



## Test Report

|              |               |
|--------------|---------------|
| Product Name | Wifi N module |
| Model No     | WPL-2N00      |
| FCC ID.      | YG7-WPL2N00   |

|           |   |
|-----------|---|
| Applicant | ZINWELL CORPORATION   |
| Address   | 7F 512, Yuan Shan Road, Chung Ho City, Taipei Hsien 235, Taiwan |

|                 |                    |
|-----------------|--------------------|
| Date of Receipt | July 15, 2010      |
| Issue Date      | Aug. 04, 2010      |
| Report No.      | 107241R-RFUSP42V01 |
| Report Version  | V1.0               |

The test results relate only to the samples tested.

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# Test Report Certification

Issue Date: Aug. 04, 2010

Report No.: 107241R-RFUSP42V01



Accredited by NIST (NVLAP)  
NVLAP Lab Code: 200533-0

|                     |   |  |
|---------------------|---|--|
| Product Name        | Wifi N module   |  |
| Applicant           | ZINWELL CORPORATION   |  |
| Address             | 7F 512, Yuan Shan Road, Chung Ho City, Taipei Hsien 235, Taiwan |  |
| Manufacturer        | ZINWELL CORPORATION   |  |
| Model No.           | WPL-2N00  |  |
| EUT Rated Voltage   | AC 100V-240V~, 50-60Hz, 0.13A, 8.0W                             |  |
| EUT Testing Voltage | AC 120V/60Hz  |  |
| Trade Name          | <b>ZINWELL</b> <sup>®</sup>                                     |  |
| Applicable Standard | FCC CFR Title 47 Part 15 Subpart C: 2009<br>ANSI C63.4: 2003    | <br><small>NVLAP Lab Code: 200533-0</small> |
| Test Result         | Complied  |  |

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Testing Laboratory  
**0914**

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## 1. GENERAL INFORMATION

### 1.1. EUT Description

|                    |   |
|--------------------|---|
| Product Name       | Wifi N module   |
| Trade Name         | <b>ZINWELL</b> <sup>®</sup>   |
| Model No.          | WPL-2N00  |
| FCC ID.            | YG7-WPL-2N00  |
| Frequency Range    | 2412-2462MHz for 802.11b/g/n-20BW, 2422-2452MHz for 802.11n-40BW              |
| Number of Channels | 802.11b/g/n-20MHz: 11, n-40MHz: 7   |
| Data Speed         | 802.11b: 1-11Mbps, 802.11g: 6-54Mbps, 802.11n: up to 300Mbps                  |
| Type of Modulation | 802.11b:DSSS (DBPSK, DQPSK, CCK)<br>802.11g/n:OFDM (BPSK, QPSK, 16QAM, 64QAM) |
| Antenna Type       | PCB Antenna   |
| Antenna Gain       | Refer to the table “Antenna List”   |
| Channel Control    | Auto  |

#### Antenna List

| No. | Manufacturer | Part No.     | Peak Gain         |
|-----|--------------|--------------|-------------------|
| 1   | Master Wave  | 98P11MIPF006 | 2.0dBi for 2.4GHz |
| 2   | Master Wave  | 98P11MIPF005 | 2.0dBi for 2.4GHz |
| 3   | Master Wave  | 98P11MIPF001 | 2.0dBi for 2.4GHz |

Note: 1. The antenna of EUT is conform to FCC 15.203

2. Only the higher gain antenna was tested and recorded in this report.

(Main Antenna: P/N: 98P11MIPF006, Aux Antenna: P/N: 98P11MIPF005)

## 802.11b/g/n-20MHz Center Frequency of Each Channel:

| Channel     | Frequency | Channel     | Frequency | Channel     | Frequency | Channel     | Frequency |
|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|
| Channel 01: | 2412 MHz  | Channel 02: | 2417 MHz  | Channel 03: | 2422 MHz  | Channel 04: | 2427 MHz  |
| Channel 05: | 2432 MHz  | Channel 06: | 2437 MHz  | Channel 07: | 2442 MHz  | Channel 08: | 2447 MHz  |
| Channel 09: | 2452 MHz  | Channel 10: | 2457 MHz  | Channel 11: | 2462 MHz  |             |           |

## 802.11n-40MHz Center Frequency of Each Channel:

| Channel     | Frequency | Channel     | Frequency | Channel     | Frequency | Channel     | Frequency |
|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|
| Channel 01: | 2422 MHz  | Channel 02: | 2427 MHz  | Channel 03: | 2432 MHz  | Channel 04: | 2437 MHz  |
| Channel 05: | 2442 MHz  | Channel 06: | 2447 MHz  | Channel 07: | 2452 MHz  |             |           |

## Note:

1. The EUT is a Wifi N module with a built-in 2.4GHz WLAN transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 11Mbps 、 802.11g is 48Mbps 、 802.11n(20M-BW) is 144.4Mbps and 、 802.11n(40M-BW) is 180Mbps)
4. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11b/g/n transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices
5. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

## 1.2. Operational Description

The EUT is a Wifi N module with 11 channels. This device provided four kinds of transmitting speed 1, 2, 5.5 and 11Mbps and the device of RF carrier is DBPSK, DQPSK and CCK (IEEE 802.11b). The device provided of eight kinds of transmitting speed 6, 9, 12, 18, 24, 36, 48 and 54Mbps the device of RF carrier is BPSK, QPSK, 16QAM and 64QAM (IEEE 802.11g).

The device provided of eight kinds of transmitting speed 14.4,28.8,43.4,57.8,86.6,115.6,130 and 144.4Mbps in 802.11n(20M-BW) mode and 30,60,90,120,180,240,270 and 300 Mbps(40M-BW) the device of RF carrier is BPSK, QPSK, 16QAM and 64QAM (IEEE 802.11n), The IEEE 802.11n is Multiple In, Multiple Out” (MIMO) technology and two antennas to support 2(Transmit) \* 2(Receive) MIMO technology.

This Wifi N module, compliant with IEEE 802.11b and IEEE 802.11g/n, is a high-efficiency Wireless LAN adapter. It allows your computer to connect to a wireless network and to share resources, such as files or printers without being bound to the network wires. Operation in 2.4GHz Direct Sequence Spread Spectrum (DSSS) and Orthogonal Frequency Division Multiplexing (OFDM) radio transmission, the Wifi N module Wired Equivalent Protection (WEP) algorithm is used. In addition, its standard compliance ensures that it can communicate with any IEEE 802.11b and IEEE 802.11g/n network.

|            |   |
|------------|---|
| Test Mode: | Mode 1: Transmit (802.11b 11Mbps)           |
|            | Mode 2: Transmit (802.11g 48Mbps)           |
|            | Mode 3: Transmit (802.11n 144.4Mbps 20M-BW) |
|            | Mode 4: Transmit (802.11n 180Mbps 40M-BW)   |

### 1.3. Tested System Details

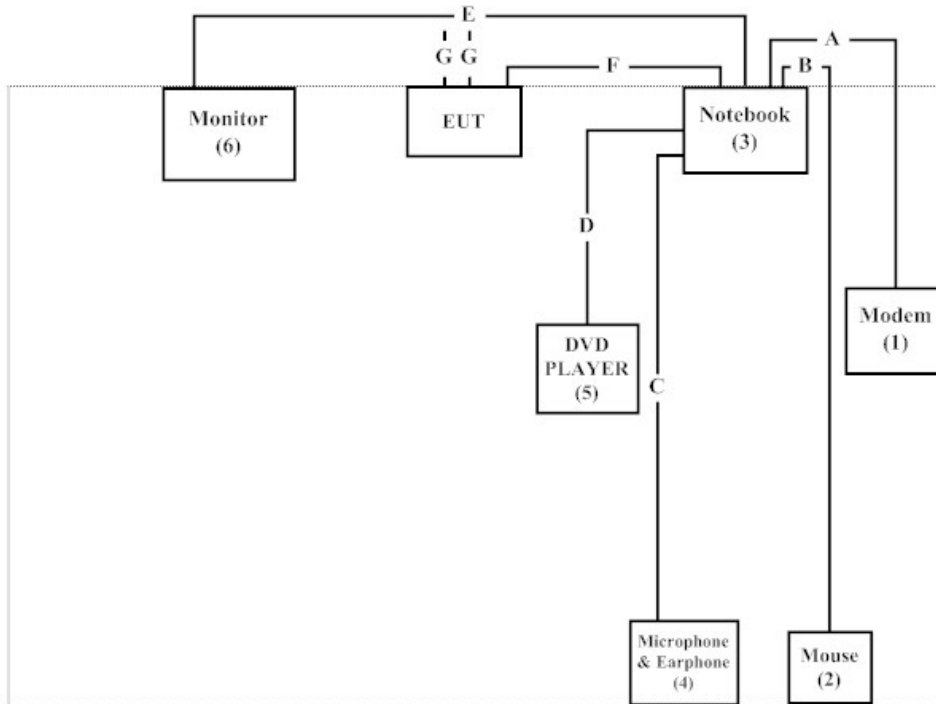
The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

| Product                 | Manufacturer | Model No. | Serial No.               | FCC ID     | Power Cord         |
|-------------------------|--------------|-----------|--------------------------|------------|--------------------|
| 1 Modem                 | ACEEX        | DM-1414   | 0102027554               | IFAXDM1414 | Non-Shielded, 1.8m |
| 2 USB Mouse             | Logitech     | M-UV83    | LNA34515276              | DoC        | N/A                |
| 3 Notebook PC           | DELL         | PPT       | N/A                      | DoC        | Non-Shielded, 0.8m |
| 4 Microphone & Earphone | Lobos        | LB-EW020  | N/A                      | N/A        | N/A                |
| 5 DVD PLAYER            | DELL         | PD01S     | N/A                      | DoC        | Non-Shielded, 1.8m |
| 6 Monitor               | Dell         | 2407WFPb  | CN-0FC255-46633-67T-03YS | DoC        | Non-Shielded, 1.8m |

|   | Signal Cable Type           | Signal cable Description                         |
|---|-----------------------------|--|
| A | RS-232 Cable                | Non-Shielded, 1.2m                               |
| B | Mouse Cable                 | Shielded, 1.8m                                   |
| C | Microphone & Earphone Cable | Non-Shielded, 2.0m                               |
| D | DVD Cable                   | Non-Shielded, 0.6m                               |
| E | VGA Cable                   | Non-Shielded, 1.8m with one ferrite core bonded. |
| F | RJ-45 Cable                 | Non-Shielded, 1.8m                               |
| G | RJ-45 Cable                 | Non-Shielded, 2.0m, two PCS.                     |



**1.4. Configuration of Tested System**



**1.5. EUT Exercise Software**

- (1) Setup the EUT as shown in section 1.4
- (2) Execute the “QA Test” program (the continuous transmission program) on the EUT
- (3) Setup the test mode, the test channel, and the data rate.
- (4) Press OK to start the transmission.
- (5) Verify that the EUT works correctly.

**1.6. Test Facility**

Ambient conditions in the laboratory:

| Items                      | Required (IEC 68-1) | Actual   |
|----------------------------|---------------------|----------|
| Temperature (°C)           | 15-35               | 20-35    |
| Humidity (%RH)             | 25-75               | 50-65    |
| Barometric pressure (mbar) | 860-1060            | 950-1000 |

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site : <http://tw.quietek.com/modules/myalbum/>  
 The address and introduction of Quietek Corporation's laboratories can be founded in our Web site : <http://www.quietek.com/>

Site Description: File on  
 Federal Communications Commission  
 FCC Engineering Laboratory  
 7435 Oakland Mills Road  
 Columbia, MD 21046  
 Registration Number: 92195



Accreditation on NVLAP  
 NVLAP Lab Code: 200533-0



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FCC Accreditation Number: TW1014



## 2. Conducted Emission

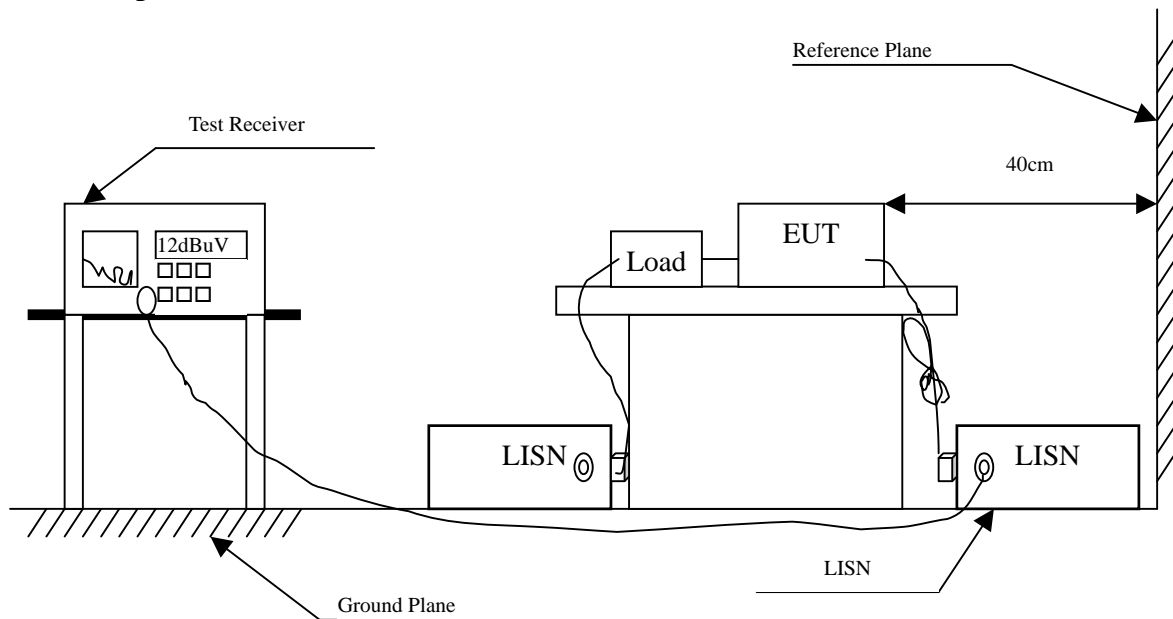
### 2.1. Test Equipment

The following test equipment are used during the conducted emission test:

| Item | Instrument         | Manufacturer | Type No./Serial No | Last Cal. | Remark      |
|------|--------------------|--------------|--------------------|-----------|-------------|
| 1    | Test Receiver      | R & S        | ESCS 30/825442/17  | May, 2010 |             |
| 2    | L.I.S.N.           | R & S        | ESH3-Z5/825016/6   | May, 2010 | EUT         |
| 3    | L.I.S.N.           | Kyoritsu     | KNW-407/8-1420-3   | May, 2010 | Peripherals |
| 4    | Pulse Limiter      | R & S        | ESH3-Z2            | May, 2010 |             |
| 5    | No.1 Shielded Room |              |                    | N/A       |             |

Note: All instruments are calibrated every one year.

