# FCC TEST REPORT

**REPORT NO.:** RF991202E06

**MODEL NO.:** AW-NM387

**FCC ID:** TLZ-NM387

**RECEIVED:** Dec. 02, 2010

**TESTED:** Dec. 10 to 30, 2010

**ISSUED:** Feb. 09, 2011

**APPLICANT:** AzureWave Technologies, Inc.

**ADDRESS:** 8 F., No. 94, Baozhong Rd., Xindian,Taipei, Taiwan 231

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

**LAB ADDRESS :** No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

**TEST LOCATION (1):** No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

**TEST LOCATION (2):** No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

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# RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|---|---|---|
| Original release | NA | Feb. 09, 2011 |

# 1. CERTIFICATION

| | |
|---|---|
| **PRODUCT:** | IEEE 802.11 b/g/n Wireless LAN & Bluetooth Module |
| **BRAND NAME:** | AzureWave |
| **MODEL NO.:** | AW-NM387 |
| **TEST SAMPLE:** | ENGINEERING SAMPLE |
| **TESTED:** | Dec. 10 to 30, 2010 |
| **APPLICANT:** | AzureWave Technologies, Inc. |
| **STANDARDS:** | FCC Part 15, Subpart C (Section 15.247)<br>ANSI C63.4-2003<br>ANSI C63.10-2009 |

The above equipment (Model: AW-NM387) 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** : Carol Liao , **DATE:** Feb. 09, 2011
( Carol Liao, Specialist )

**APPROVED BY** : , **DATE:** Feb. 09, 2011
( 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 -10.15dB at 0.150MHz |
| 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 2483.50MHz and 4874.00MHz |
| 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 I-PEX 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) | 3.30 dB |
| Radiated emissions (1GHz -18GHz) | 2.19 dB |
| Radiated emissions (18GHz -40GHz) | 2.56 dB |

# 3. GENERAL INFORMATION

## 3.1 GENERAL DESCRIPTION OF EUT

| | |
|---|---|
| **PRODUCT** | IEEE 802.11 b/g/n Wireless LAN & Bluetooth Module |
| **MODEL NO.** | AW-NM387 |
| **FCC ID** | TLZ-NM387 |
| **POWER SUPPLY** | DC 3.3V±10% from host equipment |
| **MODULATION TYPE** | CCK, DQPSK, DBPSK for DSSS<br>64QAM, 16QAM, QPSK, BPSK for OFDM |
| **MODULATION TECHNOLOGY** | DSSS, OFDM |
| **TRANSFER RATE** | 802.11b: 11 / 5.5 / 2 / 1Mbps<br>802.11g: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps<br>802.11n (20MHz, 800ns GI):<br>65 / 58.5 / 52 / 39 / 26 / 19.5 / 13 / 6.5Mbps<br>802.11n (40MHz, 800ns GI):<br>135 / 121.5 / 108.0/ 81.0/ 54.0/ 40.5/ 27.0/ 13.5 Mbps |
| **FREQUENCY RANGE** | 2412MHz ~ 2462MHz |
| **NUMBER OF CHANNEL** | 11 for 802.11b, 802.11g, 802.11n (20MHz)<br>7 for 802.11n (40MHz) |
| **MAXIMUM OUTPUT POWER** | 802.11b: 64.6mW<br>802.11g: 169.8mW<br>802.11n (20MHz): 166.0mW<br>802.11n (40MHz): 128.8mW |
| **ANTENNA TYPE** | Please see note 3 |
| **DATA CABLE** | NA |
| **I/O PORTS** | NA |
| **ASSOCIATED DEVICES** | NA |

**NOTE:**

1. There are Bluetooth technology and WLAN technology used for the EUT. <the Bluetooth test data please refer " RF991202E06-1">
2. Bluetooth technology and WLAN technology cannot transmit at same time.

3. There are nine antennas provided to this EUT, please refer to the following table:

| No. | Antenna Type | Antenna Connector | Antenna Gain (dBi) (including cable loss) | Cable loss(dB) | Cable Length (cm) | Color |
|---|---|---|---|---|---|---|
| 1 | PiFa | I-PEX for 1.13 coaxial cable | 2.98 | 0.6 | 15 | Black |
| 2 | PiFa | I-PEX for 1.13 coaxial cable | 2.28 | 2 | 40 | Black |
| 3 | PiFa | I-PEX for 1.13 coaxial cable | 2.3 | 0.24 | 6 | Black |
| 4 | PiFa | I-PEX for 1.13 coaxial cable | 1.05 | 1.3 | 31.6 | Black |
| 5 | PiFa | I-PEX for 1.37 coaxial cable | -2.5 | 4 | 61.5 | White |
| 6 | PiFa | I-PEX for 1.37 coaxial cable | 1.67 | 4.5 | 69.4 | Black |
| 7 | PiFa | I-PEX for 1.13 coaxial cable | 0.26 | 0.81 | 36.7 | White |
| 8 | PiFa | I-PEX for 1.13 coaxial cable | 1.39 | 0.5 | 10 | Black |
| 9 | PiFa | I-PEX for 1.37 coaxial cable | 1.25 | 0.4 | 6.2 | White |

From the above antennas, **antenna 1** was selected as representative antenna for the test and its data was recorded in this report.

4. The EUT's antenna was pre-tested under the following test modes for three different axes placements:

| Test Mode | Description |
|---|---|
| Mode A | X-Z plane |
| **Mode B** | **X-Y plane** |
| Mode C | Y-Z plane |

From the above modes, the radiated emission worst case was found in Mode B. Therefore only the test data of the modes were recorded in this report.

5. The EUT incorporates a SISO function with 802.11n.

6. The EUT is 1 * 1 spatial SISO without beam forming function.

7. The EUT, operates in the 2.4GHz frequency range, lets you connect IEEE 802.11g or IEEE 802.11b and 802.11n technique devices to the network.

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.

## 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 | | |

## 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

| EUT CONFIGURE MODE | APPLICABLE TO | | | | DESCRIPTION |
|---|---|---|---|---|---|
| | PLC | RE < 1G | RE ³ 1G | APCM | |
| - | √ | √ | √ | √ | - |

Where **PLC:** Power Line Conducted Emission **RE < 1G:** Radiated Emission below 1GHz

**RE ³ 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 b | √ | |
| B | 802.11 b | | √ |
| C | 802.11 g | √ | |
| D | 802.11 g | | √ |
| E | 802.11n (20MHz) for MCS 0~7 | √ | |
| F | 802.11n (20MHz) for MCS 0~7 | | √ |
| G | 802.11n (40MHz) for MCS 0~7 | √ | |
| H | 802.11n (40MHz) for MCS 0~7 | | √ |

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, E & G the worst modes were selected as representative mode for the report.

### POWER LINE CONDUCTED EMISSION TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) | TX COMBINATION |
|---|---|---|---|---|---|---|
| Worst Channel | - | - | - | - | - | - |

**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 | C |

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

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) | TX COMBINATION |
|---|---|---|---|---|---|---|
| 802.11b | 1 to 11 | 1, 6, 11 | DSSS | DBPSK | 1 | A |
| 802.11g | 1 to 11 | 1, 6, 11 | OFDM | BPSK | 6 | C |
| 802.11n (20MHz) | 1 to 11 | 1, 6, 11 | OFDM | BPSK | 6.5 | E |
| 802.11n (40MHz) | 1 to 7 | 1, 4, 7 | OFDM | BPSK | 13.5 | G |

**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 | C |
| 802.11n (20MHz) | 1 to 11 | 1, 11 | OFDM | BPSK | 6.5 | E |
| 802.11n (40MHz) | 1 to 7 | 1, 7 | OFDM | BPSK | 13.5 | G |

## 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) | 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 | C |
| 802.11n (20MHz) | 1 to 11 | 1, 6, 11 | OFDM | BPSK | 6.5 | E |
| 802.11n (40MHz) | 1 to 7 | 1, 4, 7 | OFDM | BPSK | 13.5 | G |

## ※ TEST CONDITION:

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER | TESTED BY |
|---|---|---|---|
| RE≥1G | 16deg. C, 65%RH, 1015 hPa | 120Vac, 60Hz | Kent Liu |
| RE<1G | 23deg. C, 64%RH, 1015 hPa | 120Vac, 60Hz | Kent Liu |
| PLC | 20deg. C, 65%RH, 1015 hPa | 120Vac, 60Hz | Moris Lin |
| APCM | 25deg. C, 60%RH, 1015 hPa | 120Vac, 60Hz | Kent Liu |

## 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**
**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

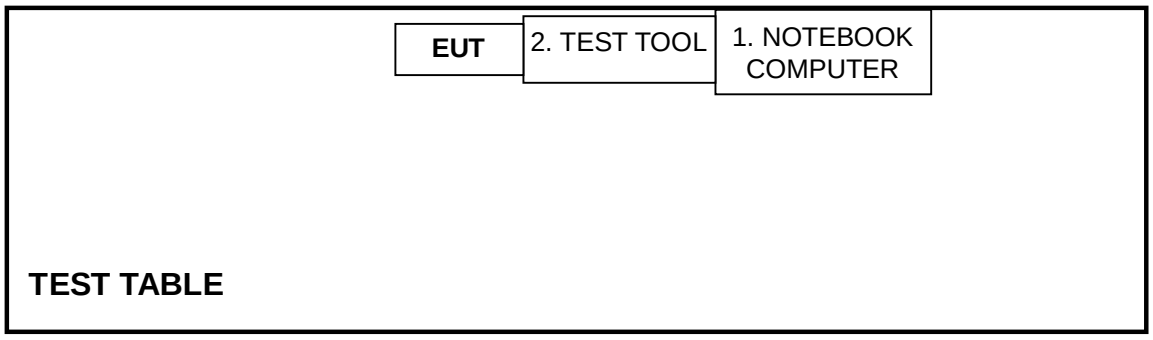
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| NO. | PRODUCT | BRAND | MODEL NO. | SERIAL NO. | FCC ID |
|---|---|---|---|---|---|
| 1 | NOTEBOOK COMPUTER | ThinkPad | 7673 | LV-R5ZD4 | NA |
| 2 | TEST TOOL | AzureWave | NA | NA | NA |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|---|---|
| 1 | NA |
| 2 | USB cable (0.5cm) |

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

## 3.5 CONFIGURATION OF SYSTEM UNDER TEST



# 4. TEST TYPES AND RESULTS

## 4.1 CONDUCTED EMISSION MEASUREMENT

### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

| FREQUENCY OF EMISSION (MHz) | CONDUCTED LIMIT (dBμV) | |
|---|---|---|
| | 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 provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

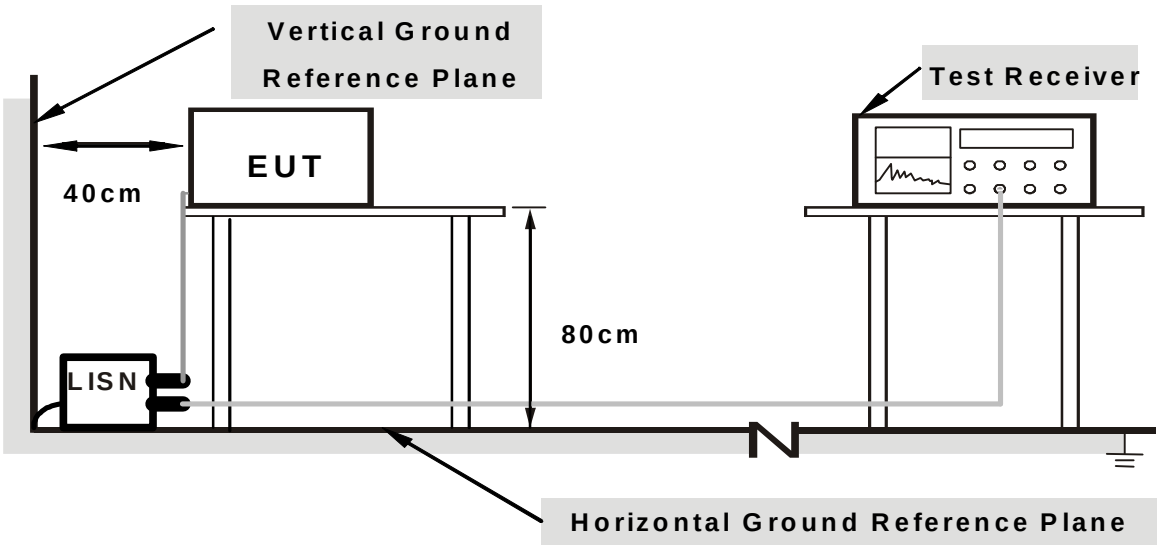
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

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. Connect the EUT with the support unit 1 (Notebook Computer) which is placed in test table.
2. The support unit 1 (Notebook Computer) runs test program “Marvell DutApiSDSD8787.exe” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

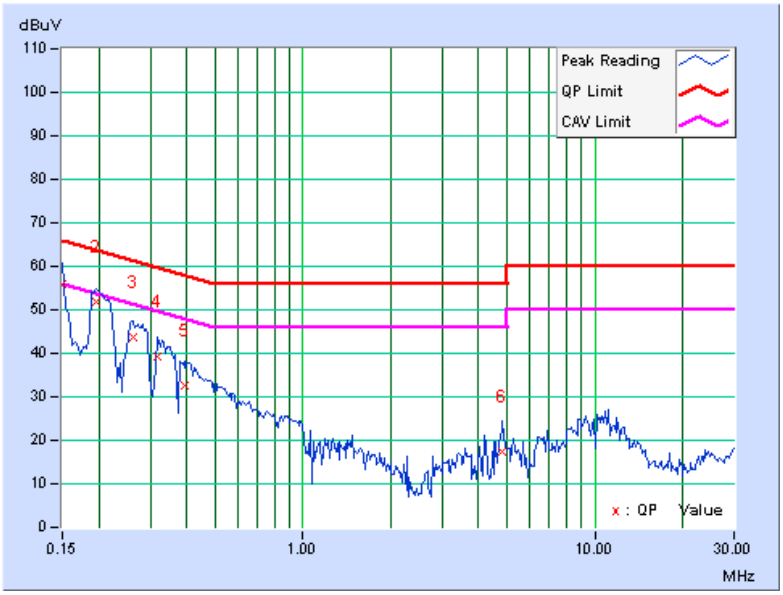
## 4.1.7 TEST RESULTS

**802.11g OFDM MODULATION:**

| PHASE | Line (L) | 6dB BANDWIDTH | 9 kHz |
|---|---|---|---|

| | Freq. | Corr. | Reading Value | | Emission Level | | Limit | | Margin | |
|---|---|---|---|---|---|---|---|---|---|---|
| No | | Factor | [dB (uV)] | | [dB (uV)] | | [dB (uV)] | | (dB) | |
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| **1** | **0.150** | **0.37** | **55.48** | **-** | **55.85** | **-** | **66.00** | **56.00** | **-10.15** | **-** |
| 2 | 0.197 | 0.36 | 51.59 | - | 51.95 | - | 63.74 | 53.74 | -11.79 | - |
| 3 | 0.263 | 0.36 | 43.24 | - | 43.60 | - | 61.33 | 51.33 | -17.73 | - |
| 4 | 0.318 | 0.36 | 38.74 | - | 39.10 | - | 59.76 | 49.76 | -20.66 | - |
| 5 | 0.392 | 0.36 | 32.08 | - | 32.44 | - | 58.02 | 48.02 | -25.58 | - |
| 6 | 4.828 | 0.53 | 16.92 | - | 17.45 | - | 56.00 | 46.00 | -38.55 | - |

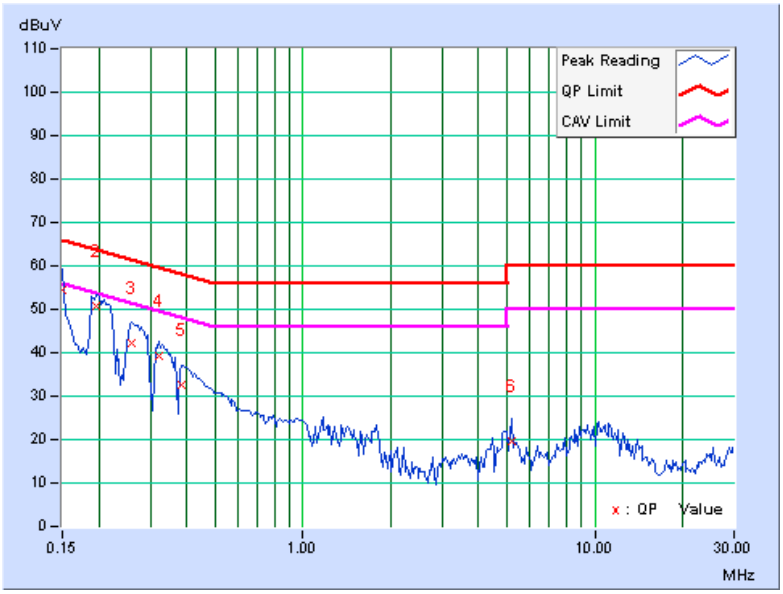
**REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value =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



| PHASE | Neutral (N) | 6dB BANDWIDTH | 9 kHz |
|---|---|---|---|

| | Freq. | Corr. | Reading Value | | Emission Level | | Limit | | Margin | |
|---|---|---|---|---|---|---|---|---|---|---|
| No | | Factor | [dB (uV)] | | [dB (uV)] | | [dB (uV)] | | (dB) | |
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.150 | 0.10 | 54.37 | - | 54.47 | - | 66.00 | 56.00 | -11.53 | - |
| 2 | 0.197 | 0.10 | 50.56 | - | 50.66 | - | 63.74 | 53.74 | -13.08 | - |
| 3 | 0.259 | 0.10 | 42.03 | - | 42.13 | - | 61.45 | 51.45 | -19.32 | - |
| 4 | 0.322 | 0.11 | 38.98 | - | 39.09 | - | 59.66 | 49.66 | -20.57 | - |
| 5 | 0.384 | 0.11 | 32.61 | - | 32.72 | - | 58.18 | 48.18 | -25.47 | - |
| 6 | 5.188 | 0.29 | 19.17 | - | 19.46 | - | 60.00 | 50.00 | -40.54 | - |

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



## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

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

**NOTE**:

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

## 4.2.2 TEST INSTRUMENTS

**Test date: Dec. 27, 2010**

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| Agilent Spectrum Analyzer | E4446A | MY48250254 | July 14, 2010 | July 13, 2011 |
| Agilent Pre-Selector | N9039A | MY46520311 | July 14, 2010 | July 13, 2011 |
| Agilent Signal Generator | N5181A | MY49060517 | July 14, 2010 | July 13, 2011 |
| Mini-Circuits Pre-Amplifier | ZFL-1000VH2B | AMP-ZFL-03 | Nov. 16, 2010 | Nov. 15, 2011 |
| Agilent Pre-Amplifier | 8449B | 3008A02578 | July 05, 2010 | July 04, 2011 |
| Miteq Pre-Amplifier | AFS33-18002650-30-8P-44 | 881786 | NA | NA |
| SCHWARZBECK Trilog Broadband Antenna | VULB 9168 | 9168-360 | Apr. 29, 2010 | Apr. 28, 2011 |
| AISI Horn_Antenna | AIH.8018 | 0000320091110 | Nov. 12, 2010 | Nov. 11, 2011 |
| SCHWARZBECK Horn_Antenna | BBHA 9170 | 9170-424 | Oct. 08, 2010 | Oct. 07, 2011 |
| RF CABLE | NA | RF104-201<br>RF104-203<br>RF104-204 | Dec. 23, 2010 | Dec. 22, 2011 |
| RF Cable | NA | CHGCAB_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. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.

### 4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meters chamber room. 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.

