

## Supplemental “Transmit Simultaneously” Test Report

**Report No.:** RFBWIN-WTW-P21040653-8

**FCC ID:** J9C-QCNFA725

**Test Model:** QCNFA725

**Received Date:** Apr. 20, 2021

**Test Date:** Aug. 18 to Oct. 01, 2021

**Issued Date:** Oct. 08, 2021

**Applicant:** Qualcomm Technologies, Inc.

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

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

**FCC Registration /  
Designation Number:** 723255 / TW2022



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### Release Control Record

| Issue No.              | Description       | Date Issued   |
|------------------------|-------------------|---------------|
| RFBWIN-WTW-P21040653-8 | Original release. | Oct. 08, 2021 |

## 1 Certificate of Conformity

**Product:** Wi-Fi 6E BT 5.2 M.2 1418 Module

**Brand:** Qualcomm

**Test Model:** QCNFA725

**Sample Status:** Engineering sample

**Applicant:** Qualcomm Technologies, Inc.

**Test Date:** Aug. 18 to Oct. 01, 2021

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.247)

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 :** Phoenix Huang, **Date:** Oct. 08, 2021  
Phoenix Huang / Specialist

**Approved by :** Clark Lin, **Date:** Oct. 08, 2021  
Clark Lin / Technical Manager

## 2 Summary of Test Results

| FCC Part 15, Subpart C, E (SECTION 15.247, 15.407)               |                                              |        |                                                                                       |
|------------------------------------------------------------------|----------------------------------------------|--------|---------------------------------------------------------------------------------------|
| FCC Clause                                                       | Test Item                                    | Result | Remarks                                                                               |
| 15.207<br>15.407(b)(6)                                           | AC Power Conducted Emission                  | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -13.29 dB at 0.17312 MHz. |
| 15.205 / 15.209 /<br>15.247(d)<br>15.407(b)<br>(1/2/3/4(i/ii)/6) | Radiated Emissions and Band Edge Measurement | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -15.9 dB at 831.57 MHz.   |

Note:

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

### 2.1 Measurement Uncertainty

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

| Measurement                        | Frequency      | Expanded Uncertainty (k=2) ( $\pm$ ) |
|------------------------------------|----------------|--------------------------------------|
| Conducted Emissions at mains ports | 150kHz ~ 30MHz | 1.9 dB                               |
| Conducted Emissions                | -              | 2.5 dB                               |
| Radiated Emissions up to 1 GHz     | 9kHz ~ 30MHz   | 3.1 dB                               |
|                                    | 30MHz ~ 1GHz   | 5.5 dB                               |
| Radiated Emissions above 1 GHz     | 1GHz ~ 18GHz   | 5.1 dB                               |
|                                    | 18GHz ~ 40GHz  | 5.3 dB                               |

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product               | Wi-Fi 6E BT 5.2 M.2 1418 Module                                                                                                                                                                                                                                                                                                                                                                                         |
| Brand                 | Qualcomm                                                                                                                                                                                                                                                                                                                                                                                                                |
| Test Model            | QCNFA725                                                                                                                                                                                                                                                                                                                                                                                                                |
| Status of EUT         | Engineering sample                                                                                                                                                                                                                                                                                                                                                                                                      |
| Power Supply Rating   | 3.3Vdc from host equipment                                                                                                                                                                                                                                                                                                                                                                                              |
| Modulation Type       | <b>WLAN:</b><br>CCK, DQPSK, DBPSK for DSSS<br>64QAM, 16QAM, QPSK, BPSK for OFDM<br>1024QAM for OFDM in 11ac mode and VHT20/40 in 2.4GHz mode<br>4096QAM for OFDMA in 11ax HE mode<br><b>BT-EDR:</b> GFSK, $\pi/4$ -DQPSK, 8DPSK<br><b>BT-LE:</b> GFSK                                                                                                                                                                   |
| Modulation Technology | <b>WLAN:</b> DSSS, OFDM, OFDMA<br><b>BT-EDR:</b> FHSS<br><b>BT-LE:</b> DTS                                                                                                                                                                                                                                                                                                                                              |
| Operating Frequency   | <b>WLAN:</b><br><b>2.4GHz:</b> 2.412 ~ 2.47 GHz<br><b>5GHz:</b> 5.18 ~ 5.32GHz, 5.5 ~ 5.72GHz, 5.745 ~ 5.825GHz, 5.845 ~ 5.885 GHz<br><b>6GHz:</b><br>Under control by Standard Power AP:<br>5.935 ~ 6.415GHz, 6.535 ~ 6.855GHz<br>Under control by Low-power Indoor AP:<br>5.935 ~ 6.415GHz, 6.435 ~ 6.525GHz, 6.535 ~ 6.855GHz, 6.865 ~ 7.115GHz<br><b>BT-EDR:</b> 2.402 ~ 2.480GHz<br><b>BT-LE:</b> 2.402 ~ 2.480GHz |
| Antenna Type          | Refer to section 3.2                                                                                                                                                                                                                                                                                                                                                                                                    |
| Antenna Connector     | Refer to section 3.2                                                                                                                                                                                                                                                                                                                                                                                                    |
| Accessory Device      | NA                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Data Cable Supplied   | NA                                                                                                                                                                                                                                                                                                                                                                                                                      |

Note:

- This report is prepared for FCC class II change. The difference compared with the Report No.: RFBWIN-WTW-P21040653-8 as the following:
  - ◆ Enable U-NII-4 and U-NII-3 & -4 span channels through software change.
- According to above conditions, for Radiated Emissions and Band Edge test item need to be performed and all data was tested to meet the requirements.
- This device of WLAN (2.4GHz & 5GHz U-NII-1 Band) can support hotspot mode.

## 4. Simultaneously transmission condition.

| Original  |              |              |
|-----------|--------------|--------------|
| Condition | Technology   |              |
| 1         | WLAN(2.4GHz) | WLAN(6GHz)   |
| 2         | WLAN(2.4GHz) | WLAN(5GHz)   |
| 3         | WLAN(6GHz)   | Bluetooth    |
| 4         | WLAN(5GHz)   | Bluetooth    |
| Newly     |              |              |
| 5         | WLAN(2.4GHz) | WLAN(5.9GHz) |
| 6         | WLAN(5.9GHz) | Bluetooth    |

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

5. The device of WLAN (2.4GHz) and Bluetooth technology can't transmit simultaneously, it was used timely shared coexistence technology.

6. The EUT incorporates a MIMO function:

| MODULATION MODE                            | 2.4GHz Band           |     |                       |     |
|--------------------------------------------|-----------------------|-----|-----------------------|-----|
|                                            | TX & RX CONFIGURATION |     |                       |     |
| 802.11b                                    | 2TX                   |     | 2RX                   |     |
| 802.11g                                    | 2TX                   |     | 2RX                   |     |
| 802.11n (HT20)                             | 2TX                   |     | 2RX                   |     |
| 802.11n (HT40)                             | 2TX                   |     | 2RX                   |     |
| VHT20                                      | 2TX                   |     | 2RX                   |     |
| VHT40                                      | 2TX                   |     | 2RX                   |     |
| 802.11ax (HE20)                            | 2TX                   |     | 2RX                   |     |
| 802.11ax (HE40)                            | 2TX                   |     | 2RX                   |     |
| 802.11ax<br>(RU26/52/106/242/484)          | 2TX                   |     | 2RX                   |     |
| MODULATION MODE                            | 5GHz Band             |     | 6GHz Band             |     |
|                                            | TX & RX CONFIGURATION |     | TX & RX CONFIGURATION |     |
| 802.11a                                    | 2TX                   | 2RX | 2TX                   | 2RX |
| 802.11n (HT20)                             | 2TX                   | 2RX | -                     | -   |
| 802.11n (HT40)                             | 2TX                   | 2RX | -                     | -   |
| 802.11ac (VHT20)                           | 2TX                   | 2RX | -                     | -   |
| 802.11ac (VHT40)                           | 2TX                   | 2RX | -                     | -   |
| 802.11ac (VHT80)                           | 2TX                   | 2RX | -                     | -   |
| 802.11ac (VHT160)                          | 2TX                   | 2RX | 2TX                   | 2RX |
| 802.11ax (HE20)                            | 2TX                   | 2RX | 2TX                   | 2RX |
| 802.11ax (HE40)                            | 2TX                   | 2RX | 2TX                   | 2RX |
| 802.11ax (HE80)                            | 2TX                   | 2RX | 2TX                   | 2RX |
| 802.11ax (HE160)                           | 2TX                   | 2RX | 2TX                   | 2RX |
| 802.11ax<br>(RU26/52/106/242/484/996/1992) | 2TX                   | 2RX | 2TX                   | 2RX |

Note: The EUT support Beamforming and non-beamforming mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data (Beamforming mode) were presented in test report.

