

TEST REPORT

FCC UNII Test for SM-F761U
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2504-FC047

DATE OF ISSUE
April 29, 2025

Tested by
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TEST REPORT

REPORT NO.

HCT-RF-2504-FC047

DATE OF ISSUE

April 29, 2025

Additional Model

SM-F761U1

Applicant

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

Product Name

Mobile Phone

Model Name

SM-F761U

FCC ID

A3LSMF761U

Date of Test

February 27, 2025 ~ April 29, 2025

FCC Classification

Unlicensed National Information Infrastructure(NII)

Test Standard Used

FCC Rule Part(s): Part 15.407

Test Results

PASS

Location of Test

☒ Permanent Testing Lab ☐ On Site Testing Lab

(Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	April 29, 2025	Initial Release

Notice

Content

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.

The laboratory is not accredited for the test results marked *.

Information provided by the applicant is marked **.

Test results provided by external providers are marked ***.

The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated.

The test results have only been applied with the test methods required by the standard(s).

When confirmation of authenticity of this test report is required, please contact www.hct.co.kr

The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) / A2LA (American Association for Laboratory Accreditation) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).

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1. GENERAL INFORMATION

EUT DESCRIPTION

Model	SM-F761U	
Additional Model	SM-F761U1	
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 160 MHz BW : 5250
	U-NII-2A	20 MHz BW : 5260 - 5320 40 MHz BW : 5270 - 5310 80 MHz BW : 5290 160 MHz BW : 5250
	U-NII-2C	20 MHz BW : 5500 - 5720 40 MHz BW : 5510 - 5710 80 MHz BW : 5530 - 5690 160 MHz BW : 5570
	U-NII-3	20 MHz BW : 5745 - 5825 40 MHz BW : 5755 - 5795 80 MHz BW : 5775 160 MHz BW : 5815
	U-NII-4	20 MHz BW : 5845 - 5885 40 MHz BW : 5835 - 5875 80 MHz BW : 5855 160 MHz BW : 5815
Straddle channel	Supported	
TDWR Band	Supported	
Dynamic Frequency Selection	Slave without radar detection	
Antenna Specification	Type: Metal	
Serial number	Conducted : R3CY20BS17M Radiated : R3CY20BS87E	

ANTENNA CONFIGURATIONS

1. Antenna configuration

Configurations	SISO		MIMO	
	Ant.1	Ant.2	CDD	SDM
802.11a	O	O	O	X
802.11n	O	O	O	O
802.11ac	O	O	O	O

Note:

- (1) O = Support, X = Not Support
- (2) SISO = Single Input Single Output
- (3) SDM = Spatial Diversity Multiplexing
- (4) CDD = Cyclic Delay Diversity

2.This device supports simultaneous transmission operation, which allows for two channels to operate independent of one another in the 2.4 GHz and 5 GHz or 6GHz Bands simultaneously on each antenna.

Simultaneous transmission Scenario	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5 GHz WiFi Ant.1	5 GHz WiFi Ant.2	6 GHz WiFi Ant.1	6 GHz WiFi Ant.2	BT Ant.1	BT Ant.2	Test Case
Dual Bluetooth + 5 GHz WiFi MIMO			on	on			on	on	Scenario1
Dual Bluetooth + 6 GHz WiFi MIMO					on	on	on	on	
2.4 GHz WiFi MIMO + 5 GHz WiFi MIMO	on	on	on	on					Scenario2
2.4 GHz WiFi MIMO + 6 GHz WiFi MIMO	on	on			on	on			
Bluetooth ANT.1 + 2.4 GHz WiFi ANT.2 + 5 GHz WiFi MIMO		on	on	on			on		Scenario3
Bluetooth ANT.1 + 2.4 GHz WiFi ANT.2 + 6 GHz WiFi MIMO		on			on	on	on		

3. Directional Gain Calculation

According to KDB 662911 D01 Multiple Transmitter Output v02r01 F) 2) e) (iii), f) ii)

$$\text{Directional Gain(CDD)} = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left(\sum_{k=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right]$$

$$\text{Directional gain(SDM)} = G_{\max} + 10 \cdot \text{LOG}(N_{ANT}/N_{SS})$$

Band	Ant Gain (dBi)		N _{ANT} / N _{SS}	Directional Gain (dBi)	
	ANT1	ANT2		CDD	SDM
UNII 1	-4.60	-6.32	2 / 2	-2.41	-4.60
UNII 2A	-5.10	-6.19		-2.62	-5.10
UNII 2C	-5.43	-6.37		-2.88	-5.43
UNII 3	-6.22	-7.11		-3.64	-6.22
UNII 4	-5.58	-7.08		-3.29	-5.58

Note

According to Ansi C63.10-2013 section 14.4.3, the directional gain is calculated using the formula, where GN is the gain of the nth antenna and NANT is the total number of antennas used.

$$\text{Directional gain(CDD)} = 10 \cdot \log \left(\left(10^{(\text{ANT1 Gain}/20)} + 10^{(\text{ANT2 Gain}/20)} \right)^2 / 2 \right) \text{ dBi}$$

$$\text{Directional gain(SDM)} = G_{\max} + 10 \cdot \text{LOG}(N_{ANT}/N_{SS})$$

Sample Calculation (Conducted Power, MIMO):

Ex) Ant 1 : 11.58 dBm Ant 2 : 12.08 dBm

$$\text{Ant1} + \text{Ant 2} = \text{MIMO}$$

$$(11.58 \text{ dBm} + 12.08 \text{ dBm}) = (14.387 \text{ mW} + 16.143 \text{ mW}) = 30.53 \text{ mW} = 14.88 \text{ dBm}$$

Sample Calculation (E.I.R.P & E.I.R.P Spectral Density, MIMO):

Ex) ANT1 : 15.35 dBm , ANT2 : 15.12 dBm, Directional Gain : 3 dBi

$$\text{Conducted Power} = (15.35 \text{ dBm} + 15.12 \text{ dBm}) = (34.276 \text{ mW} + 32.508 \text{ mW}) = 66.784 \text{ mW} = 18.25 \text{ dBm}$$

$$\text{E.I.R.P} = 18.25 \text{ dBm} + 3 \text{ dBi} = 21.25 \text{ dBm}$$

2. MAXIMUM OUTPUT POWER

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

Band	Mode	MIMO_CDD(Ant.1+ Ant.2)					
		Ant.1 Power		Ant.2 Power		Ant.1 + Ant.2 Power	
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)
UNII1	802.11a	15.26	0.034	15.35	0.034	18.31	0.068
	802.11n (HT20)	15.27	0.034	15.40	0.035	18.34	0.068
	802.11n (HT40)	14.23	0.026	14.87	0.031	17.57	0.057
	802.11ac (VHT20)	15.34	0.034	15.35	0.034	18.35	0.068
	802.11ac (VHT40)	14.27	0.027	14.67	0.029	17.49	0.056
	802.11ac (VHT80)	12.36	0.017	13.03	0.020	15.72	0.037
UNII2A	802.11a	15.24	0.033	15.48	0.035	18.37	0.069
	802.11n (HT20)	15.56	0.036	15.63	0.037	18.61	0.073
	802.11n (HT40)	14.32	0.027	14.54	0.028	17.44	0.055
	802.11ac (VHT20)	15.28	0.034	15.57	0.036	18.44	0.070
	802.11ac (VHT40)	14.31	0.027	14.40	0.028	17.36	0.055
	802.11ac (VHT80)	12.66	0.018	13.17	0.021	15.93	0.039
UNII2C	802.11a	15.04	0.032	15.16	0.033	18.11	0.065
	802.11n (HT20)	15.49	0.035	15.37	0.034	18.44	0.070
	802.11n (HT40)	14.35	0.027	14.17	0.026	17.27	0.053
	802.11ac (VHT20)	15.14	0.033	15.24	0.033	18.20	0.066
	802.11ac (VHT40)	14.30	0.027	14.12	0.026	17.22	0.053
	802.11ac (VHT80)	12.96	0.020	12.89	0.019	15.93	0.039
UNII3	802.11a	14.94	0.031	15.25	0.034	18.11	0.065
	802.11n (HT20)	15.13	0.033	15.51	0.036	18.34	0.068
	802.11n (HT40)	14.21	0.026	14.49	0.028	17.37	0.055
	802.11ac (VHT20)	15.15	0.033	15.40	0.035	18.29	0.067
	802.11ac (VHT40)	14.18	0.026	14.48	0.028	17.34	0.054
	802.11ac (VHT80)	12.76	0.019	13.00	0.020	15.89	0.039
UNII4 (Conducted For inf.)	802.11a	15.41	0.035	15.53	0.036	18.48	0.071
	802.11n (HT20)	15.17	0.033	15.56	0.036	18.38	0.069
	802.11n (HT40)	14.16	0.026	14.67	0.029	17.43	0.055
	802.11ac (VHT20)	15.15	0.033	15.45	0.035	18.31	0.068
	802.11ac (VHT40)	14.16	0.026	14.70	0.030	17.45	0.056
	802.11ac (VHT80)	12.89	0.019	13.25	0.021	16.09	0.041
UNII1-2A	802.11ac (VHT160)	11.66	0.015	12.02	0.016	14.86	0.031
UNII2C	802.11ac (VHT160)	11.49	0.014	12.22	0.017	14.88	0.031
UNII3&4	802.11ac (VHT160)	12.15	0.016	12.52	0.018	15.35	0.034

Band	Mode	MIMO_CDD(Ant.1+ Ant.2) (EIRP)											
		Ant.1 Power				Ant.2 Power				(Ant.1 + Ant.2) Power			
		(dBm)	ANT Gain(dBi)	EIRP (dBm)	(W)	(dBm)	ANT Gain(dBi)	EIRP (dBm)	(W)	(dBm)	ANT Gain(dBi)	EIRP (dBm)	(W)
UNII4 (EIRP)	802.11a	15.41	-5.58	9.83	0.010	15.53	-7.08	8.45	0.007	18.48	-3.29	15.19	0.033
	802.11n (HT20)	15.17	-5.58	9.59	0.009	15.56	-7.08	8.48	0.007	18.38	-3.29	15.09	0.032
	802.11n (HT40)	14.16	-5.58	8.58	0.007	14.67	-7.08	7.59	0.006	17.43	-3.29	14.14	0.026
	802.11ac (VHT20)	15.15	-5.58	9.57	0.009	15.45	-7.08	8.37	0.007	18.31	-3.29	15.02	0.032
	802.11ac (VHT40)	14.16	-5.58	8.58	0.007	14.70	-7.08	7.62	0.006	17.45	-3.29	14.16	0.026
	802.11ac (VHT80)	12.89	-5.58	7.31	0.005	13.25	-7.08	6.17	0.004	16.09	-3.29	12.80	0.019
	802.11ac (VHT160)	12.15	-5.58	6.57	0.005	12.52	-7.08	5.44	0.003	15.35	-3.29	12.06	0.016

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. Additionally, for U-NII-4 band, use the following measurement procedure KDB 291074 D02 EMC Measurement v01

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 Measurement Type or 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 11, 2024 (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 Measurement Typeors 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.

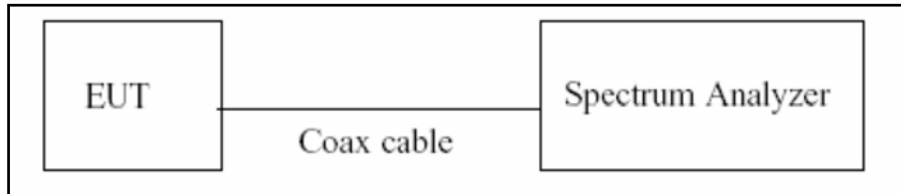
Parameter	Expanded Uncertainty ($\pm$ kHz)
X dB, 99% Bandwidth	95 (Confidence level about 95 %, $k=2$)
Frequency stability	28 (Confidence level about 95 %, $k=2$)

Parameter	Expanded Uncertainty ($\pm$ dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.54 (Confidence level about 95 %, $k=2$)
Conducted Output Power(Power Meter)	0.54 (Confidence level about 95 %, $k=2$)
Conducted Output Power(Signal Analyzer)	0.68 (Confidence level about 95 %, $k=2$)
Power Spectral Density	1.03 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.36 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.68 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.75 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.82 (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.

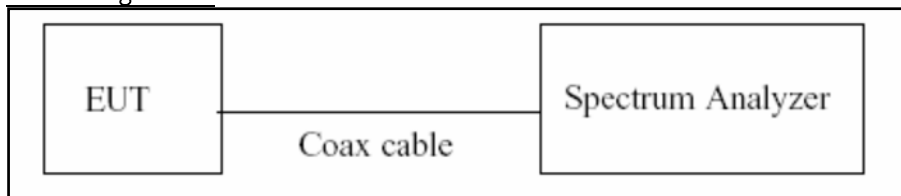
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz ($\geq$ RBW)
3. SPAN = 0 Hz
4. Measurement Type or = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = $T_{\text{on}} / T_{\text{total}}$ and Duty Cycle Factor = $10\log(1/\text{Duty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

8.2. 6 dB Bandwidth & 26 dB Bandwidth

Limit

Within the 5.725-5.85 GHz(NII-3) & 5.85-5.925 GHz(NII-4) band, 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 $\geq 3 \times$ 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 level 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.

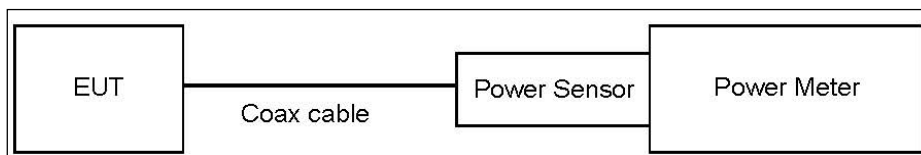
8.3. Output Power Measurement

Limit

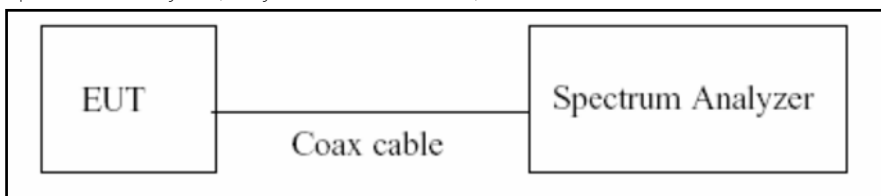
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30 dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30 dBm)
UNII 4	EIRP 30 dBm

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 $\geq$ 3 MHz.
5. Number of points in sweep $\geq 2 \times \text{span/RBW}$.
6. Sweep time = auto.
7. Measurement Type or = 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 $10\log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Sample Calculation

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. Actual value of loss for the attenuator and cable combination is below table.

Band	Ant.1 Loss(dB)	Ant.2 Loss(dB)
UNII 1	11.30	10.80
UNII 2A	11.30	10.80
UNII 2C	11.30	10.80
UNII 3&4	11.30	10.80

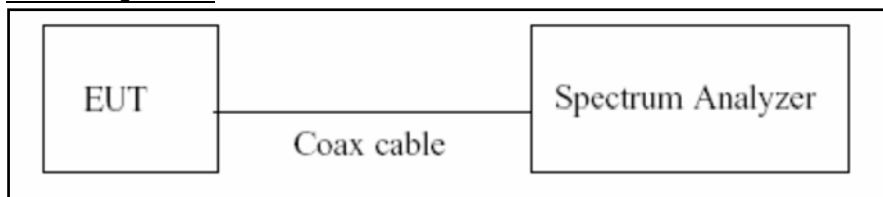
(Actual value of loss for the attenuator and cable combination)

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
UNII 4	EIRP 14 dBm/MHz

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)
→ For portion within the NII-3 be used RBW 510kHz
3. VBW $\geq$ 3 MHz
4. Number of points in sweep $\geq$ 2 x span/RBW.
5. Sweep time = auto.
6. Measurement Typeor = RMS(i.e., power averaging), if available. Otherwise, use sample Measurement Typeor 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. Actual value of loss for the attenuator and cable combination is below table.

Band	Ant.1 Loss(dB)	Ant.2 Loss(dB)
UNII 1	11.30	10.80
UNII 2A	11.30	10.80
UNII 2C	11.30	10.80
UNII 3&4	11.30	10.80

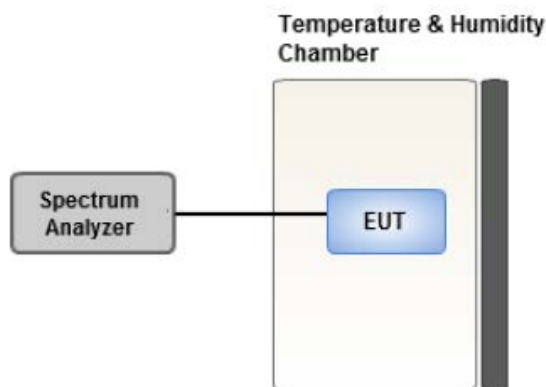
(Actual value of loss for the attenuator and cable combination)

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 °C and 50 °C.
2. The temperature was incremented by 10 °C intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.
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 μ H/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dB μ V)	
	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. Measurement Typeors : Quasi Peak and Average Measurement Typeor.

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. UNII 4: [Low Channel O.O.B.E] measured with a Peak detector
For a client device or indoor access point or subordinate device, all emissions below 5.725 GHz shall not exceed an e.i.r.p. of -27 dBm/MHz at 5.65 GHz increasing linearly to 10 dBm/MHz at 5.7 GHz, and from 5.7 GHz increasing linearly to a level of 15.6 dBm/MHz at 5.72 GHz, and from 5.72 GHz increasing linearly to a level of 27 dBm/MHz at 5.725 GHz.

[High Channel O.O.B.E] measured with an RMS detector

For a client device, all emissions at or above 5.895 GHz shall not exceed an e.i.r.p. of -5 dBm/MHz and shall decrease linearly to an e.i.r.p. of -27 dBm/MHz at or above 5.925 GHz.

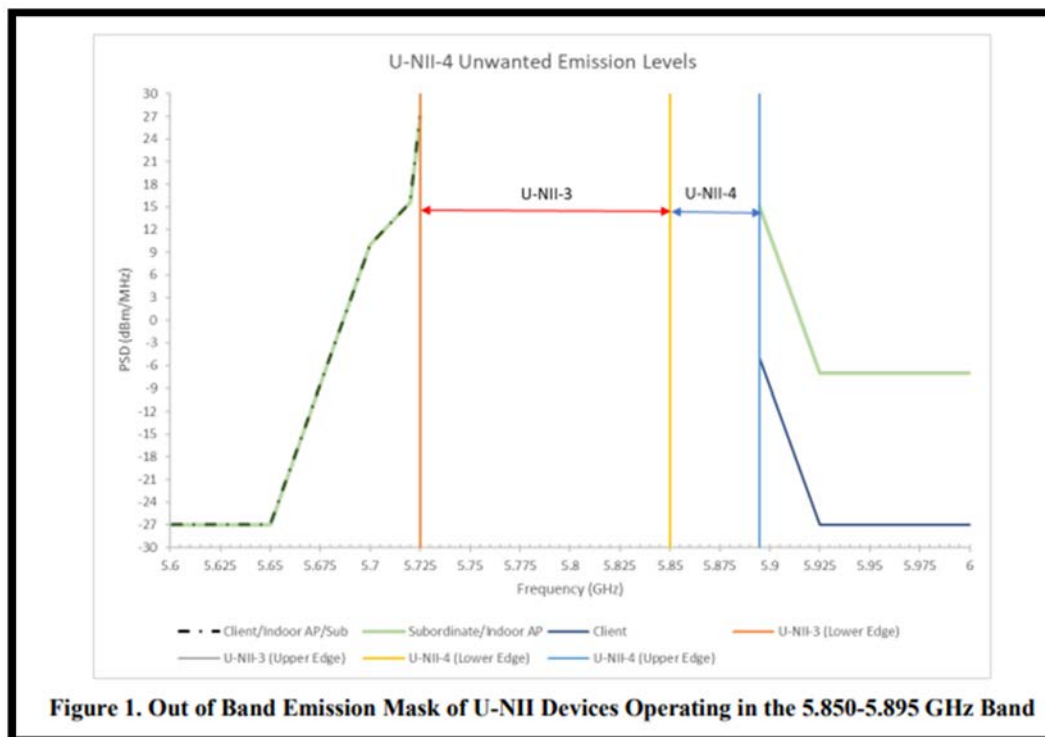


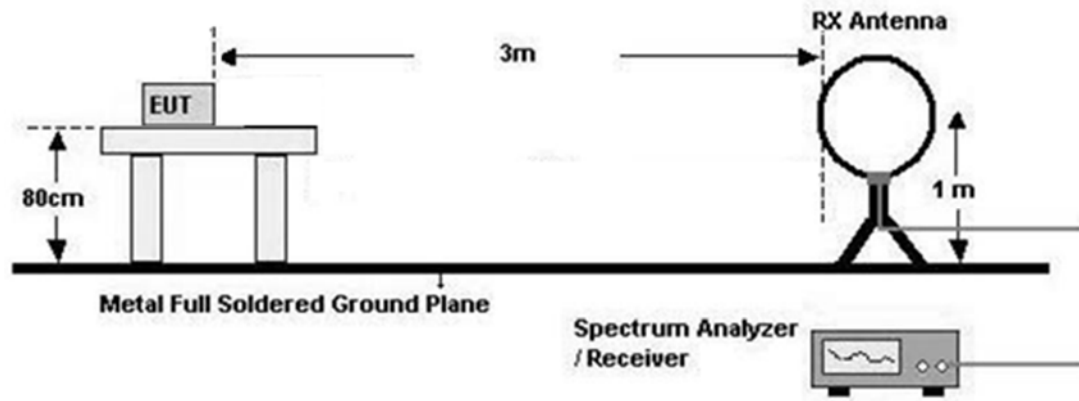
Figure 1. Out of Band Emission Mask of U-NII Devices Operating in the 5.850-5.895 GHz Band

5. 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.