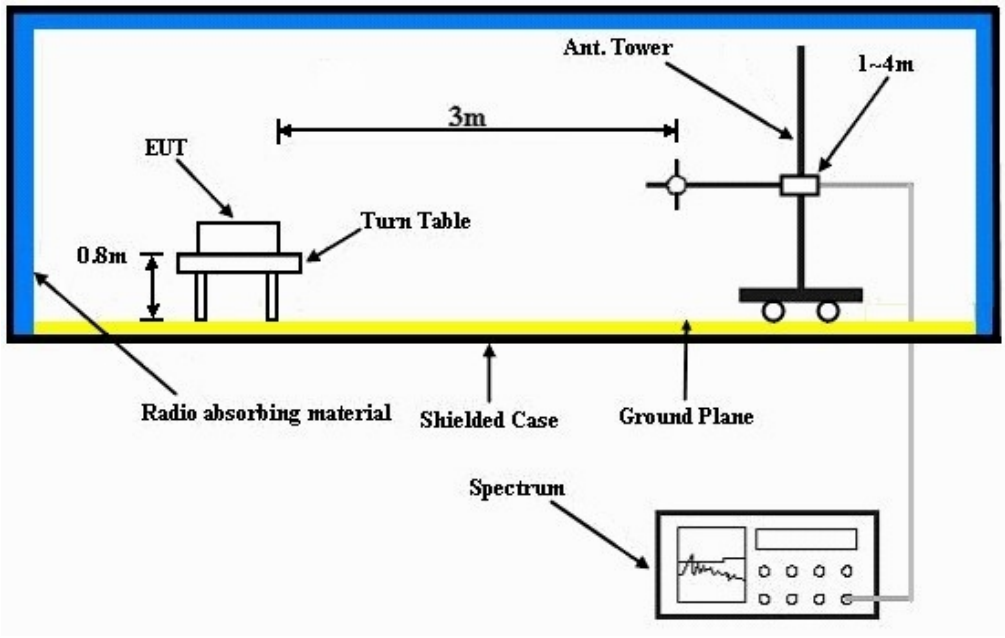
**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and 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 6 | **FREQUENCY RANGE** | Below 1000MHz |
| **INPUT POWER (SYSTEM)** | 120Vac, 60 Hz | **DETECTOR FUNCTION** | Quasi-Peak |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 64%RH 1015 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 | 162.14 | 37.5 QP | 43.5 | -6.0 | 2.00 H | 196 | 23.04 | 14.43 |
| 2 | 225.40 | 31.8 QP | 46.0 | -14.2 | 1.00 H | 360 | 19.65 | 12.14 |
| 3 | 393.20 | 33.5 QP | 46.0 | -12.6 | 1.00 H | 195 | 15.91 | 17.54 |
| 4 | 598.55 | 36.5 QP | 46.0 | -9.5 | 1.50 H | 360 | 14.12 | 22.35 |
| 5 | 665.69 | 36.7 QP | 46.0 | -9.3 | 1.00 H | 127 | 13.42 | 23.24 |
| 6 | 671.97 | 38.9 QP | 46.0 | -7.1 | 1.00 H | 85 | 15.55 | 23.32 |
| 7 | 864.05 | 39.7 QP | 46.0 | -6.3 | 1.00 H | 360 | 13.55 | 26.18 |
| **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 | 162.16 | 32.7 QP | 43.5 | -10.8 | 2.00 V | 292 | 18.24 | 14.43 |
| 2 | 270.52 | 26.7 QP | 46.0 | -19.3 | 2.00 V | 360 | 12.44 | 14.25 |
| 3 | 447.80 | 27.7 QP | 46.0 | -18.3 | 2.00 V | 320 | 8.84 | 18.83 |
| 4 | 665.46 | 33.2 QP | 46.0 | -12.8 | 1.50 V | 126 | 10.00 | 23.24 |
| 5 | 750.01 | 29.6 QP | 46.0 | -16.4 | 1.50 V | 219 | 5.24 | 24.33 |
| 6 | 864.05 | 32.6 QP | 46.0 | -13.4 | 1.50 V | 66 | 6.38 | 26.18 |
| 7 | 995.50 | 33.6 QP | 54.0 | -20.4 | 1.00 V | 360 | 5.96 | 27.60 |

**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.

## ABOVE 1GHz WORST-CASE DATA

## 802.11b DSSS MODULATION

| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|---|---|---|---|
| CHANNEL | Channel 1 | FREQUENCY RANGE | 1 ~ 25GHz |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 16deg. C, 65%RH<br>1015 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 | 56.3 PK | 74.0 | -17.7 | 1.00 H | 246 | 24.54 | 31.76 |
| 2 | 2390.00 | 43.6 AV | 54.0 | -10.4 | 1.00 H | 246 | 11.84 | 31.76 |
| 3 | *2412.00 | 105.5 PK | | | 1.00 H | 245 | 73.67 | 31.83 |
| 4 | *2412.00 | 103.1 AV | | | 1.00 H | 245 | 71.27 | 31.83 |
| 5 | 4824.00 | 56.1 PK | 74.0 | -17.9 | 1.00 H | 297 | 16.83 | 39.27 |
| 6 | 4824.00 | 53.1 AV | 54.0 | -0.9 | 1.00 H | 297 | 13.83 | 39.27 |
| 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 | 57.7 PK | 74.0 | -16.3 | 1.00 V | 85 | 25.94 | 31.76 |
| 2 | 2390.00 | 46.0 AV | 54.0 | -8.0 | 1.00 V | 85 | 14.24 | 31.76 |
| 3 | *2412.00 | 100.3 PK | | | 1.00 V | 89 | 68.47 | 31.83 |
| 4 | *2412.00 | 98.4 AV | | | 1.00 V | 89 | 66.57 | 31.83 |
| 5 | 4824.00 | 55.6 PK | 74.0 | -18.4 | 1.00 V | 278 | 16.33 | 39.27 |
| 6 | 4824.00 | 52.7 AV | 54.0 | -1.3 | 1.00 V | 278 | 13.43 | 39.27 |

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

| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|---|---|---|---|
| CHANNEL | Channel 6 | FREQUENCY RANGE | 1 ~ 25GHz |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 16deg. C, 65%RH<br>1015 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 | 105.7 PK | | | 1.00 H | 241 | 73.79 | 31.91 |
| 2 | *2437.00 | 103.3 AV | | | 1.00 H | 241 | 71.39 | 31.91 |
| 3 | 4874.00 | 56.6 PK | 74.0 | -17.4 | 1.00 H | 295 | 17.16 | 39.44 |
| **4** | **4874.00** | **53.5 AV** | **54.0** | **-0.5** | **1.00 H** | **295** | **14.06** | **39.44** |
| 5 | 7311.00 | 54.9 PK | 74.0 | -19.1 | 1.00 H | 110 | 8.13 | 46.77 |
| 6 | 7311.00 | 41.1 AV | 54.0 | -12.9 | 1.00 H | 110 | -5.67 | 46.77 |
| **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 | 100.7 PK | | | 1.00 V | 74 | 68.79 | 31.91 |
| 2 | *2437.00 | 98.6 AV | | | 1.00 V | 74 | 66.69 | 31.91 |
| 3 | 4874.00 | 54.3 PK | 74.0 | -19.7 | 1.00 V | 231 | 14.86 | 39.44 |
| 4 | 4874.00 | 51.4 AV | 54.0 | -2.6 | 1.00 V | 231 | 11.96 | 39.44 |
| 5 | 7311.00 | 53.7 PK | 74.0 | -20.3 | 1.00 V | 23 | 6.93 | 46.77 |
| 6 | 7311.00 | 39.4 AV | 54.0 | -14.6 | 1.00 V | 23 | -7.37 | 46.77 |

**REMARKS:** 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

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

| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|---|---|---|---|
| CHANNEL | Channel 11 | FREQUENCY RANGE | 1 ~ 25GHz |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 16deg. C, 65%RH<br>1015 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 | 105.9 PK | | | 1.00 H | 257 | 73.91 | 31.99 |
| 2 | *2462.00 | 103.6 AV | | | 1.00 H | 257 | 71.61 | 31.99 |
| 3 | 2483.50 | 57.9 PK | 74.0 | -16.1 | 1.00 H | 85 | 25.83 | 32.07 |
| 4 | 2483.50 | 46.9 AV | 54.0 | -7.1 | 1.00 H | 85 | 14.83 | 32.07 |
| 5 | 4924.00 | 56.5 PK | 74.0 | -17.5 | 1.07 H | 250 | 16.89 | 39.61 |
| 6 | 4924.00 | 53.3 AV | 54.0 | -0.7 | 1.07 H | 250 | 13.69 | 39.61 |
| 7 | 7386.00 | 55.6 PK | 74.0 | -18.4 | 1.01 H | 211 | 8.88 | 46.72 |
| 8 | 7386.00 | 42.3 AV | 54.0 | -11.7 | 1.01 H | 211 | -4.42 | 46.72 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2462.00 | 100.9 PK | | | 1.00 V | 85 | 68.91 | 31.99 |
| 2 | *2462.00 | 98.7 AV | | | 1.00 V | 85 | 66.71 | 31.99 |
| 3 | 2483.50 | 59.2 PK | 74.0 | -14.8 | 1.00 V | 79 | 27.13 | 32.07 |
| 4 | 2483.50 | 45.7 AV | 54.0 | -8.3 | 1.00 V | 79 | 13.63 | 32.07 |
| 5 | 4924.00 | 53.9 PK | 74.0 | -20.1 | 1.00 V | 239 | 14.29 | 39.61 |
| 6 | 4924.00 | 50.6 AV | 54.0 | -3.4 | 1.00 V | 239 | 10.99 | 39.61 |
| 7 | 7386.00 | 54.2 PK | 74.0 | -19.8 | 1.00 V | 32 | 7.48 | 46.72 |
| 8 | 7386.00 | 39.6 AV | 54.0 | -14.4 | 1.00 V | 32 | -7.12 | 46.72 |

**REMARKS:** 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

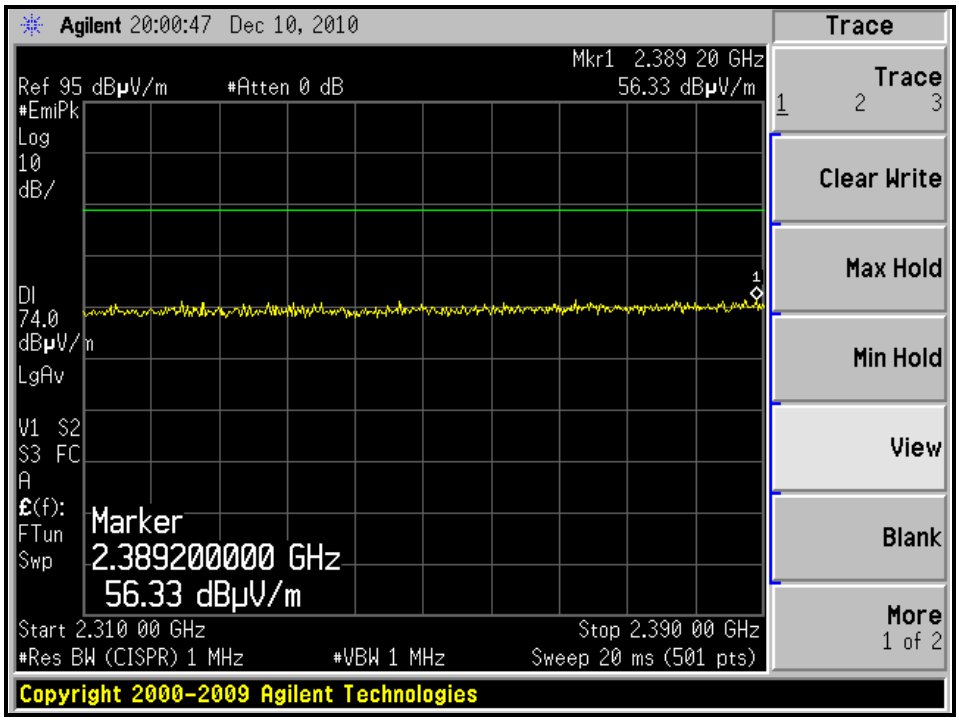
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

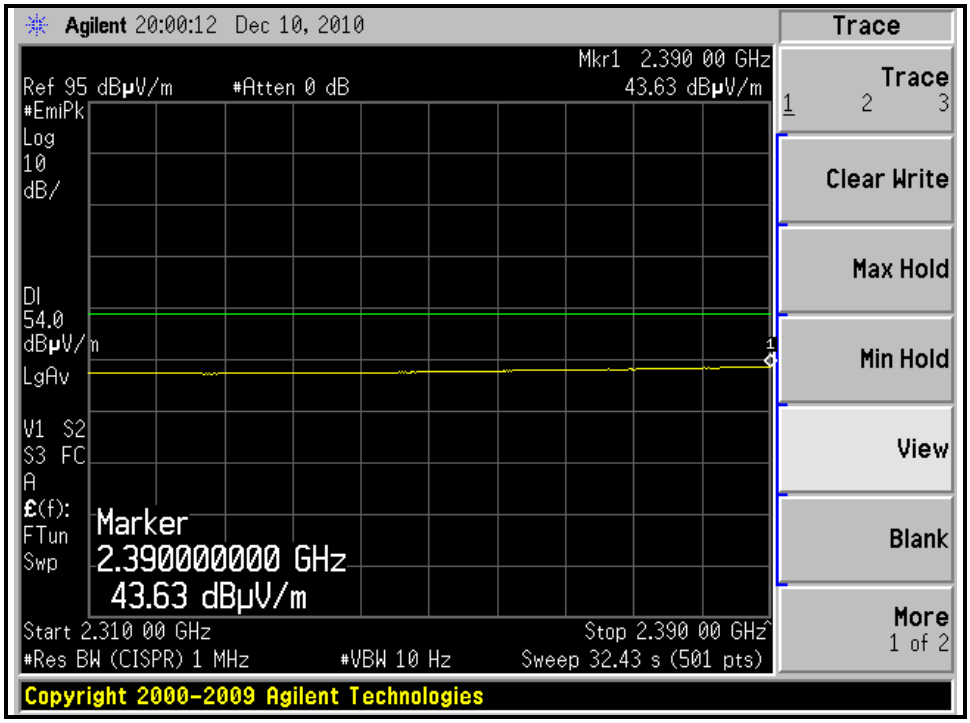
3. The other emission levels were very low against the limit.

4. Margin value = Emission level – Limit value.

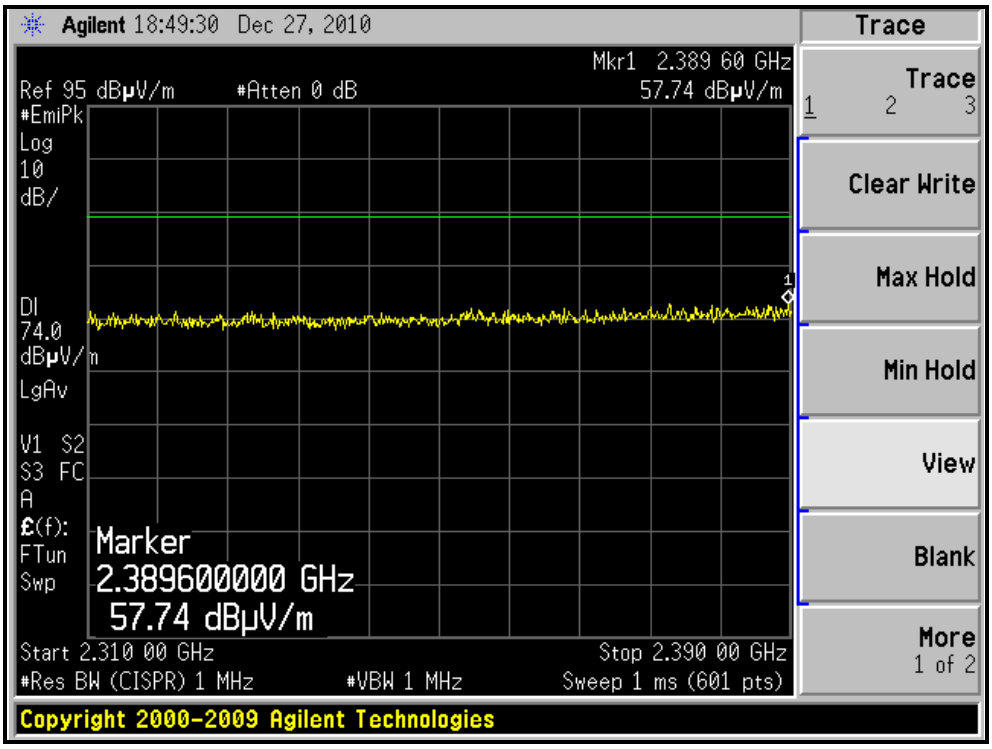
5. " * ": Fundamental frequency.

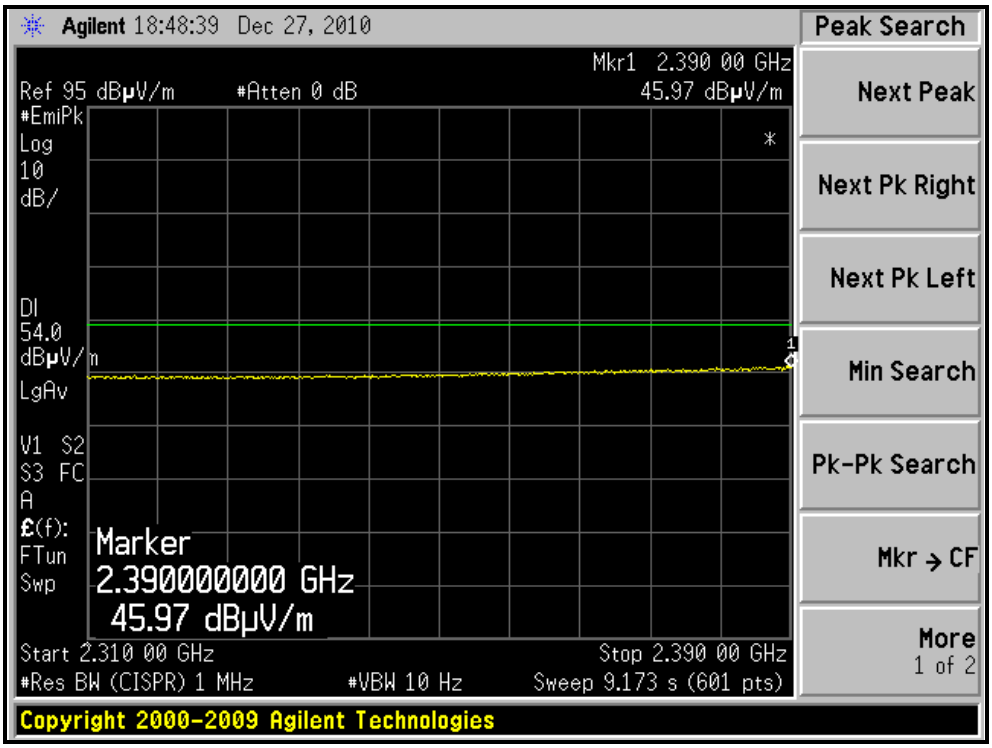
RESTRICTED BANDEDGE (802.11b MODE,CH1, HORIZONTAL)



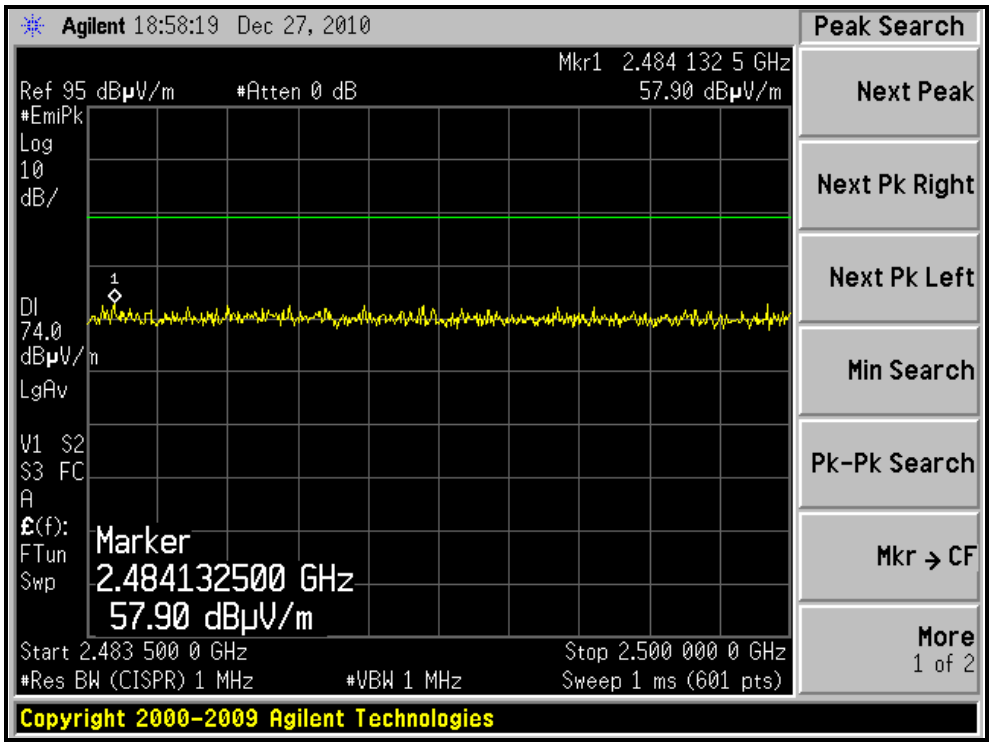



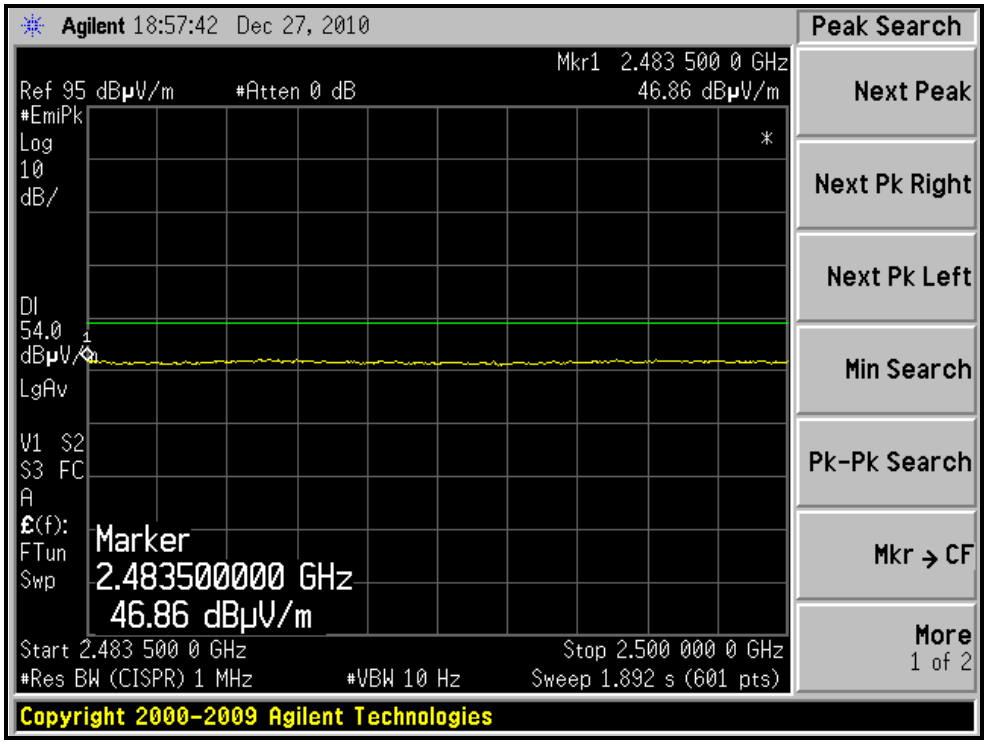
RESTRICTED BANDEDGE (802.11b MODE,CH1, VERTICAL )



