



# FCC TEST REPORT

**REPORT NO.:** RF910307R02

**MODEL NO.:** AF411W, AFN4110W

**RECEIVED:** March 11, 2002

**TESTED:** March 11 ~ March 18, 2002

**APPLICANT:** Zero One Technology Co. Ltd

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**ISSUED BY:** Advance Data Technology Corporation

**LAB LOCATION:** 47 14<sup>th</sup> Lin, Chiapau Tsun, Linko, Taipei,  
Taiwan, R.O.C.

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## 1 CERTIFICATION

**PRODUCT :** Broadband DSL/Cable Wireless Router

**BRAND NAME :** ZOT

**MODEL NO. :** AF411W, AFN4110W

**APPLICANT :** Zero One Technology Co. Ltd

**STANDARDS :** 47 CFR Part 15, Subpart C (Section 15.247),  
ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from March 11 ~ March 18, 2002. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

TESTED BY : Gary Chang, DATE: May 31, 2002  
Gary Chang

CHECKED BY : Rennie Wang, DATE: May 31, 2002  
Rennie Wang

APPROVED BY : Alan Lane, DATE: May 31, 2002  
Dr. Alan Lane, Manager

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: 47 CFR Part 15, Subpart C |   |        |   |
|---|---|--------|---|
| Standard Section                            | Test Type and Limit   | Result | REMARK  |
| 15.207                                      | AC Power Conducted Emission<br>Limit: 48dB <sub>u</sub> V                               | PASS   | Meet the requirement of limit<br>Minimum passing margin is -11.21dB <sub>u</sub> V at 2.2773MHz |
| 15.247(a)(2)                                | Spectrum Bandwidth of a Direct Sequence Spread Spectrum System<br>Limit: min. 500kHz    | PASS   | Meet the requirement of limit   |
| 15.247(b)                                   | Maximum Peak Output Power<br>Limit: max. 30dBm  | PASS   | Meet the requirement of limit   |
| 15.247(c)                                   | Radiated Emissions<br>Limit: Table 15.209   | PASS   | Meet the requirement of limit<br>Minimum passing margin is -2.3dB <sub>u</sub> V at 150.00MHz   |
| 15.247(d)                                   | Power Spectral Density<br>Limit: max. 8dBm  | PASS   | Meet the requirement of limit   |
| 15.247(c)                                   | Band Edge Measurement<br>Limit: 20 dB less than the peak value of fundamental frequency | PASS   | Meet the requirement of limit   |

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|                           |                                     |
|---------------------------|-------------------------------------|
| <b>PRODUCT</b>            | Broadband DSL/Cable Wireless Router |
| <b>MODEL NO.</b>          | AF411W, AFN4110W                    |
| <b>POWER SUPPLY</b>       | 5.0VDC from AC adapter              |
| <b>MODULATION TYPE</b>    | BPSK/QPSK/CCK (DSSS)                |
| <b>TRANSFER RATE</b>      | 1/2/5.5/11/22Mbps                   |
| <b>FREQUENCY RANGE</b>    | 2412MHz ~ 2462MHz                   |
| <b>NUMBER OF CHANNEL</b>  | 11                                  |
| <b>OUTPUT POWER</b>       | 10.5dBm                             |
| <b>ANTENNA TYPE</b>       | Dipole antenna                      |
| <b>POWER CABLE</b>        | 1.8m (Nonshielded)                  |
| <b>I/O PORTS</b>          | RJ45 port, RS232 port               |
| <b>ASSOCIATED DEVICES</b> | NA                                  |

#### NOTE:

1. The EUT is operated with the following power adapter.

|                       |                         |
|-----------------------|-------------------------|
| <b>Model No. :</b>    | BSA-15-105A             |
| <b>Input Power :</b>  | 100-120VAC 0.4A 57-63Hz |
| <b>Output Power :</b> | 5VDC 2.0A               |

2. Model AF411W and AFN4110W are identical except for their model number.
3. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

### 3.2 DESCRIPTION OF TEST MODES

Eleven channels are provided in this EUT.

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

**NOTE:**

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

### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Broadband DSL/Cable Wireless Router. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC CFR 47 Part 15, Subpart C. (15.247)**

**ANSI C63.4 : 1992**

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

**NOTE:** The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

### 3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| NO. | PRODUCT               | BRAND    | MODEL NO.  | SERIAL NO.               | FCC ID           |
|-----|-----------------------|----------|------------|--------------------------|------------------|
| 1   | PERSONAL COMPUTER     | HP       | Brio BA410 | SG12902751               | FCC DoC APPROVED |
| 2   | COLOR MONITOR         | ADI      | CM100      | 026058T10200611 A        | FCC DoC APPROVED |
| 3   | PS/2 KEYBOARD         | FORWARD  | FDA-104GA  | FDKB8110111              | F4ZDA-104G       |
| 4   | PS/2 MOUSE            | LOGITECH | M-S43      | LZE00703207              | DZL211106        |
| 5   | PRINTER               | HP       | 2225C+     | 3123S97230               | DSI6XU2225       |
| 6   | MODEM                 | ACEEX    | 1414       | 980020510                | IFAXDM1414       |
| 7   | NOTEBOOK              | DELL     | PP01L      | TW-09C748-12800-19O-B220 | FCC DoC APPROVED |
| 8   | FAST ETHERNET PC CARD | D-Link   | DFE-680TXD | RE1A044413               | MQ4FE2K5MX       |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS   |
|-----|---|
| 1   | NA  |
| 2   | 1.8 m braid shielded wire, terminated with VGA connector via metallic frame, w/o core.                |
| 3   | 1.5 m foil shielded wire, terminated with PS/2 connector via metallic frame, w/o core.                |
| 4   | 1.8 m foil shielded wire, terminated with PS/2 connector via drain wire, w/o core.                    |
| 5   | 1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core. |
| 6   | 1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.       |
| 7   | NA  |
| 8   | NA  |

**NOTE:** All power cords of the above support units are non shielded (1.8m).

## 4 TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

| FREQUENCY (MHz) | Class B (dBuV) |         |
|-----------------|----------------|---------|
|                 | Quasi-peak     | Average |
| 0.45 – 30       | 48             | -       |

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. All emanations from a class B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

#### 4.1.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER                         | MODEL NO. | SERIAL NO.   | CALIBRATED UNTIL |
|--|-----------|--------------|------------------|
| ROHDE & SCHWARZ Test Receiver                      | ESCS30    | 834115/016   | Mar. 3, 2003     |
| ROHDE & SCHWARZ Artificial Mains Network (For EUT) | ESH3-Z5   | 847265/023   | Jan. 10, 2003    |
| * ROHDE & SCHWARZ 4-wire ISN                       | ENY41     | 838119/028   | Dec. 10, 2002    |
| * ROHDE & SCHWARZ 2-wire ISN                       | ENY22     | 837497/018   | Dec. 10, 2002    |
| EMCO L.I.S.N. (For peripherals)                    | 3825/2    | 9504-2359    | July 10, 2002    |
| Software   | Cond-V2L  | NA           | NA               |
| RF cable (JYEBAO)                                  | 5D-FB     | Cable-C03.01 | July 11, 2002    |
| Terminator (For EMCO LISN)                         | NA        | E1-01-300    | Feb. 20, 2003    |
| Terminator (For EMCO LISN)                         | NA        | E1-01-301    | Feb. 20, 2003    |
| Shielded Room                                      | Site 3    | ADT-C03      | NA               |
| VCCI Site Registration No.                         | Site 3    | C-274        | NA               |

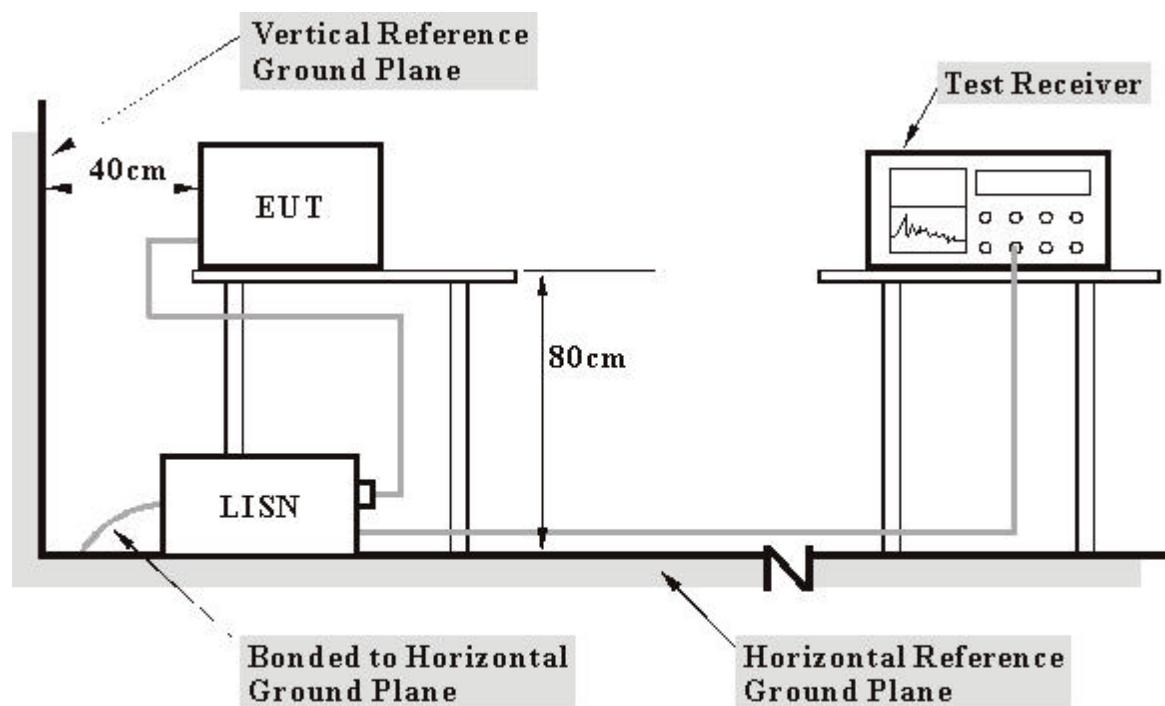
NOTE:

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.
3. “\*”: These equipment are used for conducted telecom port test only (if tested).

#### 4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 450 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported

#### 4.1.4 TEST SETUP



**Note:**

1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 4.1.5 EUT OPERATING CONDITIONS

- a. Placed the EUT (with a computer system) on the testing table.
- b. The computer system sent data to EUT by command "PIN" via an RJ 45 cable.
- c. The computer system sent "H" messages to Color Monitor and Monitor displayed "H" patterns on its screen.
- d. The computer system sent "H" messages to modem.
- e. The computer system sent "H" messages to printer, and the printer prints them on paper.
- f. Prepared another computer system to act as a communication partner and placed it outside of testing area.
- g. The communication partner run a test program to enable EUT under transmission/receiving condition continuously at specific channel frequency via an RJ 45 cable.
- h. The communication partner sent data to EUT by command "PIN".

