FCC RADIO TEST REPORT

FCC ID: 2A3VB-ZAP014

Sample： Media Player

Trade Name： Zappiti

Main Model： ZAP014

Additional Model： ZAP015, ZAP016, ZAP017, ZAP018, ZAP019

Report No.： UNIA21102016ER-63

Prepared for

ZAPPITI AV

5 rue Rene Biancarelli Porto Vecchio 20137 France

Prepared by

Shenzhen United Testing Technology Co., Ltd.

2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

TEST RESULT CERTIFICATION

Applicant ..... :	ZAPPITI AV
Address..... :	5 rue Rene Biancarelli Porto Vecchio 20137 France
Manufacturer ..... :	ZAPPITI AV
Address..... :	5 rue Rene Biancarelli Porto Vecchio 20137 France

Product description

Product ..... :	Media Player
Trade Name ..... :	Zappiti
Model Name ..... :	ZAP014, ZAP015, ZAP016, ZAP017, ZAP018, ZAP019
Test Methods ..... :	FCC Rules and Regulations Part 15 Subpart E Section 15.407 KDB 789033 D02 v02r01

This device described above has been tested by Shenzhen United Testing Technology Co., Ltd., and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report. This report shall not be reproduced except in full, without the written approval of UNI, this document may be altered or revised by Shenzhen United Testing Technology Co., Ltd., personnel only, and shall be noted in the revision of the document.

Date of Test ..... :	
Date (s) of performance of tests ..... :	Oct. 20, 2021 ~ Dec. 02, 2021
Date of Issue ..... :	Dec. 30, 2021
Test Result ..... :	Pass

Prepared by: kahn.yang

Kahn yang/Editor

Reviewer: Sky dong

Sky dong/Supervisor

Approved & Authorized Signer: liuze

Liuze/Manager

1. GENERAL INFORMATION

1.1. PRODUCT DESCRIPTION

Product:	Media Player
Trade Name:	Zappiti
Main Model:	ZAP014
Additional Model:	ZAP015, ZAP016, ZAP017, ZAP018, ZAP019
Model Difference:	All model's the function, software and electric circuit are the same, only with a product color and model named different. Test sample model: ZAP014.
FCC ID:	2A3VB-ZAP014
Operation Frequency:	5150MHz~5250MHz, 5725MHz~5850MHz
Number of Channels:	20MHz: 9CH 40MHz: 4CH
Modulation Type:	BPSK, QPSK, 16QAM, 64QAM, 128QAM, 256QAM,OFDM
Antenna Type:	SMA Antenna
Antenna Gain:	2dBi
Battery:	N/A
Adapter:	M/N: CW1203000RE Input: AC 100-240V, 50/60Hz, 1.2A Output: DC 12V, 3A
Power Source:	DC 12V from adapter with AC 120(240)V/60Hz

Note:

1. The EUT is designed as Client without Radar Detection device
2. The device do not support TPC.

1.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency	Frequency Band	Channel Number	Frequency
5150MHz ~ 5250MHz	36	5180 MHz	5725MHz ~ 5850MHz	149	5745 MHz
	38	5190 MHz		151	5755 MHz
	40	5200 MHz		153	5765 MHz
	44	5220 MHz		157	5785 MHz
	46	5230 MHz		159	5795 MHz
	48	5240 MHz		161	5805 MHz
				165	5825MHz

Note:
For 20MHz bandwidth system use Channel 36,40,44,48,149,153,157,161,165;
For 40MHz bandwidth system use Channel 38,46, 151,159.

2. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

A. Conducted Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
UNI	ANSI	9kHz ~ 150kHz	2.96	
		150kHz ~ 30MHz	2.44	

B. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
UNI	ANSI	9kHz ~ 30MHz	2.50	
		30MHz ~ 1000MHz	4.80	
		Above 1000MHz	4.13	

3. DESCRIPTION OF TEST MODES

Mode	Tested channel	Modulation	Date rate(Mbps)
802.11a/n20/ac20	36, 40, 48,149,157, 165	OFDM	6Mbps/MCS0
802.11n40/ac40	38, 46,151,159	OFDM	MCS0

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.

4. SYSTEM TEST CONFIGURATION

4.1. CONFIGURATION OF EUT SYSTEM

Configure 1:

4.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Mfr/Brand	Model/Type No.	Remark
1	Media Player	Zappiti	ZAP014	EUT

4.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.407	6dB Bandwidth	Compliant
§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

5. TEST FACILITY

Test Laboratory : Shenzhen United Testing Technology Co., Ltd.

Address : 2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.The testing quality system of our laboratory meets with ISO/IEC-17025 requirements. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

A2LA Certificate Number: 4747.01

The EMC Laboratory has been accredited by A2LA, and in compliance with ISO/IEC 17025:2017 General Requirements for testing Laboratories.

FCC Registration Number: 674885

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission.

IC Registration Number: 21947

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada.

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
Conduction Emissions Measurement					
1	Conducted Emission Test Software	EZ-EMC	Ver.CCS-3A1-CE	N/A	N/A
2	AMN	Schwarzbeck	NNLK8121	8121370	2022.09.22
3	AAN	TESEQ	T8-Cat6	38888	2022.09.22
4	Pulse Limiter	CYBRTEK	EM5010	E115010056	2022.05.17
5	EMI Test Receiver	Rohde&Schwarz	ESCI	101210	2022.09.22

Radiated Emissions Measurement					
1	Radiated Emission Test Software	EZ-EMC	Ver.CCS-03A1	N/A	N/A
2	Horn Antenna	Sunol	DRH-118	A101415	2022.09.27
3	Broadband Hybrid Antenna	Sunol	JB1	A090215	2022.03.01
4	PREAMP	HP	8449B	3008A00160	2022.09.22
5	PREAMP	HP	8447D	2944A07999	2022.05.17
6	EMI TEST RECEIVER	Rohde&Schwarz	ESR3	101891	2022.09.22
7	VECTOR Signal Generator	Rohde&Schwarz	SMU200A	101521	2022.09.22
8	Signal Generator	Agilent	E4421B	MY4335105	2022.09.22
9	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2022.09.22
10	MXA Signal Analyzer	Keysight	N9020A	MY51110104	2022.09.22
11	RF Power sensor	DARE	RPR3006W	15I00041SNO88	2022.05.17
12	RF Power sensor	DARE	RPR3006W	15I00041SNO89	2022.05.17
13	RF power divider	Anritsu	K241B	992289	2022.09.22
14	Wideband radio communication tester	Rohde&Schwarz	CMW500	154987	2022.09.22
15	Active Loop Antenna	Com-Power	AL-130R	10160009	2022.07.25
16	Broadband Hybrid Antennas	Schwarzbeck	VULB9163	VULB9163#958	2022.09.22
17	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1680	2022.05.23
18	Horn Antenna	A-INFOMW	LB-180400-KF	J211060660	2022.09.27
19	Microwave Broadband Preamplifier	Schwarzbeck	BBV 9721	100472	2022.09.22
20	Signal Generator	Agilent	N5183A	MY47420153	2022.09.22
21	Spctrum Analyzer	Rohde&Schwarz	FSP 40	100501	2022.09.22
22	Power Meter	KEYSIGHT	N1911A	MY50520168	2022.09.22
23	Frequency Meter	VICTOR	VC2000	997406086	2022.09.22
24	DC Power Source	HYELEC	HY5020E	055161818	2022.09.22

6. MAXIMUM CONDUCTED OUTPUT POWER

6.1. MEASUREMENT PROCEDURE

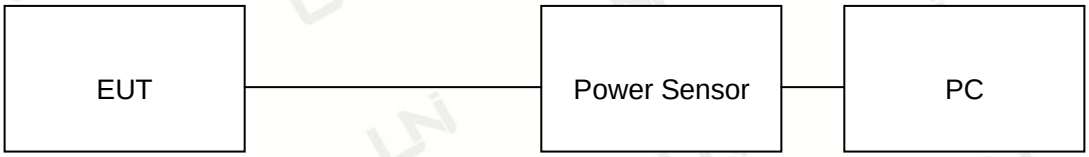
For average power test:

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.

6.2. TEST SET-UP

AVERAGE POWER SETUP



6.3. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT FOR 802.11A20 MODULATION			
Frequency (MHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
5180	12.85	24	Pass
5200	12.20	24	Pass
5240	12.67	24	Pass
5745	12.72	30	Pass
5785	12.44	30	Pass
5825	12.26	30	Pass

LIMITS AND MEASUREMENT RESULT FOR 802.11N20 MODULATION			
Frequency (MHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
5180	12.28	24	Pass
5200	12.47	24	Pass
5240	12.26	24	Pass
5745	12.11	30	Pass
5785	12.15	30	Pass
5825	11.96	30	Pass

LIMITS AND MEASUREMENT RESULT FOR 802.11N40 MODULATION			
Frequency (MHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
5190	12.33	24	Pass
5230	12.21	24	Pass
5755	12.07	30	Pass
5795	12.16	30	Pass

LIMITS AND MEASUREMENT RESULT FOR 802.11AC20 MODULATION			
Frequency (MHz)	**Average Power (dBm)**	**Applicable Limits (dBm)**	**Pass or Fail**
5180	12.76	24	Pass
5200	12.42	24	Pass
5240	12.25	24	Pass
5745	12.05	30	Pass
5785	11.85	30	Pass
5825	11.77	30	Pass

LIMITS AND MEASUREMENT RESULT FOR 802.11AC40 MODULATION			
Frequency (MHz)	**Average Power (dBm)**	**Applicable Limits (dBm)**	**Pass or Fail**
5190	12.17	24	Pass
5230	11.55	24	Pass
5755	12.36	30	Pass
5795	12.39	30	Pass

7. -6dB BANDWIDTH

7.1.1 -6dB BANDWIDTH MEASUREMENT PROCEDURE

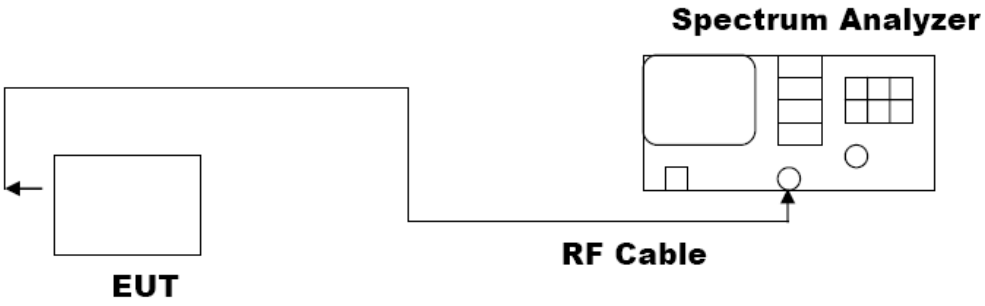
1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on operation frequency individually.
3. Set RBW = 100kHz.
4. Set the VBW ≥3*RBW. Detector = Peak. Trace mode = max hold.
5. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.

7.1.2 99% OCCUPIED BANDWIDTH

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 Span = approximately 1.5 to 5 times the OBW, centered on a nominal channel
   The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
4. 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.

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



7.3. LIMITS AND MEASUREMENT RESULTS

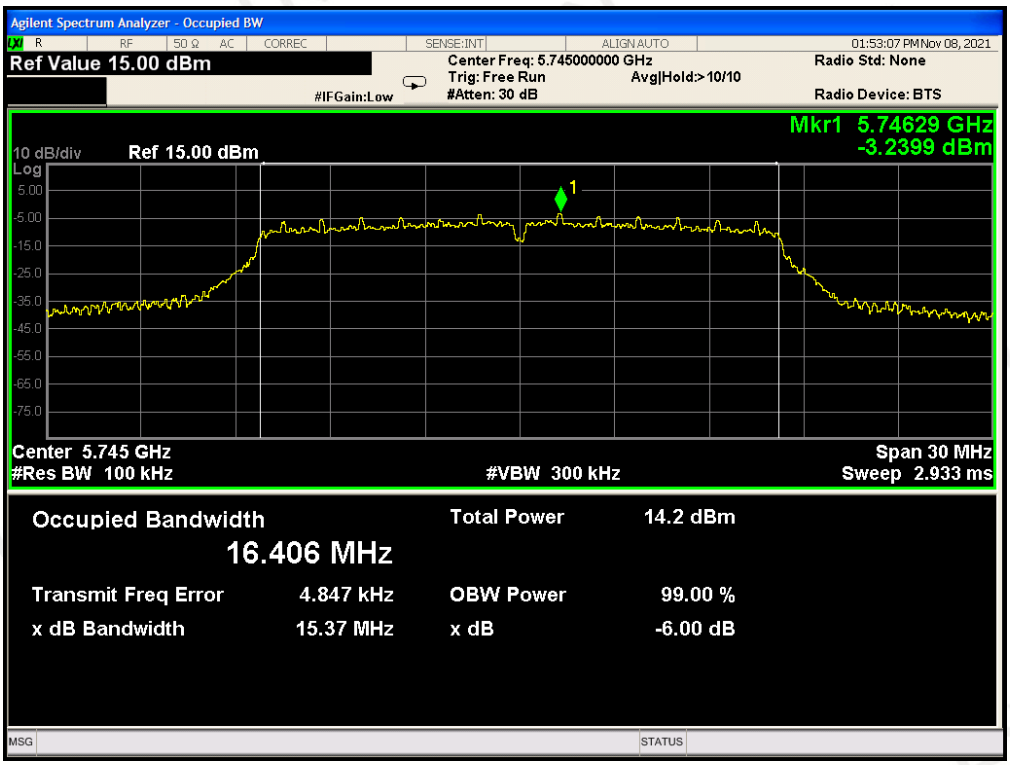
LIMITS AND MEASUREMENT RESULT FOR 802.11A20 MODULATION				
Applicable Limits	Applicable Limits			
	Test Data (MHz)			Criteria
	Frequency (MHz)	-6dB Bandwidth	99.00% Occupied Bandwidth	
>500KHZ	5745MHz	15.37	16.547	PASS
	5785MHz	15.15	16.551	PASS
	5825MHz	15.13	16.531	PASS

LIMITS AND MEASUREMENT RESULT FOR 802.11N20/40 MODULATION				
Applicable Limits	Applicable Limits			
	Test Data (MHz)			Criteria
	Frequency (MHz)	-6dB Bandwidth	99.00% Occupied Bandwidth	
>500KHZ	5745MHz	15.32	17.598	PASS
	5785MHz	15.37	17.612	PASS
	5825MHz	15.15	17.572	PASS
	5755MHz	35.25	35.999	PASS
	5795MHz	35.37	35.982	PASS

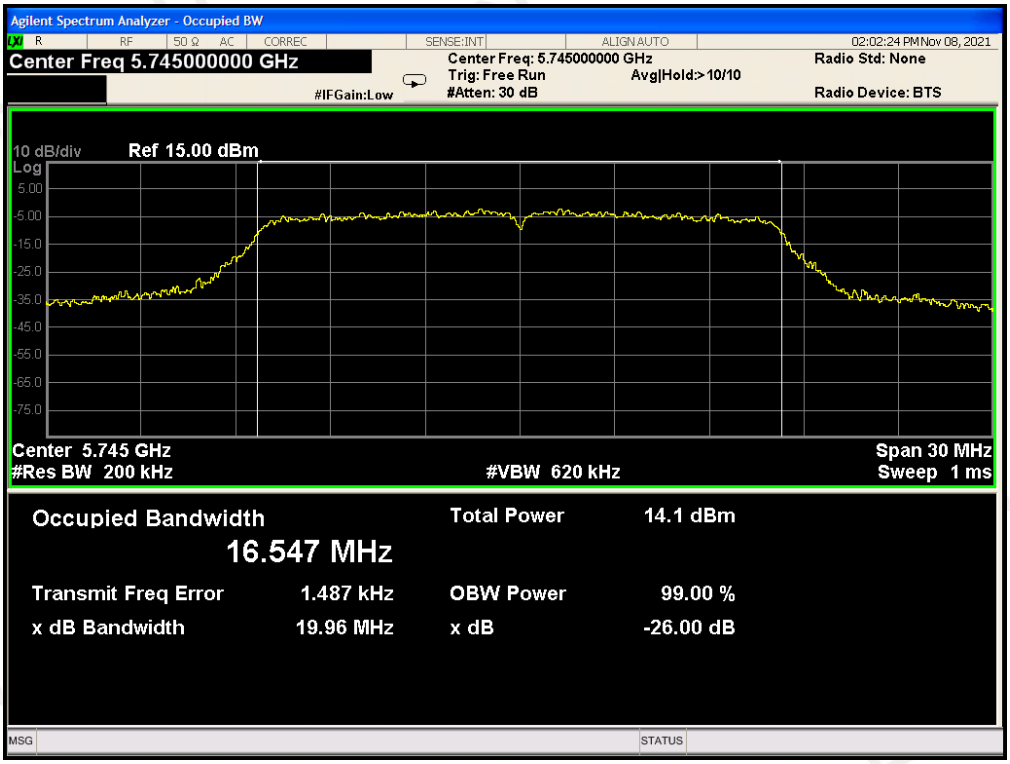
LIMITS AND MEASUREMENT RESULT FOR 802.11AC20/40 MODULATION				
Applicable Limits	Applicable Limits			
	Test Data (MHz)			Criteria
	Frequency (MHz)	-6dB Bandwidth	99.00% Occupied Bandwidth	
>500KHZ	5745MHz	15.96	17.596	PASS
	5785MHz	15.15	17.580	PASS
	5825MHz	15.31	17.561	PASS
	5755MHz	35.38	36.025	PASS
	5795MHz	35.38	35.978	PASS