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

### 3.2 Description of Antenna

The antenna gain was declared by client; please refer to the following table:

| Antenna Set | RF Chain No. | Brand  | Model     | Antenna Net Gain (dBi) | Frequency Range | Cable Loss (dB) | Antenna Type | Connector Type | Cable Length |
|-------------|--------------|--------|-----------|------------------------|-----------------|-----------------|--------------|----------------|--------------|
| 1           | Chain0/1     | HONGBO | 260-25094 | 3.53                   | 2.4~2.4835 GHz  | 0.76            | PIFA         | i-pex(MHF 4L)  | 300mm        |
|             |              |        |           | 3.06                   | 5.15~5.25 GHz   | 1.16            |              |                |              |
|             |              |        |           | 3.07                   | 5.25~5.35 GHz   | 1.18            |              |                |              |
|             |              |        |           | 4.81                   | 5.47~5.725 GHz  | 1.2             |              |                |              |
|             |              |        |           | 4.2                    | 5.725~5.850 GHz | 1.27            |              |                |              |
| 2           | Chain0/1     | HONGBO | 260-25083 | 5.09                   | 5.850~5.895 GHz | 1.29            | PIFA         | i-pex(MHF 4L)  | 300mm        |
|             |              |        |           | 5.14                   | 5.925~6.425 GHz | 1.32            |              |                |              |
|             |              |        |           | 5.09                   | 6.425~6.525 GHz | 1.35            |              |                |              |
|             |              |        |           | 5.16                   | 6.525~6.875 GHz | 1.4             |              |                |              |
|             |              |        |           | 5.12                   | 6.875~7.125 GHz | 1.45            |              |                |              |
| 3           | Chain0/1     | HONGBO | 260-25084 | 3.22                   | 2.4~2.4835 GHz  | 0.5             | Monopole     | i-pex(MHF 4L)  | 200mm        |
|             |              |        |           | 3.35                   | 5.150~5.250 GHz | 0.76            |              |                |              |
|             |              |        |           | 3.42                   | 5.250~5.350 GHz | 0.78            |              |                |              |
|             |              |        |           | 4.77                   | 5.470~5.725 GHz | 0.81            |              |                |              |
|             |              |        |           | 4.72                   | 5.725~5.850 GHz | 0.85            |              |                |              |
|             |              |        |           | 4.71                   | 5.850~5.895 GHz | 0.86            |              |                |              |
|             |              |        |           | 4.75                   | 5.925~6.425 GHz | 0.87            |              |                |              |
|             |              |        |           | 4.29                   | 6.425~6.525 GHz | 0.91            |              |                |              |
|             |              |        |           | 4.81                   | 6.525~6.875 GHz | 0.96            |              |                |              |
|             |              |        |           | 4.74                   | 6.875~7.125 GHz | 0.98            |              |                |              |

Note: The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.



### 3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT Configure Mode | Applicable To |       |     |    | Description |
|--------------------|---------------|-------|-----|----|-------------|
|                    | RE≥1G         | RE<1G | PLC | OB |             |
| -                  | √             | √     | √   | √  | -           |

Where **RE≥1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz  
**PLC**: Power Line Conducted Emission **OB**: Conducted Out-Band Emission Measurement

#### **Radiated Emission Test (Above 1GHz): (Radiated with 50 ohm load)**

- ☒ The tested configurations represent the worst-case mode from all possible combinations by the maximum power.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| Configure Mode | MODE                    | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE |
|----------------|-------------------------|-------------------|----------------|-----------------------|-----------------|
| 1              | 2.4GHz: 802.11g<br>+    | 1 to 13           | 6              | OFDM                  | BPSK            |
|                | 5.9GHz: 802.11ax (HE80) | 171               | 171            | OFDM                  | BPSK            |
| 2              | BT-EDR<br>+             | 0 to 78           | 0              | FHSS                  | GFSK            |
|                | 5.9GHz: 802.11ax (HE80) | 171               | 171            | OFDM                  | BPSK            |

#### **Radiated Emission Test (Below 1GHz): (Radiated with 50 ohm load)**

- ☒ The tested configurations represent the worst-case mode from all possible combinations by the maximum power.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| Configure Mode | MODE                    | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE |
|----------------|-------------------------|-------------------|----------------|-----------------------|-----------------|
| 1              | 2.4GHz: 802.11g<br>+    | 1 to 13           | 6              | OFDM                  | BPSK            |
|                | 5.9GHz: 802.11ax (HE80) | 171               | 171            | OFDM                  | BPSK            |
| 2              | BT-EDR<br>+             | 0 to 78           | 0              | FHSS                  | GFSK            |
|                | 5.9GHz: 802.11ax (HE80) | 171               | 171            | OFDM                  | BPSK            |

#### **Power Line Conducted Emission Test:**

- ☒ The tested configurations represent the worst-case mode from all possible combinations by the maximum power.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| Configure Mode | MODE                    | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE |
|----------------|-------------------------|-------------------|----------------|-----------------------|-----------------|
| 1              | 2.4GHz: 802.11g<br>+    | 1 to 13           | 6              | OFDM                  | BPSK            |
|                | 5.9GHz: 802.11ax (HE80) | 171               | 171            | OFDM                  | BPSK            |
| 2              | BT-EDR<br>+             | 0 to 78           | 0              | FHSS                  | GFSK            |
|                | 5.9GHz: 802.11ax (HE80) | 171               | 171            | OFDM                  | BPSK            |

### Conducted Out-Band Emission Measurement:

- ☒ The tested configurations represent the worst-case mode from all possible combinations by the maximum power.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| Configure Mode | MODE                    | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE |
|----------------|-------------------------|-------------------|----------------|-----------------------|-----------------|
| 1              | 2.4GHz: 802.11g<br>+    | 1 to 13           | 6              | OFDM                  | BPSK            |
|                | 5.9GHz: 802.11ax (HE80) | 171               | 171            | OFDM                  | BPSK            |
| 2              | BT-EDR<br>+             | 0 to 78           | 0              | FHSS                  | GFSK            |
|                | 5.9GHz: 802.11ax (HE80) | 171               | 171            | OFDM                  | BPSK            |

### Test Condition:

| Applicable To | Environmental Conditions | Input Power (system) | Tested By  |
|---------------|--------------------------|----------------------|------------|
| RE $\geq$ 1G  | 25deg. C, 65%RH          | 120Vac, 60Hz         | Carter Lin |
| RE $<$ 1G     | 24deg. C, 65%RH          | 120Vac, 60Hz         | Carter Lin |
| PLC           | 25deg. C, 75%RH          | 120Vac, 60Hz         | Carter Lin |
| OB            | 24deg. C, 57%RH          | 120Vac, 60Hz         | Eric Peng  |

### 3.3 Description of Support Units

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

| ID | Product   | Brand    | Model No.     | Serial No. | FCC ID | Remarks            |
|----|-----------|----------|---------------|------------|--------|--------------------|
| A. | Laptop    | Dell     | E5420         | 6FGHKV1    | NA     | Provided by Lab    |
| B. | Test Tool | Qualcomm | Y6570         | NA         | NA     | Supplied by client |
| C. | Adapter   | PHIHONG  | PSAA12A-120L6 | NA         | NA     | Supplied by client |