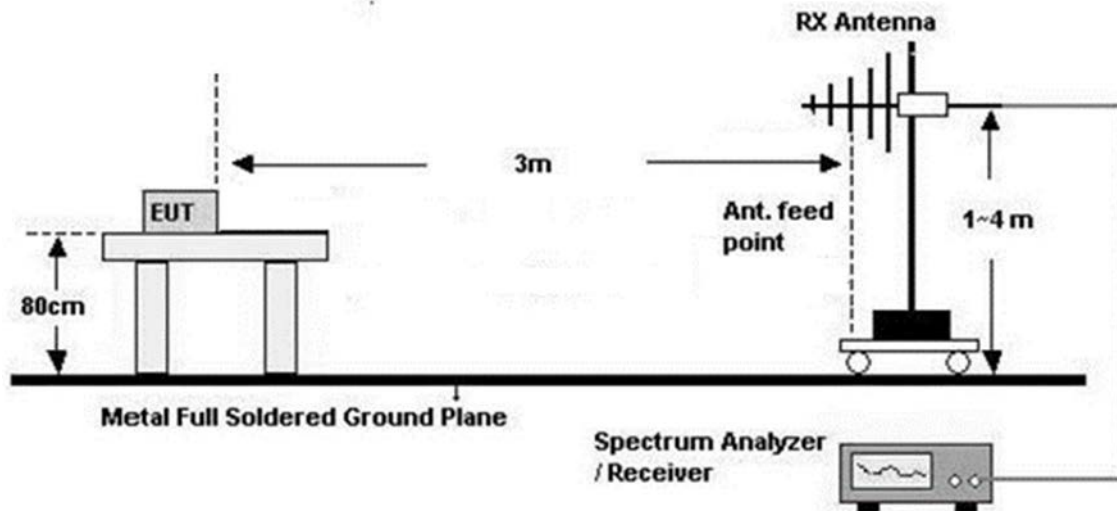
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 – 0.490	$2400/F(\text{kHz})$	300
0.490 – 1.705	$24000/F(\text{kHz})$	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

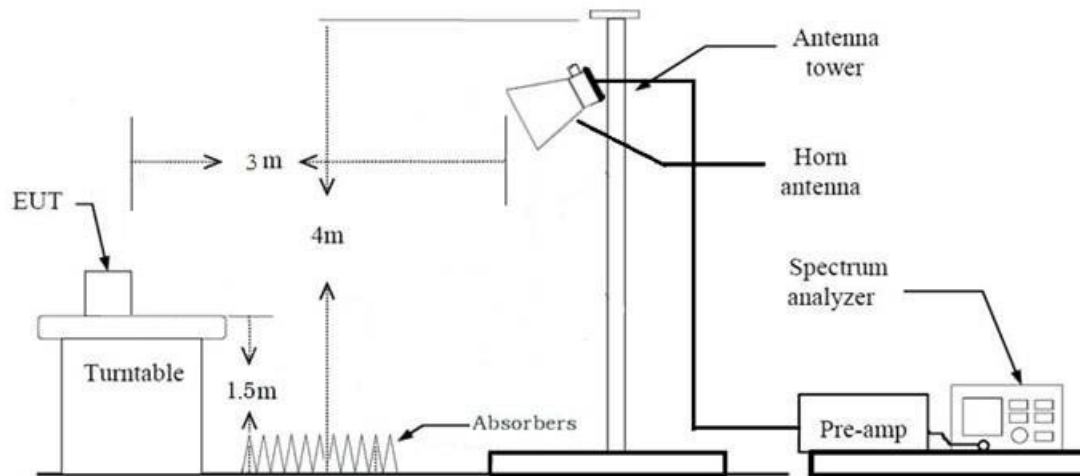
Below 30 MHz



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 0.8m 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) = $40\log(3\text{ m}/300\text{ m}) = -80\text{ dB}$
Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = $40\log(3\text{ m}/30\text{ m}) = -40\text{ dB}$
Measurement Distance : 3 m
8. Spectrum Setting
 - Frequency Range = 9 kHz ~ 30 MHz
 - Detector = Peak
 - Trace = Max Hold
 - RBW = 9 kHz
 - VBW $\geq 3 \times$ 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 0.8m 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 = Max Hold
 - RBW = 100 kHz
 - VBW $\geq$ 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 $\geq$ 3 MHz
- Detector = Peak
- Sweep Time = auto
- Trace mode = Max Hold
- Allow sweeps to continue until the trace stabilizes.

Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately $1/x$, where x is the duty cycle.

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

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

9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (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 = $20\log(\text{test distance} / \text{specific distance})$ (dB)

$$12. \text{Total} = \text{Measured Value} + \text{Antenna Factor(A.F)} + \text{Cable Loss(C.L)} - \text{Amp Gain(A.G)} \\ + \text{Distance Factor(D.F)}$$

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 $\geq$ 3 MHz
- Detector = Peak
- Sweep Time = auto
- Trace mode = Max Hold
- Allow sweeps to continue until the trace stabilizes.

Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately $1/x$, where x is the duty cycle.

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

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

9. 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 = $20\log(\text{test distance} / \text{specific distance})$ (dB)

11. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Attenuator(ATT)
+ Distance Factor(D.F)

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	0.937	0.281	1 000
802.11n(HT20)	MCS0	0.927	0.328	1 000
802.11n(HT40)	MCS0	0.864	0.634	3 000
802.11ac(VHT20)	MCS0	0.928	0.323	1 000
802.11ac(VHT40)	MCS0	0.497	3.036	3 000
802.11ac(VHT80)	MCS0	0.763	1.173	5 000
802.11ac(VHT160)	MCS0	0.724	1.404	5 000

8.8. Worst case configuration and mode

Conducted test

1. All datarate of operation were investigated and the worst case datarate results are reported.
2. SM-F761U, SM-F761U1 were tested and the worst case results are reported.
(Worst case: SM-F761U)

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. All Antenna of operation were investigated and the worst case results are reported
 - Mode : SISO, Ant.1+Ant.2(SDM), Ant.1+Ant.2(CDD)
 - Worstcase : Ant.1+Ant.2(CDD)
3. The EUT was tested in three modes(Open, Half-open, Closed), the worst case configuration results are reported.
 - Radiated Spurious Emissions Worst case : Open mode, Half-open, Closed
 - Radiated Restricted Band Edge : Open mode
4. EUT Axis
 - Radiated Spurious Emissions : X
 - Radiated Restricted Band Edge : Z
5. 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
 - 802.11ac_VHT160: MCS0
6. Radiated Spurious Emission
 - All modulation of operation were investigated and the worst case modulation results are reported.
Worst-case : 802.11a_6 Mbps
7. 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
8. SM-F761U, SM-F761U1 were tested and the worst case results are reported.
(Worst case: SM-F761U)

Radiated test(Simultaneous transmission Scenario)

1. Please refer to the [DTS], [BT], [UNII ax] Test Report.

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-F761U, SM-F761U1 were tested and the worst case results are reported.
(Worst case: SM-F761U)

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) (5850-5895 MHz)(UNII-4)		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 EIRP Output Power	§ 15.407(a)(3)(iii)	< EIRP 30dBm (5850-5895 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) < EIRP 14 dBm/MHz(5850-5895 MHz)		PASS
Frequency Stability	§ 15.407(g) § 2.1055	Maintained within the band		PASS
AC Conducted Emissions 150 kHz-30 MHz	15.207 15.407(b)(8)	<FCC 15.207 limits		PASS
Undesirable Emissions	§ 15.407(b) (1),(2),(3),(4) § 15.407(b)(5)(ii),(iii) § 15.35(b)	<-27 dBm/MHz EIRP (UNII1, 2A, 2C) cf. Section 8.6 (UNII 3&4)	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

Note:

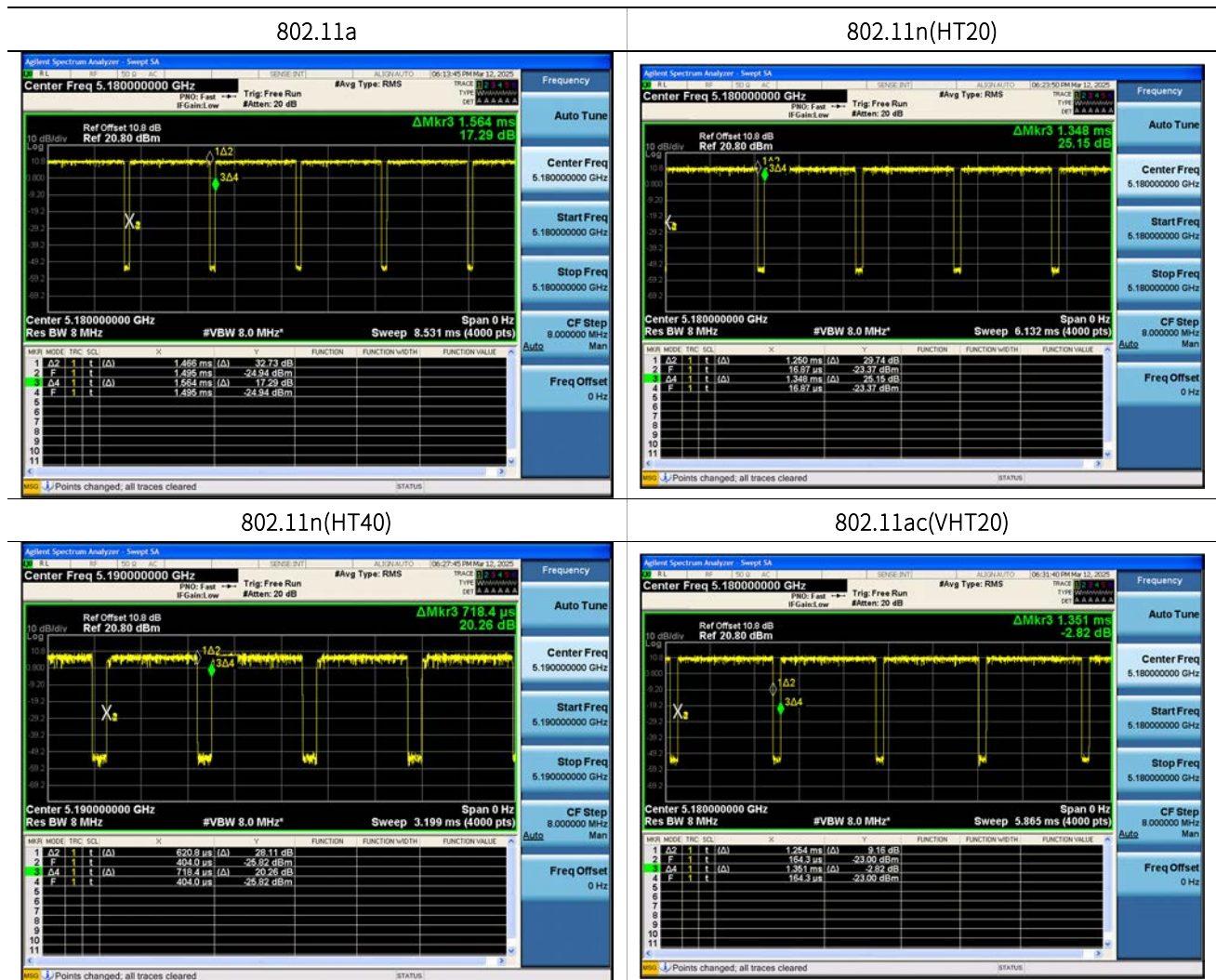
1. UNII 2A, 2C: TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.
2. The decision rule applies 'simple acceptance'

10. TEST RESULT

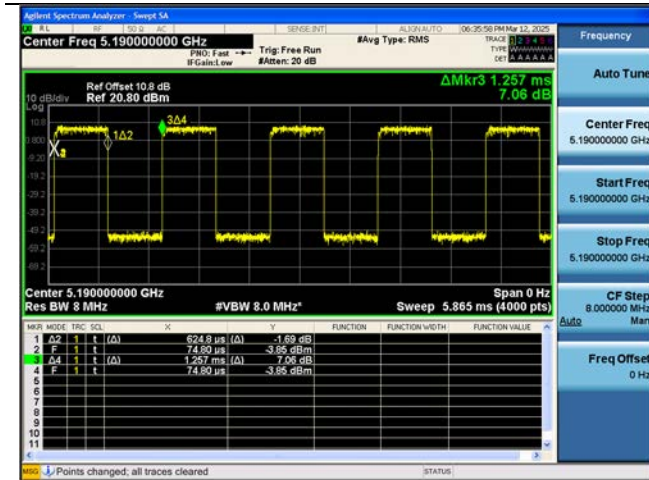
10.1 DUTY CYCLE

Mode	Data Rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11a	6M	1.466	1.564	0.937	0.281
802.11n(HT20)	MCS0	1.250	1.348	0.927	0.328
802.11n(HT40)	MCS0	0.621	0.718	0.864	0.634
802.11ac(VHT20)	MCS0	1.254	1.351	0.928	0.323
802.11ac(VHT40)	MCS0	0.625	1.257	0.497	3.036
802.11ac(VHT80)	MCS0	0.313	0.410	0.763	1.173
802.11ac(VHT160)	MCS0	0.253	0.350	0.724	1.404

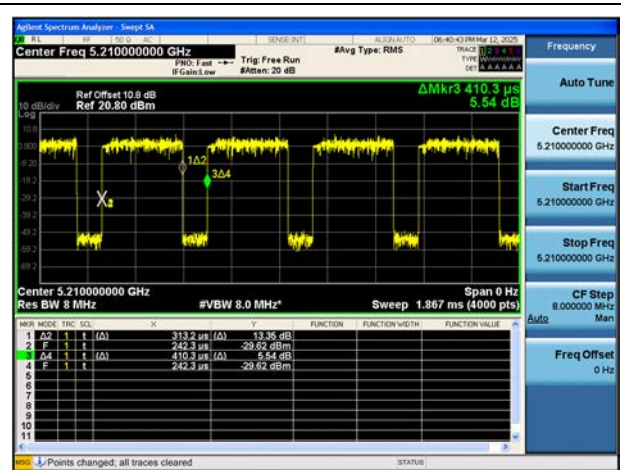
Note:In order to simplify the report, attached plots were only the lowest data rate.



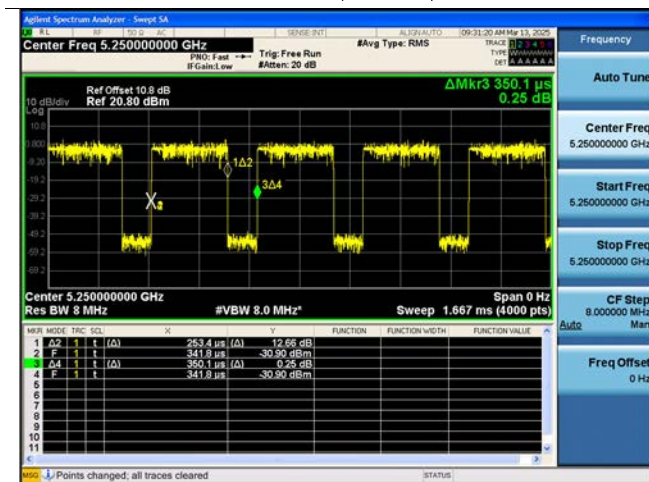
802.11ac(VHT40)



802.11ac(VHT80)



802.11ac(VHT160)



10.2 26 dB Bandwidth

Note:

Straddle channel data in the table below are for reporting purposes only. Straddle channel data were added in section 10.7.1.

[Ant.1]

Mode : 802.11a				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5180	36	21.06	16.595
	5200	40	21.09	16.587
	5240	48	21.11	16.569
UNII2A	5260	52	21.14	16.577
	5300	60	21.01	16.596
	5320	64	21.08	16.588
UNII2C	5500	100	20.88	16.580
	5580	116	20.79	16.591
	5720	144	21.09	16.605
UNII3	5745	149	21.10	16.575
	5785	157	21.04	16.585
	5825	165	20.89	16.585
UNII4	5845	169	21.01	16.569
	5865	173	20.89	16.586
	5885	177	21.10	16.588
Mode : 802.11n(HT20)				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5180	36	21.07	17.723
	5200	40	21.35	17.727
	5240	48	21.31	17.730
UNII2A	5260	52	21.01	17.738
	5300	60	21.01	17.727
	5320	64	21.36	17.740
UNII2C	5500	100	21.35	17.738
	5580	116	21.02	17.730
	5720	144	20.99	17.750
UNII3	5745	149	21.33	17.724
	5785	157	21.34	17.729
	5825	165	21.48	17.751
UNII4	5845	169	20.96	17.728
	5865	173	21.35	17.741
	5885	177	21.36	17.741

Mode : 802.11ac(VHT20)				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5180	36	21.36	17.744
	5200	40	21.27	17.759
	5240	48	21.22	17.738
UNII2A	5260	52	21.08	17.750
	5300	60	20.91	17.733
	5320	64	21.14	17.733
UNII2C	5500	100	21.29	17.731
	5580	116	21.51	17.734
	5720	144	21.37	17.730
UNII3	5745	149	21.25	17.718
	5785	157	21.29	17.743
	5825	165	21.39	17.719
UNII4	5845	169	21.16	17.740
	5865	173	21.39	17.733
	5885	177	21.33	17.767

Mode : 802.11n(HT40)				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5190	38	42.35	36.363
	5230	46	42.52	36.390
UNII2A	5270	54	41.97	36.389
	5310	62	42.38	36.391
UNII2C	5510	102	42.33	36.362
	5550	110	42.34	36.407
	5710	142	42.29	36.364
UNII3	5755	151	42.32	36.374
	5795	159	42.48	36.391
UNII4	5835	167	42.34	36.379
	5875	175	42.19	36.391

Mode : 802.11ac(VHT40)				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5190	38	42.48	36.397
	5230	46	42.07	36.385
UNII2A	5270	54	41.90	36.371
	5310	62	42.13	36.397
UNII2C	5510	102	42.15	36.378
	5550	110	42.27	36.376
	5710	142	42.65	36.396
UNII3	5755	151	42.39	36.356
	5795	159	42.15	36.392
UNII4	5835	167	41.96	36.363
	5875	175	42.25	36.374

Mode : 802.11ac(VHT80)				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5210	42	92.82	76.598
UNII2A	5290	58	93.25	76.617
UNII2C	5530	106	92.69	76.627
	5610	122	92.99	76.530
	5690	138	91.86	76.609
UNII3	5775	155	93.09	76.589
UNII4	5855	171	92.47	76.560

Mode : 802.11ac(VHT160)				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII 1-2A	5250	50	175.2	155.43
UNII 2C	5570	114	178.6	155.51
UNII 3-4	5815	163	176.9	155.44

[Ant.2]

Mode : 802.11a				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5180	36	20.88	16.579
	5200	40	21.10	16.588
	5240	48	20.95	16.580
UNII2A	5260	52	21.08	16.575
	5300	60	20.97	16.580
	5320	64	20.93	16.590
UNII2C	5500	100	20.81	16.574
	5580	116	21.01	16.562
	5720	144	21.01	16.574
UNII3	5745	149	20.67	16.576
	5785	157	20.85	16.579
	5825	165	21.07	16.584
UNII4	5845	169	21.14	16.571
	5865	173	20.73	16.570
	5885	177	21.03	16.586
Mode : 802.11n(HT20)				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5180	36	21.04	17.720
	5200	40	21.09	17.717
	5240	48	21.30	17.723
UNII2A	5260	52	21.35	17.744
	5300	60	21.31	17.741
	5320	64	21.33	17.735
UNII2C	5500	100	21.29	17.739
	5580	116	21.32	17.724
	5720	144	21.32	17.732
UNII3	5745	149	21.30	17.734
	5785	157	21.09	17.722
	5825	165	21.35	17.735
UNII4	5845	169	21.38	17.727
	5865	173	21.30	17.745
	5885	177	21.04	17.737

Mode : 802.11ac(VHT20)				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5180	36	21.33	17.740
	5200	40	21.36	17.742
	5240	48	21.35	17.736
UNII2A	5260	52	21.36	17.742
	5300	60	21.31	17.740
	5320	64	21.04	17.734
UNII2C	5500	100	21.00	17.758
	5580	116	21.29	17.738
	5720	144	21.31	17.735
UNII3	5745	149	21.22	17.720
	5785	157	21.08	17.725
	5825	165	21.34	17.729
UNII4	5845	169	20.95	17.725
	5865	173	21.63	17.739
	5885	177	21.31	17.733

Mode : 802.11n(HT40)				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5190	38	42.33	36.381
	5230	46	42.05	36.363
UNII2A	5270	54	42.10	36.394
	5310	62	42.01	36.369
UNII2C	5510	102	42.21	36.360
	5550	110	42.28	36.375
	5710	142	42.16	36.383
UNII3	5755	151	42.10	36.374
	5795	159	42.21	36.358
UNII4	5835	167	42.16	36.353
	5875	175	42.21	36.376

Mode : 802.11ac(VHT40)				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5190	38	42.22	36.366
	5230	46	42.16	36.385
UNII2A	5270	54	42.31	36.341
	5310	62	42.33	36.364
UNII2C	5510	102	42.37	36.357
	5550	110	42.45	36.362
	5710	142	42.09	36.343
UNII3	5755	151	41.91	36.364
	5795	159	42.27	36.359
UNII4	5835	167	42.00	36.346
	5875	175	42.03	36.372

Mode : 802.11ac(VHT80)				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5210	42	92.88	76.618
UNII2A	5290	58	92.37	76.510
UNII2C	5530	106	92.41	76.603
	5610	122	92.90	76.647
	5690	138	92.88	76.544
UNII3	5775	155	92.99	76.646
UNII4	5855	171	92.13	76.599

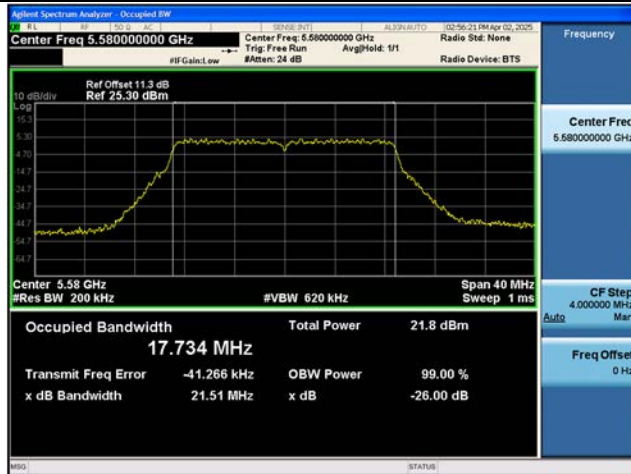
Mode : 802.11ac(VHT160)				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII 1-2A	5250	50	180.6	155.56
UNII 2C	5570	114	178.7	155.59
UNII 3-4	5815	163	176.1	155.39

[ANT. 1]

