

## FCC Test Report

**Report No.:** RF191122C08

**FCC ID:** UJH-R1LOW

**Model:** R1LOW (refer to item 3.1 for more details)

**Received Date:** Nov. 22, 2019

**Test Date:** Dec. 23, 2019 ~ Jan. 03, 2020

**Issued Date:** Jan. 10, 2020

**Applicant:** Mitsubishi Electric Corporation Sanda Works

**Address:** 2-3-33 Miwa, Sanda-City, Hyogo 669-1513, Japan

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Lin Kou Laboratories

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

**Test Location:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City  
33383, Taiwan

**FCC Registration /** 788550 / TW0003  
**Designation Number:**



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### Release Control Record

| Issue No.   | Description      | Date Issued   |
|-------------|------------------|---------------|
| RF191122C08 | Original release | Jan. 10, 2020 |

## 1 Certificate of Conformity

**Product:** Display Audio

**Brand:** Mitsubishi Electric Corporation

**Model:** R1LOW (refer to item 3.1 for more details)

**Sample Status:** DV

**Applicant:** Mitsubishi Electric Corporation Sanda Works

**Test Date:** Dec. 23, 2019 ~ Jan. 03, 2020

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.247)  
ANSI C63.10:2013

The above equipment 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 RF characteristics under the conditions specified in this report.

**Prepared by :** Pettie Chen, **Date:** Jan. 10, 2020  
Pettie Chen / Senior Specialist

**Approved by :** Bruce Chen, **Date:** Jan. 10, 2020  
Bruce Chen / Senior Project Engineer

## 2 Summary of Test Results

| 47 CFR FCC Part 15, Subpart C (Section 15.247) |                                              |        |                                                                                       |
|------------------------------------------------|----------------------------------------------|--------|---------------------------------------------------------------------------------------|
| FCC Clause                                     | Test Item                                    | Result | Remarks                                                                               |
| 15.207                                         | AC Power Conducted Emission                  | NA     | EUT is powered from DC                                                                |
| 15.205 /<br>15.209 /<br>15.247(d)              | Radiated Emissions and Band Edge Measurement | Pass   | Meet the requirement of limit. Minimum passing margin is -9.2dB at 50.37, 2483.50MHz. |
| 15.247(d)                                      | Antenna Port Emission                        | Pass   | Meet the requirement of limit.                                                        |
| 15.247(a)(2)                                   | 6dB bandwidth                                | Pass   | Meet the requirement of limit.                                                        |
| 15.247(b)                                      | Conducted power                              | Pass   | Meet the requirement of limit.                                                        |
| 15.247(e)                                      | Power Spectral Density                       | Pass   | Meet the requirement of limit.                                                        |
| 15.203                                         | Antenna Requirement                          | Pass   | Antenna connector is SMA not a standard connector.                                    |

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 2.1 Measurement Uncertainty

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

| Measurement                    | Frequency        | Expanded Uncertainty (k=2) ( $\pm$ ) |
|--------------------------------|------------------|--------------------------------------|
| Radiated Emissions up to 1 GHz | 9kHz ~ 30MHz     | 3.04 dB                              |
|                                | 30MHz ~ 200MHz   | 3.59 dB                              |
|                                | 200MHz ~ 1000MHz | 3.60 dB                              |
| Radiated Emissions above 1 GHz | 1GHz ~ 18GHz     | 2.29 dB                              |
|                                | 18GHz ~ 40GHz    | 2.29 dB                              |

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

|                       |                                                                                                                            |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------|
| Product               | Display Audio                                                                                                              |
| Brand                 | Mitsubishi Electric Corporation                                                                                            |
| Model                 | R1LOW (refer to note for more details)                                                                                     |
| Sample Status         | DV                                                                                                                         |
| Power Supply Rating   | 12Vdc                                                                                                                      |
| Modulation Type       | CCK, DQPSK, DBPSK for DSSS<br>64QAM, 16QAM, QPSK, BPSK for OFDM                                                            |
| Modulation Technology | DSSS, OFDM                                                                                                                 |
| Transfer Rate         | 802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps<br>802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps<br>802.11n: up to 144.44Mbps |
| Operating Frequency   | 2412 ~ 2462MHz                                                                                                             |
| Number of Channel     | 11 for 802.11b, 802.11g, 802.11n (HT20)                                                                                    |
| Output Power          | 28.256mW                                                                                                                   |
| Antenna Type          | Refer to note                                                                                                              |
| Antenna Connector     | Refer to note                                                                                                              |
| Accessory Device      | 2m non-shielded DC power cable without core                                                                                |
| Data Cable Supplied   | 0.5m shielded USB cable with 2 cores                                                                                       |

Note:

1. The following models with different panel size are provided to this EUT.

| Brand                           | Model | Description            |
|---------------------------------|-------|------------------------|
| Mitsubishi Electric Corporation | R1LOW | No.12 (7" ICS Panel)   |
|                                 |       | No.13 (8.4" ICS Panel) |

2. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

| Modulation Mode | TX Function |
|-----------------|-------------|
| 802.11b         | 2TX         |
| 802.11g         | 2TX         |
| 802.11n (HT20)  | 2TX         |

3. There two modules are collocated in the EUT.

| Module No. | Function                              |
|------------|---------------------------------------|
| 1          | WLAN 2.4GHz, 5GHz, BT EDR, BT LE (1M) |
| 2          | BT LE (1M, 2M)                        |

4. The EUT uses following antennas.

| Type            | Sheet metal antenna |           |           |           |
|-----------------|---------------------|-----------|-----------|-----------|
| Connector       | SMA                 |           |           |           |
| Model           | 2342059-1           |           | 2342059-2 |           |
| Frequency (MHz) | 2400-2500           | 5150-5850 | 2400-2500 | 5150-5850 |
| Gain (dBi)      | 3                   | 2         | 1         | 4         |

### 3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 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   |         |           |

### 3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT CONFIGURE MODE | APPLICABLE TO |       |        |      | DESCRIPTION                 |
|--------------------|---------------|-------|--------|------|-----------------------------|
|                    | RE≥1G         | RE<1G | PLC    | APCM |                             |
| A                  | √             | √     | Note 2 | √    | EUT: No.12 (7" ICS Panel)   |
| B                  | -             | √     | Note 2 | -    | EUT: No.13 (8.4" ICS Panel) |

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

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-plane.
2. No need to concern of PLC due to the EUT is powered from DC.
3. For radiated emission (below 1GHz) test item, the worst maximum power was selected.
4. "-": Means no effect.

#### **Radiated Emission Test (Above 1GHz):**

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

| EUT CONFIGURE MODE | MODE           | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|--------------------|----------------|-------------------|----------------|-----------------------|-----------------|------------------|
| A                  | 802.11b        | 1 to 11           | 1, 6, 11       | DSSS                  | DBPSK           | 1.0              |
| A                  | 802.11g        | 1 to 11           | 1, 6, 11       | OFDM                  | BPSK            | 6.0              |
| A                  | 802.11n (HT20) | 1 to 11           | 1, 6, 11       | OFDM                  | BPSK            | 6.5              |

#### **Radiated Emission Test (Below 1GHz):**

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

| EUT CONFIGURE MODE | MODE    | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|--------------------|---------|-------------------|----------------|-----------------------|-----------------|------------------|
| A, B               | 802.11b | 1 to 11           | 6              | DSSS                  | DBPSK           | 1.0              |

#### **Antenna Port Conducted Measurement:**

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

| EUT CONFIGURE MODE | MODE           | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|--------------------|----------------|-------------------|----------------|-----------------------|-----------------|------------------|
| A                  | 802.11b        | 1 to 11           | 1, 6, 11       | DSSS                  | DBPSK           | 1.0              |
| A                  | 802.11g        | 1 to 11           | 1, 6, 11       | OFDM                  | BPSK            | 6.0              |
| A                  | 802.11n (HT20) | 1 to 11           | 1, 6, 11       | OFDM                  | BPSK            | 6.5              |

### Test Condition:

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER  | TESTED BY |
|---------------|--------------------------|--------------|-----------|
| RE $\geq$ 1G  | 22 deg. C, 66% RH        | 120Vac, 60Hz | Han Wu    |
| RE<1G         | 22 deg. C, 66% RH        | 120Vac, 60Hz | Han Wu    |
| APCM          | 25 deg. C, 60% RH        | 120Vac, 60Hz | Ted Chang |

### 3.3 Duty Cycle of Test Signal

Duty cycle of test signal is > 98%, duty factor is not required.

Duty cycle of test signal is < 98%, duty factor shall be considered.

802.11b: Duty cycle = 100%

802.11g: Duty cycle =  $2.065/2.21 = 0.934$ , Duty factor =  $10 * \log(1/0.934) = 0.29$

802.11n (HT20): Duty cycle =  $0.984/1.097 = 0.897$ , Duty factor =  $10 * \log(1/0.897) = 0.47$



### 3.4 Description of Support Units

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

| ID | Product       | Brand | Model No.     | Serial No. | FCC ID | Remarks            |
|----|---------------|-------|---------------|------------|--------|--------------------|
| A. | Battery       | YUASA | 75D23R-CMF II | NA         | NA     | -                  |
| B. | Fixture Board | NA    | NA            | NA         | NA     | Provided by client |

Note:

1. All power cords of the above support units are non-shielded (1.8m).

| ID | Descriptions   | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks            |
|----|----------------|------|------------|--------------------|--------------|--------------------|
| 1. | DC power cable | 1    | 2          | N                  | 0            | Accessory          |
| 2. | USB cable      | 1    | 0.5        | Y                  | 2            | Accessory          |
| 3. | Harness cable  | 1    | 2          | N                  | 0            | Provided by client |

#### 3.4.1 Configuration of System under Test



### 3.5 General Description of Applied Standards and References

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

#### Test Standard:

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

ANSI C63.10-2013

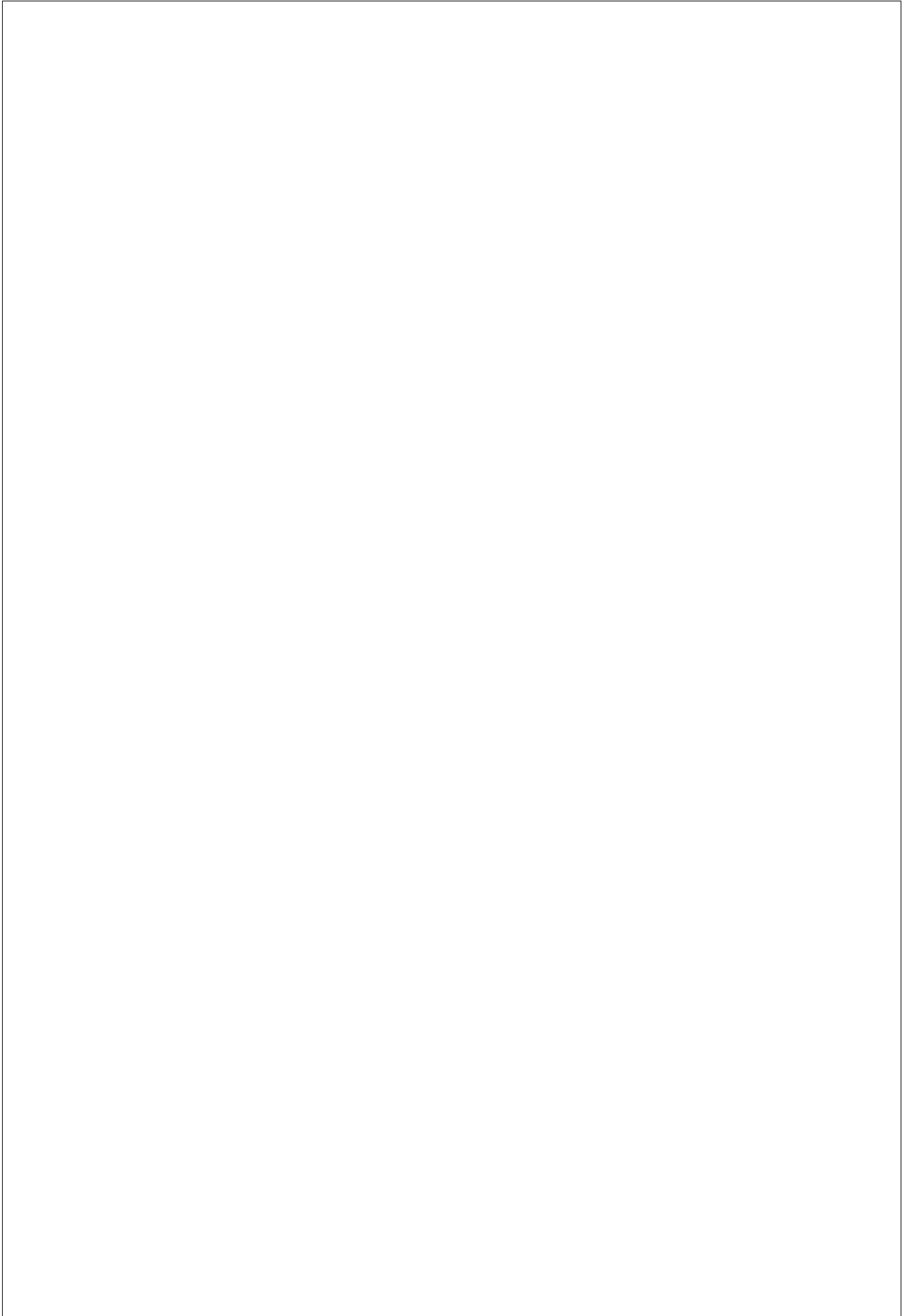
All test items have been performed and recorded as per the above standards.

