



Spectrum Research & Testing Lab., Inc.
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TEST REPORT

Reference No.:B04041208
Report No.:FCCB04041208
Page:1 of 66
Date:Jun. 25, 2004

Product Name: Wireless 1 WAN 4 LAN Multimedia Security VPN Router
Model No.: FL 1911G, Matrix 21, FL 1920
Applicant: Fiber Logic Communications, Inc.
5F-3, No. 9, Prosperity Road One, Science-Based Industrial
Park, Hsinchu, Taiwan, R.O.C.
Date of Receipt: Apr. 12, 2004
Finished date of Test: Jun. 25, 2004
Applicable Standards: 47 CFR Part 15, Subpart C
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 : Ken Su for , Date: Jun. 25, 2004
(Sunyou Chen)

Approved By : J Ho , Date: 6/25/2004
(Johnson Ho, Director)



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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

The following accessories were added to the EUT during testing:

- Connect the whole analog gnd with digital gnd of PCB.



2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

| | |
|---------------------------------|--|
| PRODUCT | Wireless 1 WAN 4 LAN Multimedia Security VPN Router |
| MODEL NO. | FL 1911G, Matrix 21, FL 1920 |
| POWER SUPPLY | DC 5V, 3A from an external power adapter: Brand: SUNNY Model No.: SYS1298-1505-W2 I/P: 100-240V~1.0A MAX, 30-40VA, 50-60Hz O/P: +5V, 3.0A Unshielded power cable (1.5m) |
| CABLE | N/A |
| I/O PORT | RJ45, USB |
| FREQUENCY BAND | 2400 ~ 2483.5MHz |
| CARRIER FREQUENCY | CH1: 2412MHz ~ CH11: 2462MHz |
| NUMBER OF CHANNEL | 11 |
| CHANNEL SPACING | 5MHz |
| RATED RF OUTPUT POWER | 17dBm MAX. (EIRP), 14dBm +/- 1dBm (before antenna) |
| I.F. & L.O. | I.F.: 374MHz, L.O.:2038~2088MHz |
| MODULATION TYPE | IEEE 802.11g: BPSK/QPSK/OFDM(64QAM, 16QAM) IEEE 802.11b: DBPSK/DQPSK/CCK |
| BIT RATE OF TRANSMISSION | 54Mbps |
| ANTENNA TYPE | Single external dipole antenna |
| ANTENNA GAIN | 3dBi |

NOTE :

The EUT has three model numbers as above on market. They are identical in all aspects except for the following:

The model no.: FL 1911G is exactly the same as the model no.: FL 1920 except for software and addition stand was provided for the model no.: Matrix 21.

The model no.: FL 1911G 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 |
|--|---------------|-------|------------|--------|
| 802.11b/g Wireless Lan card (Mini PCI) | FI WIN | WM68 | Q5SWM68 | |

2.3 DESCRIPTION OF TEST MODE

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

There are test mode for each test configuration as below:

| Mode | Modulation Type | Channel | Frequency (MHz) | |
|------|-----------------|---------|-----------------|------|
| 1 | IEEE 802.11g | 64QAM | CH1 | 2412 |
| 2 | | CH6 | 2437 | |
| 3 | | CH11 | 2462 | |
| 4 | IEEE 802.11b | CCK | CH1 | 2412 |
| 5 | | CH6 | 2437 | |
| 6 | | CH11 | 2462 | |

NOTE :

- 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.
- 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 | LOAD*4 | N/A | N/A | N/A | N/A |
| 3 | USB 2.0 HDD*4 | TERASYS | F12-U | DOC | 1.5m unshielded power cable 1.2m shielded data cable |

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



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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 (dB μ V) | | Class B (dB μ V) | |
|-----------------|----------------------|---------|----------------------|---------|
| | 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

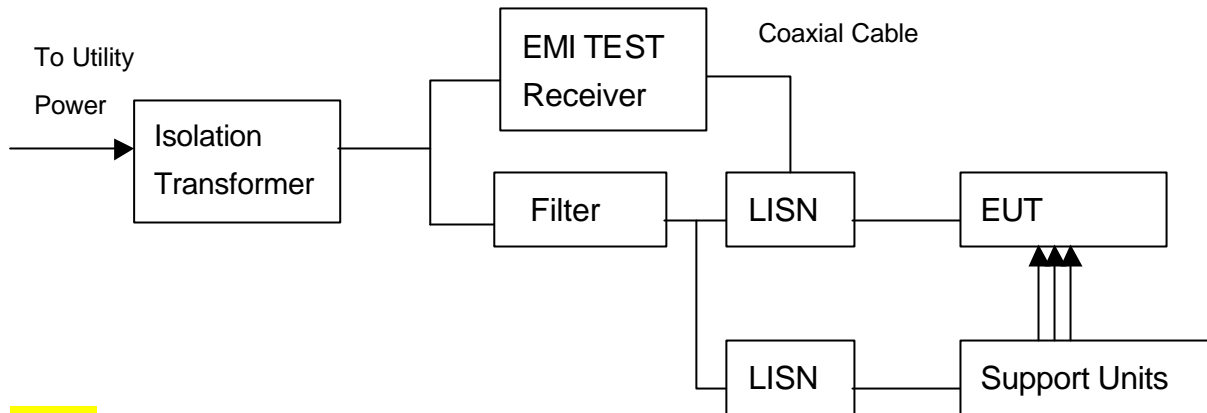
The following test equipment was used for the test:

| EQUIPMENT/ FACILITIES | SPECIFICATIONS | MANUFACTURER | MODEL#/ SERIAL# | DUE DATE OF CAL. & CAL. CENTER |
|--------------------------|------------------------|----------------------|------------------------------|-----------------------------------|
| EMI TEST RECEIVER | 9 kHz TO 2750 MHz | ROHDE & SCHWARZ | ESCS30/ 830245/012 | AUG. 2004 ETC |
| LISN (for EUT) | 50 μ H, 50 ohm | SOLAR ELECTRONICS | 8012-50-R-24-BNC / 924839 | JUN. 2005 ETC |
| LISN (for Peripheral) | 50 μ H, 50 ohm | SOLAR ELECTRONICS | 9252-50-R-24-BNC / 951318 | JUN. 2005 ETC |
| 50 ohm TERMINATOR | 50 ohm | HP | 11593A/ 4 | MAR. 2005 ETC |
| COAXIAL CABLE | 3m | SUNCITY | J400/ 3M | JUL. 2004 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 height 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 951318.
4. The serial no. of the LISN connected to support units is 924839.

4.1.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4:2003 and CISRP22:2003. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm/50 μ H 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. Set the EUT under normal condition continuously at the link mode.
2. The EUT used programs to control channels when it was tested for RF power and emission.
3. EUT accessed data from Wireless LAN.



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: | 64QAM |
| Tested By: | Hugo Yeh | Tested Channel: | CH1: 2412MHz |
| | | Tested Date: | Jun. 25, 2004 |

Power Line Measured : Line

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBmV) | | Emission Level (dBmV) | | Limit (dBmV) | | Margin (dB) | |
|-------------|----------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.157 | 0.20 | 56.66 | 46.40 | 56.86 | 46.60 | 65.60 | 55.60 | -8.74 | -9.00 |
| 1.162 | 0.20 | 35.70 | 26.60 | 35.90 | 26.80 | 56.00 | 46.00 | -20.10 | -19.20 |
| 1.690 | 0.20 | 34.24 | 24.38 | 34.44 | 24.58 | 56.00 | 46.00 | -21.56 | -21.42 |
| 1.960 | 0.20 | 36.10 | 25.54 | 36.30 | 25.74 | 56.00 | 46.00 | -19.70 | -20.26 |
| 5.000 | 0.20 | 35.00 | 24.83 | 35.20 | 25.03 | 56.00 | 46.00 | -20.80 | -20.97 |
| 20.243 | 0.20 | 27.70 | 21.70 | 27.90 | 21.90 | 60.00 | 50.00 | -32.10 | -28.10 |

Power Line Measured : Neutral

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBmV) | | Emission Level (dBmV) | | Limit (dBmV) | | Margin (dB) | |
|-------------|----------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.158 | 0.20 | 57.82 | 44.90 | 58.02 | 45.10 | 65.55 | 55.55 | -7.53 | -10.45 |
| 0.817 | 0.20 | 35.50 | 24.20 | 35.70 | 24.40 | 56.00 | 46.00 | -20.30 | -21.60 |
| 2.080 | 0.20 | 37.16 | 26.85 | 37.36 | 27.05 | 56.00 | 46.00 | -18.64 | -18.95 |
| 5.061 | 0.20 | 37.94 | 27.35 | 38.14 | 27.55 | 60.00 | 50.00 | -21.86 | -22.45 |
| 14.245 | 0.20 | 35.30 | 23.45 | 35.50 | 23.65 | 60.00 | 50.00 | -24.50 | -26.35 |
| 23.158 | 0.20 | 26.40 | 20.40 | 26.60 | 20.60 | 60.00 | 50.00 | -33.40 | -29.40 |

NOTE :

1. Measurement uncertainty is +/-1.32dB
2. Emission level = Reading value + 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: | 64QAM |
| Tested By: | Hugo Yeh | Tested Channel: | CH6: 2437MHz |
| | | Tested Date: | Jun. 25, 2004 |

Power Line Measured : Line

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBmV) | | Emission Level (dBmV) | | Limit (dBmV) | | Margin (dB) | |
|-------------|----------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.156 | 0.20 | 58.30 | 44.90 | 58.50 | 45.10 | 65.66 | 55.66 | -7.16 | -10.56 |
| 1.201 | 0.20 | 38.10 | 25.30 | 38.30 | 25.50 | 56.00 | 46.00 | -17.70 | -20.50 |
| 1.950 | 0.20 | 36.00 | 18.45 | 36.20 | 18.65 | 56.00 | 46.00 | -19.80 | -27.35 |
| 14.590 | 0.20 | 35.36 | 22.90 | 35.56 | 23.10 | 60.00 | 50.00 | -24.44 | -26.90 |
| 14.631 | 0.20 | 37.06 | 24.91 | 37.26 | 25.11 | 60.00 | 50.00 | -22.74 | -24.89 |
| 25.681 | 0.21 | 33.90 | 28.10 | 34.11 | 28.31 | 60.00 | 50.00 | -25.89 | -21.69 |

Power Line Measured : Neutral

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBmV) | | Emission Level (dBmV) | | Limit (dBmV) | | Margin (dB) | |
|-------------|----------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.159 | 0.20 | 57.60 | 48.00 | 57.80 | 48.20 | 65.50 | 55.50 | -7.70 | -7.30 |
| 1.066 | 0.20 | 34.90 | 15.70 | 35.10 | 15.90 | 56.00 | 46.00 | -20.90 | -30.10 |
| 2.210 | 0.20 | 34.70 | 19.10 | 34.90 | 19.30 | 56.00 | 46.00 | -21.10 | -26.70 |
| 14.163 | 0.20 | 38.16 | 25.24 | 38.36 | 25.44 | 60.00 | 50.00 | -21.64 | -24.56 |
| 14.946 | 0.20 | 37.20 | 23.88 | 37.40 | 24.08 | 60.00 | 50.00 | -22.60 | -25.92 |
| 22.674 | 0.20 | 26.50 | 20.40 | 26.70 | 20.60 | 60.00 | 50.00 | -33.30 | -29.40 |

NOTE :

1. Measurement uncertainty is +/-1.32dB
2. Emission level = Reading value + 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: | 64QAM |
| Tested By: | Hugo Yeh | Tested Channel: | CH11: 2462MHz |
| | | Tested Date: | Jun. 25, 2004 |

Power Line Measured : Line

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBmV) | | Emission Level (dBmV) | | Limit (dBmV) | | Margin (dB) | |
|-------------|----------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.159 | 0.20 | 61.20 | 48.30 | 61.40 | 48.50 | 65.50 | 55.50 | -4.10 | -7.00 |
| 0.572 | 0.20 | 37.40 | 30.30 | 37.60 | 30.50 | 56.00 | 46.00 | -18.40 | -15.50 |
| 2.081 | 0.20 | 33.30 | 18.45 | 33.50 | 18.65 | 56.00 | 46.00 | -22.50 | -27.35 |
| 5.000 | 0.20 | 35.36 | 22.90 | 35.56 | 23.10 | 56.00 | 46.00 | -20.44 | -22.90 |
| 5.142 | 0.20 | 37.06 | 24.91 | 37.26 | 25.11 | 60.00 | 50.00 | -22.74 | -24.89 |
| 24.625 | 0.20 | 28.40 | 22.60 | 28.60 | 22.80 | 60.00 | 50.00 | -31.40 | -27.20 |

Power Line Measured : Neutral

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBmV) | | Emission Level (dBmV) | | Limit (dBmV) | | Margin (dB) | |
|-------------|----------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.159 | 0.20 | 57.20 | 46.90 | 57.40 | 47.10 | 65.50 | 55.50 | -8.10 | -8.40 |
| 0.577 | 0.20 | 34.90 | 24.60 | 35.10 | 24.80 | 56.00 | 46.00 | -20.90 | -21.20 |
| 2.230 | 0.20 | 33.50 | 23.88 | 33.70 | 24.08 | 56.00 | 46.00 | -22.30 | -21.92 |
| 5.250 | 0.20 | 38.16 | 25.24 | 38.36 | 25.44 | 60.00 | 50.00 | -21.64 | -24.56 |
| 5.497 | 0.20 | 37.20 | 23.88 | 37.40 | 24.08 | 60.00 | 50.00 | -22.60 | -25.92 |
| 25.281 | 0.20 | 27.10 | 21.40 | 27.30 | 21.60 | 60.00 | 50.00 | -32.70 | -28.40 |

NOTE :

1. Measurement uncertainty is +/-1.32dB
2. Emission level = Reading value + 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: | Hugo Yeh | Tested Channel: | CH1: 2412MHz |
| | | Tested Date: | Jun. 23, 2004 |

Power Line Measured : Line

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBmV) | | Emission Level (dBmV) | | Limit (dBmV) | | Margin (dB) | |
|-------------|----------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.159 | 0.20 | 54.00 | 44.12 | 54.20 | 44.32 | 65.50 | 55.50 | -11.30 | -11.18 |
| 0.162 | 0.20 | 53.56 | 44.57 | 53.76 | 44.77 | 65.34 | 55.34 | -11.58 | -10.57 |
| 0.557 | 0.20 | 36.00 | 18.45 | 36.20 | 18.65 | 56.00 | 46.00 | -19.80 | -27.35 |
| 2.131 | 0.20 | 35.36 | 22.90 | 35.56 | 23.10 | 56.00 | 46.00 | -20.44 | -22.90 |
| 2.833 | 0.20 | 37.06 | 24.91 | 37.26 | 25.11 | 56.00 | 46.00 | -18.74 | -20.89 |
| 18.341 | 0.20 | 37.86 | 30.74 | 38.06 | 30.94 | 60.00 | 50.00 | -21.94 | -19.06 |

