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# FCC TEST REPORT

**REPORT NO.:** RF980505H05

**MODEL NO.:** SMART CPE

**RECEIVED:** May 07, 2009

**TESTED:** May 18 to June 01, 2009

**ISSUED:** June 02, 2009

**APPLICANT:** AirLink WiFi Networking Corp.

**ADDRESS:** 19F-1 Room A , No.97, Sec 4, Chung Hsin Rd., San Chung City, Taipei Hsien 241,Taiwan

**ISSUED BY:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

**LAB ADDRESS:** No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

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## Table of Contents

|       |  |    |
|-------|--|----|
| 1.    | CERTIFICATION .....                                      | 4  |
| 2.    | SUMMARY OF TEST RESULTS .....                            | 5  |
| 2.1   | MEASUREMENT UNCERTAINTY.....                             | 6  |
| 3.    | GENERAL INFORMATION.....                                 | 7  |
| 3.1   | GENERAL DESCRIPTION OF EUT .....                         | 7  |
| 3.2   | DESCRIPTION OF TEST MODES .....                          | 8  |
| 3.2.1 | TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL: ..... | 9  |
| 3.3   | GENERAL DESCRIPTION OF APPLIED STANDARDS .....           | 11 |
| 3.4   | DESCRIPTION OF SUPPORT UNITS.....                        | 12 |
| 3.5   | CONFIGURATION OF SYSTEM UNDER TEST.....                  | 12 |
| 4.    | TEST TYPES AND RESULTS .....                             | 13 |
| 4.1   | CONDUCTED EMISSION MEASUREMENT.....                      | 13 |
| 4.1.1 | LIMITS OF CONDUCTED EMISSION MEASUREMENT .....           | 13 |
| 4.1.2 | TEST INSTRUMENTS .....                                   | 13 |
| 4.1.3 | TEST PROCEDURES.....                                     | 14 |
| 4.1.4 | DEVIATION FROM TEST STANDARD .....                       | 14 |
| 4.1.5 | TEST SETUP .....   | 15 |
| 4.1.6 | EUT OPERATING CONDITIONS .....                           | 15 |
| 4.1.7 | TEST RESULTS .....                                       | 16 |
| 4.2   | RADIATED EMISSION MEASUREMENT .....                      | 18 |
| 4.2.1 | LIMITS OF RADIATED EMISSION MEASUREMENT.....             | 18 |
| 4.2.2 | TEST INSTRUMENTS .....                                   | 19 |
| 4.2.3 | TEST PROCEDURES.....                                     | 20 |
| 4.2.4 | DEVIATION FROM TEST STANDARD .....                       | 21 |
| 4.2.5 | TEST SETUP .....   | 21 |
| 4.2.6 | EUT OPERATING CONDITIONS .....                           | 21 |
| 4.2.7 | TEST RESULTS .....                                       | 22 |
| 4.3   | 6dB BANDWIDTH MEASUREMENT .....                          | 37 |
| 4.3.1 | LIMITS OF 6dB BANDWIDTH MEASUREMENT.....                 | 37 |
| 4.3.2 | TEST INSTRUMENTS.....                                    | 37 |
| 4.3.3 | TEST PROCEDURE.....                                      | 38 |
| 4.3.4 | DEVIATION FROM TEST STANDARD .....                       | 38 |
| 4.3.5 | TEST SETUP .....   | 38 |
| 4.3.6 | EUT OPERATING CONDITIONS .....                           | 38 |
| 4.3.7 | TEST RESULTS .....                                       | 39 |
| 4.4   | MAXIMUM PEAK OUTPUT POWER.....                           | 43 |
| 4.4.1 | LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT .....    | 43 |
| 4.4.2 | INSTRUMENTS.....   | 43 |
| 4.4.3 | TEST PROCEDURES.....                                     | 44 |
| 4.4.4 | DEVIATION FROM TEST STANDARD .....                       | 44 |



|       |  |    |
|-------|--|----|
| 4.4.5 | TEST SETUP .....   | 44 |
| 4.4.6 | EUT OPERATING CONDITIONS .....   | 44 |
| 4.4.7 | TEST RESULTS .....   | 45 |
| 4.5   | POWER SPECTRAL DENSITY MEASUREMENT.....  | 46 |
| 4.5.1 | LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....                                       | 46 |
| 4.5.2 | TEST INSTRUMENTS .....   | 46 |
| 4.5.3 | TEST PROCEDURE.....  | 47 |
| 4.5.4 | DEVIATION FROM TEST STANDARD .....   | 47 |
| 4.5.5 | TEST SETUP .....   | 47 |
| 4.5.6 | EUT OPERATING CONDITION.....   | 47 |
| 4.5.7 | TEST RESULTS .....   | 48 |
| 4.6   | CONDUCTED OUT-BAND EMISSION MEASUREMENT .....  | 52 |
| 4.6.1 | LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT.....                                   | 52 |
| 4.6.2 | TEST INSTRUMENTS .....   | 52 |
| 4.6.3 | TEST PROCEDURE.....  | 52 |
| 4.6.4 | DEVIATION FROM TEST STANDARD .....   | 53 |
| 4.6.5 | EUT OPERATING CONDITION.....   | 53 |
| 4.6.6 | TEST RESULTS .....   | 53 |
| 4.7   | ANTENNA REQUIREMENT.....   | 58 |
| 4.7.1 | STANDARD APPLICABLE .....  | 58 |
| 4.7.2 | ANTENNA CONNECTED CONSTRUCTION .....   | 58 |
| 5.    | INFORMATION ON THE TESTING LABORATORIES .....  | 59 |
| 6.    | APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB ..... | 60 |



## 1. CERTIFICATION

**PRODUCT:** Smart CPE High Power USB Adaptor  
**BRAND NAME:** AirLinkWiFi.Net  
**MODEL NO.:** SMART CPE  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**TESTED:** May 18 to June 01, 2009  
**APPLICANT:** AirLink WiFi Networking Corp.  
**STANDARDS:** FCC Part 15, Subpart C (Section 15.247),  
ANSI C63.4-2003

The above equipment (Model: SMART CPE) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**PREPARED BY** : Carol Liao , **DATE:** June 02, 2009  
( Carol Liao, Specialist )

**TECHNICAL ACCEPTANCE** : Hank Chung , **DATE:** June 02, 2009  
Responsible for RF ( Hank Chung, Deputy Manager )

**APPROVED BY** : May Chen , **DATE:** June 02, 2009  
(May Chen, Deputy Manager )



## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| <b>APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.247)</b> |  |               |   |
|--|--|---------------|---|
| <b>Standard Section</b>  | <b>Test Type and Limit</b>   | <b>Result</b> | <b>Remark</b>   |
| 15.207   | AC Power Conducted Emission  | PASS          | Meet the requirement of limit.<br>Minimum passing margin is -15.70dB at 0.326MHz and 0.296MHz |
| 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(d)  | Radiated Emissions<br>Limit: Table 15.209  | PASS          | Meet the requirement of limit.<br>Minimum passing margin is -0.66dB at 2483.50MHz             |
| 15.247(e)  | Power Spectral Density<br>Limit: max. 8dBm   | PASS          | Meet the requirement of limit.  |
| 15.247(d)  | Band Edge Measurement<br>Limit: 20dB less than the peak value of fundamental frequency | PASS          | Meet the requirement of limit.  |



## 2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

| <b>Measurement</b>                | <b>Value</b> |
|-----------------------------------|--------------|
| Conducted emissions               | 2.44 dB      |
| Radiated emissions (30MHz-1GHz)   | 3.94 dB      |
| Radiated emissions (1GHz -18GHz)  | 2.49 dB      |
| Radiated emissions (18GHz -40GHz) | 2.70 dB      |



### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|                              |   |
|------------------------------|---|
| <b>PRODUCT</b>               | Smart CPE High Power USB Adaptor  |
| <b>MODEL NO.</b>             | SMART CPE   |
| <b>FCC ID</b>                | XF4SMARTCPE   |
| <b>POWER SUPPLY</b>          | DC 5 V from host equipment  |
| <b>MODULATION TYPE</b>       | CCK, DQPSK, DBPSK for DSSS<br>64QAM, 16QAM, QPSK, BPSK for OFDM                   |
| <b>MODULATION TECHNOLOGY</b> | DSSS, OFDM  |
| <b>TRANSFER RATE</b>         | 802.11b: 11 / 5.5 / 2 / 1Mbps<br>802.11g: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps |
| <b>OPERATING FREQUENCY</b>   | 2412 ~ 2462MHz  |
| <b>MAXIMUM OUTPUT POWER</b>  | 802.11b: 50.234mW<br>802.11g: 91.201mW  |
| <b>ANTENNA TYPE</b>          | Panel antenna with 6dBi antenna gain  |
| <b>DATA CABLE</b>            | USB cable (Shielded, 2.3m)  |
| <b>INTERFACE</b>             | USB   |

**NOTE:**

1. The EUT was pre-tested in chamber under the following modes:

| Test Mode | Description                 |
|-----------|-----------------------------|
| Mode A    | Level-set (Put on tabletop) |
| Mode B    | Tower-set (Wall-mounted)    |

From the above modes, the worst radiated emission level was found in **Mode B**.

Therefore only the test data of the mode was recorded in this report individually.

2. The EUT, operates in the 2.4GHz frequency range, lets you connect IEEE 802.11g or IEEE 802.11b devices to the network. With its high-speed data transmissions of up to 54Mbps.
3. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.



### 3.2 DESCRIPTION OF TEST MODES

Eleven channels are provided for 802.11b, 802.11g:

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





### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

| EUT CONFIGURE MODE | APPLICABLE TO |         |         |      | DESCRIPTION |
|--------------------|---------------|---------|---------|------|-------------|
|                    | PLC           | RE < 1G | RE ≥ 1G | APCM |             |
| -                  | √             | √       | √       | √    | -           |

Where **PLC**: Power Line Conducted Emission      **RE < 1G**: Radiated Emission below 1GHz  
**RE ≥ 1G**: Radiated Emission above 1GHz      **APCM**: Antenna Port Conducted Measurement

#### **POWER LINE CONDUCTED EMISSION TEST:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| MODE    | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|---------|-------------------|----------------|-----------------------|-----------------|------------------|
| 802.11b | 1 to 11           | 1              | DSSS                  | DBPSK           | 1                |

#### **RADIATED EMISSION TEST (BELOW 1 GHz):**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| MODE    | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|---------|-------------------|----------------|-----------------------|-----------------|------------------|
| 802.11b | 1 to 11           | 1              | DSSS                  | DBPSK           | 1                |

**RADIATED EMISSION TEST (ABOVE 1 GHz):**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| MODE    | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|---------|-------------------|----------------|-----------------------|-----------------|------------------|
| 802.11b | 1 to 11           | 1, 6, 11       | DSSS                  | DBPSK           | 1                |
| 802.11g | 1 to 11           | 1, 6, 11       | OFDM                  | BPSK            | 6                |

**BANDEDGE MEASUREMENT:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| MODE    | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|---------|-------------------|----------------|-----------------------|-----------------|------------------|
| 802.11b | 1 to 11           | 1, 11          | DSSS                  | DBPSK           | 1                |
| 802.11g | 1 to 11           | 1, 11          | OFDM                  | BPSK            | 6                |

**ANTENNA PORT CONDUCTED MEASUREMENT:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| MODE    | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|---------|-------------------|----------------|-----------------------|-----------------|------------------|
| 802.11b | 1 to 11           | 1, 6, 11       | DSSS                  | DBPSK           | 1                |
| 802.11g | 1 to 11           | 1, 6, 11       | OFDM                  | BPSK            | 6                |

### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

#### **FCC Part 15, Subpart C. (15.247)**

#### **ANSI C63.4-2003**

All test items 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.

| For conducted test: |                   |       |           |                |         |
|---------------------|-------------------|-------|-----------|----------------|---------|
| NO.                 | PRODUCT           | BRAND | MODEL NO. | SERIAL NO.     | FCC ID  |
| 1                   | NOTEBOOK COMPUTER | DELL  | E6400     | D814C A00 APCC | FCC DoC |
| 2                   | iPod nano         | Apple | A1199     | YM712NGUVQ5    | FCC DoC |

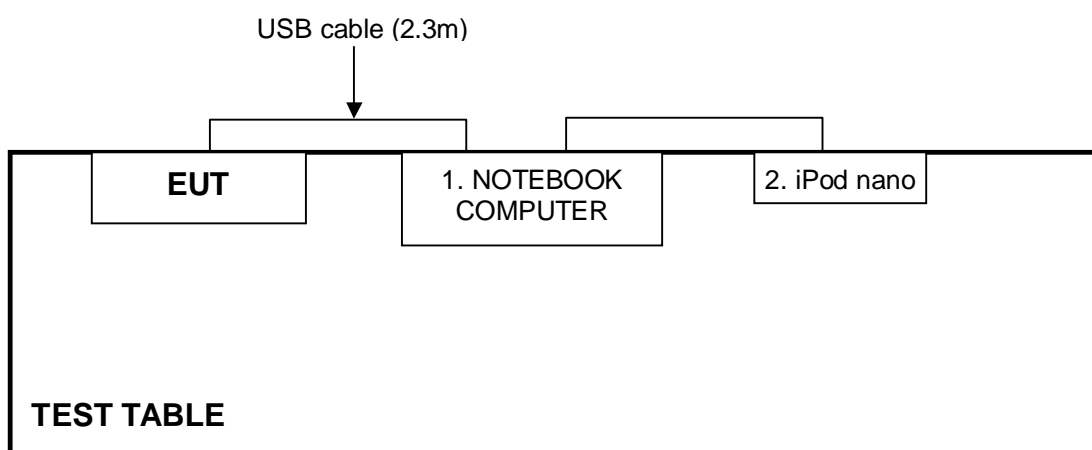
  

| For radiated test: |                   |       |           |             |         |
|--------------------|-------------------|-------|-----------|-------------|---------|
| NO.                | PRODUCT           | BRAND | MODEL NO. | SERIAL NO.  | FCC ID  |
| 1                  | NOTEBOOK COMPUTER | DELL  | PP36S     | 25733582128 | FCC DoC |
| 2                  | iPod nano         | Apple | A1137     | 6U6078FMUPR | FCC DoC |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS          |
|-----|--|
| 1   | USB Cable 2.3m   |
| 2   | 1 m shielded cable, terminated with USB connector, w/o core. |

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

### 3.5 CONFIGURATION OF SYSTEM UNDER TEST





## 4. TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

| FREQUENCY OF EMISSION (MHz) | CONDUCTED LIMIT (dBµV) |          |
|-----------------------------|------------------------|----------|
|                             | Quasi-peak             | Average  |
| 0.15-0.5                    | 66 to 56               | 56 to 46 |
| 0.5-5                       | 56                     | 46       |
| 5-30                        | 60                     | 50       |

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
  2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
  3. All emanations from a class A/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 DATE | CALIBRATED UNTIL |
|---|------------------------|------------|-----------------|------------------|
| Test Receiver   | ESCS 30                | 100375     | Mar. 23, 2009   | Mar. 22, 2010    |
| Line-Impedance Stabilization Network (for EUT)        | ENV-216                | 100071     | Nov. 26, 2008   | Nov. 25, 2009    |
| Line-Impedance Stabilization Network (for Peripheral) | ESH3-Z5                | 848773/004 | Nov. 05, 2008   | Nov. 04, 2009    |
| RF Cable (JYEBAO)                                     | 5DFB                   | COBCAB-001 | Aug. 15, 2008   | Aug. 14, 2009    |
| 50 ohms Terminator                                    | 50                     | 3          | Nov. 05, 2008   | Nov. 04, 2009    |
| Software  | BV ADT_<br>Cond_V7.3.7 | NA         | NA              | NA               |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. B.
3. The VCCI Con B Registration No. is C-2193.



