



Ecom Sertech Corp.

Rm. 258, Bldg. 17, NO.195, Sec. 4 Chung Hsing Rd., ChuTung Chen, Hsinchu, Taiwan 310, R.O.C
TEL:886-3-5918012 FAX : 886-3-5825720

FCC ID : Q87-BEFW11S4

Report No. : ER03-07-044FRF

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TEST REPORT

Product Name : Wireless Access Point Router

Model Number : BEFW11S4

Applicant : Cisco-Linksys, LLC

Address : 17401 Armstrong Avenue Irvine, CA 92614 (USA)

Received Date : Jul. 16, 2003

Tested Date : Aug. 01, 2003

Notes :

1. This report will be invalid if duplicated or photocopied in part.
2. This report refers only to the specimen(s) submitted to testing, and be invalid as seperately used.
3. This report is invalid without examination stamp and signature of this institute.
4. The tested specimen(s) will be preserved for thirty days from the data issued.
5. The report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.





Test Report Certification

Product Name : Wireless Access Point Router
Model Number : BEFW11S4
Applicant : Cisco-Linksys, LLC


Measurement Standard :

47 CFR Part 15, Subpart B and Subpart C (Section 15.247),
ANSI C63.4-2001

Tested By : K. P. Pang **Date** : (Aug. 04, 2003)
(K. P. Pang)

Reviewed By : Roger Sheng **Date** : (Aug. 04, 2003)
(Roger Sheng)

Approved By : Chieh-De Tsai **Date** : (Aug. 04, 2003)
(Chieh-De Tsai, Manager)



WE HEREBY CERTIFY THAT: The measurements shown in the attachment were made in accordance with the procedures indicated, and the energy emitted by the equipment was found to be within the limits applicable. We assume full responsibility for the accuracy and completeness of these measurements and vouch for the qualifications of all persons taking them.



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1. GENERAL INFORMATION

1.1 General Statement

MEASUREMENT DEVIATION : Comply with standard in full

TRACEABILITY : This test result is traceable to national or international std.

1.2 General Description of EUT & Power

MANUFACTURER : Cisco-Linksys, LLC

SAMPLE NAME : Wireless Access Point Router

MODEL NAME : BEFW11S4

FREQUENCY RANGE : 2412 MHz TO 2462MHz

CHANNEL NUMBER : 11

AIR DATA RATE : 11Mbps (Highest Mode)

TYPE OF MODULATION : Direct Sequence Spread Spectrum

FREQUENCY SELECTION : BY SOFTWARE

EUT Description : 2.4GHz (Direct Sequence Spread Spectrum) Data Transceiver
for Wireless Access Point Router

ANTENNA TYPE : $1/2\lambda$ Dipole ANTENNA

POWER SOURCE : 12VDC(From ADAPTER)

Power Adapter (1) :

MANUFACTURER : HON-KWANG

MODEL NUMBER : AD-121AN

INPUT POWER : 120VAC/60Hz, 25W

OUTPUT POWER : 12VDC, 1A

Power Adapter (2) :

MANUFACTURER : Cisco-Linksys, LLC

MODEL NUMBER : D12-1A

INPUT POWER : 120VAC/60Hz, 23W

OUTPUT POWER : 12VDC, 1000mA



1.3 Description of Peripherals

(1) PC

MANUFACTURER : HP CORP.
MODEL NUMBER : VECTRA VEI8DT
SERIAL NUMBER : SG1202412
FCC ID : DOC

(2) PC

MANUFACTURER : HP CORP.
MODEL NUMBER : VECTRA VEI8DT
SERIAL NUMBER : SG1202415
FCC ID : DOC

(3) Notebook PC

MANUFACTURER : DELL CORP.
MODEL NUMBER : PP01L
SERIAL NUMBER : CN-09C748-48155-1AP-6081
FCC ID : DOC
POWER CORD : Unshielded, Detachable, 1.8m

(4) Notebook PC

MANUFACTURER : DELL CORP.
MODEL NUMBER : PP01L
SERIAL NUMBER : CN-09C748-48155-1AP-6630
FCC ID : DOC
POWER CORD : Unshielded, Detachable, 1.8m

(5) MONITOR

MODEL NUMBER : D8894A
SERIAL NUMBER : CN00905269
MANUFACTURER : HP CORP.
FCC ID : ARSCM356N
POWER CORD : Unshielded , Detachable , 1.8m

(6) KEYBOARD

MODEL NUMBER : K288
SERIAL NUMBER : 206628619
MANUFACTURER : Genuine Company INC.
FCC ID : FKD46AK288
SIGNAL CABLE : Shielded , Undetachable , 1.8m
POWER SOURCE : 5VDC (from PC)



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(7) MOUSE

MODEL NUMBER : M-S34
SERIAL NUMBER : LZE95050431
MANUFACTURER : HP CORP.
FCC ID : DZL211029
SIGNAL CABLE : Shielded , Undetachable , 1.8m
POWER SOURCE : 5VDC (from PC)

(8) MONITOR

MODEL NUMBER : D8894A
SERIAL NUMBER : CN00905251
MANUFACTURER : HP CORP.
FCC ID : ARSCM356N
POWER CORD : Unshielded , Detachable , 1.8m

(9) KEYBOARD

MODEL NUMBER : K288
SERIAL NUMBER : 206628620
MANUFACTURER : Genuine Company INC.
FCC ID : FKD46AK288
SIGNAL CABLE : Shielded , Undetachable , 1.8m
POWER SOURCE : 5VDC (from PC)

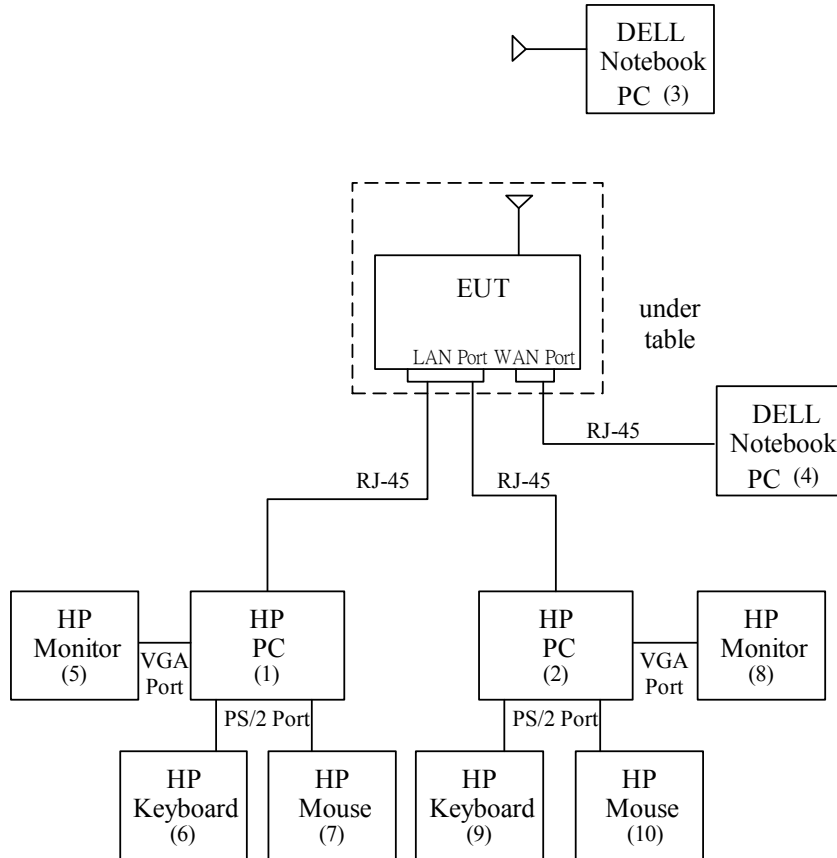
(10) MOUSE

MODEL NUMBER : M-S34
SERIAL NUMBER : LZE95050437
MANUFACTURER : HP CORP.
FCC ID : DZL211029
SIGNAL CABLE : Shielded , Undetachable , 1.8m
POWER SOURCE : 5VDC (from PC)

(11) CABLE

| | Type | Connector | shielded | Length |
|-----|-------------------|---------------|----------|--------|
| (A) | Cat5 twisted-pair | RJ-45,Plastic | NO | 15m |

1.4 EUT & Peripherals Setup Diagram



1.5 EUT Operating Condition

1. Set up all computers like the setup diagram.
2. NB (4) ping 192.168.62.1 -t -l 5000 to EUT.
3. PC (1) ping 192.168.1.80 -t -l 5000 to PC (2).
4. NB (3) ping 192.168.1.80 -t -l 5000 to PC (1).
5. All of the function are under run.
6. Start test.



1.6 Description of Test Site

SITE DESCRIPTION : FCC certificate NO. : 90585
 BSMI certificate NO. : SL2-IN-E-0002
 NVLAP Lab code : 200118-0
 CNLA certificate NO. : CNLA-ZL97018
 VCCI certificate NO. : R-1189, C-1250

NAME OF SITE : Ecom Sertech Corp. Hsin chu
 (Spin-off from ITRI / ERSO on Apr. 01, 2003)

SITE LOCATION : R1500, 195-4 , sec. 4, Chung Hsing Rd., Chu-Tung Chen.
 Hsin-Chu, Taiwan 310 R.O.C.

