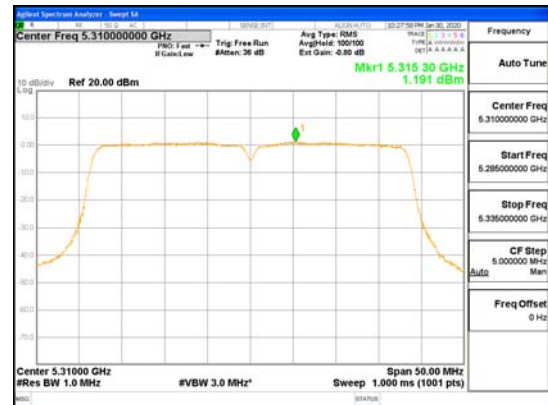
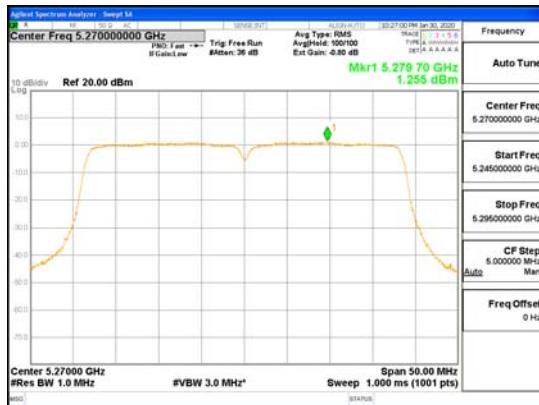
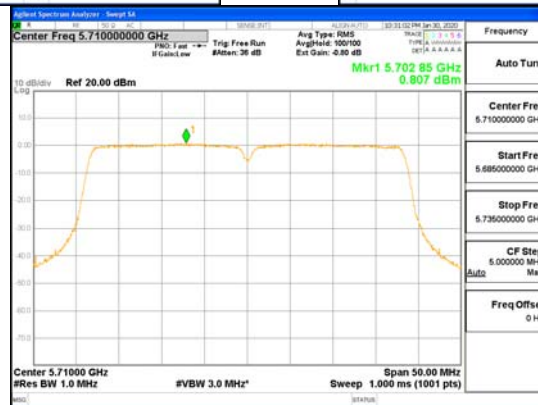
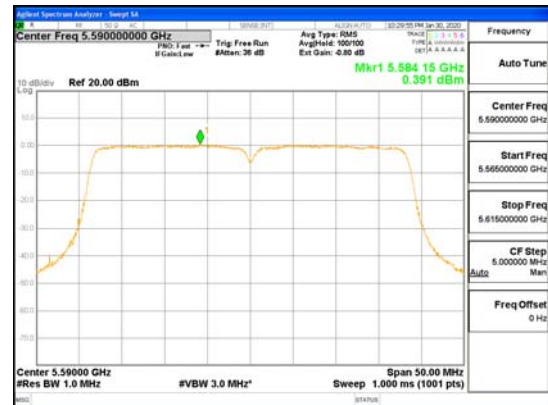
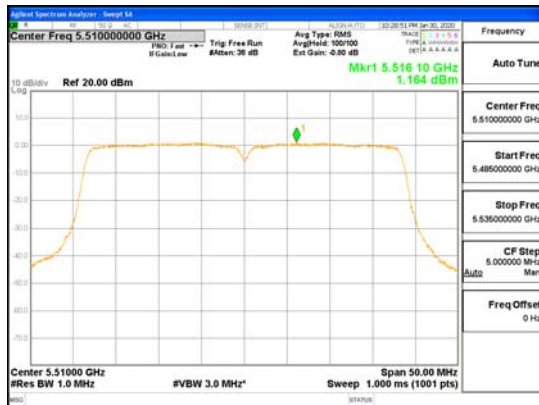
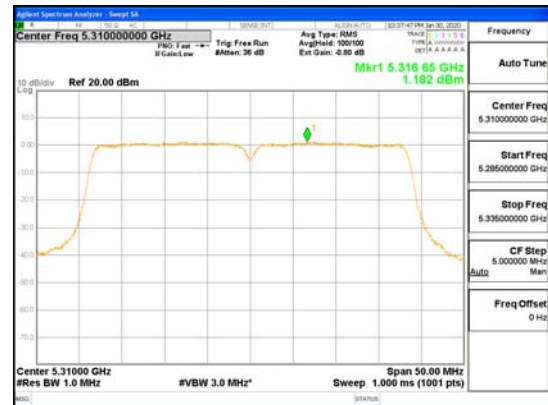
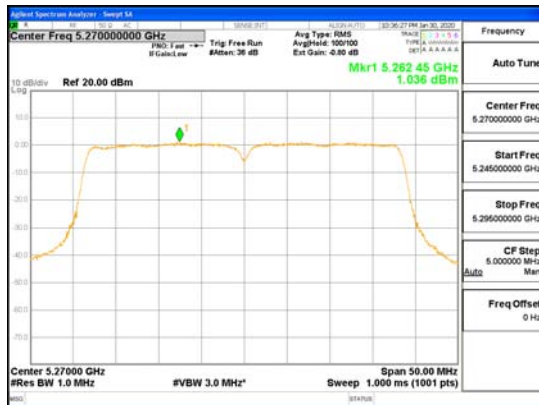




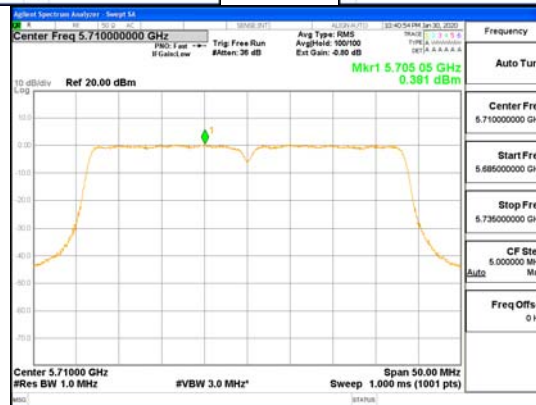
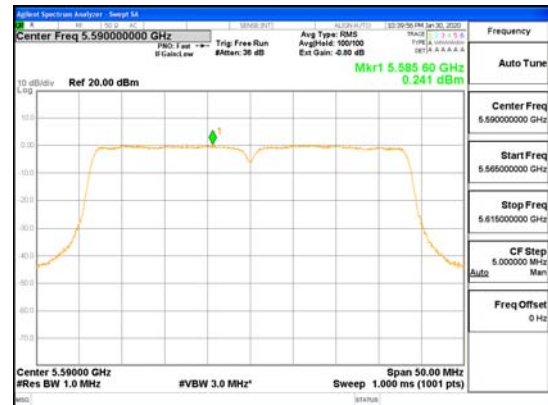
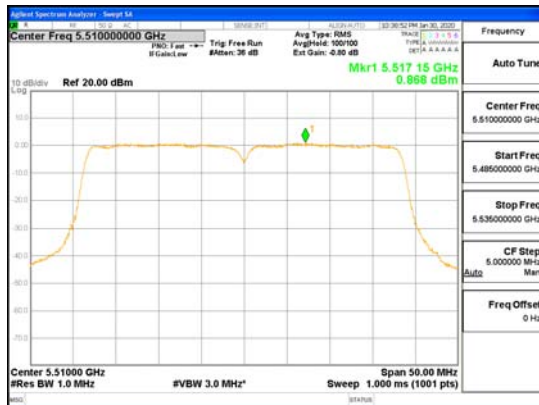
CDD Mode_ANT3_802.11n_HT40_UNII 2A



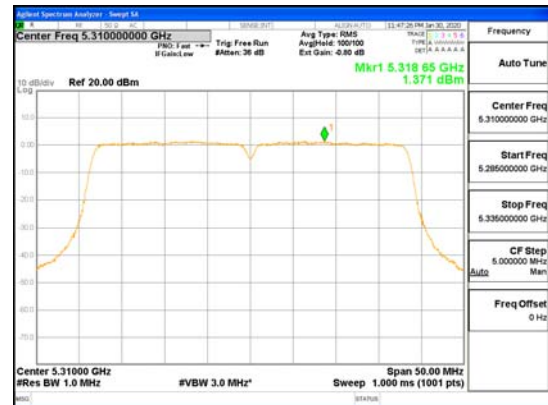
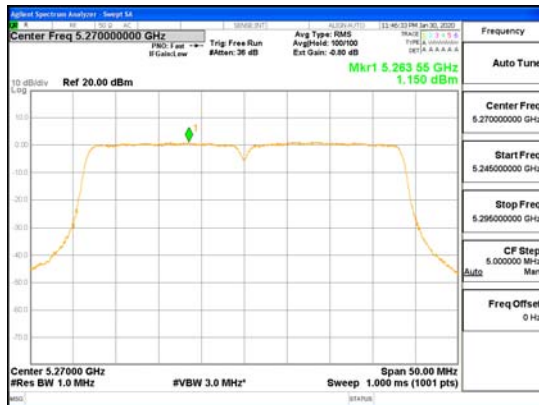
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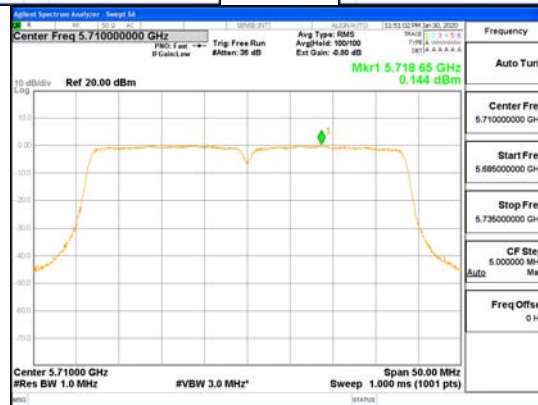
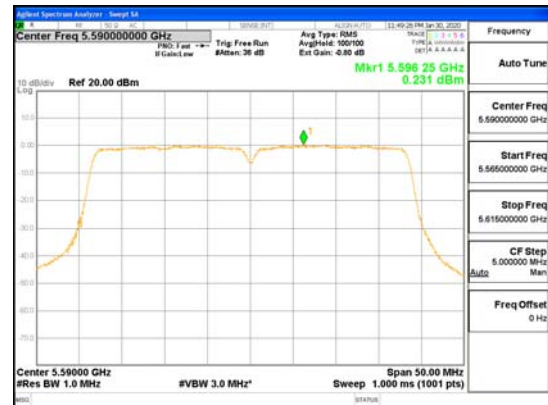
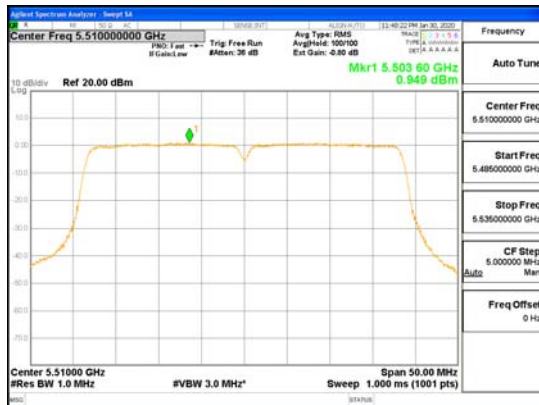
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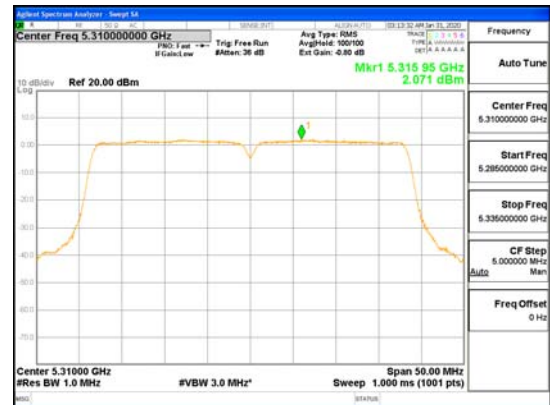
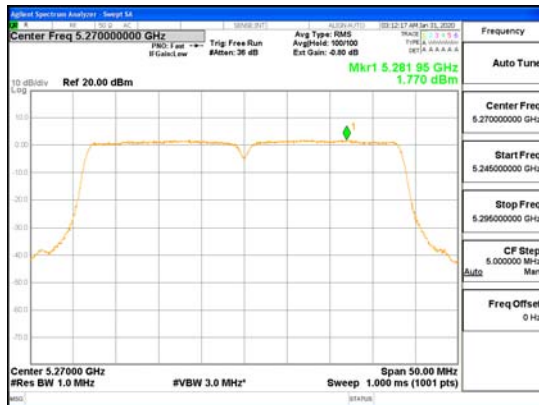
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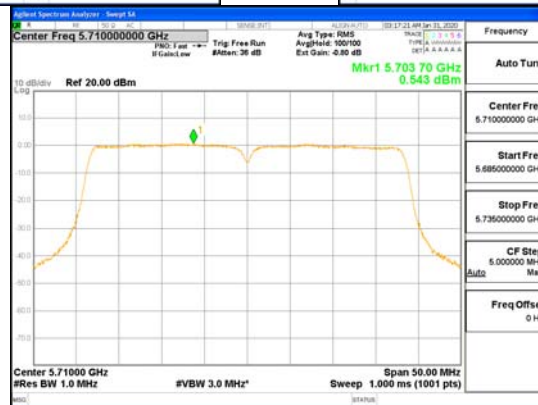
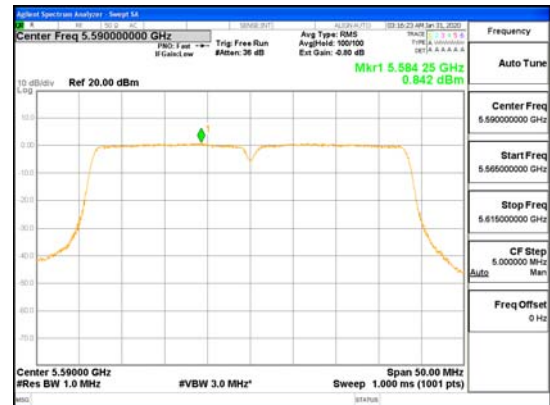
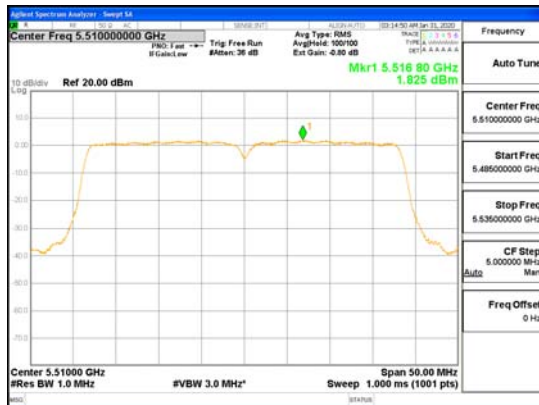
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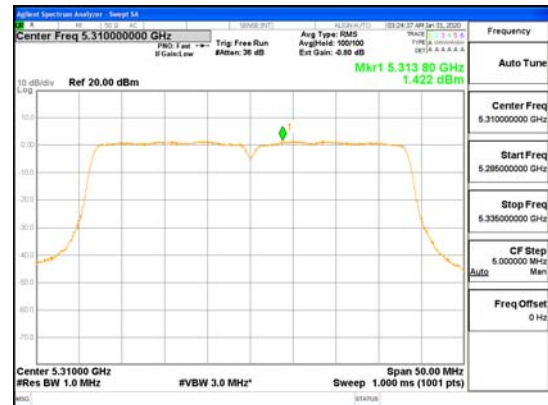
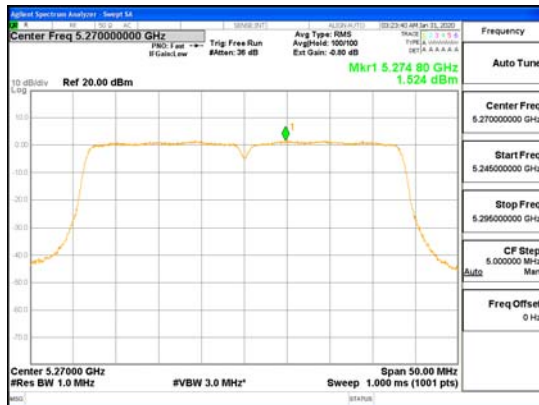
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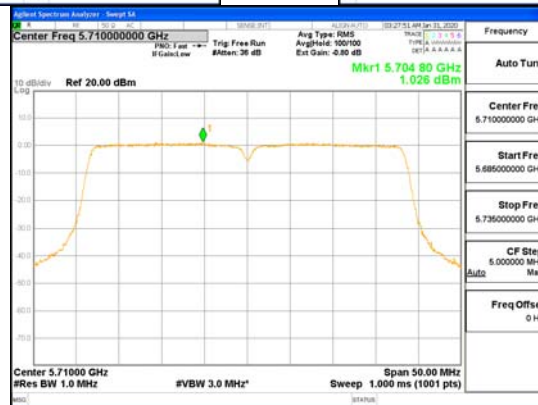
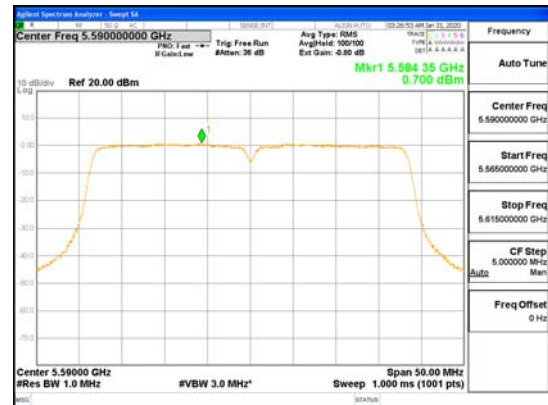
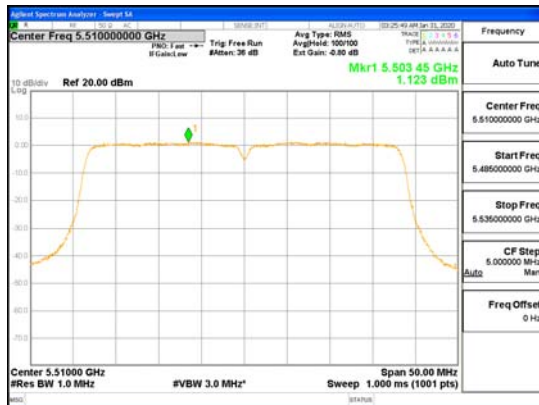
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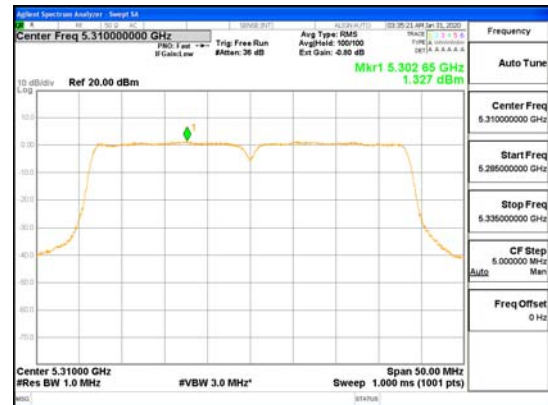
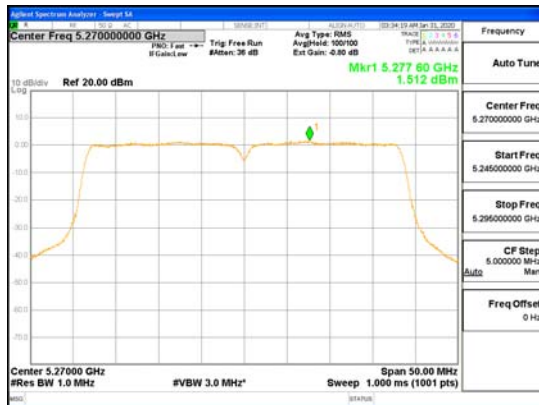
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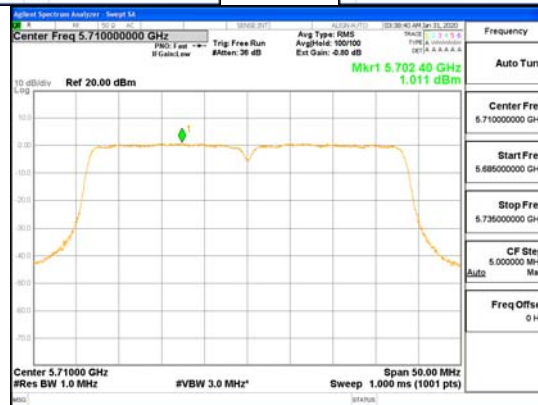
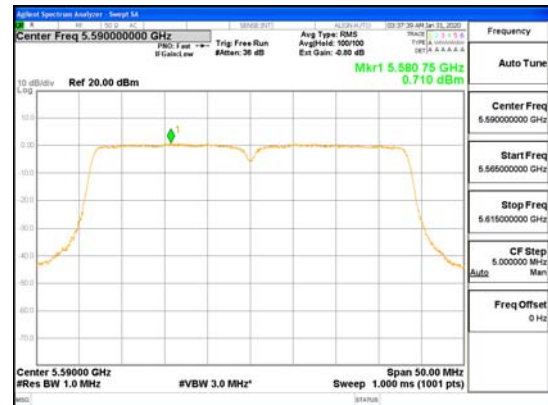
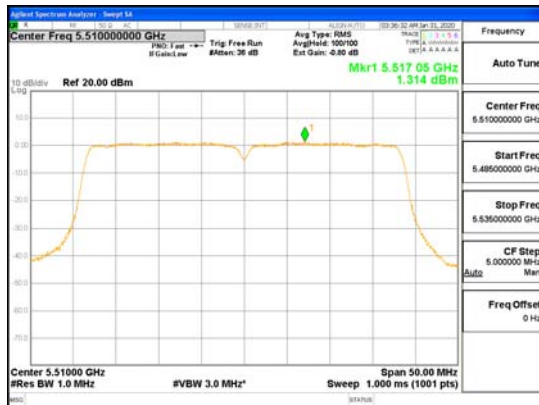
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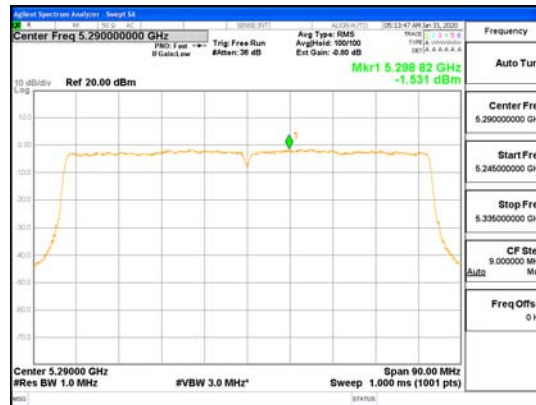
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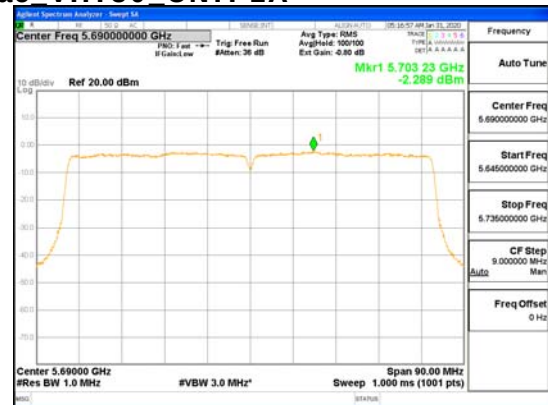
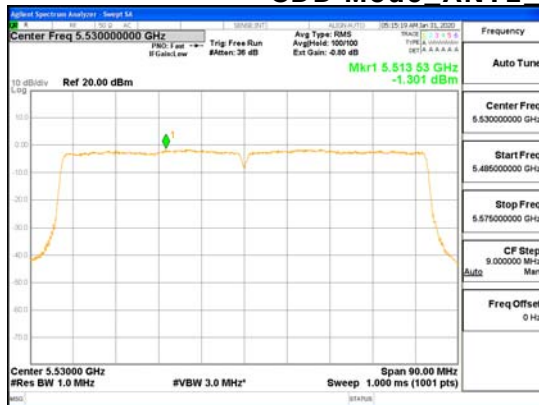
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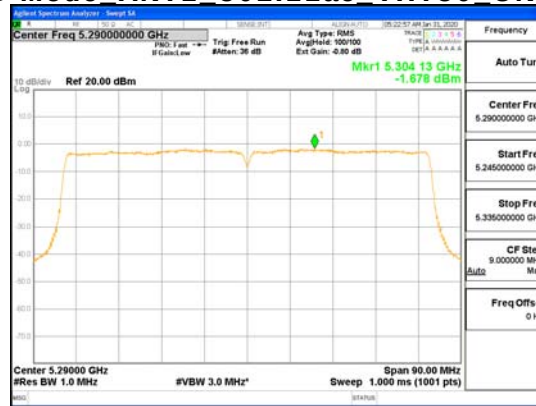
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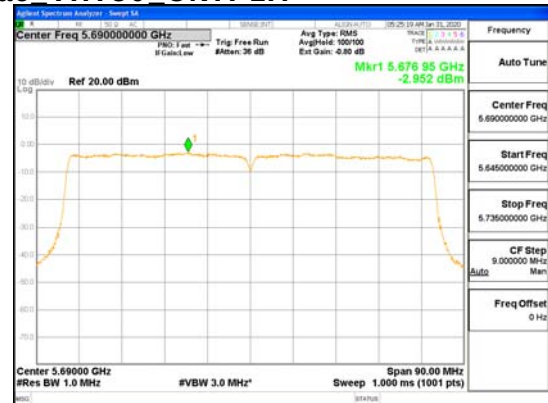
CDD Mode ANT1 802.11ac VHT80 UNII 2A



