

# CANADA TEST REPORT

**REPORT NO.:** IC131022E03F

**MODEL NO.:** WD105

**IC:** 5005A-WD105

**RECEIVED:** Mar. 03, 2014

**TESTED:** Mar. 07 to 18, 2014

**ISSUED:** May 29, 2014

**APPLICANT:** CyberTAN Technology, Inc.

**ADDRESS:** No.99, Park Avenue III, Science-based Industrial Park,  
Hsinchu, Taiwan 308,R.O.C.

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

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

**TEST LOCATION (1):** No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen,  
Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan,  
R.O.C.

**TEST LOCATION (2):** No. 49, Ln. 206, Wende Rd., Shangshan Tsuen,  
Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan,  
R.O.C.

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## RELEASE CONTROL RECORD

| ISSUE NO.    | REASON FOR CHANGE | DATE ISSUED  |
|--------------|-------------------|--------------|
| IC131022E03F | Original release  | May 29, 2014 |



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## 1. CERTIFICATION

**PRODUCT:** 1x1 802.11b/g/n module  
**BRAND NAME:** CyberTAN  
**MODEL NO.:** WD105  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**APPLICANT:** CyberTAN Technology, Inc.  
**TESTED:** Mar. 07 to 18, 2014  
**STANDARDS:** **Canada RSS-210 Issue 8 (2010-12)**  
**Canada RSS-Gen Issue 3 (2010-12)**  
**ANSI C63.10-2009**

The above equipment (Model: WD105) 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 :** Midoli Peng , **DATE:** May 29, 2014  
( Midoli Peng, Specialist )

**APPROVED BY :** May Chen , **DATE:** May 29, 2014  
( May Chen, Manager )

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| STANDARD SECTION | TEST TYPE                      | RESULT | REMARK                                                                          |
|------------------|--------------------------------|--------|---------------------------------------------------------------------------------|
| RSS-Gen 7.2.4    | AC Power Conducted Emission    | PASS   | Meet the requirement of limit. Minimum passing margin is -26.89dB at 2.52728MHz |
| RSS-Gen 4.6      | Occupied Bandwidth Measurement | -      | Meet the requirement                                                            |
| RSS-210 A8.5     | Radiated Emissions             | PASS   | Meet the requirement of limit. Minimum passing margin is -3.3dB at 160.80MHz    |
| RSS-210 A8.5     | Band Edge Measurement          | PASS   | Meet the requirement of limit.                                                  |
| RSS-210 A8.2 (a) | 6dB bandwidth                  | PASS   | Meet the requirement of limit.                                                  |
| RSS-210 A8.2 (4) | Maximum Peak Output Power      | PASS   | Meet the requirement of limit.                                                  |
| RSS-210 A8.2 (b) | Power Spectral Density         | PASS   | Meet the requirement of limit.                                                  |

## 2.1 MEASUREMENT UNCERTAINTY

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

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

| Measurement                       | Value   |
|-----------------------------------|---------|
| Conducted emissions               | 2.86 dB |
| Radiated emissions (30MHz-1GHz)   | 5.37 dB |
| Radiated emissions (1GHz -6GHz)   | 3.65 dB |
| Radiated emissions (6GHz -18GHz)  | 3.88 dB |
| Radiated emissions (18GHz -40GHz) | 4.11 dB |

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|                              |                                                                                                    |
|------------------------------|----------------------------------------------------------------------------------------------------|
| <b>PRODUCT</b>               | 1x1 802.11b/g/n module                                                                             |
| <b>MODEL NO.</b>             | WD105                                                                                              |
| <b>POWER SUPPLY</b>          | DC 3.3V from host equipment                                                                        |
| <b>MODULATION TYPE</b>       | CCK, DQPSK, DBPSK for DSSS<br>64QAM, 16QAM, QPSK, BPSK for OFDM                                    |
| <b>MODULATION TECHNOLOGY</b> | DSSS,OFDM                                                                                          |
| <b>TRANSFER RATE</b>         | 802.11b: up to 11Mbps<br>802.11g: up to 54Mbps<br>802.11n: up to 150Mbps                           |
| <b>OPERATING FREQUENCY</b>   | 2.412 ~ 2.462GHz                                                                                   |
| <b>NUMBER OF CHANNEL</b>     | 11 for 802.11b, 802.11g, 802.11n (HT20)<br>7 for 802.11n (HT40)                                    |
| <b>MAXIMUM OUTPUT POWER</b>  | 802.11b: 178.238mW<br>802.11g: 439.542mW<br>802.11n (HT20): 433.511mW<br>802.11n (HT40): 155.239mW |
| <b>ANTENNA TYPE</b>          | Please see NOTE                                                                                    |
| <b>DATA CABLE</b>            | NA                                                                                                 |
| <b>I/O PORTS</b>             | Refer to user's manual                                                                             |
| <b>ASSOCIATED DEVICES</b>    | NA                                                                                                 |

#### NOTE:

- The antennas provided to the EUT, please refer to the following table:

| Ant. No. | Brand | Model        | Ant. Gain (include cable lose) (dBi) | Frequency range (MHz to MHz) | Ant. Type | Connector Type | Cable Loss (dBi) | Cable Length (mm) |
|----------|-------|--------------|--------------------------------------|------------------------------|-----------|----------------|------------------|-------------------|
| 1        | QCA   | NA           | 1                                    | 2400~2483.5                  | PCB       | NA             | NA               | NA                |
| 2        | WNC   | 81.EBJ15.005 | 3.62                                 | 2400~2483.5                  | PIFA      | IPEX           | 1.15             | 300               |

The EUT incorporates a SISO function.

| MODULATION MODE | TX/RX FUNCTION |
|-----------------|----------------|
| 802.11b         | 1TX/1RX        |
| 802.11g         | 1TX/1RX        |
| 802.11n (HT20)  | 1TX/1RX        |
| 802.11n (HT40)  | 1TX/1RX        |

2. When the EUT operating in 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 7.
3. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

### 3.2 DESCRIPTION OF TEST MODES

11 channels are provided for 802.11b, 802.11g, 802.11n (HT20):

| 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 (HT40):

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

### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

Where **PLC**: Power Line Conducted Emission **UE < 1G**: Unwanted Emission below 1GHz  
**UE ≥ 1G**: Unwanted Emission above 1GHz **APCM**: Antenna Port Conducted Measurement  
**OB**: Conducted Out-Band Emission Measurement

#### POWER LINE CONDUCTED EMISSION TEST:

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

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

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

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

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

#### **UNWANTED EMISSION TEST (ABOVE 1 GHz):**

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

| MODE           | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|----------------|-------------------|----------------|-----------------------|-----------------|------------------|
| 802.11b        | 1 to 11           | 1, 6, 11       | DSSS                  | DBPSK           | 1                |
| 802.11g        | 1 to 11           | 1, 6, 11       | OFDM                  | BPSK            | 6                |
| 802.11n (HT20) | 1 to 11           | 1, 6, 11       | OFDM                  | BPSK            | 6.5              |
| 802.11n (HT40) | 3 to 9            | 3, 6, 9        | OFDM                  | BPSK            | 13.5             |

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

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

| MODE           | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|----------------|-------------------|----------------|-----------------------|-----------------|------------------|
| 802.11b        | 1 to 11           | 1, 6, 11       | DSSS                  | DBPSK           | 1                |
| 802.11g        | 1 to 11           | 1, 6, 11       | OFDM                  | BPSK            | 6                |
| 802.11n (HT20) | 1 to 11           | 1, 6, 11       | OFDM                  | BPSK            | 6.5              |
| 802.11n (HT40) | 3 to 9            | 3, 6, 9        | OFDM                  | BPSK            | 13.5             |

#### **CONDUCTED OUT-BAND EMISSION MEASUREMENT:**

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

| MODE           | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|----------------|-------------------|----------------|-----------------------|-----------------|------------------|
| 802.11b        | 1 to 11           | 1, 6, 11       | DSSS                  | DBPSK           | 1                |
| 802.11g        | 1 to 11           | 1, 6, 11       | OFDM                  | BPSK            | 6                |
| 802.11n (HT20) | 1 to 11           | 1, 6, 11       | OFDM                  | BPSK            | 6.5              |
| 802.11n (HT40) | 3 to 9            | 3, 6, 9        | OFDM                  | BPSK            | 13.5             |

**A D T****TEST CONDITION:**

| APPLICABLE TO      | ENVIRONMENTAL CONDITIONS | INPUT POWER (SYSTEM) | TESTED BY    |
|--------------------|--------------------------|----------------------|--------------|
| PLC                | 23deg. C, 69%RH          | 120Vac, 60Hz         | Gavin Peng   |
| UE<1G              | 23deg. C, 65%RH          | 120Vac, 60Hz         | Robert Cheng |
| UE <sup>3</sup> 1G | 23deg. C, 65%RH          | 120Vac, 60Hz         | Robert Cheng |
| APCM               | 25deg. C, 60%RH          | 120Vac, 60Hz         | Chilin Lee   |
| OB                 | 25deg. C, 60%RH          | 120Vac, 60Hz         | Chilin Lee   |

### **3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS**

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

**Canada RSS-210 Issue 8 (2010-12)**

**Canada RSS-Gen Issue 3 (2010-12)**

**558074 D01 DTS Meas Guidance v03r01**

**ANSI C63.10-2009**

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

### 3.4 DUTY CYCLE OF TEST SIGNAL

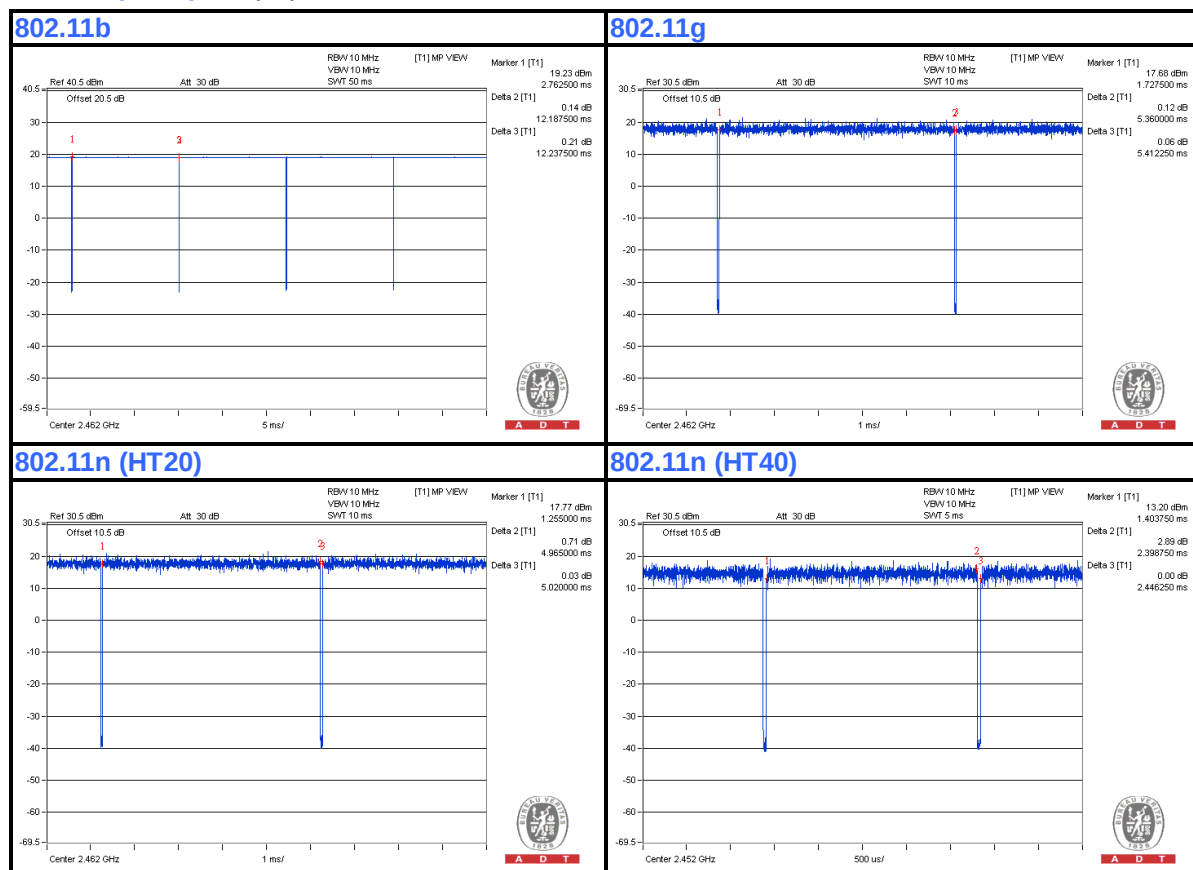
If duty cycle of test signal is  $\geq 98\%$ , duty factor is not required.

**802.11b**: Duty cycle = 12.188 ms/12.238 ms = 0.996

**802.11g**: Duty cycle = 5.36 ms/5.412 ms = 0.99

**802.11n (HT20)**: Duty cycle = 4.965 ms/5.02 ms = 0.989

**802.11n (HT40)**: Duty cycle = 2.399 ms/2.446 ms = 0.981



### 3.5 DESCRIPTION OF SUPPORT UNITS

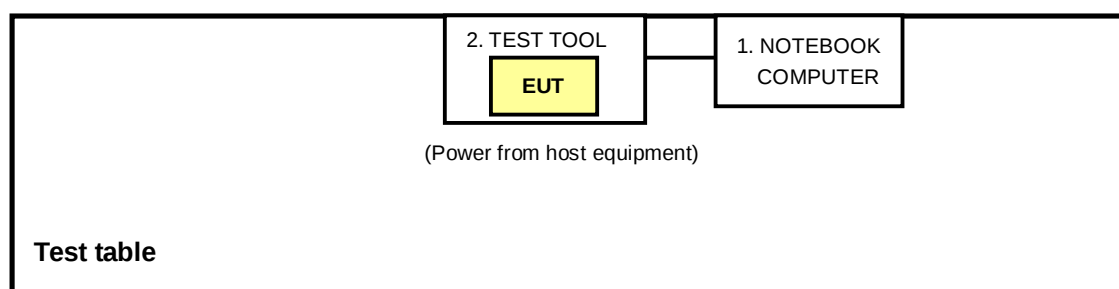
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| NO. | PRODUCT           | BRAND               | MODEL NO. | SERIAL NO. | FCC ID  |
|-----|-------------------|---------------------|-----------|------------|---------|
| 1   | NOTEBOOK COMPUTER | DELL                | PP32LA    | FSLB32S    | FCC DoC |
| 2   | TEST TOOL         | Qualcomm<br>Atheros | NA        | NA         | NA      |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|-----|-----------------------------------------------------|
| 1   | USB Cable, 1.3m                                     |
| 2   | NA                                                  |

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

### 3.6 CONFIGURATION OF SYSTEM UNDER TEST



## 4. TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

| FREQUENCY OF EMISSION (MHz) | CONDUCTED LIMIT (dB $\mu$ V) |          |
|-----------------------------|------------------------------|----------|
|                             | Quasi-peak                   | Average  |
| 0.15-0.5                    | 66 to 56                     | 56 to 46 |
| 0.5-5                       | 56                           | 46       |
| 5-30                        | 60                           | 50       |

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
  2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

#### 4.1.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER                                          | MODEL NO.                   | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---------------------------------------------------------------------|-----------------------------|------------|-----------------|------------------|
| Test Receiver<br>LIG NEX1                                           | ER-265                      | L09068005  | July 22, 2013   | July 21, 2014    |
| Pulse Limiter                                                       | VTSD 9561F                  | NA         | NA              | NA               |
| Line-Impedance<br>Stabilization Network<br>(for EUT)<br>SCHWARZBECK | NSLK8127                    | 8127-522   | Sep. 05, 2013   | Sep. 04, 2014    |
| Line-Impedance<br>Stabilization Network<br>(for Peripheral)         | ENV216                      | 100072     | June 06, 2013   | June 05, 2014    |
| RF Cable<br>(JYEBAO)                                                | 5DFB                        | COCCAB-001 | Mar. 10, 2014   | Mar. 09, 2015    |
| 50 ohms Terminator                                                  | 50                          | EMC-03     | Sep. 24, 2013   | Sep. 23, 2014    |
| Software<br>ADT                                                     | BV<br>ADT_Cond_V7.3.7.<br>3 | NA         | NA              | NA               |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Mar. 18, 2014

### 4.1.3 TEST PROCEDURES

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN.
- The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

