



Test Report

Product Name : 11Mbps Wireless Bridge

Model No.: DWL-1500, WOP-9030

FCC ID.: PSL-WOP-9030

Applicant : W-Link Systems Inc.

Address : 1F, No. 20, Park Ave. II, Science-based industrial Park,
Hsin Chu, Taiwan, R.O.C.

Date of Receipt : Mar. 28, 2002

Date of Test : Apr. 19, 2002

Report No. : 024H011FI

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of Quietek Corporation.

This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Test Date : Apr. 19, 2002

Report No. : 024H011FI



Accredited by NIST (NVLAP)
NVLAP Lab Code: 200347-0

Product Name : 11Mbps Wireless Bridge

Applicant : W-Link Systems Inc.

Address : 1F, No. 20, Park Ave. II, Science-based industrial
Park, Hsin Chu, Taiwan, R.O.C.

Manufacturer : W-Link Systems Inc.

Model No. : DWL-1500, WOP-9030

FCC ID. : PSL-WOP-9030

Rated Voltage : AC 120V/60Hz

Trade Name : W-Link

Measurement Standard : FCC Part 15 Subpart C Paragraph 15.247

Measurement Procedure : ANSI C63.4: 1992

Test Result : Complied



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1. GENERAL INFORMATION

1.1. EUT Description

Product Name : 11Mbps Wireless Bridge
Trade Name : W-Link
FCC ID. : PSL-WOP-9030
Model No. : DWL-1500, WOP-9030
Frequency Range : 2412MHz to 2462MHz
Channel Number : 11
Type of Modulation : Direct Sequence Spread Spectrum
Antenna type : Connector
Operator Selection of
Operating Frequency : By software
LAN Cable : Non-shielded, 1.8m
USB Cable : Shielded, 1.8m
Power Adapter : WP48151D, M/N: AD-151A, Non-shielded, 1.8m

Frequency of Each Channel:

| Channel | Frequency | Channel | Frequency | Channel | Frequency |
|------------|-----------|------------|-----------|-------------|-----------|
| Channel 1: | 2412 MHz | Channel 5: | 2432 MHz | Channel 9: | 2452 MHz |
| Channel 2: | 2417 MHz | Channel 6: | 2437 MHz | Channel 10: | 2457 MHz |
| Channel 3: | 2422 MHz | Channel 7: | 2442 MHz | Channel 11: | 2462 MHz |
| Channel 4: | 2427 MHz | Channel 8: | 2447 MHz | | |

Note:

1. This device is a 2.4GHz 11Mbps Wireless Bridge included a 2.4GHz receiving function, a 2.4GHz transmitting function.
2. Regards to the frequent band operation; two rate that were included the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.
3. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
4. This device is a composite device in accordance with Part 15 regulations. The function receiving was measured and made a test report that the report number is 024H011FI under Declaration of Conformity.

Test Mode Mode 1: DWL-1500
Mode 2: DWL-1500 + WOP-9030

1.2. Operational Description

EUT is a 11Mbps Wireless Bridge with 11 channels. This device provided four kind of transmitting speed 1,2,5.5 and 11Mbps. The device of RF carrier is DQPSK, DB PSK and CCK.

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

This 11Mbps Wireless Bridge is an IEEE 802.11b 11Mbps Wireless LAN/USB adapter. It allows your computer to connect to a wireless network and to share resources, such as files or printers without being bound to the network wires. Operation in 2.4GHz Direct Sequence Spread Spectrum (DSSS) radio transmission. In addition, its standard compliance ensures that it can communicate with any 802.11b network.

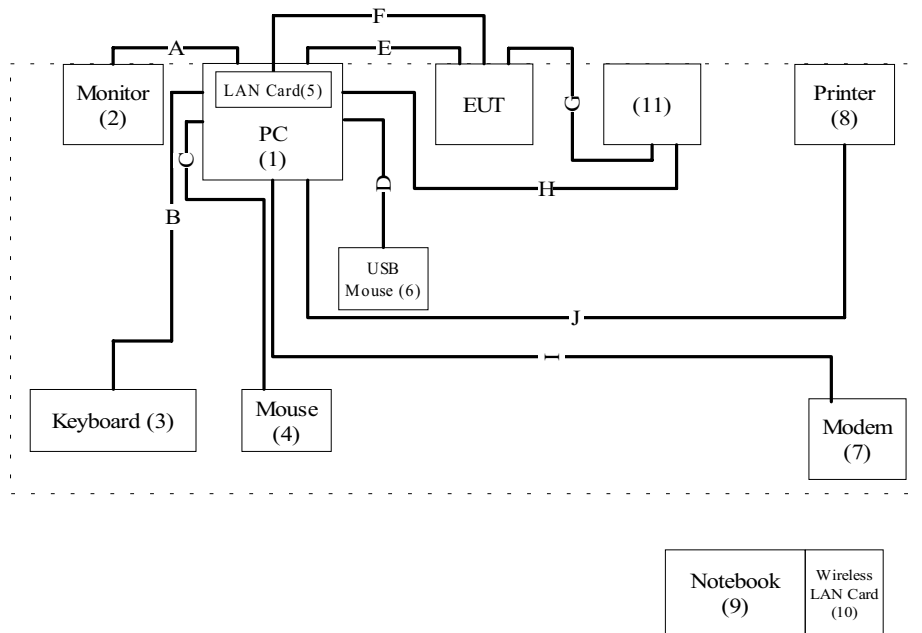
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

| | Product | Manufacturer | Model No. | Serial No. | Power Cord |
|------|------------------------------------|--------------|---------------|-------------|-------------------|
| (1) | PC | IBM | 16W | BNL676N | Non-shielded,1.8m |
| (2) | Monitor | IBM | 6540-02N | 66-AC902 | Shielded,1.8m |
| (3) | Keyboard | GENVINE | K288 | H803184663 | -- |
| (4) | Mouse | HP | M-S34 | LZB75078478 | -- |
| (5) | LAN Card | D-Link | 530TX | | -- |
| (6) | USB Mouse | Logitech | M-UE55 | DVT-322 | -- |
| (7) | Modem | ACEEX | 1414 | 980033036 | -- |
| (8) | Printer | HP | C2642A | MY75N1D2Y1 | Non-Shielded,0.7m |
| (9) | Notebook | IBM | Think Pad 570 | 27L8835 | Non-shielded,1.5m |
| (10) | Wireless LAN Card | ASKEY | WLC100 | -- | -- |
| (11) | Power Over Ethernet / Base Unit | W-Link | WOP-9030 | -- | -- |

| | Signal Cable Type | Signal cable Description |
|----|-------------------|--------------------------|
| A. | VGA Cable | Shielded, 1.7m |
| B. | Keyboard Cable | Shielded, 1.8m |
| C. | Mouse Cable | Shielded, 1.8m |
| D. | USB Cable | Shielded, 1.0m |
| E. | USB Cable | Shielded, 1.8m |
| F. | LAN Cable | Non-shielded, 1.8m |
| G. | LAN Cable | Non-shielded, 1.2m |
| H. | LAN Cable | Non-shielded, 1.0m |
| I. | Modem Cable | Shielded, 1.7m |
| J. | Printer Cable | Shielded, 1.7m |

1.4. Configuration of tested System



1.5. EUT Exercise Software

- (1) Setup the EUT and simulators as shown on 1.4
- (2) Turn on the power of all equipment.
- (3) Notebook PC reads data from disk.
- (4) Data will be transmitting through EUT.
- (5) The transmitted status will be shown on the monitor.
- (6) Repeat the above procedure 1.5.3 to 1.5.5

1.6. Test Facility

Ambient conditions in the laboratory:

| Items | Required (IEC 68-1) | Actual |
|----------------------------|---------------------|----------|
| Temperature (°C) | 15-35 | 20-35 |
| Humidity (%RH) | 25-75 | 50-65 |
| Barometric pressure (mbar) | 860-1060 | 950-1000 |

Site Description: November 3, 1998 File on
 Federal Communications Commission
 FCC Engineering Laboratory
 7435 Oakland Mills Road
 Columbia, MD 21046
 Reference 31040/SIT1300F2
 August 30, 2001 Accreditation on NVLAP
 NVLAP Lab Code: 200347-0



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2. Conducted Emission

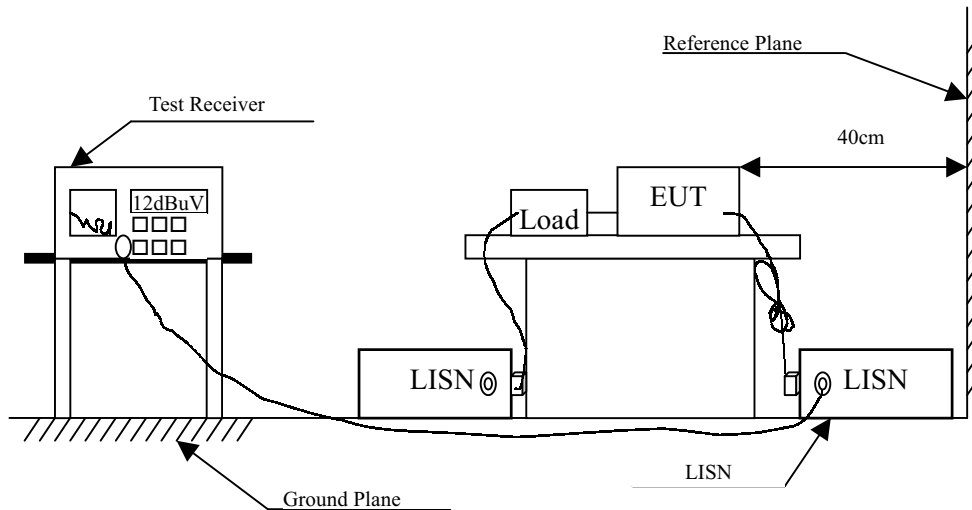
2.1. Test Equipment List

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

| Item | Instrument | Manufacturer | Type No./Serial No | Last Cal. | Remark |
|------|--------------------|--------------|--------------------|-----------|-------------|
| 1 | Test Receiver | R & S | ESCS 30/825442/17 | May, 2001 | |
| 2 | L.I.S.N. | R & S | ESH3-Z5/825016/6 | May, 2001 | EUT |
| 3 | L.I.S.N. | Kyoritsu | KNW-407/8-1420-3 | May, 2001 | Peripherals |
| 4 | Pulse Limiter | R & S | ESH3-Z2 | N/A | |
| 5 | No.2 Shielded Room | | | N/A | |

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

| FCC Part 15 Paragraph 15.207 (dBuV) | | |
|-------------------------------------|--------|------|
| Frequency MHz | Limits | |
| | uV | dBuV |
| 0.45 - 30 | 250 | 48.0 |

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4:1992 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.45MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Test Result of Conducted Emission

Product : 11Mbps Wireless Bridge
 Test Item : Conducted Emission Test
 Test Mode : Mode 1: DWL-1500

| Frequency MHz | Cable Loss dB | LISN Factor dB | Reading Level dBuV | Emission Level dBuV | Limits dBuV |
|--------------------|---------------------|----------------------|-----------------------|------------------------|----------------|
| Line 1 | | | | | |
| Quasi-Peak: | | | | | |
| *0.495 | 0.06 | 0.21 | 44.70 | 44.98 | 48.00 |
| 0.841 | 0.09 | 0.26 | 36.37 | 36.72 | 48.00 |
| 0.989 | 0.10 | 0.28 | 33.32 | 33.70 | 48.00 |
| 1.286 | 0.12 | 0.30 | 28.97 | 29.39 | 48.00 |
| 16.001 | 0.33 | 0.54 | 33.52 | 34.39 | 48.00 |
| 27.501 | 0.39 | 0.59 | 31.46 | 32.44 | 48.00 |
| Line 2 | | | | | |
| Quasi-Peak: | | | | | |
| *0.491 | 0.06 | 0.21 | 39.79 | 40.06 | 48.00 |
| 0.644 | 0.08 | 0.24 | 34.17 | 34.48 | 48.00 |
| 0.842 | 0.09 | 0.26 | 28.30 | 28.65 | 48.00 |
| 8.001 | 0.25 | 0.48 | 27.94 | 28.67 | 48.00 |
| 14.317 | 0.32 | 0.53 | 31.27 | 32.12 | 48.00 |
| 18.013 | 0.34 | 0.55 | 30.28 | 31.18 | 48.00 |