### 2.2. Test Setup



**2.3. Limits**

| <b>FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit</b> |        |       |
|--|--------|-------|
| Frequency<br>MHz   | Limits |       |
|  | QP     | AVG   |
| 0.15 - 0.50  | 66-56  | 56-46 |
| 0.50-5.0   | 56     | 46    |
| 5.0 - 30   | 60     | 50    |

**2.4. Test Procedure**

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

**2.5. Uncertainty**

± 2.26 dB

## 2.6. Test Result of Conducted Emission

Product : Wifi N module  
 Test Item : Conducted Emission Test  
 Power Line : Line 1  
 Test Mode : Mode 4: Transmit (802.11n 180Mbps 40M-BW) (2437MHz)

| Frequency<br>MHz  | Correct<br>Factor<br>dB | Reading<br>Level<br>dBuV | Measurement<br>Level<br>dBuV | Margin<br>dB | Limit<br>dBuV |
|-------------------|-------------------------|--------------------------|------------------------------|--------------|---------------|
| <b>Line 1</b>     |                         |                          |                              |              |               |
| <b>Quasi-Peak</b> |                         |                          |                              |              |               |
| 0.185             | 9.719                   | 44.340                   | 54.059                       | -10.941      | 65.000        |
| 0.232             | 9.685                   | 38.620                   | 48.305                       | -15.352      | 63.657        |
| 0.275             | 9.659                   | 34.620                   | 44.279                       | -18.150      | 62.429        |
| 0.420             | 9.643                   | 23.970                   | 33.613                       | -24.673      | 58.286        |
| 0.959             | 9.670                   | 13.470                   | 23.140                       | -32.860      | 56.000        |
| 1.400             | 9.670                   | 11.920                   | 21.590                       | -34.410      | 56.000        |
| <b>Average</b>    |                         |                          |                              |              |               |
| 0.185             | 9.719                   | 38.890                   | 48.609                       | -6.391       | 55.000        |
| 0.232             | 9.685                   | 28.920                   | 38.605                       | -15.052      | 53.657        |
| 0.275             | 9.659                   | 29.560                   | 39.219                       | -13.210      | 52.429        |
| 0.420             | 9.643                   | 16.910                   | 26.553                       | -21.733      | 48.286        |
| 0.959             | 9.670                   | 5.970                    | 15.640                       | -30.360      | 46.000        |
| 1.400             | 9.670                   | 5.480                    | 15.150                       | -30.850      | 46.000        |

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Wifi N module  
 Test Item : Conducted Emission Test  
 Power Line : Line 2  
 Test Mode : Mode 4: Transmit (802.11n 180Mbps 40M-BW) (2437MHz)

| Frequency<br>MHz  | Correct<br>Factor<br>dB | Reading<br>Level<br>dBuV | Measurement<br>Level<br>dBuV | Margin<br>dB | Limit<br>dBuV |
|-------------------|-------------------------|--------------------------|------------------------------|--------------|---------------|
| <b>Line 2</b>     |                         |                          |                              |              |               |
| <b>Quasi-Peak</b> |                         |                          |                              |              |               |
| 0.177             | 9.736                   | 42.270                   | 52.006                       | -13.223      | 65.229        |
| 0.220             | 9.703                   | 38.930                   | 48.633                       | -15.367      | 64.000        |
| 0.271             | 9.672                   | 35.370                   | 45.042                       | -17.501      | 62.543        |
| 0.334             | 9.660                   | 22.180                   | 31.840                       | -28.903      | 60.743        |
| 0.416             | 9.650                   | 24.240                   | 33.890                       | -24.510      | 58.400        |
| 1.009             | 9.670                   | 12.350                   | 22.020                       | -33.980      | 56.000        |
| <b>Average</b>    |                         |                          |                              |              |               |
| 0.177             | 9.736                   | 31.630                   | 41.366                       | -13.863      | 55.229        |
| 0.220             | 9.703                   | 31.140                   | 40.843                       | -13.157      | 54.000        |
| 0.271             | 9.672                   | 31.330                   | 41.002                       | -11.541      | 52.543        |
| 0.334             | 9.660                   | 13.620                   | 23.280                       | -27.463      | 50.743        |
| 0.416             | 9.650                   | 17.650                   | 27.300                       | -21.100      | 48.400        |
| 1.009             | 9.670                   | 7.230                    | 16.900                       | -29.100      | 46.000        |

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

### 3. Peak Power Output

#### 3.1. Test Equipment

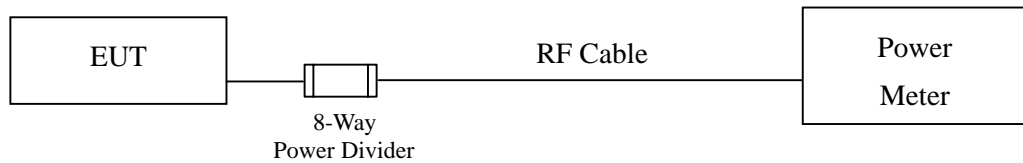
|   | Equipment           | Manufacturer | Model No./Serial No.   | Last Cal.  |
|---|---------------------|--------------|------------------------|------------|
| X | Power Meter         | Anritsu      | ML2495A/6K00003357     | May, 2010  |
| X | Power Sensor        | Anritsu      | MA2411B/0738448        | Jun, 2010  |
| X | 8-WAY Power Divider | JFW          | 50PD-647 / 526770 0916 | Apr., 2010 |

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.
3. The power combiner is used for measure 11n mode.

#### 3.2. Test Setup

Conducted Measurement



#### 3.3. Limits

The maximum peak power shall be less 1 Watt.

#### 3.4. Test Procedure

The EUT was tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

#### 3.5. Uncertainty

± 1.27 dB

### 3.6. Test Result of Peak Power Output

Product : Wifi N module  
 Test Item : Peak Power Output Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (802.11b 11Mbps)

| Channel No | Frequency (MHz) | Average Power<br>For different Data Rate (Mbps) |       |       |       | Peak Power | Required Limit | Result |
|------------|-----------------|---|-------|-------|-------|------------|----------------|--------|
|            |                 | 1   | 2     | 5.5   | 11    |            |                |        |
|            |                 | Measurement Level (dBm)                         |       |       |       |            |                |        |
| 01         | 2412            | 16.67   | 16.74 | 16.73 | 16.82 | 19.22      | <30dBm         | Pass   |
| 06         | 2437            | --  | --    | --    | 16.63 | 19.07      | <30dBm         | Pass   |
| 11         | 2462            | --  | --    | --    | 16.72 | 19.18      | <30dBm         | Pass   |

Note: Peak Power Output Value = Reading value on peak power meter + cable loss



Product : Wifi N module  
 Test Item : Peak Power Output Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit (802.11g 48Mbps)

| Channel No | Frequency (MHz) | Average Power<br>For different Data Rate (Mbps) |       |       |      |       |       |       |      | Peak Power | Required Limit | Result |
|------------|-----------------|---|-------|-------|------|-------|-------|-------|------|------------|----------------|--------|
|            |                 | 6   | 9     | 12    | 18   | 24    | 36    | 48    | 54   | 48         |                |        |
|            |                 | Measurement Level (dBm)                         |       |       |      |       |       |       |      |            |                |        |
| 01         | 2412            | 13.62   | 13.48 | 13.71 | 13.5 | 13.77 | 13.45 | 13.81 | 13.3 | 20.68      | <30dBm         | Pass   |
| 06         | 2437            | --  | --    | --    | --   | --    | --    | 13.85 | --   | 21.92      | <30dBm         | Pass   |
| 11         | 2462            | --  | --    | --    | --   | --    | --    | 13.57 | --   | 21.13      | <30dBm         | Pass   |

Note: Peak Power Output Value = Reading value on peak power meter + cable loss

Product : Wifi N module  
 Test Item : Peak Power Output Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit (802.11n 144.4Mbps 20M-BW)

| Channel No | Frequency (MHz) | Average Power<br>For different Data Rate (Mbps) |       |       |       |       |       |       |       | Peak Power | Required Limit | Result |
|------------|-----------------|---|-------|-------|-------|-------|-------|-------|-------|------------|----------------|--------|
|            |                 | 14.4  | 28.8  | 43.4  | 57.8  | 86.6  | 115.6 | 130   | 144.4 |            |                |        |
|            |                 | Measurement Level (dBm)                         |       |       |       |       |       |       |       |            |                |        |
| 01         | 2412            | 16.6  | 16.53 | 16.44 | 16.53 | 16.83 | 16.24 | 16.82 | 16.83 | 24.85      | <30dBm         | Pass   |
| 06         | 2437            | --  | --    | --    | --    | --    | --    | --    | 16.23 | 23.56      | <30dBm         | Pass   |
| 11         | 2462            | --  | --    | --    | --    | --    | --    | --    | 16.12 | 22.68      | <30dBm         | Pass   |

Note: Peak Power Output Value = Reading value on peak power meter + cable loss

Product : Wifi N module  
 Test Item : Peak Power Output Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit (802.11n 180Mbps 40M-BW)

| Channel No | Frequency (MHz) | Average Power<br>For different Data Rate (Mbps) |       |       |       |       |       |       |       | Peak Power | Required Limit | Result |
|------------|-----------------|---|-------|-------|-------|-------|-------|-------|-------|------------|----------------|--------|
|            |                 | 30  | 60    | 90    | 120   | 180   | 240   | 270   | 300   |            |                |        |
|            |                 | Measurement Level (dBm)                         |       |       |       |       |       |       |       |            |                |        |
| 01         | 2422            | 16.92   | 16.72 | 16.83 | 16.87 | 17.25 | 17.02 | 16.91 | 16.97 | 23.92      | <30dBm         | Pass   |
| 04         | 2437            | --  | --    | --    | --    | 16.62 | --    | --    | --    | 23.56      | <30dBm         | Pass   |
| 07         | 2452            | --  | --    | --    | --    | 16.82 | --    | --    | --    | 22.98      | <30dBm         | Pass   |

Note: Peak Power Output Value = Reading value on peak power meter + cable loss

#### 4. Radiated Emission

##### 4.1. Test Equipment

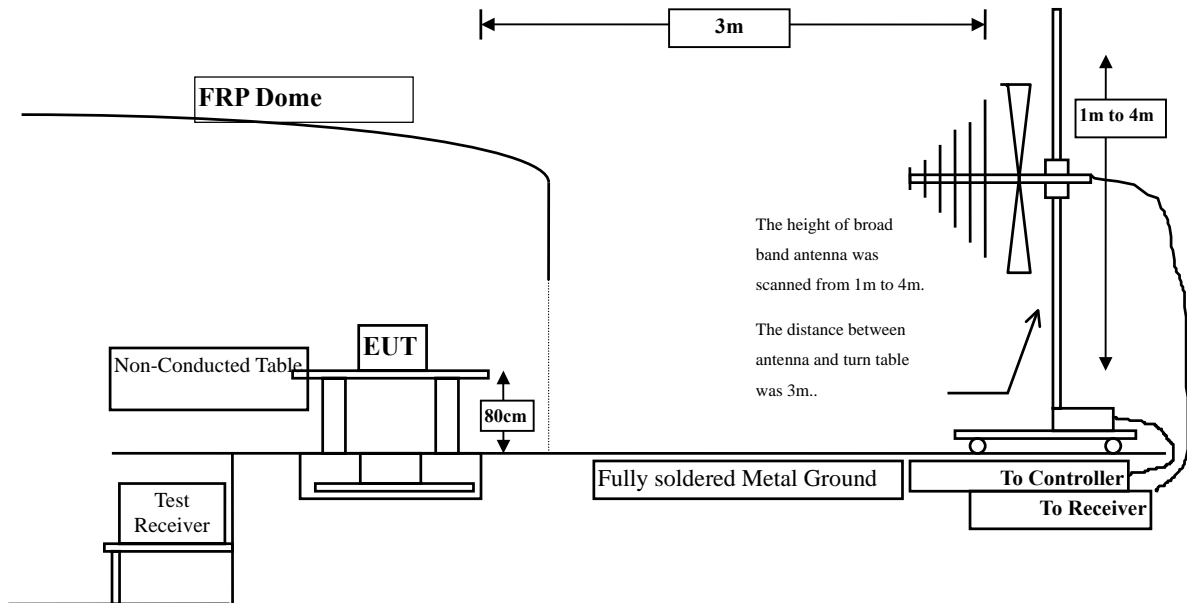
The following test equipment are used during the radiated emission test:

| Test Site  |   | Equipment         | Manufacturer    | Model No./Serial No.  | Last Cal.  |
|------------|---|-------------------|-----------------|-----------------------|------------|
| ☒ Site # 3 | X | Bilog Antenna     | Schaffner Chase | CBL6112B/2673         | Sep., 2009 |
|            | X | Horn Antenna      | Schwarzbeck     | BBHA9120D/D305        | Sep., 2009 |
|            | X | Horn Antenna      | Schwarzbeck     | BBHA9170/208          | Jul., 2010 |
|            | X | Pre-Amplifier     | Agilent         | 8447D/2944A09549      | Sep., 2009 |
|            | X | Spectrum Analyzer | Agilent         | E4407B / US39440758   | May, 2010  |
|            | X | Test Receiver     | R & S           | ESCS 30/ 825442/018   | Sep., 2009 |
|            | X | Coaxial Cable     | Quietek         | QTK-CABLE/ CAB5       | Feb., 2010 |
|            | X | Controller        | Quietek         | QTK-CONTROLLER/ CTRL3 | N/A        |
|            | X | Coaxial Switch    | Anritsu         | MP59B/6200265729      | N/A        |

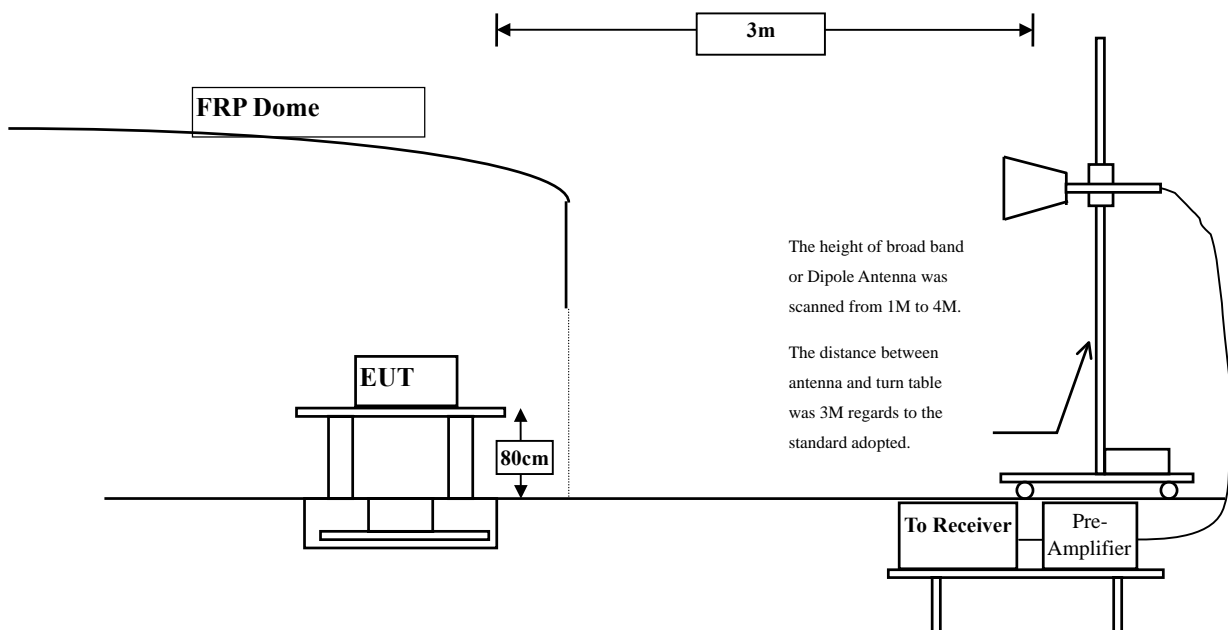
- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
  2. The test instruments marked with “X” are used to measure the final test results.

## 4.2. Test Setup

### Radiated Emission Below 1GHz



### Radiated Emission Above 1GHz



### 4.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

| <b>FCC Part 15 Subpart C Paragraph 15.209(a) Limits</b> |          |           |
|---|----------|-----------|
| Frequency<br>MHz  | uV/m @3m | dBuV/m@3m |
| 30-88   | 100      | 40        |
| 88-216  | 150      | 43.5      |
| 216-960   | 200      | 46        |
| Above 960   | 500      | 54        |

Remarks: E field strength (dBuV/m) = 20 log E field strength (uV/m)

#### 4.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2003 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB beamwidth of the antenna.

The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

The frequency range from 30MHz to 10th harmonics is checked.

#### 4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

#### 4.6. Test Result of Radiated Emission

Product : Wifi N module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (802.11b 11Mbps) (2412MHz)

| Frequency<br>MHz             | Correct<br>Factor<br>dB | Reading<br>Level<br>dBuV | Measurement<br>Level<br>dBuV/m | Margin<br>dB | Limit<br>dBuV/m |
|------------------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| <b>Horizontal</b>            |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4824.000                     | 0.428                   | 49.890                   | 50.319                         | -23.681      | 74.000          |
| 7236.000                     | 7.177                   | 38.320                   | 45.497                         | -28.503      | 74.000          |
| 9648.000                     | 8.019                   | 38.590                   | 46.610                         | -27.390      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |
| <b>Vertical</b>              |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4824.000                     | 0.836                   | 51.940                   | 52.777                         | -21.223      | 74.000          |
| 7236.000                     | 7.676                   | 38.880                   | 46.556                         | -27.444      | 74.000          |
| 9648.000                     | 8.556                   | 37.560                   | 46.117                         | -27.883      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.



