

FCC UNII REPORT

Certification

Application Name:

SAMSUNG Electronics Co., Ltd.

Date of Issue:

17 April 2020

Address:

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16677, Rep. of Korea

Test Site/Location:

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Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-RF-2004-FC025

FCC ID: A3LSMA516B

APPLICANT: SAMSUNG Electronics Co., Ltd.

Model(s):
EUT Type:
Modulation Type:
FCC Classification:
FCC Rule Part(s):

SM-A516B/DS
Mobile Phone
OFDM
Unlicensed National Information Infrastructure(NII)
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.



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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2004-FC025	April 17, 2020	- First Approval Report

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 KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

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1. GENERAL INFORMATION

EUT DESCRIPTION

Model	SM-A516B/DS	
Additional Model	-	
EUT Type	Mobile Phone	
Power Supply	DC 3.86 V	
Battery Information	Model: EB-BA516ABY Type: Li-ion Battery	
Travel Adapter Information	Model : EP-TA200 Manufacture: SOLUM	
Data Cable Information	Model : EP-DA140ABE Manufacture: Cresyn	
Ear-jack Information	Model : EHS61ASF Manufacture: Cresyn	
Modulation Type	OFDM : 802.11a, 802.11n, 802.11ac	
Frequency Range (MHz)	U-NII-1	20MHz BW : 5180 - 5240
		40MHz BW : 5190 - 5230
		80MHz BW : 5210
	U-NII-2A	20MHz BW : 5260 - 5320
40MHz BW : 5270 - 5310		
80MHz BW : 5290		
U-NII-2C	20MHz BW : 5500 - 5720	
	40MHz BW : 5510 - 5710	
	80MHz BW : 5530 – 5690	
U-NII-3	20MHz BW : 5745 - 5825	
	40MHz BW : 5755 - 5795	
	80MHz BW : 5775	
Antenna Specification	Antenna type: Metal + LDS Peak Gain : -2.1 dBi(UNII 1), -1.8 dBi(UNII 2A, UNII 2C), -2.3 dBi(UNII 3)	
Straddle channel	Supported	
TDWR Band	Supported	
Dynamic Frequency Selection	Slave without radar detection	
Date(s) of Tests	March 19, 2020 ~ April 13, 2020	

2. MAXIMUM OUTPUT POWER

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

Band	Mode	RF Output Power	
		(dBm)	(W)
UNII1	802.11a	15.94	0.039
	802.11n (HT20)	16.10	0.041
	802.11n (HT40)	14.17	0.026
	802.11ac (VHT20)	15.93	0.039
	802.11ac (VHT40)	14.41	0.028
	802.11ac (VHT80)	13.10	0.020
UNII2A	802.11a	16.14	0.041
	802.11n (HT20)	16.27	0.042
	802.11n (HT40)	14.37	0.027
	802.11ac (VHT20)	16.04	0.040
	802.11ac (VHT40)	14.45	0.028
	802.11ac (VHT80)	13.01	0.020
UNII2C	802.11a	15.19	0.033
	802.11n (HT20)	15.39	0.035
	802.11n (HT40)	13.70	0.023
	802.11ac (VHT20)	15.32	0.034
	802.11ac (VHT40)	13.86	0.024
	802.11ac (VHT80)	12.14	0.016
UNII3	802.11a	15.60	0.036
	802.11n (HT20)	15.65	0.037
	802.11n (HT40)	13.61	0.023
	802.11ac (VHT20)	15.53	0.036
	802.11ac (VHT40)	13.78	0.024
	802.11ac (VHT80)	12.40	0.017

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 3.75 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 Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

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

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203, §15.407:

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

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

7. MEASUREMENT UNCERTAINTY

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

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

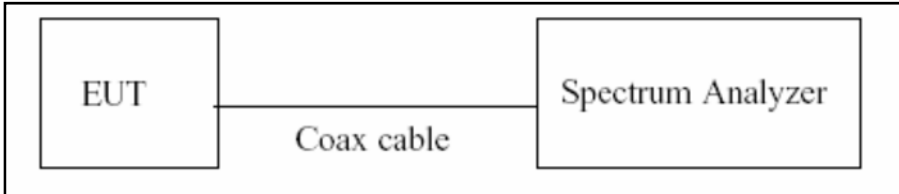
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (\pm dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.05

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.

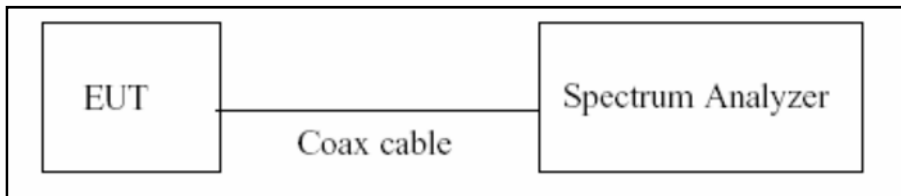
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (\geq RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10\log(1/\text{Duty Cycle})$

8.2. 6dB Bandwidth & 26dB Bandwidth

Limit

Within the 5.725-5.85 GHz band, 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.

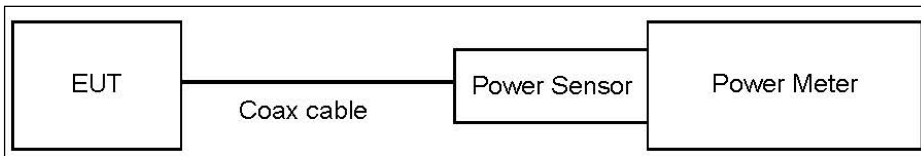
8.3. Output Power Measurement

Limit

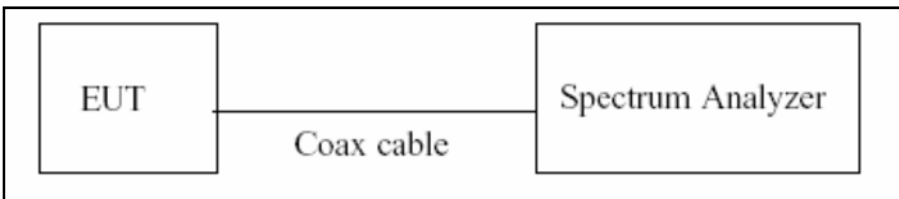
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30dBm)

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) = Reading Value(dBm) + ATT loss(dB) + Cable loss(dB) + Duty Cycle Factor(dB)

Note

1. Spectrum reading values 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 = 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	10.73
UNII 2A	10.73
UNII 2C	10.73
UNII 3	10.73

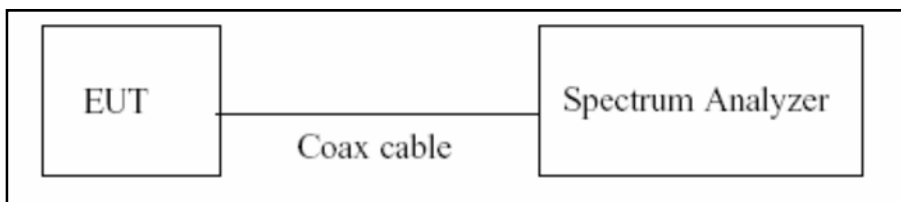
(Actual value of loss for the attenuator and cable combination)

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 \geq 3 MHz
4. Number of points in sweep \geq 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) = Reading Value(dBm) + ATT loss(dB) + Cable loss(dB) + Duty Cycle Factor(dB)

Note

1. Spectrum reading values 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 = 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	10.73
UNII 2A	10.73
UNII 2C	10.73
UNII 3	10.73

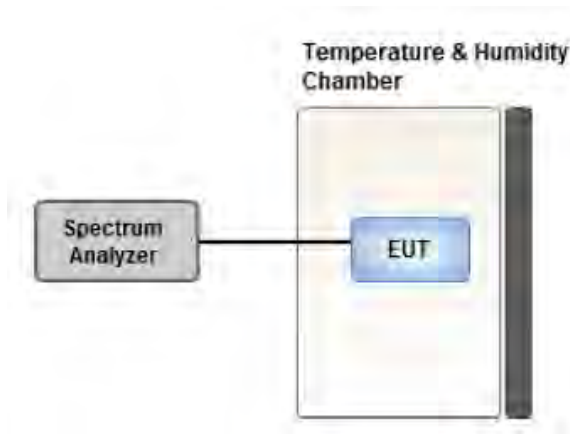
(Actual value of loss for the attenuator and cable combination)

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) = Reading Value + Correction Factor

8.7. Radiated Test

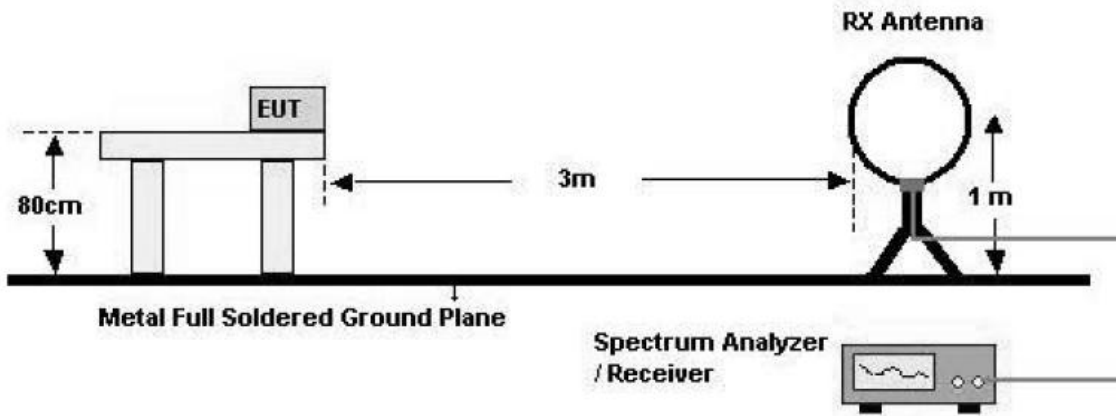
Limit

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

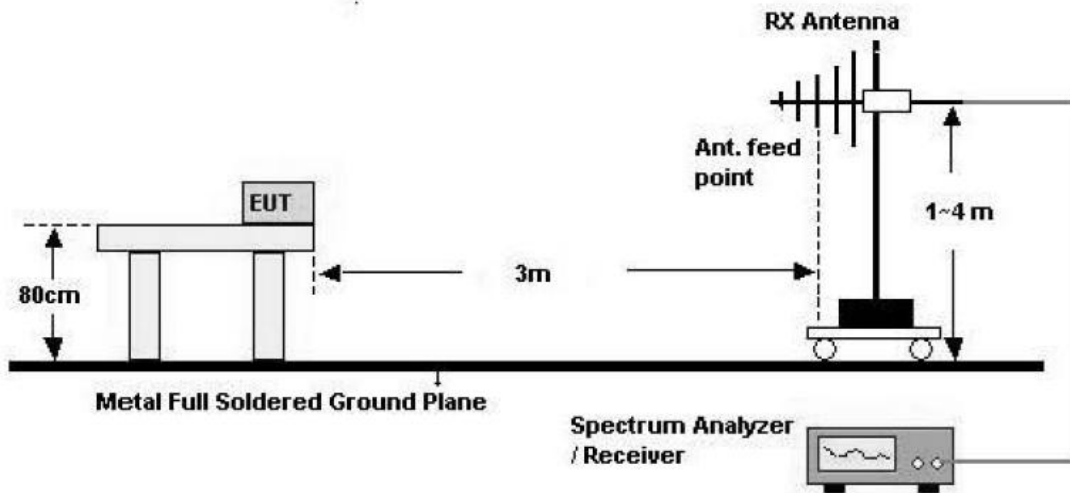
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

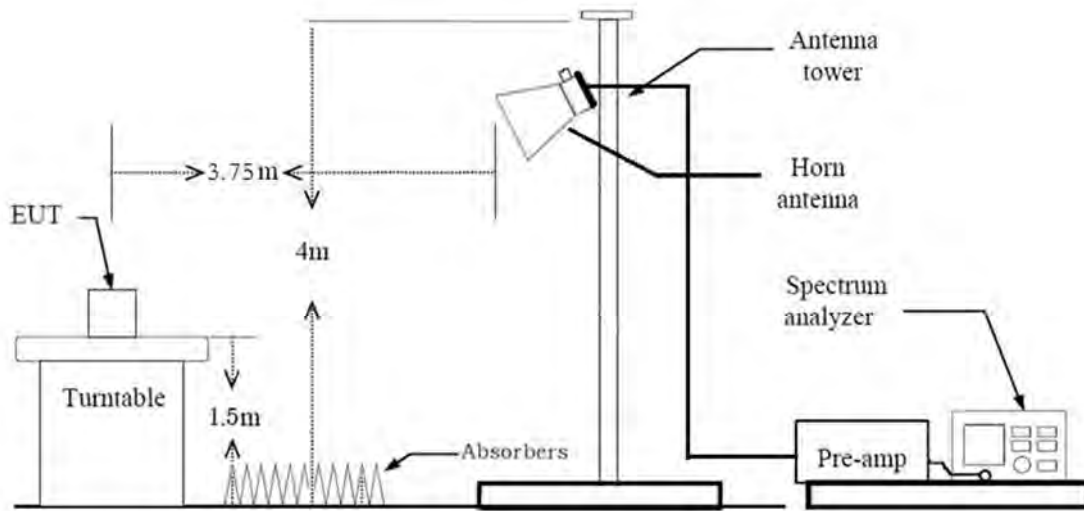
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 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 = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

KDB 414788 OFS and Chamber Correlation Justification

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

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

Test Procedure of Radiated spurious emissions(Below 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. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. Spectrum Setting

(1) Measurement Type(Peak):

- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Peak
- Trace = 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

6. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)
7. 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 3.75 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor(reference distance : 3 m).
 - ◆ Distance extrapolation factor = $20\log(\text{test distance} / \text{specific distance})$ (dB)
6. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
7. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
8. The unit was tested with its standard battery.
9. Spectrum Setting

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

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

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

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

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

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
11. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency
12. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(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 3.75 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor(reference distance : 3 m).
 - ◆ Distance extrapolation factor = $20\log(\text{test distance} / \text{specific distance})$ (dB)
6. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
7. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
8. The unit was tested with its standard battery.
9. Spectrum Setting
 - (1) Measurement Type(Peak, G.5 in KDB 789033 v02r01):
 - RBW = 1 MHz
 - VBW \geq 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Allow sweeps to continue until the trace stabilizes.Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle.
 - (2) Measurement Type(Average, G.6.d in KDB 789033 v02r01):
 - RBW = 1 MHz
 - VBW(Duty cycle \geq 98 percent) = $\text{VBW} \leq \text{RBW}/100$ (i.e., 10 kHz) but not less than 10 Hz.
 - VBW(Duty cycle is < 98 percent) = $\text{VBW} \geq 1/T$, where T is the minimum transmission duration.
 - The analyzer is set to linear detector mode.
 - Detector = Peak.
 - Sweep time = auto.
 - Trace mode = max hold.
 - Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of 1/x, where x is the duty cycle.

10. 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)

11. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Attenuator + 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	0.936	0.287	1000
802.11n(HT20)	MCS 0	0.914	0.392	1000
802.11n(HT40)	MCS 0	0.861	0.650	2000
802.11ac(VHT20)	MCS 0	0.938	0.278	1000
802.11ac(VHT40)	MCS 0	0.862	0.643	2000
802.11ac(VHT80)	MCS 0	0.851	0.700	2000

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 : Z
 - Radiated Restricted Band Edge : X , Z
3. All datarate of operation were investigated and the worst case datarate results are reported
 - 802.11a : 6Mbps
 - 802.11n : MCS0
 - 802.11ac : MCS0
4. 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)		PASS
Maximum Conducted Output Power	§15.407(a)(1)	< 250 mW(5150-5250 MHz) < 250 mW or 11+10 log log ₁₀ (BW) dBm (5250-5350 MHz) < 250 mW or 11+10 log log ₁₀ (BW) dBm (5470-5725 MHz) <1 W(5725-5850 MHz)		PASS
Peak Power Spectral Density	§15.407(a)(1),(5)	<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	<FCC 15.207 limits		PASS
Undesirable Emissions	§15.407(b)	<-27 dBm/MHz EIRP (UNII1, 2A, 2C) cf. Section 8.7 (UNII 3)		Radiated
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	15.205, 15.407(b)(5), (6)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	PASS	

10. TEST RESULT

10.1 DUTY CYCLE

Mode	Data Rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11a	6	1.428	1.525	0.936	0.287
	9	0.959	1.058	0.907	0.425
	12	0.725	0.831	0.872	0.594
	18	0.492	0.606	0.811	0.909
	24	0.372	0.478	0.777	1.094
	36	0.256	0.363	0.705	1.518
	48	0.196	0.312	0.628	2.019
	54	0.180	0.305	0.589	2.299

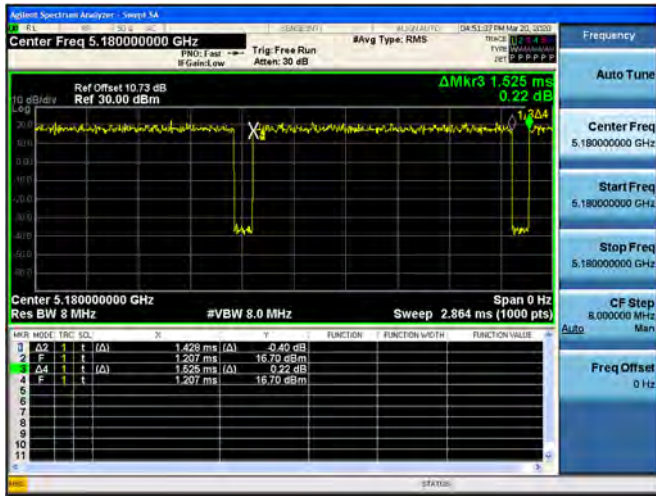
Mode	MCS Index	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11n (HT20)	0	1.336	1.462	0.914	0.392
	1	0.688	0.804	0.856	0.676
	2	0.472	0.588	0.803	0.953
	3	0.364	0.471	0.773	1.119
	4	0.257	0.373	0.688	1.623
	5	0.200	0.316	0.634	1.982
	6	0.184	0.301	0.613	2.125
	7	0.168	0.293	0.575	2.405
802.11n (HT40)	0	0.664	0.771	0.861	0.650
	1	0.352	0.467	0.754	1.226
	2	0.249	0.356	0.700	1.551
	3	0.197	0.313	0.629	2.017
	4	0.144	0.252	0.573	2.415
	5	0.116	0.232	0.500	3.010
	6	0.109	0.225	0.483	3.160
	7	0.100	0.216	0.463	3.345

Mode	MCS Index	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11ac (VHT20)	0	1.344	1.433	0.938	0.278
	1	0.692	0.808	0.856	0.677
	2	0.477	0.582	0.819	0.865
	3	0.368	0.493	0.747	1.266
	4	0.260	0.367	0.709	1.496
	5	0.204	0.320	0.638	1.954
	6	0.188	0.304	0.619	2.081
	7	0.172	0.297	0.580	2.367
	8	0.153	0.277	0.551	2.591
802.11ac (VHT40)	0	0.668	0.775	0.862	0.643
	1	0.356	0.462	0.770	1.137
	2	0.252	0.351	0.720	1.429
	3	0.200	0.307	0.652	1.861
	4	0.148	0.273	0.542	2.663
	5	0.120	0.227	0.528	2.772
	6	0.112	0.219	0.511	2.913
	7	0.104	0.220	0.472	3.257
	8	0.096	0.214	0.450	3.466
	9	0.088	0.204	0.430	3.662
802.11ac (VHT80)	0	0.612	0.719	0.851	0.700
	1	0.328	0.417	0.787	1.043
	2	0.231	0.347	0.666	1.767
	3	0.184	0.309	0.595	2.251
	4	0.136	0.253	0.538	2.696
	5	0.111	0.237	0.468	3.294
	6	0.103	0.229	0.450	3.470
	7	0.099	0.225	0.440	3.565
	8	0.087	0.204	0.426	3.701
	9	0.083	0.200	0.415	3.820

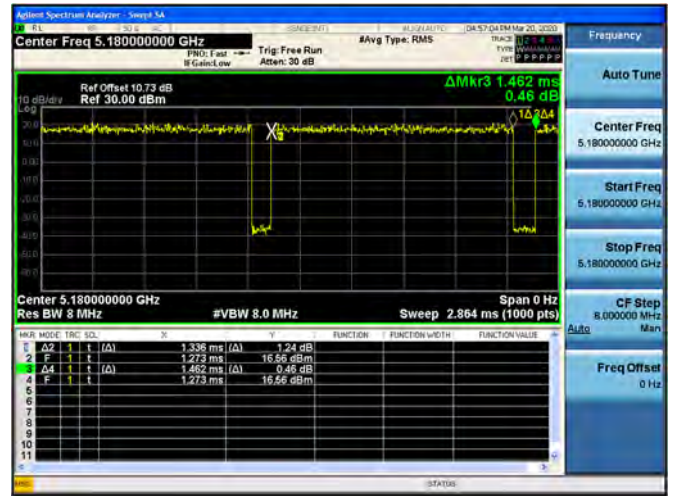
Note:

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

802.11a



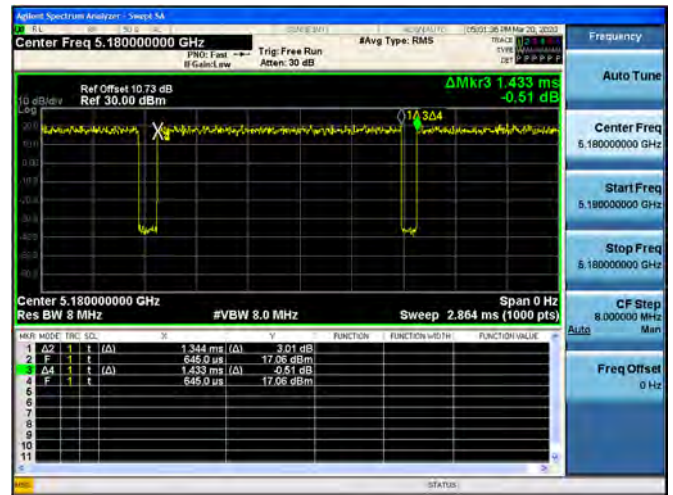
802.11n(HT20)



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	22.83	17.238
5200	40	21.42	17.174
5240	48	22.62	17.117
5260	52	24.66	17.467
5300	60	23.24	17.168
5320	64	21.47	17.101
5500	100	21.28	17.156
5600	120	21.06	16.994
5720	144	21.07	16.987
5745	149	20.93	16.907
5785	157	20.61	16.752
5825	165	21.24	17.113