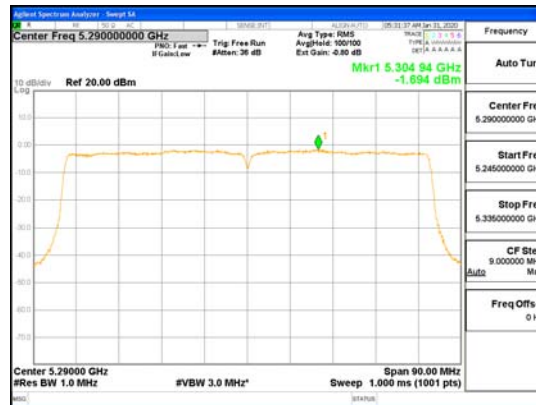
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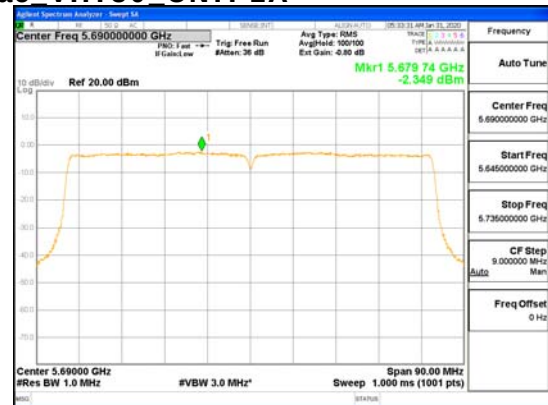
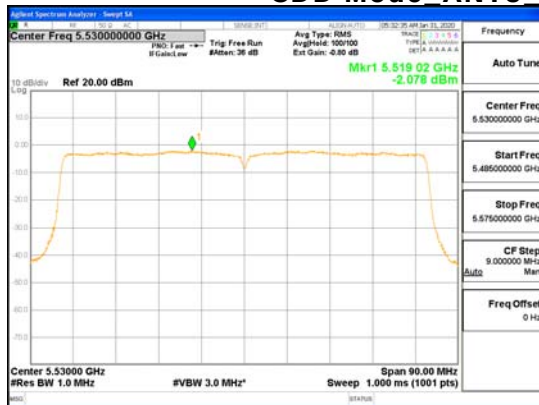
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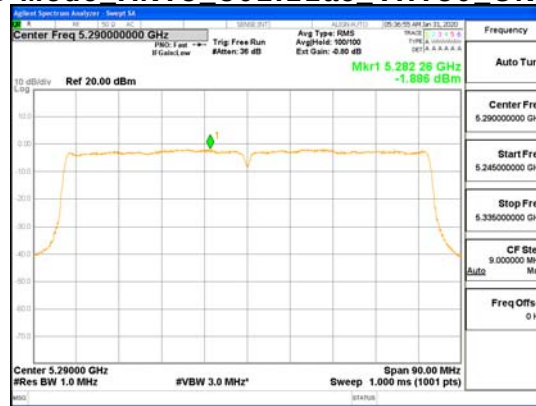
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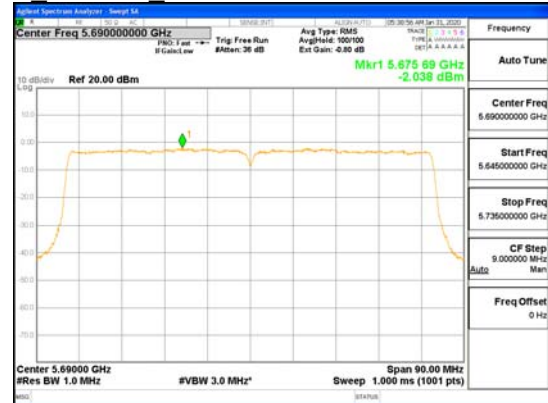
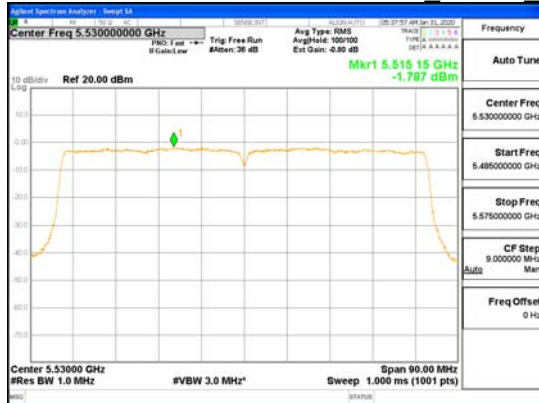
CDD Mode ANT3 802.11ac VHT80 UNII 2A



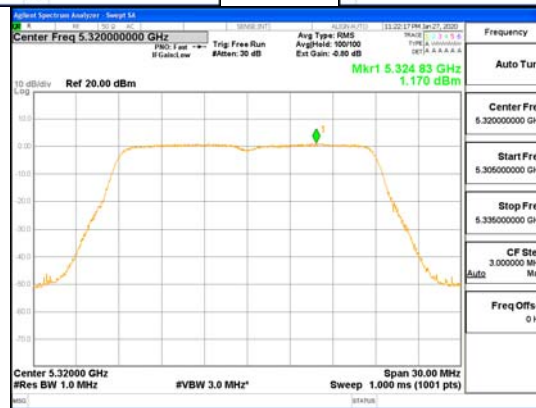
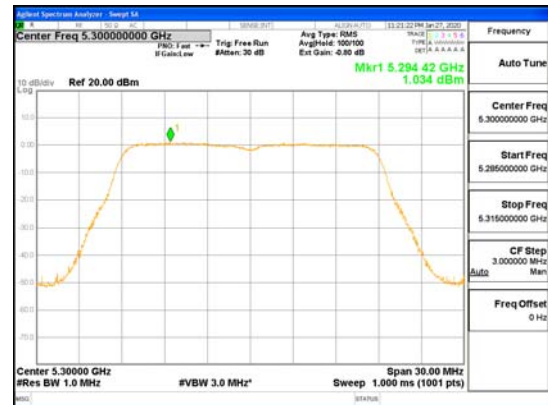
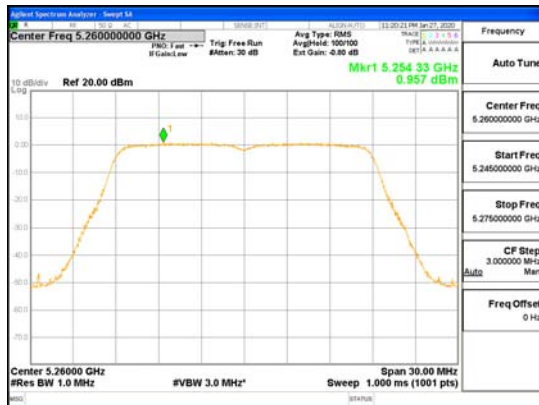
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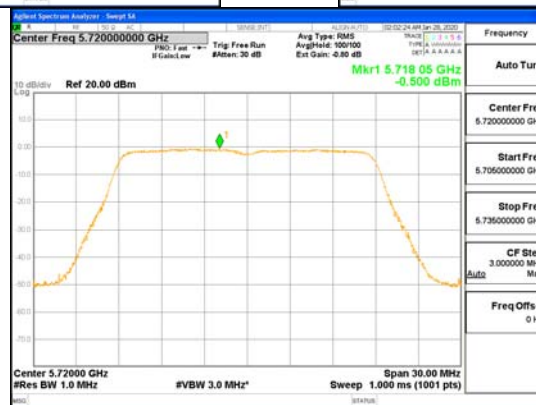
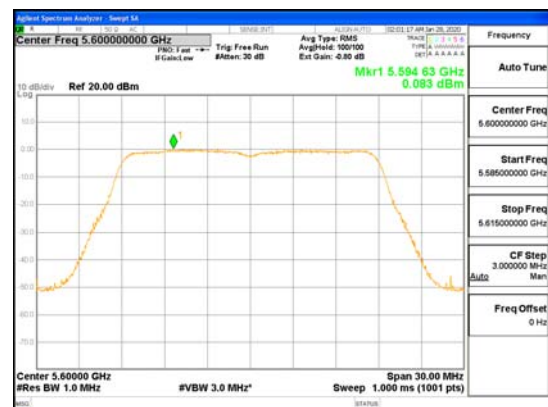
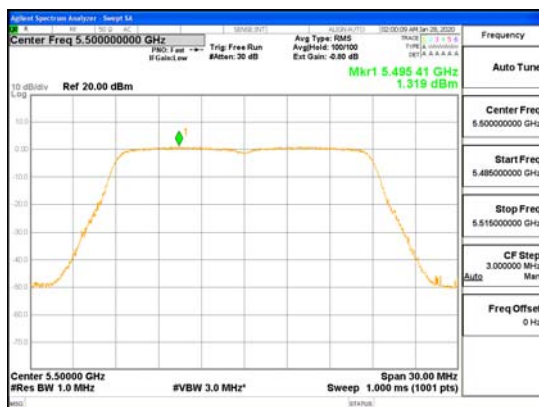
CDD Mode ANT4 802.11ac VHT80 UNII 2A



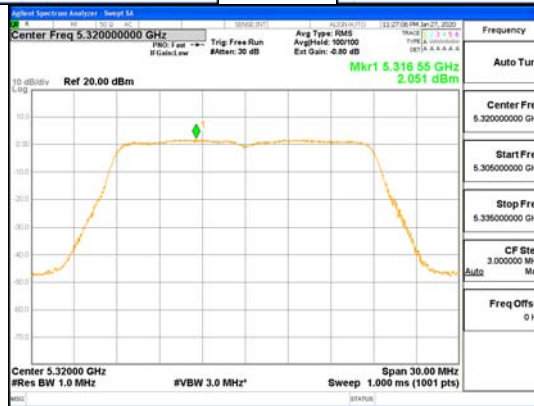
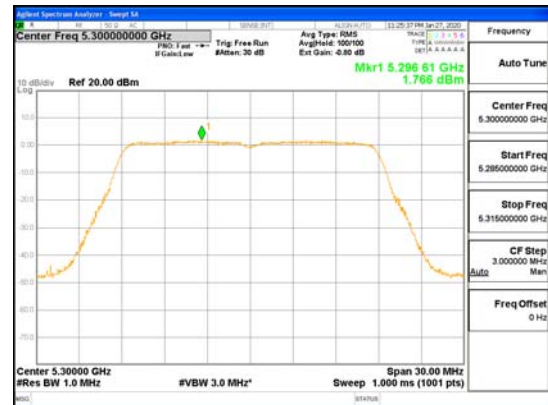
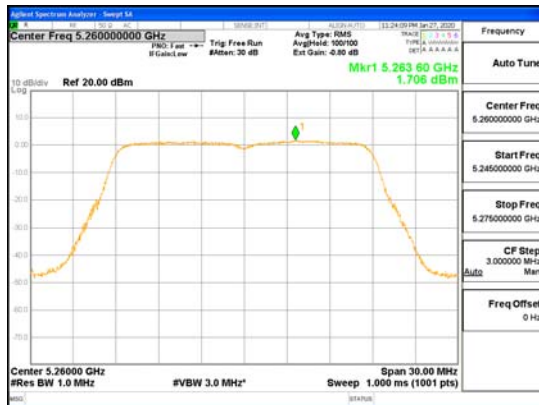
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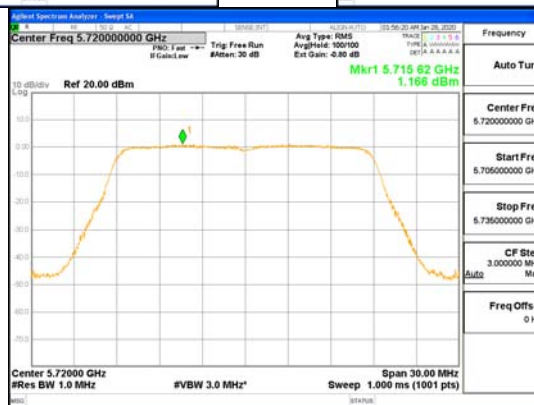
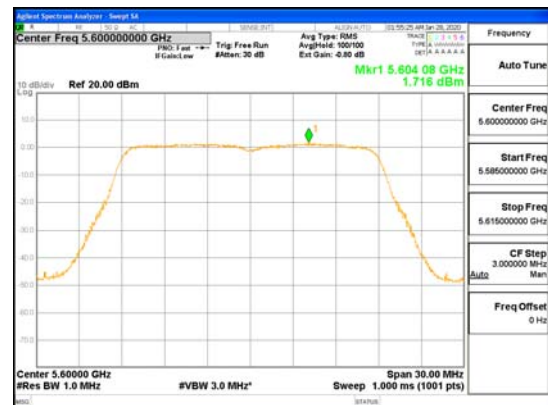
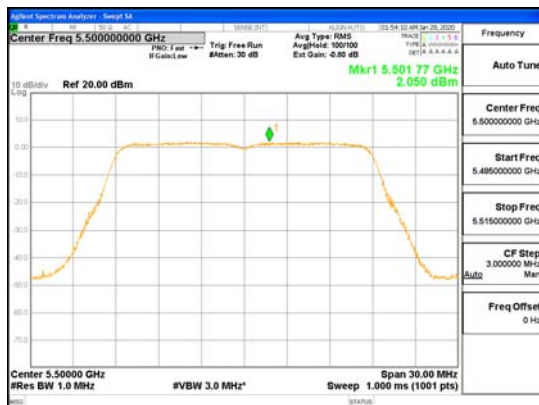
SDM Mode_ANT1_802.11n_HT20_UNII 2A