802.11a20 TEST RESULT

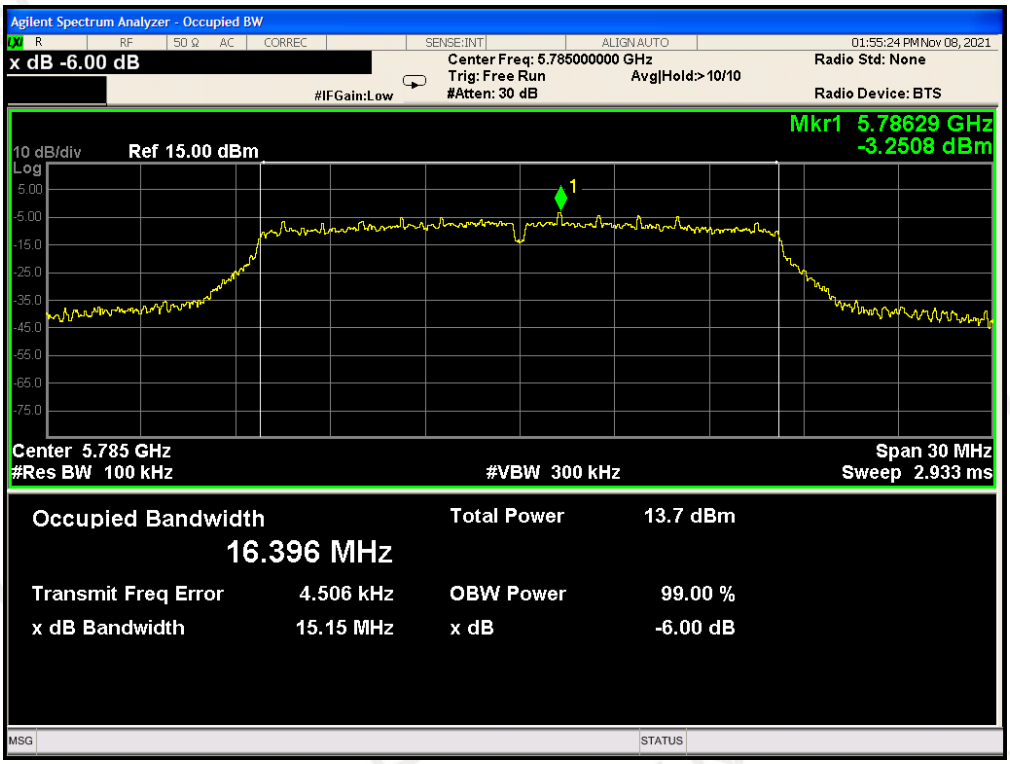
BANDWIDTH FOR 5745MHz（-6dB BANDWIDTH）



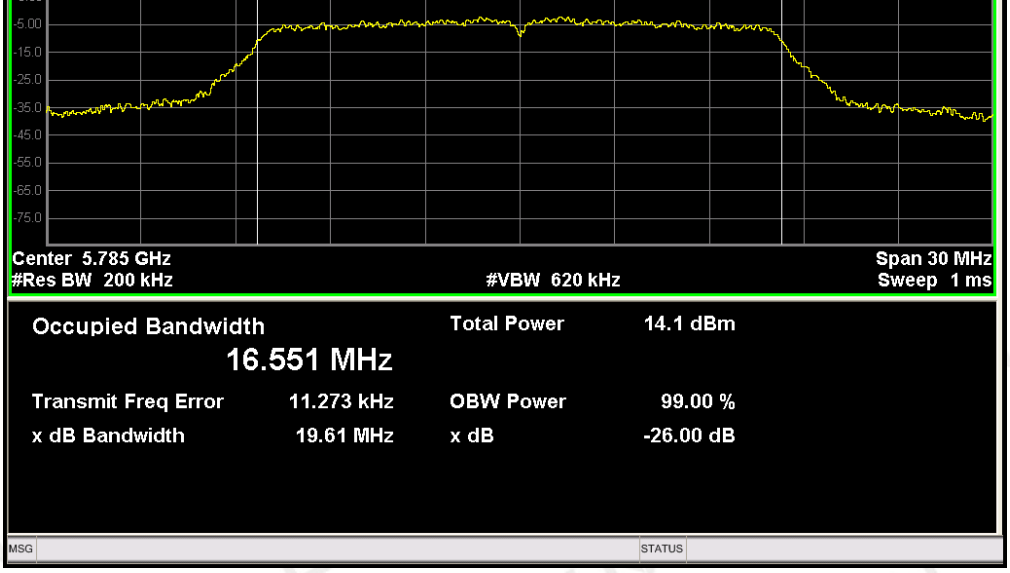
BANDWIDTH FOR 5745MHz（99% BANDWIDTH）



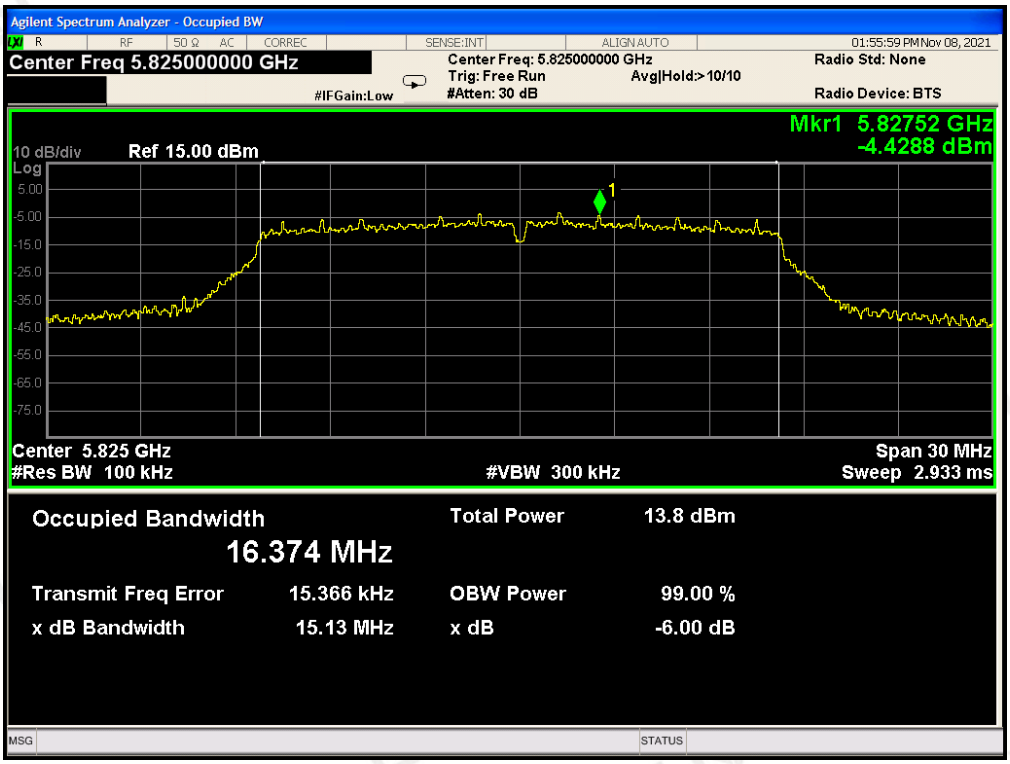
BANDWIDTH FOR 5785MHz（-6dB BANDWIDTH）



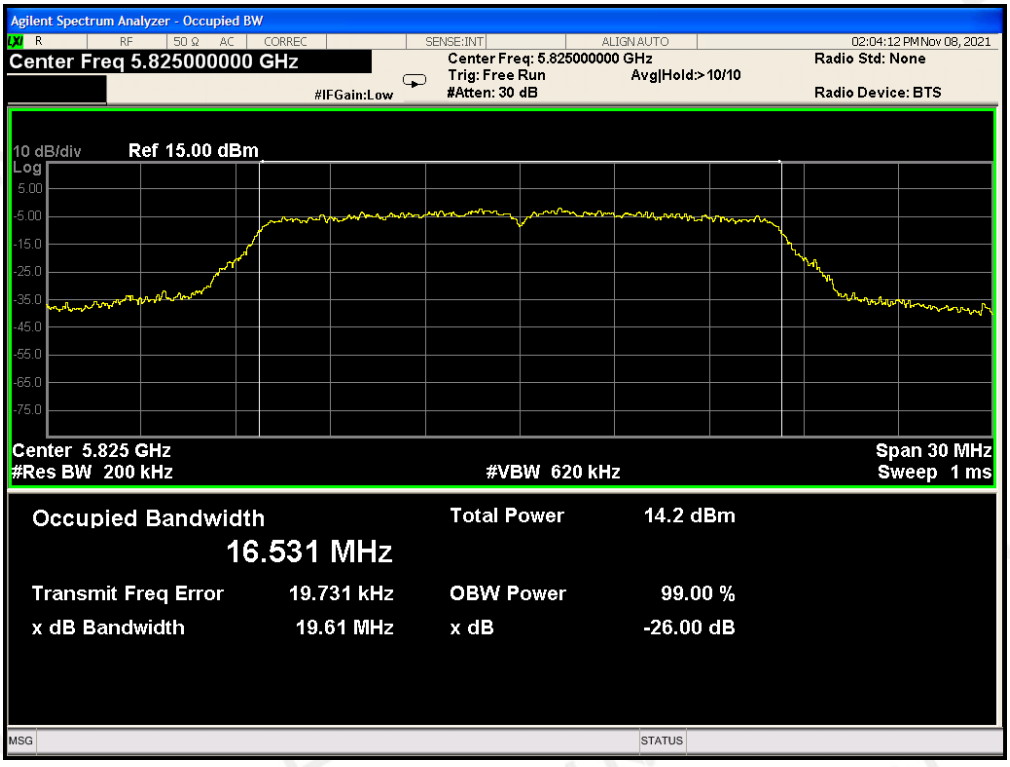
BANDWIDTH FOR 5785MHz（99% BANDWIDTH）



BANDWIDTH FOR 5825MHz（-6dB BANDWIDTH）

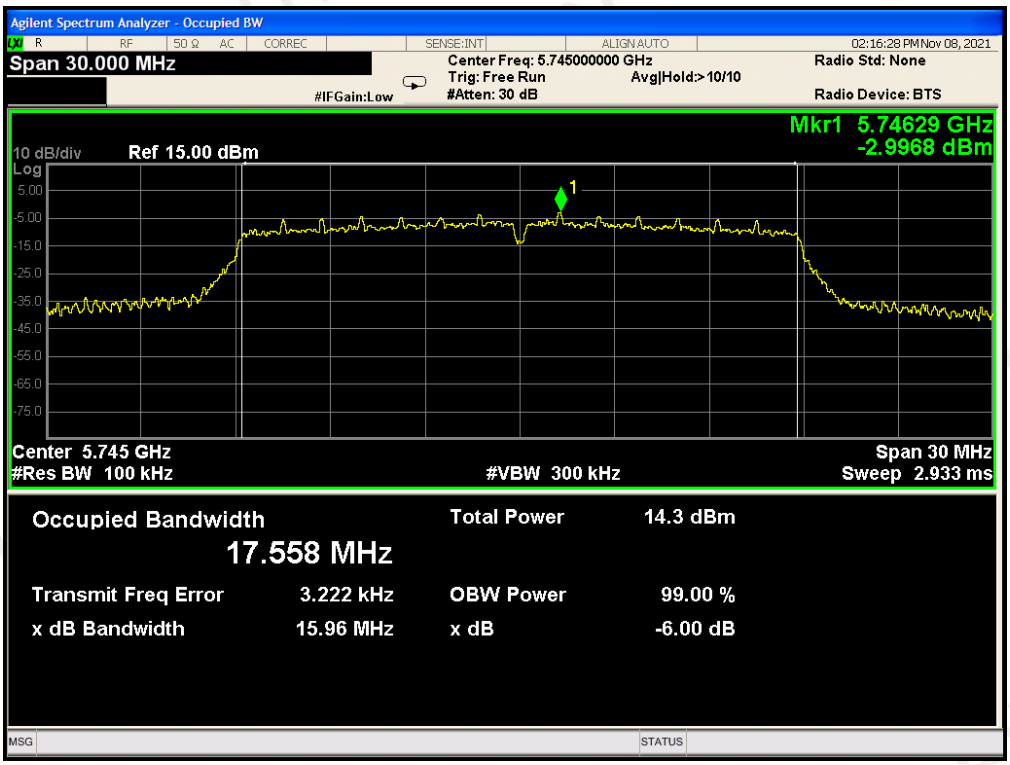


BANDWIDTH FOR 5825MHz（99% BANDWIDTH）

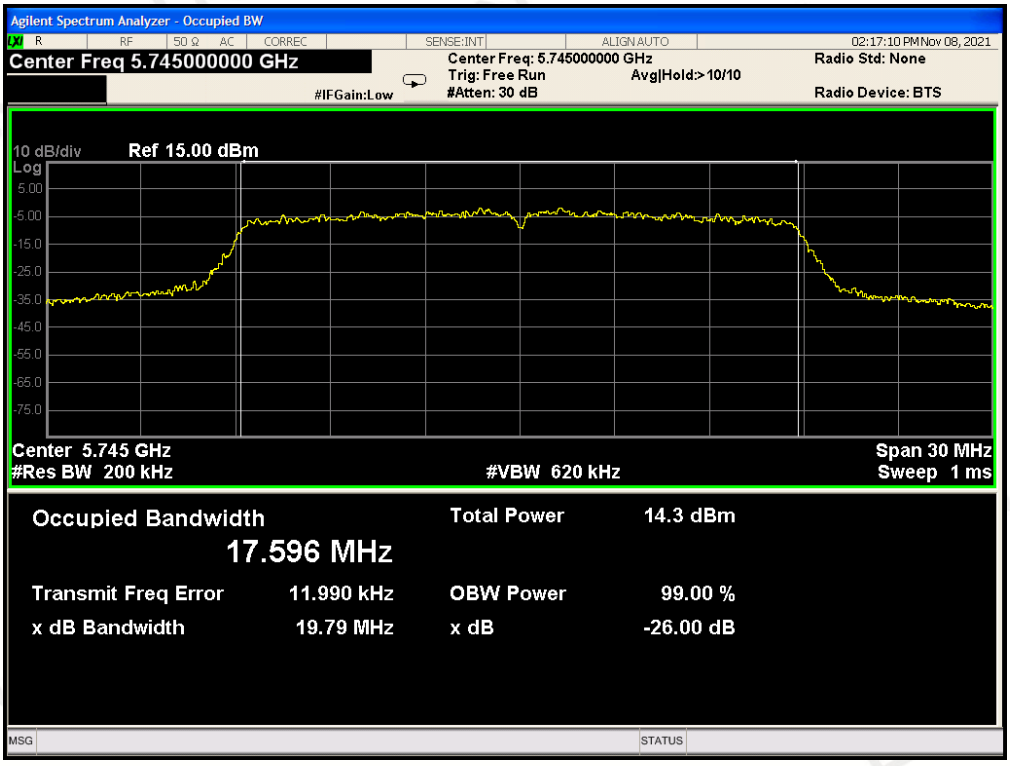


802.11n20 TEST RESULT

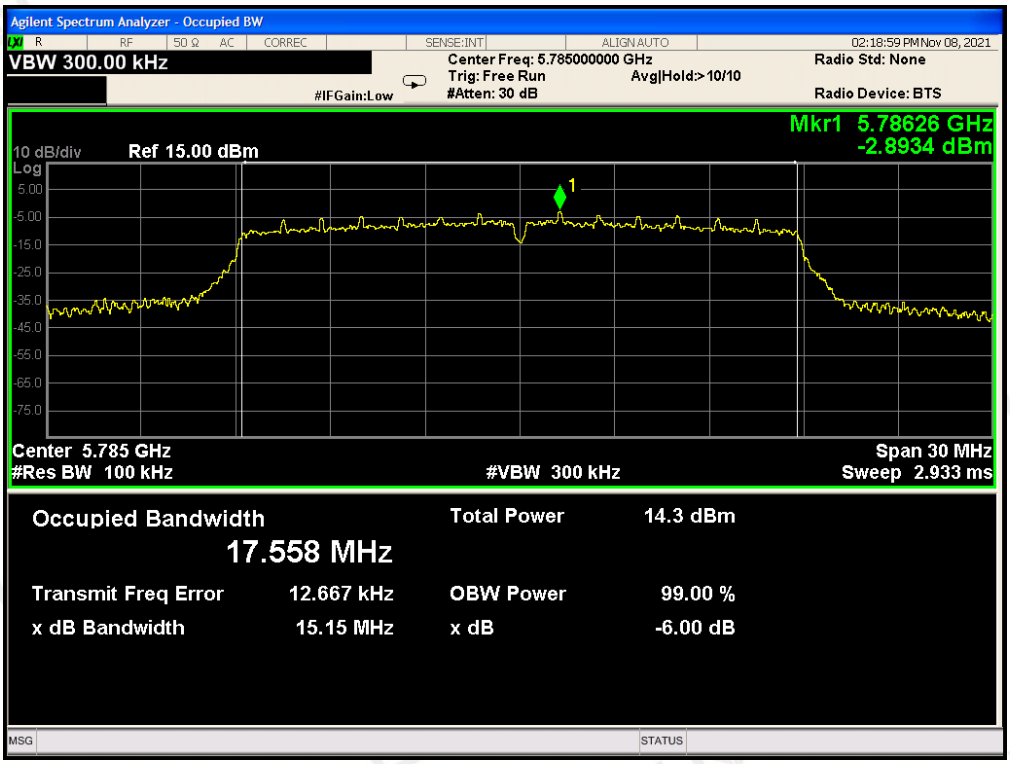
BANDWIDTH FOR 5745MHz（-6dB BANDWIDTH）



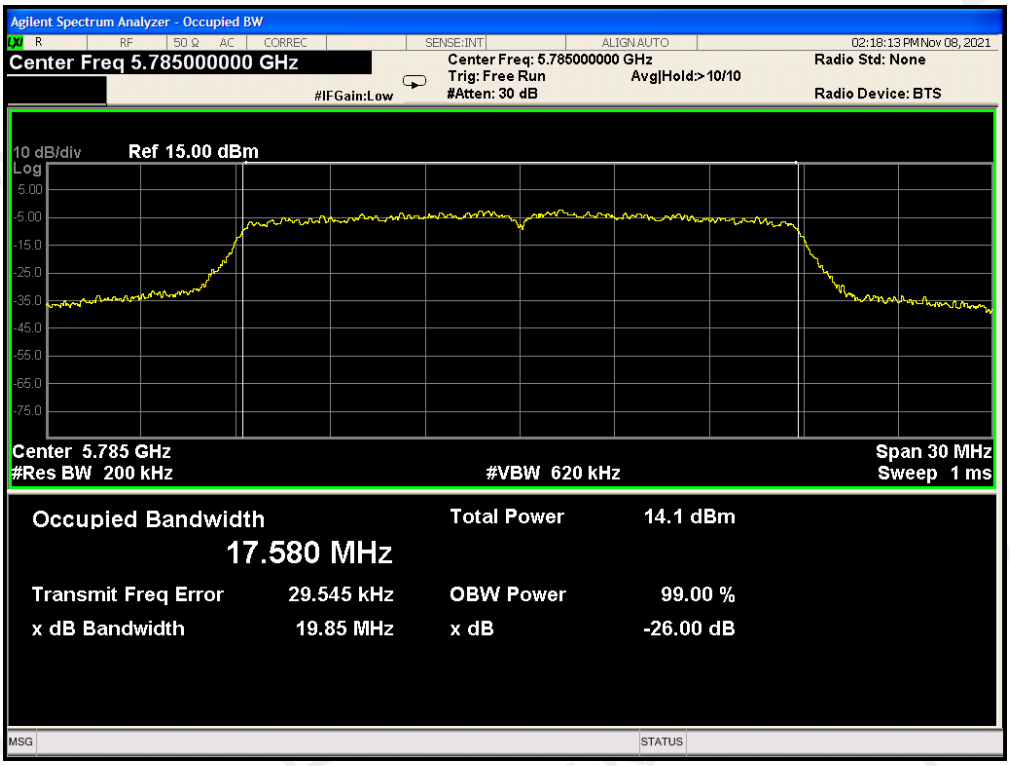
BANDWIDTH FOR 5745MHz（99% BANDWIDTH）



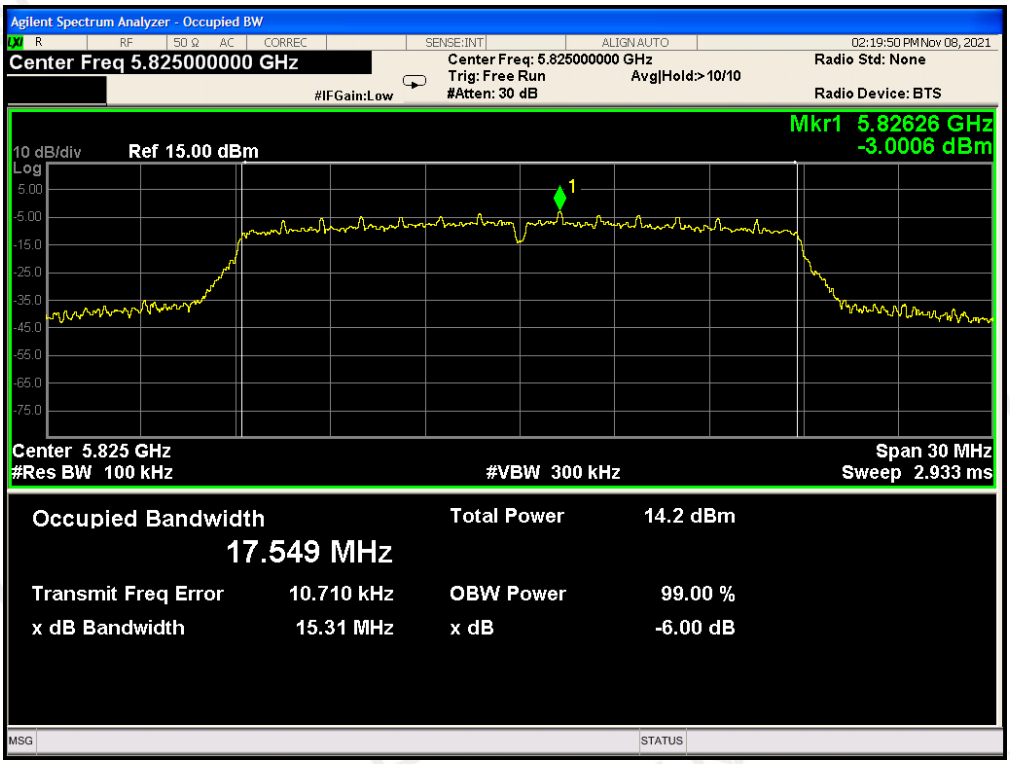
BANDWIDTH FOR 5785MHz（-6dB BANDWIDTH）



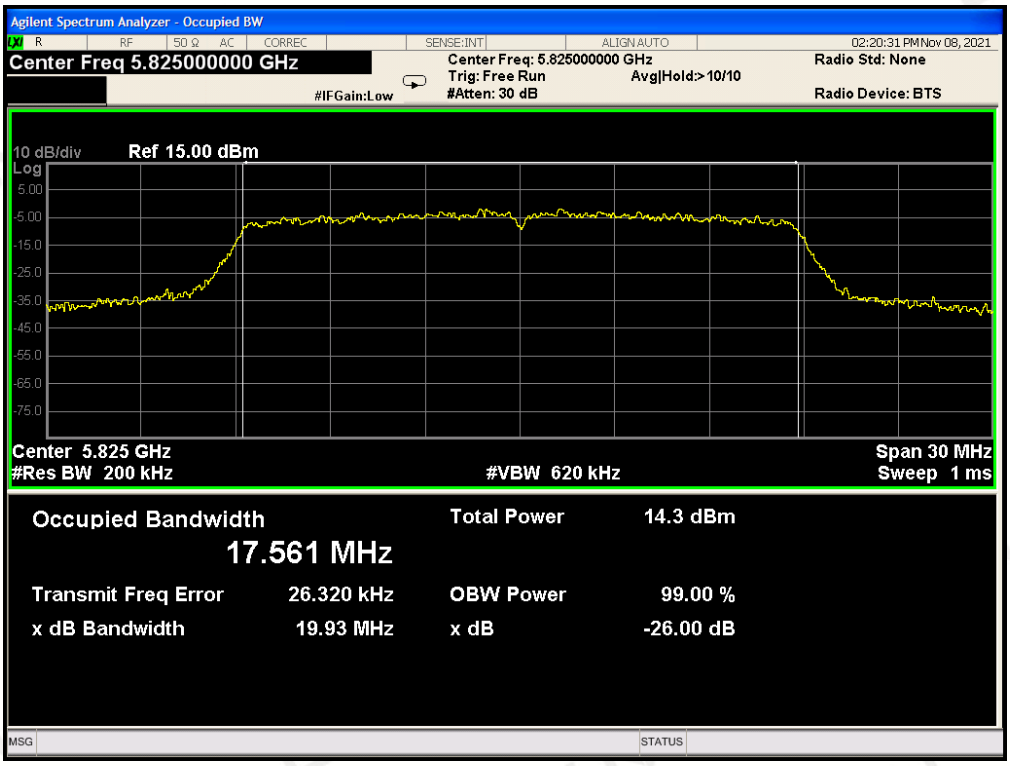
BANDWIDTH FOR 5785MHz（99% BANDWIDTH）



BANDWIDTH FOR 5825MHz（-6dB BANDWIDTH）

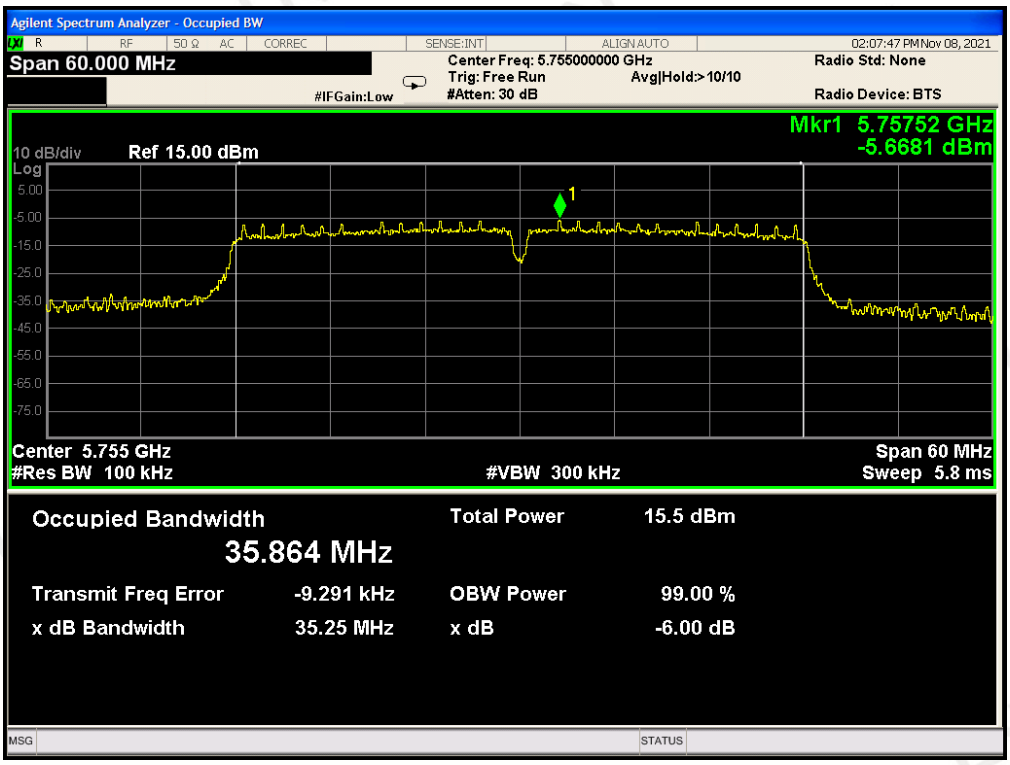


BANDWIDTH FOR 5825MHz（99% BANDWIDTH）

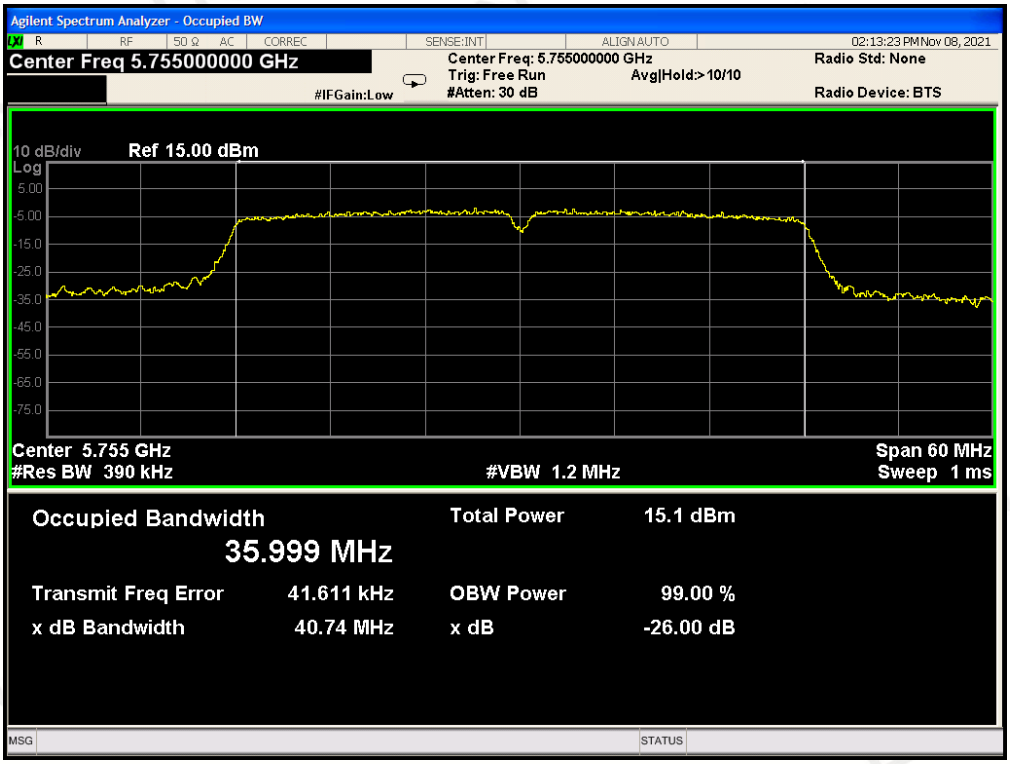


802.11n40 TEST RESULT

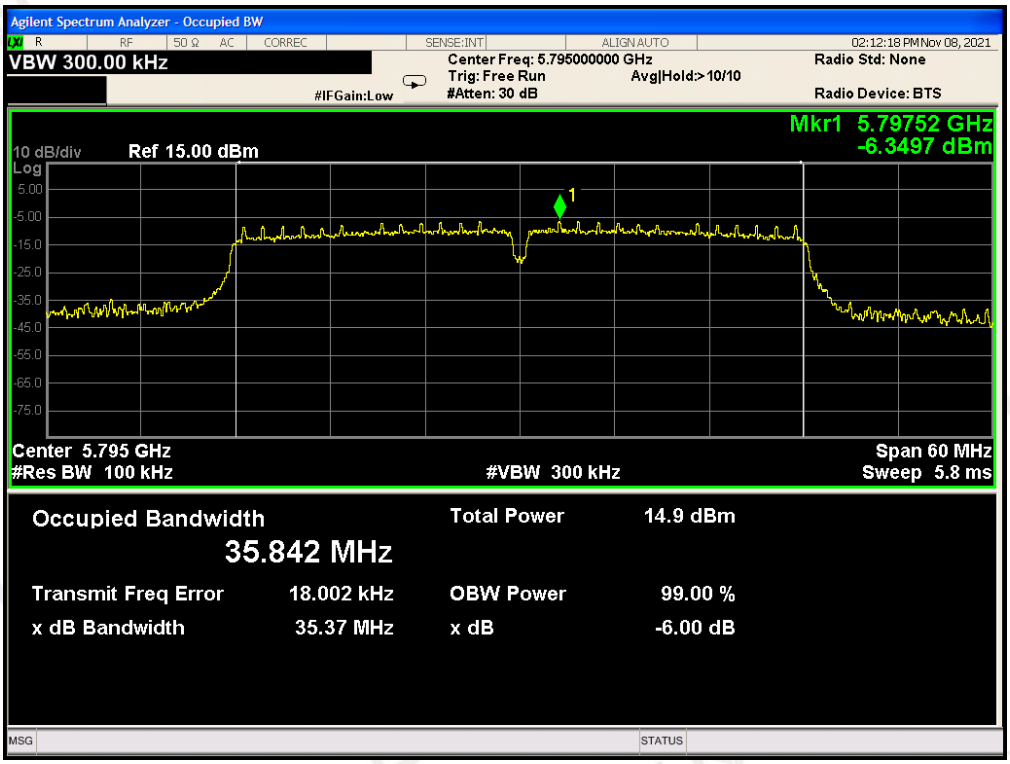
BANDWIDTH FOR 5755MHz（-6dB BANDWIDTH）



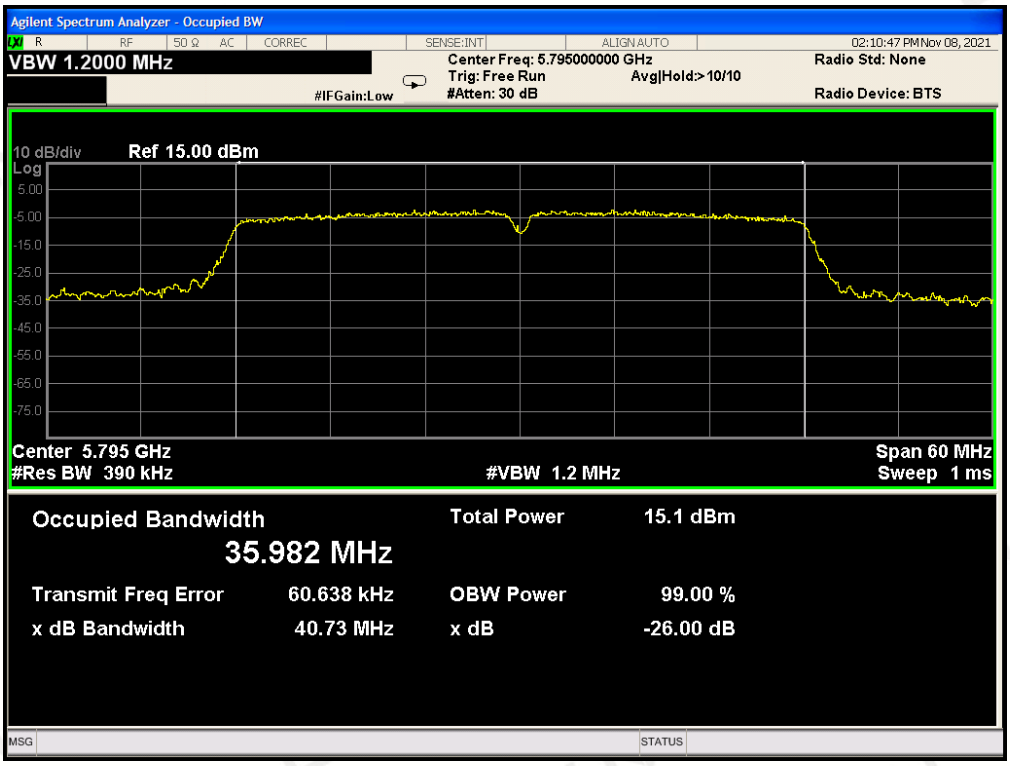
BANDWIDTH FOR 5755MHz（99% BANDWIDTH）



BANDWIDTH FOR 5795MHz（-6dB BANDWIDTH）

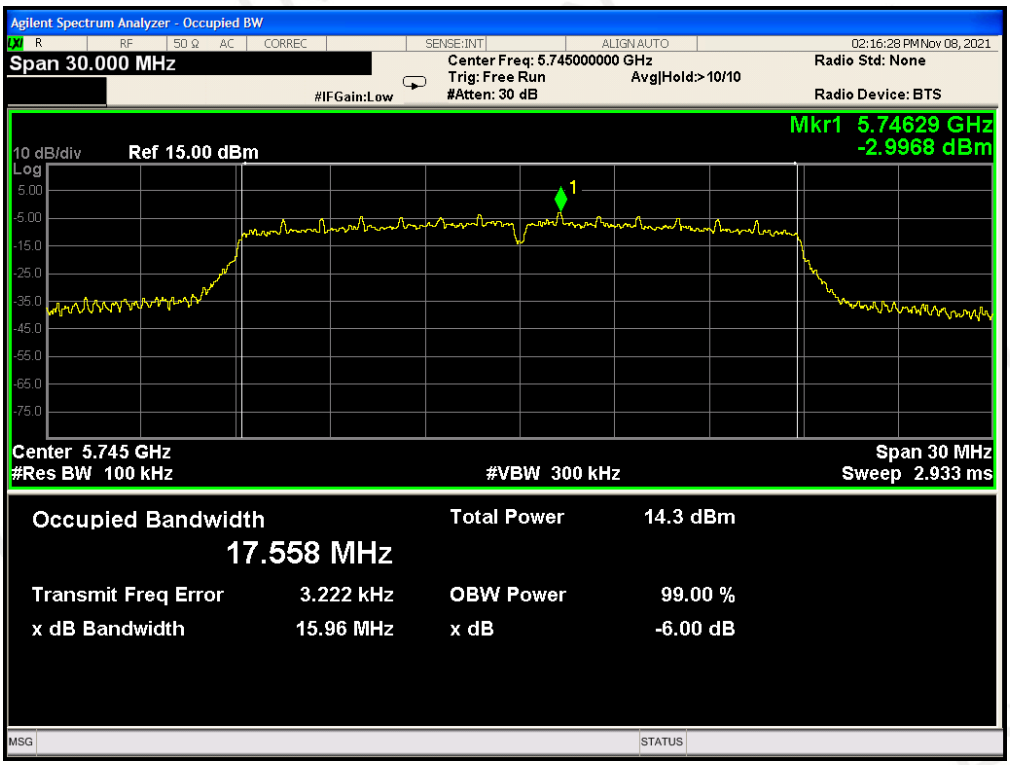


BANDWIDTH FOR 5795MHz（99% BANDWIDTH）

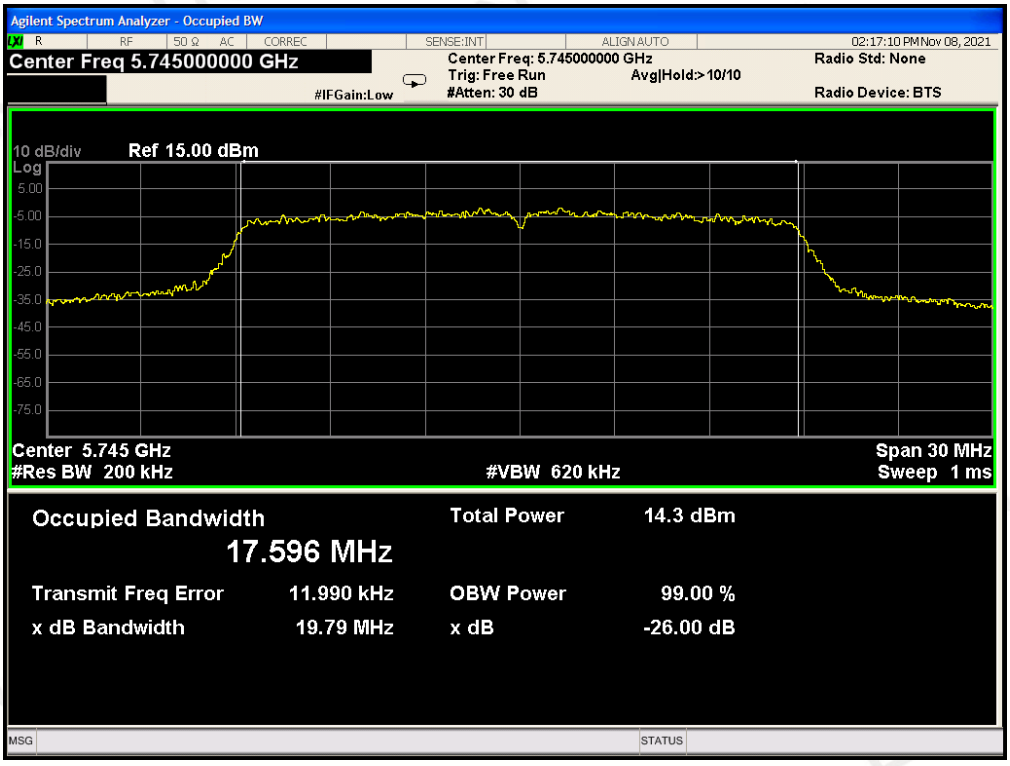


802.11ac20 TEST RESULT

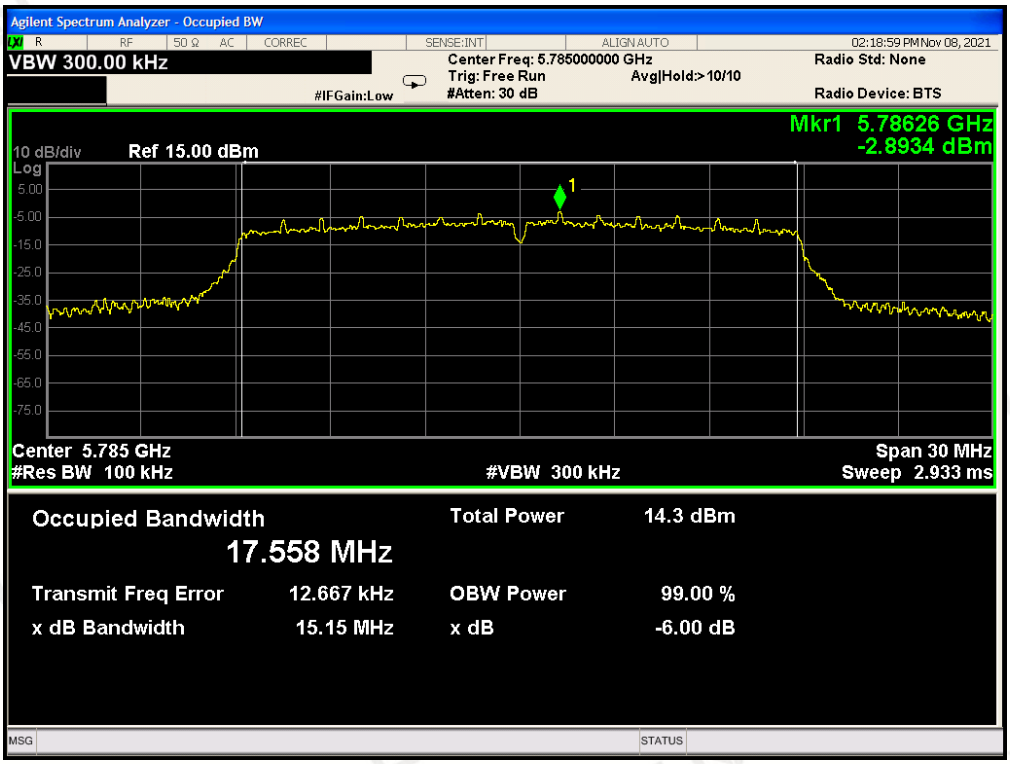
BANDWIDTH FOR 5745MHz（-6dB BANDWIDTH）



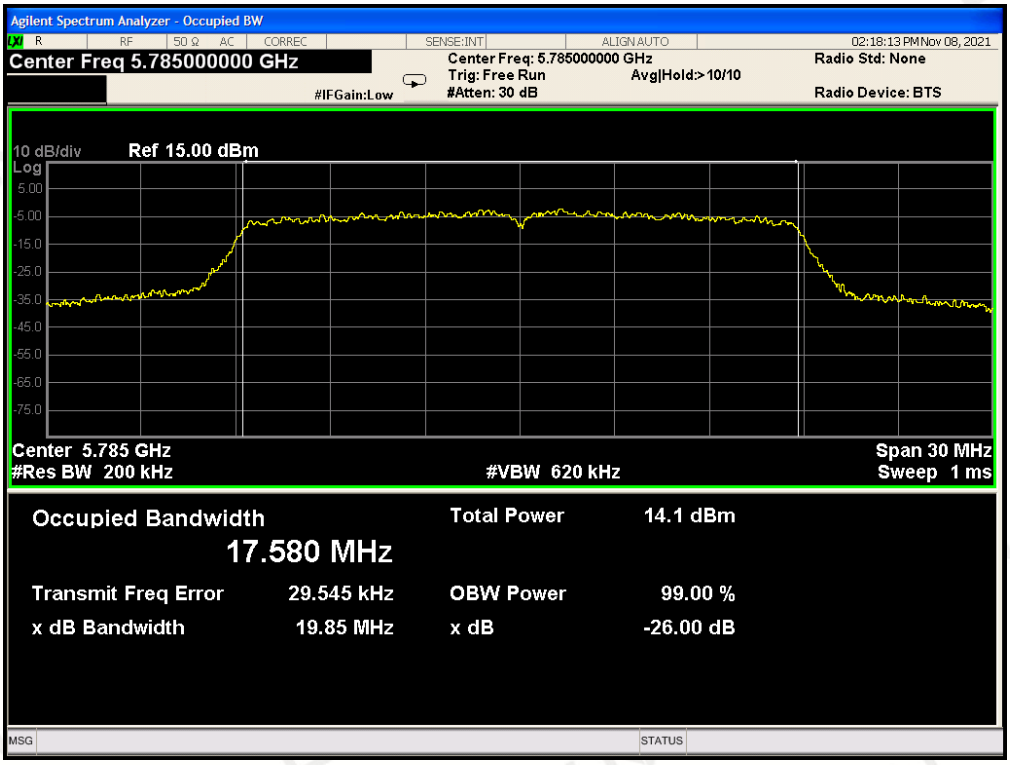
BANDWIDTH FOR 5745MHz（99% BANDWIDTH）



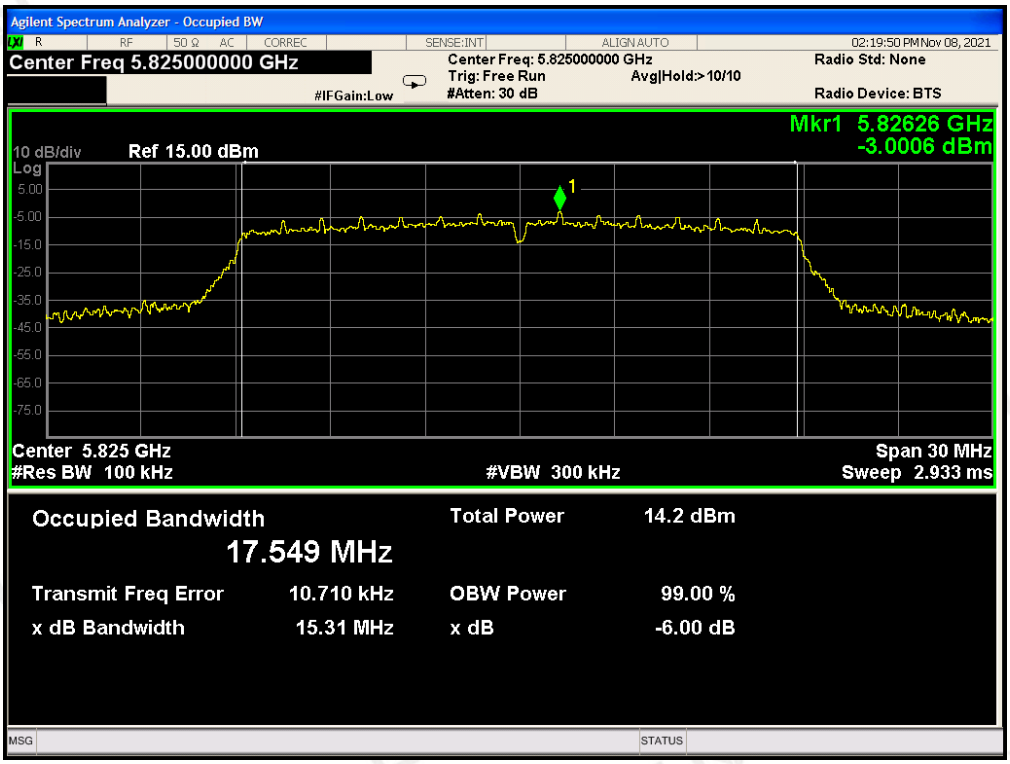
BANDWIDTH FOR 5785MHz（-6dB BANDWIDTH）



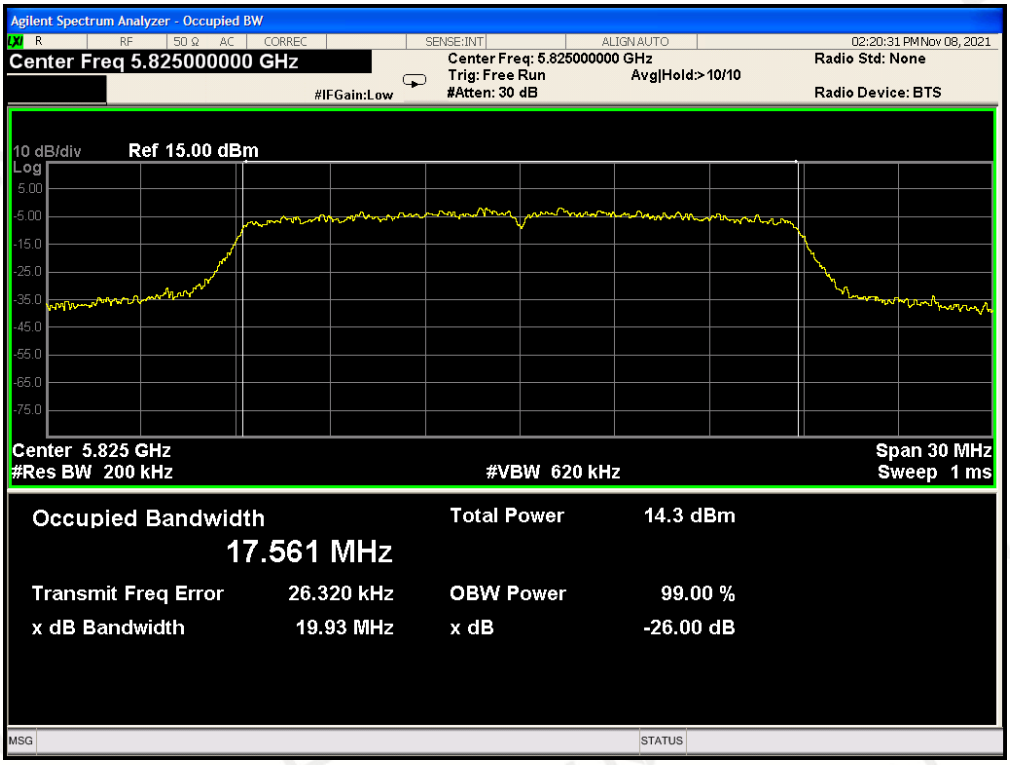
BANDWIDTH FOR 5785MHz（99% BANDWIDTH）



BANDWIDTH FOR 5825MHz（-6dB BANDWIDTH）

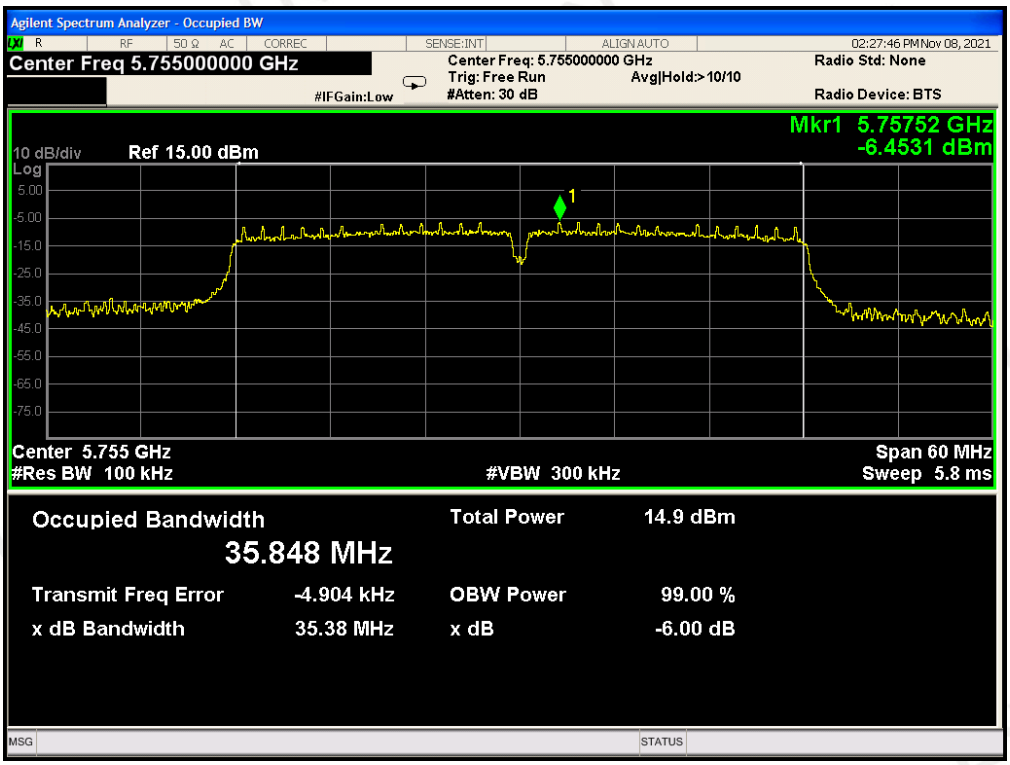


BANDWIDTH FOR 5825MHz（99% BANDWIDTH）

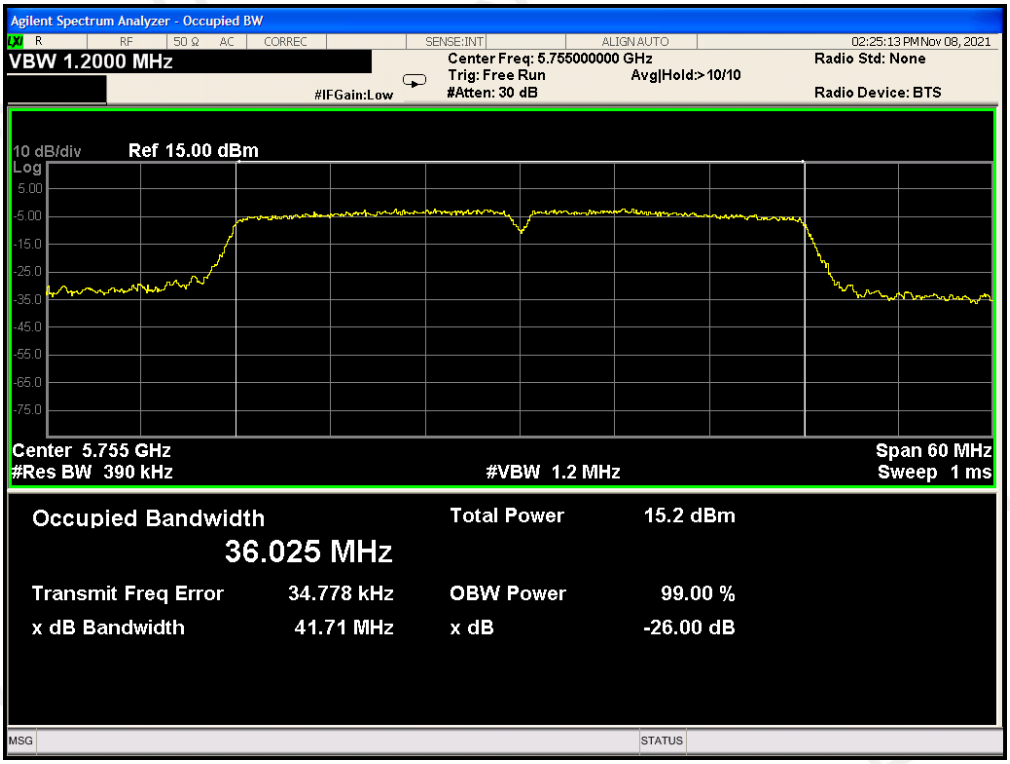


802.11ac40 TEST RESULT

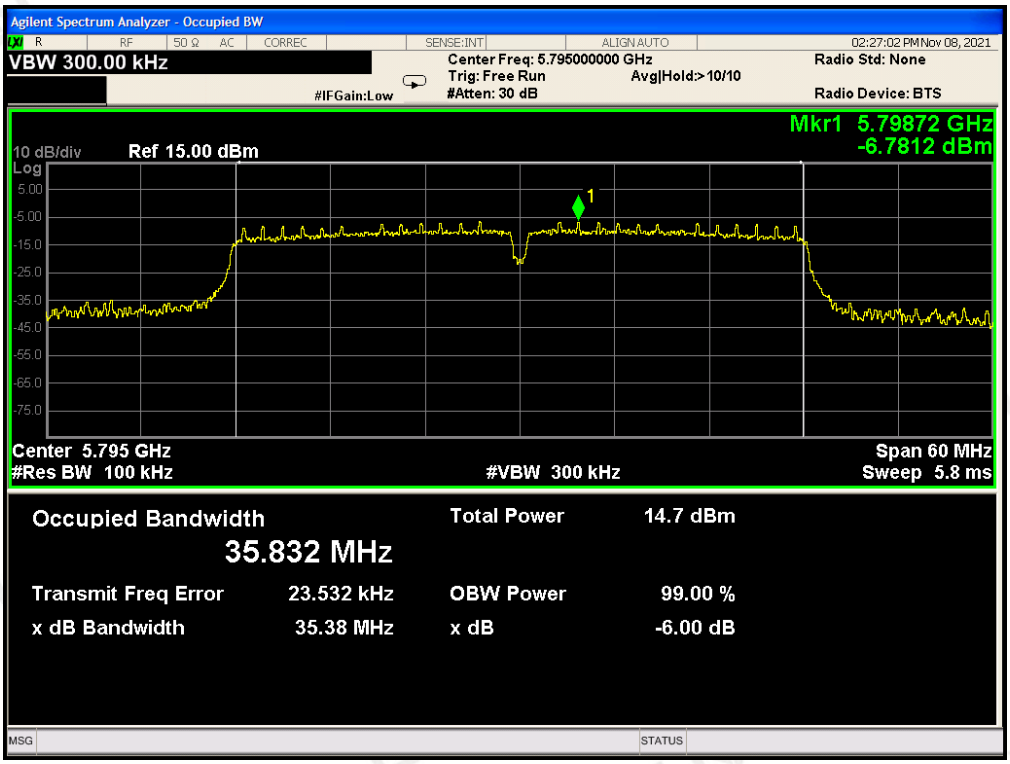
BANDWIDTH FOR 5755MHz（-6dB BANDWIDTH）



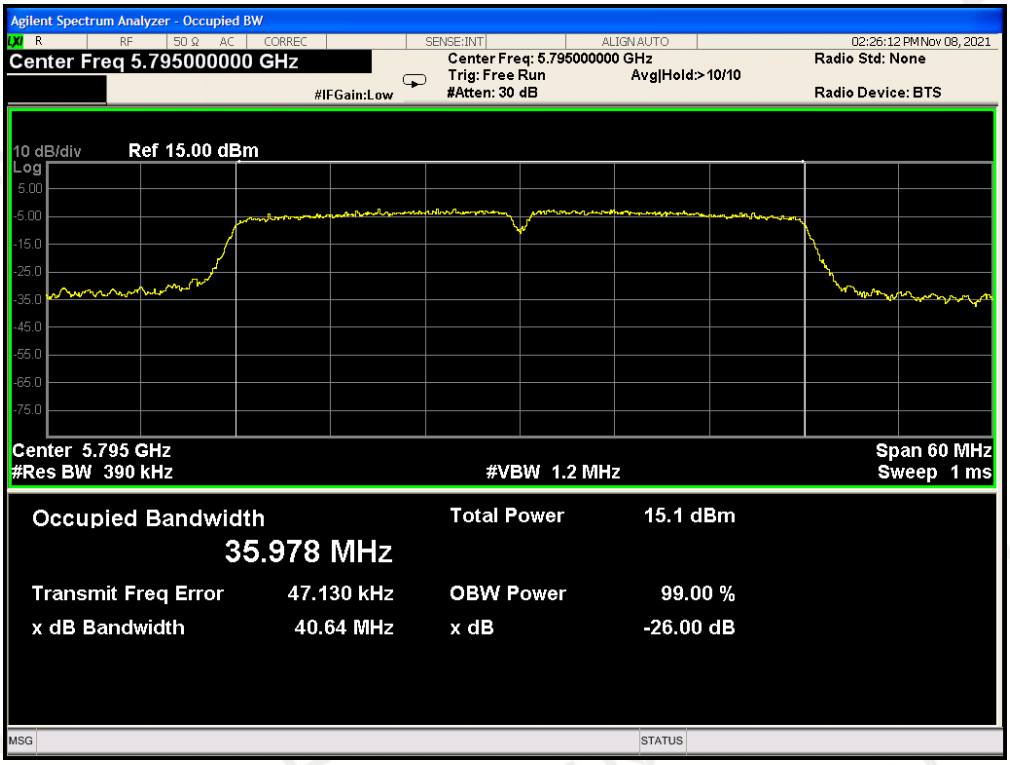
BANDWIDTH FOR 5755MHz（99% BANDWIDTH）



BANDWIDTH FOR 5795MHz（-6dB BANDWIDTH）



BANDWIDTH FOR 5795MHz（99% BANDWIDTH）



8. EMISSION BANDWIDTH

8.1. MEASUREMENT PROCEDURE