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	25.39	18.093
5200	40	24.93	18.418
5240	48	24.13	18.341
5260	52	25.05	18.263
5300	60	24.71	18.176
5320	64	23.34	18.218
5500	100	24.07	18.138
5600	120	24.37	18.216
5720	144	22.69	18.069
5745	149	23.31	18.250
5785	157	23.22	18.475
5825	165	22.24	17.966

802.11n(HT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	44.82	37.770
5230	46	43.23	37.425
5270	54	44.66	37.517
5310	62	43.46	37.216
5510	102	42.87	37.628
5590	118	42.61	37.405
5710	142	42.37	37.716
5755	151	43.40	37.207
5795	159	42.44	37.288

802.11ac(VHT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	24.23	18.676
5200	40	25.06	18.199
5240	48	23.78	18.179
5260	52	25.21	18.308
5300	60	24.70	18.332
5320	64	23.59	18.389
5500	100	23.06	18.360
5600	120	22.49	18.293
5720	144	22.71	18.227
5745	149	22.43	18.256
5785	157	22.30	18.637
5825	165	23.25	18.251

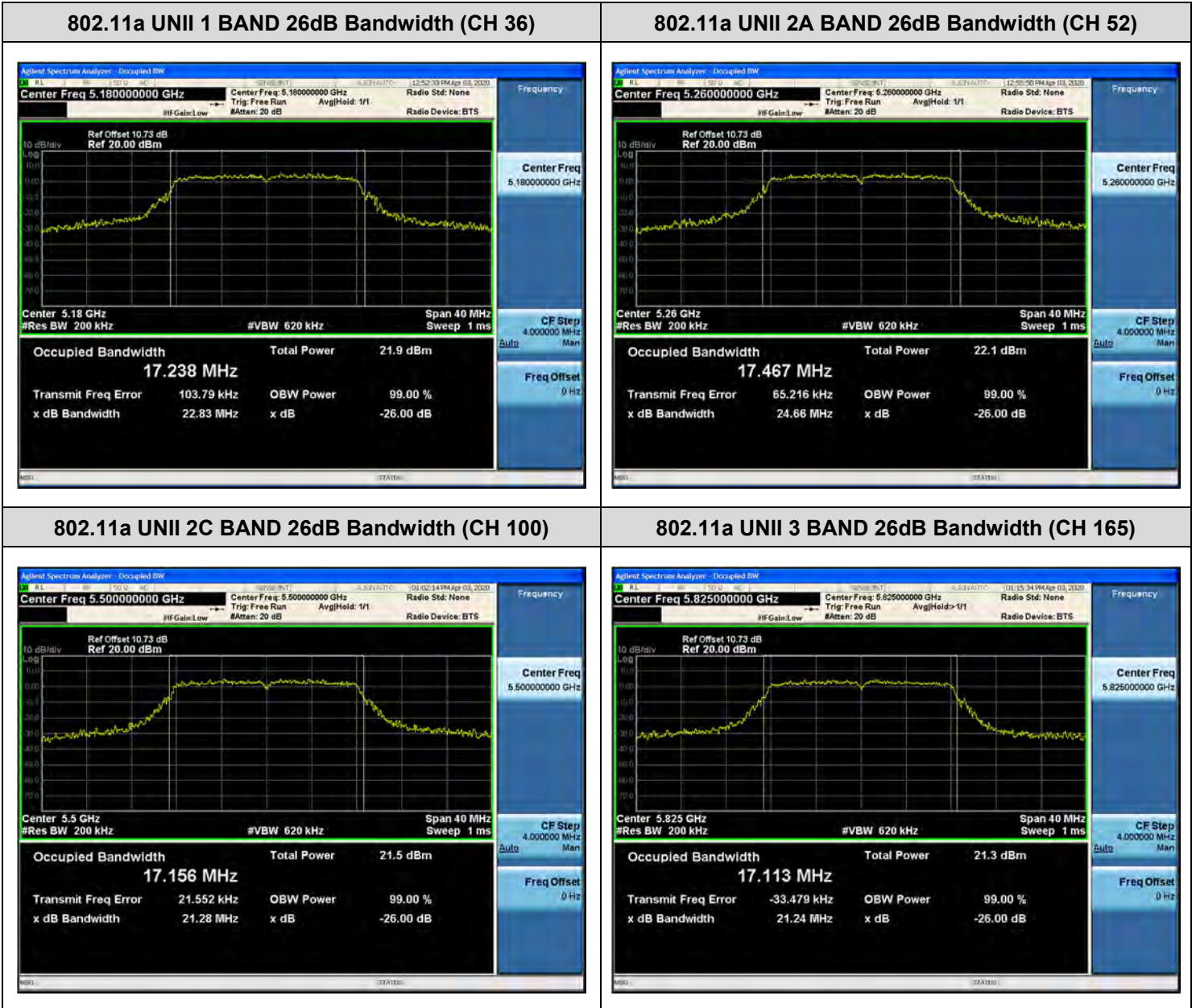
802.11ac(VHT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	42.89	37.188
5230	46	43.79	37.316
5270	54	43.81	36.863
5310	62	42.67	37.017
5510	102	42.34	37.170
5590	118	42.51	37.082
5710	142	42.35	36.690
5755	151	42.11	37.234
5795	159	42.54	37.255

802.11ac(VHT80) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	81.01	76.216
5290	58	83.76	76.175
5530	106	83.37	76.162
5610	122	80.94	76.062
5690	138	82.34	76.462
5775	155	82.49	76.147

☐ Test Plots(802.11a)

Note:

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

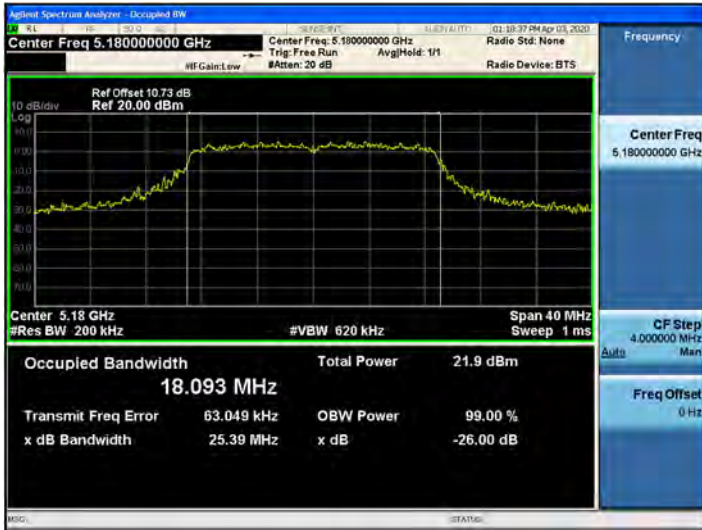


☐ Test Plots(802.11n(HT20))

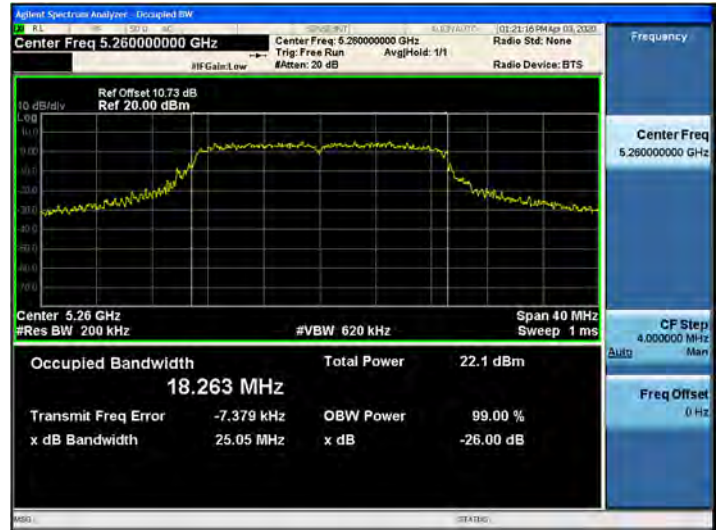
Note:

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

802.11n_HT20 UNII 1 BAND 26dB Bandwidth(CH 36)



802.11n_HT20 UNII 2A BAND 26dB Bandwidth(CH 52)



802.11n_HT20 UNII 2C BAND 26dB Bandwidth(CH 120)



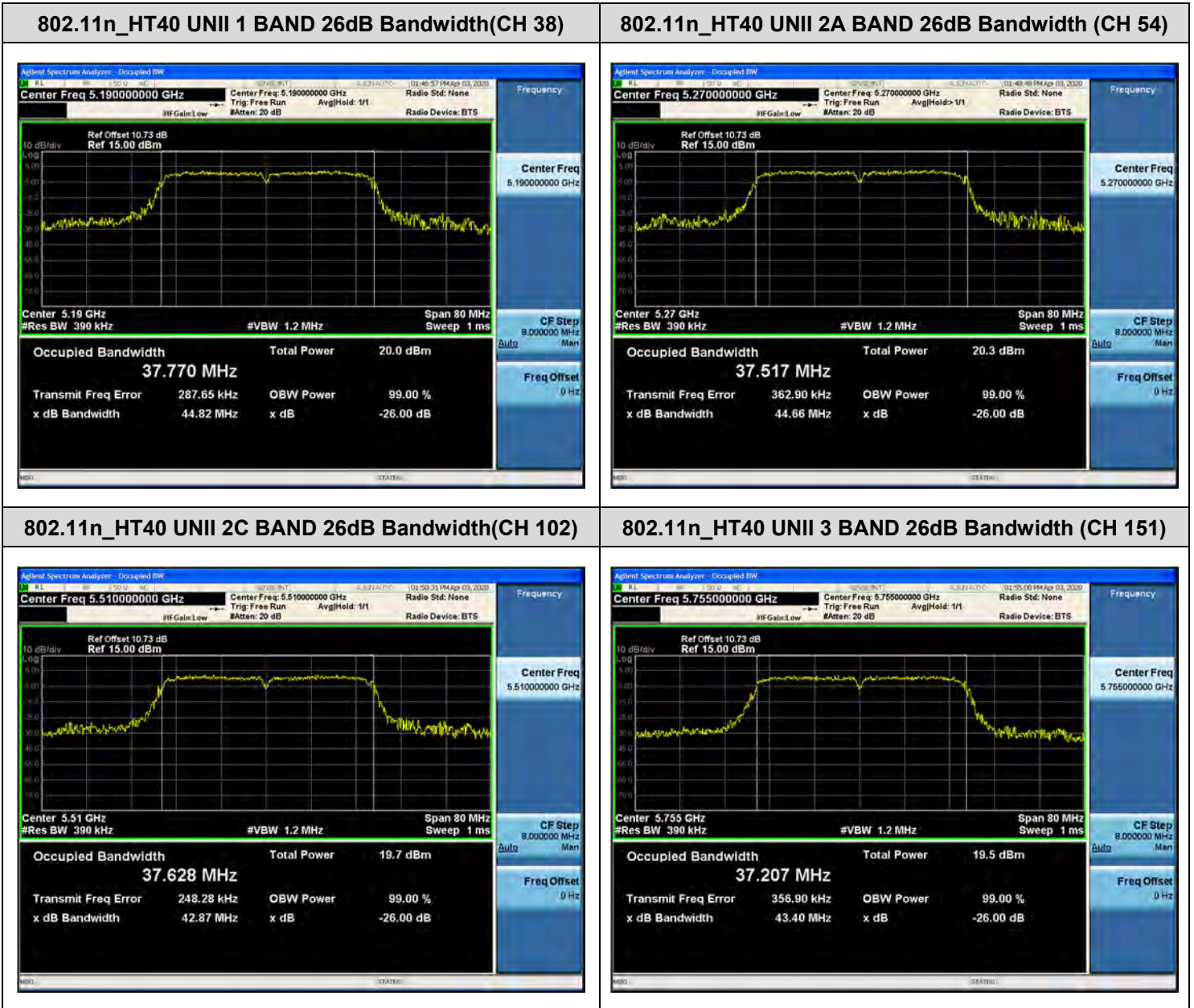
802.11n_HT20 UNII 3 BAND 26dB Bandwidth(CH 149)



☐ Test Plots(802.11n(HT40))

Note:

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



☐ 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 26dB Bandwidth(CH 40)



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



802.11ac_VHT20 UNII 2C BAND 26dB Bandwidth(CH 100)



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

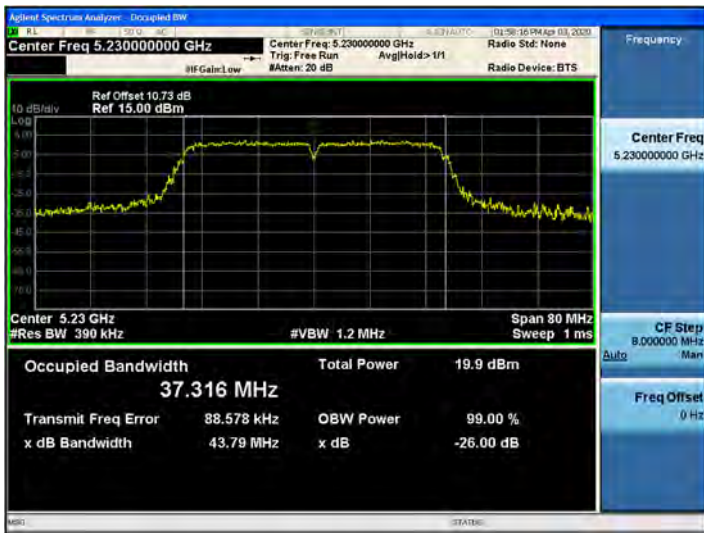


☐ Test Plots(802.11ac(VHT40))

Note:

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

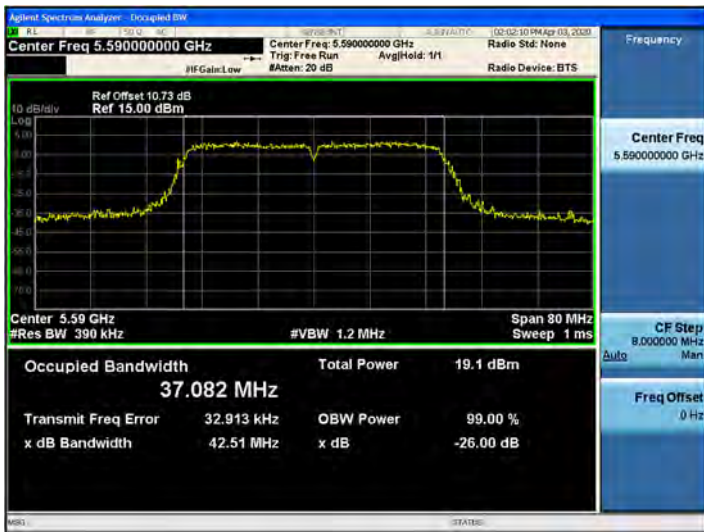
802.11ac_VHT40 UNII 1 BAND 26dB Bandwidth(CH 46)



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



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



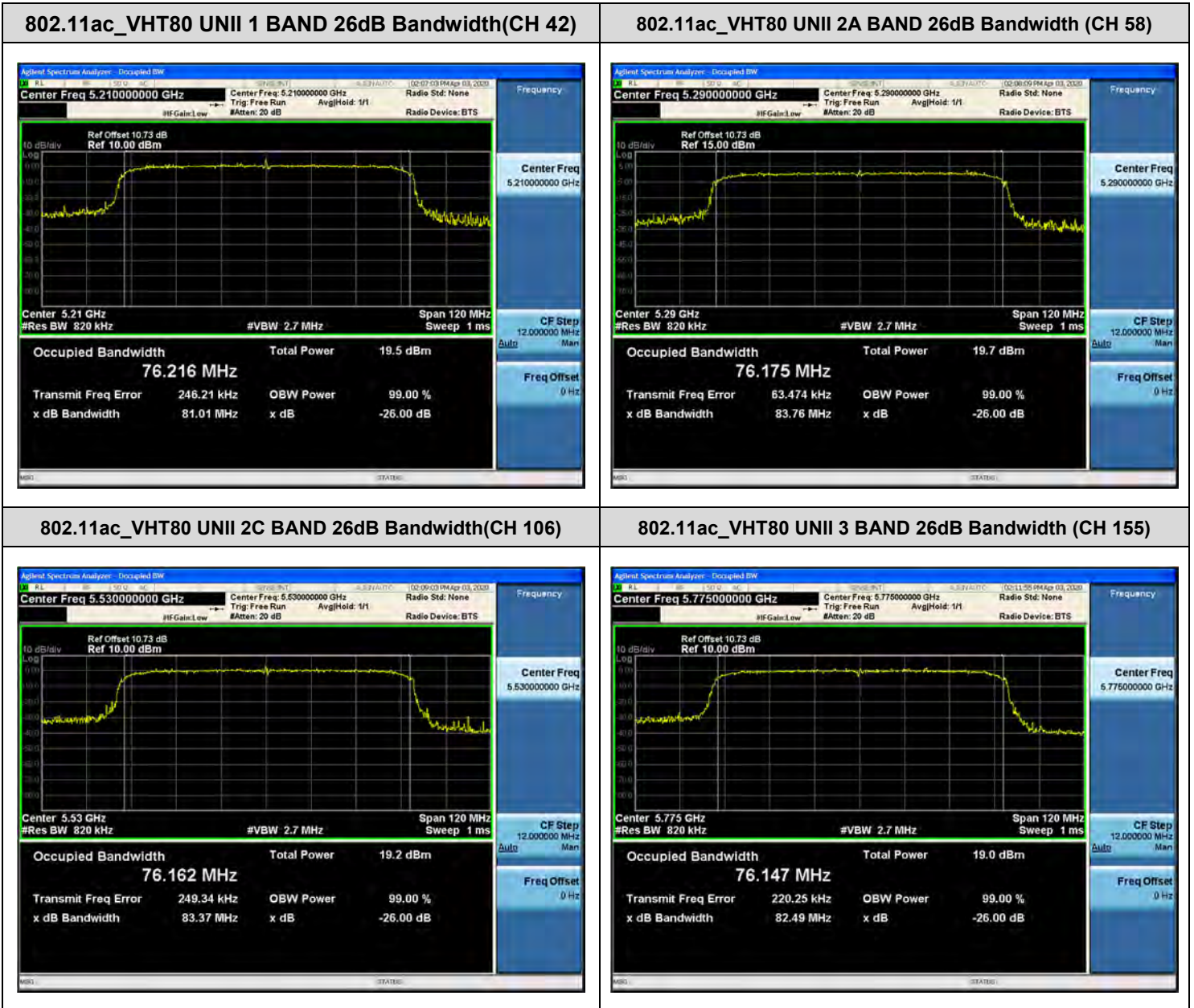
802.11ac_VHT40 UNII 3 BAND 26dB Bandwidth (CH 159)



☐ Test Plots(802.11ac(VHT80))

Note:

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



10.3 6dB BANDWIDTH

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.34	> 0.5	Pass
5785	157	15.99	> 0.5	Pass
5825	165	16.34	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.07	> 0.5	Pass
5785	157	17.35	> 0.5	Pass
5825	165	16.77	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.15	> 0.5	Pass
5795	159	35.23	> 0.5	Pass

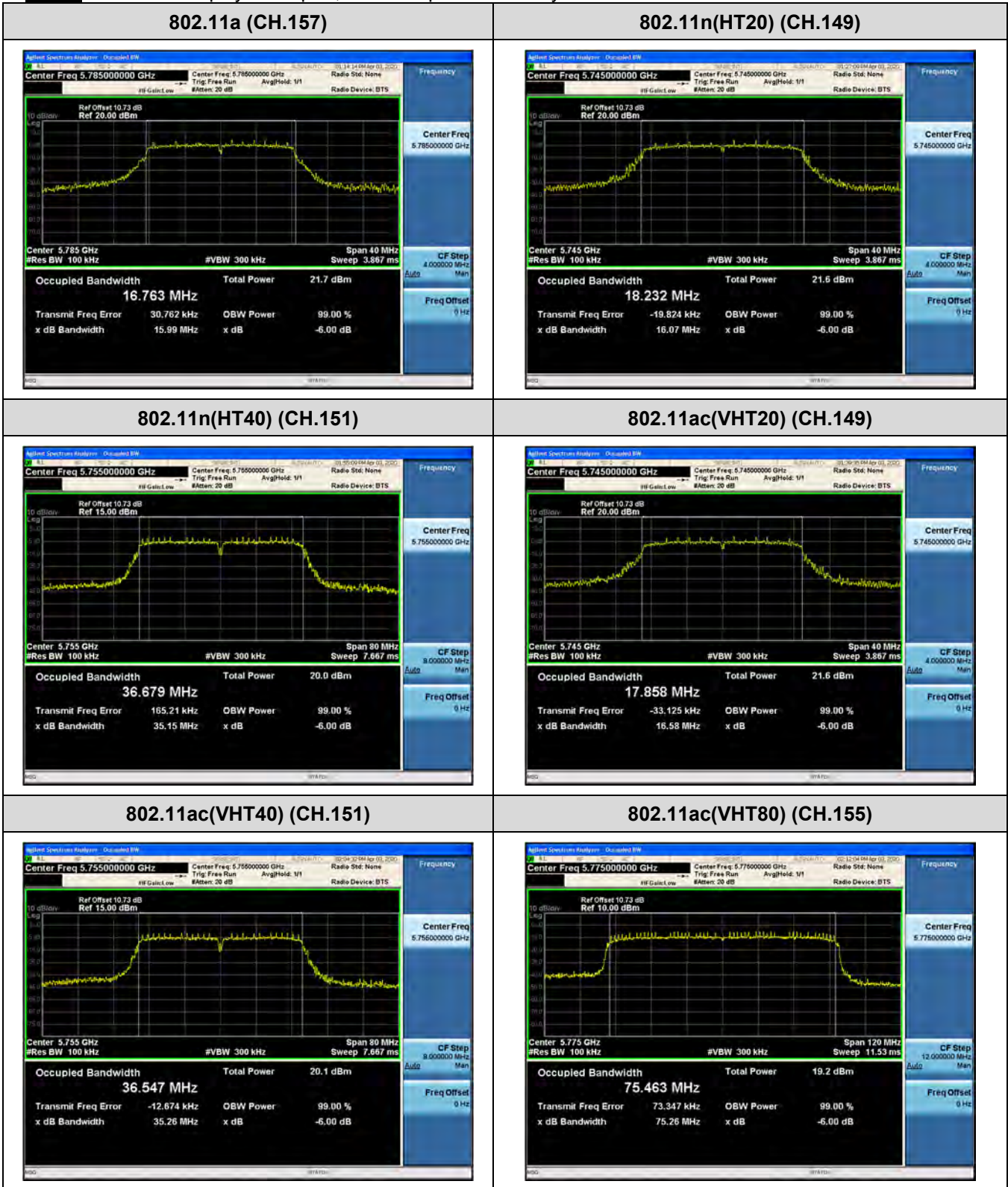
802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.58	> 0.5	Pass
5785	157	16.66	> 0.5	Pass
5825	165	17.19	> 0.5	Pass

802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.26	> 0.5	Pass
5795	159	35.26	> 0.5	Pass

802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	75.26	> 0.5	Pass

Test Plots

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



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.