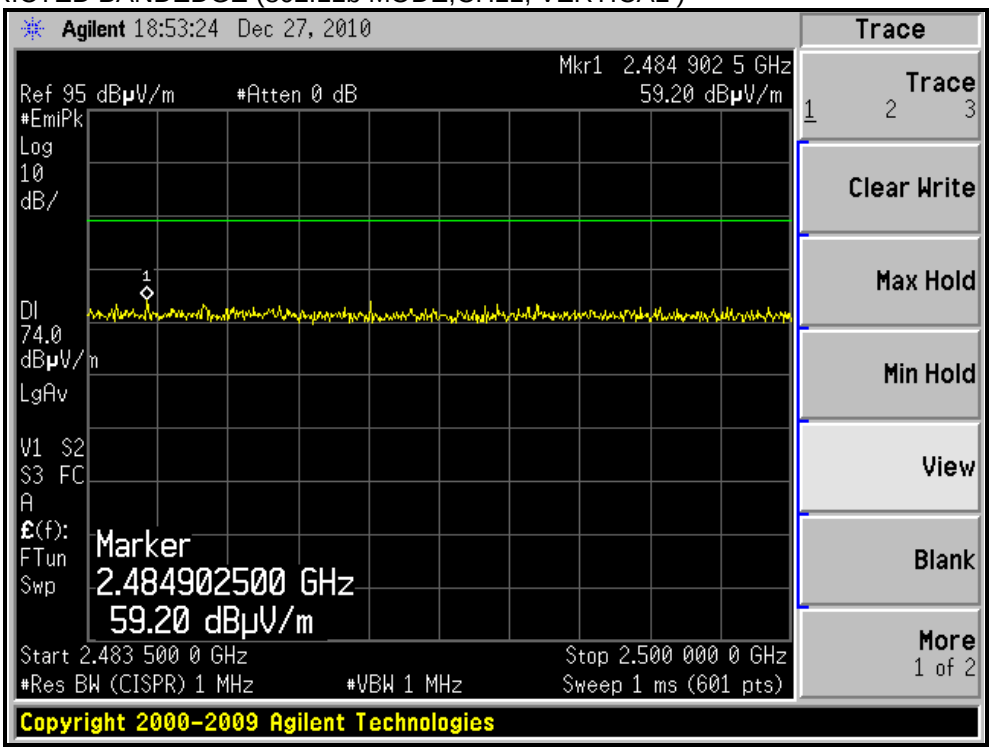



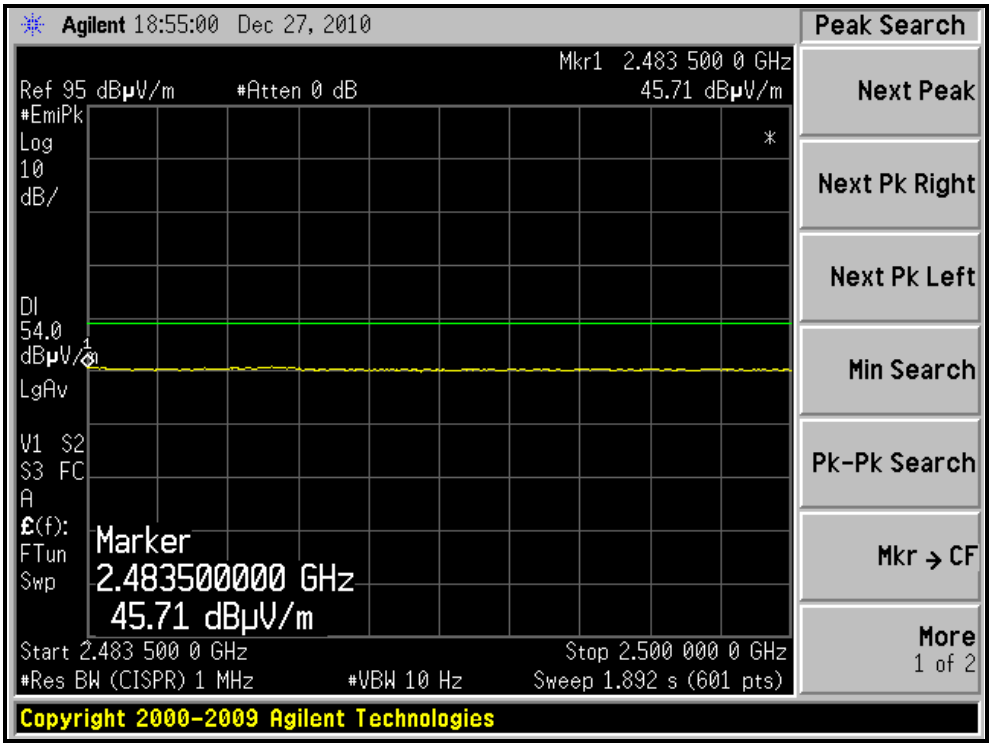
RESTRICTED BANDEDGE (802.11b MODE,CH11, HORIZONTAL )



RESTRICTED BANDEDGE (802.11b MODE,CH11, VERTICAL )



## 802.11g OFDM MODULATION

| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|---|---|---|---|
| CHANNEL | Channel 1 | FREQUENCY RANGE | 1 ~ 25GHz |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 16deg. C, 65%RH<br>1015 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 | 70.3 PK | 74.0 | -3.7 | 1.00 H | 247 | 38.54 | 31.76 |
| 2 | 2390.00 | 51.0 AV | 54.0 | -3.0 | 1.00 H | 247 | 19.24 | 31.76 |
| 3 | *2412.00 | 107.3 PK | | | 1.00 H | 247 | 75.47 | 31.83 |
| 4 | *2412.00 | 98.0 AV | | | 1.00 H | 247 | 66.17 | 31.83 |
| 5 | 4824.00 | 57.3 PK | 74.0 | -16.7 | 1.00 H | 254 | 18.03 | 39.27 |
| 6 | 4824.00 | 42.9 AV | 54.0 | -11.1 | 1.00 H | 254 | 3.63 | 39.27 |
| 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 | 1.00 V | 164 | 25.24 | 31.76 |
| 2 | 2390.00 | 45.5 AV | 54.0 | -8.5 | 1.00 V | 164 | 13.74 | 31.76 |
| 3 | *2412.00 | 102.4 PK | | | 1.00 V | 157 | 70.57 | 31.83 |
| 4 | *2412.00 | 93.1 AV | | | 1.00 V | 157 | 61.27 | 31.83 |
| 5 | 4824.00 | 54.3 PK | 74.0 | -19.7 | 1.00 V | 254 | 15.03 | 39.27 |
| 6 | 4824.00 | 41.2 AV | 54.0 | -12.8 | 1.00 V | 254 | 1.93 | 39.27 |

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

| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|---|---|---|---|
| CHANNEL | Channel 6 | FREQUENCY RANGE | 1 ~ 25GHz |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 16deg. C, 65%RH<br>1015 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 | 110.4 PK | | | 1.00 H | 239 | 78.49 | 31.91 |
| 2 | *2437.00 | 100.8 AV | | | 1.00 H | 239 | 68.89 | 31.91 |
| 3 | 4874.00 | 59.0 PK | 74.0 | -15.0 | 1.00 H | 250 | 19.56 | 39.44 |
| 4 | 4874.00 | 45.4 AV | 54.0 | -8.6 | 1.00 H | 250 | 5.96 | 39.44 |
| 5 | 7311.00 | 53.9 PK | 74.0 | -20.1 | 1.00 H | 100 | 7.13 | 46.77 |
| 6 | 7311.00 | 39.7 AV | 54.0 | -14.3 | 1.00 H | 100 | -7.07 | 46.77 |
| 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 | 104.3 PK | | | 1.00 V | 142 | 72.39 | 31.91 |
| 2 | *2437.00 | 95.2 AV | | | 1.00 V | 142 | 63.29 | 31.91 |
| 3 | 4874.00 | 57.3 PK | 74.0 | -16.7 | 1.00 V | 263 | 17.86 | 39.44 |
| 4 | 4874.00 | 44.1 AV | 54.0 | -9.9 | 1.00 V | 263 | 4.66 | 39.44 |
| 5 | 7311.00 | 53.8 PK | 74.0 | -20.2 | 1.00 V | 153 | 7.03 | 46.77 |
| 6 | 7311.00 | 39.4 AV | 54.0 | -14.6 | 1.00 V | 153 | -7.37 | 46.77 |

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

| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|---|---|---|---|
| CHANNEL | Channel 11 | FREQUENCY RANGE | 1 ~ 25GHz |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 16deg. C, 65%RH<br>1015 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 | 106.9 PK | | | 1.00 H | 242 | 74.91 | 31.99 |
| 2 | *2462.00 | 97.5 AV | | | 1.00 H | 242 | 65.51 | 31.99 |
| 3 | 2483.90 | 69.8 PK | 74.0 | -4.2 | 1.00 H | 257 | 37.73 | 32.07 |
| 4 | 2483.90 | 49.5 AV | 54.0 | -4.5 | 1.00 H | 257 | 17.43 | 32.07 |
| 5 | 4924.00 | 58.3 PK | 74.0 | -15.7 | 1.00 H | 257 | 18.69 | 39.61 |
| 6 | 4924.00 | 41.2 AV | 54.0 | -12.8 | 1.00 H | 257 | 1.59 | 39.61 |
| 7 | 7386.00 | 54.1 PK | 74.0 | -19.9 | 1.02 H | 104 | 7.38 | 46.72 |
| 8 | 7386.00 | 37.2 AV | 54.0 | -16.8 | 1.02 H | 104 | -9.52 | 46.72 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2462.00 | 101.3 PK | | | 1.00 V | 174 | 69.31 | 31.99 |
| 2 | *2462.00 | 92.4 AV | | | 1.00 V | 174 | 60.41 | 31.99 |
| 3 | 2483.50 | 57.4 PK | 74.0 | -16.6 | 1.00 V | 123 | 25.33 | 32.07 |
| 4 | 2483.50 | 45.8 AV | 54.0 | -8.2 | 1.00 V | 123 | 13.73 | 32.07 |
| 5 | 4924.00 | 56.4 PK | 74.0 | -17.6 | 1.00 V | 257 | 16.79 | 39.61 |
| 6 | 4924.00 | 42.3 AV | 54.0 | -11.7 | 1.00 V | 257 | 2.69 | 39.61 |
| 7 | 7386.00 | 53.7 PK | 74.0 | -20.3 | 1.00 V | 153 | 6.98 | 46.72 |
| 8 | 7386.00 | 39.2 AV | 54.0 | -14.8 | 1.00 V | 153 | -7.52 | 46.72 |

**REMARKS:** 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

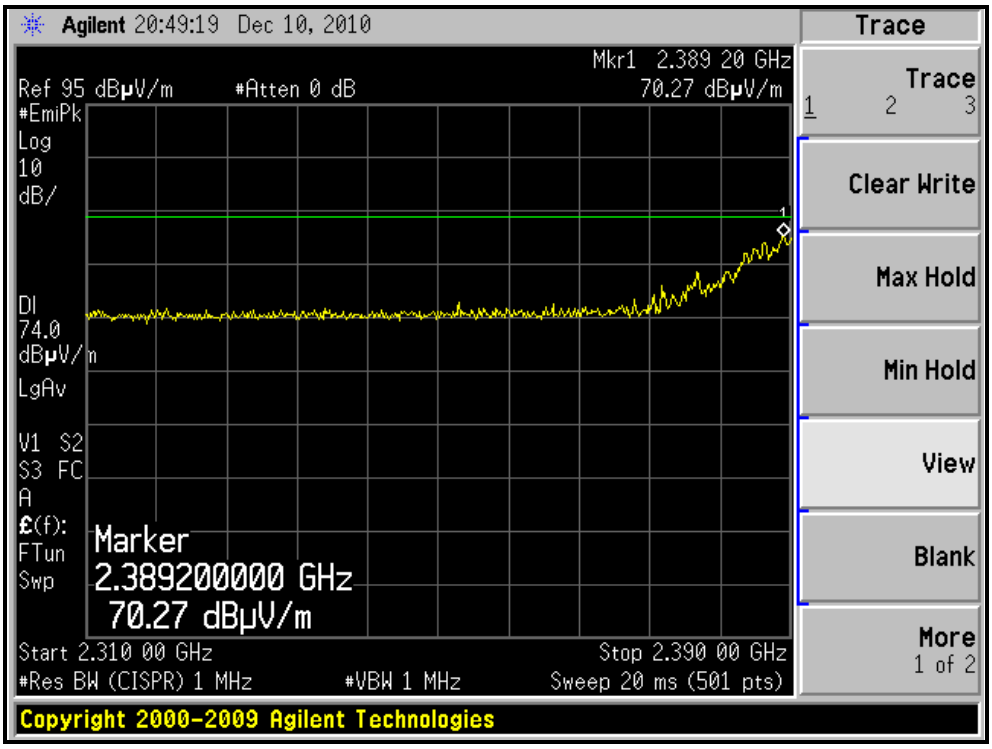
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

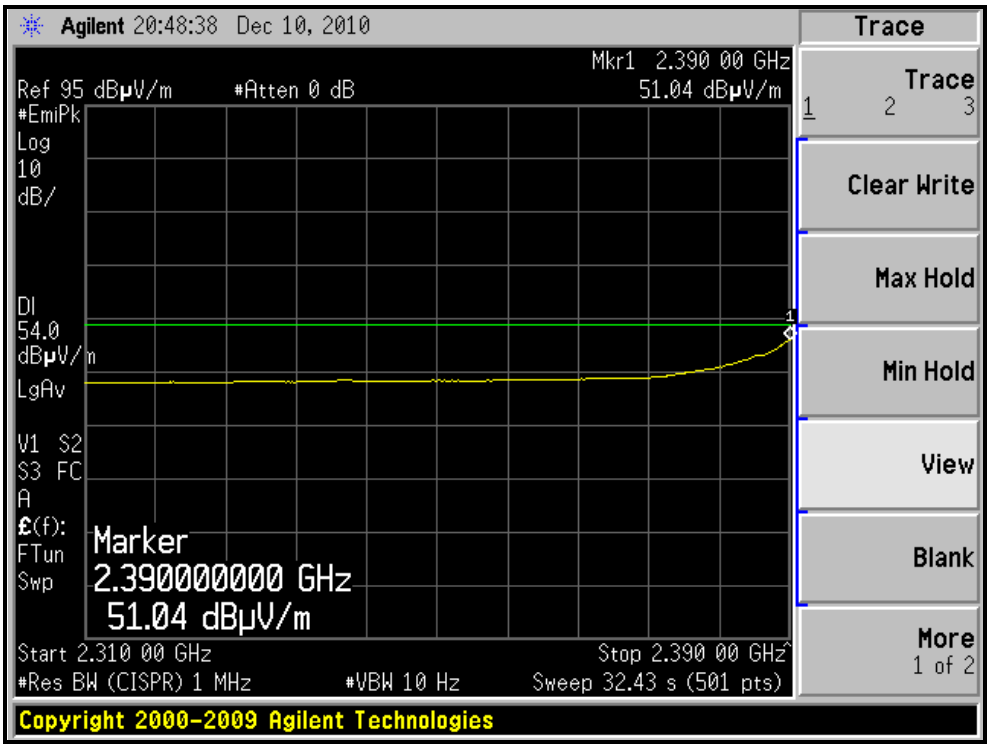
3. The other emission levels were very low against the limit.

4. Margin value = Emission level – Limit value.

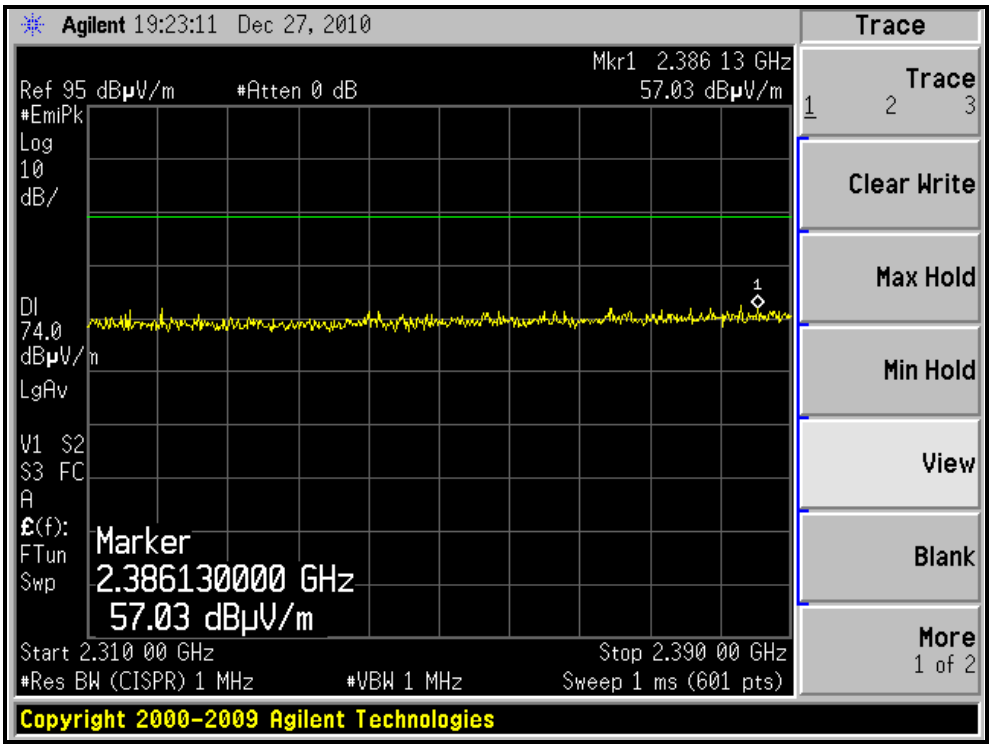
5. " * ": Fundamental frequency.

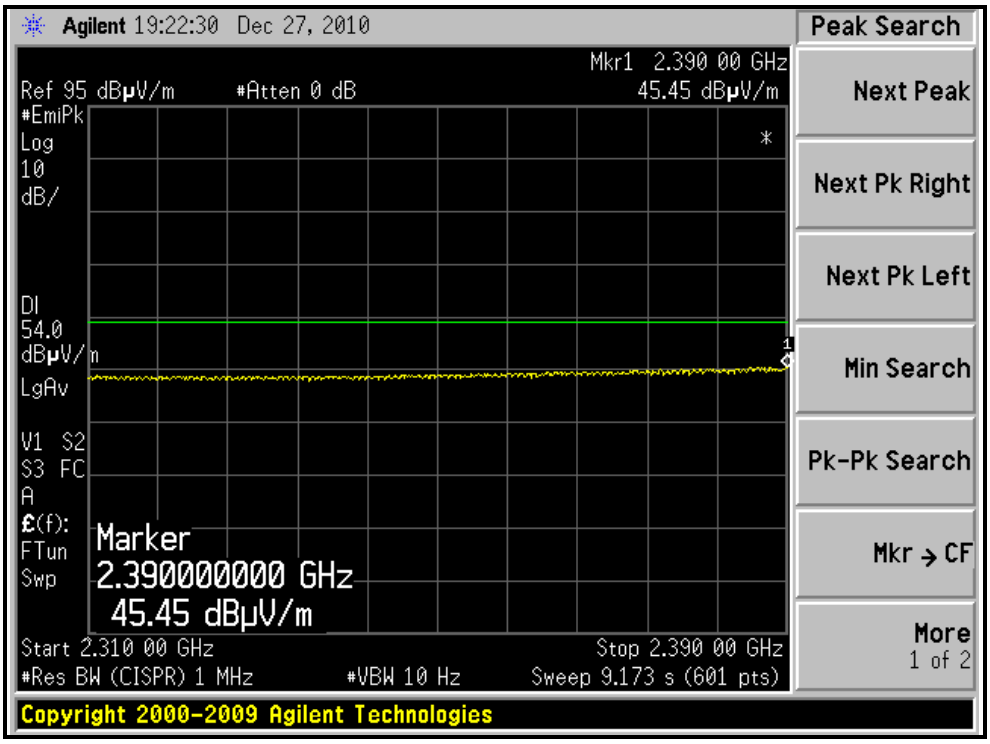
RESTRICTED BANDEDGE (802.11g MODE,CH1, HORIZONTAL )



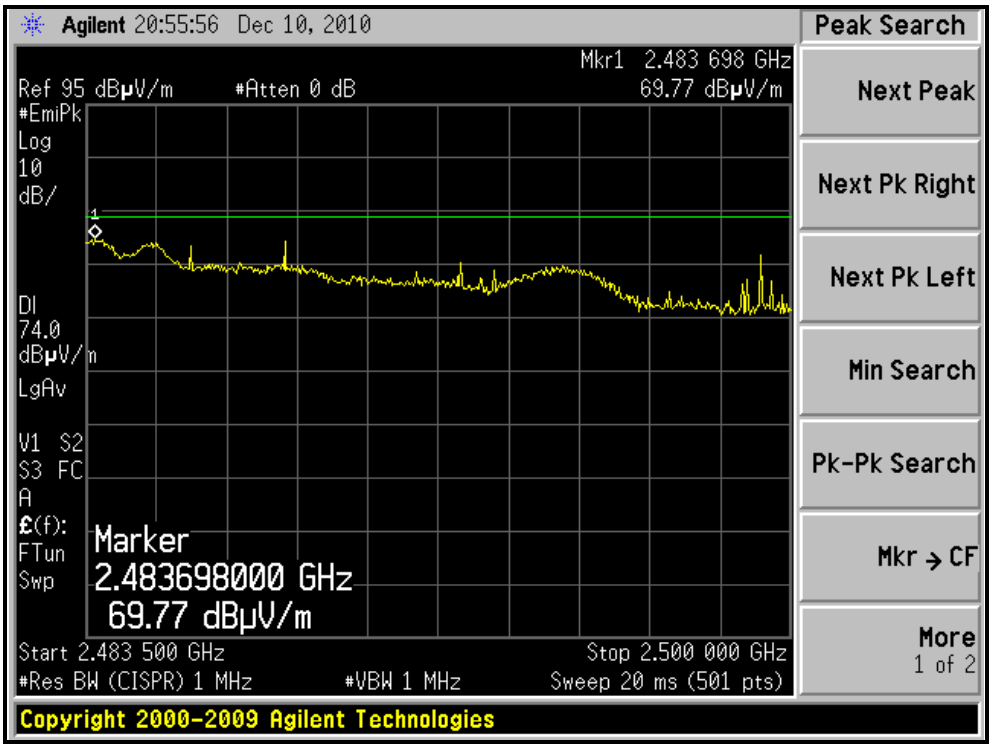



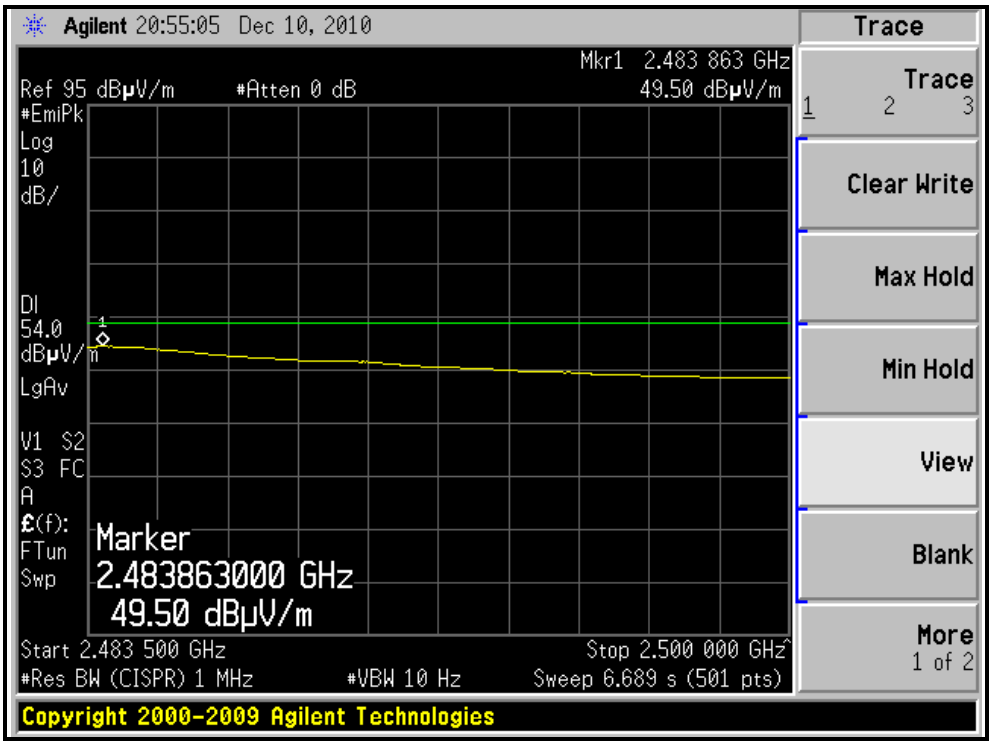
RESTRICTED BANDEDGE (802.11g MODE,CH1, VERTICAL )



