

**Test Report**  
**FOR**  
**FCC Part 15 Subpart C**  
*of*  
**WLAN 802.11b Mini-PCI Module**

*Model*  
**EM-200B**  
**(Brand: Wistron NeWeb)**

*Applied by:*  
Wistron NeWeb Corporation  
No. 10-1, Li-hsin Road I,  
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Taiwan, R. O. C



*Test Performed by:*  
(NVLAP Lab. Code: 200234-0)



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**Test Date: 2003/05/06**

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## 1. . General

### 1.1 Certification of Accuracy of Test Data

The electromagnetic interference tests which this report describes were conducted by an independent electromagnetic compatibility consultant, International Standards Laboratory in accordance with the test procedure specified in CFR 47 Part 15 Subpart C (Section 15.247), and ANSI C63.4 Rules.

The test results contained in this report accurately represent the measurements of the EMC characteristics and the energy generated by sample equipment under test at the time of the test.

**Equipment Tested**      **WLAN 802.11b Mini-PCI Module**  
Model:EM-200B  
Applied by Wistron NeWeb Corp.

**Sample received Date:** 2003/04/25

**Final test Date :** 2003/05/6

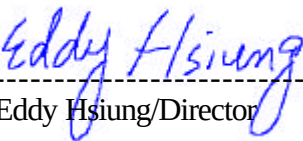
**Test Site:** Chamber 02, Conduction 02

|             |                        |                       |
|-------------|------------------------|-----------------------|
| Temperature | 24°C(Conduction Test); | 23°C (Radiation Test) |
| Humidity:   | 60% (Conduction Test); | 53% (Radiation Test)  |

**Test Engineer:** Jerry Chiou

The results show that the sample equipment tested as described in this report is in compliance with the Class B conducted and radiated emission limits of FCC Rules Part 15 Subpart B, and the limit of Part Subpart C Sec. 15.247.

Approve & Signature

  
-----  
Eddy Hsiung/Director

Test results given in this report apply only to the specific sample(s) tested under stated test conditions. This report shall not be reproduced other than in full without the explicit written consent of ISL. This report totally contains 74 pages, including 1 cover page , 2 contents page, and 71 pages for the test description.  
This report must not be use to claim product endorsement by NVLAP or any agency of the U.S. Government.

This test data shown below is traceable to NIST or national or international standard.  
International Standards Laboratory certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a).

## 2. Test Results Summary

The 802.11b functions of EUT has been tested to the FCC regulations listed below:

| Tested Standards: 47 CFR Part 15 Subpart C |                                   |        |                         |
|--------------------------------------------|-----------------------------------|--------|-------------------------|
| Standard Section                           | Test Type                         | Result | Remarks                 |
| 15.207                                     | AC Power Line Emissions           | Pass   |                         |
| 15.247(a)(2)                               | Spectrum Bandwidth Of DSSS device | Pass   |                         |
| 15.247(b)(3)                               | Max. Peak Output Power            | Pass   |                         |
| 15.247( c )                                | Radiated Emissions 30MHz – 25 GHz | Pass   |                         |
| 15.247 ( c )                               | Band Edge Measurement             | Pass   |                         |
| 15.247(b)(5), 1.1307(b)                    | Radiation Exposure                | Pass   | See Attach file for MPE |
| 15.247 (d)                                 | Power Spectral Density            | Pass   |                         |

### 3. Description of Equipment Under Test (EUT)

|                           |                                                |
|---------------------------|------------------------------------------------|
| Description:              | WLAN 802.11b Mini-PCI Module                   |
| Model No.:                | EM-200B                                        |
| FCC ID:                   | NKREM200B                                      |
| Brand:                    | Wistron NeWeb                                  |
| Frequency Range :         | 2412 - 2462 MHz                                |
| Support channel:          | 11 Channels                                    |
| Modulation Skill:         | DBPSK(1Mbps), DQPSK(2Mbps),<br>CCK(5.5/11Mbps) |
| Power Type of LAN module: | 3.3V DC from Notebook PC                       |

The channel and the operation frequency of 802.11b is listed below:

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

There are four kinds of antenna been tested.. The Details are listed below:

|                      |                    |                    |                    |                    |
|----------------------|--------------------|--------------------|--------------------|--------------------|
| Ant. Model:          | CA8-I              | 5600               | 888E               | M300N              |
| Antennas Type:       | PIFA Type in Metal | PIFA Type in Metal | PIFA Type in Metal | PIFA Type in Metal |
| Peak Gain at 2.4GHz: | 0.35dBi            | 0.47dBi            | 3.12dBi            | -2.95dBi           |
| Ant. Manufacturer:   | WNC                | CLEVO              | CLEVO              | CLEVO              |

**During the test, the EUT was tested as a modular device of a notebook PC using a PCMCIA extender board to extend the EUT outside the notebook PC enclosure.** The EUT was then connected to a set of antennas via its transmit and receive connectors.

### 3.1 Test Standards and Procedure

Test Specification: FCC Part 15 subpart C (Section 15.247) and subpart B and/or CISPR 22/EN55022, RSS210

Test Procedure: ANSI C63.4, CFR 47 Sec. 15.247 as detailed in Appendices

### 3.2 General Test Conditions

1. During the test, the EUT was set in continuously transmitting mode with a duty cycle of 100%.
2. The channel 1, 6, 11 of 802.11b of EUT were all tested.

3. **During the test, the EUT was tested as a modular device of A notebook PC using a PCMCIA extender board to extend the EUT outside the notebook PC enclosure.** The EUT was then connected to a set of antennas via its transmit and receive connectors.

## **4. Powerline Conducted Emissions [Section 15.207]**

### **4.1 EUT Configuration**

The EUT was set up on the non-conductive table that is 1.0 by 1.5 meter, 80cm above ground. The wall of the shielded room was located 40cm to the rear of the EUT.

Power to the EUT was provided through the LISN. The impedance vs. frequency characteristic of the LISN is complied with the limit shown on the figure 1 of ANSI C63.4-2001.

Both lines (neutral and hot) were connected to the LISN in series at testing. A coaxial-type connector which provides one 50 ohms terminating impedance was provided for connecting the test instrument. The excess length of the power cord was folded back and forth at the center of the lead so as to form a bundle not exceeding 40cm in length.

Any changes made to the configuration, or modifications made to the EUT, during testing are noted in the following test record.

If the EUT is a Personal Computer or a peripheral of personal computer, and the personal computer has an auxiliary AC outlet which can be used for providing power to an external monitor, then all measurements will be made with the monitor power from first the computer-mounted AC outlet and then a floor-mounted AC outlet.

### **4.2 Test Procedure**

The system was set up as described above, with the EMI diagnostic software running. The main power line conducted EMI tests were run on the hot and neutral conductors of the power cord and the results were recorded. The effect of varying the position of the interface cables has been investigated to find the configuration that produces maximum emission.

At the frequencies where the peak values of the emissions were higher than 6dB below the applicable limits, the emissions were also measured with the quasi-peak detectors. At the frequencies where the quasi-peak values of the emissions were higher than 6dB below the applicable average limits, the emissions were also measured with the average detectors.

The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

### **4.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)**

|                    |                |
|--------------------|----------------|
| Frequency Range:   | 150 KHz--30MHz |
| Detector Function: | Quasi-Peak     |
| Bandwidth (RBW):   | 9KHz           |

#### 4.4 Test Data:

**Table Power Line Conducted Emissions (Hot) Channel 1, 6, 11**

| Frequency<br>(MHz) | Corrective Factor    |                       | Quasi-Peak                       |                 |                | Average                          |                 |                |
|--------------------|----------------------|-----------------------|----------------------------------|-----------------|----------------|----------------------------------|-----------------|----------------|
|                    | LISN<br>Loss<br>(dB) | Cable<br>Loss<br>(dB) | Corrected<br>Amplitude<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) | Corrected<br>Amplitude<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) |
| 0.21138            | 1.26                 | 0.09                  | 52.74                            | 64.25           | -11.51         | 42.16                            | 54.25           | -12.09         |
| 0.28216            | 1.03                 | 0.11                  | 48.00                            | 62.22           | -14.22         | 35.54                            | 52.22           | -16.69         |
| 0.42268            | 0.64                 | 0.14                  | 40.71                            | 58.21           | -17.50         | 35.83                            | 48.21           | -12.38         |
| 0.49506            | 0.62                 | 0.14                  | 39.84                            | 56.14           | -16.30         | 36.46                            | 46.14           | -9.68          |
| 0.56616            | 0.59                 | 0.15                  | 33.54                            | 56.00           | -22.46         | 27.81                            | 46.00           | -18.19         |
| 3.2415             | 0.45                 | 0.34                  | 41.98                            | 56.00           | -14.02         | 36.58                            | 46.00           | -9.42          |
| 3.30996            | 0.46                 | 0.34                  | 43.38                            | 56.00           | -12.62         | 37.58                            | 46.00           | -8.42          |
| 3.38305            | 0.46                 | 0.35                  | 42.58                            | 56.00           | -13.42         | 37.42                            | 46.00           | -8.58          |
| 3.58996            | 0.46                 | 0.36                  | 42.88                            | 56.00           | -13.12         | 37.36                            | 46.00           | -8.64          |
| 3.87269            | 0.46                 | 0.38                  | 43.56                            | 56.00           | -12.44         | 37.21                            | 46.00           | -8.79          |