802.11a Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	16	14.35	1.518	15.87	23.98
5200	40	16	14.33	1.518	15.85	23.98
5240	48	16	14.42	1.518	15.94	23.98
5260	52	16	14.62	1.518	16.14	23.98
5300	60	16	14.52	1.518	16.04	23.98
5320	64	16	14.12	1.518	15.64	23.98
5500	100	14	12.08	1.518	13.60	23.98
5600	120	16	13.59	1.518	15.11	23.98
5720	144	16	13.67	1.518	15.19	23.98
5745	149	16	14.08	1.518	15.60	30.00
5785	157	16	13.95	1.518	15.47	30.00
5825	165	16	13.96	1.518	15.48	30.00

802.11n(20MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	16	14.37	1.623	15.99	23.98
5200	40	16	14.35	1.623	15.97	23.98
5240	48	16	14.48	1.623	16.10	23.98
5260	52	16	14.65	1.623	16.27	23.98
5300	60	16	14.48	1.623	16.10	23.98
5320	64	16	14.15	1.623	15.77	23.98
5500	100	14	12.24	1.623	13.86	23.98
5600	120	16	13.62	1.623	15.24	23.98
5720	144	16	13.77	1.623	15.39	23.98
5745	149	16	13.97	1.623	15.59	30.00
5785	157	16	14.03	1.623	15.65	30.00
5825	165	16	13.98	1.623	15.60	30.00

802.11n(40MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	13.5	12.09	2.017	14.11	23.98
5230	46	13.5	12.15	2.017	14.17	23.98
5270	54	13.5	12.35	2.017	14.37	23.98
5310	62	13.5	12.02	2.017	14.04	23.98
5510	102	13.5	11.68	2.017	13.70	23.98
5590	118	13.5	11.15	2.017	13.17	23.98
5710	142	13.5	11.17	2.017	13.19	23.98
5755	151	13.5	11.59	2.017	13.61	30.00
5795	159	13.5	11.58	2.017	13.60	30.00

802.11ac(20MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	16	14.44	1.266	15.71	23.98
5200	40	16	14.62	1.266	15.89	23.98
5240	48	16	14.66	1.266	15.93	23.98
5260	52	16	14.77	1.266	16.04	23.98
5300	60	16	14.68	1.266	15.95	23.98
5320	64	16	14.48	1.266	15.75	23.98
5500	100	14	12.51	1.266	13.78	23.98
5600	120	16	13.85	1.266	15.12	23.98
5720	144	16	14.05	1.266	15.32	23.98
5745	149	16	14.26	1.266	15.53	30.00
5785	157	16	14.26	1.266	15.53	30.00
5825	165	16	14.25	1.266	15.52	30.00

802.11ac(40MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	13.5	11.58	2.663	14.24	23.98
5230	46	13.5	11.75	2.663	14.41	23.98
5270	54	13.5	11.79	2.663	14.45	23.98
5310	62	13.5	11.59	2.663	14.25	23.98
5510	102	13.5	11.20	2.663	13.86	23.98
5590	118	13.5	10.54	2.663	13.20	23.98
5710	142	13.5	10.74	2.663	13.40	23.98
5755	151	13.5	11.12	2.663	13.78	30.00
5795	159	13.5	10.95	2.663	13.61	30.00

802.11ac(80MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5210	42	13	10.85	2.251	13.10	23.98
5290	58	13	10.76	2.251	13.01	23.98
5530	106	11	9.46	2.251	11.71	23.98
5610	122	13	9.89	2.251	12.14	23.98
5690	138	13	9.67	2.251	11.92	23.98
5775	155	13	10.15	2.251	12.40	30.00

10.5 POWER SPECTRAL DENSITY

802.11a Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	3.823	1.518	5.341	11 dBm/MHz
5200	40	3.776	1.518	5.294	
5240	48	3.804	1.518	5.322	
5260	52	3.857	1.518	5.375	
5300	60	3.761	1.518	5.279	
5320	64	3.609	1.518	5.127	
5500	100	1.625	1.518	3.143	
5600	120	3.180	1.518	4.698	
5720	144	3.119	1.518	4.637	
5745	149	0.608	1.518	2.126	30 dBm/500kHz
5785	157	0.642	1.518	2.160	
5825	165	0.553	1.518	2.071	

802.11n(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	3.396	1.623	5.019	11 dBm/MHz
5200	40	3.379	1.623	5.002	
5240	48	3.527	1.623	5.150	
5260	52	3.709	1.623	5.332	
5300	60	3.625	1.623	5.248	
5320	64	3.359	1.623	4.982	
5500	100	1.501	1.623	3.124	
5600	120	2.988	1.623	4.611	
5720	144	2.918	1.623	4.541	
5745	149	0.386	1.623	2.009	30 dBm/500kHz
5785	157	0.377	1.623	2.000	
5825	165	0.381	1.623	2.004	

802.11n(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	-1.696	2.017	0.321	11 dBm/MHz
5230	46	-1.748	2.017	0.269	
5270	54	-1.549	2.017	0.468	
5310	62	-2.159	2.017	-0.142	
5510	102	-2.274	2.017	-0.257	
5590	118	-2.793	2.017	-0.776	
5710	142	-2.982	2.017	-0.965	
5755	151	-4.748	2.017	-2.731	30 dBm /500kHz
5795	159	-5.021	2.017	-3.004	

802.11ac(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	3.568	1.266	4.834	11 dBm/MHz
5200	40	3.900	1.266	5.166	
5240	48	3.824	1.266	5.090	
5260	52	3.872	1.266	5.138	
5300	60	3.743	1.266	5.009	
5320	64	3.636	1.266	4.902	
5500	100	1.512	1.266	2.778	
5600	120	2.916	1.266	4.182	
5720	144	3.173	1.266	4.439	
5745	149	0.633	1.266	1.899	
5785	157	0.622	1.266	1.888	30 dBm/500kHz
5825	165	0.664	1.266	1.930	

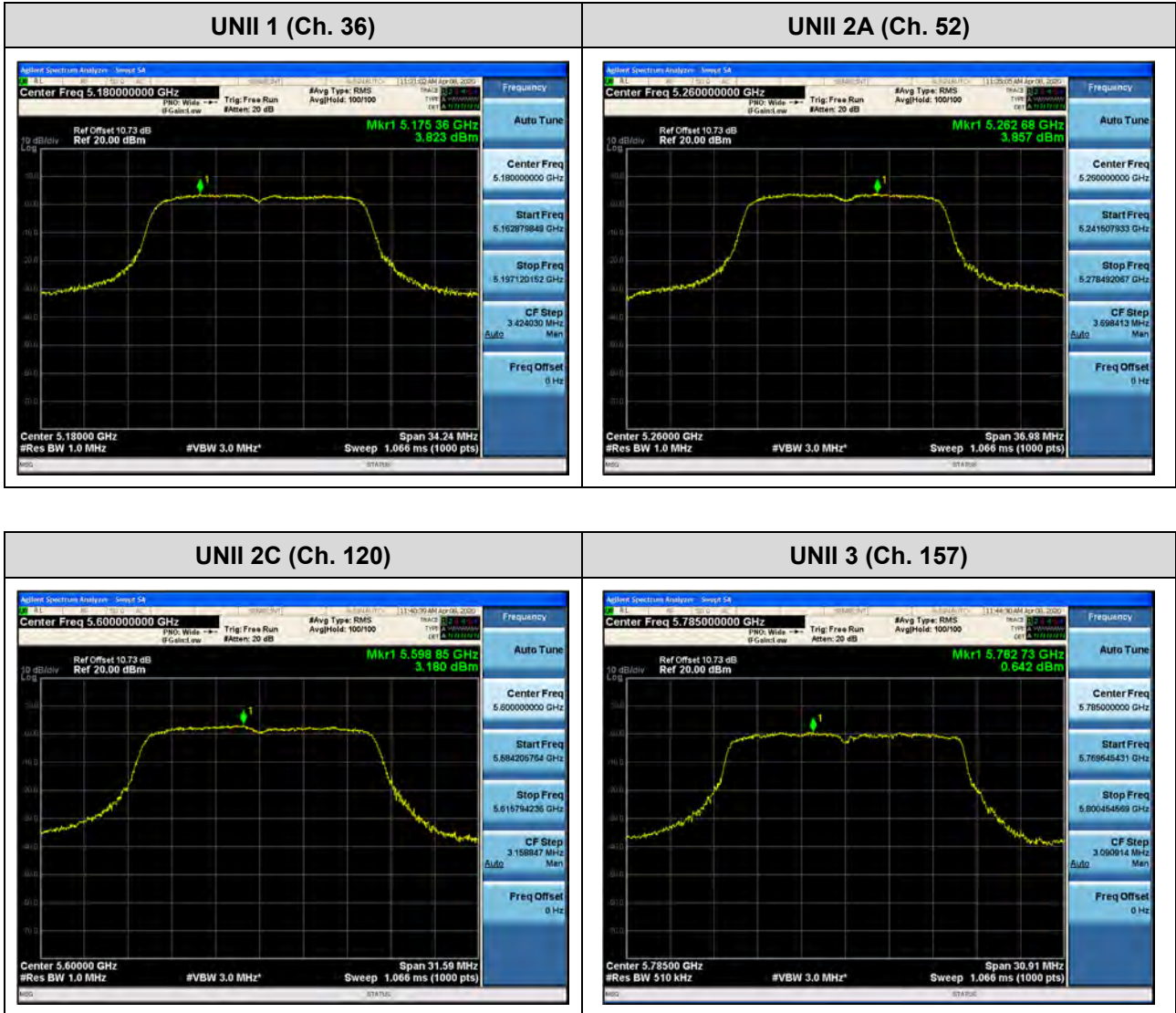
802.11ac(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	-2.238	2.663	0.425	11 dBm/MHz
5230	46	-2.131	2.663	0.532	
5270	54	-1.934	2.663	0.729	
5310	62	-2.000	2.663	0.663	
5510	102	-2.689	2.663	-0.026	
5590	118	-2.686	2.663	-0.023	
5710	142	-3.178	2.663	-0.515	
5755	151	-5.201	2.663	-2.538	30 dBm/500kHz
5795	159	-5.599	2.663	-2.936	

802.11ac(80MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5210	42	-6.025	2.251	-3.774	11 dBm/MHz
5290	58	-6.094	2.251	-3.843	
5530	106	-7.292	2.251	-5.041	
5610	122	-6.740	2.251	-4.489	
5690	138	-7.484	2.251	-5.233	
5775	155	-9.351	2.251	-7.100	30 dBm/500kHz

☐ Test Plots(802.11a)

Note:

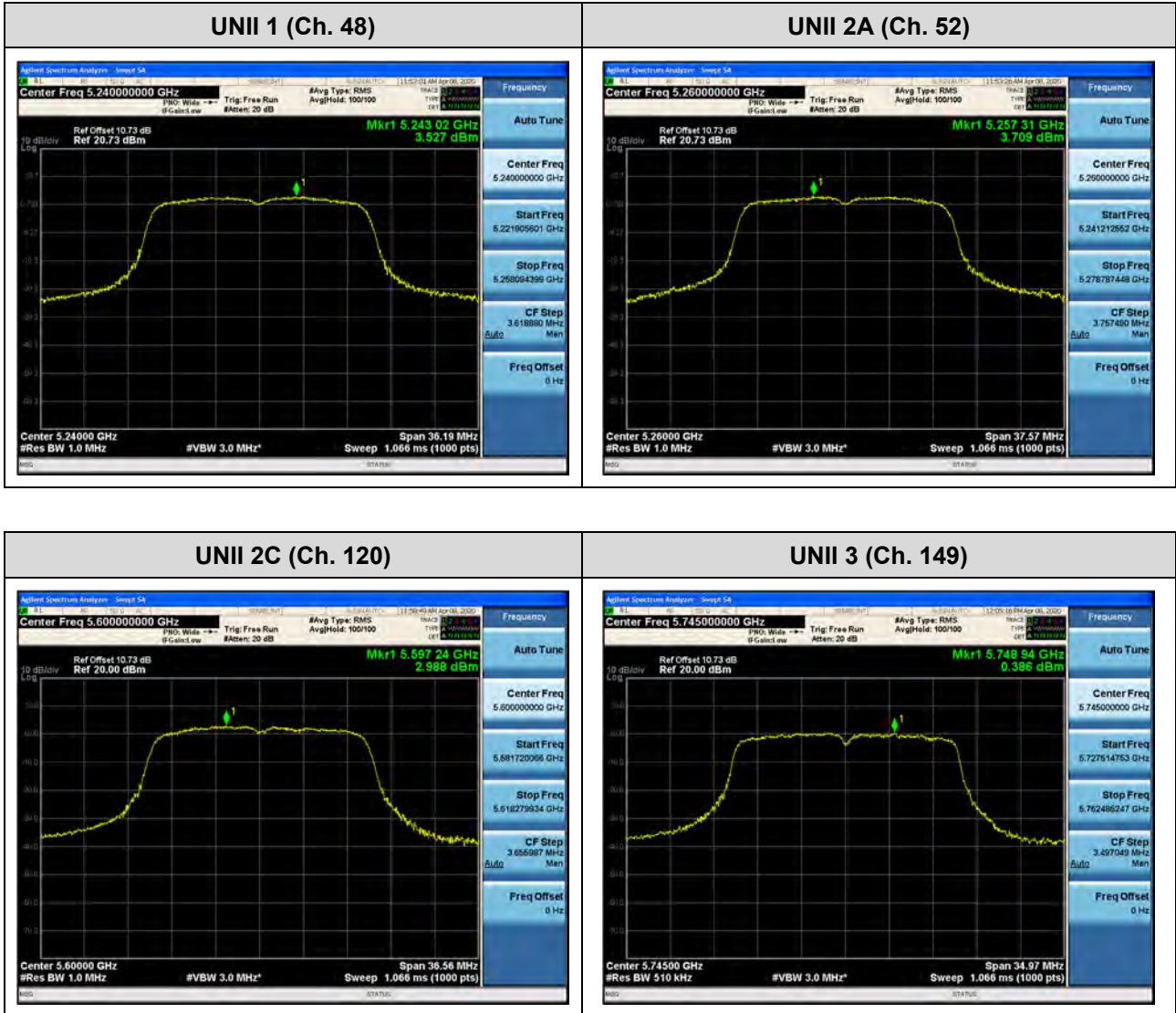
In order to simplify the report, attached plots were only channel of highest power.



Test Plots(802.11n(HT20))

Note:

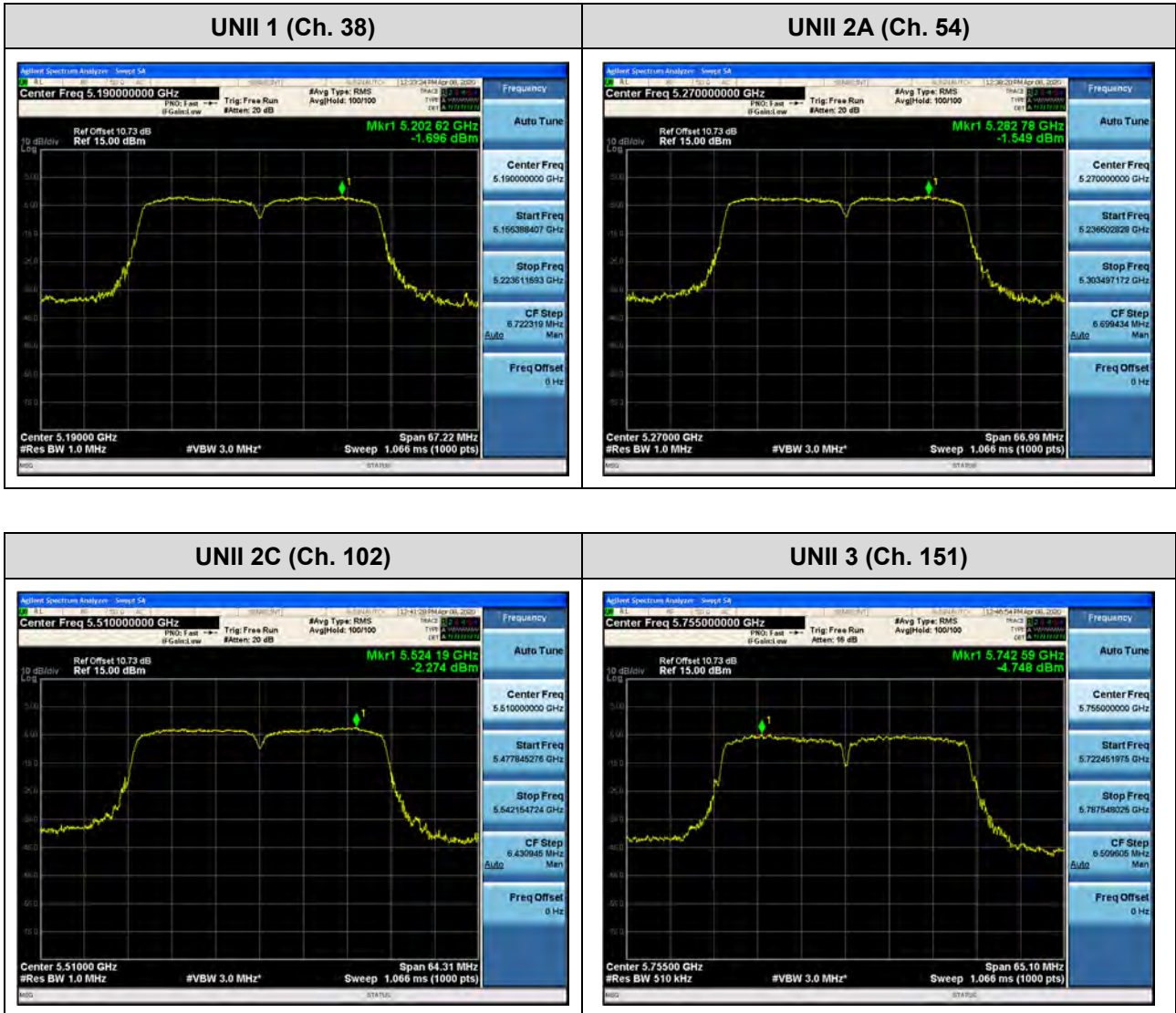
In order to simplify the report, attached plots were only channel of highest power.



☐ Test Plots(802.11n(HT40))

Note:

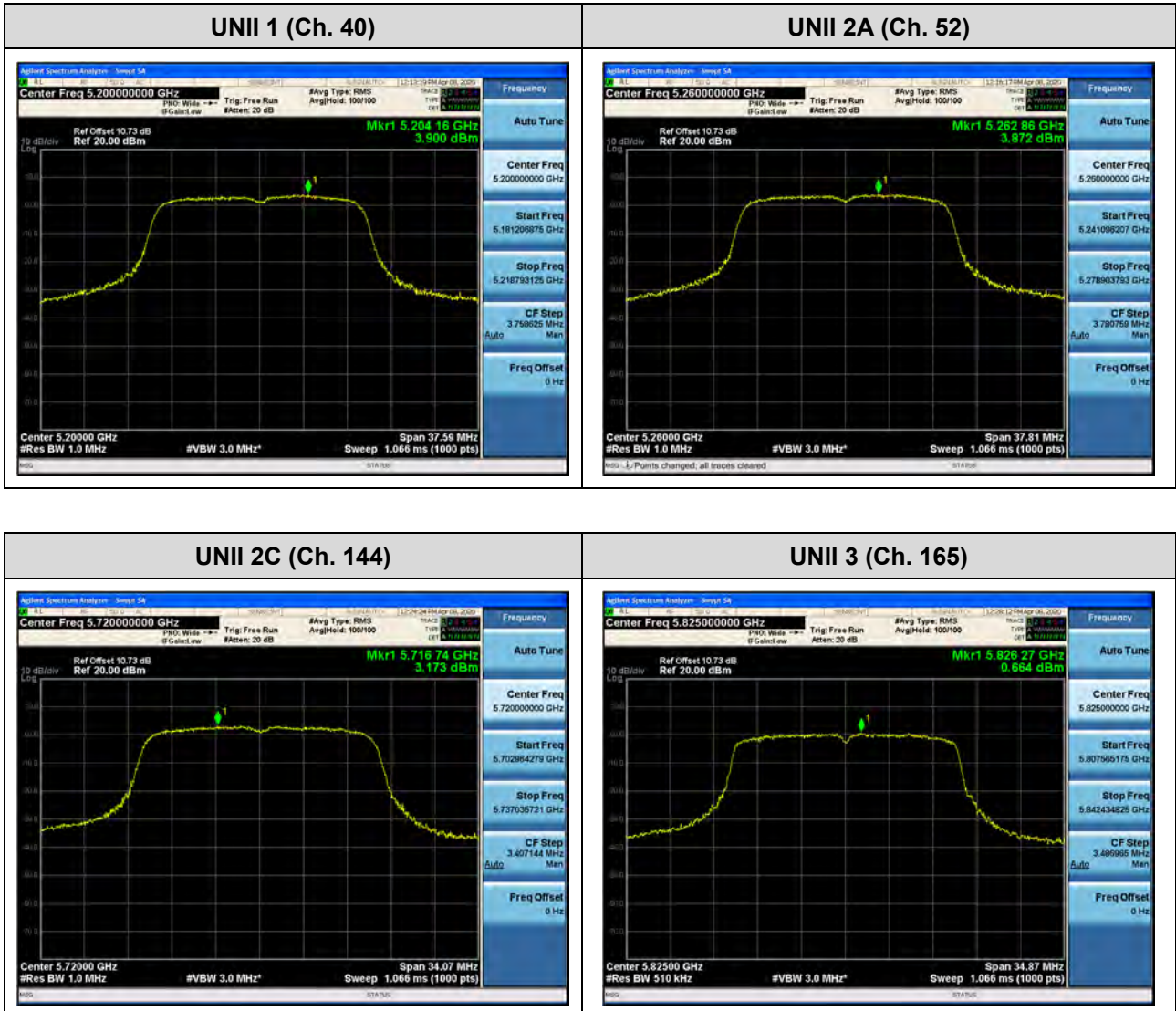
In order to simplify the report, attached plots were only channel of highest power.