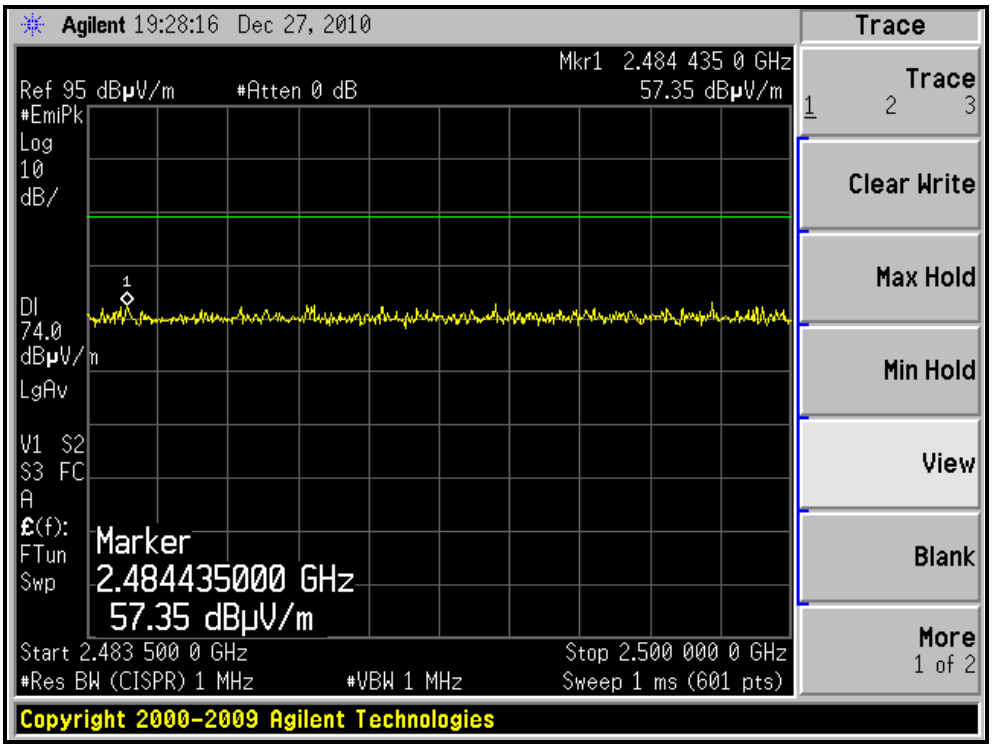



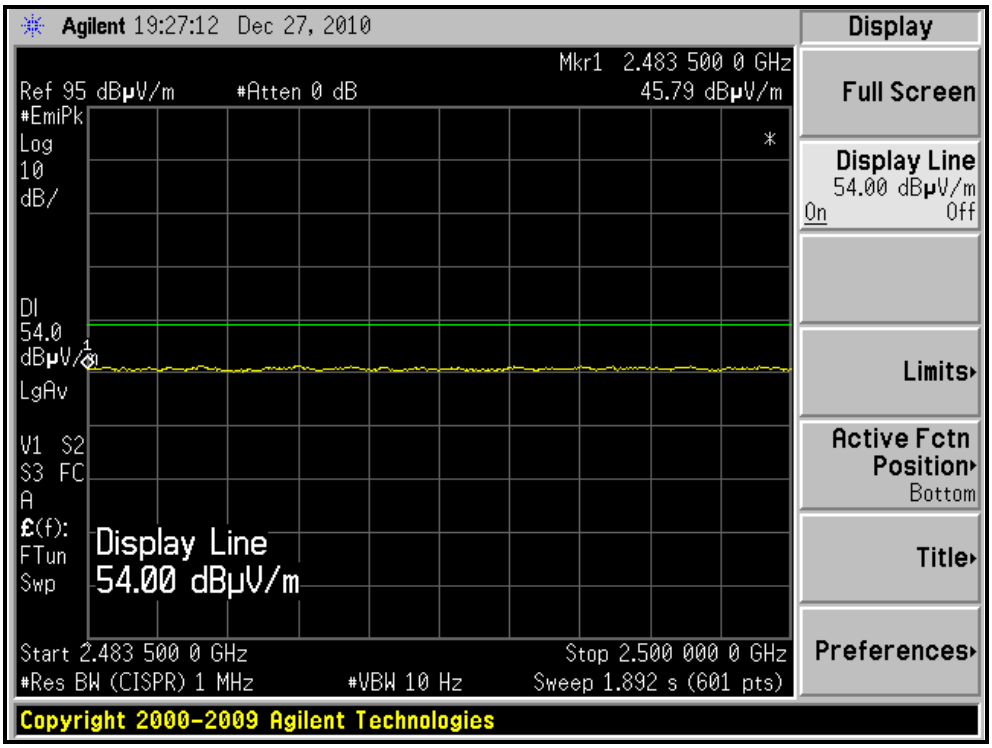
RESTRICTED BANDEDGE (802.11g MODE,CH11, HORIZONTAL )



RESTRICTED BANDEDGE (802.11g MODE,CH11, VERTICAL )



## 802.11n (20MHz) OFDM MODULATION

| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|---|---|---|---|
| CHANNEL | Channel 1 | FREQUENCY RANGE | 1 ~ 25GHz |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 16deg. C, 65%RH<br>1015 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 | 70.6 PK | 74.0 | -3.4 | 1.00 H | 242 | 38.84 | 31.76 |
| 2 | 2390.00 | 53.0 AV | 54.0 | -1.0 | 1.00 H | 242 | 21.24 | 31.76 |
| 3 | *2412.00 | 107.8 PK | | | 1.00 H | 242 | 75.97 | 31.83 |
| 4 | *2412.00 | 98.1 AV | | | 1.00 H | 242 | 66.27 | 31.83 |
| 5 | 4824.00 | 57.1 PK | 74.0 | -16.9 | 1.00 H | 203 | 17.83 | 39.27 |
| 6 | 4824.00 | 40.1 AV | 54.0 | -13.9 | 1.00 H | 203 | 0.83 | 39.27 |
| 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 | 57.4 PK | 74.0 | -16.6 | 1.00 V | 142 | 25.64 | 31.76 |
| 2 | 2390.00 | 45.1 AV | 54.0 | -8.9 | 1.00 V | 142 | 13.34 | 31.76 |
| 3 | *2412.00 | 106.7 PK | | | 1.00 V | 153 | 74.87 | 31.83 |
| 4 | *2412.00 | 92.4 AV | | | 1.00 V | 153 | 60.57 | 31.83 |
| 5 | 4824.00 | 56.2 PK | 74.0 | -17.8 | 1.00 V | 259 | 16.93 | 39.27 |
| 6 | 4824.00 | 41.1 AV | 54.0 | -12.9 | 1.00 V | 259 | 1.83 | 39.27 |

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

| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|---|---|---|---|
| CHANNEL | Channel 6 | FREQUENCY RANGE | 1 ~ 25GHz |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 16deg. C, 65%RH<br>1015 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 | 109.2 PK | | | 1.00 H | 251 | 77.29 | 31.91 |
| 2 | *2437.00 | 101.1 AV | | | 1.00 H | 251 | 69.19 | 31.91 |
| 3 | 4874.00 | 59.2 PK | 74.0 | -14.8 | 1.00 H | 213 | 19.76 | 39.44 |
| 4 | 4874.00 | 44.1 AV | 54.0 | -9.9 | 1.00 H | 213 | 4.66 | 39.44 |
| 5 | 7311.00 | 54.1 PK | 74.0 | -19.9 | 1.44 H | 109 | 7.33 | 46.77 |
| 6 | 7311.00 | 39.1 AV | 54.0 | -14.9 | 1.44 H | 109 | -7.67 | 46.77 |
| 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 | 107.1 PK | | | 1.00 V | 151 | 75.19 | 31.91 |
| 2 | *2437.00 | 94.1 AV | | | 1.00 V | 151 | 62.19 | 31.91 |
| 3 | 4874.00 | 57.8 PK | 74.0 | -16.2 | 1.00 V | 253 | 18.36 | 39.44 |
| 4 | 4874.00 | 43.4 AV | 54.0 | -10.6 | 1.00 V | 253 | 3.96 | 39.44 |
| 5 | 7311.00 | 53.8 PK | 74.0 | -20.2 | 1.00 V | 149 | 7.03 | 46.77 |
| 6 | 7311.00 | 39.3 AV | 54.0 | -14.7 | 1.00 V | 149 | -7.47 | 46.77 |

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

| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|---|---|---|---|
| CHANNEL | Channel 11 | FREQUENCY RANGE | 1 ~ 25GHz |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 16deg. C, 65%RH<br>1015 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 | 107.6 PK | | | 1.00 H | 242 | 75.61 | 31.99 |
| 2 | *2462.00 | 97.2 AV | | | 1.00 H | 242 | 65.21 | 31.99 |
| 3 | 2483.50 | 72.8 PK | 74.0 | -1.2 | 1.00 H | 242 | 40.73 | 32.07 |
| 4 | 2483.50 | 49.0 AV | 54.0 | -5.0 | 1.00 H | 242 | 16.93 | 32.07 |
| 5 | 4924.00 | 57.2 PK | 74.0 | -16.8 | 1.00 H | 242 | 17.59 | 39.61 |
| 6 | 4924.00 | 40.3 AV | 54.0 | -13.7 | 1.00 H | 242 | 0.69 | 39.61 |
| 7 | 7386.00 | 54.2 PK | 74.0 | -19.8 | 1.07 H | 103 | 7.48 | 46.72 |
| 8 | 7386.00 | 39.4 AV | 54.0 | -14.6 | 1.07 H | 103 | -7.32 | 46.72 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2462.00 | 106.4 PK | | | 1.00 V | 154 | 74.41 | 31.99 |
| 2 | *2462.00 | 92.1 AV | | | 1.00 V | 154 | 60.11 | 31.99 |
| 3 | 2483.50 | 56.8 PK | 74.0 | -17.2 | 1.00 V | 159 | 24.73 | 32.07 |
| 4 | 2483.50 | 45.0 AV | 54.0 | -9.0 | 1.00 V | 159 | 12.93 | 32.07 |
| 5 | 4924.00 | 56.3 PK | 74.0 | -17.7 | 1.00 V | 243 | 16.69 | 39.61 |
| 6 | 4924.00 | 41.9 AV | 54.0 | -12.1 | 1.00 V | 243 | 2.29 | 39.61 |
| 7 | 7386.00 | 53.6 PK | 74.0 | -20.4 | 1.00 V | 151 | 6.88 | 46.72 |
| 8 | 7386.00 | 39.4 AV | 54.0 | -14.6 | 1.00 V | 151 | -7.32 | 46.72 |

**REMARKS:** 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

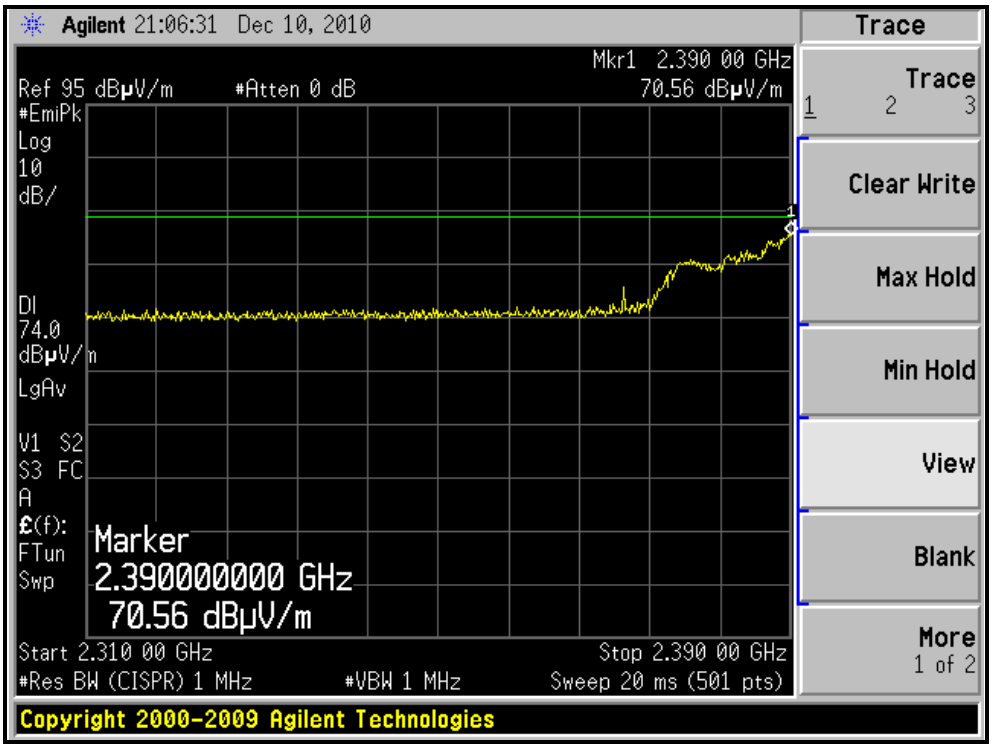
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

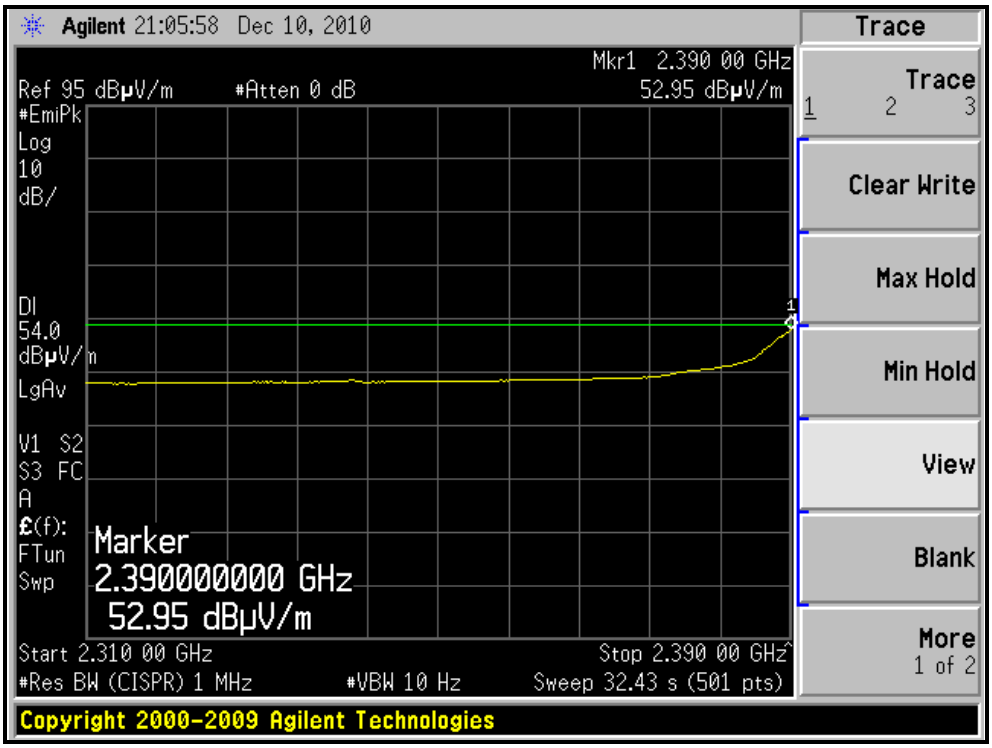
3. The other emission levels were very low against the limit.

4. Margin value = Emission level – Limit value.

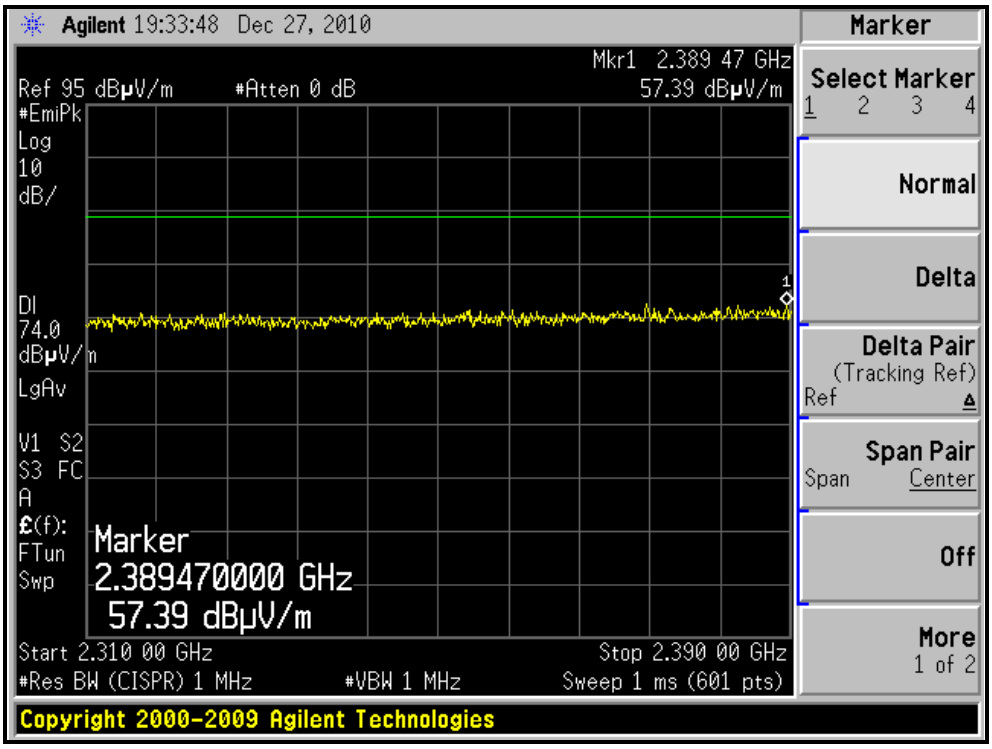
5. " * ": Fundamental frequency.