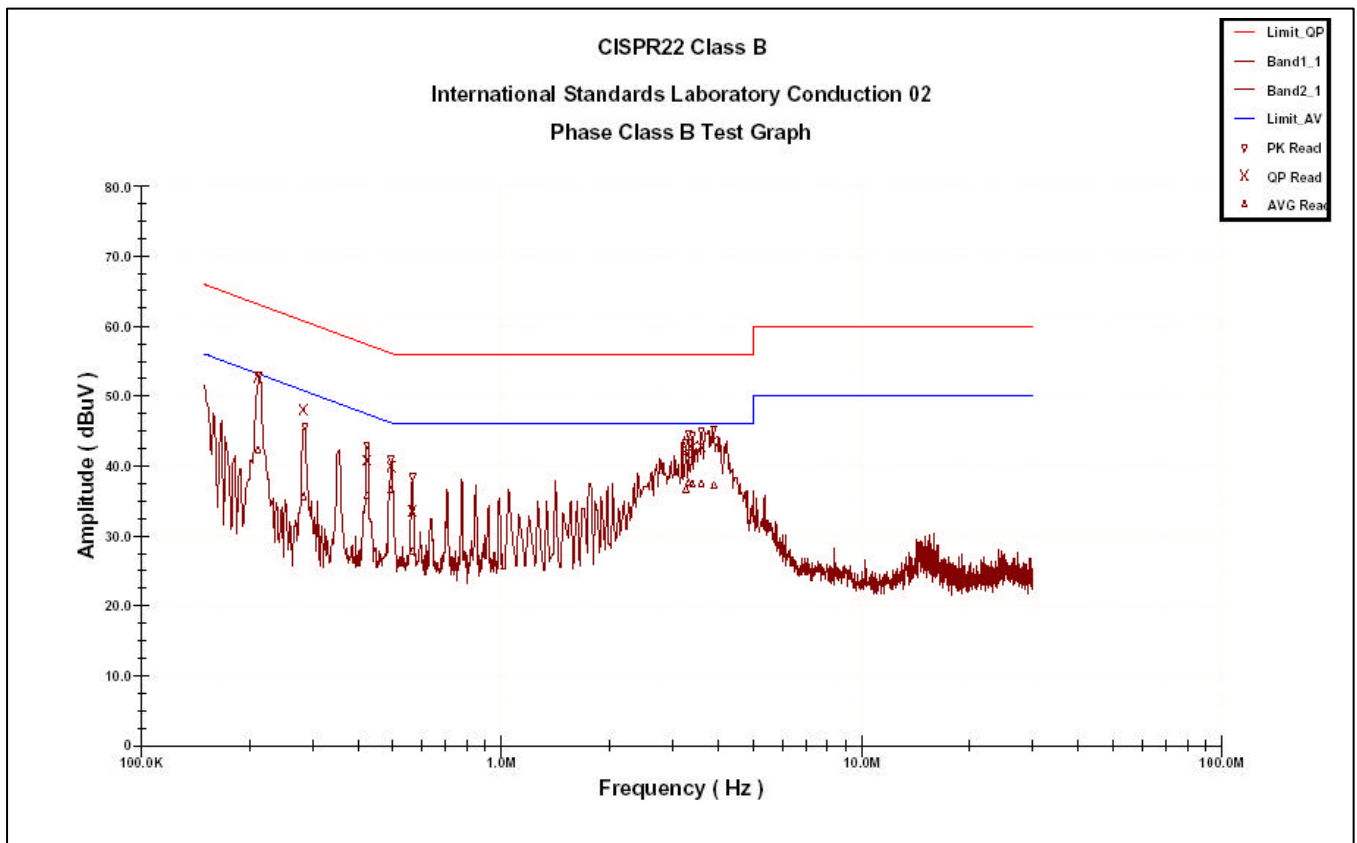
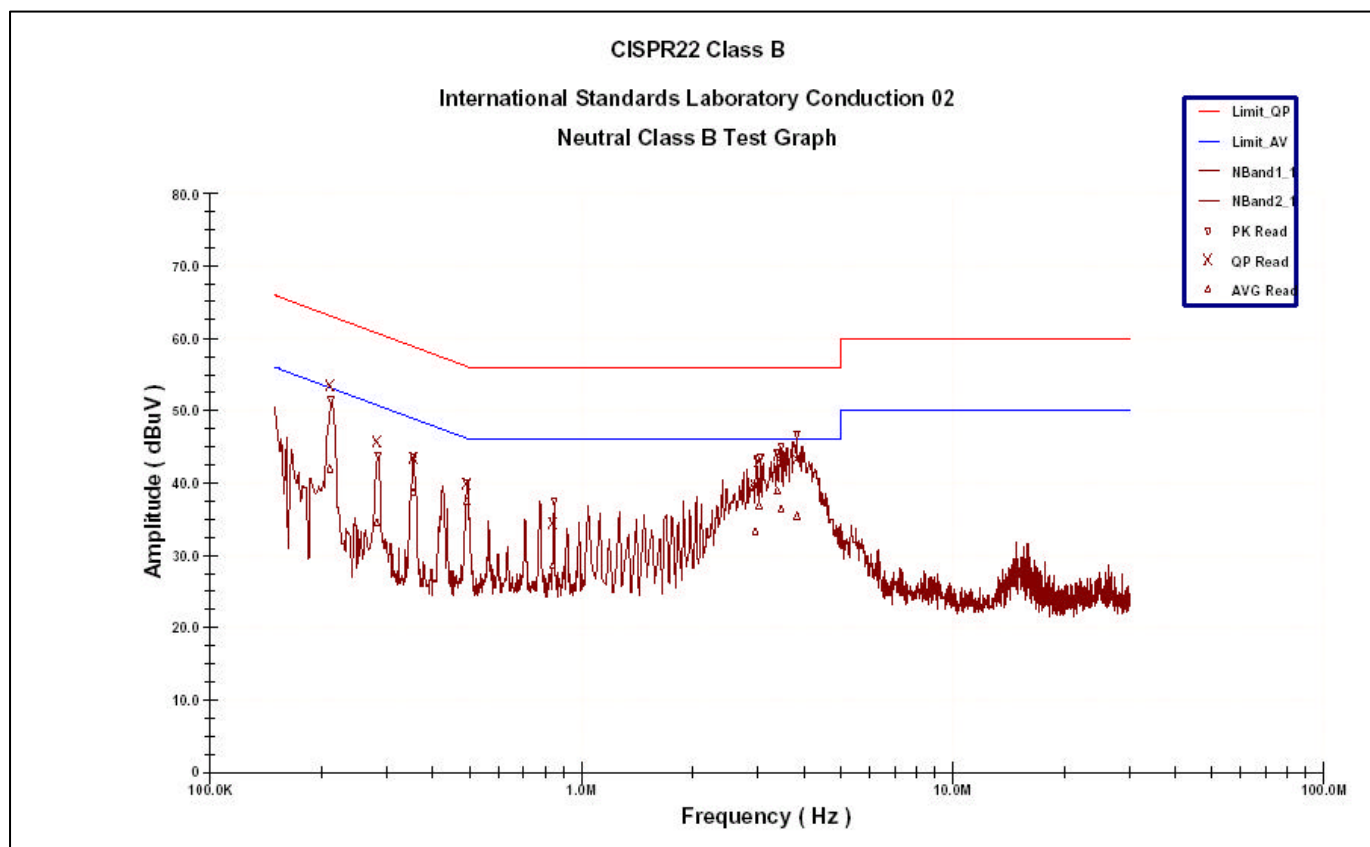


**Table Power Line Conducted Emissions (Neutral) Channel 1, 6, 11**

| Frequency<br>(MHz) | Corrective Factor    |                       | Quasi-Peak                       |                 |                | Average                          |                 |                |
|--------------------|----------------------|-----------------------|----------------------------------|-----------------|----------------|----------------------------------|-----------------|----------------|
|                    | LISN<br>Loss<br>(dB) | Cable<br>Loss<br>(dB) | Corrected<br>Amplitude<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) | Corrected<br>Amplitude<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) |
| 0.21101            | 1.26                 | 0.09                  | 53.55                            | 64.26           | -10.71         | 41.84                            | 54.26           | -12.42         |
| 0.28135            | 1.04                 | 0.11                  | 45.68                            | 62.25           | -16.57         | 34.40                            | 52.25           | -17.85         |
| 0.35226            | 0.81                 | 0.13                  | 43.45                            | 60.22           | -16.77         | 38.72                            | 50.22           | -11.50         |
| 0.49393            | 0.61                 | 0.14                  | 39.89                            | 56.17           | -16.29         | 37.36                            | 46.17           | -8.82          |
| 0.8427             | 0.47                 | 0.16                  | 34.51                            | 56.00           | -21.49         | 28.56                            | 46.00           | -17.44         |
| 2.95435            | 0.42                 | 0.32                  | 39.80                            | 56.00           | -16.20         | 33.15                            | 46.00           | -12.85         |
| 3.02723            | 0.42                 | 0.32                  | 42.91                            | 56.00           | -13.09         | 36.82                            | 46.00           | -9.18          |
| 3.3796             | 0.43                 | 0.35                  | 43.85                            | 56.00           | -12.15         | 38.80                            | 46.00           | -7.20          |
| 3.44768            | 0.43                 | 0.35                  | 42.73                            | 56.00           | -13.27         | 36.37                            | 46.00           | -9.63          |
| 3.80251            | 0.43                 | 0.38                  | 43.42                            | 56.00           | -12.58         | 35.31                            | 46.00           | -10.69         |



\* NOTE: During the test, the EMI receiver was set to Max. Hold then switch the EUT Channel between 1 , 6, 11 to get the maximum reading of all these channels .  
 Margin = Amplitude + Insertion Loss- Limit  
 A margin of -8dB means that the emission is 8dB below the limit

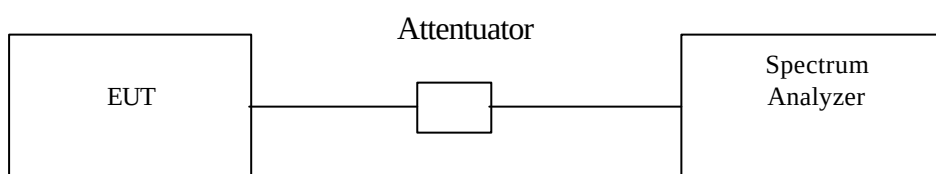
## 5. Bandwidth for DSSS [Section 15.247 (a)(2)]

### 5.1 Test Procedure

The Transmitter output of EUT was connected to the spectrum analyzer through an attenuator. The 6 dB bandwidth of the fundamental frequency was measured. The setting of spectrum analyzer is as follows

Equipment mode: Spectrum analyzer  
 Detector function: Peak mode  
 RBW: 100KHz  
 VBW: 100KHz