Test Plots(802.11ac(VHT20))

Note:

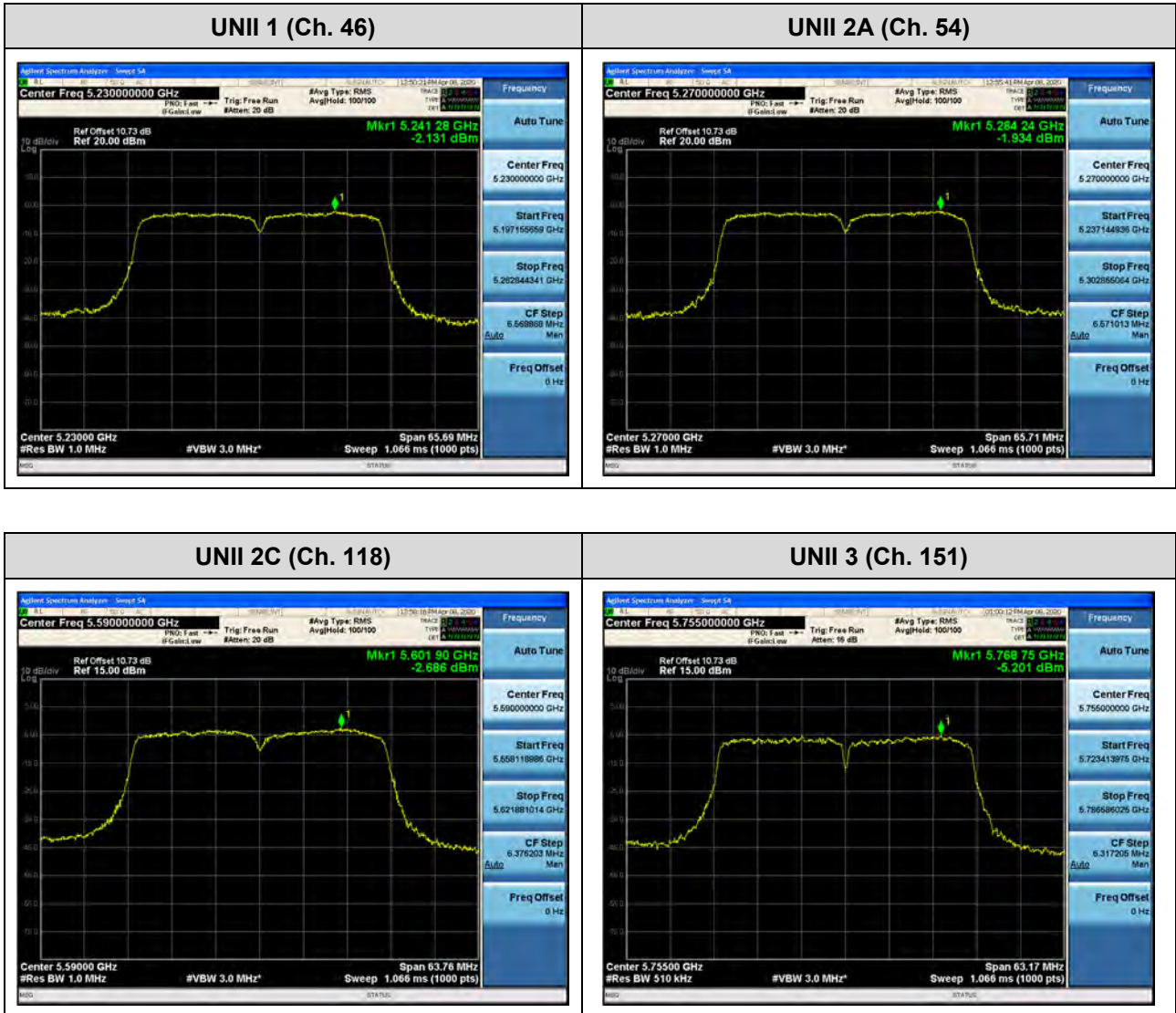
In order to simplify the report, attached plots were only channel of highest power.



☐ Test Plots(802.11ac(VHT40))

Note:

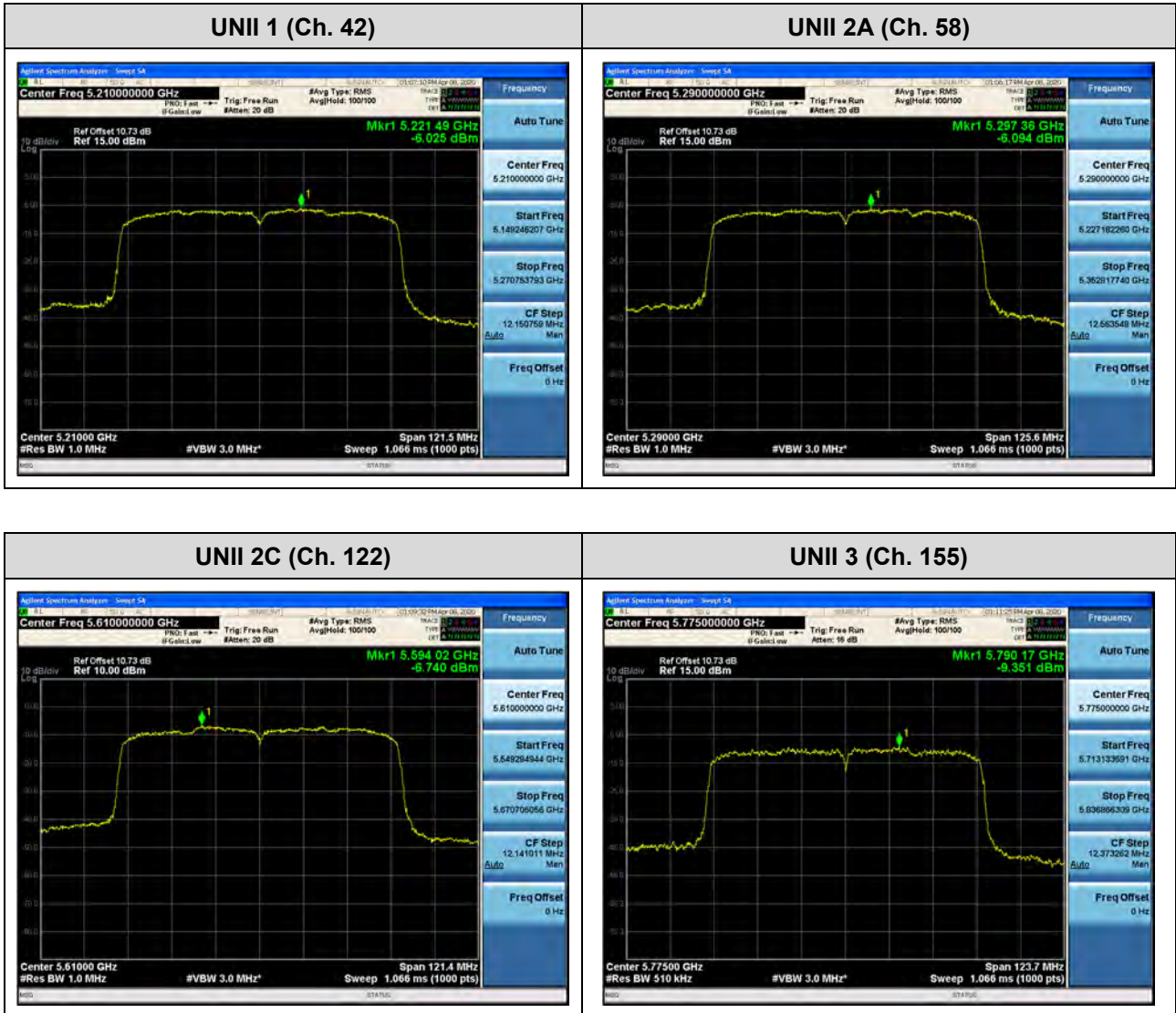
In order to simplify the report, attached plots were only channel of highest power.



Test Plots(802.11ac(VHT80))

Note:

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



10.6 FREQUENCY STABILITY.

10.6.1 80MHz BW

Startup after the EUT is energized

OPERATING BAND: UNII Band 1
 OPERATING FREQUENCY: 5,210,000,000 Hz
 CHANNEL: 42
 REFERENCE VOLTAGE: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5210033.46	33.46
100%		-30	5210052.07	52.07
100%		-20	5210033.02	33.02
100%		-10	5210075.66	75.66
100%		0	5210061.99	61.99
100%		+10	5210001.11	1.11
100%		+30	5210085.57	85.57
100%		+40	5210007.60	7.60
100%		+50	5210011.07	11.07
End point	3.4	+20	5210018.68	18.68

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: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5290048.27	48.27
100%		-30	5290078.85	78.85
100%		-20	5290086.45	86.45
100%		-10	5290003.87	3.87
100%		0	5290008.12	8.12
100%		+10	5290037.47	37.47
100%		+30	5290078.27	78.27
100%		+40	5290038.70	38.7
100%		+50	5290079.14	79.14
End point	3.4	+20	5290071.22	71.22

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: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5530012.99	12.99
100%		-30	5530044.74	44.74
100%		-20	5530044.24	44.24
100%		-10	5530031.42	31.42
100%		0	5530056.72	56.72
100%		+10	5530098.43	98.43
100%		+30	5530008.77	8.77
100%		+40	5530048.45	48.45
100%		+50	5530047.45	47.45
End point	3.4	+20	5530071.12	71.12

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: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5775083.48	83.48
100%		-30	5775064.83	64.83
100%		-20	5775023.27	23.27
100%		-10	5775043.03	43.03
100%		0	5775073.63	73.63
100%		+10	5775047.14	47.14
100%		+30	5775047.05	47.05
100%		+40	5775014.36	14.36
100%		+50	5775011.58	11.58
End point	3.4	+20	5775037.86	37.86

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: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5210071.34	71.34
100%		-30	5210009.09	9.09
100%		-20	5210036.17	36.17
100%		-10	5210098.83	98.83
100%		0	5210089.93	89.93
100%		+10	5210009.77	9.77
100%		+30	5210004.74	4.74
100%		+40	5210010.03	10.03
100%		+50	5210060.85	60.85
End point	3.4	+20	5210057.62	57.62

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: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5290013.59	13.59
100%		-30	5290007.61	7.61
100%		-20	5290051.11	51.11
100%		-10	5290065.88	65.88
100%		0	5290024.88	24.88
100%		+10	5290018.32	18.32
100%		+30	5290047.37	47.37
100%		+40	5290082.29	82.29
100%		+50	5290099.48	99.48
End point	3.4	+20	5290081.52	81.52

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.

OPERATING BAND: UNII Band 2C
 OPERATING FREQUENCY: 5,530,000,000 Hz
 CHANNEL: 106
 REFERENCE VOLTAGE: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5530077.90	77.90
100%		-30	5530044.84	44.84
100%		-20	5530017.18	17.18
100%		-10	5530095.61	95.61
100%		0	5530044.33	44.33
100%		+10	5530007.52	7.52
100%		+30	5530064.06	64.06
100%		+40	5530089.71	89.71
100%		+50	5530027.06	27.06
End point	3.4	+20	5530026.50	26.5

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: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5775035.36	35.36
100%		-30	5775058.90	58.90
100%		-20	5775017.38	17.38
100%		-10	5775053.25	53.25
100%		0	5775054.57	54.57
100%		+10	5775074.31	74.31
100%		+30	5775076.21	76.21
100%		+40	5775061.25	61.25
100%		+50	5775041.26	41.26
End point	3.4	+20	5775014.92	14.92

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.

5 minutes after the EUT is energized

OPERATING BAND: UNII Band 1
 OPERATING FREQUENCY: 5,210,000,000 Hz
 CHANNEL: 42
 REFERENCE VOLTAGE: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5210084.70	84.70
100%		-30	5210084.29	84.29
100%		-20	5210053.65	53.65
100%		-10	5210083.29	83.29
100%		0	5210048.18	48.18
100%		+10	5210008.60	8.60
100%		+30	5210081.09	81.09
100%		+40	5210070.63	70.63
100%		+50	5210064.68	64.68
End point	3.4	+20	5210065.10	65.10

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: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5290075.88	75.88
100%		-30	5290031.73	31.73
100%		-20	5290062.75	62.75
100%		-10	5290008.46	8.46
100%		0	5290020.66	20.66
100%		+10	5290091.58	91.58
100%		+30	5290096.43	96.43
100%		+40	5290061.44	61.44
100%		+50	5290027.46	27.46
End point	3.4	+20	5290052.86	52.86

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: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5530084.09	84.09
100%		-30	5530078.94	78.94
100%		-20	5530060.03	60.03
100%		-10	5530043.48	43.48
100%		0	5530064.92	64.92
100%		+10	5530019.17	19.17
100%		+30	5530067.21	67.21
100%		+40	5530054.82	54.82
100%		+50	5530060.73	60.73
End point	3.4	+20	5530055.43	55.43

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: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5775076.13	76.13
100%		-30	5775042.79	42.79
100%		-20	5775058.24	58.24
100%		-10	5775099.34	99.34
100%		0	5775047.67	47.67
100%		+10	5775063.80	63.8
100%		+30	5775025.06	25.06
100%		+40	5775013.34	13.34
100%		+50	5775075.58	75.58
End point	3.4	+20	5775005.57	5.57

Note:

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

10 minutes after the EUT is energized

OPERATING BAND: UNII Band 1
 OPERATING FREQUENCY: 5,210,000,000 Hz
 CHANNEL: 42
 REFERENCE VOLTAGE: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5210054.13	54.13
100%		-30	5210020.29	20.29
100%		-20	5210048.93	48.93
100%		-10	5210095.65	95.65
100%		0	5210090.31	90.31
100%		+10	5210063.63	63.63
100%		+30	5210077.30	77.30
100%		+40	5210003.60	3.60
100%		+50	5210035.62	35.62
End point	3.4	+20	5210093.27	93.27

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: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5290019.09	19.09
100%		-30	5290047.05	47.05
100%		-20	5290060.79	60.79
100%		-10	5290006.25	6.25
100%		0	5290077.07	77.07
100%		+10	5290025.80	25.8
100%		+30	5290034.28	34.28
100%		+40	5290002.88	2.88
100%		+50	5290074.30	74.30
End point	3.4	+20	5290058.73	58.73

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: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5530055.83	55.83
100%		-30	5530088.90	88.90
100%		-20	5530067.29	67.29
100%		-10	5530029.03	29.03
100%		0	5530061.76	61.76
100%		+10	5530080.60	80.6
100%		+30	5530030.38	30.38
100%		+40	5530083.95	83.95
100%		+50	5530053.77	53.77
End point	3.4	+20	5530076.61	76.61

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: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5775008.58	8.58
100%		-30	5775021.83	21.83
100%		-20	5775059.70	59.7
100%		-10	5775018.42	18.42
100%		0	5775084.26	84.26
100%		+10	5775099.61	99.61
100%		+30	5775034.20	34.2
100%		+40	5775077.61	77.61
100%		+50	5775031.99	31.99
End point	3.4	+20	5775070.70	70.7

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 26dB Bandwidth

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11a	UNII 2C	5720	144	5710.04	14.96
802.11n(HT20)				5709.60	15.40
802.11ac(VHT20)				5709.52	15.48
802.11a	UNII 3	5720	144	5730.20	5.20
802.11n(HT20)				5730.48	5.48
802.11ac(VHT20)				5730.48	5.48

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11n(HT40)	UNII 2C	5710	142	5689.44	35.56
802.11ac(VHT40)				5689.52	35.48
802.11n(HT40)	UNII 3	5710	142	5730.40	5.40
802.11ac(VHT40)				5730.96	5.96

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11ac(VHT80)	UNII 2C	5690	138	5649.08	75.92
	UNII 3	5690	138	5730.68	5.68

Note:

[UNII 2C] 26dB Bandwidth = 5725MHz - Measured Frequency[MHz]

[UNII 3C] 26dB Bandwidth = Measured Frequency[MHz] -5725MHz

Test Plots (26dB Bandwidth)

802.11a UNII Band



802.11n(HT20) UNII Band



802.11ac(VHT20) UNII Band



☐ Test Plots (26dB Bandwidth)

802.11n(HT40) UNII Band



802.11ac(VHT40) UNII Band



802.11ac(VHT80) UNII Band



10.7.2 6dB Bandwidth

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
802.11a	UNII 3	5720	144	5728.28	3.28	> 0.5
802.11n(HT20)				5728.56	3.56	> 0.5
802.11ac(VHT20)				5728.52	3.52	> 0.5

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
802.11n(HT40)	UNII 3	5710	142	5728.20	3.20	> 0.5
802.11ac(VHT40)				5728.12	3.12	> 0.5

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
802.11ac(VHT80)	UNII 3	5690	138	5727.80	2.80	> 0.5

Note:

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

☐ Test Plots(UNII 3 Band 6dB Bandwidth)

802.11a CH.144



802.11n_HT20 CH.144



802.11ac_VHT20 CH.144



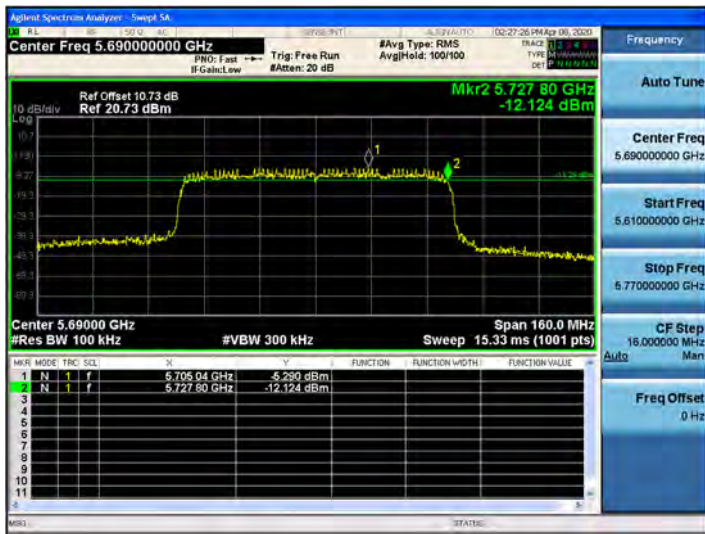
802.11n_HT40 CH.142



802.11ac_VHT40 CH.142



802.11ac_VHT80 CH.138



10.7.3 Output Power

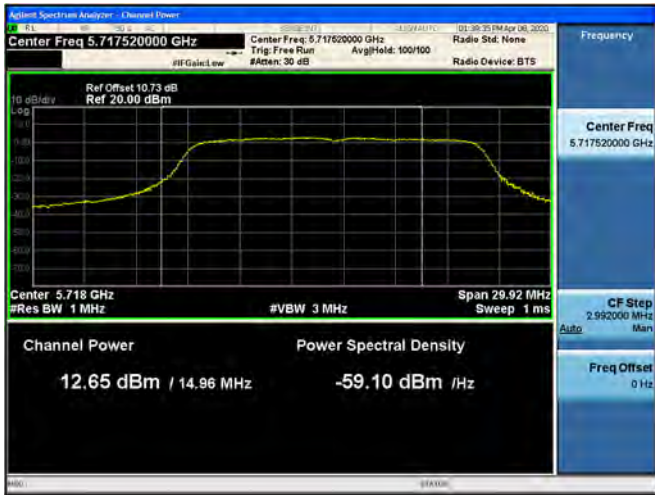
Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)
802.11a	5720 (UNII 2C Band)	144	12.65	1.52	14.17	22.75
802.11n(HT20)			12.67	1.62	14.29	22.88
802.11ac(VHT20)			13.16	1.27	14.43	22.90
802.11a	5720 (UNII 3 Band)	144	6.20	1.52	7.72	30.00
802.11n(HT20)			6.43	1.62	8.05	30.00
802.11ac(VHT20)			6.94	1.27	8.21	30.00

Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)
802.11n(HT40)	5710 (UNII 2C Band)	142	10.39	2.02	12.41	23.98
802.11ac(VHT40)			10.26	2.66	12.92	23.98
802.11n(HT40)	5710 (UNII 3 Band)	142	-0.20	2.02	1.82	30.00
802.11ac(VHT40)			-0.29	2.66	2.37	30.00

Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)
802.11ac(VHT80)	5690 (UNII 2C Band)	138	9.64	2.25	11.89	23.98
	5690 (UNII 3 Band)	138	-6.30	2.25	-4.05	30.00

