| | |
|---|---|
| Product Name: | 802.11g 54M Wireless LAN DigiShare(Digital) Media Adapter |
| Model No.: | EP(NE)-9101MA-g, DMA-100W |
| Applicant: | SURECOM TECHNOLOGY CORP.<br>6F, NO. 125, SEC. 2, DATUNG RD., SHIJR CITY, TAIPEI, TAIWAN 221, R.O.C. |
| Date of Receipt: | Apr. 12, 2005 |
| Finished date of Test: | May 16, 2005 |
| Applicable Standards: | 47 CFR Part 15, Subpart C<br>ANSI C63.4:2003 |

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Checked By : Hugo Yeh , Date: 5/16/2005
( Hugo Yeh )

Approved By : James Lee, Date: May 16, 2005
( Johnson Ho, Director ) W.A

FCC ID: MP3-9101G-0504

NVLAP

Lab Code: 200099-0

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# 1. DOCUMENT POLICY AND TEST STATEMENT

## 1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.
- The report must not be used by the applicant to claim that the product is endorsed by NVLAP, TÜV, NEMKO and SRT.
- The NVLAP logo applies only to the applicable standards specified in this report.

## 1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- AC power source, 120 Vac/60 Hz, was used during the test.

## 1.3 EUT MODIFICATION

- No modification in SRT Lab.

## 2. DESCRIPTION OF EUT AND TEST MODE

### 2.1 GENERAL DESCRIPTION OF EUT

| | |
|---|---|
| **PRODUCT** | 802.11g 54M Wireless LAN DigiShare(Digital) Media Adapter |
| **MODEL NO.** | EP(NE)-9101MA-g, DMA-100W |
| **POWER SUPPLY** | Input: 100~240V, 50/60Hz Output: DC12V |
| **CABLE** | 1.8m Unshielded S-Video Cable<br>1.8m Unshielded AV Cable |
| **FREQUENCY BAND** | 2400 ~ 2483.5MHz |
| **CARRIER FREQUENCY** | CH1: 2412MHz ~ CH11: 2462MHz |
| **NUMBER OF CHANNEL** | 11 |
| **CHANNEL SPACING** | 5MHz |
| **CHANNEL BANDWIDTH** | 20MHz |
| **BIT RATE OF TRANSMISSION** | 54Mbps |
| **RATED RF OUTPUT POWER** | 11g: 6.43dBm(4.40mW) at 54Mbps,<br>11b: 6.87dBm(4.86mW) at 11Mbps |
| **DUTY CYCLE** | 99% |
| **MODE OF OPERATION** | Half duplex |
| **I.F. & L.O.** | I.F.:0MHz, L.O.:2400 ~ 2483.5MHz |
| **MODULATION TYPE** | BPSK, QPSK, CCK, OFDM |
| **OPERATING TEMPERATURE RANGE** | 0~55℃ |
| **ANTENNA TYPE** | Dipole antenna |
| **ANTENNA GAIN** | 2dBi |

**NOTE :**
The EUT has two model numbers as below on market. They are identical in all aspects except for the case and client.
“EP-9101MA-g” and “DMA-100W” are for blue case of EUT.
“NE-9101MA-g” and “DMA-100W” are for white case of EUT.
The model: NE-9101MA-g was chosen as the representative for testing.
For more detailed information, please refer to the EUT’s specification or user’s manual provided by manufacturer.

## 2.2 DESCRIPTION OF EUT INTERNAL DEVICE

| DEVICE | BRAND / MAKER | MODEL | FCC ID/DOC | REMARK |
|---|---|---|---|---|
| WLAN 802.11g Mini-PCI Module | Wistron NeWeb | RM8 | NKRRM8 | |

## 2.3 DESCRIPTION OF TEST MODE

The EUT was tested for emission measurement under the following situations:

| Mode | Output |
|---|---|
| 1 | S-Video |
| 2 | NTSC/PAL composite video |
| 3 | DVI |

11 channels are provided by EUT. The 3 channels of lower, medium and higher were chosen for test.

There are test modes for each test configuration as below:

| Mode | | Modulation Type | Channel | Frequency (MHz) |
|---|---|---|---|---|
| 1 | IEEE 802.11g | OFDM | CH1 | 2412 |
| 2 | | | CH6 | 2437 |
| 3 | | | CH11 | 2462 |
| 4 | IEEE 802.11b | CCK | CH1 | 2412 |
| 5 | | | CH6 | 2437 |
| 6 | | | CH11 | 2462 |

**NOTE :**

1. Below 1 GHz, the channel 1, 6 and 11 were pre-tested in chamber. The channel 11, worst case one, was chosen for conducted and radiated emission test.
2. Above 1 GHz, the channel 1, 6 and 11 were tested individually

## 2.4 DESCRIPTION OF SUPPORT UNIT

The EUT was configured by the requirement of ANSI C63.4:2003. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

| NO | DEVICE | BRAND | MODEL | FCC ID/ DOC | CABLE |
|---|---|---|---|---|---|
| 1 | NOTEBOOK | DELL | PP01L | DOC | 1.5m unshielded power cord |
| 2 | LCD TV | TECO | TL2054FMJ | N/A | 1.8m unshielded AV cable<br>1.2m unshielded RCA Audio cable<br>1.5m unshielded power cable |
| 3 | LCD MONITOR | SAMSUNG | 152T | N/A | 1.5m unshielded power cable<br>1.2m shielded data cable |
| 4 | WIRELESS ROUTER | MSI | MS-6822 | DOC | 1.8m unshielded LAN cable<br>6.0m shielded LAN cable |

**NOTE :** For the actual test configuration, please refer to the photos of testing.

## 3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a kind of wireless product. According to the specifications provided by the applicant, it must comply with the requirements of the following standards:

47 CFR Part 15, Subpart C
ANSI C63.4:2003

All tests have been performed and recorded as the above standards.

# 4 . TECHNICAL CHARACTERISTICS TEST

## 4.1 CONDUCTED EMISSION TEST

### 4.1.1 LIMIT

| Frequency (MHz) | Class A (dBμV) | | Class B (dBμV) | |
|---|---|---|---|---|
| | Quasi-peak | Average | Quasi-peak | Average |
| 0.15 - 0.5 | 79 | 66 | 66 - 56 | 56 - 46 |
| 0.50 - 5.0 | 73 | 60 | 56 | 46 |
| 5.0 - 30.0 | 73 | 60 | 60 | 50 |

**NOTE :**

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

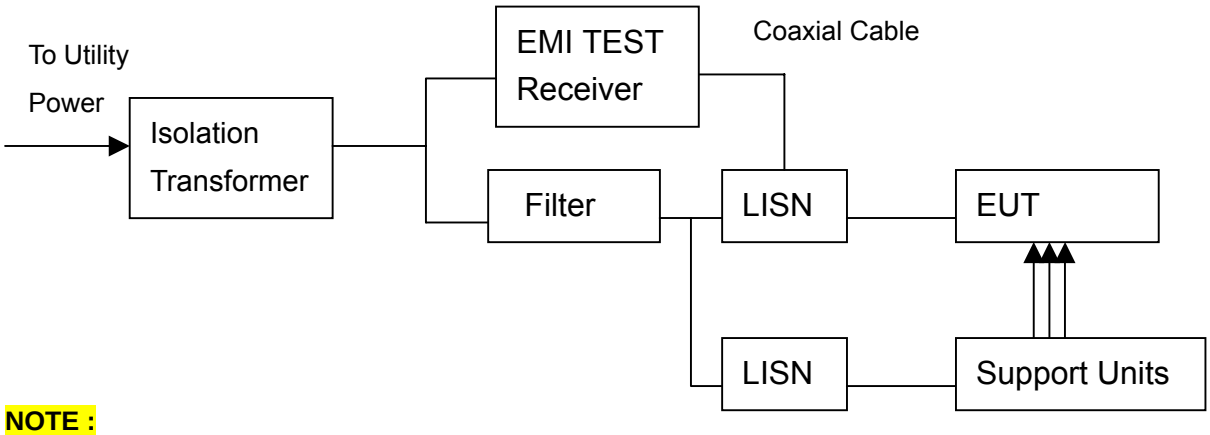
### 4.1.2 TEST EQUIPMENT

The following test equipment was used for the test:

| EQUIPMENT/ FACILITIES | SPECIFICATIONS | MANUFACTURER | MODEL#/ SERIAL# | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|---|
| EMI TEST RECEIVER | 9 kHz TO 30 MHz | ROHDE & SCHWARZ | ESHS30/ 826003/008 | AUG. 2005 ETC |
| LISN (for EUT) | 50 μH, 50 ohm | SOLAR ELECTRONICS | FCC-LISN-50-25-2 / 01018 | NOV. 2005 ETC |
| LISN (for Peripheral) | 50μH, 50 ohm | SOLAR ELECTRONICS | 9252-50-R-24-BNC / 951318 | JUN. 2005 ETC |
| 50 ohm TERMINATOR | 50 ohm | HP | 11593A/ 2 | OCT. 2005 ETC |
| COAXIAL CABLE | 3m | SUNCITY | J400/ 3M | JUL. 2005 SRT |
| ISOLATION TRANSFORMER | N/A | APC | AFC-11015/ F102040016 | N/A |
| FILTER | 2 LINE, 30A | FIL.COIL | FC-943/ 771 | N/A |
| GROUND PLANE | 2.3M (H) x 2.4M (W) | SRT | N/A | N/A |
| GROUND PLANE | 2.4M (H) x 2.4M (W) | SRT | N/A | N/A |

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.1.3 TEST SETUP




**NOTE :**

1. The EUT was put on a wooden table with 0.8m heights above ground plane, and 0.4m away from reference ground plane (> 2mx2m).
2. For the actual test configuration, please refer to the photos of testing.
3. The serial no. of the LISN connected to EUT is 01018.
4. The serial no. of the LISN connected to support units is 951318.

### 4.1.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4:2003 and CISPR22:2003. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm/50μH as specified. All readings were quasi-peak and average values with 10 kHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. Both lines of the power mains of EUT were measured and the cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.
First, find the margin or higher points at least 6 points by software, then use manual to find the maximum data. The procedure is referred on the test procedure of SRT LAB.

### 4.1.5 EUT OPERATING CONDITION

1. Link Mode:
   Set the EUT under normal condition continuously, play Video by DigiShare and run Digishare at Notebook.
2. TX Mode:
   The EUT used programs to control channels when it was tested for RF power and emission by DigiShare.
3. RX Mode:
   EUT accessed data from Wireless LAN. Play Video by DigiShare and run Digishare at Notebook.

### 4.1.6 TEST RESULT

| | | | |
|---|---|---|---|
| Temperature: | 26 °C | Humidity: | 50 %RH |
| Ferquency Range: | 0.15 – 30 MHz | Tested Mode: | IEEE 802.11g |
| Receiver Detector: | Q.P. and AV. | Modulation Type: | OFDM |
| Tested By: | Shin Chou | Tested Channel: | CH1: 2412MHz |
| | | Tested Date: | May 10, 2005 |

Power Line Measured : Line

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.477 | 0.20 | 39.6 | 36.7 | 39.8 | 36.9 | 56.4 | 46.4 | -16.6 | -9.5 |
| 0.480 | 0.20 | 40.1 | 36.5 | 40.3 | 36.7 | 56.3 | 46.3 | -16.0 | -9.6 |
| 4.487 | 0.20 | 37.5 | 27.5 | 37.7 | 27.7 | 56.0 | 46.0 | -18.3 | -18.3 |
| 11.334 | 0.20 | 37.5 | 27.9 | 37.7 | 28.1 | 60.0 | 50.0 | -22.3 | -21.9 |
| 12.044 | 0.20 | 37.6 | 27.8 | 37.8 | 28.0 | 60.0 | 50.0 | -22.2 | -22.0 |
| 27.003 | 0.24 | 37.2 | 34.5 | 37.4 | 34.7 | 60.0 | 50.0 | -22.6 | -15.3 |

Power Line Measured : Neutral

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.480 | 0.20 | 39.7 | 36.0 | 39.9 | 36.2 | 56.3 | 46.3 | -16.4 | -10.1 |
| 0.538 | 0.20 | 42.2 | 40.0 | 42.4 | 40.2 | 56.0 | 46.0 | -13.6 | -5.8 |
| 4.615 | 0.20 | 35.4 | 26.9 | 35.6 | 27.1 | 56.0 | 46.0 | -20.4 | -18.9 |
| 11.912 | 0.20 | 35.6 | 25.5 | 35.8 | 25.7 | 60.0 | 50.0 | -24.2 | -24.3 |
| 12.288 | 0.20 | 36.1 | 26.3 | 36.3 | 26.5 | 60.0 | 50.0 | -23.7 | -23.5 |
| 27.003 | 0.24 | 37.3 | 34.6 | 37.5 | 34.8 | 60.0 | 50.0 | -22.5 | -15.2 |

**NOTE :**

1. Measurement uncertainty is +/-1.32dB
2. Emission level = Reading valus + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies were very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

| | | | |
|---|---|---|---|
| Temperature: | 26 °C | Humidity: | 50 %RH |
| Ferquency Range: | 0.15 – 30 MHz | Tested Mode: | IEEE 802.11g |
| Receiver Detector: | Q.P. and AV. | Modulation Type: | OFDM |
| Tested By: | Shin Chou | Tested Channel: | CH6: 2437MHz |
| | | Tested Date: | May 10, 2005 |

Power Line Measured : Line

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.477 | 0.20 | 40.3 | 37.6 | 40.5 | 37.8 | 56.4 | 46.4 | -15.9 | -8.6 |
| 0.538 | 0.20 | 42.7 | 40.1 | 42.9 | 40.3 | 56.0 | 46.0 | -13.1 | -5.7 |
| 2.141 | 0.20 | 35.8 | 27.3 | 36.0 | 27.5 | 56.0 | 46.0 | -20.0 | -18.5 |
| 2.843 | 0.20 | 35.4 | 27.0 | 35.6 | 27.2 | 56.0 | 46.0 | -20.4 | -18.8 |
| 11.070 | 0.20 | 36.1 | 26.3 | 36.3 | 26.5 | 60.0 | 50.0 | -23.7 | -23.5 |
| 27.003 | 0.24 | 37.6 | 35.1 | 37.8 | 35.3 | 60.0 | 50.0 | -22.2 | -14.7 |

Power Line Measured : Neutral

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.477 | 0.20 | 39.8 | 36.7 | 40.0 | 36.9 | 56.4 | 46.4 | -16.4 | -9.5 |
| 0.538 | 0.20 | 42.0 | 39.2 | 42.2 | 39.4 | 56.0 | 46.0 | -13.8 | -6.6 |
| 3.675 | 0.20 | 34.5 | 24.6 | 34.7 | 24.8 | 56.0 | 46.0 | -21.3 | -21.2 |
| 4.477 | 0.20 | 34.1 | 25.7 | 34.3 | 25.9 | 56.0 | 46.0 | -21.7 | -20.1 |
| 11.242 | 0.20 | 34.5 | 25.6 | 34.7 | 25.8 | 60.0 | 50.0 | -25.3 | -24.2 |
| 27.003 | 0.24 | 37.5 | 35.0 | 37.7 | 35.2 | 60.0 | 50.0 | -22.3 | -14.8 |

**NOTE :**

1. Measurement uncertainty is +/-1.32dB
2. Emission level = Reading valus + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies were very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

| | | | |
|---|---|---|---|
| Temperature: | 26 °C | Humidity: | 50 %RH |
| Ferquency Range: | 0.15 – 30 MHz | Tested Mode: | IEEE 802.11g |
| Receiver Detector: | Q.P. and AV. | Modulation Type: | OFDM |
| Tested By: | Shin Chou | Tested Channel: | CH11: 2462MHz |
| | | Tested Date: | May 10, 2005 |

Power Line Measured : Line

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.477 | 0.20 | 40.5 | 37.4 | 40.7 | 37.6 | 56.4 | 46.4 | -15.7 | -8.8 |
| 0.480 | 0.20 | 40.6 | 36.9 | 40.8 | 37.1 | 56.3 | 46.3 | -15.5 | -9.2 |
| 0.538 | 0.20 | 42.4 | 40.0 | 42.6 | 40.2 | 56.0 | 46.0 | -13.4 | -5.8 |
| 2.507 | 0.20 | 37.0 | 29.1 | 37.2 | 29.3 | 56.0 | 46.0 | -18.8 | -16.7 |
| 10.296 | 0.20 | 35.7 | 26.5 | 35.9 | 26.7 | 60.0 | 50.0 | -24.1 | -23.3 |
| 27.003 | 0.24 | 37.6 | 35.0 | 37.9 | 35.2 | 60.0 | 50.0 | -22.1 | -14.8 |

Power Line Measured : Neutral

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.477 | 0.20 | 40.0 | 36.7 | 40.2 | 36.9 | 56.4 | 46.4 | -16.2 | -9.5 |
| 0.480 | 0.20 | 40.2 | 36.3 | 40.4 | 36.5 | 56.3 | 46.3 | -15.9 | -9.8 |
| 0.538 | 0.20 | 41.7 | 38.8 | 41.9 | 39.0 | 56.0 | 46.0 | -14.1 | -7.0 |
| 3.655 | 0.20 | 32.4 | 22.5 | 32.6 | 22.7 | 56.0 | 46.0 | -23.4 | -23.3 |
| 12.217 | 0.20 | 36.8 | 26.3 | 37.0 | 26.5 | 60.0 | 50.0 | -23.0 | -23.5 |
| 27.003 | 0.24 | 37.7 | 35.2 | 37.9 | 35.4 | 60.0 | 50.0 | -22.1 | -14.6 |

**NOTE :**

1. Measurement uncertainty is +/-1.32dB
2. Emission level = Reading valus + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies were very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

| | | | |
|---|---|---|---|
| Temperature: | 26 °C | Humidity: | 50 %RH |
| Ferquency Range: | 0.15 – 30 MHz | Tested Mode: | IEEE 802.11b |
| Receiver Detector: | Q.P. and AV. | Modulation Type: | CCK |
| Tested By: | Shin Chou | Tested Channel: | CH1: 2412MHz |
| | | Tested Date: | May 10, 2005 |

Power Line Measured : Line

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.477 | 0.20 | 38.6 | 37.1 | 38.8 | 37.3 | 56.4 | 46.4 | -17.6 | -9.1 |
| 0.480 | 0.20 | 41.2 | 37.4 | 41.4 | 37.6 | 56.3 | 46.3 | -14.9 | -8.7 |
| 4.487 | 0.20 | 36.8 | 28.7 | 37.0 | 28.9 | 56.0 | 46.0 | -19.0 | -17.1 |
| 11.334 | 0.20 | 35.4 | 29.4 | 35.6 | 29.6 | 60.0 | 50.0 | -24.4 | -20.4 |
| 12.044 | 0.20 | 36.7 | 26.8 | 36.9 | 27.0 | 60.0 | 50.0 | -23.1 | -23.0 |
| 27.003 | 0.24 | 37.1 | 35.7 | 37.3 | 35.9 | 60.0 | 50.0 | -22.7 | -14.1 |

Power Line Measured : Neutral

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.480 | 0.20 | 40.7 | 37.4 | 40.9 | 37.6 | 56.3 | 46.3 | -15.4 | -8.7 |
| 0.538 | 0.20 | 41.2 | 40.2 | 41.4 | 40.4 | 56.0 | 46.0 | -14.6 | -5.6 |
| 4.615 | 0.20 | 36.8 | 27.6 | 37.0 | 27.8 | 56.0 | 46.0 | -19.0 | -18.2 |
| 11.912 | 0.20 | 37.8 | 26.8 | 38.0 | 27.0 | 60.0 | 50.0 | -22.0 | -23.0 |
| 12.288 | 0.20 | 34.6 | 25.1 | 34.8 | 25.3 | 60.0 | 50.0 | -25.2 | -24.7 |
| 27.003 | 0.24 | 38.9 | 35.6 | 39.1 | 35.8 | 60.0 | 50.0 | -20.9 | -14.2 |

**NOTE :**

1. Measurement uncertainty is +/-1.32dB
2. Emission level = Reading valus + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies were very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

| | | | |
|---|---|---|---|
| Temperature: | 26 °C | Humidity: | 50 %RH |
| Ferquency Range: | 0.15 – 30 MHz | Tested Mode: | IEEE 802.11b |
| Receiver Detector: | Q.P. and AV. | Modulation Type: | CCK |
| Tested By: | Shin Chou | Tested Channel: | CH6: 2437MHz |
| | | Tested Date: | May 10, 2005 |

