



Test Report

Product Name : 2G Wireless NPort

Model No : NPort W2150 Plus, NPort W2250 Plus, NPort
W2150 Plus-T, NPort W2250 Plus-T

FCC ID : SLEW2250Plus

Applicant : Moxa Inc.

Address : Fl.4, No. 135, Lane 235, Pao-Chiao Rd., Shing Tien City,
Taipei, Taiwan, R.O.C.

Date of Receipt : June. 02, 2008

Issued Date : June. 19, 2008

Report No. : 086111R-RFUSP08V01

Version : V1.0

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.
This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Issued Date: June. 19, 2008

Report No.: 086111R-RFUSP08V01



Product Name : 2G Wireless NPort
Applicant : Moxa Inc.
Address : Fl.4, No. 135, Lane 235, Pao-Chiao Rd., Shing Tien City, Taipei, Taiwan, R.O.C.
Manufacturer : Moxa Inc.
Model No. : NPort W2150 Plus, NPort W2250 Plus, NPort W2150 Plus-T, NPort W2250 Plus-T
FCC ID. : SLEW2250Plus
Rated Voltage : AC 120V/60Hz
Working Voltage : DC 12V
Trade Name : Moxa
Applicable Standard : FCC CFR Title 47 Part 15 Subpart E: 2007
ANSI C63.4: 2003



Test Result : Complied

The Test Results relate only to the samples tested.

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Documented By :

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(Adm. Specialist /Leven Huang)



Tested By :

A handwritten signature in blue ink that appears to read "Tim Sung".

(Senior Engineer /Tim Sung)



Testing Laboratory

0914

Approved By :

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(Deputy Manager /Vincent Lin)

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

| | |
|--------------------|---|
| Product Name | : 2G Wireless NPort |
| Trade Name | : Moxa |
| FCC ID. | : SLEW2250Plus |
| Model No. | : NPort W2150 Plus, NPort W2250 Plus, NPort W2150 Plus-T, NPort W2250 Plus-T |
| Frequency Range | : 2412 – 2462MHz for 802.11 b/g : 5180 – 5240MHz, 5745 – 5805MHz for 802.11a |
| Number of Channels | : 11 in 2.4GHz band, 8 in 5GHz band |
| Channel Separation | : 5MHz in 2.4GHz band, 20MHz in 5GHz band |
| Channel Control | : Auto |
| Data Rate | : 802.11b – 1, 2, 5.5, 11Mbps 802.11a/g – 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11b:DSSS |
| Type of Modulation | : DBPSK, DQPSK, CCK : 802.11 a/g: OFDM BPSK, QPSK, 16QAM, 64QAM |
| Antenna type | : Connector (Reverse SMA) |
| Antenna Gain | : Refer to the table “Antenna List” |
| Power Adapter | : MFR: BLANCE, M/N: GPSA-1200120 Input: AC 100-240V, 50-60Hz, 0.5A Output: DC 12V-1.2A Cable out: Non-Shielded, 1.9m with one ferrite core bonded. |

Antenna List

| No. | Manufacturer | Part No. | Peak Gain |
|-----|--------------|------------|--|
| 1 | WANSHIH | WNW1730A1 | 1.76 dBi for 2.4 GHz 1.47 dBi for 5.0 GHz |
| 2 | KINSUN | 6602D03081 | 1.21 dBi for 2.4 GHz 1.73 dBi for 5.0 GHz |

Note:

1. Due to Ant 1 and Ant 2 are the same type antennas. Only the 5GHz band higher gain antenna “Ant 2” was tested and recorded in this report.

Frequency of Each Channel:

| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Channel 1 | 5180 MHz | Channel 2 | 5200 MHz | Channel 3 | 5220 MHz | Channel 4 | 5240 MHz |
| Channel 5 | 5745 MHz | Channel 6 | 5765 MHz | Channel 7 | 5785 MHz | Channel 8 | 5805 MHz |

Note:

1. This device is a 2G Wireless NPort with a built-in 2.4GHz and 5GHz transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps and 802.11a/g is 6Mbps)
3. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart E for Unlicensed National Information Infrastructure devices.
4. The EUT is including four models for different marketing requirement.

1.2. Operational Description

The EUT is an 2G Wireless NPort with 11 channels. for 802.11b/g and 9 channels for 802.11a. This device provides four kinds of transmitting speed 1, 2, 5.5 and 11Mbps. The modulation of device is BPSK, QPSK and CCK (IEEE 802.11b) and eight kinds of transmitting speed 6, 9, 12, 18, 24, 36, 48 and 54Mbps are provided. The technology of this device used is OFDM (IEEE 802.11 a/g).

The device adapts direct sequence spread spectrum modulation. The antenna provides diversity function to improve the receiving function.

This 2G Wireless NPort, compliant with IEEE 802.11b and IEEE 802.11 a/g, 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) radio transmission, the 2G Wireless NPort Wired Equivalent Protection (WEP) algorithm is used. In addition, its standard compliance ensures that it can communicate with any IEEE 802.11b and IEEE 802.11 a/g network.

| | |
|-----------|-----------------------------|
| Test Mode | Mode 1: Transmitter 802.11a |
|-----------|-----------------------------|

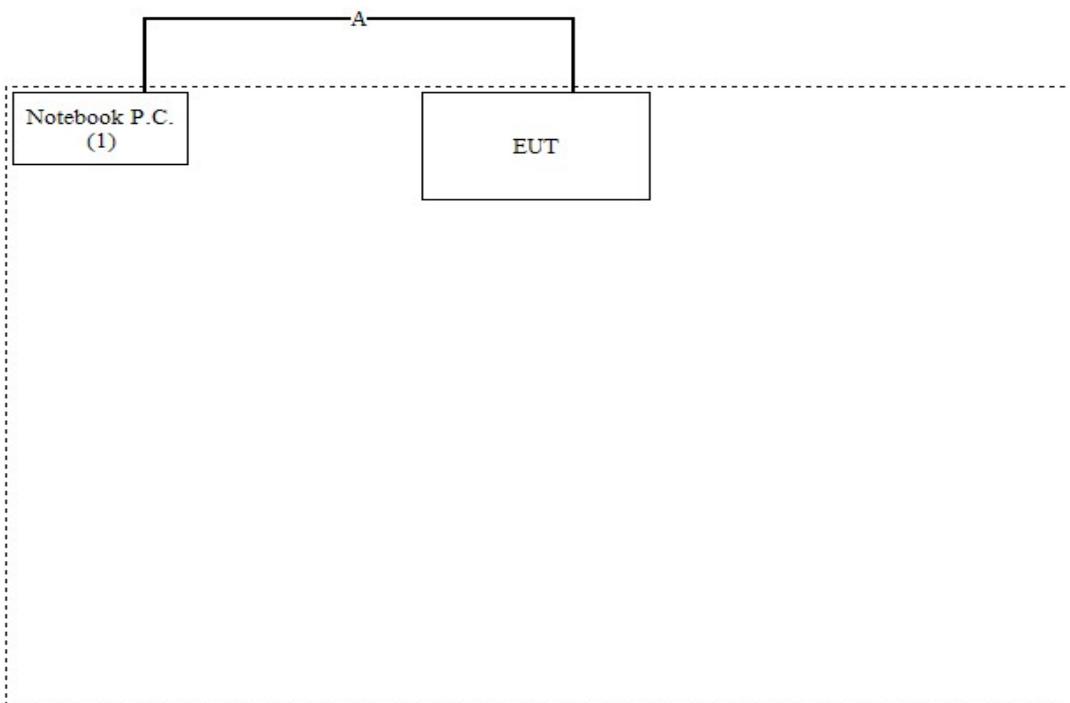
1.3. Tested System Details

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. | Power Cord | |
|---------|--------------|-----------|------------|-------------|--------------------|
| 1 | Notebook PC | DELL | PP18L | 42649348672 | Non-Shielded, 0.8m |

| Signal Cable Type | | Signal cable Description |
|-------------------|--|--------------------------|
| A | | LAN Cable |

1.4. Configuration of tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute Telnet IP on the notebook.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Press “OK” to start the continuous transmission.
- (5) Verify that the EUT works properly.

