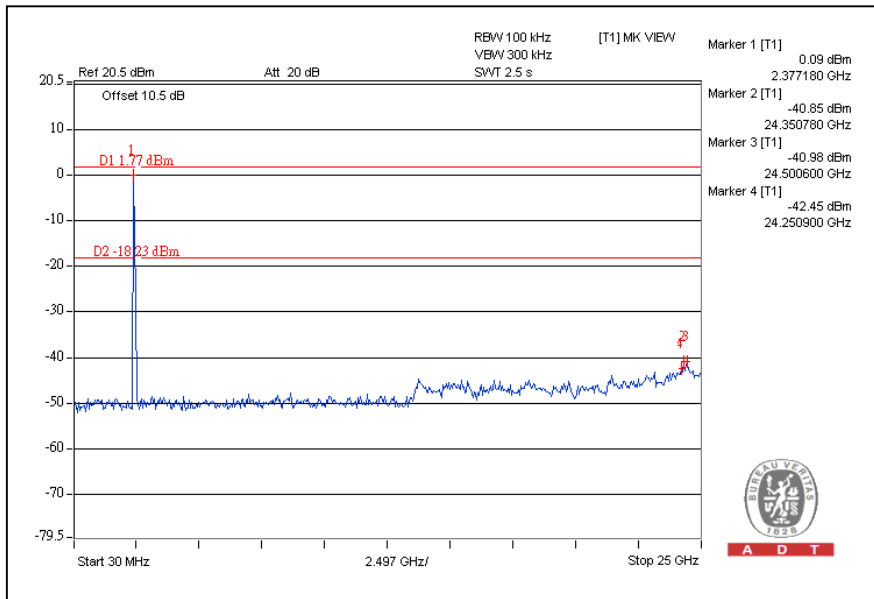
CH11



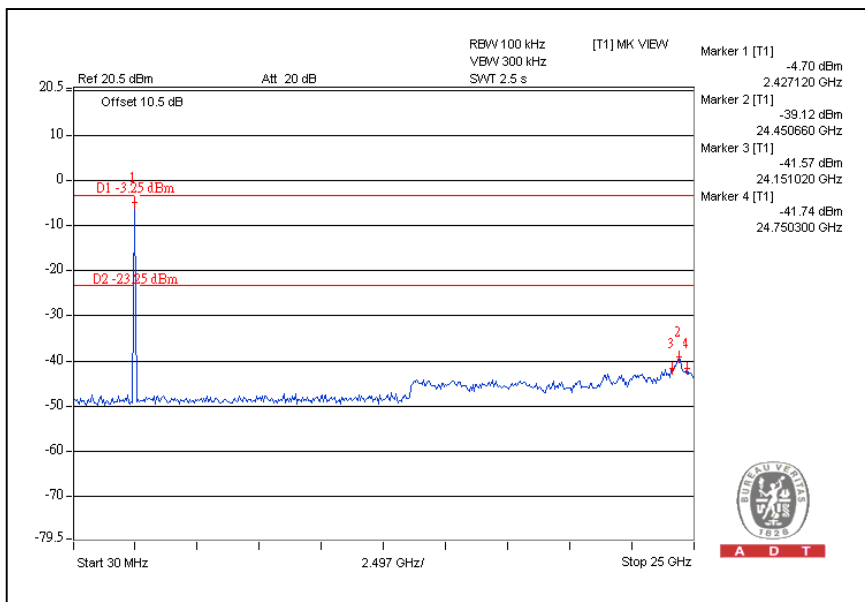


A D T

### CH1

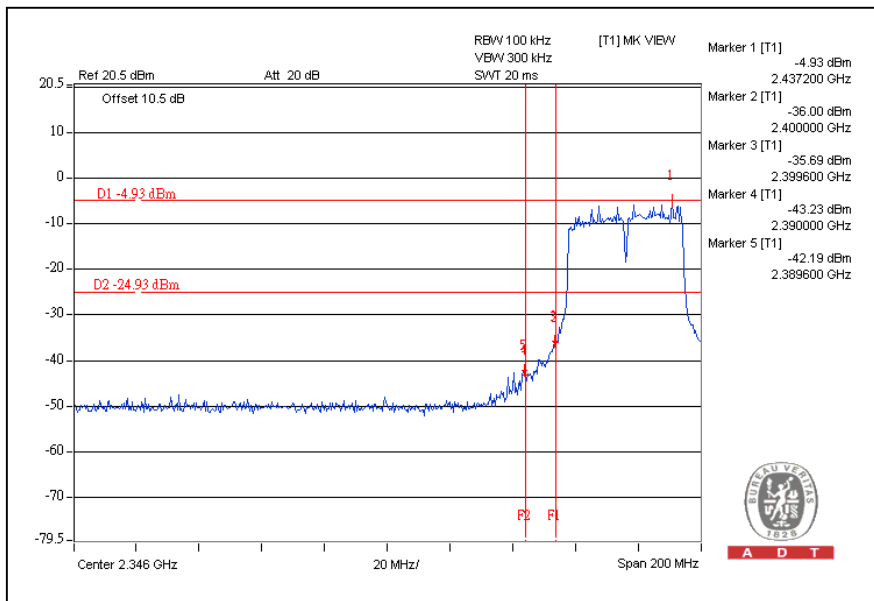


### CH11

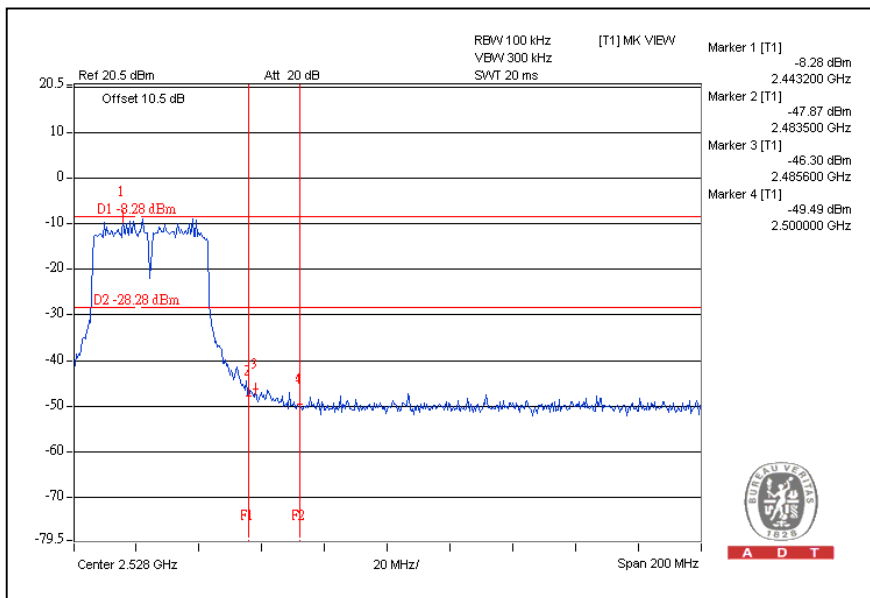


## 802.11n (40MHz) OFDM MODULATION:

CH1



