

FCC Test Report

Report No.: AGC06691200301FE06

FCC ID : 2ARU9PAN001
APPLICATION PURPOSE : Original Equipment
PRODUCT DESIGNATION : TABLET PC
BRAND NAME : HOMA
MODEL NAME : HM-PAN-110
APPLICANT : Homa Technologies JSC
DATE OF ISSUE : Jul 23, 2020
STANDARD(S) : FCC Part 15.407
TEST PROCEDURE(S) : KDB 789033 D02 v02r01
REPORT VERSION : V1.0

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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jul. 23, 2020	Valid	Initial Release

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1. VERIFICATION OF CONFORMITY

Applicant	Homa Technologies JSC
Address	Building 5, 13th Street, QTSC, Tan Chanh Hiep Ward, District12, Ho Chi Minh City, Vietnam
Manufacturer	JIANGXI HONGYAODA COMMUNICATION LIMITED
Address	NO.69, NORTH OF GOLD AVENUE, NORTH AREA OF HONGKONG INDUSTRIAL PARK, GANZHOU ECONOMIC AND TECHNOLOGICAL DEVELOPMENT ZONE, GANZHOU CITY, JIANGXI PROVINCE, CHINA
Factory 1	JIANGXI HONGYAODA COMMUNICATION LIMITED
Address	NO.69, NORTH OF GOLD AVENUE, NORTH AREA OF HONGKONG INDUSTRIAL PARK, GANZHOU ECONOMIC AND TECHNOLOGICAL DEVELOPMENT ZONE, GANZHOU CITY, JIANGXI PROVINCE, CHINA
Product Designation	TABLET PC
Brand Name	HOMA
Test Model	HM-PAN-110
Date of test	Jul. 10, 2020 to Jul. 23, 2020
Deviation	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BGN/RF

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with requirement of FCC Part 15 Rules requirement.

Prepared By



Erik Yang
(Project Engineer)

Jul. 23, 2020

Reviewed By



Max Zhang
(Reviewer)

Jul. 23, 2020

Approved By



Forrest Lei
(Authorized Officer)

Jul. 23, 2020

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as "TABLET PC". It is designed by way of utilizing the OFDM technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	5150 MHz~5250MHz
Output Power	IEEE 802.11a20:7.14dBm IEEE 802.11n(20):7.06dBm; IEEE802.11n(40):6.97dBm IEEE802.11ac(20):7.08dBm IEEE802.11ac(40):7.04dBm EEE802.11ac(80):6.86dBm
Modulation	BPSK, QPSK, 16QAM, 64QAM, 128QAM, 256QAM,OFDM
Number of channels	7
Hardware Version	UX1.1
Software Version	PF125UX.P0.V10.32.HYD-V05.8788_7249
Antenna Designation	Integral antenna
Directional gain	All transmit signals are completely uncorrelated with each other
Antenna Gain	0dBi
Power Supply	DC 5V by adapter or DC 3.7V by battery

2.2. TABLE OF CARRIER FREQUENCIES

Frequency Band	Channel Number	Frequency
5150 GHz~5250GHz	36	5180 MHz
	38	5190 MHz
	40	5200 MHz
	42	5210 MHz
	44	5220 MHz
	46	5230 MHz
	48	5240 MHz

Note: For 20MHZ bandwidth system use Channel 36,40,44,48; For 40MHZ bandwidth system use Channel 38,46; For 80MHZ bandwidth system use Channel 42

2.3. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2ARU9PAN001** filing to comply with the FCC Part 15 requirements.

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2.4. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013).

Radiated testing was performed at an antenna to EUT distance 3 meters.

Others testing (listed at item 5.3) was performed according to the procedures in FCC Part 15.407 rules KDB 789033 D02

2.5. SPECIAL ACCESSORIES

Refer to section 5.2.

2.6. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

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3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by CISPR and ANSI.

- Uncertainty of Conducted Emission, $U_c = \pm 3.1$ dB
- Uncertainty of Radiated Emission below 1GHz, $U_c = \pm 4.0$ dB
- Uncertainty of Radiated Emission above 1GHz, $U_c = \pm 5.4$ dB

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4. DESCRIPTION OF TEST MODES

Mode	Available channel	Tested channel	Modulation	Date rate(Mbps)
802.11a/n20/ac20	36,40,44,48	36,38,48	OFDM	6/6.5
802.11n40/ac40	38,46	38,46	OFDM	13.5
802.11ac80	42	42	OFDM	13.5

Note:

1. The EUT has been set to operate continuously on tested channel individually, and the EUT is operating at its maximum duty cycle>or equal 98%
2. All modes under which configure applicable have been tested and the worst mode test data recording in the test report, if no other mode data.
3. The test software is the engineering mode apk which can set the EUT into the individual test modes.

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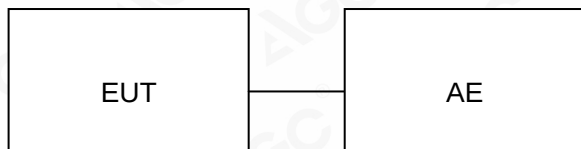
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5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure 1:



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	TABLET PC	HM-PAN-110	2ARU9PAN001	EUT
2	Adapter	GLY-G43UA-050200-629A	Input: AC100-240V, 50/60Hz, 0.3A Output: DC5V, 2A	AE

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.407	Emission Bandwidth	Compliant
§15.407	Maximum conducted output power	Compliant
§15.407	Conducted Spurious Emission	Compliant
§15.407	Maximum Conducted Output Power Density	Compliant
§15.209	Radiated Emission	Compliant
§15.407	Band Edges	Compliant
§15.207	Line Conduction Emission	Compliant

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6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Designation Number	CN1259
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	May 15, 2020	May 14, 2022
LISN	R&S	ESH2-Z5	100086	Aug. 26, 2019	Aug. 25, 2020
Test software	R&S	ES-K1(Ver.V1.71)	N/A	N/A	N/A

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	May 15, 2020	May 14, 2022
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 12, 2019	Dec. 11, 2020
Power sensor	Aglient	U2021XA	MY54110007	Sep. 09, 2019	Sep. 08, 2021
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep. 09, 2019	Sep. 08, 2021
preamplifier	ChengYi	EMC184045SE	980508	Sep. 21, 2017	Sep. 20, 2020
Active loop antenna (9K-30MHz)	A.H.	SAS-562B	18051	May 22, 2020	May 21, 2022
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May. 17, 2019	May. 16, 2021
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Oct. 15, 2019	Oct. 16, 2020
ANTENNA	SCHWARZBECK	VULB9168	D69250	Jan. 09, 2019	Jan. 08, 2021
Test software	Tonscend	JS32-RE (Ver.2.5)	N/A	N/A	N/A

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7. MAXIMUM CONDUCTED OUTPUT POWER

7.1. MEASUREMENT PROCEDURE

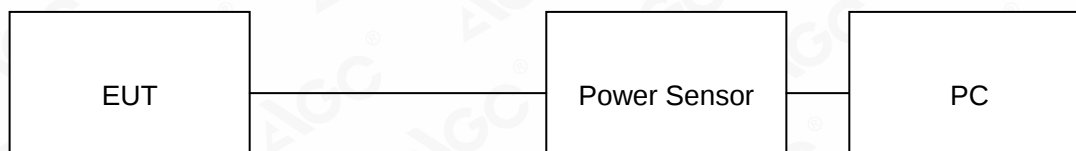
For average power test:

1. Connect EUT RF output port to power sensor through an RF attenuator.
2. Connect the power sensor to the PC.
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
4. Record the maximum power from the software.

Note : The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

7.2. TEST SET-UP

AVERAGE POWER SETUP



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7.3. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT FOR 802.11A20 MODULATION			
Frequency (MHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
5180	6.35	24	Pass
5200	7.14	24	Pass
5240	6.48	24	Pass

LIMITS AND MEASUREMENT RESULT FOR 802.11N20 MODULATION			
Frequency (MHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
5180	7.06	24	Pass
5200	6.93	24	Pass
5240	6.39	24	Pass

LIMITS AND MEASUREMENT RESULT FOR 802.11AC20 MODULATION			
Frequency (MHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
5180	7.08	24	Pass
5200	6.98	24	Pass
5240	6.38	24	Pass

LIMITS AND MEASUREMENT RESULT FOR 802.11N40 MODULATION			
Frequency (MHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
5190	6.97	24	Pass
5230	6.49	24	Pass

LIMITS AND MEASUREMENT RESULT FOR 802.11AC40 MODULATION			
Frequency (MHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
5190	7.04	24	Pass
5230	6.42	24	Pass

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LIMITS AND MEASUREMENT RESULT FOR 802.11AC80 MODULATION			
Frequency (MHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
5210	6.86	24	Pass

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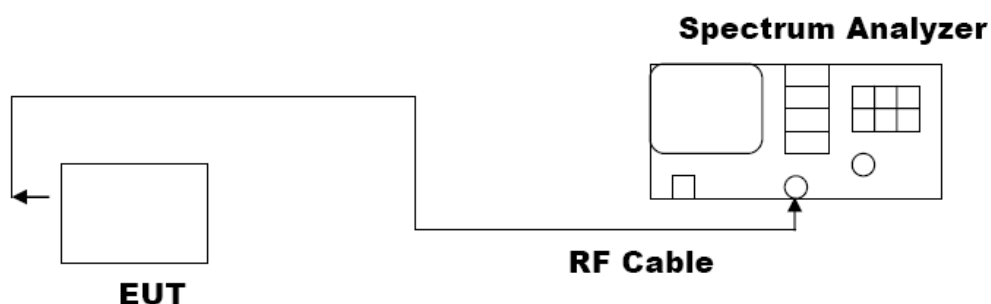
8. EMISSION BANDWIDTH

8.1. MEASUREMENT PROCEDURE

- Set RBW = approximately 1% of the emission bandwidth.
 - Set the VBW > RBW.
 - Detector = Peak.
 - Trace mode = max hold.
 - 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%.

Note: The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



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8.3. LIMITS AND MEASUREMENT RESULTS

LIMITS AND MEASUREMENT RESULT FOR 802.11A20 MODULATION				
Applicable Limits	Applicable Limits			
	Frequency (MHz)	-26dB Bandwidth	99.00% Occupied Bandwidth	Criteria
Within the Band	5180MHz	19.85	16.416	PASS
	5200MHz	19.85	16.352	PASS
	5240MHz	19.98	16.373	PASS

LIMITS AND MEASUREMENT RESULT FOR 802.11N20/40 MODULATION				
Applicable Limits	Applicable Limits			
	Frequency (MHz)	-26dB Bandwidth	99.00% Occupied Bandwidth	Criteria
Within the Band	5180MHz	19.93	17.481	PASS
	5200MHz	19.66	17.499	PASS
	5240MHz	19.86	17.486	PASS
	5190MHz	40.05	35.898	PASS
	5230MHz	40.87	35.893	PASS

LIMITS AND MEASUREMENT RESULT FOR 802.11AV20/40/80 MODULATION				
Applicable Limits	Applicable Limits			
	Frequency (MHz)	-26dB Bandwidth	99.00% Occupied Bandwidth	Criteria
Within the Band	5180MHz	19.77	17.489	PASS
	5200MHz	19.71	17.486	PASS
	5240MHz	19.72	17.479	PASS
	5190MHz	39.71	35.828	PASS
	5230MHz	39.88	35.821	PASS
	5210MHz	80.59	75.692	PASS

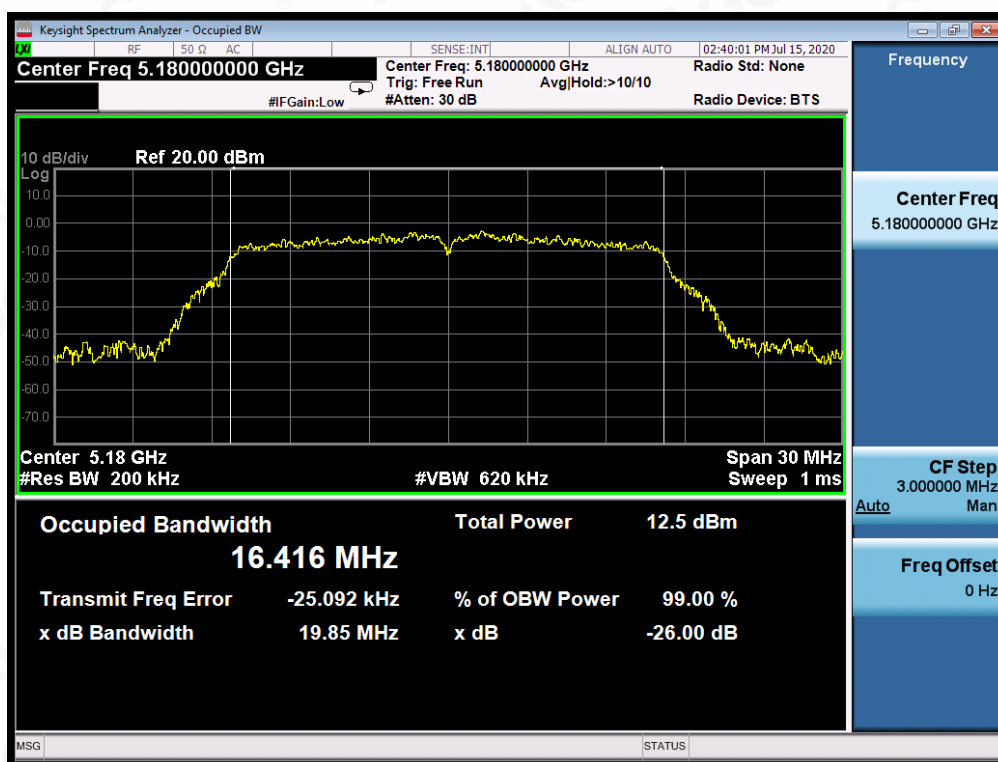
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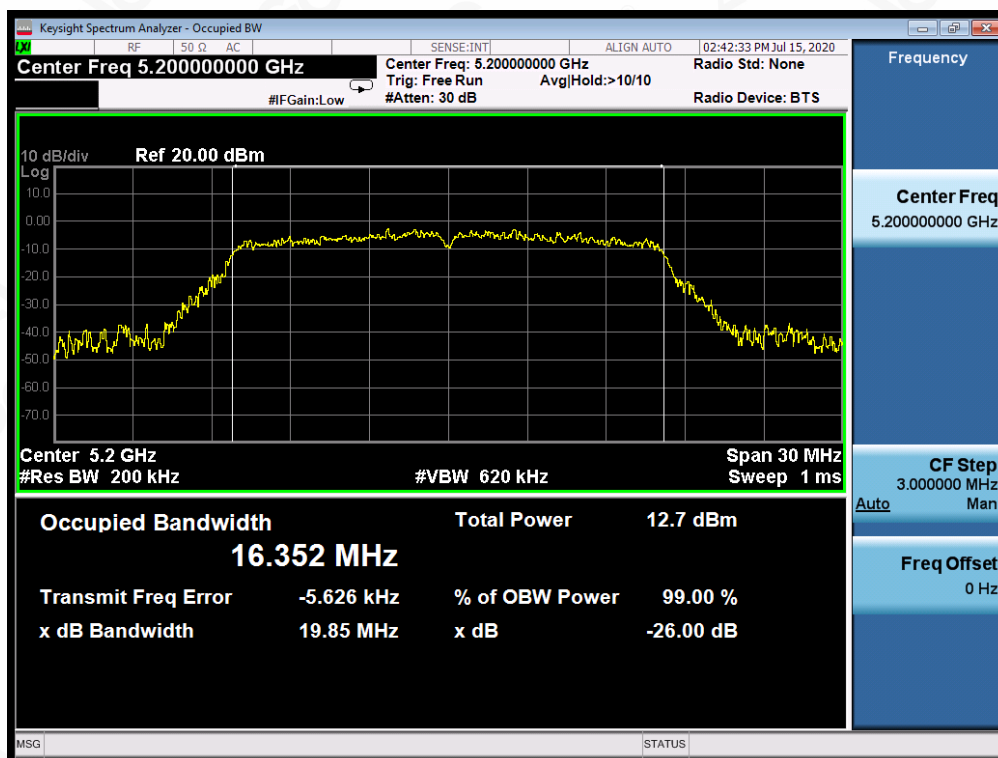


