



Test Report for FCC Part 15 Subpart B & C

of

Product Name

WLAN 802.11B/G CF MODULE

Model

DRCM-81

Applied by:

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Taiwan, R. O. C.

Test Performed by:

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ISL-T10-R2-3

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1. General

1.1 Certification of Accuracy of Test Data

Standards: CFR 47 Part 15 Subpart B Class B
CFR 47 Part 15 Subpart C (Section 15.247)

Test Procedure: ANSI C63.4:2003

Equipment Tested: WLAN 802.11B/G CF MODULE

Model: DRCM-81

Applied by: Wistron Neweb Corporation

Sample received Date: 2006/06/28

Final test Date : 2006/06/27-2006/06/29

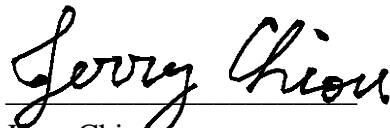
Test Result PASS

Test Site: Chamber 02, Conduction 02

Temperature Refer to each site test data

Humidity: Refer to each site test data

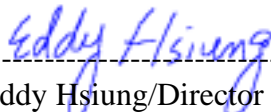
Test Engineer:


Jerry Chiou

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

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 64 pages, including 1 cover page , 2 contents page, and 61 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 according 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) | Max. Peak Output Power | Pass | |
| 15.247(c) | Radiated Emissions 30MHz – 25 GHz | Pass | |
| 15.247 (c) | Band Edge Measurement | Pass | |
| 15.247(b)(4) | Radiation Exposure | Pass | MPE report attached |
| 15.247 (d) | Power Spectral Density | Pass | |

The 802.11g functions of EUT has been tested according 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) | Max. Peak Output Power | Pass | |
| 15.247(c) | Radiated Emissions 30MHz – 25 GHz | Pass | |
| 15.247 (c) | Band Edge Measurement | Pass | |
| 15.247(b)(4) | Radiation Exposure | Pass | MPE report attached |
| 15.247 (d) | Power Spectral Density | Pass | |

3. Description of Equipment Under Test (EUT)

| | |
|-------------------------------|---|
| Description: | WLAN 802.11B/G CF MODULE |
| Model No.: | DRCM-81 |
| Frequency Range 802.11b/g: | 2400~2483.5 MHz |
| Support channel: 802.11b/g | 11 Channels |
| Modulation Skill: 802.11b | DBPSK(1Mbps), DQPSK(2Mbps), CCK(5.5/11Mbps) |
| 802.11g | OFDM (6M - 54Mbps) |
| Antennas Type: | |
| Antenna 1: Dipole | (F1B-204406-52, made by Long-Chu Co.) |
| Antenna 2: Dipole | (C478-510028-A, made by Wha Yu Co.) |
| Antenna Connected: | The antenna is connected to the RF connector of the WLAN adapter. |
| Antenna peak Gain: | |
| Antenna 1: | 1.82 dBi (11b/g) |
| Antenna 2: | 2.5 dBi (11b/g) |
| WLAN Power Type : | 3.3V DC from the EUT |

The channel and the operation frequency of 802.11b and 802.11g 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 | | |

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. There are two Dipole antennas in the EUT:

All of antennas have been tested. The worse data of each antenna type are shown. Configuration list as below:

| | |
|-----------|--------------|
| DRCM-81 | PIFA Antenna |
| 802.11b/g | Antenna 2 |

4. TEST RESULTS (802.11b)

4.1 Powerline Conducted Emissions [Section 15.207]

4.1.1 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 used.

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.

4.1.2 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.

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

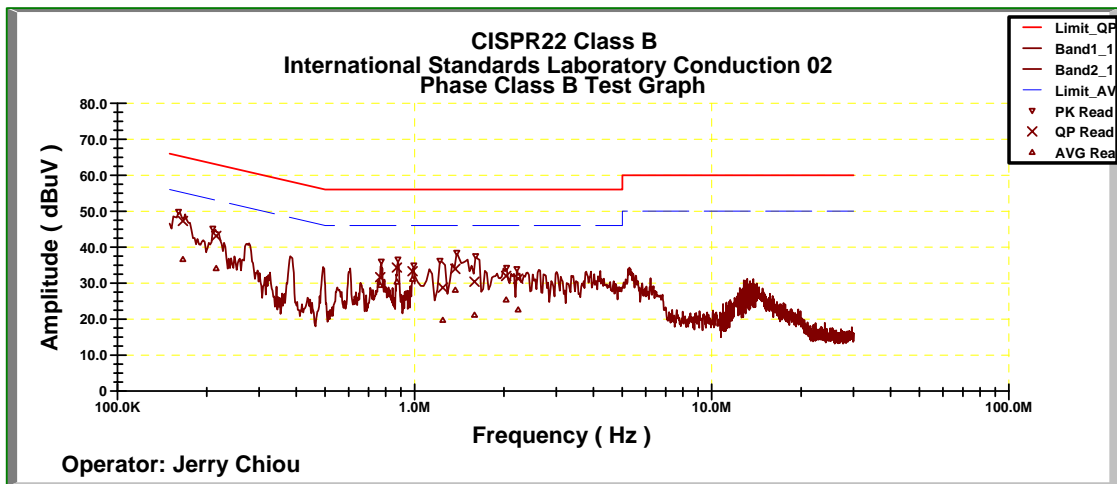
| | |
|-------------------|--------------------|
| Frequency Range | 150 KHz--30MHz |
| Detector Function | Quasi-Peak/Average |
| Bandwidth (RBW) | 9KHz |

4.1.4 Test Data:

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

Operator: Jerry Chiou
 Temperature (C): 25
 Humidity (%): 56

| Frequency MHz | LISN Loss (dB) | Cable Loss (dB) | QP Corrt. Amp.(dBuV) | QP Limit (dBuV) | QP Margin (dB) | AVE Corrt. Amp.(dBuV) | AVE Limit (dBuV) | AVE Margin (dB) |
|------------------|-------------------|--------------------|-------------------------|--------------------|-------------------|--------------------------|---------------------|--------------------|
| 0.16615 | 0.10 | 0.03 | 47.26 | 65.54 | -18.28 | 36.61 | 55.54 | -18.93 |
| 0.21498 | 0.11 | 0.05 | 43.11 | 64.14 | -21.03 | 34.09 | 54.14 | -20.06 |
| 0.7661 | 0.20 | 0.07 | 31.65 | 56.00 | -24.35 | 29.38 | 46.00 | -16.62 |
| 0.87213 | 0.20 | 0.07 | 34.32 | 56.00 | -21.68 | 30.33 | 46.00 | -15.67 |
| 0.98418 | 0.20 | 0.07 | 33.28 | 56.00 | -22.72 | 31.10 | 46.00 | -14.90 |
| 1.24436 | 0.22 | 0.07 | 28.74 | 56.00 | -27.26 | 19.67 | 46.00 | -26.33 |
| 1.37077 | 0.24 | 0.08 | 33.92 | 56.00 | -22.08 | 28.03 | 46.00 | -17.97 |
| 1.59037 | 0.26 | 0.08 | 30.39 | 56.00 | -25.61 | 21.11 | 46.00 | -24.89 |
| 2.03272 | 0.30 | 0.09 | 31.97 | 56.00 | -24.03 | 25.32 | 46.00 | -20.68 |
| 2.22993 | 0.31 | 0.10 | 31.23 | 56.00 | -24.77 | 22.56 | 46.00 | -23.44 |



* 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

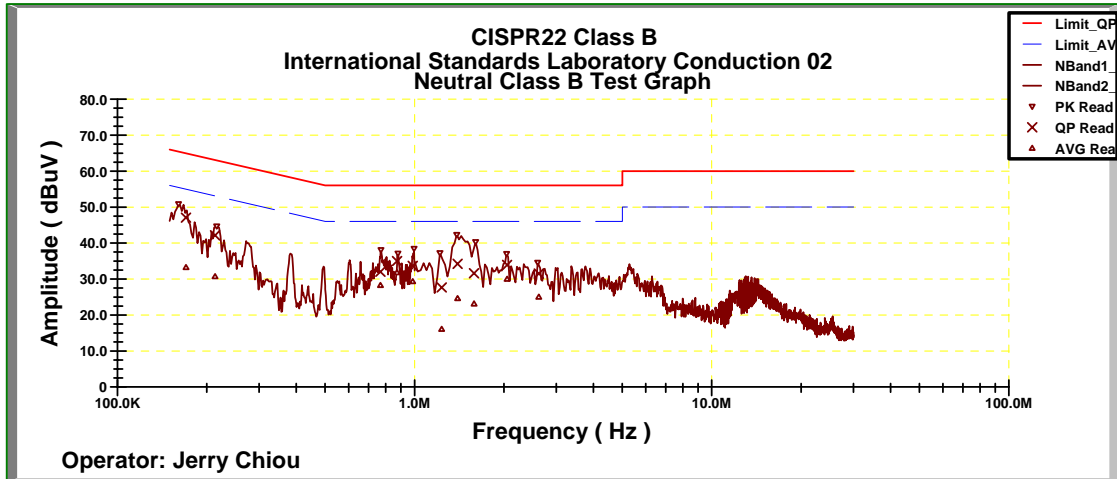
Power Line Conducted Emissions (Neutral) Channel 1, 6, 11

Operator: Jerry Chiou

Temperature (C): 25

Humidity (%): 56

| Frequency MHz | LISN Loss (dB) | Cable Loss (dB) | QP Corrt. Amp.(dBuV) | QP Limit (dBuV) | QP Margin (dB) | AVE Corrt. Amp.(dBuV) | AVE Limit (dBuV) | AVE Margin (dB) |
|------------------|-------------------|--------------------|-------------------------|--------------------|-------------------|--------------------------|---------------------|--------------------|
| 0.17016 | 0.40 | 0.03 | 47.05 | 65.42 | -18.37 | 33.22 | 55.42 | -22.21 |
| 0.21318 | 0.40 | 0.05 | 42.12 | 64.19 | -22.07 | 30.66 | 54.19 | -23.53 |
| 0.76765 | 0.40 | 0.07 | 32.00 | 56.00 | -24.00 | 28.24 | 46.00 | -17.76 |
| 0.87251 | 0.40 | 0.07 | 34.98 | 56.00 | -21.02 | 31.80 | 46.00 | -14.20 |
| 0.98525 | 0.40 | 0.07 | 33.63 | 56.00 | -22.37 | 29.28 | 46.00 | -16.72 |
| 1.23378 | 0.50 | 0.07 | 27.64 | 56.00 | -28.36 | 16.02 | 46.00 | -29.98 |
| 1.39522 | 0.50 | 0.08 | 34.22 | 56.00 | -21.78 | 24.59 | 46.00 | -21.41 |
| 1.58497 | 0.50 | 0.08 | 31.57 | 56.00 | -24.43 | 23.10 | 46.00 | -22.90 |
| 2.04712 | 0.50 | 0.09 | 33.92 | 56.00 | -22.08 | 29.96 | 46.00 | -16.04 |
| 2.61833 | 0.50 | 0.11 | 31.50 | 56.00 | -24.50 | 24.98 | 46.00 | -21.02 |



* 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

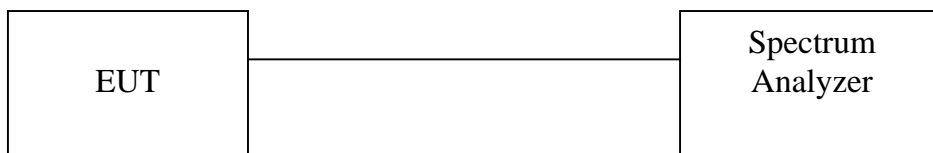
4.2 Bandwidth for DSSS [Section 15.247 (a)(2)]

4.2.1 Test Procedure

The Transmitter output of EUT was connected to the spectrum analyzer. 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 |

4.2.2 Test Setup



4.2.3 Test Data:

6dB Bandwidth

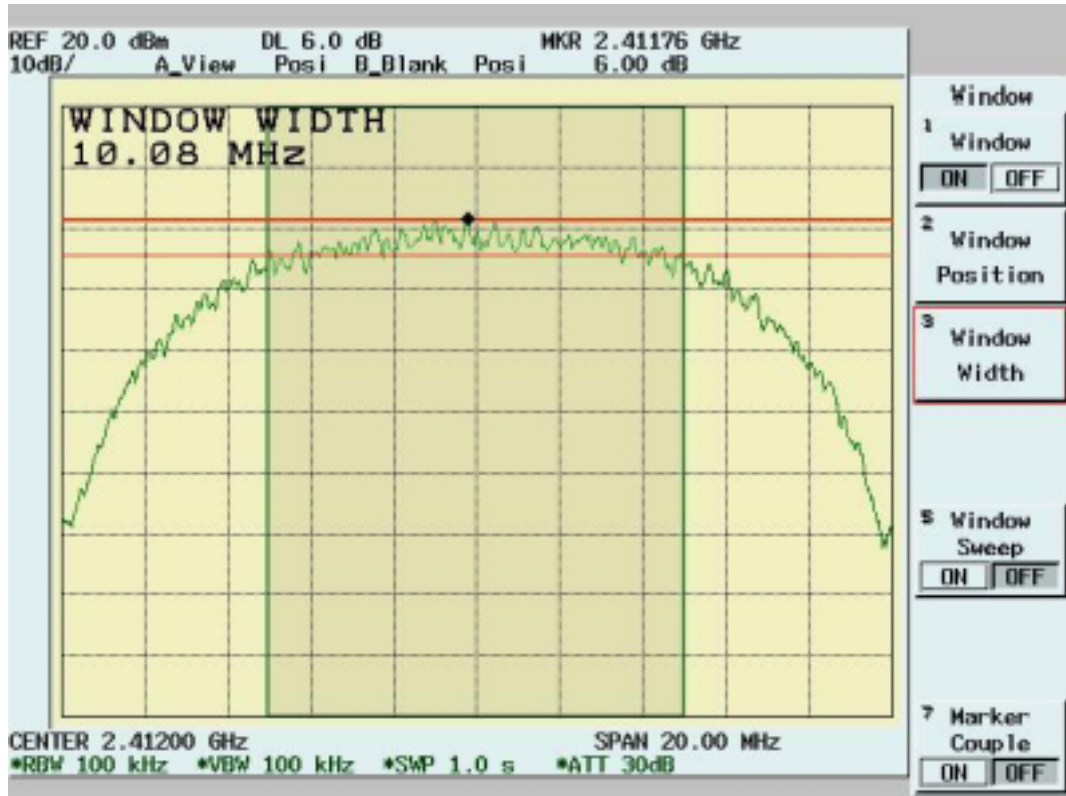
Temp. (deg. C): 25

Test Engr: Jerry Chiou

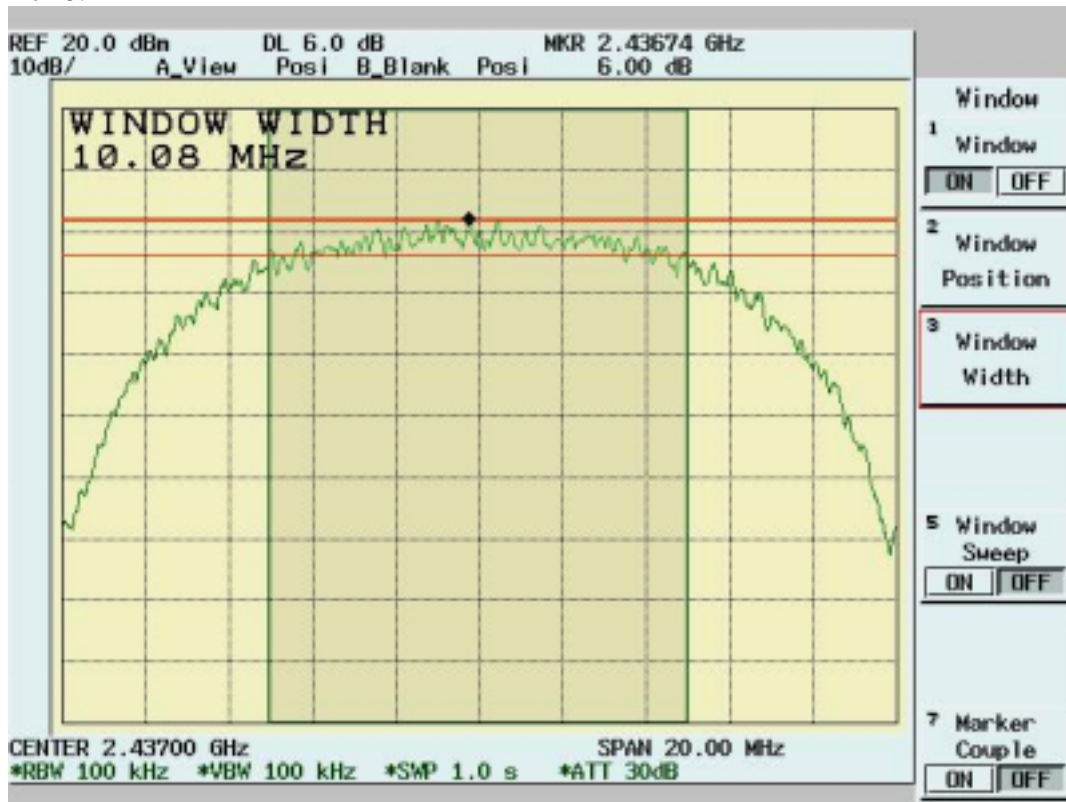
Humidity (%): 50

| Chennel | Frequency (MHz) | 6dB Bandwidth (MHz) | Limit (MHz) | Pass/Fail |
|---------|--------------------|---------------------------|----------------|-----------|
| 1 | 2412 | 10.08 | 0.5 | Pass |
| 6 | 2437 | 10.08 | 0.5 | Pass |
| 11 | 2462 | 10.04 | 0.5 | Pass |

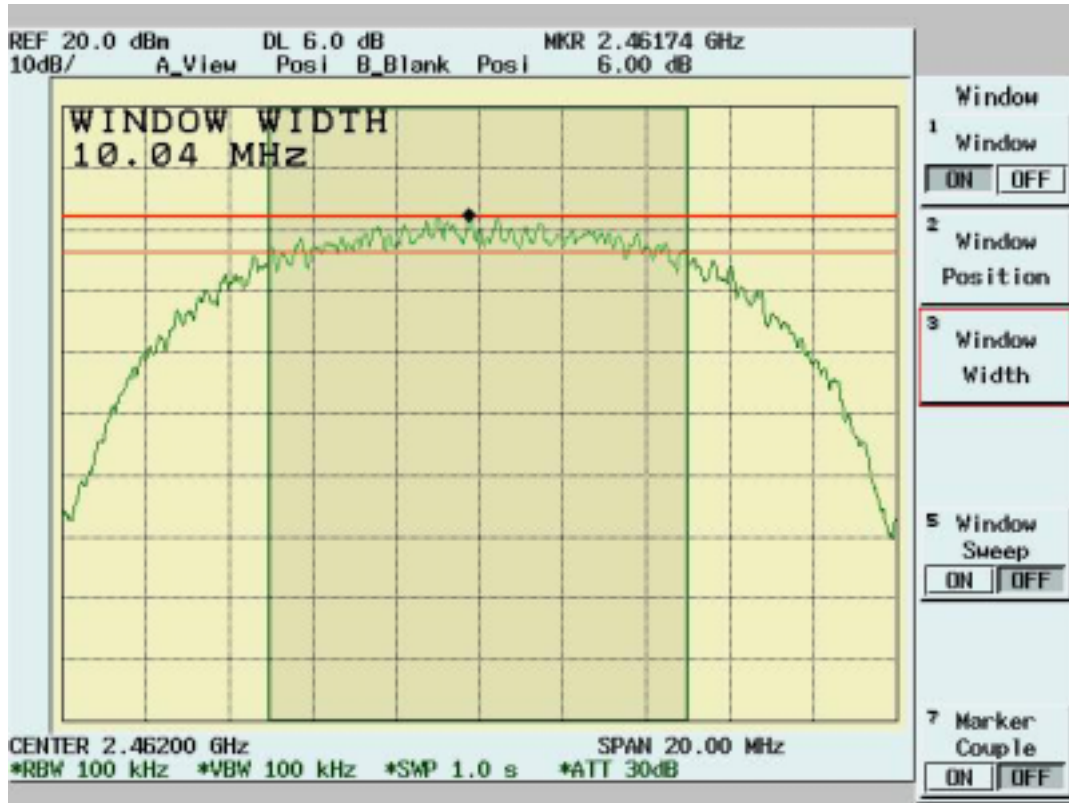
Channel 1:



Channel 6:



Channel 11:

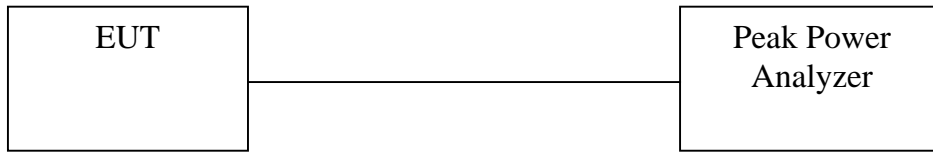


4.3 DSSS Maximum Peak Output Power [Section 15.247 (b)(1)]

4.3.1 Test Procedure

The Transmitter output of EUT was connected to the peak power analyzer.

4.3.2 Test Setup



4.3.3 Test Data

Maximum Peak Output Power

Temp. (deg. C): 25

Test Engr: Jerry Chiou

Humidity (%): 50

| Channel | Frequency (Mhz) | Analyzer Reading (dBm) | Cable Loss (dB) | Peak Power Output (mW) | Peak Power Output (dBm) | Limit (dBm) | Pass/Fail |
|---------|-----------------|------------------------|-----------------|------------------------|-------------------------|-------------|-----------|
| 1 | 2412 | 14.2 | 1.1 | 33.88 | 15.3 | 30 | Pass |
| 6 | 2437 | 14.9 | 1.1 | 39.81 | 16 | 30 | Pass |
| 11 | 2462 | 15.21 | 1.1 | 42.76 | 16.31 | 30 | Pass |

4.4 Radiated Emission Measurement [Section [15.247(c)(4)]

4.4.1 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.

4.4.2 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 2nd to 10th 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.

4.4.3 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) | 3MHz |
| Frequency Range Tested: | 1GHz – 25 GHz |
| Detector Function: | Average Mode |
| Resolution Bandwidth (RBW): | 1MHz |
| Video Bandwidth (VBW) | 10 Hz |

4.4.4 Test Data (30MHz – 1GHz):

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

Operator: Jerry Chiou
 Temperature (C): 23
 Humidity (%): 54

| Frequency | Rx Amp. | Ant Fact | CableLoss | PreAmpGain | Corrct. Emi. | Limit | Margin | Ant. Pos. | Table Pos. |
|-----------|---------|----------|-----------|------------|--------------|----------|--------|-----------|------------|
| MHz | (dBuV) | (dB/m) | (dB) | (dB) | (dBuV/m) | (dBuV/m) | (dB) | (cm) | (deg) |
| 35.82 | 4.84 | 14.71 | 1.07 | 0.00 | 20.62 | 40.00 | -19.38 | 196.00 | 245.00 |
| 95.96 | 14.31 | 9.49 | 1.91 | 0.00 | 25.71 | 43.50 | -17.79 | 103.00 | 353.00 |
| 159.98 | 17.95 | 8.70 | 2.35 | 0.00 | 29.00 | 43.50 | -14.50 | 196.00 | 188.00 |
| 186.17 | 13.40 | 8.56 | 2.65 | 0.00 | 24.61 | 43.50 | -18.89 | 196.00 | 6.00 |
| 199.75 | 12.45 | 8.89 | 2.70 | 0.00 | 24.04 | 43.50 | -19.46 | 196.00 | 23.00 |
| 239.52 | 24.94 | 10.14 | 3.03 | 0.00 | 38.11 | 46.00 | -7.89 | 103.00 | 304.00 |
| 320.03 | 15.41 | 16.02 | 3.83 | 0.00 | 35.25 | 46.00 | -10.75 | 103.00 | 123.00 |
| 404.42 | 5.96 | 15.93 | 4.47 | 0.00 | 26.36 | 46.00 | -19.64 | 103.00 | 189.00 |
| 449.04 | 4.95 | 16.19 | 4.86 | 0.00 | 26.00 | 46.00 | -20.00 | 103.00 | 321.00 |
| 499.48 | 4.70 | 17.39 | 5.28 | 0.00 | 27.37 | 46.00 | -18.63 | 196.00 | 23.00 |
| 664.38 | 0.65 | 19.00 | 6.40 | 0.00 | 26.04 | 46.00 | -19.96 | 103.00 | 8.00 |
| 832.19 | 1.44 | 20.42 | 7.71 | 0.00 | 29.57 | 46.00 | -16.43 | 103.00 | 57.00 |

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

Operator: Jerry Chiou
 Temperature (C): 23
 Humidity (%): 54

| Frequency | Rx Amp. | Ant Fact | CableLoss | PreAmpGain | Corrct. Emi. | Limit | Margin | Ant. Pos. | Table Pos. |
|-----------|---------|----------|-----------|------------|--------------|----------|--------|-----------|------------|
| MHz | (dBuV) | (dB/m) | (dB) | (dB) | (dBuV/m) | (dBuV/m) | (dB) | (cm) | (deg) |
| 57.16 | 16.48 | 6.00 | 1.31 | 0.00 | 23.79 | 40.00 | -16.21 | 203.00 | 188.00 |
| 95.96 | 15.62 | 9.49 | 1.91 | 0.00 | 27.02 | 43.50 | -16.48 | 103.00 | 171.00 |
| 239.52 | 14.85 | 10.14 | 3.03 | 0.00 | 28.03 | 46.00 | -17.97 | 203.00 | 89.00 |
| 320.03 | 8.48 | 16.02 | 3.83 | 0.00 | 28.33 | 46.00 | -17.67 | 103.00 | 7.00 |
| 359.8 | 6.53 | 16.14 | 4.17 | 0.00 | 26.85 | 46.00 | -19.15 | 203.00 | 89.00 |
| 499.48 | 5.11 | 17.39 | 5.28 | 0.00 | 27.78 | 46.00 | -18.22 | 103.00 | 73.00 |
| 539.25 | 3.69 | 18.34 | 5.45 | 0.00 | 27.48 | 46.00 | -18.52 | 103.00 | 56.00 |
| 629.46 | 1.59 | 18.88 | 6.15 | 0.00 | 26.62 | 46.00 | -19.38 | 203.00 | 56.00 |
| 640.13 | 2.80 | 18.94 | 6.23 | 0.00 | 27.98 | 46.00 | -18.02 | 103.00 | 105.00 |
| 661.47 | 2.92 | 19.00 | 6.38 | 0.00 | 28.30 | 46.00 | -17.70 | 103.00 | 303.00 |
| 731.31 | 0.95 | 19.75 | 6.88 | 0.00 | 27.57 | 46.00 | -18.43 | 103.00 | 138.00 |
| 943.74 | 1.07 | 21.21 | 8.40 | 0.00 | 30.69 | 46.00 | -15.31 | 103.00 | 253.00 |

NOTE:

➤ During the Pre-test, the EUT has been tested for Channel 1, 6, 11 transmit from Main and Aux antenna respectively to get all the critical emission frequencies. In the final test all the critical emission frequencies has been tested and the test data are listed above.

➤ 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

4.4.5 Test Data (1GHz – 25 GHz) .

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

Operator: Jerry Chiou

RBW: 1MHz
 Humidity (%): 32
 Temperature (C): 25

| Frequency MHz | Rx_R. dBuV | Ant_F. dB/m | Cab_L. dB | PreAmpl dB | Emission dBuV/m | Limit dBuV/m | Margin dB | A.Tower cm | T.Table deg |
|------------------|---------------|----------------|--------------|---------------|--------------------|-----------------|--------------|---------------|----------------|
| 2838.16 | 47.33 pk | 31.04 | 1.42 | 34.90 | 44.89 pk | 54.00 av | -9.11 | 103 | 306 |
| 2938.06 | 47.13 pk | 31.08 | 1.44 | 34.81 | 44.84 pk | 54.00 av | -9.16 | 103 | 338 |
| 4818.18 | 64.55 pk | 34.91 | 2.12 | 37.71 | 63.88 pk | 74.00 pk | -10.12 | 100 | 18 |
| 4818.18 | 52.68 av | 34.91 | 2.12 | 37.71 | 52.00 av | 54.00 av | -2.00 | 100 | 18 |

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

Operator: Jerry Chiou

RBW: 1MHz
 Humidity (%): 32
 Temperature (C): 25

| Frequency MHz | Rx_R. dBuV | Ant_F. dB/m | Cab_L. dB | PreAmpl dB | Emission dBuV/m | Limit dBuV/m | Margin dB | A.Tower cm | T.Table deg |
|------------------|---------------|----------------|--------------|---------------|--------------------|-----------------|--------------|---------------|----------------|
| 1162.34 | 51.69 pk | 25.25 | 2.19 | 34.02 | 45.11 pk | 54.00 av | -8.89 | 102 | 101 |
| 1844.16 | 47.46 pk | 29.69 | 2.48 | 34.87 | 44.76 pk | 54.00 av | -9.24 | 100 | 54 |
| 2281.22 | 47.58 pk | 30.94 | 1.74 | 35.19 | 45.07 pk | 54.00 av | -8.93 | 101 | 131 |
| 2910.59 | 47.38 pk | 31.06 | 1.43 | 34.83 | 45.05 pk | 54.00 av | -8.95 | 103 | 329 |
| 4818.18 | 57.86 pk | 34.91 | 2.12 | 37.71 | 57.18 pk | 74.00 pk | -16.82 | 100 | 18 |
| 4818.18 | 47.04 av | 34.91 | 2.12 | 37.71 | 46.36 av | 54.00 av | -7.64 | 100 | 18 |

Note:

- According to the standards used, Where limits are specified by agencies for both average and peak (or quasi-peak) detection , if the peak (or quasi-peak) measured value complies with the average limit , it is unnecessary to perform an average measurement.
- “ * ”: Fundamental Frequency
- “***”: Not in the restricted band, Limit level=Fundamental Emission-20dB
- “ pk” : peak mode
- “ av” : average mode
- “---“: 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.

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

Operator: Jerry Chiou

RBW: 1MHz
 Humidity (%): 32
 Temperature (C): 25

| Frequency MHz | Rx_R. dBuV | Ant_F. dB/m | Cab_L. dB | PreAmpl dB | Emission dBuV/m | Limit dBuV/m | Margin dB | A.Tower cm | T.Table deg |
|------------------|---------------|----------------|--------------|---------------|--------------------|-----------------|--------------|---------------|----------------|
| 1159.84 | 50.80 pk | 25.24 | 2.19 | 34.02 | 44.20 pk | 54.00 av | -9.80 | 102 | 101 |
| 2071.43 | 46.44 pk | 30.99 | 2.38 | 35.18 | 44.62 pk | 54.00 av | -9.38 | 100 | 65 |
| 4861.64 | 62.20 pk | 35.07 | 2.13 | 37.76 | 61.65 pk | 74.00 pk | -12.35 | 100 | 14 |
| 4861.64 | 50.55 av | 35.07 | 2.13 | 37.76 | 49.99 av | 54.00 av | -4.01 | 100 | 14 |

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

Operator: Jerry Chiou

RBW: 1MHz
 Humidity (%): 32
 Temperature (C): 25

| Frequency MHz | Rx_R. dBuV | Ant_F. dB/m | Cab_L. dB | PreAmpl dB | Emission dBuV/m | Limit dBuV/m | Margin dB | A.Tower cm | T.Table deg |
|------------------|---------------|----------------|--------------|---------------|--------------------|-----------------|--------------|---------------|----------------|
| 1844.16 | 48.45 pk | 29.69 | 2.48 | 34.87 | 45.75 pk | 54.00 av | -8.25 | 100 | 54 |
| 2316.18 | 47.04 pk | 30.94 | 1.64 | 35.19 | 44.42 pk | 54.00 av | -9.58 | 101 | 142 |
| 2391.11 | 47.08 pk | 30.92 | 1.42 | 35.20 | 44.22 pk | 54.00 av | -9.78 | 101 | 166 |
| 2625.87 | 46.95 pk | 30.95 | 1.38 | 35.09 | 44.20 pk | 54.00 av | -9.80 | 102 | 240 |
| 4861.64 | 58.59 pk | 35.07 | 2.13 | 37.76 | 58.04 pk | 74.00 pk | -15.96 | 100 | 14 |
| 4861.64 | 46.28 av | 35.07 | 2.13 | 37.76 | 45.72 av | 54.00 av | -8.28 | 100 | 14 |

Note:

- According to the standards used, Where limits are specified by agencies for both average and peak (or quasi-peak) detection , if the peak (or quasi-peak) measured value complies with the average limit , it is unnecessary to perform an average measurement.
- “ * ”: Fundamental Frequency
- “***”: Not in the restricted band, Limit level=Fundamental Emission-20dB
- “ pk”: peak mode
- “av”: average mode
- “---“: 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.

1GHz~ 25 GHz (Horizontal), Channel 11: 2462 MHz

Operator: Jerry Chiou

RBW: 1MHz
 Humidity (%): 32
 Temperature (C): 25

| Frequency MHz | Rx_R. dBuV | Ant_F. dB/m | Cab_L. dB | PreAmpl dB | Emission dBuV/m | Limit dBuV/m | Margin dB | A.Tower cm | T.Table deg |
|------------------|---------------|----------------|--------------|---------------|--------------------|-----------------|--------------|---------------|----------------|
| 2051.45 | 45.83 pk | 30.99 | 2.44 | 35.18 | 44.08 pk | 54.00 av | -9.92 | 100 | 59 |
| 2878.12 | 46.63 pk | 31.05 | 1.43 | 34.86 | 44.25 pk | 54.00 av | -9.75 | 103 | 319 |
| 4919.58 | 58.35 pk | 35.29 | 2.15 | 37.82 | 57.97 pk | 74.00 pk | -16.03 | 100 | 8 |
| 4919.58 | 47.74 av | 35.29 | 2.15 | 37.82 | 47.36 av | 54.00 av | -6.64 | 100 | 8 |

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

Operator: Jerry Chiou

RBW: 1MHz
 Humidity (%): 32
 Temperature (C): 25

| Frequency MHz | Rx_R. dBuV | Ant_F. dB/m | Cab_L. dB | PreAmpl dB | Emission dBuV/m | Limit dBuV/m | Margin dB | A.Tower cm | T.Table deg |
|------------------|---------------|----------------|--------------|---------------|--------------------|-----------------|--------------|---------------|----------------|
| 1162.34 | 52.21 pk | 25.25 | 2.19 | 34.02 | 45.63 pk | 54.00 av | -8.37 | 102 | 101 |
| 1844.16 | 49.61 pk | 29.69 | 2.48 | 34.87 | 46.91 pk | 54.00 av | -7.09 | 100 | 54 |
| 2001.5 | 46.41 pk | 31.00 | 2.60 | 35.18 | 44.82 pk | 54.00 av | -9.18 | 100 | 43 |
| 2321.18 | 48.55 pk | 30.94 | 1.62 | 35.19 | 45.92 pk | 54.00 av | -8.08 | 101 | 144 |
| 4919.58 | 59.50 pk | 35.29 | 2.15 | 37.82 | 59.12 pk | 74.00 pk | -14.88 | 100 | 8 |
| 4919.58 | 45.31 av | 35.29 | 2.15 | 37.82 | 44.93 av | 54.00 av | -9.07 | 100 | 8 |

Note:

- According to the standards used, Where limits are specified by agencies for both average and peak (or quasi-peak) detection , if the peak (or quasi-peak) measured value complies with the average limit , it is unnecessary to perform an average measurement.
- “ * ”: Fundamental Frequency
- “***”: Not in the restricted band, Limit level=Fundamental Emission-20dB
- “ pk” : peak mode
- “ av” : average mode
- “---“: 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.

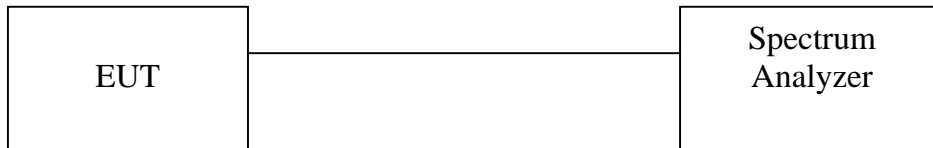
All frequencies from 1GHz to 25 GHz have been tested.

4.5 Band Edge Measurement

4.5.1 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.
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

4.5.2 Test Setup (Conducted)



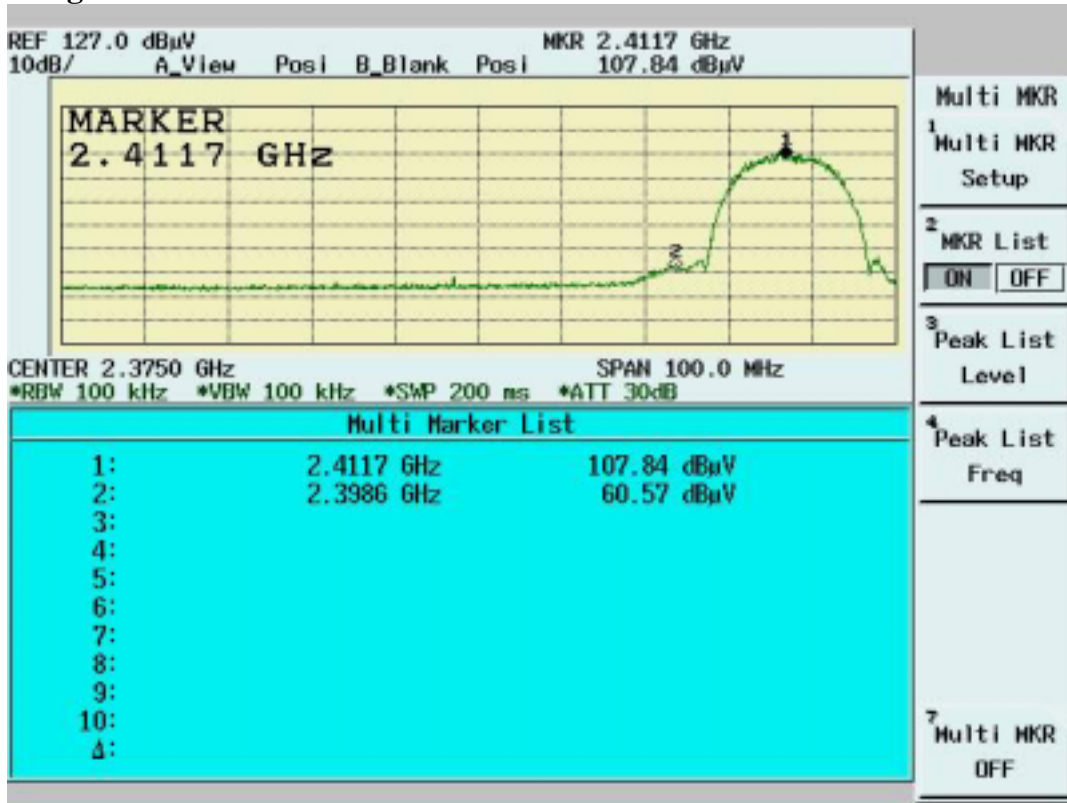
4.5.3 Test Data:

Table: Band Edge measurement (Conducted)

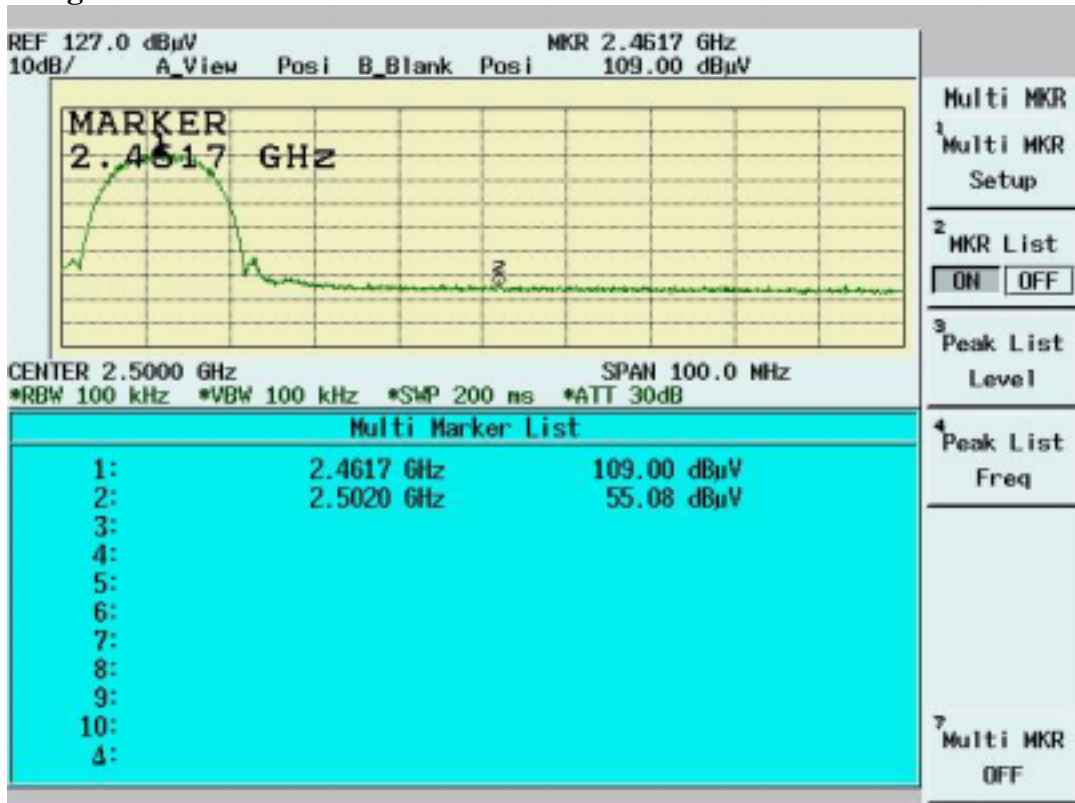
Temp. (deg. C): 25
 Humidity (%): 50
 Test Engr: Jerry Chiou

| Channel | Frequency | Spectrum Reading | Carrier - Outsideband Limit: >20dB | Pass/Fail |
|--------------|-----------|------------------|------------------------------------|-----------|
| | (MHz) | | (dB) | |
| 1 | 2411.7 | 107.84 | --- | --- |
| Outside band | 2398.6 | 60.57 | 47.27 | Pass |
| 11 | 2461.7 | 109 | --- | --- |
| Outside band | 2502 | 55.08 | 53.92 | Pass |

Band Edge Conducted measurement



Band Edge Conducted Measurement



4.5.4 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: 1MHz
VBW: 3MHz
Center frequency: 2.395GHz, 2.48GHz.
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
4. For peak frequency emission level measurement in Restricted Band
Change RBW: 1MHz
VBW: 10Hz
Span: 100MHz.
5. Get the spectrum reading after Maximum Hold function is completed.

4.5.5 Test Setup (Radiated)

Same as *Radiated Emission Measurement*

4.5.6 Test Data

Table Band Edge measurement (Radiated)

Temp. (deg. C): 25
 Humidity (%): 50

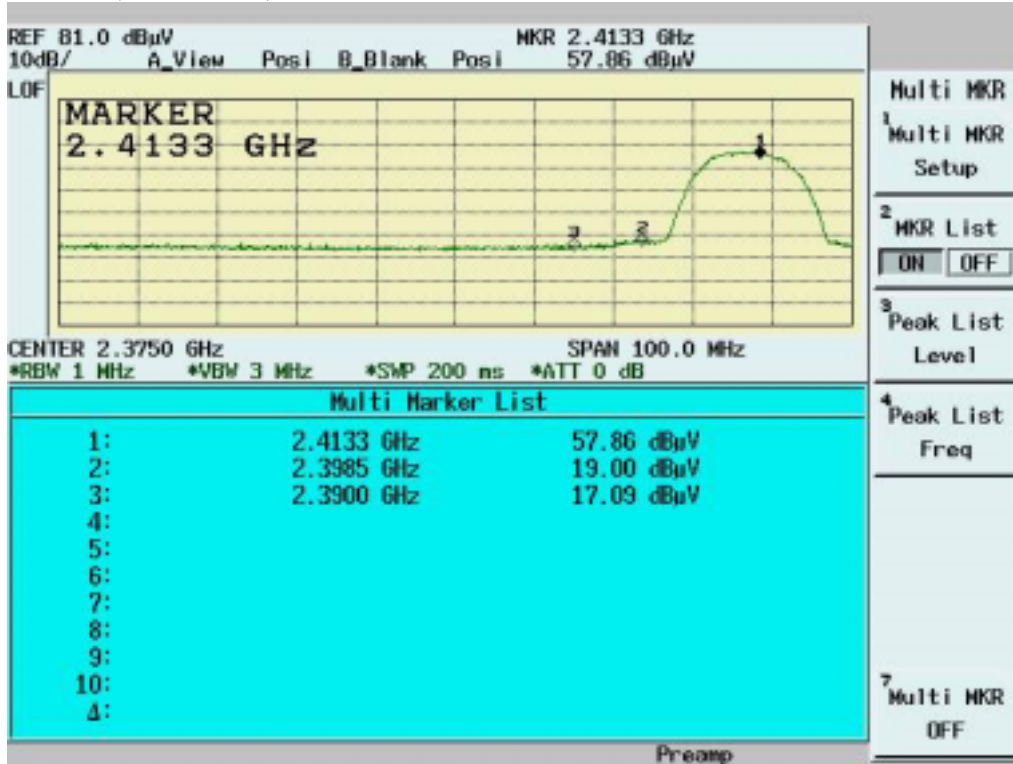
Test Engr: Jerry Chiou

| Description | Frequency (MHz) | Spectrum Reading (dBuV) | Correction Factor (dB/m) | Emission Level (dBuV/m) | dBc (Limit: > 20dBc) | Limit (dBuV/m) | Equip. Setup VBW | Pass or Fail |
|--|-----------------|-------------------------|--------------------------|-------------------------|----------------------|----------------|------------------|--------------|
| Channel_1 (average mode) | 2411.4 | 49.26 | 35.48 | 84.74 | --- | --- | 10Hz | --- |
| Channel_1 (peak mode) | 2413.3 | 57.86 | 35.48 | 93.34 | --- | --- | 3MHz | --- |
| Outside band (peak mode) | 2398.5 | 19 | 35.48 | 54.48 | 38.86 | --- | 3MHz | Pass |
| Channel_11 (average mode) | 2463.3 | 46.34 | 35.5 | 81.84 | --- | --- | 10Hz | --- |
| Channel_11 (peak mode) | 2463.2 | 55.2 | 35.5 | 90.7 | --- | --- | 3MHz | --- |
| Outside band (peak mode) | 2483.5 | 16.48 | 35.51 | 51.99 | 38.71 | --- | 3MHz | Pass |
| Channel_1 Restricted band (peak mode) | 2390 | 17.09 | 35.47 | 52.56 | --- | 74 | 3MHz | Pass |
| Restricted band (average mode) | 2326.4 | 5.38 | 35.47 | 40.85 | --- | 54 | 10Hz | Pass |
| Channel_11 Restricted band (peak mode) | 2539.2 | 17.56 | 35.51 | 53.07 | --- | 74 | 3MHz | Pass |
| Restricted band (average mode) | 2549.1 | 6.4 | 35.51 | 41.91 | --- | 54 | 10Hz | Pass |

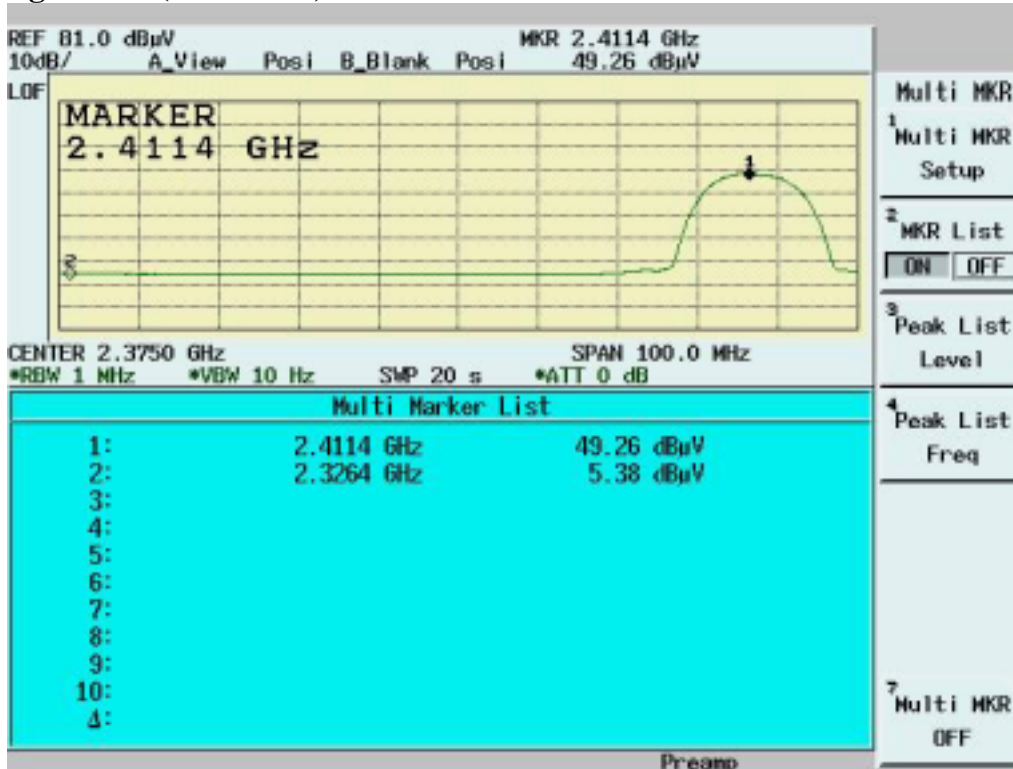
Note:

- 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
- Both Horizontal and Vertical polarizaion have been tested and the worst data is listed above.

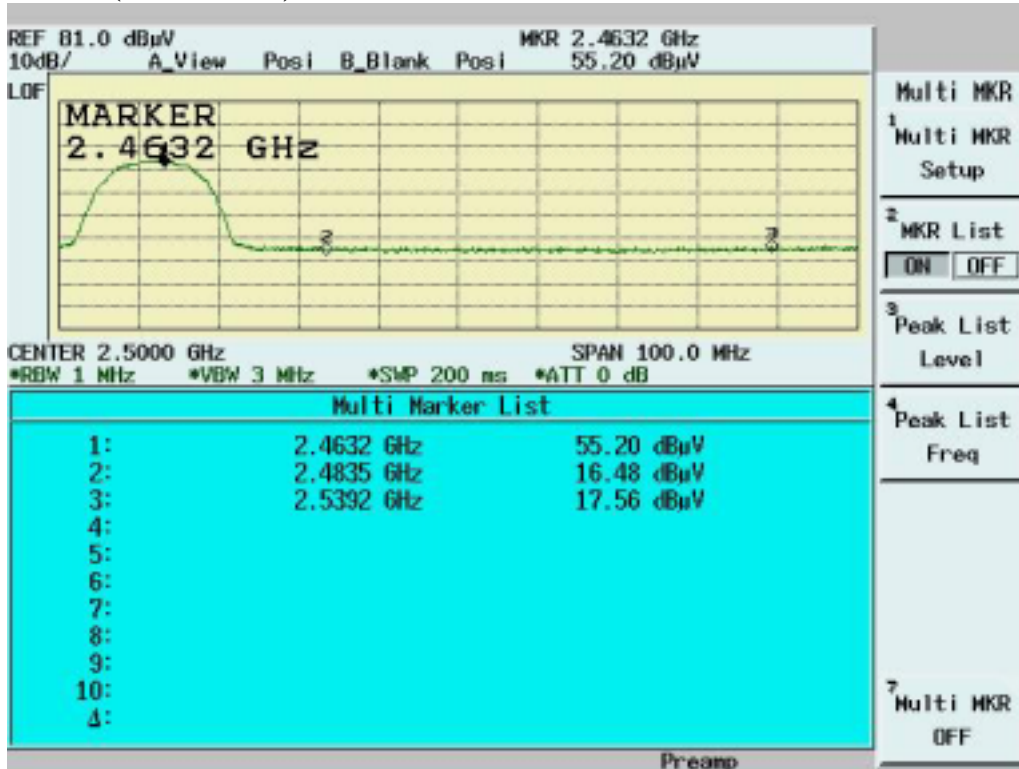
Band Edge measurement for radiated emission in Restricted Band(Radiated) Peak Mode (Channel 1)



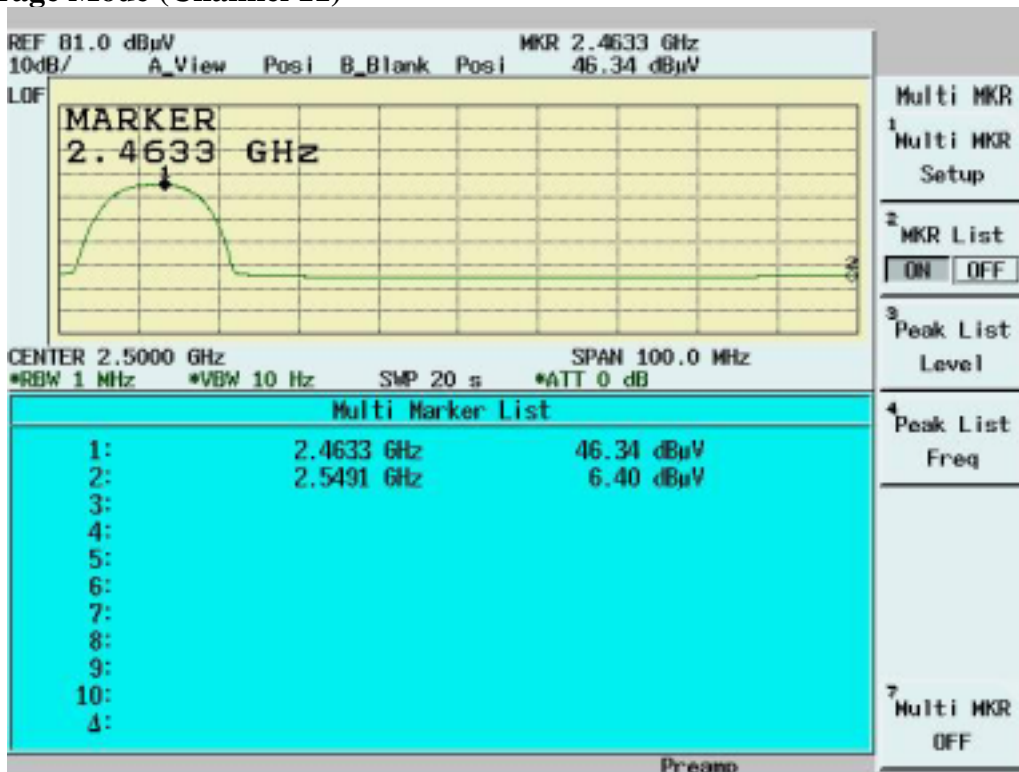
Band Edge measurement for radiated emission in Restricted Band(Radiated) Average Mode (Channel 1)



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)





4.6 RF Exposure Measurement [Section 15.247(b)(4) & 1.1307(b)]

See MPE report

4.7 DSSS Peak Power Spectral Density [Section 15.247(d)]

4.7.1 Test Procedure

1. The Transmitter output of EUT was connected to the spectrum analyzer.
 Equipment mode: Spectrum analyzer
 Detector function: Peak mode
 SPAN:1.5MHz
 RBW: 3KHz
 VBW: 30KHz
 Center frequency: fundamental frequency tested.
 Sweep time= 500 sec.
2. Using Peak Search to read the peak power after Maximum Hold function is completed.

4.7.2 Test Setup



4.7.3 Test Data

Maximum Peak Output Power Density

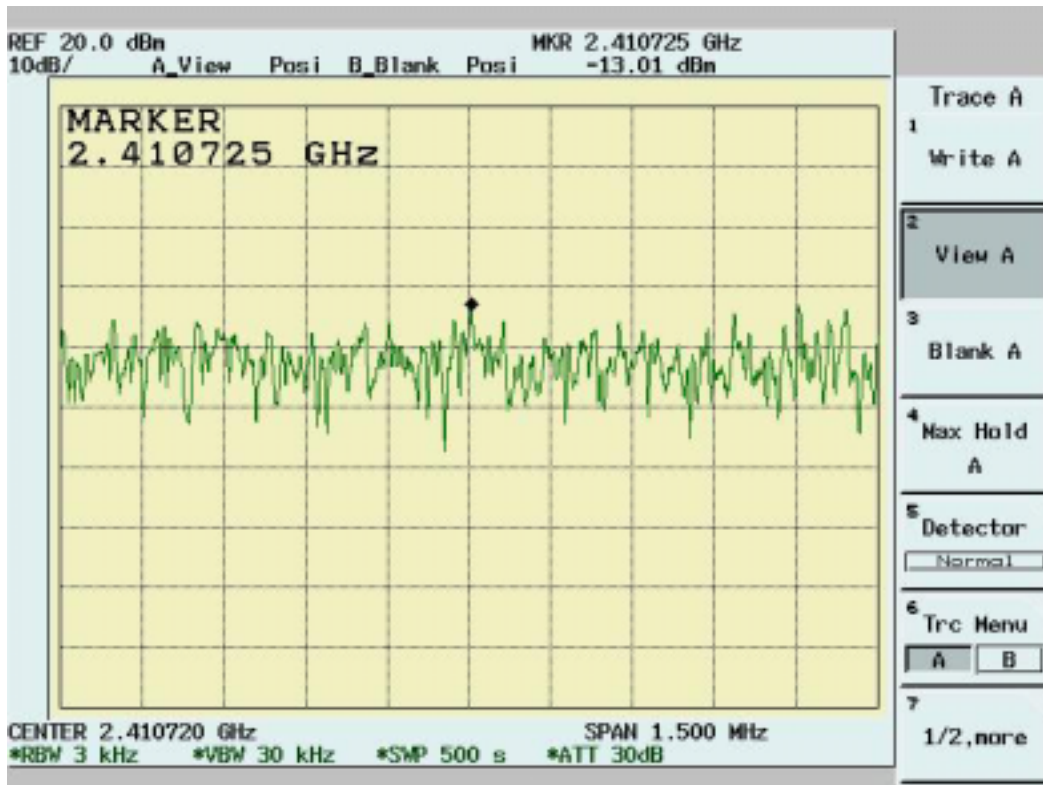
Temp. (deg. C): 25

Test Engr: Jerry Chiou

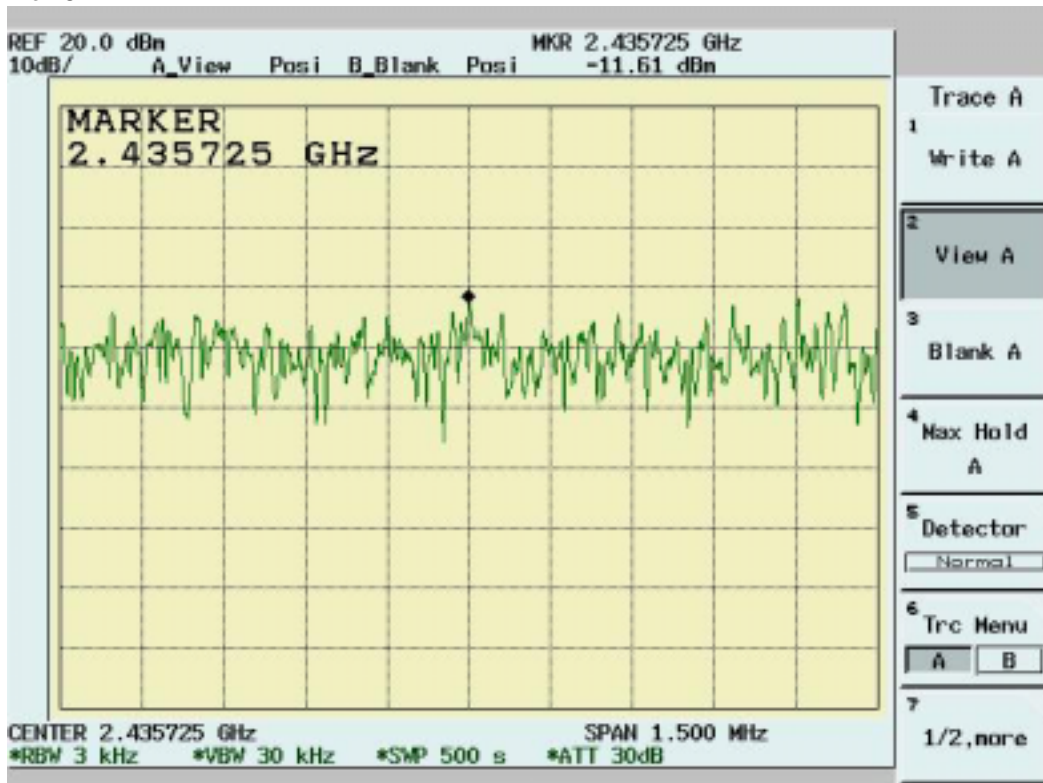
Humidity (%): 50

| Chennel | Frequency (MHz) | Spectrum Reading (dBm/3KHz) | Cable Loss (dB) | Peak Power Output (dBm/3KHz) | Limit (dBm/3KHz) | Pass/Fail |
|---------|-----------------|-----------------------------|-----------------|------------------------------|------------------|-----------|
| 1 | 2412 | -13.01 | 1.1 | -11.91 | 8 | Pass |
| 6 | 2437 | -11.61 | 1.1 | -10.51 | 8 | Pass |
| 11 | 2462 | -11.68 | 1.1 | -10.58 | 8 | Pass |

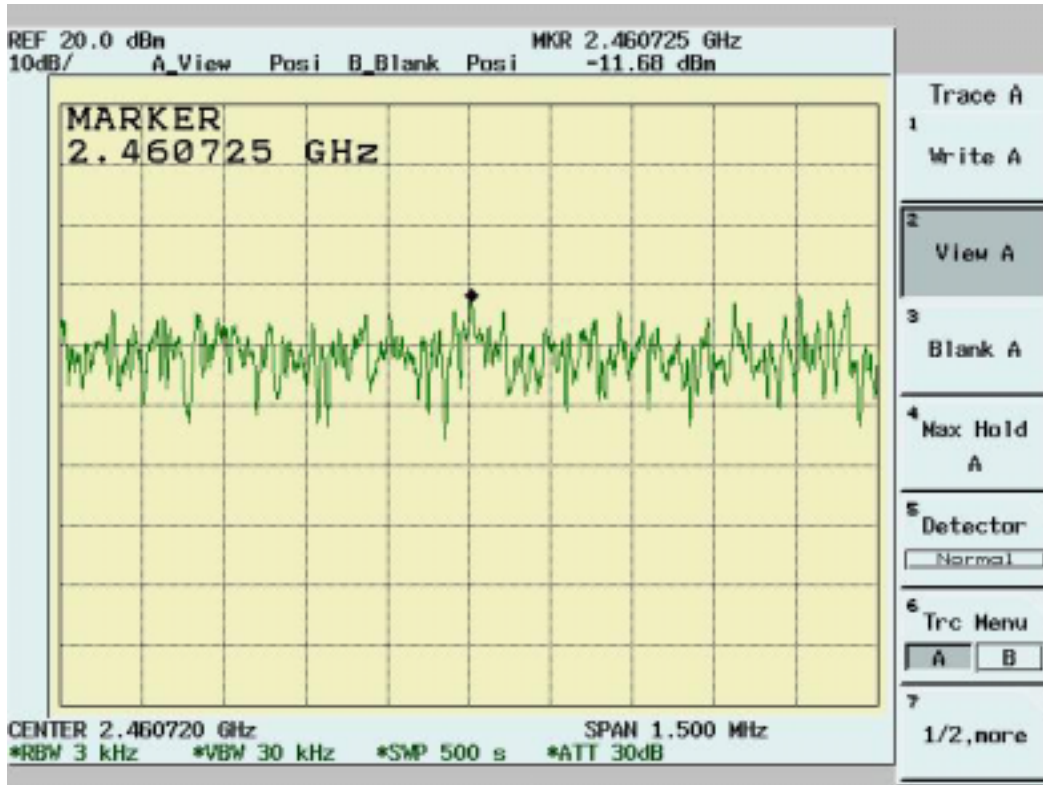
Channel 1



Channel 6



Channel 11



5. TEST RESULTS (802.11g)

5.1 Powerline Conducted Emissions [Section 15.207]

5.1.1 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 used.

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.

5.1.2 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.

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

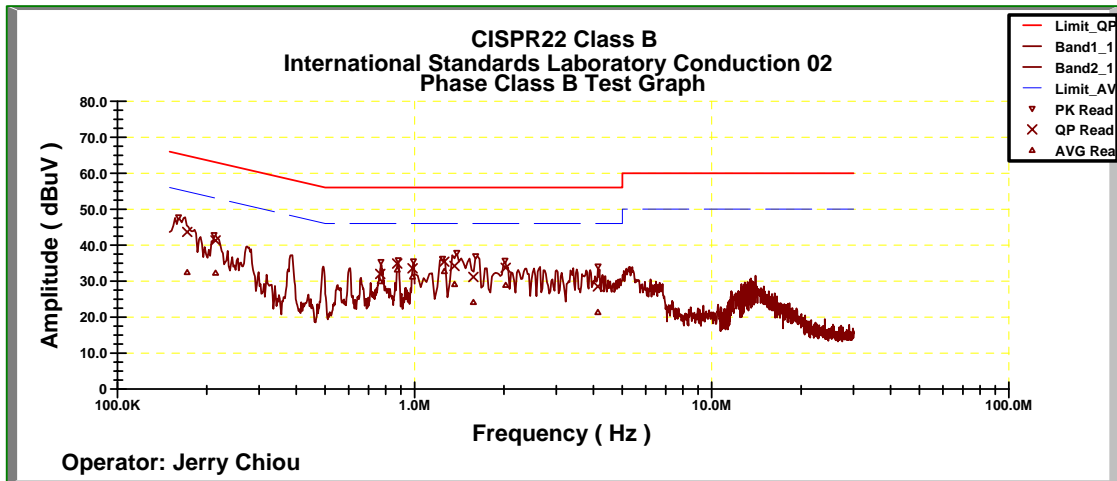
| | |
|-------------------|--------------------|
| Frequency Range | 150 KHz--30MHz |
| Detector Function | Quasi-Peak/Average |
| Bandwidth (RBW) | 9KHz |

5.1.4 Test Data:

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

Operator: Jerry Chiou
 Temperature (C): 25
 Humidity (%): 56

| Frequency | LISN Loss | Cable Loss | QP Corrcr. | QP Limit | QP Margin | AVE Corrcr. | AVE Limit | AVE Margin |
|-----------|-----------|------------|------------|----------|-----------|-------------|-----------|------------|
| MHz | (dB) | (dB) | Amp.(dBuV) | (dBuV) | (dB) | Amp.(dBuV) | (dBuV) | (dB) |
| 0.17178 | 0.10 | 0.03 | 43.66 | 65.38 | -21.72 | 32.41 | 55.38 | -22.97 |
| 0.21395 | 0.11 | 0.05 | 41.30 | 64.17 | -22.87 | 32.25 | 54.17 | -21.93 |
| 0.76585 | 0.20 | 0.07 | 31.99 | 56.00 | -24.01 | 29.87 | 46.00 | -16.13 |
| 0.87426 | 0.20 | 0.07 | 34.88 | 56.00 | -21.12 | 33.13 | 46.00 | -12.87 |
| 0.98378 | 0.20 | 0.07 | 33.52 | 56.00 | -22.48 | 31.19 | 46.00 | -14.81 |
| 1.25877 | 0.23 | 0.08 | 35.39 | 56.00 | -20.61 | 32.69 | 46.00 | -13.31 |
| 1.36222 | 0.24 | 0.08 | 34.19 | 56.00 | -21.81 | 29.09 | 46.00 | -16.91 |
| 1.57717 | 0.26 | 0.08 | 31.14 | 56.00 | -24.86 | 24.09 | 46.00 | -21.91 |
| 2.02528 | 0.30 | 0.09 | 33.70 | 56.00 | -22.30 | 28.86 | 46.00 | -17.14 |
| 4.13814 | 0.40 | 0.14 | 28.52 | 56.00 | -27.48 | 21.29 | 46.00 | -24.71 |



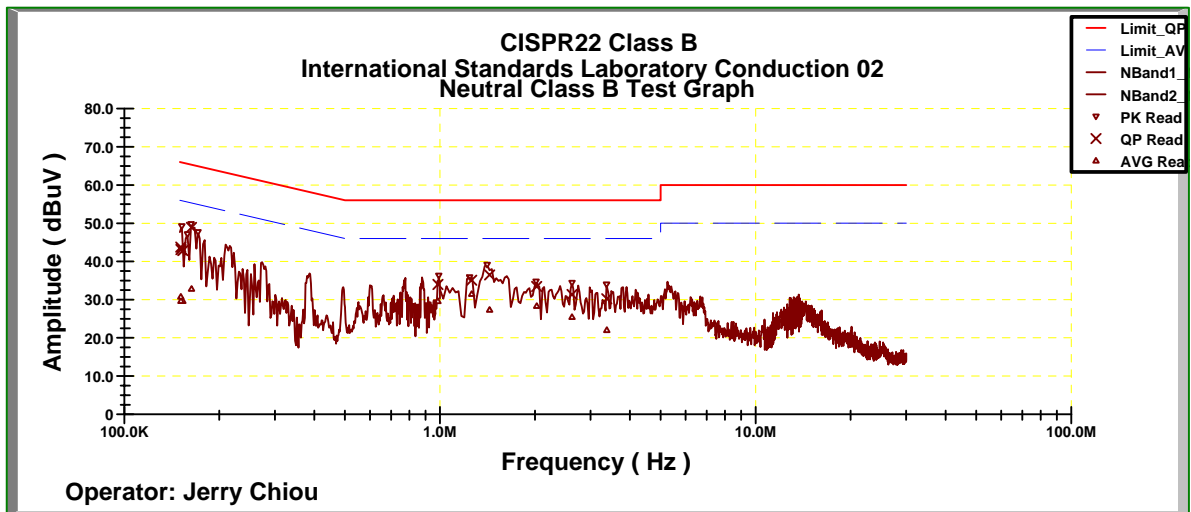
Power Line Conducted Emissions (Neutral) Channel 1, 6, 11

Operator: Jerry Chiou

Temperature (C): 25

Humidity (%): 56

| Frequency | LISN Loss | Cable Loss | QP Corrct. | QP Limit | QP Margin | AVE Corrct. | AVE Limit | AVE Margin |
|-----------|-----------|------------|------------|----------|-----------|-------------|-----------|------------|
| MHz | (dB) | (dB) | Amp.(dBuV) | (dBuV) | (dB) | Amp.(dBuV) | (dBuV) | (dB) |
| 0.15099 | 0.40 | 0.02 | 43.74 | 65.97 | -22.23 | 30.75 | 55.97 | -25.23 |
| 0.151182 | 0.40 | 0.02 | 43.08 | 65.97 | -22.89 | 29.64 | 55.97 | -26.33 |
| 0.153356 | 0.40 | 0.02 | 42.81 | 65.90 | -23.09 | 29.62 | 55.90 | -26.29 |
| 0.16334 | 0.40 | 0.03 | 48.88 | 65.62 | -16.74 | 32.79 | 55.62 | -22.83 |
| 0.98498 | 0.40 | 0.07 | 33.95 | 56.00 | -22.05 | 29.59 | 46.00 | -16.41 |
| 1.26004 | 0.50 | 0.08 | 35.09 | 56.00 | -20.91 | 31.46 | 46.00 | -14.54 |
| 1.43566 | 0.50 | 0.08 | 36.46 | 56.00 | -19.54 | 27.30 | 46.00 | -18.70 |
| 2.02423 | 0.50 | 0.09 | 33.43 | 56.00 | -22.57 | 28.34 | 46.00 | -17.66 |
| 2.61924 | 0.50 | 0.11 | 31.35 | 56.00 | -24.65 | 25.42 | 46.00 | -20.58 |
| 3.37584 | 0.50 | 0.12 | 30.22 | 56.00 | -25.78 | 22.01 | 46.00 | -23.99 |



* 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

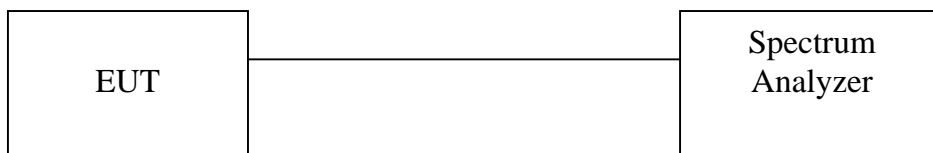
5.2 Bandwidth for DSSS [Section 15.247 (a)(2)]

5.2.1 Test Procedure

The Transmitter output of EUT was connected to the spectrum analyzer. 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 |