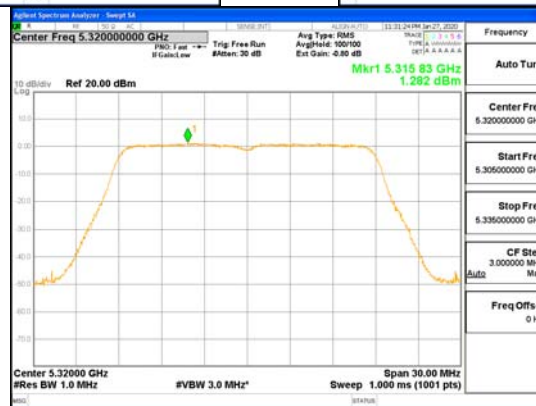
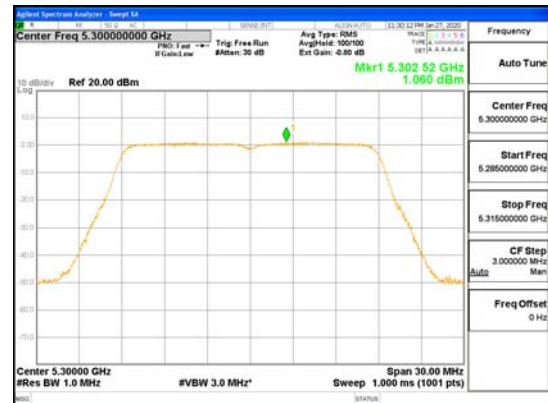
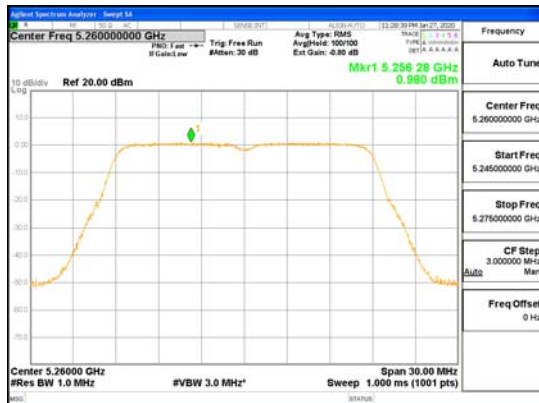
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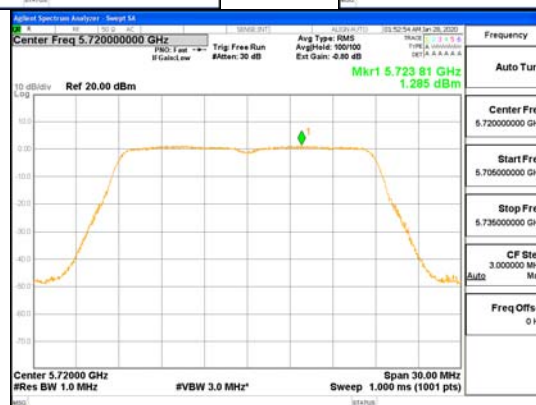
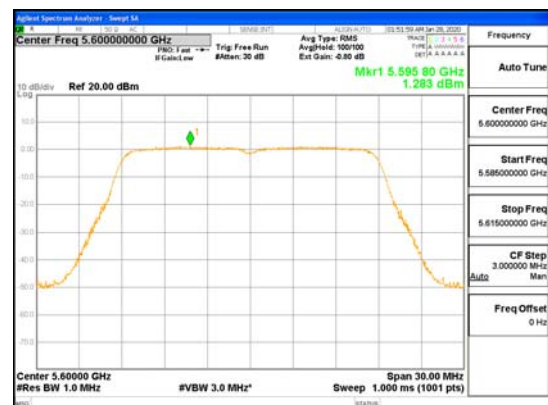
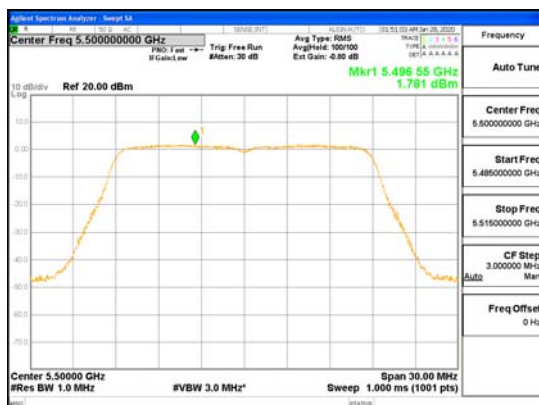
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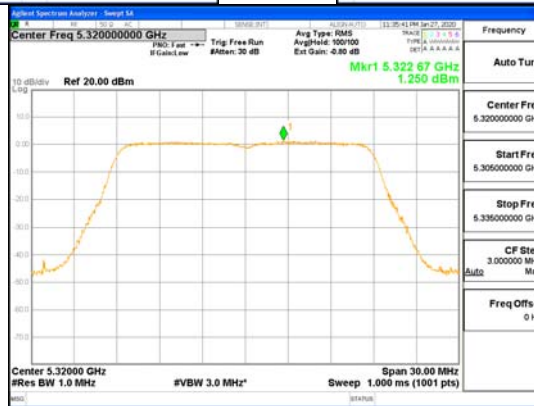
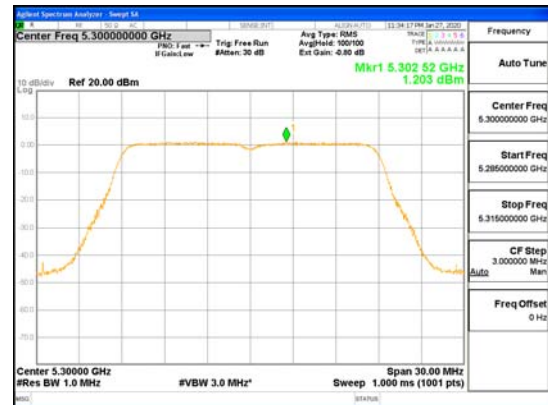
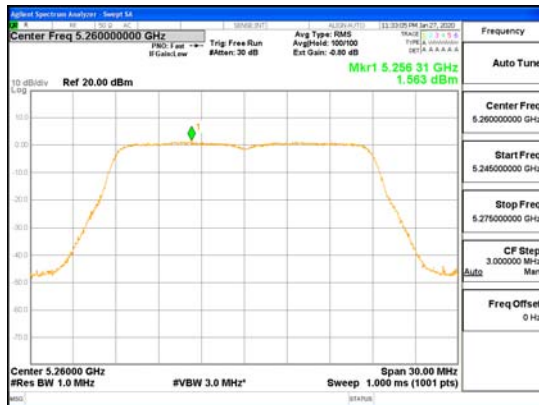
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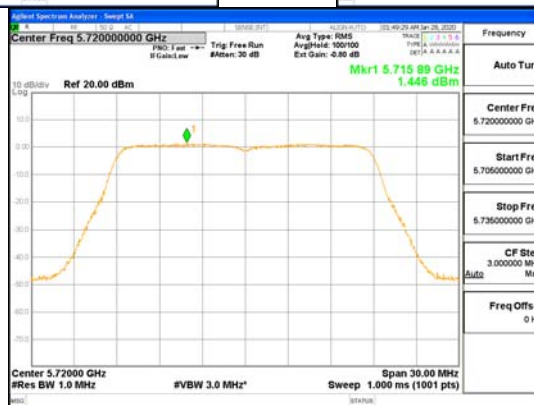
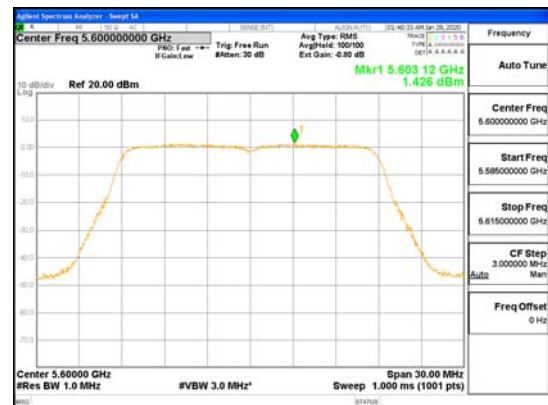
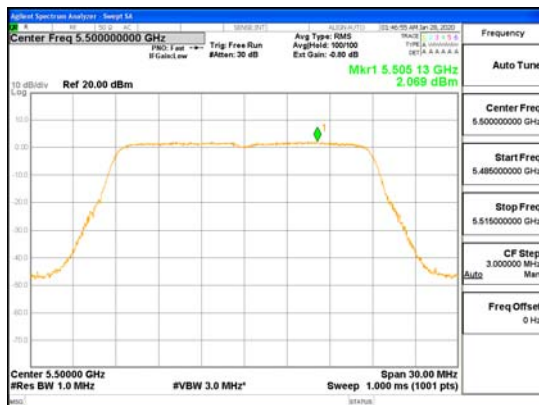
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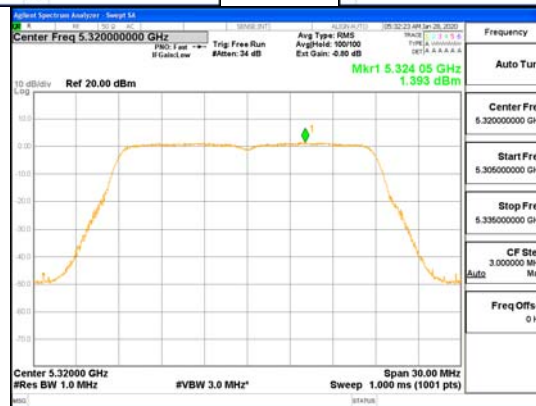
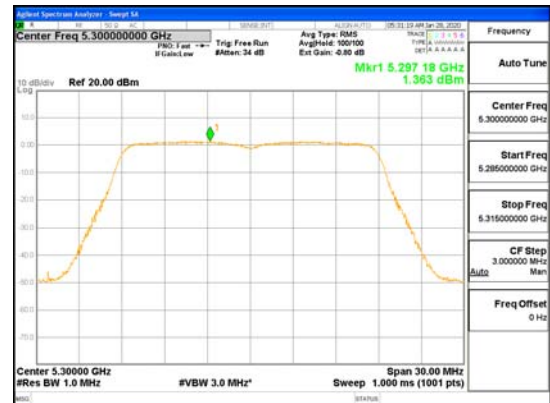
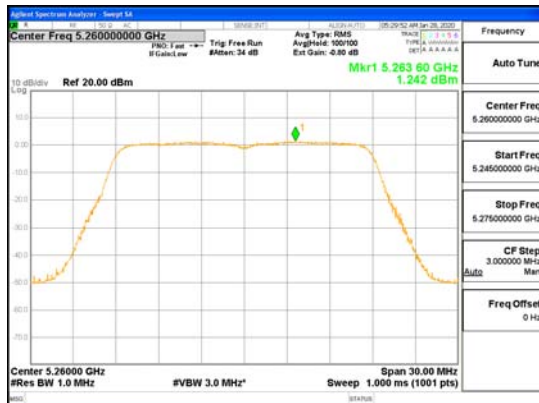
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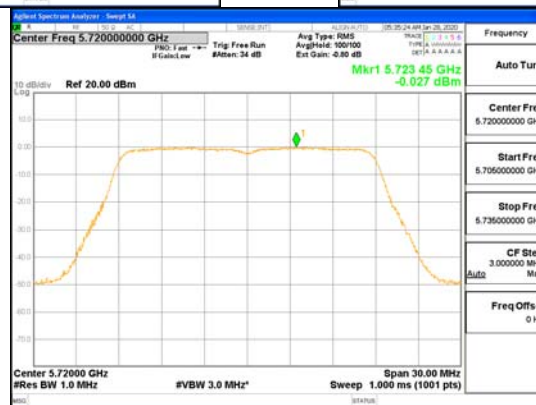
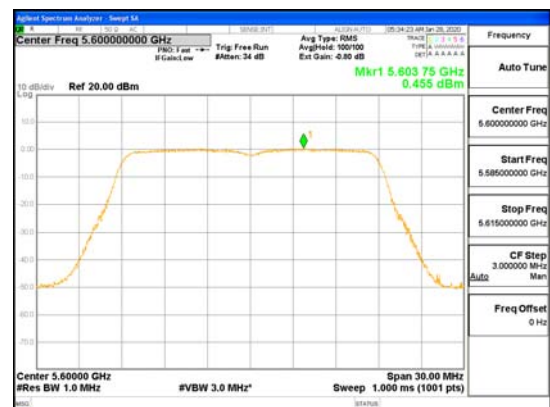
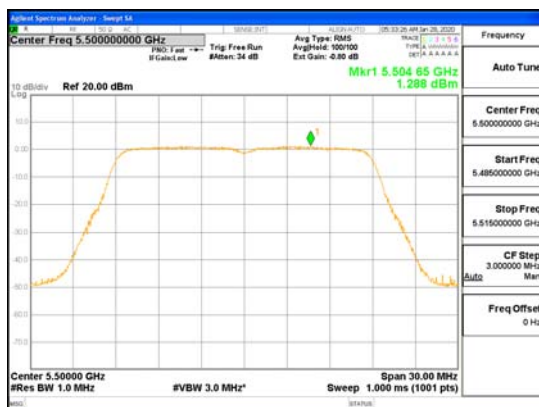
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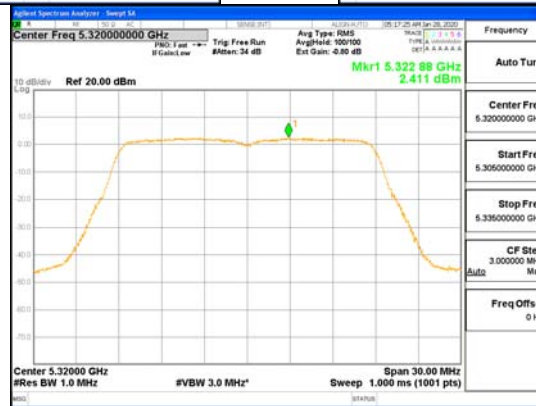
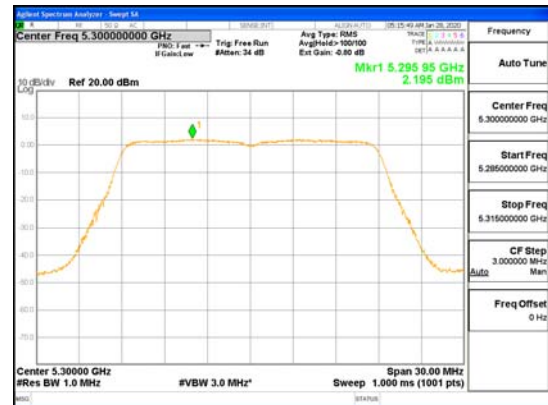
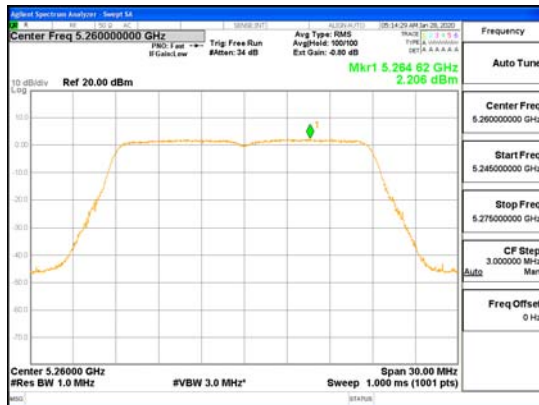
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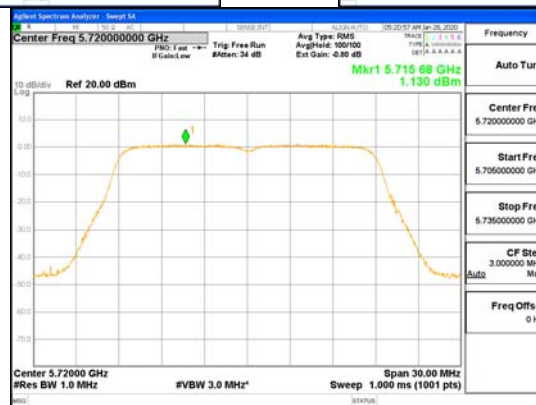
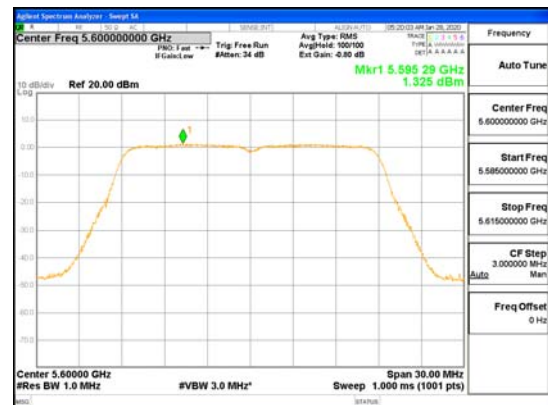
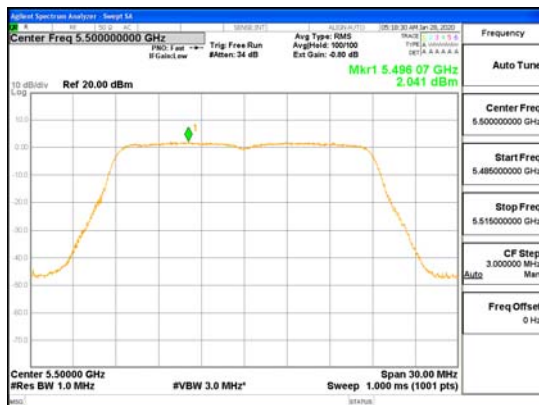
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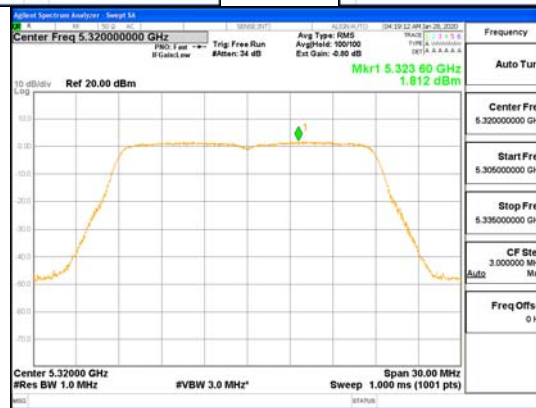
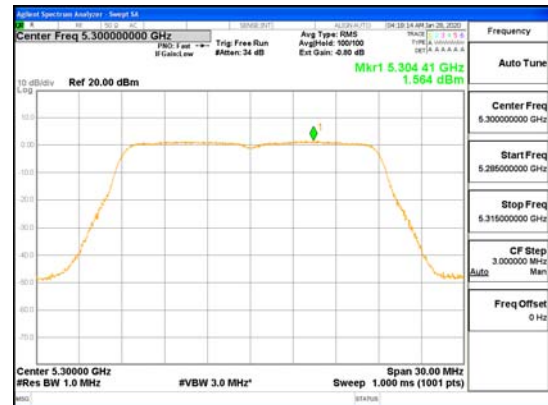
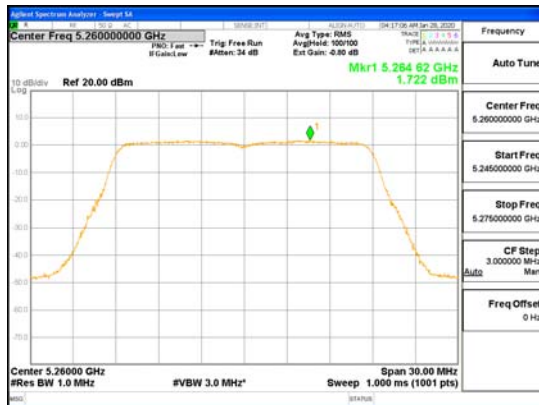
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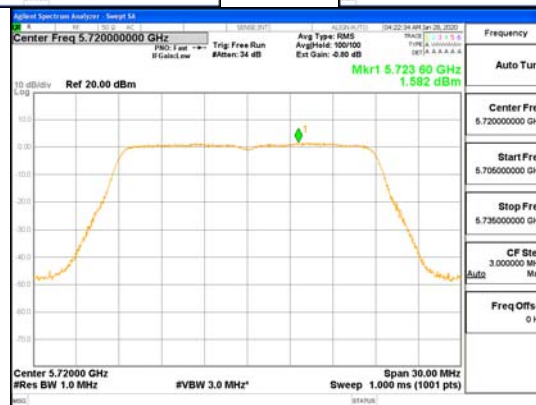
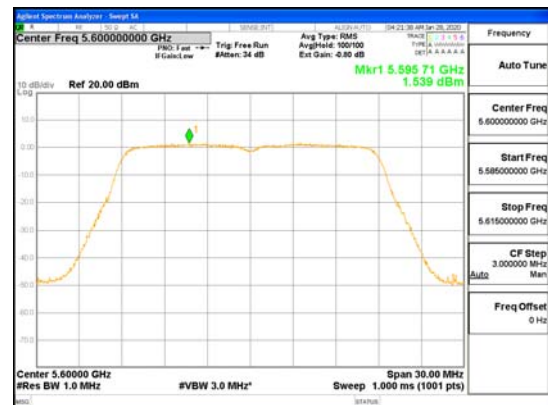
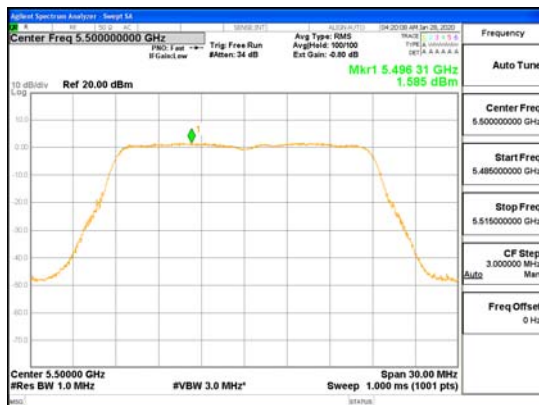
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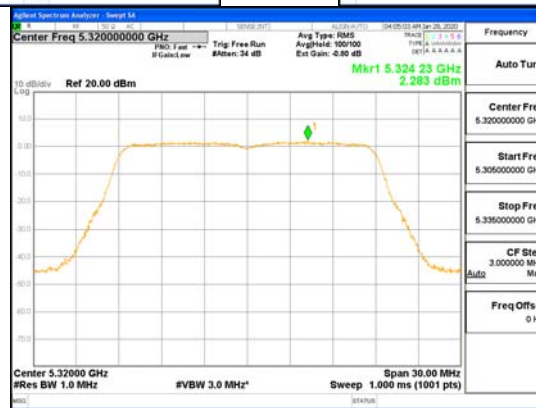
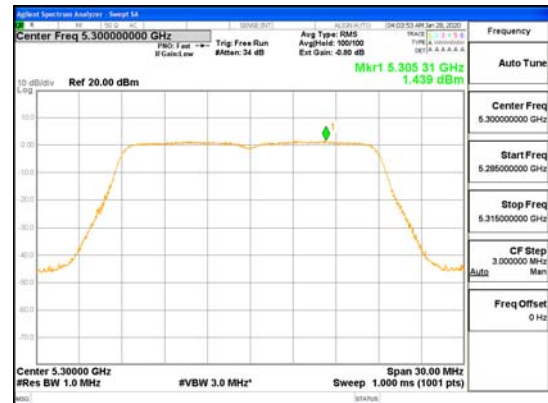
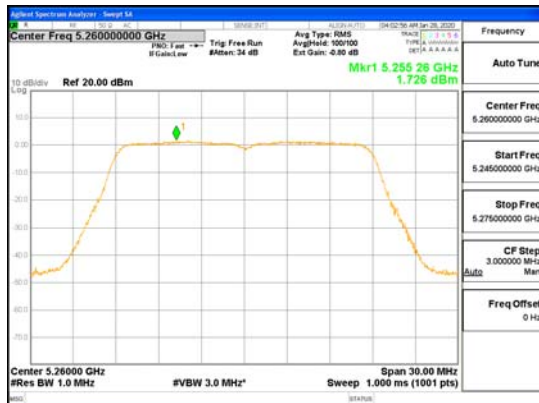
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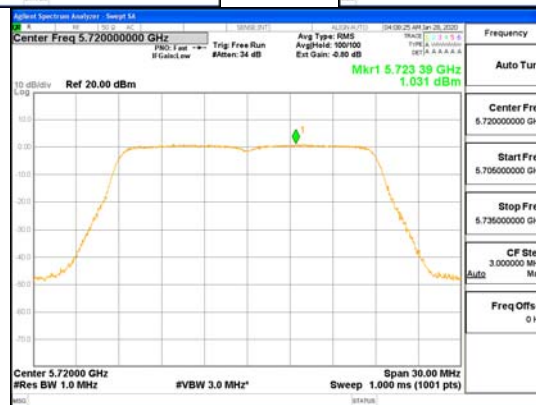
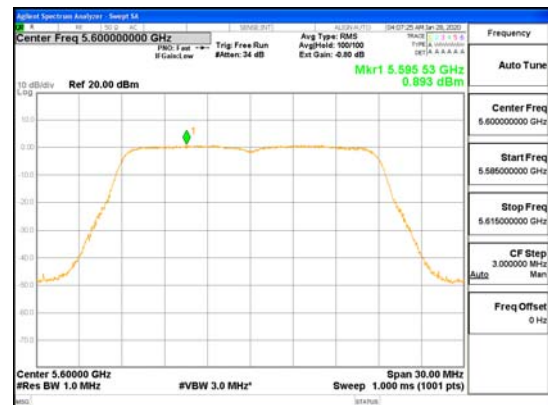
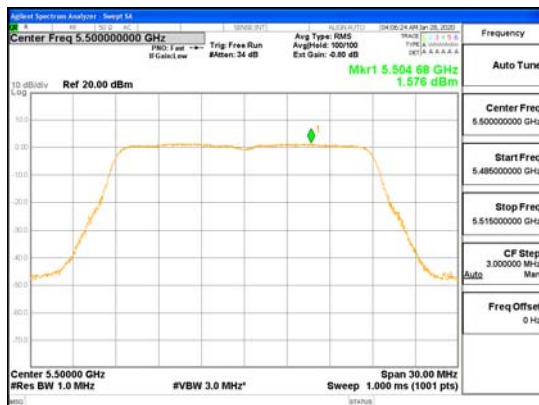
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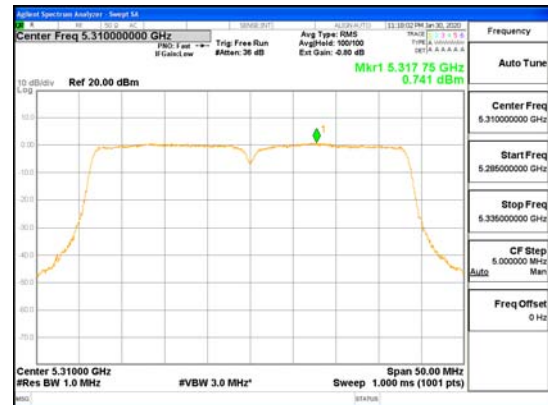
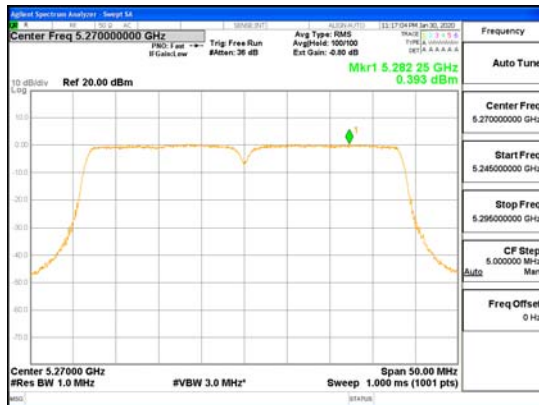
SDM Mode_ANT3_802.11ac_VHT20_UNII 2C



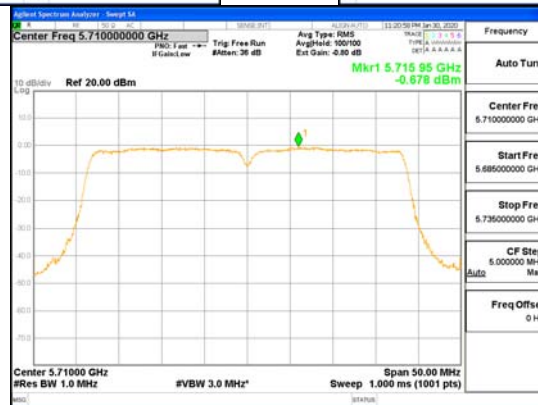
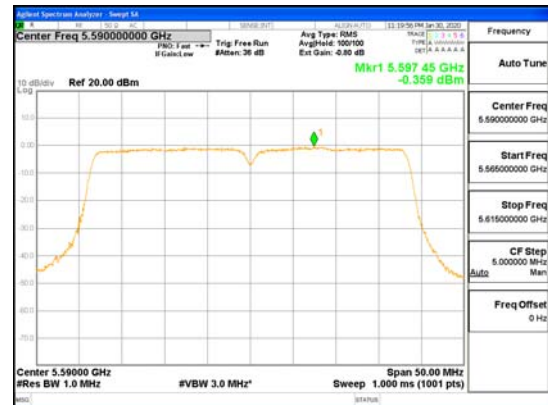
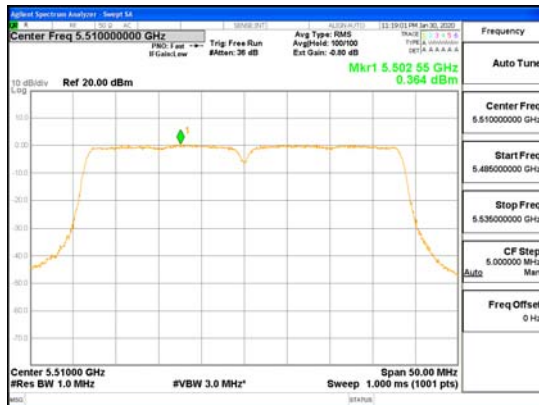
SDM Mode_ANT4_802.11ac_VHT20_UNII 2A



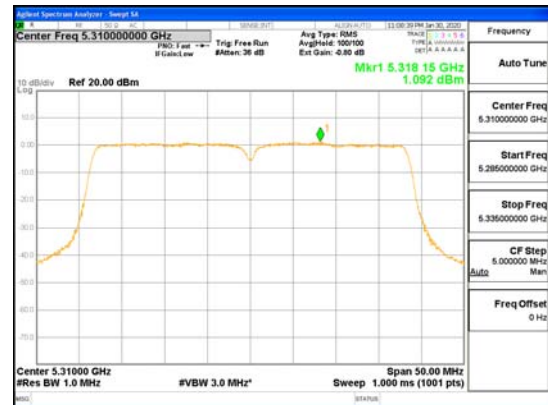
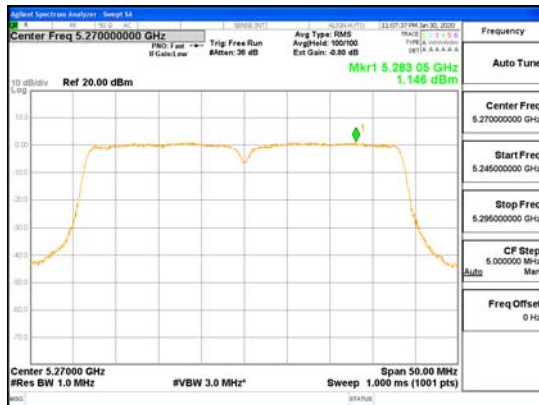
SDM Mode_ANT4_802.11ac_VHT20_UNII 2C