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 |

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



Site Name: Quietek Corporation
Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,
Lin-Kou Shiang, Taipei,
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E-Mail : service@quietek.com

FCC Accreditation Number: TW1014



2. Undesirable Emission

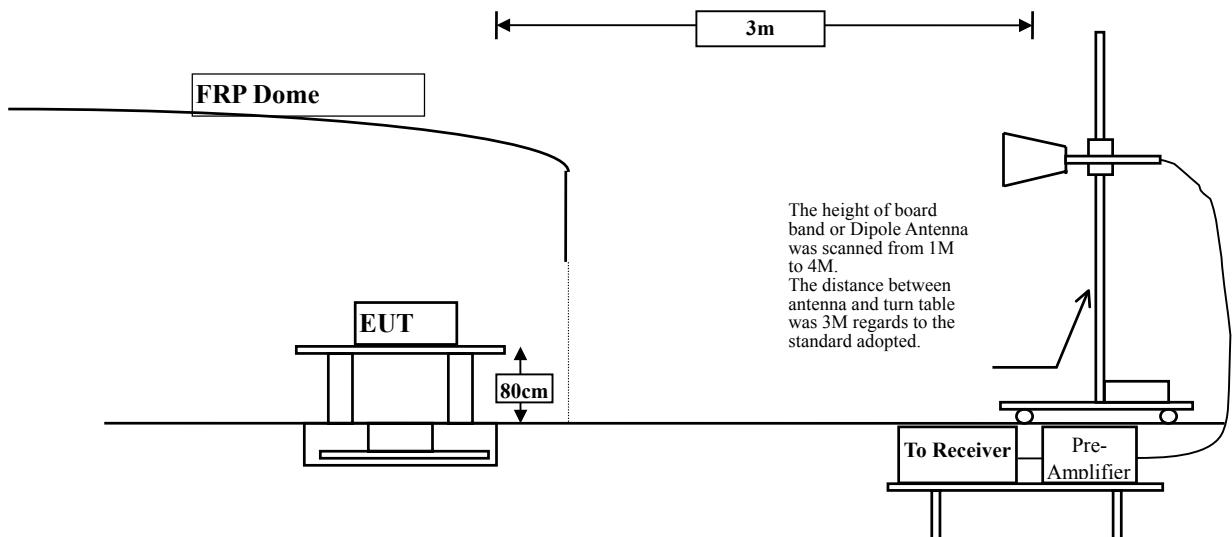
2.1. Test Equipment

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

| Test Site | Equipment | Manufacturer | Model No./Serial No. | Last Cal. |
|-----------|---------------------|--------------|-----------------------|------------|
| Site # 3 | X Test Receiver | R & S | ESI 26 / 838786 / 004 | May, 2008 |
| | X Spectrum Analyzer | Agilent | E4407B / US39440758 | May, 2008 |
| | X Pre-Amplifier | QTK | QTK-AMP-03 / 0003 | May, 2008 |
| | X Bilog Antenna | SCHAFFNER | CBL6112B / 2697 | May, 2008 |
| | X Horn Antenna | ETS | 3115 / 0005-6160 | July, 2007 |
| | X Pre-Amplifier | QTK | QTK-AMP-01 / 0001 | July, 2007 |

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

2.2. Test Setup



2.3. Limits

Inside of the restricted band(section 15.205): Apply to 15.209 limit.

Outside of the restricted band (section 15.407):

5.15GHz - 5.35 GHz < -27 dBm/MHz EIRP,

5.47GHz - 5.725 GHz < -27 dBm/MHz EIRP,

5.725GHz - 5.825 GHz < -27 dBm/MHz EIRP,

<-17 dBm/MHz EIRP (all emission within the frequency range from the band edge to 10 MHz above or below the band edge).

2.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to FCC Public Notice DA 02-2138 test procedure for compliance to FCC 47CFR 15. 407 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.

2.5. Uncertainty

± 3.8 dB below 1GHz

± 3.9 dB above 1GHz

2.6. Test Result of Undesirable Emission

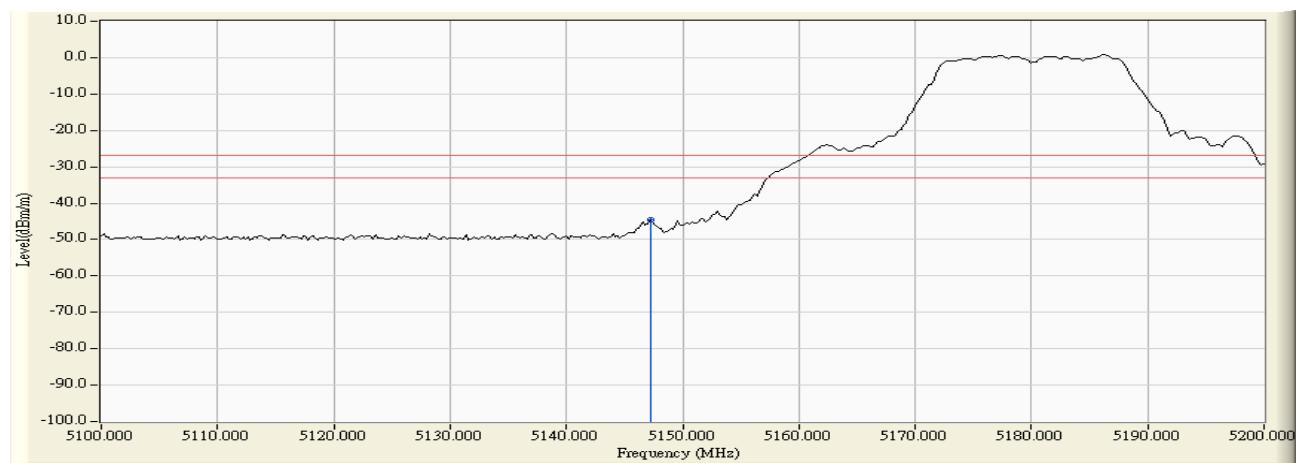
Product : 2G Wireless NPort
Test Item : Undesirable Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11a (5180MHz)

RF Radiated Measurement (Horizontal):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBm) | Measure Level (dBm/m) | Margin (dB) | Limit (dBm/m) | Result |
|-------------|-----------------|---------------------|---------------------|-----------------------|-------------|---------------|--------|
| 1 (Peak) | 5147.200 | 14.275 | -58.703 | -44.428 | -17.428 | -27.000 | Pass |

Figure Channel 1:

Horizontal (Peak)

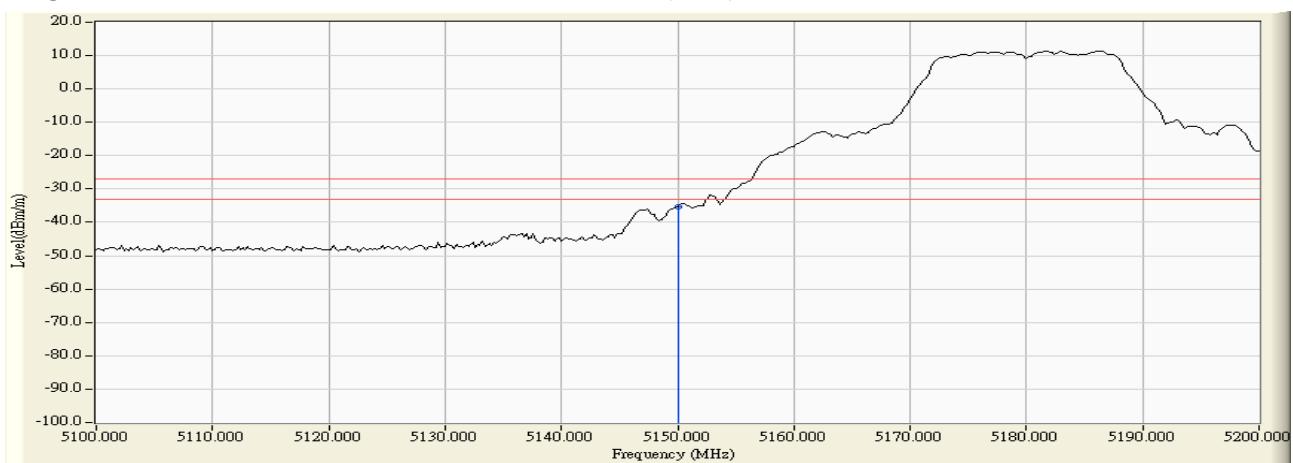


Note: Spectrum setting: Detector=Peak detector and maximum hold,
RBW= 1MHz, VBW=3 MHz.