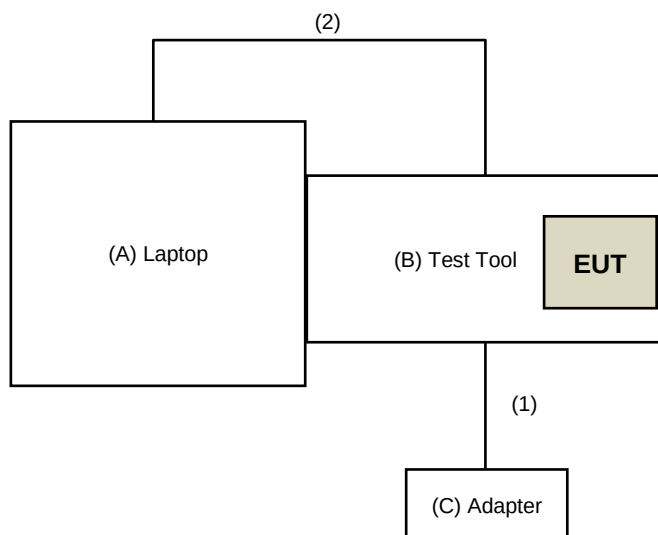
Note:

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

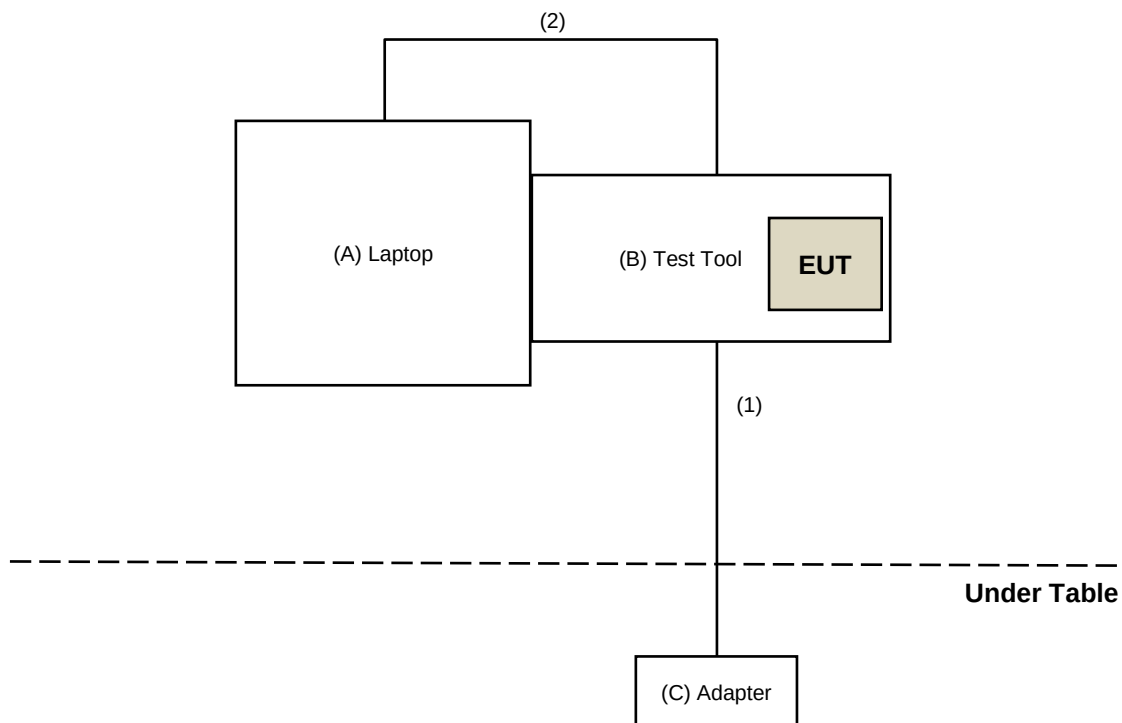
| ID | Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks            |
|----|--------------|------|------------|--------------------|--------------|--------------------|
| 1. | DC Cable     | 1    | 1.2        | No                 | 0            | Supplied by client |
| 2. | USB Cable    | 1    | 0.6        | Yes                | 0            | Provided by Lab    |

### 3.3.1 Configuration of System under Test

#### For Conducted Emissions test:



#### For other test:



## 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:

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

Limits of unwanted emission out of the restricted bands

| Applicable To                                                                                                                                                                                                                                                                                                                                                                   |                 | Limit                                                                                                                               |                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 789033 D02 General UNII Test Procedure<br>New Rules v02r01                                                                                                                                                                                                                                                                                                                      |                 | 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                                                                                                                                                                                                                                                                                                                                                                   | 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> |
| <sup>*1</sup> beyond 75 MHz or more above of the band edge.<br><sup>*2</sup> below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.<br><sup>*3</sup> below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.<br><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

##### For Radiated Emission (Below 1GHz) test:

| Description & Manufacturer                          | Model No.            | Serial No.  | Calibrated Date | Calibrated Until |
|-----------------------------------------------------|----------------------|-------------|-----------------|------------------|
| Test Receiver<br>Agilent                            | N9038A               | MY51210202  | Dec. 1, 2020    | Nov. 30, 2021    |
| Software                                            | ADT_Radiated_V8.7.08 | NA          | NA              | NA               |
| Boresight Antenna Tower &<br>Turn Table<br>Max-Full | MF-7802BS            | MF780208530 | NA              | NA               |
| Pre_Amplifier<br>EMCI                               | EMC001340            | 980142      | May 24, 2021    | May 23, 2022     |
| LOOP ANTENNA<br>Electro-Metrics                     | EM-6879              | 264         | Mar. 5, 2021    | Mar. 4, 2022     |
| RF Coaxial Cable<br>JYEBO                           | 5D-FB                | LOOPCAB-001 | Jan. 7, 2021    | Jan. 6, 2022     |
| RF Coaxial Cable<br>JYEBO                           | 5D-FB                | LOOPCAB-002 | Jan. 7, 2021    | Jan. 6, 2022     |
| Pre_Amplifier<br>EMCI                               | EMC330N              | 980701      | Mar. 10, 2021   | Mar. 9, 2022     |
| Trilog Broadband Antenna<br>Schwarzbeck             | VULB 9168            | 9168-406    | Nov. 6, 2020    | Nov. 5, 2021     |
| RF Coaxial Cable<br>COMMATE/PEWC                    | 8D                   | 966-4-1     | Mar. 17, 2021   | Mar. 16, 2022    |
| RF Coaxial Cable<br>COMMATE/PEWC                    | 8D                   | 966-4-2     | Mar. 17, 2021   | Mar. 16, 2022    |
| RF Coaxial Cable<br>COMMATE/PEWC                    | 8D                   | 966-4-3     | Mar. 17, 2021   | Mar. 16, 2022    |
| Fixed attenuator<br>Mini-Circuits                   | UNAT-5+              | PAD-ATT5-03 | Jan. 11, 2021   | Jan. 10, 2022    |

- Note: 1. The test was performed in 966 Chamber No. 4.  
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 3. Tested Date: Aug. 18, 2021

