

FCC UNII REPORT

Certification

Applicant Name: SAMSUNG Electronics Co., Ltd.	Date of Issue: April 22, 2022
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	Report No.: HCT-RF-2204-FC020

FCC ID:	A3LSMM135M
APPLICANT:	SAMSUNG Electronics Co., Ltd.

Model:	SM-M135M/DS
Additional Model:	-
EUT Type:	Mobile Phone
Modulation type	OFDM
FCC Classification:	Unlicensed National Information Infrastructure(NII)
FCC Rule Part(s):	Part 15.407

Engineering Statement:

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

Report No.: HCT-RF-2204-FC020

REVIEWED BY



Report prepared by : Jin Gwan Lee
Engineer of Telecommunication Testing Center

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

This test results were applied only to the test methods required by the standard.

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

The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2204-FC020	April 22, 2022	- First Approval Report

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1. GENERAL INFORMATION

EUT DESCRIPTION

Model	SM-M135M/DS	
Additional Model	-	
EUT Type	Mobile Phone	
Power Supply	DC 3.85 V	
Modulation Type	OFDM : 802.11a, 802.11n, 802.11ac	
Frequency Range (MHz)	U-NII-1	20 MHz BW : 5180 - 5240 40 MHz BW : 5190 - 5230 80 MHz BW : 5210
	U-NII-2A	20 MHz BW : 5260 - 5320 40 MHz BW : 5270 - 5310 80 MHz BW : 5290
	U-NII-2C	20 MHz BW : 5500 - 5720 40 MHz BW : 5510 - 5710 80 MHz BW : 5530 - 5690
	U-NII-3	20 MHz BW : 5745 - 5825 40 MHz BW : 5755 - 5795 80 MHz BW : 5775
Straddle channel	Supported	
TDWR Band	Supported	
Dynamic Frequency Selection	Slave without radar detection	
Date(s) of Tests	March 17, 2022 ~ April 21, 2022	
Serial number	Radiated: R38T20053EJ Conducted: R38T20056NK	

2. MAXIMUM OUTPUT POWER

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

Band	Mode	Power	
		(dBm)	(W)
UNII1	802.11a	13.93	0.025
	802.11n (HT20)	13.95	0.025
	802.11n (HT40)	12.94	0.020
	802.11ac (VHT20)	14.00	0.025
	802.11ac (VHT40)	12.94	0.020
	802.11ac (VHT80)	5.55	0.004
UNII2A	802.11a	13.92	0.025
	802.11n (HT20)	13.91	0.025
	802.11n (HT40)	12.91	0.020
	802.11ac (VHT20)	13.95	0.025
	802.11ac (VHT40)	12.90	0.019
	802.11ac (VHT80)	6.95	0.005
UNII2C	802.11a	13.89	0.024
	802.11n (HT20)	13.93	0.025
	802.11n (HT40)	12.91	0.020
	802.11ac (VHT20)	13.81	0.024
	802.11ac (VHT40)	12.88	0.019
	802.11ac (VHT80)	10.86	0.012
UNII3	802.11a	13.91	0.025
	802.11n (HT20)	13.94	0.025
	802.11n (HT40)	12.95	0.020
	802.11ac (VHT20)	13.87	0.024
	802.11ac (VHT40)	12.93	0.020
	802.11ac (VHT80)	10.60	0.011

3. TEST METHODOLOGY

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

EUT CONFIGURATION

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

EUT EXERCISE

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

GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. 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 April 02, 2018 (Registration Number: KR0032).

5.2 EQUIPMENT

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

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI TestReceivers. 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 MeasuringApparatus and Measurement Methods."

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203, §15.407:

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

- (1) The antennas of this E.U.T are permanently attached.
- (2) The E.U.T Complies with the requirement of §15.203, §15.407

7. MEASUREMENT UNCERTAINTY

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

All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence.

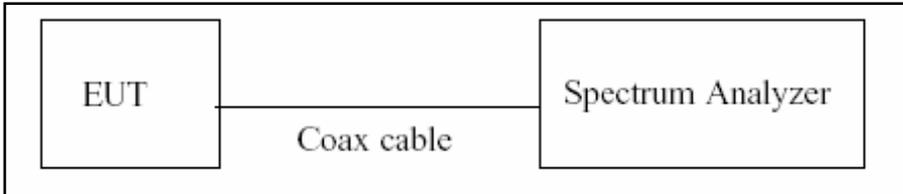
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	2.00 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.40 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.74 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.51 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.92 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (Above 40 GHz)	5.48 (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.

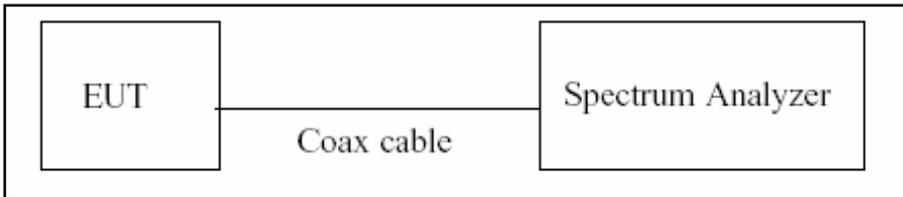
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (\geq RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10\log(1/\text{Duty Cycle})$

8.2.6dB Bandwidth & 26dB Bandwidth

Limit

Within the 5.725-5.85 GHz(NII-3) the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Configuration



Test Procedure(26dB 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 (6dB 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.

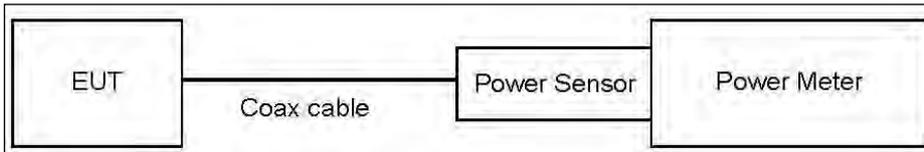
8.3. Output Power Measurement

Limit

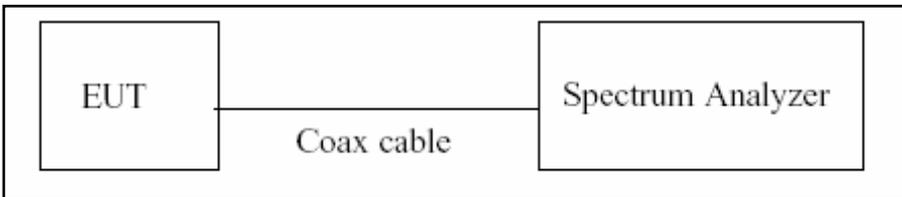
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30dBm)

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 x span/RBW.
6. Sweep time = auto.
7. Detector = RMS.
8. Do not use sweep triggering. Allow the sweep to "free run".
9. Trace average at least 100 traces in power averaging(RMS) mode
10. Integrated bandwidth = OBW
11. Add $10\log(1/x)$, 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 Level(dBm) + ATT loss(dB) + Cable loss(dB) + Duty Cycle Factor(dB)

Note

1. Spectrum Measured Levels are not plot data.

The power results in plot is already including the actual values of loss for the attenuator and cable combination.

2. Spectrum offset

Loss = Attenuator loss(10 dB) + Cable loss+ EUT Cable loss

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

Band	Loss(dB)
UNII 1	11.45
UNII 2A	11.45
UNII 2C	11.45
UNII 3	11.45

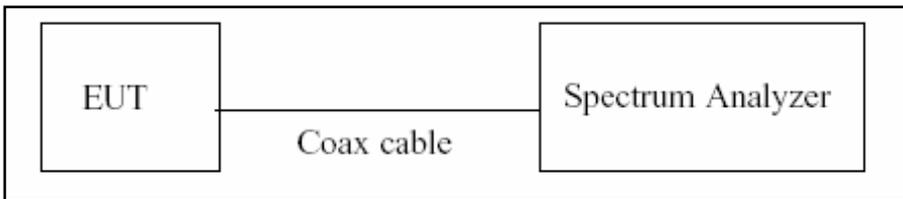
(Actual value of loss for the attenuator and cable combination)

8.4. Power Spectral Density

Limit

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

Test Configuration



Test Procedure

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

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

Sample Calculation

Total PSD(dBm) = Measured Level(dBm) + ATT loss(dB) + Cable loss(dB) + Duty Cycle Factor(dB)

Note

1. Spectrum Measured Levels are not plot data.

The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.

2. Spectrum offset

Loss = Attenuator loss(10 dB) + Cable loss

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

Band	Loss(dB)
UNII 1	11.45
UNII 2A	11.45
UNII 2C	11.45
UNII 3	11.45

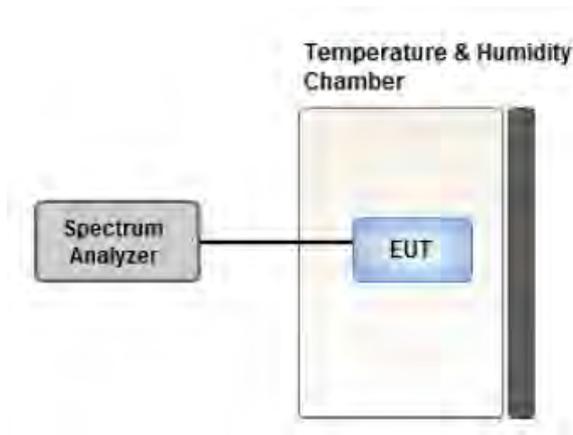
(Actual value of loss for the attenuator and cable combination)

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. Detectors : Quasi Peak and Average Detector.

Sample Calculation

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

8.7. Radiated Test

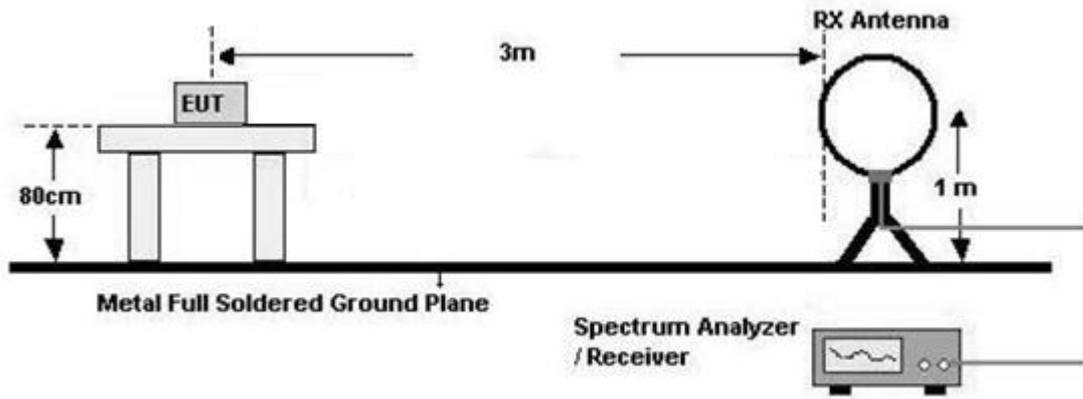
Limit

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 -27dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
4. All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Section 15.209.

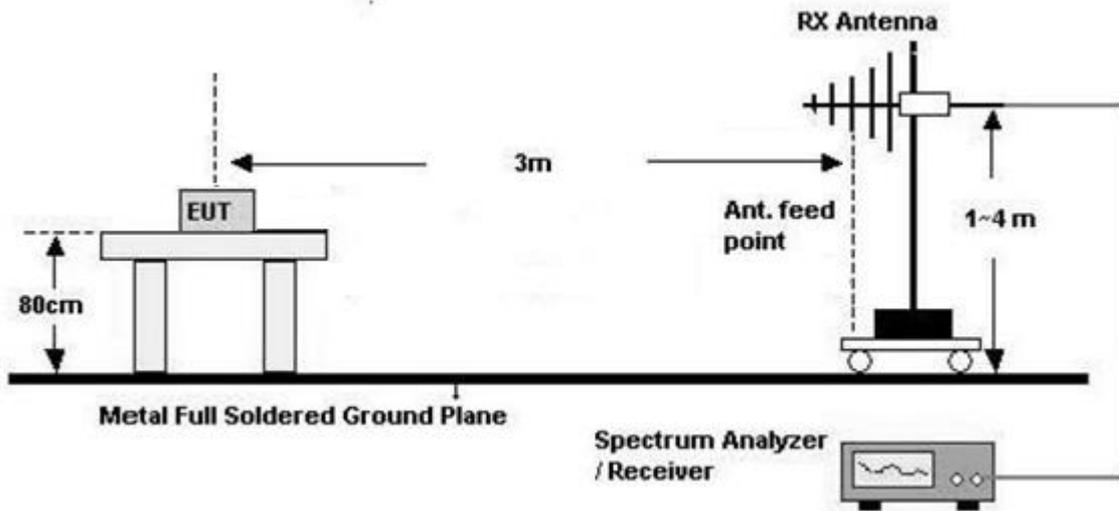
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

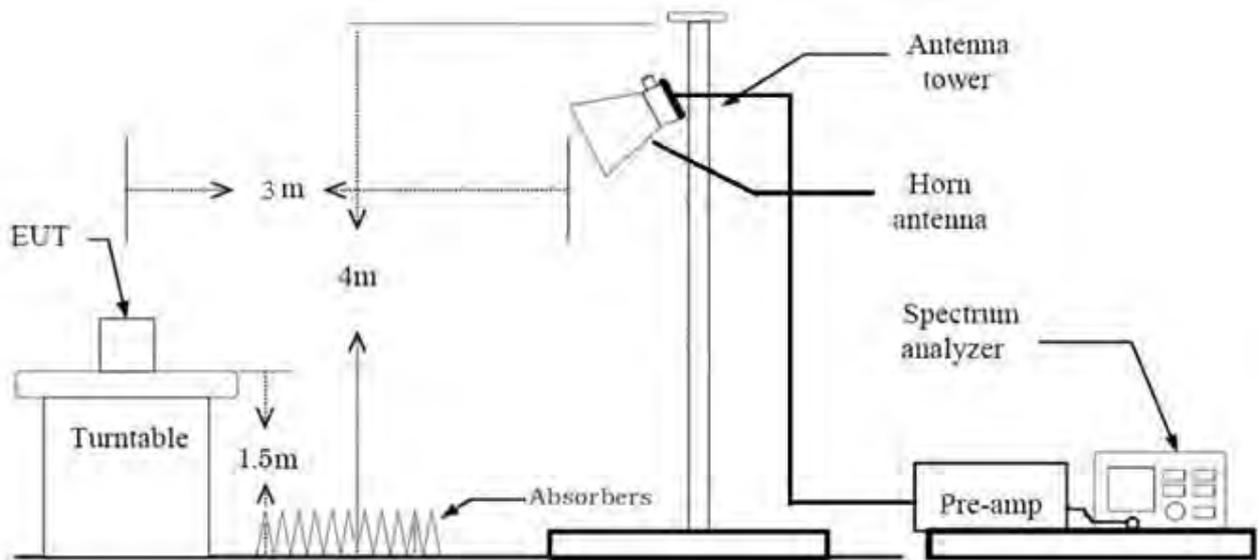
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz

**Test Procedure of Radiated spurious emissions(Below30 MHz)**

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization 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 = Maxhold
 - RBW = 9 kHz
 - VBW $\geq 3 \times$ RBW
9. Total = Measured Level + 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 1GHz)

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 3m from the EUT, which is varied from 1m to 4m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting

(1) Measurement Type(Peak):

- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Peak
- Trace = Maxhold
- RBW = 100 kHz
- VBW \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 Level + 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 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting

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

- RBW = 1 MHz
- VBW \geq 3 MHz
- Detector = Peak
- Sweep Time = auto
- Trace mode = max hold
- Allow sweeps to continue until the trace stabilizes.

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

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

- RBW = 1 MHz
- VBW(Duty cycle \geq 98 %) = $VBW \leq RBW/100$ (i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is < 98 %) = $VBW \geq 1/T$, 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 % 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. Total = Measured Level + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + 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 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting

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

- RBW = 1 MHz
- VBW \geq 3 MHz
- Detector = Peak
- Sweep Time = auto
- Trace mode = max hold
- Allow sweeps to continue until the trace stabilizes.

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

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

- RBW = 1 MHz
- VBW(Duty cycle \geq 98 %) = $VBW \leq RBW/100$ (i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is <98 %) = $VBW \geq 1/T$, 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 % 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 :

- 4500MHz ~ 5150MHz
- 5350MHz ~ 5460MHz
- 5460MHz ~ 5470MHz
- (75 MHz or more below the 5725MHz) ~ 5725MHz
- 5850MHz ~ (75 MHz or more above the 5850MHz)

10. Distance extrapolation factor = $20\log(\text{test distance} / \text{specific distance})$ (dB)

11. Total = Measured Level + 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	0.926	0.332	1000
802.11n(HT20)	MCS0	0.921	0.358	1000
802.11n(HT40)	MCS0	0.852	0.695	3000
802.11ac(VHT20)	MCS0	0.927	0.330	1000
802.11ac(VHT40)	MCS0	0.863	0.638	3000
802.11ac(VHT80)	MCS0	0.760	1.192	10000

8.8. Worst case configuration and mode

Radiated test

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

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

Conducted test

1. All datarate of operation were investigated and the worst case datarate results are reported.

9. SUMMARY OF TEST RESULTS

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

10. TEST RESULT

10.1 DUTY CYCLE

Mode	Data Rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11a	6	1.429	1.543	0.926	0.332
	9	0.961	1.066	0.901	0.452
	12	0.723	0.839	0.862	0.645
	18	0.492	0.607	0.811	0.911
	24	0.372	0.486	0.766	1.159
	36	0.256	0.380	0.675	1.707
	48	0.196	0.319	0.613	2.123
	54	0.180	0.295	0.612	2.135

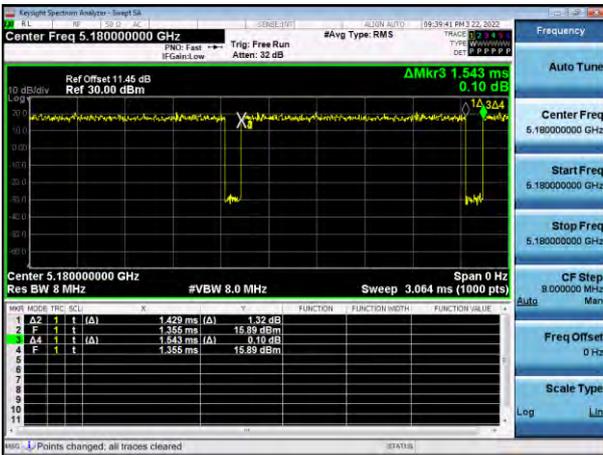
Mode	MCS Index	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11n (HT20)	0	1.336	1.451	0.921	0.358
	1	0.688	0.802	0.857	0.668
	2	0.688	0.793	0.867	0.620
	3	0.472	0.578	0.817	0.876
	4	0.256	0.371	0.690	1.613
	5	0.200	0.315	0.636	1.963
	6	0.184	0.290	0.635	1.969
	7	0.168	0.283	0.595	2.253
802.11n (HT40)	0	0.664	0.779	0.852	0.695
	1	0.352	0.457	0.769	1.139
	2	0.247	0.353	0.701	1.542
	3	0.197	0.302	0.650	1.868
	4	0.144	0.250	0.577	2.385
	5	0.116	0.231	0.504	2.977
	6	0.108	0.223	0.484	3.150
	7	0.100	0.215	0.466	3.317

Mode	MCS Index	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11ac (VHT20)	0	1.342	1.448	0.927	0.330
	1	0.692	0.806	0.859	0.663
	2	0.476	0.590	0.806	0.936
	3	0.368	0.483	0.763	1.175
	4	0.260	0.365	0.711	1.482
	5	0.204	0.318	0.641	1.934
	6	0.188	0.293	0.640	1.938
	7	0.172	0.286	0.600	2.218
	8	0.152	0.258	0.590	2.290
802.11ac (VHT40)	0	0.667	0.773	0.863	0.638
	1	0.357	0.471	0.756	1.212
	2	0.252	0.367	0.687	1.630
	3	0.200	0.306	0.654	1.847
	4	0.148	0.253	0.584	2.333
	5	0.120	0.244	0.491	3.086
	6	0.112	0.227	0.494	3.064
	7	0.105	0.218	0.482	3.173
	8	0.096	0.202	0.477	3.214
	9	0.088	0.203	0.435	3.617
802.11ac (VHT80)	0	0.333	0.438	0.760	1.192
	1	0.188	0.294	0.639	1.943
	2	0.140	0.246	0.571	2.436
	3	0.117	0.231	0.505	2.966
	4	0.092	0.207	0.445	3.516
	5	0.080	0.186	0.431	3.652
	6	0.076	0.191	0.397	4.011
	7	0.072	0.187	0.386	4.137
	8	0.068	0.183	0.371	4.303
	9	0.064	0.179	0.357	4.468

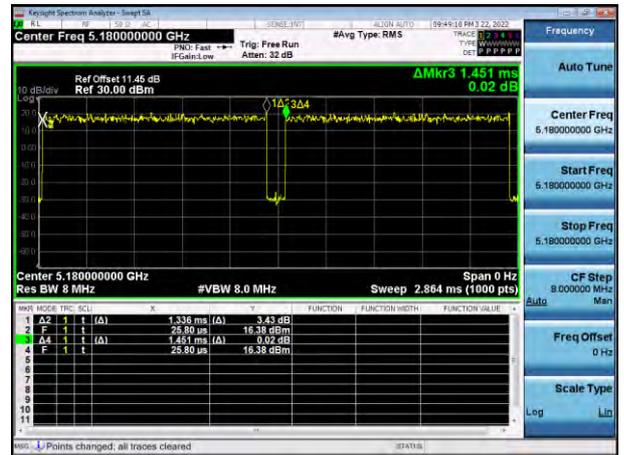
Note:

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

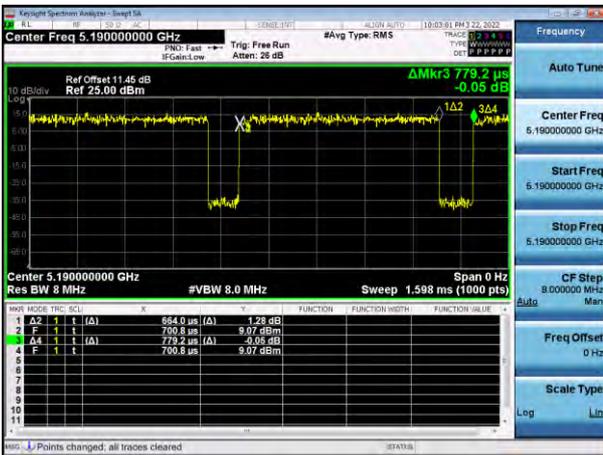
802.11a



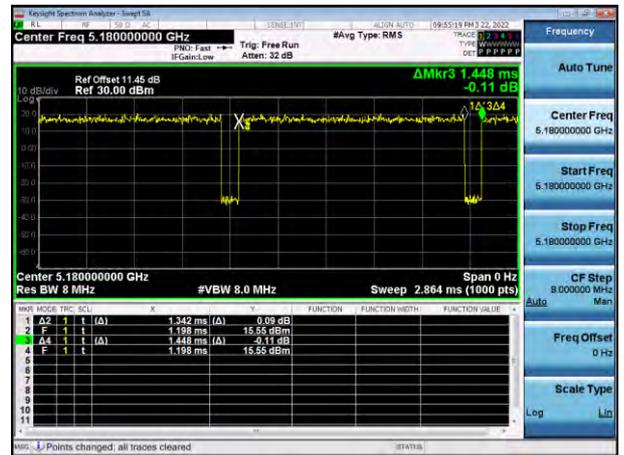
802.11n(HT20)



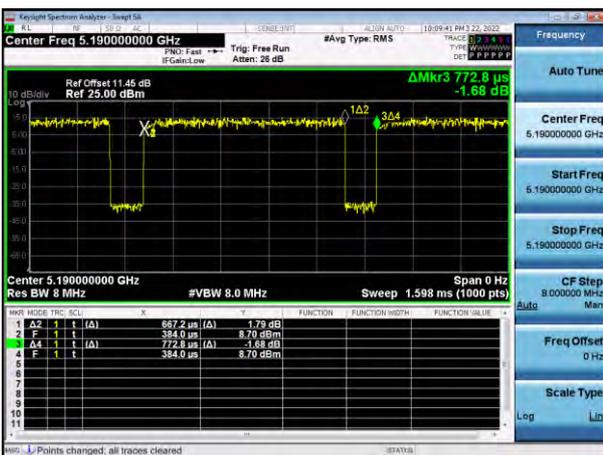
802.11n(HT40)



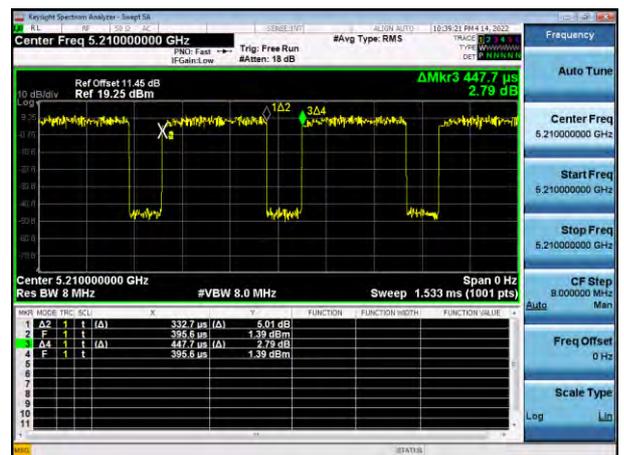
802.11ac(VHT20)



802.11ac(VHT40)



802.11ac(VHT80)



10.2 26 dB Bandwidth

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

Straddle channel data were added in section 10.7.1.

802.11a Mode		26dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	21.19	16.593
5200	40	25.70	16.795
5240	48	22.35	16.709
5260	52	22.59	16.707
5300	60	21.71	16.674
5320	64	20.80	16.656
5500	100	20.63	16.597
5600	120	20.75	16.612
5720	144	20.57	16.574
5745	149	21.33	16.630
5785	157	21.76	16.677
5825	165	22.84	16.736

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	21.71	17.674
5200	40	23.31	17.761
5240	48	24.57	17.820
5260	52	23.08	17.740
5300	60	24.38	17.751
5320	64	21.87	17.660
5500	100	21.28	17.659
5600	120	21.36	17.665
5720	144	21.38	17.658
5745	149	22.34	17.702
5785	157	21.95	17.724
5825	165	23.73	17.732

802.11n(HT40) Mode		26dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	43.25	37.686
5230	46	43.89	37.877
5270	54	44.05	38.139
5310	62	43.37	37.445
5510	102	42.68	37.215
5590	118	39.97	36.190
5710	142	45.48	38.093
5755	151	45.93	37.938
5795	159	45.72	38.015

802.11ac(VHT20) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	21.17	17.652
5200	40	26.64	17.871
5240	48	26.45	17.803
5260	52	25.50	17.769
5300	60	23.67	17.769
5320	64	21.67	17.717
5500	100	21.36	17.634
5600	120	21.47	17.647
5720	144	21.63	17.678
5745	149	21.94	17.732
5785	157	23.35	17.745
5825	165	23.97	17.756

802.11ac(VHT40) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	43.07	36.449
5230	46	45.44	37.516
5270	54	45.05	37.567
5310	62	42.40	36.695
5510	102	42.22	36.716
5590	118	43.51	37.035
5710	142	43.38	37.380
5755	151	46.90	37.064
5795	159	45.31	37.458

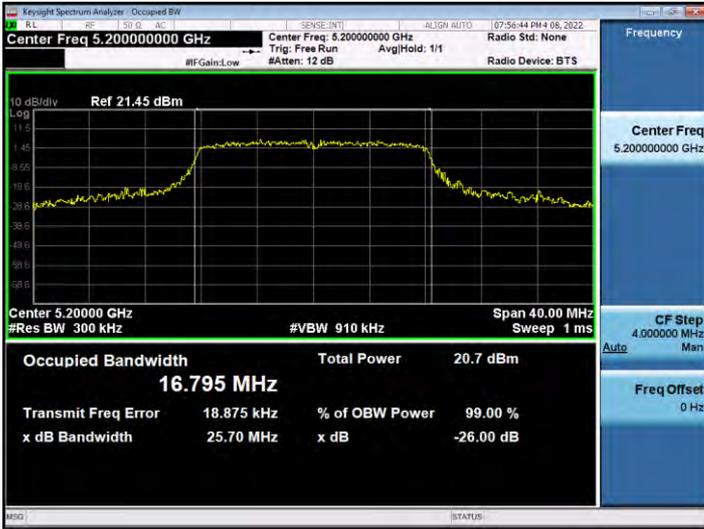
802.11ac(VHT80) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	80.48	75.265
5290	58	80.57	75.224
5530	106	80.35	75.147
5610	122	81.04	75.207
5690	138	80.80	75.318
5775	155	80.34	75.394

☐ Test Plots(802.11a)

Note:

In order to simplify the report, attached plots were only the most wide channel.

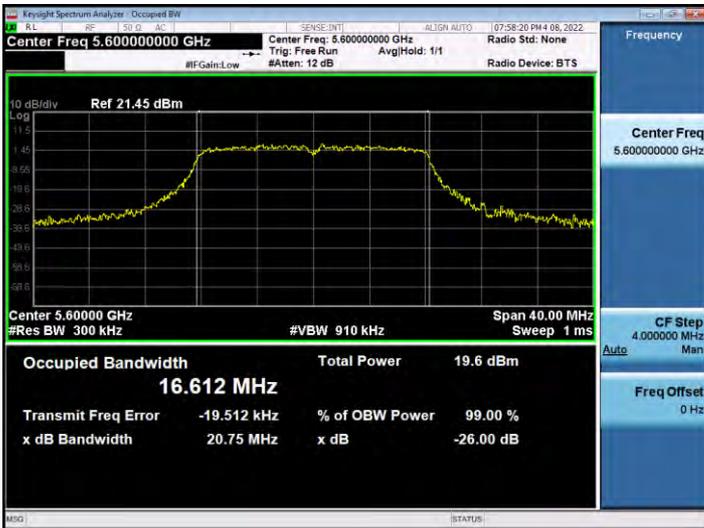
802.11a UNII 1 BAND 26 dB Bandwidth (CH 40)



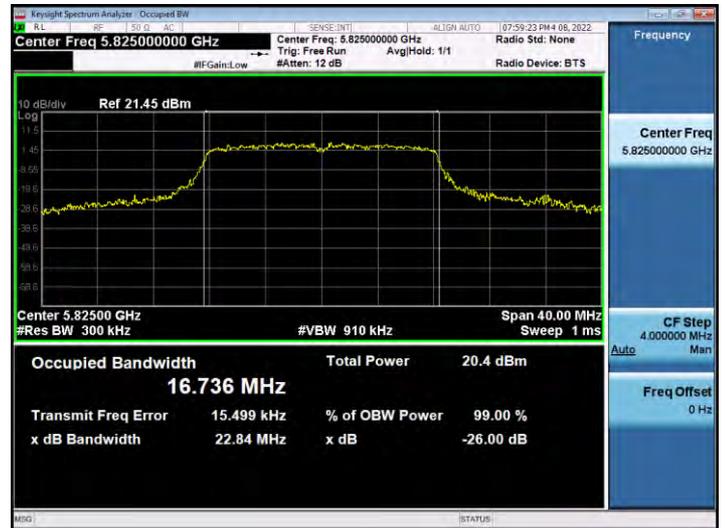
802.11a UNII 2A BAND 26 dB Bandwidth (CH 52)



802.11a UNII 2C BAND 26 dB Bandwidth (CH 120)



802.11a UNII 3 BAND 26 dB Bandwidth (CH 165)



☑ Test Plots(802.11n(HT20))

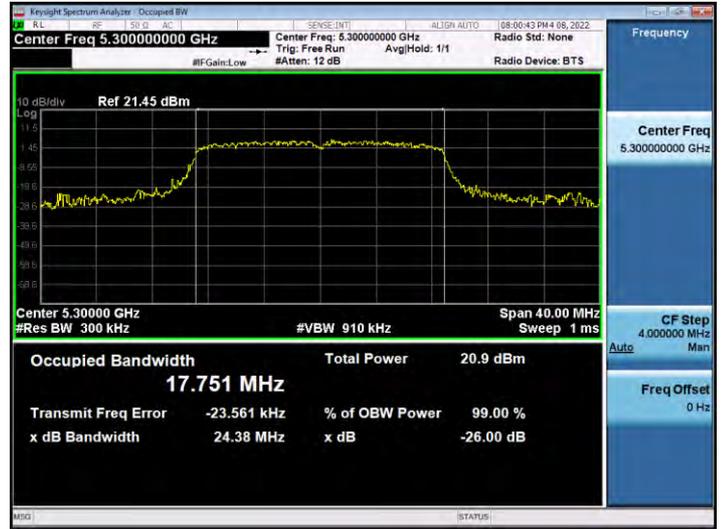
Note:

In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT20 UNII 1 BAND 26 dB Bandwidth(CH 48)



802.11n_HT20 UNII 2A BAND 26 dB Bandwidth(CH 60)



802.11n_HT20 UNII 2C BAND 26 dB Bandwidth(CH 144)



802.11n_HT20 UNII 3 BAND 26 dB Bandwidth(CH 165)



☐ Test Plots(802.11n(HT40))

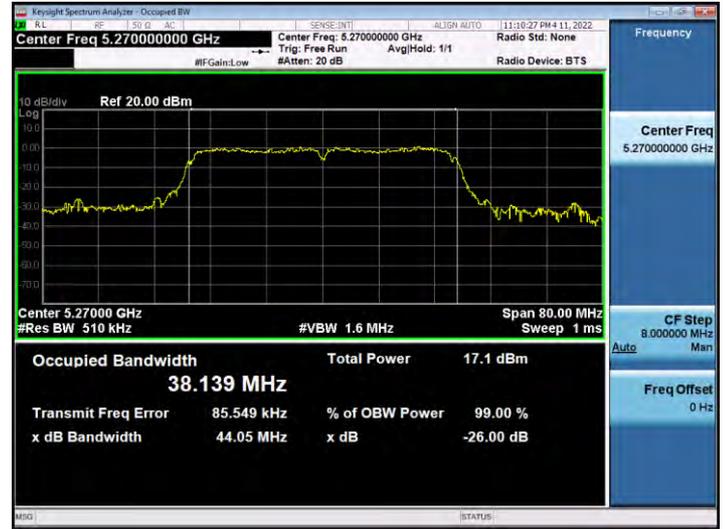
Note:

In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT40 UNII 1 BAND 26 dB Bandwidth(CH 46)



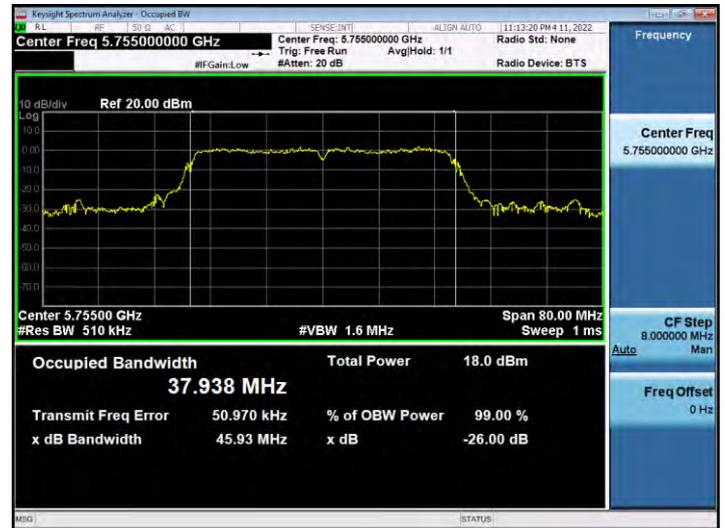
802.11n_HT40 UNII 2A BAND 26 dB Bandwidth (CH 54)



802.11n_HT40 UNII 2C BAND 26 dB Bandwidth(CH 142)



802.11n_HT40 UNII 3 BAND 26 dB Bandwidth (CH 151)

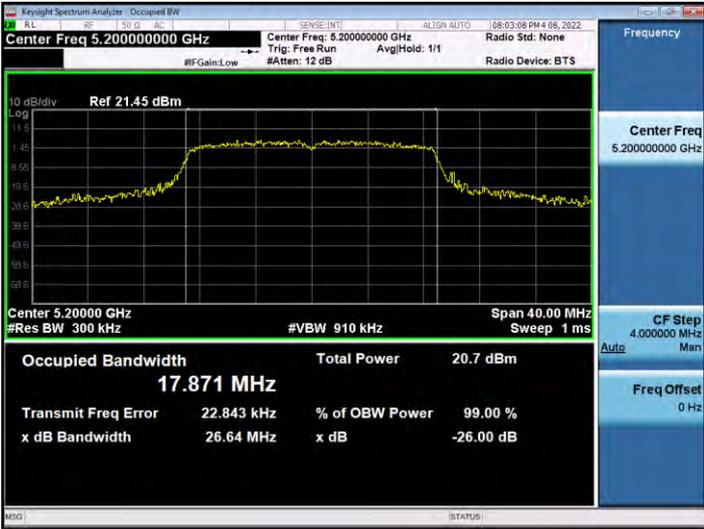


☐ Test Plots(802.11ac(VHT20))

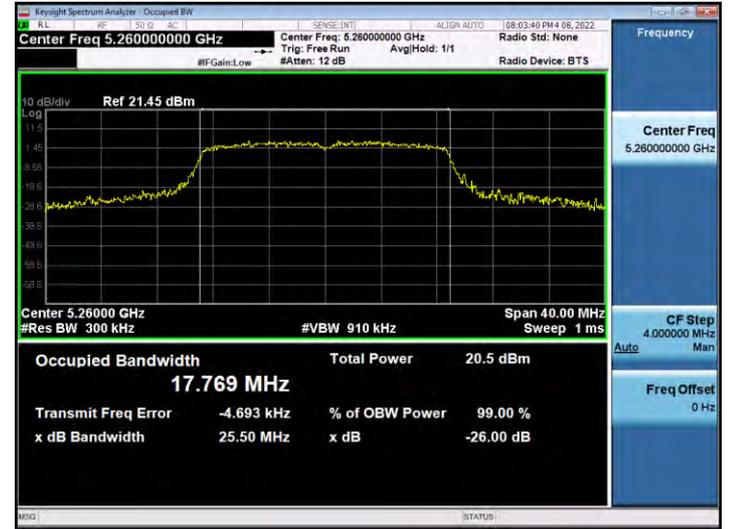
Note:

In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT20 UNII 1 BAND 26 dB Bandwidth(CH 40)



802.11ac_VHT20 UNII 2A BAND 26 dB Bandwidth(CH 52)



802.11ac_VHT20 UNII 2C BAND 26 dB Bandwidth(CH 144)



802.11ac_VHT20 UNII 3 BAND 26 dB Bandwidth(CH 165)



☐ Test Plots(802.11ac(VHT40))

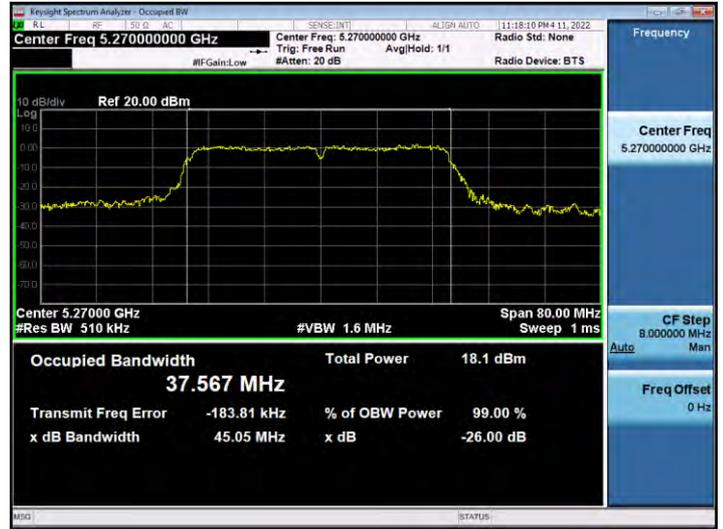
Note:

In order to simplify the report, attached plots were only the most wide channel.

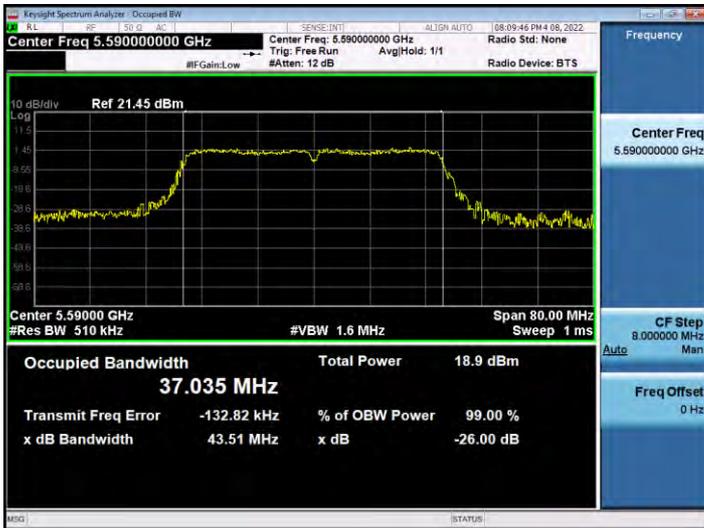
802.11ac_VHT40 UNII 1 BAND 26 dB Bandwidth(CH 46)



802.11ac_VHT40 UNII 2A BAND 26 dB Bandwidth (CH 54)



802.11ac_VHT40 UNII 2C BAND 26 dB Bandwidth(CH 118)



802.11ac_VHT40 UNII 3 BAND 26 dB Bandwidth (CH 151)

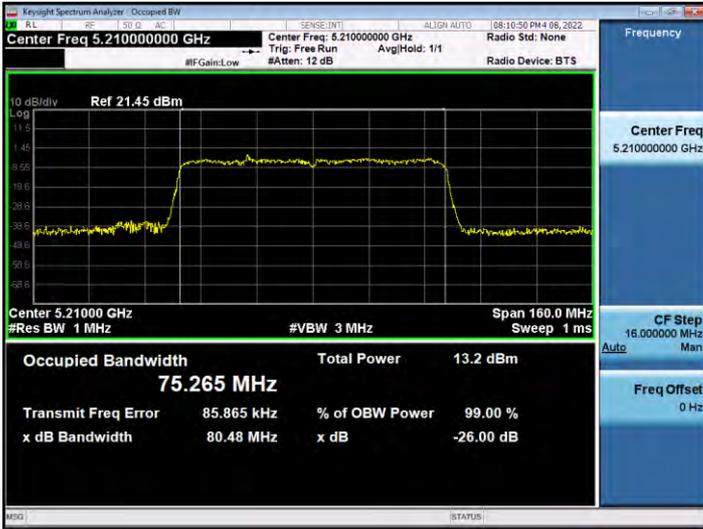


☐ Test Plots(802.11ac(VHT80))

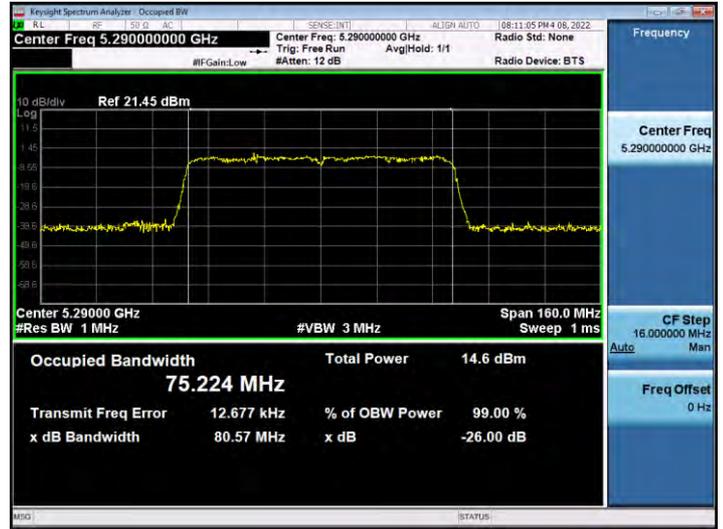
Note:

In order to simplify the report, attached plots were only the most wide channel.