1.7 Summary of Test Results

The EUT has been tested according to the following specifications :

| APPLIED STANDARD : 47 CFR Part 15, Subpart B and Subpart C | | | |
|--|--|--------|-------------------------------|
| Standard Section | Test Type and Limit | Result | REMARK |
| 15.107 15.207 | AC Power Conducted Emission Limit : 15.107 | PASS | Meet the requirement of limit |
| 15.247(a)(2) | Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit : 6dB bandwidth > 500KHz | PASS | Meet the requirement of limit |
| 15.247(b) | Maximum Peak Output Power Limit : max. 30dBm | PASS | Meet the requirement of limit |
| 15.109 15.205 15.209 | Transmitter Radiated Emissions Limit : Table 15.209 | PASS | Meet the requirement of limit |
| 15.247(d) | Power Spectral Density Limit : max. 8dBm | PASS | Meet the requirement of limit |
| 15.247(c) | Out of Band Emission and Restricted Band Radiation Limit:20dB less than peak value of fundamental frequency Restricted band Limit:Table 15.209 | PASS | Meet the requirement of limit |



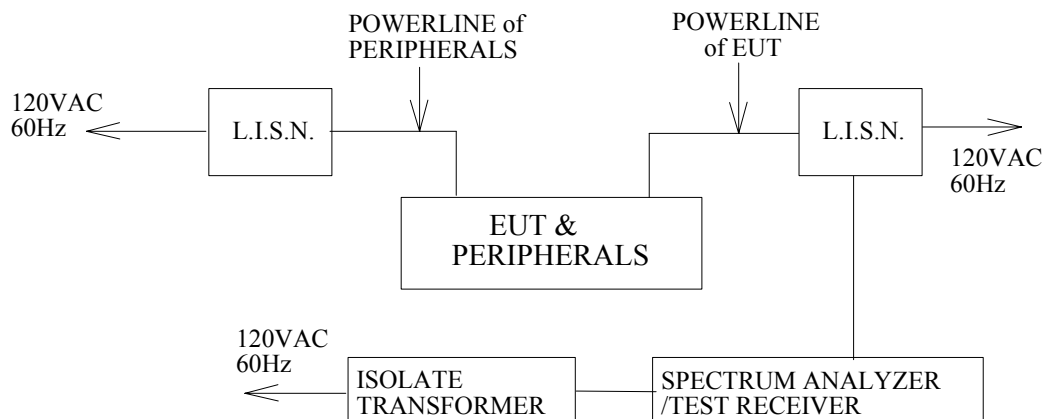
2. CONDUCTED POWERLINE TEST

2.1 Test Equipments

The following test equipments are used during the conducted powerline tests :

| Manufacturer or Type | Model No | Serial No. | Date of Calibration | Calibration Period | Remark |
|-----------------------------|--------------|------------------------|---|--------------------|---------|
| SPECTRUM ANALYZER & DISPLAY | HP 8568A | 2235A02320 | APR. 01, 2003 | 1 Year | PRETEST |
| QUASI-PEAK ADAPTER | HP 85650 A | 2341A00672 | APR. 01, 2003 | 1 Year | PRETEST |
| ISOLATION TRANSFORMER | SOLAR 7032-1 | N/A | N/A | N/A | FINAL |
| L.I.S.N. | EMCO 3850/2 | 9311-1025 9401-1028 | JAN. 08, 2003 For Characteristic impedance | 1 Year | FINAL |
| | | | MAY 18, 2003 For Insertion loss | | |
| TEST RECEIVER | R/S ESCS30 | 838550/003 | JUN. 07, 2003 | 1 Year | FINAL |
| SHIELDED ROOM | KEENE 5983 | NO.1 | N/A | N/A | FINAL |
| PULSE LIMIT | R/S EHS3Z2 | 357.8810.52 | JUL. 10, 2003 | 1 Year | FINAL |
| N TYPE COAXIAL CABLE | ----- | ----- | JUL. 10, 2003 | 1 Year | FINAL |
| 50Ω TERMINATOR | ----- | ----- | JUL. 10, 2003 | 1 Year | FINAL |

2.2 Test Setup





2.3 Conducted Power Line Emission Limit

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following :

| Frequency (MHz) | Maximum RF Line Voltage (Db μ v) | | | |
|--------------------|--------------------------------------|------|---------|-------|
| | CLASS A | | CLASS B | |
| | Q.P. | Ave. | Q.P. | Ave. |
| 0.15 - 0.50 | 79 | 66 | 66-56 | 56-46 |
| 0.50 - 5.00 | 73 | 60 | 56 | 46 |
| 5.00 - 30.0 | 73 | 60 | 60 | 50 |

For intentional device, according to § 15.207(a) Line Conducted Emission Limit is same as above table.

2.4 Test Procedure

The test procedure is performed in a 12ft×12ft×8ft(L×W×H) shielded room. the EUT along with its peripherals were placed on a 1.0m(W)× 1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chasis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chasis ground also bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

2.5 Uncertainty of Conducted Emission

The uncertainty of conducted emission is ± 1.36 dB.



2.6 Conducted RF Voltage Measurement

The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported below are more than 20 dB below the prescribed limits.

Temperature : 26 °C

Humidity : 65 % RH

| Frequency (MHz) | Loss(dB) | | Measurement | | | | L1 Emission (dBµV) | | L2 Emission (dBµV) | | Limits (dBµV) | |
|-----------------|----------|-----|-------------|------|----------|------|--------------------|------|--------------------|-------|---------------|------|
| | | | L1(dBµV) | | L2(dBµV) | | Q.P. | A.V. | Q.P. | A.V. | Q.P. | A.V. |
| | L1 | L2 | Q.P. | A.V. | Q.P. | A.V. | | | | | | |
| 0.150 | 0.1 | 0.2 | * | * | * | * | * | * | * | 66.00 | 56.00 | |
| 0.198 | 0.1 | 0.2 | 49.10 | * | * | * | 49.20 | * | * | 63.69 | 53.69 | |
| 0.225 | 0.1 | 0.2 | * | * | 48.20 | * | * | * | 48.40 | 62.63 | 52.63 | |
| 0.396 | 0.1 | 0.2 | * | * | 43.90 | * | * | * | 44.10 | 57.94 | 47.94 | |
| 0.429 | 0.1 | 0.2 | 43.00 | * | * | * | 43.10 | * | * | 57.27 | 47.27 | |
| 0.570 | 0.1 | 0.2 | * | * | 37.20 | * | * | * | 37.40 | 56.00 | 46.00 | |
| 0.618 | 0.1 | 0.2 | 34.80 | * | * | * | 34.90 | * | * | 56.00 | 46.00 | |
| 2.013 | 0.1 | 0.2 | 36.70 | * | * | * | 36.80 | * | * | 56.00 | 46.00 | |
| 2.025 | 0.1 | 0.2 | * | * | 32.10 | * | * | * | 32.30 | 56.00 | 46.00 | |
| 2.163 | 0.1 | 0.2 | 36.40 | * | * | * | 36.50 | * | * | 56.00 | 46.00 | |
| 2.190 | 0.1 | 0.2 | * | * | 30.50 | * | * | * | 30.70 | 56.00 | 46.00 | |
| 4.380 | 0.2 | 0.2 | * | * | 23.40 | * | * | * | 23.60 | 56.00 | 46.00 | |
| 4.488 | 0.2 | 0.2 | 26.70 | * | * | * | 26.90 | * | * | 56.00 | 46.00 | |
| 13.422 | 0.5 | 0.5 | * | * | 28.70 | * | * | * | 29.20 | 60.00 | 50.00 | |
| 14.337 | 0.5 | 0.6 | 31.50 | * | * | * | 32.00 | * | * | 60.00 | 50.00 | |
| 23.130 | 0.9 | 1.0 | * | * | 35.00 | * | * | * | 36.00 | 60.00 | 50.00 | |
| 23.133 | 0.9 | 1.0 | 40.40 | * | * | * | 41.30 | * | * | 60.00 | 50.00 | |
| 30.000 | 1.4 | 1.8 | * | * | * | * | * | * | * | 60.00 | 50.00 | |

REMARKS : 1. * Undetectable or the Q.P. value is lower than the limits of Ave.
 2. For Power Adapter (1).



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The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported below are more than 20 dB below the prescribed limits.

Temperature : 26 °C

Humidity : 65 % RH

| Frequency (MHz) | Loss(dB) | | Measurement | | | | L1 Emission (dBμV) | | L2 Emission (dBμV) | | Limits (dBμV) | |
|-----------------|----------|-----|-------------|------|----------|------|--------------------|------|--------------------|------|---------------|-------|
| | | | L1(dBμV) | | L2(dBμV) | | Q.P. | A.V. | Q.P. | A.V. | Q.P. | A.V. |
| | L1 | L2 | Q.P. | A.V. | Q.P. | A.V. | | | | | | |
| 0.150 | 0.1 | 0.2 | * | * | * | * | * | * | * | * | 66.00 | 56.00 |
| 0.168 | 0.1 | 0.2 | 47.60 | * | * | * | 47.70 | * | * | * | 65.06 | 55.06 |
| 0.288 | 0.1 | 0.2 | * | * | 47.50 | * | * | * | 47.70 | * | 60.58 | 50.58 |
| 0.399 | 0.1 | 0.2 | 39.20 | * | 46.50 | * | 39.30 | * | 46.70 | * | 57.87 | 47.87 |
| 0.588 | 0.1 | 0.2 | * | * | 43.90 | * | * | * | 44.10 | * | 56.00 | 46.00 |
| 0.687 | 0.1 | 0.2 | 29.20 | * | * | * | 29.30 | * | * | * | 56.00 | 46.00 |
| 1.122 | 0.1 | 0.2 | * | * | 34.00 | * | * | * | 34.20 | * | 56.00 | 46.00 |
| 2.007 | 0.1 | 0.2 | 33.20 | * | * | * | 33.30 | * | * | * | 56.00 | 46.00 |
| 2.160 | 0.1 | 0.2 | 35.40 | * | * | * | 35.50 | * | * | * | 56.00 | 46.00 |
| 2.166 | 0.1 | 0.2 | * | * | 37.90 | * | * | * | 38.10 | * | 56.00 | 46.00 |
| 4.947 | 0.2 | 0.2 | 20.00 | * | 17.40 | * | 20.20 | * | 17.60 | * | 56.00 | 46.00 |
| 14.274 | 0.5 | 0.6 | * | * | 36.30 | * | * | * | 36.90 | * | 60.00 | 50.00 |
| 14.337 | 0.5 | 0.6 | 32.60 | * | * | * | 33.10 | * | * | * | 60.00 | 50.00 |
| 23.130 | 0.9 | 1.0 | 43.40 | * | 41.80 | * | 44.30 | * | 42.80 | * | 60.00 | 50.00 |
| 30.000 | 1.4 | 1.8 | * | * | * | * | * | * | * | * | 60.00 | 50.00 |

REMARKS : 1. * Undetectable or the Q.P. value is lower than the limits of Ave.
 2. For Power Adapter (2).