## 4.1.6 TEST RESULTS

|                                 |                                     |                      |                               |
|---------------------------------|-------------------------------------|----------------------|-------------------------------|
| <b>EUT</b>                      | Broadband DSL/Cable Wireless Router | <b>MODEL</b>         | AF411W,<br>AFN4110W           |
| <b>MODE</b>                     | Channel 1                           | <b>6dB BANDWIDTH</b> | 9 kHz                         |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60Hz                        | <b>PHASE</b>         | Line (L)                      |
| <b>ENVIRONMENTAL CONDITIONS</b> | 20 deg. C, 60 %RH,<br>1005 hPa      |                      | <b>TESTED BY:</b> Bruce Chang |

| No | Freq.<br>(MHz) | Corr.<br>Factor<br>(dB) | Reading Value<br>[dB (uV)] |     | Emission Level<br>[dB (uV)] |     | Limit<br>[dB (uV)] |     | Margin<br>(dB) |     |
|----|----------------|-------------------------|----------------------------|-----|-----------------------------|-----|--------------------|-----|----------------|-----|
|    |                |                         | QP.                        | AV. | QP.                         | AV. | QP.                | AV. | QP.            | AV. |
| 1  | 0.509          | 0.10                    | 34.28                      | -   | 34.38                       | -   | 48.00              | -   | -13.62         | -   |
| 2  | 1.152          | 0.10                    | 32.02                      | -   | 32.12                       | -   | 48.00              | -   | -15.88         | -   |
| 3  | 1.895          | 0.10                    | 34.28                      | -   | 34.38                       | -   | 48.00              | -   | -13.62         | -   |
| 4  | 2.285          | 0.13                    | 36.18                      | -   | 36.31                       | -   | 48.00              | -   | -11.69         | -   |
| 5  | 14.336         | 0.76                    | 24.47                      | -   | 25.23                       | -   | 48.00              | -   | -22.77         | -   |
| 6  | 23.129         | 1.03                    | 26.67                      | -   | 27.70                       | -   | 48.00              | -   | -20.30         | -   |

Remarks: 1. \*\*: Undetectable

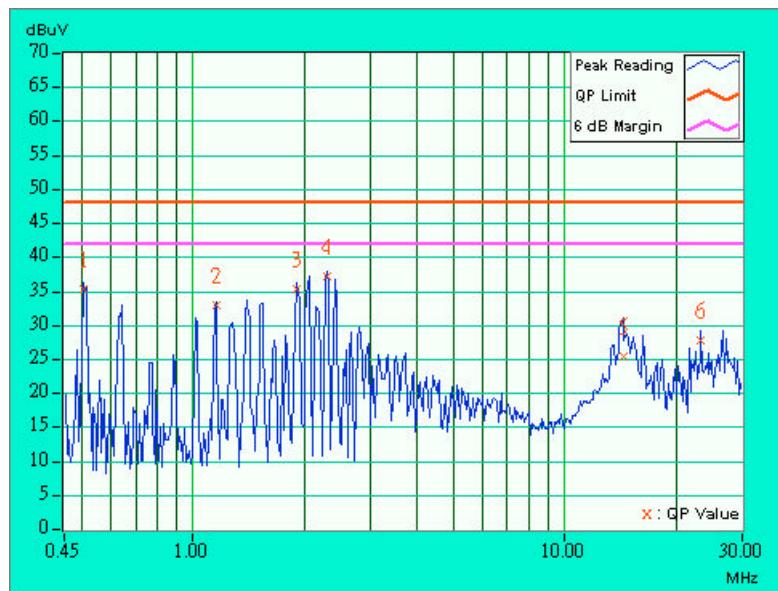
2. QP. and AV. are abbreviations of quasi-peak and average individually.

3. -: NA

4. The emission levels of other frequencies were very low against the limit.

5. Margin value = Emission level - Limit value

6. Emission Level = Correction Factor + Reading Value.



|                                 |                                     |                      |                               |
|---------------------------------|-------------------------------------|----------------------|-------------------------------|
| <b>EUT</b>                      | Broadband DSL/Cable Wireless Router | <b>MODEL</b>         | AF411W,<br>AFN4110W           |
| <b>MODE</b>                     | Channel 1                           | <b>6dB BANDWIDTH</b> | 9 kHz                         |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60Hz                        | <b>PHASE</b>         | Neutral (N)                   |
| <b>ENVIRONMENTAL CONDITIONS</b> | 20 deg. C, 60 %RH,<br>1005 hPa      |                      | <b>TESTED BY:</b> Bruce Chang |

| No | Freq.<br>(MHz) | Corr.<br>Factor<br>(dB) | Reading Value<br>[dB (uV)] |     | Emission Level<br>[dB (uV)] |     | Limit<br>[dB (uV)] |     | Margin<br>(dB) |     |
|----|----------------|-------------------------|----------------------------|-----|-----------------------------|-----|--------------------|-----|----------------|-----|
|    |                |                         | QP.                        | AV. | QP.                         | AV. | QP.                | AV. | QP.            | AV. |
| 1  | 0.513          | 0.10                    | 32.20                      | -   | 32.30                       | -   | 48.00              | -   | -15.70         | -   |
| 2  | 0.638          | 0.10                    | 35.97                      | -   | 36.07                       | -   | 48.00              | -   | -11.93         | -   |
| 3  | 1.012          | 0.10                    | 34.38                      | -   | 34.48                       | -   | 48.00              | -   | -13.52         | -   |
| 4  | 2.285          | 0.13                    | 36.24                      | -   | 36.37                       | -   | 48.00              | -   | -11.63         | -   |
| 5  | 14.699         | 0.59                    | 23.91                      | -   | 24.50                       | -   | 48.00              | -   | -23.50         | -   |
| 6  | 23.129         | 0.76                    | 26.53                      | -   | 27.29                       | -   | 48.00              | -   | -20.71         | -   |

Remarks: 1. "": Undetectable

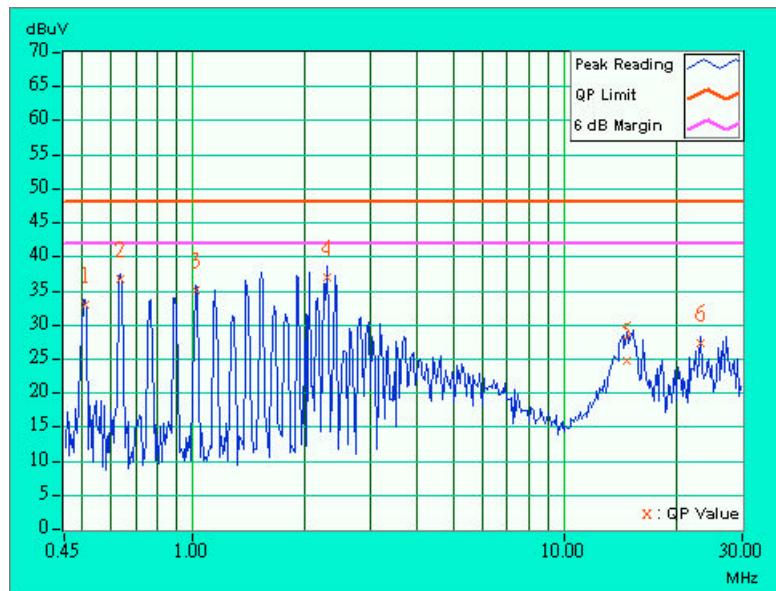
2. QP. and AV. are abbreviations of quasi-peak and average individually.

3. "-": NA

4. The emission levels of other frequencies were very low against the limit.

5. Margin value = Emission level - Limit value

6. Emission Level = Correction Factor + Reading Value.



|                                     |                                     |                      |                               |
|-------------------------------------|-------------------------------------|----------------------|-------------------------------|
| <b>EUT</b>                          | Broadband DSL/Cable Wireless Router | <b>MODEL</b>         | AF411W,<br>AFN4110W           |
| <b>MODE</b>                         | Channel 6                           | <b>6dB BANDWIDTH</b> | 9 kHz                         |
| <b>INPUT POWER<br/>(SYSTEM)</b>     | 120Vac, 60Hz                        | <b>PHASE</b>         | Line (L)                      |
| <b>ENVIRONMENTAL<br/>CONDITIONS</b> | 20 deg. C, 60 %RH,<br>1005 hPa      |                      | <b>TESTED BY:</b> Bruce Chang |

| No | Freq.<br>(MHz) | Corr.<br>Factor<br>(dB) | Reading Value<br>[dB (uV)] |     | Emission Level<br>[dB (uV)] |     | Limit<br>[dB (uV)] |     | Margin<br>(dB) |     |
|----|----------------|-------------------------|----------------------------|-----|-----------------------------|-----|--------------------|-----|----------------|-----|
|    |                |                         | QP.                        | AV. | QP.                         | AV. | QP.                | AV. | QP.            | AV. |
| 1  | 0.516          | 0.10                    | 32.46                      | -   | 32.56                       | -   | 48.00              | -   | -15.44         | -   |
| 2  | 0.641          | 0.10                    | 31.23                      | -   | 31.33                       | -   | 48.00              | -   | -16.67         | -   |
| 3  | 1.148          | 0.10                    | 31.75                      | -   | 31.85                       | -   | 48.00              | -   | -16.15         | -   |
| 4  | 2.254          | 0.13                    | 17.69                      | -   | 17.82                       | -   | 48.00              | -   | -30.18         | -   |
| 5  | 14.211         | 0.75                    | 25.60                      | -   | 26.35                       | -   | 48.00              | -   | -21.65         | -   |
| 6  | 25.875         | 1.12                    | 22.36                      | -   | 23.48                       | -   | 48.00              | -   | -24.52         | -   |

Remarks: 1. "": Undetectable

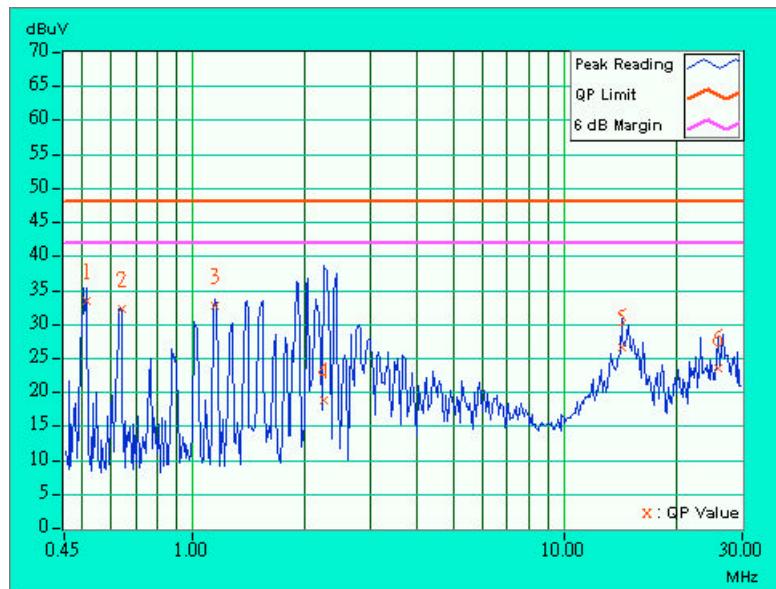
2. QP. and AV. are abbreviations of quasi-peak and average individually.