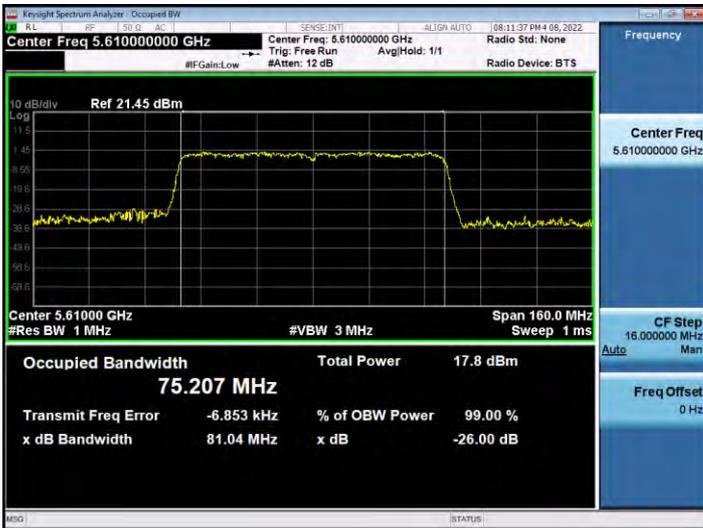
802.11ac_VHT80 UNII 1 BAND 26 dB Bandwidth(CH 42)



802.11ac_VHT80 UNII 2A BAND 26 dB Bandwidth (CH 58)



802.11ac_VHT80 UNII 2C BAND 26 dB Bandwidth(CH 122)



802.11ac_VHT80 UNII 3 BAND 26 dB Bandwidth (CH 155)



10.3 6 dB BANDWIDTH

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.86	> 0.5	Pass
5785	157	15.84	> 0.5	Pass
5825	165	15.88	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.74	> 0.5	Pass
5785	157	15.64	> 0.5	Pass
5825	165	16.38	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.75	> 0.5	Pass
5795	159	35.99	> 0.5	Pass

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.39	> 0.5	Pass
5785	157	16.46	> 0.5	Pass
5825	165	16.46	> 0.5	Pass

802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.73	> 0.5	Pass
5795	159	35.60	> 0.5	Pass

802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	75.37	> 0.5	Pass

Test Plots

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

802.11a (CH.157)



802.11n(HT20) (CH.157)



802.11n(HT40) (CH.151)



802.11ac(VHT20) (CH.149)



802.11ac(VHT40) (CH.159)



802.11ac(VHT80) (CH.155)



10.4 OUTPUT POWER MEASUREMENT

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

Straddle channel data were added in section 10.7.3.

Limit

(UNII 1) : 23.98 dBm

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

(UNII 3) : 30.00 dBm

802.11a Mode		Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase Datarate (Mbps)
Frequency [MHz]	Channel No.					
5180	36	9.96	1.707	11.67	23.98	36M
5200	40	12.22	1.707	13.93	23.98	36M
5240	48	12.20	1.707	13.91	23.98	36M
5260	52	12.16	1.707	13.86	23.98	36M
5300	60	12.22	1.707	13.92	23.98	36M
5320	64	12.11	1.707	13.82	23.98	36M
5500	100	12.18	1.707	13.89	23.98	36M
5600	120	12.17	1.707	13.88	23.98	36M
5720	144	12.18	1.707	13.89	23.98	36M
5745	149	12.20	1.707	13.91	30.00	36M
5785	157	12.16	1.707	13.87	30.00	36M
5825	165	12.20	1.707	13.91	30.00	36M

802.11n(20 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5180	36	9.85	1.613	11.47	23.98	MCS4
5200	40	12.29	1.613	13.90	23.98	MCS4
5240	48	12.34	1.613	13.95	23.98	MCS4
5260	52	12.18	1.613	13.79	23.98	MCS4
5300	60	12.30	1.613	13.91	23.98	MCS4
5320	64	11.35	1.613	12.96	23.98	MCS4
5500	100	11.38	1.613	12.99	23.98	MCS4
5600	120	12.32	1.613	13.93	23.98	MCS4
5720	144	12.18	1.613	13.80	23.98	MCS4
5745	149	12.33	1.613	13.94	30.00	MCS4
5785	157	12.31	1.613	13.92	30.00	MCS4
5825	165	12.24	1.613	13.86	30.00	MCS4

802.11n(40 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5190	38	4.89	2.385	7.28	23.98	MCS4
5230	46	10.56	2.385	12.94	23.98	MCS4
5270	54	10.53	2.385	12.91	23.98	MCS4
5310	62	7.51	2.385	9.90	23.98	MCS4
5510	102	6.76	2.385	9.15	23.98	MCS4
5590	118	10.53	2.385	12.91	23.98	MCS4
5710	142	10.35	2.385	12.73	23.98	MCS4
5755	151	10.57	2.385	12.95	30.00	MCS4
5795	159	10.36	2.385	12.75	30.00	MCS4

802.11ac(20 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5180	36	9.98	1.175	11.15	23.98	MCS3
5200	40	12.82	1.175	14.00	23.98	MCS3
5240	48	12.50	1.175	13.67	23.98	MCS3
5260	52	12.37	1.175	13.55	23.98	MCS3
5300	60	12.77	1.175	13.95	23.98	MCS3
5320	64	12.40	1.175	13.58	23.98	MCS3
5500	100	12.31	1.175	13.49	23.98	MCS3
5600	120	12.63	1.175	13.81	23.98	MCS3
5720	144	12.39	1.175	13.56	23.98	MCS3
5745	149	12.70	1.175	13.87	30.00	MCS3
5785	157	12.57	1.175	13.74	30.00	MCS3
5825	165	12.65	1.175	13.83	30.00	MCS3

802.11ac(40 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5190	38	4.90	2.333	7.23	23.98	MCS4
5230	46	10.60	2.333	12.94	23.98	MCS4
5270	54	10.56	2.333	12.90	23.98	MCS4
5310	62	7.66	2.333	9.99	23.98	MCS4
5510	102	6.83	2.333	9.16	23.98	MCS4
5590	118	10.55	2.333	12.88	23.98	MCS4
5710	142	10.42	2.333	12.75	23.98	MCS4
5755	151	10.60	2.333	12.93	30.00	MCS4
5795	159	10.42	2.333	12.75	30.00	MCS4

802.11ac(80 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5210	42	2.04	3.516	5.55	23.98	MCS4
5290	58	3.43	3.516	6.95	23.98	MCS4
5530	106	4.28	3.516	7.79	23.98	MCS4
5610	122	7.03	3.516	10.55	23.98	MCS4
5690	138	7.34	3.516	10.86	23.98	MCS4
5775	155	7.09	3.516	10.60	30.00	MCS4

10.5 POWER SPECTRAL DENSITY

802.11a Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase Datarate (Mbps)	Limit
Frequency [MHz]	Channel No.					
5180	36	-0.764	1.707	0.943	36M	11 dBm/MHz
5200	40	1.599	1.707	3.306	36M	
5240	48	1.276	1.707	2.983	36M	
5260	52	1.243	1.707	2.950	36M	
5300	60	1.756	1.707	3.463	36M	
5320	64	1.220	1.707	2.927	36M	
5500	100	1.830	1.707	3.537	36M	
5600	120	1.578	1.707	3.285	36M	
5720	144	1.135	1.707	2.842	36M	
5745	149	-1.620	1.707	0.087	36M	30 dBm/500 kHz
5785	157	-1.105	1.707	0.602	36M	
5825	165	-0.845	1.707	0.862	36M	

802.11n(20 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5180	36	-1.564	1.613	0.049	MCS4	11 dBm/MHz
5200	40	1.207	1.613	2.820	MCS4	
5240	48	1.504	1.613	3.117	MCS4	
5260	52	1.192	1.613	2.805	MCS4	
5300	60	1.680	1.613	3.293	MCS4	
5320	64	0.620	1.613	2.233	MCS4	
5500	100	0.436	1.613	2.049	MCS4	
5600	120	1.141	1.613	2.754	MCS4	
5720	144	1.572	1.613	3.185	MCS4	
5745	149	-1.014	1.613	0.599	MCS4	30 dBm/500 kHz
5785	157	-1.420	1.613	0.193	MCS4	
5825	165	-0.895	1.613	0.718	MCS4	

802.11n(40 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5190	38	-9.016	2.385	-6.631	MCS4	11 dBm/MHz
5230	46	-3.971	2.385	-1.586	MCS4	
5270	54	-3.262	2.385	-0.877	MCS4	
5310	62	-6.268	2.385	-3.883	MCS4	
5510	102	-7.273	2.385	-4.888	MCS4	
5590	118	-3.449	2.385	-1.064	MCS4	
5710	142	-3.243	2.385	-0.858	MCS4	
5755	151	-5.976	2.385	-3.591	MCS4	30 dBm /500 kHz
5795	159	-5.862	2.385	-3.477	MCS4	

802.11ac(20 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5180	36	-1.576	1.175	-0.401	MCS3	11 dBm/MHz
5200	40	1.680	1.175	2.855	MCS3	
5240	48	1.436	1.175	2.611	MCS3	
5260	52	1.478	1.175	2.653	MCS3	
5300	60	1.735	1.175	2.910	MCS3	
5320	64	1.208	1.175	2.383	MCS3	
5500	100	1.547	1.175	2.722	MCS3	
5600	120	1.134	1.175	2.309	MCS3	
5720	144	1.398	1.175	2.573	MCS3	
5745	149	-0.832	1.175	0.343	MCS3	30 dBm/500 kHz
5785	157	-1.340	1.175	-0.165	MCS3	
5825	165	-0.357	1.175	0.818	MCS3	

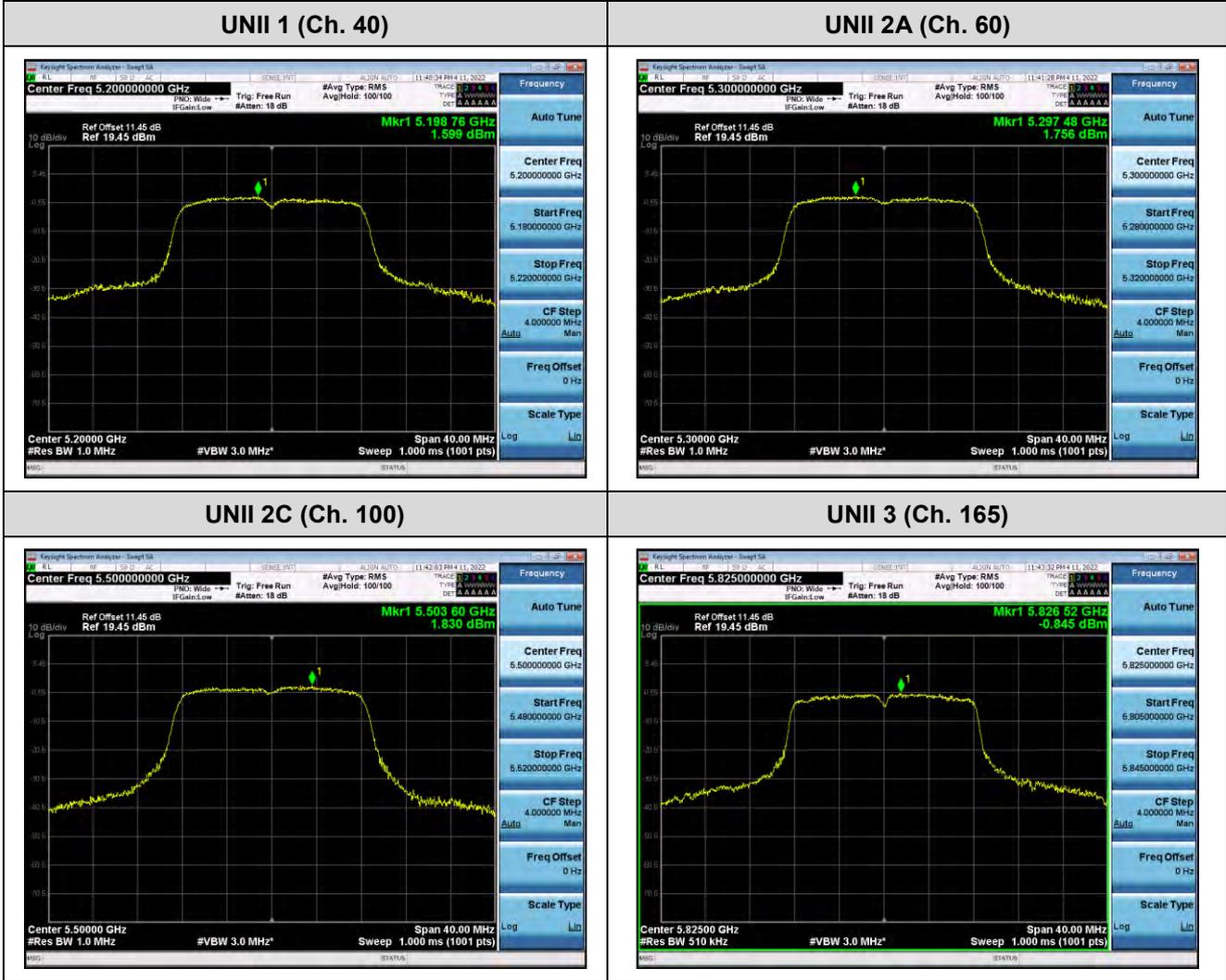
802.11ac(40 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5190	38	-9.063	2.333	-6.730	MCS4	11 dBm/MHz
5230	46	-3.511	2.333	-1.178	MCS4	
5270	54	-3.392	2.333	-1.059	MCS4	
5310	62	-6.525	2.333	-4.192	MCS4	
5510	102	-6.713	2.333	-4.380	MCS4	
5590	118	-2.797	2.333	-0.464	MCS4	
5710	142	-3.162	2.333	-0.829	MCS4	
5755	151	-5.656	2.333	-3.323	MCS4	30 dBm/500 kHz
5795	159	-6.381	2.333	-4.048	MCS4	

802.11ac(80 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5210	42	-15.407	3.516	-11.891	MCS4	11 dBm/MHz
5290	58	-13.563	3.516	-10.047	MCS4	
5530	106	-12.106	3.516	-8.590	MCS4	
5610	122	-9.777	3.516	-6.261	MCS4	
5690	138	-9.493	3.516	-5.977	MCS4	
5775	155	-12.227	3.516	-8.711	MCS4	30 dBm/500 kHz

☐ Test Plots(802.11a)

Note:

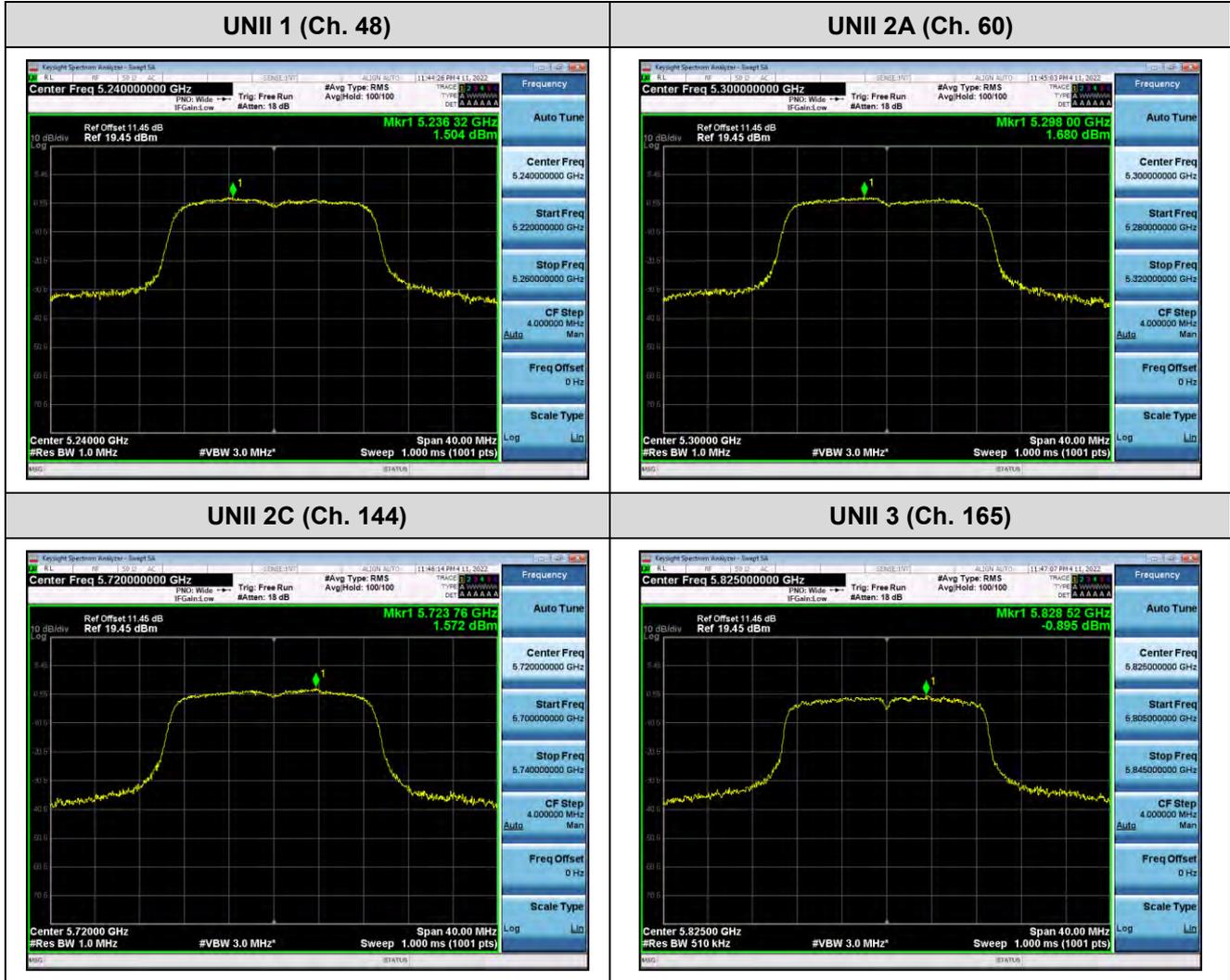
In order to simplify the report, attached plots were only channel of highest PSD.



☐ Test Plots(802.11n(HT20))

Note:

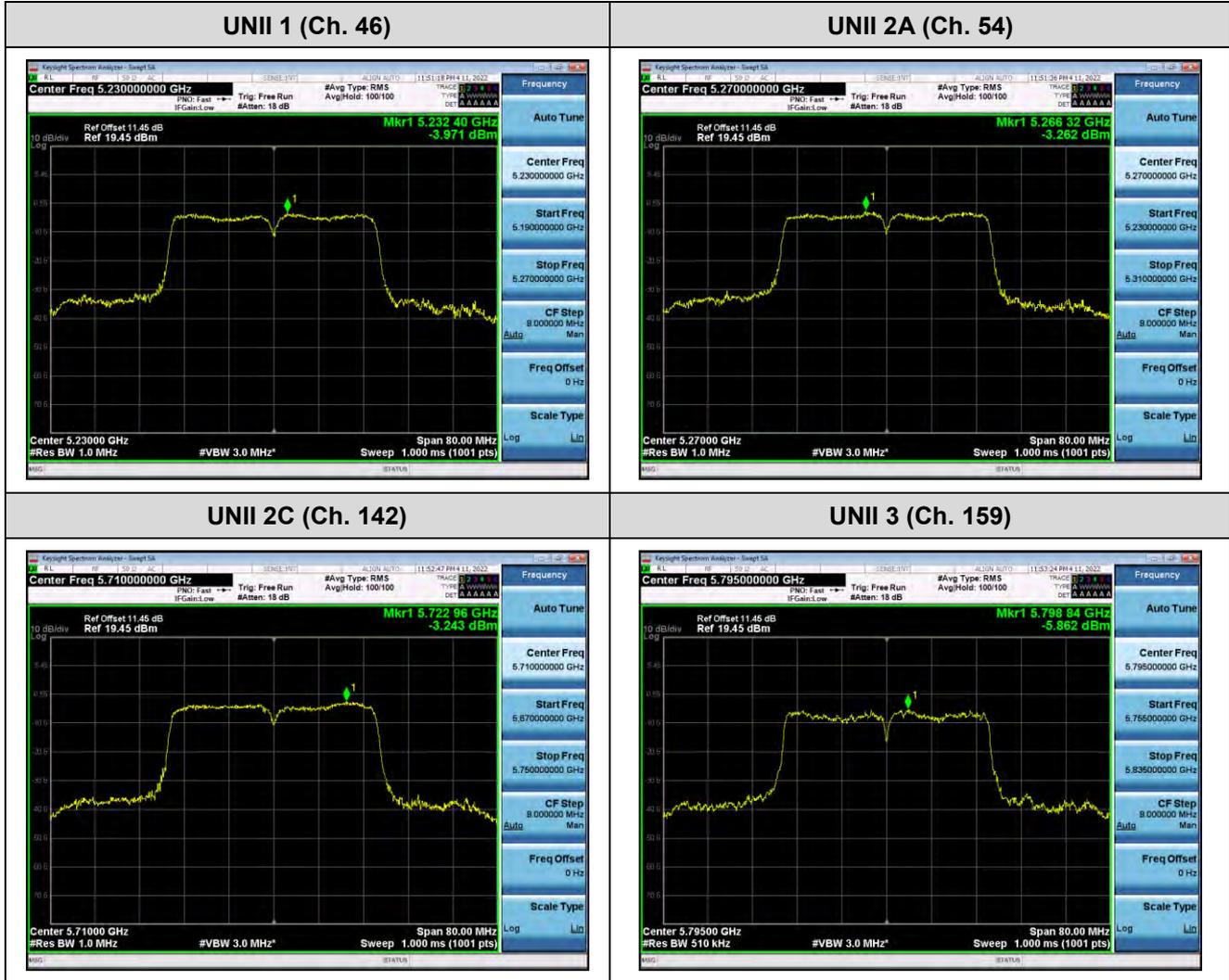
In order to simplify the report, attached plots were only channel of highest PSD.