Product : 2G Wireless NPort
Test Item : Undesirable Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11a (5180MHz)

RF Radiated Measurement (VERTICAL):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBm) | Measure Level (dBm/m) | Margin (dB) | Limit (dBm/m) | Result |
|-------------|-----------------|---------------------|---------------------|-----------------------|-------------|---------------|--------|
| 1 (Peak) | 5150.000 | 14.631 | -49.909 | -35.278 | -8.278 | -27.000 | Pass |

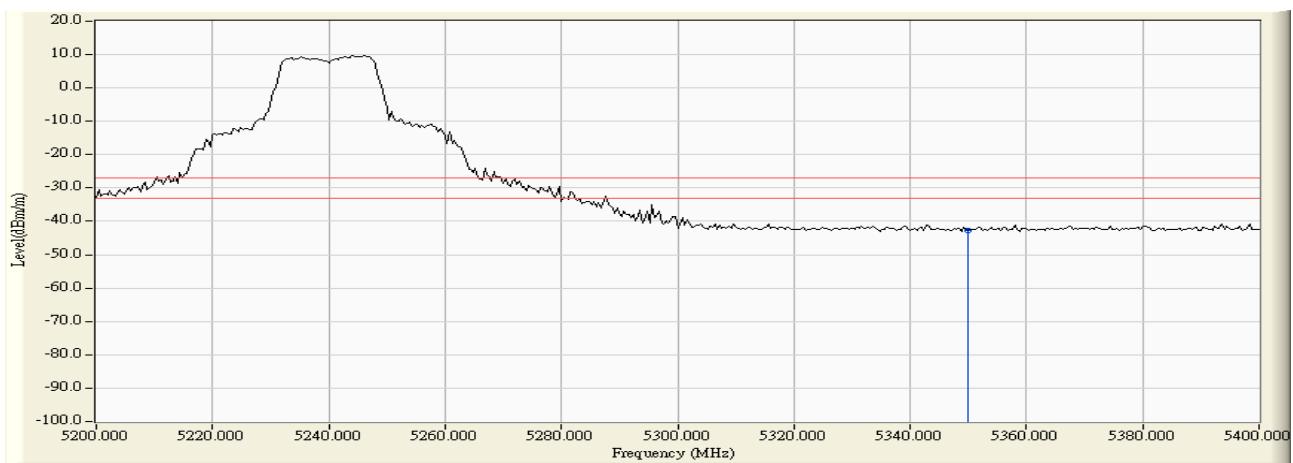
Figure Channel 1:**Vertical (Peak)**

Note: Spectrum setting: Detector=Peak detector and maximum hold,
RBW= 1MHz, VBW=3 MHz.

Product : 2G Wireless NPort
Test Item : Undesirable Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11a (5240MHz)

RF Radiated Measurement (Horizontal):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBm) | Measure Level (dBm/m) | Margin (dB) | Limit (dBm/m) | Result |
|-------------|-----------------|---------------------|---------------------|-----------------------|-------------|---------------|--------|
| 4 (Peak) | 5350.000 | 14.464 | -57.250 | -42.786 | -15.786 | -27.000 | Pass |

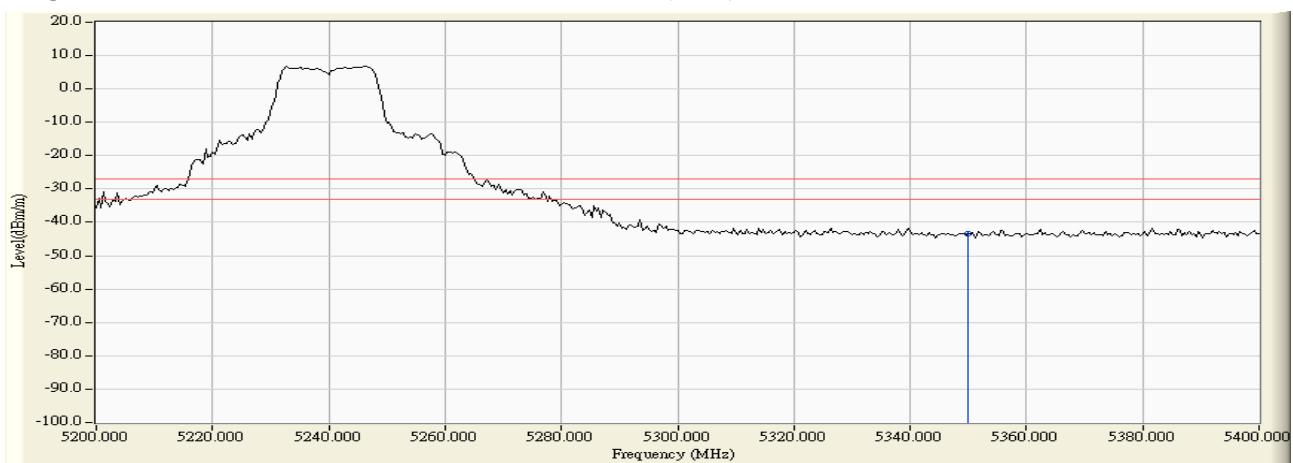
Figure Channel 4:**Horizontal (Peak)**

Note: Spectrum setting: Detector=Peak detector and maximum hold,
RBW= 1MHz, VBW=3 MHz.

Product : 2G Wireless NPort
Test Item : Undesirable Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11a (5240MHz)

RF Radiated Measurement (VERTICAL):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBm) | Measure Level (dBm/m) | Margin (dB) | Limit (dBm/m) | Result |
|-------------|-----------------|---------------------|---------------------|-----------------------|-------------|---------------|--------|
| 4 (Peak) | 5350.000 | 14.773 | -58.216 | -43.443 | -16.443 | -27.000 | Pass |

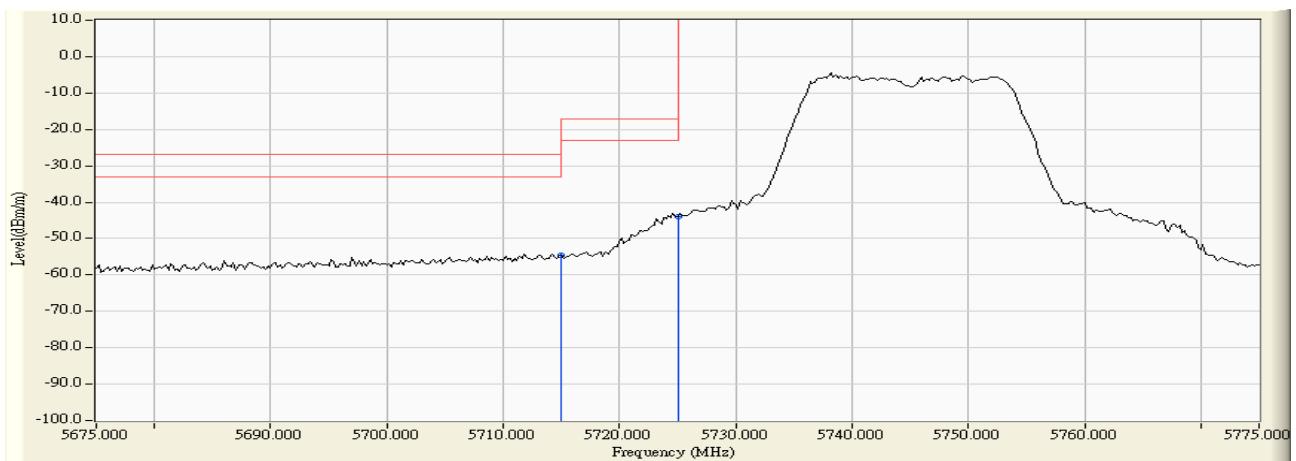
Figure Channel 4:**Vertical (Peak)**

Note: Spectrum setting: Detector=Peak detector and maximum hold,
RBW= 1MHz, VBW=3 MHz.

