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FCC UNII REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Date of Issue:
September 18, 2023

Test Site/Location:
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA

Report No.: HCT-RF-2309-FC003

FCC ID:	**A3LSMA256U**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**
Model:	SM-A256U
Additional Model:	SM-A256U1/DS, SM-S256VL
EUT Type:	Mobile Phone
Modulation type	OFDM
FCC Classification:	Unlicensed National Information Infrastructure(NII)
FCC Rule Part(s):	Part 15.407

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

REVIEWED BY

Report prepared by : Kyung Jun Woo
Engineer of Telecommunication Testing Center

Report approved by : Jong Seok Lee
Manager of Telecommunication Testing Center

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.
This test results were applied only to the test methods required by the standard.

This laboratory is not accredited for the test results marked *.
The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2309-FC003	September 18, 2023	- First Approval Report

Table of Contents

1. GENERAL INFORMATION

EUT DESCRIPTION

Model	SM-A256U	
Additional Model	SM-A256U1/DS, SM-S256VL	
EUT Type	Mobile Phone	
Power Supply	DC 3.88 V	
Modulation Type	OFDM : 802.11a, 802.11n, 802.11ac	
Frequency Range (MHz)	U-NII-1	20 MHz BW : 5180 - 5240 40 MHz BW : 5190 - 5230 80 MHz BW : 5210
	U-NII-2A	20 MHz BW : 5260 - 5320 40 MHz BW : 5270 - 5310 80 MHz BW : 5290
	U-NII-2C	20 MHz BW : 5500 - 5720 40 MHz BW : 5510 - 5710 80 MHz BW : 5530 – 5690
	U-NII-3	20 MHz BW : 5745 - 5825 40 MHz BW : 5755 - 5795 80 MHz BW : 5775
Straddle channel	Supported	
TDWR Band	Supported	
Dynamic Frequency Selection	Slave without radar detection	
Date(s) of Tests	June 09, 2023 ~ September 12, 2023	
Serial number(IMEI)	Radiated : 350225020113113 Conducted : 350225020110127	

2. MAXIMUM OUTPUT POWER

The transmitter has a maximum total conducted average output power as follows:

Band	Mode	Output Power	
		(dBm)	(W)
UNII1	802.11a	18.71	0.074
	802.11n (HT20)	18.46	0.070
	802.11n (HT40)	14.57	0.029
	802.11ac (VHT20)	18.56	0.072
	802.11ac (VHT40)	14.70	0.030
	802.11ac (VHT80)	13.74	0.024
UNII2A	802.11a	18.59	0.072
	802.11n (HT20)	18.59	0.072
	802.11n (HT40)	15.00	0.032
	802.11ac (VHT20)	18.61	0.073
	802.11ac (VHT40)	15.04	0.032
	802.11ac (VHT80)	12.82	0.019
UNII2C	802.11a	17.96	0.062
	802.11n (HT20)	18.33	0.068
	802.11n (HT40)	15.60	0.036
	802.11ac (VHT20)	18.24	0.067
	802.11ac (VHT40)	15.67	0.037
	802.11ac (VHT80)	14.39	0.027
UNII3	802.11a	18.93	0.078
	802.11n (HT20)	18.47	0.070
	802.11n (HT40)	15.68	0.037
	802.11ac (VHT20)	18.37	0.069
	802.11ac (VHT40)	15.63	0.037
	802.11ac (VHT80)	14.29	0.027

3. TEST METHODOLOGY

The measurement procedure described in FCC KDB 789033 D02 General UNII 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 30 MHz 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 1 GHz. Above 1 GHz with 1.5 m 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. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.6.5 of ANSI C63.10. (Version: 2013)

DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

4. 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).

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated March 31, 2022 (Registration Number: KR0032).

5.2 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."

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203, §15.407:

"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 antennas of this E.U.T are permanently attached.

(2) The E.U.T Complies with the requirement of §15.203, §15.407

7. 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.

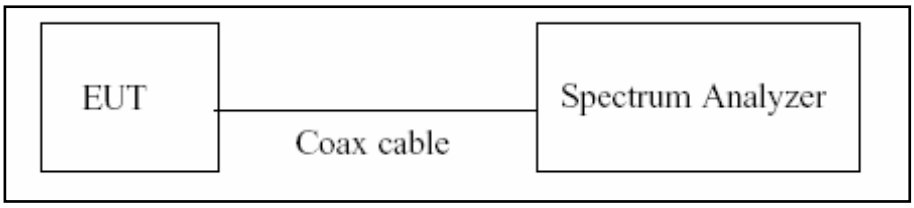
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.90 (Confidence level about 95 %, k=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.14 (Confidence level about 95 %, k=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.82 (Confidence level about 95 %, k=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.74 (Confidence level about 95 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.76 (Confidence level about 95 %, k=2)
Radiated Disturbance (Above 40 GHz)	5.52 (Confidence level about 95 %, k=2)

8. DESCRIPTION OF TESTS

8.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

We tested according to Procedure B.2 in KDB 789033 D02 v02r01.

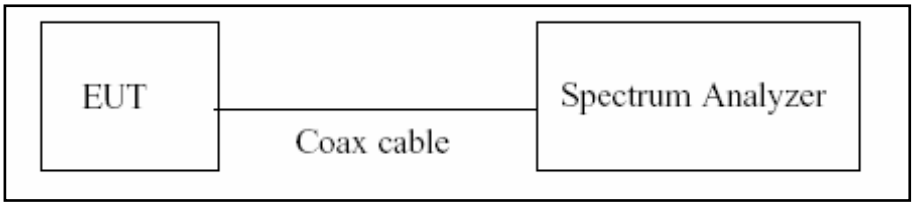
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

8.2. 6 dB Bandwidth & 26 dB Bandwidth

Limit

Within the 5.725-5.85 GHz the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Configuration



Test Procedure(26 dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

We tested according to Procedure C.1 in KDB 789033 D02 v02r01.

1. RBW = approximately 1 % of the emission bandwidth
2. VBW > RBW
3. Detector = Peak
4. Trace mode = max hold
5. Measure the maximum width of the emission that is 26 dB down from the 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 (6 dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

We tested according to Procedure C.2 in KDB 789033 D02 v02r01.

1. RBW = 100 kHz
2. VBW ≥ 3 x RBW
3. Detector = Peak
4. Trace mode = max hold
5. Allow the trace to stabilize
6. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points(upper and lower frequencies) that are attenuated by 6 dB relative to the maximum lever measured in the fundamental emission.

Note:

1. We tested X dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer.
2. DFS test channels should be defined. So, We performed the OBW test to prove that no part of the fundamental emissions of any channels belong to UNII1 and UNII3 band for DFS.
3. The 26 dB bandwidth is used to determine the conducted power limits.

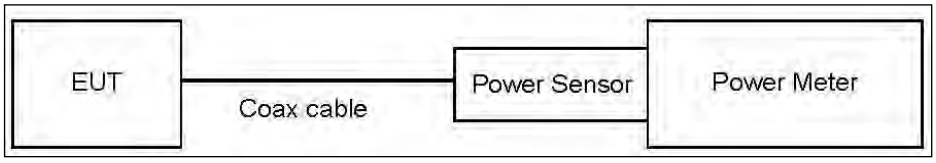
8.3. Output Power Measurement

Limit

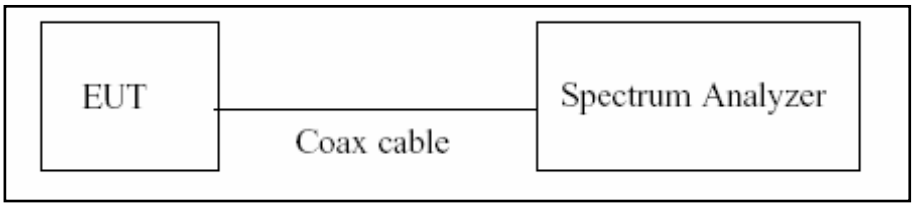
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30 dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30 dBm)

Test Configuration

Power Meter



Spectrum Analyzer(Only Straddle Channel)



Test Procedure(Power Meter)

We tested according to Procedure E.3.a in KDB 789033 D02 v02r01.

1. Measure the duty cycle.
2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3. 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.

Test Procedure (Spectrum Analyzer)

The transmitter output is connected to the Spectrum Analyzer.

We use the spectrum analyzer's integrated band power measurement function.

We tested according to Procedure E.2.d) in KDB 789033 D02 v02r01.

1. Measure the duty cycle.
2. Set span to encompass the 26 dB EBW of the signal.
3. RBW = 1 MHz.
4. VBW ≥ 3 MHz.
5. Number of points in sweep ≥ 2 x span/RBW.
6. Sweep time = auto.
7. Detector = RMS.
8. Do not use sweep triggering. Allow the sweep to "free run".
9. Trace average at least 100 traces in power averaging(RMS) mode
10. Integrated bandwidth = OBW
11. 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

Total Power(dBm) = Measured Value(dBm) + ATT loss(dB) + Cable loss(dB) + Duty Cycle Factor(dB)

Note

1. Spectrum Measured Levels are not plot data.
   The power results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset Loss = Attenuator loss + Cable loss
3. Actual value of loss for the attenuator and cable combination is below table.

Band	Loss(dB)
UNII 1	11.87
UNII 2A	11.87
UNII 2C	11.87
UNII 3	11.87

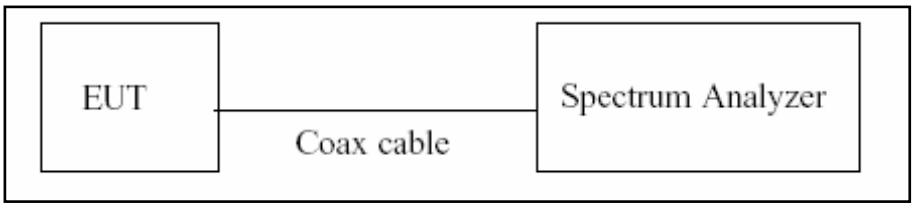
(Actual value of loss for the attenuator and cable combination)

8.4. Power Spectral Density

Limit

Band	Limit
UNII 1	11 dBm/MHz
UNII 2A, 2C	11 dBm/MHz
UNII 3	30 dBm/500 kHz

Test Configuration



Test Procedure

We tested according to Procedure F in KDB 789033 D02 v02r01.

1. Set span to encompass the entire emission bandwidth(EBW) of the signal.
2. RBW = 1 MHz (510 kHz for UNII 3)
3. VBW ≥ 3 MHz
4. Number of points in sweep ≥ 2 x span/RBW.
5. Sweep time = auto.
6. Detector = RMS(i.e., power averaging), if available. Otherwise, use sample detector mode.
7. Do not use sweep triggering. Allow the sweep to “free run”.
8. Trace average at least 100 traces in power averaging(RMS) mode
9. Use the peak search function on the spectrum analyzer to find the peak of the spectrum.
10. 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(dBm) = Measured Value(dBm) + ATT loss(dB) + Cable loss(dB) + Duty Cycle Factor(dB)

Note

1. Spectrum Measured Levels are not plot data.
   The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset Loss = Attenuator loss+ Cable loss
3. Actual value of loss for the attenuator and cable combination is below table.

Band	Loss(dB)
UNII 1	11.87
UNII 2A	11.87
UNII 2C	11.87
UNII 3	11.87

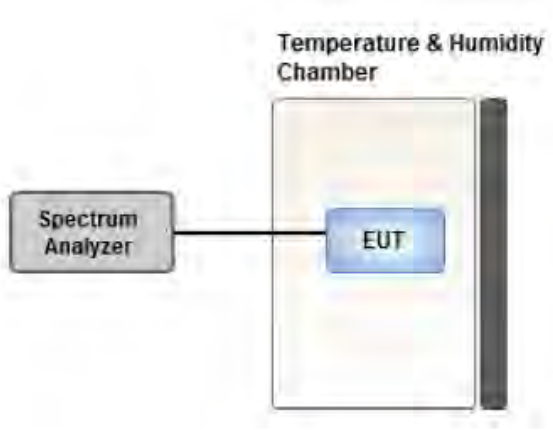
(Actual value of loss for the attenuator and cable combination)

8.5. Frequency Stability

Limit

Maintained within the band

Test Configuration



Test Procedure

1. The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between -30 ℃ and 50 ℃.
2. 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.
3. 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.
4. 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.

8.6. AC Power line Conducted Emissions

Limit

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[a]	56 to 46[a]
0.50 to 5	56	46
5 to 30	60	50

[a]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 Configuration

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.

Sample Calculation

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

8.7. Radiated Test

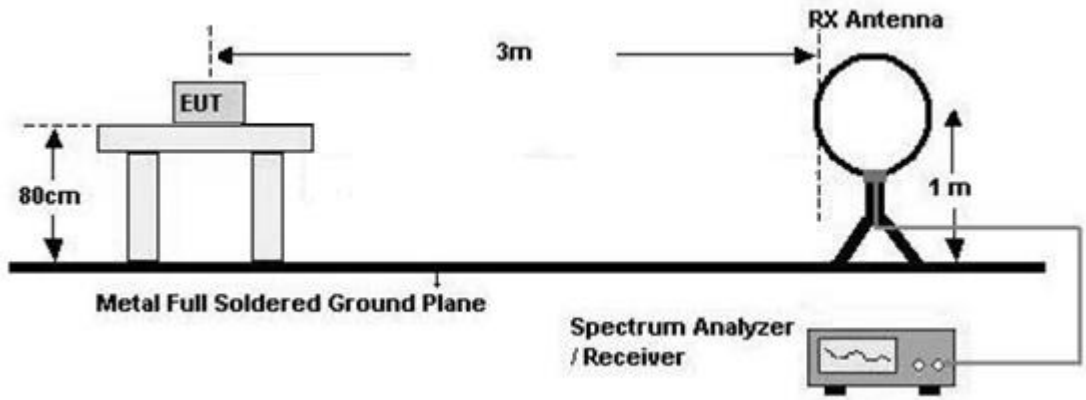
Limit

1. UNII 1: All emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of −27 dBm/MHz.
2. UNII 2A, 2C: All emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz.
3. UNII 3: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
4. All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Section 15.209.

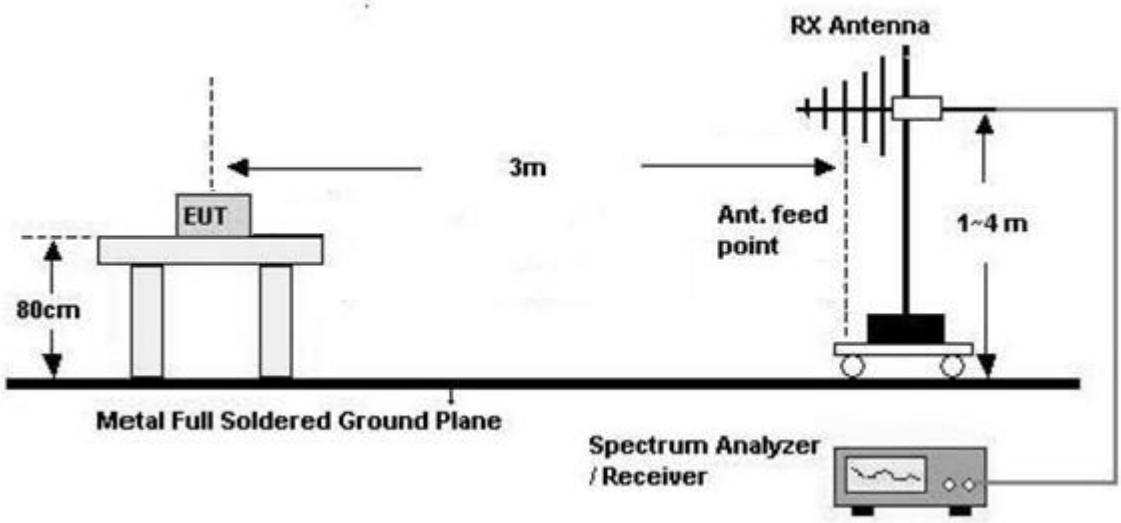
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Test Configuration

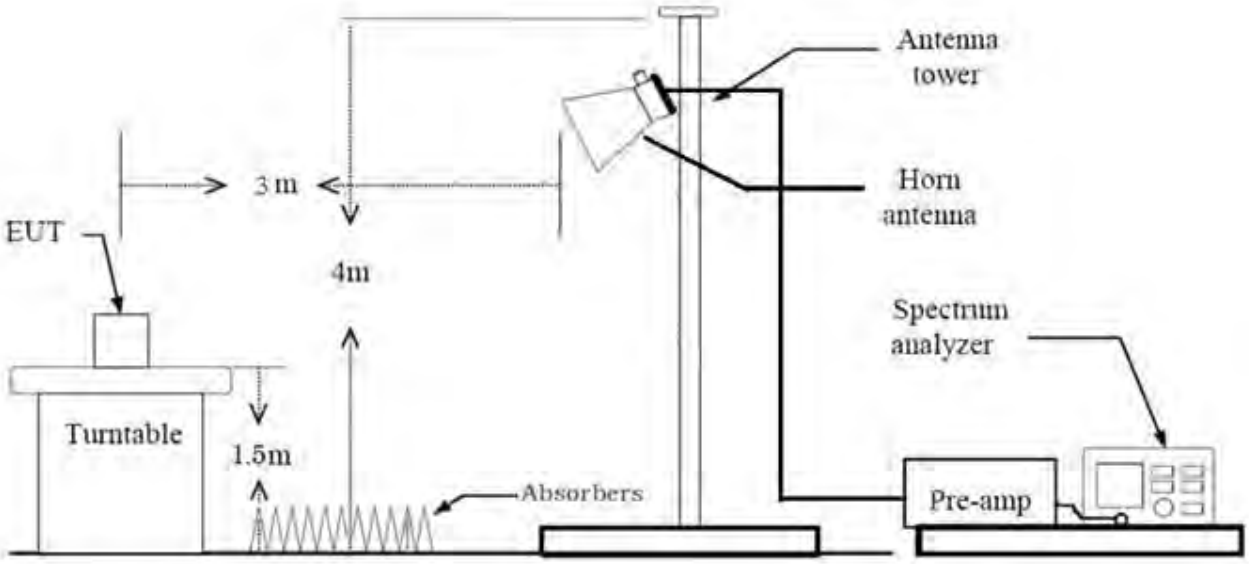
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions (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 3 m from the EUT
3. The EUT is placed on a turntable, which is 0.8 m above ground plane.
4. .We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane 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) = 40log(3 m/300 m) = - 80 dB
   Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = 40log(3 m/30 m) = - 40 dB
   Measurement Distance : 3 m
8. Spectrum Setting
   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Maxhold
   - RBW = 9 kHz
   - VBW ≥ 3 x RBW
9. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

KDB 414788 OFS and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

Test Procedure of Radiated spurious emissions (Below 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. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1 m to 4 m to find out the highest emissions.
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. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Peak
      - Trace = Maxhold
      - RBW = 100 kHz
      - VBW ≥ 3 x RBW
   (2) Measurement Type(Quasi-peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Quasi-Peak
      - RBW = 120 kHz

   ※ In general, (1) is used mainly
7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Procedure of Radiated spurious emissions (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 1 m to 4 m 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 %) = VBW ≤ RBW/100(i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is < 98 %) = 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 % 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 (ie: 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
11. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
12. Total

Measurement(Peak, Avg)

= Measured Value(Peak, Avg)

- We apply to the offset in the range 1 GHz - 18 GHz.
- The offset = Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) – Amp. Gain(A.G)

Test Procedure of Radiated Restricted Band Edge

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 1 m to 4 m 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 %) = VBW ≤ RBW/100(i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is < 98 %) = 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 % 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. Measured Frequency Range :
   - 4 500 MHz ~ 5 150 MHz
   - 5 350 MHz ~ 5 460 MHz
   - 5 460 MHz ~ 5 470 MHz
   - (75 MHz or more below the 5 725 MHz) ~ 5 725 MHz
   - 5 850 MHz ~ (75 MHz or more above the 5 850 MHz)
10. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
11. Total

    Measurement(Peak, Avg)

    = Measured Value(Peak, Avg)

    - We apply to the offset in the range 1 GHz - 18 GHz.
    - The offset = Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) – Amp. Gain(A.G)

The actual setting value of VBW

Mode	Worst Data rate (Mbps)	Duty Cycle	Duty Cycle Factor (dB)	The actual setting value of VBW (Hz)
802.11a	6	0.902	0.446	1 000
802.11n(HT20)	MCS0	0.903	0.445	1 000
802.11n(HT40)	MCS0	0.822	0.853	3 000
802.11ac(VHT20)	MCS0	0.903	0.442	1 000
802.11ac(VHT40)	MCS0	0.822	0.849	3 000
802.11ac(VHT80)	MCS0	0.670	1.736	5 000

8.8. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + External accessories(Earphone, etc)
   - Worstcase : Stand alone
2. EUT Axis
   - Radiated Spurious Emissions : Y
   - Radiated Restricted Band Edge : Y
3. All datarate of operation were investigated and the worst case datarate results are reported.
   - 802.11a : 6 Mbps
   - 802.11n_HT20 : MCS0
   - 802.11n_HT40 : MCS0
   - 802.11ac_VHT20 : MCS0
   - 802.11ac_VHT40 : MCS0
   - 802.11ac_VHT80 : MCS0
4. Radiated Spurious Emission
   - All modulation of operation were investigated and the worst case modulation results are reported.
     (Worstcase : 802.11a_6 Mbps)
5. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
   - Position : Horizontal, Vertical, Parallel to the ground plane
6. SM-A256U, SM-A256U1/DS, SM-S256VL were tested and the worst case results are reported. (Worst case: SM-A256U)

Radiated test(RSDB)

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + External accessories(Earphone., etc)
   - Worstcase : Stand alone
2. EUT Axis
   - Radiated Spurious Emissions : Y-H
3. The following tables show the worst case configurations determined during testing.

Description	Bluetooth Emission	5 GHz Emission
Antenna	WIFI/BT	WIFI/BT
Channel	39	165
Data Rate	1 Mbps	6 Mbps
Mode	GFSK : DH5	802.11a

Note : Bluetooth RSDB Data refer to Bluetooth Test Report.

4. SM-A256U, SM-A256U1/DS, SM-S256VL were tested and the worst case results are reported. (Worst case: SM-A256U)

AC Power line Conducted Emissions

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone + External accessories(Earphone, etc)+Travel Adapter, Stand alone + Travel Adapter
   - Worstcase : Stand alone + Travel Adapter
2. SM-A256U, SM-A256U1/DS, SM-S256VL were tested and the worst case results are reported. (Worst case: SM-A256U)

Conducted test

1. All datarate of operation were investigated and the worst case datarate results are reported.
2. SM-A256U, SM-A256U1/DS, SM-S256VL were tested and the worst case results are reported. (Worst case: SM-A256U)

9. SUMMARY OF TEST RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
26 dB Bandwidth	§15.407 (for Power Measurement)	N/A	Conducted	PASS
6 dB Bandwidth	§15.407(e)	> 500 kHz (5725-5850 MHz)(UNII-3)		PASS
Maximum Conducted Output Power	§15.407(a)(1),(2),(3)	< 250 mW(5150-5250 MHz) < 250 mW or 11+10log$_{10}$ (BW) dBm (5250-5350 MHz) < 250 mW or 11+10log$_{10}$ (BW) dBm (5470-5725 MHz) <1 W (5725-5850 MHz)		PASS
Maximum Power Spectral Density	§15.407(a)(1),(2),(3)	<11 dBm/ MHz (5150-5250 MHz) <11 dBm/ MHz (5250-5350 MHz) <11 dBm/ MHz (5470-5725 MHz) <30 dBm/500 kHz(5725-5850 MHz)		PASS
AC Conducted Emissions 150 kHz-30 MHz	15.207 15.407(b)(9)	<FCC 15.207 limits		PASS
Frequency Stability	§15.407(g) §2.1055	Maintained within the band		PASS
Undesirable Emissions	§15.407(b) (1),(2),(3),(4)	<-27 dBm/MHz EIRP (UNII1, 2A, 2C) cf. Section 8.6 (UNII 3)	Radiated	PASS
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	15.205, 15.407(b)(9),(10)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		PASS

10. TEST RESULT

10.1 DUTY CYCLE

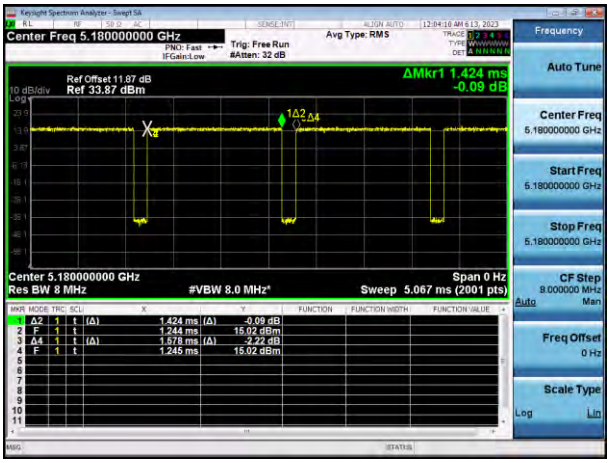
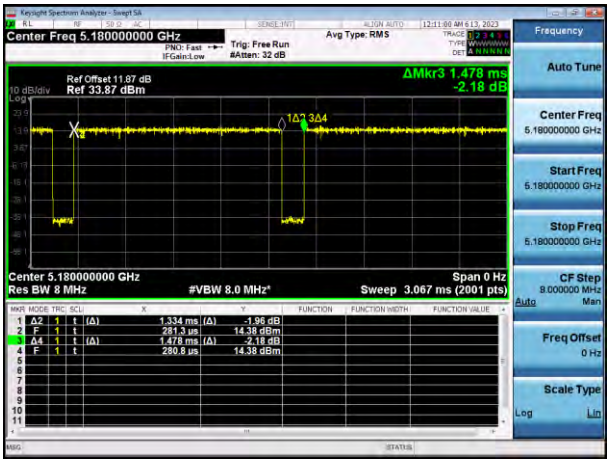
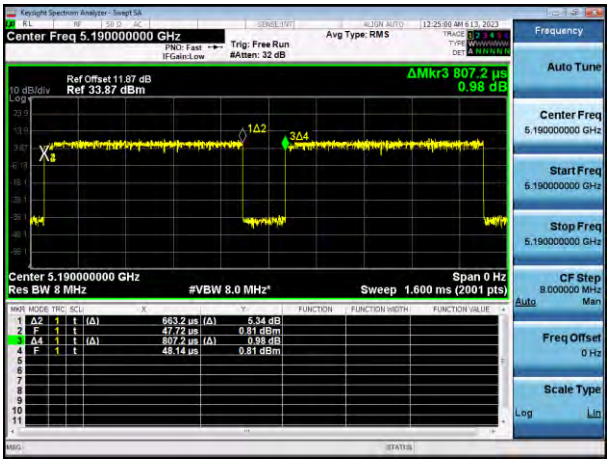
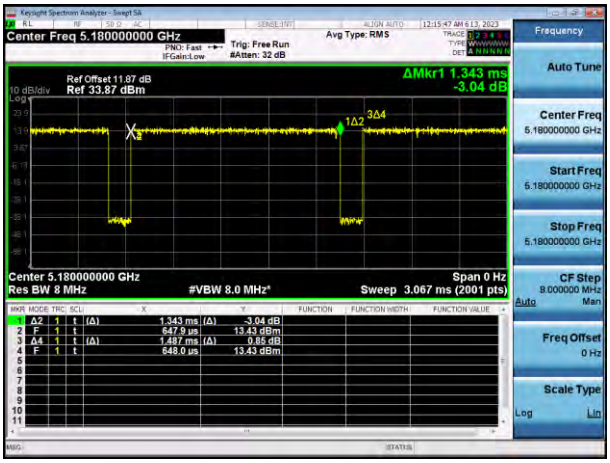
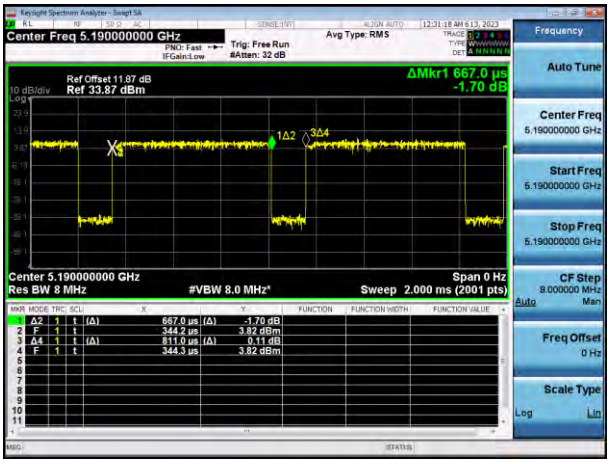
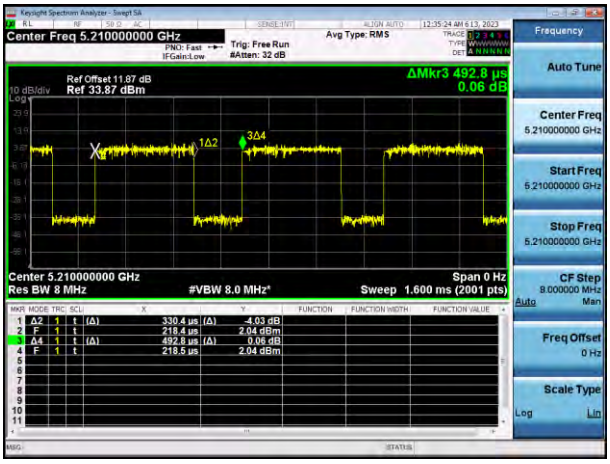
Mode	Data Rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11a	6	1.424	1.578	0.902	0.446
	9	0.963	1.105	0.872	0.597
	12	0.725	0.871	0.831	0.802
	18	0.486	0.654	0.744	1.283
	24	0.370	0.497	0.744	1.282
	36	0.253	0.385	0.658	1.818
	48	0.195	0.331	0.590	2.291
	54	0.177	0.318	0.558	2.536

Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11n (HT20)	0	1.334	1.478	0.903	0.445
	1	0.689	0.861	0.800	0.969
	2	0.471	0.633	0.744	1.284
	3	0.365	0.527	0.692	1.597
	4	0.255	0.399	0.639	1.944
	5	0.203	0.356	0.569	2.447
	6	0.183	0.336	0.545	2.639
	7	0.167	0.319	0.524	2.808
802.11n (HT40)	0	0.663	0.807	0.822	0.853
	1	0.355	0.497	0.714	1.461
	2	0.248	0.410	0.605	2.183
	3	0.193	0.365	0.528	2.775
	4	0.142	0.291	0.488	3.120
	5	0.115	0.250	0.461	3.361
	6	0.106	0.243	0.438	3.587
	7	0.101	0.234	0.433	3.635

Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11ac (VHT20)	0	1.343	1.487	0.903	0.442
	1	0.689	0.851	0.810	0.918
	2	0.476	0.628	0.758	1.203
	3	0.365	0.527	0.692	1.597
	4	0.259	0.403	0.643	1.919
	5	0.203	0.360	0.563	2.492
	6	0.187	0.340	0.550	2.595
	7	0.172	0.324	0.532	2.743
	8	0.152	0.314	0.484	3.153
802.11ac (VHT40)	0	0.667	0.811	0.822	0.849
	1	0.355	0.491	0.722	1.417
	2	0.253	0.431	0.588	2.304
	3	0.198	0.355	0.557	2.540
	4	0.147	0.299	0.491	3.086
	5	0.119	0.254	0.469	3.287
	6	0.111	0.251	0.444	3.525
	7	0.101	0.249	0.407	3.904
	8	0.096	0.249	0.387	4.127
	9	0.091	0.248	0.367	4.354
802.11ac (VHT80)	0	0.330	0.493	0.670	1.736
	1	0.187	0.350	0.536	2.706
	2	0.137	0.294	0.466	3.321
	3	0.117	0.269	0.434	3.625
	4	0.091	0.245	0.372	4.292
	5	0.080	0.224	0.356	4.489
	6	0.076	0.218	0.349	4.576
	7	0.071	0.216	0.328	4.836
	8	0.066	0.214	0.308	5.117
	9	0.064	0.214	0.299	5.242

Note:

In order to simplify the report, attached plots were only the lowest datarate.

802.11a	802.11n(HT20)
	
802.11n(HT40)	**802.11ac(VHT20)**
	
802.11ac(VHT40)	**802.11ac(VHT80)**
	

10.2 26 dB Bandwidth

Straddle channel data in the table below are for reporting purposes only.

Straddle channel data were added in section 10.7.1.

802.11a Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.80	16.621
5200	40	20.86	16.616
5240	48	21.06	16.618
5260	52	20.95	16.605
5300	60	20.67	16.598
5320	64	20.73	16.594
5500	100	20.96	16.591
5600	120	20.80	16.607
5720	144	20.59	16.610
5745	149	20.62	16.612
5785	157	20.56	16.604
5825	165	20.60	16.588

802.11n(HT20) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	22.25	17.738
5200	40	22.00	17.713
5240	48	22.25	17.686
5260	52	21.80	17.714
5300	60	21.81	17.712
5320	64	21.88	17.719
5500	100	21.69	17.688
5600	120	21.93	17.697
5720	144	22.22	17.721
5745	149	21.67	17.719
5785	157	23.81	17.712
5825	165	21.84	17.709

802.11n(HT40) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	42.21	36.371
5230	46	42.57	36.267
5270	54	42.12	36.334
5310	62	41.95	36.319
5510	102	41.90	36.276
5590	118	41.87	36.348
5710	142	41.53	36.326
5755	151	41.54	36.340
5795	159	42.17	36.337

802.11ac(VHT20) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	22.64	17.712
5200	40	22.13	17.725
5240	48	21.40	17.703
5260	52	21.95	17.690
5300	60	22.27	17.726
5320	64	21.79	17.687
5500	100	21.94	17.689
5600	120	21.86	17.665
5720	144	21.94	17.733
5745	149	22.38	17.728
5785	157	22.30	17.727
5825	165	22.02	17.701

802.11ac(VHT40) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	41.76	36.323
5230	46	41.91	36.345
5270	54	42.06	36.294
5310	62	41.72	36.267
5510	102	42.05	36.339
5590	118	41.97	36.319
5710	142	42.16	36.313
5755	151	42.14	36.312
5795	159	41.65	36.283

802.11ac(VHT80) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	81.75	74.834
5290	58	81.93	74.796
5530	106	81.57	74.840
5610	122	81.83	74.848
5690	138	81.91	74.865
5775	155	81.75	74.882

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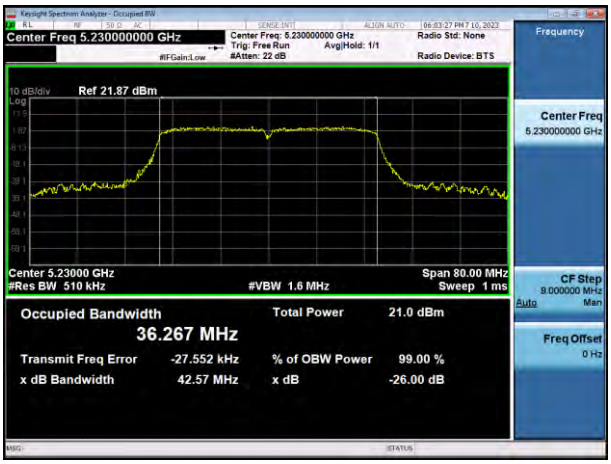
▣ Test Plots

Note:

In order to simplify the report, attached plots were only the widest channel per channel bandwidth.

802.11a 26 dB Bandwidth (CH 48)	802.11n(HT20) 26 dB Bandwidth (CH 157)
	
802.11n(HT40) 26 dB Bandwidth (CH 46)	**802.11ac(VHT20) 26 dB Bandwidth (CH 36)**
	
802.11ac(VHT40) 26 dB Bandwidth (CH 142)	**802.11ac(VHT80) 26 dB Bandwidth (CH 58)**
	

10.3 6 dB BANDWIDTH

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.32	> 0.5	Pass
5785	157	16.34	> 0.5	Pass
5825	165	16.35	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.18	> 0.5	Pass
5785	157	17.16	> 0.5	Pass
5825	165	16.94	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.53	> 0.5	Pass
5795	159	35.51	> 0.5	Pass

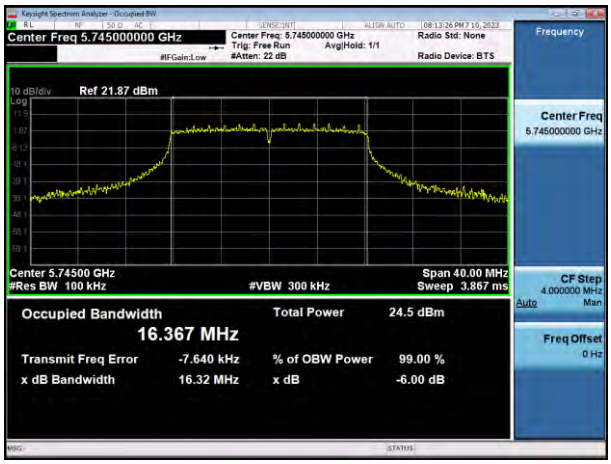
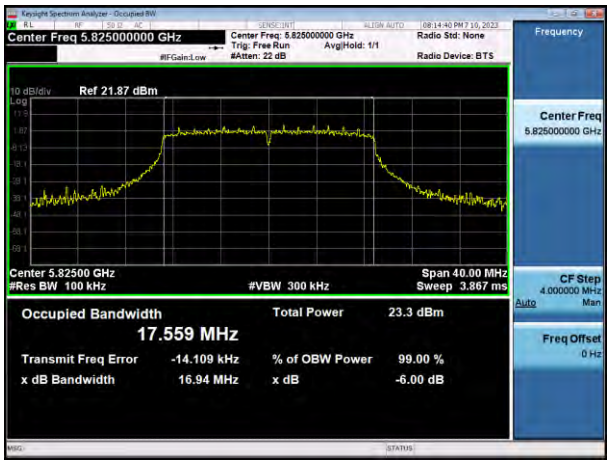
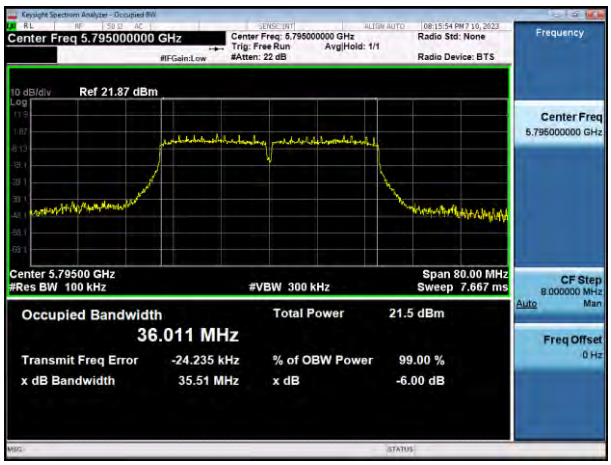
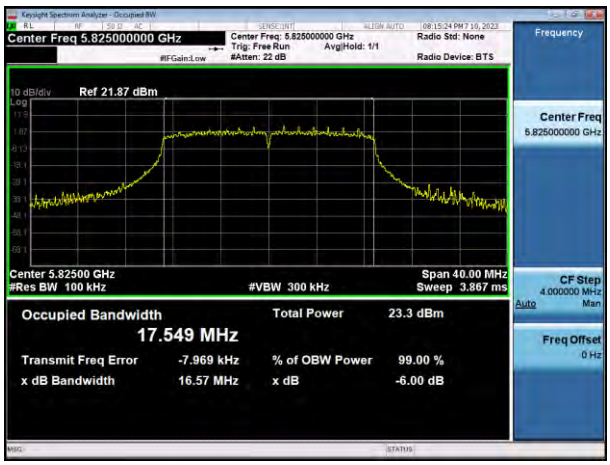
802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.92	> 0.5	Pass
5785	157	17.20	> 0.5	Pass
5825	165	16.57	> 0.5	Pass

802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.95	> 0.5	Pass
5795	159	35.72	> 0.5	Pass

802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	74.11	> 0.5	Pass

▣ Test Plots

Note: In order to simplify the report, attached plots were only the narrowest channel.

802.11a (CH.149)	802.11n(HT20) (CH.165)
	
802.11n(HT40) (CH.159)	**802.11ac(VHT20) (CH.165)**
	
802.11ac(VHT40) (CH.159)	**802.11ac(VHT80) (CH.155)**
	

10.4 OUTPUT POWER MEASUREMENT

Straddle channel data in the table below are for reporting purposes only.

Straddle channel data were added in section 10.7.3.

Limit

(UNII 1) : 23.98 dBm

(UNII 2A, 2C) : 23.98 dBm or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)

(UNII 3) : 30.00 dBm

802.11a Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase Datarate [Mbps]
Frequency [MHz]	Channel No.					
5180	36	18.00	0.446	18.45	23.98	6M
5200	40	18.07	0.446	18.52	23.98	6M
5240	48	18.26	0.446	18.71	23.98	6M
5260	52	18.14	0.446	18.59	23.98	6M
5300	60	16.93	0.446	17.38	23.98	6M
5320	64	17.92	0.446	18.37	23.98	6M
5500	100	17.13	0.446	17.58	23.98	6M
5600	120	17.10	0.446	17.55	23.98	6M
5720	144	17.51	0.446	17.96	23.98	6M
5745	149	18.35	0.446	18.80	30.00	6M
5785	157	18.48	0.446	18.93	30.00	6M
5825	165	17.92	0.446	18.37	30.00	6M

802.11n(20 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5180	36	17.75	0.445	18.20	23.98	MCS0
5200	40	17.67	0.445	18.12	23.98	MCS0
5240	48	18.01	0.445	18.46	23.98	MCS0
5260	52	18.11	0.445	18.56	23.98	MCS0
5300	60	16.88	0.445	17.33	23.98	MCS0
5320	64	18.14	0.445	18.59	23.98	MCS0
5500	100	16.99	0.445	17.44	23.98	MCS0
5600	120	16.75	0.445	17.20	23.98	MCS0
5720	144	17.88	0.445	18.33	23.98	MCS0
5745	149	18.02	0.445	18.47	30.00	MCS0
5785	157	17.94	0.445	18.39	30.00	MCS0
5825	165	17.65	0.445	18.10	30.00	MCS0

802.11n(40 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5190	38	13.70	0.853	14.55	23.98	MCS0
5230	46	13.72	0.853	14.57	23.98	MCS0
5270	54	14.15	0.853	15.00	23.98	MCS0
5310	62	13.44	0.853	14.29	23.98	MCS0
5510	102	13.52	0.853	14.37	23.98	MCS0
5590	118	14.26	0.853	15.11	23.98	MCS0
5710	142	14.75	0.853	15.60	23.98	MCS0
5755	151	14.21	0.853	15.06	30.00	MCS0
5795	159	14.83	0.853	15.68	30.00	MCS0

802.11ac(20 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5180	36	17.67	0.442	18.11	23.98	MCS0
5200	40	17.69	0.442	18.13	23.98	MCS0
5240	48	18.12	0.442	18.56	23.98	MCS0
5260	52	18.10	0.442	18.54	23.98	MCS0
5300	60	17.04	0.442	17.48	23.98	MCS0
5320	64	18.17	0.442	18.61	23.98	MCS0
5500	100	17.28	0.442	17.72	23.98	MCS0
5600	120	16.87	0.442	17.31	23.98	MCS0
5720	144	17.80	0.442	18.24	23.98	MCS0
5745	149	17.93	0.442	18.37	30.00	MCS0
5785	157	17.90	0.442	18.34	30.00	MCS0
5825	165	17.45	0.442	17.89	30.00	MCS0

802.11ac(40 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5190	38	13.65	0.849	14.50	23.98	MCS0
5230	46	13.85	0.849	14.70	23.98	MCS0
5270	54	14.19	0.849	15.04	23.98	MCS0
5310	62	13.62	0.849	14.47	23.98	MCS0
5510	102	13.70	0.849	14.55	23.98	MCS0
5590	118	14.35	0.849	15.20	23.98	MCS0
5710	142	14.82	0.849	15.67	23.98	MCS0
5755	151	14.52	0.849	15.37	30.00	MCS0
5795	159	14.78	0.849	15.63	30.00	MCS0

802.11ac(80 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5210	42	12.00	1.736	13.74	23.98	MCS0
5290	58	11.08	1.736	12.82	23.98	MCS0
5530	106	9.66	1.736	11.40	23.98	MCS0
5610	122	12.24	1.736	13.98	23.98	MCS0
5690	138	12.65	1.736	14.39	23.98	MCS0
5775	155	12.55	1.736	14.29	30.00	MCS0

10.5 POWER SPECTRAL DENSITY

802.11a Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase Datarate [Mbps]	Limit
Frequency [MHz]	Channel No.					
5180	36	5.833	0.446	6.279	6M	11 dBm/MHz
5200	40	6.618	0.446	7.064	6M	
5240	48	7.132	0.446	7.578	6M	
5260	52	7.387	0.446	7.833	6M	
5300	60	6.137	0.446	6.583	6M	
5320	64	7.327	0.446	7.773	6M	
5500	100	6.517	0.446	6.963	6M	
5600	120	5.897	0.446	6.343	6M	
5720	144	6.982	0.446	7.428	6M	
5745	149	4.761	0.446	5.207	6M	30 dBm/500 kHz
5785	157	4.645	0.446	5.091	6M	
5825	165	3.864	0.446	4.310	6M	

802.11n(20 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5180	36	6.482	0.445	6.927	MCS0	11 dBm/MHz
5200	40	6.653	0.445	7.098	MCS0	
5240	48	6.936	0.445	7.381	MCS0	
5260	52	6.937	0.445	7.382	MCS0	
5300	60	5.869	0.445	6.314	MCS0	
5320	64	7.189	0.445	7.634	MCS0	
5500	100	6.214	0.445	6.659	MCS0	
5600	120	5.698	0.445	6.143	MCS0	
5720	144	6.724	0.445	7.169	MCS0	
5745	149	4.214	0.445	4.659	MCS0	30 dBm/500 kHz
5785	157	4.260	0.445	4.705	MCS0	
5825	165	3.475	0.445	3.920	MCS0	

802.11n(40 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5190	38	-0.496	0.853	0.357	MCS0	11 dBm/MHz
5230	46	-0.343	0.853	0.510	MCS0	
5270	54	-0.164	0.853	0.689	MCS0	
5310	62	-0.633	0.853	0.220	MCS0	
5510	102	-0.663	0.853	0.190	MCS0	
5590	118	0.354	0.853	1.207	MCS0	
5710	142	1.868	0.853	2.721	MCS0	
5755	151	-1.261	0.853	-0.408	MCS0	30 dBm /500 kHz
5795	159	-1.966	0.853	-1.113	MCS0	

802.11ac(20 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5180	36	6.431	0.442	6.873	MCS0	11 dBm/MHz
5200	40	6.430	0.442	6.872	MCS0	
5240	48	6.868	0.442	7.310	MCS0	
5260	52	6.952	0.442	7.394	MCS0	
5300	60	5.686	0.442	6.128	MCS0	
5320	64	7.210	0.442	7.652	MCS0	
5500	100	6.106	0.442	6.548	MCS0	
5600	120	5.544	0.442	5.986	MCS0	
5720	144	6.637	0.442	7.079	MCS0	
5745	149	4.468	0.442	4.910	MCS0	30 dBm/500 kHz
5785	157	4.425	0.442	4.867	MCS0	
5825	165	3.535	0.442	3.977	MCS0	

802.11ac(40 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5190	38	-0.554	0.849	0.295	MCS0	11 dBm/MHz
5230	46	-0.324	0.849	0.525	MCS0	
5270	54	0.224	0.849	1.073	MCS0	
5310	62	-0.537	0.849	0.312	MCS0	
5510	102	-0.666	0.849	0.183	MCS0	
5590	118	0.331	0.849	1.180	MCS0	
5710	142	1.611	0.849	2.460	MCS0	
5755	151	-1.000	0.849	-0.151	MCS0	30 dBm/500 kHz
5795	159	-2.077	0.849	-1.228	MCS0	

802.11ac(80 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5210	42	-5.466	1.736	-3.730	MCS0	11 dBm/MHz
5290	58	-6.668	1.736	-4.932	MCS0	
5530	106	-7.603	1.736	-5.867	MCS0	
5610	122	-5.144	1.736	-3.408	MCS0	
5690	138	-4.983	1.736	-3.247	MCS0	
5775	155	-7.830	1.736	-6.094	MCS0	30 dBm/500 kHz

▣ Test Plots

Note:

In order to simplify the report, attached plots were only channel of the highest PSD.

802.11a	
UNII 1-2C (Ch. 52)	UNII 3 (Ch. 165)
	

802.11n(HT20)	
UNII 1-2C (Ch. 64)	UNII 3 (Ch. 165)
	

802.11n(HT40)	
UNII 1-2C (Ch. 142)	UNII 3 (Ch. 151)
	

802.11ac(VHT20)	
UNII 1-2C (Ch. 64)	UNII 3 (Ch. 149)
	

802.11ac(VHT40)	
UNII 1-2C (Ch. 142)	**UNII 3 (Ch. 151)**
	

802.11ac(VHT80)	
UNII 1-2C (Ch. 138)	**UNII 3 (Ch. 155)**
	

10.6 FREQUENCY STABILITY.

10.6.1 80 MHz BW

Note

All modes of operation were investigated and the worst case configuration results are reported.

Startup after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5210082.21	82.21
100%		-30	5210096.38	96.38
100%		-20	5210013.68	13.68
100%		-10	5210053.21	53.21
100%		0	5210049.15	49.15
100%		+10	5210042.73	42.73
100%		+30	5210093.10	93.10
100%		+40	5210037.07	37.07
100%		+50	5210084.30	84.30
High	4.47	+20	5210082.60	82.60
Low	3.65	+20	5210056.83	56.83

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5290012.41	12.41
100%		-30	5290085.15	85.15
100%		-20	5290065.70	65.7
100%		-10	5290084.88	84.88
100%		0	5290014.35	14.35
100%		+10	5290055.76	55.76
100%		+30	5290003.70	3.7
100%		+40	5290082.80	82.8
100%		+50	5290071.89	71.89
High	4.47	+20	5210089.23	89.23
Low	3.65	+20	5210058.19	58.19

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5530021.49	21.49
100%		-30	5530057.36	57.36
100%		-20	5530011.05	11.05
100%		-10	5530091.14	91.14
100%		0	5530058.85	58.85
100%		+10	5530026.33	26.33
100%		+30	5530063.47	63.47
100%		+40	5530082.30	82.3
100%		+50	5530035.19	35.19
High	4.47	+20	5210068.74	68.74
Low	3.65	+20	5210023.57	23.57

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5775007.56	7.56
100%		-30	5775097.69	97.69
100%		-20	5775057.52	57.52
100%		-10	5775061.71	61.71
100%		0	5775090.24	90.24
100%		+10	5775023.52	23.52
100%		+30	5775073.81	73.81
100%		+40	5775081.47	81.47
100%		+50	5775005.68	5.68
High	4.47	+20	5210036.89	36.89
Low	3.65	+20	5210035.69	35.69

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

2 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5210070.89	70.89
100%		-30	5210047.55	47.55
100%		-20	5210097.40	97.40
100%		-10	5210076.31	76.31
100%		0	5210069.83	69.83
100%		+10	5210036.05	36.05
100%		+30	5210069.58	69.58
100%		+40	5210058.60	58.60
100%		+50	5210025.87	25.87
High	4.47	+20	5210006.73	6.73
Low	3.65	+20	5210026.82	26.82

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5290021.93	21.93
100%		-30	5290004.50	4.50
100%		-20	5290012.12	12.12
100%		-10	5290019.70	19.7
100%		0	5290096.58	96.58
100%		+10	5290055.30	55.3
100%		+30	5290067.60	67.6
100%		+40	5290088.40	88.4
100%		+50	5290054.16	54.16
High	4.47	+20	5210006.77	6.77
Low	3.65	+20	5210049.38	49.38

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5530028.86	28.86
100%		-30	5530030.09	30.09
100%		-20	5530036.92	36.92
100%		-10	5530003.79	3.79
100%		0	5530057.86	57.86
100%		+10	5530028.20	28.2
100%		+30	5530060.38	60.38
100%		+40	5530019.61	19.61
100%		+50	5530094.24	94.24
High	4.47	+20	5210075.68	75.68
Low	3.65	+20	5210078.08	78.08

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5775073.09	73.09
100%		-30	5775079.80	79.80
100%		-20	5775020.73	20.73
100%		-10	5775068.34	68.34
100%		0	5775037.47	37.47
100%		+10	5775091.48	91.48
100%		+30	5775004.69	4.69
100%		+40	5775042.51	42.51
100%		+50	5775021.45	21.45
High	4.47	+20	5210003.75	3.75
Low	3.65	+20	5210096.34	96.34

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

5 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5210056.64	56.64
100%		-30	5210070.42	70.42
100%		-20	5210099.30	99.30
100%		-10	5210089.12	89.12
100%		0	5210065.21	65.21
100%		+10	5210061.30	61.30
100%		+30	5210090.56	90.56
100%		+40	5210099.81	99.81
100%		+50	5210044.73	44.73
High	4.47	+20	5210023.92	23.92
Low	3.65	+20	5210059.47	59.47

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5290053.88	53.88
100%		-30	5290035.10	35.10
100%		-20	5290047.20	47.2
100%		-10	5290047.05	47.05
100%		0	5290058.48	58.48
100%		+10	5290015.83	15.83
100%		+30	5290043.79	43.79
100%		+40	5290027.57	27.57
100%		+50	5290091.98	91.98
High	4.47	+20	5210049.07	49.07
Low	3.65	+20	5210019.92	19.92

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5530094.54	94.54
100%		-30	5530055.70	55.70
100%		-20	5530080.13	80.13
100%		-10	5530050.85	50.85
100%		0	5530054.07	54.07
100%		+10	5530009.58	9.58
100%		+30	5530054.98	54.98
100%		+40	5530016.39	16.39
100%		+50	5530092.17	92.17
High	4.47	+20	5210015.55	15.55
Low	3.65	+20	5210037.06	37.06

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5775056.36	56.36
100%		-30	5775075.25	75.25
100%		-20	5775070.10	70.1
100%		-10	5775095.22	95.22
100%		0	5775045.04	45.04
100%		+10	5775005.03	5.03
100%		+30	5775056.40	56.4
100%		+40	5775014.43	14.43
100%		+50	5775007.78	7.78
High	4.47	+20	5210075.58	75.58
Low	3.65	+20	5210015.26	15.26

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

10 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5210050.55	50.55
100%		-30	5210088.99	88.99
100%		-20	5210088.95	88.95
100%		-10	5210045.69	45.69
100%		0	5210007.10	7.10
100%		+10	5210081.48	81.48
100%		+30	5210013.13	13.13
100%		+40	5210061.14	61.14
100%		+50	5210094.55	94.55
High	4.47	+20	5210099.37	99.37
Low	3.65	+20	5210047.66	47.66

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5290004.16	4.16
100%		-30	5290018.97	18.97
100%		-20	5290073.24	73.24
100%		-10	5290056.66	56.66
100%		0	5290066.13	66.13
100%		+10	5290012.67	12.67
100%		+30	5290057.78	57.78
100%		+40	5290012.64	12.64
100%		+50	5290011.44	11.44
High	4.47	+20	5210053.60	53.60
Low	3.65	+20	5210055.40	55.40

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5530025.22	25.22
100%		-30	5530080.35	80.35
100%		-20	5530094.92	94.92
100%		-10	5530025.61	25.61
100%		0	5530025.97	25.97
100%		+10	5530036.48	36.48
100%		+30	5530017.40	17.4
100%		+40	5530015.04	15.04
100%		+50	5530072.61	72.61
High	4.47	+20	5210027.83	27.83
Low	3.65	+20	5210039.80	39.80

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5775023.84	23.84
100%		-30	5775066.39	66.39
100%		-20	5775009.95	9.95
100%		-10	5775012.89	12.89
100%		0	5775056.53	56.53
100%		+10	5775016.65	16.65
100%		+30	5775005.95	5.95
100%		+40	5775050.18	50.18
100%		+50	5775098.54	98.54
High	4.47	+20	5210077.09	77.09
Low	3.65	+20	5210045.42	45.42

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

10.7 STRADDLE CHANNEL

10.7.1 26 dB Bandwidth

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11a	UNII 2C	5720	144	5709.96	15.04
802.11n(HT20)				5709.12	15.88
802.11ac(VHT20)				5709.28	15.72
802.11a	UNII 3	5720	144	5730.20	5.20
802.11n(HT20)				5730.56	5.56
802.11ac(VHT20)				5730.64	5.64

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11n(HT40)	UNII 2C	5710	142	5689.44	35.56
802.11ac(VHT40)				5689.36	35.64
802.11n(HT40)	UNII 3	5710	142	5730.48	5.48
802.11ac(VHT40)				5730.32	5.32

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11ac(VHT80)	UNII 2C	5690	138	5649.20	75.80
	UNII 3	5690	138	5730.92	5.92

Note:

[UNII 2C] 26 dB Bandwidth = 5 725 MHz - Measured Frequency[MHz]

[UNII 3C] 26 dB Bandwidth = Measured Frequency[MHz] – 5 725 MHz

▣ Test Plots (26 dB Bandwidth)

802.11a UNII Band	802.11n(HT20) UNII Band
	

802.11ac(VHT20) UNII Band


▣ Test Plots (26 dB Bandwidth)

802.11n(HT40) UNII Band	802.11ac(VHT40) UNII Band
	
802.11ac(VHT80) UNII Band	
	

10.7.2 6 dB Bandwidth

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
802.11a	UNII 3	5720	144	5728.20	3.20	> 0.5
802.11n(HT20)				5728.56	3.56	> 0.5
802.11ac(VHT20)				5728.16	3.16	> 0.5

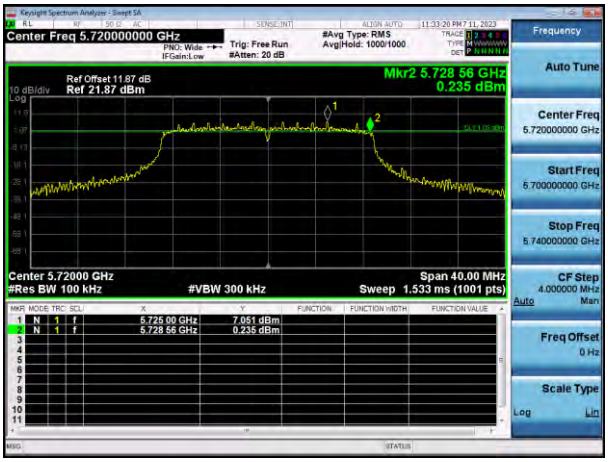
Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
802.11n(HT40)	UNII 3	5710	142	5728.00	3.00	> 0.5
802.11ac(VHT40)				5728.00	3.00	> 0.5

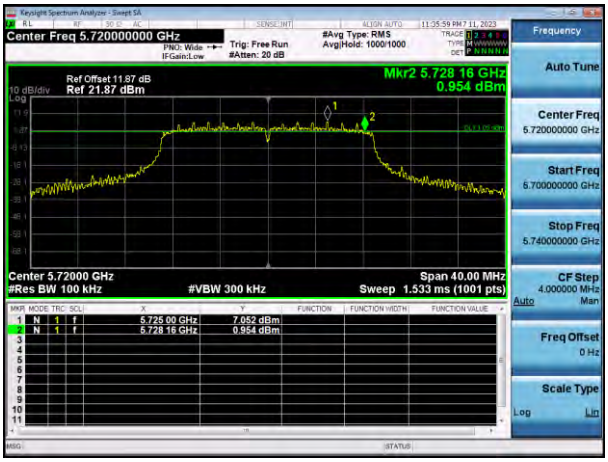
Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
802.11ac(VHT80)	UNII 3	5690	138	5727.68	2.68	> 0.5

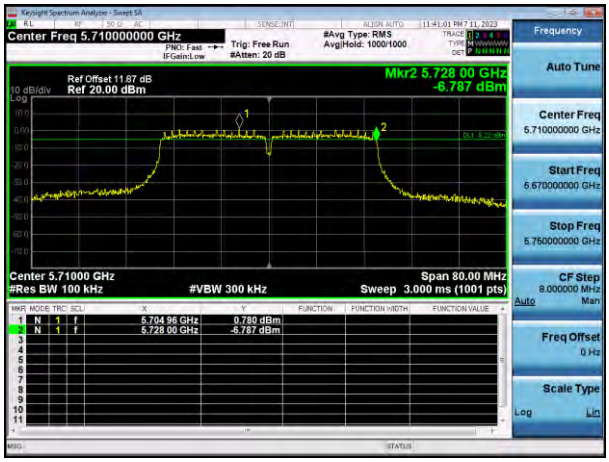
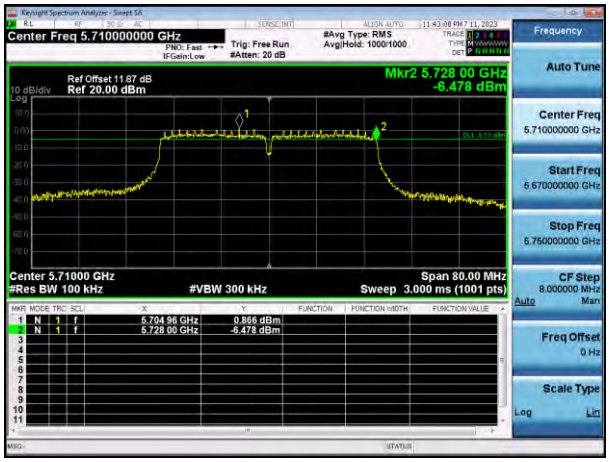
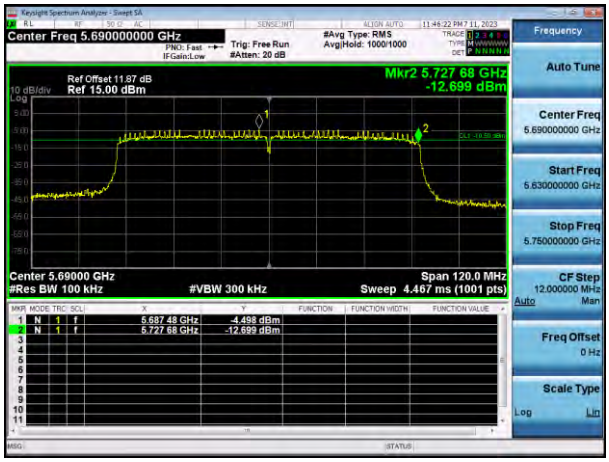
Note:

6 dB Bandwidth = Measured Frequency[MHz] – 5725MHz

▣ Test Plots(UNII 3 Band 6 dB Bandwidth)

802.11a CH.144	802.11n_HT20 CH.144
	

802.11ac_VHT20 CH.144


802.11n_HT40 CH.142	802.11ac_VHT40 CH.142
	
802.11ac_VHT80 CH.138	
	

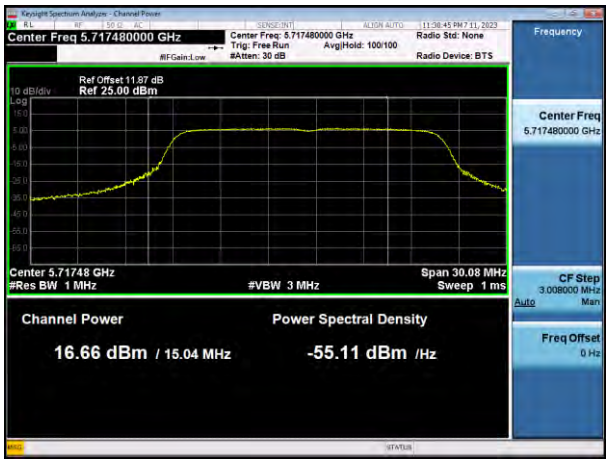
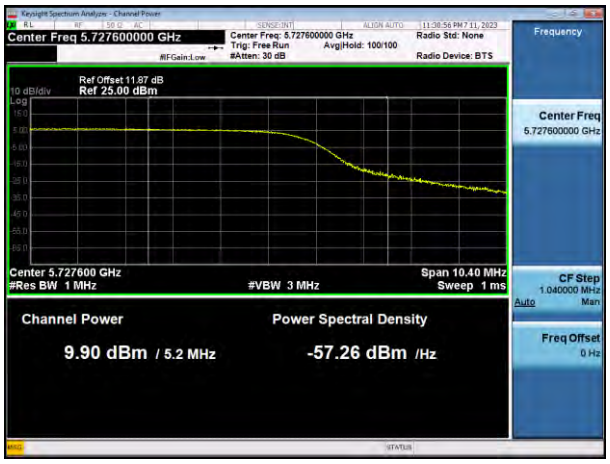
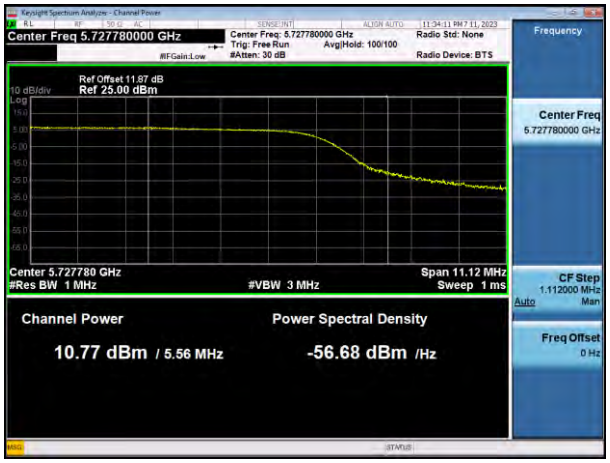
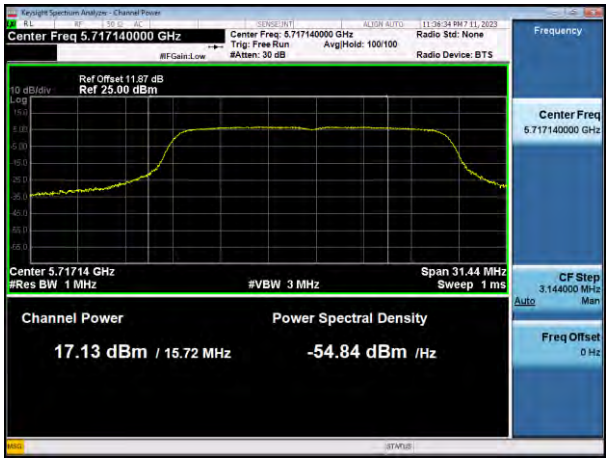
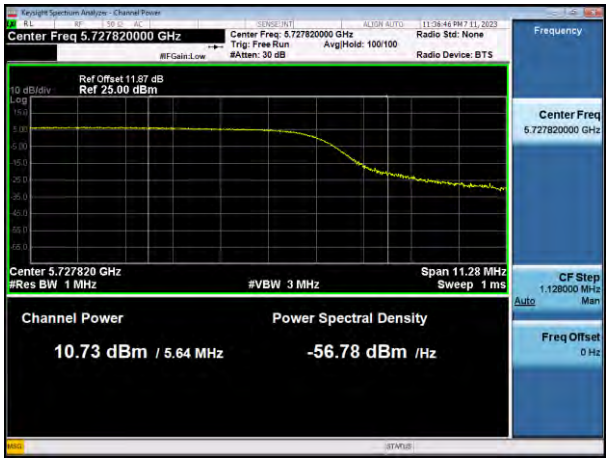
10.7.3 Output Power

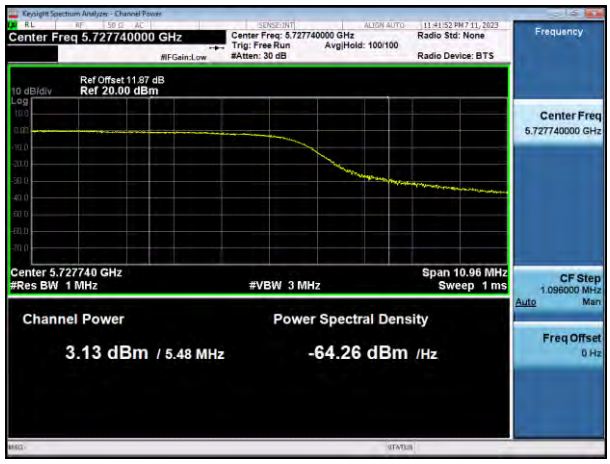
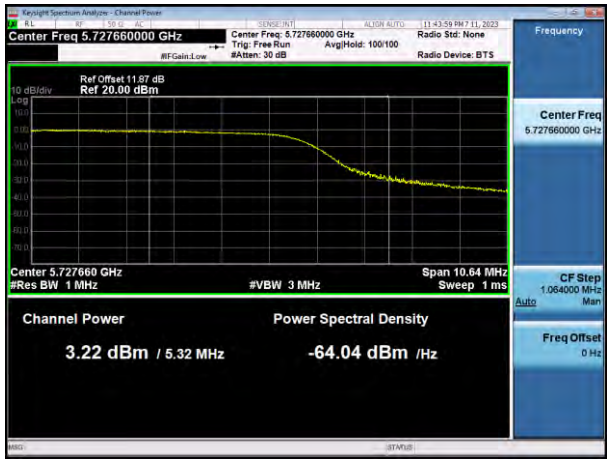
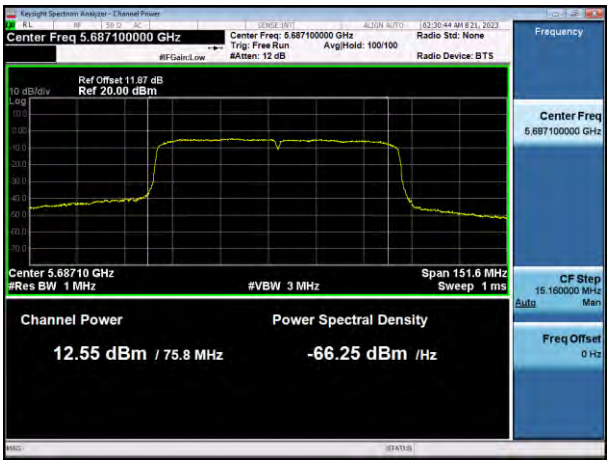
Mode	Frequency [MHz]	Channel	Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase Datarate
802.11a	5720 (UNII 2C Band)	144	16.66	0.446	17.11	22.77	6 Mbps
802.11n(HT20)			17.12	0.445	17.57	23.01	MCS0
802.11ac(VHT20)			17.13	0.442	17.57	22.96	MCS0
802.11a	5720 (UNII 3 Band)	144	9.90	0.446	10.35	30.00	6 Mbps
802.11n(HT20)			10.77	0.445	11.21	30.00	MCS0
802.11ac(VHT20)			10.73	0.442	11.17	30.00	MCS0

Mode	Frequency [MHz]	Channel	Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase Datarate
802.11n(HT40)	5710 (UNII 2C Band)	142	13.97	0.853	14.82	23.98	MCS0
802.11ac(VHT40)			14.30	0.849	15.15	23.98	MCS0
802.11n(HT40)	5710 (UNII 3 Band)	142	3.13	0.853	3.98	30.00	MCS0
802.11ac(VHT40)			3.22	0.849	4.07	30.00	MCS0

Mode	Frequency [MHz]	Channel	Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase Datarate
802.11ac(VHT80)	5690 (UNII 2C Band)	138	12.55	1.736	14.29	23.98	MCS0
	5690 (UNII 3 Band)	138	-4.40	1.736	-2.66	30.00	MCS0

▣ Test Plots

802.11a UNII 2C Band	802.11a UNII 3 Band
	
802.11n(HT20) UNII 2C Band	**802.11n(HT20) UNII 3 Band**
	
802.11ac(VHT20) UNII 2C Band	**802.11ac(VHT20) UNII 3 Band**
	

802.11n(HT40) UNII 2C Band	802.11n(HT40) UNII 3 Band
	
802.11ac(VHT40) UNII 2C Band	**802.11ac(VHT40) UNII 3 Band**
	
802.11ac(VHT80) UNII 2C Band	**802.11ac(VHT80) UNII 3 Band**
	

10.7.4 Power Spectral Density

Mode	Frequency [MHz]	Channel	Measured Density [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm]	Limit [dBm]	Worstcase Datarate
802.11a	5720 (UNII 2C)	144	6.525	0.446	6.971	11 dBm/ MHz	6 Mbps
802.11n(HT20)			6.899	0.445	7.344		MCS0
802.11ac(VHT20)			7.129	0.442	7.571		MCS0
802.11a	5720 (UNII 3)	144	3.020	0.446	3.466	30 dBm /500 kHz	6 Mbps
802.11n(HT20)			3.266	0.445	3.711		MCS0
802.11ac(VHT20)			3.351	0.442	3.793		MCS0

Mode	Frequency [MHz]	Channel	Measured Density [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm]	Limit [dBm]	Worstcase Datarate
802.11n(HT40)	5710 (UNII 2C)	142	0.364	0.853	1.217	11 dBm/ MHz	MCS0
802.11ac(VHT40)			0.443	0.849	1.292		MCS0
802.11n(HT40)	5710 (UNII 3)	142	-3.272	0.853	-2.419	30 dBm/ 500 kHz	MCS0
802.11ac(VHT40)			-3.698	0.849	-2.849		MCS0

Mode	Frequency [MHz]	Channel	Measured Density [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm]	Limit [dBm]	Worstcase Datarate
802.11ac(VHT80)	5690 (UNII 2C)	138	-5.570	1.736	-3.834	11 dBm/ MHz	MCS0
	5690 (UNII 3)	138	-11.791	1.736	-10.055	30 dBm/ 500 kHz	MCS0

▣ Test Plots

802.11a UNII 2C Band	802.11a UNII 3 Band
	
802.11n(HT20) UNII 2C Band	**802.11n(HT20) UNII 3 Band**
	
802.11ac(VHT20) UNII 2C Band	**802.11ac(VHT20) UNII 3 Band**
	

802.11n(HT40) UNII 2C Band	802.11n(HT40) UNII 3 Band
	
802.11ac(VHT40) UNII 2C Band	**802.11ac(VHT40) UNII 3 Band**
	
802.11ac(VHT80) UNII 2C Band	**802.11ac(VHT80) UNII 3 Band**
	

10.8 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30 MHz

Frequency	Measured Value	A.F+D.F+C.L	POL	Total	Limit	Margin
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]
No Critical peaks found						

Note:

1. The Measured Value of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
2. Distance extrapolation factor = 40log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBμV) + Distance extrapolation factor

Frequency Range : Below 1 GHz

Frequency	Measured Value	A.F+C.L	POL	Total	Limit	Margin
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]
No Critical peaks found						

Note:

1. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode

Frequency Range : Above 1 GHz

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Measured Value [dBµV]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
10360	56.02	V	56.02	68.20	12.18	PK
15540	54.63	V	54.63	73.98	19.35	PK
15540	41.39	V	41.39	53.98	12.59	AV
10360	56.10	H	56.10	68.20	12.10	PK
15540	54.57	H	54.57	73.98	19.41	PK
15540	41.33	H	41.33	53.98	12.65	AV

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5200 MHz
Channel No.	40 Ch

Frequency [MHz]	Measured Value [dBµV]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
10400	52.31	V	52.31	68.20	15.89	PK
15600	52.51	V	52.51	73.98	21.47	PK
15600	39.44	V	39.44	53.98	14.54	AV
10400	52.44	H	52.44	68.20	15.76	PK
15600	52.39	H	52.39	73.98	21.59	PK
15600	39.41	H	39.41	53.98	14.57	AV

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5240 MHz
Channel No.	48 Ch

Frequency [MHz]	Measured Value [dBµV]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
10480	53.08	V	53.08	68.20	15.12	PK
15720	52.18	V	52.18	73.98	21.80	PK
15720	38.70	V	38.70	53.98	15.28	AV
10480	53.19	H	53.19	68.20	15.01	PK
15720	52.17	H	52.17	73.98	21.81	PK
15720	38.64	H	38.64	53.98	15.34	AV

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5260 MHz
Channel No.	52 Ch

Frequency [MHz]	Measured Value [dBµV]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
10520	53.42	V	53.42	68.20	14.78	PK
15780	52.06	V	52.06	73.98	21.92	PK
15780	38.68	V	38.68	53.98	15.30	AV
10520	53.59	H	53.59	68.20	14.61	PK
15780	52.13	H	52.13	73.98	21.85	PK
15780	38.94	H	38.94	53.98	15.04	AV

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5300 MHz
Channel No.	60 Ch

Frequency [MHz]	Measured Value [dBµV]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
10600	53.28	V	53.28	73.98	20.70	PK
10600	40.20	V	40.20	53.98	13.78	AV
15900	53.26	V	53.26	73.98	20.72	PK
15900	39.91	V	39.91	53.98	14.07	AV
10600	53.56	H	53.56	73.98	20.42	PK
10600	40.29	H	40.29	53.98	13.69	AV
15900	53.12	H	53.12	73.98	20.86	PK
15900	39.68	H	39.68	53.98	14.30	AV

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency [MHz]	Measured Value [dBµV]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
10640	54.11	V	54.11	73.98	19.87	PK
10640	40.39	V	40.39	53.98	13.59	AV
15960	52.98	V	52.98	73.98	21.00	PK
15960	39.94	V	39.94	53.98	14.04	AV
10640	54.21	H	54.21	73.98	19.77	PK
10640	40.82	H	40.82	53.98	13.16	AV
15960	52.58	H	52.58	73.98	21.40	PK
15960	39.31	H	39.31	53.98	14.67	AV

Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Measured Value [dBµV]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
11000	53.62	V	53.62	73.98	20.36	PK
11000	40.07	V	40.07	53.98	13.91	AV
16500	54.26	V	54.26	68.20	13.94	PK
11000	53.34	H	53.34	73.98	20.64	PK
11000	39.94	H	39.94	53.98	14.04	AV
16500	54.18	H	54.18	68.20	14.02	PK

Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5600 MHz
Channel No.	120 Ch

Frequency [MHz]	Measured Value [dBµV]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
11200	52.77	V	52.77	73.98	21.21	PK
11200	39.85	V	39.85	53.98	14.13	AV
16800	54.85	V	54.85	68.20	13.35	PK
11200	52.49	H	52.49	73.98	21.49	PK
11200	39.63	H	39.63	53.98	14.35	AV
16800	54.63	H	54.63	68.20	13.57	PK

Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5720 MHz
Channel No.	144 Ch

Frequency [MHz]	Measured Value [dBµV]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
11440	54.33	V	54.33	73.98	19.65	PK
11440	39.93	V	39.93	53.98	14.05	AV
17160	55.79	V	55.79	68.20	12.41	PK
11440	54.28	H	54.28	73.98	19.70	PK
11440	39.86	H	39.86	53.98	14.12	AV
17160	55.61	H	55.61	68.20	12.59	PK

Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5745MHz
Channel No.	149 Ch

Frequency [MHz]	Measured Value [dBµV]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
11490	52.18	V	52.18	73.98	21.80	PK
11490	38.72	V	38.72	53.98	15.26	AV
17235	55.95	V	55.95	68.20	12.25	PK
11490	52.02	H	52.02	73.98	21.96	PK
11490	38.67	H	38.67	53.98	15.31	AV
17235	55.79	H	55.79	68.20	12.41	PK

Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5785 MHz
Channel No.	157 Ch

Frequency [MHz]	Measured Value [dBµV]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
11570	53.40	V	53.40	73.98	20.58	PK
11570	39.92	V	39.92	53.98	14.06	AV
17355	56.52	V	56.52	68.20	11.68	PK
11570	52.97	H	52.97	73.98	21.01	PK
11570	39.84	H	39.84	53.98	14.14	AV
17355	56.27	H	56.27	68.20	11.93	PK

Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5825 MHz
Channel No.	165 Ch

Frequency [MHz]	Measured Value [dBµV]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
11650	53.19	V	53.19	73.98	20.79	PK
11650	40.22	V	40.22	53.98	13.76	AV
17475	57.64	V	57.64	68.20	10.56	PK
11650	52.97	H	52.97	73.98	21.01	PK
11650	40.15	H	40.15	53.98	13.83	AV
17475	57.56	H	57.56	68.20	10.64	PK

Note :

1. The offset was included in the Siganl Analyzer.

- The offset = Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) – Amp. Gain(A.G)

[RSDB Mode]

Bluetooth_Ch. 39_DH5_GFSK + WLAN_5 GHz_802.11a_6 Mbps_Ch.165

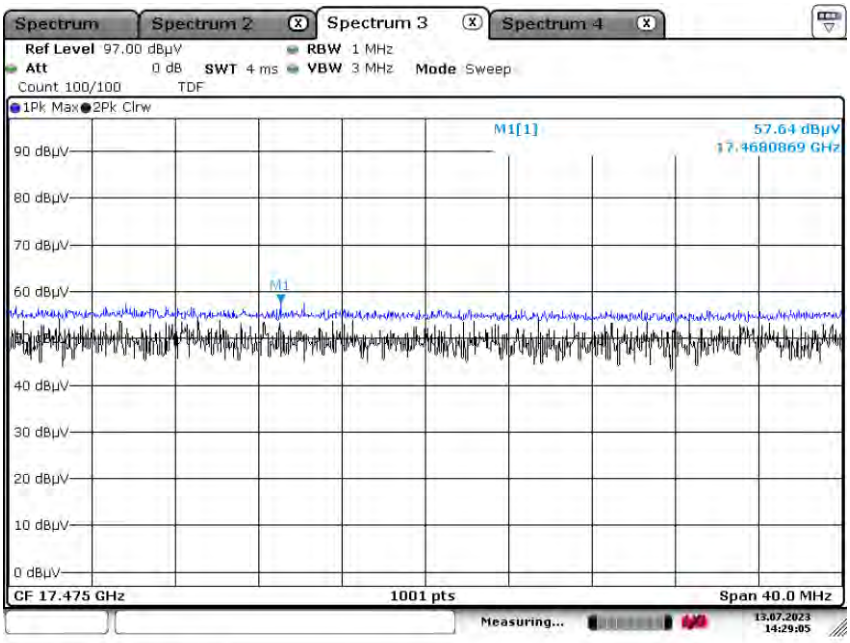
Frequency [MHz]	Measured Value [dBµV]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
11650	52.69	V	52.69	73.98	21.29	PK
11650	39.75	V	39.75	53.98	14.23	AV
17475	56.18	V	56.18	68.20	12.02	PK
11650	52.94	H	52.94	73.98	21.04	PK
11650	39.80	H	39.80	53.98	14.18	AV
17475	56.29	H	56.29	68.20	11.91	PK

Note :

1. Bluetooth RSDB Data refer to Bluetooth Test Report.
2. The offset was included in the Siganl Analyzer.
   - The offset = Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) – Amp. Gain(A.G)

▣ Test Plots

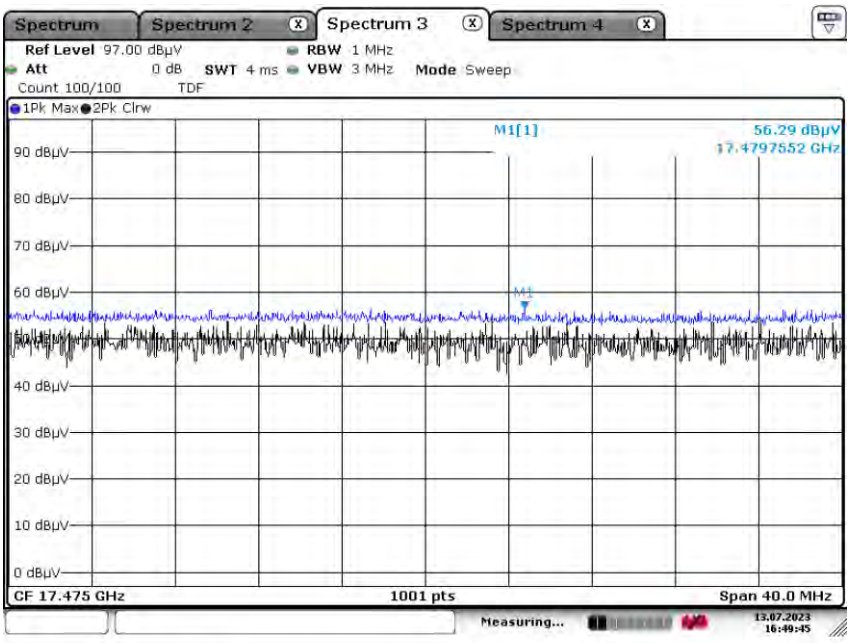
Peak Result (802.11a, Ch.165 3rd Spurious Emissions, Y-V)



[RSDB Mode]

Bluetooth_Ch. 39_DH5_GFSK + WLAN_5 GHz_802.11a_6 Mbps_Ch.165

Peak Result (3rd Spurious Emissions, Y-H)



Note:

Only the worst case plots for Radiated Spurious Emissions.

10.9 RADIATED RESTRICTED BAND EDGE

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Measured Value [dBµV]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4500-5150	62.15	H	62.15	73.98	11.83	PK
4500-5150	46.38	H	46.38	53.98	7.60	AV
4500-5150	62.31	V	62.31	73.98	11.67	PK
4500-5150	46.11	V	46.11	53.98	7.87	AV

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency [MHz]	Measured Value [dBµV]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5350-5460	65.60	H	65.60	73.98	8.38	PK
5350-5460	47.99	H	47.99	53.98	5.99	AV
5350-5460	65.08	V	65.08	73.98	8.90	PK
5350-5460	47.51	V	47.51	53.98	6.47	AV

Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Measured Value [dBµV]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5350-5460	66.82	H	66.82	73.98	7.16	PK
5350-5460	48.10	H	48.10	53.98	5.88	AV
#5460-5470	60.24	H	60.24	68.20	7.96	PK
5350-5460	65.44	V	65.44	73.98	8.54	PK
5350-5460	49.33	V	49.33	53.98	4.65	AV
#5460-5470	60.04	V	60.04	68.20	8.16	PK

Note : # Integration method Used (KDB 789033 D02 v02r01 Section 3) d) (ii)

Band :	UNII 1
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Measured Value [dBµV]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4500-5150	61.24	H	61.24	73.98	12.74	PK
4500-5150	46.33	H	46.33	53.98	7.65	AV
4500-5150	61.11	V	61.11	73.98	12.87	PK
4500-5150	46.24	V	46.24	53.98	7.74	AV

Band :	UNII 2A
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency [MHz]	Measured Value [dBµV]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5350-5460	66.07	H	66.07	73.98	7.91	PK
5350-5460	48.50	H	48.50	53.98	5.48	AV
5350-5460	66.02	V	66.02	73.98	7.96	PK
5350-5460	47.96	V	47.96	53.98	6.02	AV

Band :	UNII 2C
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Measured Value [dBµV]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5350-5460	67.08	H	67.08	73.98	6.90	PK
5350-5460	49.58	H	49.58	53.98	4.40	AV
#5460-5470	60.78	H	60.78	68.20	7.42	PK
5350-5460	66.14	V	66.14	73.98	7.84	PK
5350-5460	49.54	V	49.54	53.98	4.44	AV
#5460-5470	60.03	V	60.03	68.20	8.17	PK

Note : # Integration method Used (KDB 789033 D02 v02r01 Section 3) d) (ii)

Band :	UNII 1
Operation Mode:	802.11 ac_VHT20
Transfer MCS Index:	0
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Measured Value [dBµV]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4500-5150	63.18	H	63.18	73.98	10.80	PK
4500-5150	46.57	H	46.57	53.98	7.41	AV
4500-5150	62.18	V	62.18	73.98	11.80	PK
4500-5150	46.12	V	46.12	53.98	7.86	AV

Band :	UNII 2A
Operation Mode:	802.11 ac_VHT20
Transfer MCS Index:	0
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency [MHz]	Measured Value [dBµV]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5350-5460	66.24	H	66.24	73.98	7.74	PK
5350-5460	48.50	H	48.50	53.98	5.48	AV
5350-5460	65.17	V	65.17	73.98	8.81	PK
5350-5460	47.89	V	47.89	53.98	6.09	AV

Band :	UNII 2C
Operation Mode:	802.11 ac_VHT20
Transfer MCS Index:	0
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Measured Value [dBµV]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5350-5460	66.53	H	66.53	73.98	7.45	PK
5350-5460	49.58	H	49.58	53.98	4.40	AV
#5460-5470	60.38	H	60.38	68.20	7.82	PK
5350-5460	65.84	V	65.84	73.98	8.14	PK
5350-5460	49.59	V	49.59	53.98	4.39	AV
#5460-5470	60.39	V	60.39	68.20	7.81	PK

Note : # Integration method Used (KDB 789033 D02 v02r01 Section 3) d) (ii)

Band :	UNII 1
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5190 MHz
Channel No.	38 Ch

Frequency [MHz]	Measured Value [dBµV]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4500-5150	64.54	H	64.54	73.98	9.44	PK
4500-5150	50.15	H	50.15	53.98	3.83	AV
4500-5150	64.52	V	64.52	73.98	9.46	PK
4500-5150	49.98	V	49.98	53.98	4.00	AV

Band :	UNII 2A
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5310 MHz
Channel No.	62 Ch

Frequency [MHz]	Measured Value [dBµV]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5350-5460	65.57	H	65.57	73.98	8.41	PK
5350-5460	51.67	H	51.67	53.98	2.31	AV
5350-5460	64.88	V	64.88	73.98	9.10	PK
5350-5460	50.78	V	50.78	53.98	3.20	AV

Band :	UNII 2C
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5510 MHz
Channel No.	102 Ch

Frequency [MHz]	Measured Value [dBµV]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5350-5460	64.79	H	64.79	73.98	9.19	PK
5350-5460	50.01	H	50.01	53.98	3.97	AV
#5460-5470	66.11	H	66.11	68.20	2.09	PK
5350-5460	65.16	V	65.16	73.98	8.82	PK
5350-5460	49.16	V	49.16	53.98	4.82	AV
#5460-5470	65.51	V	65.51	68.20	2.69	PK

Note : # Integration method Used (KDB 789033 D02 v02r01 Section 3) d) (ii)

Band :	UNII 1
Operation Mode:	802.11 ac_VHT40
Transfer MCS Index:	0
Operating Frequency	5190 MHz
Channel No.	38 Ch

Frequency [MHz]	Measured Value [dBµV]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4500-5150	65.58	H	65.58	73.98	8.40	PK
4500-5150	49.75	H	49.75	53.98	4.23	AV
4500-5150	65.16	V	65.16	73.98	8.82	PK
4500-5150	49.63	V	49.63	53.98	4.35	AV

Band :	UNII 2A
Operation Mode:	802.11 ac_VHT40
Transfer MCS Index:	0
Operating Frequency	5310 MHz
Channel No.	62 Ch

Frequency [MHz]	Measured Value [dBµV]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5350-5460	65.57	H	65.57	73.98	8.41	PK
5350-5460	51.35	H	51.35	53.98	2.63	AV
5350-5460	64.42	V	64.42	73.98	9.56	PK
5350-5460	51.39	V	51.39	53.98	2.59	AV

Band :	UNII 2C
Operation Mode:	802.11 ac_VHT40
Transfer MCS Index:	0
Operating Frequency	5510 MHz
Channel No.	102 Ch

Frequency [MHz]	Measured Value [dBµV]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5350-5460	66.35	H	66.35	73.98	7.63	PK
5350-5460	49.44	H	49.44	53.98	4.54	AV
#5460-5470	66.00	H	66.00	68.20	2.20	PK
5350-5460	64.95	V	64.95	73.98	9.03	PK
5350-5460	49.43	V	49.43	53.98	4.55	AV
#5460-5470	65.77	V	65.77	68.20	2.43	PK

Note : # Integration method Used (KDB 789033 D02 v02r01 Section 3) d) (ii)

Band :	UNII 1
Operation Mode:	802.11 ac_VHT80
Transfer MCS Index:	0
Operating Frequency	5210 MHz
Channel No.	42 Ch

Frequency [MHz]	Measured Value [dBµV]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4500-5150	63.49	H	63.49	73.98	10.49	PK
4500-5150	48.13	H	48.13	53.98	5.85	AV
4500-5150	63.28	V	63.28	73.98	10.70	PK
4500-5150	48.11	V	48.11	53.98	5.87	AV

Band :	UNII 2A
Operation Mode:	802.11 ac_VHT80
Transfer MCS Index:	0
Operating Frequency	5290 MHz
Channel No.	58 Ch

Frequency [MHz]	Measured Value [dBμV]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5350-5460	63.44	H	63.44	73.98	10.54	PK
5350-5460	51.86	H	51.86	53.98	2.12	AV
5350-5460	62.35	V	62.35	73.98	11.63	PK
5350-5460	51.17	V	51.17	53.98	2.81	AV

Band :	UNII 2C
Operation Mode:	802.11 ac_VHT80
Transfer MCS Index:	0
Operating Frequency	5530 MHz
Channel No.	106 Ch

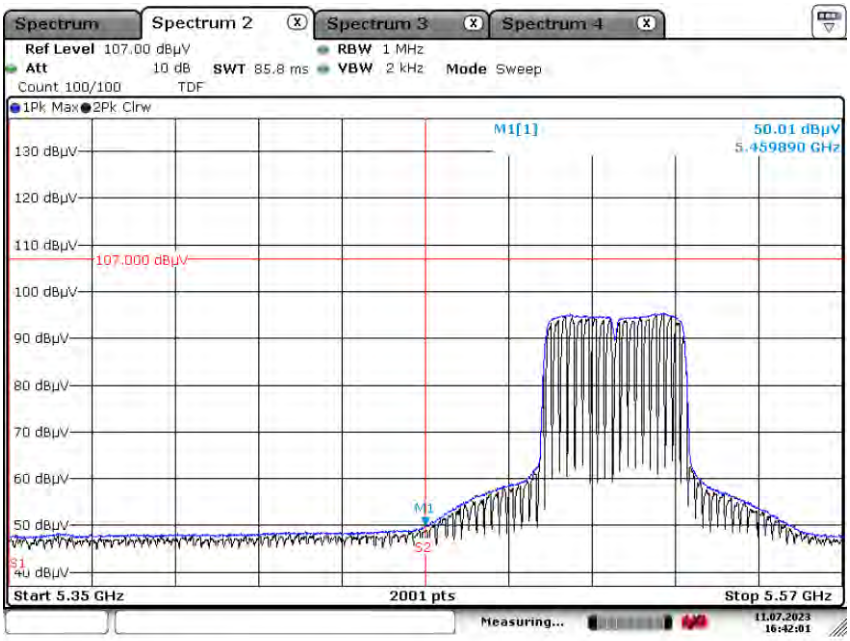
Frequency [MHz]	Measured Value [dBμV]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5350-5460	63.50	H	63.50	73.98	10.48	PK
5350-5460	51.36	H	51.36	53.98	2.62	AV
5460-5470	62.17	H	62.17	68.20	6.03	PK
5350-5460	63.42	V	63.42	73.98	10.56	PK
5350-5460	51.28	V	51.28	53.98	2.70	AV
#5460-5470	62.09	V	62.09	68.20	6.11	PK

Note :

1. # Integration method Used (KDB 789033 D02 v02r01 Section 3) d) (ii)
2. The offset was included in the Siganl Analyzer.
   - The offset = Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) – Amp. Gain(A.G)

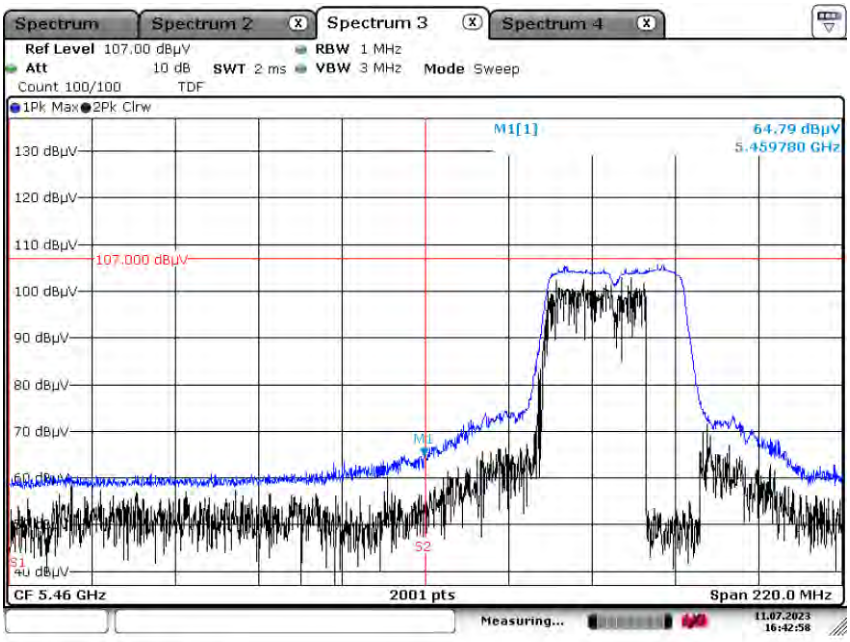
▣ Test Plots(UNII 1, 2A, 2C)

Average Result_(802.11 n_HT40, MCS0, Ch.102, Y-H)



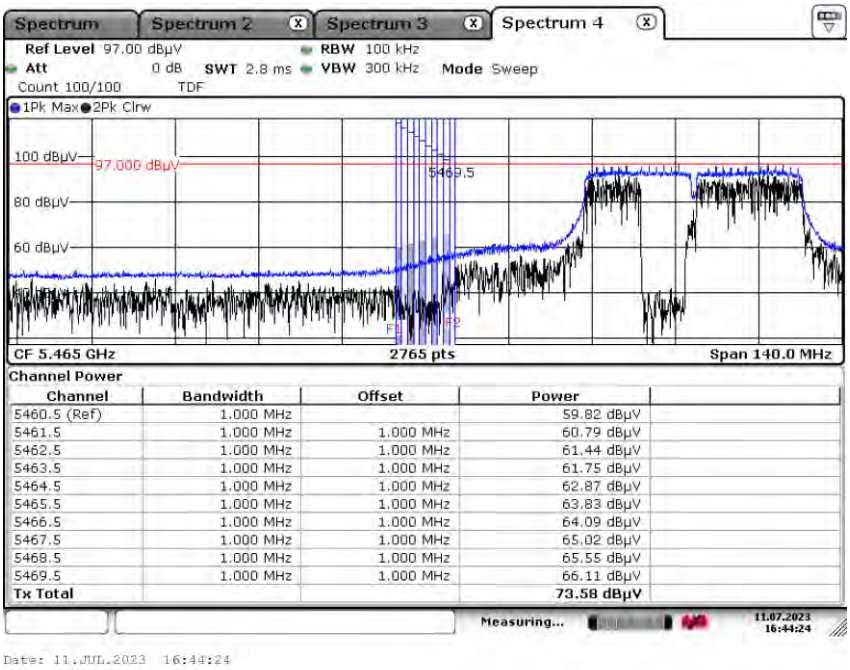
Date: 11.JUL.2023 16:42:01

Peak Result (802.11 n_HT40, MCS0, Ch.102, Y-H)



Date: 11.JUL.2023 16:42:58

Peak Result (802.11 n_HT40, MCS0, Ch.102, Y-H)

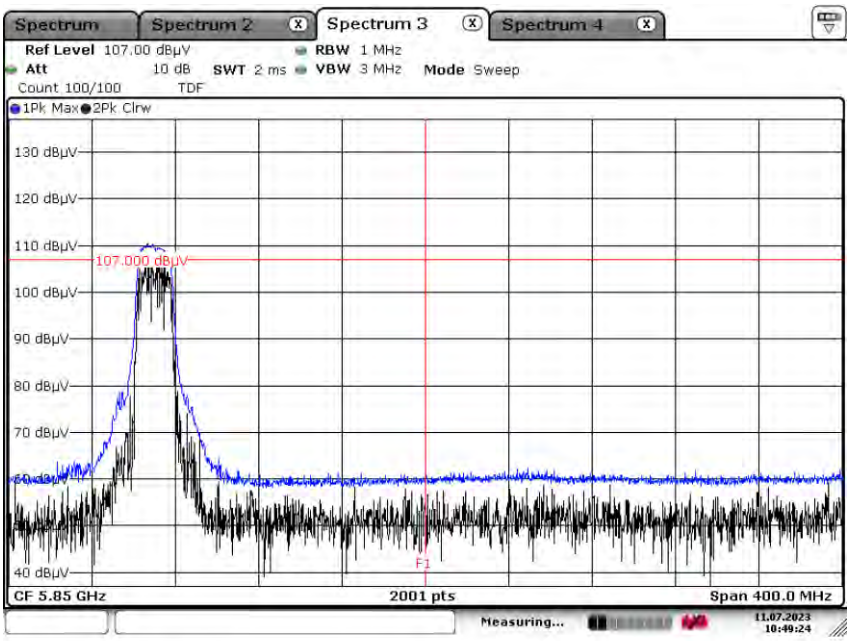


Note:

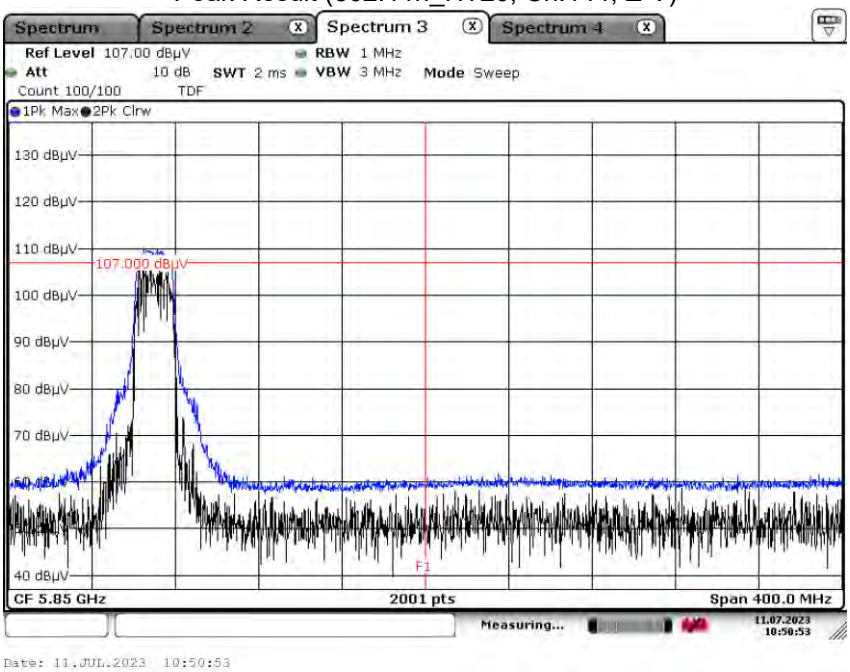
Only the worst case plots for Radiated Restricted Band Edge.

▣ Test Plots(Straddle Channel)

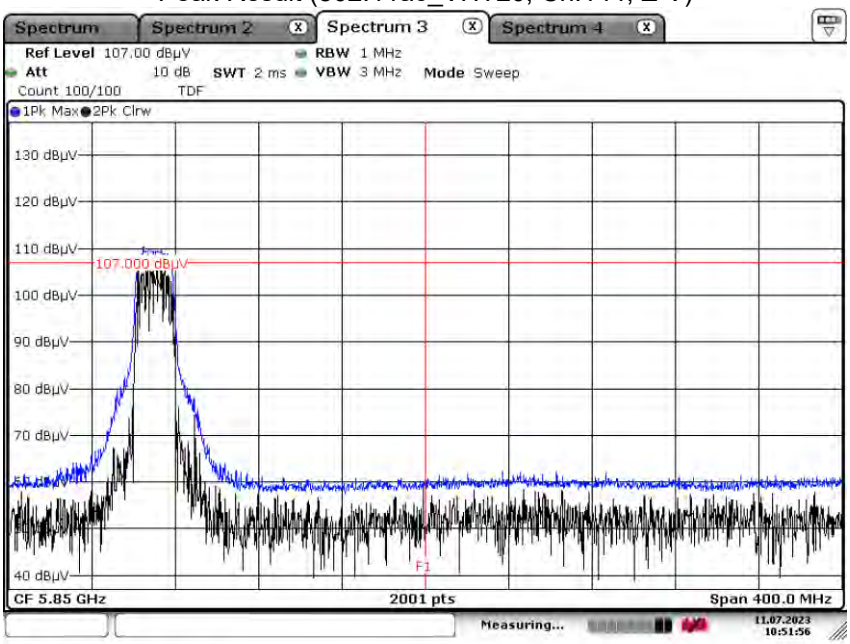
Peak Result (802.11a, Ch.144, Z-V)



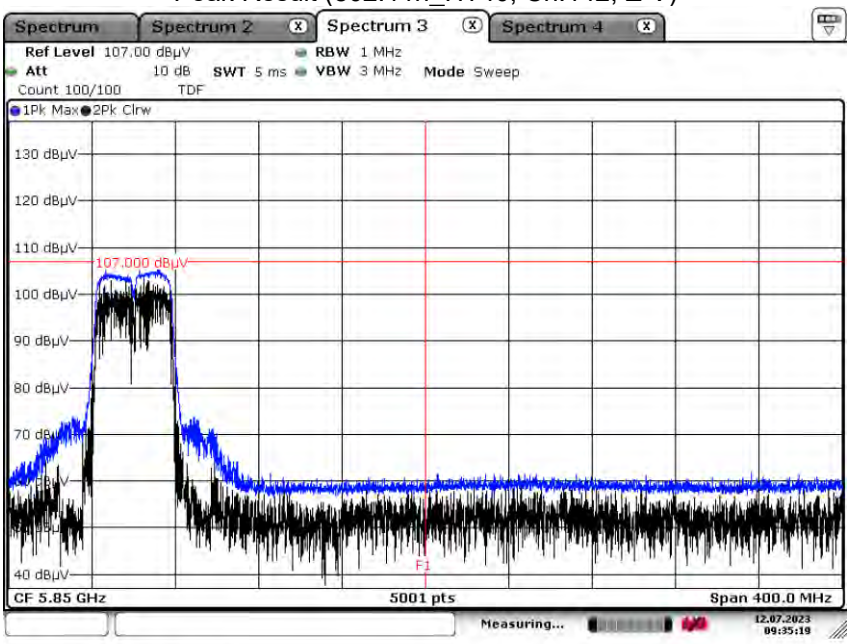
Peak Result (802.11n_HT20, Ch.144, Z-V)



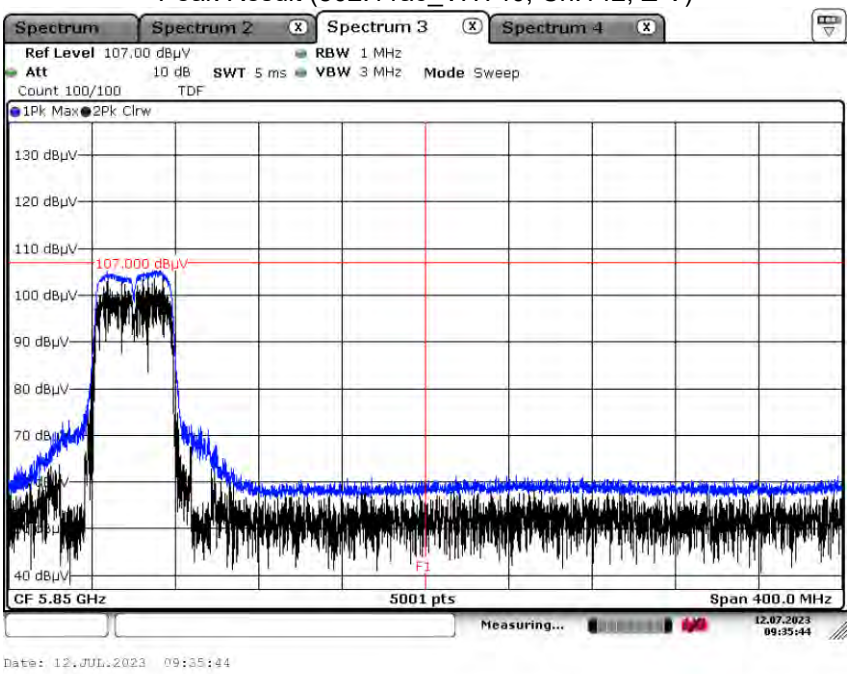
Peak Result (802.11ac_VHT20, Ch.144, Z-V)



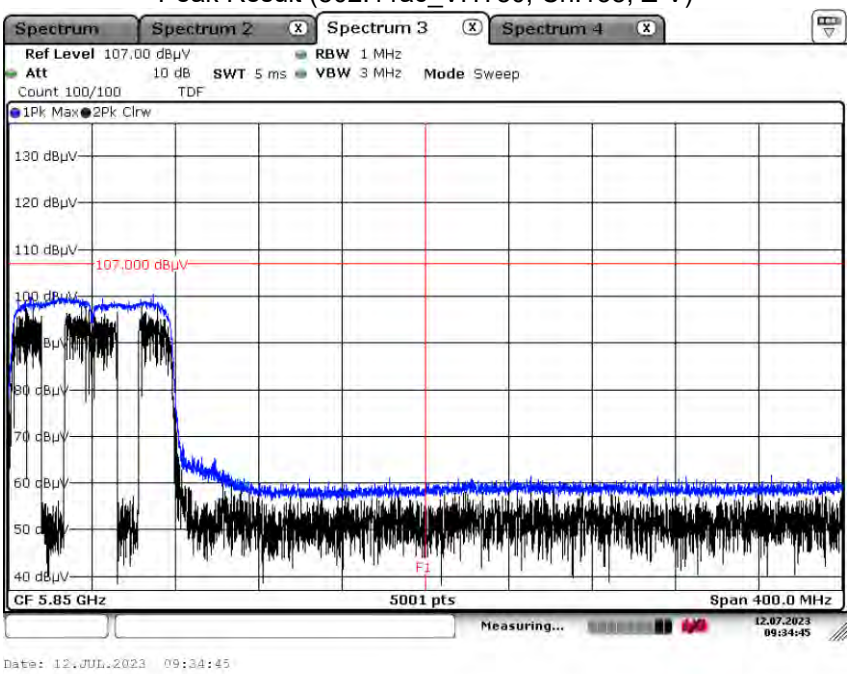
Peak Result (802.11n_HT40, Ch.142, Z-V)



Peak Result (802.11ac_VHT40, Ch.142, Z-V)



Peak Result (802.11ac_VHT80, Ch.138, Z-V)

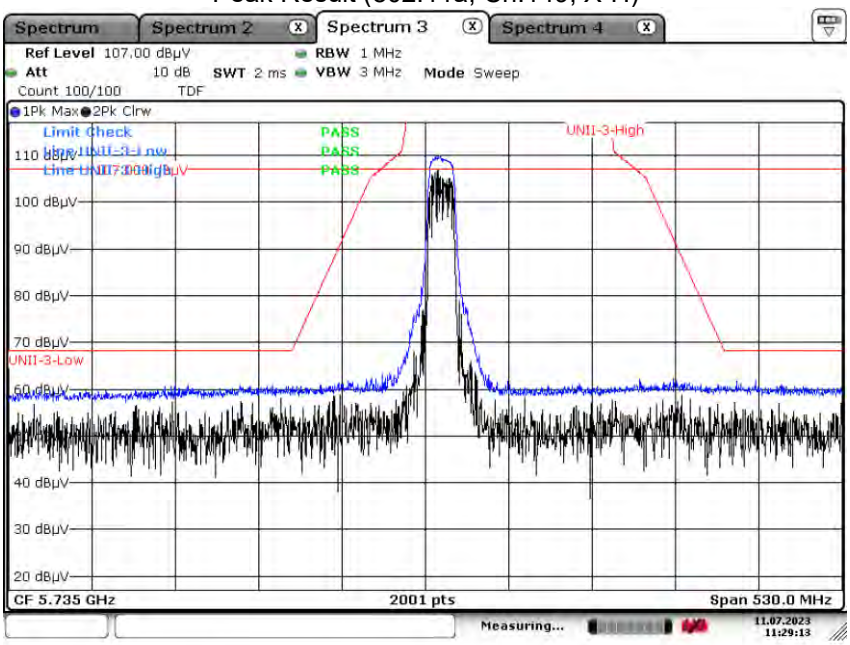


Note :

1. Only the worst case plots for Radiated Restricted Band Edge.
2. Red line : 5 850 MHz
3. Ambient Noise (Because of ambient noise, We attached only the worst plot without a data table)

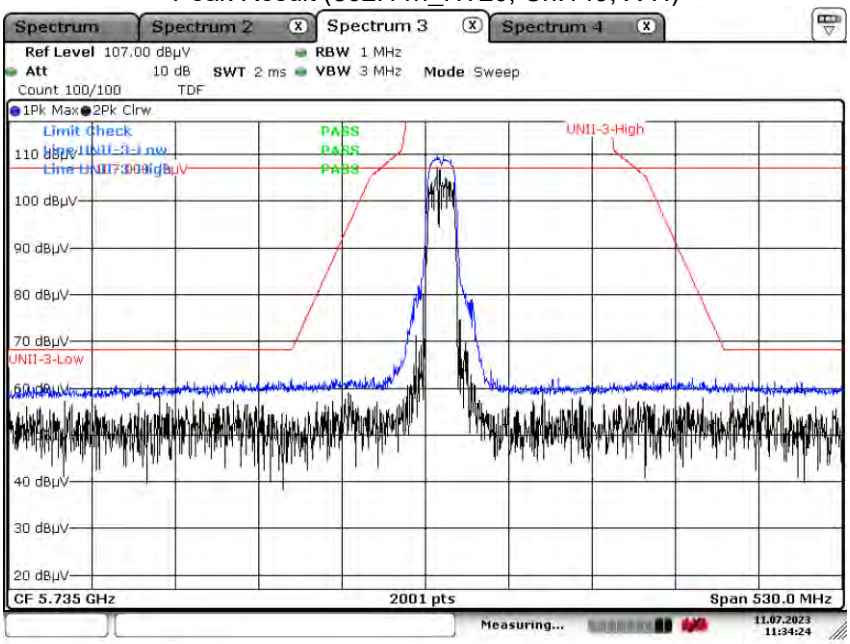
▣ Test Plots(UNII 3)

Peak Result (802.11a, Ch.149, X-H)



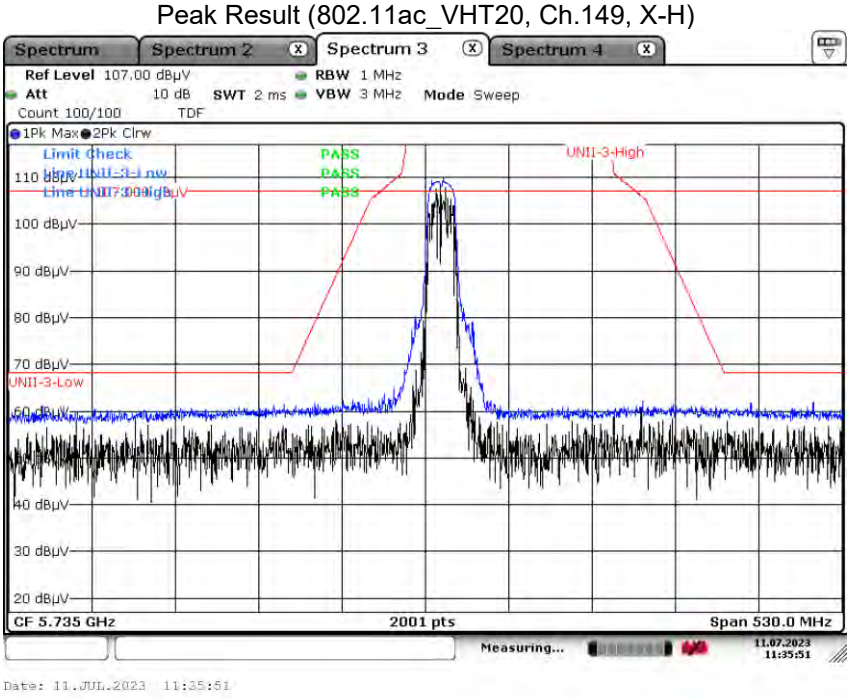
Date: 11.JUL.2023 11:29:13

Peak Result (802.11n_HT20, Ch.149, X-H)

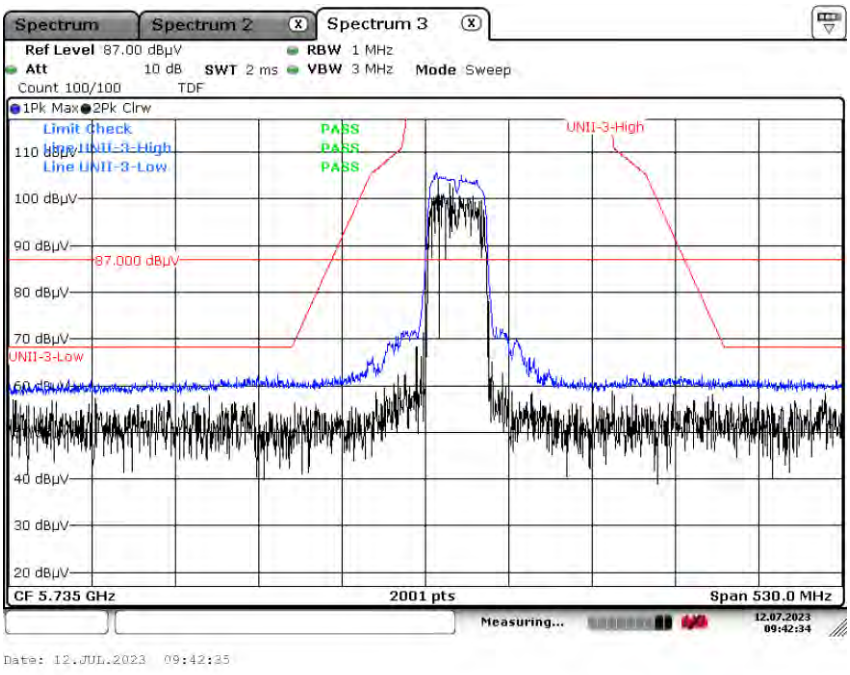


Date: 11.JUL.2023 11:34:24

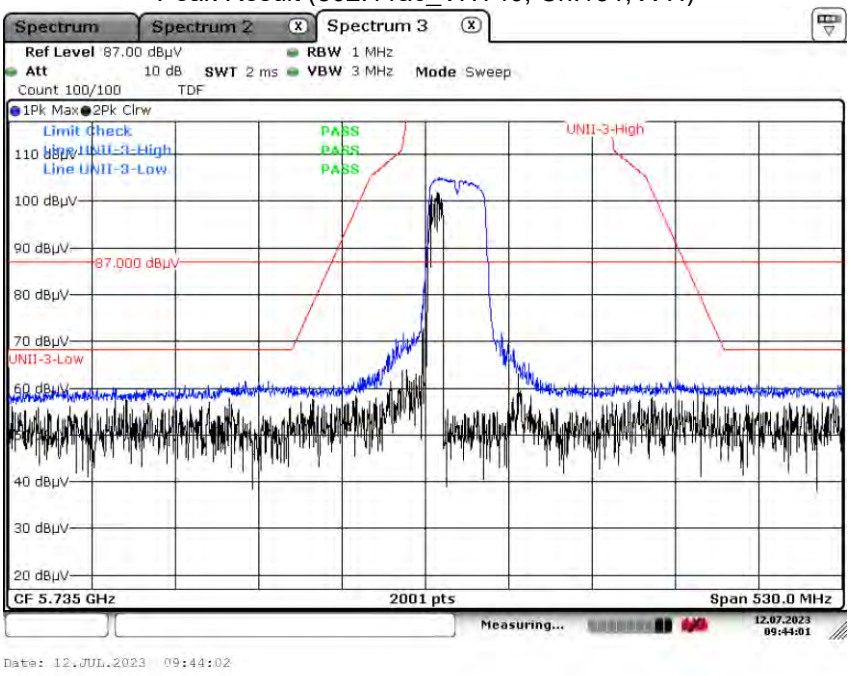
Peak Result (802.11ac_VHT20, Ch.149, X-H)



Peak Result (802.11n_HT40, Ch.151, X-H)

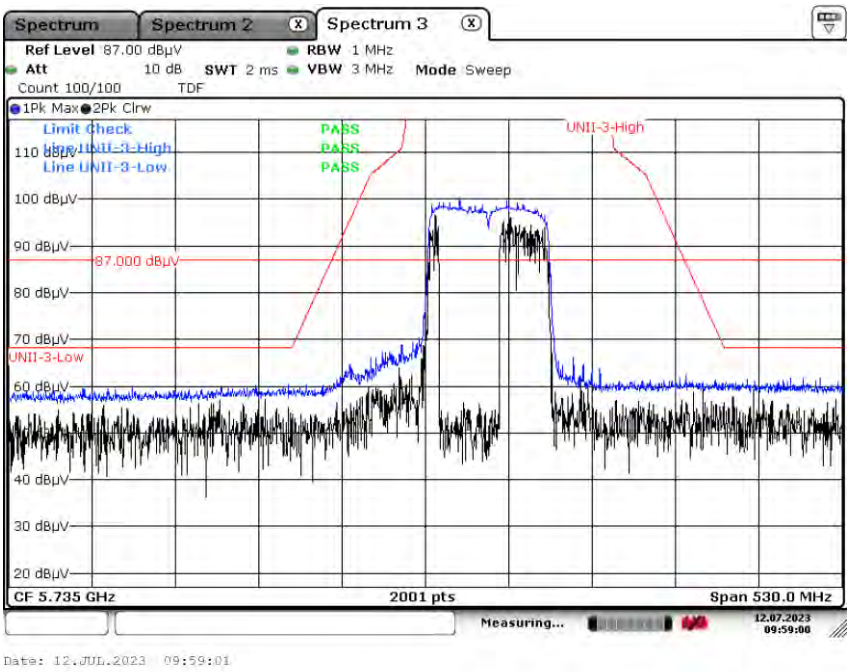


Peak Result (802.11ac_VHT40, Ch.151, X-H)



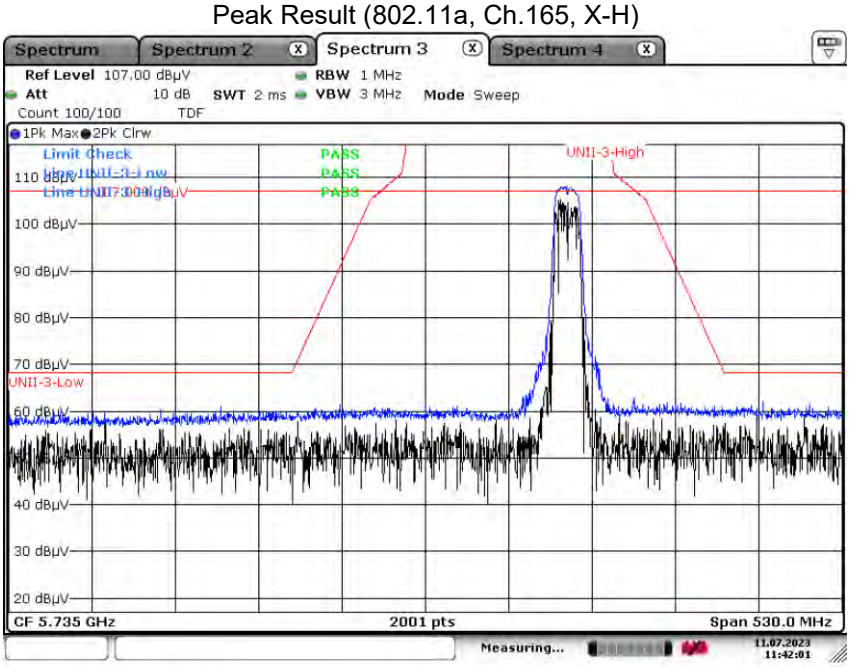
Date: 12.JUL.2023 09:44:02

Peak Result (802.11ac_VHT80, Ch.155, X-H)



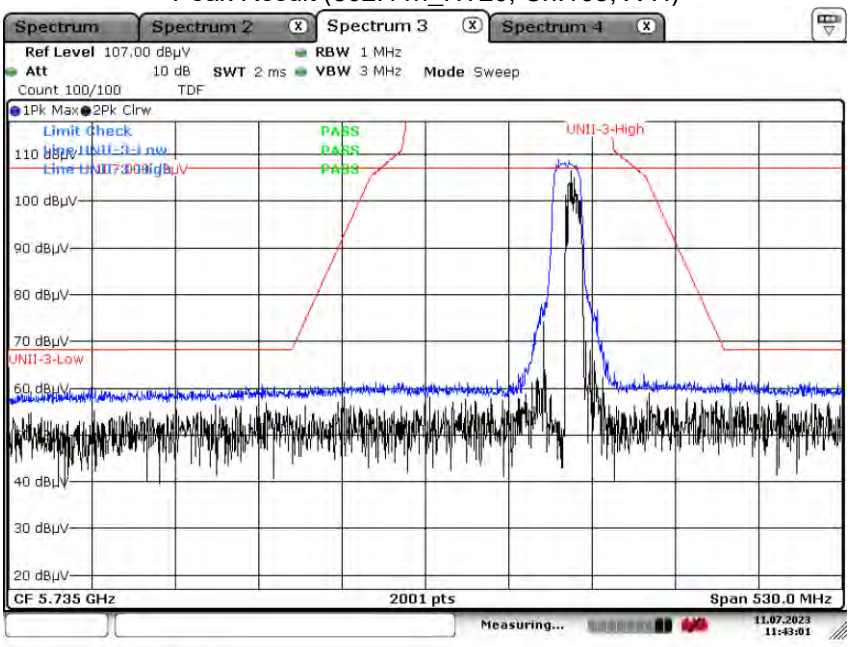
Date: 12.JUL.2023 09:59:01

Peak Result (802.11a, Ch.165, X-H)



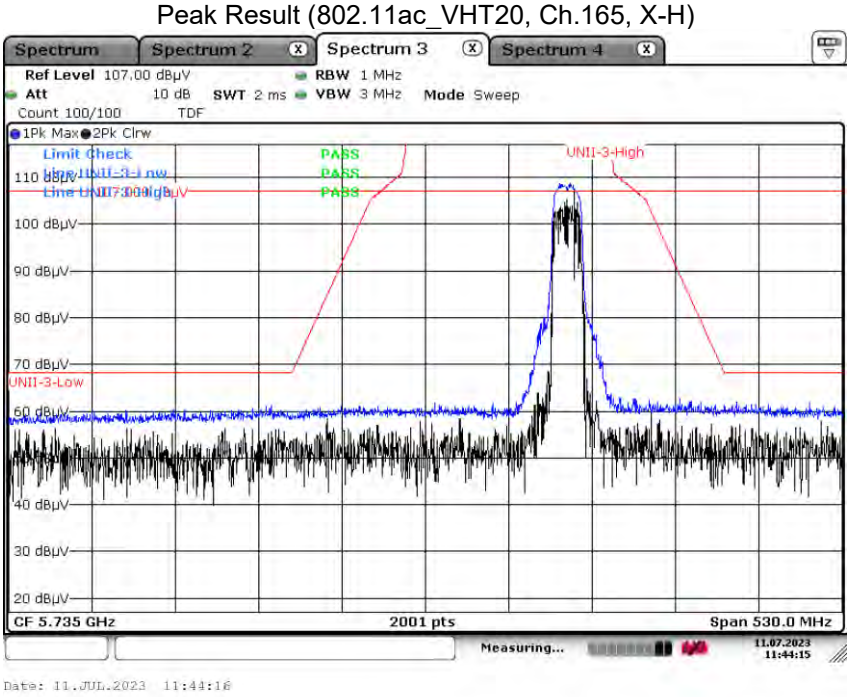
Date: 11.JUL.2023 11:42:01

Peak Result (802.11n_HT20, Ch.165, X-H)



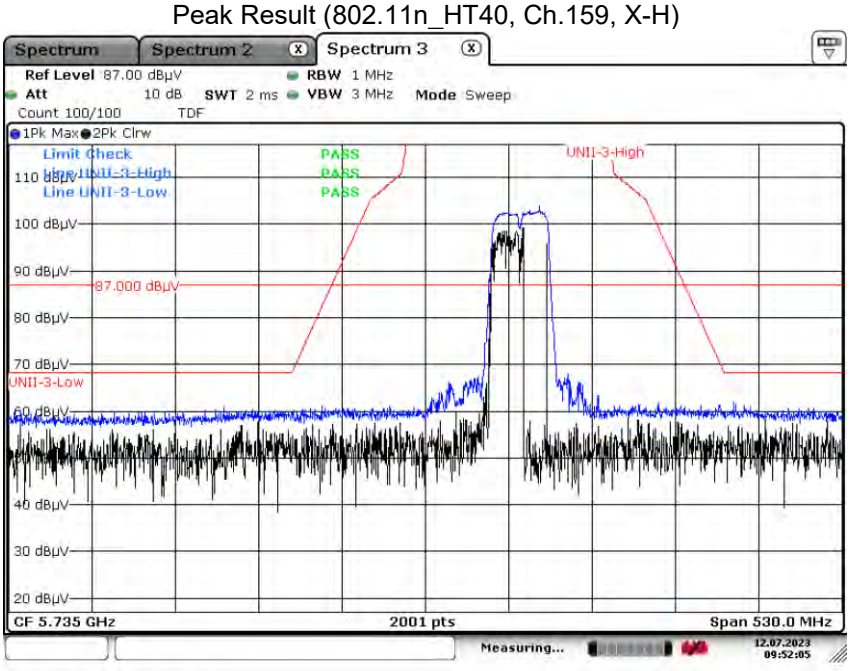
Date: 11.JUL.2023 11:43:02

Peak Result (802.11ac_VHT20, Ch.165, X-H)



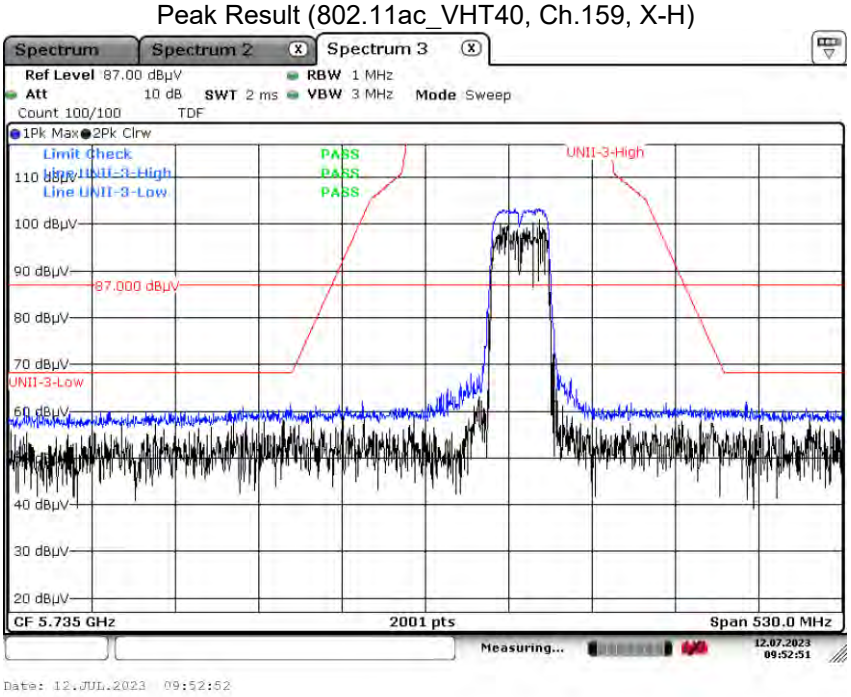
Date: 11.JUL.2023 11:44:16

Peak Result (802.11n_HT40, Ch.159, X-H)

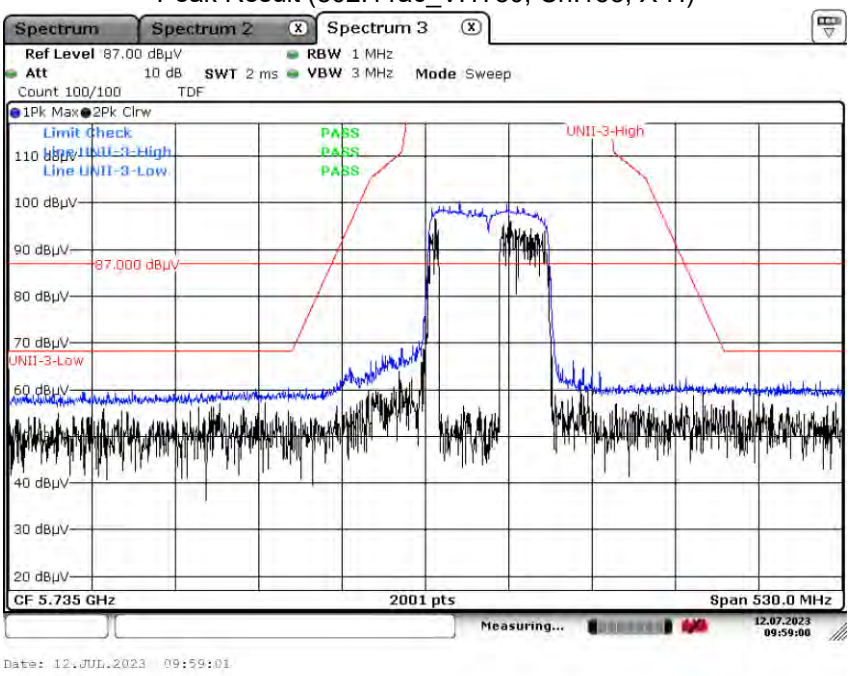


Date: 12.JUL.2023 09:52:06

Peak Result (802.11ac_VHT40, Ch.159, X-H)



Peak Result (802.11ac_VHT80, Ch.155, X-H)



Note :

1. Only the worst case plots for U-NII-3 Out of Band e.i.r.p Emission.
2. U-NII-3 Low & High Band Edge RedLine is Final Test Limit about factor value compensation.

10.10 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions

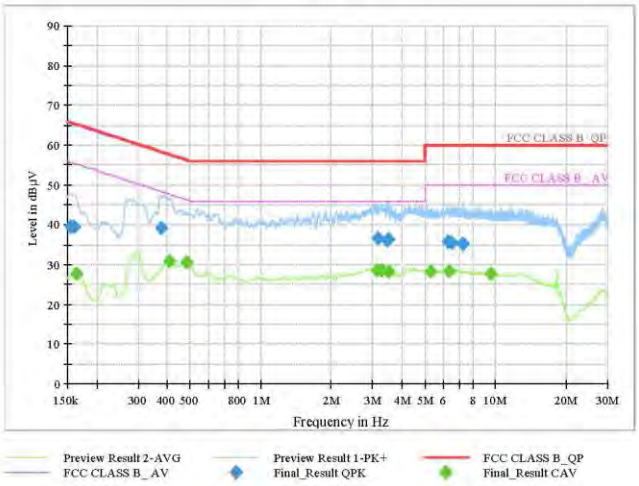
Test 1 / 1

Test Report

Common Information

EUT : SM-A256U
Operating Conditions : 5G WLAN Mode
Comment :

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	39.59	65.75	26.16	1000.0	9.000	N	OFF	9.6
0.1613	39.43	65.40	25.97	1000.0	9.000	N	OFF	9.6
0.3773	39.32	58.34	19.02	1000.0	9.000	L1	OFF	9.7
3.1573	36.58	56.00	19.42	1000.0	9.000	L1	OFF	9.8
3.4790	35.92	56.00	20.08	1000.0	9.000	L1	OFF	9.8
3.4880	36.39	56.00	19.61	1000.0	9.000	L1	OFF	9.8
6.2915	35.78	60.00	24.22	1000.0	9.000	L1	OFF	9.9
6.5075	35.61	60.00	24.39	1000.0	9.000	L1	OFF	9.9
7.3108	35.20	60.00	24.80	1000.0	9.000	L1	OFF	9.9

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1635	27.58	55.28	27.70	1000.0	9.000	N	OFF	9.6
0.4088	30.80	47.67	16.88	1000.0	9.000	L1	OFF	9.7
0.4853	30.54	46.25	15.71	1000.0	9.000	L1	OFF	9.7
3.1348	28.58	46.00	17.42	1000.0	9.000	L1	OFF	9.8
3.2765	28.61	46.00	17.39	1000.0	9.000	L1	OFF	9.8
3.5105	28.31	46.00	17.69	1000.0	9.000	L1	OFF	9.8
5.3353	28.21	50.00	21.79	1000.0	9.000	L1	OFF	9.9
6.3793	28.38	50.00	21.62	1000.0	9.000	L1	OFF	9.9
9.5090	27.77	50.00	22.23	1000.0	9.000	L1	OFF	10.0

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11. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	08/02/2024	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	05/26/2024	Annual
Temperature Chamber	SU-642	ESPEC	93008124	02/22/2024	Annual
Signal Analyzer	N9030A	Keysight	MY55410508	09/04/2024	Annual
Power Meter	N1911A	Agilent	MY45100523	03/06/2024	Annual
Power Sensor	N1921A	Agilent	MY57820067	03/06/2024	Annual
Directional Coupler	87300B	Agilent	3116A03621	11/02/2023	Annual
Power Splitter	11667B	Hewlett Packard	10545	02/06/2024	Annual
DC Power Supply	E3632A	Agilent	KR75305528	01/03/2024	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C-010	Agilent	08285	06/02/2024	Annual
Attenuator(20 dB)	18N-20dB	Rohde & Schwarz	8	03/08/2024	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	HCT CO., LTD.	N/A	N/A	N/A
Bluetooth Tester	CBT	Rohde & Schwarz	100808	02/16/2024	Annual

Note:

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.

Radiated Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	S3AM	08/03/2025	Biennial
Controller	EM2090	Emco	060520	N/A	N/A
Turn Table	N/A	Ets	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	08/16/2024	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1191	11/18/2023	Biennial
Horn Antenna(15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170124	03/28/2025	Biennial
Amp & Filter Bank Switch Controller	FBSM-01A	TNM system	0	N/A	N/A
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/05/2024	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	06/12/2024	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	06/12/2024	Annual
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments	1	02/09/2024	Annual
RF Switching System	FBSR-03A (3G HPF+LNA)	T&M SYSTEM	S3L1	12/05/2023	Annual
RF Switching System	FBSR-03A (10dB ATT+LNA)	T&M SYSTEM	S3L2	12/05/2023	Annual
RF Switching System	FBSR-03A (7G HPF+LNA)	T&M SYSTEM	S3L3	12/05/2023	Annual
RF Switching System	FBSR-03A (3dB ATT+LNA)	T&M SYSTEM	S3L4	12/05/2023	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/01/2023	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/02/2024	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	03/28/2024	Annual
Spectrum Analyzer	FSVA40 (10 Hz ~ 40 GHz)	Rohde & Schwarz	101502	03/17/2024	Annual

Note:

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.
3. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5(Version : 2017).

12. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2309-FC003-P