Power Line Measured : Neutral

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBmV) | | Emission Level (dBmV) | | Limit (dBmV) | | Margin (dB) | |
|-------------|----------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.159 | 0.20 | 54.64 | 44.24 | 54.84 | 44.44 | 65.50 | 55.50 | -10.66 | -11.06 |
| 0.162 | 0.20 | 54.14 | 44.66 | 54.34 | 44.86 | 65.34 | 55.34 | -11.00 | -10.48 |
| 0.500 | 0.20 | 39.44 | 23.88 | 39.64 | 24.08 | 55.98 | 45.98 | -16.34 | -21.90 |
| 2.734 | 0.20 | 38.16 | 25.24 | 38.36 | 25.44 | 56.00 | 46.00 | -17.64 | -20.56 |
| 2.843 | 0.20 | 37.20 | 23.88 | 37.40 | 24.08 | 56.00 | 46.00 | -18.60 | -21.92 |
| 19.121 | 0.20 | 38.68 | 32.08 | 38.88 | 32.28 | 60.00 | 50.00 | -21.12 | -17.72 |

NOTE :

1. Measurement uncertainty is +/-1.32dB
2. Emission level = Reading value + 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: | Hugo Yeh | Tested Channel: | CH6: 2437MHz |
| | | Tested Date: | Jun. 25, 2004 |

Power Line Measured : Line

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBmV) | | Emission Level (dBmV) | | Limit (dBmV) | | Margin (dB) | |
|-------------|----------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.150 | 0.20 | 56.66 | 42.06 | 56.86 | 42.26 | 65.98 | 55.98 | -9.12 | -13.72 |
| 0.153 | 0.20 | 51.96 | 36.18 | 52.16 | 36.38 | 65.82 | 55.82 | -13.66 | -19.44 |
| 0.960 | 0.20 | 34.24 | 24.38 | 34.44 | 24.58 | 56.00 | 46.00 | -21.56 | -21.42 |
| 2.635 | 0.20 | 36.10 | 25.54 | 36.30 | 25.74 | 56.00 | 46.00 | -19.70 | -20.26 |
| 2.824 | 0.20 | 35.00 | 24.83 | 35.20 | 25.03 | 56.00 | 46.00 | -20.80 | -20.97 |
| 20.484 | 0.20 | 40.36 | 32.89 | 40.56 | 33.09 | 60.00 | 50.00 | -19.44 | -16.91 |

Power Line Measured : Neutral

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBmV) | | Emission Level (dBmV) | | Limit (dBmV) | | Margin (dB) | |
|-------------|----------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.150 | 0.20 | 57.82 | 43.93 | 58.02 | 44.13 | 65.98 | 55.98 | -7.96 | -11.85 |
| 0.177 | 0.20 | 51.00 | 37.74 | 51.20 | 37.94 | 64.61 | 54.61 | -13.41 | -16.67 |
| 0.509 | 0.20 | 37.16 | 26.85 | 37.36 | 27.05 | 56.00 | 46.00 | -18.64 | -18.95 |
| 2.586 | 0.20 | 37.94 | 27.35 | 38.14 | 27.55 | 56.00 | 46.00 | -17.86 | -18.45 |
| 2.814 | 0.20 | 35.30 | 23.45 | 35.50 | 23.65 | 56.00 | 46.00 | -20.50 | -22.35 |
| 20.433 | 0.20 | 40.14 | 32.79 | 40.34 | 32.99 | 60.00 | 50.00 | -19.66 | -17.01 |

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: | Hugo Yeh | Tested Channel: | CH11: 2462MHz |
| | | Tested Date: | Jun. 25, 2004 |

Power Line Measured : Line

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBmV) | | Emission Level (dBmV) | | Limit (dBmV) | | Margin (dB) | |
|-------------|----------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.150 | 0.20 | 55.40 | 42.29 | 55.60 | 42.49 | 65.98 | 55.98 | -10.38 | -13.49 |
| 0.153 | 0.20 | 51.70 | 39.21 | 51.90 | 39.41 | 65.82 | 55.82 | -13.92 | -16.41 |
| 0.932 | 0.20 | 36.72 | 25.13 | 36.92 | 25.33 | 56.00 | 46.00 | -19.08 | -20.67 |
| 2.616 | 0.20 | 37.42 | 26.91 | 37.62 | 27.11 | 56.00 | 46.00 | -18.38 | -18.89 |
| 2.635 | 0.20 | 37.42 | 26.98 | 37.62 | 27.18 | 56.00 | 46.00 | -18.38 | -18.82 |
| 20.146 | 0.20 | 39.84 | 32.30 | 40.04 | 32.50 | 60.00 | 50.00 | -19.96 | -17.50 |

Power Line Measured : Neutral

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBmV) | | Emission Level (dBmV) | | Limit (dBmV) | | Margin (dB) | |
|-------------|----------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.447 | 0.20 | 38.48 | 27.12 | 38.68 | 27.32 | 56.92 | 46.92 | -18.24 | -19.60 |
| 0.495 | 0.20 | 37.70 | 24.85 | 37.90 | 25.05 | 56.07 | 46.07 | -18.17 | -21.02 |
| 0.500 | 0.20 | 37.00 | 25.10 | 37.20 | 25.30 | 55.98 | 45.98 | -18.78 | -20.68 |
| 2.586 | 0.20 | 38.58 | 27.86 | 38.78 | 28.06 | 56.00 | 46.00 | -17.22 | -17.94 |
| 2.616 | 0.20 | 38.88 | 28.04 | 39.08 | 28.24 | 56.00 | 46.00 | -16.92 | -17.76 |
| 20.750 | 0.20 | 39.74 | 33.54 | 39.94 | 33.74 | 60.00 | 50.00 | -20.06 | -16.26 |

NOTE :

1. Measurement uncertainty is +/-1.32dB
2. Emission level = Reading value + 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 (dBmV/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, antenna, 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:

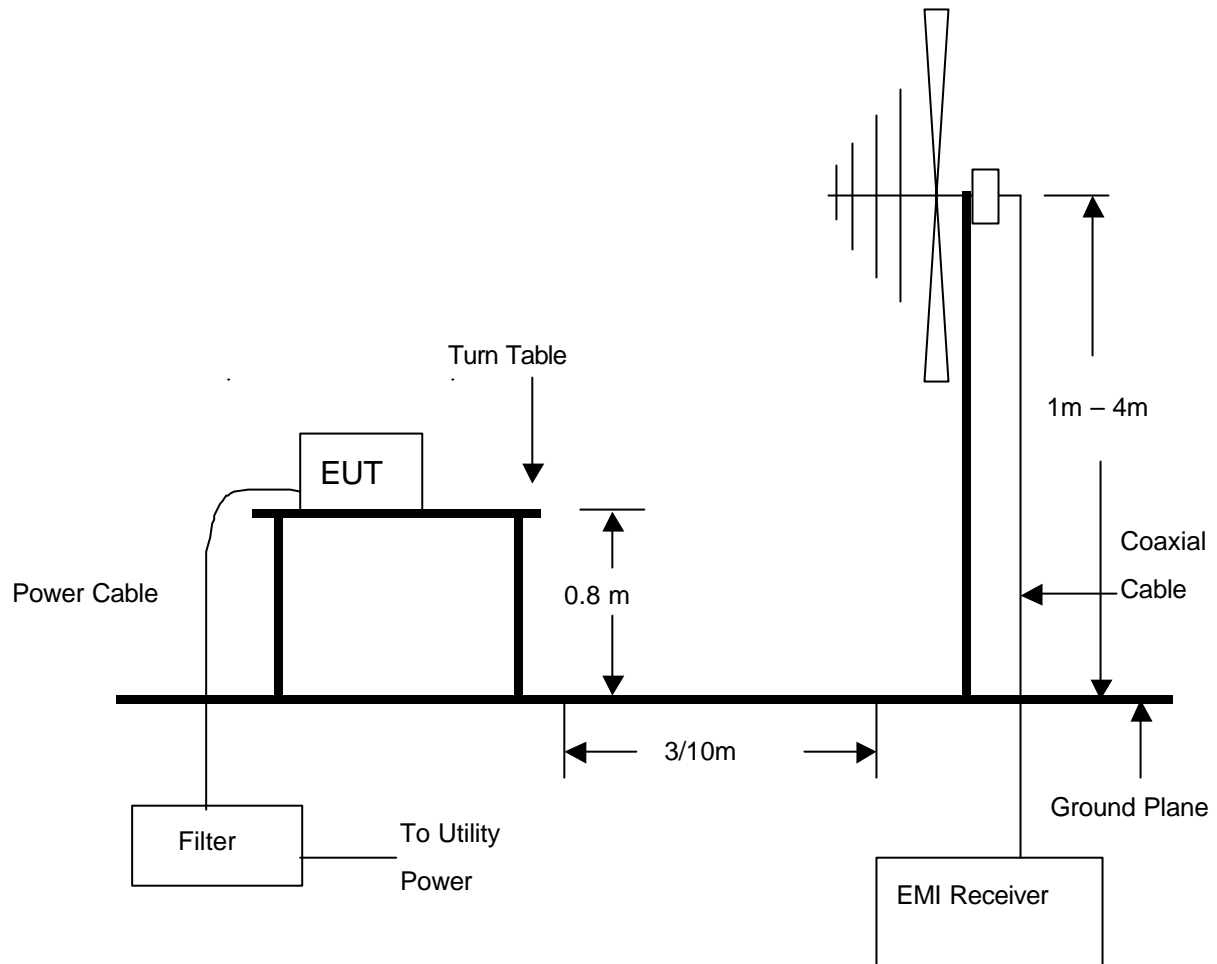
| EQUIPMENT/ FACILITIES | SPECIFICATIONS | MANUFACTURER | MODEL#/ SERIAL# | DUE DATE OF CAL. & CAL. CENTER |
|--------------------------|-------------------------|--------------------|-----------------------|-----------------------------------|
| EMI TEST RECEIVER | 9 kHz TO 2750 MHz | ROHDE & SCHWARZ | ESCS30/ 830245/012 | AUG. 2004 R&S |
| BI-LOG ANTENNA | 25 MHz TO 2 GHz | EMCO | 3142/ 9701-1124 | APR. 2005 SRT |
| SPECTRUM ANALYZER | 9 KHz TO 26.5 GHz | HP | 8593E/ 3710A03220 | MAY 2005 ETC |
| PRE-AMPLIFIER | 1 GHz TO 26.5 GHz | HP | 8449B/ 3008A01019 | DEC. 2004 ETC |
| HORN ANTENNA | 1 GHz TO 18 GHz | EMCO | 3115/ 9602-4681 | JAN. 2005 ETC |
| OATS | 3 – 10 M MEASUREMENT | SRT | SRT-1 | APR. 2005 SRT |
| COAXIAL CABLE | 25M | SUNCITY | J400/ 25M | AUG. 2004 SRT |
| FILTER | 2 LINE, 30A | FIL.COIL | FC-943/ 869 | N/A |
| FREQUENCY CONVERTER | N/A | APC | AFC-1KW/ 860612 | AUG. 2004 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: | 27 °C | Humidity: | 54 %RH |
| Ferquency Range: | 30 – 1000 MHz | Measured Distance: | 3m |
| Receiver Detector: | Q.P. | Tested Mode: | RX |
| Tested By: | Hugo Yeh | Tested Date: | Jun. 24, 2004 |

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) |
|-----------------|-----------------|-----------------------|---------------------|-------------------------|----------------|-------------|-------|-------|
| 133.3346 | 1.21 | 7.37 | 25.8 | 34.4 | 43.5 | -9.1 | 295.6 | 2.62 |
| 400.0060 | 2.29 | 15.80 | 20.4 | 38.5 | 46.0 | -7.5 | 86.7 | 1.00 |
| 480.0400 | 2.61 | 19.46 | 16.7 | 38.8 | 46.0 | -7.2 | 342.6 | 1.60 |
| 566.6760 | 2.86 | 19.75 | 15.1 | 37.7 | 46.0 | -8.3 | 168.6 | 1.55 |
| 666.6760 | 3.10 | 21.26 | 13.2 | 37.6 | 46.0 | -8.4 | 225.6 | 1.21 |
| 780.0688 | 3.33 | 22.74 | 16.1 | 42.2 | 46.0 | -3.8 | 180.2 | 1.24 |

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) |
|-----------------|-----------------|-----------------------|---------------------|-------------------------|----------------|-------------|-------|-------|
| 133.3358 | 1.21 | 7.37 | 26.3 | 34.9 | 43.5 | -8.6 | 167.6 | 1.00 |
| 400.0060 | 2.29 | 15.80 | 20.8 | 38.9 | 46.0 | -7.1 | 89.1 | 1.31 |
| 480.0400 | 2.61 | 19.46 | 20.5 | 42.6 | 46.0 | -3.4 | 349.2 | 1.13 |
| 540.0464 | 2.82 | 19.70 | 16.7 | 39.2 | 46.0 | -6.8 | 180.2 | 1.00 |
| 600.0122 | 2.88 | 20.70 | 16.3 | 39.9 | 46.0 | -6.1 | 250.3 | 1.16 |
| 666.6782 | 3.10 | 21.26 | 15.9 | 40.3 | 46.0 | -5.7 | 223.9 | 1.00 |

NOTE :

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



| | | | |
|--------------------|---------------|--------------------|----------------|
| Temperature: | 27 °C | Humidity: | 54 %RH |
| Ferquency Range: | 1 – 25 GHz | Measured Distance: | 3m |
| Receiver Detector: | PK. or AV. | Tested Mode: | IEEE 802.11g |
| Tested By: | Hugo Yeh | Tested Channel: | CH 1 : 2412MHz |
| Tested Date: | Jun. 24, 2004 | Modulation Type: | 64QAM |

Antenna Polarization : Horizontal

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dB μ V) | | Emission Level (dB μ V/m) | | Limit (dB μ V/m) | | Margin (dB) | | AZ (°) | EL (m) |
|-----------------|---------------------|--------------------|---------------------------|------|-------------------------------|------|----------------------|------|-------------|-------|--------|--------|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2412.0000(F) | -32.18 | 28.02 | 110.8 | 85.8 | 106.6 | 81.6 | N/A | N/A | N/A | N/A | 196.0 | 1.50 |
| 2400.0000 | -32.16 | 28.00 | 49.6 | 27.3 | 45.4 | 23.1 | 74.0 | 54.0 | -28.6 | -30.9 | 322.0 | 1.53 |
| 2393.2000 | -32.19 | 27.99 | 45.7 | 25.8 | 41.5 | 21.6 | 74.0 | 54.0 | -32.5 | -32.4 | 319.0 | 1.50 |
| 2425.6300 | -32.20 | 28.05 | 49.2 | 27.5 | 45.0 | 23.3 | 74.0 | 54.0 | -29.0 | -30.7 | 322.0 | 1.42 |
| 4824.0000 | -30.41 | 33.66 | 40.6 | * | 43.8 | * | 74.0 | 54.0 | -30.2 | * | 2.5 | 1.46 |

Antenna Polarization : Vertical

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dB μ V) | | Emission Level (dB μ V/m) | | Limit (dB μ V/m) | | Margin (dB) | | AZ (°) | EL (m) |
|-----------------|---------------------|--------------------|---------------------------|------|-------------------------------|------|----------------------|------|-------------|-------|--------|--------|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2412.0000(F) | -32.18 | 28.56 | 112.4 | 87.2 | 108.8 | 83.6 | N/A | N/A | N/A | N/A | 301.0 | 1.22 |
| 2400.0000 | -32.16 | 28.00 | 58.4 | 34.5 | 54.2 | 30.3 | 74.0 | 54.0 | -19.8 | -23.7 | 265.0 | 1.22 |
| 2398.3500 | -32.17 | 28.00 | 55.3 | 31.2 | 51.1 | 27.0 | 74.0 | 54.0 | -22.9 | -27.0 | 299.0 | 1.23 |
| 2427.8000 | -32.20 | 28.05 | 54.1 | 30.8 | 50.0 | 26.7 | 74.0 | 54.0 | -24.0 | -27.3 | 300.0 | 1.24 |
| 4824.0000 | -30.41 | 33.66 | 42.1 | * | 45.3 | * | 74.0 | 54.0 | -28.7 | * | 313.0 | 1.52 |