Product : 2G Wireless NPort
Test Item : Undesirable Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11a (5745MHz)

RF Radiated Measurement (Horizontal):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBm) | Measure Level (dBm/m) | Margin (dB) | Limit (dBm/m) | Result |
|-------------|-----------------|---------------------|---------------------|-----------------------|-------------|---------------|--------|
| 5 (Peak) | 5715.000 | 4.791 | -59.498 | -54.707 | -27.707 | -27.000 | Pass |
| 5 (Peak) | 5725.000 | 4.802 | -48.874 | -44.072 | -27.072 | -17.000 | Pass |

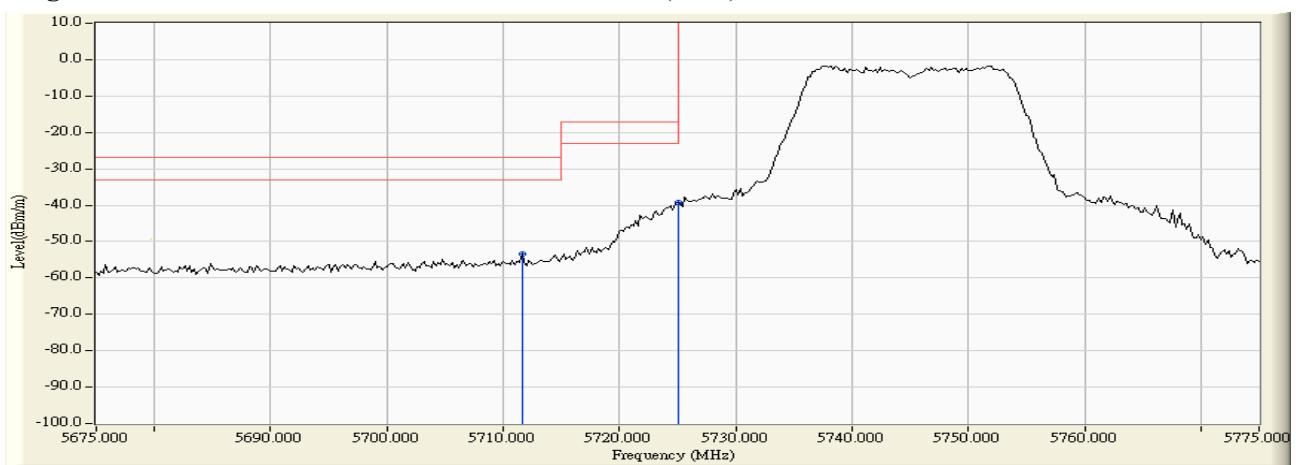
Figure Channel 5:**Horizontal (Peak)**

Note: Spectrum setting: Detector=Peak detector and maximum hold,
RBW= 1MHz, VBW=3 MHz.

Product : 2G Wireless NPort
Test Item : Undesirable Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11a (5745MHz)

RF Radiated Measurement (VERTICAL):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBm) | Measure Level (dBm/m) | Margin (dB) | Limit (dBm/m) | Result |
|-------------|-----------------|---------------------|---------------------|-----------------------|-------------|---------------|--------|
| 5 (Peak) | 5711.600 | 4.788 | -58.100 | -53.313 | -26.313 | -27.000 | Pass |
| 5 (Peak) | 5725.000 | 4.802 | -44.101 | -39.299 | -22.299 | -17.000 | Pass |

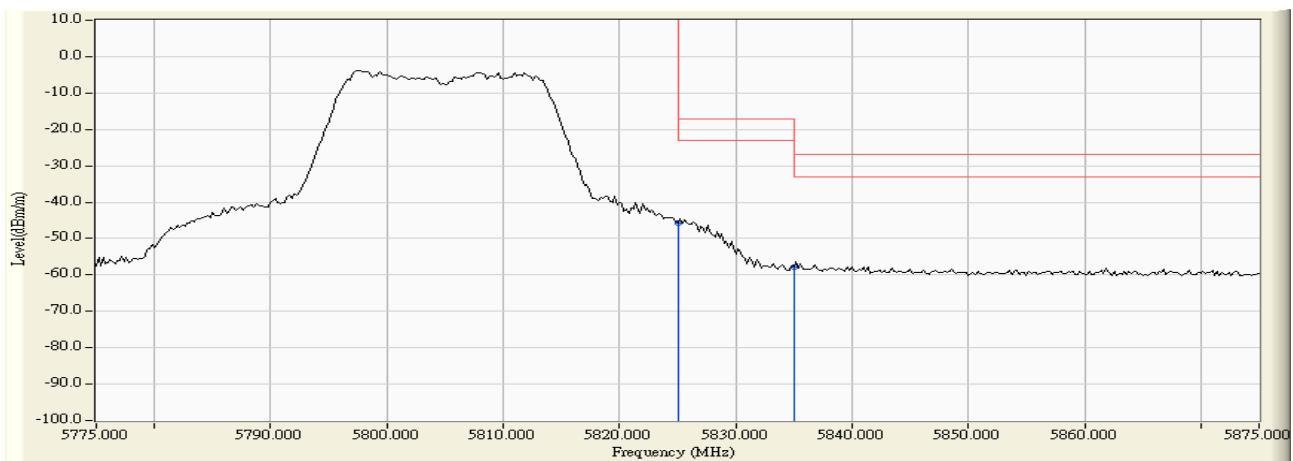
Figure Channel 5:**Vertical (Peak)**

Note: Spectrum setting: Detector=Peak detector and maximum hold,
RBW= 1MHz, VBW=3 MHz.

Product : 2G Wireless NPort
Test Item : Undesirable Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11a (5805MHz)

RF Radiated Measurement (Horizontal):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBm) | Measure Level (dBm/m) | Margin (dB) | Limit (dBm/m) | Result |
|-------------|-----------------|---------------------|---------------------|-----------------------|-------------|---------------|--------|
| 8 (Peak) | 5825.000 | 4.946 | -50.602 | -45.656 | -28.656 | -17.000 | Pass |
| 8 (Peak) | 5835.000 | 4.958 | -62.894 | -57.936 | -30.936 | -27.000 | Pass |