☐ Test Plots

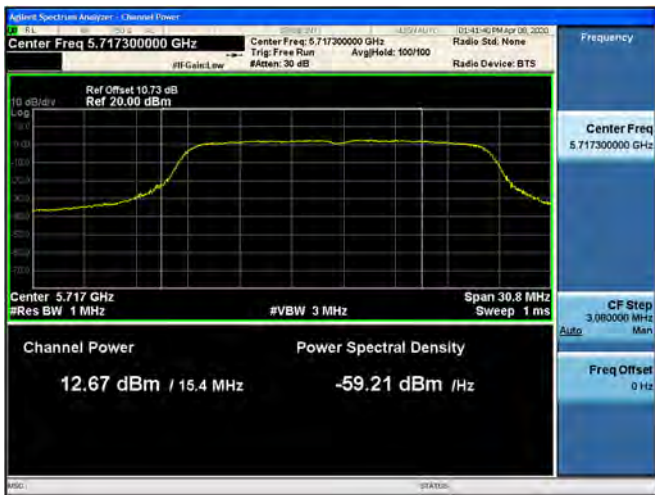
802.11a UNII 2C Band



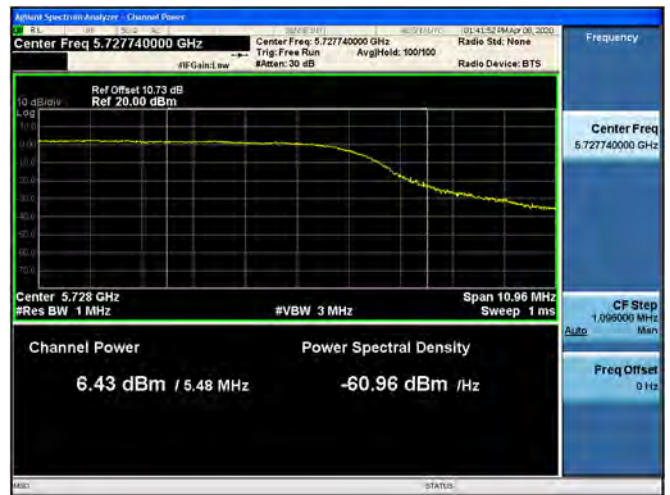
802.11a UNII 3 Band



802.11n(HT20) UNII 2C Band



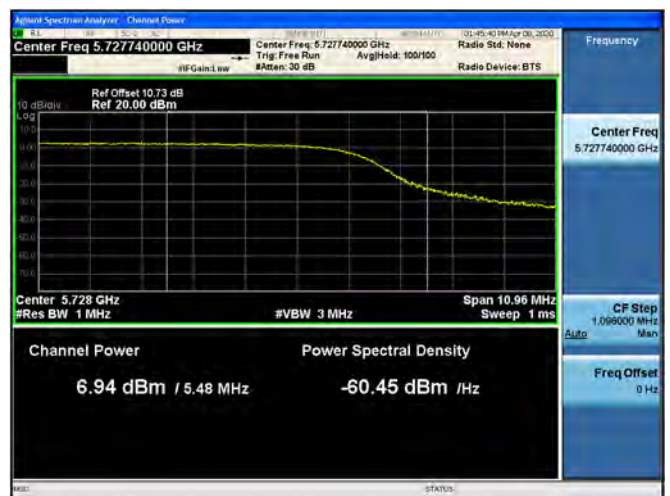
802.11n(HT20) UNII 3 Band



802.11ac(VHT20) UNII 2C Band



802.11ac(VHT20) UNII 3 Band



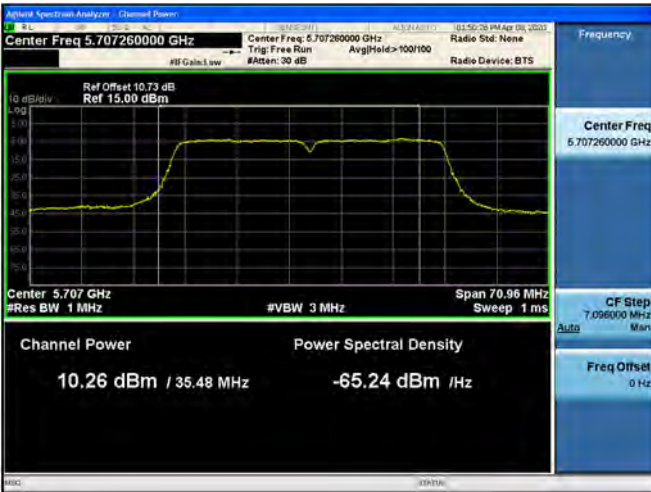
802.11n(HT40) UNII 2C Band



802.11n(HT40) UNII 3 Band



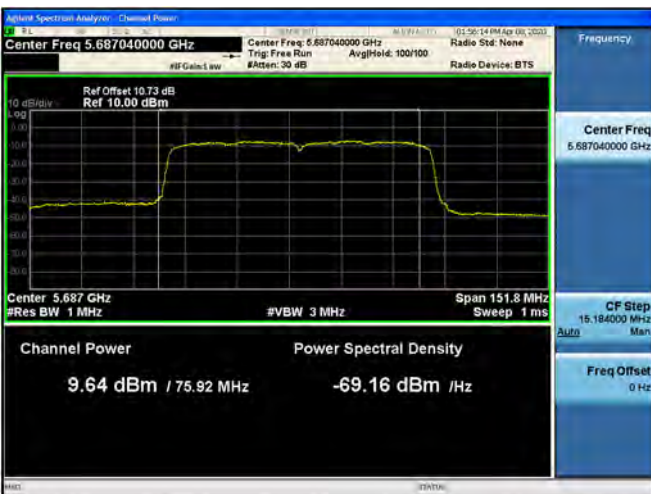
802.11ac(VHT40) UNII 2C Band



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)
802.11a	5720 (UNII 2C Band)	144	2.844	1.52	4.362	11dBm/ MHz
802.11n(HT20)			2.909	1.62	4.532	
802.11ac(VHT20)			3.321	1.27	4.591	
802.11a	5720 (UNII 3 Band)	144	-0.189	1.52	1.329	30 dBm/ 500kHz
802.11n(HT20)			-0.530	1.62	1.093	
802.11ac(VHT20)			-0.542	1.27	0.728	

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)
802.11n(HT40)	5710 (UNII 2C Band)	142	-3.033	2.02	-1.016	11dBm/ MHz
802.11ac(VHT40)			-3.152	2.66	-0.489	
802.11n(HT40)	5710 (UNII 3 Band)	142	-6.212	2.02	-4.195	30 dBm/ 500kHz
802.11ac(VHT40)			-6.810	2.66	-4.147	

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)
802.11ac(VHT80)	5690 (UNII 2C Band)	138	-7.226	2.25	-4.975	11dBm/ MHz
	5690 (UNII 3 Band)	138	-12.795	2.25	-10.544	30 dBm/ 500kHz

☐ Test Plots

802.11a UNII 2C Band



802.11a UNII 3 Band



802.11n(HT20) UNII 2C Band



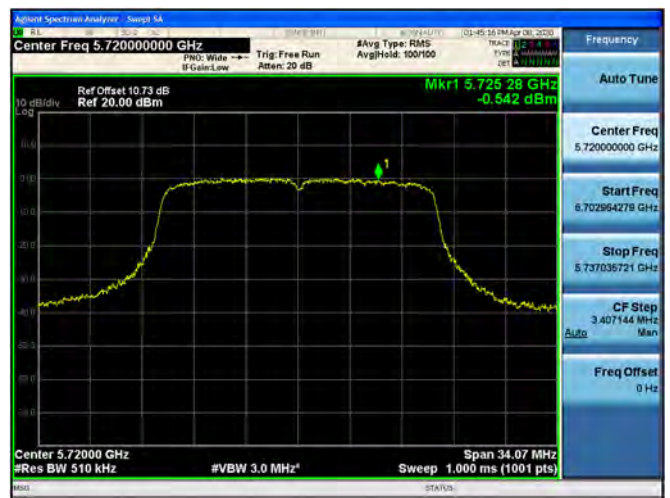
802.11n(HT20) UNII 3 Band



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	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBuV/m	dBm/m	dBm	(H/V)	dBuV/m	dBuV/m	dB
No Critical peaks found							

Note:

1. The reading 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 (dBuV) + Distance extrapolation factor

Frequency Range : Below 1 GHz

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBuV/m	dBm/m	dBm	(H/V)	dBuV/m	dBuV/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]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10360	54.27	0.49	V	54.76	68.20	13.44	PK
15540	50.60	2.62	V	53.22	73.98	20.76	PK
15540	37.56	2.62	V	40.18	53.98	13.80	AV
10360	52.80	0.49	H	53.29	68.20	14.91	PK
15540	50.90	2.62	H	53.52	73.98	20.46	PK
15540	37.55	2.62	H	40.17	53.98	13.81	AV

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

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10400	53.86	1.38	V	55.24	68.20	12.96	PK
15600	50.21	1.50	V	51.71	73.98	22.27	PK
15600	37.64	1.50	V	39.14	53.98	14.84	AV
10400	53.74	1.38	H	55.12	68.20	13.08	PK
15600	50.51	1.50	H	52.01	73.98	21.97	PK
15600	37.82	1.50	H	39.32	53.98	14.66	AV

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

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10480	56.55	-0.33	V	56.22	68.20	11.98	PK
15720	51.76	0.56	V	52.32	73.98	21.66	PK
15720	38.44	0.56	V	39.00	53.98	14.98	AV
10480	56.66	-0.33	H	56.33	68.20	11.87	PK
15720	51.85	0.56	H	52.41	73.98	21.57	PK
15720	38.58	0.56	H	39.14	53.98	14.84	AV

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

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10520	57.38	-0.06	V	57.32	68.20	10.88	PK
15780	52.88	0.96	V	53.84	73.98	20.14	PK
15780	39.70	0.96	V	40.66	53.98	13.32	AV
10520	59.28	-0.06	H	59.22	68.20	8.98	PK
15780	53.65	0.96	H	54.61	73.98	19.37	PK
15780	40.01	0.96	H	40.97	53.98	13.01	AV

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

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10600	58.31	-0.18	V	58.13	73.98	15.85	PK
10600	45.50	-0.18	V	45.32	53.98	8.66	AV
15900	53.19	-0.13	V	53.06	73.98	20.92	PK
15900	40.44	-0.13	V	40.31	53.98	13.67	AV
10600	58.66	-0.18	H	58.48	73.98	15.50	PK
10600	45.98	-0.18	H	45.80	53.98	8.18	AV
15900	53.83	-0.13	H	53.70	73.98	20.28	PK
15900	40.89	-0.13	H	40.76	53.98	13.22	AV

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

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10640	56.33	-0.04	V	56.29	73.98	17.69	PK
10640	44.58	-0.04	V	44.54	53.98	9.44	AV
15960	52.95	-0.36	V	52.59	73.98	21.39	PK
15960	40.89	-0.36	V	40.53	53.98	13.45	AV
10640	56.75	-0.04	H	56.71	73.98	17.27	PK
10640	44.91	-0.04	H	44.87	53.98	9.11	AV
15960	53.63	-0.36	H	53.27	73.98	20.71	PK
15960	41.26	-0.36	H	40.90	53.98	13.08	AV

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

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11000	51.50	1.75	V	53.25	73.98	20.73	PK
11000	40.02	1.75	V	41.77	53.98	12.21	AV
16500	51.99	1.06	V	53.05	68.20	15.15	PK
11000	51.88	1.75	H	53.63	73.98	20.35	PK
11000	40.23	1.75	H	41.98	53.98	12.00	AV
16500	53.05	1.06	H	54.11	68.20	14.09	PK

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

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11200	51.74	0.26	V	52.00	73.98	21.98	PK
11200	39.41	0.26	V	39.67	53.98	14.31	AV
16800	54.89	3.41	V	58.30	68.20	9.90	PK
11200	51.98	0.26	H	52.24	73.98	21.74	PK
11200	39.70	0.26	H	39.96	53.98	14.02	AV
16800	55.46	3.41	H	58.87	68.20	9.33	PK

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

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11440	51.91	0.74	V	52.65	73.98	21.33	PK
11440	39.34	0.74	V	40.08	53.98	13.90	AV
17160	55.34	5.47	V	60.81	68.20	7.39	PK
11440	52.19	0.74	H	52.93	73.98	21.05	PK
11440	39.51	0.74	H	40.25	53.98	13.73	AV
17160	55.48	5.47	H	60.95	68.20	7.25	PK

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

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11490	50.35	0.57	V	50.92	73.98	23.06	PK
11490	38.44	0.57	V	39.01	53.98	14.97	AV
17235	54.66	5.22	V	59.88	68.20	8.32	PK
11490	50.61	0.57	H	51.18	73.98	22.80	PK
11490	38.63	0.57	H	39.20	53.98	14.78	AV
17235	55.12	5.22	H	60.34	68.20	7.86	PK

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

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11570	50.85	0.73	V	51.58	73.98	22.40	PK
11570	38.89	0.73	V	39.62	53.98	14.36	AV
17355	52.65	6.04	V	58.69	68.20	9.51	PK
11570	51.81	0.73	H	52.54	73.98	21.44	PK
11570	39.10	0.73	H	39.83	53.98	14.15	AV
17355	53.64	6.04	H	59.68	68.20	8.52	PK

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

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11650	50.64	-0.65	V	49.99	73.98	23.99	PK
11650	39.07	-0.65	V	38.42	53.98	15.56	AV
17475	52.60	7.62	V	60.22	68.20	7.98	PK
11650	51.39	-0.65	H	50.74	73.98	23.24	PK
11650	39.57	-0.65	H	38.92	53.98	15.06	AV
17475	53.95	7.62	H	61.57	68.20	6.63	PK

Band : UNII 3
 Operation Mode: 802.11 n(HT20)
 Transfer MCS Index: MCS0
 Operating Frequency 5825 MHz
 Channel No. 165 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11650	51.34	-0.65	V	50.69	73.98	23.29	PK
11650	39.44	-0.65	V	38.79	53.98	15.19	AV
17475	52.84	7.62	V	60.46	68.20	7.74	PK
11650	51.91	-0.65	H	51.26	73.98	22.72	PK
11650	39.54	-0.65	H	38.89	53.98	15.09	AV
17475	53.37	7.62	H	60.99	68.20	7.21	PK

Band : UNII 3
 Operation Mode: 802.11 ac(VHT20)
 Transfer MCS Index: MCS0
 Operating Frequency 5825 MHz
 Channel No. 165 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11650	51.55	-0.65	V	50.90	73.98	23.08	PK
11650	39.40	-0.65	V	38.75	53.98	15.23	AV
17475	53.01	7.62	V	60.63	68.20	7.57	PK
11650	51.94	-0.65	H	51.29	73.98	22.69	PK
11650	39.53	-0.65	H	38.88	53.98	15.10	AV
17475	53.77	7.62	H	61.39	68.20	6.81	PK

Band : UNII 2C
 Operation Mode: 802.11 n(HT40)
 Transfer MCS Index: MCS0
 Operating Frequency 5710 MHz
 Channel No. 142 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11420	51.88	0.92	V	52.80	73.98	21.18	PK
11420	39.87	0.92	V	40.79	53.98	13.19	AV
17130	51.37	4.98	V	56.35	68.20	11.85	PK
11420	52.40	0.92	H	53.32	73.98	20.66	PK
11420	40.22	0.92	H	41.14	53.98	12.84	AV
17130	51.99	4.98	H	56.97	68.20	11.23	PK

Band : UNII 3
 Operation Mode: 802.11 n(HT40)
 Transfer MCS Index: MCS0
 Operating Frequency 5795 MHz
 Channel No. 159 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11590	52.10	0.49	V	52.59	73.98	21.39	PK
11590	40.25	0.49	V	40.74	53.98	13.24	AV
17385	49.76	3.54	V	53.30	68.20	14.90	PK
11590	52.54	0.49	H	53.03	73.98	20.95	PK
11590	40.45	0.49	H	40.94	53.98	13.04	AV
17385	50.59	3.54	H	54.13	68.20	14.07	PK

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Band : UNII 2C
 Operation Mode: 802.11 ac(VHT40)
 Transfer MCS Index: MCS0
 Operating Frequency 5710 MHz
 Channel No. 142 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11420	50.50	0.92	V	51.42	73.98	22.56	PK
11420	40.00	0.92	V	40.92	53.98	13.06	AV
17130	50.64	4.98	V	55.62	68.20	12.58	PK
11420	52.18	0.92	H	53.10	73.98	20.88	PK
11420	40.18	0.92	H	41.10	53.98	12.88	AV
17130	50.85	4.98	H	55.83	68.20	12.37	PK

Band : UNII 3
 Operation Mode: 802.11 ac(VHT40)
 Transfer MCS Index: MCS0
 Operating Frequency 5795 MHz
 Channel No. 159 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11590	52.10	0.49	V	52.59	73.98	21.39	PK
11590	40.04	0.49	V	40.53	53.98	13.45	AV
17385	50.51	3.54	V	54.05	68.20	14.15	PK
11590	51.89	0.49	H	52.38	73.98	21.60	PK
11590	40.23	0.49	H	40.72	53.98	13.26	AV
17385	50.71	3.54	H	54.25	68.20	13.95	PK

Band : UNII 2C
 Operation Mode: 802.11 ac(VHT80)
 Transfer MCS Index: MCS0
 Operating Frequency 5690 MHz
 Channel No. 138 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11380	51.77	0.20	V	51.97	73.98	22.01	PK
11380	40.75	0.20	V	40.95	53.98	13.03	AV
17070	50.50	4.81	V	55.31	68.20	12.89	PK
11380	52.24	0.20	H	52.44	73.98	21.54	PK
11380	41.04	0.20	H	41.24	53.98	12.74	AV
17070	50.87	4.81	H	55.68	68.20	12.52	PK

Band : UNII 3
 Operation Mode: 802.11 ac(VHT80)
 Transfer MCS Index: MCS0
 Operating Frequency 5775 MHz
 Channel No. 155 Ch

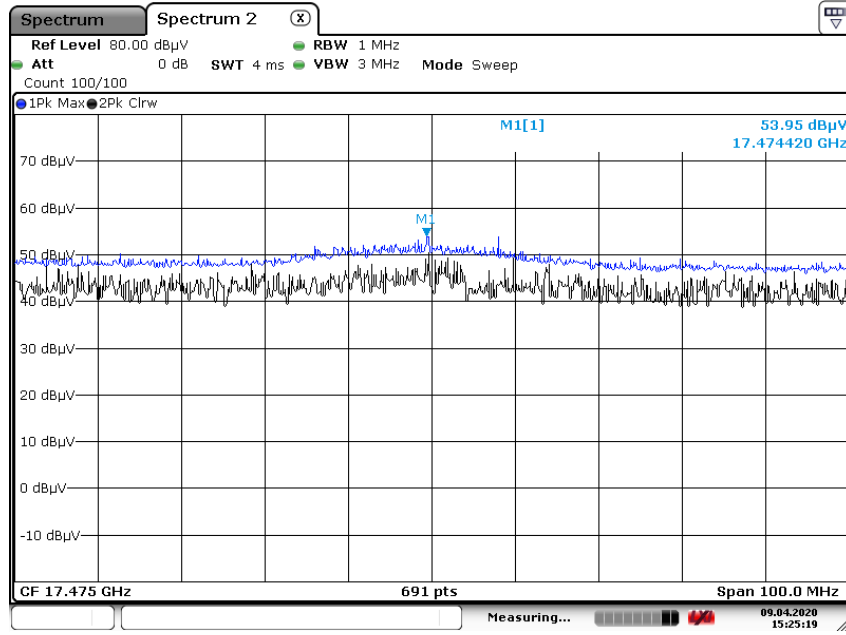
Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11550	51.89	0.55	V	52.44	73.98	21.54	PK
11550	39.25	0.55	V	39.80	53.98	14.18	AV
17325	49.85	5.18	V	55.03	68.20	13.17	PK
11550	52.31	0.55	H	52.86	73.98	21.12	PK
11550	39.44	0.55	H	39.99	53.98	13.99	AV
17325	50.04	5.18	H	55.22	68.20	12.98	PK

Note:

All Modes of operation were investigated and the worst case configuration results are reported.
 In order to simplify the report, We only have attached RSE result of worst channel.

▣ Test Plots

Peak Reading (802.11a, Ch.165 3rd Harmonic, Z-H)



Date: 9.APR.2020 15:25:19

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]	Reading dBuV	AN.+CL-AMP+ATT. +D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	53.70	5.75	H	59.45	73.98	14.53	PK
5150	40.82	5.75	H	46.57	53.98	7.41	AV
5150	53.12	5.75	V	58.87	73.98	15.11	PK
5150	40.50	5.75	V	46.25	53.98	7.73	AV

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

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT. +D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	56.77	5.52	H	62.29	73.98	11.69	PK
5350	41.56	5.52	H	47.08	53.98	6.90	AV
5350	56.35	5.52	V	61.87	73.98	12.11	PK
5350	41.14	5.52	V	46.66	53.98	7.32	AV

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

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT. +D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	51.48	7.05	H	58.53	73.98	15.45	PK
5460	36.73	7.05	H	43.78	53.98	10.20	AV
5470	56.58	6.59	H	63.17	68.20	5.03	PK
5460	51.11	7.05	V	58.16	73.98	15.82	PK
5460	36.50	7.05	V	43.55	53.98	10.43	AV
5470	56.08	6.59	V	62.67	68.20	5.53	PK

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

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT.		Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
		+D.F. [dB]	ANT. POL [H/V]				
5150	53.69	5.75	H	59.44	73.98	14.54	PK
5150	40.68	5.75	H	46.43	53.98	7.55	AV
5150	52.94	5.75	V	58.69	73.98	15.29	PK
5150	40.31	5.75	V	46.06	53.98	7.92	AV

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

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT.		Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
		+D.F. [dB]	ANT. POL [H/V]				
5350	59.29	5.52	H	64.81	73.98	9.17	PK
5350	42.04	5.52	H	47.56	53.98	6.42	AV
5350	58.65	5.52	V	64.17	73.98	9.81	PK
5350	41.59	5.52	V	47.11	53.98	6.87	AV

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

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT. +D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	53.56	7.05	H	60.61	73.98	13.37	PK
5460	37.02	7.05	H	44.07	53.98	9.91	AV
5470	58.03	6.59	H	64.62	68.20	3.58	PK
5460	52.85	7.05	V	59.9	73.98	14.08	PK
5460	36.84	7.05	V	43.89	53.98	10.09	AV
5470	57.35	6.59	V	63.94	68.20	4.26	PK

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

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT.		Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
		+D.F. [dB]	ANT. POL [H/V]				
5150	56.44	5.75	H	62.19	73.98	11.79	PK
5150	40.77	5.75	H	46.52	53.98	7.46	AV
5150	55.19	5.75	V	60.94	73.98	13.04	PK
5150	40.50	5.75	V	46.25	53.98	7.73	AV

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

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT.		Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
		+D.F. [dB]	ANT. POL [H/V]				
5350	59.14	5.52	H	64.66	73.98	9.32	PK
5350	41.29	5.52	H	46.81	53.98	7.17	AV
5350	58.64	5.52	V	64.16	73.98	9.82	PK
5350	40.81	5.52	V	46.33	53.98	7.65	AV

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

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT. +D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	54.79	7.05	H	61.84	73.98	12.14	PK
5460	37.12	7.05	H	44.17	53.98	9.81	AV
5470	58.44	6.59	H	65.03	68.20	3.17	PK
5460	53.88	7.05	V	60.93	73.98	13.05	PK
5460	36.30	7.05	V	43.35	53.98	10.63	AV
5470	57.67	6.59	V	64.26	68.20	3.94	PK

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

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT.		ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
		+D.F. [dB]						
5150	58.78	5.75		H	64.53	73.98	9.45	PK
5150	42.61	5.75		H	48.36	53.98	5.62	AV
5150	57.96	5.75		V	63.71	73.98	10.27	PK
5150	42.01	5.75		V	47.76	53.98	6.22	AV

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

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT.		ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
		+D.F. [dB]						
5350	59.37	5.52		H	64.89	73.98	9.09	PK
5350	41.27	5.52		H	46.79	53.98	7.19	AV
5350	58.44	5.52		V	63.96	73.98	10.02	PK
5350	40.89	5.52		V	46.41	53.98	7.57	AV

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

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT. +D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	56.60	7.05	H	63.65	73.98	10.33	PK
5460	40.28	7.05	H	47.33	53.98	6.65	AV
5470	59.18	6.59	H	65.77	68.20	2.43	PK
5460	55.58	7.05	V	62.63	73.98	11.35	PK
5460	39.80	7.05	V	46.85	53.98	7.13	AV
5470	56.95	6.59	V	63.54	68.20	4.66	PK

Band : UNII 1

Operation Mode: 802.11 ac_VHT40

Transfer MCS Index: 0

Operating Frequency 5190 MHz

Channel No. 38 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT.		ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
		+D.F. [dB]						
5150	55.85	5.75		H	61.60	73.98	12.38	PK
5150	41.57	5.75		H	47.32	53.98	6.66	AV
5150	55.17	5.75		V	60.92	73.98	13.06	PK
5150	41.26	5.75		V	47.01	53.98	6.97	AV