Remarks :

1. All Readings below 1GHz are Quasi-Peak value.
2. “ * ” means that this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable loss

Product : 11Mbps Wireless Bridge
 Test Item : Conducted Emission Test
 Test Mode : Mode 2: DWL-1500 + WOP-9030

| Frequency | Cable | LISN | Reading Level | Emission Level | Limits |
|-----------|-------|--------|---------------|----------------|--------|
| MHz | Loss | Factor | dBuV | dBuV | dBuV |
| | dB | dB | | | |

Line 1
Quasi-Peak:

| | | | | | |
|--------|------|------|-------|-------|-------|
| *0.546 | 0.07 | 0.22 | 43.67 | 43.96 | 48.00 |
| 0.844 | 0.09 | 0.26 | 35.73 | 36.08 | 48.00 |
| 1.140 | 0.11 | 0.29 | 31.59 | 31.99 | 48.00 |
| 14.497 | 0.32 | 0.53 | 26.97 | 27.82 | 48.00 |
| 17.751 | 0.34 | 0.55 | 30.61 | 31.50 | 48.00 |
| 27.501 | 0.39 | 0.59 | 30.92 | 31.90 | 48.00 |

Line 2
Quasi-Peak:

| | | | | | |
|--------|------|------|-------|-------|-------|
| *0.494 | 0.06 | 0.21 | 40.09 | 40.37 | 48.00 |
| 0.542 | 0.07 | 0.22 | 38.47 | 38.76 | 48.00 |
| 0.795 | 0.09 | 0.26 | 29.22 | 29.57 | 48.00 |
| 8.247 | 0.26 | 0.48 | 24.25 | 24.98 | 48.00 |
| 12.001 | 0.30 | 0.51 | 24.23 | 25.04 | 48.00 |
| 15.995 | 0.33 | 0.54 | 26.66 | 27.53 | 48.00 |

Remarks :

1. All Readings below 1GHz are Quasi-Peak value.
2. “ * ” means that this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable loss

3. Peak Power Output

3.1. Test Equipment

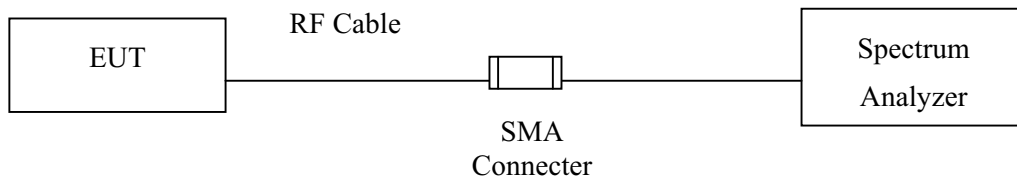
The following test equipments are used during the radiated emission tests:

| | Equipment | Manufacturer | Model No./Serial No. | Last Cal. |
|---|-------------------|--------------|----------------------|-----------|
| X | Spectrum Analyzer | Advantest | R3272 / 72421194 | May, 2001 |

Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.
 2. Mark "X" test instruments are used to measure the final test results.

3.2. Test Setup

Conduction Power Measurement



3.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

3.4. Minimum Standard

The maximum peak power shall be less 1 Watt.

3.5. Test Result of Peak Power Output

Product : 11Mbps Wireless Bridge
 Test Item : Peak Power Output Data
 Test Site : No.1 OATS
 Test Mode : Normal Operation

Data Speed: 1Mbps

| Channel No. | Frequency(MHz) | Measurement | Required Limit | Result |
|-------------|----------------|-------------|----------------|--------|
| 1 | 2411.40 | 14.67 dBm | 1 Watt= 30 dBm | Pass |
| 6 | 2437.80 | 13.55 dBm | 1 Watt= 30 dBm | Pass |
| 11 | 2462.40 | 13.09 dBm | 1 Watt= 30 dBm | Pass |

Data Speed: 11Mbps

| Channel No. | Frequency (MHz) | Measurement | Required Limit | Result |
|-------------|-----------------|-------------|----------------|--------|
| 1 | 2413.20 | 17.16 dBm | 1 Watt= 30 dBm | Pass |
| 6 | 2438.30 | 16.77dBm | 1 Watt= 30 dBm | Pass |
| 11 | 2463.20 | 16.49dBm | 1 Watt= 30 dBm | Pass |

4. RF Exposure Evaluation

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| Frequency Range (MHz) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm ²) | Average Time (Minutes) |
|---|-------------------------------|-------------------------------|-------------------------------------|------------------------|
| (A) Limits for Occupational/ Control Exposures | | | | |
| 300-1500 | -- | -- | F/300 | 6 |
| 1500-100,000 | -- | -- | 5 | 6 |
| (B) Limits for General Population/ Uncontrolled Exposures | | | | |
| 300-1500 | -- | -- | F/1500 | 6 |
| 1500-100,000 | -- | -- | 1 | 30 |

F= Frequency in MHz

4.1. Fries Formula

$$\text{Fries transmission formula: } P_d = (P_{out} * G) / (4 * \pi * r^2)$$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

4.2. EUT Operation condition

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.3. Test Result of RF Exposure Evaluation

Product : 11Mbps Wireless Bridge
 Test Item : RF Exposure Evaluation Data
 Test Site : No.1 OATS
 Test Mode : Normal Operation

4.3.1 Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 4dBi.

4.3.2 Output Power Into Antenna & RF Exposure Evaluation Distance

| Channel | Channel Frequency (MHz) | Output Power to Antenna (dBm) | Minimum Allowable Distance ® From Skin(cm) |
|-------------|-------------------------|-------------------------------|--|
| 1 (1Mbps) | 2411.40 | 14.67 | 2.420445 |
| 1 (11Mbps) | 2413.20 | 17.16 | 3.224002 |
| 6 (1Mbps) | 2437.80 | 13.55 | 2.127626 |
| 6 (11Mbps) | 2438.30 | 16.77 | 3.082444 |
| 11 (1Mbps) | 2462.40 | 13.09 | 2.01788 |
| 11 (11Mbps) | 2463.20 | 16.49 | 2.984663 |

The distance r (4th column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement. So, RF exposure limit warning or SAR test are not required.

5. Radiated Emission

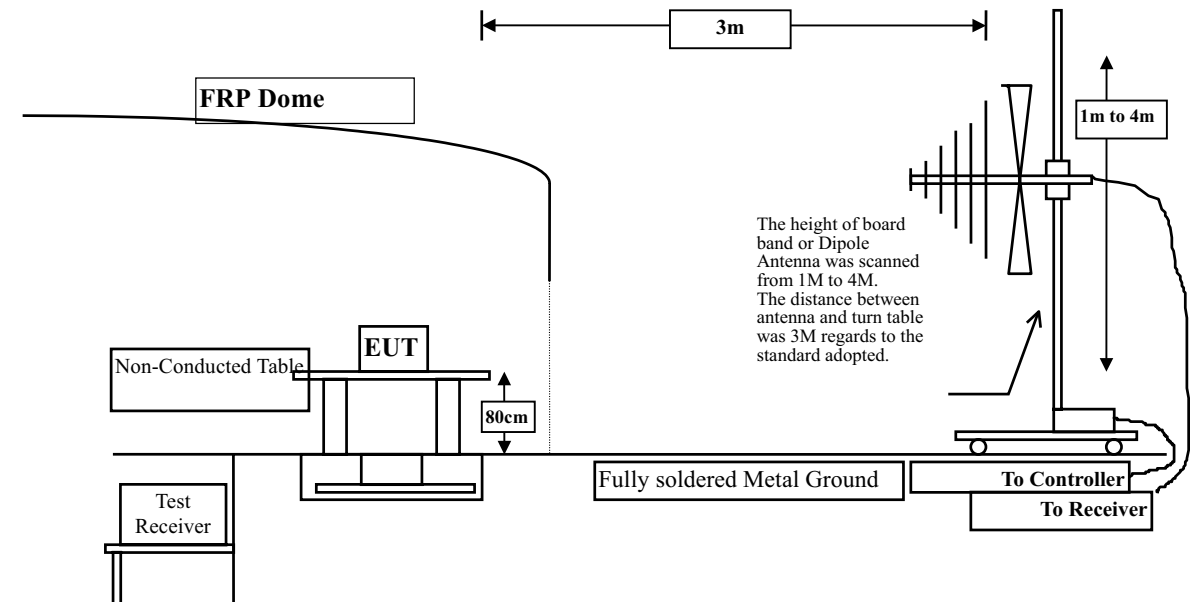
5.1. Test Equipment

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

| Test Site | Equipment | Manufacturer | Model No./Serial No. | Last Cal. |
|-----------|---------------------|--------------|----------------------|------------|
| Site # 1 | X Test Receiver | R & S | ESCS 30 / 825442/14 | May, 2001 |
| | X Spectrum Analyzer | Advantest | R3261C / 71720140 | May, 2001 |
| | X Pre-Amplifier | HP | 8447D/3307A01812 | May, 2001 |
| | X Bilog Antenna | Chase | CBL6112B / 12452 | Sep., 2001 |
| | X Horn Antenna | EM | EM6917 / 103325 | May, 2001 |
| Site # 2 | Test Receiver | R & S | ESCS 30 / 825442/17 | May, 2001 |
| | Spectrum Analyzer | Advantest | R3261C / 71720609 | May, 2001 |
| | Pre-Amplifier | HP | 8447D/3307A01814 | May, 2001 |
| | Bilog Antenna | Chase | CBL6112B / 2455 | Sep., 2001 |
| | Horn Antenna | EM | EM6917 / 103325 | May, 2001 |

- Note: 1. All equipments that need to calibrate are with calibration period of 1 year.
 2. Mark "X" test instruments are used to measure the final test results.

5.2. Test Setup



5.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

5.4. Limits

► General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

| FCC Part 15 Subpart C Paragraph 15.209(a) Limits | | |
|---|----------|-----------|
| Frequency MHz | uV/m @3m | dBuV/m@3m |
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43.5 |
| 216-960 | 200 | 46 |
| Above 960 | 500 | 54 |

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

5.5. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

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

The additional latch filter below 1GHz was used to measure the level of harmonics radiated emission during field strength of harmonics measurement.

The bandwidth below 1GHz setting on the field strength meter (R&S Test Receiver ESCS 30)is 120 kHz, above 1GHz are 1 MHz.

The frequency range from 30MHz to 10th harmonics is checked.