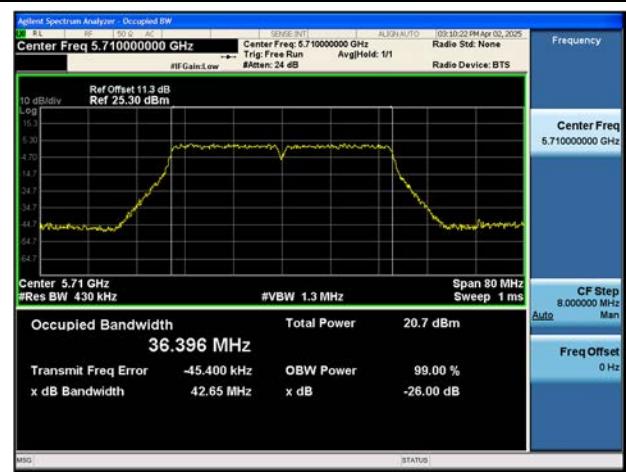
Test Plots

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

Bandwidth 20M, 802.11ac(VHT20) Ch.116



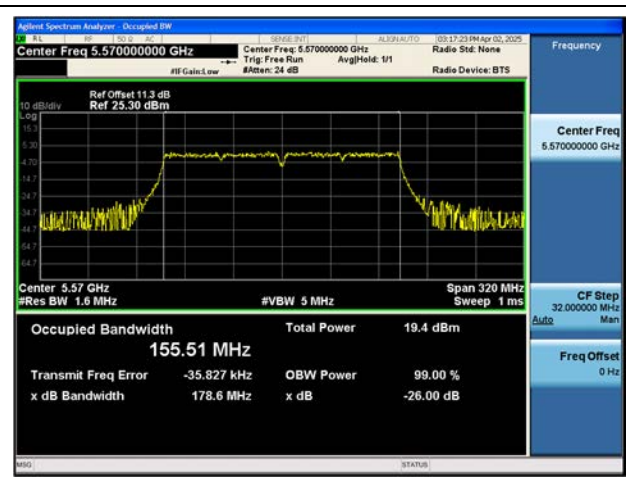
Bandwidth 40M, 802.11ac(VHT40) Ch.142



Bandwidth 80M, 802.11ac(VHT80) Ch.58



Bandwidth 160M, 802.11ac(VHT160) Ch.114

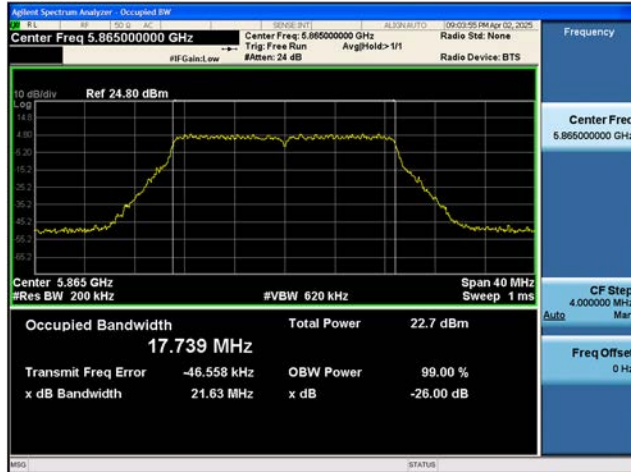


[ANT. 2]

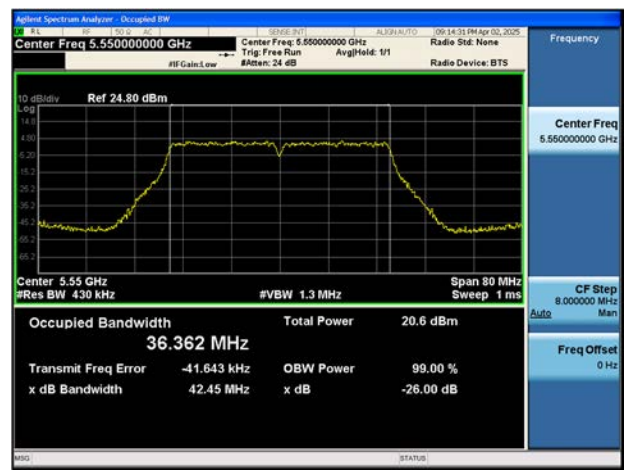
Test Plots

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

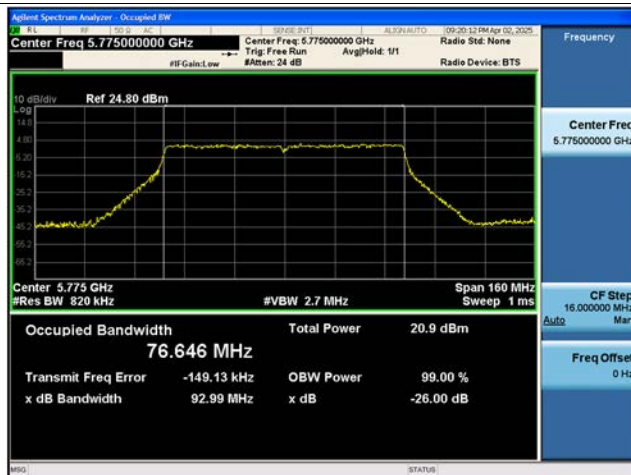
Bandwidth 20M, 802.11ac(VHT20) Ch.173



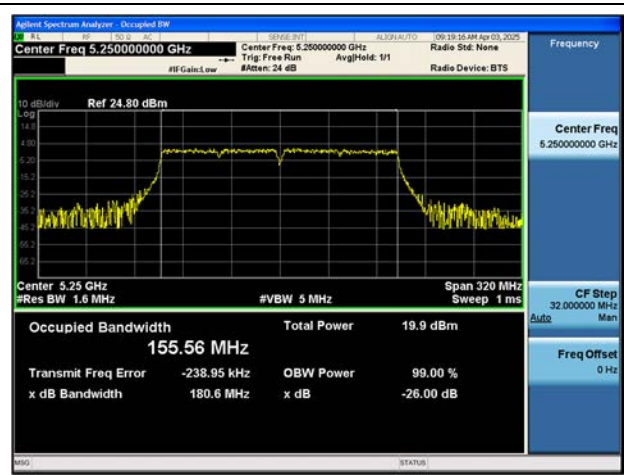
Bandwidth 40M, 802.11ac(VHT40) Ch.110



Bandwidth 80M, 802.11ac(VHT80) Ch.155



Bandwidth 160M, 802.11ac(VHT160) Ch.50



10.3 6 dB BANDWIDTH

[Ant.1]

Mode : 802.11a				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5745	149	16.41	> 0.5
	5785	157	16.41	> 0.5
	5825	165	16.40	> 0.5
UNII4	5845	169	16.40	> 0.5
	5865	173	16.41	> 0.5
	5885	177	16.40	> 0.5

Mode : 802.11n(HT20)				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5745	149	17.65	> 0.5
	5785	157	17.64	> 0.5
	5825	165	17.63	> 0.5
UNII4	5845	169	17.64	> 0.5
	5865	173	17.63	> 0.5
	5885	177	17.64	> 0.5

Mode : 802.11ac(VHT20)				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5745	149	17.64	> 0.5
	5785	157	17.65	> 0.5
	5825	165	17.65	> 0.5
UNII4	5845	169	17.64	> 0.5
	5865	173	17.64	> 0.5
	5885	177	17.63	> 0.5

Mode : 802.11n(HT40)				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5755	151	36.46	> 0.5
	5795	159	36.45	> 0.5
UNII4	5835	167	36.44	> 0.5
	5875	175	36.45	> 0.5

Mode : 802.11ac(VHT40)				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5755	151	36.45	> 0.5
	5795	159	36.43	> 0.5
UNII4	5835	167	36.45	> 0.5
	5875	175	36.45	> 0.5

Mode : 802.11ac(VHT80)				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5775	155	76.46	> 0.5
UNII4	5855	171	76.48	> 0.5
Mode : 802.11ac(VHT160)				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3-4	5815	163	156.3	> 0.5

[Ant.2]

Mode : 802.11a				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5745	149	16.41	> 0.5
	5785	157	16.41	> 0.5
	5825	165	16.41	> 0.5
UNII4	5845	169	16.40	> 0.5
	5865	173	16.40	> 0.5
	5885	177	16.40	> 0.5

Mode : 802.11n(HT20)				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5745	149	17.63	> 0.5
	5785	157	17.63	> 0.5
	5825	165	17.64	> 0.5
UNII4	5845	169	17.64	> 0.5
	5865	173	17.64	> 0.5
	5885	177	17.63	> 0.5

Mode : 802.11ac(VHT20)				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5745	149	17.64	> 0.5
	5785	157	17.63	> 0.5
	5825	165	17.64	> 0.5
UNII4	5845	169	17.63	> 0.5
	5865	173	17.64	> 0.5
	5885	177	17.64	> 0.5

Mode : 802.11n(HT40)				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5755	151	36.44	> 0.5
	5795	159	36.43	> 0.5
UNII4	5835	167	36.43	> 0.5
	5875	175	36.45	> 0.5

Mode : 802.11ac(VHT40)				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5755	151	36.43	> 0.5
	5795	159	36.43	> 0.5
UNII4	5835	167	36.42	> 0.5
	5875	175	36.45	> 0.5

Mode : 802.11ac(VHT80)				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5775	155	76.51	> 0.5
UNII4	5855	171	76.48	> 0.5

Mode : 802.11ac(VHT160)				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3-4	5815	163	156.3	> 0.5

[ANT. 1]

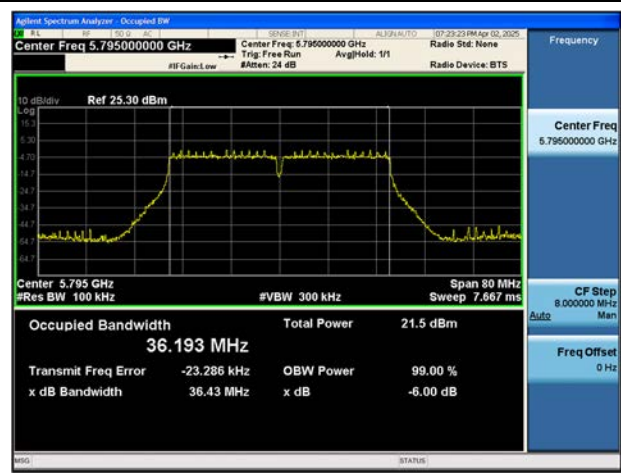
☐ Test Plots

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

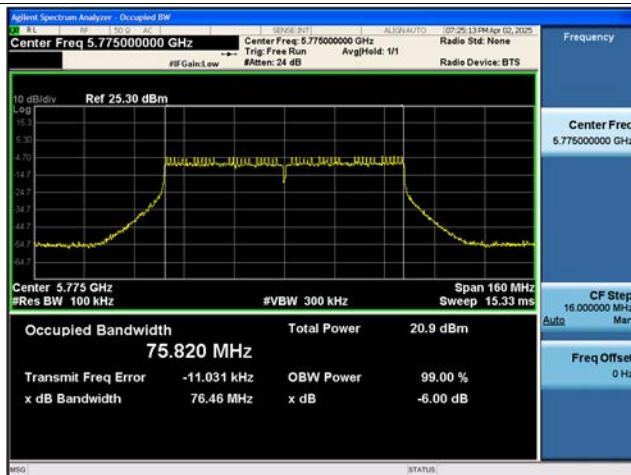
Bandwidth 20M, 802.11a Ch.169



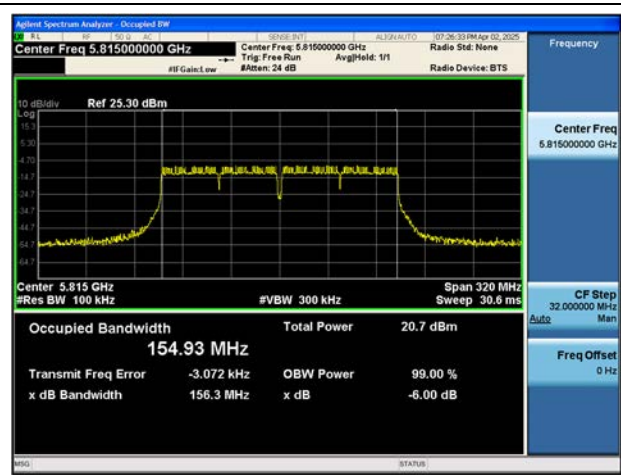
Bandwidth 40M, 802.11ac(VHT40) Ch.159



Bandwidth 80M, 802.11ac(VHT80) Ch.155



Bandwidth 160M, 802.11ac(VHT160) Ch.163



[ANT. 2]

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

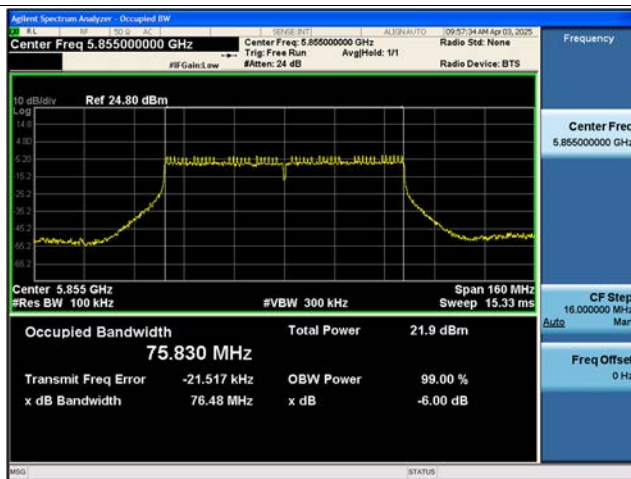
Bandwidth 20M, 802.11a Ch.177



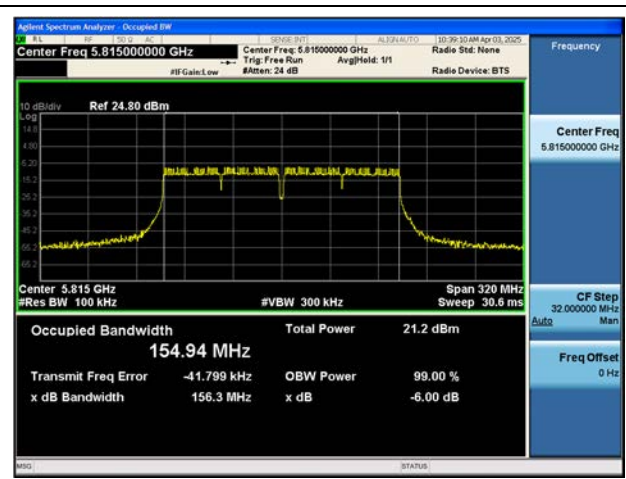
Bandwidth 40M, 802.11ac(VHT40) Ch.167



Bandwidth 80M, 802.11ac(VHT80) Ch.171



Bandwidth 160M, 802.11ac(VHT160) Ch.163



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 $11 \text{ dBm} + 10 \log B$, (where B is the 26 dB emission bandwidth in megahertz.)

(UNII 3) : 30.00 dBm

(UNII 4) : EIRP 30.0 dBm/MHz

(UNII 3&4) : Worst limit 30.00 dBm → UNII 4 Band Antenna Gain Negative

[MIMO_CDD(Ant.1+ Ant.2)]

Ant Total Power [dBm] = Measured Power [dBm] + Duty Cycle Factor [dB]

MIMO_CDD(Ant.1+ Ant.2) Total Power [dBm] = Ant.1 Total Power [dBm] + Ant.2 Total Power [dBm]

Max EIRP = MIMO Total Power [dBm] + Directional Gain [dBi]

Mode : 802.11a											
BAND	Freq. [MHz]	CH.	Datarate	Total Average Power [dBm]			Ant1 Gain	Ant2 Gain	Directional Gain	Max EIRP	Limit
				ANT1	ANT2	MIMO	[dBi]	[dBi]	[dBi]	[dBm]	[dBm]
UNII1	5180	36	6M	15.37	15.23	18.31	-	-	-	-	23.98
	5200	40	6M	15.32	15.22	18.28	-	-	-	-	23.98
	5240	48	6M	15.26	15.35	18.31	-	-	-	-	23.98
UNII2A	5260	52	6M	14.93	15.40	18.18	-	-	-	-	23.98
	5300	60	6M	14.84	15.25	18.06	-	-	-	-	23.98
	5320	64	6M	15.24	15.48	18.37	-	-	-	-	23.98
UNII2C	5500	100	6M	15.07	15.11	18.10	-	-	-	-	23.98
	5580	116	6M	14.80	15.19	18.01	-	-	-	-	23.98
	5720	144	6M	15.04	15.16	18.11	-	-	-	-	23.98
UNII3	5745	149	6M	14.94	15.25	18.11	-	-	-	-	30.00
	5785	157	6M	14.77	15.28	18.04	-	-	-	-	30.00
	5825	165	6M	15.07	14.51	17.81	-	-	-	-	30.00
UNII4	5845	169	6M	15.39	15.51	18.46	-5.58	-7.08	-3.29	15.17	30 EIRP
	5865	173	6M	15.41	15.53	18.48	-5.58	-7.08	-3.29	15.19	30 EIRP
	5885	177	6M	15.26	15.09	18.19	-5.58	-7.08	-3.29	14.90	30 EIRP

Mode : 802.11n(HT20)											
BAND	Freq. [MHz]	CH.	Datarate	Total Average Power [dBm]			Ant1 Gain	Ant2 Gain	Directional Gain	Max EIRP	Limit
				ANT1	ANT2	MIMO	[dBi]	[dBi]	[dBi]	[dBm]	[dBm]
UNII1	5180	36	MCS0	15.31	15.30	18.32	-	-	-	-	23.98
	5200	40	MCS0	15.30	15.29	18.30	-	-	-	-	23.98
	5240	48	MCS0	15.27	15.40	18.34	-	-	-	-	23.98
UNII2A	5260	52	MCS0	15.17	15.53	18.36	-	-	-	-	23.98
	5300	60	MCS0	15.11	15.42	18.28	-	-	-	-	23.98
	5320	64	MCS0	15.56	15.63	18.61	-	-	-	-	23.98
UNII2C	5500	100	MCS0	15.49	15.37	18.44	-	-	-	-	23.98
	5580	116	MCS0	15.06	15.32	18.20	-	-	-	-	23.98
	5720	144	MCS0	15.25	15.22	18.25	-	-	-	-	23.98
UNII3	5745	149	MCS0	15.18	15.29	18.25	-	-	-	-	30.00
	5785	157	MCS0	15.13	15.35	18.25	-	-	-	-	30.00
	5825	165	MCS0	15.13	15.51	18.34	-	-	-	-	30.00
UNII4	5845	169	MCS0	15.17	15.56	18.38	-5.58	-7.08	-3.29	15.09	30 EIRP
	5865	173	MCS0	15.09	15.48	18.30	-5.58	-7.08	-3.29	15.01	30 EIRP
	5885	177	MCS0	15.22	14.61	17.94	-5.58	-7.08	-3.29	14.65	30 EIRP

Mode : 802.11ac(VHT20)											
BAND	Freq. [MHz]	CH.	Datarate	Total Average Power [dBm]			Ant1 Gain	Ant2 Gain	Directional Gain	Max EIRP	Limit
				ANT1	ANT2	MIMO	[dBi]	[dBi]	[dBi]	[dBm]	[dBm]
UNII1	5180	36	MCS0	15.26	15.24	18.26	-	-	-	-	23.98
	5200	40	MCS0	15.38	15.24	18.32	-	-	-	-	23.98
	5240	48	MCS0	15.34	15.35	18.35	-	-	-	-	23.98
UNII2A	5260	52	MCS0	15.01	15.51	18.28	-	-	-	-	23.98
	5300	60	MCS0	14.88	15.32	18.12	-	-	-	-	23.98
	5320	64	MCS0	15.28	15.57	18.44	-	-	-	-	23.98
UNII2C	5500	100	MCS0	15.14	15.24	18.20	-	-	-	-	23.98
	5580	116	MCS0	14.91	15.17	18.06	-	-	-	-	23.98
	5720	144	MCS0	15.09	15.02	18.07	-	-	-	-	23.98
UNII3	5745	149	MCS0	14.99	15.04	18.03	-	-	-	-	30.00
	5785	157	MCS0	15.06	15.31	18.20	-	-	-	-	30.00
	5825	165	MCS0	15.15	15.40	18.29	-	-	-	-	30.00
UNII4	5845	169	MCS0	15.15	15.45	18.31	-5.58	-7.08	-3.29	15.02	30 EIRP
	5865	173	MCS0	15.05	15.41	18.24	-5.58	-7.08	-3.29	14.95	30 EIRP
	5885	177	MCS0	15.22	14.64	17.95	-5.58	-7.08	-3.29	14.66	30 EIRP

Mode : 802.11n(HT40)											
BAND	Freq. [MHz]	CH.	Datarate	Total Average Power [dBm]			Ant1 Gain	Ant2 Gain	Directional Gain	Max EIRP	Limit
				ANT1	ANT2	MIMO	[dBi]	[dBi]	[dBi]	[dBm]	[dBm]
UNII1	5190	38	MCS0	14.35	14.61	17.49	-	-	-	-	23.98
	5230	46	MCS0	14.23	14.87	17.57	-	-	-	-	23.98
UNII2A	5270	54	MCS0	14.02	14.41	17.23	-	-	-	-	23.98
	5310	62	MCS0	14.32	14.54	17.44	-	-	-	-	23.98
UNII2C	5510	102	MCS0	14.14	14.11	17.13	-	-	-	-	23.98
	5550	110	MCS0	14.37	13.98	17.19	-	-	-	-	23.98
	5710	142	MCS0	14.35	14.17	17.27	-	-	-	-	23.98
UNII3	5755	151	MCS0	14.14	14.34	17.25	-	-	-	-	30.00
	5795	159	MCS0	14.21	14.49	17.37	-	-	-	-	30.00
UNII4	5835	167	MCS0	14.26	14.55	17.42	-5.58	-7.08	-3.29	14.13	30 EIRP
	5875	175	MCS0	14.16	14.67	17.43	-5.58	-7.08	-3.29	14.14	30 EIRP

Mode : 802.11ac(VHT40)											
BAND	Freq. [MHz]	CH.	Datarate	Total Average Power [dBm]			Ant1 Gain	Ant2 Gain	Directional Gain	Max EIRP	Limit
				ANT1	ANT2	MIMO	[dBi]	[dBi]	[dBi]	[dBm]	[dBm]
UNII1	5190	38	MCS0	14.34	14.45	17.40	-	-	-	-	23.98
	5230	46	MCS0	14.27	14.67	17.49	-	-	-	-	23.98
UNII2A	5270	54	MCS0	14.01	14.24	17.14	-	-	-	-	23.98
	5310	62	MCS0	14.31	14.40	17.36	-	-	-	-	23.98
UNII2C	5510	102	MCS0	14.08	14.13	17.11	-	-	-	-	23.98
	5550	110	MCS0	14.32	13.97	17.16	-	-	-	-	23.98
	5710	142	MCS0	14.30	14.12	17.22	-	-	-	-	23.98
UNII3	5755	151	MCS0	14.08	14.31	17.20	-	-	-	-	30.00
	5795	159	MCS0	14.18	14.48	17.34	-	-	-	-	30.00
UNII4	5835	167	MCS0	14.29	14.49	17.40	-5.58	-7.08	-3.29	14.11	30 EIRP
	5875	175	MCS0	14.16	14.70	17.45	-5.58	-7.08	-3.29	14.16	30 EIRP