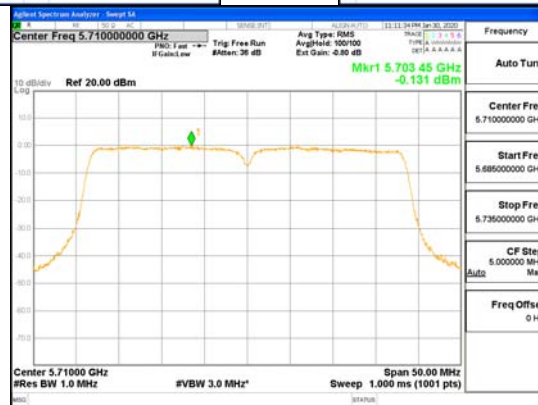
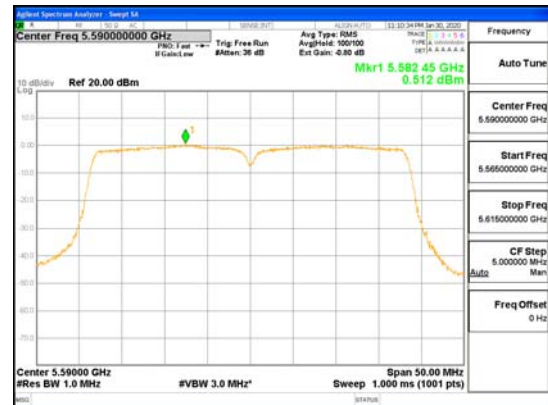
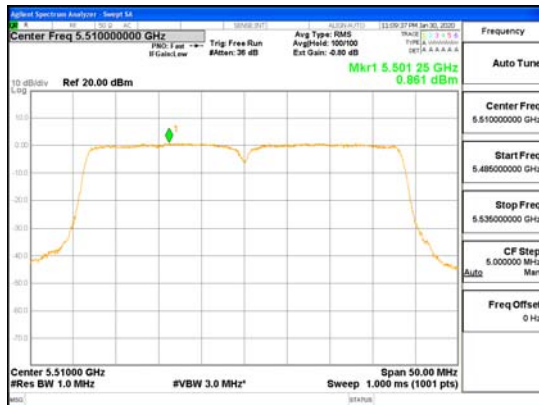
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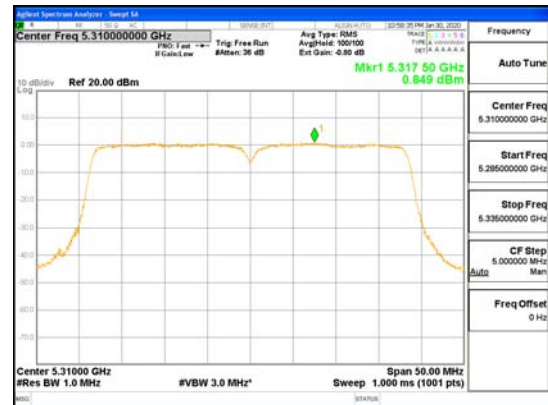
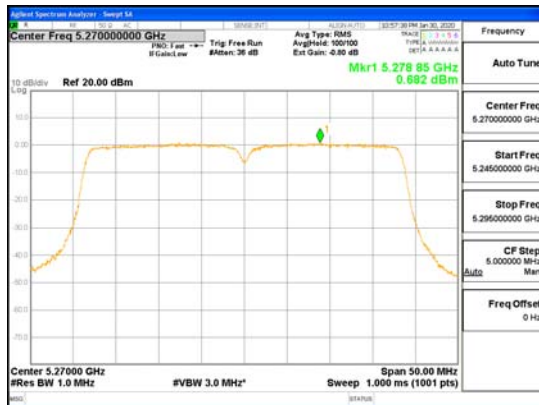
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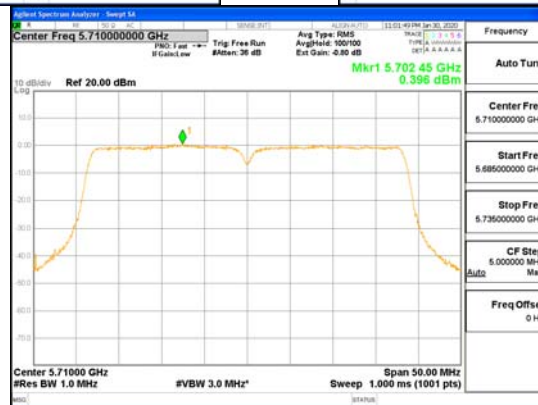
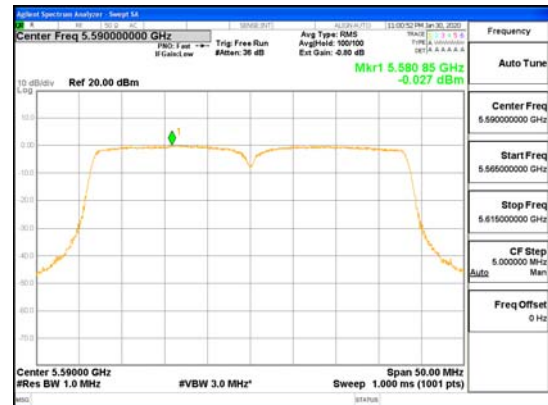
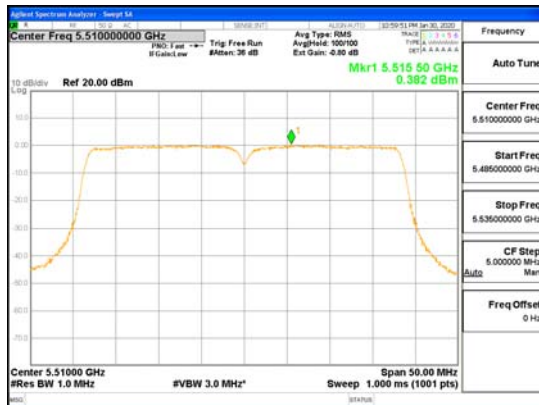
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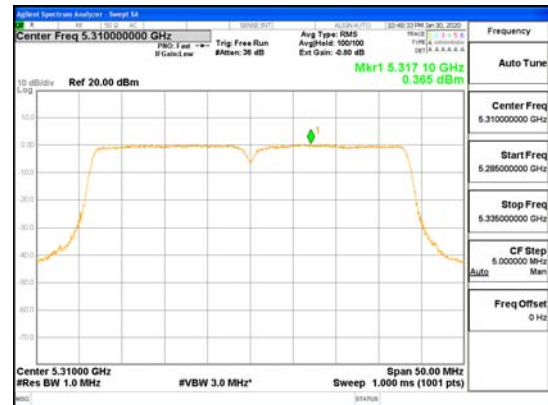
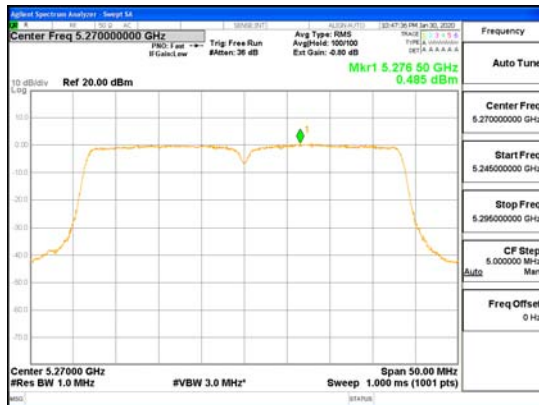
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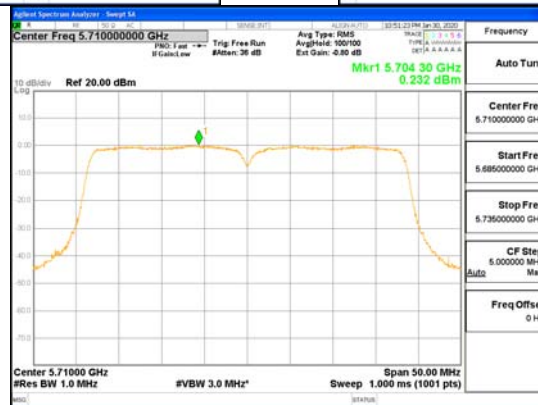
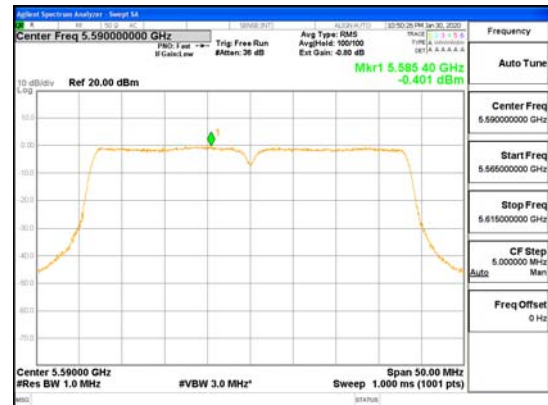
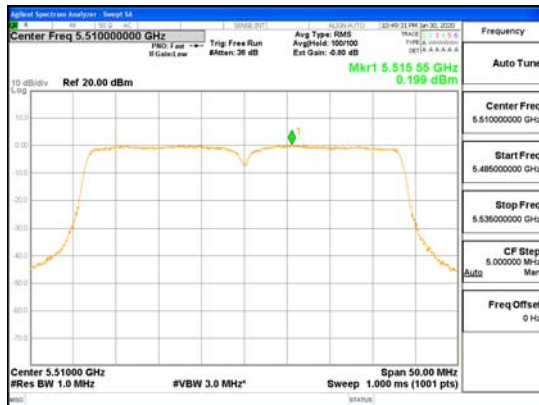
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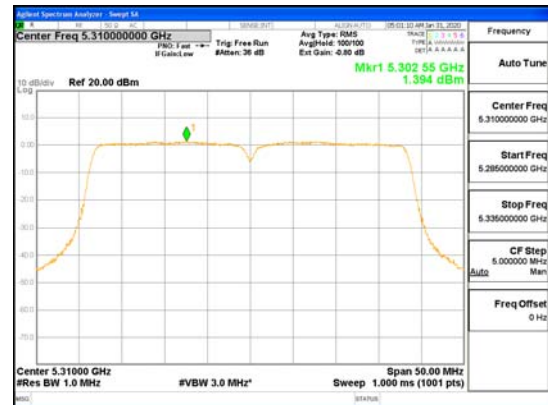
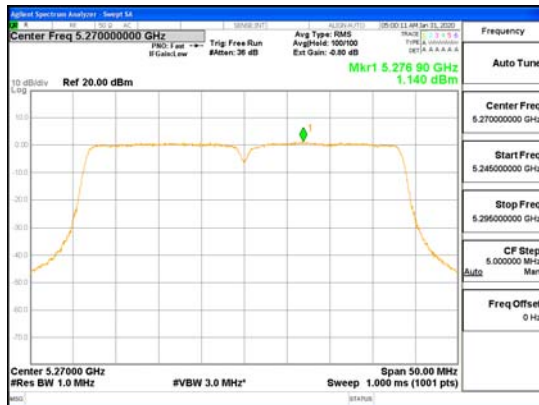
SDM Mode_ANT3_802.11n_HT40_UNII 2C



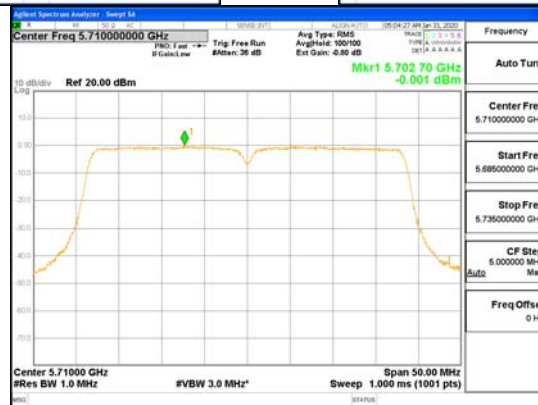
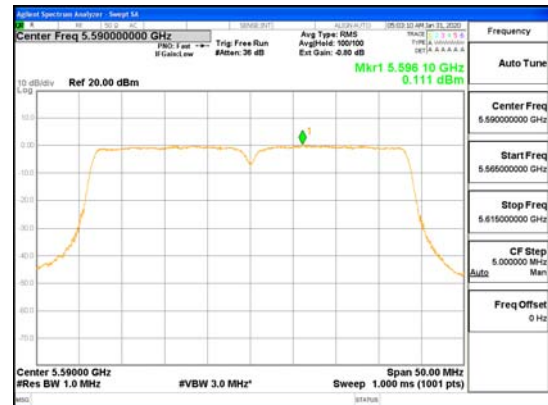
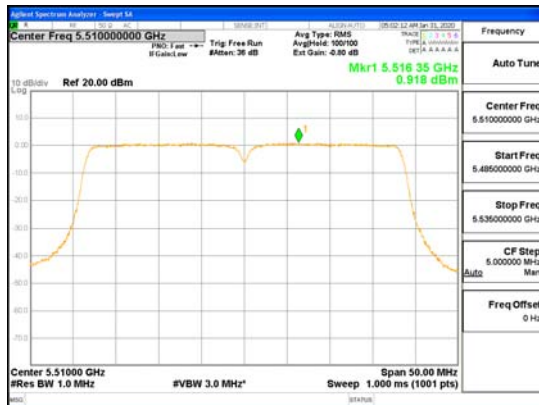
SDM Mode_ANT4_802.11n_HT40_UNII 2A



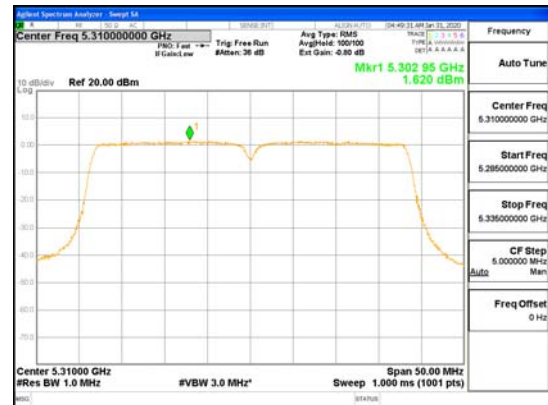
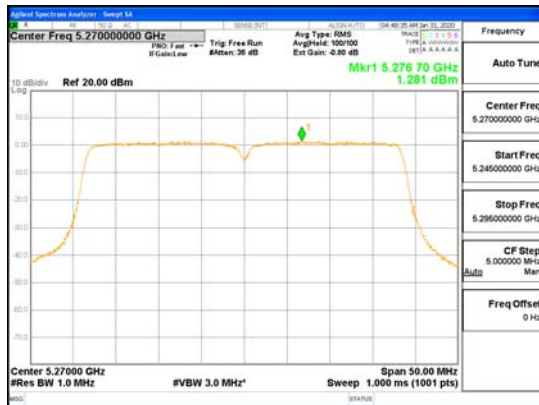
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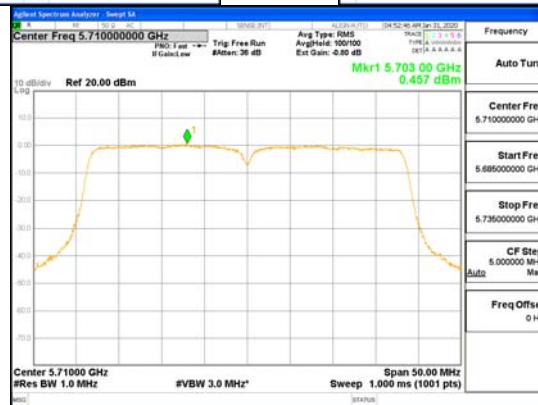
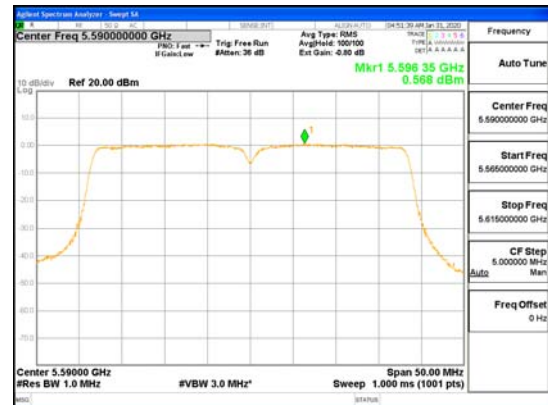
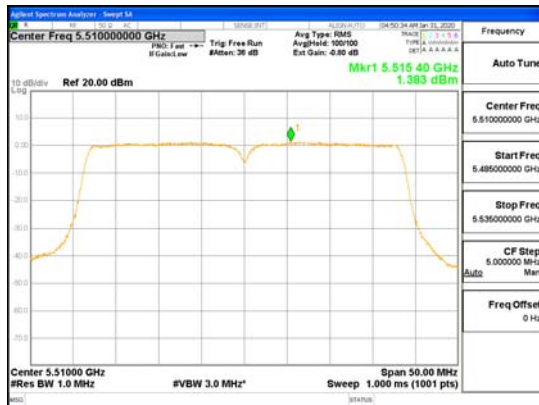
SDM Mode_ANT1_802.11ac_VHT40_UNII 2A



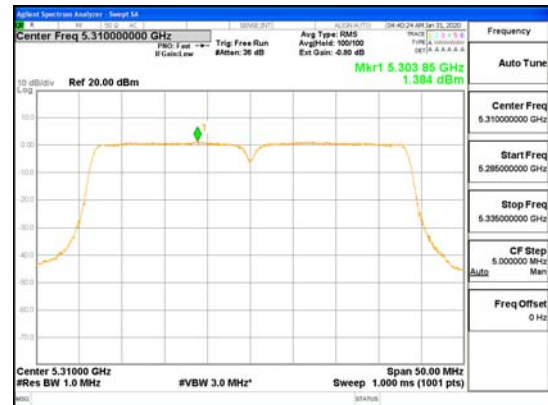
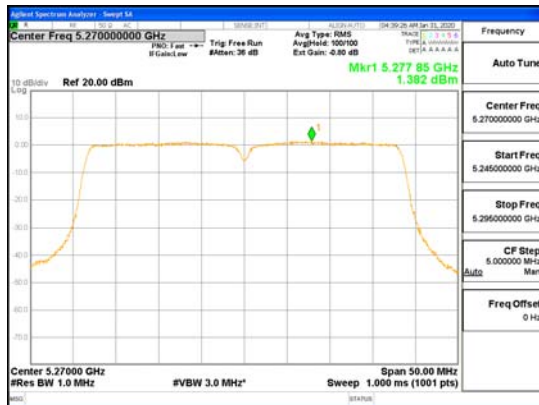
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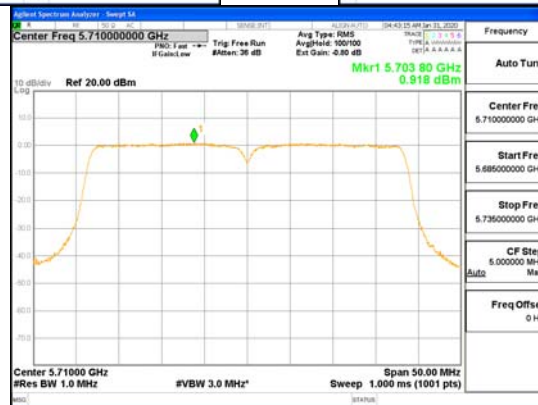
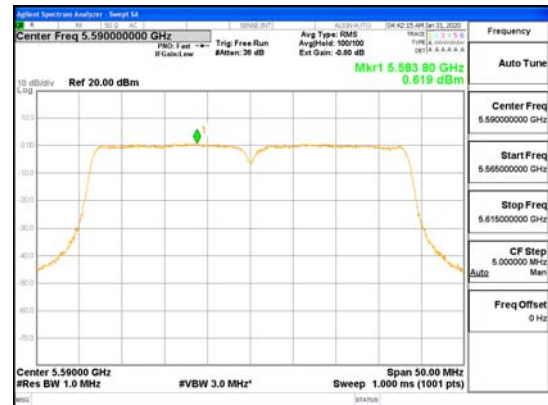
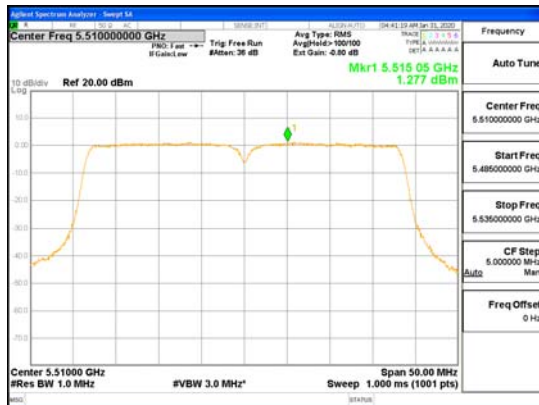
SDM Mode_ANT2_802.11ac_VHT40_UNII 2A



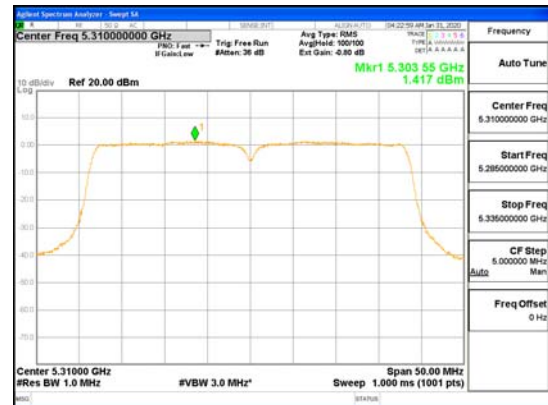
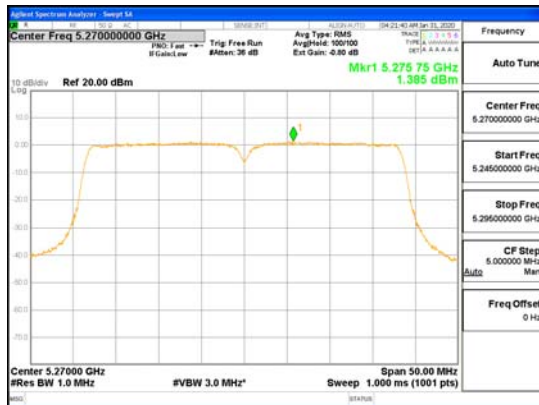
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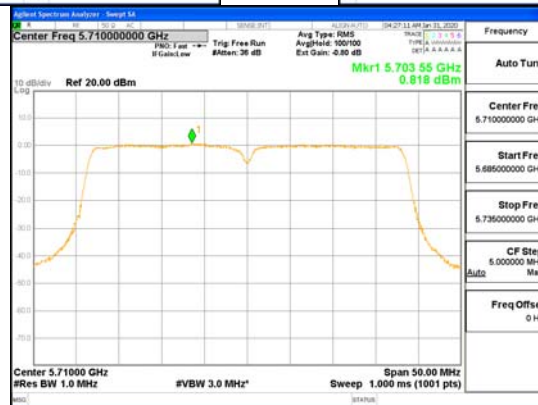
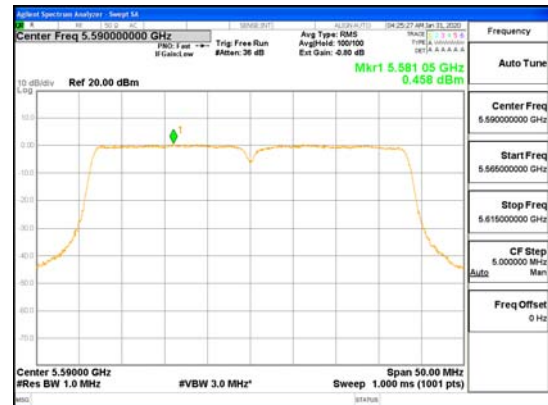
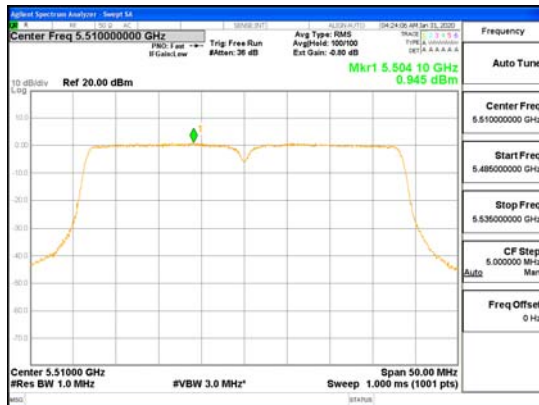
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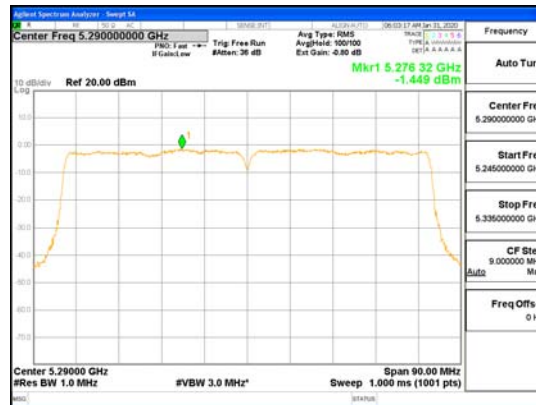
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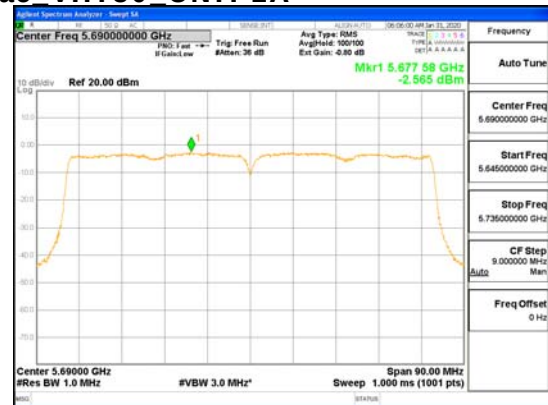
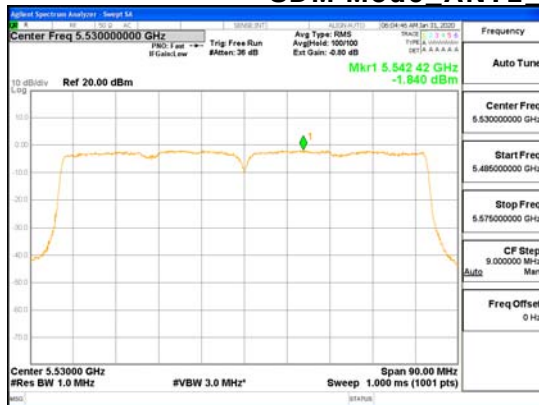
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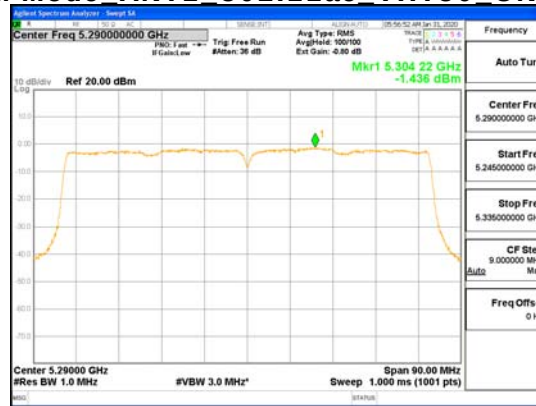
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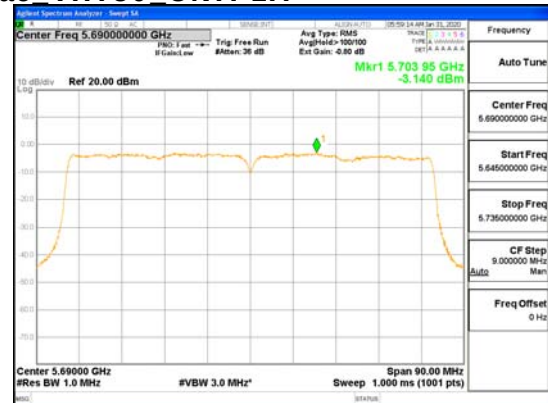
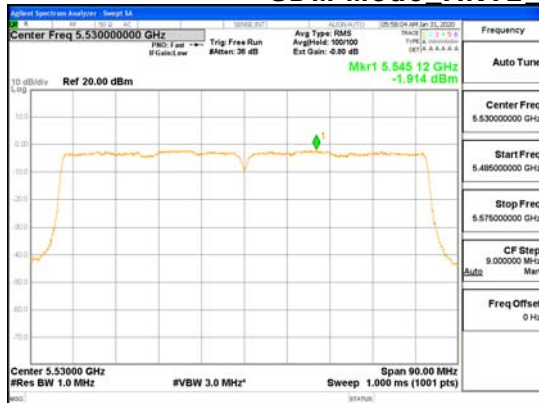
SDM Mode ANT1 802.11ac VHT80 UNII 2A