8.1.1. -26dB Bandwidth MEASUREMENT PROCEDURE

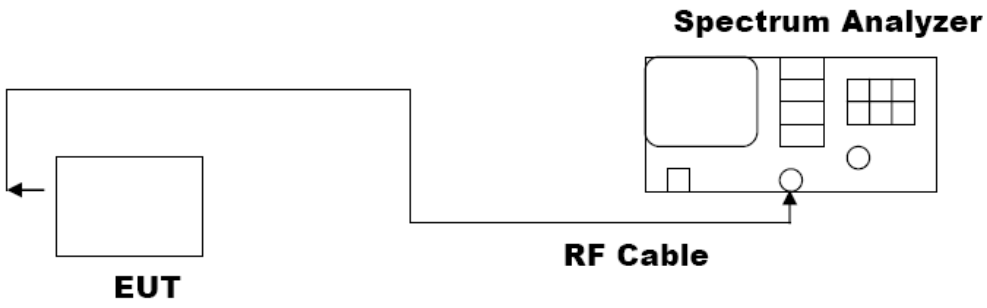
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

8.1.2. 99.00% Occupied Bandwidth MEASUREMENT PROCEDURE

a) Connect the antenna port(s) to the spectrum analyzer input.
b)Configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).
Center Frequency =Channel center frequency
Span=2 x emission bandwidth
RBW = 1% to 5% of the emission bandwidth
VBW>3 x RBW
Sweep time= auto couple
Detector = Peak
Trace mode = max hold
c)Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form on the spectrum analyzer.
d) Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is 1% to 5%.

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)



8.3. LIMITS AND MEASUREMENT RESULTS

LIMITS AND MEASUREMENT RESULT FOR 802.11A20 MODULATION				
Applicable Limits	Applicable Limits			
	Test Data (MHz)			Criteria
	Frequency (MHz)	-26dB Bandwidth	99.00% Occupied Bandwidth	
Within the Band	5180MHz	20.70	16.582	PASS
	5200MHz	20.14	16.554	PASS
	5240MHz	19.87	16.583	PASS

LIMITS AND MEASUREMENT RESULT FOR 802.11N20 MODULATION				
Applicable Limits	Applicable Limits			
	Test Data (MHz)			Criteria
	Frequency (MHz)	-26dB Bandwidth	99.00% Occupied Bandwidth	
Within the Band	5180MHz	20.06	17.635	PASS
	5200MHz	20.22	17.627	PASS
	5240MHz	20.29	17.633	PASS

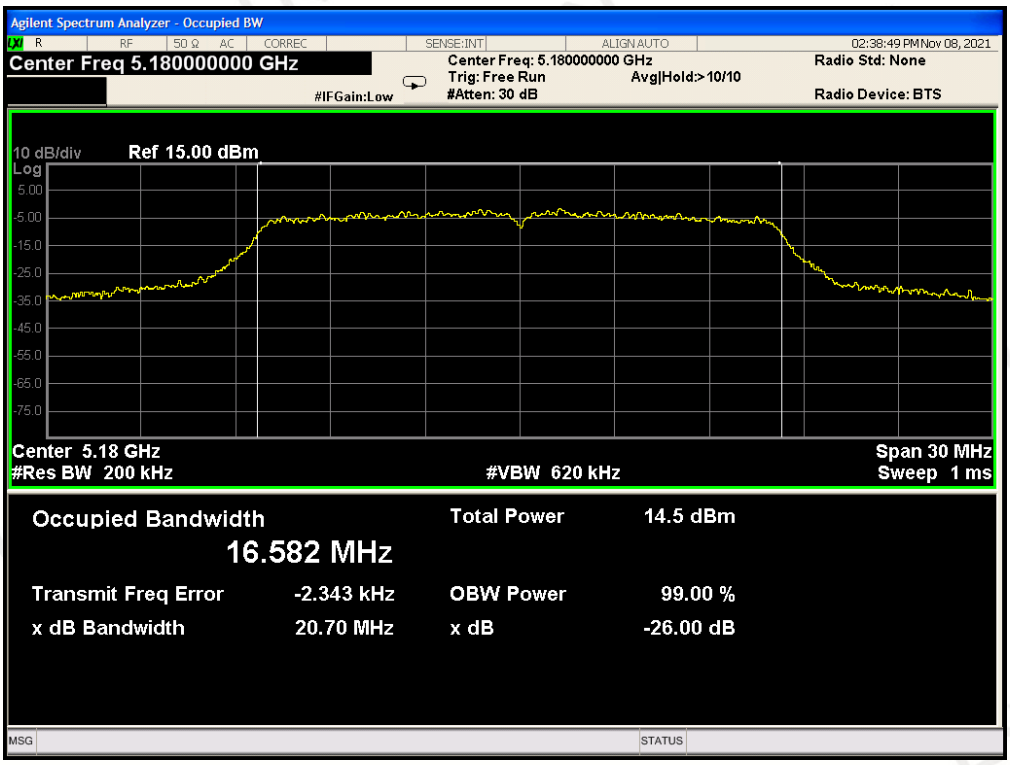
LIMITS AND MEASUREMENT RESULT FOR 802.11N40 MODULATION				
Applicable Limits	Applicable Limits			
	Test Data (MHz)			Criteria
	Frequency (MHz)	-26dB Bandwidth	99.00% Occupied Bandwidth	
Within the Band	5190MHz	48.69	36.130	PASS
	5230MHz	42.22	36.041	PASS

LIMITS AND MEASUREMENT RESULT FOR 802.11AC20 MODULATION				
Applicable Limits	Applicable Limits			
	Test Data (MHz)			Criteria
	Frequency (MHz)	-26dB Bandwidth	99.00% Occupied Bandwidth	
Within the Band	5180MHz	20.66	17.623	PASS
	5200MHz	20.80	17.622	PASS
	5240MHz	20.54	17.646	PASS

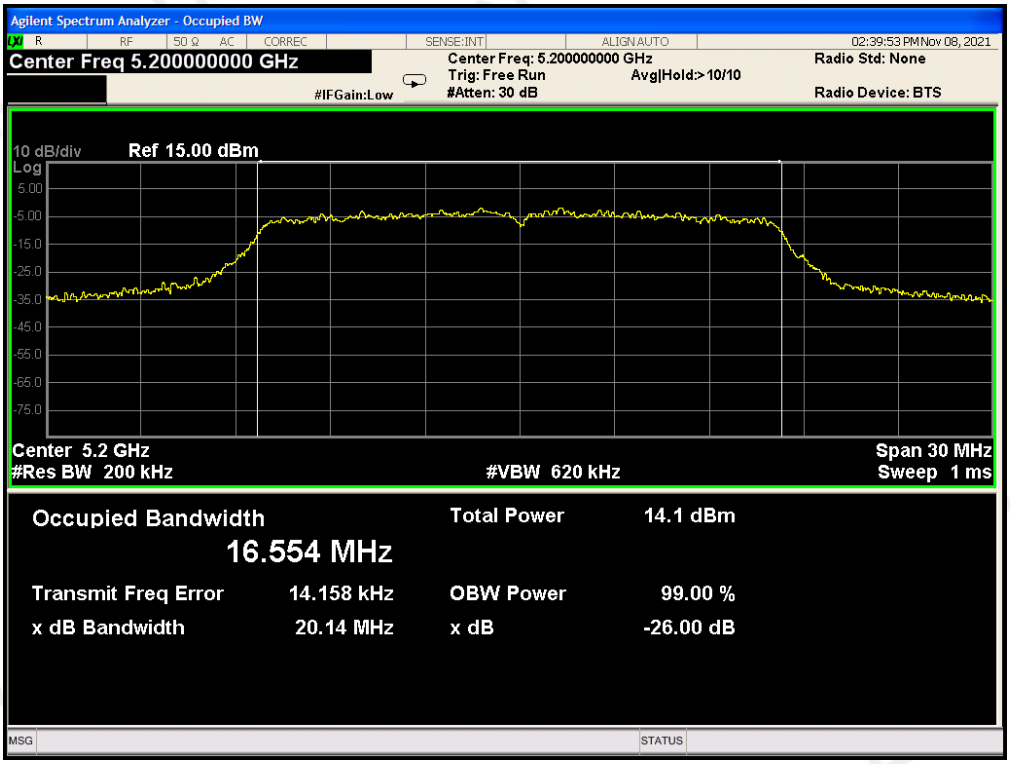
LIMITS AND MEASUREMENT RESULT FOR 802.11AC40 MODULATION				
Applicable Limits	Applicable Limits			
	Test Data (MHz)			Criteria
	Frequency (MHz)	-26dB Bandwidth	99.00% Occupied Bandwidth	
Within the Band	5190MHz	44.95	36.063	PASS
	5230MHz	43.41	36.075	PASS

