



Test Report

Product Name : Wireless Ethernet Router

Model No.: WER120

FCC ID.: R3L-WER120-IDU

Applicant : IWICS, INC.

Address : 19125 North Creek Parkway, Suite 201, Bothell, WA 98011, USA

Date of Receipt : Aug. 12, 2004

Date of Test : Sep. 10, 2004

Report No. : 048H048FI

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 : Sep. 10, 2004

Report No. : 048H048FI



Accredited by NIST (NVLAP)

NVLAP Lab Code: 200347-0

Product Name : Wireless Ethernet Router

Applicant : IWICS, INC.

Address : 19125 North Creek Parkway, Suite 201, Bothell, WA 98011, USA

Manufacturer : ZyGATE Communications Inc.

Model No. : WER120

FCC ID. : R3L-WER120-IDU

Rated Voltage : AC 120V/60Hz

Trade Name : IWICS

Measurement Standard : FCC CFR Title 47 Part 15 Subpart C 15.247: 2003

Measurement Procedure : ANSI C63.4: 2001


Test Result : Complied




The Test Results relate only to the samples tested.

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Documented By : 
(Carol Tsai)

Tested By : 
(Dampier Chang)


Approved By : 
(Kevin Wang)

TABLE OF CONTENTS

| Description | Page |
|--|-----------|
| 1. GENERAL INFORMATION..... | 4 |
| 1.1. EUT Description..... | 4 |
| 1.2. Operational Description | 5 |
| 1.3. Tested System Details..... | 6 |
| 1.4. Configuration of tested System | 7 |
| 1.5. EUT Exercise Software | 7 |
| 1.6. Test Facility | 8 |
| 2. Conducted Emission..... | 9 |
| 2.1. Test Equipment..... | 9 |
| 2.2. Test Setup | 9 |
| 2.3. Limits | 9 |
| 2.4. Test Procedure | 10 |
| 2.5. Test Result of Conducted Emission..... | 11 |
| 3. Peak Power Output | 13 |
| 3.1. Test Equipment..... | 13 |
| 3.2. Test Setup | 13 |
| 3.3. Limits | 13 |
| 3.4. Test Result of Peak Power Output..... | 14 |
| 4. Radiated Emission..... | 15 |
| 4.1. Test Equipment..... | 15 |
| 4.2. Test Setup | 15 |
| 4.3. Limits | 16 |
| 4.4. Test Procedure | 16 |
| 4.5. Test Result of Radiated Emission..... | 17 |
| 5. Band Edge | 23 |
| 5.1. Test Equipment..... | 23 |
| 5.2. Test Setup | 23 |
| 5.3. Limits | 25 |
| 5.4. Test Procedure | 25 |
| 5.5. Test Result of Band Edge | 26 |
| 6. Occupied Bandwidth..... | 29 |
| 6.1. Test Equipment..... | 29 |
| 6.2. Test Setup | 29 |
| 6.3. Limits | 29 |
| 6.4. Test Result of Occupied Bandwidth | 30 |
| 7. Power Density | 31 |
| 7.1. Test Equipment..... | 31 |
| 7.2. Test Setup | 31 |
| 7.3. Limits | 31 |
| 7.4. Test Result of Power Density | 32 |
| 8. EMI Reduction Method During Compliance Testing | 33 |
| Attachment 1: EUT Test Photographs | |
| Attachment 2: EUT Detailed Photographs | |

1. GENERAL INFORMATION

1.1. EUT Description

Product Name : Wireless Ethernet Router
Trade Name : IWICS
FCC ID. : R3L-WER120-IDU
Model No. : WER120
Frequency Range : 2412MHz to 2462MHz
Channel Number : 11
Type of Modulation : Direct Sequence Spread Spectrum
Antenna Type : Connector Reverse SMA
Data Speed : 1 Mbps, 2 Mbps, 5.5 Mbps, 11 Mbps
Antenna Gain : 2dBi
Channel Control : Auto
LAN Cable : Non-Shielded, 1.8m
Power Adapter : FAIRWAY, TC10A-050
Cable Out: 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 Wireless Ethernet Router included a 2.4GHz receiving function, a 2.4GHz transmitting function.
2. Regards to the frequency band operation; the highest rate that was 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 048H048F under Declaration of Conformity.

1.2. Operational Description

EUT is an Wireless Ethernet Router 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 was provides diversity function to improve the receiving function.

This Wireless Ethernet Router is an IEEE 802.11b Wireless LAN 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 Direst Sequence Spread Spectrum (DSSS) radio transmission, the Wireless Ethernet Router transfers data at speeds up to 64/128-bit Wired Equivalent Protection (WEP) algorithm is used. In addition, its standard compliance ensures that it can communicate with any 802.11b network.

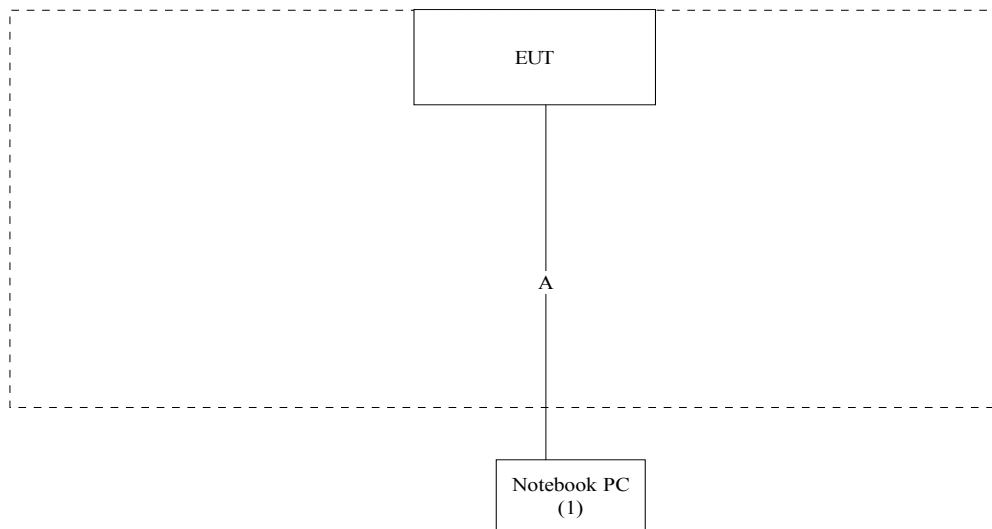
1.3. Tested System Details

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. | FCC ID | Power Cord |
|-----------------|--------------|--------------|------------|--------|---|
| (1) Notebook PC | DELL | Latitude 600 | N/A | DoC | Non-shielded, 1.7m, a ferrite core bonded |

| Signal Cable Type | Signal cable Description |
|-------------------|--------------------------|
| A. LAN Cable | Non-Shielded, 3.0m |