802.11a20 TEST RESULT

TEST PLOT OF BANDWIDTH FOR 5180MHz



TEST PLOT OF BANDWIDTH FOR 5200MHz

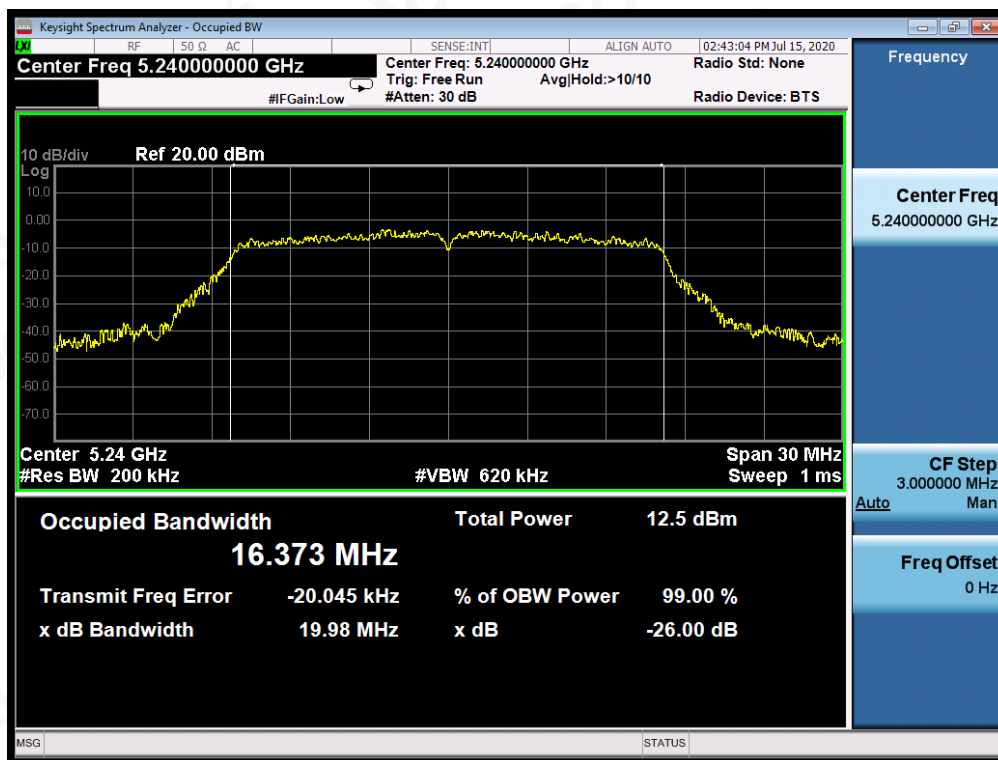


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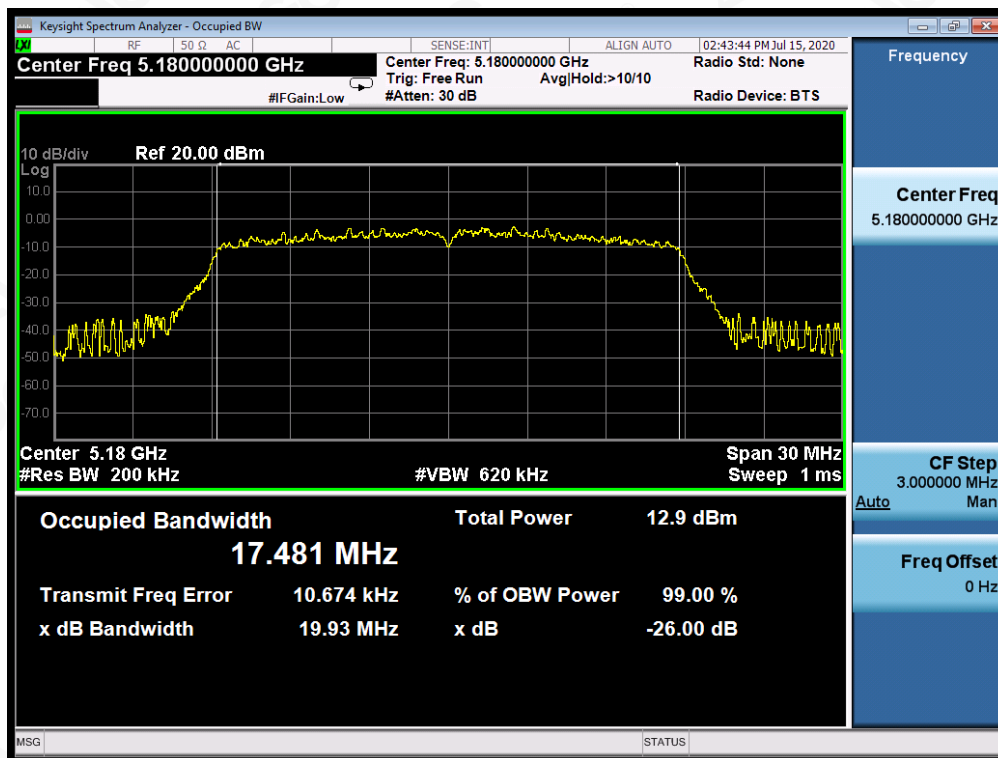


TEST PLOT OF BANDWIDTH FOR 5240MHz



802.11n20 TEST RESULT

TEST PLOT OF BANDWIDTH FOR 5180MHz

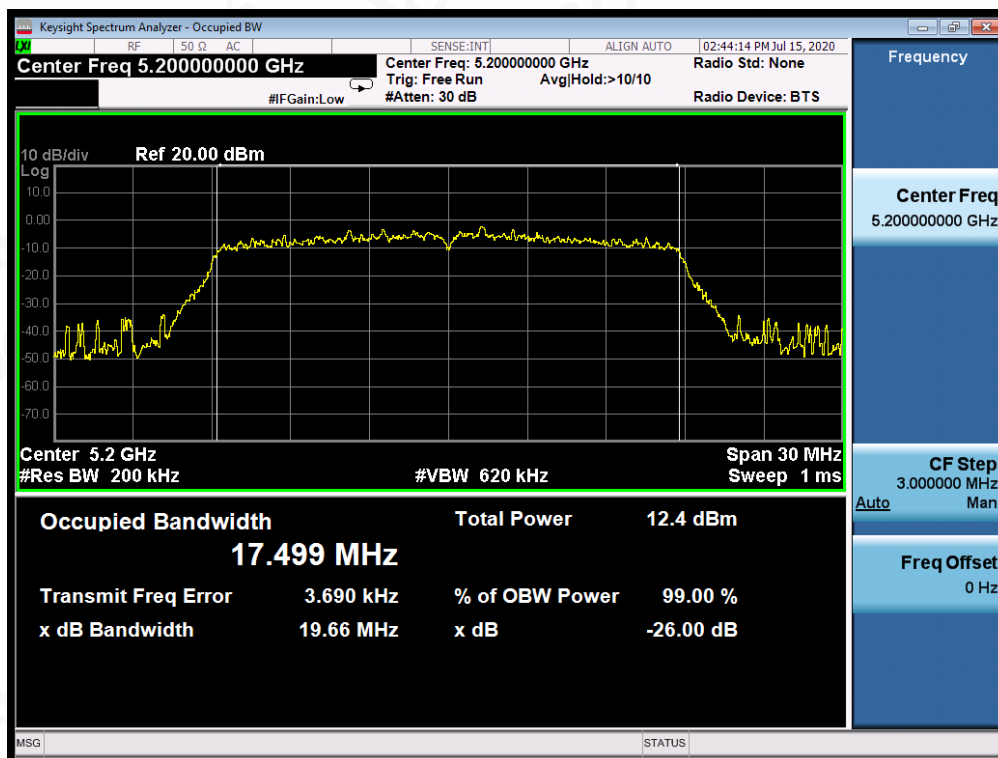


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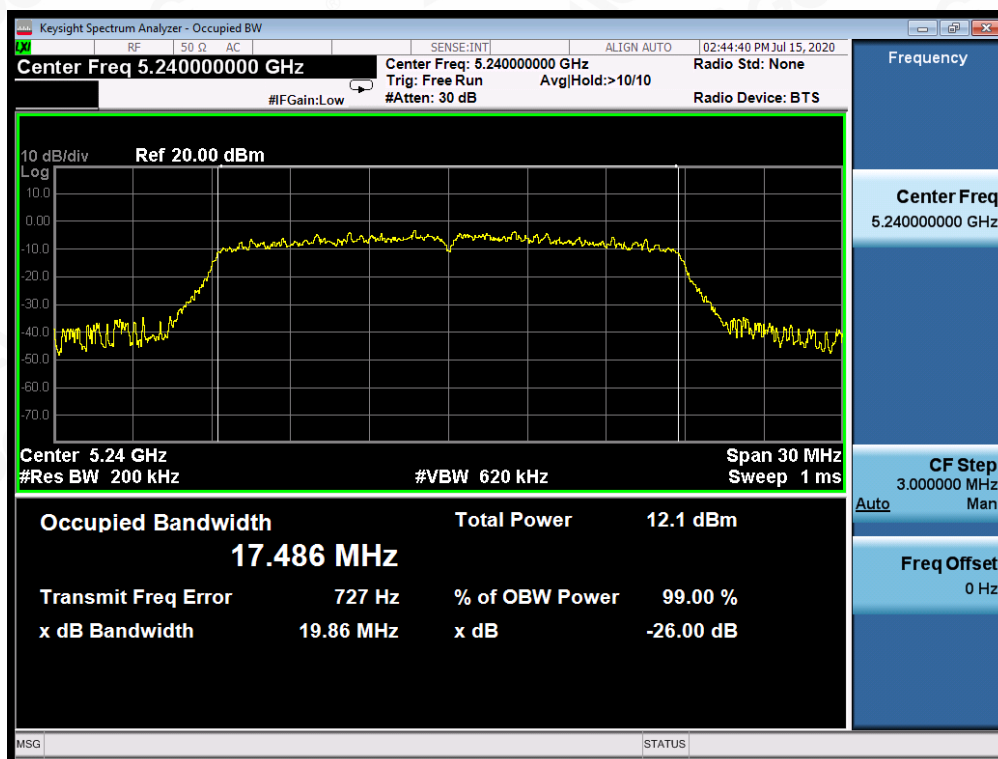
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TEST PLOT OF BANDWIDTH FOR 5200MHz



TEST PLOT OF BANDWIDTH FOR 5240MHz



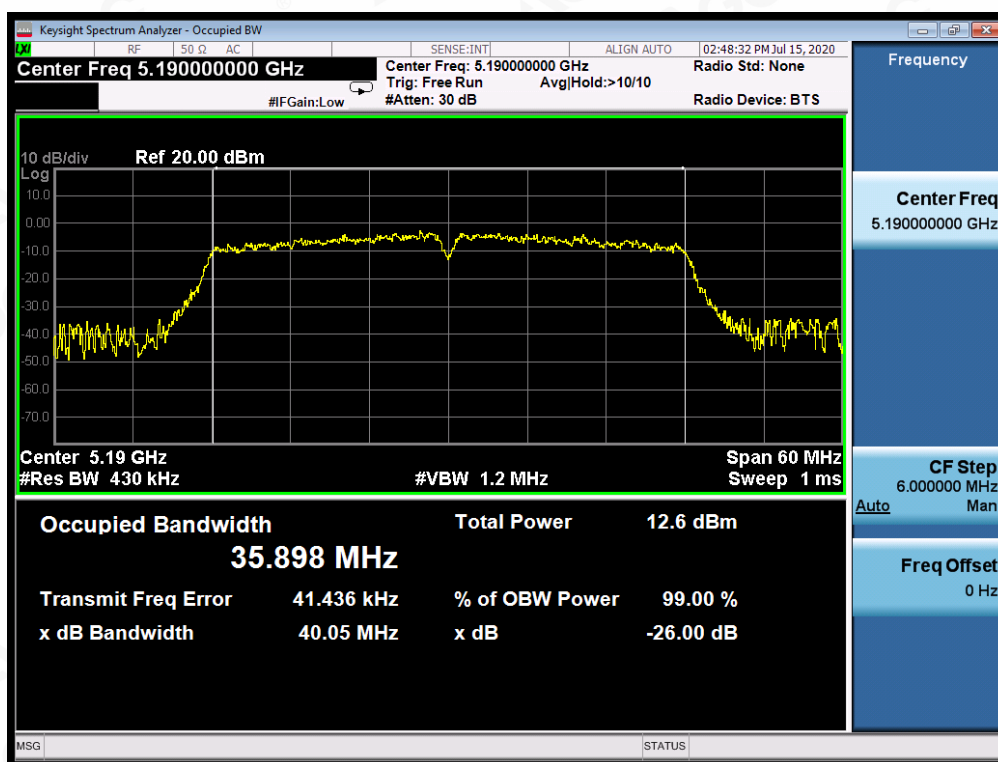
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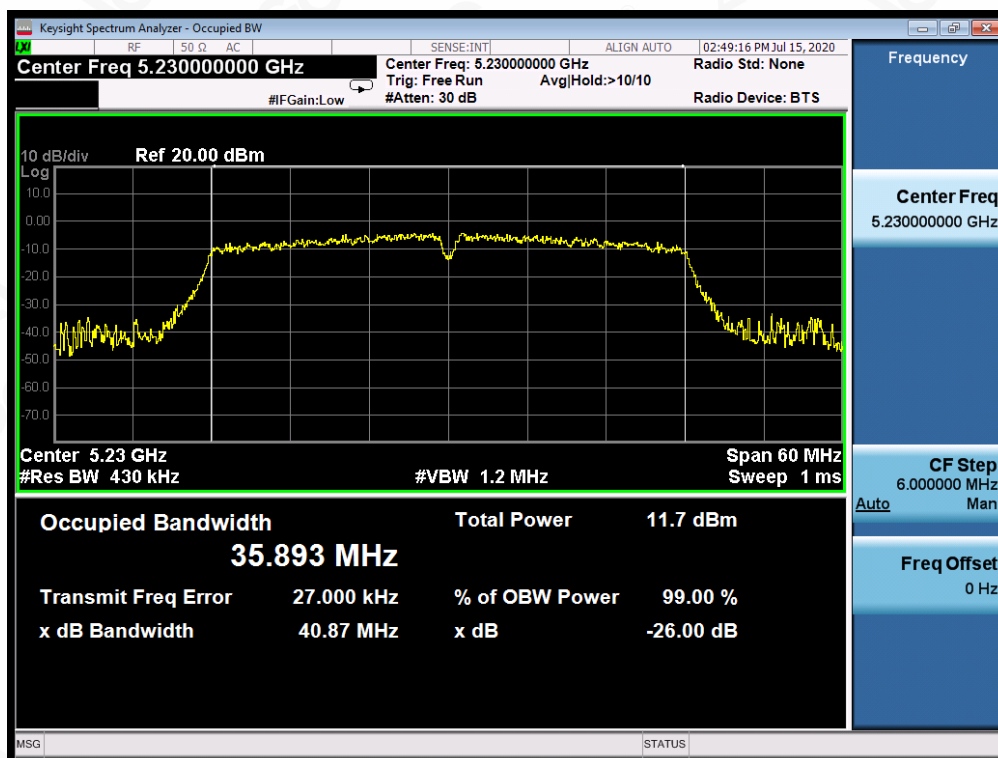


802.11n40 TEST RESULT

TEST PLOT OF BANDWIDTH FOR 5190MHz



TEST PLOT OF BANDWIDTH FOR 5230MHz



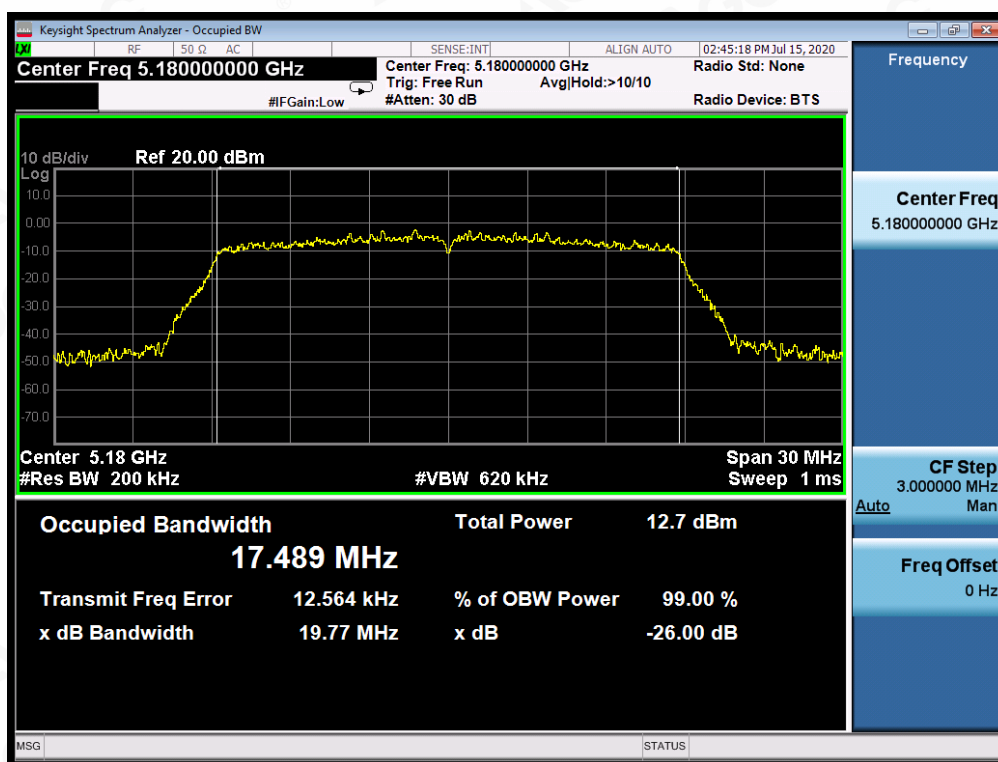
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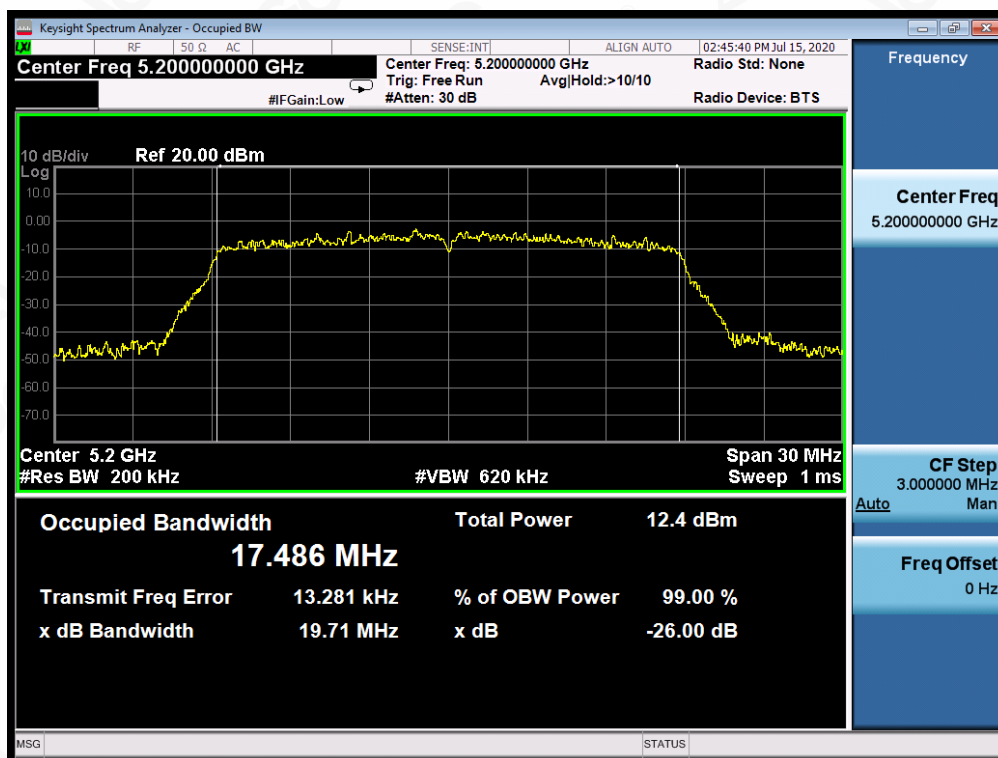