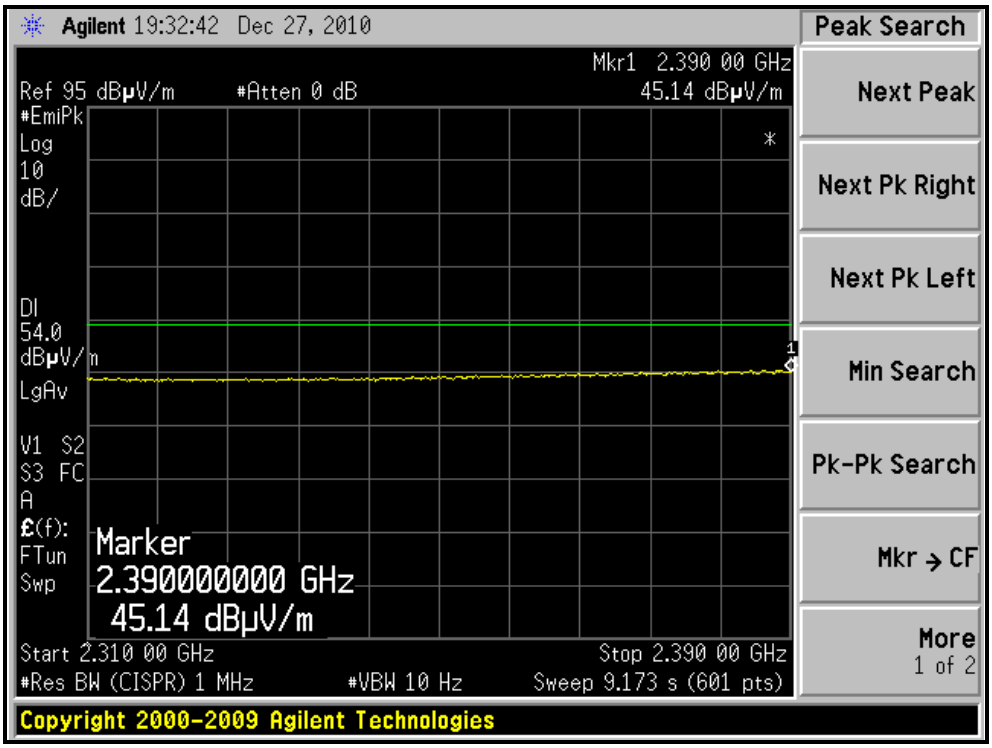
RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH1, HORIZONTAL )



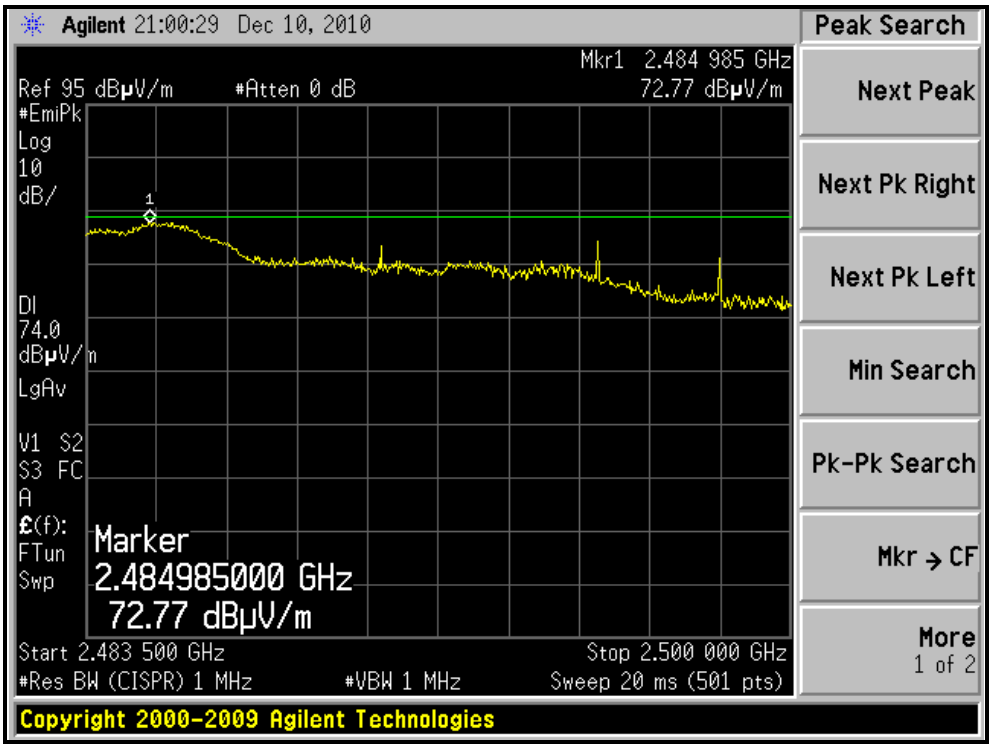



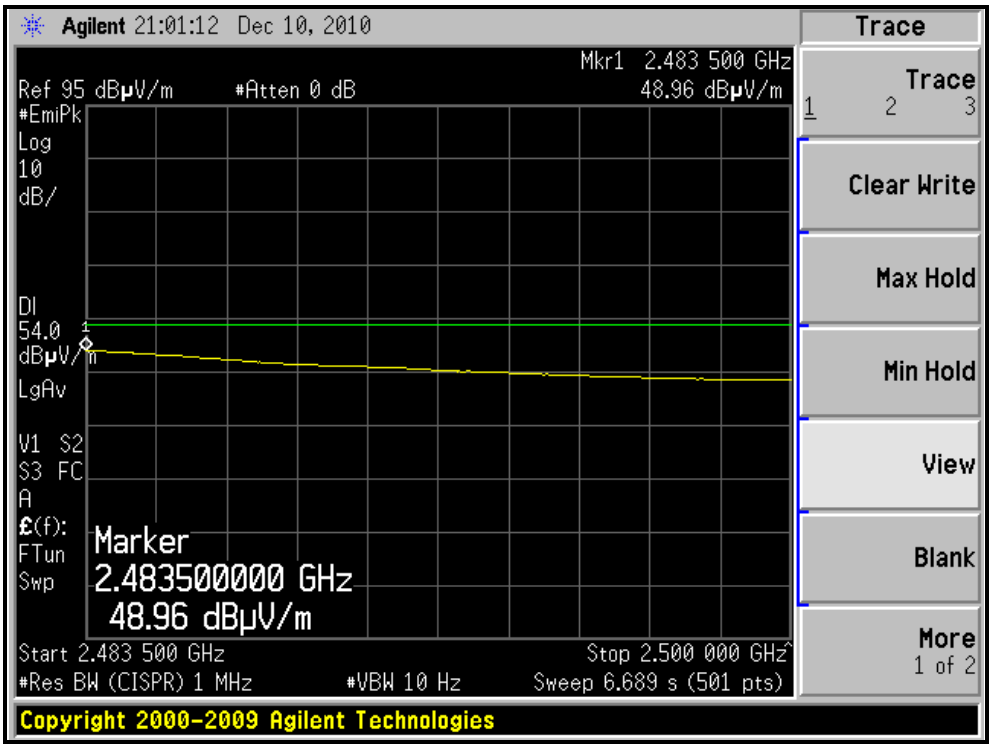
RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH1, VERTICAL )



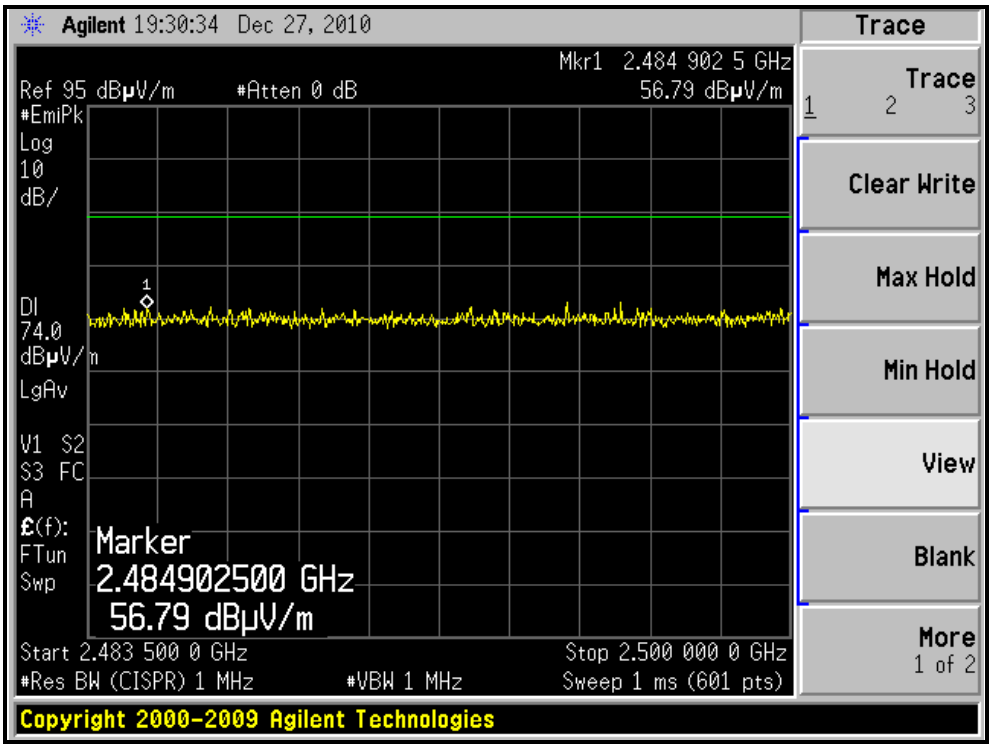



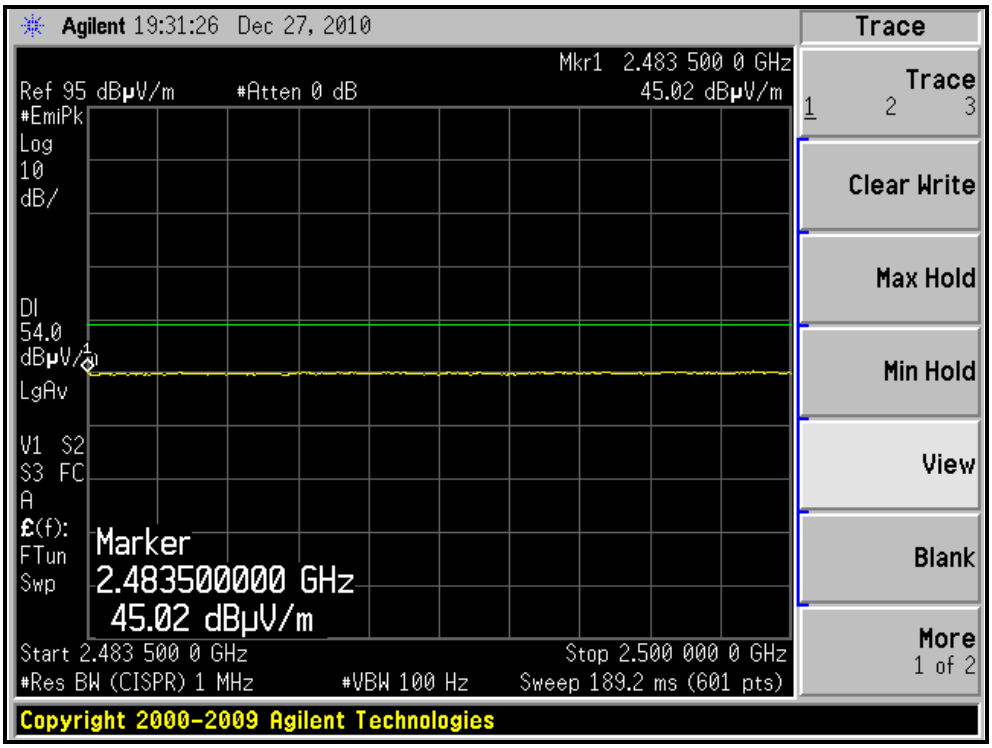
RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH11, HORIZONTAL )



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



## 802.11n (40MHz) OFDM MODULATION

| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|---|---|---|---|
| CHANNEL | Channel 1 | FREQUENCY RANGE | 1 ~ 25GHz |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 16deg. C, 65%RH<br>1015 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 | 67.6 PK | 74.0 | -6.4 | 1.06 H | 242 | 35.84 | 31.76 |
| 2 | 2390.00 | 52.1 AV | 54.0 | -1.9 | 1.06 H | 242 | 20.34 | 31.76 |
| 3 | *2422.00 | 101.9 PK | | | 1.00 H | 242 | 70.04 | 31.86 |
| 4 | *2422.00 | 91.9 AV | | | 1.00 H | 242 | 60.04 | 31.86 |
| 5 | 4844.00 | 57.2 PK | 74.0 | -16.8 | 1.00 H | 243 | 17.86 | 39.34 |
| 6 | 4844.00 | 39.6 AV | 54.0 | -14.4 | 1.00 H | 243 | 0.26 | 39.34 |
| 7 | 7266.00 | 54.1 PK | 74.0 | -19.9 | 1.02 H | 241 | 7.29 | 46.81 |
| 8 | 7266.00 | 39.2 AV | 54.0 | -14.8 | 1.02 H | 241 | -7.61 | 46.81 |
| 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 | 61.2 PK | 74.0 | -12.8 | 1.00 V | 157 | 29.44 | 31.76 |
| 2 | 2390.00 | 48.8 AV | 54.0 | -5.2 | 1.00 V | 157 | 17.04 | 31.76 |
| 3 | *2422.00 | 95.3 PK | | | 1.00 V | 237 | 63.44 | 31.86 |
| 4 | *2422.00 | 86.2 AV | | | 1.00 V | 237 | 54.34 | 31.86 |
| 5 | 4844.00 | 54.3 PK | 74.0 | -19.7 | 1.00 V | 157 | 14.96 | 39.34 |
| 6 | 4844.00 | 40.1 AV | 54.0 | -13.9 | 1.00 V | 157 | 0.76 | 39.34 |
| 7 | 7266.00 | 54.1 PK | 74.0 | -19.9 | 1.00 V | 159 | 7.29 | 46.81 |
| 8 | 7266.00 | 39.4 AV | 54.0 | -14.6 | 1.00 V | 159 | -7.41 | 46.81 |

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

| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|---|---|---|---|
| CHANNEL | Channel 4 | FREQUENCY RANGE | 1 ~ 25GHz |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 16deg. C, 65%RH<br>1015 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 | 65.9 PK | 74.0 | -8.1 | 1.06 H | 244 | 34.14 | 31.76 |
| 2 | 2390.00 | 51.3 AV | 54.0 | -2.7 | 1.06 H | 244 | 19.54 | 31.76 |
| 3 | *2437.00 | 104.9 PK | | | 1.00 H | 243 | 72.99 | 31.91 |
| 4 | *2437.00 | 94.7 AV | | | 1.00 H | 243 | 62.79 | 31.91 |
| 5 | 4874.00 | 57.8 PK | 74.0 | -16.2 | 1.00 H | 253 | 18.36 | 39.44 |
| 6 | 4874.00 | 41.0 AV | 54.0 | -13.0 | 1.00 H | 253 | 1.56 | 39.44 |
| 7 | 7311.00 | 54.2 PK | 74.0 | -19.8 | 1.00 H | 101 | 7.43 | 46.77 |
| 8 | 7311.00 | 39.4 AV | 54.0 | -14.6 | 1.00 H | 101 | -7.37 | 46.77 |
| 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 | 99.3 PK | | | 1.00 V | 241 | 67.39 | 31.91 |
| 2 | *2437.00 | 90.4 AV | | | 1.00 V | 241 | 58.49 | 31.91 |
| 3 | 4874.00 | 56.8 PK | 74.0 | -17.2 | 1.00 V | 154 | 17.36 | 39.44 |
| 4 | 4874.00 | 40.7 AV | 54.0 | -13.3 | 1.00 V | 154 | 1.26 | 39.44 |
| 5 | 7311.00 | 54.3 PK | 74.0 | -19.7 | 1.00 V | 157 | 7.53 | 46.77 |
| 6 | 7311.00 | 39.1 AV | 54.0 | -14.9 | 1.00 V | 157 | -7.67 | 46.77 |

**REMARKS:** 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

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

| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|---|---|---|---|
| CHANNEL | Channel 7 | FREQUENCY RANGE | 1 ~ 25GHz |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 16deg. C, 65%RH<br>1015 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 | 104.1 PK | | | 1.01 H | 244 | 72.14 | 31.96 |
| 2 | *2452.00 | 94.5 AV | | | 1.01 H | 244 | 62.54 | 31.96 |
| 3 | 2483.50 | 72.2 PK | 74.0 | -1.8 | 1.01 H | 244 | 40.13 | 32.07 |
| **4** | **2483.50** | **53.5 AV** | **54.0** | **-0.5** | **1.01 H** | **244** | **21.43** | **32.07** |
| 5 | 4904.00 | 54.7 PK | 74.0 | -19.3 | 1.04 H | 121 | 15.16 | 39.54 |
| 6 | 4904.00 | 39.1 AV | 54.0 | -14.9 | 1.04 H | 121 | -0.44 | 39.54 |
| 7 | 7356.00 | 54.2 PK | 74.0 | -19.8 | 1.04 H | 323 | 7.46 | 46.74 |
| 8 | 7356.00 | 39.1 AV | 54.0 | -14.9 | 1.04 H | 323 | -7.64 | 46.74 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2452.00 | 100.3 PK | | | 1.00 V | 213 | 68.34 | 31.96 |
| 2 | *2452.00 | 89.2 AV | | | 1.00 V | 213 | 57.24 | 31.96 |
| 3 | 2483.50 | 67.6 PK | 74.0 | -6.4 | 1.00 V | 219 | 35.53 | 32.07 |
| 4 | 2483.50 | 52.2 AV | 54.0 | -1.8 | 1.00 V | 219 | 20.16 | 32.07 |
| 5 | 4904.00 | 54.3 PK | 74.0 | -19.7 | 1.00 V | 151 | 14.76 | 39.54 |
| 6 | 4904.00 | 38.4 AV | 54.0 | -15.6 | 1.00 V | 151 | -1.14 | 39.54 |
| 7 | 7356.00 | 54.7 PK | 74.0 | -19.3 | 1.00 V | 162 | 7.96 | 46.74 |
| 8 | 7356.00 | 39.4 AV | 54.0 | -14.6 | 1.00 V | 162 | -7.34 | 46.74 |

**REMARKS:** 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

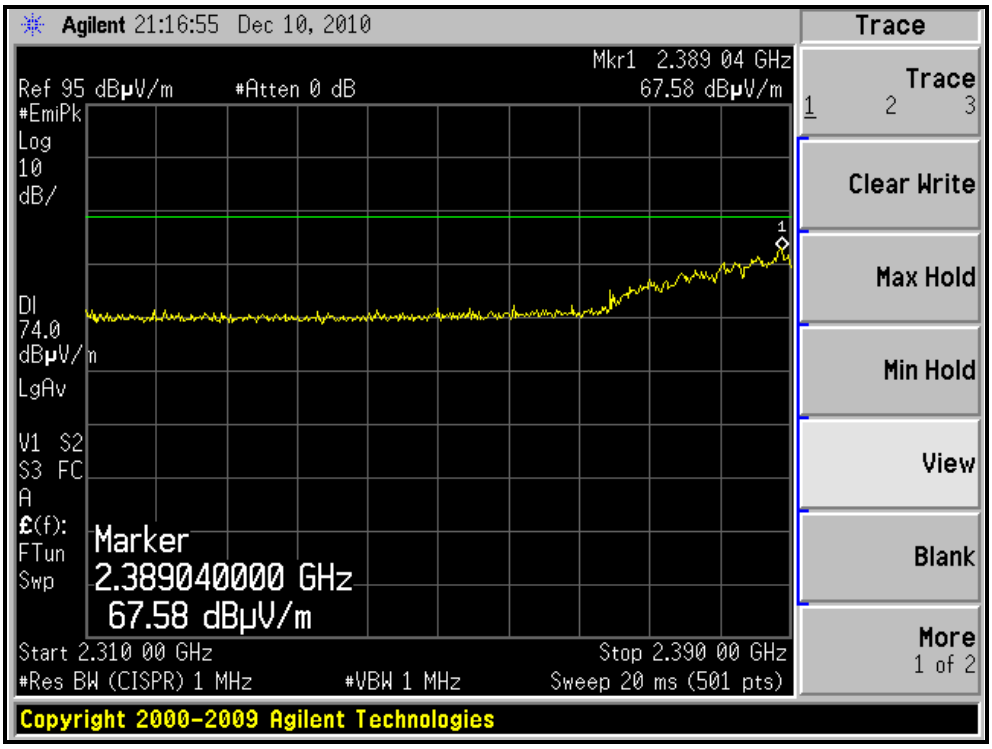
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

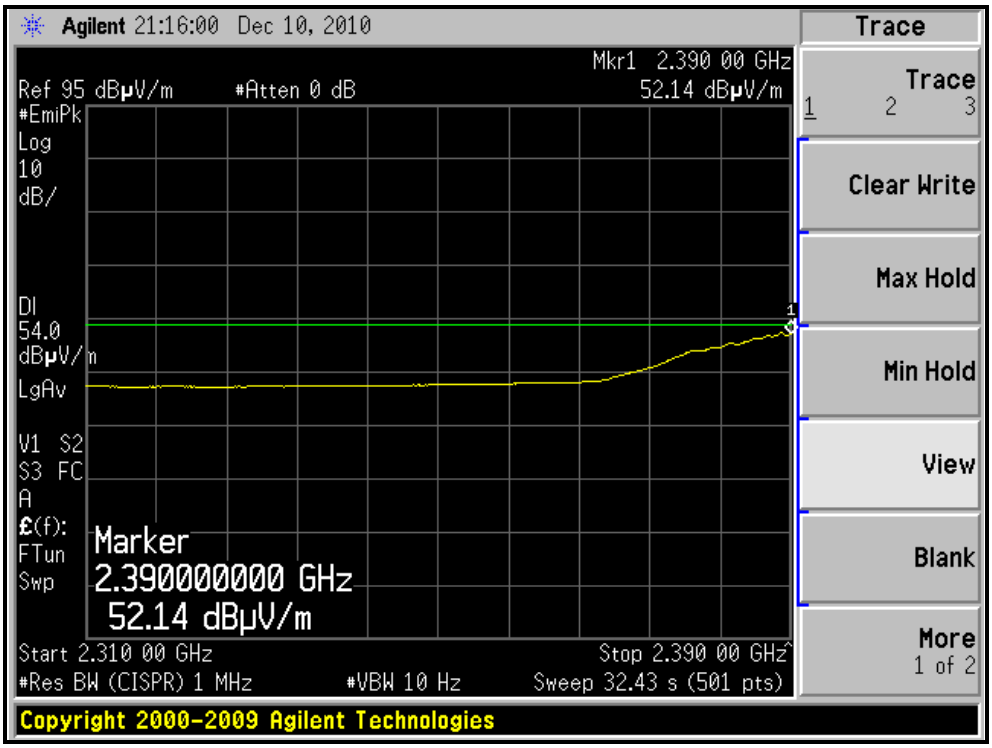
3. The other emission levels were very low against the limit.

4. Margin value = Emission level – Limit value.

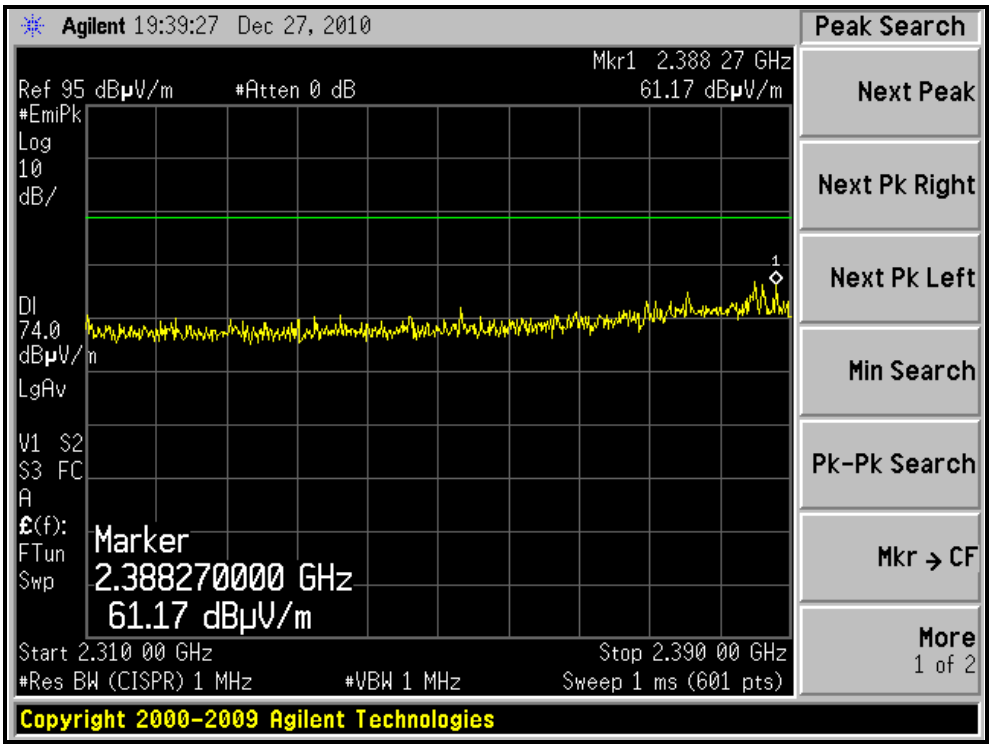
5. " * ": Fundamental frequency.