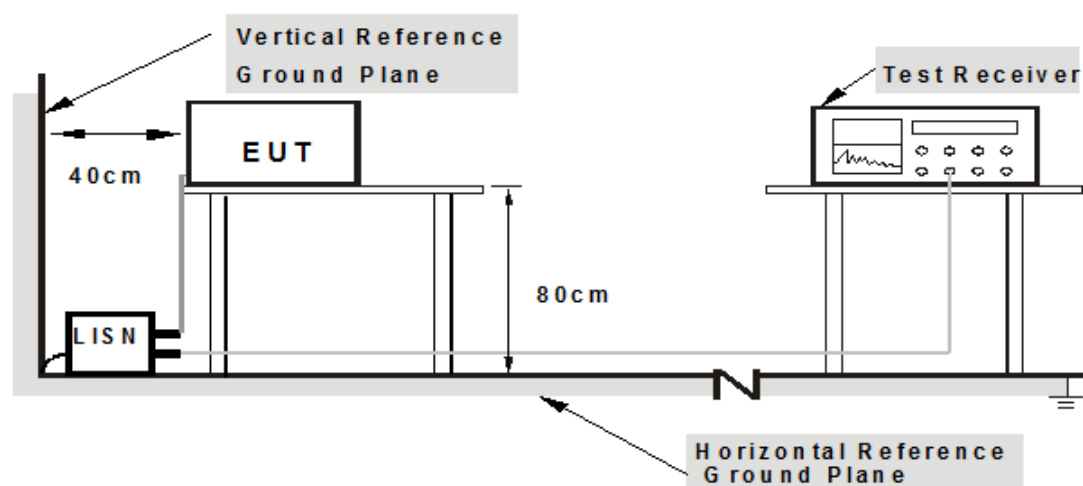
#### NOTE:

- The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.1.5 TEST SETUP



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

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

#### 4.1.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support unit 1 (Notebook Computer) which is placed on a testing table.
2. The communication partner run test program “artgui.exe [ver2.3]” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

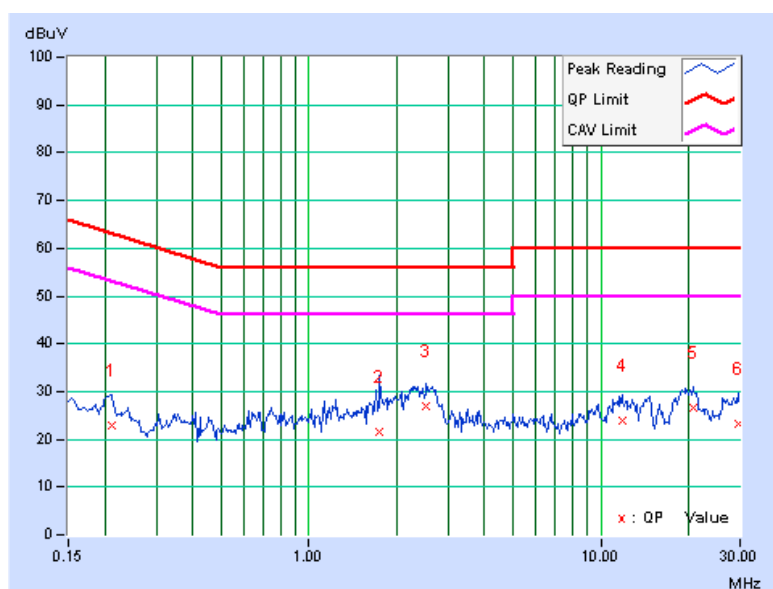
#### 4.1.7 TEST RESULTS

| PHASE | Line (L) | DETECTOR FUNCTION | Quasi-Peak (QP) / Average (AV) |
|-------|----------|-------------------|--------------------------------|
|-------|----------|-------------------|--------------------------------|

| No | Freq. [MHz] | Corr. Factor [dB] | Reading Value [dB (uV)] |      | Emission Level [dB (uV)] |       | Limit [dB (uV)] |       | Margin (dB) |        |
|----|-------------|-------------------|-------------------------|------|--------------------------|-------|-----------------|-------|-------------|--------|
|    |             |                   | Q.P.                    | AV.  | Q.P.                     | AV.   | Q.P.            | AV.   | Q.P.        | AV.    |
| 1  | 0.21041     | 9.96              | 12.97                   | 8.84 | 22.93                    | 18.80 | 63.19           | 53.19 | -40.26      | -34.39 |
| 2  | 1.75310     | 10.02             | 11.54                   | 4.89 | 21.56                    | 14.91 | 56.00           | 46.00 | -34.44      | -31.09 |
| 3  | 2.52728     | 10.05             | 16.79                   | 9.06 | 26.84                    | 19.11 | 56.00           | 46.00 | -29.16      | -26.89 |
| 4  | 11.81353    | 10.34             | 13.43                   | 5.82 | 23.77                    | 16.16 | 60.00           | 50.00 | -36.23      | -33.84 |
| 5  | 20.63449    | 10.58             | 15.94                   | 9.34 | 26.52                    | 19.92 | 60.00           | 50.00 | -33.48      | -30.08 |
| 6  | 29.60403    | 10.87             | 12.30                   | 6.30 | 23.17                    | 17.17 | 60.00           | 50.00 | -36.83      | -32.83 |

#### REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission Level – Limit value
4. Correction Factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

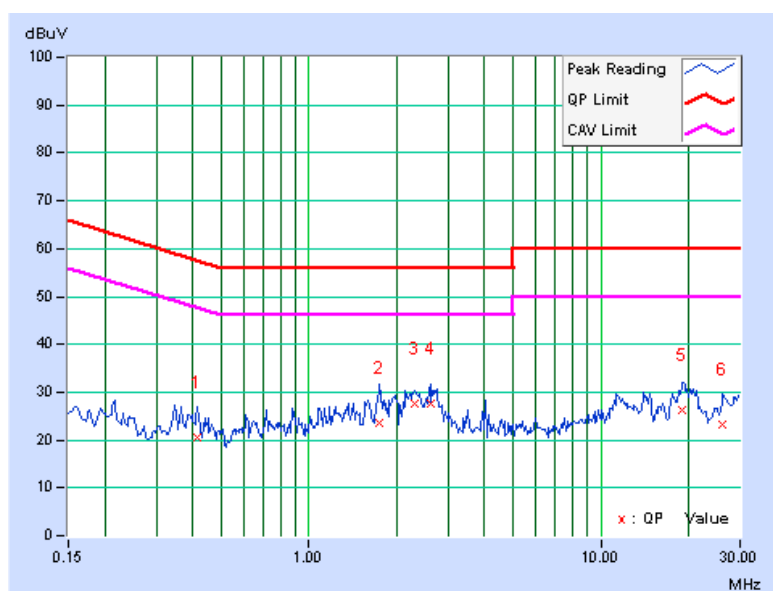


|       |             |                   |                                |
|-------|-------------|-------------------|--------------------------------|
| PHASE | Neutral (N) | DETECTOR FUNCTION | Quasi-Peak (QP) / Average (AV) |
|-------|-------------|-------------------|--------------------------------|

|    | Freq.    | Corr.  | Reading Value |      | Emission Level |       | Limit     |       | Margin |        |
|----|----------|--------|---------------|------|----------------|-------|-----------|-------|--------|--------|
| No |          | Factor | [dB (uV)]     |      | [dB (uV)]      |       | [dB (uV)] |       | (dB)   |        |
|    | [MHz]    | (dB)   | Q.P.          | AV.  | Q.P.           | AV.   | Q.P.      | AV.   | Q.P.   | AV.    |
| 1  | 0.41197  | 9.98   | 10.73         | 3.52 | 20.71          | 13.50 | 57.61     | 47.61 | -36.90 | -34.11 |
| 2  | 1.74528  | 10.03  | 13.45         | 6.90 | 23.48          | 16.93 | 56.00     | 46.00 | -32.52 | -29.07 |
| 3  | 2.31614  | 10.05  | 17.44         | 6.73 | 27.49          | 16.78 | 56.00     | 46.00 | -28.51 | -29.22 |
| 4  | 2.60157  | 10.06  | 17.40         | 6.23 | 27.46          | 16.29 | 56.00     | 46.00 | -28.54 | -29.71 |
| 5  | 19.05876 | 10.53  | 15.62         | 8.66 | 26.15          | 19.19 | 60.00     | 50.00 | -33.85 | -30.81 |
| 6  | 26.19842 | 10.75  | 12.58         | 6.28 | 23.33          | 17.03 | 60.00     | 50.00 | -36.67 | -32.97 |

#### REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission Level – Limit value
4. Correction Factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



## 4.2 UNWANTED EMISSION MEASUREMENT (Radiated versus Conducted)

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

**NOTE:**

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

## 4.2.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER              | MODEL NO.                | SERIAL NO.                          | CALIBRATED DATE | CALIBRATED UNTIL |
|-----------------------------------------|--------------------------|-------------------------------------|-----------------|------------------|
| MXE EMI Receiver<br>Agilent             | N9038A                   | MY51210105                          | Jan. 21, 2014   | Jan. 20, 2015    |
| Pre-Amplifier<br>Mini-Circuits          | ZFL-1000VH2<br>B         | AMP-ZFL-03                          | Nov. 13, 2013   | Nov. 12, 2014    |
| Trilog Broadband Antenna<br>SCHWARZBECK | VULB 9168                | 9168-360                            | Mar. 19, 2013   | Mar. 18, 2014    |
| RF Cable                                | NA                       | CHGCAB_001                          | Oct. 05, 2013   | Oct. 04, 2014    |
| Spectrum Analyzer<br>R&S                | FSV40                    | 100964                              | July 15, 2013   | July 14, 2014    |
| Horn_Antenna<br>AISI                    | AIH.8018                 | 0000320091110                       | Nov. 18, 2013   | Nov. 17, 2014    |
| Pre-Amplifier<br>Agilent                | 8449B                    | 3008A02578                          | June 25, 2013   | June 24, 2014    |
| RF Cable                                | NA                       | RF104-201<br>RF104-203<br>RF104-204 | Dec. 12, 2013   | Dec. 11, 2014    |
| Spectrum Analyzer<br>Agilent            | E4446A                   | MY48250253                          | Aug. 28, 2013   | Aug. 27, 2014    |
| Pre-Amplifier<br>SPACEK LABS            | SLKKa-48-6               | 9K16                                | Nov. 13, 2013   | Nov. 12, 2014    |
| Horn_Antenna<br>SCHWARZBECK             | BBHA 9170                | 9170-424                            | Oct. 08, 2013   | Oct. 07, 2014    |
| Software                                | ADT_Radiated<br>_V8.7.07 | NA                                  | NA              | NA               |
| Antenna Tower & Turn Table<br>CT        | NA                       | NA                                  | NA              | NA               |

### Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 3 The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
- 5 The VCCI Site Registration No. is G-137.
- 6 The CANADA Site Registration No. is IC 7450H-2.
- 7 Tested Date: Mar. 08, 2014

#### 4.2.3 TEST PROCEDURES

Following FCC KDB 558074 D01 DTS Meas. Guidance :

Radiated versus Conducted Measurements.

The unwanted emission limits in both the restricted and non-restricted bands are based on antenna-port conducted measurements in conjunction with cabinet emissions tests are permitted to demonstrate compliance.

The following steps was performed:

- a. Cabinet emissions measurements. Radiated measurement was performed to ensure that cabinet emissions are below the emission limits. For the cabinet-emission measurements the antenna was replaced by a termination matching the nominal impedance of the antenna.
- b. Conducted tests was performed using equipment that matches the nominal impedance of the antenna assembly used with the EUT
- c. EIRP calculation. A value representative of an upper bound on out-of-band antenna gain (in dBi) shall be added to the measured antenna-port conducted emission power to compute EIRP within the specified measurement bandwidth. (For emissions in the restricted bands, additional calculations are required to convert EIRP to field strength at the specified distance.) The upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands or 2 dBi, whichever is greater
- d. For all of Radiation emission test
  - d-1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
  - d-2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
  - d-3. The height of antenna 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-4. 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.
  - d-5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
  - d-6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

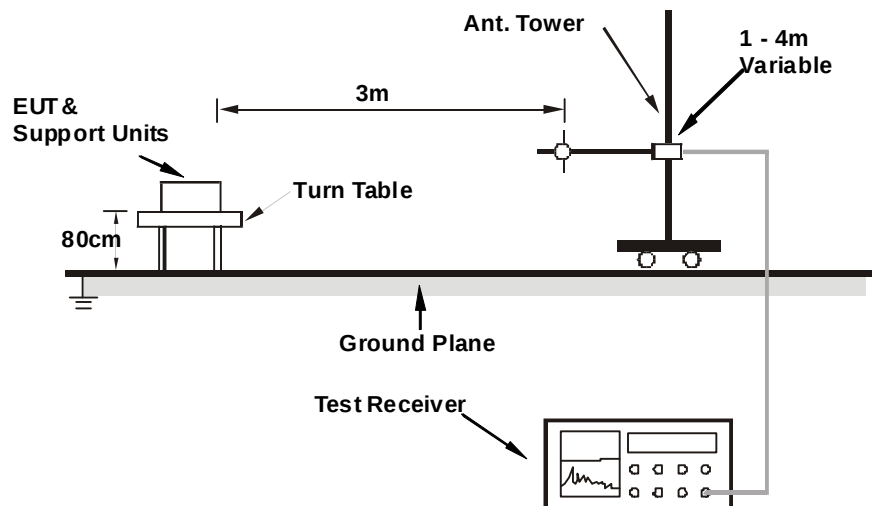
#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation

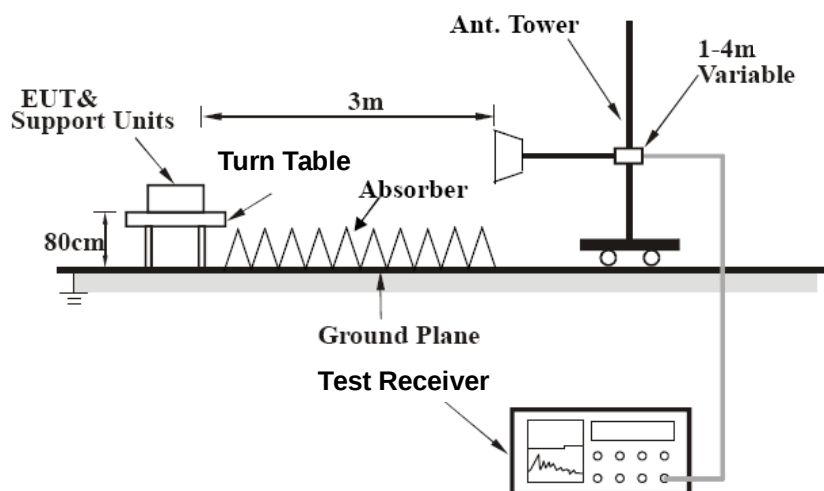
#### 4.2.5 TEST SETUP

**For radiated configuration:**

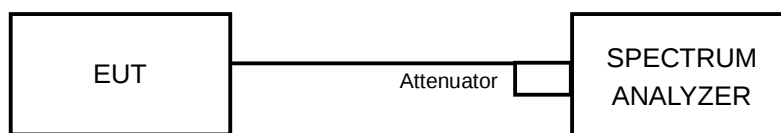
**<Frequency Range below 1GHz>**



**<Frequency Range above 1GHz>**



**For conducted configuration:**



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

#### 4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

#### 4.2.7 TEST RESULTS (RADIATED MEASUREMENT)

| Radiated versus Conducted Measurement                                                                                                                                                                                                                                                                                                                                                                   |                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| <input type="checkbox"/> Conducted measurement                                                                                                                                                                                                                                                                                                                                                          | <input checked="" type="checkbox"/> Radiated measurement |
| <p><u>For Radiated measurement:</u></p> <p>The level of unwanted emissions was measured when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation)</p> <p><u>For Conducted measurement:</u></p> <p>The level of unwanted emissions was measured as their power in a specified load (conducted spurious emissions).</p> |                                                          |