802.11a20 TEST RESULT

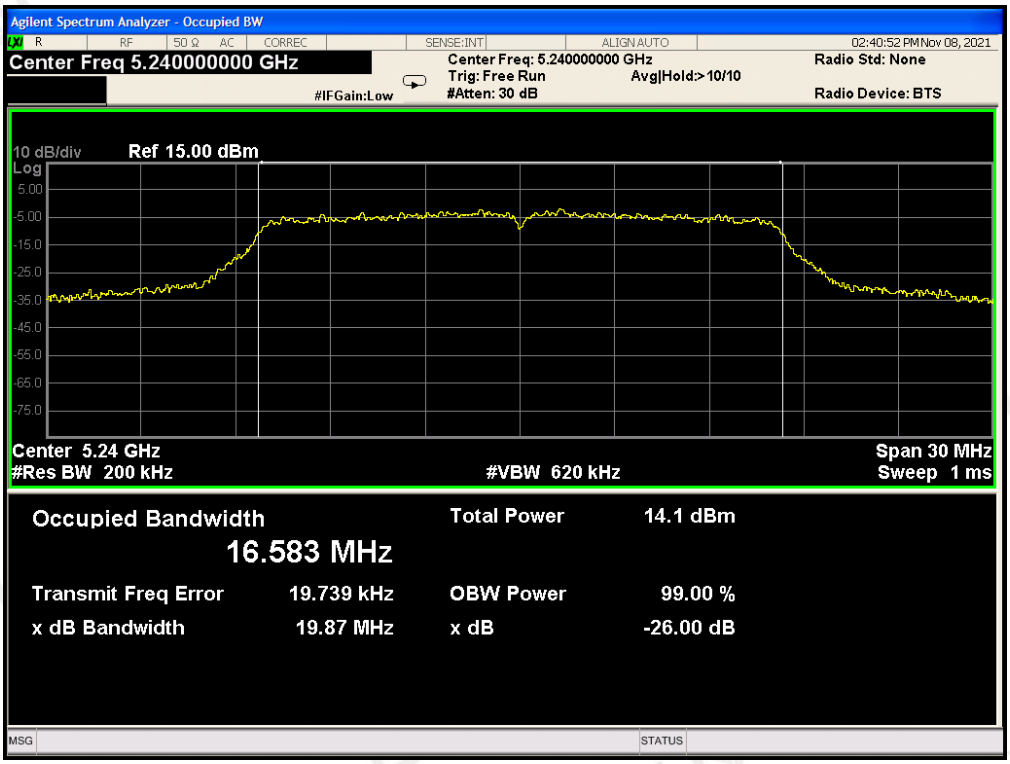
BANDWIDTH FOR 5180MHz



BANDWIDTH FOR 5200MHz

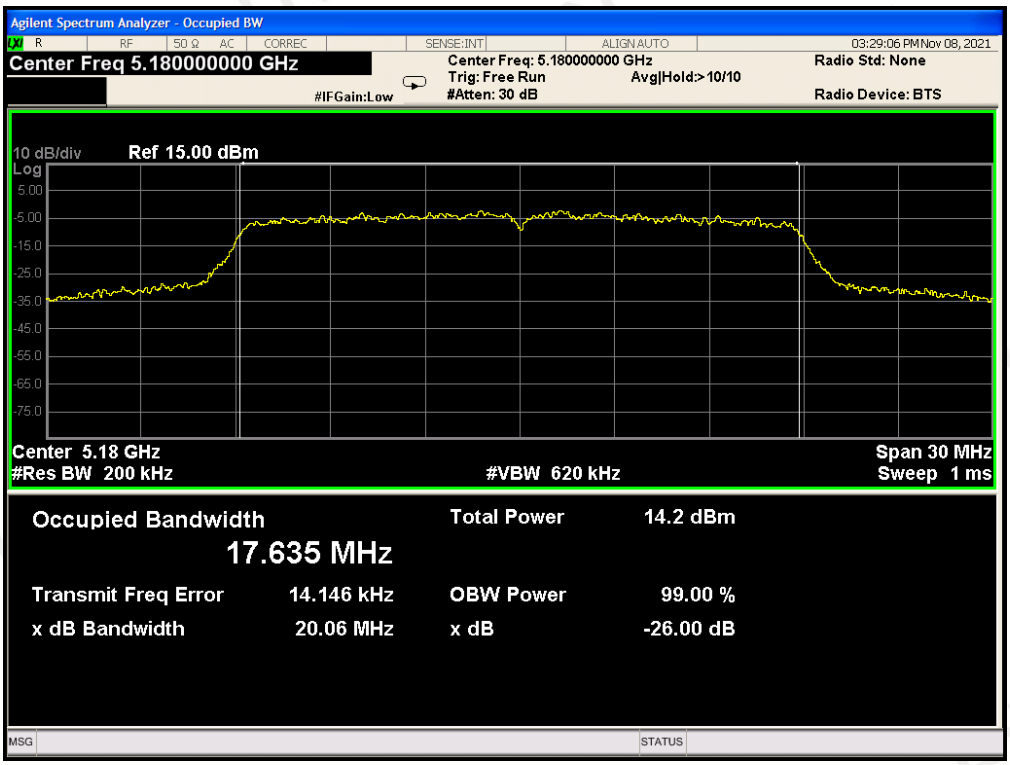


BANDWIDTH FOR 5240MHz

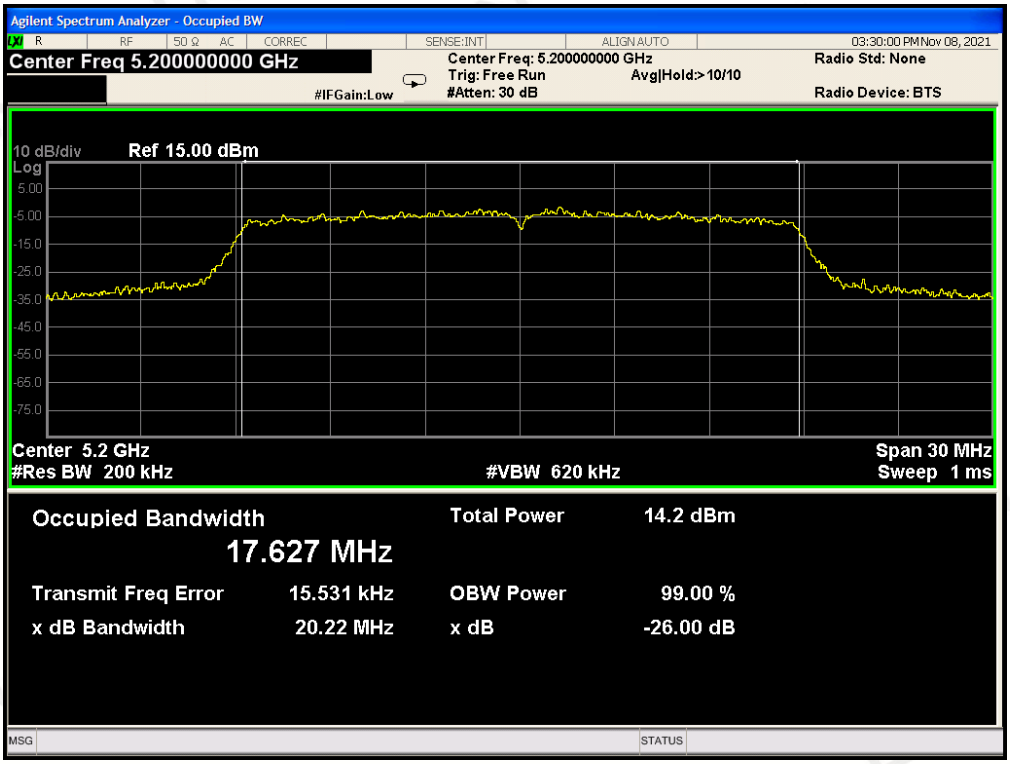


802.11n20 TEST RESULT

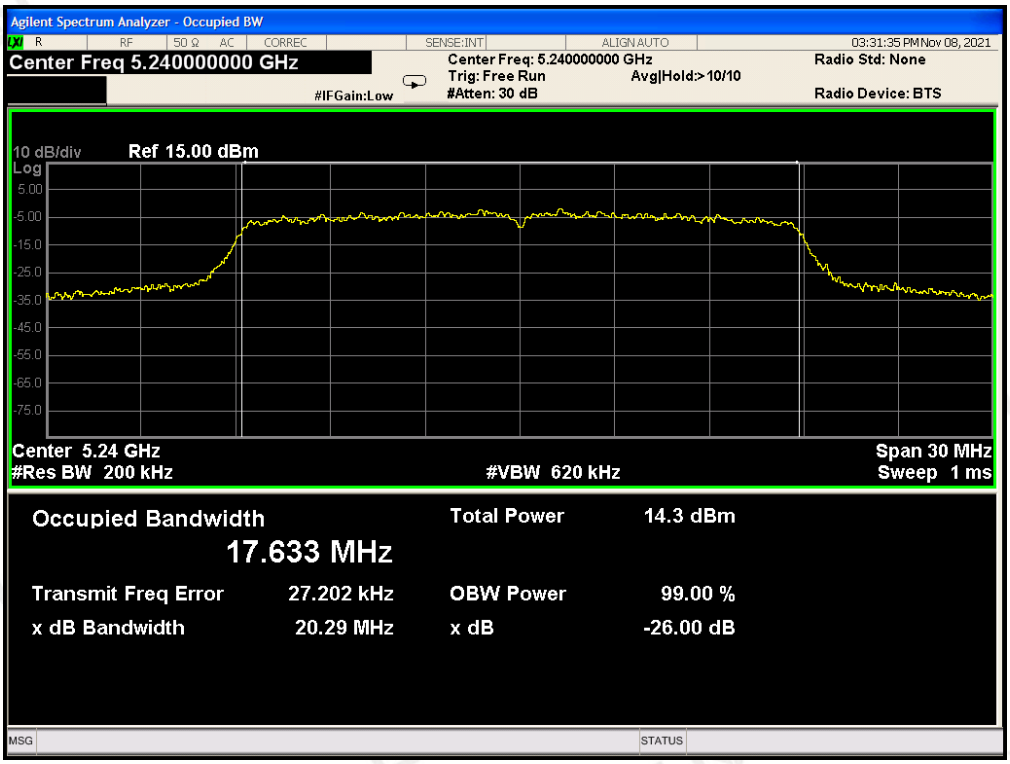
BANDWIDTH FOR 5180MHz



BANDWIDTH FOR 5200MHz

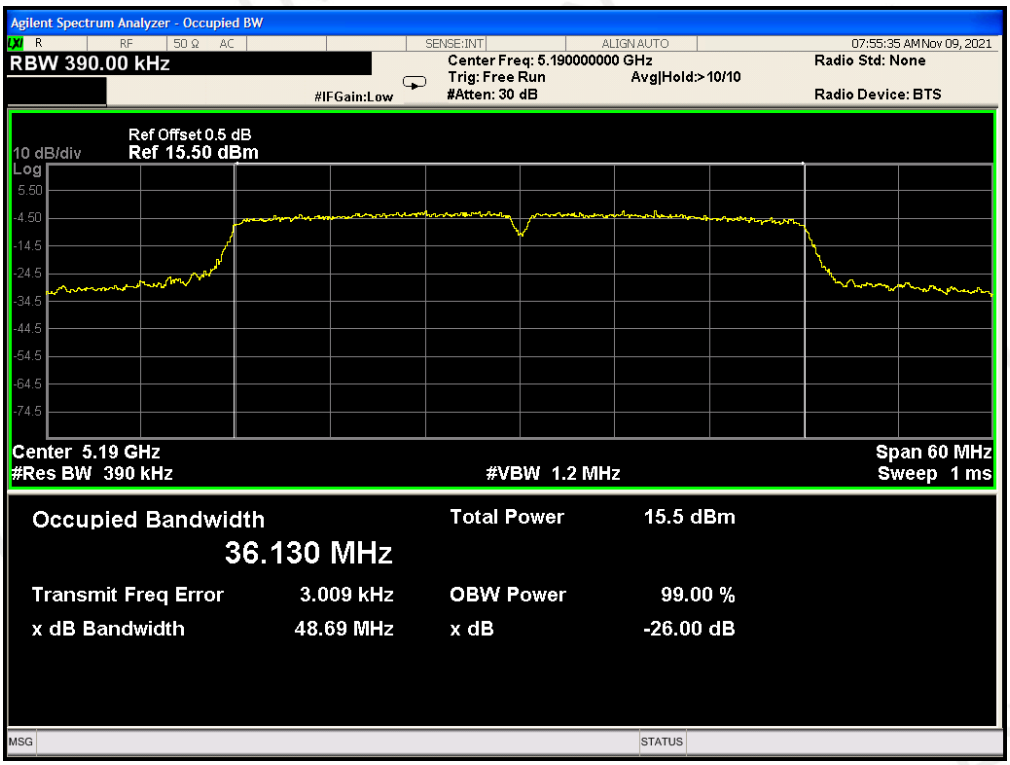


BANDWIDTH FOR 5240MHz

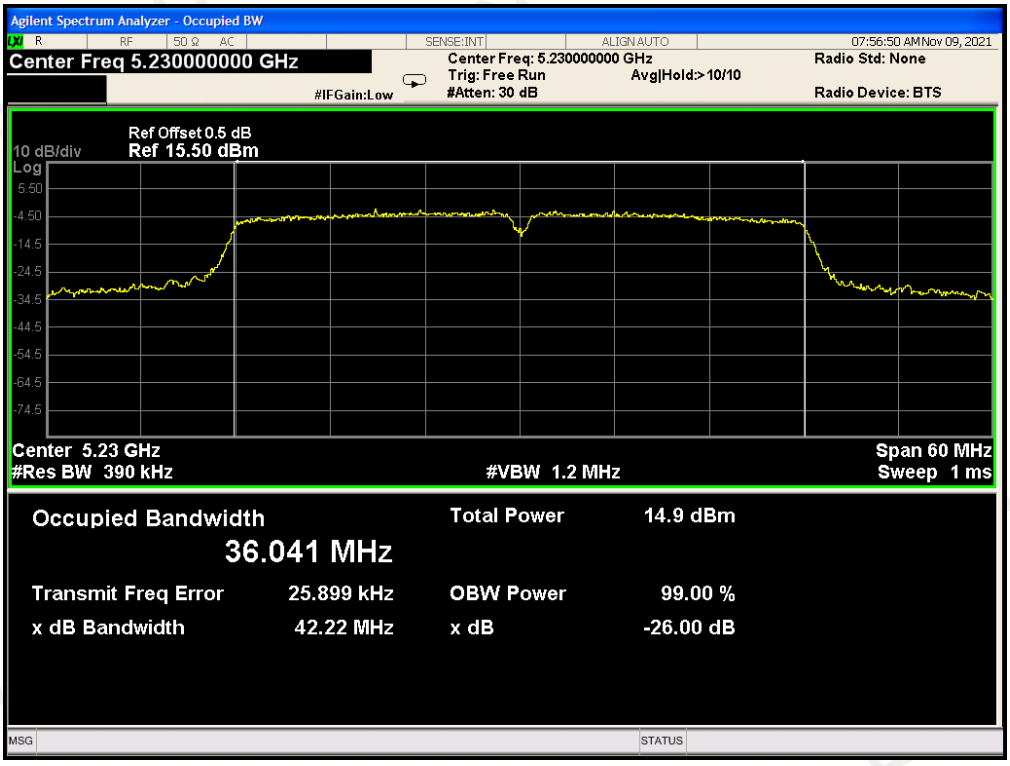


802.11n40 TEST RESULT

BANDWIDTH FOR 5190MHz

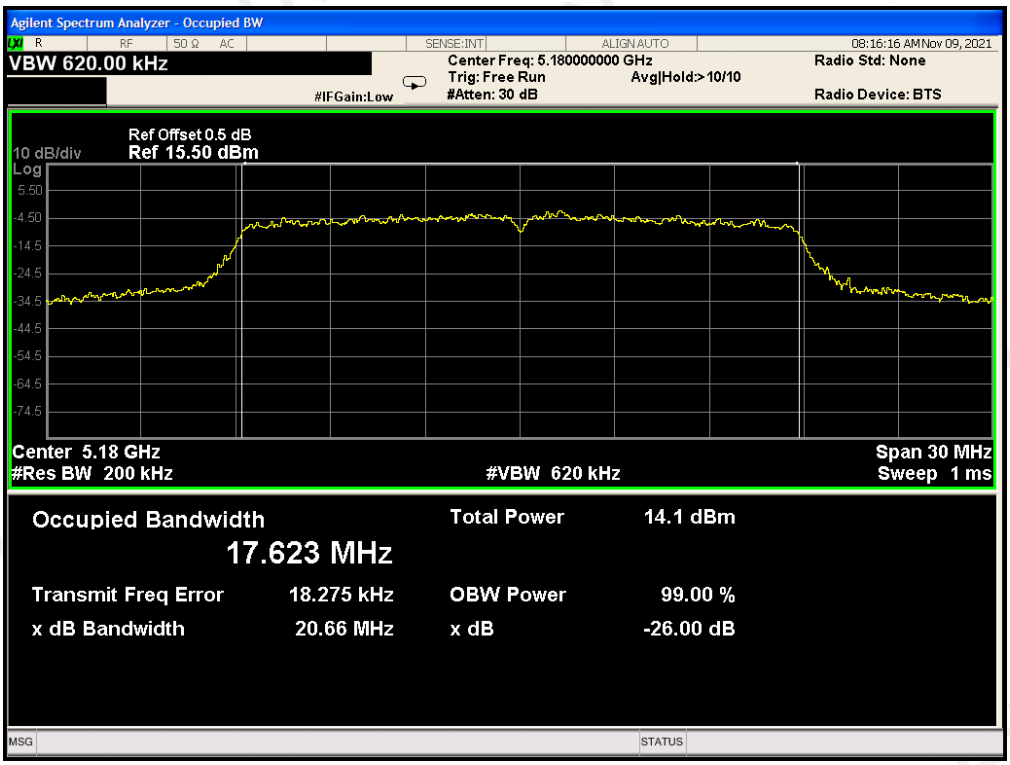


BANDWIDTH FOR 5230MHz

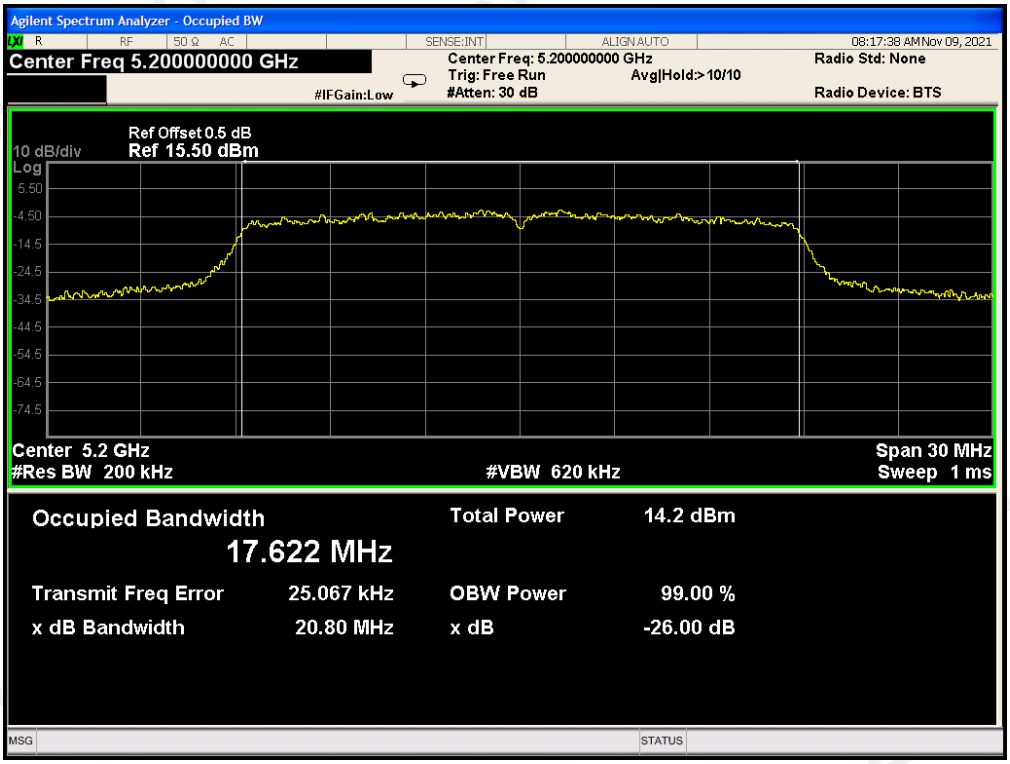


802.11ac20 TEST RESULT

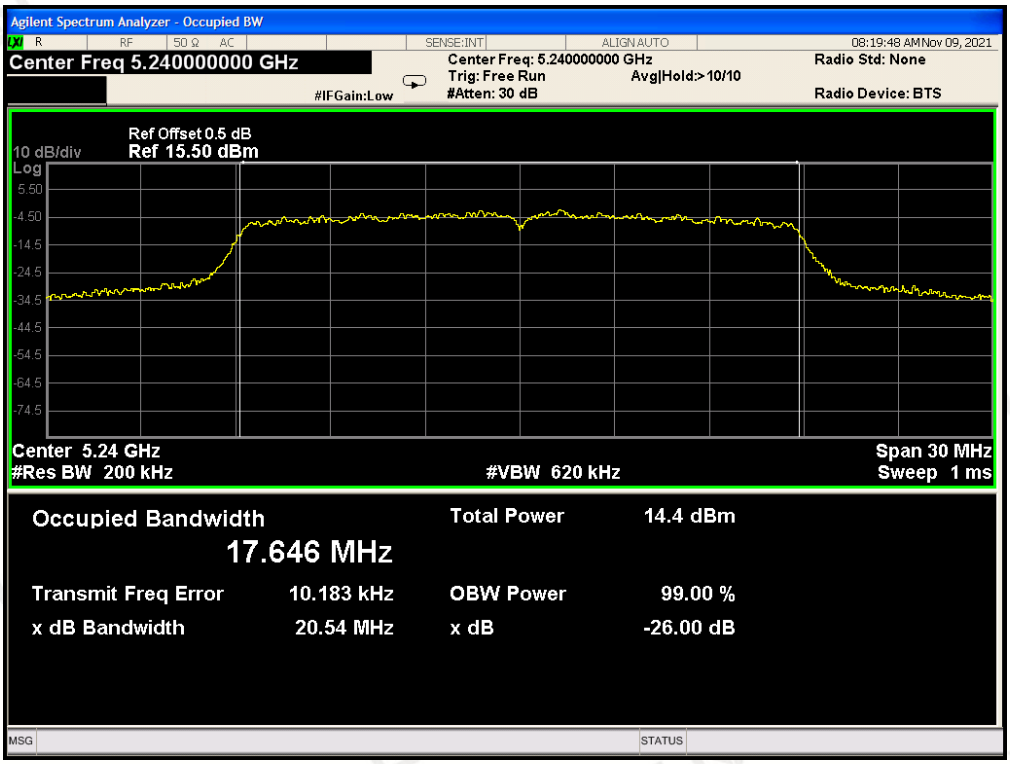
BANDWIDTH FOR 5180MHz



BANDWIDTH FOR 5200MHz

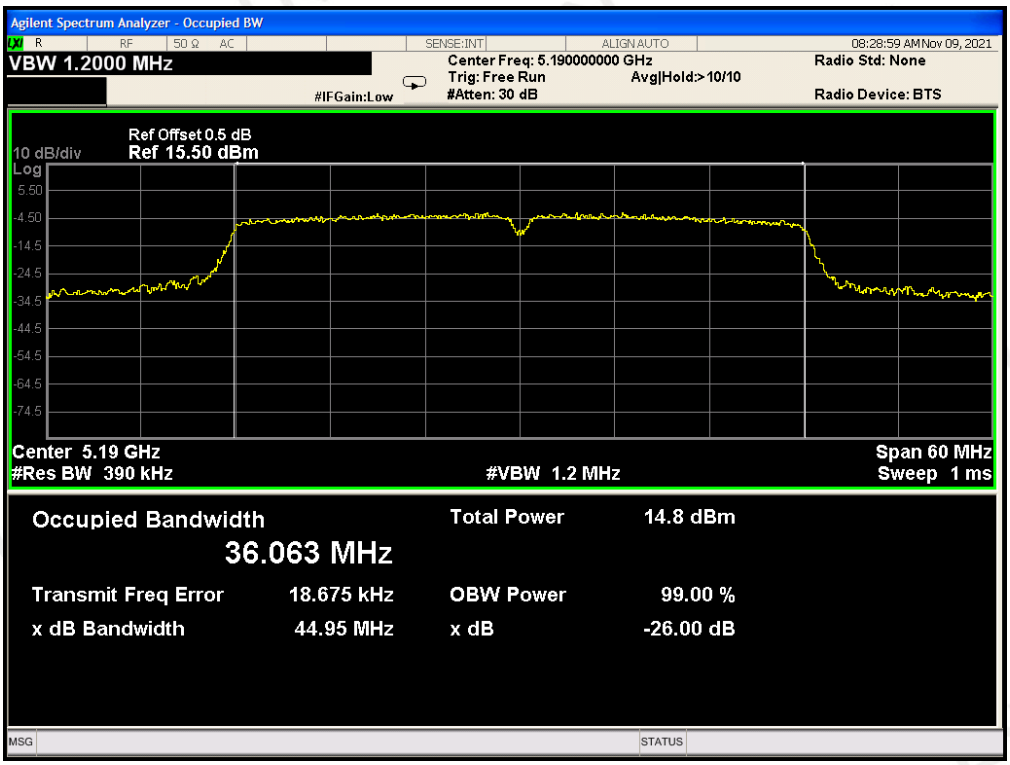


BANDWIDTH FOR 5240MHz

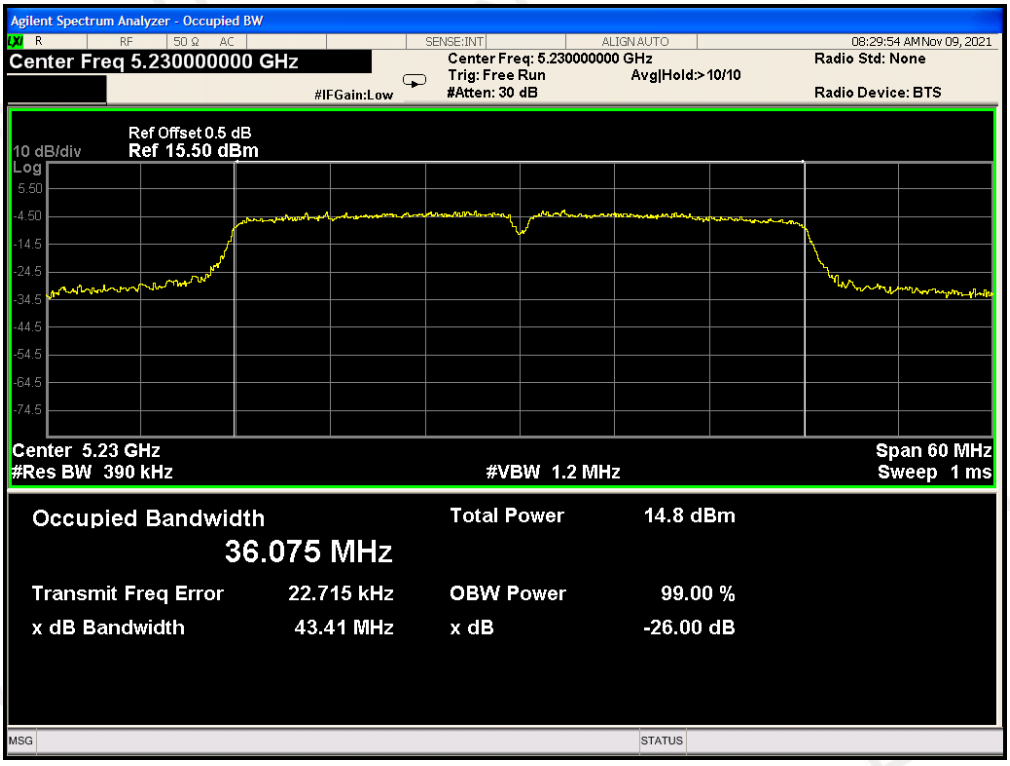


802.11ac40 TEST RESULT

BANDWIDTH FOR 5190MHz



BANDWIDTH FOR 5230MHz



9. MAXIMUM CONDUCTED OUTPUT AVERAGE 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/MHz)**	**Pass or Fail**
5180	-3.495	11	Pass
5200	-3.491	11	Pass
5240	-3.377	11	Pass
Frequency (MHz)	**Power density (30dBm/500kHz)**	**Applicable Limits (30dBm/500kHz)**	**Pass or Fail**
5745	-2.536	30	Pass
5785	-2.553	30	Pass
5825	-2.496	30	Pass