NOTE :

1. Measurement uncertainty is +/-2dB.
2. "**": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission 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 strenght of fundamental frequency.



| | | | |
|--------------------|---------------|--------------------|----------------|
| Temperature: | 27 °C | Humidity: | 54 %RH |
| Ferquency Range: | 1 – 25 GHz | Measured Distance: | 3m |
| Receiver Detector: | PK. or AV. | Tested Mode: | IEEE 802.11g |
| Tested By: | Hugo Yeh | Tested Channel: | CH 6 : 2437MHz |
| Tested Date: | Jun. 24, 2004 | Modulation Type: | 64QAM |

Antenna Polarization : Horizontal

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dB μ V) | | Emission Level (dB μ V/m) | | Limit (dB μ V/m) | | Margin (dB) | | AZ (°) | EL (m) |
|-----------------|---------------------|--------------------|---------------------------|------|-------------------------------|------|----------------------|------|-------------|-------|--------|--------|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2437.0000(F) | -32.22 | 28.07 | 110.7 | 85.8 | 106.6 | 81.7 | N/A | N/A | N/A | N/A | 95.7 | 1.48 |
| 2425.3500 | -32.20 | 28.05 | 51.0 | 28.6 | 46.8 | 24.4 | 74.0 | 54.0 | -27.2 | -29.6 | 96.1 | 1.48 |
| 2449.2100 | -32.24 | 28.10 | 50.8 | 27.3 | 46.7 | 23.2 | 74.0 | 54.0 | -27.3 | -30.8 | 123.7 | 1.37 |
| 2451.6000 | -32.24 | 28.10 | 48.0 | 25.7 | 43.9 | 21.6 | 74.0 | 54.0 | -30.1 | -32.4 | 91.9 | 1.46 |
| 4874.0000 | -30.28 | 33.70 | 42.1 | * | 45.5 | * | 74.0 | 54.0 | -28.5 | * | 29.4 | 1.25 |

Antenna Polarization : Vertical

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dB μ V) | | Emission Level (dB μ V/m) | | Limit (dB μ V/m) | | Margin (dB) | | AZ (°) | EL (m) |
|-----------------|---------------------|--------------------|---------------------------|------|-------------------------------|------|----------------------|------|-------------|-------|--------|--------|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2437.0000(F) | -32.22 | 28.61 | 109.2 | 84.3 | 105.6 | 80.7 | N/A | N/A | N/A | N/A | 174.1 | 1.51 |
| 2425.2300 | -32.20 | 28.05 | 57.9 | 33.8 | 53.7 | 29.6 | 74.0 | 54.0 | -20.3 | -24.4 | 24.9 | 1.49 |
| 2422.6000 | -32.20 | 28.04 | 54.5 | 31.3 | 50.3 | 27.1 | 74.0 | 54.0 | -23.7 | -26.9 | 162.1 | 1.52 |
| 2452.6000 | -32.24 | 28.10 | 53.9 | 30.6 | 49.8 | 26.5 | 74.0 | 54.0 | -24.2 | -27.5 | 176.7 | 1.50 |
| 4874.0000 | -30.28 | 33.70 | 43.2 | * | 46.6 | * | 74.0 | 54.0 | -27.4 | * | 347.6 | 1.62 |

NOTE :

1. Measurement uncertainty is +/-2dB.
2. "**": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission 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 strenght of fundamental frequency.



| | | | |
|--------------------|---------------|--------------------|-----------------|
| Temperature: | 27 °C | Humidity: | 54 %RH |
| Ferquency Range: | 1 – 25 GHz | Measured Distance: | 3m |
| Receiver Detector: | PK. or AV. | Tested Mode: | IEEE 802.11g |
| Tested By: | Hugo Yeh | Tested Channel: | CH 11 : 2462MHz |
| Tested Date: | Jun. 24, 2004 | Modulation Type: | 64QAM |

Antenna Polarization : Horizontal

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dB μ V) | | Emission Level (dB μ V/m) | | Limit (dB μ V/m) | | Margin (dB) | | AZ (°) | EL (m) |
|-----------------|---------------------|--------------------|---------------------------|------|-------------------------------|------|----------------------|------|-------------|-------|--------|--------|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2462.0000(F) | -32.22 | 28.12 | 109.8 | 84.6 | 105.7 | 80.5 | N/A | N/A | N/A | N/A | 4.5 | 1.49 |
| 2477.8000 | -32.20 | 28.15 | 47.6 | 26.3 | 43.6 | 22.3 | 74.0 | 54.0 | -30.4 | -31.7 | 320.1 | 1.46 |
| 2483.5000 | -32.19 | 28.17 | 44.1 | 25.7 | 40.1 | 21.7 | 74.0 | 54.0 | -33.9 | -32.3 | 5.7 | 1.48 |
| 2450.4000 | -32.24 | 28.10 | 50.1 | 29.6 | 46.0 | 25.5 | 74.0 | 54.0 | -28.0 | -28.5 | 8.9 | 1.49 |
| 4924.0000 | -30.23 | 33.74 | 41.3 | * | 44.8 | * | 74.0 | 54.0 | -29.2 | * | 340.9 | 1.28 |

Antenna Polarization : Vertical

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dB μ V) | | Emission Level (dB μ V/m) | | Limit (dB μ V/m) | | Margin (dB) | | AZ (°) | EL (m) |
|-----------------|---------------------|--------------------|---------------------------|------|-------------------------------|------|----------------------|------|-------------|-------|--------|--------|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2462.0000(F) | -32.22 | 28.69 | 108.4 | 83.2 | 104.9 | 79.7 | N/A | N/A | N/A | N/A | 293.0 | 1.50 |
| 2477.8200 | -32.20 | 28.15 | 55.6 | 31.2 | 51.6 | 27.2 | 74.0 | 54.0 | -22.4 | -26.8 | 189.7 | 1.51 |
| 2483.5000 | -32.19 | 28.17 | 47.2 | 26.3 | 43.2 | 22.3 | 74.0 | 54.0 | -30.8 | -31.7 | 287.4 | 1.50 |
| 2447.2000 | -32.24 | 28.09 | 55.1 | 31.7 | 51.0 | 27.6 | 74.0 | 54.0 | -23.0 | -26.4 | 301.6 | 1.50 |
| 4924.0000 | -30.23 | 33.74 | 42.5 | * | 46.0 | * | 74.0 | 54.0 | -28.0 | * | 112.4 | 1.62 |

NOTE :

1. Measurement uncertainty is +/-2dB.
2. "**": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission 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 strength of fundamental frequency.



| | | | |
|--------------------|---------------|--------------------|----------------|
| Temperature: | 27 °C | Humidity: | 54 %RH |
| Ferquency Range: | 1 – 25 GHz | Measured Distance: | 3m |
| Receiver Detector: | PK. or AV. | Tested Mode: | IEEE 802.11b |
| Tested By: | Hugo Yeh | Tested Channel: | CH 1 : 2412MHz |
| Tested Date: | Jun. 24, 2004 | Modulation Type: | CCK |

Antenna Polarization : Horizontal

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dB μ V) | | Emission Level (dB μ V/m) | | Limit (dB μ V/m) | | Margin (dB) | | AZ (°) | EL (m) |
|-----------------|---------------------|--------------------|---------------------------|------|-------------------------------|------|----------------------|------|-------------|-------|--------|--------|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2412.0000(F) | -32.18 | 28.02 | 115.3 | 89.3 | 111.1 | 85.1 | N/A | N/A | N/A | N/A | 273.4 | 1.04 |
| 2400.0000 | -32.16 | 28.00 | 62.8 | 39.4 | 58.6 | 35.2 | 74.0 | 54.0 | -15.4 | -18.8 | 268.1 | 1.03 |
| 2397.3000 | -32.17 | 27.99 | 62.4 | 39.2 | 58.2 | 35.0 | 74.0 | 54.0 | -15.8 | -19.0 | 197.4 | 1.04 |
| 2428.3000 | -32.20 | 28.06 | 57.9 | 37.4 | 53.8 | 33.3 | 74.0 | 54.0 | -20.2 | -20.7 | 340.0 | 1.05 |
| 4824.0000 | -30.41 | 33.66 | 42.1 | * | 45.3 | * | 74.0 | 54.0 | -28.7 | * | 216.2 | 1.00 |

Antenna Polarization : Vertical

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dB μ V) | | Emission Level (dB μ V/m) | | Limit (dB μ V/m) | | Margin (dB) | | AZ (°) | EL (m) |
|-----------------|---------------------|--------------------|---------------------------|------|-------------------------------|------|----------------------|------|-------------|-------|--------|--------|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2412.0000(F) | -32.18 | 28.56 | 114.4 | 88.4 | 110.8 | 84.8 | N/A | N/A | N/A | N/A | 333.0 | 1.02 |
| 2400.0000 | -32.16 | 28.00 | 67.9 | 42.5 | 63.7 | 38.3 | 74.0 | 54.0 | -10.3 | -15.7 | 354.8 | 1.02 |
| 2396.6300 | -32.18 | 27.99 | 69.1 | 43.4 | 64.9 | 39.2 | 74.0 | 54.0 | -9.1 | -14.8 | 328.1 | 1.00 |
| 2438.5000 | -32.22 | 28.08 | 49.2 | 26.8 | 45.1 | 22.7 | 74.0 | 54.0 | -28.9 | -31.3 | 284.7 | 1.02 |
| 4824.0000 | -30.41 | 33.66 | 43.6 | * | 46.8 | * | 74.0 | 54.0 | -27.2 | * | 232.1 | 1.23 |

NOTE :

1. Measurement uncertainty is +/-2dB.
2. "**": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission 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 strenght of fundamental frequency.



| | | | |
|--------------------|---------------|--------------------|----------------|
| Temperature: | 27 °C | Humidity: | 54 %RH |
| Ferquency Range: | 1 – 25 GHz | Measured Distance: | 3m |
| Receiver Detector: | PK. or AV. | Tested Mode: | IEEE 802.11b |
| Tested By: | Hugo Yeh | Tested Channel: | CH 6 : 2437MHz |
| Tested Date: | Jun. 24, 2004 | Modulation Type: | CCK |

Antenna Polarization : Horizontal

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dB μ V) | | Emission Level (dB μ V/m) | | Limit (dB μ V/m) | | Margin (dB) | | AZ (°) | EL (m) |
|-----------------|---------------------|--------------------|---------------------------|------|-------------------------------|------|----------------------|------|-------------|-------|--------|--------|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2437.0000(F) | -32.22 | 28.07 | 116.2 | 90.3 | 112.1 | 86.2 | N/A | N/A | N/A | N/A | 302.5 | 1.49 |
| 2421.8000 | -32.19 | 28.04 | 62.7 | 36.3 | 58.5 | 32.1 | 74.0 | 54.0 | -15.5 | -21.9 | 286.5 | 1.50 |
| 2453.0000 | -32.24 | 28.11 | 62.0 | 35.8 | 57.9 | 31.7 | 74.0 | 54.0 | -16.1 | -22.3 | 273.9 | 1.49 |
| 2425.8000 | -32.20 | 28.05 | 61.9 | 34.6 | 57.7 | 30.4 | 74.0 | 54.0 | -16.3 | -23.6 | 37.9 | 1.48 |
| 4874.0000 | -30.28 | 33.70 | 43.1 | * | 46.5 | * | 74.0 | 54.0 | -27.5 | * | 320.8 | 1.27 |

Antenna Polarization : Vertical

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dB μ V) | | Emission Level (dB μ V/m) | | Limit (dB μ V/m) | | Margin (dB) | | AZ (°) | EL (m) |
|-----------------|---------------------|--------------------|---------------------------|------|-------------------------------|------|----------------------|------|-------------|-------|--------|--------|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2437.0000(F) | -32.22 | 28.61 | 113.5 | 87.6 | 109.9 | 84.0 | N/A | N/A | N/A | N/A | 311.8 | 1.20 |
| 2422.0000 | -32.20 | 28.04 | 70.3 | 43.2 | 66.1 | 39.0 | 74.0 | 54.0 | -7.9 | -15.0 | 348.2 | 1.20 |
| 2419.5000 | -32.19 | 28.04 | 67.8 | 40.7 | 63.6 | 36.5 | 74.0 | 54.0 | -10.4 | -17.5 | 293.1 | 1.21 |
| 2453.0000 | -32.24 | 28.11 | 71.0 | 43.6 | 66.9 | 39.5 | 74.0 | 54.0 | -7.1 | -14.5 | 299.7 | 1.19 |
| 4874.0000 | -30.28 | 33.70 | 44.6 | * | 48.0 | * | 74.0 | 54.0 | -26.0 | * | 112.6 | 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. Emission 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 strength of fundamental frequency.



| | | | |
|--------------------|---------------|--------------------|-----------------|
| Temperature: | 27 °C | Humidity: | 54 %RH |
| Ferquency Range: | 1 – 25 GHz | Measured Distance: | 3m |
| Receiver Detector: | PK. or AV. | Tested Mode: | IEEE 802.11b |
| Tested By: | Hugo Yeh | Tested Channel: | CH 11 : 2462MHz |
| Tested Date: | Jun. 24, 2004 | Modulation Type: | CCK |

Antenna Polarization : Horizontal

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dB μ V) | | Emission Level (dB μ V/m) | | Limit (dB μ V/m) | | Margin (dB) | | AZ (°) | EL (m) |
|-----------------|---------------------|--------------------|---------------------------|------|-------------------------------|------|----------------------|------|-------------|-------|--------|--------|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2462.0000(F) | -32.22 | 28.12 | 114.3 | 88.2 | 110.2 | 84.1 | N/A | N/A | N/A | N/A | 131.7 | 1.48 |
| 2477.8000 | -32.20 | 28.15 | 62.4 | 36.1 | 58.4 | 32.1 | 74.0 | 54.0 | -15.6 | -21.9 | 130.1 | 1.49 |
| 2483.5000 | -32.19 | 28.17 | 47.5 | 23.9 | 43.5 | 19.9 | 74.0 | 54.0 | -30.5 | -34.1 | 130.1 | 1.48 |
| 2446.8000 | -32.23 | 28.09 | 64.4 | 38.1 | 60.3 | 34.0 | 74.0 | 54.0 | -13.7 | -20.0 | 269.7 | 1.48 |
| 4924.0000 | -30.23 | 33.74 | 42.1 | * | 45.6 | * | 74.0 | 54.0 | -28.4 | * | 134.2 | 1.49 |

Antenna Polarization : Vertical

| Frequency (MHz) | Correct Factor (dB) | Ant. Factor (dB/m) | Reading Data (dB μ V) | | Emission Level (dB μ V/m) | | Limit (dB μ V/m) | | Margin (dB) | | AZ (°) | EL (m) |
|-----------------|---------------------|--------------------|---------------------------|------|-------------------------------|------|----------------------|------|-------------|-------|--------|--------|
| | | | PK. | AV. | PK. | AV. | PK. | AV. | PK. | AV. | | |
| 2462.0000(F) | -32.22 | 28.69 | 115.8 | 89.8 | 112.3 | 86.3 | N/A | N/A | N/A | N/A | 2.7 | 1.50 |
| 2478.2500 | -32.20 | 28.16 | 70.7 | 43.2 | 66.7 | 39.2 | 74.0 | 54.0 | -7.3 | -14.8 | 132.4 | 1.51 |
| 2483.5000 | -32.19 | 28.17 | 53.1 | 28.2 | 49.1 | 24.2 | 74.0 | 54.0 | -24.9 | -29.8 | 243.4 | 1.50 |
| 2447.0000 | -32.24 | 28.09 | 71.0 | 43.6 | 66.9 | 39.5 | 74.0 | 54.0 | -7.1 | -14.5 | 264.8 | 1.50 |
| 4924.0000 | -30.23 | 33.74 | 45.2 | * | 48.7 | * | 74.0 | 54.0 | -25.3 | * | 269.7 | 1.52 |

NOTE :

1. Measurement uncertainty is +/-2dB.
2. "**": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission 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 strenght 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.