Radiated test was done with 50ohm terminator on antenna port

# BELOW 1GHz WORST-CASE DATA

802.11g

|                 |              |                      |                 |
|-----------------|--------------|----------------------|-----------------|
| CHANNEL         | TX Channel 6 | DETECTOR<br>FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | Below 1GHz   |                      |                 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 149.60         | 36.2 QP                       | 43.5              | -7.3           | 2.00 H                   | 236                        | 49.58                  | -13.40                         |
| 2                                                   | 160.80         | 40.2 QP                       | 43.5              | -3.3           | 1.50 H                   | 34                         | 53.26                  | -13.09                         |
| 3                                                   | 248.40         | 35.4 QP                       | 46.0              | -10.6          | 2.00 H                   | 82                         | 49.82                  | -14.40                         |
| 4                                                   | 282.83         | 42.5 QP                       | 46.0              | -3.5           | 1.00 H                   | 104                        | 55.55                  | -13.03                         |
| 5                                                   | 334.68         | 39.3 QP                       | 46.0              | -6.7           | 1.00 H                   | 0                          | 50.83                  | -11.52                         |
| 6                                                   | 609.09         | 38.1 QP                       | 46.0              | -7.9           | 1.00 H                   | 287                        | 42.80                  | -4.71                          |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 31.02          | 30.3 QP                       | 40.0              | -9.7           | 1.00 V                   | 360                        | 44.95                  | -14.68                         |
| 2                                                   | 49.74          | 29.0 QP                       | 40.0              | -11.1          | 1.00 V                   | 360                        | 42.69                  | -13.74                         |
| 3                                                   | 152.85         | 32.7 QP                       | 43.5              | -10.8          | 1.00 V                   | 278                        | 45.61                  | -12.94                         |
| 4                                                   | 242.53         | 29.6 QP                       | 46.0              | -16.4          | 2.00 V                   | 358                        | 44.26                  | -14.65                         |
| 5                                                   | 289.96         | 32.2 QP                       | 46.0              | -13.8          | 1.50 V                   | 280                        | 44.96                  | -12.80                         |
| 6                                                   | 609.09         | 30.4 QP                       | 46.0              | -15.6          | 1.50 V                   | 240                        | 35.12                  | -4.71                          |

## 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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

Radiated test was done with 50ohm terminator on antenna port

# ABOVE 1GHz DATA

## 802.11b

|                 |              |                      |              |
|-----------------|--------------|----------------------|--------------|
| CHANNEL         | TX Channel 1 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz |                      | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4824.00        | 49.8 PK                       | 74.0              | -24.2          | 1.49 H                   | 169                        | 42.60                  | 7.20                           |
| 2                                                   | 4824.00        | 43.1 AV                       | 54.0              | -10.9          | 1.49 H                   | 169                        | 35.90                  | 7.20                           |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4824.00        | 49.9 PK                       | 74.0              | -24.1          | 1.28 V                   | 95                         | 42.70                  | 7.20                           |
| 2                                                   | 4824.00        | 42.4 AV                       | 54.0              | -11.6          | 1.28 V                   | 95                         | 35.20                  | 7.20                           |

## 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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

|                 |              |                      |              |
|-----------------|--------------|----------------------|--------------|
| CHANNEL         | TX Channel 6 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz |                      | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4874.00        | 50.4 PK                       | 74.0              | -23.6          | 1.52 H                   | 158                        | 43.07                  | 7.33                           |
| 2                                                   | 4874.00        | 43.5 AV                       | 54.0              | -10.5          | 1.52 H                   | 158                        | 36.17                  | 7.33                           |
| 3                                                   | 7311.00        | 53.9 PK                       | 74.0              | -20.1          | 1.02 H                   | 34                         | 38.94                  | 14.96                          |
| 4                                                   | 7311.00        | 41.6 AV                       | 54.0              | -12.4          | 1.02 H                   | 34                         | 26.64                  | 14.96                          |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4874.00        | 49.5 PK                       | 74.0              | -24.5          | 1.23 V                   | 81                         | 42.17                  | 7.33                           |
| 2                                                   | 4874.00        | 41.9 AV                       | 54.0              | -12.1          | 1.23 V                   | 81                         | 34.57                  | 7.33                           |
| 3                                                   | 7311.00        | 54.1 PK                       | 74.0              | -19.9          | 1.00 V                   | 261                        | 39.14                  | 14.96                          |
| 4                                                   | 7311.00        | 41.8 AV                       | 54.0              | -12.2          | 1.00 V                   | 261                        | 26.84                  | 14.96                          |

**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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

|                 |               |                      |              |
|-----------------|---------------|----------------------|--------------|
| CHANNEL         | TX Channel 11 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz  |                      | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4924.00        | 47.5 PK                       | 74.0              | -26.5          | 1.00 H                   | 212                        | 40.03                  | 7.47                           |
| 2                                                   | 4924.00        | 38.2 AV                       | 54.0              | -15.8          | 1.00 H                   | 212                        | 30.73                  | 7.47                           |
| 3                                                   | 7386.00        | 54.1 PK                       | 74.0              | -19.9          | 1.00 H                   | 45                         | 39.21                  | 14.89                          |
| 4                                                   | 7386.00        | 41.9 AV                       | 54.0              | -12.1          | 1.00 H                   | 45                         | 27.01                  | 14.89                          |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4924.00        | 47.3 PK                       | 74.0              | -26.7          | 1.00 V                   | 98                         | 39.83                  | 7.47                           |
| 2                                                   | 4924.00        | 38.1 AV                       | 54.0              | -15.9          | 1.00 V                   | 98                         | 30.63                  | 7.47                           |
| 3                                                   | 7386.00        | 54.2 PK                       | 74.0              | -19.8          | 1.00 V                   | 254                        | 39.31                  | 14.89                          |
| 4                                                   | 7386.00        | 42.1 AV                       | 54.0              | -11.9          | 1.00 V                   | 254                        | 27.21                  | 14.89                          |

**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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

# 802.11g

|                 |              |                      |              |
|-----------------|--------------|----------------------|--------------|
| CHANNEL         | TX Channel 1 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz |                      | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4824.00        | 47.2 PK                       | 74.0              | -26.8          | 1.00 H                   | 208                        | 40.00                  | 7.20                           |
| 2                                                   | 4824.00        | 34.2 AV                       | 54.0              | -19.8          | 1.00 H                   | 208                        | 27.00                  | 7.20                           |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4824.00        | 47.4 PK                       | 74.0              | -26.6          | 1.00 V                   | 127                        | 40.20                  | 7.20                           |
| 2                                                   | 4824.00        | 34.4 AV                       | 54.0              | -19.6          | 1.00 V                   | 127                        | 27.20                  | 7.20                           |

## 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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

|                 |              |                      |              |
|-----------------|--------------|----------------------|--------------|
| CHANNEL         | TX Channel 6 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz |                      | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4874.00        | 47.0 PK                       | 74.0              | -27.0          | 1.03 H                   | 202                        | 39.67                  | 7.33                           |
| 2                                                   | 4874.00        | 34.2 AV                       | 54.0              | -19.8          | 1.03 H                   | 202                        | 26.87                  | 7.33                           |
| 3                                                   | 7311.00        | 54.3 PK                       | 74.0              | -19.7          | 1.04 H                   | 58                         | 39.34                  | 14.96                          |
| 4                                                   | 7311.00        | 42.1 AV                       | 54.0              | -11.9          | 1.04 H                   | 58                         | 27.14                  | 14.96                          |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4874.00        | 47.6 PK                       | 74.0              | -26.4          | 1.00 V                   | 132                        | 40.27                  | 7.33                           |
| 2                                                   | 4874.00        | 34.6 AV                       | 54.0              | -19.4          | 1.00 V                   | 132                        | 27.27                  | 7.33                           |
| 3                                                   | 7311.00        | 54.6 PK                       | 74.0              | -19.4          | 1.00 V                   | 253                        | 39.64                  | 14.96                          |
| 4                                                   | 7311.00        | 42.6 AV                       | 54.0              | -11.4          | 1.00 V                   | 253                        | 27.64                  | 14.96                          |

**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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

|                 |               |                      |              |
|-----------------|---------------|----------------------|--------------|
| CHANNEL         | TX Channel 11 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz  |                      | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4924.00        | 47.7 PK                       | 74.0              | -26.3          | 1.05 H                   | 197                        | 40.23                  | 7.47                           |
| 2                                                   | 4924.00        | 34.6 AV                       | 54.0              | -19.4          | 1.05 H                   | 197                        | 27.13                  | 7.47                           |
| 3                                                   | 7386.00        | 54.6 PK                       | 74.0              | -19.4          | 1.05 H                   | 57                         | 39.71                  | 14.89                          |
| 4                                                   | 7386.00        | 42.4 AV                       | 54.0              | -11.6          | 1.05 H                   | 57                         | 27.51                  | 14.89                          |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4924.00        | 47.9 PK                       | 74.0              | -26.1          | 1.00 V                   | 146                        | 40.43                  | 7.47                           |
| 2                                                   | 4924.00        | 34.7 AV                       | 54.0              | -19.3          | 1.00 V                   | 146                        | 27.23                  | 7.47                           |
| 3                                                   | 7386.00        | 54.1 PK                       | 74.0              | -19.9          | 1.02 V                   | 249                        | 39.21                  | 14.89                          |
| 4                                                   | 7386.00        | 41.7 AV                       | 54.0              | -12.3          | 1.02 V                   | 249                        | 26.81                  | 14.89                          |

**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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

# 802.11n (HT20)

|                 |              |                      |              |
|-----------------|--------------|----------------------|--------------|
| CHANNEL         | TX Channel 1 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz |                      | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4824.00        | 47.5 PK                       | 74.0              | -26.5          | 1.06 H                   | 197                        | 40.30                  | 7.20                           |
| 2                                                   | 4824.00        | 34.5 AV                       | 54.0              | -19.5          | 1.06 H                   | 197                        | 27.30                  | 7.20                           |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4824.00        | 47.4 PK                       | 74.0              | -26.6          | 1.00 V                   | 124                        | 40.20                  | 7.20                           |
| 2                                                   | 4824.00        | 34.2 AV                       | 54.0              | -19.8          | 1.00 V                   | 124                        | 27.00                  | 7.20                           |

## 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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

|                 |              |                      |              |
|-----------------|--------------|----------------------|--------------|
| CHANNEL         | TX Channel 6 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz |                      | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4874.00        | 47.4 PK                       | 74.0              | -26.6          | 1.02 H                   | 194                        | 40.07                  | 7.33                           |
| 2                                                   | 4874.00        | 34.5 AV                       | 54.0              | -19.5          | 1.02 H                   | 194                        | 27.17                  | 7.33                           |
| 3                                                   | 7311.00        | 54.0 PK                       | 74.0              | -20.0          | 1.02 H                   | 60                         | 39.04                  | 14.96                          |
| 4                                                   | 7311.00        | 41.5 AV                       | 54.0              | -12.5          | 1.02 H                   | 60                         | 26.54                  | 14.96                          |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4874.00        | 48.1 PK                       | 74.0              | -25.9          | 1.00 V                   | 131                        | 40.77                  | 7.33                           |
| 2                                                   | 4874.00        | 34.9 AV                       | 54.0              | -19.1          | 1.00 V                   | 131                        | 27.57                  | 7.33                           |
| 3                                                   | 7311.00        | 54.4 PK                       | 74.0              | -19.6          | 1.00 V                   | 252                        | 39.44                  | 14.96                          |
| 4                                                   | 7311.00        | 42.1 AV                       | 54.0              | -11.9          | 1.00 V                   | 252                        | 27.14                  | 14.96                          |

**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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

|                 |               |                      |              |
|-----------------|---------------|----------------------|--------------|
| CHANNEL         | TX Channel 11 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz  |                      | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4924.00        | 47.3 PK                       | 74.0              | -26.7          | 1.03 H                   | 223                        | 39.83                  | 7.47                           |
| 2                                                   | 4924.00        | 34.2 AV                       | 54.0              | -19.8          | 1.03 H                   | 223                        | 26.73                  | 7.47                           |
| 3                                                   | 7386.00        | 54.1 PK                       | 74.0              | -19.9          | 1.04 H                   | 43                         | 39.21                  | 14.89                          |
| 4                                                   | 7386.00        | 42.2 AV                       | 54.0              | -11.8          | 1.04 H                   | 43                         | 27.31                  | 14.89                          |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4924.00        | 47.6 PK                       | 74.0              | -26.4          | 1.00 V                   | 143                        | 40.13                  | 7.47                           |
| 2                                                   | 4924.00        | 34.9 AV                       | 54.0              | -19.1          | 1.00 V                   | 143                        | 27.43                  | 7.47                           |
| 3                                                   | 7386.00        | 53.6 PK                       | 74.0              | -20.4          | 1.00 V                   | 245                        | 38.71                  | 14.89                          |
| 4                                                   | 7386.00        | 41.6 AV                       | 54.0              | -12.4          | 1.00 V                   | 245                        | 26.71                  | 14.89                          |

**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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

# 802.11n (HT40)

|                 |              |                      |              |
|-----------------|--------------|----------------------|--------------|
| CHANNEL         | TX Channel 3 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz |                      | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4844.00        | 47.1 PK                       | 74.0              | -26.9          | 1.02 H                   | 210                        | 39.86                  | 7.24                           |
| 2                                                   | 4844.00        | 33.9 AV                       | 54.0              | -20.1          | 1.02 H                   | 210                        | 26.66                  | 7.24                           |
| 3                                                   | 7266.00        | 53.9 PK                       | 74.0              | -20.1          | 1.00 H                   | 33                         | 38.88                  | 15.02                          |
| 4                                                   | 7266.00        | 41.7 AV                       | 54.0              | -12.3          | 1.00 H                   | 33                         | 26.68                  | 15.02                          |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4844.00        | 47.3 PK                       | 74.0              | -26.7          | 1.06 V                   | 132                        | 40.06                  | 7.24                           |
| 2                                                   | 4844.00        | 34.3 AV                       | 54.0              | -19.7          | 1.06 V                   | 132                        | 27.06                  | 7.24                           |
| 3                                                   | 7266.00        | 53.9 PK                       | 74.0              | -20.1          | 1.06 V                   | 264                        | 38.88                  | 15.02                          |
| 4                                                   | 7266.00        | 42.1 AV                       | 54.0              | -11.9          | 1.06 V                   | 264                        | 27.08                  | 15.02                          |

## 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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

|                 |              |                      |              |
|-----------------|--------------|----------------------|--------------|
| CHANNEL         | TX Channel 6 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz |                      | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4874.00        | 47.5 PK                       | 74.0              | -26.5          | 1.05 H                   | 194                        | 40.17                  | 7.33                           |
| 2                                                   | 4874.00        | 34.4 AV                       | 54.0              | -19.6          | 1.05 H                   | 194                        | 27.07                  | 7.33                           |
| 3                                                   | 7311.00        | 54.3 PK                       | 74.0              | -19.7          | 1.00 H                   | 58                         | 39.34                  | 14.96                          |
| 4                                                   | 7311.00        | 41.8 AV                       | 54.0              | -12.2          | 1.00 H                   | 58                         | 26.84                  | 14.96                          |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4874.00        | 47.5 PK                       | 74.0              | -26.5          | 1.04 V                   | 130                        | 40.17                  | 7.33                           |
| 2                                                   | 4874.00        | 34.6 AV                       | 54.0              | -19.4          | 1.04 V                   | 130                        | 27.27                  | 7.33                           |
| 3                                                   | 7311.00        | 54.6 PK                       | 74.0              | -19.4          | 1.00 V                   | 263                        | 39.64                  | 14.96                          |
| 4                                                   | 7311.00        | 42.5 AV                       | 54.0              | -11.5          | 1.00 V                   | 263                        | 27.54                  | 14.96                          |

#### 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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

|                 |              |                      |              |
|-----------------|--------------|----------------------|--------------|
| CHANNEL         | TX Channel 9 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz |                      | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4904.00        | 47.7 PK                       | 74.0              | -26.3          | 1.05 H                   | 219                        | 40.29                  | 7.41                           |
| 2                                                   | 4904.00        | 34.6 AV                       | 54.0              | -19.4          | 1.05 H                   | 219                        | 27.19                  | 7.41                           |
| 3                                                   | 7356.00        | 53.8 PK                       | 74.0              | -20.2          | 1.01 H                   | 61                         | 38.89                  | 14.91                          |
| 4                                                   | 7356.00        | 41.7 AV                       | 54.0              | -12.3          | 1.01 H                   | 61                         | 26.79                  | 14.91                          |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 4904.00        | 48.0 PK                       | 74.0              | -26.0          | 1.00 V                   | 131                        | 40.59                  | 7.41                           |
| 2                                                   | 4904.00        | 35.0 AV                       | 54.0              | -19.0          | 1.00 V                   | 131                        | 27.59                  | 7.41                           |
| 3                                                   | 7356.00        | 54.2 PK                       | 74.0              | -19.8          | 1.00 V                   | 239                        | 39.29                  | 14.91                          |
| 4                                                   | 7356.00        | 42.4 AV                       | 54.0              | -11.6          | 1.00 V                   | 239                        | 27.49                  | 14.91                          |

**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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

#### 4.2.8 TEST RESULTS (CONDUCTED MEASUREMENT)

| Radiated versus Conducted Measurement                                                                                                                                                                                                                                                                                                                                                                   |                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| <input checked="" type="checkbox"/> Conducted measurement                                                                                                                                                                                                                                                                                                                                               | <input type="checkbox"/> Radiated measurement |
| <p><u>For Radiated measurement:</u></p> <p>The level of unwanted emissions was measured when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation)</p> <p><u>For Conducted measurement:</u></p> <p>The level of unwanted emissions was measured as their power in a specified load (conducted spurious emissions).</p> |                                               |

| Conducted Measurement Factor                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>a. For the out of band spurious the gain for the specific band may have been used rather than the highest gain across all bands.</p> <p>b. For the band edge the gain for the specific band may have been used.</p> <p>c. In restricted bands below 1000 MHz, add upper bound on ground plane reflection:<br/>For <math>f = 30 - 1000</math> MHz, add 4.7 dB.</p> <p>Note: The conducted emission test was considered some factor to compute test result.</p> |

The declared antenna gain is 3.62dBi, this antenna gain was used for conducted spurious/bandedge calculations.