2.7 Photos of Conduction Test



3. RADIATED EMISSION TEST

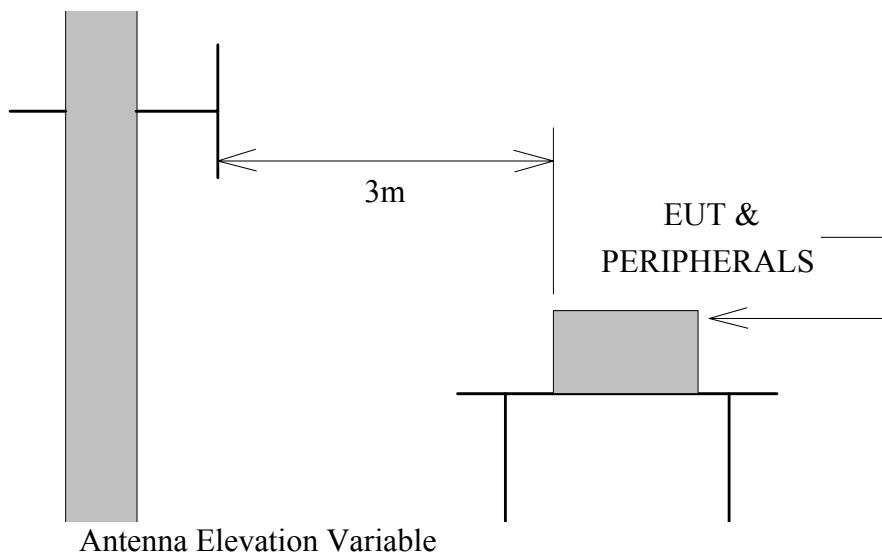
3.1 Test Equipments

The following test equipments are utilized in making the measurements contained in this report.

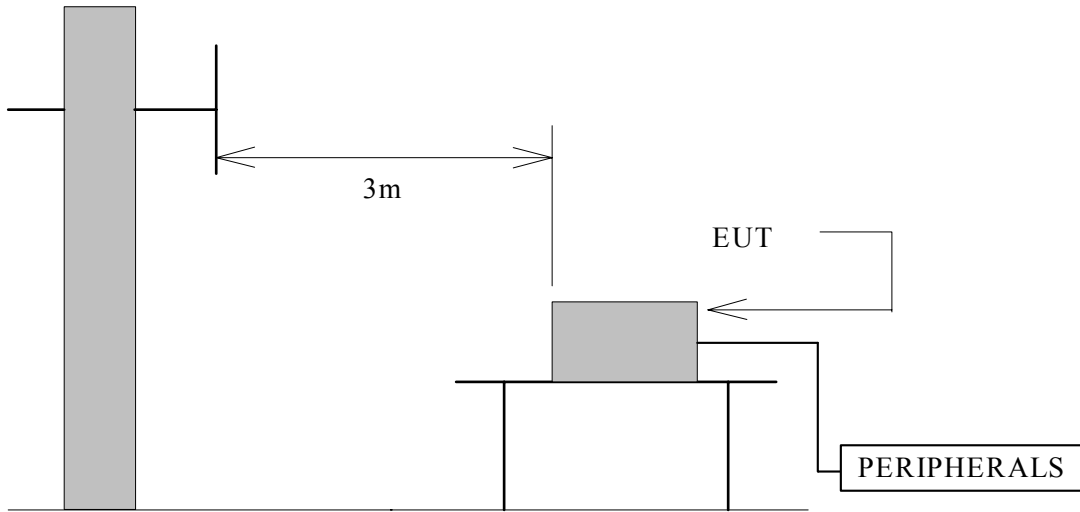
| Manufacturer or Type | Model No | Serial No | Date of Calibration | Calibration Period | Remark |
|----------------------|-------------|------------|---------------------|--------------------|--------|
| CHASE BI-LOG ANTENNA | CBL6112B | 2421 | MAY 07, 2003 | 1 Year | FINAL |
| SPECTRUM ANALYZER | FSEK30 | 835253/002 | JUN. 17, 2003 | 1 Year | FINAL |
| OPEN SITE | ----- | No.2 | JAN. 10, 2003 | 1 Year | FINAL |
| N TYPE COAXIAL CABLE | CHA9525 | 4 | JUL. 13, 2003 | 1 Year | FINAL |
| Horn Antenna | AH-118 | 10089 | FEB. 25, 2003 | 1 Year | FINAL |
| HP Pre-amplifier | 8449B | 3008A01471 | OCT. 11, 2002 | 1 Year | FINAL |
| HP High pass filter | 84300/80038 | 011 | cal. on use | 1 Year | FINAL |
| Horn Antenna | AH-840 | 03077 | FEB. 25, 2003 | 1 Year | FINAL |

3.2 Test Setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 to 1GHz.



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



Antenna Elevation Variable

3.3 Radiation Limit

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values :

| Frequency (MHz) | Distance (Meters) | Radiated (dBμV/M) | Radiated (μV/M) |
|-----------------|-------------------|-------------------|-----------------|
| 30-88 | 3 | 40.0 | 100 |
| 88-216 | 3 | 43.5 | 150 |
| 216-960 | 3 | 46.0 | 200 |
| Above 960 | 3 | 54.0 | 500 |

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.



3.4 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE :

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

3.5 Uncertainty of Radiated Emission

The uncertainty of radiated emission is ± 2.72 dB.



3.6 Radiated RF Noise Measurement

Test Requirement: 15.109, 15.209

The frequency spectrum from 30 MHz to 1000 MHz was investigated. All emissions not reported below are more than 20 dB below the prescribed limits.

All readings are quasi-peak values.

Temperature : 25 °C

Humidity : 65 % RH

| Frequency (MHz) | Antenna Factor (dB) | Cable Loss (dB) | Meter Reading at 3m(dB μ V/M) | | Limits at 3m (dB μ V/M) | Emission Level at 3m(dB μ V/M) | |
|--------------------|---------------------------|-----------------------|--------------------------------------|----------|-----------------------------------|---------------------------------------|----------|
| | | | Horizontal | Vertical | | Horizontal | Vertical |
| 30.00 | 21.39 | 0.90 | * | * | 40.00 | * | * |
| 49.96 | 9.44 | 1.20 | 16.00 | 24.73 | 40.00 | 26.64 | 35.37 |
| 124.96 | 13.33 | 2.10 | 10.50 | 10.42 | 43.50 | 25.93 | 25.85 |
| 131.96 | 13.23 | 2.15 | 13.21 | 10.42 | 43.50 | 28.59 | 25.80 |
| 199.96 | 10.39 | 2.80 | 25.70 | 15.59 | 43.50 | 38.89 | 28.78 |
| 249.95 | 13.09 | 3.20 | 24.50 | 18.95 | 46.00 | 40.79 | 35.24 |
| 374.95 | 16.30 | 4.05 | 15.01 | 10.77 | 46.00 | 35.36 | 31.12 |
| 395.96 | 17.09 | 4.18 | 9.52 | 7.21 | 46.00 | 30.78 | 28.47 |
| 499.94 | 18.32 | 4.90 | 10.52 | 7.03 | 46.00 | 33.74 | 30.25 |
| 1000.00 | 21.58 | 7.00 | * | * | 54.00 | * | * |

REMARKS : 1. * Undetectable

2. Emission level (dB μ V/M) =Antenna Factor (dB/m) + Cable loss (dB)
+ Meter Reading (dB μ V).

3. According to technical experiences, all spurious emission at channel 1,6,11 are almost the same below 1GHz,so that the channel 1 was chosen as representation for the test.

4. Mode : Transmitting test



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Test Requirement: 15.109 ,15.209

The frequency spectrum above 1 GHz was investigated. All emissions not reported below are more than 40 dB below the prescribed limits. Readings are both peak and average values.

| | | | |
|--------------|------------------------------|-----------------|------------|
| Company | Cisco-Linksys, LLC | Test Date : | 2003/7/16 |
| Product Name | Wireless Access Point Router | Test By: | K. P. Pang |
| Model Name | BEFW11S4 | TEMP&Humidity : | 26°C , 55% |

| CH1 RX | | | | Measurement Distance at 1m | | | | | Horizontal polarity | | |
|---------|---------|-------|-------|----------------------------|------|--------|----------|----------|---------------------|---------|---------|
| Freq. | Reading | AF | Cable | Pre-amp | Dist | Filter | Level | Limit | Margin | Mark | Height |
| (MHz) | (dBuV) | (dB) | (dB) | (dB) | dB | dB | (dBuV/m) | (dBuV/m) | (dB) | (P/Q/A) | (Meter) |
| 4076.03 | 45.21 | 32.55 | 2.98 | 35.19 | 9.5 | 0 | 36.06 | 74 | -37.94 | P | 1.0 |
| 4076.03 | 41.11 | 32.55 | 2.98 | 35.19 | 9.5 | 0 | 31.96 | 54 | -22.04 | A | 1.0 |
| 6114.39 | 38.84 | 37.32 | 4.93 | 35.53 | 9.5 | 0 | 36.07 | 74 | -37.93 | P | 1.0 |
| 6114.39 | 29.21 | 37.32 | 4.93 | 35.53 | 9.5 | 0 | 26.44 | 54 | -27.56 | A | 1.0 |
| 8152.43 | 40.19 | 39.44 | 4.68 | 35.60 | 9.5 | 0 | 39.21 | 74 | -34.79 | P | 1.0 |
| 8152.43 | 30.96 | 39.44 | 4.68 | 35.60 | 9.5 | 0 | 29.98 | 54 | -24.02 | A | 1.0 |

1. Measurement was up to 18GHz harmonic,“---” means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
3. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz,VBW=10Hz
4. Dist : correction to extrea plate reading to 3m specification distance 1m measurement distance = -9.5dB
5. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Closs} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
6. The test limit is 3M limit.
7. The other emission levels were very low against the limit.