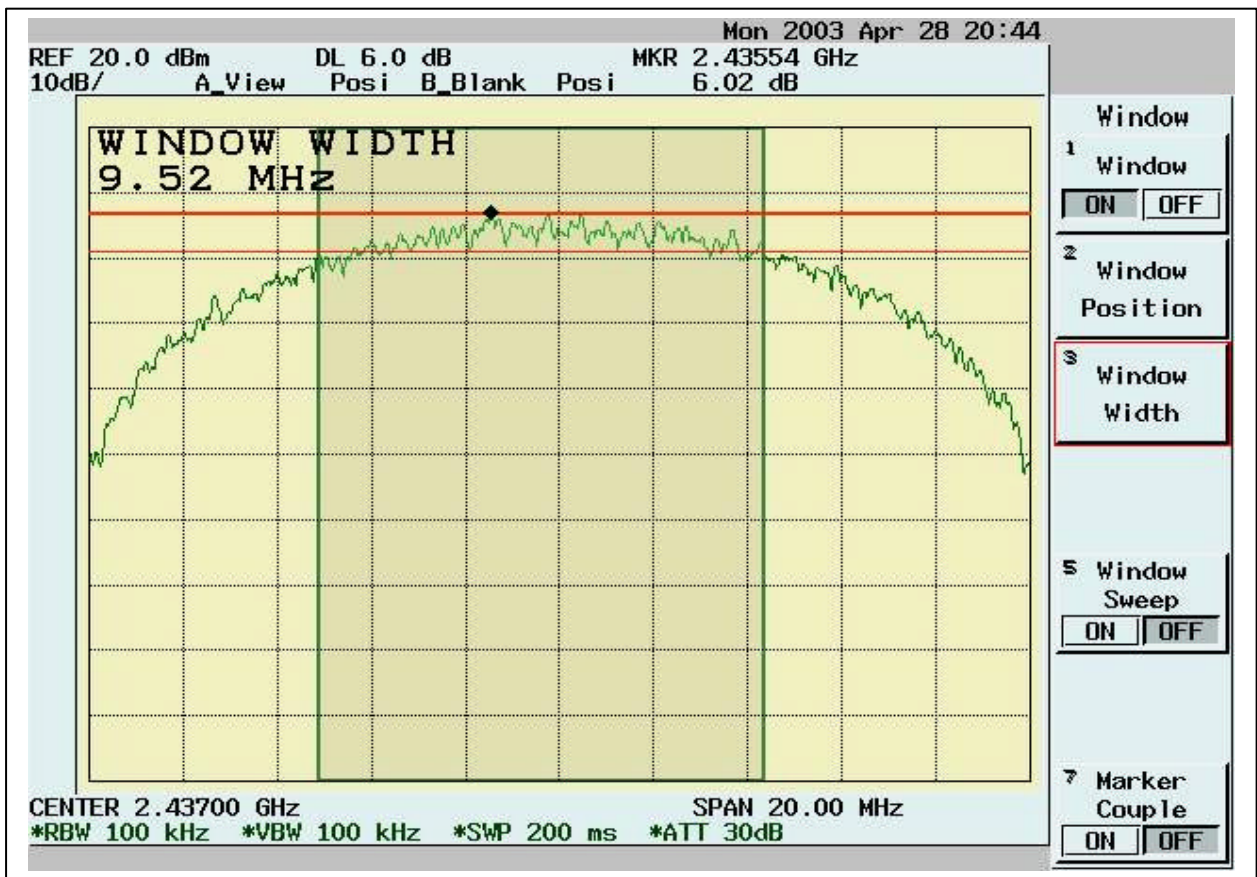
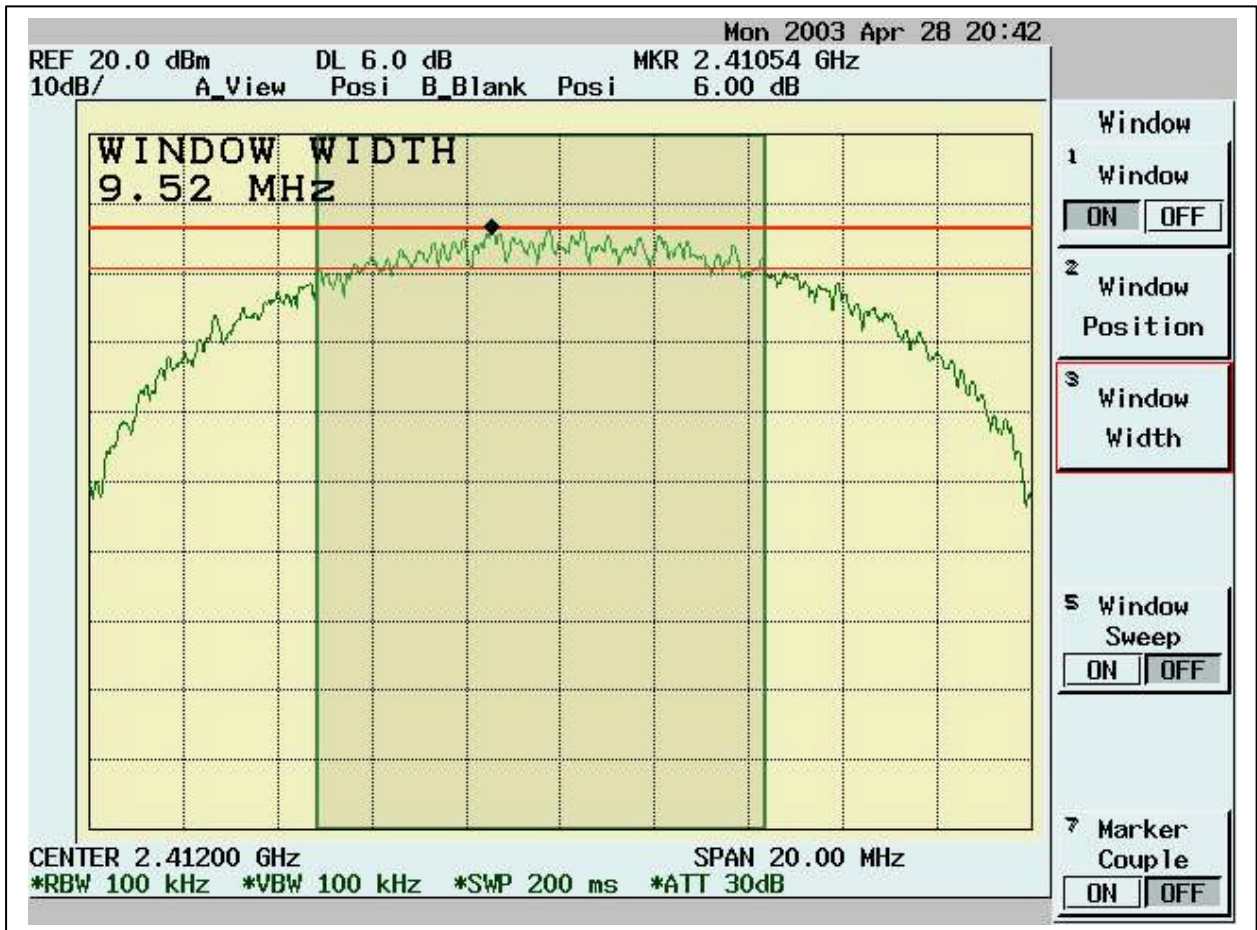
### 5.2 Test Setup

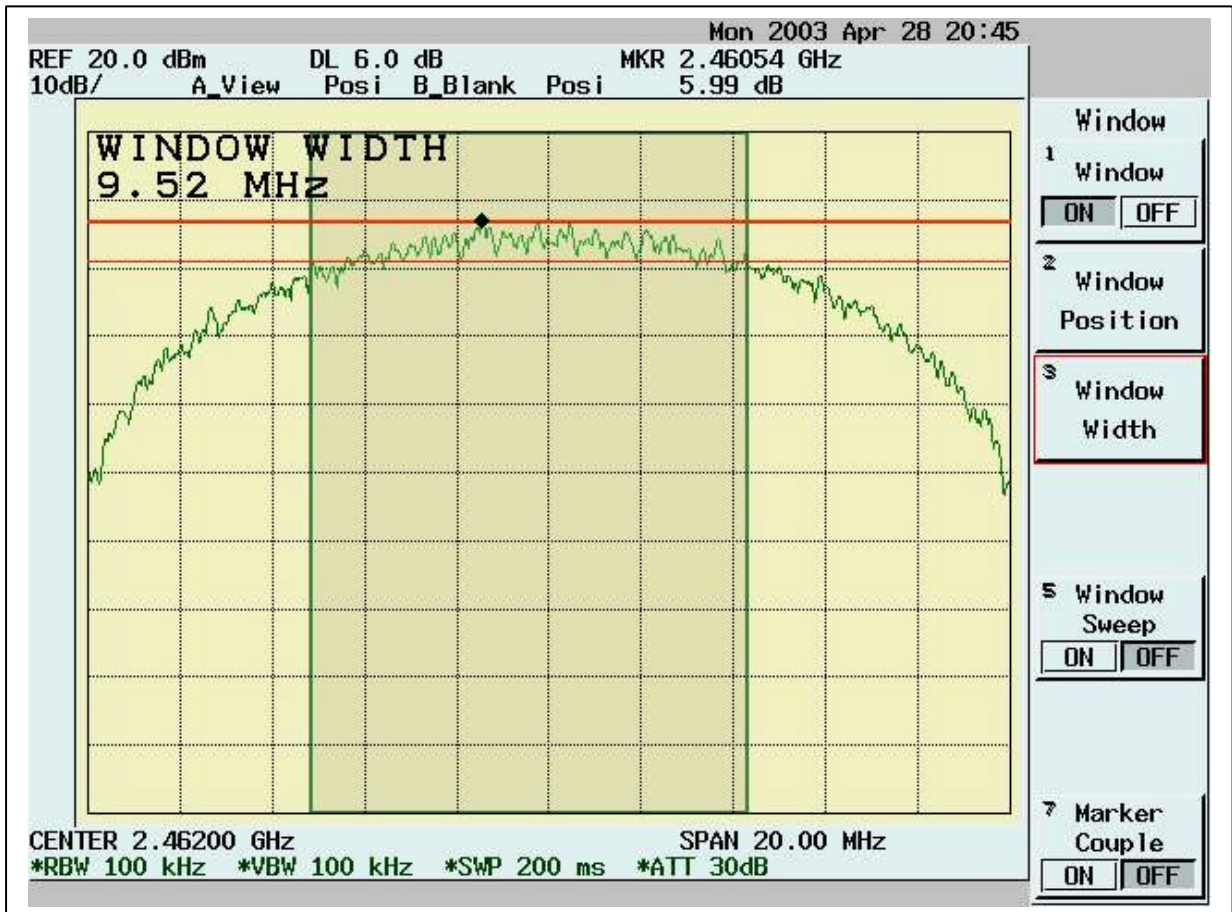


### 5.3 Test Data

**Table 6dB Bandwidth**

| Channel | Frequency<br>(MHz) | 6dB Bandwidth<br>(MHz) | Limit<br>(MHz) | Pass/Fail |
|---------|--------------------|------------------------|----------------|-----------|
| 1       | 2412               | 9.52                   | 0.5            | Pass      |
| 6       | 2437               | 9.52                   | 0.5            | Pass      |
| 11      | 2462               | 9.52                   | 0.5            | Pass      |



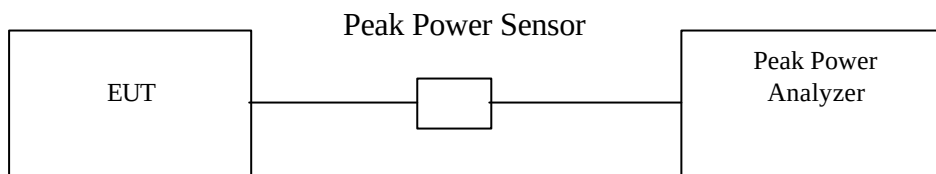


## 6. DSSS Maximum Peak Output Power [Section 15.247 (b)(3)]

### 6.1 Test Procedure

1. The Transmitter output of EUT was connected to the peak power analyzer through an attenuator.

### 6.2 Test Setup



### 6.3 Test Data:

**Table Maximum Peak Output Power**

| Channel | Frequency<br>(MHz) | Peak Power<br>Output (mW) | Peak Power<br>Output (dBm) | Limit (dBm) | Pass/Fail |
|---------|--------------------|---------------------------|----------------------------|-------------|-----------|
| 1       | 2412               | 76.348                    | 18.828                     | 30          | Pass      |
| 6       | 2437               | 79.708                    | 19.015                     | 30          | Pass      |
| 11      | 2462               | 82.928                    | 19.187                     | 30          | Pass      |

## 7. Radiated Emission Measurement [Section [15.247(c)]]

### 7.1 EUT Configuration

The equipment under test was set up on the 10 meter chamber with measurement distance of 3 meters. The EUT was placed on a non-conductive table 80cm above ground.