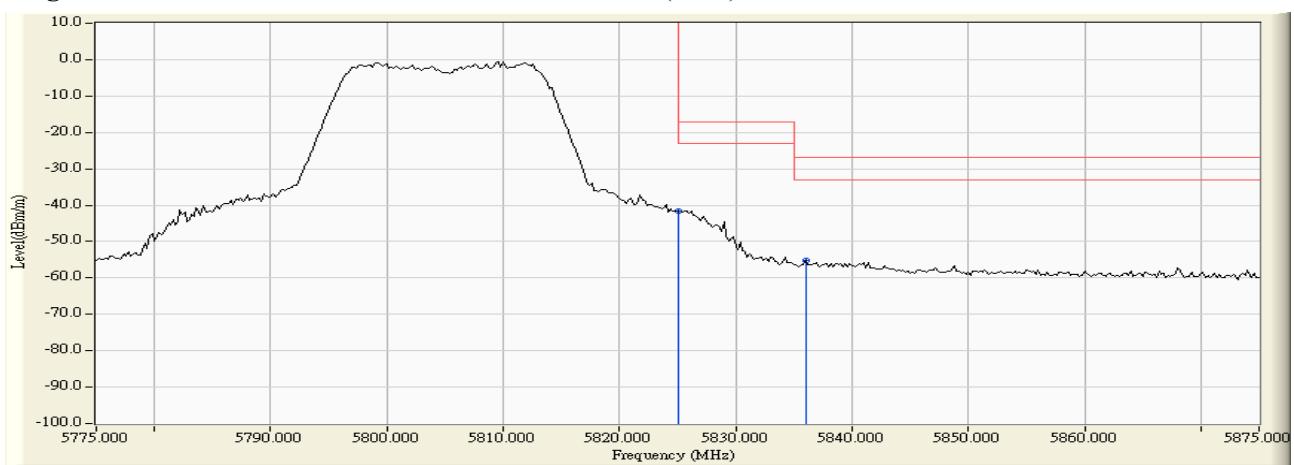
Figure Channel 8:**Horizontal (Peak)**

Note: Spectrum setting: Detector=Peak detector and maximum hold,
RBW= 1MHz, VBW=3 MHz.

Product : 2G Wireless NPort
Test Item : Undesirable Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11a (5805MHz)

RF Radiated Measurement (VERTICAL):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBm) | Measure Level (dBm/m) | Margin (dB) | Limit (dBm/m) | Result |
|-------------|-----------------|---------------------|---------------------|-----------------------|-------------|---------------|--------|
| 8 (Peak) | 5825.000 | 4.946 | -46.543 | -41.597 | -24.597 | -17.000 | Pass |
| 8 (Peak) | 5836.000 | 4.960 | -60.003 | -55.043 | -28.043 | -27.000 | Pass |

Figure Channel 8:**Vertical (Peak)**

Note: Spectrum setting: Detector=Peak detector and maximum hold,
RBW= 1MHz, VBW=3 MHz.

3. Radiated Emission

3.1. Test Equipment

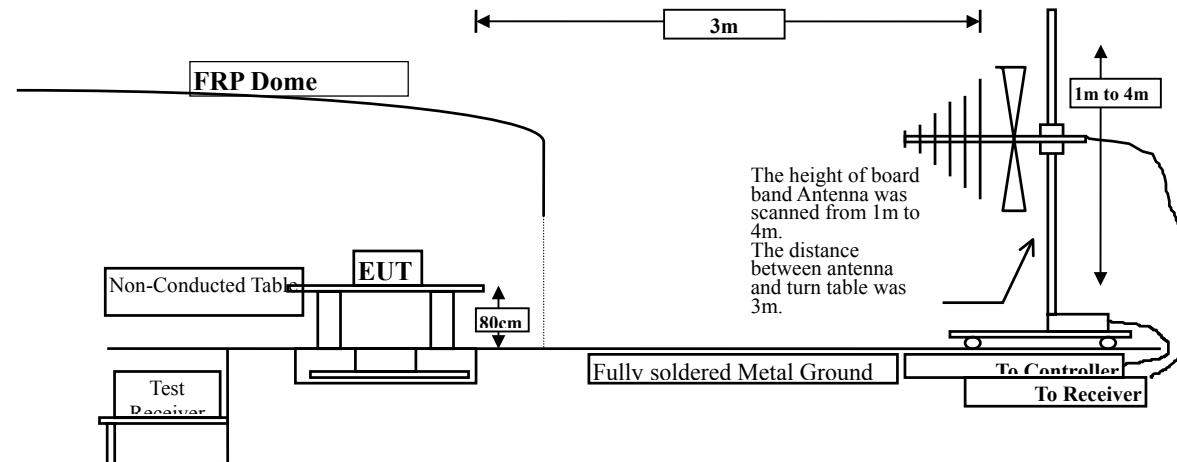
The following test equipment are used during the radiated emission test:

| Test Site | Equipment | Manufacturer | Model No./Serial No. | Last Cal. |
|-----------|---------------------|--------------|-----------------------|------------|
| Site # 1 | Test Receiver | R & S | ESCS 30 / 825442/14 | May, 2008 |
| | Spectrum Analyzer | Advantest | R3261C / 71720140 | May, 2008 |
| | Pre-Amplifier | HP | 8447D/3307A01812 | May, 2008 |
| | Bilog Antenna | Chase | CBL6112B / 12452 | Sep., 2007 |
| | Horn Antenna | EM | EM6917 / 103325 | May, 2008 |
| Site # 2 | Test Receiver | R & S | ESCS 30 / 825442/17 | May, 2008 |
| | Spectrum Analyzer | Advantest | R3261C / 71720609 | May, 2008 |
| | Pre-Amplifier | HP | 8447D/3307A01814 | May, 2008 |
| | Bilog Antenna | Chase | CBL6112B / 2455 | Sep., 2007 |
| | Horn Antenna | EM | EM6917 / 103325 | May, 2008 |
| Site # 3 | X Test Receiver | R & S | ESI 26 / 838786 / 004 | May, 2008 |
| | X Spectrum Analyzer | Agilent | E4407B / US39440758 | May, 2008 |
| | X Biolog Antenna | SCHAFFNER | CBL6112B / 2697 | May, 2008 |
| | X Horn Antenna | Schwarzbeck | BBHA9120D / 305, 306 | July, 2007 |
| | X Horn Antenna | Schwarzbeck | BBHA9170 / 208, 209 | July, 2007 |
| | X Pre-Amplifier | QTK | QTK-AMP-01 / 0001 | July, 2007 |
| | X Pre-Amplifier | QTK | QTK-AMP-03 / 0003 | May, 2008 |
| | X Pre-Amplifier | HP | 8449B / 3008A01123 | July, 2007 |

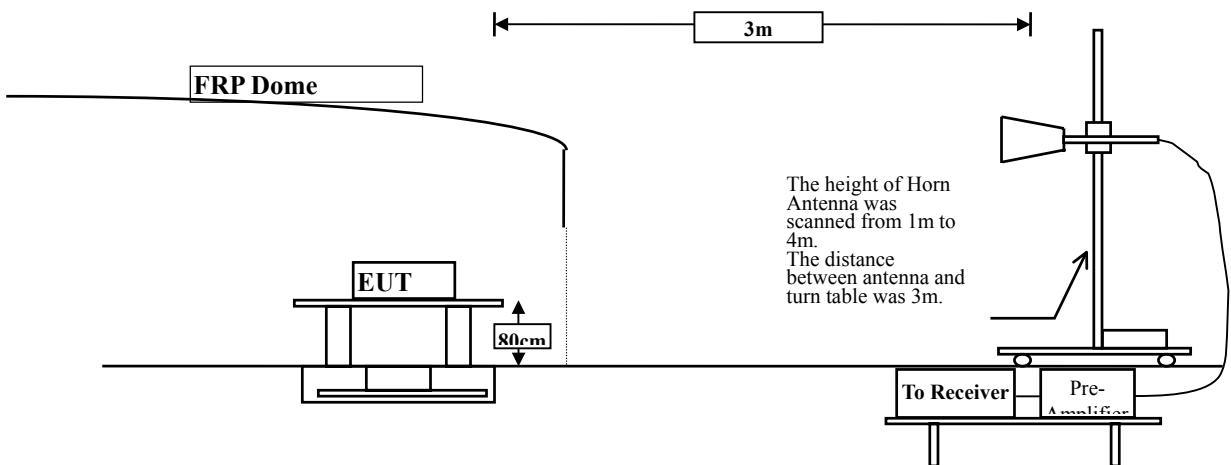
Note: 1. All instruments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

3.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



3.3. 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.

| FCC Part 15 Subpart C Paragraph 15.209(a) Limits | | |
|---|----------|-----------|
| Frequency 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 :

1. RF Voltage (dBuV) = $20 \log_{10}$ RF Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to DTS test procedure of Oct 2002 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 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 beam width of the antenna. The worst radiated emission is measured on the Final Measurement. The frequency range from 30MHz to 10th harmonics is checked.