5.6. Test Result of Radiated Emission

Product : 11Mbps Wireless Bridge
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Channel 1 (1Mbps)

| Freq. | Cable Loss | Probe Factor | PreAMP Reading | Emission Margin | Limit |
|-------|------------|--------------|----------------|-----------------|--------|
| MHz | dB | dB/m | dB | Level | Level |
| | | | | dBuV | dBuV/m |

Horizontal

Peak Detector:

| | | | | | | | |
|----------|-------|-------|-------|-------|---------|-------|-------|
| 4823.899 | 6.27 | 33.50 | 34.77 | 36.53 | 41.53 | 32.47 | 74.00 |
| 7237.903 | 8.32 | 36.24 | 34.90 | 38.55 | 48.21 | 25.79 | 74.00 |
| 9648.100 | 10.18 | 37.43 | 35.10 | 38.89 | 51.40 | 22.60 | 74.00 |
| 12060.10 | 11.91 | 39.13 | 34.65 | 34.30 | < 50.69 | 23.31 | 74.00 |
| 14472.10 | 13.53 | 40.80 | 34.34 | 24.31 | < 44.29 | 29.71 | 74.00 |

Vertical

Peak Detector:

| | | | | | | | |
|----------|-------|-------|-------|-------|---------|-------|-------|
| 4823.899 | 6.27 | 33.50 | 34.77 | 39.84 | 44.84 | 29.16 | 74.00 |
| 7236.701 | 8.32 | 36.24 | 34.90 | 42.59 | 52.25 | 21.75 | 74.00 |
| 9647.899 | 10.18 | 37.43 | 35.10 | 42.60 | 55.11 | 18.89 | 74.00 |
| 12060.05 | 11.91 | 39.13 | 34.65 | 38.85 | 55.24 | 18.76 | 74.00 |
| 14472.30 | 13.53 | 40.80 | 34.34 | 24.27 | < 44.25 | 29.75 | 74.00 |
| 16884.10 | 15.08 | 42.56 | 33.99 | 28.99 | < 52.64 | 21.36 | 74.00 |

Average Detector:

| | | | | | | | |
|----------|-------|-------|-------|-------|-------|------|-------|
| 9847.949 | 10.33 | 37.47 | 35.10 | 38.21 | 50.91 | 3.09 | 54.00 |
|----------|-------|-------|-------|-------|-------|------|-------|

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Emission Level = Reading Level + Probe Factor + Cable loss- Pre AMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 11Mbps Wireless Bridge
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Channel 6 (1Mbps)

| Freq. | Cable | Probe | PreAMP | Reading | Emission | Margin | Limit |
|-------|-------|--------|--------|---------|----------|--------|--------|
| MHz | Loss | Factor | dB | Level | Level | dB | dBuV/m |
| | dB | dB/m | dB | dBuV | dBuV/m | | |

Horizontal

Peak Detector:

| | | | | | | | |
|----------|-------|-------|-------|-------|---------|-------|-------|
| 4873.799 | 6.32 | 33.56 | 34.75 | 37.29 | 42.42 | 31.58 | 74.00 |
| 7309.847 | 8.38 | 36.31 | 34.90 | 40.02 | 49.80 | 24.20 | 74.00 |
| 9747.899 | 10.24 | 37.45 | 35.10 | 37.89 | 50.48 | 23.52 | 74.00 |
| 12188.15 | 11.99 | 39.17 | 34.55 | 34.41 | < 51.03 | 22.97 | 74.00 |
| 14626.80 | 13.62 | 40.51 | 34.45 | 22.91 | < 42.59 | 31.41 | 74.00 |

Vertical

Peak Detector:

| | | | | | | | |
|----------|-------|-------|-------|-------|---------|-------|-------|
| 4873.999 | 6.32 | 33.56 | 34.75 | 40.23 | 45.36 | 28.64 | 74.00 |
| 7311.651 | 8.38 | 36.31 | 34.90 | 44.03 | 53.81 | 20.19 | 74.00 |
| 9747.899 | 10.24 | 37.45 | 35.10 | 43.35 | 55.94 | 18.06 | 74.00 |
| 12186.15 | 11.99 | 39.17 | 34.55 | 37.99 | 54.61 | 19.39 | 74.00 |
| 14626.60 | 13.62 | 40.51 | 34.45 | 21.12 | < 40.80 | 33.20 | 74.00 |
| 17063.25 | 15.18 | 42.92 | 33.90 | 27.96 | < 52.16 | 21.84 | 74.00 |

Average Detector:

| | | | | | | | |
|----------|-------|-------|-------|-------|-------|------|-------|
| 9748.049 | 10.24 | 37.45 | 35.10 | 39.77 | 52.36 | 1.64 | 54.00 |
| 12184.09 | 11.99 | 39.17 | 34.55 | 27.77 | 44.39 | 9.61 | 54.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Emission Level = Reading Level + Probe Factor + Cable loss- Pre AMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 11Mbps Wireless Bridge
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Channel 11 (1Mbps)

| Freq. | Cable Loss | Probe Factor | PreAMP Reading | Emission Margin | Limit |
|-------|------------|--------------|----------------|-----------------|--------|
| MHz | dB | dB/m | dB | Level | Level |
| | | | dB | dBuV | dBuV/m |

Horizontal

Peak Detector:

| | | | | | | | |
|----------|-------|-------|-------|-------|---------|-------|-------|
| 4923.899 | 6.37 | 33.62 | 34.73 | 36.43 | 41.69 | 32.31 | 74.00 |
| 7387.803 | 8.45 | 36.39 | 34.90 | 39.56 | 49.50 | 24.50 | 74.00 |
| 9848.099 | 10.33 | 37.47 | 35.10 | 37.96 | 50.66 | 23.34 | 74.00 |
| 12316.21 | 12.08 | 39.23 | 34.44 | 35.17 | < 52.04 | 21.96 | 74.00 |
| 14779.71 | 13.73 | 40.16 | 34.52 | 25.75 | < 45.12 | 28.88 | 74.00 |

Vertical

Peak Detector:

| | | | | | | | |
|----------|-------|-------|-------|-------|---------|-------|-------|
| 4924.099 | 6.37 | 33.62 | 34.73 | 40.19 | 45.45 | 28.55 | 74.00 |
| 7384.997 | 8.45 | 36.39 | 34.90 | 43.03 | 52.97 | 21.03 | 74.00 |
| 9847.899 | 10.33 | 37.47 | 35.10 | 42.63 | 55.33 | 18.67 | 74.00 |
| 12314.00 | 12.08 | 39.23 | 34.44 | 34.20 | < 51.07 | 22.93 | 74.00 |
| 14780.11 | 13.73 | 40.16 | 34.52 | 25.63 | < 45.00 | 29.00 | 74.00 |

Average Detector:

| | | | | | | | |
|----------|-------|-------|-------|-------|-------|------|-------|
| 9647.949 | 10.18 | 37.43 | 35.10 | 38.42 | 50.93 | 3.07 | 54.00 |
| 12059.19 | 11.91 | 39.13 | 34.65 | 28.91 | 45.30 | 8.70 | 54.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Emission Level = Reading Level + Probe Factor + Cable loss- Pre AMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 11Mbps Wireless Bridge
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Channel 1 (11Mbps)

| Freq. | Cable Loss | Probe Factor | PreAMP Reading | Emission Level | Margin | Limit |
|-------|------------|--------------|----------------|----------------|--------|-------|
| MHz | dB | dB/m | dB | dBuV | dBuV/m | dB |

Horizontal

Peak Detector:

| | | | | | | | |
|----------|-------|-------|-------|-------|---------|-------|-------|
| 4823.849 | 6.27 | 33.50 | 34.77 | 35.07 | 40.07 | 33.93 | 74.00 |
| 7236.551 | 8.32 | 36.24 | 34.90 | 38.87 | 48.53 | 25.47 | 74.00 |
| 9801.499 | 10.29 | 37.46 | 35.10 | 35.19 | < 47.84 | 26.16 | 74.00 |
| 12264.94 | 12.05 | 39.21 | 34.48 | 34.09 | < 50.87 | 23.13 | 74.00 |

Vertical

Peak Detector:

| | | | | | | | |
|----------|-------|-------|-------|-------|---------|-------|-------|
| 4823.749 | 6.27 | 33.50 | 34.77 | 38.36 | 43.36 | 30.64 | 74.00 |
| 7237.452 | 8.32 | 36.24 | 34.90 | 43.18 | 52.84 | 21.16 | 74.00 |
| 9802.120 | 10.29 | 37.46 | 35.10 | 35.60 | < 48.25 | 25.75 | 74.00 |
| 12265.35 | 12.05 | 39.21 | 34.48 | 32.92 | < 49.70 | 24.30 | 74.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Emission Level = Reading Level + Probe Factor + Cable loss- Pre AMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 11Mbps Wireless Bridge
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Channel 6 (11Mbps)

| Freq. | Cable | Probe | PreAMP | Reading | Emission | Margin | Limit |
|-------|-------|--------|--------|---------|----------|--------|--------|
| MHz | Loss | Factor | dB | Level | Level | dB | dBuV/m |
| | dB | dB/m | dB | dBuV | dBuV/m | | |

Horizontal

Peak Detector:

| | | | | | | | |
|----------|-------|-------|-------|-------|---------|-------|-------|
| 4875.749 | 6.32 | 33.56 | 34.75 | 35.97 | 41.10 | 32.90 | 74.00 |
| 7312.046 | 8.38 | 36.31 | 34.90 | 40.77 | 50.55 | 23.45 | 74.00 |
| 9827.900 | 10.31 | 37.46 | 35.10 | 34.73 | < 47.40 | 26.60 | 74.00 |
| 12291.15 | 12.06 | 39.22 | 34.47 | 33.32 | < 50.13 | 23.87 | 74.00 |

Vertical

Peak Detector:

| | | | | | | | |
|----------|-------|-------|-------|-------|---------|-------|-------|
| 4873.845 | 6.32 | 33.56 | 34.75 | 39.47 | 44.60 | 29.40 | 74.00 |
| 7312.446 | 8.38 | 36.31 | 34.90 | 43.30 | 53.08 | 20.92 | 74.00 |
| 9827.699 | 10.31 | 37.46 | 35.10 | 35.27 | < 47.94 | 26.06 | 74.00 |
| 12290.74 | 12.06 | 39.22 | 34.47 | 33.99 | < 50.80 | 23.20 | 74.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Emission Level = Reading Level + Probe Factor + Cable loss- Pre AMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 11Mbps Wireless Bridge
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Channel 11 (11Mbps)

| Freq. | Cable Loss | Probe Factor | PreAMP Reading | Emission Margin | Limit |
|-------|------------|--------------|----------------|-----------------|--------|
| MHz | dB | dB/m | dB | Level | Level |
| | | | dB | dBuV | dBuV/m |

Horizontal

Peak Detector:

| | | | | | | | |
|----------|-------|-------|-------|-------|---------|-------|-------|
| 4925.600 | 6.37 | 33.62 | 34.73 | 34.74 | 40.00 | 34.00 | 74.00 |
| 7386.440 | 8.45 | 36.39 | 34.90 | 39.53 | 49.47 | 24.53 | 74.00 |
| 9847.691 | 10.33 | 37.47 | 35.10 | 37.05 | 49.75 | 24.25 | 74.00 |
| 12314.44 | 12.08 | 39.23 | 34.44 | 33.57 | < 50.44 | 23.56 | 74.00 |
| 14777.79 | 13.73 | 40.16 | 34.52 | 25.47 | < 44.84 | 29.16 | 74.00 |

Vertical

Peak Detector:

| | | | | | | | |
|----------|-------|-------|-------|-------|---------|-------|-------|
| 4923.897 | 6.37 | 33.62 | 34.73 | 38.31 | 43.57 | 30.43 | 74.00 |
| 7384.542 | 8.45 | 36.39 | 34.90 | 43.32 | 53.26 | 20.74 | 74.00 |
| 9847.892 | 10.33 | 37.47 | 35.10 | 40.77 | 53.47 | 20.53 | 74.00 |
| 12314.54 | 12.08 | 39.23 | 34.44 | 33.76 | < 50.63 | 23.37 | 74.00 |
| 14777.89 | 13.73 | 40.16 | 34.52 | 24.37 | < 43.74 | 30.26 | 74.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Emission Level = Reading Level + Probe Factor + Cable loss- Pre AMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 11Mbps Wireless Bridge
 Test Item : General Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Mode 1: DWL-1500 (Channel 1 (1Mbps))

| Freq. | Cable Loss | Probe Factor | PreAMP Reading | Emission Margin | Limit |
|-------|------------|--------------|----------------|-----------------|--------|
| MHz | dB | dB/m | Level | Level | dB |
| | | | dBuV | dBuV/m | dBuV/m |

Horizontal

| | | | | | | | |
|----------|------|-------|-------|-------|-------|-------|-------|
| *199.750 | 1.71 | 15.24 | 26.91 | 43.00 | 33.04 | 10.46 | 43.50 |
| 233.700 | 1.85 | 16.59 | 26.93 | 42.20 | 33.71 | 12.29 | 46.00 |
| 251.160 | 1.92 | 18.09 | 26.93 | 36.80 | 29.89 | 16.11 | 46.00 |
| 297.720 | 2.12 | 18.50 | 26.95 | 41.40 | 35.07 | 10.93 | 46.00 |
| 351.070 | 2.34 | 18.58 | 26.87 | 38.60 | 32.65 | 13.35 | 46.00 |
| 643.040 | 3.54 | 22.26 | 26.41 | 33.40 | 32.78 | 13.22 | 46.00 |

Vertical

| | | | | | | | |
|----------|------|-------|-------|-------|-------|-------|-------|
| *232.730 | 1.85 | 20.45 | 26.93 | 40.00 | 35.37 | 10.63 | 46.00 |
| 250.190 | 1.92 | 18.97 | 26.93 | 34.60 | 28.56 | 17.44 | 46.00 |
| 297.720 | 2.12 | 18.50 | 26.95 | 36.40 | 30.07 | 15.93 | 46.00 |
| 351.070 | 2.34 | 18.58 | 26.87 | 34.00 | 28.05 | 17.95 | 46.00 |
| 364.650 | 2.39 | 19.22 | 26.85 | 31.80 | 26.56 | 19.44 | 46.00 |
| 494.630 | 2.92 | 20.81 | 26.64 | 37.20 | 34.29 | 11.71 | 46.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss - PreAMP.