Mode : 802.11ac(VHT80)											
BAND	Freq. [MHz]	CH.	Datarate	Total Average Power [dBm]			Ant1 Gain	Ant2 Gain	Directional Gain	Max EIRP	Limit
				ANT1	ANT2	MIMO	[dBi]	[dBi]	[dBi]	[dBm]	[dBm]
UNII1	5210	42	MCS0	12.36	13.03	15.72	-	-	-	-	23.98
UNII2A	5290	58	MCS0	12.66	13.17	15.93	-	-	-	-	23.98
UNII2C	5530	106	MCS0	12.81	12.61	15.72	-	-	-	-	23.98
	5610	122	MCS0	12.85	12.62	15.75	-	-	-	-	23.98
	5690	138	MCS0	12.96	12.89	15.93	-	-	-	-	23.98
UNII3	5775	155	MCS0	12.76	13.00	15.89	-	-	-	-	30.00
UNII4	5855	171	MCS0	12.89	13.25	16.09	-5.58	-7.08	-3.29	12.80	30 EIRP

Mode : 802.11ac(VHT160)											
BAND	Freq. [MHz]	CH.	Datarate	Total Average Power [dBm]			Ant1 Gain	Ant2 Gain	Directional Gain	Max EIRP	Limit
				ANT1	ANT2	MIMO	[dBi]	[dBi]	[dBi]	[dBm]	[dBm]
UNII1-2A	5250	50	MCS0	11.66	12.02	14.86	-	-	-	-	23.98
UNII2C	5570	114	MCS0	11.49	12.22	14.88	-	-	-	-	23.98
UNII3-4	5815	163	MCS0	12.15	12.52	15.35	-5.58	-7.08	-3.29	12.06	30.00

10.5 POWER SPECTRAL DENSITY

[MIMO_CDD(Ant.1+ Ant.2)]

Ant Total PSD [dBm] = Measured PSD [dBm/MHz] + Duty Cycle Factor [dB]

MIMO_CDD(Ant.1+ Ant.2) Total PSD [dBm/MHz] = Ant.1 Total PSD [dBm/MHz] + Ant.2 Total PSD [dB]

Max EIRP = MIMO Total PSD [dBm/MHz] + Directional Gain [dBi]

Mode : 802.11a											
BAND	Freq. [MHz]	CH.	Datarate	Total Power Spectral Density [dBm/MHz]			Ant1 Gain	Ant2 Gain	Directional Gain	Max EIRP	Limit
				ANT1	ANT2	MIMO	[dBi]	[dBi]	[dBi]	[dBm/MHz]	[dBm/MHz]
UNII1	5180	36	6M	4.087	4.096	7.102	-	-	-	-	11.00
	5200	40	6M	3.932	4.071	7.013	-	-	-	-	11.00
	5240	48	6M	4.043	4.410	7.241	-	-	-	-	11.00
UNII2A	5260	52	6M	3.664	4.408	7.063	-	-	-	-	11.00
	5300	60	6M	3.915	4.256	7.100	-	-	-	-	11.00
	5320	64	6M	4.223	4.386	7.316	-	-	-	-	11.00
UNII2C	5500	100	6M	3.870	4.097	6.996	-	-	-	-	11.00
	5580	116	6M	3.653	3.923	6.801	-	-	-	-	11.00
	5720	144	6M	3.808	3.970	6.901	-	-	-	-	11.00
UNII3	5745	149	6M	1.100	1.041	4.081	-	-	-	-	30 dBm/500kHz
	5785	157	6M	1.022	1.321	4.185	-	-	-	-	30 dBm/500kHz
	5825	165	6M	0.908	1.553	4.253	-	-	-	-	30 dBm/500kHz
UNII4	5845	169	6M	4.034	4.326	7.193	-5.58	-7.08	-3.29	3.903	14 EIRP
	5865	173	6M	3.891	4.408	7.168	-5.58	-7.08	-3.29	3.878	14 EIRP
	5885	177	6M	3.948	3.102	6.556	-5.58	-7.08	-3.29	3.266	14 EIRP

Mode : 802.11n(HT20)											
BAND	Freq. [MHz]	CH.	Datarate	Total Power Spectral Density [dBm/MHz]			Ant1 Gain	Ant2 Gain	Directional Gain	Max EIRP	Limit
				ANT1	ANT2	MIMO	[dBi]	[dBi]	[dBi]	[dBm/MHz]	[dBm/MHz]
UNII1	5180	36	MCS0	3.758	3.685	6.732	-	-	-	-	11.00
	5200	40	MCS0	3.741	3.819	6.791	-	-	-	-	11.00
	5240	48	MCS0	4.029	3.925	6.988	-	-	-	-	11.00
UNII2A	5260	52	MCS0	3.684	3.780	6.743	-	-	-	-	11.00
	5300	60	MCS0	3.565	3.814	6.702	-	-	-	-	11.00
	5320	64	MCS0	3.880	4.055	6.979	-	-	-	-	11.00
UNII2C	5500	100	MCS0	3.752	3.512	6.644	-	-	-	-	11.00
	5580	116	MCS0	3.325	3.544	6.446	-	-	-	-	11.00
	5720	144	MCS0	3.659	3.475	6.579	-	-	-	-	11.00
UNII3	5745	149	MCS0	0.750	0.809	3.790	-	-	-	-	30 dBm/500kHz
	5785	157	MCS0	0.767	0.900	3.845	-	-	-	-	30 dBm/500kHz
	5825	165	MCS0	0.879	1.297	4.104	-	-	-	-	30 dBm/500kHz
UNII4	5845	169	MCS0	4.070	4.138	7.115	-5.58	-7.08	-3.29	3.825	14 EIRP
	5865	173	MCS0	3.638	3.954	6.809	-5.58	-7.08	-3.29	3.519	14 EIRP
	5885	177	MCS0	3.832	2.743	6.332	-5.58	-7.08	-3.29	3.042	14 EIRP

Mode : 802.11ac(VHT20)											
BAND	Freq. [MHz]	CH.	Datarate	Total Power Spectral Density [dBm/MHz]			Ant1 Gain	Ant2 Gain	Directional Gain	Max EIRP	Limit
				ANT1	ANT2	MIMO	[dBi]	[dBi]	[dBi]	[dBm/MHz]	[dBm/MHz]
UNII1	5180	36	MCS0	3.635	4.028	6.846	-	-	-	-	11.00
	5200	40	MCS0	3.709	3.927	6.830	-	-	-	-	11.00
	5240	48	MCS0	3.711	4.262	7.005	-	-	-	-	11.00
UNII2A	5260	52	MCS0	3.867	4.193	7.043	-	-	-	-	11.00
	5300	60	MCS0	3.459	3.714	6.599	-	-	-	-	11.00
	5320	64	MCS0	3.821	4.160	7.004	-	-	-	-	11.00
UNII2C	5500	100	MCS0	3.790	3.538	6.676	-	-	-	-	11.00
	5580	116	MCS0	3.421	3.827	6.639	-	-	-	-	11.00
	5720	144	MCS0	3.474	3.615	6.555	-	-	-	-	11.00
UNII3	5745	149	MCS0	0.856	1.020	3.949	-	-	-	-	30 dBm/500kHz
	5785	157	MCS0	0.681	1.239	3.979	-	-	-	-	30 dBm/500kHz
	5825	165	MCS0	0.760	1.215	4.004	-	-	-	-	30 dBm/500kHz
UNII4	5845	169	MCS0	3.747	4.377	7.084	-5.58	-7.08	-3.29	3.794	14 EIRP
	5865	173	MCS0	3.604	3.953	6.792	-5.58	-7.08	-3.29	3.502	14 EIRP
	5885	177	MCS0	3.925	3.085	6.536	-5.58	-7.08	-3.29	3.246	14 EIRP

Mode : 802.11n(HT40)											
BAND	Freq. [MHz]	CH.	Datarate	Total Power Spectral Density [dBm/MHz]			Ant1 Gain	Ant2 Gain	Directional Gain	Max EIRP	Limit
				ANT1	ANT2	MIMO	[dBi]	[dBi]	[dBi]	[dBm/MHz]	[dBm/MHz]
UNII1	5190	38	MCS0	-0.073	0.102	3.026	-	-	-	-	11.00
	5230	46	MCS0	-0.190	0.273	3.058	-	-	-	-	11.00
UNII2A	5270	54	MCS0	-0.528	-0.086	2.709	-	-	-	-	11.00
	5310	62	MCS0	-0.029	0.701	3.362	-	-	-	-	11.00
UNII2C	5510	102	MCS0	-0.343	-0.495	2.592	-	-	-	-	11.00
	5550	110	MCS0	0.064	-0.628	2.742	-	-	-	-	11.00
	5710	142	MCS0	-0.043	-0.101	2.939	-	-	-	-	11.00
UNII3	5755	151	MCS0	-3.085	-3.008	-0.036	-	-	-	-	30 dBm/500kHz
	5795	159	MCS0	-3.032	-2.457	0.275	-	-	-	-	30 dBm/500kHz
UNII4	5835	167	MCS0	-0.223	0.159	2.983	-5.58	-7.08	-3.29	-0.307	14 EIRP
	5875	175	MCS0	-0.171	0.374	3.120	-5.58	-7.08	-3.29	-0.170	14 EIRP

Mode : 802.11ac(VHT40)											
BAND	Freq. [MHz]	CH.	Datarate	Total Power Spectral Density [dBm/MHz]			Ant1 Gain	Ant2 Gain	Directional Gain	Max EIRP	Limit
				ANT1	ANT2	MIMO	[dBi]	[dBi]	[dBi]	[dBm/MHz]	[dBm/MHz]
UNII1	5190	38	MCS0	0.127	0.081	3.114	-	-	-	-	11.00
	5230	46	MCS0	-0.234	0.694	3.265	-	-	-	-	11.00
UNII2A	5270	54	MCS0	-0.240	0.580	3.199	-	-	-	-	11.00
	5310	62	MCS0	-0.113	0.943	3.457	-	-	-	-	11.00
UNII2C	5510	102	MCS0	0.125	0.398	3.274	-	-	-	-	11.00
	5550	110	MCS0	0.406	0.240	3.334	-	-	-	-	11.00
	5710	142	MCS0	0.298	-0.109	3.109	-	-	-	-	11.00
UNII3	5755	151	MCS0	-2.819	-2.926	0.138	-	-	-	-	30 dBm/500kHz
	5795	159	MCS0	-2.920	-2.295	0.414	-	-	-	-	30 dBm/500kHz
UNII4	5835	167	MCS0	0.130	0.147	3.149	-5.58	-7.08	-3.29	-0.141	14 EIRP
	5875	175	MCS0	-0.029	0.616	3.315	-5.58	-7.08	-3.29	0.025	14 EIRP

Mode : 802.11ac(VHT80)											
BAND	Freq. [MHz]	CH.	Datarate	Total Power Spectral Density [dBm/MHz]			Ant1 Gain	Ant2 Gain	Directional Gain	Max EIRP	Limit
				ANT1	ANT2	MIMO	[dBi]	[dBi]	[dBi]	[dBm/MHz]	[dBm/MHz]
UNII1	5210	42	MCS0	-4.826	-3.520	-1.114	-	-	-	-	11.00
UNII2A	5290	58	MCS0	-4.584	-4.064	-1.306	-	-	-	-	11.00
UNII2C	5530	106	MCS0	-4.447	-3.991	-1.203	-	-	-	-	11.00
	5610	122	MCS0	-4.579	-4.525	-1.542	-	-	-	-	11.00
	5690	138	MCS0	-3.970	-4.057	-1.003	-	-	-	-	11.00
UNII3	5775	155	MCS0	-7.452	-6.517	-3.949	-	-	-	-	30 dBm/500kHz
UNII4	5855	171	MCS0	-4.104	-4.060	-1.072	-5.58	-7.08	-3.29	-4.362	14 EIRP

Mode : 802.11ac(VHT160)											
BAND	Freq. [MHz]	CH.	Datarate	Total Power Spectral Density [dBm/MHz]			Ant1 Gain	Ant2 Gain	Directional Gain	Max EIRP	Limit
				ANT1	ANT2	MIMO	[dBi]	[dBi]	[dBi]	[dBm/MHz]	[dBm/MHz]
UNII1-2A	5250	50	MCS0	-8.993	-8.397	-5.675	-	-	-	-	11.00
UNII2C	5570	114	MCS0	-9.554	-8.882	-6.195	-	-	-	-	11.00
UNII3-4	5815	163	MCS0	-8.587	-8.091	-5.322	-5.58	-7.08	-3.29	-8.612	14 EIRP

[MIMO_CDD(Ant.1+ Ant.2)]

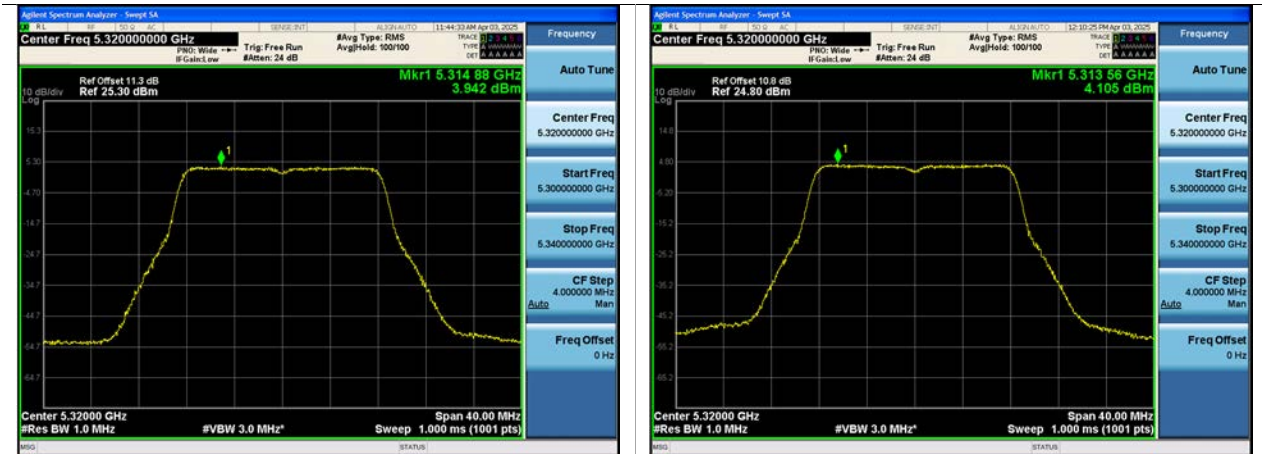
Test Plots

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

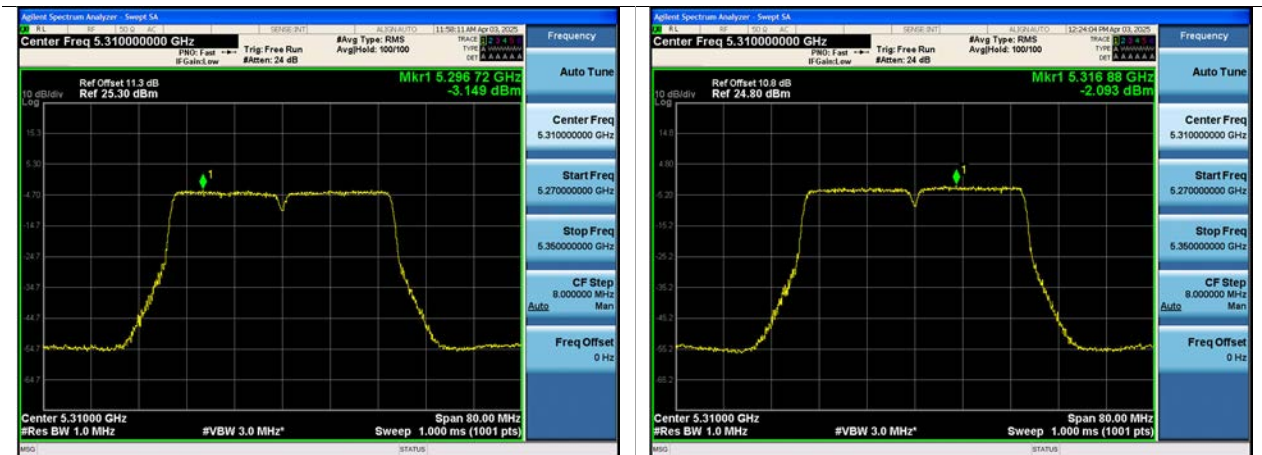
ANT. 1

ANT. 2

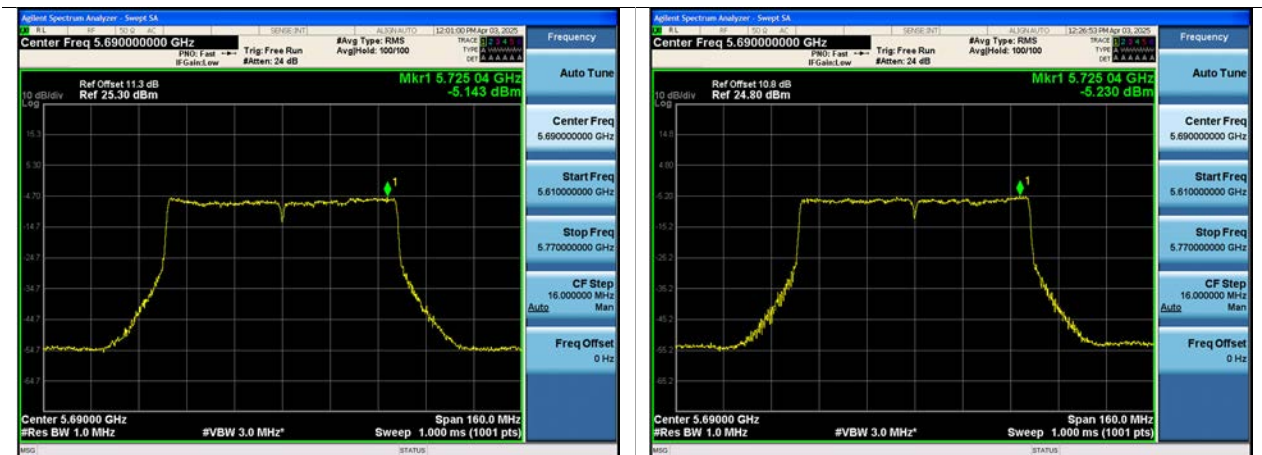
Bandwidth 20M, 802.11a(Ch. 64)



Bandwidth 40M, 802.11ac(VHT40) (Ch. 62)



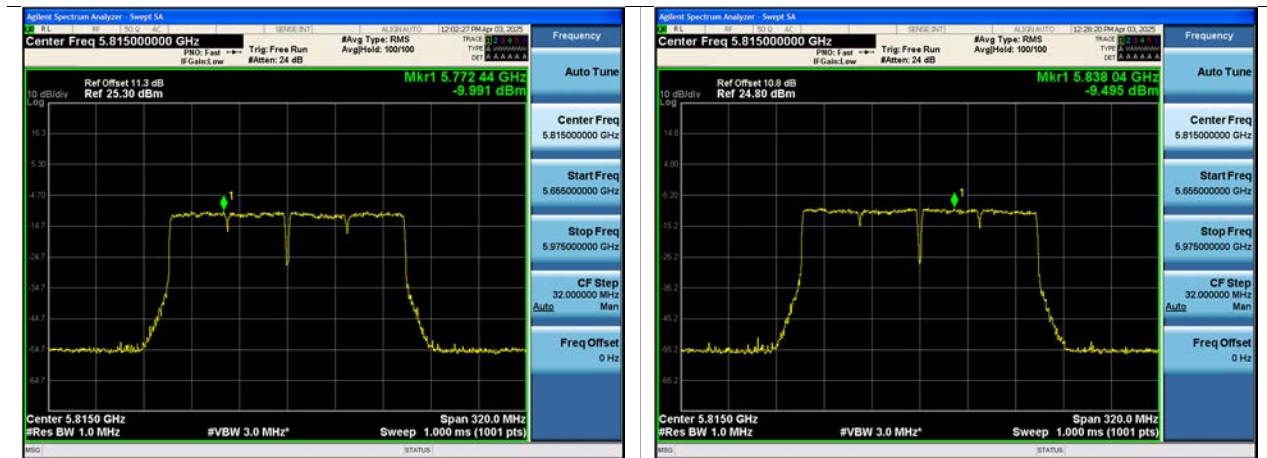
Bandwidth 80M, 802.11ac(VHT80) (Ch. 138)



ANT. 1

ANT. 2

Bandwidth 160M, 802.11ac(VHT160) (Ch. 163)



10.6 FREQUENCY STABILITY

Note:

1. All modes of operation were investigated and the worst case configuration results are reported.
2. 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.