Any changes made to the configuration, or modifications made to the EUT, during testing are noted in the following test record.

### 7.2 Test Procedure

The system was set up as described above, with the EMI diagnostic software running. We found the maximum readings by varying the height of antenna and then rotating the turntable. Both polarization of antenna, horizontal and vertical, are measured.

30M to 1GHz: The highest emissions between 30 MHz to 1000 MHz were also analyzed in details by operating the spectrum analyzer and/or EMI receiver in quasi-peak mode to determine the precise amplitude of the emissions. While doing so, the interconnecting cables and major parts of the system were moved around, the antenna height was varied between one and four meters, its polarization was varied between vertical and horizontal, and the turntable was slowly rotated, to maximize the emission.

1GHz – 25GHz: The highest emissions were also analyzed in details by operating the spectrum analyzer and/or EMI receiver in peak mode to determine the precise amplitude of the emission. While doing so, the interconnecting cables and major parts of the system were moved around, the antenna height was varied between one and four meters, its polarization was varied between vertical and horizontal, and the turntable was slowly rotated, to maximize the emission. During test the EMI receiver and spectrum was setup according to *EMI Receiver/Spectrum Analyzer Configuration*. For the test of 2<sup>nd</sup> to 10<sup>th</sup> harmonics frequencies, the equipment setup was also refer to *EMI Receiver/Spectrum Analyzer Configuration*. The frequencies were tested using Peak mode first, if the test data is higher than the emissions limit, an additional measurement using Average mode will be performed and the average reading will be compared to the limit and record in test report.

### 7.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)

|                             |                 |
|-----------------------------|-----------------|
| Frequency Range Tested:     | 30MHz~1000MHz   |
| Detector Function:          | Quasi-Peak Mode |
| Resolution Bandwidth (RBW): | 120KHz          |
| Video Bandwidth (VBW)       | 1MHz            |
| Frequency Range Tested:     | 1GHz – 25 GHz   |
| Detector Function:          | Peak Mode       |
| Resolution Bandwidth (RBW): | 1MHz            |
| Video Bandwidth (VBW)       | 1MHz            |
| Frequency Range Tested:     | 1GHz – 25 GHz   |
| Detector Function:          | Average Mode    |
| Resolution Bandwidth (RBW): | 1MHz            |
| Video Bandwidth (VBW)       | 10 Hz           |

#### 7.4 Test Data (30MHz – 1GHz) with 3m Test Distance :

(a)Antenna \_\_ CA8-I:

##### 30M – 1GHz Open Field Radiated Emissions (Horizontal) Channel 1, 6, 11

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |         | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|---------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin* | Height<br>(cm) | Position<br>(°) |
| 42.61          | 14.47           | 11.16             | 1.09          | 0.00              | 26.72               | 40.00             | -13.28  | 100.00         | 89.00           |
| 207.51         | 16.80           | 8.80              | 2.67          | 0.00              | 28.27               | 43.50             | -15.23  | 100.00         | 61.00           |
| 325.85         | 15.07           | 13.59             | 3.37          | 0.00              | 32.02               | 46.00             | -13.98  | 150.00         | 116.00          |
| 335.55         | 17.34           | 13.79             | 3.42          | 0.00              | 34.55               | 46.00             | -11.45  | 100.00         | 144.00          |
| 399.57         | 21.21           | 15.58             | 3.80          | 0.00              | 40.59               | 46.00             | -5.41   | 200.00         | 34.00           |
| 455.83         | 9.29            | 16.43             | 4.06          | 0.00              | 29.78               | 46.00             | -16.22  | 150.00         | 116.00          |
| 847.71         | 4.69            | 20.30             | 5.79          | 0.00              | 30.78               | 46.00             | -15.22  | 100.00         | 144.00          |

##### 30M – 1GHz Open Field Radiated Emissions (Vertical) Channel 1, 6, 11

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |         | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|---------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin* | Height<br>(cm) | Position<br>(°) |
| 43.58          | 15.38           | 10.63             | 1.10          | 0.00              | 27.12               | 40.00             | -12.88  | 100.00         | 270.00          |
| 215.27         | 17.42           | 8.62              | 2.72          | 0.00              | 28.76               | 43.50             | -14.74  | 100.00         | 243.00          |
| 674.08         | 7.60            | 18.83             | 5.05          | 0.00              | 31.49               | 46.00             | -14.51  | 150.00         | 353.00          |
| 719.67         | 8.47            | 19.39             | 5.26          | 0.00              | 33.12               | 46.00             | -12.88  | 100.00         | 325.00          |
| 799.21         | 9.73            | 19.90             | 5.63          | 0.00              | 35.25               | 46.00             | -10.75  | 200.00         | 298.00          |
| 815.7          | 5.49            | 20.01             | 5.68          | 0.00              | 31.19               | 46.00             | -14.81  | 150.00         | 133.00          |
| 832.19         | 7.08            | 20.22             | 5.74          | 0.00              | 33.04               | 46.00             | -12.96  | 100.00         | 325.00          |

**(b) Antenna \_\_ 5600:****30M – 1GHz Open Field Radiated Emissions (Horizontal) Channel 1, 6, 11**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |         | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|---------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin* | Height<br>(cm) | Position<br>(°) |
| 42.61          | 13.15           | 11.16             | 1.09          | 0.00              | 25.40               | 40.00             | -14.60  | 100.00         | 78.00           |
| 79.47          | 16.16           | 6.69              | 1.57          | 0.00              | 24.43               | 40.00             | -15.57  | 100.00         | 270.00          |
| 227.88         | 18.33           | 9.69              | 2.79          | 0.00              | 30.81               | 46.00             | -15.19  | 150.00         | 242.00          |
| 386.96         | 16.78           | 15.01             | 3.72          | 0.00              | 35.51               | 46.00             | -10.49  | 200.00         | 133.00          |
| 533.43         | 13.23           | 17.25             | 4.41          | 0.00              | 34.89               | 46.00             | -11.11  | 200.00         | 352.00          |
| 632.37         | 7.24            | 19.00             | 4.86          | 0.00              | 31.11               | 46.00             | -14.89  | 100.00         | 352.00          |
| 796.3          | 5.08            | 19.90             | 5.61          | 0.00              | 30.59               | 46.00             | -15.41  | 100.00         | 78.00           |

**30M – 1GHz Open Field Radiated Emissions (Vertical) Channel 1, 6, 11**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |         | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|---------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin* | Height<br>(cm) | Position<br>(°) |
| 74.62          | 16.93           | 5.79              | 1.51          | 0.00              | 24.23               | 40.00             | -15.77  | 100.00         | 336.00          |
| 129.91         | 17.03           | 11.10             | 2.06          | 0.00              | 30.20               | 43.50             | -13.30  | 100.00         | 226.00          |
| 227.88         | 18.32           | 9.69              | 2.79          | 0.00              | 30.80               | 46.00             | -15.20  | 150.00         | 61.00           |
| 698.33         | 12.72           | 18.97             | 5.16          | 0.00              | 36.85               | 46.00             | -9.15   | 100.00         | 254.00          |
| 719.67         | 6.91            | 19.39             | 5.26          | 0.00              | 31.56               | 46.00             | -14.44  | 100.00         | 226.00          |
| 815.7          | 6.54            | 20.01             | 5.68          | 0.00              | 32.24               | 46.00             | -13.76  | 200.00         | 226.00          |
| 832.19         | 6.31            | 20.22             | 5.74          | 0.00              | 32.27               | 46.00             | -13.73  | 100.00         | 226.00          |

**(c ) Antenna \_\_888E:****30M – 1GHz Open Field Radiated Emissions (Horizontal) Channel 1, 6, 11**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |         | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|---------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin* | Height<br>(cm) | Position<br>(°) |
| 207.51         | 15.57           | 8.80              | 2.67          | 0.00              | 27.04               | 43.50             | -16.46  | 100.00         | 243.00          |
| 325.85         | 14.20           | 13.59             | 3.37          | 0.00              | 31.15               | 46.00             | -14.85  | 150.00         | 215.00          |
| 532.46         | 9.45            | 17.08             | 4.41          | 0.00              | 30.94               | 46.00             | -15.06  | 150.00         | 105.00          |
| 565.44         | 15.45           | 18.65             | 4.56          | 0.00              | 38.65               | 46.00             | -7.35   | 200.00         | 105.00          |
| 599.39         | 14.08           | 18.50             | 4.71          | 0.00              | 37.29               | 46.00             | -8.71   | 200.00         | 78.00           |
| 799.21         | 4.83            | 19.90             | 5.63          | 0.00              | 30.35               | 46.00             | -15.65  | 100.00         | 78.00           |
| 899.12         | 2.72            | 20.40             | 5.96          | 0.00              | 29.08               | 46.00             | -16.92  | 100.00         | 243.00          |

**30M – 1GHz Open Field Radiated Emissions (Vertical) Channel 1, 6, 11**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |         | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|---------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin* | Height<br>(cm) | Position<br>(°) |
| 79.47          | 16.21           | 6.69              | 1.57          | 0.00              | 24.48               | 40.00             | -15.52  | 100.00         | 35.00           |
| 87.23          | 15.41           | 8.05              | 1.67          | 0.00              | 25.13               | 40.00             | -14.87  | 150.00         | 173.00          |
| 224            | 17.59           | 9.32              | 2.77          | 0.00              | 29.68               | 46.00             | -16.32  | 150.00         | 8.00            |
| 670.2          | 6.51            | 18.85             | 5.04          | 0.00              | 30.39               | 46.00             | -15.61  | 200.00         | 255.00          |
| 674.08         | 7.66            | 18.83             | 5.05          | 0.00              | 31.55               | 46.00             | -14.45  | 100.00         | 255.00          |
| 719.67         | 6.52            | 19.39             | 5.26          | 0.00              | 31.18               | 46.00             | -14.82  | 100.00         | 228.00          |
| 815.7          | 4.21            | 20.01             | 5.68          | 0.00              | 29.91               | 46.00             | -16.09  | 200.00         | 228.00          |