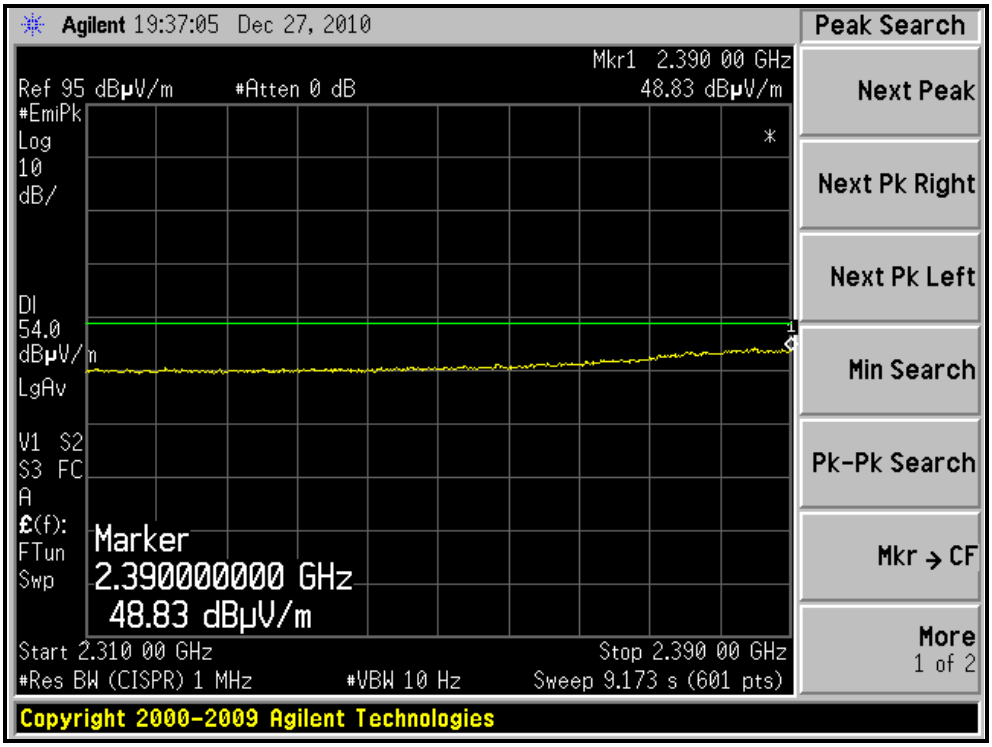
RESTRICTED BANDEDGE (802.11n (40MHz) MODE,CH1, HORIZONTAL )



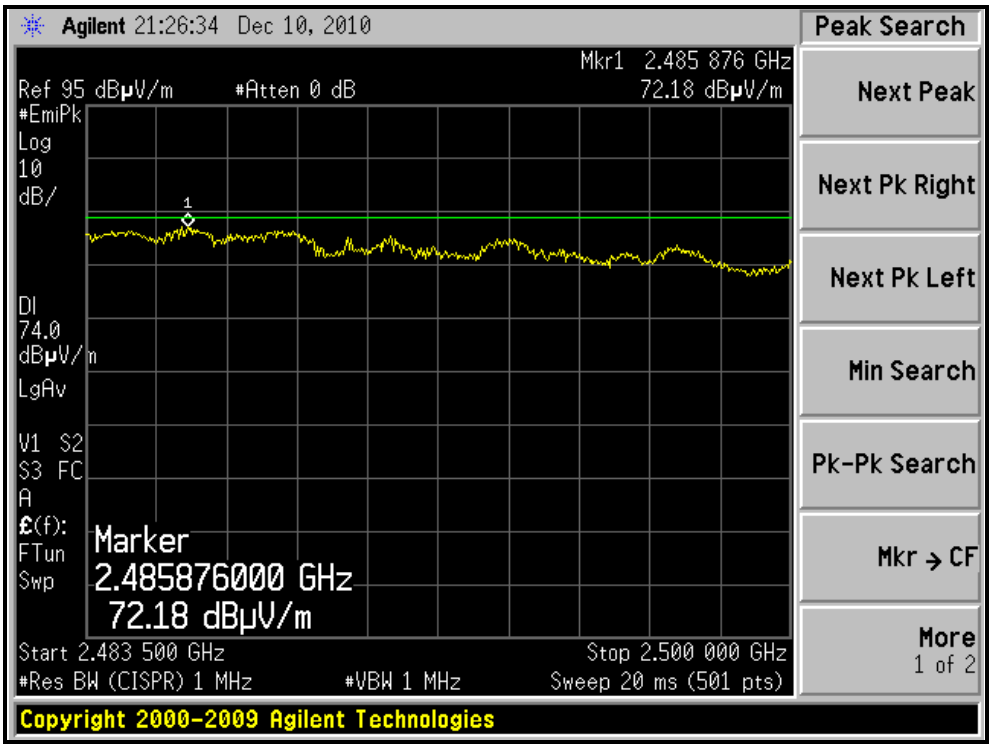



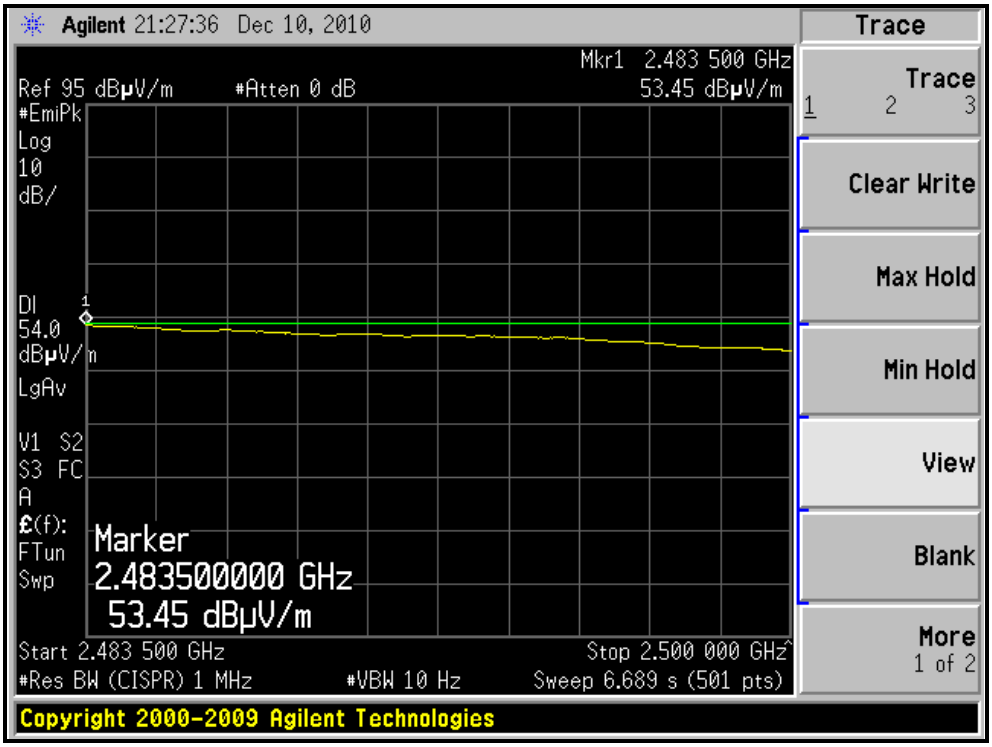
RESTRICTED BANDEDGE (802.11n (40MHz) MODE,CH1, VERTICAL )



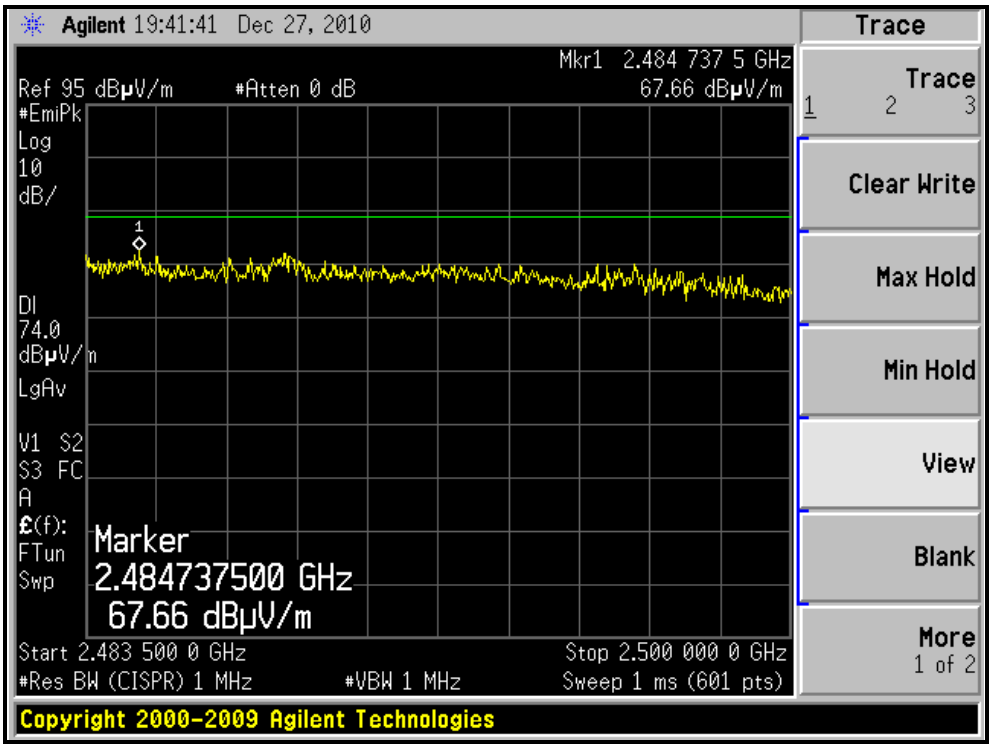



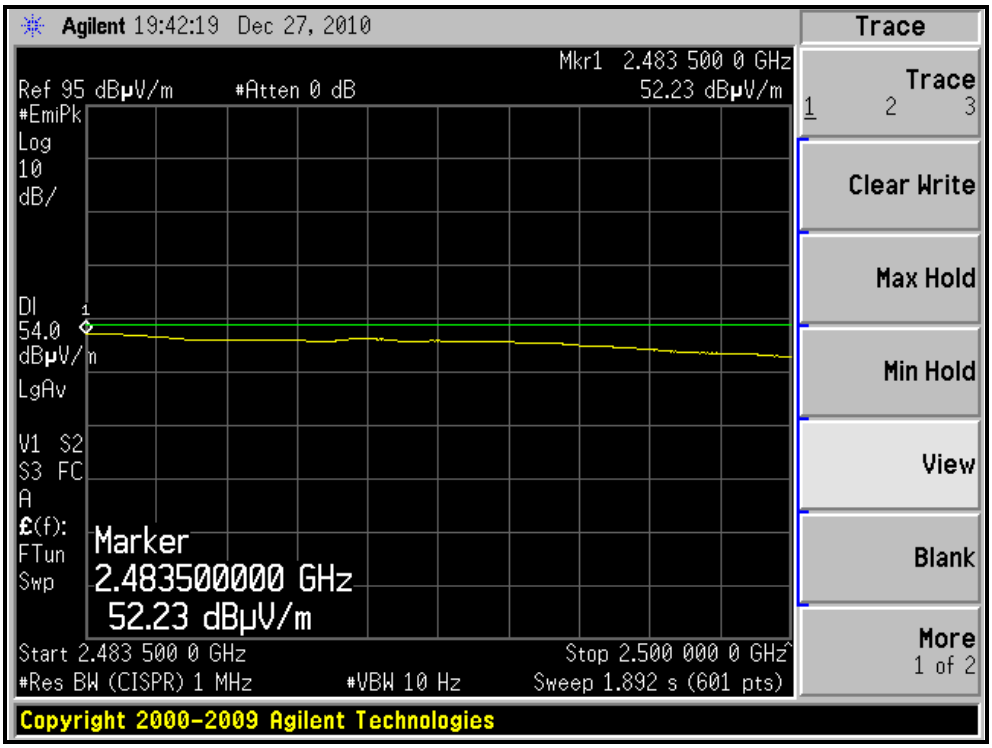
RESTRICTED BANDEDGE (802.11n (40MHz) MODE,CH7, HORIZONTAL )



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 | E4446A | MY48250253 | Aug. 02, 2010 | Aug. 01, 2011 |

**NOTE:**

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

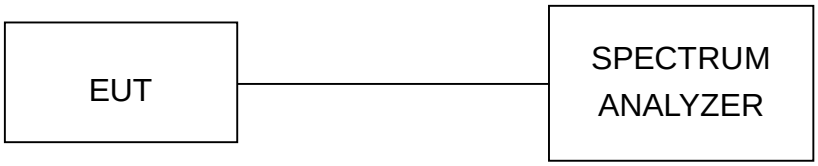
### 4.3.3 TEST PROCEDURE

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

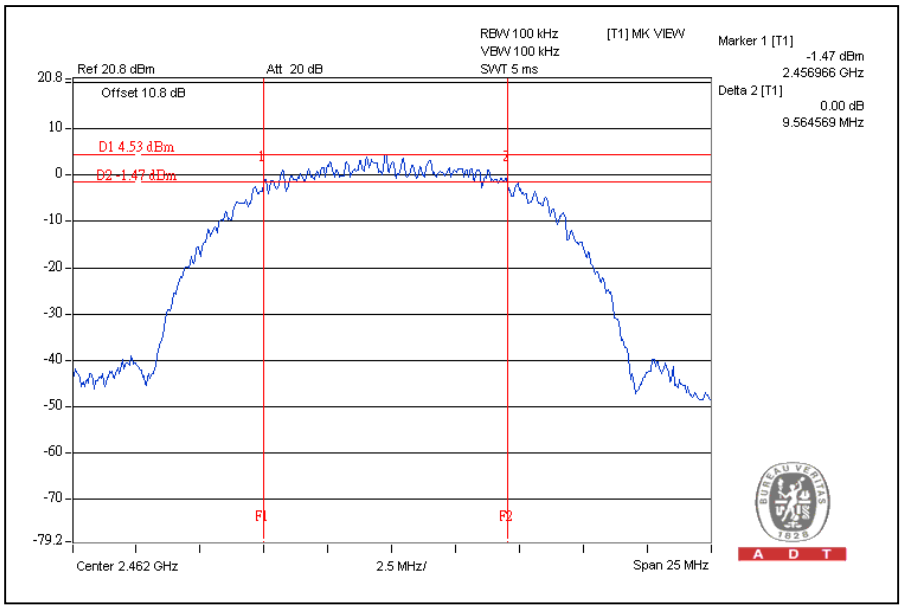
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

## 4.3.7 TEST RESULTS

### 802.11b DSSS MODULATION:

| CHANNEL | CHANNEL FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---|---|---|---|---|
| 1 | 2412 | 9.56 | 0.5 | PASS |
| 6 | 2437 | 9.53 | 0.5 | PASS |
| 11 | 2462 | 9.56 | 0.5 | PASS |

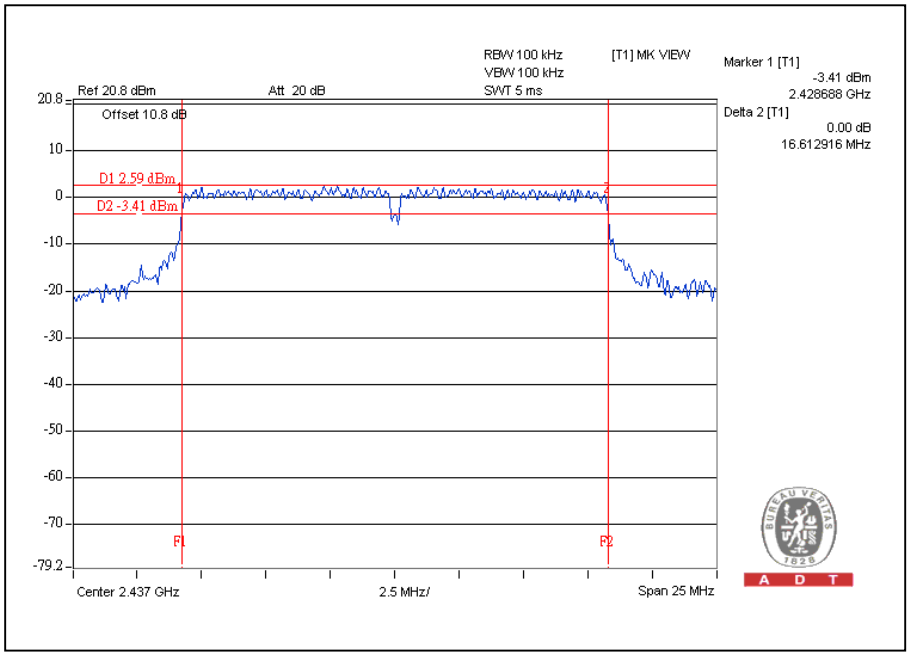
CH11



## 802.11g OFDM MODULATION:

| CHANNEL | CHANNEL FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---|---|---|---|---|
| 1 | 2412 | 16.60 | 0.5 | PASS |
| 6 | 2437 | 16.61 | 0.5 | PASS |
| 11 | 2462 | 16.60 | 0.5 | PASS |

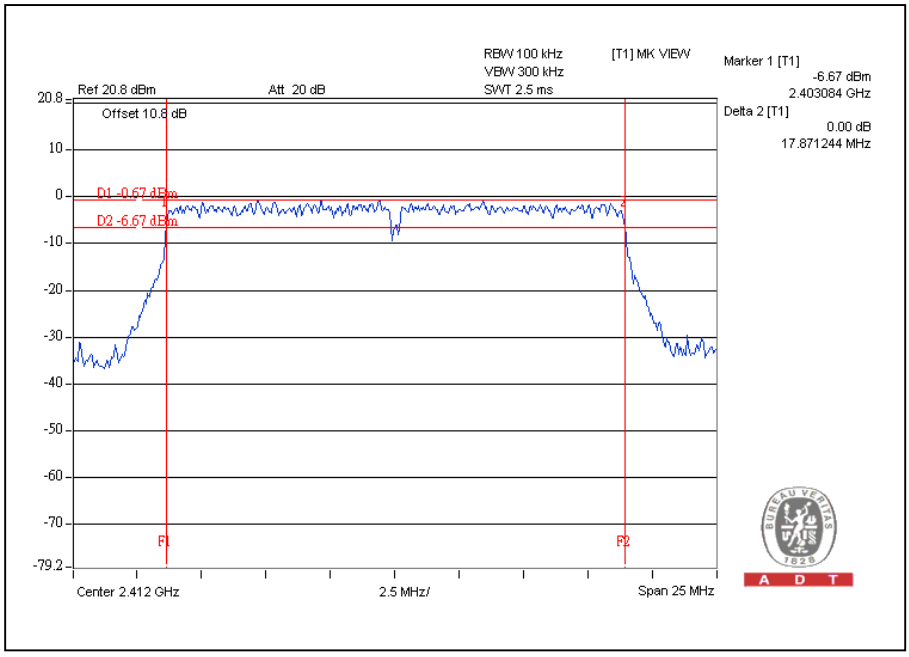
CH6



## 802.11n (20MHz) OFDM MODULATION:

| CHANNEL | CHANNEL FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---|---|---|---|---|
| 1 | 2412 | 17.87 | 0.5 | PASS |
| 6 | 2437 | 17.86 | 0.5 | PASS |
| 11 | 2462 | 17.78 | 0.5 | PASS |

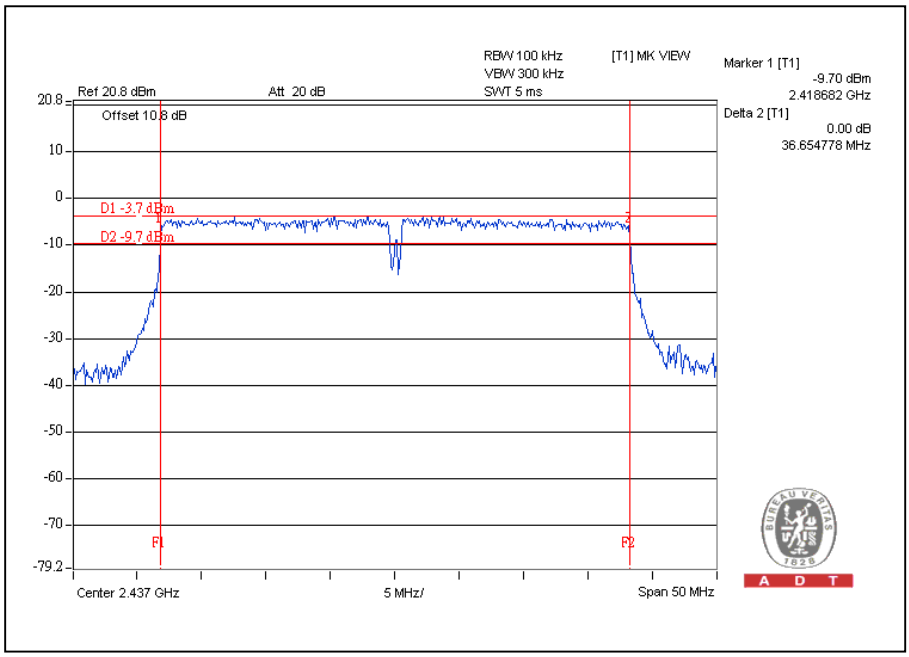
CH1



## 802.11n (40MHz) OFDM MODULATION:

| CHANNEL | CHANNEL FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---|---|---|---|---|
| 1 | 2422 | 36.62 | 0.5 | PASS |
| 4 | 2437 | 36.65 | 0.5 | PASS |
| 7 | 2452 | 36.64 | 0.5 | PASS |

CH4



## 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 |
|---|---|---|---|---|
| Anritsu Power Meter | ML2495A | 0824006 | May 04, 2010 | May 03, 2011 |
| Pulse 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.