Product : 11Mbps Wireless Bridge
 Test Item : General Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Mode 1: DWL-1500 (Channel 6 (1Mbps))

| Freq. | Cable | Probe | PreAMP | Reading | Emission | Margin | Limit |
|-------|-------|--------|--------|---------|----------|--------|--------|
| MHz | Loss | Factor | | Level | Level | | |
| | dB | dB/m | dB | dBuV | dBuV/m | dB | dBuV/m |

Horizontal

| | | | | | | | |
|----------|------|-------|-------|-------|-------|-------|-------|
| 99.840 | 1.30 | 17.25 | 26.88 | 39.40 | 31.08 | 12.42 | 43.50 |
| *143.490 | 1.48 | 17.06 | 26.89 | 43.20 | 34.86 | 8.64 | 43.50 |
| 231.760 | 1.84 | 16.31 | 26.92 | 39.40 | 30.63 | 15.37 | 46.00 |
| 247.280 | 1.91 | 17.85 | 26.93 | 37.00 | 29.83 | 16.17 | 46.00 |
| 330.700 | 2.25 | 19.66 | 26.90 | 33.40 | 28.41 | 17.59 | 46.00 |
| 350.100 | 2.33 | 18.58 | 26.87 | 36.20 | 30.24 | 15.76 | 46.00 |

Vertical

| | | | | | | | |
|----------|------|-------|-------|-------|-------|-------|-------|
| 144.460 | 1.49 | 16.86 | 26.89 | 36.80 | 28.26 | 15.24 | 43.50 |
| *199.750 | 1.71 | 15.24 | 26.91 | 40.60 | 30.64 | 12.86 | 43.50 |
| 231.760 | 1.84 | 20.31 | 26.92 | 35.60 | 30.83 | 15.17 | 46.00 |
| 249.220 | 1.92 | 18.87 | 26.93 | 32.20 | 26.06 | 19.94 | 46.00 |
| 352.040 | 2.34 | 18.60 | 26.87 | 33.60 | 27.68 | 18.32 | 46.00 |
| 495.600 | 2.93 | 20.81 | 26.64 | 34.40 | 31.49 | 14.51 | 46.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss - PreAMP.

Product : 11Mbps Wireless Bridge
 Test Item : General Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Mode 1: DWL-1500 (Channel 11 (1Mbps))

| Freq. | Cable Loss | Probe Factor | PreAMP Reading | Reading Level | Emission Level | Margin | Limit |
|-------------------|------------|--------------|----------------|---------------|----------------|--------|--------|
| MHz | dB | dB/m | dB | dBuV | dBuV/m | dB | dBuV/m |
| Horizontal | | | | | | | |
| 100.810 | 1.31 | 17.44 | 26.88 | 40.60 | 32.48 | 11.02 | 43.50 |
| *210.420 | 1.76 | 14.87 | 26.92 | 45.40 | 35.11 | 8.39 | 43.50 |
| 232.730 | 1.85 | 16.45 | 26.93 | 40.60 | 31.97 | 14.03 | 46.00 |
| 251.160 | 1.92 | 18.09 | 26.93 | 36.80 | 29.89 | 16.11 | 46.00 |
| 352.040 | 2.34 | 18.60 | 26.87 | 37.80 | 31.88 | 14.12 | 46.00 |
| 640.130 | 3.52 | 22.34 | 26.41 | 32.80 | 32.25 | 13.75 | 46.00 |
| Vertical | | | | | | | |
| 198.780 | 1.71 | 15.14 | 26.91 | 37.20 | 27.13 | 16.37 | 43.50 |
| 232.730 | 1.85 | 20.45 | 26.93 | 35.60 | 30.97 | 15.03 | 46.00 |
| 264.740 | 1.98 | 18.33 | 26.94 | 32.60 | 25.97 | 20.03 | 46.00 |
| 350.100 | 2.33 | 18.58 | 26.87 | 32.40 | 26.44 | 19.56 | 46.00 |
| 495.600 | 2.93 | 20.81 | 26.64 | 33.00 | 30.09 | 15.91 | 46.00 |
| *621.700 | 3.45 | 22.29 | 26.44 | 31.80 | 31.09 | 14.91 | 46.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss - PreAMP.

Product : 11Mbps Wireless Bridge
 Test Item : General Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Mode 1: DWL-1500 (Channel 1 (11Mbps))

| Freq. | Cable | Probe | PreAMP | Reading | Emission | Margin | Limit |
|-------|-------|--------|--------|---------|----------|--------|--------|
| MHz | Loss | Factor | | Level | Level | | |
| | dB | dB/m | dB | dBuV | dBuV/m | dB | dBuV/m |

Horizontal

| | | | | | | | |
|---------|------|-------|-------|-------|-------|-------|-------|
| *99.840 | 1.30 | 17.25 | 26.88 | 41.40 | 33.08 | 10.42 | 43.50 |
| 199.750 | 1.71 | 15.24 | 26.91 | 43.00 | 33.04 | 10.46 | 43.50 |
| 232.730 | 1.85 | 16.45 | 26.93 | 43.40 | 34.77 | 11.23 | 46.00 |
| 339.430 | 2.29 | 18.85 | 26.89 | 38.00 | 32.25 | 13.75 | 46.00 |
| 358.830 | 2.37 | 19.06 | 26.86 | 34.20 | 28.77 | 17.23 | 46.00 |
| 495.600 | 2.93 | 20.81 | 26.64 | 35.20 | 32.29 | 13.71 | 46.00 |

Vertical

| | | | | | | | |
|---------|------|-------|-------|-------|-------|-------|-------|
| *99.840 | 1.30 | 17.25 | 26.88 | 40.00 | 31.68 | 11.82 | 43.50 |
| 232.730 | 1.85 | 20.45 | 26.93 | 38.60 | 33.97 | 12.03 | 46.00 |
| 250.190 | 1.92 | 18.97 | 26.93 | 33.60 | 27.56 | 18.44 | 46.00 |
| 262.800 | 1.97 | 18.59 | 26.94 | 33.80 | 27.43 | 18.57 | 46.00 |
| 352.040 | 2.34 | 18.60 | 26.87 | 34.00 | 28.08 | 17.92 | 46.00 |
| 364.650 | 2.39 | 19.22 | 26.85 | 32.40 | 27.16 | 18.84 | 46.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss - PreAMP.

Product : 11Mbps Wireless Bridge
 Test Item : General Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Mode 1: DWL-1500 (Channel 6 (11Mbps))

| Freq. | Cable | Probe | PreAMP | Reading | Emission | Margin | Limit |
|-------|-------|--------|--------|---------|----------|--------|--------|
| MHz | Loss | Factor | | Level | Level | | |
| | dB | dB/m | dB | dBuV | dBuV/m | dB | dBuV/m |

Horizontal

| | | | | | | | |
|----------|------|-------|-------|-------|-------|-------|-------|
| *100.810 | 1.31 | 17.44 | 26.88 | 39.60 | 31.48 | 12.02 | 43.50 |
| 232.730 | 1.85 | 16.45 | 26.93 | 40.60 | 31.97 | 14.03 | 46.00 |
| 249.220 | 1.92 | 17.87 | 26.93 | 35.40 | 28.26 | 17.74 | 46.00 |
| 340.400 | 2.29 | 18.97 | 26.89 | 37.00 | 31.38 | 14.62 | 46.00 |
| 352.040 | 2.34 | 18.60 | 26.87 | 38.60 | 32.68 | 13.32 | 46.00 |
| 494.630 | 2.92 | 20.81 | 26.64 | 35.80 | 32.89 | 13.11 | 46.00 |

Vertical

| | | | | | | | |
|----------|------|-------|-------|-------|-------|-------|-------|
| 199.750 | 1.71 | 15.24 | 26.91 | 38.00 | 28.04 | 15.46 | 43.50 |
| 231.760 | 1.84 | 20.31 | 26.92 | 34.20 | 29.43 | 16.57 | 46.00 |
| 351.070 | 2.34 | 18.58 | 26.87 | 34.40 | 28.45 | 17.55 | 46.00 |
| 393.750 | 2.51 | 19.57 | 26.80 | 31.20 | 26.48 | 19.52 | 46.00 |
| 496.570 | 2.93 | 20.83 | 26.64 | 33.80 | 30.93 | 15.07 | 46.00 |
| *670.200 | 3.64 | 21.99 | 26.37 | 32.60 | 31.86 | 14.14 | 46.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss - PreAMP.

Product : 11Mbps Wireless Bridge
 Test Item : General Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Mode 1: DWL-1500 (Channel 11 (11Mbps))

| Freq. | Cable Loss | Probe Factor | PreAMP Reading | Emission Margin | Limit | | |
|-------------------|------------|--------------|----------------|-----------------|--------|-------|--------|
| MHz | dB | dB/m | dB | Level | Level | dB | dBuV/m |
| | | | dB | dBuV | dBuV/m | dB | dBuV/m |
| Horizontal | | | | | | | |
| 99.840 | 1.30 | 17.25 | 26.88 | 38.00 | 29.68 | 13.82 | 43.50 |
| 231.760 | 1.84 | 16.31 | 26.92 | 40.80 | 32.03 | 13.97 | 46.00 |
| 251.160 | 1.92 | 18.09 | 26.93 | 37.00 | 30.09 | 15.91 | 46.00 |
| 340.400 | 2.29 | 18.97 | 26.89 | 37.20 | 31.58 | 14.42 | 46.00 |
| 350.100 | 2.33 | 18.58 | 26.87 | 38.00 | 32.04 | 13.96 | 46.00 |
| *495.600 | 2.93 | 20.81 | 26.64 | 35.20 | 32.29 | 13.71 | 46.00 |
| Vertical | | | | | | | |
| 232.730 | 1.85 | 20.45 | 26.93 | 35.80 | 31.17 | 14.83 | 46.00 |
| 352.040 | 2.34 | 18.60 | 26.87 | 33.00 | 27.08 | 18.92 | 46.00 |
| *494.630 | 2.92 | 20.81 | 26.64 | 34.80 | 31.89 | 14.11 | 46.00 |
| 621.700 | 3.45 | 22.29 | 26.44 | 31.60 | 30.89 | 15.11 | 46.00 |
| 641.100 | 3.53 | 22.24 | 26.41 | 30.60 | 29.96 | 16.04 | 46.00 |
| 670.200 | 3.64 | 21.99 | 26.37 | 31.40 | 30.66 | 15.34 | 46.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss - PreAMP.

Product : 11Mbps Wireless Bridge
 Test Item : General Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Mode 2: DWL-1500 + WOP-9030 (Channel 1 (1Mbps))

| Freq. | Cable Loss | Probe Factor | PreAMP Reading | Emission Margin | Limit | | |
|-------------------|------------|--------------|----------------|-----------------|--------|-------|--------|
| MHz | dB | dB/m | dB | Level | Level | dB | dBuV/m |
| | | | | dBuV | dBuV/m | | |
| Horizontal | | | | | | | |
| *88.200 | 1.26 | 15.91 | 26.87 | 41.40 | 31.70 | 11.80 | 43.50 |
| 149.310 | 1.51 | 16.96 | 26.89 | 35.40 | 26.98 | 16.52 | 43.50 |
| 263.770 | 1.98 | 18.41 | 26.94 | 34.00 | 27.45 | 18.55 | 46.00 |
| 297.720 | 2.12 | 18.50 | 26.95 | 37.00 | 30.67 | 15.33 | 46.00 |
| 382.110 | 2.46 | 19.38 | 26.82 | 32.40 | 27.42 | 18.58 | 46.00 |
| 498.510 | 2.94 | 20.96 | 26.64 | 36.20 | 33.46 | 12.54 | 46.00 |
| Vertical | | | | | | | |
| 100.810 | 1.31 | 17.44 | 26.88 | 38.20 | 30.08 | 13.42 | 43.50 |
| 159.010 | 1.55 | 16.23 | 26.90 | 35.80 | 26.68 | 16.82 | 43.50 |
| 232.730 | 1.85 | 20.45 | 26.93 | 32.80 | 28.17 | 17.83 | 46.00 |
| 250.190 | 1.92 | 18.97 | 26.93 | 32.60 | 26.56 | 19.44 | 46.00 |
| 350.100 | 2.33 | 18.58 | 26.87 | 31.20 | 25.24 | 20.76 | 46.00 |
| *495.600 | 2.93 | 20.81 | 26.64 | 36.40 | 33.49 | 12.51 | 46.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss - PreAMP.