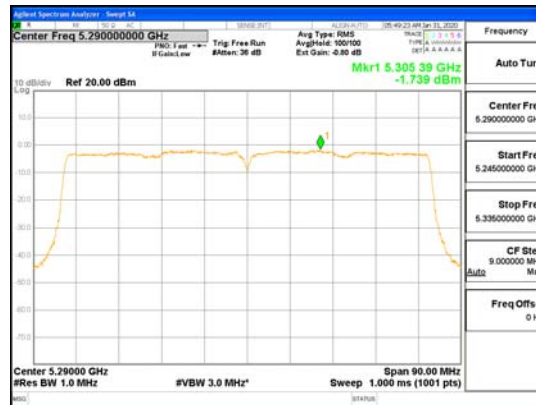
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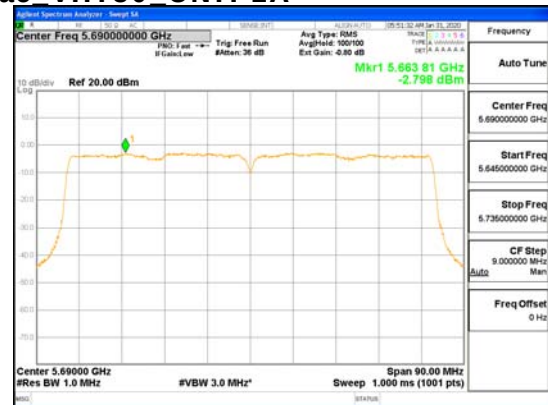
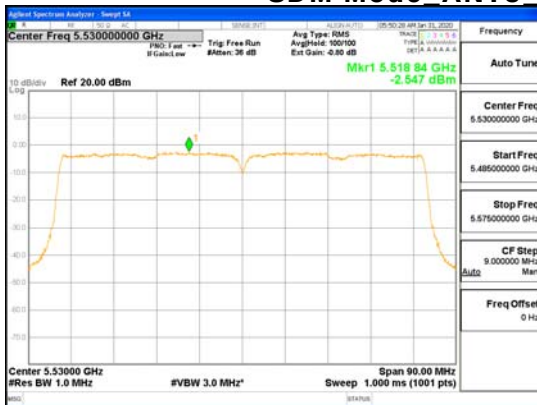
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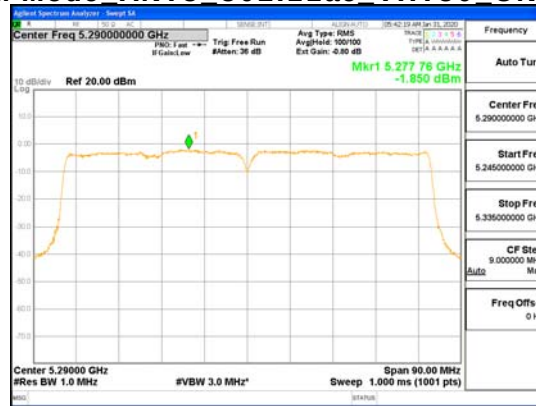
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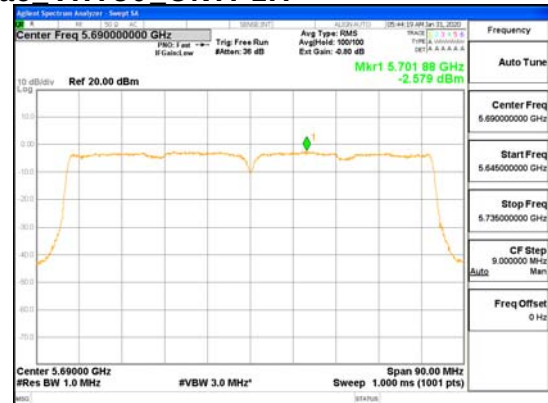
SDM Mode ANT3 802.11ac VHT80 UNII 2A



SDM Mode ANT3 802.11ac VHT80 UNII 2C



SDM Mode ANT4 802.11ac VHT80 UNII 2A



SDM Mode ANT4 802.11ac VHT80 UNII 2C

4.4 Frequency Stability

Test Procedures

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between 0℃ and +40℃ (Declaration by the Manufacturer). The temperature was incremented by 10℃ (5℃) 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.

Data for the worst case channel is shown below.

Temperature (℃)	0	10	20	30	40
Frequency	Measured Frequency Error (kHz)				
5 260 MHz	25.051	2.301	-17.797	-46.806	-45.999
5 300 MHz	22.829	-6.341	-28.632	-40.327	-53.003
5 320 MHz	19.941	-2.906	-20.448	-44.253	-50.580
5 500 MHz	40.668	17.155	0.840	-6.094	-38.553
5 600 MHz	50.581	32.239	7.845	-14.766	-23.873
5 720 MHz	46.467	19.022	-7.143	-29.110	-33.339

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 deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature range as tested.

4.5 Unwanted Emissions

Test Location

- ☒ 10 m SAC (test distance : ☐ 10 m, ☒ 3 m)
☒ 3 m SAC (test distance : 3 m)

Test Procedures

- 1) In the frequency range of 9 kHz to 30 MHz, magnetic field is measured with Loop Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
- 2) In the frequency range above 30 MHz, Bi-Log Test Antenna(30 MHz to 1 GHz) and Horn Test Antenna(above 1 GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is carried from 1m to 4m above the ground to determine the maximum value of the field strength. The emissions levels at both horizontal and vertical polarizations should be tested.

Test Settings:

Frequency Range = 9 kHz ~ 1 GHz

a) RBW = 100 kHz for $f < 1$ GHz, 9 kHz for $f < 30$ MHz

b) VBW $\geq$ RBW

c) Detector = CISPR Quasi-peak

d) Sweep time = auto couple

- Peak

Frequency Range = 1 GHz ~ 40 GHz

a) RBW = 1 MHz

b) VBW $\geq 3 \times$ RBW

d) Sweep time = auto

c) Detector = Peak

e) Trace mode = max hold

- Average (duty cycle $\geq 98\%$)

Frequency Range = 1 GHz ~ 40 GHz

a) RBW = 1 MHz

b) VBW $\geq 3 \times$ RBW

d) Sweep time = auto

f) Trace mode = average (at least 100 traces)

c) Detector = RMS

e) Averaging type = power (i.e., RMS)

- Average (duty cycle < 98%)

Frequency Range = 1 GHz ~ 40 GHz

a) RBW = 1 MHz

b) VBW $\geq 3 \times$ RBW

c) Detector = RMS

d) Sweep time = auto

e) Averaging type = power (i.e., RMS)

f) Trace mode = average (at least 100 traces)

If power averaging (RMS) mode, then the applicable correction factor is $10 \log(1/x)$, where x is the duty cycle.

Test mode		Duty Cycle Factor (dB)
CDD Mode	802.11a	0.22
	802.11n_HT20	0.21
	802.11n_HT40	0.20
	802.11ac_VHT20	0.41
	802.11ac_VHT40	0.12
	802.11ac_VHT80	0.24
SDM Mode	802.11n_HT20	0.21
	802.11n_HT40	0.20
	802.11ac_VHT20	0.41
	802.11ac_VHT40	0.12
	802.11ac_VHT80	0.24

Limit

- 15.209(a)

Frequency(MHz)	Field Strength uV/m@3m	Field Strength dBuV/m@3m	Deasurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705-30	30	-	30
30-88	100**	40	3
88-216	150**	43.5	3
216-960	200**	46	3
Above 960	500	54	3

** Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231 and 15.241.

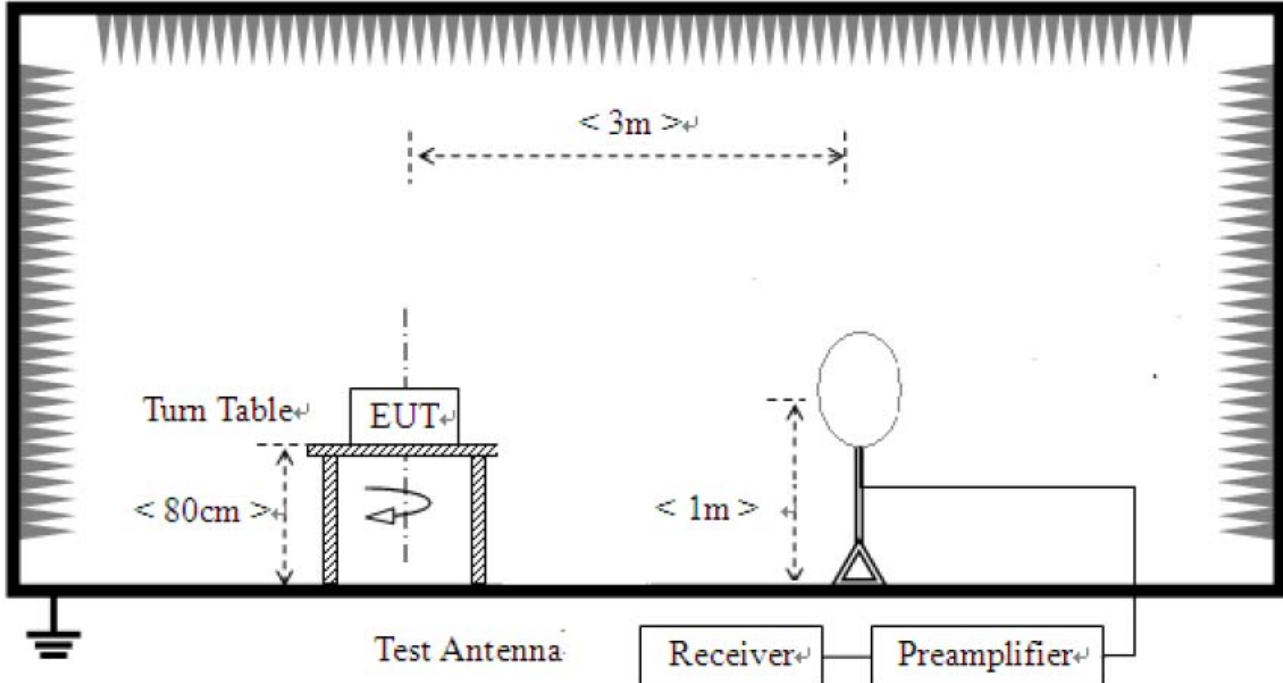
- 15.407, KDB 789033

E.I.R.P -27 dBm/MHz

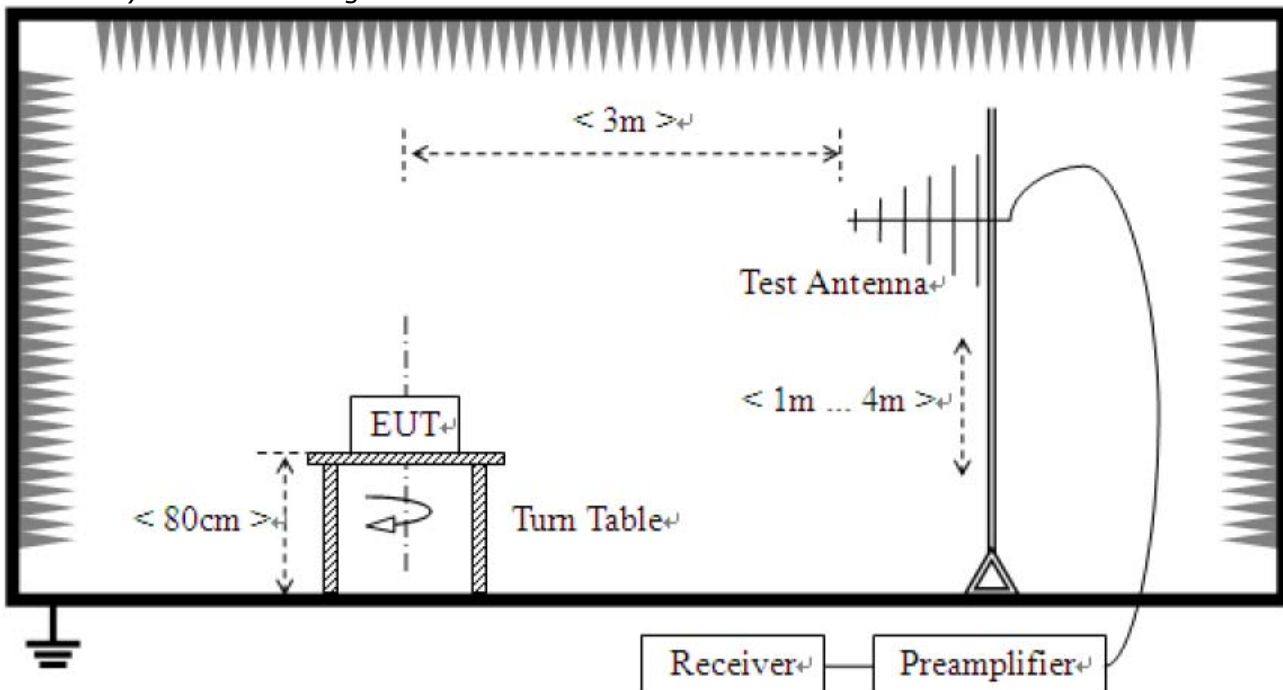
$E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2$, for $d = 3\text{m}$

Test Setup:

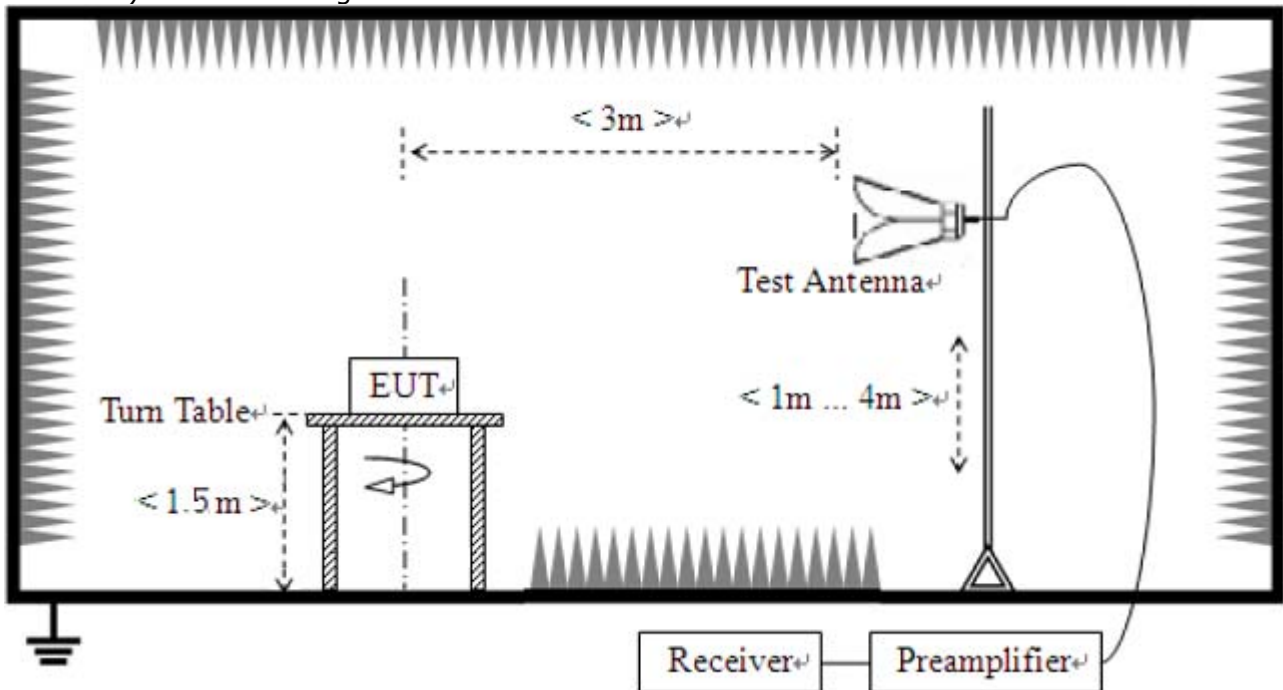
- 1) For field strength of emissions from 9 kHz to 30 MHz



- 2) For field strength of emissions from 30 MHz to 1 GHz



3) For field strength of emissions above 1 GHz



Test Mode

We have done all test mode.

The worst-case antenna configuration are determined to be as follows for each mode.

802.11a mode : ANT1 + ANT2 + ANT3 + ANT 4 (MIMO)

802.11n SDM mode : ANT1 + ANT2 + ANT3 + ANT4 (MIMO)

802.11ac SDM mode : ANT1 + ANT2 + ANT3 + ANT4 (MIMO)

So the results are only attached worst cases.

Test Results

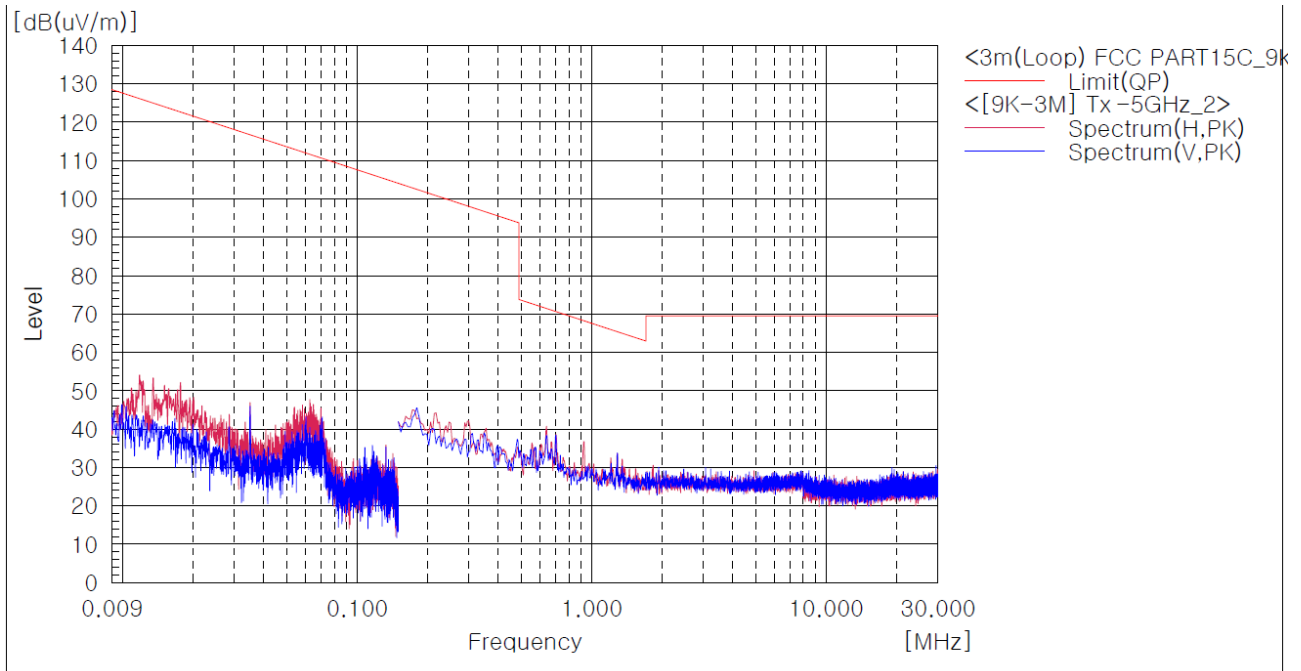
1) 9 kHz to 30 MHz

Test mode : Transmitter (Worst Case)

The requirements are:

☒ Complies

Test Data



Frequency (MHz)	Measured Data (dBUV/m)	Margin (dB)	Remark
The emissions 9 kHz to 30 MHz were 20 dB lower than the limit.			

Remark :

1. The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in stand=up position(Z axis) and the worst case was recorded.
2. Result = Reading + c.f(Correction factor)
3. Correction factor = Antenna factor + Cable loss + 6 dB attenuator - Amp Gain
4. This data is the Peak(PK) value.

