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

Applicant	Tarana Wireless, Inc.
Applicant Address	590 Alder Drive, Milpitas, CA 95035
FCC ID	2ABOF-G1RN5AHB012
Model Name	G1RN5AHB012
EUT Type	5GHz RF Remote Node (RN)
FCC Classification	Unlicensed National Information Infrastructure (NII)
FCC Rule Part(s)	Part 15.407
Test Procedure	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	**Reviewed By**
Yongsoo Park	Sunwoo Kim
Test Engineer	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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Hyundai C-Tech, Inc. dba HCT America, Inc., 1726 Ringwood Avenue, San Jose, CA 95131, USA. TEL: +1-510-933-8848 FAX: +1-510-933-8849

1. GENERAL INFORMATION

EUT DESCRIPTION

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

RF SPECIFICATION SUBJECT TO THE REPORT

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

Accredited Laboratory

A2LA has accredited

HYUNDAI C-TECH, INC. DBA HCT AMERICA, INC.

San Jose, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 10th day of June 2021.

Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 4201.01
Valid to July 31, 2023

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

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	± 0.35 dB
Occupied Bandwidth	± 12.4 kHz
Unwanted Emissions, Conducted	± 0.46 dB
Radiated Emissions (below 1 GHz)	± 6.09 dB
Radiated Emissions (Above 1 GHz)	± 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 ≤ 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 (≥ 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/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 ≒ 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)	≤ 1 W (= 30dBm) ≤ 125 mW (= 21dBm) EIRP at max elevation angle (30°) from horizon
	Master (Indoor)	≤ 1 W (= 30dBm)
	Client Device	≤ 250 mW (= 24 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 ≥ 3 MHz
- Number of points in sweep ≥ 2*span/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 10log(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	≤ 17 dBm/MHz
	Client Device	≤ 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 ≥ 3 MHz
- Number of points in sweep ≥ 2*span/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

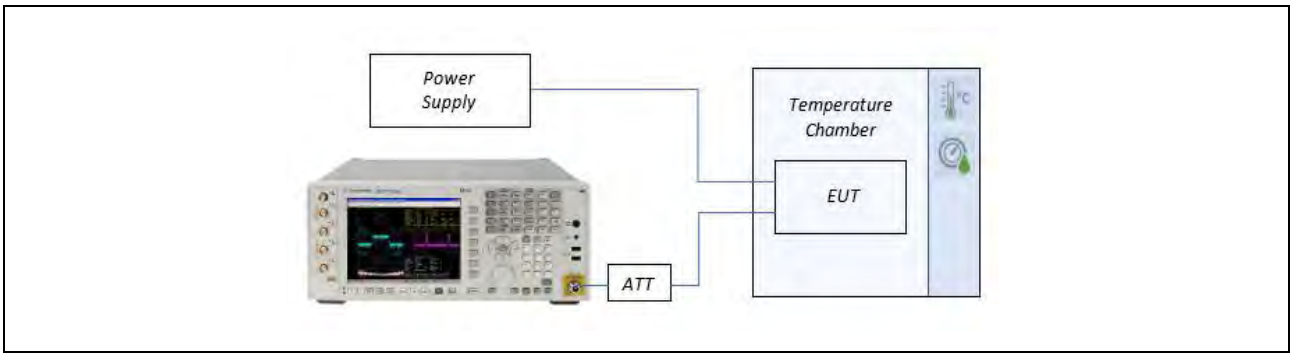
Total PSD (Average) = Reading Value + ATT loss + Cable loss + Duty Cycle Factor

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 ℃ and 50 ℃.

- The temperature was incremented by 10 ℃ 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 **47 CFR §15.407(b)(1)** 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

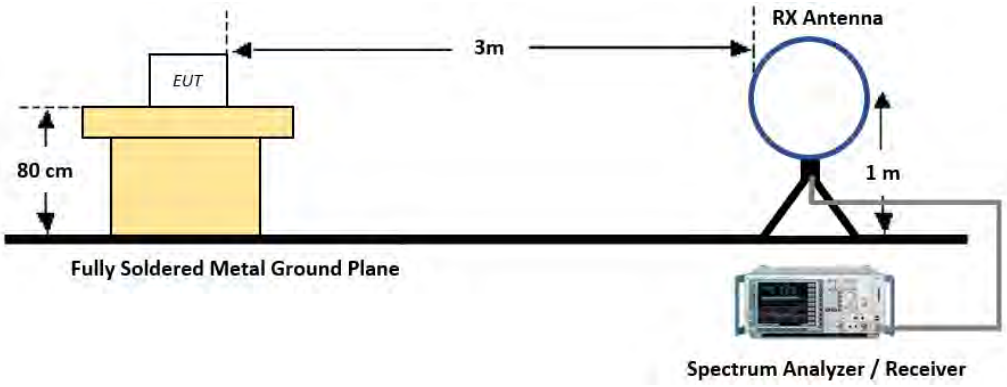
FCC : 47 CFR § 15.209		
Frequency (MHz)	**Field Strength (uV/m)**	**Measurement Distance (m)**
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

RESTRICTED BANDS OF OPERATION

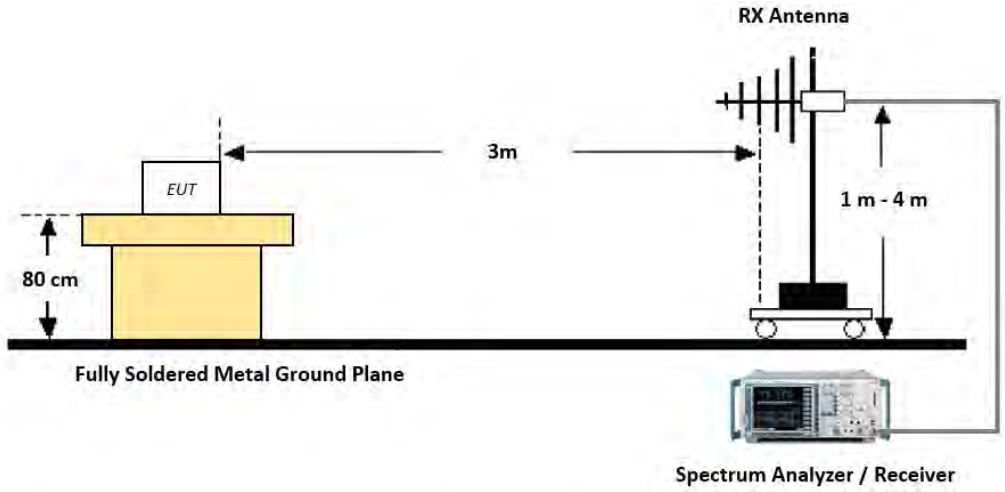
FCC : 47 CFR § 15.205(a)				
Frequency (MHz)	**Frequency (MHz)**	**Frequency (MHz)**	**Frequency (MHz)**	**Frequency (MHz)**
0.090 – 0.110	12.29-12.293	149.9 - 150.05	1660.0 - 1710.0	8025 – 8500
0.495 - 0.505	12.51975-12.52025	156.52475 - 156.52525	1718.8 - 1722.2	9000 – 9200
2.1735 – 2.1905	12.57675-12.57725	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

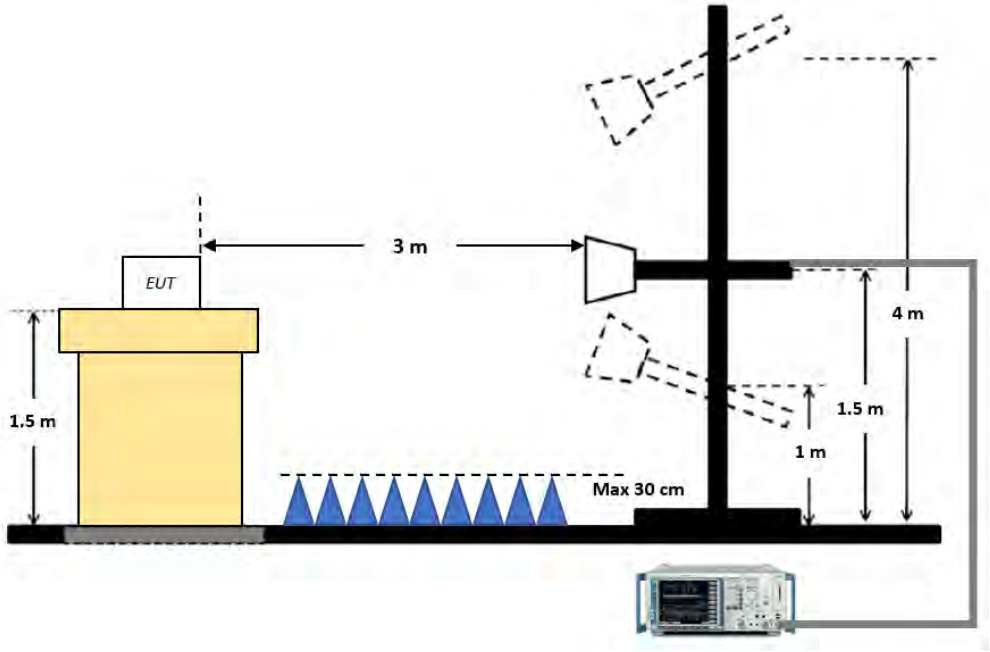
Below 30 MHz



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*log(3 m/300 m) = - 80 dB
   Measurement Distance: 3 m
7. Distance Correction Factor (0.490 MHz – 30 MHz) = 40*log(3 m/30 m) = - 40 dB
   Measurement Distance: 3 m
8. Spectrum Setting

   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Max hold
   - RBW = 9 kHz
   - VBW ≥ 3*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 ≥ 3*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 ≥ 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 ≥ 98 percent) = VBW ≤ RBW/100(i.e., 10 kHz) but not less than 10 Hz.
   - VBW(Duty cycle is < 98 percent) = VBW ≥ 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 ≥ 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 ≥ 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 ≥ 98 percent) = VBW ≤ RBW/100(i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is < 98 percent) = VBW ≥ 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 ≥ 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 µH/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dBµV)	
	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 (For power measurement)	Conducted	-
Maximum Conducted Output Power	§15.407(a)(1)	≤ 1 W		PASS
Power Spectral Density	§15.407(a)(1)	≤ 17 dBm/MHz		PASS
Frequency Stability	§15.407(g) §2.1055	Maintained within the band		PASS
AC Power line Conducted Emissions	§15.207 §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 §15.407(b)(9)	cf. Section 7.7		PASS
Radiated Restricted Band Edge	§15.407(b)(7) §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

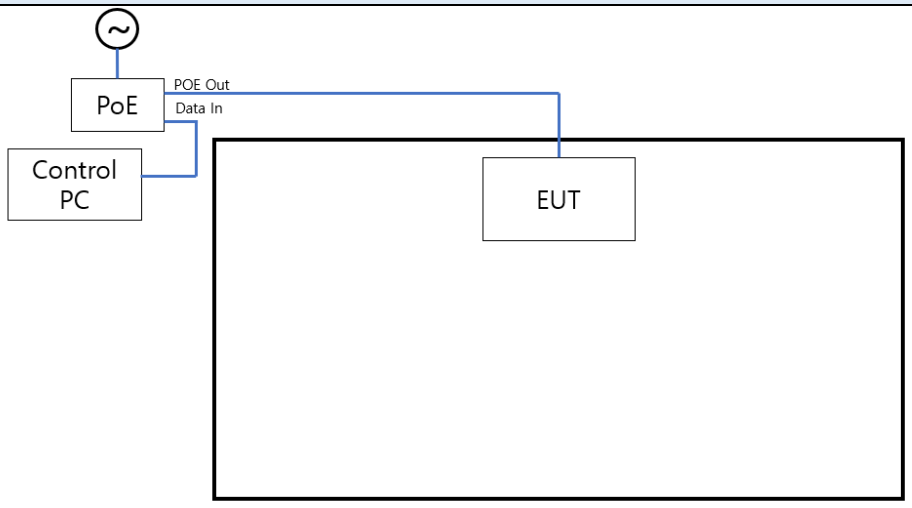
1. AC line conducted emission was performed only in single carrier transmission mode as the worst case for each of the two PoE adapters.
2. RF conducted emission was performed at the low / mid / high channels of each carrier's combination.

