

# RF TEST REPORT

## FCC

APPLICANT

**Tarana Wireless, Inc.**

MODEL NAME

**G1RN5AHB012**

FCC ID

**2ABOF-G1RN5AHB012**

REPORT NUMBER

**HA220826-TAR-006-R01**

# TEST REPORT

**Date of Issue**  
October 10, 2022

**Test Site**  
Hyundai C-Tech, Inc. dba HCT America, Inc.  
1726 Ringwood Ave, San Jose, CA 95131, USA

|                           |                                                      |
|---------------------------|------------------------------------------------------|
| <b>Applicant</b>          | Tarana Wireless, Inc.                                |
| <b>Applicant Address</b>  | 590 Alder Drive, Milpitas, CA 95035                  |
| <b>FCC ID</b>             | 2ABOF-G1RN5AHB012                                    |
| <b>Model Name</b>         | G1RN5AHB012                                          |
| <b>EUT Type</b>           | 5GHz RF Remote Node (RN)                             |
| <b>FCC Classification</b> | Unlicensed National Information Infrastructure (NII) |
| <b>FCC Rule Part(s)</b>   | Part 15.407                                          |
| <b>Test Procedure</b>     | ANSI C63.10-2013, KDB 789033 D02 v02r01              |

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures required. The results of testing in this report apply only to the product which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Hyundai C-Tech, Inc. dba HCT America, Inc. certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

**Tested By**



Yongsoo Park  
Test Engineer

**Reviewed By**



Sunwoo Kim  
Technical Manager

## REVISION HISTORY

*The revision history for this document is shown in table.*

| TEST REPORT NO.      | DATE             | DESCRIPTION   |
|----------------------|------------------|---------------|
| HA220826-TAR-006-R01 | October 10, 2022 | Initial Issue |
|                      |                  |               |
|                      |                  |               |
|                      |                  |               |

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## 1. GENERAL INFORMATION

### EUT DESCRIPTION

|                              |                                                                                                                                                                                                                             |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Model</b>                 | G1RN5AHB012                                                                                                                                                                                                                 |
| <b>Serial Number</b>         | S158T1223600281 (RF Conducted)<br>S160T1223000007 (RF Radiated)                                                                                                                                                             |
| <b>EUT Type</b>              | 5GHz RF Remote Node (RN)                                                                                                                                                                                                    |
| <b>Description of Device</b> | Fixed outdoor point-to-point device                                                                                                                                                                                         |
| <b>Power Supply</b>          | PoE (Power over Ethernet) : 44 ~ 60 V d.c.                                                                                                                                                                                  |
| <b>RF Specification</b>      | 5 GHz RF : U-NII 1 band / U-NII 3 band<br>Single Carrier : 10 / 20 / 40 MHz<br>Multi-Carrier (Contiguous) : 10+10 / 20+20 / 20+40 / 40+20 / 40+40 MHz<br>Multi-Carrier (Non-Contiguous) : 10+10 / 20+20 / 20+40 / 40+20 MHz |
| <b>Transmitter Chain</b>     | 8                                                                                                                                                                                                                           |
| <b>Operating Environment</b> | Outdoor                                                                                                                                                                                                                     |
| <b>Operating Temperature</b> | -40°C - 55°C                                                                                                                                                                                                                |

### RF SPECIFICATION SUBJECT TO THE REPORT

|                                            |                                                                                                                                                                                                              |                                                                                                       |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>RF Specification</b>                    | 5 GHz RF : U-NII 1 band<br>Single Carrier : 10 / 20 / 40 MHz<br>Multi-Carrier (Contiguous) : 10+10 / 20+20 / 20+40 / 40+20 / 40+40 MHz<br>Multi-Carrier (Non-Contiguous) : 10+10 / 20+20 / 20+40 / 40+20 MHz |                                                                                                       |
| <b>Frequency Range</b>                     | U-NII 1                                                                                                                                                                                                      | 10 MHz BW : 5175 MHz – 5245 MHz<br>20 MHz BW : 5180 MHz – 5240 MHz<br>40 MHz BW : 5190 MHz – 5230 MHz |
| <b>Max. RF Output Power</b>                | U-NII 1                                                                                                                                                                                                      | 29.79 dBm (952.80 mW)                                                                                 |
| <b>Modulation Type</b>                     | OFDM, Adaptive MCS (QPSK to 256QAM 7.35/8)                                                                                                                                                                   |                                                                                                       |
| <b>Antenna Specification <sup>1)</sup></b> | Array Antenna<br>RN Antenna Gain : 13.9 dBi<br>Directional Gain with Array Gain : 19.92 dBi                                                                                                                  |                                                                                                       |
| <b>Firmware Version <sup>2)</sup></b>      | SYS.A3.R10.XXX.0.992.033.02                                                                                                                                                                                  |                                                                                                       |
| <b>Hardware Version <sup>2)</sup></b>      | 31-0170-301.1.0                                                                                                                                                                                              |                                                                                                       |
| <b>Date(s) of Tests</b>                    | September 12, 2022 ~ October 7, 2022                                                                                                                                                                         |                                                                                                       |

#### Note :

1. Antenna information is based on the document provided.
2. Firmware and Hardware Version are as received by the client.

## ANTENNA CONFIGURATION

### DIRECTIONAL GAIN

In accordance with KDB 662911 D01 v02r01, KDB 662911 D02 v01

Directional Gain = RN Antenna Gain + Array Gain

The EUT has 4 Horizontal and 4 Vertical Cross-polarized antennas.

RN Antenna Gain : 13.9 dBi

Array Gain =  $10 \log(4/1) = 6.02$  dB, where No of Horizontal Antenna = 4 / No of Spatial Stream = 1

Directional Gain = 13.9 dBi + 6.02 dB = 19.92 dBi

### ADDITIONAL LOSS

The RF conducted sample has internal loss of 23.73 dB between RF chipset and the antenna port for RF conducted emission measurement purpose. The loss was provided by the manufacturer and applied during the conducted test.

Additional loss detail:

In order to conduct tests in a conducted fashion, the RN antenna board is replaced with a RWFS, which stands for RN Wave-Front Simulator. This board basically connects the RF ports to the SMA connectors that show on the face of the radome. This RWFS board is a lossy board since it has multiple stages of splitter / combiners. In order to reflect the measured power on a spectrum analyzer all the way to the RF connector, this loss needs to be accounted for. The 1W is always referred to at the antenna connector itself, and not at the SMA connector on the radome. The 23.73 dB is the loss of the RWFS which was calibrated using a network analyzer.

## OPERATING FREQUENCY CHANNELS

| Band    | Channel | Frequency (MHz) | 10 MHz | 20 MHz | 40 MHz |
|---------|---------|-----------------|--------|--------|--------|
| U-NII 1 | 35      | 5175            | O      | -      | -      |
|         | 36      | 5180            | O      | O      | -      |
|         | 37      | 5185            | O      | O      | -      |
|         | 38      | 5190            | O      | O      | O      |
|         | 39      | 5195            | O      | O      | O      |
|         | 40      | 5200            | O      | O      | O      |
|         | 41      | 5205            | O      | O      | O      |
|         | 42      | 5210            | O      | O      | O      |
|         | 43      | 5215            | O      | O      | O      |
|         | 44      | 5220            | O      | O      | O      |
|         | 45      | 5225            | O      | O      | O      |
|         | 46      | 5230            | O      | O      | O      |
|         | 47      | 5235            | O      | O      | -      |
|         | 48      | 5240            | O      | O      | -      |
|         | 49      | 5245            | O      | -      | -      |

**Note :**

This product is not limited to the channel, and the frequency can be freely selected within the frequency range.

## 2. METHODOLOGY

The measurement procedure described in FCC KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 dated December 14, 2017 entitled "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part15, Subpart E" and ANSI C63.10 (Version : 2013) 'the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices' were used in the measurement.

### EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

### EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.407 under the FCC Rules Part 15 Subpart E.

## GENERAL TEST PROCEDURES

### Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

### Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. Also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emission, the relative positions of this hand-held transmitter (EUT) were rotated through three orthogonal axes according to the requirements in Section 8 of ANSI C63.10. (Version: 2013)

## DESCRIPTION OF TEST MODES

The EUT has been tested under radio operating condition. Test software to control the channel, power level setting, and the bandwidth has been pre-installed in the EUT and Teraterm application was used to control the RF parameters during the test.

## 3. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).



## 4. FACILITIES AND ACCREDITATIONS

### FACILITIES

The SAC (Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at 1726 Ringwood Avenue, San Jose, California 95131, USA.

The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.



### EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

## 5. ANTENNA REQUIREMENTS

**According to FCC 47 CFR §15.203:**

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

- (1) The antenna of this E.U.T is permanently attached and there is no provision for connection to an external antenna.
- (2) The E.U.T Complies with the requirement of §15.203

## 6. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

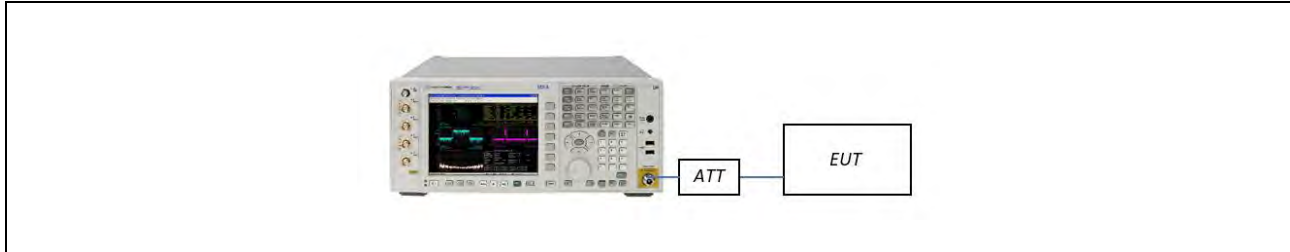
All measurement uncertainty values are shown with a coverage factor of  $k = 2$  to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the  $U_{CISPR}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

| Parameter                        | Expanded Uncertainty |
|----------------------------------|----------------------|
| Output Power, Conducted          | $\pm 0.35$ dB        |
| Occupied Bandwidth               | $\pm 12.4$ kHz       |
| Unwanted Emissions, Conducted    | $\pm 0.46$ dB        |
| Radiated Emissions (below 1 GHz) | $\pm 6.09$ dB        |
| Radiated Emissions (Above 1 GHz) | $\pm 5.23$ dB        |

## 7. DESCRIPTION OF TESTS

### 7.1. DUTY CYCLE

#### TEST SETUP



#### TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

Measurement is performed in accordance with the section B.2 in KDB 789033 D02 v02r01.

The largest available value of RBW is 8 MHz and VBW is 50 MHz.

The zero-span method of measuring duty cycle shall not be used if  $T \leq 6.25$  microseconds. ( $50/6.25 = 8$ )

The zero-span method was used because all measured T data are  $> 6.25$  microseconds and both RBW and VBW are  $> 50/T$ .

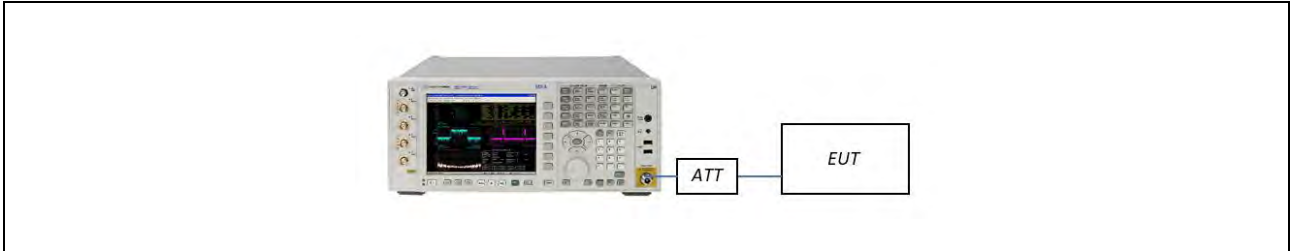
- RBW = 8 MHz (the largest available value)
- VBW = 8 MHz ( $\geq$  RBW)
- SPAN = 0 Hz
- Detector = Peak
- Number of points in sweep  $> 100$
- Trace mode = Clear write
- Measure  $T_{total}$  and  $T_{on}$
- Calculate Duty Cycle =  $T_{on} / T_{total}$  and Duty Cycle Factor =  $10 * \log(1/\text{Duty Cycle})$

## 7.2. 26 dB BANDWIDTH / 99 % OCCUPIED BANDWIDTH

### LIMIT

Emission bandwidth was measured to define the minimum frequency range which the spectrum is integrated for maximum conducted output power measurement.

### TEST SETUP



### TEST PROCEDURE (26 dB Bandwidth)

Testing was performed according to the section C.1 in KDB 789033 D02 v02r01.

The transmitter output is connected to the spectrum analyzer.

The Spectrum Analyzer setting :

- RBW = Approximately 1 % of the emission bandwidth
- VBW > RBW
- Detector = Peak
- Trace mode = max hold
- Sweep = auto couple
- Measure the maximum width of the emission that is 26 dB down from the maximum 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 %.

### TEST PROCEDURE (99% Bandwidth)

Testing was performed according to the section D in KDB 789033 D02 v02r01.

The transmitter output is connected to the spectrum analyzer.

- RBW = 1% ~ 5% of the occupied bandwidth
- VBW  $\approx$  3 x RBW
- Detector = Peak
- Trace mode = max hold
- Sweep = auto couple
- Allow the trace to stabilize

### Note:

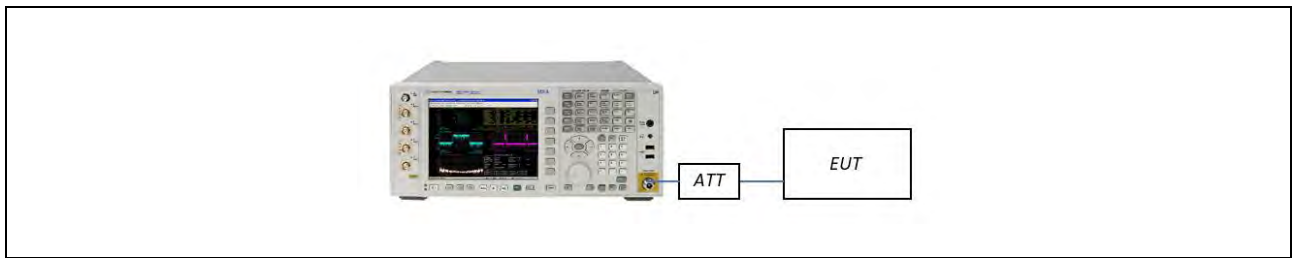
1. The bandwidth measurement function from the spectrum analyzer is used to measure X dB bandwidth.
2. 26 dB bandwidth is used to determine the conducted power limits.

### 7.3. OUTPUT POWER

#### LIMIT

| Band    | 47 CFR §15.407(a)(1) |                                                                                                                              |
|---------|----------------------|------------------------------------------------------------------------------------------------------------------------------|
| U-NII 1 | Master (Outdoor)     | $\leq 1 \text{ W} (= 30\text{dBm})$<br>$\leq 125 \text{ mW} (= 21\text{dBm})$ EIRP at max elevation angle (30°) from horizon |
|         | Master (Indoor)      | $\leq 1 \text{ W} (= 30\text{dBm})$                                                                                          |
|         | Client Device        | $\leq 250 \text{ mW} (= 24 \text{ dBm})$                                                                                     |

#### TEST SETUP



#### TEST PROCEDURE

Refer to the section E.2.d) in KDB 789033 D02 v02r01

The transmitter output is connected to the Spectrum Analyzer.

Spectrum analyzer's integrated band power measurement function was used.

- Measure the duty cycle.
- Set span to encompass the 26 dB EBW of the signal.
- RBW = 1 MHz
- VBW  $\geq 3$  MHz
- Number of points in sweep  $\geq 2 \cdot \text{span} / \text{RBW}$ .
- Sweep time = auto.
- Detector = RMS.
- Do not use sweep triggering. Allow the sweep to "free run".
- Trace average at least 100 traces in power averaging (RMS) mode
- Integrated bandwidth = EBW

Add  $10\log(1/x)$ , where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times

#### Sample Calculation

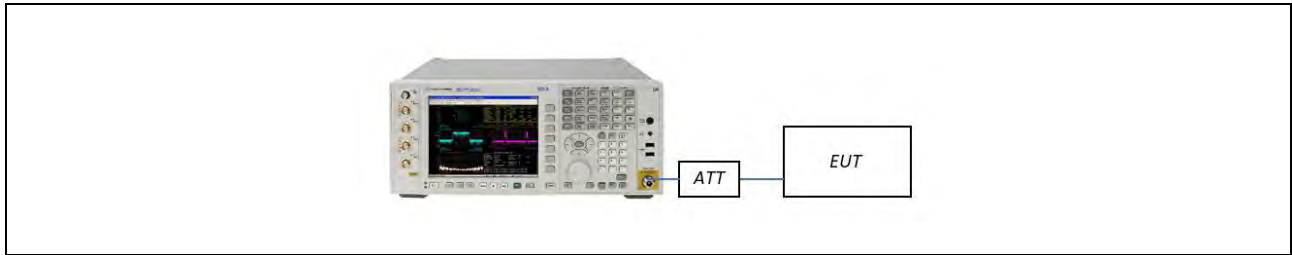
- Conducted Output Power (Average) = Reading Value + ATT loss + Cable loss + Duty Cycle Factor

## 7.4. POWER SPECTRAL DENSITY

### LIMIT

| Band    | 47 CFR §15.407(a)(1) |                   |
|---------|----------------------|-------------------|
| U-NII 1 | Master Device        | $\leq 17$ dBm/MHz |
|         | Client Device        | $\leq 11$ dBm/MHz |

### TEST SETUP



### TEST PROCEDURE

Refer to the section F in KDB 789033 D02 v02r01.

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- RBW = 1 MHz (510 kHz for U-NII 3)
- VBW  $\geq 3$  MHz
- Number of points in sweep  $\geq 2 \times \text{span} / \text{RBW}$ .
- Sweep time = auto.
- Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
- Do not use sweep triggering. Allow the sweep to “free run”.
- Trace average at least 100 traces in power averaging (RMS) mode
- Use the peak search function on the spectrum analyzer to find the peak of the spectrum.
- If Method SA-2 was used, add  $10 \log(1/x)$ , where x is the duty cycle, to the peak of the spectrum.

### Sample Calculation

Total PSD (Average) = Reading Value + ATT loss + Cable loss + Duty Cycle Factor

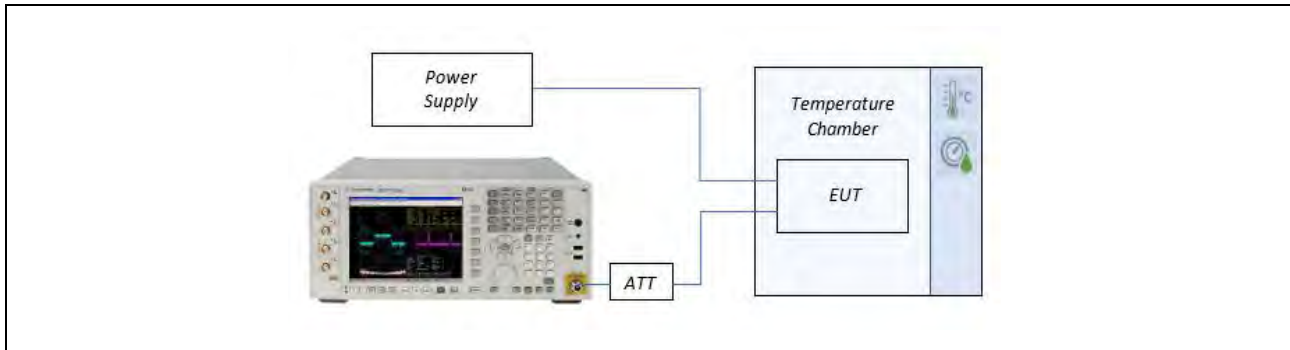
## 7.5. FREQUENCY STABILITY

### LIMIT

#### \$15.407(g)

Fundamental emissions of the radio devices should be kept within at least the central 80% of its permitted operating frequency band to minimize the possibility of out of band operation.

### TEST SETUP



### TEST PROCEDURE

- The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between -30 °C and 50 °C.
- The temperature was incremented by 10 °C intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.
- The primary supply voltage is varied from 85% to 115% of the nominal value for non-hand carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.
- While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.