802.11ac20 TEST RESULT

TEST PLOT OF BANDWIDTH FOR 5180MHz



TEST PLOT OF BANDWIDTH FOR 5200MHz

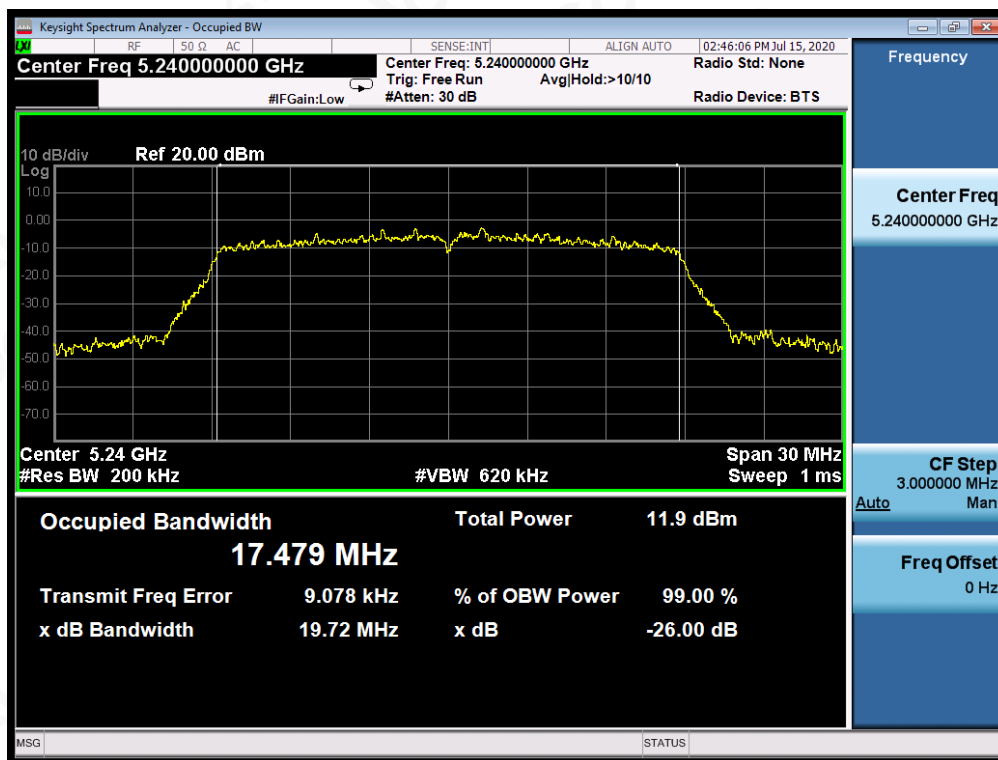


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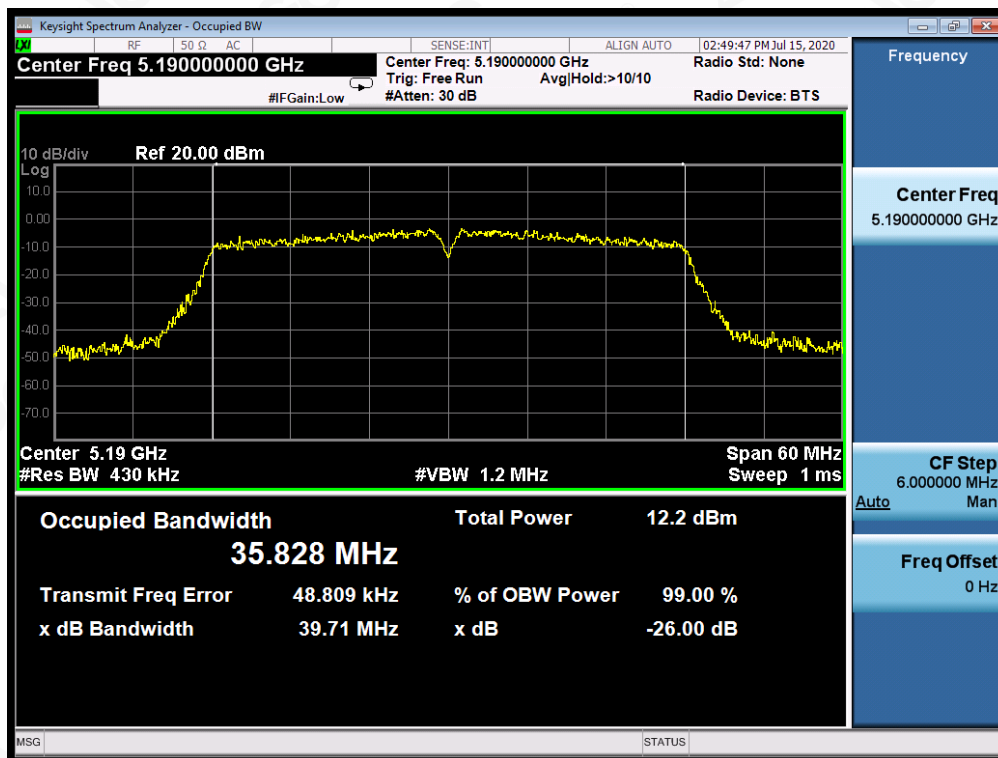


TEST PLOT OF BANDWIDTH FOR 5240MHz



802.11ac40 TEST RESULT

TEST PLOT OF BANDWIDTH FOR 5190MHz



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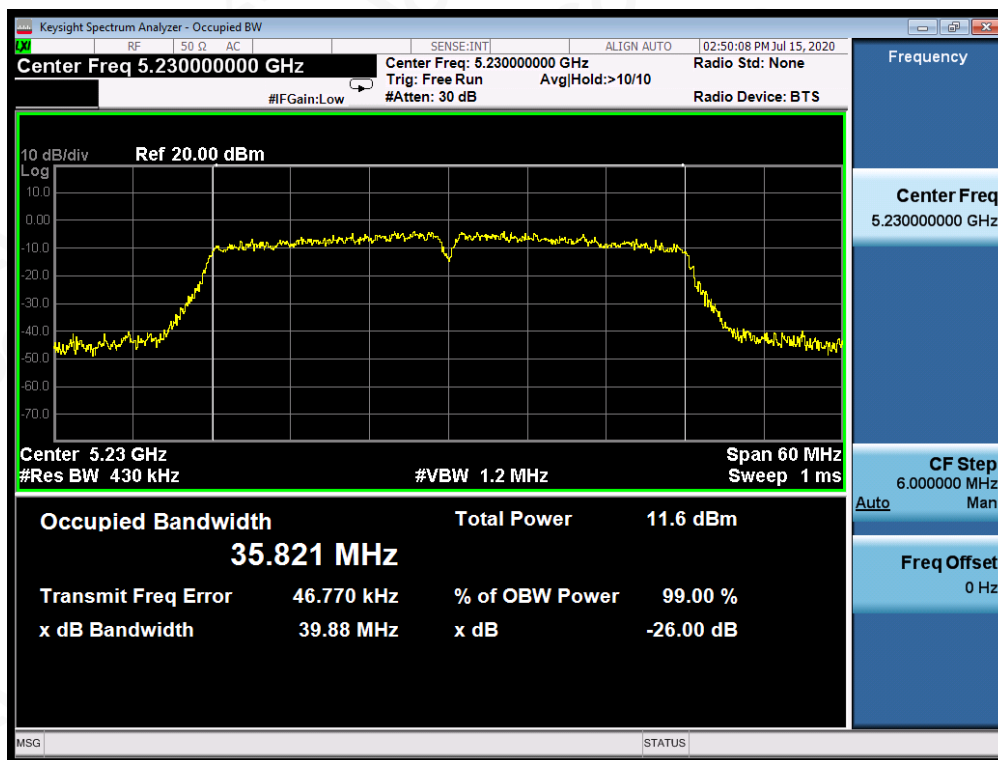
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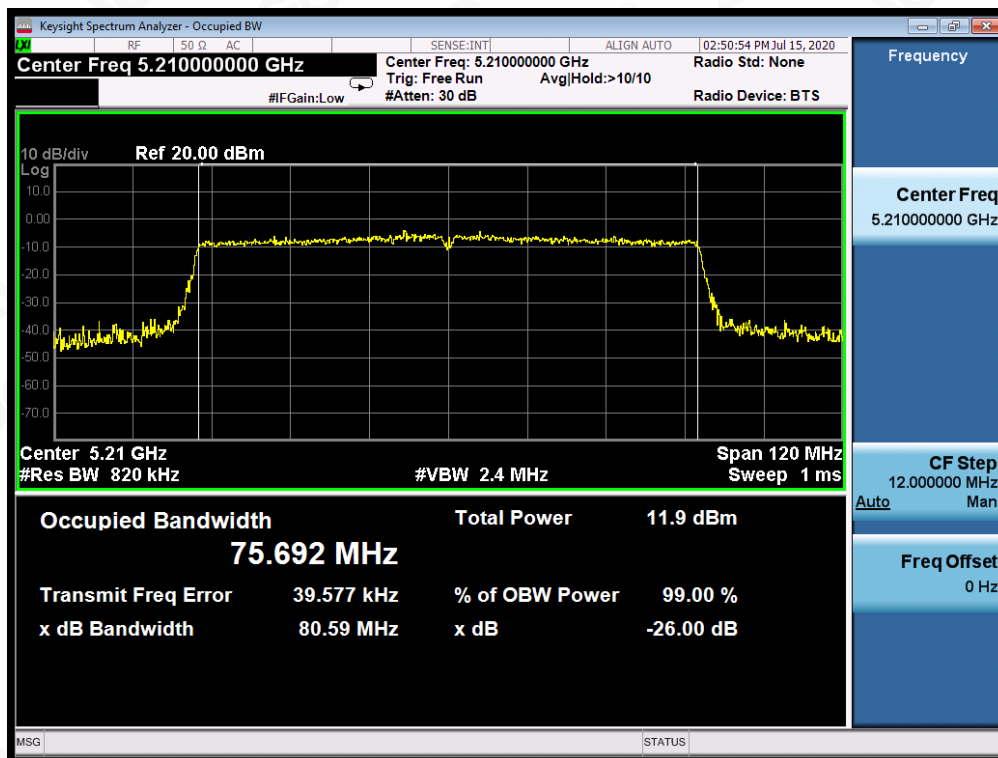


TEST PLOT OF BANDWIDTH FOR 5230MHz



802.11ac80 TEST RESULT

TEST PLOT OF BANDWIDTH FOR 5210MHz



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9. MAXIMUM CONDUCTED OUTPUT PEAK POWER SPECTRAL DENSITY

9.1 MEASUREMENT PROCEDURE

Refer to KDB 789033 section F

9.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

Refer To Section 8.2.

9.3 MEASUREMENT EQUIPMENT USED

Refer To Section 6.

9.4 LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT FOR 802.11A20 MODULATION			
Frequency (MHz)	Power density (dBm/MHz)	Applicable Limits (dBm)	Pass or Fail
5180	-3.857	11	Pass
5200	-3.200	11	Pass
5240	-3.758	11	Pass

LIMITS AND MEASUREMENT RESULT FOR 802.11N20/40 MODULATION			
Frequency (MHz)	Power density (dBm/MHz)	Applicable Limits (dBm)	Pass or Fail
5180	-2.642	11	Pass
5200	-3.353	11	Pass
5240	-4.249	11	Pass
5190	-5.806	11	Pass
5230	-6.852	11	Pass

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LIMITS AND MEASUREMENT RESULT FOR 802.11AC20/40/80 MODULATION			
Frequency (MHz)	Power density (dBm/MHz)	Applicable Limits (dBm)	Pass or Fail
5180	-2.868	11	Pass
5200	-3.273	11	Pass
5240	-3.880	11	Pass
5190	-5.910	11	Pass
5230	-6.897	11	Pass
5210	-10.115	11	Pass

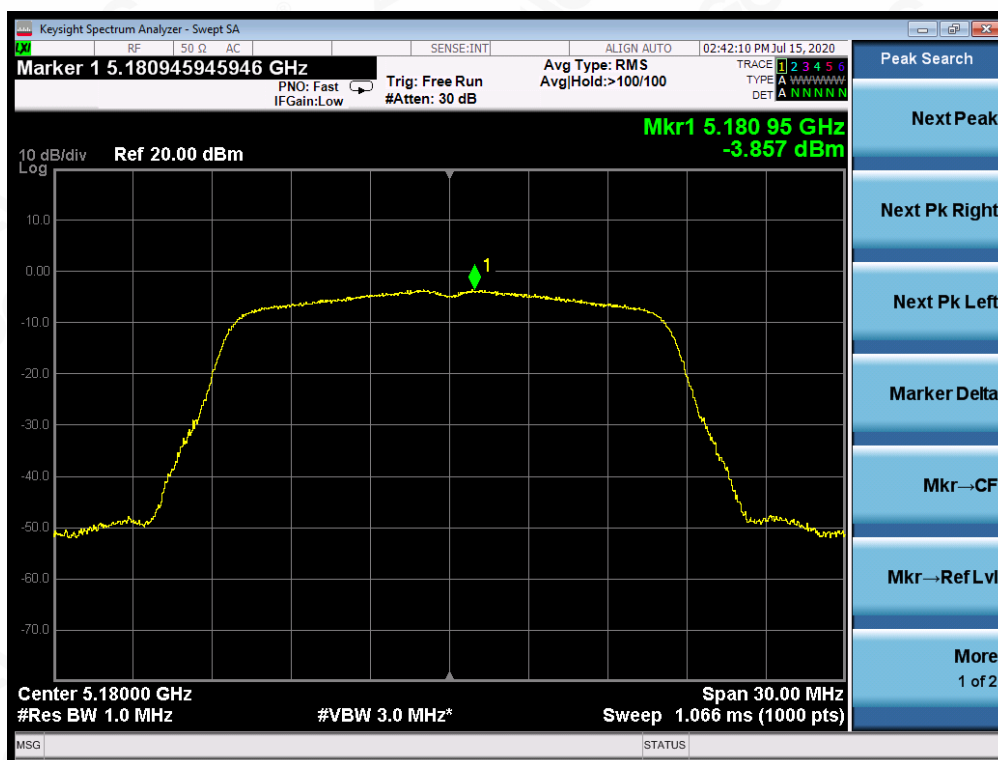
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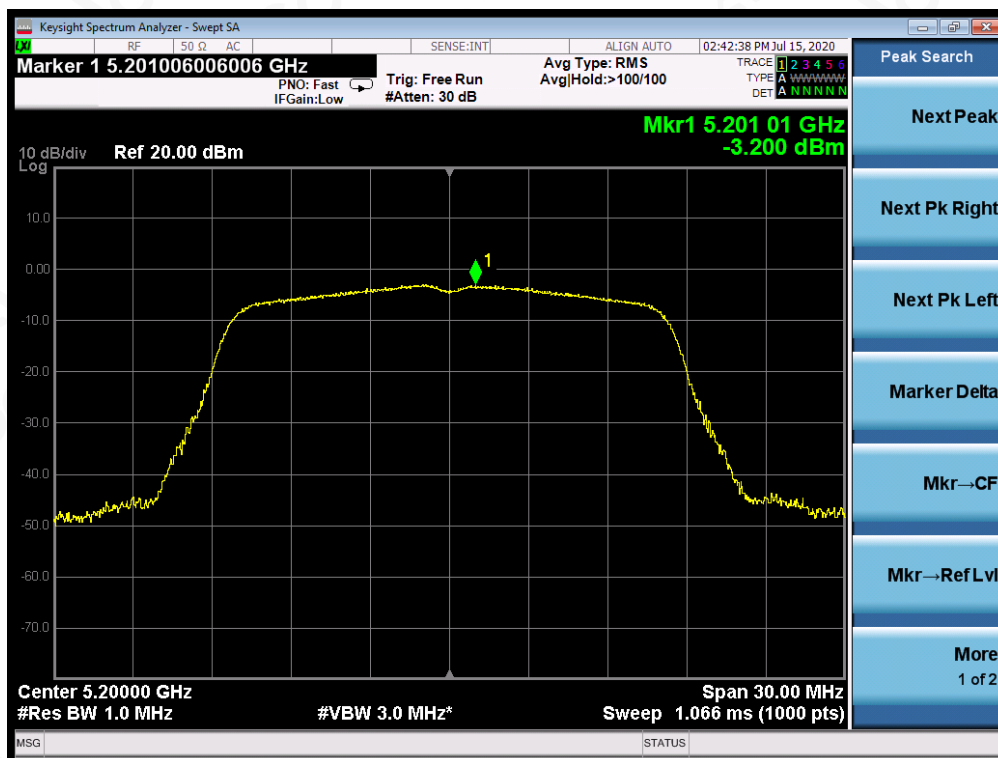