## BELOW 1GHz DATA

### 802.11g - Channel 6

#### Conducted spurious emission table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 79.955 QP       | 31.23                   | 40             | -8.77       | -67.65          | 3.62                   | -64.03           |
| 2   | 129.91 QP       | 24.25                   | 43.5           | -19.25      | -74.63          | 3.62                   | -71.01           |
| 3   | 259.89 QP       | 24.93                   | 46             | -21.07      | -73.95          | 3.62                   | -70.33           |
| 4   | 569.805 QP      | 24.36                   | 46             | -21.64      | -74.52          | 3.62                   | -70.9            |
| 5   | 796.0575 QP     | 32.58                   | 46             | -13.42      | -66.3           | 3.62                   | -62.68           |
| 6   | 827.34 QP       | 32.66                   | 46             | -13.34      | -66.22          | 3.62                   | -62.6            |

Note 1. Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8  
d = measurement distance in 3 meters.

Note 2. The raw value was include the ground plane reflection (4.7dB)

Note 3. These frequencies in test report was the highest value below 1 GHz emission even restricted and non-restricted band

## ABOVE 1GHz DATA

### 802.11b - Channel 1

#### Conducted spurious emission table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 4821.875 PK     | 54.16                   | 74             | -19.84      | -44.72          | 3.62                   | -41.1            |
| 2   | 4821.875 AV     | 49.39                   | 54             | -4.61       | -49.49          | 3.62                   | -45.87           |

Note :

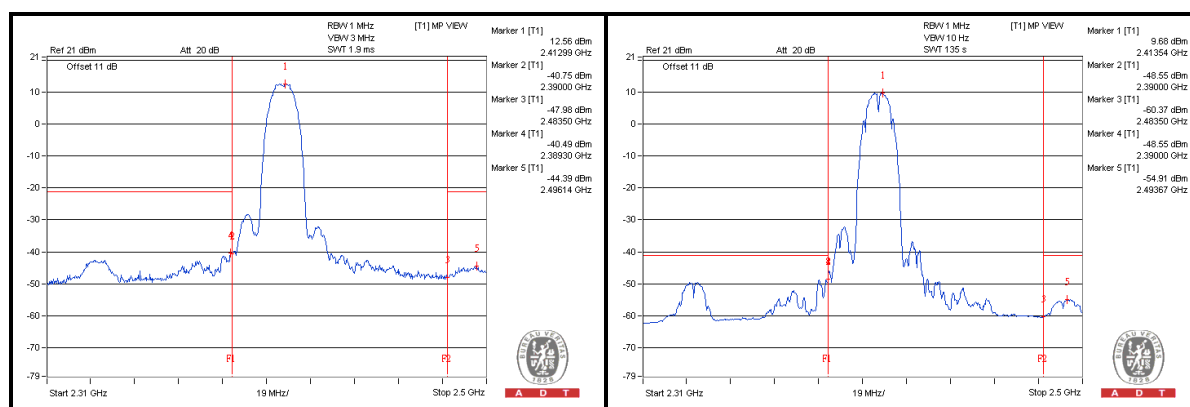
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8  
d = measurement distance in 3 meters.

#### Bandedge table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 2389.3 PK       | 58.39                   | 74             | -15.61      | -40.49          | 3.62                   | -36.87           |
| 2   | 2390 AV         | 50.09                   | 54             | -3.91       | -48.55          | 3.62                   | -45.17           |
| 3   | 2496.14 PK      | 54.49                   | 74             | -19.51      | -44.39          | 3.62                   | -40.77           |
| 4   | 2493.67 AV      | 43.97                   | 54             | -10.03      | -54.91          | 3.62                   | -51.29           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8  
d = measurement distance in 3 meters.



## 802.11b - Channel 6

### Conducted spurious emission table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 4871.875 PK     | 52.48                   | 74             | -21.52      | -46.4           | 3.62                   | -42.78           |
| 2   | 4871.875 AV     | 46.86                   | 54             | -7.14       | -52.02          | 3.62                   | -48.4            |
| 3   | 7303.125 PK     | 51.4                    | 74             | -22.6       | -47.48          | 3.62                   | -43.86           |
| 4   | 7306.25 AV      | 39.8                    | 54             | -14.2       | -59.08          | 3.62                   | -55.46           |

Note :

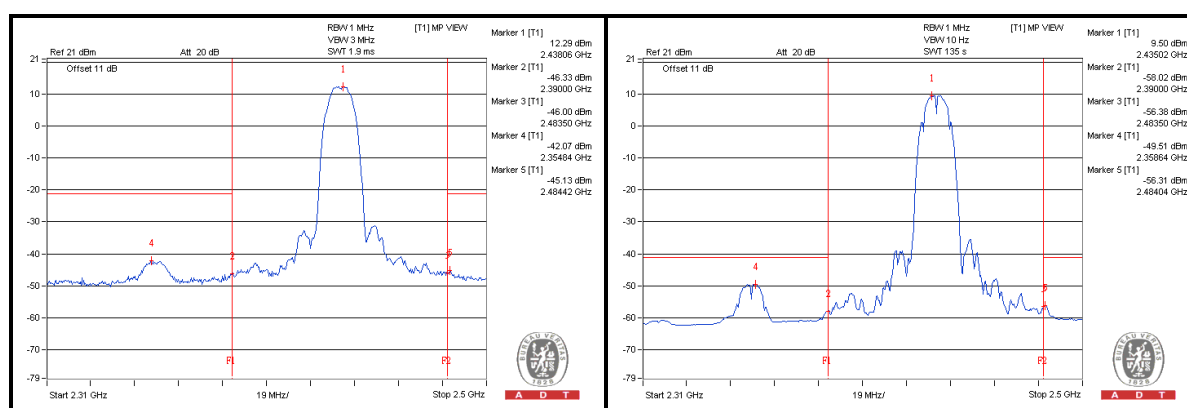
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8  
d = measurement distance in 3 meters.

### Bandedge table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 2354.84 PK      | 56.81                   | 74             | -17.19      | -42.07          | 3.62                   | -38.45           |
| 2   | 2358.64 AV      | 49.37                   | 54             | -4.63       | -49.51          | 3.62                   | -45.89           |
| 3   | 2484.42 PK      | 53.75                   | 74             | -20.25      | -45.13          | 3.62                   | -41.51           |
| 4   | 2484.04 AV      | 42.57                   | 54             | -11.43      | -56.31          | 3.62                   | -52.69           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8  
d = measurement distance in 3 meters.



## 802.11b - Channel 11

### Conducted spurious emission table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 4928.125 PK     | 51.67                   | 74             | -22.33      | -47.21          | 3.62                   | -43.59           |
| 2   | 4921.875 AV     | 40.93                   | 54             | -13.07      | -57.95          | 3.62                   | -54.33           |
| 3   | 7403.125 PK     | 52.36                   | 74             | -21.64      | -46.52          | 3.62                   | -42.9            |
| 4   | 7368.75 AV      | 39.52                   | 54             | -14.48      | -59.36          | 3.62                   | -55.74           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

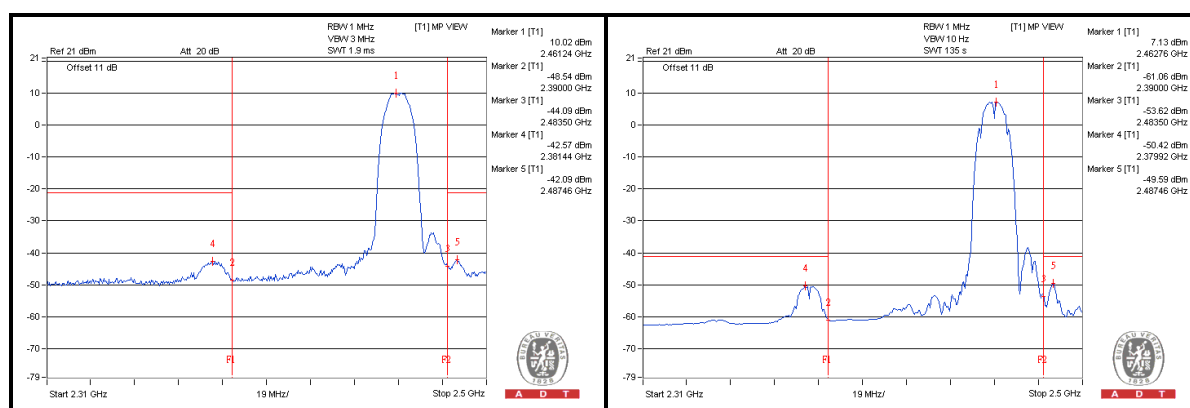
### Bandedge table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 2381.44 PK      | 56.31                   | 74             | -17.69      | -42.57          | 3.62                   | -38.95           |
| 2   | 2379.92 AV      | 48.46                   | 54             | -5.54       | -50.42          | 3.62                   | -46.8            |
| 3   | 2487.46 PK      | 56.79                   | 74             | -17.21      | -42.09          | 3.62                   | -38.47           |
| 4   | 2487.46 AV      | 49.29                   | 54             | -4.71       | -49.59          | 3.62                   | -45.97           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.



## 802.11g - Channel 1

### Conducted spurious emission table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 4818.75 PK      | 50.81                   | 74             | -23.19      | -48.07          | 3.62                   | -44.45           |
| 2   | 4821.875 AV     | 38.81                   | 54             | -15.19      | -60.07          | 3.62                   | -56.45           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

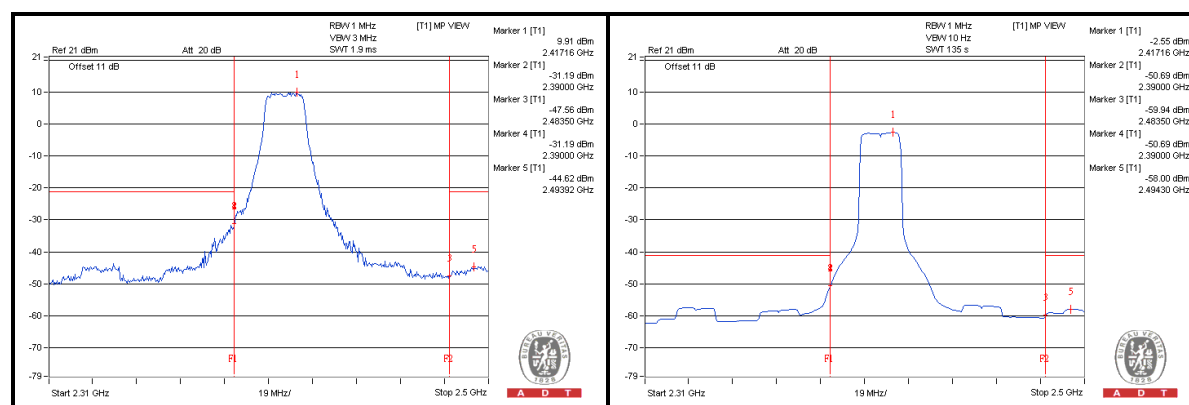
### Bandedge table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 2390 PK         | 67.32                   | 74             | -6.68       | -31.19          | 3.62                   | -27.94           |
| 2   | 2390 AV         | 47.79                   | 54             | -6.21       | -50.69          | 3.62                   | -47.47           |
| 3   | 2493.92 PK      | 54.26                   | 74             | -19.74      | -44.62          | 3.62                   | -41              |
| 4   | 2494.3 AV       | 40.88                   | 54             | -13.12      | -58             | 3.62                   | -54.38           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.



## 802.11g - Channel 6

### Conducted spurious emission table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 4878.125 PK     | 51.49                   | 74             | -22.51      | -47.39          | 3.62                   | -43.77           |
| 2   | 4871.875 AV     | 39.58                   | 54             | -14.42      | -59.3           | 3.62                   | -55.68           |
| 3   | 7325 PK         | 51.85                   | 74             | -22.15      | -47.03          | 3.62                   | -43.41           |
| 4   | 7306.25 AV      | 39.87                   | 54             | -14.13      | -59.01          | 3.62                   | -55.39           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

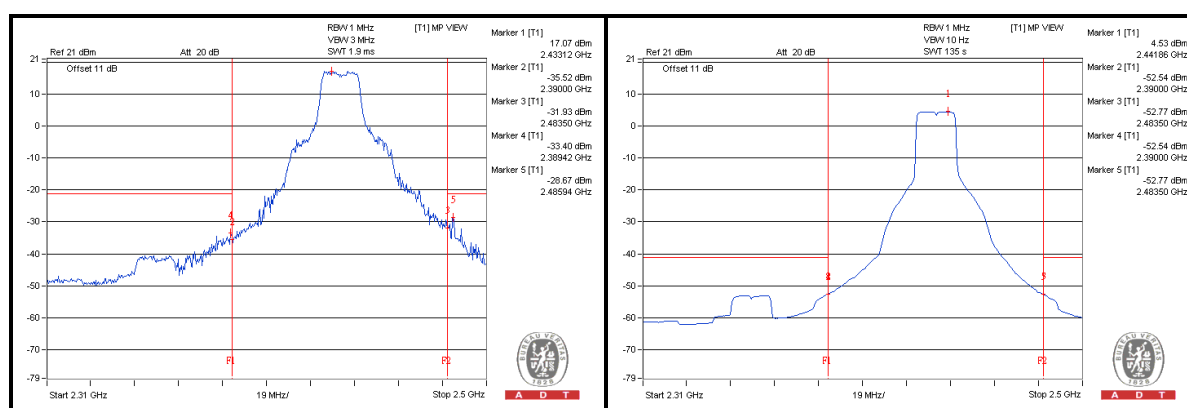
### Bandedge table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 2389.42 PK      | 65.48                   | 74             | -8.52       | -33.4           | 3.62                   | -29.78           |
| 2   | 2390 AV         | 46.25                   | 54             | -7.75       | -52.54          | 3.62                   | -49.01           |
| 3   | 2485.94 PK      | 70.21                   | 74             | -3.79       | -28.67          | 3.62                   | -25.05           |
| 4   | 2483.5 AV       | 46.05                   | 54             | -7.95       | -52.77          | 3.62                   | -49.21           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.