Product : 11Mbps Wireless Bridge
 Test Item : General Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Mode 2: DWL-1500 + WOP-9030 (Channel 6 (1Mbps))

| Freq. | Cable | Probe | PreAMP | Reading | Emission | Margin | Limit |
|-------------------|-------|--------|--------|---------|----------|--------|--------|
| MHz | Loss | Factor | Level | Level | Level | dB | dBuV/m |
| | dB | dB/m | dB | dBuV | dBuV/m | | |
| Horizontal | | | | | | | |
| *87.230 | 1.25 | 15.91 | 26.87 | 42.40 | 32.70 | 7.30 | 40.00 |
| 149.310 | 1.51 | 16.96 | 26.89 | 35.80 | 27.38 | 16.12 | 43.50 |
| 199.750 | 1.71 | 15.24 | 26.91 | 38.00 | 28.04 | 15.46 | 43.50 |
| 262.800 | 1.97 | 18.59 | 26.94 | 33.60 | 27.23 | 18.77 | 46.00 |
| 298.690 | 2.12 | 18.50 | 26.95 | 38.00 | 31.68 | 14.32 | 46.00 |
| 350.100 | 2.33 | 18.58 | 26.87 | 33.40 | 27.44 | 18.56 | 46.00 |
| Vertical | | | | | | | |
| 100.810 | 1.31 | 17.44 | 26.88 | 38.60 | 30.48 | 13.02 | 43.50 |
| 149.310 | 1.51 | 16.96 | 26.89 | 36.40 | 27.98 | 15.52 | 43.50 |
| 200.720 | 1.72 | 15.14 | 26.91 | 39.80 | 29.74 | 13.76 | 43.50 |
| 232.730 | 1.85 | 20.45 | 26.93 | 31.60 | 26.97 | 19.03 | 46.00 |
| 352.040 | 2.34 | 18.60 | 26.87 | 31.40 | 25.48 | 20.52 | 46.00 |
| *495.600 | 2.93 | 20.81 | 26.64 | 36.80 | 33.89 | 12.11 | 46.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss - PreAMP.

Product : 11Mbps Wireless Bridge
 Test Item : General Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Mode 2: DWL-1500 + WOP-9030 (Channel 11 (1Mbps))

| Freq. | Cable Loss | Probe Factor | PreAMP Reading | Emission Margin | Limit | | |
|-------------------|------------|--------------|----------------|-----------------|--------|-------|--------|
| MHz | dB | dB/m | dB | Level | Level | dB | dBuV/m |
| | | | | dBuV | dBuV/m | | |
| Horizontal | | | | | | | |
| *99.840 | 1.30 | 17.25 | 26.88 | 37.60 | 29.28 | 14.22 | 43.50 |
| 151.250 | 1.52 | 16.74 | 26.89 | 37.20 | 28.56 | 14.94 | 43.50 |
| 199.750 | 1.71 | 15.24 | 26.91 | 37.60 | 27.64 | 15.86 | 43.50 |
| 262.800 | 1.97 | 18.59 | 26.94 | 34.00 | 27.63 | 18.37 | 46.00 |
| 307.420 | 2.16 | 18.81 | 26.94 | 32.00 | 26.02 | 19.98 | 46.00 |
| 351.070 | 2.34 | 18.58 | 26.87 | 34.00 | 28.05 | 17.95 | 46.00 |
| Vertical | | | | | | | |
| *100.810 | 1.31 | 17.44 | 26.88 | 38.40 | 30.28 | 13.22 | 43.50 |
| 149.310 | 1.51 | 16.96 | 26.89 | 38.00 | 29.58 | 13.92 | 43.50 |
| 199.750 | 1.71 | 15.24 | 26.91 | 38.00 | 28.04 | 15.46 | 43.50 |
| 231.760 | 1.84 | 20.31 | 26.92 | 33.40 | 28.63 | 17.37 | 46.00 |
| 250.190 | 1.92 | 18.97 | 26.93 | 31.40 | 25.36 | 20.64 | 46.00 |
| 352.040 | 2.34 | 18.60 | 26.87 | 32.00 | 26.08 | 19.92 | 46.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss - PreAMP.

Product : 11Mbps Wireless Bridge
 Test Item : General Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Mode 2: DWL-1500 + WOP-9030 (Channel 1 (11Mbps))

| Freq. | Cable | Probe | PreAMP | Reading | Emission | Margin | Limit |
|-------|-------|--------|--------|---------|----------|--------|--------|
| MHz | Loss | Factor | dB | Level | Level | dB | dBuV/m |
| | dB | dB/m | dB | dBuV | dBuV/m | | |

Horizontal

| | | | | | | | |
|---------|------|-------|-------|-------|-------|-------|-------|
| *88.200 | 1.26 | 15.91 | 26.87 | 42.80 | 33.10 | 10.40 | 43.50 |
| 198.780 | 1.71 | 15.14 | 26.91 | 37.80 | 27.73 | 15.77 | 43.50 |
| 263.770 | 1.98 | 18.41 | 26.94 | 34.00 | 27.45 | 18.55 | 46.00 |
| 297.720 | 2.12 | 18.50 | 26.95 | 37.40 | 31.07 | 14.93 | 46.00 |
| 361.740 | 2.38 | 19.00 | 26.85 | 35.80 | 30.33 | 15.67 | 46.00 |
| 383.080 | 2.47 | 19.38 | 26.82 | 33.20 | 28.23 | 17.77 | 46.00 |

Vertical

| | | | | | | | |
|---------|------|-------|-------|-------|-------|-------|-------|
| *87.230 | 1.25 | 17.91 | 26.87 | 40.80 | 33.10 | 6.90 | 40.00 |
| 151.250 | 1.52 | 16.74 | 26.89 | 36.60 | 27.96 | 15.54 | 43.50 |
| 198.780 | 1.71 | 15.14 | 26.91 | 37.60 | 27.53 | 15.97 | 43.50 |
| 218.180 | 1.79 | 20.23 | 26.92 | 31.80 | 26.90 | 19.10 | 46.00 |
| 297.720 | 2.12 | 18.50 | 26.95 | 32.80 | 26.47 | 19.53 | 46.00 |
| 352.040 | 2.34 | 18.60 | 26.87 | 32.20 | 26.28 | 19.72 | 46.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss - PreAMP.

Product : 11Mbps Wireless Bridge
 Test Item : General Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Mode 2: DWL-1500 + WOP-9030 (Channel 6 (11Mbps))

| Freq. | Cable | Probe | PreAMP | Reading | Emission | Margin | Limit |
|-------|-------|--------|--------|---------|----------|--------|--------|
| MHz | Loss | Factor | | Level | Level | | |
| | dB | dB/m | dB | dBuV | dBuV/m | dB | dBuV/m |

Horizontal

| | | | | | | | |
|---------|------|-------|-------|-------|-------|-------|-------|
| *88.200 | 1.26 | 15.91 | 26.87 | 42.80 | 33.10 | 10.40 | 43.50 |
| 149.310 | 1.51 | 16.96 | 26.89 | 37.00 | 28.58 | 14.92 | 43.50 |
| 263.770 | 1.98 | 18.41 | 26.94 | 34.80 | 28.25 | 17.75 | 46.00 |
| 298.690 | 2.12 | 18.50 | 26.95 | 38.40 | 32.08 | 13.92 | 46.00 |
| 361.740 | 2.38 | 19.00 | 26.85 | 35.40 | 29.93 | 16.07 | 46.00 |
| 383.080 | 2.47 | 19.38 | 26.82 | 33.60 | 28.63 | 17.37 | 46.00 |

Vertical

| | | | | | | | |
|----------|------|-------|-------|-------|-------|-------|-------|
| *100.810 | 1.31 | 17.44 | 26.88 | 37.40 | 29.28 | 14.22 | 43.50 |
| 149.310 | 1.51 | 16.96 | 26.89 | 36.40 | 27.98 | 15.52 | 43.50 |
| 199.750 | 1.71 | 15.24 | 26.91 | 37.00 | 27.04 | 16.46 | 43.50 |
| 220.120 | 1.80 | 20.38 | 26.92 | 32.40 | 27.66 | 18.34 | 46.00 |
| 232.730 | 1.85 | 20.45 | 26.93 | 32.20 | 27.57 | 18.43 | 46.00 |
| 352.040 | 2.34 | 18.60 | 26.87 | 32.60 | 26.68 | 19.32 | 46.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss - PreAMP.

Product : 11Mbps Wireless Bridge
 Test Item : General Radiated Emission Data
 Test Site : No.1 OATS
 Test Mode : Mode 2: DWL-1500 + WOP-9030 (Channel 11 (11Mbps))

| Freq. | Cable | Probe | PreAMP | Reading | Emission | Margin | Limit |
|-------|-------|--------|--------|---------|----------|--------|--------|
| MHz | Loss | Factor | | Level | Level | | |
| | dB | dB/m | dB | dBuV | dBuV/m | dB | dBuV/m |

Horizontal

| | | | | | | | |
|---------|------|-------|-------|-------|-------|-------|-------|
| *99.840 | 1.30 | 17.25 | 26.88 | 38.60 | 30.28 | 13.22 | 43.50 |
| 149.310 | 1.51 | 16.96 | 26.89 | 36.00 | 27.58 | 15.92 | 43.50 |
| 199.750 | 1.71 | 15.24 | 26.91 | 37.60 | 27.64 | 15.86 | 43.50 |
| 262.800 | 1.97 | 18.59 | 26.94 | 34.20 | 27.83 | 18.17 | 46.00 |
| 352.040 | 2.34 | 18.60 | 26.87 | 36.40 | 30.48 | 15.52 | 46.00 |
| 360.770 | 2.38 | 18.98 | 26.85 | 36.40 | 30.90 | 15.10 | 46.00 |

Vertical

| | | | | | | | |
|----------|------|-------|-------|-------|-------|-------|-------|
| *100.810 | 1.31 | 17.44 | 26.88 | 39.80 | 31.68 | 11.82 | 43.50 |
| 149.310 | 1.51 | 16.96 | 26.89 | 35.40 | 26.98 | 16.52 | 43.50 |
| 198.780 | 1.71 | 15.14 | 26.91 | 37.20 | 27.13 | 16.37 | 43.50 |
| 232.730 | 1.85 | 20.45 | 26.93 | 32.00 | 27.37 | 18.63 | 46.00 |
| 249.220 | 1.92 | 18.87 | 26.93 | 32.80 | 26.66 | 19.34 | 46.00 |
| 351.070 | 2.34 | 18.58 | 26.87 | 33.40 | 27.45 | 18.55 | 46.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss - PreAMP.