10.6.1 802.11ac 160 MHz BW

[MIMO_CDD(Ant1+Ant2)]

REFERENCE VOLTAGE: 3.88 VDC

Startup after the EUT is energized

OPERATING BAND:			UNII Band 1 & 2A		UNII Band 2C		UNII Band 3 & 4	
OPERATING FREQUENCY:			5,250,000,000 Hz		5,570,000,000 Hz		5,815,000,000 Hz	
CHANNEL:			50		114		163	
Voltage	Power	Temp.	Frequency	Frequency Error	Frequency	Frequency Error	Frequency	Frequency Error
(%)	(VDC)	(°C)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)
100%	3.88	+20(Ref)	5250030.70	30.70	5570034.19	34.19	5815030.21	30.21
100%		-30	5250015.08	15.08	5570017.24	17.24	5815017.99	17.99
100%		-20	5250018.44	18.44	5570019.81	19.81	5815021.90	21.90
100%		-10	5250021.48	21.48	5570021.95	21.95	5815021.65	21.65
100%		0	5250025.62	25.62	5570025.85	25.85	5815024.22	24.22
100%		+10	5250028.24	28.24	5570027.42	27.42	5815027.63	27.63
100%		+30	5250033.23	33.23	5570036.45	36.45	5815034.89	34.89
100%		+40	5250038.36	38.36	5570039.83	39.83	5815039.59	39.59
100%		+50	5250039.17	39.17	5570041.16	41.16	5815040.02	40.02
High	4.45	+20	5250031.97	31.97	5570031.73	31.73	5815030.05	30.05
End Point	3.30	+20	5250030.04	30.04	5570031.20	31.20	5815029.96	29.96

2 minutes after the EUT is energized

OPERATING BAND:			UNII Band 1 & 2A		UNII Band 2C		UNII Band 3 & 4	
OPERATING FREQUENCY:			5,250,000,000 Hz		5,570,000,000 Hz		5,815,000,000 Hz	
CHANNEL:			50		114		163	
Voltage	Power	Temp.	Frequency	Frequency Error	Frequency	Frequency Error	Frequency	Frequency Error
(%)	(VDC)	(°C)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)
100%	3.88	+20(Ref)	5250032.02	32.02	5570031.43	31.43	5815034.44	34.44
100%		-30	5250015.84	15.84	5570015.39	15.39	5815017.70	17.70
100%		-20	5250020.15	20.15	5570018.60	18.60	5815021.19	21.19
100%		-10	5250022.92	22.92	5570024.60	24.60	5815024.44	24.44
100%		0	5250025.85	25.85	5570024.27	24.27	5815025.99	25.99
100%		+10	5250027.12	27.12	5570029.52	29.52	5815027.99	27.99
100%		+30	5250034.11	34.11	5570033.97	33.97	5815036.28	36.28
100%		+40	5250039.49	39.49	5570038.77	38.77	5815039.89	39.89
100%		+50	5250041.57	41.57	5570042.50	42.50	5815039.58	39.58
High	4.45	+20	5250031.89	31.89	5570031.47	31.47	5815029.44	29.44
End Point	3.30	+20	5250029.64	29.64	5570031.25	31.25	5815030.60	30.60

5 minutes after the EUT is energized

OPERATING BAND:			UNII Band 1 & 2A		UNII Band 2C		UNII Band 3 & 4	
OPERATING FREQUENCY:			5,250,000,000 Hz		5,570,000,000 Hz		5,815,000,000 Hz	
CHANNEL:			50		114		163	
Voltage	Power	Temp.	Frequency	Frequency Error	Frequency	Frequency Error	Frequency	Frequency Error
(%)	(VDC)	(°C)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)
100%	3.88	+20(Ref)	5250030.68	30.68	5570033.59	33.59	5815030.38	30.38
100%		-30	5250017.03	17.03	5570018.96	18.96	5815018.74	18.74
100%		-20	5250019.06	19.06	5570021.29	21.29	5815020.11	20.11
100%		-10	5250023.08	23.08	5570021.47	21.47	5815023.47	23.47
100%		0	5250026.71	26.71	5570025.87	25.87	5815025.87	25.87
100%		+10	5250027.28	27.28	5570028.84	28.84	5815028.25	28.25
100%		+30	5250036.47	36.47	5570035.61	35.61	5815034.27	34.27
100%		+40	5250038.89	38.89	5570039.24	39.24	5815036.78	36.78
100%		+50	5250042.69	42.69	5570040.04	40.04	5815041.82	41.82
High	4.45	+20	5250031.15	31.15	5570029.40	29.40	5815029.84	29.84
End Point	3.30	+20	5250031.33	31.33	5570030.05	30.05	5815030.11	30.11

10 minutes after the EUT is energized

OPERATING BAND:			UNII Band 1 & 2A		UNII Band 2C		UNII Band 3 & 4	
OPERATING FREQUENCY:			5,250,000,000 Hz		5,570,000,000 Hz		5,815,000,000 Hz	
CHANNEL:			50		114		163	
Voltage	Power	Temp.	Frequency	Frequency Error	Frequency	Frequency Error	Frequency	Frequency Error
(%)	(VDC)	(°C)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)
100%	3.88	+20(Ref)	5250035.34	35.34	5570035.12	35.12	5815033.02	33.02
100%		-30	5250017.70	17.70	5570016.40	16.40	5815017.07	17.07
100%		-20	5250018.55	18.55	5570018.11	18.11	5815020.47	20.47
100%		-10	5250021.95	21.95	5570024.25	24.25	5815023.52	23.52
100%		0	5250024.52	24.52	5570024.90	24.90	5815024.21	24.21
100%		+10	5250028.21	28.21	5570028.27	28.27	5815030.54	30.54
100%		+30	5250035.80	35.80	5570034.76	34.76	5815033.09	33.09
100%		+40	5250039.57	39.57	5570038.56	38.56	5815036.36	36.36
100%		+50	5250041.31	41.31	5570040.03	40.03	5815040.52	40.52
High	4.45	+20	5250029.92	29.92	5570029.98	29.98	5815030.59	30.59
End Point	3.30	+20	5250031.66	31.66	5570030.94	30.94	5815029.68	29.68

10.7 STRADDLE CHANNEL

Test Description	Note
26 dB Bandwidth	[UNII 2C] 26 dB Bandwidth = 5725 MHz - Measured Frequency[MHz] [UNII 3] 26 dB Bandwidth = Measured Frequency[MHz] -5725 MHz
6 dB Bandwidth	6 dB Bandwidth = Measured Frequency[MHz] – 5725 MHz - Limit : > 0.5 MHz
Output Power	- Limit(UNII2C) : 23.98 dBm or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.) - Limit(UNII 3) : 30.00 dBm - Total Power (dBm) = Measured Value (dBm) + Duty Cycle Factor (dB)
Power Spectral Density	- Limit(UNII 2C) : 11.0 dBm/MHz - Limit(UNII 3) : 30.0 dBm/500kHz - Total PSD (dBm/MHz) = Measured Value (dBm/MHz) + Duty Cycle Factor (dB)

[ANT. 1]

Mode	Band	Freq. [MHz]	CH.	26dB BW [MHz]	6dB BW [MHz]	Total Power [dBm]	Limit [dBm]	Total PSD [dBm]	Limit [dBm/MHz]
802.11a	UNII2C	5720	144	15.44	-	14.02	22.89	3.602	11
802.11n(HT20)				15.88	-	13.98	23.01	3.338	11
802.11ac(VHT20)				15.92	-	13.92	23.02	3.374	11
802.11a	UNII3	5720	144	5.52	3.20	7.99	30.00	0.769	30 dBm/500kHz
802.11n(HT20)				5.48	3.80	8.55	30.00	0.484	30 dBm/500kHz
802.11ac(VHT20)				5.64	3.80	8.57	30.00	0.376	30 dBm/500kHz

Mode	Band	Freq. [MHz]	Channel	26dB BW [MHz]	6dB BW [MHz]	Total Power [dBm]	Limit [dBm]	Total PSD [dBm]	Limit [dBm/MHz]
802.11n(HT40)	UNII2C	5710	142	36.44	-	13.90	23.98	-0.368	11
802.11ac(VHT40)				36.36	-	13.62	23.98	-0.109	11
802.11n(HT40)	UNII3	5710	142	6.04	3.24	3.79	30.00	-3.400	30 dBm/500kHz
802.11ac(VHT40)				6.20	3.24	3.89	30.00	-3.986	30 dBm/500kHz

Mode	Band	Freq. [MHz]	Channel	26dB BW [MHz]	6dB BW [MHz]	Total Power [dBm]	Limit [dBm]	Total PSD [dBm]	Limit [dBm/MHz]
802.11ac(VHT80)	UNII2C	5690	138	82.04	-	12.88	23.98	-4.808	11
802.11ac(VHT80)	UNII3	5690	138	10.76	3.24	0.22	30.00	-6.955	30 dBm/500kHz

[ANT. 2]

Mode	Band	Freq. [MHz]	CH.	26dB BW [MHz]	6dB BW [MHz]	Total Power [dBm]	Limit [dBm]	Total PSD [dBm]	Limit [dBm/MHz]
802.11a	UNII2C	5720	144	15.52	-	14.17	22.91	3.803	11
802.11n(HT20)				15.88	-	14.16	23.01	3.636	11
802.11ac(VHT20)				15.92	-	14.09	23.02	3.487	11
802.11a	UNII3	5720	144	5.44	3.20	8.20	30.00	0.940	30 dBm/500kHz
802.11n(HT20)				5.48	3.80	8.58	30.00	0.621	30 dBm/500kHz
802.11ac(VHT20)				5.44	3.80	8.62	30.00	0.611	30 dBm/500kHz

Mode	Band	Freq. [MHz]	Channel	26dB BW [MHz]	6dB BW [MHz]	Total Power [dBm]	Limit [dBm]	Total PSD [dBm]	Limit [dBm/MHz]
802.11n(HT40)	UNII2C	5710	142	36.36	-	14.03	23.98	-0.280	11
802.11ac(VHT40)				36.12	-	13.78	23.98	0.071	11
802.11n(HT40)	UNII3	5710	142	6.12	3.24	3.69	30.00	-3.611	30 dBm/500kHz
802.11ac(VHT40)				5.96	3.24	3.60	30.00	-3.696	30 dBm/500kHz

Mode	Band	Freq. [MHz]	Channel	26dB BW [MHz]	6dB BW [MHz]	Total Power [dBm]	Limit [dBm]	Total PSD [dBm]	Limit [dBm/MHz]
802.11ac(VHT80)	UNII2C	5690	138	82.04	-	13.01	23.98	-4.171	11
802.11ac(VHT80)	UNII3	5690	138	10.92	3.24	0.38	30.00	-6.654	30 dBm/500kHz

□ Test Plots (26 dB Bandwidth)

[ANT. 1]

802.11a UNII Band



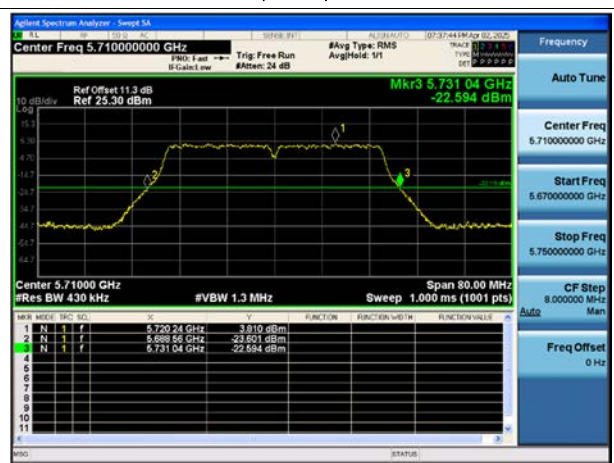
802.11n(HT20) UNII Band



802.11ac(VHT20) UNII Band



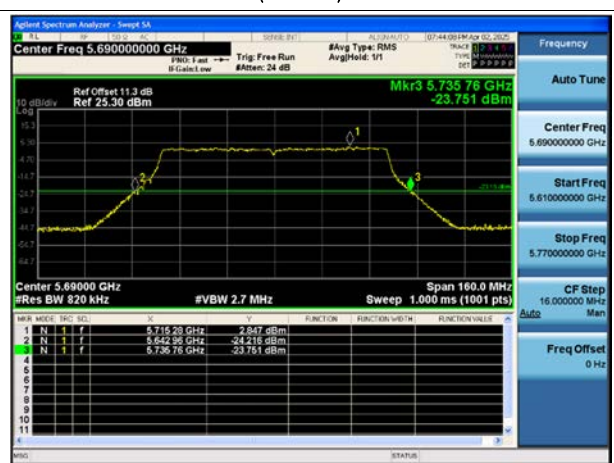
802.11n(HT40) UNII Band



802.11ac(VHT40) UNII Band

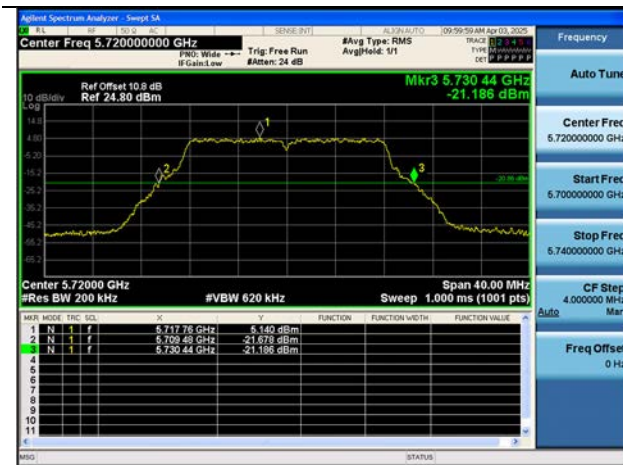


802.11ac(VHT80) UNII Band

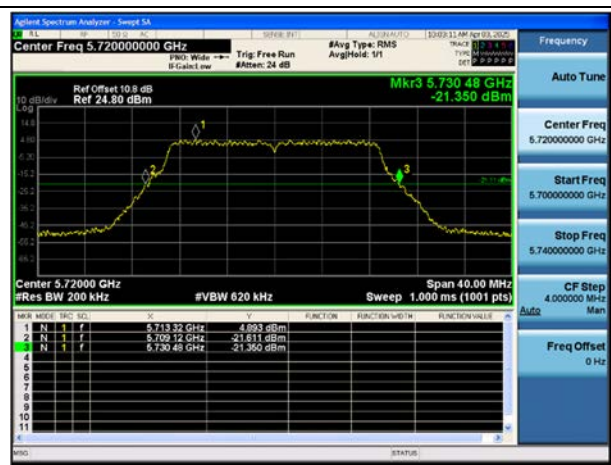


[ANT. 2]

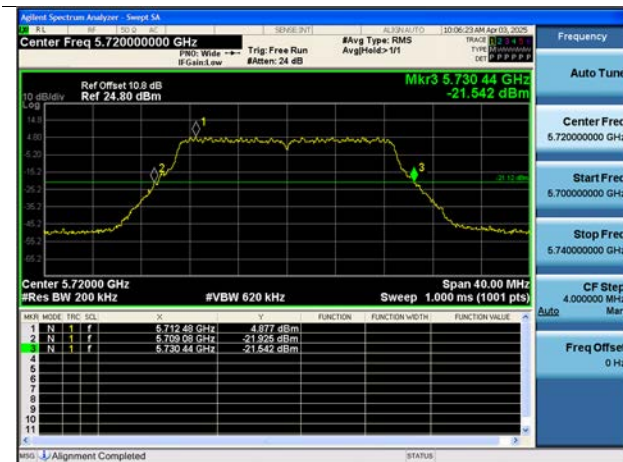
802.11a UNII Band



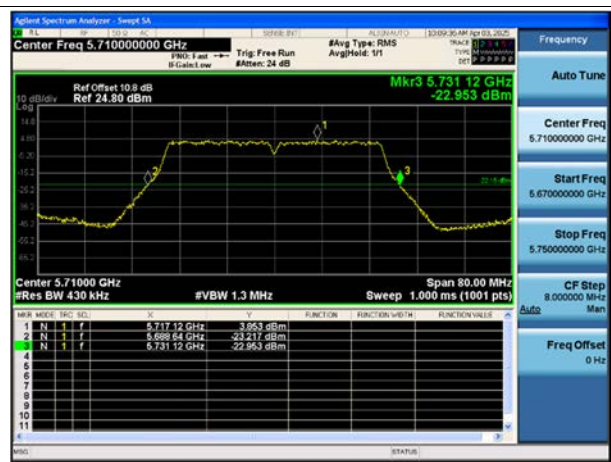
802.11n(HT20) UNII Band



802.11ac(VHT20) UNII Band



802.11n(HT40) UNII Band



802.11ac(VHT40) UNII Band



802.11ac(VHT80) UNII Band

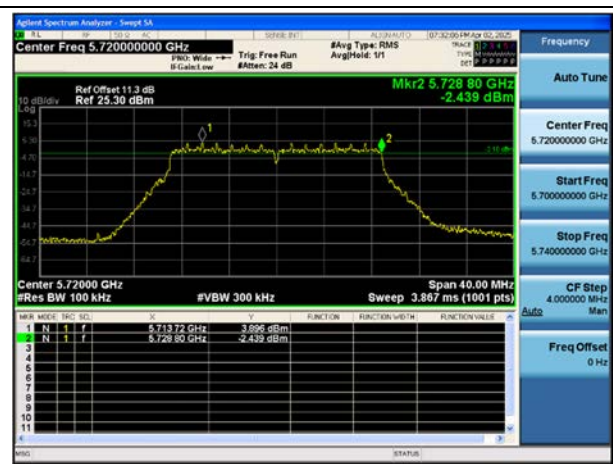


□ Test Plots(UNII 3 Band 6 dB Bandwidth)
[ANT. 1]

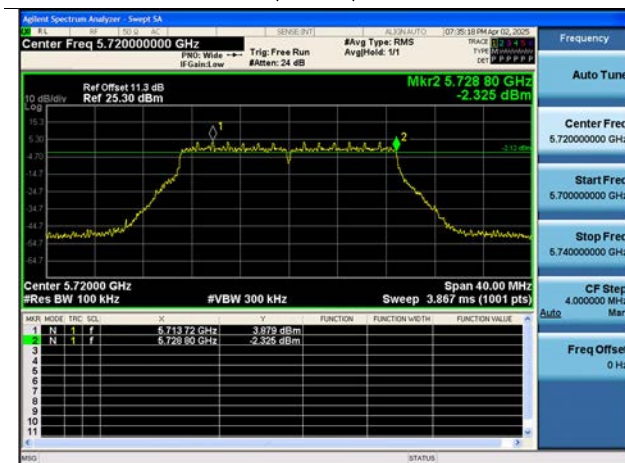
802.11a UNII Band



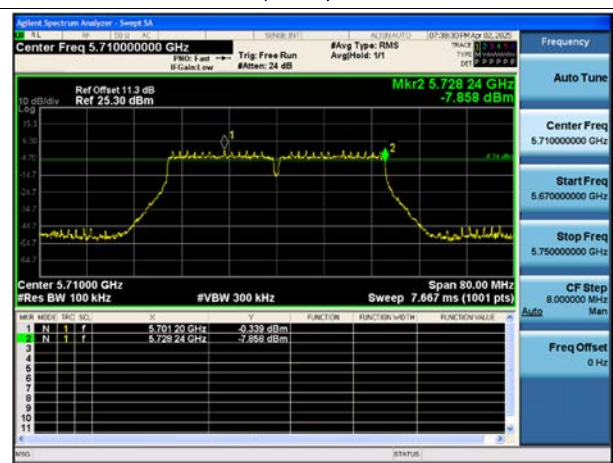
802.11n(HT20) UNII Band



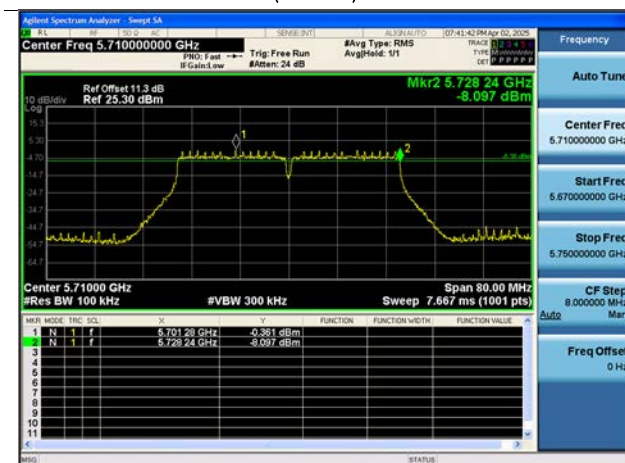
802.11ac(VHT20) UNII Band



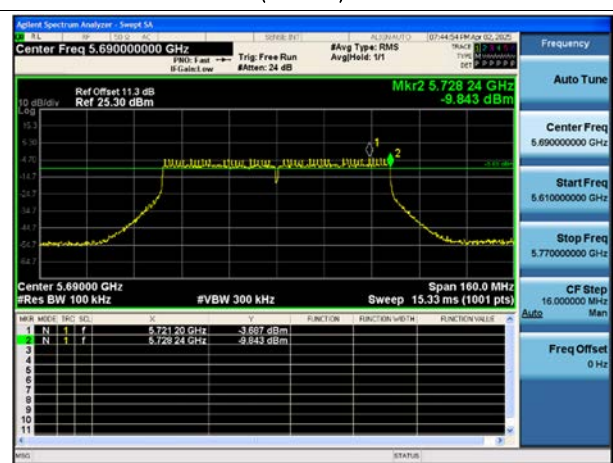
802.11n(HT40) UNII Band



802.11ac(VHT40) UNII Band

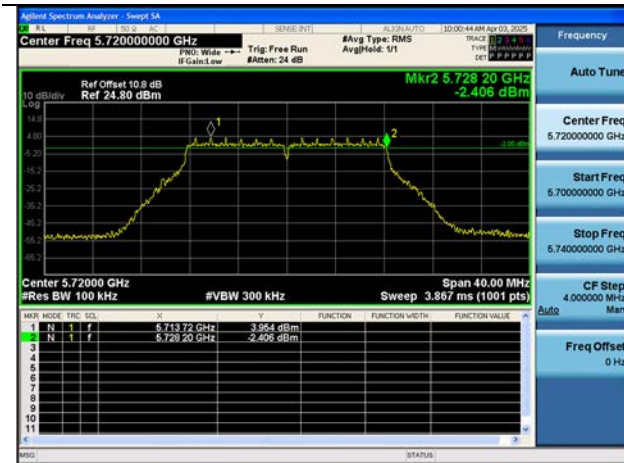


802.11ac(VHT80) UNII Band

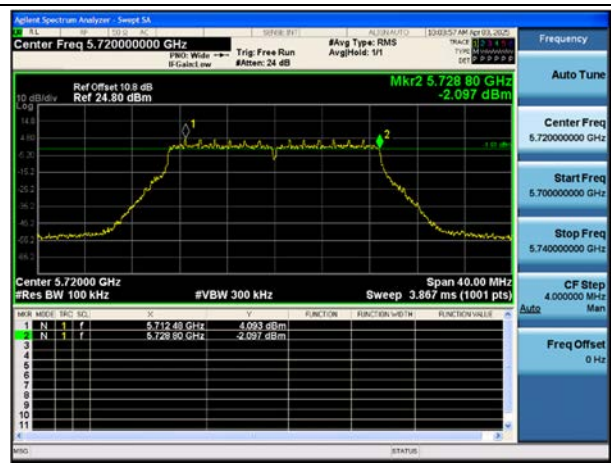


[ANT. 2]