## 7.6. UNDESIRABLE EMISSION

### LIMIT

| Frequency Band | 47 CFR §15.407(b)(1)                                                                                                                    |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| U-NII 1        | In accordance with <b>47 CFR §15.407(b)(1)</b><br>All emissions outside the 5.15-5.35 GHz band shall not exceed an -27 dBm/MHz e.i.r.p. |

## 7.7. RADIATED EMISSIONS

### RADIATION EMISSION LIMIT

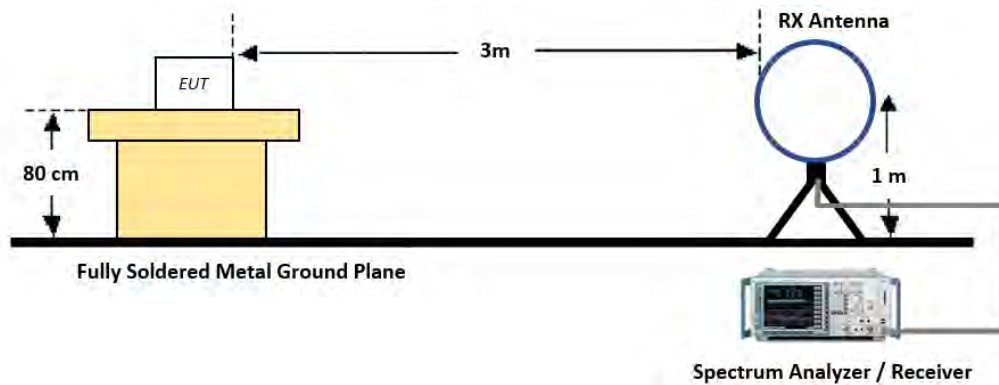
| FCC : 47 CFR § 15.209 |                       |                          |
|-----------------------|-----------------------|--------------------------|
| Frequency (MHz)       | Field Strength (uV/m) | Measurement Distance (m) |
| 0.009 – 0.490         | 2400/F(kHz)           | 300                      |
| 0.490 – 1.705         | 24000/F(kHz)          | 30                       |
| 1.705 – 30            | 30                    | 30                       |
| 30-88                 | 100                   | 3                        |
| 88-216                | 150                   | 3                        |
| 216-960               | 200                   | 3                        |
| Above 960             | 500                   | 3                        |

### RESTRICTED BANDS OF OPERATION

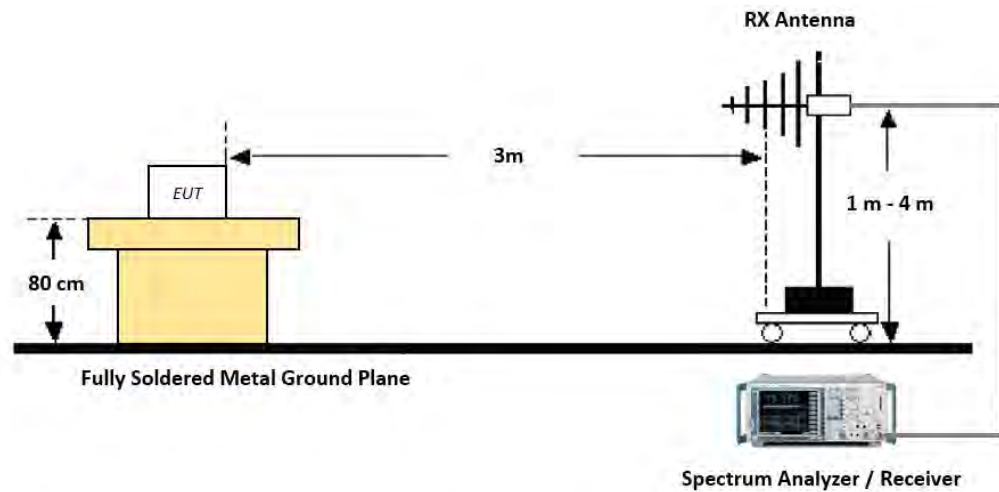
| FCC : 47 CFR § 15.205(a) |                   |                       |                 |                 |
|--------------------------|-------------------|-----------------------|-----------------|-----------------|
| Frequency (MHz)          | Frequency (MHz)   | Frequency (MHz)       | Frequency (MHz) | Frequency (MHz) |
| 0.090 – 0.110            | 12.29-12.293      | 149.9 - 150.05        | 1660.0 - 1710.0 | 8025 – 8500     |
| 0.495 - 0.505            | 12.51975-12.52025 | 156.52475 - 156.52525 | 1718.8 - 1722.2 | 9000 – 9200     |
| 2.1735 – 2.1905          | 12.57675-12.57725 | 156.7 - 156.9         | 2200.0 - 2300.0 | 9300 – 9500     |
| 4.125 - 4.128            | 13.36-13.41       | 162.0125 - 167.17     | 2310.0 - 2390.0 | 10600 - 12700   |
| 4.17725-4.17775          | 16.42-16.423      | 167.72 - 173.2        | 2483.5 – 2500.0 | 13250 – 13400   |
| 4.20725-4.20775          | 16.69475-16.69525 | 240.0 - 285.0         | 2690.0 - 2900.0 | 14470 – 14500   |
| 6.215-6.218              | 16.80425-16.80475 | 322.0 - 335.4         | 3260.0 – 3267.0 | 15350 – 16200   |
| 6.26775-6.26825          | 25.5-25.67        | 399.9 - 410.0         | 3332.0 – 3339.0 | 17700 – 21400   |
| 6.31175-6.31225          | 37.5-38.25        | 608.0 - 614.0         | 3345.8 – 3358.0 | 22010 – 23120   |
| 8.291-8.294              | 73 - 74.6         | 960.0 - 1240.0        | 3600.0 – 4400.0 | 23600 – 24000   |
| 8.362-8.366              | 74.8 - 75.2       | 1300.0 - 1427.0       | 4500.0 – 5150.0 | 31200 – 31800   |
| 8.37625-8.38675          | 108 - 121.94      | 1435.0 - 1626.5       | 5350.0 – 5460.0 | 36430 – 36500   |
| 8.41425-8.41475          | 123 - 138         | 1645.5 - 1646.5       | 7250.0 – 7750.0 | Above 38600     |

## TEST SETUP

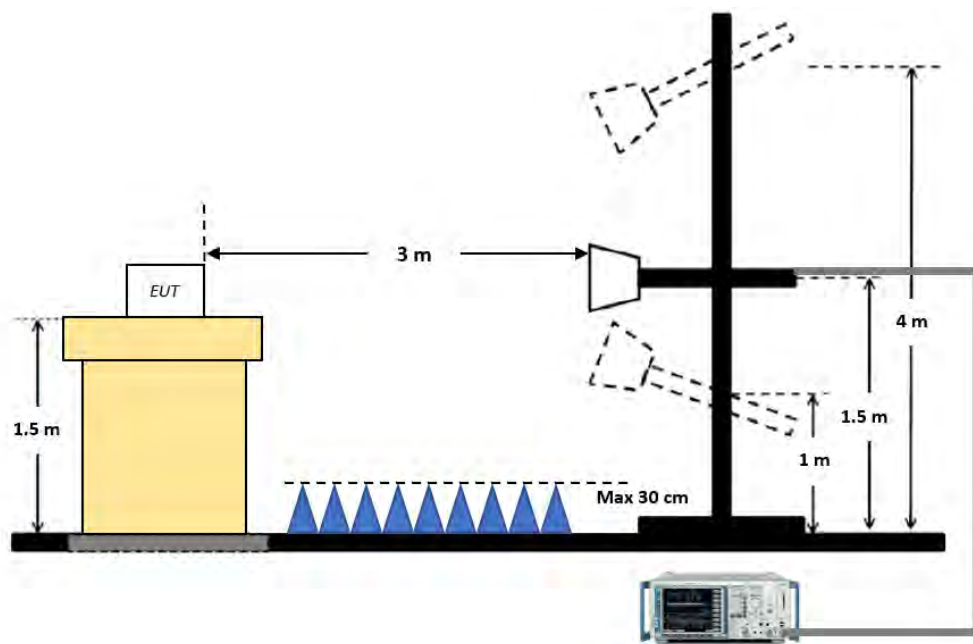
### Below 30 MHz



### 30 MHz - 1 GHz



### Above 1 GHz



#### TEST PROCEDURE OF RADIATED SPURIOUS EMISSION (BELOW 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor (0.009 MHz – 0.490 MHz) =  $40 \cdot \log(3 \text{ m}/300 \text{ m}) = -80 \text{ dB}$   
Measurement Distance: 3 m
7. Distance Correction Factor (0.490 MHz – 30 MHz) =  $40 \cdot \log(3 \text{ m}/30 \text{ m}) = -40 \text{ dB}$   
Measurement Distance: 3 m
8. Spectrum Setting
  - Frequency Range = 9 kHz ~ 30 MHz
  - Detector = Peak
  - Trace = Max hold
  - RBW = 9 kHz
  - VBW  $\geq 3 \cdot \text{RBW}$
9. Total = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)
10. There is a comparison data both open-field test site and alternative test site – semi-Anechoic chamber according to 414788 D01. And the results are properly calibrated.

#### TEST PROCEDURE OF RADIATED SPURIOUS EMISSION (30 MHz – 1 GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. Spectrum Setting
  - (1) Measurement Type (Peak):
    - Measured Frequency Range: 30 MHz – 1 GHz
    - Detector = Peak
    - Trace = Max hold
    - RBW = 100 kHz
    - VBW  $\geq 3 \cdot \text{RBW}$
  - (2) Measurement Type(Quasi-peak):
    - Measured Frequency Range: 30 MHz – 1 GHz
    - Detector = Quasi-Peak
    - RBW = 120 kHz
6. Total = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)

## TEST PROCEDURE OF RADIATED SPURIOUS EMISSION (ABOVE 1 GHz)

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting

### (1) Measurement Type(Peak, G.5 in KDB 789033 v02r01):

- RBW = 1 MHz
- VBW  $\geq$  3 MHz
- Detector = Peak
- Sweep Time = auto
- Trace mode = Max hold
- Allow sweeps to continue until the trace stabilizes.
- Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately  $1/x$ , where x is the duty cycle.

### (2) Measurement Type(Average, G.6.d in KDB 789033 v02r01):

- RBW = 1 MHz
- VBW(Duty cycle  $\geq$  98 percent) = VBW  $\leq$  RBW/100(i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is < 98 percent) = VBW  $\geq$   $1/T$ , where T is the minimum transmission duration.
- The analyzer is set to linear detector mode.
- Detector = Peak.
- Sweep time = auto.
- Trace mode = Max hold.
- Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of  $1/x$ , where x is the duty cycle.

9. Measurement value only up to 6 maximum emissions noted or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor
10. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency (or 40 GHz whichever comes first)
11. Sample Calculation

(1) Total (Peak) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G)

(2) Total (Average, Duty  $\geq$  98%) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G)

(3) Total (Average, Duty < 98%) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Duty Cycle Factor

## TEST PROCEDURE OF RADIATED RESTRICTED BAND EDGE

1. Radiated test is performed with hopping off (if there is any)
2. The EUT is placed on a turntable, which is 1.5 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting

### (1) Measurement Type(Peak, G.5 in KDB 789033 v02r01):

- RBW = 1 MHz
- VBW  $\geq$  3 MHz
- Detector = Peak
- Sweep Time = auto
- Trace mode = Max hold
- Allow sweeps to continue until the trace stabilizes.
- Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately  $1/x$ , where x is the duty cycle.

### (2) Measurement Type(Average, G.6.d in KDB 789033 v02r01):

- RBW = 1 MHz
- $VBW(\text{Duty cycle} \geq 98 \text{ percent}) = VBW \leq RBW/100(\text{i.e., } 10 \text{ kHz})$  but not less than 10 Hz.
- $VBW(\text{Duty cycle is } < 98 \text{ percent}) = VBW \geq 1/T$ , where T is the minimum transmission duration.
- The analyzer is set to linear detector mode.
- Detector = Peak.
- Sweep time = auto.
- Trace mode = Max hold.
- Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of  $1/x$ , where x is the duty cycle.

## 9. Sample Calculation

(1) Total (Peak) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)

(2) Total (Average, Duty  $\geq$  98%) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G)

(3) Total (Average, Duty  $<$  98%) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Duty Cycle Factor

## 7.8. AC POWER LINE CONDUCTED EMISSIONS

### LIMIT

#### 47 CFR § 15.207

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN).

| Frequency Range (MHz) | Limits (dB $\mu$ V) |           |
|-----------------------|---------------------|-----------|
|                       | Quasi-peak          | Average   |
| 0.15 to 0.50          | 66 to 56*           | 56 to 46* |
| 0.50 to 5             | 56                  | 46        |
| 5 to 30               | 60                  | 50        |

\*Decreases with the logarithm of the frequency.

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

### TEST SETUP

See test photographs attached in Annex A for the actual connections between EUT and support equipment.

### TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors : Quasi Peak and Average Detector.

According to FCC KDB 174176 D01 Line Conducted FAQ v01r01 :

#### Devices Operating Above 30 MHz

For a device with a permanent or detachable antenna operating above 30 MHz, measurements must be performed with the antenna connected as specified in clause 6.2 of ANSI C63.10-2013.

#### Devices Operating Below 30 MHz

For a device with a permanent or detachable antenna operating at or below 30 MHz, the FCC will accept measurements performed with a suitable dummy load in lieu of the antenna under the following conditions:

- (1) Perform the AC power-line conducted tests with the antenna connected to determine compliance with Section 15.207 limits outside the transmitter's fundamental emission band;
- (2) Retest with a dummy load in lieu of the antenna to determine compliance with Section 15.207 limits within the transmitter's fundamental emission band. For a detachable antenna, remove the antenna and connect a suitable dummy load to the antenna connector. For a permanent antenna, remove the antenna and terminate the RF output with a dummy load or network which simulates the antenna in the fundamental frequency band. All measurements must be performed as specified in clause 6.2 of ANSI C63.10-2013.

#### Sample Calculation

Quasi-peak(Final Result) = Reading Value + Correction Factor

## 8. SUMMARY OF TEST RESULTS

| Test Description                  | FCC Part Section(s)         | Test Limit                     | Test Condition | Test Result |
|-----------------------------------|-----------------------------|--------------------------------|----------------|-------------|
| 26 dB Bandwidth                   | §15.407                     | N/A<br>(For power measurement) | Conducted      | -           |
| Maximum Conducted Output Power    | §15.407(a)(1)               | $\leq 1$ W                     |                | PASS        |
| Power Spectral Density            | §15.407(a)(1)               | $\leq 17$ dBm/MHz              |                | PASS        |
| Frequency Stability               | §15.407(g)<br>§2.1055       | Maintained within the band     |                | PASS        |
| AC Power line Conducted Emissions | §15.207<br>§15.407(b)(9)    | cf. Section 7.8                |                | PASS        |
| Undesirable Emissions             | §15.407(b)(1)               | cf. Section 7.6                | Radiated       | PASS        |
| Radiated Spurious Emissions       | §15.209<br>§15.407(b)(9)    | cf. Section 7.7                |                | PASS        |
| Radiated Restricted Band Edge     | §15.407(b)(7)<br>§15.205(a) | cf. Section 7.7                |                | PASS        |



## WORST CASE CONFIGURATION

### RADIATED TEST

#### 1. EUT Axis

All X, Y, and Z positions for horizontal / vertical antenna polarization were investigated to find the worst-case position. Y position was selected for the final evaluation for the radiated band edge and spurious emission.

#### 2. The EUT supports single carrier mode and multi-carrier mode (contiguous and non-contiguous).

- Single Carrier Mode : 10 MHz / 20 MHz / 40 MHz
- Multi-Carrier Mode (Contiguous) : 10+10 MHz / 20+20 MHz / 20+40 MHz / 40+20 MHz / 40+40 MHz
- Multi-Carrier Mode (Non-Contiguous) : 10+10 MHz / 20+20 MHz / 20+40 MHz / 40+20 MHz

#### 3. The worst case modulation was determined by the manufacturer after comparing the power spectral density, peak-to-average ratio, and roll-off characteristics of the different supported modulation rates. QPSK was selected for the final test as the worst case.

Band edge test was performed for each bandwidth and spurious emission measurement was performed for 10 MHz / 20 MHz / 40 MHz for single carrier. and 10+10 MHz / 20+20 MHz / 20+40 MHz / 40+20 MHz for multi-carrier mode.

For below 1GHz, radiated tests were performed for each of the two PoE adapters.

For above 1GHz, radiated tests were performed with the worst adapter #2.

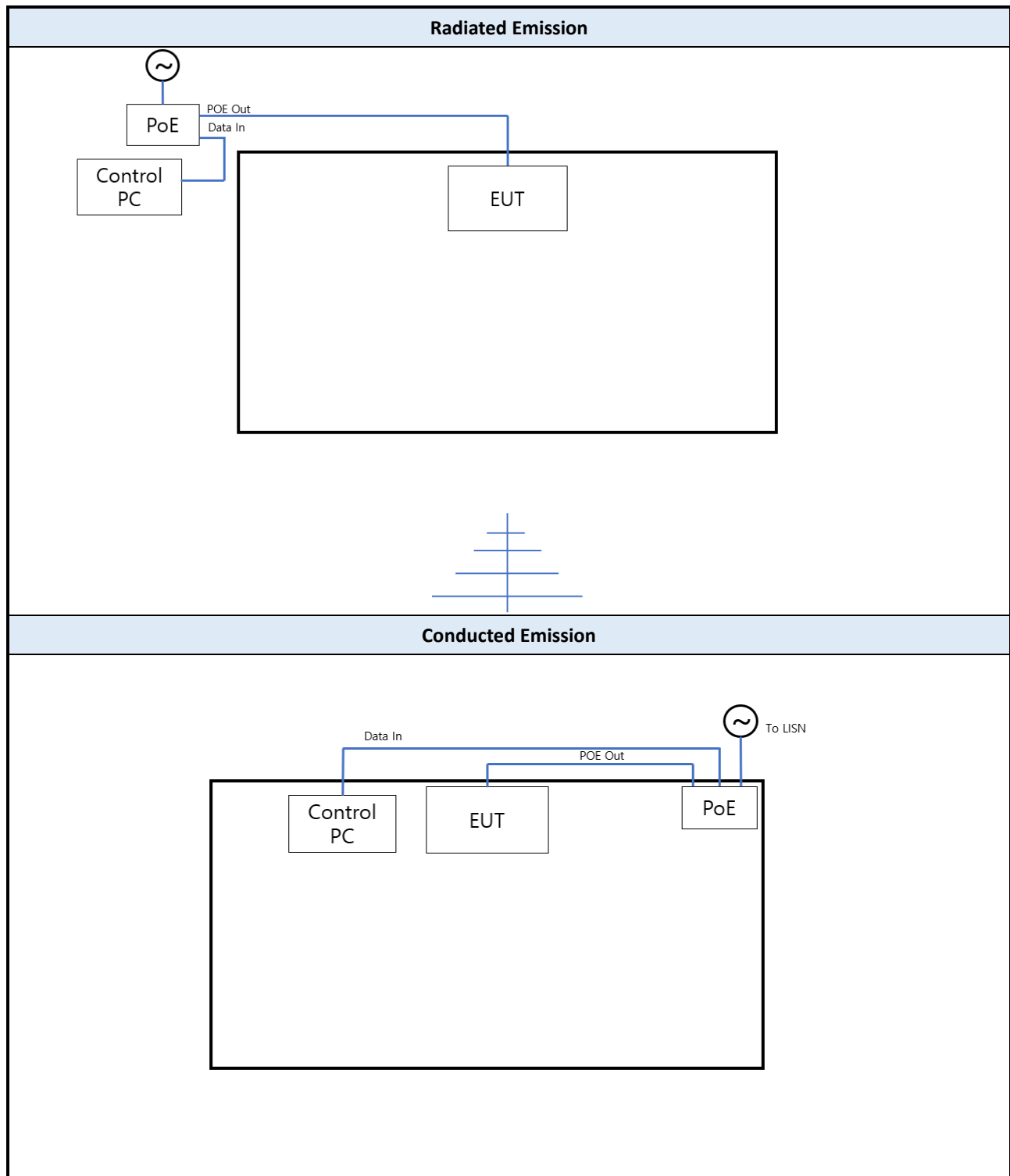
### CONDUCTED TEST

1. AC line conducted emission was performed only in single carrier transmission mode as the worst case for each of the two PoE adapters.
2. RF conducted emission was performed at the low / mid / high channels of each carrier's combination.

### CHANNEL UNDER TEST

| Mode (U-NII 1)                      | Bandwidth (MHz) | Low Channel (MHz) | Mid Channel (MHz) | High Channel (MHz) |
|-------------------------------------|-----------------|-------------------|-------------------|--------------------|
| Single Carrier Mode                 | 10              | 5175              | 5210              | 5245               |
|                                     | 20              | 5180              | 5200              | 5240               |
|                                     | 40              | 5190              | -                 | 5230               |
| Multi-Carrier Mode (Contiguous)     | 10+10           | 5175+5185         | 5210+5220         | 5235+5245          |
|                                     | 20+20           | 5180+5200         | 5200+5220         | 5220+5240          |
|                                     | 20+40           | -                 | 5200+5230         | -                  |
|                                     | 40+20           | -                 | 5190+5220         | -                  |
|                                     | 40+40           | -                 | 5190+5230         | -                  |
| Multi-Carrier Mode (Non-Contiguous) | 10+10           | 5175+5245         |                   |                    |
|                                     | 20+20           | 5180+5240         |                   |                    |
|                                     | 20+40           | 5180+5230         |                   |                    |
|                                     | 40+20           | 5190+5240         |                   |                    |

## TEST CONFIGURATION



**LIST OF SUPPORT EQUIPMENT**

| Equipment Type                  | Model No.     | Serial Number      | Manufacturer                   | Qty | Note                                    |
|---------------------------------|---------------|--------------------|--------------------------------|-----|-----------------------------------------|
| PoE Adapter #1                  | G0566-500-120 | -                  | Shenzhen Gospell Digital Tech. | 1   | 100-240 VAC, 1.5 A<br>50/60 Hz (50 VDC) |
| PoE Adapter #2<br>(Alternative) | PD-9501GC/AC  | C19436280000000494 | Microsemi                      | 1   | 100-240 VAC, 1.5 A<br>50/60 Hz (55 VDC) |
| Laptop                          | TP00076A      | R9-0NUJ14 17/08    | Lenovo                         | 1   | -                                       |

## SUMMARY OF OUTPUT POWER SETTING

| Single Carrier Mode |         |                 | Power Level Setting |      |
|---------------------|---------|-----------------|---------------------|------|
| Bandwidth           | Channel | Frequency [MHz] | ATT                 | ADAK |
| 10 MHz              | 35      | 5175            | 9                   | -1.0 |
|                     | 42      | 5210            | 9                   | -0.8 |
|                     | 49      | 5245            | 9                   | -1.6 |
| 20 MHz              | 36      | 5180            | 6                   | -1.0 |
|                     | 40      | 5200            | 6                   | -0.8 |
|                     | 48      | 5240            | 6                   | -1.1 |
| 40 MHz              | 38      | 5190            | 3                   | -2.0 |
|                     | 46      | 5230            | 3                   | -1.5 |

| Multi-Carrier Mode (Contiguous) |         |                 | Power Level Setting |      |
|---------------------------------|---------|-----------------|---------------------|------|
| Bandwidth                       | Channel | Frequency [MHz] | ATT                 | ADAK |
| 10+10 MHz                       | 35+37   | 5175+5185       | 9                   | -0.8 |
|                                 | 42+44   | 5210+5220       | 9                   | -0.8 |
|                                 | 47+49   | 5235+5245       | 9                   | -0.8 |
| 20+20 MHz                       | 36+40   | 5180+5200       | 6                   | -2.0 |
|                                 | 40+44   | 5200+5220       | 6                   | -0.6 |
|                                 | 44+48   | 5220+5240       | 6                   | -1.5 |
| 20+40 MHz                       | 40+46   | 5200+5230       | 6                   | -1.0 |
| 40+20 MHz                       | 38+44   | 5190+5220       | 6                   | -0.5 |
| 40+40 MHz                       | 38+46   | 5190+5230       | 6                   | -0.5 |

| Multi-Carrier Mode (Non-Contiguous) |         |                 | Power Level Setting |      |
|-------------------------------------|---------|-----------------|---------------------|------|
| Bandwidth                           | Channel | Frequency [MHz] | ATT                 | ADAK |
| 10+10 MHz                           | 35+49   | 5175+5245       | 9                   | -0.8 |
| 20+20 MHz                           | 36+48   | 5180+5240       | 6                   | -2.5 |
| 20+40 MHz                           | 36+46   | 5180+5230       | 6                   | -2.0 |
| 40+20 MHz                           | 38+48   | 5190+5240       | 9                   | 0    |

### Note :

power setting value shown on the table above is based on attenuation. Power level fine tuning was done using the ADAK.

## 9. TEST RESULT

### 9.1 DUTY CYCLE

Duty cycle is 100% continuous.