3. "-": NA

4. The emission levels of other frequencies were very low against the limit.

5. Margin value = Emission level - Limit value

6. Emission Level = Correction Factor + Reading Value.



|                                 |                                     |                      |                               |
|---------------------------------|-------------------------------------|----------------------|-------------------------------|
| <b>EUT</b>                      | Broadband DSL/Cable Wireless Router | <b>MODEL</b>         | AF411W,<br>AFN4110W           |
| <b>MODE</b>                     | Channel 6                           | <b>6dB BANDWIDTH</b> | 9 kHz                         |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60Hz                        | <b>PHASE</b>         | Neutral (N)                   |
| <b>ENVIRONMENTAL CONDITIONS</b> | 20 deg. C, 60 %RH,<br>1005 hPa      |                      | <b>TESTED BY:</b> Bruce Chang |

| No | Freq.<br>(MHz) | Corr.<br>Factor<br>(dB) | Reading Value<br>[dB (uV)] |     | Emission Level<br>[dB (uV)] |     | Limit<br>[dB (uV)] |     | Margin<br>(dB) |     |
|----|----------------|-------------------------|----------------------------|-----|-----------------------------|-----|--------------------|-----|----------------|-----|
|    |                |                         | QP.                        | AV. | QP.                         | AV. | QP.                | AV. | QP.            | AV. |
| 1  | 0.513          | 0.10                    | 32.60                      | -   | 32.70                       | -   | 48.00              | -   | -15.30         | -   |
| 2  | 0.770          | 0.10                    | 32.62                      | -   | 32.72                       | -   | 48.00              | -   | -15.28         | -   |
| 3  | 1.527          | 0.10                    | 35.86                      | -   | 35.96                       | -   | 48.00              | -   | -12.04         | -   |
| 4  | 2.277          | 0.13                    | 36.66                      | -   | 36.79                       | -   | 48.00              | -   | -11.21         | -   |
| 5  | 14.273         | 0.57                    | 25.90                      | -   | 26.47                       | -   | 48.00              | -   | -21.53         | -   |
| 6  | 23.129         | 0.76                    | 26.29                      | -   | 27.05                       | -   | 48.00              | -   | -20.95         | -   |

Remarks: 1. "": Undetectable

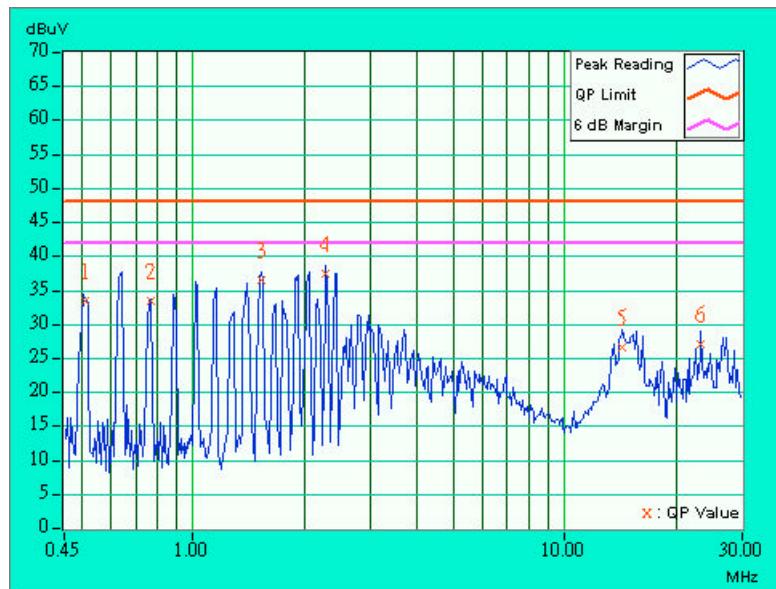
2. QP. and AV. are abbreviations of quasi-peak and average individually.

3. "-": NA

4. The emission levels of other frequencies were very low against the limit.

5. Margin value = Emission level - Limit value

6. Emission Level = Correction Factor + Reading Value.



|                                 |                                     |                      |                               |
|---------------------------------|-------------------------------------|----------------------|-------------------------------|
| <b>EUT</b>                      | Broadband DSL/Cable Wireless Router | <b>MODEL</b>         | AF411W,<br>AFN4110W           |
| <b>MODE</b>                     | Channel 11                          | <b>6dB BANDWIDTH</b> | 9 kHz                         |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60Hz                        | <b>PHASE</b>         | Line (L)                      |
| <b>ENVIRONMENTAL CONDITIONS</b> | 20 deg. C, 60 %RH,<br>1005 hPa      |                      | <b>TESTED BY:</b> Bruce Chang |

| No | Freq.<br>(MHz) | Corr.<br>Factor<br>(dB) | Reading Value<br>[dB (uV)] |     | Emission Level<br>[dB (uV)] |     | Limit<br>[dB (uV)] |     | Margin<br>(dB) |     |
|----|----------------|-------------------------|----------------------------|-----|-----------------------------|-----|--------------------|-----|----------------|-----|
|    |                |                         | QP.                        | AV. | QP.                         | AV. | QP.                | AV. | QP.            | AV. |
| 1  | 0.513          | 0.10                    | 34.45                      | -   | 34.55                       | -   | 48.00              | -   | -13.45         | -   |
| 2  | 0.641          | 0.10                    | 31.21                      | -   | 31.31                       | -   | 48.00              | -   | -16.69         | -   |
| 3  | 1.387          | 0.10                    | 30.82                      | -   | 30.92                       | -   | 48.00              | -   | -17.08         | -   |
| 4  | 2.289          | 0.13                    | 35.40                      | -   | 35.53                       | -   | 48.00              | -   | -12.47         | -   |
| 5  | 14.207         | 0.75                    | 21.57                      | -   | 22.32                       | -   | 48.00              | -   | -25.68         | -   |
| 6  | 23.129         | 1.03                    | 26.63                      | -   | 27.66                       | -   | 48.00              | -   | -20.34         | -   |

Remarks: 1. "": Undetectable

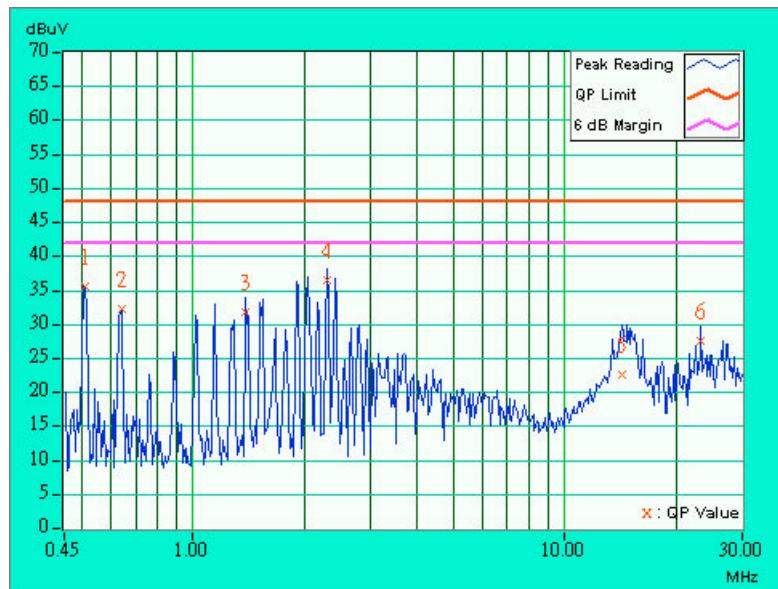
2. QP. and AV. are abbreviations of quasi-peak and average individually.

3. "-": NA

4. The emission levels of other frequencies were very low against the limit.

5. Margin value = Emission level - Limit value

6. Emission Level = Correction Factor + Reading Value.



|                                     |                                     |                      |                               |
|-------------------------------------|-------------------------------------|----------------------|-------------------------------|
| <b>EUT</b>                          | Broadband DSL/Cable Wireless Router | <b>MODEL</b>         | AF411W,<br>AFN4110W           |
| <b>MODE</b>                         | Channel 11                          | <b>6dB BANDWIDTH</b> | 9 kHz                         |
| <b>INPUT POWER<br/>(SYSTEM)</b>     | 120Vac, 60Hz                        | <b>PHASE</b>         | Neutral (N)                   |
| <b>ENVIRONMENTAL<br/>CONDITIONS</b> | 20 deg. C, 60 %RH,<br>1005 hPa      |                      | <b>TESTED BY:</b> Bruce Chang |

| No | Freq.<br>[MHz] | Corr.<br>Factor<br>(dB) | Reading Value<br>[dB (uV)] |     | Emission Level<br>[dB (uV)] |     | Limit<br>[dB (uV)] |     | Margin<br>(dB) |     |
|----|----------------|-------------------------|----------------------------|-----|-----------------------------|-----|--------------------|-----|----------------|-----|
|    |                |                         | QP.                        | AV. | QP.                         | AV. | QP.                | AV. | QP.            | AV. |
| 1  | 0.505          | 0.10                    | 32.94                      | -   | 33.04                       | -   | 48.00              | -   | -14.96         | -   |
| 2  | 0.638          | 0.10                    | 36.06                      | -   | 36.16                       | -   | 48.00              | -   | -11.84         | -   |
| 3  | 1.016          | 0.10                    | 34.62                      | -   | 34.72                       | -   | 48.00              | -   | -13.28         | -   |
| 4  | 2.055          | 0.11                    | 35.41                      | -   | 35.52                       | -   | 48.00              | -   | -12.48         | -   |
| 5  | 14.215         | 0.57                    | 23.89                      | -   | 24.46                       | -   | 48.00              | -   | -23.54         | -   |
| 6  | 23.129         | 0.76                    | 26.53                      | -   | 27.29                       | -   | 48.00              | -   | -20.71         | -   |

Remarks: 1. "": Undetectable

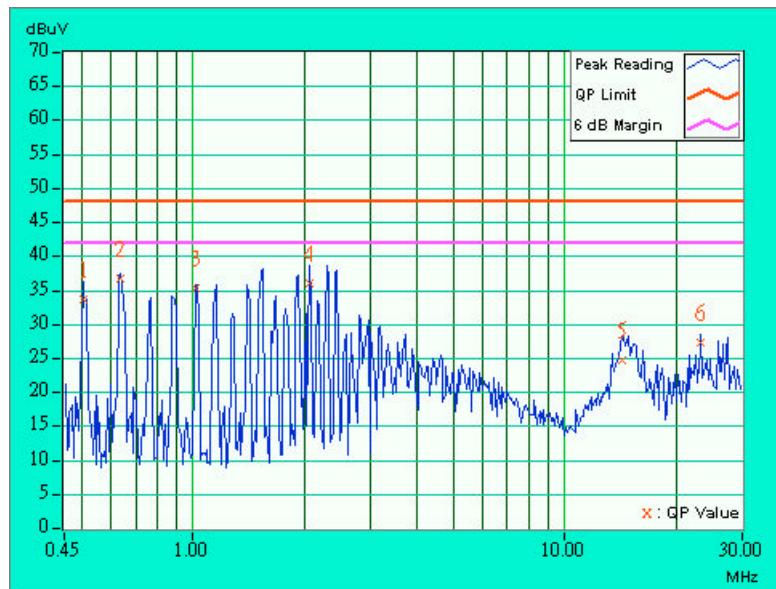
2. QP. and AV. are abbreviations of quasi-peak and average individually.

3. "-": NA

4. The emission levels of other frequencies were very low against the limit.

5. Margin value = Emission level - Limit value

6. Emission Level = Correction Factor + Reading Value.



## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Field strength limits are at the distance of 3 meters, emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

| Frequencies<br>(MHz) | Field Strength of Fundamental |        |
|----------------------|-------------------------------|--------|
|                      | uV/m                          | dBuV/m |
| 30-88                | 100                           | 40.0   |
| 88-216               | 150                           | 43.5   |
| 216-960              | 200                           | 46.0   |
| Above 960            | 500                           | 54.0   |

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

#### 4.2.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER         | MODEL NO.   | SERIAL NO.               | CALIBRATED UNTIL |
|------------------------------------|---|--------------------------|------------------|
| * HP Spectrum Analyzer             | 8590L   | 3544A01176               | May 14, 2003     |
| * HP Preamplifier                  | 8447D   | 2944A08485               | Oct. 30, 2002    |
| * HP Preamplifier                  | 8449B   | 3008A01201               | Dec. 06, 2002    |
| * HP Preamplifier                  | 8449B   | 3008A01292               | Aug. 21, 2002    |
| * ROHDE & SCHWARZ TEST RECEIVER    | ESMI  | 839013/007<br>839379/002 | Jan. 27, 2003    |
| SCHWARZBECK Tunable Dipole Antenna | VHA 9103<br>UHA 9105                              | E101051<br>E101055       | Nov. 23, 2002    |
| * CHASE BILOG Antenna              | CBL6112A  | 2221                     | Aug. 2, 2002     |
| * SCHWARZBECK Horn Antenna         | BBHA9120-D1                                       | D130                     | July 6, 2002     |
| * EMCO Horn Antenna                | 3115  | 9312-4192                | April 8, 2003    |
| * EMCO Turn Table                  | 1060  | 1115                     | NA               |
| * SHOSHIN Tower                    | AP-4701   | A6Y005                   | NA               |
| * Software                         | AS61D4  | NA                       | NA               |
| * ANRITSU RF Switches              | MP59B   | M35046                   | Aug. 2, 2002     |
| * TIMES RF cable                   | LMR-600   | CABLE-ST5-01             | Aug. 2, 2002     |
| * Antenna (Horn)                   | BBHA9120-D  | D130                     | July 10, 2002    |
| Open Field Test Site               | Site 5  | ADT-R05                  | July 28, 2002    |
| VCCI Site Registration No.         | Site 5  | R-1039                   | NA               |
| Site Registration No.              | FCC: 90422<br>Canada IC: IC 3789<br>VCCI : R-1039 |                          |                  |

**NOTE:**

1. The measurement uncertainty is less than +/- 3.0dB, 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.
3. \*\* = These equipments are used for the final measurement.