Band : UNII 2A

Operation Mode: 802.11 ac_VHT40

Transfer MCS Index: 0

Operating Frequency 5310 MHz

Channel No. 62 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT.		ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
		+D.F. [dB]						
5350	60.48	5.52		H	66.00	73.98	7.98	PK
5350	42.22	5.52		H	47.74	53.98	6.24	AV
5350	59.46	5.52		V	64.98	73.98	9.00	PK
5350	41.85	5.52		V	47.37	53.98	6.61	AV

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

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT. +D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	54.90	7.05	H	61.95	73.98	12.03	PK
5460	39.40	7.05	H	46.45	53.98	7.53	AV
5470	58.90	6.59	H	65.49	68.20	2.71	PK
5460	54.61	7.05	V	61.66	73.98	12.32	PK
5460	39.08	7.05	V	46.13	53.98	7.85	AV
5470	58.11	6.59	V	64.7	68.20	3.50	PK

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

Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT.	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
		+D.F. [dB]					
5150	58.46	5.75	H	64.21	73.98	9.77	PK
5150	43.47	5.75	H	49.22	53.98	4.76	AV
5150	57.83	5.75	V	63.58	73.98	10.40	PK
5150	43.20	5.75	V	48.95	53.98	5.03	AV

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

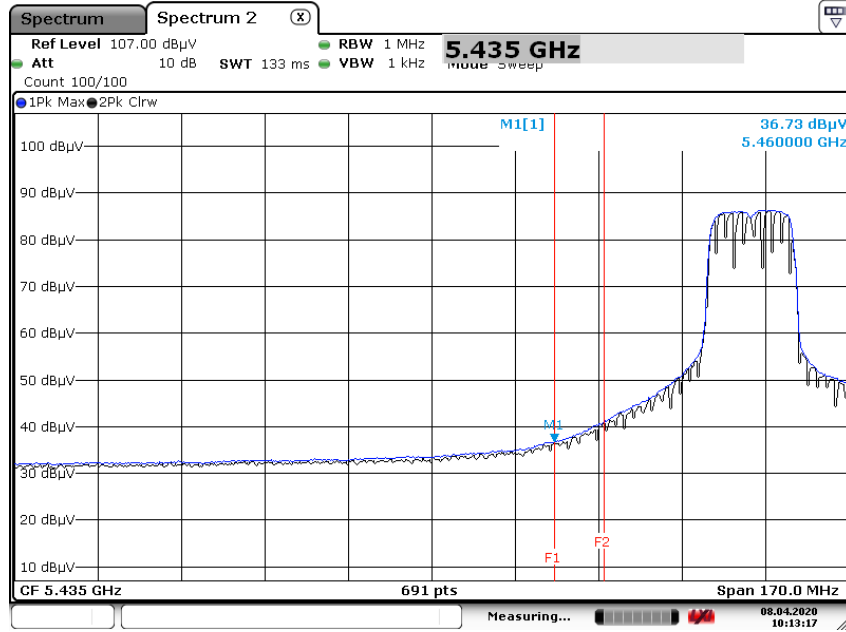
Frequency [MHz]	Reading dBuV	AN.+CL-AMP+ATT.	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
		+D.F. [dB]					
5350	59.11	5.52	H	64.63	73.98	9.35	PK
5350	40.94	5.52	H	46.46	53.98	7.52	AV
5350	58.50	5.52	V	64.02	73.98	9.96	PK
5350	40.51	5.52	V	46.03	53.98	7.95	AV

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

Frequency [MHz]	Reading DBuV	AN.+CL-AMP+ATT. +D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	55.92	7.05	H	62.97	73.98	11.01	PK
5460	39.02	7.05	H	46.07	53.98	7.91	AV
5470	58.07	6.59	H	64.66	68.20	3.54	PK
5460	54.53	7.05	V	61.58	73.98	12.40	PK
5460	37.80	7.05	V	44.85	53.98	9.13	AV
5470	55.98	6.59	V	62.57	68.20	5.63	PK

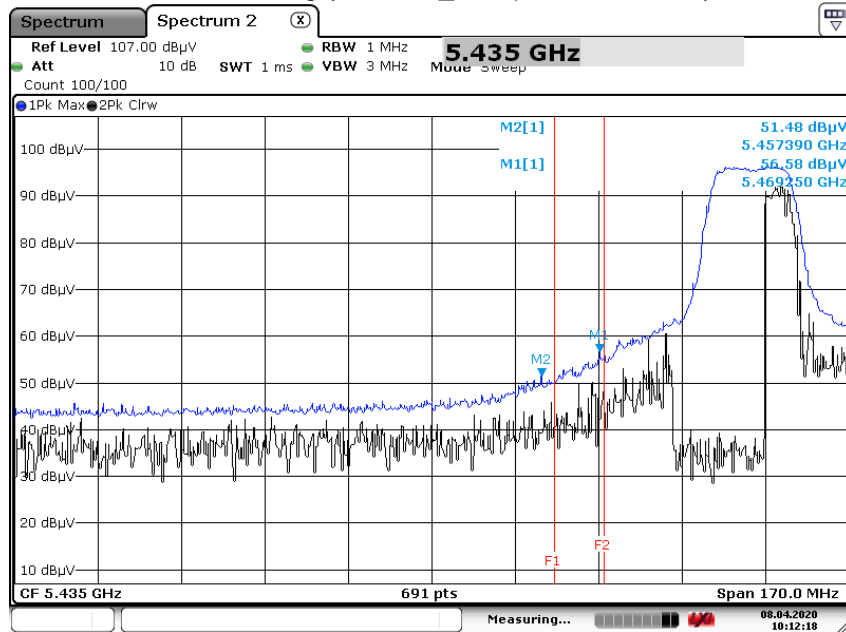
Test Plots(UNII 1, 2A, 2C)

Average Reading (802.11 a_6 Mbps, Ch.100, X-H)



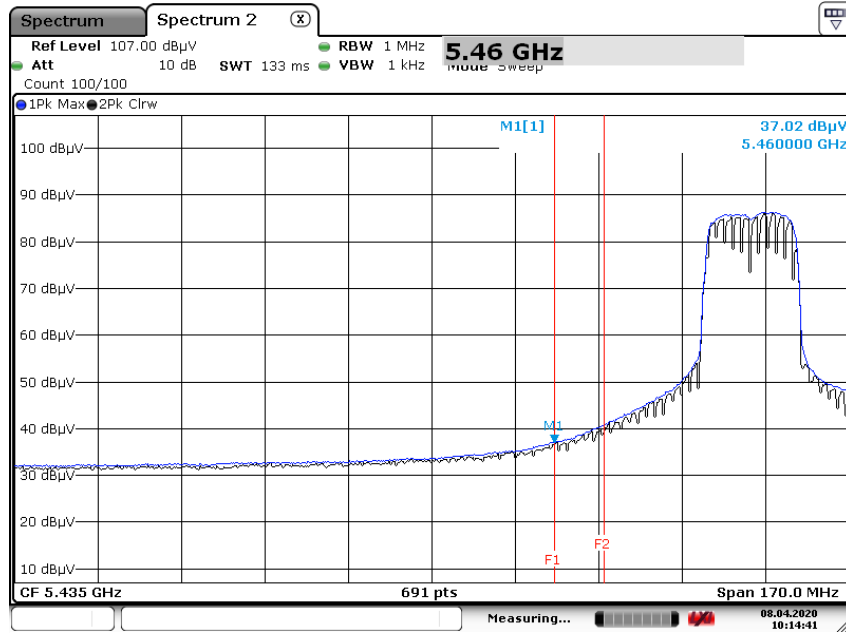
Date: 8.APR.2020 10:13:17

Peak Reading (802.11 a_6 Mbps, Ch.100, X-H)



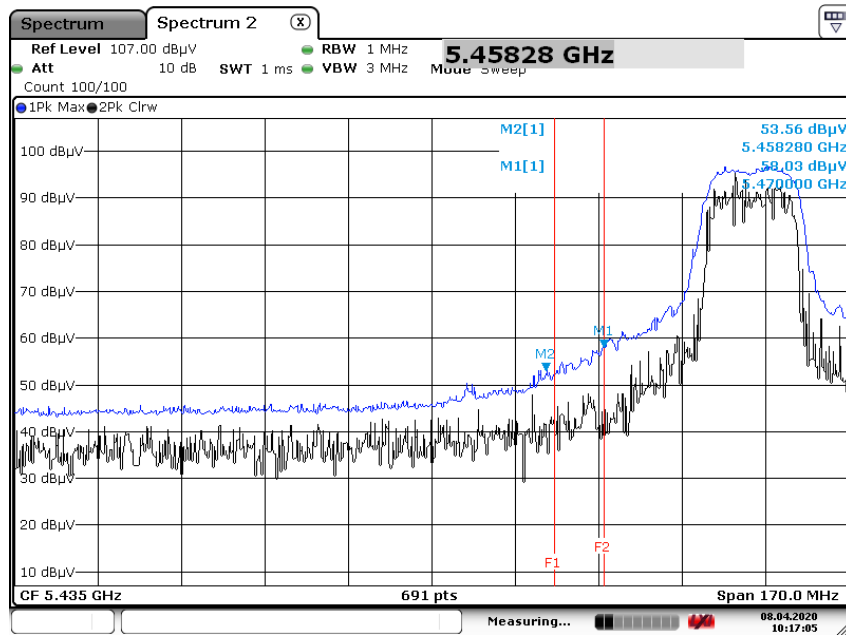
Date: 8.APR.2020 10:12:17

Average Reading (802.11 n(HT20)_MCS0, Ch.100, X-H)



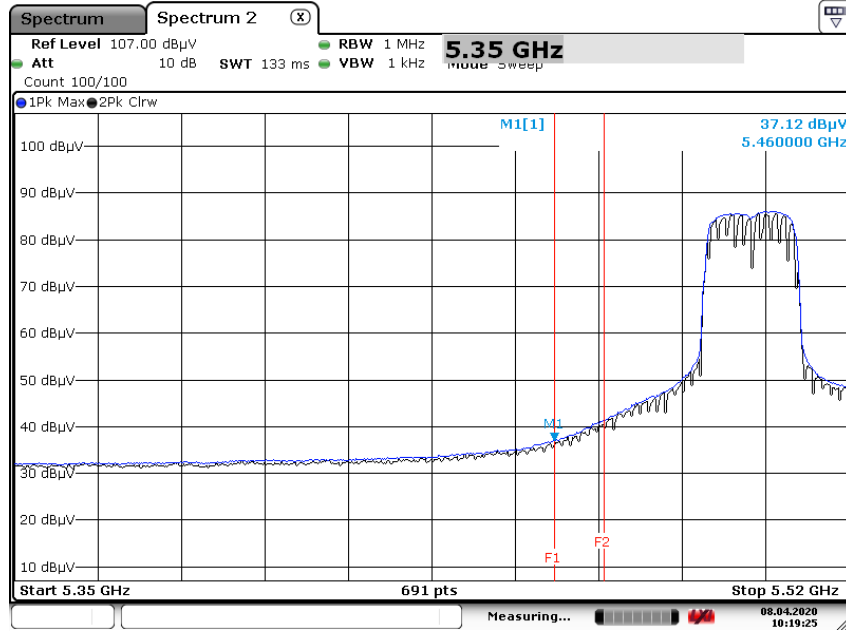
Date: 8.APR.2020 10:14:41

Peak Reading (802.11 n(HT20)_MCS0, Ch.100, X-H)



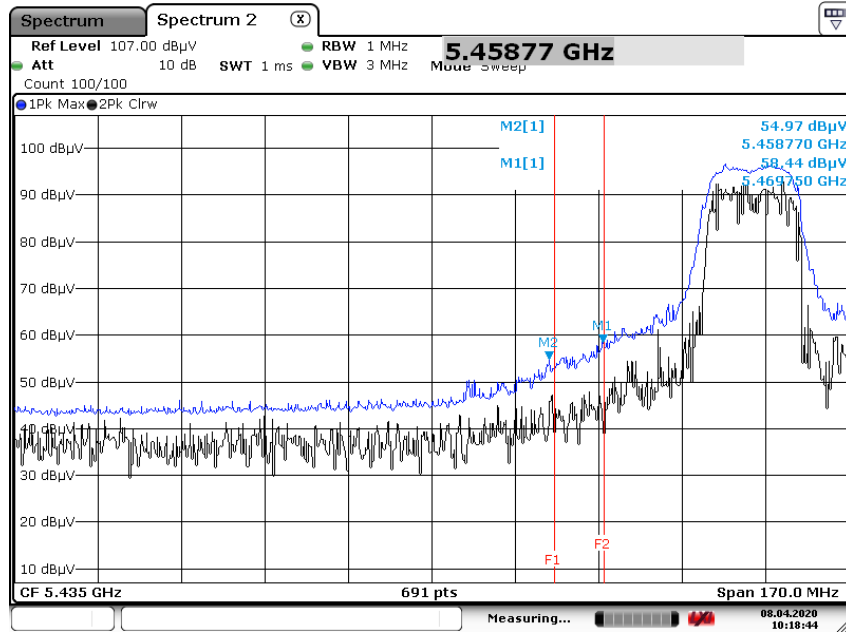
Date: 8.APR.2020 10:17:05

Average Reading (802.11 ac(VHT20)_MCS0, Ch.100, X-H)



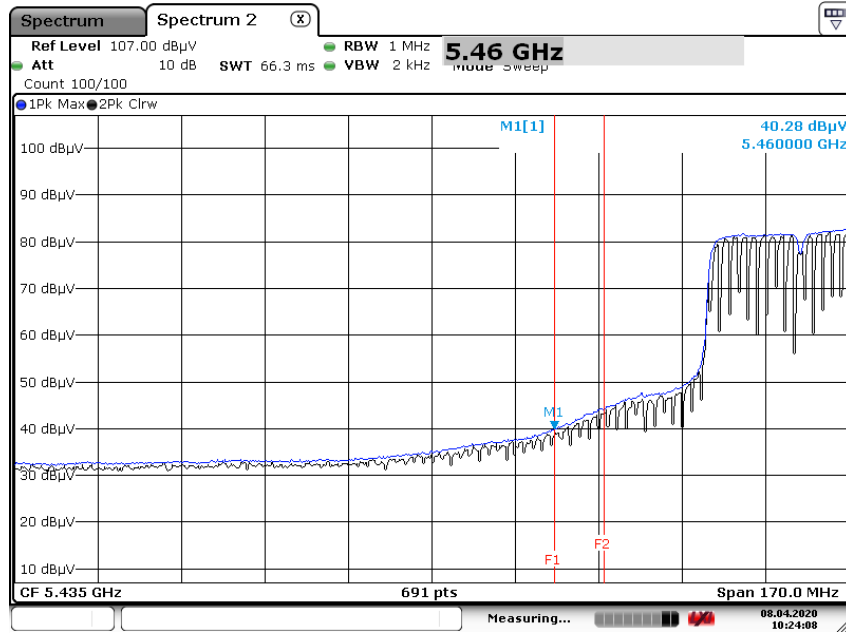
Date: 8.APR.2020 10:19:25

Peak Reading (802.11 ac(VHT20)_MCS0, Ch.100, X-H)



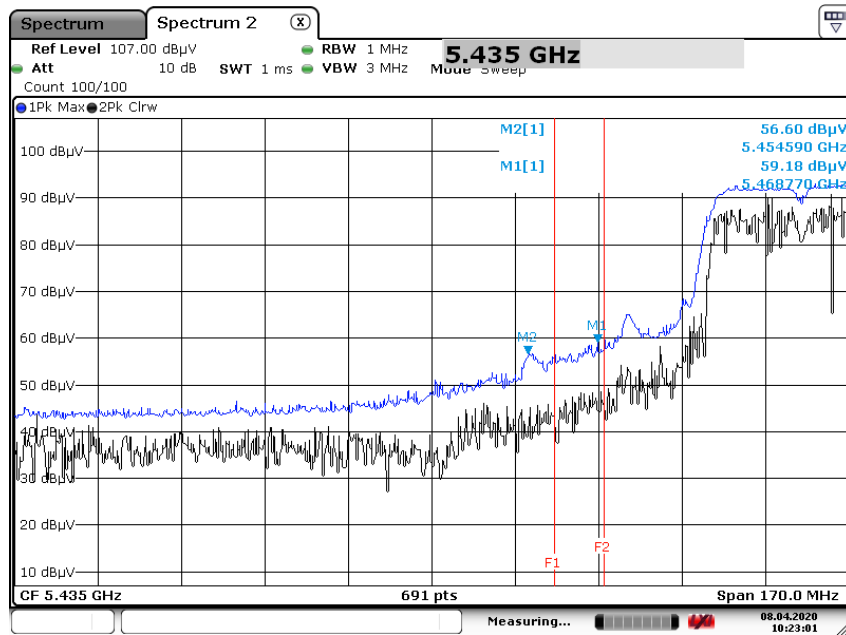
Date: 8.APR.2020 10:18:44

Average Reading (802.11 n(HT40)_MCS0, Ch.102, X-H)



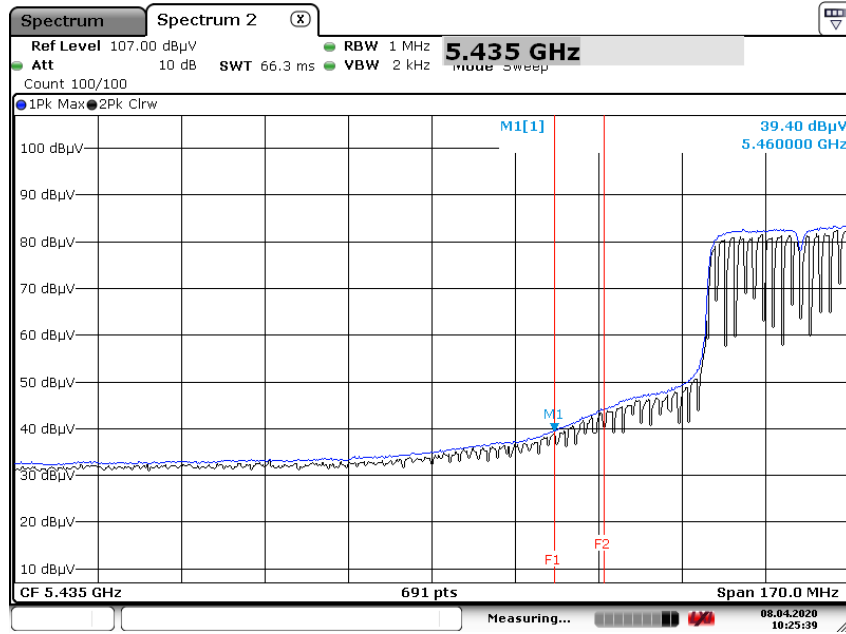
Date: 8. APR. 2020 10:24:08

Peak Reading (802.11 n(HT40)_MCS0, Ch.102, X-H)



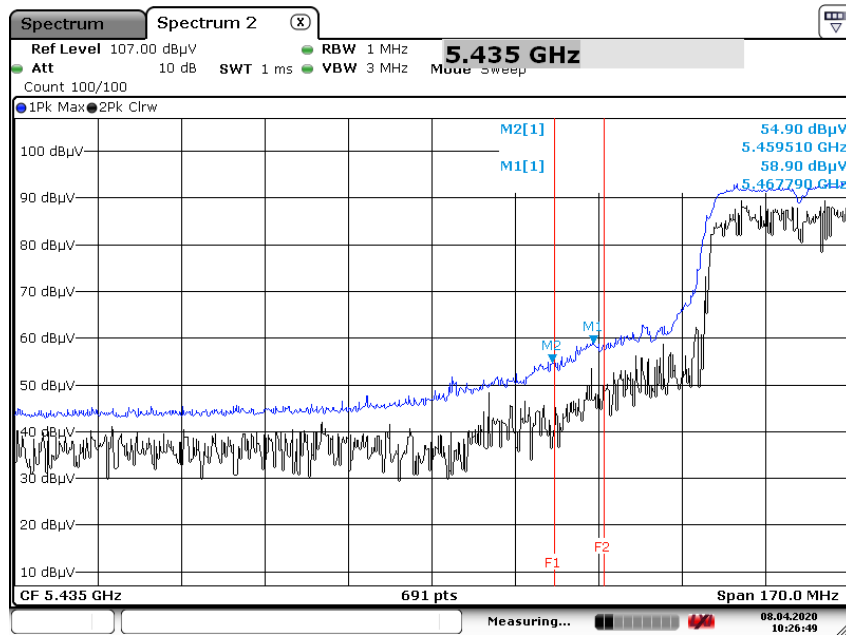
Date: 8. APR. 2020 10:23:01

Average Reading (802.11 ac(VHT40)_MCS0, Ch.102, X-H)



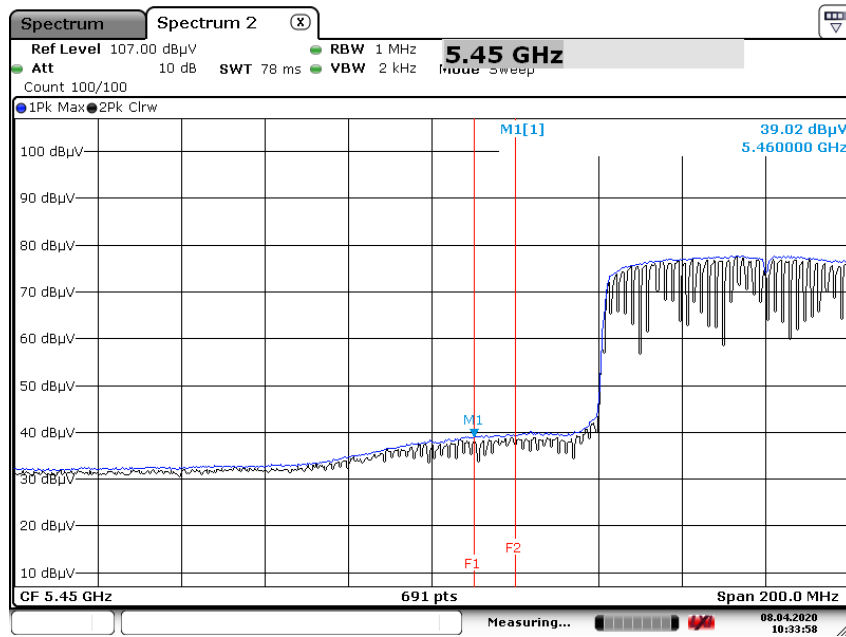
Date: 8.APR.2020 10:25:39

Peak Reading (802.11 ac(VHT40)_MCS0, Ch.102, X-H)