Product : Wifi N module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (802.11b 11Mbps) (2437 MHz)

| Frequency<br>MHz             | Correct<br>Factor<br>dB | Reading<br>Level<br>dBUV | Measurement<br>Level<br>dBUV/m | Margin<br>dB | Limit<br>dBUV/m |
|------------------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| <b>Horizontal</b>            |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4874.000                     | 0.076                   | 47.150                   | 47.227                         | -26.773      | 74.000          |
| 7311.000                     | 7.512                   | 37.220                   | 44.732                         | -29.268      | 74.000          |
| 9748.000                     | 7.630                   | 38.120                   | 45.750                         | -28.250      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |
| <b>Vertical</b>              |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4874.000                     | 0.532                   | 49.830                   | 50.362                         | -23.638      | 74.000          |
| 7311.000                     | 8.089                   | 38.260                   | 46.349                         | -27.651      | 74.000          |
| 9748.000                     | 8.266                   | 37.720                   | 45.987                         | -28.013      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wifi N module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (802.11b 11Mbps) (2462 MHz)

| Frequency<br>MHz             | Correct<br>Factor<br>dB | Reading<br>Level<br>dBuV | Measurement<br>Level<br>dBuV/m | Margin<br>dB | Limit<br>dBuV/m |
|------------------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| <b>Horizontal</b>            |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4924.000                     | 0.191                   | 47.980                   | 48.171                         | -25.829      | 74.000          |
| 7386.000                     | 8.373                   | 36.870                   | 45.244                         | -28.756      | 74.000          |
| 9848.000                     | 7.964                   | 38.840                   | 46.804                         | -27.196      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |
| <b>Vertical</b>              |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4924.000                     | 0.805                   | 48.840                   | 49.645                         | -24.355      | 74.000          |
| 7386.000                     | 9.180                   | 37.650                   | 46.830                         | -27.170      | 74.000          |
| 9848.000                     | 8.801                   | 38.140                   | 46.941                         | -27.059      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wifi N module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit (802.11g 48Mbps) (2412MHz)

| Frequency<br>MHz             | Correct<br>Factor<br>dB | Reading<br>Level<br>dBuV | Measurement<br>Level<br>dBuV/m | Margin<br>dB | Limit<br>dBuV/m |
|------------------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| <b>Horizontal</b>            |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4824.000                     | 0.428                   | 47.060                   | 47.489                         | -26.511      | 74.000          |
| 7236.000                     | 7.177                   | 37.590                   | 44.767                         | -29.233      | 74.000          |
| 9648.000                     | 8.019                   | 37.680                   | 45.700                         | -28.300      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |
| <b>Vertical</b>              |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4824.000                     | 0.836                   | 46.410                   | 47.247                         | -26.753      | 74.000          |
| 7236.000                     | 7.676                   | 37.590                   | 45.266                         | -28.734      | 74.000          |
| 9648.000                     | 8.556                   | 37.940                   | 46.497                         | -27.503      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wifi N module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit (802.11g 48Mbps) (2437 MHz)

| Frequency<br>MHz             | Correct<br>Factor<br>dB | Reading<br>Level<br>dBUV | Measurement<br>Level<br>dBUV/m | Margin<br>dB | Limit<br>dBUV/m |
|------------------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| <b>Horizontal</b>            |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4874.000                     | 0.076                   | 43.990                   | 44.067                         | -29.933      | 74.000          |
| 7311.000                     | 7.512                   | 37.130                   | 44.642                         | -29.358      | 74.000          |
| 9748.000                     | 7.630                   | 37.720                   | 45.350                         | -28.650      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |
| <b>Vertical</b>              |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4874.000                     | 0.532                   | 46.020                   | 46.552                         | -27.448      | 74.000          |
| 7311.000                     | 8.089                   | 37.400                   | 45.489                         | -28.511      | 74.000          |
| 9748.000                     | 8.266                   | 37.730                   | 45.997                         | -28.003      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wifi N module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit (802.11g 48Mbps) (2462 MHz)

| Frequency<br>MHz             | Correct<br>Factor<br>dB | Reading<br>Level<br>dBuV | Measurement<br>Level<br>dBuV/m | Margin<br>dB | Limit<br>dBuV/m |
|------------------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| <b>Horizontal</b>            |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4924.000                     | 0.191                   | 44.480                   | 44.671                         | -29.329      | 74.000          |
| 7386.000                     | 8.373                   | 38.320                   | 46.694                         | -27.306      | 74.000          |
| 9848.000                     | 7.964                   | 38.950                   | 46.914                         | -27.086      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |
| <b>Vertical</b>              |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4924.000                     | 0.805                   | 44.510                   | 45.315                         | -28.685      | 74.000          |
| 7386.000                     | 9.180                   | 37.440                   | 46.620                         | -27.380      | 74.000          |
| 9848.000                     | 8.801                   | 38.610                   | 47.411                         | -26.589      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wifi N module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit (802.11n 144.4Mbps 20M-BW) (2412MHz)

| Frequency<br>MHz             | Correct<br>Factor<br>dB | Reading<br>Level<br>dBuV | Measurement<br>Level<br>dBuV/m | Margin<br>dB | Limit<br>dBuV/m |
|------------------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| <b>Horizontal</b>            |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4824.000                     | 0.428                   | 42.330                   | 42.759                         | -31.241      | 74.000          |
| 7236.000                     | 7.177                   | 37.510                   | 44.687                         | -29.313      | 74.000          |
| 9648.000                     | 8.019                   | 38.213                   | 46.233                         | -27.767      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |
| <b>Vertical</b>              |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4824.000                     | 0.836                   | 43.240                   | 44.077                         | -29.923      | 74.000          |
| 7236.000                     | 7.676                   | 37.580                   | 45.256                         | -28.744      | 74.000          |
| 9648.000                     | 8.556                   | 37.730                   | 46.287                         | -27.713      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wifi N module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit (802.11n 144.4Mbps 20M-BW) (2437 MHz)

| Frequency<br>MHz             | Correct<br>Factor<br>dB | Reading<br>Level<br>dBUV | Measurement<br>Level<br>dBUV/m | Margin<br>dB | Limit<br>dBUV/m |
|------------------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| <b>Horizontal</b>            |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4874.000                     | 0.076                   | 43.960                   | 44.037                         | -29.963      | 74.000          |
| 7311.000                     | 7.512                   | 37.260                   | 44.772                         | -29.228      | 74.000          |
| 9748.000                     | 7.630                   | 37.480                   | 45.110                         | -28.890      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |
| <b>Vertical</b>              |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4874.000                     | 0.532                   | 44.560                   | 45.092                         | -28.908      | 74.000          |
| 7311.000                     | 8.089                   | 37.490                   | 45.579                         | -28.421      | 74.000          |
| 9748.000                     | 8.266                   | 37.280                   | 45.547                         | -28.453      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wifi N module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit (802.11n 144.4Mbps 20M-BW) (2462 MHz)

| Frequency<br>MHz             | Correct<br>Factor<br>dB | Reading<br>Level<br>dBuV | Measurement<br>Level<br>dBuV/m | Margin<br>dB | Limit<br>dBuV/m |
|------------------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| <b>Horizontal</b>            |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4924.000                     | 0.191                   | 43.060                   | 43.251                         | -30.749      | 74.000          |
| 7386.000                     | 8.373                   | 37.210                   | 45.584                         | -28.416      | 74.000          |
| 9848.000                     | 7.964                   | 38.590                   | 46.554                         | -27.446      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |
| <b>Vertical</b>              |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4924.000                     | 0.805                   | 43.940                   | 44.745                         | -29.255      | 74.000          |
| 7386.000                     | 9.180                   | 37.310                   | 46.490                         | -27.510      | 74.000          |
| 9848.000                     | 8.801                   | 37.580                   | 46.381                         | -27.619      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.



Product : Wifi N module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit (802.11n 180Mbps 40M-BW) (2422MHz)

| Frequency<br>MHz             | Correct<br>Factor<br>dB | Reading<br>Level<br>dBuV | Measurement<br>Level<br>dBuV/m | Margin<br>dB | Limit<br>dBuV/m |
|------------------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| <b>Horizontal</b>            |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4844.000                     | 0.280                   | 42.190                   | 42.471                         | -31.529      | 74.000          |
| 7266.000                     | 7.106                   | 37.610                   | 44.716                         | -29.284      | 74.000          |
| 9688.000                     | 7.663                   | 37.540                   | 45.203                         | -28.797      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |
| <b>Vertical</b>              |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4844.000                     | 0.707                   | 43.680                   | 44.388                         | -29.612      | 74.000          |
| 7266.000                     | 7.626                   | 37.420                   | 45.046                         | -28.954      | 74.000          |
| 9688.000                     | 8.284                   | 37.220                   | 45.504                         | -28.496      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wifi N module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit (802.11n 180Mbps 40M-BW) (2437 MHz)

| Frequency<br>MHz | Correct<br>Factor<br>dB | Reading<br>Level<br>dBUV | Measurement<br>Level<br>dBUV/m | Margin<br>dB | Limit<br>dBUV/m |
|------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
|------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|

**Horizontal**

**Peak Detector:**

|          |       |        |        |         |        |
|----------|-------|--------|--------|---------|--------|
| 4874.000 | 0.076 | 42.560 | 42.637 | -31.363 | 74.000 |
| 7311.000 | 7.512 | 38.440 | 45.952 | -28.048 | 74.000 |
| 9748.000 | 7.630 | 37.400 | 45.030 | -28.970 | 74.000 |

**Average  
Detector:**

--

**Vertical**

**Peak Detector:**

|          |       |        |        |         |        |
|----------|-------|--------|--------|---------|--------|
| 4874.000 | 0.532 | 44.220 | 44.752 | -29.248 | 74.000 |
| 7311.000 | 8.089 | 37.590 | 45.679 | -28.321 | 74.000 |
| 9748.000 | 8.266 | 38.130 | 46.397 | -27.603 | 74.000 |

**Average  
Detector:**

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wifi N module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit (802.11n 180Mbps 40M-BW) (2452 MHz)

| Frequency<br>MHz             | Correct<br>Factor<br>dB | Reading<br>Level<br>dBuV | Measurement<br>Level<br>dBuV/m | Margin<br>dB | Limit<br>dBuV/m |
|------------------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| <b>Horizontal</b>            |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4904.000                     | 0.000                   | 42.590                   | 42.591                         | -31.409      | 74.000          |
| 7356.000                     | 8.308                   | 37.290                   | 45.598                         | -28.402      | 74.000          |
| 9808.000                     | 7.850                   | 38.700                   | 46.550                         | -27.450      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |
| <b>Vertical</b>              |                         |                          |                                |              |                 |
| <b>Peak Detector:</b>        |                         |                          |                                |              |                 |
| 4904.000                     | 0.513                   | 42.670                   | 43.184                         | -30.816      | 74.000          |
| 7356.000                     | 9.022                   | 37.000                   | 46.022                         | -27.978      | 74.000          |
| 9808.000                     | 8.512                   | 37.770                   | 46.282                         | -27.718      | 74.000          |
| <b>Average<br/>Detector:</b> |                         |                          |                                |              |                 |
| --                           |                         |                          |                                |              |                 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wifi N module  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (802.11b 11Mbps)(2437 MHz)

| Frequency<br>MHz  | Correct<br>Factor<br>dB | Reading<br>Level<br>dBuV | Measurement<br>Level<br>dBuV/m | Margin<br>dB | Limit<br>dBuV/m |
|-------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| <b>Horizontal</b> |                         |                          |                                |              |                 |
| 72.680            | -10.475                 | 40.920                   | 30.445                         | -9.555       | 40.000          |
| 136.700           | -10.313                 | 33.359                   | 23.046                         | -20.454      | 43.500          |
| 194.900           | -10.186                 | 41.531                   | 31.345                         | -12.155      | 43.500          |
| 330.700           | -9.969                  | 31.465                   | 21.496                         | -24.504      | 46.000          |
| 499.480           | -9.743                  | 32.193                   | 22.450                         | -23.550      | 46.000          |
| 912.700           | -9.273                  | 29.992                   | 20.719                         | -25.281      | 46.000          |
| <b>Vertical</b>   |                         |                          |                                |              |                 |
| 97.900            | -8.540                  | 44.611                   | 36.071                         | -7.429       | 43.500          |
| 194.900           | -8.325                  | 44.998                   | 36.673                         | -6.827       | 43.500          |
| 456.800           | -7.927                  | 35.767                   | 27.840                         | -18.160      | 46.000          |
| 499.480           | -7.882                  | 36.828                   | 28.946                         | -17.054      | 46.000          |
| 782.720           | -7.589                  | 39.848                   | 32.259                         | -13.741      | 46.000          |
| 846.740           | -7.457                  | 36.645                   | 29.188                         | -16.812      | 46.000          |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wifi N module  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit (802.11g 48Mbps)(2437 MHz)

| Frequency<br>MHz  | Correct<br>Factor<br>dB | Reading<br>Level<br>dBuV | Measurement<br>Level<br>dBuV/m | Margin<br>dB | Limit<br>dBuV/m |
|-------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| <b>Horizontal</b> |                         |                          |                                |              |                 |
| 66.860            | -10.492                 | 40.950                   | 30.458                         | -9.542       | 40.000          |
| 72.680            | -10.475                 | 40.841                   | 30.366                         | -9.634       | 40.000          |
| 194.900           | -10.186                 | 41.839                   | 31.653                         | -11.847      | 43.500          |
| 249.220           | -10.109                 | 35.132                   | 25.023                         | -20.977      | 46.000          |
| 782.720           | -9.450                  | 35.377                   | 25.927                         | -20.073      | 46.000          |
| 800.180           | -9.429                  | 36.652                   | 27.223                         | -18.777      | 46.000          |
| <b>Vertical</b>   |                         |                          |                                |              |                 |
| 72.680            | -8.614                  | 45.184                   | 36.570                         | -3.430       | 40.000          |
| 171.620           | -8.373                  | 38.596                   | 30.223                         | -13.277      | 43.500          |
| 194.900           | -8.325                  | 41.563                   | 33.238                         | -10.262      | 43.500          |
| 456.800           | -7.927                  | 38.565                   | 30.638                         | -15.362      | 46.000          |
| 499.480           | -7.882                  | 35.406                   | 27.524                         | -18.476      | 46.000          |
| 782.720           | -7.589                  | 41.623                   | 34.034                         | -11.966      | 46.000          |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wifi N module  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit (802.11n 144.4Mbps 20M-BW)(2437 MHz)

| Frequency<br>MHz  | Correct<br>Factor<br>dB | Reading<br>Level<br>dBuV | Measurement<br>Level<br>dBuV/m | Margin<br>dB | Limit<br>dBuV/m |
|-------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| <b>Horizontal</b> |                         |                          |                                |              |                 |
| 72.680            | -10.475                 | 42.789                   | 32.314                         | -7.686       | 40.000          |
| 123.120           | -10.353                 | 41.499                   | 31.146                         | -12.354      | 43.500          |
| 194.900           | -10.186                 | 36.582                   | 26.396                         | -17.104      | 43.500          |
| 379.200           | -9.912                  | 44.659                   | 34.747                         | -11.253      | 46.000          |
| 641.100           | -9.618                  | 33.544                   | 23.926                         | -22.074      | 46.000          |
| 782.720           | -9.450                  | 33.863                   | 24.413                         | -21.587      | 46.000          |
| <b>Vertical</b>   |                         |                          |                                |              |                 |
| 97.900            | -8.540                  | 43.194                   | 34.654                         | -8.846       | 43.500          |
| 138.640           | -8.447                  | 40.862                   | 32.415                         | -11.085      | 43.500          |
| 194.900           | -8.325                  | 38.071                   | 29.746                         | -13.754      | 43.500          |
| 249.220           | -8.248                  | 36.162                   | 27.914                         | -18.086      | 46.000          |
| 454.860           | -7.929                  | 38.614                   | 30.685                         | -15.315      | 46.000          |
| 782.720           | -7.589                  | 33.000                   | 25.411                         | -20.589      | 46.000          |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wifi N module  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit (802.11n 180Mbps 40M-BW)(2437 MHz)

| Frequency<br>MHz  | Correct<br>Factor<br>dB | Reading<br>Level<br>dBuV | Measurement<br>Level<br>dBuV/m | Margin<br>dB | Limit<br>dBuV/m |
|-------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| <b>Horizontal</b> |                         |                          |                                |              |                 |
| 194.900           | -10.186                 | 37.945                   | 27.759                         | -15.741      | 43.500          |
| 249.220           | -10.109                 | 30.820                   | 20.711                         | -25.289      | 46.000          |
| 383.080           | -9.907                  | 32.084                   | 22.177                         | -23.823      | 46.000          |
| 499.480           | -9.743                  | 31.937                   | 22.194                         | -23.806      | 46.000          |
| 641.100           | -9.618                  | 33.452                   | 23.834                         | -22.166      | 46.000          |
| 782.720           | -9.450                  | 31.235                   | 21.785                         | -24.215      | 46.000          |
| <b>Vertical</b>   |                         |                          |                                |              |                 |
| 97.900            | -8.540                  | 42.949                   | 34.409                         | -9.091       | 43.500          |
| 142.520           | -8.439                  | 40.020                   | 31.581                         | -11.919      | 43.500          |
| 194.900           | -8.325                  | 38.424                   | 30.099                         | -13.401      | 43.500          |
| 458.740           | -7.924                  | 37.664                   | 29.740                         | -16.260      | 46.000          |
| 782.720           | -7.589                  | 36.794                   | 29.205                         | -16.795      | 46.000          |
| 792.420           | -7.578                  | 33.238                   | 25.660                         | -20.340      | 46.000          |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