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 (3) to (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: June 22, 2001 File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2



July 03, 2001 Accreditation on NVLAP
NVLAP Lab Code: 200533-0



Site Name: Quietek Corporation

Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,
Lin-Kou Shiang, Taipei,
Taiwan, R.O.C.
TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com



2. Conducted Emission

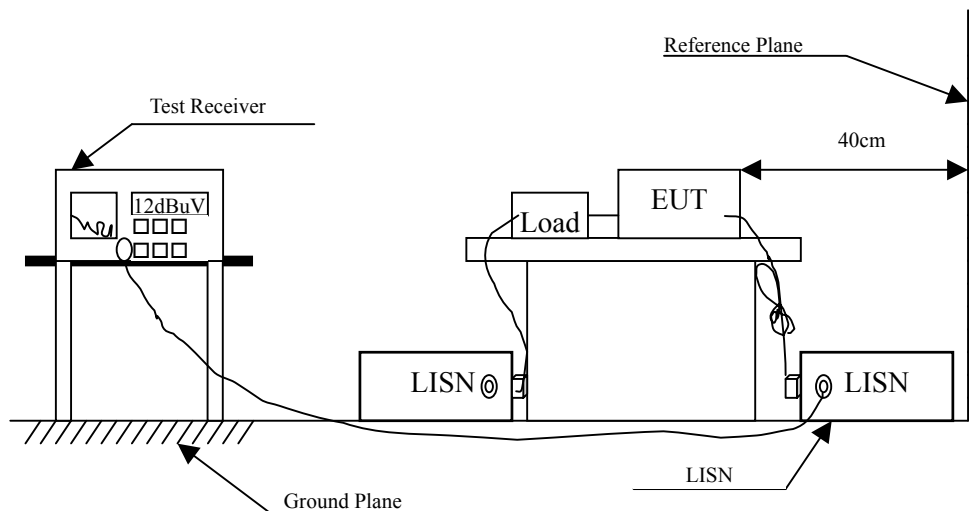
2.1. Test Equipment

The following test equipment are used during the test:

| Item | Equipment | Manufacturer | Model No. / Serial No. | Last Cal. | Remark |
|------|--------------------------|--------------|------------------------|------------|-------------|
| 1 | Test Receiver | R & S | ESCS 30 / 825442/018 | Sep., 2004 | |
| 2 | Artificial Mains Network | R & S | ENV4200 / 848411/10 | Feb., 2004 | Peripherals |
| 3 | LISN | R & S | ESH3-Z5 / 825562/002 | Feb., 2004 | EUT |
| 4 | Pulse Limiter | R & S | ESH3-Z2 / 357.8810.52 | Feb., 2004 | |
| 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 Subpart C Paragraph 15.207 (dBuV) Limit | | |
|---|--------|-------|
| Frequency MHz | Limits | |
| | QP | AV |
| 0.15 - 0.50 | 66-56 | 56-46 |
| 0.50-5.0 | 56 | 46 |
| 5.0 - 30 | 60 | 50 |

Remarks : In the above table, the tighter limit applies at the band edges.

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: 2001 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Test Result of Conducted Emission

Product : Wireless Ethernet Router
 Test Item : Conducted Emission
 Power Line : Line 1
 Test Mode : Normal Operation

| Frequency | Cable | Probe | Reading | Emission | Limits |
|-------------------|-------|--------|---------|----------|--------|
| | Loss | Factor | Level | Level | |
| MHz | dB | dB | dBuV | dBuV | dBuV |
| Quasi-Peak | | | | | |
| 0.215 | 0.10 | 0.13 | 38.44 | 38.67 | 63.02 |
| 0.425 | 0.10 | 0.20 | 37.49 | 37.79 | 57.35 |
| * 0.745 | 0.11 | 0.25 | 37.53 | 37.89 | 56.00 |
| 1.059 | 0.11 | 0.28 | 36.34 | 36.74 | 56.00 |
| 1.693 | 0.12 | 0.33 | 32.64 | 33.09 | 56.00 |
| 12.905 | 0.27 | 0.52 | 22.63 | 23.42 | 60.00 |
| Average | | | | | |
| 0.215 | 0.10 | 0.13 | 34.50 | 34.73 | 53.01 |
| * 0.425 | 0.10 | 0.20 | 30.90 | 31.20 | 47.35 |
| 0.745 | 0.11 | 0.25 | 28.30 | 28.66 | 46.00 |
| 1.039 | 0.11 | 0.28 | 25.00 | 25.39 | 46.00 |
| 1.693 | 0.12 | 0.33 | 20.40 | 20.85 | 46.00 |
| 12.905 | 0.27 | 0.52 | 17.40 | 18.19 | 50.00 |

Note:

1. All Reading Levels are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable Loss.

Product : Wireless Ethernet Router
Test Item : Conducted Emission
Power Line : Line 2
Test Mode : Normal Operation

| Frequency | Cable | Probe | Reading | Emission | Limits |
|-------------------|-------|--------|---------|----------|--------|
| | Loss | Factor | Level | Level | |
| MHz | dB | dB | dBuV | dBuV | dBuV |
| ===== | | | | | |
| Quasi-Peak | | | | | |
| 0.212 | 0.10 | 0.13 | 36.92 | 37.15 | 63.11 |
| 0.430 | 0.10 | 0.20 | 39.43 | 39.73 | 57.26 |
| * 0.751 | 0.11 | 0.25 | 40.31 | 40.67 | 56.00 |
| 1.053 | 0.11 | 0.28 | 37.73 | 38.13 | 56.00 |
| 1.694 | 0.12 | 0.33 | 32.34 | 32.79 | 56.00 |
| 13.208 | 0.27 | 0.52 | 21.75 | 22.55 | 60.00 |
| Average | | | | | |
| 0.212 | 0.10 | 0.13 | 29.90 | 30.13 | 53.13 |
| 0.430 | 0.10 | 0.20 | 32.50 | 32.80 | 47.25 |
| * 0.751 | 0.11 | 0.25 | 31.30 | 31.66 | 46.00 |
| 1.053 | 0.11 | 0.28 | 23.90 | 24.30 | 46.00 |
| 1.694 | 0.12 | 0.33 | 20.20 | 20.65 | 46.00 |
| 13.208 | 0.27 | 0.52 | 16.40 | 17.20 | 50.00 |