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Test Requirement: 15.109 ,15.209

The frequency spectrum above 1 GHz was investigated. All emissions not reported below are more than 40 dB below the prescribed limits. Readings are both peak and average values.

| | | | |
|--------------|------------------------------|-----------------|------------|
| Company | Cisco-Linksys, LLC | Test Date : | 2003/7/16 |
| Product Name | Wireless Access Point Router | Test By: | K. P. Pang |
| Model Name | BEFW11S4 | TEMP&Humidity : | 26°C , 55% |

| CH1 RX | | | | Measurement Distance at 1m | | | | | Vertical polarity | | |
|---------|---------|-------|-------|----------------------------|------|--------|----------|----------|-------------------|---------|---------|
| Freq. | Reading | AF | Cable | Pre-amp | Dist | Filter | Level | Limit | Margin | Mark | Height |
| (MHz) | (dBuV) | (dB) | (dB) | (dB) | dB | dB | (dBuV/m) | (dBuV/m) | (dB) | (P/Q/A) | (Meter) |
| 4075.99 | 50.02 | 32.55 | 2.98 | 35.19 | 9.5 | 0 | 40.87 | 74 | -33.13 | P | 1.0 |
| 4075.99 | 47.54 | 32.55 | 2.98 | 35.19 | 9.5 | 0 | 38.39 | 54 | -15.61 | A | 1.0 |
| 6114.55 | 39.34 | 37.32 | 4.93 | 35.53 | 9.5 | 0 | 36.57 | 74 | -37.43 | P | 1.0 |
| 6114.55 | 28.67 | 37.32 | 4.93 | 35.53 | 9.5 | 0 | 25.90 | 54 | -28.10 | A | 1.0 |
| 8152.05 | 40.92 | 39.44 | 4.68 | 35.60 | 9.5 | 0 | 39.94 | 74 | -34.06 | P | 1.0 |
| 8152.05 | 32.62 | 39.44 | 4.68 | 35.60 | 9.5 | 0 | 31.64 | 54 | -22.36 | A | 1.0 |

1. Measurement was up to 18GHz harmonic,“---” means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
3. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz,VBW=10Hz
4. Dist : correction to extrea plate reading to 3m specification distance 1m measurement distance = -9.5dB
5. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Closs} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
6. The test limit is 3M limit.
7. The other emission levels were very low against the limit.



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Test Requirement: 15.109 ,15.209

The frequency spectrum above 1 GHz was investigated. All emissions not reported below are more than 40 dB below the prescribed limits. Readings are both peak and average values.

| | | | |
|--------------|------------------------------|-----------------|------------|
| Company | Cisco-Linksys, LLC | Test Date : | 2003/7/16 |
| Product Name | Wireless Access Point Router | Test By: | K. P. Pang |
| Model Name | BEFW11S4 | TEMP&Humidity : | 26°C , 55% |

| CH6 RX | | | | Measurement Distance at 1m | | | | | Horizontal polarity | | |
|---------|---------|-------|-------|----------------------------|------|--------|----------|----------|---------------------|---------|---------|
| Freq. | Reading | AF | Cable | Pre-amp | Dist | Filter | Level | Limit | Margin | Mark | Height |
| (MHz) | (dBuV) | (dB) | (dB) | (dB) | dB | dB | (dBuV/m) | (dBuV/m) | (dB) | (P/Q/A) | (Meter) |
| 4125.99 | 47.14 | 32.52 | 2.94 | 35.20 | 9.5 | 0 | 37.90 | 74 | -36.10 | P | 1.0 |
| 4125.99 | 43.61 | 32.52 | 2.94 | 35.20 | 9.5 | 0 | 34.37 | 54 | -19.63 | A | 1.0 |
| 6186.94 | 38.33 | 37.47 | 4.72 | 35.53 | 9.5 | 0 | 35.49 | 74 | -38.51 | P | 1.0 |
| 6186.94 | 29.18 | 37.47 | 4.72 | 35.53 | 9.5 | 0 | 26.34 | 54 | -27.66 | A | 1.0 |
| 8247.96 | 40.12 | 39.35 | 4.87 | 35.58 | 9.5 | 0 | 39.27 | 74 | -34.73 | P | 1.0 |
| 8247.96 | 30.15 | 39.35 | 4.87 | 35.58 | 9.5 | 0 | 29.30 | 54 | -24.70 | A | 1.0 |

1. Measurement was up to 18GHz harmonic,“---” means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
3. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz,VBW=10Hz
4. Dist : correction to extrea plate reading to 3m specification distance 1m measurement distance = -9.5dB
5. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Closs} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
6. The test limit is 3M limit.
7. The other emission levels were very low against the limit.



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Test Requirement: 15.109 ,15.209

The frequency spectrum above 1 GHz was investigated. All emissions not reported below are more than 40 dB below the prescribed limits. Readings are both peak and average values.

| | | | |
|--------------|------------------------------|-----------------|------------|
| Company | Cisco-Linksys, LLC | Test Date : | 2003/7/16 |
| Product Name | Wireless Access Point Router | Test By: | K. P. Pang |
| Model Name | BEFW11S4 | TEMP&Humidity : | 26°C , 55% |

| CH6 RX | | | | Measurement Distance at 1m | | | | | Vertical polarity | | |
|---------|---------|--------|-------|----------------------------|------|--------|----------|----------|-------------------|---------|---------|
| Freq. | Reading | AF | Cable | Pre-amp | Dist | Filter | Level | Limit | Margin | Mark | Height |
| (MHz) | (dBuV) | (dB) | (dB) | (dB) | dB | dB | (dBuV/m) | (dBuV/m) | (dB) | (P/Q/A) | (Meter) |
| 4125.99 | 51.12 | 32.52 | 2.94 | 35.20 | 9.5 | 0 | 41.88 | 74 | -32.12 | P | 1.0 |
| 4125.99 | 49.19 | 32.52 | 2.94 | 35.20 | 9.5 | 0 | 39.95 | 54 | -14.05 | A | 1.0 |
| 6185.98 | 39.12 | 37.47 | 4.72 | 35.53 | 9.5 | 0 | 36.28 | 74 | -37.72 | P | 1.0 |
| 6185.98 | 29.22 | 37.47 | 4.72 | 35.53 | 9.5 | 0 | 26.38 | 54 | -27.62 | A | 1.0 |
| 8248.55 | 39.15 | 39.351 | 4.87 | 35.58 | 9.5 | 0 | 38.30 | 74 | -35.70 | P | 1.0 |
| 8248.55 | 30.14 | 39.351 | 4.87 | 35.58 | 9.5 | 0 | 29.29 | 54 | -24.71 | A | 1.0 |

1. Measurement was up to 18GHz harmonic,“---” means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
3. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz,VBW=10Hz
4. Dist : correction to extrea plate reading to 3m specification distance 1m measurement distance = -9.5dB
5. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Closs} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
6. The test limit is 3M limit.
7. The other emission levels were very low against the limit.



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Test Requirement: 15.109 ,15.209

The frequency spectrum above 1 GHz was investigated. All emissions not reported below are more than 40 dB below the prescribed limits. Readings are both peak and average values.

| | | | |
|--------------|------------------------------|-----------------|------------|
| Company | Cisco-Linksys, LLC | Test Date : | 2003/7/16 |
| Product Name | Wireless Access Point Router | Test By: | K. P. Pang |
| Model Name | BEFW11S4 | TEMP&Humidity : | 26°C , 55% |

| CH11 RX | | | | Measurement Distance at 1m | | | | | Horizontal polarity | | |
|---------|---------|-------|-------|----------------------------|------|--------|----------|----------|---------------------|---------|---------|
| Freq. | Reading | AF | Cable | Pre-amp | Dist | Filter | Level | Limit | Margin | Mark | Height |
| (MHz) | (dBuV) | (dB) | (dB) | (dB) | dB | dB | (dBuV/m) | (dBuV/m) | (dB) | (P/Q/A) | (Meter) |
| 4176.05 | 48.06 | 32.49 | 2.89 | 35.22 | 9.5 | 0 | 38.73 | 74 | -35.27 | P | 1.0 |
| 4176.05 | 45.04 | 32.49 | 2.89 | 35.22 | 9.5 | 0 | 35.71 | 54 | -18.29 | A | 1.0 |
| 6261.75 | 39.06 | 37.62 | 4.49 | 35.54 | 9.5 | 0 | 36.14 | 74 | -37.86 | P | 1.0 |
| 6261.75 | 29.28 | 37.62 | 4.49 | 35.54 | 9.5 | 0 | 26.36 | 54 | -27.64 | A | 1.0 |
| 8348.16 | 40.02 | 39.25 | 5.07 | 35.55 | 9.5 | 0 | 39.30 | 74 | -34.70 | P | 1.0 |
| 8348.16 | 30.19 | 39.25 | 5.07 | 35.55 | 9.5 | 0 | 29.47 | 54 | -24.53 | A | 1.0 |

1. Measurement was up to 18GHz harmonic,“---” means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
3. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz,VBW=10Hz
4. Dist : correction to extrea plate reading to 3m specification distance 1m measurement distance = -9.5dB
5. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Closs} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
6. The test limit is 3M limit.
7. The other emission levels were very low against the limit.