☐ Test Plots(802.11n(HT40))

Note:

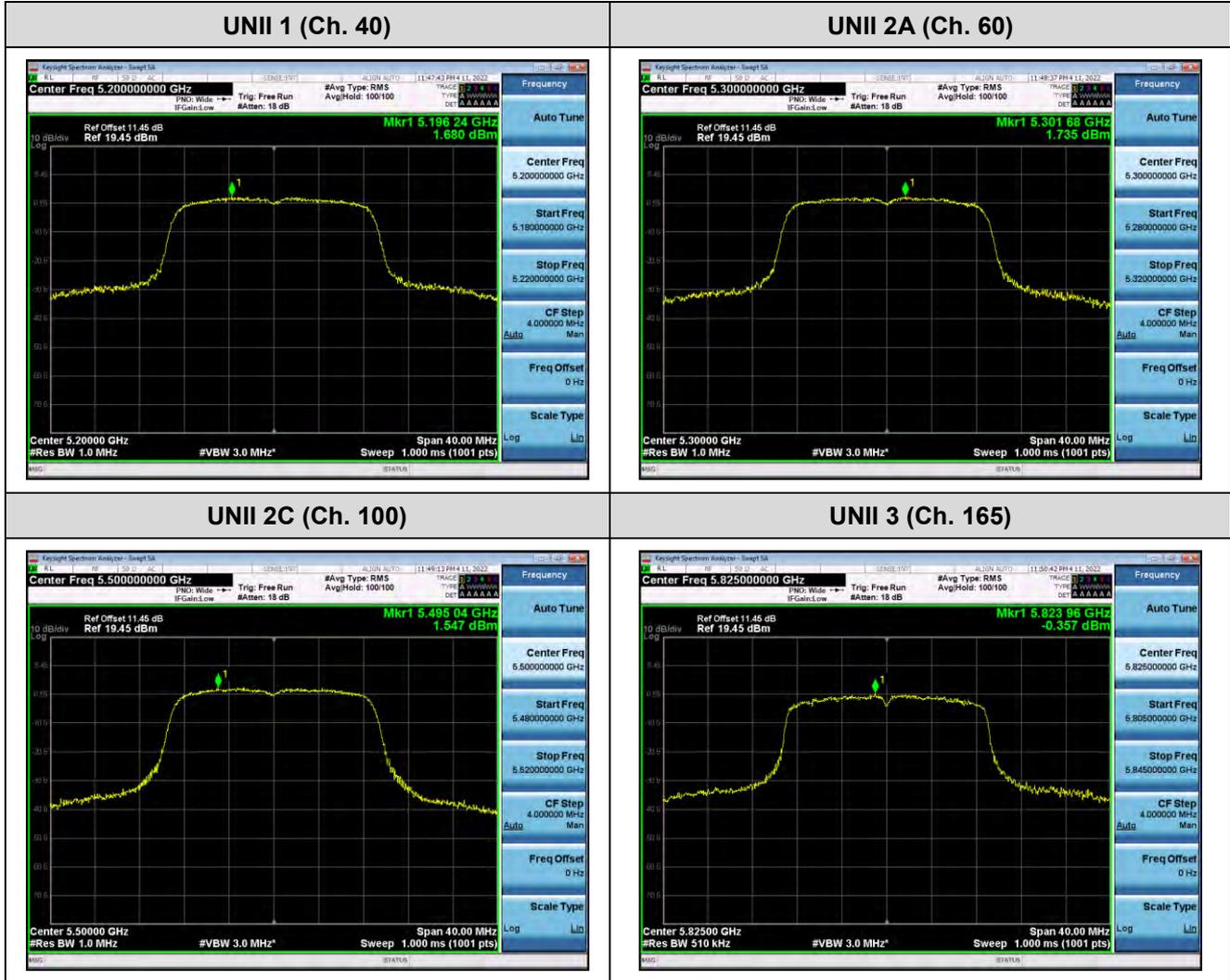
In order to simplify the report, attached plots were only channel of highest PSD.



☑ Test Plots(802.11ac(VHT20))

Note:

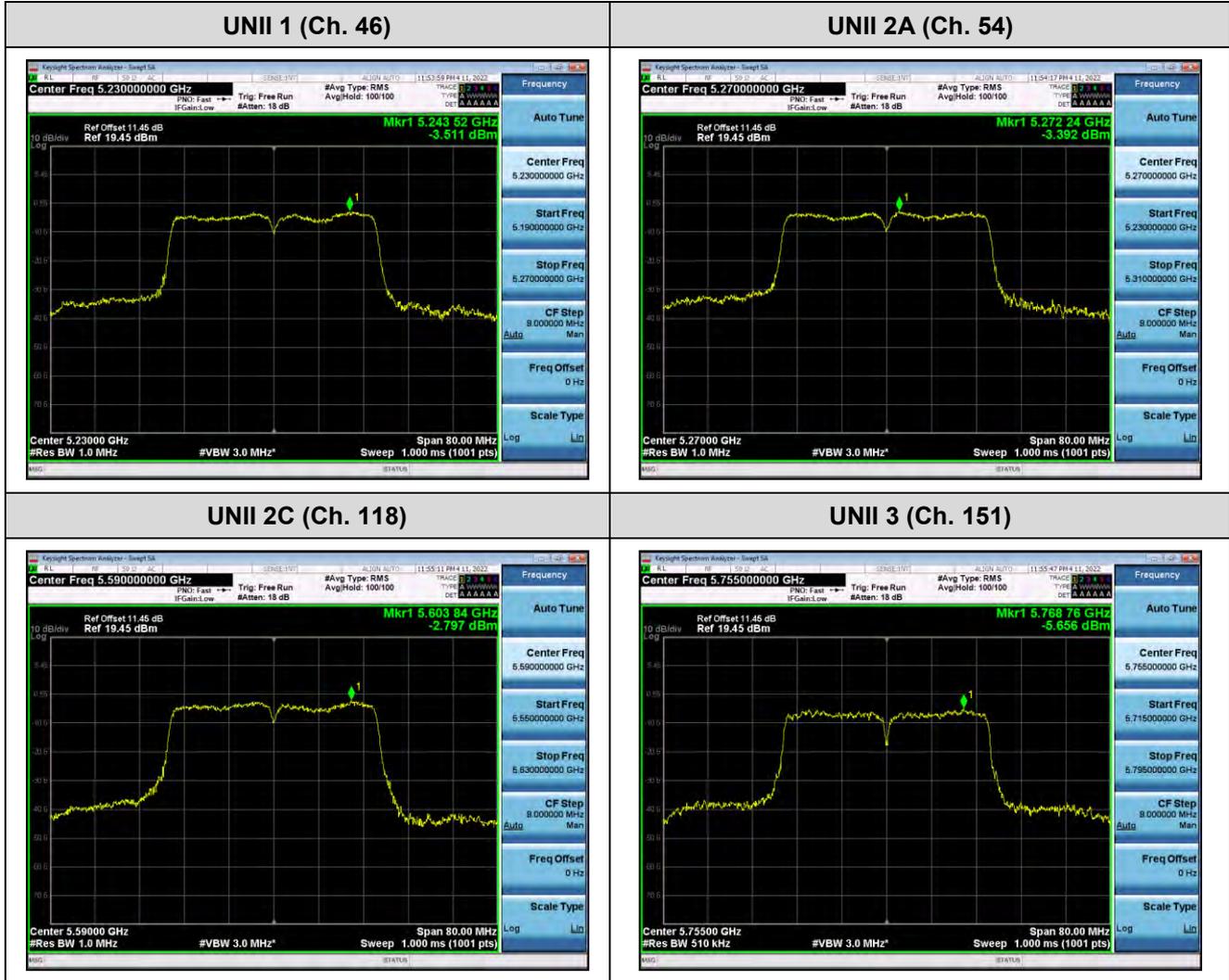
In order to simplify the report, attached plots were only channel of highest PSD.



☐ Test Plots(802.11ac(VHT40))

Note:

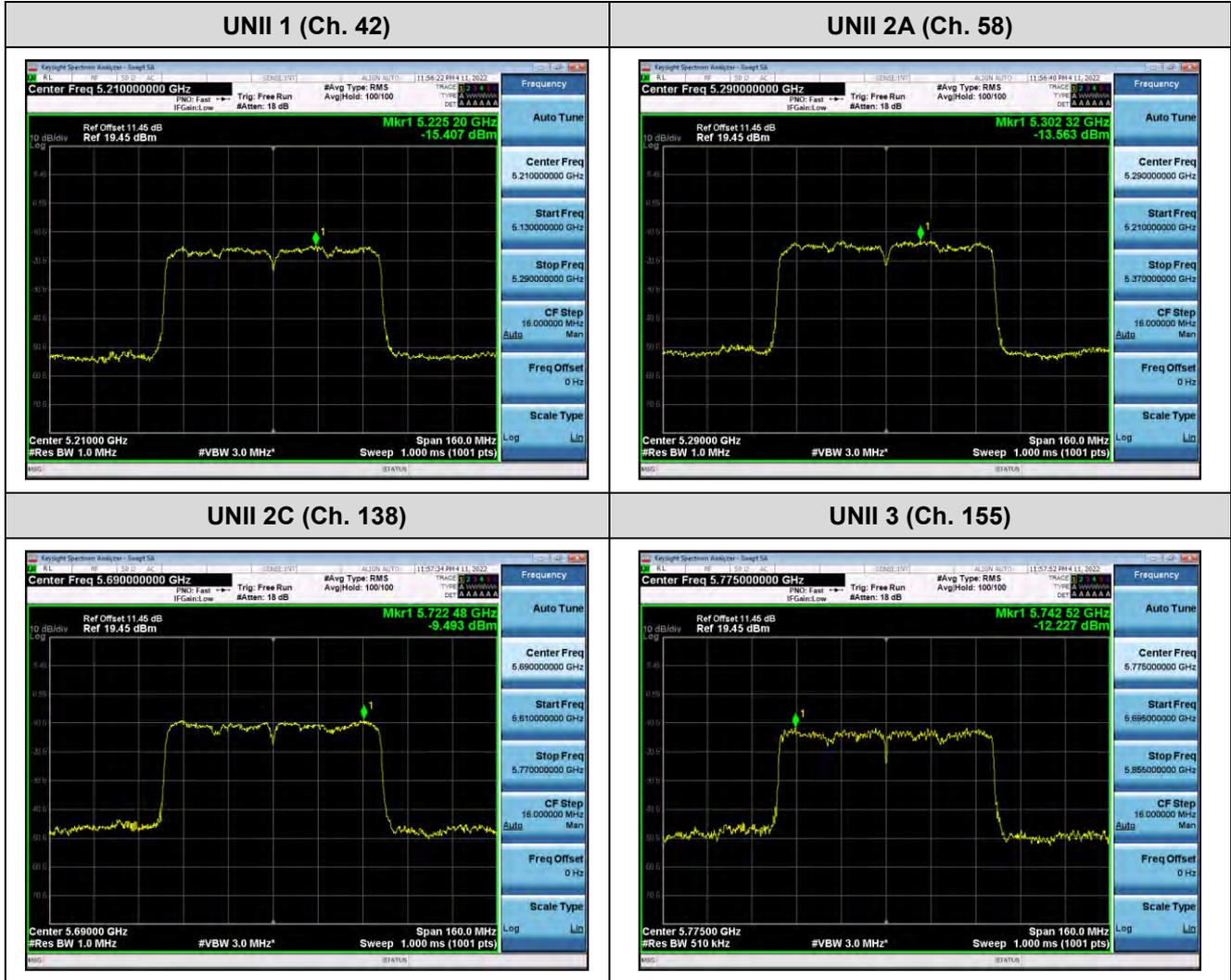
In order to simplify the report, attached plots were only channel of highest PSD.



☐ Test Plots(802.11ac(VHT80))

Note:

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



10.6 FREQUENCY STABILITY.

10.6.1 80 MHz BW

Startup after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210038.96	8.85
100%		-30	5210059.68	61.29
100%		-20	5210056.44	93.45
100%		-10	5210049.47	42.88
100%		0	5210045.16	19.02
100%		+10	5210042.35	47.43
100%		+30	5210041.41	91.69
100%		+40	5210050.83	71.72
100%		+50	5210056.36	58.48
High		4.4	+20	5210058.49
Low	3.6	+20	5210056.63	96.07

Note:

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

OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290037.65	14.37
100%		-30	5290057.62	65.01
100%		-20	5290054.93	52.69
100%		-10	5290049.37	50.22
100%		0	5290045.20	74.42
100%		+10	5290041.11	74.10
100%		+30	5290041.22	81.87
100%		+40	5290050.40	78.54
100%		+50	5290053.82	55.63
High		4.4	+20	5290055.07
Low	3.6	+20	5290056.63	67.92

Note:

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

OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530039.08	91.77
100%		-30	5530059.15	69.85
100%		-20	5530055.14	94.86
100%		-10	5530049.12	18.89
100%		0	5530045.26	10.42
100%		+10	5530042.31	43.400
100%		+30	5530041.92	46.71
100%		+40	5530050.85	31.96
100%		+50	5530056.32	88.48
High		4.4	+20	5530058.55
Low	3.6	+20	5530058.13	54.26

Note:

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

OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775040.22	22.42
100%		-30	5775059.35	93.72
100%		-20	5775056.45	26.33
100%		-10	5775050.75	24.86
100%		0	5775045.97	50.95
100%		+10	5775041.99	9.08
100%		+30	5775043.78	34.07
100%		+40	5775051.92	5.60
100%		+50	5775056.67	28.83
High		4.4	+20	5775058.97
Low	3.6	+20	5775057.24	90.05

Note:

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

2 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210043.57	57.73
100%		-30	5210062.53	72.97
100%		-20	5210059.55	14.12
100%		-10	5210053.99	68.14
100%		0	5210049.06	4.03
100%		+10	5210046.49	80.64
100%		+30	5210046.47	1.81
100%		+40	5210054.26	68.16
100%		+50	5210058.92	78.60
High		4.4	+20	5210062.23
Low	3.6	+20	5210061.72	54.26

Note:

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

OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290040.96	47.84
100%		-30	5290060.02	57.37
100%		-20	5290056.58	57.23
100%		-10	5290051.25	23.39
100%		0	5290048.07	73.66
100%		+10	5290045.53	80.17
100%		+30	5290043.47	7.54
100%		+40	5290051.90	85.30
100%		+50	5290057.20	50.47
High		4.4	+20	5290060.26
Low	3.6	+20	5290060.84	30.38

Note:

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

OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530041.85	59.79
100%		-30	5530060.89	19.04
100%		-20	5530058.41	42.75
100%		-10	5530052.80	5.84
100%		0	5530049.10	15.43
100%		+10	5530046.97	4.62
100%		+30	5530044.41	97.92
100%		+40	5530053.65	62.27
100%		+50	5530057.92	74.96
High		4.4	+20	5530060.12
Low	3.6	+20	5530059.59	36.13

Note:

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

OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775043.64	94.68
100%		-30	5775062.99	4.21
100%		-20	5775059.89	62.46
100%		-10	5775054.06	22.18
100%		0	5775049.30	61.02
100%		+10	5775045.79	6.33
100%		+30	5775046.29	52.87
100%		+40	5775055.32	72.87
100%		+50	5775060.44	34.92
High		4.4	+20	5775062.76
Low	3.6	+20	5775060.74	6.32

Note:

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

5 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210044.10	6.92
100%		-30	5210063.23	78.79
100%		-20	5210060.06	18.37
100%		-10	5210053.76	29.62
100%		0	5210050.35	74.08
100%		+10	5210047.19	33.67
100%		+30	5210046.21	62.98
100%		+40	5210055.33	57.13
100%		+50	5210060.45	45.54
High		4.4	+20	5210063.22
Low	3.6	+20	5210061.05	91.63

Note:

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

OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290048.83	27.87
100%		-30	5290066.81	44.44
100%		-20	5290064.53	49.63
100%		-10	5290058.21	1.90
100%		0	5290054.90	84.85
100%		+10	5290051.47	16.84
100%		+30	5290050.68	24.29
100%		+40	5290059.95	83.66
100%		+50	5290063.65	76.74
High		4.4	+20	5290064.53
Low	3.6	+20	5290066.39	90.36

Note:

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

OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530045.74	18.65
100%		-30	5530065.82	95.29
100%		-20	5530063.35	86.08
100%		-10	5530057.27	39.61
100%		0	5530054.07	61.51
100%		+10	5530050.32	6.09
100%		+30	5530048.29	36.55
100%		+40	5530057.91	57.73
100%		+50	5530062.64	92.80
High		4.4	+20	5530064.47
Low	3.6	+20	5530064.78	33.60

Note:

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

OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775046.19	8.53
100%		-30	5775066.32	44.69
100%		-20	5775064.10	57.96
100%		-10	5775057.73	89.59
100%		0	5775054.54	1.65
100%		+10	5775052.10	64.97
100%		+30	5775049.48	38.33
100%		+40	5775058.93	62.77
100%		+50	5775063.07	74.04
High		4.4	+20	5775064.33
Low	3.6	+20	5775065.08	5.52

Note:

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

10 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210050.21	75.74
100%		-30	5210070.62	62.67
100%		-20	5210068.05	8.97
100%		-10	5210061.26	60.8
100%		0	5210057.85	36.46
100%		+10	5210055.42	71.38
100%		+30	5210053.77	94.51
100%		+40	5210064.42	60.11
100%		+50	5210069.96	46.81
High		4.4	+20	5210069.75
Low	3.6	+20	5210068.56	17.28

Note:

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

OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290049.85	74.7
100%		-30	5290069.56	99.68
100%		-20	5290067.06	20.47
100%		-10	5290061.06	30.04
100%		0	5290056.89	10.82
100%		+10	5290054.09	61.19
100%		+30	5290053.04	80.8
100%		+40	5290060.93	12.53
100%		+50	5290066.44	98.96
High		4.4	+20	5290069.36
Low	3.6	+20	5290069.04	53.84

Note:

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

OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530051.11	3.59
100%		-30	5530070.13	41.75
100%		-20	5530066.94	30.32
100%		-10	5530060.99	35.73
100%		0	5530056.85	53.04
100%		+10	5530053.84	84.95
100%		+30	5530054.14	17.70
100%		+40	5530063.53	80.89
100%		+50	5530067.01	18.38
High	4.4	+20	5530068.59	34.66
Low	3.6	+20	5530070.50	60.93

Note:

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

OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775055.69	37.99
100%		-30	5775075.37	89.67
100%		-20	5775071.43	86.3
100%		-10	5775066.20	35.77
100%		0	5775062.98	7.59
100%		+10	5775060.77	84.02
100%		+30	5775059.33	60.93
100%		+40	5775068.17	9.33
100%		+50	5775073.60	22.53
High		4.4	+20	5775075.12
Low	3.6	+20	5775074.38	35.51

Note:

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

10.7 STRADDLE CHANNEL

10.7.1 26 dB Bandwidth

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11a	UNII 2C	5720	144	5709.92	15.08
802.11n(HT20)				5709.48	15.52
802.11ac(VHT20)				5709.52	15.48
802.11a	UNII 3	5720	144	5730.04	5.04
802.11n(HT20)				5730.32	5.32
802.11ac(VHT20)				5730.48	5.48

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11n(HT40)	UNII 2C	5710	142	5689.20	35.80
802.11ac(VHT40)				5688.40	36.60
802.11n(HT40)	UNII 3	5710	142	5731.04	6.04
802.11ac(VHT40)				5730.80	5.80

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11ac(VHT80)	UNII 2C	5690	138	5649.36	75.64
	UNII 3	5690	138	5730.48	5.48

Note:

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

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

☐ Test Plots (26 dB Bandwidth)

802.11a UNII Band



802.11n(HT20) UNII Band



802.11ac(VHT20) UNII Band



☐ Test Plots (26 dB Bandwidth)

802.11n(HT40) UNII Band



802.11ac(VHT40) UNII Band



802.11ac(VHT80) UNII Band



10.7.2 6 dB Bandwidth

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
802.11a	UNII 3	5720	144	5728.20	3.20	> 0.5
802.11n(HT20)				5727.88	2.88	> 0.5
802.11ac(VHT20)				5728.76	3.76	> 0.5

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
802.11n(HT40)	UNII 3	5710	142	5727.76	2.76	> 0.5
802.11ac(VHT40)				5727.84	2.84	> 0.5

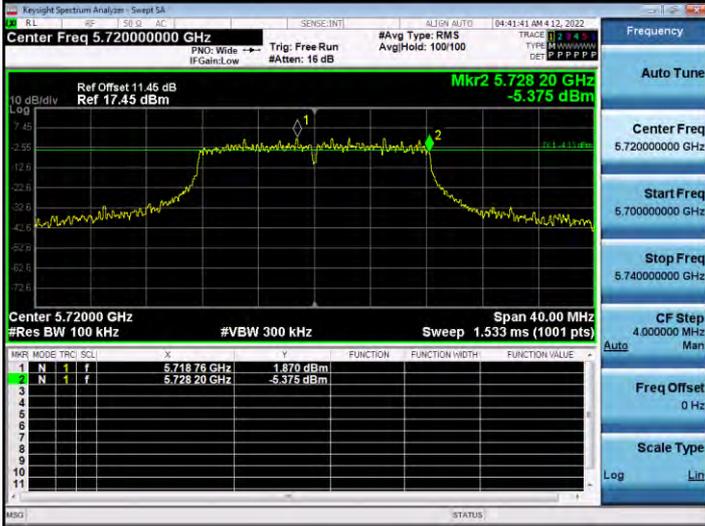
Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
802.11ac(VHT80)	UNII 3	5690	138	5727.76	2.76	> 0.5