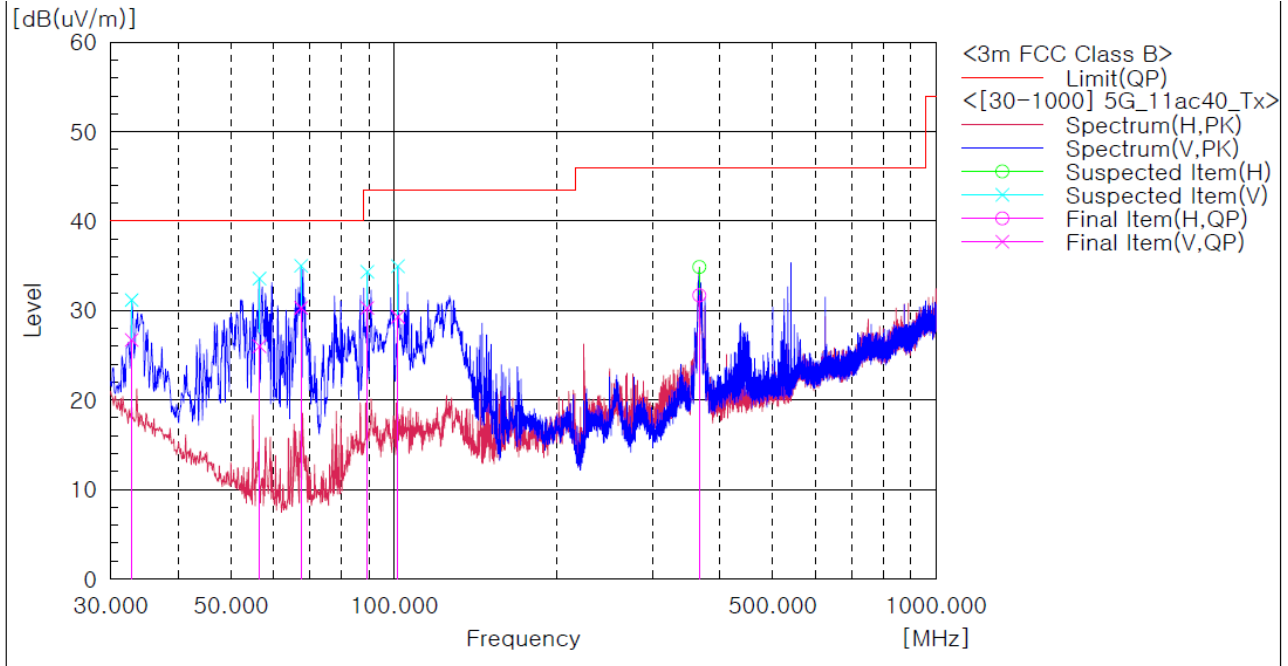
2) 30 MHz to 1 GHz

Test mode : Transmitter (Worst Case)

The requirements are:

☒ Complies

Test Data



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	32.789	V	34.3	-7.6	26.7	40.0	13.3	101.0	308.0
2	56.433	V	44.0	-18.0	26.0	40.0	14.0	195.0	6.0
3	67.345	V	48.0	-17.7	30.3	40.0	9.7	101.0	141.0
4	89.291	V	45.1	-14.8	30.3	43.5	13.2	101.0	305.0
5	101.659	V	42.6	-13.3	29.3	43.5	14.2	101.0	216.0
6	366.105	H	38.1	-6.4	31.7	46.0	14.3	101.0	289.0

Remark :

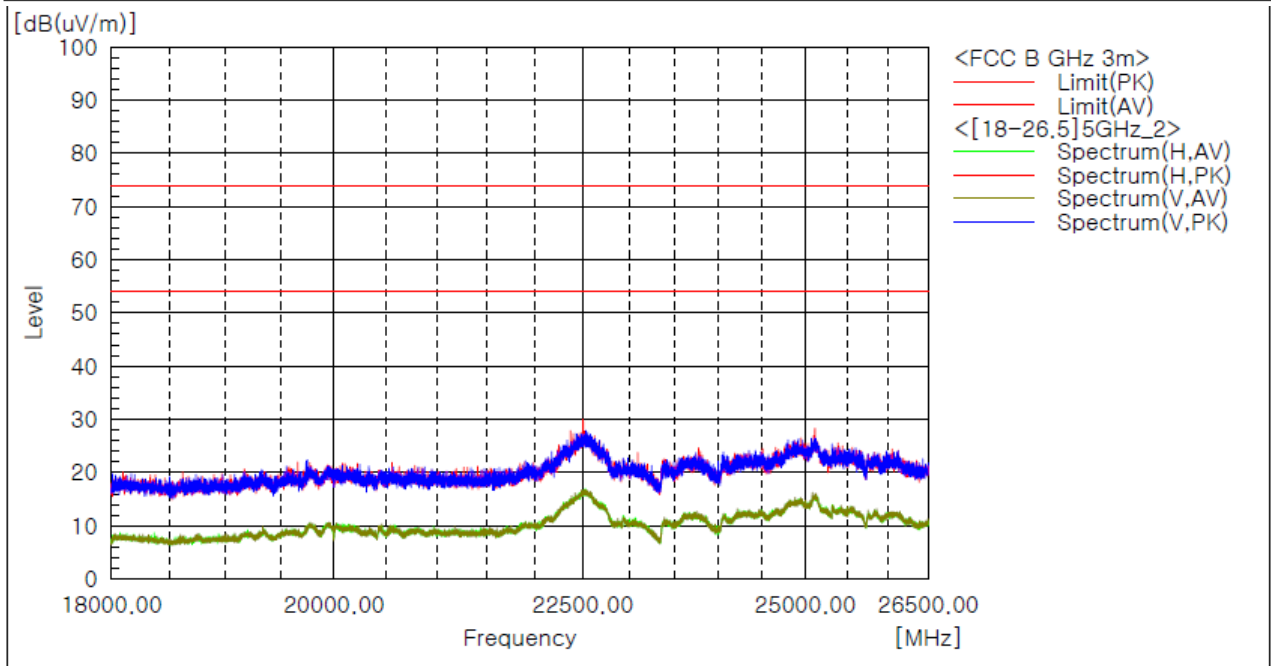
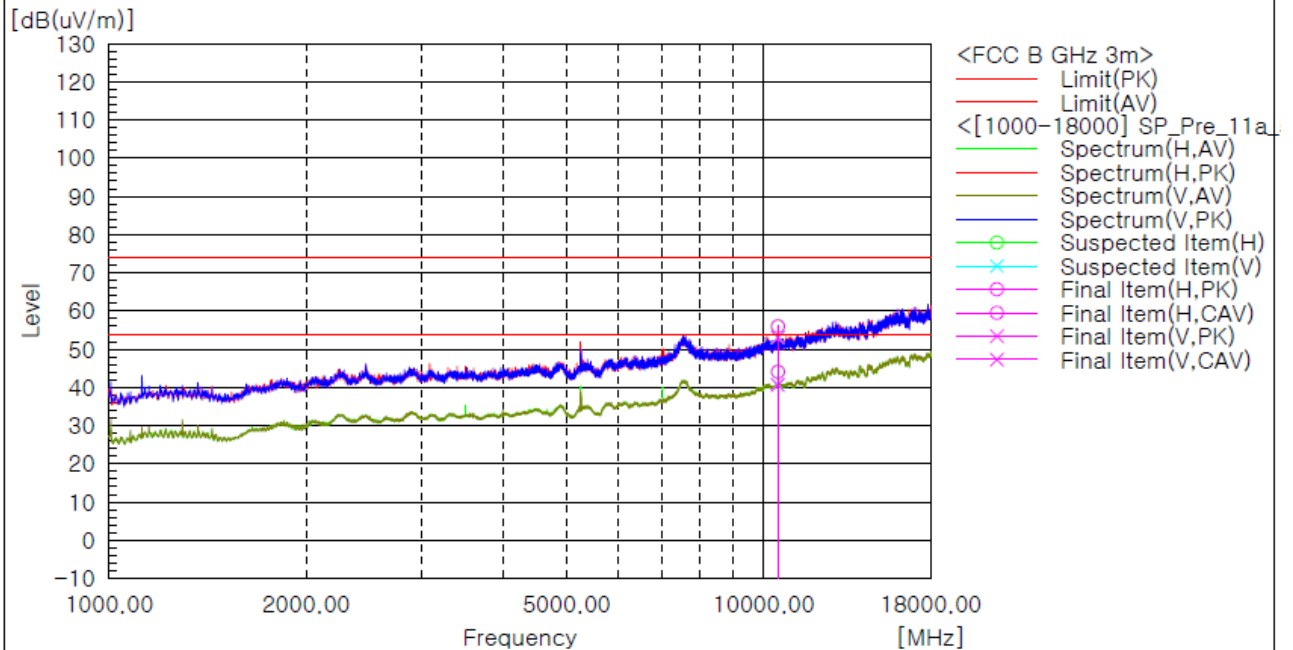
1. The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in stand=up position(Z axis) and the worst case was recorded.
2. Result = Reading + c.f(Correction factor)
3. Correction factor = Antenna factor + Cable loss + 6 dB attenuator - Amp Gain
4. We have done all test mode. The results are only attached worst cases.

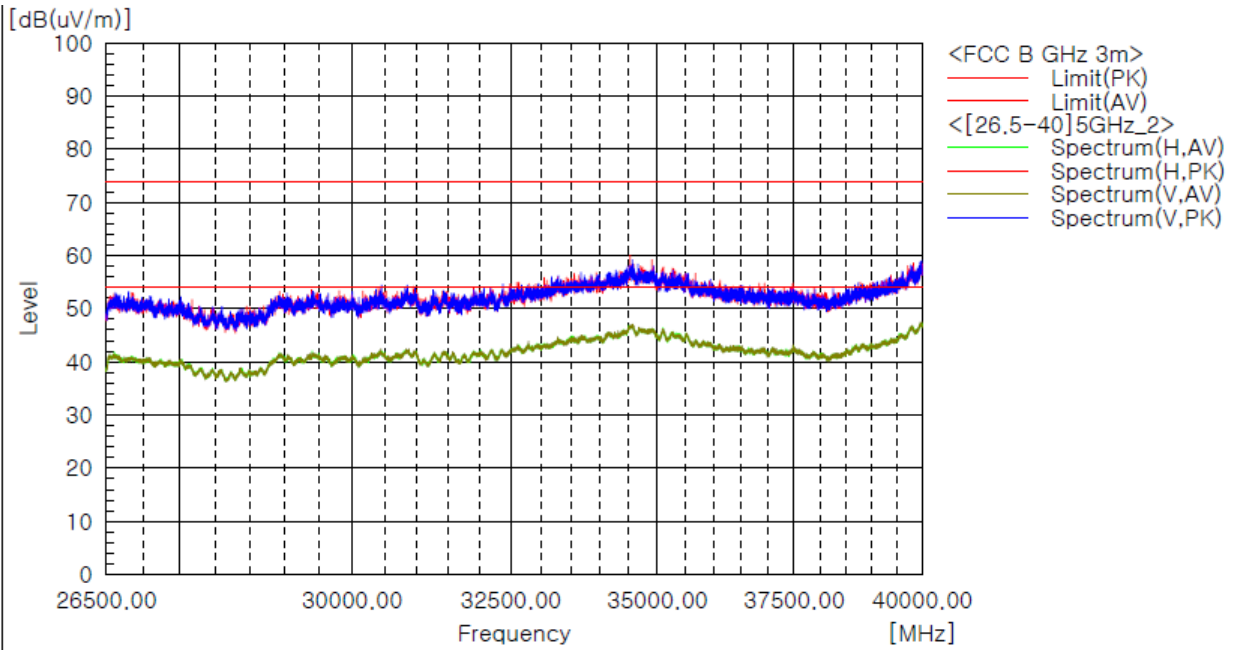
3) above 1 GHz

The requirements are:

☒ Complies

Test Data





Test mode : Transmitter, 802.11a

The requirements are:

☒ Complies

Test Data

Ch.52(5 260 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
10 518.81	H	59.5	-----	74.0	-----	14.5	-----
10 523.08	H	-----	45.5	-----	54.0	-----	8.5
10 521.85	V	54.4	-----	74.0	-----	19.6	-----
10 532.31	V	-----	41.0	-----	54.0	-----	13.0

Ch.60(5 300 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
10 600.80	H	59.7	-----	74.0	-----	14.3	-----
10 602.58	H	-----	45.8	-----	54.0	-----	8.2
10 608.78	V	53.1	-----	74.0	-----	20.9	-----
10 608.93	V	-----	40.8	-----	54.0	-----	13.2

Ch.64(5 320 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
10 642.38	H	59.4	-----	74.0	-----	14.6	-----
10 642.24	H	-----	45.7	-----	54.0	-----	8.3
10 636.44	V	54.2	-----	74.0	-----	19.8	-----
10 643.29	V	-----	41.2	-----	54.0	-----	12.8

Ch.100(5 500 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
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The emissions above 1 GHz were 20 dB lower than the limit.

Ch.120(5 600 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
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The emissions above 1 GHz were 20 dB lower than the limit.

Ch.144(5 720 MHz)

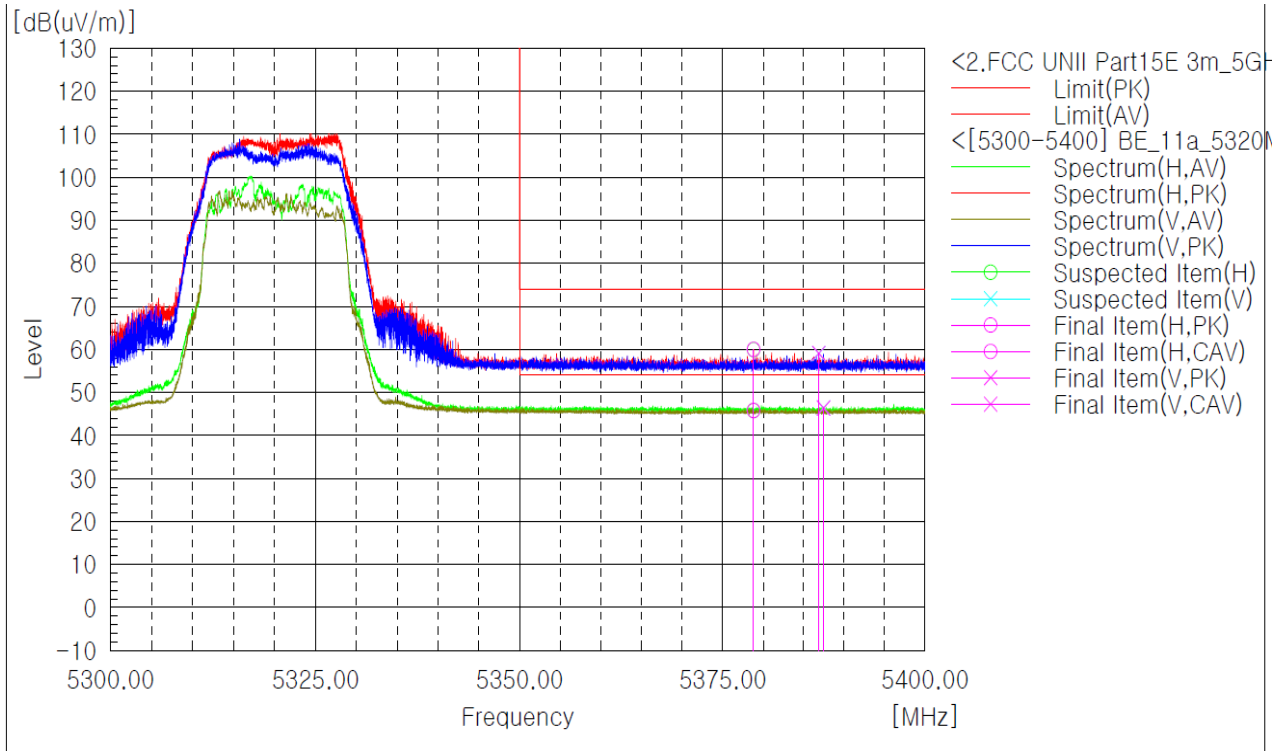
Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
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The emissions above 1 GHz were 20 dB lower than the limit.

Remarks

1. The unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in stand-up position(Z axis) and the worst case was recorded.
2. Correction factor = Antenna factor + Cable loss - Amp Gain

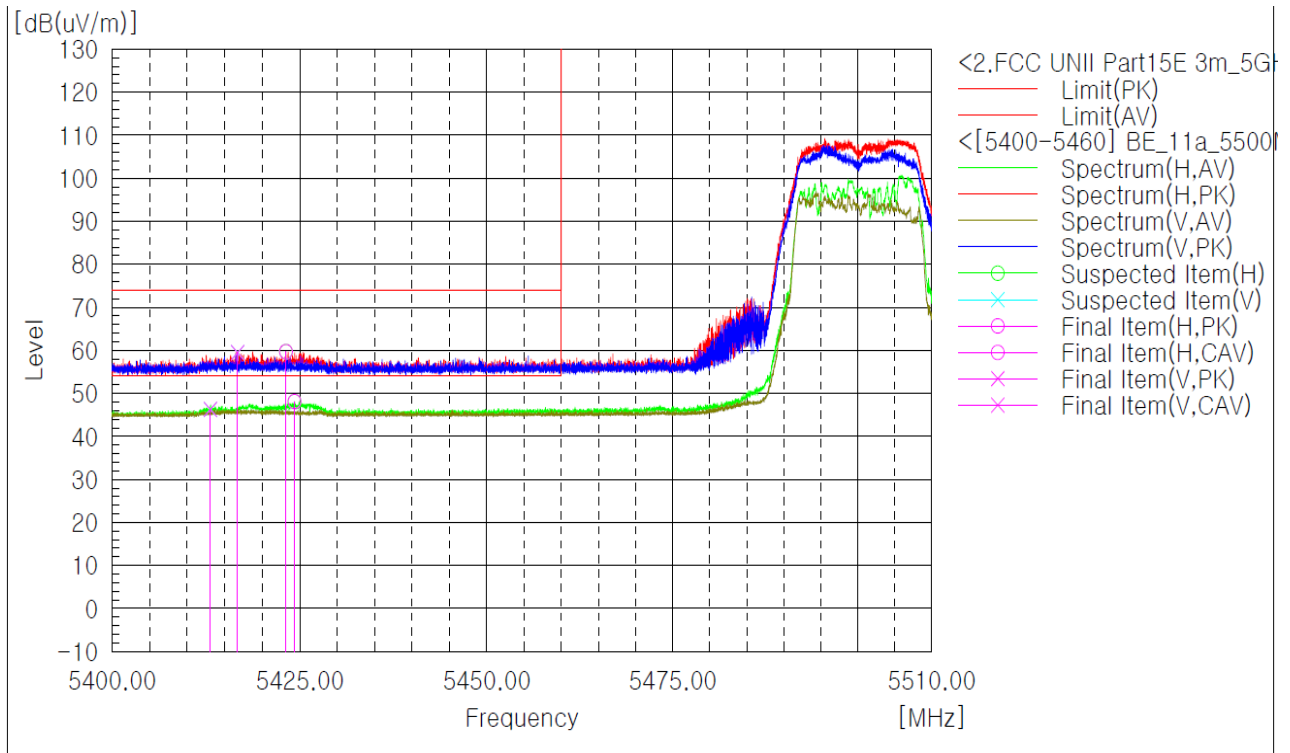
Worst Case Mode :	802.11a
Worst Case Transfer Rate :	6 Mbps
Distance of Measurements :	3 Meters
Operating Frequency :	5 320 MHz
Channel :	64



Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
5 378.81	H	60.0	-----	74.0	-----	14.0	-----
5 378.81	H	-----	45.8	-----	54.0	-----	8.2
5 386.86	V	59.1	-----	74.0	-----	14.9	-----
5 387.45	V	-----	46.4	-----	54.0	-----	7.6

Radiated Restricted Band Edge Plot

Worst Case Mode :	802.11a
Worst Case Transfer Rate :	6 Mbps
Distance of Measurements :	3 Meters
Operating Frequency :	5 500 MHz
Channel :	100



Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
5 423.17	H	59.7	-----	74.0	-----	14.3	-----
5 424.30	H	-----	48.1	-----	54.0	-----	5.9
5 416.71	V	59.5	-----	74.0	-----	14.5	-----
5 413.09	V	-----	46.3	-----	54.0	-----	7.7

Radiated Restricted Band Edge Plot

Test mode : Transmitter, 802.11n_HT20

The requirements are:

☒ Complies

Test Data

Ch.52(5 260 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
10 519.62	H	61.0	-----	74.0	-----	13.0	-----
10 518.74	H	-----	46.3	-----	54.0	-----	7.7
10 519.36	V	53.8	-----	74.0	-----	20.2	-----
10 524.56	V	-----	41.5	-----	54.0	-----	12.5

Ch.60(5 300 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
10 597.57	H	62.5	-----	74.0	-----	11.5	-----
10 600.38	H	-----	46.0	-----	54.0	-----	8.0
10 623.70	V	54.2	-----	74.0	-----	19.8	-----
10 622.28	V	-----	42.1	-----	54.0	-----	11.9

Ch.64(5 320 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
10 639.35	H	61.4	-----	74.0	-----	12.6	-----
10 639.01	H	-----	46.2	-----	54.0	-----	7.8
10 639.08	V	54.3	-----	74.0	-----	19.7	-----
10 656.77	V	-----	41.6	-----	54.0	-----	12.4

Ch.100(5 500 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
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The emissions above 1 GHz were 20 dB lower than the limit.

Ch.120(5 600 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
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The emissions above 1 GHz were 20 dB lower than the limit.

Ch.144(5 720 MHz)

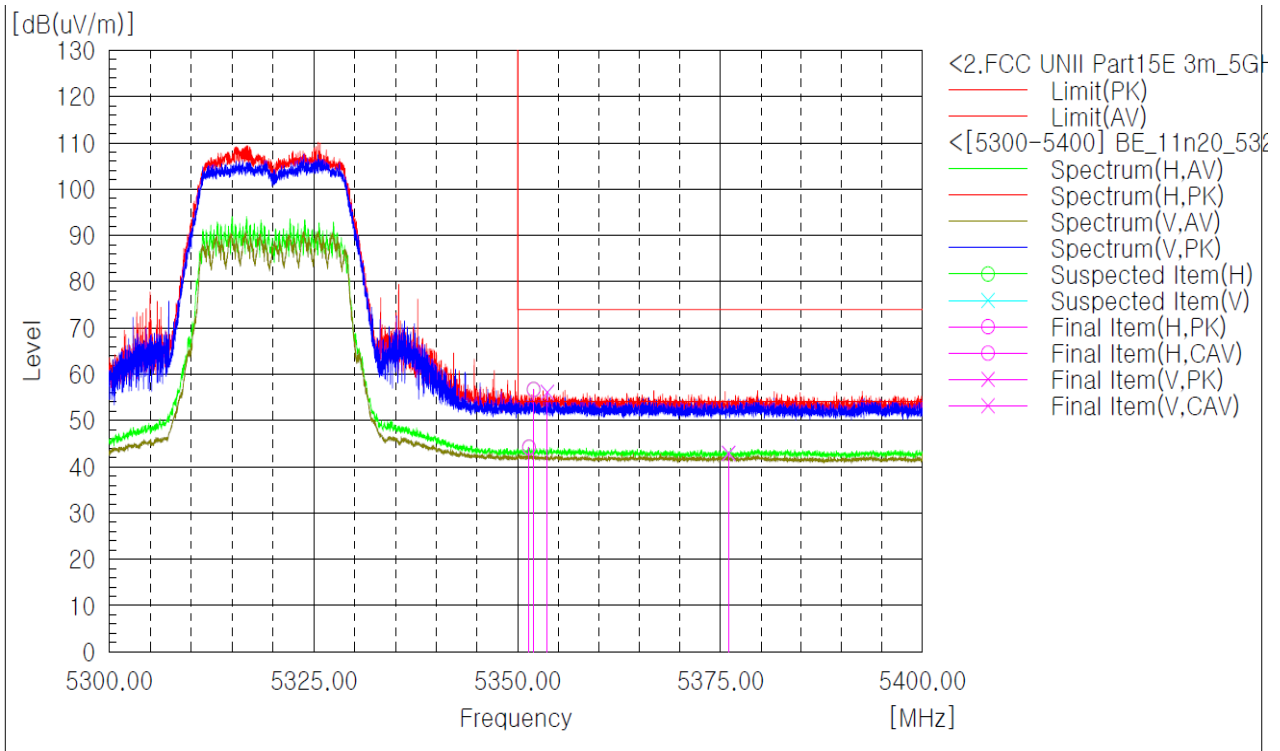
Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
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The emissions above 1 GHz were 20 dB lower than the limit.