**5. RF antenna conducted test**

**5.1. Test Equipment**

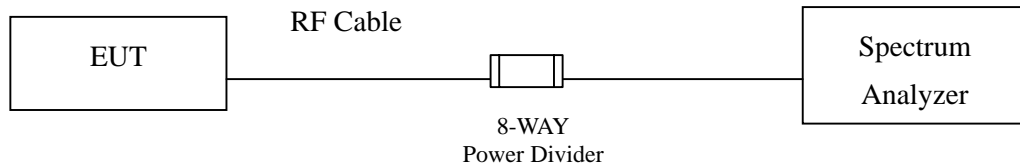
The following test equipments are used during the radiated emission tests:

|   | Equipment           | Manufacturer | Model No./Serial No.   | Last Cal.  |
|---|---------------------|--------------|------------------------|------------|
|   | Spectrum Analyzer   | R&S          | FSP40 / 100170         | Jun, 2010  |
|   | Spectrum Analyzer   | Agilent      | E4407B / US39440758    | Jun, 2010  |
| X | Spectrum Analyzer   | Agilent      | N9010A / MY48030495    | Apr., 2010 |
| X | 8-WAY Power Divider | JFW          | 50PD-647 / 526770 0916 | Apr., 2010 |

- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
  2. The test instruments marked with “X” are used to measure the final test results.
  3. The power combiner is used for measure 11n mode.

**5.2. Test Setup**

**RF antenna Conducted Measurement:**



**5.3. Limits**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).



#### 5.4. Test Procedure

The EUT was tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

#### 5.5. Uncertainty

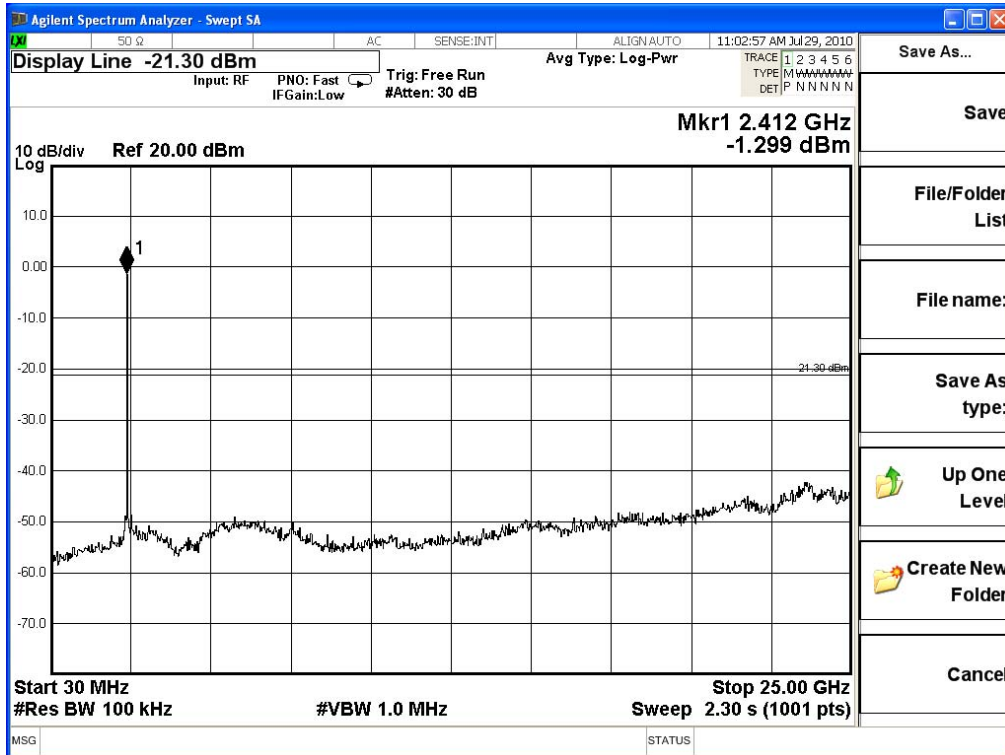
The measurement uncertainty

Conducted is defined as  $\pm 1.27\text{dB}$

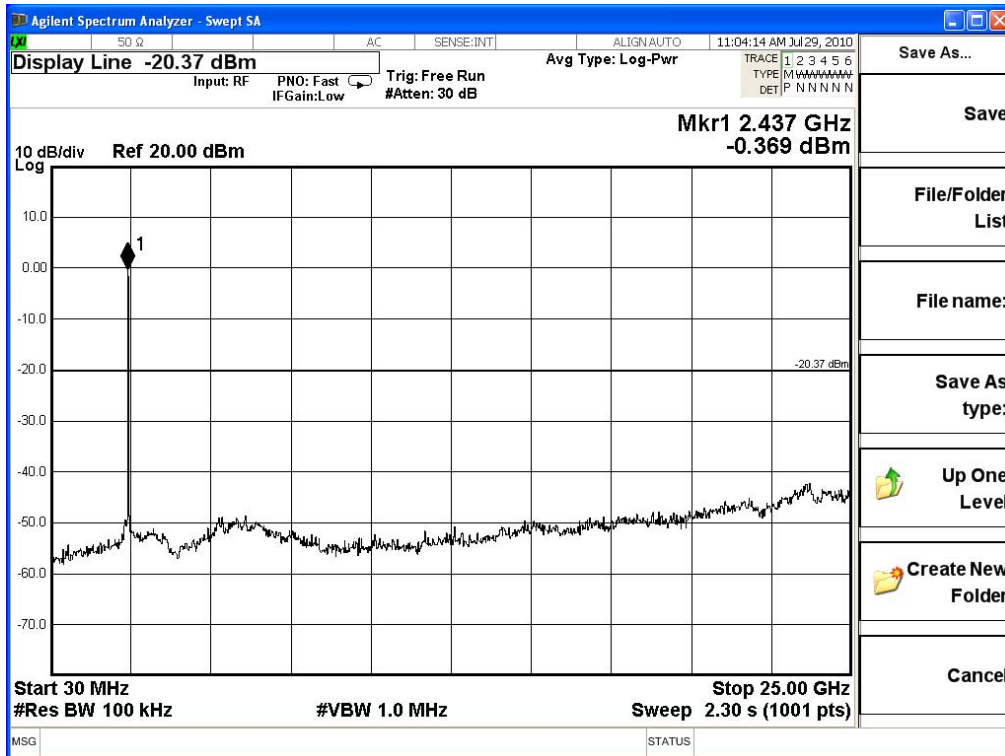
**5.6. Test Result of RF antenna conducted test**

Product : Wifi N module  
 Test Item : RF antenna conducted test  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (802.11b 11Mbps)

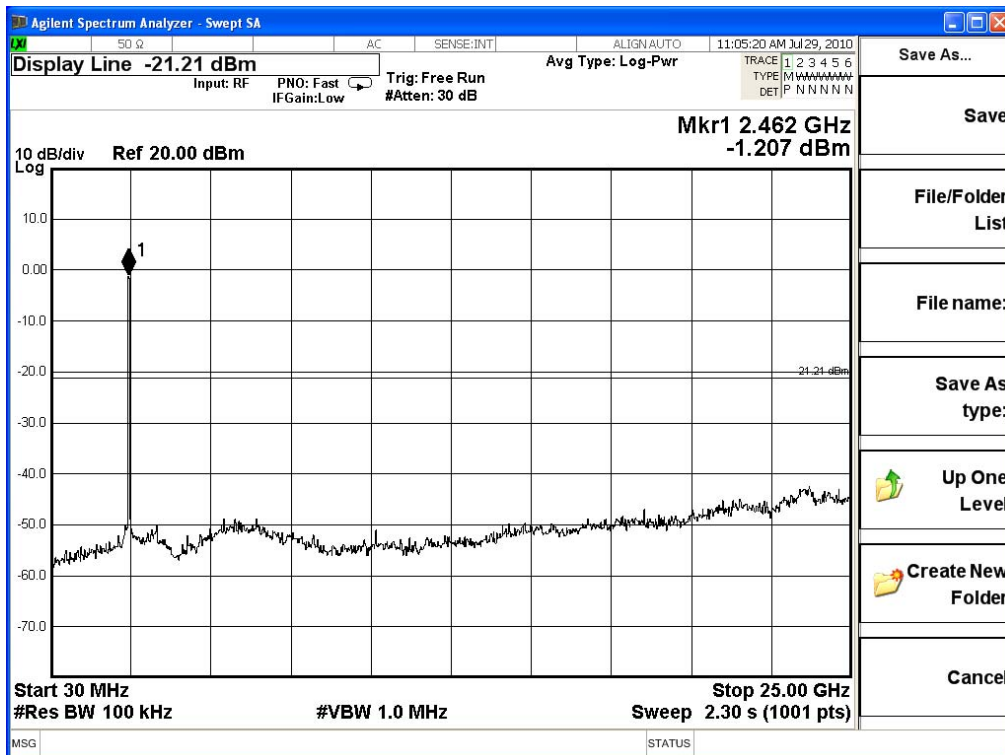
**Channel 01 (2412MHz) 30-25GHz**



**Channel 06 (2437MHz) 30-25GHz**

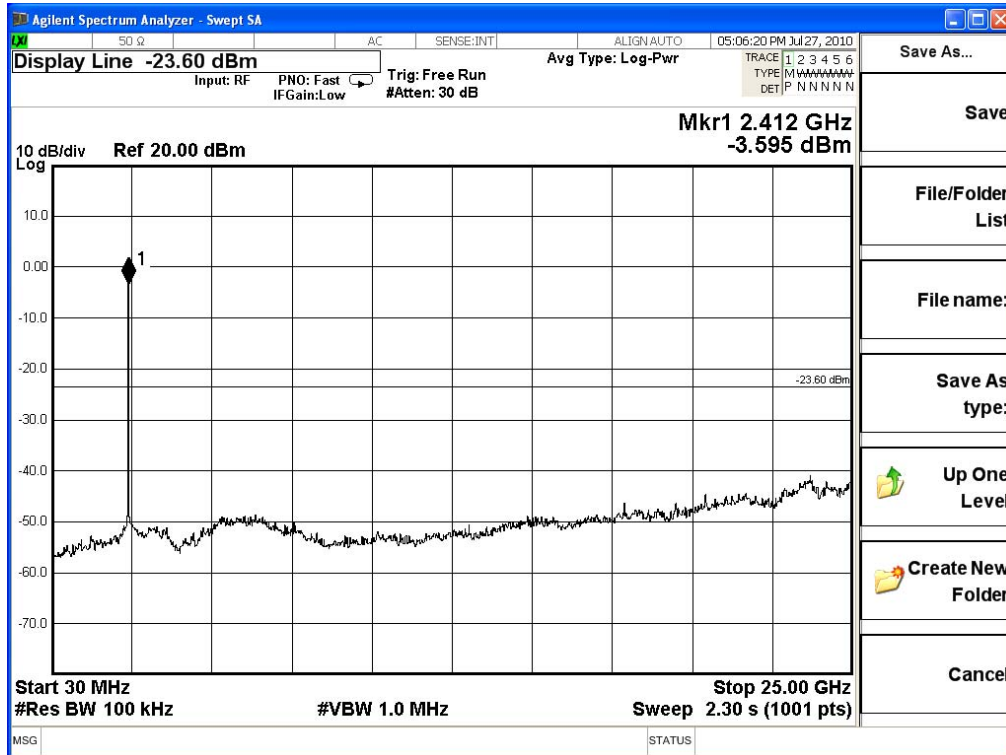


**Channel 11 (2462MHz) 30-25GHz**

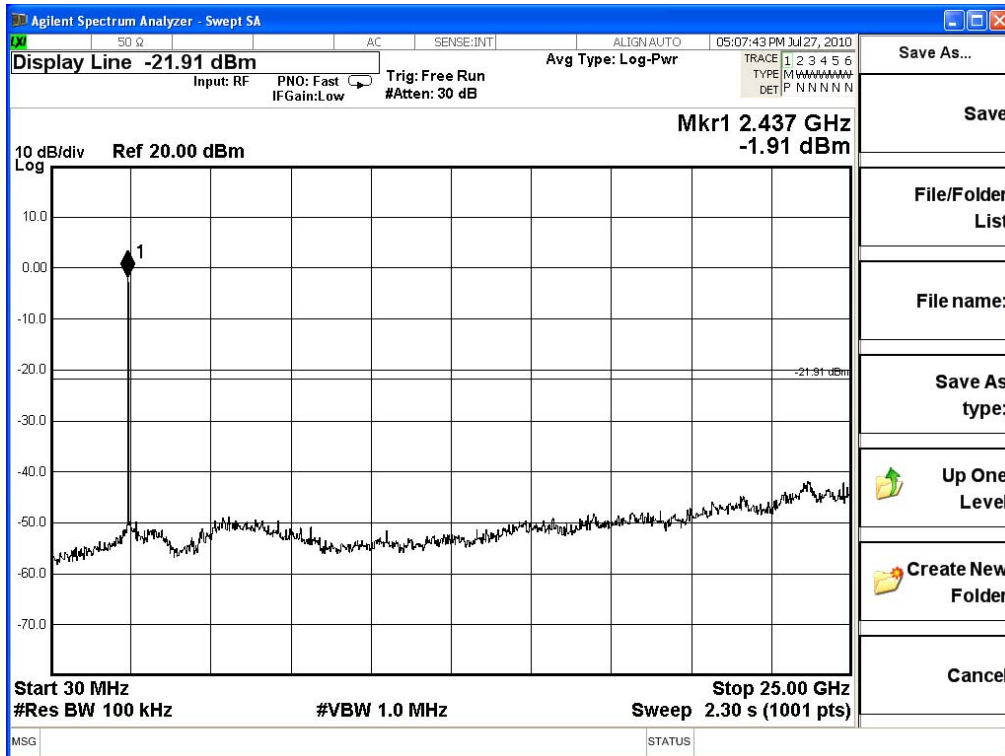


Product : Wifi N module  
 Test Item : RF Antenna Conducted Spurious  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit (802.11g 48Mbps)