CHANNEL UNDER TEST

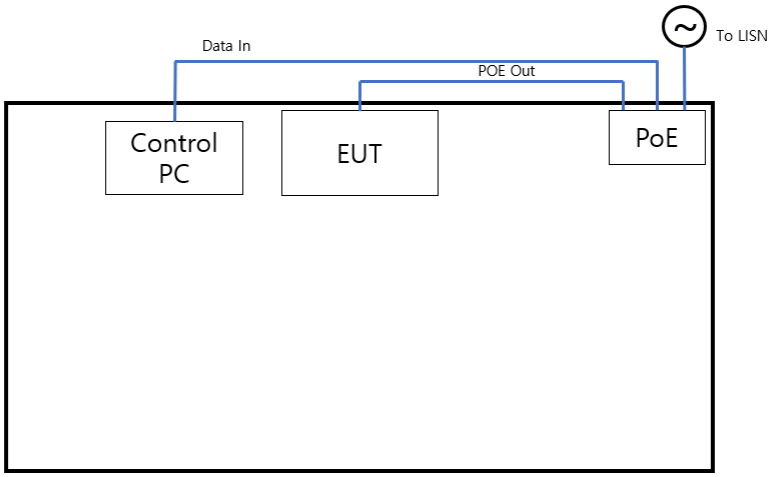
Mode (U-NII 1)	Bandwidth (MHz)	Low Channel (MHz)	Mid Channel (MHz)	High Channel (MHz)
Single Carrier Mode	10	5175	5210	5245
	20	5180	5200	5240
	40	5190	-	5230
Multi-Carrier Mode (Contiguous)	10+10	5175+5185	5210+5220	5235+5245
	20+20	5180+5200	5200+5220	5220+5240
	20+40	-	5200+5230	-
	40+20	-	5190+5220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

Radiated Emission



Conducted Emission



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 50/60 Hz (50 VDC)
PoE Adapter #2 (Alternative)	PD-9501GC/AC	C19436280000000494	Microsemi	1	100-240 VAC, 1.5 A 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 [MHz]	99% Bandwidth [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 [MHz]	99% Bandwidth [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

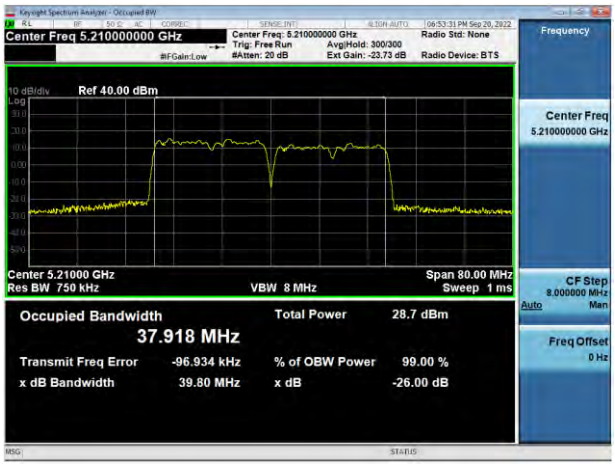
Multi-Carrier Mode (Non-Contiguous)			26 dB Bandwidth [MHz]	99% Bandwidth [MHz]
Bandwidth	Channel	Frequency [MHz]		
10+10 MHz	35	5175	19.01	18.02
	+	+		
	49	5245		
20+20 MHz	36	5180	38.16	36.11
	+	+		
	48	5240		
20+40 MHz	36	5180	78.72	55.35
	+	+		
	46	5230		
40+20 MHz	38	5190	58.20	55.31
	+	+		
	48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

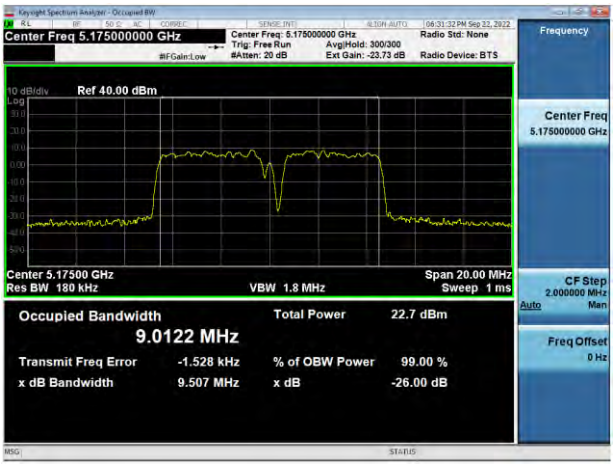
Note :
The worst plots are reported.

▣ TEST PLOTS

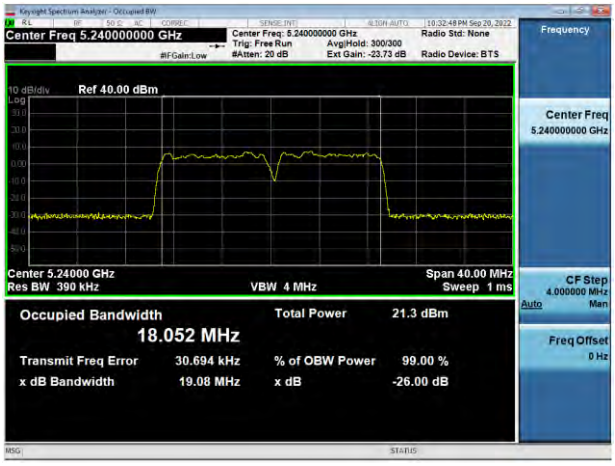
26 dB Bandwidth / 99 % Bandwidth : Contiguous Carrier Mode	
10+10 MHz (5210+5220 MHz)	**20+20 MHz (5200+5220 MHz)**
	
20+40 MHz (5200+5230 MHz)	**40+20 MHz (5190+5220 MHz)**
	
40+40 MHz (5190+5230 MHz)	
	

Note :
The worst plots are reported.

▣ TEST PLOTS

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

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

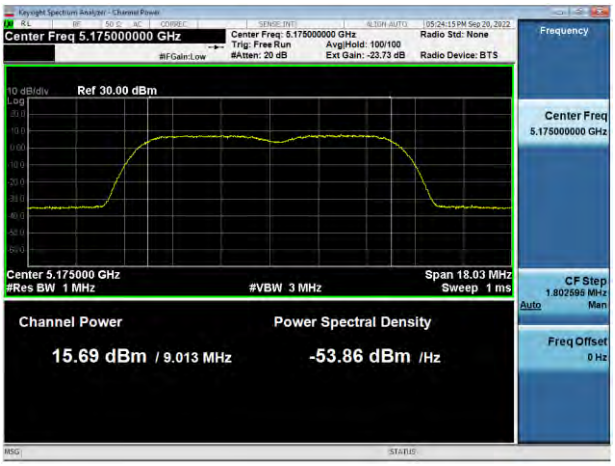
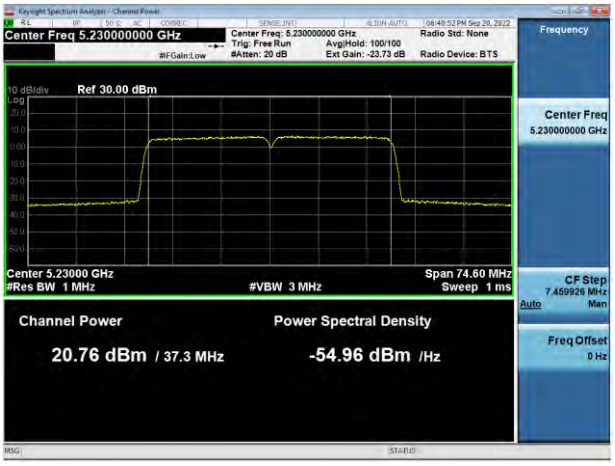
Multi-Carrier Mode (Contiguous)			Output Power [dBm]		Limit [dBm]
Bandwidth	Channel	Frequency [MHz]	Single Chain	All 8 Chains	
10+10 MHz	35+37	5175+5185	17.71	26.74	30
	42+44	5210+5220	17.39	26.42	30
	47+49	5235+5245	17.87	26.91	30
20+20 MHz	36+40	5180+5200	20.57	29.60	30
	40+44	5200+5220	20.65	29.68	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	30
	+	+	+			
	49	5245	13.31			
20+20 MHz	36	5180	17.13	18.95	27.98	30
	+	+	+			
	48	5240	14.29			
20+40 MHz	36	5180	17.67	19.34	28.37	30
	+	+	+			
	46	5230	14.36			
40+20 MHz	38	5190	16.32	18.26	27.29	30
	+	+	+			
	48	5240	13.83			

Note :

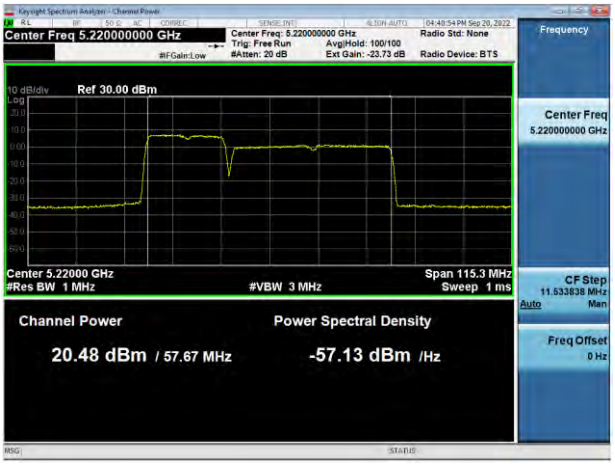
1. The output power results in the table include the spectrum offset, which is a combination loss of the attenuator and the cable used for testing. Attenuation between the chipset and the SMA antenna port used for RF conducted measurement were provided by the manufacturer, which is 23.73 dB.
2. Output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

▣ TEST PLOTS

Output Power : Single Carrier Mode	
10 MHz BW (5175 MHz)	**20 MHz BW (5240 MHz)**
	
40 MHz (5230 MHz)	
	

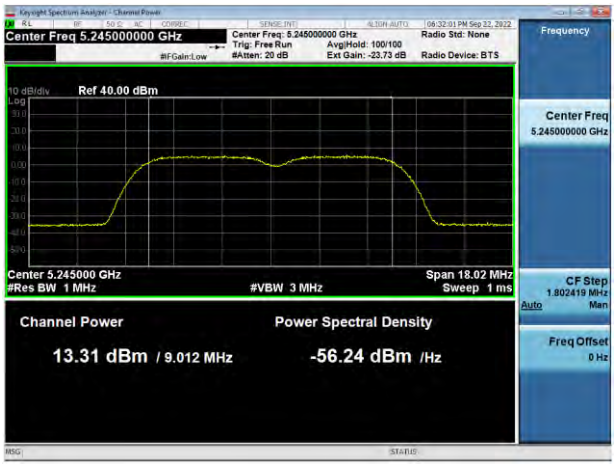
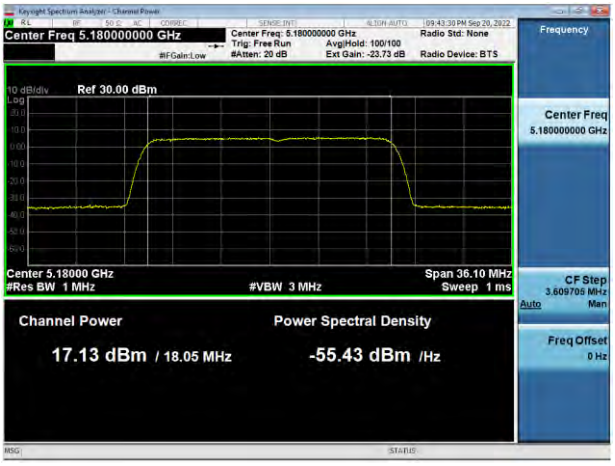
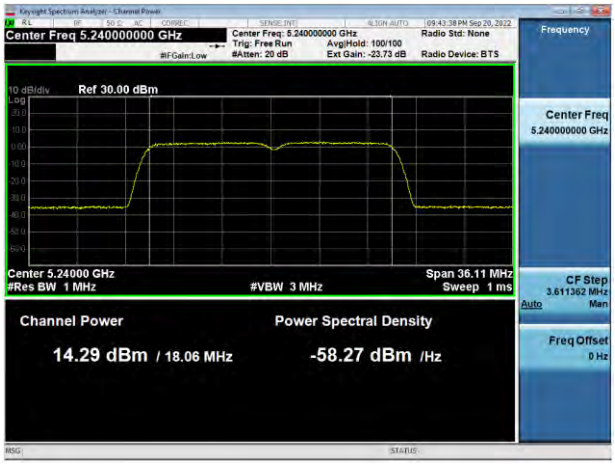
Note :
The worst plots are reported.