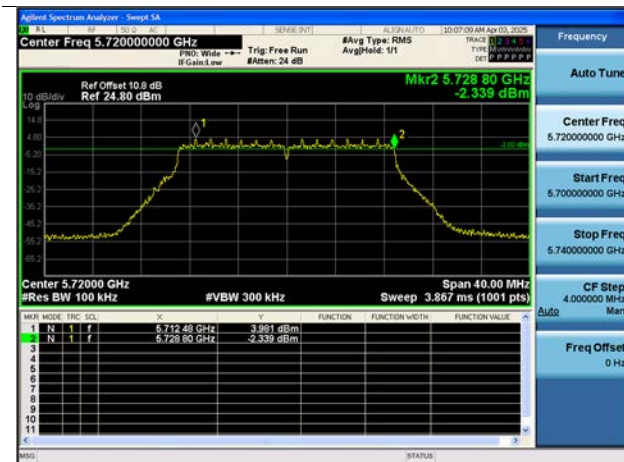
802.11a UNII Band



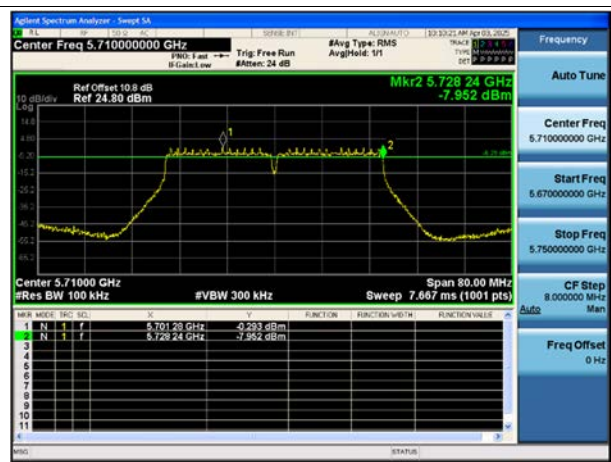
802.11n(HT20) UNII Band



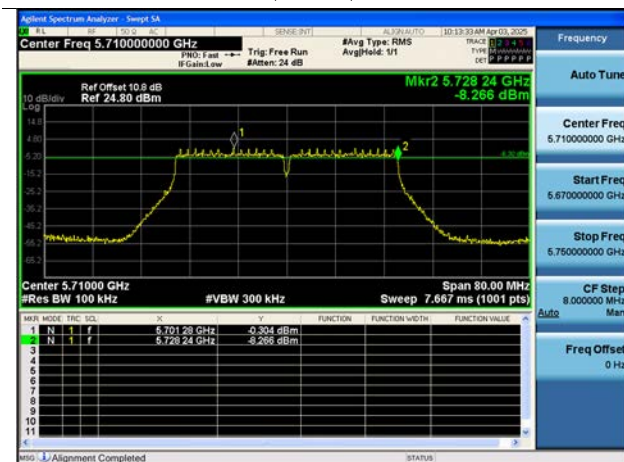
802.11ac(VHT20) UNII Band



802.11n(HT40) UNII Band



802.11ac(VHT40) UNII Band



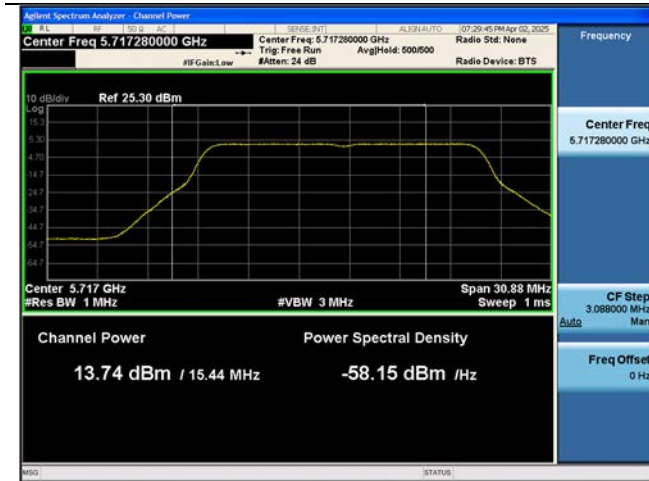
802.11ac(VHT80) UNII Band



▣ Test Plots(Output Power)

[ANT. 1]

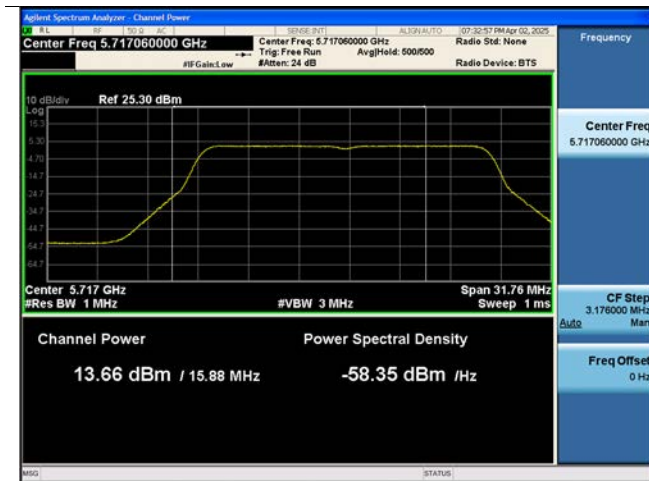
802.11a UNII 2C Band



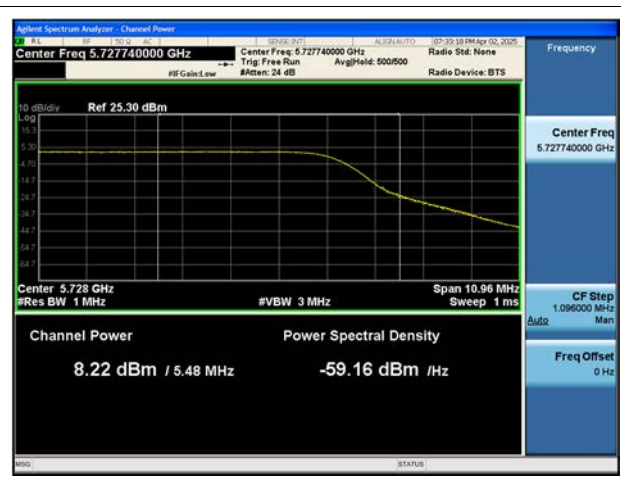
802.11a UNII 3 Band



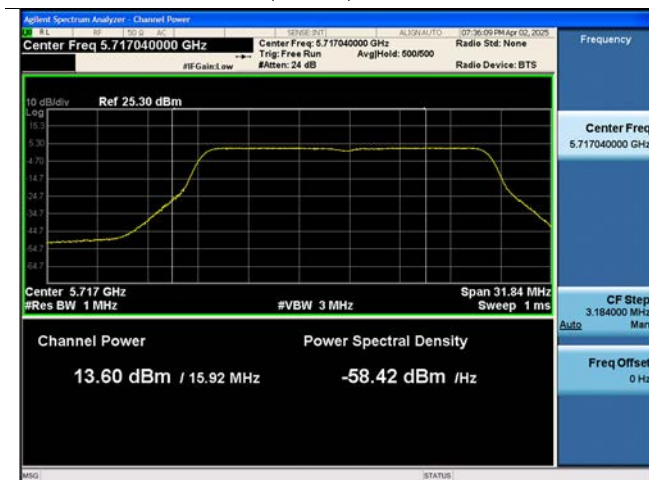
802.11n(HT20) UNII 2C Band



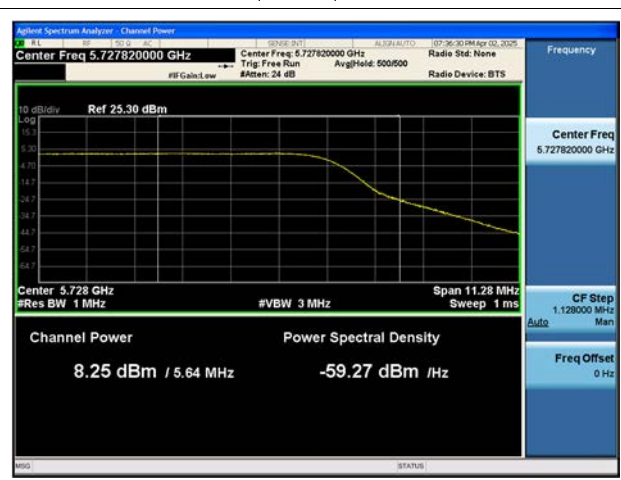
802.11n(HT20) UNII 3 Band



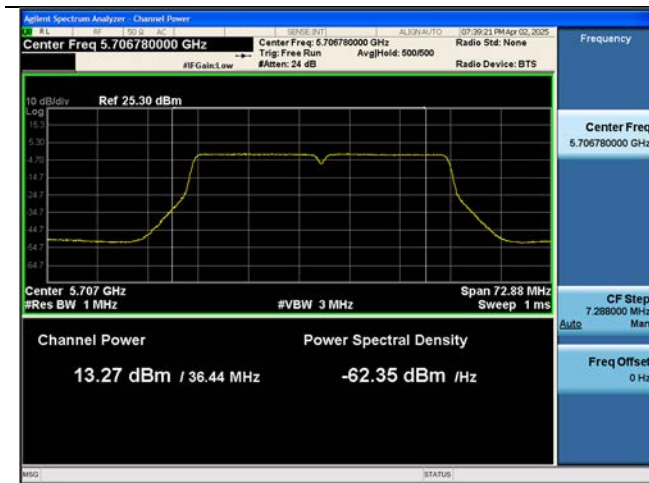
802.11ac(VHT20) UNII 2C Band



802.11ac(VHT20) UNII 3 Band



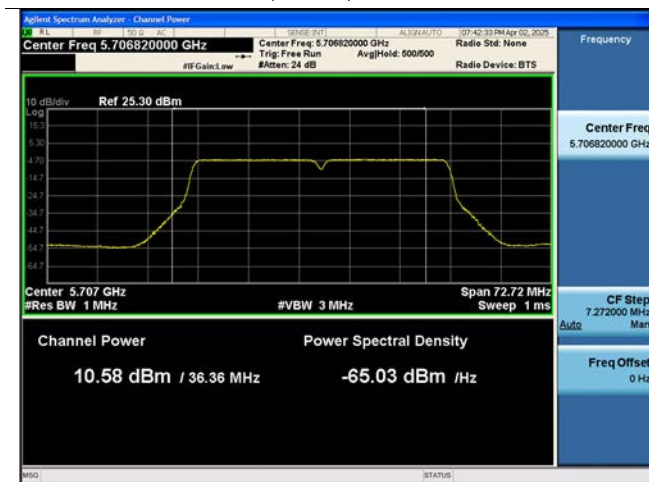
802.11n(HT40) UNII 2C Band



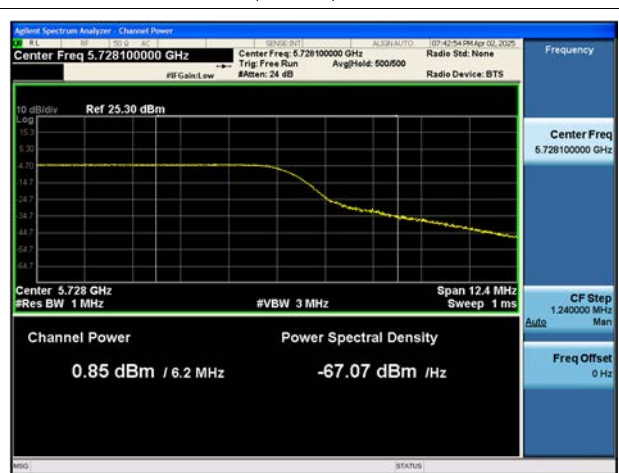
802.11n(HT40) UNII 3 Band



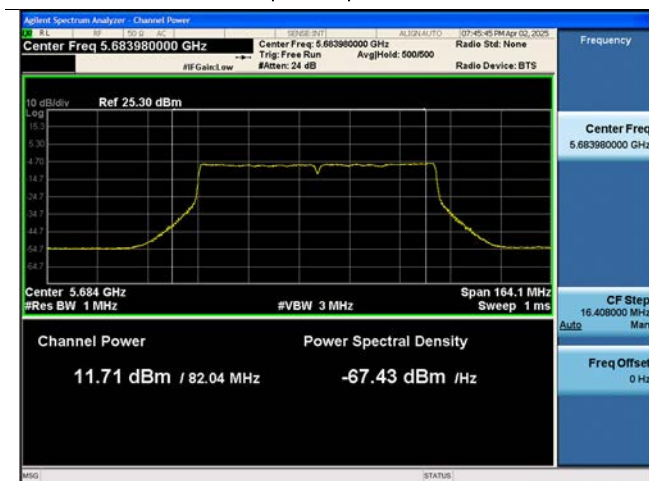
802.11ac(VHT40) UNII 2C Band



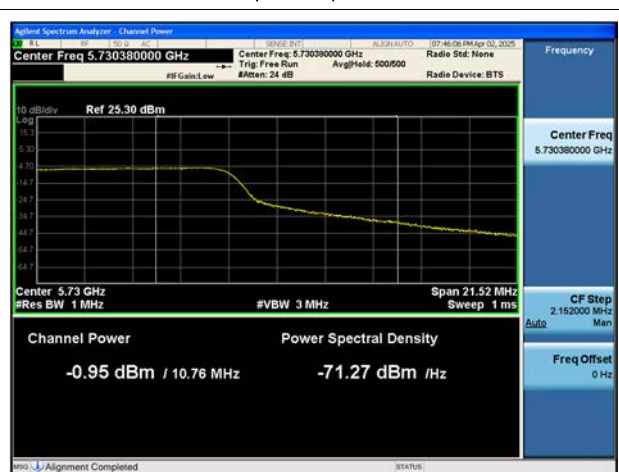
802.11ac(VHT40) UNII 3 Band



802.11ac(VHT80) UNII 2C Band

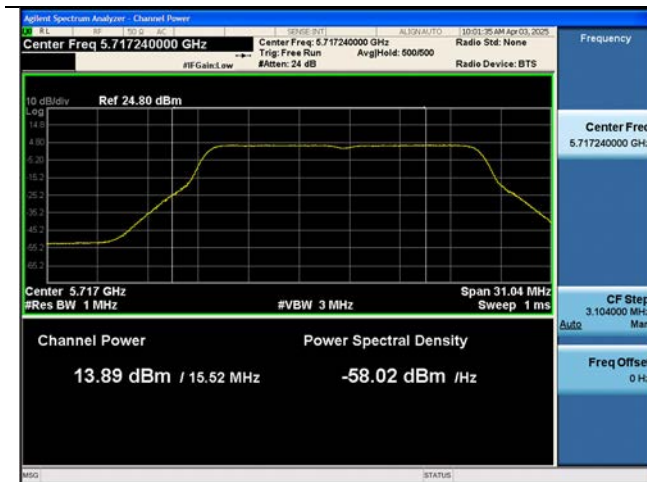


802.11ac(VHT80) UNII 3 Band

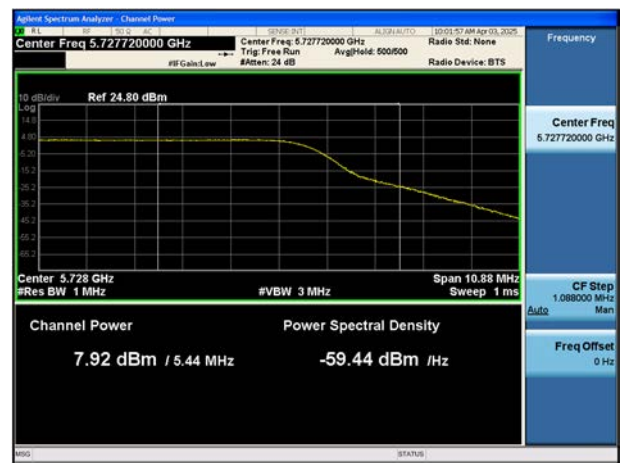


[ANT. 2]

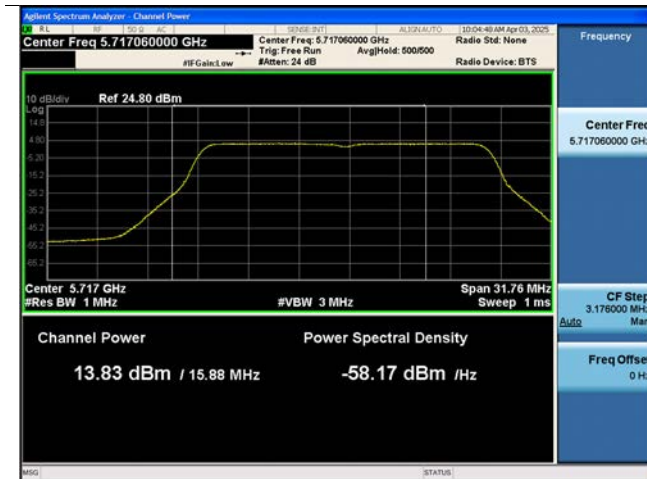
802.11a UNII 2C Band



802.11a UNII 3 Band



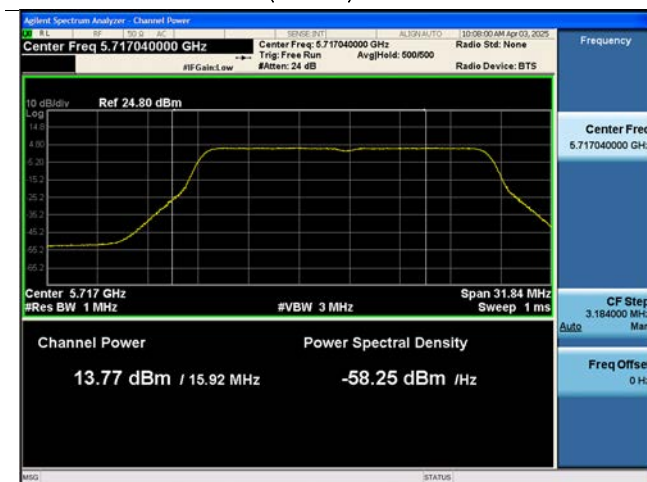
802.11n(HT20) UNII 2C Band



802.11n(HT20) UNII 3 Band



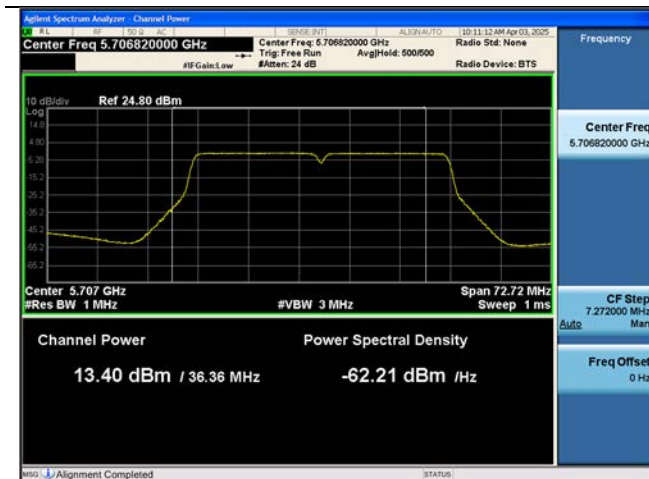
802.11ac(VHT20) UNII 2C Band



802.11ac(VHT20) UNII 3 Band



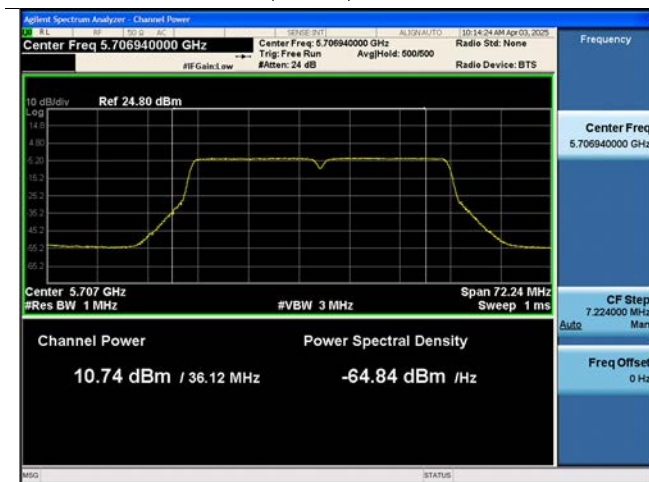
802.11n(HT40) UNII 2C Band



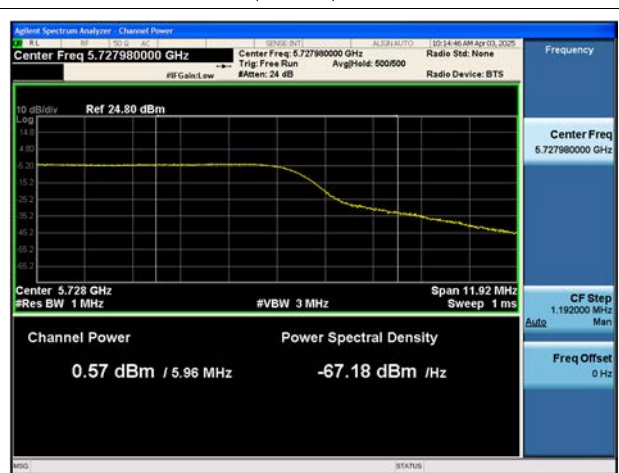
802.11n(HT40) UNII 3 Band



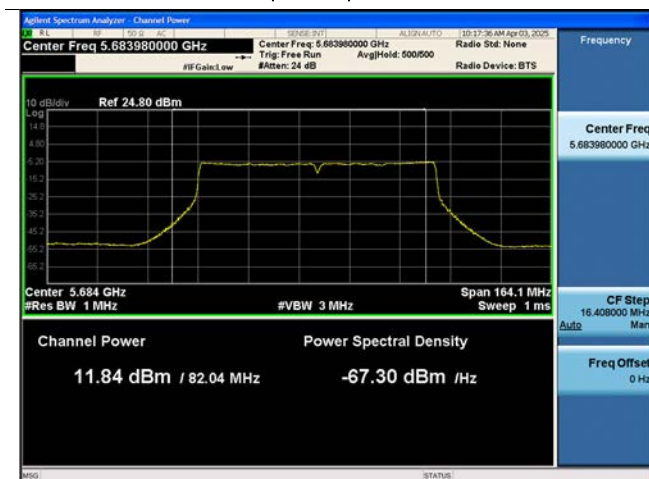
802.11ac(VHT40) UNII 2C Band



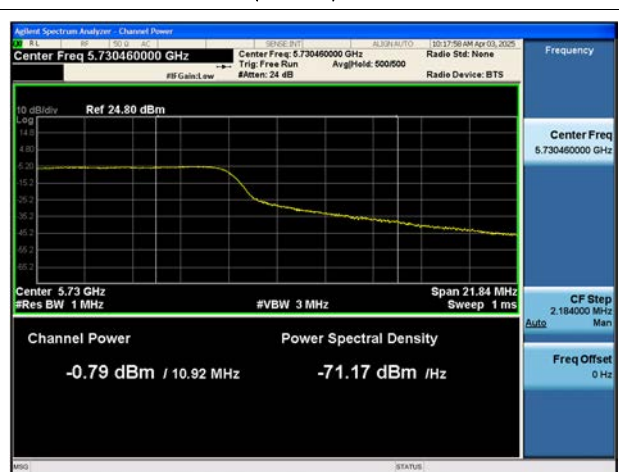
802.11ac(VHT40) UNII 3 Band



802.11ac(VHT80) UNII 2C Band



802.11ac(VHT80) UNII 3 Band



▣ Test Plots(Power Spectral Density)
[ANT. 1]