#### References Test Guidance:

#### KDB 558074 D01 DTS Meas Guidance v05r02

#### KDB 662911 D01 Multiple Transmitter Output v02r01

All test items have been performed as a reference to the above KDB test guidance.



## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

#### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

| Frequencies<br>(MHz) | Field Strength<br>(microvolts/meter) | Measurement Distance<br>(meters) |
|----------------------|--------------------------------------|----------------------------------|
| 0.009 ~ 0.490        | 2400/F(kHz)                          | 300                              |
| 0.490 ~ 1.705        | 24000/F(kHz)                         | 30                               |
| 1.705 ~ 30.0         | 30                                   | 30                               |
| 30 ~ 88              | 100                                  | 3                                |
| 88 ~ 216             | 150                                  | 3                                |
| 216 ~ 960            | 200                                  | 3                                |
| Above 960            | 500                                  | 3                                |

**Note:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 30dB under any condition of modulation.

#### 4.1.2 Test Instruments

| Description & Manufacturer               | Model No.                              | Serial No.                                          | Date Of Calibration | Due Date Of Calibration |
|------------------------------------------|----------------------------------------|-----------------------------------------------------|---------------------|-------------------------|
| Test Receiver<br>KEYSIGHT                | N9038A                                 | MY55420137                                          | Apr. 15, 2019       | Apr. 14, 2020           |
| Spectrum Analyzer<br>ROHDE & SCHWARZ     | FSP40                                  | 100269                                              | Jun. 04, 2019       | Jun. 03, 2020           |
| BILOG Antenna<br>SCHWARZBECK             | VULB9168                               | 9168-160                                            | Nov. 07, 2019       | Nov. 06, 2020           |
| HORN Antenna<br>SCHWARZBECK              | BBHA 9120 D                            | 9120D-1169                                          | Nov. 24, 2019       | Nov. 23, 2020           |
| HORN Antenna<br>SCHWARZBECK              | BBHA 9170                              | BBHA9170241                                         | Nov. 24, 2019       | Nov. 23, 2020           |
| Preamplifier<br>Agilent<br>(Below 1GHz)  | 8447D                                  | 2944A10638                                          | Jul. 11, 2019       | Jul. 10, 2020           |
| Preamplifier<br>Agilent<br>(Above 1GHz)  | 8449B                                  | 3008A02367                                          | Feb. 19, 2019       | Feb. 18, 2020           |
| RF signal cable<br>HUBER+SUHNER&EMCI     | SUCOFLEX 104 &<br>EMC104-SM-SM80<br>00 | CABLE-CH9-02<br>(248780+171006)                     | Jan. 19, 2019       | Jan. 18, 2020           |
| RF signal cable<br>HUBER+SUHNER          | SUCOFLEX 104                           | CABLE-CH9-(25079<br>5/4)                            | Jul. 11, 2019       | Jul. 10, 2020           |
| RF signal cable<br>Woken                 | 8D-FB                                  | Cable-CH9-01                                        | Jul. 30, 2019       | Jul. 29, 2020           |
| Software<br>BV ADT                       | ADT_Radiated_<br>V7.6.15.9.5           | NA                                                  | NA                  | NA                      |
| Antenna Tower<br>EMCO                    | 2070/2080                              | 512.835.4684                                        | NA                  | NA                      |
| Turn Table<br>EMCO                       | 2087-2.03                              | NA                                                  | NA                  | NA                      |
| Antenna Tower & Turn<br>BV ADT           | AT100                                  | AT93021705                                          | NA                  | NA                      |
| Turn Table<br>BV ADT                     | TT100                                  | TT93021705                                          | NA                  | NA                      |
| Turn Table Controller<br>BV ADT          | SC100                                  | SC93021705                                          | NA                  | NA                      |
| Boresight Antenna Fixture                | FBA-01                                 | FBA-SIP01                                           | NA                  | NA                      |
| USB Wideband Power<br>Sensor<br>KEYSIGHT | U2021XA                                | MY55050005/MY55<br>190004/MY5519000<br>7/MY55210005 | Jul. 15, 2019       | Jul. 14, 2020           |

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 HwaYa Chamber 9.

#### 4.1.3 Test Procedures

##### For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

##### NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

##### For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The 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. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

##### Note:

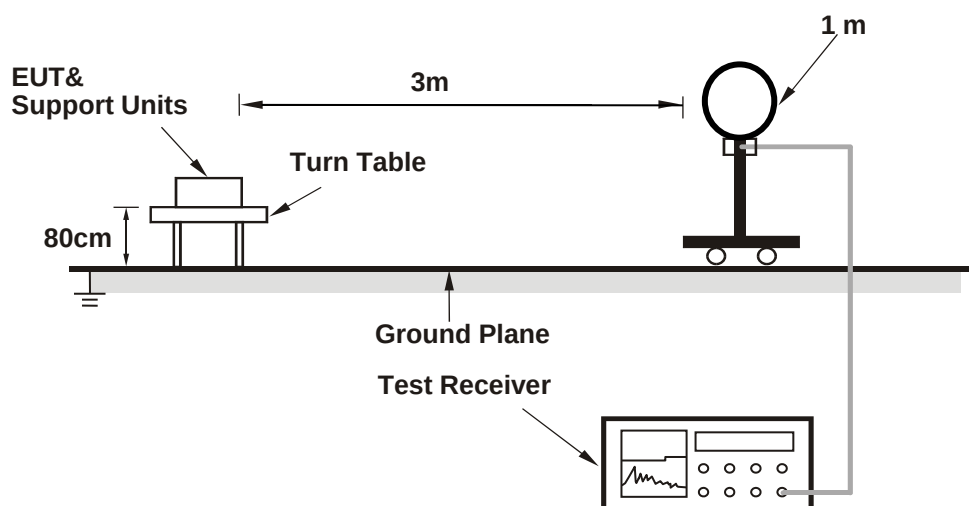
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98%) or 10Hz (Duty cycle  $\geq 98\%$ ) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 Deviation from Test Standard

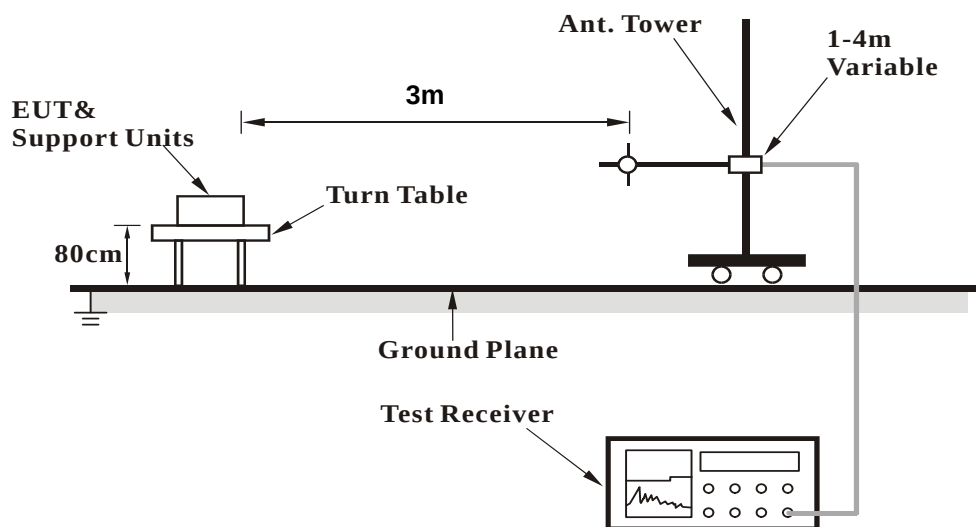
No deviation.

#### 4.1.5 Test Set Up

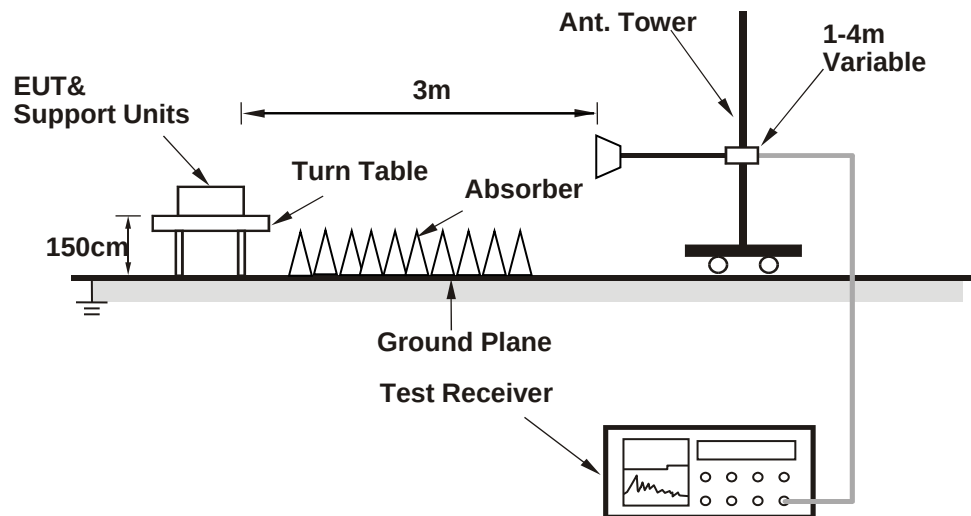
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



## For Radiated emission above 1GHz



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

### 4.1.6 EUT Operating Conditions

- Set the EUT under transmission condition continuously at specific channel frequency.

#### 4.1.7 Test Results

Above 1GHz worst-Case 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                                                   | 2390.00        | 56.2 PK                       | 74.0              | -17.8          | 1.86 H                   | 25                         | 24.3                   | 31.9                           |
| 2                                                   | 2390.00        | 44.4 AV                       | 54.0              | -9.6           | 1.86 H                   | 25                         | 12.5                   | 31.9                           |
| 3                                                   | *2412.00       | 101.5 PK                      |                   |                | 1.88 H                   | 29                         | 69.6                   | 31.9                           |
| 4                                                   | *2412.00       | 98.3 AV                       |                   |                | 1.88 H                   | 29                         | 66.4                   | 31.9                           |
| 5                                                   | 4824.00        | 47.0 PK                       | 74.0              | -27.0          | 3.14 H                   | 61                         | 43.2                   | 3.8                            |
| 6                                                   | 4824.00        | 39.4 AV                       | 54.0              | -14.6          | 3.14 H                   | 61                         | 35.6                   | 3.8                            |
| 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                                                   | 2390.00        | 56.1 PK                       | 74.0              | -17.9          | 1.72 V                   | 11                         | 24.2                   | 31.9                           |
| 2                                                   | 2390.00        | 44.2 AV                       | 54.0              | -9.8           | 1.72 V                   | 11                         | 12.3                   | 31.9                           |
| 3                                                   | *2412.00       | 100.9 PK                      |                   |                | 1.78 V                   | 11                         | 69.0                   | 31.9                           |
| 4                                                   | *2412.00       | 98.2 AV                       |                   |                | 1.78 V                   | 11                         | 66.3                   | 31.9                           |
| 5                                                   | 4824.00        | 48.1 PK                       | 74.0              | -25.9          | 1.79 V                   | 36                         | 44.3                   | 3.8                            |
| 6                                                   | 4824.00        | 42.2 AV                       | 54.0              | -11.8          | 1.79 V                   | 36                         | 38.4                   | 3.8                            |

#### REMARKS:

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

|                 |              |                      |              |
|-----------------|--------------|----------------------|--------------|
| 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                                                   | *2437.00       | 102.0 PK                      |                   |                | 2.01 H                   | 29                         | 70.1                   | 31.9                           |
| 2                                                   | *2437.00       | 98.7 AV                       |                   |                | 2.01 H                   | 29                         | 66.8                   | 31.9                           |
| 3                                                   | 4874.00        | 47.0 PK                       | 74.0              | -27.0          | 3.14 H                   | 68                         | 43.2                   | 3.8                            |
| 4                                                   | 4874.00        | 39.5 AV                       | 54.0              | -14.5          | 3.14 H                   | 68                         | 35.7                   | 3.8                            |
| 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                                                   | *2437.00       | 101.4 PK                      |                   |                | 1.66 V                   | 11                         | 69.5                   | 31.9                           |
| 2                                                   | *2437.00       | 98.4 AV                       |                   |                | 1.66 V                   | 11                         | 66.5                   | 31.9                           |
| 3                                                   | 4874.00        | 47.8 PK                       | 74.0              | -26.2          | 1.84 V                   | 37                         | 44.0                   | 3.8                            |
| 4                                                   | 4874.00        | 42.4 AV                       | 54.0              | -11.6          | 1.84 V                   | 37                         | 38.6                   | 3.8                            |