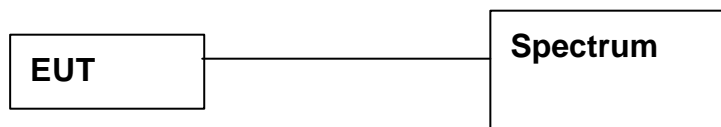
4.3.2 TEST EQUIPMENT

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 | MAR. 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.

4.3.3 TEST SET-UP



The EUT was connected to a spectrum through a 50 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.

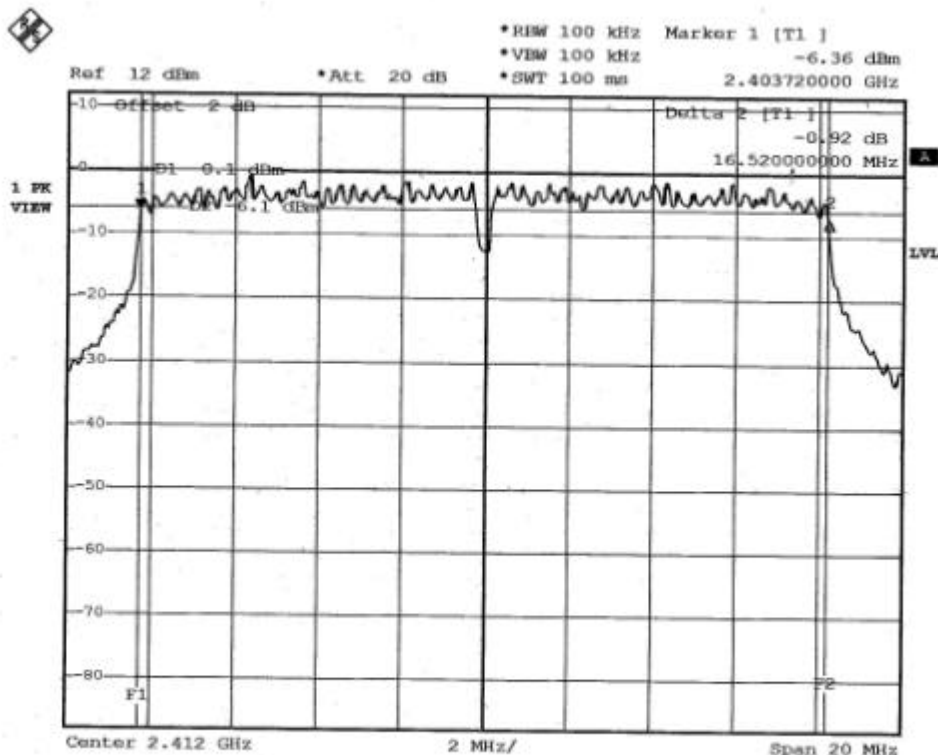


4.3.6 TEST RESULT

| | | | |
|--------------------|----------------------|------------------|---------------------|
| Temperature: | <u>23°C</u> | Humidity: | <u>60%RH</u> |
| Spectrum Detector: | <u>PK.</u> | Tested Mode: | <u>IEEE 802.11g</u> |
| Tested By: | <u>Hugo Yeh</u> | Modulation Type: | <u>64QAM</u> |
| Tested Date: | <u>Jun. 04, 2004</u> | | |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz) | 6dB DOWN BW (MHz) | MINIMUM LIMIT (MHz) |
|----------------|-------------------------|-------------------|---------------------|
| 1 | 2412 | 16.52 | 0.5 |
| 6 | 2437 | 16.28 | 0.5 |
| 11 | 2462 | 16.52 | 0.5 |

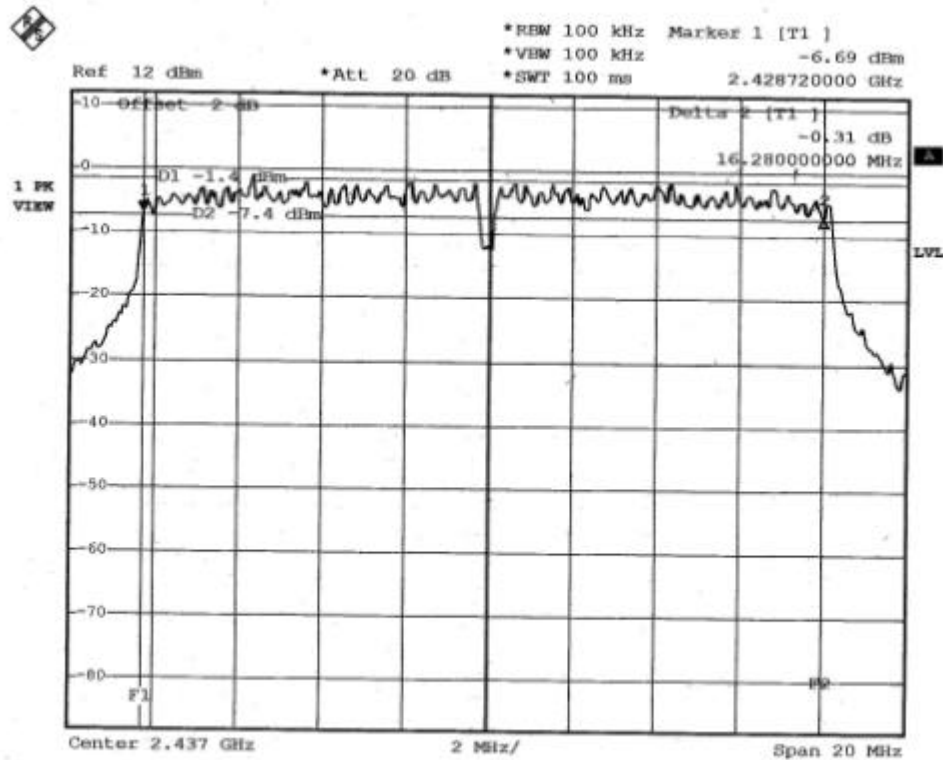
CH1:



Date: 4.JUN.2004 11:02:51



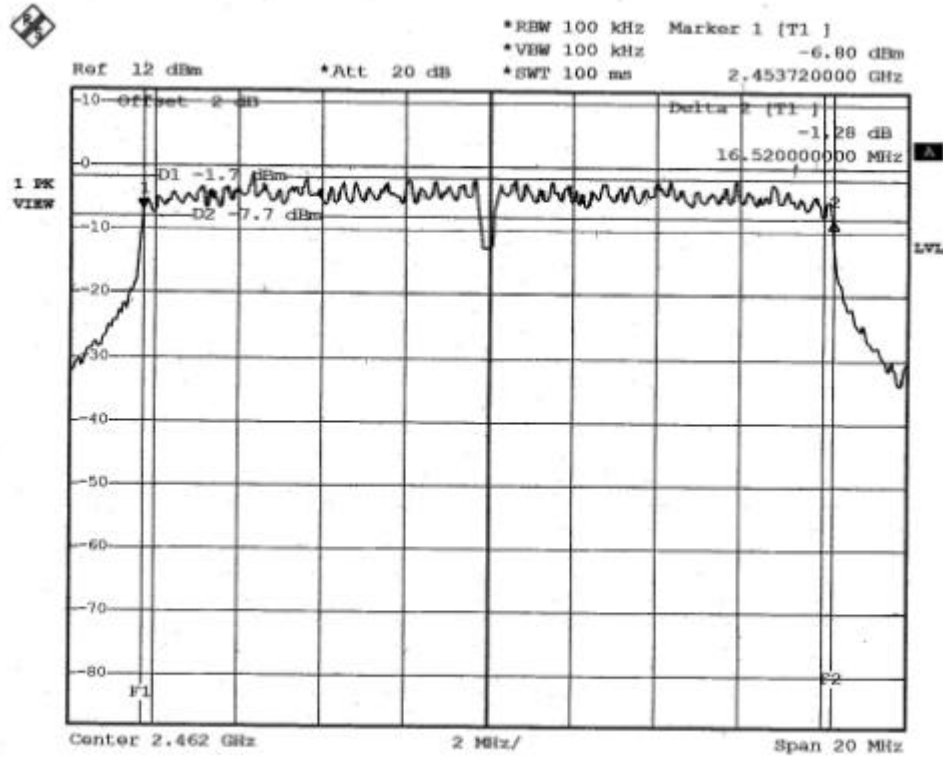
CH 6:



Date: 4.JUN.2004 11:05:38



CH 11:



Date: 4.JUN.2004 11:09:08



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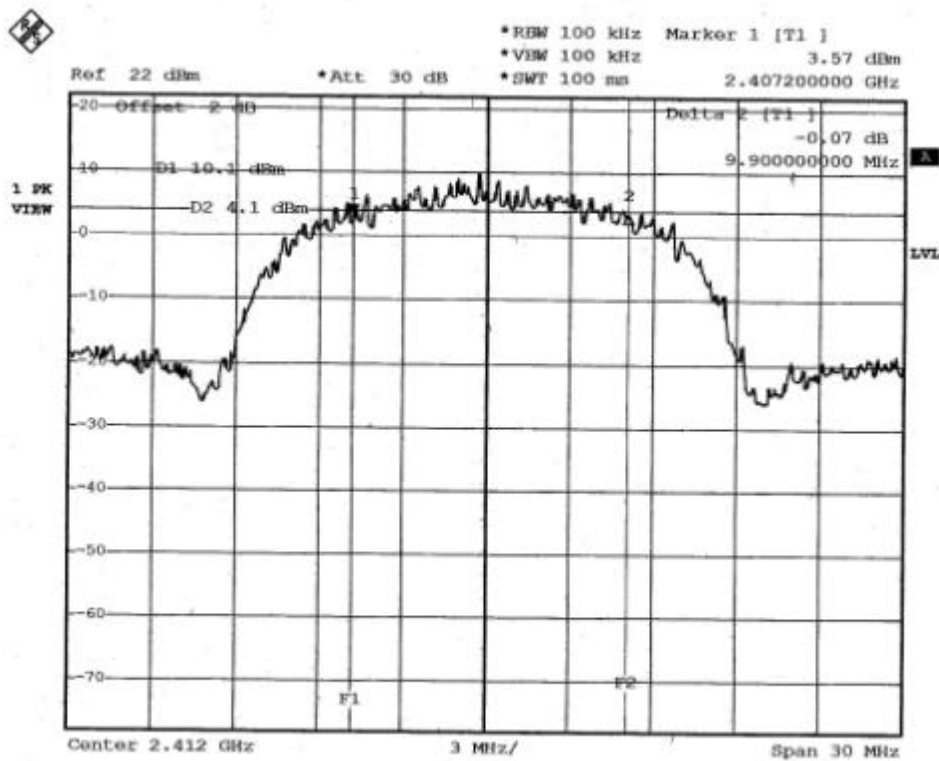
TEST REPORT

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| | | | |
|--------------------|----------------------|------------------|---------------------|
| Temperature: | <u>23°C</u> | Humidity: | <u>60%RH</u> |
| Spectrum Detector: | <u>PK.</u> | Tested Mode: | <u>IEEE 802.11b</u> |
| Tested By: | <u>Hugo Yeh</u> | Modulation Type: | <u>CCK</u> |
| Tested Date: | <u>Jun. 04, 2004</u> | | |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz) | 6dB DOWN BW (MHz) | MINIMUM LIMIT (MHz) |
|----------------|-------------------------|-------------------|---------------------|
| 1 | 2412 | 9.90 | 0.5 |
| 6 | 2437 | 10.32 | 0.5 |
| 11 | 2462 | 10.68 | 0.5 |

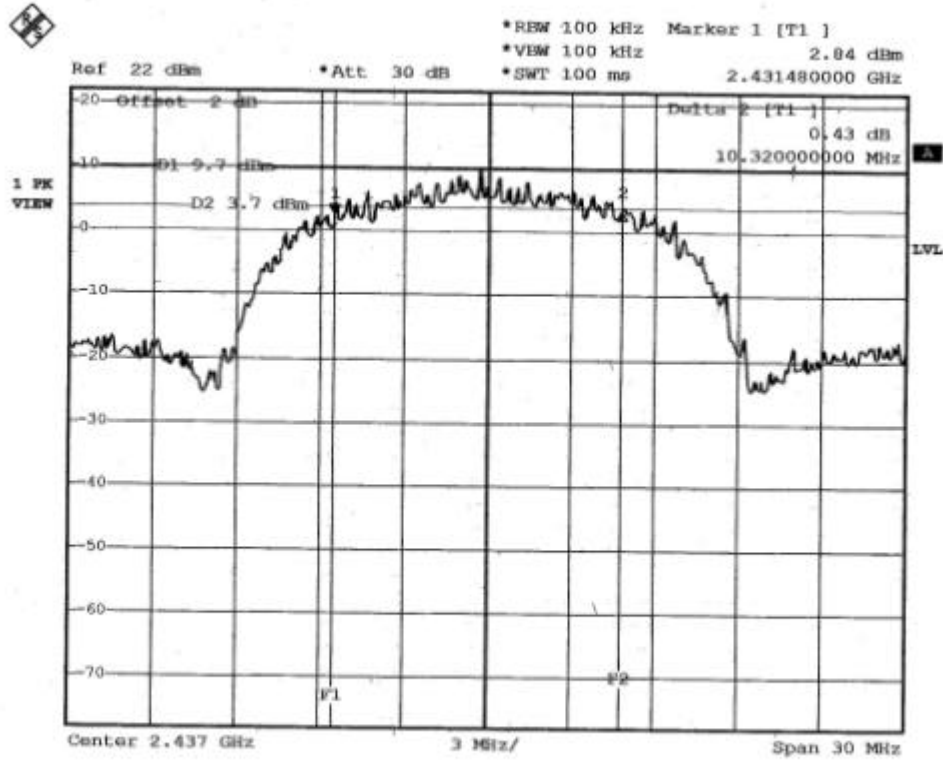
CH1:



Date: 4.JUN.2004 10:39:57



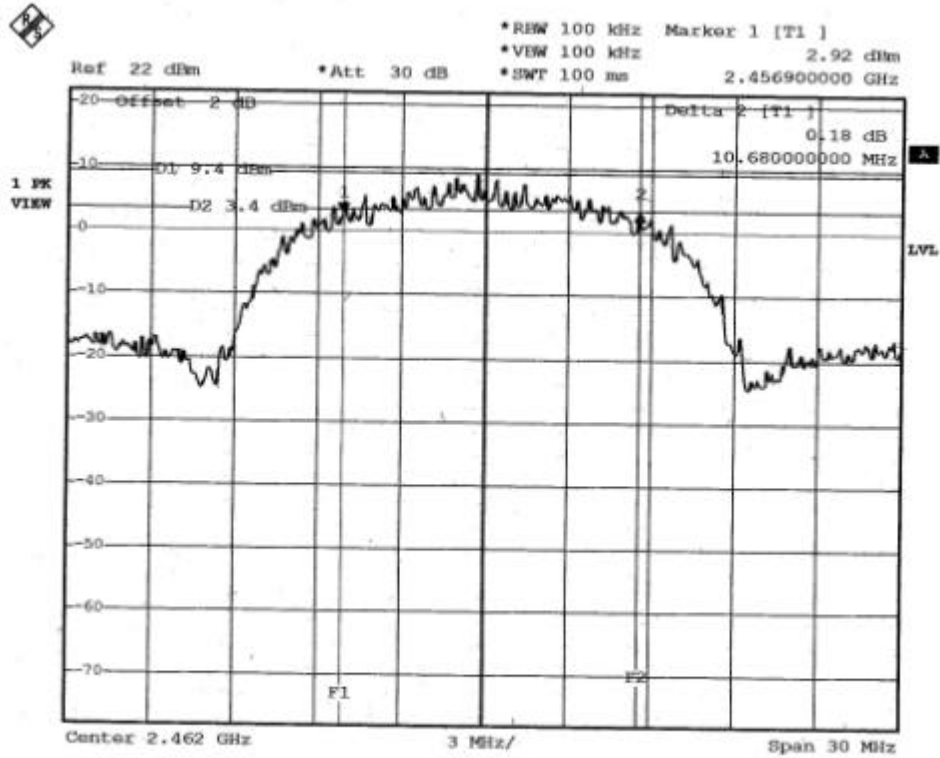
CH 6:



Date: 4.JUN.2004 10:43:17



CH 11:



Date: 4.JUN.2004 10:48:47



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

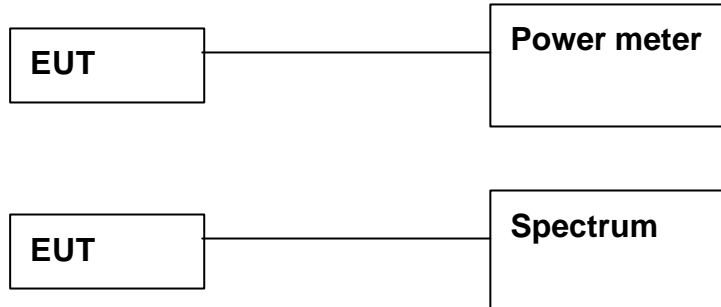
The following test equipment was used during the test:

| EQUIPMENT/ FACILITIES | SPECIFICATIONS | MANUFACTURER | MODEL#/ SERIAL# | DUE DATE OF CAL. & CAL. CENTER |
|-----------------------|----------------|-----------------|---------------------|--------------------------------|
| SPECTRUM | 9kHz-7GHz | ROHDE & SCHWARZ | FSP7/ 839511/010 | MAR. 2005 ETC |
| POWER METER | N/A | BOONTON | 4232A/ 29001 | MAY. 2005 ETC |
| POWER SENSOR | DC-8GHz 50 | BOONTON | 51011EMC/ 31181 | NOV. 2004 BOONTON |

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 50 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.

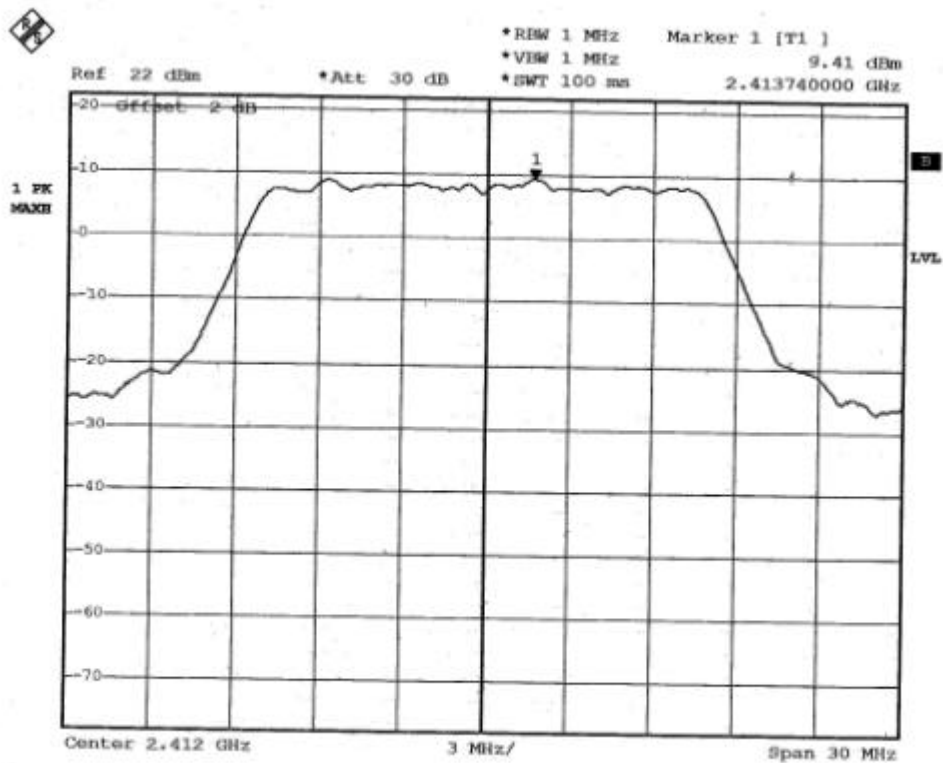


4.4.6 TEST RESULT

| | | | |
|--------------------|----------------------|------------------|---------------------|
| Temperature: | <u>23°C</u> | Humidity: | <u>60%RH</u> |
| Spectrum Detector: | <u>PK.</u> | Tested Mode: | <u>IEEE 802.11g</u> |
| Tested By: | <u>Hugo Yeh</u> | Modulation Type: | <u>64QAM</u> |
| Tested Date: | <u>Jun. 04, 2004</u> | | |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (dBm) | PEAK POWER LIMIT (dBm) |
|----------------|-------------------------|-------------------------|------------------------|
| 1 | 2412 | 9.41 | 30 |
| 6 | 2437 | 9.27 | 30 |
| 11 | 2462 | 9.04 | 30 |

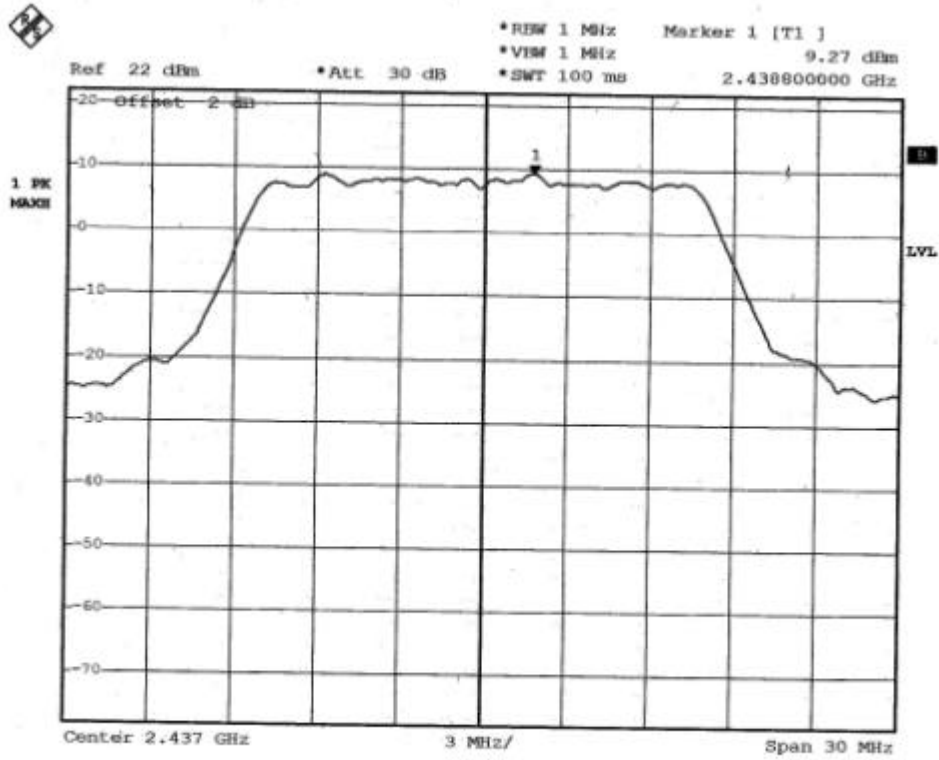
CH 1:



Date: 4 JUN 2004 11:45:26



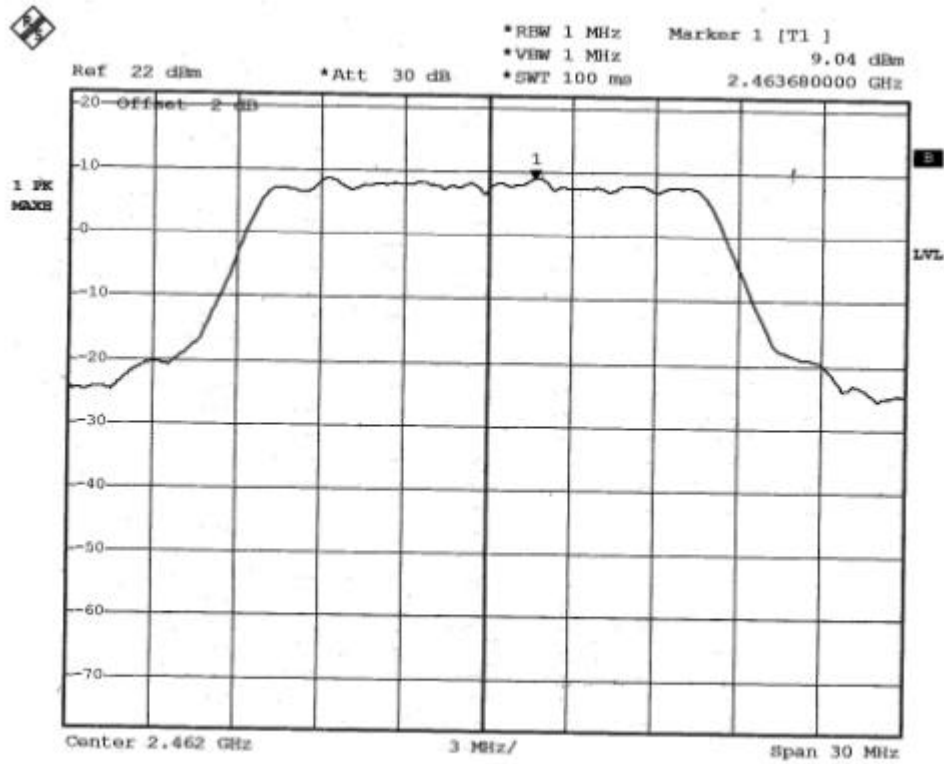
CH 6:



Date: 4.JUN.2004 11:44:18



CH 11:



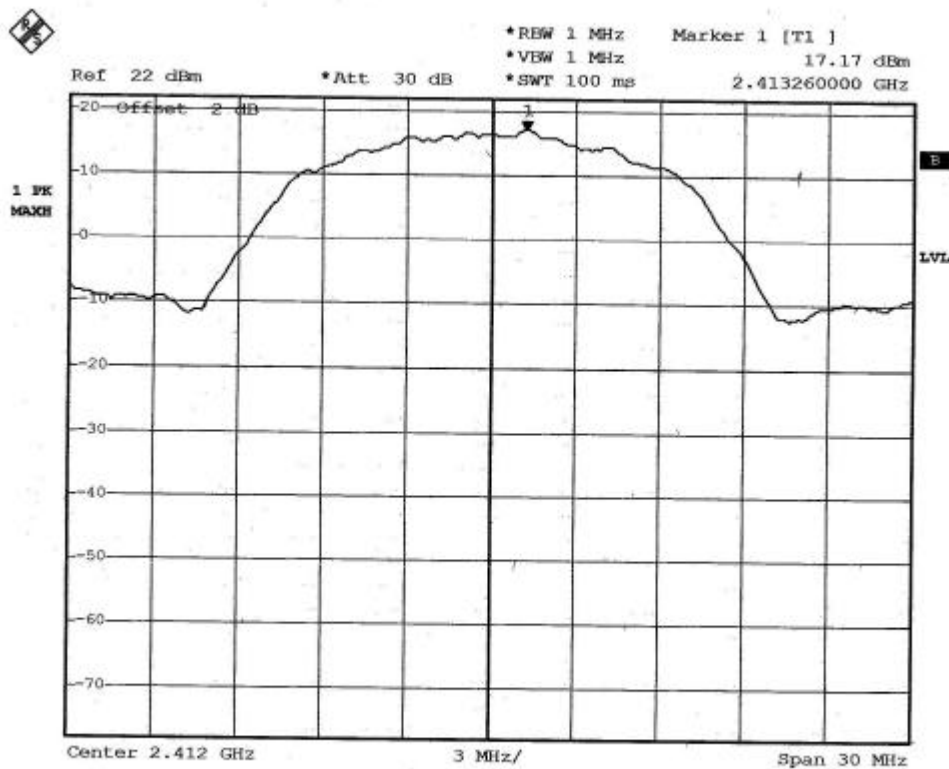
Date: 4 JUN 2004 11:46:20



| | | | |
|--------------------|----------------------|------------------|---------------------|
| Temperature: | <u>23°C</u> | Humidity: | <u>60%RH</u> |
| Spectrum Detector: | <u>PK.</u> | Tested Mode: | <u>IEEE 802.11b</u> |
| Tested By: | <u>Ken Su</u> | Modulation Type: | <u>CCK</u> |
| Tested Date: | <u>Jun. 04, 2004</u> | | |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (dBm) | PEAK POWER LIMIT (dBm) |
|----------------|-------------------------|-------------------------|------------------------|
| 1 | 2412 | 17.17 | 30 |
| 6 | 2437 | 16.94 | 30 |
| 11 | 2462 | 16.58 | 30 |