## 802.11g - Channel 11

### Conducted spurious emission table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 4943.75 PK      | 51.14                   | 74             | -22.86      | -47.74          | 3.62                   | -44.12           |
| 2   | 4925 AV         | 38.87                   | 54             | -15.13      | -60.01          | 3.62                   | -56.39           |
| 3   | 7400 PK         | 51.68                   | 74             | -22.32      | -47.2           | 3.62                   | -43.58           |
| 4   | 7400 AV         | 39.57                   | 54             | -14.43      | -59.31          | 3.62                   | -55.69           |

Note :

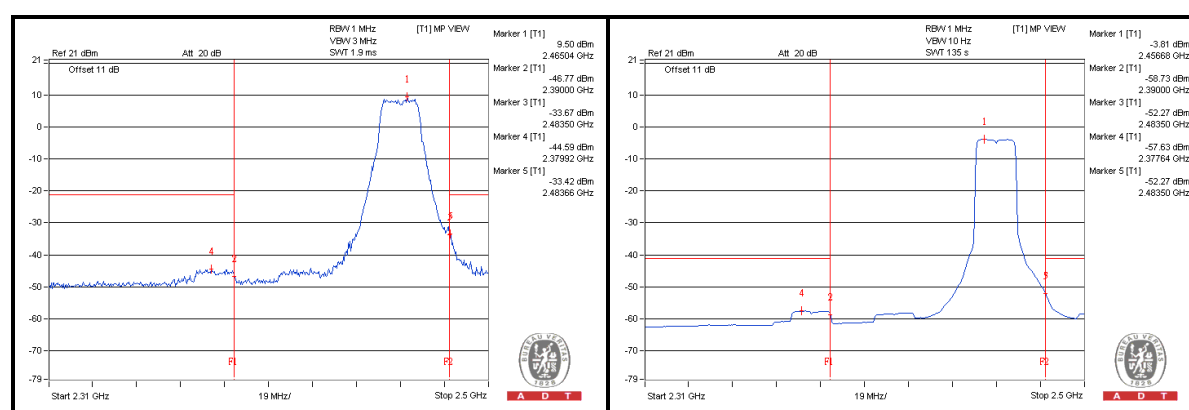
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8  
d = measurement distance in 3 meters.

### Bandedge table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 2379.92 PK      | 54.29                   | 74             | -19.71      | -44.59          | 3.62                   | -40.97           |
| 2   | 2377.64 AV      | 41.25                   | 54             | -12.75      | -57.63          | 3.62                   | -54.01           |
| 3   | 2483.66 PK      | 65.46                   | 74             | -8.54       | -33.42          | 3.62                   | -29.8            |
| 4   | 2483.5 AV       | 46.35                   | 54             | -7.65       | -52.27          | 3.62                   | -48.91           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8  
d = measurement distance in 3 meters.



## 802.11n (HT20) - Channel 1

### Conducted spurious emission table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 4828.125 PK     | 50.78                   | 74             | -23.22      | -48.1           | 3.62                   | -44.48           |
| 2   | 4818.75 AV      | 38.88                   | 54             | -15.12      | -60             | 3.62                   | -56.38           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

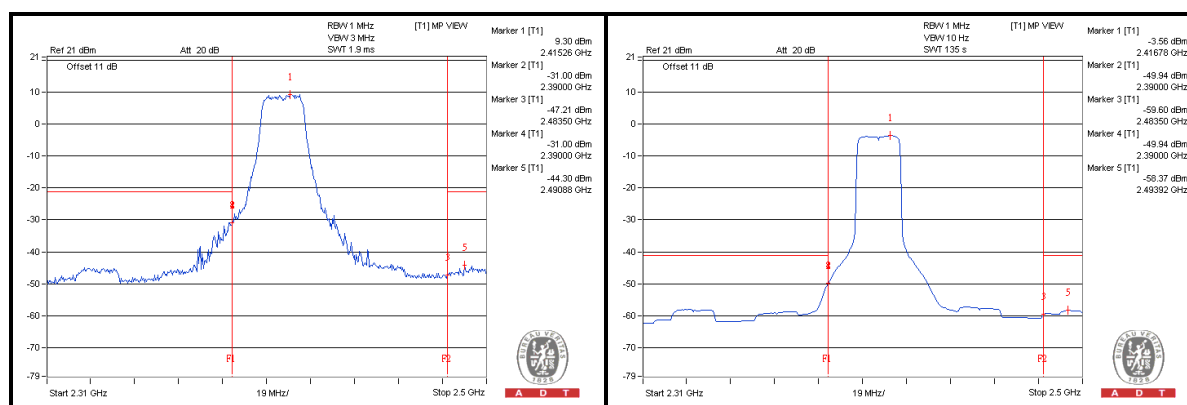
### Bandedge table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 2390 PK         | 67.99                   | 74             | -6.01       | -31             | 3.62                   | -27.27           |
| 2   | 2390 AV         | 48.66                   | 54             | -5.34       | -49.94          | 3.62                   | -46.6            |
| 3   | 2490.88 PK      | 54.58                   | 74             | -19.42      | -44.3           | 3.62                   | -40.68           |
| 4   | 2493.92 AV      | 40.51                   | 54             | -13.49      | -58.37          | 3.62                   | -54.75           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.



## 802.11n (HT20) - Channel 6

### Conducted spurious emission table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 4890.625 PK     | 51.72                   | 74             | -22.28      | -47.16          | 3.62                   | -43.54           |
| 2   | 4871.875 AV     | 39.24                   | 54             | -14.76      | -59.64          | 3.62                   | -56.02           |
| 3   | 7325 PK         | 51.94                   | 74             | -22.06      | -46.94          | 3.62                   | -43.32           |
| 4   | 7300 AV         | 39.77                   | 54             | -14.23      | -59.11          | 3.62                   | -55.49           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

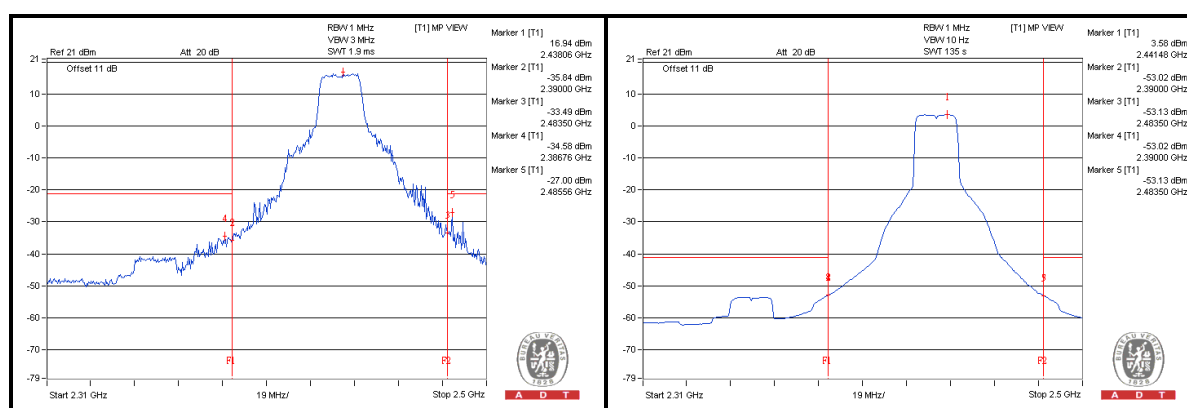
### Bandedge table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 2386.76 PK      | 64.3                    | 74             | -9.7        | -34.58          | 3.62                   | -30.96           |
| 2   | 2390 AV         | 45.73                   | 54             | -8.27       | -53.02          | 3.62                   | -49.53           |
| 3   | 2485.56 PK      | 71.88                   | 74             | -2.12       | -27             | 3.62                   | -23.38           |
| 4   | 2483.5 AV       | 45.68                   | 54             | -8.32       | -53.13          | 3.62                   | -49.58           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.



## 802.11n (HT20) - Channel 11

### Conducted spurious emission table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 4921.875 PK     | 50.47                   | 74             | -23.53      | -48.41          | 3.62                   | -44.79           |
| 2   | 4940.625 AV     | 38.94                   | 54             | -15.06      | -59.94          | 3.62                   | -56.32           |
| 3   | 7403.125 PK     | 51.38                   | 74             | -22.62      | -47.5           | 3.62                   | -43.88           |
| 4   | 7381.25 AV      | 39.58                   | 54             | -14.42      | -59.3           | 3.62                   | -55.68           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

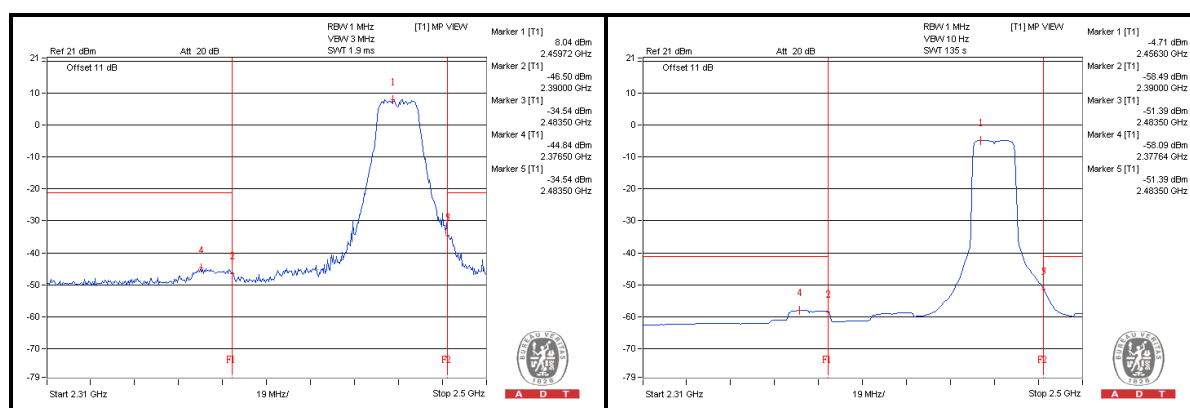
### Bandedge table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 2376.5 PK       | 54.04                   | 74             | -19.96      | -44.84          | 3.62                   | -41.22           |
| 2   | 2377.64 AV      | 40.79                   | 54             | -13.21      | -58.09          | 3.62                   | -54.47           |
| 3   | 2483.5 PK       | 64.23                   | 74             | -9.77       | -34.54          | 3.62                   | -31.03           |
| 4   | 2483.5 AV       | 47.3                    | 54             | -6.7        | -51.39          | 3.62                   | -47.96           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.



## 802.11n (HT40) - Channel 3

### Conducted spurious emission table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 4818.75 PK      | 51.06                   | 74             | -22.94      | -47.82          | 3.62                   | -44.2            |
| 2   | 4837.5 AV       | 38.82                   | 54             | -15.18      | -60.06          | 3.62                   | -56.44           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

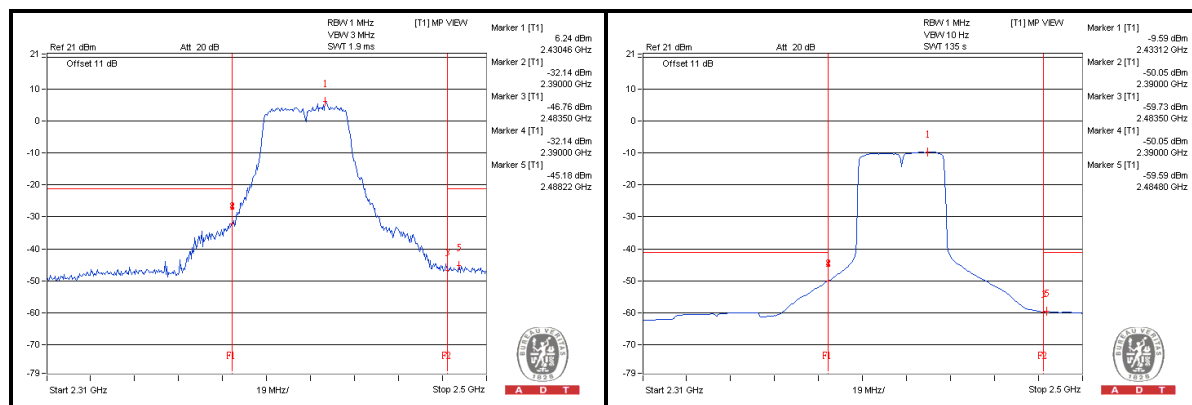
### Bandedge table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 2390 PK         | 66.78                   | 74             | -7.22       | -32.14          | 3.62                   | -28.48           |
| 2   | 2390 AV         | 48.7                    | 54             | -5.3        | -50.05          | 3.62                   | -46.56           |
| 3   | 2488.22 PK      | 53.7                    | 74             | -20.3       | -45.18          | 3.62                   | -41.56           |
| 4   | 2484.8 AV       | 39.29                   | 54             | -14.71      | -59.59          | 3.62                   | -55.97           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.



## 802.11n (HT40) - Channel 6

### Conducted spurious emission table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 4868.75 PK      | 50.65                   | 74             | -23.35      | -48.23          | 3.62                   | -44.61           |
| 2   | 4893.75 AV      | 38.62                   | 54             | -15.38      | -60.26          | 3.62                   | -56.64           |
| 3   | 7300 PK         | 51.95                   | 74             | -22.05      | -46.93          | 3.62                   | -43.31           |
| 4   | 7293.75 AV      | 39.85                   | 54             | -14.15      | -59.03          | 3.62                   | -55.41           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

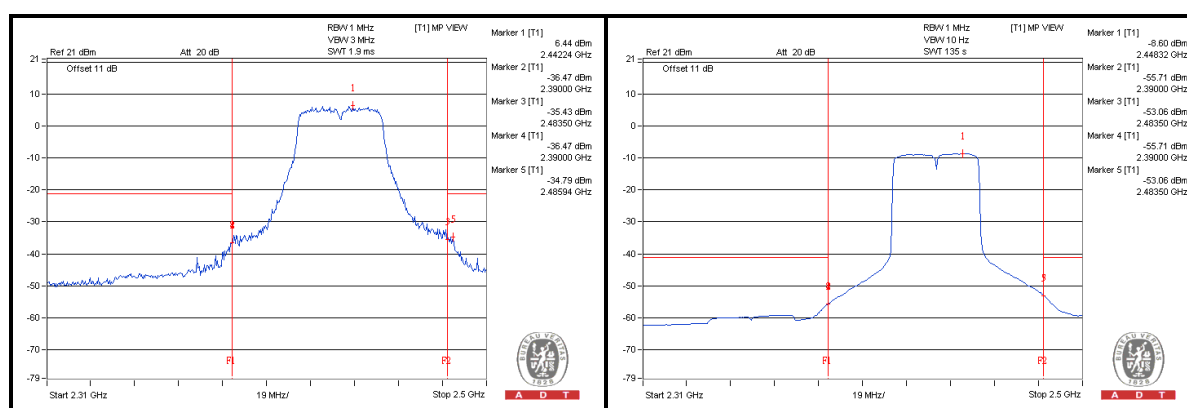
### Bandedge table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 2390 PK         | 62.19                   | 74             | -11.81      | -36.47          | 3.62                   | -33.07           |
| 2   | 2390 AV         | 43.02                   | 54             | -10.98      | -55.71          | 3.62                   | -52.24           |
| 3   | 2485.94 PK      | 64.09                   | 74             | -9.91       | -34.79          | 3.62                   | -31.17           |
| 4   | 2483.5 AV       | 45.71                   | 54             | -8.29       | -53.06          | 3.62                   | -49.55           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.



## 802.11n (HT40) - Channel 9

### Conducted spurious emission table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 4915.625 PK     | 51.59                   | 74             | -22.41      | -47.29          | 3.62                   | -43.67           |
| 2   | 4937.5 AV       | 38.98                   | 54             | -15.02      | -59.9           | 3.62                   | -56.28           |
| 3   | 7368.75 PK      | 52.1                    | 74             | -21.9       | -46.78          | 3.62                   | -43.16           |
| 4   | 7375 AV         | 39.67                   | 54             | -14.33      | -59.21          | 3.62                   | -55.59           |

Note :

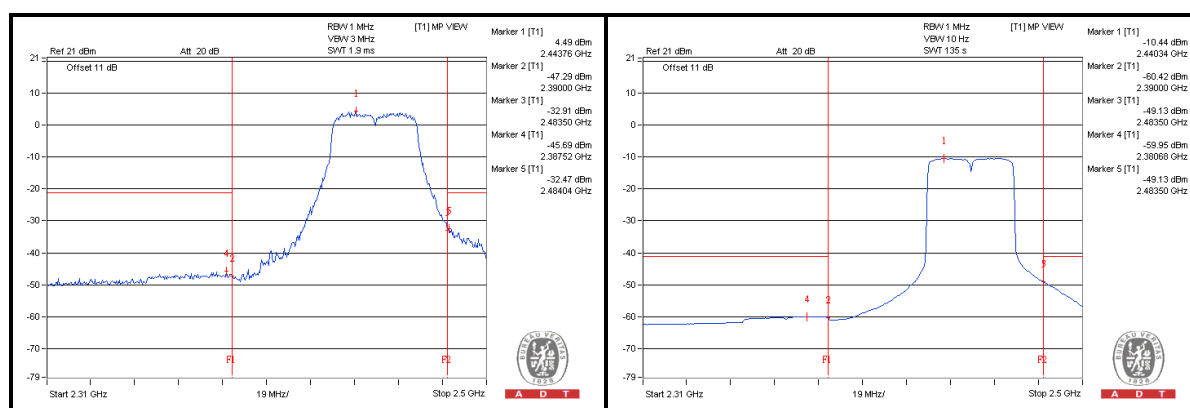
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8  
d = measurement distance in 3 meters.