LIMITS AND MEASUREMENT RESULT FOR 802.11N20 MODULATION			
Frequency (MHz)	**Power density (dBm/MHz)**	**Applicable Limits (dBm/MHz)**	**Pass or Fail**
5180	-4.009	11	Pass
5200	-3.723	11	Pass
5240	-3.467	11	Pass
Frequency (MHz)	**Power density (30dBm/500kHz)**	**Applicable Limits (30dBm/500kHz)**	**Pass or Fail**
5745	-2.495	30	Pass
5785	-2.876	30	Pass
5825	-2.313	30	Pass

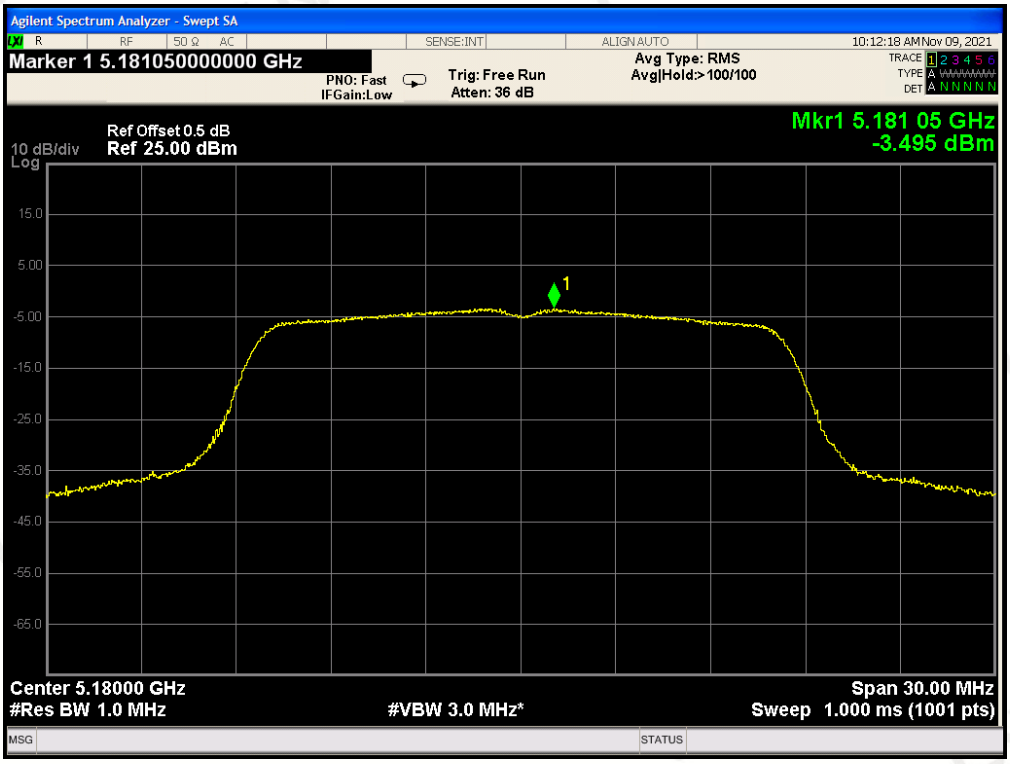
LIMITS AND MEASUREMENT RESULT FOR 802.1N40 MODULATION			
Frequency (MHz)	**Power density (dBm/MHz)**	**Applicable Limits (dBm/MHz)**	**Pass or Fail**
5190	-6.457	11	Pass
5230	-6.996	11	Pass
Frequency (MHz)	**Power density (30dBm/500kHz)**	**Applicable Limits (30dBm/500kHz)**	**Pass or Fail**
5755	-5.694	30	Pass
5795	-5.582	30	Pass

LIMITS AND MEASUREMENT RESULT FOR 802.11AC20 MODULATION			
Frequency (MHz)	**Power density (dBm/MHz)**	**Applicable Limits (dBm/MHz)**	**Pass or Fail**
5180	-3.754	11	Pass
5200	-3.859	11	Pass
5240	-3.944	11	Pass
Frequency (MHz)	**Power density (30dBm/500kHz)**	**Applicable Limits (30dBm/500kHz)**	**Pass or Fail**
5745	-2.460	30	Pass
5785	-2.611	30	Pass
5825	-2.745	30	Pass

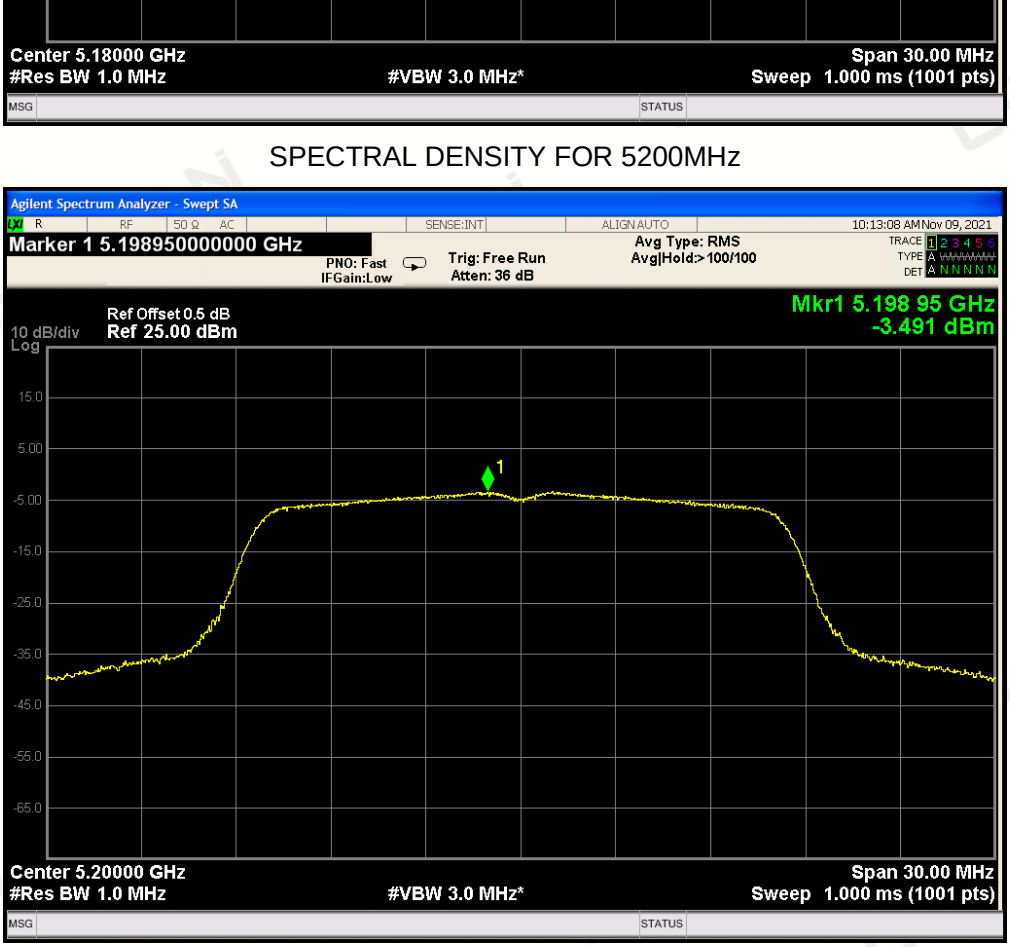
LIMITS AND MEASUREMENT RESULT FOR 802.1AC40 MODULATION			
Frequency (MHz)	**Power density (dBm/MHz)**	**Applicable Limits (dBm/MHz)**	**Pass or Fail**
5190	-6.898	11	Pass
5230	-6.908	11	Pass
Frequency (MHz)	**Power density (30dBm/500kHz)**	**Applicable Limits (30dBm/500kHz)**	**Pass or Fail**
5755	-5.620	30	Pass
5795	-5.806	30	Pass