**Channel 01 (2412MHz) 30-25GHz**



**Channel 06 (2437MHz) 30-25GHz**

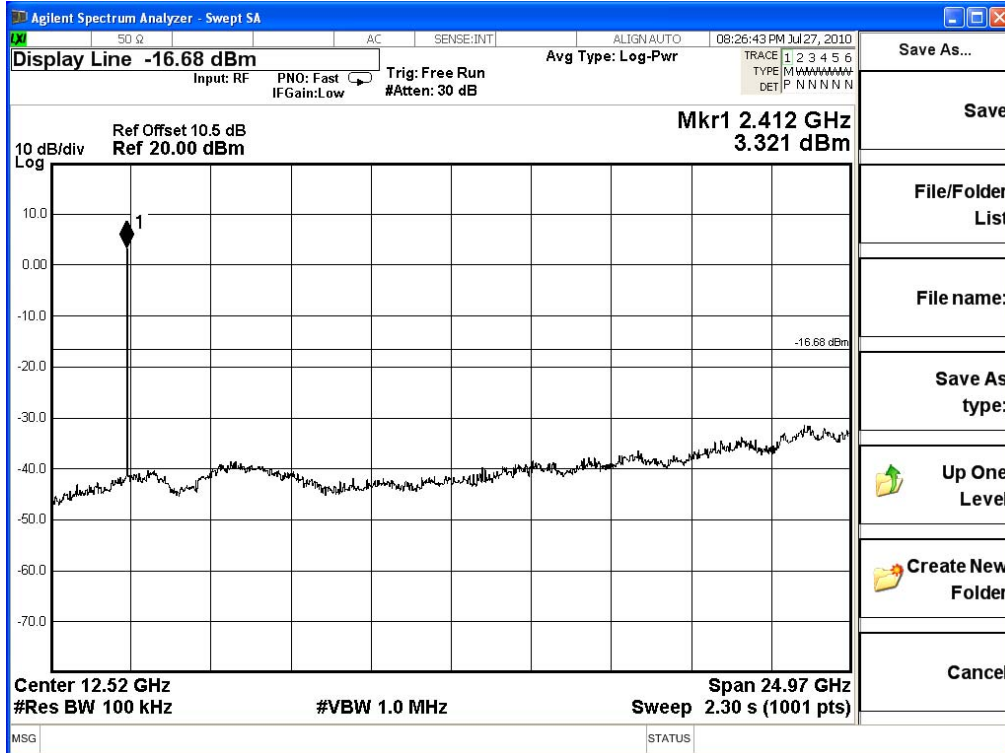


**Channel 11 (2462MHz) 30-25GHz**

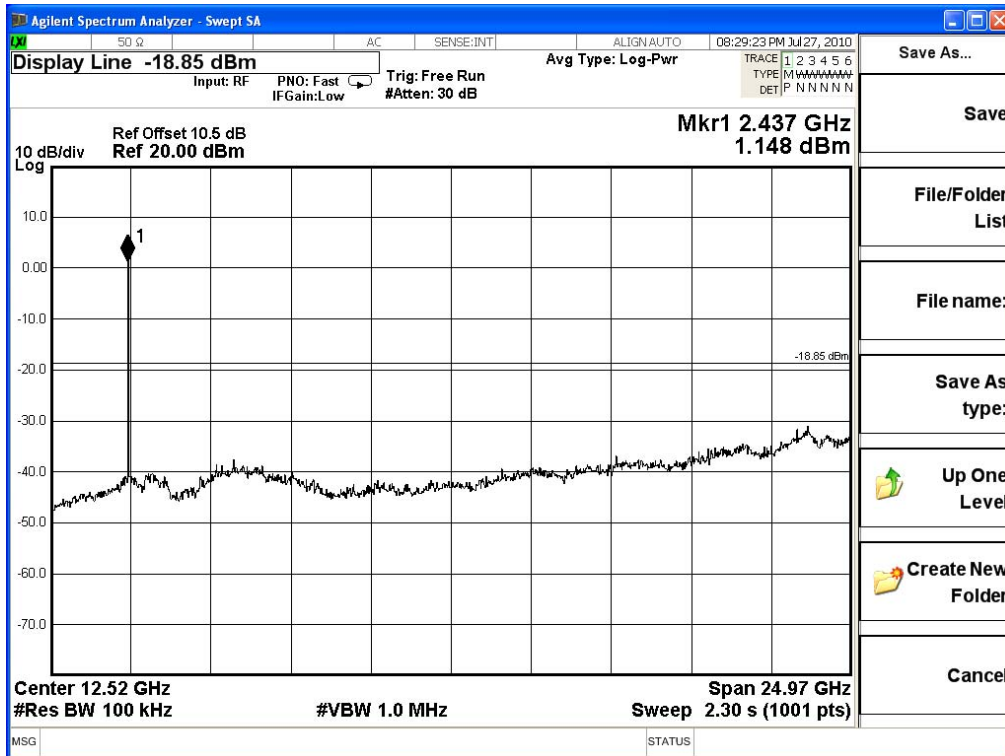


Product : Wifi N module  
 Test Item : RF Antenna Conducted Spurious  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit (802.11n 144.4Mbps 20M-BW)

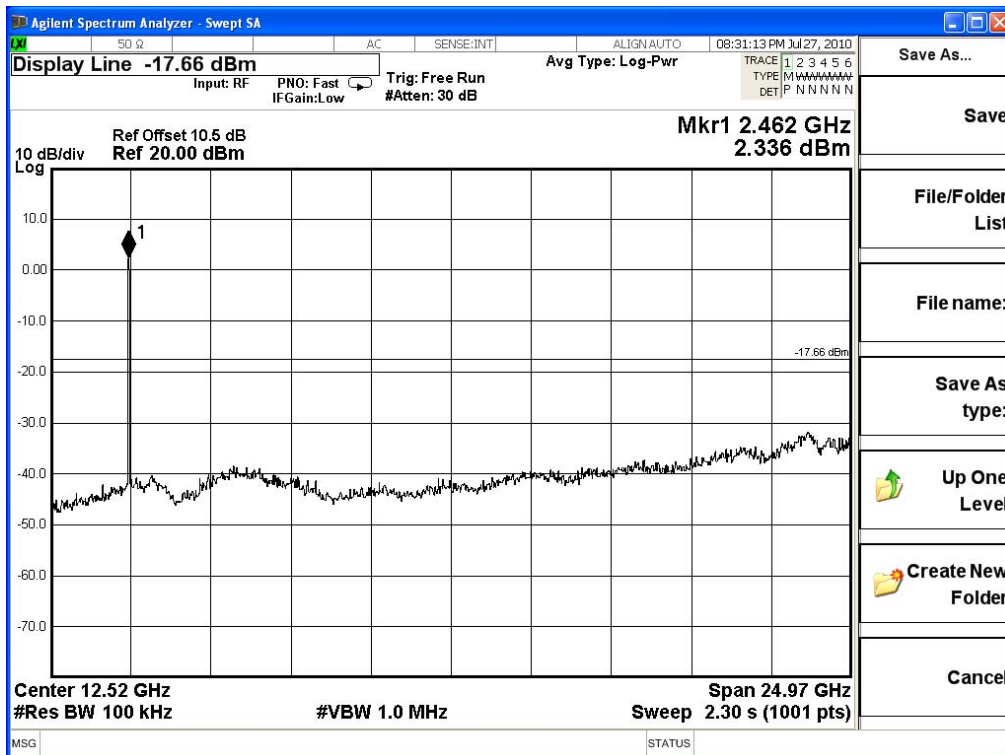
**Channel 01 (2412MHz) 30-25GHz**



### Channel 06 (2437MHz) 30-25GHz

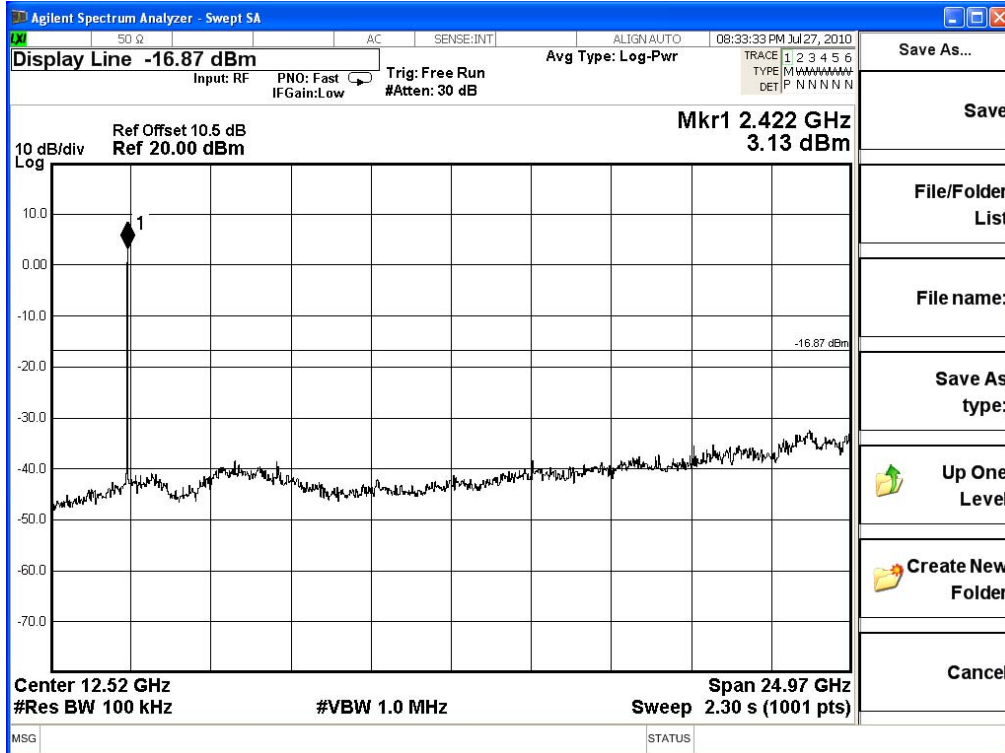


### Channel 11 (2462MHz) 30-25GHz



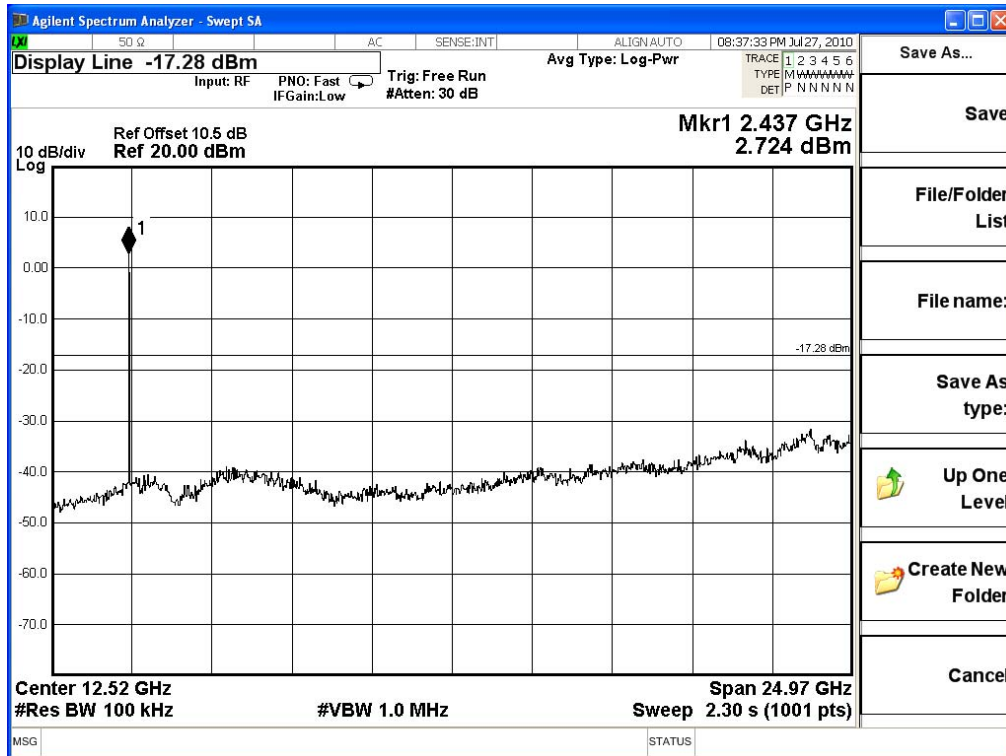
Product : Wifi N module  
 Test Item : RF Antenna Conducted Spurious  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit (802.11n 180Mbps 40M-BW)

**Channel 01 (2422MHz) 30-25GHz**

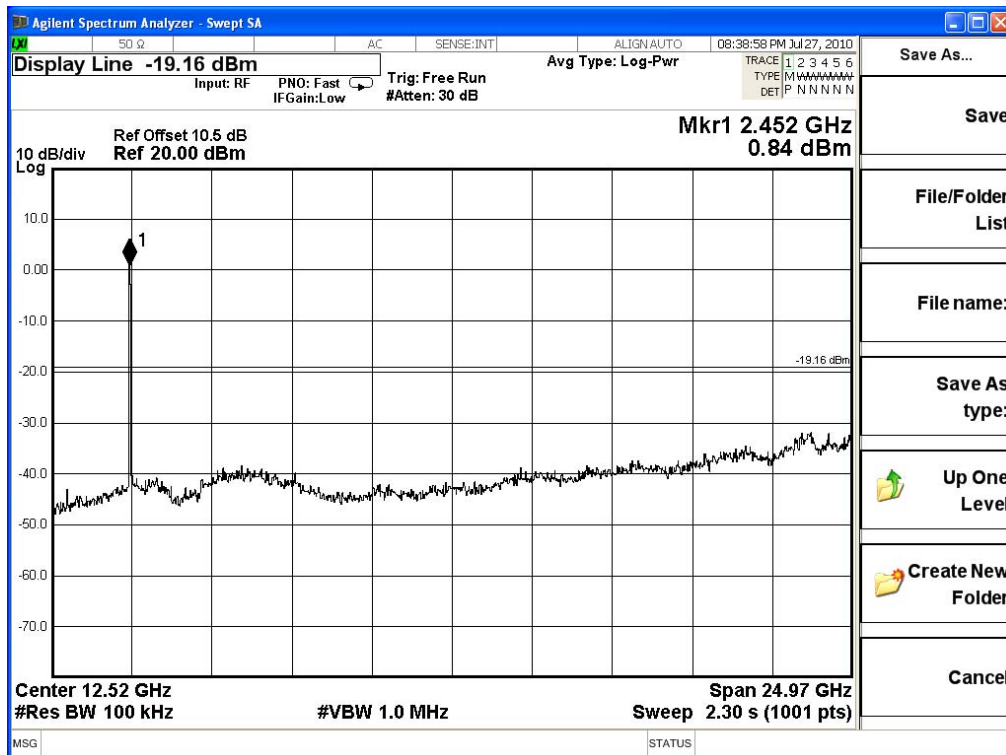




**Channel 04 (2437MHz) 30-25GHz**



**Channel 07 (2452MHz) 30-25GHz**



## 6. Band Edge

### 6.1. Test Equipment

#### RF Conducted Measurement

The following test equipments are used during the band edge tests:

|   | Equipment           | Manufacturer | Model No./Serial No.   | Last Cal.  |
|---|---------------------|--------------|------------------------|------------|
|   | Spectrum Analyzer   | R&S          | FSP40 / 100170         | Jun, 2010  |
|   | Spectrum Analyzer   | Agilent      | E4407B / US39440758    | Jun, 2010  |
| X | Spectrum Analyzer   | Agilent      | N9010A / MY48030495    | Apr., 2010 |
| X | 8-WAY Power Divider | JFW          | 50PD-647 / 526770 0916 | Apr., 2010 |

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with "X" are used to measure the final test results.
3. The power combiner is used for measure 11n mode.