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Test Requirement: 15.109 ,15.209

The frequency spectrum above 1 GHz was investigated. All emissions not reported below are more than 40 dB below the prescribed limits. Readings are both peak and average values.

| | | | |
|--------------|------------------------------|-----------------|------------|
| Company | Cisco-Linksys, LLC | Test Date : | 2003/7/16 |
| Product Name | Wireless Access Point Router | Test By: | K. P. Pang |
| Model Name | BEFW11S4 | TEMP&Humidity : | 26°C , 55% |

| CH11 RX | | | | Measurement Distance at 1m | | | | | Vertical polarity | | |
|---------|---------|-------|-------|----------------------------|------|--------|----------|----------|-------------------|---------|---------|
| Freq. | Reading | AF | Cable | Pre-amp | Dist | Filter | Level | Limit | Margin | Mark | Height |
| (MHz) | (dBuV) | (dB) | (dB) | (dB) | dB | dB | (dBuV/m) | (dBuV/m) | (dB) | (P/Q/A) | (Meter) |
| 4176.05 | 52.80 | 32.49 | 2.89 | 35.22 | 9.5 | 0 | 43.47 | 74 | -30.53 | P | 1.0 |
| 4176.05 | 50.68 | 32.49 | 2.89 | 35.22 | 9.5 | 0 | 41.35 | 54 | -12.65 | A | 1.0 |
| 6261.73 | 38.04 | 37.62 | 4.49 | 35.54 | 9.5 | 0 | 35.12 | 74 | -38.88 | P | 1.0 |
| 6261.73 | 28.97 | 37.62 | 4.49 | 35.54 | 9.5 | 0 | 26.05 | 54 | -27.95 | A | 1.0 |
| 8348.16 | 41.12 | 39.25 | 5.07 | 35.55 | 9.5 | 0 | 40.40 | 74 | -33.60 | P | 1.0 |
| 8348.16 | 30.15 | 39.25 | 5.07 | 35.55 | 9.5 | 0 | 29.43 | 54 | -24.57 | A | 1.0 |

1. Measurement was up to 18GHz harmonic,“---” means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
3. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz,VBW=10Hz
4. Dist : correction to extrea plate reading to 3m specification distance 1m measurement distance = -9.5dB
5. The result basic equation calculation as follow :
Level = Reading + AF + Closs - Preamp + Filter - Dist, Margin = Level - Limit
6. The test limit is 3M limit.
7. The other emission levels were very low against the limit.



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Test Requirement: 15.205

The frequency spectrum above 1 GHz was investigated. All emissions not reported below are more than 40 dB below the prescribed limits. Readings are both peak and average values.

| | | | |
|--------------|------------------------------|-----------------|------------|
| Company | Cisco-Linksys, LLC | Test Date : | 2003/7/24 |
| Product Name | Wireless Access Point Router | Test By: | K. P. Pang |
| Model Name | BEFW11S4 | TEMP&Humidity : | 26°C , 55% |

| CH1 TX | | | | Measurement Distance at 3m | | | | Horizontal polarity | | | |
|-----------|---------|--|-------|----------------------------|------|--------|----------|-----------------------|--------|---------|---------|
| Freq. | Reading | AF | Cable | Pre-amp | Dist | Filter | Level | Limit | Margin | Mark | Height |
| (MHz) | (dBuV) | (dBuV) | (dB) | (dB) | dB | dB | (dBuV/m) | (dBuV/m) | (dB) | (P/Q/A) | (Meter) |
| *2376.20 | 52.87 | (delta between carrier and local max emission) | | | | | 43.74 | 74 | -30.26 | P | 1.00 |
| *2376.20 | 52.87 | (delta between carrier and local max emission) | | | | | 36.76 | 54 | -17.24 | A | 1.00 |
| 2413.00 | 71.96 | 31.79 | 2.36 | 0.00 | 9.50 | 0.00 | 96.61 | Fundamental Frequency | | P | 1.00 |
| 2413.00 | 64.98 | 31.79 | 2.36 | 0.00 | 9.50 | 0.00 | 89.63 | | | A | 1.00 |
| *4824.05 | 48.23 | 34.44 | 2.77 | 35.38 | 9.50 | 1.00 | 41.56 | 74 | -32.44 | P | 1.00 |
| *4824.05 | 38.68 | 34.44 | 2.77 | 35.38 | 9.50 | 1.00 | 32.01 | 54 | -21.99 | A | 1.00 |
| *7326.27 | 39.04 | 39.77 | 4.01 | 35.57 | 9.50 | 1.00 | 38.75 | 74 | -35.25 | P | 1.00 |
| *7326.27 | 30.94 | 39.77 | 4.01 | 35.57 | 9.50 | 1.00 | 30.65 | 54 | -23.35 | A | 1.00 |
| 9648.12 | 39.21 | 38.54 | 4.10 | 35.67 | 9.50 | 1.00 | 37.67 | 74 | -36.33 | P | 1.00 |
| 9648.12 | 30.43 | 38.54 | 4.10 | 35.67 | 9.50 | 1.00 | 28.89 | 54 | -25.11 | A | 1.00 |
| *12065.00 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| *14478.00 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 16891.00 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| *19304.00 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 21717.00 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 24130.00 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means that Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 $Level = Reading + AF + Closs - Preamp + Filter - Dist$, $Margin = Level - Limit$
- The other emission levels were very low against the limit
- The test limit is 3M limit.



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Test Requirement: 15.205

The frequency spectrum above 1 GHz was investigated. All emissions not reported below are more than 40 dB below the prescribed limits. Readings are both peak and average values.

| | | | |
|--------------|------------------------------|-----------------|------------|
| Company | Cisco-Linksys, LLC | Test Date : | 2003/7/24 |
| Product Name | Wireless Access Point Router | Test By: | K. P. Pang |
| Model Name | BEFW11S4 | TEMP&Humidity : | 26°C , 55% |

| CH1 TX | | | | Measurement Distance at 3m | | | | Vertical polarity | | | |
|-----------|---------|--|-------|----------------------------|------|--------|----------|-----------------------|--------|---------|---------|
| Freq. | Reading | AF | Cable | Pre-amp | Dist | Filter | Level | Limit | Margin | Mark | Height |
| (MHz) | (dBuV) | (dBuV) | (dB) | (dB) | dB | dB | (dBuV/m) | (dBuV/m) | (dB) | (P/Q/A) | (Meter) |
| *2376.20 | 52.87 | (delta between carrier and local max emission) | | | | | 53.44 | 74 | -20.56 | P | 1.00 |
| *2376.20 | 52.87 | (delta between carrier and local max emission) | | | | | 46.43 | 54 | -7.57 | A | 1.00 |
| 2413.05 | 81.66 | 31.79 | 2.36 | 0.00 | 9.50 | 0.00 | 106.31 | Fundamental Frequency | | P | 1.00 |
| 2413.05 | 74.65 | 31.79 | 2.36 | 0.00 | 9.50 | 0.00 | 99.30 | | | A | 1.00 |
| *4824.04 | 51.75 | 34.44 | 2.77 | 35.38 | 9.50 | 1.00 | 45.08 | 74 | -28.92 | P | 1.00 |
| *4824.04 | 39.26 | 34.44 | 2.77 | 35.38 | 9.50 | 1.00 | 32.59 | 54 | -21.41 | A | 1.00 |
| 7326.27 | 39.04 | 39.77 | 4.01 | 35.57 | 9.50 | 1.00 | 38.75 | 74 | -35.25 | P | 1.00 |
| 7326.27 | 29.61 | 39.77 | 4.01 | 35.57 | 9.50 | 1.00 | 29.32 | 54 | -24.68 | A | 1.00 |
| 9648.37 | 40.64 | 38.54 | 4.10 | 35.67 | 9.50 | 1.00 | 39.10 | 74 | -34.90 | P | 1.00 |
| 9648.37 | 30.47 | 38.54 | 4.10 | 35.67 | 9.50 | 1.00 | 28.93 | 54 | -25.07 | A | 1.00 |
| *12065.25 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| *14478.30 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 16891.35 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| *19304.40 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 21717.45 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 24130.50 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means that Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 $Level = Reading + AF + Closs - Preamp + Filter - Dist$, $Margin = Level - Limit$
- The other emission levels were very low against the limit
- The test limit is 3M limit.



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FCC ID : Q87-BEFW11S4

Report No. : ER03-07-044FRF

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Test Requirement: 15.205

The frequency spectrum above 1 GHz was investigated. All emissions not reported below are more than 40 dB below the prescribed limits. Readings are both peak and average values.

| | | | |
|--------------|------------------------------|-----------------|------------|
| Company | Cisco-Linksys, LLC | Test Date : | 2003/7/24 |
| Product Name | Wireless Access Point Router | Test By: | K. P. Pang |
| Model Name | BEFW11S4 | TEMP&Humidity : | 26°C , 55% |

| CH6 TX | | | | Measurement Distance at 3m | | | | Horizontal polarity | | | |
|-----------|---------|--------|-------|----------------------------|------|--------|----------|-----------------------|--------|---------|---------|
| Freq. | Reading | AF | Cable | Pre-amp | Dist | Filter | Level | Limit | Margin | Mark | Height |
| (MHz) | (dBuV) | (dBuV) | (dB) | (dB) | dB | dB | (dBuV/m) | (dBuV/m) | (dB) | (P/Q/A) | (Meter) |
| 2435.89 | 72.10 | 31.76 | 2.42 | 0.00 | 9.50 | 0.00 | 96.78 | Fundamental Frequency | | P | 1.00 |
| 2435.89 | 65.63 | 31.76 | 2.42 | 0.00 | 9.50 | 0.00 | 90.31 | | | A | 1.00 |
| *4873.94 | 51.96 | 34.77 | 2.80 | 35.40 | 9.50 | 1.00 | 45.63 | 74 | -28.37 | P | 1.00 |
| *4873.94 | 41.91 | 34.77 | 2.80 | 35.40 | 9.50 | 1.00 | 35.58 | 54 | -18.42 | A | 1.00 |
| *7311.37 | 39.08 | 39.78 | 4.00 | 35.57 | 9.50 | 1.00 | 38.79 | 74 | -35.21 | P | 1.00 |
| *7311.37 | 29.72 | 39.78 | 4.00 | 35.57 | 9.50 | 1.00 | 29.43 | 54 | -24.57 | A | 1.00 |
| 9748.25 | 41.26 | 38.53 | 4.02 | 35.72 | 9.50 | 1.00 | 39.58 | 74 | -34.42 | P | 1.00 |
| 9748.25 | 31.86 | 38.53 | 4.02 | 35.72 | 9.50 | 1.00 | 30.18 | 54 | -23.82 | A | 1.00 |
| *12179.45 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 14615.34 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 17051.23 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| *19487.12 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 21923.01 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 24358.90 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means that Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 $Level = Reading + AF + Closs - Preamp + Filter - Dist, Margin = Level - Limit$
- The other emission levels were very low against the limit
- The test limit is 3M limit.



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FCC ID : Q87-BEFW11S4

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Test Requirement: 15.205

The frequency spectrum above 1 GHz was investigated. All emissions not reported below are more than 40 dB below the prescribed limits. Readings are both peak and average values.

| | | | |
|--------------|------------------------------|-----------------|------------|
| Company | Cisco-Linksys, LLC | Test Date : | 2003/7/24 |
| Product Name | Wireless Access Point Router | Test By: | K. P. Pang |
| Model Name | BEFW11S4 | TEMP&Humidity : | 26°C , 55% |

| CH6 TX | | | | Measurement Distance at 3m | | | | Vertical polarity | | | |
|-----------|---------|--------|-------|----------------------------|------|--------|----------|-----------------------|--------|---------|---------|
| Freq. | Reading | AF | Cable | Pre-amp | Dist | Filter | Level | Limit | Margin | Mark | Height |
| (MHz) | (dBuV) | (dBuV) | (dB) | (dB) | dB | dB | (dBuV/m) | (dBuV/m) | (dB) | (P/Q/A) | (Meter) |
| 2435.84 | 80.86 | 31.76 | 2.42 | 0.00 | 9.50 | 0.00 | 105.54 | Fundamental Frequency | | P | 1.00 |
| 2435.84 | 74.37 | 31.76 | 2.42 | 0.00 | 9.50 | 0.00 | 99.05 | | | A | 1.00 |
| *4873.97 | 57.19 | 34.77 | 2.80 | 35.40 | 9.50 | 1.00 | 50.86 | 74 | -23.14 | P | 1.00 |
| *4873.97 | 45.68 | 34.77 | 2.80 | 35.40 | 9.50 | 1.00 | 39.35 | 54 | -14.65 | A | 1.00 |
| *7311.77 | 38.67 | 39.78 | 4.00 | 35.57 | 9.50 | 1.00 | 38.38 | 74 | -35.62 | P | 1.00 |
| *7311.77 | 29.91 | 39.78 | 4.00 | 35.57 | 9.50 | 1.00 | 29.62 | 54 | -24.38 | A | 1.00 |
| 9747.98 | 43.05 | 38.53 | 4.02 | 35.72 | 9.50 | 1.00 | 41.37 | 74 | -32.63 | P | 1.00 |
| 9747.98 | 35.85 | 38.53 | 4.02 | 35.72 | 9.50 | 1.00 | 34.17 | 54 | -19.83 | A | 1.00 |
| *12179.20 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 14615.04 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 17050.88 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| *19486.72 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 21922.56 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 24358.40 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means that Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 $Level = Reading + AF + Closs - Preamp + Filter - Dist$, $Margin = Level - Limit$
- The other emission levels were very low against the limit
- The test limit is 3M limit.



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Test Requirement: 15.205

The frequency spectrum above 1 GHz was investigated. All emissions not reported below are more than 40 dB below the prescribed limits. Readings are both peak and average values.

| | | | |
|--------------|------------------------------|-----------------|------------|
| Company | Cisco-Linksys, LLC | Test Date : | 2003/7/24 |
| Product Name | Wireless Access Point Router | Test By: | K. P. Pang |
| Model Name | BEFW11S4 | TEMP&Humidity : | 26°C , 55% |

| CH11 TX | | | | Measurement Distance at 3m | | | | Horizontal polarity | | | |
|-----------|---------|--|-------|----------------------------|------|--------|----------|-----------------------|--------|---------|---------|
| Freq. | Reading | AF | Cable | Pre-amp | Dist | Filter | Level | Limit | Margin | Mark | Height |
| (MHz) | (dBuV) | (dBuV) | (dB) | (dB) | dB | dB | (dBuV/m) | (dBuV/m) | (dB) | (P/Q/A) | (Meter) |
| 2463.02 | 71.82 | 31.74 | 2.49 | 0.00 | 9.50 | 0.00 | 96.55 | Fundamental Frequency | | P | 1.00 |
| 2463.02 | 64.82 | 31.74 | 2.49 | 0.00 | 9.50 | 0.00 | 89.55 | | | A | 1.00 |
| *2484.20 | 56.91 | (delta between carrier and local max emission) | | | | | 39.64 | 74 | -34.36 | P | 1.00 |
| *2484.20 | 56.91 | (delta between carrier and local max emission) | | | | | 32.64 | 54 | -21.36 | A | 1.00 |
| *4923.97 | 55.41 | 35.10 | 2.83 | 35.41 | 9.50 | 1.00 | 49.43 | 74 | -24.57 | P | 1.00 |
| *4923.97 | 43.34 | 35.10 | 2.83 | 35.41 | 9.50 | 1.00 | 37.36 | 54 | -16.64 | A | 1.00 |
| *7386.82 | 39.51 | 39.75 | 4.06 | 35.57 | 9.50 | 1.00 | 39.24 | 74 | -34.76 | P | 1.00 |
| *7386.82 | 29.73 | 39.75 | 4.06 | 35.57 | 9.50 | 1.00 | 29.46 | 54 | -24.54 | A | 1.00 |
| 9848.12 | 40.66 | 38.52 | 3.93 | 35.77 | 9.50 | 1.00 | 38.84 | 74 | -35.16 | P | 1.00 |
| 9848.12 | 31.63 | 38.52 | 3.93 | 35.77 | 9.50 | 1.00 | 29.81 | 54 | -24.19 | A | 1.00 |
| *12315.10 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 14778.12 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 17241.14 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| *19704.16 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| *22167.18 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 24630.20 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means that Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 $Level = Reading + AF + Closs - Preamp + Filter - Dist$, $Margin = Level - Limit$
- The other emission levels were very low against the limit
- The test limit is 3M limit.



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Test Requirement: 15.205

The frequency spectrum above 1 GHz was investigated. All emissions not reported below are more than 40 dB below the prescribed limits. Readings are both peak and average values.

| | | | |
|--------------|------------------------------|-----------------|------------|
| Company | Cisco-Linksys, LLC | Test Date : | 2003/7/24 |
| Product Name | Wireless Access Point Router | Test By: | K. P. Pang |
| Model Name | BEFW11S4 | TEMP&Humidity : | 26°C , 55% |

| CH11 TX | | | | Measurement Distance at 3m | | | | Vertical polarity | | | |
|-----------|---------|--|-------|----------------------------|------|--------|----------|-----------------------|--------|---------|---------|
| Freq. | Reading | AF | Cable | Pre-amp | Dist | Filter | Level | Limit | Margin | Mark | Height |
| (MHz) | (dBuV) | (dBuV) | (dB) | (dB) | dB | dB | (dBuV/m) | (dBuV/m) | (dB) | (P/Q/A) | (Meter) |
| 2463.02 | 79.96 | 31.74 | 2.49 | 0.00 | 9.50 | 0.00 | 104.69 | Fundamental Frequency | | P | 1.00 |
| 2463.02 | 72.97 | 31.74 | 2.49 | 0.00 | 9.50 | 0.00 | 97.70 | | | A | 1.00 |
| *2484.20 | 56.91 | (delta between carrier and local max emission) | | | | | 47.78 | 74 | -26.22 | P | 1.00 |
| *2484.20 | 56.91 | (delta between carrier and local max emission) | | | | | 40.79 | 54 | -13.21 | A | 1.00 |
| *4923.97 | 61.14 | 35.10 | 2.83 | 35.41 | 9.50 | 1.00 | 55.16 | 74 | -18.84 | P | 1.00 |
| *4923.97 | 49.53 | 35.10 | 2.83 | 35.41 | 9.50 | 1.00 | 43.55 | 54 | -10.45 | A | 1.00 |
| *7385.97 | 38.06 | 39.75 | 4.06 | 35.57 | 9.50 | 1.00 | 37.79 | 74 | -36.21 | P | 1.00 |
| *7385.97 | 29.42 | 39.75 | 4.06 | 35.57 | 9.50 | 1.00 | 29.15 | 54 | -24.85 | A | 1.00 |
| 9848.12 | 42.02 | 38.52 | 3.93 | 35.77 | 9.50 | 1.00 | 40.20 | 74 | -33.80 | P | 1.00 |
| 9848.12 | 33.50 | 38.52 | 3.93 | 35.77 | 9.50 | 1.00 | 31.68 | 54 | -22.32 | A | 1.00 |
| *12315.10 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 14778.12 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 17241.14 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| *19704.16 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 22167.18 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |
| 24630.20 | ----- | ----- | ----- | ----- | 9.50 | 1.00 | ----- | ----- | ----- | ----- | 1.00 |

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means that Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 $Level = Reading + AF + Closs - Preamp + Filter - Dist$, $Margin = Level - Limit$
- The other emission levels were very low against the limit
- The test limit is 3M limit.