▣ TEST PLOTS

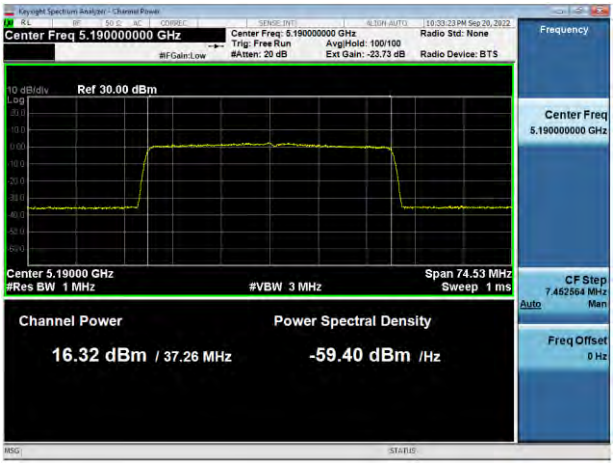
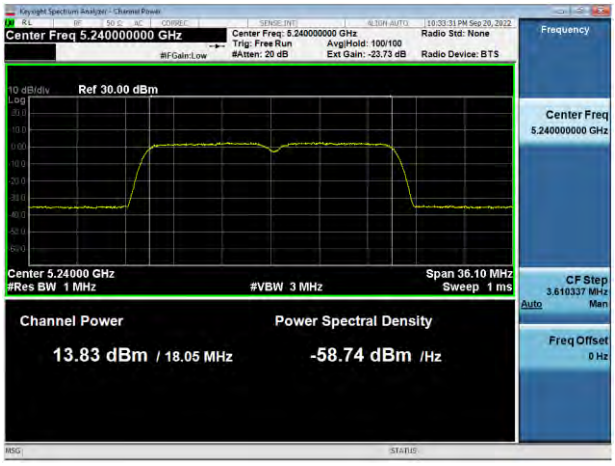
Output Power : Contiguous Carrier Mode	
10+10 MHz (5235+5245 MHz)	**20+20 MHz (5220+5240 MHz)**
	
20+40 MHz (5200+5230 MHz)	**40+20 MHz (5190+5220 MHz)**
	
40+40 MHz (5190+5230 MHz)	
	

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 [dBm/MHz]
Bandwidth	Channel	Frequency [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

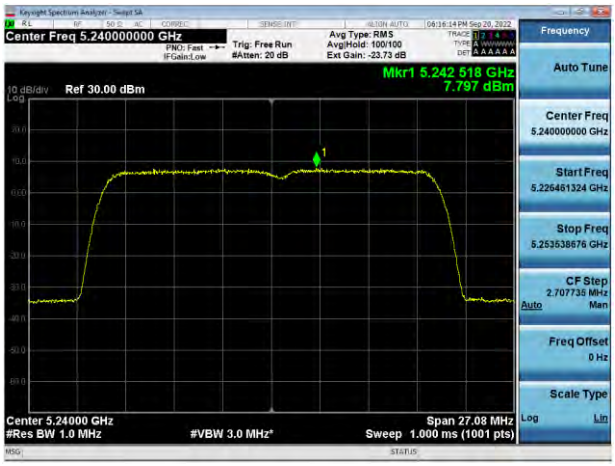
Multi-Carrier Mode (Contiguous)			Power Spectral Density [dBm/MHz]		Limit [dBm/MHz]
Bandwidth	Channel	Frequency [MHz]	Single Chain	All 8 Chains	
10+10 MHz	35+37	5175+5185	7.79	16.82	17
	42+44	5210+5220	7.80	16.83	17
	47+49	5235+5245	7.75	16.78	17
20+20 MHz	36+40	5180+5200	7.70	16.73	17
	40+44	5200+5220	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 [dBm/MHz]
Bandwidth	Channel	Frequency [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 :

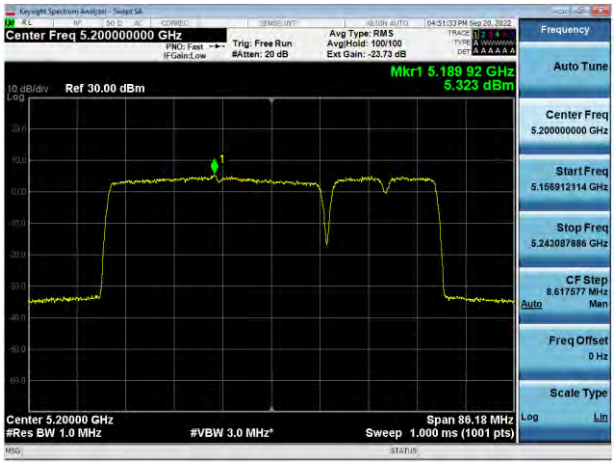
1. The output power results in the table and the plot include the spectrum offset, which is a combination loss of the attenuator and the cable used for testing. Attenuation between the chipset and the SMA antenna port used for RF conducted measurement were provided by the manufacturer, which is 23.73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

▣ TEST PLOTS

PSD : Single Carrier Mode	
10 MHz BW (5175 MHz)	**20 MHz BW (5240 MHz)**
	
40 MHz (5230 MHz)	
	

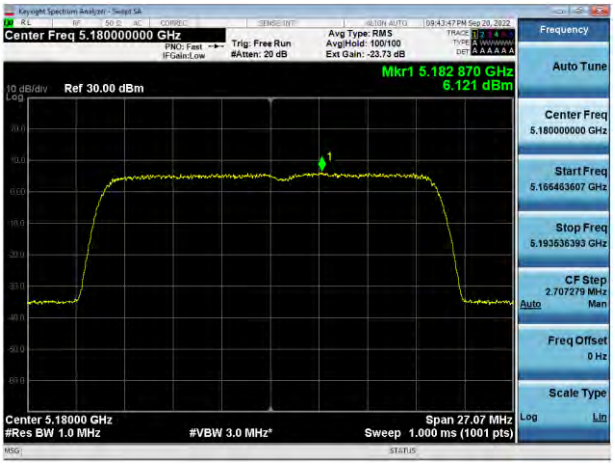
Note :
The worst plots are reported.

▣ TEST PLOTS

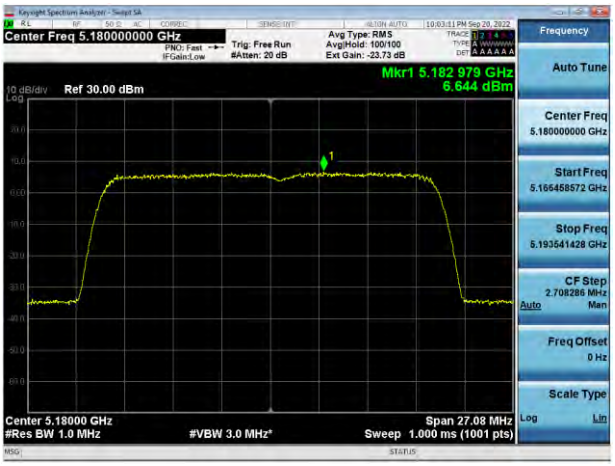
PSD : Contiguous Carrier Mode	
10+10 MHz (5210+5220 MHz)	20+20 MHz (5200+5220 MHz)
	
20+40 MHz (5200+5230 MHz)	40+20 MHz (5190+5220 MHz)
	
40+40 MHz (5190+5230 MHz)	
	

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. [1] (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. [1] (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. [1] (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. [1] (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. [1] (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. [1] (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. [1] (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. [1)] (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. [1)] (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. [1)] (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. [1] (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. [1] (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. [1] (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. [1] (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.[1)]	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.[1)]	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.[1)]	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)	Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	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)	Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	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)	Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	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.[1)]	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.[1)]	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) :

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 (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.[1)]	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.[1)]	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.[1)]	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.[1)]	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.[1)]	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.[1)]	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.[1)]	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.[1)]	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	Corr.[1)]	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	Corr.[1)]	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) :

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 (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.[1)]	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)

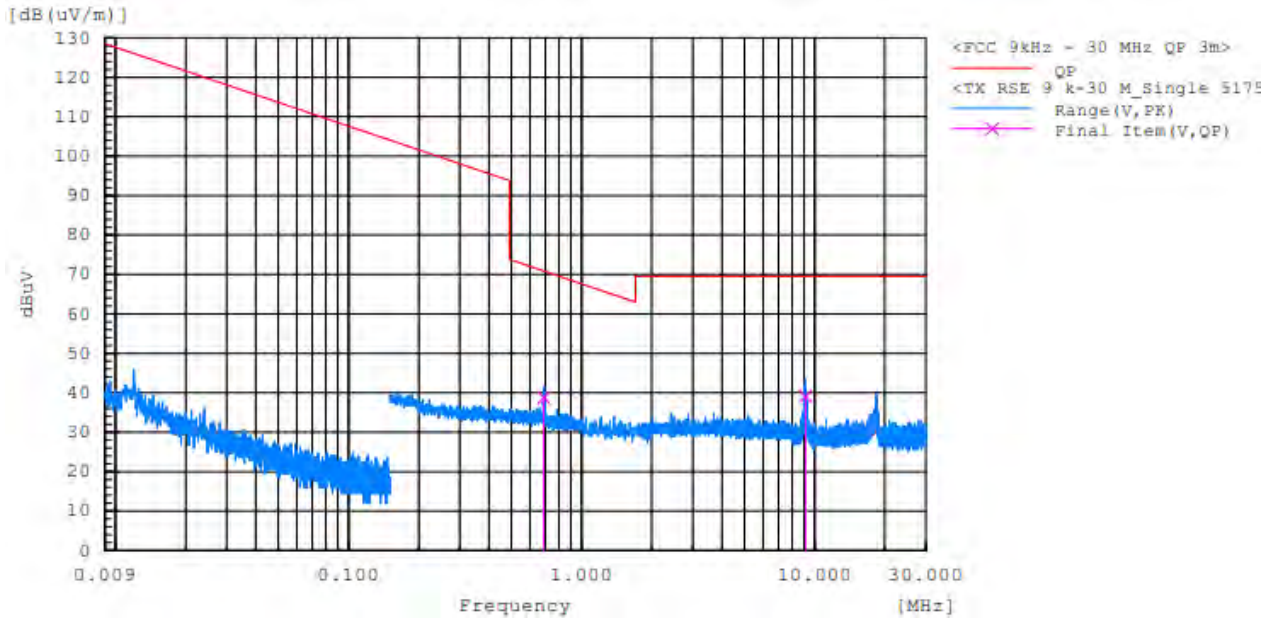
Operating Frequency 5190+5240 MHz (CH 38+48)