802.11a UNII 2C Band



802.11a UNII 3 Band



802.11n(HT20) UNII 2C Band



802.11n(HT20) UNII 3 Band



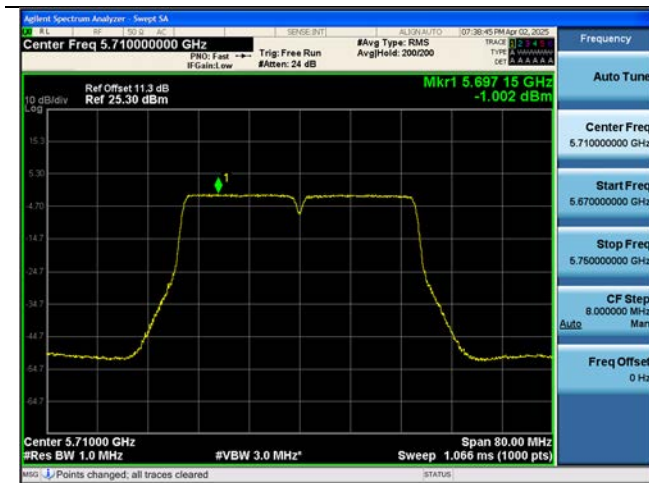
802.11ac(VHT20) UNII 2C Band



802.11ac(VHT20) UNII 3 Band



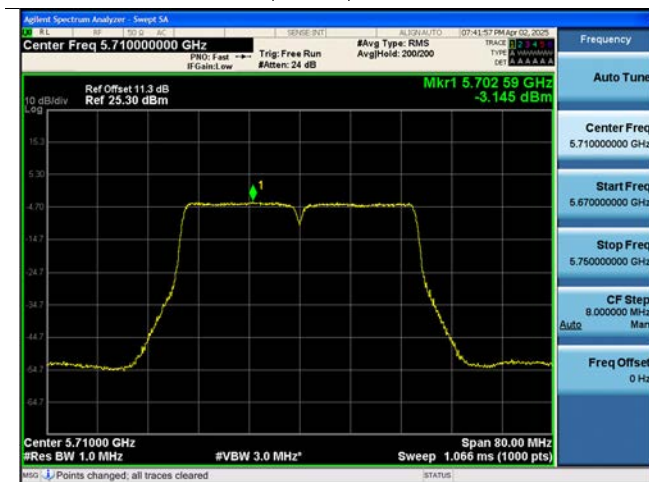
802.11n(HT40) UNII 2C Band



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



[ANT. 2]

802.11a UNII 2C Band



802.11a UNII 3 Band



802.11n(HT20) UNII 2C Band



802.11n(HT20) UNII 3 Band



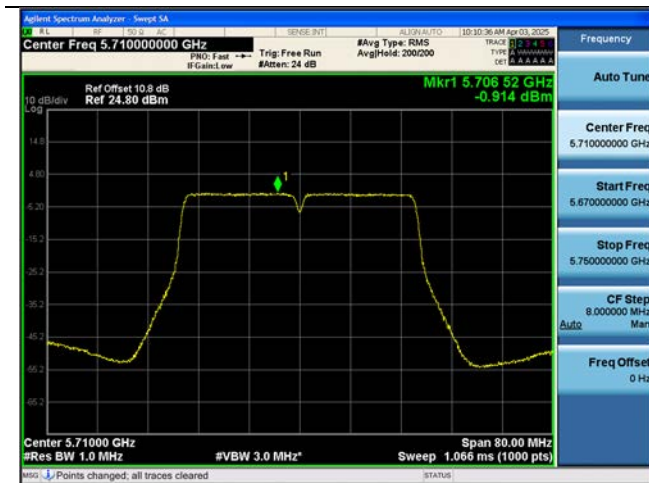
802.11ac(VHT20) UNII 2C Band



802.11ac(VHT20) UNII 3 Band



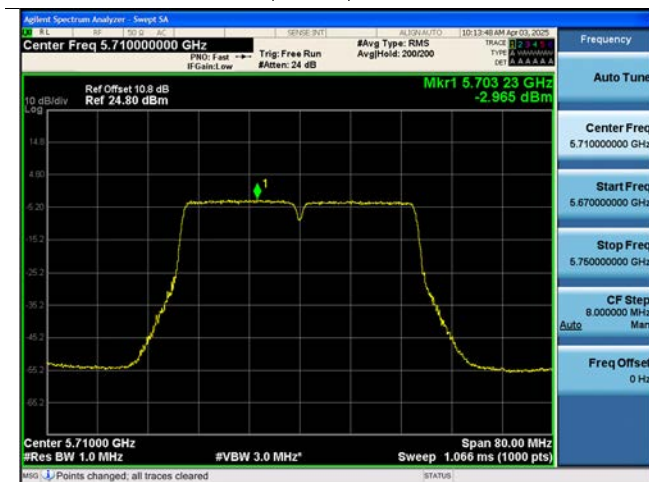
802.11n(HT40) UNII 2C Band



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	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin
[MHz]	[dB μ V]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/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 = $40\log(\text{specific distance} / \text{test distance})$ (dB)
3. Limit line = specific Limits (dB μ V) + Distance extrapolation factor

Frequency Range : Below 1 GHz

Frequency	Measured Value	A.F+C.L	ANT. POL	Total	Limit	Margin
[MHz]	[dB μ V]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/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

[MIMO_CDD(Ant1+Ant2)]

[Open mode]

Band : UNII 1			Operation Mode : 802.11a				
CH.36 5180 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10360	57.68	-2.83	V	54.85	68.20	13.35	PK
15540	52.70	-0.82	V	51.88	73.98	22.10	PK
15540	38.92	-0.82	V	38.10	53.98	15.88	AV
10360	55.73	-2.83	H	52.90	68.20	15.30	PK
15540	53.58	-0.82	H	52.76	73.98	21.22	PK
15540	39.27	-0.82	H	38.45	53.98	15.53	AV

Band : UNII 1			Operation Mode : 802.11a				
CH.40 5200 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10400	55.34	-2.79	V	52.55	68.20	15.65	PK
15600	53.87	-1.30	V	52.57	73.98	21.41	PK
15600	40.14	-1.30	V	38.84	53.98	15.14	AV
10400	55.03	-2.79	H	52.24	68.20	15.96	PK
15600	53.96	-1.30	H	52.66	73.98	21.32	PK
15600	40.46	-1.30	H	39.16	53.98	14.82	AV

Band : UNII 1			Operation Mode : 802.11a				
CH.48 5240 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10480	54.02	-3.15	V	50.87	68.20	17.33	PK
15720	53.55	-1.57	V	51.98	73.98	22.00	PK
15720	40.48	-1.57	V	38.91	53.98	15.07	AV
10480	54.35	-3.15	H	51.20	68.20	17.00	PK
15720	53.93	-1.57	H	52.36	73.98	21.62	PK
15720	40.26	-1.57	H	38.69	53.98	15.29	AV

Band : UNII 2A			Operation Mode : 802.11a				
CH.52 5260 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10520	54.52	-3.35	V	51.17	68.20	17.03	PK
15780	53.16	-1.91	V	51.25	73.98	22.73	PK
15780	39.52	-1.91	V	37.61	53.98	16.37	AV
10520	54.42	-3.35	H	51.07	68.20	17.13	PK
15780	53.60	-1.91	H	51.69	73.98	22.29	PK
15780	39.74	-1.91	H	37.83	53.98	16.15	AV

Band : UNII 2A			Operation Mode : 802.11a				
CH.60 5300 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10600	54.96	-2.99	V	51.97	73.98	22.01	PK
10600	41.60	-2.99	V	38.61	53.98	15.37	AV
15900	52.93	-2.09	V	50.84	73.98	23.14	PK
15900	39.86	-2.09	V	37.77	53.98	16.21	AV
10600	55.50	-2.99	H	52.51	73.98	21.47	PK
10600	41.62	-2.99	H	38.63	53.98	15.35	AV
15900	52.42	-2.09	H	50.33	73.98	23.65	PK
15900	39.34	-2.09	H	37.25	53.98	16.73	AV

Band : UNII 2A			Operation Mode : 802.11a				
CH.64 5320 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10640	55.08	-2.91	V	52.17	73.98	21.81	PK
10640	41.90	-2.91	V	38.99	53.98	14.99	AV
15960	53.14	-1.81	V	51.33	73.98	22.65	PK
15960	39.59	-1.81	V	37.78	53.98	16.20	AV
10640	54.91	-2.91	H	52.00	73.98	21.98	PK
10640	41.65	-2.91	H	38.74	53.98	15.24	AV
15960	53.79	-1.81	H	51.98	73.98	22.00	PK
15960	39.45	-1.81	H	37.64	53.98	16.34	AV

Band : UNII 2C			Operation Mode : 802.11a				
CH.100 5500 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
11000	54.47	-2.24	V	52.23	73.98	21.75	PK
11000	40.88	-2.24	V	38.64	53.98	15.34	AV
16500	52.12	-2.07	V	50.05	68.20	18.15	PK
11000	54.05	-2.24	H	51.81	73.98	22.17	PK
11000	40.81	-2.24	H	38.57	53.98	15.41	AV
16500	53.47	-2.07	H	51.40	68.20	16.80	PK

Band : UNII 2C			Operation Mode : 802.11a				
CH.116 5580 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
11160	53.92	-3.10	V	50.82	73.98	23.16	PK
11160	40.28	-3.10	V	37.18	53.98	16.80	AV
16740	53.01	-2.07	V	50.94	68.20	17.26	PK
11160	53.66	-3.10	H	50.56	73.98	23.42	PK
11160	40.19	-3.10	H	37.09	53.98	16.89	AV
16740	52.86	-2.07	H	50.79	68.20	17.41	PK

Band : UNII 2C			Operation Mode : 802.11a				
CH.144 5720 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
11440	55.15	-2.58	V	52.57	73.98	21.41	PK
11440	41.19	-2.58	V	38.61	53.98	15.37	AV
17160	52.86	-1.97	V	50.89	68.20	17.31	PK
11440	55.17	-2.58	H	52.59	73.98	21.39	PK
11440	41.07	-2.58	H	38.49	53.98	15.49	AV
17160	53.34	-1.97	H	51.37	68.20	16.83	PK

Band : UNII 3			Operation Mode : 802.11a				
CH.149 5745 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
11490	55.10	-2.65	V	52.45	73.98	21.53	PK
11490	41.09	-2.65	V	38.44	53.98	15.54	AV
17235	52.99	-1.84	V	51.15	68.20	17.05	PK
11490	54.38	-2.65	H	51.73	73.98	22.25	PK
11490	41.12	-2.65	H	38.47	53.98	15.51	AV
17235	53.37	-1.84	H	51.53	68.20	16.67	PK

Band : UNII 3			Operation Mode : 802.11a				
CH.157 5785 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
11570	54.73	-3.00	V	51.73	73.98	22.25	PK
11570	40.99	-3.00	V	37.99	53.98	15.99	AV
17355	53.01	-1.56	V	51.45	68.20	16.75	PK
11570	54.62	-3.00	H	51.62	73.98	22.36	PK
11570	41.03	-3.00	H	38.03	53.98	15.95	AV
17355	53.15	-1.56	H	51.59	68.20	16.61	PK

Band : UNII 3			Operation Mode : 802.11a				
CH.165 5825 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
11650	54.90	-3.48	V	51.42	73.98	22.56	PK
11650	41.56	-3.48	V	38.08	53.98	15.90	AV
17475	51.99	-0.28	V	51.71	68.20	16.49	PK
11650	54.63	-3.48	H	51.15	73.98	22.83	PK
11650	41.29	-3.48	H	37.81	53.98	16.17	AV
17475	52.01	-0.28	H	51.73	68.20	16.47	PK

Band : UNII 4			Operation Mode : 802.11a				
CH.169 5845 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
11690	53.96	-3.24	V	50.72	73.98	23.26	PK
11690	41.10	-3.24	V	37.86	53.98	16.12	AV
17535	51.91	0.90	V	52.81	68.20	15.39	PK
11690	54.59	-3.24	H	51.35	73.98	22.63	PK
11690	40.93	-3.24	H	37.69	53.98	16.29	AV
17535	52.12	0.90	H	53.02	68.20	15.18	PK

Band : UNII 4			Operation Mode : 802.11a				
CH.173 5865 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
11730	53.68	-3.04	V	50.64	73.98	23.34	PK
11730	40.81	-3.04	V	37.77	53.98	16.21	AV
17595	52.62	1.19	V	53.81	68.20	14.39	PK
11730	53.80	-3.04	H	50.76	73.98	23.22	PK
11730	40.79	-3.04	H	37.75	53.98	16.23	AV
17595	52.05	1.19	H	53.24	68.20	14.96	PK

Band : UNII 4			Operation Mode : 802.11a				
CH.177 5885 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
11770	53.52	-2.86	V	50.66	73.98	23.32	PK
11770	39.95	-2.86	V	37.09	53.98	16.89	AV
17655	51.61	1.64	V	53.25	68.20	14.95	PK
11770	53.88	-2.86	H	51.02	73.98	22.96	PK
11770	40.28	-2.86	H	37.42	53.98	16.56	AV
17655	52.13	1.64	H	53.77	68.20	14.43	PK

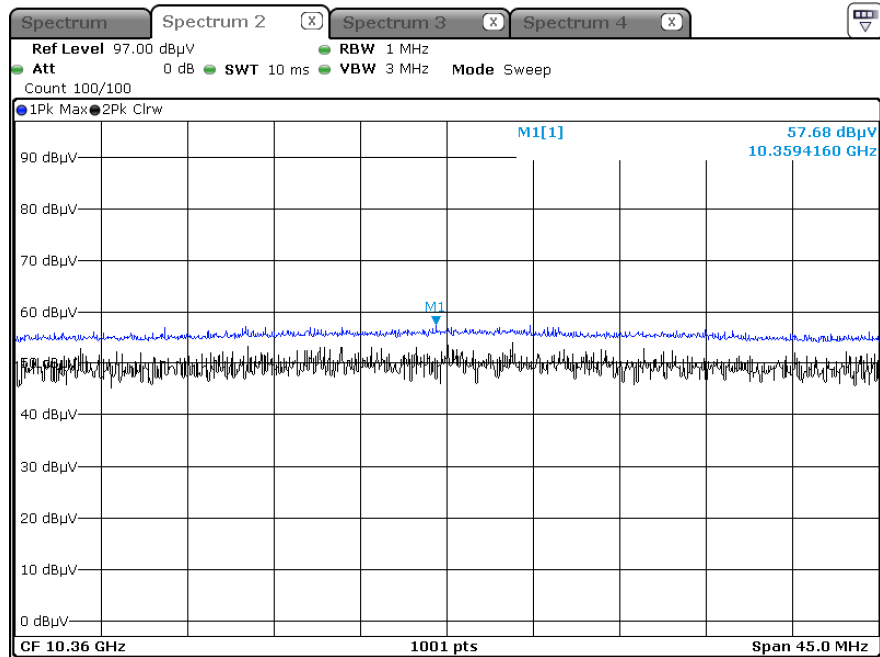
Test Plots

Note: Only the worst case plots for Radiated Spurious Emissions.

[MIMO_CDD(Ant1+Ant2)]

[Open mode]

Radiated Spurious Emissions plot – Peak Result (802.11a, Ch.36 Spurious Emissions, X-V)



10.9 RADIATED RESTRICTED BAND EDGE

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

[MIMO_CDD(Ant1+Ant2)]

[Open mode]

802.11 a		6 Mbps					
Channel	Ch.36	5180 MHz	UNII 1				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5150	45.41	13.10	H	58.51	73.98	15.47	PK
5150	32.49	13.10	H	45.59	53.98	8.39	AV

802.11 a		6 Mbps					
Channel	Ch. 64	5320 MHz	UNII 2A				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5350	49.51	13.57	H	63.08	73.98	10.90	PK
5350	33.00	13.57	H	46.57	53.98	7.41	AV

802.11 a		6 Mbps					
Channel	Ch. 100	5500 MHz	UNII 2C				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5460	47.72	14.14	H	61.86	73.98	12.12	PK
5460	31.93	14.14	H	46.07	53.98	7.91	AV
#5460~5470	48.76	14.15	H	62.91	68.20	5.29	PK

802.11 n_HT20		MCS 0					
Channel	Ch. 36	5180 MHz	UNII 1				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5150	45.05	13.10	H	58.15	73.98	15.83	PK
5150	32.61	13.10	H	45.71	53.98	8.27	AV

802.11 n_HT20		MCS 0					
Channel	Ch. 64	5320 MHz	UNII 2A				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5350	45.04	13.57	H	58.61	73.98	15.37	PK
5350	32.20	13.57	H	45.77	53.98	8.21	AV

802.11 n_HT20		MCS 0					
Channel	Ch. 100	5500 MHz	UNII 2C				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5460	44.60	14.14	H	58.74	73.98	15.24	PK
5460	31.99	14.14	H	46.13	53.98	7.85	AV
5470	43.99	14.15	H	58.14	68.20	10.06	PK

802.11 ac_VHT20		MCS 0					
Channel	Ch. 36	5180 MHz	UNII 1				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5150	45.31	13.10	H	58.41	73.98	15.57	PK
5150	32.71	13.10	H	45.81	53.98	8.17	AV

802.11 ac_VHT20		MCS 0					
Channel	Ch. 64	5320 MHz	UNII 2A				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5350	44.77	13.57	H	58.34	73.98	15.64	PK
5350	32.07	13.57	H	45.64	53.98	8.34	AV

802.11 ac_VHT20		MCS 0					
Channel	Ch. 100	5500 MHz	UNII 2C				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5460	44.45	14.14	H	58.59	73.98	15.39	PK
5460	32.10	14.14	H	46.24	53.98	7.74	AV
5470	43.43	14.15	H	57.58	68.20	10.62	PK

802.11 n_HT40		MCS 0					
Channel	Ch. 38	5190 MHz	UNII 1				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5150	45.95	13.10	H	59.05	73.98	14.93	PK
5150	33.54	13.10	H	46.64	53.98	7.34	AV

802.11 n_HT40		MCS 0					
Channel	Ch. 62	5310 MHz	UNII 2A				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5350	46.10	13.57	H	59.67	73.98	14.31	PK
5350	33.15	13.57	H	46.72	53.98	7.26	AV

802.11 n_HT40		MCS 0					
Channel	Ch. 102	5510 MHz	UNII 2C				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5460	44.98	14.14	H	59.12	73.98	14.86	PK
5460	33.15	14.14	H	47.29	53.98	6.69	AV
5470	45.94	14.15	H	60.09	68.20	8.11	PK

802.11 ac_VHT40		MCS 0					
Channel	Ch. 38	5190 MHz	UNII 1				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5150	45.57	13.10	H	58.67	73.98	15.31	PK
5150	33.66	13.10	H	46.76	53.98	7.22	AV

802.11 ac_VHT40		MCS 0					
Channel	Ch. 62	5310 MHz	UNII 2A				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5350	45.36	13.57	H	58.93	73.98	15.05	PK
5350	32.73	13.57	H	46.30	53.98	7.68	AV

802.11 ac_VHT40		MCS 0					
Channel	Ch. 102	5510 MHz	UNII 2C				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5460	45.47	14.14	H	59.61	73.98	14.37	PK
5460	33.14	14.14	H	47.28	53.98	6.70	AV
5470	46.14	14.15	H	60.29	68.20	7.91	PK

802.11 ac_VHT80		MCS 0					
Channel	Ch. 42	5210 MHz	UNII 1				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5150	45.92	13.10	H	59.02	73.98	14.96	PK
5150	34.17	13.10	H	47.27	53.98	6.71	AV

802.11 ac_VHT80		MCS 0					
Channel	Ch. 58	5290 MHz	UNII 2A				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5350	45.67	13.57	H	59.24	73.98	14.74	PK
5350	33.06	13.57	H	46.63	53.98	7.35	AV

802.11 ac_VHT80		MCS 0					
Channel	Ch. 106	5530 MHz	UNII 2C				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5460	45.75	14.14	H	59.89	73.98	14.09	PK
5460	33.80	14.14	H	47.94	53.98	6.04	AV
#5460~5470	44.47	14.15	H	58.62	68.20	9.58	PK

802.11 ac_VHT160(Lower)		MCS 0					
Channel	Ch. 50	5250 MHz	UNII 1 & 2A				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5150	52.57	13.10	H	65.67	73.98	8.31	PK
5150	33.86	13.10	H	46.96	53.98	7.02	AV

802.11 ac_VHT160(Upper)		MCS 0					
Channel	Ch. 50	5250 MHz	UNII 1 & 2A				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5350	52.86	13.57	H	66.43	73.98	7.55	PK
5350	33.34	13.57	H	46.91	53.98	7.07	AV

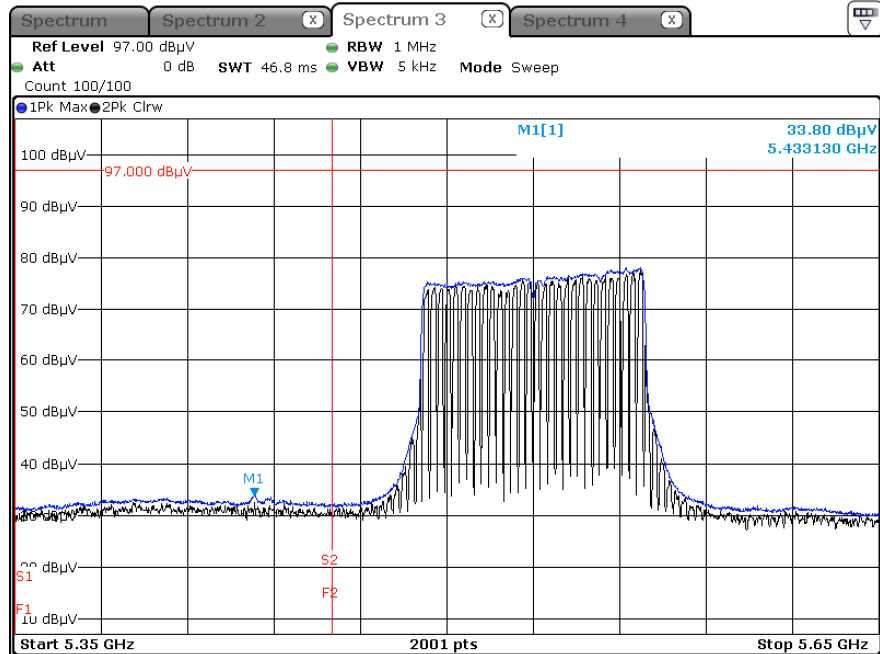
802.11 ac_VHT160		MCS 0					
Channel	Ch. 114	5570 MHz	UNII 2C				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
5460	51.85	14.14	H	65.99	73.98	7.99	PK
5460	33.65	14.14	H	47.79	53.98	6.19	AV
#5460~5470	45.23	14.15	H	59.38	68.20	8.82	PK

[MIMO_CDD(Ant1+Ant2)]

[Open mode]