5.2.2 Test Setup



5.2.3 Test Data:

6dB Bandwidth

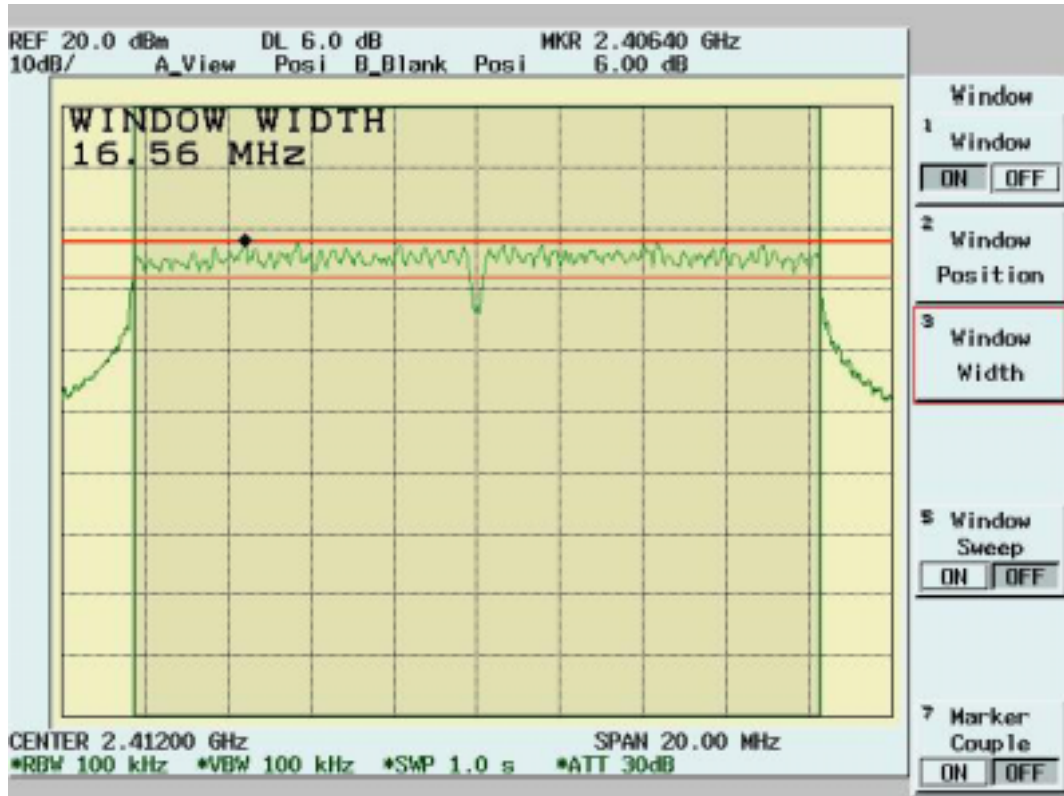
Temp. (deg. C): 25

Humidity (%): 50

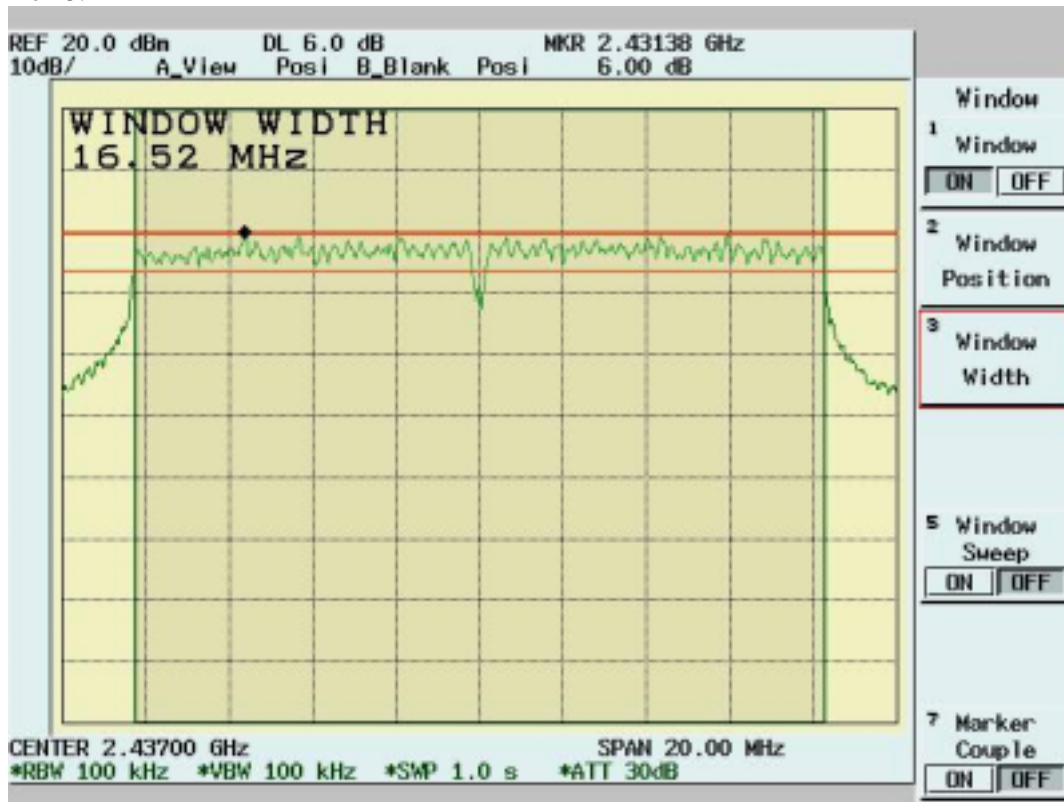
Test Engr: Jerry Chiou

| Chennel | Frequency (MHz) | 6dB Bandwidth (MHz) | Limit (MHz) | Pass/Fail |
|---------|--------------------|---------------------------|----------------|-----------|
| 1 | 2412 | 16.56 | 0.5 | Pass |
| 6 | 2437 | 16.52 | 0.5 | Pass |
| 11 | 2462 | 16.52 | 0.5 | Pass |

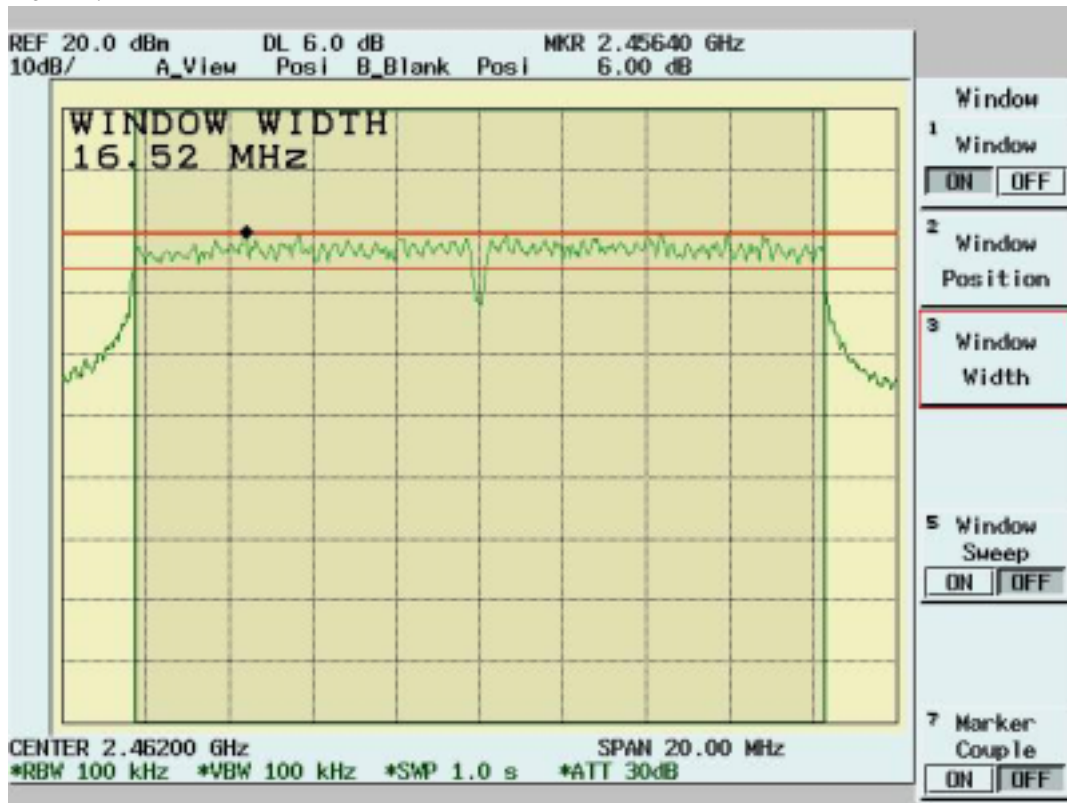
Channel 1:



Channel 6:



Channel 11:

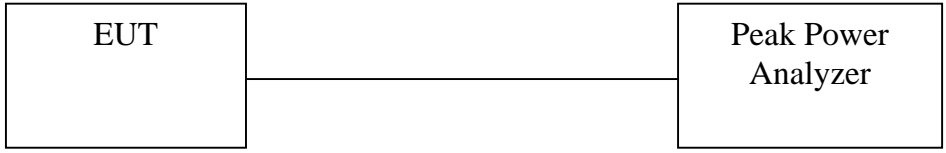


5.3 DSSS Maximum Peak Output Power [Section 15.247 (b)(1)]

5.3.1 Test Procedure

The Transmitter output of EUT was connected to the peak power analyzer.

5.3.2 Test Setup



5.3.3 Test Data

Maximum Peak Output Power

Temp. (deg. C): 25
 Humidity (%): 50
 Test Engr: Jerry Chiou

| Channel | Frequency (Mhz) | Analyzer Reading (dBm) | Cable Loss (dB) | Peak Power Output (mW) | Peak Power Output (dBm) | Limit (dBm) | Pass/Fail |
|---------|-----------------|------------------------|-----------------|------------------------|-------------------------|-------------|-----------|
| 1 | 2412 | 16.68 | 1.1 | 59.98 | 17.78 | 30 | Pass |
| 6 | 2437 | 16.86 | 1.1 | 62.52 | 17.96 | 30 | Pass |
| 11 | 2462 | 16.64 | 1.1 | 59.43 | 17.74 | 30 | Pass |

5.4 Radiated Emission Measurement [Section [15.247(c)(4)]

5.4.1 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.

5.4.2 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 2nd to 10th 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.

5.4.3 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) | 3MHz |
| Frequency Range Tested: | 1GHz – 25 GHz |
| Detector Function: | Average Mode |
| Resolution Bandwidth (RBW): | 1MHz |
| Video Bandwidth (VBW) | 10 Hz |

5.4.4 Test Data (30MHz – 1GHz):

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

Operator: Jerry Chiou
 Temperature (C): 23
 Humidity (%): 54

| Frequency | Rx Amp. | Ant Fact | CableLoss | PreAmpGain | Corrct. Emi. | Limit | Margin | Ant. Pos. | Table Pos. |
|-----------|---------|----------|-----------|------------|--------------|----------|--------|-----------|------------|
| MHz | (dBuV) | (dB/m) | (dB) | (dB) | (dBuV/m) | (dBuV/m) | (dB) | (cm) | (deg) |
| 159.98 | 16.14 | 8.70 | 2.35 | 0.00 | 27.19 | 43.50 | -16.31 | 196.00 | 353.00 |
| 183.26 | 13.80 | 8.53 | 2.62 | 0.00 | 24.95 | 43.50 | -18.55 | 196.00 | 320.00 |
| 195.87 | 13.28 | 8.78 | 2.67 | 0.00 | 24.72 | 43.50 | -18.78 | 196.00 | 336.00 |
| 199.75 | 15.19 | 8.89 | 2.70 | 0.00 | 26.78 | 43.50 | -16.72 | 196.00 | 336.00 |
| 239.52 | 26.12 | 10.14 | 3.03 | 0.00 | 39.30 | 46.00 | -6.70 | 196.00 | 336.00 |
| 320.03 | 14.41 | 16.02 | 3.83 | 0.00 | 34.26 | 46.00 | -11.74 | 103.00 | 56.00 |
| 352.04 | 7.12 | 16.19 | 4.12 | 0.00 | 27.44 | 46.00 | -18.56 | 103.00 | 90.00 |
| 404.42 | 7.19 | 15.93 | 4.47 | 0.00 | 27.58 | 46.00 | -18.42 | 196.00 | 353.00 |
| 499.48 | 3.64 | 17.39 | 5.28 | 0.00 | 26.31 | 46.00 | -19.69 | 103.00 | 123.00 |
| 639.16 | 1.30 | 18.93 | 6.23 | 0.00 | 26.47 | 46.00 | -19.53 | 103.00 | 320.00 |
| 664.38 | 2.08 | 19.00 | 6.40 | 0.00 | 27.47 | 46.00 | -18.53 | 103.00 | 352.00 |
| 827.34 | 1.09 | 20.37 | 7.70 | 0.00 | 29.15 | 46.00 | -16.85 | 196.00 | 21.00 |

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

Operator: Jerry Chiou
 Temperature (C): 23
 Humidity (%): 54

| Frequency | Rx Amp. | Ant Fact | CableLoss | PreAmpGain | Corrct. Emi. | Limit | Margin | Ant. Pos. | Table Pos. |
|-----------|---------|----------|-----------|------------|--------------|----------|--------|-----------|------------|
| MHz | (dBuV) | (dB/m) | (dB) | (dB) | (dBuV/m) | (dBuV/m) | (dB) | (cm) | (deg) |
| 57.16 | 13.98 | 6.00 | 1.31 | 0.00 | 21.28 | 40.00 | -18.72 | 196.00 | 254.00 |
| 95.96 | 15.95 | 9.49 | 1.91 | 0.00 | 27.34 | 43.50 | -16.16 | 103.00 | 336.00 |
| 159.98 | 16.05 | 8.70 | 2.35 | 0.00 | 27.11 | 43.50 | -16.39 | 196.00 | 353.00 |
| 180.35 | 14.01 | 8.50 | 2.59 | 0.00 | 25.10 | 43.50 | -18.40 | 196.00 | 353.00 |
| 239.52 | 23.16 | 10.14 | 3.03 | 0.00 | 36.33 | 46.00 | -9.67 | 196.00 | 336.00 |
| 320.03 | 8.98 | 16.02 | 3.83 | 0.00 | 28.82 | 46.00 | -17.18 | 103.00 | 56.00 |
| 359.8 | 8.05 | 16.14 | 4.17 | 0.00 | 28.37 | 46.00 | -17.63 | 196.00 | 53.00 |
| 499.48 | 5.23 | 17.39 | 5.28 | 0.00 | 27.91 | 46.00 | -18.09 | 103.00 | 123.00 |
| 539.25 | 4.45 | 18.34 | 5.45 | 0.00 | 28.24 | 46.00 | -17.76 | 103.00 | 106.00 |
| 666.32 | 3.45 | 19.00 | 6.41 | 0.00 | 28.86 | 46.00 | -17.14 | 103.00 | 352.00 |
| 731.31 | 0.94 | 19.75 | 6.88 | 0.00 | 27.57 | 46.00 | -18.43 | 103.00 | 172.00 |
| 764.29 | 1.61 | 20.17 | 7.06 | 0.00 | 28.85 | 46.00 | -17.15 | 196.00 | 254.00 |

NOTE:

- During the Pre-test, the EUT has been tested for Channel 1, 6, 11 transmit from Main and Aux antenna respectively to get all the critical emission frequencies. In the final test all the critical emission frequencies has been tested and the test data are listed above.
- 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

5.4.5 Test Data (1GHz – 25 GHz) .

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 32
Temperature (C): 25

| Frequency MHz | Rx_R. dBuV | Ant_F. dB/m | Cab_L. dB | PreAmpl dB | Emission dBuV/m | Limit dBuV/m | Margin dB | A.Tower cm | T.Table deg |
|------------------|---------------|----------------|--------------|---------------|--------------------|-----------------|--------------|---------------|----------------|
| 1984.02 | 45.97 pk | 30.87 | 2.59 | 35.15 | 44.27 pk | 54.00 av | -9.73 | 100 | 44 |
| 2878.12 | 46.85 pk | 31.05 | 1.43 | 34.86 | 44.47 pk | 54.00 av | -9.53 | 103 | 319 |
| 4818.18 | 62.59 pk | 34.91 | 2.12 | 37.71 | 61.91 pk | 74.00 pk | -12.09 | 100 | 18 |
| 4818.18 | 50.92 av | 34.91 | 2.12 | 37.71 | 50.24 av | 54.00 av | -3.76 | 100 | 18 |

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 32
Temperature (C): 25

| Frequency MHz | Rx_R. dBuV | Ant_F. dB/m | Cab_L. dB | PreAmpl dB | Emission dBuV/m | Limit dBuV/m | Margin dB | A.Tower cm | T.Table deg |
|------------------|---------------|----------------|--------------|---------------|--------------------|-----------------|--------------|---------------|----------------|
| 1162.34 | 53.55 pk | 25.25 | 2.19 | 34.02 | 46.97 pk | 54.00 av | -7.03 | 102 | 101 |
| 1839.16 | 47.17 pk | 29.65 | 2.48 | 34.86 | 44.44 pk | 54.00 av | -9.56 | 100 | 54 |
| 2316.18 | 50.66 pk | 30.94 | 1.64 | 35.19 | 48.04 pk | 54.00 av | -5.96 | 101 | 142 |
| 2510.99 | 48.38 pk | 30.90 | 1.36 | 35.19 | 45.46 pk | 54.00 av | -8.54 | 102 | 203 |
| 4818.18 | 58.18 pk | 34.91 | 2.12 | 37.71 | 57.50 pk | 74.00 pk | -16.50 | 100 | 18 |
| 4818.18 | 45.98 av | 34.91 | 2.12 | 37.71 | 45.30 av | 54.00 av | -8.70 | 100 | 18 |

Note:

- According to the standards used, Where limits are specified by agencies for both average and peak (or quasi-peak) detection , if the peak (or quasi-peak) measured value complies with the average limit , it is unnecessary to perform an average measurement.
- “ * ”: Fundamental Frequency
- “**”: Not in the restricted band, Limit level=Fundamental Emission-20dB
- “ pk” : peak mode
- “ av” : average mode
- “---“: 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.