Note:

1. All Reading Levels are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable Loss.

3. Peak Power Output

3.1. Test Equipment

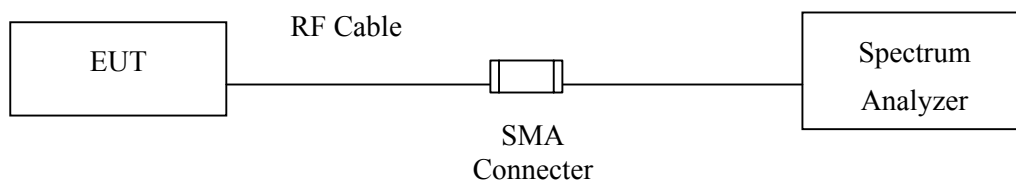
The following test equipment are used during the test:

| Item | Equipment | Manufacturer | Model No. / Serial No. | Last Cal. | Remark |
|------|-------------------|--------------|------------------------|------------|--------|
| 1 | Spectrum Analyzer | R & S | FSP / 100561 | Mar., 2004 | |
| 2 | No.1 OATS | | | Sep., 2004 | |

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

3.2. Test Setup

Conduction Power Measurement



3.3. Limits

The maximum peak power shall be less 1 Watt.

3.4. Test Result of Peak Power Output

Product : Wireless Ethernet Router
Test Item : Peak Power Output
Test Site : No.1 OATS
Test Mode : Normal Operation

| Channel No. | Frequency(MHz) | Measurement | Required Limit | Result |
|-------------|----------------|-------------|----------------|--------|
| 1 | 2412.00 | 19.36dBm | 1 Watt= 30 dBm | Pass |
| 6 | 2437.00 | 19.48dBm | 1 Watt= 30 dBm | Pass |
| 11 | 2462.00 | 19.72dBm | 1 Watt= 30 dBm | Pass |

4. Radiated Emission

4.1. Test Equipment

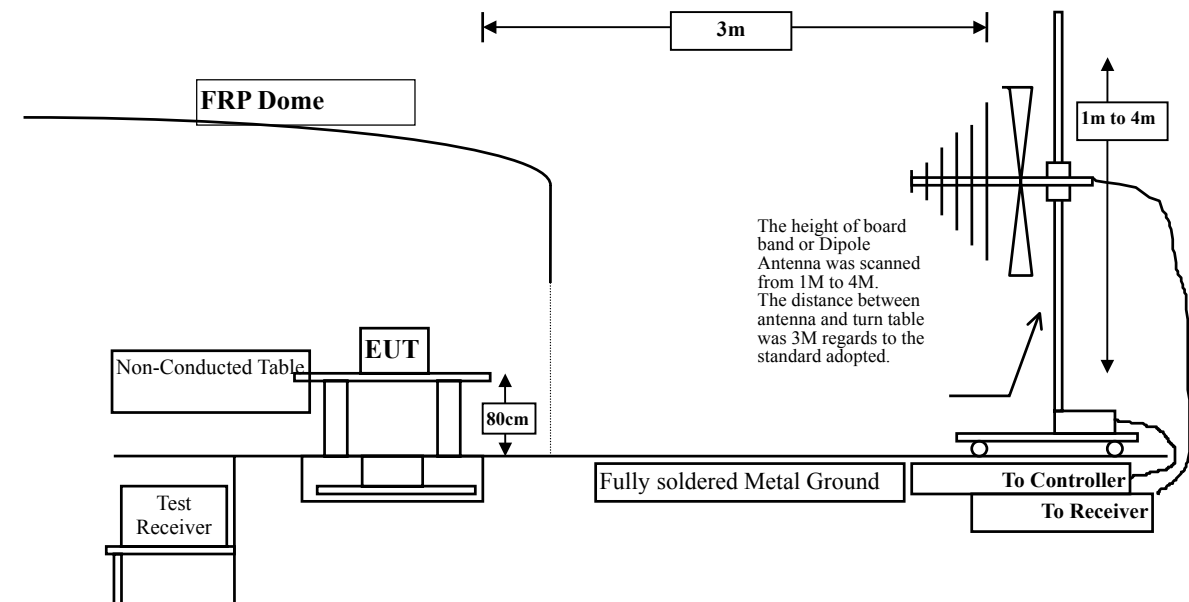
The following test equipment are used during the test:

| Item | | Equipment | Manufacturer | Model No. / Serial No. | Last Cal. |
|------|---|-------------------|--------------|------------------------------|------------|
| 1 | X | Test Receiver | R & S | ESCS 30 / 825442/017 | Jan., 2004 |
| 2 | X | Spectrum Analyzer | Advantest | R3261C / 81720266 | N/A |
| 3 | X | Pre-Amplifier | HP | 8447D / 2944A09276 | N/A |
| 4 | X | Bilog Antenna | Chase | CBL6112B / 2455 | Sep., 2004 |
| 5 | X | Spectrum Analyzer | R & S | FSP40 / 100005 | Aug., 2004 |
| 6 | X | Pre-Amplifier | HP | 8449B / 3008A01123 | Feb., 2004 |
| 7 | X | Horn Antenna | Schwarzbeck | BBHA 9120D / BBHA9120D312 | Jul., 2004 |
| 8 | | No.1 OATS | | | Sep., 2004 |

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.

4.2. Test Setup



4.3. 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 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.

4.4. 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: 2001 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.

4.5. Test Result of Radiated Emission

Product : Wireless Ethernet Router
 Test Item : Harmonic Radiated Emission
 Test Site : No.1 OATS
 Test Mode : Channel 1

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

Horizontal

Peak Detector:

| | | | | | | | |
|----------|------|-------|-------|-------|---------|-------|-------|
| 1130.000 | 2.13 | 24.43 | 31.90 | 41.82 | 36.48 | 37.52 | 74.00 |
| 4823.860 | 4.24 | 31.22 | 31.95 | 39.84 | 43.36 | 30.64 | 74.00 |
| 7235.880 | 5.63 | 35.95 | 32.67 | 36.59 | < 45.50 | 28.50 | 74.00 |
| 9648.120 | 7.01 | 38.05 | 31.88 | 35.48 | < 48.66 | 25.34 | 74.00 |
| 12060.00 | 8.40 | 38.59 | 31.32 | 34.10 | < 49.76 | 24.24 | 74.00 |

Vertical

Peak Detector:

| | | | | | | | |
|----------|------|-------|-------|-------|---------|-------|-------|
| 1016.000 | 2.06 | 24.27 | 31.88 | 42.61 | 37.06 | 36.94 | 74.00 |
| 4823.920 | 4.24 | 31.22 | 31.95 | 42.75 | 46.27 | 27.73 | 74.00 |
| 7235.960 | 5.63 | 35.95 | 32.67 | 35.97 | < 44.88 | 29.12 | 74.00 |
| 9647.980 | 7.01 | 38.05 | 31.88 | 34.56 | < 47.74 | 26.26 | 74.00 |
| 12060.00 | 8.40 | 38.59 | 31.32 | 32.83 | < 48.49 | 25.51 | 74.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz °
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz °
4. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Wireless Ethernet Router
 Test Item : Harmonic Radiated Emission
 Test Site : No.1 OATS
 Test Mode : Channel 6

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

Horizontal

Peak Detector:

| | | | | | | | |
|----------|------|-------|-------|-------|---------|-------|-------|
| 1196.000 | 2.16 | 24.49 | 31.91 | 41.39 | 36.13 | 37.87 | 74.00 |
| 4873.900 | 4.27 | 31.32 | 31.95 | 38.58 | 42.22 | 31.78 | 74.00 |
| 7311.200 | 5.67 | 36.09 | 32.60 | 35.48 | < 44.63 | 29.37 | 74.00 |
| 9747.900 | 7.07 | 38.07 | 31.66 | 34.12 | < 47.60 | 26.40 | 74.00 |
| 12185.40 | 8.47 | 38.51 | 31.21 | 33.32 | < 49.08 | 24.92 | 74.00 |

Vertical

Peak Detector:

| | | | | | | | |
|----------|------|-------|-------|-------|---------|-------|-------|
| 1000.000 | 2.05 | 24.25 | 31.88 | 42.00 | 36.42 | 37.58 | 74.00 |
| 4873.900 | 4.27 | 31.32 | 31.95 | 43.49 | 47.13 | 26.87 | 74.00 |
| 7311.200 | 5.67 | 36.09 | 32.60 | 35.93 | < 45.08 | 28.92 | 74.00 |
| 9747.400 | 7.07 | 38.07 | 31.66 | 35.18 | < 48.66 | 25.34 | 74.00 |
| 12185.30 | 8.47 | 38.51 | 31.21 | 33.02 | < 48.78 | 25.22 | 74.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz °
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz °
4. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Wireless Ethernet Router
 Test Item : Harmonic Radiated Emission
 Test Site : No.1 OATS
 Test Mode : Channel 11

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

Horizontal

Peak Detector:

| | | | | | | | |
|----------|------|-------|-------|-------|---------|-------|-------|
| 1016.000 | 2.06 | 24.27 | 31.88 | 41.72 | 36.17 | 37.83 | 74.00 |
| 4924.100 | 4.30 | 31.41 | 31.96 | 38.90 | 42.66 | 31.34 | 74.00 |
| 7386.200 | 5.72 | 36.26 | 32.51 | 35.45 | < 44.91 | 29.09 | 74.00 |
| 9847.900 | 7.12 | 38.09 | 31.48 | 34.58 | < 48.31 | 25.69 | 74.00 |
| 12310.10 | 8.54 | 38.42 | 31.09 | 33.16 | < 49.03 | 24.97 | 74.00 |

Vertical

Peak Detector:

| | | | | | | | |
|----------|------|-------|-------|-------|---------|-------|-------|
| 1016.000 | 2.06 | 24.27 | 31.88 | 42.53 | 36.98 | 37.02 | 74.00 |
| 4923.900 | 4.30 | 31.41 | 31.96 | 41.78 | 45.54 | 28.46 | 74.00 |
| 7386.300 | 5.72 | 36.26 | 32.51 | 35.22 | < 44.68 | 29.32 | 74.00 |
| 9848.000 | 7.12 | 38.09 | 31.48 | 35.08 | < 48.81 | 25.19 | 74.00 |
| 12309.80 | 8.53 | 38.43 | 31.10 | 33.78 | < 49.64 | 24.36 | 74.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz °
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz °
4. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Wireless Ethernet Router
Test Item : General Radiated Emission
Test Site : No.1 OATS
Test Mode : Channel 1

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

Horizontal

| | | | | | | | |
|-----------|------|-------|-------|-------|-------|-------|-------|
| 162.890 | 1.56 | 9.55 | 20.93 | 41.00 | 31.19 | 12.31 | 43.50 |
| 265.710 | 1.98 | 11.35 | 20.65 | 44.40 | 37.09 | 8.91 | 46.00 |
| 396.660 | 2.52 | 16.14 | 20.20 | 28.80 | 27.26 | 18.74 | 46.00 |
| 661.470 | 3.61 | 18.19 | 19.90 | 31.60 | 33.50 | 12.50 | 46.00 |
| * 925.310 | 4.69 | 25.16 | 19.72 | 32.00 | 42.14 | 3.86 | 46.00 |
| 990.300 | 4.96 | 24.53 | 19.84 | 27.20 | 36.85 | 17.15 | 54.00 |

Vertical

| | | | | | | | |
|-----------|------|-------|-------|-------|-------|-------|-------|
| * 100.810 | 1.31 | 17.44 | 21.10 | 41.60 | 39.25 | 4.25 | 43.50 |
| 220.120 | 1.80 | 13.36 | 20.80 | 40.80 | 35.16 | 10.84 | 46.00 |
| 265.710 | 1.98 | 13.64 | 20.65 | 39.00 | 33.98 | 12.02 | 46.00 |
| 497.540 | 2.94 | 16.88 | 20.17 | 30.00 | 29.65 | 16.35 | 46.00 |
| 745.860 | 3.96 | 20.35 | 20.10 | 27.00 | 31.20 | 14.80 | 46.00 |
| 925.310 | 4.69 | 21.87 | 19.72 | 27.40 | 34.24 | 11.76 | 46.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable Loss - PreAMP.

Product : Wireless Ethernet Router
Test Item : General Radiated Emission
Test Site : No.1 OATS
Test Mode : Channel 6

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

Horizontal

| | | | | | | | |
|-----------|------|-------|-------|-------|-------|-------|-------|
| 192.960 | 1.68 | 9.30 | 20.87 | 47.60 | 37.71 | 5.79 | 43.50 |
| 264.740 | 1.98 | 11.23 | 20.66 | 45.40 | 37.95 | 8.05 | 46.00 |
| 419.940 | 2.62 | 15.21 | 20.10 | 34.20 | 31.93 | 14.07 | 46.00 |
| 541.190 | 3.12 | 21.81 | 20.20 | 36.20 | 40.93 | 5.07 | 46.00 |
| 660.500 | 3.60 | 18.23 | 19.90 | 30.00 | 31.93 | 14.07 | 46.00 |
| * 925.310 | 4.69 | 25.16 | 19.72 | 32.60 | 42.74 | 3.26 | 46.00 |

Vertical

| | | | | | | | |
|-----------|------|-------|-------|-------|-------|-------|-------|
| 219.150 | 1.79 | 13.30 | 20.80 | 41.40 | 35.69 | 10.31 | 46.00 |
| * 292.870 | 2.10 | 16.77 | 20.50 | 38.20 | 36.57 | 9.43 | 46.00 |
| 406.360 | 2.56 | 13.72 | 20.15 | 30.00 | 26.14 | 19.86 | 46.00 |
| 497.540 | 2.94 | 16.88 | 20.17 | 28.40 | 28.05 | 17.95 | 46.00 |
| 857.410 | 4.42 | 24.78 | 19.56 | 25.40 | 35.04 | 10.96 | 46.00 |
| 925.310 | 4.69 | 21.87 | 19.72 | 28.00 | 34.84 | 11.16 | 46.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable Loss - PreAMP.

Product : Wireless Ethernet Router
Test Item : General Radiated Emission
Test Site : No.1 OATS
Test Mode : Channel 11

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

Horizontal

| | | | | | | | |
|-----------|------|-------|-------|-------|-------|-------|-------|
| 162.890 | 1.56 | 9.55 | 20.93 | 40.60 | 30.79 | 12.71 | 43.50 |
| 264.740 | 1.98 | 11.23 | 20.66 | 45.20 | 37.75 | 8.25 | 46.00 |
| 395.690 | 2.52 | 16.18 | 20.20 | 29.00 | 27.50 | 18.50 | 46.00 |
| 660.500 | 3.60 | 18.23 | 19.90 | 30.40 | 32.33 | 13.67 | 46.00 |
| * 923.370 | 4.68 | 25.16 | 19.65 | 32.80 | 42.99 | 3.01 | 46.00 |
| 991.270 | 4.96 | 24.53 | 19.84 | 26.80 | 36.46 | 17.54 | 54.00 |

Vertical

| | | | | | | | |
|-----------|------|-------|-------|-------|-------|-------|-------|
| 218.180 | 1.79 | 13.23 | 20.80 | 41.00 | 35.22 | 10.78 | 46.00 |
| * 265.710 | 1.98 | 13.64 | 20.65 | 40.80 | 35.78 | 10.22 | 46.00 |
| 374.350 | 2.43 | 14.87 | 20.40 | 28.60 | 25.50 | 20.50 | 46.00 |
| 497.540 | 2.94 | 16.88 | 20.17 | 29.60 | 29.25 | 16.75 | 46.00 |
| 861.290 | 4.43 | 24.63 | 19.60 | 25.60 | 35.06 | 10.94 | 46.00 |
| 924.340 | 4.69 | 21.89 | 19.72 | 28.80 | 35.67 | 10.33 | 46.00 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable Loss - PreAMP.

5. Band Edge

5.1. Test Equipment

The following test equipment are used during the test:

RF Conducted Measurement:

| Item | Equipment | Manufacturer | Model No. / Serial No. | Last Cal. | Remark |
|------|-------------------|--------------|------------------------|------------|--------|
| 1 | Spectrum Analyzer | R & S | FSP / 100561 | Mar., 2004 | |
| 2 | No.1 OATS | | | Sep., 2004 | |

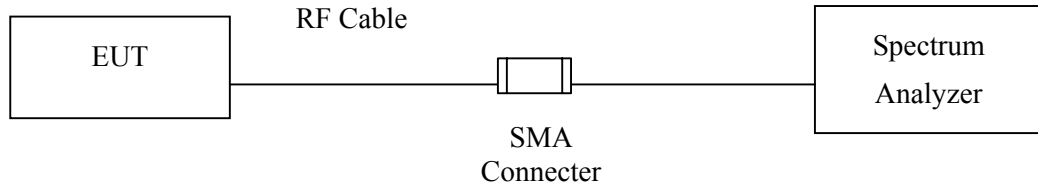
RF Radiated Measurement:

| Item | | Equipment | Manufacturer | Model No. / Serial No. | Last Cal. |
|------|---|-------------------|--------------|------------------------------|------------|
| 1 | X | Spectrum Analyzer | R & S | FSP40 / 100005 | Aug., 2004 |
| 2 | | Pre-Amplifier | HP | 8449B / 3008A01123 | Feb., 2004 |
| 3 | | Pre-Amplifier | HP | 8447D / 2944A09276 | N/A |
| 4 | | Loop Antenna | R & S | HFH2-Z2 / 833799/004 | Sep., 2004 |
| 5 | | BiconiLog Antenna | Schwarzbeck | VULB 9166 / 1061 | Sep., 2004 |
| 6 | | Bilog Antenna | Chase | CBL6112B / 2455 | Sep., 2004 |
| 7 | X | Horn Antenna | Schwarzbeck | BBHA 9120D / BBHA9120D312 | Jul., 2004 |
| 8 | | No.1 OATS | | | Sep., 2004 |