3.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

3.6. Test Result of Radiated Emission

Product : 2G Wireless NPort
 Test Item : Undesirable Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5180MHz)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|-----------|----------------|---------------|-------------------|--------|--------|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |

Horizontal

Peak Detector

| | | | | | |
|-----------|--------|--------|--------|---------|--------|
| 10360.000 | 13.175 | 35.140 | 48.315 | -25.685 | 74.000 |
|-----------|--------|--------|--------|---------|--------|

Average Detector

--

Vertical

Peak Detector

| | | | | | |
|-----------|--------|--------|--------|---------|--------|
| 10360.000 | 13.175 | 37.111 | 50.286 | -23.714 | 74.000 |
|-----------|--------|--------|--------|---------|--------|

Average Detector

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz.
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz.
4. Measurement Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : 2G Wireless NPort
 Test Item : Undesirable Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5220MHz)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|-----------|----------------|---------------|-------------------|--------|--------|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |

Horizontal

Peak Detector

| | | | | | |
|-----------|--------|--------|--------|---------|--------|
| 10440.000 | 13.599 | 35.780 | 49.379 | -24.621 | 74.000 |
|-----------|--------|--------|--------|---------|--------|

Average Detector

--

Vertical

Peak Detector

| | | | | | |
|-----------|--------|--------|--------|---------|--------|
| 10440.000 | 13.599 | 36.140 | 49.739 | -24.261 | 74.000 |
|-----------|--------|--------|--------|---------|--------|

Average Detector

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz.
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz.
4. Measurement Level = Reading Level + Correct Factor..
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : 2G Wireless NPort
 Test Item : Undesirable Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5240MHz)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|-----------|----------------|---------------|-------------------|--------|--------|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |

Horizontal

Peak Detector

| | | | | | |
|-----------|--------|--------|--------|---------|--------|
| 10480.000 | 13.934 | 35.780 | 49.714 | -24.286 | 74.000 |
|-----------|--------|--------|--------|---------|--------|

Average Detector

--

Vertical

Peak Detector

| | | | | | |
|-----------|--------|--------|--------|---------|--------|
| 10480.000 | 13.934 | 35.890 | 49.824 | -24.176 | 74.000 |
|-----------|--------|--------|--------|---------|--------|

Average Detector

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz .
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz .
4. Measurement Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : 2G Wireless NPort
 Test Item : Undesirable Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5745Hz)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|-----------|----------------|---------------|-------------------|--------|--------|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |

Horizontal
Peak Detector

| | | | | | |
|-----------|--------|--------|--------|---------|--------|
| 11490.000 | 15.784 | 33.980 | 49.763 | -24.237 | 74.000 |
|-----------|--------|--------|--------|---------|--------|

Average Detector

--

Vertical
Peak Detector

| | | | | | |
|-----------|--------|--------|--------|---------|--------|
| 11490.000 | 15.784 | 34.950 | 50.733 | -23.267 | 74.000 |
|-----------|--------|--------|--------|---------|--------|

Average Detector

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz .
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz .
4. Measurement Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied

Product : 2G Wireless NPort
 Test Item : Undesirable Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5785MHz)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|-----------|----------------|---------------|-------------------|--------|--------|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |

Horizontal
Peak Detector

| | | | | | |
|-----------|--------|--------|--------|---------|--------|
| 11570.000 | 15.226 | 33.740 | 48.965 | -25.035 | 74.000 |
|-----------|--------|--------|--------|---------|--------|

Average Detector

--

Vertical
Peak Detector

| | | | | | |
|-----------|--------|--------|--------|---------|--------|
| 11570.000 | 15.226 | 35.840 | 51.065 | -22.935 | 74.000 |
|-----------|--------|--------|--------|---------|--------|

Average Detector

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz .
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz .
4. Measurement Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied

Product : 2G Wireless NPort
 Test Item : Undesirable Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5805MHz)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|-----------|----------------|---------------|-------------------|--------|--------|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |

Horizontal
Peak Detector

| | | | | | |
|-----------|--------|--------|--------|---------|--------|
| 11610.000 | 15.016 | 34.170 | 49.186 | -24.814 | 74.000 |
|-----------|--------|--------|--------|---------|--------|

Average Detector

--

Vertical
Peak Detector

| | | | | | |
|-----------|--------|--------|--------|---------|--------|
| 11610.000 | 15.016 | 35.210 | 50.226 | -23.774 | 74.000 |
|-----------|--------|--------|--------|---------|--------|

Average Detector

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz .
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz .
4. Measurement Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied

Product : 2G Wireless NPort
 Test Item : Undesirable Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5220MHz)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|-----------|----------------|---------------|-------------------|--------|--------|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |

Horizontal

Peak Detector

| | | | | | |
|---------|--------|--------|--------|---------|--------|
| 336.580 | 14.434 | 13.156 | 27.590 | -18.410 | 46.000 |
| 431.580 | 17.742 | 13.908 | 31.650 | -14.350 | 46.000 |
| 465.980 | 18.699 | 5.881 | 24.580 | -21.420 | 46.000 |
| 625.480 | 20.832 | 6.019 | 26.850 | -19.150 | 46.000 |
| 724.580 | 21.155 | 8.425 | 29.580 | -16.420 | 46.000 |
| 864.250 | 22.207 | 9.373 | 31.580 | -14.420 | 46.000 |

Vertical

Peak Detector

| | | | | | |
|---------|--------|--------|--------|---------|--------|
| 288.250 | 13.845 | 20.405 | 34.250 | -11.750 | 46.000 |
| 342.590 | 14.611 | 11.969 | 26.580 | -19.420 | 46.000 |
| 465.850 | 18.455 | 8.395 | 26.850 | -19.150 | 46.000 |
| 625.360 | 21.144 | 3.707 | 24.850 | -21.150 | 46.000 |
| 735.590 | 23.173 | 6.408 | 29.580 | -16.420 | 46.000 |
| 811.260 | 21.703 | 5.947 | 27.650 | -18.350 | 46.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

Product : 2G Wireless NPort
 Test Item : Undesirable Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5785MHz)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|-----------|----------------|---------------|-------------------|--------|--------|
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |

Horizontal

Peak Detector

| | | | | | |
|---------|--------|--------|--------|---------|--------|
| 288.250 | 13.483 | 13.097 | 26.580 | -19.420 | 46.000 |
| 383.450 | 15.804 | 13.146 | 28.950 | -17.050 | 46.000 |
| 512.480 | 19.077 | 9.373 | 28.450 | -17.550 | 46.000 |
| 625.400 | 20.839 | 6.011 | 26.850 | -19.150 | 46.000 |
| 833.200 | 21.825 | 2.674 | 24.500 | -21.500 | 46.000 |
| 931.400 | 22.910 | 5.449 | 28.360 | -17.640 | 46.000 |

Vertical

Peak Detector

| | | | | | |
|---------|--------|--------|--------|---------|--------|
| 265.850 | 14.363 | 17.488 | 31.850 | -14.150 | 46.000 |
| 336.520 | 14.364 | 12.486 | 26.850 | -19.150 | 46.000 |
| 431.590 | 19.266 | 12.424 | 31.690 | -14.310 | 46.000 |
| 523.400 | 18.824 | 7.476 | 26.300 | -19.700 | 46.000 |
| 605.400 | 21.817 | 5.783 | 27.600 | -18.400 | 46.000 |
| 733.480 | 23.135 | 4.455 | 27.590 | -18.410 | 46.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