Remarks

1. The unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in stand-up position(Z axis) and the worst case was recorded.
2. Correction factor = Antenna factor + Cable loss - Amp Gain

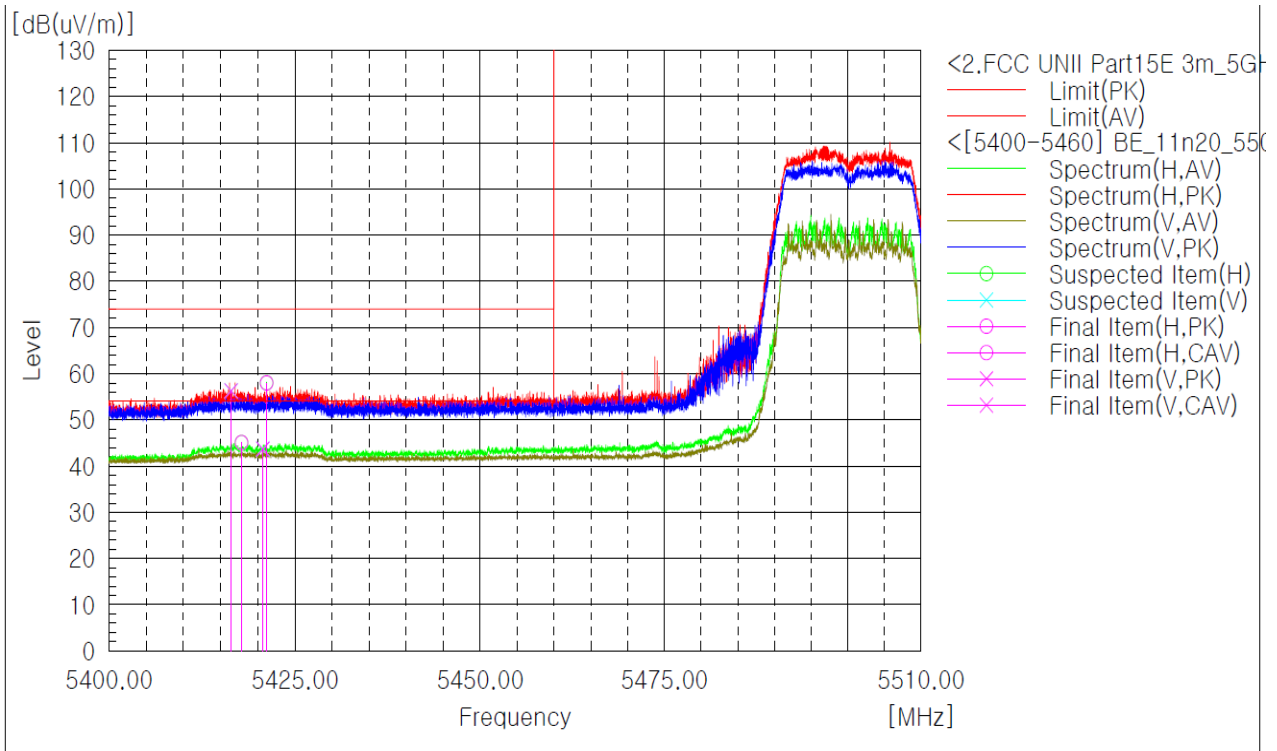
Worst Case Mode :	802.11n_HT20
Worst Case Transfer Rate :	MCS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 320 MHz
Channel :	64



Frequency [MHz]	(P)	Level PK [dB(uV / m)]	Level AV [dB(uV / m)]	Limit PK [dB(uV / m)]	Limit AV [dB(uV / m)]	Margin PK [dB]	Margin AV [dB]
5 351.96	H	56.7	-----	74.0	-----	17.3	-----
5 351.39	H	-----	44.2	-----	54.0	-----	9.8
5 353.66	V	56.1	-----	74.0	-----	17.9	-----
5 376.00	V	-----	42.9	-----	54.0	-----	11.1

Radiated Restricted Band Edge Plot

Worst Case Mode :	802.11n_HT20
Worst Case Transfer Rate :	MCS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 500 MHz
Channel :	100



Frequency [MHz]	(P)	Level PK [dB(uV / m)]	Level AV [dB(uV / m)]	Limit PK [dB(uV / m)]	Limit AV [dB(uV / m)]	Margin PK [dB]	Margin AV [dB]
5 421.19	H	58.0	-----	74.0	-----	16.0	-----
5 417.82	H	-----	45.1	-----	54.0	-----	8.9
5 416.40	V	56.3	-----	74.0	-----	17.7	-----
5 420.68	V	-----	43.7	-----	54.0	-----	10.3

Radiated Restricted Band Edge Plot

Test mode : Transmitter, 802.11ac_VHT20

The requirements are:

☒ Complies

Test Data

Ch.52(5 260 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
10 519.83	H	63.8	-----	74.0	-----	10.2	-----
10 520.82	H	-----	45.5	-----	54.0	-----	8.5
10 530.46	V	54.6	-----	74.0	-----	19.4	-----
10 559.08	V	-----	41.5	-----	54.0	-----	12.5

Ch.60(5 300 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
10 599.63	H	61.4	-----	74.0	-----	12.6	-----
10 600.88	H	-----	46.2	-----	54.0	-----	7.8
10 613.85	V	53.9	-----	74.0	-----	20.1	-----
10 621.32	V	-----	41.8	-----	54.0	-----	12.2

Ch.64(5 320 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
10 640.35	H	61.1	-----	74.0	-----	12.9	-----
10 641.46	H	-----	46.2	-----	54.0	-----	7.8
10 623.66	V	53.7	-----	74.0	-----	20.3	-----
10 667.73	V	-----	42.0	-----	54.0	-----	12.0

Ch.100(5 500 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
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The emissions above 1 GHz were 20 dB lower than the limit.

Ch.120(5 600 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
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The emissions above 1 GHz were 20 dB lower than the limit.

Ch.144(5 720 MHz)

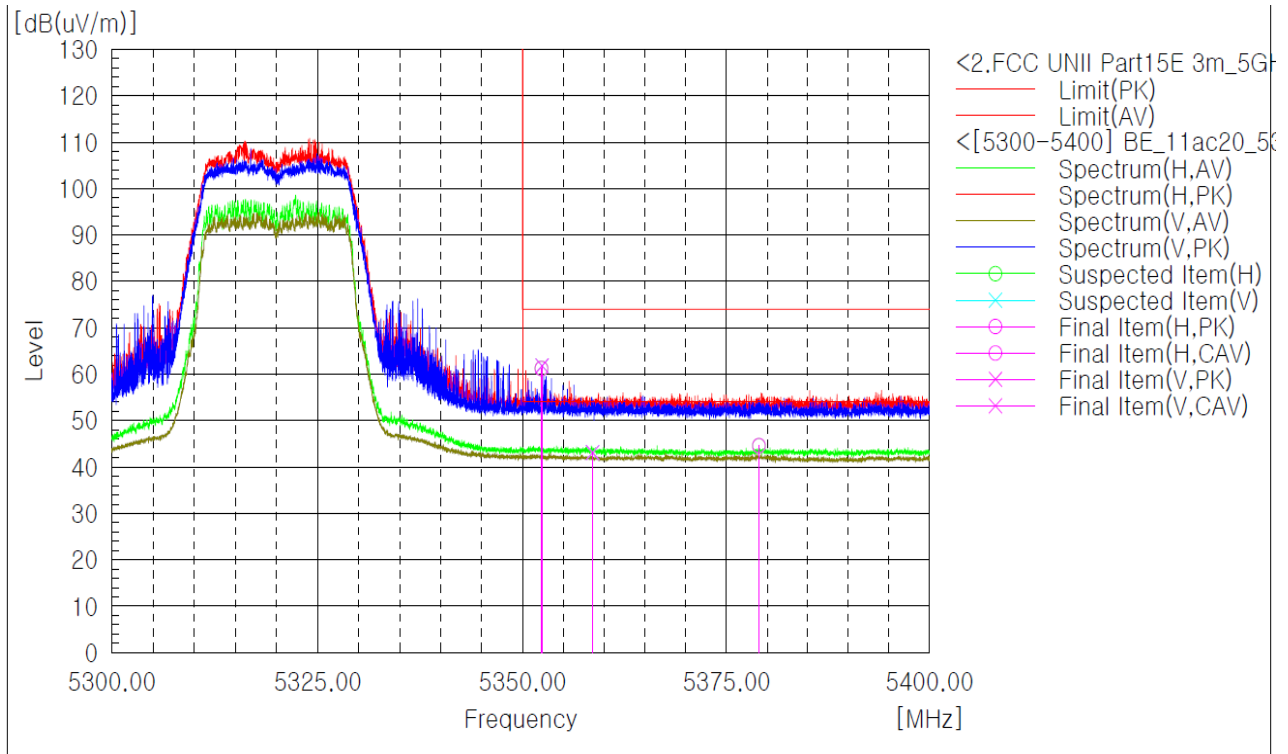
Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
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The emissions above 1 GHz were 20 dB lower than the limit.

Remarks

1. The unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in stand-up position(Z axis) and the worst case was recorded.
2. Correction factor = Antenna factor + Cable loss - Amp Gain

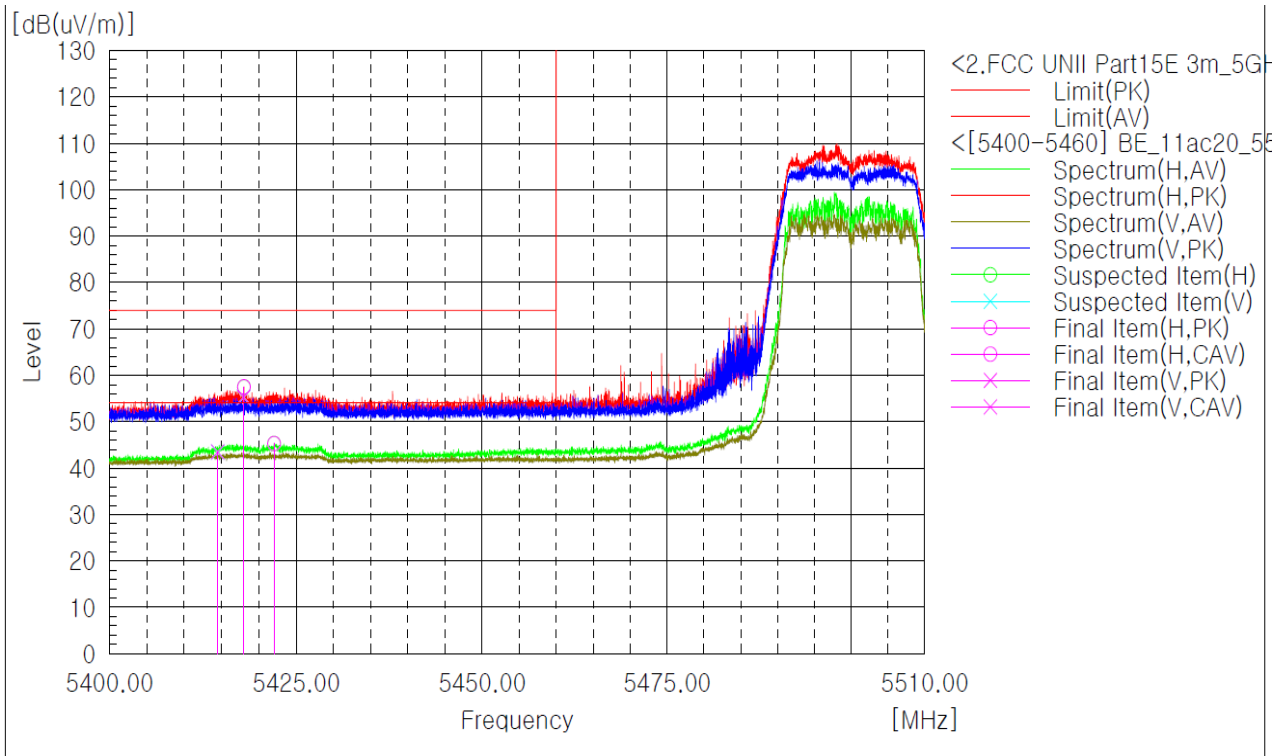
Worst Case Mode :	802.11ac_VHT20
Worst Case Transfer Rate :	MNSS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 320 MHz
Channel :	64



Frequency [MHz]	(P)	Level PK [dB(uV / m)]	Level AV [dB(uV / m)]	Limit PK [dB(uV / m)]	Limit AV [dB(uV / m)]	Margin PK [dB]	Margin AV [dB]
5 352.31	H	61.2	-----	74.0	-----	12.8	-----
5 379.00	H	-----	44.6	-----	54.0	-----	9.4
5 352.39	V	61.8	-----	74.0	-----	12.2	-----
5 358.58	V	-----	43.1	-----	54.0	-----	10.9

Radiated Restricted Band Edge Plot

Worst Case Mode :	802.11ac_VHT20
Worst Case Transfer Rate :	MNSS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 500 MHz
Channel :	100



Frequency [MHz]	(P)	Level PK [dB(uV / m)]	Level AV [dB(uV / m)]	Limit PK [dB(uV / m)]	Limit AV [dB(uV / m)]	Margin PK [dB]	Margin AV [dB]
5 418.01	H	57.5	-----	74.0	-----	16.5	-----
5 422.04	H	-----	45.3	-----	54.0	-----	8.7
5 417.96	V	55.3	-----	74.0	-----	18.7	-----
5 414.49	V	-----	43.5	-----	54.0	-----	10.5

Radiated Restricted Band Edge Plot

Test mode : Transmitter, 802.11n_HT40

The requirements are:

☒ Complies

Test Data

Ch.54(5 270 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
10 540.76	H	63.8	-----	74.0	-----	10.2	-----
10 541.45	H	-----	47.2	-----	54.0	-----	6.8
10 541.04	V	56.2	-----	74.0	-----	17.8	-----
10 546.22	V	-----	41.6	-----	54.0	-----	12.4

Ch.62(5 310 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
10 620.30	H	63.4	-----	74.0	-----	10.6	-----
10 621.55	H	-----	47.0	-----	54.0	-----	7.0
10 620.93	V	55.5	-----	74.0	-----	18.5	-----
10 618.22	V	-----	41.7	-----	54.0	-----	12.3

Ch.102(5 510 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
6 122.26	H	56.0	-----	74.0	-----	18.0	-----
6 122.22	H	-----	43.1	-----	54.0	-----	10.9
6 122.18	V	56.1	-----	74.0	-----	17.9	-----
6 122.38	V	-----	47.9	-----	54.0	-----	6.1

Ch.118(5 590 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
6 166.67	H	56.1	-----	74.0	-----	17.9	-----
6 166.77	H	-----	44.0	-----	54.0	-----	10.0
6 166.66	V	53.5	-----	74.0	-----	20.5	-----
6 166.64	V	-----	46.4	-----	54.0	-----	7.6

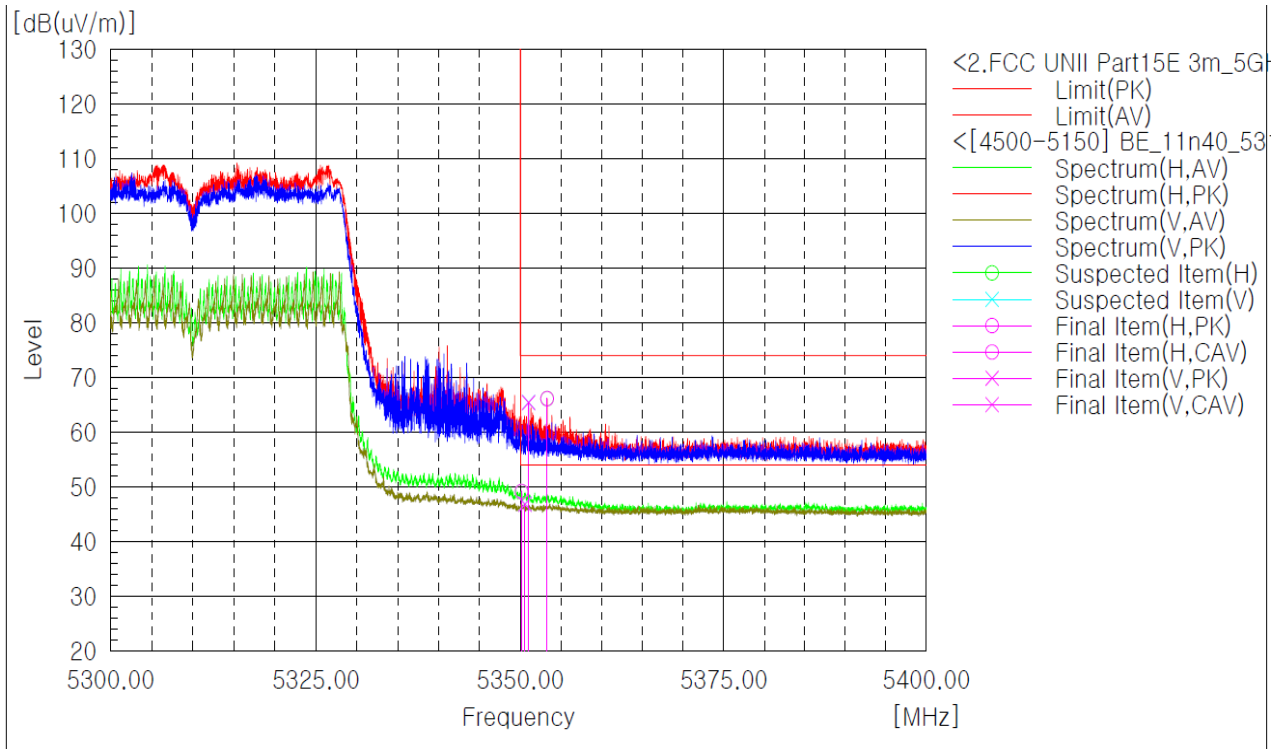
Ch.142(5 710 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV / m)]	Level AV [dB(uV / m)]	Limit PK [dB(uV / m)]	Limit AV [dB(uV / m)]	Margin PK [dB]	Margin AV [dB]
3 806.67	H	56.1	-----	74.0	-----	17.9	-----
3 806.77	H	-----	50.8	-----	54.0	-----	3.2
3 806.80	V	50.2	-----	74.0	-----	23.8	-----
3 806.80	V	-----	37.2	-----	54.0	-----	16.8

Remarks

1. The unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in stand-up position(Z axis) and the worst case was recorded.
2. Correction factor = Antenna factor + Cable loss - Amp Gain

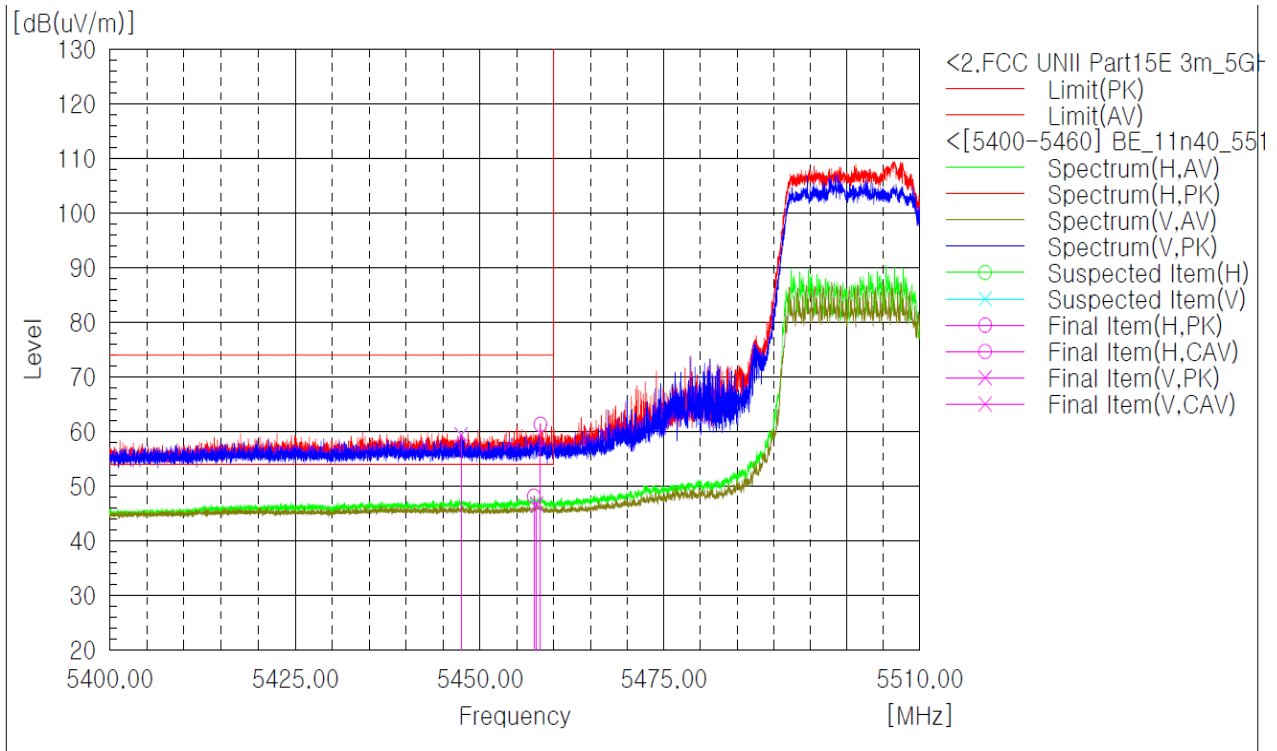
Worst Case Mode :	802.11n_HT40
Worst Case Transfer Rate :	MCS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 310 MHz
Channel :	62



Frequency [MHz]	(P)	Level PK [dB(uV / m)]	Level AV [dB(uV / m)]	Limit PK [dB(uV / m)]	Limit AV [dB(uV / m)]	Margin PK [dB]	Margin AV [dB]
5 353.30	H	66.1	-----	74.0	-----	7.9	-----
5 350.16	H	-----	49.1	-----	54.0	-----	4.9
5 351.03	V	65.4	-----	74.0	-----	8.6	-----
5 350.59	V	-----	46.8	-----	54.0	-----	7.2

Radiated Restricted Band Edge Plot

Worst Case Mode :	802.11n_HT40
Worst Case Transfer Rate :	MCS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 510 MHz
Channel :	102



Frequency [MHz]	(P)	Level PK [dB(uV / m)]	Level AV [dB(uV / m)]	Limit PK [dB(uV / m)]	Limit AV [dB(uV / m)]	Margin PK [dB]	Margin AV [dB]
5 458.20	H	61.3	-----	74.0	-----	12.7	-----
5 457.32	H	-----	48.1	-----	54.0	-----	5.9
5 447.45	V	59.4	-----	74.0	-----	14.6	-----
5 457.70	V	-----	46.7	-----	54.0	-----	7.3

Radiated Restricted Band Edge Plot

Test mode : Transmitter, 802.11ac_VHT40

The requirements are:

☒ Complies

Test Data

Ch.54(5 270 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
10 540.63	H	62.1	-----	74.0	-----	11.9	-----
10 541.55	H	-----	47.8	-----	54.0	-----	6.2
10 541.22	V	55.2	-----	74.0	-----	18.8	-----
10 543.32	V	-----	41.7	-----	54.0	-----	12.3

Ch.62(5 310 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
10 617.01	H	63.4	-----	74.0	-----	10.6	-----
10 621.42	H	-----	48.0	-----	54.0	-----	6.0
10 616.43	V	55.0	-----	74.0	-----	19.0	-----
10 621.38	V	-----	41.6	-----	54.0	-----	12.4

Ch.102(5 510 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
3 673.52	H	51.1	-----	74.0	-----	22.9	-----
3 673.39	H	-----	44.0	-----	54.0	-----	10.0
3 673.49	V	47.7	-----	74.0	-----	26.3	-----
3 673.46	V	-----	36.4	-----	54.0	-----	17.6
6 122.30	H	54.6	-----	74.0	-----	19.4	-----
6 122.34	H	-----	45.3	-----	54.0	-----	8.7
6 122.33	V	56.1	-----	74.0	-----	17.9	-----
6 122.40	V	-----	49.7	-----	54.0	-----	4.3

Ch.118(5 590 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
3 726.77	H	53.1	-----	74.0	-----	20.9	-----
3 726.73	H	-----	48.9	-----	54.0	-----	5.1
3 726.90	V	48.0	-----	74.0	-----	26.0	-----
3 726.72	V	-----	36.7	-----	54.0	-----	17.3