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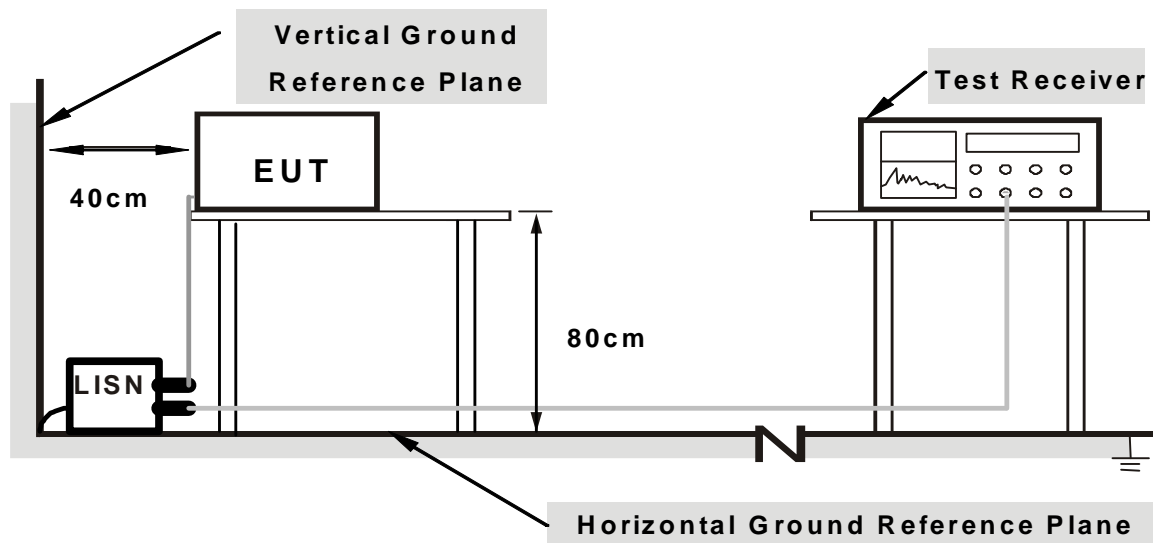
#### 4.1.3 TEST PROCEDURES

- 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 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.5 TEST SETUP



**Note: 1. Support units were connected to second LISN.**

**2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

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

#### 4.1.6 EUT OPERATING CONDITIONS

- a. Connect the EUT with the support unit 1 (Notebook computer) which placed on a testing table.
- b. Support unit 1 (Notebook computer) run test program “ZD121XEVL 5 5 0 0” to enable EUT under transmission condition continuously at specific channel frequency.



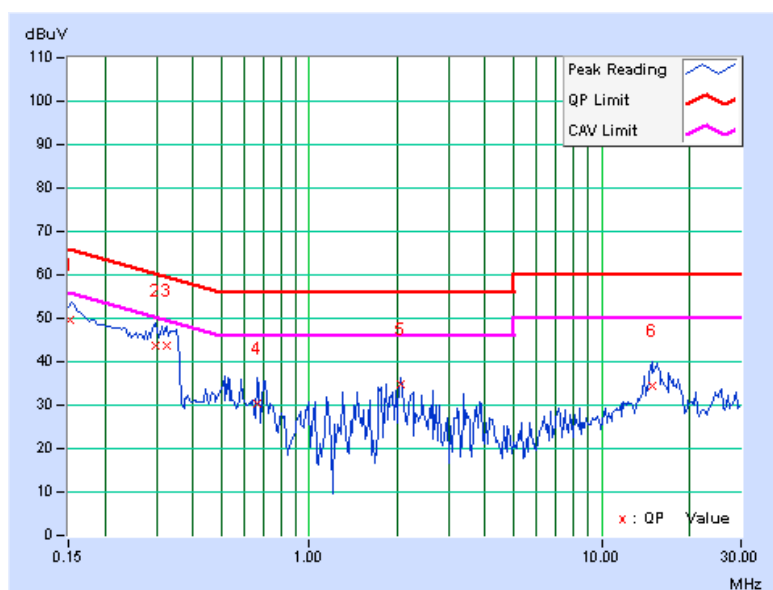
### 4.1.7 TEST RESULTS

#### 802.11b DSSS MODULATION

| EUT TEST CONDITION       |                         | MEASUREMENT DETAIL |               |
|--------------------------|-------------------------|--------------------|---------------|
| CHANNEL                  | Channel 1               | PHASE              | Line (L)      |
| MODULATION TYPE          | DBPSK                   | 6dB BANDWIDTH      | 9 kHz         |
| TRANSFER RATE            | 1Mbps                   | INPUT POWER        | 120Vac, 60 Hz |
| ENVIRONMENTAL CONDITIONS | 24deg. C, 64%RH, 965hPa | TESTED BY          | Eric Lee      |

| No       | Freq.        | Corr.       | Reading Value |     | Emission Level |     | Limit        |              | Margin        |     |
|----------|--------------|-------------|---------------|-----|----------------|-----|--------------|--------------|---------------|-----|
|          | [MHz]        | Factor (dB) | [dB (uV)]     |     | [dB (uV)]      |     | [dB (uV)]    |              | (dB)          |     |
|          |              |             | Q.P.          | AV. | Q.P.           | AV. | Q.P.         | AV.          | Q.P.          | AV. |
| 1        | 0.151        | 0.19        | 49.37         | -   | 49.56          | -   | 65.92        | 55.92        | -16.36        | -   |
| 2        | 0.298        | 0.34        | 43.27         | -   | 43.61          | -   | 60.29        | 50.29        | -16.68        | -   |
| <b>3</b> | <b>0.326</b> | <b>0.37</b> | <b>43.49</b>  | -   | <b>43.86</b>   | -   | <b>59.56</b> | <b>49.56</b> | <b>-15.70</b> | -   |
| 4        | 0.666        | 0.38        | 29.91         | -   | 30.29          | -   | 56.00        | 46.00        | -25.71        | -   |
| 5        | 2.063        | 0.42        | 34.21         | -   | 34.63          | -   | 56.00        | 46.00        | -21.37        | -   |
| 6        | 14.832       | 1.08        | 33.49         | -   | 34.57          | -   | 60.00        | 50.00        | -25.43        | -   |

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.





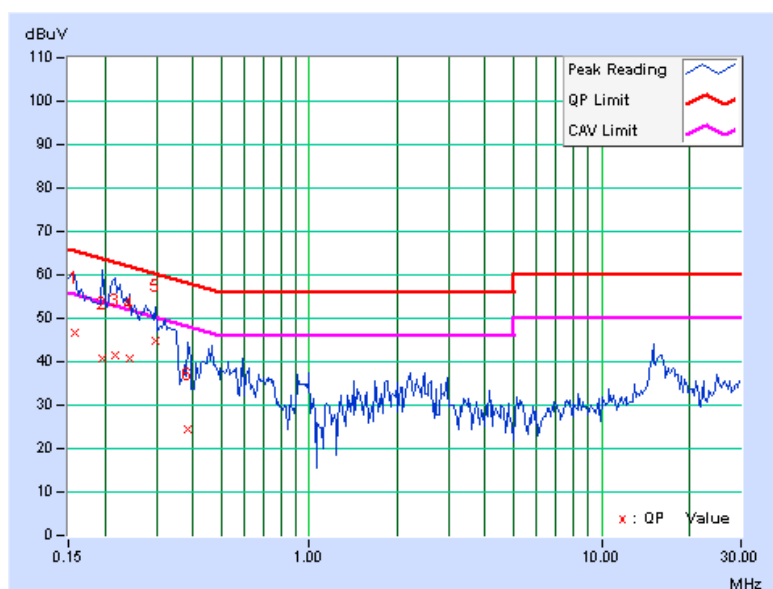


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| EUT test condition       |                         | MEASUREMENT DETAIL |               |
|--------------------------|-------------------------|--------------------|---------------|
| CHANNEL                  | Channel 1               | PHASE              | Neutral (N)   |
| MODULATION TYPE          | DBPSK                   | 6dB BANDWIDTH      | 9 kHz         |
| TRANSFER RATE            | 1Mbps                   | INPUT POWER        | 120Vac, 60 Hz |
| ENVIRONMENTAL CONDITIONS | 24deg. C, 64%RH, 965hPa | TESTED BY          | Eric Lee      |

| 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) |        |
|----------|----------------|-------------------------|----------------------------|-------|-----------------------------|-------|--------------------|--------------|----------------|--------|
|          |                |                         | Q.P.                       | AV.   | Q.P.                        | AV.   | Q.P.               | AV.          | Q.P.           | AV.    |
|          | 1              | 0.158                   | 0.12                       | 46.38 | -                           | 46.50 | -                  | 65.58        | 55.58          | -19.07 |
| 2        | 0.197          | 0.15                    | 40.45                      | -     | 40.60                       | -     | 63.74              | 53.74        | -23.14         | -      |
| 3        | 0.216          | 0.17                    | 41.21                      | -     | 41.38                       | -     | 62.96              | 52.96        | -21.58         | -      |
| 4        | 0.244          | 0.20                    | 40.64                      | -     | 40.84                       | -     | 61.97              | 51.97        | -21.12         | -      |
| <b>5</b> | <b>0.296</b>   | <b>0.27</b>             | <b>44.37</b>               | -     | <b>44.64</b>                | -     | <b>60.34</b>       | <b>50.34</b> | <b>-15.70</b>  | -      |
| 6        | 0.384          | 0.38                    | 24.18                      | -     | 24.56                       | -     | 58.18              | 48.18        | -33.62         | -      |

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

| Frequencies (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|-------------------|-----------------------------------|-------------------------------|
| 0.009-0.490       | 2400/F(kHz)                       | 300                           |
| 0.490-1.705       | 24000/F(kHz)                      | 30                            |
| 1.705-30.0        | 30                                | 30                            |
| 30-88             | 100                               | 3                             |
| 88-216            | 150                               | 3                             |
| 216-960           | 200                               | 3                             |
| Above 960         | 500                               | 3                             |

**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.



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## 4.2.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER           | MODEL NO.                | SERIAL NO.      | CALIBRATED DATE | CALIBRATED UNTIL |
|--------------------------------------|--------------------------|-----------------|-----------------|------------------|
| ROHDE & SCHWARZ Spectrum Analyzer    | FSP40                    | 100036          | Dec. 9, 2008    | Dec. 08, 2009    |
| HP Pre_Amplifier                     | 8449B                    | 3008A01923      | Nov. 10, 2008   | Nov. 09, 2009    |
| ROHDE & SCHWARZ Test Receiver        | ESCS30                   | 847124/029      | Sep. 9, 2008    | Sep. 08, 2009    |
| SCHWARZBECK TRILOG Broadband Antenna | VULB 9168                | 138             | April 29, 2009  | April 28, 2010   |
| Schwarzbeck Horn_Antenna             | BBHA9120                 | D124            | Dec. 09, 2008   | Dec. 08, 2009    |
| Schwarzbeck Horn_Antenna             | BBHA 9170                | BBHA9170153     | Jan. 22, 2009   | Jan. 21, 2010    |
| R&S Loop Antenna                     | HFH2-Z2                  | 100070          | Jan. 14, 2008   | Jan. 13, 2010    |
| RF Switches                          | EMH-011                  | 08009           | Oct. 07, 2008   | Oct. 06, 2009    |
| RF CABLE (Chaintek)                  | Sucoflex 106             | 28077           | Aug. 15, 2008   | Aug. 14, 2009    |
| RF Cable                             | 8DFB                     | STCCAB-30M-1GHz | Oct. 07, 2008   | Oct. 06, 2009    |
| Software                             | ADT_Radiated_V7.6.15.9.2 | NA              | NA              | NA               |
| CT Antenna Tower & Turn Table        | NA                       | NA              | NA              | NA               |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: FSP40) are used only for the measurement of emission frequency above 1GHz if tested.

3. The test was performed in Open Site No. C.

4. The FCC Site Registration No. is 656396.

5. The VCCI Site Registration No. is R-1626.

6. The CANADA Site Registration No. is IC 7450G-3.

#### 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 peak, quasi-peak or average method as specified and then reported in a data sheet.

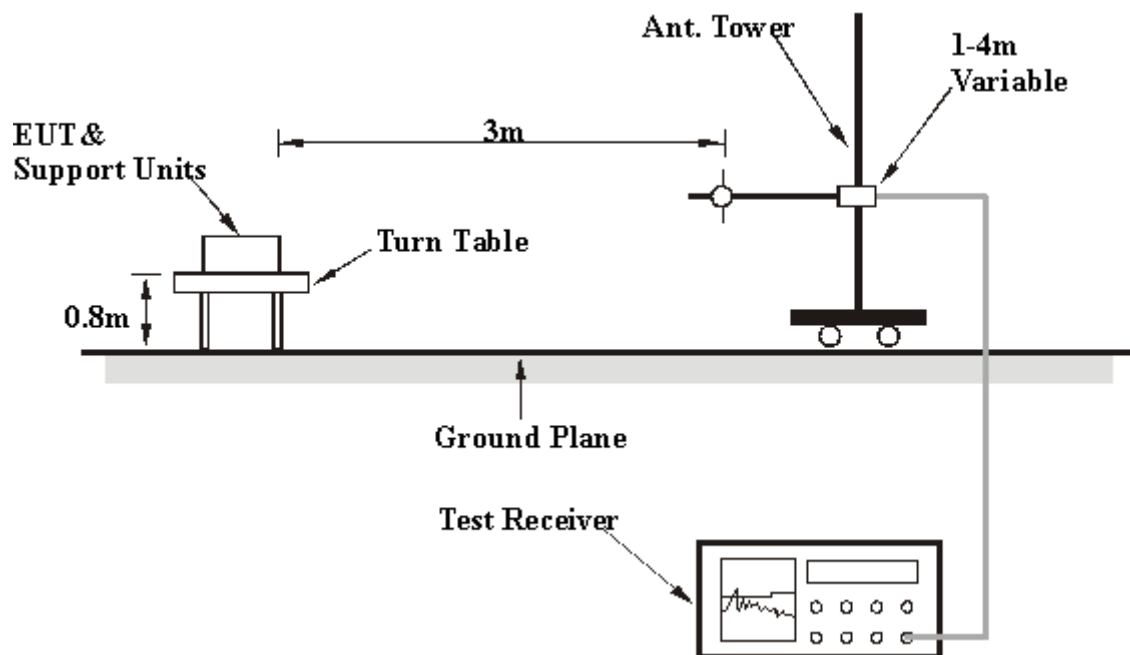
#### NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at 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.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.2.5 TEST SETUP



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

#### 4.2.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support unit 1 (Notebook computer) which placed on a testing table.
2. Support unit 1 (Notebook computer) run test program “ZD121XEVL 5 5 0 0” to enable EUT under transmission condition continuously at specific channel frequency.



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### 4.2.7 TEST RESULTS

#### BELOW 1GHz WORST-CASE DATA : 802.11b DSSS MODULATION

| EUT TEST CONDITION       |                           | MEASUREMENT DETAIL |               |
|--------------------------|---------------------------|--------------------|---------------|
| CHANNEL                  | Channel 1                 | FREQUENCY RANGE    | Below 1000MHz |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz             | DETECTOR FUNCTION  | Quasi-Peak    |
| ENVIRONMENTAL CONDITIONS | 27deg. C, 62%RH<br>965hPa | TESTED BY          | Wen Yu        |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |             |                         |                |             |                    |                      |                  |                          |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO.   | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1   | 192.00      | 33.07 QP                | 43.50          | -10.43      | 1.27 H             | 85                   | 19.47            | 13.60                    |
| 2   | 200.00      | 41.38 QP                | 43.50          | -2.12       | 1.18 H             | 106                  | 28.40            | 12.98                    |
| 3   | 216.00      | 34.98 QP                | 43.50          | -8.52       | 1.07 H             | 119                  | 21.22            | 13.76                    |
| 4   | 228.00      | 34.14 QP                | 46.00          | -11.86      | 1.25 H             | 122                  | 19.79            | 14.35                    |
| 5   | 240.00      | 44.36 QP                | 46.00          | -1.64       | 1.27 H             | 125                  | 29.43            | 14.93                    |
| 6   | 264.00      | 28.72 QP                | 46.00          | -17.28      | 1.03 H             | 241                  | 12.85            | 15.87                    |
| 7   | 480.00      | 40.43 QP                | 46.00          | -5.57       | 1.61 H             | 226                  | 18.08            | 22.35                    |
| 8   | 600.00      | 32.91 QP                | 46.00          | -13.09      | 1.25 H             | 249                  | 8.14             | 24.77                    |
| 9   | 960.00      | 33.53 QP                | 46.00          | -12.47      | 1.65 H             | 232                  | 1.56             | 31.97                    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |             |                         |                |             |                    |                      |                  |                          |
| NO.   | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1   | 60.67       | 37.31 QP                | 40.00          | -2.69       | 1.00 V             | 20                   | 23.05            | 14.26                    |
| 2   | 120.00      | 36.48 QP                | 43.50          | -7.02       | 1.00 V             | 0                    | 22.65            | 13.83                    |
| 3   | 200.00      | 36.17 QP                | 43.50          | -7.33       | 1.25 V             | 176                  | 23.19            | 12.98                    |
| 4   | 216.00      | 29.98 QP                | 43.50          | -13.52      | 1.00 V             | 175                  | 16.22            | 13.76                    |
| 5   | 220.00      | 28.41 QP                | 46.00          | -17.59      | 1.05 V             | 162                  | 14.45            | 13.96                    |
| 6   | 240.00      | 34.37 QP                | 46.00          | -11.63      | 1.00 V             | 155                  | 19.44            | 14.93                    |
| 7   | 444.00      | 37.60 QP                | 46.00          | -8.40       | 1.00 V             | 204                  | 15.80            | 21.80                    |
| 8   | 480.00      | 40.99 QP                | 46.00          | -5.01       | 1.00 V             | 184                  | 18.64            | 22.35                    |

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.



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### 802.11b DSSS MODULATION

| EUT TEST CONDITION       |                           | MEASUREMENT DETAIL |                           |
|--------------------------|---------------------------|--------------------|---------------------------|
| CHANNEL                  | Channel 1                 | FREQUENCY RANGE    | 1 ~ 25GHz                 |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz             | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 29deg. C, 65%RH<br>965hPa | TESTED BY          | Wen Yu                    |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |             |                         |                |             |                    |                      |                  |                          |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO.   | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1   | 2386.00     | 54.85 PK                | 74.00          | -19.15      | 1.63 H             | 66                   | 24.58            | 30.27                    |
| 2   | 2386.00     | 43.41 AV                | 54.00          | -10.59      | 1.63 H             | 66                   | 13.14            | 30.27                    |
| 3   | *2412.00    | 98.43 PK                |                |             | 1.63 H             | 39                   | 68.07            | 30.36                    |
| 4   | *2412.00    | 84.47 AV                |                |             | 1.63 H             | 39                   | 54.11            | 30.36                    |
| 5   | 4824.00     | 56.26 PK                | 74.00          | -17.74      | 1.30 H             | 123                  | 19.47            | 36.79                    |
| 6   | 4824.00     | 53.32 AV                | 54.00          | -0.68       | 1.30 H             | 123                  | 16.53            | 36.79                    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |             |                         |                |             |                    |                      |                  |                          |
| NO.   | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1   | 2386.00     | 58.86 PK                | 74.00          | -15.14      | 1.61 V             | 150                  | 28.59            | 30.27                    |
| 2   | 2386.00     | 48.70 AV                | 54.00          | -5.30       | 1.61 V             | 150                  | 18.43            | 30.27                    |
| 3   | *2412.00    | 109.88 PK               |                |             | 1.60 V             | 352                  | 79.52            | 30.36                    |
| 4   | *2412.00    | 105.40 AV               |                |             | 1.60 V             | 352                  | 75.04            | 30.36                    |
| 5   | 4824.00     | 53.81 PK                | 74.00          | -20.19      | 1.13 V             | 300                  | 17.02            | 36.79                    |
| 6   | 4824.00     | 50.24 AV                | 54.00          | -3.76       | 1.13 V             | 300                  | 13.45            | 36.79                    |

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.



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| EUT TEST CONDITION       |                           | MEASUREMENT DETAIL |                           |
|--------------------------|---------------------------|--------------------|---------------------------|
| CHANNEL                  | Channel 6                 | FREQUENCY RANGE    | 1 ~ 25GHz                 |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz             | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 29deg. C, 65%RH<br>965hPa | TESTED BY          | Wen Yu                    |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |             |                         |                |             |                    |                      |                  |                          |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO.   | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1   | *2437.00    | 95.56 PK                |                |             | 1.66 H             | 62                   | 65.10            | 30.46                    |
| 2   | *2437.00    | 90.91 AV                |                |             | 1.66 H             | 62                   | 60.45            | 30.46                    |
| 3   | 4874.00     | 56.59 PK                | 74.00          | -17.41      | 1.42 H             | 124                  | 19.67            | 36.92                    |
| 4   | 4874.00     | 53.03 AV                | 54.00          | -0.97       | 1.42 H             | 124                  | 16.11            | 36.92                    |
| 5   | 7311.00     | 52.57 PK                | 74.00          | -21.43      | 1.77 H             | 19                   | 9.43             | 43.14                    |
| 6   | 7311.00     | 39.41 AV                | 54.00          | -14.59      | 1.77 H             | 19                   | -3.73            | 43.14                    |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |             |                         |                |             |                    |                      |                  |                          |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO.   | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1   | *2437.00    | 106.27 PK               |                |             | 1.60 V             | 349                  | 75.81            | 30.46                    |
| 2   | *2437.00    | 101.70 AV               |                |             | 1.60 V             | 349                  | 71.24            | 30.46                    |
| 3   | 4874.00     | 53.12 PK                | 74.00          | -20.88      | 1.14 V             | 284                  | 16.20            | 36.92                    |
| 4   | 4874.00     | 49.83 AV                | 54.00          | -4.17       | 1.14 V             | 284                  | 12.91            | 36.92                    |
| 5   | 7311.00     | 53.08 PK                | 74.00          | -20.92      | 1.36 V             | 359                  | 9.94             | 43.14                    |
| 6   | 7311.00     | 40.61 AV                | 54.00          | -13.39      | 1.36 V             | 359                  | -2.53            | 43.14                    |

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.





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| EUT TEST CONDITION       |                           | MEASUREMENT DETAIL |                           |
|--------------------------|---------------------------|--------------------|---------------------------|
| CHANNEL                  | Channel 11                | FREQUENCY RANGE    | 1 ~ 25GHz                 |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz             | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 29deg. C, 65%RH<br>965hPa | TESTED BY          | Wen Yu                    |

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

| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1   | *2462.00    | 96.74 PK                |                |             | 1.95 H             | 58                   | 66.19            | 30.55                    |
| 2   | *2462.00    | 92.82 AV                |                |             | 1.95 H             | 58                   | 62.27            | 30.55                    |
| 3   | 2487.79     | 56.72 PK                | 74.00          | -17.28      | 1.85 H             | 60                   | 26.08            | 30.64                    |
| 4   | 2487.79     | 45.27 AV                | 54.00          | -8.73       | 1.85 H             | 60                   | 14.63            | 30.64                    |
| 5   | 4924.00     | 56.26 PK                | 74.00          | -17.74      | 1.35 H             | 124                  | 19.20            | 37.06                    |
| 6   | 4924.00     | 53.16 AV                | 54.00          | -0.84       | 1.35 H             | 124                  | 16.10            | 37.06                    |
| 7   | 7386.00     | 52.63 PK                | 74.00          | -21.37      | 1.81 H             | 24                   | 9.50             | 43.13                    |
| 8   | 7386.00     | 39.84 AV                | 54.00          | -14.16      | 1.81 H             | 24                   | -3.29            | 43.13                    |

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

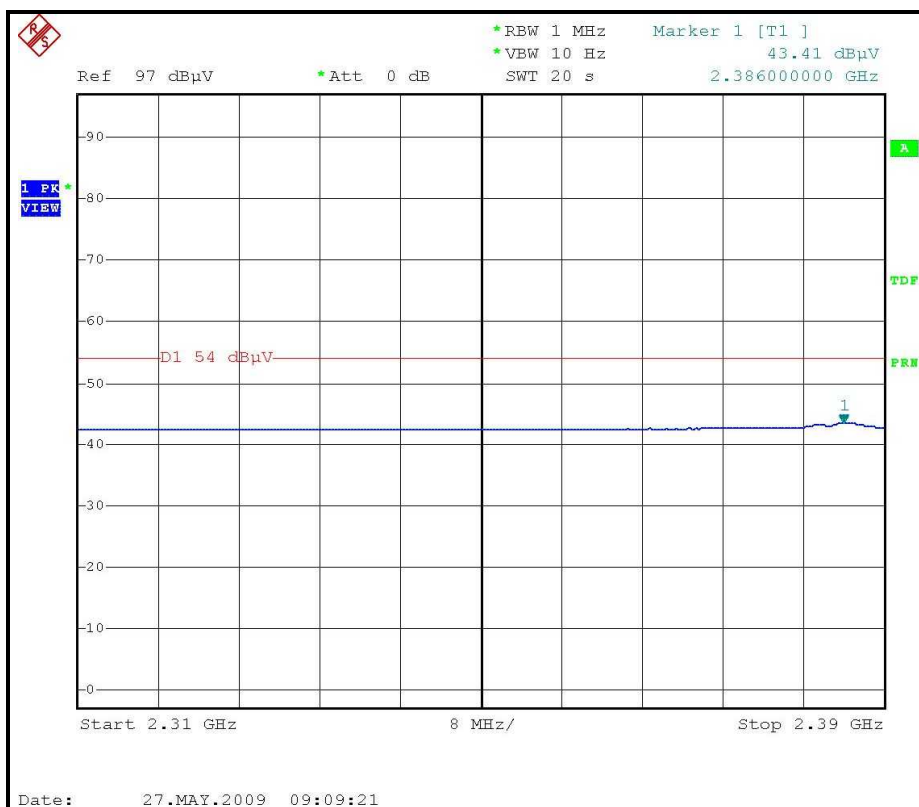
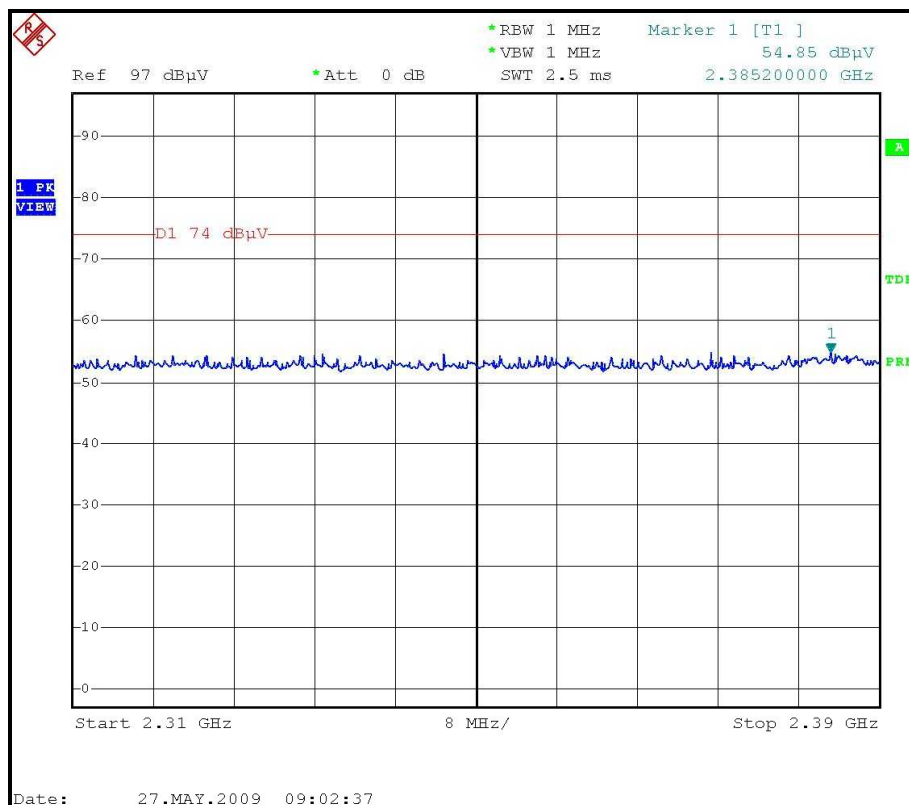
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1   | *2462.00    | 104.40 PK               |                |             | 1.58 V             | 352                  | 73.85            | 30.55                    |
| 2   | *2462.00    | 99.71 AV                |                |             | 1.58 V             | 352                  | 69.16            | 30.55                    |
| 3   | 2483.60     | 55.35 PK                | 74.00          | -18.65      | 1.58 V             | 349                  | 24.72            | 30.63                    |
| 4   | 2483.60     | 43.50 AV                | 54.00          | -10.50      | 1.58 V             | 349                  | 12.87            | 30.63                    |
| 5   | 4924.00     | 53.57 PK                | 74.00          | -20.43      | 1.15 V             | 247                  | 16.51            | 37.06                    |
| 6   | 4924.00     | 50.26 AV                | 54.00          | -3.74       | 1.15 V             | 247                  | 13.20            | 37.06                    |
| 7   | 7386.00     | 53.14 PK                | 74.00          | -20.86      | 1.37 V             | 354                  | 10.01            | 43.13                    |
| 8   | 7386.00     | 40.73 AV                | 54.00          | -13.27      | 1.37 V             | 354                  | -2.40            | 43.13                    |

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.



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### RESTRICTED BANDEDGE (802.11b MODE,CH1, HORIZONTAL )

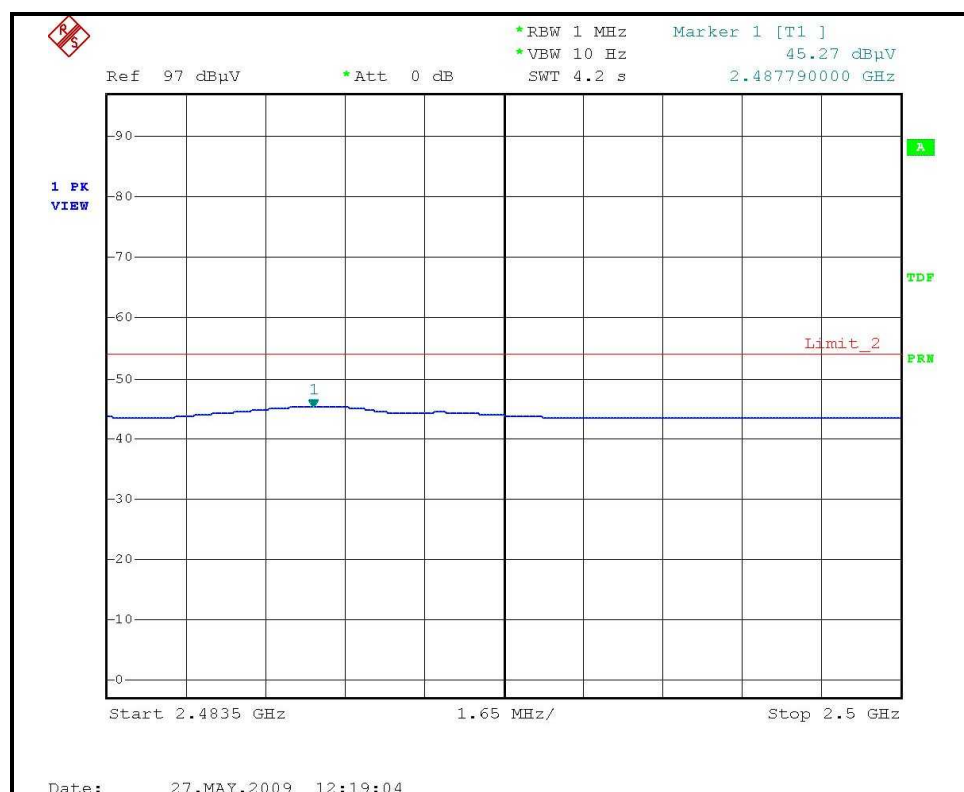
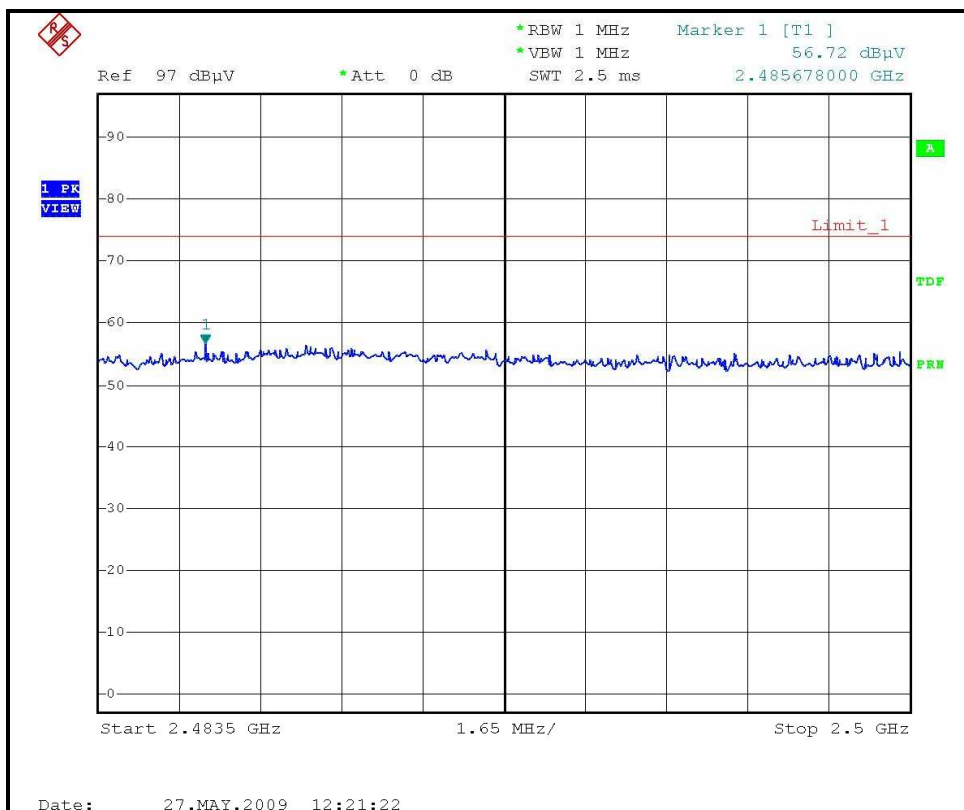






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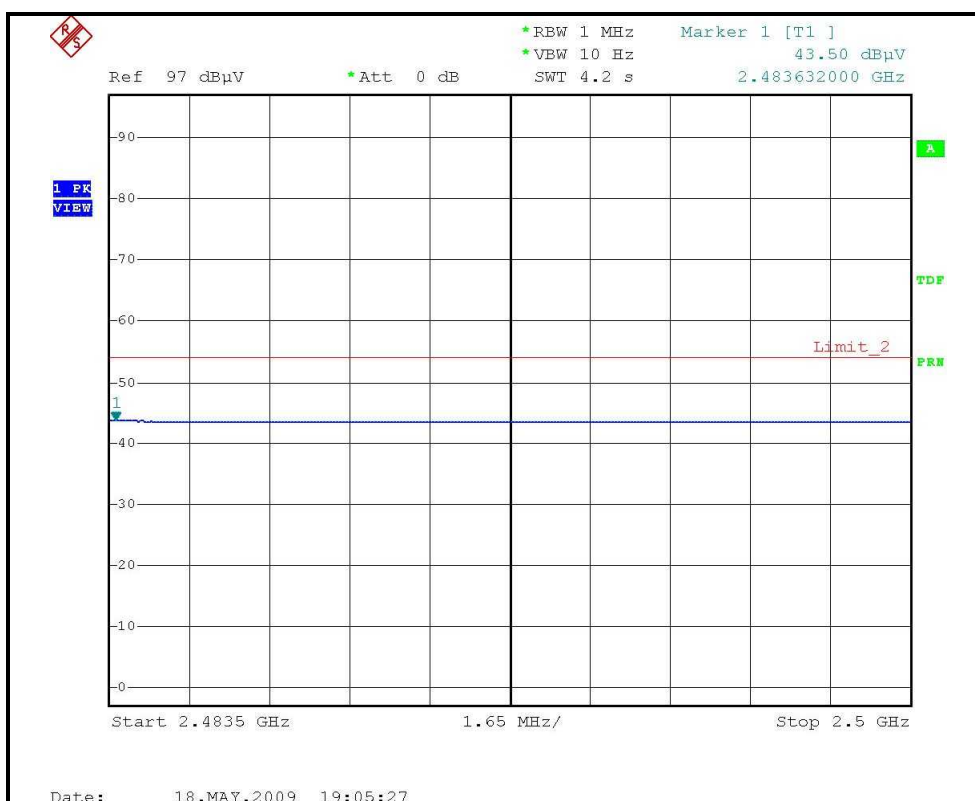
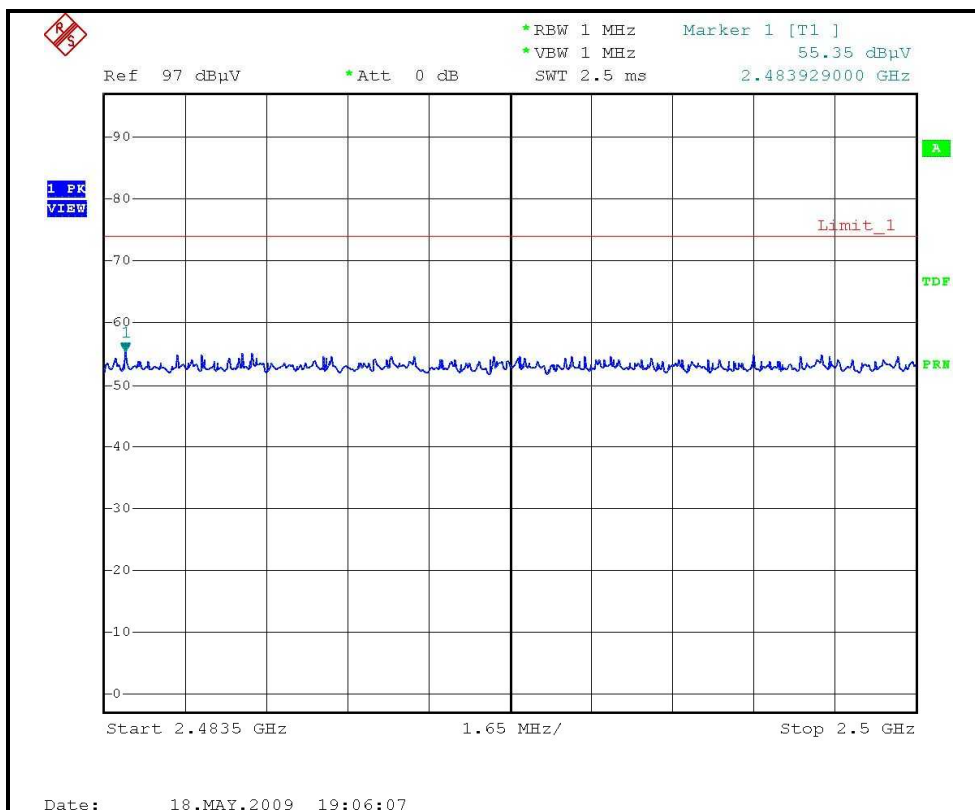
### RESTRICTED BANDEDGE (802.11b MODE,CH11, HORIZONTAL )





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### RESTRICTED BANDEDGE (802.11b MODE,CH11, VERTICAL )





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### 802.11g OFDM MODULATION

| EUT TEST CONDITION       |                               | MEASUREMENT DETAIL |                           |
|--------------------------|-------------------------------|--------------------|---------------------------|
| CHANNEL                  | Channel 1                     | FREQUENCY RANGE    | 1 ~ 25GHz                 |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz                 | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 29.0deg. C, 65.0%RH<br>965hPa | TESTED BY          | Wen Yu                    |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |             |                         |                |             |                    |                      |                  |                          |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO.   | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1   | 2390.00     | 59.21 PK                | 74.00          | -14.79      | 1.90 H             | 321                  | 28.93            | 30.28                    |
| 2   | 2390.00     | 46.88 AV                | 54.00          | -7.12       | 1.90 H             | 321                  | 16.60            | 30.28                    |
| 3   | *2412.00    | 94.16 PK                |                |             | 1.92 H             | 129                  | 63.80            | 30.36                    |
| 4   | *2412.00    | 84.54 AV                |                |             | 1.92 H             | 129                  | 54.18            | 30.36                    |
| 5   | 4824.00     | 64.27 PK                | 74.00          | -9.73       | 1.04 H             | 145                  | 27.48            | 36.79                    |
| 6   | 4824.00     | 49.13 AV                | 54.00          | -4.87       | 1.04 H             | 145                  | 12.34            | 36.79                    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |             |                         |                |             |                    |                      |                  |                          |
| NO.   | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1   | 2390.00     | 70.86 PK                | 74.00          | -3.14       | 1.62 V             | 351                  | 40.58            | 30.28                    |
| 2   | 2390.00     | 53.12 AV                | 54.00          | -0.88       | 1.62 V             | 351                  | 22.84            | 30.28                    |
| 3   | *2412.00    | 108.91 PK               |                |             | 1.00 V             | 350                  | 78.55            | 30.36                    |
| 4   | *2412.00    | 98.63 AV                |                |             | 1.00 V             | 350                  | 68.27            | 30.36                    |
| 5   | 4824.00     | 65.38 PK                | 74.00          | -8.62       | 1.14 V             | 139                  | 28.59            | 36.79                    |
| 6   | 4824.00     | 50.67 AV                | 54.00          | -3.33       | 1.14 V             | 139                  | 13.88            | 36.79                    |

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.



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| EUT TEST CONDITION       |                               | MEASUREMENT DETAIL |                           |
|--------------------------|-------------------------------|--------------------|---------------------------|
| CHANNEL                  | Channel 6                     | FREQUENCY RANGE    | 1 ~ 25GHz                 |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz                 | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 29.0deg. C, 65.0%RH<br>965hPa | TESTED BY          | Wen Yu                    |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |             |                         |                |             |                    |                      |                  |                          |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO.   | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1   | *2437.00    | 96.33 PK                |                |             | 1.95 H             | 53                   | 65.87            | 30.46                    |
| 2   | *2437.00    | 87.09 AV                |                |             | 1.95 H             | 53                   | 56.63            | 30.46                    |
| 3   | 4874.00     | 64.75 PK                | 74.00          | -9.25       | 1.06 H             | 151                  | 27.83            | 36.92                    |
| 4   | 4874.00     | 49.48 AV                | 54.00          | -4.52       | 1.06 H             | 151                  | 12.56            | 36.92                    |
| 5   | 7311.00     | 56.88 PK                | 74.00          | -17.12      | 1.78 H             | 317                  | 13.74            | 43.14                    |
| 6   | 7311.00     | 42.34 AV                | 54.00          | -11.66      | 1.78 H             | 317                  | -0.80            | 43.14                    |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |             |                         |                |             |                    |                      |                  |                          |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO.   | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1   | *2437.00    | 110.91 PK               |                |             | 1.59 V             | 350                  | 80.45            | 30.46                    |
| 2   | *2437.00    | 100.40 AV               |                |             | 1.59 V             | 350                  | 69.94            | 30.46                    |
| 3   | 4874.00     | 65.28 PK                | 74.00          | -8.72       | 1.13 V             | 135                  | 28.36            | 36.92                    |
| 4   | 4874.00     | 50.32 AV                | 54.00          | -3.68       | 1.13 V             | 135                  | 13.40            | 36.92                    |
| 5   | 7311.00     | 63.03 PK                | 74.00          | -10.97      | 1.13 V             | 177                  | 19.89            | 43.14                    |
| 6   | 7311.00     | 48.40 AV                | 54.00          | -5.60       | 1.13 V             | 177                  | 5.26             | 43.14                    |

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.



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| EUT TEST CONDITION       |                               | MEASUREMENT DETAIL |                           |
|--------------------------|-------------------------------|--------------------|---------------------------|
| CHANNEL                  | Channel 11                    | FREQUENCY RANGE    | 1 ~ 25GHz                 |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz                 | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 29.0deg. C, 65.0%RH<br>965hPa | TESTED BY          | Wen Yu                    |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                         |                |              |                    |                      |                  |                          |
|---|----------------|-------------------------|----------------|--------------|--------------------|----------------------|------------------|--------------------------|
| NO.   | FREQ. (MHz)    | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB)  | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1   | *2462.00       | 98.00 PK                |                |              | 1.83 H             | 321                  | 67.45            | 30.55                    |
| 2   | *2462.00       | 88.53 AV                |                |              | 1.83 H             | 321                  | 57.98            | 30.55                    |
| 3   | 2483.50        | 68.83 PK                | 74.00          | -5.17        | 1.74 H             | 320                  | 38.20            | 30.63                    |
| 4   | 2483.50        | 50.03 AV                | 54.00          | -3.97        | 1.74 H             | 320                  | 19.40            | 30.63                    |
| 5   | 4924.00        | 65.23 PK                | 74.00          | -8.77        | 1.08 H             | 150                  | 28.17            | 37.06                    |
| 6   | 4924.00        | 49.84 AV                | 54.00          | -4.16        | 1.08 H             | 150                  | 12.78            | 37.06                    |
| 7   | 7386.00        | 57.13 PK                | 74.00          | -16.87       | 1.74 H             | 334                  | 14.00            | 43.13                    |
| 8   | 7386.00        | 40.59 AV                | 54.00          | -13.41       | 1.74 H             | 334                  | -2.54            | 43.13                    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                |                         |                |              |                    |                      |                  |                          |
| NO.   | FREQ. (MHz)    | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB)  | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1   | *2462.00       | 108.48 PK               |                |              | 1.59 V             | 350                  | 77.93            | 30.55                    |
| 2   | *2462.00       | 97.97 AV                |                |              | 1.59 V             | 350                  | 67.42            | 30.55                    |
| <b>3</b>  | <b>2483.50</b> | <b>73.34 PK</b>         | <b>74.00</b>   | <b>-0.66</b> | <b>1.59 V</b>      | <b>345</b>           | <b>42.71</b>     | <b>30.63</b>             |
| 4   | 2483.50        | 53.31 AV                | 54.00          | -0.69        | 1.59 V             | 345                  | 22.68            | 30.63                    |
| 5   | 4924.00        | 65.72 PK                | 74.00          | -8.28        | 1.14 V             | 339                  | 28.66            | 37.06                    |
| 6   | 4924.00        | 50.58 AV                | 54.00          | -3.42        | 1.14 V             | 339                  | 13.52            | 37.06                    |
| 7   | 7386.00        | 63.78 PK                | 74.00          | -10.22       | 1.24 V             | 176                  | 20.65            | 43.13                    |
| 8   | 7386.00        | 49.04 AV                | 54.00          | -4.96        | 1.24 V             | 176                  | 5.91             | 43.13                    |

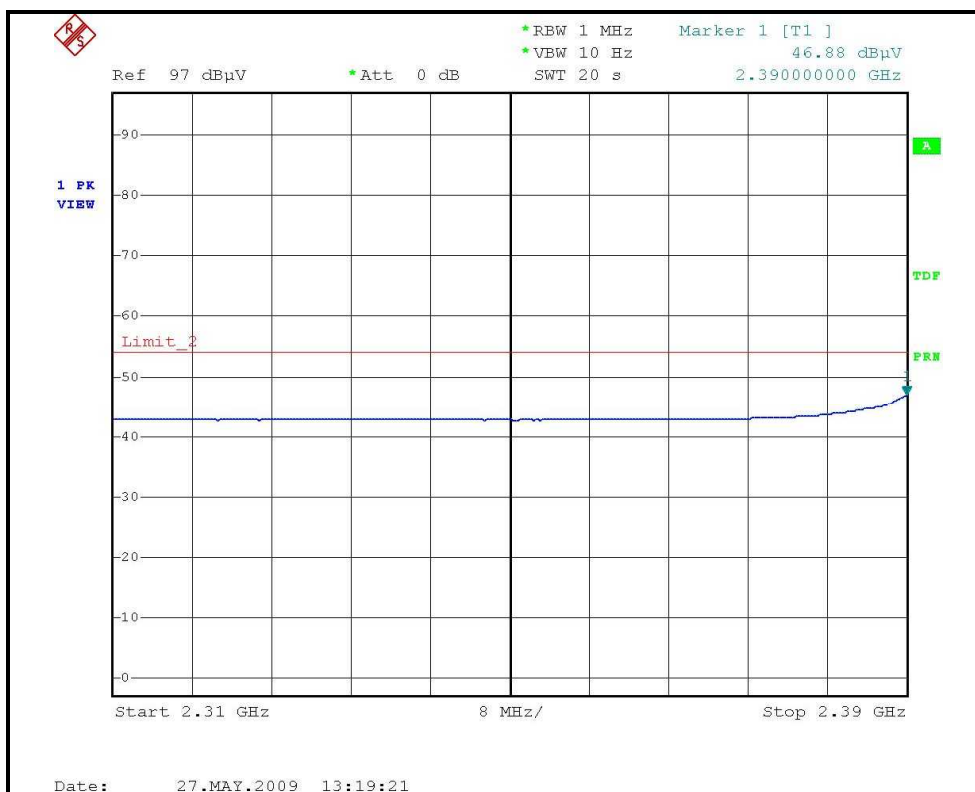
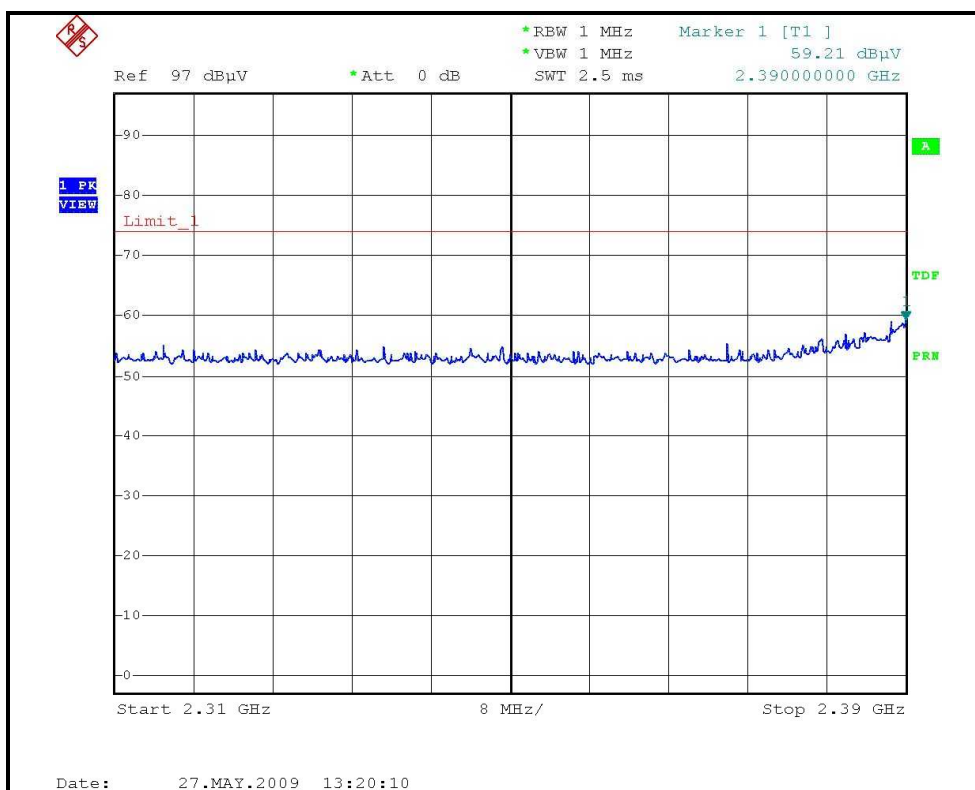
- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.





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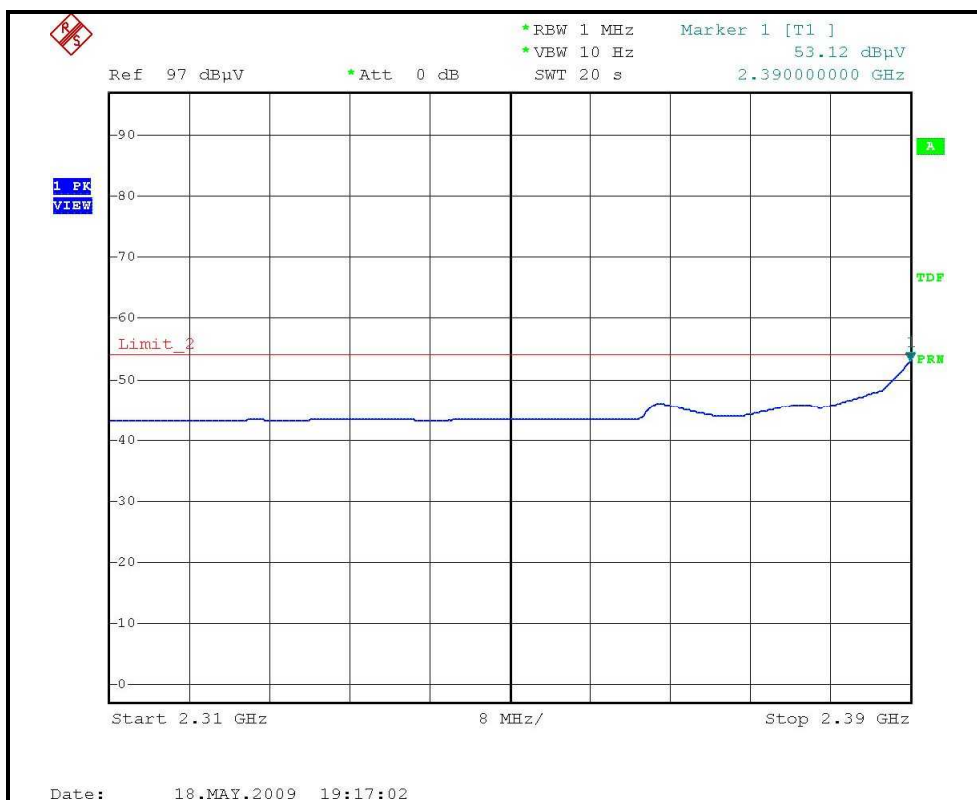
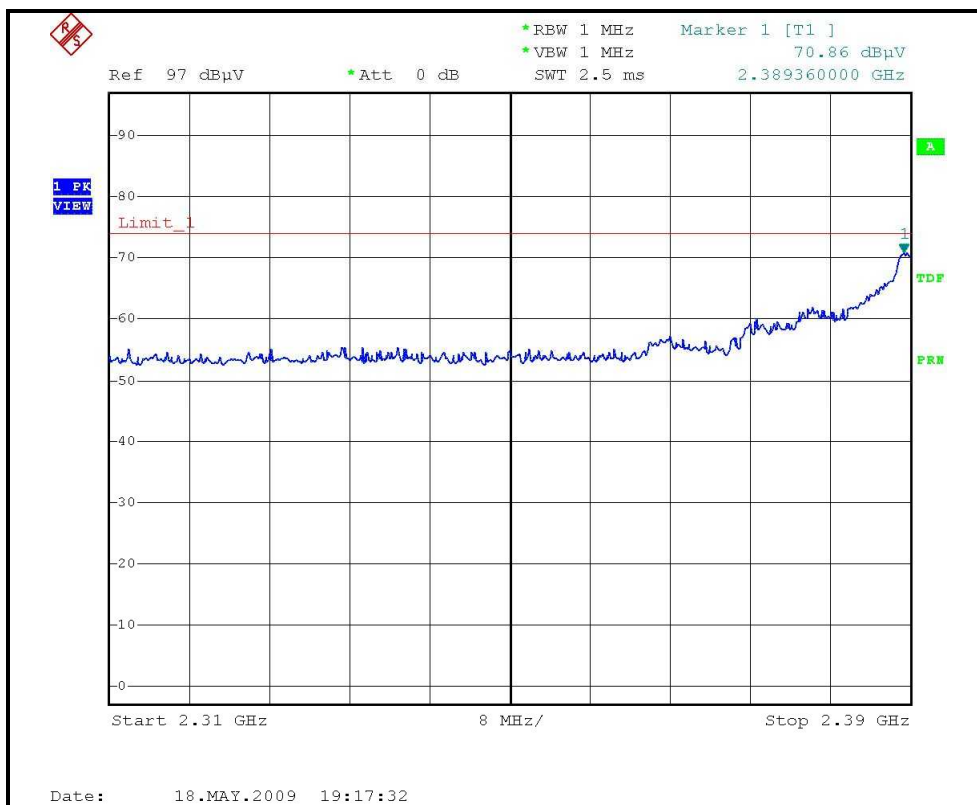
### RESTRICTED BANDEDGE (802.11g MODE,CH1, HORIZONTAL )





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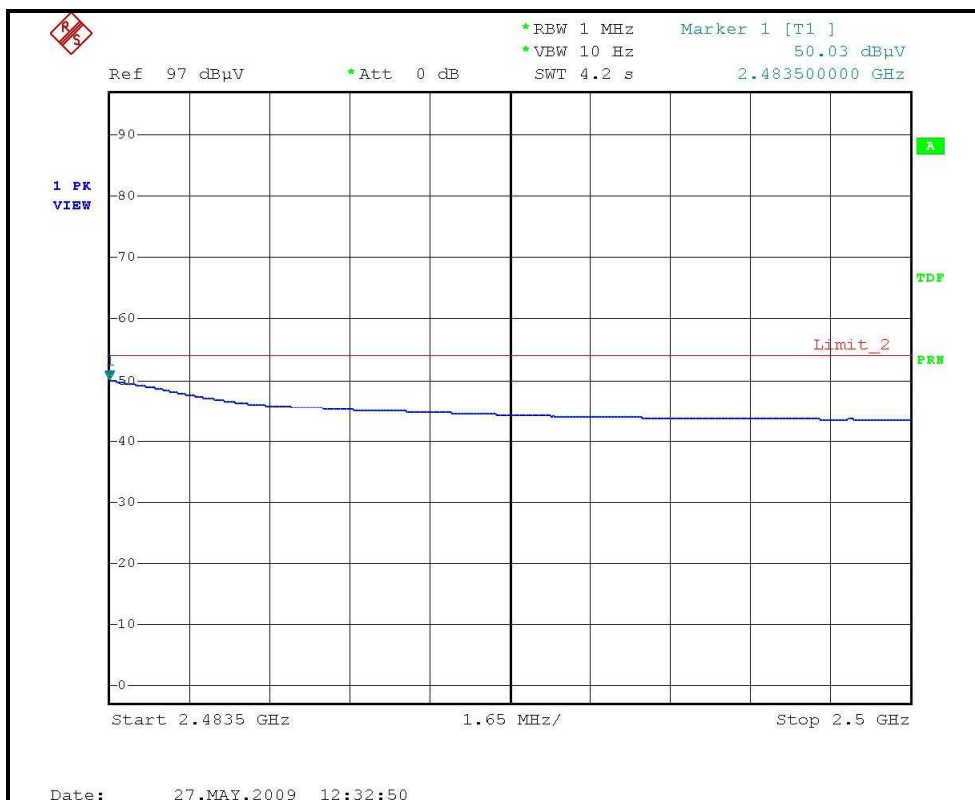
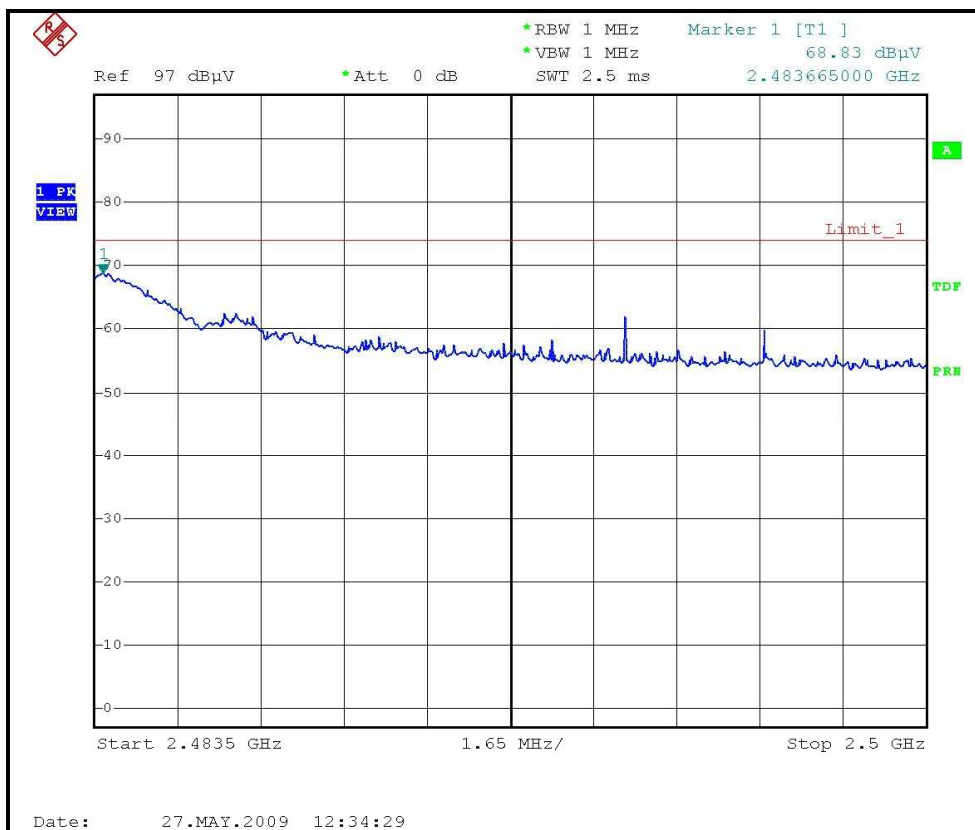
### RESTRICTED BANDEDGE (802.11g MODE,CH1, VERTICAL )





# RESTRICTED BANDEDGE (802.11g MODE, CH11, HORIZONTAL)

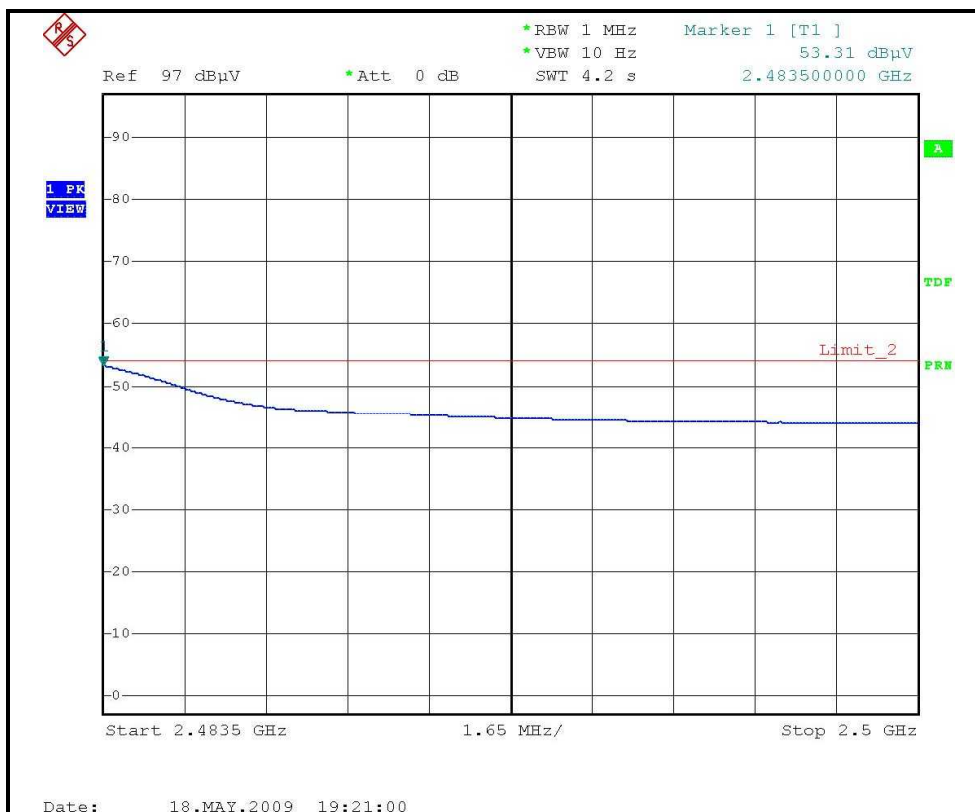
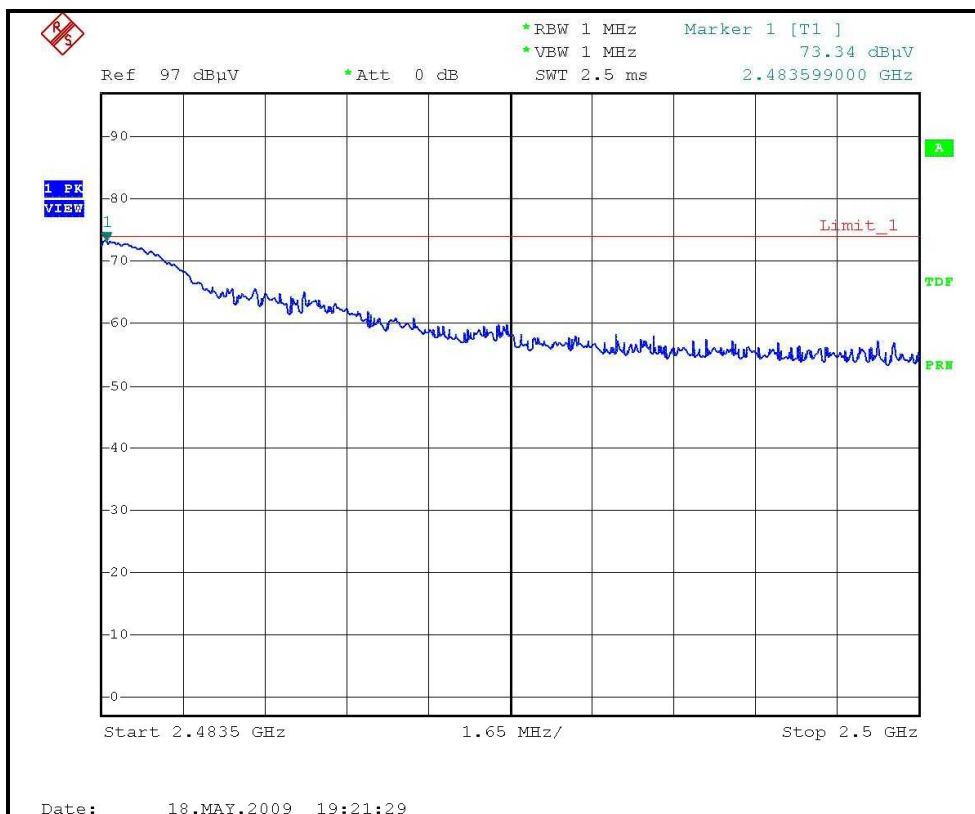
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# RESTRICTED BANDEDGE (802.11g MODE, CH11, VERTICAL )





### 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 DATE | Calibrated Until |
|----------------------------|-----------|------------|-----------------|------------------|
| R&S SPECTRUM ANALYZER      | FSP40     | 100036     | Dec. 09, 2008   | Dec. 08, 2009    |

**NOTE:**

- 1.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 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

#### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.3.5 TEST SETUP



#### 4.3.6 EUT OPERATING CONDITIONS

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



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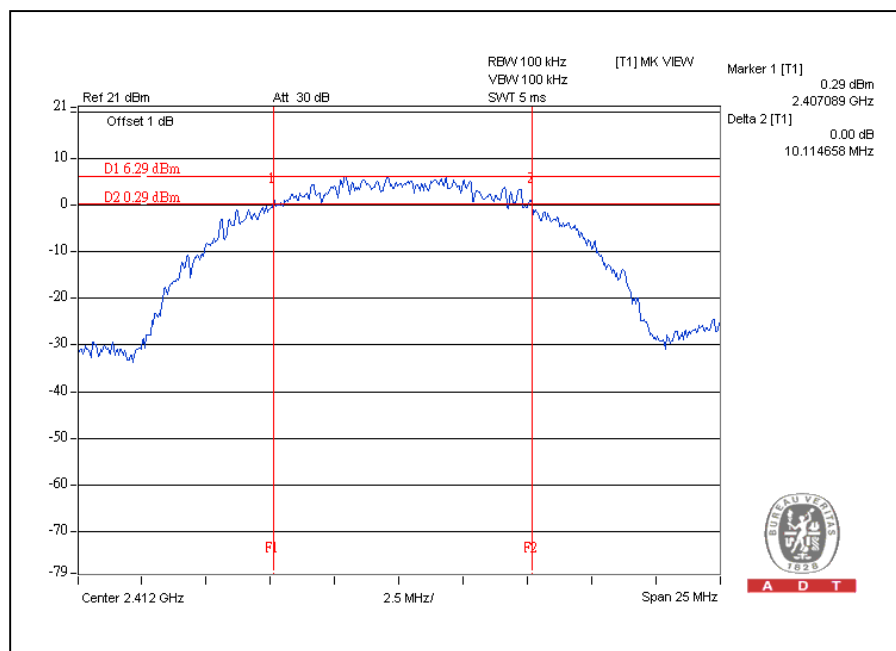
### 4.3.7 TEST RESULTS

#### 802.11b DSSS MODULATION:

|                        |               |                                 |                        |
|------------------------|---------------|---------------------------------|------------------------|
| <b>MODULATION TYPE</b> | DBPSK         | <b>TRANSFER RATE</b>            | 1 Mbps                 |
| <b>INPUT POWER</b>     | 120Vac, 60 Hz | <b>ENVIRONMENTAL CONDITIONS</b> | 25deg.C, 60%RH, 965hPa |
| <b>TESTED BY</b>       | Kent Liu      |                                 |                        |

| CHANNEL | CHANNEL FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---------|-------------------------|---------------------|---------------------|-------------|
| 1       | 2412                    | 10.11               | 0.5                 | PASS        |
| 6       | 2437                    | 10.11               | 0.5                 | PASS        |
| 11      | 2462                    | 10.13               | 0.5                 | PASS        |

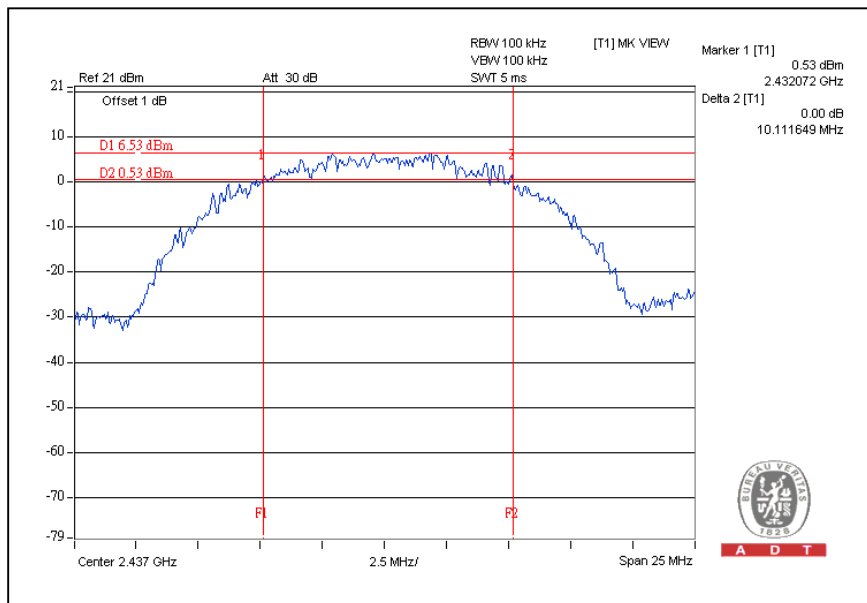
CH1



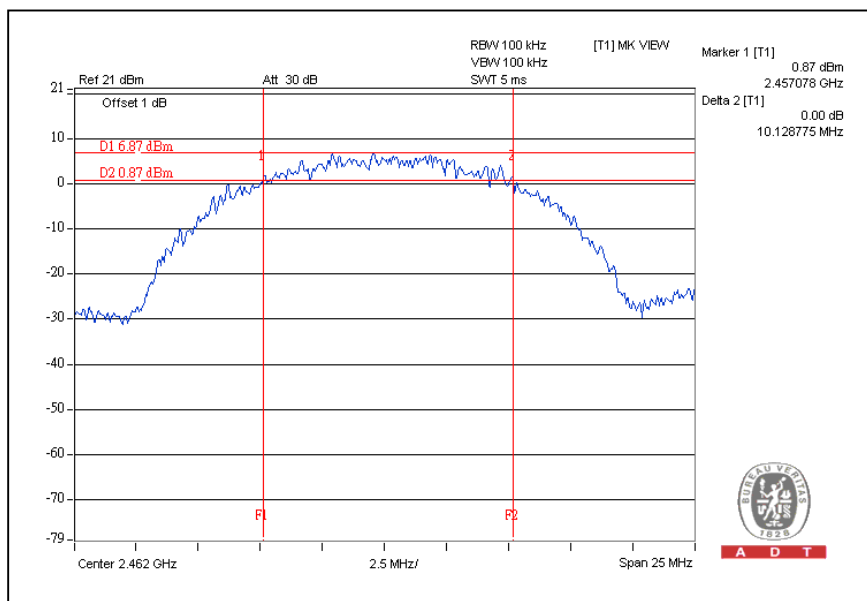


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### CH6



### CH11







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### 802.11g OFDM MODULATION:

|                        |               |                                 |                        |
|------------------------|---------------|---------------------------------|------------------------|
| <b>MODULATION TYPE</b> | BPSK          | <b>TRANSFER RATE</b>            | 6Mbps                  |
| <b>INPUT POWER</b>     | 120Vac, 60 Hz | <b>ENVIRONMENTAL CONDITIONS</b> | 25deg.C, 60%RH, 965hPa |
| <b>TESTED BY</b>       | Kent Liu      |                                 |                        |

| CHANNEL | CHANNEL FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---------|-------------------------|---------------------|---------------------|-------------|
| 1       | 2412                    | 16.49               | 0.5                 | PASS        |
| 6       | 2437                    | 16.46               | 0.5                 | PASS        |
| 11      | 2462                    | 16.48               | 0.5                 | PASS        |

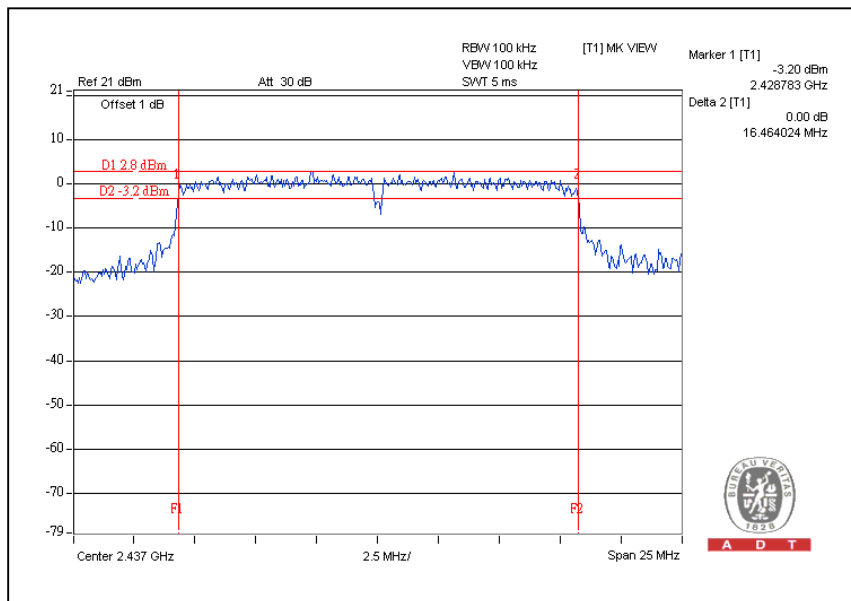
CH1



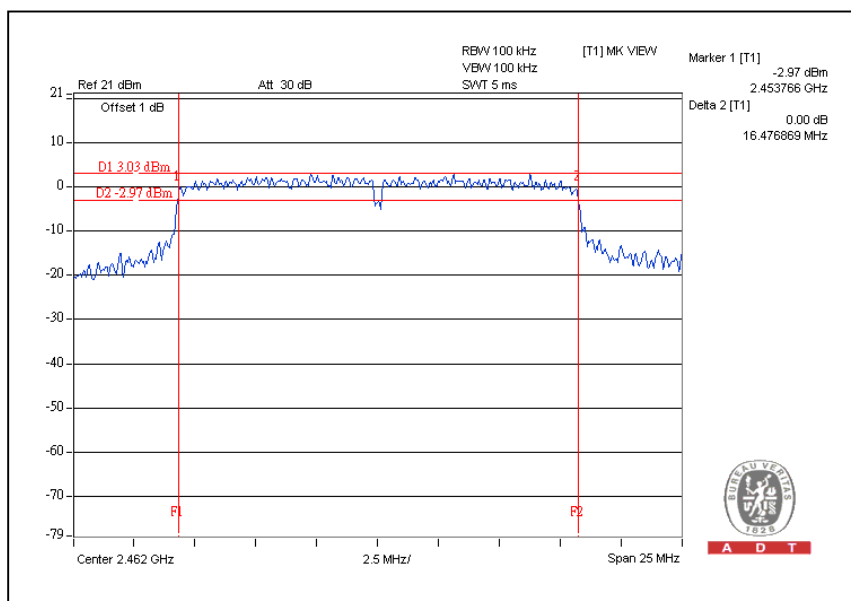


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### CH6



### CH11





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#### 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 date | Calibrated Until |
|----------------------------|-----------|------------|-----------------|------------------|
| Anritsu Power Meter        | ML2495A   | 0824006    | June 14, 2008   | June 13, 2009    |
| Pulse Power Sensor         | MA2411B   | 0738172    | April 25, 2009  | April 24, 2010   |

**NOTE:**

The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

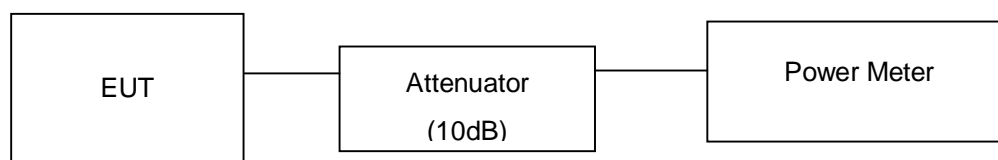
#### 4.4.3 TEST PROCEDURES

1. The transmitter output was connected to the power meter through an attenuator; the bandwidth of the fundamental frequency was measured with the power meter.
2. Record the power level.

#### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.4.5 TEST SETUP



#### 4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6



#### 4.4.7 TEST RESULTS

##### 802.11b DSSS MODULATION:

|                        |               |                                 |                        |
|------------------------|---------------|---------------------------------|------------------------|
| <b>MODULATION TYPE</b> | DBPSK         | <b>TRANSFER RATE</b>            | 1Mbps                  |
| <b>INPUT POWER</b>     | 120Vac, 60 Hz | <b>ENVIRONMENTAL CONDITIONS</b> | 25deg.C, 60%RH, 965hPa |
| <b>TESTED BY</b>       | Kent Liu      |                                 |                        |

| CHANNEL | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (mW) | PEAK POWER OUTPUT (dBm) | PEAK POWER LIMIT (dBm) | PASS / FAIL |
|---------|-------------------------|------------------------|-------------------------|------------------------|-------------|
| 1       | 2412                    | 50.234                 | 17.01                   | 30                     | PASS        |
| 6       | 2437                    | 32.137                 | 15.07                   | 30                     | PASS        |
| 11      | 2462                    | 20.417                 | 13.10                   | 30                     | PASS        |

##### 802.11g OFDM MODULATION:

|                        |               |                                 |                        |
|------------------------|---------------|---------------------------------|------------------------|
| <b>MODULATION TYPE</b> | BPSK          | <b>TRANSFER RATE</b>            | 6Mbps                  |
| <b>INPUT POWER</b>     | 120Vac, 60 Hz | <b>ENVIRONMENTAL CONDITIONS</b> | 25deg.C, 60%RH, 965hPa |
| <b>TESTED BY</b>       | Kent Liu      |                                 |                        |

| CHANNEL | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (mW) | PEAK POWER OUTPUT (dBm) | PEAK POWER LIMIT (dBm) | PASS / FAIL |
|---------|-------------------------|------------------------|-------------------------|------------------------|-------------|
| 1       | 2412                    | 72.444                 | 18.60                   | 30                     | PASS        |
| 6       | 2437                    | 91.201                 | 19.60                   | 30                     | PASS        |
| 11      | 2462                    | 77.625                 | 18.90                   | 30                     | PASS        |



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## 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 DATE | Calibrated Until |
|----------------------------|-----------|------------|-----------------|------------------|
| R&S SPECTRUM ANALYZER      | FSP40     | 100036     | Dec. 09, 2008   | Dec. 08, 2009    |

**NOTE:**

- 1.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

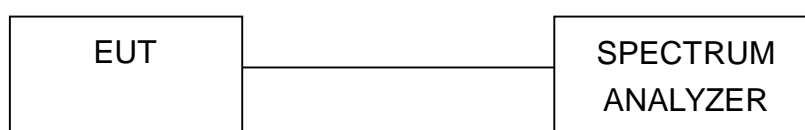
#### 4.5.3 TEST PROCEDURE

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 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.

#### 4.5.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.5.5 TEST SETUP



#### 4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6



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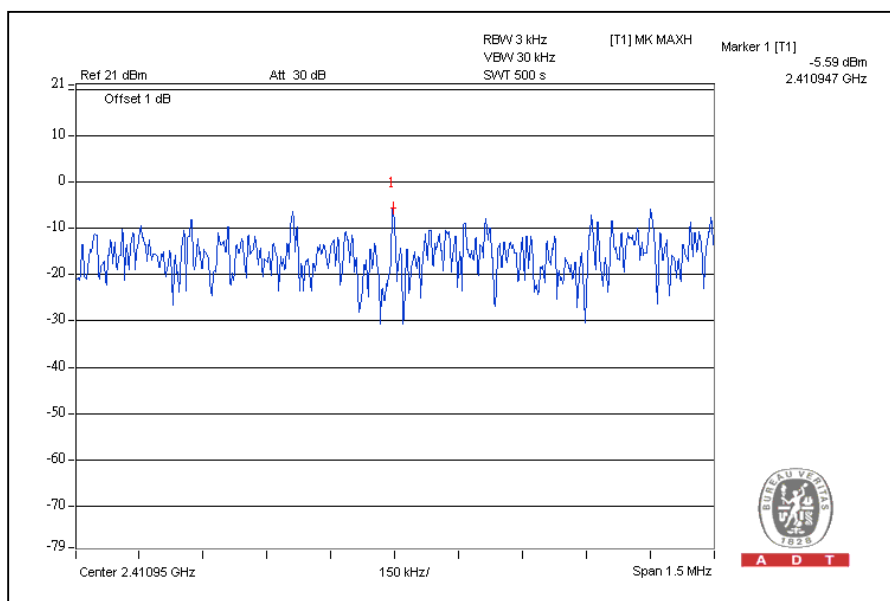
### 4.5.7 TEST RESULTS

#### 802.11b DSSS MODULATION:

|                        |               |                                 |                        |
|------------------------|---------------|---------------------------------|------------------------|
| <b>MODULATION TYPE</b> | DBPSK         | <b>TRANSFER RATE</b>            | 1Mbps                  |
| <b>INPUT POWER</b>     | 120Vac, 60 Hz | <b>ENVIRONMENTAL CONDITIONS</b> | 25deg.C, 60%RH, 965hPa |
| <b>TESTED BY</b>       | Kent Liu      |                                 |                        |

| CHANNEL | CHANNEL FREQUENCY (MHz ) | RF POWER LEVEL IN 3kHz BW (dBm) | MAXIMUM LIMIT (dBm) | PASS / FAIL |
|---------|--------------------------|---------------------------------|---------------------|-------------|
| 1       | 2412                     | -5.59                           | 8                   | PASS        |
| 6       | 2437                     | -5.23                           | 8                   | PASS        |
| 11      | 2462                     | -5.25                           | 8                   | PASS        |

CH1



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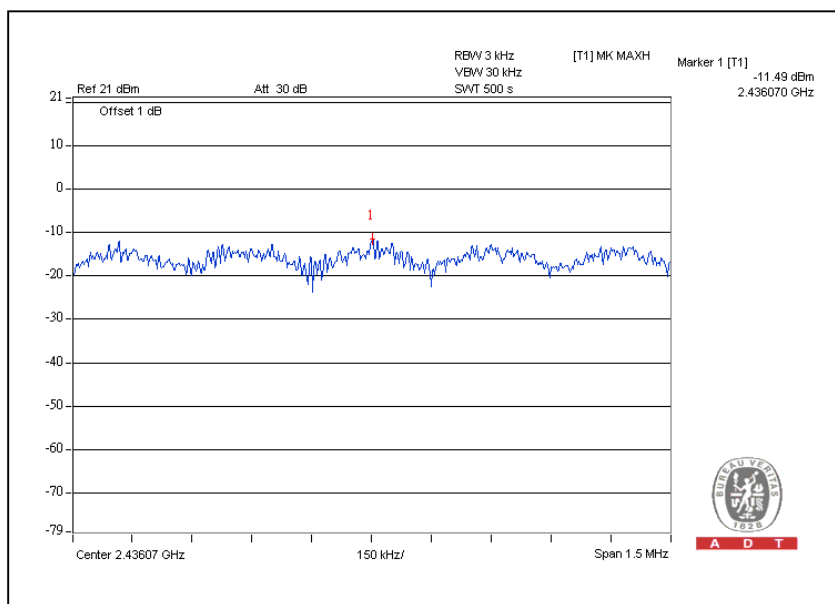




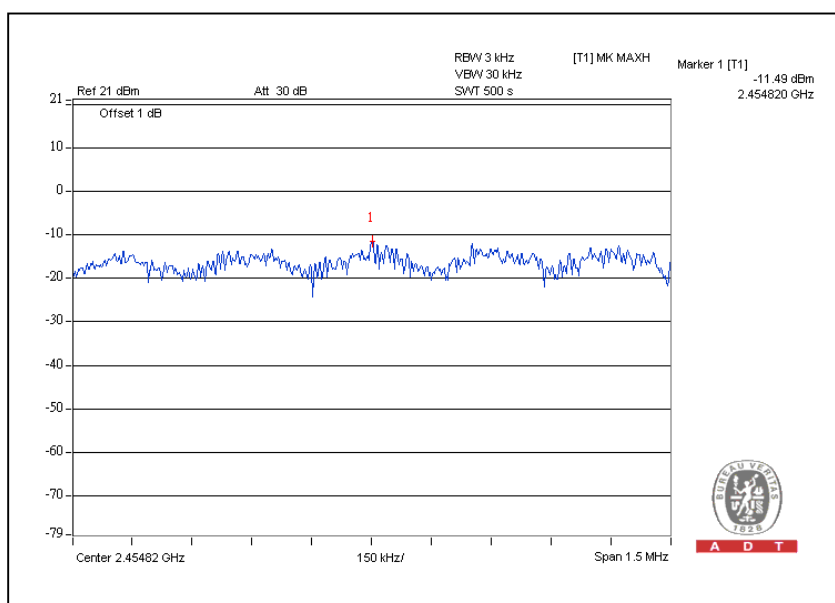


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### CH6



### CH11





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## 4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

### 4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.6.2 TEST INSTRUMENTS

| Description & Manufacturer | Model No. | Serial No. | Calibrated DATE | Calibrated Until |
|----------------------------|-----------|------------|-----------------|------------------|
| R&S SPECTRUM ANALYZER      | FSP40     | 100036     | Dec. 09, 2008   | Dec. 08, 2009    |

**NOTE:**

1. 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 of spectrum analyzer to 100kHz and VBW of spectrum analyzer to 300kHz with suitable frequency span including 100 MHz bandwidth from band edge. The conducted out-band emission was measured and recorded.

The spectrum plots (RBW = 100kHz, VBW = 300kHz) are attached on the following pages.

#### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6

#### 4.6.6 TEST RESULTS

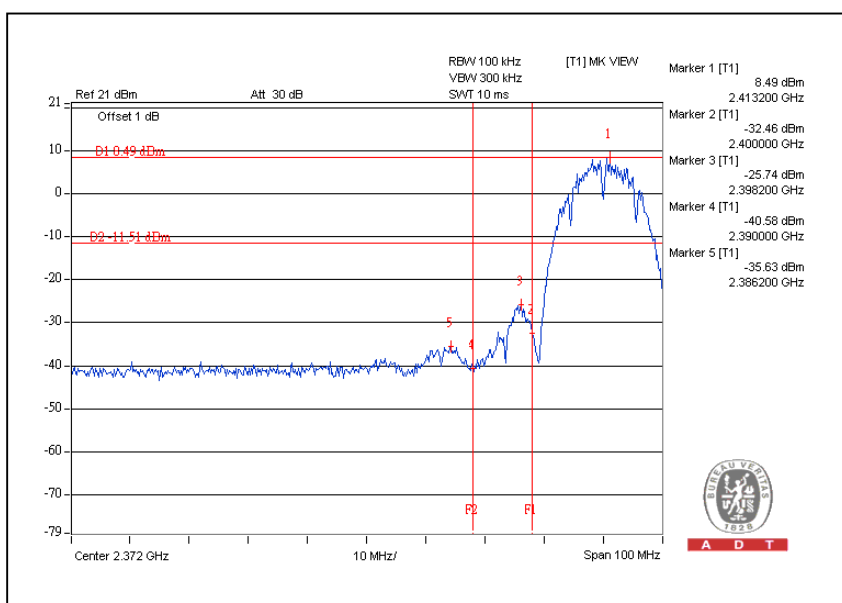
The spectrum plots are attached on the following below images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).



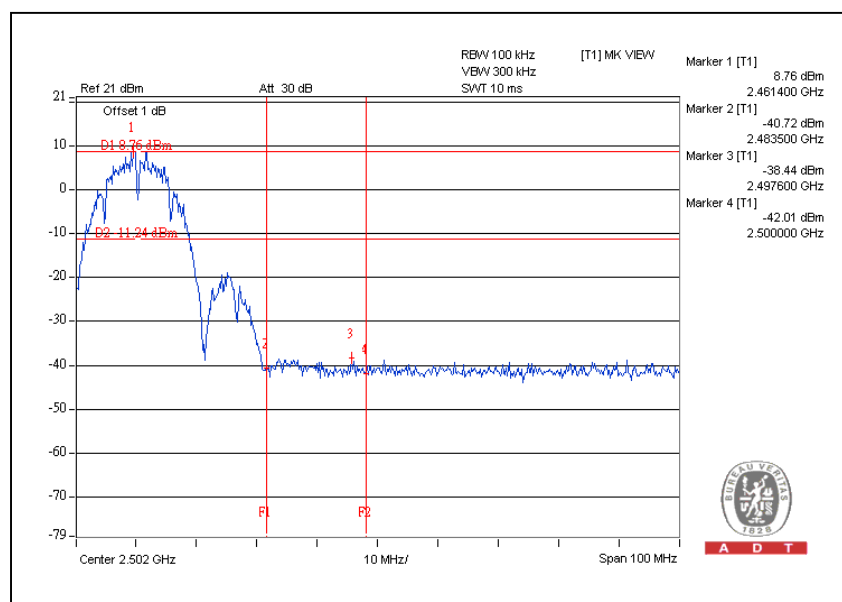
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## 802.11b DSSS MODULATION:

### CH1



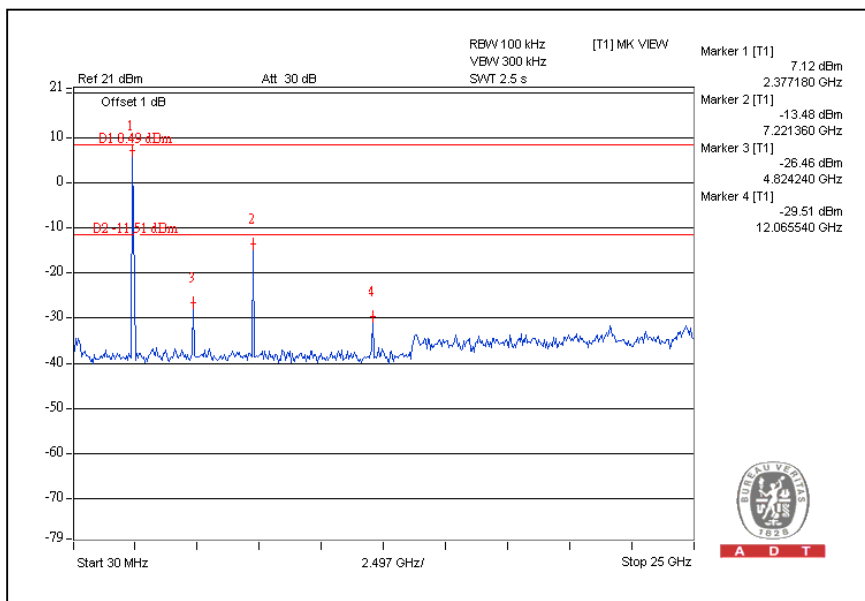
### CH11



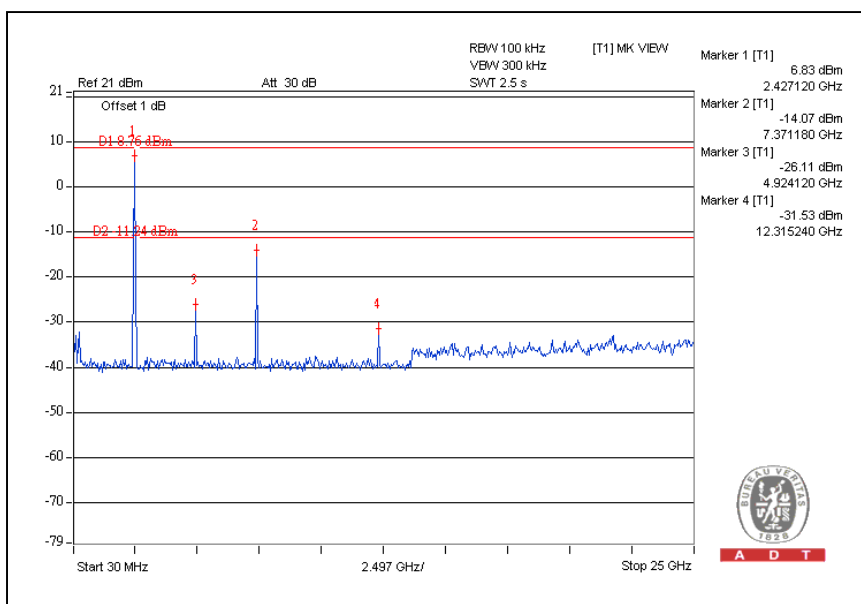


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# CH1

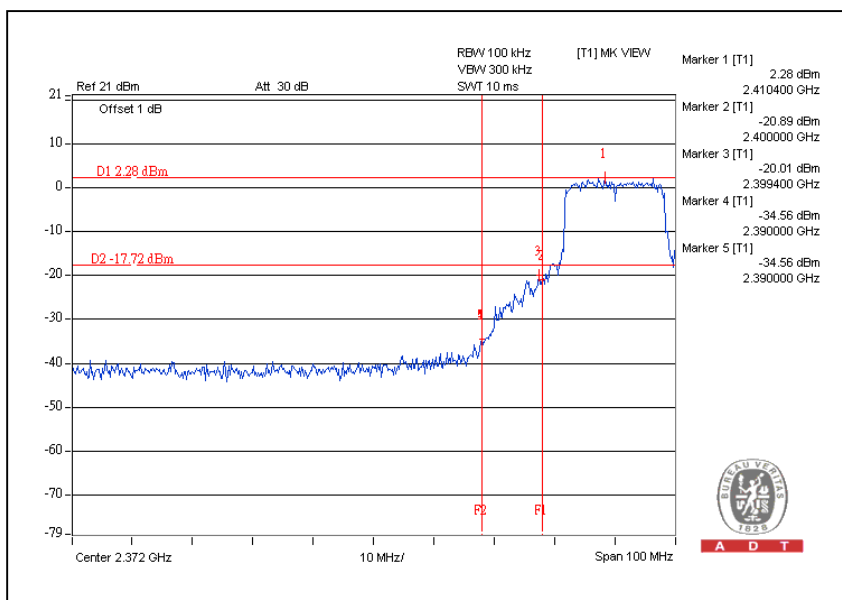


# CH11

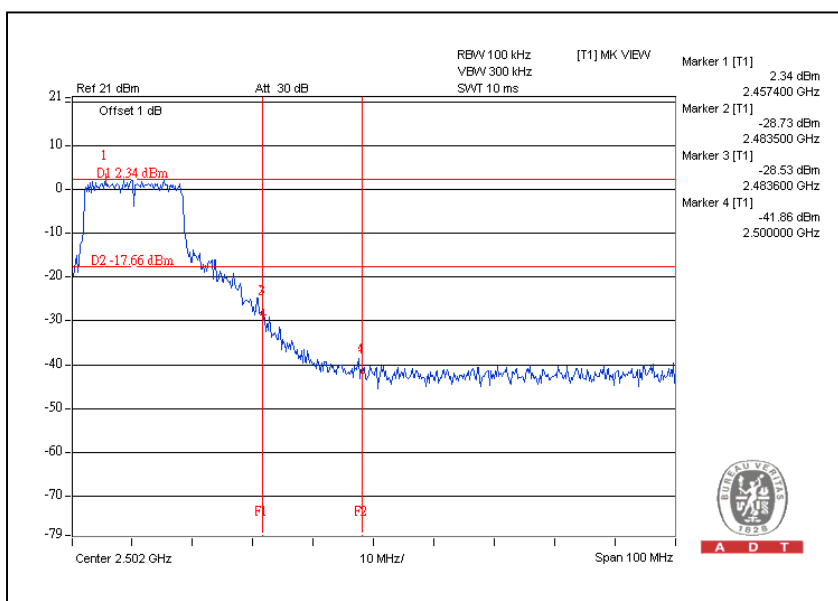


### 802.11g OFDM MODULATION:

#### CH 1



#### CH11

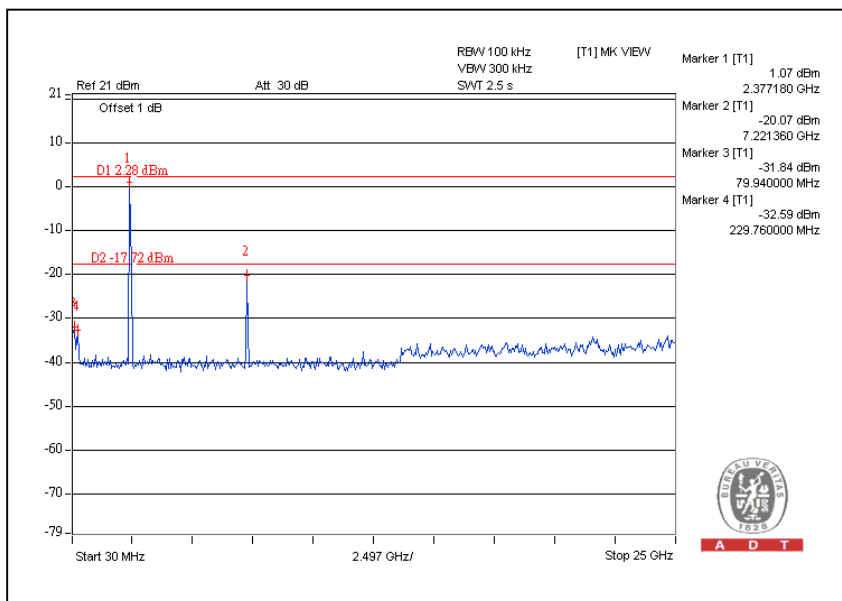




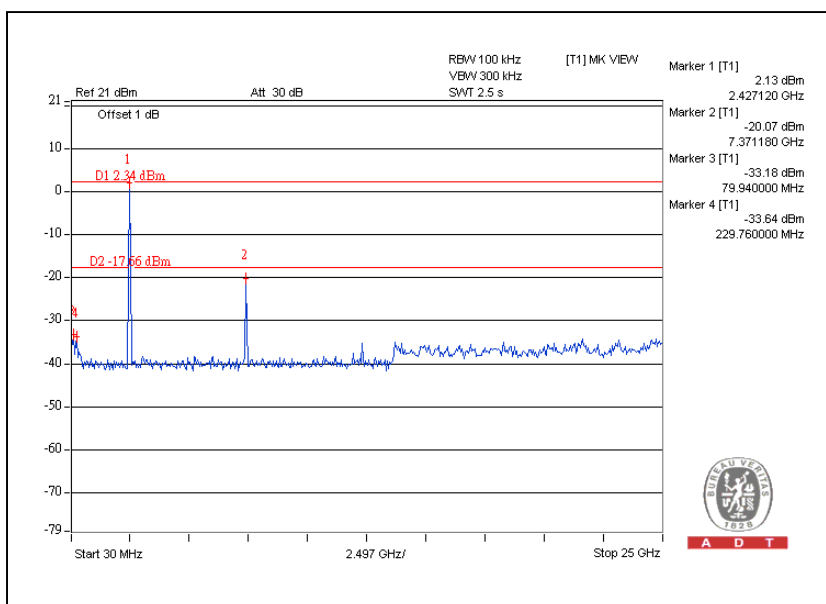


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# CH1



# CH11





## 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 panel antenna without connector. The maximum Gain of the antenna is 6 dBi.



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## 5. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

|                    |                      |
|--------------------|----------------------|
| <b>USA</b>         | FCC, NVLAP           |
| <b>Germany</b>     | TUV Rheinland        |
| <b>Japan</b>       | VCCI                 |
| <b>Norway</b>      | NEMKO                |
| <b>Canada</b>      | INDUSTRY CANADA, CSA |
| <b>R.O.C.</b>      | TAF, BSMI, NCC       |
| <b>Netherlands</b> | Telefication         |
| <b>Singapore</b>   | GOST-ASIA(MOU)       |
| <b>Russia</b>      | CERTIS(MOU)          |

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:

**Linko EMC/RF Lab:**

Tel: 886-2-26052180  
Fax: 886-2-26052943

**Hsin Chu EMC/RF Lab:**

Tel: 886-3-5935343  
Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety Telecom Lab:**

Tel: 886-3-3183232  
Fax: 886-3-3185050

**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



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## **6. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

No any modifications are made to the EUT by the lab during the test.

**--- END ---**