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 32
Temperature (C): 25

| Frequency | Rx_R. | Ant_F. | Cab_L. | PreAmpl | Emission | Limit | Margin | A.Tower | T.Table |
|-----------|----------|--------|--------|---------|----------|----------|--------|---------|---------|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | cm | deg |
| 1492.01 | 50.25 pk | 26.76 | 2.23 | 34.20 | 45.05 pk | 54.00 av | -8.95 | 101 | 78 |
| 4876.12 | 60.65 pk | 35.13 | 2.14 | 37.77 | 60.14 pk | 74.00 pk | -13.86 | 100 | 12 |
| 4876.12 | 49.90 av | 35.13 | 2.14 | 37.77 | 49.40 av | 54.00 av | -4.60 | 100 | 12 |

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 32
Temperature (C): 25

| Frequency | Rx_R. | Ant_F. | Cab_L. | PreAmpl | Emission | Limit | Margin | A.Tower | T.Table |
|-----------|----------|--------|--------|---------|----------|----------|--------|---------|---------|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | cm | deg |
| 1162.34 | 51.39 pk | 25.25 | 2.19 | 34.02 | 44.81 pk | 54.00 av | -9.19 | 102 | 101 |
| 1332.17 | 50.40 pk | 26.03 | 2.21 | 34.11 | 44.53 pk | 54.00 av | -9.47 | 101 | 89 |
| 2301.2 | 48.84 pk | 30.94 | 1.68 | 35.19 | 46.26 pk | 54.00 av | -7.74 | 101 | 138 |
| 4861.64 | 55.97 pk | 35.07 | 2.13 | 37.76 | 55.42 pk | 74.00 pk | -18.58 | 100 | 14 |
| 4861.64 | 46.04 av | 35.07 | 2.13 | 37.76 | 45.48 av | 54.00 av | -8.52 | 100 | 14 |

Note:

- According to the standards used, Where limits are specified by agencies for both average and peak (or quasi-peak) detection , if the peak (or quasi-peak) measured value complies with the average limit , it is unnecessary to perform an average measurement.
- “ * ”: Fundamental Frequency
- “**”: Not in the restricted band, Limit level=Fundamental Emission-20dB
- “ pk” : peak mode
- “ av” : average mode
- “---“: 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.

1GHz~ 25 GHz (Horizontal), Channel 11: 2462 MHz

Operator: Jerry Chiou

RBW: 1MHz
 Humidity (%): 32
 Temperature (C): 25

| Frequency | Rx_R. | Ant_F. | Cab_L. | PreAmpl | Emission | Limit | Margin | A.Tower | T.Table |
|-----------|----------|--------|--------|---------|----------|----------|--------|---------|---------|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | cm | deg |
| 1159.84 | 52.12 pk | 25.24 | 2.19 | 34.02 | 45.53 pk | 54.00 av | -8.47 | 102 | 101 |
| 2041.46 | 46.43 pk | 30.99 | 2.47 | 35.18 | 44.71 pk | 54.00 av | -9.29 | 100 | 56 |
| 4919.58 | 58.43 pk | 35.29 | 2.15 | 37.82 | 58.05 pk | 74.00 pk | -15.95 | 100 | 8 |
| 4919.58 | 47.36 av | 35.29 | 2.15 | 37.82 | 46.98 av | 54.00 av | -7.02 | 100 | 8 |

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

Operator: Jerry Chiou

RBW: 1MHz
 Humidity (%): 32
 Temperature (C): 25

| Frequency | Rx_R. | Ant_F. | Cab_L. | PreAmpl | Emission | Limit | Margin | A.Tower | T.Table |
|-----------|----------|--------|--------|---------|----------|----------|--------|---------|---------|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | cm | deg |
| 1159.84 | 51.45 pk | 25.24 | 2.19 | 34.02 | 44.85 pk | 54.00 av | -9.15 | 102 | 101 |
| 1841.66 | 47.64 pk | 29.67 | 2.48 | 34.87 | 44.92 pk | 54.00 av | -9.08 | 100 | 54 |
| 2296.2 | 49.30 pk | 30.94 | 1.70 | 35.19 | 46.74 pk | 54.00 av | -7.26 | 101 | 136 |
| 4905.09 | 54.91 pk | 35.24 | 2.15 | 37.81 | 54.49 pk | 74.00 pk | -19.51 | 100 | 9 |
| 4905.09 | 42.64 av | 35.24 | 2.15 | 37.81 | 42.22 av | 54.00 av | -11.78 | 100 | 9 |

Note:

- According to the standards used, Where limits are specified by agencies for both average and peak (or quasi-peak) detection , if the peak (or quasi-peak) measured value complies with the average limit , it is unnecessary to perform an average measurement.
- “ * ”: Fundamental Frequency
- “**”: Not in the restricted band, Limit level=Fundamental Emission-20dB
- “ pk”: peak mode
- “av”: average mode
- “---“: 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.

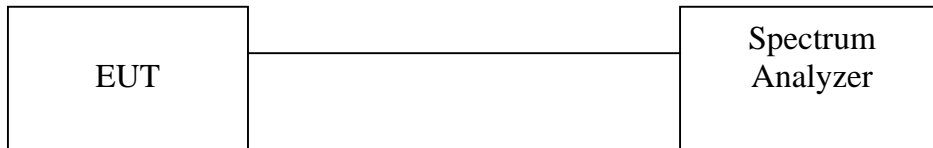
All frequencies from 1GHz to 25 GHz have been tested.

5.5 Band Edge Measurement

5.5.1 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.
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

5.5.2 Test Setup (Conducted)



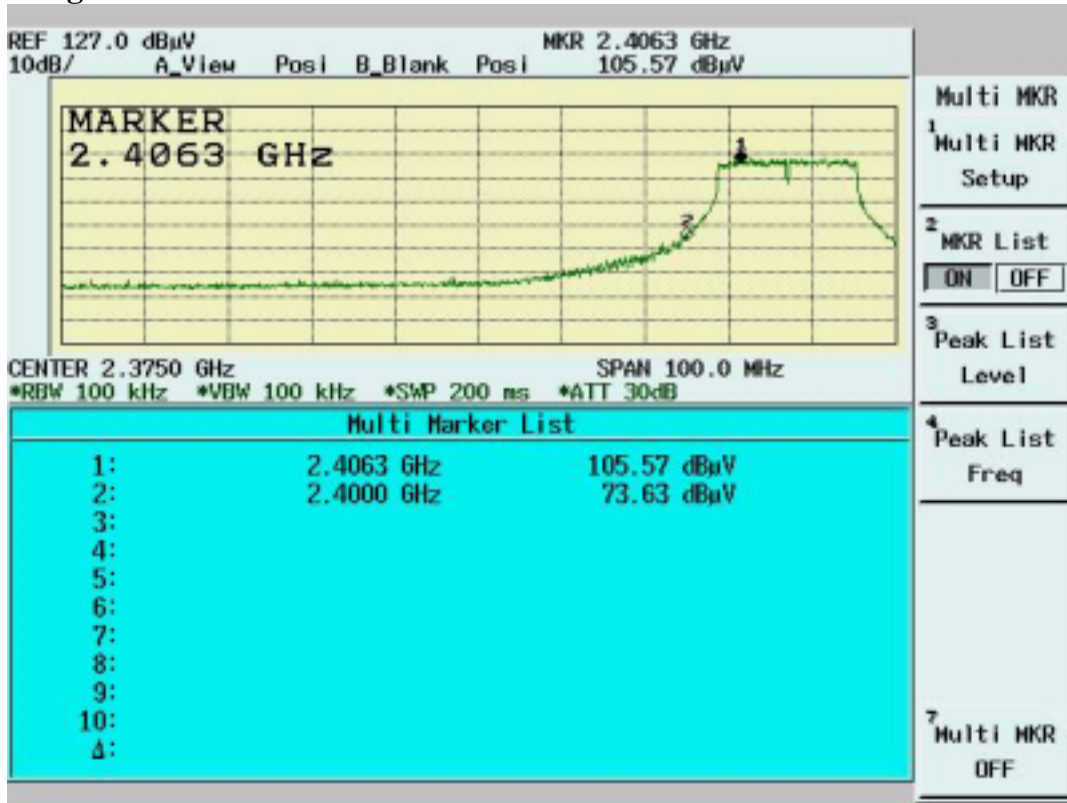
5.5.3 Test Data:

Table: Band Edge measurement (Conducted)

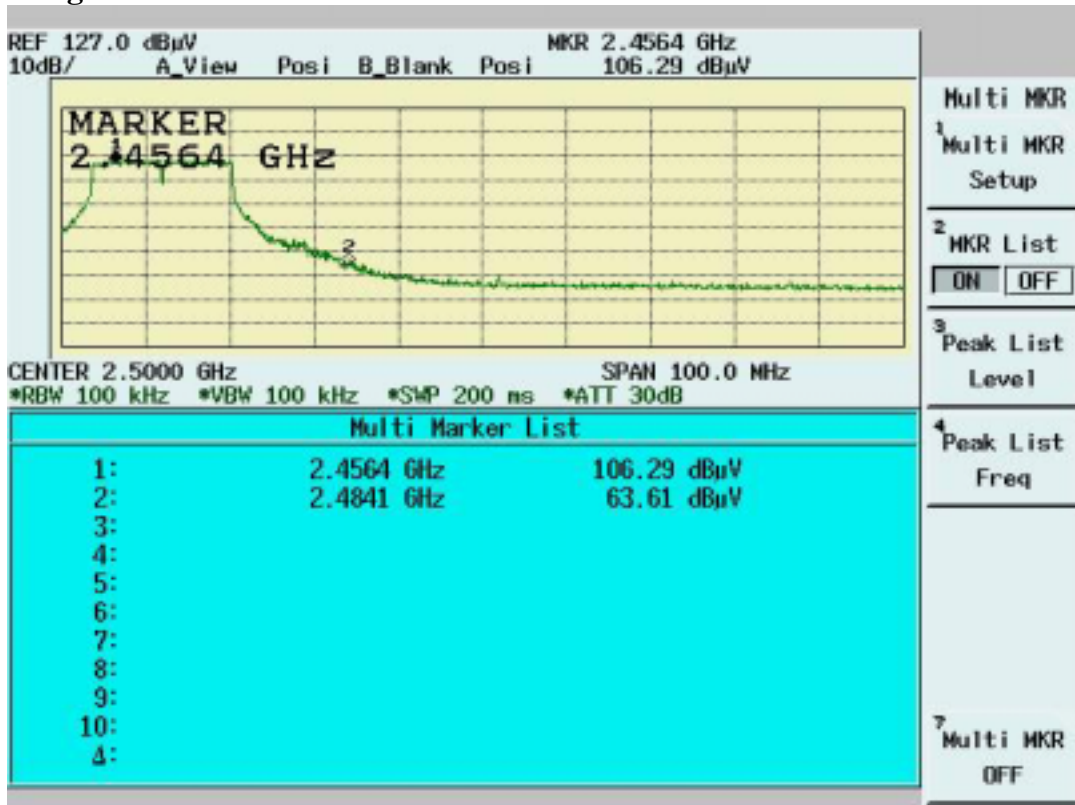
Temp. (deg. C): 25
 Humidity (%): 50
 Test Engr: Jerry Chiou

| Channel | Frequency | Spectrum Reading | Carrier - Outsideband Limit: >20dB | Pass/Fail |
|--------------|-----------|------------------|------------------------------------|-----------|
| | (MHz) | | (dB) | |
| 1 | 2406.3 | 105.57 | --- | --- |
| Outside band | 2400 | 73.63 | 31.94 | Pass |
| 11 | 2456.4 | 106.29 | --- | --- |
| Outside band | 2484.1 | 63.61 | 42.68 | Pass |

Band Edge Conducted measurement



Band Edge Conducted Measurement



5.5.4 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: 1MHz
VBW: 3MHz
Center frequency: 2.395GHz, 2.48GHz.
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
4. For peak frequency emission level measurement in Restricted Band ,
Change RBW: 1MHz
VBW: 10Hz
Span: 100MHz.
5. Get the spectrum reading after Maximum Hold function is completed.

5.5.5 Test Setup (Radiated)

Same as *Radiated Emission Measurement*

5.5.6 Test Data

Table Band Edge measurement (Radiated)

Temp. (deg. C): 25
 Humidity (%): 50

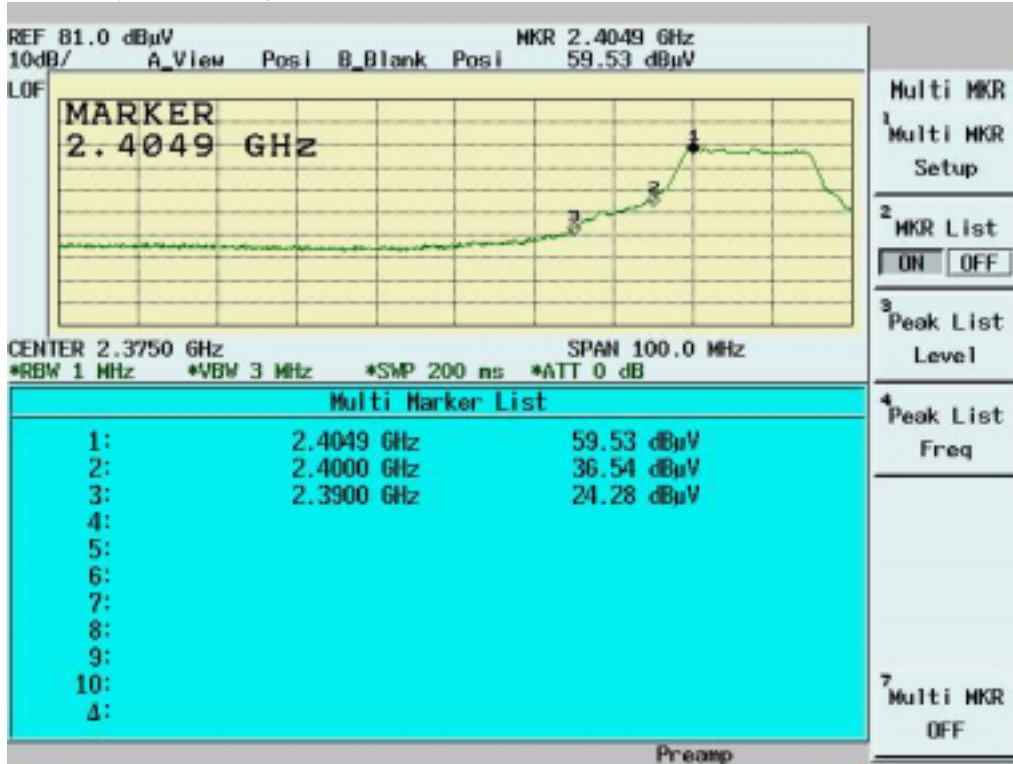
Test Engr: Jerry Chiou

| Description | Frequency (MHz) | Spectrum Reading (dBuV) | Correction Factor (dB/m) | Emission Level (dBuV/m) | dBc (Limit: > 20dBc) | Limit (dBuV/m) | Equip. Setup VBW | Pass or Fail |
|--|-----------------|-------------------------|--------------------------|-------------------------|----------------------|----------------|------------------|--------------|
| Channel_1 (average mode) | 2406.5 | 47.91 | 35.48 | 83.39 | --- | --- | 10Hz | --- |
| Channel_1 (peak mode) | 2404.9 | 59.53 | 35.48 | 95.01 | --- | --- | 3MHz | --- |
| Outside band (peak mode) | 2400 | 36.54 | 35.48 | 72.02 | 22.99 | --- | 3MHz | Pass |
| Channel_11 (average mode) | 2468.2 | 44 | 35.5 | 79.5 | --- | --- | 10Hz | --- |
| Channel_11 (peak mode) | 2465 | 55.7 | 35.5 | 91.2 | --- | --- | 3MHz | --- |
| Outside band (peak mode) | 2483.5 | 20.88 | 35.51 | 56.39 | 34.81 | --- | 3MHz | Pass |
| Channel_1 Restricted band (peak mode) | 2390 | 24.28 | 35.47 | 59.75 | --- | 74 | 3MHz | Pass |
| Restricted band (average mode) | 2390 | 8.32 | 35.47 | 43.79 | --- | 54 | 10Hz | Pass |
| Channel_11 Restricted band (peak mode) | 2483.8 | 21.53 | 35.51 | 57.04 | --- | 74 | 3MHz | Pass |
| Restricted band (average mode) | 2483.5 | 7.62 | 35.51 | 43.13 | --- | 54 | 10Hz | Pass |

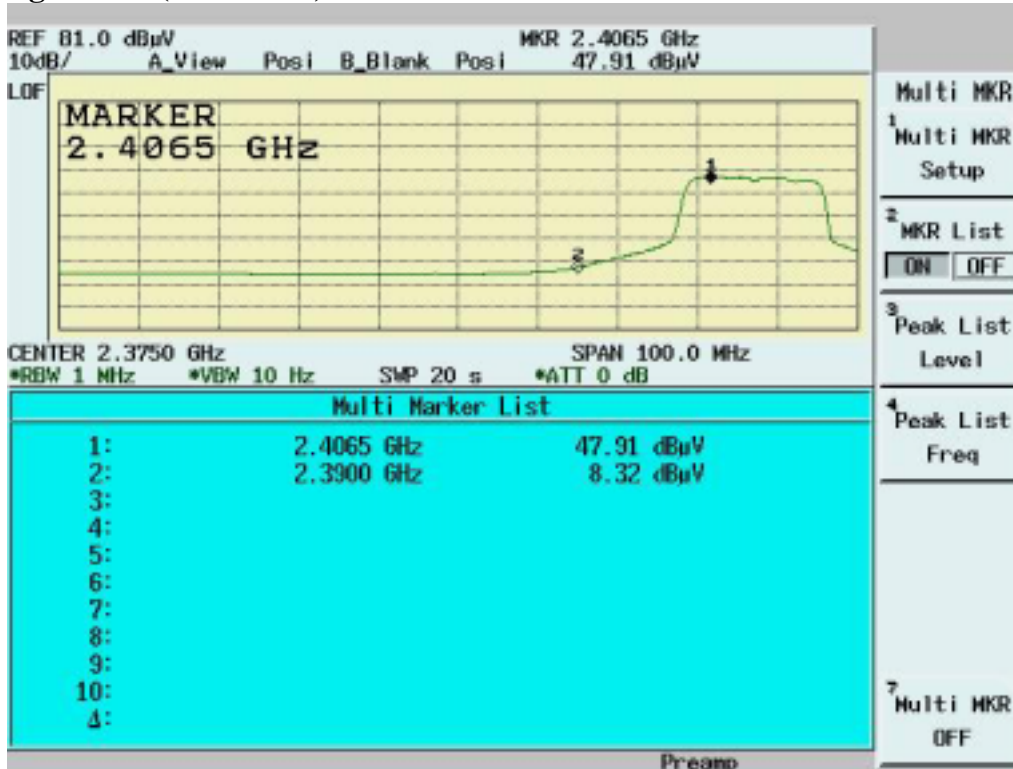
Note:

- 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
- Both Horizontal and Vertical polarizaion have been tested and the worst data is listed above.