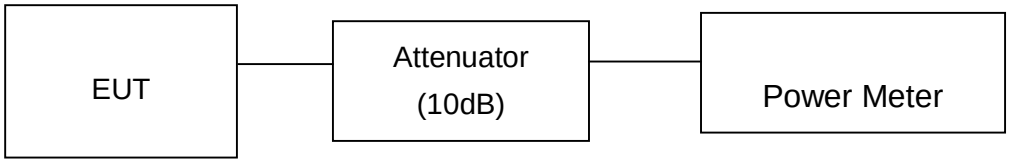
### 4.4.3 TEST PROCEDURES

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

## 4.4.7 TEST RESULTS

### 802.11b DSSS MODULATION:

| CHANNEL | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (mW) | PEAK POWER OUTPUT (dBm) | PEAK POWER LIMIT (dBm) | PASS / FAIL |
|---|---|---|---|---|---|
| 1 | 2412 | 63.1 | 18.0 | 30 | PASS |
| 6 | 2437 | 64.6 | 18.1 | 30 | PASS |
| 11 | 2462 | 63.1 | 18.0 | 30 | PASS |

### 802.11g OFDM MODULATION:

| CHANNEL | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (mW) | PEAK POWER OUTPUT (dBm) | PEAK POWER LIMIT (dBm) | PASS / FAIL |
|---|---|---|---|---|---|
| 1 | 2412 | 128.8 | 21.1 | 30 | PASS |
| 6 | 2437 | 169.8 | 22.3 | 30 | PASS |
| 11 | 2462 | 147.9 | 21.7 | 30 | PASS |

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

| CHANNEL | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (mW) | PEAK POWER OUTPUT (dBm) | PEAK POWER LIMIT (dBm) | PASS / FAIL |
|---|---|---|---|---|---|
| 1 | 2412 | 120.2 | 20.8 | 30 | PASS |
| 6 | 2437 | 166.0 | 22.2 | 30 | PASS |
| 11 | 2462 | 134.9 | 21.3 | 30 | PASS |

## 802.11n (40MHz) OFDM MODULATION:

| CHANNEL | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (mW) | PEAK POWER OUTPUT (dBm) | PEAK POWER LIMIT (dBm) | PASS / FAIL |
|---|---|---|---|---|---|
| 1 | 2422 | 70.8 | 18.5 | 30 | PASS |
| 4 | 2437 | 112.2 | 20.5 | 30 | PASS |
| 7 | 2452 | 128.8 | 21.1 | 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 | E4446A | MY48250253 | Aug. 02, 2010 | Aug. 01, 2011 |

**NOTE:**

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

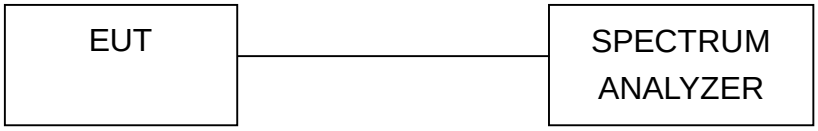
### 4.5.3 TEST PROCEDURE

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

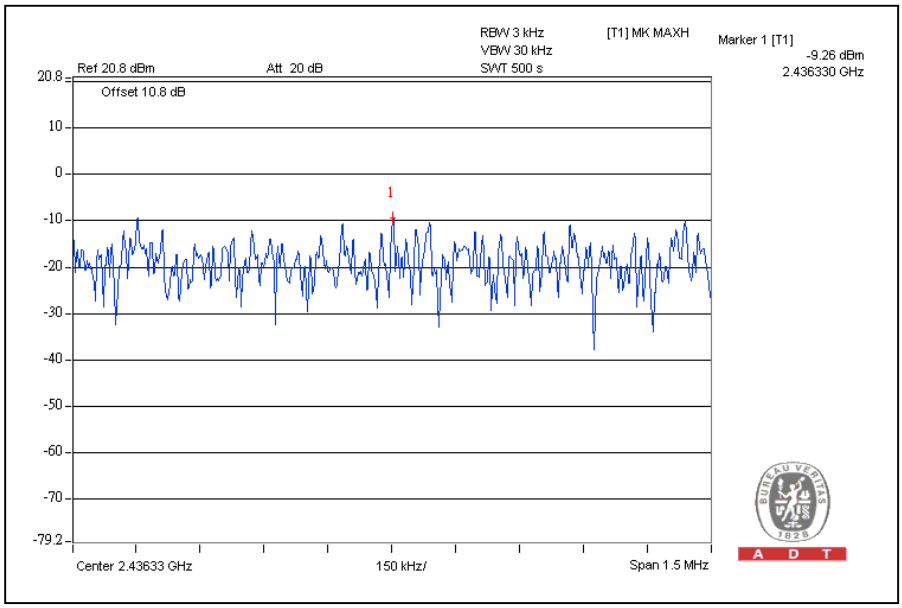
Same as Item 4.3.6

## 4.5.7 TEST RESULTS

### 802.11b DSSS MODULATION:

| CHANNEL | CHANNEL FREQUENCY (MHz ) | RF POWER LEVEL IN 3kHz BW (dBm) | MAXIMUM LIMIT (dBm) | PASS / FAIL |
|---|---|---|---|---|
| 1 | 2412 | -9.5 | 8 | PASS |
| 6 | 2437 | -9.3 | 8 | PASS |
| 11 | 2462 | -9.3 | 8 | PASS |

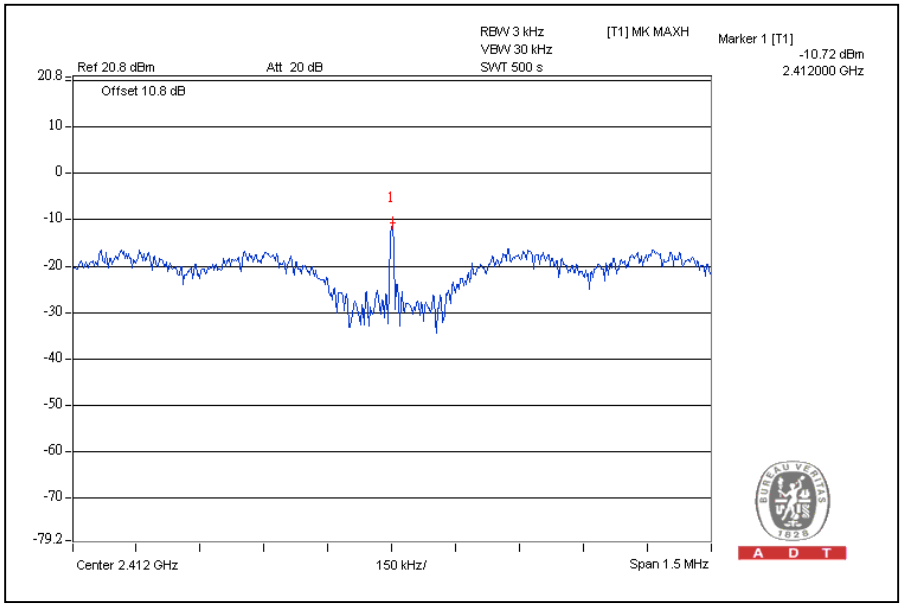
CH6



## 802.11g OFDM MODULATION:

| CHANNEL | CHANNEL FREQUENCY (MHz ) | RF POWER LEVEL IN 3kHz BW (dBm) | MAXIMUM LIMIT (dBm) | PASS / FAIL |
|---|---|---|---|---|
| 1 | 2412 | -10.7 | 8 | PASS |
| 6 | 2437 | -10.9 | 8 | PASS |
| 11 | 2462 | -11.6 | 8 | PASS |

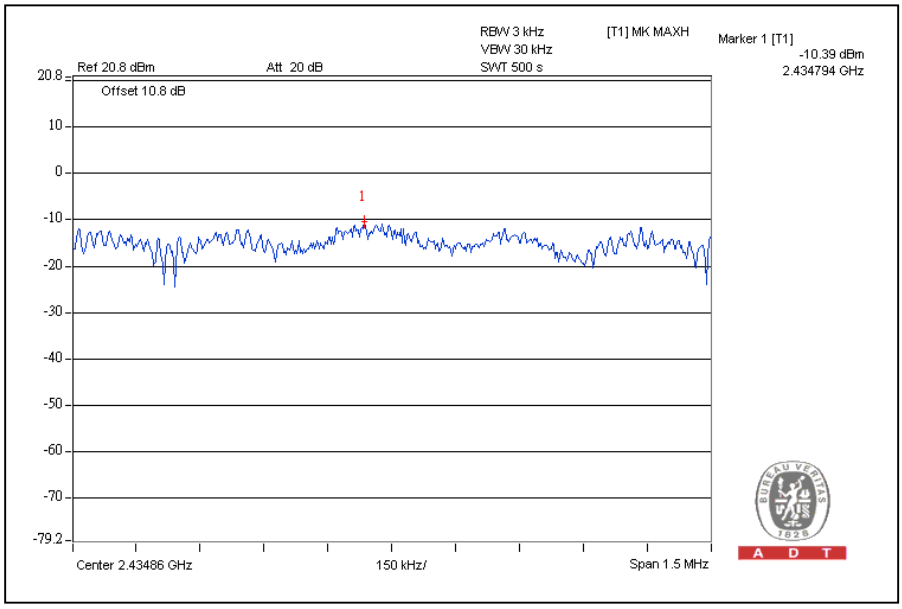
CH1



## 802.11n (20MHz) OFDM MODULATION:

| CHANNEL | CHANNEL FREQUENCY (MHz ) | RF POWER LEVEL IN 3kHz BW (dBm) | MAXIMUM LIMIT (dBm) | PASS / FAIL |
|---|---|---|---|---|
| 1 | 2412 | -10.5 | 8 | PASS |
| 6 | 2437 | -10.4 | 8 | PASS |
| 11 | 2462 | -11.9 | 8 | PASS |

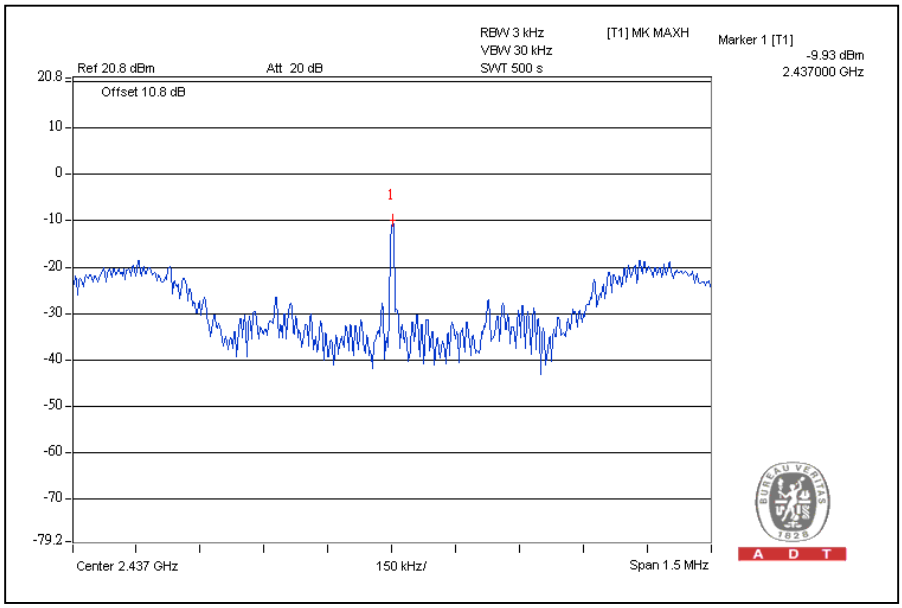
CH6



## 802.11n (40MHz) OFDM MODULATION:

| CHANNEL | CHANNEL FREQUENCY (MHz ) | RF POWER LEVEL IN 3kHz BW (dBm) | MAXIMUM LIMIT (dBm) | PASS / FAIL |
|---|---|---|---|---|
| 1 | 2422 | -16.3 | 8 | PASS |
| 4 | 2437 | -9.9 | 8 | PASS |
| 7 | 2452 | -11.2 | 8 | PASS |

CH4



## 4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

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

### 4.6.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| R&S SPECTRUM ANALYZER | E4446A | MY48250253 | Aug. 02, 2010 | Aug. 01, 2011 |

**NOTE:**

1. 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 lose 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

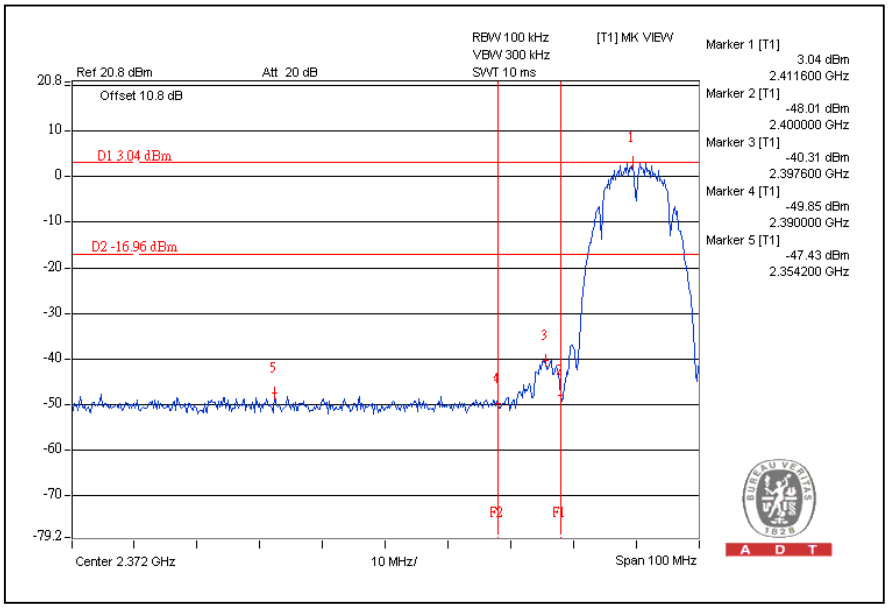
Same as Item 4.3.6

### 4.6.6 TEST RESULTS

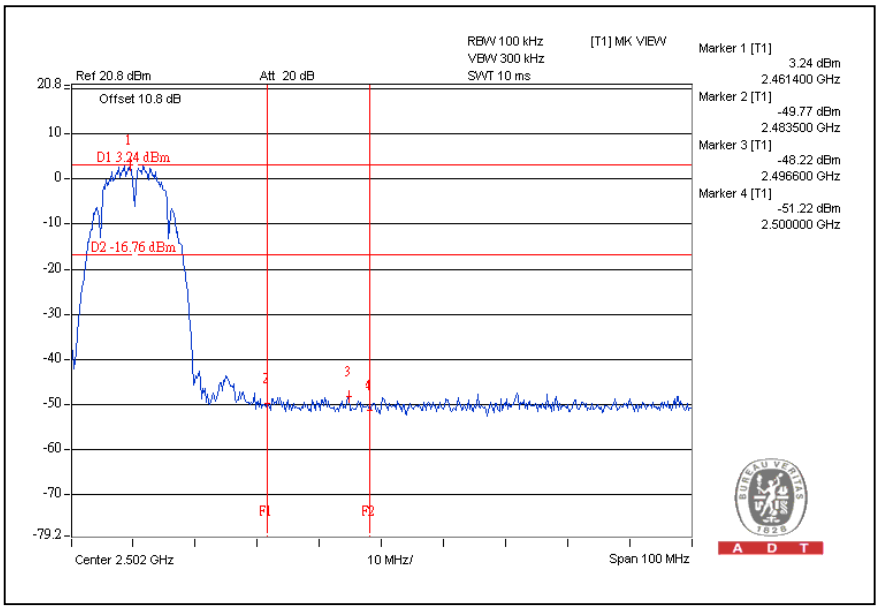
The spectrum plots are attached on the following images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

## 802.11b DSSS MODULATION:

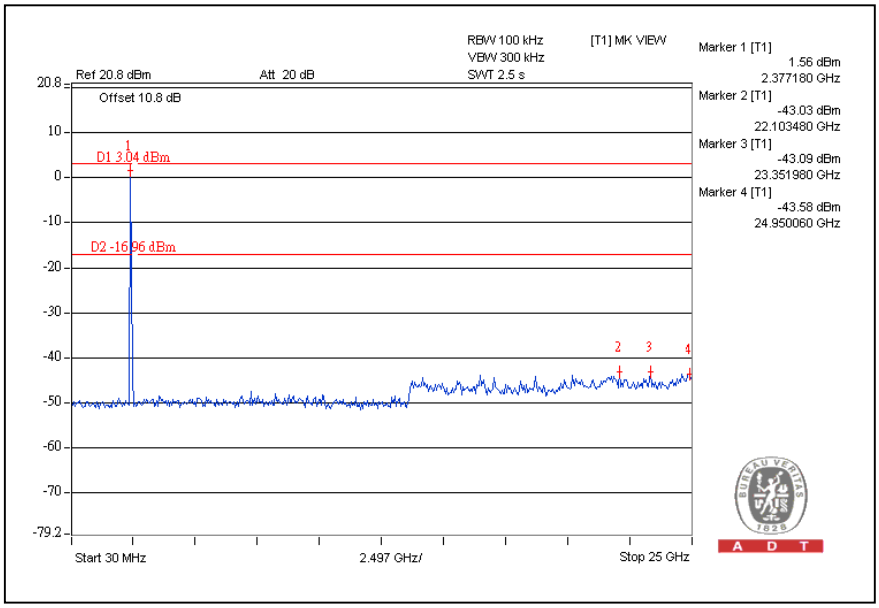
CH1



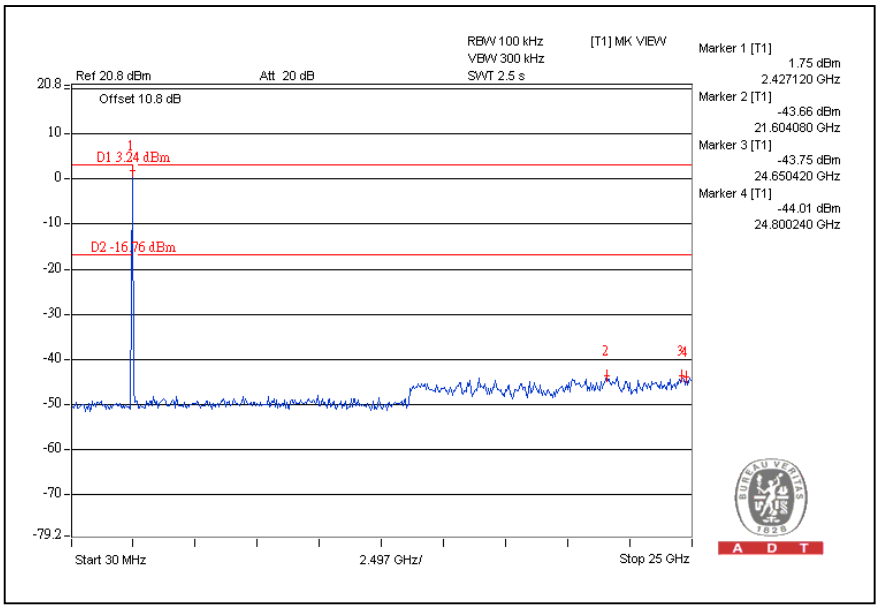

CH11



CH1

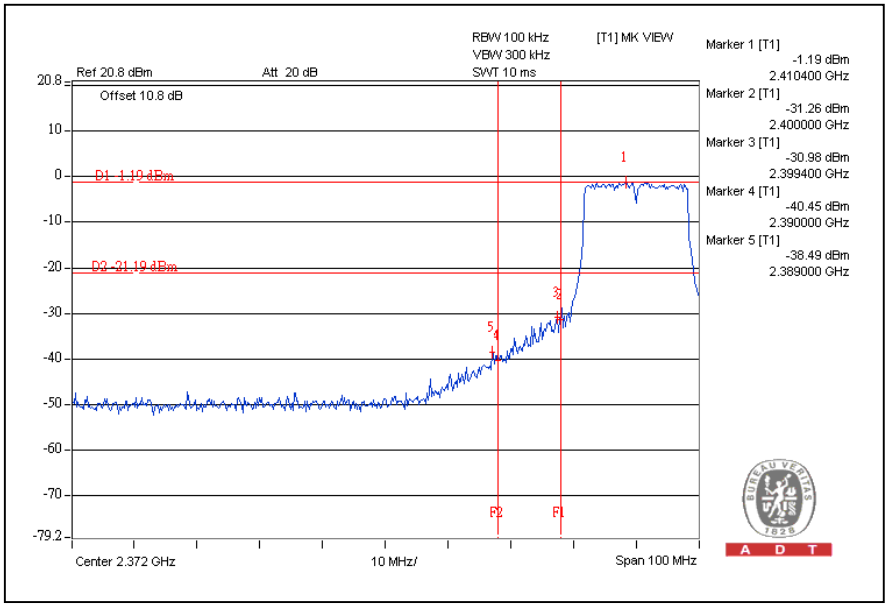

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.8 dBm
Att 20 dB
Offset 10.8 dB
D1 3.04 dBm
D2 -16.96 dBm
Marker 1 [T1]
1.56 dBm
2.377180 GHz
Marker 2 [T1]
-43.03 dBm
22.103480 GHz
Marker 3 [T1]
-43.09 dBm
23.351980 GHz
Marker 4 [T1]
-43.58 dBm
24.950060 GHz
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH11

