

## FCC Test Report (BT-LE)

**Report No.:** RF150126E05K-3

**FCC ID:** TLZ-CM2XXNF

**Test Model:** AW-CM195NF

**Series Model:** AW-CM217NF, AW-CM235NF, AW-CM240NF

**Received Date:** Aug. 17, 2018

**Test Date:** Oct. 23 to 31, 2018

**Issued Date:** Nov. 06, 2018

**Applicant:** AzureWave Technologies, Inc.

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

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Taiwan R.O.C.

**Test Location:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
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**FCC Registration /  
Designation Number:** 723255 / TW2022



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### Release Control Record

| Issue No.      | Description       | Date Issued   |
|----------------|-------------------|---------------|
| RF150126E05K-3 | Original release. | Nov. 06, 2018 |

## 1 Certificate of Conformity

**Product:** IEEE 802.11 a/b/g/n/ac Wireless LAN and Bluetooth M.2 Combo Module

**Brand:** AzureWave

**Test Model:** AW-CM195NF

**Series Model:** AW-CM217NF, AW-CM235NF, AW-CM240NF

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** AzureWave Technologies, Inc.

**Test Date:** Oct. 23 to 31, 2018

**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 EMC characteristics under the conditions specified in this report.

**Prepared by :** Phoenix Huang, **Date:** Nov. 06, 2018  
Phoenix Huang / Specialist

**Approved by :** May Chen, **Date:** Nov. 06, 2018  
May Chen / Manager

## 2 Summary of Test Results

| 47 CFR FCC Part 15, Subpart C (Section 15.247) |                                              |        |                                                                                   |
|------------------------------------------------|----------------------------------------------|--------|-----------------------------------------------------------------------------------|
| FCC Clause                                     | Test Item                                    | Result | Remarks                                                                           |
| 15.205 /<br>15.209 /<br>15.247(d)              | Radiated Emissions and Band Edge Measurement | PASS   | Meet the requirement of limit.<br>Minimum passing margin is -5.1dB at 2483.50MHz. |
| 15.247(b)                                      | Conducted power                              | PASS   | Meet the requirement of limit.                                                    |

### 2.1 Measurement Uncertainty

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

| Measurement                    | Frequency     | Expanded Uncertainty (k=2) (±) |
|--------------------------------|---------------|--------------------------------|
| Radiated Emissions up to 1 GHz | 30MHz ~ 1GHz  | 5.33 dB                        |
| Radiated Emissions above 1 GHz | 1GHz ~ 6GHz   | 5.10 dB                        |
|                                | 6GHz ~ 18GHz  | 4.85 dB                        |
|                                | 18GHz ~ 40GHz | 5.24 dB                        |

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT (BT-LE)

|                       |                                                                    |
|-----------------------|--------------------------------------------------------------------|
| Product               | IEEE 802.11 a/b/g/n/ac Wireless LAN and Bluetooth M.2 Combo Module |
| Brand                 | AzureWave                                                          |
| Test Model            | AW-CM195NF                                                         |
| Status of EUT         | ENGINEERING SAMPLE                                                 |
| Power Supply Rating   | 3.3Vdc from host equipment                                         |
| Modulation Type       | GFSK                                                               |
| Modulation Technology | DTS                                                                |
| Transfer Rate         | Up to 1Mbps                                                        |
| Operating Frequency   | 2.402 ~ 2.480GHz                                                   |
| Number of Channel     | 40                                                                 |
| Output Power          | 7.112mW                                                            |
| Antenna Type          | Refer to Note                                                      |
| Antenna Connector     | Refer to Note                                                      |
| Accessory Device      | NA                                                                 |
| Data Cable Supplied   | NA                                                                 |

Note:

- This report is prepared for FCC class II change. The difference compared with the Report No.: RF150126E05C-3 as the following:

- ◆ Upgraded standard version.
- ◆ Added six sets of antennas as below table:

| Original              |                       |                 |                      |                                    |                  |                |                              |                              |                              |
|-----------------------|-----------------------|-----------------|----------------------|------------------------------------|------------------|----------------|------------------------------|------------------------------|------------------------------|
| Antenna No            | Chain No.             | Brand           | Model                | Gain (dBi)                         | Antenna Type     | Connector Type | Frequency range (GHz to GHz) | Cable Length (External only) |                              |
| 1                     | Chain (0) (Aux)       | MAG.LAYERS      | MSA-4008-25GC1-A1    | 2.98                               | PIFA             | i-pex(MHF4)    | 2.4~2.5                      | 15cm                         |                              |
|                       |                       |                 |                      | 5.16                               |                  |                | 4.9~5.9                      |                              |                              |
|                       | Chain (1) (Main)      | MAG.LAYERS      | MSA-4008-25GC1-A1    | 2.98                               | PIFA             | i-pex(MHF4)    | 2.4~2.5                      | 15cm                         |                              |
|                       |                       |                 |                      | 5.16                               |                  |                | 4.9~5.9                      |                              |                              |
| 2                     | Chain (0) (Aux)       | LUXSHARE ICT    | Speedy               | 1.43                               | PIFA             | i-pex(MHF4)    | 2.4~2.5                      | 507mm                        |                              |
|                       |                       |                 |                      | -3.12                              |                  |                | 4.9~5.9                      |                              |                              |
|                       | Chain (1) (Main)      | LUXSHARE ICT    | Speedy               | -2.46                              | PIFA             | i-pex(MHF4)    | 2.4~2.5                      | 472mm                        |                              |
|                       |                       |                 |                      | -0.02                              |                  |                | 4.9~5.9                      |                              |                              |
| 3                     | Chain (0) (Aux)       | Amphenol        | 867-00013            | -3.8                               | PIFA             | i-pex(MHF4)    | 2.4~2.5                      | 70mm                         |                              |
|                       |                       |                 |                      | 3.5                                |                  |                | 4.9~5.9                      |                              |                              |
|                       | Chain (1) (Main)      | Amphenol        | 867-00014            | -5.1                               | PIFA             | i-pex(MHF4)    | 2.4~2.5                      | 220mm                        |                              |
|                       |                       |                 |                      | 0.2                                |                  |                | 4.9~5.9                      |                              |                              |
| Newly                 |                       |                 |                      |                                    |                  |                |                              |                              |                              |
| Antenna Set No        | Chain No.             | Brand           | Model                | Gain (dBi)<br>Including cable loss | Cable Loss (dBi) | Antenna Type   | Connector Type               | Frequency range (GHz to GHz) | Cable Length (External only) |
| 4                     | Chain (0) (Aux)       | TONGDA          | T-543-3010450-2      | -4.23                              | 0.46             | PIFA           | i-pex-MFH4                   | 2.4~2.5                      | 79.5mm                       |
|                       |                       |                 |                      | 5.15-5.35 GHz:2.13                 |                  |                |                              | 4.9~5.9                      |                              |
|                       |                       |                 |                      | 5.47-5.725 GHz:-1.32               |                  |                |                              |                              |                              |
|                       | 5.725-5.850 GHz:-2.77 |                 |                      |                                    |                  |                |                              |                              |                              |
| Chain (1) (Main)      | TONGDA                | T-543-3010450-1 | -4.56                | 0.28                               | PIFA             | i-pex-MFH4     | 2.4~2.5                      | 43mm                         |                              |
|                       |                       |                 | 5.15-5.35 GHz:-3.53  |                                    |                  |                | 4.9~5.9                      |                              |                              |
|                       |                       |                 | 5.47-5.725 GHz:-1.87 |                                    |                  |                |                              |                              |                              |
| 5.725-5.850 GHz:-1.87 |                       |                 |                      |                                    |                  |                |                              |                              |                              |