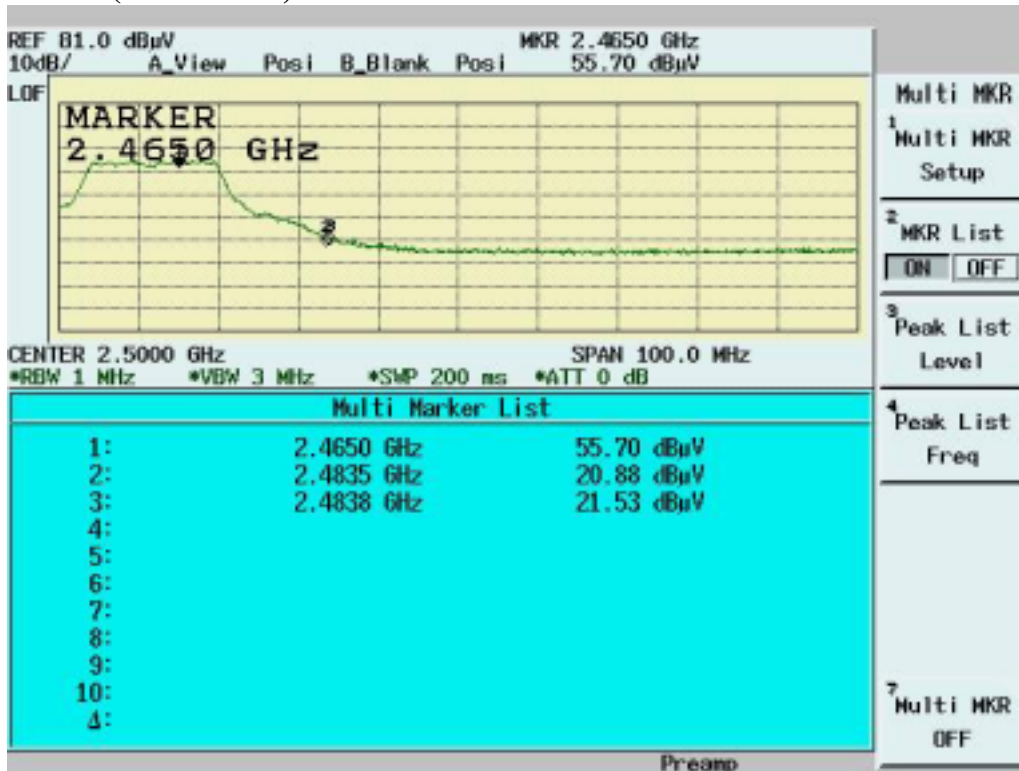
Band Edge measurement for radiated emission in Restricted Band(Radiated) Peak Mode (Channel 1)



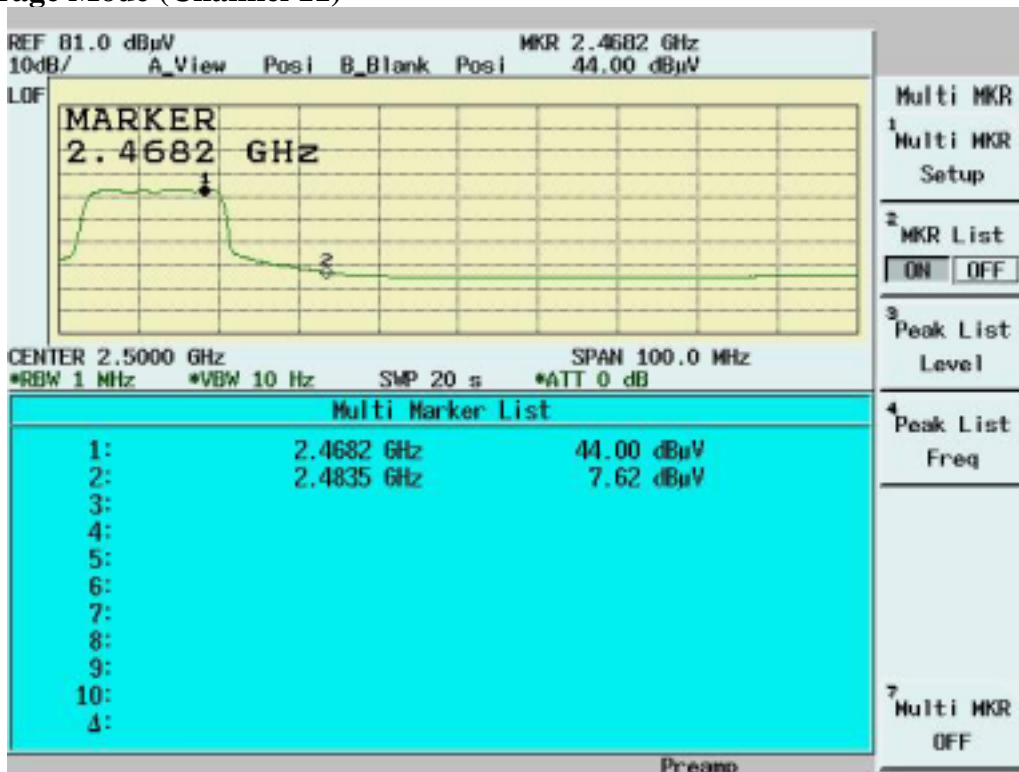
Band Edge measurement for radiated emission in Restricted Band(Radiated) Average Mode (Channel 1)



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)





5.6 RF Exposure Measurement [Section 15.247(b)(4) & 1.1307(b)]

See MPE report

5.7 DSSS Peak Power Spectral Density [Section 15.247(d)]

5.7.1 Test Procedure

1. The Transmitter output of EUT was connected to the spectrum analyzer.
 Equipment mode: Spectrum analyzer
 Detector function: Peak mode
 SPAN:1.5MHz
 RBW: 3KHz
 VBW: 30KHz
 Center frequency: fundamental frequency tested.
 Sweep time= 500 sec.
2. Using Peak Search to read the peak power after Maximum Hold function is completed.

5.7.2 Test Setup



5.7.3 Test Data

Maximum Peak Output Power Density

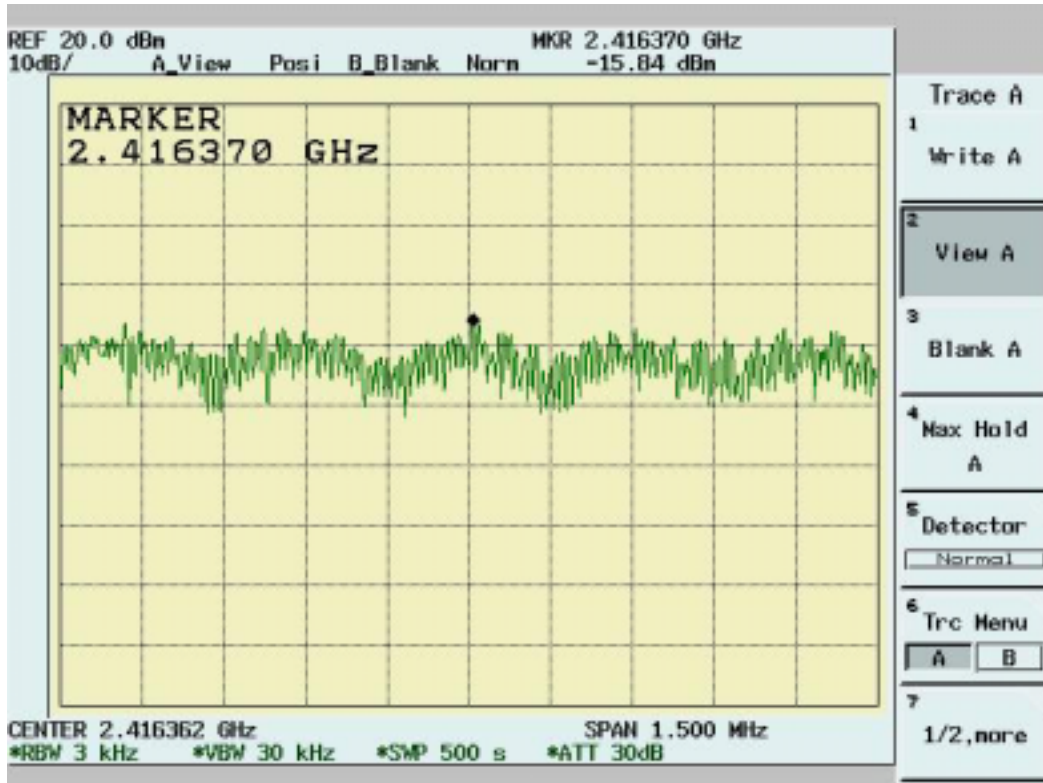
Temp. (deg. C): 25

Test Engr: Jerry Chiou

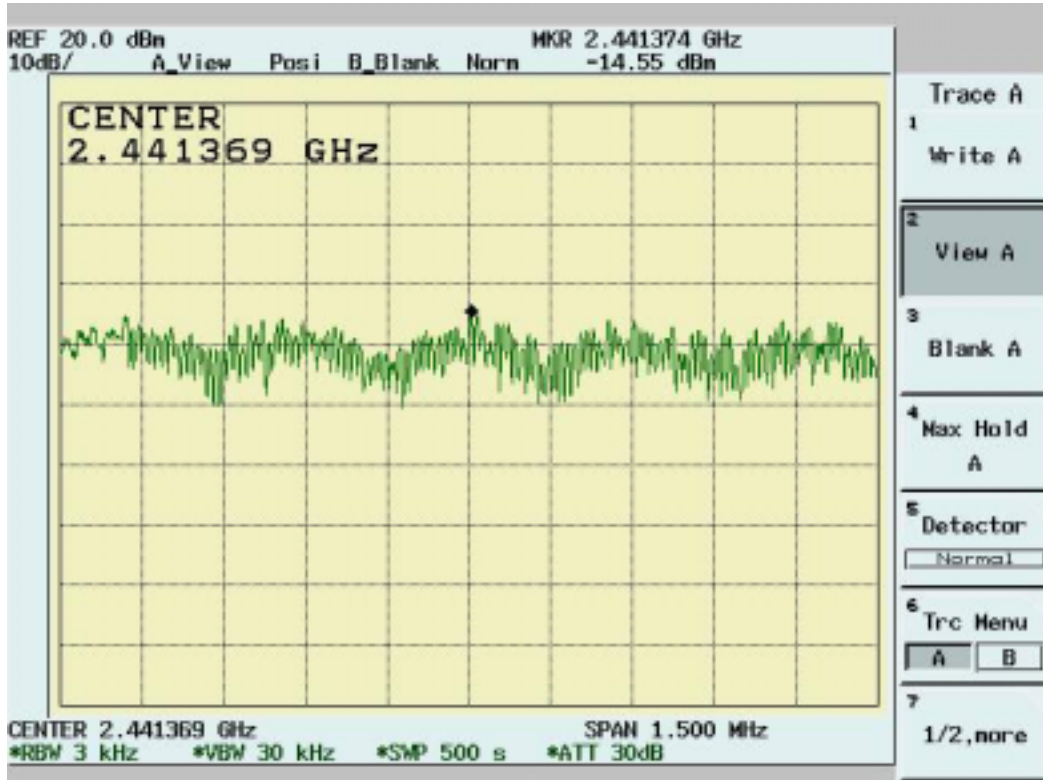
Humidity (%): 50

| Chennel | Frequency (MHz) | Spectrum Reading (dBm/3KHz) | Cable Loss (dB) | Peak Power Output (dBm/3KHz) | Limit (dBm/3KHz) | Pass/Fail |
|---------|-----------------|-----------------------------|-----------------|------------------------------|------------------|-----------|
| 1 | 2412 | -15.84 | 1.1 | -14.74 | 8 | Pass |
| 6 | 2437 | -14.55 | 1.1 | -13.45 | 8 | Pass |
| 11 | 2462 | -14.27 | 1.1 | -13.17 | 8 | Pass |

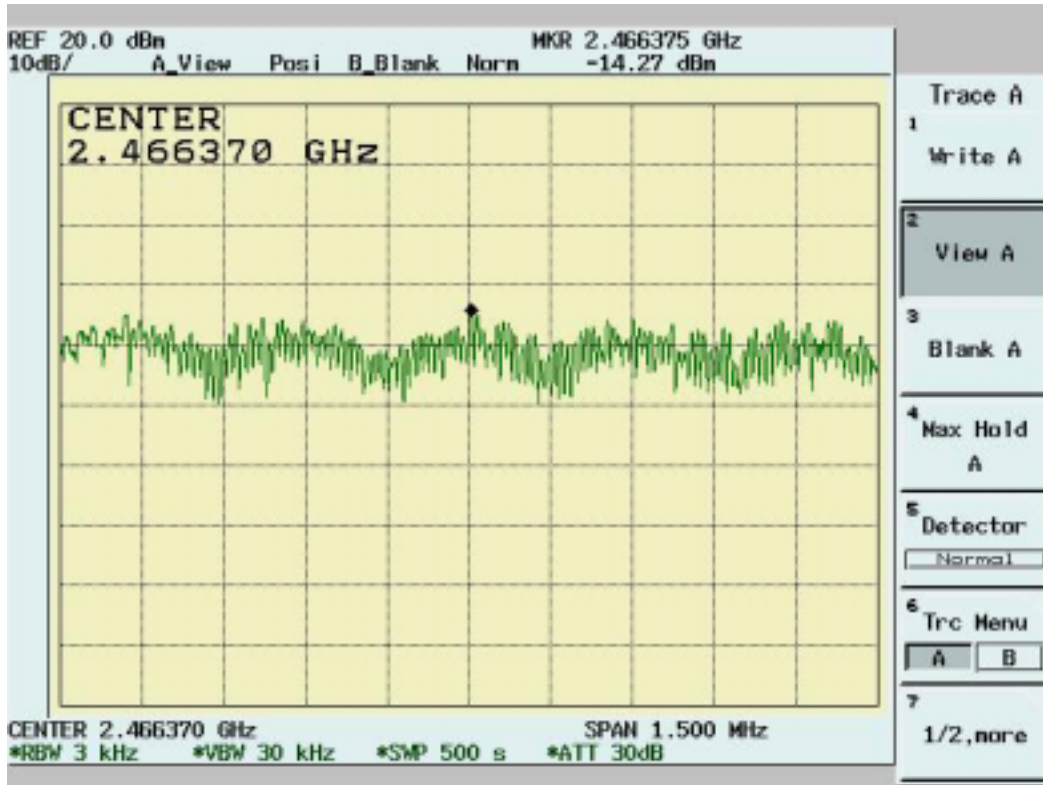
Channel 1



Channel 6



Channel 11



6. Appendix

6.1 Appendix A: Measurement Procedure for Power line Conducted Emissions

The measurements are performed in a 3.5m x 3.4m x 2.5m shielded room, which referred as Conduction 01 test site, or a 3m x 3m x 2.3m test site, which referred as Conduction 02 test site. The EUT was placed on non-conduction 1.0m x 1.5m table, which is 0.8 meters above an earth-grounded.

Power to the EUT was provided through the LISN which has the Impedance (50ohm/50uH) vs. Frequency Characteristic in accordance with the required standard. Power to the LISNs were filtered to eliminate ambient signal interference and these filters were bonded to the ground plane. Peripheral equipment required to provide a functional system (support equipment) for EUT testing was powered from the second LISN through a ganged, metal power outlet box which is bonded to the ground plane at the LISN.

If the EUT is supplied with a flexible power cord, the power cord length in excess of the distance separating the EUT from the LISN shall be folded back and forth at the center of the lead so as to form a bundle not exceeding 40cm in length. If the EUT is provided with a permanently coiled power cord, bundling of the cord is not required. If the EUT is supplied without a power cord, the EUT shall be connected to the LISN by a power cord of the type specified by the manufacturer which shall not be longer than 1 meter. The excess power cord shall be bundled as described above. If a non-flexible power cord is provided with the EUT, it shall be cut to the length necessary to attach the EUT to the LISN and shall not be bundled.

The interconnecting cables were arranged and moved to get the maximum emission. Both the line of power cord, hot and neutral, were measured.

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.

6.2 Appendix B: Test Procedure for Radiated Emissions

Preliminary Measurements in the Anechoic Chamber

The radiated emissions are initially measured in the anechoic chamber at a measurement distance of 3 meters. Desktop EUT are placed on a wooden stand 0.8 meter in height. The measurement antenna is 3 meters from the EUT. The test setup in anechoic chamber is the same as open site. The turntable rotated 360°. The antenna height is varied from 1-2.5m. The primary objective of the radiated measurements in the anechoic chamber is to identify the frequency spectrum in the absence of the electromagnetic environment existing on the open test site. The frequencies can then be pre-selected on the open test site to obtain the corresponding amplitude. The initial scan is made with the spectrum analyzer in automatic sweep mode. The spectrum peaks are then measured manually to determine the exact frequencies.

Measurements on the Open Site or 10m EMC Chamber

The radiated emissions test will then be repeated on the open site or 10m EMC chamber to measure the amplitudes accurately and without the multiple reflections existing in the shielded room. The EUT and support equipment are set up on the turntable of one of the 3 or 10 meter open field sites. Desktop EUT are set up on a wooden stand 0.8 meter above the ground.

For the initial measurements, the receiving antenna is varied from 1-4 meter height and is changed in the vertical plane from vertical to horizontal polarization at each frequency. Both readings are recorded with the quasi-peak detector with 120KHz bandwidth. For frequency between 30 MHz and 1000MHz, the reading is recorded with peak detector or quasi-peak detector. For frequency above 1 GHz, the reading is recorded with peak detector or average detector with 1 MHz bandwidth.

At the highest amplitudes observed, the EUT is rotated in the horizontal plane while changing the antenna polarization in the vertical plane to maximize the reading. The interconnecting cables were arranged and moved to get the maximum emission. Once the maximum reading is obtained, the antenna elevation and polarization will be varied between specified limits to maximize the readings.