**(d) Antenna \_\_ M300N:****30M – 1GHz Open Field Radiated Emissions (Horizontal) Channel 1, 6, 11**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |                 | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|-----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin*<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 40.67          | 15.80           | 12.23             | 1.06          | 0.00              | 29.10               | 40.00             | -10.90          | 100.00         | 61.00           |
| 129.91         | 17.65           | 11.10             | 2.06          | 0.00              | 30.82               | 43.50             | -12.68          | 100.00         | 144.00          |
| 260.86         | 16.60           | 12.63             | 2.99          | 0.00              | 32.21               | 46.00             | -13.79          | 150.00         | 116.00          |
| 335.55         | 17.34           | 13.79             | 3.42          | 0.00              | 34.55               | 46.00             | -11.45          | 150.00         | 171.00          |
| 360.77         | 15.17           | 14.52             | 3.57          | 0.00              | 33.26               | 46.00             | -12.74          | 200.00         | 144.00          |
| 719.67         | 9.83            | 19.39             | 5.26          | 0.00              | 34.48               | 46.00             | -11.52          | 200.00         | 116.00          |
| 832.19         | 7.84            | 20.22             | 5.74          | 0.00              | 33.80               | 46.00             | -12.20          | 200.00         | 171.00          |

**30M – 1GHz Open Field Radiated Emissions (Vertical) Channel 1, 6, 11**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |                 | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|-----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin*<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 77.53          | 19.87           | 6.31              | 1.55          | 0.00              | 27.72               | 40.00             | -12.28          | 100.00         | 78.00           |
| 129.91         | 20.67           | 11.10             | 2.06          | 0.00              | 33.84               | 43.50             | -9.66           | 100.00         | 242.00          |
| 211.39         | 16.71           | 8.67              | 2.70          | 0.00              | 28.08               | 43.50             | -15.42          | 150.00         | 242.00          |
| 674.08         | 7.10            | 18.83             | 5.05          | 0.00              | 30.99               | 46.00             | -15.01          | 200.00         | 352.00          |
| 677.96         | 6.15            | 18.81             | 5.07          | 0.00              | 30.03               | 46.00             | -15.97          | 200.00         | 352.00          |
| 719.67         | 7.53            | 19.39             | 5.26          | 0.00              | 32.19               | 46.00             | -13.81          | 150.00         | 325.00          |
| 815.7          | 5.11            | 20.01             | 5.68          | 0.00              | 30.81               | 46.00             | -15.19          | 150.00         | 325.00          |

**NOTE:**

During the test, the EUT was set to Channel 1, 6, 11 respectively to get the maximum reading of all the critical emission frequencies.

Margin = Corrected Amplitude – Limit

Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain

A margin of –8dB means that the emission is 8dB below the limit

All frequencies from 30MHz to 1GHz have been tested, and the test distance is 3m.

## 7.5 Test Data ( 1GHz – 25 GHz) with 3m Test Distance .

### (a) Antenna \_\_ CA8-I:

#### 1GHz~ 25 GHz (Horizontal), Channel 1 : 2412 MHz

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |                | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4824           | 67.05 (pk)      | 33.9              | 1.9           | 49.21             | 53.64               | 74                | -20.36         | 100            | 92              |
| 4824           | 54.16 (av)      | 33.9              | 1.9           | 49.21             | 40.75               | 54                | -13.25         | 100            | 92              |
| 7236           | 48.19(pk)       | 39.88             | 2.32          | 48.01             | 42.38               | 54                | -11.62         | 100            | 10              |
| 9648           | 41.44(pk)       | 38.93             | 2.72          | 44.59             | 38.5                | 54                | -15.5          | 100            | 0               |

#### 1GHz~ 25 GHz (Vertical), , Channel 1 : 2412 MHz

| Meter Reading  |                 | Correction Factor |               |                       | Corrected Emissions |                   |                | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-----------------------|---------------------|-------------------|----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Am<br>pl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4824           | 72.45(pk)       | 33.9              | 1.9           | 49.21                 | 59.04               | 74                | -15.96         | 100            | 85              |
| 4824           | 59.46(av)       | 33.9              | 1.9           | 49.21                 | 46.05               | 54                | -7.95          | 100            | 88              |
| 7236           | 49.5(pk)        | 39.88             | 2.32          | 48.01                 | 43.69               | 54                | -10.31         | 100            | 5               |
| 9648           | 43.97(pk)       | 38.93             | 2.72          | 44.59                 | 41.03               | 54                | -12.97         | 100            | 10              |

Note:

“ \* ” : Fundamental Frequency

“\*\*” Not in the restricted band, Limit level=Fundamental Emission-20dB

“ pk” : peak reading

“ av” : average reading

“---“ : No meter reading data due to the emission level is smaller than spectrum noise level.

The Spectrum noise level + Correction Factor < Limit - 6 dB

Margin = Corrected Amplitude – Limit

Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss -

Pre-Amplifier Gain

A margin of -8dB means that the emission is 8dB below the limit

All frequencies from 1GHz to 25 GHz have been tested , and the test distance is 3m,.

**(b) Antenna \_\_ 5600:****1GHz~ 25 GHz (Horizontal), Channel 1 : 2412 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |                | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4823.88        | 57.88(pk)       | 33.9              | 1.9           | 49.21             | 44.47               | 54                | -9.53          | 100            | 94              |
| 7235.58        | 48.97(pk)       | 39.88             | 2.32          | 48.01             | 43.16               | 54                | -10.84         | 100            | 0               |
| 9648.09        | 49.84(pk)       | 38.93             | 2.72          | 44.59             | 46.9                | 54                | -7.1           | 100            | 348             |
| 12060.3        | 42.04(pk)       | 42.09             | 3.03          | 45.42             | 41.74               | 54                | -12.26         | 100            | 38              |

**1GHz~ 25 GHz (Vertical), , Channel 1 : 2412 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |                | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4824.06        | 62.02(pk)       | 33.9              | 1.9           | 49.21             | 48.61               | 54                | -5.39          | 100            | 121             |
| 7235.64        | 51.59(pk)       | 39.88             | 2.32          | 48.01             | 45.78               | 54                | -8.22          | 100            | 300             |
| 9648           | 53.98(pk)       | 38.93             | 2.72          | 44.59             | 51.04               | 54                | -2.96          | 100            | 0               |
| 12061          | 44.77(pk)       | 42.09             | 3.03          | 45.42             | 44.47               | 54                | -9.53          | 100            | 312             |

**Note:**

“ \* ” : Fundamental Frequency

“\*\*” Not in the restricted band, Limit level=Fundamental Emission-20dB

“ pk ”: peak reading

“ av ”: average reading

“ --- ” : No meter reading data due to the emission level is smaller than spectrum noise level.

The Spectrum noise level + Correction Factor < Limit - 6 dB

Margin = Corrected Amplitude – Limit

Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss -  
Pre-Amplifier Gain

A margin of -8dB means that the emission is 8dB below the limit

All frequencies from 1GHz to 25 GHz have been tested, and the test distance is 3m.

**(c) Antenna \_\_ 888E:****1GHz~ 25 GHz (Horizontal), Channel 1 : 2412 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |                | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4824           | 63.65(pk)       | 33.9              | 1.9           | 49.21             | 50.24               | 54                | -3.76          | 100            | 65              |
| 7236           | 45.73(pk)       | 39.88             | 2.32          | 48.01             | 39.92               | 54                | -14.08         | 100            | 6               |
| 9648           | 43.72(pk)       | 38.93             | 2.72          | 44.59             | 40.78               | 54                | -13.22         | 100            | 25              |

**1GHz~ 25 GHz (Vertical), , Channel 1 : 2412 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |                | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4824           | 68.93(pk)       | 33.9              | 1.9           | 49.21             | 55.52               | 74                | -18.48         | 100            | 70              |
| 4824           | 56.38(av)       | 33.9              | 1.9           | 49.21             | 42.97               | 54                | -11.03         | 100            | 70              |
| 7236           | 47.66(pk)       | 39.88             | 2.32          | 48.01             | 41.85               | 54                | -12.15         | 100            | 63              |
| 9648           | 47.5(pk)        | 38.93             | 2.72          | 44.59             | 44.56               | 54                | -9.44          | 100            | 32              |

**Note:**

“ \* ” : Fundamental Frequency

“\*\*” Not in the restricted band, Limit level=Fundamental Emission-20dB

“ pk”: peak reading

“av”: average reading

“---“ : No meter reading data due to the emission level is smaller than spectrum noise level.

The Spectrum noise level + Correction Factor < Limit - 6 dB

Margin = Corrected Amplitude – Limit

Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss -  
Pre-Amplifier Gain

A margin of -8dB means that the emission is 8dB below the limit

All frequencies from 1GHz to 25 GHz have been tested, and the test distance is 3m.

**(d) Antenna \_\_ M300N:****1GHz~ 25 GHz (Horizontal), Channel 1 : 2412 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |                | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4824           | 65.51(pk)       | 33.9              | 1.9           | 49.21             | 52.1                | 74                | -21.9          | 100            | 65              |
| 4824           | 53.12(av)       | 33.9              | 1.9           | 49.21             | 39.71               | 54                | -14.29         | 100            | 65              |
| 7235.55        | 47.4(pk)        | 39.88             | 2.32          | 48.01             | 41.59               | 54                | -12.41         | 100            | 100             |
| 9647.85        | 46.02(pk)       | 38.93             | 2.72          | 44.59             | 43.08               | 54                | -10.92         | 100            | 105             |
| 12060.7        | 41.23(pk)       | 42.09             | 3.03          | 45.42             | 40.93               | 54                | -13.07         | 100            | 125             |

**1GHz~ 25 GHz (Vertical), , Channel 1 : 2412 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |                | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4824           | 71.24(pk)       | 33.9              | 1.9           | 49.21             | 57.83               | 74                | -16.17         | 100            | 0               |
| 4824           | 58.28(av)       | 33.9              | 1.9           | 49.21             | 44.87               | 54                | -9.13          | 100            | 0               |
| 7235.55        | 51.21(pk)       | 39.88             | 2.32          | 48.01             | 45.4                | 54                | -8.6           | 100            | 180             |
| 9648.24        | 48.21(pk)       | 38.93             | 2.72          | 44.59             | 45.27               | 54                | -8.73          | 100            | 98              |
| 12060.1        | 45.35(pk)       | 42.09             | 3.03          | 45.42             | 45.05               | 54                | -8.95          | 100            | 15              |

**Note:**

“ \* ” : Fundamental Frequency

“\*\*” Not in the restricted band, Limit level=Fundamental Emission-20dB

“ pk”: peak reading

“av”: average reading

“---“ : No meter reading data due to the emission level is smaller than spectrum noise level.

The Spectrum noise level + Correction Factor < Limit - 6 dB

Margin = Corrected Amplitude – Limit

Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss -  
Pre-Amplifier Gain

A margin of -8dB means that the emission is 8dB below the limit

All frequencies from 1GHz to 25 GHz have been tested, and the test distance is 3m .