**REMARKS:**

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

|                 |               |                      |              |
|-----------------|---------------|----------------------|--------------|
| 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                                                   | *2462.00       | 101.2 PK                      |                   |                | 2.05 H                   | 30                         | 69.3                   | 31.9                           |
| 2                                                   | *2462.00       | 98.6 AV                       |                   |                | 2.05 H                   | 30                         | 66.7                   | 31.9                           |
| 3                                                   | 2483.50        | 55.9 PK                       | 74.0              | -18.1          | 2.03 H                   | 30                         | 23.9                   | 32.0                           |
| 4                                                   | 2483.50        | 44.3 AV                       | 54.0              | -9.7           | 2.03 H                   | 30                         | 12.3                   | 32.0                           |
| 5                                                   | 4924.00        | 47.2 PK                       | 74.0              | -26.8          | 3.21 H                   | 65                         | 43.4                   | 3.8                            |
| 6                                                   | 4924.00        | 39.3 AV                       | 54.0              | -14.7          | 3.21 H                   | 65                         | 35.5                   | 3.8                            |
| 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                                                   | *2462.00       | 101.0 PK                      |                   |                | 1.82 V                   | 12                         | 69.1                   | 31.9                           |
| 2                                                   | *2462.00       | 98.0 AV                       |                   |                | 1.82 V                   | 12                         | 66.1                   | 31.9                           |
| 3                                                   | 2483.50        | 56.8 PK                       | 74.0              | -17.2          | 1.71 V                   | 11                         | 24.8                   | 32.0                           |
| 4                                                   | 2483.50        | 44.4 AV                       | 54.0              | -9.6           | 1.71 V                   | 11                         | 12.4                   | 32.0                           |
| 5                                                   | 4924.00        | 48.3 PK                       | 74.0              | -25.7          | 1.75 V                   | 43                         | 44.5                   | 3.8                            |
| 6                                                   | 4924.00        | 42.5 AV                       | 54.0              | -11.5          | 1.75 V                   | 43                         | 38.7                   | 3.8                            |

**REMARKS:**

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

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                                                   | 2390.00        | 56.4 PK                       | 74.0              | -17.6          | 2.00 H                   | 25                         | 24.5                   | 31.9                           |
| 2                                                   | 2390.00        | 44.7 AV                       | 54.0              | -9.3           | 2.00 H                   | 25                         | 12.8                   | 31.9                           |
| 3                                                   | *2412.00       | 101.1 PK                      |                   |                | 2.08 H                   | 28                         | 69.2                   | 31.9                           |
| 4                                                   | *2412.00       | 91.0 AV                       |                   |                | 2.08 H                   | 28                         | 59.1                   | 31.9                           |
| 5                                                   | 4824.00        | 43.4 PK                       | 74.0              | -30.6          | 3.23 H                   | 73                         | 39.6                   | 3.8                            |
| 6                                                   | 4824.00        | 31.4 AV                       | 54.0              | -22.6          | 3.23 H                   | 73                         | 27.6                   | 3.8                            |
| 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                                                   | 2390.00        | 56.6 PK                       | 74.0              | -17.4          | 1.72 V                   | 16                         | 24.7                   | 31.9                           |
| 2                                                   | 2390.00        | 44.6 AV                       | 54.0              | -9.4           | 1.72 V                   | 16                         | 12.7                   | 31.9                           |
| 3                                                   | *2412.00       | 100.7 PK                      |                   |                | 1.65 V                   | 10                         | 68.8                   | 31.9                           |
| 4                                                   | *2412.00       | 90.5 AV                       |                   |                | 1.65 V                   | 10                         | 58.6                   | 31.9                           |
| 5                                                   | 4824.00        | 43.4 PK                       | 74.0              | -30.6          | 1.74 V                   | 32                         | 39.6                   | 3.8                            |
| 6                                                   | 4824.00        | 31.5 AV                       | 54.0              | -22.5          | 1.74 V                   | 32                         | 27.7                   | 3.8                            |

REMARKS:

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

|                 |              |                      |              |
|-----------------|--------------|----------------------|--------------|
| 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                                                   | *2437.00       | 100.2 PK                      |                   |                | 2.03 H                   | 32                         | 68.3                   | 31.9                           |
| 2                                                   | *2437.00       | 90.6 AV                       |                   |                | 2.03 H                   | 32                         | 58.7                   | 31.9                           |
| 3                                                   | 4874.00        | 45.2 PK                       | 74.0              | -28.8          | 3.21 H                   | 62                         | 41.4                   | 3.8                            |
| 4                                                   | 4874.00        | 31.2 AV                       | 54.0              | -22.8          | 3.21 H                   | 62                         | 27.4                   | 3.8                            |
| 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                                                   | *2437.00       | 100.1 PK                      |                   |                | 1.65 V                   | 9                          | 68.2                   | 31.9                           |
| 2                                                   | *2437.00       | 90.2 AV                       |                   |                | 1.65 V                   | 9                          | 58.3                   | 31.9                           |
| 3                                                   | 4874.00        | 45.3 PK                       | 74.0              | -28.7          | 1.86 V                   | 29                         | 41.5                   | 3.8                            |
| 4                                                   | 4874.00        | 31.5 AV                       | 54.0              | -22.5          | 1.86 V                   | 29                         | 27.7                   | 3.8                            |

**REMARKS:**

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

|                 |               |                      |              |
|-----------------|---------------|----------------------|--------------|
| 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                                                   | *2462.00       | 99.4 PK                       |                   |                | 2.00 H                   | 27                         | 67.5                   | 31.9                           |
| 2                                                   | *2462.00       | 89.6 AV                       |                   |                | 2.00 H                   | 27                         | 57.7                   | 31.9                           |
| 3                                                   | 2483.50        | 57.3 PK                       | 74.0              | -16.7          | 2.00 H                   | 24                         | 25.3                   | 32.0                           |
| 4                                                   | <b>2483.50</b> | <b>44.8 AV</b>                | <b>54.0</b>       | <b>-9.2</b>    | <b>2.00 H</b>            | <b>24</b>                  | <b>12.8</b>            | <b>32.0</b>                    |
| 5                                                   | 4924.00        | 45.1 PK                       | 74.0              | -28.9          | 3.24 H                   | 56                         | 41.3                   | 3.8                            |
| 6                                                   | 4924.00        | 31.6 AV                       | 54.0              | -22.4          | 3.24 H                   | 56                         | 27.8                   | 3.8                            |
| 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                                                   | *2462.00       | 98.8 PK                       |                   |                | 1.76 V                   | 10                         | 66.9                   | 31.9                           |
| 2                                                   | *2462.00       | 89.0 AV                       |                   |                | 1.76 V                   | 10                         | 57.1                   | 31.9                           |
| 3                                                   | 2483.50        | 56.8 PK                       | 74.0              | -17.2          | 1.70 V                   | 8                          | 24.8                   | 32.0                           |
| 4                                                   | 2483.50        | 44.4 AV                       | 54.0              | -9.6           | 1.70 V                   | 8                          | 12.4                   | 32.0                           |
| 5                                                   | 4924.00        | 45.2 PK                       | 74.0              | -28.8          | 1.78 V                   | 40                         | 41.4                   | 3.8                            |
| 6                                                   | 4924.00        | 31.5 AV                       | 54.0              | -22.5          | 1.78 V                   | 40                         | 27.7                   | 3.8                            |

REMARKS:

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

# 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                                                   | 2390.00        | 56.2 PK                       | 74.0              | -17.8          | 2.03 H                   | 28                         | 24.3                   | 31.9                           |
| 2                                                   | 2390.00        | 44.6 AV                       | 54.0              | -9.4           | 2.03 H                   | 28                         | 12.7                   | 31.9                           |
| 3                                                   | *2412.00       | 99.6 PK                       |                   |                | 2.05 H                   | 29                         | 67.7                   | 31.9                           |
| 4                                                   | *2412.00       | 88.0 AV                       |                   |                | 2.05 H                   | 29                         | 56.1                   | 31.9                           |
| 5                                                   | 4824.00        | 44.5 PK                       | 74.0              | -29.5          | 3.15 H                   | 64                         | 40.7                   | 3.8                            |
| 6                                                   | 4824.00        | 31.4 AV                       | 54.0              | -22.6          | 3.15 H                   | 64                         | 27.6                   | 3.8                            |
| 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                                                   | 2390.00        | 56.0 PK                       | 74.0              | -18.0          | 1.64 V                   | 12                         | 24.1                   | 31.9                           |
| 2                                                   | 2390.00        | 44.6 AV                       | 54.0              | -9.4           | 1.64 V                   | 12                         | 12.7                   | 31.9                           |
| 3                                                   | *2412.00       | 99.1 PK                       |                   |                | 1.63 V                   | 16                         | 67.2                   | 31.9                           |
| 4                                                   | *2412.00       | 87.7 AV                       |                   |                | 1.63 V                   | 16                         | 55.8                   | 31.9                           |
| 5                                                   | 4824.00        | 44.6 PK                       | 74.0              | -29.4          | 1.89 V                   | 30                         | 40.8                   | 3.8                            |
| 6                                                   | 4824.00        | 31.3 AV                       | 54.0              | -22.7          | 1.89 V                   | 30                         | 27.5                   | 3.8                            |

## REMARKS:

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

|                 |              |                      |              |
|-----------------|--------------|----------------------|--------------|
| 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                                                   | *2437.00       | 99.3 PK                       |                   |                | 2.05 H                   | 30                         | 67.4                   | 31.9                           |
| 2                                                   | *2437.00       | 87.8 AV                       |                   |                | 2.05 H                   | 30                         | 55.9                   | 31.9                           |
| 3                                                   | 4874.00        | 44.4 PK                       | 74.0              | -29.6          | 3.17 H                   | 57                         | 40.6                   | 3.8                            |
| 4                                                   | 4874.00        | 31.5 AV                       | 54.0              | -22.5          | 3.17 H                   | 57                         | 27.7                   | 3.8                            |
| 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                                                   | *2437.00       | 98.7 PK                       |                   |                | 1.65 V                   | 13                         | 66.8                   | 31.9                           |
| 2                                                   | *2437.00       | 87.6 AV                       |                   |                | 1.65 V                   | 13                         | 55.7                   | 31.9                           |
| 3                                                   | 4874.00        | 44.3 PK                       | 74.0              | -29.7          | 1.72 V                   | 46                         | 40.5                   | 3.8                            |
| 4                                                   | 4874.00        | 31.6 AV                       | 54.0              | -22.4          | 1.72 V                   | 46                         | 27.8                   | 3.8                            |

**REMARKS:**

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

|                 |               |                      |              |
|-----------------|---------------|----------------------|--------------|
| 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                                                   | *2462.00       | 98.4 PK                       |                   |                | 2.02 H                   | 29                         | 66.5                   | 31.9                           |
| 2                                                   | *2462.00       | 87.0 AV                       |                   |                | 2.02 H                   | 29                         | 55.1                   | 31.9                           |
| 3                                                   | 2483.50        | 56.1 PK                       | 74.0              | -17.9          | 2.09 H                   | 24                         | 24.1                   | 32.0                           |
| 4                                                   | <b>2483.50</b> | <b>44.8 AV</b>                | <b>54.0</b>       | <b>-9.2</b>    | <b>2.09 H</b>            | <b>24</b>                  | <b>12.8</b>            | <b>32.0</b>                    |
| 5                                                   | 4924.00        | 45.0 PK                       | 74.0              | -29.0          | 3.27 H                   | 73                         | 41.2                   | 3.8                            |
| 6                                                   | 4924.00        | 31.3 AV                       | 54.0              | -22.7          | 3.27 H                   | 73                         | 27.5                   | 3.8                            |
| 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                                                   | 2390.00        | 56.0 PK                       | 74.0              | -18.0          | 1.72 V                   | 14                         | 24.1                   | 31.9                           |
| 2                                                   | 2390.00        | 44.6 AV                       | 54.0              | -9.4           | 1.72 V                   | 14                         | 12.7                   | 31.9                           |
| 3                                                   | *2462.00       | 97.9 PK                       |                   |                | 1.70 V                   | 9                          | 66.0                   | 31.9                           |
| 4                                                   | *2462.00       | 86.6 AV                       |                   |                | 1.70 V                   | 9                          | 54.7                   | 31.9                           |
| 5                                                   | 4924.00        | 45.2 PK                       | 74.0              | -28.8          | 1.86 V                   | 42                         | 41.4                   | 3.8                            |
| 6                                                   | 4924.00        | 31.3 AV                       | 54.0              | -22.7          | 1.86 V                   | 42                         | 27.5                   | 3.8                            |

REMARKS:

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

Below 1GHz worst-case data:

Test Mode A

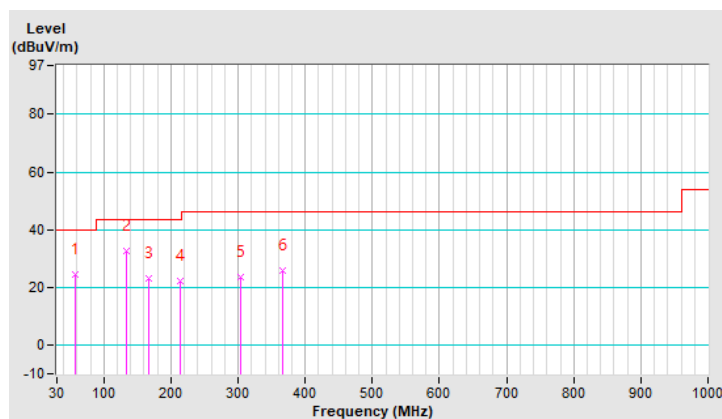
802.11b

|                 |              |                      |                 |
|-----------------|--------------|----------------------|-----------------|
| CHANNEL         | TX Channel 6 | DETECTOR<br>FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 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                                                   | 58.13          | 24.3 QP                       | 40.0              | -15.7          | 1.00 H                   | 10                         | 34.4                   | -10.1                          |
| 2                                                   | 133.79         | 32.8 QP                       | 43.5              | -10.7          | 1.00 H                   | 242                        | 43.1                   | -10.3                          |
| 3                                                   | 167.74         | 23.0 QP                       | 43.5              | -20.5          | 1.00 H                   | 348                        | 32.3                   | -9.3                           |
| 4                                                   | 214.30         | 22.2 QP                       | 43.5              | -21.3          | 1.00 H                   | 106                        | 34.1                   | -11.9                          |
| 5                                                   | 303.54         | 23.5 QP                       | 46.0              | -22.5          | 1.00 H                   | 240                        | 31.4                   | -7.9                           |
| 6                                                   | 366.59         | 25.7 QP                       | 46.0              | -20.3          | 1.00 H                   | 55                         | 32.1                   | -6.4                           |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB below the permissible value to be report.