#### RF Radiated Measurement:

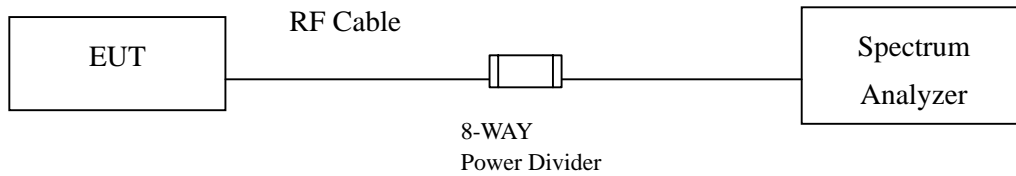
The following test equipments are used during the band edge tests:

| Test Site                                    | Equipment           | Manufacturer    | Model No./Serial No.  | Last Cal.  |
|--|---------------------|-----------------|-----------------------|------------|
| <input checked="" type="checkbox"/> Site # 3 | Bilog Antenna       | Schaffner Chase | CBL6112B/2673         | Sep., 2009 |
|  | X Horn Antenna      | Schwarzbeck     | BBHA9120D/D305        | Sep., 2009 |
|  | Horn Antenna        | Schwarzbeck     | BBHA9170/208          | Jul., 2010 |
|  | X Pre-Amplifier     | Agilent         | 8447D/2944A09549      | Sep., 2009 |
|  | X Spectrum Analyzer | Agilent         | E4407B / US39440758   | May, 2010  |
|  | Test Receiver       | R & S           | ESCS 30/ 825442/018   | Sep., 2009 |
|  | X Coaxial Cable     | Quietek         | QTK-CABLE/ CAB5       | Feb., 2010 |
|  | X Controller        | Quietek         | QTK-CONTROLLER/ CTRL3 | N/A        |
|  | X Coaxial Switch    | Anritsu         | MP59B/6200265729      | N/A        |

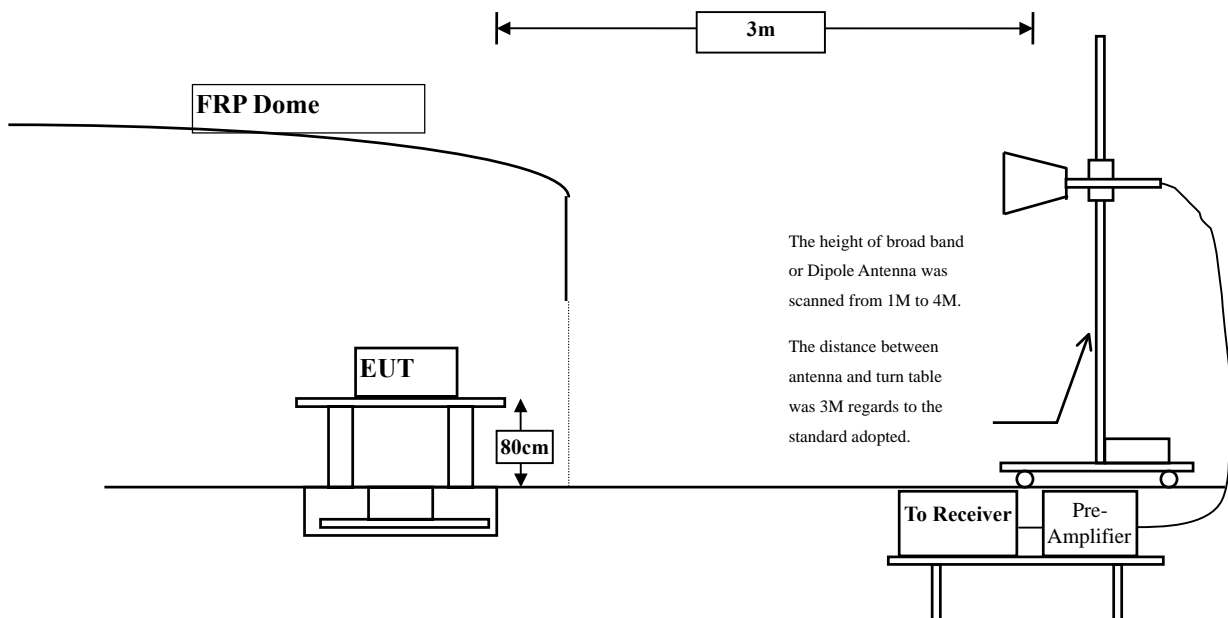
- Note:
1. All instruments are calibrated every one year.
  2. The test instruments marked by "X" are used to measure the final test results.

## 6.2. Test Setup

### RF Conducted Measurement



### RF Radiated Measurement:



## 6.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

#### **6.4. Test Procedure**

The EUT was setup according to ANSI C63.4, 2003 and tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2003 on radiated measurement.

#### **6.5. Uncertainty**

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

## 6.6. Test Result of Band Edge

Product : Wifi N module  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (802.11b 11Mbps)

### Fundamental Filed Strength

| Antenna Pole | Frequency [MHz] | Correction Factor [dB/m] | Reading Level [dBuV] | Emission Level [dBuV/m] | Detector |
|--------------|-----------------|--------------------------|----------------------|-------------------------|----------|
| Horizontal   | 2412            | 31.771                   | 68.8                 | 100.572                 | Peak     |
| Horizontal   | 2412            | 31.771                   | 58.85                | 90.622                  | Average  |
| Vertical     | 2412            | 30.248                   | 74.04                | 104.289                 | Peak     |
| Vertical     | 2412            | 30.248                   | 62.32                | 92.569                  | Average  |

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

### Band Edge Test Data

| Antenna Pole | Test Frequency (MHz) | Fundamental (dBuV/m) | $\Delta$ (dB) | Band Edge Field Strength (dBuV/m) | Detector |
|--------------|----------------------|----------------------|---------------|-----------------------------------|----------|
| Horizontal   | 2373.7               | 100.572              | 49.624        | 50.948                            | Peak     |
| Horizontal   | 2374.8               | 90.622               | 53.6          | 37.022                            | Average  |
| Vertical     | 2373.7               | 104.289              | 49.624        | 54.665                            | Peak     |
| Vertical     | 2374.8               | 92.569               | 53.6          | 38.969                            | Average  |

Note:

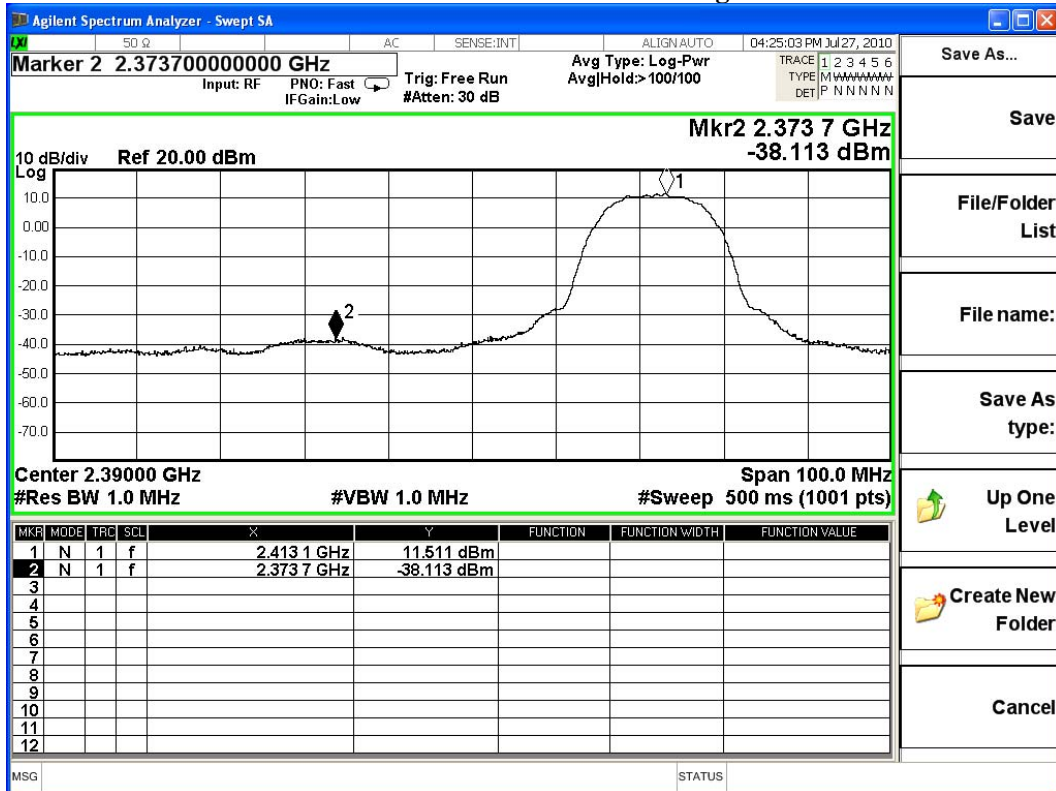
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F -  $\Delta$

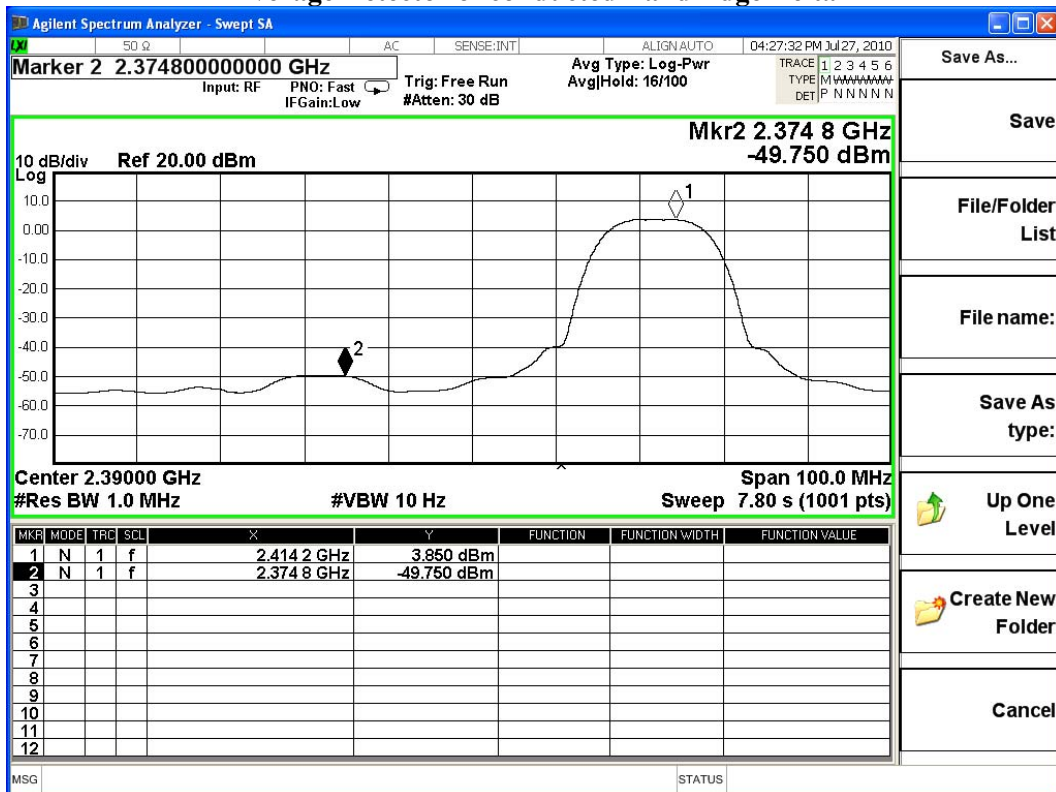
F = Fundamental field Strength (Peak or Average)

$\Delta$  = Conducted Band Edge Delta (Peak or Average)

### Peak Detector of conducted Band Edge Delta



### Average Detector of conducted Band Edge Delta



Product : Wifi N module  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (802.11b 11Mbps)

**Fundamental Filed Strength**

| Antenna Pole | Frequency [MHz] | Correction Factor [dB/m] | Reading Level [dBuV] | Emission Level [dBuV/m] | Detector |
|--------------|-----------------|--------------------------|----------------------|-------------------------|----------|
| Horizontal   | 2462            | 30.48                    | 70.04                | 100.52                  | Peak     |
| Horizontal   | 2462            | 30.48                    | 62.32                | 92.8                    | Average  |
| Vertical     | 2462            | 30.48                    | 70.75                | 101.23                  | Peak     |
| Vertical     | 2462            | 30.48                    | 60.49                | 90.97                   | Average  |

Note: 1: Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

**Band Edge Test Data**

| Antenna Pole | Test Frequency (MHz) | Fundamental (dBuV/m) | $\Delta$ (dB) | Band Edge Field Strength (dBuV/m) | Detector |
|--------------|----------------------|----------------------|---------------|-----------------------------------|----------|
| Horizontal   | 2500                 | 100.52               | 49.201        | 51.319                            | Peak     |
| Horizontal   | 2500                 | 92.8                 | 52.522        | 40.278                            | Average  |
| Vertical     | 2500                 | 101.23               | 49.201        | 52.029                            | Peak     |
| Vertical     | 2500                 | 90.97                | 52.522        | 38.448                            | Average  |

Note:

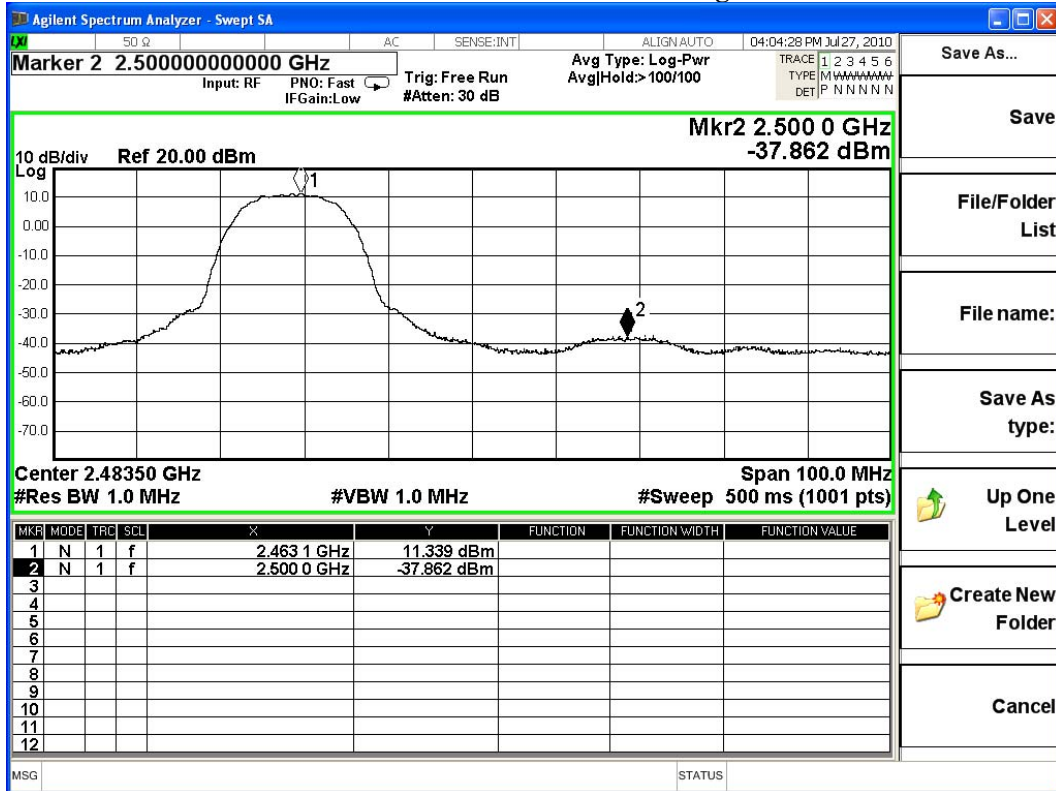
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F -  $\Delta$