**(a) Antenna \_\_ CA8-I:****1GHz~ 25 GHz (Horizontal), , Channel 6 : 2437 MHz**

| Meter Reading  |                 | Correction Factor |               |                       | Corrected Emissions |                   |                | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-----------------------|---------------------|-------------------|----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Am<br>pl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4874           | 66.02(pk)       | 34.1              | 1.91          | 49.24                 | 52.79               | 74                | -18.79         | 100            | 141             |
| 4874           | 54.11(av)       | 34.1              | 1.91          | 49.24                 | 40.88               | 54                | -13.12         | 100            | 141             |
| 7311           | 47.43(pk)       | 39.72             | 2.34          | 47.9                  | 41.59               | 54                | -12.41         | 100            | 0               |
| 9748           | 44.16(pk)       | 38.75             | 2.74          | 44.45                 | 41.2                | 54                | -12.8          | 100            | 98              |

**1GHz~ 25 GHz (Vertical), Channel 6 : 2437 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |                 | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|-----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin*<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4874           | 72.58(pk)       | 34.1              | 1.91          | 49.24             | 59.35               | 74                | -14.65          | 100            | 5               |
| 4874           | 59.46(av)       | 34.1              | 1.91          | 49.24             | 46.23               | 54                | -7.77           | 100            | 5               |
| 7311           | 48.67(pk)       | 39.72             | 2.34          | 47.9              | 42.83               | 54                | -11.17          | 100            | 74              |
| 9748           | 45.04(pk)       | 38.75             | 2.74          | 44.45             | 42.08               | 54                | -11.92          | 100            | 106             |

Note:

“ \* ” : Fundamental Frequency

“\*\*” Not in the restricted band, Limit level=Fundamental Emission-20dB

“ pk ”: peak reading

“ av ”: average reading

“ --- ” : No meter reading data due to the emission level is smaller than spectrum noise level.

The Spectrum noise level + Correction Factor < Limit - 6 dB

Margin = Corrected Amplitude – Limit

Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss -  
Pre-Amplifier Gain

A margin of -8dB means that the emission is 8dB below the limit

All frequencies from 1GHz to 25 GHz have been tested , and the test distance is 3m.

**(b) Antenna \_\_ 5600:****1GHz~ 25 GHz (Horizontal), , Channel 6 : 2437 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |                | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4874           | 53.5(pk)        | 34.1              | 1.91          | 49.24             | 40.27               | 54                | -13.73         | 100            | 141             |
| 7310.73        | 46.04(pk)       | 39.72             | 2.34          | 47.9              | 40.2                | 54                | -13.8          | 100            | 0               |
| 9747.84        | 47.16(pk)       | 38.75             | 2.74          | 44.45             | 44.2                | 54                | -9.8           | 100            | 98              |

**1GHz~ 25 GHz (Vertical), Channel 6 : 2437 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |                 | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|-----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin*<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4874           | 62.09(pk)       | 34.1              | 1.91          | 49.24             | 48.86               | 54                | -5.14           | 100            | 125             |
| 7310.7         | 51.06(pk)       | 39.72             | 2.34          | 47.9              | 45.22               | 54                | -8.78           | 100            | 5               |
| 9747.99        | 54.17(pk)       | 38.75             | 2.74          | 44.45             | 51.21               | 74                | -22.79          | 100            | 93              |
| 9748           | 47.18(av)       | 38.75             | 2.74          | 44.45             | 44.22               | 54                | -9.78           | 100            | 93              |

Note:

“ \* ” : Fundamental Frequency

“\*\*” Not in the restricted band, Limit level=Fundamental Emission-20dB

“ pk”: peak reading

“av”: average reading

“---“ : No meter reading data due to the emission level is smaller than spectrum noise level.

The Spectrum noise level + Correction Factor < Limit - 6 dB

Margin = Corrected Amplitude – Limit

Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss -  
Pre-Amplifier Gain

A margin of -8dB means that the emission is 8dB below the limit

All frequencies from 1GHz to 25 GHz have been tested, and the test distance is 3m .

**(c) Antenna \_\_ 888E:****1GHz~ 25 GHz (Horizontal), , Channel 6 : 2437 MHz**

| Meter Reading  |                 | Correction Factor |               |                       | Corrected Emissions |                   |                | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-----------------------|---------------------|-------------------|----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Am<br>pl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4874           | 62.63(pk)       | 34.1              | 1.91          | 49.24                 | 49.4                | 54                | -4.6           | 100            | 141             |
| 7311           | 44.96(pk)       | 39.72             | 2.34          | 47.9                  | 39.12               | 54                | -14.88         | 100            | 0               |
| 9748           | 46.41(pk)       | 38.75             | 2.74          | 44.45                 | 43.45               | 54                | -10.55         | 100            | 98              |

**1GHz~ 25 GHz (Vertical), Channel 6 : 2437 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |         | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|---------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin* | Height<br>(cm) | Position<br>(°) |
| 4874           | 68.8(pk)        | 34.1              | 1.91          | 49.24             | 55.57               | 74                | -18.43  | 100            | 110             |
| 4874           | 56.2(av)        | 34.1              | 1.91          | 49.24             | 42.97               | 54                | -11.03  | 100            | 110             |
| 7311           | 47.46(pk)       | 39.72             | 2.34          | 47.9              | 41.62               | 54                | -12.38  | 100            | 23              |
| 9748           | 45.34(pk)       | 38.75             | 2.74          | 44.45             | 42.38               | 54                | -11.62  | 100            | 30              |

Note:

“ \* ” : Fundamental Frequency

“\*\*” Not in the restricted band, Limit level=Fundamental Emission-20dB

“ pk”: peak reading

“av”: average reading

“---“ : No meter reading data due to the emission level is smaller than spectrum noise level.

The Spectrum noise level + Correction Factor < Limit - 6 dB

Margin = Corrected Amplitude – Limit

Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss -  
Pre-Amplifier Gain

A margin of -8dB means that the emission is 8dB below the limit

All frequencies from 1GHz to 25 GHz have been tested, and the test distance is 3m.

**(d) Antenna \_\_ M300N:****1GHz~ 25 GHz (Horizontal), , Channel 6 : 2437 MHz**

| Meter Reading  |                 | Correction Factor |               |                       | Corrected Emissions |                   |                | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-----------------------|---------------------|-------------------|----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Am<br>pl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4874           | 52.86(pk)       | 34.1              | 1.91          | 49.24                 | 39.63               | 54                | -14.37         | 100            | 141             |
| 7311           | 45.05(pk)       | 39.72             | 2.34          | 47.9                  | 39.21               | 54                | -14.79         | 100            | 0               |
| 9748           | 46.81(pk)       | 38.75             | 2.74          | 44.45                 | 43.85               | 54                | -10.15         | 100            | 98              |

**1GHz~ 25 GHz (Vertical), Channel 6 : 2437 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |                 | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|-----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin*<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4874           | 61.44(pk)       | 34.1              | 1.91          | 49.24             | 48.21               | 54                | -5.79           | 100            | 120             |
| 7311           | 47.07(pk)       | 39.72             | 2.34          | 47.9              | 41.23               | 54                | -12.77          | 100            | 10              |
| 9748           | 49.44(pk)       | 38.75             | 2.74          | 44.45             | 46.48               | 54                | -7.52           | 100            | 10              |

Note:

“ \* ” : Fundamental Frequency

“\*\*\*” Not in the restricted band, Limit level=Fundamental Emission-20dB

“ pk”: peak reading

“av”: average reading

“---“ : No meter reading data due to the emission level is smaller than spectrum noise level.

The Spectrum noise level + Correction Factor < Limit - 6 dB

Margin = Corrected Amplitude – Limit

Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss -  
Pre-Amplifier Gain

A margin of -8dB means that the emission is 8dB below the limit

All frequencies from 1GHz to 25 GHz have been tested, and the test distance is 3m .

**(a) Antenna \_\_ CA8-I:****1GHz~ 25 GHz (Horizontal), Channel 11: 2462 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |                 | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|-----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin*<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4924           | 68.48(pk)       | 34.3              | 1.92          | 49.26             | 55.44               | 74                | -18.56          | 100            | 94              |
| 4924           | 55.49(av)       | 34.3              | 1.92          | 49.26             | 42.45               | 54                | -11.55          | 100            | 94              |
| 7386           | 45.52(pk)       | 39.55             | 2.35          | 47.79             | 39.63               | 54                | -14.37          | 100            | 12              |
| 9848           | 41.46(pk)       | 38.57             | 2.75          | 44.31             | 38.47               | 54                | -15.53          | 100            | 18              |

**1GHz~ 25 GHz (Vertical), Main antenna , Channel 11 : 2462 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |                 | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|-----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin*<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4924           | 72.66(pk)       | 34.3              | 1.92          | 49.26             | 59.62               | 74                | -14.38          | 100            | 155             |
| 4924           | 60.77(av)       | 34.3              | 1.92          | 49.26             | 47.73               | 54                | -6.27           | 100            | 155             |
| 7386           | 45.72(pk)       | 39.55             | 2.35          | 47.79             | 39.83               | 54                | -14.17          | 100            | 5               |
| 9848           | 43.63(pk)       | 38.57             | 2.75          | 44.31             | 40.64               | 54                | -13.36          | 100            | 2               |

Note:

“ \* ” : Fundamental Frequency

“\*\*\*” Not in the restricted band, Limit level=Fundamental Emission-20dB

“ pk”: peak reading

“av”: average reading

“---“ : No meter reading data due to the emission level is smaller than spectrum noise level.

The Spectrum noise level + Correction Factor &lt; Limit - 6 dB

Margin = Corrected Amplitude – Limit

Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss -

Pre-Amplifier Gain

A margin of -8dB means that the emission is 8dB below the limit

All frequencies from 1GHz to 25 GHz have been tested, and the test distance is 3m.

**(b) Antenna \_\_ 5600:****1GHz~ 25 GHz (Horizontal), Channel 11: 2462 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |         | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|---------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin* | Height<br>(cm) | Position<br>(°) |
| 4924           | 55.54(pk)       | 34.3              | 1.92          | 49.26             | 42.5                | 54                | -11.5   | 100            | 35              |
| 7386           | 52.59(pk)       | 39.55             | 2.35          | 47.79             | 46.7                | 54                | -7.3    | 100            | 10              |
| 9848           | 46.77(pk)       | 38.57             | 2.75          | 44.31             | 43.78               | 54                | -10.22  | 100            | 100             |

**1GHz~ 25 GHz (Vertical), Main antenna , Channel 11 : 2462 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |         | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|---------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin* | Height<br>(cm) | Position<br>(°) |
| 4924.1         | 62.68(pk)       | 34.3              | 1.92          | 49.26             | 49.64               | 54                | -4.36   | 100            | 15              |
| 7385.5         | 59.66(pk)       | 39.55             | 2.35          | 47.79             | 53.77               | 74                | -20.23  | 100            | 20              |
| 7386           | 47.8(av)        | 39.55             | 2.35          | 47.79             | 41.91               | 54                | -12.09  | 100            | 20              |
| 9848.0         | 54.79(pk)       | 38.57             | 2.75          | 44.31             | 51.8                | 74                | -22.2   | 100            | 110             |
| 9848           | 47.25(av)       | 38.57             | 2.75          | 44.31             | 44.26               | 54                | -9.74   | 100            | 110             |

Note:

“ \* ” : Fundamental Frequency

“\*\*\*” Not in the restricted band, Limit level=Fundamental Emission-20dB

“ pk”: peak reading

“av”: average reading

“---“ : No meter reading data due to the emission level is smaller than spectrum noise level.