Power Line Measured : Line

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.477 | 0.20 | 41.5 | 38.9 | 41.7 | 39.1 | 56.4 | 46.4 | -14.7 | -7.3 |
| 0.538 | 0.20 | 40.2 | 38.4 | 40.4 | 38.6 | 56.0 | 46.0 | -15.6 | -7.4 |
| 2.141 | 0.20 | 36.4 | 26.4 | 36.6 | 26.6 | 56.0 | 46.0 | -19.4 | -19.4 |
| 2.843 | 0.20 | 35.1 | 26.8 | 35.3 | 27.0 | 56.0 | 46.0 | -20.7 | -19.0 |
| 11.070 | 0.20 | 35.8 | 25.9 | 36.0 | 26.1 | 60.0 | 50.0 | -24.0 | -23.9 |
| 27.003 | 0.24 | 36.5 | 34.1 | 36.7 | 34.3 | 60.0 | 50.0 | -23.3 | -15.7 |

Power Line Measured : Neutral

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.477 | 0.20 | 40.4 | 35.9 | 40.6 | 36.1 | 56.4 | 46.4 | -15.8 | -10.3 |
| 0.538 | 0.20 | 41.9 | 39.4 | 42.1 | 39.6 | 56.0 | 46.0 | -13.9 | -6.4 |
| 3.675 | 0.20 | 35.6 | 25.8 | 35.8 | 26.0 | 56.0 | 46.0 | -20.2 | -20.0 |
| 4.477 | 0.20 | 36.8 | 26.7 | 37.0 | 26.9 | 56.0 | 46.0 | -19.0 | -19.1 |
| 11.242 | 0.20 | 35.4 | 26.8 | 35.6 | 27.0 | 60.0 | 50.0 | -24.4 | -23.0 |
| 27.003 | 0.24 | 37.8 | 35.1 | 38.0 | 35.3 | 60.0 | 50.0 | -22.0 | -14.7 |

**NOTE :**

1. Measurement uncertainty is +/-1.32dB
2. Emission level = Reading valus + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies were very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

| | | | |
|---|---|---|---|
| Temperature: | 26 °C | Humidity: | 50 %RH |
| Ferquency Range: | 0.15 – 30 MHz | Tested Mode: | IEEE 802.11b |
| Receiver Detector: | Q.P. and AV. | Modulation Type: | CCK |
| Tested By: | Shin Chou | Tested Channel: | CH11: 2462MHz |
| | | Tested Date: | May 10, 2005 |

Power Line Measured : Line

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.477 | 0.20 | 41.2 | 38.5 | 41.4 | 38.7 | 56.4 | 46.4 | -15.0 | -7.7 |
| 0.480 | 0.20 | 39.4 | 37.6 | 39.6 | 37.8 | 56.3 | 46.3 | -16.7 | -8.5 |
| 0.538 | 0.20 | 41.2 | 40.8 | 41.4 | 41.0 | 56.0 | 46.0 | -14.6 | -5.0 |
| 2.501 | 0.20 | 39.4 | 30.9 | 39.6 | 31.1 | 56.0 | 46.0 | -16.4 | -14.9 |
| 10.296 | 0.20 | 36.7 | 27.8 | 36.9 | 28.0 | 60.0 | 50.0 | -23.1 | -22.0 |
| 27.003 | 0.24 | 38.4 | 36.7 | 38.6 | 36.9 | 60.0 | 50.0 | -21.4 | -13.1 |

Power Line Measured : Neutral

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.477 | 0.20 | 42.5 | 37.4 | 42.7 | 37.6 | 56.4 | 46.4 | -13.7 | -8.8 |
| 0.480 | 0.20 | 41.6 | 37.1 | 41.8 | 37.3 | 56.3 | 46.3 | -14.5 | -9.0 |
| 0.538 | 0.20 | 40.6 | 39.4 | 40.8 | 39.6 | 56.0 | 46.0 | -15.2 | -6.4 |
| 3.654 | 0.20 | 33.4 | 23.8 | 33.6 | 24.0 | 56.0 | 46.0 | -22.4 | -22.0 |
| 12.217 | 0.20 | 37.9 | 27.8 | 38.1 | 28.0 | 60.0 | 50.0 | -21.9 | -22.0 |
| 27.003 | 0.24 | 39.4 | 34.1 | 39.6 | 34.3 | 60.0 | 50.0 | -20.4 | -15.7 |

**NOTE :**

1. Measurement uncertainty is +/-1.32dB
2. Emission level = Reading valus + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies were very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

| | | | |
|---|---|---|---|
| Temperature: | 25 °C | Humidity: | 50 %RH |
| Ferquency Range: | 0.15 – 30 MHz | Tested Date: | May 10, 2005 |
| Receiver Detector: | Q.P. and AV. | Tested By: | Shin Chou |
| | | Test Mode: | S-Video |

Power Line Measured : Line

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.477 | 0.20 | 40.8 | 38.0 | 41.0 | 38.2 | 56.4 | 46.4 | -15.4 | -8.2 |
| 0.480 | 0.20 | 41.2 | 37.7 | 41.4 | 37.9 | 56.3 | 46.3 | -14.9 | -8.4 |
| 0.533 | 0.20 | 38.0 | 34.7 | 38.2 | 34.9 | 56.0 | 46.0 | -17.8 | -11.1 |
| 4.893 | 0.20 | 33.4 | 25.6 | 33.6 | 25.8 | 56.0 | 46.0 | -22.4 | -20.2 |
| 11.973 | 0.20 | 37.5 | 29.0 | 37.7 | 29.2 | 60.0 | 50.0 | -22.3 | -20.8 |
| 25.353 | 0.21 | 19.1 | 14.7 | 19.3 | 14.9 | 60.0 | 50.0 | -40.7 | -35.1 |

Power Line Measured : Neutral

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.483 | 0.20 | 37.8 | 33.5 | 38.0 | 33.7 | 56.3 | 46.3 | -18.3 | -12.6 |
| 0.538 | 0.20 | 39.1 | 36.9 | 39.3 | 37.1 | 56.0 | 46.0 | -16.7 | -8.9 |
| 2.992 | 0.20 | 32.9 | 25.5 | 33.1 | 25.7 | 56.0 | 46.0 | -22.9 | -20.3 |
| 4.912 | 0.20 | 31.8 | 18.1 | 32.0 | 18.3 | 56.0 | 46.0 | -24.0 | -27.7 |
| 11.679 | 0.20 | 39.5 | 28.8 | 39.7 | 29.0 | 60.0 | 50.0 | -20.3 | -21.0 |
| 15.523 | 0.20 | 27.6 | 21.6 | 27.8 | 21.8 | 60.0 | 50.0 | -32.2 | -28.2 |

**NOTE :**

1. Measurement uncertainty is +/-1.32dB
2. Emission level = Reading valus + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies were very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

| | | | |
|---|---|---|---|
| Temperature: | 25 °C | Humidity: | 50 %RH |
| Ferquency Range: | 0.15 – 30 MHz | Tested Date: | May 10, 2005 |
| Receiver Detector: | Q.P. and AV. | Tested By: | Shin Chou |
| | | Test Mode: | NTSC/PAL composite video |

Power Line Measured : Line

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.480 | 0.20 | 41.5 | 37.8 | 41.7 | 38.0 | 56.3 | 46.3 | -14.6 | -8.3 |
| 0.533 | 0.20 | 42.5 | 38.5 | 42.7 | 38.7 | 56.0 | 46.0 | -13.3 | -7.3 |
| 3.715 | 0.20 | 34.8 | 28.5 | 35.0 | 28.7 | 56.0 | 46.0 | -21.0 | -17.3 |
| 11.943 | 0.20 | 38.0 | 29.1 | 38.2 | 29.3 | 60.0 | 50.0 | -21.8 | -20.7 |
| 12.024 | 0.20 | 38.2 | 28.3 | 38.4 | 28.5 | 60.0 | 50.0 | -21.6 | -21.5 |
| 25.404 | 0.21 | 33.3 | 25.8 | 33.5 | 26.0 | 60.0 | 50.0 | -26.5 | -24.0 |

Power Line Measured : Neutral

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.477 | 0.20 | 40.6 | 37.6 | 40.8 | 37.8 | 56.4 | 46.4 | -15.6 | -8.6 |
| 0.480 | 0.20 | 41.2 | 37.5 | 41.4 | 37.7 | 56.3 | 46.3 | -14.9 | -8.6 |
| 0.538 | 0.20 | 41.9 | 39.2 | 42.1 | 39.4 | 56.0 | 46.0 | -13.9 | -6.6 |
| 3.467 | 0.20 | 34.2 | 26.9 | 34.4 | 27.1 | 56.0 | 46.0 | -21.6 | -18.9 |
| 12.227 | 0.20 | 34.7 | 26.2 | 34.9 | 26.4 | 60.0 | 50.0 | -25.1 | -23.6 |
| 25.312 | 0.21 | 33.8 | 29.2 | 34.0 | 29.4 | 60.0 | 50.0 | -26.0 | -20.6 |

**NOTE :**

1. Measurement uncertainty is +/-1.32dB
2. Emission level = Reading valus + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies were very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

| | | | |
|---|---|---|---|
| Temperature: | 25 °C | Humidity: | 50 %RH |
| Ferquency Range: | 0.15 – 30 MHz | Tested Date: | May 10, 2005 |
| Receiver Detector: | Q.P. and AV. | Tested By: | Shin Chou |
| | | Test Mode: | DVI |

Power Line Measured : Line

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.177 | 0.20 | 41.7 | 36.0 | 41.9 | 36.2 | 64.6 | 54.6 | -22.7 | -18.4 |
| 0.533 | 0.20 | 47.0 | 44.1 | 47.2 | 44.3 | 56.0 | 46.0 | -8.8 | -1.7 |
| 3.734 | 0.20 | 37.5 | 25.0 | 37.7 | 25.2 | 56.0 | 46.0 | -18.3 | -20.8 |
| 4.566 | 0.20 | 34.3 | 27.8 | 34.5 | 28.0 | 56.0 | 46.0 | -21.5 | -18.0 |
| 13.120 | 0.20 | 37.4 | 27.3 | 37.6 | 27.5 | 60.0 | 50.0 | -22.4 | -22.5 |
| 15.574 | 0.20 | 33.1 | 24.5 | 33.3 | 24.7 | 60.0 | 50.0 | -26.7 | -25.3 |

Power Line Measured : Neutral

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.474 | 0.20 | 41.4 | 36.7 | 41.6 | 36.9 | 56.4 | 46.4 | -14.8 | -9.5 |
| 0.533 | 0.20 | 46.6 | 43.5 | 46.8 | 43.7 | 56.0 | 46.0 | -9.2 | -2.3 |
| 1.240 | 0.20 | 41.6 | 38.3 | 41.8 | 38.5 | 56.0 | 46.0 | -14.2 | -7.5 |
| 3.012 | 0.20 | 39.9 | 33.5 | 40.1 | 33.7 | 56.0 | 46.0 | -15.9 | -12.3 |
| 5.436 | 0.20 | 38.9 | 30.6 | 39.1 | 30.8 | 60.0 | 50.0 | -20.9 | -19.2 |
| 15.687 | 0.20 | 32.2 | 23.7 | 32.4 | 23.9 | 60.0 | 50.0 | -27.6 | -26.1 |

**NOTE :**

1. Measurement uncertainty is +/-1.32dB
2. Emission level = Reading valus + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies were very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

## 4.2 RADIATED EMISSION TEST

### 4.2.1 LIMIT

FCC Part15, Subpart C Section 15.209 limit of radiated emission for frequency below1000MHz. The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| FREQUENCY (MHz) | DISTANCE (m) | FIELD STRENGTH (dBμV/m) |
|---|---|---|
| 30 - 88 | 3 | 40.0 |
| 88 - 216 | 3 | 43.5 |
| 216 - 960 | 3 | 46.0 |
| Above 960 | 3 | 54.0 |

**NOTE :**

1. In the emission tables above , the tighter limit applies at the band edges.
2. Distance refers to the distance between measuring instrument, antemma, and the closest point of any part of the device or system.

FCC Part 15, Section15.35(b) limit of radiated emission for frequency above 1000 MHz

| FREQUENCY (MHz) | Class A (dBuV/m) (at 3m) | | Class B (dBuV/m) (at 3m) | |
|---|---|---|---|---|
| | PEAK | AVERAGE | PEAK | AVERAGE |
| Above 1000 | 80.0 | 60.0 | 74.0 | 54.0 |

### 4.2.2 TEST EQUIPMENT

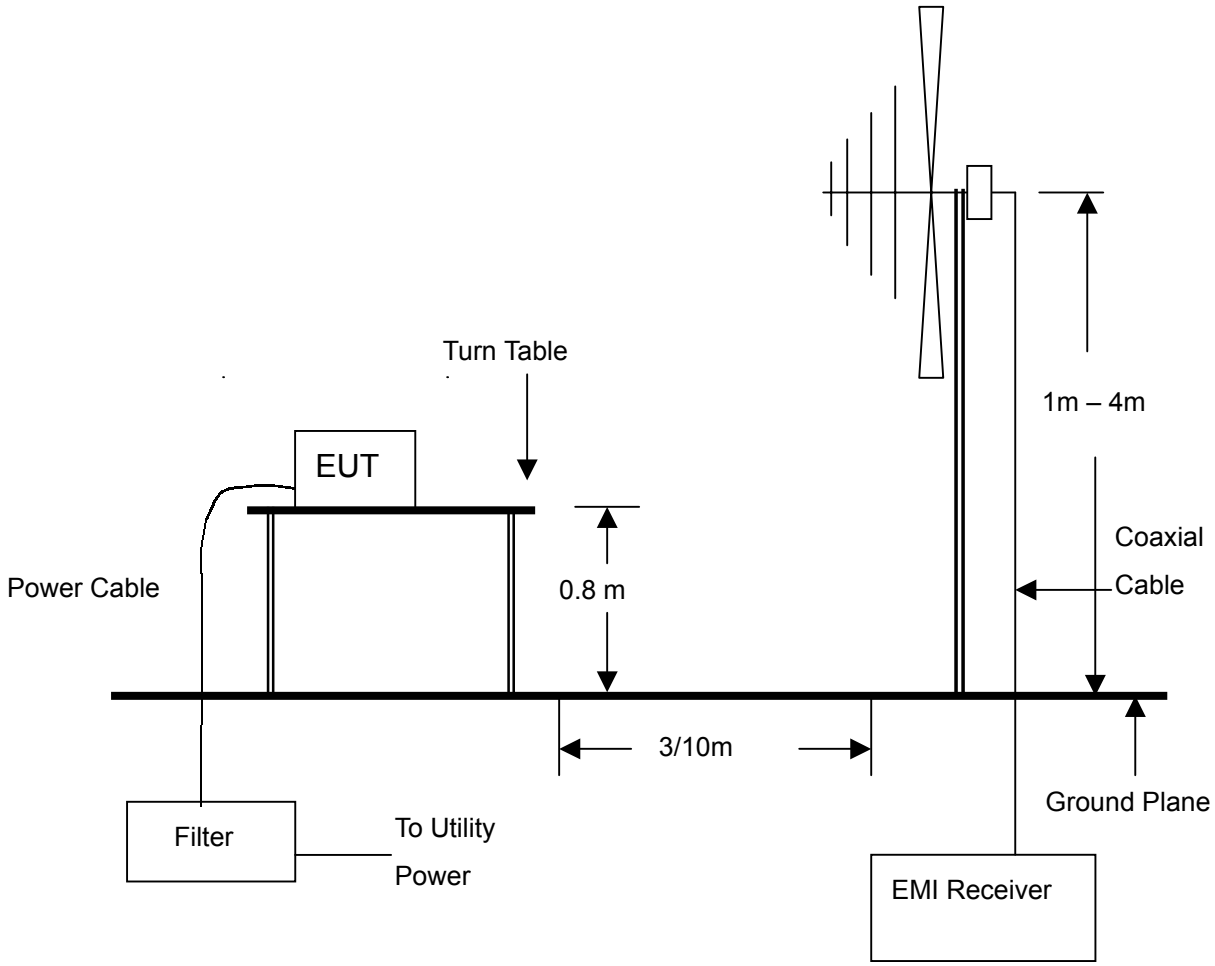
The following test equipment was used during the radiated emission test:

| EQUIPMENT/ FACILITIES | SPECIFICATIONS | MANUFACTURER | MODEL#/ SERIAL# | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|---|
| EMI TEST RECEIVER | 9 kHz TO 2750 MHz | ROHDE & SCHWARZ | ESCS30/ 830245/012 | OCT. 2005 ETC |
| BI-LOG ANTENNA | 25 MHz TO 2 GHz | EMCO | 3142/ 9701-1124 | FEB. 2006 SRT |
| SPECTRUM ANALYZER | 9 KHz TO 26.5 GHz | HP | 8593E/ 3710A03220 | MAY 2006 ETC |
| PRE-AMPLIFIER | 1 GHz TO 26.5 GHz | HP | 8449B/ 3008A01019 | NOV. 2005 ETC |
| HORN ANTENNA | 1 GHz TO 18 GHz | EMCO | 3115/ 9602-4681 | DEC. 2005 ETC |
| OATS | 3 – 10 M MEASUREMENT | SRT | SRT-1 | APR. 2006 SRT |
| COAXIAL CABLE | 25M | SUNCITY | J400/ 25M | APR. 2006 SRT |
| FILTER | 2 LINE, 30A | FIL.COIL | FC-943/ 869 | N/A |
| FREQUENCY CONVERTER | N/A | APC | AFC-2KBB/ F100030031 | AUG. 2005 SRT |

**NOTE:**

1. The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.
2. The Open Area Test Site (SRT-1) is registered by FCC with No. 90957 and VCCI with No. R-1081.
3. The Open Area Test Site (SRT-2) is registered by FCC with No. 98458 and VCCI with No. R-1168.

### 4.2.3 TEST SET-UP




**NOTE :**

1. The EUT system was put on a wooden table with 0.8m heights above a ground plane.
2. For the actual test configuration, please refer to the photos of testing.

### 4.2.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4:2003 and CISPR 22:2003. The measurements were made at an open area test site with 10 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 30 MHz. Under 1 GHz, all readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak or average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.
First, find the margin or higher points at least 6 points by software, then use manual to find the maximum data. The procedure is referred on the test procedure of SRT LAB.

### 4.2.5 EUT OPERATING CONDITION

Same as section 4.1.5 of this report.