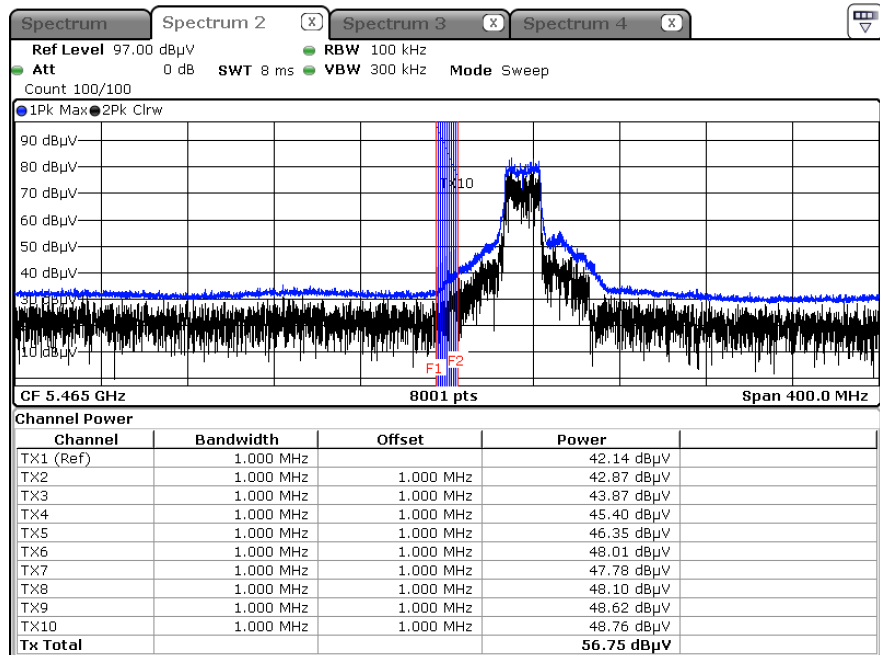
▣ Test Plots(UNII 1, 2A, 2C)

Average Result (802.11 ac_VHT80_ MCS0, Ch.106, Z-H)



Peak Result (802.11a _ 6 Mbps, Ch.100, Z-H)

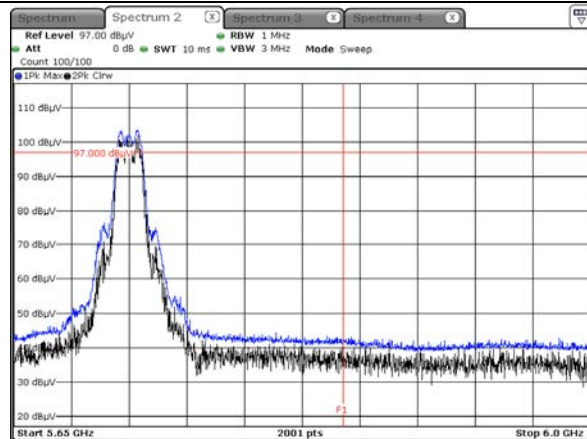
(Integration method Used)



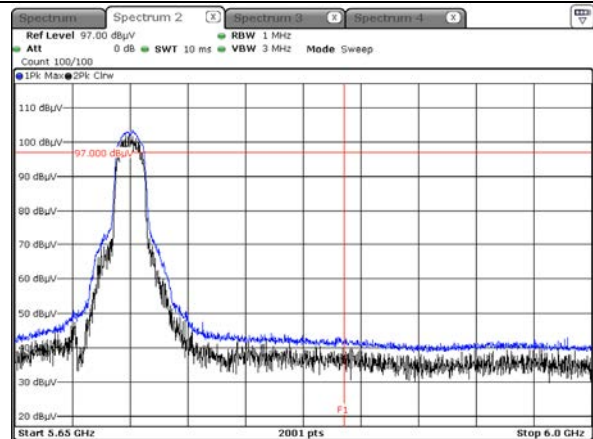
Note: Only the worst case plots for Radiated Restricted Band Edge.

Test Plots(Straddle Channel)

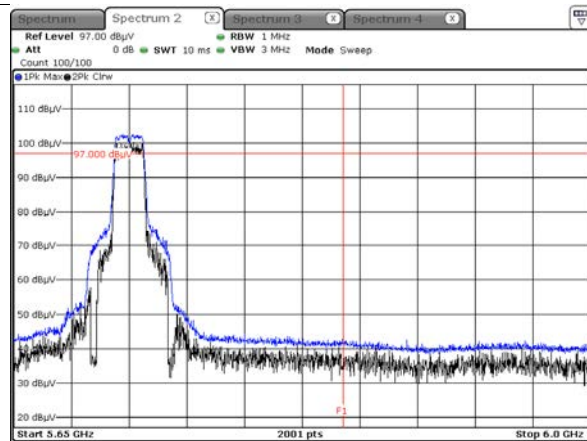
Peak Result (802.11a, Ch.144, Z-H)



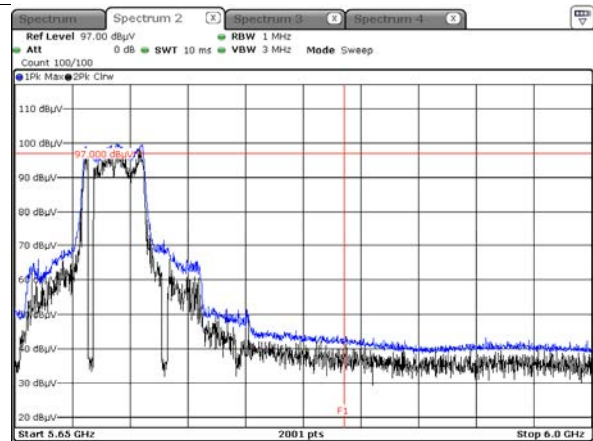
Peak Result (802.11n_HT20, Ch.144, Z-H)



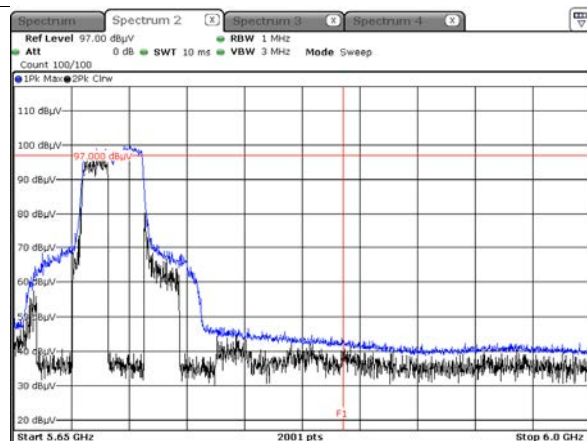
Peak Result (802.11ac_VHT20, Ch.144, Z-H)



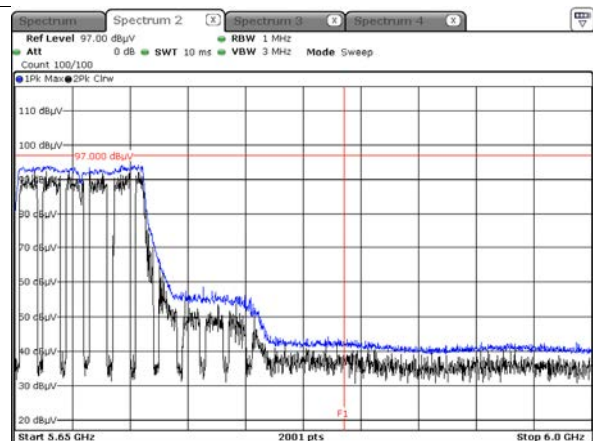
Peak Result (802.11n_HT40, Ch.142, Z-H)



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



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

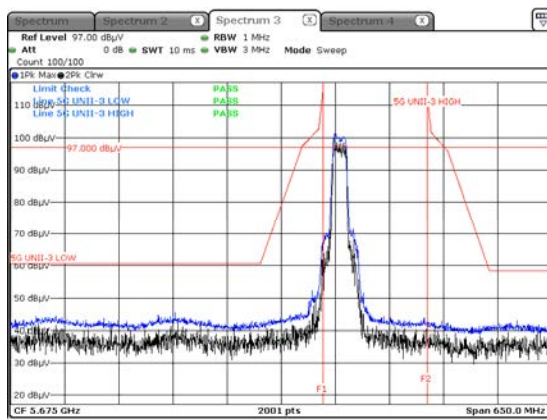


Note :

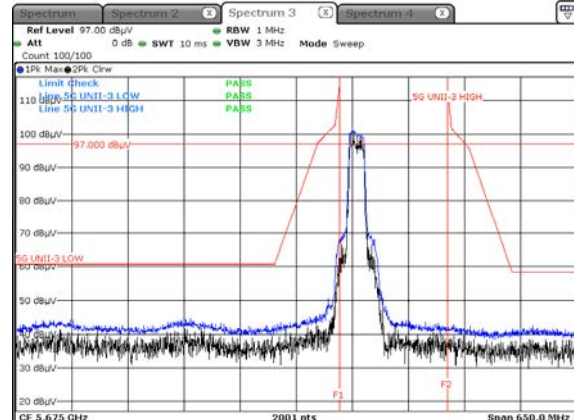
1. Only the worst case plots for Radiated Restricted Band Edge.
2. Red line : 5 850 MHz
3. Ambient Noise (Because of ambient noise, We attached only the worst plot without a data table)

Test Plots(UNII 3)

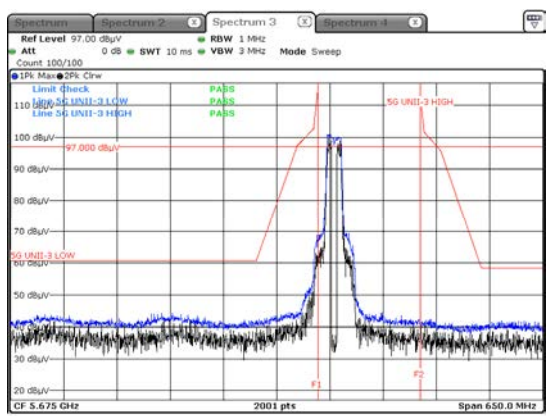
Peak Result (802.11a, Ch.149, Z-H)



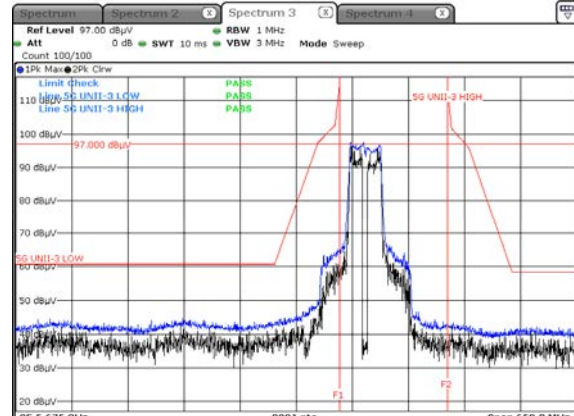
Peak Result (802.11n_HT20, Ch.149, Z-H)



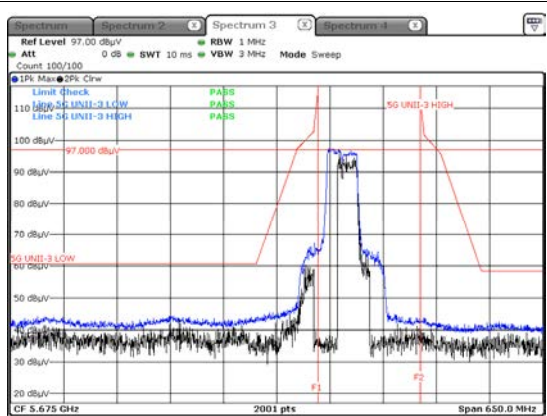
Peak Result (802.11ac_VHT20, Ch.149, Z-H)



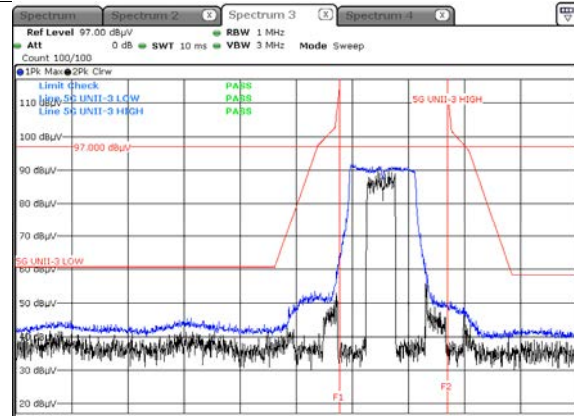
Peak Result (802.11n_HT40, Ch.151, Z-H)



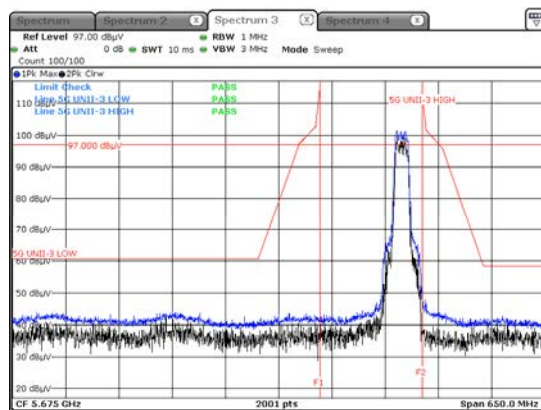
Peak Result (802.11ac_VHT40, Ch.151, Z-H)



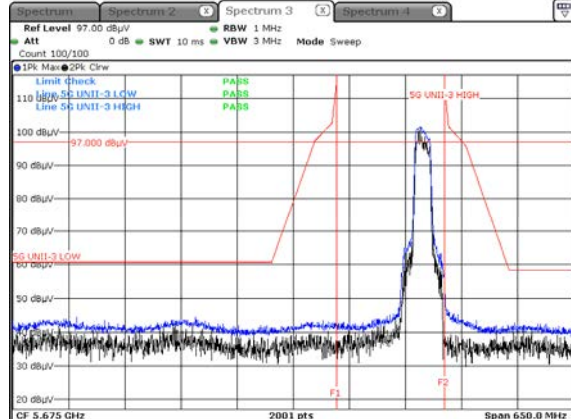
Peak Result (802.11ac_VHT80, Ch.155, Z-H)



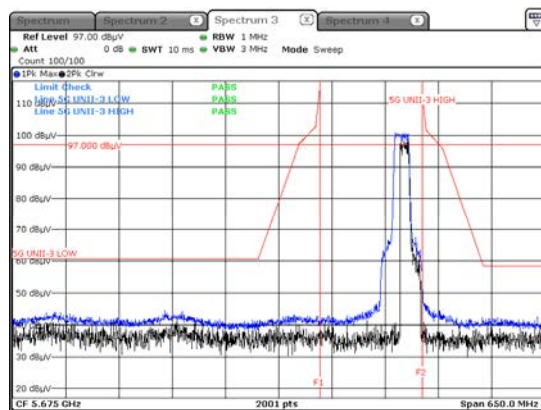
Peak Result (802.11a, Ch.165, Z-H)



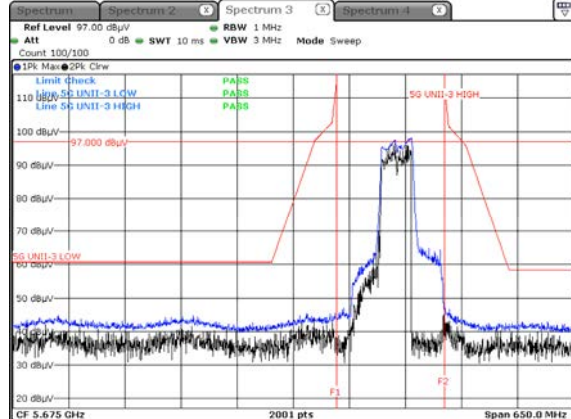
Peak Result (802.11n_HT20, Ch.165, Z-H)



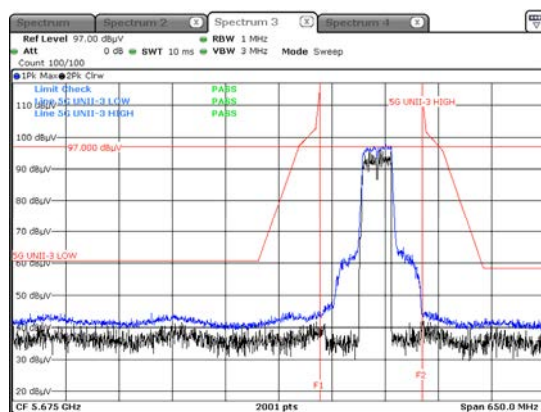
Peak Result (802.11ac_VHT20, Ch.165, Z-H)



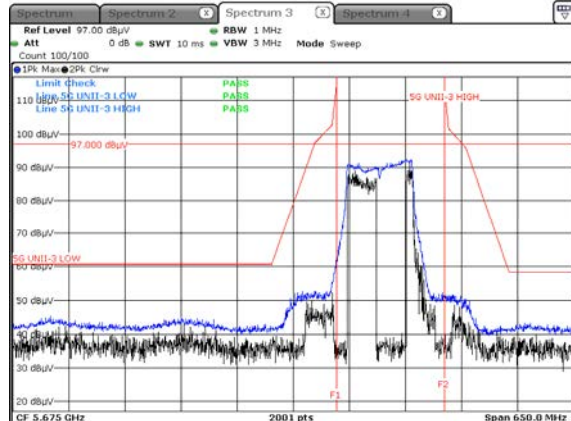
Peak Result (802.11n_HT40, Ch.159, Z-H)



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



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



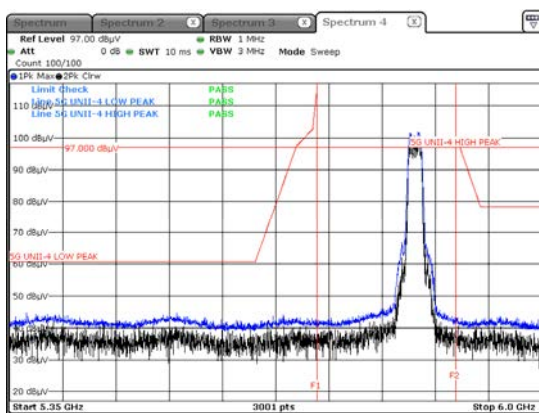
Note:

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 Mode Sweep.

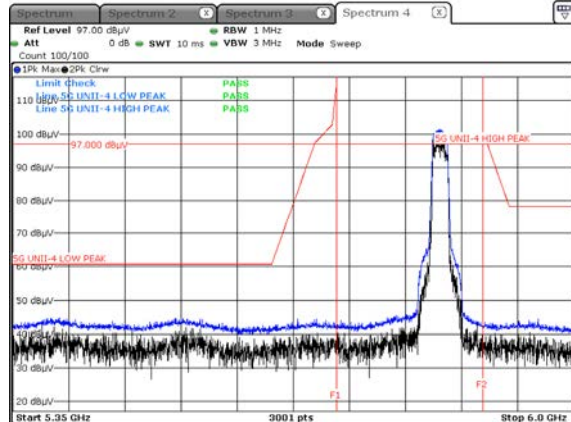
Test Plots(UNII 4) – O.O.B.E

Peak Result

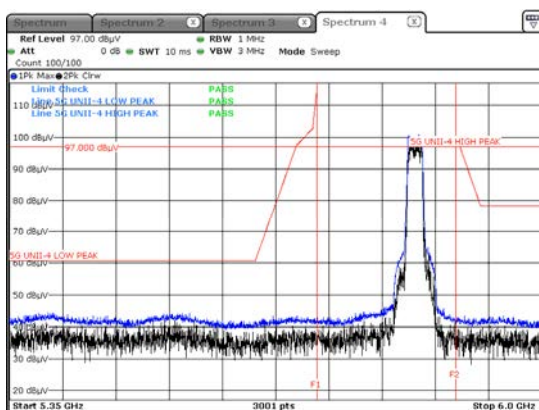
Peak Result (802.11a, Ch.169, Z-H)



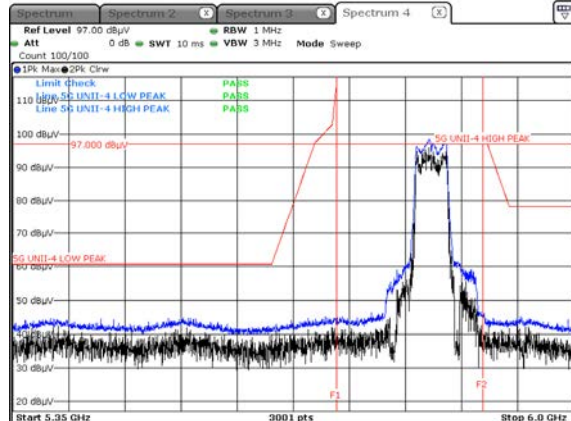
Peak Result (802.11n_HT20, Ch.169, Z-H)



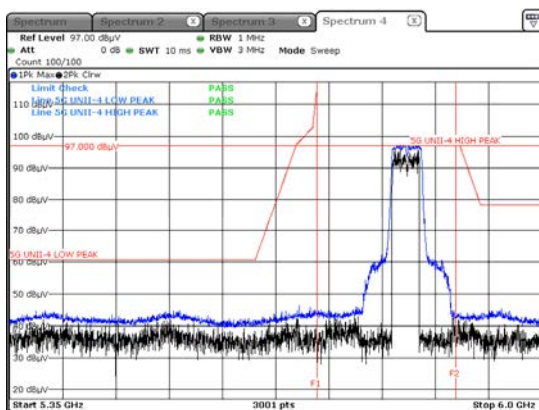
Peak Result (802.11ac_VHT20, Ch.169, Z-H)



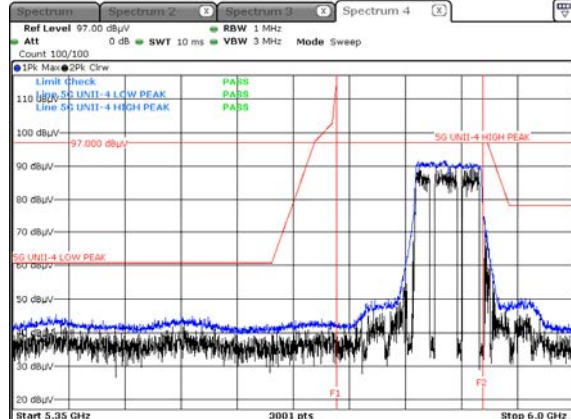
Peak Result (802.11n_HT40, Ch.167, Z-H)



Peak Result (802.11ac_VHT40, Ch.167, Z-H)



Peak Result (802.11ac_VHT80, Ch.171, Z-H)



Peak Result (802.11ac_VHT160, Ch.163, Z-H)