**For Radiated Emission (Above 1GHz) test:**

| Description & Manufacturer                          | Model No.            | Serial No.  | Calibrated Date | Calibrated Until |
|-----------------------------------------------------|----------------------|-------------|-----------------|------------------|
| Test Receiver<br>Agilent                            | N9038A               | MY51210202  | Dec. 1, 2020    | Nov. 30, 2021    |
| Software                                            | ADT_Radiated_V8.7.08 | NA          | NA              | NA               |
| Boresight Antenna Tower &<br>Turn Table<br>Max-Full | MF-7802BS            | MF780208530 | NA              | NA               |
| Horn Antenna<br>SCHWARZBECK                         | BBHA 9120D           | 9120D-783   | Nov. 22, 2020   | Nov. 21, 2021    |
| Pre_Amplifier<br>EMCI                               | EMC 12630 SE         | 980638      | Apr. 7, 2021    | Apr. 6, 2022     |
| RF Cable-Frequency Range :<br>1-26.5GHz<br>EMCI     | EMC104-SM-SM-1200    | 160922      | Dec. 25, 2020   | Dec. 24, 2021    |
| RF Coaxial Cable<br>EMCI                            | EMC104-SM-SM-2000    | 180502      | Apr. 26, 2021   | Apr. 25, 2022    |
| RF Coaxial Cable<br>EMCI                            | EMC104-SM-SM-6000    | 180418      | Apr. 26, 2021   | Apr. 25, 2022    |
| Pre_Amplifier<br>EMCI                               | EMC184045SE          | 980387      | Jan. 11, 2021   | Jan. 10, 2022    |
| Horn Antenna<br>Schwarzbeck                         | BBHA 9170            | BBHA9170519 | Nov. 22, 2020   | Nov. 21, 2021    |
| RF Cable-Frequency range:<br>1-40GHz<br>EMCI        | EMC102-KM-KM-1200    | 160924      | Jan. 11, 2021   | Jan. 10, 2022    |
| RF cable (40GHz)<br>EMCI                            | EMC-KM-KM-4000       | 200214      | Mar. 10, 2021   | Mar. 9, 2022     |

- Note: 1. The test was performed in 966 Chamber No. 4.  
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 3. Tested Date: Oct. 1, 2021

**For other test items:**

| DESCRIPTION &<br>MANUFACTURER | MODEL NO.                        | SERIAL NO.    | CALIBRATED<br>DATE | CALIBRATED<br>UNTIL |
|-------------------------------|----------------------------------|---------------|--------------------|---------------------|
| Spectrum Analyzer<br>R&S      | FSV40                            | 101516        | Mar. 08, 2021      | Mar. 07, 2022       |
| 10dB Attenuator<br>Woken      | MDCS18N-10                       | MDCS18N-10-01 | Apr. 13, 2021      | Apr. 12, 2022       |
| Software                      | ADT_RF Test Software<br>V6.6.5.4 | NA            | NA                 | NA                  |

- NOTE:** 1. The test was performed in Oven room 2.  
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 3. Tested Date: Sep. 24, 2021

#### 4.1.3 Test Procedures

##### **For Radiated emission below 30MHz**

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

##### **NOTE:**

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

##### **For Radiated emission above 30MHz**

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

##### **Note:**

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

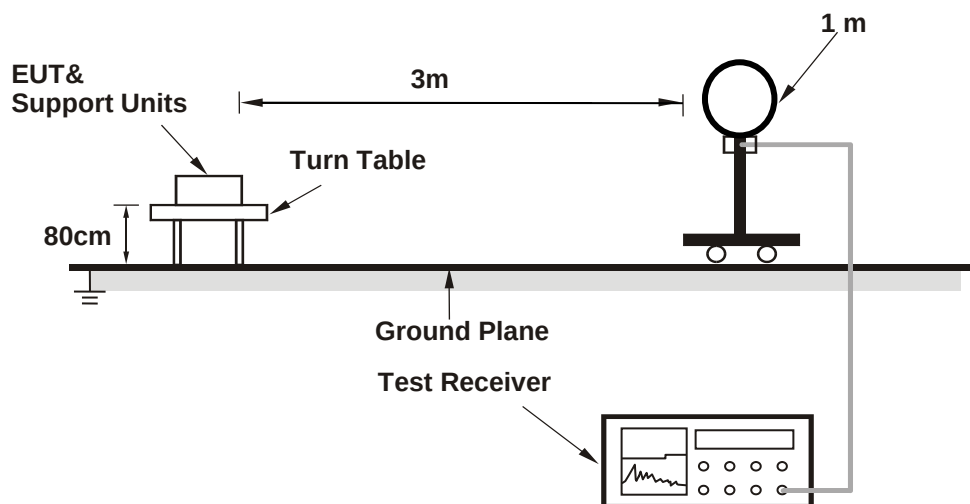
#### 4.1.4 Deviation from Test Standard

No deviation.

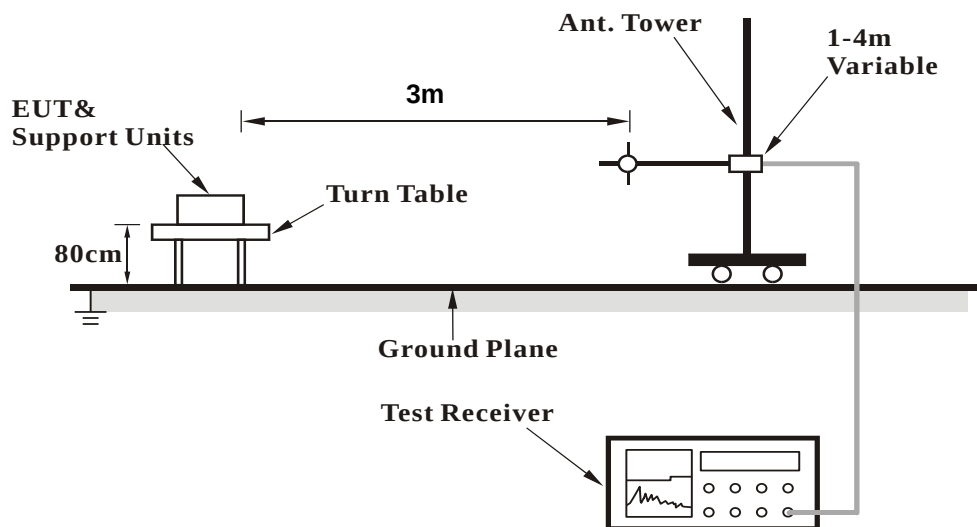


#### 4.1.5 Test Setup

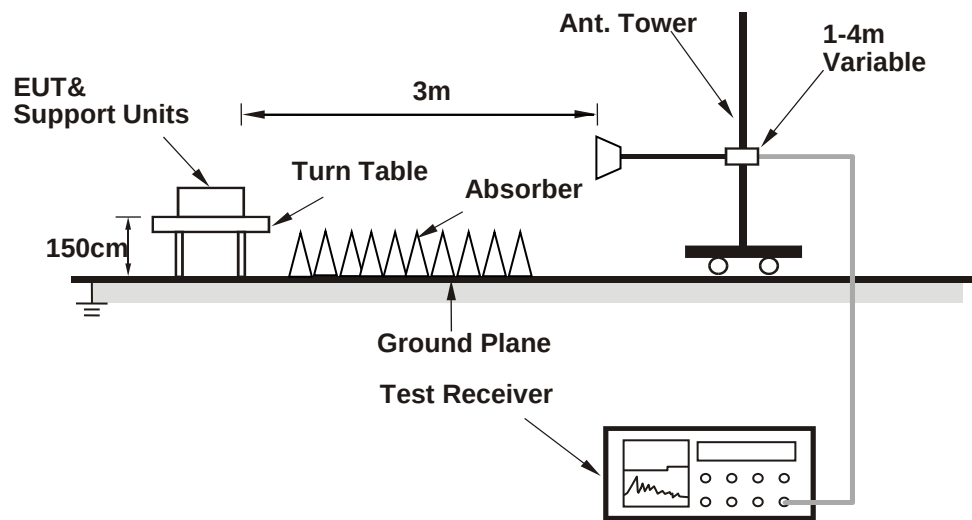
##### For Radiated emission below 30MHz



##### For Radiated emission 30MHz to 1GHz



### For Radiated emission above 1GHz



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

#### 4.1.6 EUT Operating Conditions

- Connected the EUT with the Laptop which is placed on the testing table.
- Controlling software (QRCT 4.0.00177.0) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

#### 4.1.7 Test Results (Mode 1)

Radiated test with 50ohm terminator on antenna port.