## 9.2 26 dB BANDWIDTH / 99% BANDWIDTH

| Single Carrier Mode |         |                 | 26 dB Bandwidth<br>[MHz] | 99% Bandwidth<br>[MHz] |
|---------------------|---------|-----------------|--------------------------|------------------------|
| Bandwidth           | Channel | Frequency [MHz] |                          |                        |
| 10 MHz              | 35      | 5175            | 9.51                     | 9.01                   |
|                     | 42      | 5210            | 9.51                     | 9.01                   |
|                     | 49      | 5245            | 9.51                     | 9.01                   |
| 20 MHz              | 36      | 5180            | 19.07                    | 18.06                  |
|                     | 40      | 5200            | 19.09                    | 18.07                  |
|                     | 48      | 5240            | 19.08                    | 18.05                  |
| 40 MHz              | 38      | 5190            | 39.15                    | 37.28                  |
|                     | 46      | 5230            | 39.17                    | 37.30                  |

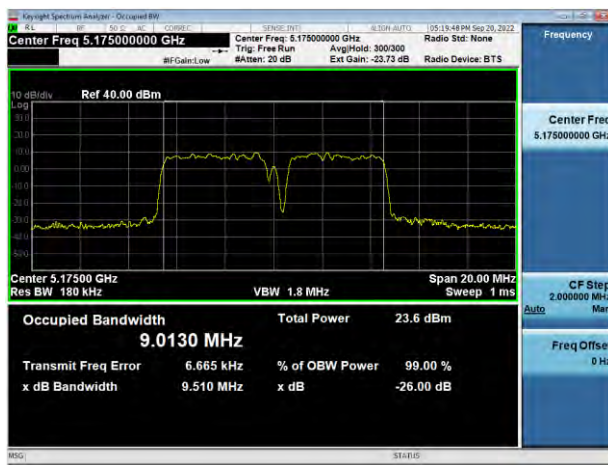
| Multi-Carrier Mode (Contiguous) |         |                 | 26 dB Bandwidth<br>[MHz] | 99% Bandwidth<br>[MHz] |
|---------------------------------|---------|-----------------|--------------------------|------------------------|
| Bandwidth                       | Channel | Frequency [MHz] |                          |                        |
| 10+10 MHz                       | 35+37   | 5175+5185       | 19.92                    | 18.95                  |
|                                 | 42+44   | 5210+5220       | 19.93                    | 18.96                  |
|                                 | 47+49   | 5235+5245       | 19.93                    | 18.95                  |
| 20+20 MHz                       | 36+40   | 5180+5200       | 39.76                    | 37.82                  |
|                                 | 40+44   | 5200+5220       | 39.80                    | 37.92                  |
|                                 | 44+48   | 5220+5240       | 39.79                    | 37.89                  |
| 20+40 MHz                       | 40+46   | 5200+5230       | 60.08                    | 57.67                  |
| 40+20 MHz                       | 38+44   | 5190+5220       | 60.22                    | 57.45                  |
| 40+40 MHz                       | 38+46   | 5190+5230       | 80.71                    | 77.20                  |

| Multi-Carrier Mode (Non-Contiguous) |         |                 | 26 dB Bandwidth<br>[MHz] | 99% Bandwidth<br>[MHz] |
|-------------------------------------|---------|-----------------|--------------------------|------------------------|
| Bandwidth                           | Channel | Frequency [MHz] |                          |                        |
| 10+10 MHz                           | 35      | 5175            | 19.01                    | 18.02                  |
|                                     | +       | +               |                          |                        |
|                                     | 49      | 5245            |                          |                        |
| 20+20 MHz                           | 36      | 5180            | 38.16                    | 36.11                  |
|                                     | +       | +               |                          |                        |
|                                     | 48      | 5240            |                          |                        |
| 20+40 MHz                           | 36      | 5180            | 78.72                    | 55.35                  |
|                                     | +       | +               |                          |                        |
|                                     | 46      | 5230            |                          |                        |
| 40+20 MHz                           | 38      | 5190            | 58.20                    | 55.31                  |
|                                     | +       | +               |                          |                        |
|                                     | 48      | 5240            |                          |                        |

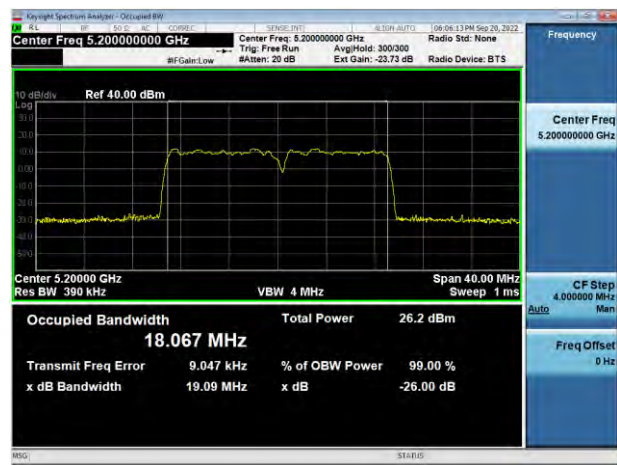
## TEST PLOTS

### 26 dB Bandwidth / 99 % Bandwidth : Single Carrier Mode

#### 10 MHz BW (5175 MHz)



#### 20 MHz BW (5200 MHz)



#### 40 MHz (5230 MHz)



### Note :

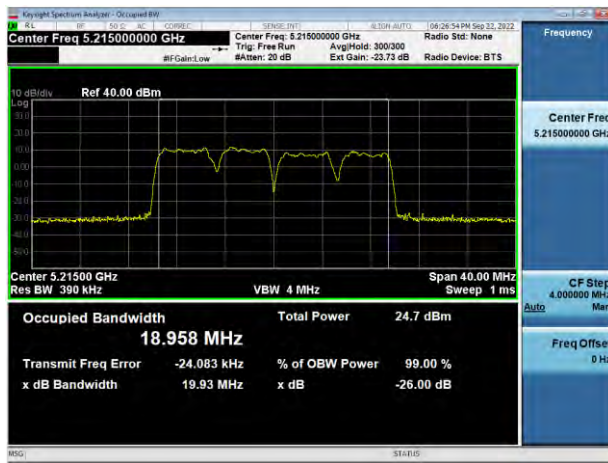
The worst plots are reported.



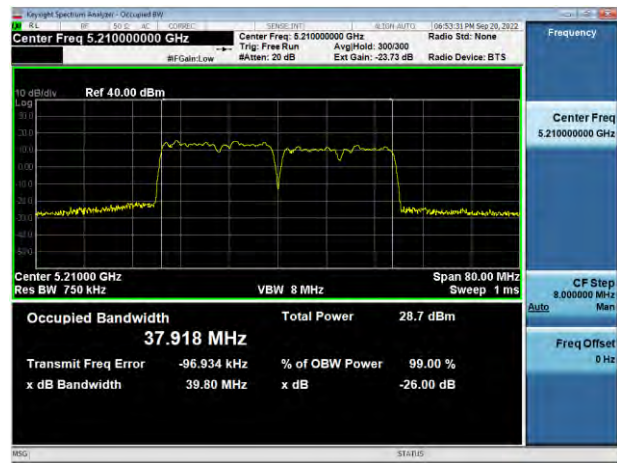
## TEST PLOTS

### 26 dB Bandwidth / 99 % Bandwidth : Contiguous Carrier Mode

#### 10+10 MHz (5210+5220 MHz)



#### 20+20 MHz (5200+5220 MHz)



#### 20+40 MHz (5200+5230 MHz)



#### 40+20 MHz (5190+5220 MHz)



#### 40+40 MHz (5190+5230 MHz)



### Note :

The worst plots are reported.

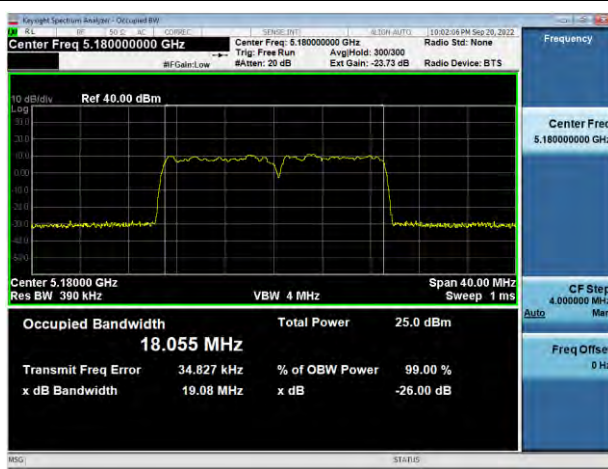




## TEST PLOTS

### 26 dB Bandwidth / 99 % Bandwidth : Non-Contiguous Carrier Mode

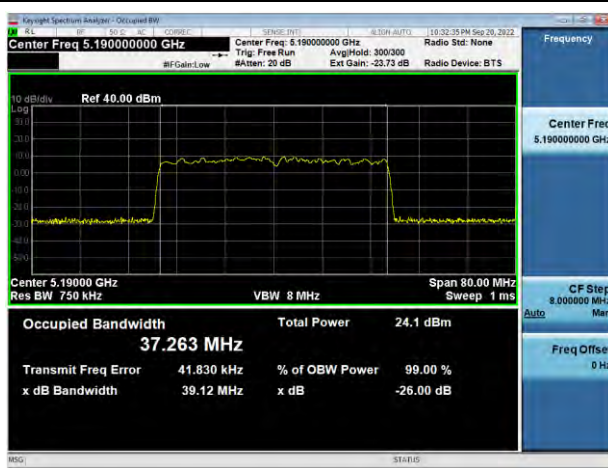
#### 20+40 MHz (5180+5230 MHz) : Low



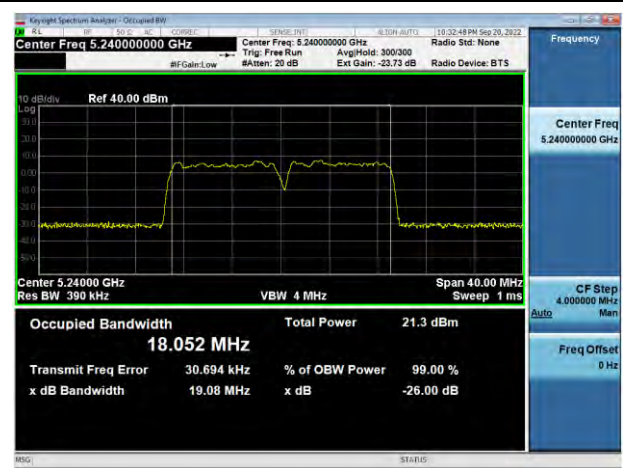
#### 20+40 MHz (5180+5230 MHz) : High



#### 40+20 MHz (5190+5240 MHz) : Low



#### 40+20 MHz (5190+5240 MHz) : High



### 9.3 OUTPUT POWER

| Single Carrier Mode |         |                 | Output Power [dBm] |              | Limit [dBm] |
|---------------------|---------|-----------------|--------------------|--------------|-------------|
| Bandwidth           | Channel | Frequency [MHz] | Single Chain       | All 8 Chains |             |
| 10 MHz              | 35      | 5175            | 15.69              | 24.72        | 30          |
|                     | 42      | 5210            | 15.65              | 24.68        | 30          |
|                     | 49      | 5245            | 15.67              | 24.70        | 30          |
| 20 MHz              | 36      | 5180            | 18.77              | 27.80        | 30          |
|                     | 40      | 5200            | 18.78              | 27.81        | 30          |
|                     | 48      | 5240            | 18.84              | 27.87        | 30          |
| 40 MHz              | 38      | 5190            | 20.35              | 29.38        | 30          |
|                     | 46      | 5230            | 20.76              | 29.79        | 30          |

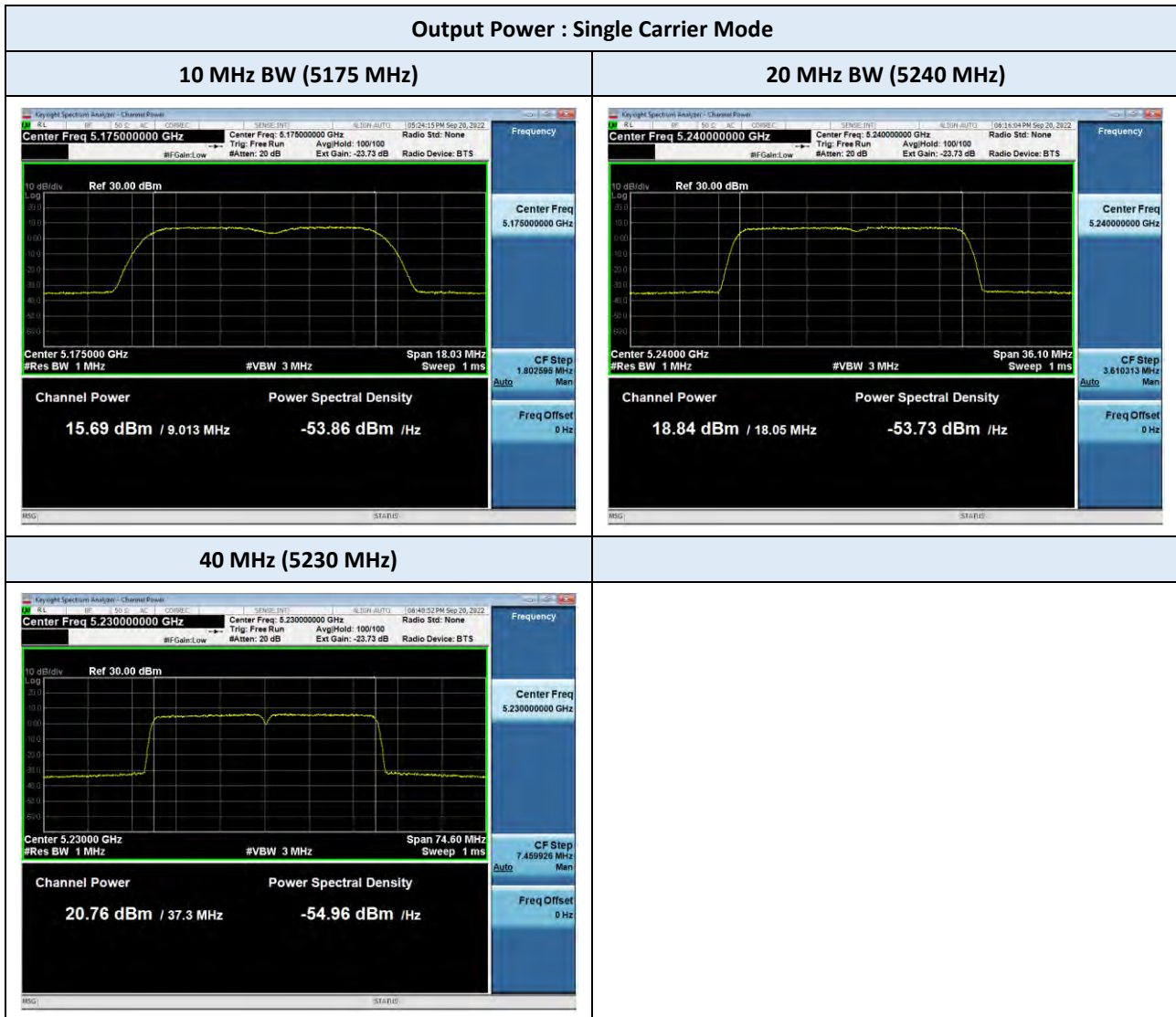
| Multi-Carrier Mode (Contiguous) |         |                 | Output Power [dBm] |              | Limit [dBm] |
|---------------------------------|---------|-----------------|--------------------|--------------|-------------|
| Bandwidth                       | Channel | Frequency [MHz] | Single Chain       | All 8 Chains |             |
| 10+10 MHz                       | 35+37   | 5175+5185       | 17.71              | 26.74        | 30          |
|                                 | 42+44   | 5210+5220       | 17.39              | 26.42        | 30          |
|                                 | 47+49   | 5235+5245       | 17.87              | 26.91        | 30          |
| 20+20 MHz                       | 36+40   | 5180+5200       | 20.57              | 29.60        | 30          |
|                                 | 40+44   | 5200+5220       | 20.65              | 29.68        | 30          |
|                                 | 44+48   | 5220+5240       | 20.66              | 29.69        | 30          |
| 20+40 MHz                       | 40+46   | 5200+5230       | 20.48              | 29.51        | 30          |
| 40+20 MHz                       | 38+44   | 5190+5220       | 20.73              | 29.76        | 30          |
| 40+40 MHz                       | 38+46   | 5190+5230       | 20.58              | 29.61        | 30          |

| Multi-Carrier Mode (Non-Contiguous) |         |                 | Output Power [dBm] |              | Limit [dBm] |
|-------------------------------------|---------|-----------------|--------------------|--------------|-------------|
| Bandwidth                           | Channel | Frequency [MHz] | Single Chain       | All 8 Chains |             |
| 10+10 MHz                           | 35      | 5175            | 15.64              | 17.64        | 26.67       |
|                                     | +       | +               | +                  |              |             |
|                                     | 49      | 5245            | 13.31              |              |             |
| 20+20 MHz                           | 36      | 5180            | 17.13              | 18.95        | 27.98       |
|                                     | +       | +               | +                  |              |             |
|                                     | 48      | 5240            | 14.29              |              |             |
| 20+40 MHz                           | 36      | 5180            | 17.67              | 19.34        | 28.37       |
|                                     | +       | +               | +                  |              |             |
|                                     | 46      | 5230            | 14.36              |              |             |
| 40+20 MHz                           | 38      | 5190            | 16.32              | 18.26        | 27.29       |
|                                     | +       | +               | +                  |              |             |
|                                     | 48      | 5240            | 13.83              |              |             |

**Note :**

1. The output power results in the table include the spectrum offset, which is a combination loss of the attenuator and the cable used for testing. Attenuation between the chipset and the SMA antenna port used for RF conducted measurement were provided by the manufacturer, which is 23.73 dB.
2. Output Power (All chains) = Output Power (Single Chain) + 10 log(8)

## TEST PLOTS



### Note :

The worst plots are reported.



## TEST PLOTS

### Output Power : Contiguous Carrier Mode

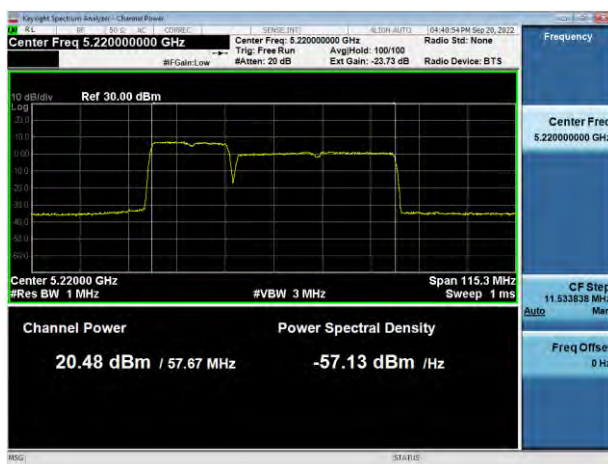
#### 10+10 MHz (5235+5245 MHz)



#### 20+20 MHz (5220+5240 MHz)



#### 20+40 MHz (5200+5230 MHz)



#### 40+20 MHz (5190+5220 MHz)



#### 40+40 MHz (5190+5230 MHz)



### Note :

The worst plots are reported.

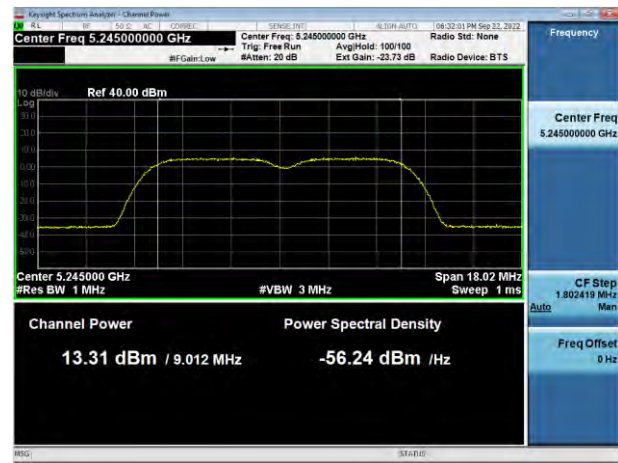
## TEST PLOTS

### Output Power : Non-Contiguous Carrier Mode

#### 10+10 MHz (5175+5245 MHz) : Low



#### 10+10 MHz (5175+5245 MHz) :High



#### 20+20 MHz (5180+5240 MHz) : Low



#### 20+20 MHz (5180+5240 MHz) : High



## TEST PLOTS

### Output Power : Non-Contiguous Carrier Mode

#### 20+40 MHz (5180+5230 MHz) : Low



#### 20+40 MHz (5180+5230 MHz) : High



#### 40+20 MHz (5190+5240 MHz) : Low



#### 40+20 MHz (5190+5240 MHz) : High





## 9.4 POWER SPECTRAL DENSITY

| Single Carrier Mode |         |                    | Power Spectral Density [dBm/MHz] |              | Limit<br>[dBm/MHz] |
|---------------------|---------|--------------------|----------------------------------|--------------|--------------------|
| Bandwidth           | Channel | Frequency<br>[MHz] | Single Chain                     | All 8 Chains |                    |
| 10 MHz              | 35      | 5175               | 7.84                             | 16.87        | 17                 |
|                     | 42      | 5210               | 7.73                             | 16.76        | 17                 |
|                     | 49      | 5245               | 7.78                             | 16.81        | 17                 |
| 20 MHz              | 36      | 5180               | 7.78                             | 16.81        | 17                 |
|                     | 40      | 5200               | 7.74                             | 16.77        | 17                 |
|                     | 48      | 5240               | 7.80                             | 16.83        | 17                 |
| 40 MHz              | 38      | 5190               | 6.59                             | 15.62        | 17                 |
|                     | 46      | 5230               | 6.77                             | 15.80        | 17                 |

| Multi-Carrier Mode (Contiguous) |         |                    | Power Spectral Density [dBm/MHz] |              | Limit<br>[dBm/MHz] |
|---------------------------------|---------|--------------------|----------------------------------|--------------|--------------------|
| Bandwidth                       | Channel | Frequency<br>[MHz] | Single Chain                     | All 8 Chains |                    |
| 10+10 MHz                       | 35+37   | 5175+5185          | 7.79                             | 16.82        | 17                 |
|                                 | 42+44   | 5210+5220          | 7.80                             | 16.83        | 17                 |
|                                 | 47+49   | 5235+5245          | 7.75                             | 16.78        | 17                 |
| 20+20 MHz                       | 36+40   | 5180+5200          | 7.70                             | 16.73        | 17                 |
|                                 | 40+44   | 5200+5220          | 7.83                             | 16.86        | 17                 |
|                                 | 44+48   | 5220+5240          | 7.34                             | 16.37        | 17                 |
| 20+40 MHz                       | 40+46   | 5200+5230          | 7.51                             | 16.54        | 17                 |
| 40+20 MHz                       | 38+44   | 5190+5220          | 5.32                             | 14.35        | 17                 |
| 40+40 MHz                       | 38+46   | 5190+5230          | 5.27                             | 14.30        | 17                 |

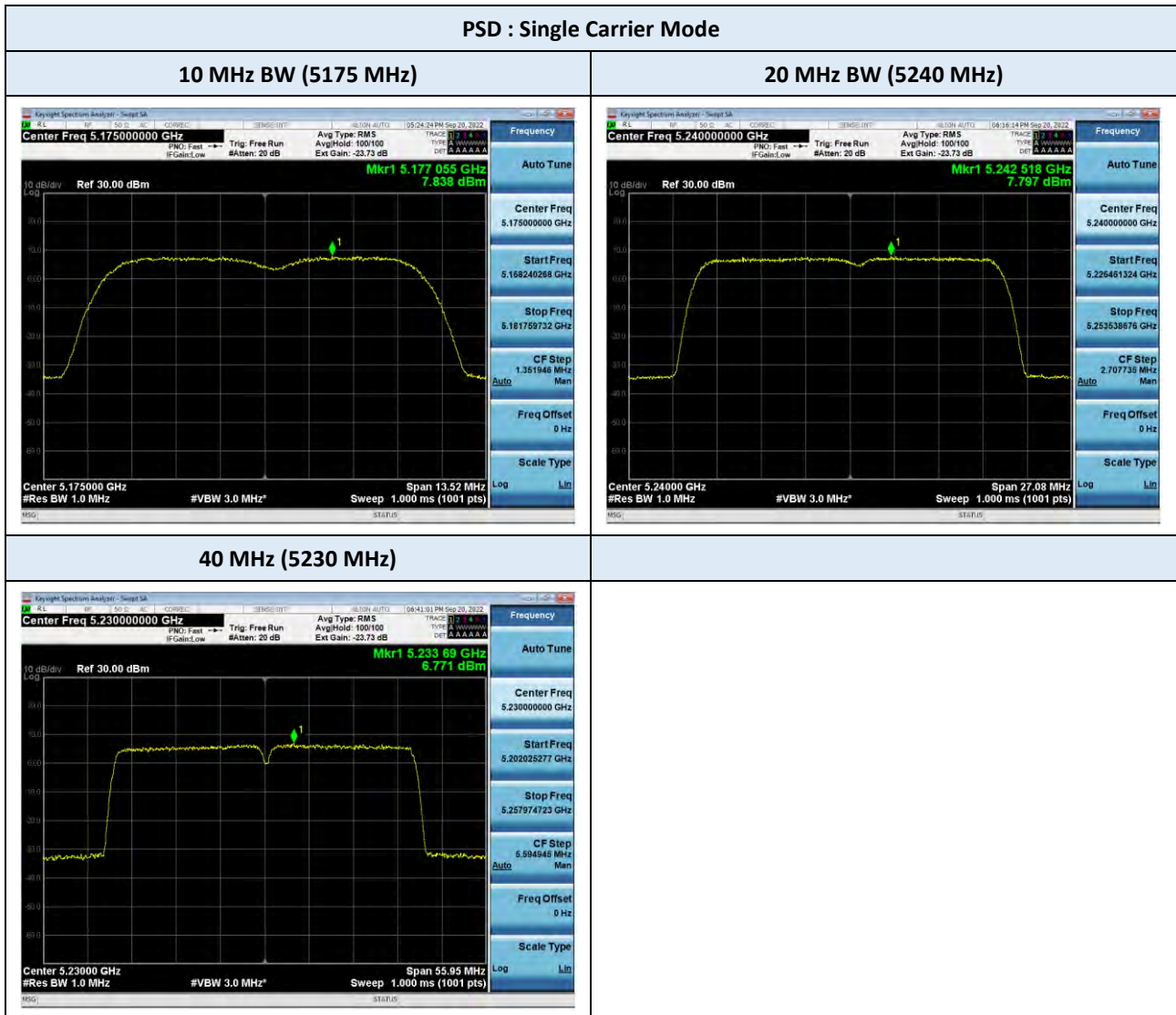
| Multi-Carrier Mode (Non-Contiguous) |         |                    | Power Spectral Density [dBm/MHz] |              | Limit<br>[dBm/MHz] |
|-------------------------------------|---------|--------------------|----------------------------------|--------------|--------------------|
| Bandwidth                           | Channel | Frequency<br>[MHz] | Single Chain                     | All 8 Chains |                    |
| 10+10 MHz                           | 35      | 5175               | 7.83                             | 16.86        | 17                 |
|                                     | +       | +                  |                                  |              |                    |
|                                     | 49      | 5245               |                                  |              |                    |
| 20+20 MHz                           | 36      | 5180               | 6.12                             | 15.15        | 17                 |
|                                     | +       | +                  |                                  |              |                    |
|                                     | 48      | 5240               |                                  |              |                    |
| 20+40 MHz                           | 36      | 5180               | 6.64                             | 15.67        | 17                 |
|                                     | +       | +                  |                                  |              |                    |
|                                     | 46      | 5230               |                                  |              |                    |
| 40+20 MHz                           | 38      | 5190               | 2.89                             | 11.92        | 17                 |
|                                     | +       | +                  |                                  |              |                    |
|                                     | 48      | 5240               |                                  |              |                    |

### Note :

1. The output power results in the table and the plot include the spectrum offset, which is a combination loss of the attenuator and the cable used for testing. Attenuation between the chipset and the SMA antenna port used for RF conducted measurement were provided by the manufacturer, which is 23.73 dB.
2. PSD (All chains) = PSD (Single Chain) + 10 log(8)



## TEST PLOTS



### Note :

The worst plots are reported.