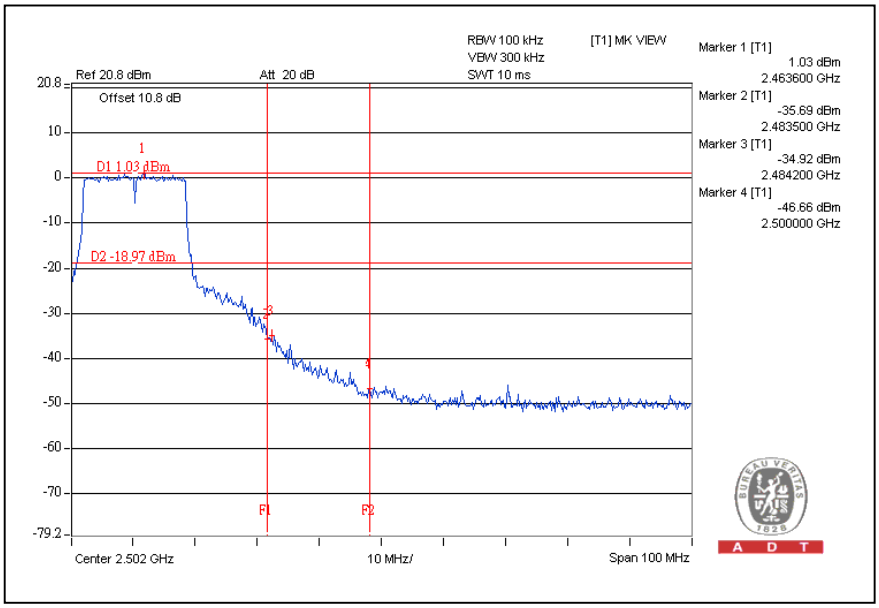

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.8 dBm
Att 20 dB
Offset 10.8 dB
D1 3.24 dBm
D2 -16.76 dBm
Marker 1 [T1]
1.75 dBm
2.427120 GHz
Marker 2 [T1]
-43.66 dBm
21.604080 GHz
Marker 3 [T1]
-43.75 dBm
24.650420 GHz
Marker 4 [T1]
-44.01 dBm
24.800240 GHz
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
Start 30 MHz
2.497 GHz/
Stop 25 GHz

## 802.11g OFDM MODULATION:

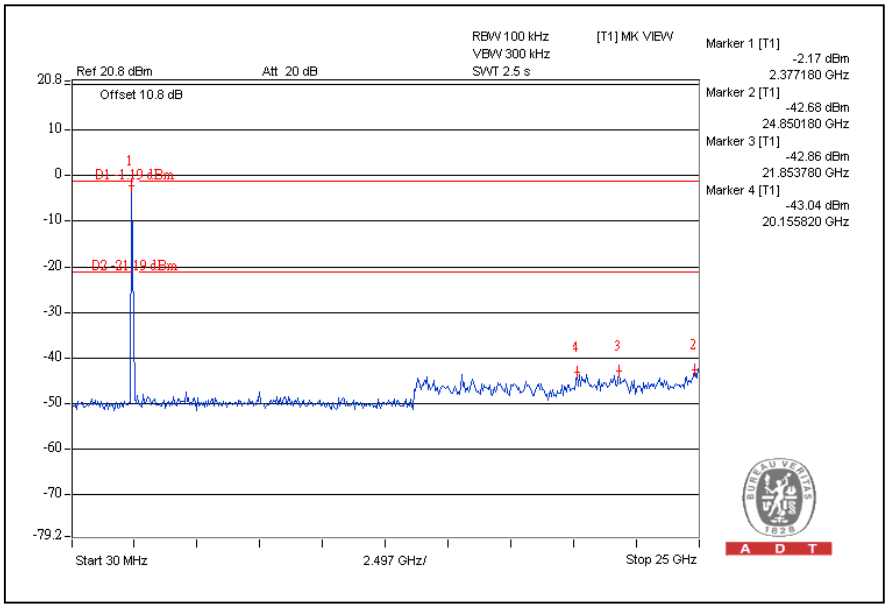
CH1



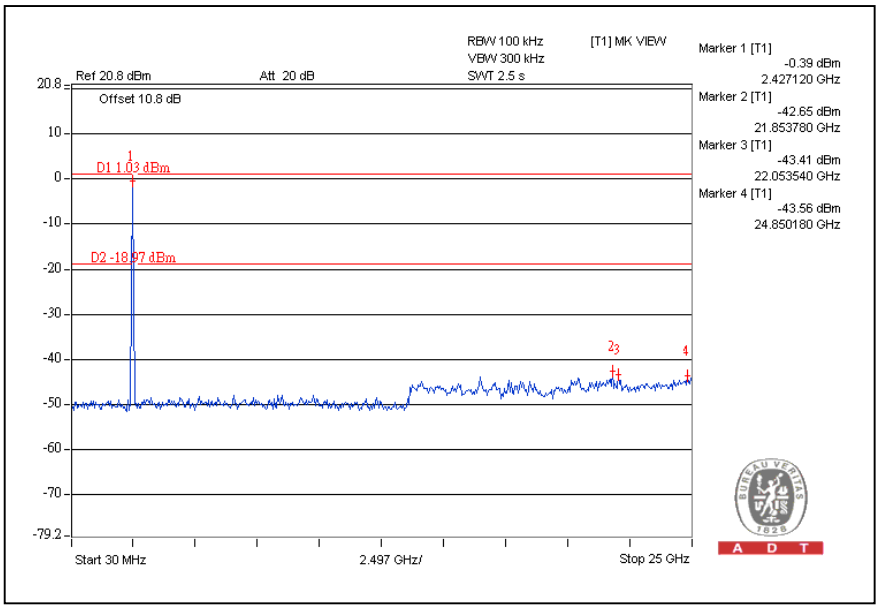

CH11



CH1

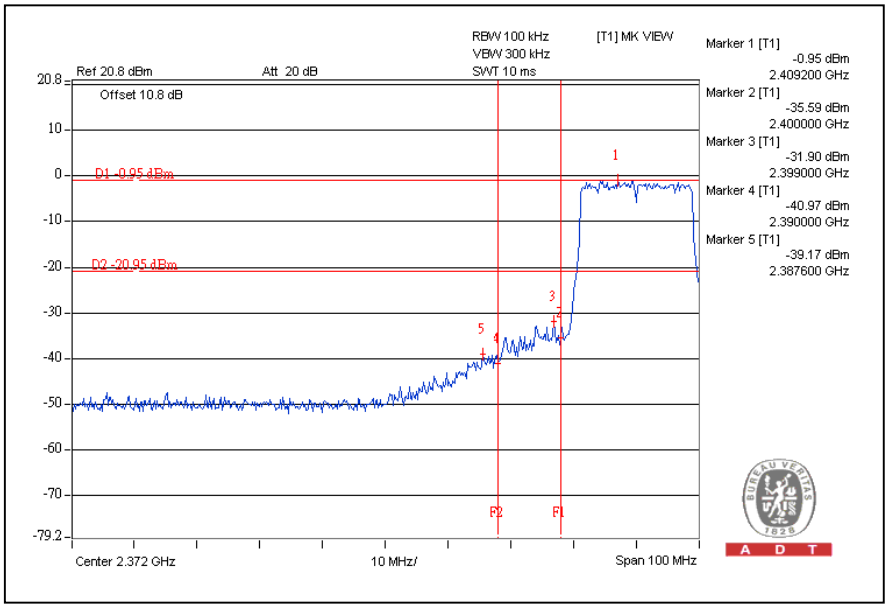

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.8 dBm
Att 20 dB
Offset 10.8 dB
D1 1.19 dBm
D2 -21.19 dBm
Marker 1 [T1]
-2.17 dBm
2.377180 GHz
Marker 2 [T1]
-42.68 dBm
24.850180 GHz
Marker 3 [T1]
-42.86 dBm
21.853780 GHz
Marker 4 [T1]
-43.04 dBm
20.155820 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH11

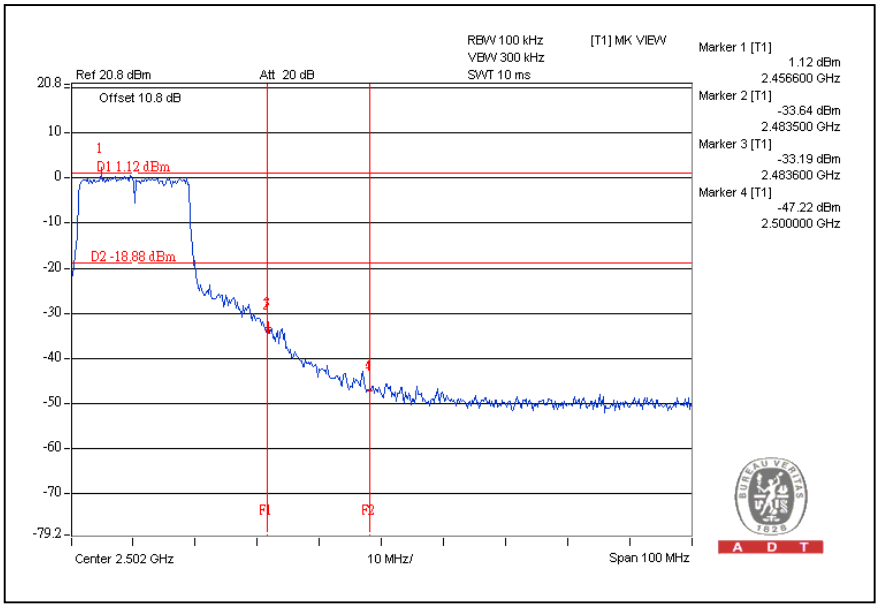

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.8 dBm
Att 20 dB
Offset 10.8 dB
D1 1.03 dBm
D2 -18.97 dBm
Marker 1 [T1]
-0.39 dBm
2.427120 GHz
Marker 2 [T1]
-42.65 dBm
21.853780 GHz
Marker 3 [T1]
-43.41 dBm
22.053540 GHz
Marker 4 [T1]
-43.56 dBm
24.850180 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz

## 802.11n (20MHz) OFDM MODULATION:

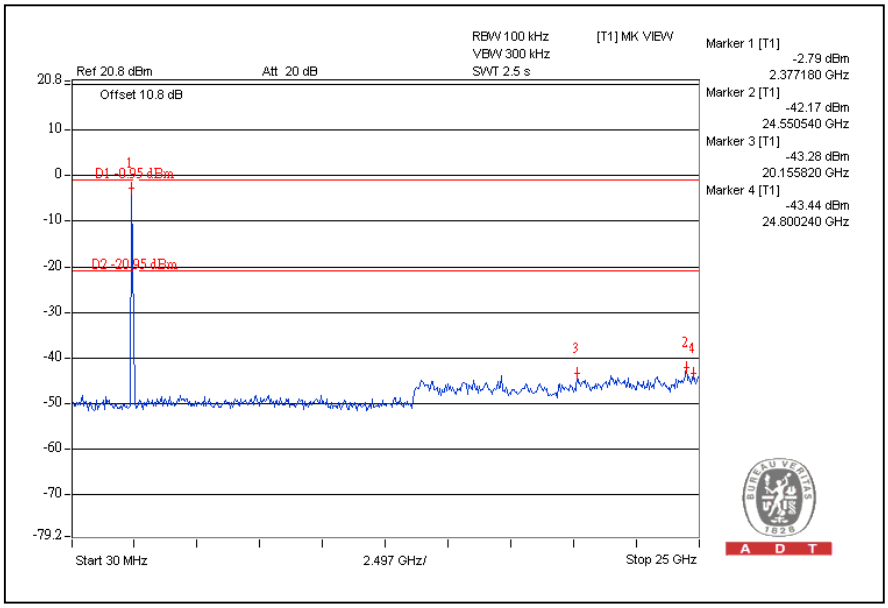
CH1



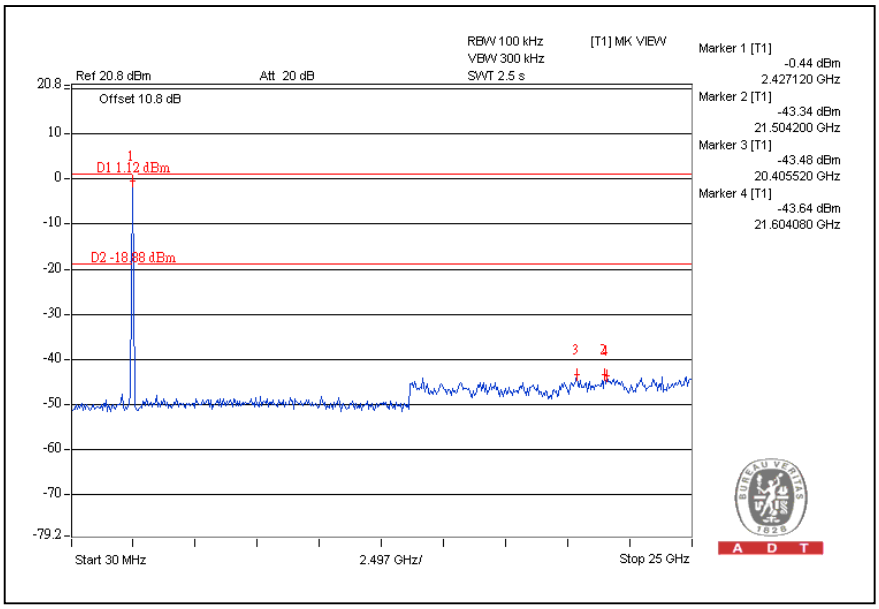

CH11



CH1

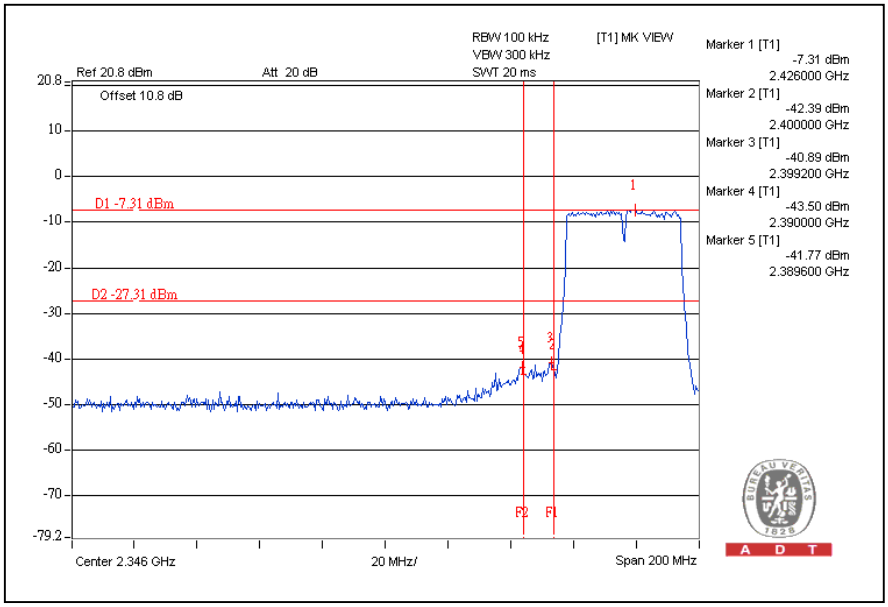

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.8 dBm
Att 20 dB
Offset 10.8 dB
D1 -0.95 dBm
D2 -20.95 dBm
Marker 1 [T1]
-2.79 dBm
2.377180 GHz
Marker 2 [T1]
-42.17 dBm
24.550540 GHz
Marker 3 [T1]
-43.28 dBm
20.155820 GHz
Marker 4 [T1]
-43.44 dBm
24.800240 GHz
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH11

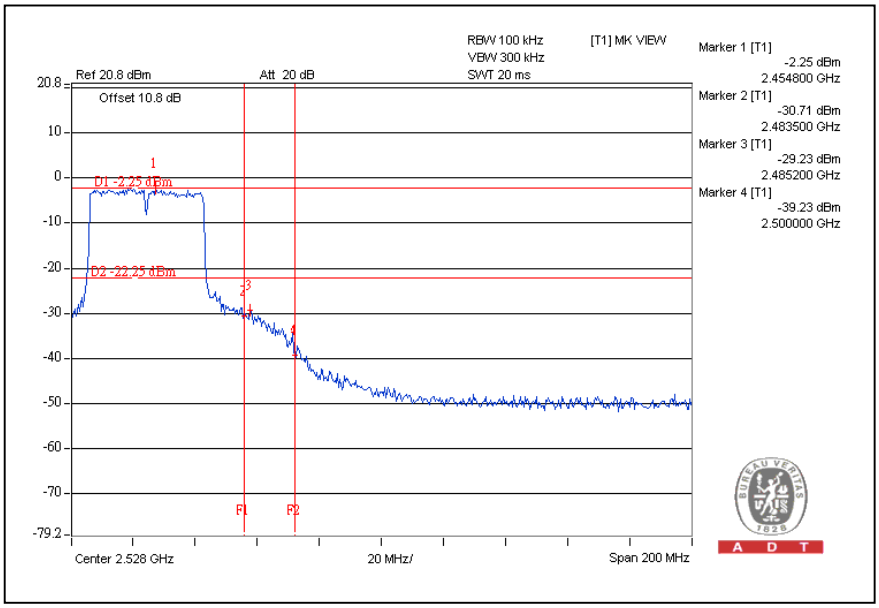

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.8 dBm
Att 20 dB
Offset 10.8 dB
D1 1.12 dBm
D2 -18.88 dBm
Marker 1 [T1]
-0.44 dBm
2.427120 GHz
Marker 2 [T1]
-43.34 dBm
21.504200 GHz
Marker 3 [T1]
-43.48 dBm
20.405520 GHz
Marker 4 [T1]
-43.64 dBm
21.604080 GHz
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
Start 30 MHz
2.497 GHz/
Stop 25 GHz

## 802.11n (40MHz) OFDM MODULATION:

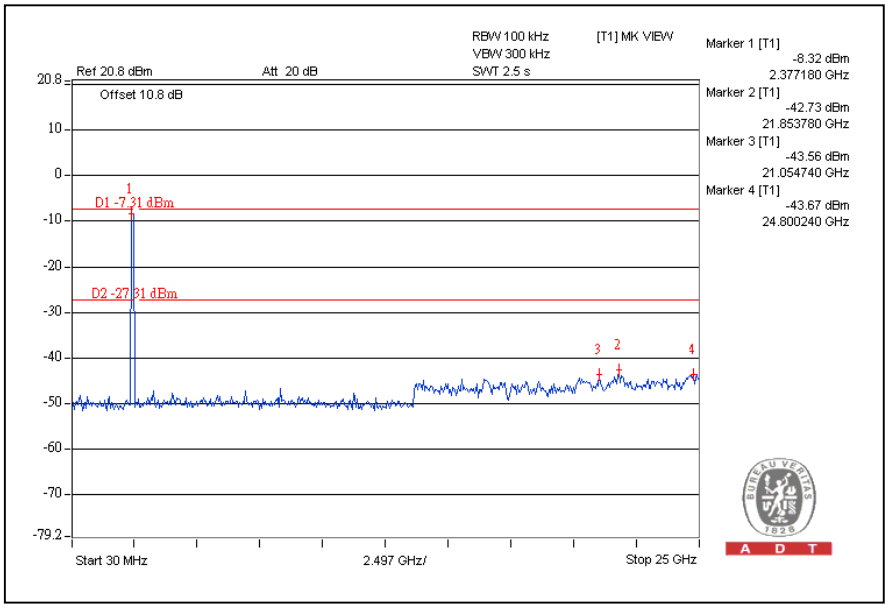
CH1



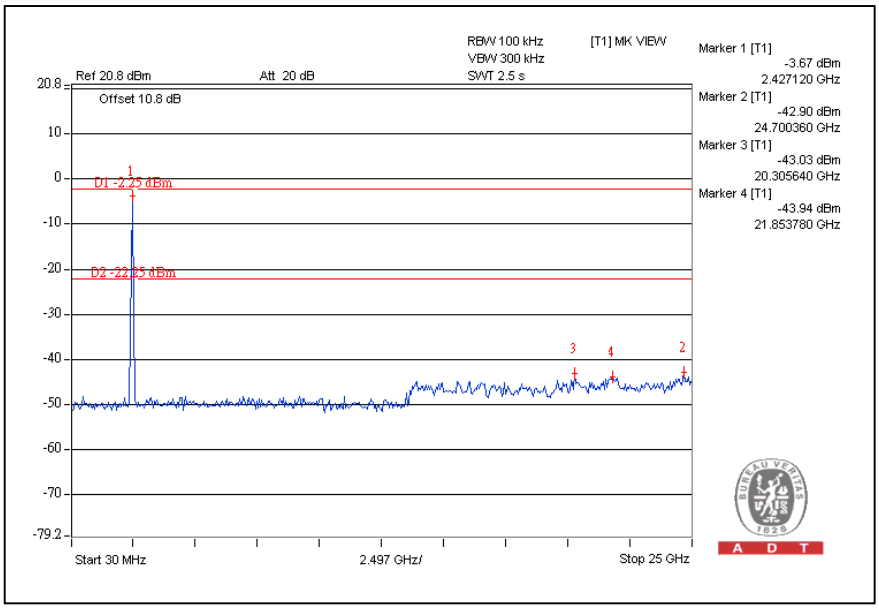

CH7



CH1


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.8 dBm
Att 20 dB
Offset 10.8 dB
D1 -7.31 dBm
D2 -27.31 dBm
Marker 1 [T1]
-8.32 dBm
2.377180 GHz
Marker 2 [T1]
-42.73 dBm
21.853780 GHz
Marker 3 [T1]
-43.56 dBm
21.054740 GHz
Marker 4 [T1]
-43.67 dBm
24.800240 GHz
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH7


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.8 dBm
Att 20 dB
Offset 10.8 dB
D1 -2.25 dBm
D2 -22.25 dBm
Marker 1 [T1]
-3.67 dBm
2.427120 GHz
Marker 2 [T1]
-42.90 dBm
24.700360 GHz
Marker 3 [T1]
-43.03 dBm
20.305640 GHz
Marker 4 [T1]
-43.94 dBm
21.853780 GHz
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
Start 30 MHz
2.497 GHz/
Stop 25 GHz

# 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. 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
**Web Site**: www.adt.com.tw


The address and road map of all our labs can be found in our web site also.

# 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 ---**