802.11a20 TEST RESULT

TEST PLOT OF SPECTRAL DENSITY FOR 5180MHz



TEST PLOT OF SPECTRAL DENSITY FOR 5200MHz



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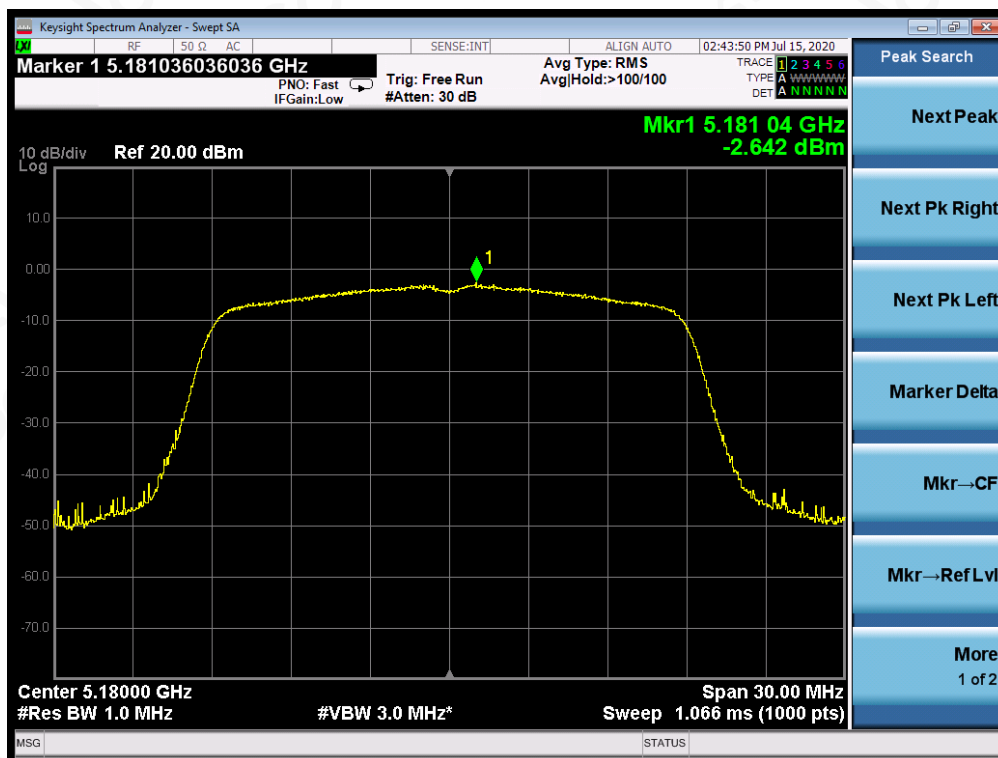


TEST PLOT OF SPECTRAL DENSITY FOR 5240MHz AT CHAIN 1



802.11n20 TEST RESULT

TEST PLOT OF SPECTRAL DENSITY FOR 5180MHz

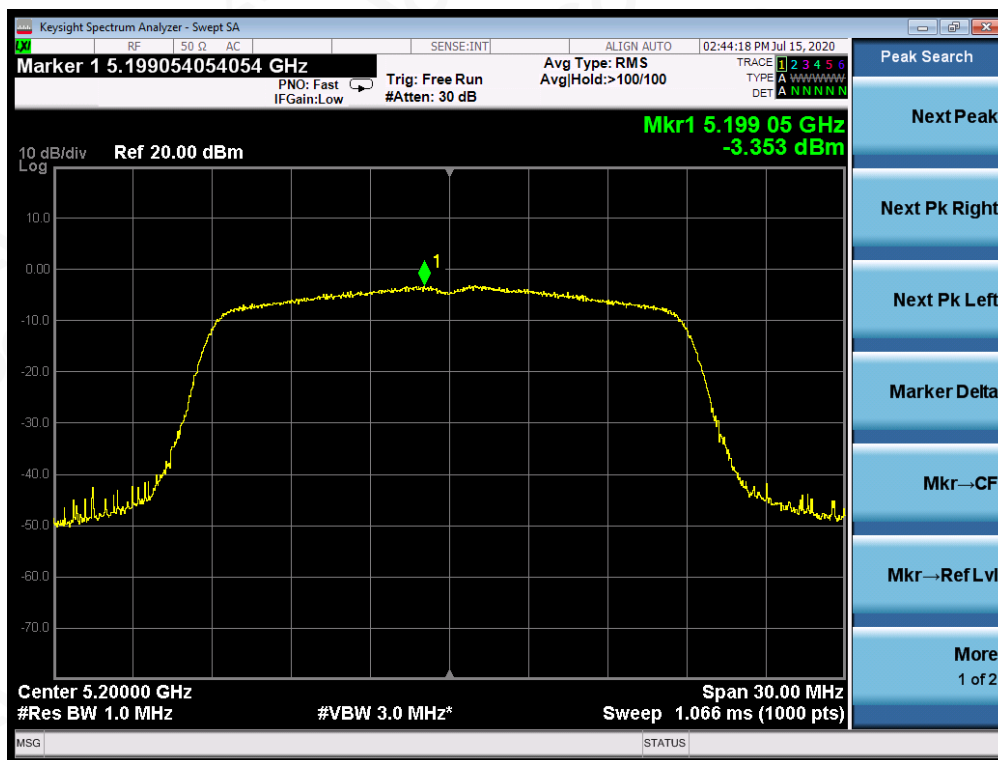


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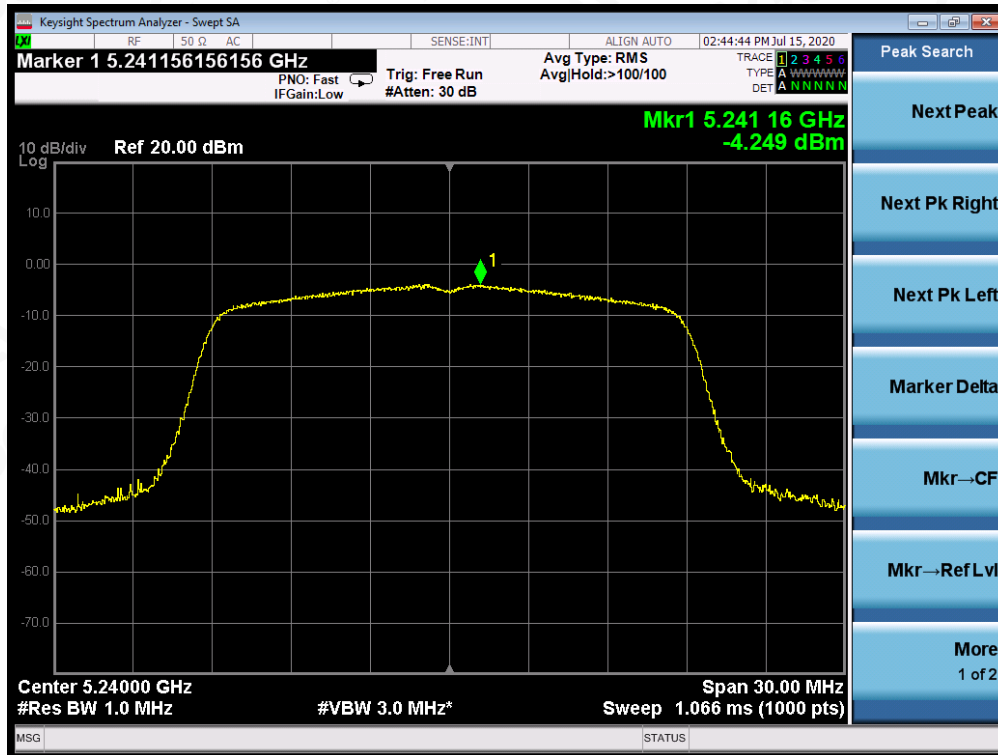
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TEST PLOT OF SPECTRAL DENSITY FOR 5200MHz



TEST PLOT OF SPECTRAL DENSITY FOR 5240MHz



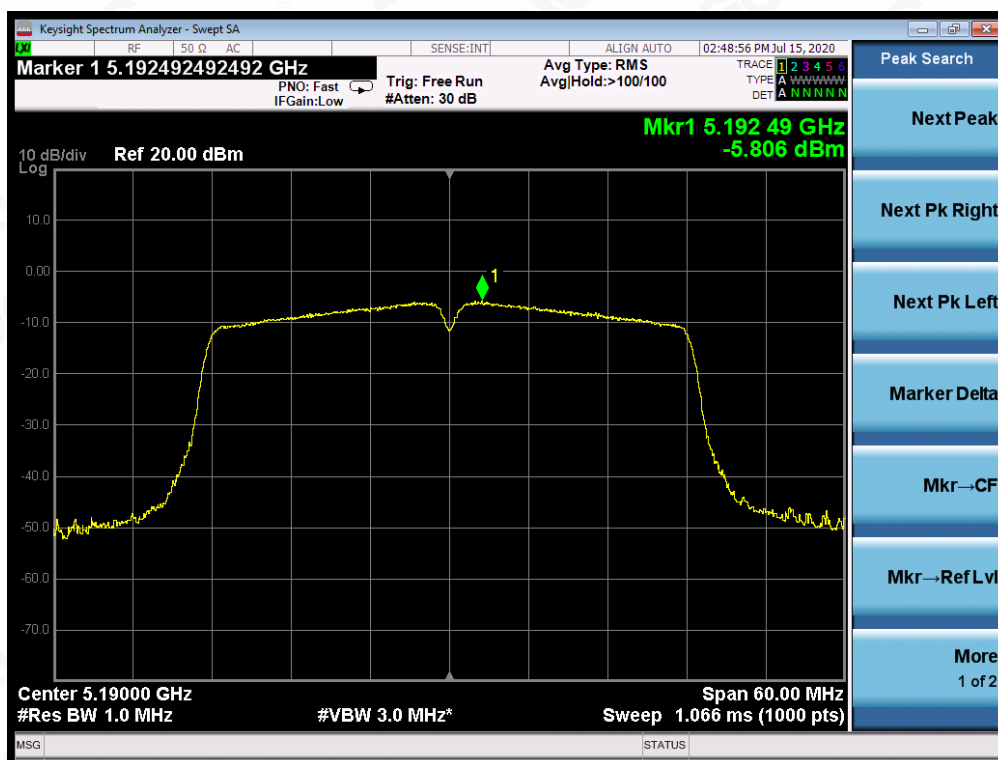
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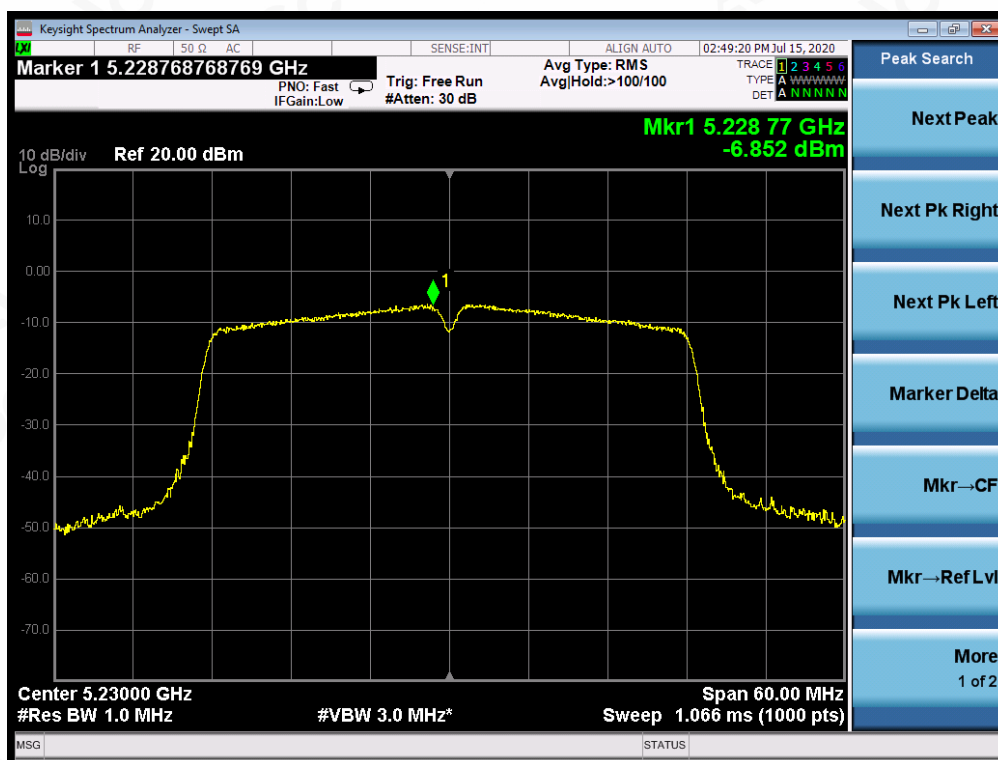


802.11n40 TEST RESULT

TEST PLOT OF SPECTRAL DENSITY FOR 5190MHz



TEST PLOT OF SPECTRAL DENSITY FOR 5230MHz



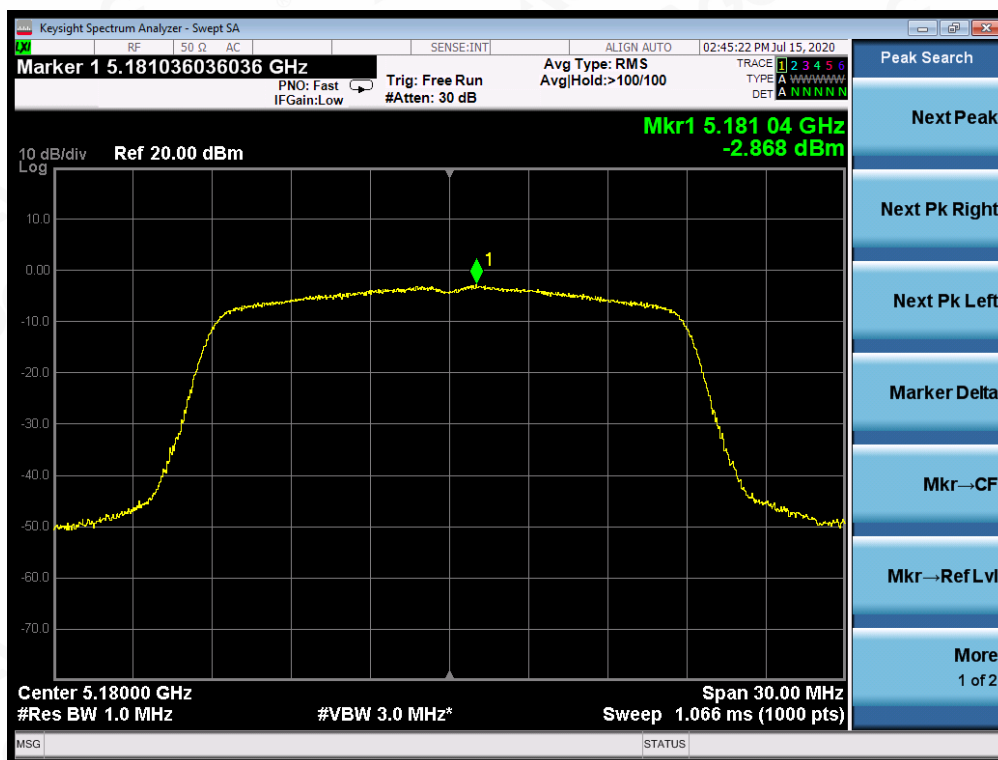
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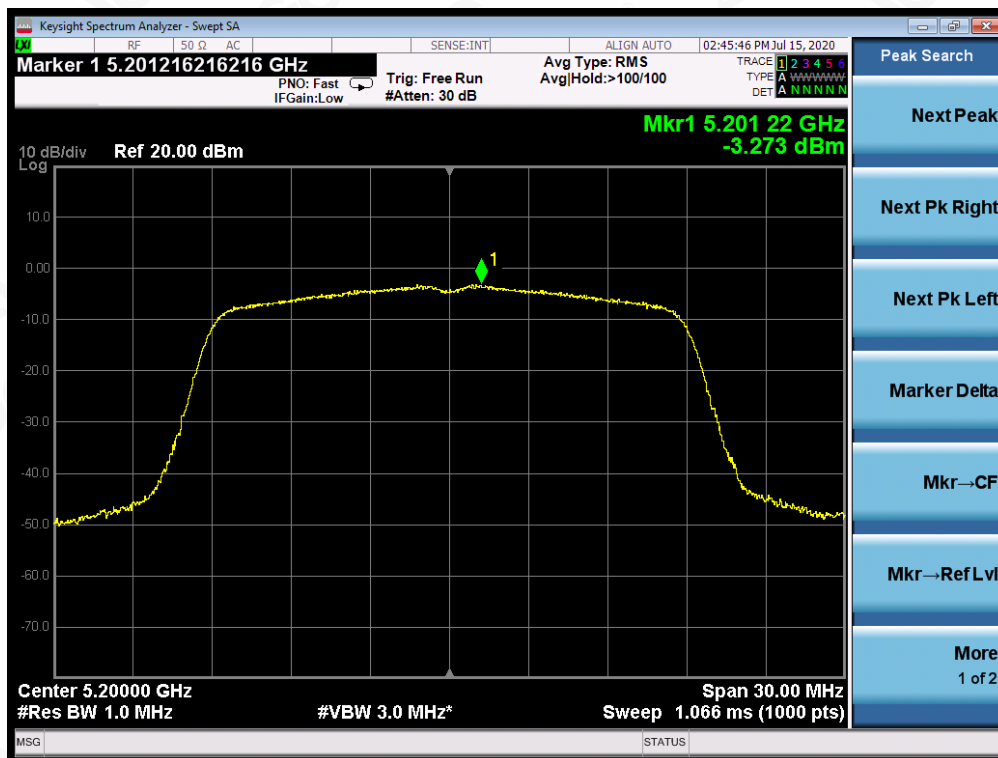