4. Band Edge

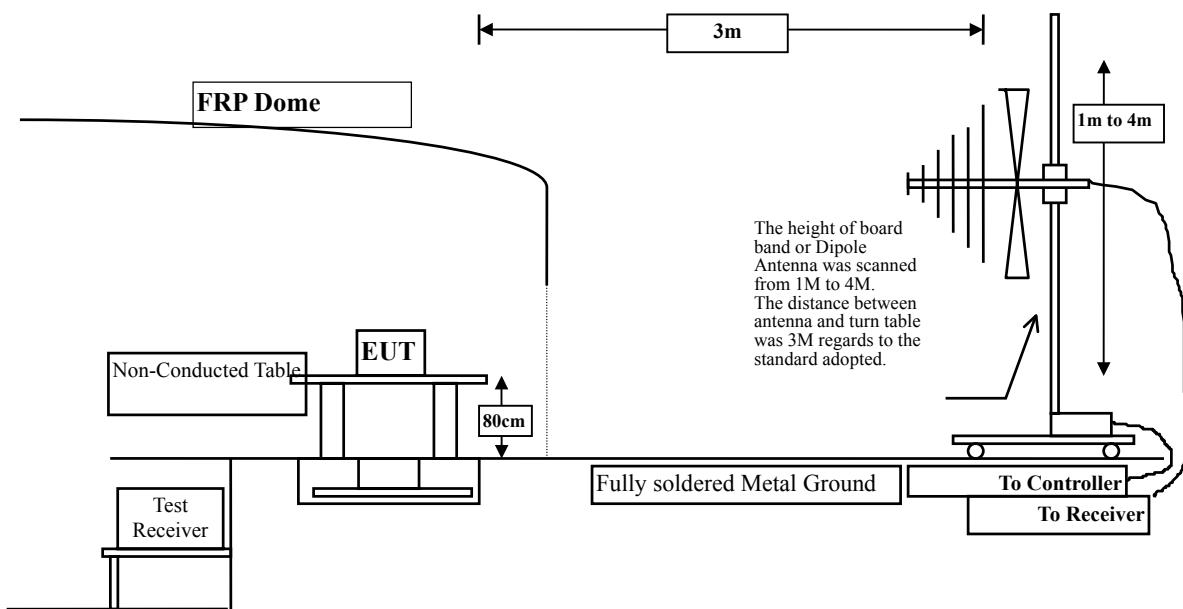
4.1. Test Equipment

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

| Test Site | Equipment | Manufacturer | Model No./Serial No. | Last Cal. |
|-----------|---------------------|--------------|-----------------------|------------|
| Site # 3 | X Test Receiver | R & S | ESI 26 / 838786 / 004 | May, 2008 |
| | X Spectrum Analyzer | Agilent | E4407B / US39440758 | May, 2008 |
| | X Pre-Amplifier | QTK | QTK-AMP-03 / 0003 | May, 2008 |
| | X Bilog Antenna | SCHAFFNER | CBL6112B / 2697 | May, 2008 |
| | X Horn Antenna | ETS | 3115 / 0005-6160 | July, 2007 |
| | X Pre-Amplifier | QTK | QTK-AMP-01 / 0001 | July, 2007 |

4.2. Test Setup

RF Radiated Measurement:



4.3. Limits

The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.

Radiated emissions which fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209:

| FCC Part 15 Subpart C Paragraph 15.209 Limits | | |
|---|----------|-----------|
| Frequency 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 : 1. RF Voltage (dBuV) = $20 \log \text{RF Voltage (uV)}$

2. In the Above Table, the tighter limit applies at the band edges.

3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 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 can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:1992 on radiated measurement.

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

4.5. Uncertainty

± 3.8 dB below 1GHz

± 3.9 dB above 1GHz

4.6. Test Result of Band Edge

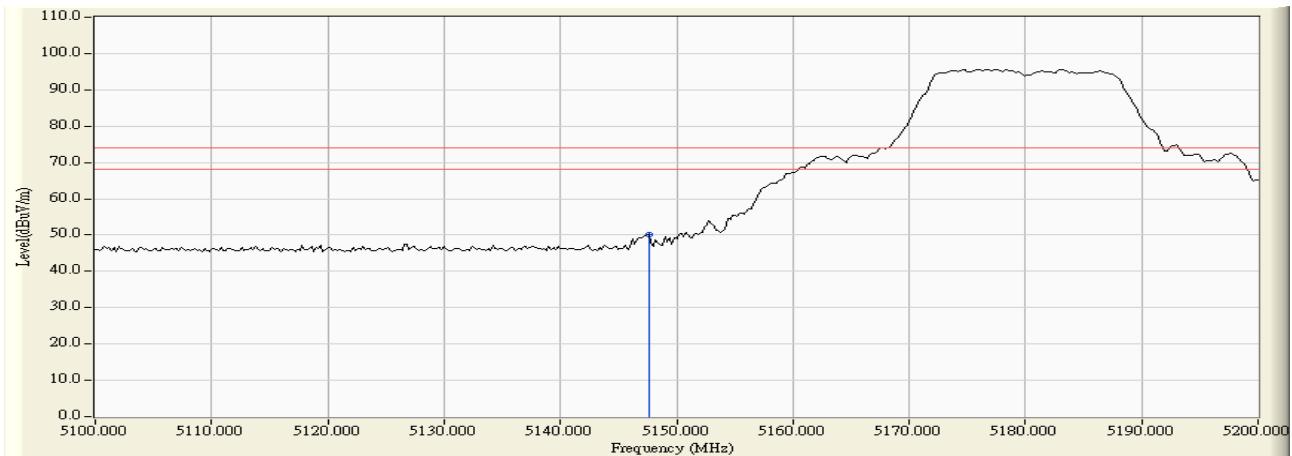
Product : 2G Wireless NPort
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5180MHz)

RF Radiated Measurement (Horizontal):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|-------------|-----------------|---------------------|----------------------|-------------------------|---------------------|------------------------|--------|
| 1 (Peak) | 5147.600 | 4.304 | 45.828 | 50.133 | 74.00 | 54.00 | Pass |
| 1 (Average) | -- | -- | -- | -- | 74.00 | 54.00 | Pass |

Figure Channel 1:

Horizontal (Peak)