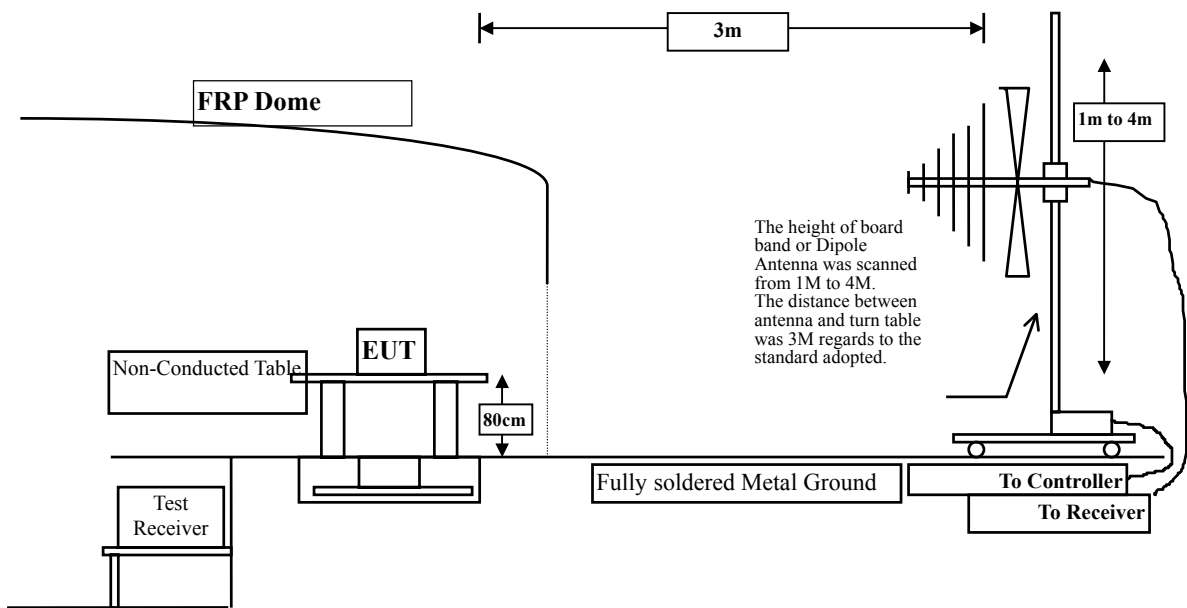
Note: 1. All equipments that need to calibrate are with calibration period of 1 year.
2. Mark "X" test instruments are used to measure the final test results.

5.2. Test Setup

RF Conducted Measurement:



RF Radiated Measurement:



5.3. Limits

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)).

5.4. 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 C63.4:2001 on radiated 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.

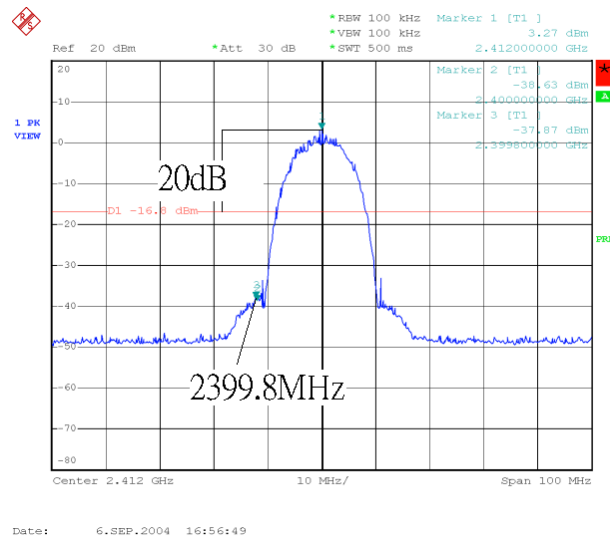
5.5. Test Result of Band Edge

Product : Wireless Ethernet Router
 Test Item : Band Edge
 Test Site : No.1 OATS
 Test Mode : Channel 1

RF Conducted Measurement:

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

Figure Channel 1:



Product : Wireless Ethernet Router
 Test Item : Band Edge
 Test Site : No.1 OATS
 Test Mode : Channel 11

RF Radiated Measurement: (Peak Detector)

| Channel No. | Frequency (MHz) | Reading Level (dBuV) | Probe Factor (dB/m) | Cable Loss (dB) | PreAMP (dB) | Emission Level (dBuV/m) | Limit (dBuV/m) | Result |
|----------------|-----------------|----------------------|---------------------|-----------------|-------------|-------------------------|----------------|--------|
| 11(Horizontal) | 2483.800 | 28.00 | 27.50 | 2.90 | 0.00 | 58.40 | 74 | Pass |
| 11 (Vertical) | 2485.400 | 26.07 | 27.50 | 2.90 | 0.00 | 56.47 | 74 | Pass |

Figure Channel 11:

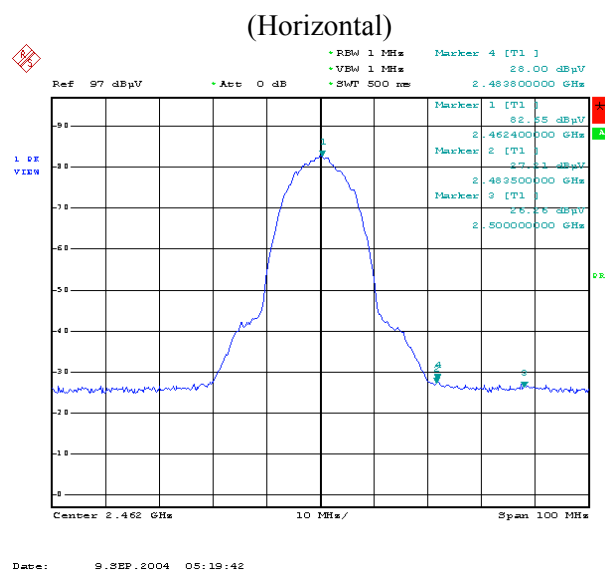
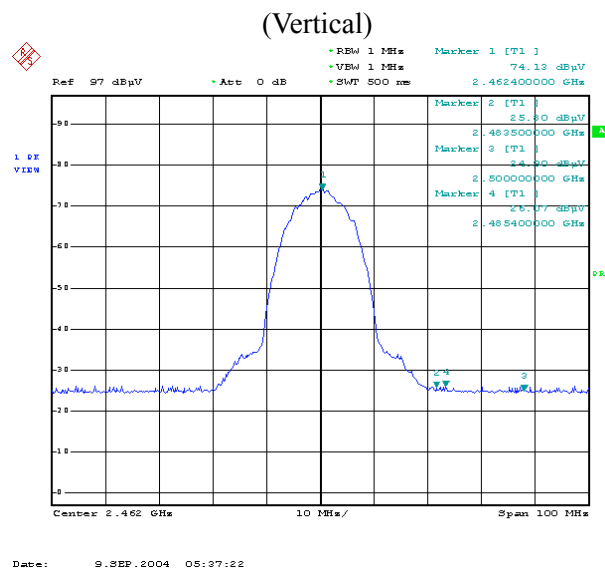


Figure Channel 11:



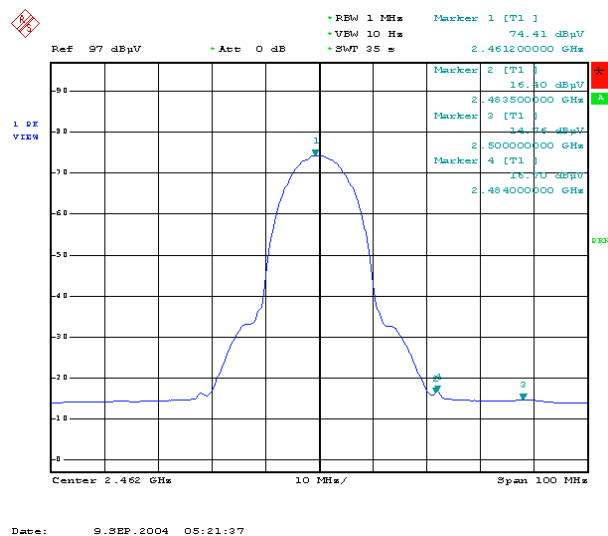
Note: The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Wireless Ethernet Router
 Test Item : Band Edge
 Test Site : No.1 OATS
 Test Mode : Channel 11

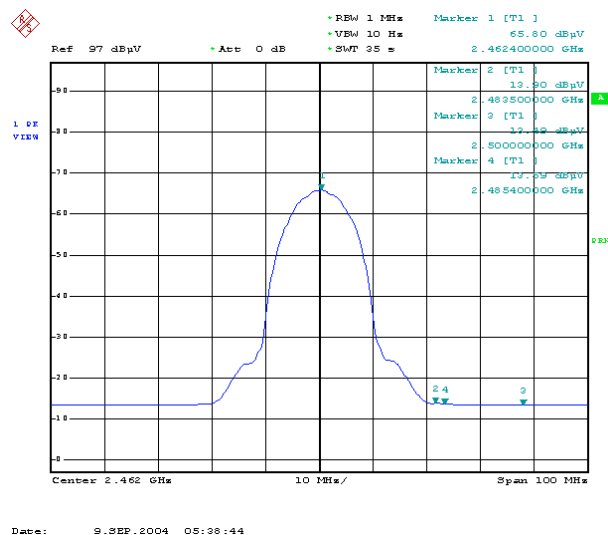
RF Radiated Measurement: (Average Detector)

| Channel No. | Frequency (MHz) | Reading Level (dBuV) | Probe Factor (dB/m) | Cable Loss (dB) | PreAMP (dB) | Emission Level (dBuV/m) | Limit (dBuV/m) | Result |
|----------------|-----------------|----------------------|---------------------|-----------------|-------------|-------------------------|----------------|--------|
| 11(Horizontal) | 2484.000 | 16.70 | 27.50 | 2.90 | 0.00 | 47.10 | 54 | Pass |
| 11 (Vertical) | 2485.4000 | 13.59 | 27.50 | 2.90 | 0.00 | 43.99 | 54 | Pass |

Figure Channel 11: (Horizontal)



(Vertical)



Note: The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

6. Occupied Bandwidth

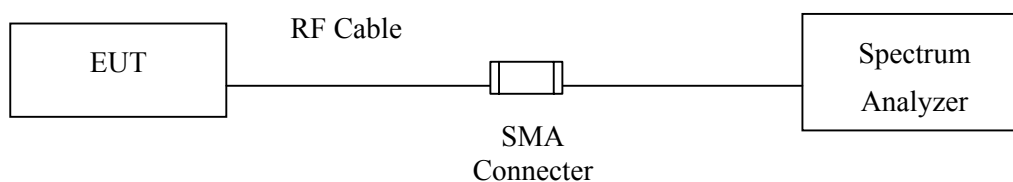
6.1. Test Equipment

The following test equipment are used during the test:

| Item | Equipment | Manufacturer | Model No. / Serial No. | Last Cal. | Remark |
|------|-------------------|--------------|------------------------|------------|--------|
| 1 | Spectrum Analyzer | R & S | FSP / 100561 | Mar., 2004 | |
| 2 | No.1 OATS | | | Sep., 2004 | |

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

6.2. Test Setup



6.3. Limits

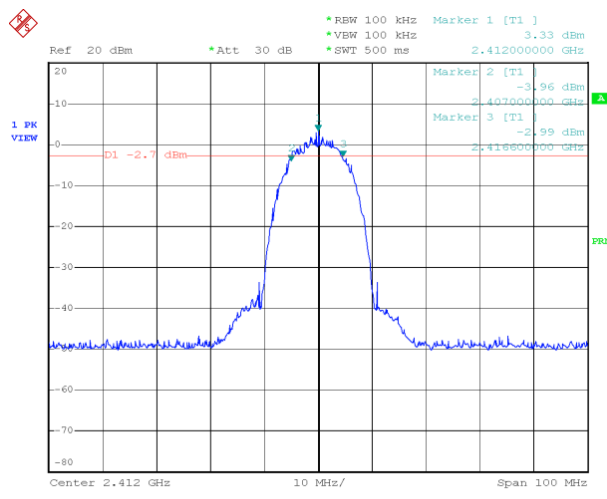
The minimum 6dB bandwidth shall be at least 500kHz.

6.4. Test Result of Occupied Bandwidth

Product : Wireless Ethernet Router
 Test Item : Occupied Bandwidth
 Test Site : No.1 OATS
 Test Mode : Normal Operation

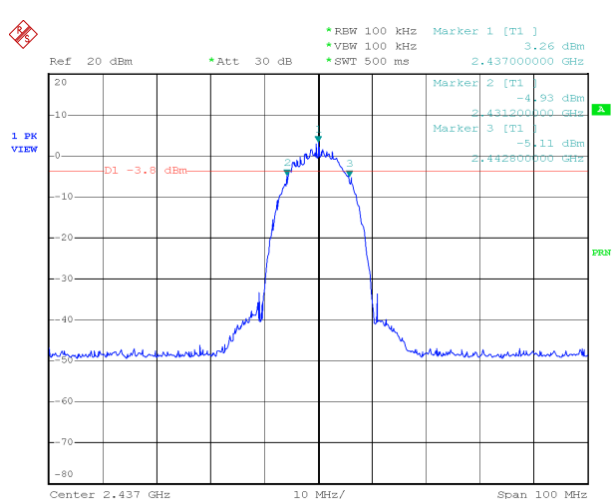
| Channel No. | Frequency (MHz) | Measurement Level (kHz) | Required Limit (kHz) | Result |
|-------------|-----------------|-------------------------|----------------------|--------|
| 1 | 2412 | 9600 | >500 | Pass |
| 6 | 2437 | 11600 | >500 | Pass |
| 11 | 2462 | 10600 | >500 | Pass |