6. Band Edge

6.1. Test Equipment

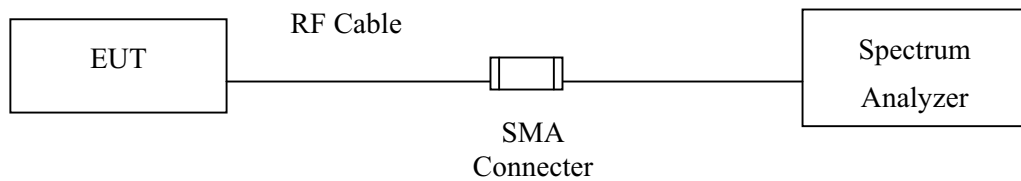
The following test equipments are used during the band edge tests:

| | Equipment | Manufacturer | Model No./Serial No. | Last Cal. |
|---|-------------------|--------------|----------------------|------------|
| X | Spectrum Analyzer | Advantest | R3272 / 72421194 | May, 2001 |
| X | Test Receiver | R & S | ESCS 30 / 825442/14 | May, 2001 |
| X | Spectrum Analyzer | Advantest | R3261C / 71720140 | May, 2001 |
| X | Pre-Amplifier | HP | 8447D/3307A01812 | May, 2001 |
| X | Bilog Antenna | Chase | CBL6112B / 12452 | Sep., 2001 |
| X | Horn Antenna | EM | EM6917 / 103325 | May, 2001 |

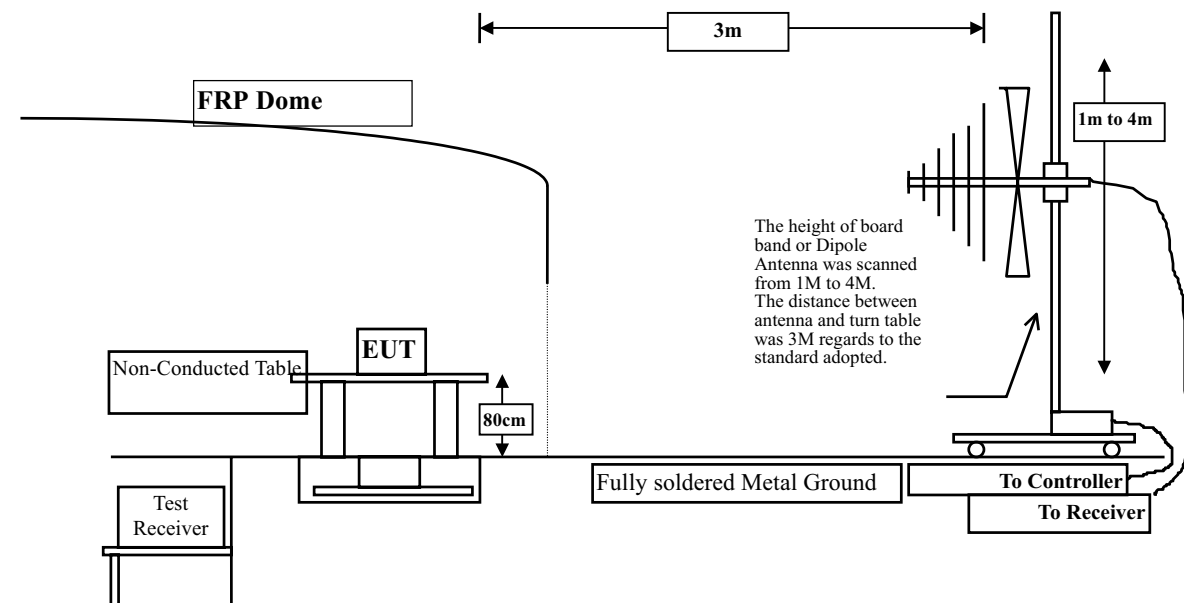
- Note: 1. All equipments that need to calibrate are with calibration period of 1 year.
 2. Mark "X" test instruments are used to measure the final test results.

6.2. Test Setup

RF Conducted Measurement:



RF Radiated Measurement:



6.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

6.4. Standard Requirement

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)).

6.5. Test Result of Band Edge

Product : 11Mbps Wireless Bridge
 Test Item : Band Edge Data
 Test Site : No.1 OATS
 Test Mode : Channel 1 (1Mbps)

RF Radiated Measurement:

| Channel No. | Frequency (MHz) | Required Limit (dBc) | Result |
|----------------|-----------------|----------------------|--------|
| 1 (Horizontal) | <2400 | >20 | Pass |
| 1 (Vertical) | <2400 | >20 | Pass |

Figure Channel 1: (Horizontal)

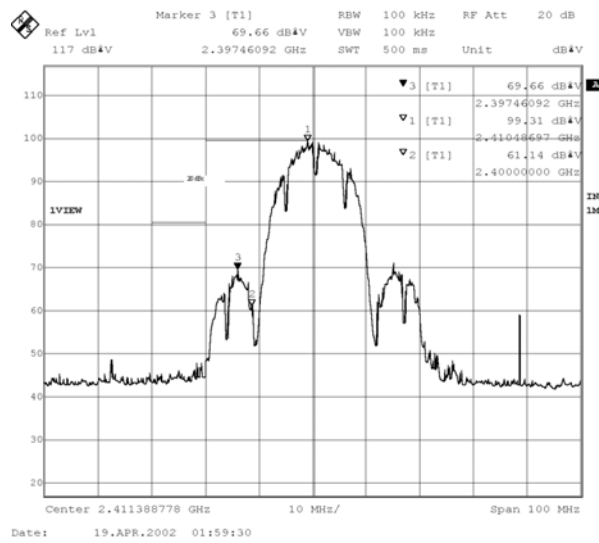
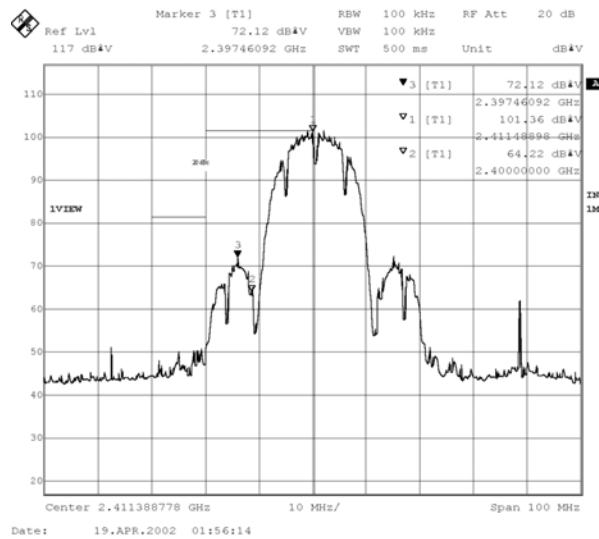


Figure Channel 1: (Vertical)



Product : 11Mbps Wireless Bridge
 Test Item : Band Edge Data
 Test Site : No.1 OATS
 Test Mode : Channel 1 (11Mbps)

RF Radiated Measurement:

| Channel No. | Frequency (MHz) | Required Limit (dBc) | Result |
|----------------|-----------------|----------------------|--------|
| 1 (Horizontal) | <2400 | >20 | Pass |
| 1 (Vertical) | <2400 | >20 | Pass |

Figure Channel 1: (Horizontal)

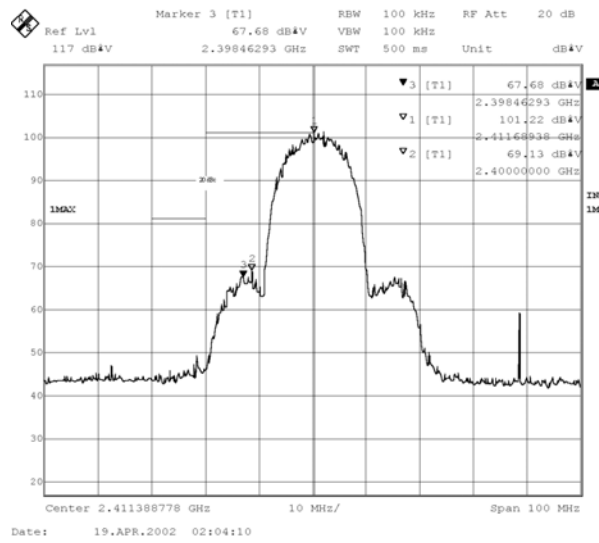
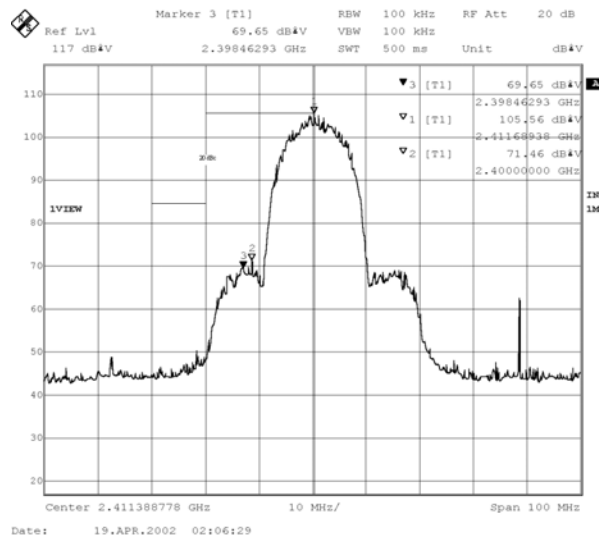


Figure Channel 1: (Vertical)



Product : 11Mbps Wireless Bridge
 Test Item : Band Edge Data
 Test Site : No.1 OATS
 Test Mode : Channel 11 (1Mbps)

RF Radiated Measurement:

| Channel No. | Frequency (MHz) | Reading Level (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Result |
|----------------|-----------------|----------------------|-------------------------|----------------|--------|
| 11(Horizontal) | 2483.9438 | 54.76 | 51.80 | 54 | Pass |
| 11 (Vertical) | 2484.0440 | 48.98 | 46.07 | 54 | Pass |

Figure Channel 11:

(Horizontal)

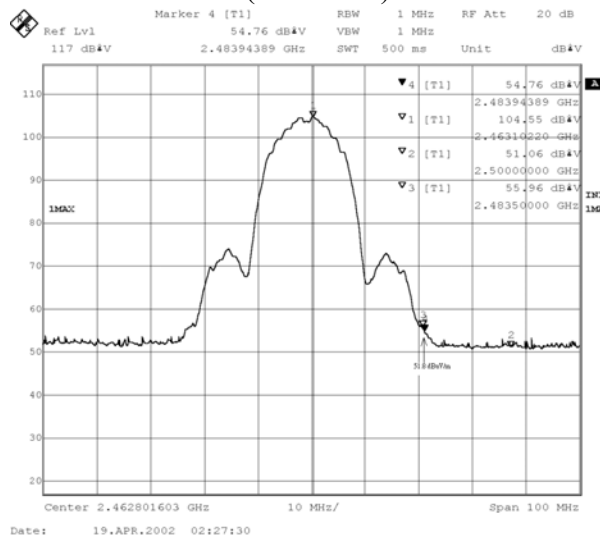
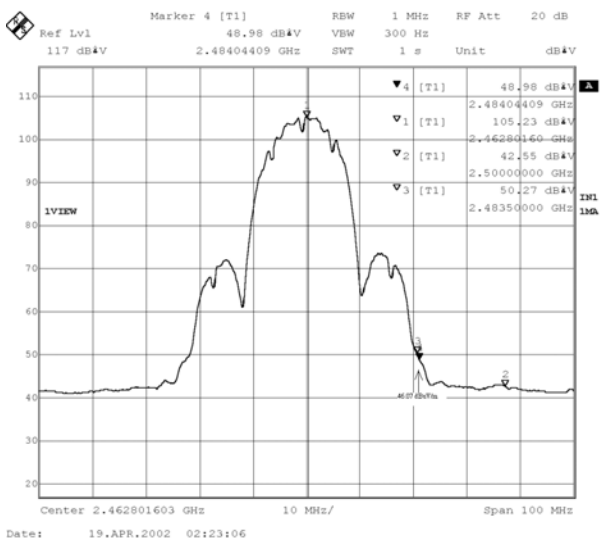


Figure Channel 11:

(Vertical)



Product : 11Mbps Wireless Bridge
 Test Item : Band Edge Data
 Test Site : No.1 OATS
 Test Mode : Channel 11 (11Mbps)

RF Radiated Measurement:

| Channel No. | Frequency (MHz) | Reading Level (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Result |
|----------------|-----------------|----------------------|-------------------------|----------------|--------|
| 11(Horizontal) | 2483.9438 | 54.68 | 51.72 | 54 | Pass |
| 11(Vertical) | 2484.2024 | 45.99 | 43.08 | 54 | Pass |

Figure Channel 11:

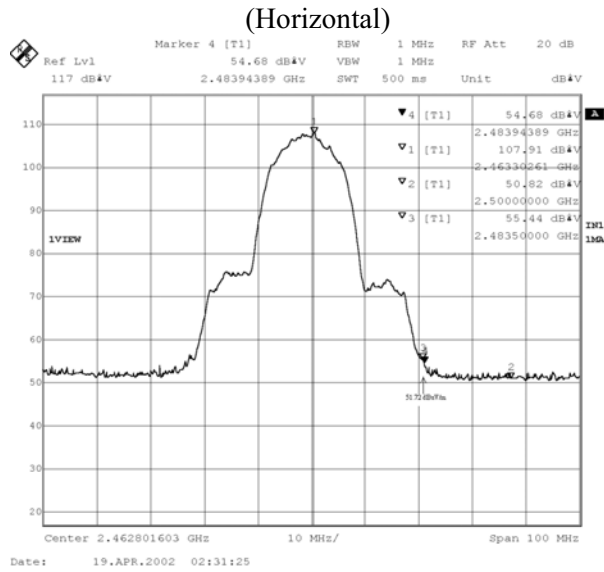
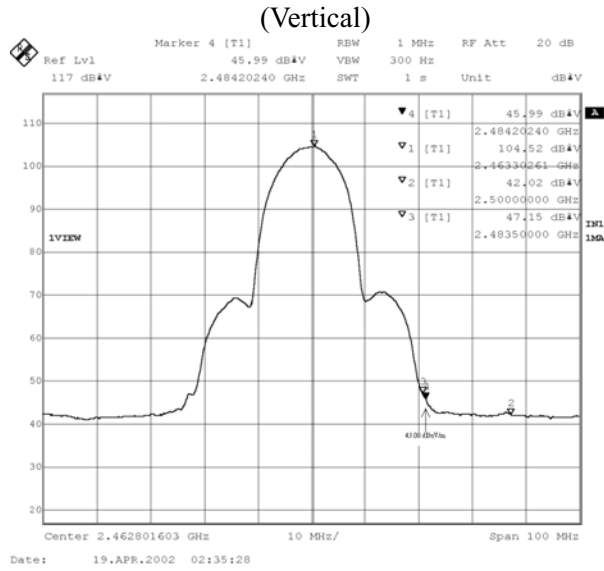


Figure Channel 11:



7. Occupied Bandwidth

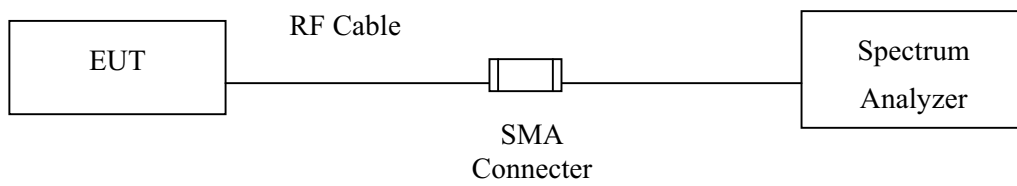
7.1. Test Equipment

The following test equipments are used during the radiated emission tests:

| Equipment | Manufacturer | Model No./Serial No. | Last Cal. |
|---------------------|--------------|----------------------|-----------|
| X Spectrum Analyzer | Advantest | R3272 / 72421194 | May, 2001 |

Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.
 2. Mark “X” test instruments are used to measure the final test results.

7.2. Test Setup



7.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

7.4. Standard Requirement

The minimum bandwidth shall be at least 500kHz.

7.5. Test Result of Occupied Bandwidth

Product : 11Mbps Wireless Bridge
 Test Item : Occupied Bandwidth Data
 Test Site : No.1 OATS
 Test Mode : Channel 1

| Channel No. | Frequency (MHz) | Measurement Level (kHz) | Required Limit (kHz) | Result |
|-------------|-----------------|-------------------------|----------------------|--------|
| 1 (1Mbps) | 2412.00 | 11000 | >500 | Pass |
| 1 (11Mbps) | 2412.00 | 11000 | >500 | Pass |

Figure Channel 1:

1Mbps

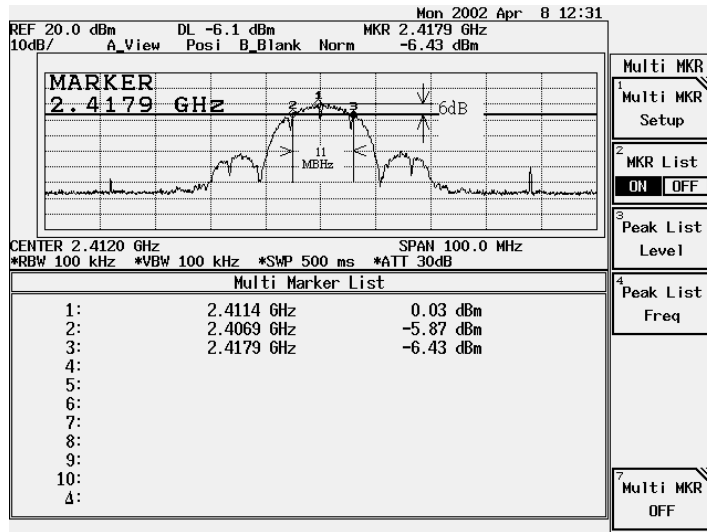
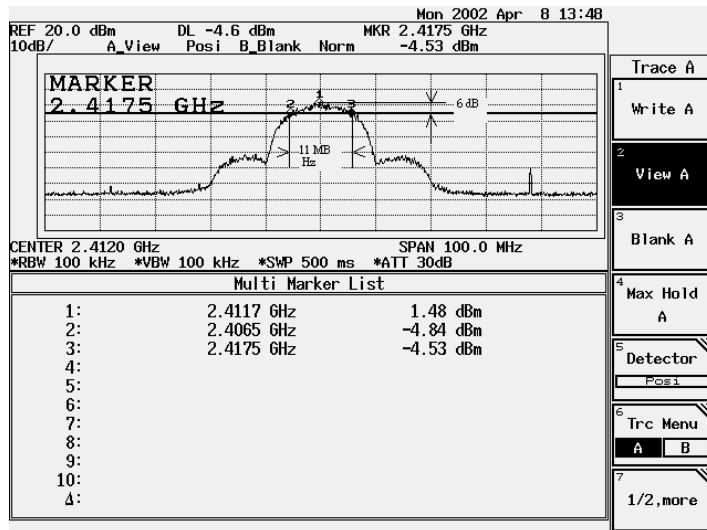


Figure Channel 1:

11Mbps



Product : 11Mbps Wireless Bridge
 Test Item : Occupied Bandwidth Data
 Test Site : No.1 OATS
 Test Mode : Channel 6

| Channel No. | Frequency (MHz) | Measurement Level (kHz) | Required Limit (kHz) | Result |
|-------------|-----------------|-------------------------|----------------------|--------|
| 6 (1Mbps) | 2437.00 | 9700 | >500 | Pass |
| 6 (11Mbps) | 2437.00 | 9300 | >500 | Pass |

Figure Channel 6: 1Mbps

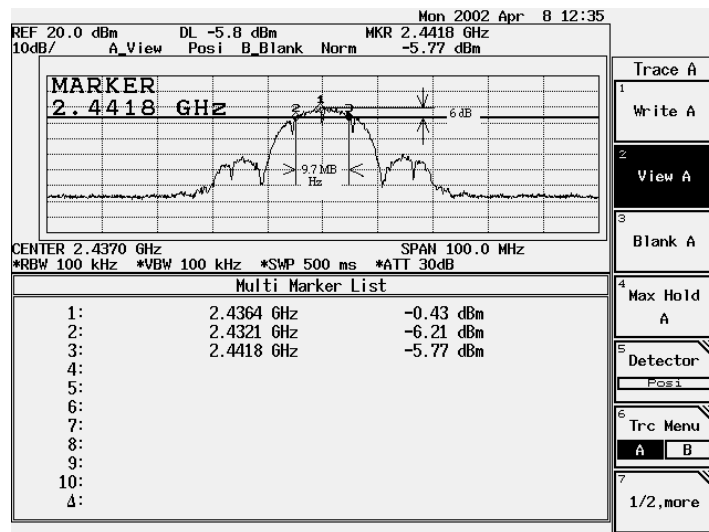
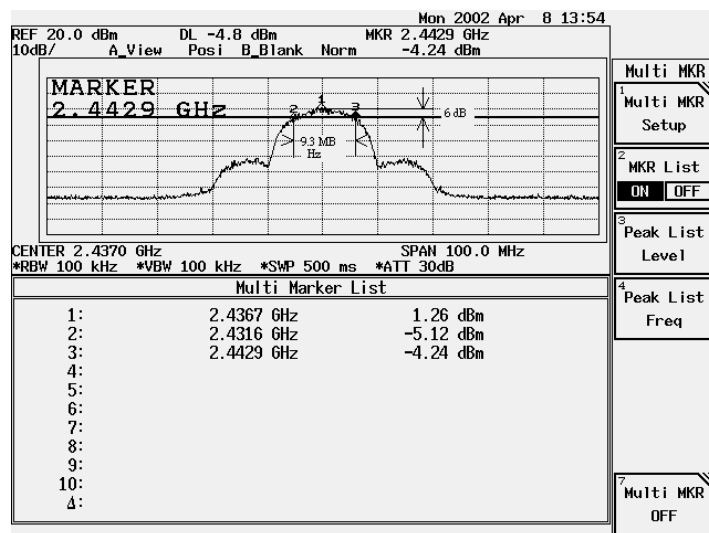


Figure Channel 6: 11Mbps



Product : 11Mbps Wireless Bridge
 Test Item : Occupied Bandwidth Data
 Test Site : No.1 OATS
 Test Mode : Channel 11

| Channel No. | Frequency (MHz) | Measurement Level (kHz) | Required Limit (kHz) | Result |
|-------------|-----------------|-------------------------|----------------------|--------|
| 11 (1Mbps) | 2462.00 | 11100 | >500 | Pass |
| 11 (11Mbps) | 2462.00 | 11000 | >500 | Pass |

Figure Channel 11: 1Mbps

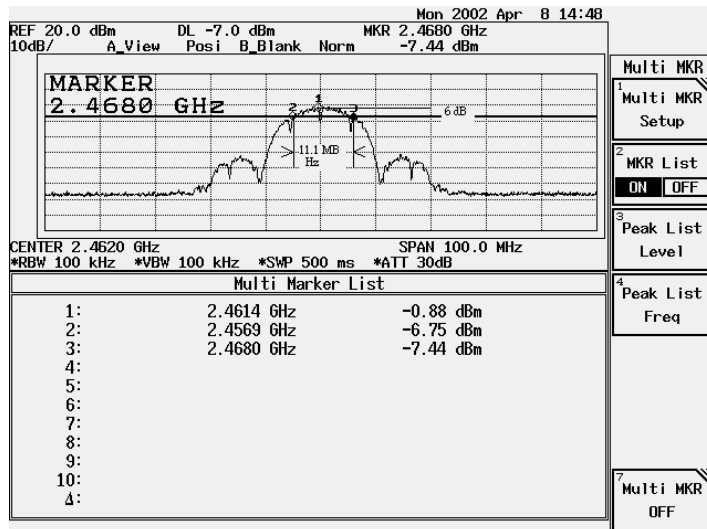
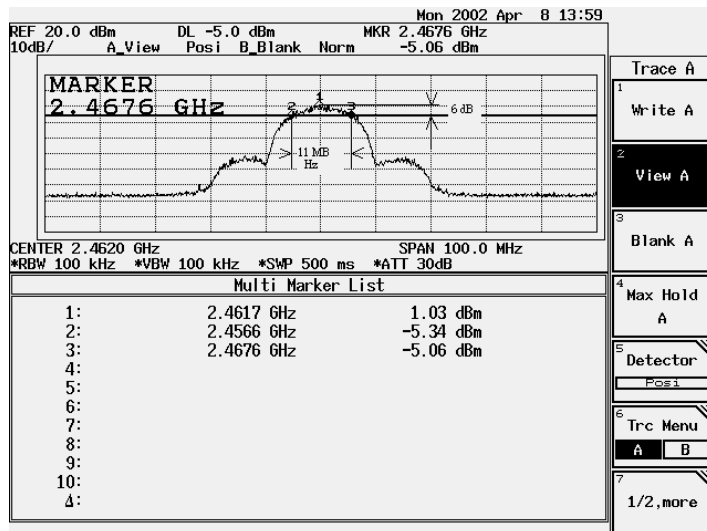


Figure Channel 11: 11Mbps



8. Transmitter Power Density

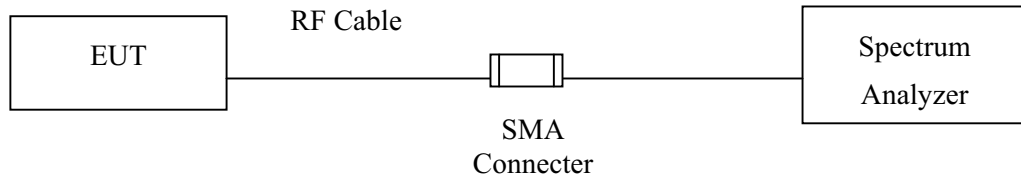
8.1. Test Equipment

The following test equipments are used during the radiated emission tests:

| | Equipment | Manufacturer | Model No./Serial No. | Last Cal. |
|---|-------------------|--------------|----------------------|-----------|
| X | Spectrum Analyzer | Advantest | R3272 / 72421194 | May, 2001 |

Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.
 2. Mark "X" test instruments are used to measure the final test results.