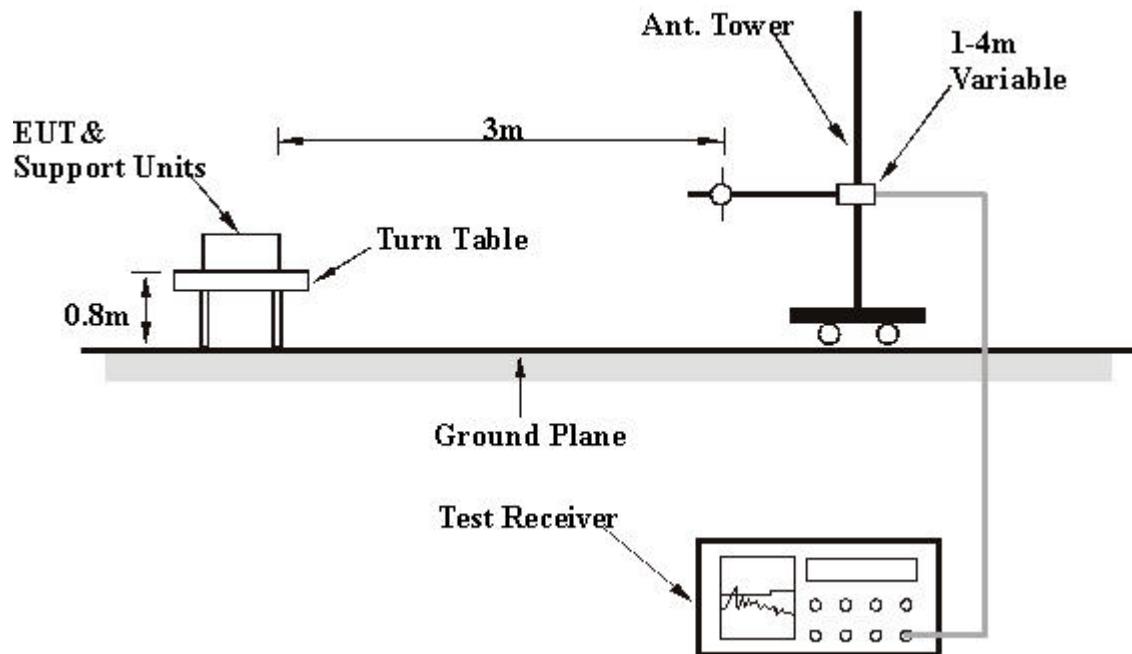
#### 4.2.3 TEST PROCEDURES

- 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 polarizations 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 the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 300 Hz for Average detection (AV) at frequency above 1GHz.

#### 4.2.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 4.2.5 EUT OPERATING CONDITIONS

Same as 4.1.5.

## 4.2.6 TEST RESULTS

|                                     |  |                              |                     |
|-------------------------------------|--|------------------------------|---------------------|
| <b>EUT</b>                          | Broadband DSL/Cable<br>Wireless Router | <b>MODEL</b>                 | AF411W,<br>AFN4110W |
| <b>MODE</b>                         | Channel 11                             | <b>FREQUENCY<br/>RANGE</b>   | 30-1000 MHz         |
| <b>INPUT POWER<br/>(SYSTEM)</b>     | 120Vac, 60Hz                           | <b>DETECTOR<br/>FUNCTION</b> | Quasi-Peak          |
| <b>ENVIRONMENTAL<br/>CONDITIONS</b> | 20deg. C, 70%RH,<br>1005 hPa           | <b>TESTED BY:</b>            | Gary Chang          |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                             |                         |                            |                                |
|---|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|-----------------------------|-------------------------|----------------------------|--------------------------------|
| No.   | Freq.<br>(MHz) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Factor<br>(dB) | Pre-Amp.<br>Factor<br>(dB) | Correction<br>Factor<br>(dB/m) |
| 1   | 150.00         | 37.0 QP                       | 43.50             | -6.50          | 2.81H                    | 356                        | 25.49                  | 10.30                       | 1.20                    | 0.00                       | -11.51                         |
| 2   | 250.00         | 38.4 QP                       | 46.00             | -7.60          | 1.45H                    | 336                        | 24.71                  | 12.02                       | 1.66                    | 0.00                       | -13.69                         |
| 3   | 400.00         | 34.0 QP                       | 46.00             | -12.00         | 1.05H                    | 296                        | 15.65                  | 16.11                       | 2.24                    | 0.00                       | -18.35                         |
| 4   | 528.00         | 34.0 QP                       | 46.00             | -12.00         | 1.70H                    | 166                        | 13.78                  | 17.62                       | 2.60                    | 0.00                       | -20.22                         |
| 5   | 650.00         | 35.0 QP                       | 46.00             | -11.00         | 1.43H                    | 353                        | 12.75                  | 19.23                       | 3.02                    | 0.00                       | -22.25                         |
| 6   | 725.00         | 34.2 QP                       | 46.00             | -11.80         | 1.27H                    | 173                        | 11.23                  | 19.76                       | 3.21                    | 0.00                       | -22.97                         |
| 7   | 748.50         | 35.0 QP                       | 46.00             | -11.00         | 1.17H                    | 4                          | 11.60                  | 20.14                       | 3.26                    | 0.00                       | -23.41                         |
| 8   | 750.00         | 39.0 QP                       | 46.00             | -7.00          | 1.19H                    | 7                          | 15.56                  | 20.18                       | 3.26                    | 0.00                       | -23.44                         |
| 9   | 800.00         | 33.0 QP                       | 46.00             | -13.00         | 1.41H                    | 61                         | 8.99                   | 20.69                       | 3.32                    | 0.00                       | -24.02                         |
| 10  | 850.00         | 34.0 QP                       | 46.00             | -12.00         | 1.52H                    | 356                        | 10.02                  | 20.48                       | 3.50                    | 0.00                       | -23.98                         |
| 11  | 875.00         | 34.6 QP                       | 46.00             | -11.40         | 1.40H                    | 185                        | 10.43                  | 20.63                       | 3.54                    | 0.00                       | -24.17                         |
| 12  | 950.00         | 33.0 QP                       | 46.00             | -13.00         | 1.10H                    | 210                        | 8.01                   | 21.20                       | 3.79                    | 0.00                       | -25.00                         |

**NOTE:**

- 1 Emission level = Raw Value - Correction Factor
- 2 Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss  
(External Preamp. Gain = 0, when the test receiver is used for the test.)
- 3 The other emission levels were very low against the limit.
- 4 Margin value = Emission level - Limit value

|                                     |  |                              |                     |
|-------------------------------------|--|------------------------------|---------------------|
| <b>EUT</b>                          | Broadband DSL/Cable<br>Wireless Router | <b>MODEL</b>                 | AF411W,<br>AFN4110W |
| <b>MODE</b>                         | Channel 11                             | <b>FREQUENCY<br/>RANGE</b>   | 30-1000 MHz         |
| <b>INPUT POWER<br/>(SYSTEM)</b>     | 120Vac, 60Hz                           | <b>DETECTOR<br/>FUNCTION</b> | Quasi-Peak          |
| <b>ENVIRONMENTAL<br/>CONDITIONS</b> | 20deg. C, 70%RH,<br>1005 hPa           | <b>TESTED BY:</b>            | Gary Chang          |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                |                               |                   |                |                          |                            |                        |                             |                         |                            |                                |
|---|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|-----------------------------|-------------------------|----------------------------|--------------------------------|
| No.   | Freq.<br>(MHz) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Factor<br>(dB) | Pre-Amp.<br>Factor<br>(dB) | Correction<br>Factor<br>(dB/m) |
| 1   | 125.00         | 33.4 QP                       | 43.50             | -10.10         | 1.31V                    | 241                        | 20.83                  | 11.47                       | 1.10                    | 0.00                       | -12.57                         |
| 2   | 150.00         | 41.2 QP                       | 43.50             | -2.30          | 1.07V                    | 248                        | 29.69                  | 10.30                       | 1.20                    | 0.00                       | -11.52                         |
| 3   | 250.00         | 38.0 QP                       | 46.00             | -8.00          | 1.02V                    | 208                        | 24.31                  | 12.02                       | 1.66                    | 0.00                       | -13.70                         |
| 4   | 375.00         | 32.4 QP                       | 46.00             | -13.60         | 1.77V                    | 88                         | 15.13                  | 15.13                       | 2.14                    | 0.00                       | -17.28                         |
| 5   | 396.00         | 30.0 QP                       | 46.00             | -16.00         | 1.39V                    | 222                        | 11.82                  | 15.96                       | 2.22                    | 0.00                       | -18.18                         |
| 6   | 500.00         | 35.0 QP                       | 46.00             | -11.00         | 1.11V                    | 308                        | 15.24                  | 17.26                       | 2.50                    | 0.00                       | -19.76                         |
| 7   | 528.00         | 29.0 QP                       | 46.00             | -17.00         | 1.24V                    | 108                        | 8.78                   | 17.62                       | 2.60                    | 0.00                       | -20.23                         |
| 8   | 650.00         | 32.3 QP                       | 46.00             | -13.70         | 1.94V                    | 196                        | 10.05                  | 19.23                       | 3.02                    | 0.00                       | -22.25                         |
| 9   | 750.00         | 41.0 QP                       | 46.00             | -5.00          | 1.06V                    | 156                        | 17.56                  | 20.18                       | 3.26                    | 0.00                       | -23.45                         |

**NOTE:**

- 1 Emission level = Raw Value - Correction Factor
- 2 Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss  
(External Preamp. Gain = 0, when the test receiver is used for the test.)
- 3 The other emission levels were very low against the limit.
- 4 Margin value = Emission level - Limit value

|                                     |  |                              |                          |
|-------------------------------------|--|------------------------------|--------------------------|
| <b>EUT</b>                          | Broadband DSL/Cable<br>Wireless Router | <b>MODEL</b>                 | AF411W,<br>AFN4110W      |
| <b>MODE</b>                         | Channel 1                              | <b>FREQUENCY<br/>RANGE</b>   | Above 1000 MHz           |
| <b>INPUT POWER<br/>(SYSTEM)</b>     | 120Vac, 60Hz                           | <b>DETECTOR<br/>FUNCTION</b> | Peak(PK)<br>Average (AV) |
| <b>ENVIRONMENTAL<br/>CONDITIONS</b> | 20deg. C, 70%RH,<br>1005 hPa           | <b>TESTED BY:</b> Gary Chang |                          |

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

| No. | Freq.<br>(MHz) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Factor<br>(dB) | Pre-Amp.<br>Factor<br>(dB) | Correction<br>Factor<br>(dB/m) |
|-----|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|-----------------------------|-------------------------|----------------------------|--------------------------------|
| 1   | 2038.00        | 45.8 PK                       | 74.00             | -28.20         | 1.65H                    | 17                         | 50.60                  | 25.20                       | 4.86                    | 34.90                      | 4.84                           |
| 2   | *2413.00       | 89.2 AV                       |                   |                | 1.42H                    | 356                        | 57.00                  | 27.11                       | 5.10                    | 0.00                       | -32.21                         |
| 3   | *2413.00       | 97.0 PK                       |                   |                | 1.42H                    | 356                        | 64.80                  | 27.11                       | 5.10                    | 0.00                       | -32.21                         |
| 4   | 4076.00        | 47.7 PK                       | 74.00             | -26.30         | 1.17H                    | 353                        | 45.30                  | 30.13                       | 6.78                    | 34.52                      | -2.39                          |
| 5   | 6114.00        | 49.2 PK                       | 74.00             | -24.80         | 1.43H                    | 46                         | 42.80                  | 32.80                       | 8.23                    | 34.60                      | -6.44                          |