### 4.2.6 TEST RESULT

| | | | |
|---|---|---|---|
| Temperature: | 22 °C | Humidity: | 57 %RH |
| Ferquency Range: | 30 – 1000 MHz | Measured Distance: | 3m |
| Receiver Detector: | Q.P. | Tested Mode: | RX |
| Tested By: | Shin Chou | Tested Date: | May 13, 2005 |

Antenna Polarization:Horizontal

| Frequency (MHz) | Cable Loss (dB) | Antenna Factor (dB/m) | Reading Data (dBμV) | Emission Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | AZ(°) | EL(m) |
|---|---|---|---|---|---|---|---|---|
| 132.0000 | 1.20 | 7.38 | 18.4 | 27.0 | 43.5 | -16.5 | 102.2 | 1.15 |
| 198.0000 | 1.51 | 9.92 | 18.2 | 29.6 | 43.5 | -13.9 | 98.4 | 1.43 |
| 296.9978 | 1.92 | 14.00 | 23.9 | 39.8 | 46.0 | -6.2 | 153.1 | 1.54 |
| 364.5040 | 2.17 | 15.87 | 6.6 | 24.6 | 46.0 | -21.4 | 147.5 | 1.62 |
| 391.5050 | 2.26 | 15.82 | 6.9 | 25.0 | 46.0 | -21.0 | 201.6 | 1.10 |
| 526.5060 | 2.77 | 20.26 | 7.1 | 30.1 | 46.0 | -15.9 | 175.5 | 1.23 |

Antenna Polarization:Vertical

| Frequency (MHz) | Cable Loss (dB) | Antenna Factor (dB/m) | Reading Data (dBμV) | Emission Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | AZ(°) | EL(m) |
|---|---|---|---|---|---|---|---|---|
| 132.0000 | 1.20 | 7.38 | 26.0 | 34.6 | 43.5 | -8.9 | 121.9 | 1.48 |
| 198.0000 | 1.51 | 9.92 | 16.2 | 27.6 | 43.5 | -15.9 | 157.6 | 1.08 |
| 296.9988 | 1.92 | 14.00 | 25.8 | 41.7 | 46.0 | -4.3 | 298.4 | 1.26 |
| 333.0035 | 2.05 | 15.32 | 17.6 | 35.0 | 46.0 | -11.0 | 152.7 | 1.12 |
| 364.5040 | 2.17 | 15.87 | 5.9 | 23.9 | 46.0 | -22.1 | 147.8 | 1.24 |
| 526.5060 | 2.77 | 20.26 | 5.2 | 28.2 | 46.0 | -17.8 | 342.4 | 1.22 |

**NOTE :**

1. Measurement uncertainty is +/-2dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.

| | | | |
|---|---|---|---|
| Temperature: | 22 °C | Humidity: | 55 %RH |
| Ferquency Range: | 1 – 25 GHz | Measured Distance: | 3m |
| Receiver Detector: | PK. or AV. | Tested Mode: | IEEE 802.11g |
| Tested By: | Shin Chou | Tested Channel: | CH 1 : 2412MHz |
| Tested Date: | May 13, 2005 | Modulation Type: | OFDM |

Antenna Polarization : Horizontal

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dBμV) | | Emission Level (dBμV/m) | | Limit (dBμV/m) | | Margin (dB) | | AZ (°) | EL (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2412.00(F) | -32.18 | 28.02 | 58.4 | 50.4 | 54.2 | 46.2 | N/A | N/A | N/A | N/A | 180.4 | 1.09 |
| 2399.40 | -32.16 | 28.00 | 44.5 | 43.7 | 40.3 | 39.5 | 74.0 | 54.0 | -33.7 | -14.5 | 160.1 | 1.15 |
| 2423.25 | -32.20 | 28.05 | 43.4 | 42.6 | 39.2 | 38.4 | 74.0 | 54.0 | -34.8 | -15.6 | 156.1 | 1.00 |
| 2423.43 | -32.20 | 28.05 | 44.8 | 40.9 | 40.6 | 36.7 | 74.0 | 54.0 | -33.4 | -17.3 | 163.8 | 1.18 |
| 4824.00 | -30.41 | 33.66 | 41.4 | * | 44.6 | * | 74.0 | 54.0 | -29.4 | * | 183.4 | 1.37 |
| 7236.00 | -28.98 | 36.29 | 40.2 | * | 47.5 | * | 74.0 | 54.0 | -26.5 | * | 210.1 | 1.50 |

Antenna Polarization : Vertical

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dBμV) | | Emission Level (dBμV/m) | | Limit (dBμV/m) | | Margin (dB) | | AZ (°) | EL (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2412.00(F) | -32.18 | 28.56 | 61.4 | 60.1 | 57.8 | 56.5 | N/A | N/A | N/A | N/A | 141.7 | 1.26 |
| 2399.85 | -32.16 | 28.00 | 46.2 | 42.5 | 42.0 | 38.3 | 74.0 | 54.0 | -32.0 | -15.7 | 118.4 | 1.61 |
| 2401.35 | -32.16 | 28.00 | 45.2 | 43.6 | 41.0 | 39.4 | 74.0 | 54.0 | -33.0 | -14.6 | 165.1 | 1.44 |
| 2424.08 | -32.20 | 28.05 | 46.3 | 43.4 | 42.1 | 39.2 | 74.0 | 54.0 | -31.9 | -14.8 | 151.3 | 1.39 |
| 4824.00 | -30.41 | 33.66 | 42.1 | * | 45.3 | * | 74.0 | 54.0 | -28.7 | * | 120.2 | 1.35 |
| 7236.00 | -28.98 | 36.29 | 40.1 | * | 47.4 | * | 74.0 | 54.0 | -26.6 | * | 92.3 | 1.28 |

**NOTE :**

1. Measurement uncertainty is +/-2dB.
2. "*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emissiom Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field stregth of fundamental frequency.

| | | | |
|---|---|---|---|
| Temperature: | 22 °C | Humidity: | 55 %RH |
| Ferquency Range: | 1 – 25 GHz | Measured Distance: | 3m |
| Receiver Detector: | PK. or AV. | Tested Mode: | IEEE 802.11g |
| Tested By: | Shin Chou | Tested Channel: | CH 6 : 2437MHz |
| Tested Date: | May 13, 2005 | Modulation Type: | OFDM |

Antenna Polarization : Horizontal

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dBμV) | | Emission Level (dBμV/m) | | Limit (dBμV/m) | | Margin (dB) | | AZ (°) | EL (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2437.00(F) | -32.22 | 28.07 | 58.4 | 57.5 | 54.3 | 53.4 | N/A | N/A | N/A | N/A | 189.4 | 1.04 |
| 2426.13 | -32.20 | 28.05 | 43.6 | 42.7 | 39.5 | 38.6 | 74.0 | 54.0 | -34.5 | -15.4 | 162.1 | 1.25 |
| 2448.33 | -32.24 | 28.10 | 43.7 | 42.6 | 39.6 | 38.5 | 74.0 | 54.0 | -34.4 | -15.5 | 156.8 | 1.25 |
| 2450.80 | -32.24 | 28.10 | 44.1 | 41.9 | 40.0 | 37.8 | 74.0 | 54.0 | -34.0 | -16.2 | 165.8 | 1.38 |
| 4874.00 | -30.28 | 33.70 | 42.3 | * | 45.7 | * | 74.0 | 54.0 | -28.3 | * | 183.4 | 1.37 |
| 7311.00 | -29.07 | 36.35 | 40.2 | * | 47.5 | * | 74.0 | 54.0 | -26.5 | * | 208.1 | 1.58 |

Antenna Polarization : Vertical

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dBμV) | | Emission Level (dBμV/m) | | Limit (dBμV/m) | | Margin (dB) | | AZ (°) | EL (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2437.00(F) | -32.22 | 28.61 | 57.0 | 55.6 | 53.4 | 52.0 | N/A | N/A | N/A | N/A | 149.4 | 1.34 |
| 2426.25 | -32.20 | 28.05 | 49.9 | 43.4 | 45.7 | 39.3 | 74.0 | 54.0 | -28.3 | -14.7 | 102.4 | 1.61 |
| 2447.58 | -32.24 | 28.09 | 49.7 | 43.9 | 45.6 | 39.8 | 74.0 | 54.0 | -28.4 | -14.2 | 155.1 | 1.44 |
| 2450.28 | -32.24 | 28.10 | 49.3 | 43.2 | 45.2 | 39.1 | 74.0 | 54.0 | -28.8 | -14.9 | 165.8 | 1.29 |
| 4874.00 | -30.28 | 33.70 | 42.7 | * | 46.1 | * | 74.0 | 54.0 | -27.9 | * | 122.2 | 1.35 |
| 7311.00 | -29.07 | 36.35 | 40.1 | * | 47.4 | * | 74.0 | 54.0 | -26.6 | * | 32.3 | 1.31 |

**NOTE :**

1. Measurement uncertainty is +/-2dB.
2. "*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emissiom Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field stregth of fundamental frequency.

| | | | |
|---|---|---|---|
| Temperature: | 22 °C | Humidity: | 55 %RH |
| Ferquency Range: | 1 – 25 GHz | Measured Distance: | 3m |
| Receiver Detector: | PK. or AV. | Tested Mode: | IEEE 802.11g |
| Tested By: | Shin Chou | Tested Channel: | CH 11 : 2462MHz |
| Tested Date: | May 13, 2005 | Modulation Type: | OFDM |

Antenna Polarization : Horizontal

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dBμV) | | Emission Level (dBμV/m) | | Limit (dBμV/m) | | Margin (dB) | | AZ (°) | EL (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2462.00(F) | -32.22 | 28.12 | 56.6 | 56.3 | 52.5 | 52.2 | N/A | N/A | N/A | N/A | 179.4 | 1.00 |
| 2450.75 | -32.24 | 28.10 | 44.7 | 44.1 | 40.6 | 40.0 | 74.0 | 54.0 | -33.4 | -14.0 | 180.7 | 1.15 |
| 2472.00 | -32.20 | 28.14 | 43.3 | 42.4 | 39.2 | 38.3 | 74.0 | 54.0 | -34.8 | -15.7 | 166.8 | 1.05 |
| 2474.23 | -32.20 | 28.15 | 43.2 | 41.7 | 39.1 | 37.6 | 74.0 | 54.0 | -34.9 | -16.4 | 215.8 | 1.48 |
| 4924.00 | -30.23 | 33.74 | 45.2 | * | 48.7 | * | 74.0 | 54.0 | -25.3 | * | 193.4 | 1.27 |
| 7386.00 | -28.94 | 36.41 | 43.5 | * | 51.0 | * | 74.0 | 54.0 | -23.0 | * | 228.7 | 1.48 |

Antenna Polarization : Vertical

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dBμV) | | Emission Level (dBμV/m) | | Limit (dBμV/m) | | Margin (dB) | | AZ (°) | EL (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2462.00(F) | -32.22 | 28.69 | 62.8 | 62.2 | 59.3 | 58.6 | N/A | N/A | N/A | N/A | 152.1 | 1.38 |
| 2451.43 | -32.24 | 28.10 | 44.3 | 43.1 | 40.2 | 39.0 | 74.0 | 54.0 | -33.8 | -15.0 | 103.4 | 1.68 |
| 2472.65 | -32.20 | 28.14 | 43.5 | 42.9 | 39.4 | 38.8 | 74.0 | 54.0 | -34.6 | -15.2 | 156.1 | 1.54 |
| 2475.95 | -32.20 | 28.15 | 43.2 | 40.8 | 39.1 | 36.8 | 74.0 | 54.0 | -34.9 | -17.2 | 165.1 | 1.19 |
| 4924.00 | -30.23 | 33.74 | 41.8 | * | 45.3 | * | 74.0 | 54.0 | -28.7 | * | 121.2 | 1.32 |
| 7386.00 | -28.94 | 36.41 | 40.2 | * | 47.6 | * | 74.0 | 54.0 | -26.4 | * | 22.3 | 1.37 |

**NOTE :**

1. Measurement uncertainty is +/-2dB.
2. "*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emissiom Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field stregth of fundamental frequency.

| | | | |
|---|---|---|---|
| Temperature: | 22 °C | Humidity: | 55 %RH |
| Ferquency Range: | 1 – 25 GHz | Measured Distance: | 3m |
| Receiver Detector: | PK. or AV. | Tested Mode: | IEEE 802.11b |
| Tested By: | Shin Chou | Tested Channel: | CH 1 : 2412MHz |
| Tested Date: | May 13, 2005 | Modulation Type: | CCK |

Antenna Polarization : Horizontal

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dBμV) | | Emission Level (dBμV/m) | | Limit (dBμV/m) | | Margin (dB) | | AZ (°) | EL (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2412.00(F) | -32.18 | 28.02 | 59.8 | 57.8 | 55.6 | 53.6 | N/A | N/A | N/A | N/A | 156.4 | 2.08 |
| 2400.19 | -32.16 | 28.00 | 45.1 | 44.2 | 40.9 | 40.0 | 74.0 | 54.0 | -33.1 | -14.0 | 120.9 | 1.56 |
| 2422.98 | -32.20 | 28.04 | 44.7 | 43.2 | 40.5 | 39.0 | 74.0 | 54.0 | -33.5 | -15.0 | 145.5 | 1.09 |
| 2424.91 | -32.20 | 28.05 | 43.7 | 42.9 | 39.5 | 38.7 | 74.0 | 54.0 | -34.5 | -15.3 | 136.5 | 1.24 |
| 4824.00 | -30.41 | 33.66 | 42.5 | * | 45.7 | * | 74.0 | 54.0 | -28.3 | * | 121.1 | 1.46 |
| 7236.00 | -28.98 | 36.29 | 41.6 | * | 48.9 | * | 74.0 | 54.0 | -25.1 | * | 189.4 | 1.16 |

Antenna Polarization : Vertical

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dBμV) | | Emission Level (dBμV/m) | | Limit (dBμV/m) | | Margin (dB) | | AZ (°) | EL (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2412.00(F) | -32.18 | 28.56 | 61.8 | 59.7 | 58.2 | 56.1 | N/A | N/A | N/A | N/A | 136.4 | 1.03 |
| 2399.98 | -32.16 | 28.00 | 45.8 | 44.9 | 41.6 | 40.7 | 74.0 | 54.0 | -32.4 | -13.3 | 124.7 | 1.15 |
| 2402.45 | -32.16 | 28.00 | 44.9 | 43.7 | 40.7 | 39.5 | 74.0 | 54.0 | -33.3 | -14.5 | 146.5 | 1.24 |
| 2425.14 | -32.20 | 28.05 | 45.7 | 44.7 | 41.5 | 40.5 | 74.0 | 54.0 | -32.5 | -13.5 | 158.9 | 1.05 |
| 4824.00 | -30.41 | 33.66 | 43.8 | * | 47.0 | * | 74.0 | 54.0 | -27.0 | * | 111.6 | 1.01 |
| 7236.00 | -28.98 | 36.29 | 42.7 | * | 50.0 | * | 74.0 | 54.0 | -24.0 | * | 100.5 | 1.28 |

**NOTE :**

1. Measurement uncertainty is +/-2dB.
2. "*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emissiom Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field stregth of fundamental frequency.

| | | | |
|---|---|---|---|
| Temperature: | 22 °C | Humidity: | 55 %RH |
| Ferquency Range: | 1 – 25 GHz | Measured Distance: | 3m |
| Receiver Detector: | PK. or AV. | Tested Mode: | IEEE 802.11b |
| Tested By: | Shin Chou | Tested Channel: | CH 6 : 2437MHz |
| Tested Date: | May 13, 2005 | Modulation Type: | CCK |

Antenna Polarization : Horizontal

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dBμV) | | Emission Level (dBμV/m) | | Limit (dBμV/m) | | Margin (dB) | | AZ (°) | EL (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2437.00(F) | -32.22 | 28.07 | 61.2 | 59.4 | 57.1 | 55.3 | N/A | N/A | N/A | N/A | 200.4 | 1.06 |
| 2426.54 | -32.20 | 28.05 | 46.8 | 45.7 | 42.7 | 41.6 | 74.0 | 54.0 | -31.3 | -12.4 | 198.4 | 1.08 |
| 2448.49 | -32.24 | 28.10 | 44.9 | 43.7 | 40.8 | 39.6 | 74.0 | 54.0 | -33.2 | -14.4 | 148.9 | 1.05 |
| 2451.73 | -32.24 | 28.10 | 45.7 | 44.1 | 41.6 | 40.0 | 74.0 | 54.0 | -32.4 | -14.0 | 198.4 | 1.78 |
| 4874.00 | -30.28 | 33.70 | 43.2 | * | 46.6 | * | 74.0 | 54.0 | -27.4 | * | 179.4 | 1.29 |
| 7311.00 | -29.07 | 36.35 | 41.6 | * | 48.9 | * | 74.0 | 54.0 | -25.1 | * | 198.4 | 1.47 |

Antenna Polarization : Vertical

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dBμV) | | Emission Level (dBμV/m) | | Limit (dBμV/m) | | Margin (dB) | | AZ (°) | EL (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2437.00(F) | -32.22 | 28.61 | 60.4 | 57.6 | 56.8 | 54.0 | N/A | N/A | N/A | N/A | 256.1 | 1.61 |
| 2425.12 | -32.20 | 28.05 | 48.6 | 46.5 | 44.4 | 42.3 | 74.0 | 54.0 | -29.6 | -11.7 | 241.6 | 1.25 |
| 2448.94 | -32.24 | 28.10 | 47.7 | 46.7 | 43.6 | 42.6 | 74.0 | 54.0 | -30.4 | -11.4 | 149.5 | 1.43 |
| 2451.19 | -32.24 | 28.10 | 46.7 | 45.7 | 42.6 | 41.6 | 74.0 | 54.0 | -31.4 | -12.4 | 134.7 | 1.08 |
| 4874.00 | -30.28 | 33.70 | 44.1 | * | 47.5 | * | 74.0 | 54.0 | -26.5 | * | 321.8 | 1.05 |
| 7311.00 | -29.07 | 36.35 | 42.2 | * | 49.5 | * | 74.0 | 54.0 | -24.5 | * | 55.9 | 1.41 |

**NOTE :**

1. Measurement uncertainty is +/-2dB.
2. "*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emissiom Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field stregth of fundamental frequency.

| | | | |
|---|---|---|---|
| Temperature: | 22 °C | Humidity: | 55 %RH |
| Ferquency Range: | 1 – 25 GHz | Measured Distance: | 3m |
| Receiver Detector: | PK. or AV. | Tested Mode: | IEEE 802.11b |
| Tested By: | Shin Chou | Tested Channel: | CH 11 : 2462MHz |
| Tested Date: | May 13, 2005 | Modulation Type: | CCK |

Antenna Polarization : Horizontal

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dBμV) | | Emission Level (dBμV/m) | | Limit (dBμV/m) | | Margin (dB) | | AZ (°) | EL (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2462.00(F) | -32.22 | 28.12 | 59.4 | 57.8 | 55.3 | 53.7 | N/A | N/A | N/A | N/A | 158.6 | 1.06 |
| 2450.45 | -32.24 | 28.10 | 45.6 | 43.8 | 41.5 | 39.7 | 74.0 | 54.0 | -32.5 | -14.3 | 187.5 | 1.14 |
| 2469.47 | -32.21 | 28.14 | 44.6 | 45.7 | 40.5 | 41.6 | 74.0 | 54.0 | -33.5 | -12.4 | 165.7 | 1.04 |
| 2473.12 | -32.20 | 28.15 | 42.5 | 41.9 | 38.4 | 37.8 | 74.0 | 54.0 | -35.6 | -16.2 | 222.5 | 1.05 |
| 4924.00 | -30.23 | 33.74 | 44.6 | * | 48.1 | * | 74.0 | 54.0 | -25.9 | * | 165.4 | 1.85 |
| 7386.00 | -28.94 | 36.41 | 42.9 | * | 50.4 | * | 74.0 | 54.0 | -23.6 | * | 198.5 | 1.24 |

Antenna Polarization : Vertical

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dBμV) | | Emission Level (dBμV/m) | | Limit (dBμV/m) | | Margin (dB) | | AZ (°) | EL (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2462.00(F) | -32.22 | 28.69 | 60.4 | 59.4 | 56.9 | 55.9 | N/A | N/A | N/A | N/A | 178.5 | 1.69 |
| 2450.18 | -32.24 | 28.10 | 44.8 | 40.3 | 40.7 | 36.2 | 74.0 | 54.0 | -33.3 | -17.8 | 116.8 | 1.47 |
| 2469.61 | -32.21 | 28.14 | 43.5 | 39.4 | 39.4 | 35.3 | 74.0 | 54.0 | -34.6 | -18.7 | 148.9 | 1.06 |
| 2477.87 | -32.20 | 28.15 | 42.3 | 40.8 | 38.3 | 36.8 | 74.0 | 54.0 | -35.7 | -17.2 | 172.1 | 1.00 |
| 4924.00 | -30.23 | 33.74 | 41.8 | * | 45.3 | * | 74.0 | 54.0 | -28.7 | * | 133.5 | 1.04 |
| 7386.00 | -28.94 | 36.41 | 40.5 | * | 48.0 | * | 74.0 | 54.0 | -26.0 | * | 94.2 | 1.00 |

**NOTE :**

1. Measurement uncertainty is +/-2dB.
2. "*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emissiom Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field stregth of fundamental frequency.

## 4.3 6dBc BANDWIDTH TEST

### 4.3.1 LIMIT

FCC Part15, Subpart C Section 15.247(2). The minimum 6 dB bandwidth shall be at least 500 kHz.

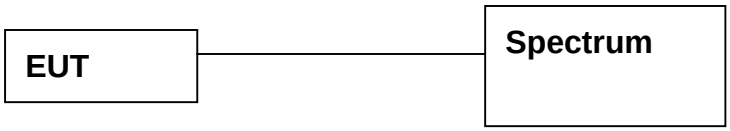
### 4.3.2 TEST EQUIPMENT

The following test equipment was used during the test:

| EQUIPMENT/ FACILITIES | SPECIFICATIONS | MANUFACTURER | MODEL#/ SERIAL# | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|---|
| SPECTRUM | 9kHz-7GHz | ROHDE & SCHWARZ | FSP7/ 839511/010 | APR. 2006 R&S |

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.3.3 TEST SET-UP




The EUT was connected to a spectrum through a 50Ω RF cable.

### 4.3.4 TEST PROCEDURE

The EUT was operating in the transmitter mode and could control its channels.
The test result was printed by the hard copy function of the spectrum.