802.11ac20 TEST RESULT

TEST PLOT OF SPECTRAL DENSITY FOR 5180MHz



TEST PLOT OF SPECTRAL DENSITY FOR 5200MHz

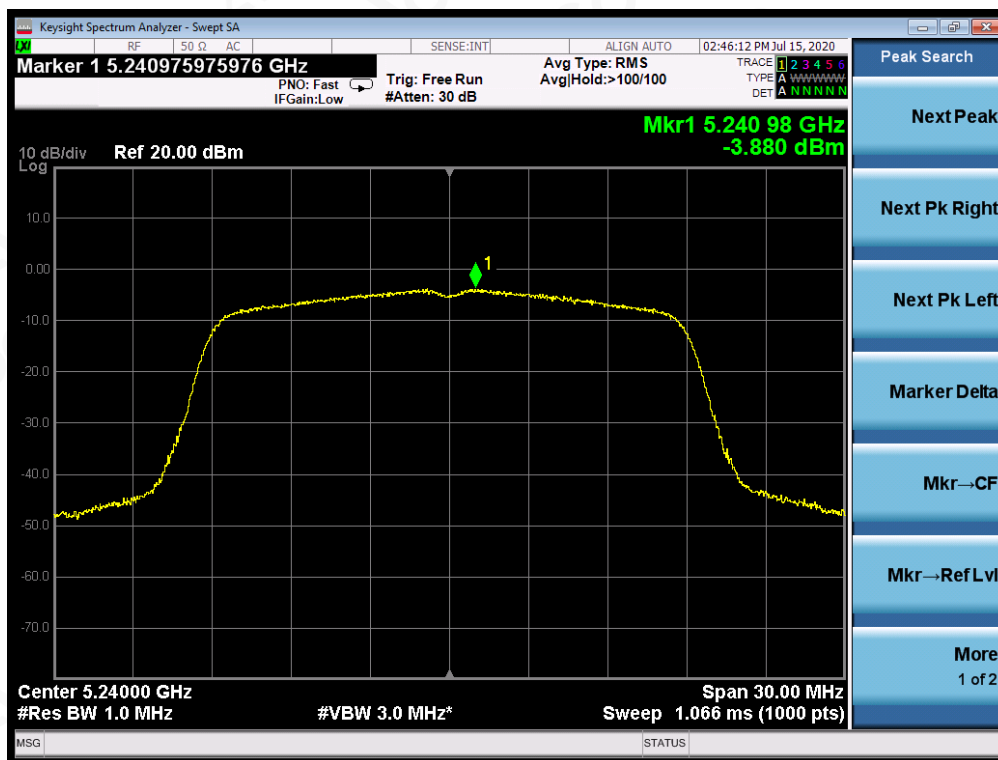


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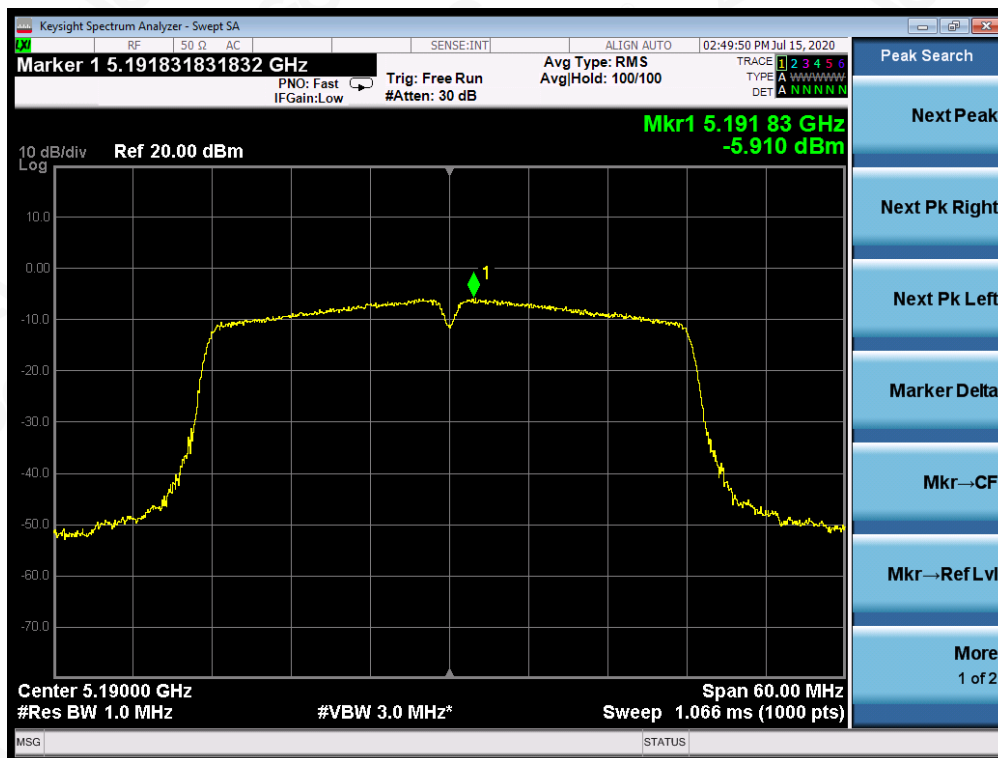


TEST PLOT OF SPECTRAL DENSITY FOR 5240MHz



802.11ac40 TEST RESULT

TEST PLOT OF SPECTRAL DENSITY FOR 5190MHz

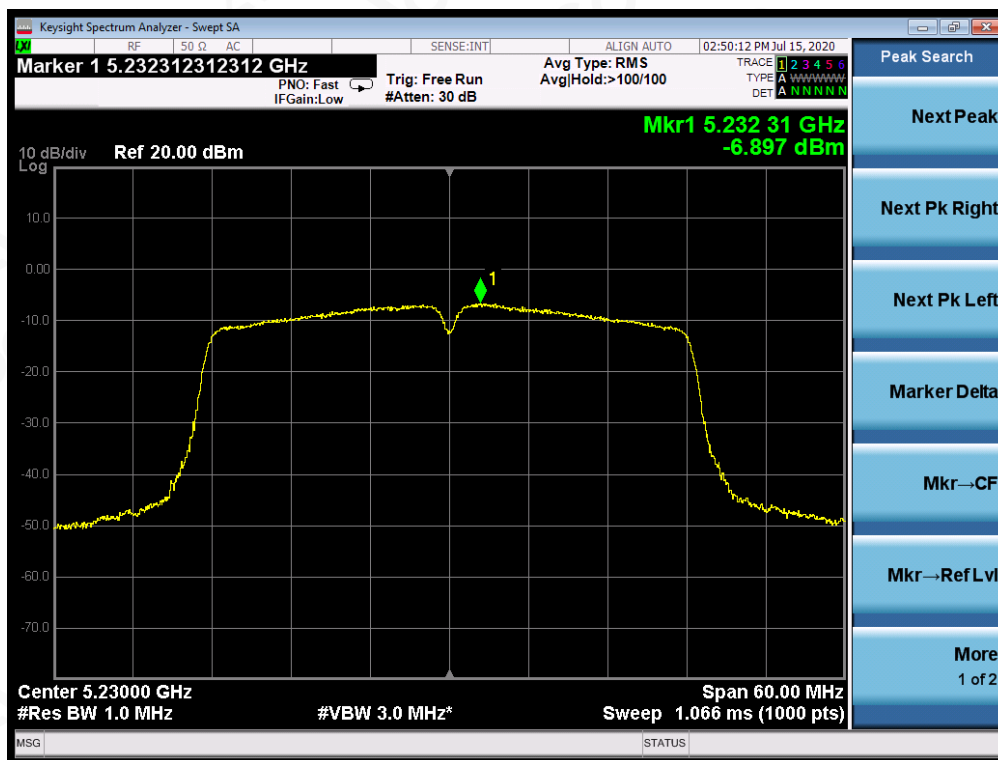


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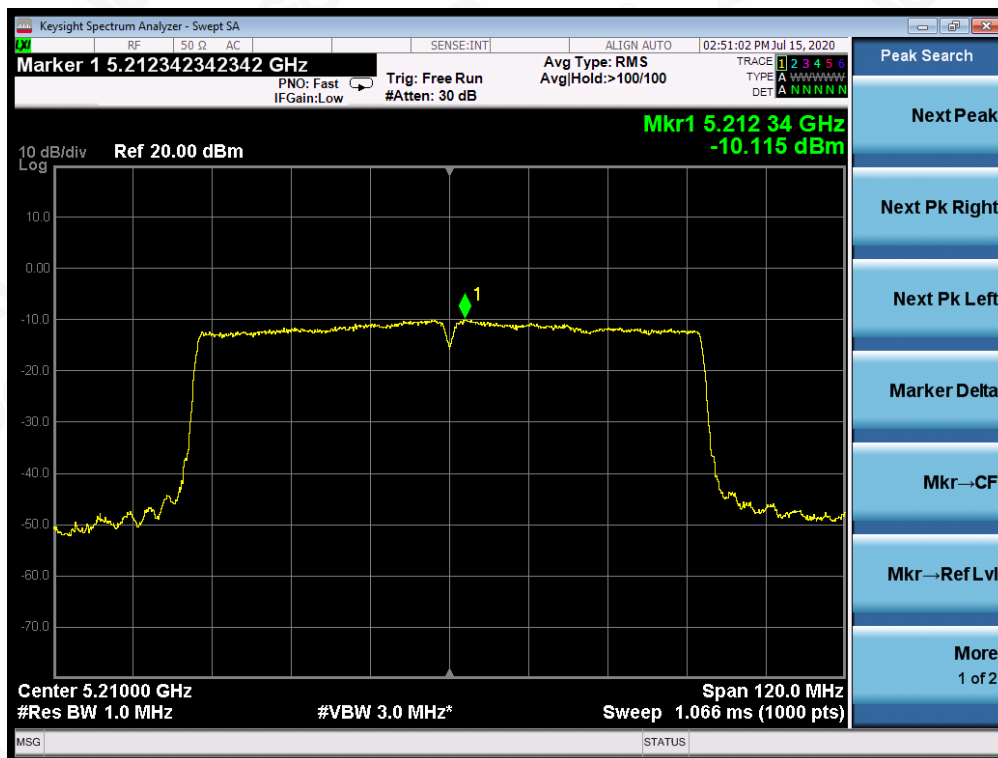


TEST PLOT OF SPECTRAL DENSITY FOR 5230MHz



802.11ac80 TEST RESULT

TEST PLOT OF SPECTRAL DENSITY FOR 5210MHz



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10. CONDUCTED SPURIOUS EMISSION

10.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 8.2.

10.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6.

10.4. LIMITS AND MEASUREMENT RESULT

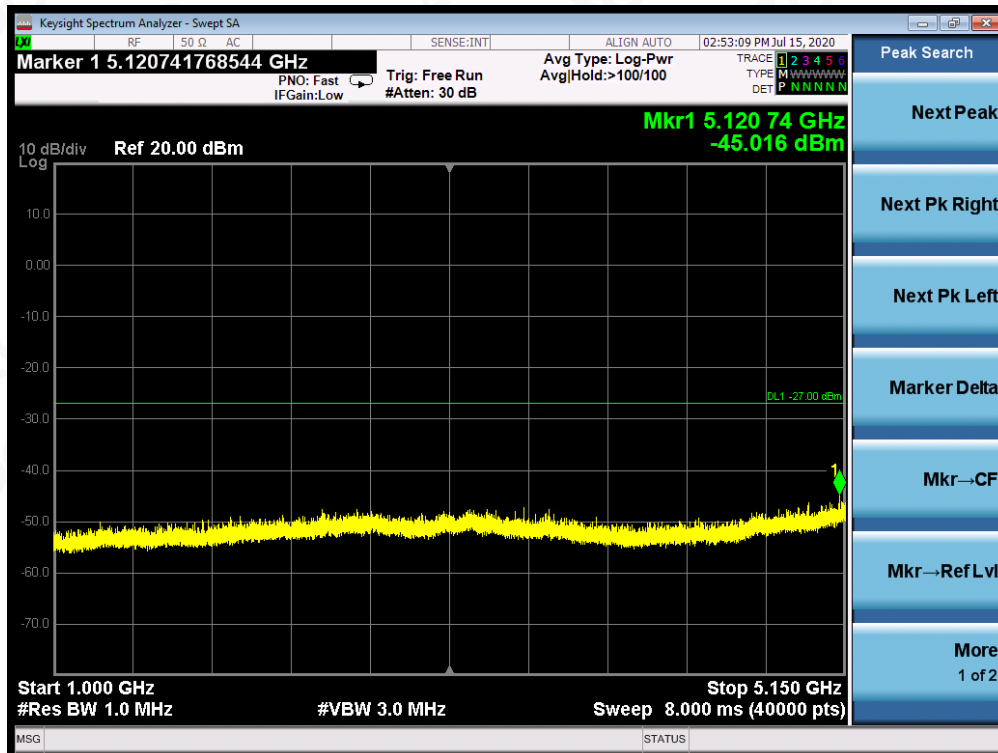
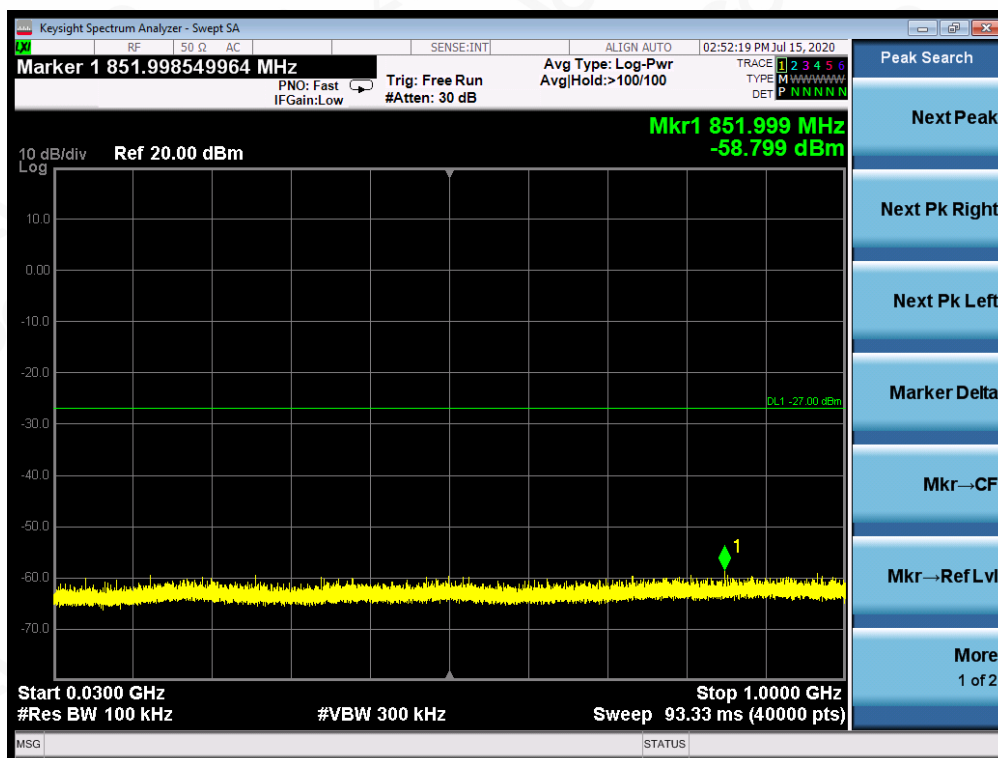
LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test channel	Criteria
-27dBm/MHz	5150MHz-5250MHz	PASS

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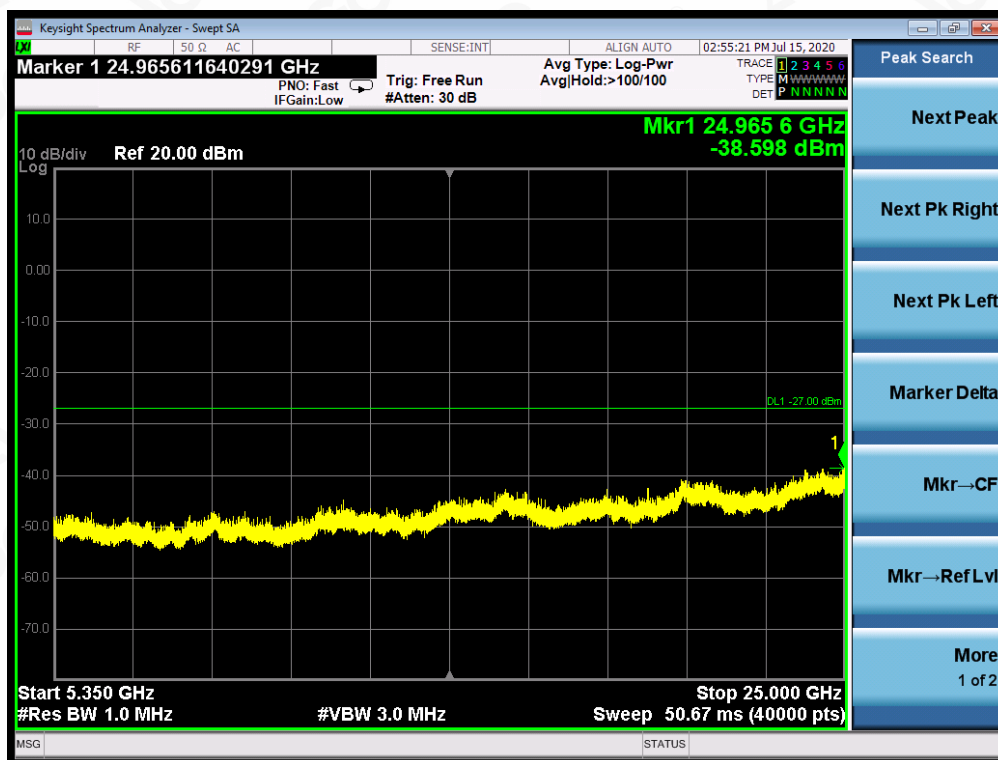
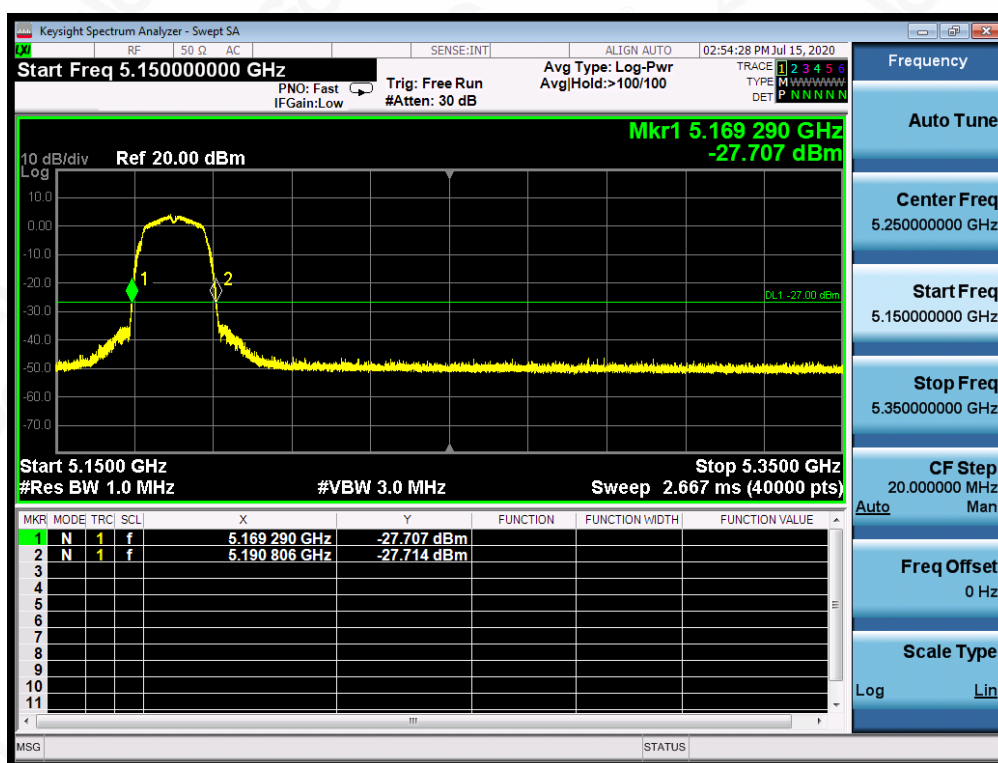
FOR 802.11A20 MODULATION
TEST PLOT OF OUT OF BAND EMISSIONS FOR MODULATION IN 5180MHz