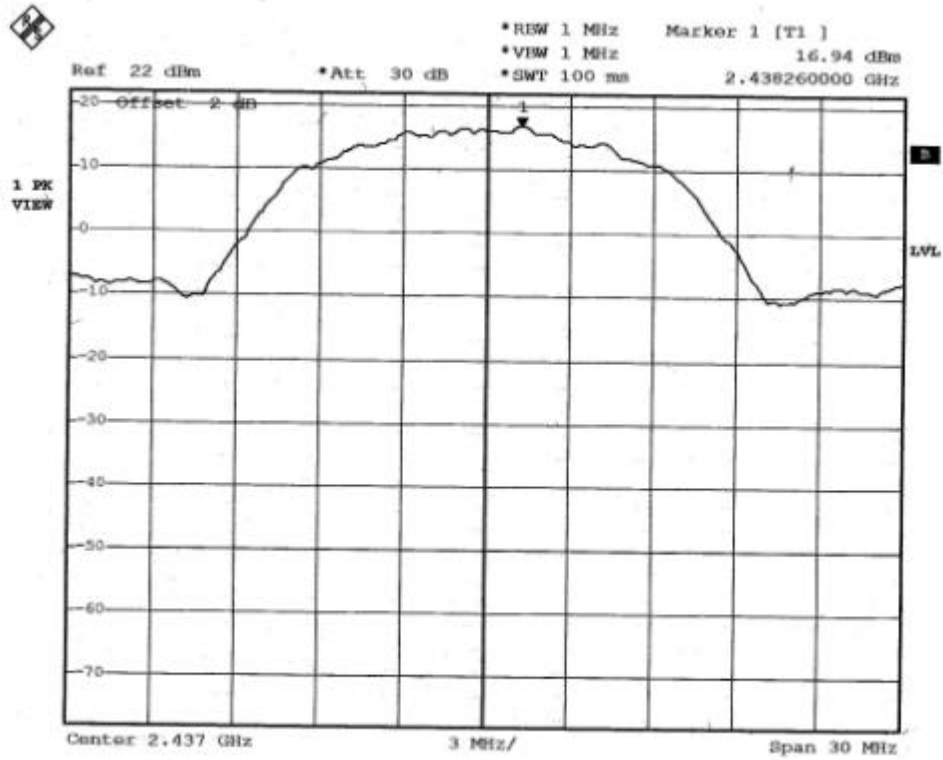
CH 1:



Date: 4.JUN.2004 11:48:35



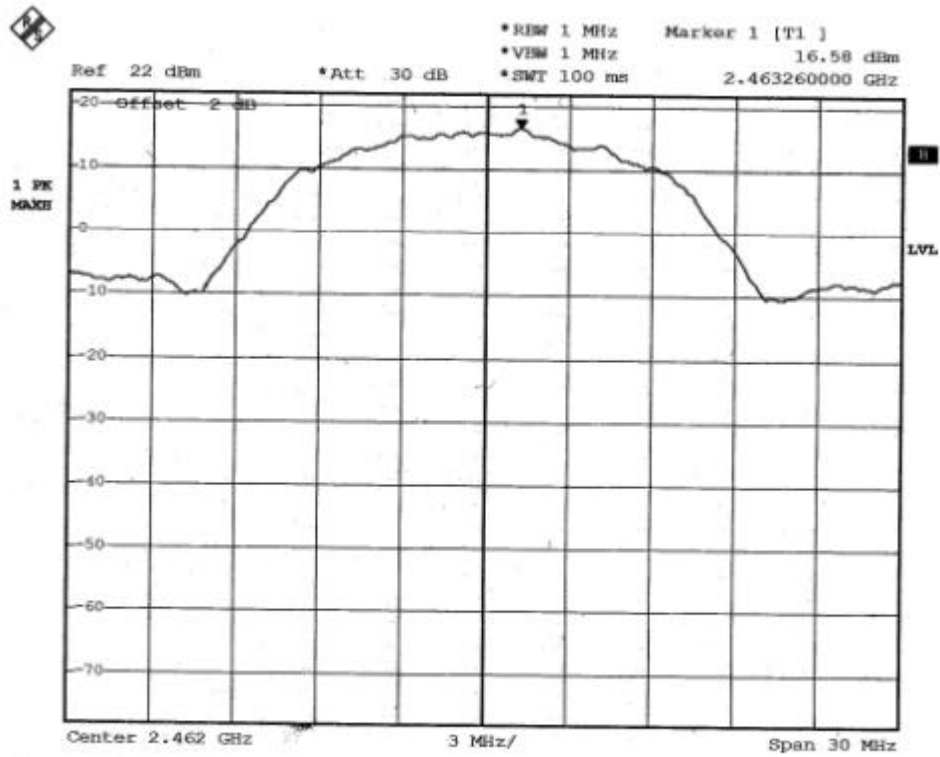
CH 6:



Date: 4.JUN.2004 11:49:30



CH 11:



Date: 4.JUN.2004 11:50:26



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:

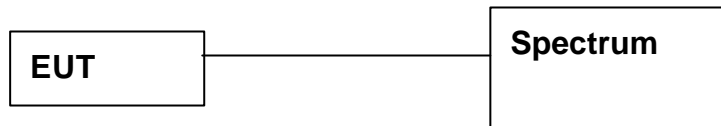
| EQUIPMENT/ FACILITIES | SPECIFICATIONS | MANUFACTURER | MODEL#/ SERIAL# | DUE DATE OF CAL. & CAL. CENTER |
|-----------------------|---------------------------------|-----------------|----------------------|--------------------------------|
| SPECTRUM | 9kHz-7GHz | ROHDE & SCHWARZ | FSP7/ 839511/010 | MAR. 2005 ETC |
| SPECTRUM | 9KHz-26.5GHz | HP | 8953E/ 3710A03220 | MAY 2005 ETC |
| PRE-AMPLIFIER | 1GHz-26.5GHz Gain:30dB(typ.) | HP | 8449B/ 3008A01019 | DEC. 2004 ETC |
| HORN ANTENNA | 1GHz to 18GHz | EMCO | 3115/ 9602-4681 | NOV. 2004 ETC |
| OATS | 3 - 10 M measurement | SRT | SRT-1 | APR. 2005 SRT |

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



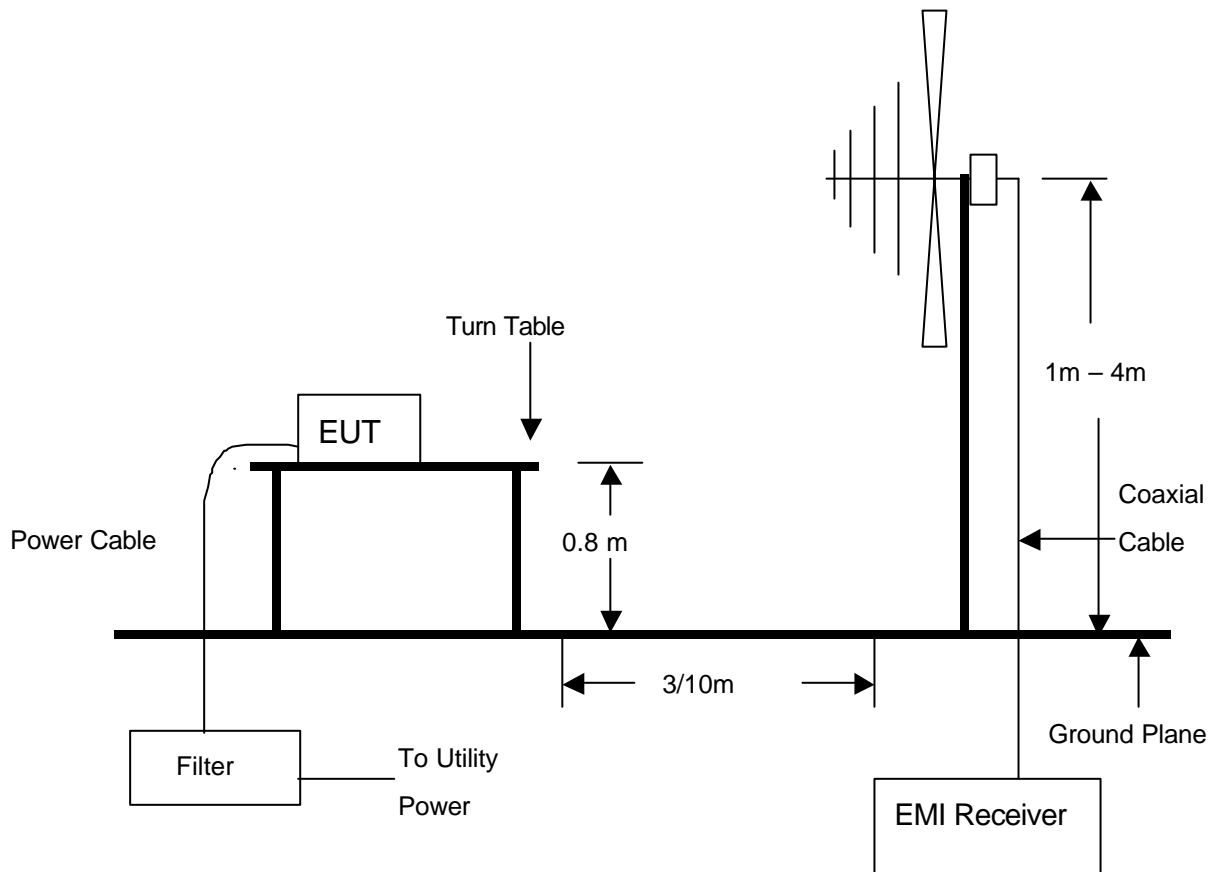
4.5.3 TEST SET-UP

FOR RF CONDUCTED TEST (dBc)



The EUT was connected to a spectrum through a 50 Ω 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: Hugo Yeh Modulation Type: 64QAM
Tested Date: Jun. 04, 2004

1. Conducted test

| Frequency (MHz) | Emission read Value(dBm) | Result of Band edge (dBc) | Band edge LIMIT (dBc) |
|-----------------|--------------------------|---------------------------|-----------------------|
| <2400 | -0.83 | 34.10 | >20dBc |
| >2483.5 | -1.07 | 47.55 | >20dBc |

2. Radiated emission test

| Frequency (MHz) | Antenna polarization (H/V) | PEAK POWER OUTPUT (dBuV/m) | Emission read Value(dBuV/m) | Band edge LIMIT (dBuV/m) |
|-----------------|----------------------------|----------------------------|-----------------------------|--------------------------|
| <2400 | V | 108.8 | 30.3 | 54 |
| >2483.5 | H | 105.7 | 25.5 | 54 |

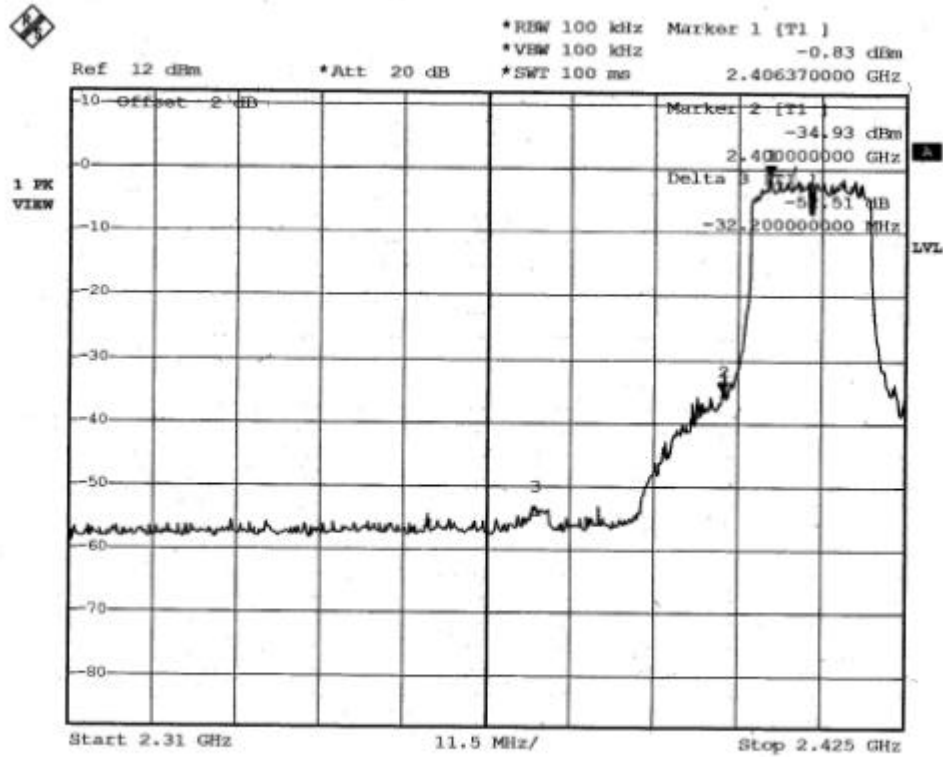


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City, Taoyuan, Taiwan

TEST REPORT

Reference No.:B04041208
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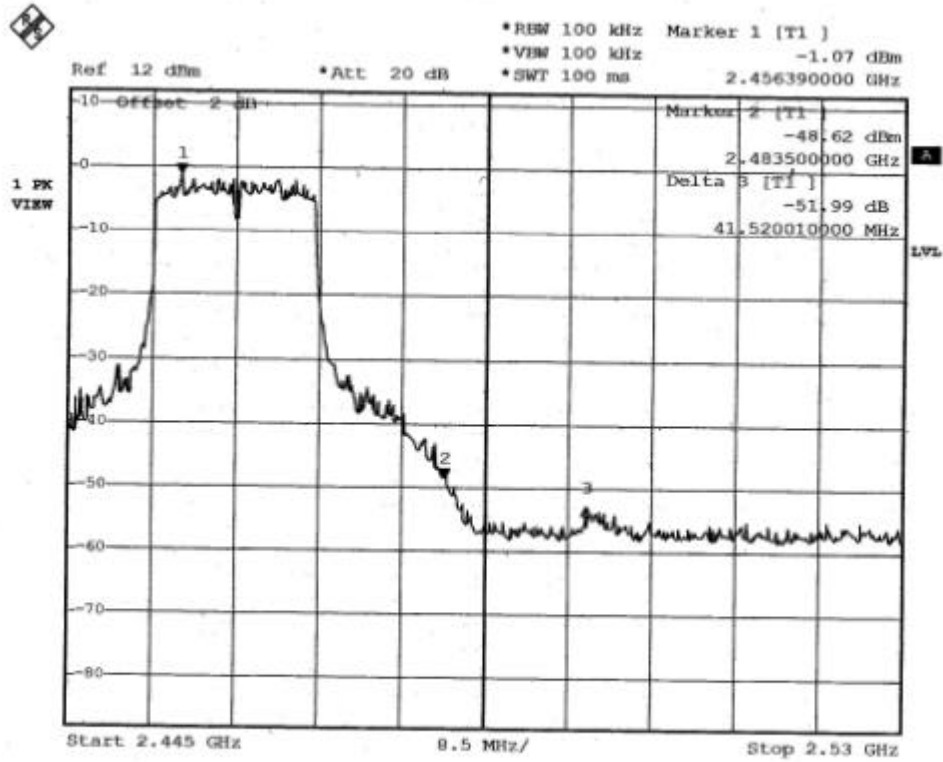
<2400MHz



Date: 4.JUN.2004 11:11:58



>2483.5MHz



Date: 4.JUN.2004 11:14:06



TEST REPORT

Temperature: 23° C Humidity: 60%RH
Spectrum Detector: PK. & AV. Tested Mode: IEEE 802.11b
Tested By: Hugo Yeh Modulation Type: CCK
Tested Date: Jun. 04, 2004

1. Conducted test

| Frequency (MHz) | Emission read Value(dBm) | Result of Band edge (dBc) | Band edge LIMIT (dBc) |
|-----------------|--------------------------|---------------------------|-----------------------|
| <2400 | 7.47 | 30.22 | >20dBc |
| >2483.5 | 9.19 | 45.40 | >20dBc |