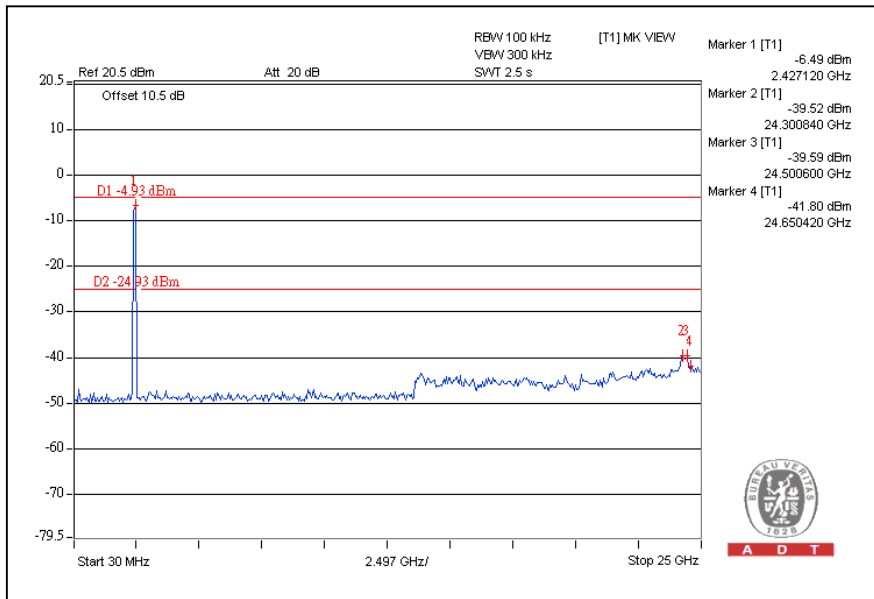
CH7



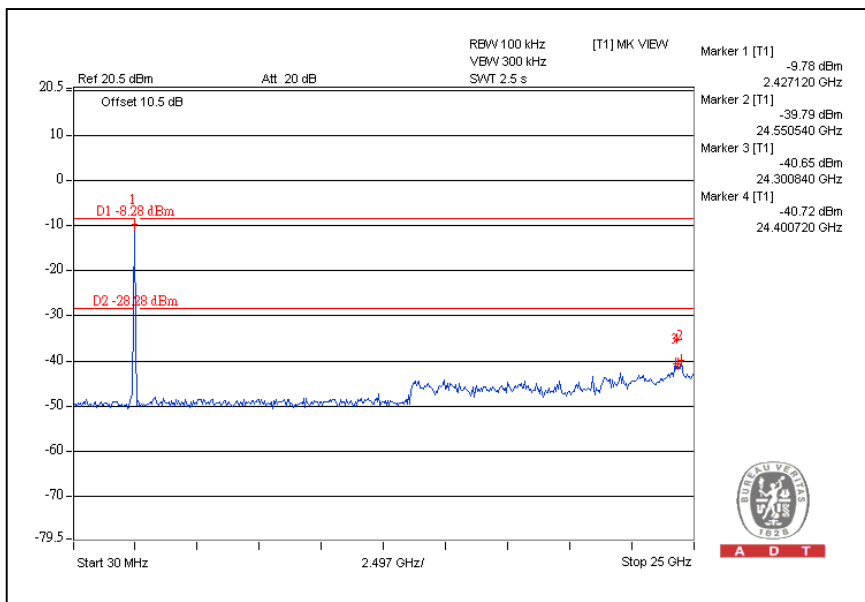


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### CH1



### CH7





## 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.

**--- END ---**