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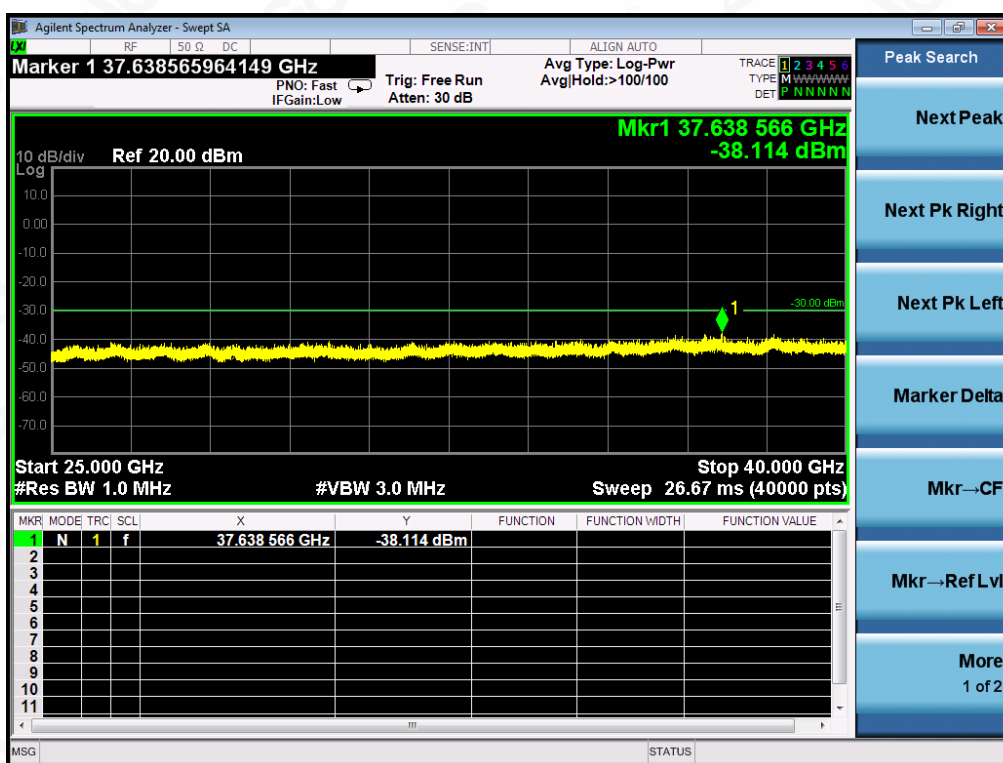




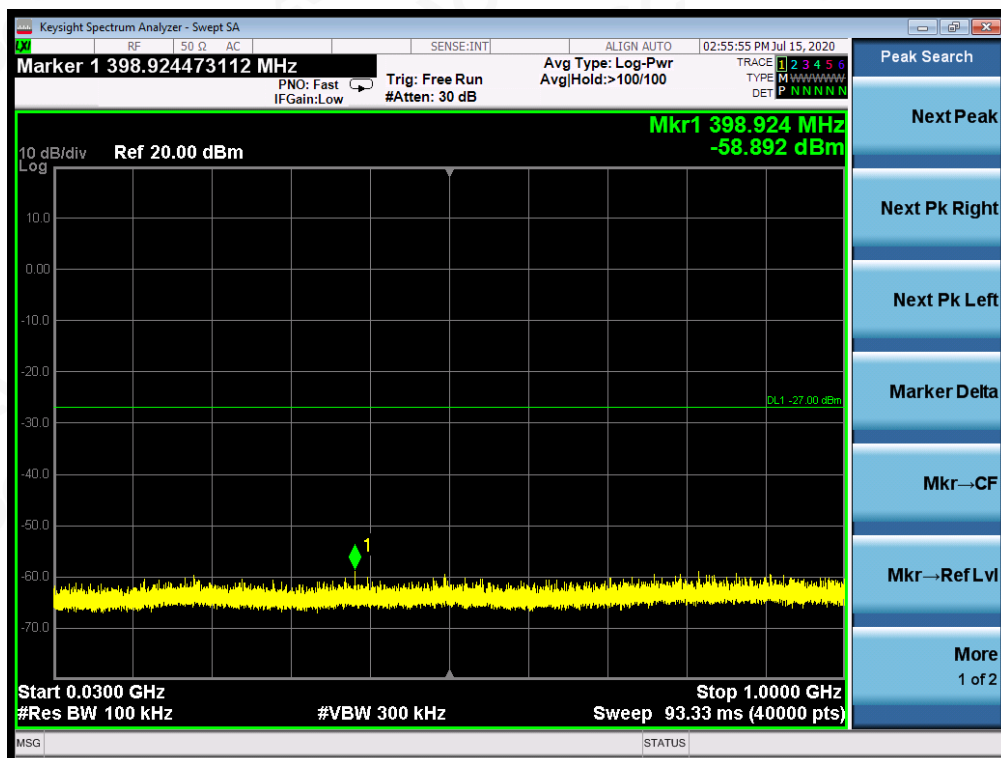
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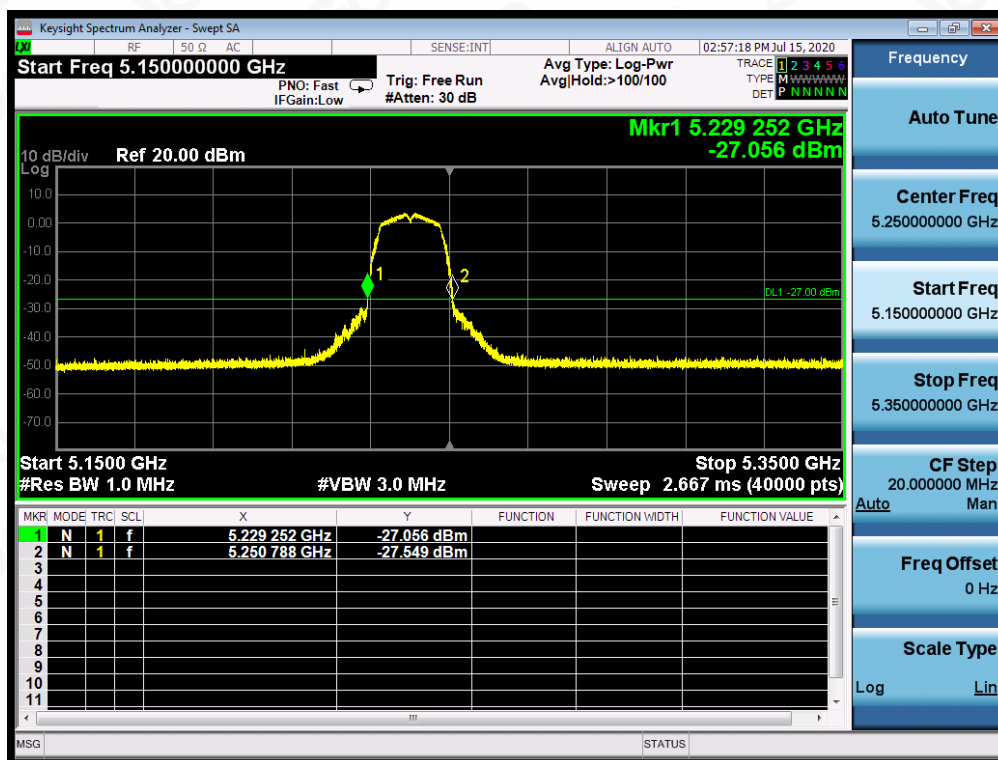
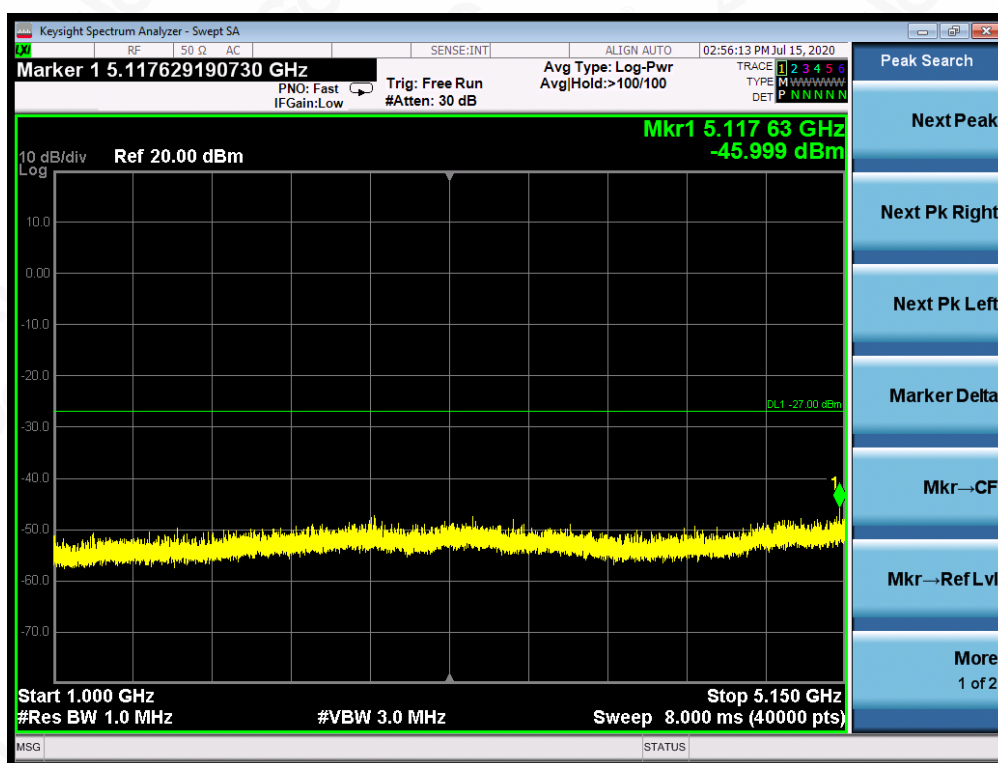
TEST PLOT OF OUT OF BAND EMISSIONS FOR MODULATION IN 5240MHz



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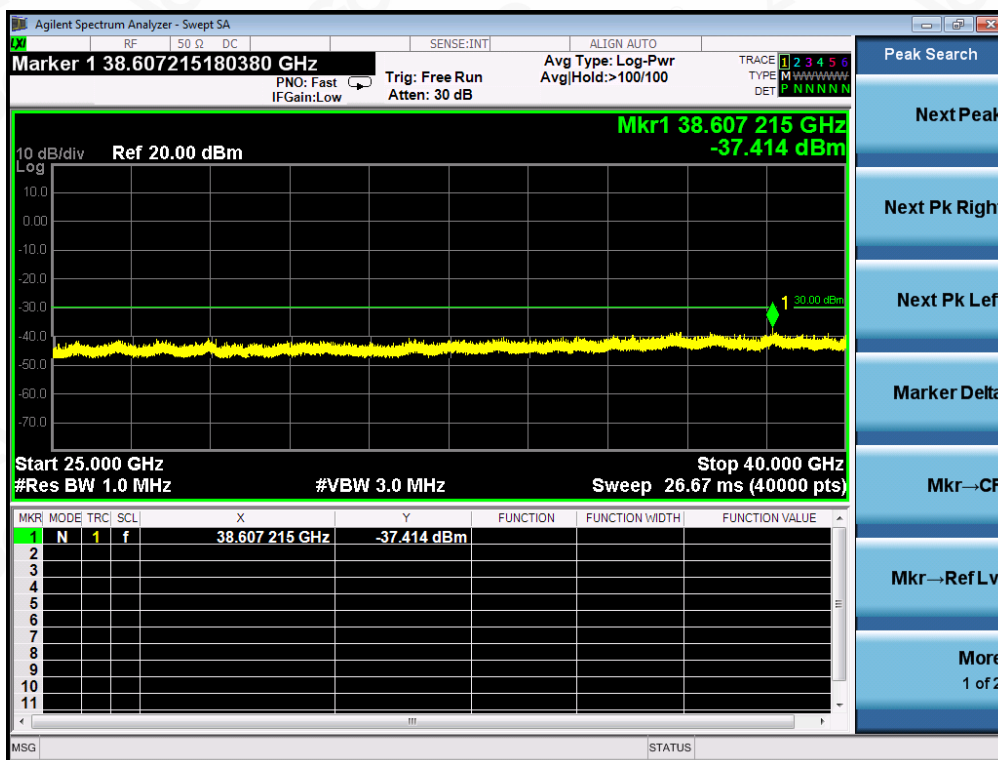
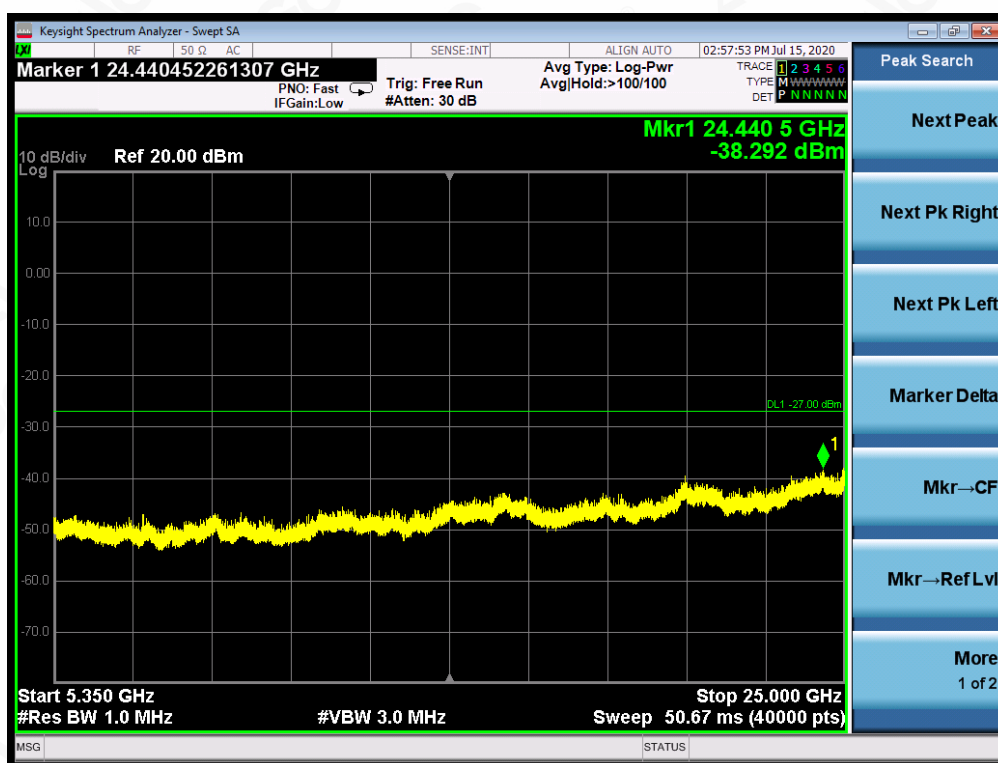