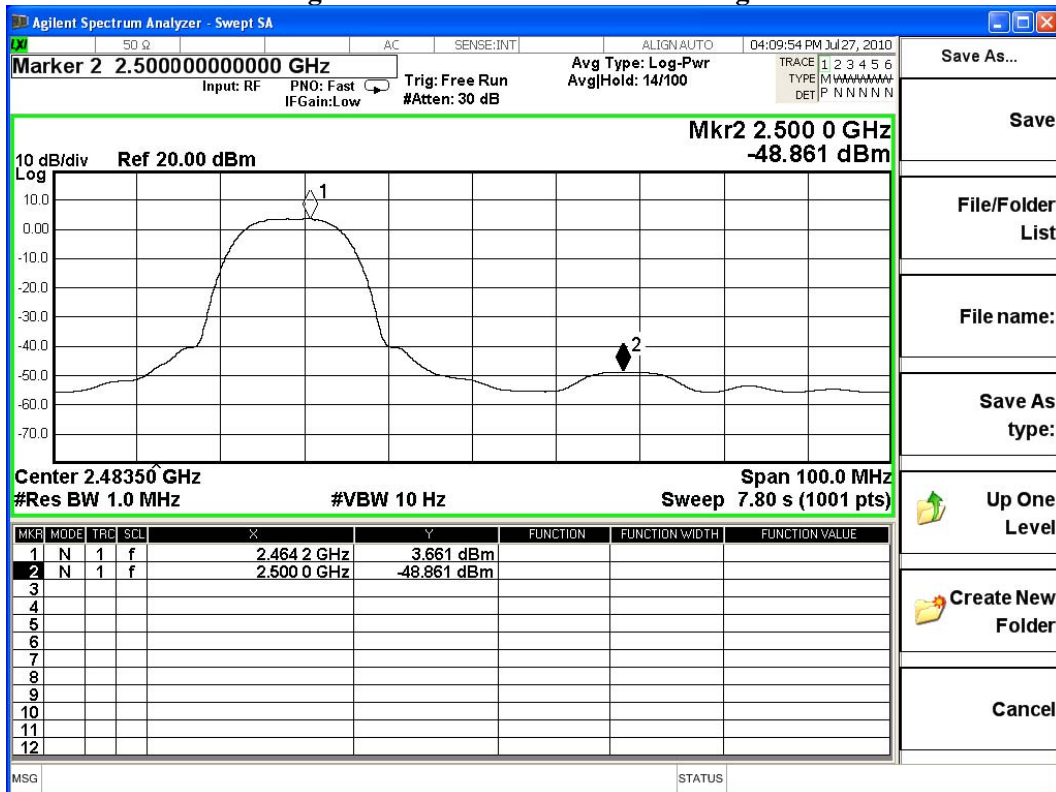
F = Fundamental field Strength (Peak or Average)

$\Delta$  = Conducted Band Edge Delta (Peak or Average)

### Peak Detector of conducted Band Edge Delta



### Average Detector of conducted Band Edge Delta





Product : Wifi N module  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit (802.11g 48Mbps)

**Fundamental Filed Strength**

| Antenna Pole | Frequency [MHz] | Correction Factor [dB/m] | Reading Level [dBuV] | Emission Level [dBuV/m] | Detector |
|--------------|-----------------|--------------------------|----------------------|-------------------------|----------|
| Horizontal   | 2412            | 30.325                   | 66.48                | 98.252                  | Peak     |
| Horizontal   | 2412            | 30.325                   | 58.87                | 90.642                  | Average  |
| Vertical     | 2412            | 30.248                   | 66.47                | 96.719                  | Peak     |
| Vertical     | 2412            | 30.248                   | 59.4                 | 89.649                  | Average  |

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

**Band Edge Test Data**

| Antenna Pole | Test Frequency (MHz) | Fundamental (dBuV/m) | $\Delta$ (dB) | Band Edge Field Strength (dBuV/m) | Detector |
|--------------|----------------------|----------------------|---------------|-----------------------------------|----------|
| Horizontal   | 2359.1               | 98.252               | 46.046        | 52.206                            | Peak     |
| Horizontal   | 2367.6               | 90.642               | 52.057        | 38.585                            | Average  |
| Vertical     | 2359.1               | 96.719               | 46.046        | 50.673                            | Peak     |
| Vertical     | 2367.6               | 89.649               | 52.057        | 37.592                            | Average  |

Note:

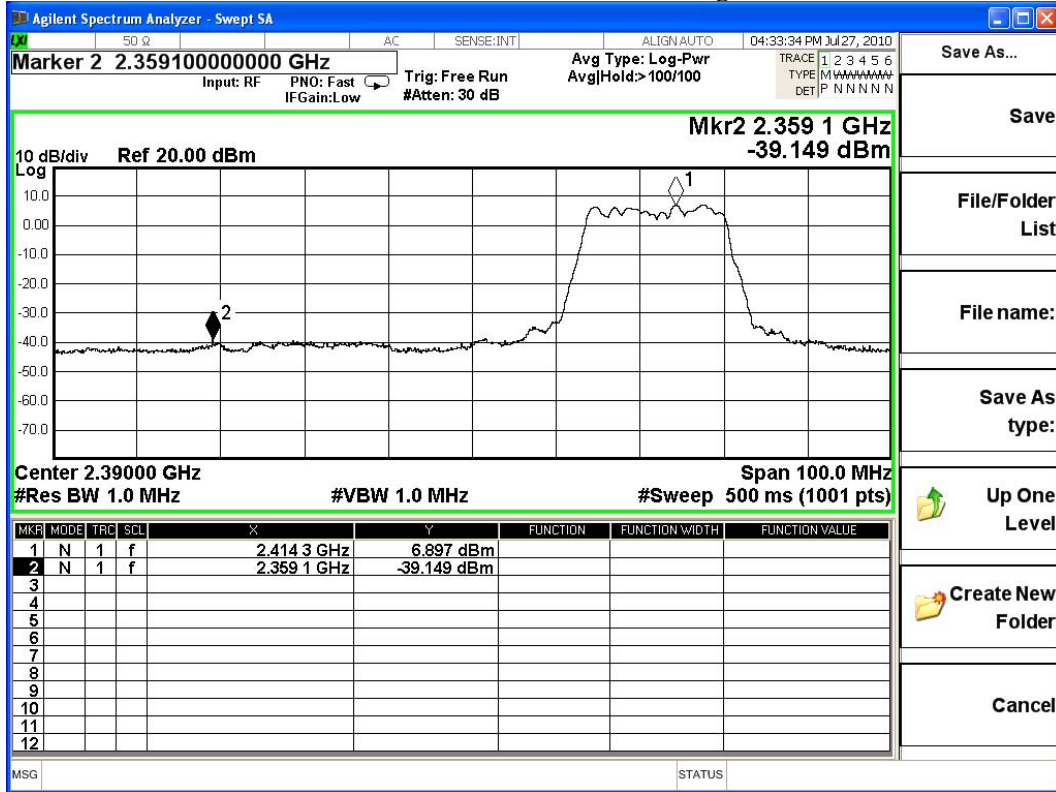
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F -  $\Delta$

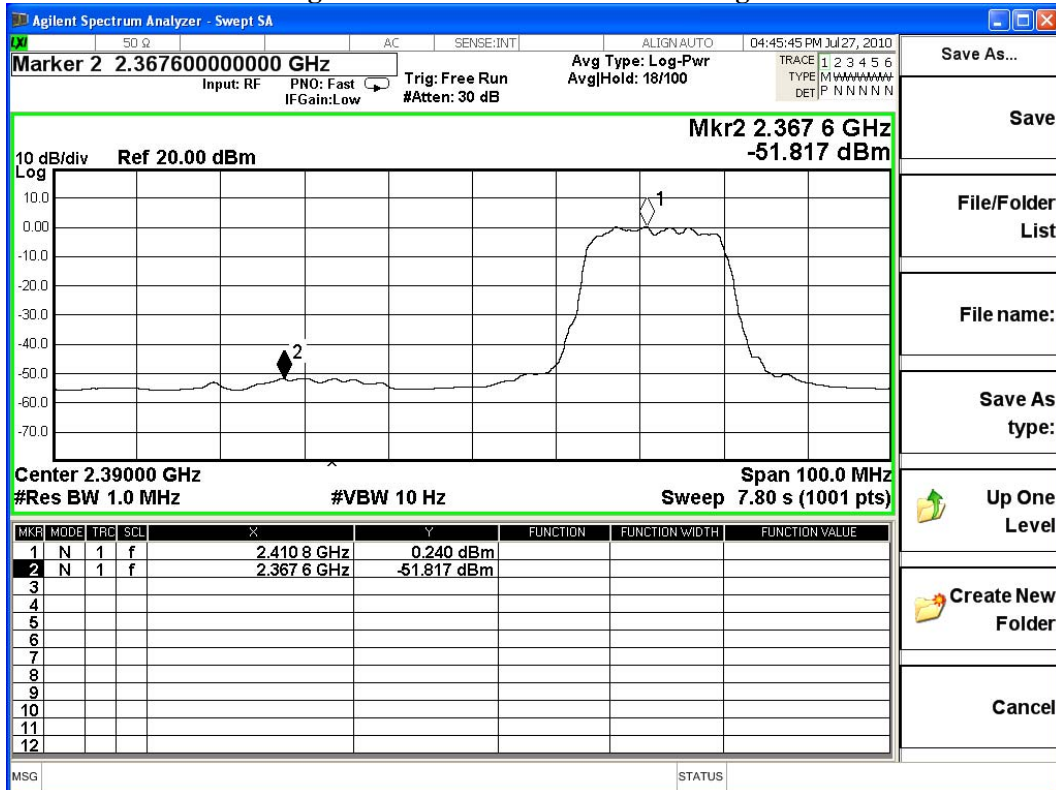
F = Fundamental field Strength (Peak or Average)

$\Delta$  = Conducted Band Edge Delta (Peak or Average)

### Peak Detector of conducted Band Edge Delta



### Average Detector of conducted Band Edge Delta



Product : Wifi N module  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit (802.11g 48Mbps)

**Fundamental Filed Strength**

| Antenna Pole | Frequency [MHz] | Correction Factor [dB/m] | Reading Level [dBuV] | Emission Level [dBuV/m] | Detector |
|--------------|-----------------|--------------------------|----------------------|-------------------------|----------|
| Horizontal   | 2462            | 31.892                   | 64.9                 | 96.792                  | Peak     |
| Horizontal   | 2462            | 31.892                   | 55.69                | 87.582                  | Average  |
| Vertical     | 2462            | 30.48                    | 67.21                | 97.69                   | Peak     |
| Vertical     | 2462            | 30.48                    | 57.91                | 88.39                   | Average  |

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

**Band Edge Test Data**

| Antenna Pole | Test Frequency (MHz) | Fundamental (dBuV/m) | $\Delta$ (dB) | Band Edge Field Strength (dBuV/m) | Detector |
|--------------|----------------------|----------------------|---------------|-----------------------------------|----------|
| Horizontal   | 2499                 | 96.792               | 46.469        | 50.323                            | Peak     |
| Horizontal   | 2500                 | 87.582               | 51.52         | 36.062                            | Average  |
| Vertical     | 2499                 | 97.69                | 46.469        | 51.221                            | Peak     |
| Vertical     | 2500                 | 88.39                | 51.52         | 36.87                             | Average  |

Note:

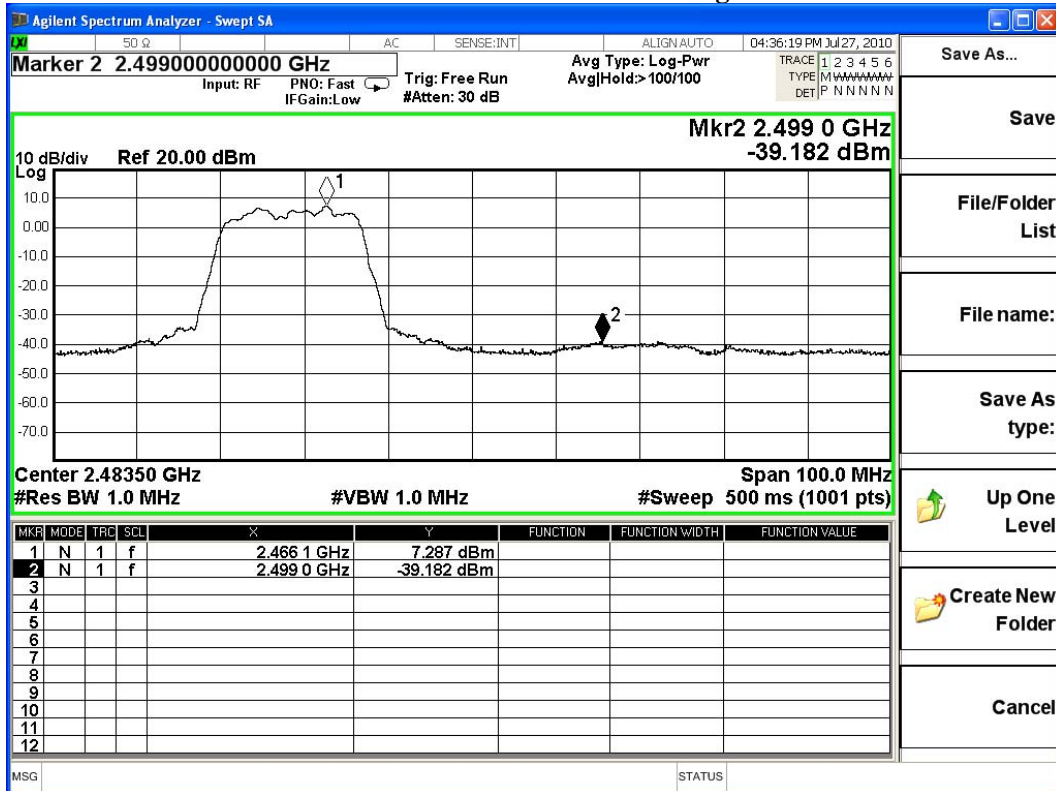
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F -  $\Delta$

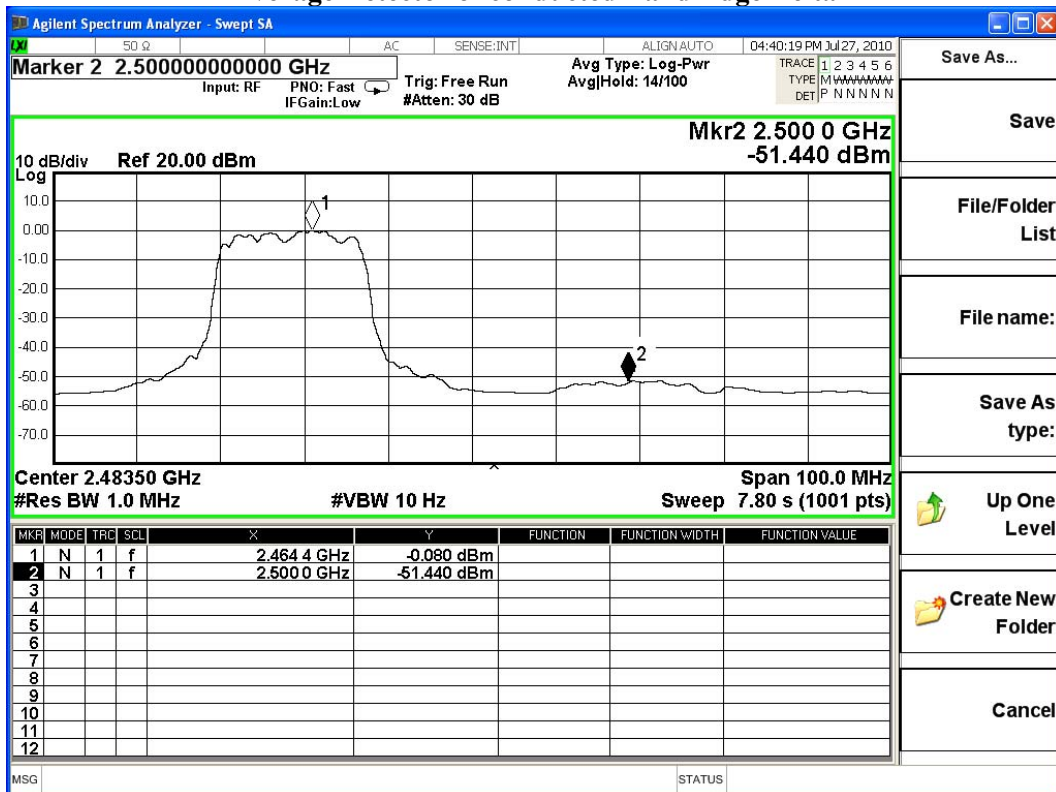
F = Fundamental field Strength (Peak or Average)