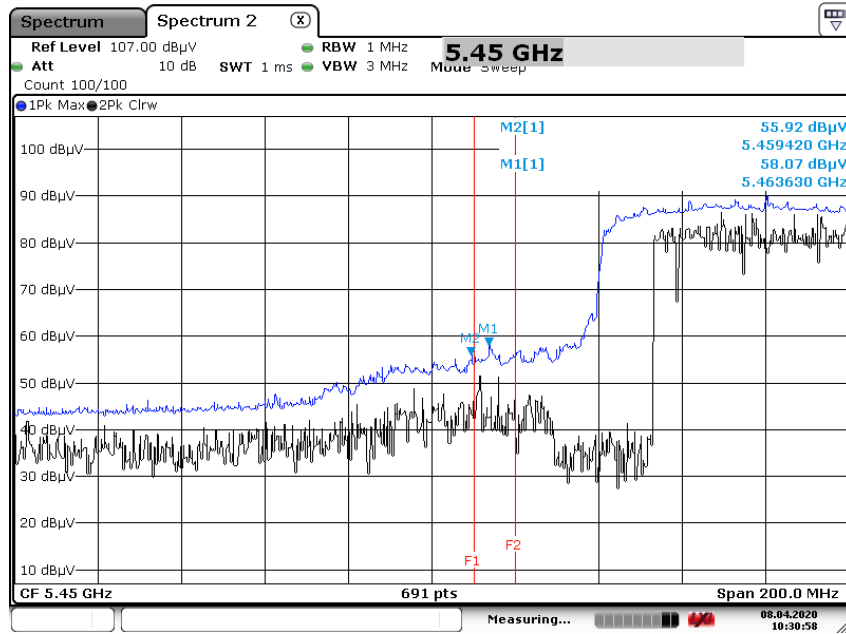
Date: 8.APR.2020 10:26:49

Average Reading (802.11 ac_VHT80_MCS0, Ch.106, X-H)



Date: 8.APR.2020 10:33:58

Peak Reading (802.11 ac_VHT80_MCS0, Ch.106, X-H)



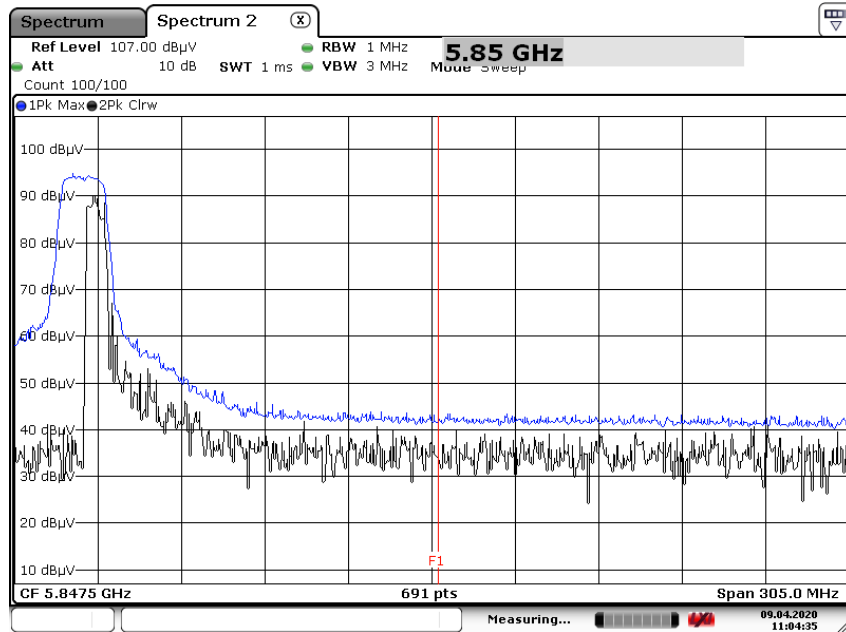
Date: 8.APR.2020 10:30:58

Note:

Only the worst case plots for Radiated Restricted Band Edge.

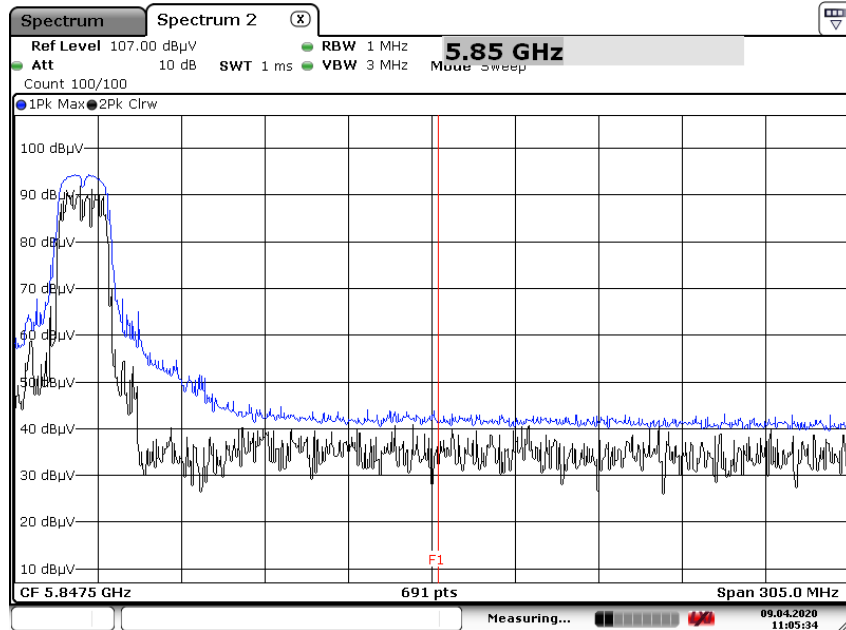
☑ Test Plots(Staraddle Channel)

Peak Reading (802.11a, Ch.144, X-H)



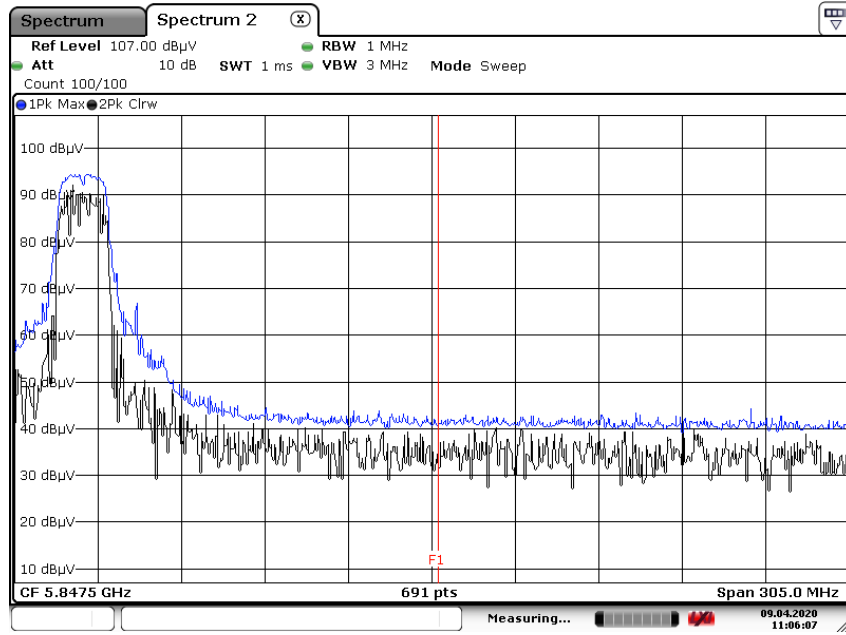
Date: 9. APR. 2020 11:04:35

Peak Reading (802.11n_HT20, Ch.144, X-H)



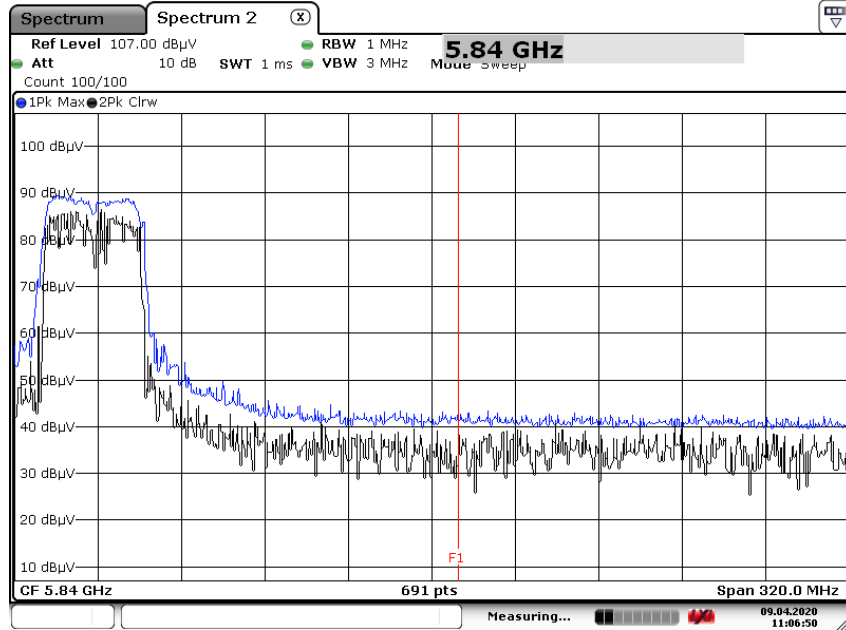
Date: 9. APR. 2020 11:05:35

Peak Reading (802.11ac_VHT20, Ch.144, X-H)



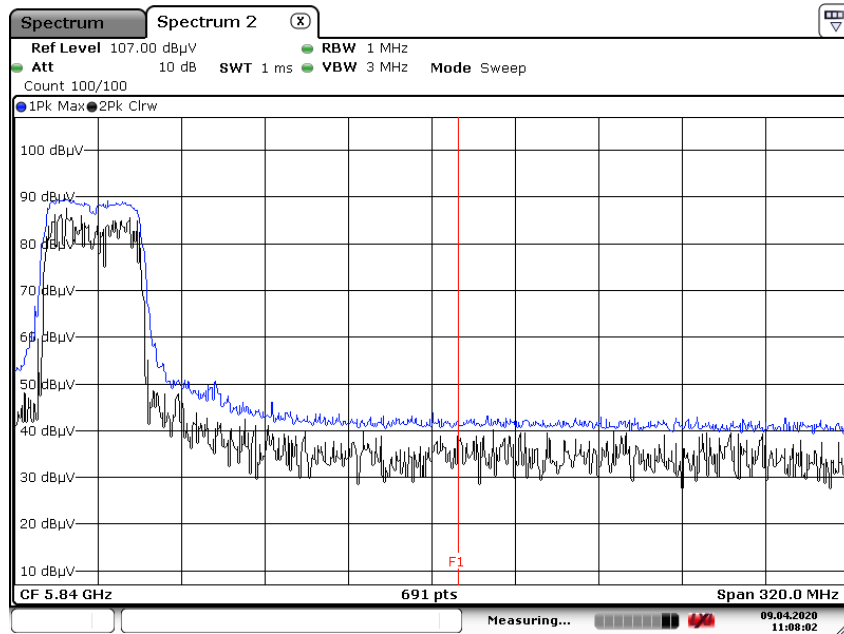
Date: 9.APR.2020 11:06:07

Peak Reading (802.11n_HT40, Ch.142, X-H)



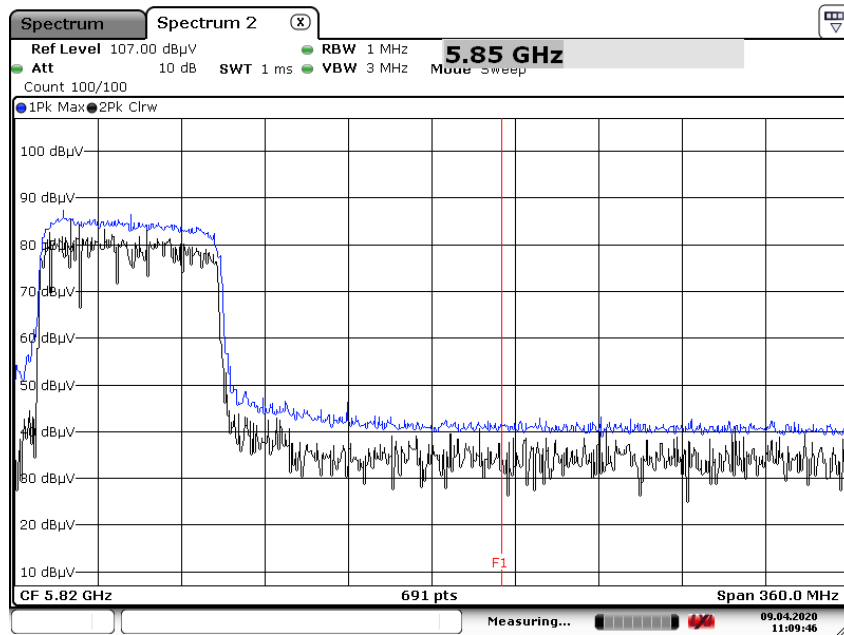
Date: 9.APR.2020 11:06:50

Peak Reading (802.11ac_VHT40, Ch.142, X-H)



Date: 9. APR. 2020 11:08:03

Peak Reading (802.11ac_VHT80, Ch.138, X-H)



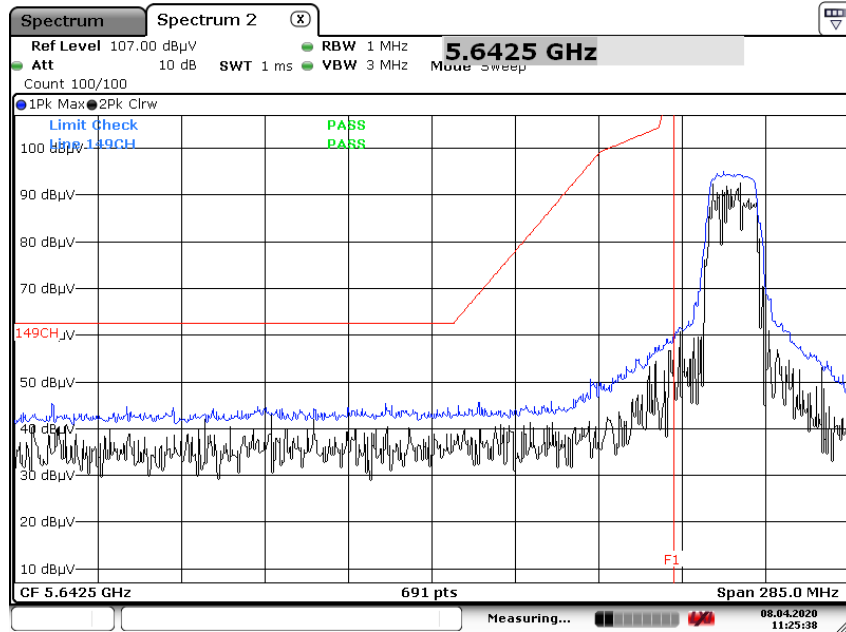
Date: 9. APR. 2020 11:09:46

Note :

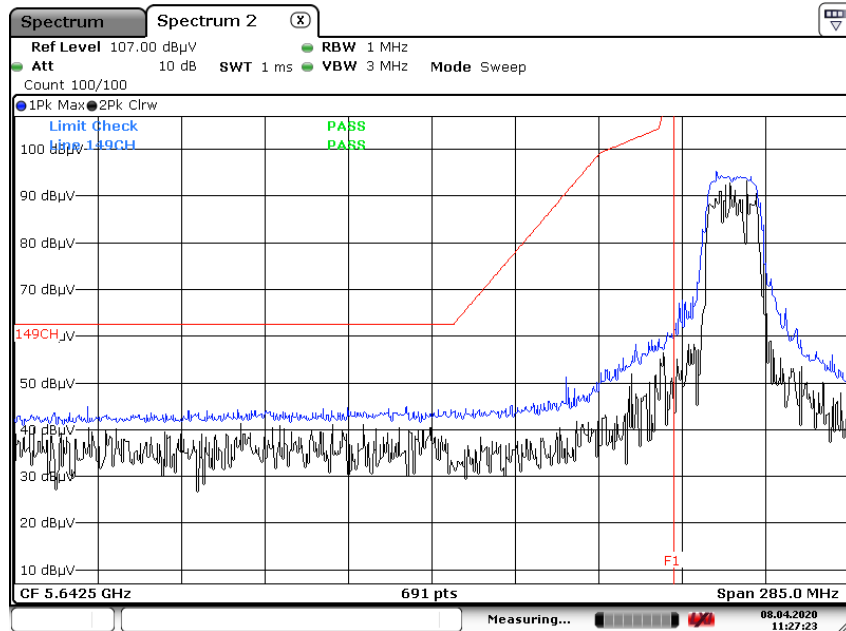
1. Only the worst case plots for Radiated Restricted Band Edge.
2. Red line : 5 850 MHz
3. Ambient Noise (Because of ambient noise, We attached only the worst plot without a data table)

☑ Test Plots(UNII 3)

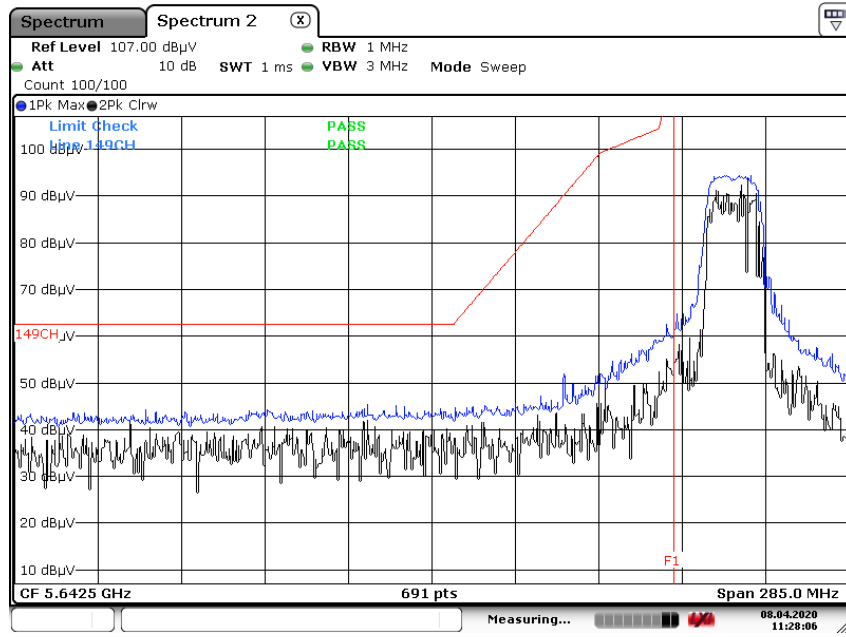
Peak Reading (802.11a, Ch.149, Z-H)



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

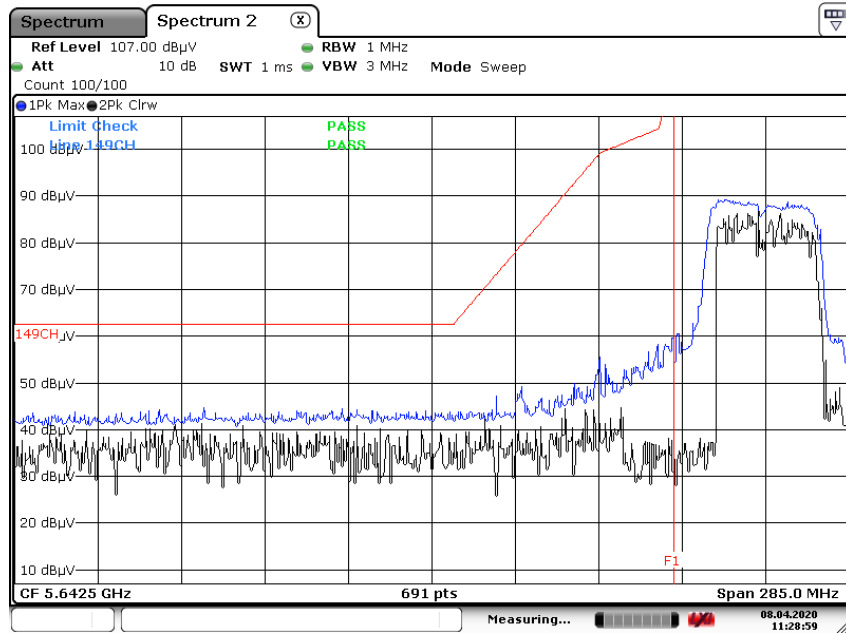


Peak Reading (802.11ac_VHT20, Ch.149, Z-H)