Note:

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

Test Plots(UNII 3 Band 6 dB Bandwidth)

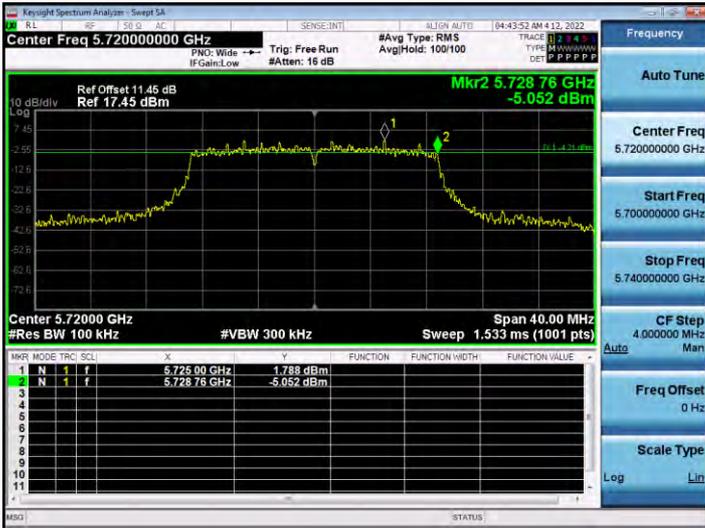
802.11a CH.144



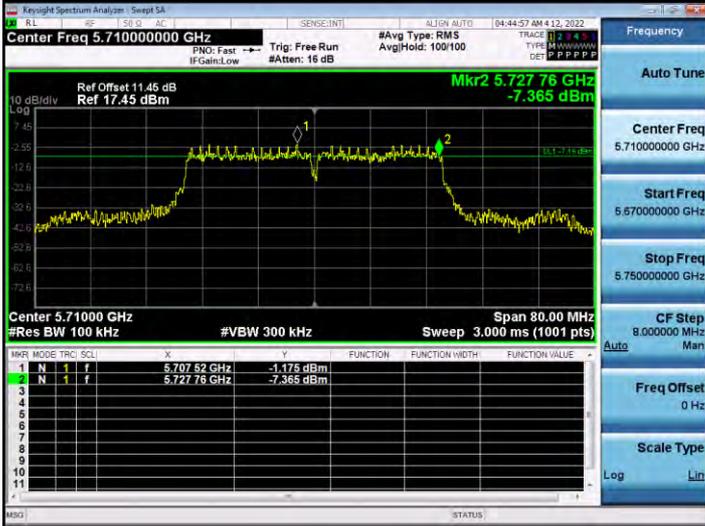
802.11n_HT20 CH.144



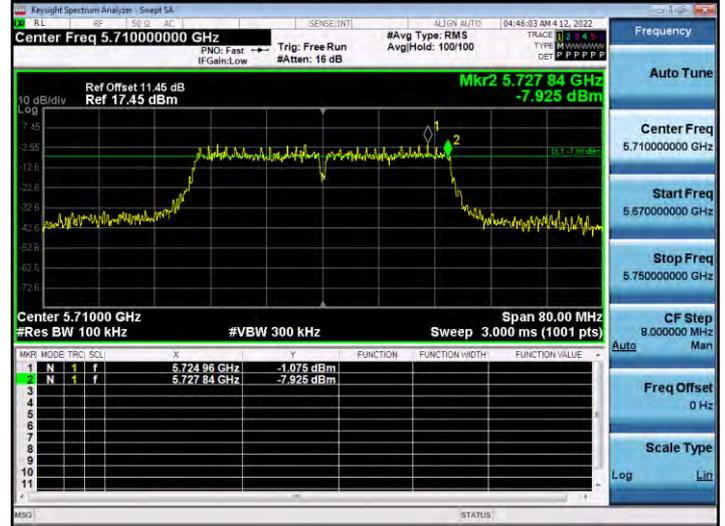
802.11ac_VHT20 CH.144



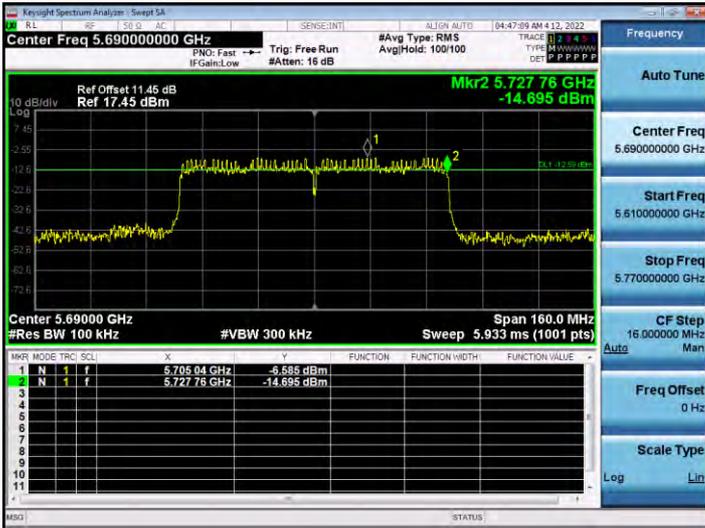
802.11n_HT40 CH.142



802.11ac_VHT40 CH.142



802.11ac_VHT80 CH.138



10.7.3 Output Power

Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)	Worstcase Datarate
802.11a	5720	144	10.81	1.707	12.52	22.78	36 Mbps
802.11n(HT20)	(UNII 2C Band)		10.68	1.613	12.30	22.91	MCS4
802.11ac(VHT20)			11.03	1.175	12.21	22.90	MCS3
802.11a	5720	144	4.07	1.707	5.78	30.00	36 Mbps
802.11n(HT20)	(UNII 3 Band)		4.32	1.613	5.93	30.00	MCS4
802.11ac(VHT20)			4.71	1.175	5.89	30.00	MCS3

Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)	Worstcase Datarate
802.11n(HT40)	5710	142	9.74	2.385	12.13	23.98	MCS4
802.11ac(VHT40)	(UNII 2C Band)		9.73	2.333	12.07	23.98	MCS4
802.11n(HT40)	5710	142	-0.02	2.385	2.36	30.00	MCS4
802.11ac(VHT40)	(UNII 3 Band)		0.06	2.333	2.39	30.00	MCS4

Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)	Worstcase Datarate
802.11ac(VHT80)	5690	138	6.84	3.516	10.35	23.98	MCS4
	(UNII 2C Band)						
	5690	138	-7.37	3.516	-3.85	30.00	MCS4
	(UNII 3 Band)						

Test Plots

802.11a UNII 2C Band



802.11a UNII 3 Band



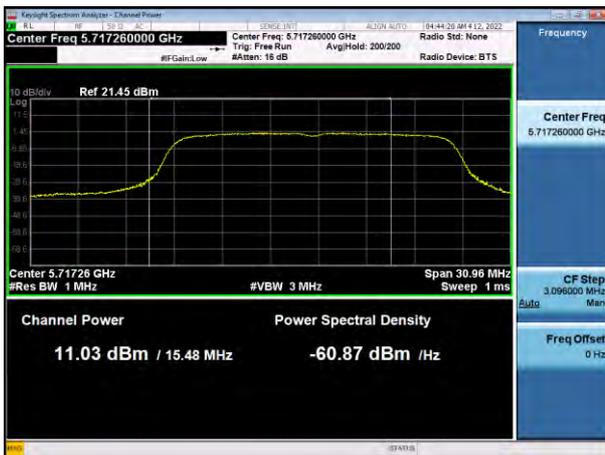
802.11n(HT20) UNII 2C Band



802.11n(HT20) UNII 3 Band



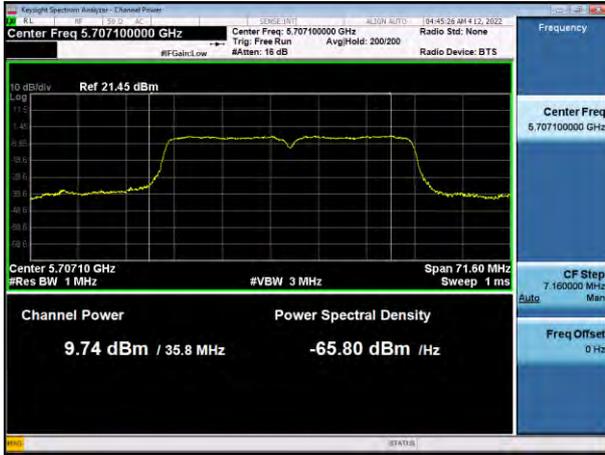
802.11ac(VHT20) UNII 2C Band



802.11ac(VHT20) UNII 3 Band



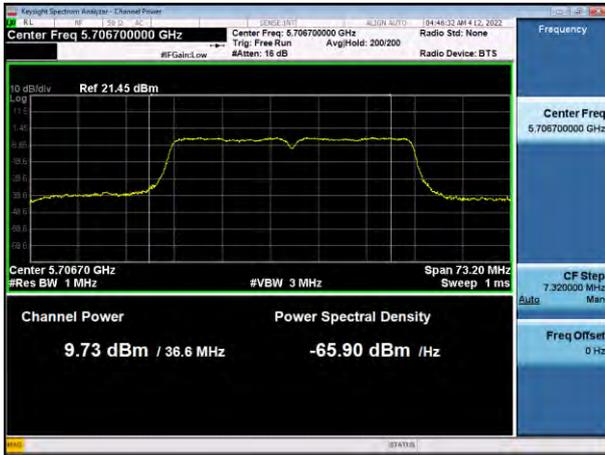
802.11n(HT40) UNII 2C Band



802.11n(HT40) UNII 3 Band



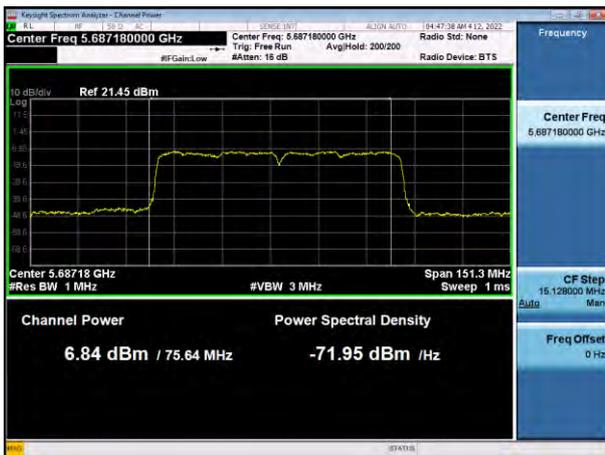
802.11ac(VHT40) UNII 2C Band



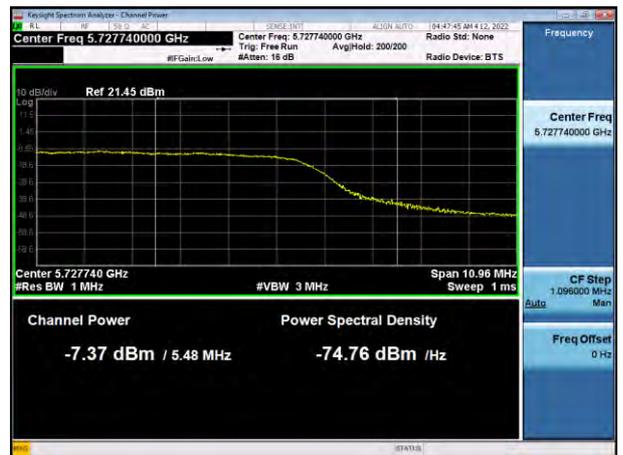
802.11ac(VHT40) UNII 3 Band



802.11ac(VHT80) UNII 2C Band



802.11ac(VHT80) UNII 3 Band



10.7.4 Power Spectral Density

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)	Worstcase Datarate
802.11a	5720	144	0.827	1.707	2.534	11dBm/ MHz	36 Mbps
802.11n(HT20)	(UNII 2C		0.488	1.613	2.102		MCS4
802.11ac(VHT20)	Band)		1.118	1.175	2.293		MCS3
802.11a	5720	144	-3.124	1.707	-1.417	30 dBm/ 500 kHz	36 Mbps
802.11n(HT20)	(UNII 3 Band)		-2.613	1.613	-1.000		MCS4
802.11ac(VHT20)			-2.536	1.175	-1.361		MCS3

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)	Worstcase Datarate
802.11n(HT40)	5710	142	-3.464	2.385	-1.079	11dBm/ MHz	MCS4
802.11ac(VHT40)	(UNII 2C Band)		-3.181	2.333	-0.847		MCS4
802.11n(HT40)	5710	142	-7.214	2.385	-4.829	30 dBm/ 500 kHz	MCS4
802.11ac(VHT40)	(UNII 3 Band)		-6.931	2.333	-4.597		MCS4

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)	Worstcase Datarate
802.11ac(VHT80)	5690 (UNII 2C Band)	138	-9.766	3.516	-6.251	11dBm/ MHz	MCS4
	5690 (UNII 3 Band)	138	-13.730	3.516	-10.214	30 dBm/ 500 kHz	MCS4

Test Plots

802.11a UNII 2C Band



802.11a UNII 3 Band



802.11n(HT20) UNII 2C Band



802.11n(HT20) UNII 3 Band



802.11ac(VHT20) UNII 2C Band



802.11ac(VHT20) UNII 3 Band



802.11n(HT40) UNII 2C Band



802.11n(HT40) UNII 3 Band



802.11ac(VHT40) UNII 2C Band



802.11ac(VHT40) UNII 3 Band



802.11ac(VHT80) UNII 2C Band



802.11ac(VHT80) UNII 3 Band



10.8 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30MHz

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

Note:

1. The Measured 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 (dBμV) + Distance extrapolation factor

Frequency Range : Below 1 GHz

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

Note:

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

Frequency Range : Above 1 GHz

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

Frequency [MHz]	Measured Level [dBμV]	C.L+A.F +D.F-A.G [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10360	47.80	4.78	V	52.58	68.20	15.62	PK
15540	52.26	4.74	V	57.00	73.98	16.98	PK
15540	37.39	4.74	V	42.13	53.98	11.85	AV
10360	46.85	4.78	H	51.63	68.20	16.57	PK
15540	50.24	4.74	H	54.98	73.98	19.00	PK
15540	36.55	4.74	H	41.29	53.98	12.69	AV

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

Frequency [MHz]	Measured Level [dBμV]	C.L+A.F +D.F-A.G [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10400	47.25	4.37	V	51.62	68.20	16.58	PK
15600	51.88	4.20	V	56.08	73.98	17.90	PK
15600	37.43	4.20	V	41.63	53.98	12.35	AV
10400	46.22	4.37	H	50.59	68.20	17.61	PK
15600	50.28	4.20	H	54.48	73.98	19.50	PK
15600	36.10	4.20	H	40.30	53.98	13.68	AV

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

Frequency [MHz]	Measured Level [dBμV]	C.L+A.F +D.F-A.G [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10480	47.55	5.17	V	52.72	68.20	15.48	PK
15720	51.95	3.76	V	55.71	73.98	18.27	PK
15720	37.39	3.76	V	41.15	53.98	12.83	AV
10480	46.32	5.17	H	51.49	68.20	16.71	PK
15720	50.00	3.76	H	53.76	73.98	20.22	PK
15720	35.96	3.76	H	39.72	53.98	14.26	AV

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

Frequency [MHz]	Measured Level [dBμV]	C.L+A.F +D.F-A.G [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10520	48.00	4.93	V	52.93	68.20	15.27	PK
15780	51.65	4.08	V	55.73	73.98	18.25	PK
15780	37.33	4.08	V	41.41	53.98	12.57	AV
10520	47.72	4.93	H	52.65	68.20	15.55	PK
15780	50.83	4.08	H	54.91	73.98	19.07	PK
15780	36.85	4.08	H	40.93	53.98	13.05	AV

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

Frequency [MHz]	Measured Level [dBμV]	C.L+A.F +D.F-A.G [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10600	47.42	5.16	V	52.58	73.98	21.40	PK
10600	34.09	5.16	V	39.25	53.98	14.73	AV
15900	50.00	5.46	V	55.46	73.98	18.52	PK
15900	35.86	5.46	V	41.32	53.98	12.66	AV
10600	46.85	5.16	H	52.01	73.98	21.97	PK
10600	33.85	5.16	H	39.01	53.98	14.97	AV
15900	48.95	5.46	H	54.41	73.98	19.57	PK
15900	34.28	5.46	H	39.74	53.98	14.24	AV

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

Frequency [MHz]	Measured Level [dBμV]	C.L+A.F +D.F-A.G [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10640	48.17	5.36	V	53.53	73.98	20.45	PK
10640	34.31	5.36	V	39.67	53.98	14.31	AV
15960	49.57	4.92	V	54.49	73.98	19.49	PK
15960	35.01	4.92	V	39.93	53.98	14.05	AV
10640	46.55	5.36	H	51.91	73.98	22.07	PK
10640	33.82	5.36	H	39.18	53.98	14.80	AV
15960	48.76	4.92	H	53.68	73.98	20.30	PK
15960	34.29	4.92	H	39.21	53.98	14.77	AV

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

Frequency [MHz]	Measured Level [dBμV]	C.L+A.F +D.F-A.G [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
11000	47.47	5.57	V	53.04	73.98	20.94	PK
11000	34.45	5.57	V	40.02	53.98	13.96	AV
16500	46.23	7.18	V	53.41	68.20	14.79	PK
11000	46.91	5.57	H	52.48	73.98	21.50	PK
11000	34.72	5.57	H	40.29	53.98	13.69	AV
16500	45.95	7.18	H	53.13	68.20	15.07	PK

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

Frequency [MHz]	Measured Level [dBμV]	C.L+A.F +D.F-A.G [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
11200	46.12	5.43	V	51.55	73.98	22.43	PK
11200	33.95	5.43	V	39.38	53.98	14.60	AV
16800	46.30	8.86	V	55.16	68.20	13.04	PK
11200	47.91	5.43	H	53.34	73.98	20.64	PK
11200	34.50	5.43	H	39.93	53.98	14.05	AV
16800	45.82	8.86	H	54.68	68.20	13.52	PK

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

Frequency [MHz]	Measured Level [dB μ V]	C.L+A.F +D.F-A.G [dB/m]	ANT. POL [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measurement Type
11440	46.08	5.08	V	51.16	73.98	22.82	PK
11440	33.28	5.08	V	38.36	53.98	15.62	AV
17160	45.68	8.92	V	54.60	68.20	13.60	PK
11440	47.06	5.08	H	52.14	73.98	21.84	PK
11440	34.04	5.08	H	39.12	53.98	14.86	AV
17160	44.95	8.92	H	53.87	68.20	14.33	PK

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

Frequency [MHz]	Measured Level [dB μ V]	C.L+A.F +D.F-A.G [dB/m]	ANT. POL [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measurement Type
11490	48.91	5.07	V	53.98	73.98	20.00	PK
11490	37.77	5.07	V	42.84	53.98	11.14	AV
17235	47.30	9.49	V	56.79	68.20	11.41	PK
11490	49.58	5.07	H	54.65	73.98	19.33	PK
11490	38.52	5.07	H	43.59	53.98	10.39	AV
17235	46.63	9.49	H	56.12	68.20	12.08	PK

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

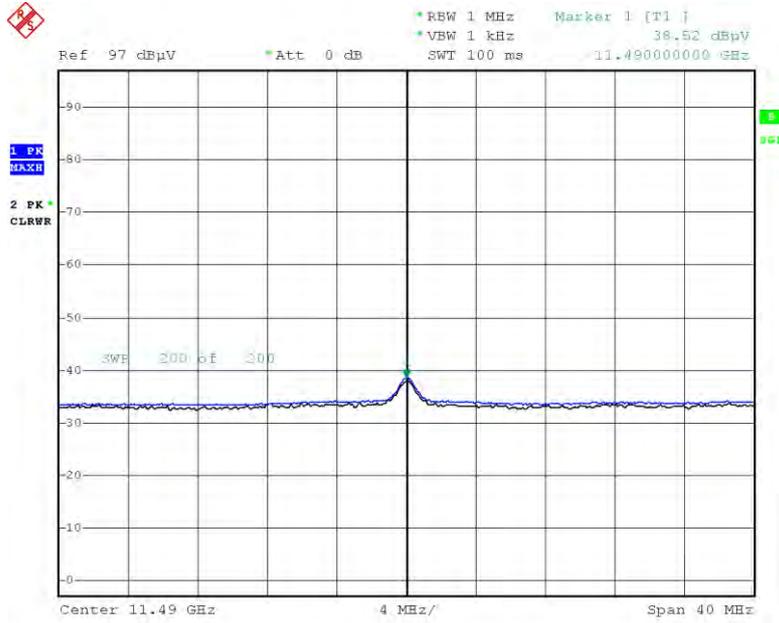
Frequency [MHz]	Measured Level [dBμV]	C.L+A.F +D.F-A.G [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
11570	47.06	5.07	V	52.13	73.98	21.85	PK
11570	37.52	5.07	V	42.59	53.98	11.39	AV
17355	46.27	10.87	V	57.14	68.20	11.06	PK
11570	47.54	5.07	H	52.61	73.98	21.37	PK
11570	37.95	5.07	H	43.02	53.98	10.96	AV
17355	46.91	10.87	H	57.78	68.20	10.42	PK

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

Frequency [MHz]	Measured Level [dBμV]	C.L+A.F +D.F-A.G [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
11650	47.32	4.76	V	52.08	73.98	21.90	PK
11650	36.81	4.76	V	41.57	53.98	12.41	AV
17475	47.18	10.29	V	57.47	68.20	10.73	PK
11650	48.16	4.76	H	52.92	73.98	21.06	PK
11650	37.15	4.76	H	41.91	53.98	12.07	AV
17475	46.33	10.29	H	56.62	68.20	11.58	PK

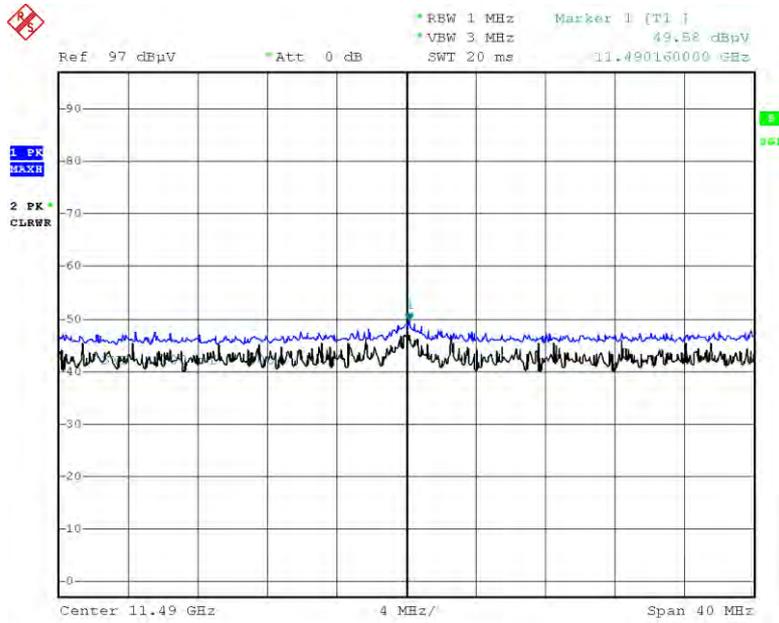
Test Plots

Average Result (802.11a 6 Mbps, Ch.149 2nd Harmonic, Y-H)



Date: 31.MAR.2022 10:54:27

Peak Result (802.11a 6 Mbps, Ch.149 2nd Harmonic, Y-H)



Date: 31.MAR.2022 10:54:55

Note:

Only the worst case plots for Radiated Spurious Emissions.