Above 1GHz Data:

|                 |              |                   |                           |
|-----------------|--------------|-------------------|---------------------------|
| Frequency Range | 1GHz ~ 40GHz | Detector Function | Peak (PK)<br>Average (AV) |
|-----------------|--------------|-------------------|---------------------------|

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |                         |                |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 4874.00         | 41.1 PK                 | 74.0           | -32.9       | 1.88 H             | 188                  | 37.3             | 3.8                      |
| 2                                                    | 4874.00         | 27.8 AV                 | 54.0           | -26.2       | 1.88 H             | 188                  | 24.0             | 3.8                      |
| 3                                                    | 7311.00         | 44.5 PK                 | 74.0           | -29.5       | 2.43 H             | 350                  | 34.8             | 9.7                      |
| 4                                                    | 7311.00         | 30.5 AV                 | 54.0           | -23.5       | 2.43 H             | 350                  | 20.8             | 9.7                      |
| 5                                                    | 11710.00        | 49.2 PK                 | 74.0           | -24.8       | 1.69 H             | 216                  | 34.8             | 14.4                     |
| 6                                                    | 11710.00        | 37.8 AV                 | 54.0           | -16.2       | 1.69 H             | 216                  | 23.4             | 14.4                     |
| 7                                                    | #17565.00       | 52.5 PK                 | 88.2           | -35.7       | 2.18 H             | 131                  | 33.2             | 19.3                     |
| 8                                                    | #17565.00       | 40.5 AV                 | 68.2           | -27.7       | 2.18 H             | 131                  | 21.2             | 19.3                     |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |                         |                |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 4874.00         | 39.9 PK                 | 74.0           | -34.1       | 1.67 V             | 229                  | 36.1             | 3.8                      |
| 2                                                    | 4874.00         | 26.7 AV                 | 54.0           | -27.3       | 1.67 V             | 229                  | 22.9             | 3.8                      |
| 3                                                    | 7311.00         | 45.0 PK                 | 74.0           | -29.0       | 2.00 V             | 85                   | 35.3             | 9.7                      |
| 4                                                    | 7311.00         | 31.5 AV                 | 54.0           | -22.5       | 2.00 V             | 85                   | 21.8             | 9.7                      |
| 5                                                    | 11710.00        | 51.6 PK                 | 74.0           | -22.4       | 3.15 V             | 307                  | 37.2             | 14.4                     |
| 6                                                    | 11710.00        | 41.1 AV                 | 54.0           | -12.9       | 3.15 V             | 307                  | 26.7             | 14.4                     |
| 7                                                    | #17565.00       | 50.3 PK                 | 88.2           | -37.9       | 2.42 V             | 161                  | 31.0             | 19.3                     |
| 8                                                    | #17565.00       | 39.2 AV                 | 68.2           | -29.0       | 2.42 V             | 161                  | 19.9             | 19.3                     |

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

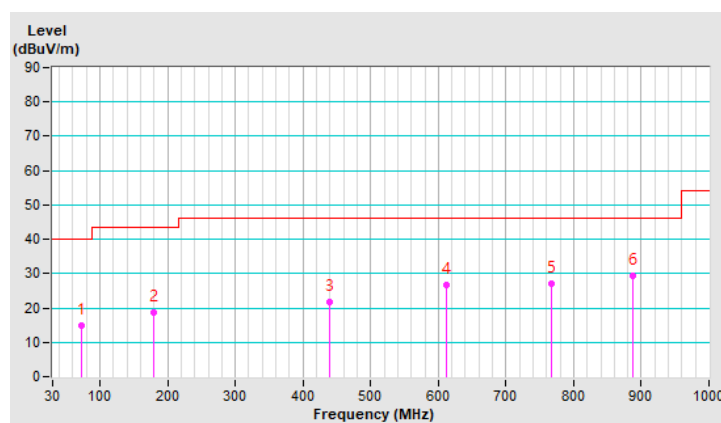
### Below 1GHz Data:

|                 |             |                   |                 |
|-----------------|-------------|-------------------|-----------------|
| Frequency Range | 9kHz ~ 1GHz | Detector Function | Quasi-Peak (QP) |
|-----------------|-------------|-------------------|-----------------|

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |                         |                |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 73.59           | 15.0 QP                 | 40.0           | -25.0       | 1.00 H             | 275                  | 30.8             | -15.8                    |
| 2                                                    | 179.79          | 18.6 QP                 | 43.5           | -24.9       | 2.00 H             | 171                  | 32.2             | -13.6                    |
| 3                                                    | 438.43          | 21.7 QP                 | 46.0           | -24.3       | 1.00 H             | 74                   | 28.1             | -6.4                     |
| 4                                                    | 611.39          | 26.7 QP                 | 46.0           | -19.3       | 1.50 H             | 237                  | 28.6             | -1.9                     |
| 5                                                    | 767.94          | 27.2 QP                 | 46.0           | -18.8       | 1.00 H             | 256                  | 25.9             | 1.3                      |
| 6                                                    | 888.40          | 29.2 QP                 | 46.0           | -16.8       | 2.00 H             | 245                  | 25.9             | 3.3                      |

### 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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

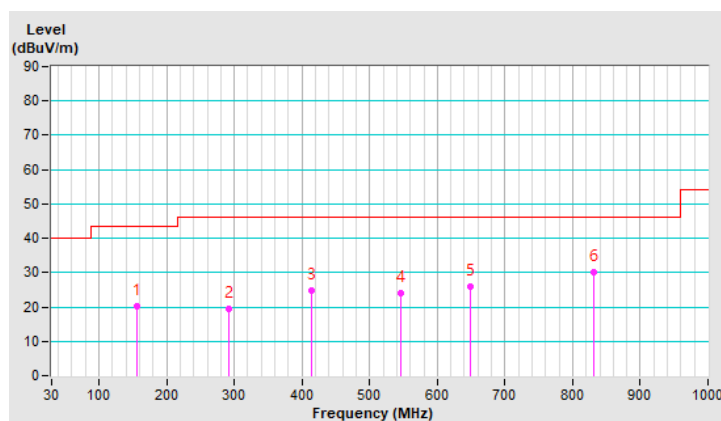


|                 |             |                   |                 |
|-----------------|-------------|-------------------|-----------------|
| Frequency Range | 9kHz ~ 1GHz | Detector Function | Quasi-Peak (QP) |
|-----------------|-------------|-------------------|-----------------|

| Antenna Polarity & Test Distance : Vertical at 3 m |                 |                         |                |             |                    |                      |                  |                          |
|----------------------------------------------------|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                 | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                  | 155.86          | 20.1 QP                 | 43.5           | -23.4       | 2.00 V             | 335                  | 32.0             | -11.9                    |
| 2                                                  | 292.68          | 19.4 QP                 | 46.0           | -26.6       | 1.00 V             | 10                   | 30.4             | -11.0                    |
| 3                                                  | 414.84          | 24.8 QP                 | 46.0           | -21.2       | 1.00 V             | 347                  | 32.2             | -7.4                     |
| 4                                                  | 547.01          | 24.1 QP                 | 46.0           | -21.9       | 2.00 V             | 360                  | 28.1             | -4.0                     |
| 5                                                  | 649.81          | 26.0 QP                 | 46.0           | -20.0       | 1.00 V             | 26                   | 27.3             | -1.3                     |
| 6                                                  | 831.57          | 30.1 QP                 | 46.0           | -15.9       | 1.00 V             | 172                  | 28.0             | 2.1                      |

**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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



#### 4.1.8 Test Results (Mode 2)

**Radiated test with 50ohm terminator on antenna port.**

**Above 1GHz Data:**

|                        |              |                          |                           |
|------------------------|--------------|--------------------------|---------------------------|
| <b>Frequency Range</b> | 1GHz ~ 40GHz | <b>Detector Function</b> | Peak (PK)<br>Average (AV) |
|------------------------|--------------|--------------------------|---------------------------|

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |                         |                |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 4804.00         | 41.1 PK                 | 74.0           | -32.9       | 1.89 H             | 179                  | 37.3             | 3.8                      |
| 2                                                    | 4804.00         | 28.0 AV                 | 54.0           | -26.0       | 1.89 H             | 179                  | 24.2             | 3.8                      |
| 3                                                    | 11710.00        | 48.4 PK                 | 74.0           | -25.6       | 1.69 H             | 204                  | 34.0             | 14.4                     |
| 4                                                    | 11710.00        | 37.3 AV                 | 54.0           | -16.7       | 1.69 H             | 204                  | 22.9             | 14.4                     |
| 5                                                    | #17565.00       | 51.4 PK                 | 88.2           | -36.8       | 2.21 H             | 157                  | 32.1             | 19.3                     |
| 6                                                    | #17565.00       | 39.6 AV                 | 68.2           | -28.6       | 2.21 H             | 157                  | 20.3             | 19.3                     |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |                         |                |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 4804.00         | 39.8 PK                 | 74.0           | -34.2       | 1.65 V             | 217                  | 36.0             | 3.8                      |
| 2                                                    | 4804.00         | 26.8 AV                 | 54.0           | -27.2       | 1.65 V             | 217                  | 23.0             | 3.8                      |
| 3                                                    | 11710.00        | 51.2 PK                 | 74.0           | -22.8       | 3.23 V             | 304                  | 36.8             | 14.4                     |
| 4                                                    | 11710.00        | 40.6 AV                 | 54.0           | -13.4       | 3.23 V             | 304                  | 26.2             | 14.4                     |
| 5                                                    | #17565.00       | 49.9 PK                 | 88.2           | -38.3       | 2.45 V             | 139                  | 30.6             | 19.3                     |
| 6                                                    | #17565.00       | 38.8 AV                 | 68.2           | -29.4       | 2.45 V             | 139                  | 19.5             | 19.3                     |

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

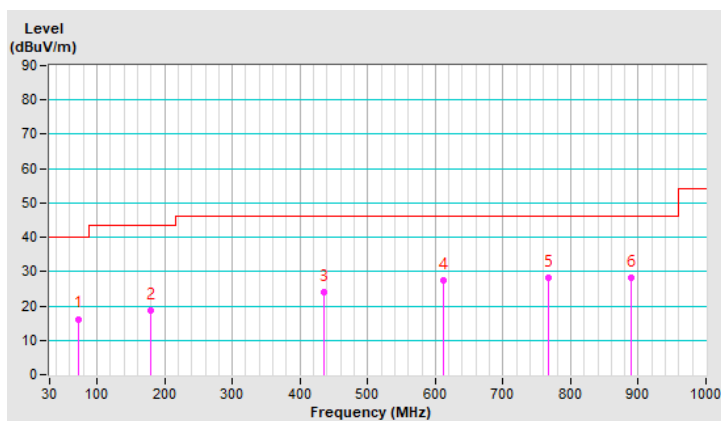
# Below 1GHz Data:

|                 |             |                   |                 |
|-----------------|-------------|-------------------|-----------------|
| Frequency Range | 9kHz ~ 1GHz | Detector Function | Quasi-Peak (QP) |
|-----------------|-------------|-------------------|-----------------|

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |                         |                |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 71.88           | 16.2 QP                 | 40.0           | -23.8       | 1.00 H             | 298                  | 31.6             | -15.4                    |
| 2                                                    | 179.08          | 18.6 QP                 | 43.5           | -24.9       | 2.00 H             | 163                  | 32.0             | -13.4                    |
| 3                                                    | 436.27          | 24.1 QP                 | 46.0           | -21.9       | 1.00 H             | 48                   | 30.5             | -6.4                     |
| 4                                                    | 612.62          | 27.5 QP                 | 46.0           | -18.5       | 1.50 H             | 248                  | 29.4             | -1.9                     |
| 5                                                    | 766.86          | 28.1 QP                 | 46.0           | -17.9       | 1.00 H             | 248                  | 26.8             | 1.3                      |
| 6                                                    | 889.00          | 28.2 QP                 | 46.0           | -17.8       | 2.00 H             | 234                  | 24.9             | 3.3                      |

## 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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

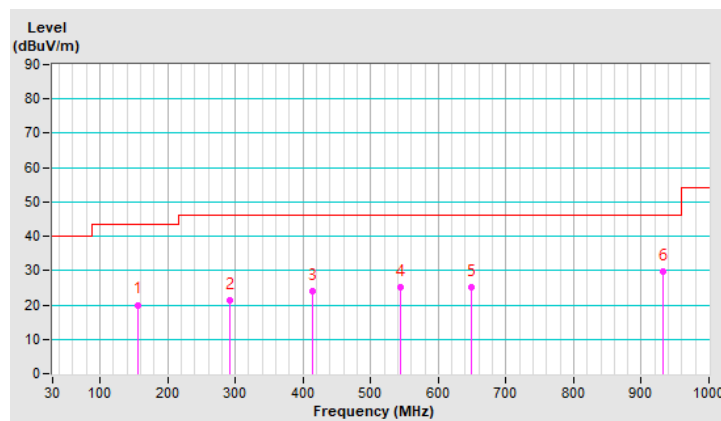


|                 |             |                   |                 |
|-----------------|-------------|-------------------|-----------------|
| Frequency Range | 9kHz ~ 1GHz | Detector Function | Quasi-Peak (QP) |
|-----------------|-------------|-------------------|-----------------|

| Antenna Polarity & Test Distance : Vertical at 3 m |                 |                         |                |             |                    |                      |                  |                          |
|----------------------------------------------------|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                 | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                  | 155.62          | 20.0 QP                 | 43.5           | -23.5       | 2.00 V             | 334                  | 31.9             | -11.9                    |
| 2                                                  | 292.59          | 21.4 QP                 | 46.0           | -24.6       | 1.00 V             | 22                   | 32.4             | -11.0                    |
| 3                                                  | 414.15          | 24.0 QP                 | 46.0           | -22.0       | 1.00 V             | 322                  | 31.4             | -7.4                     |
| 4                                                  | 544.73          | 25.1 QP                 | 46.0           | -20.9       | 2.00 V             | 351                  | 29.1             | -4.0                     |
| 5                                                  | 649.67          | 25.1 QP                 | 46.0           | -20.9       | 1.00 V             | 65                   | 26.4             | -1.3                     |
| 6                                                  | 932.29          | 29.8 QP                 | 46.0           | -16.2       | 1.00 V             | 187                  | 25.7             | 4.1                      |

**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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.





## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

| Frequency (MHz) | Conducted Limit (dBuV) |         |
|-----------------|------------------------|---------|
|                 | Quasi-peak             | Average |
| 0.15 - 0.5      | 66 - 56                | 56 - 46 |
| 0.50 - 5.0      | 56                     | 46      |
| 5.0 - 30.0      | 60                     | 50      |

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

### 4.2.2 Test Instruments

| Description & Manufacturer | Model No.           | Serial No. | Calibrated Date | Calibrated Until |
|----------------------------|---------------------|------------|-----------------|------------------|
| Test Receiver R&S          | ESCS 30             | 847124/029 | Oct. 20, 2020   | Oct. 19, 2021    |
| LISN R&S                   | ESH3-Z5             | 848773/004 | Oct. 27, 2020   | Oct. 26, 2021    |
| LISN R & S                 | ESH3-Z5             | 835239/001 | Mar. 26, 2021   | Mar. 25, 2022    |
| 50 ohms Terminator         | 50                  | 3          | Oct. 26, 2020   | Oct. 25, 2021    |
| RF Coaxial Cable JYEBO     | 5D-FB               | COCCAB-001 | Sep. 26, 2020   | Sep. 25, 2021    |
| Fixed attenuator STI       | STI02-2200-10       | 005        | Aug. 29, 2020   | Aug. 28, 2021    |
| Software BVADT             | BVADT_Cond_V7.3.7.4 | NA         | NA              | NA               |

Note: 1. The test was performed in Conduction 1.

2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

3. Tested Date: Aug. 18, 2021

#### 4.2.3 Test Procedures

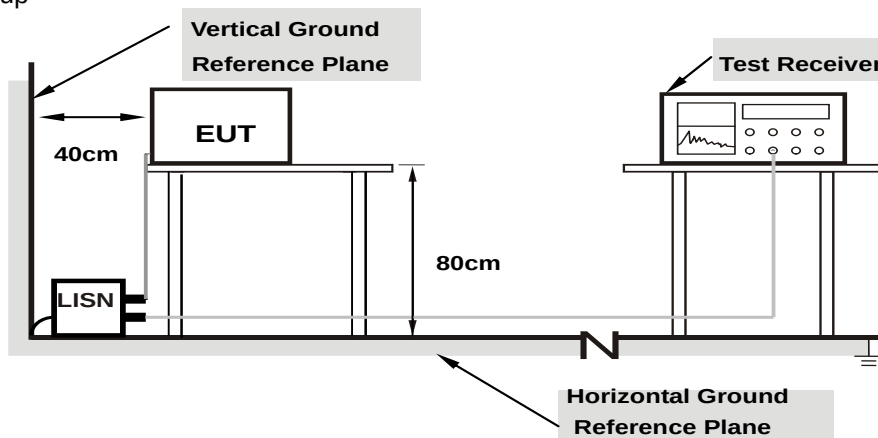
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

**Note:** The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

#### 4.2.4 Deviation from Test Standard

No deviation.

#### 4.2.5 Test Setup



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

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

#### 4.2.6 EUT Operating Conditions

Same as 4.1.6.

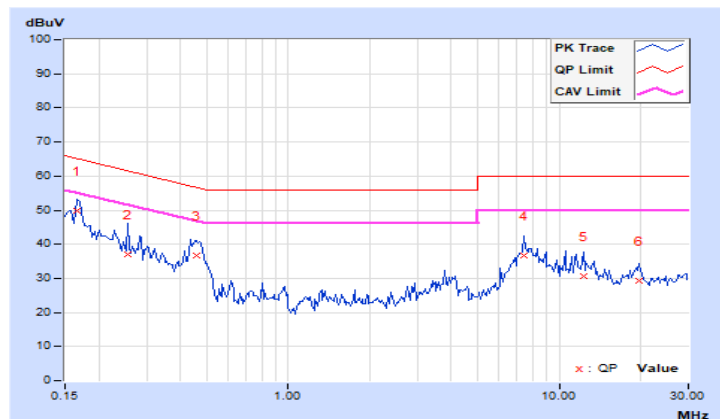
#### 4.2.7 Test Results (Mode 1)

|                        |                |                                                     |                                      |
|------------------------|----------------|-----------------------------------------------------|--------------------------------------|
| <b>Frequency Range</b> | 150kHz ~ 30MHz | <b>Detector Function &amp; Resolution Bandwidth</b> | Quasi-Peak (QP) / Average (AV), 9kHz |
|------------------------|----------------|-----------------------------------------------------|--------------------------------------|

| Phase Of Power : Line (L) |                 |                        |                      |       |                       |       |              |       |             |        |
|---------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                        | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                           |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                         | 0.16585         | 10.05                  | 39.63                | 30.42 | 49.68                 | 40.47 | 65.17        | 55.17 | -15.49      | -14.70 |
| 2                         | 0.25528         | 10.06                  | 27.13                | 21.85 | 37.19                 | 31.91 | 61.58        | 51.58 | -24.39      | -19.67 |
| 3                         | 0.45845         | 10.07                  | 26.67                | 18.90 | 36.74                 | 28.97 | 56.72        | 46.72 | -19.98      | -17.75 |
| 4                         | 7.38614         | 10.46                  | 26.14                | 20.65 | 36.60                 | 31.11 | 60.00        | 50.00 | -23.40      | -18.89 |
| 5                         | 12.29263        | 10.75                  | 19.85                | 14.27 | 30.60                 | 25.02 | 60.00        | 50.00 | -29.40      | -24.98 |
| 6                         | 19.67556        | 11.20                  | 18.06                | 12.11 | 29.26                 | 23.31 | 60.00        | 50.00 | -30.74      | -26.69 |

#### Remarks:

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

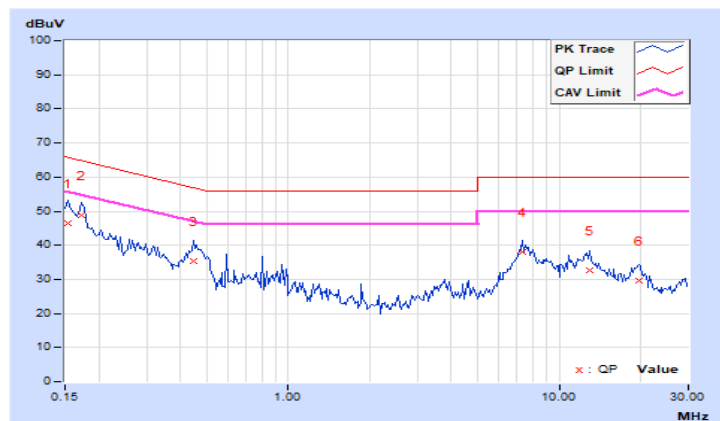


|                        |                |                                                     |                                      |
|------------------------|----------------|-----------------------------------------------------|--------------------------------------|
| <b>Frequency Range</b> | 150kHz ~ 30MHz | <b>Detector Function &amp; Resolution Bandwidth</b> | Quasi-Peak (QP) / Average (AV), 9kHz |
|------------------------|----------------|-----------------------------------------------------|--------------------------------------|

| Phase Of Power : Neutral (N) |                 |                        |                      |              |                       |              |              |              |               |               |
|------------------------------|-----------------|------------------------|----------------------|--------------|-----------------------|--------------|--------------|--------------|---------------|---------------|
| No                           | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |              | Emission Level (dBuV) |              | Limit (dBuV) |              | Margin (dB)   |               |
|                              |                 |                        | Q.P.                 | AV.          | Q.P.                  | AV.          | Q.P.         | AV.          | Q.P.          | AV.           |
| 1                            | 0.15334         | 10.02                  | 36.53                | 25.43        | 46.55                 | 35.45        | 65.82        | 55.82        | -19.27        | -20.37        |
| 2                            | <b>0.17312</b>  | <b>10.02</b>           | <b>38.85</b>         | <b>31.50</b> | <b>48.87</b>          | <b>41.52</b> | <b>64.81</b> | <b>54.81</b> | <b>-15.94</b> | <b>-13.29</b> |
| 3                            | 0.44686         | 10.04                  | 25.43                | 16.79        | 35.47                 | 26.83        | 56.93        | 46.93        | -21.46        | -20.10        |
| 4                            | 7.31226         | 10.36                  | 27.63                | 21.52        | 37.99                 | 31.88        | 60.00        | 50.00        | -22.01        | -18.12        |
| 5                            | 13.00510        | 10.63                  | 22.13                | 16.09        | 32.76                 | 26.72        | 60.00        | 50.00        | -27.24        | -23.28        |
| 6                            | 19.72276        | 10.94                  | 18.75                | 13.59        | 29.69                 | 24.53        | 60.00        | 50.00        | -30.31        | -25.47        |

**Remarks:**

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



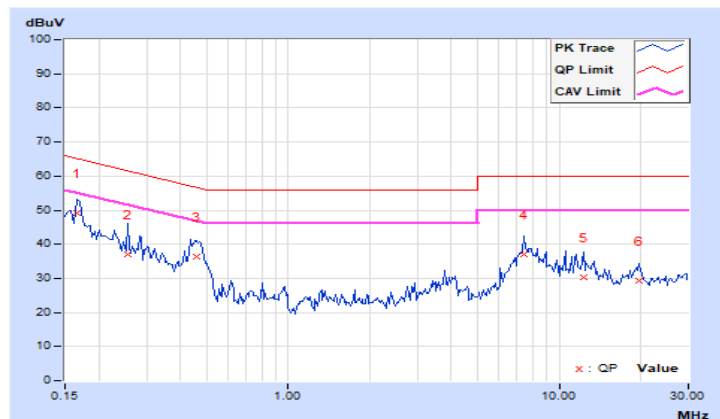
#### 4.2.8 Test Results (Mode 2)

|                        |                |                                                     |                                      |
|------------------------|----------------|-----------------------------------------------------|--------------------------------------|
| <b>Frequency Range</b> | 150kHz ~ 30MHz | <b>Detector Function &amp; Resolution Bandwidth</b> | Quasi-Peak (QP) / Average (AV), 9kHz |
|------------------------|----------------|-----------------------------------------------------|--------------------------------------|

| Phase Of Power : Line (L) |                 |                        |                      |       |                       |       |              |       |             |        |
|---------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                        | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                           |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                         | 0.16540         | 10.05                  | 39.18                | 30.08 | 49.23                 | 40.13 | 65.19        | 55.19 | -15.96      | -15.06 |
| 2                         | 0.25516         | 10.06                  | 27.03                | 21.40 | 37.09                 | 31.46 | 61.59        | 51.59 | -24.50      | -20.13 |
| 3                         | 0.45820         | 10.07                  | 26.42                | 18.04 | 36.49                 | 28.11 | 56.73        | 46.73 | -20.24      | -18.62 |
| 4                         | 7.38604         | 10.46                  | 26.41                | 20.30 | 36.87                 | 30.76 | 60.00        | 50.00 | -23.13      | -19.24 |
| 5                         | 12.29218        | 10.75                  | 19.46                | 14.14 | 30.21                 | 24.89 | 60.00        | 50.00 | -29.79      | -25.11 |
| 6                         | 19.67530        | 11.20                  | 18.17                | 12.01 | 29.37                 | 23.21 | 60.00        | 50.00 | -30.63      | -26.79 |

#### Remarks:

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

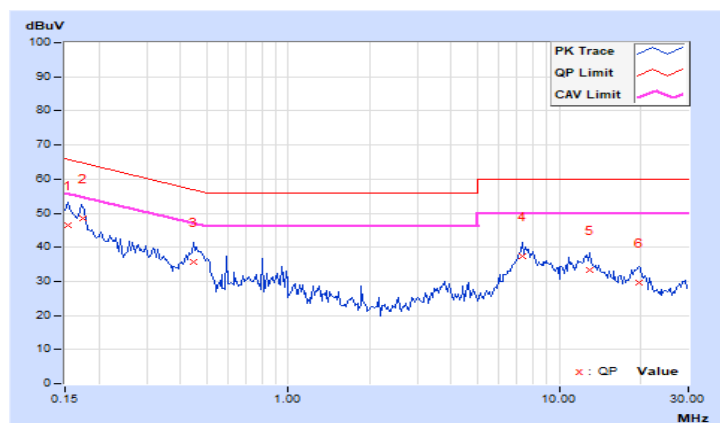


|                        |                |                                                     |                                      |
|------------------------|----------------|-----------------------------------------------------|--------------------------------------|
| <b>Frequency Range</b> | 150kHz ~ 30MHz | <b>Detector Function &amp; Resolution Bandwidth</b> | Quasi-Peak (QP) / Average (AV), 9kHz |
|------------------------|----------------|-----------------------------------------------------|--------------------------------------|

| Phase Of Power : Neutral (N) |                 |                        |                      |       |                       |       |              |       |             |        |
|------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                           | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                              |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                            | 0.15318         | 10.02                  | 36.56                | 25.12 | 46.58                 | 35.14 | 65.83        | 55.83 | -19.25      | -20.69 |
| 2                            | 0.17379         | 10.02                  | 38.44                | 31.30 | 48.46                 | 41.32 | 64.78        | 54.78 | -16.32      | -13.46 |
| 3                            | 0.44656         | 10.04                  | 25.53                | 16.64 | 35.57                 | 26.68 | 56.94        | 46.94 | -21.37      | -20.26 |
| 4                            | 7.31235         | 10.36                  | 27.17                | 21.18 | 37.53                 | 31.54 | 60.00        | 50.00 | -22.47      | -18.46 |
| 5                            | 13.00516        | 10.63                  | 22.65                | 16.29 | 33.28                 | 26.92 | 60.00        | 50.00 | -26.72      | -23.08 |
| 6                            | 19.72287        | 10.94                  | 18.85                | 13.16 | 29.79                 | 24.10 | 60.00        | 50.00 | -30.21      | -25.90 |

**Remarks:**

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

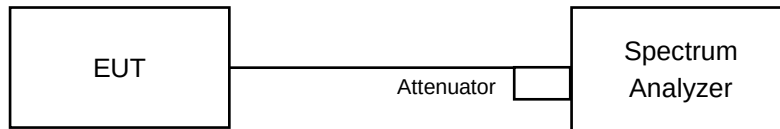


### 4.3 Conducted Out of Band Emission Measurement

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

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

#### 4.3.2 Test Setup



#### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 Test Procedures

##### MEASUREMENT PROCEDURE REF

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

##### MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW  $\geq$  300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

#### 4.3.5 Deviation from Test Standard

No deviation.

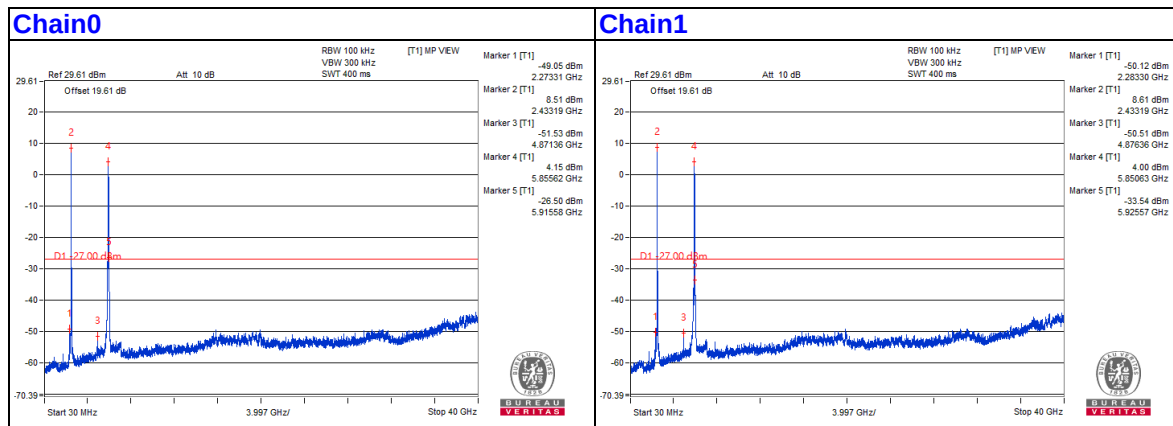
#### 4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

#### 4.3.7 Test Results (Mode 1)

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

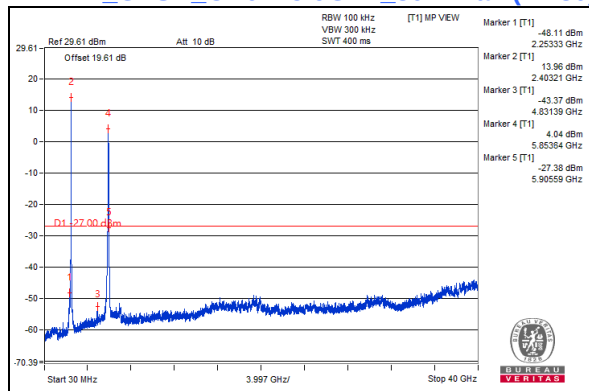
##### 2.4GHz\_802.11g\_CH6 + 5.9GHz\_802.11ax (HE80)\_CH171



#### 4.3.8 Test Results (Mode 2)

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

##### BT-EDR\_GFSK\_CH0 + 5.9GHz\_802.11ax (HE80)\_CH171





## 5 Pictures of Test Arrangements

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

## Appendix – Information of the Testing Laboratories

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