802.11a20 TEST RESULT

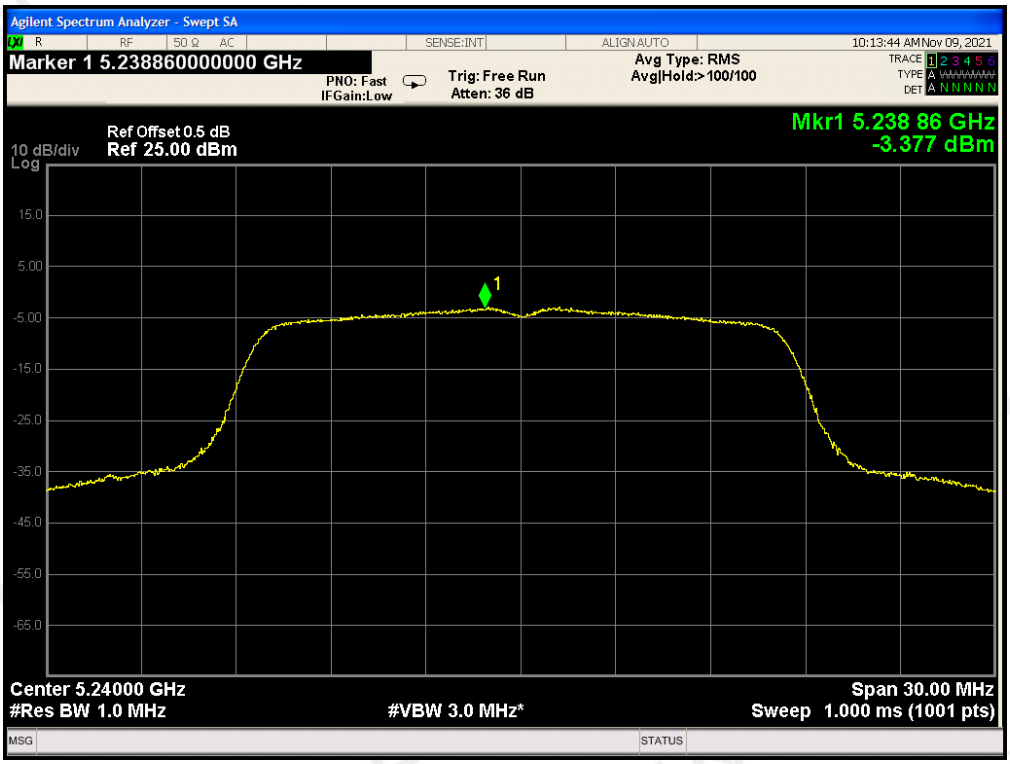
SPECTRAL DENSITY FOR 5180MHz



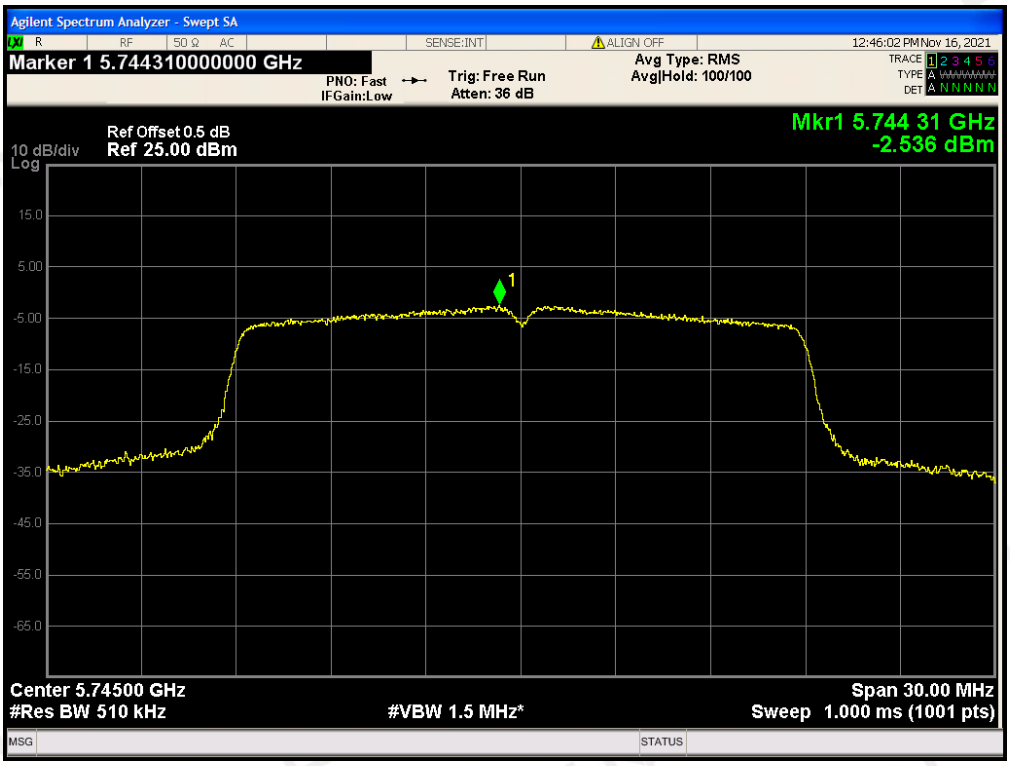
SPECTRAL DENSITY FOR 5200MHz



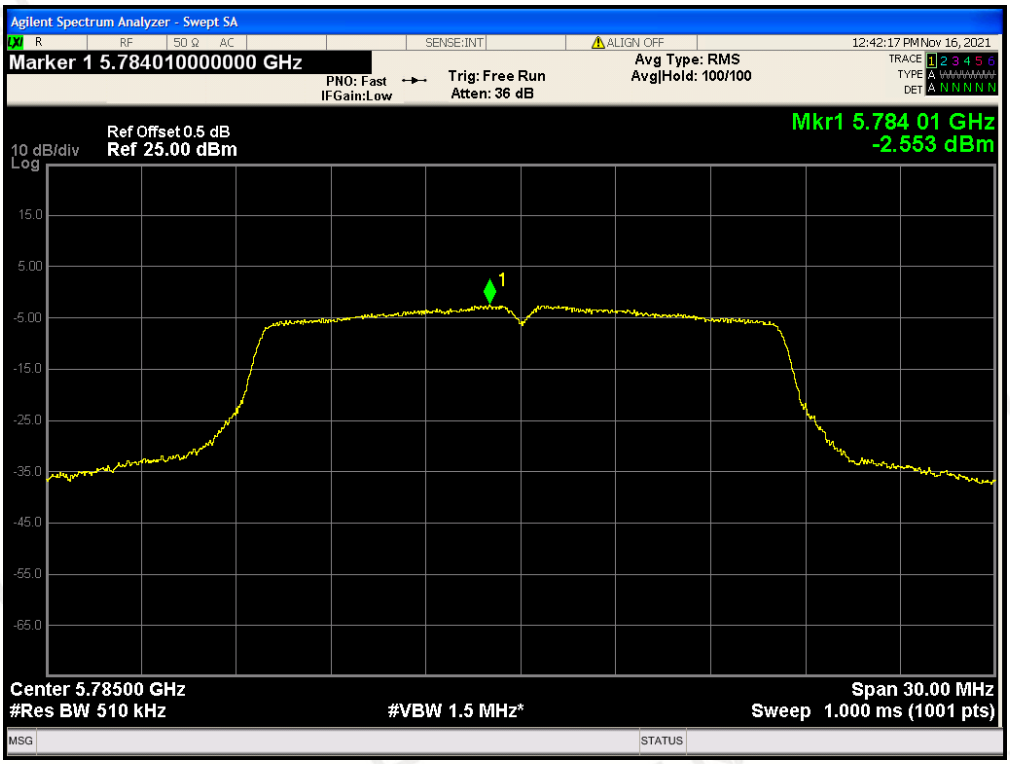
SPECTRAL DENSITY FOR 5240MHz



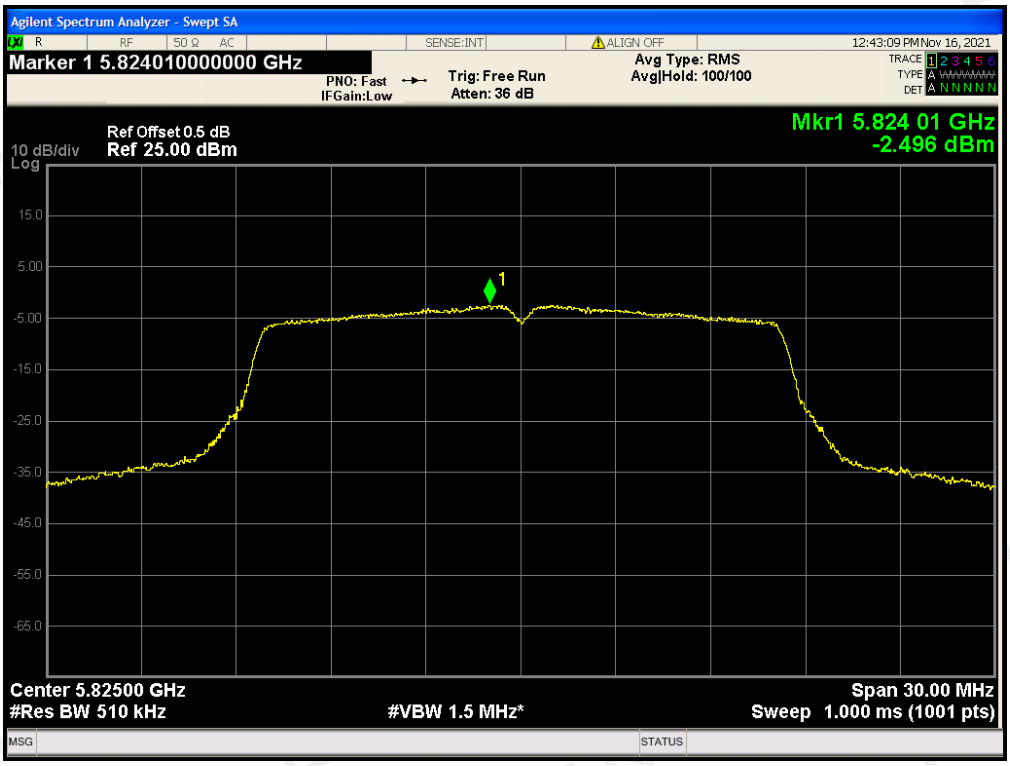
SPECTRAL DENSITY FOR 5745MHz



SPECTRAL DENSITY FOR 5785MHz

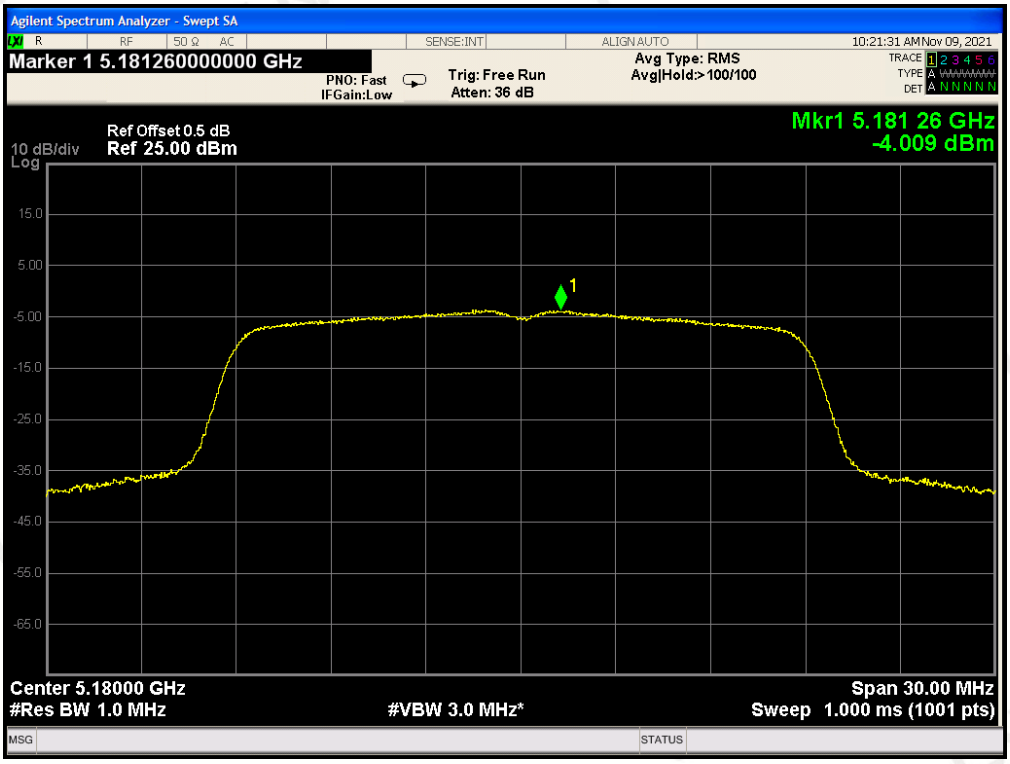


SPECTRAL DENSITY FOR 5825MHz

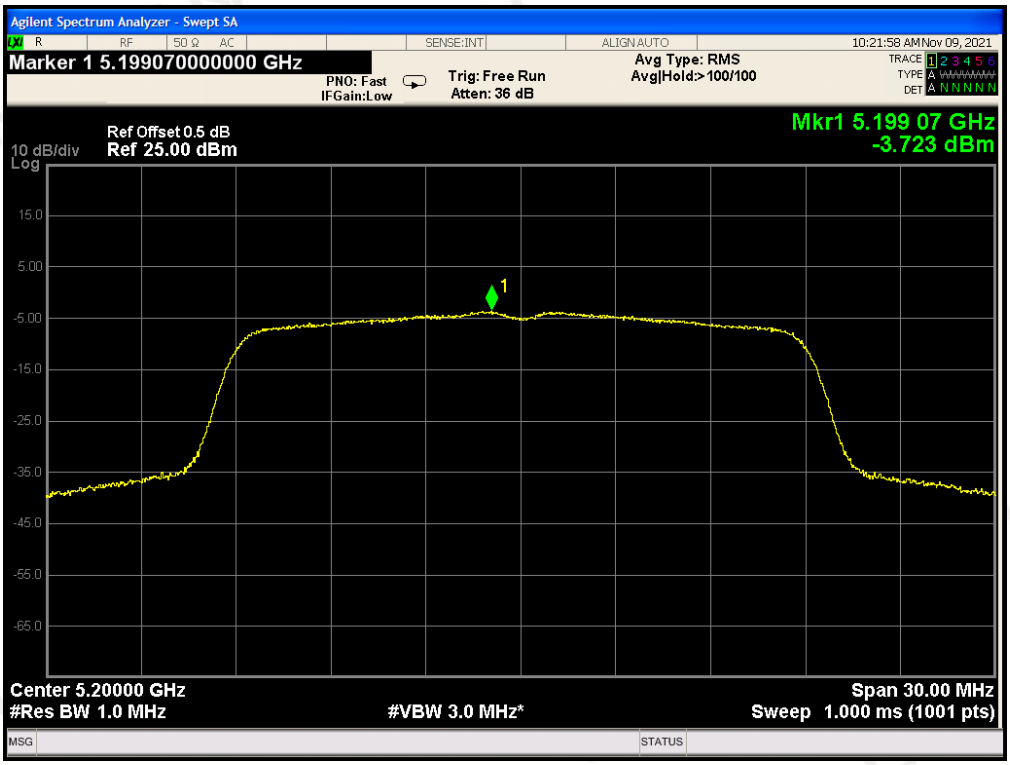


802.11n20 TEST RESULT

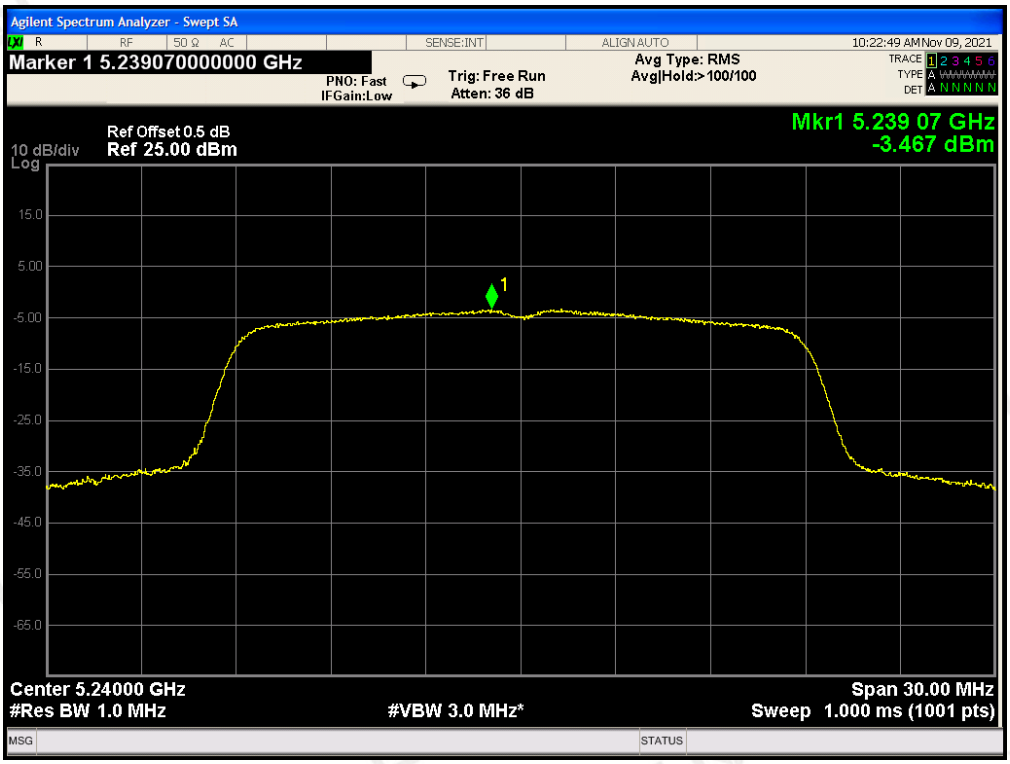
SPECTRAL DENSITY FOR 5180MHz



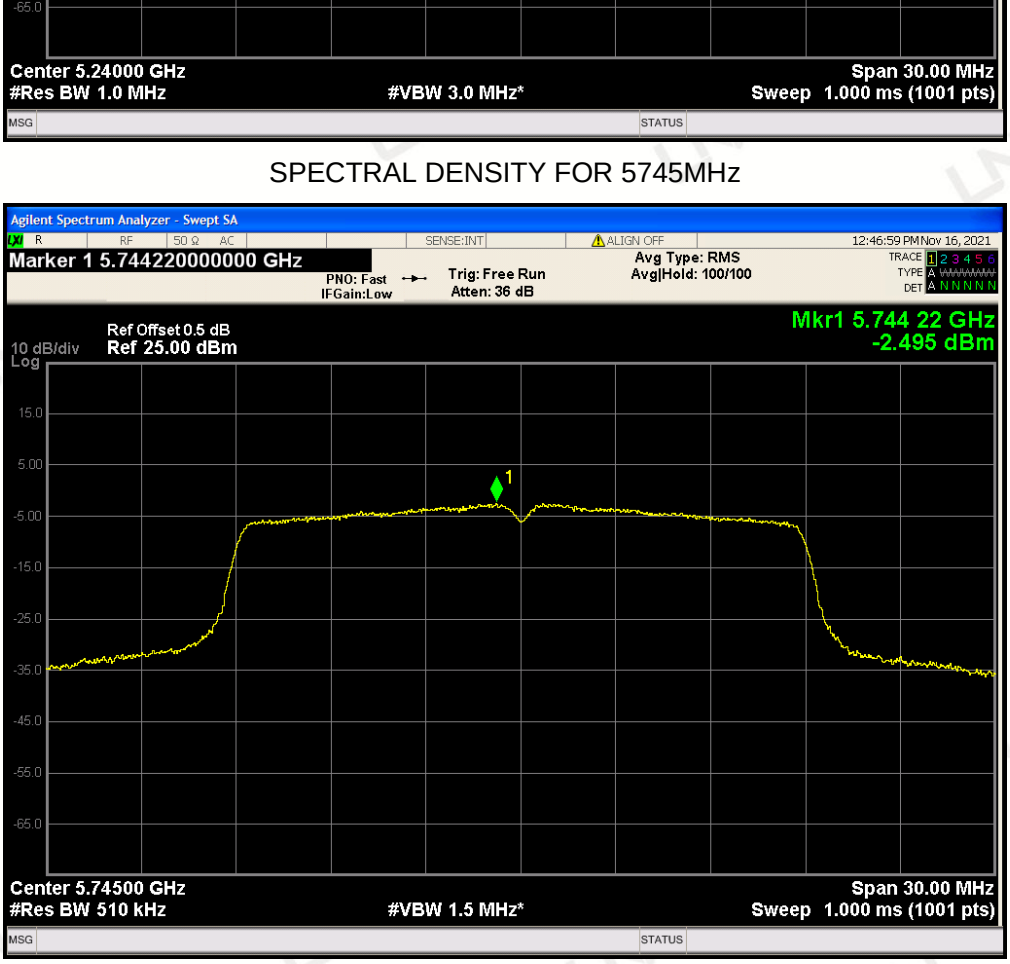
SPECTRAL DENSITY FOR 5200MHz



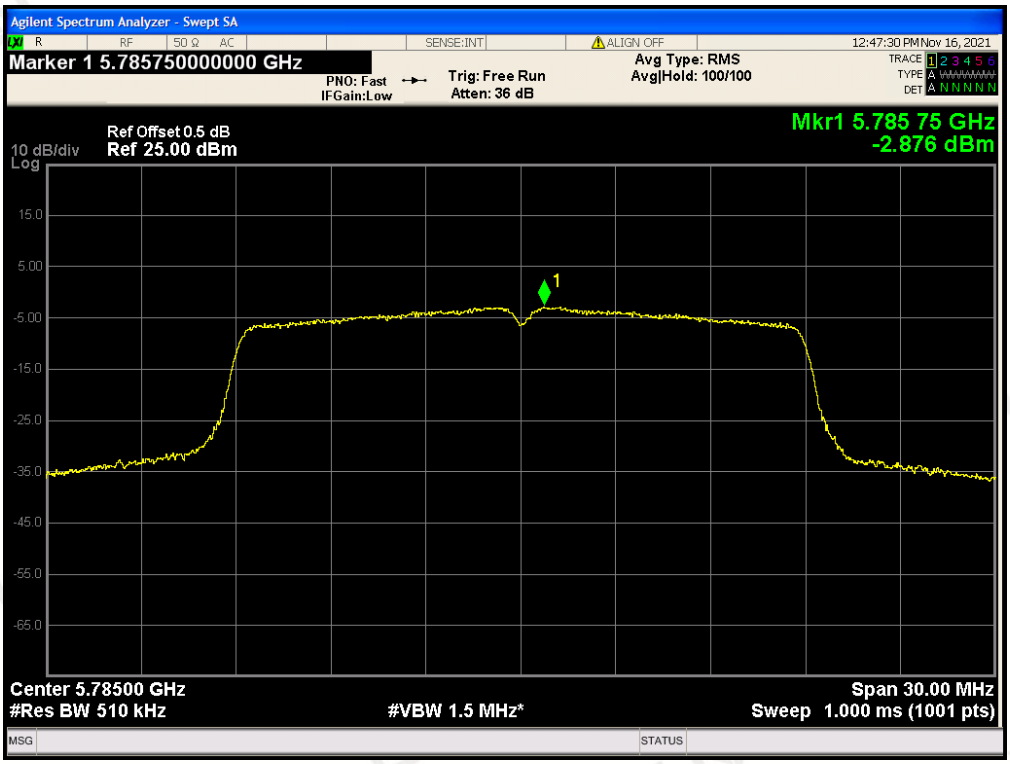
SPECTRAL DENSITY FOR 5240MHz



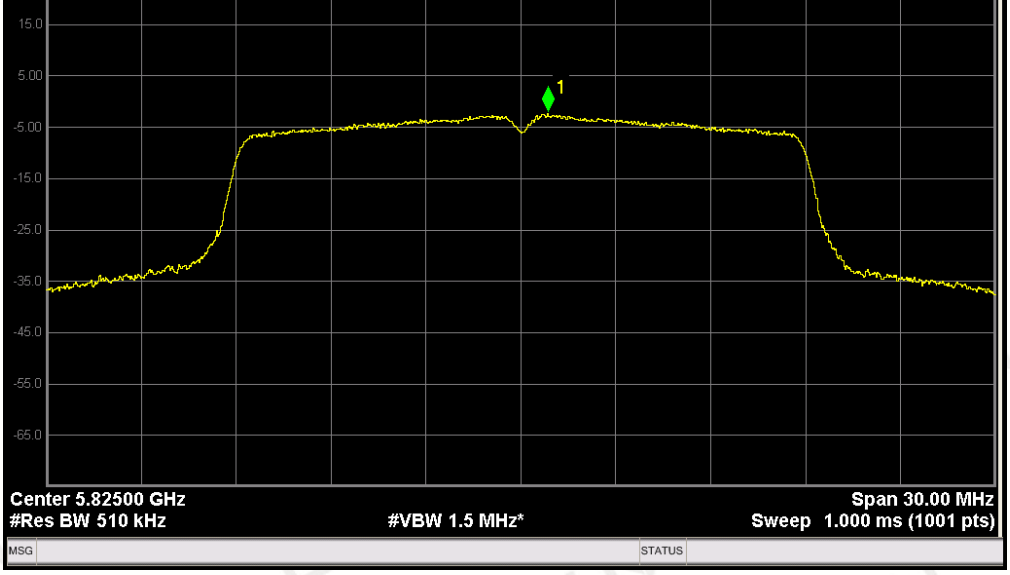
SPECTRAL DENSITY FOR 5745MHz



SPECTRAL DENSITY FOR 5785MHz

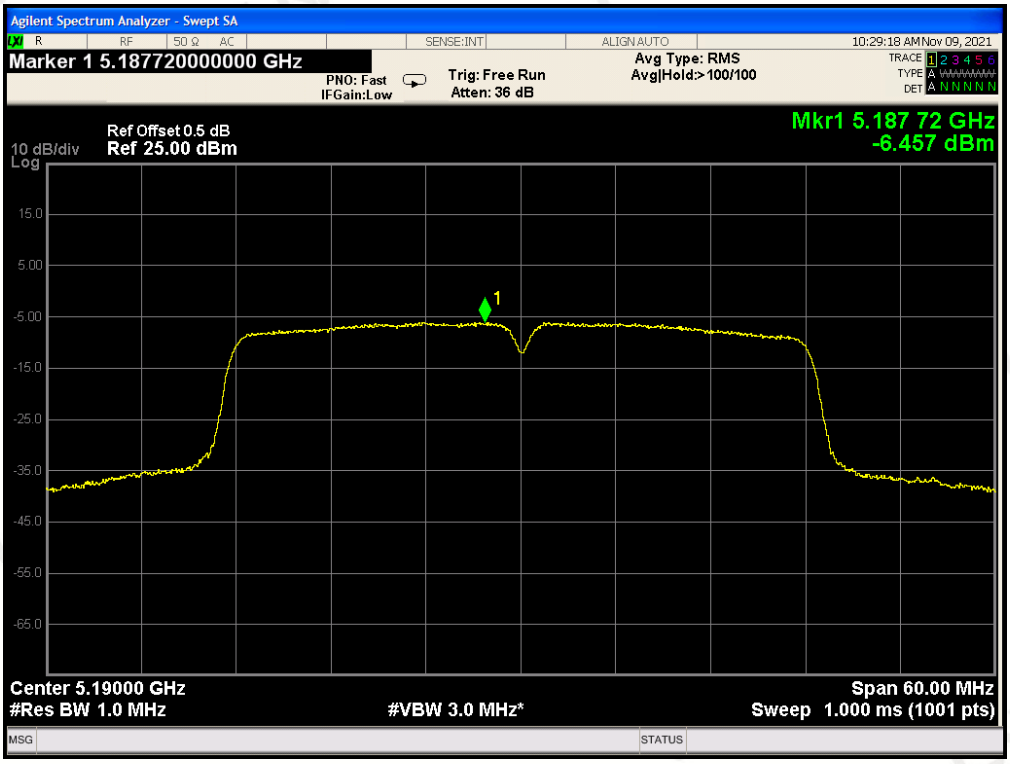


SPECTRAL DENSITY FOR 5825MHz

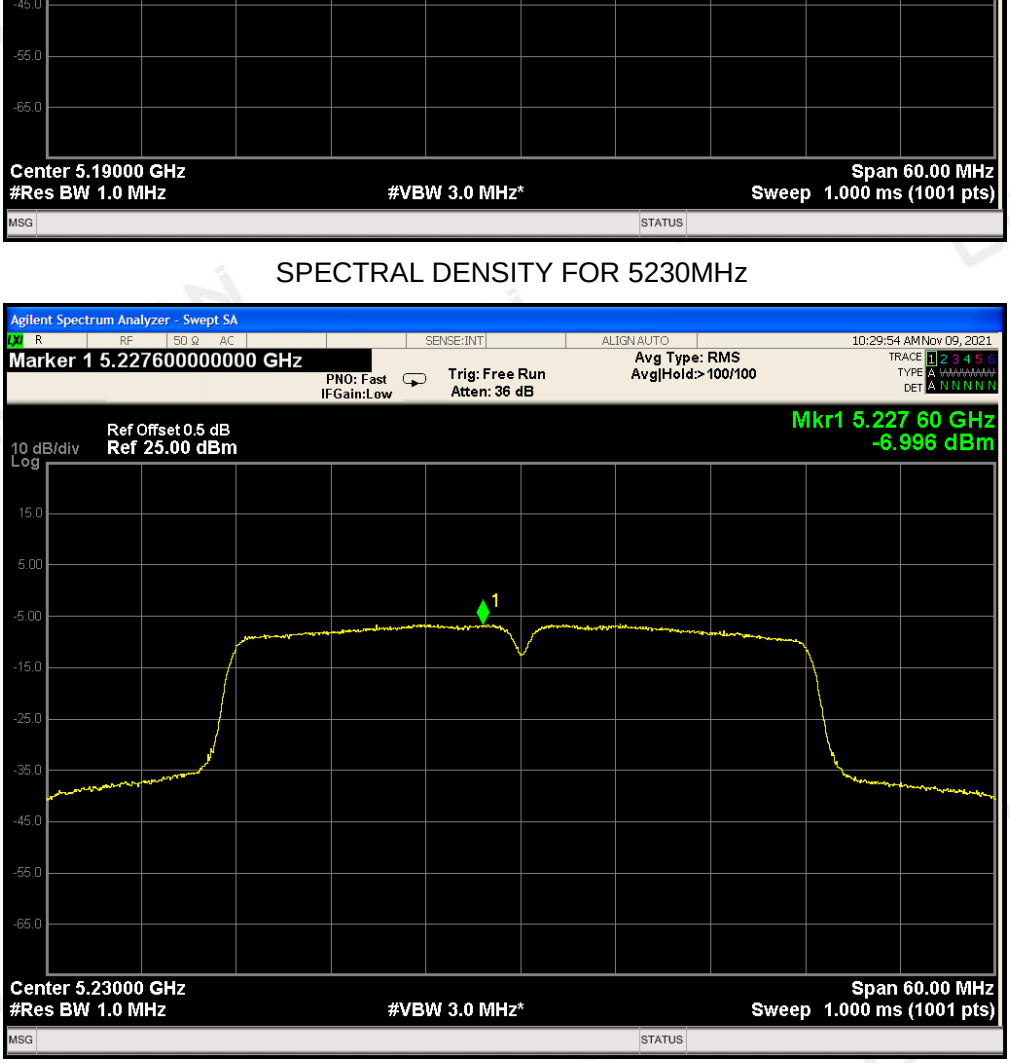


802.11n40 TEST RESULT

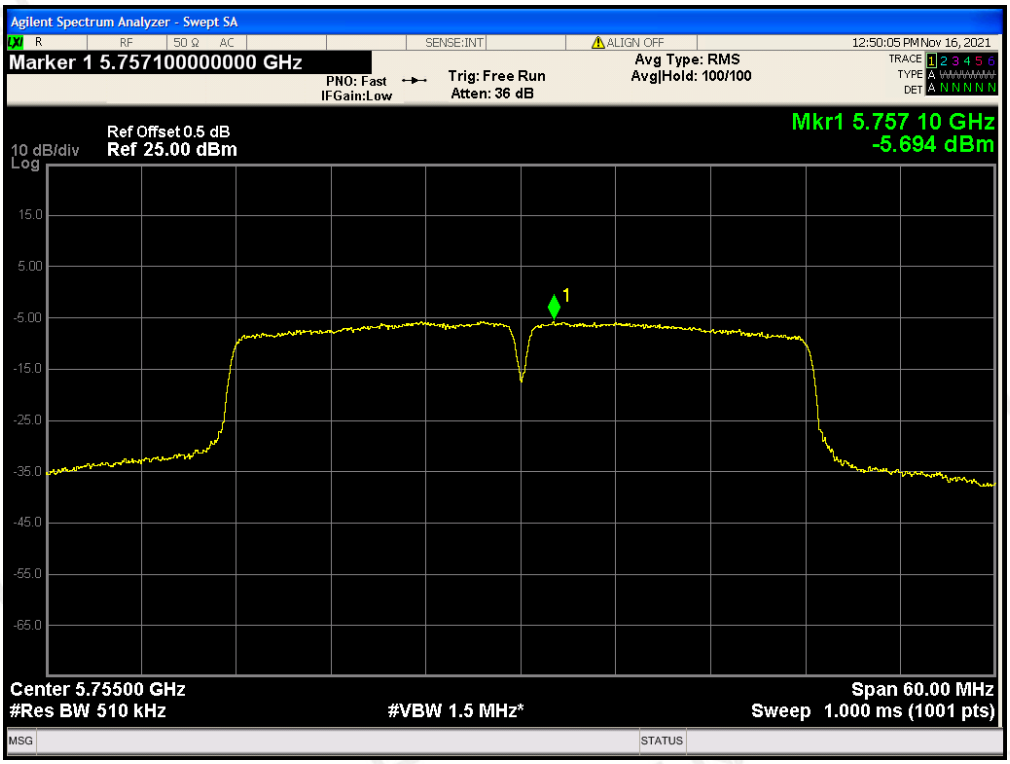
SPECTRAL DENSITY FOR 5190MHz



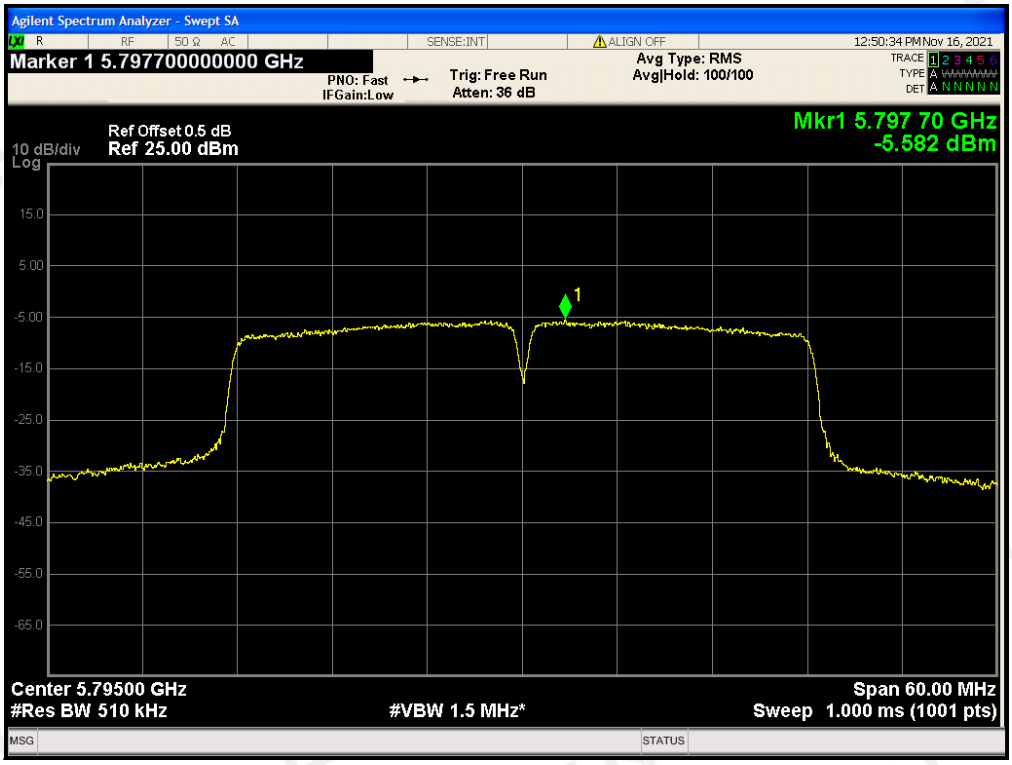
SPECTRAL DENSITY FOR 5230MHz



SPECTRAL DENSITY FOR 5755MHz

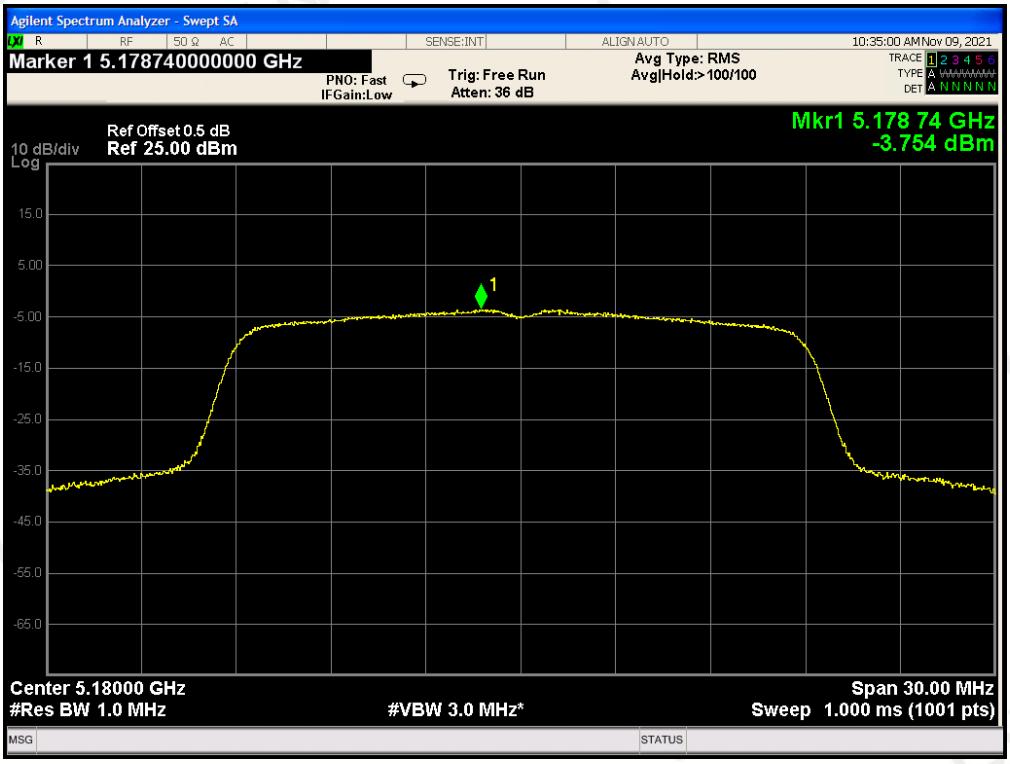


SPECTRAL DENSITY FOR 5795MHz

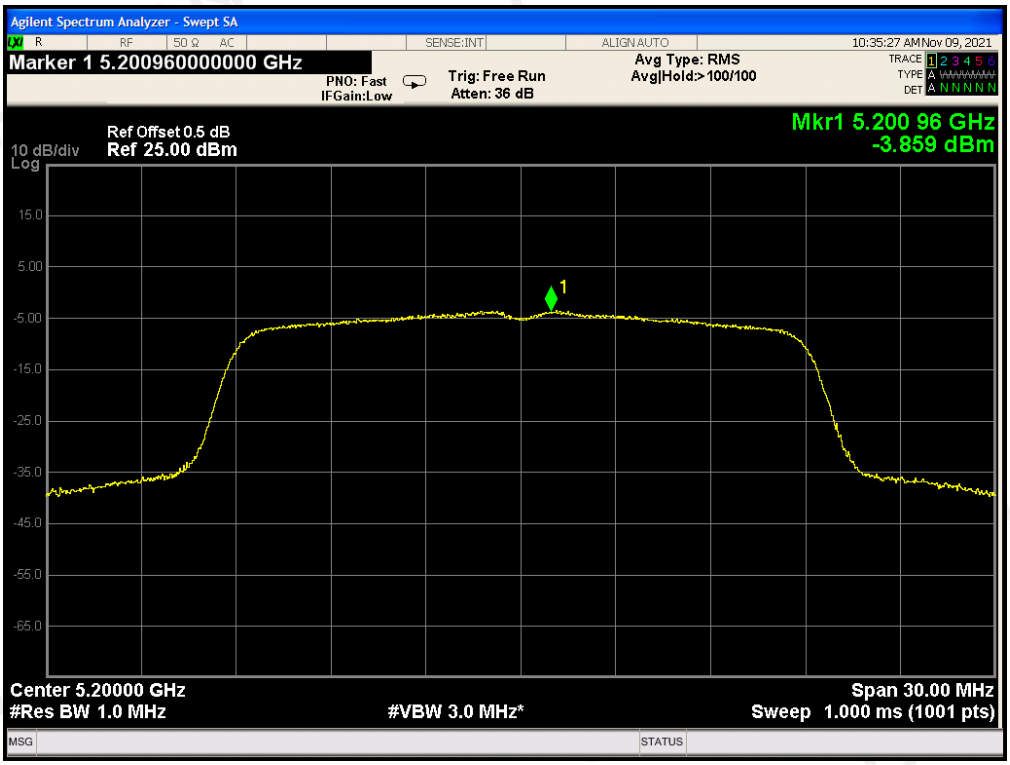


802.11ac20 TEST RESULT

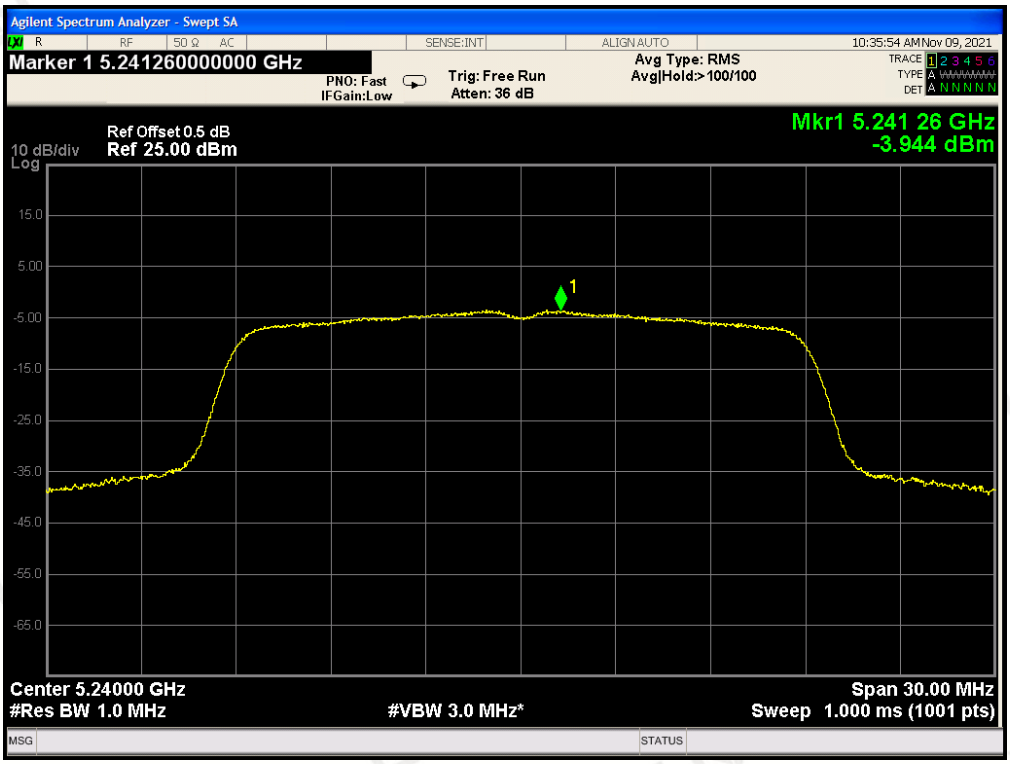
SPECTRAL DENSITY FOR 5180MHz



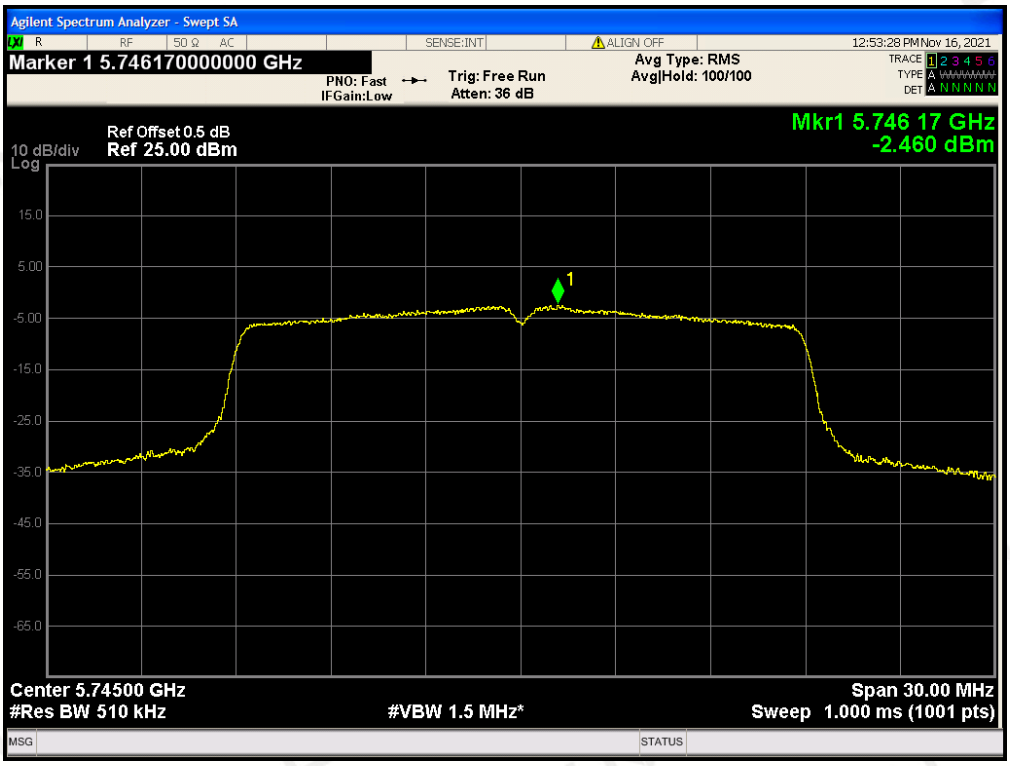
SPECTRAL DENSITY FOR 5200MHz



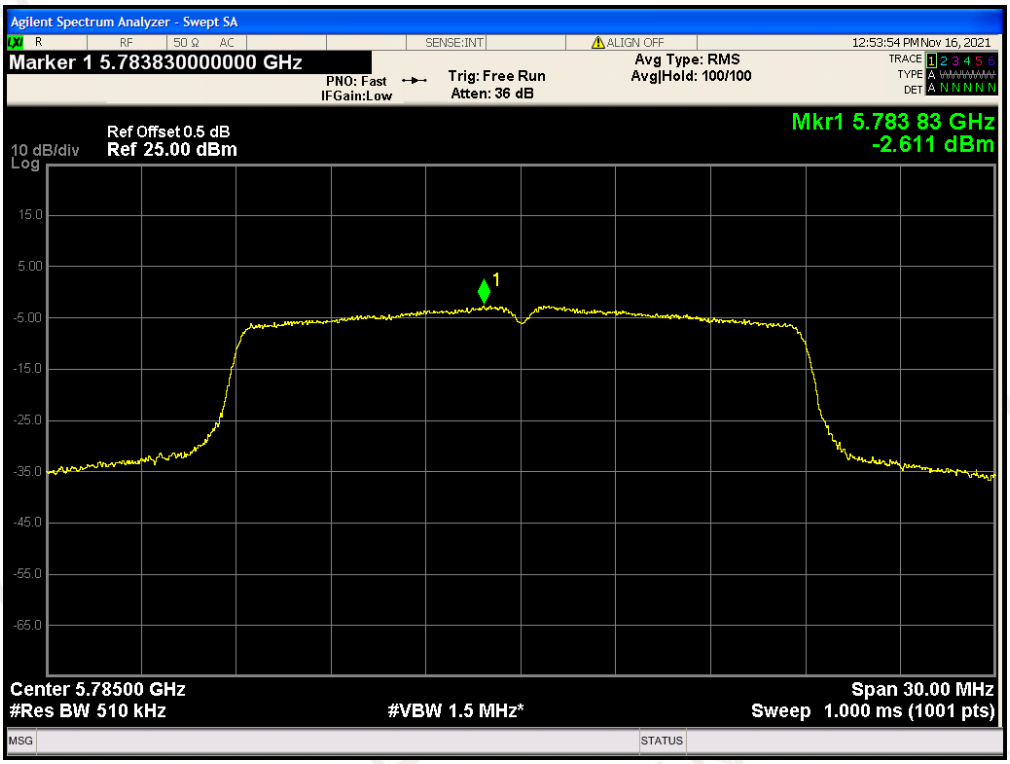
SPECTRAL DENSITY FOR 5240MHz



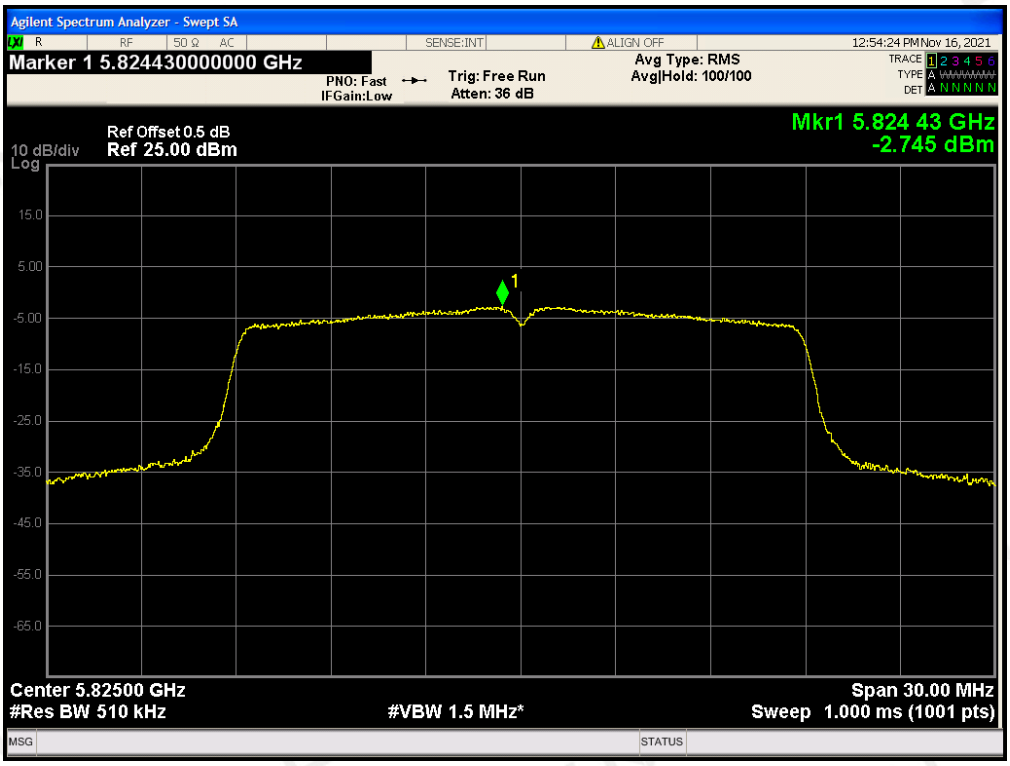
SPECTRAL DENSITY FOR 5745MHz