10.9 RADIATED RESTRICTED BAND EDGE

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

Frequency [MHz]	Measured Level [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5150	54.17	12.12	H	66.29	73.98	7.69	PK
5150	39.30	12.12	H	51.42	53.98	2.56	AV
5150	53.27	12.12	V	65.39	73.98	8.59	PK
5150	39.12	12.12	V	51.24	53.98	2.74	AV

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

Frequency [MHz]	Measured Level [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5350	57.89	12.14	H	70.03	73.98	3.95	PK
5350	39.24	12.14	H	51.38	53.98	2.60	AV
5350	56.80	12.14	V	68.94	73.98	5.04	PK
5350	38.16	12.14	V	50.30	53.98	3.68	AV

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

Frequency [MHz]	Measured Level [dB μ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measurement Type
5460	47.10	12.67	H	59.77	73.98	14.21	PK
5460	33.68	12.67	H	46.35	53.98	7.63	AV
5470	51.84	12.70	H	64.54	68.20	3.66	PK
5460	46.52	12.67	V	59.19	73.98	14.79	PK
5460	33.58	12.67	V	46.25	53.98	7.73	AV
5470	52.35	12.70	V	65.05	68.20	3.15	PK

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

Frequency [MHz]	Measured Level [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5150	57.05	12.12	H	69.17	73.98	4.81	PK
5150	38.38	12.12	H	50.50	53.98	3.48	AV
5150	56.52	12.12	V	68.64	73.98	5.34	PK
5150	38.56	12.12	V	50.68	53.98	3.30	AV

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

Frequency [MHz]	Measured Level [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5350	55.05	12.14	H	67.19	73.98	6.79	PK
5350	38.74	12.14	H	50.88	53.98	3.10	AV
5350	54.85	12.14	V	66.99	73.98	6.99	PK
5350	38.04	12.14	V	50.18	53.98	3.80	AV

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

Frequency [MHz]	Measured Level [dB μ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measurement Type
5460	48.16	12.67	H	60.83	73.98	13.15	PK
5460	33.57	12.67	H	46.24	53.98	7.74	AV
5470	51.29	12.70	H	63.99	68.20	4.21	PK
5460	46.30	12.67	V	58.97	73.98	15.01	PK
5460	33.80	12.67	V	46.47	53.98	7.51	AV
5470	51.37	12.70	V	64.07	68.20	4.13	PK

Band : UNII 1

Operation Mode: 802.11 ac_VHT20

Transfer MCS Index: 0

Operating Frequency 5180 MHz

Channel No. 36 Ch

Frequency [MHz]	Measured Level [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5150	53.16	12.12	H	65.28	73.98	8.70	PK
5150	37.90	12.12	H	50.02	53.98	3.96	AV
5150	54.34	12.12	V	66.46	73.98	7.52	PK
5150	38.42	12.12	V	50.54	53.98	3.44	AV

Band : UNII 2A

Operation Mode: 802.11 ac_VHT20

Transfer MCS Index: 0

Operating Frequency 5320 MHz

Channel No. 64 Ch

Frequency [MHz]	Measured Level [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5350	55.24	12.14	H	67.38	73.98	6.60	PK
5350	39.11	12.14	H	51.25	53.98	2.73	AV
5350	55.70	12.14	V	67.84	73.98	6.14	PK
5350	39.13	12.14	V	51.27	53.98	2.71	AV

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

Frequency [MHz]	Measured Level [dB μ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measurement Type
5460	46.12	12.67	H	58.79	73.98	15.19	PK
5460	33.61	12.67	H	46.28	53.98	7.70	AV
5470	52.40	12.70	H	65.10	68.20	3.10	PK
5460	46.14	12.67	V	58.81	73.98	15.17	PK
5460	33.98	12.67	V	46.65	53.98	7.33	AV
5470	52.79	12.70	V	65.49	68.20	2.71	PK

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

Frequency [MHz]	Measured Level [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5150	55.56	12.12	H	67.68	73.98	6.30	PK
5150	39.27	12.12	H	51.39	53.98	2.59	AV
5150	55.32	12.12	V	67.44	73.98	6.54	PK
5150	39.43	12.12	V	51.55	53.98	2.43	AV

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

Frequency [MHz]	Measured Level [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5350	57.27	12.14	H	69.41	73.98	4.57	PK
5350	38.70	12.14	H	50.84	53.98	3.14	AV
5350	57.86	12.14	V	70.00	73.98	3.98	PK
5350	38.94	12.14	V	51.08	53.98	2.90	AV

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

Frequency [MHz]	Measured Level [dB μ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measurement Type
5460	48.58	12.67	H	61.25	73.98	12.73	PK
5460	34.88	12.67	H	47.55	53.98	6.43	AV
5470	51.86	12.70	H	64.56	68.20	3.64	PK
5460	48.80	12.67	V	61.47	73.98	12.51	PK
5460	36.23	12.67	V	48.90	53.98	5.08	AV
5470	52.52	12.70	V	65.22	68.20	2.98	PK

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

Frequency [MHz]	Measured Level [dB μ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measurement Type
5150	55.65	12.12	H	67.77	73.98	6.21	PK
5150	39.37	12.12	H	51.49	53.98	2.49	AV
5150	55.33	12.12	V	67.45	73.98	6.53	PK
5150	39.36	12.12	V	51.48	53.98	2.50	AV

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

Frequency [MHz]	Measured Level [dB μ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measurement Type
5350	57.75	12.14	H	69.89	73.98	4.09	PK
5350	39.27	12.14	H	51.41	53.98	2.57	AV
5350	57.57	12.14	V	69.71	73.98	4.27	PK
5350	39.36	12.14	V	51.50	53.98	2.48	AV

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

Frequency [MHz]	Measured Level [dB μ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measurement Type
5460	48.39	12.67	H	61.06	73.98	12.92	PK
5460	35.22	12.67	H	47.89	53.98	6.09	AV
5470	52.34	12.70	H	65.04	68.20	3.16	PK
5460	48.31	12.67	V	60.98	73.98	13.00	PK
5460	35.78	12.67	V	48.45	53.98	5.53	AV
5470	52.01	12.70	V	64.71	68.20	3.49	PK

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

Frequency [MHz]	Measured Level [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5150	51.58	12.12	H	63.70	73.98	10.28	PK
5150	39.22	12.12	H	51.34	53.98	2.64	AV
5150	51.49	12.12	V	63.61	73.98	10.37	PK
5150	38.53	12.12	V	50.65	53.98	3.33	AV

Band :	UNII 1
Operation Mode:	802.11 ac_VHT80
Transfer MCS Index:	0
Operating Frequency	5290 MHz
Channel No.	58 Ch

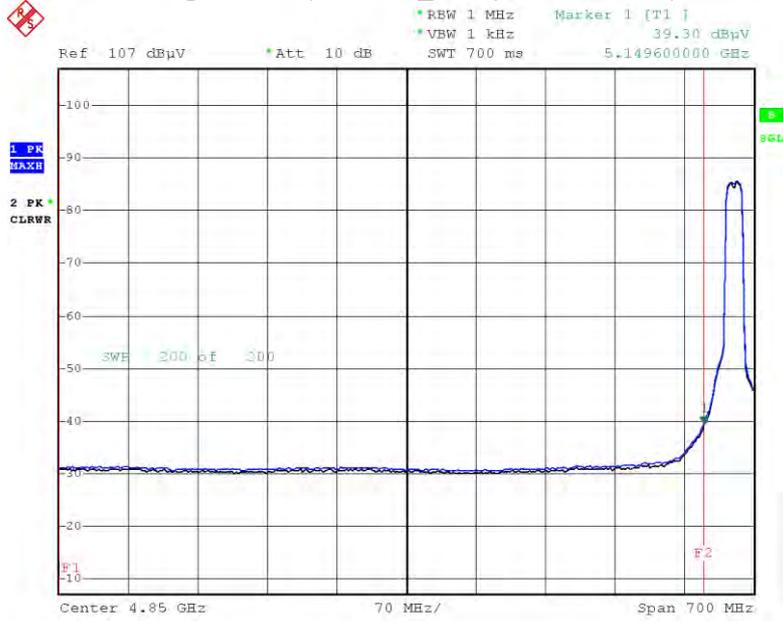
Frequency [MHz]	Measured Level [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5350	51.88	12.14	H	64.02	73.98	9.96	PK
5350	39.00	12.14	H	51.14	53.98	2.84	AV
5350	51.64	12.14	V	63.78	73.98	10.20	PK
5350	39.19	12.14	V	51.33	53.98	2.65	AV

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

Frequency [MHz]	Measured Level [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5460	50.01	12.67	H	62.68	73.98	11.30	PK
5460	37.96	12.67	H	50.63	53.98	3.35	AV
5470	48.16	12.70	H	60.86	68.20	7.34	PK
5460	50.97	12.67	V	63.64	73.98	10.34	PK
5460	38.30	12.67	V	50.97	53.98	3.01	AV
5470	49.55	12.70	V	62.25	68.20	5.95	PK

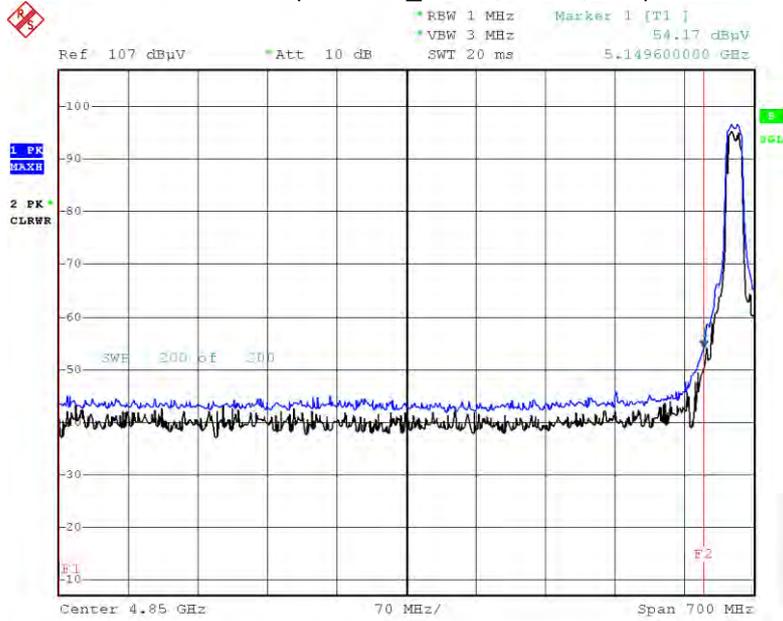
▣ Test Plots(UNII 1, 2A, 2C)

Average Result (802.11 a_6 Mbps, Ch.36, X-H)



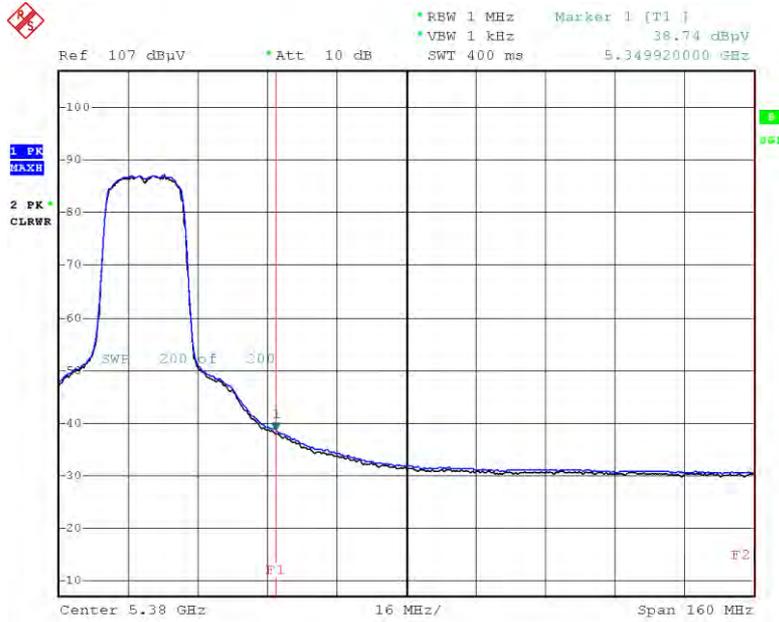
Date: 5.APR.2022 11:25:06

Peak Result (802.11 a_6 Mbs, Ch.36, X-H)



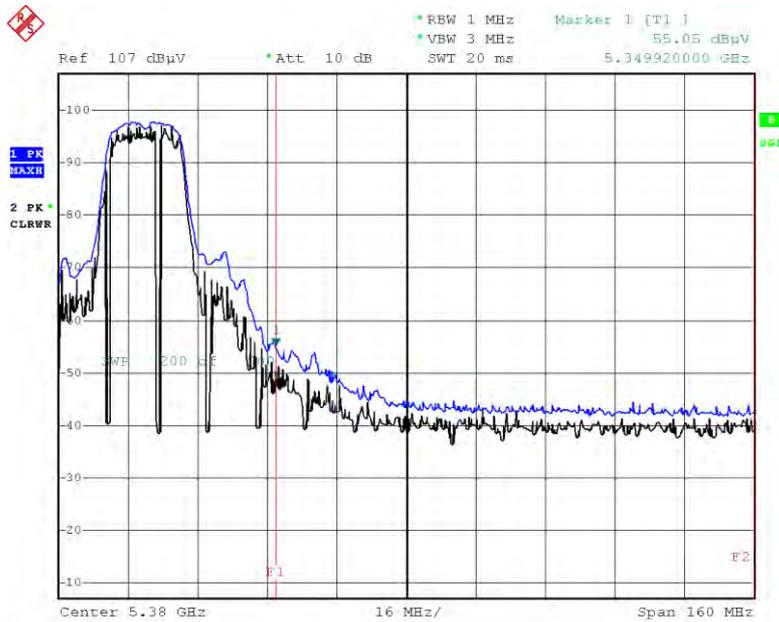
Date: 5.APR.2022 10:55:16

Average Result (802.11 n_HT20_MCS0, Ch.64, Y-H)



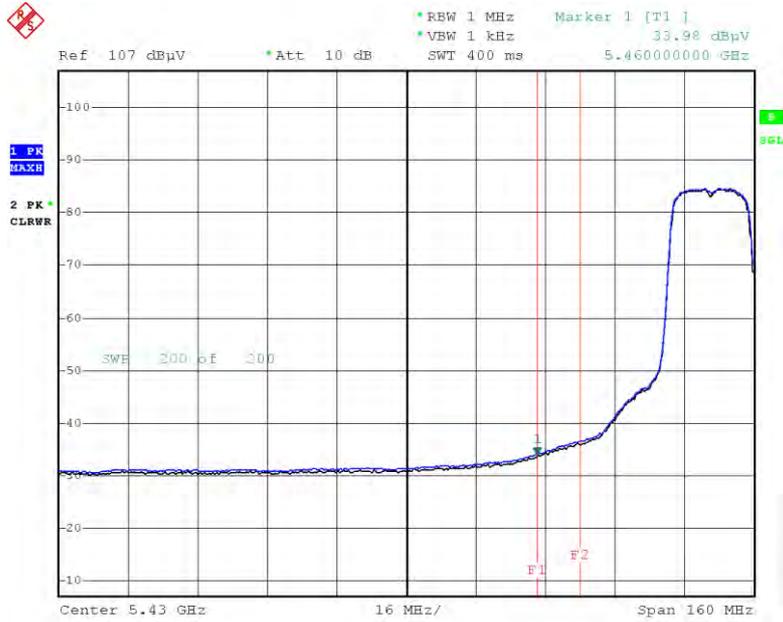
Date: 5.APR.2022 17:53:05

Peak Result (802.11 n_HT20_MCS0, Ch.64, Y-H)



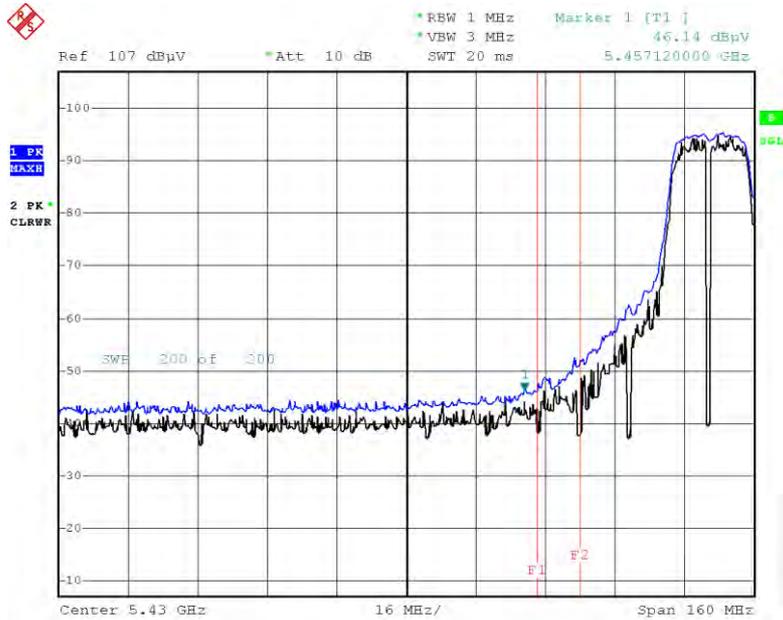
Date: 5.APR.2022 17:53:27

Average Result (802.11 ac_VHT20_ MCS0, Ch.100, Z-V)



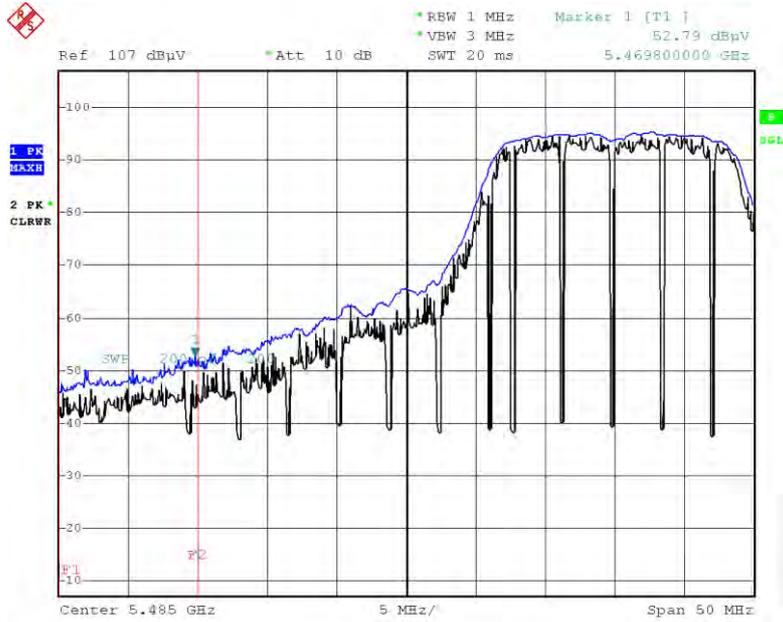
Date: 6.APR.2022 12:09:29

Peak Result (802.11 ac_VHT20_ MCS0, Ch.100, Z-V)