3.7 Photos of Open Site





4. 6dB BANDWIDTH MEASUREMENT

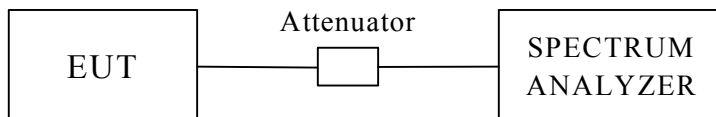
4.1 Test Equipments

| Description & Manufacturer | Model No. | Serial No. | Date Of Calibration |
|-----------------------------------|-----------|-------------|---------------------|
| ROHDE & SCHWARZ SPECTRUM ANALYZER | FSEK30 | 835253/002 | JUN. 17, 2003 |
| HP ATTENUATOR | 8496B | 3247A18505 | Cal. on use |
| HP PLOTTER | 7750A | 725A 852141 | N/A |

NOTE :

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.2 Test Setup



4.3 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is >500KHz

4.4 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 100 KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

4.5 Uncertainty of Conducted Emission

The uncertainty of conducted emission is ± 200KHz.



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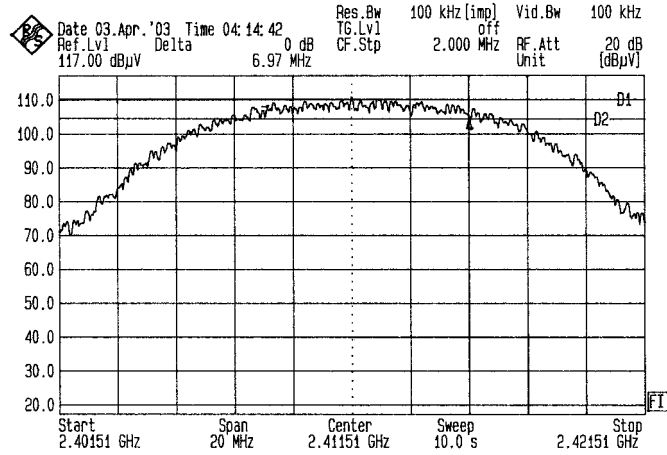
4.6 Test Results

| | | | |
|-----------------------------|--------------------|---------------------------------|--------------|
| Input Power (System) | 5VDC(Form Adapter) | Environmental Conditions | 27°C, 70%RH, |
| Tested By | K. P. Pang | | |

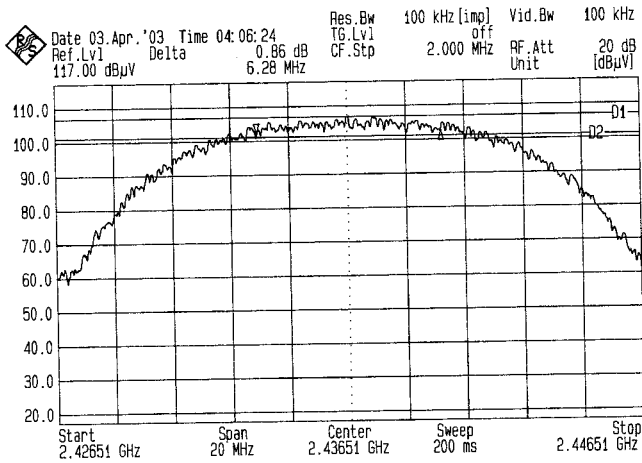
| Channel | Channel Frequency (MHz) | 6dB Bandwidth (MHz) | Minimum Limit (MHz) | Pass / Fail |
|----------------|--------------------------------|----------------------------|----------------------------|--------------------|
| 1 | 2412 | 6.97 | 0.5 | PASS |
| 6 | 2437 | 6.28 | 0.5 | PASS |
| 11 | 2462 | 7.11 | 0.5 | PASS |



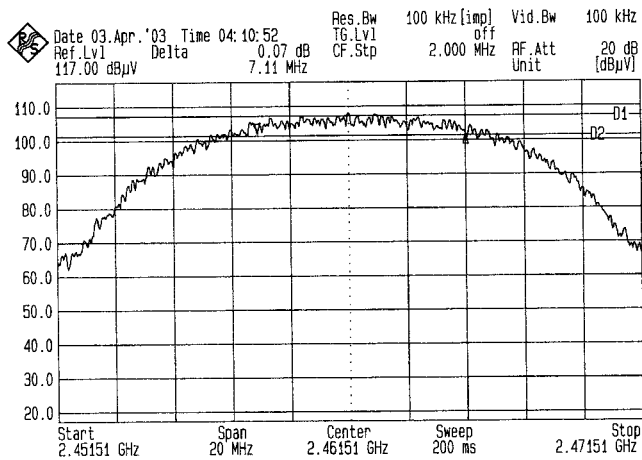
4.7 Photo of 6dB Bandwidth Measurement



Channel 1



Channel 6



Channel 11

5. MAXIMUM PEAK OUTPUT POWER

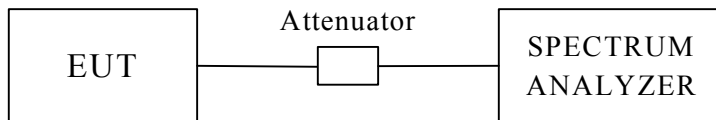
5.1 Test Equipments

| Description & Manufacturer | Model No. | Serial No. | Date Of Calibration |
|-----------------------------------|-----------|-------------|---------------------|
| ROHDE & SCHWARZ SPECTRUM ANALYZER | FSEK30 | 835253/002 | JUN. 17, 2003 |
| HP ATTENUATOR | 8496B | 3247A18505 | Cal. on use |
| HP PLOTTER | 7750A | 725A 852141 | N/A |

NOTE :

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.2 Test Setup



5.3 Limits of Maximum Peak Output Power

The Maximum Peak Output Power Measurement is 30dBm.



5.4 Test Procedure

The RF power output was measured with a Power meter connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency.

5.5 Uncertainty of Conducted Emission

The uncertainty of conducted emission is $\pm 1.82\text{dB}$.

5.6 Test Results

| | | | |
|-----------------------------|--------------------|---------------------------------|--------------|
| Input Power (System) | 5VDC(Form Adapter) | Environmental Conditions | 27°C, 70%RH, |
| Tested By | K. P. Pang | | |

| Channel | Channel Frequency (MHz) | Peak Power Output (dBm) | Peak Power Limit (dBm) | Pass / Fail |
|----------------|--------------------------------|--------------------------------|-------------------------------|--------------------|
| 1 | 2412 | 20.01 | 30 | PASS |
| 6 | 2437 | 19.01 | 30 | PASS |
| 11 | 2462 | 18.53 | 30 | PASS |

6. POWER SPECTRAL DENSITY MEASUREMENT

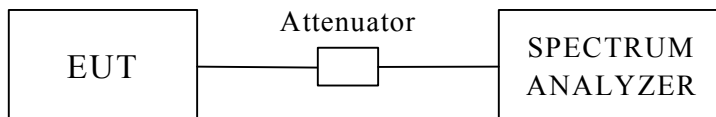
6.1 Test Equipments

| Description & Manufacturer | Model No. | Serial No. | Date Of Calibration |
|-----------------------------------|-----------|-------------|---------------------|
| ROHDE & SCHWARZ SPECTRUM ANALYZER | FSEK30 | 835253/002 | JUN. 17, 2003 |
| HP ATTENUATOR | 8496B | 3247A18505 | Cal. on use |
| HP PLOTTER | 7750A | 725A 852141 | N/A |

NOTE :

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

6.2 Test Setup



6.3 Limits of Power Spectral Density Measurement

The Maximum Power Spectral Density Measurement is 8dBm.



6.4 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3KHz RBW and 30KHz VBW, set sweep time=span / 3KHz.

The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span / 3KHz for a full response of the mixer in the spectrum analyzer.

6.5 Uncertainty of Conducted Emission

The uncertainty of conducted emission is ± 1.82 dB.

6.6 Test Results

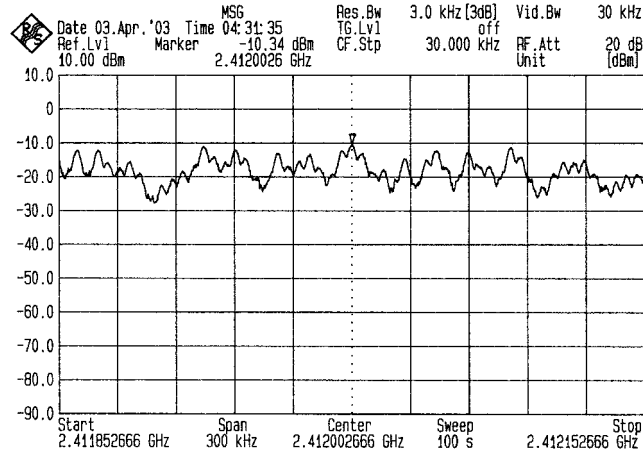
| | | | |
|-----------------------------|--------------------|---------------------------------|--------------|
| Input Power (System) | 5VDC(Form Adapter) | Environmental Conditions | 27°C, 70%RH, |
| Tested By | K. P. Pang | | |

| Channel | Channel Frequency (MHz) | Final RF Power Level in 3KHz BW (dBm) | Maxmum Limit (dBm) | Pass / Fail |
|----------------|--------------------------------|--|---------------------------|--------------------|
| 1 | 2412 | -0.34 | 8 | PASS |
| 6 | 2437 | -1.81 | 8 | PASS |
| 11 | 2462 | -0.82 | 8 | PASS |

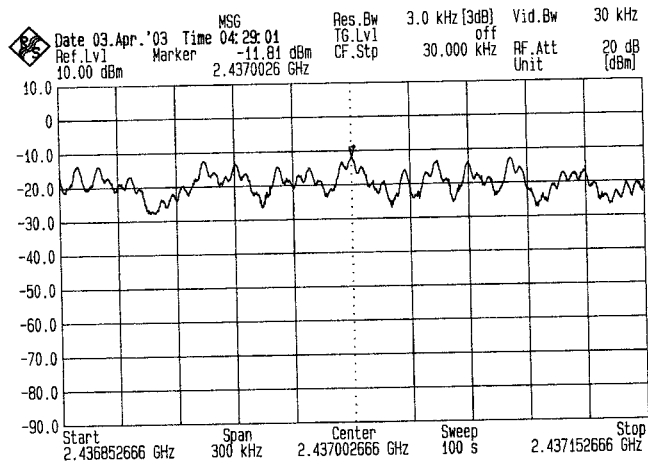
Note : 1.The measurement value of RF Power Level + 10dB attenuator=Final RF Power Level.