SPECTRAL DENSITY FOR 5785MHz

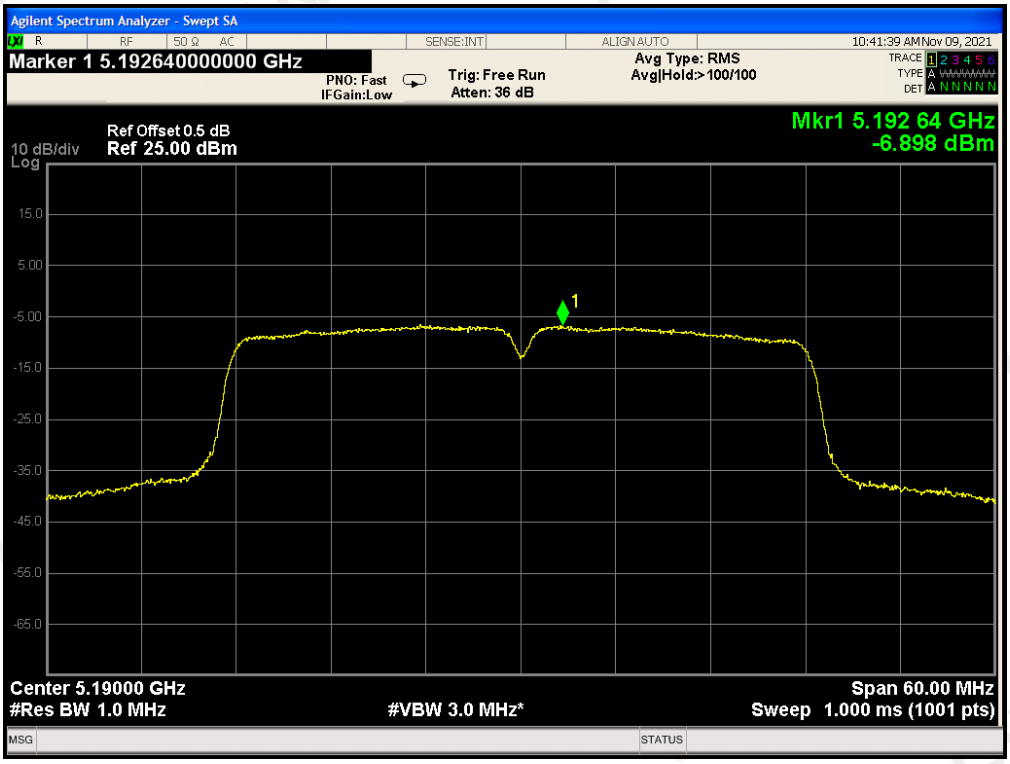


SPECTRAL DENSITY FOR 5825MHz

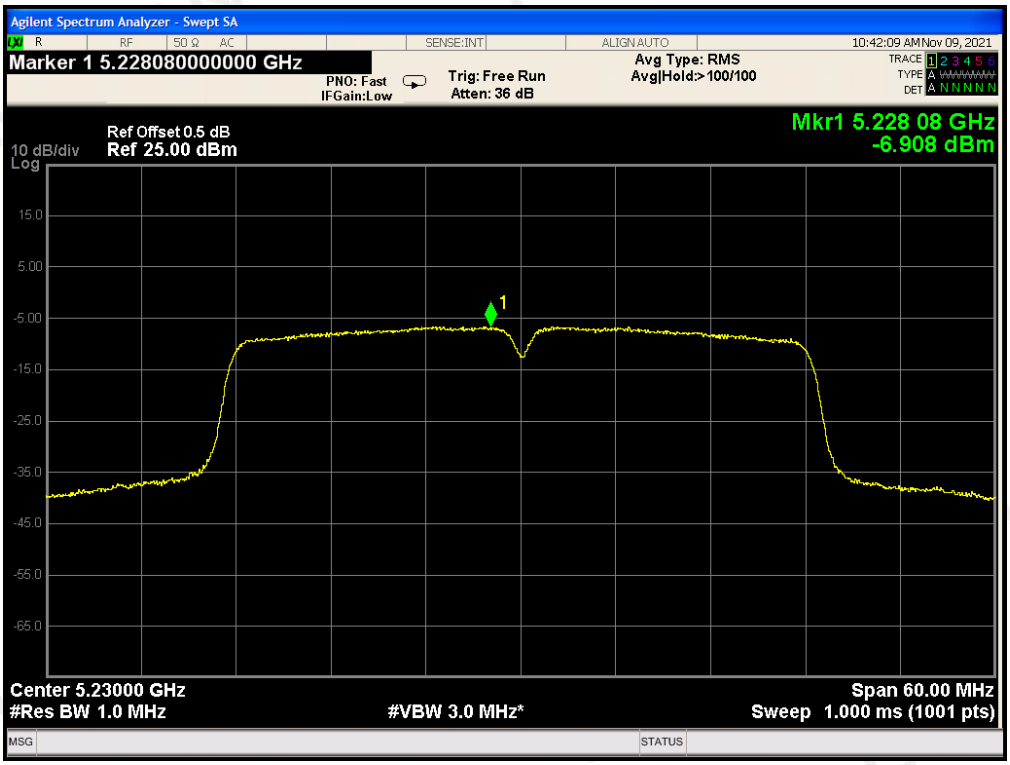


802.11ac40 TEST RESULT

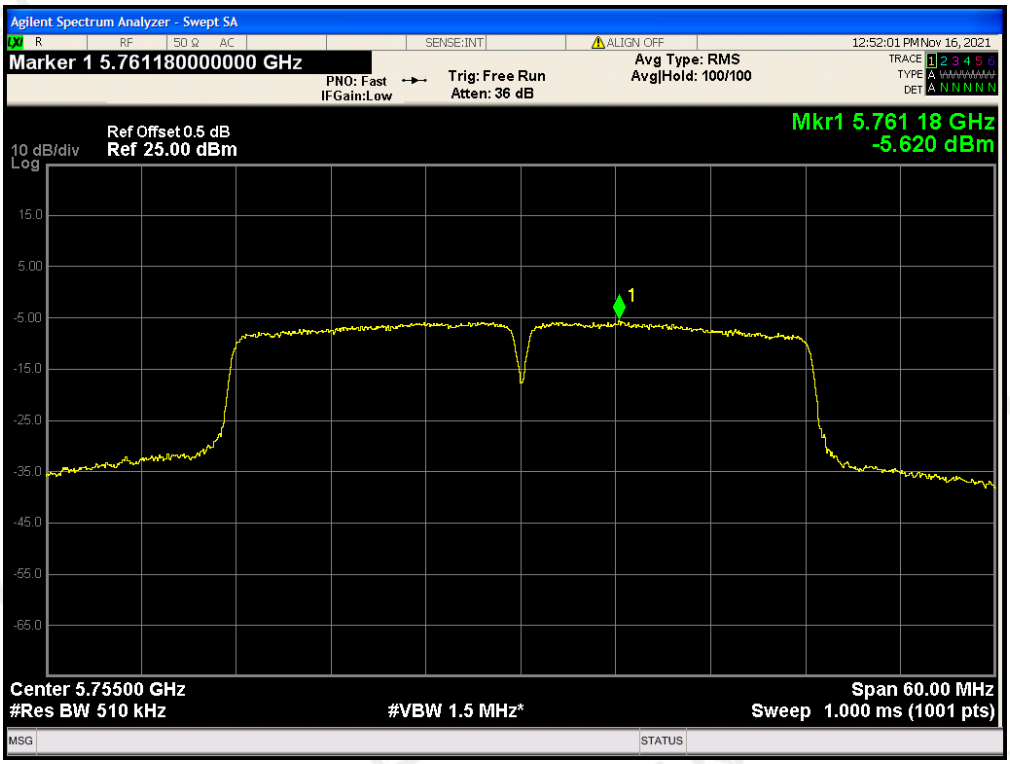
SPECTRAL DENSITY FOR 5190MHz



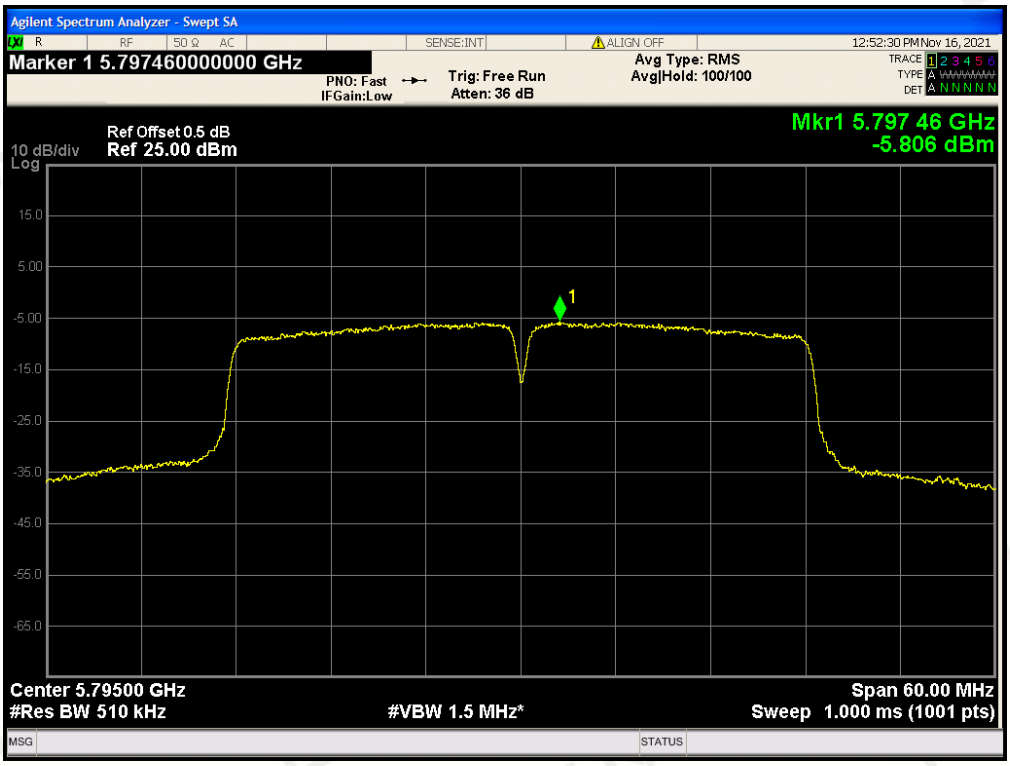
SPECTRAL DENSITY FOR 5230MHz



SPECTRAL DENSITY FOR 5755MHz



SPECTRAL DENSITY FOR 5795MHz



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

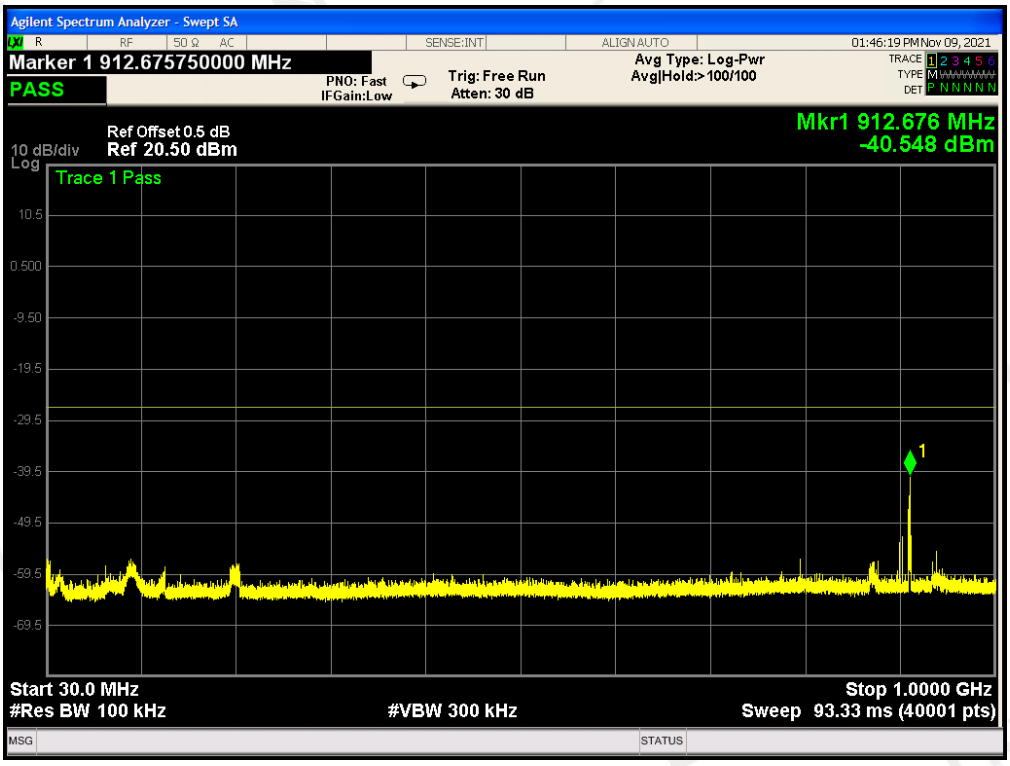
The same as described in section 6.

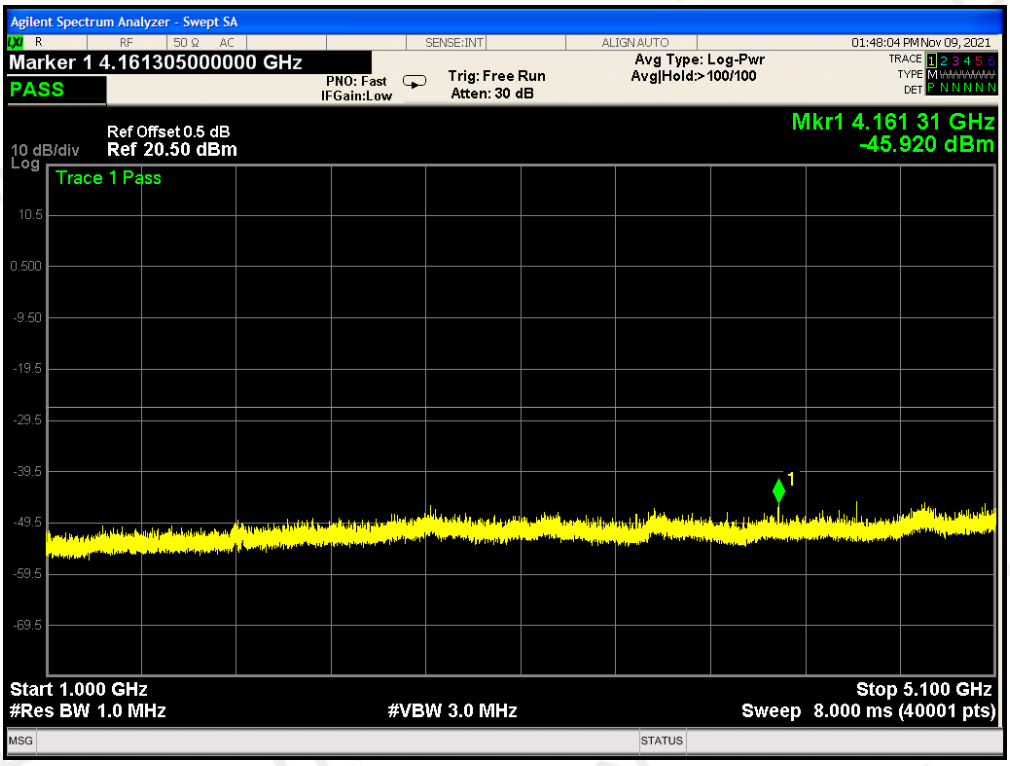
10.4. LIMITS AND MEASUREMENT RESULT

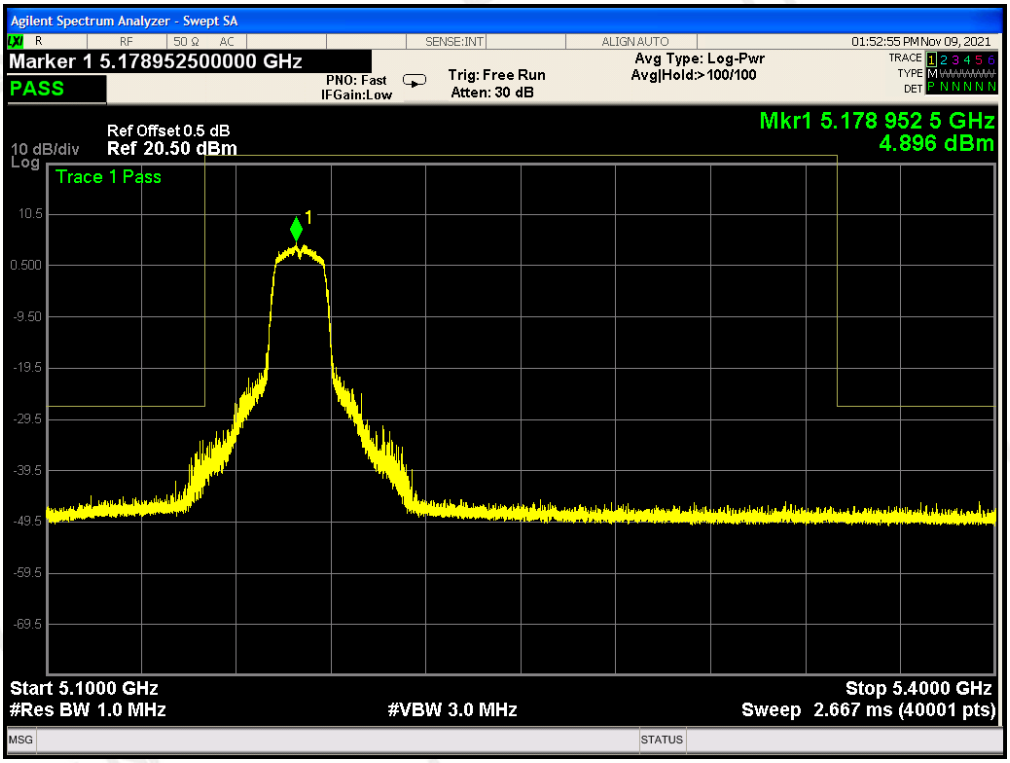
LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test channel	Criteria
-27dBm/MHz	5150MHz-5250MHz	PASS
-27dBm/MHz	5250MHz-5350MHz	PASS
-27dBm/MHz	5470MHz-5725MHz	PASS
All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing 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.	5725MHz-5850MHz	PASS

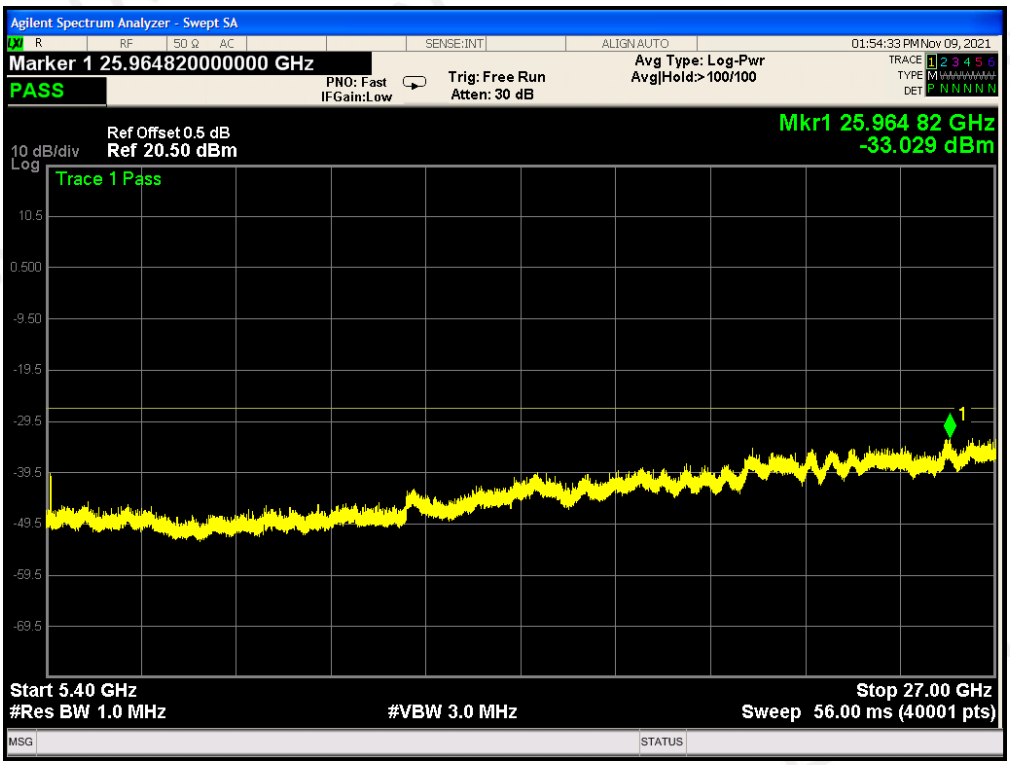
FOR 802.11A20 MODULATION

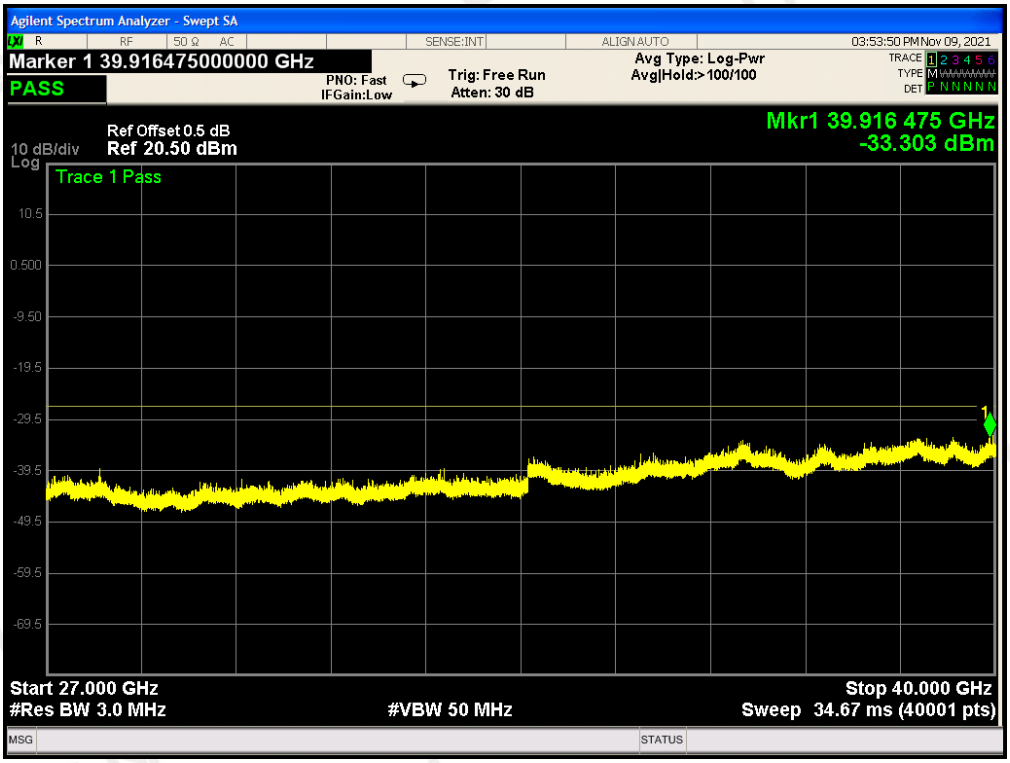
OUT OF BAND EMISSIONS FOR MODULATION IN 5180MHz



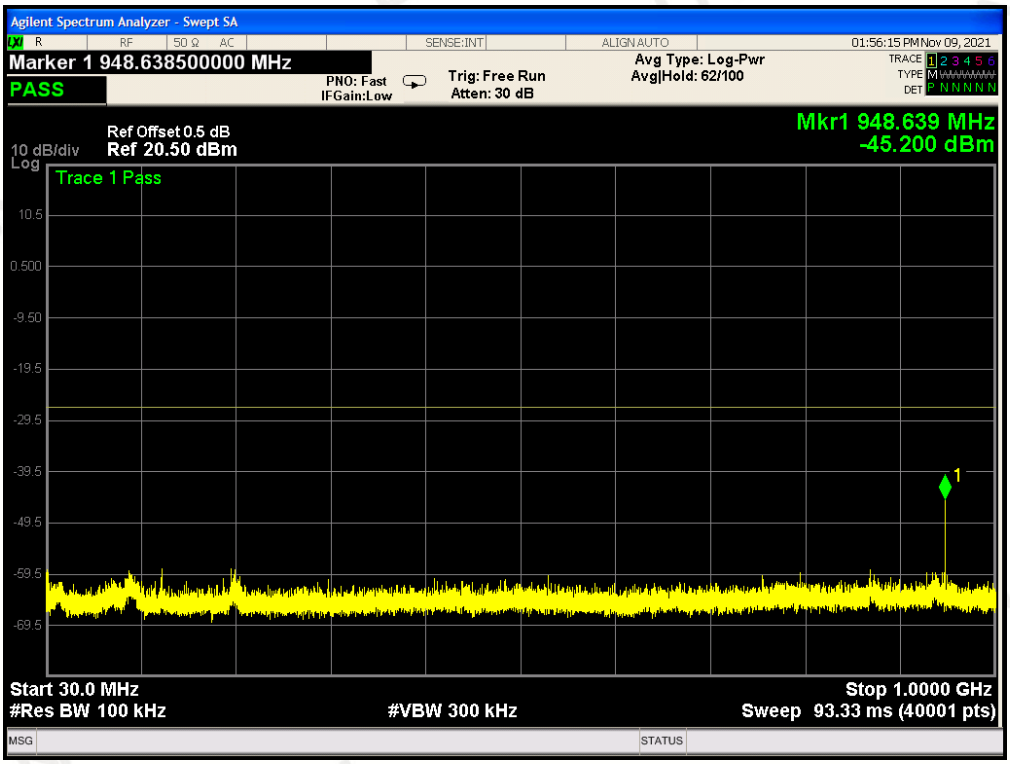


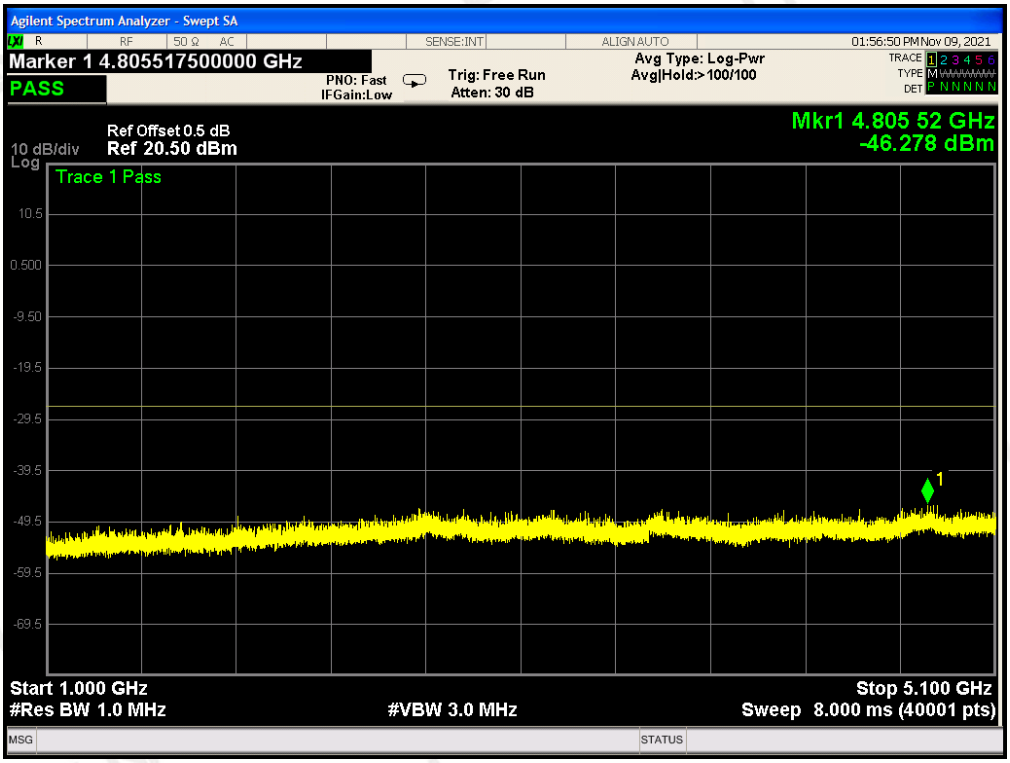

Agilent Spectrum Analyzer - Swept SA
Marker 1 5.178952500000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
01:52:55 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Log
Ref 20.50 dBm
Mkr1 5.178 952 5 GHz
4.896 dBm
Trace 1 Pass
Start 5.1000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 5.4000 GHz
Sweep 2.667 ms (40001 pts)