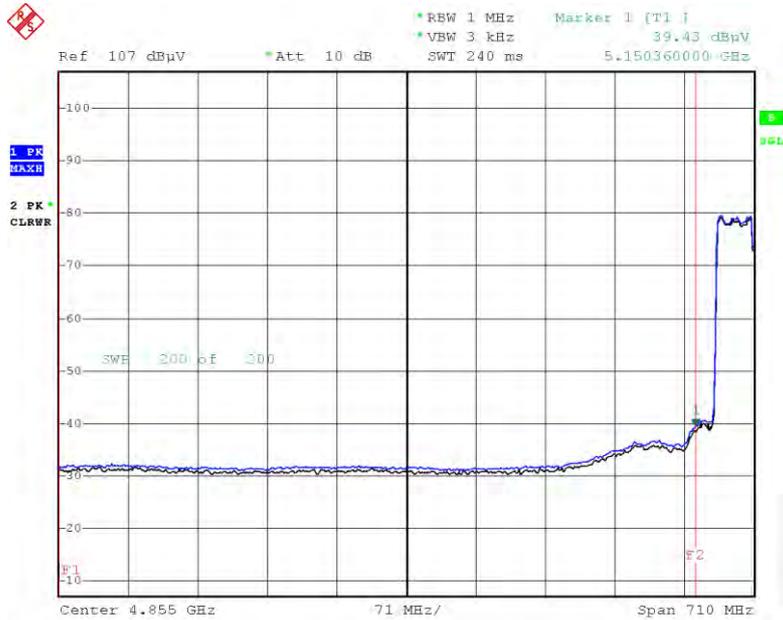
Date: 6.APR.2022 12:06:46

Peak Result (802.11 ac_VHT20_ MCS0, Ch.100, Z-V)



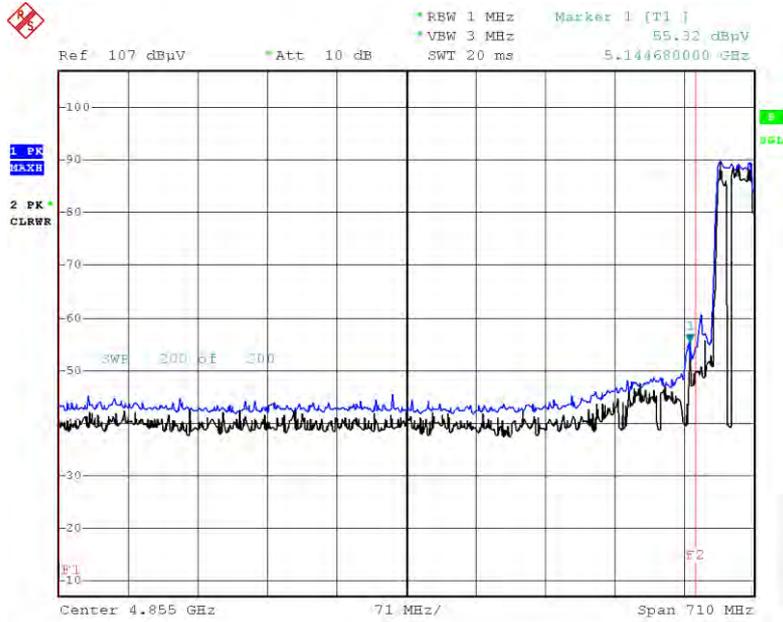
Date: 6.APR.2022 12:05:47

Average Result (802.11 n_HT40_ MCS0, Ch.38, Z-V)



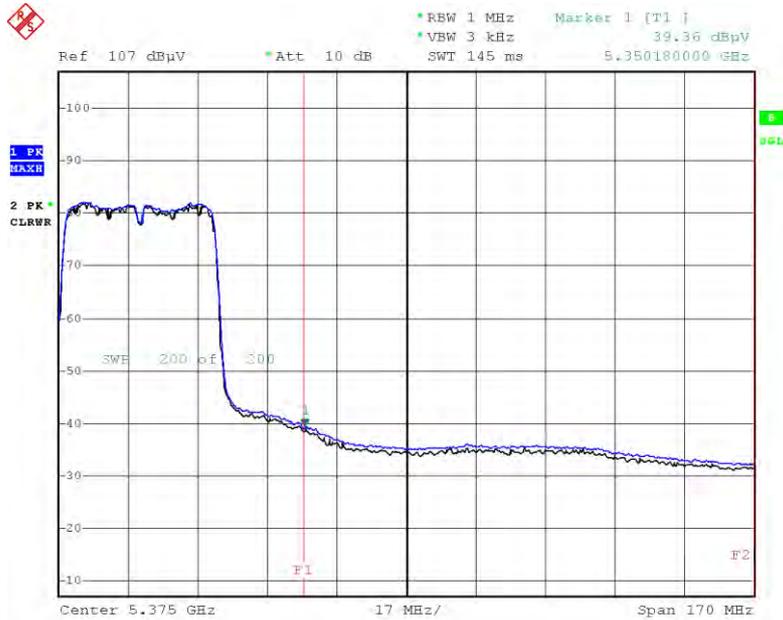
Date: 5.APR.2022 22:29:55

Peak Result (802.11 n_HT40_ MCS0, Ch.38, Z-V)



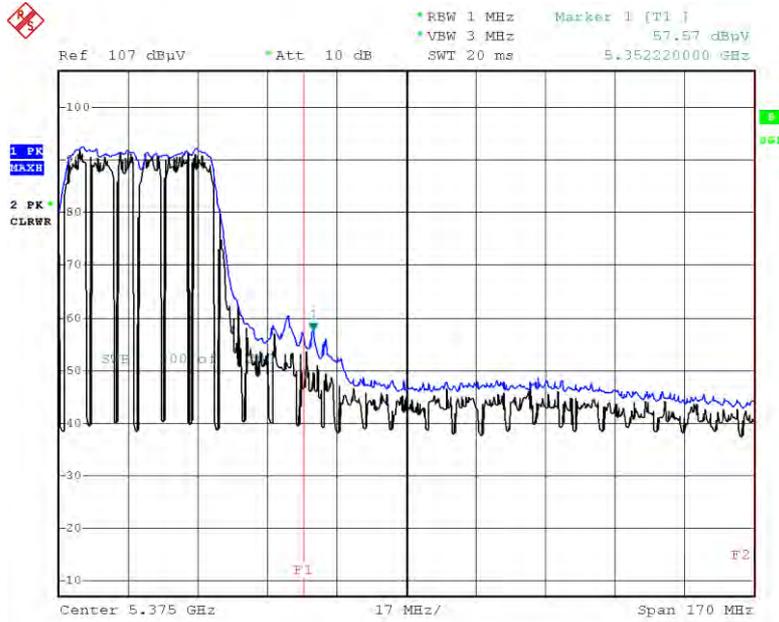
Date: 5.APR.2022 22:30:35

Average Result (802.11 ac_VHT40_ MCS0, Ch.62, Z-V)



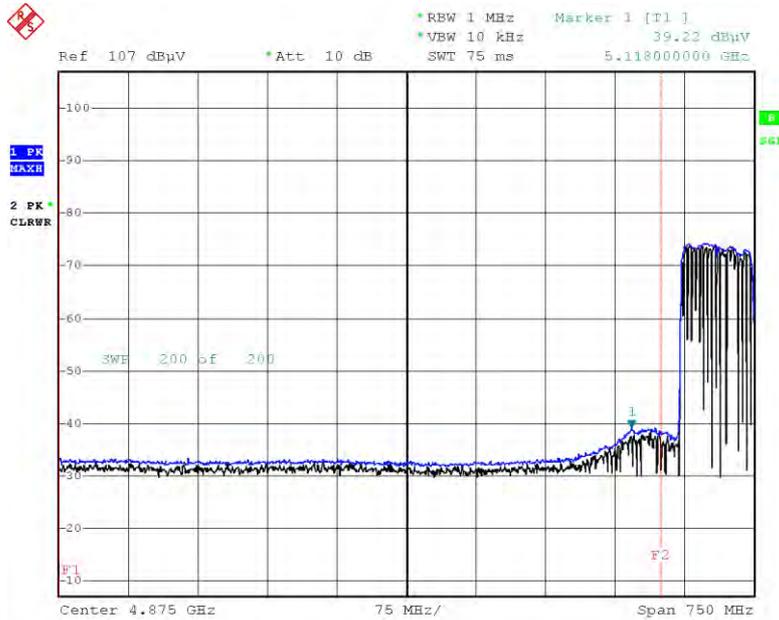
Date: 5.APR.2022 20:18:05

Peak Result (802.11 ac_VHT40_MCS0, Ch.62, Z-V)



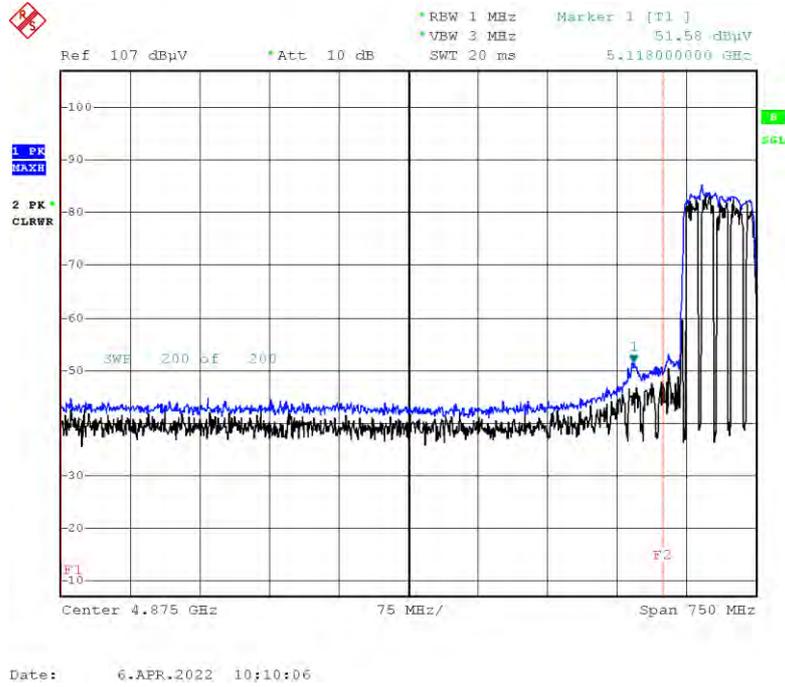
Date: 5.APR.2022 20:18:26

Average Result (802.11 ac_VHT80_MCS0, Ch.42, X-H)



Date: 6.APR.2022 10:09:32

Peak Result (802.11 ac_VHT80_ MCS0, Ch.42, X-H)

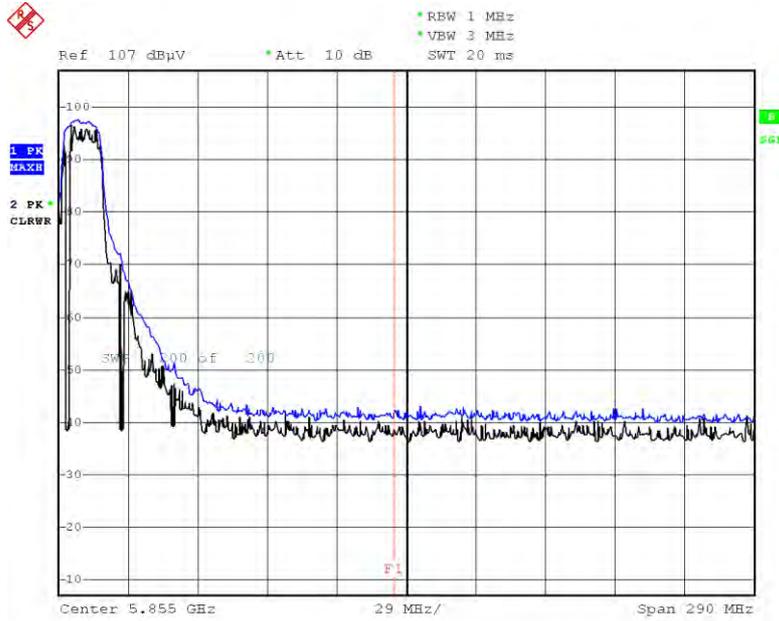


Note:

Only the worst case plots for Radiated Restricted Band Edge.

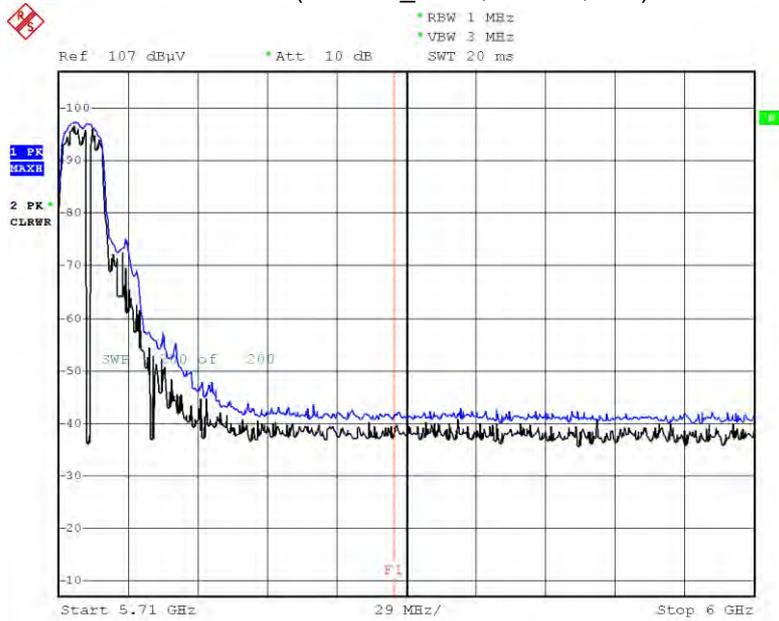
▣ Test Plots(Straddle Channel)

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



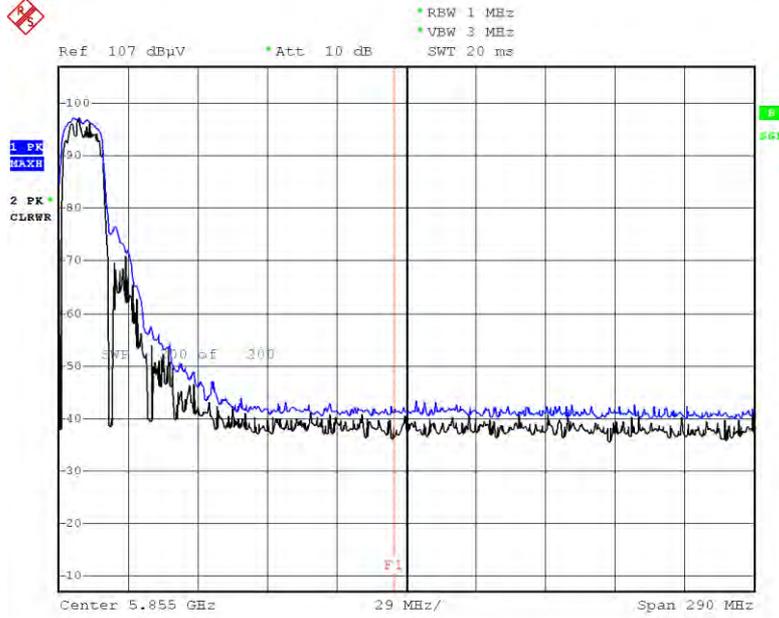
Date: 6.APR.2022 17:32:11

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



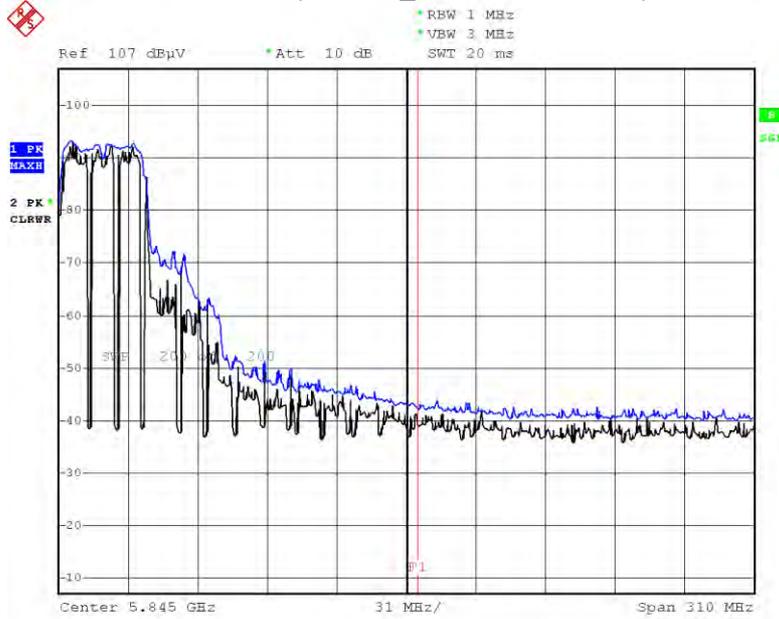
Date: 6.APR.2022 17:29:54

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



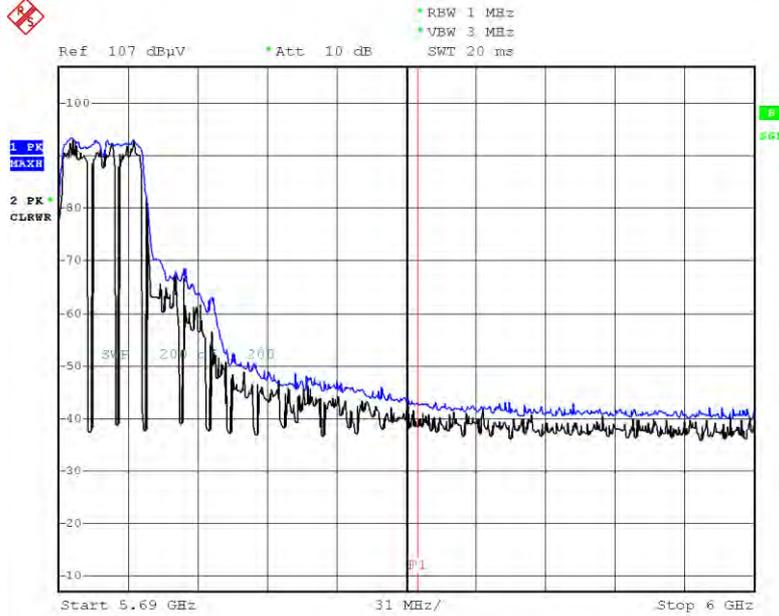
Date: 6.APR.2022 17:33:26

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



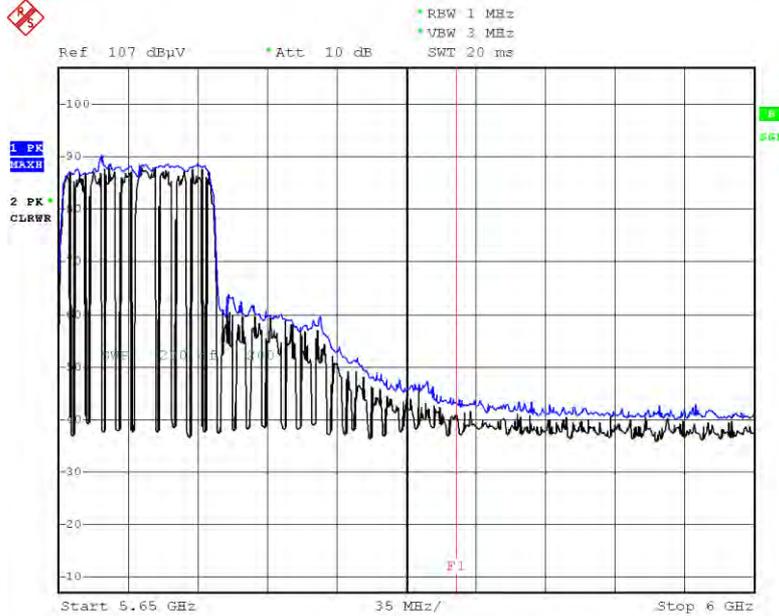
Date: 6.APR.2022 17:35:59

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



Date: 6.APR.2022 17:37:08

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

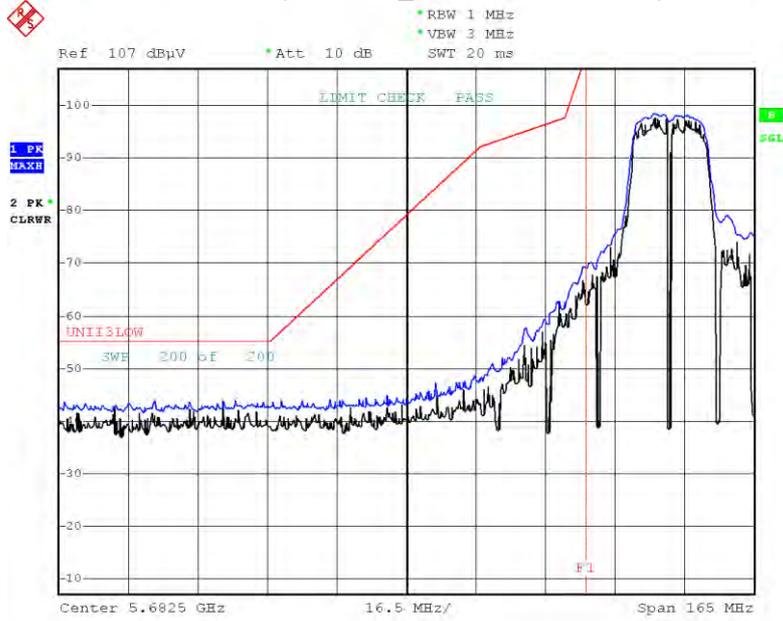


Date: 6.APR.2022 17:38:42

Note :