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

| No. | Freq.<br>(MHz) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Factor<br>(dB) | Pre-Amp.<br>Factor<br>(dB) | Correction<br>Factor<br>(dB/m) |
|-----|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|-----------------------------|-------------------------|----------------------------|--------------------------------|
| 1   | 2038.00        | 47.3 PK                       | 74.00             | -26.70         | 1.39V                    | 327                        | 52.10                  | 25.20                       | 4.86                    | 34.90                      | 4.84                           |
| 2   | *2412.00       | 103.0 PK                      |                   |                | 2.22V                    | 337                        | 70.80                  | 27.11                       | 5.10                    | 0.00                       | -32.21                         |
| 3   | *2412.00       | 95.7 AV                       |                   |                | 2.22V                    | 72                         | 63.50                  | 27.11                       | 5.10                    | 0.00                       | -32.21                         |
| 4   | 4076.00        | 47.2 PK                       | 74.00             | -26.80         | 1.14V                    | 13                         | 44.80                  | 30.13                       | 6.78                    | 34.52                      | -2.39                          |
| 5   | 6113.00        | 49.1 PK                       | 74.00             | -24.90         | 1.29V                    | 334                        | 42.70                  | 32.80                       | 8.23                    | 34.60                      | -6.43                          |

**NOTE:**

1. Emission level = Raw Value - Correction Factor
2. Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss  
(External Preamp. Gain = 0, when the test receiver is used for the test.)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value
5. The limit value is defined as per 15.247
6. “\*”: Fundamental frequency

|                                     |  |                              |                          |
|-------------------------------------|--|------------------------------|--------------------------|
| <b>EUT</b>                          | Broadband DSL/Cable<br>Wireless Router | <b>MODEL</b>                 | AF411W,<br>AFN4110W      |
| <b>MODE</b>                         | Channel 6                              | <b>FREQUENCY<br/>RANGE</b>   | Above 1000 MHz           |
| <b>INPUT POWER<br/>(SYSTEM)</b>     | 120Vac, 60Hz                           | <b>DETECTOR<br/>FUNCTION</b> | Peak(PK)<br>Average (AV) |
| <b>ENVIRONMENTAL<br/>CONDITIONS</b> | 20deg. C, 70%RH,<br>1005 hPa           | <b>TESTED BY:</b>            | Gary Chang               |

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

| No. | Freq.<br>(MHz) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Factor<br>(dB) | Pre-Amp.<br>Factor<br>(dB) | Correction<br>Factor<br>(dB/m) |
|-----|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|-----------------------------|-------------------------|----------------------------|--------------------------------|
| 1   | 2063.00        | 46.7 PK                       | 74.00             | -27.30         | 1.62H                    | 4                          | 51.25                  | 25.41                       | 4.96                    | 34.90                      | 4.53                           |
| 2   | *2437.00       | 97.3 PK                       |                   |                | 1.41H                    | 307                        | 64.90                  | 27.33                       | 5.08                    | 0.00                       | -32.40                         |
| 3   | *2437.00       | 93.9 AV                       |                   |                | 1.41H                    | 354                        | 61.50                  | 27.33                       | 5.08                    | 0.00                       | -32.40                         |
| 4   | 4125.80        | 47.4 PK                       | 74.00             | -26.60         | 1.20H                    | 297                        | 44.90                  | 30.32                       | 6.70                    | 34.56                      | -2.46                          |
| 5   | 6188.00        | 50.4 PK                       | 74.00             | -23.60         | 1.40H                    | 212                        | 43.90                  | 33.14                       | 8.01                    | 34.60                      | -6.55                          |

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

| No. | Freq.<br>(MHz) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Factor<br>(dB) | Pre-Amp.<br>Factor<br>(dB) | Correction<br>Factor<br>(dB/m) |
|-----|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|-----------------------------|-------------------------|----------------------------|--------------------------------|
| 1   | 2063.00        | 47.3 PK                       | 74.00             | -26.70         | 1.55V                    | 331                        | 51.80                  | 25.41                       | 4.96                    | 34.90                      | 4.53                           |
| 2   | *2437.00       | 95.3 AV                       |                   |                | 1.87V                    | 301                        | 62.90                  | 27.33                       | 5.08                    | 0.00                       | -32.40                         |
| 3   | *2437.00       | 104.0 PK                      |                   |                | 1.87V                    | 170                        | 71.60                  | 27.33                       | 5.08                    | 0.00                       | -32.40                         |
| 4   | 4125.60        | 47.4 PK                       | 74.00             | -26.60         | 1.52V                    | 95                         | 44.90                  | 30.32                       | 6.70                    | 34.56                      | -2.46                          |
| 5   | 6188.00        | 50.1 PK                       | 74.00             | -23.90         | 1.29V                    | 237                        | 43.60                  | 33.14                       | 8.01                    | 34.60                      | -6.55                          |

**NOTE:**

1. Emission level = Raw Value - Correction Factor
2. Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss  
(External Preamp. Gain = 0, when the test receiver is used for the test.)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value
5. The limit value is defined as per 15.247
6. “\*”: Fundamental frequency

|                                     |  |                              |                          |
|-------------------------------------|--|------------------------------|--------------------------|
| <b>EUT</b>                          | Broadband DSL/Cable<br>Wireless Router | <b>MODEL</b>                 | AF411W,<br>AFN4110W      |
| <b>MODE</b>                         | Channel 11                             | <b>FREQUENCY<br/>RANGE</b>   | Above 1000 MHz           |
| <b>INPUT POWER<br/>(SYSTEM)</b>     | 120Vac, 60Hz                           | <b>DETECTOR<br/>FUNCTION</b> | Peak(PK)<br>Average (AV) |
| <b>ENVIRONMENTAL<br/>CONDITIONS</b> | 20deg. C, 70%RH,<br>1005 hPa           | <b>TESTED BY:</b>            | Bunny Yao                |

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

| No. | Freq.<br>(MHz) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Factor<br>(dB) | Pre-Amp.<br>Factor<br>(dB) | Correction<br>Factor<br>(dB/m) |
|-----|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|-----------------------------|-------------------------|----------------------------|--------------------------------|
| 1   | 2088.00        | 46.2 PK                       | 74.00             | -27.80         | 1.75H                    | 356                        | 50.50                  | 25.62                       | 5.02                    | 34.90                      | 4.26                           |
| 2   | *2462.00       | 96.7 PK                       |                   |                | 1.44H                    | 150                        | 64.30                  | 27.33                       | 5.08                    | 0.00                       | -32.41                         |
| 3   | *2462.00       | 95.1 AV                       |                   |                | 1.44H                    | 4                          | 62.68                  | 27.33                       | 5.08                    | 0.00                       | -32.40                         |
| 4   | 2499.00        | 45.6 PK                       | 74.00             | -28.40         | 1.44H                    | 358                        | 47.90                  | 27.54                       | 5.06                    | 34.90                      | 2.32                           |
| 5   | 4176.00        | 37.2 AV                       | 54.00             | -16.80         | 1.81H                    | 28                         | 34.70                  | 30.41                       | 6.68                    | 34.58                      | -2.51                          |
| 6   | 4176.00        | 43.2 PK                       | 74.00             | -30.80         | 1.46H                    | 195                        | 40.70                  | 30.41                       | 6.68                    | 34.58                      | -2.51                          |
| 7   | 6263.00        | 49.8 PK                       | 74.00             | -24.20         | 1.14H                    | 11                         | 42.80                  | 33.48                       | 8.13                    | 34.60                      | -7.01                          |

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

| No. | Freq.<br>(MHz) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Factor<br>(dB) | Pre-Amp.<br>Factor<br>(dB) | Correction<br>Factor<br>(dB/m) |
|-----|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|-----------------------------|-------------------------|----------------------------|--------------------------------|
| 1   | 2088.00        | 47.7 PK                       | 74.00             | -26.30         | 1.54V                    | 6                          | 52.00                  | 25.62                       | 5.02                    | 34.90                      | 4.26                           |
| 2   | *2462.00       | 103.1 PK                      |                   |                | 1.78V                    | 355                        | 70.70                  | 27.33                       | 5.08                    | 0.00                       | -32.40                         |
| 3   | *2462.00       | 95.8 AV                       |                   |                | 1.78V                    | 355                        | 63.40                  | 27.33                       | 5.08                    | 0.00                       | -32.40                         |
| 4   | 2499.00        | 50.3 PK                       | 74.00             | -23.70         | 1.43V                    | 5                          | 52.60                  | 27.54                       | 5.06                    | 34.90                      | 2.31                           |
| 5   | 4176.00        | 48.1 PK                       | 74.00             | -25.90         | 2.11V                    | 346                        | 45.60                  | 30.41                       | 6.68                    | 34.58                      | -2.51                          |
| 6   | 6263.00        | 49.3 PK                       | 74.00             | -24.70         | 1.30V                    | 74                         | 42.30                  | 33.48                       | 8.13                    | 34.60                      | -7.01                          |

**NOTE:**

1. Emission level= Raw Value - Correction Factor
2. Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss  
(External Preamp. Gain = 0, when the test receiver is used for the test.)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value
5. The limit value is defined as per 15.247
6. “\*”: Fundamental frequency

## 4.3 6dB BANDWIDTH MEASUREMENT

### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

### 4.3.2 TEST INSTRUMENTS

| Description & Manufacturer | Model No. | Serial No. | Calibrated Until |
|----------------------------|-----------|------------|------------------|
| R&S SPECTRUM ANALYZER      | FSEK30    | 100049     | July 17, 2002    |

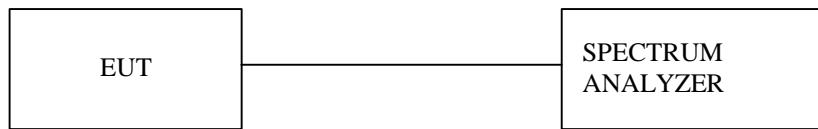
**NOTE:**

- 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.

#### 4.3.3 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 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.

#### 4.3.4 TEST SETUP



#### 4.3.5 EUT OPERATING CONDITIONS

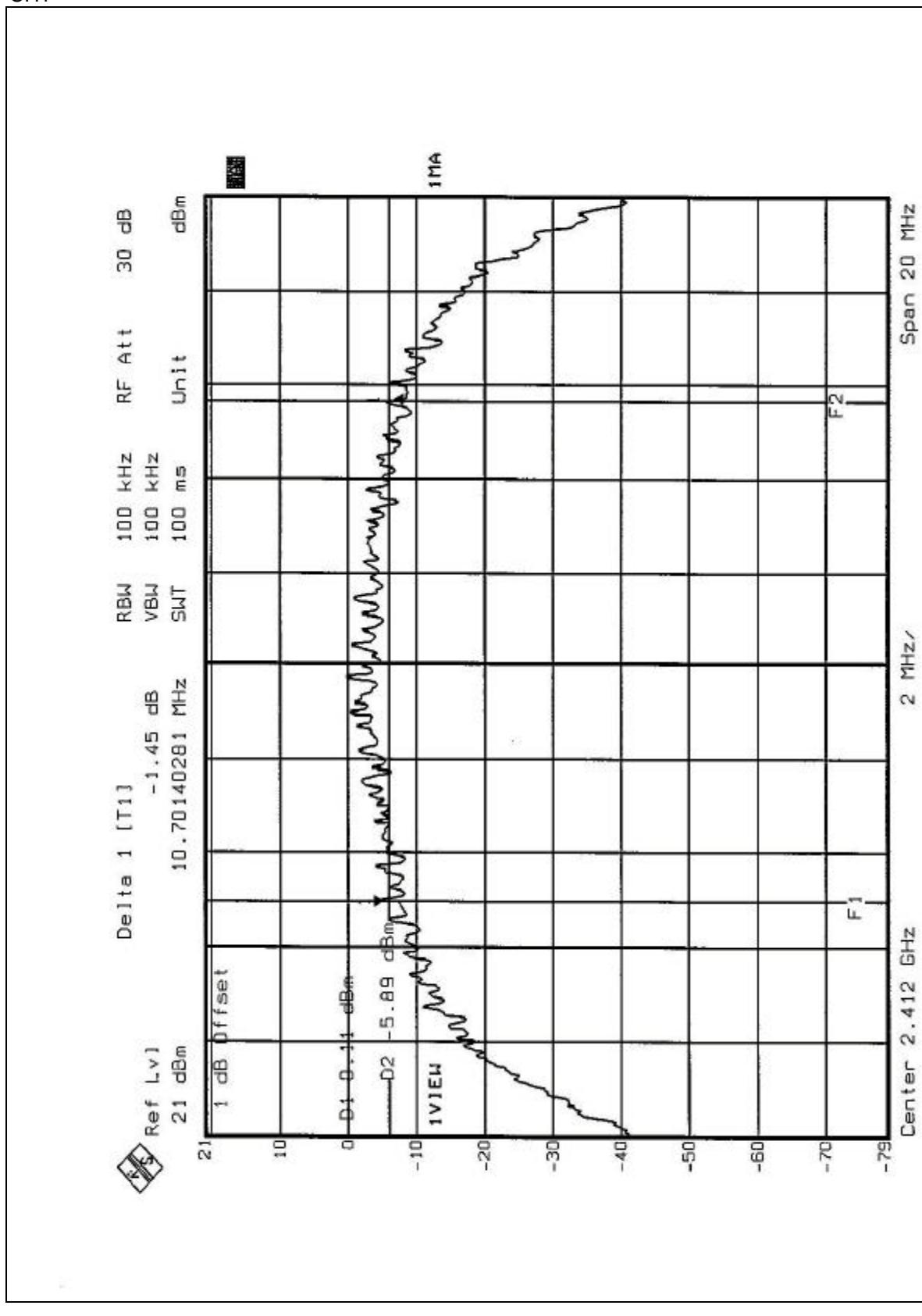
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