8.2. Test Setup



8.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

8.4. Standard Requirement

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

8.5. Test Result of Transmitter Power Density

Product : 11Mbps Wireless Bridge
 Test Item : Transmitter Power Density Data
 Test Site : No.1 OATS
 Test Mode : Channel 1

| Channel No. | Frequency (MHz) | Measurement Level (dBm) | Required Limit (dBm) | Result |
|-------------|-----------------|-------------------------|----------------------|--------|
| 1 (1Mbps) | 2412.750 | -17.19 | < 8dBm | Pass |
| 1 (11Mbps) | 2411.310 | -11.52 | < 8dBm | Pass |

Figure Channel 1: 1Mbps

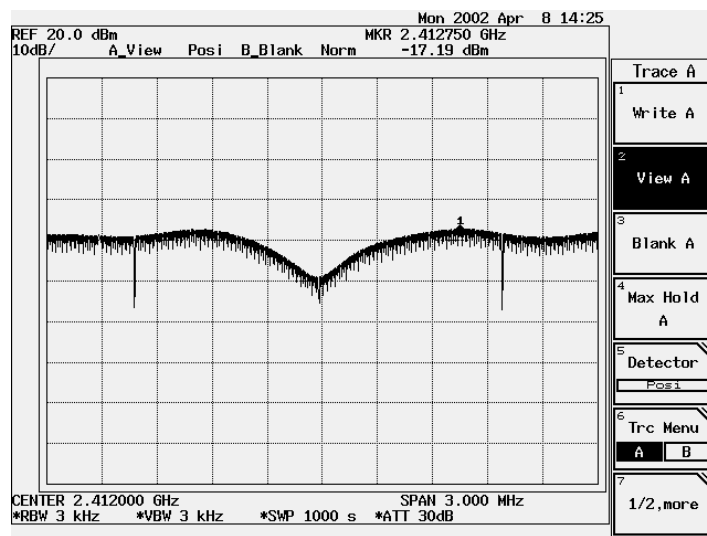
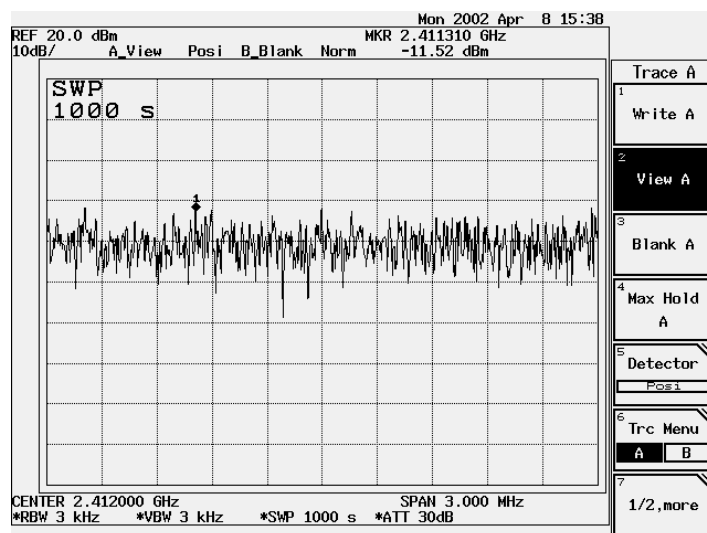


Figure Channel 1: 11Mbps



Product : 11Mbps Wireless Bridge
 Test Item : Transmitter Power Density Data
 Test Site : No.1 OATS
 Test Mode : Channel 6

| Channel No. | Frequency (MHz) | Measurement Level (dBm) | Required Limit (dBm) | Result |
|-------------|-----------------|-------------------------|----------------------|--------|
| 6 (1Mbps) | 2437.735 | -17.47 | < 8dBm | Pass |
| 6 (11Mbps) | 2436.310 | -11.81 | < 8dBm | Pass |

Figure Channel 6:

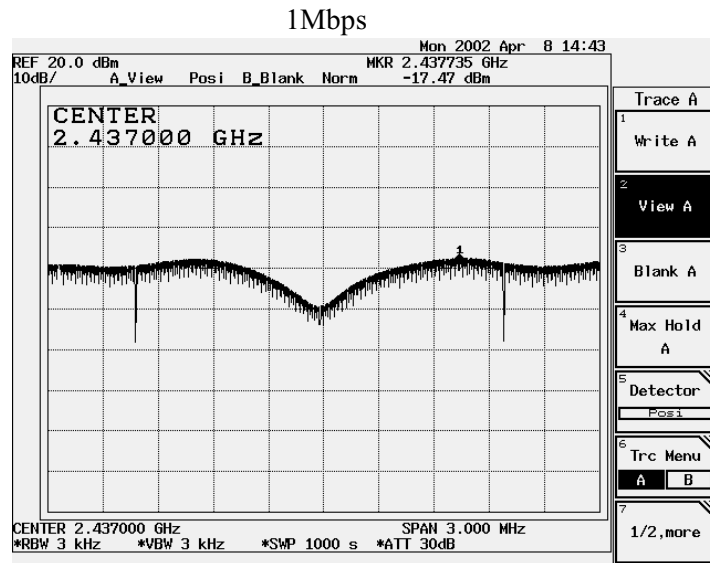
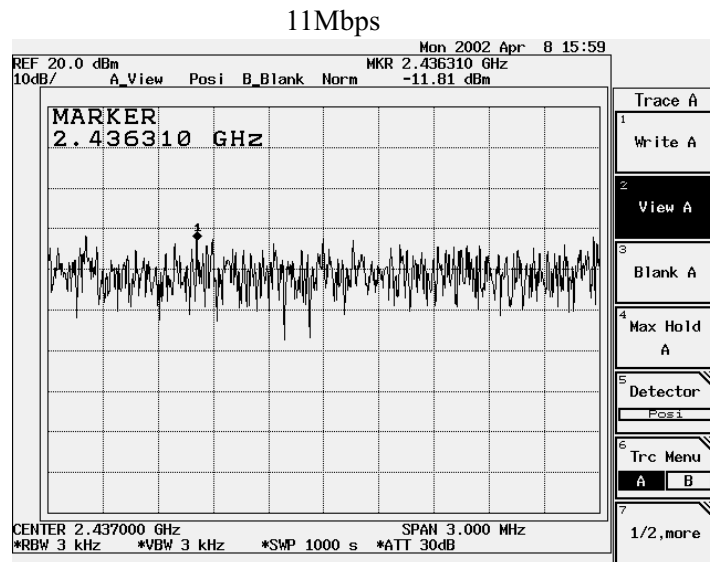


Figure Channel 6:



Product : 11Mbps Wireless Bridge
 Test Item : Transmitter Power Density Data
 Test Site : No.1 OATS
 Test Mode : Channel 11

| Channel No. | Frequency (MHz) | Measurement Level (dBm) | Required Limit (dBm) | Result |
|-------------|-----------------|-------------------------|----------------------|--------|
| 11 (1Mbps) | 2462.771 | -17.88 | < 8dBm | Pass |
| 11 (11Mbps) | 2461.310 | -12.20 | < 8dBm | Pass |

Figure Channel 11: 1Mbps

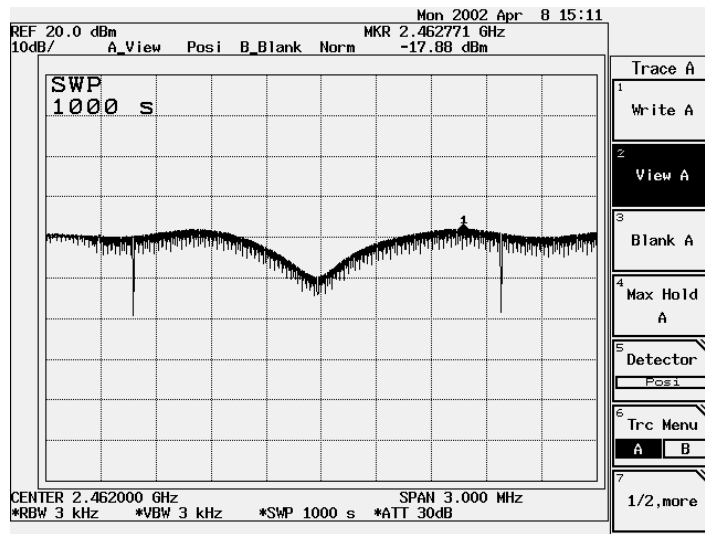
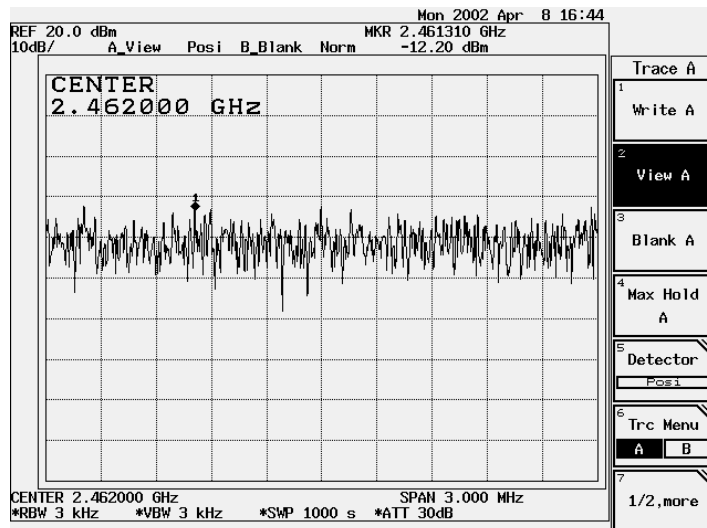


Figure Channel 11: 11Mbps



9. Processing Gain

9.1. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

9.2. Minimum Standard

The processing gain shall be at least 10 dB.

9.3. Method of Measurement

The processing gain of this spread spectrum was measured the CW jamming method. The Section 9.1 illustrates the measurement setup. The output power of the spread spectrum transmitter is fixed and the output power of jammer is adjustable. The frequency of jammer was stepped through the pass band of nominal channel in 50kHz steps. In each frequency step of the jammer, the output power of jammer is adjusted to cause the Bit Error Rate (BER) to be 1.0×10^{-6} . The power levels are recorded to calculate the J/S as shown in Table 1.

9.4. Calculation of Processing Gain:

The processing gain was determined by measuring the jamming margin of the EUT and using the following formula:

$$G_p = (S/N)_o + M_j + L_{sys}$$

Where $(S/N)_o$ is the required signal to noise ratio at the receiver output

M_j is the jammer to signal ratio (J/S)

L_{sys} is the system loss

The $(S/N)_o$ is calculated from:

$$P_e = 1/2 \exp(-1/2(S/N)_o) \quad ; \quad P_e = \text{probability of error (BER)}$$

For the $P_e(\text{BER}) = 1.0 \times 10^{-6}$, the required $(S/N)_o$ is 16.4dB

From Measurement, the minimum J/S(M_j) is $\geq 8.4\text{dB}$

We assume the system loss is 2dB.

Therefore the processing gain is calculated below:

$$G_p = (S/N)_o + M_j + L_{sys} = 16.4 + (-8.4) + 2 = 10 \text{ (dB)}$$

9.5. Test Result of Processing Gain

As EUT power is less than 20dBm, processing gain is not applicable.

EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs