

# FCC TEST REPORT (15.247)

**REPORT NO.:** RF130321C09

**MODEL NO.:** DNUR-S2

**FCC ID:** VPQ-DNURS2

**RECEIVED:** Mar. 21, 2013

**TESTED:** Mar. 29 ~ Mar. 31, 2013

**ISSUED:** Apr. 08, 2013

**APPLICANT:** Trixell

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**ISSUED BY:** Bureau Veritas Consumer Products Services  
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A D T

## RELEASE CONTROL RECORD

| ISSUE NO.   | REASON FOR CHANGE | DATE ISSUED   |
|-------------|-------------------|---------------|
| RF130321C09 | Original release  | Apr. 08, 2013 |



A D T

## 1. CERTIFICATION

**PRODUCT:** 802.11 abgn 2x2 USB Wifi Module

**MODEL NO.:** DNUR-S2

**BRAND:** Unex

**APPLICANT:** Trixell

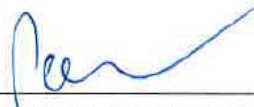
**TESTED:** Mar. 29 ~ Mar. 31, 2013

**TEST SAMPLE:** ENGINEERING SAMPLE

**STANDARDS:** FCC Part 15, Subpart C (Section 15.247)

ANSI C63.10-2009

The above equipment (model: DNUR-S2) 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** :  , **DATE** : Apr. 08, 2013  
Pettie Chen / Senior Specialist

**APPROVED BY** :  , **DATE** : Apr. 08, 2013  
Ken Liu / Senior Manager

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247) |                             |        |                                                                                     |
|-----------------------------------------------------------|-----------------------------|--------|-------------------------------------------------------------------------------------|
| STANDARD SECTION                                          | TEST TYPE                   | RESULT | REMARK                                                                              |
| 15.207                                                    | AC Power Conducted Emission | NA     | Without AC power port of the EUT.                                                   |
| 15.247(d)<br>15.209                                       | Radiated Emissions          | PASS   | Meet the requirement of limit. Minimum passing margin is -4.8dB at 5850.00MHz.      |
| 15.247(d)                                                 | Band Edge Measurement       | PASS   | Meet the requirement of limit.                                                      |
| 15.247(a)(2)                                              | 6dB bandwidth               | PASS   | Meet the requirement of limit.                                                      |
| 15.247(b)                                                 | Conducted power             | PASS   | Meet the requirement of limit.                                                      |
| 15.247(e)                                                 | Power Spectral Density      | PASS   | Meet the requirement of limit.                                                      |
| 15.203                                                    | Antenna Requirement         | PASS   | Antenna connector is IPEX MHF Connector (U.FL compatible) not a standard connector. |

### 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:

| MEASUREMENT        | FREQUENCY       | UNCERTAINTY |
|--------------------|-----------------|-------------|
| Radiated emissions | 30MHz ~ 200MHz  | 3.34 dB     |
|                    | 200MHz ~1000MHz | 3.35 dB     |
|                    | 1GHz ~ 18GHz    | 2.26 dB     |
|                    | 18GHz ~ 40GHz   | 1.94 dB     |

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

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|                              |                                                                                                                                                                                        |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EUT</b>                   | 802.11 abgn 2x2 USB Wifi Module                                                                                                                                                        |
| <b>MODEL NO.</b>             | DNUR-S2                                                                                                                                                                                |
| <b>POWER SUPPLY</b>          | 12Vdc (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: 11.0/ 5.5/ 2.0/ 1.0Mbps<br>802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps<br>802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps<br>802.11n: up to 300.0Mbps |
| <b>OPERATING FREQUENCY</b>   | <b>2.4GHz:</b> 2412 ~ 2462MHz<br><b>5.0GHz:</b> 5745 ~ 5825MHz                                                                                                                         |
| <b>NUMBER OF CHANNEL</b>     | <b>2.4GHz:</b><br>11 for 802.11b, 802.11g, 802.11n (20MHz)<br>7 for 802.11n (40MHz)<br><b>5.0GHz:</b><br>5 for 802.11a, 802.11n (20MHz)<br>2 for 802.11n (40MHz)                       |
| <b>OUTPUT POWER</b>          | 4.688mW for 2412 ~ 2462MHz<br>1.746mW for 5745 ~ 5825MHz                                                                                                                               |
| <b>ANTENNA TYPE</b>          | 2.4GHz: Dipole antenna with 3.0dBi gain<br>5.0GHz: Dipole antenna with 5.5dBi gain                                                                                                     |
| <b>ANTENNA CONNECTOR</b>     | IPEX MHF Connector (U.FL compatible)                                                                                                                                                   |
| <b>DATA CABLE</b>            | NA                                                                                                                                                                                     |
| <b>I/O PORTS</b>             | Refer to user's manual                                                                                                                                                                 |
| <b>ACCESSORY DEVICES</b>     | NA                                                                                                                                                                                     |

**NOTE:**

1. The EUT provides two completed transmitters and two receivers.

| MODULATION MODE | TX FUNCTION |
|-----------------|-------------|
| 802.11b         | 1TX         |
| 802.11g         | 1TX         |
| 802.11a         | 1TX         |
| 802.11n (20MHz) | 2TX         |
| 802.11n (40MHz) | 2TX         |

2. The EUT is only used in the following end product. All models are listed as below. The EUT install to end product are material, electrically identical, different model names and size are for different appearance.

| Product        | Brand   | Model          | Difference                           |
|----------------|---------|----------------|--------------------------------------|
| X-ray detector | Trixell | Pixium 3543EZ  | 35*43 cm <sup>2</sup> Cassette sized |
|                |         | Pixium 3543EZh | 35*43 cm <sup>2</sup> Handle version |
|                |         | Pixium 2430EZ  | 24*30 cm <sup>2</sup> Cassette sized |

\* After pre-testing each model, the model: Pixium 2430EZ is the worst for the final test.

3. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

### 3.2 DESCRIPTION OF TEST MODES

#### FOR 2.4GHz:

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

| 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   |         |           |

7 channels are provided for 802.11n (40MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 3       | 2422MHz   | 7       | 2442MHz   |
| 4       | 2427MHz   | 8       | 2447MHz   |
| 5       | 2432MHz   | 9       | 2452MHz   |
| 6       | 2437MHz   |         |           |

#### FOR 5.0GHz (5745 ~ 5825MHz):

5 channels are provided for 802.11a, 802.11n (20MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 149     | 5745MHz   | 161     | 5805MHz   |
| 153     | 5765MHz   | 165     | 5825MHz   |
| 157     | 5785MHz   |         |           |

2 channels are provided for 802.11n (40MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 151     | 5755MHz   | 159     | 5795MHz   |

### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

#### FOR 2.4GHz:

| EUT<br>CONFIGURE<br>MODE | APPLICABLE TO |       |        |      | DESCRIPTION |
|--------------------------|---------------|-------|--------|------|-------------|
|                          | RE $\geq$ 1G  | RE<1G | PLC    | APCM |             |
| -                        | √             | √     | NOTE 2 | √    | -           |

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

#### NOTE 1:

The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

**NOTE 2**: No need to concern of Conducted Emission due to the EUT is powered by power supply.

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

- ☒ 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.

| EUT<br>CONFIGURE<br>MODE | MODE            | AVAILABLE<br>CHANNEL | TESTED<br>CHANNEL | MODULATION<br>TECHNOLOGY | MODULATION<br>TYPE | DATA<br>RATE<br>(Mbps) |
|--------------------------|-----------------|----------------------|-------------------|--------------------------|--------------------|------------------------|
| -                        | 802.11b         | 1 to 11              | 1, 6, 11          | DSSS                     | DBPSK              | 1.0                    |
| -                        | 802.11g         | 1 to 11              | 1, 6, 11          | OFDM                     | BPSK               | 6.0                    |
| -                        | 802.11n (20MHz) | 1 to 11              | 1, 6, 11          | OFDM                     | BPSK               | 7.2                    |
| -                        | 802.11n (40MHz) | 3 to 9               | 3, 6, 9           | OFDM                     | BPSK               | 15.0                   |

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

- ☒ 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.

| EUT<br>CONFIGURE<br>MODE | MODE            | AVAILABLE<br>CHANNEL | TESTED<br>CHANNEL | MODULATION<br>TECHNOLOGY | MODULATION<br>TYPE | DATA<br>RATE<br>(Mbps) |
|--------------------------|-----------------|----------------------|-------------------|--------------------------|--------------------|------------------------|
| -                        | 802.11n (20MHz) | 1 to 11              | 1                 | OFDM                     | BPSK               | 7.2                    |

#### **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.

| EUT CONFIGURE MODE | MODE            | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|--------------------|-----------------|-------------------|----------------|-----------------------|-----------------|------------------|
| -                  | 802.11b         | 1 to 11           | 1, 11          | DSSS                  | DBPSK           | 1.0              |
| -                  | 802.11g         | 1 to 11           | 1, 11          | OFDM                  | BPSK            | 6.0              |
| -                  | 802.11n (20MHz) | 1 to 11           | 1, 11          | OFDM                  | BPSK            | 7.2              |
| -                  | 802.11n (40MHz) | 3 to 9            | 3, 9           | OFDM                  | BPSK            | 15.0             |

#### **ANTENNA PORT CONDUCTED MEASUREMENT:**

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ 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.

| EUT CONFIGURE MODE | MODE            | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|--------------------|-----------------|-------------------|----------------|-----------------------|-----------------|------------------|
| -                  | 802.11b         | 1 to 11           | 1, 6, 11       | DSSS                  | DBPSK           | 1.0              |
| -                  | 802.11g         | 1 to 11           | 1, 6, 11       | OFDM                  | BPSK            | 6.0              |
| -                  | 802.11n (20MHz) | 1 to 11           | 1, 6, 11       | OFDM                  | BPSK            | 7.2              |
| -                  | 802.11n (40MHz) | 3 to 9            | 3, 6, 9        | OFDM                  | BPSK            | 15.0             |

#### **TEST CONDITION:**

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER  | TESTED BY |
|---------------|--------------------------|--------------|-----------|
| RE $\geq$ 1G  | 25deg. C, 65%RH          | 120Vac, 60Hz | Sun Lin   |
| RE<1G         | 25deg. C, 65%RH          | 120Vac, 60Hz | Brad Tung |
| APCM          | 25deg. C, 60%RH          | 120Vac, 60Hz | Nick Chen |

### FOR 5.0GHz (5745 ~ 5825MHz):

| EUT<br>CONFIGURE<br>MODE | APPLICABLE TO |       |        |      | DESCRIPTION |
|--------------------------|---------------|-------|--------|------|-------------|
|                          | RE $\geq$ 1G  | RE<1G | PLC    | APCM |             |
| -                        | √             | √     | NOTE 2 | √    | -           |

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

#### NOTE 1:

The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

**NOTE 2:** No need to concern of Conducted Emission due to the EUT is powered by power supply.

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

- ☒ 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.

| EUT<br>CONFIGURE<br>MODE | MODE            | AVAILABLE<br>CHANNEL | TESTED<br>CHANNEL | MODULATION<br>TECHNOLOGY | MODULATION<br>TYPE | DATA<br>RATE<br>(Mbps) |
|--------------------------|-----------------|----------------------|-------------------|--------------------------|--------------------|------------------------|
| -                        | 802.11a         | 149 to 165           | 149, 157, 165     | OFDM                     | BPSK               | 6.0                    |
| -                        | 802.11n (20MHz) | 149 to 165           | 149, 157, 165     | OFDM                     | BPSK               | 7.2                    |
| -                        | 802.11n (40MHz) | 151 to 159           | 151, 159          | OFDM                     | BPSK               | 15.0                   |

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

- ☒ 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.

| EUT<br>CONFIGURE<br>MODE | MODE            | AVAILABLE<br>CHANNEL | TESTED<br>CHANNEL | MODULATION<br>TECHNOLOGY | MODULATION<br>TYPE | DATA<br>RATE<br>(Mbps) |
|--------------------------|-----------------|----------------------|-------------------|--------------------------|--------------------|------------------------|
| -                        | 802.11n (20MHz) | 149 to 165           | 149               | OFDM                     | BPSK               | 7.2                    |

### **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.

| EUT<br>CONFIGURE<br>MODE | MODE            | AVAILABLE<br>CHANNEL | TESTED<br>CHANNEL | MODULATION<br>TECHNOLOGY | MODULATION<br>TYPE | DATA<br>RATE<br>(Mbps) |
|--------------------------|-----------------|----------------------|-------------------|--------------------------|--------------------|------------------------|
| -                        | 802.11a         | 149 to 165           | 149, 165          | OFDM                     | BPSK               | 6.0                    |
| -                        | 802.11n (20MHz) | 149 to 165           | 149, 165          | OFDM                     | BPSK               | 7.2                    |
| -                        | 802.11n (40MHz) | 151 to 159           | 151, 159          | OFDM                     | BPSK               | 15.0                   |

### **ANTENNA PORT CONDUCTED MEASUREMENT:**

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ 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.

| EUT<br>CONFIGURE<br>MODE | MODE            | AVAILABLE<br>CHANNEL | TESTED<br>CHANNEL | MODULATION<br>TECHNOLOGY | MODULATION<br>TYPE | DATA<br>RATE<br>(Mbps) |
|--------------------------|-----------------|----------------------|-------------------|--------------------------|--------------------|------------------------|
| -                        | 802.11a         | 149 to 165           | 149, 157, 165     | OFDM                     | BPSK               | 6.0                    |
| -                        | 802.11n (20MHz) | 149 to 165           | 149, 157, 165     | OFDM                     | BPSK               | 7.2                    |
| -                        | 802.11n (40MHz) | 151 to 159           | 151, 159          | OFDM                     | BPSK               | 15.0                   |

### **TEST CONDITION:**

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER  | TESTED BY |
|---------------|--------------------------|--------------|-----------|
| RE $\geq$ 1G  | 25deg. C, 65%RH          | 120Vac, 60Hz | Sun Lin   |
| RE<1G         | 25deg. C, 65%RH          | 120Vac, 60Hz | Brad Tung |
| APCM          | 25deg. C, 60%RH          | 120Vac, 60Hz | Nick Chen |

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### 3.3 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.

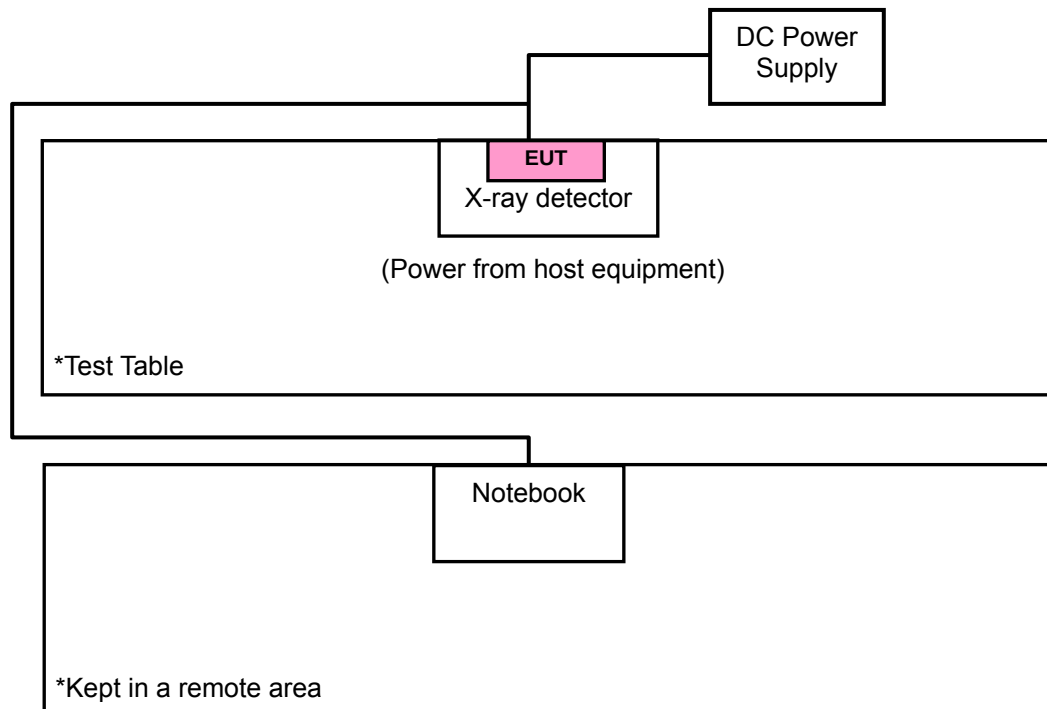
| NO. | PRODUCT         | BRAND   | MODEL NO.     | SERIAL NO. | FCC ID           |
|-----|-----------------|---------|---------------|------------|------------------|
| 1   | Notebook        | DELL    | E5420         | 33MKMQ1    | FCC DoC Approved |
| 2   | X-ray detector  | Trixell | Pixium 2430EZ | NA         | NA               |
| 3   | DC Power supply | TOPWARD | 6603D         | 802001     | NA               |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|-----|-----------------------------------------------------|
| 1   | NA                                                  |
| 2   | NA                                                  |
| 3   | NA                                                  |

**NOTE:**

1. All power cords of the above support units are non-shielded (1.8 m).
2. Item 1 acted as a communication partner to transfer data.
3. Item 2 was provided by client.

### 3.3.1 CONFIGURATION OF SYSTEM UNDER TEST



### 3.4 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)**

**558074 D01 DTS Meas Guidance v02**

**662911 D01 Multiple Transmitter Output v01 r02**

**ANSI C63.10-2009**

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.

## 4. TEST TYPES AND RESULTS (FOR 2.4GHz BAND)

### 4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

#### 4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

| FREQUENCIES<br>(MHz) | FIELD STRENGTH<br>(microvolts/meter) | MEASUREMENT DISTANCE<br>(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. 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.

#### 4.1.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER                 | MODEL NO.                    | SERIAL NO.           | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|--------------------------------------------|------------------------------|----------------------|---------------------|-------------------------|
| Test Receiver<br>ROHDE & SCHWARZ           | ESIB7                        | 100212               | Aug. 06, 2012       | Aug. 05, 2013           |
| Spectrum Analyzer<br>ROHDE & SCHWARZ       | FSP40                        | 100039               | Jan. 31, 2013       | Jan. 30, 2014           |
| BILOG Antenna<br>SCHWARZBECK               | VULB9168                     | 9168-160             | Apr. 06, 2012       | Apr. 05, 2013           |
| HORN Antenna<br>SCHWARZBECK                | 9120D                        | 209                  | Sep. 03, 2012       | Sep. 02, 2013           |
| HORN Antenna<br>SCHWARZBECK                | BBHA 9170                    | 148                  | Jul. 11, 2012       | Jul. 10, 2013           |
| Loop Antenna                               | HFH2-Z2                      | 100070               | Jan. 31, 2012       | Jan. 30, 2014           |
| Preamplifier<br>Agilent                    | 8447D                        | 2944A10633           | Oct. 25, 2012       | Oct. 24, 2013           |
| Preamplifier<br>Agilent                    | 8449B                        | 3008A01964           | Oct. 25, 2012       | Oct. 24, 2013           |
| RF signal cable<br>HUBER+SUHNNER           | SUCOFLEX 104                 | 250723/4             | Aug. 28, 2012       | Aug. 27, 2013           |
| RF signal cable<br>HUBER+SUHNNER           | SUCOFLEX 106                 | 12738/6+309224/<br>4 | Aug. 28, 2012       | Aug. 27, 2013           |
| Software<br>ADT.                           | ADT_Radiated_<br>V7.6.15.9.2 | NA                   | NA                  | NA                      |
| Antenna Tower<br>inn-co GmbH               | MA 4000                      | 013303               | NA                  | NA                      |
| Antenna Tower<br>Controller<br>inn-co GmbH | CO2000                       | 017303               | NA                  | NA                      |
| Turn Table<br>ADT.                         | TT100                        | TT93021703           | NA                  | NA                      |
| Turn Table Controller<br>ADT.              | SC100                        | SC93021703           | NA                  | NA                      |
| High Speed Peak<br>Power Meter             | ML2495A                      | 0842014              | Apr. 28, 2012       | Apr. 27, 2013           |
| Power Sensor                               | MA2411B                      | 0738404              | Apr. 28, 2012       | Apr. 27, 2013           |

- 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 calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in HwaYa Chamber 3.
4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
5. The FCC Site Registration No. is 988962.
6. The IC Site Registration No. is IC 7450F-3.

#### 4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. 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 lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

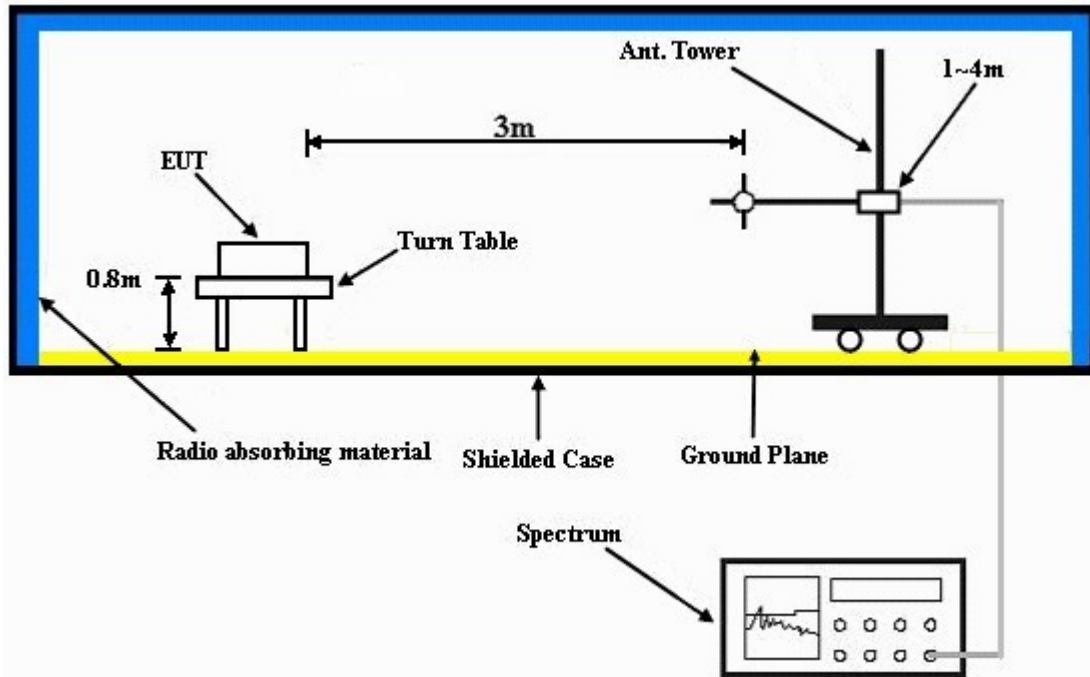
**NOTE:**

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 of test receiver/spectrum analyzer is 100kHz and video bandwidth is 300kHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 1kHz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.1.5 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.1.6 EUT OPERATING CONDITIONS

- Installed the EUT into the X-ray detector and placed them on the testing table.
- Prepared notebook to act as a communication partner and placed it outside of testing area.
- The communication partner connected with EUT and run a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.

#### 4.1.7 TEST RESULTS

##### ABOVE 1GHz DATA :

##### 802.11b

| 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 | 25deg. C, 65%RH | TESTED BY          | Sun Lin                   |

| 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     | 56.0 PK                 | 74.0           | -18.0       | 1.34 H             | 258                  | 25.20            | 30.80                    |
| 2                                                   | 2390.00     | 46.2 AV                 | 54.0           | -7.8        | 1.34 H             | 258                  | 15.40            | 30.80                    |
| 3                                                   | *2412.00    | 88.4 PK                 |                |             | 1.34 H             | 285                  | 57.50            | 30.90                    |
| 4                                                   | *2412.00    | 81.1 AV                 |                |             | 1.34 H             | 285                  | 50.20            | 30.90                    |
| 5                                                   | 4824.00     | 46.6 PK                 | 74.0           | -27.4       | 1.37 H             | 288                  | 9.60             | 37.00                    |
| 6                                                   | 4824.00     | 35.7 AV                 | 54.0           | -18.3       | 1.37 H             | 288                  | -1.30            | 37.00                    |
| 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     | 55.6 PK                 | 74.0           | -18.4       | 1.08 V             | 253                  | 24.80            | 30.80                    |
| 2                                                   | 2390.00     | 46.0 AV                 | 54.0           | -8.0        | 1.08 V             | 253                  | 15.20            | 30.80                    |
| 3                                                   | *2412.00    | 85.2 PK                 |                |             | 1.08 V             | 253                  | 54.30            | 30.90                    |
| 4                                                   | *2412.00    | 76.7 AV                 |                |             | 1.08 V             | 253                  | 45.80            | 30.90                    |
| 5                                                   | 4824.00     | 46.4 PK                 | 74.0           | -27.6       | 1.28 V             | 147                  | 9.40             | 37.00                    |
| 6                                                   | 4824.00     | 34.4 AV                 | 54.0           | -19.6       | 1.28 V             | 147                  | -2.60            | 37.00                    |

##### 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 | 25deg. C, 65%RH | TESTED BY          | Sun Lin                   |

| 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    | 88.7 PK                 |                |             | 1.29 H             | 262                  | 57.70            | 31.00                    |
| 2                                                   | *2437.00    | 81.5 AV                 |                |             | 1.29 H             | 262                  | 50.50            | 31.00                    |
| 3                                                   | 4874.00     | 46.8 PK                 | 74.0           | -27.2       | 1.28 H             | 301                  | 9.70             | 37.10                    |
| 4                                                   | 4874.00     | 35.8 AV                 | 54.0           | -18.2       | 1.28 H             | 301                  | -1.30            | 37.10                    |
| 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    | 85.6 PK                 |                |             | 1.12 V             | 257                  | 54.60            | 31.00                    |
| 2                                                   | *2437.00    | 76.8 AV                 |                |             | 1.12 V             | 257                  | 45.80            | 31.00                    |
| 3                                                   | 4874.00     | 46.8 PK                 | 74.0           | -27.2       | 1.32 V             | 152                  | 9.70             | 37.10                    |
| 4                                                   | 4874.00     | 34.8 AV                 | 54.0           | -19.2       | 1.32 V             | 152                  | -2.30            | 37.10                    |

**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 | 25deg. C, 65%RH | TESTED BY          | Sun Lin                   |

| 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    | 90.3 PK                 |                |             | 1.30 H             | 347                  | 59.20            | 31.10                    |
| 2                                                   | *2462.00    | 82.2 AV                 |                |             | 1.30 H             | 347                  | 51.10            | 31.10                    |
| 3                                                   | 2483.50     | 56.8 PK                 | 74.0           | -17.2       | 1.30 H             | 347                  | 25.60            | 31.20                    |
| 4                                                   | 2483.50     | 47.2 AV                 | 54.0           | -6.8        | 1.30 H             | 347                  | 16.00            | 31.20                    |
| 5                                                   | 4924.00     | 46.2 PK                 | 74.0           | -27.8       | 1.39 H             | 304                  | 9.00             | 37.20                    |
| 6                                                   | 4924.00     | 35.4 AV                 | 54.0           | -18.6       | 1.39 H             | 304                  | -1.80            | 37.20                    |
| 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    | 85.6 PK                 |                |             | 1.04 V             | 269                  | 54.50            | 31.10                    |
| 2                                                   | *2462.00    | 76.9 AV                 |                |             | 1.04 V             | 269                  | 45.80            | 31.10                    |
| 3                                                   | 2483.50     | 55.2 PK                 | 74.0           | -18.8       | 1.04 V             | 269                  | 24.00            | 31.20                    |
| 4                                                   | 2483.50     | 45.8 AV                 | 54.0           | -8.2        | 1.04 V             | 269                  | 14.60            | 31.20                    |
| 5                                                   | 4924.00     | 45.9 PK                 | 74.0           | -28.1       | 1.22 V             | 152                  | 8.70             | 37.20                    |
| 6                                                   | 4924.00     | 35.0 AV                 | 54.0           | -19.0       | 1.22 V             | 152                  | -2.20            | 37.20                    |

**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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## 802.11g

| 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 | 25deg. C, 65%RH | TESTED BY          | Sun Lin                   |

| 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     | 56.3 PK                 | 74.0           | -17.7       | 1.34 H             | 29                   | 25.50            | 30.80                    |
| 2                                                   | 2390.00     | 46.0 AV                 | 54.0           | -8.0        | 1.34 H             | 29                   | 15.20            | 30.80                    |
| 3                                                   | *2412.00    | 90.1 PK                 |                |             | 1.34 H             | 29                   | 59.20            | 30.90                    |
| 4                                                   | *2412.00    | 82.8 AV                 |                |             | 1.34 H             | 29                   | 51.90            | 30.90                    |
| 5                                                   | 4824.00     | 46.6 PK                 | 74.0           | -27.4       | 1.32 H             | 296                  | 9.60             | 37.00                    |
| 6                                                   | 4824.00     | 35.6 AV                 | 54.0           | -18.4       | 1.32 H             | 296                  | -1.40            | 37.00                    |
| 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     | 57.0 PK                 | 74.0           | -17.0       | 1.08 V             | 253                  | 26.20            | 30.80                    |
| 2                                                   | 2390.00     | 46.5 AV                 | 54.0           | -7.5        | 1.08 V             | 253                  | 15.70            | 30.80                    |
| 3                                                   | *2412.00    | 84.9 PK                 |                |             | 1.08 V             | 253                  | 54.00            | 30.90                    |
| 4                                                   | *2412.00    | 77.9 AV                 |                |             | 1.08 V             | 253                  | 47.00            | 30.90                    |
| 5                                                   | 4824.00     | 45.2 PK                 | 74.0           | -28.8       | 1.32 V             | 152                  | 8.20             | 37.00                    |
| 6                                                   | 4824.00     | 35.4 AV                 | 54.0           | -18.6       | 1.32 V             | 152                  | -1.60            | 37.00                    |

## 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 | 25deg. C, 65%RH | TESTED BY          | Sun Lin                   |

| 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    | 90.5 PK                 |                |             | 1.39 H             | 32                   | 59.50            | 31.00                    |
| 2                                                   | *2437.00    | 83.1 AV                 |                |             | 1.39 H             | 32                   | 52.10            | 31.00                    |
| 3                                                   | 4874.00     | 46.8 PK                 | 74.0           | -27.2       | 1.34 H             | 301                  | 9.70             | 37.10                    |
| 4                                                   | 4874.00     | 35.8 AV                 | 54.0           | -18.2       | 1.34 H             | 301                  | -1.30            | 37.10                    |
| 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    | 85.2 PK                 |                |             | 1.02 V             | 265                  | 54.20            | 31.00                    |
| 2                                                   | *2437.00    | 78.0 AV                 |                |             | 1.02 V             | 265                  | 47.00            | 31.00                    |
| 3                                                   | 4874.00     | 45.6 PK                 | 74.0           | -28.4       | 1.29 V             | 162                  | 8.50             | 37.10                    |
| 4                                                   | 4874.00     | 35.8 AV                 | 54.0           | -18.2       | 1.29 V             | 162                  | -1.30            | 37.10                    |

**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 | 25deg. C, 65%RH | TESTED BY          | Sun Lin                   |

| 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    | 90.7 PK                 |                |             | 1.06 H             | 12                   | 59.60            | 31.10                    |
| 2                                                   | *2462.00    | 83.7 AV                 |                |             | 1.06 H             | 12                   | 52.60            | 31.10                    |
| 3                                                   | 2483.50     | 57.0 PK                 | 74.0           | -17.0       | 1.06 H             | 12                   | 25.80            | 31.20                    |
| 4                                                   | 2483.50     | 46.5 AV                 | 54.0           | -7.5        | 1.06 H             | 12                   | 15.30            | 31.20                    |
| 5                                                   | 4924.00     | 46.9 PK                 | 74.0           | -27.1       | 1.37 H             | 305                  | 9.70             | 37.20                    |
| 6                                                   | 4924.00     | 35.8 AV                 | 54.0           | -18.2       | 1.37 H             | 305                  | -1.40            | 37.20                    |
| 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    | 85.2 PK                 |                |             | 1.29 V             | 148                  | 54.10            | 31.10                    |
| 2                                                   | *2462.00    | 78.0 AV                 |                |             | 1.29 V             | 148                  | 46.90            | 31.10                    |
| 3                                                   | 2483.50     | 56.4 PK                 | 74.0           | -17.6       | 1.29 V             | 148                  | 25.20            | 31.20                    |
| 4                                                   | 2483.50     | 46.2 AV                 | 54.0           | -7.8        | 1.29 V             | 148                  | 15.00            | 31.20                    |
| 5                                                   | 4924.00     | 45.8 PK                 | 74.0           | -28.2       | 1.28 V             | 137                  | 8.60             | 37.20                    |
| 6                                                   | 4924.00     | 35.8 AV                 | 54.0           | -18.2       | 1.28 V             | 137                  | -1.40            | 37.20                    |

**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.



A D T

## 802.11n (20MHz)

| 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 | 25deg. C, 65%RH | TESTED BY          | Sun Lin                   |

| 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     | 56.5 PK                 | 74.0           | -17.5       | 1.05 H             | 16                   | 25.70            | 30.80                    |
| 2                                                   | 2390.00     | 46.3 AV                 | 54.0           | -7.7        | 1.05 H             | 16                   | 15.50            | 30.80                    |
| 3                                                   | *2412.00    | 86.7 PK                 |                |             | 1.12 H             | 7                    | 55.80            | 30.90                    |
| 4                                                   | *2412.00    | 78.5 AV                 |                |             | 1.12 H             | 7                    | 47.60            | 30.90                    |
| 5                                                   | 4824.00     | 47.7 PK                 | 74.0           | -26.3       | 1.04 H             | 196                  | 10.70            | 37.00                    |
| 6                                                   | 4824.00     | 36.8 AV                 | 54.0           | -17.2       | 1.04 H             | 196                  | -0.20            | 37.00                    |
| 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     | 55.4 PK                 | 74.0           | -18.6       | 1.07 V             | 254                  | 24.60            | 30.80                    |
| 2                                                   | 2390.00     | 45.1 AV                 | 54.0           | -8.9        | 1.07 V             | 254                  | 14.30            | 30.80                    |
| 3                                                   | *2412.00    | 81.3 PK                 |                |             | 1.07 V             | 254                  | 50.40            | 30.90                    |
| 4                                                   | *2412.00    | 73.4 AV                 |                |             | 1.07 V             | 254                  | 42.50            | 30.90                    |
| 5                                                   | 4824.00     | 45.8 PK                 | 74.0           | -28.2       | 1.28 V             | 307                  | 8.80             | 37.00                    |
| 6                                                   | 4824.00     | 35.5 AV                 | 54.0           | -18.5       | 1.28 V             | 307                  | -1.50            | 37.00                    |

## 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 | 25deg. C, 65%RH | TESTED BY          | Sun Lin                   |

| 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    | 86.9 PK                 |                |             | 1.08 H             | 15                   | 55.90            | 31.00                    |
| 2                                                   | *2437.00    | 78.6 AV                 |                |             | 1.08 H             | 15                   | 47.60            | 31.00                    |
| 3                                                   | 4874.00     | 47.2 PK                 | 74.0           | -26.8       | 1.08 H             | 202                  | 10.10            | 37.10                    |
| 4                                                   | 4874.00     | 36.4 AV                 | 54.0           | -17.6       | 1.08 H             | 202                  | -0.70            | 37.10                    |
| 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    | 81.5 PK                 |                |             | 1.05 V             | 258                  | 50.50            | 31.00                    |
| 2                                                   | *2437.00    | 73.5 AV                 |                |             | 1.05 V             | 258                  | 42.50            | 31.00                    |
| 3                                                   | 4874.00     | 46.2 PK                 | 74.0           | -27.8       | 1.22 V             | 298                  | 9.10             | 37.10                    |
| 4                                                   | 4874.00     | 35.8 AV                 | 54.0           | -18.2       | 1.22 V             | 298                  | -1.30            | 37.10                    |

**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 | 25deg. C, 65%RH | TESTED BY          | Sun Lin                   |

| 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    | 88.9 PK                 |                |             | 1.04 H             | 23                   | 57.80            | 31.10                    |
| 2                                                   | *2462.00    | 80.5 AV                 |                |             | 1.04 H             | 23                   | 49.40            | 31.10                    |
| 3                                                   | 2483.50     | 56.7 PK                 | 74.0           | -17.3       | 1.04 H             | 23                   | 25.50            | 31.20                    |
| 4                                                   | 2483.50     | 46.8 AV                 | 54.0           | -7.2        | 1.04 H             | 23                   | 15.60            | 31.20                    |
| 5                                                   | 4924.00     | 47.2 PK                 | 74.0           | -26.8       | 1.05 H             | 189                  | 10.00            | 37.20                    |
| 6                                                   | 4924.00     | 36.5 AV                 | 54.0           | -17.5       | 1.05 H             | 189                  | -0.70            | 37.20                    |
| 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    | 83.4 PK                 |                |             | 1.02 V             | 262                  | 52.30            | 31.10                    |
| 2                                                   | *2462.00    | 75.8 AV                 |                |             | 1.02 V             | 262                  | 44.70            | 31.10                    |
| 3                                                   | 2483.50     | 55.4 PK                 | 74.0           | -18.6       | 1.02 V             | 262                  | 24.20            | 31.20                    |
| 4                                                   | 2483.50     | 45.8 AV                 | 54.0           | -8.2        | 1.02 V             | 262                  | 14.60            | 31.20                    |
| 5                                                   | 4924.00     | 45.4 PK                 | 74.0           | -28.6       | 1.32 V             | 299                  | 8.20             | 37.20                    |
| 6                                                   | 4924.00     | 35.2 AV                 | 54.0           | -18.8       | 1.32 V             | 299                  | -2.00            | 37.20                    |

**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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## 802.11n (40MHz)

| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |                           |
|--------------------------|-----------------|--------------------|---------------------------|
| CHANNEL                  | Channel 3       | FREQUENCY RANGE    | 1 ~ 25GHz                 |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY          | Sun Lin                   |

| 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     | 56.0 PK                 | 74.0           | -18.0       | 1.06 H             | 10                   | 25.20            | 30.80                    |
| 2                                                   | 2390.00     | 46.2 AV                 | 54.0           | -7.8        | 1.06 H             | 10                   | 15.40            | 30.80                    |
| 3                                                   | *2422.00    | 85.5 PK                 |                |             | 1.06 H             | 10                   | 54.60            | 30.90                    |
| 4                                                   | *2422.00    | 78.4 AV                 |                |             | 1.06 H             | 10                   | 47.50            | 30.90                    |
| 5                                                   | 4844.00     | 46.4 PK                 | 74.0           | -27.6       | 1.02 H             | 202                  | 9.40             | 37.00                    |
| 6                                                   | 4844.00     | 35.6 AV                 | 54.0           | -18.4       | 1.02 H             | 202                  | -1.40            | 37.00                    |
| 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     | 54.5 PK                 | 74.0           | -19.5       | 1.05 V             | 252                  | 23.70            | 30.80                    |
| 2                                                   | 2390.00     | 45.3 AV                 | 54.0           | -8.7        | 1.05 V             | 252                  | 14.50            | 30.80                    |
| 3                                                   | *2422.00    | 79.5 PK                 |                |             | 1.08 V             | 252                  | 48.60            | 30.90                    |
| 4                                                   | *2422.00    | 72.4 AV                 |                |             | 1.08 V             | 252                  | 41.50            | 30.90                    |
| 5                                                   | 4844.00     | 45.7 PK                 | 74.0           | -28.3       | 1.32 V             | 312                  | 8.70             | 37.00                    |
| 6                                                   | 4844.00     | 35.8 AV                 | 54.0           | -18.2       | 1.32 V             | 312                  | -1.20            | 37.00                    |

## 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 | 25deg. C, 65%RH | TESTED BY          | Sun Lin                   |

| 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    | 85.8 PK                 |                |             | 1.08 H             | 7                    | 54.80            | 31.00                    |
| 2                                                   | *2437.00    | 78.6 AV                 |                |             | 1.08 H             | 7                    | 47.60            | 31.00                    |
| 3                                                   | 4874.00     | 46.7 PK                 | 74.0           | -27.3       | 1.08 H             | 183                  | 9.60             | 37.10                    |
| 4                                                   | 4874.00     | 35.9 AV                 | 54.0           | -18.1       | 1.08 H             | 183                  | -1.20            | 37.10                    |
| 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    | 79.9 PK                 |                |             | 1.08 V             | 247                  | 48.90            | 31.00                    |
| 2                                                   | *2437.00    | 72.6 AV                 |                |             | 1.08 V             | 247                  | 41.60            | 31.00                    |
| 3                                                   | 4874.00     | 45.8 PK                 | 74.0           | -28.2       | 1.28 V             | 309                  | 8.70             | 37.10                    |
| 4                                                   | 4874.00     | 36.2 AV                 | 54.0           | -17.8       | 1.28 V             | 309                  | -0.90            | 37.10                    |

**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 9       | FREQUENCY RANGE    | 1 ~ 25GHz                 |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY          | Sun Lin                   |

| 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                                                   | *2452.00    | 86.8 PK                 |                |             | 1.02 H             | 12                   | 55.70            | 31.10                    |
| 2                                                   | *2452.00    | 79.5 AV                 |                |             | 1.02 H             | 12                   | 48.40            | 31.10                    |
| 3                                                   | 2483.50     | 56.4 PK                 | 74.0           | -17.6       | 1.02 H             | 12                   | 25.20            | 31.20                    |
| 4                                                   | 2483.50     | 46.0 AV                 | 54.0           | -8.0        | 1.02 H             | 12                   | 14.80            | 31.20                    |
| 5                                                   | 4904.00     | 46.8 PK                 | 74.0           | -27.2       | 1.08 H             | 198                  | 9.60             | 37.20                    |
| 6                                                   | 4904.00     | 35.8 AV                 | 54.0           | -18.2       | 1.08 H             | 198                  | -1.40            | 37.20                    |
| 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                                                   | *2452.00    | 80.6 PK                 |                |             | 1.02 V             | 236                  | 49.50            | 31.10                    |
| 2                                                   | *2452.00    | 73.6 AV                 |                |             | 1.02 V             | 236                  | 42.50            | 31.10                    |
| 3                                                   | 2483.50     | 56.0 PK                 | 74.0           | -18.0       | 1.02 V             | 236                  | 24.80            | 31.20                    |
| 4                                                   | 2483.50     | 45.8 AV                 | 54.0           | -8.2        | 1.02 V             | 236                  | 14.60            | 31.20                    |
| 5                                                   | 4904.00     | 46.8 PK                 | 74.0           | -27.2       | 1.28 V             | 298                  | 9.60             | 37.20                    |
| 6                                                   | 4904.00     | 35.9 AV                 | 54.0           | -18.1       | 1.28 V             | 298                  | -1.30            | 37.20                    |

**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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## BELOW 1GHz WORST-CASE DATA : 802.11n (20MHz)

| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |               |
|--------------------------|-----------------|--------------------|---------------|
| CHANNEL                  | Channel 1       | FREQUENCY RANGE    | Below 1000MHz |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Quasi-Peak    |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY          | Brad Tung     |

| 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                                                   | 57.12       | 26.9 QP                 | 40.0           | -13.1       | 1.50 H             | 6                    | 13.30            | 13.60                    |
| 2                                                   | 103.78      | 27.0 QP                 | 43.5           | -16.5       | 1.25 H             | 57                   | 17.30            | 9.70                     |
| 3                                                   | 175.72      | 25.1 QP                 | 43.5           | -18.4       | 1.00 H             | 100                  | 12.10            | 13.00                    |
| 4                                                   | 249.60      | 21.9 QP                 | 46.0           | -24.1       | 1.50 H             | 208                  | 8.70             | 13.20                    |
| 5                                                   | 352.65      | 24.2 QP                 | 46.0           | -21.8       | 1.00 H             | 248                  | 7.80             | 16.40                    |
| 6                                                   | 500.42      | 23.9 QP                 | 46.0           | -22.1       | 1.00 H             | 176                  | 3.80             | 20.10                    |
| 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                                                   | 49.34       | 31.7 QP                 | 40.0           | -8.3        | 1.25 V             | 279                  | 17.90            | 13.80                    |
| 2                                                   | 97.95       | 34.1 QP                 | 43.5           | -9.4        | 1.00 V             | 84                   | 25.10            | 9.00                     |
| 3                                                   | 142.67      | 26.6 QP                 | 43.5           | -16.9       | 2.00 V             | 243                  | 13.10            | 13.50                    |
| 4                                                   | 249.60      | 27.7 QP                 | 46.0           | -18.3       | 1.00 V             | 251                  | 14.50            | 13.20                    |
| 5                                                   | 327.38      | 35.1 QP                 | 46.0           | -10.9       | 1.00 V             | 211                  | 19.30            | 15.80                    |
| 6                                                   | 500.42      | 32.2 QP                 | 46.0           | -13.8       | 2.00 V             | 73                   | 12.10            | 20.10                    |

## REMARKS:

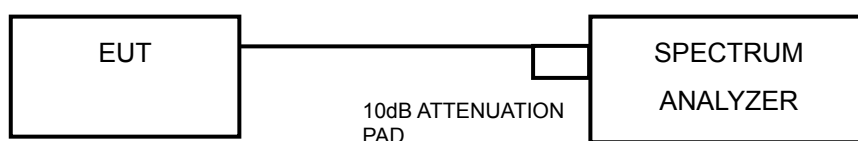
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

## 4.2 6dB BANDWIDTH MEASUREMENT

### 4.2.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

### 4.2.2 TEST SETUP



### 4.2.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.2.4 TEST PROCEDURE

- Set resolution bandwidth (RBW) = approximately 1% of the emission bandwidth
- Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

### 4.2.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.2.6 EUT OPERATING CONDITIONS

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

## 4.2.7 TEST RESULTS

### 802.11b

| CHANNEL | FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---------|-----------------|---------------------|---------------------|-------------|
| 1       | 2412            | 12.08               | 0.5                 | PASS        |
| 6       | 2437            | 12.10               | 0.5                 | PASS        |
| 11      | 2462            | 12.10               | 0.5                 | PASS        |

### 802.11g

| CHANNEL | FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---------|-----------------|---------------------|---------------------|-------------|
| 1       | 2412            | 16.54               | 0.5                 | PASS        |
| 6       | 2437            | 16.53               | 0.5                 | PASS        |
| 11      | 2462            | 16.51               | 0.5                 | PASS        |

### 802.11n (20MHz)

| CHANNEL | FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) |         | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---------|-----------------|---------------------|---------|---------------------|-------------|
|         |                 | CHAIN 0             | CHAIN 1 |                     |             |
| 1       | 2412            | 17.63               | 17.61   | 0.5                 | PASS        |
| 6       | 2437            | 17.65               | 17.63   | 0.5                 | PASS        |
| 11      | 2462            | 17.63               | 17.61   | 0.5                 | PASS        |

### 802.11n (40MHz)

| CHANNEL | FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) |         | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---------|-----------------|---------------------|---------|---------------------|-------------|
|         |                 | CHAIN 0             | CHAIN 1 |                     |             |
| 3       | 2422            | 36.47               | 36.48   | 0.5                 | PASS        |
| 6       | 2437            | 36.52               | 36.50   | 0.5                 | PASS        |
| 9       | 2452            | 36.53               | 36.50   | 0.5                 | PASS        |

### 4.3 CONDUCTED OUTPUT POWER

#### 4.3.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output v01r02 Method of conducted output power measurement on IEEE 802.11 devices,

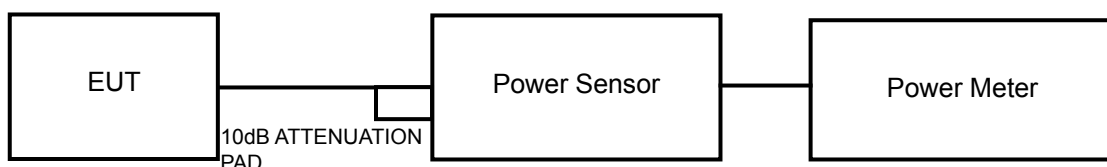
Array Gain = 0 dB (i.e., no array gain) for  $NANT \leq 4$ ;

Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  MHz for any NANT;

Array Gain =  $5 \log(NANT/NSS)$  dB or 3 dB, whichever is less for 20-MHz channel widths with  $NANT \geq 5$ .

For power measurements on all other devices: Array Gain =  $10 \log(NANT/NSS)$  dB.

#### 4.3.2 TEST SETUP



#### 4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 TEST PROCEDURES

An average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor. Record the average power level.



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#### 4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.3.6 EUT OPERATING CONDITIONS

Same as Item 4.2.6.

#### 4.3.7 TEST RESULTS

##### FOR AVERAGE POWER

###### 802.11b

| CHANNEL | FREQUENCY (MHz) | AVERAGE POWER (mW) | AVERAGE POWER (dBm) |
|---------|-----------------|--------------------|---------------------|
| 1       | 2412            | 4.395              | 6.43                |
| 6       | 2437            | 4.477              | 6.51                |
| 11      | 2462            | 4.227              | 6.26                |

###### 802.11g

| CHANNEL | FREQUENCY (MHz) | AVERAGE POWER (mW) | AVERAGE POWER (dBm) |
|---------|-----------------|--------------------|---------------------|
| 1       | 2412            | 4.667              | 6.69                |
| 6       | 2437            | 4.688              | 6.71                |
| 11      | 2462            | 4.560              | 6.59                |

###### 802.11n (20MHz)

| CHAN. | FREQUENCY (MHz) | AVG. POWER (dBm) |         | TOTAL POWER (mW) | TOTAL POWER (dBm) |
|-------|-----------------|------------------|---------|------------------|-------------------|
|       |                 | CHAIN 0          | CHAIN 1 |                  |                   |
| 1     | 2412            | 3.73             | 3.65    | 4.677            | 6.70              |
| 6     | 2437            | 3.90             | 3.42    | 4.653            | 6.68              |
| 11    | 2462            | 3.84             | 3.03    | 4.430            | 6.46              |

###### 802.11n (40MHz)

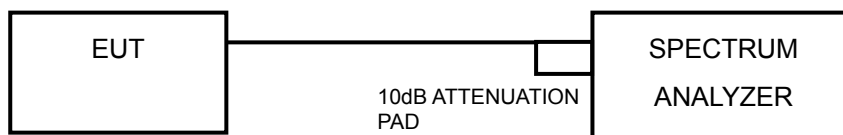
| CHAN. | FREQUENCY (MHz) | AVG. POWER (dBm) |         | TOTAL POWER (mW) | TOTAL POWER (dBm) |
|-------|-----------------|------------------|---------|------------------|-------------------|
|       |                 | CHAIN 0          | CHAIN 1 |                  |                   |
| 3     | 2422            | 3.46             | 3.20    | 4.307            | 6.34              |
| 6     | 2437            | 3.64             | 3.12    | 4.363            | 6.40              |
| 9     | 2452            | 3.51             | 3.02    | 4.248            | 6.28              |

#### 4.4 POWER SPECTRAL DENSITY MEASUREMENT

##### 4.4.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

##### 4.4.2 TEST SETUP



##### 4.4.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

##### 4.4.4 TEST PROCEDURE

- Set the RBW = 3 kHz, VBW = 10 kHz, Detector = peak.
- Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

##### 4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

##### 4.4.6 EUT OPERATING CONDITION

Same as Item 4.2.6

#### 4.4.7 TEST RESULTS

##### 802.11b

| Channel | Freq. (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | PASS /FAIL |
|---------|-------------|----------------|------------------|------------|
| 1       | 2412        | -24.33         | 8                | PASS       |
| 6       | 2437        | -23.42         | 8                | PASS       |
| 11      | 2462        | -23.70         | 8                | PASS       |

##### 802.11g

| Channel | Freq. (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | PASS /FAIL |
|---------|-------------|----------------|------------------|------------|
| 1       | 2412        | -21.90         | 8                | PASS       |
| 6       | 2437        | -21.34         | 8                | PASS       |
| 11      | 2462        | -21.54         | 8                | PASS       |

##### 802.11n (20MHz)

| TX chain | Channel | Freq. (MHz) | PSD (dBm/3kHz) | 10 log (N=2) dB | Total PSD (dBm/3kHz) | Limit (dBm/3kHz) | PASS /FAIL |
|----------|---------|-------------|----------------|-----------------|----------------------|------------------|------------|
| 0        | 1       | 2412        | -22.15         | 3.01            | -19.14               | 7.99             | PASS       |
|          | 6       | 2437        | -23.09         | 3.01            | -20.08               | 7.99             | PASS       |
|          | 11      | 2462        | -22.92         | 3.01            | -19.91               | 7.99             | PASS       |
| 1        | 1       | 2412        | -22.66         | 3.01            | -19.65               | 7.99             | PASS       |
|          | 6       | 2437        | -23.40         | 3.01            | -20.39               | 7.99             | PASS       |
|          | 11      | 2462        | -23.48         | 3.01            | -20.47               | 7.99             | PASS       |

**NOTE:** Directional gain = 3dBi + 10log(2) = 6.01dBi > 6dBi, so the power density limit shall be reduced to 8-(6.01-6) = 7.99dBm.

##### 802.11n (40MHz)

| TX chain | Channel | Freq. (MHz) | PSD (dBm/3kHz) | 10 log (N=2) dB | Total PSD (dBm/3kHz) | Limit (dBm/3kHz) | PASS /FAIL |
|----------|---------|-------------|----------------|-----------------|----------------------|------------------|------------|
| 0        | 3       | 2422        | -24.57         | 3.01            | -21.56               | 7.99             | PASS       |
|          | 6       | 2437        | -25.50         | 3.01            | -22.49               | 7.99             | PASS       |
|          | 9       | 2452        | -24.62         | 3.01            | -21.61               | 7.99             | PASS       |
| 1        | 3       | 2422        | -24.50         | 3.01            | -21.49               | 7.99             | PASS       |
|          | 6       | 2437        | -25.69         | 3.01            | -22.68               | 7.99             | PASS       |
|          | 9       | 2452        | -26.45         | 3.01            | -23.44               | 7.99             | PASS       |

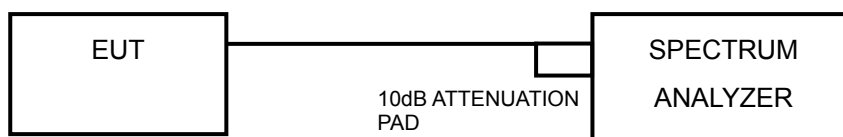
**NOTE:** Directional gain = 3dBi + 10log(2) = 6.01dBi > 6dBi, so the power density limit shall be reduced to 8-(6.01-6) = 7.99dBm.

## 4.5 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

### 4.5.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

### 4.5.2 TEST SETUP



### 4.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.5.4 TEST PROCEDURE

#### MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW  $\geq$  300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

## **MEASUREMENT PROCEDURE OOB**

1. Set RBW = 100 kHz.
2. Set VBW  $\geq$  300 kHz.
3. Set span to encompass the spectrum to be examined.
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

### **4.5.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **4.5.6 EUT OPERATING CONDITION**

Same as Item 4.2.6

### **4.5.7 TEST RESULTS**

The conducted emission test is performed on each TX port of operating mode without summing or adding  $10\log(N)$  since the limit is relative emission limit.

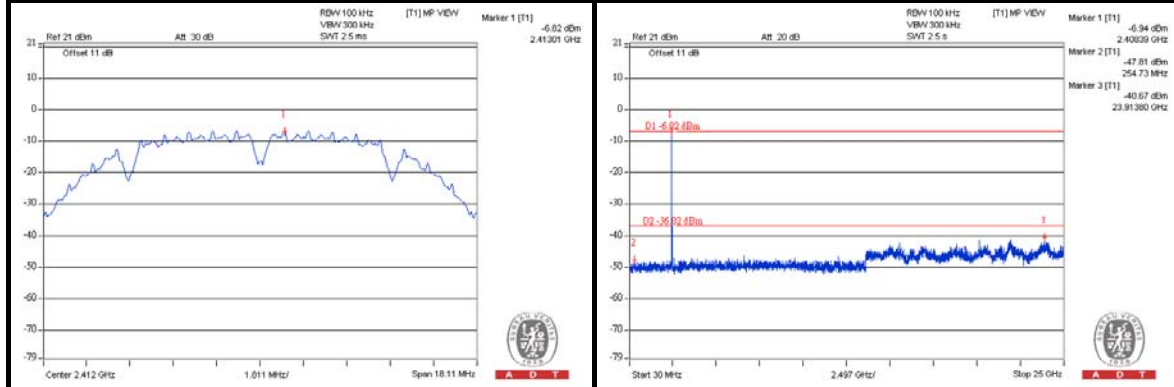
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



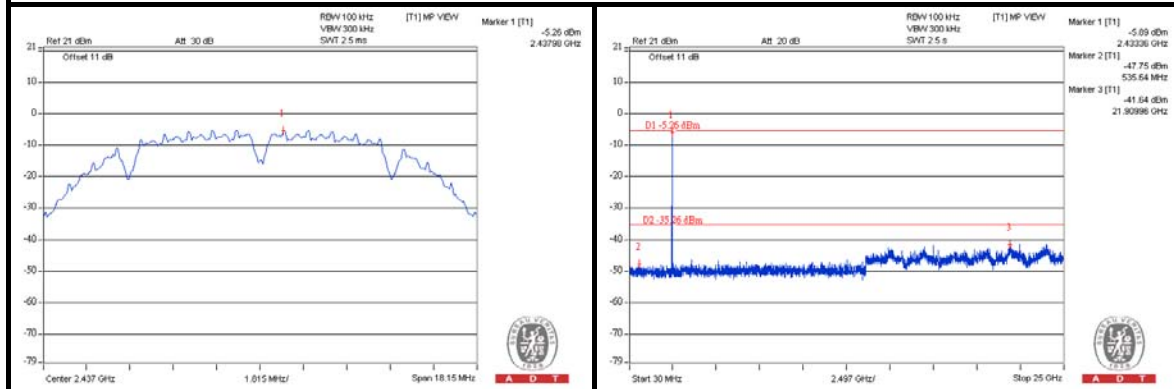
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802.11b

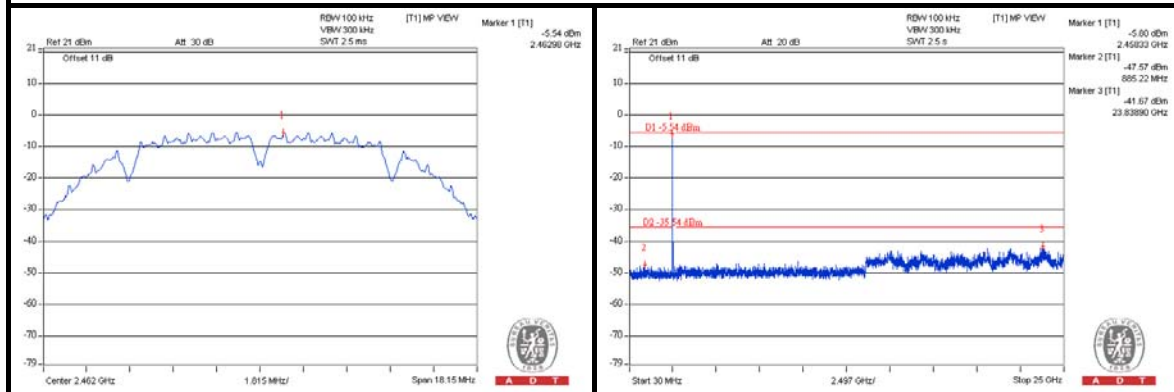
### CH 1



### CH 6

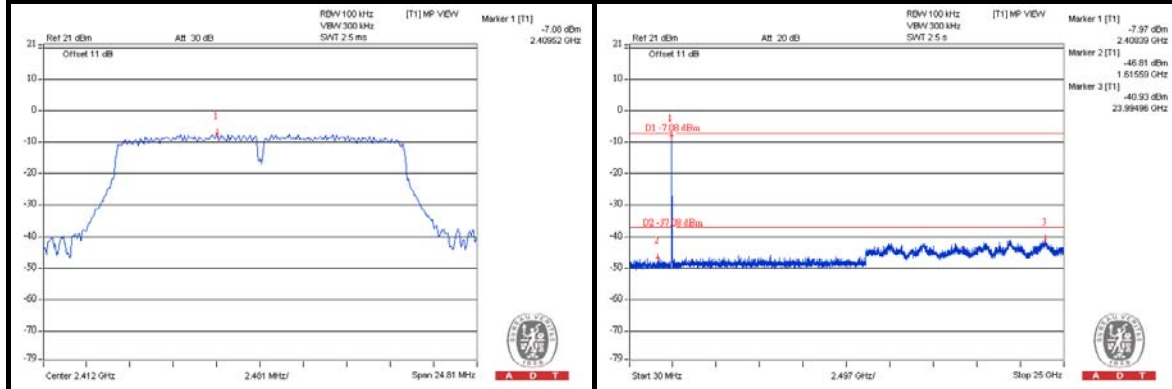


### CH 11

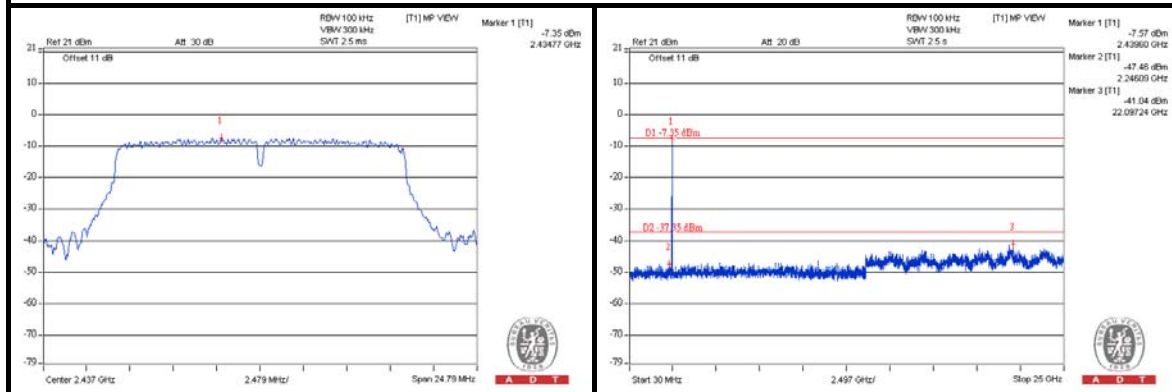


802.11g

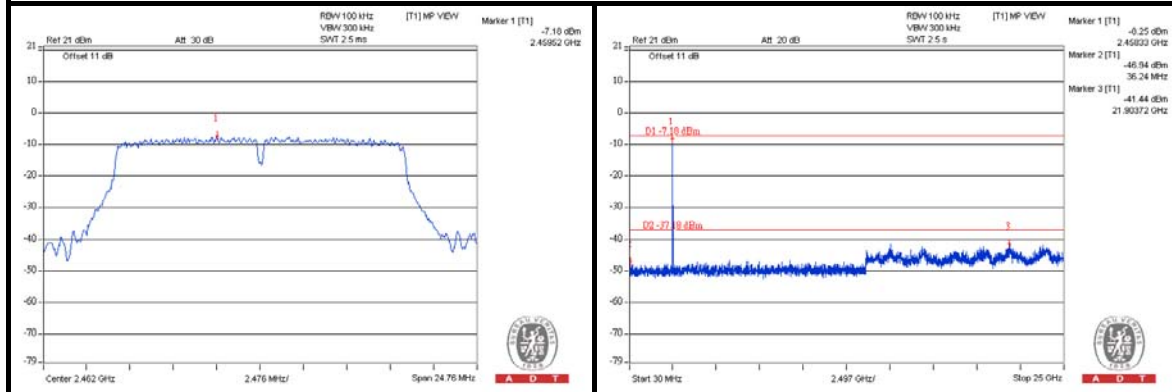
### CH 1



### CH 6



### CH 11



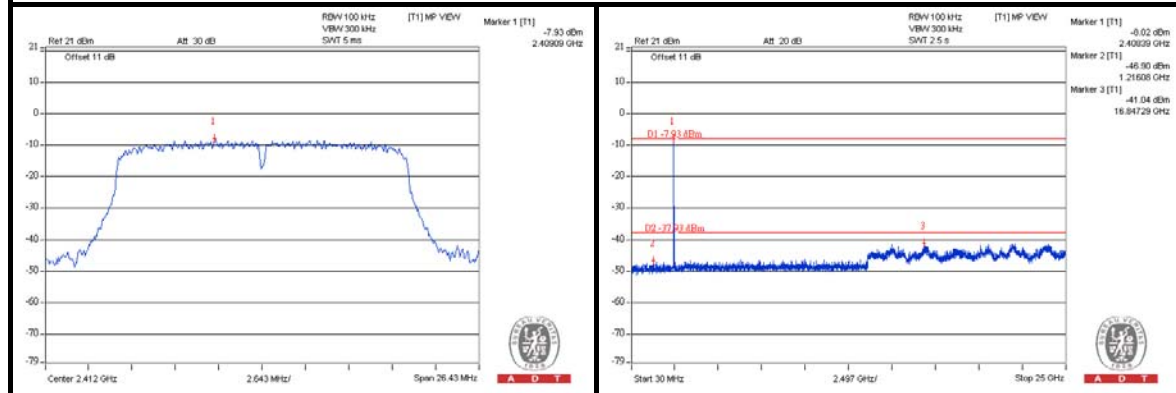


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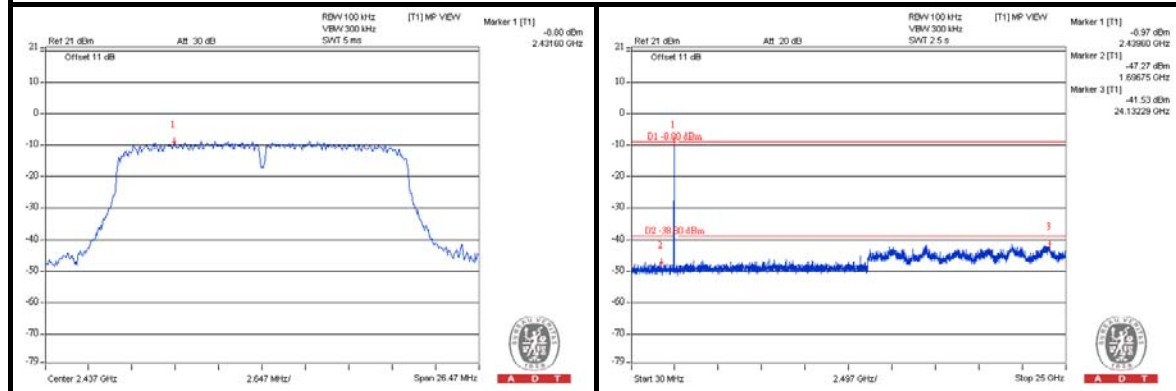
802.11n (20MHz)

CHAIN 0

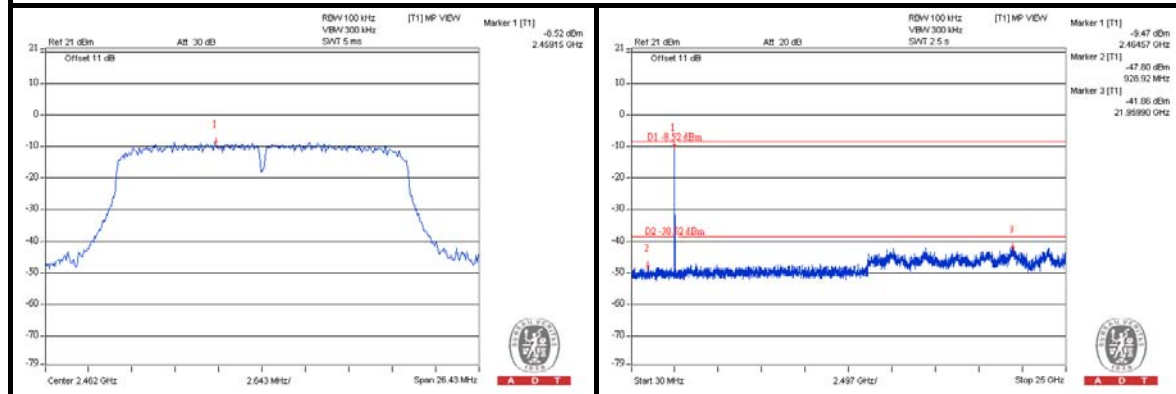
CH 1



CH 6



CH 11

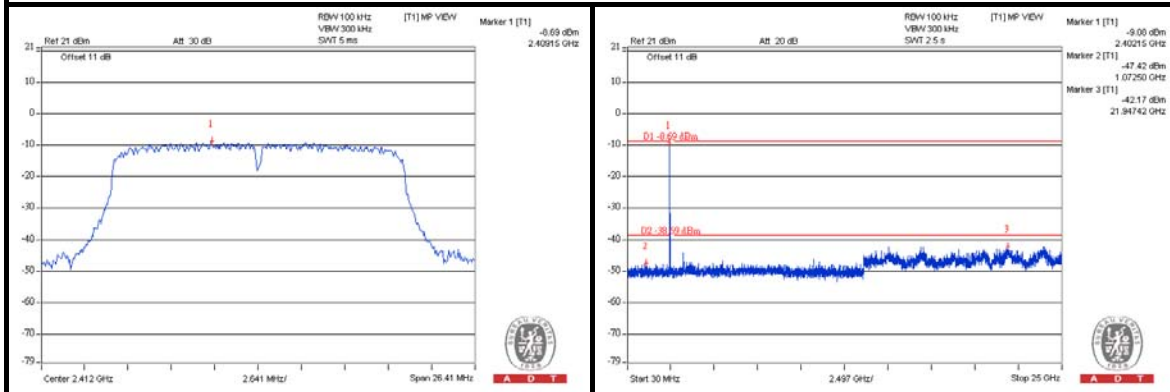




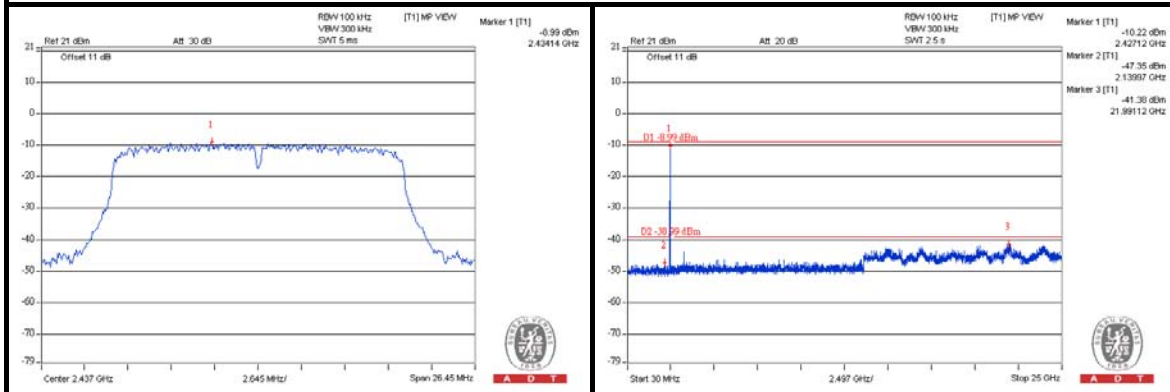
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## CHAIN 1

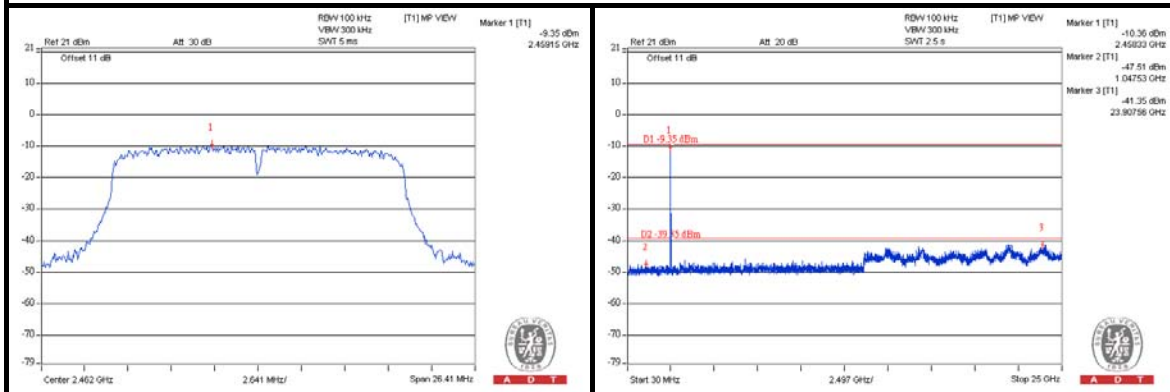
### CH 1



### CH 6

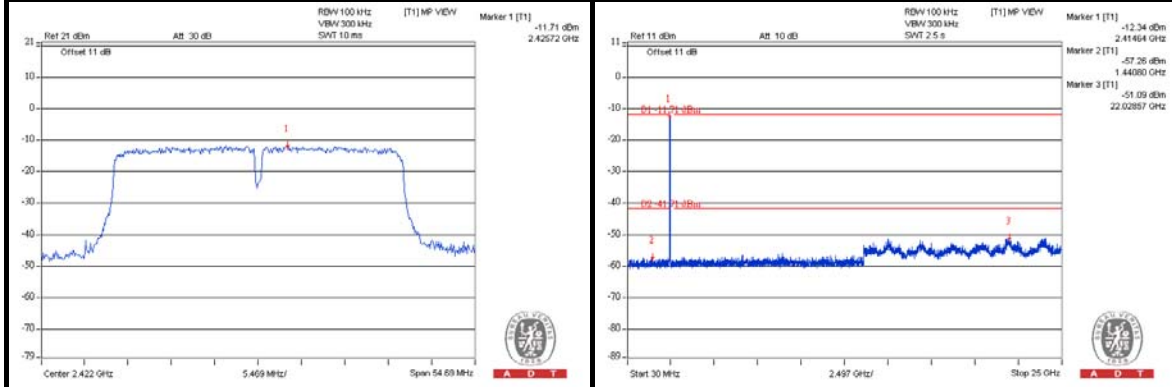


### CH 11

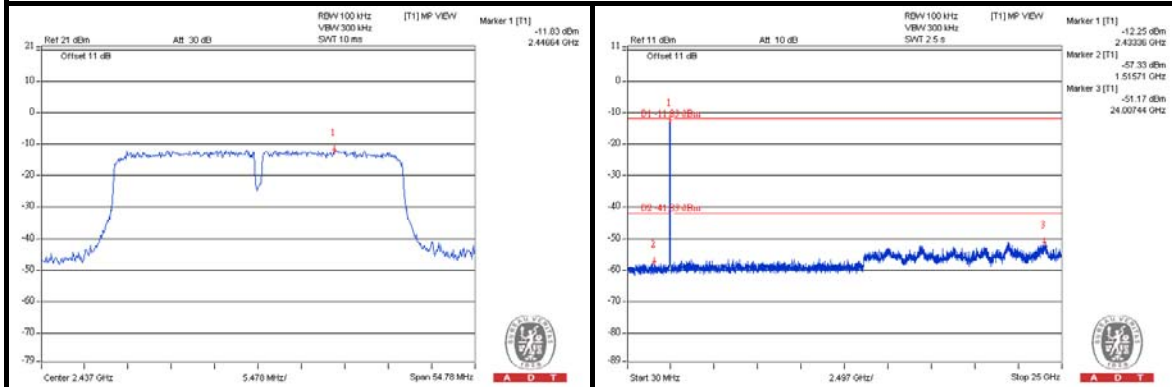


# 802.11n (40MHz) CHAIN 0

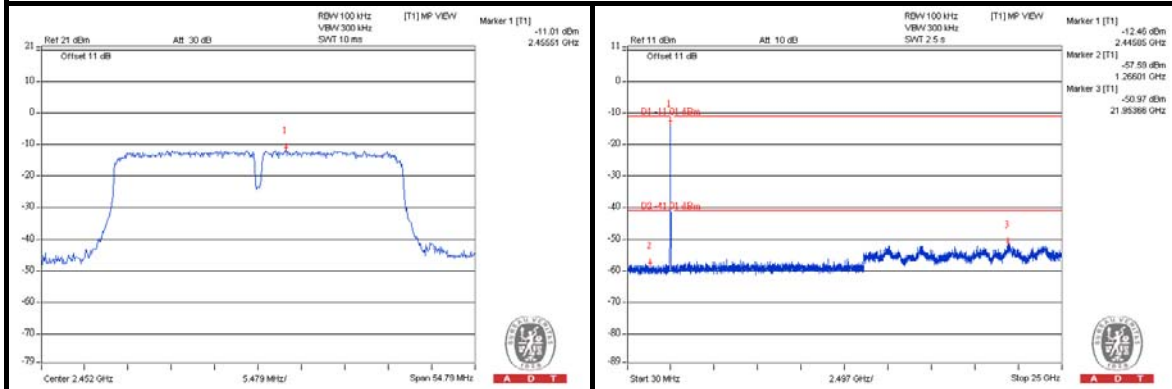
## CH 3



## CH 6



## CH 9

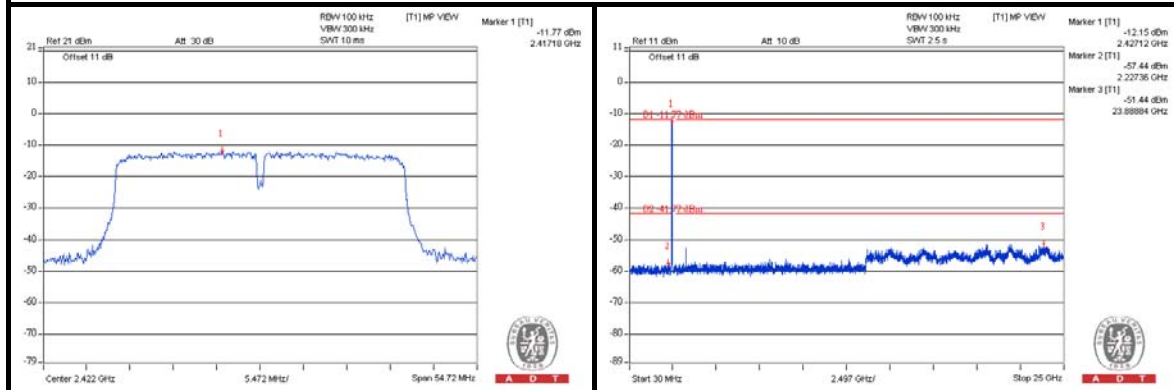




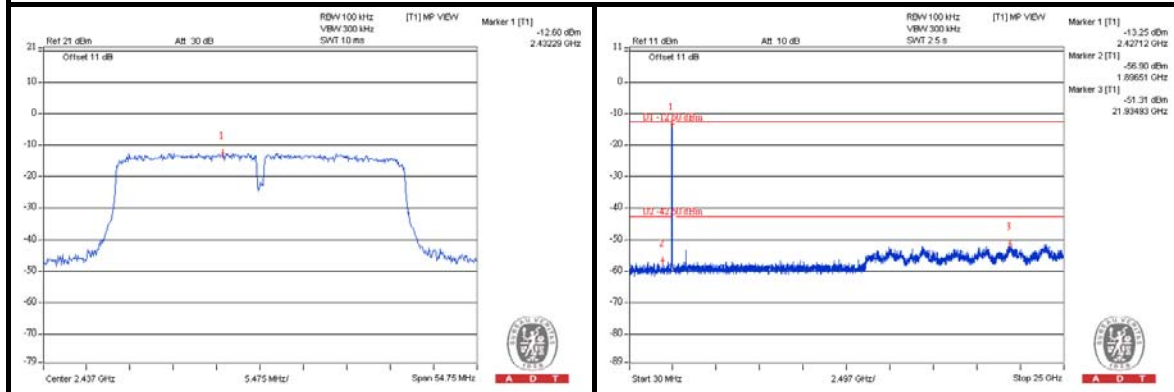
A D T

## CHAIN 1

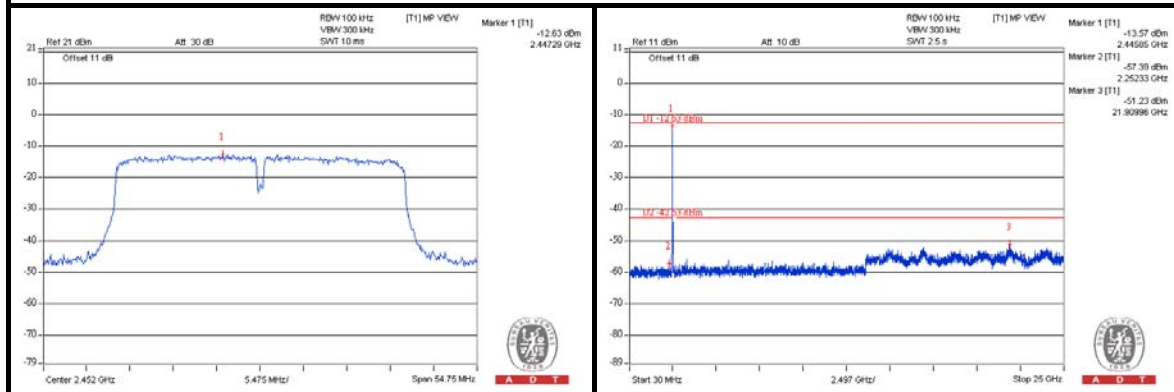
### CH 3



### CH 6



### CH 9



## 5. TEST TYPES AND RESULTS (FOR 5.0GHz BAND)

### 5.1 RADIATED EMISSION MEASUREMENT

#### 5.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

| FREQUENCIES<br>(MHz) | FIELD STRENGTH<br>(microvolts/meter) | MEASUREMENT DISTANCE<br>(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. 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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#### 5.1.2 TEST INSTRUMENTS

Same as item 4.1.2.

#### 5.1.3 TEST PROCEDURES

Same as item 4.1.3.

#### 5.1.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 5.1.5 TEST SETUP

Same as item 4.1.5.

#### 5.1.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.

## 5.1.7 TEST RESULTS

### ABOVE 1GHz DATA :

#### 802.11a

| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |                           |
|--------------------------|-----------------|--------------------|---------------------------|
| CHANNEL                  | Channel 149     | FREQUENCY RANGE    | 1 ~ 40GHz                 |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY          | Sun Lin                   |

| 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                                                   | 5725.00     | 57.5 PK                 | 74.0           | -16.5       | 1.00 H             | 72                   | 18.80            | 38.70                    |
| 2                                                   | 5725.00     | 46.9 AV                 | 54.0           | -7.1        | 1.00 H             | 72                   | 8.20             | 38.70                    |
| 3                                                   | *5745.00    | 83.5 PK                 |                |             | 1.00 H             | 72                   | 44.80            | 38.70                    |
| 4                                                   | *5745.00    | 72.9 AV                 |                |             | 1.00 H             | 72                   | 34.20            | 38.70                    |
| 5                                                   | 11490.00    | 59.1 PK                 | 74.0           | -14.9       | 1.03 H             | 43                   | 9.60             | 49.50                    |
| 6                                                   | 11490.00    | 44.0 AV                 | 54.0           | -10.0       | 1.03 H             | 43                   | -5.50            | 49.50                    |
| 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                                                   | 5725.00     | 57.1 PK                 | 74.0           | -16.9       | 1.52 V             | 248                  | 18.40            | 38.70                    |
| 2                                                   | 5725.00     | 46.7 AV                 | 54.0           | -7.3        | 1.52 V             | 248                  | 8.00             | 38.70                    |
| 3                                                   | *5745.00    | 83.1 PK                 |                |             | 1.52 V             | 248                  | 44.40            | 38.70                    |
| 4                                                   | *5745.00    | 72.7 AV                 |                |             | 1.52 V             | 248                  | 34.00            | 38.70                    |
| 5                                                   | 11490.00    | 59.0 PK                 | 74.0           | -15.0       | 1.25 V             | 126                  | 9.50             | 49.50                    |
| 6                                                   | 11490.00    | 43.8 AV                 | 54.0           | -10.2       | 1.25 V             | 126                  | -5.70            | 49.50                    |

#### 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.
6. The limit value is defined as per 15.247.



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| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |                           |
|--------------------------|-----------------|--------------------|---------------------------|
| CHANNEL                  | Channel 157     | FREQUENCY RANGE    | 1 ~ 40GHz                 |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY          | Sun Lin                   |

| 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                                                   | *5785.00    | 84.0 PK                 |                |             | 1.00 H             | 85                   | 45.20            | 38.80                    |
| 2                                                   | *5785.00    | 73.6 AV                 |                |             | 1.00 H             | 85                   | 34.80            | 38.80                    |
| 3                                                   | 11570.00    | 59.0 PK                 | 74.0           | -15.0       | 1.08 H             | 28                   | 9.60             | 49.40                    |
| 4                                                   | 11570.00    | 44.0 AV                 | 54.0           | -10.0       | 1.08 H             | 28                   | -5.40            | 49.40                    |
| 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                                                   | *5785.00    | 83.8 PK                 |                |             | 1.55 V             | 238                  | 45.00            | 38.80                    |
| 2                                                   | *5785.00    | 73.0 AV                 |                |             | 1.55 V             | 238                  | 34.20            | 38.80                    |
| 3                                                   | 11570.00    | 58.9 PK                 | 74.0           | -15.1       | 1.16 V             | 130                  | 9.50             | 49.40                    |
| 4                                                   | 11570.00    | 43.9 AV                 | 54.0           | -10.1       | 1.16 V             | 130                  | -5.50            | 49.40                    |

**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.
6. The limit value is defined as per 15.247.



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| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |                           |
|--------------------------|-----------------|--------------------|---------------------------|
| CHANNEL                  | Channel 165     | FREQUENCY RANGE    | 1 ~ 40GHz                 |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY          | Sun Lin                   |

| 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                                                   | *5825.00    | 84.2 PK                 |                |             | 1.00 H             | 59                   | 45.30            | 38.90                    |
| 2                                                   | *5825.00    | 74.1 AV                 |                |             | 1.00 H             | 59                   | 35.20            | 38.90                    |
| 3                                                   | 5850.00     | 59.2 PK                 | 74.0           | -14.8       | 1.00 H             | 59                   | 20.30            | 38.90                    |
| 4                                                   | 5850.00     | 49.1 AV                 | 54.0           | -4.9        | 1.00 H             | 59                   | 10.20            | 38.90                    |
| 5                                                   | 11650.00    | 59.2 PK                 | 74.0           | -14.8       | 1.10 H             | 54                   | 9.90             | 49.30                    |
| 6                                                   | 11650.00    | 44.3 AV                 | 54.0           | -9.7        | 1.10 H             | 54                   | -5.00            | 49.30                    |
| 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                                                   | *5825.00    | 84.1 PK                 |                |             | 1.50 V             | 250                  | 45.20            | 38.90                    |
| 2                                                   | *5825.00    | 74.2 AV                 |                |             | 1.50 V             | 250                  | 35.30            | 38.90                    |
| 3                                                   | 5850.00     | 59.1 PK                 | 74.0           | -14.9       | 1.50 V             | 250                  | 20.20            | 38.90                    |
| 4                                                   | 5850.00     | 49.2 AV                 | 54.0           | -4.8        | 1.50 V             | 250                  | 10.30            | 38.90                    |
| 5                                                   | 11650.00    | 59.6 PK                 | 74.0           | -14.4       | 1.26 V             | 158                  | 10.30            | 49.30                    |
| 6                                                   | 11650.00    | 44.6 AV                 | 54.0           | -9.4        | 1.26 V             | 158                  | -4.70            | 49.30                    |

**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.
6. The limit value is defined as per 15.247.
7. “#”:The radiated frequency is out the restricted band.



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## 802.11n (20MHz)

| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |                           |
|--------------------------|-----------------|--------------------|---------------------------|
| CHANNEL                  | Channel 149     | FREQUENCY RANGE    | 1 ~ 40GHz                 |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 68%RH | TESTED BY          | Sun Lin                   |

| 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                                                   | 5725.00     | 47.6 PK                 | 74.0           | -26.4       | 1.07 H             | 2                    | 8.90             | 38.70                    |
| 2                                                   | 5725.00     | 36.6 AV                 | 54.0           | -17.4       | 1.07 H             | 2                    | -2.10            | 38.70                    |
| 3                                                   | *5745.00    | 85.3 PK                 |                |             | 1.07 H             | 1                    | 46.60            | 38.70                    |
| 4                                                   | *5745.00    | 75.6 AV                 |                |             | 1.07 H             | 1                    | 36.90            | 38.70                    |
| 5                                                   | 11490.00    | 58.4 PK                 | 74.0           | -15.6       | 1.34 H             | 89                   | 8.90             | 49.50                    |
| 6                                                   | 11490.00    | 48.4 AV                 | 54.0           | -5.6        | 1.34 H             | 89                   | -1.10            | 49.50                    |
| 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                                                   | 5725.00     | 46.8 PK                 | 74.0           | -27.2       | 1.12 V             | 338                  | 8.10             | 38.70                    |
| 2                                                   | 5725.00     | 36.0 AV                 | 54.0           | -18.0       | 1.12 V             | 338                  | -2.70            | 38.70                    |
| 3                                                   | *5745.00    | 83.4 PK                 |                |             | 1.12 V             | 338                  | 44.70            | 38.70                    |
| 4                                                   | *5745.00    | 73.8 AV                 |                |             | 1.12 V             | 338                  | 35.10            | 38.70                    |
| 5                                                   | 11490.00    | 57.6 PK                 | 74.0           | -16.4       | 1.05 V             | 171                  | 8.10             | 49.50                    |
| 6                                                   | 11490.00    | 46.7 AV                 | 54.0           | -7.3        | 1.05 V             | 171                  | -2.80            | 49.50                    |

## 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.
6. The limit value is defined as per 15.247.



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| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |                           |
|--------------------------|-----------------|--------------------|---------------------------|
| CHANNEL                  | Channel 157     | FREQUENCY RANGE    | 1 ~ 40GHz                 |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 68%RH | TESTED BY          | Sun Lin                   |

| 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                                                   | *5785.00    | 85.6 PK                 |                |             | 1.05 H             | 18                   | 46.80            | 38.80                    |
| 2                                                   | *5785.00    | 75.9 AV                 |                |             | 1.05 H             | 18                   | 37.10            | 38.80                    |
| 3                                                   | 11570.00    | 57.8 PK                 | 74.0           | -16.2       | 1.29 H             | 92                   | 8.40             | 49.40                    |
| 4                                                   | 11570.00    | 47.8 AV                 | 54.0           | -6.2        | 1.29 H             | 92                   | -1.60            | 49.40                    |
| 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                                                   | *5785.00    | 83.8 PK                 |                |             | 1.09 V             | 327                  | 45.00            | 38.80                    |
| 2                                                   | *5785.00    | 74.1 AV                 |                |             | 1.09 V             | 327                  | 35.30            | 38.80                    |
| 3                                                   | 11570.00    | 57.2 PK                 | 74.0           | -16.8       | 1.09 V             | 164                  | 7.80             | 49.40                    |
| 4                                                   | 11570.00    | 46.4 AV                 | 54.0           | -7.6        | 1.09 V             | 164                  | -3.00            | 49.40                    |

**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.
6. The limit value is defined as per 15.247.



A D T

| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |                           |
|--------------------------|-----------------|--------------------|---------------------------|
| CHANNEL                  | Channel 165     | FREQUENCY RANGE    | 1 ~ 40GHz                 |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 68%RH | TESTED BY          | Sun Lin                   |

| 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                                                   | *5825.00    | 85.8 PK                 |                |             | 1.12 H             | 24                   | 46.90            | 38.90                    |
| 2                                                   | *5825.00    | 75.9 AV                 |                |             | 1.12 H             | 24                   | 37.00            | 38.90                    |
| 3                                                   | 5850.00     | 47.4 PK                 | 74.0           | -26.6       | 1.12 H             | 24                   | 8.50             | 38.90                    |
| 4                                                   | 5850.00     | 36.2 AV                 | 54.0           | -17.8       | 1.12 H             | 24                   | -2.70            | 38.90                    |
| 5                                                   | 11650.00    | 57.8 PK                 | 74.0           | -16.2       | 1.29 H             | 92                   | 8.50             | 49.30                    |
| 6                                                   | 11650.00    | 47.6 AV                 | 54.0           | -6.4        | 1.29 H             | 92                   | -1.70            | 49.30                    |
| 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                                                   | *5825.00    | 83.8 PK                 |                |             | 1.09 V             | 347                  | 44.90            | 38.90                    |
| 2                                                   | *5825.00    | 74.1 AV                 |                |             | 1.09 V             | 347                  | 35.20            | 38.90                    |
| 3                                                   | 5850.00     | 46.4 PK                 | 74.0           | -27.6       | 1.09 V             | 347                  | 7.50             | 38.90                    |
| 4                                                   | 5850.00     | 36.2 AV                 | 54.0           | -17.8       | 1.09 V             | 347                  | -2.70            | 38.90                    |
| 5                                                   | 11650.00    | 57.9 PK                 | 74.0           | -16.1       | 1.04 V             | 158                  | 8.60             | 49.30                    |
| 6                                                   | 11650.00    | 46.2 AV                 | 54.0           | -7.8        | 1.04 V             | 158                  | -3.10            | 49.30                    |

**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.
6. The limit value is defined as per 15.247.



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## 802.11n (40MHz)

| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |                           |
|--------------------------|-----------------|--------------------|---------------------------|
| CHANNEL                  | Channel 151     | FREQUENCY RANGE    | 1 ~ 40GHz                 |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 68%RH | TESTED BY          | Sun Lin                   |

| 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                                                   | 5725.00     | 47.5 PK                 | 74.0           | -26.5       | 1.38 H             | 57                   | 8.80             | 38.70                    |
| 2                                                   | 5725.00     | 38.0 AV                 | 54.0           | -16.0       | 1.38 H             | 57                   | -0.70            | 38.70                    |
| 3                                                   | *5755.00    | 82.0 PK                 |                |             | 1.38 H             | 57                   | 43.30            | 38.70                    |
| 4                                                   | *5755.00    | 72.5 AV                 |                |             | 1.38 H             | 57                   | 33.80            | 38.70                    |
| 5                                                   | 11510.00    | 55.8 PK                 | 74.0           | -18.2       | 1.25 H             | 89                   | 6.30             | 49.50                    |
| 6                                                   | 11510.00    | 45.8 AV                 | 54.0           | -8.2        | 1.25 H             | 89                   | -3.70            | 49.50                    |
| 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                                                   | 5725.00     | 42.9 PK                 | 74.0           | -31.1       | 1.14 V             | 345                  | 4.20             | 38.70                    |
| 2                                                   | 5725.00     | 33.5 AV                 | 54.0           | -20.5       | 1.14 V             | 345                  | -5.20            | 38.70                    |
| 3                                                   | *5755.00    | 79.1 PK                 |                |             | 1.14 V             | 345                  | 40.40            | 38.70                    |
| 4                                                   | *5755.00    | 69.7 AV                 |                |             | 1.14 V             | 345                  | 31.00            | 38.70                    |
| 5                                                   | 11510.00    | 55.8 PK                 | 74.0           | -18.2       | 1.08 V             | 162                  | 6.30             | 49.50                    |
| 6                                                   | 11510.00    | 45.2 AV                 | 54.0           | -8.8        | 1.08 V             | 162                  | -4.30            | 49.50                    |

## 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.
6. The limit value is defined as per 15.247.



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| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |                           |
|--------------------------|-----------------|--------------------|---------------------------|
| CHANNEL                  | Channel 159     | FREQUENCY RANGE    | 1 ~ 40GHz                 |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 68%RH | TESTED BY          | Sun Lin                   |

| 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                                                   | *5795.00    | 83.2 PK                 |                |             | 1.07 H             | 2                    | 44.40            | 38.80                    |
| 2                                                   | *5795.00    | 73.7 AV                 |                |             | 1.07 H             | 2                    | 34.90            | 38.80                    |
| 3                                                   | 5850.00     | 48.2 PK                 | 74.0           | -25.8       | 1.07 H             | 2                    | 9.30             | 38.90                    |
| 4                                                   | 5850.00     | 38.7 AV                 | 54.0           | -15.3       | 1.07 H             | 2                    | -0.20            | 38.90                    |
| 5                                                   | 11590.00    | 56.0 PK                 | 74.0           | -18.0       | 1.21 H             | 108                  | 6.60             | 49.40                    |
| 6                                                   | 11590.00    | 45.8 AV                 | 54.0           | -8.2        | 1.21 H             | 108                  | -3.60            | 49.40                    |
| 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                                                   | *5795.00    | 80.2 PK                 |                |             | 1.24 V             | 356                  | 41.40            | 38.80                    |
| 2                                                   | *5795.00    | 71.0 AV                 |                |             | 1.24 V             | 356                  | 32.20            | 38.80                    |
| 3                                                   | 5850.00     | 44.1 PK                 | 74.0           | -29.9       | 1.24 V             | 356                  | 5.20             | 38.90                    |
| 4                                                   | 5850.00     | 34.9 AV                 | 54.0           | -19.1       | 1.24 V             | 356                  | -4.00            | 38.90                    |
| 5                                                   | 11590.00    | 56.8 PK                 | 74.0           | -17.2       | 1.16 V             | 169                  | 7.40             | 49.40                    |
| 6                                                   | 11590.00    | 46.2 AV                 | 54.0           | -7.8        | 1.16 V             | 169                  | -3.20            | 49.40                    |

**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.
6. The limit value is defined as per 15.247.



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## BELOW 1GHz WORST-CASE DATA : 802.11n (20MHz)

| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |               |
|--------------------------|-----------------|--------------------|---------------|
| CHANNEL                  | Channel 149     | FREQUENCY RANGE    | Below 1000MHz |
| INPUT POWER (SYSTEM)     | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Quasi-Peak    |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY          | Brad Tung     |

| 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                                                   | 57.12       | 26.5 QP                 | 40.0           | -13.5       | 1.50 H             | 61                   | 12.90            | 13.60                    |
| 2                                                   | 109.62      | 26.4 QP                 | 43.5           | -17.1       | 2.00 H             | 55                   | 16.00            | 10.40                    |
| 3                                                   | 175.72      | 25.8 QP                 | 43.5           | -17.7       | 2.00 H             | 95                   | 12.80            | 13.00                    |
| 4                                                   | 249.60      | 22.7 QP                 | 46.0           | -23.3       | 1.00 H             | 195                  | 9.50             | 13.20                    |
| 5                                                   | 350.71      | 23.6 QP                 | 46.0           | -22.4       | 1.25 H             | 250                  | 7.30             | 16.30                    |
| 6                                                   | 420.70      | 22.9 QP                 | 46.0           | -23.1       | 1.00 H             | 250                  | 4.80             | 18.10                    |
| 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                                                   | 66.84       | 33.4 QP                 | 40.0           | -6.6        | 1.50 V             | 38                   | 20.60            | 12.80                    |
| 2                                                   | 99.89       | 33.2 QP                 | 43.5           | -10.3       | 1.00 V             | 17                   | 24.00            | 9.20                     |
| 3                                                   | 173.78      | 28.4 QP                 | 43.5           | -15.1       | 1.25 V             | 18                   | 15.20            | 13.20                    |
| 4                                                   | 249.60      | 27.1 QP                 | 46.0           | -18.9       | 2.00 V             | 238                  | 13.90            | 13.20                    |
| 5                                                   | 302.10      | 23.9 QP                 | 46.0           | -22.1       | 1.00 V             | 352                  | 8.70             | 15.20                    |
| 6                                                   | 500.42      | 31.8 QP                 | 46.0           | -14.2       | 1.00 V             | 75                   | 11.70            | 20.10                    |

## 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.

## **5.2 6dB BANDWIDTH MEASUREMENT**

### **5.2.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT**

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

### **5.2.2 TEST SETUP**

Same as item 4.2.2.

### **5.2.3 TEST INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

### **5.2.4 TEST PROCEDURE**

Same as item 4.2.4.

### **5.2.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **5.2.6 EUT OPERATING CONDITIONS**

Same as item 4.2.6.

## 5.2.7 TEST RESULTS

### 802.11a

| CHANNEL | FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---------|-----------------|---------------------|---------------------|-------------|
| 149     | 5745            | 16.45               | 0.5                 | PASS        |
| 157     | 5785            | 16.52               | 0.5                 | PASS        |
| 165     | 5825            | 16.45               | 0.5                 | PASS        |

### 802.11n (20MHz)

| CHANNEL | FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) |         | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---------|-----------------|---------------------|---------|---------------------|-------------|
|         |                 | CHAIN 0             | CHAIN 1 |                     |             |
| 149     | 5745            | 17.64               | 17.08   | 0.5                 | PASS        |
| 157     | 5785            | 17.46               | 17.63   | 0.5                 | PASS        |
| 165     | 5825            | 17.40               | 17.16   | 0.5                 | PASS        |

### 802.11n (40MHz)

| CHANNEL | FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) |         | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---------|-----------------|---------------------|---------|---------------------|-------------|
|         |                 | CHAIN 0             | CHAIN 1 |                     |             |
| 151     | 5755            | 36.47               | 36.43   | 0.5                 | PASS        |
| 159     | 5795            | 36.52               | 36.48   | 0.5                 | PASS        |

### **5.3 CONDUCTED OUTPUT POWER**

#### **5.3.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT**

For systems using digital modulation in the 5725 –5850 MHz bands: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output v01r02 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for  $NANT \leq 4$ ;

Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  MHz for any NANT;

Array Gain =  $5 \log(NANT/NSS)$  dB or 3 dB, whichever is less for 20-MHz channel widths with  $NANT \geq 5$ .

For power measurements on all other devices: Array Gain =  $10 \log(NANT/NSS)$  dB.

#### **5.3.2 TEST SETUP**

Same as Item 4.3.2.

#### **5.3.3 INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

#### **5.3.4 TEST PROCEDURES**

Same as Item 4.3.4.

#### **5.3.5 DEVIATION FROM TEST STANDARD**

No deviation.

#### **5.3.6 EUT OPERATING CONDITIONS**

Same as Item 4.2.6.

### 5.3.7 TEST RESULTS

#### FOR AVERAGE POWER

##### 802.11a

| CHANNEL | FREQUENCY (MHz) | AVERAGE POWER (mW) | AVERAGE POWER (dBm) |
|---------|-----------------|--------------------|---------------------|
| 149     | 5745            | 1.702              | 2.31                |
| 157     | 5785            | 1.746              | 2.42                |
| 165     | 5825            | 1.734              | 2.39                |

##### 802.11n (20MHz)

| CHANNEL | FREQUENCY (MHz) | AVG. POWER (dBm) |         | TOTAL POWER (mW) | TOTAL POWER (dBm) |
|---------|-----------------|------------------|---------|------------------|-------------------|
|         |                 | CHAIN 0          | CHAIN 1 |                  |                   |
| 149     | 5745            | -0.79            | -0.63   | 1.699            | 2.30              |
| 157     | 5785            | -0.52            | -0.68   | 1.742            | 2.41              |
| 165     | 5825            | -0.58            | -0.79   | 1.709            | 2.33              |

##### 802.11n (40MHz)

| CHANNEL | FREQUENCY (MHz) | AVG. POWER (dBm) |         | TOTAL POWER (mW) | TOTAL POWER (dBm) |
|---------|-----------------|------------------|---------|------------------|-------------------|
|         |                 | CHAIN 0          | CHAIN 1 |                  |                   |
| 151     | 5755            | -0.73            | -0.52   | 1.732            | 2.39              |
| 159     | 5795            | -0.56            | -0.64   | 1.742            | 2.41              |

## **5.4 POWER SPECTRAL DENSITY MEASUREMENT**

### **5.4.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT**

The Maximum of Power Spectral Density Measurement is 8dBm.

### **5.4.2 TEST SETUP**

Same as item 4.4.2.

### **5.4.3 TEST INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

### **5.4.4 TEST PROCEDURE.**

Same as item 4.4.4.

### **5.4.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **5.4.6 EUT OPERATING CONDITION**

Same as item 4.2.6.

## 5.4.7 TEST RESULTS

### 802.11a

| Channel | Freq. (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | PASS /FAIL |
|---------|-------------|----------------|------------------|------------|
| 149     | 5745        | -26.69         | 8                | PASS       |
| 157     | 5785        | -26.40         | 8                | PASS       |
| 165     | 5825        | -27.16         | 8                | PASS       |

### 802.11n (20MHz)

| TX chain | Channel | Freq. (MHz) | PSD (dBm/3kHz) | 10 log (N=2) dB | Total PSD (dBm/3kHz) | Limit (dBm/3kHz) | PASS /FAIL |
|----------|---------|-------------|----------------|-----------------|----------------------|------------------|------------|
| 0        | 149     | 5745        | -25.83         | 3.01            | -22.82               | 5.49             | PASS       |
|          | 157     | 5785        | -26.35         | 3.01            | -23.34               | 5.49             | PASS       |
|          | 165     | 5825        | -27.35         | 3.01            | -24.34               | 5.49             | PASS       |
| 1        | 149     | 5745        | -23.17         | 3.01            | -20.16               | 5.49             | PASS       |
|          | 157     | 5785        | -25.38         | 3.01            | -22.37               | 5.49             | PASS       |
|          | 165     | 5825        | -25.33         | 3.01            | -22.32               | 5.49             | PASS       |

**NOTE:** Directional gain = 5.5dBi + 10log(2) = 8.51dBi > 6dBi , so the power density limit shall be reduced to 8-(8.51-6) = 5.49dBm.

### 802.11n (40MHz)

| TX chain | Channel | Freq. (MHz) | PSD (dBm/3kHz) | 10 log (N=2) dB | Total PSD (dBm/3kHz) | Limit (dBm/3kHz) | PASS /FAIL |
|----------|---------|-------------|----------------|-----------------|----------------------|------------------|------------|
| 0        | 151     | 5755        | -29.43         | 3.01            | -26.42               | 5.49             | PASS       |
|          | 159     | 5795        | -29.63         | 3.01            | -26.62               | 5.49             | PASS       |
| 1        | 151     | 5755        | -24.61         | 3.01            | -21.60               | 5.49             | PASS       |
|          | 159     | 5795        | -25.51         | 3.01            | -22.50               | 5.49             | PASS       |

**NOTE:** Directional gain = 5.5dBi + 10log(2) = 8.51dBi > 6dBi , so the power density limit shall be reduced to 8-(8.51-6) = 5.49dBm.

## **5.5 CONDUCTED OUT OF BAND EMISSION MEASUREMENT**

### **5.5.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT**

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

### **5.5.2 TEST SETUP**

Same as Item 4.5.2

### **5.5.3 TEST INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

### **5.5.4 TEST PROCEDURE**

Same as Item 4.5.4

### **5.5.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **5.5.6 EUT OPERATING CONDITION**

Same as Item 4.3.6

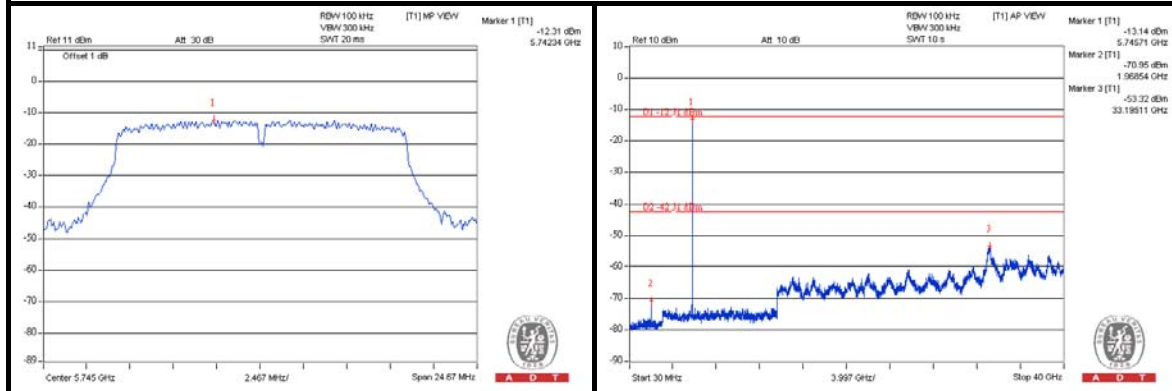
### **5.5.7 TEST RESULTS**

The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.

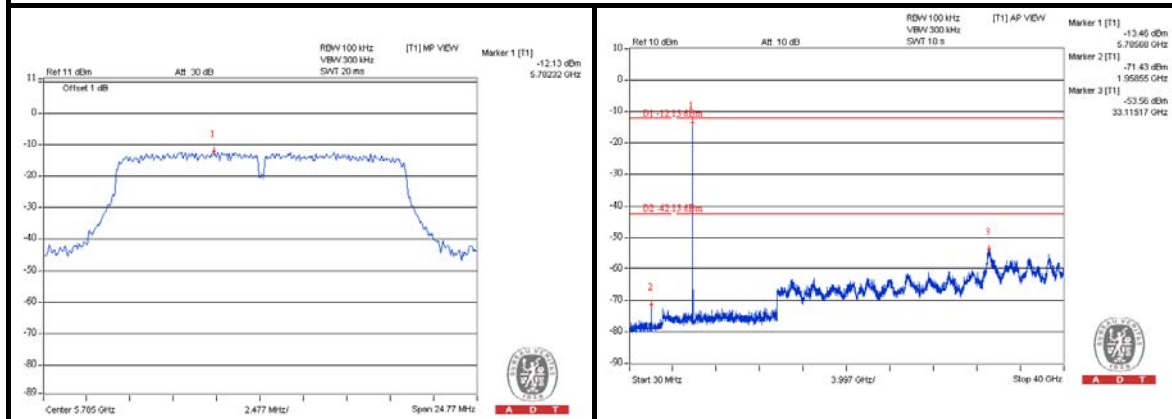
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11a

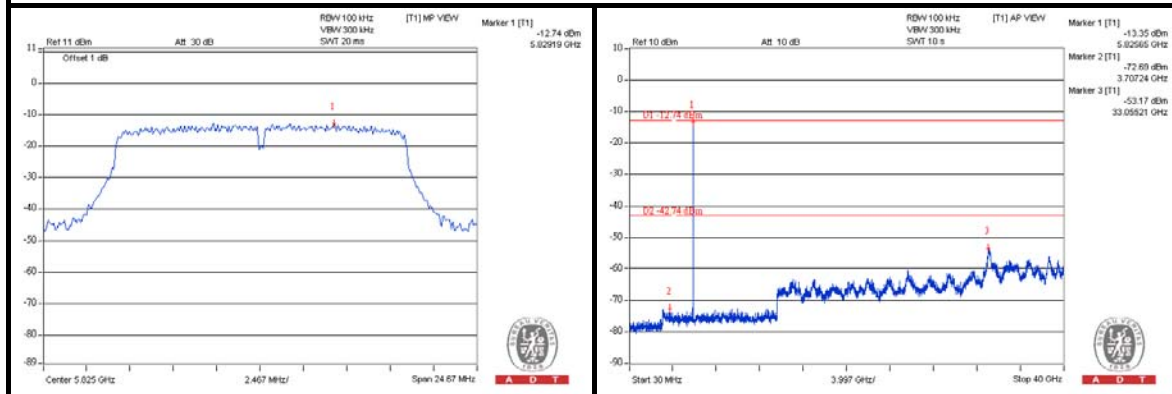
### CH 149



### CH 157



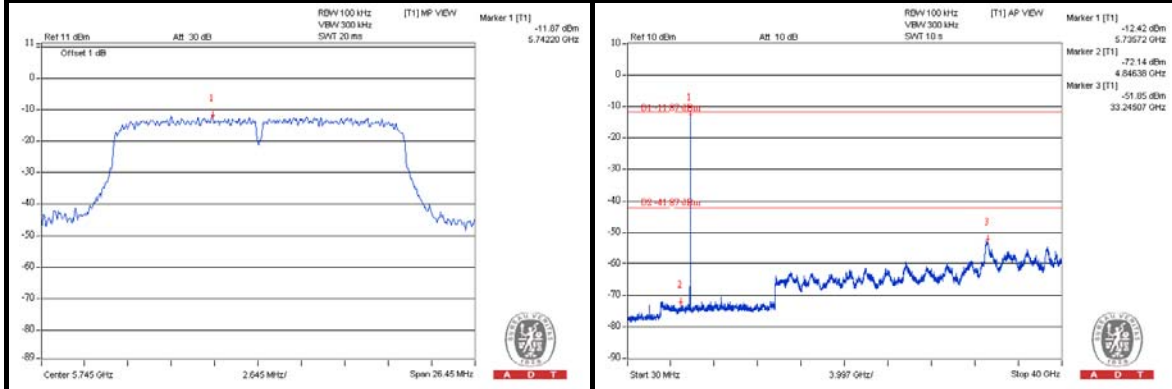
### CH 165



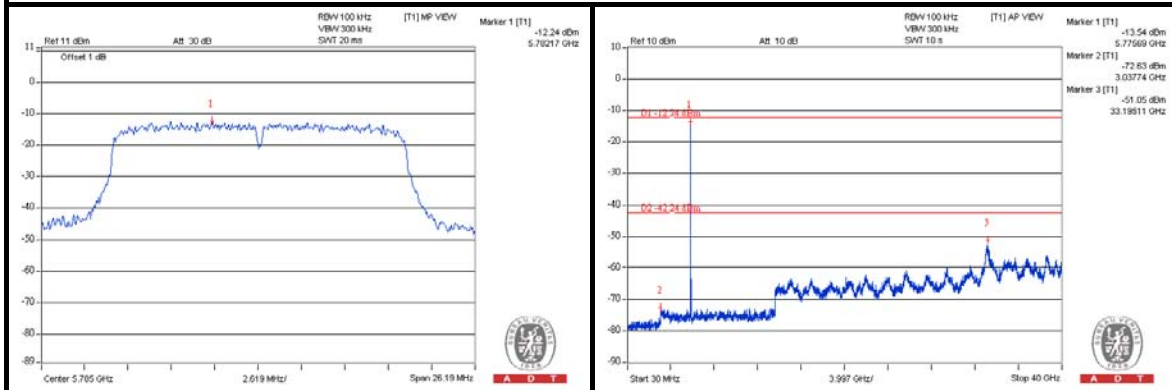
802.11n(20MHz)

CHAIN 0

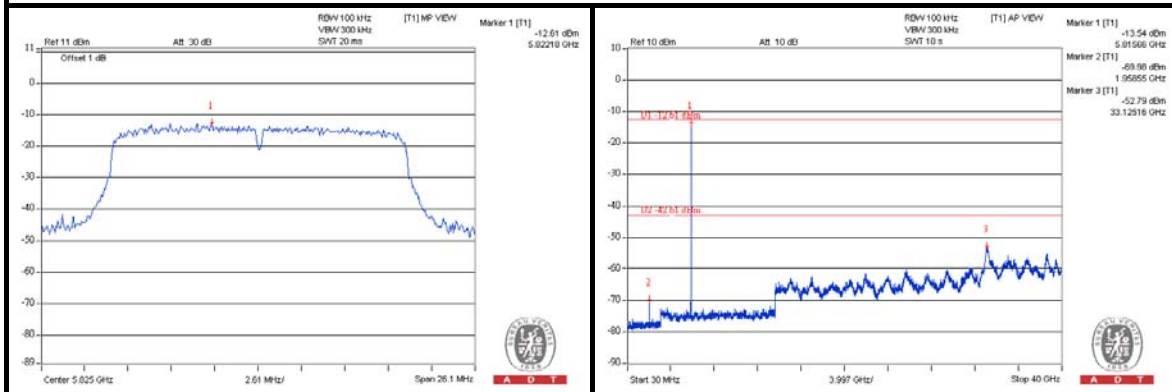
### CH 149



### CH 157



### CH 165

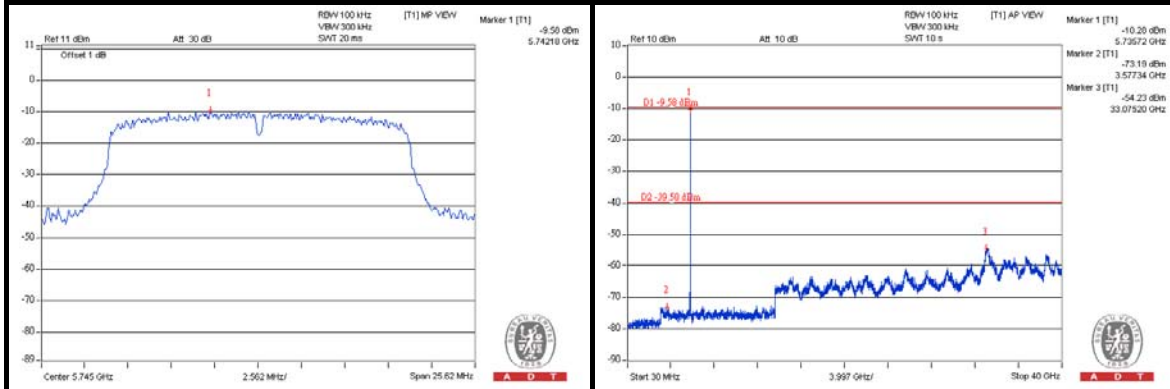




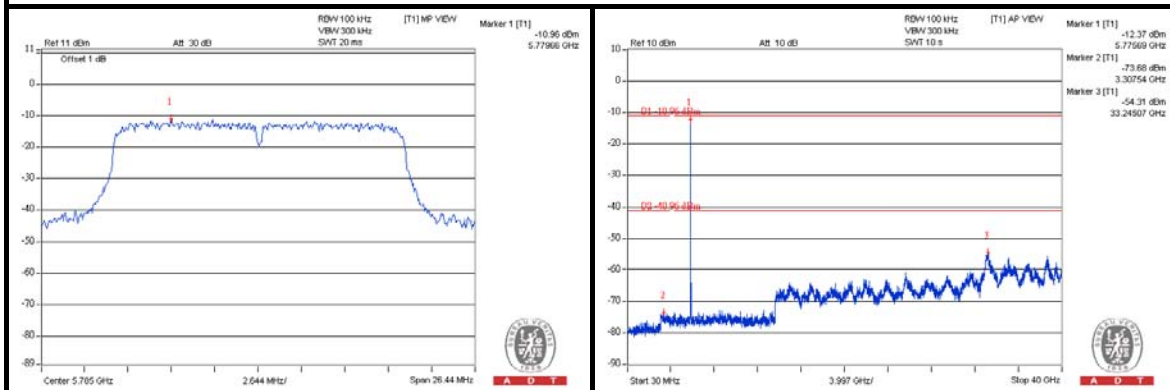
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## CHAIN 1

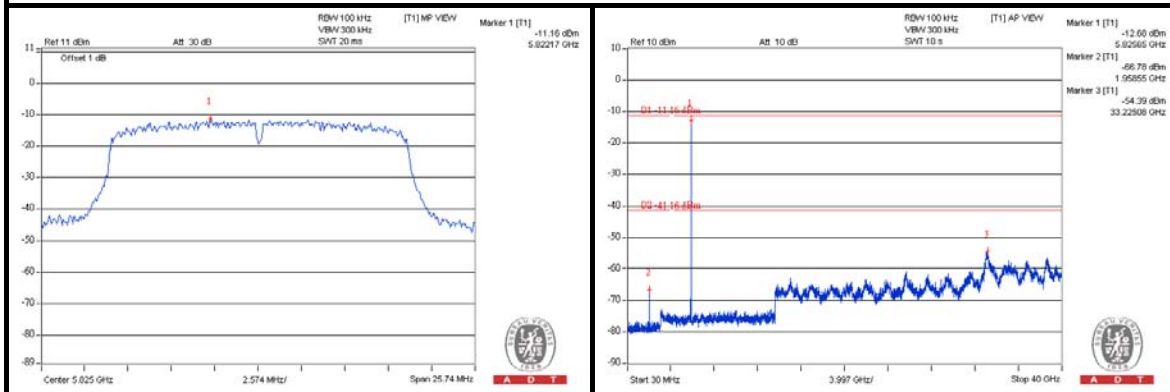
### CH 149



### CH 157

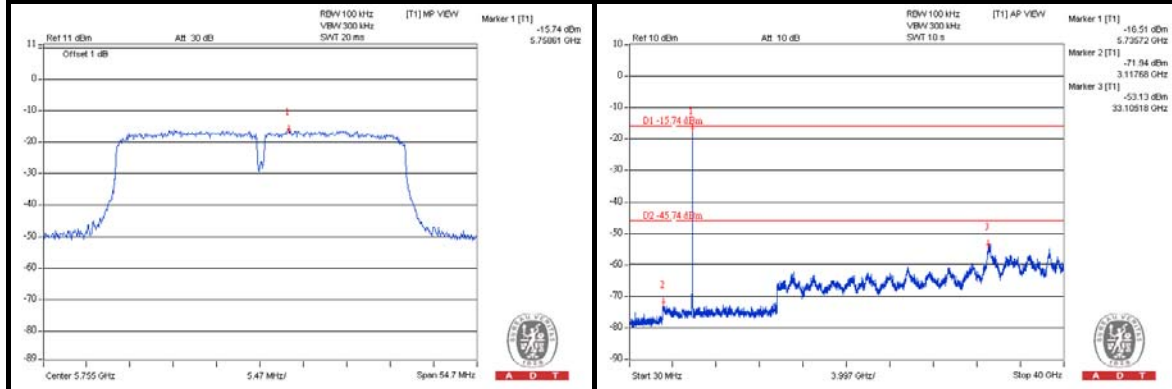


### CH 165

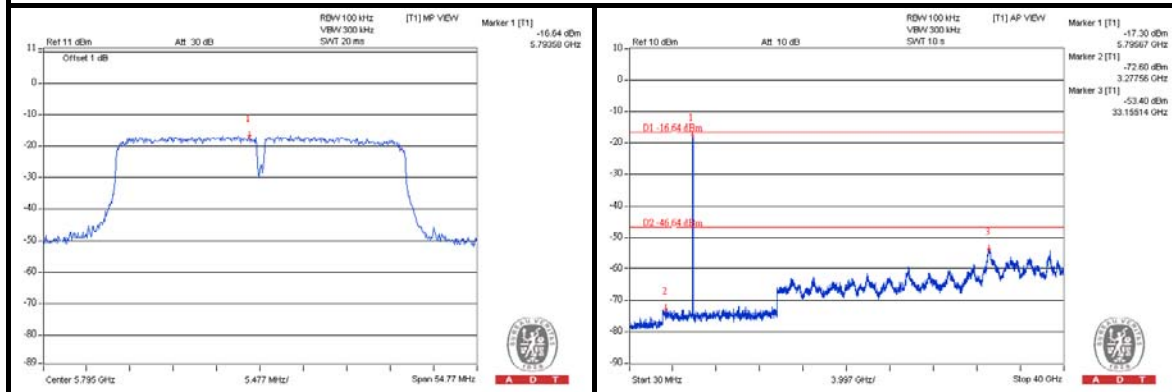


## 802.11n (40MHz) CHAIN 0

### CH 151



### CH 159

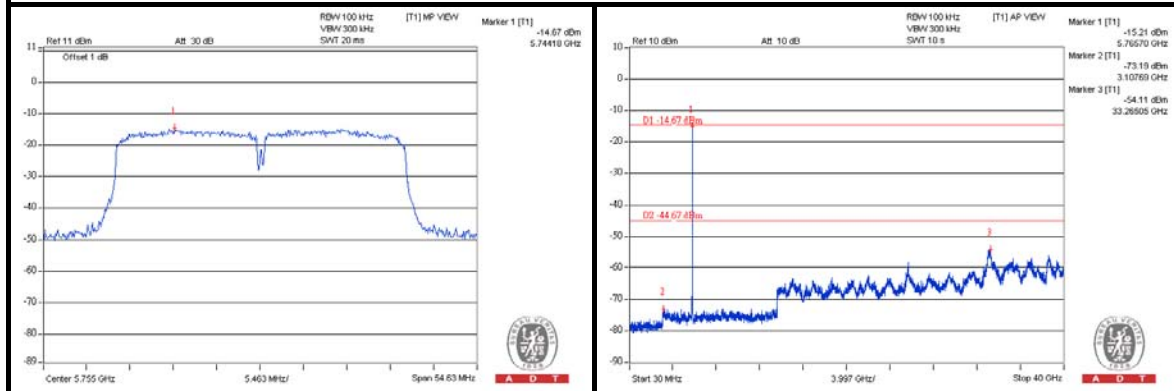




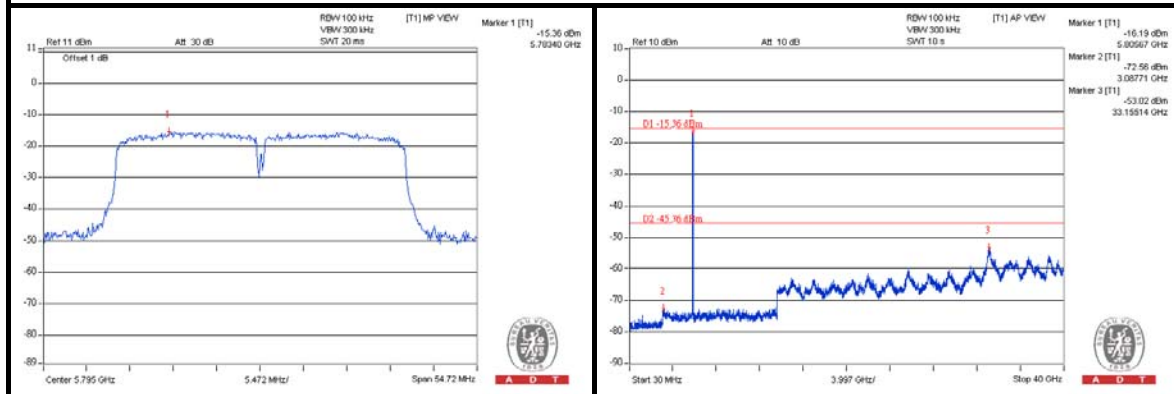
A D T

## CHAIN 1

### CH 151



### CH 159





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## 6. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



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## 7. 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 according to ISO/IEC 17025.

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



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## **8. APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

No modifications were made to the EUT by the lab during the test.

**---END---**