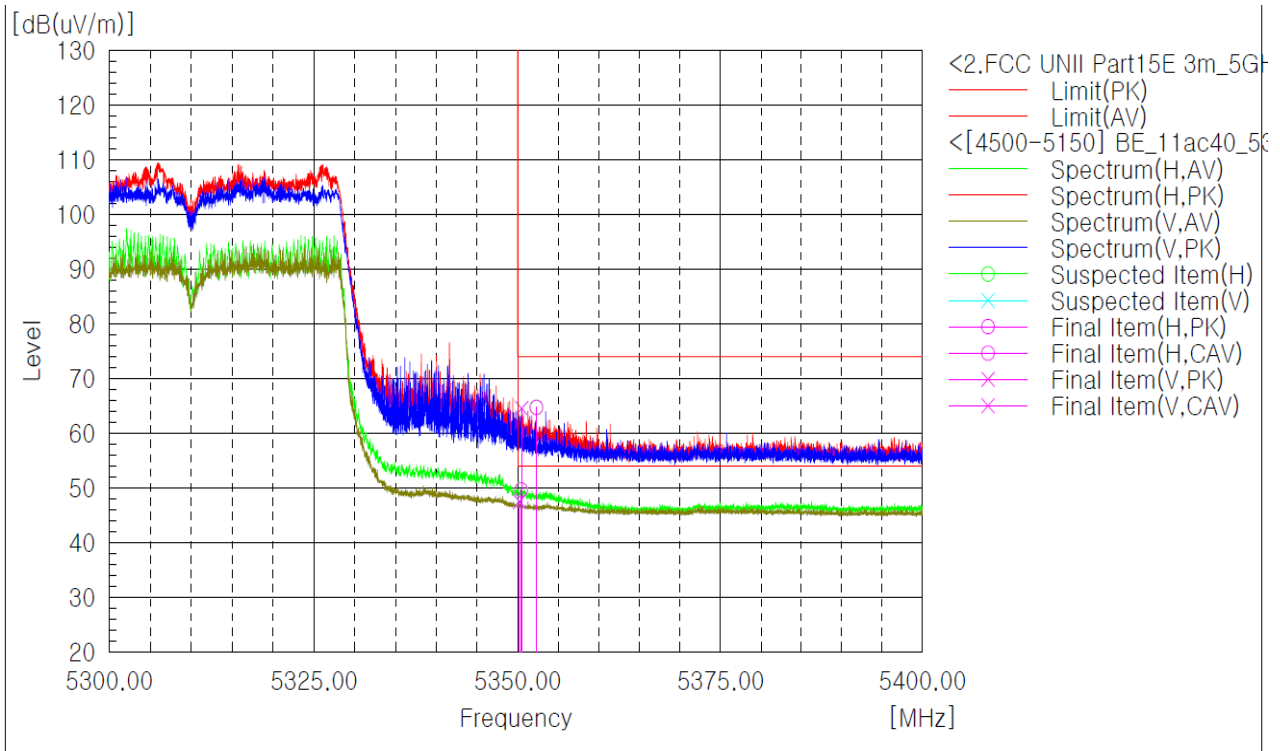
Ch.142(5 710 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
3 806.68	H	55.1	-----	74.0	-----	18.9	-----
3 806.68	H	-----	43.9	-----	54.0	-----	10.1
3 806.85	V	48.9	-----	74.0	-----	25.1	-----
3 806.66	V	-----	37.5	-----	54.0	-----	16.5

Remarks

1. The unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in stand-up position(Z axis) and the worst case was recorded.
2. Correction factor = Antenna factor + Cable loss - Amp Gain

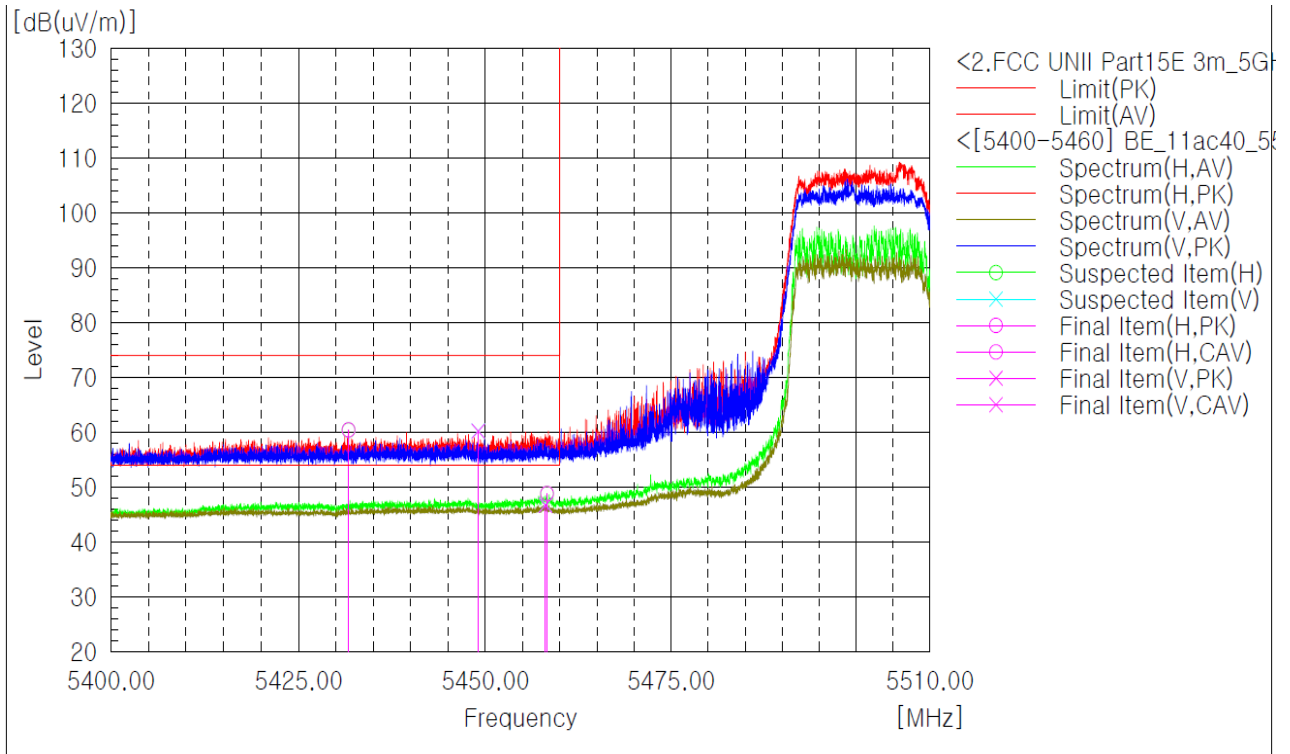
Worst Case Mode :	802.11ac_VHT40
Worst Case Transfer Rate :	MNSS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 310 MHz
Channel :	62



Frequency [MHz]	(P)	Level PK [dB(uV / m)]	Level AV [dB(uV / m)]	Limit PK [dB(uV / m)]	Limit AV [dB(uV / m)]	Margin PK [dB]	Margin AV [dB]
5 352.30	H	64.7	-----	74.0	-----	9.3	-----
5 350.44	H	-----	49.6	-----	54.0	-----	4.4
5 350.49	V	64.5	-----	74.0	-----	9.5	-----
5 350.23	V	-----	47.5	-----	54.0	-----	6.5

Radiated Restricted Band Edge Plot

Worst Case Mode :	802.11ac_VHT40
Worst Case Transfer Rate :	MNSS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 510 MHz
Channel :	102



Frequency [MHz]	(P)	Level PK [dB(uV / m)]	Level AV [dB(uV / m)]	Limit PK [dB(uV / m)]	Limit AV [dB(uV / m)]	Margin PK [dB]	Margin AV [dB]
5 431.69	H	60.4	-----	74.0	-----	13.6	-----
5 458.30	H	-----	48.8	-----	54.0	-----	5.2
5 449.06	V	60.2	-----	74.0	-----	13.8	-----
5 458.09	V	-----	46.7	-----	54.0	-----	7.3

Radiated Restricted Band Edge Plot

Test mode : Transmitter, 802.11ac_VHT80

The requirements are:

☒ Complies

Test Data

Ch.58(5 290 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
10 602.45	H	56.7	-----	74.0	-----	17.3	-----
10 673.83	H	-----	42.3	-----	54.0	-----	11.7
10 570.83	V	53.8	-----	74.0	-----	20.2	-----
10 651.60	V	-----	42.5	-----	54.0	-----	11.5

Ch.106(5 530 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
3 686.75	H	49.4	-----	74.0	-----	24.6	-----
3 686.72	H	-----	42.6	-----	54.0	-----	11.4
3 686.56	V	45.8	-----	74.0	-----	28.2	-----
3 686.76	V	-----	33.9	-----	54.0	-----	20.1

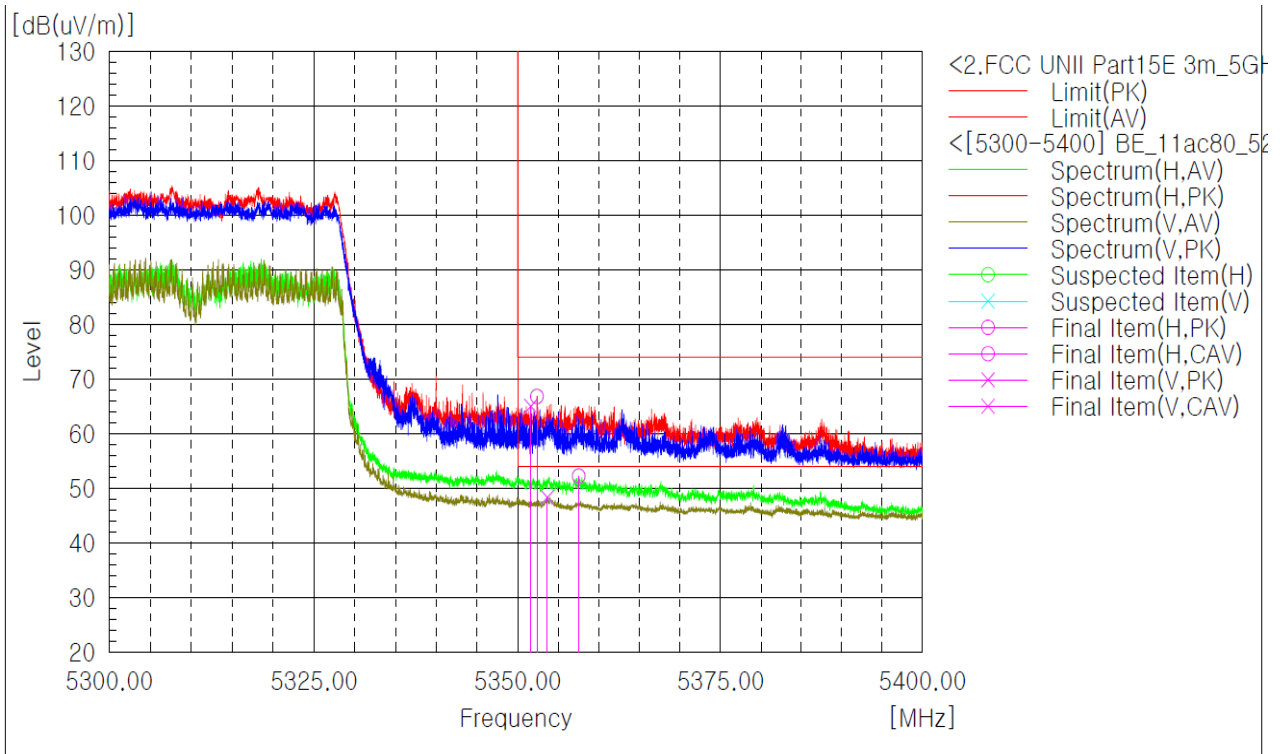
Ch.138(5 690 MHz)

Frequency [MHz]	(P)	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
3 793.24	H	54.0	-----	74.0	-----	20.0	-----
3 793.42	H	-----	47.8	-----	54.0	-----	6.2
3 793.47	V	47.1	-----	74.0	-----	26.9	-----
3 793.36	V	-----	35.3	-----	54.0	-----	18.7

Remarks

1. The unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in stand-up position(Z axis) and the worst case was recorded.
2. Correction factor = Antenna factor + Cable loss - Amp Gain

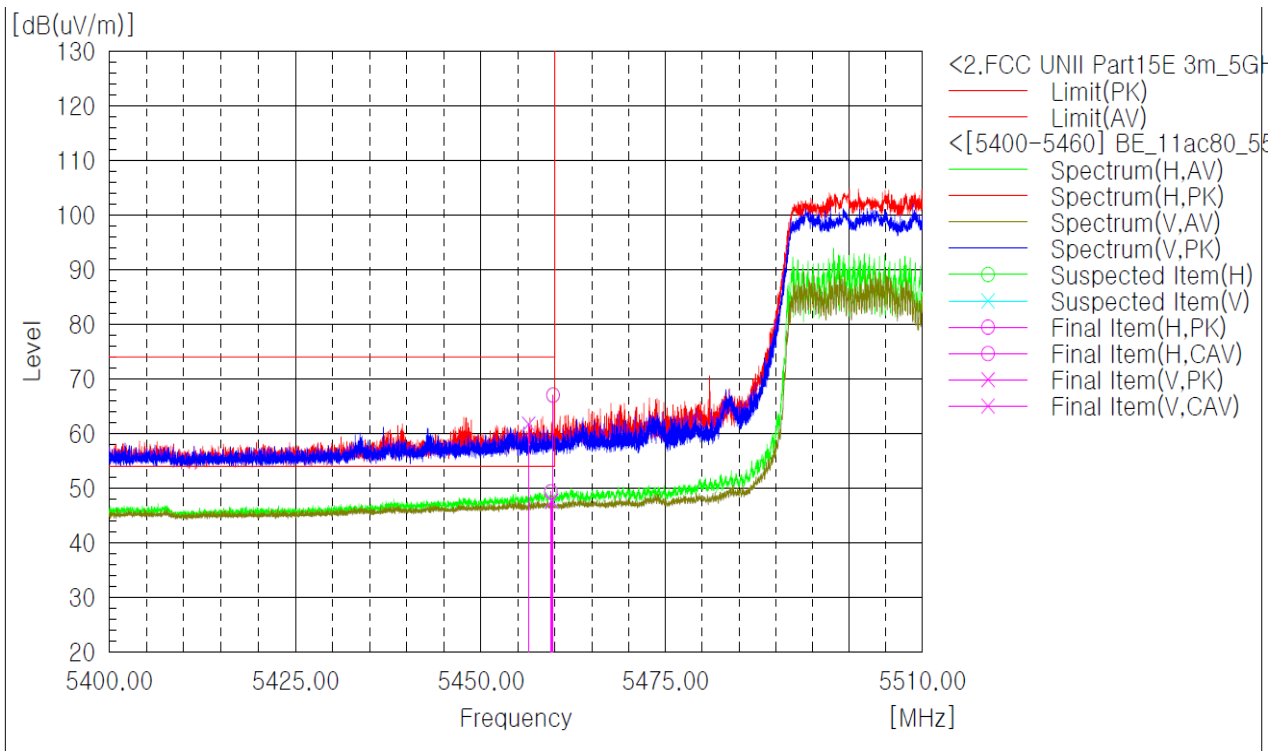
Worst Case Mode :	802.11ac_VHT80
Worst Case Transfer Rate :	MNSS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 290 MHz
Channel :	58



Frequency [MHz]	(P)	Level PK [dB(uV / m)]	Level AV [dB(uV / m)]	Limit PK [dB(uV / m)]	Limit AV [dB(uV / m)]	Margin PK [dB]	Margin AV [dB]
5 352.36	H	66.8	-----	74.0	-----	7.2	-----
5 357.51	H	-----	52.2	-----	54.0	-----	1.8
5 351.63	V	65.0	-----	74.0	-----	9.0	-----
5 353.66	V	-----	48.3	-----	54.0	-----	5.7

Radiated Restricted Band Edge Plot

Worst Case Mode :	802.11ac_VHT80
Worst Case Transfer Rate :	MNSS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 530 MHz
Channel :	106



Frequency [MHz]	(P)	Level PK [dB(μV / m)]	Level AV [dB(μV / m)]	Limit PK [dB(μV / m)]	Limit AV [dB(μV / m)]	Margin PK [dB]	Margin AV [dB]
5 459.77	H	67.0	-----	74.0	-----	7.0	-----
5 459.48	H	-----	49.3	-----	54.0	-----	4.7
5 456.46	V	61.7	-----	74.0	-----	12.3	-----
5 459.59	V	-----	47.6	-----	54.0	-----	6.4

Radiated Restricted Band Edge Plot

4.6 AC Conducted Emissions

Test Location

Shielded Room

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Procedures

The EUT was placed on a non-metallic table 0.8m above the metallic, grounded floor and 0.4m from the reference ground plane wall. The distance to other metallic surfaces was at least 0.8m.

Amplitude measurements were performed with a quasi-peak detector and an average detector.

Limit

- 15.207(a)

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56*	56 to 46*
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency.

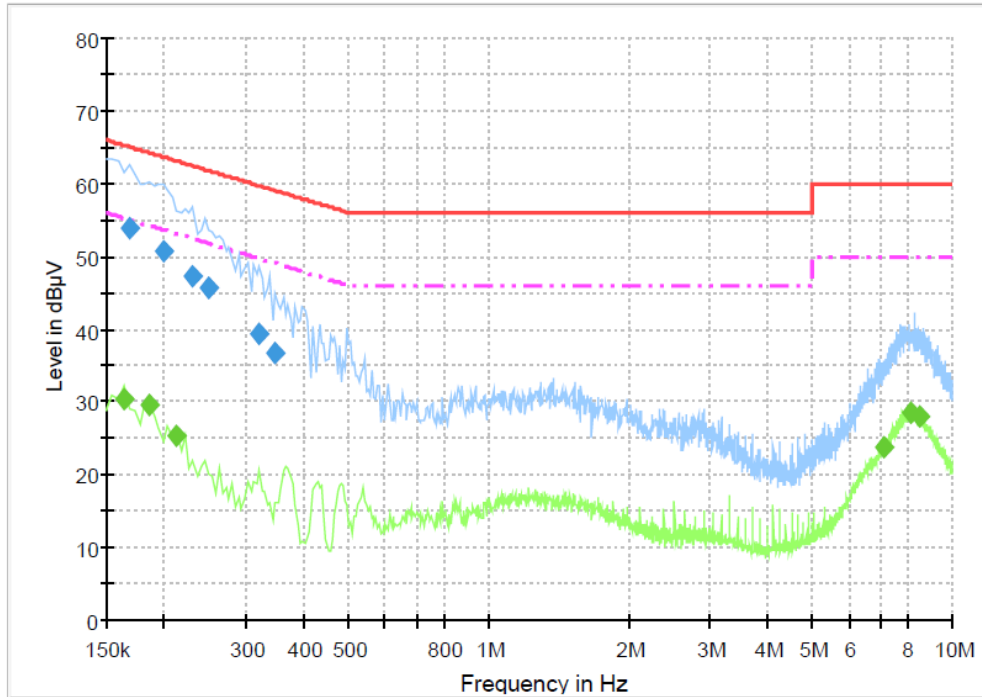
Test Results

The requirements are:

☒ Complies

Test Data

[LINE]
3CE_Class B_L1



Final Result 1

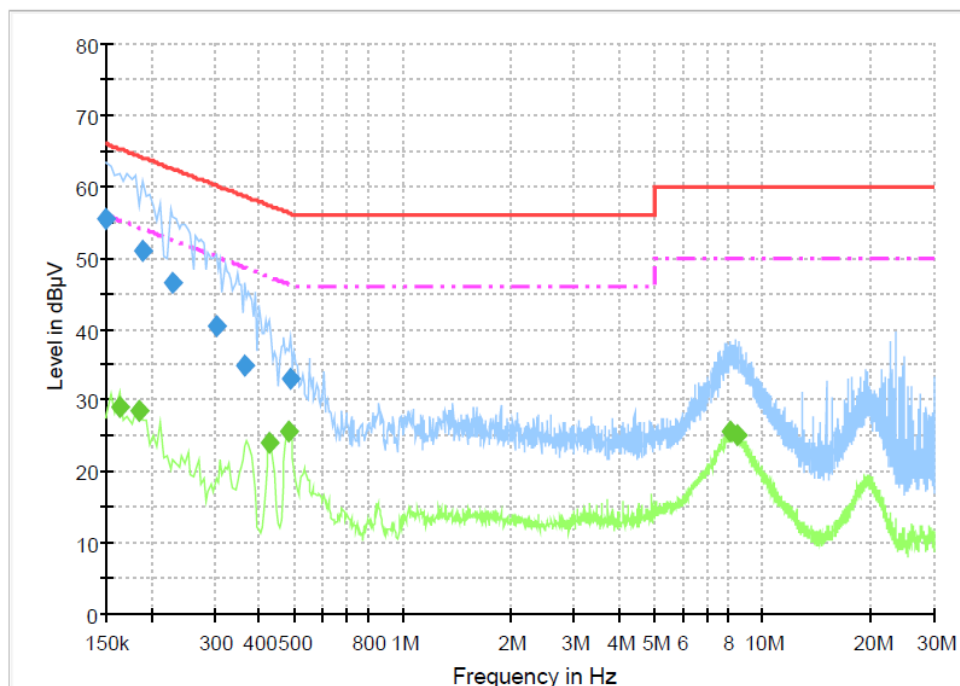
Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.168000	53.9	1000.0	9.000	On	L1	9.8	11.2	65.1
0.199500	50.6	1000.0	9.000	On	L1	9.8	13.0	63.6
0.231000	47.2	1000.0	9.000	On	L1	9.8	15.2	62.4
0.249000	45.7	1000.0	9.000	On	L1	9.7	16.1	61.8
0.321000	39.2	1000.0	9.000	On	L1	9.9	20.5	59.7
0.348000	36.8	1000.0	9.000	On	L1	9.9	22.2	59.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.163500	30.4	1000.0	9.000	On	L1	9.8	24.9	55.3
0.186000	29.7	1000.0	9.000	On	L1	9.8	24.5	54.2
0.213000	25.4	1000.0	9.000	On	L1	9.8	27.7	53.1
7.143000	23.9	1000.0	9.000	On	L1	9.8	26.1	50.0
8.119500	28.5	1000.0	9.000	On	L1	9.8	21.5	50.0
8.520000	27.9	1000.0	9.000	On	L1	9.8	22.1	50.0

[NEUTRAL]

3CE_Class B_N



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	55.4	1000.0	9.000	On	N	9.8	10.6	66.0
0.190500	51.0	1000.0	9.000	On	N	9.8	13.0	64.0
0.231000	46.6	1000.0	9.000	On	N	9.8	15.9	62.4
0.303000	40.4	1000.0	9.000	On	N	9.8	19.7	60.2
0.366000	35.0	1000.0	9.000	On	N	9.9	23.6	58.6
0.487500	33.1	1000.0	9.000	On	N	10.0	23.1	56.2

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.163500	29.1	1000.0	9.000	On	N	9.8	26.2	55.3
0.186000	28.5	1000.0	9.000	On	N	9.8	25.7	54.2
0.429000	24.0	1000.0	9.000	On	N	10.0	23.3	47.3
0.483000	25.5	1000.0	9.000	On	N	10.0	20.8	46.3
8.097000	25.7	1000.0	9.000	On	N	9.8	24.3	50.0
8.524500	25.2	1000.0	9.000	On	N	9.8	24.8	50.0

APPENDIX A – Test Equipment Used For Tests

	Name of Equipment	Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date
1	Signal Analyzer	Agilent	N9020A	MY48011598	2019-10-16	2020-10-16
2	Signal Analyzer	Agilent	N9020A	MY50200512	2019-04-23	2020-04-23
3	Signal Generator	Rohde & Schwarz	SMB100A	175528	2019-10-16	2020-10-16
4	EMI Test Receiver	Rohde & Schwarz	ESCI7	100814	2019-10-22	2020-10-22
5	Bilog Antenna	Schaffner	CBL6111C	2551	2018-05-10	2020-05-10
6	Active Loop Antenna	SCHWARZBECK	FMZB 1513	1513-126	2018-05-27	2020-05-27
7	6dB Attenuator	R&S	DNF	272.4110.50-2	2019-10-25	2020-10-25
8	AMPLIFIER	SONOMA	310	291721	2020-01-22	2021-01-22
9	EMI Test Receiver	Rohde & Schwarz	ESU40	100336	2020-01-17	2021-01-17
10	Preamplifier	Agilent	8449B	3008A02011	2019-11-25	2020-11-25
11	Singnal Canditioning Unit	Rohde & Schwarz	SCU-40	10023	2019-10-16	2020-10-16
12	Horn Antenna	ETS-Lindgren	3117	00154525	2019-09-25	2021-09-25
13	Horn Antenna	ETS-Lindgren	3116	00062916	2019-04-22	2021-04-22
14	Band Reject Filter	Micro Tronics	BRM50716	G264	2019-07-05	2020-07-05
15	LISN	Rohde & Schwarz	ENV216	101235	2020-01-17	2021-01-17
16	Temp&Humi Chamber	ESPEC CORP.	SH-242	93008423	2019-09-10	2020-09-10