6.3 Appendix C: Test Equipment

6.3.1 Test Equipment List

| Location | Equipment Name | Brand | Model | S/N | Last Cal. Date | Next Cal. Date |
|------------|-----------------------------------|-------------------|------------------------------|------------------|----------------|----------------|
| Conduction | Coaxial Cable 1F-C2 | Harbourindustries | RG400 | 1F-C2 | 05/20/2006 | 05/20/2007 |
| Conduction | Digital Hygro-Thermometer Conduct | MicroLife | HT-2126G | ISL-Conduction02 | 11/30/2004 | 11/30/2006 |
| Conduction | EMI Receiver 02 | HP | 85460A | 3448A00183 | 10/01/2005 | 10/01/2006 |
| Conduction | LISN 01 | R&S | ESH2-Z5 | 890485/013 | 05/05/2007 | 05/05/2007 |
| Conduction | LISN 06 | R&S | ESH3-Z5 | 828874/009 | 12/13/2005 | 12/13/2006 |
| Radiation | BILOG Antenna 08 | Schaffner | CBL6112B | 2756 | 06/07/2006 | 06/07/2007 |
| Radiation | Coaxial Cable Chmb 02-10M | Belden | RG-8/U | Chmb 02-10M | 12/28/2005 | 12/28/2006 |
| Radiation | Digital Hygro-Thermometer Chmb 02 | MicroLife | HT-2126G | Chmb 02 | 11/30/2004 | 12/30/2006 |
| Radiation | EMI Receiver 03 | HP | 85460A | 3448A00209 | 04/01/2006 | 04/01/2007 |
| Radiation | Spectrum Analyzer 13 | Advantest | R3132 | 121200411 | 02/17/2006 | 02/17/2007 |
| Radiation | Horn Antenna 02 | Com-Power | AH-118 | 10088 | 07/22/2005 | 07/22/2006 |
| Radiation | Horn Antenna 04 | Com-Power | AH-826 | 081-001 | 01/13/2006 | 01/13/2007 |
| Radiation | Horn Antenna 05 | Com-Power | AH-640 | 100A | 09/30/2005 | 09/30/2006 |
| Radiation | Microwave Cable RF SK-01 | HUBER+SUHNERAG. | Sucoflex 102 | 22139 /2 | 07/07/2005 | 07/07/2006 |
| Chamber 05 | Peak Power Analyzer | HP | 8990A | 3621A01269 | 03/28/2006 | 03/28/2007 |
| Chamber 05 | Power Sensor Radar | HP | 84815A | 3318A01828 | 03/28/2006 | 03/28/2007 |
| Radiation | Preamplifier 02 | MITEQ | AFS44-00102 650-40-10P-44 | 728229 | 11/28/2005 | 11/28/2006 |
| Radiation | Preamplifier 10 | MITEQ | JS-26004000-2 7-5A | 818471 | 11/22/2005 | 11/22/2006 |
| Radiation | High Pass Filter 01 | HEWLETT-PACKARD | 84300-80038 | 001 | N/A | N/A |
| Radiation | High Pass Filter 02 | HEWLETT-PACKARD | 84300-80039 | 005 | N/A | N/A |
| Radiation | Spectrum Analyzer 14 | Advantest | R3182 | 140600028 | 11/22/2005 | 11/22/2006 |

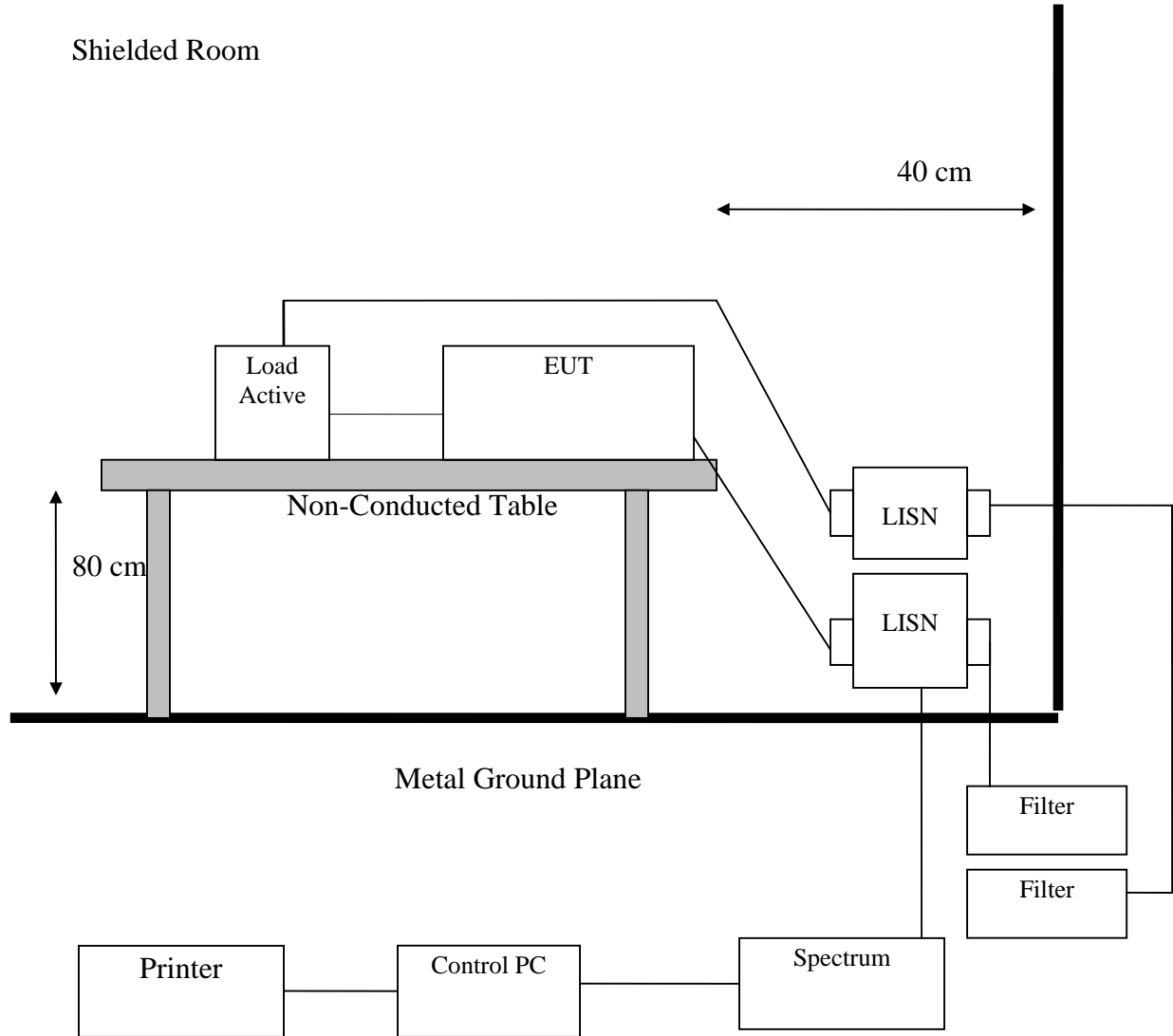
Note: Calibration is traceable to NIST or national or international standards.

6.3.2 Software for Controlling Spectrum/Receiver and Calculating Test Data

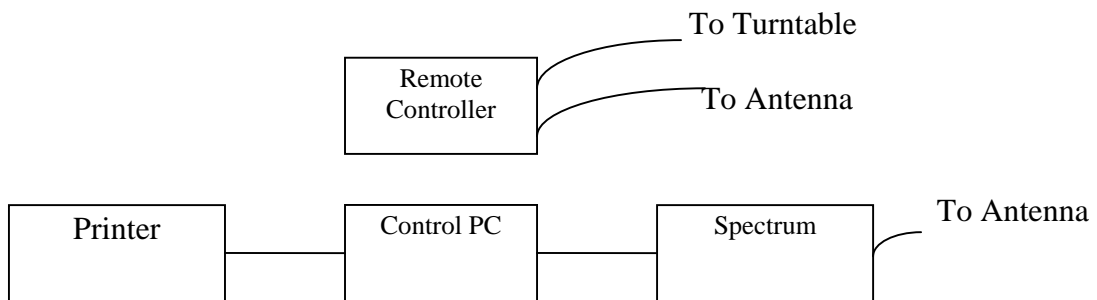
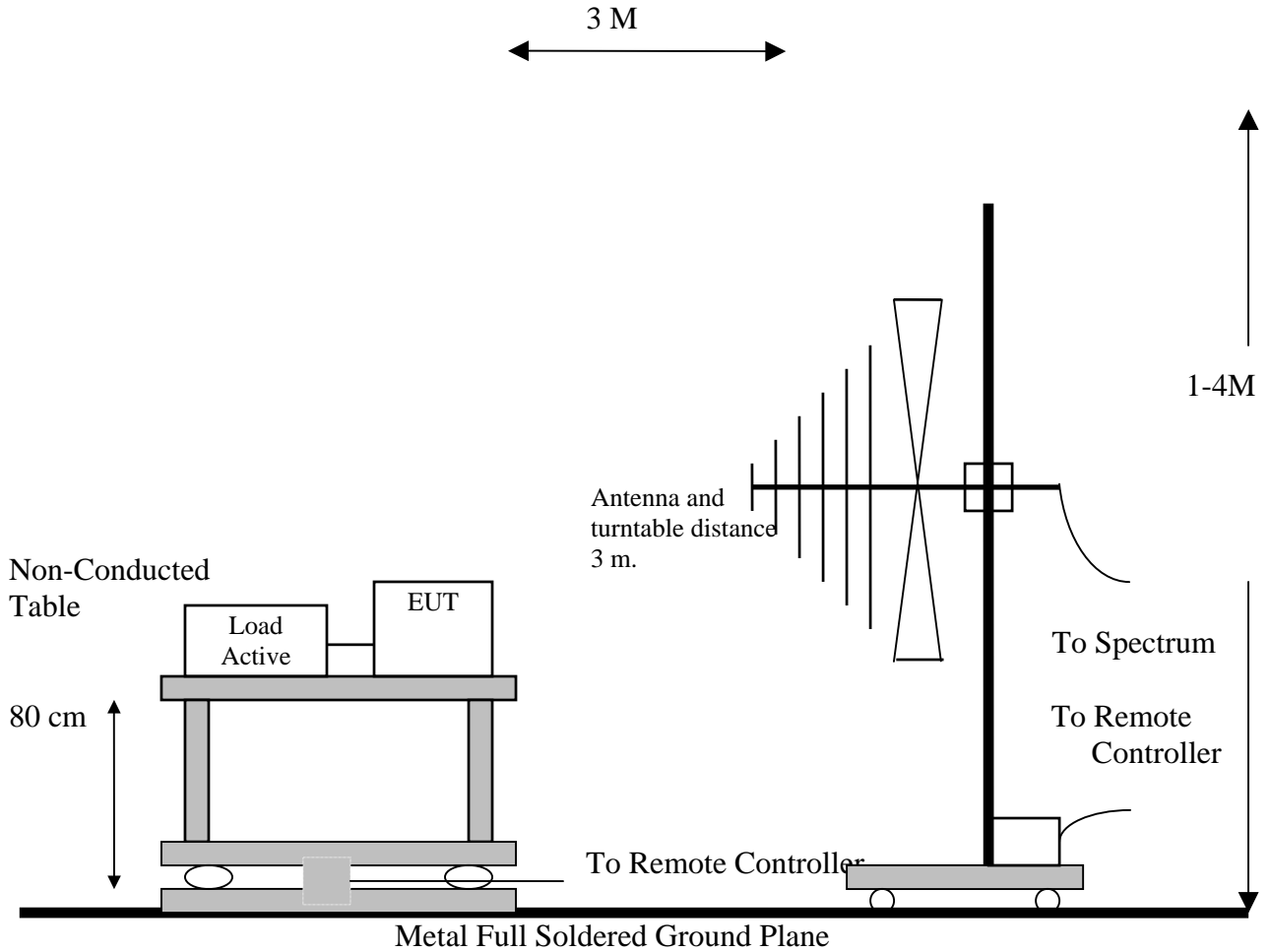
| Radiation/Conduction | Filename | Version | Issued Date |
|----------------------|----------|---------|-------------|
| Conduction | Tile.exe | 1.12E | 7/7/2000 |
| Radiation | Tile.exe | 1.12C | 6/16/2000 |

6.4 Appendix D: Layout of EUT and Support Equipment

6.4.1 General Conducted Test Configuration



6.4.2 General Radiation Test Configuration



6.5 Appendix E: Description of Support Equipment

6.5.1 Description of Support Equipment

Support Unit 1.

| | |
|-----------------|--------------------------|
| Description: | USB Keyboard |
| Brand: | DELL |
| Model Number:: | RT7D10 |
| Serial Number:: | TH-05695W-37171-2B7-1021 |
| Power Cord: | 無 |
| FCC ID: | (Complied with FCC DOC) |

Support Unit 2.

| | |
|-----------------|-------------------------|
| Description: | Mouse |
| Brand: | DELL |
| Model Number:: | MO56UC |
| Serial Number:: | N/A |
| Power Cord:: | 無 |
| FCC ID: | (Complied with FCC DOC) |

Support Unit 3.

| | |
|----------------|-------------------------|
| Description:: | Monitor |
| Brand: | Philips |
| Model Number:: | 201P10 |
| Serial Number: | TY100134004889 |
| Power Cord:: | Nonshielded, Detachable |
| FCC ID: | (Complied with FCC DOC) |

Support Unit 4.

| | |
|-----------------------------|--|
| Description: | IBM Notebook Personal Computer |
| Model: | 2371 |
| Serial Number: | N/A |
| Power Supply Type: | Switching AC Adapte 56W Lite-On (Model: 02K6809) 3 pins |
| CPU Type: | Intel Pentium-M 1.2 GHz |
| Hard Disk Device: | Hitachi 20GB (Model: HTC424020F7AT00) |
| DDR: 256MB | Infineon (Model: HYB25D256160BT-6) |
| BT/MODEM card: | Actiontec (Model: BMDC200) |
| Wireless card: | Phillips (Model: WLAN 802.11ABG 930700811107 WW) |
| DC-In: | one |
| VGA Port: | one |
| USB2.0 Connector: | two |
| LAN Connector: | one |
| Modem Port: | one |
| PCIMCIA Connector: | one |
| SD Connector | one |
| Docking Connector: | one |
| Battery: | Sanyo 4 cell (Model: 92P0999) |
| Power Cord: | Shielded 3 PIN, 2 PIN |
| LCD: | Samsung 12.1" XGA TFT (Model: LTN121XA-L01) |
| Maximum display Resolution: | 1024X768 Non-interlaced |

6.5.2 Software for Controlling Support Unit

Test programs exercising various part of EUT were used. The programs were executed as follows:

- A. Read and write to the disk drives.
- B. The RF software makes the transmitter continuously sending RF signals**
- C. Repeat the above steps.

| | Filename | Issued Date |
|-----------------------|-------------------|-------------|
| Marvell test software | DutApiCf8385p.exe | 2004/10/05 |

6.5.3 I/O Cable Condition of EUT and Support Units

| Description | Path | Cable Length | Cable Type | Connector Type |
|---------------------|---|--------------|-------------------------|----------------|
| AC Power Cord | 110V (~240V) to AC Power Cord Inlet (3-pin) | 1.8M | Nonshielded, Detachable | Plastic Head |
| Monitor data cable | Monitor to PC VGA port | 1.6M | Shielded, Undetachable | Metal Head |
| USB data cable | USB Mouse to PC USB port | 1.8M | Shielded, Undetachable | Metal Head |
| Keyboard data cable | Keyboard to PC Keyboard port | 1.8M | Shielded, Undetachable | Metal Head |

6.6 Appendix F: Accuracy of Measurement

Test Site: Conduction 02

| Item | Source of Uncertainty | Probability Distribution | Total Uncertainties (dB) | | Standard Uncertainty (dB) | |
|------|--|--------------------------|--------------------------|--------------|---------------------------|-------|
| | | | k | Value | k | Value |
| 1 | Systematic Effects: (Assessment from 20 repeat observation; 1 reading on EUT) | Normal | k=2 | 0.104 | k=1 | 0.052 |
| 2 | Random Effects: (Assessment from 20 random observations; 1 reading on EUT) | Normal | k=2 | 0.330 | k=1 | 0.165 |
| 3 | Receiver Calibration | Rectangular | k=1.73 | 1.000 | k=1 | 0.577 |
| 4 | LISN Factor Calibration | Normal | k=2 | 1.200 | k=1 | 0.600 |
| 5 | Cable Loss Calibration | Normal | k=2 | 1.000 | k=1 | 0.500 |
| 6 | Combined Standard Uncertainty $U_c(y)$ | Normal | | | k=1 | 0.850 |
| 7 | Total Uncertainty @95% min. Confidence Level | Normal | k=2 | 1.701 | | |

Measurement Uncertainty Calculations:

$$U_c(y) = \text{square root} (u_1(y)^2 + u_2(y)^2 + \dots + u_n(y)^2)$$

$$U = 2 * U_c(y)$$

Note: The measurement Uncertainties mentioned above also refer to NIS 81-1994 of NAMAS :
The treatment of Uncertainty in EMC Measurement.

Test Site: Chamber 02-3M

| Item | Source of Uncertainty | Probability Distribution | Total Uncertainties (dB) | | Standard Uncertainty (dB) | |
|------|--|--------------------------|--------------------------|--------------|---------------------------|-------|
| | | | k | Value | k | Value |
| 1 | Systematic Effects: (Assessment from 20 repeat observation; 1 reading on EUT) | Normal | k=2 | 0.067 | k=1 | 0.034 |
| 2 | Random Effects: (Assessment from 20 random observations; 1 reading on EUT) | Normal | k=2 | 0.103 | k=1 | 0.052 |
| 3 | Receiver Calibration | Rectangular | k=1.73 | 1.000 | k=1 | 0.577 |
| 4 | Antenna Factor Calibration | Normal | k=2 | 1.700 | k=1 | 0.850 |
| 5 | Cable Loss Calibration | Normal | k=2 | 1.000 | k=1 | 0.500 |
| 6 | Combined Standard Uncertainty Uc(y) | Normal | | | k=1 | 1.029 |
| 7 | Total Uncertainty @95% mim. Confidence Level | Normal | k=2 | 2.059 | | |

Measurement Uncertainty Calculations:

$$U_c(y) = \text{square root} (u_1(y)^2 + u_2(y)^2 + \dots + u_n(y)^2)$$

$$U = 2 * U_c(y)$$

Note: The measurement Uncertainties mentioned above also refer to NIS 81-1994 of NAMAS :
The treatment of Uncertainty in EMC Measurement.

6.7 Appendix G: Photographs of EUT Configuration Test Set Up



The Front View of Highest Conducted Set-up For EUT

The Back View of Highest Conducted Set-up For EUT



The Front View of Highest Radiated Set-up For EUT



The Back View of Highest Radiated Set-up For EUT





6.8 Appendix H: Antenna Spec.

Please refer to the attached file.