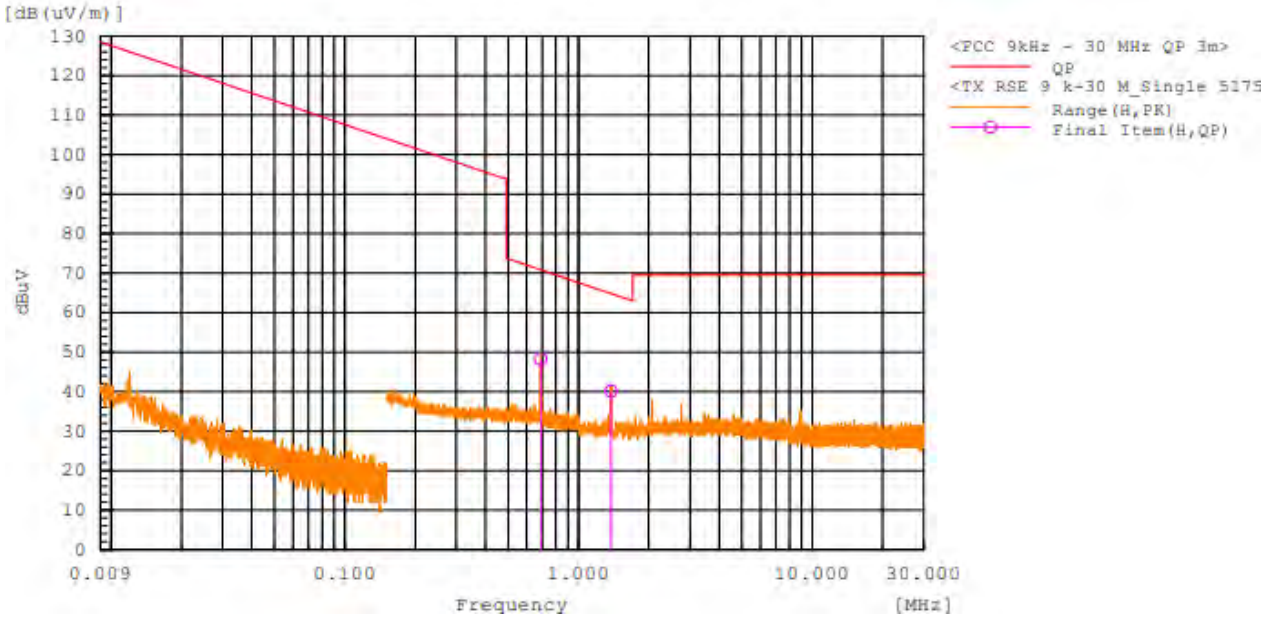
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)	Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	AV	PK	AV	PK	AV	PK
10380.630	H	-	48.3	2.4	-	50.7	-	68.2	-	17.5
10380.710	V	-	47.4	2.4	-	49.8	-	68.2	-	18.4
10480.230	H	-	48.5	2.7	-	51.2	-	68.2	-	17.0
10480.640	V	-	48.7	2.7	-	51.4	-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

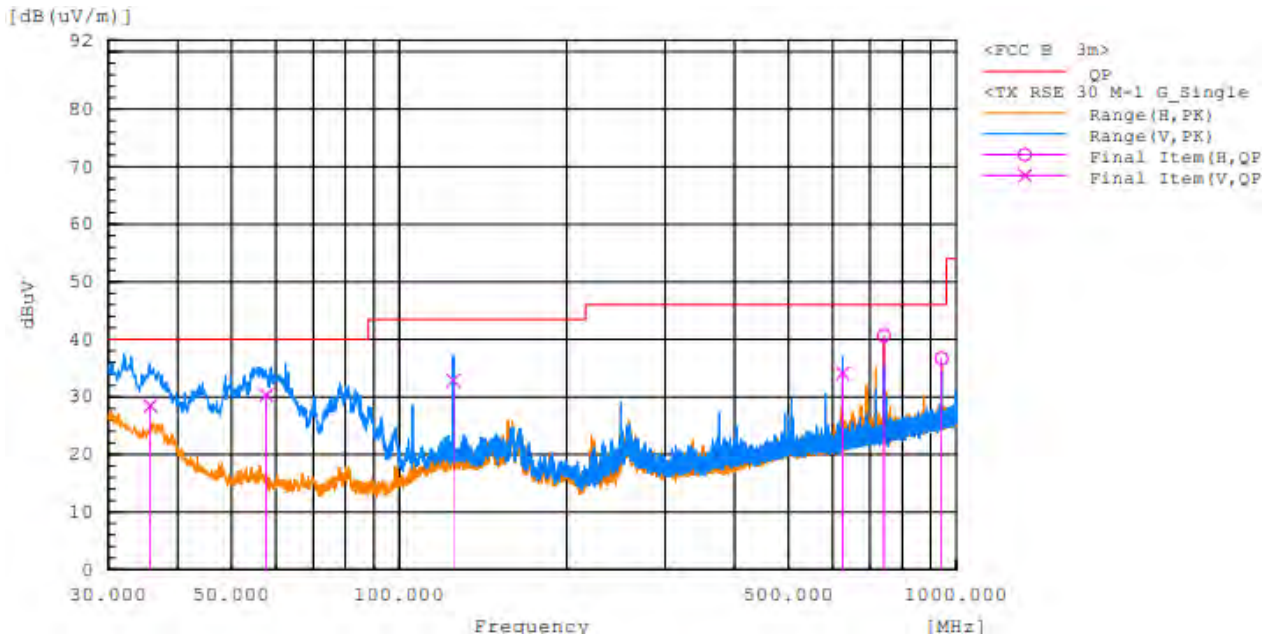
Radiated Spurious Emission 9 kHz – 30 MHz (Antenna Position 90°) : Single Carrier 10 MHz (5175 MHz)


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


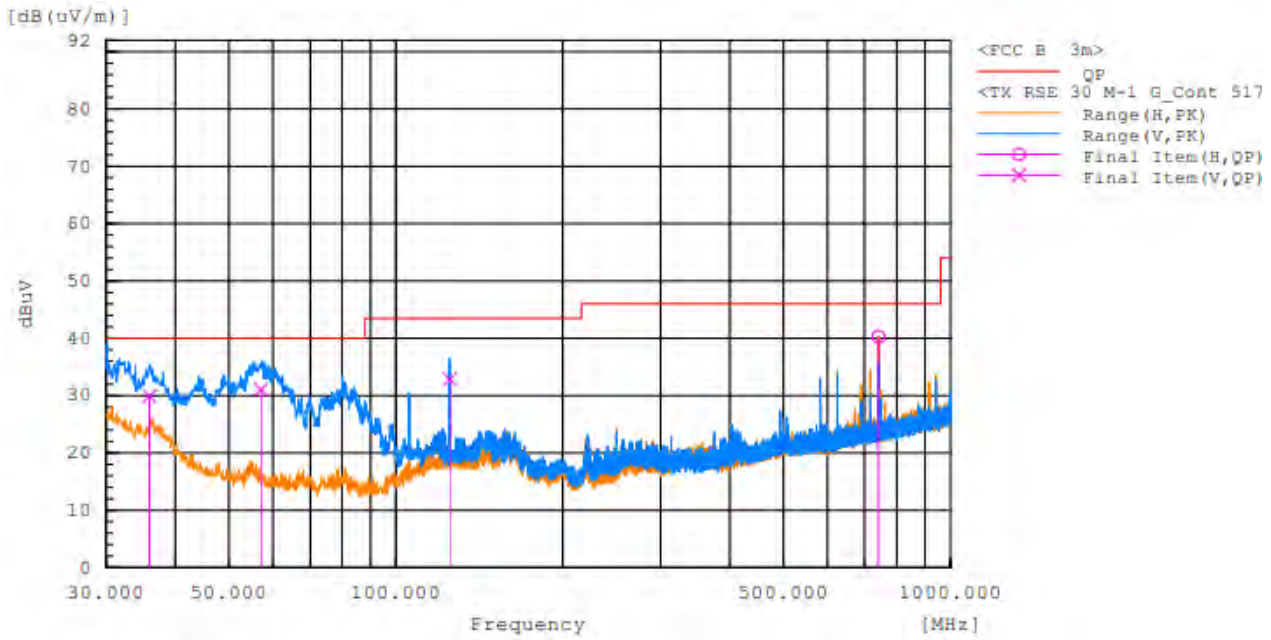
Note:
The worst-case plots are included in this report.

▣ TEST PLOTS (With PoE Adapter #1)

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



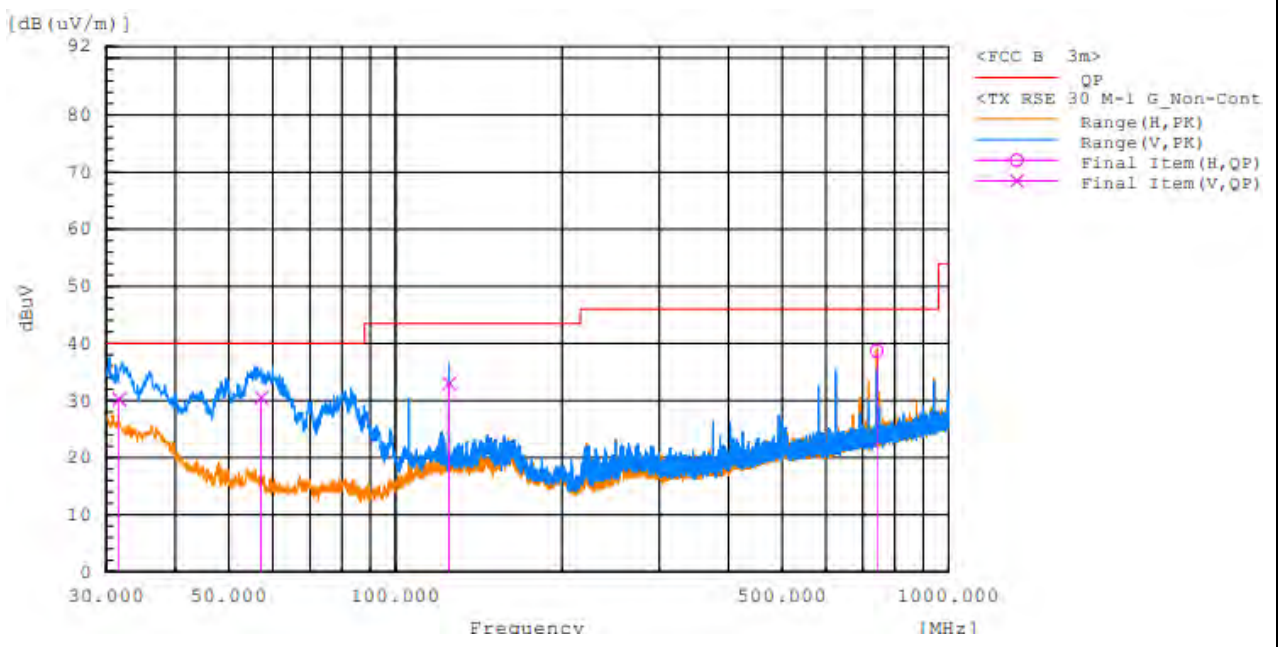
Radiated Spurious Emission 30 MHz – 1 GHz : Contiguous Carrier 10+10 MHz (5175+5185 MHz)



Note:
The worst-case plots are included in this report.

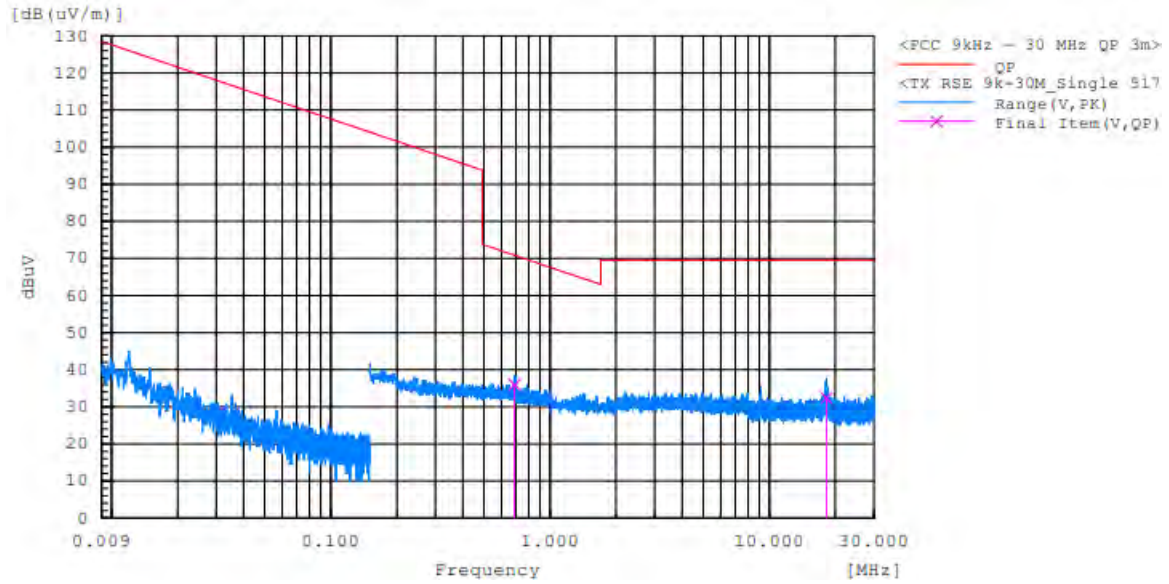
▣ TEST PLOTS (With PoE Adapter #1)

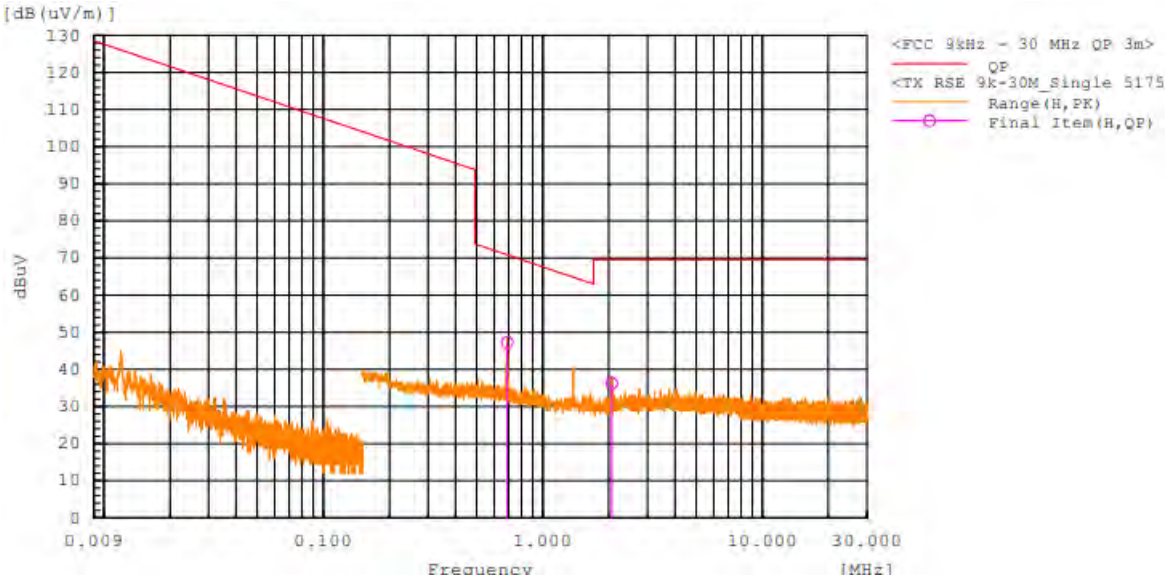
Radiated Spurious Emission 30 MHz – 1 GHz : Non-Contiguous Carrier 10+10 MHz (5175+5245 MHz)



Note:
The worst-case plots are included in this report.

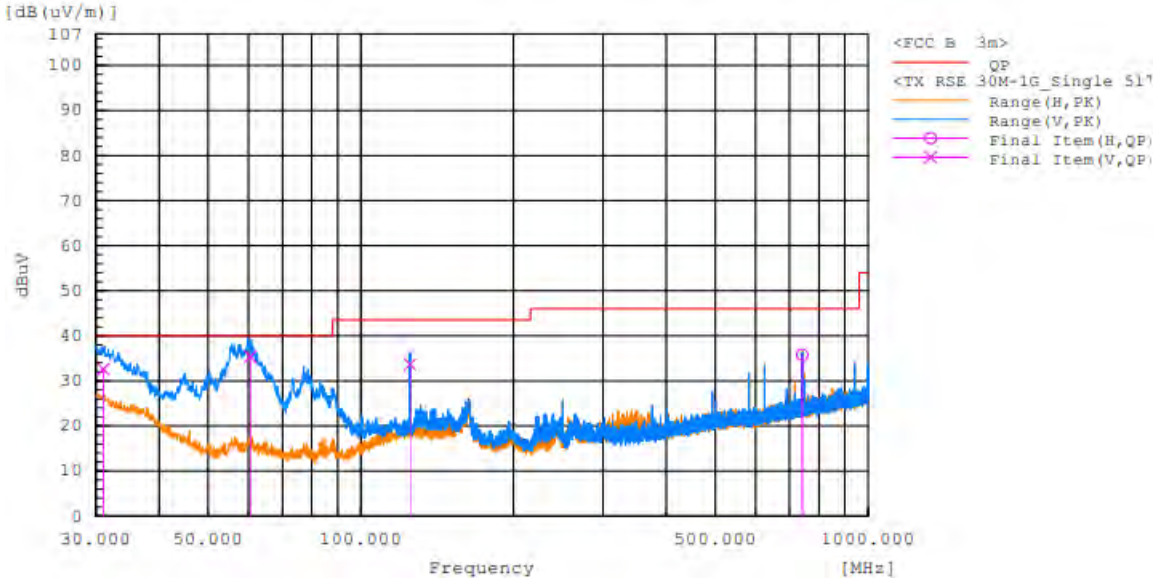
▣ TEST PLOTS (With PoE Adapter #2)

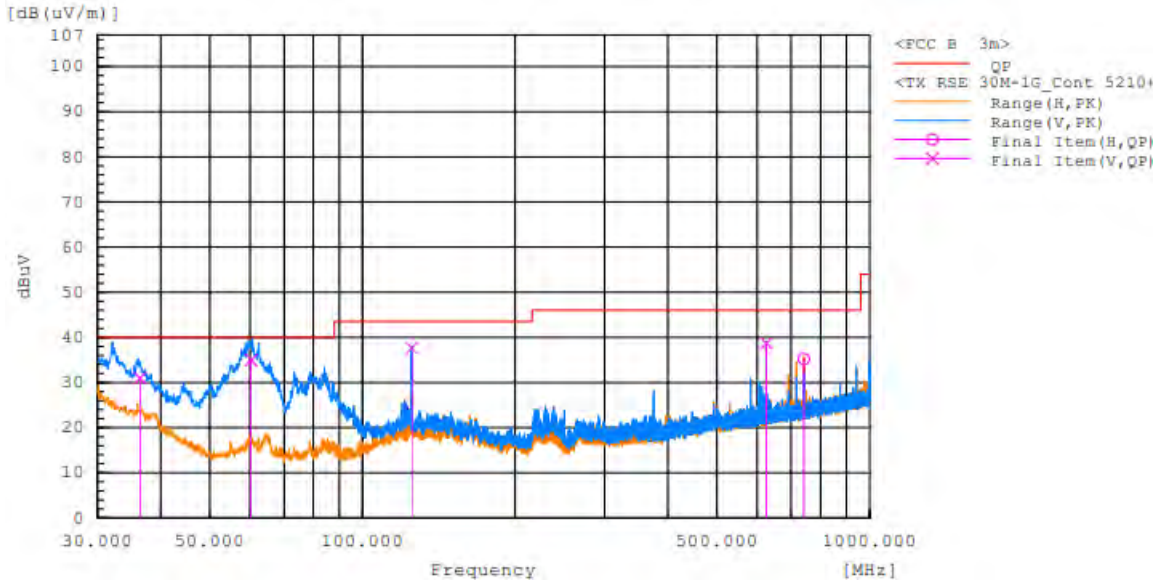
Radiated Spurious Emission 9 kHz – 30 MHz (Antenna Position 90°) : Single Carrier 10 MHz (5175 MHz)


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)

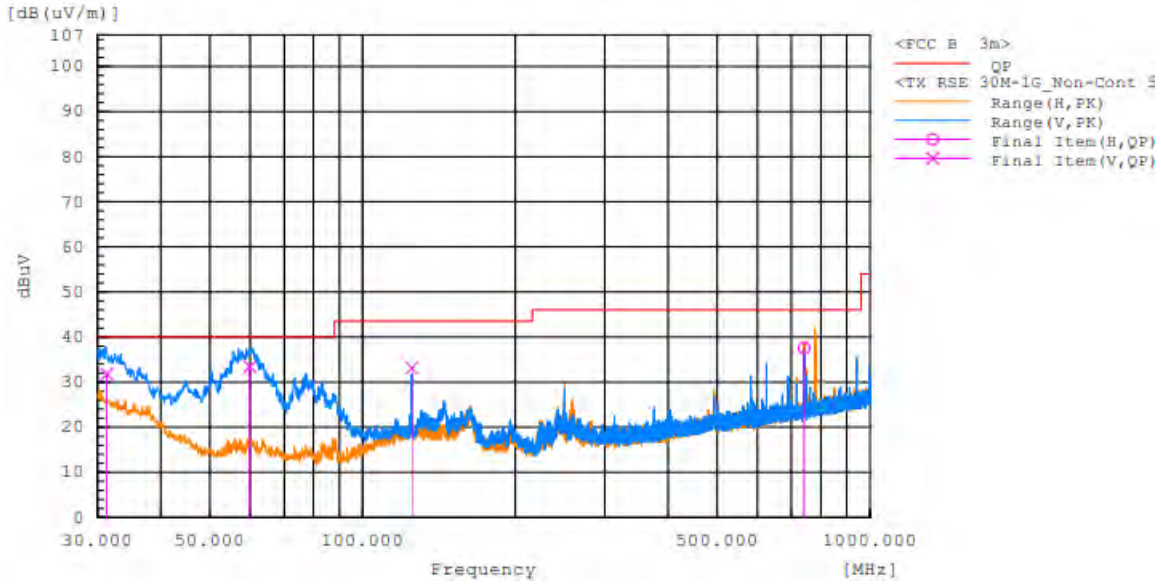
Radiated Spurious Emission 30 MHz – 1 GHz : Single Carrier 10 MHz (5175 MHz)


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)

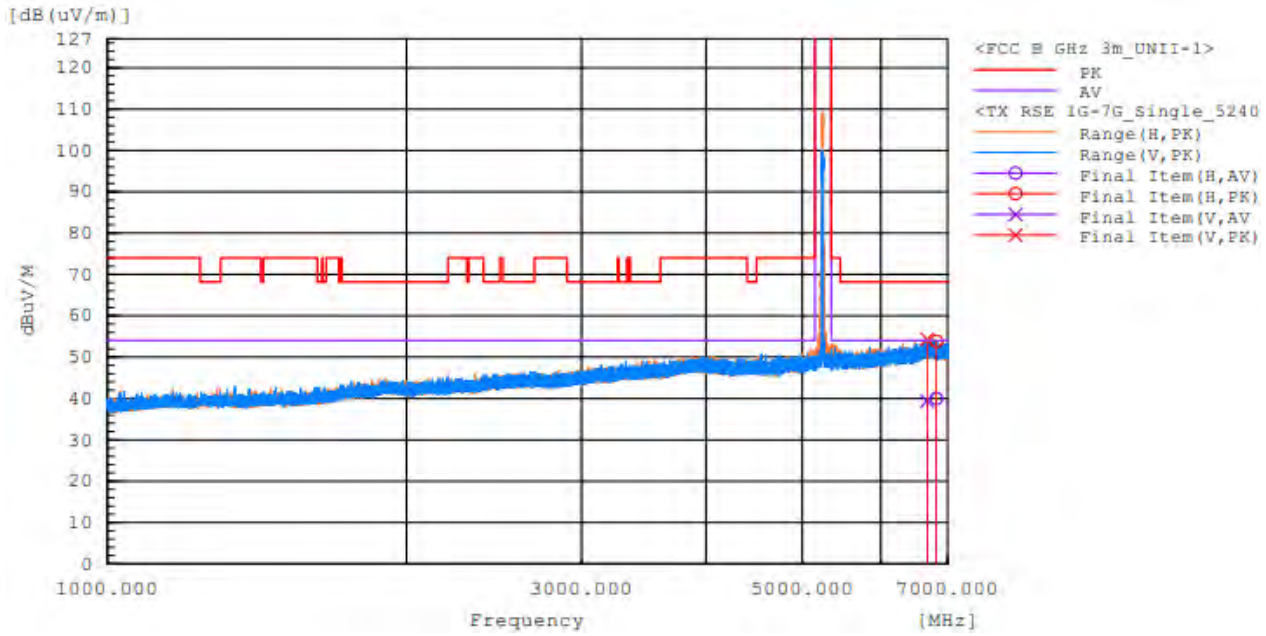
Radiated Spurious Emission 30 MHz – 1 GHz : Non-Contiguous Carrier 10+10 MHz (5175+5245 MHz)



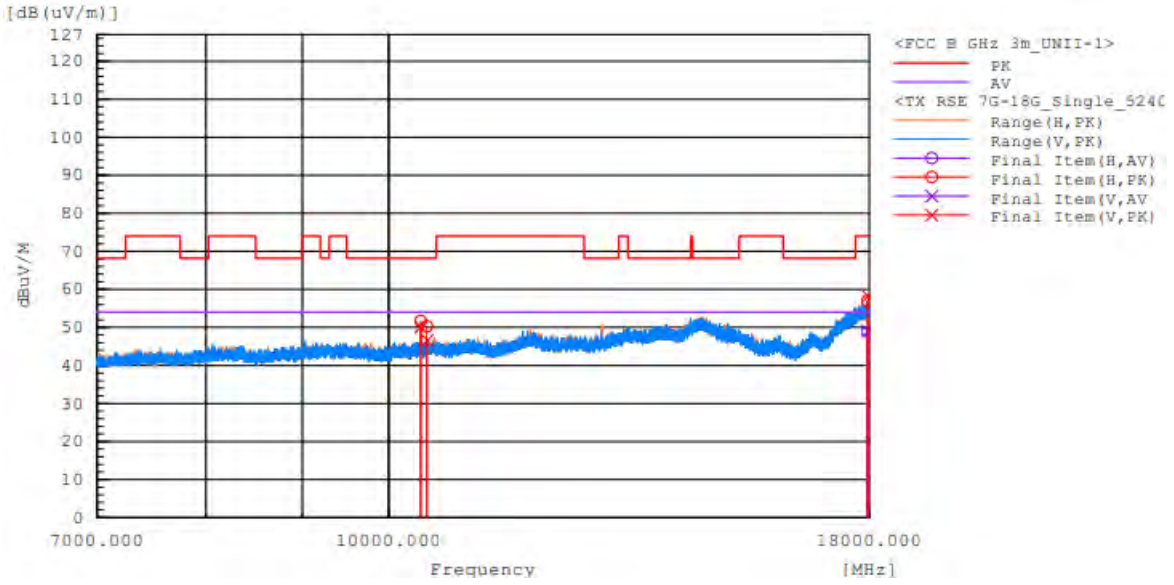
Note:
The worst-case plots are included in this report.

▣ TEST PLOTS

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



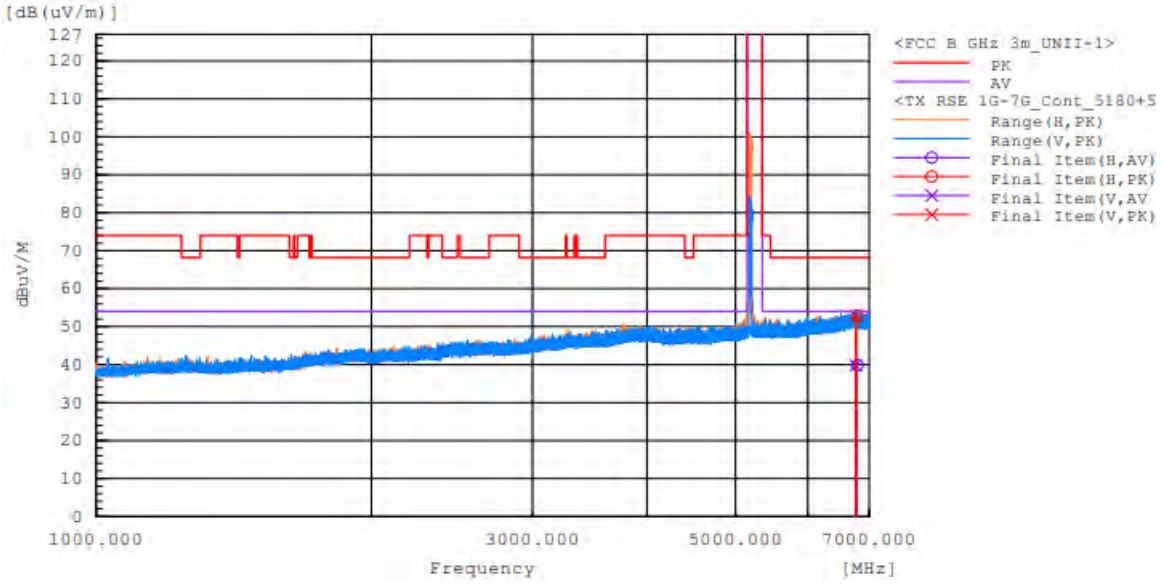
Radiated Spurious Emission 7 GHz - 18 GHz : Single Carrier 20 MHz (5240 MHz)



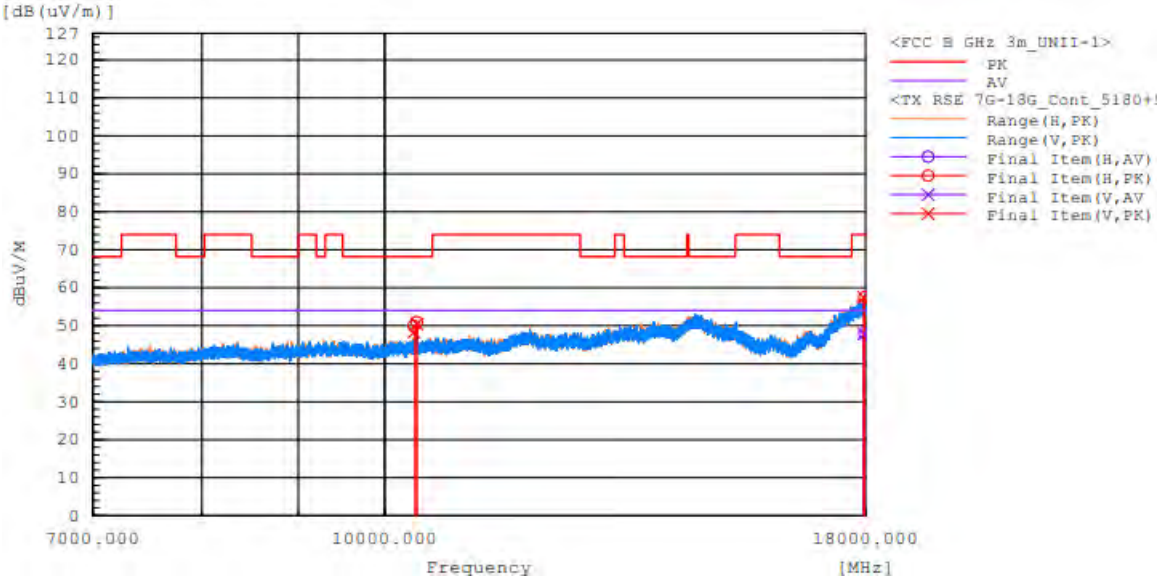
Note:
The worst-case plots are included in this report.

▣ TEST PLOTS

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



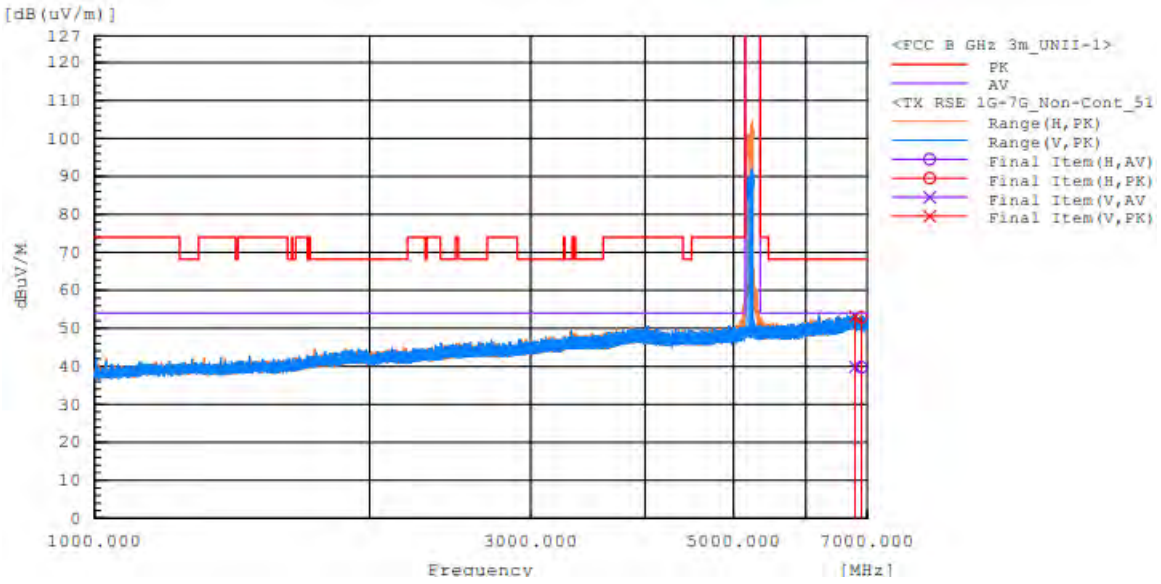
Radiated Spurious Emission 7 GHz - 18 GHz : Contiguous Carrier 20+20 MHz (5180+5200 MHz)



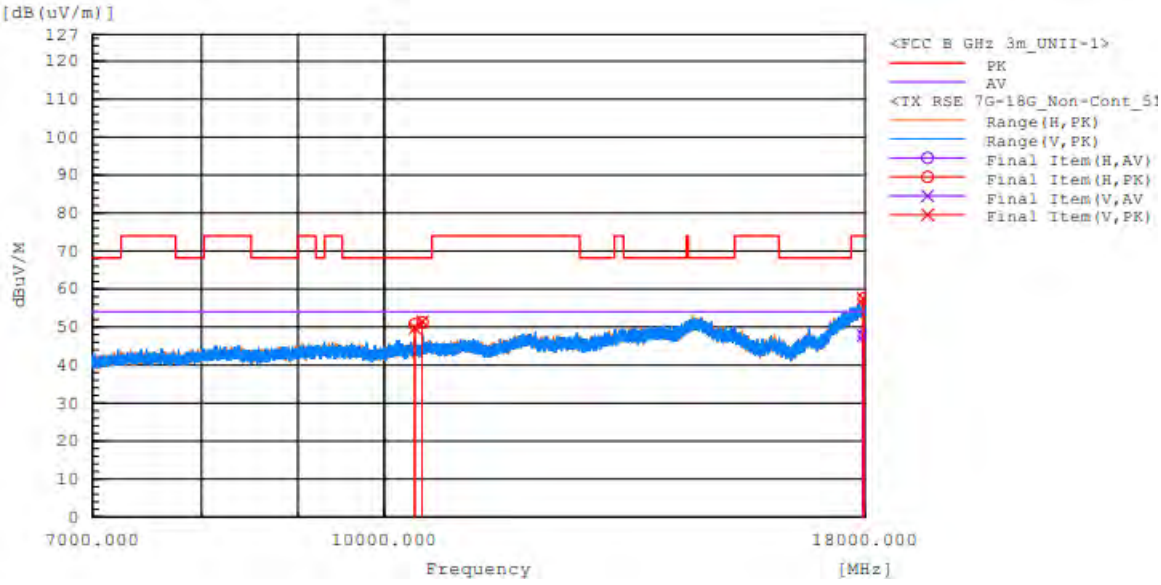
Note:
The worst-case plots are included in this report.

▣ TEST PLOTS

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



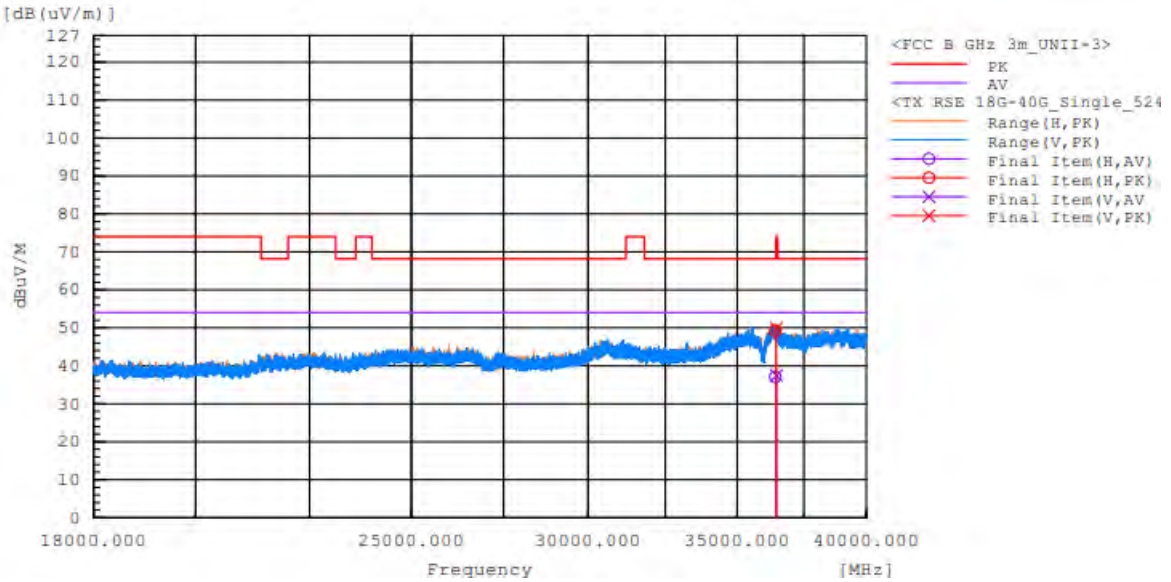
Radiated Spurious Emission 7 GHz - 18 GHz : Non-Contiguous Carrier 40+20 MHz (5190+5240 MHz)



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)

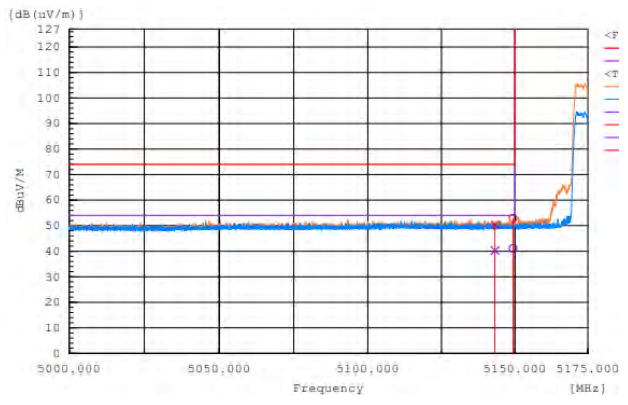
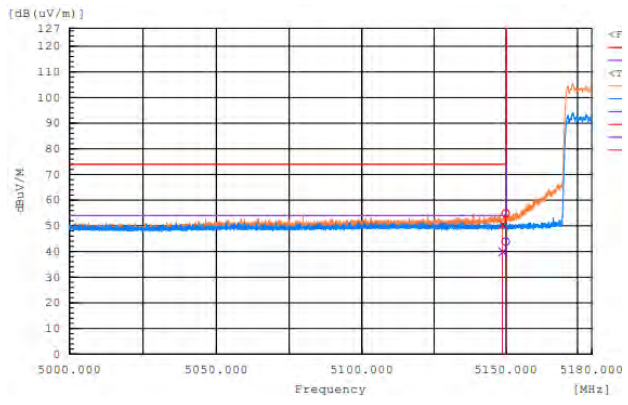
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)	Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	AV	PK	AV	PK	AV	PK
5143.214	V	35.2	45.3	5.1	40.3	50.4	54	74	13.7	23.6
5149.353	H	36.0	47.8	5.1	41.1	52.9	54	74	12.9	21.1

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.[1)]	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

Band Edges : Single (CH 35)	Band Edges : Single (CH 36)
	

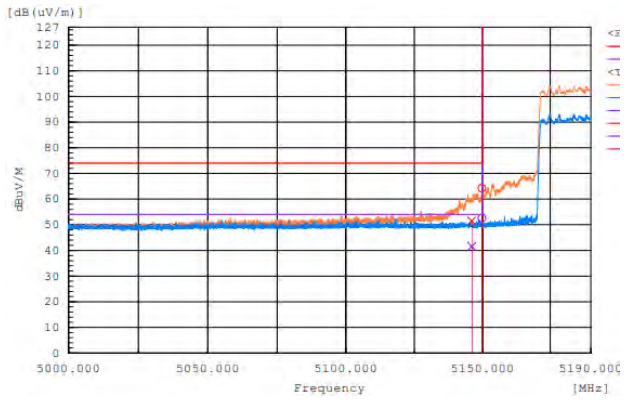
Operating Frequency	5190 MHz
Channel No.	CH 38
Mode	Single Carrier (40 MHz)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)	Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	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

Band Edges : Single (CH 38)	
	

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.[1)]	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

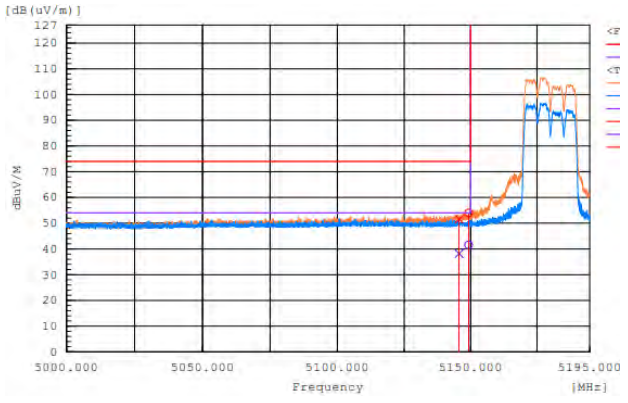
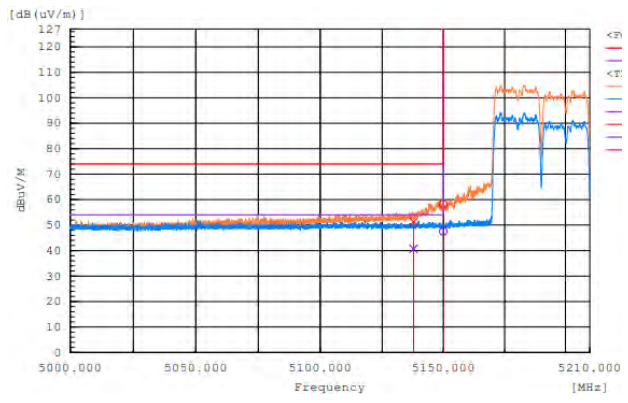
Operating Frequency	5180+5200 MHz
Channel No.	CH 36+40
Mode	Contiguous Carriers (20+20 MHz)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)	Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	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

Band Edges : Contiguous (CH 35+37)	Band Edges : Contiguous (CH 36+40)
	

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.[1)]	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

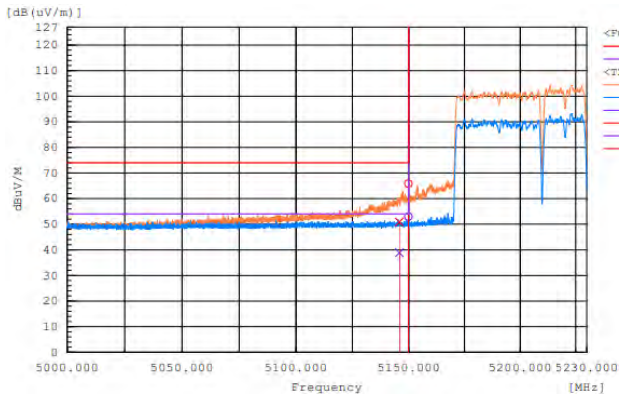
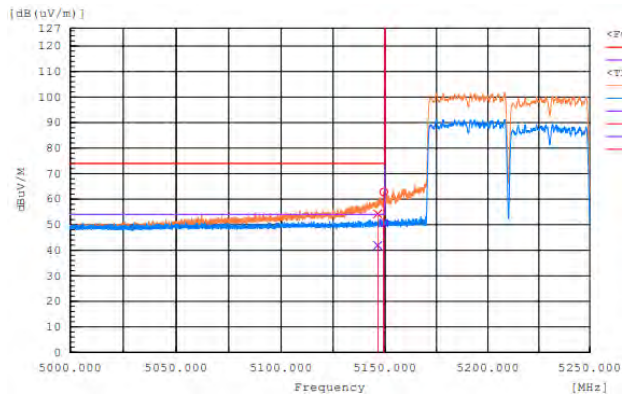
Operating Frequency	5190+5230 MHz
Channel No.	CH 38+46
Mode	Contiguous Carriers (40+40 MHz)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)	Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	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

Band Edges : Contiguous (CH 38+44)	Band Edges : Contiguous (CH 38+46)
	

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

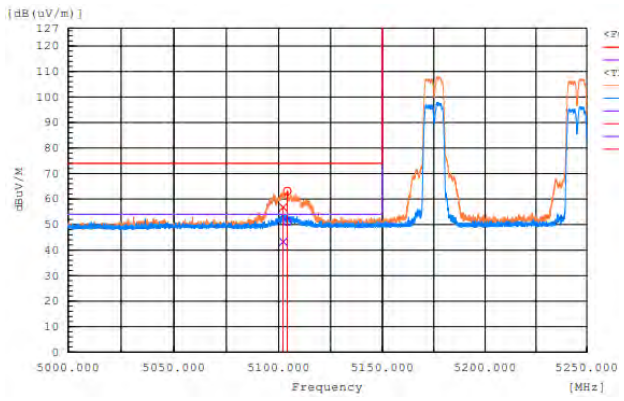
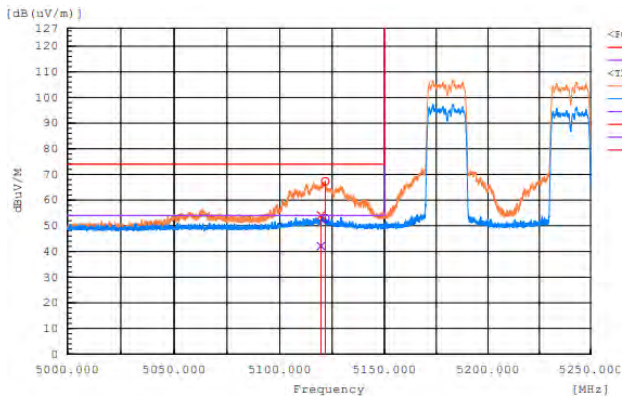
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)	Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	AV	PK	AV	PK	AV	PK
5102.155	V	38.3	51.8	5.0	43.3	56.8	54	74	10.7	17.2
5104.184	H	46.1	58.1	5.0	51.1	63.1	54	74	2.9	10.9

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.[1)]	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

Band Edges : Non-Contiguous (CH 35+49)	Band Edges : Non-Contiguous (CH 36+48)
	

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

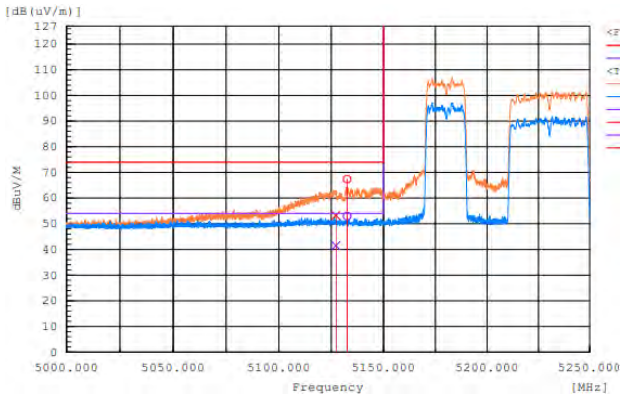
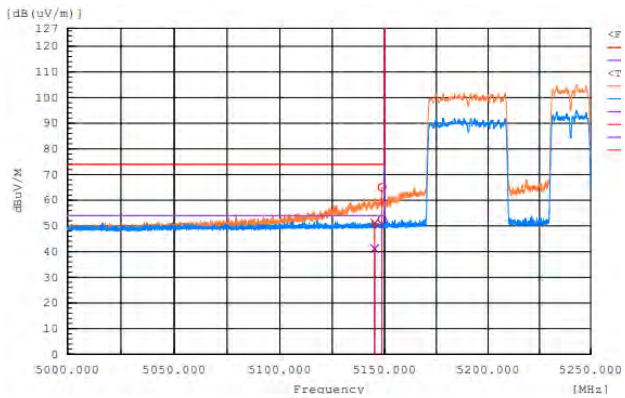
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)	Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	AV	PK	AV	PK	AV	PK
5127.165	V	36.5	48.3	5.0	41.5	53.3	54	74	12.5	20.7
5132.578	H	47.9	62.3	5.1	53.0	67.4	54	74	1.0	6.6

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.[1)]	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

Band Edges : Non-Contiguous (CH 36+46)	Band Edges : Non-Contiguous (CH 38+48)
	

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

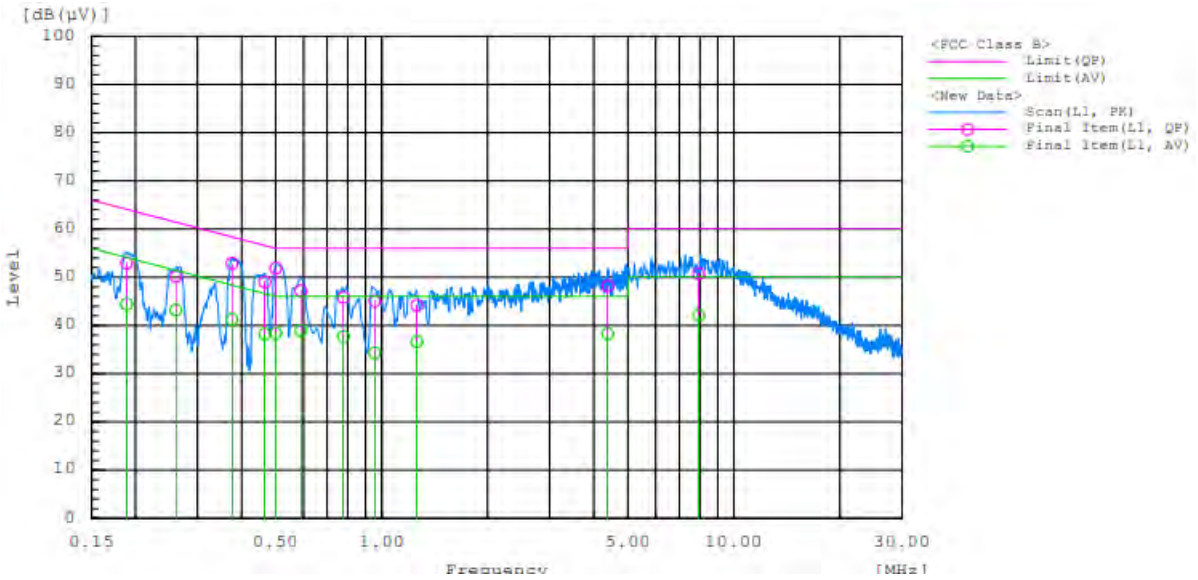
Frequency (MHz)	Line	Reading (dBµV)		Corr. (dB)	Level (dBµV)		Limit (dBµV)		Margin (dB)	
		QP	CAV		QP	CAV	QP	CAV	QP	CAV
0.150	L1	48.7	35.4	9.7	58.4	45.1	66	56	7.6	10.9
0.192	L1	42.2	28.0	9.7	51.9	37.7	64	54	12.1	16.3
0.499	L1	33.8	21.9	9.6	43.4	31.5	56	46	12.6	14.5
0.582	L1	35.3	27.5	9.6	44.9	37.1	56	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

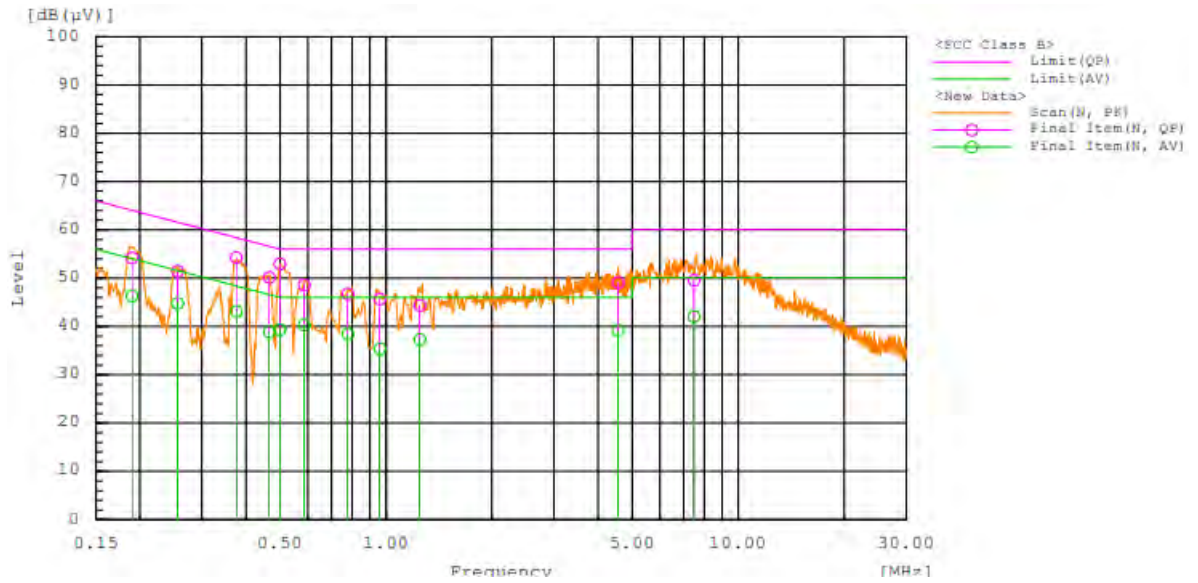
Note : Quasi-peak(Final Result) = Reading Value + Correction Factor

▣ TEST PLOTS

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

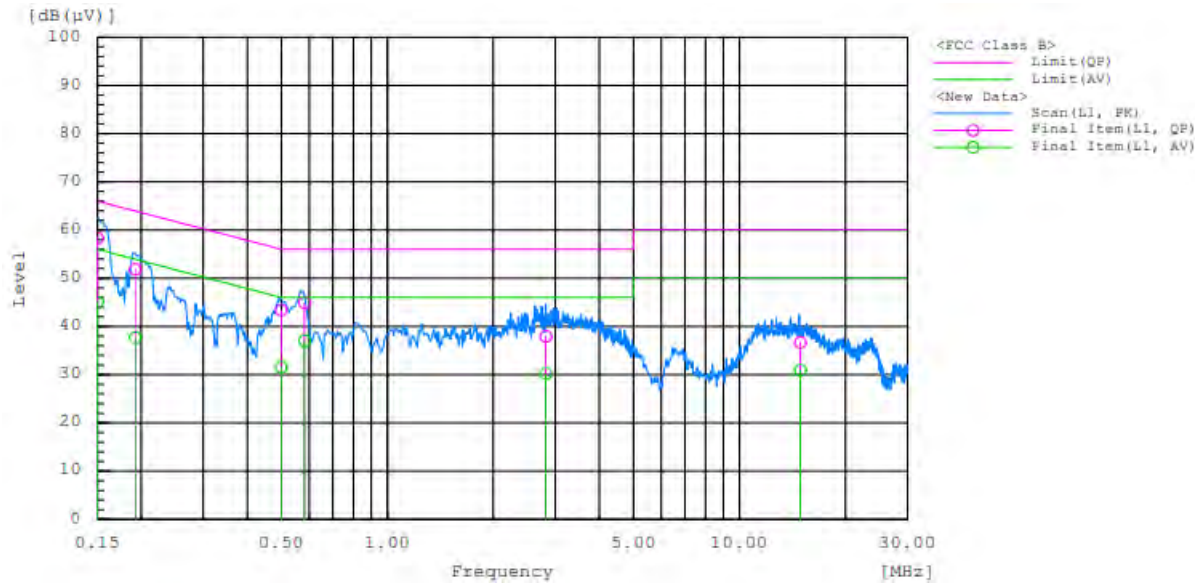


PoE Adapter #1 : AC Line Conducted Emission (N)

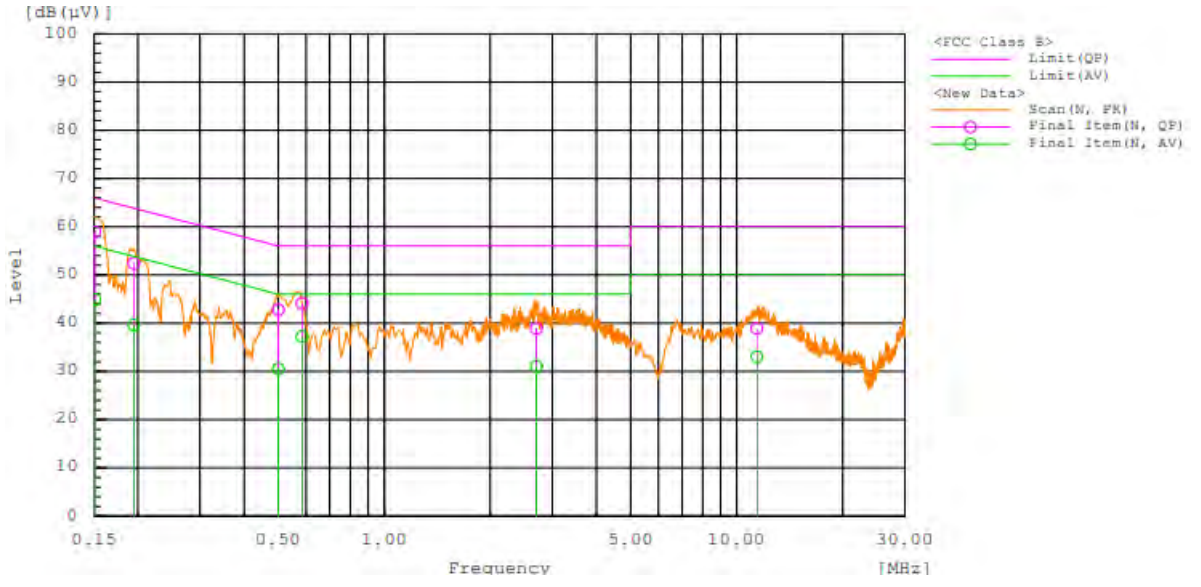


▣ TEST PLOTS

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.
☒	Signal Analyzer (20 Hz ~ 40.0 GHz)	ESU40	12/03/2022	Rohde & Schwarz	100529
☒	Signal Analyzer (10 Hz ~ 40.0 GHz)	ESW44	10/25/2022	Rohde & Schwarz	102015
☒	Signal Analyzer (10 Hz ~ 26.5 GHz)	N9020A	11/04/2022	Keysight	MY52091291
☐	Attenuator (20 dB, DC ~ 26.5 GHz)	CFADC262002	01/13/2023	CERNEX	-
☒	Attenuator (10 dB, DC ~ 26.5 GHz)	CFADC261002	01/13/2023	CERNEX	-
☒	Loop Antenna (0.009 ~ 30 MHz)	HLA 6121	09/15/2023	TESEQ	43964
☒	BI-LOG Antenna (30 MHz ~ 6 GHz)	JB6	10/26/2022	Sunol	A071116
☒	LNA (30 MHz ~ 1GHz)	PAM-103	04/14/2023	Com-Power	18020254
☒	Horn Antenna (1 GHz ~ 18 GHz)	DRH-118	10/21/2022	Sunol	A070516
☒	LNA (1 GHz ~ 18 GHz)	PAM-118A	06/21/2023	Com-Power	18040074
☒	Horn Antenna (18 GHz ~ 40 GHz)	DRH-1840	02/16/2023	Sunol	17121
☒	LNA (18 GHz ~ 40 GHz)	CBL18405045-01	02/10/2023	CERNEX, Inc.	27973
☐	High Pass Filter	WHK10-2520-3000-18000-40EF	01/13/2023	Wainwright	9
☒	High Pass Filter	WHKX8-6090-7000-18000-40SS	01/13/2023	Wainwright	23
☒	EMI Test Receiver	ESR3	12/03/2022	Rohde & Schwarz	102363
☒	LISN	ENV216	01/19/2023	Rohde & Schwarz	101349
☒	DC Power Supply	6030A	01/19/2023	HP	2482A-01331
☒	Temperature/Humidity Chamber	92002929	06/14/2023	ESPEC	92002929

Note(s) :

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. 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