### Bandedge table

| No. | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBm) | Correction Factor (dB) | EIRP Level (dBm) |
|-----|-----------------|-------------------------|----------------|-------------|-----------------|------------------------|------------------|
| 1   | 2387.52 PK      | 53.19                   | 74             | -20.81      | -45.69          | 3.62                   | -42.07           |
| 2   | 2380.68 AV      | 38.93                   | 54             | -15.07      | -59.95          | 3.62                   | -56.33           |
| 3   | 2484.04 PK      | 66.41                   | 74             | -7.59       | -32.47          | 3.62                   | -28.85           |
| 4   | 2483.5 AV       | 49.68                   | 54             | -4.32       | -49.13          | 3.62                   | -45.58           |

Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8  
d = measurement distance in 3 meters.



### 4.3 6dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|----------------------------|-----------|------------|-----------------|------------------|
| SPECTRUM ANALYZER R&S      | FSV 40    | 100964     | July 15, 2013   | July 14, 2014    |

**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. Tested date : Mar. 07, 2014

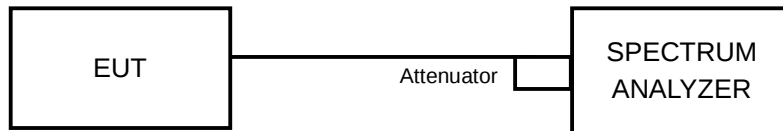
#### 4.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100kHz.
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. 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

#### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.3.5 TEST SETUP



#### 4.3.6 EUT OPERATING CONDITIONS

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

#### 4.3.7 TEST RESULTS

##### 802.11b

| CHANNEL | CHANNEL<br>FREQUENCY<br>(MHz) | 6dB<br>BANDWIDTH<br>(MHz) | MINIMUM LIMIT<br>(MHz) | PASS / FAIL |
|---------|-------------------------------|---------------------------|------------------------|-------------|
| 1       | 2412                          | 10.12                     | 0.5                    | PASS        |
| 6       | 2437                          | 10.13                     | 0.5                    | PASS        |
| 11      | 2462                          | 10.13                     | 0.5                    | PASS        |

##### 802.11g

| CHANNEL | CHANNEL<br>FREQUENCY<br>(MHz) | 6dB<br>BANDWIDTH<br>(MHz) | MINIMUM LIMIT<br>(MHz) | PASS / FAIL |
|---------|-------------------------------|---------------------------|------------------------|-------------|
| 1       | 2412                          | 16.40                     | 0.5                    | PASS        |
| 6       | 2437                          | 16.39                     | 0.5                    | PASS        |
| 11      | 2462                          | 16.39                     | 0.5                    | PASS        |

##### 802.11n (HT20)

| CHANNEL | CHANNEL<br>FREQUENCY<br>(MHz) | 6dB<br>BANDWIDTH<br>(MHz) | MINIMUM LIMIT<br>(MHz) | PASS / FAIL |
|---------|-------------------------------|---------------------------|------------------------|-------------|
| 1       | 2412                          | 17.62                     | 0.5                    | PASS        |
| 6       | 2437                          | 17.60                     | 0.5                    | PASS        |
| 11      | 2462                          | 17.59                     | 0.5                    | PASS        |

##### 802.11n (HT40)

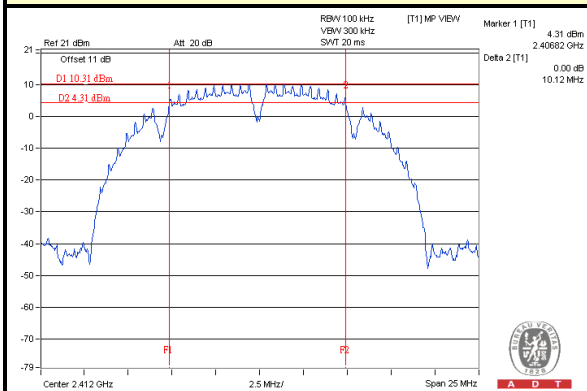
| CHANNEL | CHANNEL<br>FREQUENCY<br>(MHz) | 6dB<br>BANDWIDTH<br>(MHz) | MINIMUM LIMIT<br>(MHz) | PASS / FAIL |
|---------|-------------------------------|---------------------------|------------------------|-------------|
| 3       | 2422                          | 36.19                     | 0.5                    | PASS        |
| 6       | 2437                          | 36.43                     | 0.5                    | PASS        |
| 9       | 2452                          | 36.38                     | 0.5                    | PASS        |



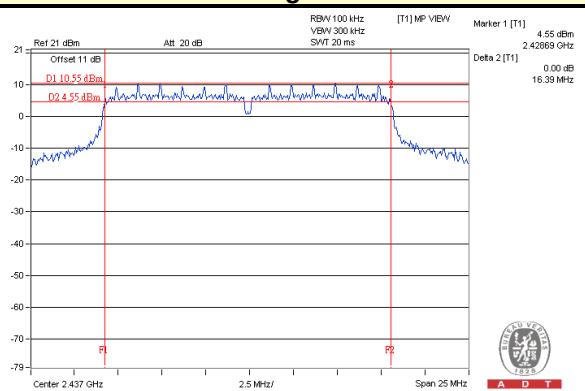
A D T

## SPECTRUM PLOT OF WORST VALUE

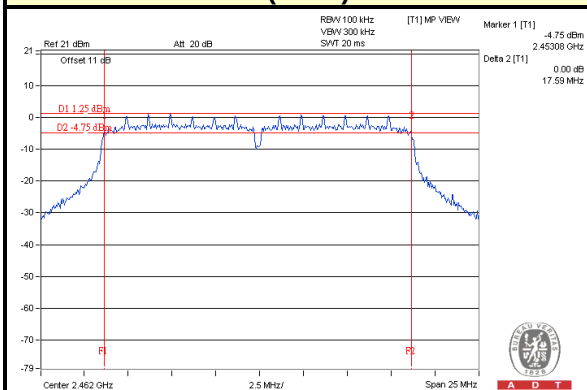
### 802.11b / CH1



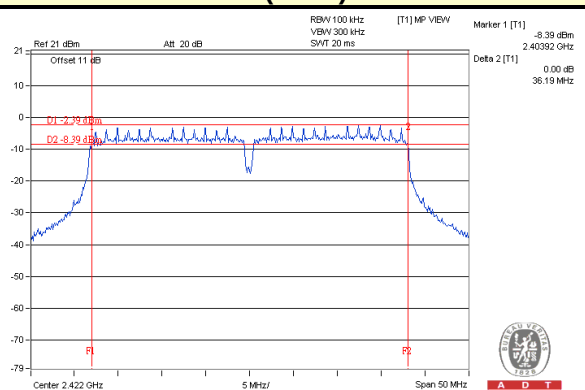
### 802.11g / CH6



### 802.11n (HT20) / CH11



### 802.11n (HT40) / CH3



## 4.4 OCCUPIED BANDWIDTH MEASUREMENT

### 4.4.1 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|----------------------------|-----------|------------|-----------------|------------------|
| SPECTRUM ANALYZER R&S      | FSV 40    | 100964     | July 15, 2013   | July 14, 2014    |

**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. Tested date : Mar. 07, 2014

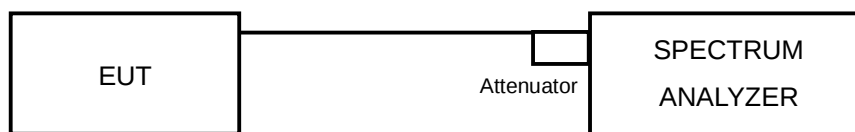
### 4.4.2 TEST PROCEDURE

1. Set RBW  $\geq 1\%$  of the emission bandwidth.
2. Set the VBW  $\geq 3 \times$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Record the 99% emission bandwidth.

### 4.4.3 DEVIATION FROM TEST STANDARD

No deviation

### 4.4.4 TEST SETUP



### 4.4.5 EUT OPERATING CONDITIONS

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

#### 4.4.6 TEST RESULTS

##### 802.11b

| CHANNEL | CHANNEL FREQUENCY (MHz) | OCCUPIED BANDWIDTH (MHz) |
|---------|-------------------------|--------------------------|
| 1       | 2412                    | 13.91                    |
| 6       | 2437                    | 13.92                    |
| 11      | 2462                    | 13.92                    |

##### 802.11g

| CHANNEL | CHANNEL FREQUENCY (MHz) | OCCUPIED BANDWIDTH (MHz) |
|---------|-------------------------|--------------------------|
| 1       | 2412                    | 17.04                    |
| 6       | 2437                    | 19.80                    |
| 11      | 2462                    | 17.04                    |

##### 802.11n (HT20)

| CHANNEL | CHANNEL FREQUENCY (MHz) | OCCUPIED BANDWIDTH (MHz) |
|---------|-------------------------|--------------------------|
| 1       | 2412                    | 18.24                    |
| 6       | 2437                    | 19.92                    |
| 11      | 2462                    | 18.12                    |

##### 802.11n (HT40)

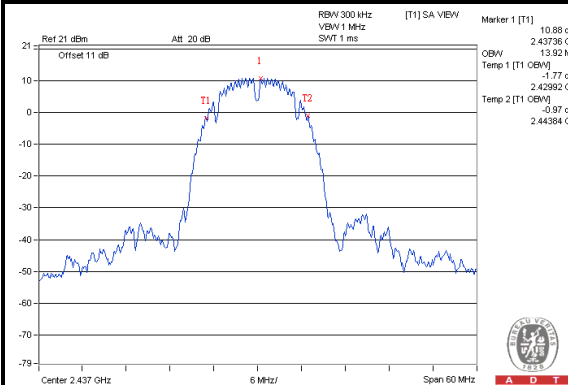
| CHANNEL | CHANNEL FREQUENCY (MHz) | OCCUPIED BANDWIDTH (MHz) |
|---------|-------------------------|--------------------------|
| 3       | 2422                    | 37.60                    |
| 6       | 2437                    | 37.60                    |
| 9       | 2452                    | 37.60                    |



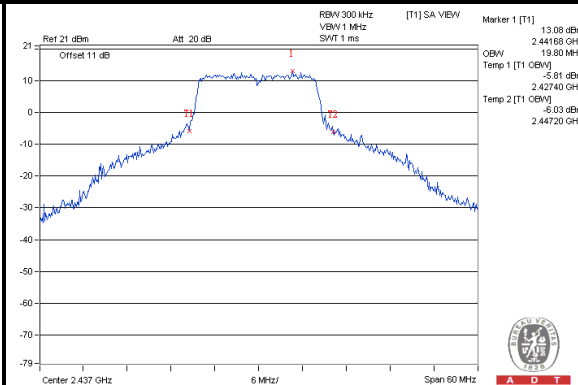
A D T

## SPECTRUM PLOT OF WORST VALUE

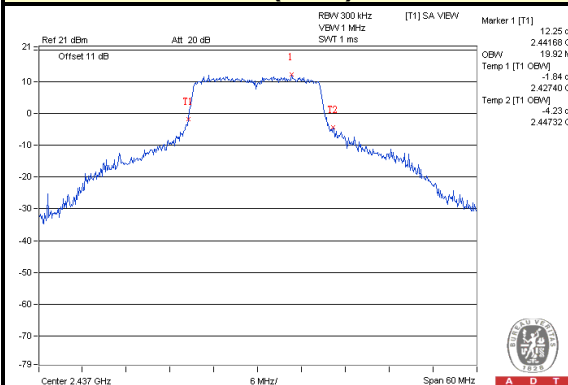
### 802.11b / CH6



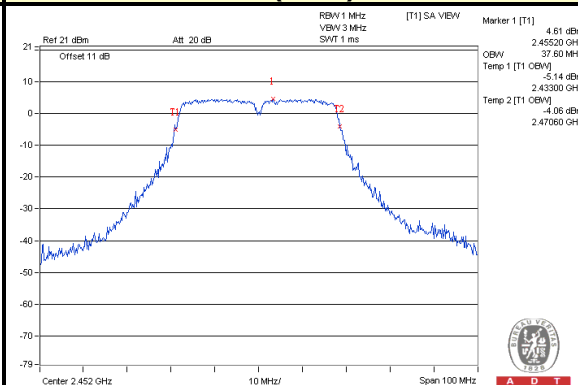
### 802.11g / CH6



### 802.11n (HT20) : CH6



### 802.11n (HT40) : CH6



## 4.5 CONDUCTED OUTPUT POWER MEASUREMENT

### 4.5.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

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

### 4.5.2 INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|----------------------------|-----------|------------|-----------------|------------------|
| Power meter<br>Anritsu     | ML2495A   | 0824006    | May 20, 2013    | May 19, 2014     |
| Power sensor<br>Anritsu    | MA2411B   | 0738172    | May 20, 2013    | May 19, 2014     |

**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. Tested date : Mar. 07, 2014

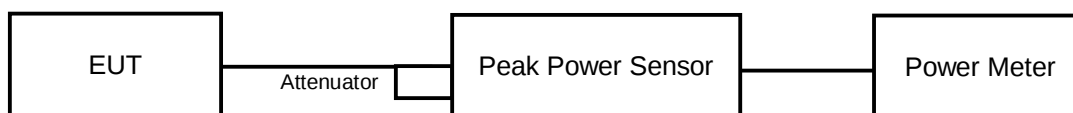
### 4.5.3 TEST PROCEDURES

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

### 4.5.4 DEVIATION FROM TEST STANDARD

No deviation.

### 4.5.5 TEST SETUP



### 4.5.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

## 4.5.7 TEST RESULTS

### 802.11b

| CHANNEL | FREQUENCY (MHz) | PEAK POWER (mW) | PEAK POWER (dBm) | LIMIT (dBm) | PASS/FAIL |
|---------|-----------------|-----------------|------------------|-------------|-----------|
| 1       | 2412            | 174.985         | 22.43            | 30          | PASS      |
| 6       | 2437            | 178.238         | 22.51            | 30          | PASS      |
| 11      | 2462            | 109.901         | 20.41            | 30          | PASS      |

### 802.11g

| CHANNEL | FREQUENCY (MHz) | PEAK POWER (mW) | PEAK POWER (dBm) | LIMIT (dBm) | PASS/FAIL |
|---------|-----------------|-----------------|------------------|-------------|-----------|
| 1       | 2412            | 229.615         | 23.61            | 30          | PASS      |
| 6       | 2437            | 439.542         | 26.43            | 30          | PASS      |
| 11      | 2462            | 164.059         | 22.15            | 30          | PASS      |

### 802.11n (HT20)

| CHANNEL | FREQUENCY (MHz) | PEAK POWER (mW) | PEAK POWER (dBm) | LIMIT (dBm) | PASS/FAIL |
|---------|-----------------|-----------------|------------------|-------------|-----------|
| 1       | 2412            | 206.063         | 23.14            | 30          | PASS      |
| 6       | 2437            | 433.511         | 26.37            | 30          | PASS      |
| 11      | 2462            | 152.405         | 21.83            | 30          | PASS      |

### 802.11n (HT40)

| CHANNEL | FREQUENCY (MHz) | PEAK POWER (mW) | PEAK POWER (dBm) | LIMIT (dBm) | PASS/FAIL |
|---------|-----------------|-----------------|------------------|-------------|-----------|
| 3       | 2422            | 118.032         | 20.72            | 30          | PASS      |
| 6       | 2437            | 155.239         | 21.91            | 30          | PASS      |
| 9       | 2452            | 107.895         | 20.33            | 30          | PASS      |

## 4.6 AVERAGE OUTPUT POWER

### 4.6.1 FOR REFERENCE

### 4.6.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|----------------------------|-----------|------------|-----------------|------------------|
| Power meter<br>Anritsu     | ML2495A   | 0824006    | May 20, 2013    | May 19, 2014     |
| Power sensor<br>Anritsu    | MA2411B   | 0738172    | May 20, 2013    | May 19, 2014     |

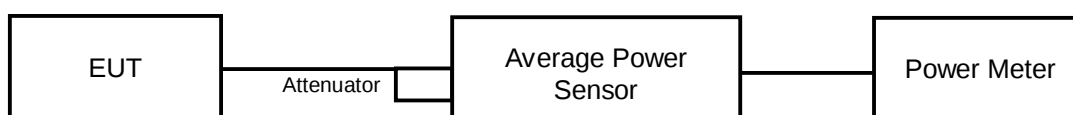
**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Mar. 07, 2014

### 4.6.3 TEST PROCEDURES

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

### 4.6.4 TEST SETUP



### 4.6.5 EUT OPERATING CONDITIONS

Same as Item 4.3.6

## 4.6.6 TEST RESULTS

### 802.11b

| CHANNEL | FREQUENCY (MHz) | AVERAGE POWER (mW) | AVERAGE POWER (dBm) |
|---------|-----------------|--------------------|---------------------|
| 1       | 2412            | 108.643            | 20.36               |
| 6       | 2437            | 106.414            | 20.27               |
| 11      | 2462            | 64.714             | 18.11               |

### 802.11g

| CHANNEL | FREQUENCY (MHz) | AVERAGE POWER (mW) | AVERAGE POWER (dBm) |
|---------|-----------------|--------------------|---------------------|
| 1       | 2412            | 28.445             | 14.54               |
| 6       | 2437            | 163.305            | 22.13               |
| 11      | 2462            | 21.038             | 13.23               |

### 802.11n (HT20)

| CHANNEL | FREQUENCY (MHz) | AVERAGE POWER (mW) | AVERAGE POWER (dBm) |
|---------|-----------------|--------------------|---------------------|
| 1       | 2412            | 25.177             | 14.01               |
| 6       | 2437            | 127.057            | 21.04               |
| 11      | 2462            | 19.634             | 12.93               |

### 802.11n (HT40)

| CHANNEL | FREQUENCY (MHz) | AVERAGE POWER (mW) | AVERAGE POWER (dBm) |
|---------|-----------------|--------------------|---------------------|
| 3       | 2422            | 14.894             | 11.73               |
| 6       | 2437            | 19.770             | 12.96               |
| 9       | 2452            | 13.305             | 11.24               |

## 4.7 POWER SPECTRAL DENSITY MEASUREMENT

### 4.7.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 4.7.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|----------------------------|-----------|------------|-----------------|------------------|
| SPECTRUM ANALYZER R&S      | FSV 40    | 100964     | July 15, 2013   | July 14, 2014    |

**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. Tested date : Mar. 07, 2014

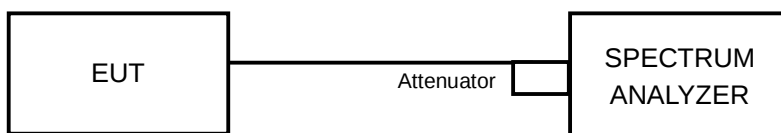
### 4.7.3 TEST PROCEDURE

1. Set the RBW = 3 kHz, VBW =10 kHz, Detector = peak.
2. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
3. Use the peak marker function to determine the maximum amplitude level.

### 4.7.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.7.5 TEST SETUP



### 4.7.6 EUT OPERATING CONDITION

Same as Item 4.3.6

#### 4.7.7 TEST RESULTS

##### 802.11b

| Channel | FREQUENCY (MHz) | PSD (dBm) | Limit (dBm) | PASS /FAIL |
|---------|-----------------|-----------|-------------|------------|
| 1       | 2412            | -2.19     | 8           | PASS       |
| 6       | 2437            | -2.54     | 8           | PASS       |
| 11      | 2462            | -4.96     | 8           | PASS       |

##### 802.11g

| Channel | FREQUENCY (MHz) | PSD (dBm) | Limit (dBm) | PASS /FAIL |
|---------|-----------------|-----------|-------------|------------|
| 1       | 2412            | -9.06     | 8           | PASS       |
| 6       | 2437            | -1.59     | 8           | PASS       |
| 11      | 2462            | -10.18    | 8           | PASS       |

##### 802.11n (HT20)

| Channel | FREQUENCY (MHz) | PSD (dBm) | Limit (dBm) | PASS /FAIL |
|---------|-----------------|-----------|-------------|------------|
| 1       | 2412            | -11.12    | 8           | PASS       |
| 6       | 2437            | -2.53     | 8           | PASS       |
| 11      | 2462            | -10.98    | 8           | PASS       |

##### 802.11n (HT40)

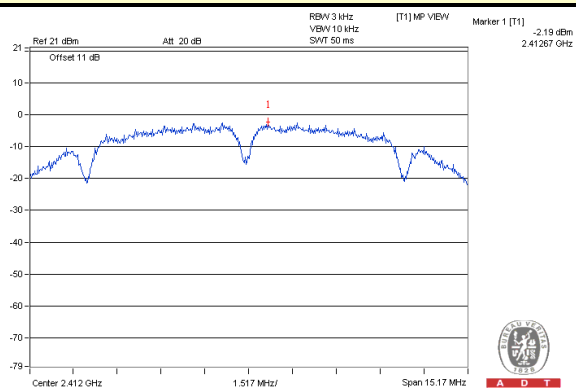
| Channel | FREQUENCY (MHz) | PSD (dBm) | Limit (dBm) | PASS /FAIL |
|---------|-----------------|-----------|-------------|------------|
| 3       | 2422            | -15.57    | 8           | PASS       |
| 6       | 2437            | -14.41    | 8           | PASS       |
| 9       | 2452            | -16.40    | 8           | PASS       |



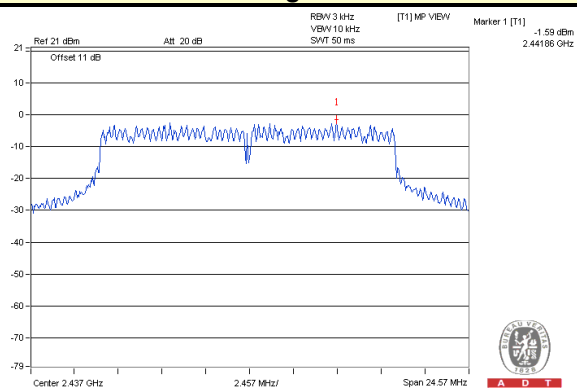
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## SPECTRUM PLOT OF WORST VALUE

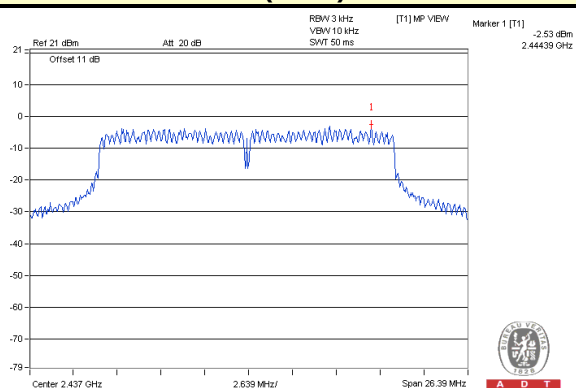
### 802.11b / CH1



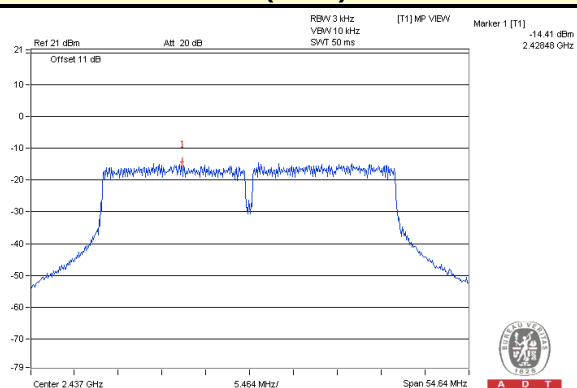
### 802.11g / CH6



### 802.11n (HT20) / CH6



### 802.11n (HT40) / CH6



## 4.8 CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

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

### 4.8.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|----------------------------|-----------|------------|-----------------|------------------|
| SPECTRUM ANALYZER R&S      | FSV 40    | 100964     | July 15, 2013   | July 14, 2014    |

**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. Tested date : Mar. 07, 2014

### 4.8.3 TEST PROCEDURE

#### Measurement Procedure - Reference Level

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.

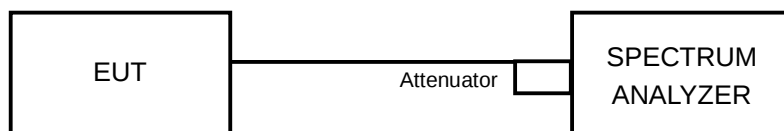
#### Measurement Procedure –Unwanted Emission Level

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.

#### 4.8.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.8.5 TEST SETUP



#### 4.8.6 EUT OPERATING CONDITION

Same as Item 4.3.6

#### 4.8.7 TEST RESULTS

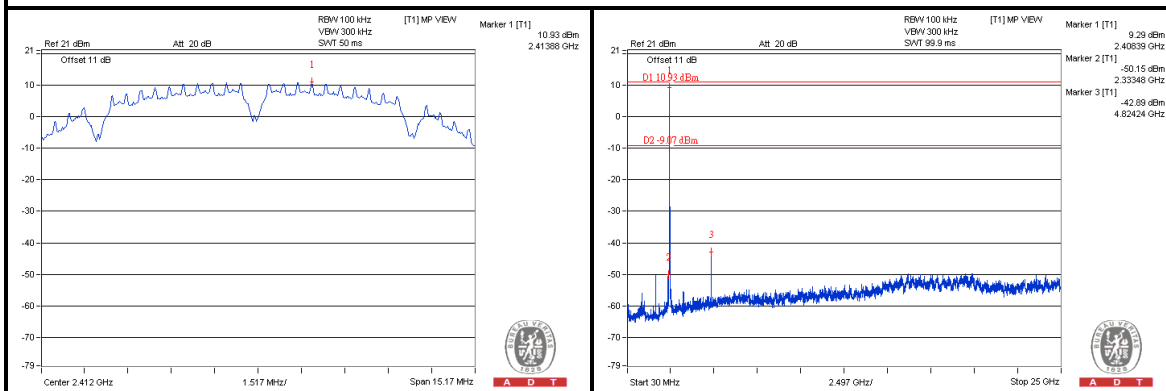
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



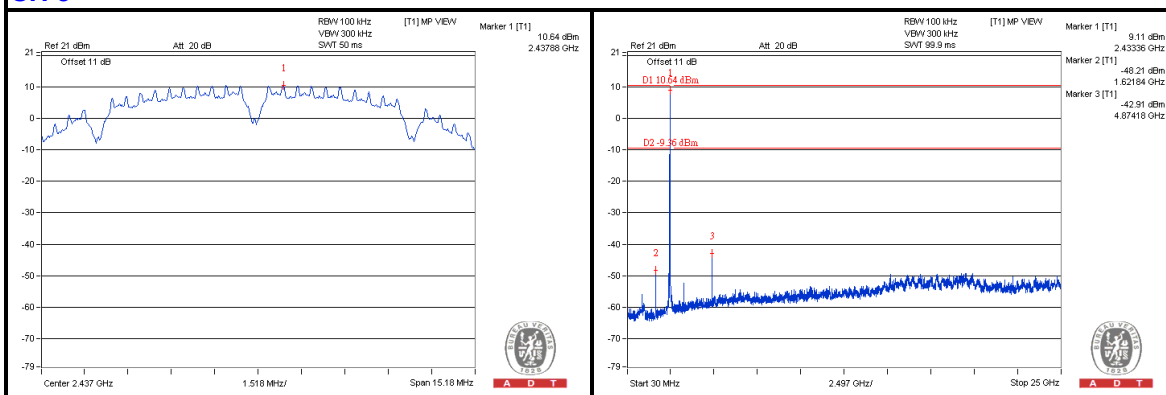
A D T

802.11b

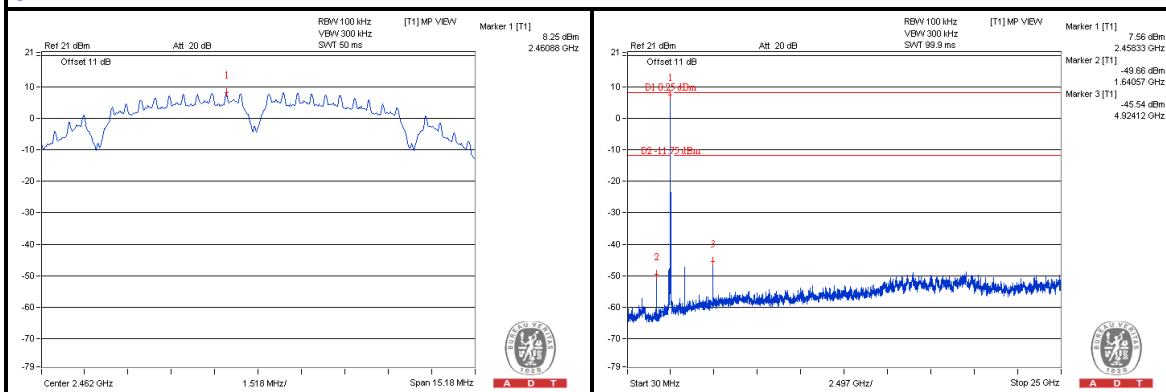
CH 1



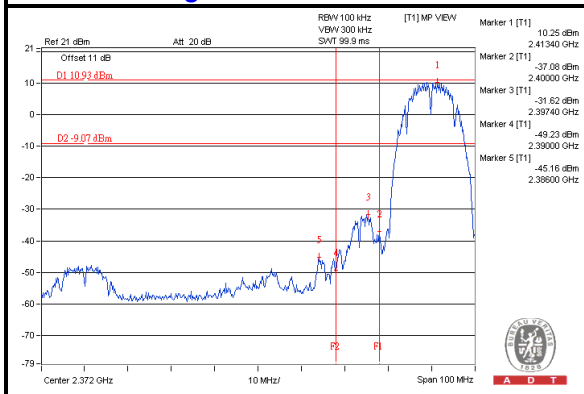
CH 6



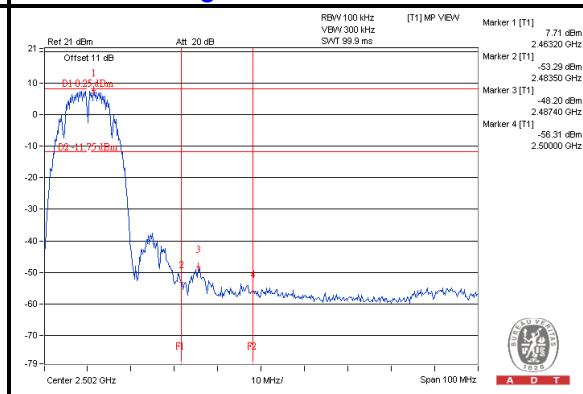
CH 11



CH 1 Band edge



CH 11 Band edge

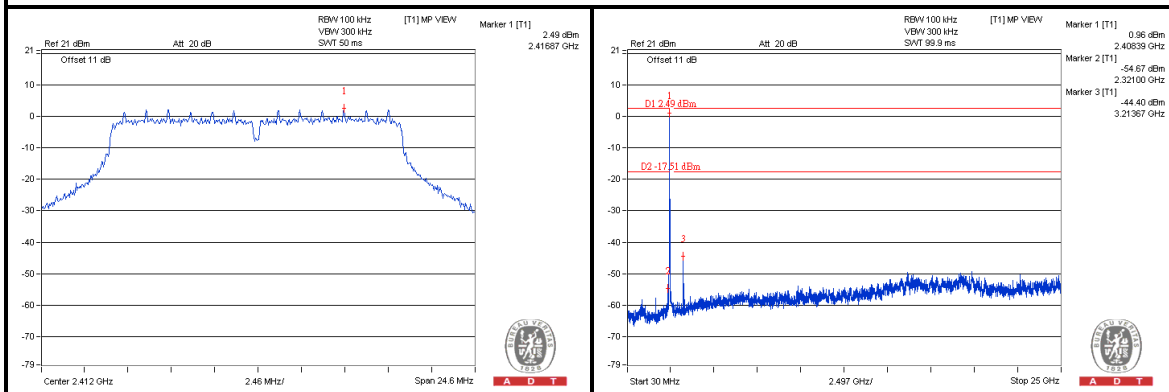




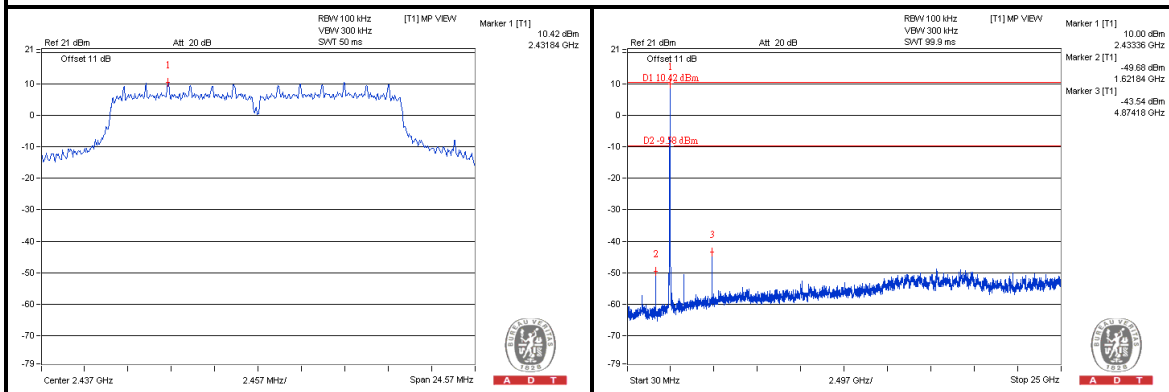
A D T

802.11g

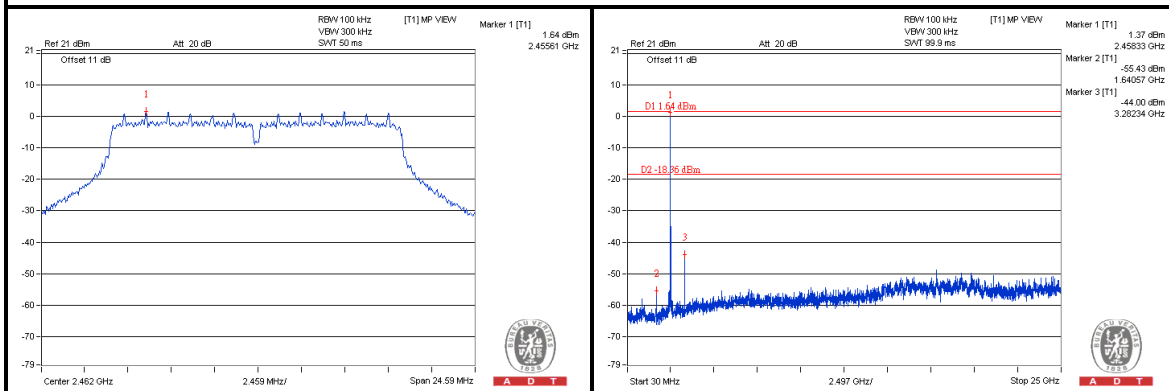
### CH 1



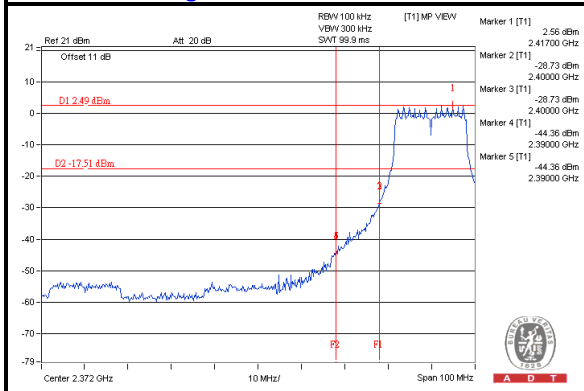
### CH 6



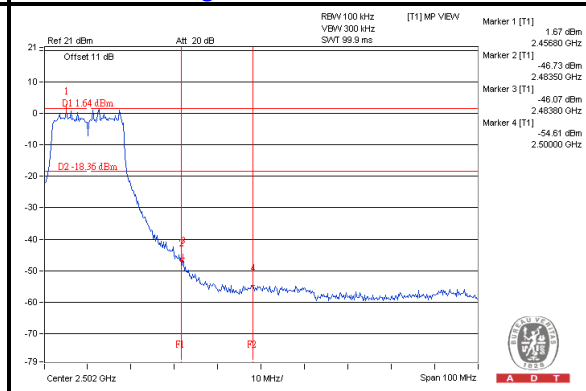
### CH 11



### CH 1 Band edge



### CH 11 Band edge

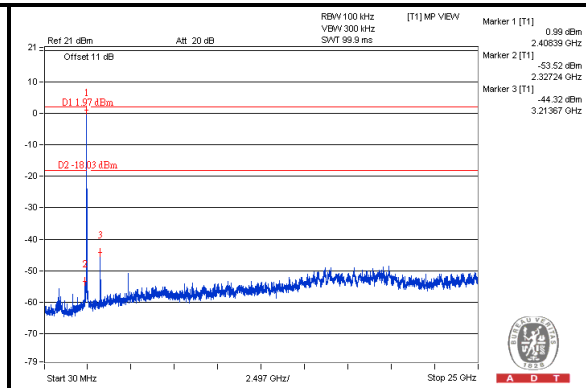
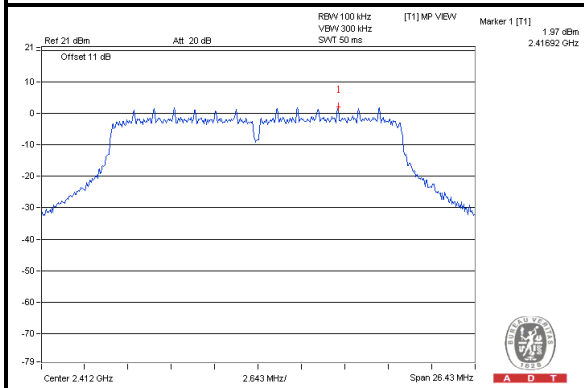




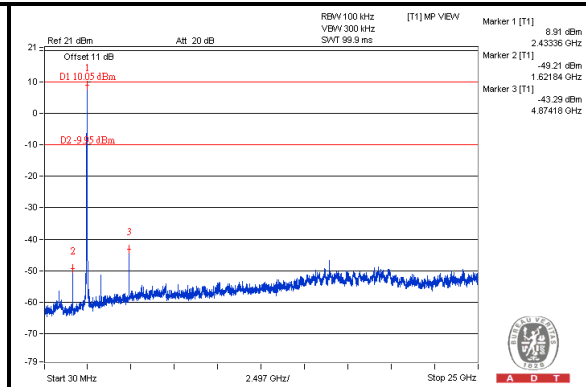
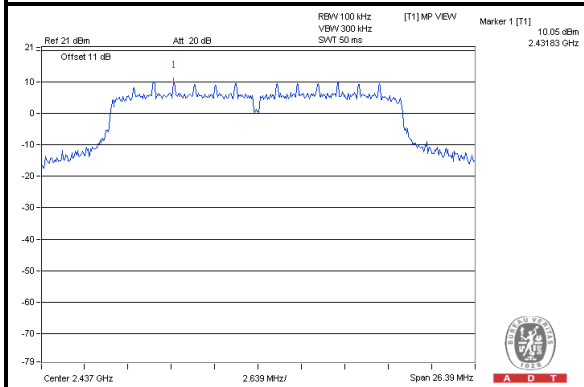
A D T

## 802.11n (HT20)

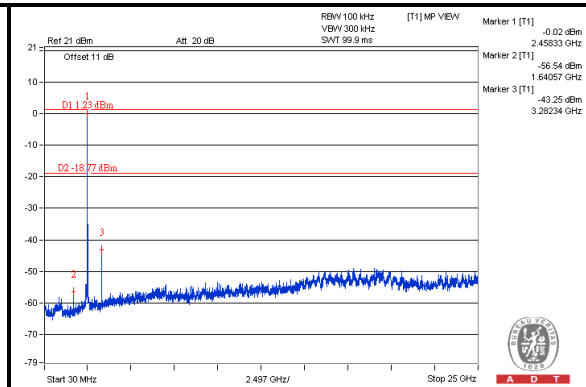
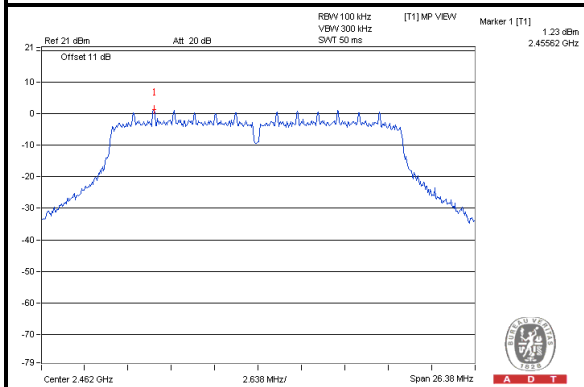
### CH 1



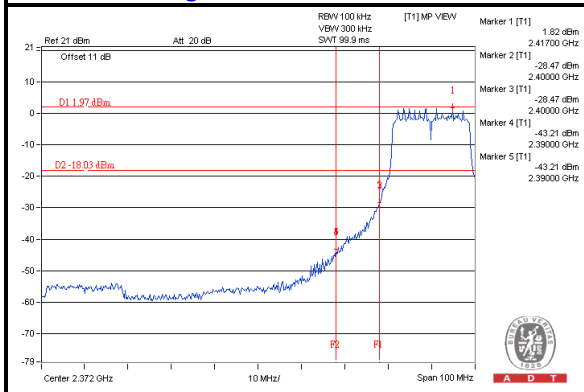
### CH 6



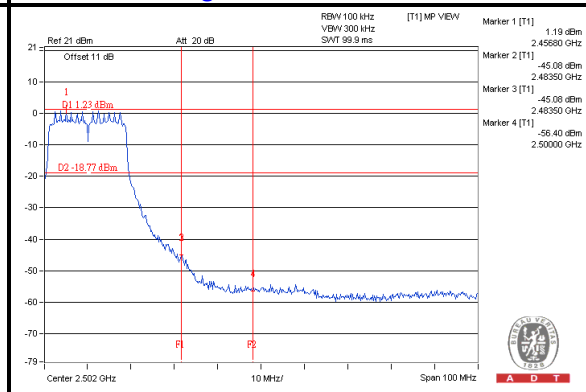
### CH 11



### CH 1 Band edge



### CH 11 Band edge

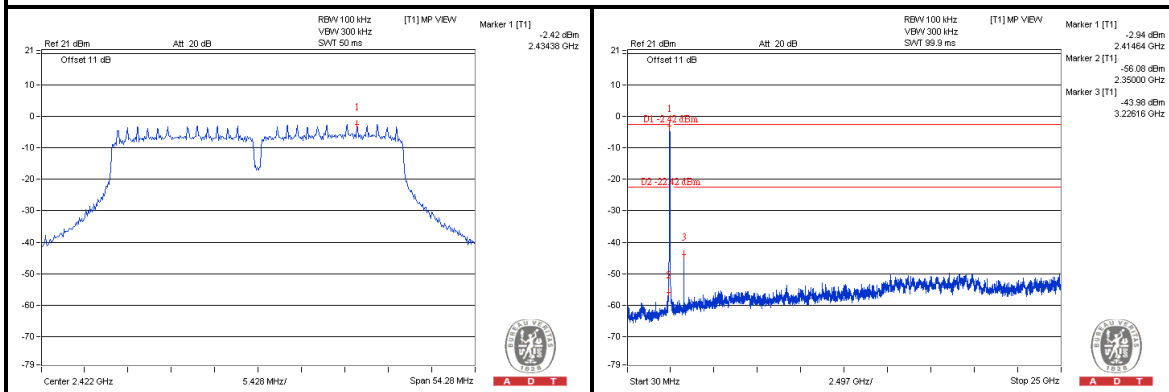




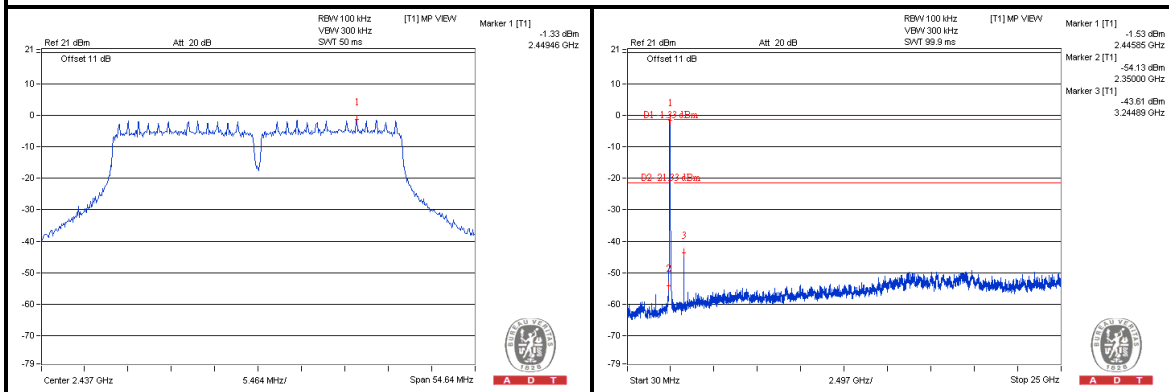
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## 802.11n (HT40)

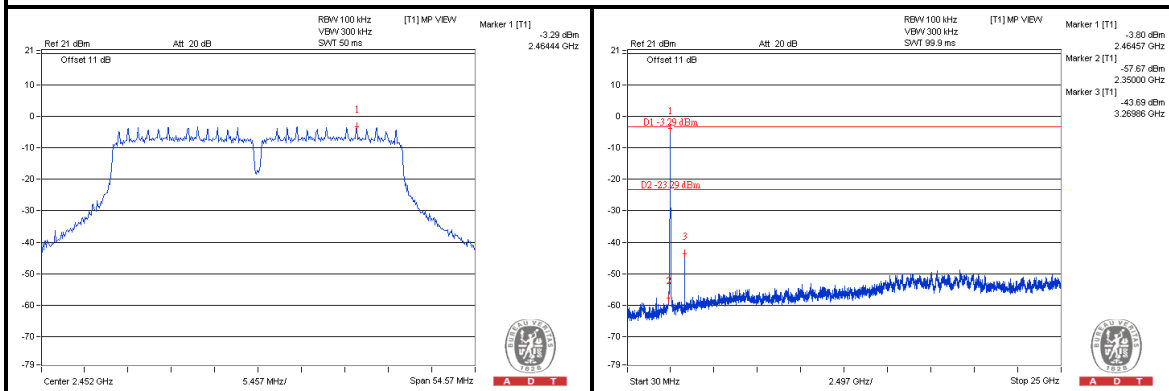
### CH 3



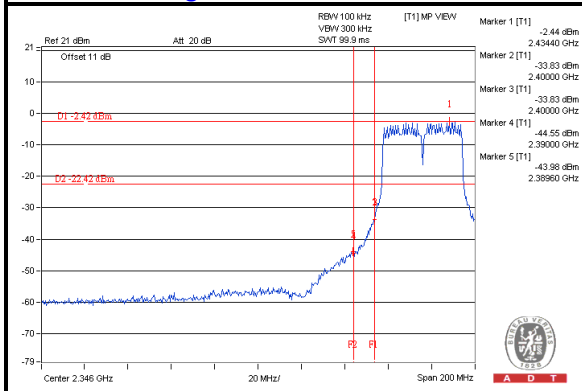
### CH 6



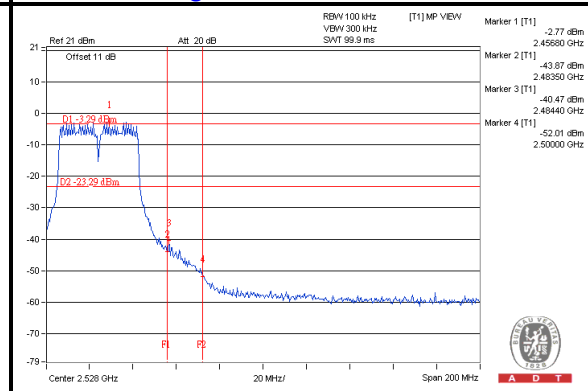
### CH 9



### CH 3 Band edge



### CH 9 Band edge



## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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## 6. 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.

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

**Linko EMC/RF Lab:**

Tel: 886-2-26052180

Fax: 886-2-26052943

**Hsin Chu EMC/RF Lab:**

Tel: 886-3-5935343

Fax: 886-3-5935342

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

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

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

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



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## **7. 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 ---**