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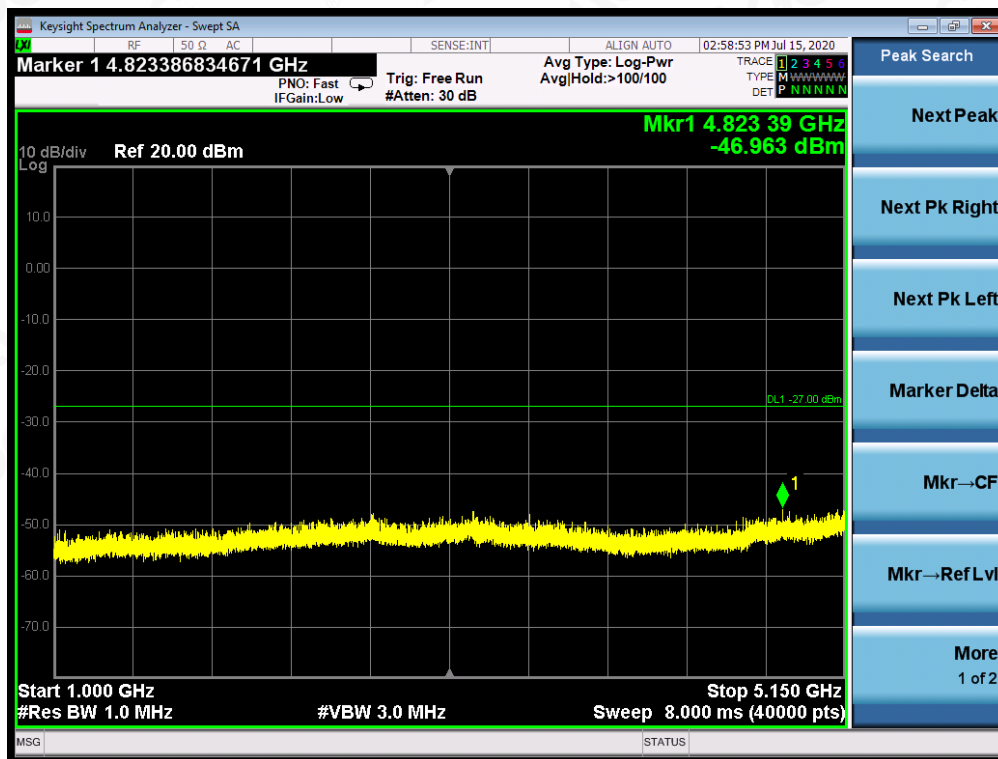
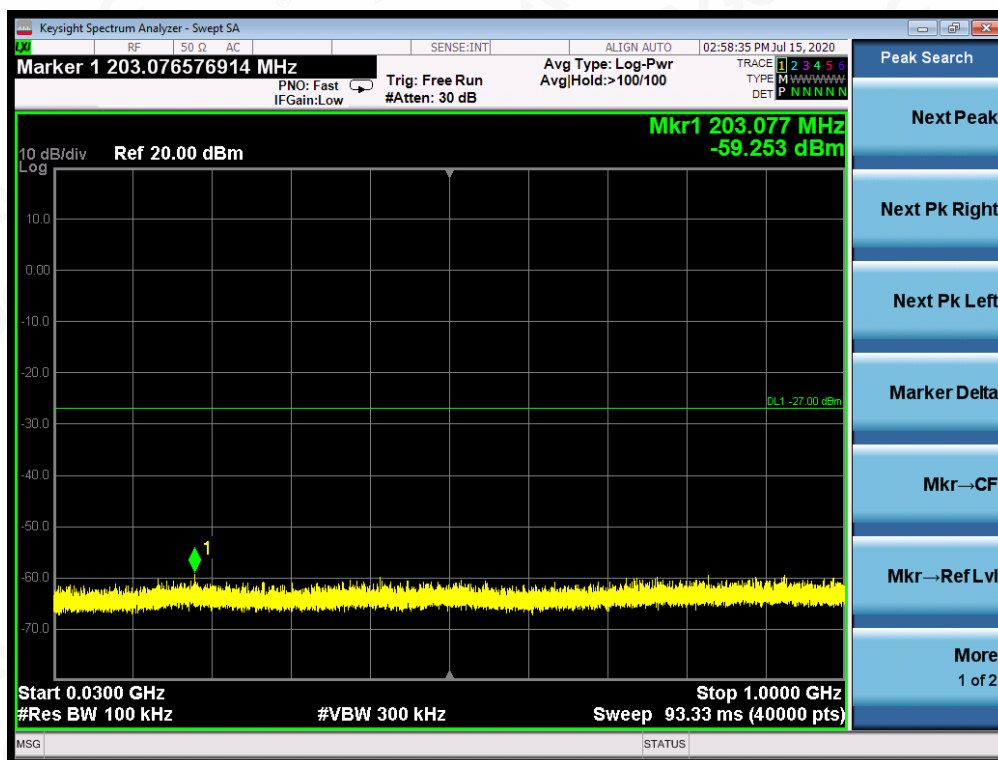
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FOR 802.11N40 MODULATION

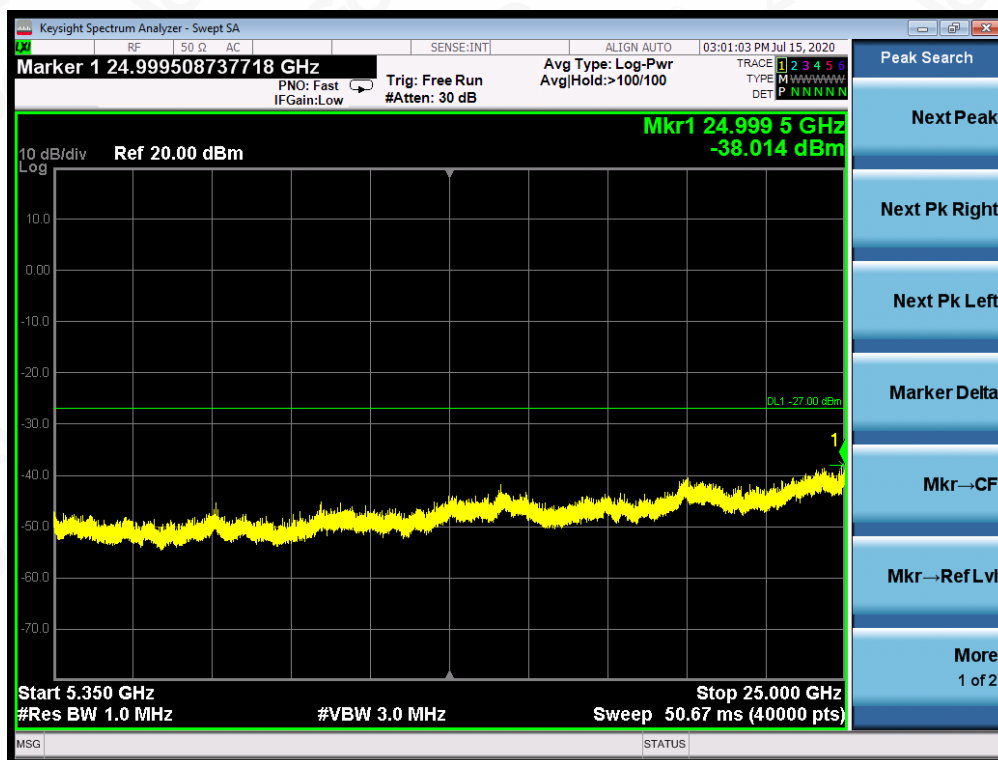
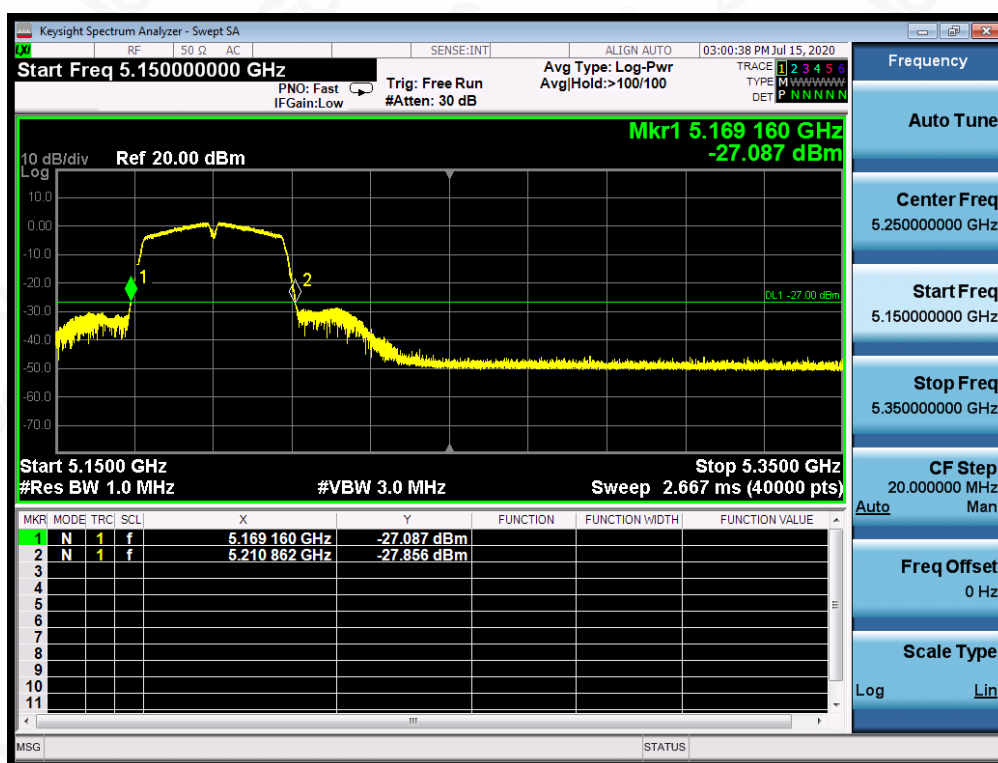
TEST PLOT OF OUT OF BAND EMISSIONS FOR MODULATION IN 5190MHZ



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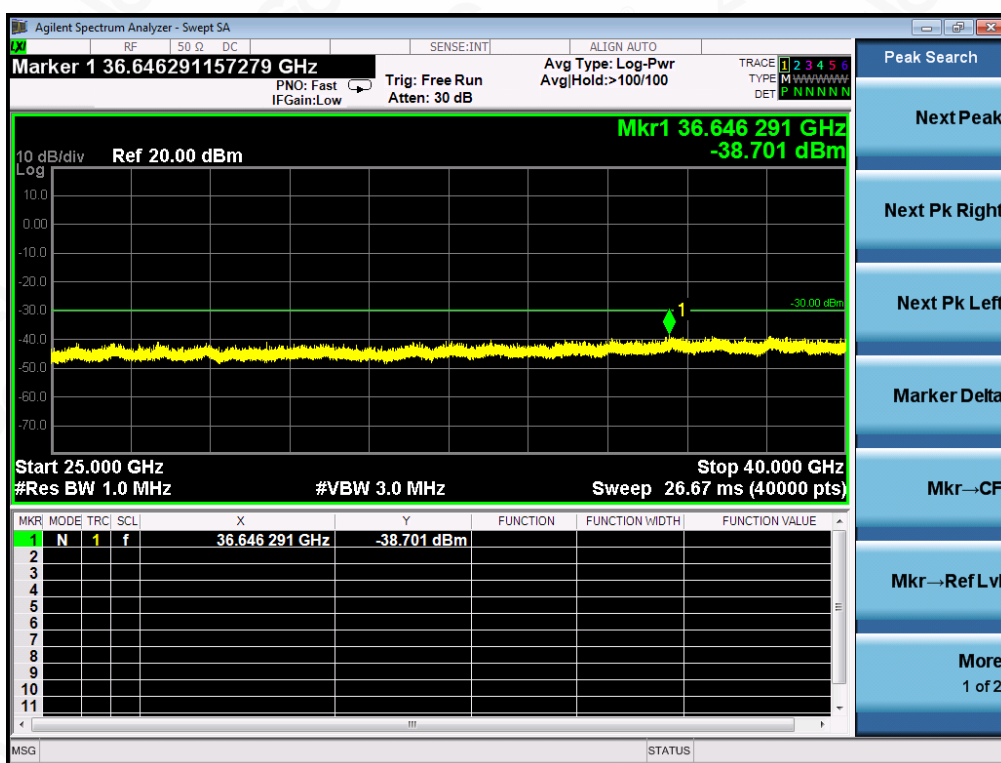




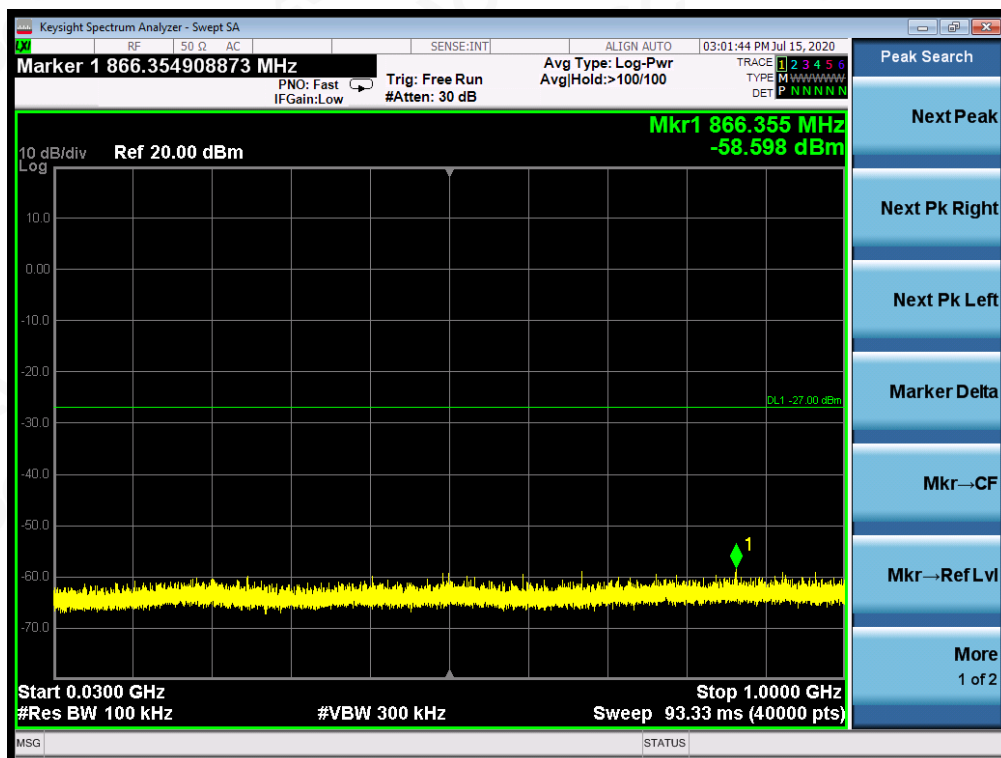
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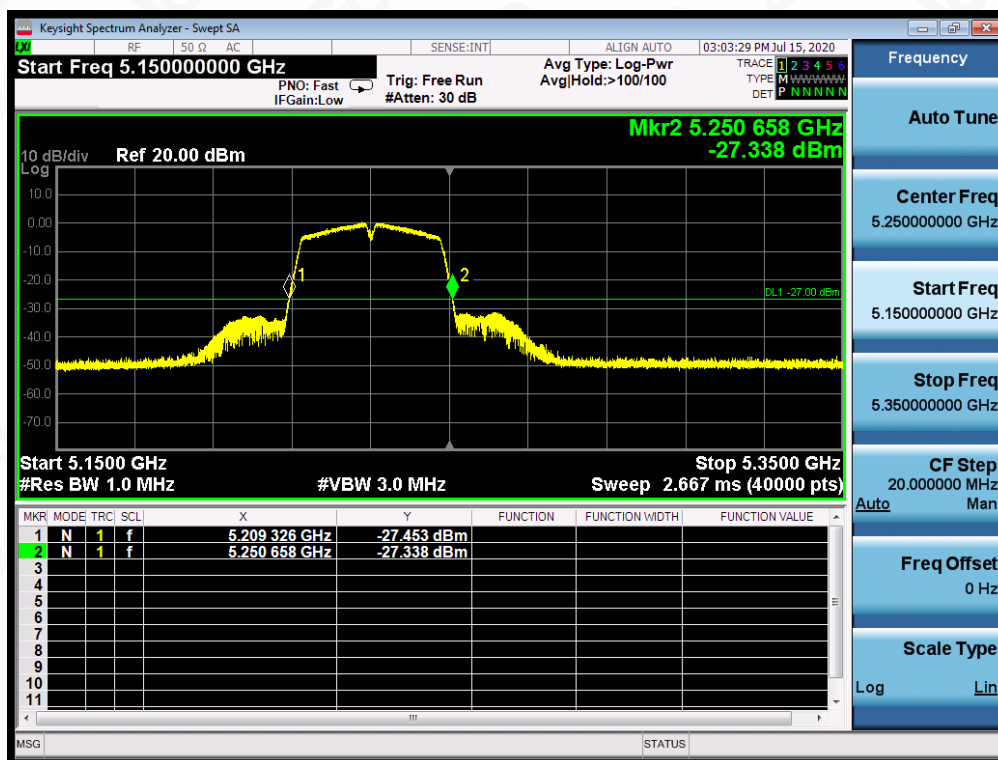
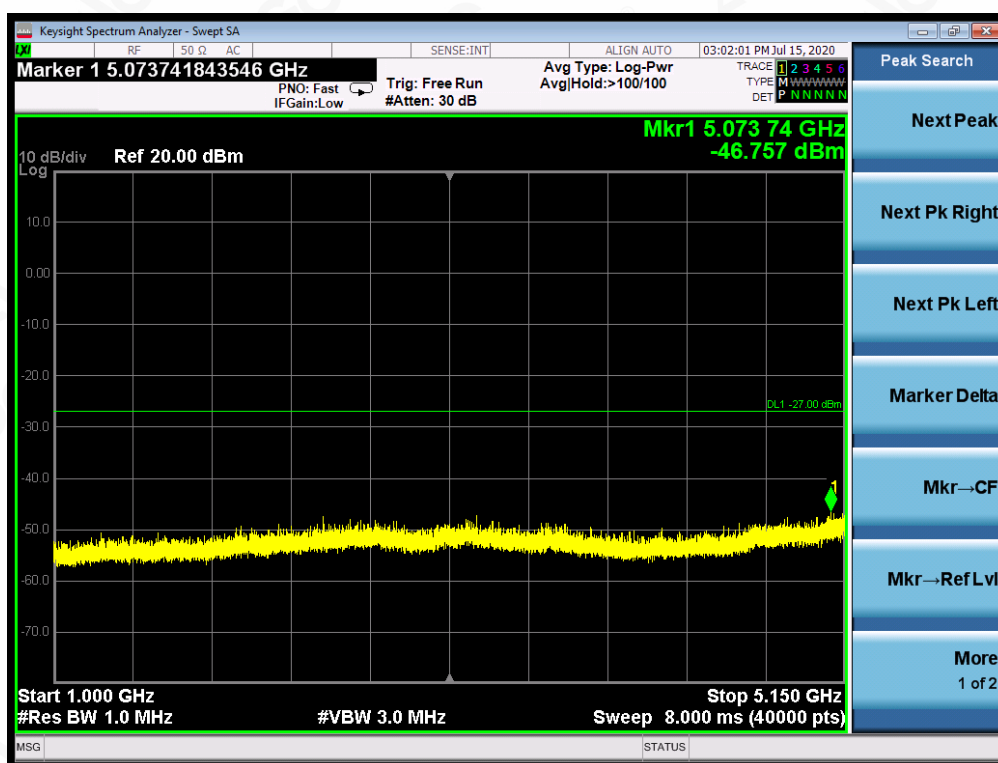
TEST PLOT OF OUT OF BAND EMISSIONS FOR MODULATION IN 5230MHz