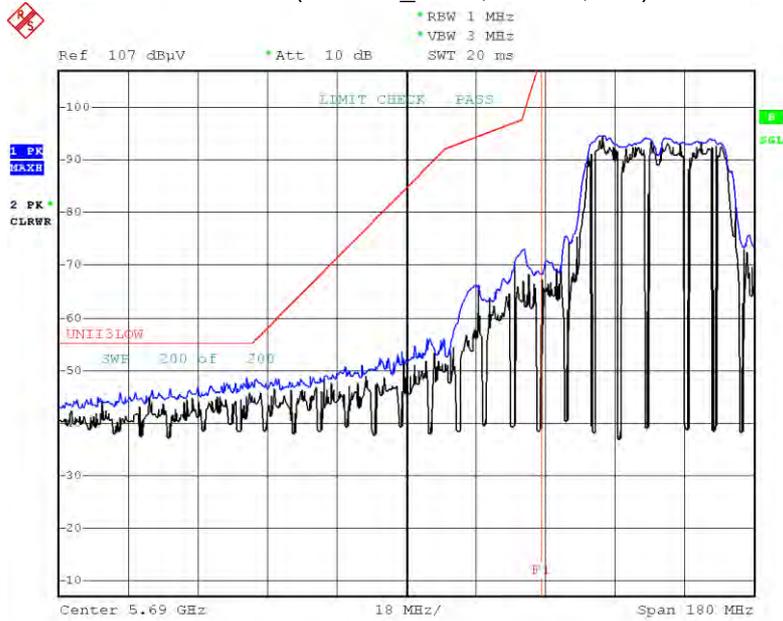
1. Only the worst case plots for Radiated Restricted Band Edge.
2. Red line : 5 850 MHz
3. Ambient Noise (Because of ambient noise, We attached only the worst plot without a data table)

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



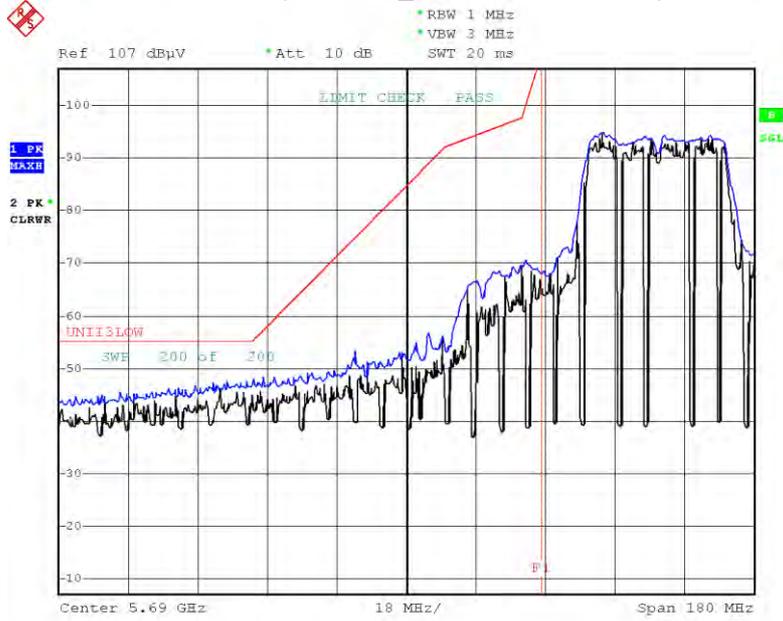
Date: 7.APR.2022 10:31:45

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



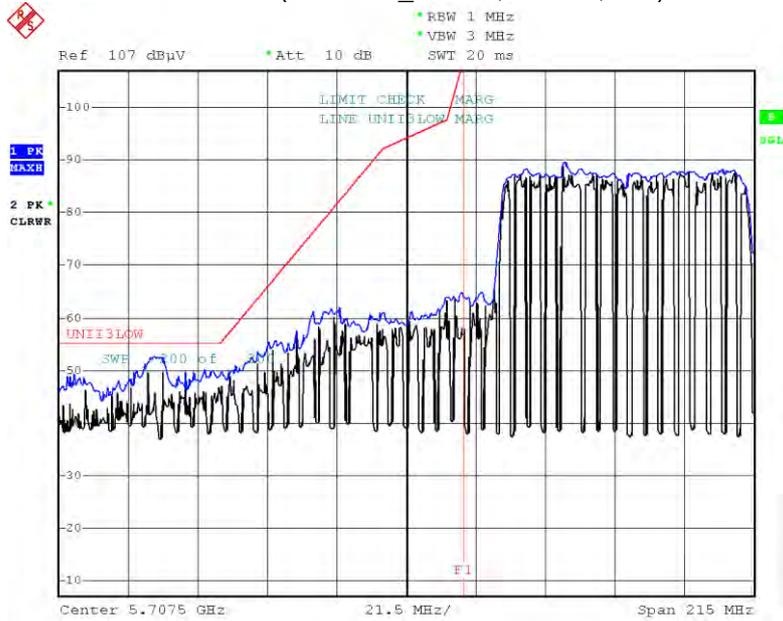
Date: 7.APR.2022 10:35:54

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



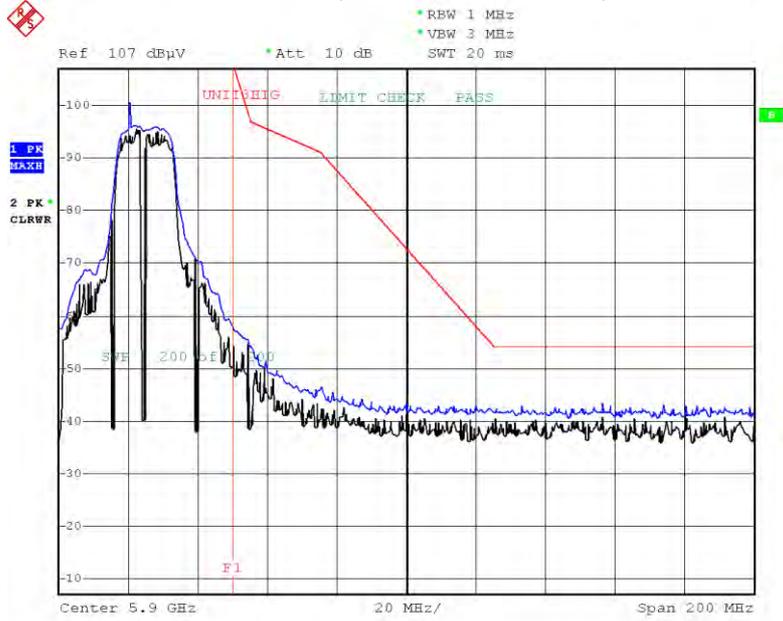
Date: 7.APR.2022 10:38:23

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



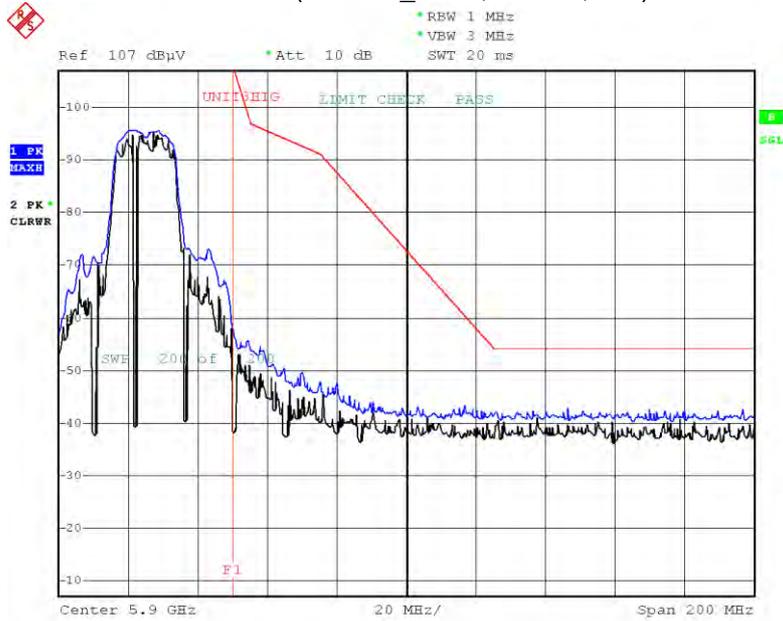
Date: 7.APR.2022 11:26:57

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



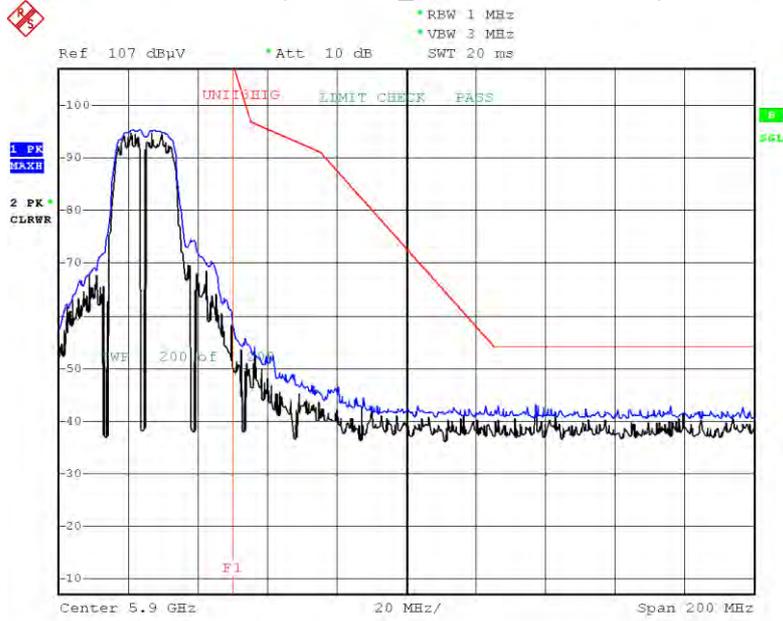
Date: 7.APR.2022 12:09:37

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



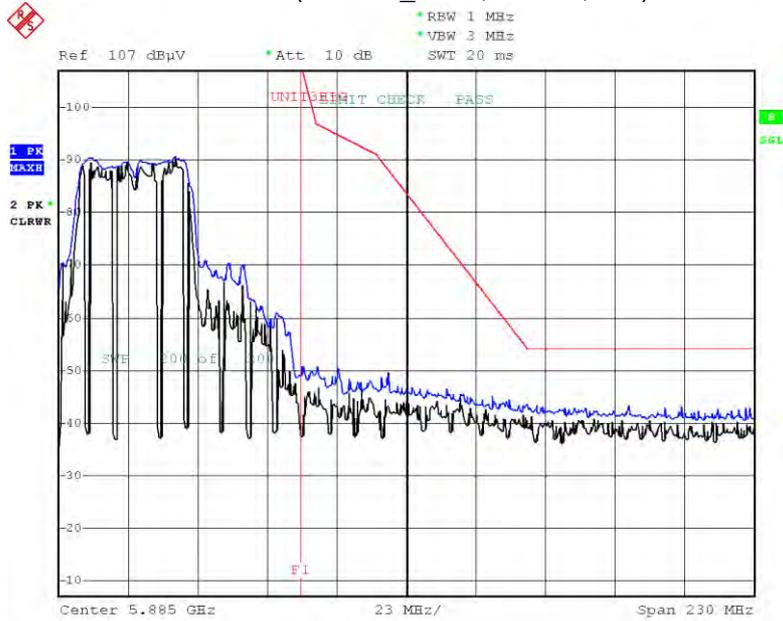
Date: 7.APR.2022 12:11:20

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



Date: 7.APR.2022 12:12:30

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



Date: 7.APR.2022 12:14:58

10.10 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions (Line 1)

Test

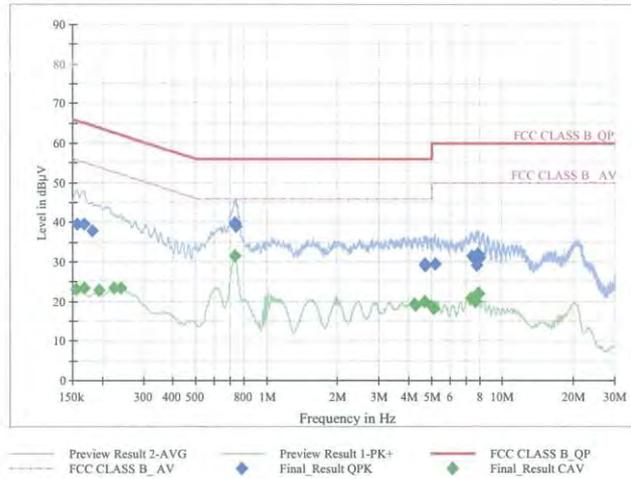
1 / 2

Test Report

Common Information

EUT : SM-M135M/DS
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : 5G WLAN_L1
 Operator Name:
 Comment:

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1568	39.64	65.63	26.00	9.000	L1	OFF	9.6
0.1680	39.38	65.06	25.68	9.000	L1	OFF	9.6
0.1815	37.86	64.42	26.55	9.000	L1	OFF	9.6
0.7318	39.72	56.00	16.28	9.000	L1	OFF	9.7
0.7363	39.60	56.00	16.40	9.000	L1	OFF	9.7
0.7408	38.94	56.00	17.06	9.000	L1	OFF	9.7
4.6760	29.24	56.00	26.76	9.000	L1	OFF	9.8
4.6850	29.54	56.00	26.46	9.000	L1	OFF	9.8
4.7098	29.36	56.00	26.64	9.000	L1	OFF	9.8
4.7233	29.02	56.00	26.98	9.000	L1	OFF	9.8
5.1823	29.42	60.00	30.58	9.000	L1	OFF	9.9
5.1868	29.28	60.00	30.72	9.000	L1	OFF	9.9
7.4660	31.50	60.00	28.50	9.000	L1	OFF	9.9
7.7383	29.22	60.00	30.78	9.000	L1	OFF	10.0
7.7743	30.37	60.00	29.63	9.000	L1	OFF	10.0
7.8620	31.94	60.00	28.06	9.000	L1	OFF	10.0
7.8823	31.62	60.00	28.38	9.000	L1	OFF	10.0
7.9115	30.93	60.00	29.07	9.000	L1	OFF	10.0

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Test

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Final Result CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	23.12	55.75	32.64	9.000	L1	OFF	9.6
0.1680	23.29	55.06	31.77	9.000	L1	OFF	9.6
0.1950	22.79	53.82	31.03	9.000	L1	OFF	9.6
0.2243	23.35	52.66	29.31	9.000	L1	OFF	9.6
0.2400	23.32	52.10	28.77	9.000	L1	OFF	9.6
0.7295	31.52	46.00	14.48	9.000	L1	OFF	9.7
4.2238	19.32	46.00	26.68	9.000	L1	OFF	9.8
4.2328	19.22	46.00	26.78	9.000	L1	OFF	9.8
4.2643	19.17	46.00	26.83	9.000	L1	OFF	9.8
4.6828	19.96	46.00	26.04	9.000	L1	OFF	9.8
4.9910	18.75	46.00	27.25	9.000	L1	OFF	9.8
5.1283	18.26	50.00	31.74	9.000	L1	OFF	9.9
7.3603	20.90	50.00	29.10	9.000	L1	OFF	9.9
7.6978	19.90	50.00	30.10	9.000	L1	OFF	10.0
7.7315	20.12	50.00	29.88	9.000	L1	OFF	10.0
7.8620	21.86	50.00	28.14	9.000	L1	OFF	10.0
7.9070	22.02	50.00	27.98	9.000	L1	OFF	10.0
7.9340	21.91	50.00	28.09	9.000	L1	OFF	10.0

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Conducted Emissions (Line 2)

Test

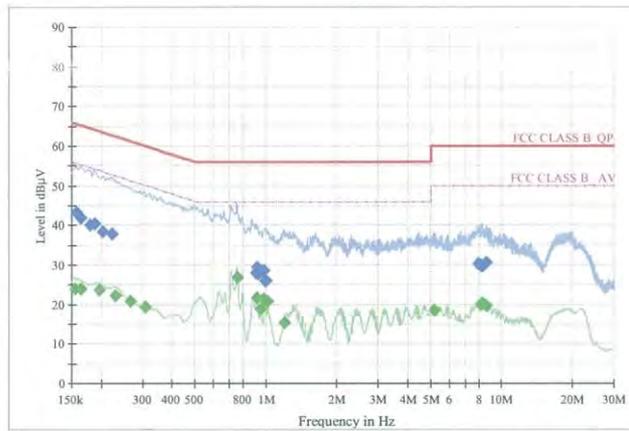
1 / 2

Test Report

Common Information

EUT : SM-M135M/DS
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : 5G WLAN_N
 Operator Name:
 Comment:

Full Spectrum



Preview Result 2-AVG Preview Result 1-PK+ FCC CLASS B_QP
 FCC CLASS B_AV Final_Result QPK Final_Result CAV

Final Result QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1568	43.23	65.63	22.41	9.000	N	OFF	9.6
0.1635	41.78	65.28	23.51	9.000	N	OFF	9.6
0.1793	40.22	64.52	24.30	9.000	N	OFF	9.6
0.1883	40.45	64.11	23.67	9.000	N	OFF	9.6
0.2040	38.33	63.45	25.11	9.000	N	OFF	9.6
0.2220	37.73	62.74	25.02	9.000	N	OFF	9.6
0.9073	28.01	56.00	27.99	9.000	N	OFF	9.7
0.9140	29.56	56.00	26.44	9.000	N	OFF	9.7
0.9275	27.57	56.00	28.43	9.000	N	OFF	9.7
0.9860	28.51	56.00	27.49	9.000	N	OFF	9.7
0.9928	25.98	56.00	30.02	9.000	N	OFF	9.7
0.9995	26.00	56.00	30.00	9.000	N	OFF	9.7
7.9273	30.41	60.00	29.59	9.000	N	OFF	10.0
8.1523	29.90	60.00	30.10	9.000	N	OFF	10.0
8.2603	29.80	60.00	30.20	9.000	N	OFF	10.0
8.3030	29.58	60.00	30.42	9.000	N	OFF	10.0
8.3075	29.83	60.00	30.17	9.000	N	OFF	10.0
8.6405	30.44	60.00	29.56	9.000	N	OFF	10.0

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Test

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Final Result_CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	24.02	55.75	31.74	9.000	N	OFF	9.6
0.1635	23.91	55.28	31.38	9.000	N	OFF	9.6
0.1973	23.57	53.73	30.15	9.000	N	OFF	9.6
0.2310	22.14	52.41	30.28	9.000	N	OFF	9.6
0.2648	20.82	51.28	30.46	9.000	N	OFF	9.6
0.3098	19.46	49.98	30.52	9.000	N	OFF	9.6
0.7565	26.84	46.00	19.16	9.000	N	OFF	9.7
0.9163	21.68	46.00	24.32	9.000	N	OFF	9.7
0.9523	18.87	46.00	27.13	9.000	N	OFF	9.7
0.9860	21.44	46.00	24.56	9.000	N	OFF	9.7
1.0198	20.74	46.00	25.26	9.000	N	OFF	9.7
1.1953	15.19	46.00	30.81	9.000	N	OFF	9.7
5.1733	18.34	50.00	31.66	9.000	N	OFF	9.9
8.1568	19.99	50.00	30.01	9.000	N	OFF	10.0
8.2018	20.16	50.00	29.84	9.000	N	OFF	10.0
8.2445	19.95	50.00	30.05	9.000	N	OFF	10.0
8.2873	20.17	50.00	29.83	9.000	N	OFF	10.0
8.6158	19.49	50.00	30.51	9.000	N	OFF	10.0

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11. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	08/23/2022	Annual
Test Receiver	ESCI	Rohde & Schwarz	100033	06/15/2022	Annual
Temperature Chamber	SU-642	ESPAC	0093008124	03/04/2023	Annual
Signal Analyzer	N9020A	Agilent	MY52440870	09/02/2022	Annual
Signal Analyzer	N9030A	Agilent	MY49431210	01/11/2023	Annual
Power Meter	N1911A	Agilent	MY45100523	03/23/2023	Annual
Power Sensor	N1921A	Agilent	MY57820067	03/23/2023	Annual
Directional Coupler	87300B	Agilent	3116A03621	11/02/2022	Annual
Power Splitter	11667B	Hewlett Packard	05001	05/20/2022	Annual
DC Power Supply	E3632A	Hewlett Packard	KR75303960	06/10/2022	Annual
Attenuator (10 dB)	5910-N-50-010	H+S	00801	10/29/2022	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	FCC WLAN&BT&BLE Conducted Test Software v3.0	HCT CO., LTD.	N/A	N/A	N/A

Note:

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

Radiated Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller (Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	N/A	N/A	N/A
Controller	2090	Emco	060520	N/A	N/A
Turn Table	Turn Table	Ets	N/A	N/A	N/A
Loop Antenna	Loop Antenna	Rohde & Schwarz	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	09/04/2022	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1191	11/18/2023	Biennial
Horn Antenna (15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170124	04/12/2023	Biennial
Spectrum Analyzer	FSP (9 kHz ~ 30 GHz)	Rohde & Schwarz	836650/016	09/13/2022	Annual
Spectrum Analyzer	FSV40-N	Rohde & Schwarz	101068-SZ	09/15/2022	Annual
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/06/2023	Annual
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments	1	02/07/2023	Annual
Attenuator (10 dB)	CBLU1183540B-01	CERNECX	N/A	12/22/2022	Annual
56-10	56-10	WEINSCHHEL			
Broadband Low Noise Amplifier	CBL06185030	CERNECX	N/A	12/22/2022	Annual
Attenuator (3 dB)	18B-03	Api tech.			
High Pass Filter	WHKX10-2700-3000-18000-40SS	Wainwright Instruments	N/A	12/22/2022	Annual
High Pass Filter	WHKX8-6090-7000-18000-40SS	Wainwright Instruments	N/A	12/22/2022	Annual
High Pass Filter	WHKX10-7150-8000-18000-50SS	Wainwright Instruments	1	03/11/2023	Annual
Thru	COAXIAL ATTENUATOR	T&M SYSTEM	N/A	12/22/2022	Annual
Power Amplifier	CBL18265035	CERNECX	22966	12/02/2022	Annual
Power Amplifier	CBL26405040	CERNECX	25956	03/11/2023	Annual

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
3. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5(Version : 2017).

12. ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2204-FC020-P