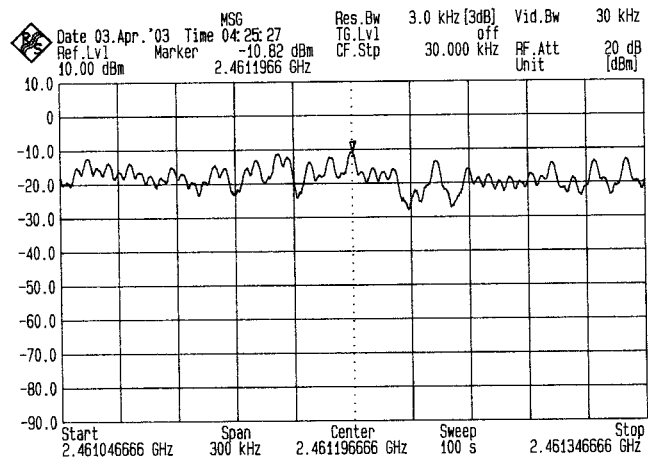
6.7 Photo of Power Spectral Density Measurement



Channel 1



Channel 6



Channel 11

7. OUT OF BAND MEASUREMENT

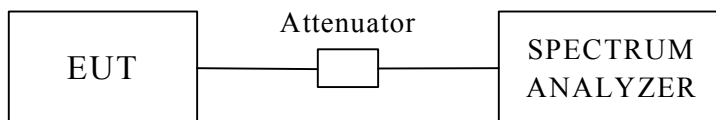
7.1 Test Equipments

| Description & Manufacturer | Model No. | Serial No. | Date Of Calibration |
|-----------------------------------|-----------|-------------|---------------------|
| ROHDE & SCHWARZ SPECTRUM ANALYZER | FSEK30 | 835253/002 | JUN. 17, 2003 |
| HP ATTENUATOR | 8496B | 3247A18505 | Cal. on use |
| HP PLOTTER | 7750A | 725A 852141 | N/A |

NOTE :

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

7.2 Test Setup



7.3 Limits of Out of Band Emissions Measurement

1. Below -20dB of the highest emission level of operating band (in 100KHz Resolution Bandwidth).
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.



7.4 Test Procedure

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100KHz with suitable frequency span including 100KHz bandwidth from band edge. The band edges was measured and recorded.

7.5 Uncertainty of Conducted Emission

The uncertainty of conducted emission is ± 1.82 dB.

7.6 Test Results

A. Conducted

Refer to 7.7 photo of out band Emission measurement

B. Radiated

NOTE1: The band edge emission plot on the following first figure shows 52.87dB delta between carrier maximum power and local maximum emission in restrict band (2.3762GHz). The emission of carrier strength list in the test result of channel 1 at the item 3.6 is 99.30dBuV/m(AV), so the maximum field strength in restrict band is $99.30-52.87=46.43$ dBuV/m which is under 54 dBuV/m limit.

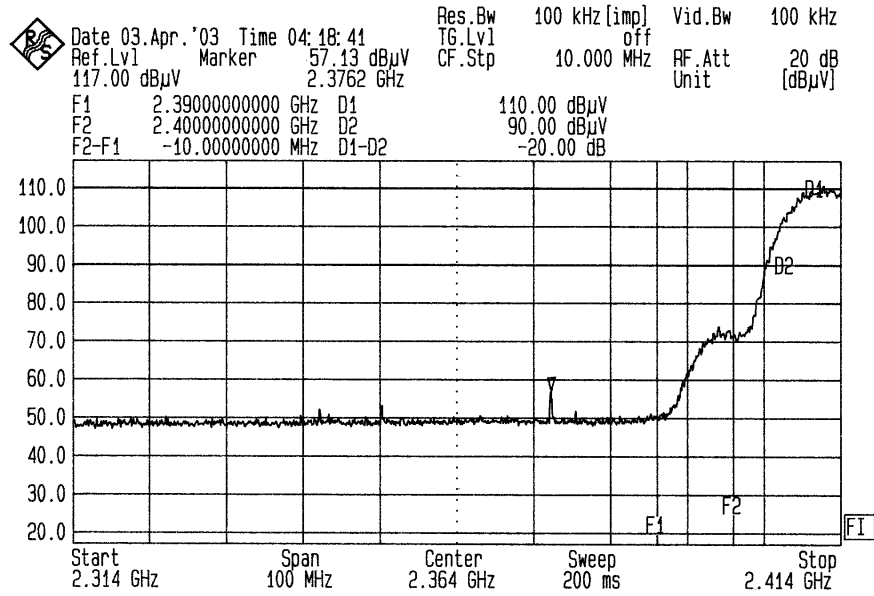
NOTE2: The band edge emission plot on the following second figure shows 56.91dB delta between carrier maximum power and local maximum emission in restrict band (2.4842GHz). The emission of carrier strength list in the test result of channel 11 at the item 3.6 is 97.70dBuV/m(AV), so the maximum field strength in restrict band is $97.70-56.91=40.79$ dBuV/m which is under 54 dBuV/m limit.

| | | | |
|-----------------------------|---------------------|---------------------------------|--------------|
| Input Power (System) | 5VDC (From Adapter) | Environmental Conditions | 27°C, 70%RH, |
| Tested By | K. P. Pang | | |

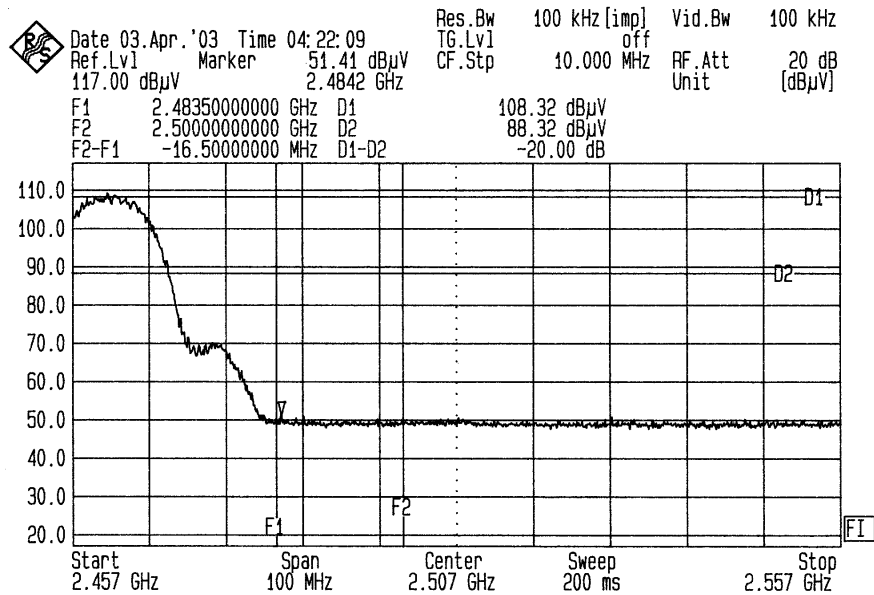
| Channel Frequency (MHz) | Required Limit (dBc) | Pass / Fail |
|--------------------------------|-----------------------------|--------------------|
| <2400 | >20 | PASS |
| >2483.5 | >20 | PASS |



7.7 Photo of Out of Band Measurement



FRONT



BACK



8. ANTENNA REQUIREMENT

8.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

8.2 Antenna Connected Construction

The antenna used in this product is DIPOLE antenna. The DIPOLE antenna connector is MMCX And the maximum Gain of these antennas are only 3.3dBi.



9. 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 |
|---|-------------------------------|-------------------------------|-------------------------------------|--------------|
| (A) Limits for Occupational / Control Exposures | | | | |
| 300-1,500 | -- | -- | F/300 | 6 |
| 1,500-100,000 | -- | -- | 5 | 6 |
| (B) Limits for General Population / Uncontrol Exposures | | | | |
| 300-1,500 | -- | -- | F/1500 | 6 |
| 1,500-100,000 | -- | -- | 1 | 30 |

9.1 Friis Formula

Friis transmission formula : $Pd = (Pout * G) / (4 * pi * r^2)$

Where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

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

Pd 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.

9.2 EUT Operating Condition

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



9.3 Test Result of RF Exposure Evaluation

Test Item : RF Exposure Evaluation Data

Test Mode : Normal Operation

9.3.1 Antenna Gain

Antenna Gain : The maximum Gain measured in fully anechoic chamber is 2.0dBi linear scale.

9.3.2 Output Power into Antenna & RF Exposure Evaluation Distance

| Channel | Channel Frequency (MHz) | Output Power to Antenna (dBm) | Power density in mW/cm ² at Friis formula when r=20cm(mW/cm ²) | LIMITS |
|---------|-------------------------|-------------------------------|---|--------|
| CH1 | 2412.00 | 20.01 | 0.031603 | 1 |
| CH6 | 2437.00 | 19.01 | 0.025103 | 1 |
| CH11 | 2462.00 | 18.53 | 0.022477 | 1 |

The power density Pd (4th column) at a distance of 20cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm². So, RF exposure limit warning or SAR test are not required.