## 4.3.6 TEST RESULTS

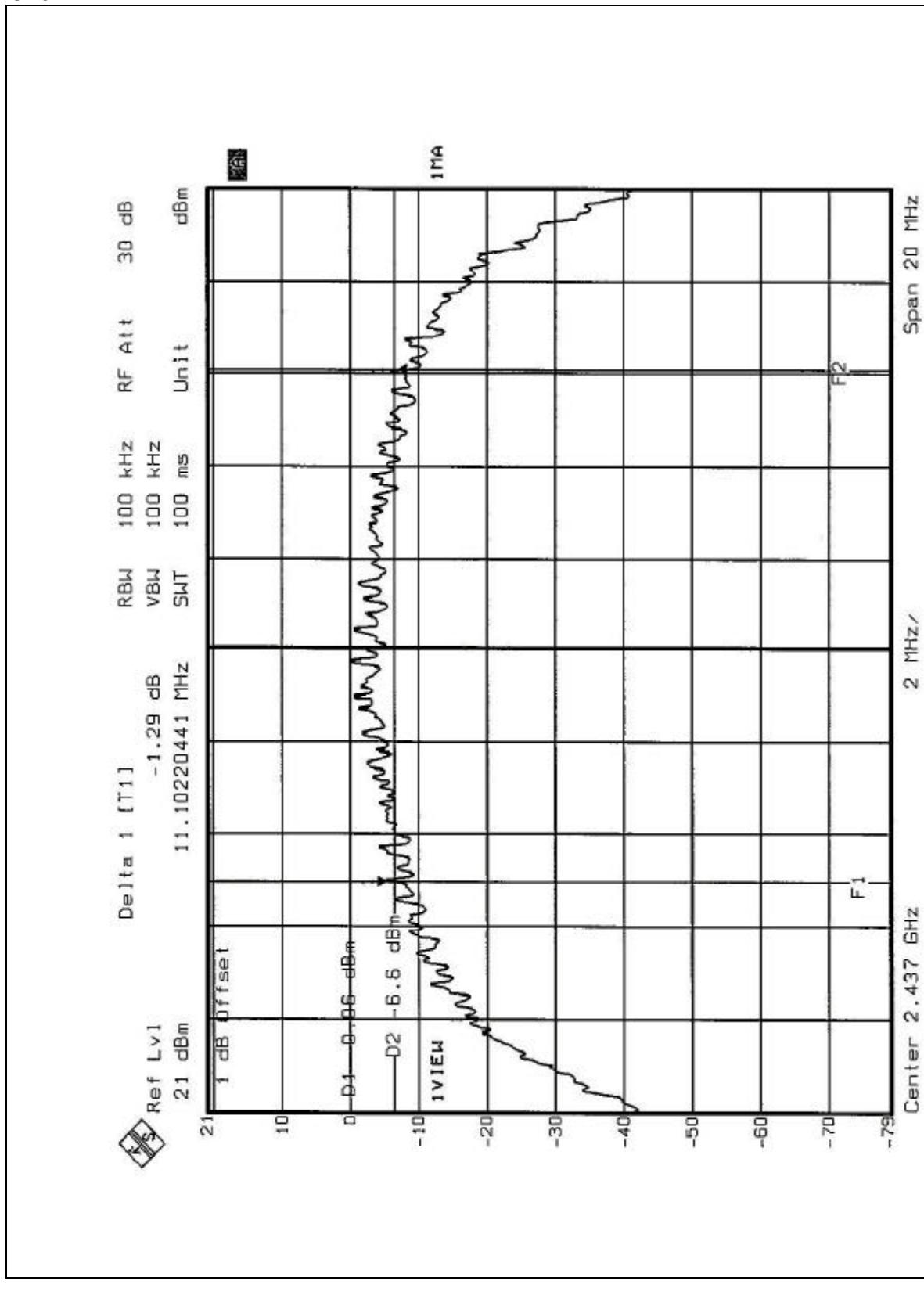
|                                 |  |                                     |                                |
|---------------------------------|--|-------------------------------------|--------------------------------|
| <b>EUT</b>                      | Broadband DSL/Cable<br>Wireless Router | <b>MODEL</b>                        | AF411W, AFN4110W               |
| <b>INPUT POWER<br/>(SYSTEM)</b> | 120Vac, 60Hz                           | <b>ENVIRONMENTAL<br/>CONDITIONS</b> | 20 deg. C, 50 %RH,<br>1005 hPa |
| <b>TESTED BY:</b> Steven Lu     |  |                                     |                                |

| CHANNEL | CHANNEL<br>FREQUENCY<br>(MHz) | 6 dB BANDWIDTH<br>(MHz) | MINIMUM LIMIT<br>(MHz) | PASS/FAIL |
|---------|-------------------------------|-------------------------|------------------------|-----------|
| 1       | 2412                          | 10.70                   | 0.5                    | PASS      |
| 6       | 2437                          | 11.10                   | 0.5                    | PASS      |
| 11      | 2462                          | 10.38                   | 0.5                    | PASS      |

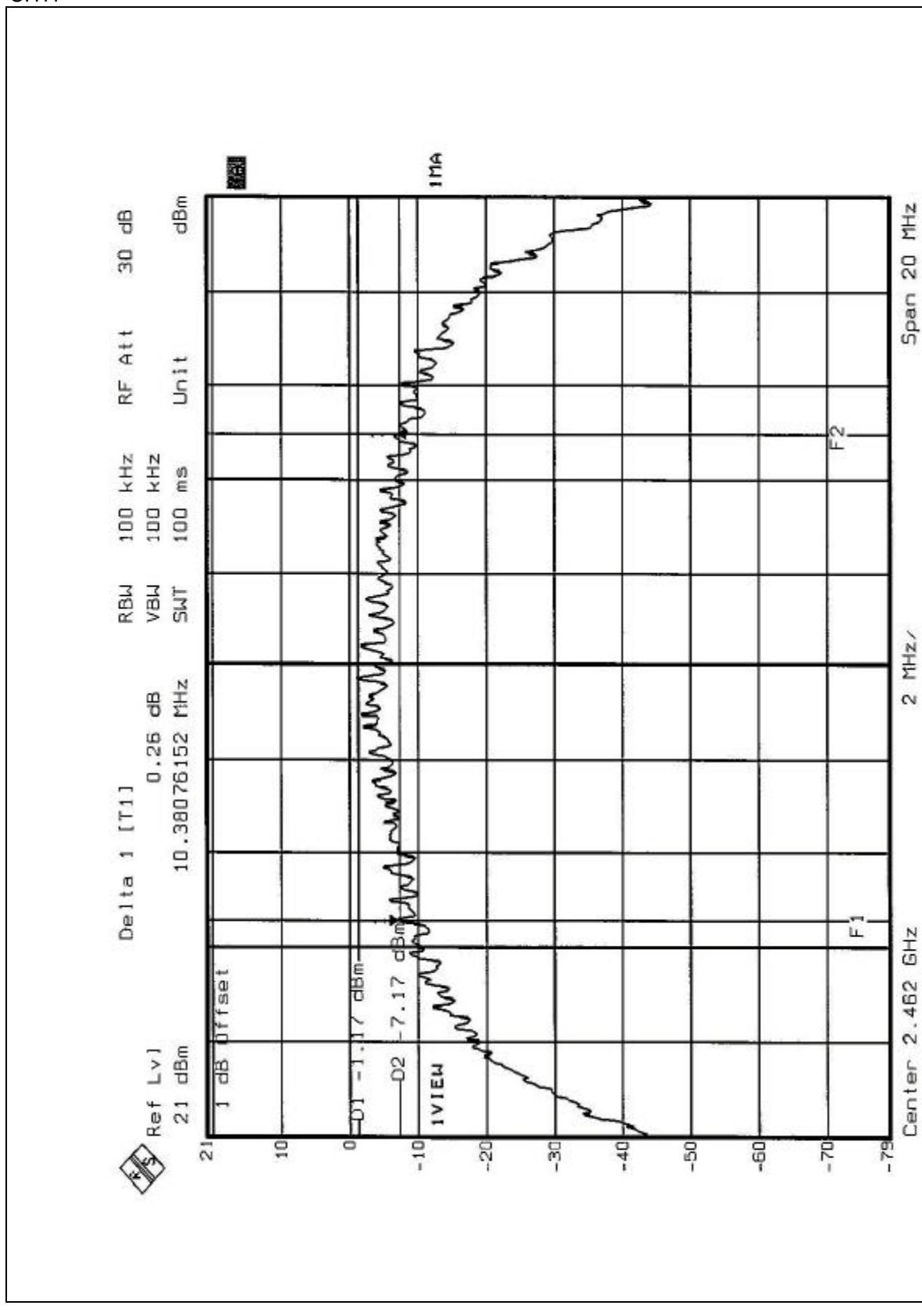
CH1



CH6



CH11



#### 4.4 MAXIMUM PEAK OUTPUT POWER

##### 4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

##### 4.4.2 INSTRUMENTS

| Description & Manufacturer | Model No. | Serial No. | Calibrated Until |
|----------------------------|-----------|------------|------------------|
| PEAK POWER SENSOR          | NRV-Z32   | 100013     | Feb. 21, 2003    |
| POWER METER                | NRVS      | 100026     | Feb. 21, 2003    |

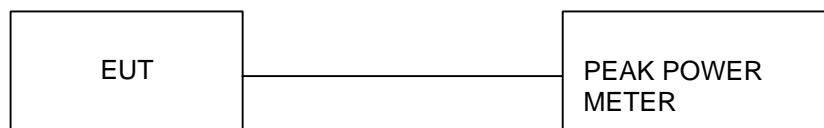
**NOTE:**

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.

#### 4.4.3 TEST PROCEDURES

The transmitter output was connected to the peak power meter.