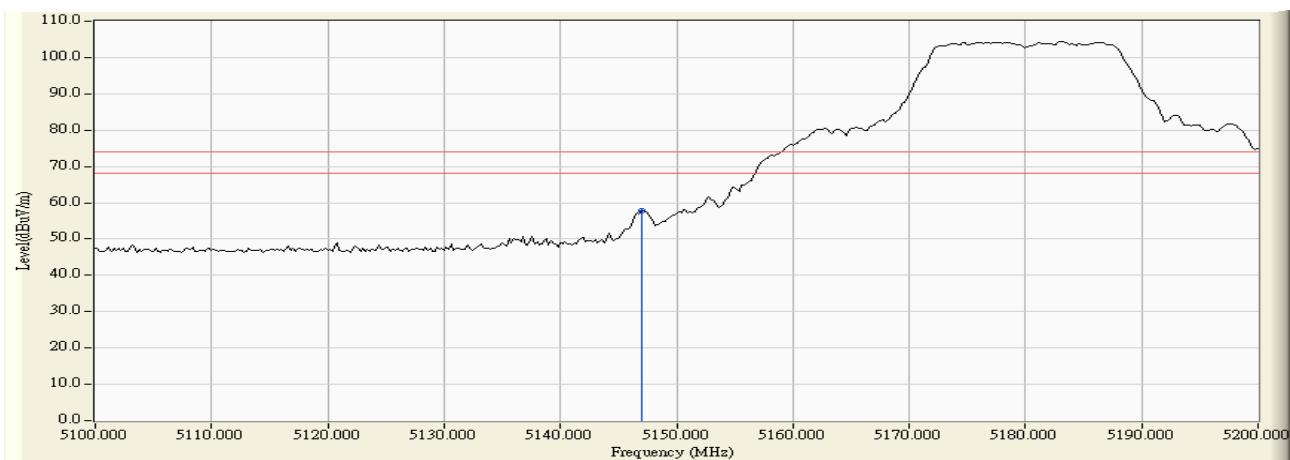
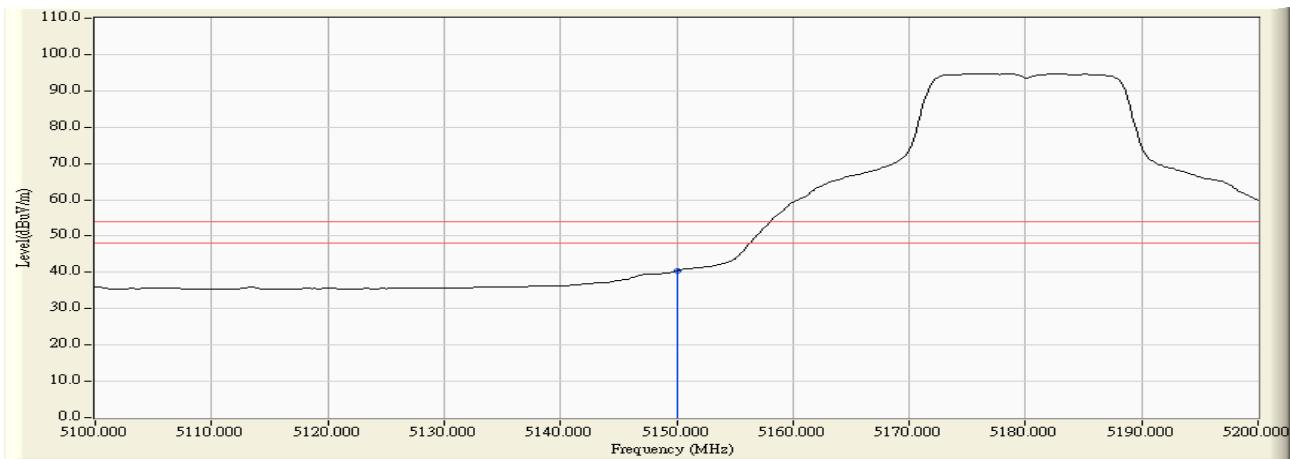
Note:

1. All readings 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 : 2G Wireless NPort
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5180MHz)

RF Radiated Measurement (Vertical):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|-------------|-----------------|---------------------|----------------------|-------------------------|---------------------|------------------------|--------|
| 1 (Peak) | 5147.000 | 4.305 | 53.564 | 57.868 | 74.00 | 54.00 | Pass |
| 1 (Average) | 5150.000 | 4.305 | 36.020 | 40.325 | 74.00 | 54.00 | Pass |

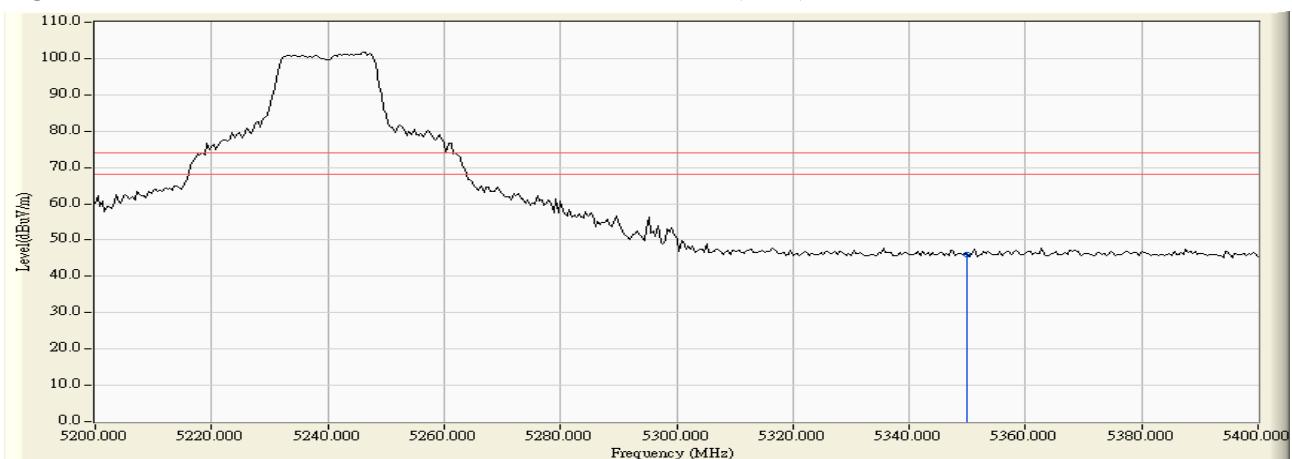
Figure Channel 1:
Vertical (Peak)

Figure Channel 1:
Vertical (Average)

Note:

1. All readings 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 : 2G Wireless NPort
Test Item : Band Edge
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11a (5240MHz)

RF Radiated Measurement (Horizontal):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|-------------|-----------------|---------------------|----------------------|-------------------------|---------------------|------------------------|--------|
| 4 (Peak) | 5350.000 | 4.446 | 41.500 | 45.946 | 74.00 | 54.00 | Pass |
| 4 (Average) | -- | -- | -- | -- | 74.00 | 54.00 | Pass |

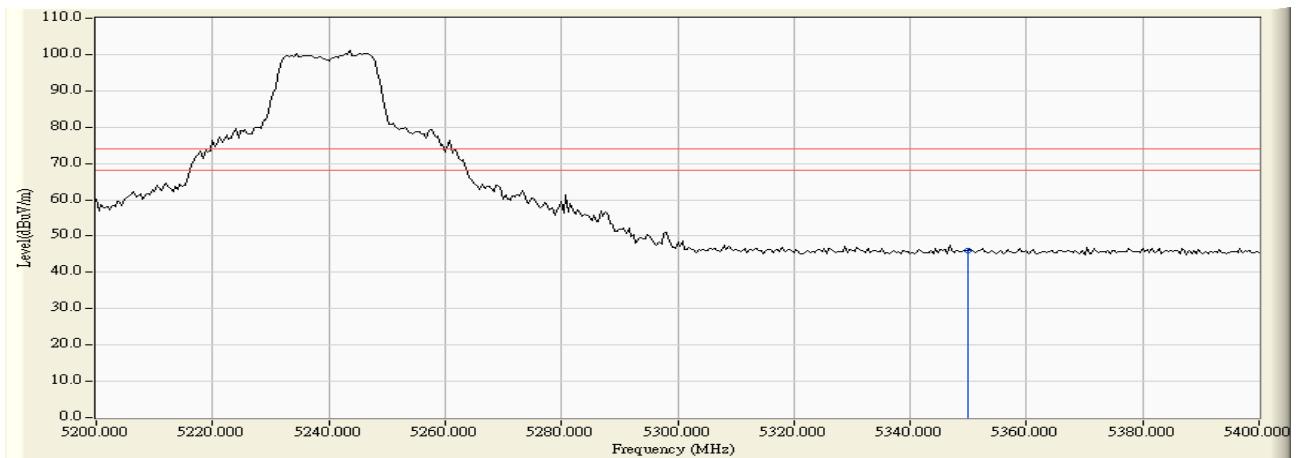
Figure Channel 4:**Horizontal (Peak)****Note:**

1. All readings 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 : 2G Wireless NPort
Test Item : Band Edge
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11a (5240MHz)

RF Radiated Measurement (Vertical):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|-------------|-----------------|---------------------|----------------------|-------------------------|---------------------|------------------------|--------|
| 4 (Peak) | 5350.000 | 4.446 | 41.559 | 46.005 | 74.00 | 54.00 | Pass |
| 4 (Average) | -- | -- | -- | -- | 74.00 | 54.00 | Pass |

Figure Channel 4:**Vertical (Peak)****Note:**

1. All readings 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. EMI Reduction Method During Compliance Testing

No modification was made during testing.