The Spectrum noise level + Correction Factor &lt; Limit - 6 dB

Margin = Corrected Amplitude – Limit

Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss -

Pre-Amplifier Gain

A margin of -8dB means that the emission is 8dB below the limit

All frequencies from 1GHz to 25 GHz have been tested, and the test distance is 3m.

**(c) Antenna \_\_ 888E:****1GHz~ 25 GHz (Horizontal), Channel 11: 2462 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |         | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|---------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin* | Height<br>(cm) | Position<br>(°) |
| 4924           | 60.57(pk)       | 34.3              | 1.92          | 49.26             | 47.53               | 54                | -6.47   | 100            | 0               |
| 7386           | 47.74(pk)       | 39.55             | 2.35          | 47.79             | 41.85               | 54                | -12.15  | 100            | 32              |
| 9848           | 45.35(pk)       | 38.57             | 2.75          | 44.31             | 42.36               | 54                | -11.64  | 100            | 73              |

**1GHz~ 25 GHz (Vertical), Main antenna , Channel 11 : 2462 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |         | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|---------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin* | Height<br>(cm) | Position<br>(°) |
| 4924           | 68.29(pk)       | 34.3              | 1.92          | 49.26             | 55.25               | 74                | -18.75  | 100            | 25              |
| 4924           | 54.48(av)       | 34.3              | 1.92          | 49.26             | 41.44               | 54                | -12.56  | 100            | 25              |
| 7386           | 50.17(pk)       | 39.55             | 2.35          | 47.79             | 44.28               | 54                | -9.72   | 100            | 10              |
| 9848           | 45.8(pk)        | 38.57             | 2.75          | 44.31             | 42.81               | 54                | -11.19  | 100            | 31              |

Note:

“ \* ” : Fundamental Frequency

“\*\*\*” Not in the restricted band, Limit level=Fundamental Emission-20dB

“ pk”: peak reading

“av”: average reading

“---“ : No meter reading data due to the emission level is smaller than spectrum noise level.

The Spectrum noise level + Correction Factor &lt; Limit - 6 dB

Margin = Corrected Amplitude – Limit

Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss -  
Pre-Amplifier Gain

A margin of -8dB means that the emission is 8dB below the limit

All frequencies from 1GHz to 25 GHz have been tested, and the test distance is 3m.

**(d) Antenna \_\_ M300N:****1GHz~ 25 GHz (Horizontal), Channel 11: 2462 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |                 | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|-----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin*<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4924           | 56.14(pk)       | 34.3              | 1.92          | 49.26             | 43.1                | 54                | -10.9           | 100            | 0               |
| 7386           | 51.68(pk)       | 39.55             | 2.35          | 47.79             | 45.79               | 54                | -8.21           | 100            | 50              |
| 9848           | 48.19(pk)       | 38.57             | 2.75          | 44.31             | 45.2                | 54                | -8.8            | 100            | 22              |

**1GHz~ 25 GHz (Vertical), Main antenna , Channel 11 : 2462 MHz**

| Meter Reading  |                 | Correction Factor |               |                   | Corrected Emissions |                   |                 | Antenna        | Turntable       |
|----------------|-----------------|-------------------|---------------|-------------------|---------------------|-------------------|-----------------|----------------|-----------------|
| Freq.<br>(MHz) | Ampl.<br>(dBuV) | Ant.<br>(dB/m)    | Cable<br>(dB) | Pre-Ampl.<br>(dB) | Ampl.<br>(dBuV/m)   | Limit<br>(dBuV/m) | Margin*<br>(dB) | Height<br>(cm) | Position<br>(°) |
| 4924           | 62.48(pk)       | 34.3              | 1.92          | 49.26             | 49.44               | 54                | -4.56           | 100            | 20              |
| 7386           | 52.71(pk)       | 39.55             | 2.35          | 47.79             | 46.82               | 54                | -7.18           | 100            | 25              |
| 9848           | 52.37(pk)       | 38.57             | 2.75          | 44.31             | 49.38               | 54                | -4.62           | 100            | 45              |

**Note:**

“ \* ” : Fundamental Frequency

“\*\*” Not in the restricted band, Limit level=Fundamental Emission-20dB

“ pk”: peak reading

“av”: average reading

”---“ : No meter reading data due to the emission level is smaller than spectrum noise level.

The Spectrum noise level + Correction Factor &lt; Limit - 6 dB

Margin = Corrected Amplitude – Limit

Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss - Pre-Amplifier Gain

A margin of -8dB means that the emission is 8dB below the limit

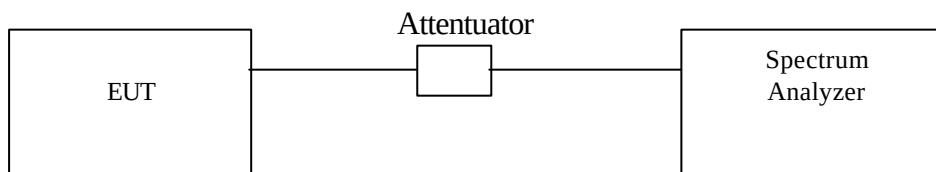
All frequencies from 1GHz to 25 GHz have been tested, and the test distance is 3m.

## 8. Band Edge Measurement [Section 15.247(c) ]

### 8.1 Test Procedure (Conducted)

1. The Transmitter output of EUT was connected to the spectrum analyzer.  
Equipment mode: Spectrum analyzer  
Detector function: Peak mode  
SPAN: 100MHz  
RBW: 100KHz  
VBW: 100KHz  
Center frequency: 2.4GHz, 2.4835GHz.  
Sweep time= 200ms sec.
2. Using Peak Search to read the peak power of Carrier frequencies after Maximum Hold function is completed.
3. Find the next peak frequency outside the operation frequency band.

### 8.2 Test Setup (Conducted)



### 8.3 Test Data:

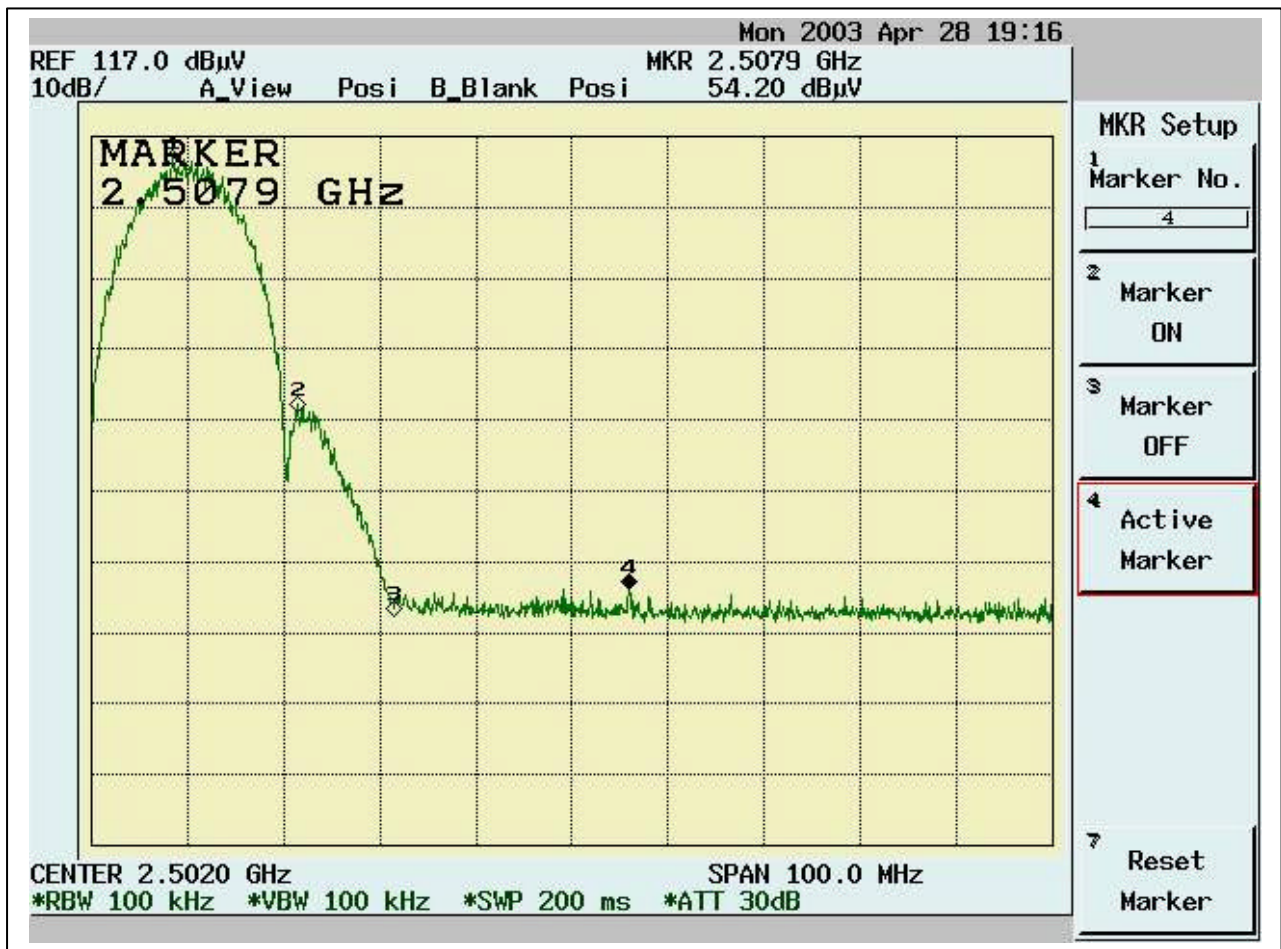
**Table Band Edge measurement (Conducted)**

| Channel      | Frequency (MHz) | Spectrum Reading (dBuV) | Carrier - Outsideband Limit: > 20dB (dB) | Pass/Fail |
|--------------|-----------------|-------------------------|------------------------------------------|-----------|
| 1            | 2410.5          | 113.84                  | ---                                      | ---       |
| Outside band | 2400            | 78.56                   | 35.28                                    | Pass      |
| 11           | 2460.5          | 114.13                  | ---                                      | ---       |
| Outside band | 2473.4          | 79.13                   | 35                                       | Pass      |

## Band Edge Conducted measurement



### Band Edge Conducted Measurement



#### 8.4 Band Edge measurement Test Procedure (Radiated)

1. Antenna and Turntable test procedure same as *Radiated Emission Measurement*  
Equipment mode: Spectrum analyzer  
Detector function: Peak mode  
SPAN:100MHz  
RBW: 100KHz  
VBW: 100KHz  
Center frequency: 2.395GHz, 2.48 GHz.
2. Using Peak Search to read the peak power of Carrier frequencies after Maximun Hold function is completed.
3. Find the next peak frequency outside the operation frequency band.
4. For peak frequency emission level measurement in Restricted Band ,  
Change RBW: 1MHz ,  
VBW: 10Hz,  
Span: 100MHz.
5. Get the spectrum reading after Maximun Hold function is completed.