## TEST PLOTS

### PSD : Contiguous Carrier Mode

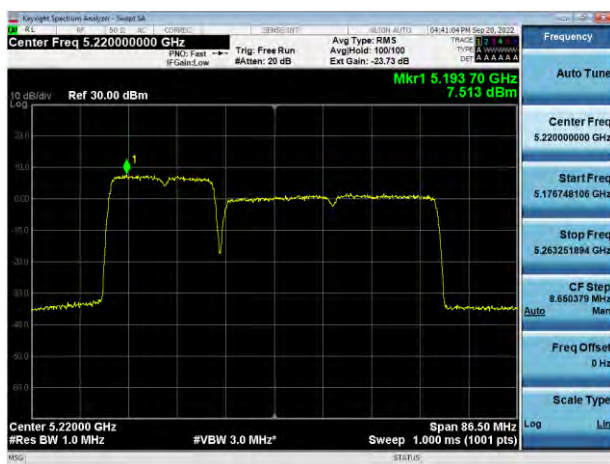
#### 10+10 MHz (5210+5220 MHz)



#### 20+20 MHz (5200+5220 MHz)



#### 20+40 MHz (5200+5230 MHz)



#### 40+20 MHz (5190+5220 MHz)



#### 40+40 MHz (5190+5230 MHz)



### Note :

The worst plots are reported.

## TEST PLOTS

### PSD : Non-Contiguous Carrier Mode

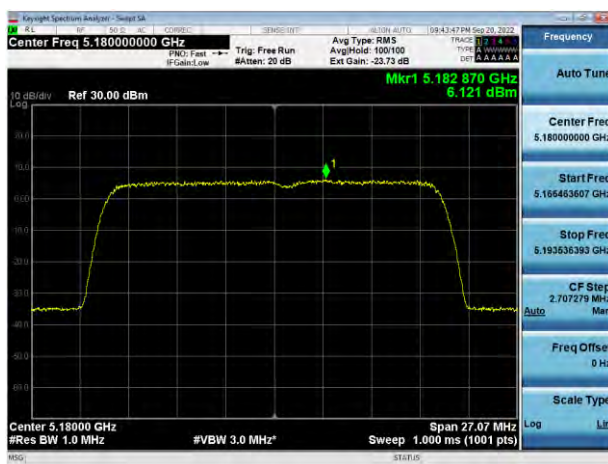
#### 10+10 MHz (5175+5245 MHz) : Low



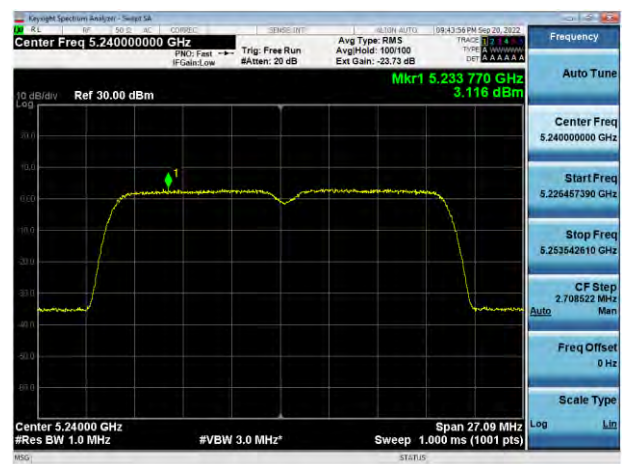
#### 10+10 MHz (5175+5245 MHz) : High



#### 20+20 MHz (5180+5240 MHz) : Low



#### 20+20 MHz (5180+5240 MHz) : High





TEST PLOTS

PSD : Non-Contiguous Carrier Mode

20+40 MHz (5180+5230 MHz) : Low



20+40 MHz (5180+5230 MHz) : High



40+20 MHz (5190+5240 MHz) : Low



40+20 MHz (5190+5240 MHz) : High



## 9.5 FREQUENCY STABILITY

|                       |                          |
|-----------------------|--------------------------|
| Operating Band :      | U-NII Band 1             |
| Operating Frequency : | 5,180,000,000 Hz (CH 36) |
| Reference Voltage :   | 55 VDC                   |

| Voltage (%) | Power (VDC) | Temp (°C) | Frequency error (ppm) |           |           |            |
|-------------|-------------|-----------|-----------------------|-----------|-----------|------------|
|             |             |           | 0 minutes             | 2 minutes | 5 minutes | 10 minutes |
| 100%        | 55.0        | +20 (Ref) | 2.50                  | 2.50      | 2.51      | 2.50       |
| 100%        |             | -30       | 2.14                  | 2.14      | 2.14      | 2.14       |
| 100%        |             | -20       | 2.22                  | 2.24      | 2.28      | 2.30       |
| 100%        |             | -10       | 2.38                  | 2.41      | 2.44      | 2.45       |
| 100%        |             | 0         | 2.48                  | 2.48      | 2.48      | 2.48       |
| 100%        |             | +10       | 2.50                  | 2.51      | 2.52      | 2.51       |
| 100%        |             | +30       | 2.49                  | 2.50      | 2.52      | 2.54       |
| 100%        |             | +40       | 2.59                  | 2.62      | 2.63      | 2.63       |
| 100%        |             | +50       | 2.61                  | 2.60      | 2.58      | 2.58       |
| 115%        | 63.3        | +20       | 2.50                  | 2.51      | 2.51      | 2.51       |
| 85%         | 46.8        | +20       | 2.51                  | 2.53      | 2.53      | 2.53       |

### Note:

According to the results of the frequency stability test above, the frequency deviation measured are very small. The channels at the band edge should remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore, the Radio frequency should remain in-band during operation over the temperature and voltage range as tested.

## 9.6 RADIATED SPURIOUS EMISSIONS

### Frequency Range : Below 1 GHz (With PoE Adapter #1)

Test Mode Single Carrier (10 MHz)  
 Operating Frequency 5175 MHz (CH 35)

| Frequency (MHz) | Polarization | Reading (dBuV) | Corr. <sup>1)</sup> (dB) | Total (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement Type |
|-----------------|--------------|----------------|--------------------------|----------------|----------------|-------------|------------------|
| 35.706          | V            | 41.7           | -13.2                    | 28.5           | 40             | 11.5        | QP               |
| 57.671          | V            | 52.8           | -22.5                    | 30.3           | 40             | 9.7         | QP               |
| 124.995         | V            | 48.5           | -15.6                    | 32.9           | 43.5           | 10.6        | QP               |
| 625.011         | V            | 42.9           | -8.8                     | 34.1           | 46             | 11.9        | QP               |
| 741.998         | H            | 47.7           | -7.0                     | 40.7           | 46             | 5.3         | QP               |
| 940.797         | H            | 40.8           | -4.1                     | 36.7           | 46             | 9.3         | QP               |

Test Mode Single Carrier (10 MHz)  
 Operating Frequency 5210 MHz (CH 42)

| Frequency (MHz) | Polarization | Reading (dBuV) | Corr. <sup>1)</sup> (dB) | Total (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement Type |
|-----------------|--------------|----------------|--------------------------|----------------|----------------|-------------|------------------|
| 35.243          | V            | 41.3           | -13.0                    | 28.3           | 40             | 11.7        | QP               |
| 58.783          | V            | 52.8           | -22.4                    | 30.4           | 40             | 9.6         | QP               |
| 124.990         | V            | 48.7           | -15.6                    | 33.1           | 43.5           | 10.4        | QP               |
| 453.442         | V            | 42.0           | -11.9                    | 30.1           | 46             | 15.9        | QP               |
| 741.999         | H            | 47.4           | -7.0                     | 40.4           | 46             | 5.6         | QP               |

Test Mode Single Carrier (10 MHz)  
 Operating Frequency 5245 MHz (CH 49)

| Frequency (MHz) | Polarization | Reading (dBuV) | Corr. <sup>1)</sup> (dB) | Total (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement Type |
|-----------------|--------------|----------------|--------------------------|----------------|----------------|-------------|------------------|
| 35.937          | V            | 43.3           | -13.4                    | 29.9           | 40             | 10.1        | QP               |
| 55.879          | V            | 53.8           | -22.5                    | 31.3           | 40             | 8.7         | QP               |
| 124.997         | V            | 48.2           | -15.6                    | 32.6           | 43.5           | 10.9        | QP               |
| 741.994         | H            | 47.2           | -7.0                     | 40.2           | 46             | 5.8         | QP               |

#### Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain

### Frequency Range : Below 1 GHz (With PoE Adapter #1)

Test Mode Contiguous Carrier (10+10 MHz)  
 Operating Frequency 5175+5185 MHz (CH 35+37)

| Frequency (MHz) | Polarization | Reading (dBuV) | Corr. <sup>1)</sup> (dB) | Total (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement Type |
|-----------------|--------------|----------------|--------------------------|----------------|----------------|-------------|------------------|
| 35.928          | V            | 43.3           | -13.4                    | 29.9           | 40             | 10.1        | QP               |
| 57.051          | V            | 53.5           | -22.5                    | 31.0           | 40             | 9.0         | QP               |
| 124.984         | V            | 48.5           | -15.6                    | 32.9           | 43.5           | 10.6        | QP               |
| 741.998         | H            | 47.3           | -7.0                     | 40.3           | 46             | 5.7         | QP               |

Test Mode Contiguous Carrier (10+10 MHz)  
 Operating Frequency 5210+5220 MHz (CH 42+44)

| Frequency (MHz) | Polarization | Reading (dBuV) | Corr. <sup>1)</sup> (dB) | Total (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement Type |
|-----------------|--------------|----------------|--------------------------|----------------|----------------|-------------|------------------|
| 32.453          | V            | 43.2           | -11.3                    | 31.9           | 40             | 8.1         | QP               |
| 57.414          | V            | 53.0           | -22.5                    | 30.5           | 40             | 9.5         | QP               |
| 124.985         | V            | 48.6           | -15.6                    | 33.0           | 43.5           | 10.5        | QP               |
| 742.001         | H            | 46.6           | -7.0                     | 39.6           | 46             | 6.4         | QP               |

Test Mode Contiguous Carrier (10+10 MHz)  
 Operating Frequency 5235+5245 MHz (CH 47+49)

| Frequency (MHz) | Polarization | Reading (dBuV) | Corr. <sup>1)</sup> (dB) | Total (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement Type |
|-----------------|--------------|----------------|--------------------------|----------------|----------------|-------------|------------------|
| 35.696          | V            | 42.8           | -13.2                    | 29.6           | 40             | 10.4        | QP               |
| 57.200          | V            | 53.9           | -22.5                    | 31.4           | 40             | 8.6         | QP               |
| 741.990         | H            | 46.0           | -7.0                     | 39.0           | 46             | 7.0         | QP               |
| 124.998         | V            | 48.6           | -15.6                    | 33.0           | 43.5           | 10.5        | QP               |

Test Mode Non-Contiguous Carrier (10+10 MHz)  
 Operating Frequency 5175+245 MHz (CH 35+49)

| Frequency (MHz) | Polarization | Reading (dBuV) | Corr. <sup>1)</sup> (dB) | Total (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement Type |
|-----------------|--------------|----------------|--------------------------|----------------|----------------|-------------|------------------|
| 31.637          | V            | 41.1           | -10.9                    | 30.2           | 40             | 9.8         | QP               |
| 57.129          | V            | 53.0           | -22.5                    | 30.5           | 40             | 9.5         | QP               |
| 124.995         | V            | 48.6           | -15.6                    | 33.0           | 43.5           | 10.5        | QP               |
| 741.998         | H            | 45.7           | -7.0                     | 38.7           | 46             | 7.3         | QP               |

### Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain



# Frequency Range : Below 1 GHz (With PoE Adapter #2)

Test Mode Single Carrier (10 MHz)  
Operating Frequency 5175 MHz (CH 35)

| Frequency (MHz) | Polarization | Reading (dBuV) | Corr. <sup>1)</sup> (dB) | Total (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement Type |
|-----------------|--------------|----------------|--------------------------|----------------|----------------|-------------|------------------|
| 31.031          | V            | 43.2           | -10.6                    | 32.6           | 40             | 7.4         | QP               |
| 60.470          | V            | 57.7           | -22.3                    | 35.4           | 40             | 4.6         | QP               |
| 124.996         | V            | 49.3           | -15.6                    | 33.7           | 43.5           | 9.8         | QP               |
| 741.990         | H            | 42.8           | -7.0                     | 35.8           | 46             | 10.2        | QP               |
| 741.998         | H            | 47.7           | -7.0                     | 40.7           | 46             | 5.3         | QP               |
| 940.797         | H            | 40.8           | -4.1                     | 36.7           | 46             | 9.3         | QP               |

Test Mode Single Carrier (10 MHz)  
Operating Frequency 5210 MHz (CH 42)

| Frequency (MHz) | Polarization | Reading (dBuV) | Corr. <sup>1)</sup> (dB) | Total (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement Type |
|-----------------|--------------|----------------|--------------------------|----------------|----------------|-------------|------------------|
| 59.860          | V            | 56.1           | -22.3                    | 33.8           | 40             | 6.2         | QP               |
| 32.829          | V            | 43.3           | -11.5                    | 31.8           | 40             | 8.2         | QP               |
| 124.987         | V            | 51.2           | -15.6                    | 35.6           | 43.5           | 7.9         | QP               |
| 742.009         | H            | 40.9           | -7.0                     | 33.9           | 46             | 12.1        | QP               |
| 741.999         | H            | 47.4           | -7.0                     | 40.4           | 46             | 5.6         | QP               |

Test Mode Single Carrier (10 MHz)  
Operating Frequency 5245 MHz (CH 49)

| Frequency (MHz) | Polarization | Reading (dBuV) | Corr. <sup>1)</sup> (dB) | Total (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement Type |
|-----------------|--------------|----------------|--------------------------|----------------|----------------|-------------|------------------|
| 31.664          | V            | 43.9           | -10.9                    | 33.0           | 40             | 7.0         | QP               |
| 59.981          | V            | 56.1           | -22.3                    | 33.8           | 40             | 6.2         | QP               |
| 124.990         | V            | 51.1           | -15.6                    | 35.5           | 43.5           | 8.0         | QP               |
| 741.995         | H            | 42.5           | -7.0                     | 35.5           | 46             | 10.5        | QP               |

## Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain

### Frequency Range : Below 1 GHz (With PoE Adapter #2)

Test Mode Contiguous Carrier (10+10 MHz)  
 Operating Frequency 5175+5185 MHz (CH 35+37)

| Frequency (MHz) | Polarization | Reading (dBuV) | Corr. <sup>1)</sup> (dB) | Total (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement Type |
|-----------------|--------------|----------------|--------------------------|----------------|----------------|-------------|------------------|
| 33.304          | V            | 42.8           | -11.8                    | 31.0           | 40             | 9.0         | QP               |
| 60.422          | V            | 56.5           | -22.3                    | 34.2           | 40             | 5.8         | QP               |
| 124.988         | V            | 53.4           | -15.6                    | 37.8           | 43.5           | 5.7         | QP               |
| 625.016         | V            | 47.7           | -8.8                     | 38.9           | 46             | 7.1         | QP               |
| 741.997         | H            | 43.5           | -7.0                     | 36.5           | 46             | 9.5         | QP               |

Test Mode Contiguous Carrier (10+10 MHz)  
 Operating Frequency 5210+5220 MHz (CH 42+44)

| Frequency (MHz) | Polarization | Reading (dBuV) | Corr. <sup>1)</sup> (dB) | Total (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement Type |
|-----------------|--------------|----------------|--------------------------|----------------|----------------|-------------|------------------|
| 36.379          | V            | 44.6           | -13.6                    | 31.0           | 40             | 9.0         | QP               |
| 60.315          | V            | 57.3           | -22.3                    | 35.0           | 40             | 5.0         | QP               |
| 124.997         | V            | 53.3           | -15.6                    | 37.7           | 43.5           | 5.8         | QP               |
| 624.993         | V            | 47.5           | -8.8                     | 38.7           | 46             | 7.3         | QP               |
| 742.013         | H            | 42.2           | -7.0                     | 35.2           | 46             | 10.8        | QP               |

Test Mode Contiguous Carrier (10+10 MHz)  
 Operating Frequency 5235+5245 MHz (CH 47+49)

| Frequency (MHz) | Polarization | Reading (dBuV) | Corr. <sup>1)</sup> (dB) | Total (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement Type |
|-----------------|--------------|----------------|--------------------------|----------------|----------------|-------------|------------------|
| 35.953          | V            | 43.2           | -13.4                    | 29.8           | 40             | 10.2        | QP               |
| 59.216          | V            | 56.7           | -22.4                    | 34.3           | 40             | 5.7         | QP               |
| 124.992         | V            | 53.3           | -15.6                    | 37.7           | 43.5           | 5.8         | QP               |
| 625.011         | V            | 47.7           | -8.8                     | 38.9           | 46             | 7.1         | QP               |
| 742.003         | H            | 43.2           | -7.0                     | 36.2           | 46             | 9.8         | QP               |

Test Mode Non-Contiguous Carrier (10+10 MHz)  
 Operating Frequency 5175+245 MHz (CH 35+49)

| Frequency (MHz) | Polarization | Reading (dBuV) | Corr. <sup>1)</sup> (dB) | Total (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement Type |
|-----------------|--------------|----------------|--------------------------|----------------|----------------|-------------|------------------|
| 31.325          | V            | 42.5           | -10.7                    | 31.8           | 40             | 8.2         | QP               |
| 59.912          | V            | 55.7           | -22.3                    | 33.4           | 40             | 6.6         | QP               |
| 124.996         | V            | 48.7           | -15.6                    | 33.1           | 43.5           | 10.4        | QP               |
| 741.986         | H            | 44.6           | -7.0                     | 37.6           | 46             | 8.4         | QP               |

### Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain

# Frequency Range : Above 1 GHz

Test Mode Single Carrier (10 MHz)  
Operating Frequency 5175 MHz (CH 35)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK   | AV          | PK   |
| 10350.480       | V            | -              | 46.0 | 2.3                 | -              | 48.3 | -              | 68.2 | -           | 19.9 |
| 10350.660       | H            | -              | 47.5 | 2.3                 | -              | 49.8 | -              | 68.2 | -           | 18.4 |
| 10370.710       | V            | -              | 48.6 | 2.4                 | -              | 51.0 | -              | 68.2 | -           | 17.2 |
| 10370.720       | H            | -              | 48.7 | 2.4                 | -              | 51.1 | -              | 68.2 | -           | 17.1 |

Test Mode Single Carrier (10 MHz)  
Operating Frequency 5210 MHz (CH 42)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK   | AV          | PK   |
| 10420.470       | V            | -              | 46.8 | 2.5                 | -              | 49.3 | -              | 68.2 | -           | 18.9 |
| 10420.780       | H            | -              | 46.9 | 2.5                 | -              | 49.4 | -              | 68.2 | -           | 18.8 |
| 10440.720       | H            | -              | 48.0 | 2.6                 | -              | 50.6 | -              | 68.2 | -           | 17.6 |
| 10440.750       | V            | -              | 45.7 | 2.6                 | -              | 48.3 | -              | 68.2 | -           | 19.9 |

Test Mode Single Carrier (10 MHz)  
Operating Frequency 5245 MHz (CH 49)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK   | AV          | PK   |
| 10450.560       | V            | -              | 45.6 | 2.6                 | -              | 48.2 | -              | 68.2 | -           | 20.0 |
| 10450.610       | H            | -              | 48.1 | 2.6                 | -              | 50.7 | -              | 68.2 | -           | 17.5 |
| 10490.530       | V            | -              | 47.1 | 2.7                 | -              | 49.8 | -              | 68.2 | -           | 18.4 |
| 10490.540       | H            | -              | 48.3 | 2.7                 | -              | 51.0 | -              | 68.2 | -           | 17.2 |

## Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).  
Since the EUT was set to transmit 100 % duty during the test, duty cycle correction factor was not applied.

# Frequency Range : Above 1 GHz

Test Mode Single Carrier (20 MHz)  
Operating Frequency 5180 MHz (CH 36)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)<br>Corr. <sup>1)</sup> | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|------------------------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   |                                    | AV             | PK   | AV             | PK   | AV          | PK   |
| 10360.410       | V            | -              | 46.6 | 2.3                                | -              | 48.9 | -              | 68.2 | -           | 19.3 |
| 10360.860       | H            | -              | 47.0 | 2.3                                | -              | 49.3 | -              | 68.2 | -           | 18.9 |
| 10440.140       | H            | -              | 45.9 | 2.6                                | -              | 48.5 | -              | 68.2 | -           | 19.7 |
| 10440.780       | V            | -              | 46.2 | 2.6                                | -              | 48.8 | -              | 68.2 | -           | 19.4 |

Test Mode Single Carrier (20 MHz)  
Operating Frequency 5200 MHz (CH 40)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)<br>Corr. <sup>1)</sup> | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|------------------------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   |                                    | AV             | PK   | AV             | PK   | AV          | PK   |
| 10400.000       | V            | -              | 45.2 | 2.4                                | -              | 47.6 | -              | 68.2 | -           | 20.6 |
| 10400.020       | H            | -              | 45.0 | 2.4                                | -              | 47.4 | -              | 68.2 | -           | 20.8 |
| 10480.660       | V            | -              | 47.1 | 2.7                                | -              | 49.8 | -              | 68.2 | -           | 18.4 |
| 10480.920       | H            | -              | 47.4 | 2.7                                | -              | 50.1 | -              | 68.2 | -           | 18.1 |

Test Mode Single Carrier (20 MHz)  
Operating Frequency 5240 MHz (CH 48)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)<br>Corr. <sup>1)</sup> | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|------------------------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   |                                    | AV             | PK   | AV             | PK   | AV          | PK   |
| 10400.550       | V            | -              | 47.8 | 2.4                                | -              | 50.2 | -              | 68.2 | -           | 18.0 |
| 10400.620       | H            | -              | 49.3 | 2.4                                | -              | 51.7 | -              | 68.2 | -           | 16.5 |
| 10480.620       | H            | -              | 47.6 | 2.7                                | -              | 50.3 | -              | 68.2 | -           | 17.9 |
| 10481.560       | V            | -              | 43.9 | 2.7                                | -              | 46.6 | -              | 68.2 | -           | 21.6 |

## Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).  
Since the EUT was set to transmit 100 % duty during the test, duty cycle correction factor was not applied.

# Frequency Range : Above 1 GHz

Test Mode Single Carrier (40 MHz)  
Operating Frequency 5180 MHz (CH 36)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK   | AV          | PK   |
| 10378.640       | V            | -              | 44.3 | 2.4                 | -              | 46.7 | -              | 68.2 | -           | 21.5 |
| 10379.990       | H            | -              | 46.5 | 2.4                 | -              | 48.9 | -              | 68.2 | -           | 19.3 |
| 10460.430       | H            | -              | 47.1 | 2.7                 | -              | 49.8 | -              | 68.2 | -           | 18.4 |
| 10460.790       | V            | -              | 47.2 | 2.7                 | -              | 49.9 | -              | 68.2 | -           | 18.3 |

Test Mode Single Carrier (40 MHz)  
Operating Frequency 5200 MHz (CH 40)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK   | AV          | PK   |
| 10380.620       | H            | -              | 49.1 | 2.4                 | -              | 51.5 | -              | 68.2 | -           | 16.7 |
| 10380.660       | V            | -              | 49.2 | 2.4                 | -              | 51.6 | -              | 68.2 | -           | 16.6 |
| 10460.920       | V            | -              | 45.6 | 2.7                 | -              | 48.3 | -              | 68.2 | -           | 19.9 |
| 10464.350       | H            | -              | 44.9 | 2.7                 | -              | 47.6 | -              | 68.2 | -           | 20.6 |

## Note(s) :

- Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
- AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).  
Since the EUT was set to transmit 100 % duty during the test, duty cycle correction factor was not applied.

# Frequency Range : Above 1 GHz

Test Mode Contiguous Carriers (10+10 MHz)  
Operating Frequency 5175+5185 MHz (CH 35+37)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK   | AV          | PK   |
| 10350.500       | H            | -              | 47.7 | 2.3                 | -              | 50.0 | -              | 68.2 | -           | 18.2 |
| 10350.630       | V            | -              | 46.7 | 2.3                 | -              | 49.0 | -              | 68.2 | -           | 19.2 |
| 10369.960       | H            | -              | 47.9 | 2.4                 | -              | 50.3 | -              | 68.2 | -           | 17.9 |
| 10370.630       | V            | -              | 48.3 | 2.4                 | -              | 50.7 | -              | 68.2 | -           | 17.5 |

Test Mode Contiguous Carriers (10+10 MHz)  
Operating Frequency 5210+5220 MHz (CH 42+44)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK   | AV          | PK   |
| 10417.480       | H            | -              | 43.8 | 2.5                 | -              | 46.3 | -              | 68.2 | -           | 21.9 |
| 10420.900       | V            | -              | 45.9 | 2.5                 | -              | 48.4 | -              | 68.2 | -           | 19.8 |
| 10437.080       | H            | -              | 44.8 | 2.6                 | -              | 47.4 | -              | 68.2 | -           | 20.8 |
| 10440.170       | V            | -              | 46.9 | 2.6                 | -              | 49.5 | -              | 68.2 | -           | 18.7 |

Test Mode Contiguous Carriers (10+10 MHz)  
Operating Frequency 5235+5245 MHz (CH 47+49)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK   | AV          | PK   |
| 10470.520       | H            | -              | 46.8 | 2.7                 | -              | 49.5 | -              | 68.2 | -           | 18.7 |
| 10470.770       | V            | -              | 44.8 | 2.7                 | -              | 47.5 | -              | 68.2 | -           | 20.7 |
| 10490.040       | H            | -              | 47.1 | 2.7                 | -              | 49.8 | -              | 68.2 | -           | 18.4 |
| 10490.460       | V            | -              | 47.7 | 2.7                 | -              | 50.4 | -              | 68.2 | -           | 17.8 |

## Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).  
Since the EUT was set to transmit 100 % duty during the test, duty cycle correction factor was not applied.



# Frequency Range : Above 1 GHz

Test Mode                      Contiguous Carriers (20+20 MHz)  
Operating Frequency        5180+5200 MHz (CH 36+40)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK   | AV          | PK   |
| 10359.970       | V            | -              | 46.1 | 2.3                 | -              | 48.4 | -              | 68.2 | -           | 19.8 |
| 10360.100       | H            | -              | 47.7 | 2.3                 | -              | 50.0 | -              | 68.2 | -           | 18.2 |
| 10400.220       | V            | -              | 48.1 | 2.4                 | -              | 50.5 | -              | 68.2 | -           | 17.7 |
| 10400.440       | H            | -              | 48.6 | 2.4                 | -              | 51.0 | -              | 68.2 | -           | 17.2 |

Test Mode                      Contiguous Carriers (20+20 MHz)  
Operating Frequency        5200+5220 MHz (CH 40+44)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK   | AV          | PK   |
| 10399.890       | H            | -              | 47.6 | 2.4                 | -              | 50.0 | -              | 68.2 | -           | 18.2 |
| 10400.550       | V            | -              | 46.2 | 2.4                 | -              | 48.6 | -              | 68.2 | -           | 19.6 |
| 10439.540       | V            | -              | 45.9 | 2.6                 | -              | 48.5 | -              | 68.2 | -           | 19.7 |
| 10440.200       | H            | -              | 47.1 | 2.6                 | -              | 49.7 | -              | 68.2 | -           | 18.5 |

Test Mode                      Contiguous Carriers (20+20 MHz)  
Operating Frequency        5220+5240 MHz (CH 44+48)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK   | AV          | PK   |
| 10440.610       | H            | -              | 46.2 | 2.6                 | -              | 48.8 | -              | 68.2 | -           | 19.4 |
| 10440.610       | V            | -              | 45.5 | 2.6                 | -              | 48.1 | -              | 68.2 | -           | 20.1 |
| 10480.160       | V            | -              | 46.4 | 2.7                 | -              | 49.1 | -              | 68.2 | -           | 19.1 |
| 10480.710       | H            | -              | 47.9 | 2.7                 | -              | 50.6 | -              | 68.2 | -           | 17.6 |

## Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).  
Since the EUT was set to transmit 100 % duty during the test, duty cycle correction factor was not applied.

# Frequency Range : Above 1 GHz

Test Mode Contiguous Carriers (20+40 MHz)  
Operating Frequency 5200+5230 MHz (CH 40+46)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK   | AV          | PK   |
| 10400.060       | V            | -              | 45.3 | 2.4                 | -              | 47.7 | -              | 68.2 | -           | 20.5 |
| 10400.480       | H            | -              | 47.4 | 2.4                 | -              | 49.8 | -              | 68.2 | -           | 18.4 |
| 10460.600       | H            | -              | 47.9 | 2.7                 | -              | 50.6 | -              | 68.2 | -           | 17.6 |
| 10460.770       | V            | -              | 46.9 | 2.7                 | -              | 49.6 | -              | 68.2 | -           | 18.6 |

Test Mode Contiguous Carriers (40+20 MHz)  
Operating Frequency 5190+5220 MHz (CH 38+44)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK   | AV          | PK   |
| 10379.720       | V            | -              | 46.5 | 2.4                 | -              | 48.9 | -              | 68.2 | -           | 19.3 |
| 10380.760       | H            | -              | 46.2 | 2.4                 | -              | 48.6 | -              | 68.2 | -           | 19.6 |
| 10440.000       | V            | -              | 45.3 | 2.6                 | -              | 47.9 | -              | 68.2 | -           | 20.3 |
| 10440.150       | H            | -              | 46.0 | 2.6                 | -              | 48.6 | -              | 68.2 | -           | 19.6 |

## Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).  
Since the EUT was set to transmit 100 % duty during the test, duty cycle correction factor was not applied.

# Frequency Range : Above 1 GHz

Test Mode Non-Contiguous Carriers (10+10 MHz)  
Operating Frequency 5175+5235 MHz (CH 35+49)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB) | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|-------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   |             | AV             | PK   | AV             | PK   | AV          | PK   |
| 10350.020       | V            | -              | 45.1 | 2.3         | -              | 47.4 | -              | 68.2 | -           | 20.8 |
| 10350.070       | H            | -              | 47.2 | 2.3         | -              | 49.5 | -              | 68.2 | -           | 18.7 |
| 10490.450       | V            | -              | 47.7 | 2.7         | -              | 50.4 | -              | 68.2 | -           | 17.8 |
| 10490.660       | H            | -              | 48.5 | 2.7         | -              | 51.2 | -              | 68.2 | -           | 17.0 |

Test Mode Non-Contiguous Carriers (20+20 MHz)  
Operating Frequency 5180+5240 MHz (CH 36+48)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB) | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|-------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   |             | AV             | PK   | AV             | PK   | AV          | PK   |
| 10360.750       | V            | -              | 46.0 | 2.3         | -              | 48.3 | -              | 68.2 | -           | 19.9 |
| 10360.910       | H            | -              | 46.4 | 2.3         | -              | 48.7 | -              | 68.2 | -           | 19.5 |
| 10480.650       | H            | -              | 47.8 | 2.7         | -              | 50.5 | -              | 68.2 | -           | 17.7 |
| 10480.720       | V            | -              | 47.7 | 2.7         | -              | 50.4 | -              | 68.2 | -           | 17.8 |

## Note(s) :

- Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
- AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).  
Since the EUT was set to transmit 100 % duty during the test, duty cycle correction factor was not applied.

# Frequency Range : Above 1 GHz

Test Mode Non-Contiguous Carriers (20+40 MHz)  
Operating Frequency 5180+5230 MHz (CH 36+46)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK   | AV          | PK   |
| 10360.120       | V            | -              | 46.3 | 2.3                 | -              | 48.6 | -              | 68.2 | -           | 19.6 |
| 10360.540       | H            | -              | 46.5 | 2.3                 | -              | 48.8 | -              | 68.2 | -           | 19.4 |
| 10460.370       | V            | -              | 44.8 | 2.7                 | -              | 47.5 | -              | 68.2 | -           | 20.7 |
| 10460.530       | H            | -              | 47.3 | 2.7                 | -              | 50.0 | -              | 68.2 | -           | 18.2 |

Test Mode Non-Contiguous Carriers (40+20 MHz)  
Operating Frequency 5190+5240 MHz (CH 38+48)

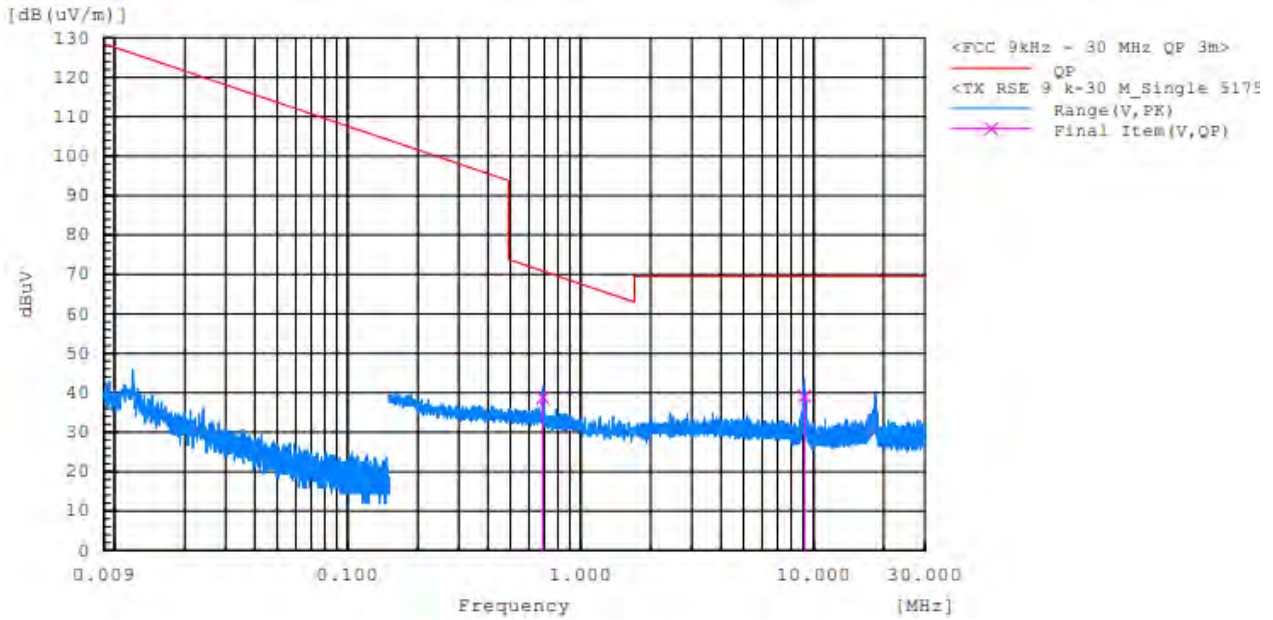
| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |      | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|------|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK   | AV          | PK   |
| 10380.630       | H            | -              | 48.3 | 2.4                 | -              | 50.7 | -              | 68.2 | -           | 17.5 |
| 10380.710       | V            | -              | 47.4 | 2.4                 | -              | 49.8 | -              | 68.2 | -           | 18.4 |
| 10480.230       | H            | -              | 48.5 | 2.7                 | -              | 51.2 | -              | 68.2 | -           | 17.0 |
| 10480.640       | V            | -              | 48.7 | 2.7                 | -              | 51.4 | -              | 68.2 | -           | 16.8 |

## Note(s) :

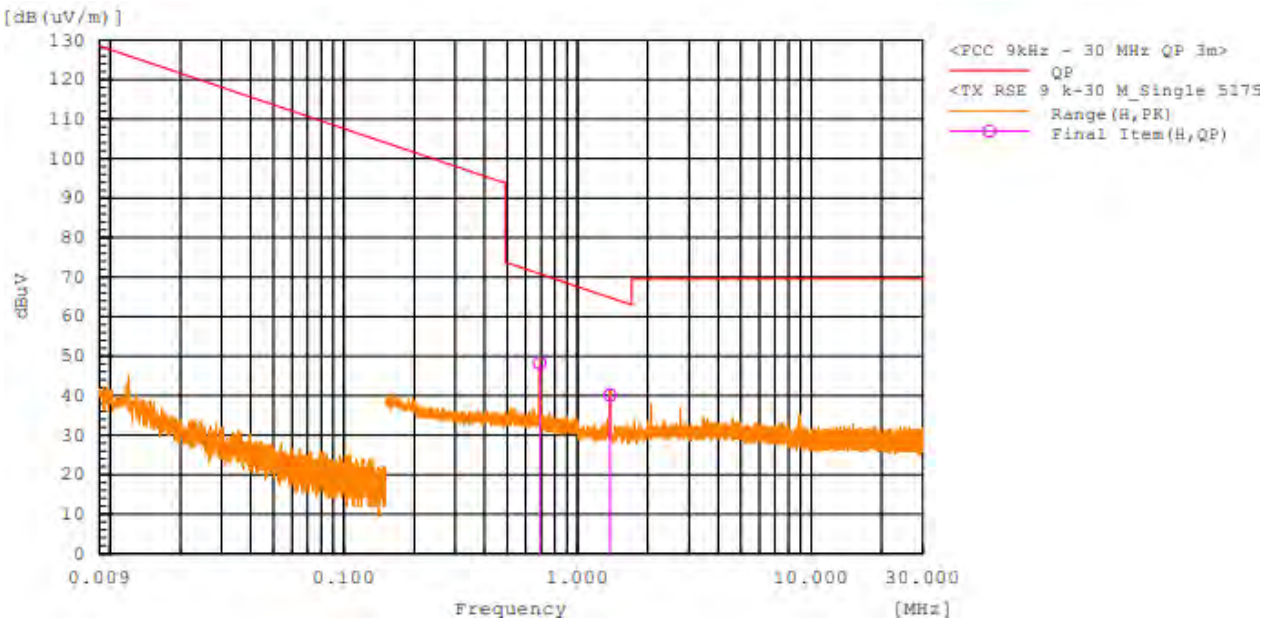
1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
  2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).
- Since the EUT was set to transmit 100 % duty during the test, duty cycle correction factor was not applied.

■ TEST PLOTS (With PoE Adapter #1)

**Radiated Spurious Emission 9 kHz – 30 MHz (Antenna Position 90°) : Single Carrier 10 MHz (5175 MHz)**



**Radiated Spurious Emission 9 kHz – 30 MHz (Antenna Position 180°) : Single Carrier 10 MHz (5175 MHz)**

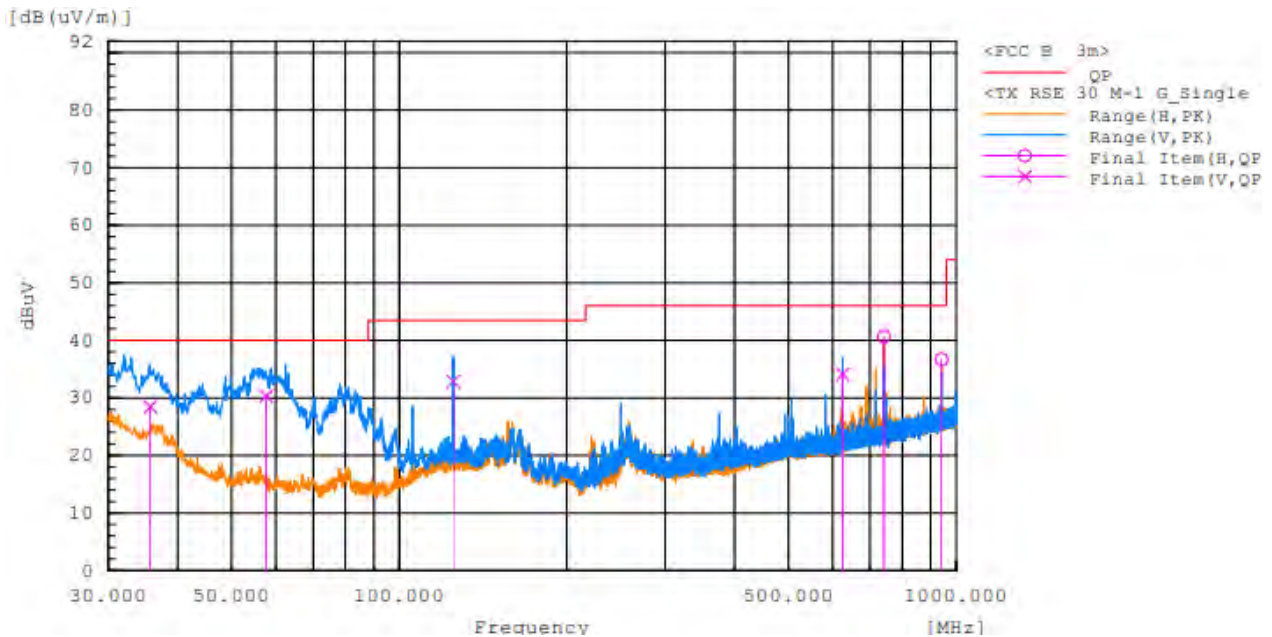


**Note:**

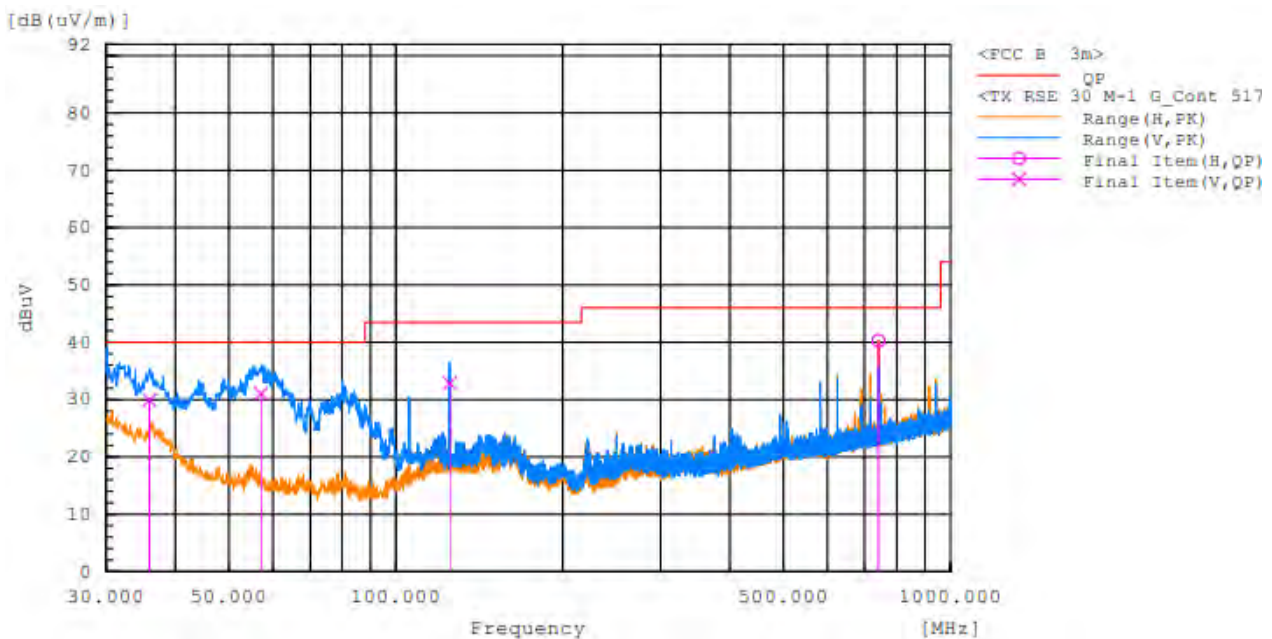
The worst-case plots are included in this report.

■ TEST PLOTS (With PoE Adapter #1)

**Radiated Spurious Emission 30 MHz – 1 GHz : Single Carrier 10 MHz (5175 MHz)**



**Radiated Spurious Emission 30 MHz – 1 GHz : Contiguous Carrier 10+10 MHz (5175+5185 MHz)**

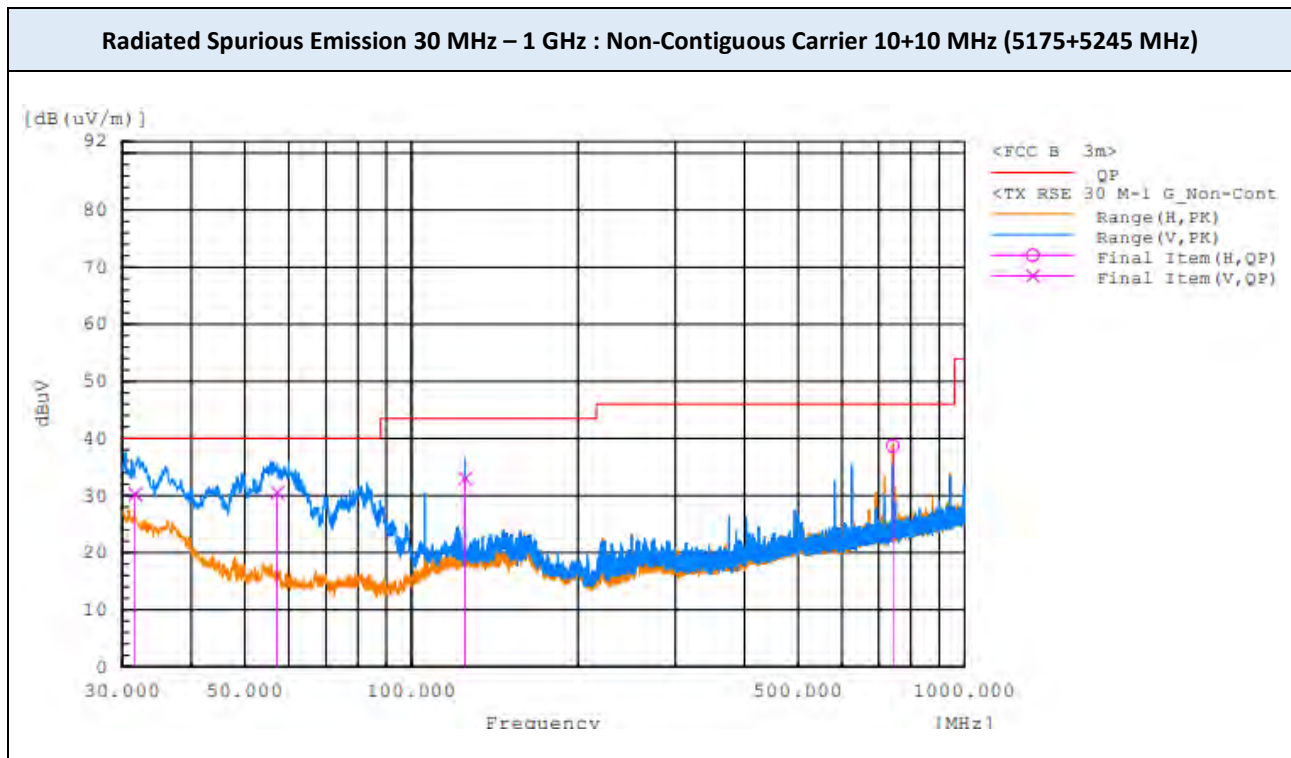


**Note:**

The worst-case plots are included in this report.



■ TEST PLOTS (With PoE Adapter #1)

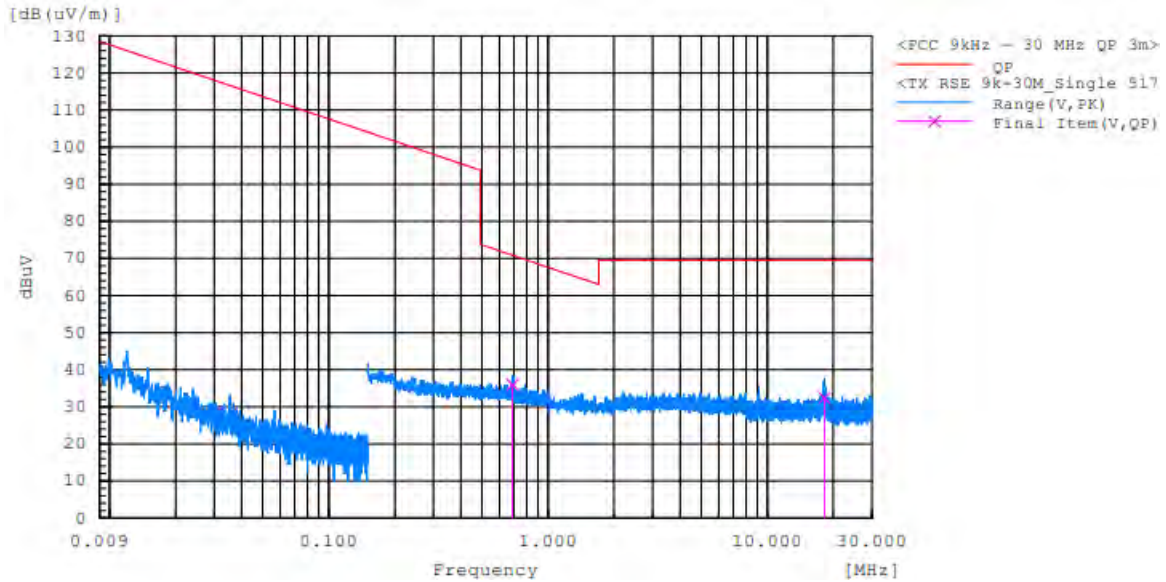


**Note:**

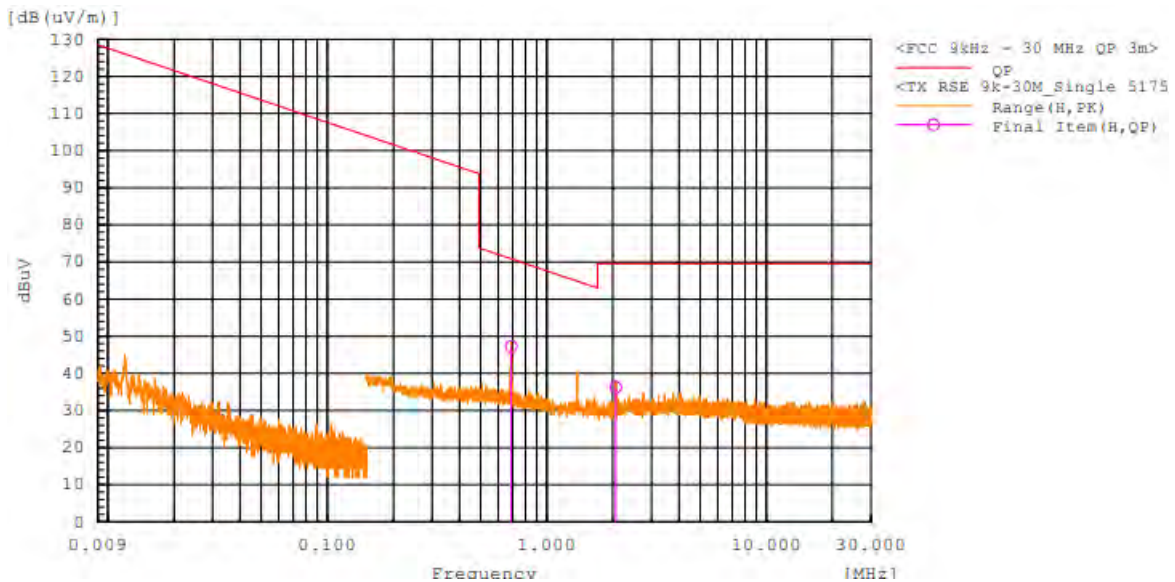
The worst-case plots are included in this report.

■ TEST PLOTS (With PoE Adapter #2)

**Radiated Spurious Emission 9 kHz – 30 MHz (Antenna Position 90°) : Single Carrier 10 MHz (5175 MHz)**



**Radiated Spurious Emission 9 kHz – 30 MHz (Antenna Position 180°) : Single Carrier 10 MHz (5175 MHz)**

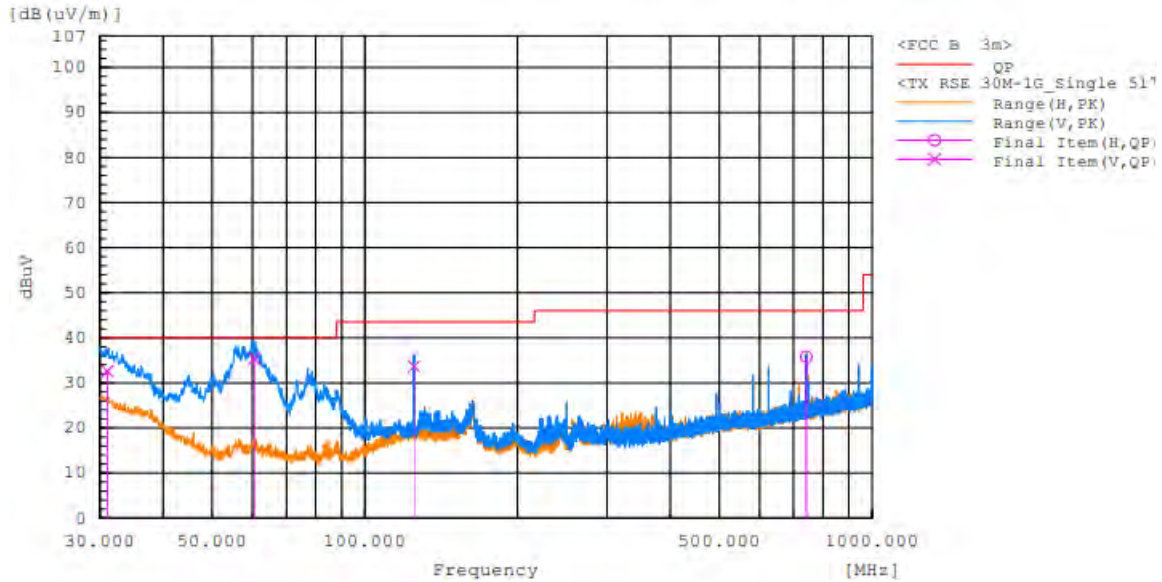


**Note:**

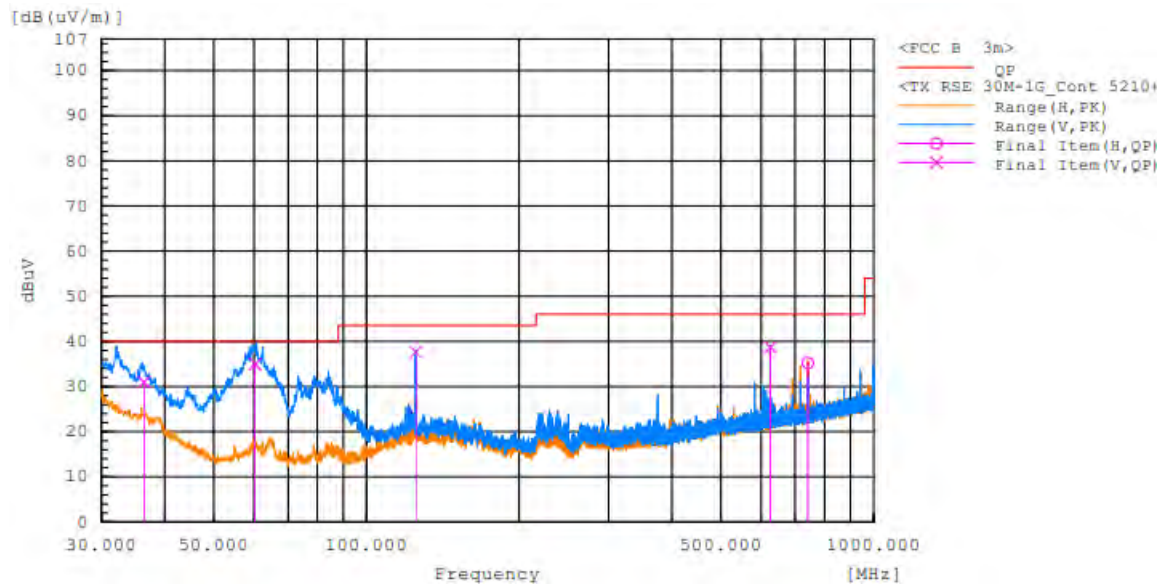
The worst-case plots are included in this report.

■ TEST PLOTS (With PoE Adapter #2)

**Radiated Spurious Emission 30 MHz – 1 GHz : Single Carrier 10 MHz (5175 MHz)**



**Radiated Spurious Emission 30 MHz – 1 GHz : Contiguous Carrier 10+10 MHz (5210+5220 MHz)**

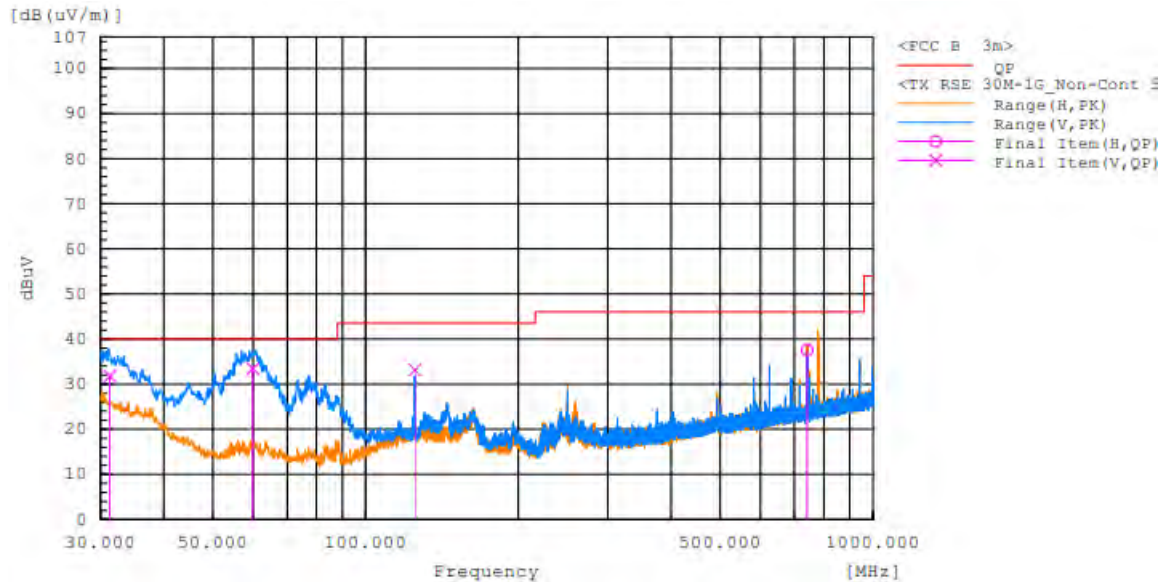


**Note:**

The worst-case plots are included in this report.

■ TEST PLOTS (With PoE Adapter #2)

**Radiated Spurious Emission 30 MHz – 1 GHz : Non-Contiguous Carrier 10+10 MHz (5175+5245 MHz)**



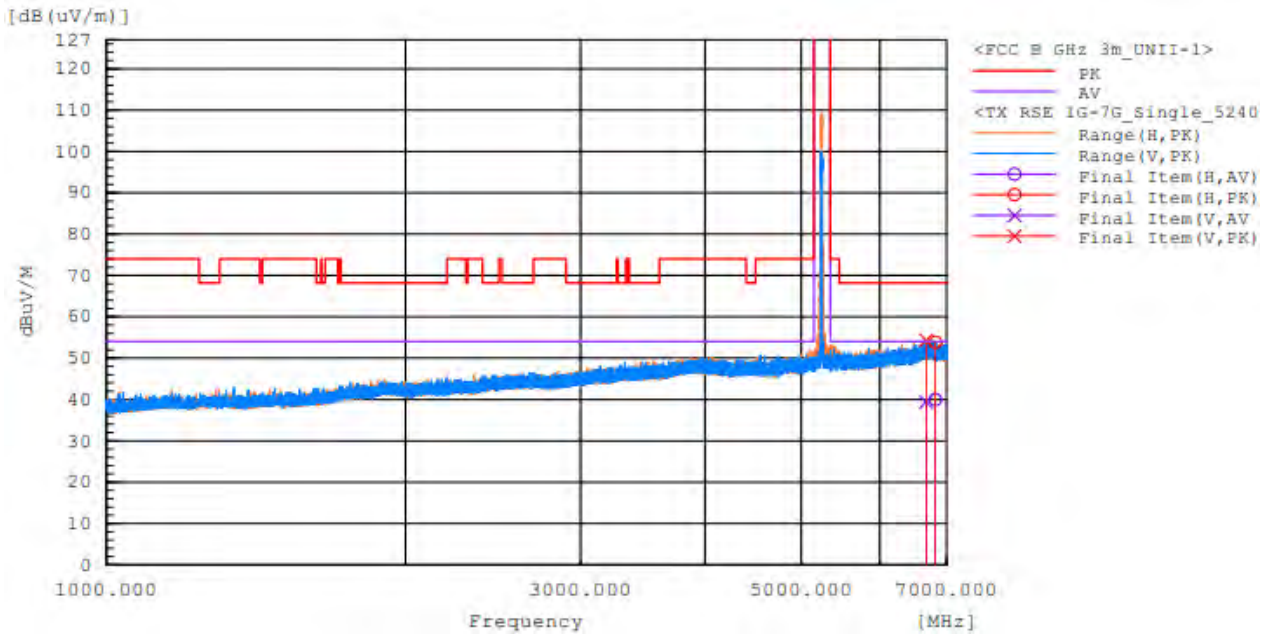
**Note:**

The worst-case plots are included in this report.

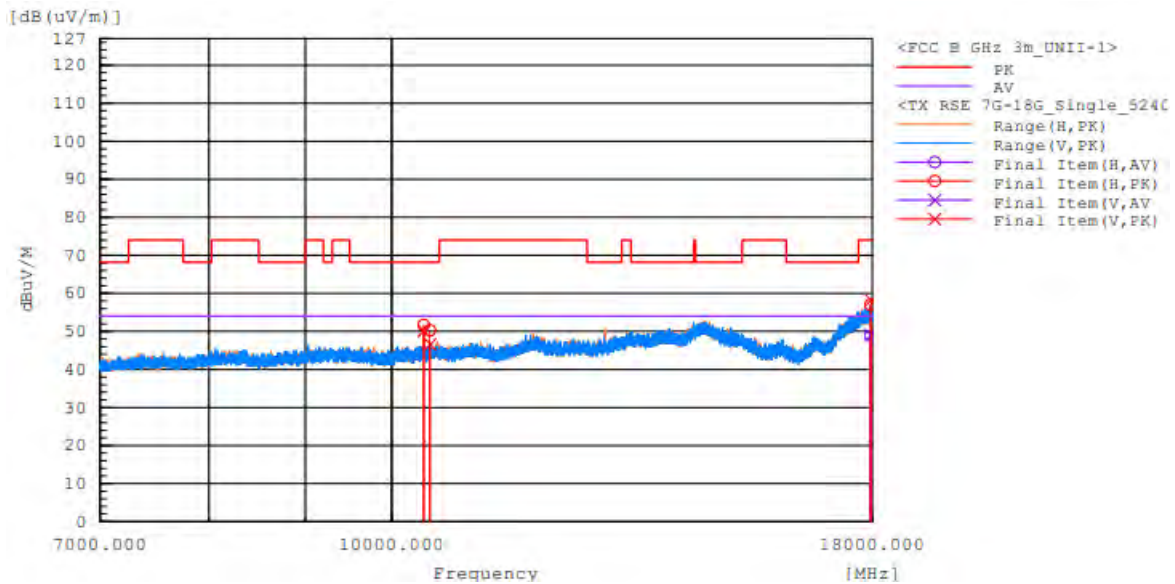


■ TEST PLOTS

**Radiated Spurious Emission 1 GHz - 7 GHz : Single Carrier 20 MHz (5240 MHz)**



**Radiated Spurious Emission 7 GHz - 18 GHz : Single Carrier 20 MHz (5240 MHz)**

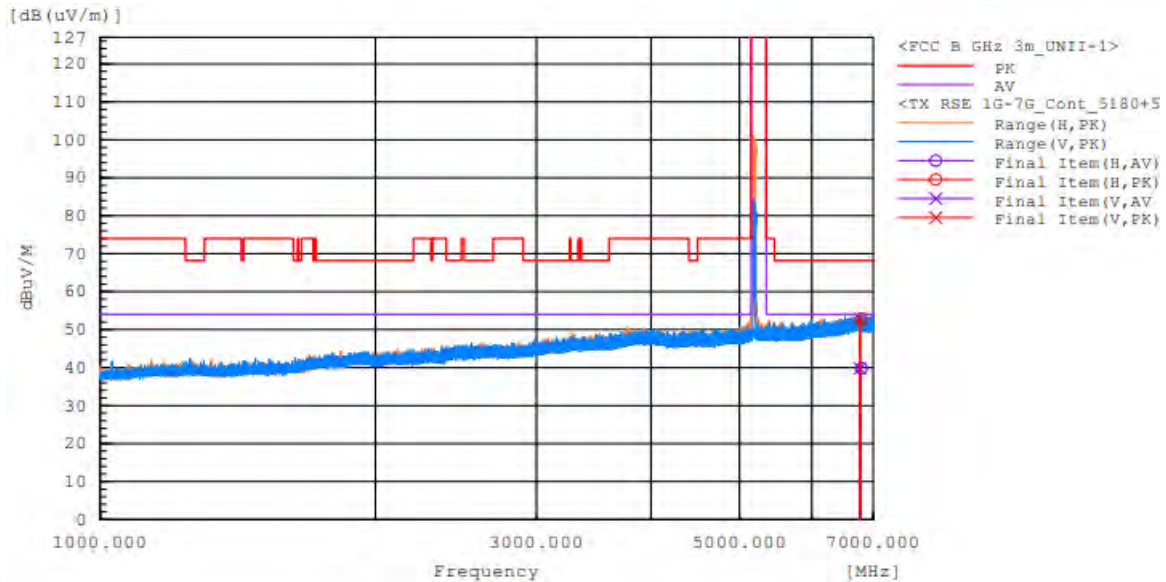


**Note:**

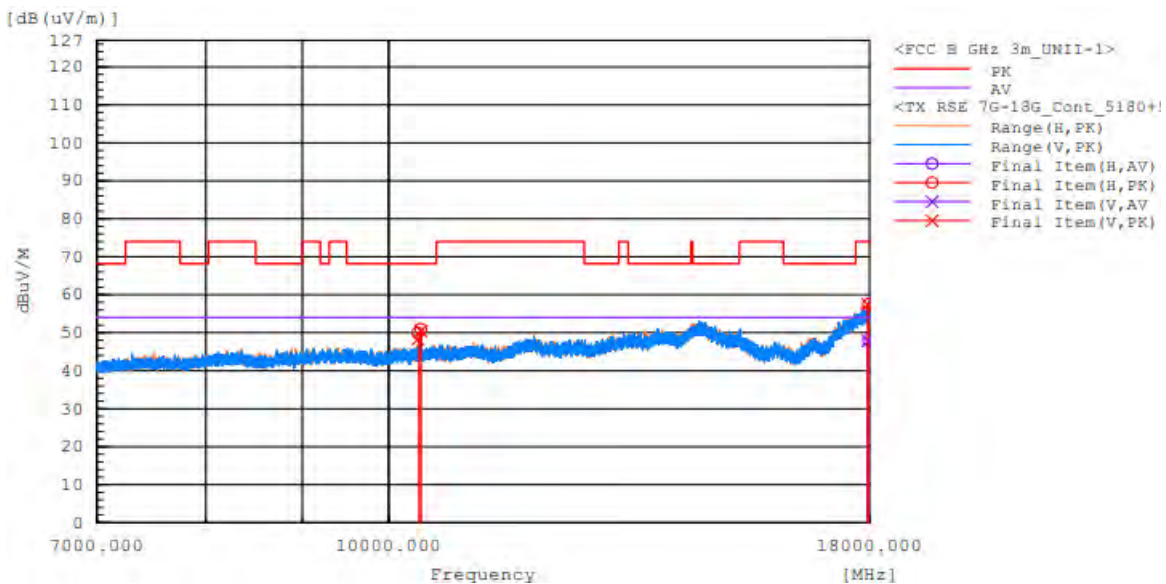
The worst-case plots are included in this report.

■ TEST PLOTS

**Radiated Spurious Emission 1 GHz - 7 GHz : Contiguous Carrier 20+20 MHz (5180+5200 MHz)**



**Radiated Spurious Emission 7 GHz - 18 GHz : Contiguous Carrier 20+20 MHz (5180+5200 MHz)**



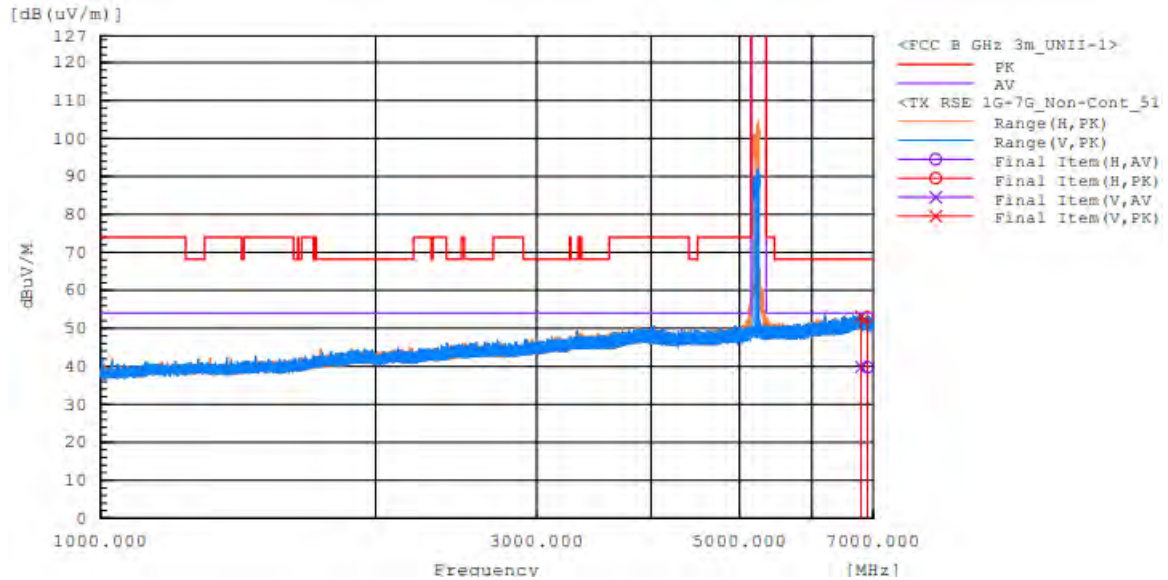
**Note:**

The worst-case plots are included in this report.

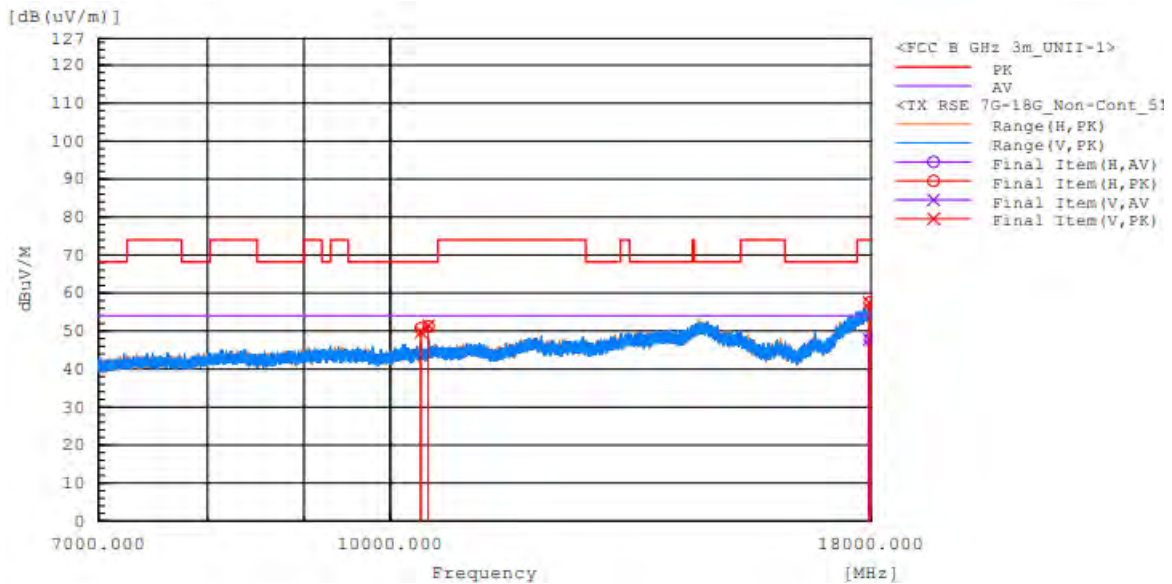


■ TEST PLOTS

**Radiated Spurious Emission 1 GHz - 7 GHz : Non-Contiguous Carrier 40+20 MHz (5190+5240 MHz)**



**Radiated Spurious Emission 7 GHz - 18 GHz : Non-Contiguous Carrier 40+20 MHz (5190+5240 MHz)**

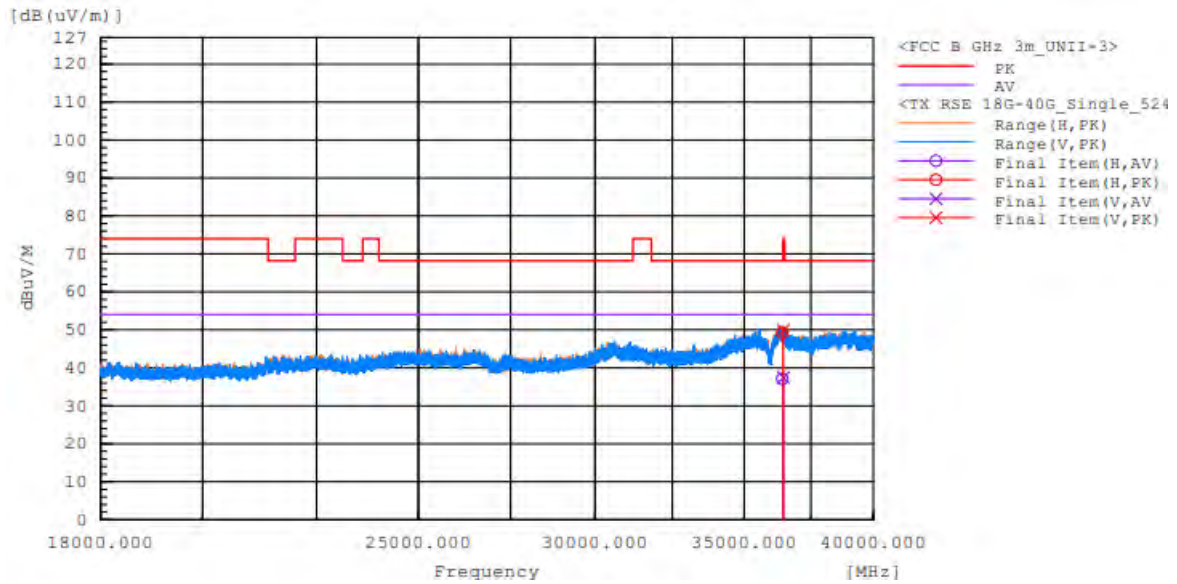


**Note:**

The worst-case plots are included in this report.

■ TEST PLOTS

**Radiated Spurious Emission 18 GHz - 40 GHz : Single Carrier 20 MHz (5240 MHz)**



**Note:**

The worst-case plots are included in this report.

## 9.7 RADIATED RESTRICTED BAND EDGES

Operating Frequency 5175 MHz  
Channel No. CH 35  
Mode Single Carrier (10 MHz)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |    | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|----|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK | AV          | PK   |
| 5143.214        | V            | 35.2           | 45.3 | 5.1                 | 40.3           | 50.4 | 54             | 74 | 13.7        | 23.6 |
| 5149.353        | H            | 36.0           | 47.8 | 5.1                 | 41.1           | 52.9 | 54             | 74 | 12.9        | 21.1 |

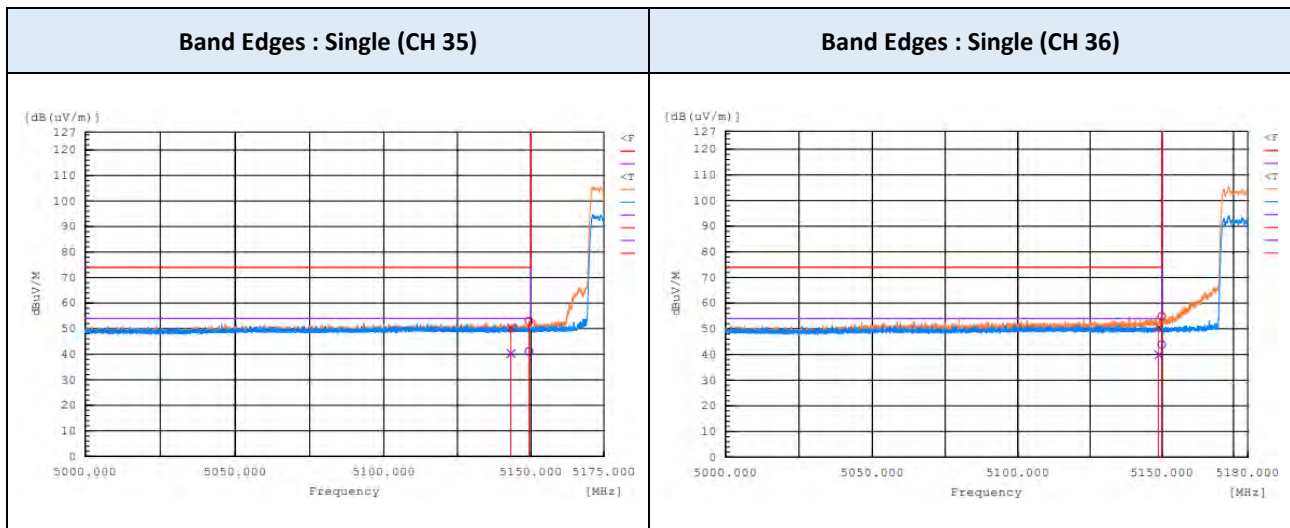
Operating Frequency 5180 MHz  
Channel No. CH 36  
Mode Single Carrier (20 MHz)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |    | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|----|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK | AV          | PK   |
| 5148.882        | V            | 34.8           | 45.5 | 5.1                 | 39.9           | 50.6 | 54             | 74 | 14.1        | 23.4 |
| 5149.895        | H            | 38.8           | 49.7 | 5.1                 | 43.9           | 54.8 | 54             | 74 | 10.1        | 19.2 |

### Notes:

1. Correction Factor: Antenna Factor + Cable loss
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB)  
Since the EUT was set to transmit 100 % duty during the test, duty cycle correction factor was not applied.

### TEST PLOTS



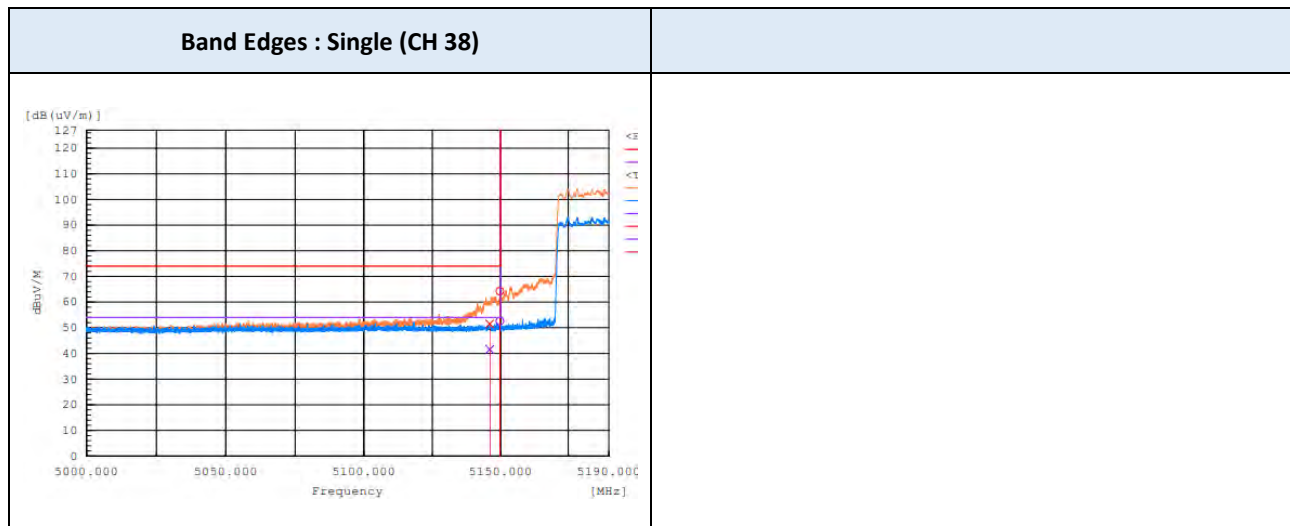
Operating Frequency 5190 MHz  
Channel No. CH 38  
Mode Single Carrier (40 MHz)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |    | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|----|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK | AV          | PK   |
| 5146.004        | V            | 36.5           | 46.4 | 5.1                 | 41.6           | 51.5 | 54             | 74 | 12.4        | 22.5 |
| 5149.779        | H            | 47.5           | 59.2 | 5.1                 | 52.6           | 64.3 | 54             | 74 | 1.4         | 9.7  |

**Notes:**

1. Correction Factor: Antenna Factor + Cable loss
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB)  
Since the EUT was set to transmit 100 % duty during the test, duty cycle correction factor was not applied.

**TEST PLOTS**



Operating Frequency 5175+5185 MHz  
Channel No. CH 35+37  
Mode Contiguous Carrier (10+10 MHz)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |    | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|----|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK | AV          | PK   |
| 5145.606        | V            | 33.1           | 46.5 | 5.1                 | 38.2           | 51.6 | 54             | 74 | 15.8        | 22.4 |
| 5149.210        | H            | 36.5           | 48.9 | 5.1                 | 41.6           | 54.0 | 54             | 74 | 12.4        | 20.0 |

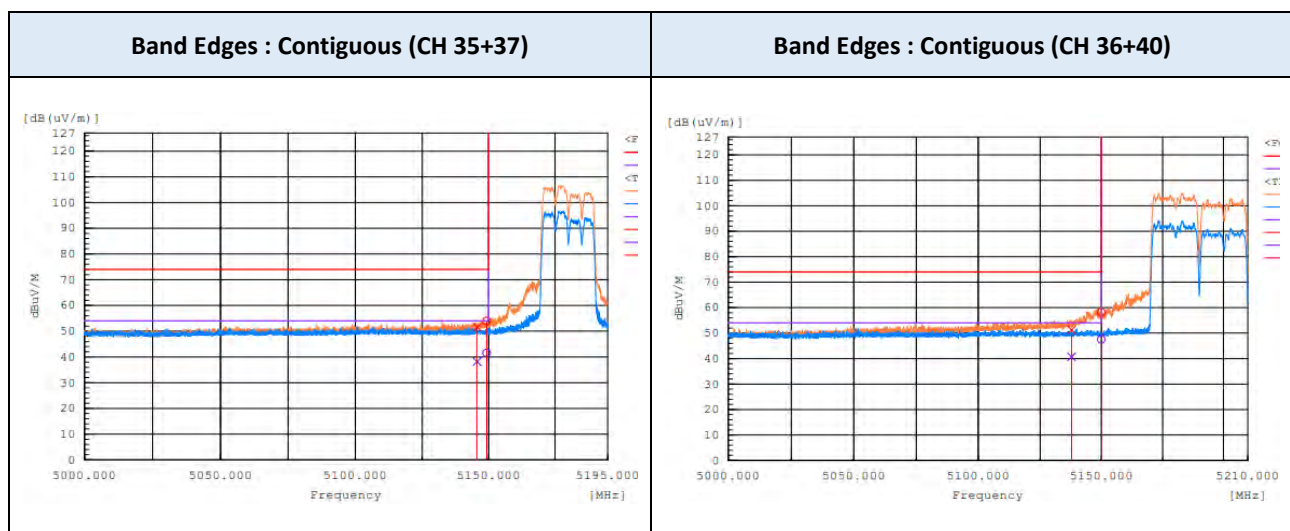
Operating Frequency 5180+5200 MHz  
Channel No. CH 36+40  
Mode Contiguous Carriers (20+20 MHz)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |    | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|----|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK | AV          | PK   |
| 5137.763        | V            | 35.6           | 46.2 | 5.1                 | 40.7           | 51.3 | 54             | 74 | 13.3        | 22.7 |
| 5149.896        | H            | 42.4           | 53.2 | 5.1                 | 47.5           | 58.3 | 54             | 74 | 6.5         | 15.7 |

#### Notes:

1. Correction Factor: Antenna Factor + Cable loss
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB)  
Since the EUT was set to transmit 100 % duty during the test, duty cycle correction factor was not applied.

#### TEST PLOTS





Operating Frequency 5190+5220 MHz  
Channel No. CH 38+44  
Mode Contiguous Carriers (40+20 MHz)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |    | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|----|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK | AV          | PK   |
| 5145.786        | V            | 33.8           | 45.8 | 5.1                 | 38.9           | 50.9 | 54             | 74 | 15.1        | 23.1 |
| 5149.865        | H            | 47.9           | 60.8 | 5.1                 | 53.0           | 65.9 | 54             | 74 | 1.0         | 8.1  |

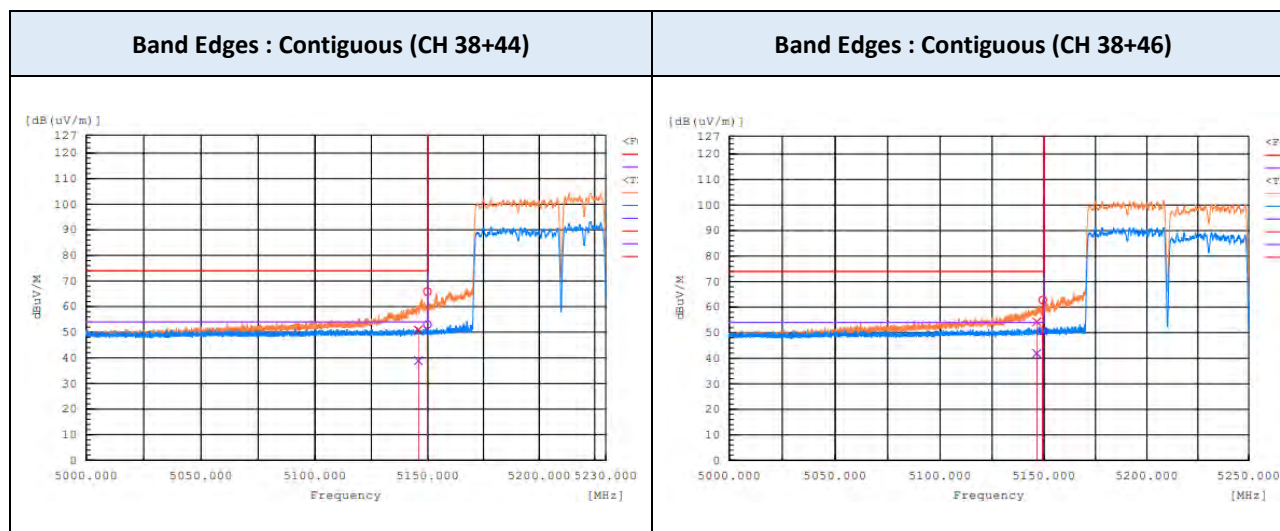
Operating Frequency 5190+5230 MHz  
Channel No. CH 38+46  
Mode Contiguous Carriers (40+40 MHz)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |    | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|----|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK | AV          | PK   |
| 5146.481        | V            | 36.8           | 49.2 | 5.1                 | 41.9           | 54.3 | 54             | 74 | 12.1        | 19.7 |
| 5149.409        | H            | 45.6           | 57.7 | 5.1                 | 50.7           | 62.8 | 54             | 74 | 3.3         | 11.2 |

#### Notes:

1. Correction Factor: Antenna Factor + Cable loss
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB)  
Since the EUT was set to transmit 100 % duty during the test, duty cycle correction factor was not applied.

#### TEST PLOTS





Operating Frequency 5175+5245 MHz  
Channel No. CH 35+49  
Mode Non-Contiguous Carriers (10+10 MHz)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |    | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|----|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK | AV          | PK   |
| 5102.155        | V            | 38.3           | 51.8 | 5.0                 | 43.3           | 56.8 | 54             | 74 | 10.7        | 17.2 |
| 5104.184        | H            | 46.1           | 58.1 | 5.0                 | 51.1           | 63.1 | 54             | 74 | 2.9         | 10.9 |

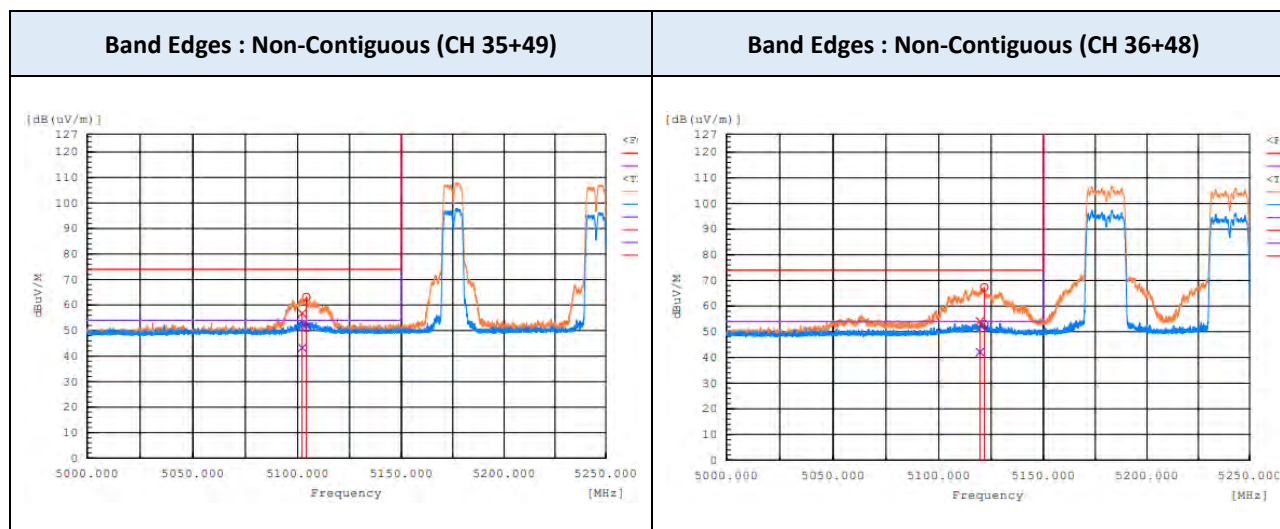
Operating Frequency 5180+5240 MHz  
Channel No. CH 36+48  
Mode Non-Contiguous Carriers (20+20 MHz)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |    | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|----|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK | AV          | PK   |
| 5121.662        | H            | 48.0           | 62.3 | 5.0                 | 53.0           | 67.3 | 54             | 74 | 1.0         | 6.7  |
| 5119.593        | V            | 37.1           | 49.1 | 5.0                 | 42.1           | 54.1 | 54             | 74 | 11.9        | 19.9 |

#### Notes:

1. Correction Factor: Antenna Factor + Cable loss
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB)  
Since the EUT was set to transmit 100 % duty during the test, duty cycle correction factor was not applied.

#### TEST PLOTS



Operating Frequency 5180+5230 MHz  
Channel No. CH 36+46  
Mode Non-Contiguous Carriers (20+40 MHz)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |    | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|----|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK | AV          | PK   |
| 5127.165        | V            | 36.5           | 48.3 | 5.0                 | 41.5           | 53.3 | 54             | 74 | 12.5        | 20.7 |
| 5132.578        | H            | 47.9           | 62.3 | 5.1                 | 53.0           | 67.4 | 54             | 74 | 1.0         | 6.6  |

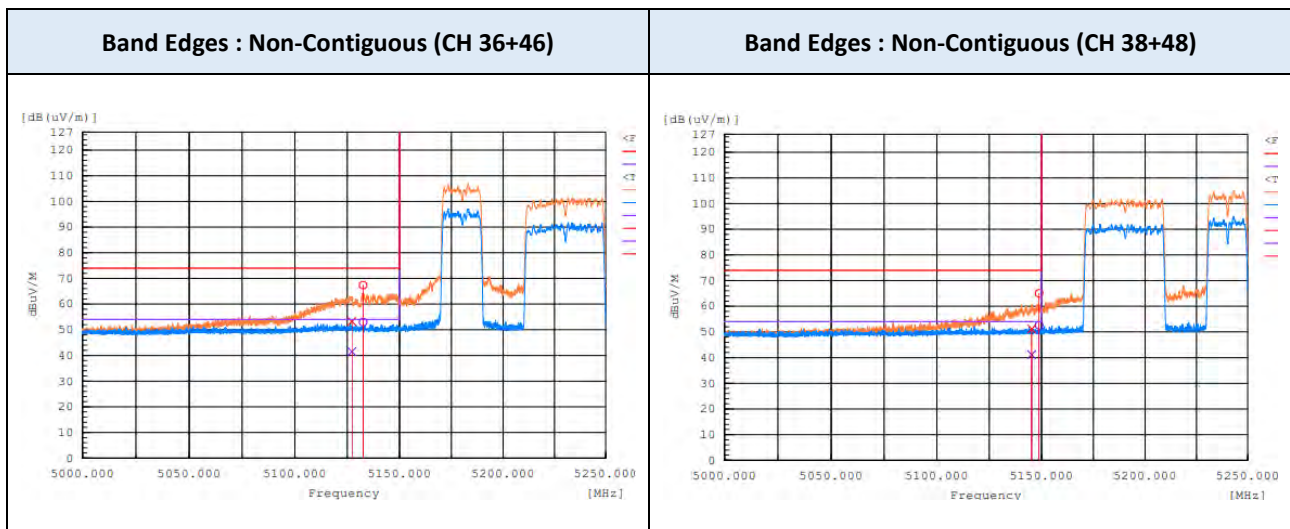
Operating Frequency 5190+5240 MHz  
Channel No. CH 38+48  
Mode Non-Contiguous Carriers (20+40 MHz)

| Frequency (MHz) | Polarization | Reading (dBuV) |      | Factor (dB)         | Level (dBuV/m) |      | Limit (dBuV/m) |    | Margin (dB) |      |
|-----------------|--------------|----------------|------|---------------------|----------------|------|----------------|----|-------------|------|
|                 |              | AV             | PK   | Corr. <sup>1)</sup> | AV             | PK   | AV             | PK | AV          | PK   |
| 5145.289        | V            | 36.1           | 46.1 | 5.1                 | 41.2           | 51.2 | 54             | 74 | 12.8        | 22.8 |
| 5148.826        | H            | 47.5           | 59.9 | 5.1                 | 52.6           | 65.0 | 54             | 74 | 1.4         | 9.0  |

#### Notes:

1. Correction Factor: Antenna Factor + Cable loss
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB)  
Since the EUT was set to transmit 100 % duty during the test, duty cycle correction factor was not applied.

#### TEST PLOTS



## 9.8 POWERLINE CONDUCTED EMISSIONS

### PoE Adapter #1

| Frequency (MHz) | Line | Reading (dBμV) |      | Corr. (dB) | Level (dBμV) |      | Limit (dBμV) |      | Margin (dB) |      |
|-----------------|------|----------------|------|------------|--------------|------|--------------|------|-------------|------|
|                 |      | QP             | CAV  |            | QP           | CAV  | QP           | CAV  | QP          | CAV  |
| 0.189           | L1   | 43.3           | 34.8 | 9.7        | 53.0         | 44.5 | 64.1         | 54.1 | 11.1        | 9.6  |
| 0.260           | L1   | 40.5           | 33.6 | 9.7        | 50.2         | 43.3 | 61.4         | 51.4 | 11.2        | 8.1  |
| 0.375           | L1   | 43.2           | 31.6 | 9.7        | 52.9         | 41.3 | 58.4         | 48.4 | 5.5         | 7.1  |
| 0.465           | L1   | 39.4           | 28.7 | 9.6        | 49.0         | 38.3 | 56.6         | 46.6 | 7.6         | 8.3  |
| 0.500           | L1   | 42.3           | 28.9 | 9.6        | 51.9         | 38.5 | 56           | 46   | 4.1         | 7.5  |
| 0.589           | L1   | 37.6           | 29.3 | 9.6        | 47.2         | 38.9 | 56           | 46   | 8.8         | 7.1  |
| 0.778           | L1   | 36.2           | 28.1 | 9.7        | 45.9         | 37.8 | 56           | 46   | 10.1        | 8.2  |
| 0.955           | L1   | 35.4           | 24.6 | 9.7        | 45.1         | 34.3 | 56           | 46   | 10.9        | 11.7 |
| 1.256           | L1   | 34.5           | 26.9 | 9.7        | 44.2         | 36.6 | 56           | 46   | 11.8        | 9.4  |
| 4.379           | L1   | 38.4           | 28.5 | 9.8        | 48.2         | 38.3 | 56           | 46   | 7.8         | 7.7  |
| 7.942           | L1   | 40.8           | 32.1 | 10.0       | 50.8         | 42.1 | 60           | 50   | 9.2         | 7.9  |

| Frequency (MHz) | Line | Reading (dBμV) |      | Corr. (dB) | Level (dBμV) |      | Limit (dBμV) |      | Margin (dB) |      |
|-----------------|------|----------------|------|------------|--------------|------|--------------|------|-------------|------|
|                 |      | QP             | CAV  |            | QP           | CAV  | QP           | CAV  | QP          | CAV  |
| 0.190           | N    | 44.5           | 36.6 | 9.7        | 54.2         | 46.3 | 64           | 54   | 9.8         | 7.7  |
| 0.256           | N    | 41.8           | 35.1 | 9.7        | 51.5         | 44.8 | 61.6         | 51.6 | 10.1        | 6.8  |
| 0.375           | N    | 44.6           | 33.5 | 9.7        | 54.3         | 43.2 | 58.4         | 48.4 | 4.1         | 5.2  |
| 0.499           | N    | 43.4           | 29.8 | 9.6        | 53.0         | 39.4 | 56           | 46   | 3.0         | 6.6  |
| 0.466           | N    | 40.6           | 29.3 | 9.6        | 50.2         | 38.9 | 56.6         | 46.6 | 6.4         | 7.7  |
| 0.585           | N    | 39.0           | 30.7 | 9.6        | 48.6         | 40.3 | 56           | 46   | 7.4         | 5.7  |
| 0.778           | N    | 37.1           | 28.8 | 9.7        | 46.8         | 38.5 | 56           | 46   | 9.2         | 7.5  |
| 0.959           | N    | 36.0           | 25.7 | 9.7        | 45.7         | 35.4 | 56           | 46   | 10.3        | 10.6 |
| 1.247           | N    | 34.7           | 27.6 | 9.7        | 44.4         | 37.3 | 56           | 46   | 11.6        | 8.7  |
| 4.559           | N    | 39.3           | 29.4 | 9.8        | 49.1         | 39.2 | 56           | 46   | 6.9         | 6.8  |
| 7.491           | N    | 39.7           | 32.2 | 9.9        | 49.6         | 42.1 | 60           | 50   | 10.4        | 7.9  |
| 0.190           | N    | 44.5           | 36.6 | 9.7        | 54.2         | 46.3 | 64           | 54   | 9.8         | 7.7  |

**Note :** Quasi-peak(Final Result) = Reading Value + Correction Factor

# PoE Adapter #2

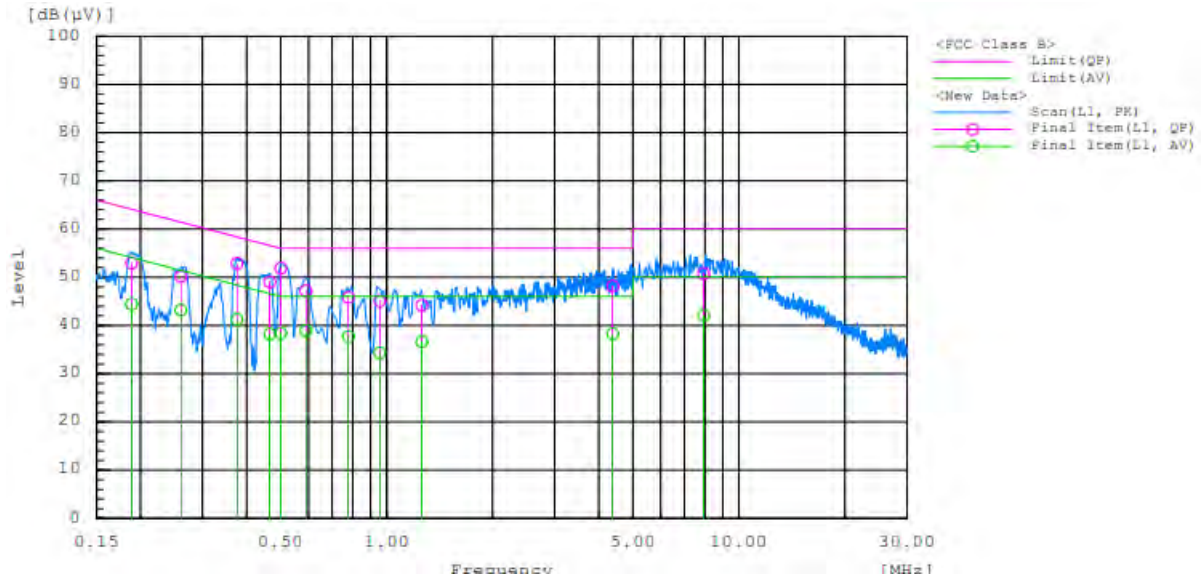
| Frequency (MHz) | Line | Reading (dBμV) |      | Corr. (dB) | Level (dBμV) |      | Limit (dBμV) |     | Margin (dB) |      |
|-----------------|------|----------------|------|------------|--------------|------|--------------|-----|-------------|------|
|                 |      | QP             | CAV  |            | QP           | CAV  | QP           | CAV | QP          | CAV  |
| 0.150           | L1   | 48.7           | 35.4 | 9.7        | 58.4         | 45.1 | 66           | 56  | 7.6         | 10.9 |
| 0.192           | L1   | 42.2           | 28.0 | 9.7        | 51.9         | 37.7 | 64           | 54  | 12.1        | 16.3 |
| 0.499           | L1   | 33.8           | 21.9 | 9.6        | 43.4         | 31.5 | 56           | 46  | 12.6        | 14.5 |
| 0.582           | L1   | 35.3           | 27.5 | 9.6        | 44.9         | 37.1 | 56           | 46  | 11.1        | 8.9  |
| 2.820           | L1   | 28.3           | 20.6 | 9.7        | 38.0         | 30.3 | 56           | 46  | 18.0        | 15.7 |
| 14.874          | L1   | 26.5           | 20.8 | 10.2       | 36.7         | 31.0 | 60           | 50  | 23.3        | 19.0 |

| Frequency (MHz) | Line | Reading (dBμV) |      | Corr. (dB) | Level (dBμV) |      | Limit (dBμV) |      | Margin (dB) |      |
|-----------------|------|----------------|------|------------|--------------|------|--------------|------|-------------|------|
|                 |      | QP             | CAV  |            | QP           | CAV  | QP           | CAV  | QP          | CAV  |
| 0.151           | N    | 49.3           | 35.2 | 9.7        | 59.0         | 44.9 | 66           | 56   | 7.0         | 11.1 |
| 0.194           | N    | 42.7           | 30.0 | 9.7        | 52.4         | 39.7 | 63.8         | 53.8 | 11.4        | 14.1 |
| 0.500           | N    | 33.2           | 21.0 | 9.6        | 42.8         | 30.6 | 56           | 46   | 13.2        | 15.4 |
| 0.583           | N    | 34.6           | 27.6 | 9.6        | 44.2         | 37.2 | 56           | 46   | 11.8        | 8.8  |
| 2.700           | N    | 29.3           | 21.4 | 9.7        | 39.0         | 31.1 | 56           | 46   | 17.0        | 14.9 |
| 11.397          | N    | 28.8           | 23.0 | 10.1       | 38.9         | 33.1 | 60           | 50   | 21.1        | 16.9 |

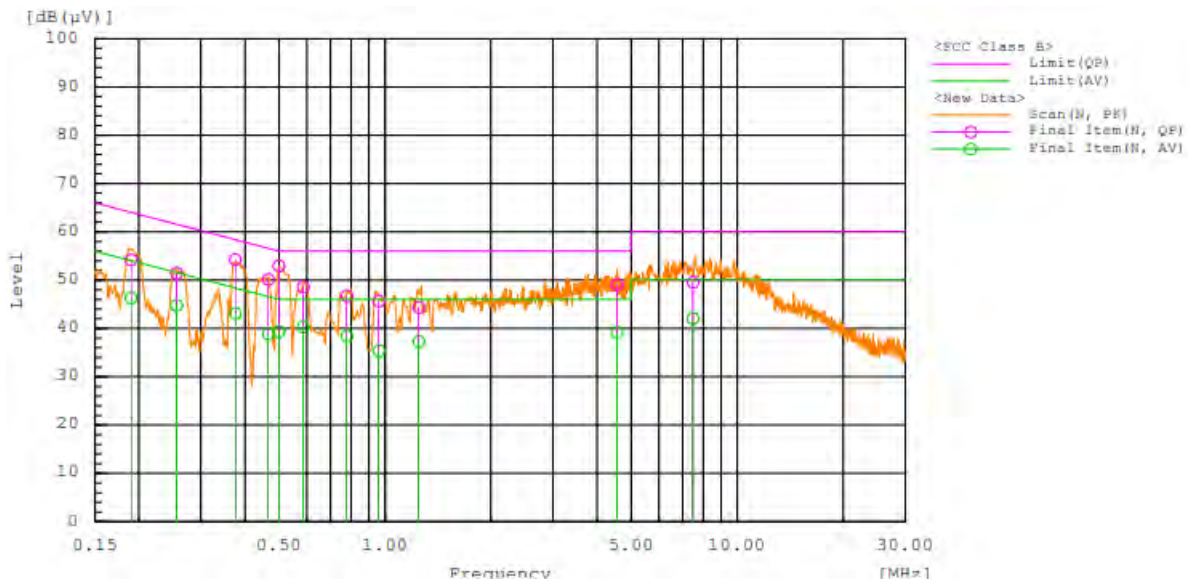
**Note :** Quasi-peak(Final Result) = Reading Value + Correction Factor

■ TEST PLOTS

PoE Adapter #1 : AC Line Conducted Emission (L1)



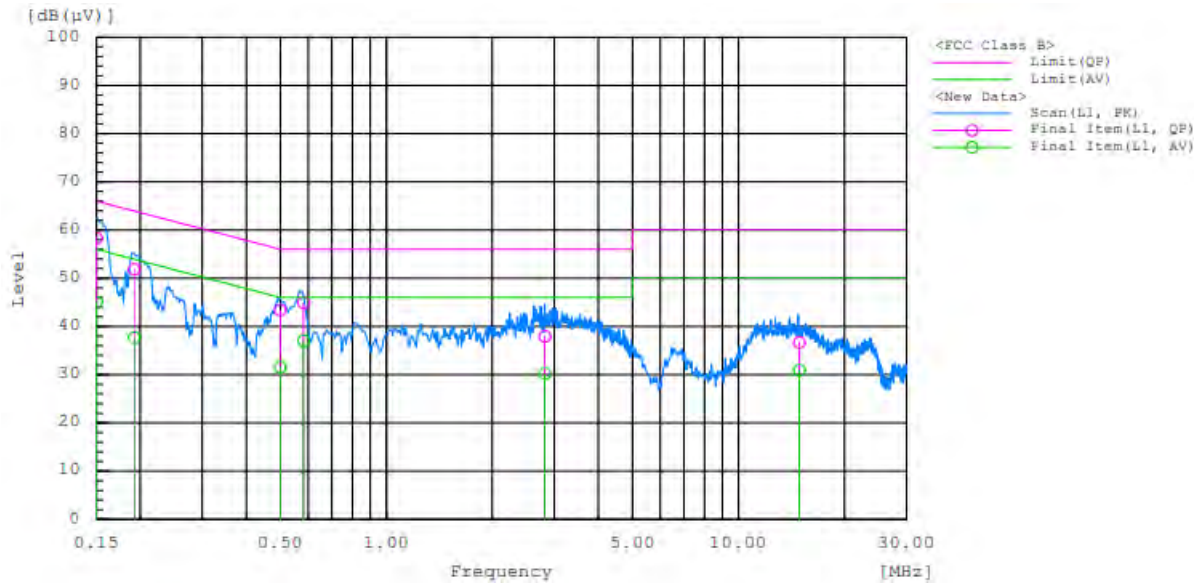
PoE Adapter #1 : AC Line Conducted Emission (N)



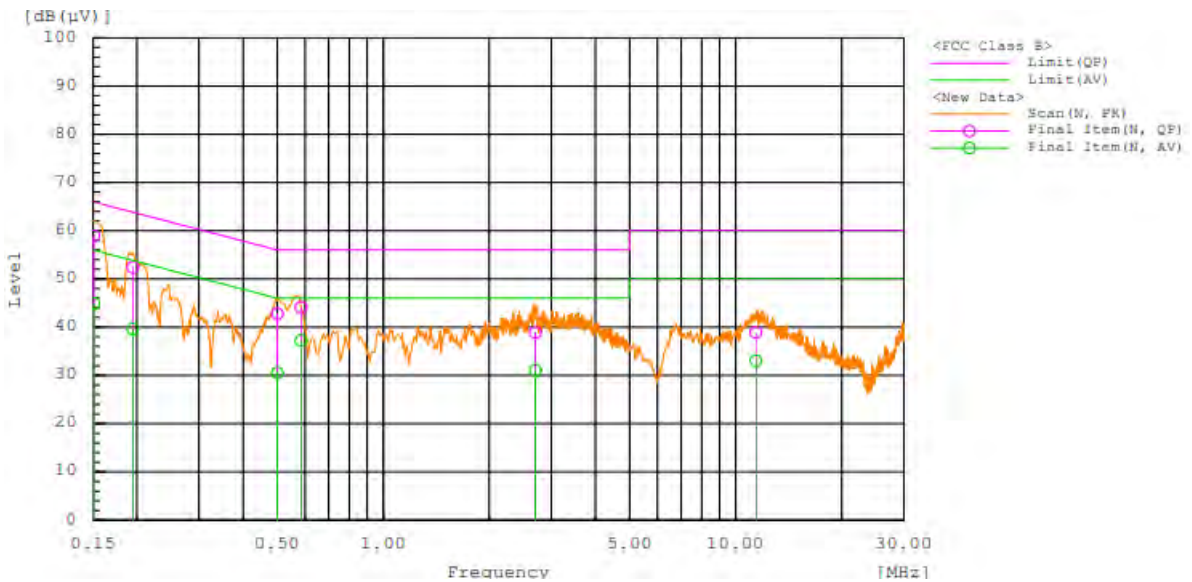


■ TEST PLOTS

PoE Adapter #2 : AC Line Conducted Emission (L1)



PoE Adapter #2 : AC Line Conducted Emission (N)





## 10. LIST OF TEST EQUIPMENT

| No.                                 | Instrument                            | Model No.                  | Calibration Due (mm/dd/yy) | Manufacture     | Serial No.  |
|-------------------------------------|---------------------------------------|----------------------------|----------------------------|-----------------|-------------|
| <input checked="" type="checkbox"/> | Signal Analyzer<br>(20 Hz ~ 40.0 GHz) | ESU40                      | 12/03/2022                 | Rohde & Schwarz | 100529      |
| <input checked="" type="checkbox"/> | Signal Analyzer<br>(10 Hz ~ 40.0 GHz) | ESW44                      | 10/25/2022                 | Rohde & Schwarz | 102015      |
| <input checked="" type="checkbox"/> | Signal Analyzer<br>(10 Hz ~ 26.5 GHz) | N9020A                     | 11/04/2022                 | Keysight        | MY52091291  |
| <input type="checkbox"/>            | Attenuator<br>(20 dB, DC ~ 26.5 GHz)  | CFADC262002                | 01/13/2023                 | CERNEX          | -           |
| <input checked="" type="checkbox"/> | Attenuator<br>(10 dB, DC ~ 26.5 GHz)  | CFADC261002                | 01/13/2023                 | CERNEX          | -           |
| <input checked="" type="checkbox"/> | Loop Antenna<br>(0.009 ~ 30 MHz)      | HLA 6121                   | 09/15/2023                 | TESEQ           | 43964       |
| <input checked="" type="checkbox"/> | BI-LOG Antenna<br>(30 MHz ~ 6 GHz)    | JB6                        | 10/26/2022                 | Sunol           | A071116     |
| <input checked="" type="checkbox"/> | LNA<br>(30 MHz ~ 1GHz)                | PAM-103                    | 04/14/2023                 | Com-Power       | 18020254    |
| <input checked="" type="checkbox"/> | Horn Antenna<br>(1 GHz ~ 18 GHz)      | DRH-118                    | 10/21/2022                 | Sunol           | A070516     |
| <input checked="" type="checkbox"/> | LNA<br>(1 GHz ~ 18 GHz)               | PAM-118A                   | 06/21/2023                 | Com-Power       | 18040074    |
| <input checked="" type="checkbox"/> | Horn Antenna<br>(18 GHz ~ 40 GHz)     | DRH-1840                   | 02/16/2023                 | Sunol           | 17121       |
| <input checked="" type="checkbox"/> | LNA<br>(18 GHz ~ 40 GHz)              | CBL18405045-01             | 02/10/2023                 | CERNEX, Inc.    | 27973       |
| <input type="checkbox"/>            | High Pass Filter                      | WHK10-2520-3000-18000-40EF | 01/13/2023                 | Wainwright      | 9           |
| <input checked="" type="checkbox"/> | High Pass Filter                      | WHKX8-6090-7000-18000-40SS | 01/13/2023                 | Wainwright      | 23          |
| <input checked="" type="checkbox"/> | EMI Test Receiver                     | ESR3                       | 12/03/2022                 | Rohde & Schwarz | 102363      |
| <input checked="" type="checkbox"/> | LISN                                  | ENV216                     | 01/19/2023                 | Rohde & Schwarz | 101349      |
| <input checked="" type="checkbox"/> | DC Power Supply                       | 6030A                      | 01/19/2023                 | HP              | 2482A-01331 |
| <input checked="" type="checkbox"/> | Temperature/Humidity Chamber          | 92002929                   | 06/14/2023                 | ESPEC           | 92002929    |

### Note(s) :

- Equipment listed above that calibrated during the testing period was set for test after the calibration.
- Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

## APPENDIX A. TEST SETUP PHOTOS

*The setup photos are provided as a separate document.*

## **APPENDIX B. PHOTOGRAPHS OF EUT**

### **B.1. EXTERNAL PHOTOS**

*The external photos are provided as a separate document.*

### **B.2. INTERNAL PHOTOS**

*The internal photos are provided as a separate document.*

***END OF TEST REPORT***