$\Delta$  = Conducted Band Edge Delta (Peak or Average)

### Peak Detector of conducted Band Edge Delta



### Average Detector of conducted Band Edge Delta



Product : Wifi N module  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit (802.11n 144.4Mbps 20M-BW)

**Fundamental Filed Strength**

| Antenna Pole | Frequency [MHz] | Correction Factor [dB/m] | Reading Level [dBuV] | Emission Level [dBuV/m] | Detector |
|--------------|-----------------|--------------------------|----------------------|-------------------------|----------|
| Horizontal   | 2412            | 31.771                   | 68.57                | 100.342                 | Peak     |
| Horizontal   | 2412            | 31.771                   | 59.66                | 91.432                  | Average  |
| Vertical     | 2412            | 30.248                   | 70.46                | 100.709                 | Peak     |
| Vertical     | 2412            | 30.248                   | 61.98                | 92.229                  | Average  |

Note: 1: Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

**Band Edge Test Data**

| Antenna Pole | Test Frequency (MHz) | Fundamental (dBuV/m) | $\Delta$ (dB) | Band Edge Field Strength (dBuV/m) | Detector |
|--------------|----------------------|----------------------|---------------|-----------------------------------|----------|
| Horizontal   | 2360.1               | 100.342              | 43.939        | 56.403                            | Peak     |
| Horizontal   | 2369.8               | 91.432               | 48.898        | 42.534                            | Average  |
| Vertical     | 2360.1               | 100.709              | 43.939        | 56.77                             | Peak     |
| Vertical     | 2369.8               | 92.229               | 48.898        | 43.331                            | Average  |

Note:

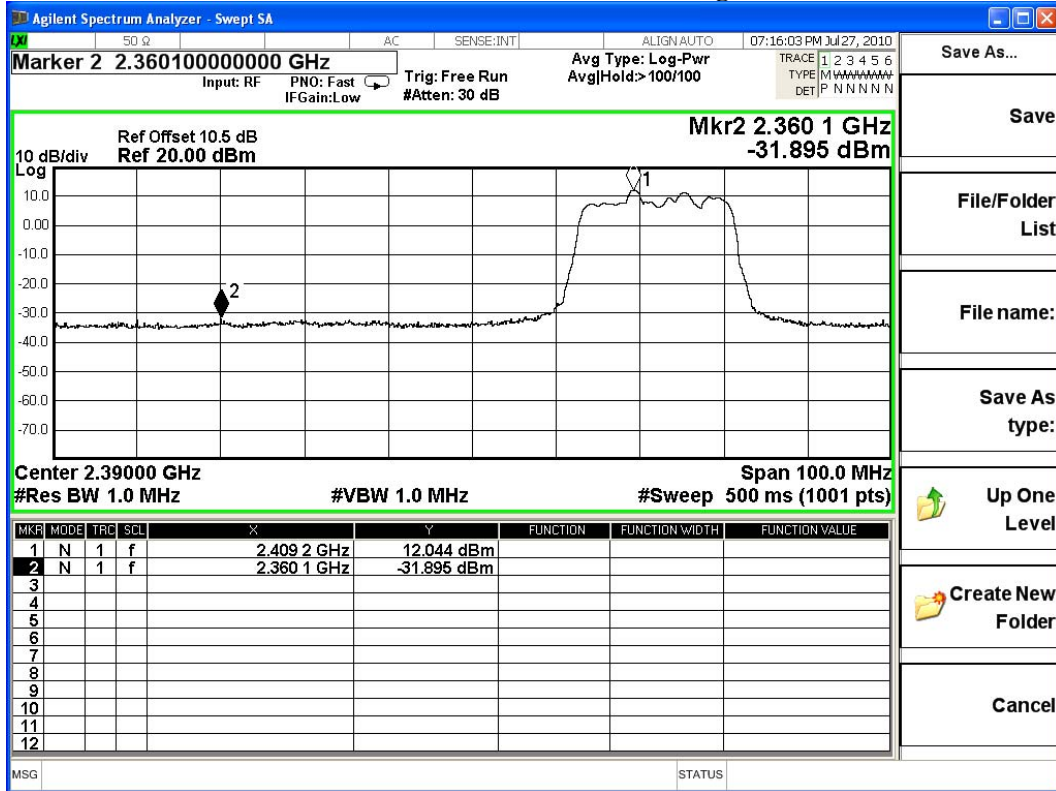
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F -  $\Delta$

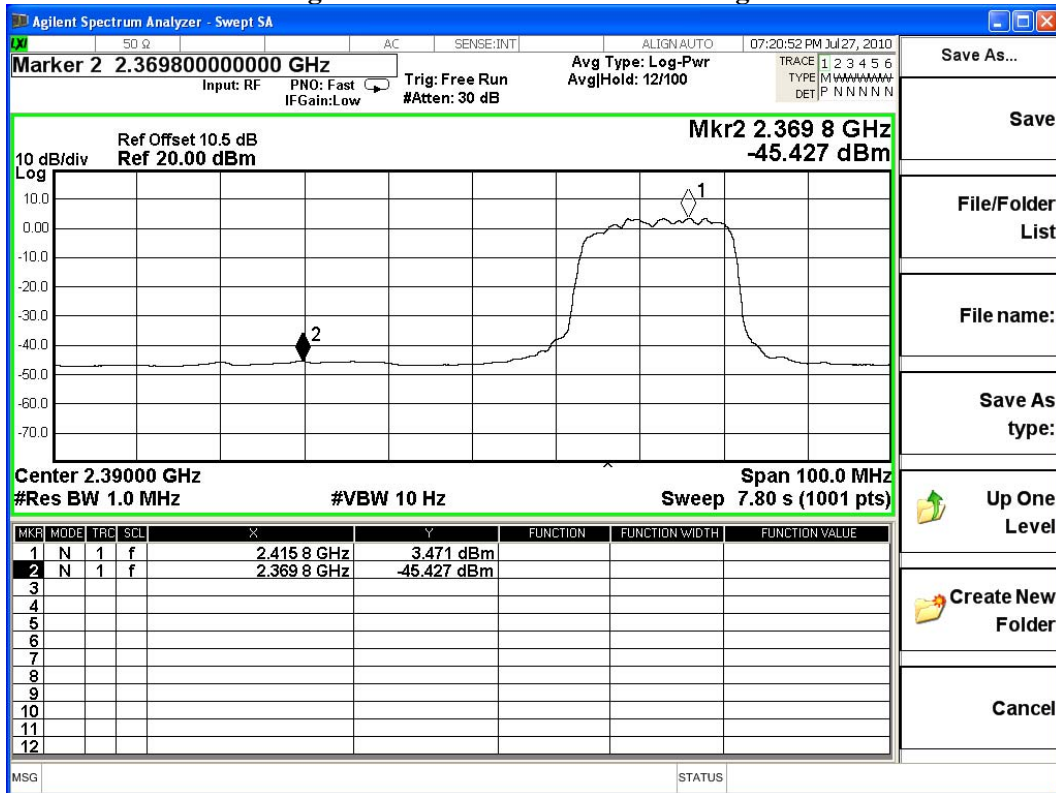
F = Fundamental field Strength (Peak or Average)

$\Delta$  = Conducted Band Edge Delta (Peak or Average)

### Peak Detector of conducted Band Edge Delta



### Average Detector of conducted Band Edge Delta



Product : Wifi N module  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit (802.11n 144.4Mbps 20M-BW)

**Fundamental Filed Strength**

| Antenna Pole | Frequency [MHz] | Correction Factor [dB/m] | Reading Level [dBuV] | Emission Level [dBuV/m] | Detector |
|--------------|-----------------|--------------------------|----------------------|-------------------------|----------|
| Horizontal   | 2462            | 31.892                   | 67.21                | 99.102                  | Peak     |
| Horizontal   | 2462            | 31.892                   | 59.36                | 91.252                  | Average  |
| Vertical     | 2462            | 30.48                    | 68.68                | 99.16                   | Peak     |
| Vertical     | 2462            | 30.48                    | 61.6                 | 92.08                   | Average  |

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

**Band Edge Test Data**

| Antenna Pole | Test Frequency (MHz) | Fundamental (dBuV/m) | $\Delta$ (dB) | Band Edge Field Strength (dBuV/m) | Detector |
|--------------|----------------------|----------------------|---------------|-----------------------------------|----------|
| Horizontal   | 2500                 | 99.102               | 42.176        | 56.926                            | Peak     |
| Horizontal   | 2500                 | 91.252               | 49.617        | 41.635                            | Average  |
| Vertical     | 2500                 | 99.16                | 42.176        | 56.984                            | Peak     |
| Vertical     | 2500                 | 92.08                | 49.617        | 42.463                            | Average  |

Note:

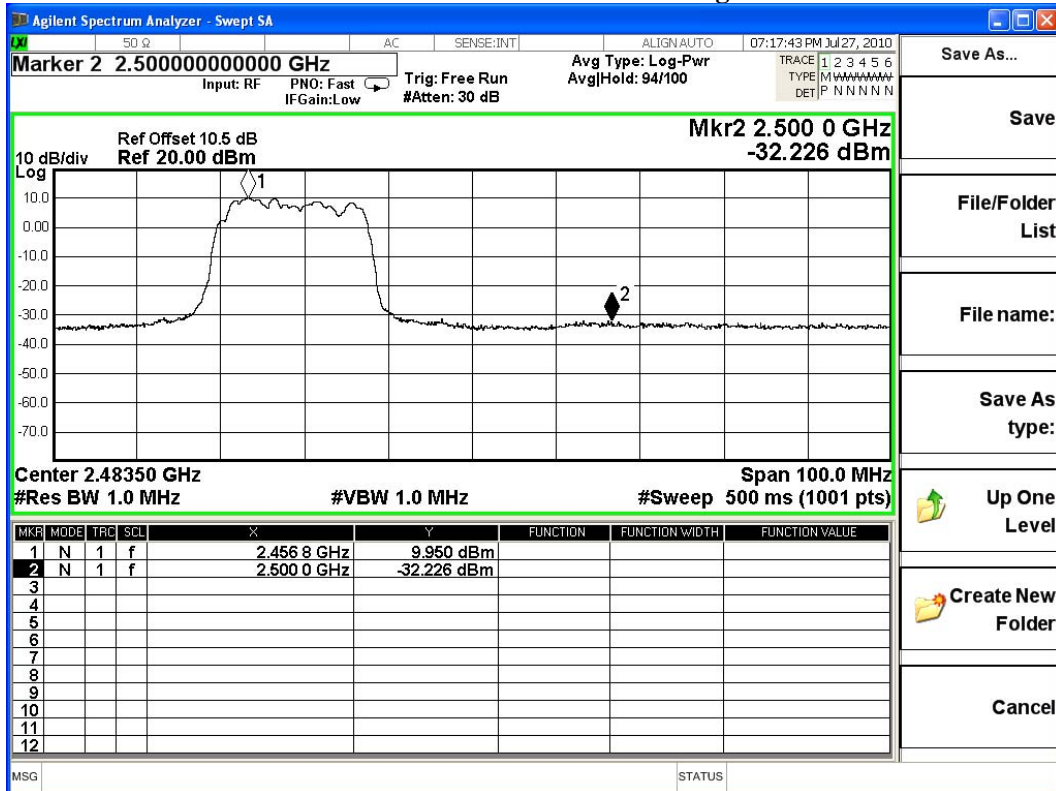
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F -  $\Delta$

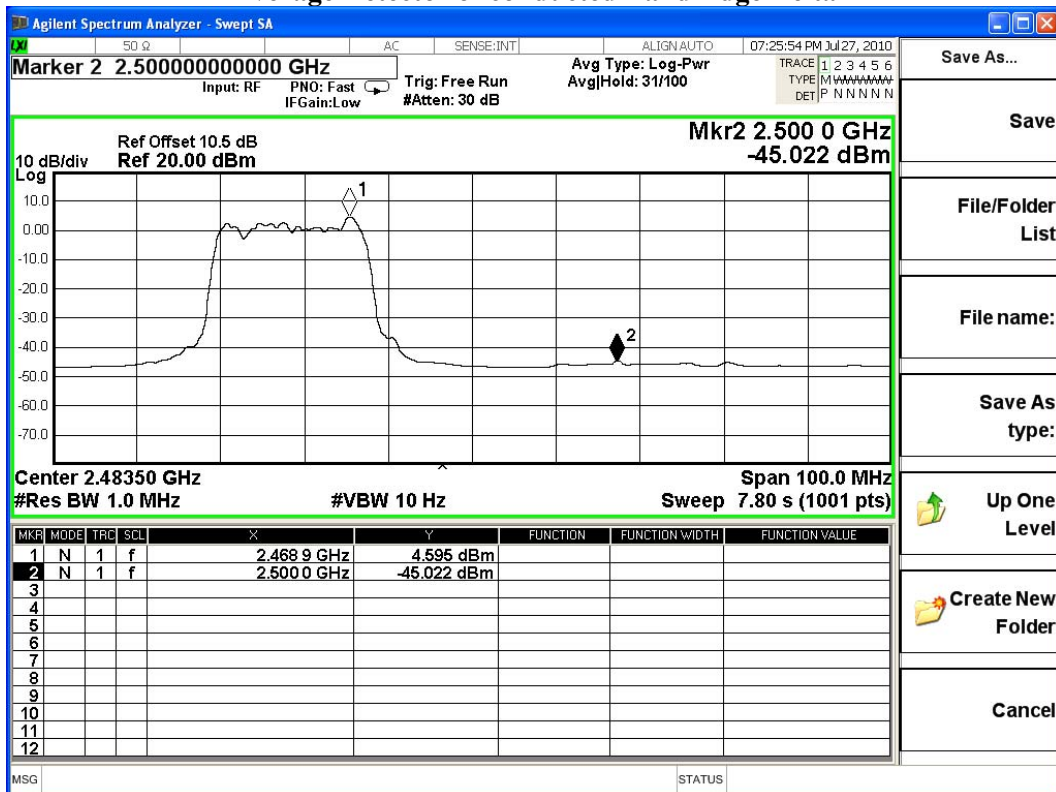
F = Fundamental field Strength (Peak or Average)

$\Delta$  = Conducted Band Edge Delta (Peak or Average)

### Peak Detector of conducted Band Edge Delta



### Average Detector of conducted Band Edge Delta





Product : Wifi N module  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit (802.11n 180Mbps 40M-BW)

**Fundamental Filed Strength**

| Antenna Pole | Frequency [MHz] | Correction Factor [dB/m] | Reading Level [dBuV] | Emission Level [dBuV/m] | Detector |
|--------------|-----------------|--------------------------|----------------------|-------------------------|----------|
| Horizontal   | 2422            | 31.796                   | 67.82                | 99.616                  | Peak     |
| Horizontal   | 2422            | 31.796                   | 59.05                | 90.846                  | Average  |
| Vertical     | 2422            | 30.294                   | 67.92                | 98.214                  | Peak     |
| Vertical     | 2422            | 30.294                   | 61                   | 91.294                  | Average  |

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

**Band Edge Test Data**

| Antenna Pole | Test Frequency (MHz) | Fundamental (dBuV/m) | $\Delta$ (dB) | Band Edge Field Strength (dBuV/m) | Detector |
|--------------|----------------------|----------------------|---------------|-----------------------------------|----------|
| Horizontal   | 2382.7               | 99.616               | 40.555        | 59.061                            | Peak     |
| Horizontal   | 2382.9               | 90.846               | 46.3          | 44.546                            | Average  |
| Vertical     | 2382.7               | 98.214               | 40.555        | 57.659                            | Peak     |
| Vertical     | 2382.9               | 91.294               | 46.3          | 44.994                            | Average  |

Note:

The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F -  $\Delta$

F = Fundamental field Strength (Peak or Average)

$\Delta$  = Conducted Band Edge Delta (Peak or Average)