#### 8.5 Test Setup (Radiated)

Same as *Radiated Emission Measurement*

**8.6 Test Data with 3m Test Distance:****(a) Antenna \_ CA8-I:****Table Band Edge measurement (Radiated)**

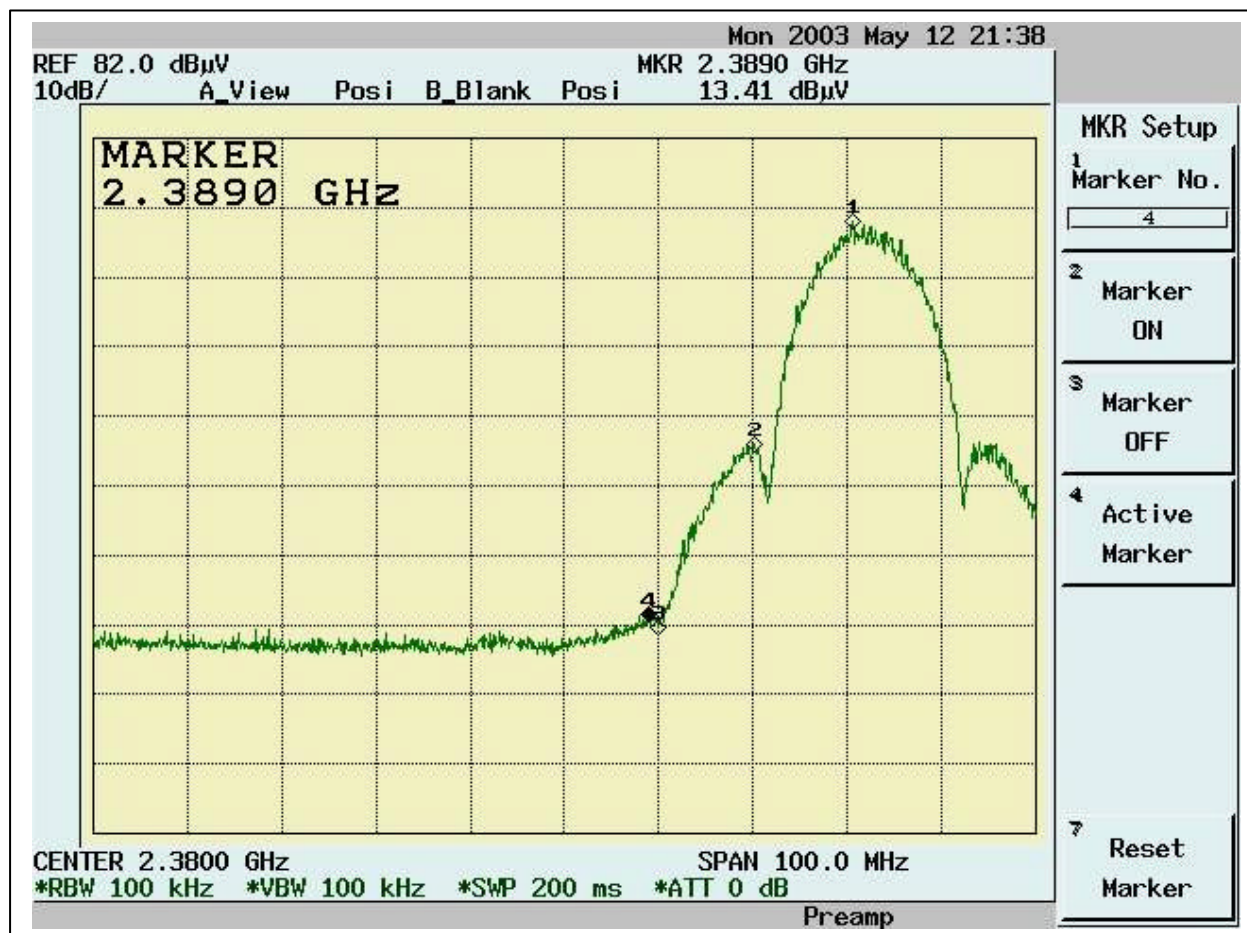
| Channel          | Frequency (MHz) | Spectrum Reading (dBuV) | Correction Factor (dB/m) | Emission Level (dBuV/m) | Limit: > 20dB (dBC) | Limit (dBuV/m) | Equip. Setup VBW | Pass or Fail |
|------------------|-----------------|-------------------------|--------------------------|-------------------------|---------------------|----------------|------------------|--------------|
| 1(peak mode)     | 2410.5          | 69.98                   | 30.97                    | 100.95                  | ---                 | ---            | 100KHz           | ---          |
| Outside band     | 2400.0          | 37.94                   | 30.97                    | 68.91                   | 32.04               | ---            | 100KHz           | Pass         |
| 1(average mode)  | 2411.3          | 69.17                   | 30.97                    | 100.14                  | ---                 | ---            | 10Hz             | ---          |
| Restricted band  | 2388.7          | 11.22                   | 30.97                    | 42.19                   | -----               | 54             | 10Hz             | Pass         |
| 11(peak mode)    | 2460.5          | 72.72                   | 30.98                    | 103.70                  | ----                | ---            | 100KHz           | ---          |
| Outside band     | 2474.0          | 41.12                   | 30.98                    | 72.10                   | 31.6                | ---            | 100KHz           | Pass         |
| 11(average mode) | 2462.6          | 72.14                   | 30.98                    | 103.12                  | ----                | ---            | 10Hz             | ---          |
| Restricted band  | 2483.5          | 16.10                   | 30.98                    | 47.08                   | -----               | 54             | 10Hz             | Pass         |

Note: The Spectrum plot of emission level measurement in Restricted band is attached.

Emission Level = Spectrum Reading + Correction Factor

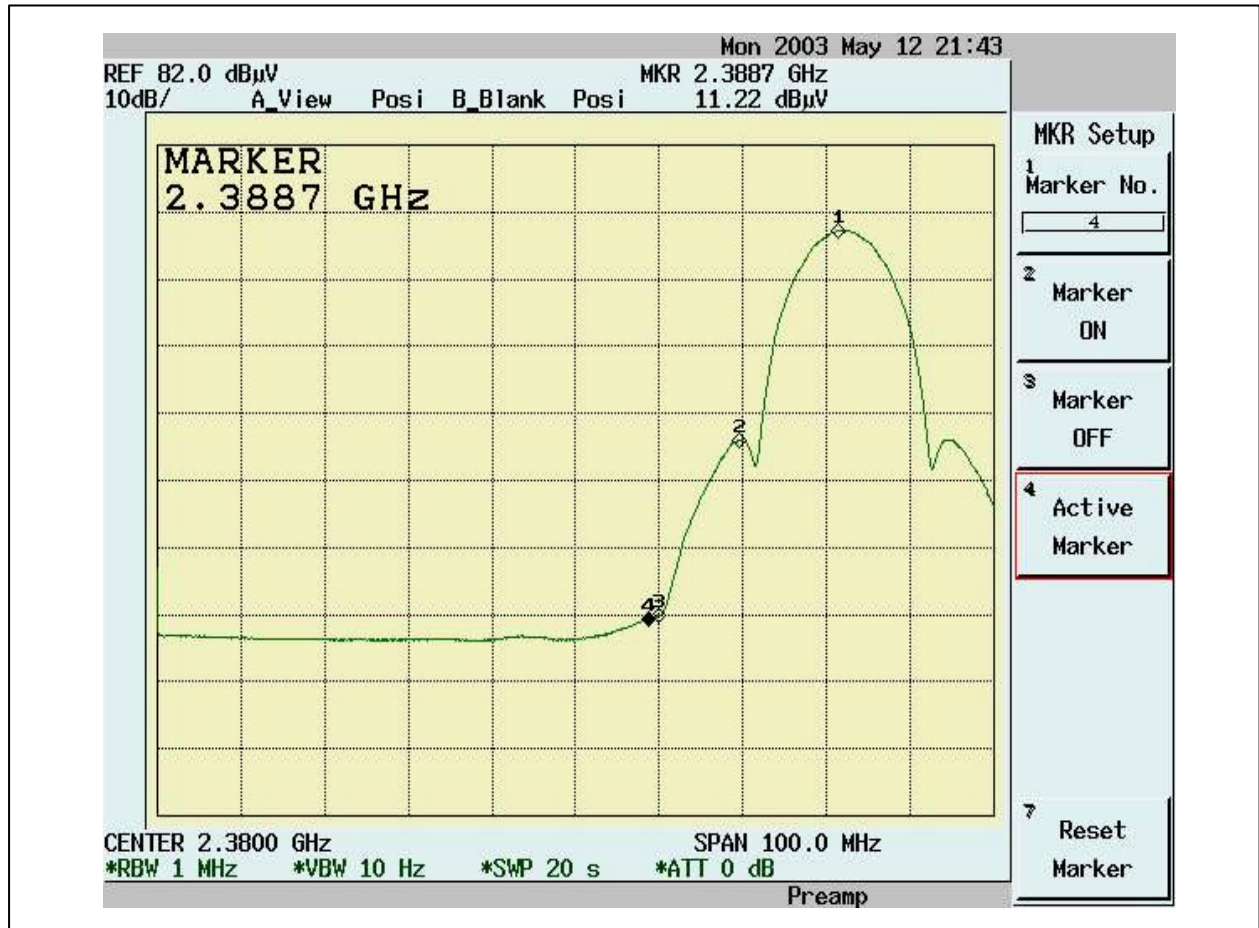
Correction Factor = Antenna Factor + cable loss – amplifier gain

The test distance is 3m.

**Band Edge measurement for radiated emission in Restricted Band(Radiated)****Peak Mode (Channel 1)**

# Band Edge measurement for radiated emission in Restricted Band(Radiated)

## Average Mode (Channel 1)



**Band Edge measurement for radiated emission in Restricted Band(Radiated)****Peak Mode (Channel 11)**

**Band Edge measurement for radiated emission in Restricted Band(Radiated)****Average Mode (Channel 11)**