### 4.3.5 EUT OPERATING CONDITION

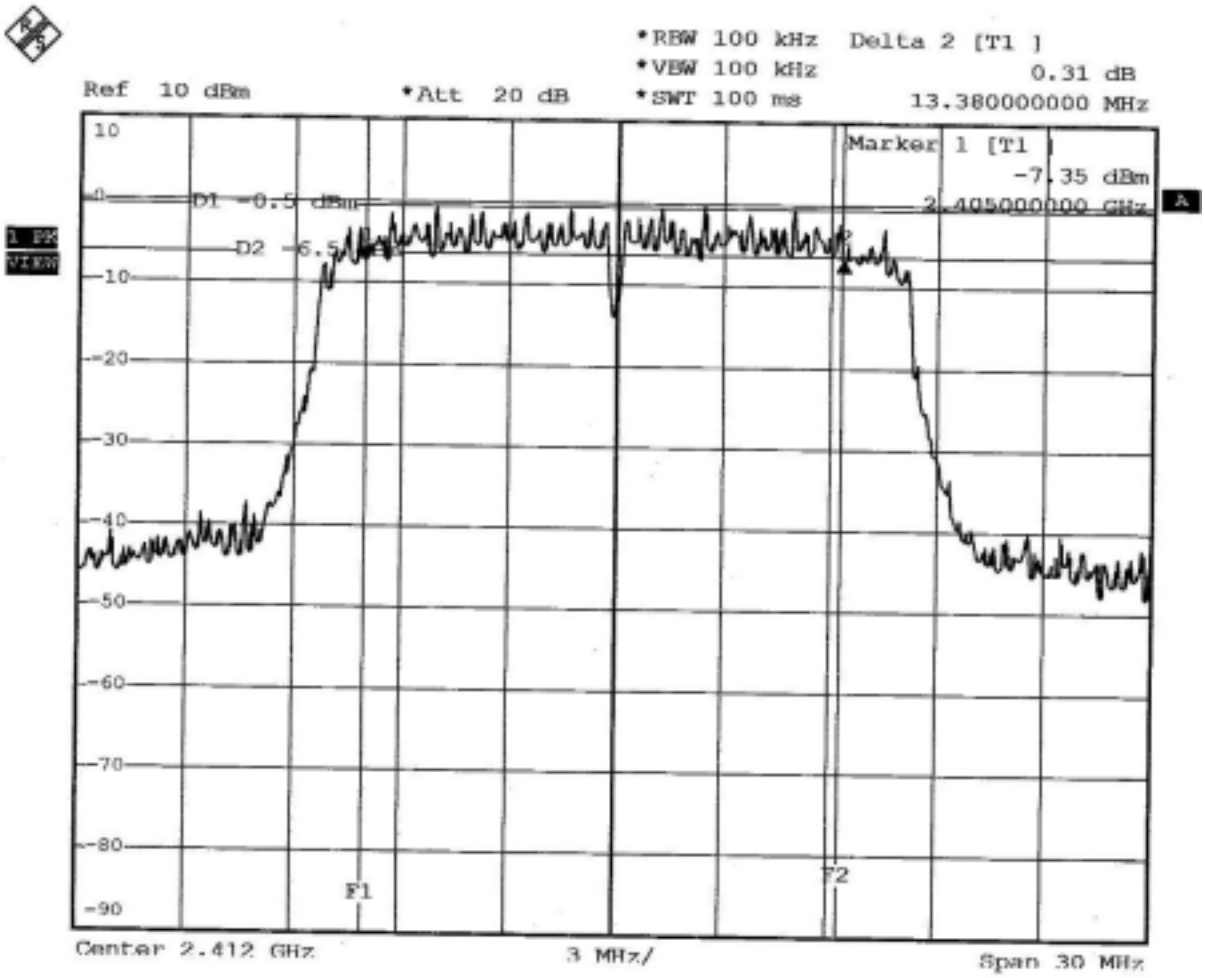
Same as section 4.1.5 of this report.

### 4.3.6 TEST RESULT

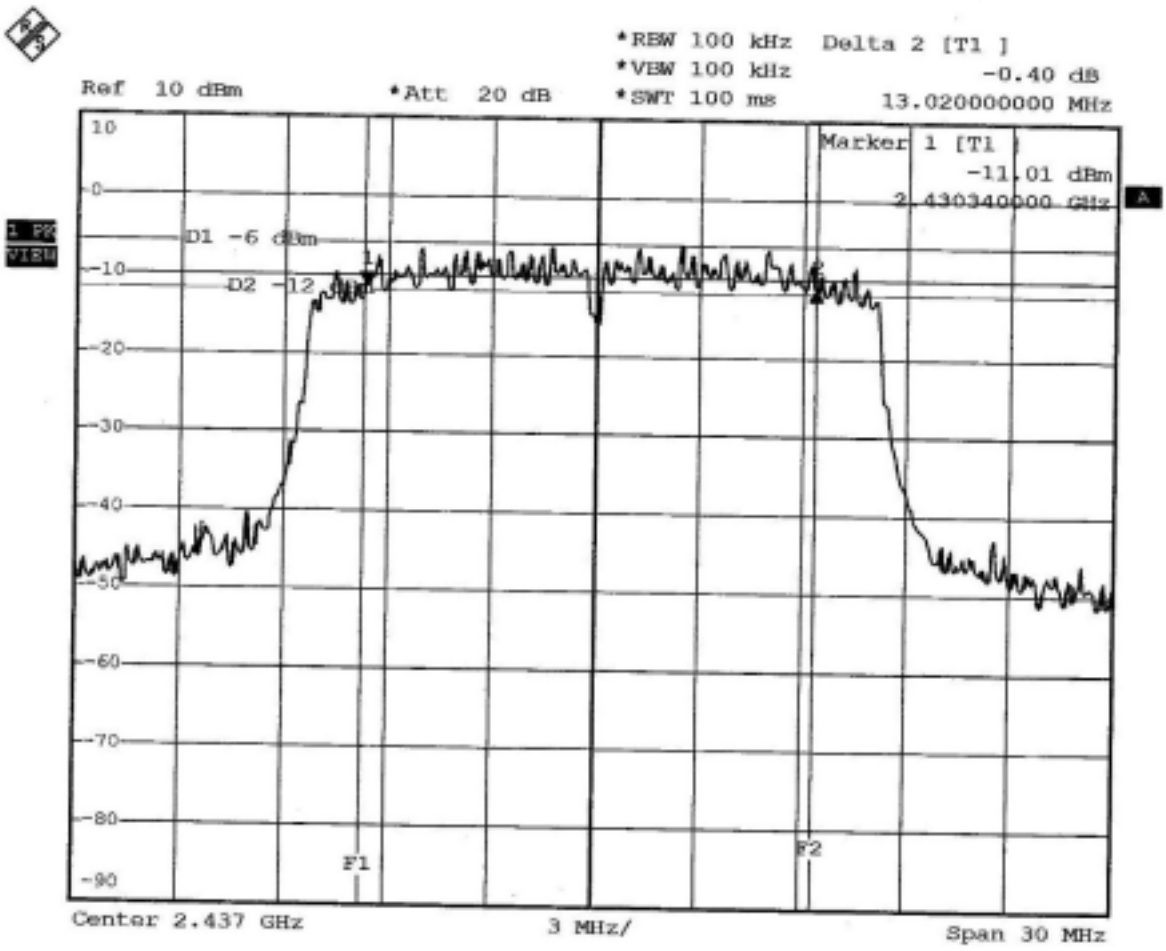
| | | | |
|---|---|---|---|
| Temperature: | 23°C | Humidity: | 60%RH |
| Spectrum Detector: | PK. | Tested Mode: | IEEE 802.11g |
| Tested By: | Shin Chou | Modulation Type: | OFDM |
| Tested Date: | May 12, 2005 | | |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz) | 6dB DOWN BW (MHz) | MINIMUM LIMIT (MHz) |
|---|---|---|---|
| 1 | 2412 | 13.38 | 0.5 |
| 6 | 2437 | 13.02 | 0.5 |
| 11 | 2462 | 13.26 | 0.5 |

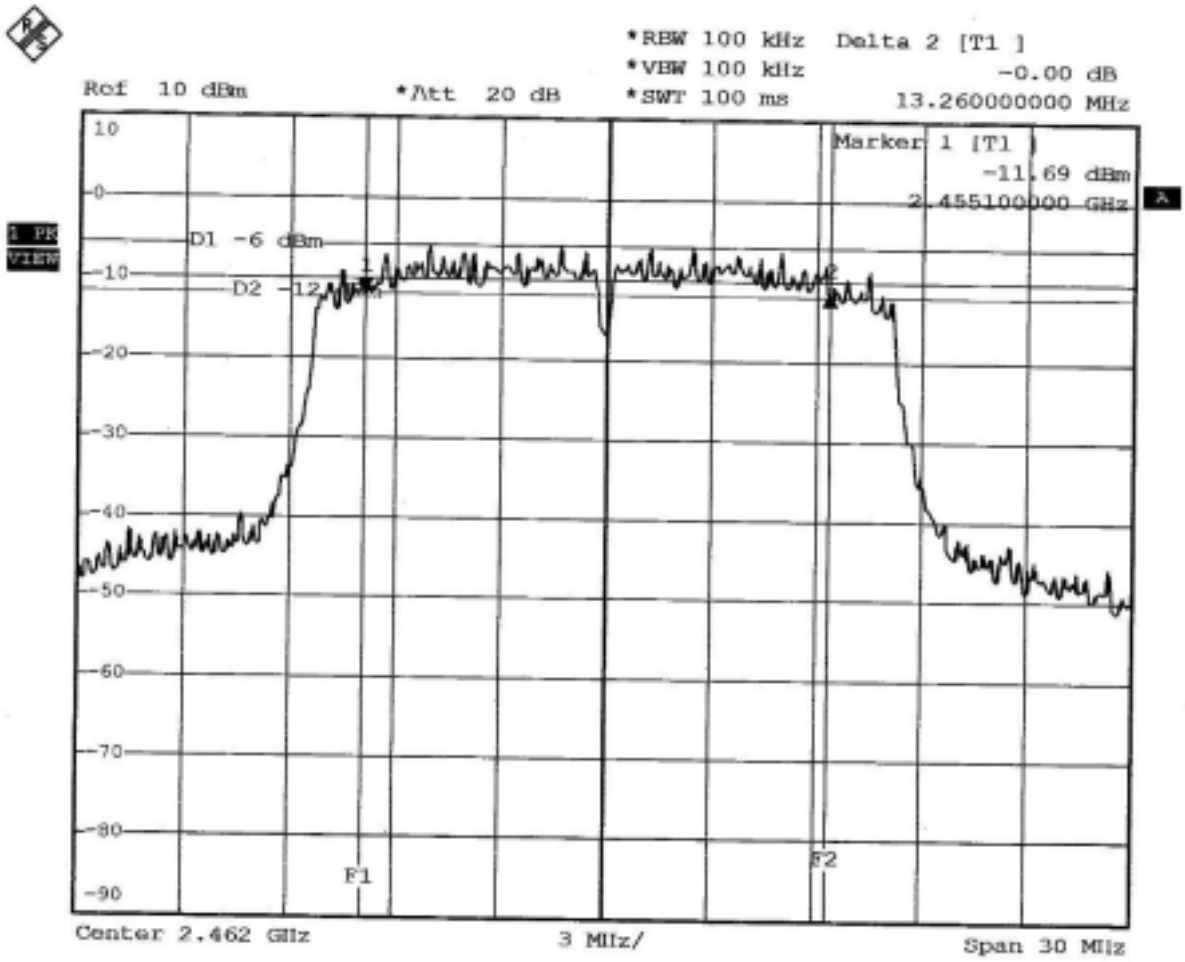
CH1:



CH 6:


*RBW 100 kHz
*VBW 100 kHz
*SWT 100 ms
Delta 2 [T1 ]
-0.40 dB
13.020000000 MHz
Ref 10 dBm
*Att 20 dB
Marker 1 [T1 ]
-11.01 dBm
2.430340000 GHz
D1 -6 dBm
D2 -12
F1
F2
Center 2.437 GHz
3 MHz/
Span 30 MHz

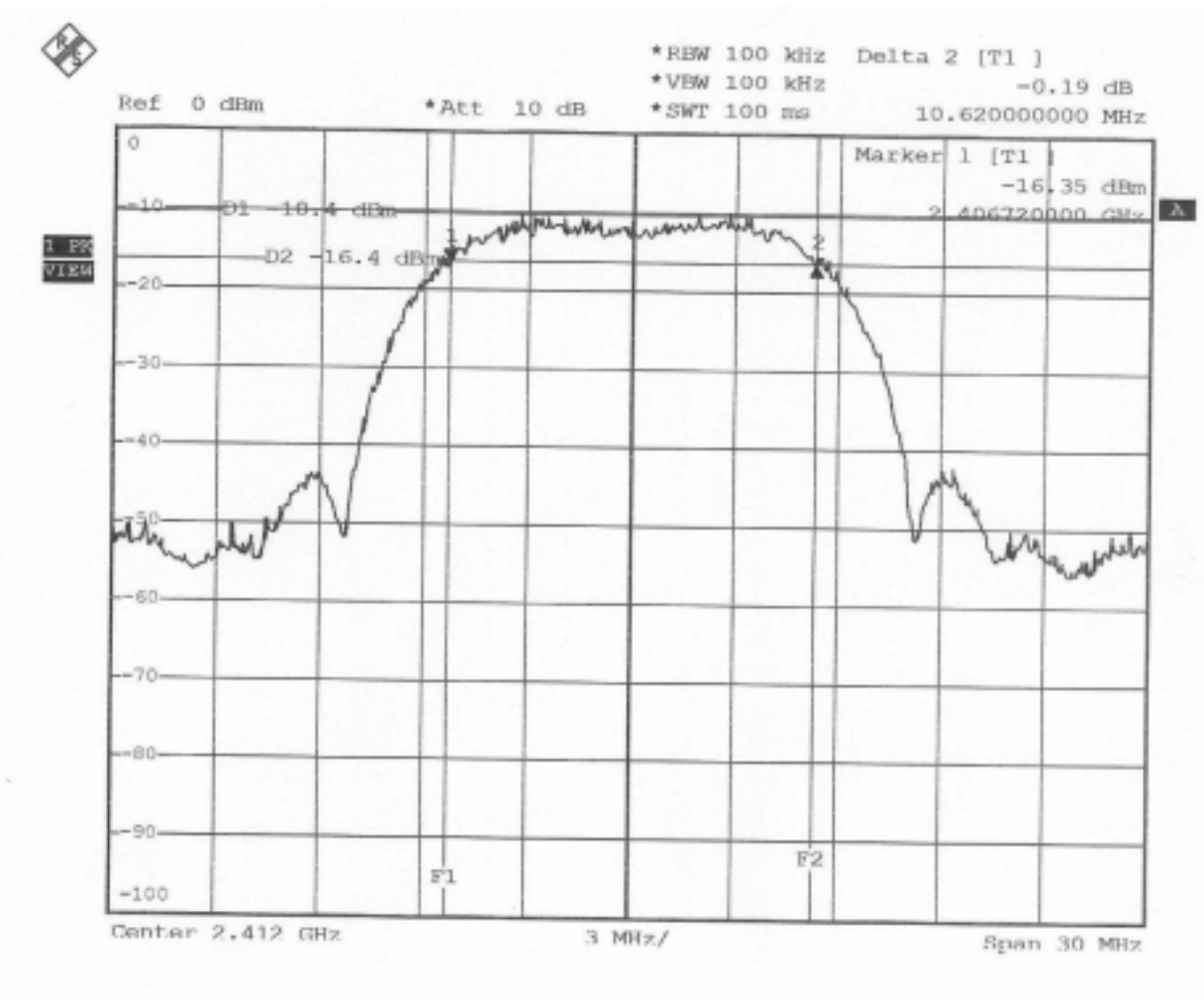
CH 11:


*RBW 100 kHz
*VBW 100 kHz
*SWT 100 ms
Delta 2 [T1 ]
-0.00 dB
13.260000000 MHz
Ref 10 dBm
*Att 20 dB
Marker 1 [T1 ]
-11.69 dBm
2.455100000 GHz
D1 -6 dBm
D2 -12
F1
F2
Center 2.462 GHz
3 MHz/
Span 30 MHz

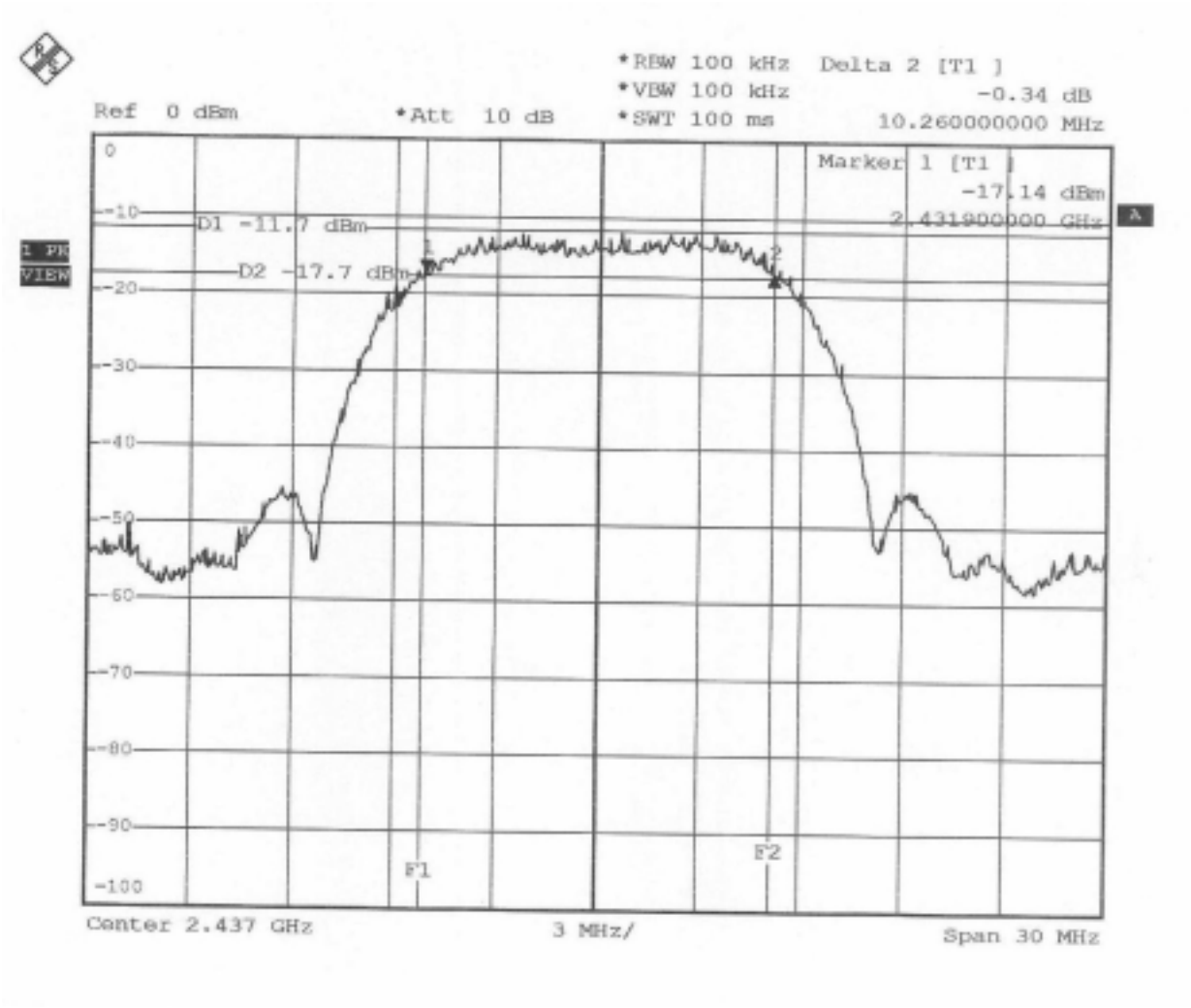
| | | | |
|---|---|---|---|
| Temperature: | 23°C | Humidity: | 60%RH |
| Spectrum Detector: | PK. | Tested Mode: | IEEE 802.11b |
| Tested By: | Shin Chou | Modulation Type: | CCK |
| Tested Date: | May 12, 2005 | | |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz) | 6dB DOWN BW (MHz) | MINIMUM LIMIT (MHz) |
|---|---|---|---|
| 1 | 2412 | 10.62 | 0.5 |
| 6 | 2437 | 10.26 | 0.5 |
| 11 | 2462 | 9.78 | 0.5 |