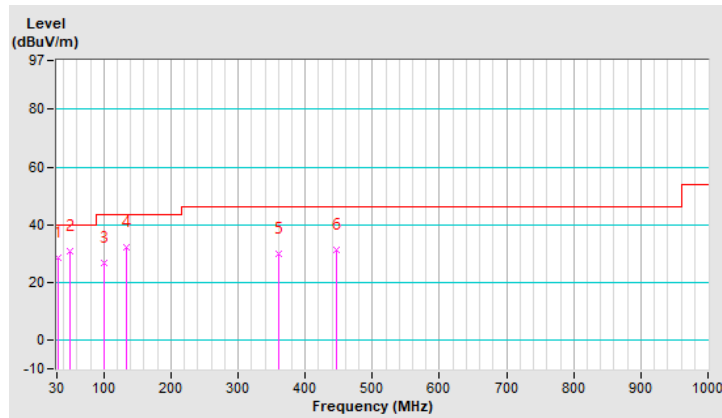


|                 |              |                   |                 |
|-----------------|--------------|-------------------|-----------------|
| CHANNEL         | TX Channel 6 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz |                   |                 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |              |                         |                |             |                    |                      |                  |                          |
|---------------------------------------------------|--------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO.                                               | FREQ. (MHz)  | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1                                                 | 32.91        | 28.4 QP                 | 40.0           | -11.6       | 1.00 V             | 282                  | 39.8             | -11.4                    |
| 2                                                 | <b>50.37</b> | <b>30.8 QP</b>          | <b>40.0</b>    | <b>-9.2</b> | <b>1.00 V</b>      | <b>147</b>           | <b>40.5</b>      | <b>-9.7</b>              |
| 3                                                 | 99.84        | 26.6 QP                 | 43.5           | -16.9       | 1.00 V             | 8                    | 40.5             | -13.9                    |
| 4                                                 | 132.82       | 32.1 QP                 | 43.5           | -11.4       | 1.00 V             | 339                  | 42.5             | -10.4                    |
| 5                                                 | 360.77       | 29.7 QP                 | 46.0           | -16.3       | 1.00 V             | 93                   | 36.3             | -6.6                     |
| 6                                                 | 447.10       | 31.2 QP                 | 46.0           | -14.8       | 1.00 V             | 8                    | 35.7             | -4.5                     |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB below the permissible value to be report.



## Test Mode B

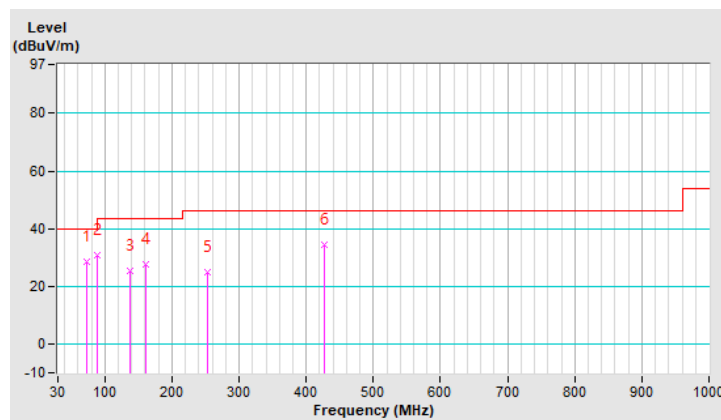
### 802.11b

|                 |              |                      |                 |
|-----------------|--------------|----------------------|-----------------|
| CHANNEL         | TX Channel 6 | DETECTOR<br>FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 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                                                   | 73.65          | 28.6 QP                       | 40.0              | -11.4          | 1.00 H                   | 95                         | 41.0                   | -12.4                          |
| 2                                                   | 89.17          | 30.8 QP                       | 43.5              | -12.7          | 1.00 H                   | 95                         | 45.7                   | -14.9                          |
| 3                                                   | 136.70         | 25.3 QP                       | 43.5              | -18.2          | 1.00 H                   | 250                        | 35.4                   | -10.1                          |
| 4                                                   | 160.95         | 27.8 QP                       | 43.5              | -15.7          | 1.00 H                   | 125                        | 37.0                   | -9.2                           |
| 5                                                   | 252.13         | 24.9 QP                       | 46.0              | -21.1          | 1.00 H                   | 319                        | 34.8                   | -9.9                           |
| 6                                                   | 426.73         | 34.6 QP                       | 46.0              | -11.4          | 1.00 H                   | 355                        | 39.7                   | -5.1                           |

#### Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB below the permissible value to be report.

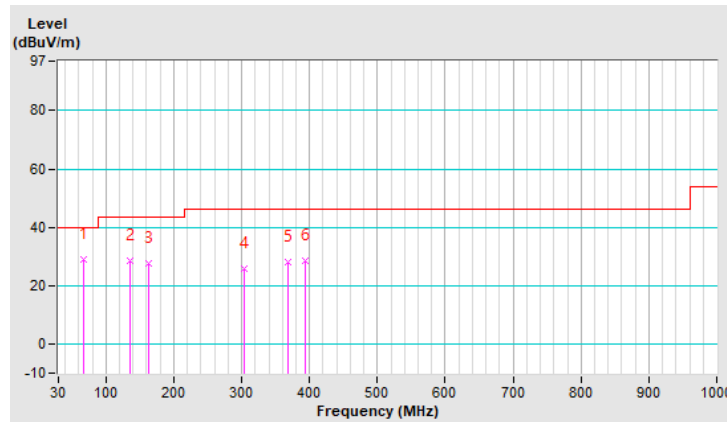


|                 |              |                   |                 |
|-----------------|--------------|-------------------|-----------------|
| CHANNEL         | TX Channel 6 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz |                   |                 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |             |                         |                |             |                    |                      |                  |                          |
|---------------------------------------------------|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO.                                               | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1                                                 | 66.86       | 29.1 QP                 | 40.0           | -10.9       | 1.00 V             | 359                  | 40.0             | -10.9                    |
| 2                                                 | 135.73      | 28.6 QP                 | 43.5           | -14.9       | 1.00 V             | 261                  | 38.7             | -10.1                    |
| 3                                                 | 163.86      | 27.6 QP                 | 43.5           | -15.9       | 1.00 V             | 247                  | 36.9             | -9.3                     |
| 4                                                 | 303.54      | 25.9 QP                 | 46.0           | -20.1       | 1.00 V             | 68                   | 33.8             | -7.9                     |
| 5                                                 | 367.56      | 28.3 QP                 | 46.0           | -17.7       | 1.00 V             | 165                  | 34.7             | -6.4                     |
| 6                                                 | 392.78      | 28.7 QP                 | 46.0           | -17.3       | 1.00 V             | 179                  | 34.6             | -5.9                     |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB below the permissible value to be report.

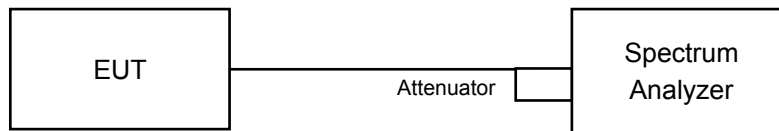


## 4.2 6dB Bandwidth Measurement

### 4.2.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

### 4.2.2 Test Setup



### 4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.2.4 Test Procedure

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = average.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

### 4.2.5 Deviation from Test Standard

No deviation.

### 4.2.6 EUT Operating Conditions

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

#### 4.2.7 Test Result

##### 802.11b

| Channel | Frequency (MHz) | 6dB Bandwidth (MHz) |         | Minimum Limit (MHz) | Pass / Fail |
|---------|-----------------|---------------------|---------|---------------------|-------------|
|         |                 | Chain 0             | Chain 1 |                     |             |
| 1       | 2412            | 8.12                | 7.69    | 0.5                 | Pass        |
| 6       | 2437            | 8.11                | 8.07    | 0.5                 | Pass        |
| 11      | 2462            | 8.12                | 8.12    | 0.5                 | Pass        |

##### 802.11g

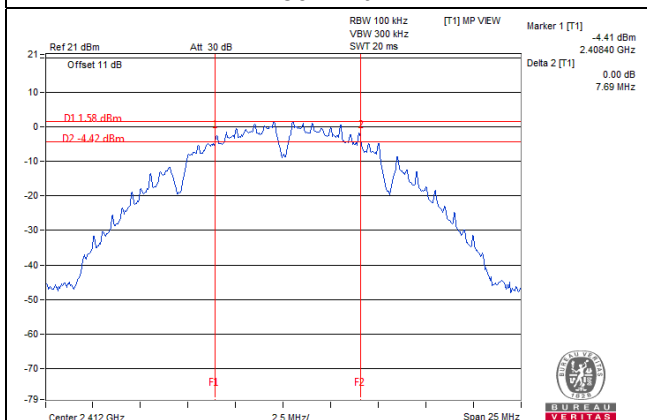
| Channel | Frequency (MHz) | 6dB Bandwidth (MHz) |         | Minimum Limit (MHz) | Pass / Fail |
|---------|-----------------|---------------------|---------|---------------------|-------------|
|         |                 | Chain 0             | Chain 1 |                     |             |
| 1       | 2412            | 15.60               | 15.16   | 0.5                 | Pass        |
| 6       | 2437            | 15.62               | 15.21   | 0.5                 | Pass        |
| 11      | 2462            | 15.62               | 15.22   | 0.5                 | Pass        |

##### 802.11n (HT20)

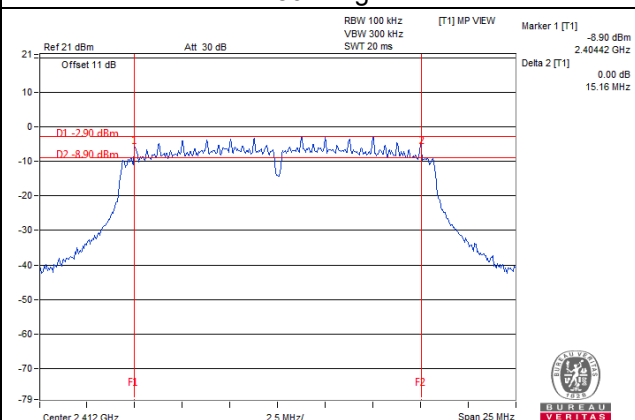
| Channel | Frequency (MHz) | 6dB Bandwidth (MHz) |         | Minimum Limit (MHz) | Pass / Fail |
|---------|-----------------|---------------------|---------|---------------------|-------------|
|         |                 | Chain 0             | Chain 1 |                     |             |
| 1       | 2412            | 15.49               | 16.33   | 0.5                 | Pass        |
| 6       | 2437            | 15.21               | 16.33   | 0.5                 | Pass        |
| 11      | 2462            | 15.34               | 15.78   | 0.5                 | Pass        |

## Spectrum Plot of Worst Value

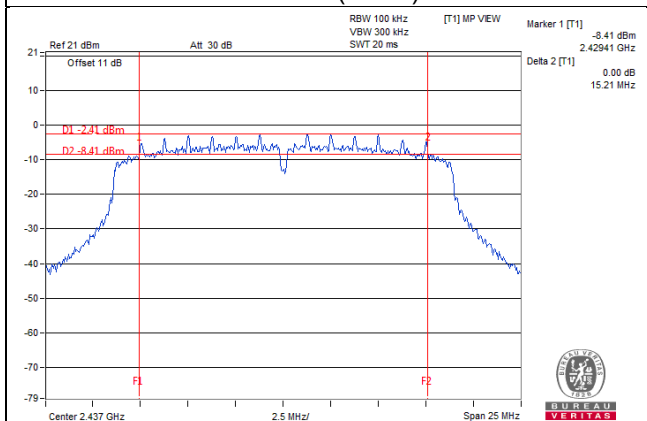
### 802.11b



### 802.11g



### 802.11n (HT20)



### 4.3 Conducted Output Power Measurement

#### 4.3.1 Limits of Conducted Output Power Measurement

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

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

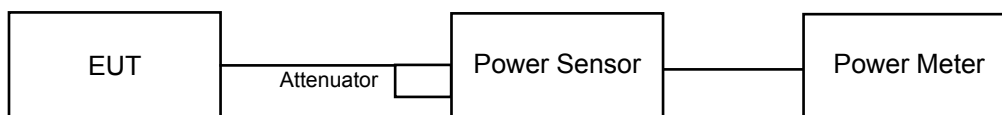
Array Gain = 0 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ;

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

Array Gain =  $5 \log(N_{ANT}/N_{SS})$  dB or 3 dB, whichever is less for 20-MHz channel widths with  $N_{ANT} \geq 5$ .

For power measurements on all other devices: Array Gain =  $10 \log(N_{ANT}/N_{SS})$  dB.

#### 4.3.2 Test Setup



#### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 Test Procedures

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

#### 4.3.5 Deviation from Test Standard

No deviation.

#### 4.3.6 EUT Operating Conditions

Same as Item 4.3.6.

#### 4.3.7 Test Results

##### 802.11b

| Chan. | Freq.<br>(MHz) | Average Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|---------------------|---------|------------------------|-------------------------|----------------|----------------|
|       |                | Chain 0             | Chain 1 |                        |                         |                |                |
| 1     | 2412           | 11.76               | 11.21   | 28.210                 | 14.50                   | 30             | Pass           |
| 6     | 2437           | 11.72               | 11.27   | <b>28.256</b>          | 14.51                   | 30             | Pass           |
| 11    | 2462           | 11.79               | 11.11   | 28.013                 | 14.47                   | 30             | Pass           |

##### 802.11g

| Chan. | Freq.<br>(MHz) | Average Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|---------------------|---------|------------------------|-------------------------|----------------|----------------|
|       |                | Chain 0             | Chain 1 |                        |                         |                |                |
| 1     | 2412           | 9.15                | 8.48    | 15.269                 | 11.84                   | 30             | Pass           |
| 6     | 2437           | 8.97                | 8.48    | 14.936                 | 11.74                   | 30             | Pass           |
| 11    | 2462           | 9.04                | 8.38    | 14.903                 | 11.73                   | 30             | Pass           |

##### 802.11n (HT20)

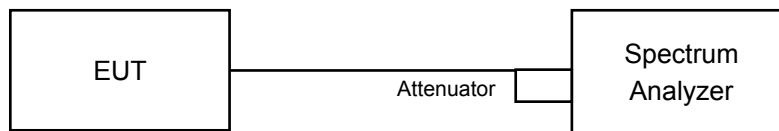
| Chan. | Freq.<br>(MHz) | Average Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|---------------------|---------|------------------------|-------------------------|----------------|----------------|
|       |                | Chain 0             | Chain 1 |                        |                         |                |                |
| 1     | 2412           | 8.97                | 8.31    | 14.665                 | 11.66                   | 30             | Pass           |
| 6     | 2437           | 8.96                | 8.29    | 14.616                 | 11.65                   | 30             | Pass           |
| 11    | 2462           | 9.06                | 8.31    | 14.830                 | 11.71                   | 30             | Pass           |

#### 4.4 Power Spectral Density Measurement

##### 4.4.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm in any 3 kHz.

##### 4.4.2 Test Setup



##### 4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

##### 4.4.4 Test Procedure

For duty cycle  $\geq 98\%$

- Set instrument center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- Set RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- Set VBW  $\geq 3 \times \text{RBW}$ .
- Detector = power averaging (RMS) or sample detector (when RMS not available).
- Ensure that the number of measurement points in the sweep  $\geq 2 \times \text{span}/\text{RBW}$ .
- Sweep time = auto couple.
- Employ trace averaging (RMS) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.

For duty cycle  $< 98\%$

- Measure the duty cycle (x).
- Set instrument center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- Set RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- Set VBW  $\geq 3 \times \text{RBW}$ .
- Detector = power averaging (RMS) or sample detector (when RMS not available).
- Ensure that the number of measurement points in the sweep  $\geq 2 \times \text{span}/\text{RBW}$ .
- Sweep time = auto couple.
- Do not use sweep triggering. Allow sweep to "free run".
- Employ trace averaging (RMS) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.
- Add  $10 \log (1/x)$ , where x is the duty cycle measured in step (a), to the measured PSD to compute the average PSD during the actual transmission time.

#### **4.4.5 Deviation from Test Standard**

No deviation.

#### **4.4.6 EUT Operating Condition**

Same as Item 4.3.6

#### 4.4.7 Test Results

##### 802.11b

| Chan. | Freq. (MHz) | PSD (dBm/10kHz) |         | Total PSD (dBm/10kHz) | Total PSD (dBm/3kHz) | Limit (dBm/3kHz) | Pass / Fail |
|-------|-------------|-----------------|---------|-----------------------|----------------------|------------------|-------------|
|       |             | Chain 0         | Chain 1 |                       |                      |                  |             |
| 1     | 2412        | -16.05          | -16.04  | -13.03                | -18.26               | 8                | Pass        |
| 6     | 2437        | -15.58          | -16.04  | -12.79                | -18.02               | 8                | Pass        |
| 11    | 2462        | -15.66          | -16.00  | -12.82                | -18.05               | 8                | Pass        |

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 5.07\text{dBi} < 6\text{dBi}$ , so the limit no need to reduced.

##### 802.11g

| Chan. | Freq. (MHz) | PSD (dBm/10kHz) |         | Duty Factor | Total PSD (dBm/10kHz) | Total PSD (dBm/3kHz) | Limit (dBm/3kHz) | Pass / Fail |
|-------|-------------|-----------------|---------|-------------|-----------------------|----------------------|------------------|-------------|
|       |             | Chain 0         | Chain 1 |             |                       |                      |                  |             |
| 1     | 2412        | -22.24          | -23.08  | 0.29        | -19.33                | -24.56               | 8                | Pass        |
| 6     | 2437        | -22.22          | -22.25  | 0.29        | -18.93                | -24.16               | 8                | Pass        |
| 11    | 2462        | -22.62          | -22.90  | 0.29        | -19.45                | -24.68               | 8                | Pass        |

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 5.07\text{dBi} < 6\text{dBi}$ , so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

##### 802.11n (HT20)

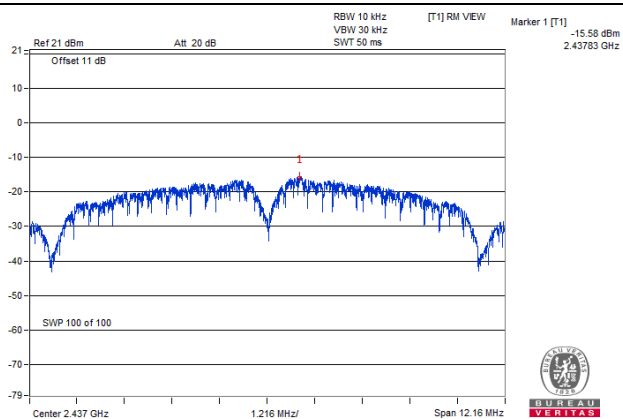
| Chan. | Freq. (MHz) | PSD (dBm/10kHz) |         | Duty Factor | Total PSD (dBm/10kHz) | Total PSD (dBm/3kHz) | Limit (dBm/3kHz) | Pass / Fail |
|-------|-------------|-----------------|---------|-------------|-----------------------|----------------------|------------------|-------------|
|       |             | Chain 0         | Chain 1 |             |                       |                      |                  |             |
| 1     | 2412        | -23.41          | -24.23  | 0.47        | -20.32                | -25.55               | 8                | Pass        |
| 6     | 2437        | -22.82          | -23.69  | 0.47        | -19.75                | -24.98               | 8                | Pass        |
| 11    | 2462        | -22.91          | -23.12  | 0.47        | -19.53                | -24.76               | 8                | Pass        |

Note:

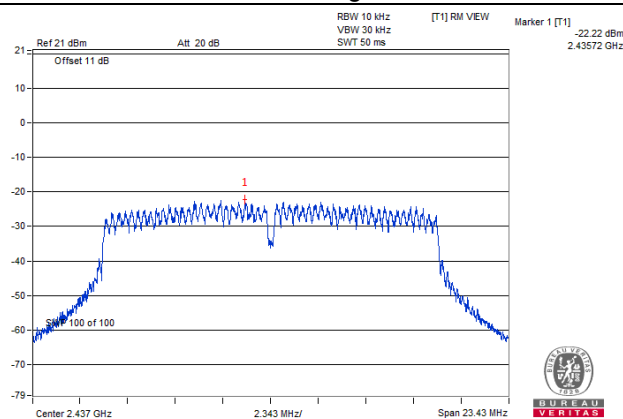
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 5.07\text{dBi} < 6\text{dBi}$ , so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

## Spectrum Plot of Worst Value

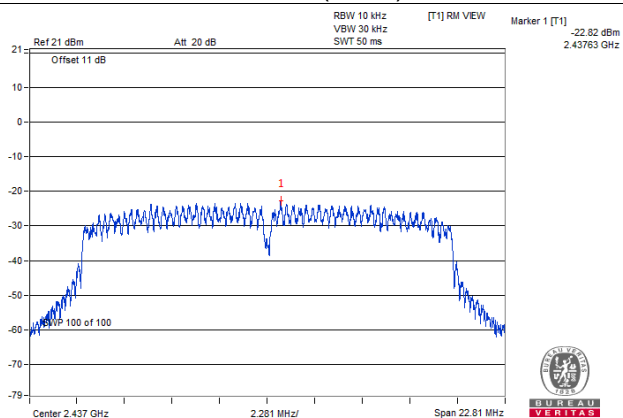
### 802.11b



### 802.11g



### 802.11n (HT20)

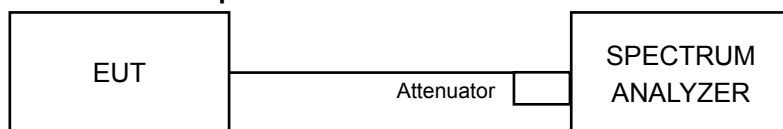


## 4.5 Conducted Out of Band Emission Measurement

### 4.5.1 Limits of Conducted Out of Band Emission Measurement

Below 30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.5.2 Test Setup



### 4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.5.4 Test Procedure

#### MEASUREMENT PROCEDURE REF

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

#### MEASUREMENT PROCEDURE OOB

- Set RBW = 100 kHz.
- Set VBW  $\geq$  300 kHz.
- Ensure that the number of measurement points  $\geq$  span/RBW
- According to measurement points to set differ measurement span.
- Detector = peak.
- Trace Mode = max hold.
- Sweep = auto couple.

### 4.5.5 Deviation from Test Standard

No deviation.

#### **4.5.6 EUT Operating Condition**

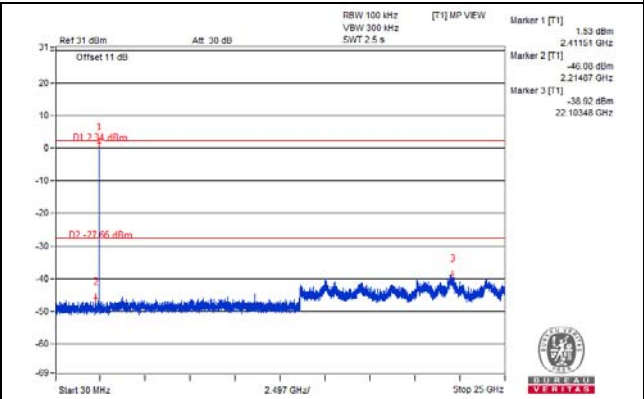
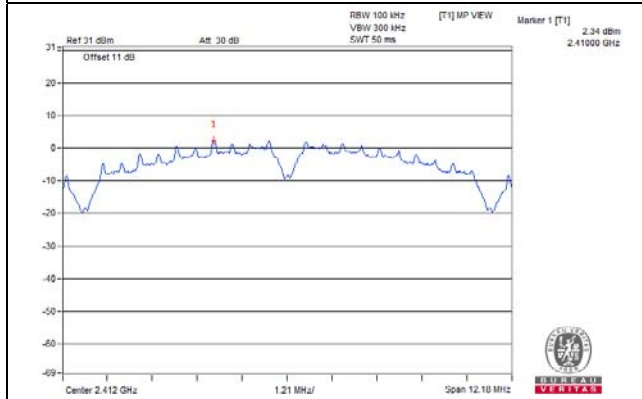
Same as Item 4.3.6

#### **4.5.7 Test Results**

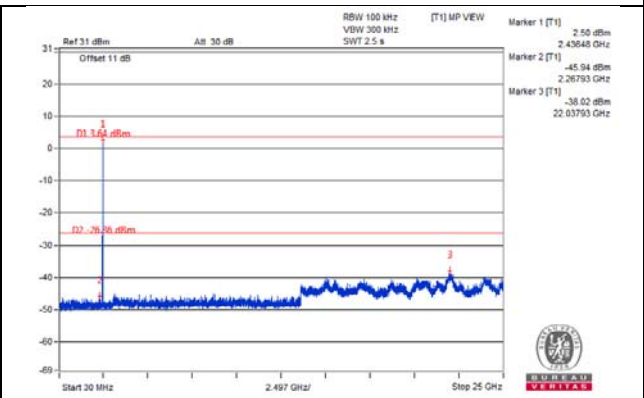
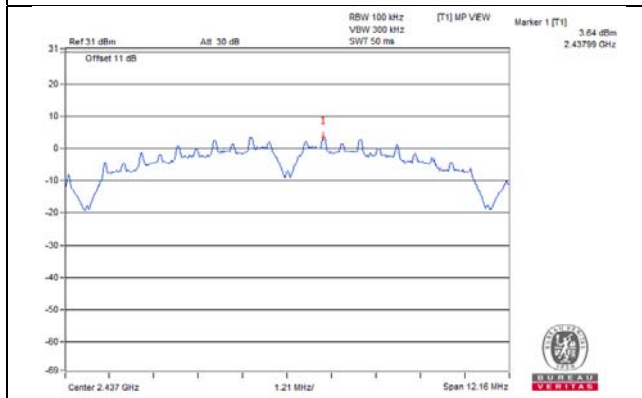
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

## 802.11b\_Chain 0

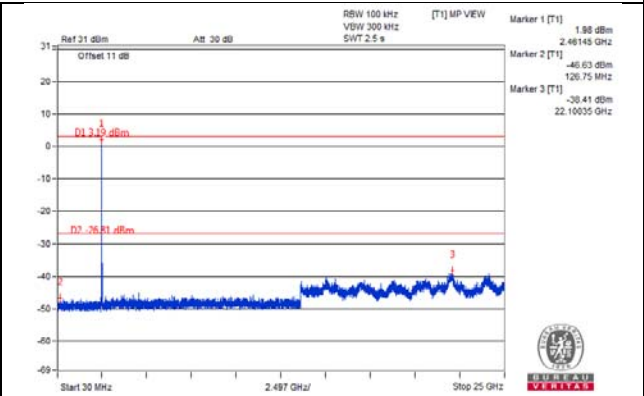
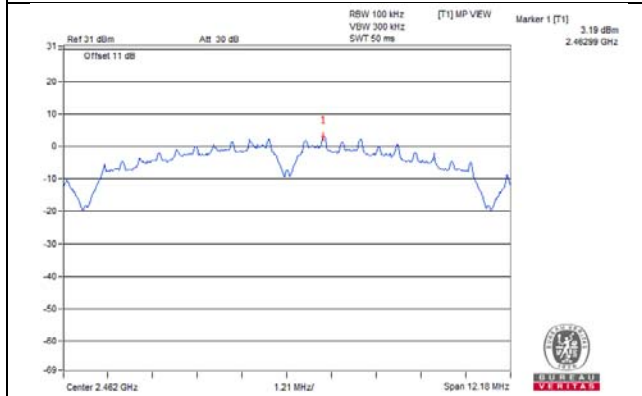
### CH 1



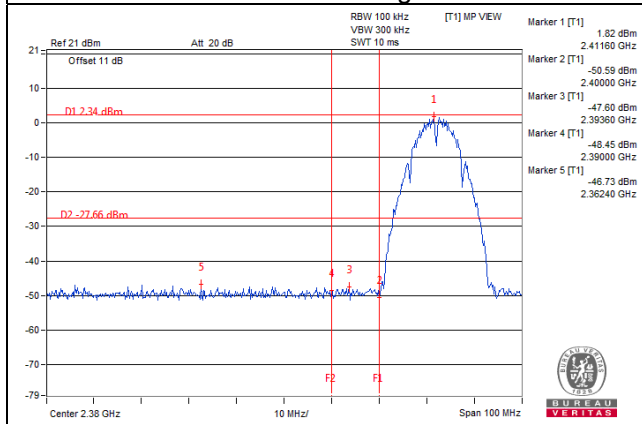
### CH 6



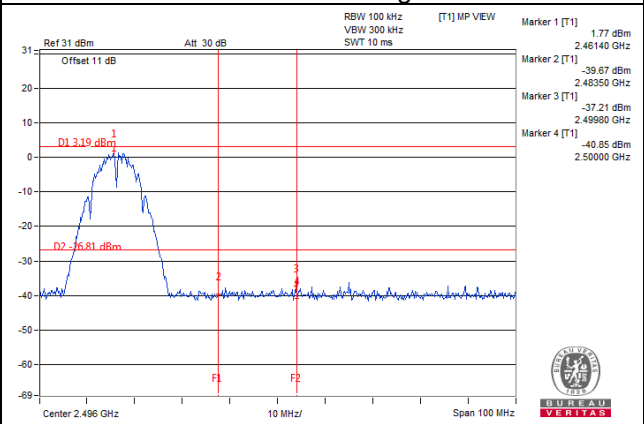
### CH 11



### CH 1 Band edge

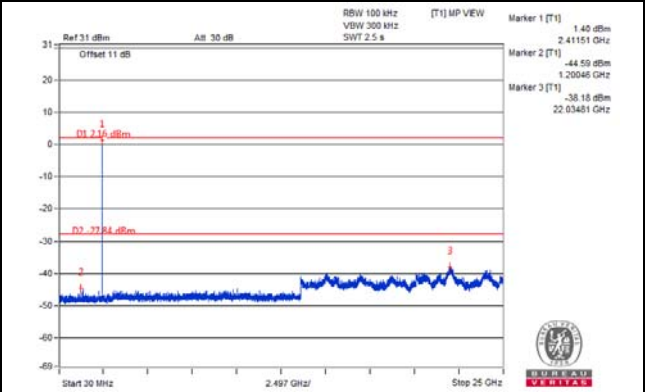
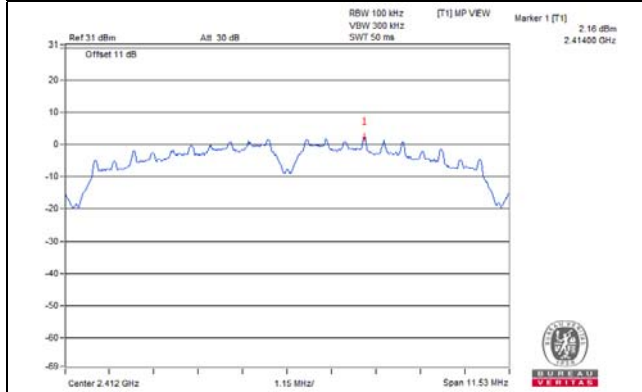


### CH 11 Band edge

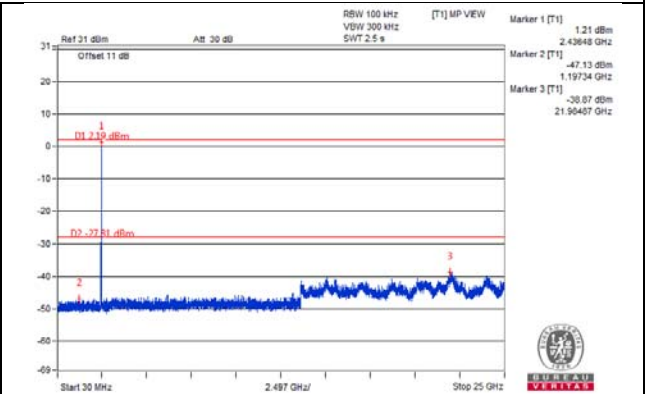
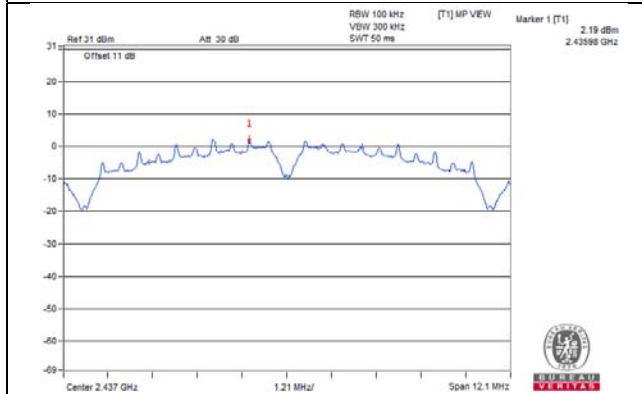


## 802.11b\_Chain 1

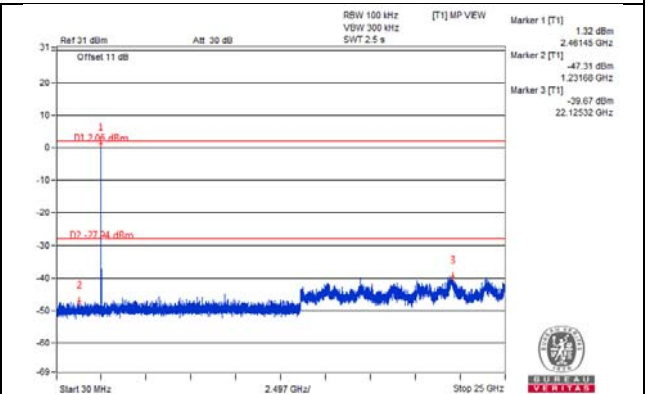
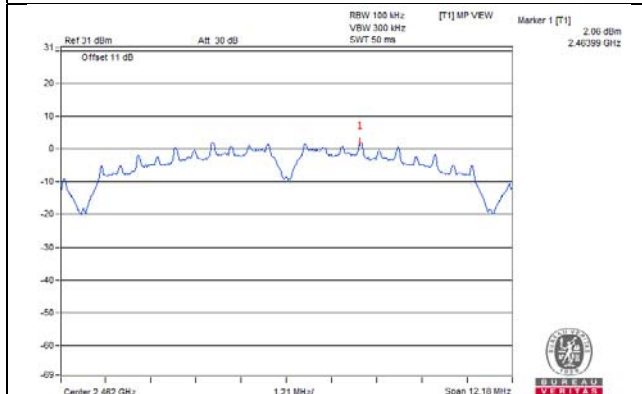
### CH 1



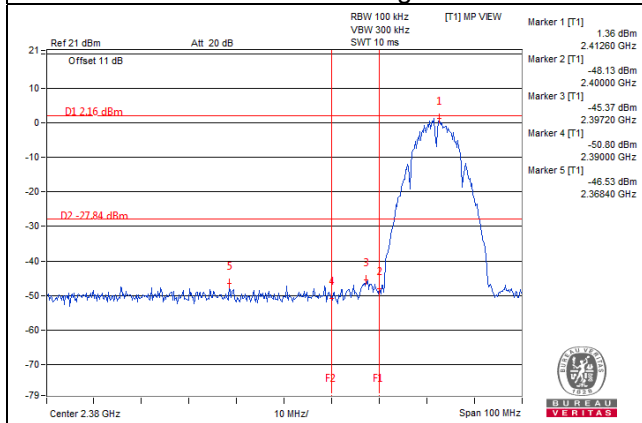
### CH 6



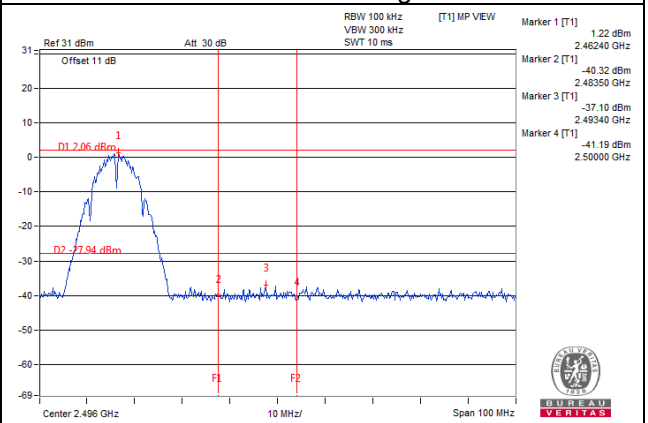
### CH 11



### CH 1 Band edge

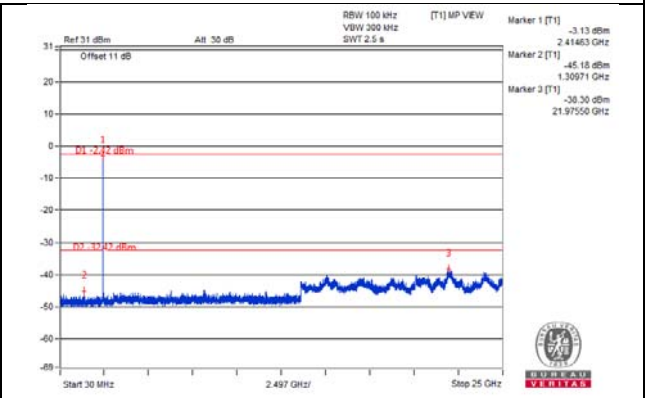
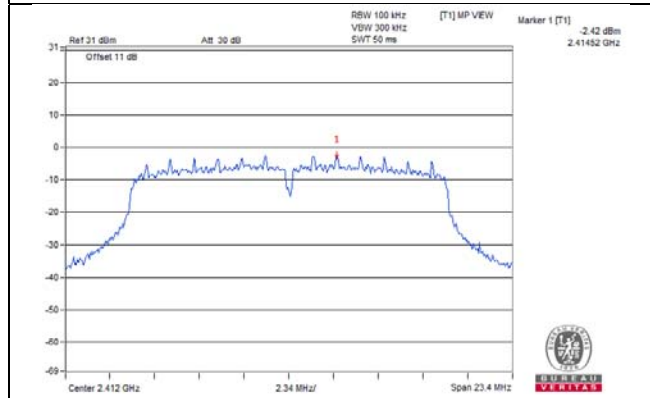


### CH 11 Band edge

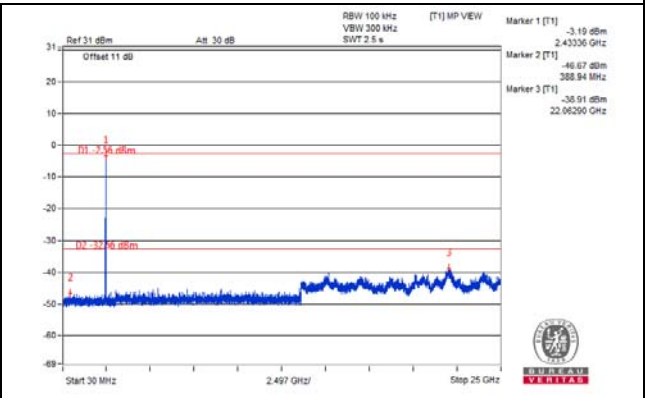
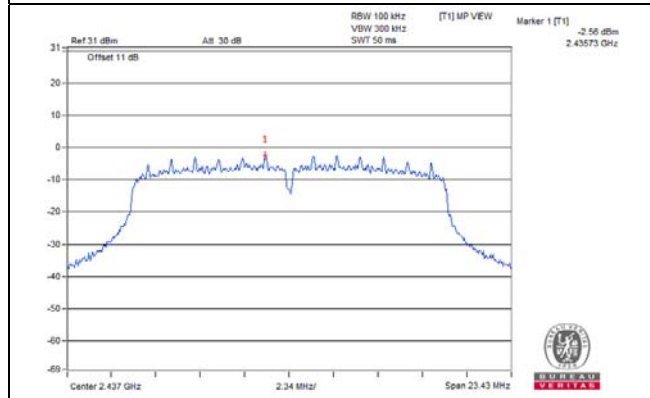


## 802.11g\_Chain 0

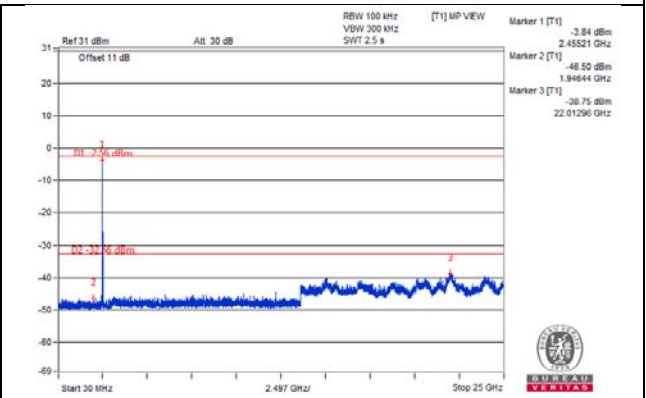
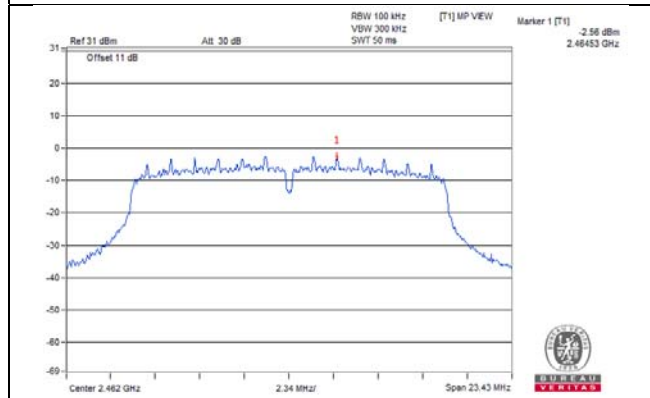
### CH 1



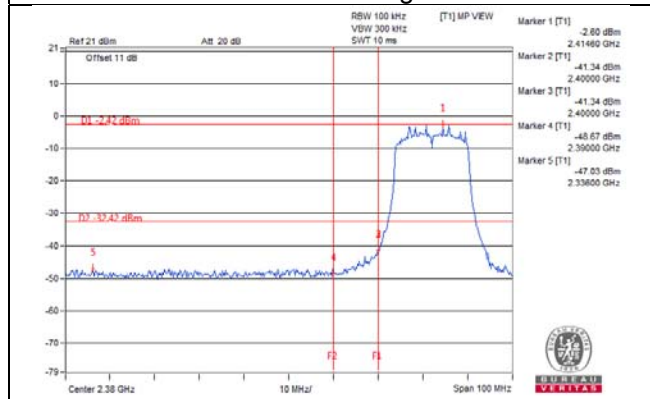
### CH 6



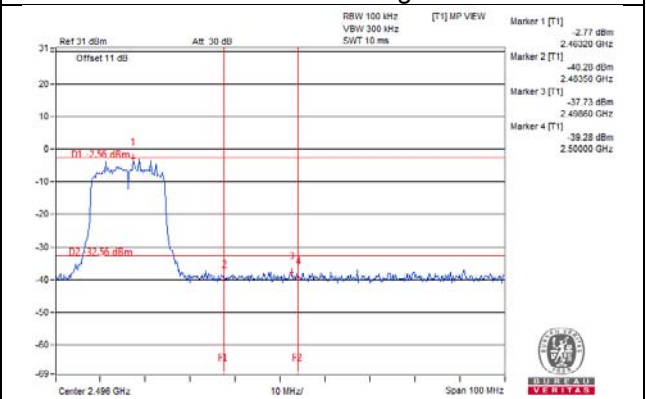
### CH 11



### CH 1 Band edge

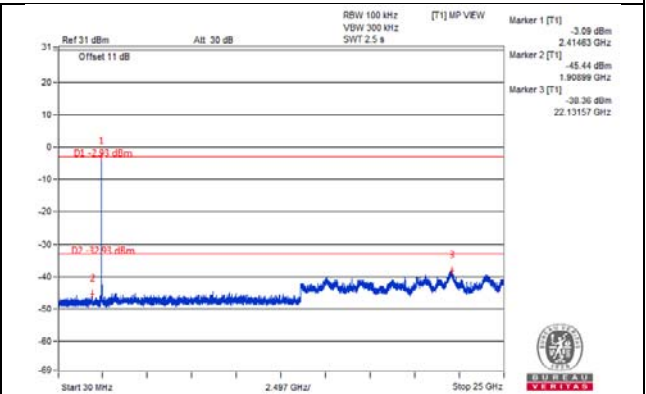
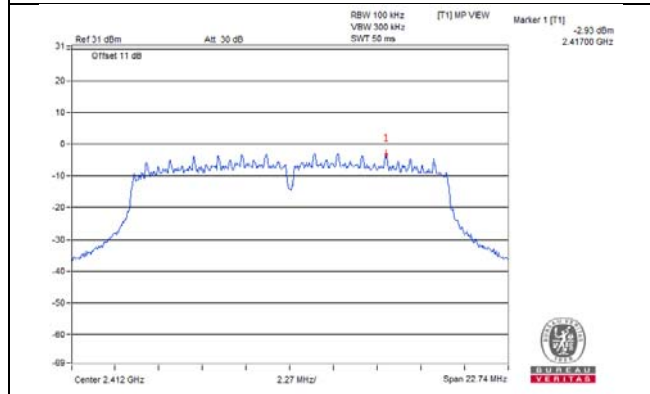


### CH 11 Band edge

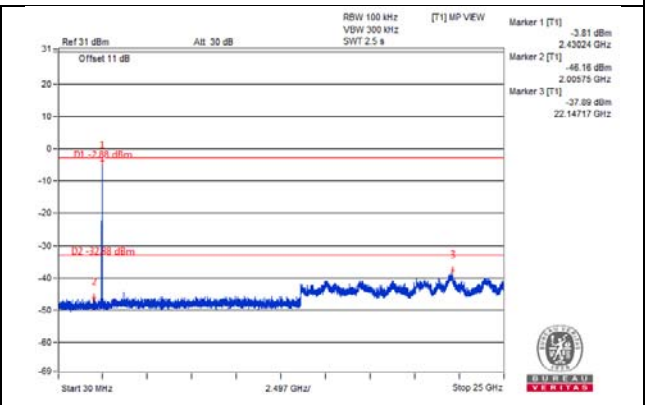
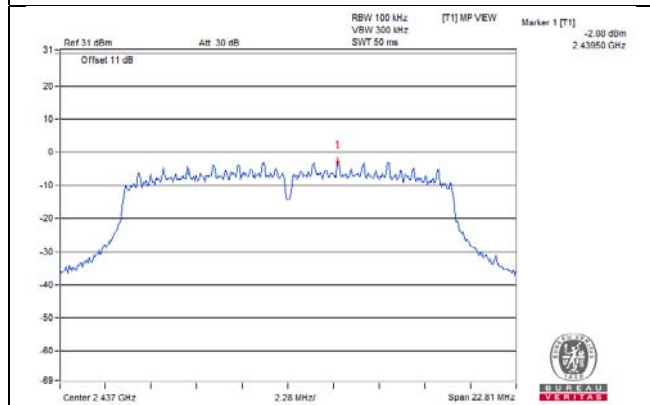


## 802.11g\_Chain 1

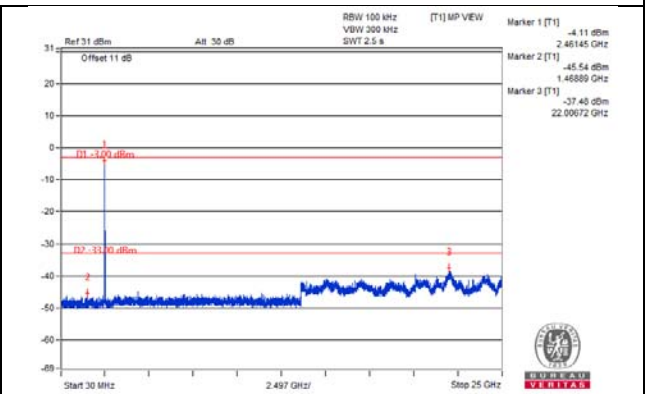
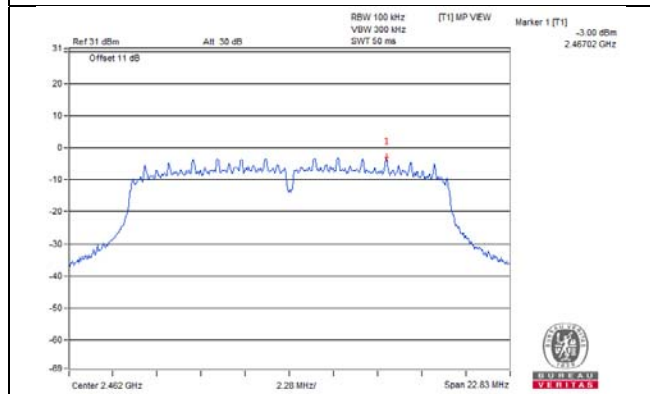
### CH 1



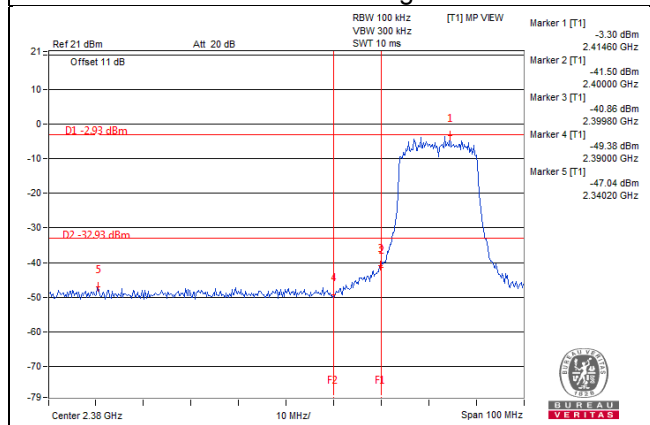
### CH 6



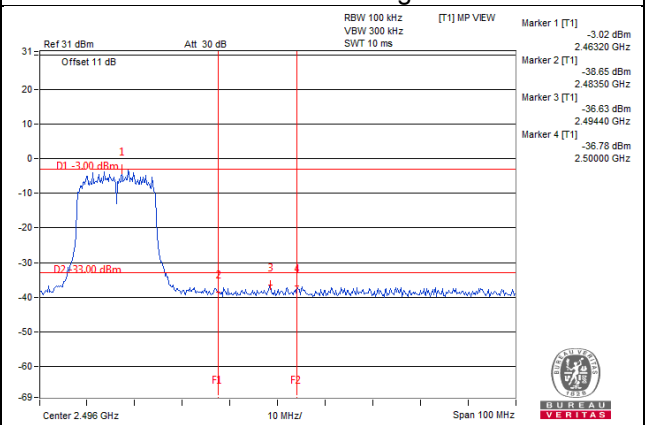
### CH 11



### CH 1 Band edge

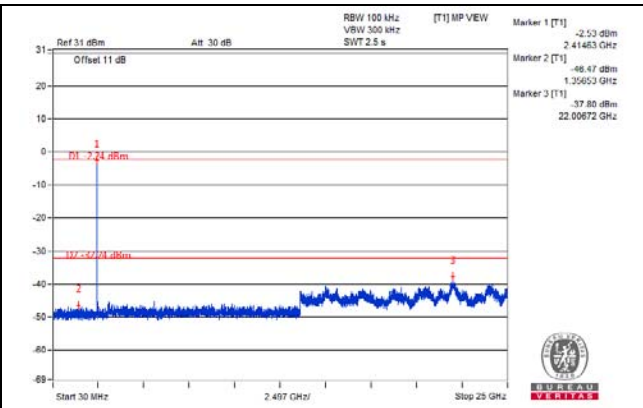
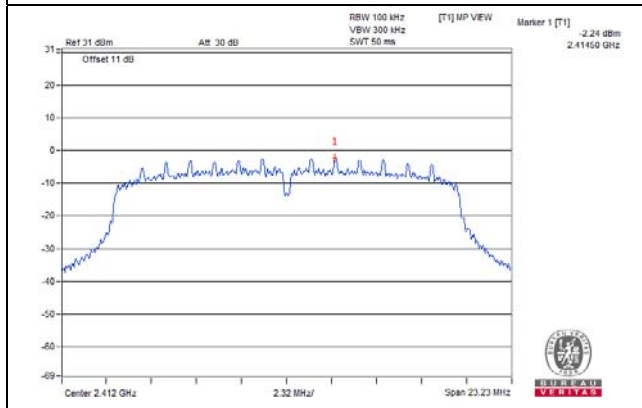


### CH 11 Band edge

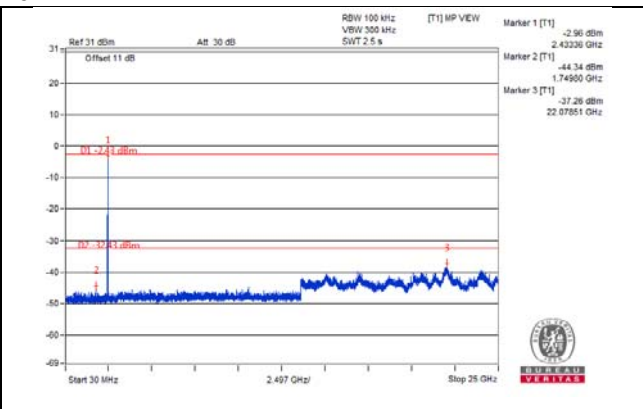
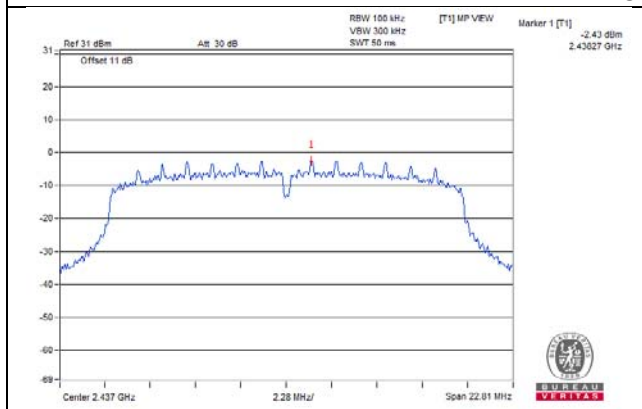


## 802.11n (HT20)\_Chain 0

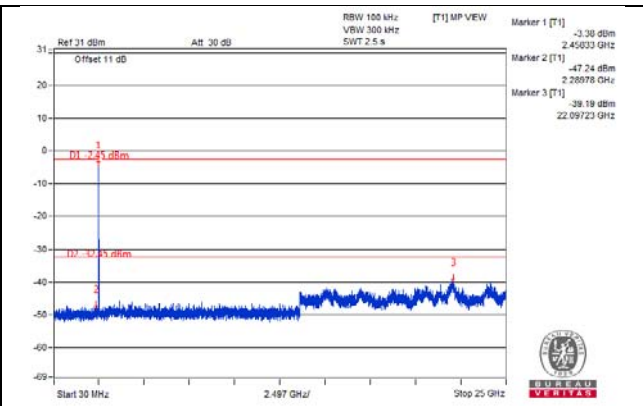
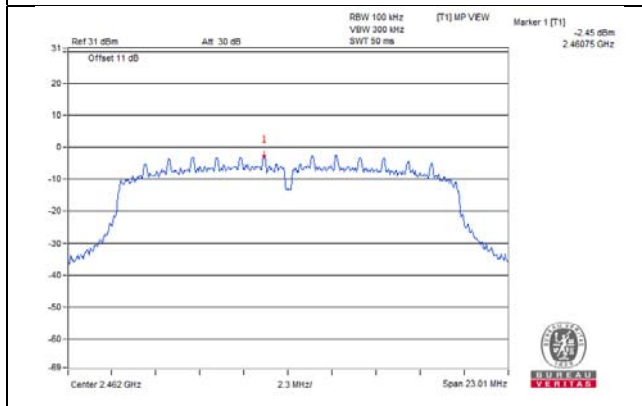
### CH 1



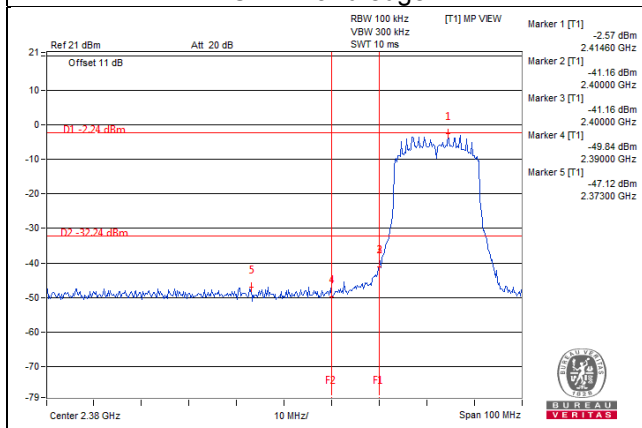
### CH 6



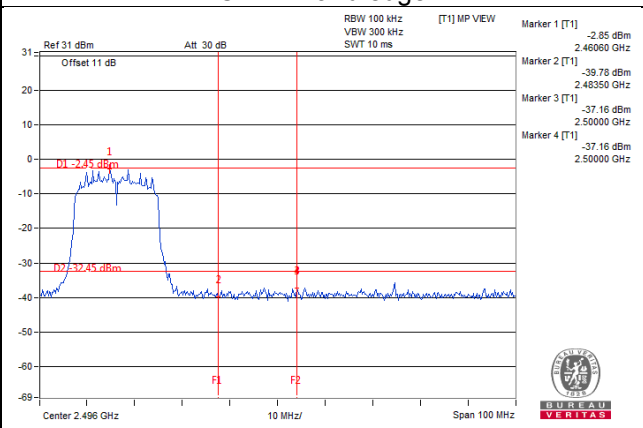
### CH 11



### CH 1 Band edge

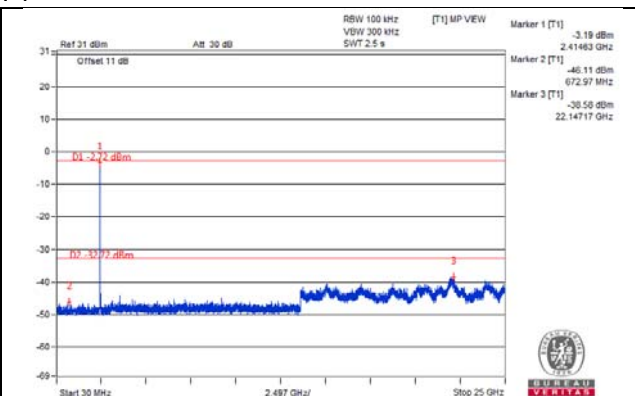
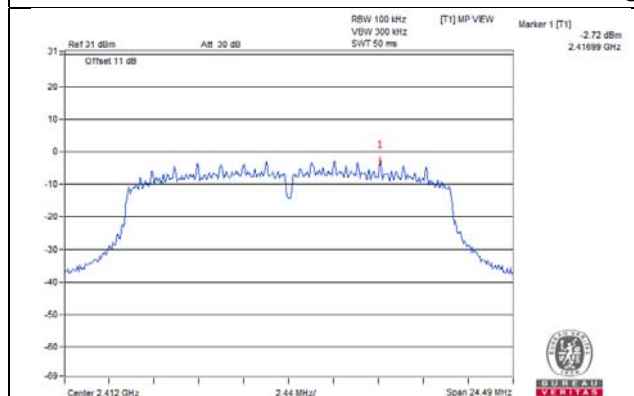


### CH 11 Band edge

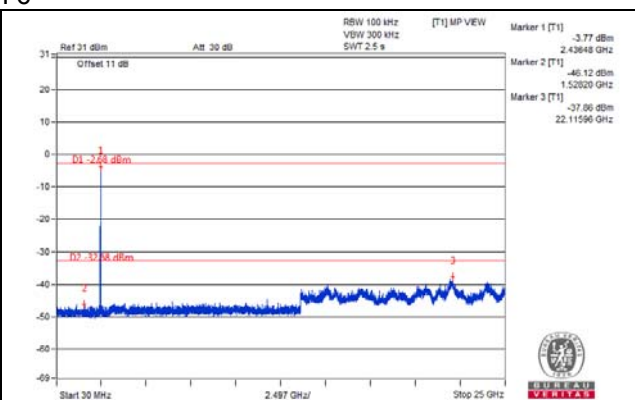
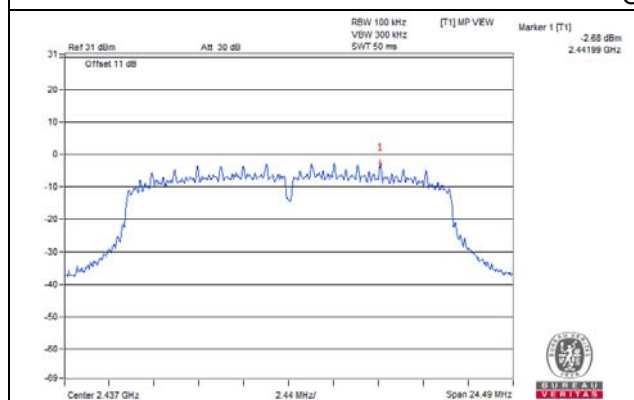


## 802.11n (HT20)\_Chain 1

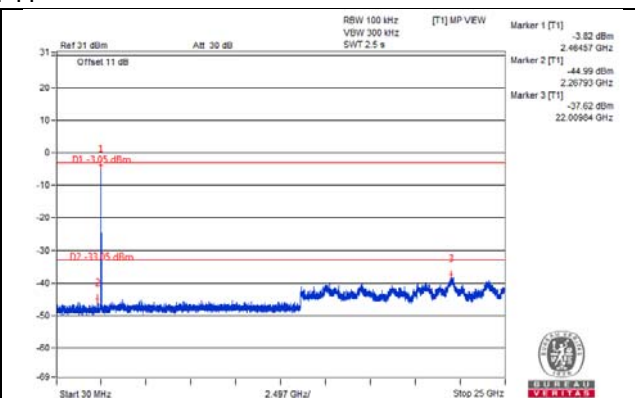
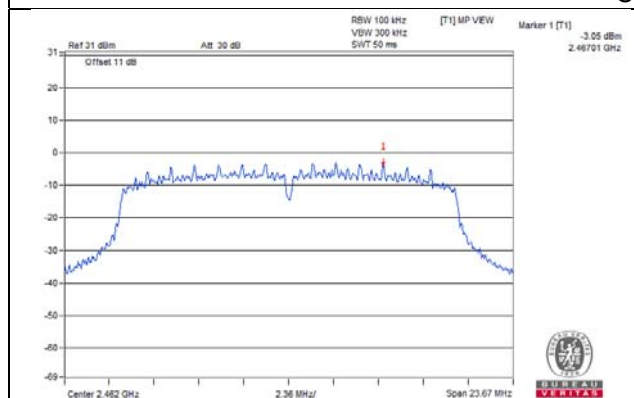
### CH 1



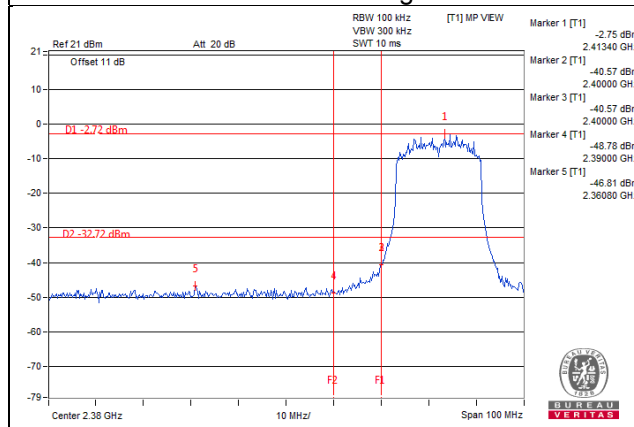
### CH 6



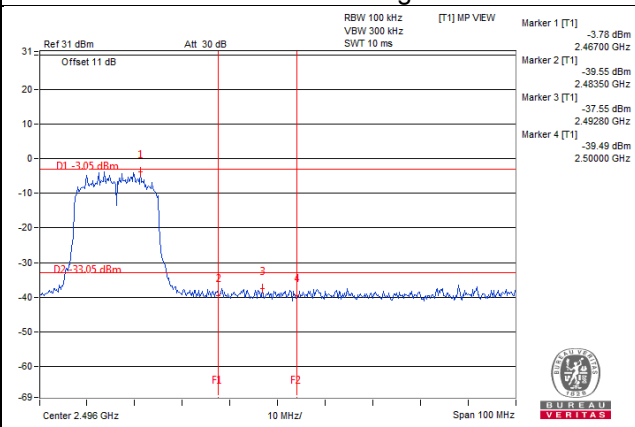
### CH 11



### CH 1 Band edge



### CH 11 Band edge



## 5 Pictures of Test Arrangements

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

## Appendix – Information of 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 FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

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**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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