2. Radiated emission test

| Frequency (MHz) | Antenna polarization (H/V) | PEAK POWER OUTPUT (dBuV/m) | Emission read Value(dBuV/m) | Band edge LIMIT (dBuV/m) |
|-----------------|----------------------------|----------------------------|-----------------------------|--------------------------|
| <2400 | H | 111.1 | 35.2 | 54.0 |
| >2483.5 | V | 112.3 | 39.5 | 54.0 |

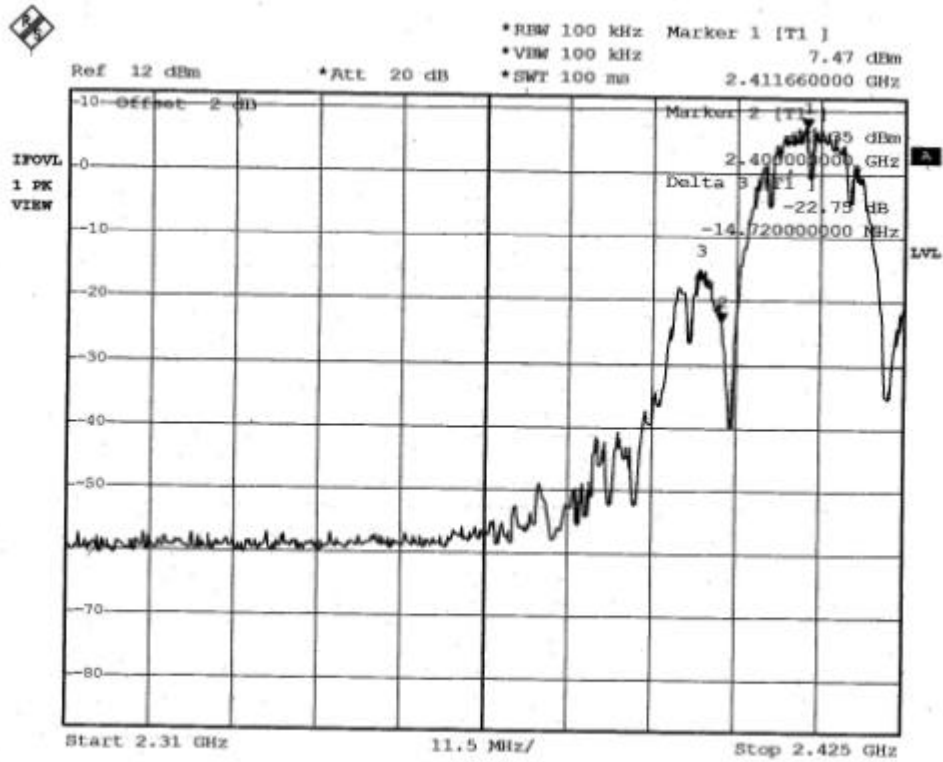


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TEST REPORT

Reference No.:B04041208
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Date:Jun. 25, 2004

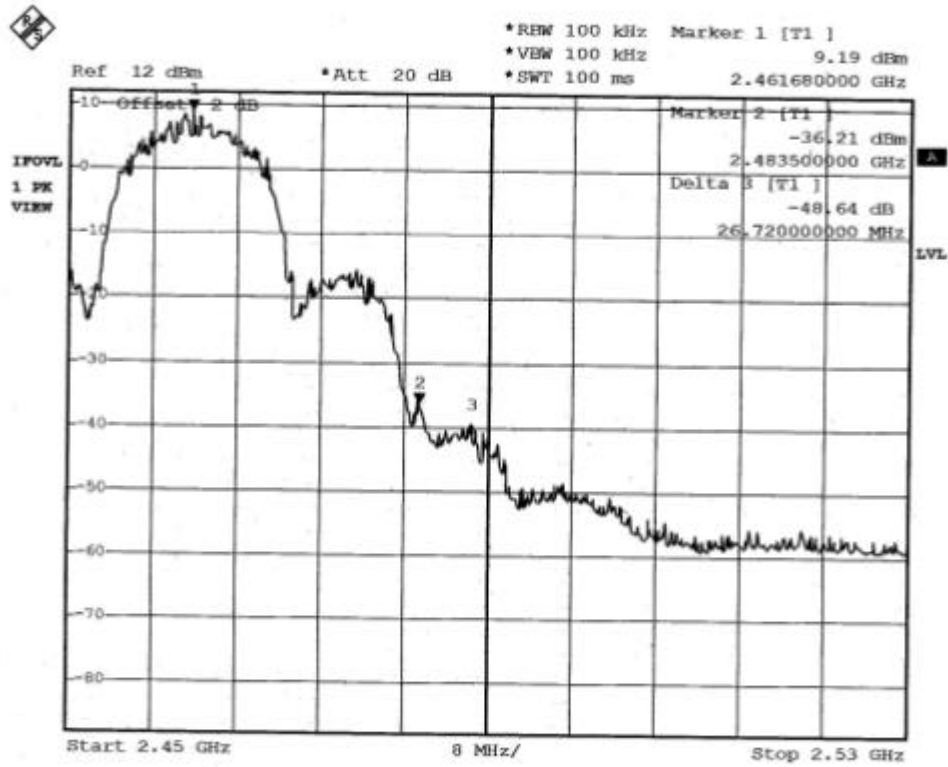
<2400MHz



Date: 4.JUN.2004 11:18:03



>2483.5MHz



Date: 4.JUN.2004 11:19:58



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 | |

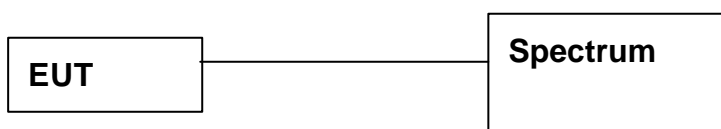
4.6.2 TEST EQUIPMENT

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 | MAR. 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.

4.6.3 TEST SET-UP



The EUT was connected to a spectrum through a 50 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.

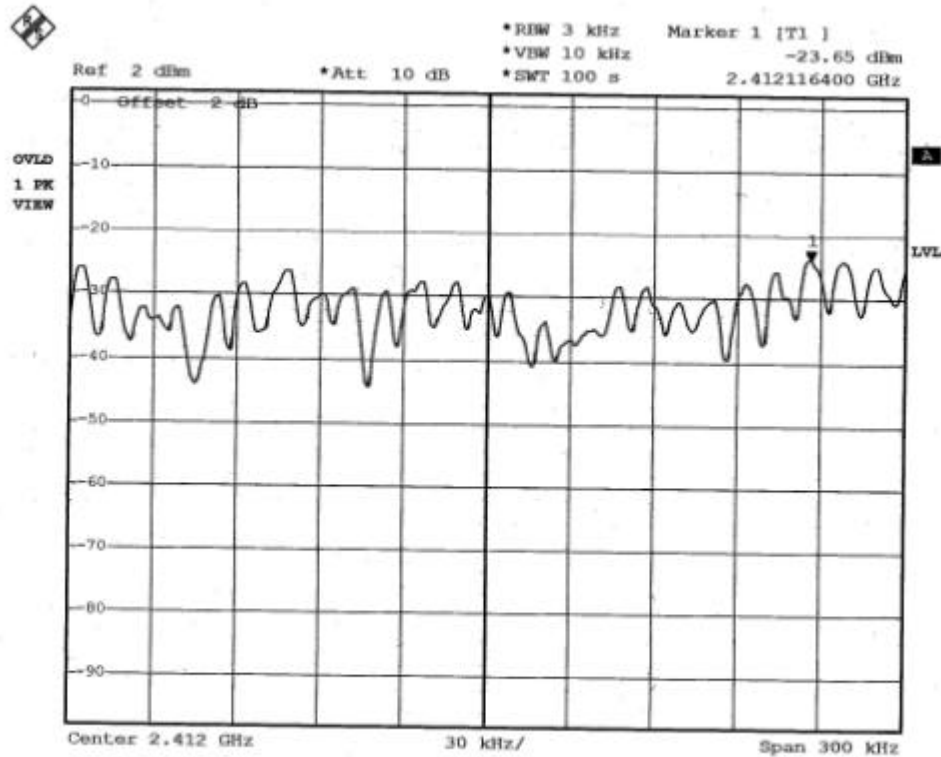


4.6.6 TEST RESULT

| | | | |
|--------------------|----------------------|------------------|---------------------|
| Temperature: | <u>23°C</u> | Humidity: | <u>60%RH</u> |
| Spectrum Detector: | <u>PK.</u> | Tested Mode: | <u>IEEE 802.11g</u> |
| Tested By: | <u>Hugo Yeh</u> | Modulation Type: | <u>64QAM</u> |
| Tested Date: | <u>Jun. 04, 2004</u> | | |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz) | RF POWER LEVEL IN 3kHz BW (dBm/3kHz) | MAXIMUM LIMIT (dBm/3kHz) |
|----------------|-------------------------|--------------------------------------|--------------------------|
| 1 | 2412 | -23.65 | 8 |
| 6 | 2437 | -23.80 | 8 |
| 11 | 2462 | -24.07 | 8 |

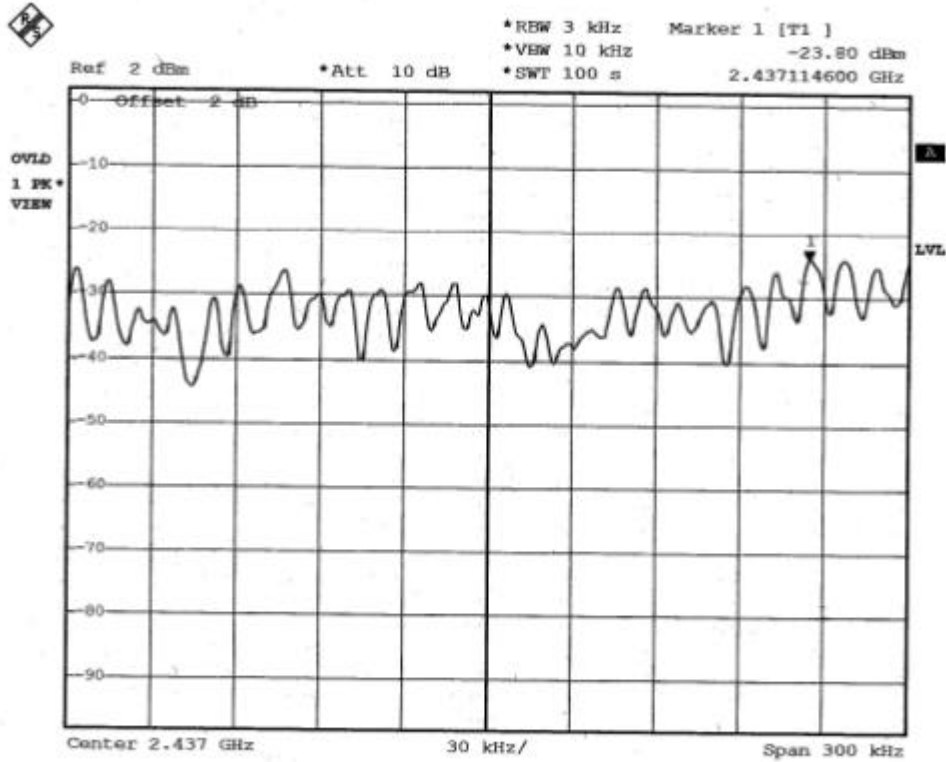
CH 1:



Date: 4.JUN.2004 09:53:54



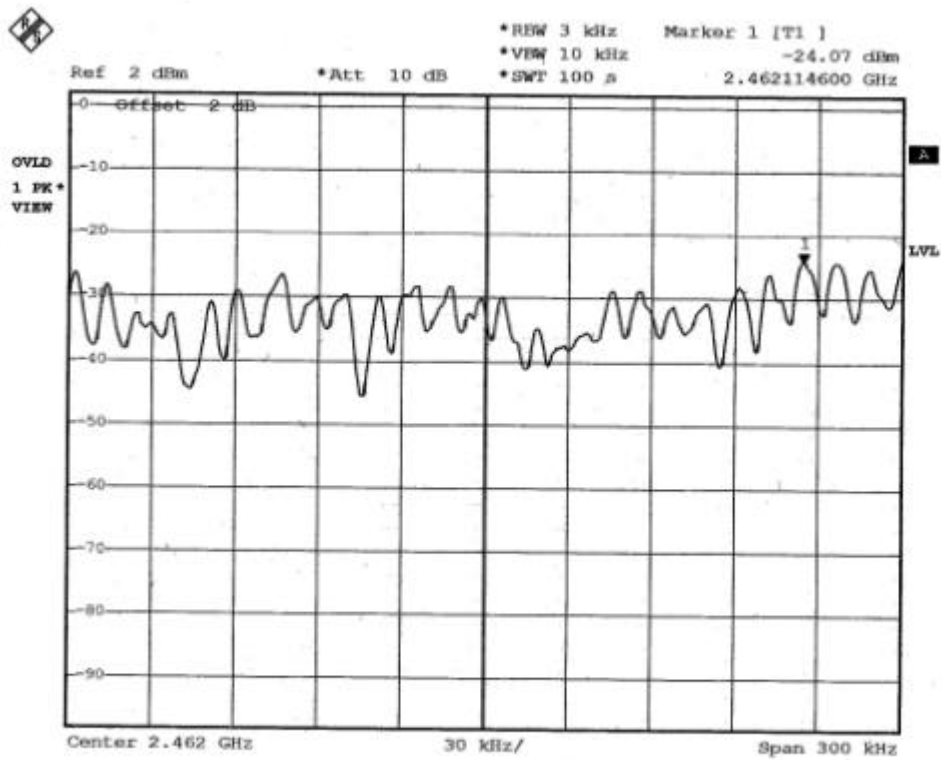
CH 6:



Date: 4 JUN. 2004 10:02:01



CH 11:



Date: 4.JUN.2004 10:07:25



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 City, Taoyuan, Taiwan

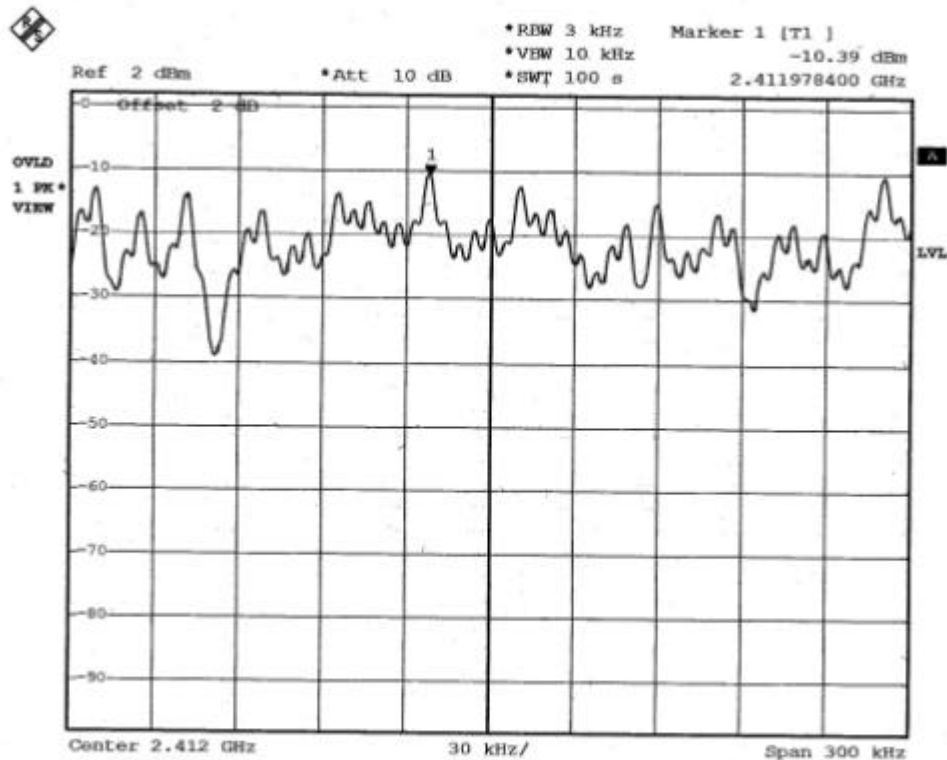
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| | | | |
|--------------------|----------------------|------------------|---------------------|
| Temperature: | <u>23°C</u> | Humidity: | <u>60%RH</u> |
| Spectrum Detector: | <u>PK.</u> | Tested Mode: | <u>IEEE 802.11b</u> |
| Tested By: | <u>Hugo Yeh</u> | Modulation Type: | <u>CCK</u> |
| Tested Date: | <u>Jun. 04, 2004</u> | | |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz) | RF POWER LEVEL IN 3KHz BW (dBm/3kHz) | MAXIMUM LIMIT (dBm/3kHz) |
|----------------|-------------------------|--------------------------------------|--------------------------|
| 1 | 2412 | -10.39 | 8 |
| 6 | 2437 | -10.49 | 8 |
| 11 | 2462 | -10.53 | 8 |