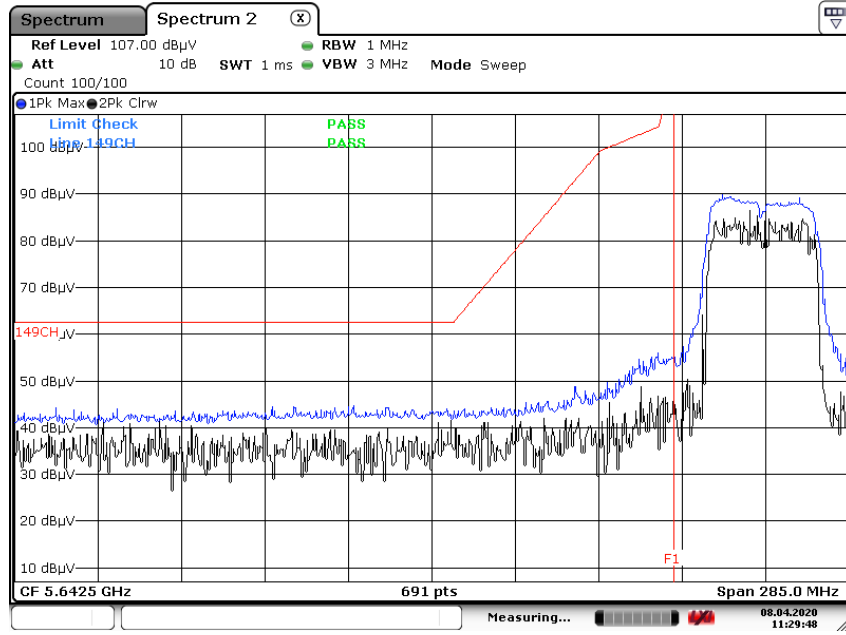
Date: 8.APR.2020 11:28:06

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



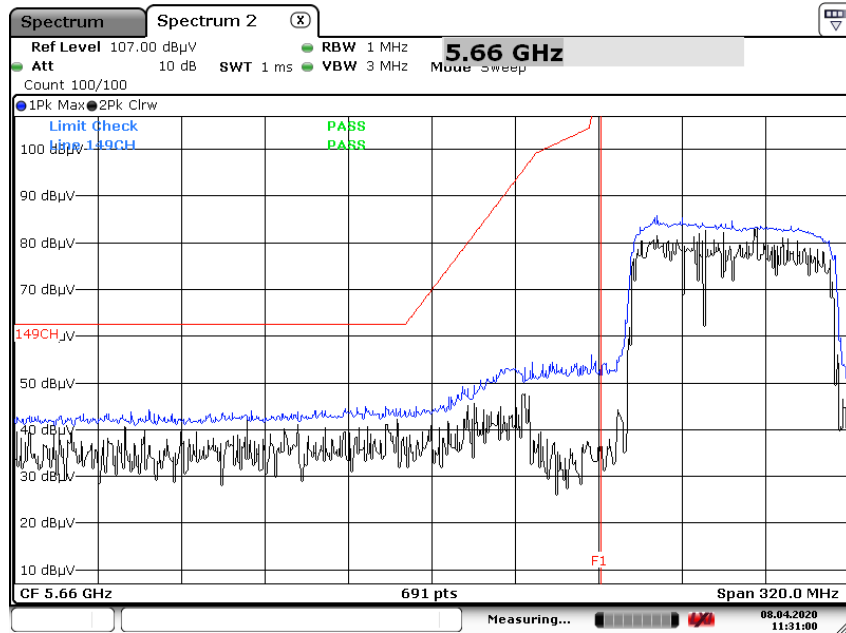
Date: 8.APR.2020 11:28:59

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



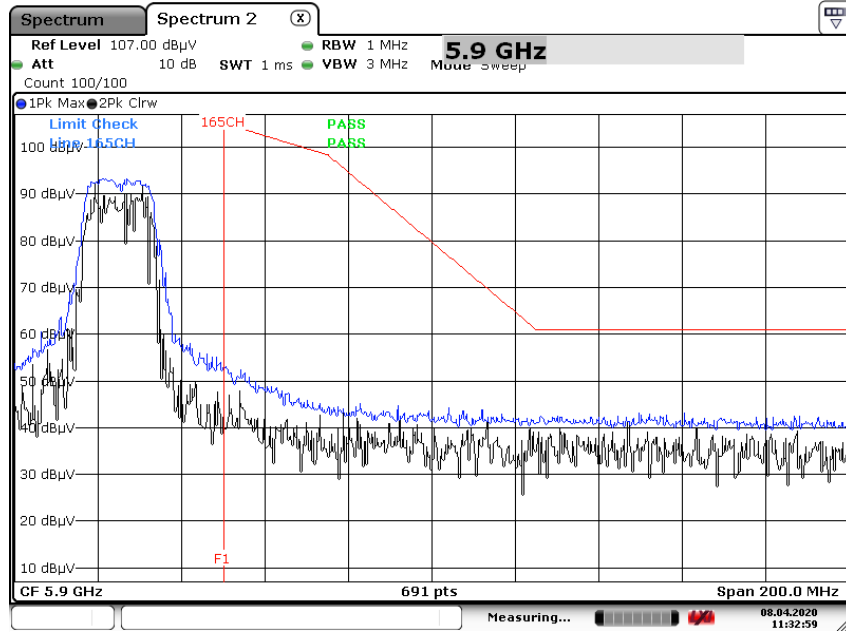
Date: 8.APR.2020 11:29:48

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



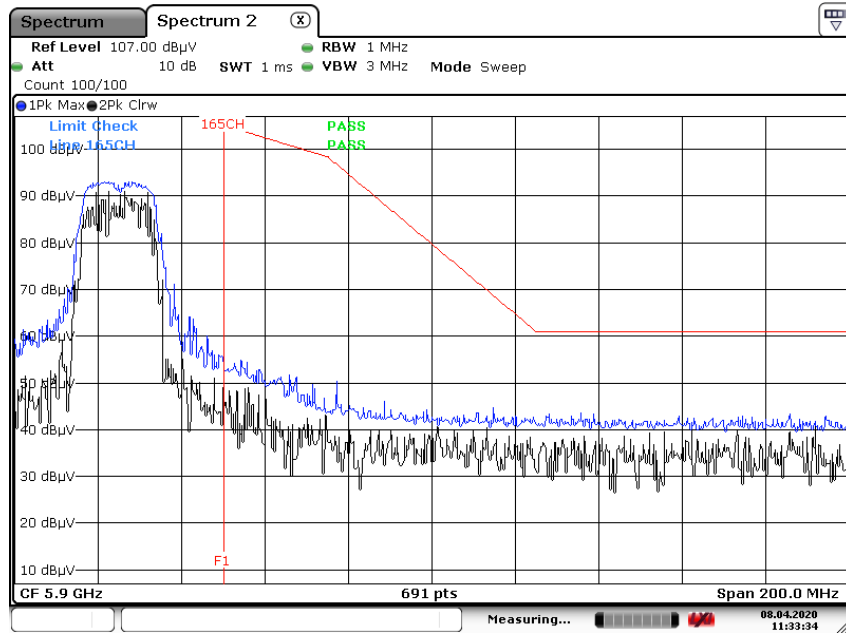
Date: 8.APR.2020 11:31:00

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



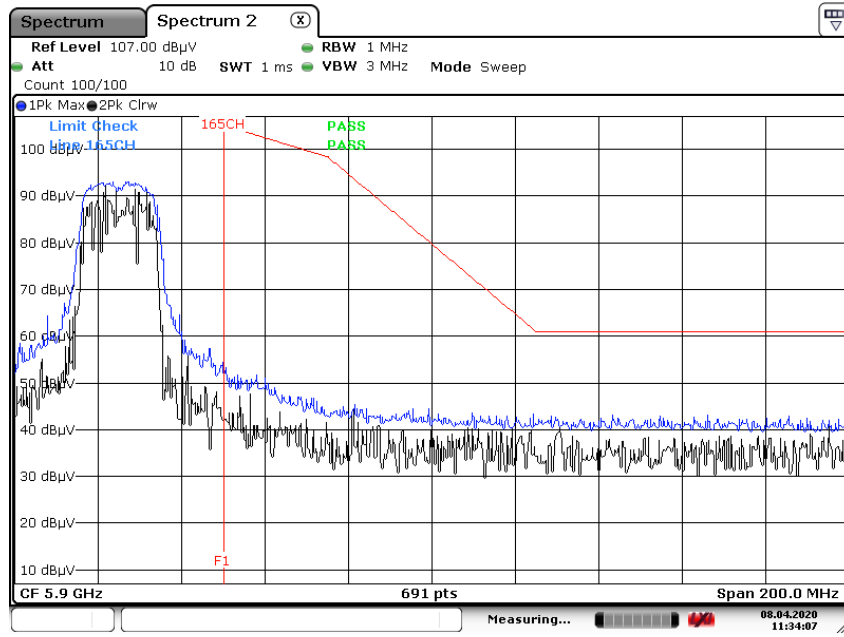
Date: 8. APR. 2020 11:32:59

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



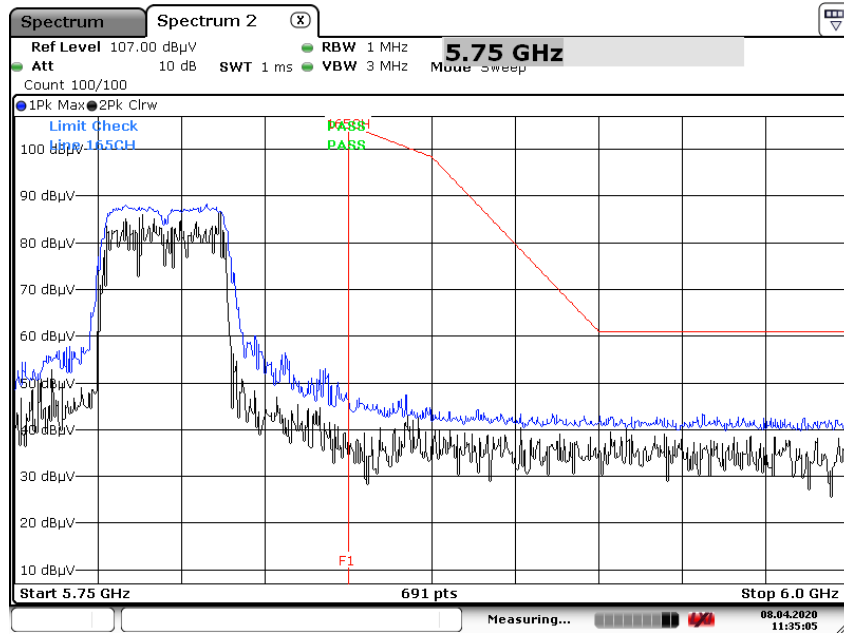
Date: 8. APR. 2020 11:33:35

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



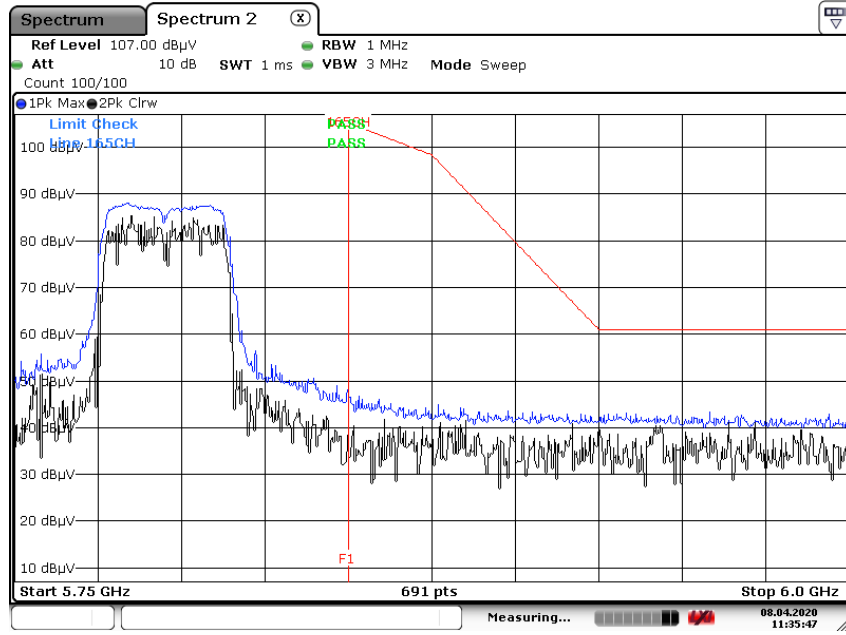
Date: 8. APR. 2020 11:34:07

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



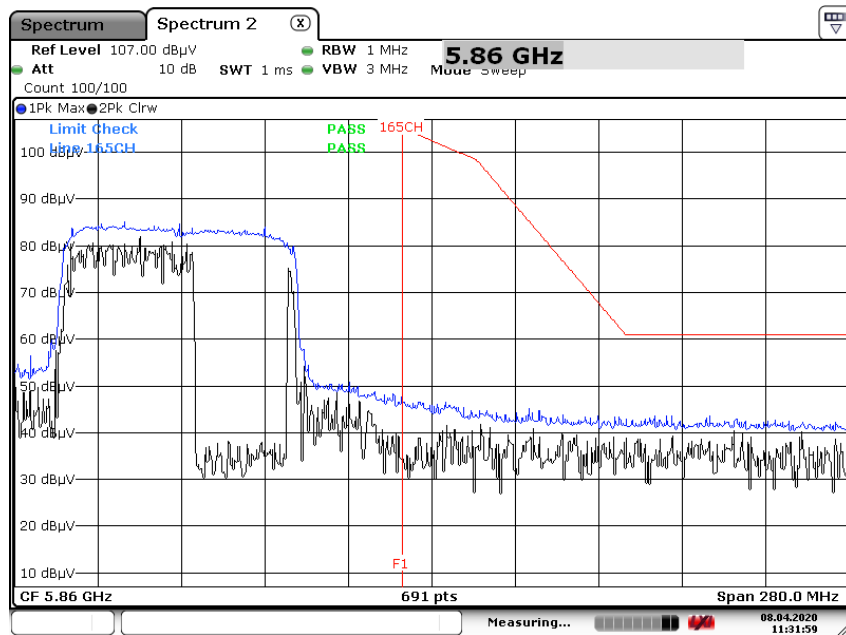
Date: 8. APR. 2020 11:35:06

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



Date: 8.APR.2020 11:35:48

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



Date: 8.APR.2020 11:31:59

10.10 POWERLINE CONDUCTED EMISSIONS
Conducted Emissions (Line 1)

Test

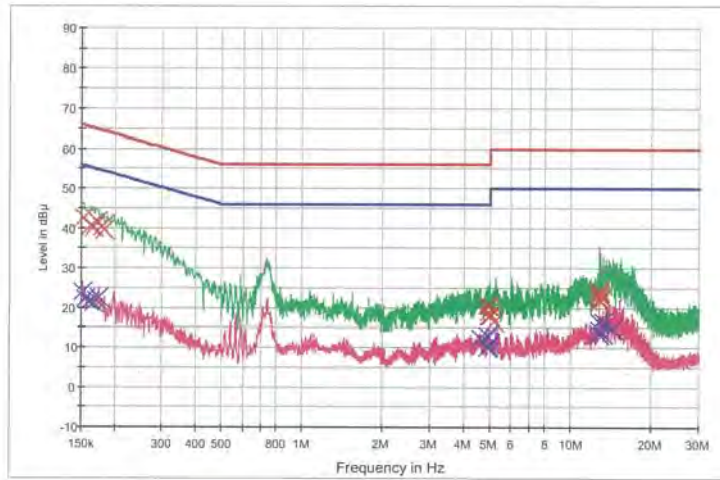
1 / 2

HCT TEST Report

Common Information

EUT: SM-A516B/DS
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: 5G WLAN MODE L1

FCC CLASS B_Exten Cable



— FCC CLASS B_QP — FCC CLASS B_AV — Preview Result 1-PK+
 — Preview Result 2-AVG × Final Result 1-QPK × Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154000	42.6	9.000	Off	L1	9.8	23.2	65.8
0.162000	40.4	9.000	Off	L1	9.8	25.0	65.4
0.166000	40.1	9.000	Off	L1	9.8	25.0	65.2
0.172000	41.4	9.000	Off	L1	9.8	23.5	64.9
0.178000	40.3	9.000	Off	L1	9.8	24.3	64.6
0.182000	39.5	9.000	Off	L1	9.8	24.9	64.4
4.890000	20.5	9.000	Off	L1	10.0	35.5	56.0
4.932000	18.8	9.000	Off	L1	10.0	37.2	56.0
4.936000	20.5	9.000	Off	L1	10.0	35.5	56.0
4.950000	17.8	9.000	Off	L1	10.0	38.2	56.0
5.034000	17.8	9.000	Off	L1	10.0	42.2	60.0
5.166000	16.4	9.000	Off	L1	10.0	43.6	60.0
12.756000	24.0	9.000	Off	L1	10.3	36.0	60.0
12.796000	21.9	9.000	Off	L1	10.3	38.1	60.0
12.800000	22.1	9.000	Off	L1	10.3	37.9	60.0
12.804000	23.3	9.000	Off	L1	10.3	36.7	60.0
12.808000	24.4	9.000	Off	L1	10.3	35.6	60.0
12.852000	22.0	9.000	Off	L1	10.3	38.0	60.0

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오전 9:07:08

Test

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Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	24.0	9.000	Off	L1	9.8	31.9	55.9
0.156000	22.3	9.000	Off	L1	9.8	33.4	55.7
0.160000	21.4	9.000	Off	L1	9.8	34.1	55.5
0.166000	21.3	9.000	Off	L1	9.8	33.9	55.2
0.170000	22.0	9.000	Off	L1	9.8	33.0	55.0
0.174000	22.7	9.000	Off	L1	9.8	32.1	54.8
4.596000	12.4	9.000	Off	L1	10.0	33.6	46.0
4.890000	13.1	9.000	Off	L1	10.0	32.9	46.0
4.906000	10.0	9.000	Off	L1	10.0	36.0	46.0
4.936000	12.6	9.000	Off	L1	10.0	33.4	46.0
4.950000	10.3	9.000	Off	L1	10.0	35.7	46.0
5.032000	10.9	9.000	Off	L1	10.0	39.1	50.0
12.798000	13.3	9.000	Off	L1	10.3	36.7	50.0
12.802000	14.4	9.000	Off	L1	10.3	35.6	50.0
12.808000	16.3	9.000	Off	L1	10.3	33.7	50.0
13.230000	16.5	9.000	Off	L1	10.3	33.5	50.0
13.236000	13.4	9.000	Off	L1	10.3	36.6	50.0
14.292000	14.9	9.000	Off	L1	10.3	35.1	50.0

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Conducted Emissions (Line 2)

Test

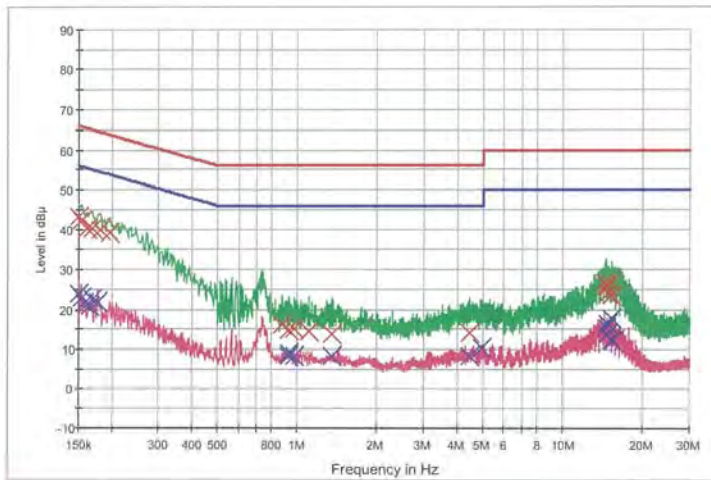
1/2

HCT TEST Report

Common Information

EUT: SM-A516B/DS
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: 5G WLAN MODE N

FCC CLASS B_Exten Cable



— FCC CLASS B_QP —×— FCC CLASS B_AV —×— Preview Result 1-PK+
 —×— Preview Result 2-AVG —×— Final Result 1-QPK —×— Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	43.2	9.000	Off	N	9.8	22.8	66.0
0.154000	42.1	9.000	Off	N	9.8	23.7	65.8
0.160000	40.2	9.000	Off	N	9.8	25.2	65.5
0.168000	40.2	9.000	Off	N	9.8	24.9	65.1
0.180000	39.7	9.000	Off	N	9.8	24.8	64.5
0.196000	39.2	9.000	Off	N	9.8	24.6	63.8
0.882000	16.2	9.000	Off	N	9.8	39.8	56.0
0.934000	14.6	9.000	Off	N	9.8	41.4	56.0
0.974000	15.0	9.000	Off	N	9.8	41.0	56.0
1.110000	14.5	9.000	Off	N	9.8	41.5	56.0
1.348000	13.9	9.000	Off	N	9.8	42.1	56.0
4.482000	14.1	9.000	Off	N	10.0	41.9	56.0
14.396000	26.5	9.000	Off	N	10.4	33.5	60.0
14.444000	25.8	9.000	Off	N	10.4	34.2	60.0
14.764000	25.7	9.000	Off	N	10.4	34.3	60.0
14.778000	24.0	9.000	Off	N	10.4	36.0	60.0
15.152000	26.6	9.000	Off	N	10.5	33.4	60.0
15.186000	23.6	9.000	Off	N	10.5	36.4	60.0

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Test

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Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	23.8	9.000	Off	N	9.8	32.2	56.0
0.154000	23.0	9.000	Off	N	9.8	32.8	55.8
0.158000	21.6	9.000	Off	N	9.8	34.0	55.6
0.164000	20.7	9.000	Off	N	9.8	34.5	55.3
0.168000	22.6	9.000	Off	N	9.8	32.5	55.1
0.176000	22.0	9.000	Off	N	9.8	32.7	54.7
0.926000	9.1	9.000	Off	N	9.8	36.9	46.0
0.934000	8.4	9.000	Off	N	9.8	37.6	46.0
0.974000	8.3	9.000	Off	N	9.8	37.7	46.0
1.348000	8.2	9.000	Off	N	9.8	37.8	46.0
4.482000	8.3	9.000	Off	N	10.0	37.7	46.0
4.940000	10.4	9.000	Off	N	10.0	35.6	46.0
14.444000	15.3	9.000	Off	N	10.4	34.7	50.0
14.764000	16.4	9.000	Off	N	10.4	33.6	50.0
14.778000	13.6	9.000	Off	N	10.4	36.4	50.0
15.178000	17.6	9.000	Off	N	10.5	32.4	50.0
15.186000	12.5	9.000	Off	N	10.5	37.5	50.0
15.316000	12.2	9.000	Off	N	10.5	37.8	50.0

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11. LIST OF TEST EQUIPMENT

Conducted Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	09/11/2019	Annual	102245
Rohde & Schwarz	ESCI / Test Receiver	06/18/2019	Annual	100033
ESPAC	SU-642 /Temperature Chamber	03/18/2020	Annual	0093008124
Agilent	N9030A / Signal Analyzer	01/13/2020	Annual	MY49431210
Rohde & Schwarz	OSP 120 / Power Measurement Set	07/24/2019	Annual	101231
Agilent	N1911A / Power Meter	09/10/2019	Annual	MY45101406
Agilent	N1921A / Power Sensor	09/06/2019	Annual	MY55220026
Agilent	87300B / Directional Coupler	11/11/2019	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	05/24/2019	Annual	05001
Hewlett Packard	E3632A / DC Power Supply	06/18/2019	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	07/02/2019	Annual	07560
Rohde & Schwarz	EMC32 / Software	N/A	N/A	N/A
HCT CO., LTD.	FCC WLAN&BT&BLE Conducted Test Software v3.0	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

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	060520
Audix	Turn Table	N/A	N/A	N/A
Schwarzbeck	Loop Antenna	03/19/2020	Biennial	1531-333
Schwarzbeck	VULB 9168 / Hybrid Antenna	03/22/2019	Biennial	760
Schwarzbeck	VULB 9160 / TRILOG Antenna	08/09/2018	Biennial	9160-3368
Schwarzbeck	BBHA 9120D / Horn Antenna	04/29/2019	Biennial	9120D-937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	11/29/2019	Biennial	BBHA9170541
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	07/31/2019	Annual	102168
Agilent	N9030A / Signal Analyzer	01/13/2020	Annual	MY49431210
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	06/19/2019	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	02/10/2020	Annual	1
Api tech.	18B-03 / Attenuator (3 dB)	03/02/2020	Annual	1
Agilent	8493C-10 / Attenuator(10 dB)	03/02/2020	Annual	08285
CERNEX	CBLU1183540 / Power Amplifier	03/02/2020	Annual	22964
CERNEX	CBL06185030 / Power Amplifier	03/02/2020	Annual	22965
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	03/02/2020	Annual	8
Wainwright Instruments	WHKX7.0/18G-8SS / High Pass Filter	03/02/2020	Annual	25
CERNEX	CBL18265035 / Power Amplifier	12/26/2019	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	06/18/2019	Annual	25956

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-2004-FC025-P