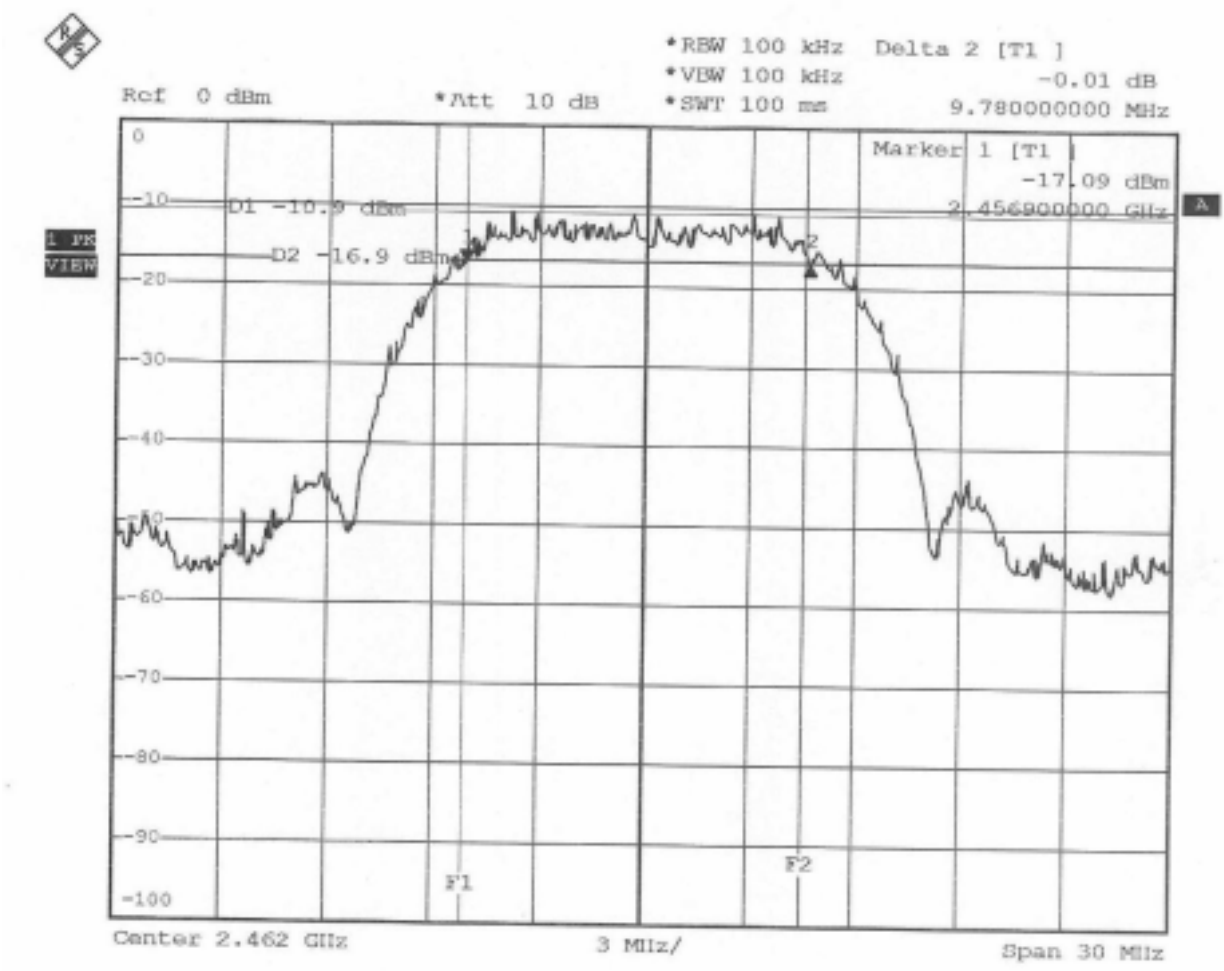
CH1:



CH 6:


*RBW 100 kHz
*VBW 100 kHz
*SWT 100 ms
Delta 2 [T1 ]
-0.34 dB
10.260000000 MHz
Ref 0 dBm
*Att 10 dB
Marker 1 [T1 ]
-17.14 dBm
2.431900000 GHz
D1 -11.7 dBm
D2 -17.7 dBm
1 PK
VIEW
A
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
F1
F2
Center 2.437 GHz
3 MHz/
Span 30 MHz

CH 11:


*RBW 100 kHz
*VBW 100 kHz
*SWT 100 ms
Delta 2 [T1 ]
-0.01 dB
9.780000000 MHz
Ref 0 dBm
*Att 10 dB
Marker 1 [T1 ]
-17.09 dBm
2.456900000 GHz
D1 -10.9 dBm
D2 -16.9 dBm
1 PK
VIEW
A
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
F1
F2
Center 2.462 GHz
3 MHz/
Span 30 MHz

## 4.4 PEAK POWER TEST

### 4.4.1 LIMIT

FCC Part15, Subpart C Section 15.247

| FREQUENCY RANGE (MHz) | LIMIT (W) |
|---|---|
| 902 - 928 | 1(30dBm) |
| 2400 - 2483.5 | 1(30dBm) |
| 5725 - 5850 | 1(30dBm) |

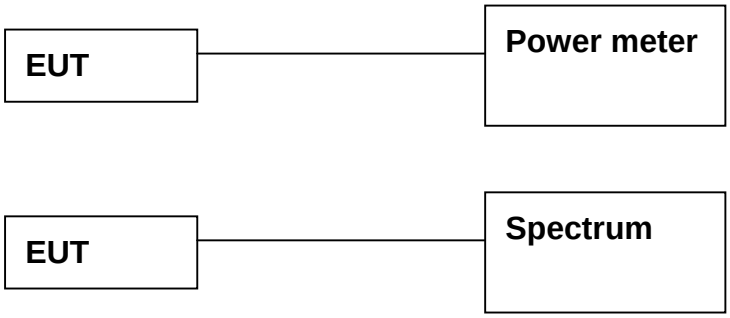
### 4.4.2 TEST EQUIPMENT

The following test equipment was used during the test:

| EQUIPMENT/ FACILITIES | SPECIFICATIONS | MANUFACTURER | MODEL#/ SERIAL# | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|---|
| SPECTRUM | 9kHz-7GHz | ROHDE & SCHWARZ | FSP7/ 839511/010 | APR. 2006 R&S |
| POWER METER | N/A | BOONTON | 4232A/ 29001 | MAY 2005 ETC |
| POWER SENSOR | DC-8GHz 50 Ω | BOONTON | 51011EMC/ 31181 | NOV. 2005 ETC |

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.4.3 TEST SET-UP




The EUT was connected to a spectrum through a 50Ω RF cable.

### 4.4.4 TEST PROCEDURE

The EUT was operating in transmitter mode and could control its channel.
Printed out the test result from the spectrum by hard copy function.
Recorded the read value of the power meter.

### 4.4.5 EUT OPERATING CONDITION

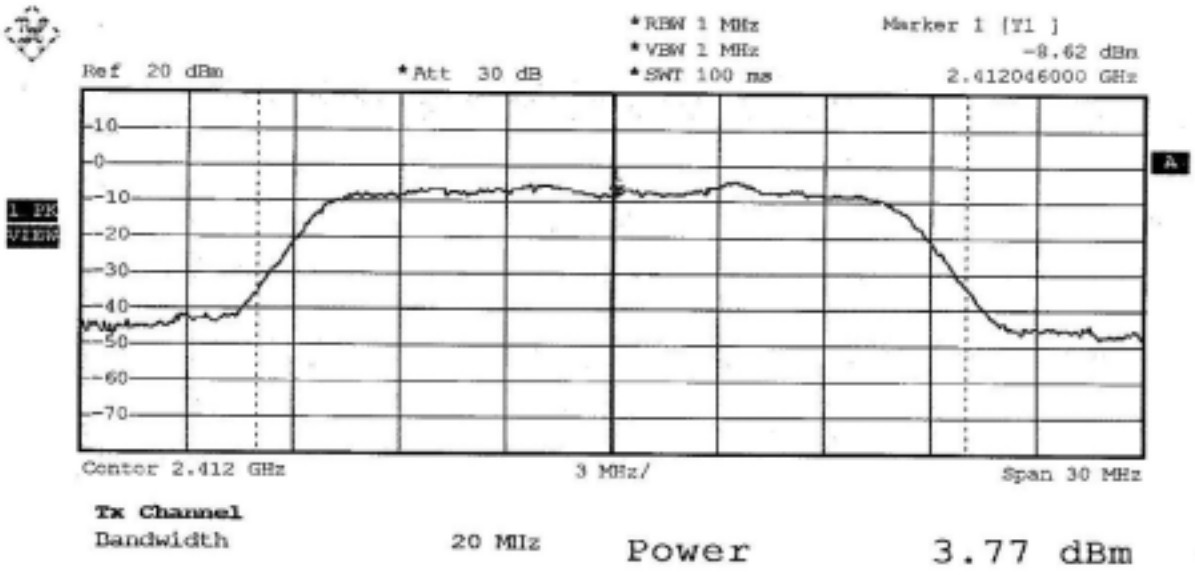
Same as section 4.1.5 of this report.

### 4.4.6 TEST RESULT

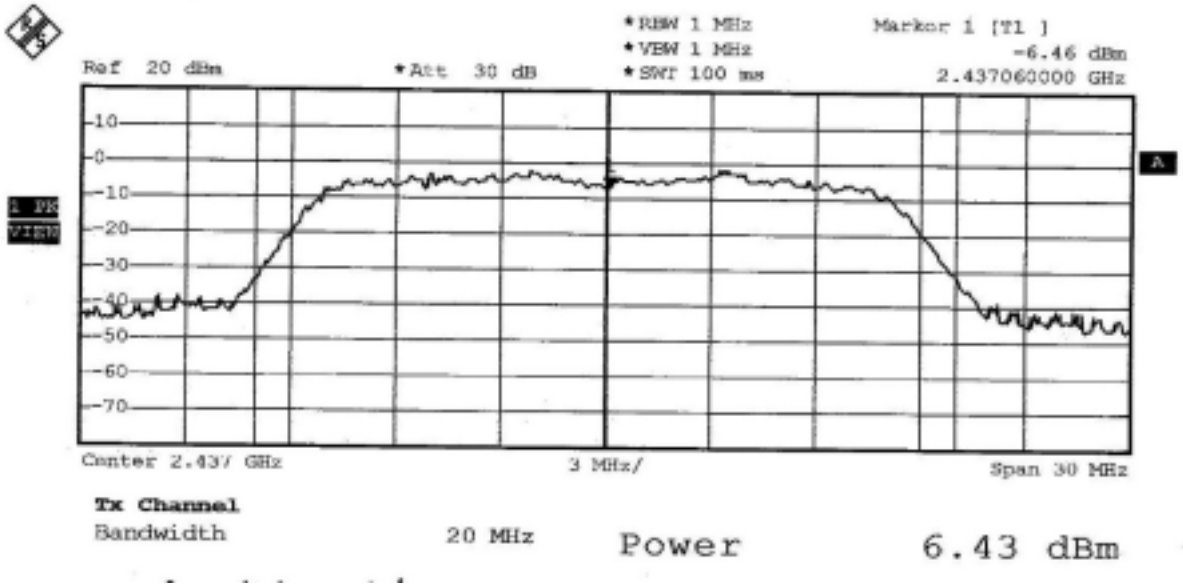
| | | | |
|---|---|---|---|
| Temperature: | 23°C | Humidity: | 60%RH |
| Spectrum Detector: | PK. | Tested Mode: | IEEE 802.11g |
| Tested By: | Shin Chou | Modulation Type: | OFDM |
| Tested Date: | May 12, 2005 | | |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (dBm) | PEAK POWER LIMIT (dBm) |
|---|---|---|---|
| 1 | 2412 | 3.77 | 30 |
| 6 | 2437 | 6.43 | 30 |
| 11 | 2462 | 5.97 | 30 |

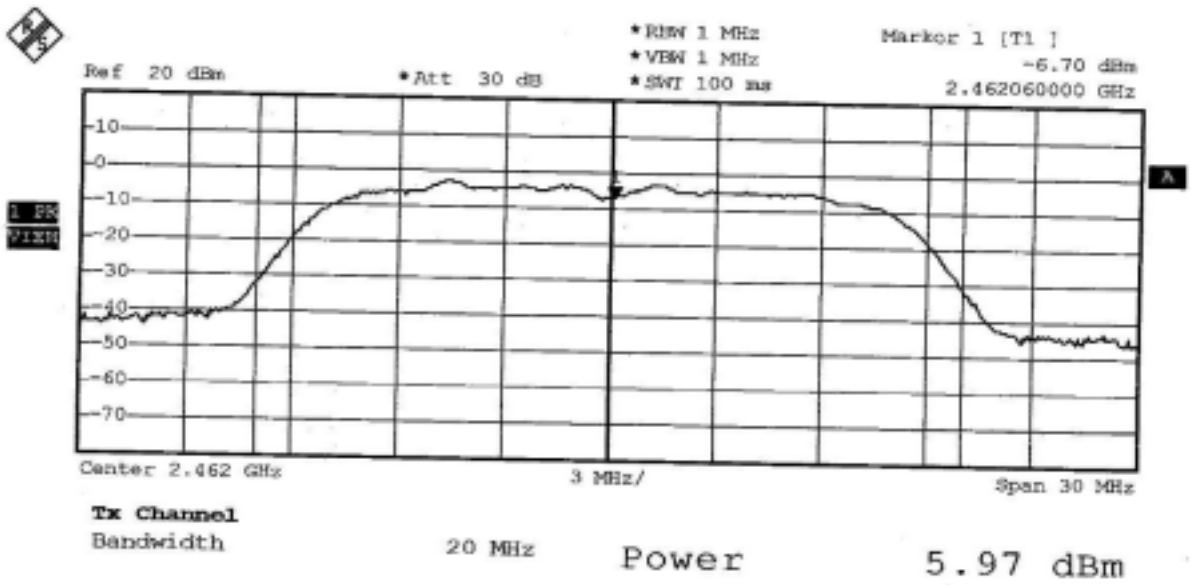
CH 1:



CH 6:


*RBW 1 MHz
*VBW 1 MHz
*SWT 100 ms
Marker 1 [T1 ]
-6.46 dBm
2.437060000 GHz
Ref 20 dBm
*Att 30 dB
1 PK VIEW
A
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.437 GHz
3 MHz/
Span 30 MHz
Tx Channel
Bandwidth
20 MHz
Power
6.43 dBm

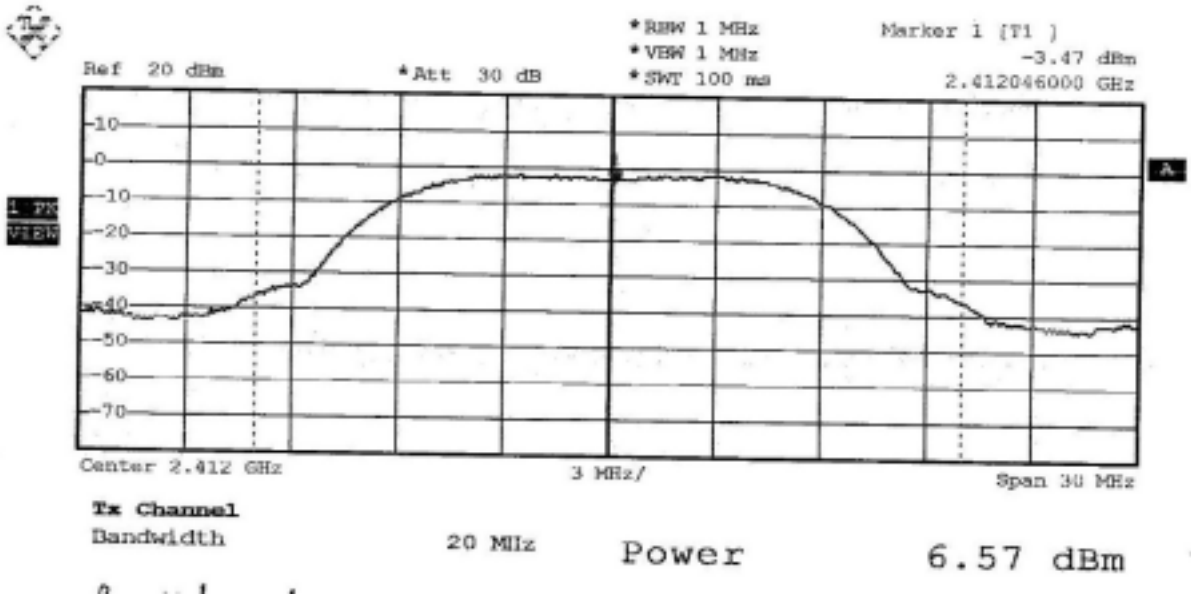
CH 11:


*RBW 1 MHz
*VBW 1 MHz
*SWT 100 ms
Marker 1 [T1 ]
-6.70 dBm
2.462060000 GHz
Ref 20 dBm
*Att 30 dB
1 PK VIEW
A
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.462 GHz
3 MHz/
Span 30 MHz
Tx Channel
Bandwidth
20 MHz
Power
5.97 dBm

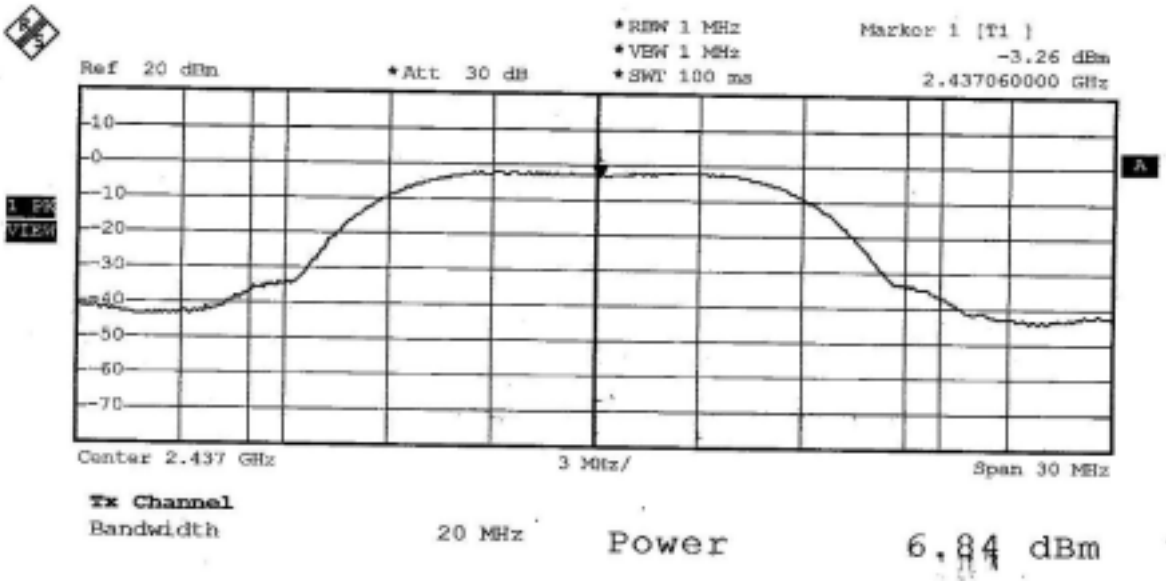
| | | | |
|---|---|---|---|
| Temperature: | 23°C | Humidity: | 60%RH |
| Spectrum Detector: | PK. | Tested Mode: | IEEE 802.11b |
| Tested By: | Shin Chou | Modulation Type: | CCK |
| Tested Date: | May 12, 2005 | | |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (dBm) | PEAK POWER LIMIT (dBm) |
|---|---|---|---|
| 1 | 2412 | 6.57 | 30 |
| 6 | 2437 | 6.87 | 30 |
| 11 | 2462 | 6.22 | 30 |

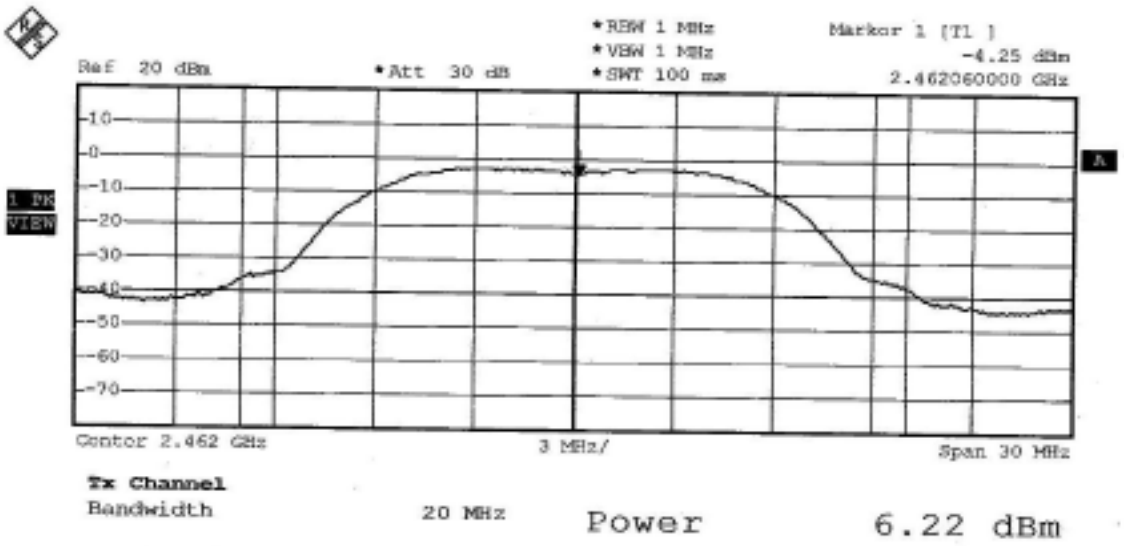
CH 1:



CH 6:


*RBW 1 MHz
*VBW 1 MHz
*SWT 100 ms
Marker 1 [T1 ]
-3.26 dBm
2.437060000 GHz
Ref 20 dBm
*Att 30 dB
1 PK VIEW
A
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.437 GHz
3 MHz/
Span 30 MHz
Tx Channel
Bandwidth
20 MHz
Power
6.84 dBm

CH 11:


*RBW 1 MHz
*VBW 1 MHz
*SWT 100 ms
Marker 1 [T1 ]
-4.25 dBm
2.462060000 GHz
Ref 20 dBm
*Att 30 dB
1 PK VIEW
A
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.462 GHz
3 MHz/
Span 30 MHz
Tx Channel
Bandwidth
20 MHz
Power
6.22 dBm

## 4.5 BAND EDGE TEST

### 4.5.1 LIMIT

FCC Part15, Subpart C Section 15.247. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

| OPERATING FREQUENCY RANGE (MHz) | SPURIOUS EMISSION FREQUENCY (MHz) | LIMIT | |
|---|---|---|---|
| | | Peak power ration to emission(dBc) | Emission level(dBuV/m) |
| 902 - 928 | <902 | >20 | NA |
| | >928 | >20 | NA |
| | 960-1240 | NA | 54 |
| 2400 - 2483.5 | <2400 | >20 | NA |
| | >2483.5-2500 | NA | 54 |
| 5725 - 5850 | <5350-5460 | NA | 54 |
| | <5725 | >20 | NA |
| | >5850 | >20 | NA |

### 4.5.2 TEST EQUIPMENT

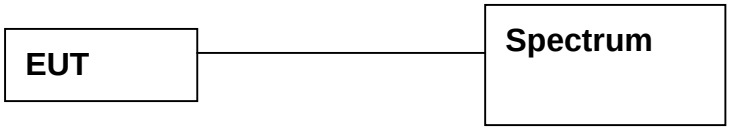
The following test equipment was used during the test:

| EQUIPMENT/ FACILITIES | SPECIFICATIONS | MANUFACTURER | MODEL#/ SERIAL# | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|---|
| SPECTRUM | 9kHz-7GHz | ROHDE & SCHWARZ | FSP7/ 839511/010 | APR. 2006 R&S |
| SPECTRUM | 9KHz-26.5GHz | HP | 8953E/ 3710A03220 | MAY 2006 ETC |
| PRE-AMPLIFIER | 1GHz-26.5GHz Gain:30dB(typ.) | HP | 8449B/ 3008A01019 | NOV. 2005 ETC |
| HORN ANTENNA | 1GHz to 18GHz | EMCO | 3115/ 9602-4681 | DEC. 2005 ETC |
| OATS | 3 - 10 M measurement | SRT | SRT-1 | APR. 2006 SRT |

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

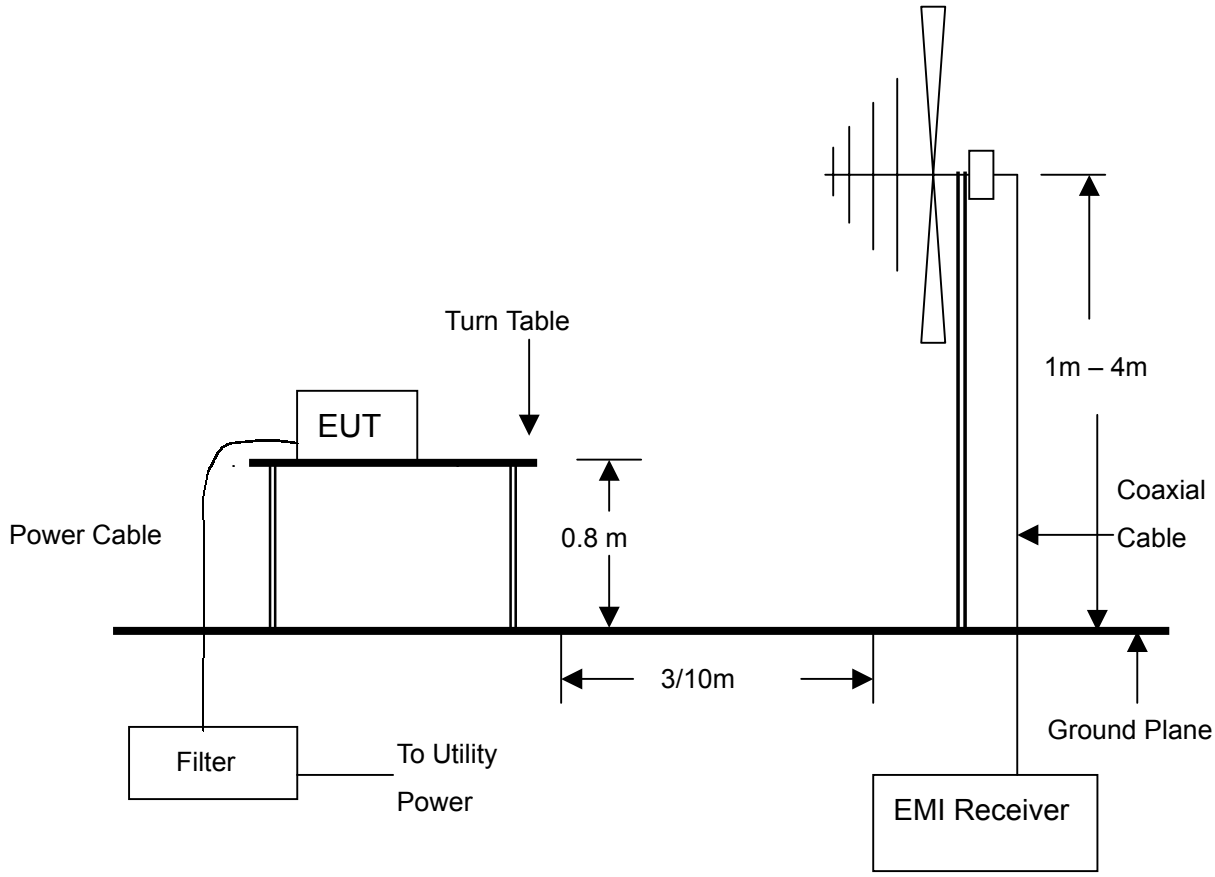
### 4.5.3 TEST SET-UP

**FOR RF CONDUCTED TEST (dBc)**




The EUT was connected to a spectrum through a 50Ω RF cable.

**FOR RADIATED EMISSION TEST**




**NOTE :**

1. The EUT system was put on a wooden table with 0.8m heights above a ground plane.
2. For the actual test configuration, please refer to the photos of testing.

### 4.5.4 TEST PROCEDURE

1. The EUT was operating in transmitter mode and could be controlled its channel. Printed out the test result from the spectrum by hard copy function.
2. The EUT was tested according to the requirement of ANSI C63.4 and CISPR 22. The measurements were made at an open area test site with 10 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 30 MHz. Under 1 GHz. All readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak and average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

### 4.5.5 EUT OPERATING CONDITION

Same as section 4.1.5 of this report.

### 4.5.6 TEST RESULT

| | | | |
|---|---|---|---|
| Temperature: | 23°C | Humidity: | 60%RH |
| Spectrum Detector: | PK. & AV. | Tested Mode: | IEEE 802.11g |
| Tested By: | Shin Chou | Modulation Type: | OFDM |
| Tested Date: | May 04, 2005 | | |

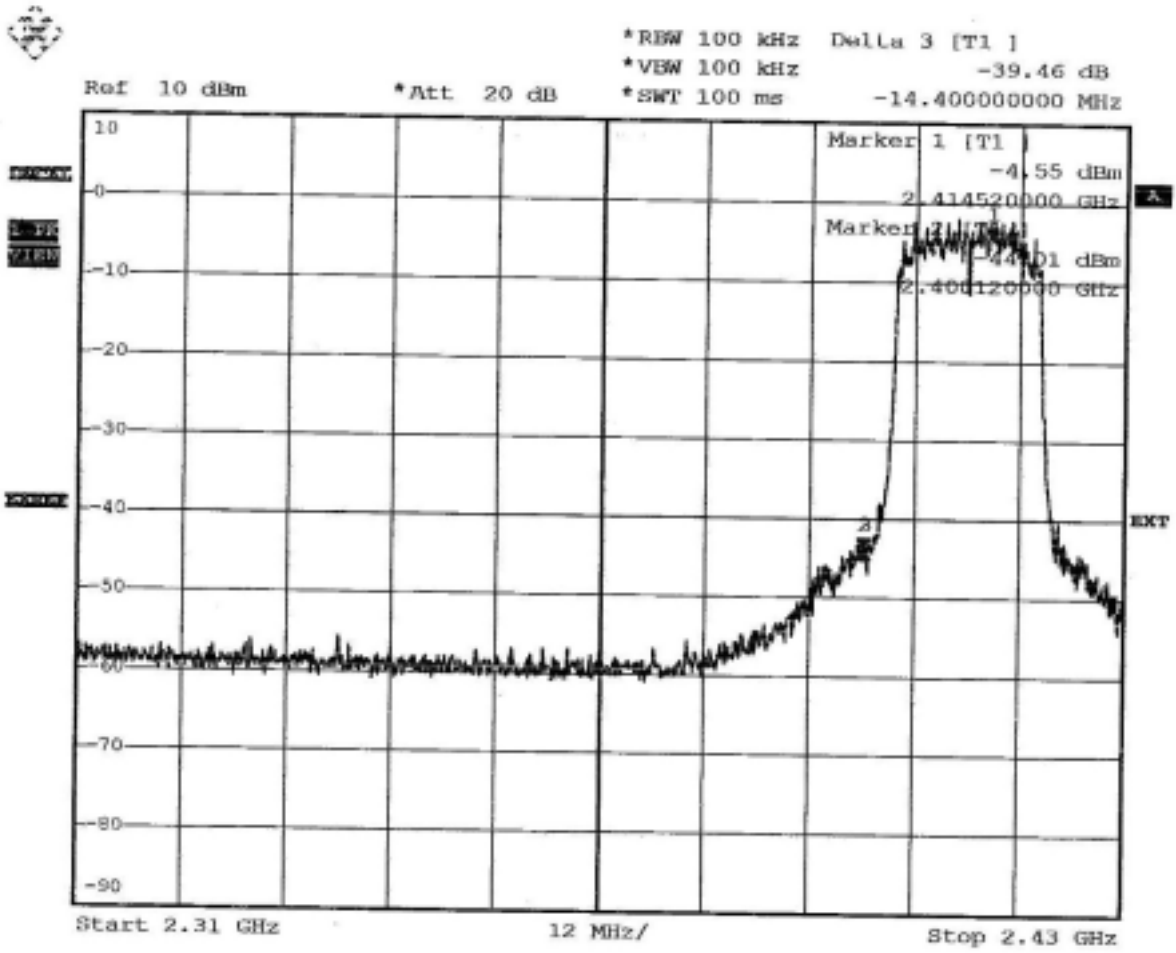
1.Conducted test

| Frequency (MHz) | PEAK POWER OUTPUT (dBm) | Emission read Value(dBm) | Result of Band edge (dBc) | Band edge LIMIT (dBc) |
|---|---|---|---|---|
| <2400 | -4.55 | -44.01 | 39.46 | >20dBc |
| >2483.5 | -1.58 | -53.66 | 52.08 | >20dBc |

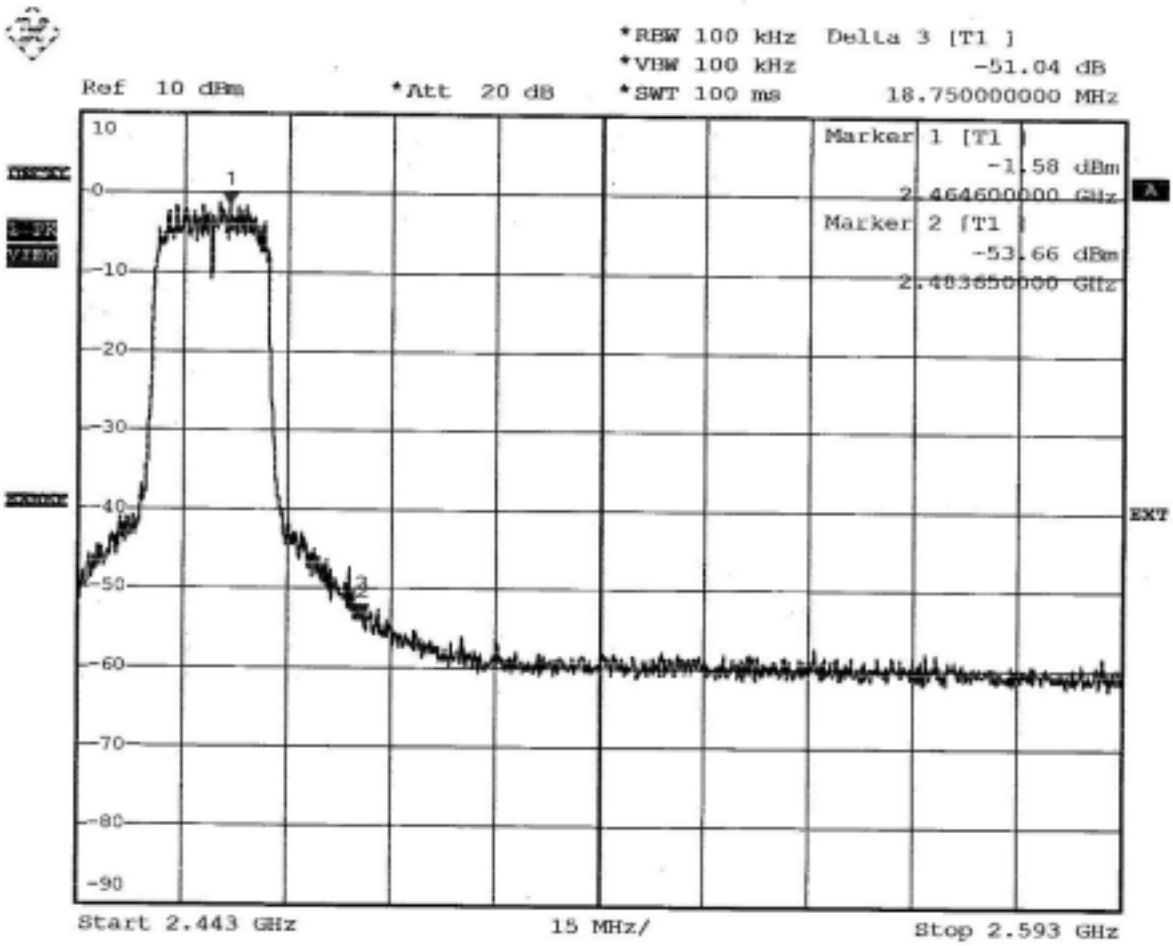
2.Radiated emission test

| Frequency (MHz) | Antenna polarization (H/V) | Reading (dBuV) | | Emission (dBuV/m) | | Band edge Limit (dBuV/m) | |
|---|---|---|---|---|---|---|---|
| | | PK | AV | PK | AV | PK | AV |
| <2400 | V | 46.2 | 42.5 | 42.0 | 38.3 | 74.0 | 54.0 |
| >2483.5 | V | 43.5 | 42.9 | 39.4 | 38.8 | 74.0 | 54.0 |

<2400MHz


*RBW 100 kHz
*VBW 100 kHz
*SWT 100 ms
Delta 3 [T1 ]
-39.46 dB
-14.400000000 MHz
Ref 10 dBm
*Att 20 dB
Marker 1 [T1 ]
-4.55 dBm
2.414520000 GHz
Marker 2 [T2 ]
2.400120000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
EXT
Start 2.31 GHz
12 MHz/
Stop 2.43 GHz

>2483.5MHz


*RBW 100 kHz
*VBW 100 kHz
*SWT 100 ms
Delta 3 [T1 ]
-51.04 dB
18.750000000 MHz
Ref 10 dBm
*Att 20 dB
Marker 1 [T1 ]
-1.58 dBm
2.464600000 GHz
Marker 2 [T1 ]
-53.66 dBm
2.483650000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Start 2.443 GHz
15 MHz/
Stop 2.593 GHz
EXT

| | | | |
|---|---|---|---|
| Temperature: | 23°C | Humidity: | 60%RH |
| Spectrum Detector: | PK. & AV. | Tested Mode: | IEEE 802.11b |
| Tested By: | Shin Chou | Modulation Type: | CCK |
| Tested Date: | May 04, 2005 | | |

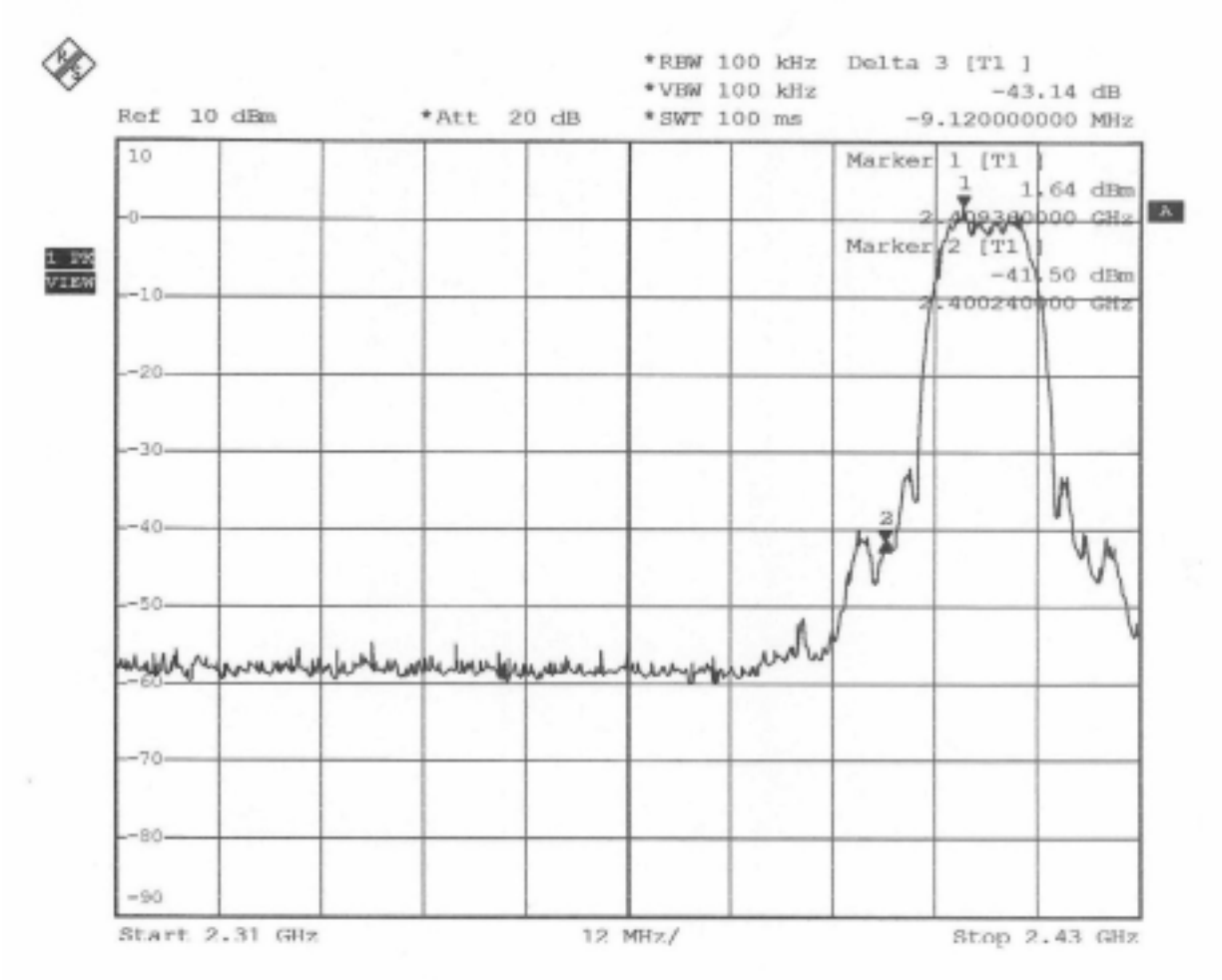
1.Conducted test

| Frequency (MHz) | PEAK POWER OUTPUT (dBm) | Emission read Value(dBm) | Result of Band edge (dBc) | Band edge LIMIT (dBc) |
|---|---|---|---|---|
| <2400 | 1.64 | -41.50 | 43.14 | >20dBc |
| >2483.5 | 2.27 | -40.28 | 42.55 | >20dBc |