|   |                     |         |                  |                                                                               |              |        |                |                        |        |
|---|---------------------|---------|------------------|-------------------------------------------------------------------------------|--------------|--------|----------------|------------------------|--------|
| 5 | Chain (0)<br>(Aux)  | HONGLIN | 260-26080        | -4.39<br>5.15-5.35 GHz:1.29<br>5.47-5.725 GHz:0.41<br>5.725-5.850 GHz:-3.41   | 0.46<br>0.73 | PIFA   | i-pex-<br>MFH4 | 2.4~2.5<br>4.9~5.9     | 79.5mm |
|   | Chain (1)<br>(Main) | HONGLIN | 260-26079        | -4.71<br>5.15-5.35 GHz:-3.73<br>5.47-5.725 GHz:-2.26<br>5.725-5.850 GHz:-2.23 | 0.28<br>0.44 | PIFA   | i-pex-<br>MFH4 | 2.4~2.5<br>4.9~5.9     | 43mm   |
|   | Chain 0<br>(Aux)    | Taoglas | GW20.54.0400A.km | 2.29<br>1.73                                                                  | NA           | Dipole | IPEX<br>MHF4L  | 2400~2500<br>5150~5850 | 400mm  |
|   | Chain 1<br>(Main)   | Taoglas | GW20.54.0400A.km | 2.29<br>1.73                                                                  | NA           | Dipole | IPEX<br>MHF4L  | 2400~2500<br>5150~5850 | 400mm  |
| 7 | Chain 0<br>(Aux)    | Taoglas | GW20.54.0180A.km | 2.47<br>2.62                                                                  | NA           | Dipole | IPEX<br>MHF4L  | 2400~2500<br>5150~5850 | 180mm  |
|   | Chain 1<br>(Main)   | Taoglas | GW20.54.0180A.km | 2.47<br>2.62                                                                  | NA           | Dipole | IPEX<br>MHF4L  | 2400~2500<br>5150~5850 | 180mm  |
|   | Chain 0<br>(Aux)    | Taoglas | GW20.54.0180A.km | 2.47<br>2.62                                                                  | NA           | Dipole | IPEX<br>MHF4L  | 2400~2500<br>5150~5850 | 180mm  |
|   | Chain 1<br>(Main)   | Taoglas | GW20.54.0400A.km | 2.29<br>1.73                                                                  | NA           | Dipole | IPEX<br>MHF4L  | 2400~2500<br>5150~5850 | 400mm  |
| 9 | Chain 0<br>(Aux)    | Taoglas | GW20.54.0400A.km | 2.29<br>1.73                                                                  | NA           | Dipole | IPEX<br>MHF4L  | 2400~2500<br>5150~5850 | 400mm  |
|   | Chain 1<br>(Main)   | Taoglas | GW20.54.0180A.km | 2.47<br>2.62                                                                  | NA           | Dipole | IPEX<br>MHF4L  | 2400~2500<br>5150~5850 | 180mm  |

Note:

1. For radiated emission (below 1GHz), the Dipole (Antenna Set 7) was selected as representative adapter for the test and its data was recorded in this report.
2. For radiated emission (above 1GHz), the PIFA antenna (Antenna Set 1) and Dipole (Antenna Set 7) were selected as representative adapter for the test and its data was recorded in this report.

2. According to above condition, only Radiated Emissions and Conducted power test items need to be performed. And all data were verified to meet the requirements.
3. There are Bluetooth technology and WLAN technology used for the EUT.
4. For WLAN, 2.4GHz and 5GHz technology can not transmit at same time.
5. WLAN (5GHz) and Bluetooth technology can transmit at same time.
6. The EUT has four model names which are identical to each other in all aspects except for the following table. These solutions have same RF circuit /parameter and are pin to pin compatible. (Detail information please refer declaration letter by client)

| AW model name | Difference. Broadcom solution               |
|---------------|---------------------------------------------|
| AW-CM195NF    | BCM43540                                    |
| AW-CM217NF    | BCM4356                                     |
| AW-CM235NF    | BCM4354                                     |
| AW-CM240NF    | BCM4356 (Change the Interface of PCIE+UART) |

Note: In original report, from the above models, model: **AW-CM195NF** was selected as representative model for the test and its data was recorded in this report.

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

### 3.2 Description of Test Modes

40 channels are provided to this EUT:

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|
| 0       | 2402            | 10      | 2422            | 20      | 2442            | 30      | 2462            |
| 1       | 2404            | 11      | 2424            | 21      | 2444            | 31      | 2464            |
| 2       | 2406            | 12      | 2426            | 22      | 2446            | 32      | 2466            |
| 3       | 2408            | 13      | 2428            | 23      | 2448            | 33      | 2468            |
| 4       | 2410            | 14      | 2430            | 24      | 2450            | 34      | 2470            |
| 5       | 2412            | 15      | 2432            | 25      | 2452            | 35      | 2472            |
| 6       | 2414            | 16      | 2434            | 26      | 2454            | 36      | 2474            |
| 7       | 2416            | 17      | 2436            | 27      | 2456            | 37      | 2476            |
| 8       | 2418            | 18      | 2438            | 28      | 2458            | 38      | 2478            |
| 9       | 2420            | 19      | 2440            | 29      | 2460            | 39      | 2480            |

### 3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT CONFIGURE MODE | APPLICABLE TO |       |      | DESCRIPTION |
|--------------------|---------------|-------|------|-------------|
|                    | RE $\geq$ 1G  | RE<1G | APCM |             |
| -                  | √             | √     | √    | -           |

Where **RE $\geq$ 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. In the original report, the EUT's antenna (PIFA) had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.