#### 4.4.4 TEST SETUP



#### 4.4.5 EUT OPERATING CONDITIONS

Same as Item 3.4.5



## 4.4.6 TEST RESULTS

|                             |                                     |                                 |                             |
|-----------------------------|-------------------------------------|---------------------------------|-----------------------------|
| <b>EUT</b>                  | Broadband DSL/Cable Wireless Router | <b>MODEL</b>                    | AF411W, AFN4110W            |
| <b>INPUT POWER (SYSTEM)</b> | 120Vac, 60Hz                        | <b>ENVIRONMENTAL CONDITIONS</b> | 20 deg. C, 50 %RH, 1005 hPa |
| <b>TESTED BY:</b> Steven Lu |                                     |                                 |                             |

| CHANNEL | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (dBm) | PEAK POWER LIMIT (dBm) | PASS/FAIL |
|---------|-------------------------|-------------------------|------------------------|-----------|
| 1       | 2412                    | 10.33                   | 30                     | PASS      |
| 6       | 2437                    | 10.52                   | 30                     | PASS      |
| 11      | 2462                    | 9.35                    | 30                     | PASS      |

## 4.5 POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 4.5.2 TEST INSTRUMENTS

| Description & Manufacturer | Model No. | Serial No. | Calibrated Until |
|----------------------------|-----------|------------|------------------|
| R&S SPECTRUM ANALYZER      | FSEK30    | 100049     | July 17, 2002    |

**NOTE:**

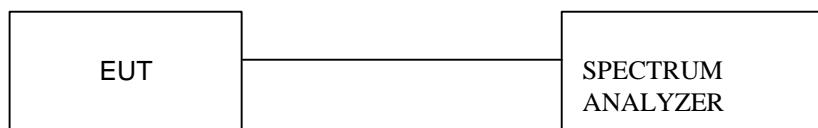
1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

#### 4.5.3 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 3 kHz RBW and 30 kHz VBW, set sweep time = span/3 kHz. The power spectral density was measured and recorded.

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

#### 4.5.4 TEST SETUP



#### 4.5.5 EUT OPERATING CONDITION

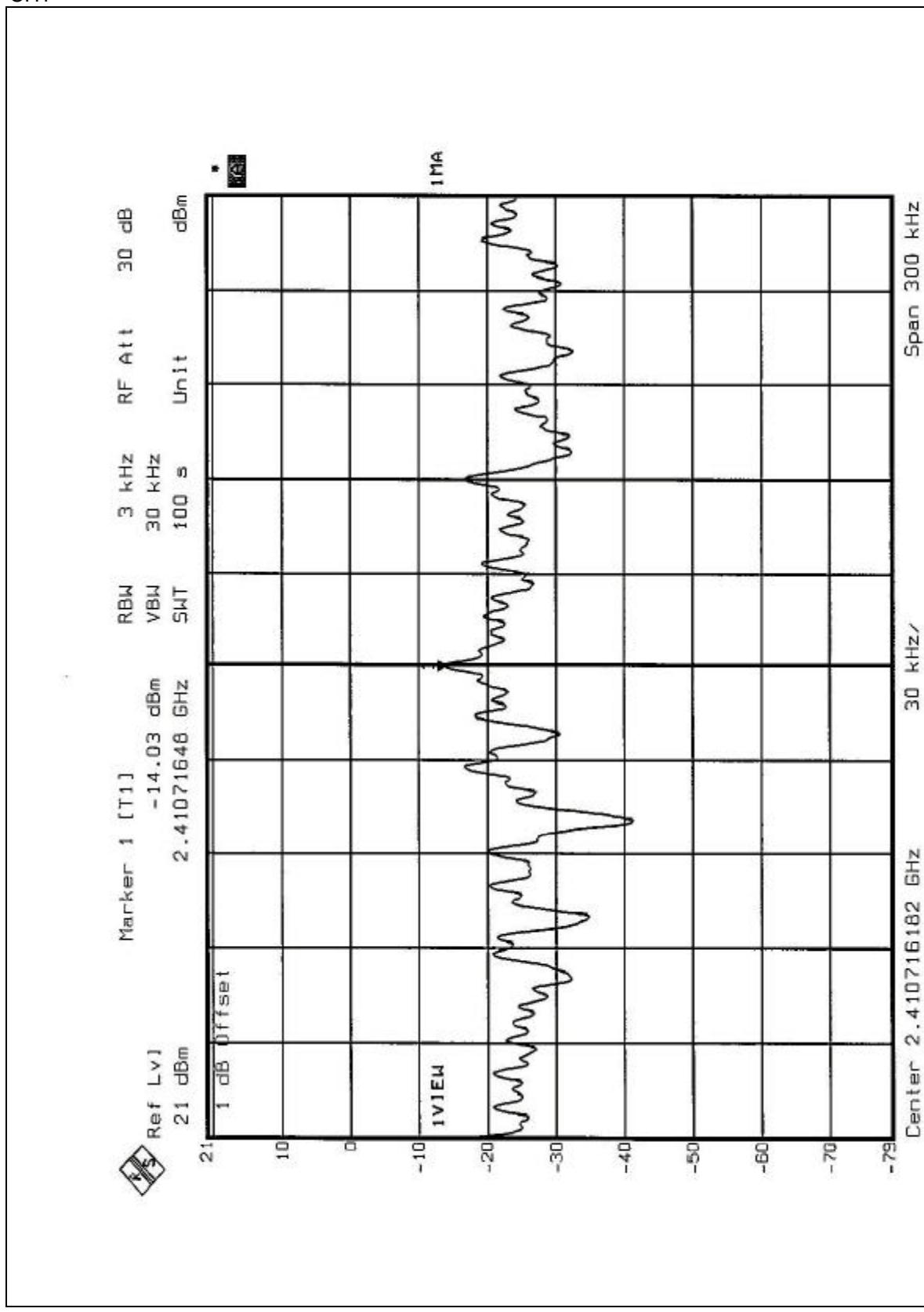
Same as Item 3.4.5

## 4.5.6 TEST RESULTS

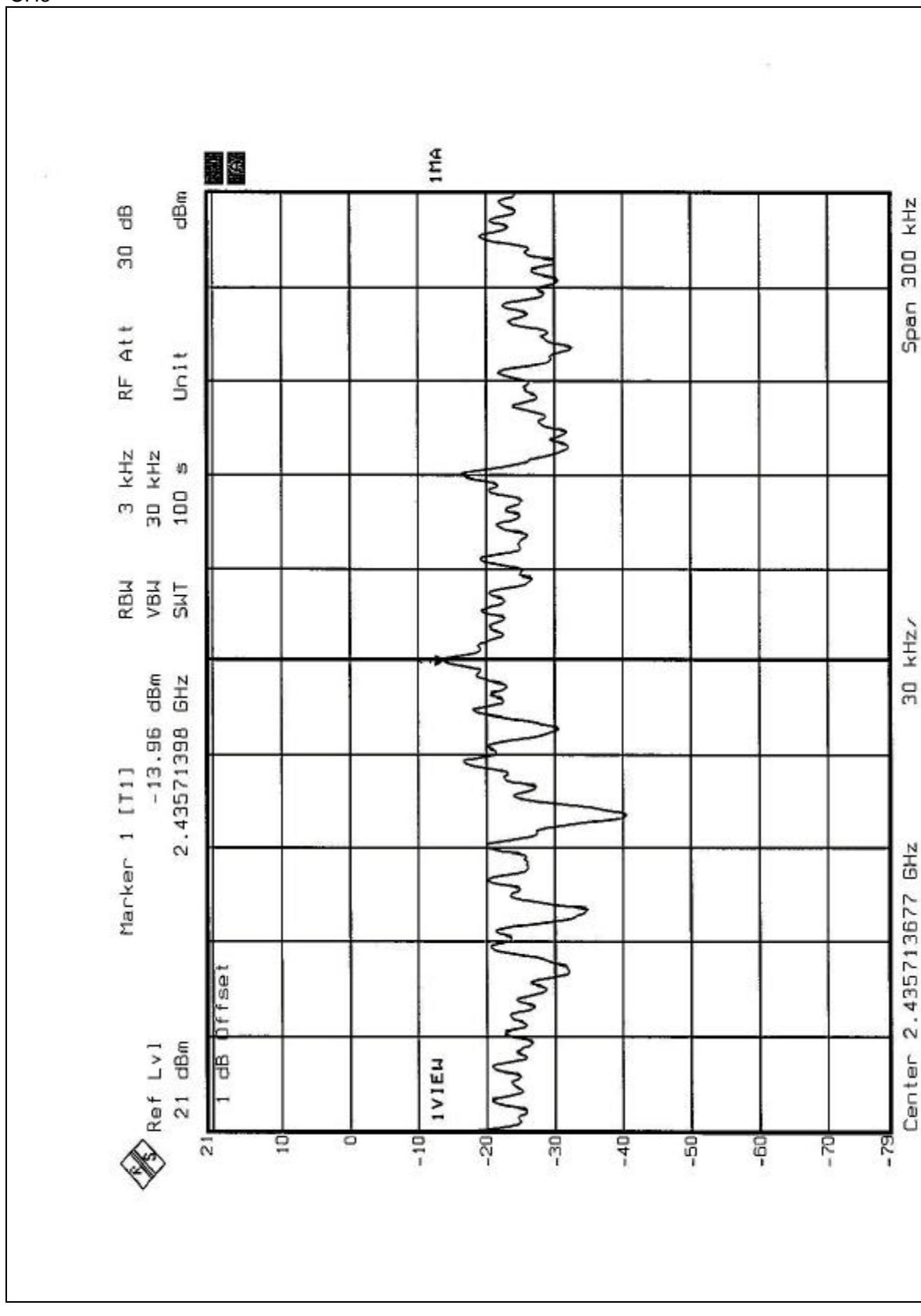
|                                 |  |                                     |                                |
|---------------------------------|--|-------------------------------------|--------------------------------|
| <b>EUT</b>                      | Broadband DSL/Cable<br>Wireless Router | <b>MODEL</b>                        | AF411W, AFN4110W               |
| <b>INPUT POWER<br/>(SYSTEM)</b> | 120Vac, 60Hz                           | <b>ENVIRONMENTAL<br/>CONDITIONS</b> | 20 deg. C, 50 %RH,<br>1005 hPa |
| <b>TESTED BY:</b> Steven Lu     |  |                                     |                                |

| CHANNEL<br>NUMBER | CHANNEL<br>FREQUENCY<br>(MHz) | RF POWER LEVEL<br>IN 3 kHz BW<br>(dBm) | MAXIMUM<br>LIMIT<br>(dBm) | PASS/FAIL |
|-------------------|-------------------------------|--|---------------------------|-----------|
| 1                 | 2412                          | -14.03                                 | 8                         | PASS      |
| 6                 | 2437                          | -13.96                                 | 8                         | PASS      |
| 11                | 2462                          | -14.68                                 | 8                         | PASS      |