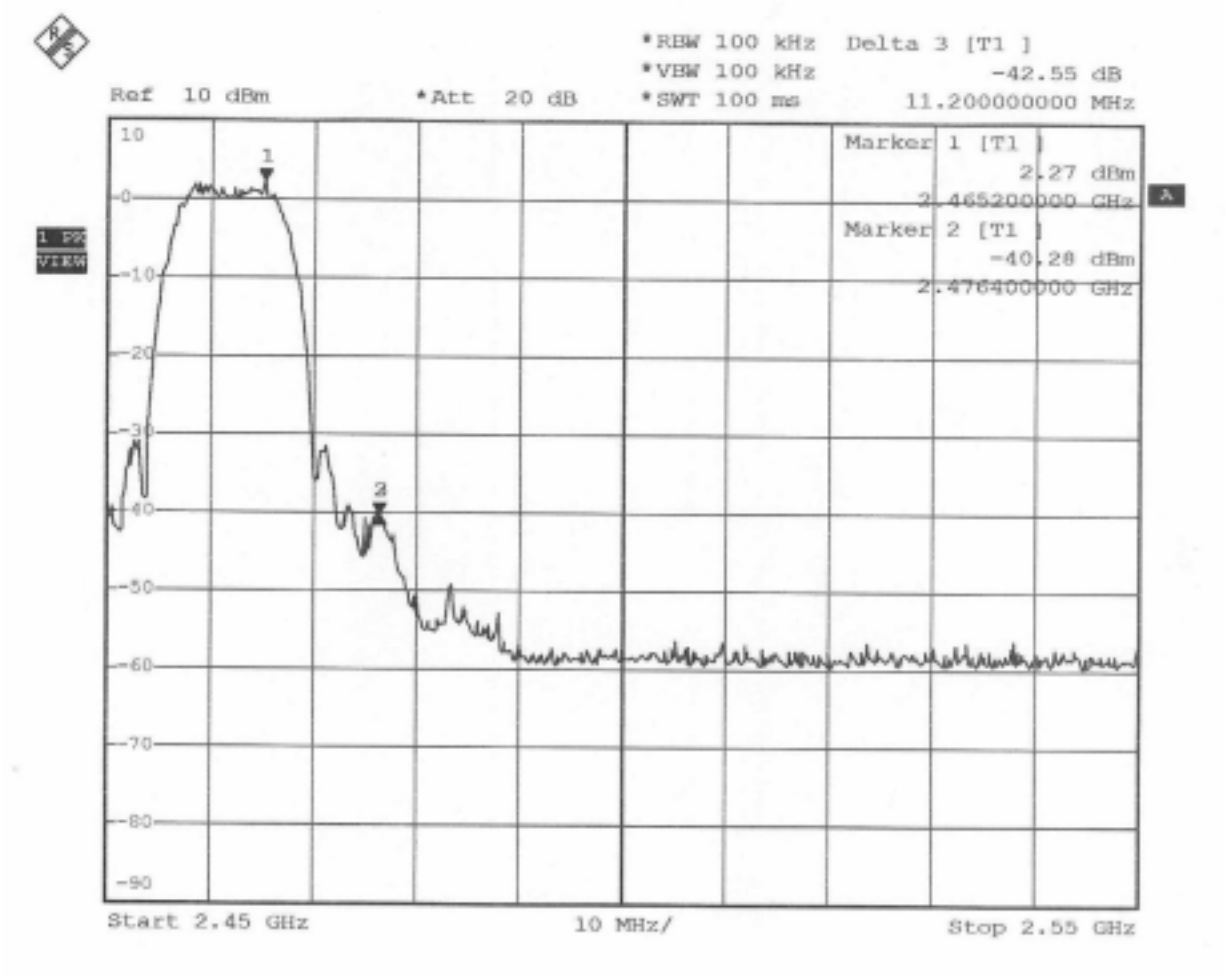
2.Radiated emission test

| Frequency (MHz) | Antenna polarization (H/V) | Reading (dBuV) | | Emission (dBuV/m) | | Band edge Limit (dBuV/m) | |
|---|---|---|---|---|---|---|---|
| | | PK | AV | PK | AV | PK | AV |
| <2400 | V | 45.8 | 44.9 | 41.6 | 40.7 | 74.0 | 54.0 |
| >2483.5 | H | 44.6 | 45.7 | 40.5 | 41.6 | 74.0 | 54.0 |

<2400MHz


*RBW 100 kHz
*VBW 100 kHz
*SWT 100 ms
Delta 3 [T1 ]
-43.14 dB
-9.120000000 MHz
Ref 10 dBm
*Att 20 dB
Marker 1 [T1 ]
1.64 dBm
Marker 2 [T1 ]
-41.50 dBm
Start 2.31 GHz
12 MHz/
Stop 2.43 GHz

>2483.5MHz


*RBW 100 kHz
*VBW 100 kHz
*SWT 100 ms
Delta 3 [T1 ]
-42.55 dB
11.200000000 MHz
Ref 10 dBm
*Att 20 dB
Marker 1 [T1 ]
2.27 dBm
2.465200000 GHz
Marker 2 [T1 ]
-40.28 dBm
2.476400000 GHz
1 P2
VIEW
A
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Start 2.45 GHz
10 MHz/
Stop 2.55 GHz

## 4.6 POWER DENSITY TEST

### 4.6.1 LIMIT

FCC Part15, Subpart C Section 15.247

| FREQUENCY RANGE (MHz) | Limit(dBm/kHz) |
|---|---|
| 902-928 | 8dBm/3kHz |
| 2400-2483.5 | |
| 5725-5850 | |

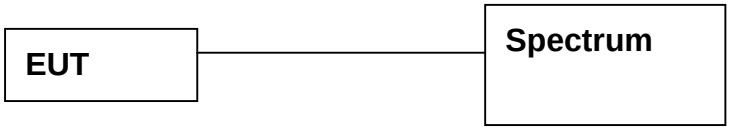
### 4.6.2 TEST EQUIPMENT

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

| EQUIPMENT/ FACILITIES | SPECIFICATIONS | MANUFACTURER | MODEL#/ SERIAL# | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|---|
| SPECTRUM | 9kHz-7GHz | ROHDE & SCHWARZ | FSP7/ 839511/010 | APR. 2006 R&S |

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.6.3 TEST SET-UP




The EUT was connected to a spectrum through a 50Ω RF cable.

### 4.6.4 TEST PROCEDURE

The EUT was operating in transmitter mode and could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

### 4.6.5 EUT OPERATING CONDITION

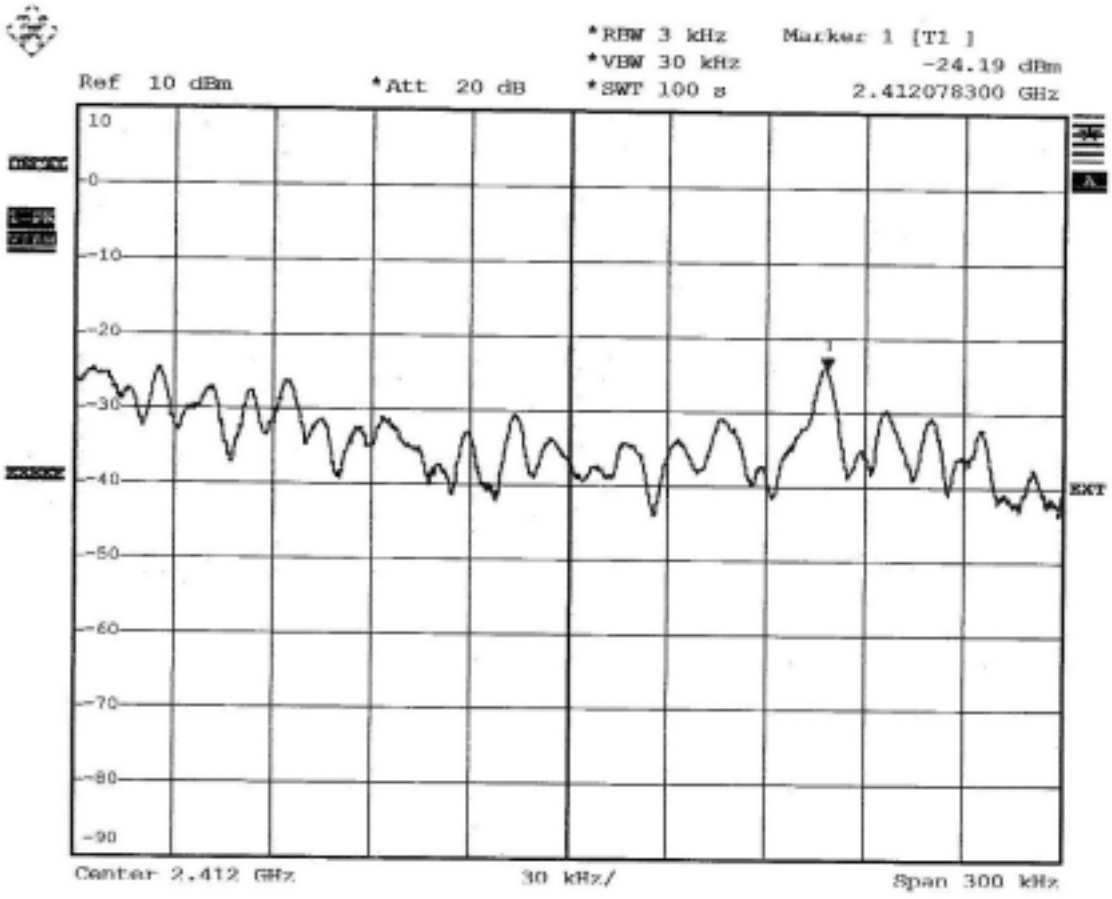
Same as section 4.1.5 of this report.

### 4.6.6 TEST RESULT

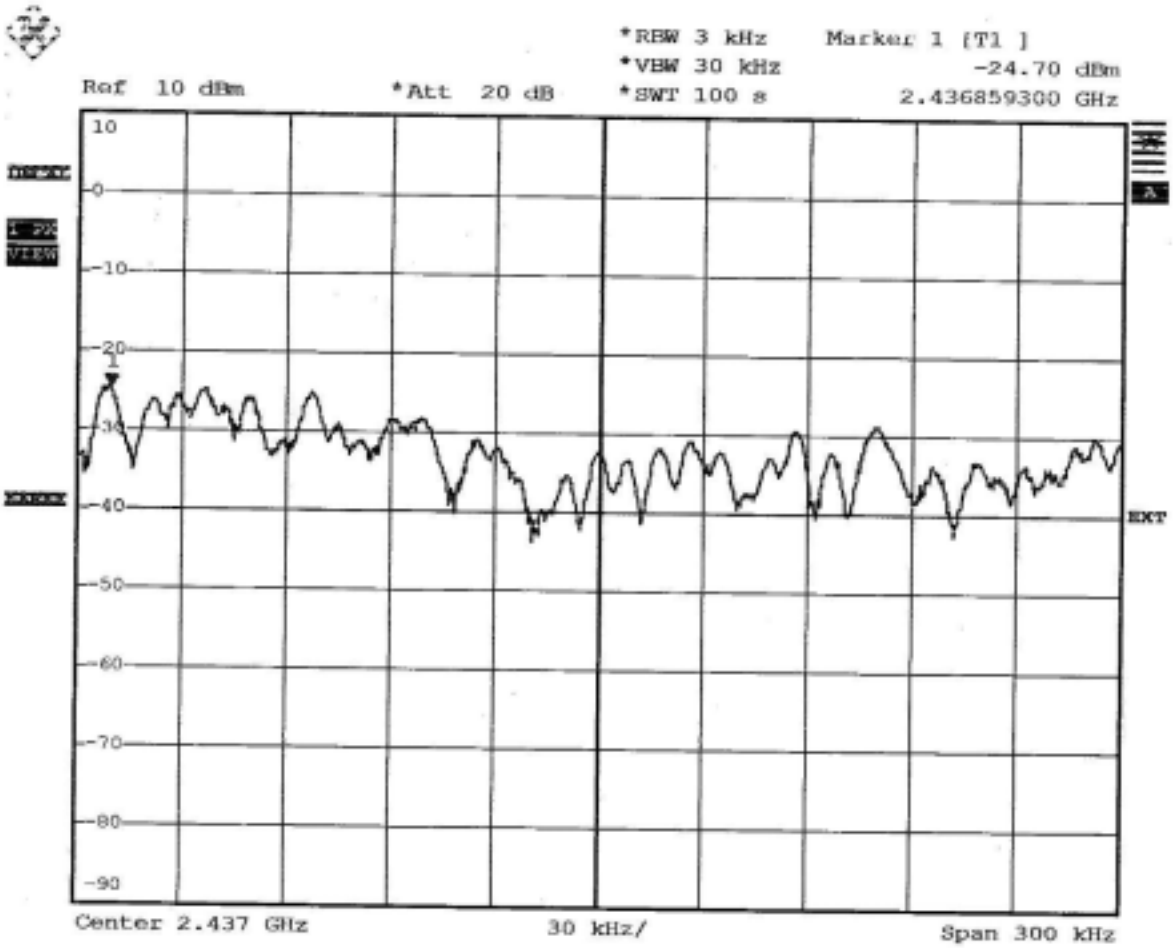
| | | | |
|---|---|---|---|
| Temperature: | 23°C | Humidity: | 60%RH |
| Spectrum Detector: | PK. | Tested Mode: | IEEE 802.11g |
| Tested By: | Shin Chao | Modulation Type: | OFDM |
| Tested Date: | May 04, 2005 | | |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz) | RF POWER LEVEL IN 3KHz BW (dBm/3kHz) | MAXIMUM LIMIT (dBm/3kHz) |
|---|---|---|---|
| 1 | 2412 | -24.19 | 8 |
| 6 | 2437 | -24.70 | 8 |
| 11 | 2462 | -18.47 | 8 |

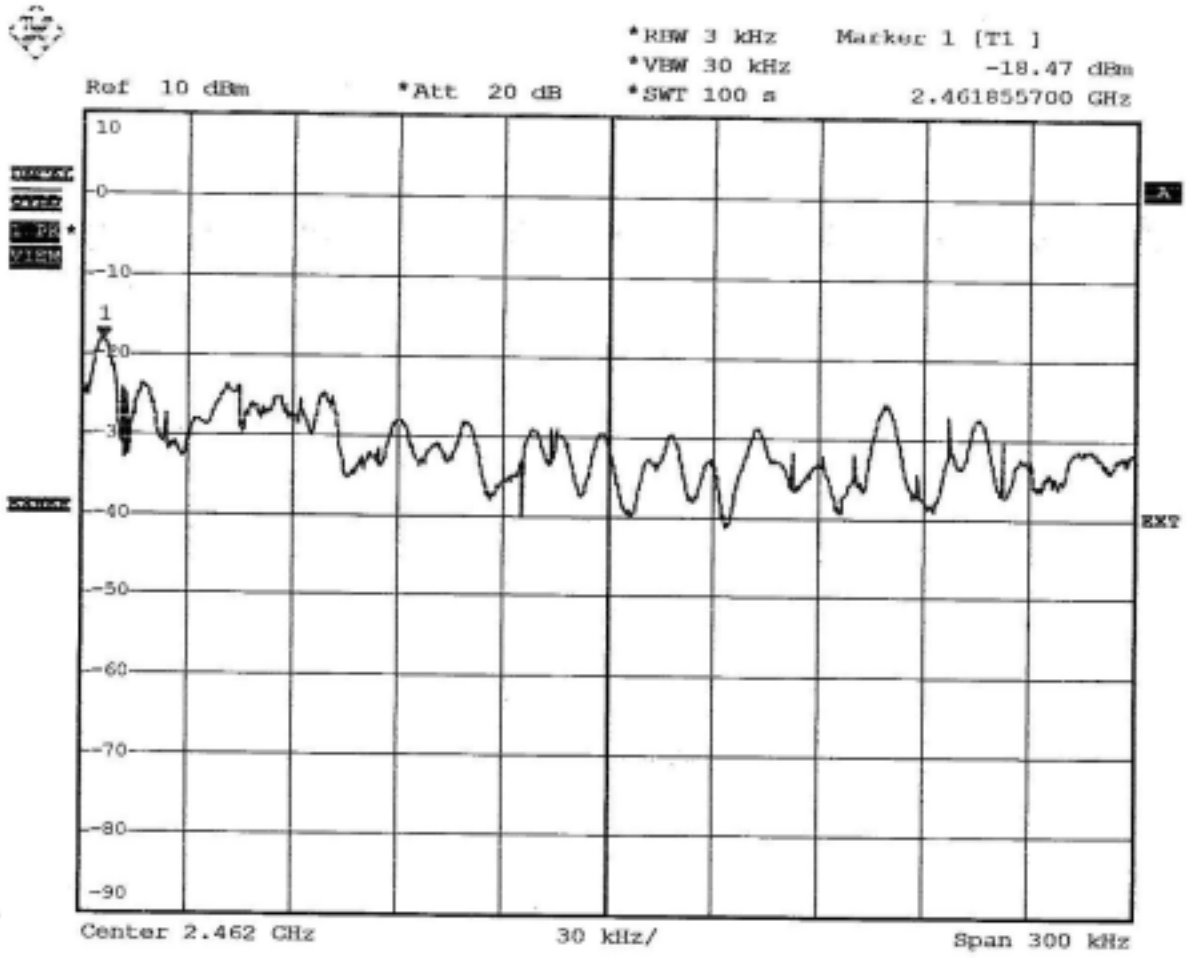
CH 1:



CH 6:


*RBW 3 kHz
*VBW 30 kHz
*SWT 100 s
Marker 1 [T1 ]
-24.70 dBm
2.436859300 GHz
Ref 10 dBm
*Att 20 dB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.437 GHz
30 kHz/
Span 300 kHz

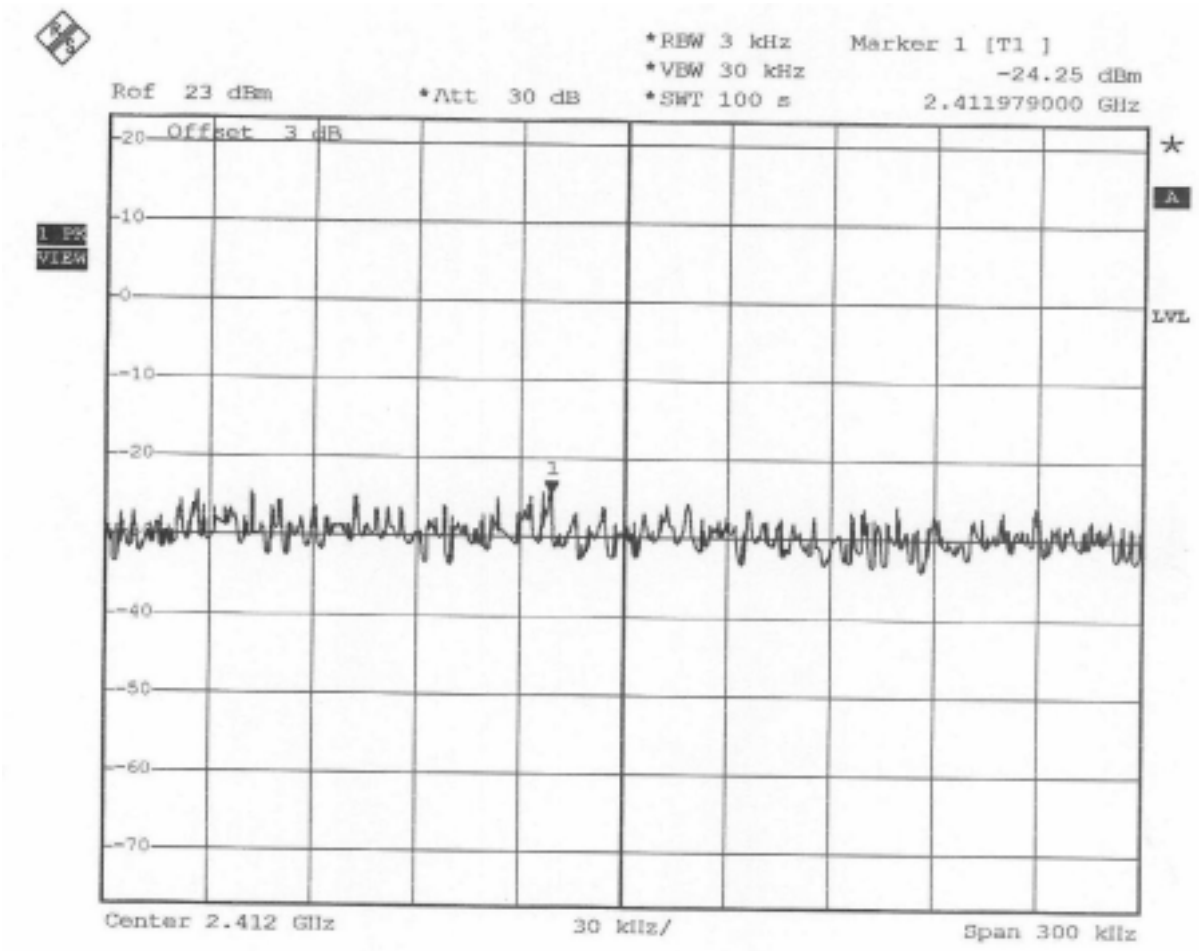
CH 11:


*RBW 3 kHz
*VBW 30 kHz
*SWT 100 s
Marker 1 [T1 ]
-18.47 dBm
2.461855700 GHz
Ref 10 dBm
*Att 20 dB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1
A
EXT
Center 2.462 GHz
30 kHz/
Span 300 kHz

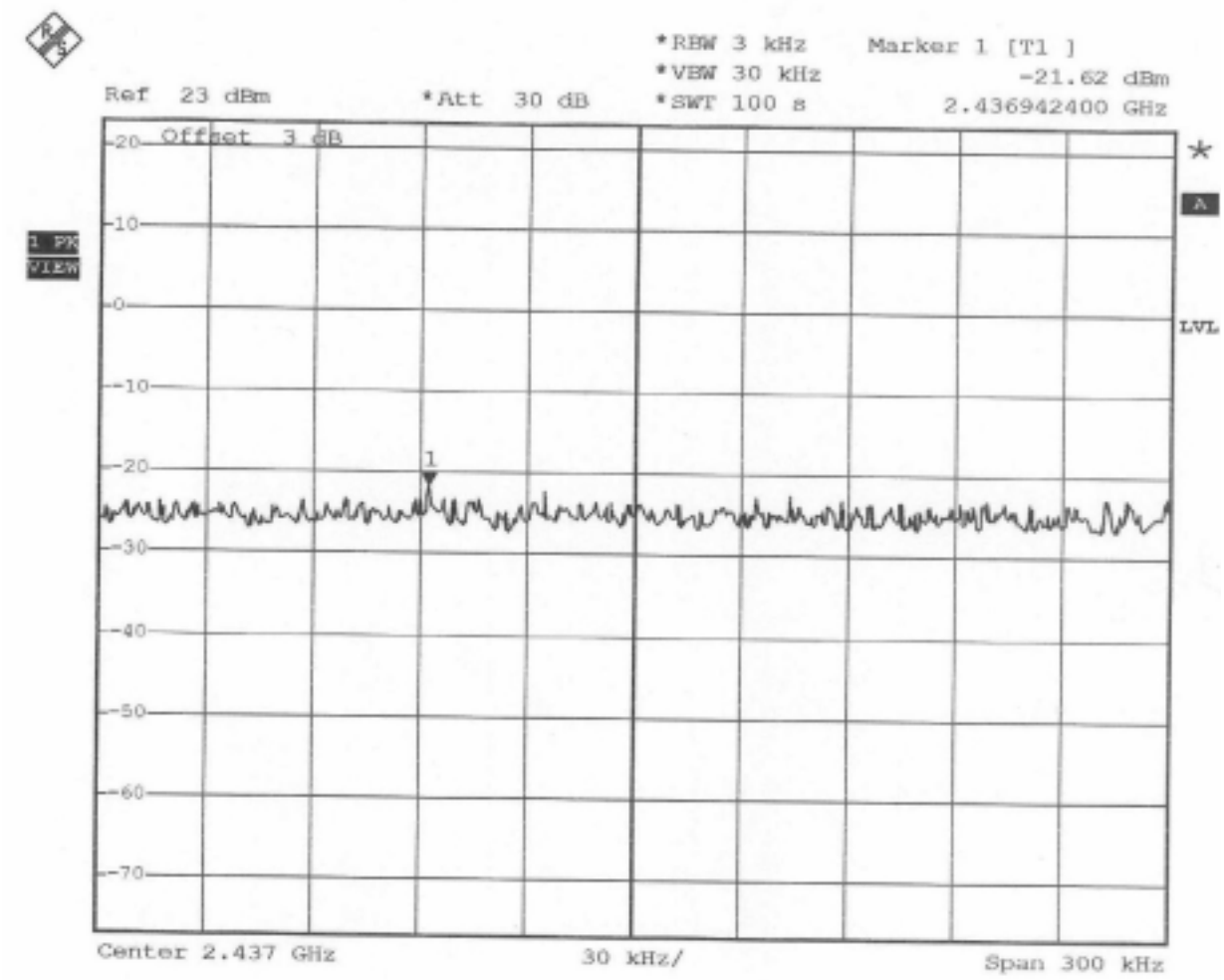
| | | | |
|---|---|---|---|
| Temperature: | 23°C | Humidity: | 60%RH |
| Spectrum Detector: | PK. | Tested Mode: | IEEE 802.11b |
| Tested By: | Shin Chao | Modulation Type: | CCK |
| Tested Date: | May 04, 2005 | | |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz) | RF POWER LEVEL IN 3KHz BW (dBm/3kHz) | MAXIMUM LIMIT (dBm/3kHz) |
|---|---|---|---|
| 1 | 2412 | -24.25 | 8 |
| 6 | 2437 | -21.62 | 8 |
| 11 | 2462 | -19.97 | 8 |

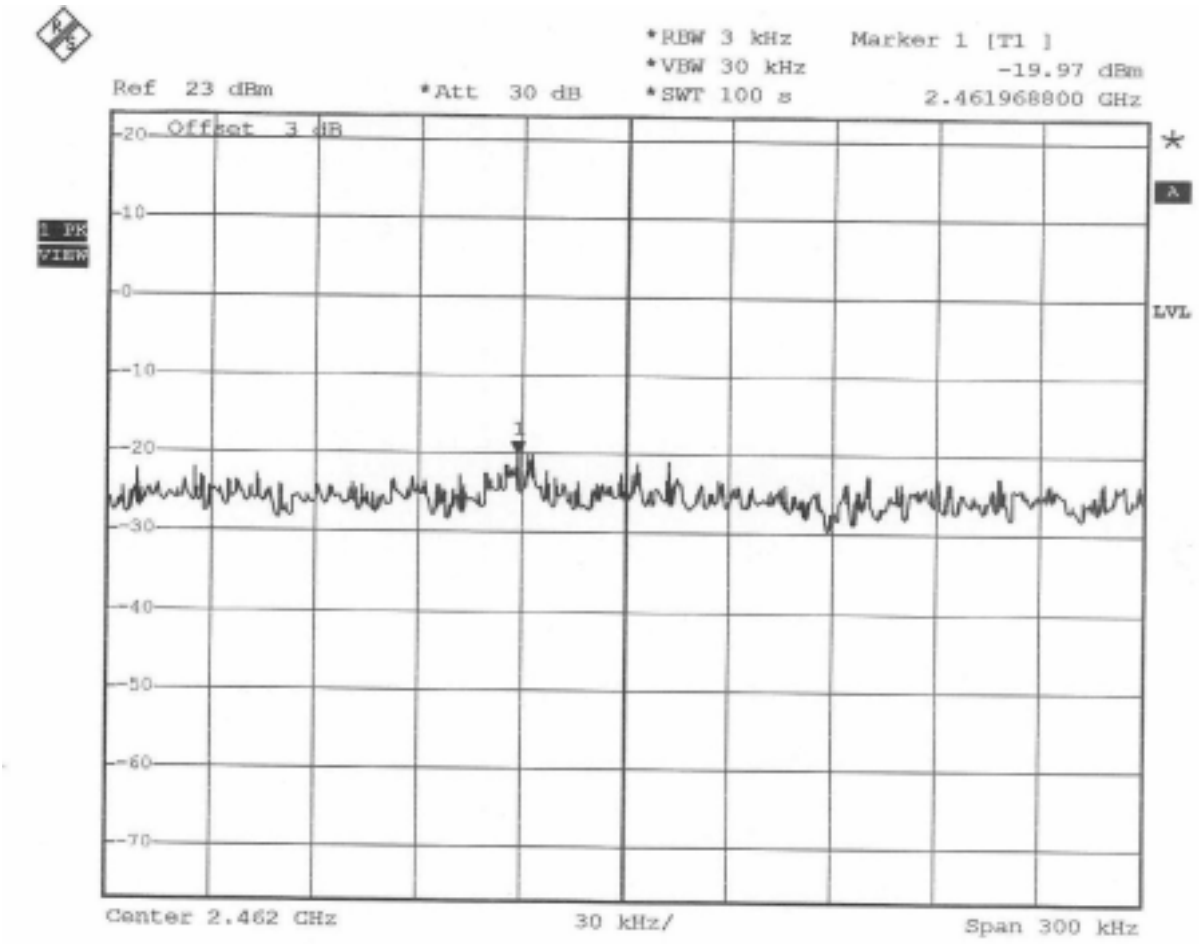
CH 1:



CH 6:


*RBW 3 kHz
*VBW 30 kHz
*SWT 100 s
Marker 1 [T1 ]
-21.62 dBm
2.436942400 GHz
Ref 23 dBm
*Att 30 dB
Offset 3 dB
1 PK
VIEW
A
LVL
20
10
0
-10
-20
-30
-40
-50
-60
-70
1
Center 2.437 GHz
30 kHz/
Span 300 kHz

CH 11:


*RBW 3 kHz
*VBW 30 kHz
*SWT 100 s
Marker 1 [T1 ]
-19.97 dBm
2.461968800 GHz
Ref 23 dBm
*Att 30 dB
Offset 3 dB
1 PK VIEW
A
LVL
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.462 GHz
30 kHz/
Span 300 kHz

## 4.7 RF POWER EXPOSURE EVALUATION TEST

### 4.7.1 LIMIT

According to the requirement of IEEE C95.1 and FCC OET Bulletin 65.

**Limits for Occupational/Controlled Exposure**

| Frequency Range (MHz) | Electric Field Strength(E) (V/m) | Magnetic Field Strength(H) (A/m) | Power density (S) (mW/cm²) | Averaging Time \|E\|², \|H\|² or S (minutes) |
|---|---|---|---|---|
| 0.3-3.0 | 614 | 1.63 | (100)* | 6 |
| 3.0-30 | 1842/f | 4.89/f | (900/f²)* | 6 |
| 30-300 | 61.4 | 0.163 | 1.0 | 6 |
| 300-1500 | -- | -- | f/300 | 6 |
| 1500-100,000 | -- | -- | 5 | 6 |

**Limits for General Population/Uncontrolled Exposure**

| Frequency Range (MHz) | Electric Field Strength(E) (V/m) | Magnetic Field Strength(H) (A/m) | Power density (S) (mW/cm²) | Averaging Time \|E\|², \|H\|² or S (minutes) |
|---|---|---|---|---|
| 0.3-1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34-30 | 824/f | 2.19/f | (180/f²)* | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | -- | -- | f/1500 | 30 |
| 1500-100,000 | -- | -- | 1.0 | 30 |

f = frequency in MHz *Plane-wave equivalent power density

NOTE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

### 4.7.2 TEST EQUIPMENT

The following test equipment was used during the test:

| EQUIPMENT/ FACILITIES | SPECIFICATIONS | MANUFACTURER | MODEL#/ SERIAL# | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|---|
| POWER METER | N/A | BOONTON | 4232A/ 29001 | MAY 2005 ETC |
| POWER SENSOR | DC-8GHz 50 Ω | BOONTON | 51011EMC/ 31181 | NOV. 2005 ETC |

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.7.3 TEST SET-UP

The EUT was connected to a spectrum through a 50Ω RF cable.

### 4.7.4 TEST PROCEDURE

1. The EUT was operating in transmitter mode and could be controlled its channel. The power meter read power value.
2. The EUT uses an sleeve dipole antenna and the antenna gain is 2dBi declared by manufacturer.
3. As discussed in OET Bulletin 65, calculations can be made to predict RF field strength and power density levels around typical RF sources. For example, in the case of a non-directional antenna, a prediction for power density in the far-field of the antenna can be made by use of the general Equations (1) or (2) below [for conversion to electric or magnetic field strength see Equation (3) above]. These equations are generally accurate in the far-field of an antenna but will over-predict power density in the near field, where it could be used for making a" worst case" or conservative prediction.

$$S=PG/4\pi R^2 \qquad \text{(Eq.1)}$$

$$S=EIRP/4\pi R^2 \qquad \text{(Eq. 2)}$$

$$S=E^2/3770=37.7H^2 \qquad \text{(Eq. 3)}$$

where: S = power density (mW/cm2)

E = electric field strength (V/m)

H = magnetic field strength (A/m)

S = power density (in appropriate units, e.g. $mW/cm^2$)

P = power input to the antenna (in appropriate units, e.g., mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator (dBi)

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

where: EIRP = equivalent (or effective) isotropically radiated power

### 4.7.5 EUT OPERATING CONDITION

Same as section 4.1.5 of this report.

### 4.7.6 RESULT

| | | | |
|---|---|---|---|
| Temperature: | 23°C | Humidity: | 60%RH |
| Spectrum Detector: | PK. | Tested Mode: | IEEE 802.11g |
| Tested By: | Shin Chou | Modulation Type: | OFDM |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz) | RF Output Power (mW) | Result calculated when nearby person (cm) | Limit when nearby person (cm) |
|---|---|---|---|---|
| 1 | 2412 | 2.382 | 0.435 | 20 |
| 6 | 2437 | 4.400 | 0.592 | 20 |
| 11 | 2462 | 3.954 | 0.561 | 20 |

| | | | |
|---|---|---|---|
| Temperature: | 23°C | Humidity: | 60%RH |
| Spectrum Detector: | PK. | Tested Mode: | IEEE 802.11b |
| Tested By: | Shin Chou | Modulation Type: | CCK |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz) | RF Output Power (mW) | Result calculated when nearby person (cm) | Limit when nearby person (cm) |
|---|---|---|---|---|
| 1 | 2412 | 4.540 | 0.601 | 20 |
| 6 | 2437 | 4.864 | 0.622 | 20 |
| 11 | 2462 | 4.188 | 0.577 | 20 |

**NOTE :** The EUT uses a dipole antenna and the antenna gain is 0.5dBi (1.12 numeric)

# 5. Antenna application

## 5.1 Antenna requirement

The EUT's antenna is met the requirement of FCC part15C section15.203 and 15.204.

FCC part15C section15.247 requirement:
Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

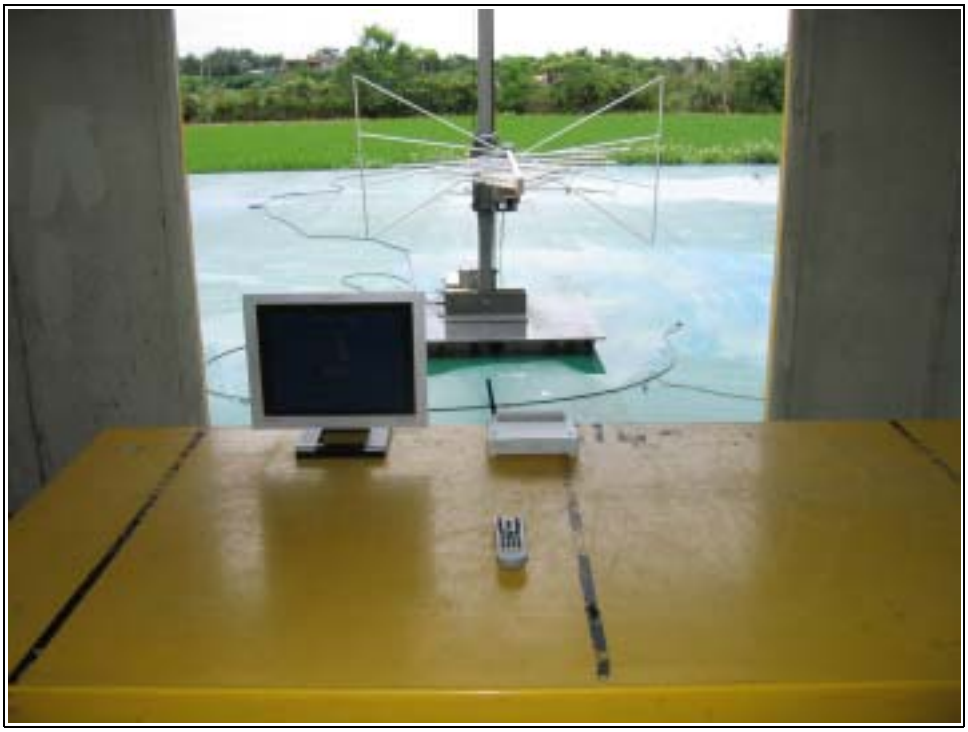
## 5.2 Result

The EUT's antenna used an external dipole antenna. The type of connector is coaxial connector. The antenna's gain is 2dBi and meets the requirement.

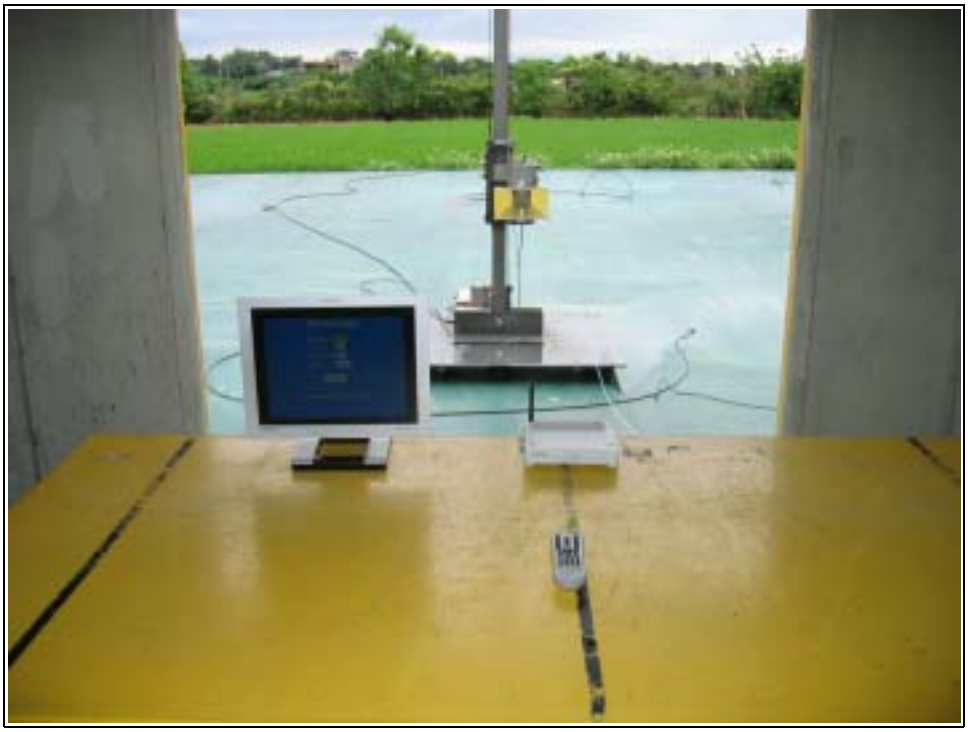
## 6. PHOTOS OF TESTING

- Conducted test

- Radiated test (RX)



- Radiated test (TX)



## 7. TERMS OF ABRIVATION

| | |
|---|---|
| AV. | Average detection |
| AZ(°) | Turn table azimuth |
| Correct. | Correction |
| EL(m) | Antenna height (meter) |
| EUT | Equipment Under Test |
| Horiz. | Horizontal direction |
| LISN | Line Impedance Stabilization Network |
| NSA | Normalized Site Attenuation |
| Q.P. | Quasi-peak detection |
| SRT Lab | Spectrum Research & Testing Laboratory, Inc. |
| Vert. | Vertical direction |