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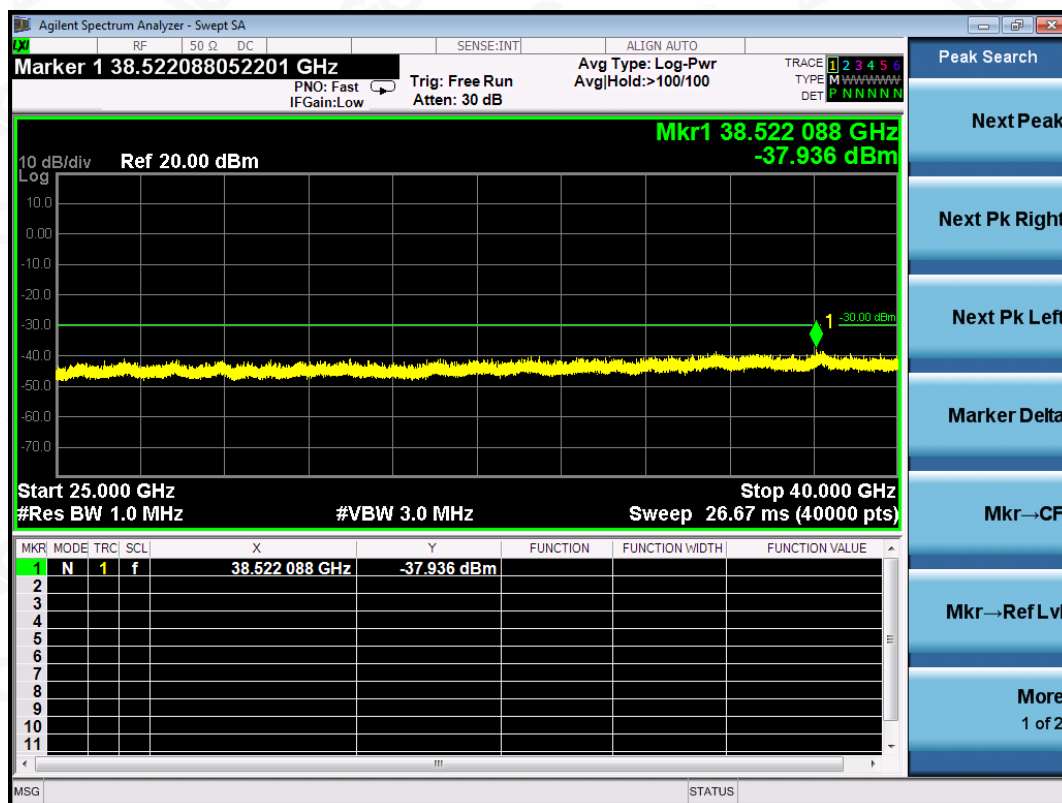
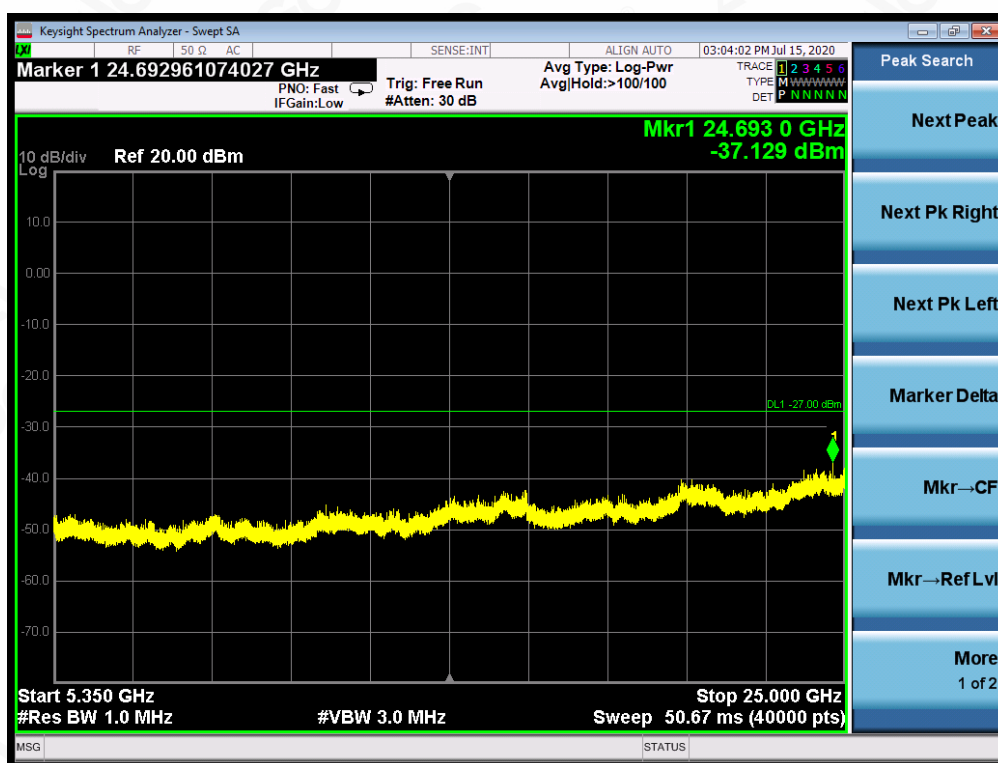




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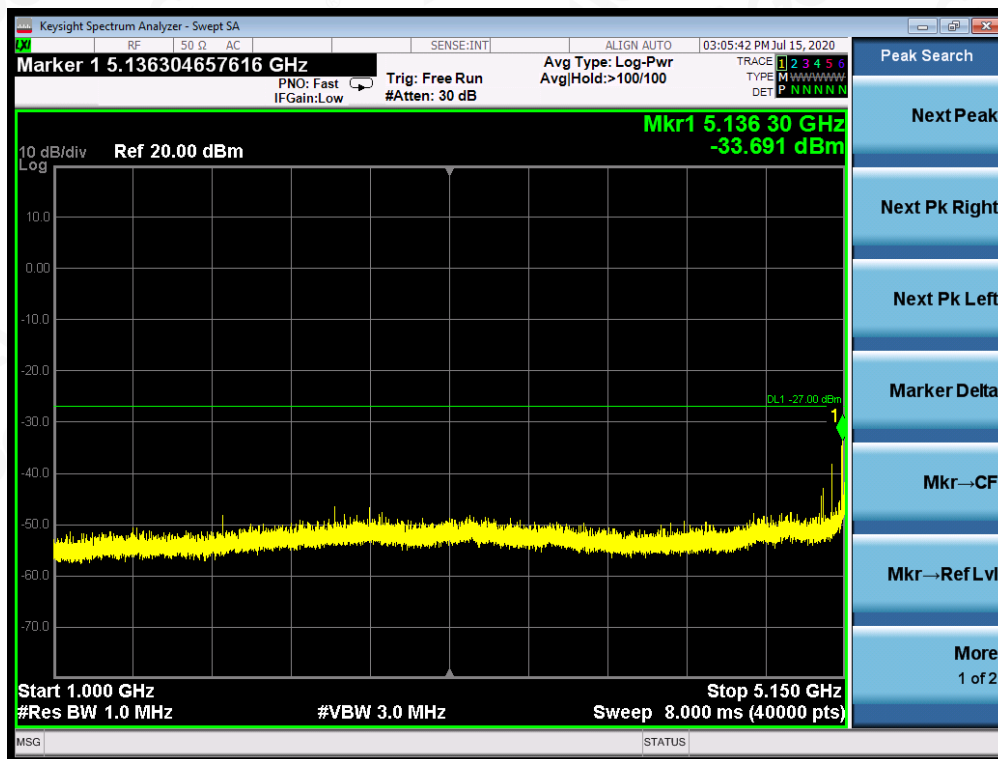
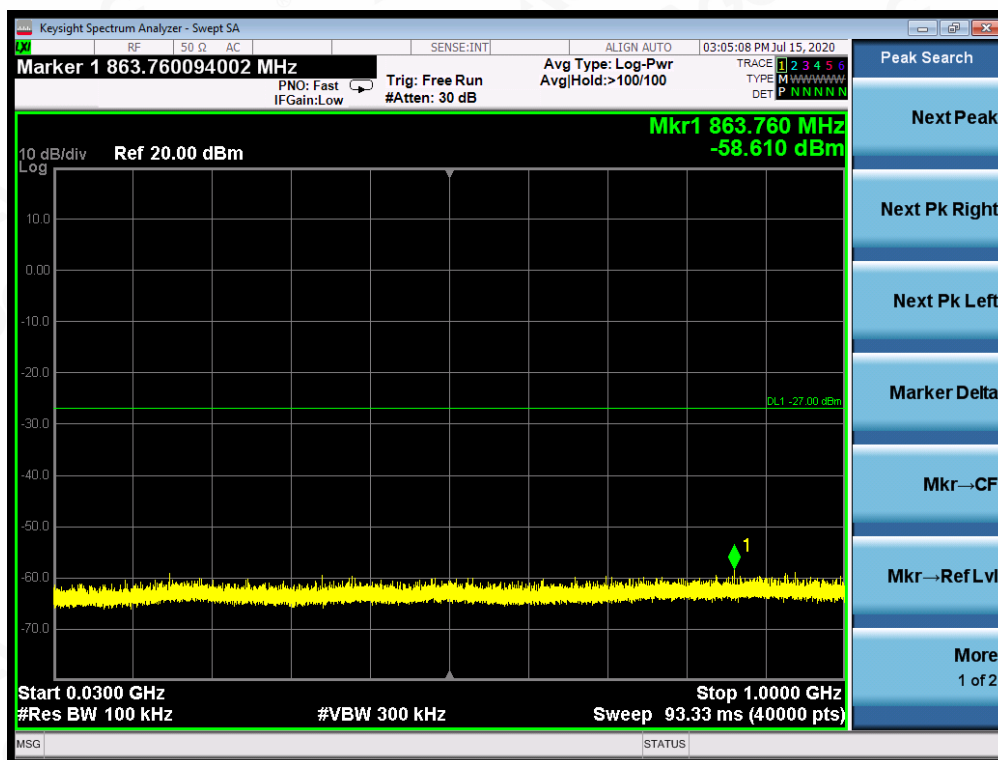
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FOR 802.11AC80 MODULATION

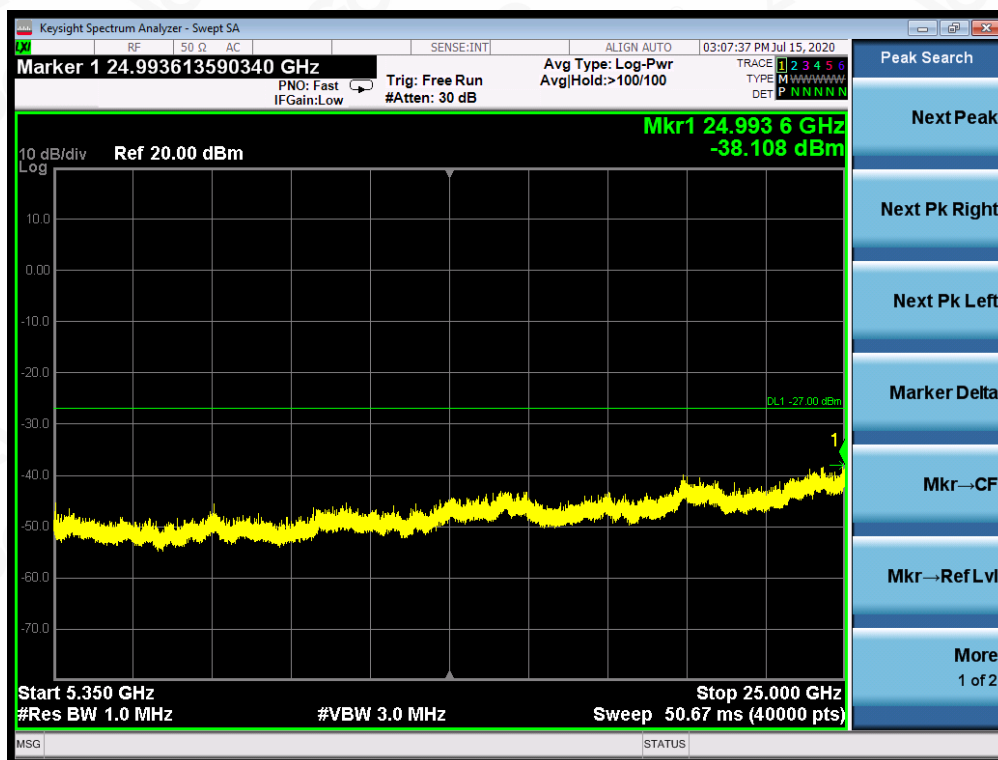
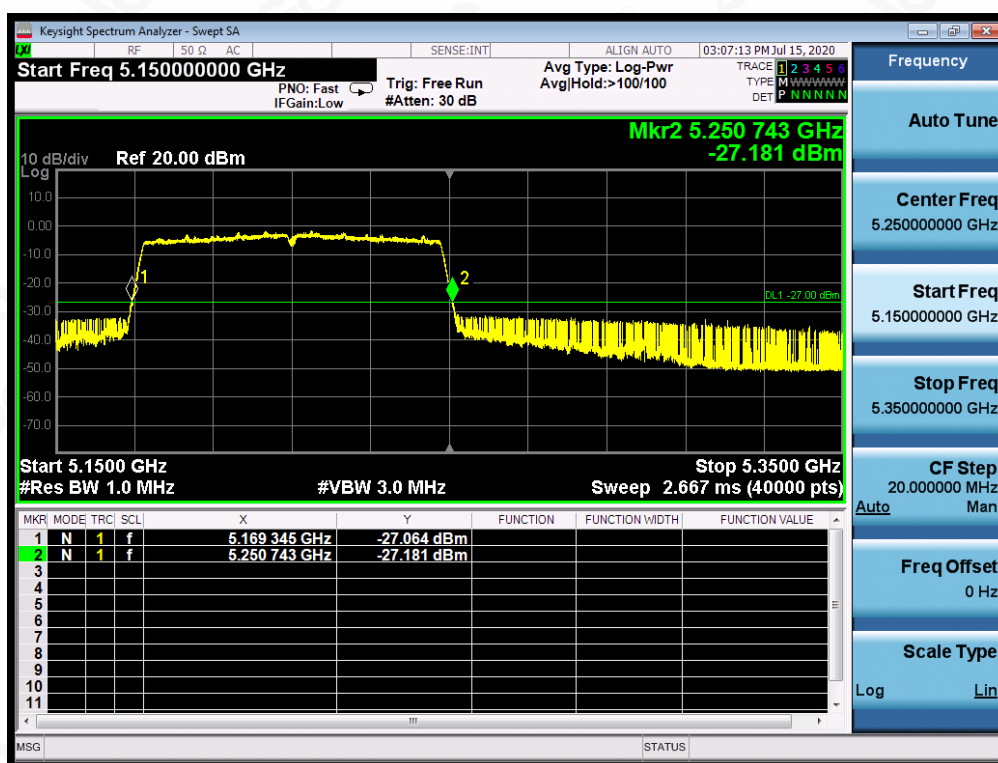
TEST PLOT OF OUT OF BAND EMISSIONS FOR MODULATION IN 5210MHZ



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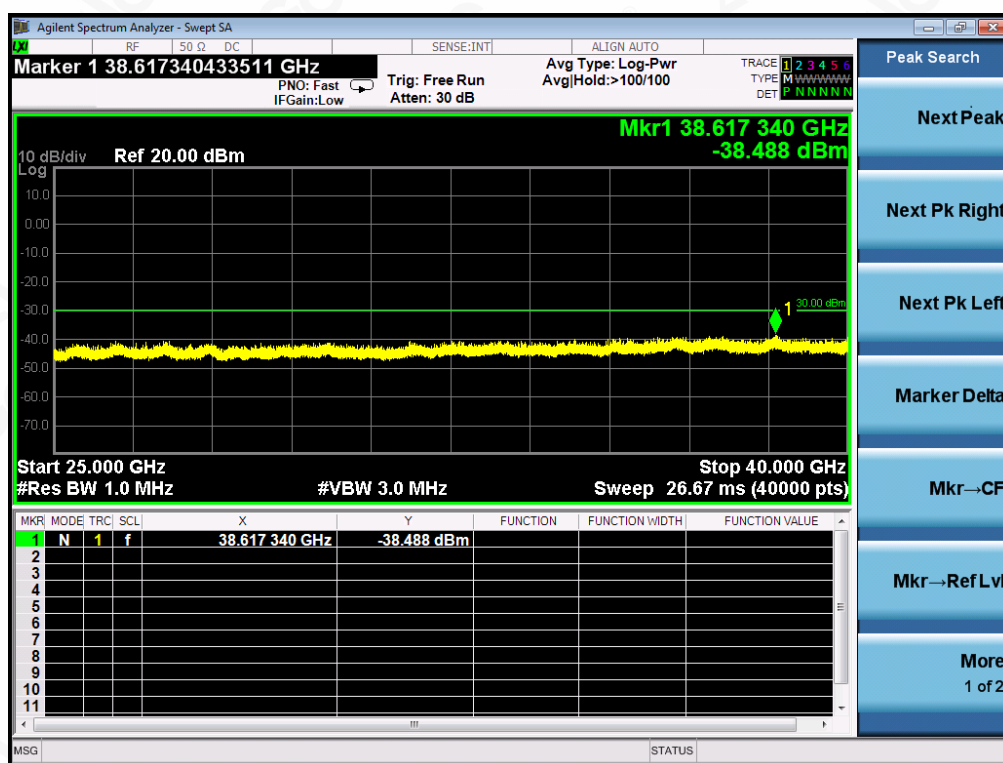




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Note: All the 20MHz bandwidth modulation had been tested, the 802.11a20 was the worst case and record in his test report. All the 40MHz bandwidth modulation had been tested, the 802.11N40 was the worst case and record in his test report. All the 80MHz bandwidth modulation had been tested, the 802.11ac80 was the worst case and record in his test report.

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11. RADIATED EMISSION

11.1. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3M VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

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