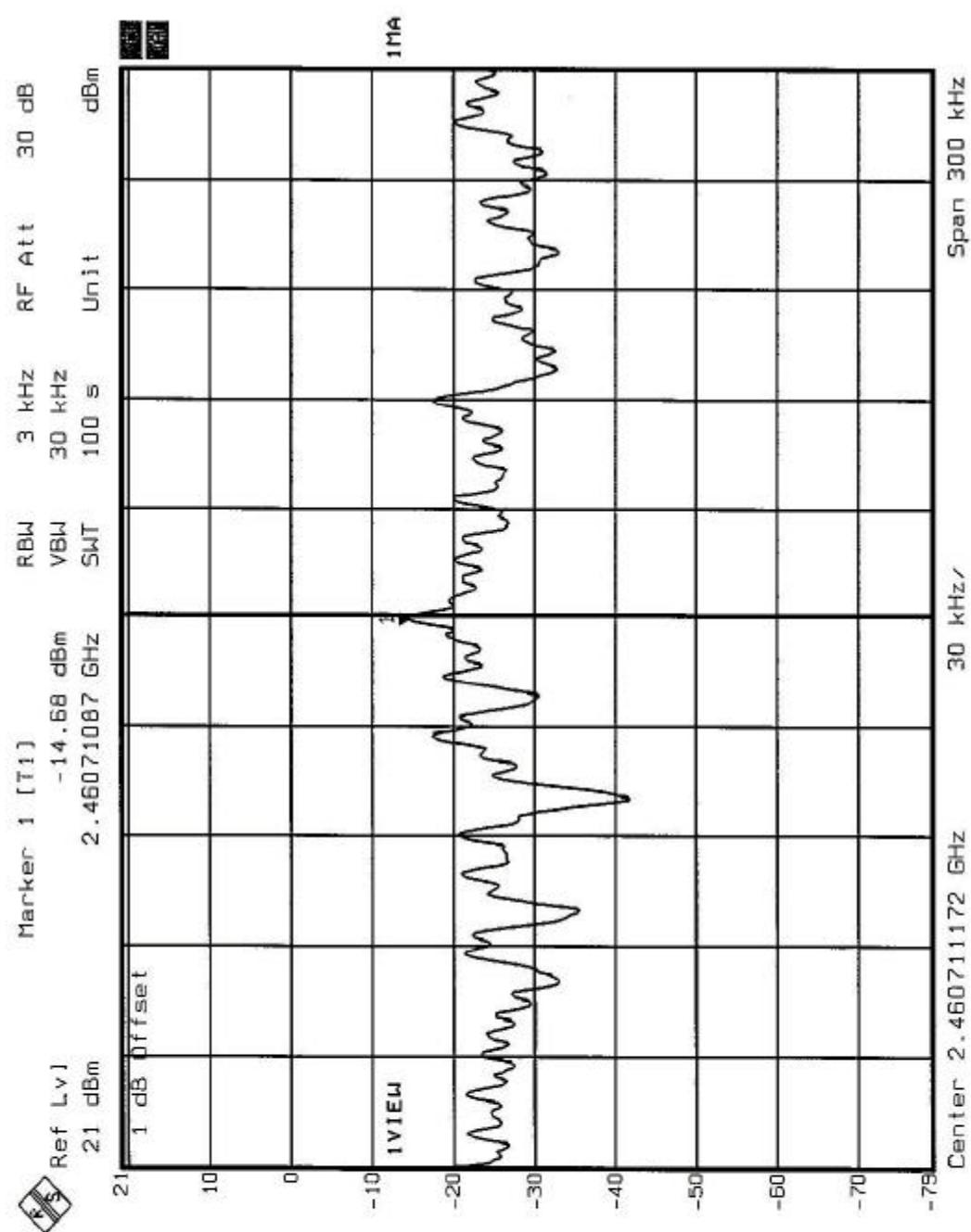
CH1



CH6



CH11



## 4.6 BAND EDGES MEASUREMENT

### 4.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100KHz Resolution Bandwidth).

### 4.6.2 TEST INSTRUMENTS

| Description & Manufacturer | Model No. | Serial No. | Calibrated Until |
|----------------------------|-----------|------------|------------------|
| R&S SPECTRUM ANALYZER      | FSEK30    | 100049     | July 17, 2002    |

#### 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.

### 4.6.3 TEST PROCEDURE

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

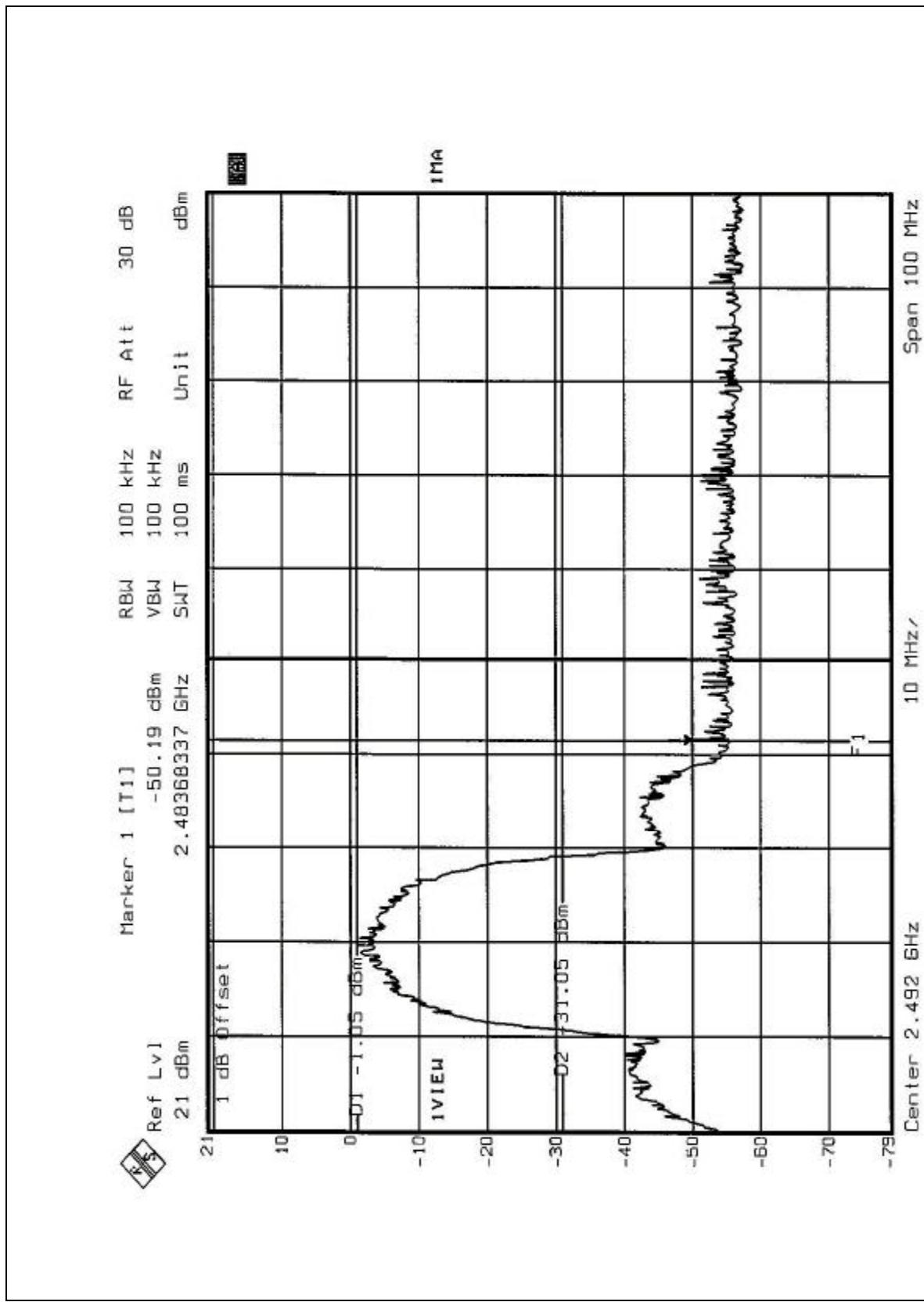
#### 4.6.4 EUT OPERATING CONDITION

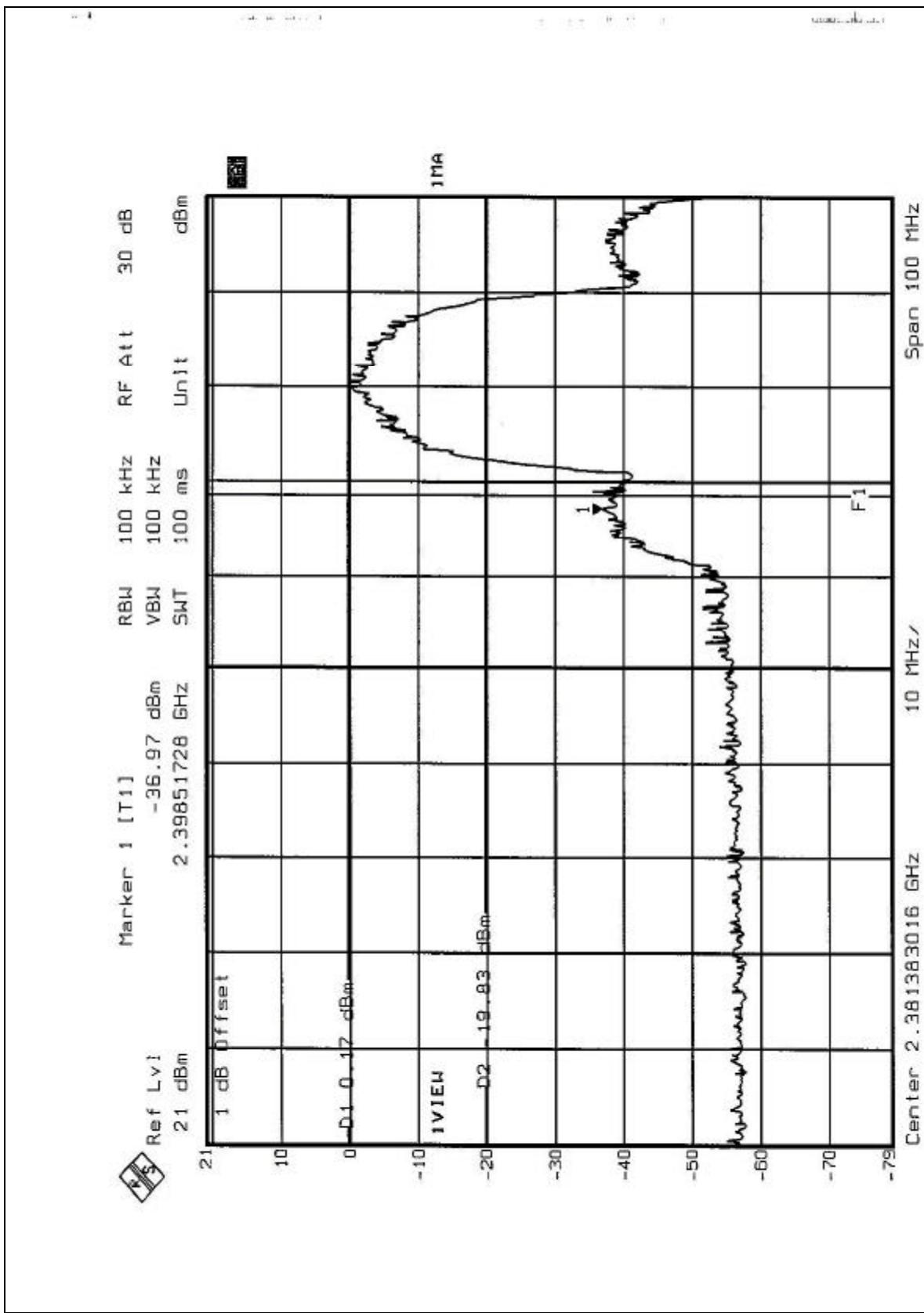
Same as Item 3.4.5

#### 4.6.5 TEST RESULTS

The spectrum plots are attached on the following 2 pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

**NOTE:** The band edge emission plot on the following 2 pages shows 49.14dB delta between carrier maximum power and local maximum emission in restrict band (2.4837GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.6 (Page 26) is 95.8dB<sub>u</sub>V/m, so the maximum field strength in restrict band is  $95.8 - 49.14 = 46.66$ dB<sub>u</sub>V/m which is under 54 dB<sub>u</sub>V/m limit.





## 4.7 ANTENNA REQUIREMENT

### 4.7.1 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.

### 4.7.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is Dipole Antenna. The antenna connector is Reversed SMA. And the maximum Gain of this antenna is only 1dBi.

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

### CONDUCTED EMISSION TEST



## RADIATED EMISSION TEST





## 6 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

|                    |                 |
|--------------------|-----------------|
| <b>USA</b>         | FCC, NVLAP, UL  |
| <b>Germany</b>     | TUV Rheinland   |
| <b>Japan</b>       | VCCI            |
| <b>New Zealand</b> | MoC             |
| <b>Norway</b>      | NEMKO           |
| <b>R.O.C.</b>      | BSMI, DGT, CNLA |

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site:

[www.adt.com.tw/index.5/phtml](http://www.adt.com.tw/index.5/phtml).

If you have any comments, please feel free to contact us at the following:

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Fax: 886-2-26052943

**Hsin Chu EMC Lab:**  
Tel: 886-35-935343  
Fax: 886-35-935342

**Lin Kou Safety Lab:**  
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Fax: 886-2-26093184

**Lin Kou RF&Telecom Lab**  
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Fax: 886-3-3270892

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**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

The address and road map of all our labs can be found in our web site also.