#### **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.

| AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE | DATA RATE (Mbps) |
|-------------------|----------------|-----------------|------------------|
| 0 to 39           | 0, 19, 39      | GFSK            | 1                |

#### **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.

| AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE | DATA RATE (Mbps) |
|-------------------|----------------|-----------------|------------------|
| 0 to 39           | 39             | GFSK            | 1                |

#### **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.

| AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE | DATA RATE (Mbps) |
|-------------------|----------------|-----------------|------------------|
| 0 to 39           | 0, 19, 39      | GFSK            | 1                |

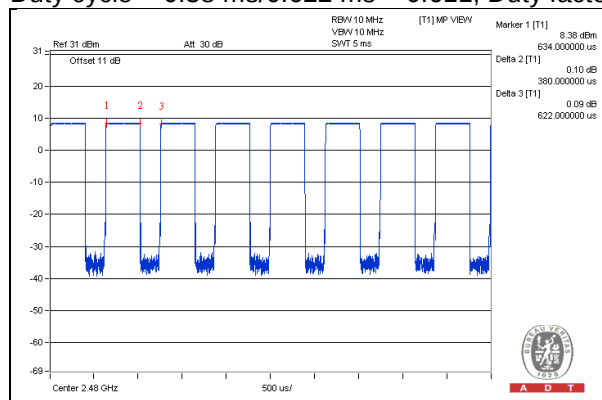
#### **Test Condition:**

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER           | TESTED BY     |
|---------------|--------------------------|-----------------------|---------------|
| RE $\geq$ 1G  | 24deg. C, 68%RH          | 120Vac, 60Hz (System) | Steven Chiang |
|               | 21deg. C, 63%RH          | 120Vac, 60Hz (System) | Steven Chiang |
| RE<1G         | 23deg. C, 65%RH          | 120Vac, 60Hz (System) | Steven Chiang |
| APCM          | 25deg. C, 60%RH          | 3.3Vdc                | Weiwei Lo     |

### 3.3 Duty Cycle of Test Signal

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

Duty cycle =  $0.38 \text{ ms} / 0.622 \text{ ms} = 0.611$ , Duty factor =  $10 * \log(1/\text{Duty cycle}) = 2.1$



### 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.

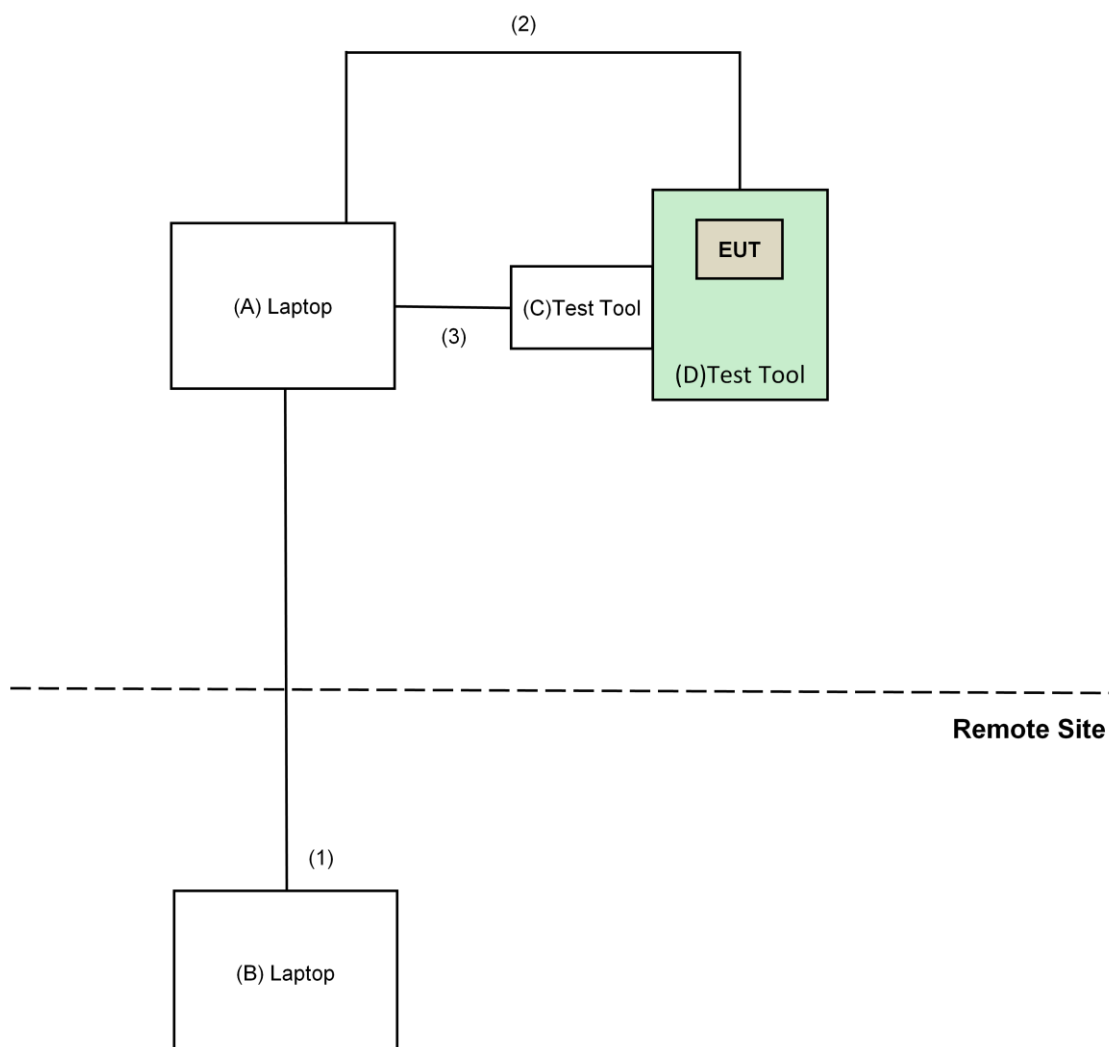
| ID | Product   | Brand     | Model No.              | Serial No. | FCC ID | Remarks            |
|----|-----------|-----------|------------------------|------------|--------|--------------------|
| A. | Laptop    | HP        | Pavilion<br>14-ab023TU | 5CD5340WXZ | NA     | Provided by Lab    |
| B. | Laptop    | ASUS      | AA2SJ.AVBoW202         | NA         | NA     | Supplied by client |
| C. | Test Tool | AzureWave | 9027-V01               | NA         | NA     | Supplied by client |
| D. | Test Tool | AzureWave | 2218-17                | NA         | NA     | Supplied by client |

Note:

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

| ID | Descriptions | Qty. | Length (m) | Shielding<br>(Yes/No) | Cores (Qty.) | Remarks            |
|----|--------------|------|------------|-----------------------|--------------|--------------------|
| 1. | RJ-45 Cable  | 1    | 10         | No                    | 0            | Provided by Lab    |
| 2. | USB Cable    | 1    | 1.8        | No                    | 0            | Provided by Lab    |
| 3. | USB Cable    | 1    | 1          | No                    | 0            | Supplied by client |

### 3.4.1 Configuration of System under Test



### 3.5 General Description of Applied Standards

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

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

**KDB 558074 D01 15.247 Meas Guidance v05**

**ANSI C63.10-2013**

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

## 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 20dB below the highest level of the desired power:

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

**Note:**

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

#### 4.1.2 Test Instruments

| DESCRIPTION & MANUFACTURER                          | MODEL NO.            | SERIAL NO.  | CALIBRATED DATE | CALIBRATED UNTIL |
|-----------------------------------------------------|----------------------|-------------|-----------------|------------------|
| Test Receiver<br>Keysight                           | N9038A               | MY54450088  | July 05, 2018   | July 04, 2019    |
| Pre-Amplifier<br>EMCI                               | EMC001340            | 980142      | Feb. 09, 2018   | Feb. 08, 2019    |
| Loop Antenna <sup>(*)</sup><br>Electro-Metrics      | EM-6879              | 264         | Dec. 16, 2016   | Dec. 15, 2018    |
| RF Cable                                            | NA                   | LOOPCAB-001 | Jan. 15, 2018   | Jan. 14, 2019    |
| RF Cable                                            | NA                   | LOOPCAB-002 | Jan. 15, 2018   | Jan. 14, 2019    |
| Pre-Amplifier<br>Mini-Circuits                      | ZFL-1000VH2B         | AMP-ZFL-01  | Nov. 09, 2017   | Nov. 08, 2018    |
| Trilog Broadband Antenna<br>SCHWARZBECK             | VULB 9168            | 9168-406    | Nov. 29, 2017   | Nov. 28, 2018    |
| RF Cable                                            | 8D                   | 966-4-1     | Mar. 21, 2018   | Mar. 20, 2019    |
| RF Cable                                            | 8D                   | 966-4-2     | Mar. 21, 2018   | Mar. 20, 2019    |
| RF Cable                                            | 8D                   | 966-4-3     | Mar. 21, 2018   | Mar. 20, 2019    |
| Fixed attenuator<br>Mini-Circuits                   | UNAT-5+              | PAD-3m-4-01 | Sep. 27, 2018   | Sep. 26, 2019    |
| Horn_Antenna<br>SCHWARZBECK                         | BBHA 9120D           | 9120D-783   | Dec. 12, 2017   | Dec. 11, 2018    |
| Pre-Amplifier<br>Mini-Circuits                      | ZVA-183-S+           | AMP-ZVA-03  | May 10, 2018    | May 09, 2019     |
| RF Cable                                            | EMC104-SM-SM-1200    | 160923      | Jan. 29, 2018   | Jan. 28, 2019    |
| RF Cable                                            | EMC104-SM-SM-2000    | 150318      | Jan. 29, 2018   | Jan. 28, 2019    |
| RF Cable                                            | EMC104-SM-SM-5000    | 150321      | Jan. 29, 2018   | Jan. 28, 2019    |
| Pre-Amplifier<br>EMCI                               | EMC184045SE          | 980387      | Jan. 29, 2018   | Jan. 28, 2019    |
| Horn_Antenna<br>SCHWARZBECK                         | BBHA 9170            | BBHA9170608 | Dec. 14, 2017   | Dec. 13, 2018    |
| RF Cable                                            | EMC102-KM-KM-1200    | 160925      | Jan. 29, 2018   | Jan. 28, 2019    |
| Software                                            | ADT_Radiated_V8.7.08 | NA          | NA              | NA               |
| Boresight Antenna Tower &<br>Turn Table<br>Max-Full | MF-7802BS            | MF780208530 | NA              | NA               |
| Spectrum Analyzer<br>R&S                            | FSV40                | 100964      | June 20, 2018   | June 19, 2019    |
| Power meter<br>Anritsu                              | ML2495A              | 1014008     | May 09, 2018    | May 08, 2019     |
| Power sensor<br>Anritsu                             | MA2411B              | 0917122     | May 09, 2018    | May 08, 2019     |

#### Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. \*The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 4.
4. The CANADA Site Registration No. is 20331-2
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Oct. 23 to 31, 2018

#### 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:**

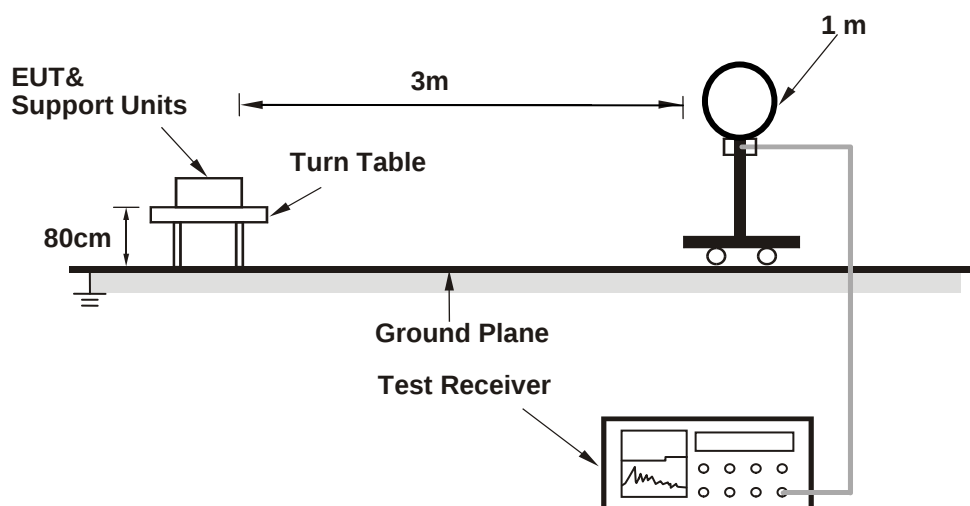
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

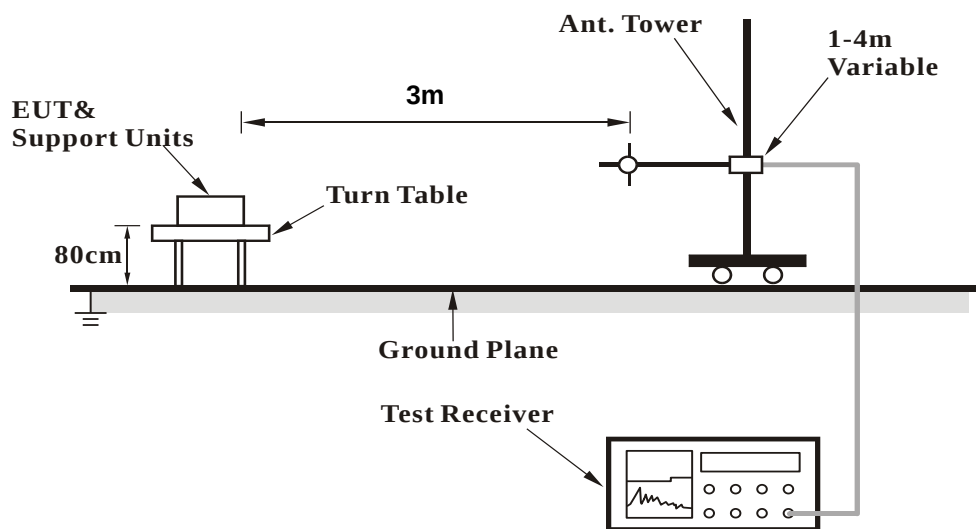
No deviation.

#### 4.1.5 Test Setup

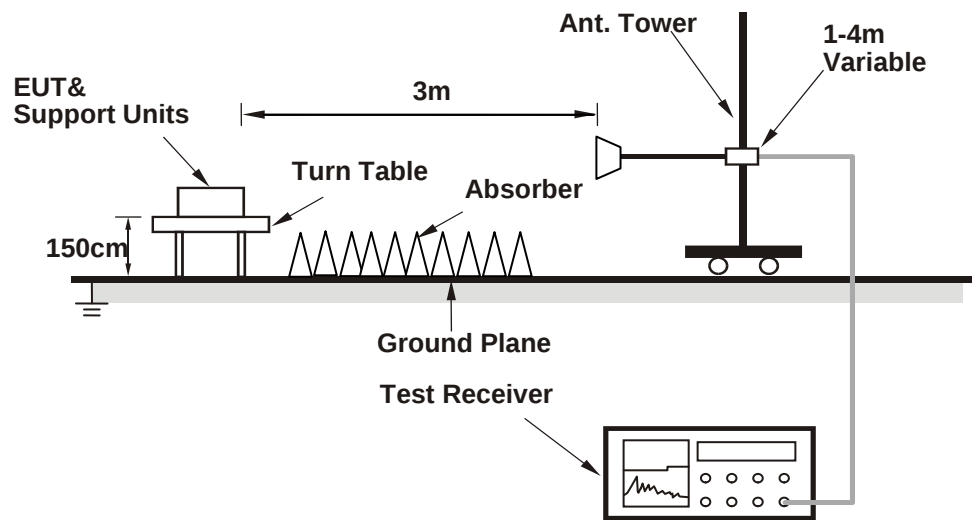
##### For Radiated emission below 30MHz



##### 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

- Connected the EUT with the Laptop which is placed on the testing table.
- Controlling software (wl.exe[paste XXX.sh command]) has been activated to set the EUT on specific status.

#### 4.1.7 Test Results (PIFA Antenna)

##### Above 1GHz Data:

|                        |              |                              |              |
|------------------------|--------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 0 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 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        | 47.5 PK                       | 74.0              | -26.5          | 1.38 H                   | 312                        | 49.7                   | -2.2                           |
| 2                                                   | 2390.00        | 35.9 AV                       | 54.0              | -18.1          | 1.38 H                   | 312                        | 38.1                   | -2.2                           |
| 3                                                   | *2402.00       | 102.6 PK                      |                   |                | 1.38 H                   | 312                        | 104.9                  | -2.3                           |
| 4                                                   | *2402.00       | 101.3 AV                      |                   |                | 1.38 H                   | 312                        | 103.6                  | -2.3                           |
| 5                                                   | 4804.00        | 47.2 PK                       | 74.0              | -26.8          | 1.41 H                   | 210                        | 45.4                   | 1.8                            |
| 6                                                   | 4804.00        | 38.7 AV                       | 54.0              | -15.3          | 1.41 H                   | 210                        | 36.9                   | 1.8                            |
| 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        | 48.0 PK                       | 74.0              | -26.0          | 1.00 V                   | 147                        | 50.2                   | -2.2                           |
| 2                                                   | 2390.00        | 35.7 AV                       | 54.0              | -18.3          | 1.00 V                   | 147                        | 37.9                   | -2.2                           |
| 3                                                   | *2402.00       | 100.1 PK                      |                   |                | 1.72 V                   | 155                        | 102.4                  | -2.3                           |
| 4                                                   | *2402.00       | 98.9 AV                       |                   |                | 1.72 V                   | 155                        | 101.2                  | -2.3                           |
| 5                                                   | 4804.00        | 50.1 PK                       | 74.0              | -23.9          | 1.39 V                   | 142                        | 48.3                   | 1.8                            |
| 6                                                   | 4804.00        | 40.5 AV                       | 54.0              | -13.5          | 1.39 V                   | 142                        | 38.7                   | 1.8                            |

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

|                        |               |                              |              |
|------------------------|---------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 19 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 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        | 46.5 PK                       | 74.0              | -27.5          | 1.37 H                   | 320                        | 48.7                   | -2.2                           |
| 2                                                   | 2390.00        | 38.0 AV                       | 54.0              | -16.0          | 1.37 H                   | 320                        | 40.2                   | -2.2                           |
| 3                                                   | *2440.00       | 103.4 PK                      |                   |                | 1.37 H                   | 320                        | 106.0                  | -2.6                           |
| 4                                                   | *2440.00       | 102.5 AV                      |                   |                | 1.37 H                   | 320                        | 105.1                  | -2.6                           |
| 5                                                   | 2483.50        | 49.3 PK                       | 74.0              | -24.7          | 1.37 H                   | 320                        | 51.7                   | -2.4                           |
| 6                                                   | 2483.50        | 37.2 AV                       | 54.0              | -16.8          | 1.37 H                   | 320                        | 39.6                   | -2.4                           |
| 7                                                   | 4880.00        | 47.0 PK                       | 74.0              | -27.0          | 1.41 H                   | 200                        | 45.0                   | 2.0                            |
| 8                                                   | 4880.00        | 38.5 AV                       | 54.0              | -15.5          | 1.41 H                   | 200                        | 36.5                   | 2.0                            |
| 9                                                   | 7320.00        | 53.9 PK                       | 74.0              | -20.1          | 1.27 H                   | 142                        | 45.5                   | 8.4                            |
| 10                                                  | 7320.00        | 40.4 AV                       | 54.0              | -13.6          | 1.27 H                   | 142                        | 32.0                   | 8.4                            |

| 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        | 48.3 PK                       | 74.0              | -25.7          | 1.70 V                   | 166                        | 50.5                   | -2.2                           |
| 2                                                 | 2390.00        | 36.1 AV                       | 54.0              | -17.9          | 1.70 V                   | 166                        | 38.3                   | -2.2                           |
| 3                                                 | *2440.00       | 100.9 PK                      |                   |                | 1.70 V                   | 166                        | 103.5                  | -2.6                           |
| 4                                                 | *2440.00       | 99.3 AV                       |                   |                | 1.70 V                   | 166                        | 101.9                  | -2.6                           |
| 5                                                 | 2483.50        | 47.5 PK                       | 74.0              | -26.5          | 1.70 V                   | 166                        | 49.9                   | -2.4                           |
| 6                                                 | 2483.50        | 35.6 AV                       | 54.0              | -18.4          | 1.70 V                   | 166                        | 38.0                   | -2.4                           |
| 7                                                 | 4880.00        | 50.2 PK                       | 74.0              | -23.8          | 1.34 V                   | 128                        | 48.2                   | 2.0                            |
| 8                                                 | 4880.00        | 40.5 AV                       | 54.0              | -13.5          | 1.34 V                   | 128                        | 38.5                   | 2.0                            |
| 9                                                 | 7320.00        | 56.5 PK                       | 74.0              | -17.5          | 1.10 V                   | 102                        | 48.1                   | 8.4                            |
| 10                                                | 7320.00        | 42.0 AV                       | 54.0              | -12.0          | 1.10 V                   | 102                        | 33.6                   | 8.4                            |

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

|                        |               |                              |              |
|------------------------|---------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 39 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 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                                                   | *2480.00       | 105.7 PK                      |                   |                | 1.34 H                   | 299                        | 108.3                  | -2.6                           |
| 2                                                   | *2480.00       | 104.5 AV                      |                   |                | 1.34 H                   | 299                        | 107.1                  | -2.6                           |
| 3                                                   | 2483.50        | 49.2 PK                       | 74.0              | -24.8          | 1.34 H                   | 299                        | 51.6                   | -2.4                           |
| 4                                                   | 2483.50        | 39.1 AV                       | 54.0              | -14.9          | 1.34 H                   | 299                        | 41.5                   | -2.4                           |
| 5                                                   | 4960.00        | 46.3 PK                       | 74.0              | -27.7          | 1.41 H                   | 198                        | 44.2                   | 2.1                            |
| 6                                                   | 4960.00        | 38.3 AV                       | 54.0              | -15.7          | 1.41 H                   | 198                        | 36.2                   | 2.1                            |
| 7                                                   | 7440.00        | 54.2 PK                       | 74.0              | -19.8          | 1.33 H                   | 141                        | 45.4                   | 8.8                            |
| 8                                                   | 7440.00        | 40.5 AV                       | 54.0              | -13.5          | 1.33 H                   | 141                        | 31.7                   | 8.8                            |
| 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                                                   | *2480.00       | 100.7 PK                      |                   |                | 1.66 V                   | 170                        | 103.3                  | -2.6                           |
| 2                                                   | *2480.00       | 99.7 AV                       |                   |                | 1.66 V                   | 170                        | 102.3                  | -2.6                           |
| 3                                                   | 2483.50        | 48.0 PK                       | 74.0              | -26.0          | 1.66 V                   | 170                        | 50.4                   | -2.4                           |
| 4                                                   | 2483.50        | 35.7 AV                       | 54.0              | -18.3          | 1.66 V                   | 170                        | 38.1                   | -2.4                           |
| 5                                                   | 4960.00        | 49.3 PK                       | 74.0              | -24.7          | 1.43 V                   | 151                        | 47.2                   | 2.1                            |
| 6                                                   | 4960.00        | 40.3 AV                       | 54.0              | -13.7          | 1.43 V                   | 151                        | 38.2                   | 2.1                            |
| 7                                                   | 7440.00        | 55.9 PK                       | 74.0              | -18.1          | 1.11 V                   | 102                        | 47.1                   | 8.8                            |
| 8                                                   | 7440.00        | 41.6 AV                       | 54.0              | -12.4          | 1.11 V                   | 102                        | 32.8                   | 8.8                            |

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

#### 4.1.8 Test Results (Dipole Antenna)

##### Above 1GHz Data:

|                        |              |                              |              |
|------------------------|--------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 0 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 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        | 57.0 PK                       | 74.0              | -17.0          | 1.11 H                   | 153                        | 59.2                   | -2.2                           |
| 2                                                   | 2390.00        | 44.9 AV                       | 54.0              | -9.1           | 1.11 H                   | 153                        | 47.1                   | -2.2                           |
| 3                                                   | *2402.00       | 92.2 PK                       |                   |                | 1.11 H                   | 153                        | 94.5                   | -2.3                           |
| 4                                                   | *2402.00       | 91.3 AV                       |                   |                | 1.11 H                   | 153                        | 93.6                   | -2.3                           |
| 5                                                   | 4804.00        | 46.5 PK                       | 74.0              | -27.5          | 1.09 H                   | 12                         | 44.7                   | 1.8                            |
| 6                                                   | 4804.00        | 38.2 AV                       | 54.0              | -15.8          | 1.09 H                   | 12                         | 36.4                   | 1.8                            |
| 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        | 57.1 PK                       | 74.0              | -16.9          | 1.40 V                   | 291                        | 59.3                   | -2.2                           |
| 2                                                   | 2390.00        | 45.3 AV                       | 54.0              | -8.7           | 1.40 V                   | 291                        | 47.5                   | -2.2                           |
| 3                                                   | *2402.00       | 102.1 PK                      |                   |                | 1.40 V                   | 294                        | 104.4                  | -2.3                           |
| 4                                                   | *2402.00       | 100.8 AV                      |                   |                | 1.40 V                   | 294                        | 103.1                  | -2.3                           |
| 5                                                   | 4804.00        | 49.5 PK                       | 74.0              | -24.5          | 1.04 V                   | 215                        | 47.7                   | 1.8                            |
| 6                                                   | 4804.00        | 40.5 AV                       | 54.0              | -13.5          | 1.04 V                   | 215                        | 38.7                   | 1.8                            |

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

|                        |               |                              |              |
|------------------------|---------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 19 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 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                                                   | *2440.00       | 94.9 PK                       |                   |                | 1.08 H                   | 135                        | 97.5                   | -2.6                           |
| 2                                                   | *2440.00       | 94.0 AV                       |                   |                | 1.08 H                   | 135                        | 96.6                   | -2.6                           |
| 3                                                   | 4880.00        | 47.0 PK                       | 74.0              | -27.0          | 1.06 H                   | 23                         | 45.0                   | 2.0                            |
| 4                                                   | 4880.00        | 38.4 AV                       | 54.0              | -15.6          | 1.06 H                   | 23                         | 36.4                   | 2.0                            |
| 5                                                   | 7320.00        | 53.6 PK                       | 74.0              | -20.4          | 1.07 H                   | 83                         | 45.2                   | 8.4                            |
| 6                                                   | 7320.00        | 39.9 AV                       | 54.0              | -14.1          | 1.07 H                   | 83                         | 31.5                   | 8.4                            |
| 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                                                   | *2440.00       | 104.3 PK                      |                   |                | 1.38 V                   | 290                        | 106.9                  | -2.6                           |
| 2                                                   | *2440.00       | 103.0 AV                      |                   |                | 1.38 V                   | 290                        | 105.6                  | -2.6                           |
| 3                                                   | 4880.00        | 49.5 PK                       | 74.0              | -24.5          | 1.01 V                   | 214                        | 47.5                   | 2.0                            |
| 4                                                   | 4880.00        | 40.2 AV                       | 54.0              | -13.8          | 1.01 V                   | 214                        | 38.2                   | 2.0                            |
| 5                                                   | 7320.00        | 56.0 PK                       | 74.0              | -18.0          | 1.30 V                   | 142                        | 47.6                   | 8.4                            |
| 6                                                   | 7320.00        | 41.5 AV                       | 54.0              | -12.5          | 1.30 V                   | 142                        | 33.1                   | 8.4                            |

**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) – Pre-Amplifier 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 39 | 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                                                   | *2480.00       | 95.8 PK                       |                   |                | 1.10 H                   | 137                        | 98.4                   | -2.6                           |
| 2                                                   | *2480.00       | 94.7 AV                       |                   |                | 1.10 H                   | 137                        | 97.3                   | -2.6                           |
| 3                                                   | 2483.50        | 57.3 PK                       | 74.0              | -16.7          | 1.10 H                   | 137                        | 59.7                   | -2.4                           |
| 4                                                   | 2483.50        | 45.2 AV                       | 54.0              | -8.8           | 1.10 H                   | 137                        | 47.6                   | -2.4                           |
| 5                                                   | 4960.00        | 46.3 PK                       | 74.0              | -27.7          | 1.07 H                   | 22                         | 44.2                   | 2.1                            |
| 6                                                   | 4960.00        | 37.9 AV                       | 54.0              | -16.1          | 1.07 H                   | 22                         | 35.8                   | 2.1                            |
| 7                                                   | 7440.00        | 53.6 PK                       | 74.0              | -20.4          | 1.06 H                   | 91                         | 44.8                   | 8.8                            |
| 8                                                   | 7440.00        | 40.1 AV                       | 54.0              | -13.9          | 1.06 H                   | 91                         | 31.3                   | 8.8                            |
| 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                                                   | *2480.00       | 105.4 PK                      |                   |                | 1.31 V                   | 296                        | 108.0                  | -2.6                           |
| 2                                                   | *2480.00       | 104.4 AV                      |                   |                | 1.31 V                   | 296                        | 107.0                  | -2.6                           |
| 3                                                   | 2483.50        | 59.1 PK                       | 74.0              | -14.9          | 1.36 V                   | 308                        | 61.5                   | -2.4                           |
| 4                                                   | 2483.50        | 48.9 AV                       | 54.0              | -5.1           | 1.36 V                   | 308                        | 51.3                   | -2.4                           |
| 5                                                   | 4960.00        | 49.4 PK                       | 74.0              | -24.6          | 1.00 V                   | 202                        | 47.3                   | 2.1                            |
| 6                                                   | 4960.00        | 40.2 AV                       | 54.0              | -13.8          | 1.00 V                   | 202                        | 38.1                   | 2.1                            |
| 7                                                   | 7440.00        | 55.5 PK                       | 74.0              | -18.5          | 1.32 V                   | 148                        | 46.7                   | 8.8                            |
| 8                                                   | 7440.00        | 41.3 AV                       | 54.0              | -12.7          | 1.32 V                   | 148                        | 32.5                   | 8.8                            |

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

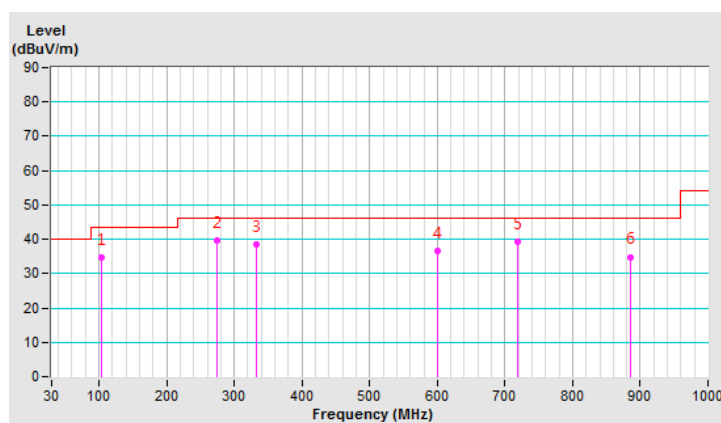
#### Below 1GHz Data:

|                        |               |                              |                 |
|------------------------|---------------|------------------------------|-----------------|
| <b>CHANNEL</b>         | TX Channel 39 | <b>DETECTOR<br/>FUNCTION</b> | Quasi-Peak (QP) |
| <b>FREQUENCY RANGE</b> | 9kHz ~ 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                                                   | 103.72         | 34.7 QP                       | 43.5              | -8.8           | 1.50 H                   | 2                          | 46.4                   | -11.7                          |
| 2                                                   | 273.95         | 39.7 QP                       | 46.0              | -6.3           | 1.00 H                   | 139                        | 47.5                   | -7.8                           |
| 3                                                   | 333.10         | 38.5 QP                       | 46.0              | -7.5           | 1.00 H                   | 128                        | 44.6                   | -6.1                           |
| 4                                                   | 600.02         | 36.4 QP                       | 46.0              | -9.6           | 1.50 H                   | 28                         | 35.6                   | 0.8                            |
| 5                                                   | 718.92         | 39.1 QP                       | 46.0              | -6.9           | 1.00 H                   | 34                         | 37.1                   | 2.0                            |
| 6                                                   | 886.17         | 34.9 QP                       | 46.0              | -11.1          | 1.50 H                   | 37                         | 29.7                   | 5.2                            |

#### REMARKS:

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

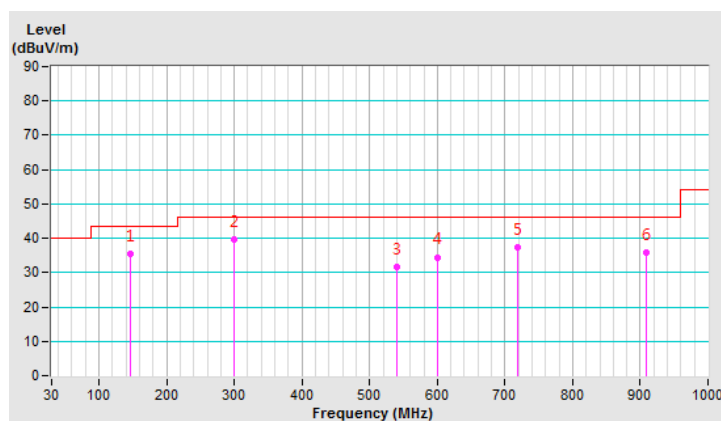


|                        |               |                          |                 |
|------------------------|---------------|--------------------------|-----------------|
| <b>CHANNEL</b>         | TX Channel 39 | <b>DETECTOR FUNCTION</b> | Quasi-Peak (QP) |
| <b>FREQUENCY RANGE</b> | 9kHz ~ 1GHz   |                          |                 |

| 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                                                 | 145.58      | 35.6 QP                 | 43.5           | -7.9        | 1.50 V             | 360                  | 43.5             | -7.9                     |
| 2                                                 | 299.51      | 39.5 QP                 | 46.0           | -6.5        | 1.00 V             | 58                   | 46.6             | -7.1                     |
| 3                                                 | 540.73      | 31.5 QP                 | 46.0           | -14.5       | 1.00 V             | 73                   | 32.5             | -1.0                     |
| 4                                                 | 600.02      | 34.5 QP                 | 46.0           | -11.5       | 1.00 V             | 202                  | 33.7             | 0.8                      |
| 5                                                 | 718.89      | 37.3 QP                 | 46.0           | -8.7        | 1.00 V             | 318                  | 35.3             | 2.0                      |
| 6                                                 | 907.92      | 35.9 QP                 | 46.0           | -10.1       | 1.50 V             | 66                   | 30.4             | 5.5                      |

#### 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) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

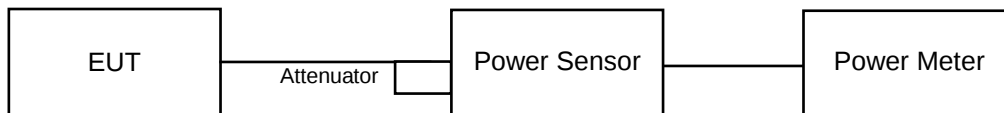


## 4.2 Conducted Output Power Measurement

### 4.2.1 Limits of Conducted Output Power Measurement

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

### 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 Procedures

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

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

### 4.2.5 Deviation from Test Standard

No deviation.

### 4.2.6 EUT Operating Conditions

Same as Item 4.3.6.

#### 4.2.7 Test Results

##### FOR PEAK POWER

| Channel | Frequency (MHz) | Peak Power (mW) | Peak Power (dBm) | Limit (dBm) | Pass/Fail |
|---------|-----------------|-----------------|------------------|-------------|-----------|
| 0       | 2402            | 3.776           | 5.77             | 30          | Pass      |
| 19      | 2440            | 5.408           | 7.33             | 30          | Pass      |
| 39      | 2480            | 7.112           | 8.52             | 30          | Pass      |

##### FOR AVERAGE POWER

| Channel | Frequency (MHz) | Average Power (mW) | Average Power (dBm) |
|---------|-----------------|--------------------|---------------------|
| 0       | 2402            | 3.475              | 5.41                |
| 19      | 2440            | 5.152              | 7.12                |
| 39      | 2480            | 6.839              | 8.35                |

## 5 Pictures of Test Arrangements

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

## Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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

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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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