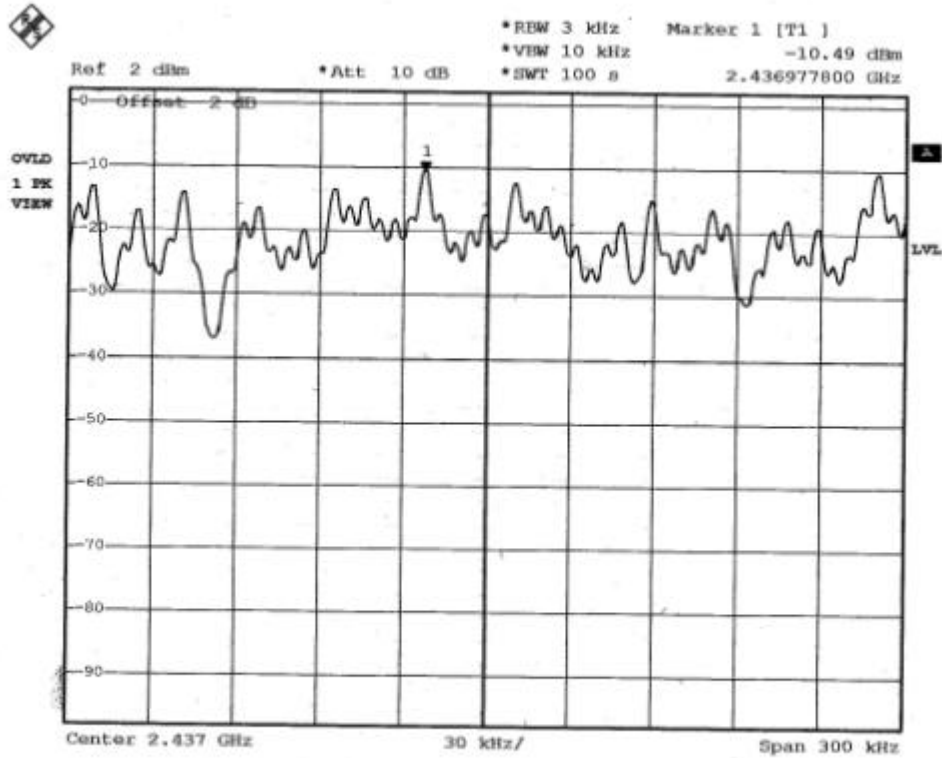
CH 1:



Date: 4.JUN.2004 10:11:28



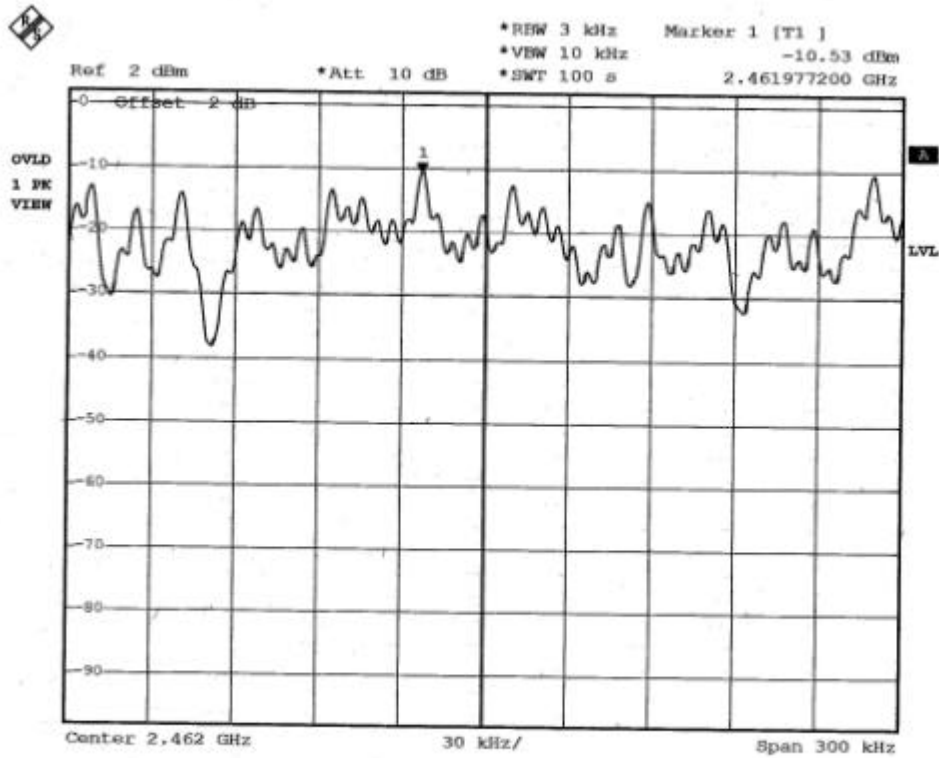
CH 6:



Date: 4 JUN. 2004 10:15:46



CH 11:



Date: 4.JUN.2004 10:20:01



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/cm ²) | 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/f ²)* | 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/cm ²) | 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/f ²)* | 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.



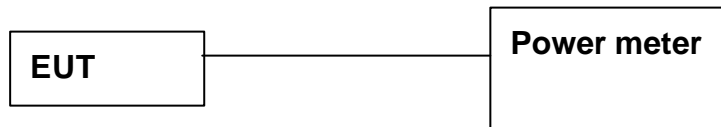
4.7.2 TEST EQUIPMENT

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 | BOONTON | 51011EMC/ 31181 | NOV. 2004 BOONTON |

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 50 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.

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

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

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

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/cm²)

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: | <u>23° C</u> | Humidity: | <u>60%RH</u> |
| Spectrum Detector: | <u>PK.</u> | Tested Mode: | <u>IEEE 802.11g</u> |
| Tested By: | <u>Hugo Yeh</u> | Modulation Type: | <u>64QAM</u> |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz) | RF Output Power (mW) | Result calculated when nearby person (cm) | Limit when nearby person (cm) |
|----------------|-------------------------|----------------------|---|-------------------------------|
| 1 | 2412 | 9.41 | 0.83 | 20 |
| 6 | 2437 | 9.27 | 0.82 | 20 |
| 11 | 2462 | 9.04 | 0.80 | 20 |

| | | | |
|--------------------|-----------------|------------------|---------------------|
| Temperature: | <u>23° C</u> | Humidity: | <u>60%RH</u> |
| Spectrum Detector: | <u>PK.</u> | Tested Mode: | <u>IEEE 802.11b</u> |
| Tested By: | <u>Hugo Yeh</u> | Modulation Type: | <u>CCK</u> |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz) | RF Output Power (mW) | Result calculated when nearby person (cm) | Limit when nearby person (cm) |
|----------------|-------------------------|----------------------|---|-------------------------------|
| 1 | 2412 | 17.17 | 2.04 | 20 |
| 6 | 2437 | 16.94 | 1.98 | 20 |
| 11 | 2462 | 16.58 | 1.90 | 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.

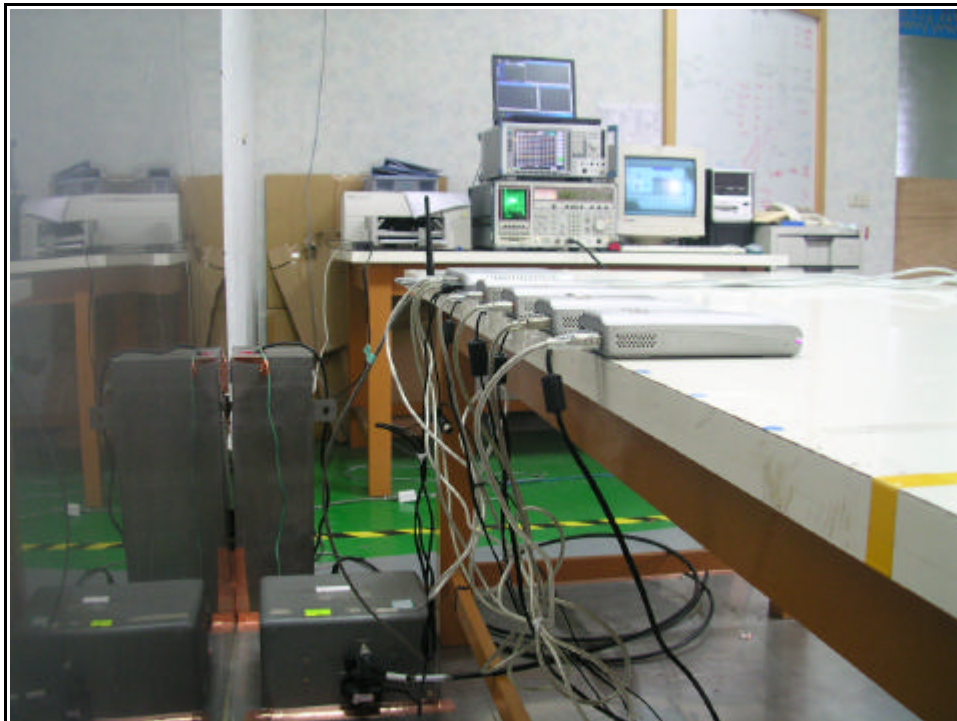
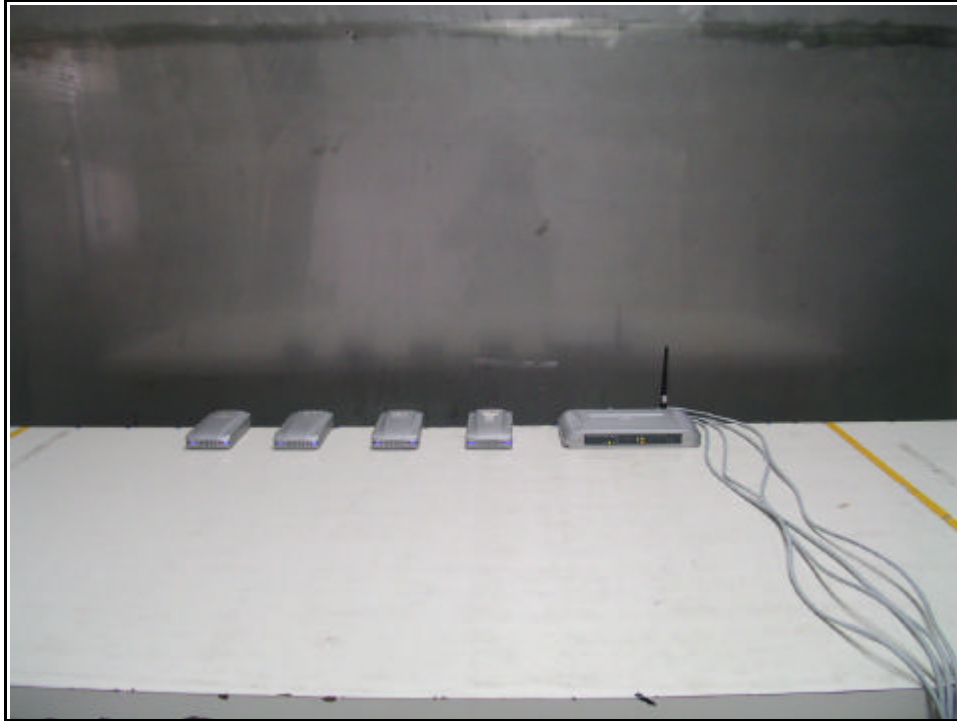
5.2 Result

The EUT' s antenna used two external dipole antennas. The antenna' s gain is 3dBi and meets the requirement.



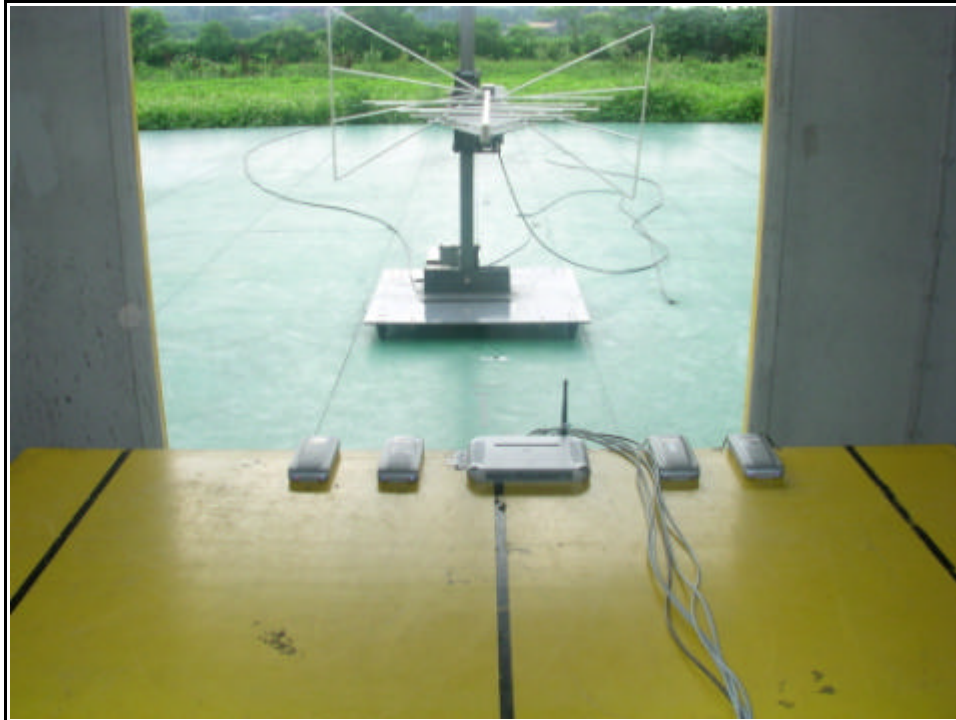
6. PHOTOS OF TESTING

- Conducted test





- Radiated test (RX)





- Radiated test (TX)





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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 |