Channel 1:



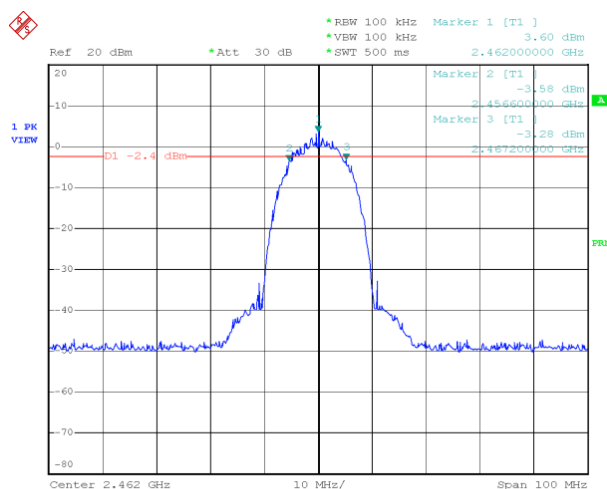
Date: 6.SEP.2004 16:48:37

Channel 6



Date: 6.SEP.2004 16:53:08

Channel 11:



Date: 6.SEP.2004 16:54:51

7. Power Density

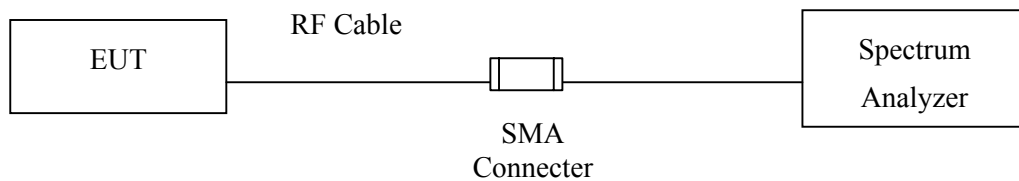
7.1. Test Equipment

The following test equipment are used during the test:

| Item | Equipment | Manufacturer | Model No. / Serial No. | Last Cal. | Remark |
|------|-------------------|--------------|------------------------|------------|--------|
| 1 | Spectrum Analyzer | R & S | FSP / 100561 | Mar., 2004 | |
| 2 | No.1 OATS | | | Sep., 2004 | |

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

7.2. Test Setup



7.3. Limits

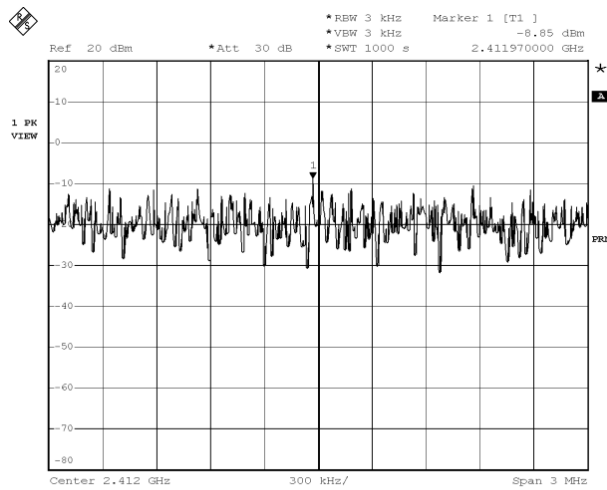
The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

7.4. Test Result of Power Density

Product : Wireless Ethernet Router
 Test Item : Power Density
 Test Site : No.1 OATS
 Test Mode : Normal Operation

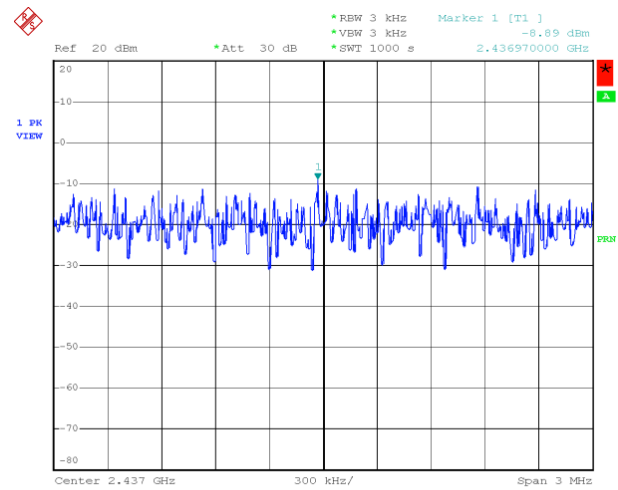
| Channel No. | Frequency (MHz) | Measurement Level (dBm) | Required Limit (dBm) | Result |
|-------------|-----------------|-------------------------|----------------------|--------|
| 1 | 2411.970 | -8.85 | < 8dBm | Pass |
| 6 | 2436.970 | -8.89 | < 8dBm | Pass |
| 11 | 2461.970 | -8.38 | < 8dBm | Pass |

Channel 1:



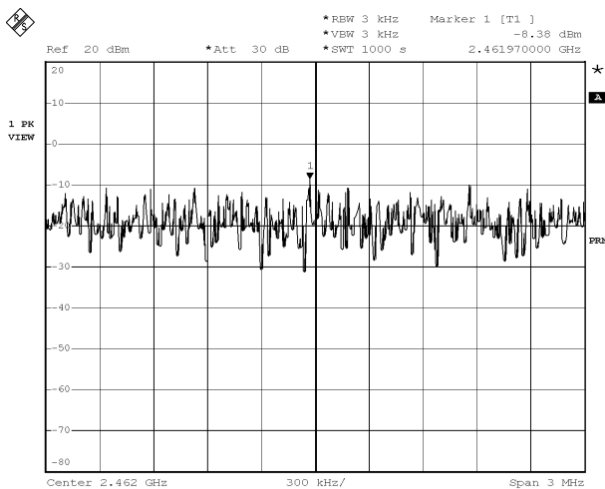
Date: 6.SEP.2004 17:23:51

Channel 6



Date: 6.SEP.2004 17:05:17

Channel 11:



Date: 6.SEP.2004 17:26:16

8. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs