

## FCC Test Report

**Report No.:** RF170908C01A-1

**FCC ID:** HD5-CT60L0N

**Test Model:** CT60L0N

**Received Date:** Oct. 30, 2017

**Test Date:** Nov. 01 to 03, 2017

**Issued Date:** Nov. 15, 2017

**Applicant:** Honeywell International Inc.

**Address:** 9680 Old Bailes Road, Fort Mill, SC 29707 USA

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

**Lab Address:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan R.O.C.

**Test Location :** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan R.O.C.



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### Release Control Record

| Issue No.      | Description       | Date Issued   |
|----------------|-------------------|---------------|
| RF170908C01A-1 | Original release. | Nov. 15, 2017 |

## 1 Certificate of Conformity

**Product:** Dolphin CT60

**Brand:** Honeywell

**Test Model:** CT60L0N

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** Honeywell International Inc.

**Test Date:** Nov. 01 to 03, 2017

**Standard:** 47 CFR FCC Part 15, Subpart E (Section 15.407)  
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 :**

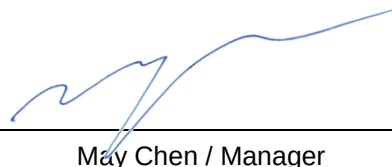


**Date:**

Nov. 15, 2017

Claire Kuan / Specialist

**Approved by :**



**Date:**

Nov. 15, 2017

May Chen / Manager

## 2 Summary of Test Results

| 47 CFR FCC Part 15, Subpart E (Section 15.407) |                                            |        |                                                                                    |
|------------------------------------------------|--------------------------------------------|--------|------------------------------------------------------------------------------------|
| FCC Clause                                     | Test Item                                  | Result | Remarks                                                                            |
| 15.407(b)<br>(1/2/3/4(i/ii)/6)                 | Radiated Emissions & Band Edge Measurement | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -12.1dB at 6906.00MHz. |
| 15.407(a)(1/2/3)                               | Max Average Transmit Power                 | Pass   | Meet the requirement of limit.                                                     |

Note: This report is supplementary report.

### 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 | 30MHz ~ 1GHz  | 5.30 dB                              |
| Radiated Emissions above 1 GHz | 1GHz ~ 6GHz   | 5.16 dB                              |
|                                | 6GHz ~ 18GHz  | 4.91 dB                              |
|                                | 18GHz ~ 40GHz | 5.30 dB                              |

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT (WLAN)

|                       |                                                                                                                                                                                        |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product               | Dolphin CT60                                                                                                                                                                           |
| Brand                 | Honeywell                                                                                                                                                                              |
| Test Model            | CT60L0N                                                                                                                                                                                |
| Status of EUT         | ENGINEERING SAMPLE                                                                                                                                                                     |
| HW Version            | V1.0                                                                                                                                                                                   |
| SW Version            | 249D                                                                                                                                                                                   |
| HW P/N                | DVT2.2                                                                                                                                                                                 |
| Power Supply Rating   | 3.6Vdc from battery<br>5Vdc from USB interface                                                                                                                                         |
| Modulation Type       | CCK, DQPSK, DBPSK for DSSS<br>64QAM, 16QAM, QPSK, BPSK for OFDM<br>256QAM for OFDM in 11ac mode only                                                                                   |
| Modulation Technology | DSSS, OFDM                                                                                                                                                                             |
| Transfer Rate         | 802.11b: up to 11Mbps<br>802.11a/g: up to 54Mbps<br>802.11n: up to 150Mbps<br>802.11ac: up to 433.3Mbps                                                                                |
| Operating Frequency   | <b>2.4GHz:</b> 2.412 ~ 2.462GHz<br><b>5GHz:</b> 5.18 ~ 5.24GHz, 5.26 ~ 5.32GHz, 5.50 ~ 5.72GHz, 5.745 ~ 5.825GHz                                                                       |
| Number of Channel     | <b>2.4GHz:</b><br>802.11b, 802.11g, 802.11n (HT20): 11<br><b>5GHz:</b><br>802.11a, 802.11n (HT20), 802.11ac (VHT20): 25<br>802.11n (HT40), 802.11ac (VHT40): 12<br>802.11ac (VHT80): 6 |
| Output Power          | <b>2.4GHz:</b> 328.095mW<br><b>5GHz:</b><br><b>5.18 ~ 5.24GHz:</b> 34.514mW<br><b>5.26 ~ 5.32GHz:</b> 35.975mW<br><b>5.50 ~ 5.72GHz:</b> 36.813mW<br><b>5.745 ~ 5.825GHz:</b> 36.983mW |
| Antenna Type          | Refer to Note                                                                                                                                                                          |
| Antenna Connector     | Refer to Note                                                                                                                                                                          |
| Accessory Device      | Battery x 1                                                                                                                                                                            |
| Data Cable Supplied   | USB snap-on adapter x 1 (1.25m, Shielded with two cores)                                                                                                                               |

Note:

1. This report is prepared for FCC Class II change. The difference compared with the Report No.: RF170908C01-1 design is as the following:

◆ The change list as below table:

| No. | Change Item                                                                                                                          | BOM Change | Layout Change |
|-----|--------------------------------------------------------------------------------------------------------------------------------------|------------|---------------|
| 1   | 1.U2101 SIM_SWIO_1 connect to SIM1 J1301<br>2.U2101 SIM_SWIO_2 connect to SIM1 J1303<br>3. SIM powers path change                    | Yes        | Yes           |
| 2   | Add a pull-up 100K resistor to VREG_L11A_1P8 at J1202 pin-34 and connect J1202 pin-35 to GPIO_56                                     | Yes        | Yes           |
| 3   | 1. Pull-down WIPWR_CHG_OK.<br>2. There is divided voltage 1.8V from VDC_IN by 180K and 100K resistors to QI_PMA_ON                   | Yes        | Yes           |
| 4   | Add more vias to mic pads to make the pads hold.                                                                                     | No         | Yes           |
| 5   | They need to be shifted base on MD's drawing.                                                                                        | No         | Yes           |
| 6   | Add more vias to the solder pads to make them hold better. (SW1401~SW1406)                                                           | No         | Yes           |
| 7   | Circuit change between J2003 and U2001                                                                                               | Yes        | Yes           |
| 8   | Remove U1901 circuit, just keep J1901,L1906(DNI),R1910(OR), E1911(DNI),EMI1901 from original for RF.                                 | Yes        | Yes           |
| 9   | 1.Remove U1801 circuit,just keep EMI1801,EMI1802,R1813,R1812,L1806,J1801,R1809,R1810,R1811 for RF.                                   | Yes        | Yes           |
| 10  | AIN1 pin needs to be pulled down                                                                                                     | No         | Yes           |
| 11  | CT50 pad size is 2.0x3.0mm but MD team suggests pad size is 1.5x3.0mm because receiver spec suggested having 0.5mm gape requirement. | No         | Yes           |
| 12  | Moving camera's test points x 7 pcs to left                                                                                          | No         | Yes           |
| 13  | Moving U1107 circuit to right for 0.5mm                                                                                              | No         | Yes           |
| 14  | Add additional vias on the battery connector pads                                                                                    | No         | Yes           |
| 15  | RF team needs to have NFC circuit changes and matching components value changes.                                                     | Yes        | Yes           |
| 16  | Open a ground pad to contact receiver's back side metal                                                                              | No         | Yes           |
| 17  | R401 needs to be changed to 33 Ohm                                                                                                   | Yes        | No            |
| 18  | Put R1219 and R1220                                                                                                                  | Yes        | No            |
| 19  | Change Tool1716 to PTH.                                                                                                              | No         | Yes           |
| 20  | Add 0.5pF to USIM2_DATA_CONN, USIM1_DATA_CONN between system GND,instead to SIM GND                                                  | Yes        | Yes           |
| 21  | Add Ferried Bead and capacitor on Vibrator driving line.                                                                             | Yes        | Yes           |
| 22  | Remove R505,C512,C513                                                                                                                | Yes        | Yes           |

2. According to above conditions, only radiated emissions (Above 1GHz test: only 11ac (VHT20) modulation test) and conducted power test item needs to be performed. And all data was verified to meet the requirements.
3. There are WLAN, Bluetooth and NFC technology used for the EUT.

4. Simultaneously transmission condition.

| Condition | Technology  |     |
|-----------|-------------|-----|
| 1         | WLAN 2.4GHz | NFC |
| 2         | WLAN 5GHz   | NFC |
| 3         | Bluetooth   | NFC |

**Note:** The emission of the simultaneous operation has been evaluated and no non-compliance was found.

5. The EUT needs to be supplied from battery, the information is as below table:

| Brand    | Model No. | Spec.                   |
|----------|-----------|-------------------------|
| Inventus | CT50-BTSC | 3.6Vdc, 4040mAh, 14.6Wh |

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

| WLAN / Bluetooth Antenna Spec. |                                      |                      |              |                |
|--------------------------------|--------------------------------------|----------------------|--------------|----------------|
| Antenna No.                    | Antenna Gain include path loss (dBi) | Frequency rang (GHz) | Antenna type | Connector type |
| 1                              | 0.62                                 | 2.4~2.4835           | PIFA         | UFL            |
|                                | 1.14                                 | 5.15~5.25            |              |                |
|                                | 1.14                                 | 5.25~5.35            |              |                |
|                                | 1.14                                 | 5.47~5.725           |              |                |
|                                | 1.14                                 | 5.725~5.85           |              |                |

| NFC Antenna Spec. |                      |              |                |
|-------------------|----------------------|--------------|----------------|
| Antenna No.       | Frequency rang (MHz) | Antenna type | Connector type |
| 1                 | 13~14                | Loop         | NA             |

Note: 1. The antenna has path loss. 2.4GHz: 1dB; 5GHz: 1.7dB

7. The EUT incorporates a SISO function.

| 2.4GHz Band      |                 |                       |     |
|------------------|-----------------|-----------------------|-----|
| MODULATION MODE  | DATA RATE (MCS) | TX & RX CONFIGURATION |     |
| 802.11b          | 1 ~ 11Mbps      | 1TX                   | 1RX |
| 802.11g          | 6 ~ 54Mbps      | 1TX                   | 1RX |
| 802.11n (HT20)   | MCS 0~7         | 1TX                   | 1RX |
| 5GHz Band        |                 |                       |     |
| MODULATION MODE  | DATA RATE (MCS) | TX & RX CONFIGURATION |     |
| 802.11a          | 6 ~ 54Mbps      | 1TX                   | 1RX |
| 802.11n (HT20)   | MCS 0~7         | 1TX                   | 1RX |
| 802.11n (HT40)   | MCS 0~7         | 1TX                   | 1RX |
| 802.11ac (VHT20) | MCS0~8 Nss=1    | 1TX                   | 1RX |
| 802.11ac (VHT40) | MCS0~9 Nss=1    | 1TX                   | 1RX |
| 802.11ac (VHT80) | MCS0~9 Nss=1    | 1TX                   | 1RX |

8. In the original test report, for the radiated emissions, the EUT was pre-tested under the following modes:

| Test Mode | Description        |
|-----------|--------------------|
| Mode A    | Power from laptop  |
| Mode B    | Power from adapter |

From the above modes, the worst case was found in **Mode A**. Therefore only the test data of the mode was recorded in this report.

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



## 3.2 Description of Test Modes

### FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

| Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|
| 36      | 5180 MHz  | 44      | 5220 MHz  |
| 40      | 5200 MHz  | 48      | 5240 MHz  |

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

| Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|
| 38      | 5190 MHz  | 46      | 5230 MHz  |

1 channel is provided for 802.11ac (VHT80):

| Channel | Frequency |
|---------|-----------|
| 42      | 5210 MHz  |

### FOR 5260 ~ 5320MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

| Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|
| 52      | 5260 MHz  | 60      | 5300 MHz  |
| 56      | 5280 MHz  | 64      | 5320 MHz  |

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

| Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|
| 54      | 5270 MHz  | 62      | 5310 MHz  |

1 channel is provided for 802.11ac (VHT80):

| Channel | Frequency |
|---------|-----------|
| 58      | 5290 MHz  |

### FOR 5500 ~ 5720MHz

12 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

| Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|
| 100     | 5500 MHz  | 124     | 5620 MHz  |
| 104     | 5520 MHz  | 128     | 5640 MHz  |
| 108     | 5540 MHz  | 132     | 5660 MHz  |
| 112     | 5560 MHz  | 136     | 5680 MHz  |
| 116     | 5580 MHz  | 140     | 5700 MHz  |
| 120     | 5600 MHz  | 144     | 5720 MHz  |

6 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

| Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|
| 102     | 5510 MHz  | 126     | 5630 MHz  |
| 110     | 5550 MHz  | 134     | 5670 MHz  |
| 118     | 5590 MHz  | 142     | 5710 MHz  |

3 channels are provided for 802.11ac (VHT80):

| Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|
| 106     | 5530MHz   | 138     | 5690MHz   |
| 122     | 5610 MHz  |         |           |

### FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

| Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|
| 149     | 5745 MHz  | 161     | 5805 MHz  |
| 153     | 5765 MHz  | 165     | 5825 MHz  |
| 157     | 5785 MHz  |         |           |

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

| Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|
| 151     | 5755 MHz  | 159     | 5795 MHz  |

1 channel is provided for 802.11ac (VHT80):

| Channel | Frequency |
|---------|-----------|
| 155     | 5775 MHz  |

### 3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT Configure Mode | Applicable To |       |      | Description       |
|--------------------|---------------|-------|------|-------------------|
|                    | RE $\geq$ 1G  | RE<1G | APCM |                   |
| -                  | √             | √     | √    | Power from Laptop |

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz

**APCM**: Antenna Port Conducted Measurement

**NOTE**: In the original test report, the EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane (below 1GHz) & X-plane (Above 1GHz)**.

#### **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.

| Mode             | FREQ. Band (MHz) | Available Channel | Tested Channel     | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|------------------|------------------|-------------------|--------------------|-----------------------|-----------------|------------------|
| 802.11ac (VHT20) | 5180-5240        | 36 to 48          | 36, 40, 48         | OFDM                  | BPSK            | 6.5              |
|                  | 5260-5320        | 52 to 64          | 52, 60, 64         |                       |                 |                  |
|                  | 5500-5720        | 100 to 144        | 100, 116, 140, 144 |                       |                 |                  |
|                  | 5745-5825        | 149 to 165        | 149, 157, 165      |                       |                 |                  |

#### **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.

| Mode             | FREQ. Band (MHz) | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|------------------|------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| 802.11ac (VHT20) | 5180-5240        | 36 to 48          | 36             | OFDM                  | BPSK            | 6.5              |
|                  | 5745-5825        | 52 to 64          |                |                       |                 |                  |
|                  | 5500-5720        | 100 to 144        |                |                       |                 |                  |
|                  | 5745-5825        | 149 to 165        |                |                       |                 |                  |

### 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.

| Mode             | FREQ. Band (MHz) | Available Channel | Tested Channel     | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|------------------|------------------|-------------------|--------------------|-----------------------|-----------------|------------------|
| 802.11a          | 5180-5240        | 36 to 48          | 36, 40, 48         | OFDM                  | BPSK            | 6                |
| 802.11ac (VHT20) |                  | 36 to 48          | 36, 40, 48         | OFDM                  | BPSK            | 6.5              |
| 802.11ac (VHT40) |                  | 38 to 46          | 38, 46             | OFDM                  | BPSK            | 13.5             |
| 802.11ac (VHT80) |                  | 42                | 42                 | OFDM                  | BPSK            | 29.3             |
| 802.11a          | 5260-5320        | 52 to 64          | 52, 60, 64         | OFDM                  | BPSK            | 6                |
| 802.11ac (VHT20) |                  | 52 to 64          | 52, 60, 64         | OFDM                  | BPSK            | 6.5              |
| 802.11ac (VHT40) |                  | 54 to 62          | 54, 62             | OFDM                  | BPSK            | 13.5             |
| 802.11ac (VHT80) |                  | 58                | 58                 | OFDM                  | BPSK            | 29.3             |
| 802.11a          | 5500-5720        | 100 to 144        | 100, 116, 140, 144 | OFDM                  | BPSK            | 6                |
| 802.11ac (VHT20) |                  | 100 to 144        | 100, 116, 140, 144 | OFDM                  | BPSK            | 6.5              |
| 802.11ac (VHT40) |                  | 102 to 142        | 102, 110, 134, 142 | OFDM                  | BPSK            | 13.5             |
| 802.11ac (VHT80) |                  | 106 to 138        | 106, 122, 138      | OFDM                  | BPSK            | 29.3             |
| 802.11a          | 5745-5825        | 149 to 165        | 149, 157, 165      | OFDM                  | BPSK            | 6                |
| 802.11ac (VHT20) |                  | 149 to 165        | 149, 157, 165      | OFDM                  | BPSK            | 6.5              |
| 802.11ac (VHT40) |                  | 151 to 159        | 151, 159           | OFDM                  | BPSK            | 13.5             |
| 802.11ac (VHT80) |                  | 155               | 155                | OFDM                  | BPSK            | 29.3             |

### Test Condition:

| Applicable To | ENVIRONMENTAL CONDITIONS | INPUT POWER (System) | TESTED BY     |
|---------------|--------------------------|----------------------|---------------|
| RE≥1G         | 23deg. C, 71%RH          | 120Vac, 60Hz         | Weiwei Lo     |
| RE<1G         | 22deg. C, 63%RH          | 120Vac, 60Hz         | Rey Chen      |
| APCM          | 25deg. C, 60%RH          | 120Vac, 60Hz         | Anderson Chen |

### 3.3 Duty Cycle of Test Signal

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

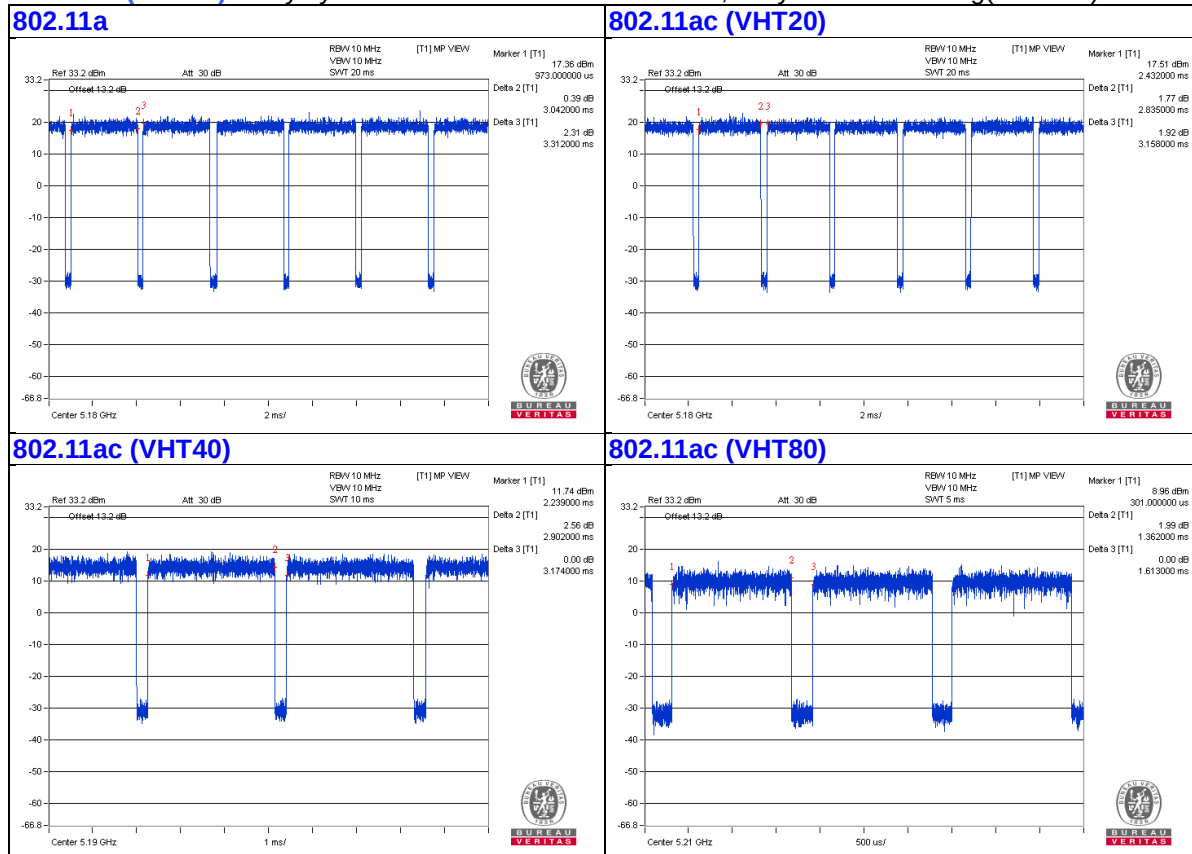
If duty cycle of test signal is  $< 98\%$ , duty factor shall be considered.

**802.11a:** Duty cycle =  $3.042 \text{ ms} / 3.312 \text{ ms} = 0.918$ , Duty factor =  $10 * \log(1/0.918) = 0.37$

**802.11ac (VHT20):** Duty cycle =  $2.835 \text{ ms} / 3.158 \text{ ms} = 0.898$ , Duty factor =  $10 * \log(1/0.898) = 0.47$

**802.11ac (VHT40):** Duty cycle =  $2.902 \text{ ms} / 3.174 \text{ ms} = 0.914$ , Duty factor =  $10 * \log(1/0.914) = 0.39$

**802.11ac (VHT80):** Duty cycle =  $1.362 \text{ ms} / 1.613 \text{ ms} = 0.844$ , Duty factor =  $10 * \log(1/0.844) = 0.73$



### 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 14-ab023TU | 5CD5340WXZ | FCC DoC | Provided by Lab |
| B. | Micro SD Card | Transcend | 16GB                | NA         | NA      | Provided by Lab |

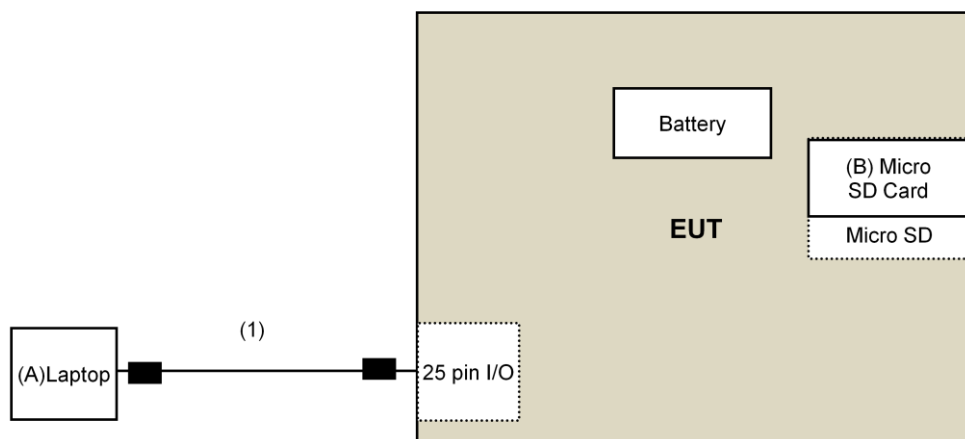
Note:

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. | USB Charging Cable | 1    | 1.25       | Yes                | 2            | Supplied by client(for RF Setup) |

Note: The core(s) is(are) originally attached to the cable(s).

#### 3.4.1 Configuration of System under Test



### 3.5 General Description of Applied Standard

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 E (15.407)**

**KDB 789033 D02 General UNII Test Procedure New Rules v01r04**

**ANSI C63.10-2013**

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

**NOTE:** The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

## 4 Test Types and Results

### 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.

| 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:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 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.

Limits of unwanted emission out of the restricted bands

| Applicable To                                                                                    |                                                     | Limit                                                                                                                               |                                                                                                                                         |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 789033 D02 General UNII Test Procedure<br>New Rules v01r04                                       |                                                     | Field Strength at 3m                                                                                                                |                                                                                                                                         |
|                                                                                                  |                                                     | PK:74 (dBuV/m)                                                                                                                      | AV:54 (dBuV/m)                                                                                                                          |
| Frequency Band                                                                                   | Applicable To                                       | EIRP Limit                                                                                                                          | Equivalent Field Strength at 3m                                                                                                         |
| 5150~5250 MHz                                                                                    | 15.407(b)(1)                                        | PK:-27 (dBm/MHz)                                                                                                                    | PK:68.2(dBuV/m)                                                                                                                         |
| 5250~5350 MHz                                                                                    | 15.407(b)(2)                                        |                                                                                                                                     |                                                                                                                                         |
| 5470~5725 MHz                                                                                    | 15.407(b)(3)                                        |                                                                                                                                     |                                                                                                                                         |
| 5725~5850 MHz                                                                                    | <input checked="" type="checkbox"/> 15.407(b)(4)(i) | PK:-27 (dBm/MHz) <sup>*1</sup><br>PK:10 (dBm/MHz) <sup>*2</sup><br>PK:15.6 (dBm/MHz) <sup>*3</sup><br>PK:27 (dBm/MHz) <sup>*4</sup> | PK: 68.2(dBuV/m) <sup>*1</sup><br>PK:105.2 (dBuV/m) <sup>*2</sup><br>PK: 110.8(dBuV/m) <sup>*3</sup><br>PK:122.2 (dBuV/m) <sup>*4</sup> |
|                                                                                                  | <input type="checkbox"/> 15.407(b)(4)(ii)           | Emission limits in section 15.247(d)                                                                                                |                                                                                                                                         |
| <sup>*1</sup> beyond 75 MHz or more above of the band edge.                                      |                                                     | <sup>*2</sup> below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.                                                |                                                                                                                                         |
| <sup>*3</sup> below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above. |                                                     | <sup>*4</sup> from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.                |                                                                                                                                         |

#### Note:

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$



#### 4.1.2 Test Instruments

| DESCRIPTION & MANUFACTURER                     | MODEL NO.                                                   | SERIAL NO.                    | CALIBRATED DATE                                 | CALIBRATED UNTIL                                |
|------------------------------------------------|-------------------------------------------------------------|-------------------------------|-------------------------------------------------|-------------------------------------------------|
| Test Receiver<br>Keysight                      | N9038A                                                      | MY54450088                    | July 08, 2017                                   | July 07, 2018                                   |
| Pre-Amplifier <sup>(*)</sup><br>EMCI           | EMC001340                                                   | 980142                        | Jan. 20, 2016                                   | Jan. 19, 2018                                   |
| Loop Antenna <sup>(*)</sup><br>Electro-Metrics | EM-6879                                                     | 264                           | Dec. 16, 2016                                   | Dec. 15, 2018                                   |
| RF Cable                                       | NA                                                          | LOOPCAB-001<br>LOOPCAB-002    | Jan. 17, 2017                                   | Jan. 16, 2018                                   |
| Pre-Amplifier<br>Mini-Circuits                 | ZFL-1000VH2B                                                | AMP-ZFL-01                    | Nov. 10, 2016                                   | Nov. 09, 2017                                   |
| Trilog Broadband Antenna<br>SCHWARZBECK        | VULB 9168                                                   | 9168-406                      | Dec. 13, 2016                                   | Dec. 12, 2017                                   |
| RF Cable                                       | 8D                                                          | 966-4-1<br>966-4-2<br>966-4-3 | Apr. 01, 2017                                   | Mar. 31, 2018                                   |
| Fixed attenuator<br>Mini-Circuits              | UNAT-5+                                                     | PAD-3m-4-01                   | Oct. 03, 2017                                   | Oct. 02, 2018                                   |
| Horn_Antenna<br>SCHWARZBECK                    | BBHA 9120D                                                  | 9120D-783                     | Dec. 27, 2016                                   | Dec. 26, 2017                                   |
| Pre-Amplifier<br>EMCI                          | EMC12630SE                                                  | 980385                        | Feb. 02, 2017                                   | Feb. 01, 2018                                   |
| RF Cable                                       | EMC104-SM-SM-1200<br>EMC104-SM-SM-2000<br>EMC104-SM-SM-5000 | 160923<br>150318<br>150321    | Feb. 02, 2017<br>Mar. 29, 2017<br>Mar. 29, 2017 | Feb. 01, 2018<br>Mar. 28, 2018<br>Mar. 28, 2018 |
| Pre-Amplifier<br>EMCI                          | EMC184045SE                                                 | 980387                        | Feb. 02, 2017                                   | Feb. 01, 2018                                   |
| Horn_Antenna<br>SCHWARZBECK                    | BBHA 9170                                                   | BBHA9170608                   | Dec. 15, 2016                                   | Dec. 14, 2017                                   |
| RF Cable                                       | SUCOFLEX 102                                                | 36432/2<br>36433/2            | Jan. 15, 2017                                   | Jan. 14, 2018                                   |
| Software                                       | ADT_Radiated_V8.7.08                                        | NA                            | NA                                              | NA                                              |
| Antenna Tower & Turn Table<br>Max-Full         | MF-7802                                                     | MF780208410                   | NA                                              | NA                                              |
| Boresight Antenna Fixture                      | FBA-01                                                      | FBA-SIP02                     | NA                                              | NA                                              |
| Spectrum Analyzer<br>Agilent                   | E4446A                                                      | MY48250253                    | Dec. 21, 2016                                   | Dec. 20, 2017                                   |
| Power meter<br>Anritsu                         | ML2495A                                                     | 1014008                       | May 11, 2017                                    | May 10, 2018                                    |
| Power sensor<br>Anritsu                        | MA2411B                                                     | 0917122                       | May 11, 2017                                    | May 10, 2018                                    |

#### 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 FCC Designation Number is TW2022.
5. The CANADA Site Registration No. is 20331-2
6. Tested Date: Nov. 01 to 03, 2017

#### 4.1.3 Test Procedure

##### **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. Both X and Y axes 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 detect 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:**

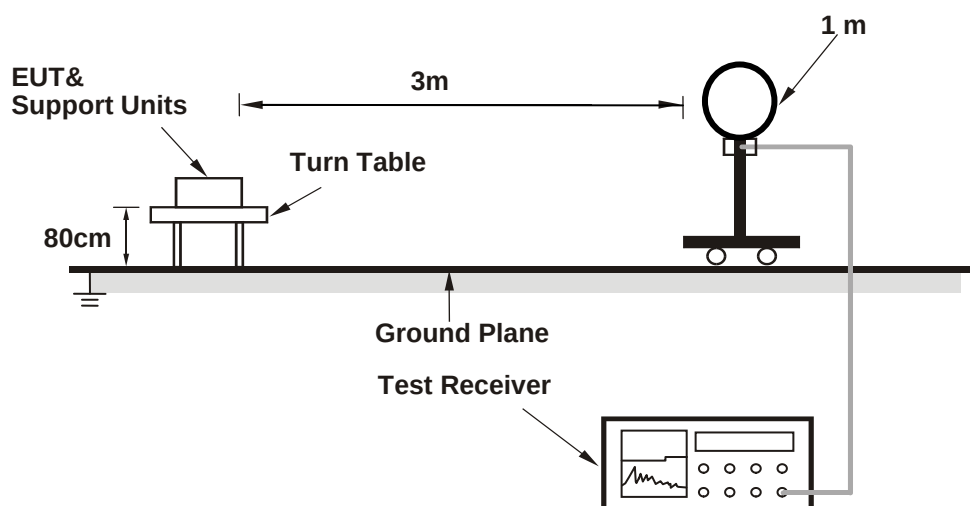
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

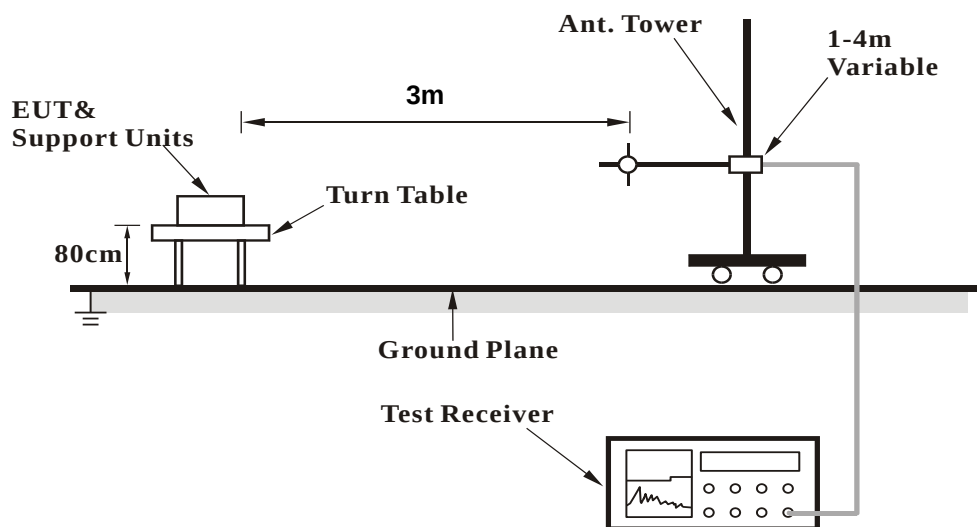
No deviation.

#### 4.1.5 Test Setup

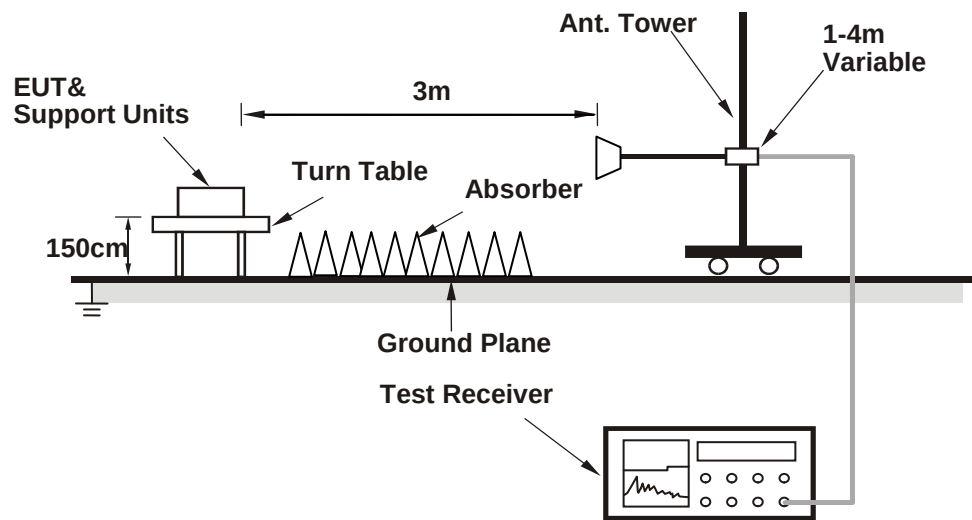
##### For Radiated emission below 30MHz



##### 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 Condition

- Connected the EUT with the Laptop.
- Controlling software (QRCT\_Version3.0.268.0) has been activated to set the EUT on specific status.

#### 4.1.7 Test Results

##### Above 1GHz Data:

##### 802.11ac (VHT20)

|                 |               |                      |              |
|-----------------|---------------|----------------------|--------------|
| CHANNEL         | TX Channel 36 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 40GHz  |                      | 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                                                   | 5150.00        | 53.7 PK                       | 74.0              | -20.3          | 1.14 H                   | 77                         | 49.7                   | 4.0                            |
| 2                                                   | 5150.00        | 39.6 AV                       | 54.0              | -14.4          | 1.14 H                   | 77                         | 35.6                   | 4.0                            |
| 3                                                   | *5180.00       | 102.2 PK                      |                   |                | 1.14 H                   | 77                         | 98.2                   | 4.0                            |
| 4                                                   | *5180.00       | 93.1 AV                       |                   |                | 1.14 H                   | 77                         | 89.1                   | 4.0                            |
| 5                                                   | #6906.00       | 51.3 PK                       | 74.0              | -22.7          | 1.61 H                   | 360                        | 42.7                   | 8.6                            |
| 6                                                   | #6906.00       | 41.9 AV                       | 54.0              | -12.1          | 1.61 H                   | 360                        | 33.3                   | 8.6                            |
| 7                                                   | #10360.00      | 46.5 PK                       | 74.0              | -27.5          | 1.53 H                   | 124                        | 32.9                   | 13.6                           |
| 8                                                   | #10360.00      | 34.1 AV                       | 54.0              | -19.9          | 1.53 H                   | 124                        | 20.5                   | 13.6                           |
| 9                                                   | 15540.00       | 46.9 PK                       | 74.0              | -27.1          | 1.48 H                   | 189                        | 33.7                   | 13.2                           |
| 10                                                  | 15540.00       | 34.4 AV                       | 54.0              | -19.6          | 1.48 H                   | 189                        | 21.2                   | 13.2                           |
| 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                                                   | 5150.00        | 47.3 PK                       | 74.0              | -26.7          | 1.48 V                   | 360                        | 43.3                   | 4.0                            |
| 2                                                   | 5150.00        | 36.2 AV                       | 54.0              | -17.8          | 1.48 V                   | 360                        | 32.2                   | 4.0                            |
| 3                                                   | *5180.00       | 97.8 PK                       |                   |                | 1.48 V                   | 360                        | 93.8                   | 4.0                            |
| 4                                                   | *5180.00       | 87.2 AV                       |                   |                | 1.48 V                   | 360                        | 83.2                   | 4.0                            |
| 5                                                   | #6906.00       | 51.9 PK                       | 74.0              | -22.1          | 1.16 V                   | 90                         | 43.3                   | 8.6                            |
| 6                                                   | #6906.00       | 41.5 AV                       | 54.0              | -12.5          | 1.16 V                   | 90                         | 32.9                   | 8.6                            |
| 7                                                   | #10360.00      | 46.1 PK                       | 74.0              | -27.9          | 1.53 V                   | 111                        | 32.5                   | 13.6                           |
| 8                                                   | #10360.00      | 33.6 AV                       | 54.0              | -20.4          | 1.53 V                   | 111                        | 20.0                   | 13.6                           |
| 9                                                   | 15540.00       | 46.9 PK                       | 74.0              | -27.1          | 1.49 V                   | 74                         | 33.7                   | 13.2                           |
| 10                                                  | 15540.00       | 34.1 AV                       | 54.0              | -19.9          | 1.49 V                   | 74                         | 20.9                   | 13.2                           |

#### 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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

|                        |               |                              |              |
|------------------------|---------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 40 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 40GHz  |                              | 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                                                   | 5150.00        | 48.8 PK                       | 74.0              | -25.2          | 1.11 H                   | 68                         | 44.8                   | 4.0                            |
| 2                                                   | 5150.00        | 38.2 AV                       | 54.0              | -15.8          | 1.11 H                   | 68                         | 34.2                   | 4.0                            |
| 3                                                   | *5200.00       | 102.7 PK                      |                   |                | 1.11 H                   | 68                         | 98.7                   | 4.0                            |
| 4                                                   | *5200.00       | 93.2 AV                       |                   |                | 1.11 H                   | 68                         | 89.2                   | 4.0                            |
| 5                                                   | 5350.00        | 49.2 PK                       | 74.0              | -24.8          | 1.11 H                   | 68                         | 44.8                   | 4.4                            |
| 6                                                   | 5350.00        | 35.8 AV                       | 54.0              | -18.2          | 1.11 H                   | 68                         | 31.4                   | 4.4                            |
| 7                                                   | #10400.00      | 47.0 PK                       | 74.0              | -27.0          | 1.62 H                   | 101                        | 33.4                   | 13.6                           |
| 8                                                   | #10400.00      | 34.4 AV                       | 54.0              | -19.6          | 1.62 H                   | 101                        | 20.8                   | 13.6                           |
| 9                                                   | 15600.00       | 47.6 PK                       | 74.0              | -26.4          | 1.52 H                   | 178                        | 34.2                   | 13.4                           |
| 10                                                  | 15600.00       | 35.1 AV                       | 54.0              | -18.9          | 1.52 H                   | 178                        | 21.7                   | 13.4                           |

| 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                                                 | 5150.00        | 47.4 PK                       | 74.0              | -26.6          | 1.51 V                   | 360                        | 43.4                   | 4.0                            |
| 2                                                 | 5150.00        | 36.4 AV                       | 54.0              | -17.6          | 1.51 V                   | 360                        | 32.4                   | 4.0                            |
| 3                                                 | *5200.00       | 98.1 PK                       |                   |                | 1.51 V                   | 360                        | 94.1                   | 4.0                            |
| 4                                                 | *5200.00       | 87.3 AV                       |                   |                | 1.51 V                   | 360                        | 83.3                   | 4.0                            |
| 5                                                 | 5350.00        | 44.5 PK                       | 74.0              | -29.5          | 1.51 V                   | 360                        | 40.1                   | 4.4                            |
| 6                                                 | 5350.00        | 34.6 AV                       | 54.0              | -19.4          | 1.51 V                   | 360                        | 30.2                   | 4.4                            |
| 7                                                 | #10400.00      | 46.2 PK                       | 74.0              | -27.8          | 1.55 V                   | 130                        | 32.6                   | 13.6                           |
| 8                                                 | #10400.00      | 33.9 AV                       | 54.0              | -20.1          | 1.55 V                   | 130                        | 20.3                   | 13.6                           |
| 9                                                 | 15600.00       | 47.4 PK                       | 74.0              | -26.6          | 1.47 V                   | 77                         | 34.0                   | 13.4                           |
| 10                                                | 15600.00       | 34.5 AV                       | 54.0              | -19.5          | 1.47 V                   | 77                         | 21.1                   | 13.4                           |

#### 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.
6. " # ": The radiated frequency is out of the restricted band.

|                        |               |                              |              |
|------------------------|---------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 48 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 40GHz  |                              | 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                                                   | *5240.00       | 102.5 PK                      |                   |                | 1.11 H                   | 64                         | 98.3                   | 4.2                            |
| 2                                                   | *5240.00       | 93.3 AV                       |                   |                | 1.11 H                   | 64                         | 89.1                   | 4.2                            |
| 3                                                   | 5350.00        | 48.9 PK                       | 74.0              | -25.1          | 1.11 H                   | 64                         | 44.5                   | 4.4                            |
| 4                                                   | 5350.00        | 37.2 AV                       | 54.0              | -16.8          | 1.11 H                   | 64                         | 32.8                   | 4.4                            |
| 5                                                   | #10480.00      | 46.2 PK                       | 74.0              | -27.8          | 1.59 H                   | 99                         | 32.5                   | 13.7                           |
| 6                                                   | #10480.00      | 33.7 AV                       | 54.0              | -20.3          | 1.59 H                   | 99                         | 20.0                   | 13.7                           |
| 7                                                   | 15720.00       | 47.3 PK                       | 74.0              | -26.7          | 1.48 H                   | 189                        | 33.3                   | 14.0                           |
| 8                                                   | 15720.00       | 34.9 AV                       | 54.0              | -19.1          | 1.48 H                   | 189                        | 20.9                   | 14.0                           |
| 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                                                   | *5240.00       | 98.0 PK                       |                   |                | 1.51 V                   | 360                        | 93.8                   | 4.2                            |
| 2                                                   | *5240.00       | 87.2 AV                       |                   |                | 1.51 V                   | 360                        | 83.0                   | 4.2                            |
| 3                                                   | 5350.00        | 47.3 PK                       | 74.0              | -26.7          | 1.51 V                   | 360                        | 42.9                   | 4.4                            |
| 4                                                   | 5350.00        | 36.4 AV                       | 54.0              | -17.6          | 1.51 V                   | 360                        | 32.0                   | 4.4                            |
| 5                                                   | #10480.00      | 46.2 PK                       | 74.0              | -27.8          | 1.52 V                   | 135                        | 32.5                   | 13.7                           |
| 6                                                   | #10480.00      | 33.7 AV                       | 54.0              | -20.3          | 1.52 V                   | 135                        | 20.0                   | 13.7                           |
| 7                                                   | 15720.00       | 47.4 PK                       | 74.0              | -26.6          | 1.52 V                   | 72                         | 33.4                   | 14.0                           |
| 8                                                   | 15720.00       | 34.4 AV                       | 54.0              | -19.6          | 1.52 V                   | 72                         | 20.4                   | 14.0                           |

**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.
6. " # ": The radiated frequency is out of the restricted band.

|                        |               |                              |              |
|------------------------|---------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 52 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 40GHz  |                              | 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                                                   | 5150.00        | 47.4 PK                       | 74.0              | -26.6          | 1.10 H                   | 65                         | 43.4                   | 4.0                            |
| 2                                                   | 5150.00        | 36.2 AV                       | 54.0              | -17.8          | 1.10 H                   | 65                         | 32.2                   | 4.0                            |
| 3                                                   | *5260.00       | 103.2 PK                      |                   |                | 1.10 H                   | 65                         | 99.0                   | 4.2                            |
| 4                                                   | *5260.00       | 93.6 AV                       |                   |                | 1.10 H                   | 65                         | 89.4                   | 4.2                            |
| 5                                                   | #10520.00      | 46.6 PK                       | 74.0              | -27.4          | 1.52 H                   | 120                        | 32.8                   | 13.8                           |
| 6                                                   | #10520.00      | 34.5 AV                       | 54.0              | -19.5          | 1.52 H                   | 120                        | 20.7                   | 13.8                           |
| 7                                                   | 15780.00       | 47.3 PK                       | 74.0              | -26.7          | 1.53 H                   | 183                        | 33.2                   | 14.1                           |
| 8                                                   | 15780.00       | 34.8 AV                       | 54.0              | -19.2          | 1.53 H                   | 183                        | 20.7                   | 14.1                           |
| 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                                                   | 5150.00        | 44.3 PK                       | 74.0              | -29.7          | 1.45 V                   | 360                        | 40.3                   | 4.0                            |
| 2                                                   | 5150.00        | 35.6 AV                       | 54.0              | -18.4          | 1.45 V                   | 360                        | 31.6                   | 4.0                            |
| 3                                                   | *5260.00       | 99.3 PK                       |                   |                | 1.45 V                   | 360                        | 95.1                   | 4.2                            |
| 4                                                   | *5260.00       | 88.3 AV                       |                   |                | 1.45 V                   | 360                        | 84.1                   | 4.2                            |
| 5                                                   | #10520.00      | 47.4 PK                       | 74.0              | -26.6          | 1.50 V                   | 115                        | 33.6                   | 13.8                           |
| 6                                                   | #10520.00      | 34.6 AV                       | 54.0              | -19.4          | 1.50 V                   | 115                        | 20.8                   | 13.8                           |
| 7                                                   | 15780.00       | 46.6 PK                       | 74.0              | -27.4          | 1.50 V                   | 85                         | 32.5                   | 14.1                           |
| 8                                                   | 15780.00       | 34.0 AV                       | 54.0              | -20.0          | 1.50 V                   | 85                         | 19.9                   | 14.1                           |

**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) – 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.
6. " # ": The radiated frequency is out of the restricted band.



|                        |               |                              |              |
|------------------------|---------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 60 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 40GHz  |                              | 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                                                   | *5300.00       | 104.2 PK                      |                   |                | 1.09 H                   | 63                         | 99.9                   | 4.3                            |
| 2                                                   | *5300.00       | 94.7 AV                       |                   |                | 1.09 H                   | 63                         | 90.4                   | 4.3                            |
| 3                                                   | 10600.00       | 47.1 PK                       | 74.0              | -26.9          | 1.47 H                   | 97                         | 33.3                   | 13.8                           |
| 4                                                   | 10600.00       | 34.6 AV                       | 54.0              | -19.4          | 1.47 H                   | 97                         | 20.8                   | 13.8                           |
| 5                                                   | 15900.00       | 47.0 PK                       | 74.0              | -27.0          | 1.57 H                   | 170                        | 33.8                   | 13.2                           |
| 6                                                   | 15900.00       | 34.2 AV                       | 54.0              | -19.8          | 1.57 H                   | 170                        | 21.0                   | 13.2                           |
| 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                                                   | *5300.00       | 99.8 PK                       |                   |                | 1.53 V                   | 360                        | 95.5                   | 4.3                            |
| 2                                                   | *5300.00       | 88.7 AV                       |                   |                | 1.53 V                   | 360                        | 84.4                   | 4.3                            |
| 3                                                   | 10600.00       | 46.6 PK                       | 74.0              | -27.4          | 1.49 V                   | 120                        | 32.8                   | 13.8                           |
| 4                                                   | 10600.00       | 34.3 AV                       | 54.0              | -19.7          | 1.49 V                   | 120                        | 20.5                   | 13.8                           |
| 5                                                   | 15900.00       | 47.6 PK                       | 74.0              | -26.4          | 1.45 V                   | 65                         | 34.4                   | 13.2                           |
| 6                                                   | 15900.00       | 34.9 AV                       | 54.0              | -19.1          | 1.45 V                   | 65                         | 21.7                   | 13.2                           |

**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. 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 64 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 40GHz  |                              | 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                                                   | *5320.00       | 103.9 PK                      |                   |                | 1.11 H                   | 62                         | 99.6                   | 4.3                            |
| 2                                                   | *5320.00       | 94.2 AV                       |                   |                | 1.11 H                   | 62                         | 89.9                   | 4.3                            |
| 3                                                   | 5350.00        | 58.3 PK                       | 74.0              | -15.7          | 1.11 H                   | 62                         | 53.9                   | 4.4                            |
| 4                                                   | 5350.00        | 40.9 AV                       | 54.0              | -13.1          | 1.11 H                   | 62                         | 36.5                   | 4.4                            |
| 5                                                   | 10640.00       | 46.5 PK                       | 74.0              | -27.5          | 1.44 H                   | 113                        | 32.5                   | 14.0                           |
| 6                                                   | 10640.00       | 34.3 AV                       | 54.0              | -19.7          | 1.44 H                   | 113                        | 20.3                   | 14.0                           |
| 7                                                   | 15960.00       | 47.7 PK                       | 74.0              | -26.3          | 1.50 H                   | 181                        | 34.2                   | 13.5                           |
| 8                                                   | 15960.00       | 34.9 AV                       | 54.0              | -19.1          | 1.50 H                   | 181                        | 21.4                   | 13.5                           |
| 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                                                   | *5320.00       | 99.2 PK                       |                   |                | 1.48 V                   | 360                        | 94.9                   | 4.3                            |
| 2                                                   | *5320.00       | 88.1 AV                       |                   |                | 1.48 V                   | 360                        | 83.8                   | 4.3                            |
| 3                                                   | 5350.00        | 57.6 PK                       | 74.0              | -16.4          | 1.48 V                   | 360                        | 53.2                   | 4.4                            |
| 4                                                   | 5350.00        | 40.2 AV                       | 54.0              | -13.8          | 1.48 V                   | 360                        | 35.8                   | 4.4                            |
| 5                                                   | 10640.00       | 47.1 PK                       | 74.0              | -26.9          | 1.44 V                   | 130                        | 33.1                   | 14.0                           |
| 6                                                   | 10640.00       | 34.5 AV                       | 54.0              | -19.5          | 1.44 V                   | 130                        | 20.5                   | 14.0                           |
| 7                                                   | 15960.00       | 47.3 PK                       | 74.0              | -26.7          | 1.50 V                   | 87                         | 33.8                   | 13.5                           |
| 8                                                   | 15960.00       | 34.7 AV                       | 54.0              | -19.3          | 1.50 V                   | 87                         | 21.2                   | 13.5                           |

#### 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. 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 100 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 40GHz   |                              | 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                                                   | #5470.00       | 56.9 PK                       | 74.0              | -17.1          | 1.22 H                   | 58                         | 52.4                   | 4.5                            |
| 2                                                   | #5470.00       | 39.3 AV                       | 54.0              | -14.7          | 1.22 H                   | 58                         | 34.8                   | 4.5                            |
| 3                                                   | *5500.00       | 101.6 PK                      |                   |                | 1.22 H                   | 58                         | 97.1                   | 4.5                            |
| 4                                                   | *5500.00       | 91.8 AV                       |                   |                | 1.22 H                   | 58                         | 87.3                   | 4.5                            |
| 5                                                   | 11000.00       | 46.4 PK                       | 74.0              | -27.6          | 1.47 H                   | 118                        | 31.6                   | 14.8                           |
| 6                                                   | 11000.00       | 33.8 AV                       | 54.0              | -20.2          | 1.47 H                   | 118                        | 19.0                   | 14.8                           |
| 7                                                   | #16500.00      | 47.2 PK                       | 74.0              | -26.8          | 1.54 H                   | 185                        | 31.6                   | 15.6                           |
| 8                                                   | #16500.00      | 35.1 AV                       | 54.0              | -18.9          | 1.54 H                   | 185                        | 19.5                   | 15.6                           |
| 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                                                   | #5470.00       | 47.1 PK                       | 74.0              | -26.9          | 1.50 V                   | 360                        | 42.6                   | 4.5                            |
| 2                                                   | #5470.00       | 36.0 AV                       | 54.0              | -18.0          | 1.50 V                   | 360                        | 31.5                   | 4.5                            |
| 3                                                   | *5500.00       | 99.0 PK                       |                   |                | 1.50 V                   | 360                        | 94.5                   | 4.5                            |
| 4                                                   | *5500.00       | 88.2 AV                       |                   |                | 1.50 V                   | 360                        | 83.7                   | 4.5                            |
| 5                                                   | 11000.00       | 46.4 PK                       | 74.0              | -27.6          | 1.58 V                   | 95                         | 31.6                   | 14.8                           |
| 6                                                   | 11000.00       | 33.9 AV                       | 54.0              | -20.1          | 1.58 V                   | 95                         | 19.1                   | 14.8                           |
| 7                                                   | #16500.00      | 46.7 PK                       | 74.0              | -27.3          | 1.43 V                   | 91                         | 31.1                   | 15.6                           |
| 8                                                   | #16500.00      | 34.5 AV                       | 54.0              | -19.5          | 1.43 V                   | 91                         | 18.9                   | 15.6                           |

**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.
6. " # ": The radiated frequency is out of the restricted band.

|                        |                |                              |              |
|------------------------|----------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 116 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 40GHz   |                              | 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                                                   | *5580.00       | 100.0 PK                      |                   |                | 1.20 H                   | 57                         | 95.4                   | 4.6                            |
| 2                                                   | *5580.00       | 90.3 AV                       |                   |                | 1.20 H                   | 57                         | 85.7                   | 4.6                            |
| 3                                                   | 11160.00       | 46.0 PK                       | 74.0              | -28.0          | 1.47 H                   | 111                        | 31.6                   | 14.4                           |
| 4                                                   | 11160.00       | 33.6 AV                       | 54.0              | -20.4          | 1.47 H                   | 111                        | 19.2                   | 14.4                           |
| 5                                                   | #16740.00      | 46.7 PK                       | 74.0              | -27.3          | 1.44 H                   | 195                        | 30.2                   | 16.5                           |
| 6                                                   | #16740.00      | 34.2 AV                       | 54.0              | -19.8          | 1.44 H                   | 195                        | 17.7                   | 16.5                           |
| 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                                                   | *5580.00       | 98.6 PK                       |                   |                | 1.48 V                   | 360                        | 94.0                   | 4.6                            |
| 2                                                   | *5580.00       | 87.8 AV                       |                   |                | 1.48 V                   | 360                        | 83.2                   | 4.6                            |
| 3                                                   | 11160.00       | 47.3 PK                       | 74.0              | -26.7          | 1.58 V                   | 106                        | 32.9                   | 14.4                           |
| 4                                                   | 11160.00       | 34.6 AV                       | 54.0              | -19.4          | 1.58 V                   | 106                        | 20.2                   | 14.4                           |
| 5                                                   | #16740.00      | 46.9 PK                       | 74.0              | -27.1          | 1.47 V                   | 96                         | 30.4                   | 16.5                           |
| 6                                                   | #16740.00      | 34.2 AV                       | 54.0              | -19.8          | 1.47 V                   | 96                         | 17.7                   | 16.5                           |

**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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

|                        |                |                              |              |
|------------------------|----------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 140 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 40GHz   |                              | 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                                                   | *5700.00       | 100.6 PK                      |                   |                | 1.18 H                   | 61                         | 95.8                   | 4.8                            |
| 2                                                   | *5700.00       | 90.5 AV                       |                   |                | 1.18 H                   | 61                         | 85.7                   | 4.8                            |
| 3                                                   | #5725.00       | 55.8 PK                       | 74.0              | -18.2          | 1.18 H                   | 61                         | 50.9                   | 4.9                            |
| 4                                                   | #5725.00       | 39.9 AV                       | 54.0              | -14.1          | 1.18 H                   | 61                         | 35.0                   | 4.9                            |
| 5                                                   | 11400.00       | 46.5 PK                       | 74.0              | -27.5          | 1.54 H                   | 138                        | 32.1                   | 14.4                           |
| 6                                                   | 11400.00       | 34.1 AV                       | 54.0              | -19.9          | 1.54 H                   | 138                        | 19.7                   | 14.4                           |
| 7                                                   | #17100.00      | 47.2 PK                       | 74.0              | -26.8          | 1.49 H                   | 187                        | 28.7                   | 18.5                           |
| 8                                                   | #17100.00      | 34.7 AV                       | 54.0              | -19.3          | 1.49 H                   | 187                        | 16.2                   | 18.5                           |
| 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                                                   | *5700.00       | 97.9 PK                       |                   |                | 1.46 V                   | 360                        | 93.1                   | 4.8                            |
| 2                                                   | *5700.00       | 87.2 AV                       |                   |                | 1.46 V                   | 360                        | 82.4                   | 4.8                            |
| 3                                                   | #5725.00       | 47.9 PK                       | 74.0              | -26.1          | 1.46 V                   | 360                        | 43.0                   | 4.9                            |
| 4                                                   | #5725.00       | 36.8 AV                       | 54.0              | -17.2          | 1.46 V                   | 360                        | 31.9                   | 4.9                            |
| 5                                                   | 11400.00       | 46.7 PK                       | 74.0              | -27.3          | 1.53 V                   | 98                         | 32.3                   | 14.4                           |
| 6                                                   | 11400.00       | 33.9 AV                       | 54.0              | -20.1          | 1.53 V                   | 98                         | 19.5                   | 14.4                           |
| 7                                                   | #17100.00      | 47.2 PK                       | 74.0              | -26.8          | 1.43 V                   | 90                         | 28.7                   | 18.5                           |
| 8                                                   | #17100.00      | 34.9 AV                       | 54.0              | -19.1          | 1.43 V                   | 90                         | 16.4                   | 18.5                           |

**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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

|                        |                |                              |              |
|------------------------|----------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 144 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 40GHz   |                              | 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                                                   | #5470.00       | 48.6 PK                       | 74.0              | -25.4          | 1.19 H                   | 85                         | 44.1                   | 4.5                            |
| 2                                                   | #5470.00       | 36.2 AV                       | 54.0              | -17.8          | 1.19 H                   | 85                         | 31.7                   | 4.5                            |
| 3                                                   | *5720.00       | 101.8 PK                      |                   |                | 1.19 H                   | 85                         | 96.9                   | 4.9                            |
| 4                                                   | *5720.00       | 91.7 AV                       |                   |                | 1.19 H                   | 85                         | 86.8                   | 4.9                            |
| 5                                                   | #5850.00       | 49.3 PK                       | 74.0              | -24.7          | 1.19 H                   | 85                         | 44.2                   | 5.1                            |
| 6                                                   | #5850.00       | 37.9 AV                       | 54.0              | -16.1          | 1.19 H                   | 85                         | 32.8                   | 5.1                            |
| 7                                                   | 11440.00       | 45.9 PK                       | 74.0              | -28.1          | 1.50 H                   | 140                        | 31.7                   | 14.2                           |
| 8                                                   | 11440.00       | 33.3 AV                       | 54.0              | -20.7          | 1.50 H                   | 140                        | 19.1                   | 14.2                           |
| 9                                                   | #17160.00      | 47.3 PK                       | 74.0              | -26.7          | 1.46 H                   | 169                        | 29.0                   | 18.3                           |
| 10                                                  | #17160.00      | 35.0 AV                       | 54.0              | -19.0          | 1.46 H                   | 169                        | 16.7                   | 18.3                           |

| 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                                                 | #5470.00       | 45.1 PK                       | 74.0              | -28.9          | 1.57 V                   | 360                        | 40.6                   | 4.5                            |
| 2                                                 | #5470.00       | 34.9 AV                       | 54.0              | -19.1          | 1.57 V                   | 360                        | 30.4                   | 4.5                            |
| 3                                                 | *5720.00       | 97.8 PK                       |                   |                | 1.57 V                   | 360                        | 92.9                   | 4.9                            |
| 4                                                 | *5720.00       | 87.1 AV                       |                   |                | 1.57 V                   | 360                        | 82.2                   | 4.9                            |
| 5                                                 | #5850.00       | 47.0 PK                       | 74.0              | -27.0          | 1.57 V                   | 360                        | 41.9                   | 5.1                            |
| 6                                                 | #5850.00       | 36.2 AV                       | 54.0              | -17.8          | 1.57 V                   | 360                        | 31.1                   | 5.1                            |
| 7                                                 | 11440.00       | 46.9 PK                       | 74.0              | -27.1          | 1.50 V                   | 88                         | 32.7                   | 14.2                           |
| 8                                                 | 11440.00       | 34.4 AV                       | 54.0              | -19.6          | 1.50 V                   | 88                         | 20.2                   | 14.2                           |
| 9                                                 | #17160.00      | 46.7 PK                       | 74.0              | -27.3          | 1.48 V                   | 98                         | 28.4                   | 18.3                           |
| 10                                                | #17160.00      | 34.5 AV                       | 54.0              | -19.5          | 1.48 V                   | 98                         | 16.2                   | 18.3                           |

#### 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.
6. " # ": The radiated frequency is out of the restricted band.

|                        |                |                              |              |
|------------------------|----------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 149 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 40GHz   |                              | 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                                                   | #5632.99       | 50.5 PK                       | 68.2              | -17.7          | 1.08 H                   | 84                         | 45.7                   | 4.8                            |
| 2                                                   | *5745.00       | 101.3 PK                      |                   |                | 1.08 H                   | 84                         | 96.3                   | 5.0                            |
| 3                                                   | *5745.00       | 92.0 AV                       |                   |                | 1.08 H                   | 84                         | 87.0                   | 5.0                            |
| 4                                                   | #5938.54       | 50.5 PK                       | 68.2              | -17.7          | 1.08 H                   | 84                         | 45.1                   | 5.4                            |
| 5                                                   | 11490.00       | 47.3 PK                       | 74.0              | -26.7          | 1.54 H                   | 169                        | 33.2                   | 14.1                           |
| 6                                                   | 11490.00       | 34.5 AV                       | 54.0              | -19.5          | 1.54 H                   | 169                        | 20.4                   | 14.1                           |
| 7                                                   | #17235.00      | 54.6 PK                       | 74.0              | -19.4          | 1.50 H                   | 205                        | 36.3                   | 18.3                           |
| 8                                                   | #17235.00      | 41.7 AV                       | 54.0              | -12.3          | 1.50 H                   | 205                        | 23.4                   | 18.3                           |
| 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                                                   | #5599.51       | 49.9 PK                       | 68.2              | -18.3          | 1.09 V                   | 117                        | 45.3                   | 4.6                            |
| 2                                                   | *5745.00       | 98.1 PK                       |                   |                | 1.09 V                   | 117                        | 93.1                   | 5.0                            |
| 3                                                   | *5745.00       | 88.3 AV                       |                   |                | 1.09 V                   | 117                        | 83.3                   | 5.0                            |
| 4                                                   | #5953.69       | 51.2 PK                       | 68.2              | -17.0          | 1.09 V                   | 117                        | 45.8                   | 5.4                            |
| 5                                                   | 11490.00       | 47.6 PK                       | 74.0              | -26.4          | 1.47 V                   | 50                         | 33.5                   | 14.1                           |
| 6                                                   | 11490.00       | 34.4 AV                       | 54.0              | -19.6          | 1.47 V                   | 50                         | 20.3                   | 14.1                           |
| 7                                                   | #17235.00      | 54.1 PK                       | 74.0              | -19.9          | 1.52 V                   | 47                         | 35.8                   | 18.3                           |
| 8                                                   | #17235.00      | 41.2 AV                       | 54.0              | -12.8          | 1.52 V                   | 47                         | 22.9                   | 18.3                           |

**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.
6. " # ": The radiated frequency is out of the restricted band.

|                        |                |                              |              |
|------------------------|----------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 157 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 40GHz   |                              | 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                                                   | #5640.70       | 50.1 PK                       | 68.2              | -18.1          | 1.17 H                   | 83                         | 45.3                   | 4.8                            |
| 2                                                   | *5785.00       | 101.6 PK                      |                   |                | 1.17 H                   | 83                         | 96.6                   | 5.0                            |
| 3                                                   | *5785.00       | 91.7 AV                       |                   |                | 1.17 H                   | 83                         | 86.7                   | 5.0                            |
| 4                                                   | #5952.14       | 50.5 PK                       | 68.2              | -17.7          | 1.17 H                   | 83                         | 45.1                   | 5.4                            |
| 5                                                   | 11570.00       | 48.0 PK                       | 74.0              | -26.0          | 1.58 H                   | 149                        | 34.0                   | 14.0                           |
| 6                                                   | 11570.00       | 35.0 AV                       | 54.0              | -19.0          | 1.58 H                   | 149                        | 21.0                   | 14.0                           |
| 7                                                   | #17355.00      | 54.3 PK                       | 74.0              | -19.7          | 1.51 H                   | 212                        | 35.4                   | 18.9                           |
| 8                                                   | #17355.00      | 41.0 AV                       | 54.0              | -13.0          | 1.51 H                   | 212                        | 22.1                   | 18.9                           |
| 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                                                   | #5604.40       | 49.6 PK                       | 68.2              | -18.6          | 1.03 V                   | 118                        | 45.0                   | 4.6                            |
| 2                                                   | *5785.00       | 97.6 PK                       |                   |                | 1.03 V                   | 118                        | 92.6                   | 5.0                            |
| 3                                                   | *5785.00       | 88.1 AV                       |                   |                | 1.03 V                   | 118                        | 83.1                   | 5.0                            |
| 4                                                   | #5960.99       | 49.9 PK                       | 68.2              | -18.3          | 1.03 V                   | 118                        | 44.4                   | 5.5                            |
| 5                                                   | 11570.00       | 47.6 PK                       | 74.0              | -26.4          | 1.50 V                   | 68                         | 33.6                   | 14.0                           |
| 6                                                   | 11570.00       | 34.8 AV                       | 54.0              | -19.2          | 1.50 V                   | 68                         | 20.8                   | 14.0                           |
| 7                                                   | #17355.00      | 54.3 PK                       | 74.0              | -19.7          | 1.53 V                   | 67                         | 35.4                   | 18.9                           |
| 8                                                   | #17355.00      | 41.4 AV                       | 54.0              | -12.6          | 1.53 V                   | 67                         | 22.5                   | 18.9                           |

**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) – 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.
6. " # ": The radiated frequency is out of the restricted band.



|                        |                |                              |              |
|------------------------|----------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 165 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 40GHz   |                              | 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                                                   | #5625.26       | 50.4 PK                       | 68.2              | -17.8          | 1.14 H                   | 84                         | 45.7                   | 4.7                            |
| 2                                                   | *5825.00       | 101.8 PK                      |                   |                | 1.14 H                   | 84                         | 96.6                   | 5.2                            |
| 3                                                   | *5825.00       | 92.1 AV                       |                   |                | 1.14 H                   | 84                         | 86.9                   | 5.2                            |
| 4                                                   | #6020.88       | 51.2 PK                       | 68.2              | -17.0          | 1.14 H                   | 84                         | 45.5                   | 5.7                            |
| 5                                                   | 11650.00       | 47.9 PK                       | 74.0              | -26.1          | 1.55 H                   | 169                        | 33.8                   | 14.1                           |
| 6                                                   | 11650.00       | 35.2 AV                       | 54.0              | -18.8          | 1.55 H                   | 169                        | 21.1                   | 14.1                           |
| 7                                                   | #17475.00      | 54.4 PK                       | 74.0              | -19.6          | 1.47 H                   | 181                        | 34.7                   | 19.7                           |
| 8                                                   | #17475.00      | 40.9 AV                       | 54.0              | -13.1          | 1.47 H                   | 181                        | 21.2                   | 19.7                           |
| 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                                                   | #5598.70       | 49.9 PK                       | 68.2              | -18.3          | 1.03 V                   | 124                        | 45.3                   | 4.6                            |
| 2                                                   | *5825.00       | 98.2 PK                       |                   |                | 1.03 V                   | 124                        | 93.0                   | 5.2                            |
| 3                                                   | *5825.00       | 88.6 AV                       |                   |                | 1.03 V                   | 124                        | 83.4                   | 5.2                            |
| 4                                                   | #6005.18       | 51.0 PK                       | 68.2              | -17.2          | 1.03 V                   | 124                        | 45.3                   | 5.7                            |
| 5                                                   | 11650.00       | 47.0 PK                       | 74.0              | -27.0          | 1.47 V                   | 65                         | 32.9                   | 14.1                           |
| 6                                                   | 11650.00       | 34.1 AV                       | 54.0              | -19.9          | 1.47 V                   | 65                         | 20.0                   | 14.1                           |
| 7                                                   | #17475.00      | 53.2 PK                       | 74.0              | -20.8          | 1.57 V                   | 53                         | 33.5                   | 19.7                           |
| 8                                                   | #17475.00      | 40.5 AV                       | 54.0              | -13.5          | 1.57 V                   | 53                         | 20.8                   | 19.7                           |

#### 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.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Data:

802.11ac (VHT20)

|                 |               |                      |                 |
|-----------------|---------------|----------------------|-----------------|
| CHANNEL         | TX Channel 36 | DETECTOR<br>FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 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                                                   | 42.32          | 18.8 QP                       | 40.0              | -21.2          | 2.00 H                   | 360                        | 27.0                   | -8.2                           |
| 2                                                   | 157.87         | 22.5 QP                       | 43.5              | -21.0          | 1.50 H                   | 308                        | 30.2                   | -7.7                           |
| 3                                                   | 236.93         | 27.8 QP                       | 46.0              | -18.2          | 1.00 H                   | 292                        | 37.9                   | -10.1                          |
| 4                                                   | 318.26         | 25.3 QP                       | 46.0              | -20.7          | 1.00 H                   | 281                        | 32.5                   | -7.2                           |
| 5                                                   | 359.05         | 24.4 QP                       | 46.0              | -21.6          | 2.00 H                   | 94                         | 30.6                   | -6.2                           |
| 6                                                   | 719.74         | 33.5 QP                       | 46.0              | -12.5          | 1.00 H                   | 307                        | 32.4                   | 1.1                            |
| 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                                                   | 34.39          | 24.8 QP                       | 40.0              | -15.2          | 1.50 V                   | 360                        | 33.6                   | -8.8                           |
| 2                                                   | 83.52          | 22.3 QP                       | 40.0              | -17.7          | 1.00 V                   | 279                        | 36.0                   | -13.7                          |
| 3                                                   | 149.92         | 21.3 QP                       | 43.5              | -22.2          | 2.00 V                   | 324                        | 29.5                   | -8.2                           |
| 4                                                   | 284.94         | 21.0 QP                       | 46.0              | -25.0          | 1.00 V                   | 49                         | 28.9                   | -7.9                           |
| 5                                                   | 549.63         | 26.3 QP                       | 46.0              | -19.7          | 1.00 V                   | 209                        | 28.3                   | -2.0                           |
| 6                                                   | 712.78         | 30.2 QP                       | 46.0              | -15.8          | 1.50 V                   | 178                        | 29.2                   | 1.0                            |

**REMARKS:**

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

## 4.2 Transmit Power Measurement

### 4.2.1 Limits of Transmit Power Measurement

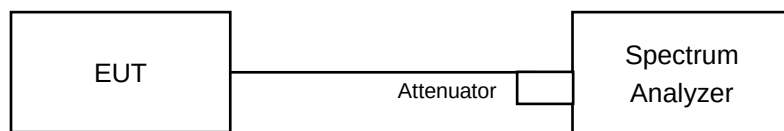
| Operation Band | EUT Category |                                   | Limit                                                                                                                       |
|----------------|--------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| U-NII-1        |              | Outdoor Access Point              | 1 Watt (30 dBm)<br>(Max. e.i.r.p $\leq$ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon) |
|                |              | Fixed point-to-point Access Point | 1 Watt (30 dBm)                                                                                                             |
|                |              | Indoor Access Point               | 1 Watt (30 dBm)                                                                                                             |
|                | √            | Mobile and Portable client device | 250mW (24 dBm)                                                                                                              |
| U-NII-2A       |              | √                                 | 250mW (24 dBm) or 11 dBm+10 log B*                                                                                          |
| U-NII-2C       |              | √                                 | 250mW (24 dBm) or 11 dBm+10 log B*                                                                                          |
| U-NII-3        |              | √                                 | 1 Watt (30 dBm)                                                                                                             |

\*B is the 26 dB emission bandwidth in megahertz

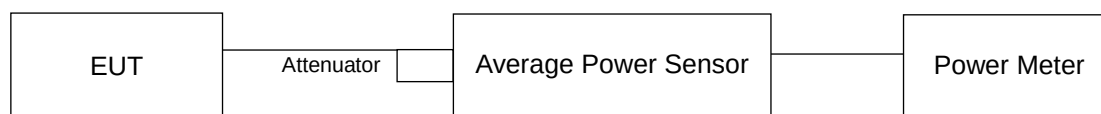
### 4.2.2 Test Setup

#### FOR POWER OUTPUT MEASUREMENT

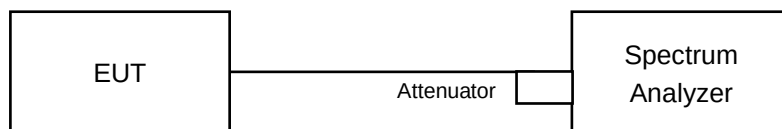
For channel straddling 5725MHz:



For other channels:



#### FOR 26dB OCCUPIED BANDWIDTH



### 4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.2.4 Test Procedure

##### For Average Power Measurement

##### For channel straddling 5725MHz:

Method SA-2

1. Set span to encompass the emission bandwidth (EBW) of the signal.
2. Set RBW =1MHz.
3. Set the VBW  $\geq 3 \times$  RBW.
4. Number of points in sweep  $\geq 2$  Span / RBW.
5. Sweep time = auto.
6. Detector = RMS.
7. Trace average at least 100 traces in power averaging mode
8. Compute power by integrating the spectrum across the 26 dB EBW of the signal.
9. Duty factor need added to measured value (duty cycle < 98 percent).

##### Other Modulation mode

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

##### FOR 26dB OCCUPIED BANDWIDTH

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

#### 4.2.5 Deviation from Test Standard

No deviation.

#### 4.2.6 EUT Operating Condition

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

##### 802.11a

##### Power Output:

| Channel             | Channel Frequency (MHz) | Maximum Conducted Power (mW) | Maximum Conducted Power (dBm) | Power Limit (dBm) | Pass/Fail |
|---------------------|-------------------------|------------------------------|-------------------------------|-------------------|-----------|
| 36                  | 5180                    | 30.761                       | 14.88                         | 24.00             | Pass      |
| 40                  | 5200                    | 30.62                        | 14.86                         | 24.00             | Pass      |
| 48                  | 5240                    | 34.198                       | 15.34                         | 24.00             | Pass      |
| 52                  | 5260                    | 33.884                       | 15.30                         | 24.00             | Pass      |
| 60                  | 5300                    | 34.914                       | 15.43                         | 24.00             | Pass      |
| 64                  | 5320                    | 34.674                       | 15.40                         | 24.00             | Pass      |
| 100                 | 5500                    | 32.734                       | 15.15                         | 24.00             | Pass      |
| 116                 | 5580                    | 33.884                       | 15.30                         | 24.00             | Pass      |
| 140                 | 5700                    | 35.892                       | 15.55                         | 24.00             | Pass      |
| *144 (UNII-2C Band) | 5720                    | 8.748                        | 9.42                          | 23.15             | Pass      |
| *144 (UNII-3 Band)  | 5720                    | 2.377                        | 3.76                          | 30.00             | Pass      |
| 149                 | 5745                    | 36.898                       | 15.67                         | 30.00             | Pass      |
| 157                 | 5785                    | 36.728                       | 15.65                         | 30.00             | Pass      |
| 165                 | 5825                    | 36.308                       | 15.60                         | 30.00             | Pass      |

Note: \* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test.

The Average Power for the straddle channel:

| Chan. | Chan. Freq. (MHz) | Average Power (mW) | Average Power (dBm) |
|-------|-------------------|--------------------|---------------------|
| 144   | 5720              | 11.125             | 10.46               |

Note: The total power was calculated through formula and record the value for reference only.

## 26dB OCCUPIED BANDWIDTH

| Channel            | Frequency (MHz) | 26dBc Bandwidth (MHz) |
|--------------------|-----------------|-----------------------|
| 52                 | 5260            | 23.25                 |
| 60                 | 5300            | 22.89                 |
| 64                 | 5320            | 22.62                 |
| 100                | 5500            | 22.86                 |
| 116                | 5580            | 22.90                 |
| 140                | 5700            | 22.91                 |
| 144 (UNII-2C Band) | 5720            | 16.41                 |

**Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth**

| Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C > |            |             |                                  |
|-----------------------------------------------------|------------|-------------|----------------------------------|
| Channel Number                                      | Freq.(MHz) | Min. B(MHz) | Determined Conducted Limit (dBm) |
| 52                                                  | 5260       | 23.25       | 24.66 > 24                       |
| 60                                                  | 5300       | 22.89       | 24.59 > 24                       |
| 64                                                  | 5320       | 22.62       | 24.54 > 24                       |
| 100                                                 | 5500       | 22.86       | 24.59 > 24                       |
| 116                                                 | 5580       | 22.90       | 24.59 > 24                       |
| 140                                                 | 5700       | 22.91       | 24.6 > 24                        |
| 144 (UNII-2C Band)                                  | 5720       | 16.41       | 23.15 < 24                       |

## 802.11ac (VHT20)

### Power Output:

| Channel             | Channel Frequency (MHz) | Maximum Conducted Power (mW) | Maximum Conducted Power (dBm) | Power Limit (dBm) | Pass/Fail |
|---------------------|-------------------------|------------------------------|-------------------------------|-------------------|-----------|
| 36                  | 5180                    | 34.356                       | 15.36                         | 24.00             | Pass      |
| 40                  | 5200                    | 34.514                       | 15.38                         | 24.00             | Pass      |
| 48                  | 5240                    | 34.041                       | 15.32                         | 24.00             | Pass      |
| 52                  | 5260                    | 33.963                       | 15.31                         | 24.00             | Pass      |
| 60                  | 5300                    | 35.481                       | 15.50                         | 24.00             | Pass      |
| 64                  | 5320                    | 34.914                       | 15.43                         | 24.00             | Pass      |
| 100                 | 5500                    | 35.81                        | 15.54                         | 24.00             | Pass      |
| 116                 | 5580                    | 34.435                       | 15.37                         | 24.00             | Pass      |
| 140                 | 5700                    | 34.674                       | 15.40                         | 24.00             | Pass      |
| *144 (UNII-2C Band) | 5720                    | 7.479                        | 8.74                          | 23.27             | Pass      |
| *144 (UNII-3 Band)  | 5720                    | 2.192                        | 3.41                          | 30.00             | Pass      |
| 149                 | 5745                    | 34.041                       | 15.32                         | 30.00             | Pass      |
| 157                 | 5785                    | 33.884                       | 15.30                         | 30.00             | Pass      |
| 165                 | 5825                    | 34.041                       | 15.32                         | 30.00             | Pass      |

Note: \* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test.

The Average Power for the straddle channel:

| Chan. | Chan. Freq. (MHz) | Average Power (mW) | Average Power (dBm) |
|-------|-------------------|--------------------|---------------------|
| 144   | 5720              | 9.671              | 9.85                |

Note: The total power was calculated through formula and record the value for reference only.

## 26dB OCCUPIED BANDWIDTH

| Channel            | Frequency (MHz) | 26dBc Bandwidth (MHz) |
|--------------------|-----------------|-----------------------|
| 52                 | 5260            | 23.16                 |
| 60                 | 5300            | 24.01                 |
| 64                 | 5320            | 23.68                 |
| 100                | 5500            | 23.87                 |
| 116                | 5580            | 23.68                 |
| 140                | 5700            | 23.92                 |
| 144 (UNII-2C Band) | 5720            | 16.89                 |

**Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth**

| Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C > |            |             |                                  |
|-----------------------------------------------------|------------|-------------|----------------------------------|
| Channel Number                                      | Freq.(MHz) | Min. B(MHz) | Determined Conducted Limit (dBm) |
| 52                                                  | 5260       | 23.16       | 24.64 > 24                       |
| 60                                                  | 5300       | 24.01       | 24.8 > 24                        |
| 64                                                  | 5320       | 23.68       | 24.74 > 24                       |
| 100                                                 | 5500       | 23.87       | 24.77 > 24                       |
| 116                                                 | 5580       | 23.68       | 24.74 > 24                       |
| 140                                                 | 5700       | 23.92       | 24.78 > 24                       |
| 144 (UNII-2C Band)                                  | 5720       | 16.89       | 23.27 < 24                       |



## 802.11ac (VHT40)

### Power Output:

| Channel             | Channel Frequency (MHz) | Maximum Conducted Power (mW) | Maximum Conducted Power (dBm) | Power Limit (dBm) | Pass/Fail |
|---------------------|-------------------------|------------------------------|-------------------------------|-------------------|-----------|
| 38                  | 5190                    | 34.514                       | 15.38                         | 24.00             | Pass      |
| 46                  | 5230                    | 34.356                       | 15.36                         | 24.00             | Pass      |
| 54                  | 5270                    | 33.189                       | 15.21                         | 24.00             | Pass      |
| 62                  | 5310                    | 35.975                       | 15.56                         | 24.00             | Pass      |
| 102                 | 5510                    | 35.81                        | 15.54                         | 24.00             | Pass      |
| 110                 | 5550                    | 36.813                       | 15.66                         | 24.00             | Pass      |
| 134                 | 5670                    | 34.356                       | 15.36                         | 24.00             | Pass      |
| *142 (UNII-2C Band) | 5710                    | 8.993                        | 9.54                          | 24.00             | Pass      |
| *142 (UNII-3 Band)  | 5710                    | 0.9592                       | -0.18                         | 30.00             | Pass      |
| 151                 | 5755                    | 36.983                       | 15.68                         | 30.00             | Pass      |
| 159                 | 5795                    | 33.497                       | 15.25                         | 30.00             | Pass      |

Note: \* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test.

The Average Power for the straddle channel:

| Chan. | Chan. Freq. (MHz) | Average Power (mW) | Average Power (dBm) |
|-------|-------------------|--------------------|---------------------|
| 142   | 5710              | 9.9522             | 9.98                |

Note: The total power was calculated through formula and record the value for reference only.

## 26dB OCCUPIED BANDWIDTH

| Channel            | Frequency (MHz) | 26dBc Bandwidth (MHz) |
|--------------------|-----------------|-----------------------|
| 54                 | 5270            | 54.80                 |
| 62                 | 5310            | 52.19                 |
| 102                | 5510            | 45.10                 |
| 110                | 5550            | 43.48                 |
| 134                | 5670            | 44.15                 |
| 142 (UNII-2C Band) | 5710            | 37.03                 |

**Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth**

| Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C > |            |             |                                  |
|-----------------------------------------------------|------------|-------------|----------------------------------|
| Channel Number                                      | Freq.(MHz) | Min. B(MHz) | Determined Conducted Limit (dBm) |
| 54                                                  | 5270       | 54.80       | 28.38 > 24                       |
| 62                                                  | 5310       | 52.19       | 28.17 > 24                       |
| 102                                                 | 5510       | 45.10       | 27.54 > 24                       |
| 110                                                 | 5550       | 43.48       | 27.38 > 24                       |
| 134                                                 | 5670       | 44.15       | 27.44 > 24                       |
| 142 (UNII-2C Band)                                  | 5710       | 37.03       | 26.68 > 24                       |

## 802.11ac (VHT80)

### Power Output:

| Channel             | Channel Frequency (MHz) | Maximum Conducted Power (mW) | Maximum Conducted Power (dBm) | Power Limit (dBm) | Pass/Fail |
|---------------------|-------------------------|------------------------------|-------------------------------|-------------------|-----------|
| 42                  | 5210                    | 34.119                       | 15.33                         | 24.00             | Pass      |
| 58                  | 5290                    | 33.963                       | 15.31                         | 24.00             | Pass      |
| 106                 | 5530                    | 33.884                       | 15.30                         | 24.00             | Pass      |
| 122                 | 5610                    | 33.343                       | 15.23                         | 24.00             | Pass      |
| *138 (UNII-2C Band) | 5690                    | 5.734                        | 7.58                          | 24.00             | Pass      |
| *138 (UNII-3 Band)  | 5690                    | 0.3543                       | -4.51                         | 30.00             | Pass      |
| 155                 | 5775                    | 33.266                       | 15.22                         | 30.00             | Pass      |

Note: \* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test.

The Average Power for the straddle channel:

| Chan. | Chan. Freq. (MHz) | Average Power (mW) | Average Power (dBm) |
|-------|-------------------|--------------------|---------------------|
| 138   | 5690              | 6.0883             | 7.84                |

Note: The total power was calculated through formula and record the value for reference only.

### 26dB OCCUPIED BANDWIDTH

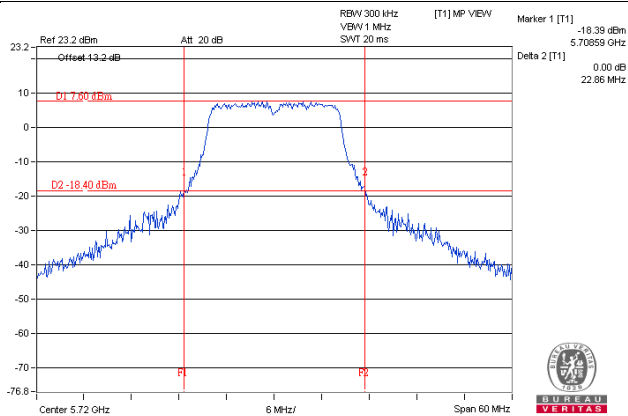
| Channel            | Frequency (MHz) | 26dBc Bandwidth (MHz) |
|--------------------|-----------------|-----------------------|
| 58                 | 5290            | 94.65                 |
| 106                | 5530            | 84.91                 |
| 122                | 5610            | 86.53                 |
| 138 (UNII-2C Band) | 5690            | 77.57                 |

**Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth**

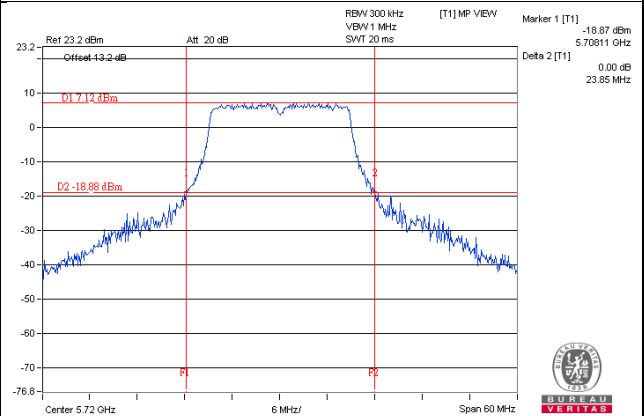
| Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C > |            |             |                                  |
|-----------------------------------------------------|------------|-------------|----------------------------------|
| Channel Number                                      | Freq.(MHz) | Min. B(MHz) | Determined Conducted Limit (dBm) |
| 58                                                  | 5290       | 94.65       | 30.76 > 24                       |
| 106                                                 | 5530       | 84.91       | 30.28 > 24                       |
| 122                                                 | 5610       | 86.53       | 30.37 > 24                       |
| 138 (UNII-2C Band)                                  | 5690       | 77.57       | 29.89 > 24                       |

# Spectrum Plot of Worst Value

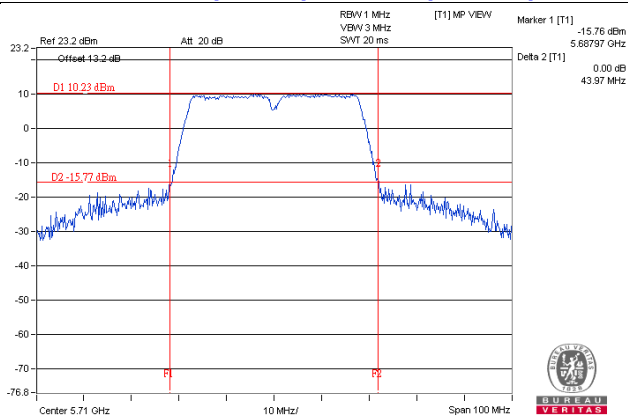
## 802.11a: CH144 (UNII-2C)



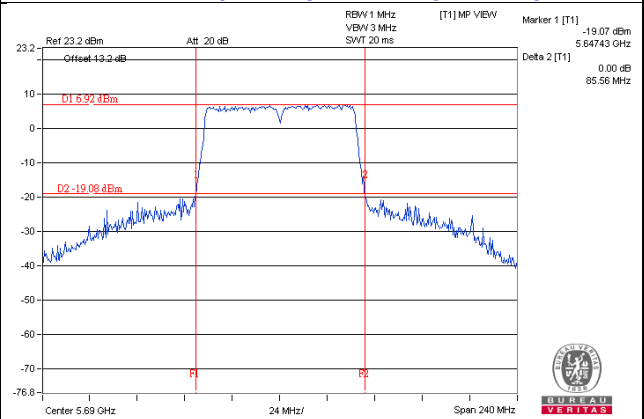
## 802.11ac (VHT20) / CH144 (UNII-2C)



## 802.11ac (VHT40) / CH142 (UNII-2C)



## 802.11ac (VHT80) / CH138 (UNII-2C)



## 5 Pictures of Test Arrangements

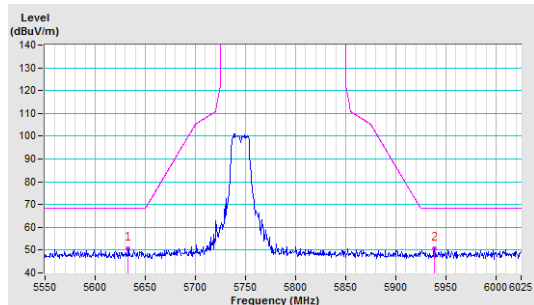
Please refer to the attached file (Test Setup Photo).

## Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

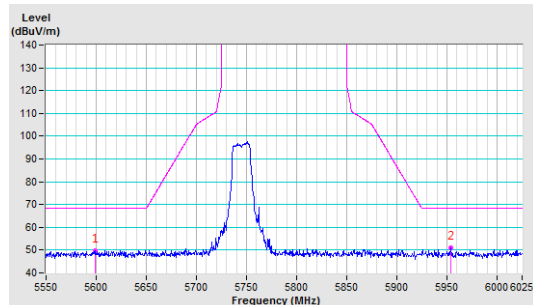
802.11n (HT20)

CH 149 5745 MHz

Horizontal

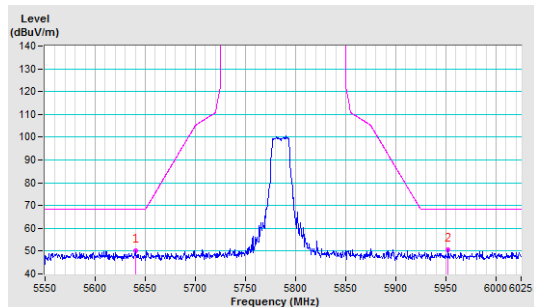


Vertical

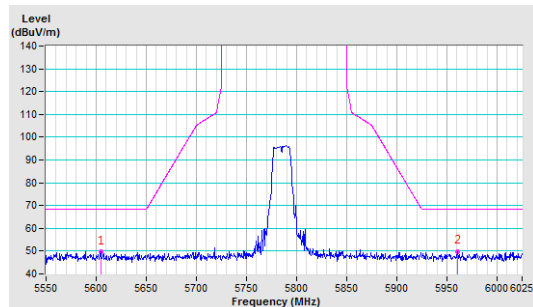


CH 157 5785 MHz

Horizontal

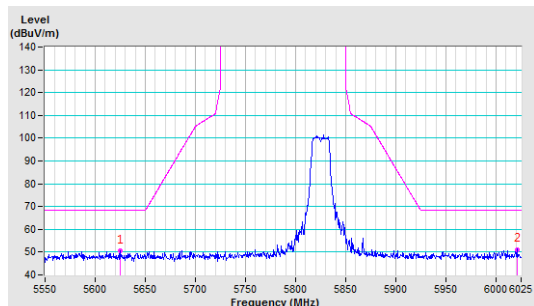


Vertical

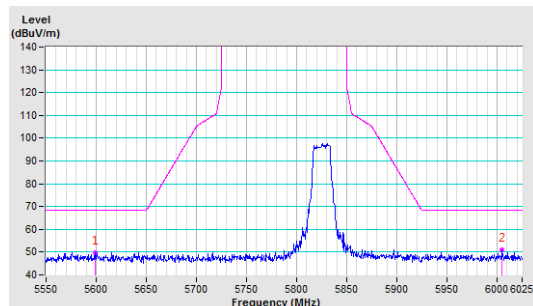


CH 165 5825 MHz

Horizontal



Vertical



## 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.

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

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