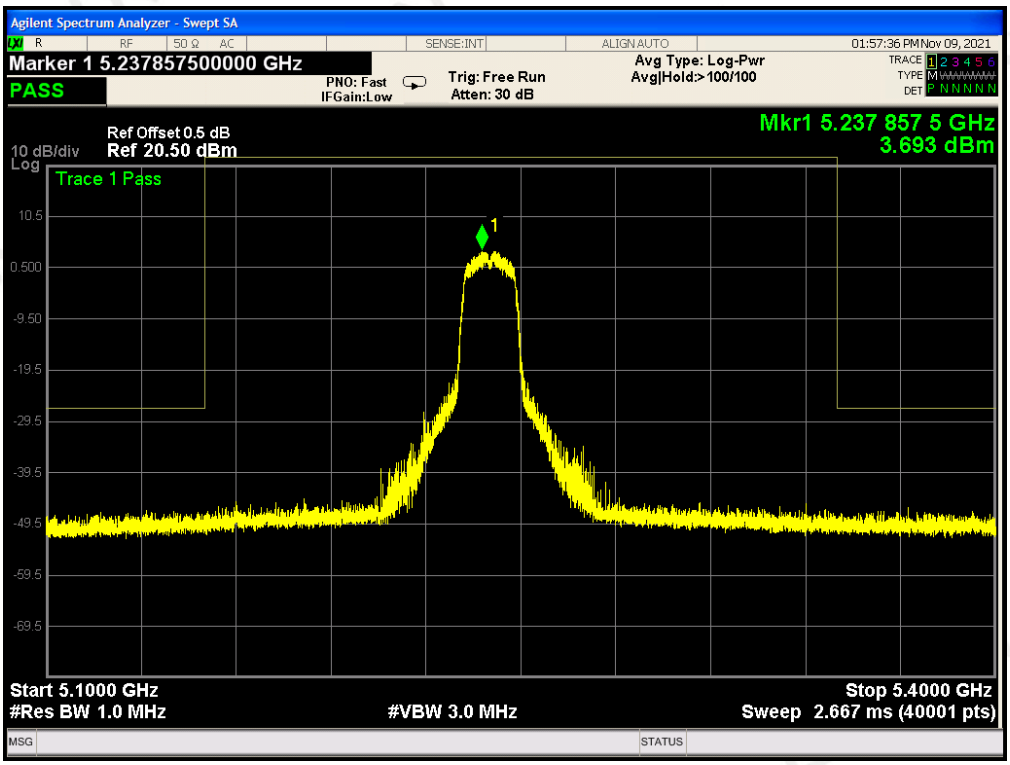

Agilent Spectrum Analyzer - Swept SA
Marker 1 25.964820000000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
01:54:33 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Log
Ref 20.50 dBm
Mkr1 25.964 82 GHz
-33.029 dBm
Trace 1 Pass
Start 5.40 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 27.00 GHz
Sweep 56.00 ms (40001 pts)

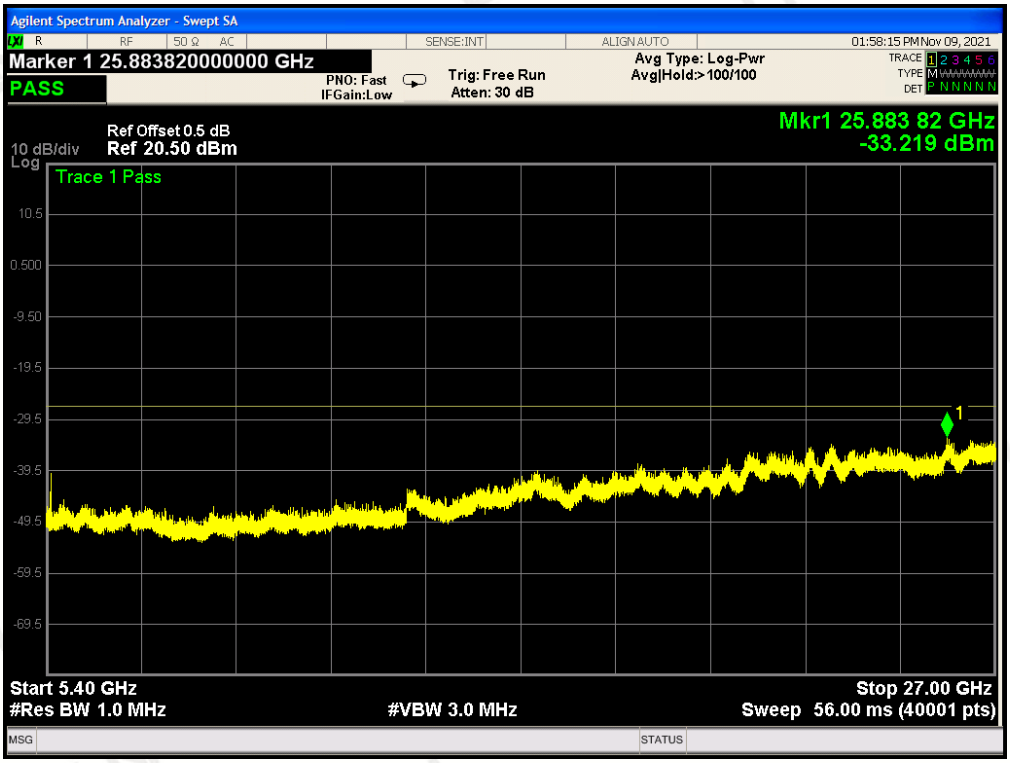


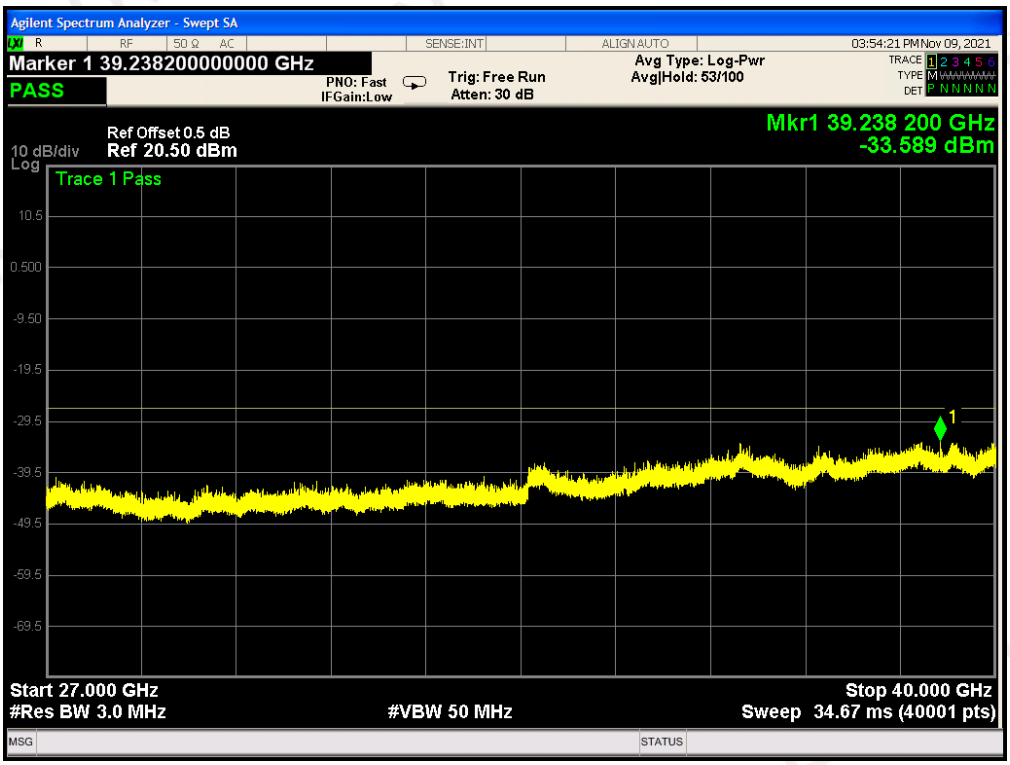
OUT OF BAND EMISSIONS FOR MODULATION IN 5240MHz



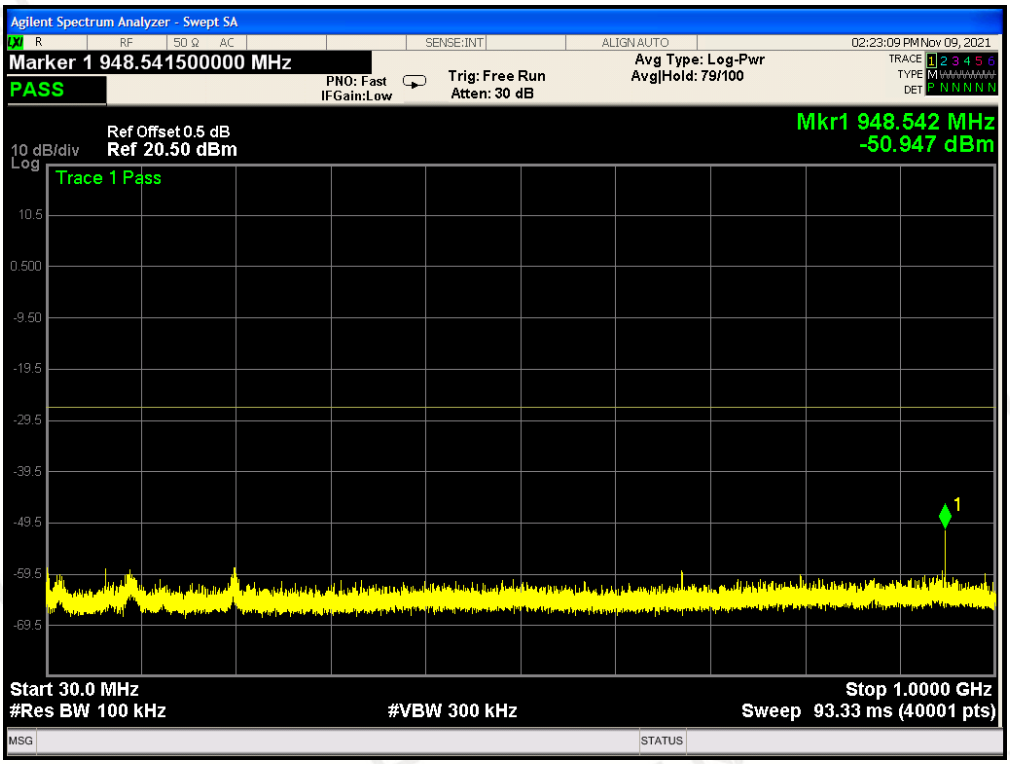

Agilent Spectrum Analyzer - Swept SA
Marker 1 4.805517500000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
01:56:50 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Log
Mkr1 4.805 52 GHz
-46.278 dBm
Trace 1 Pass
10.5
0.500
-9.50
-19.5
-29.5
-39.5
-49.5
-59.5
-69.5
Start 1.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 5.100 GHz
Sweep 8.000 ms (40001 pts)
MSG
STATUS

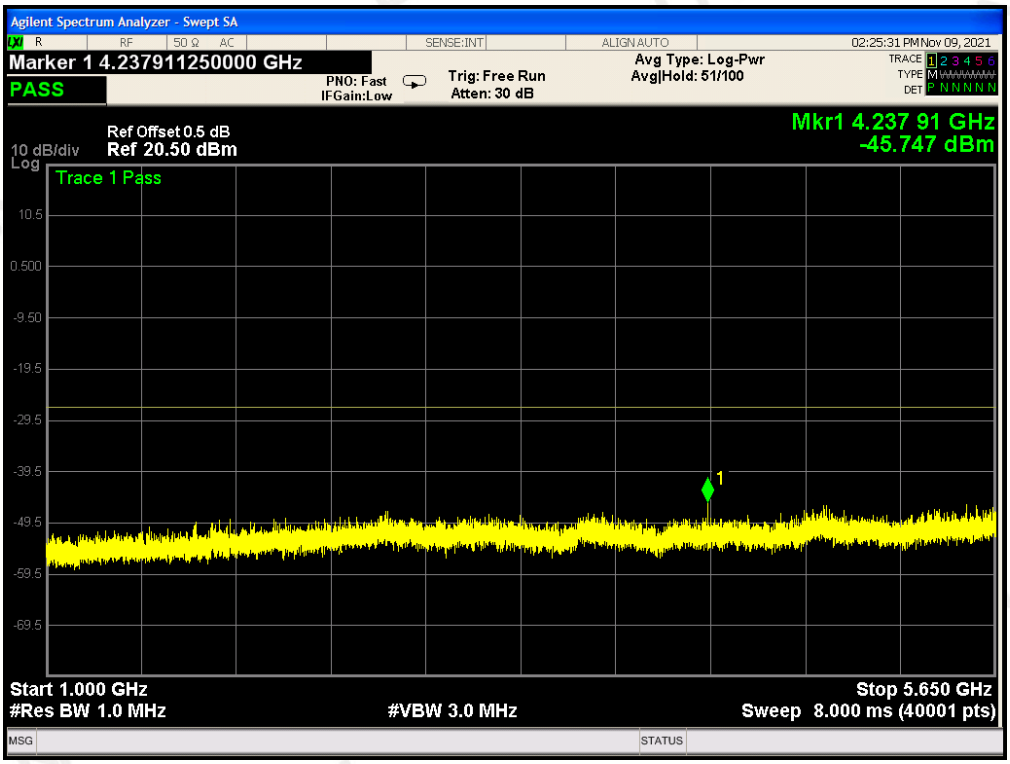

Agilent Spectrum Analyzer - Swept SA
Marker 1 5.237857500000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
01:57:36 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Log
Mkr1 5.237 857 5 GHz
3.693 dBm
Trace 1 Pass
10.5
0.500
-9.50
-19.5
-29.5
-39.5
-49.5
-59.5
-69.5
Start 5.1000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 5.4000 GHz
Sweep 2.667 ms (40001 pts)
MSG
STATUS

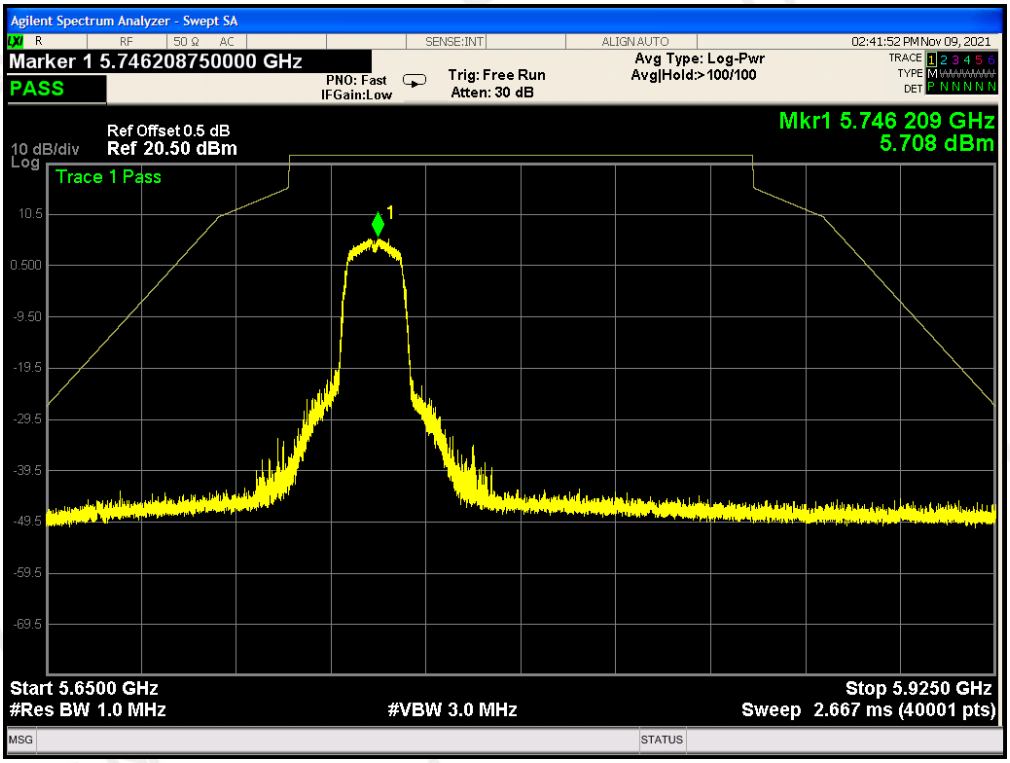

Agilent Spectrum Analyzer - Swept SA
Marker 1 25.883820000000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
01:58:15 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Mkr1 25.883 82 GHz
-33.219 dBm
Trace 1 Pass
Start 5.40 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 27.00 GHz
Sweep 56.00 ms (40001 pts)

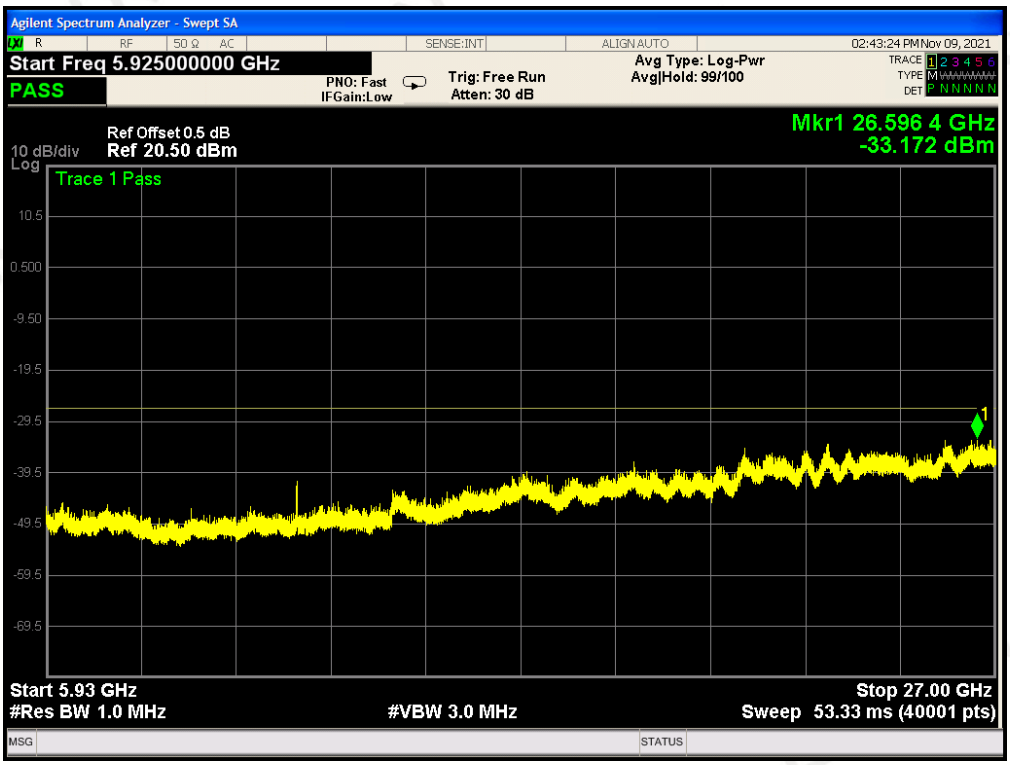

Agilent Spectrum Analyzer - Swept SA
Marker 1 39.238200000000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 53/100
03:54:21 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Mkr1 39.238 200 GHz
-33.589 dBm
Trace 1 Pass
Start 27.000 GHz
#Res BW 3.0 MHz
#VBW 50 MHz
Stop 40.000 GHz
Sweep 34.67 ms (40001 pts)

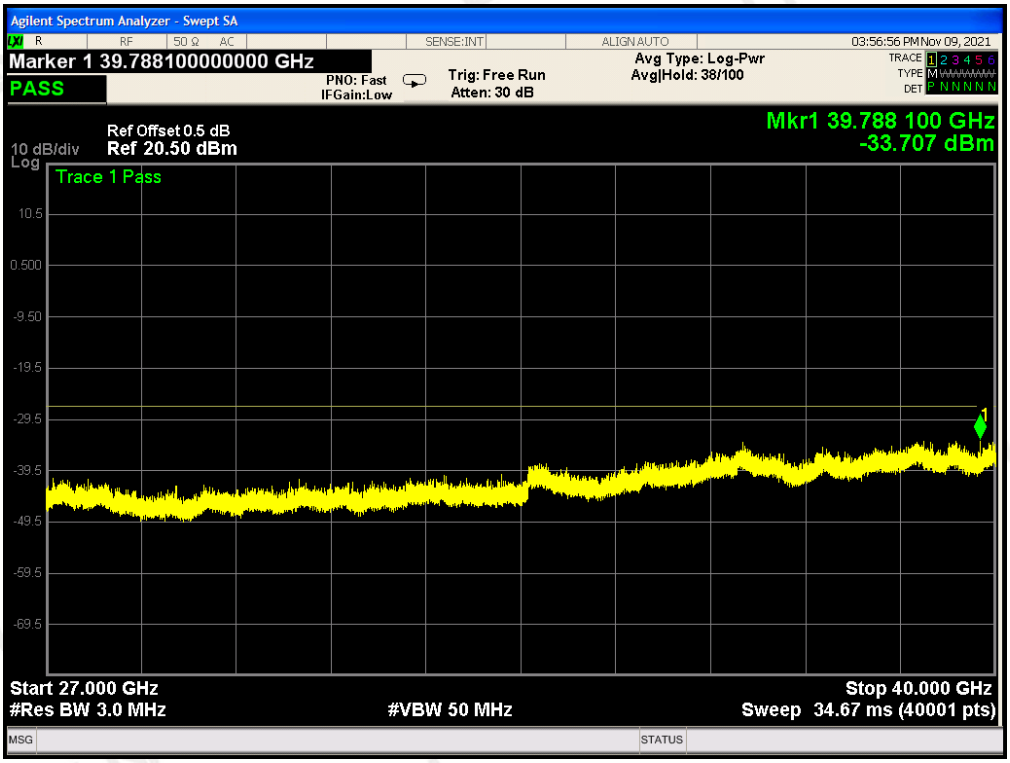
OUT OF BAND EMISSIONS FOR MODULATION IN 5745MHz



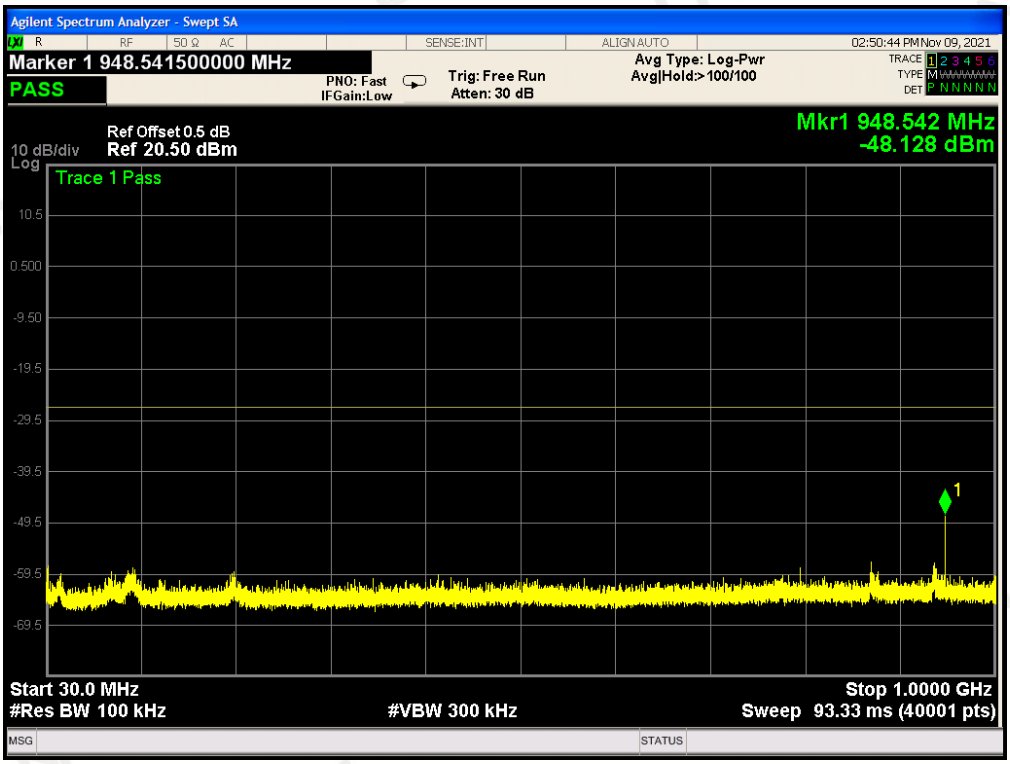


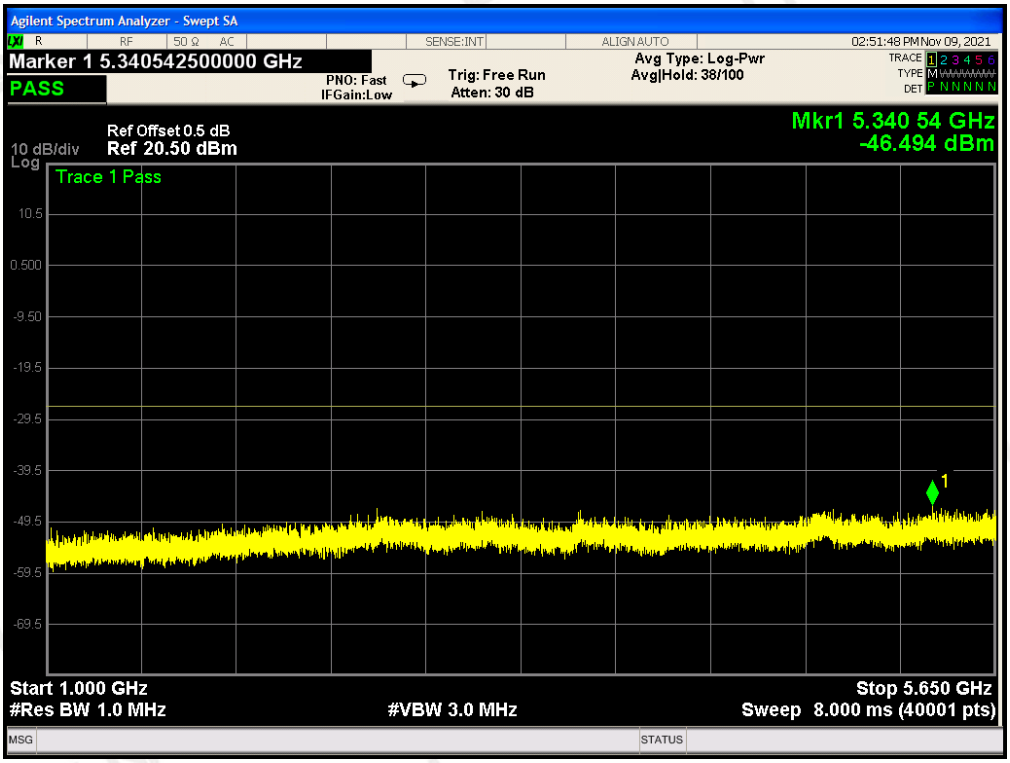

Agilent Spectrum Analyzer - Swept SA
02:41:52 PM Nov 09, 2021
Marker 1 5.746208750000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
Ref Offset 0.5 dB
10 dB/div
Log
Ref 20.50 dBm
Mkr1 5.746 209 GHz
5.708 dBm
Trace 1 Pass
10.5
0.500
-9.50
-19.5
-29.5
-39.5
-49.5
-59.5
-69.5
Start 5.6500 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 5.9250 GHz
Sweep 2.667 ms (40001 pts)
MSG
STATUS

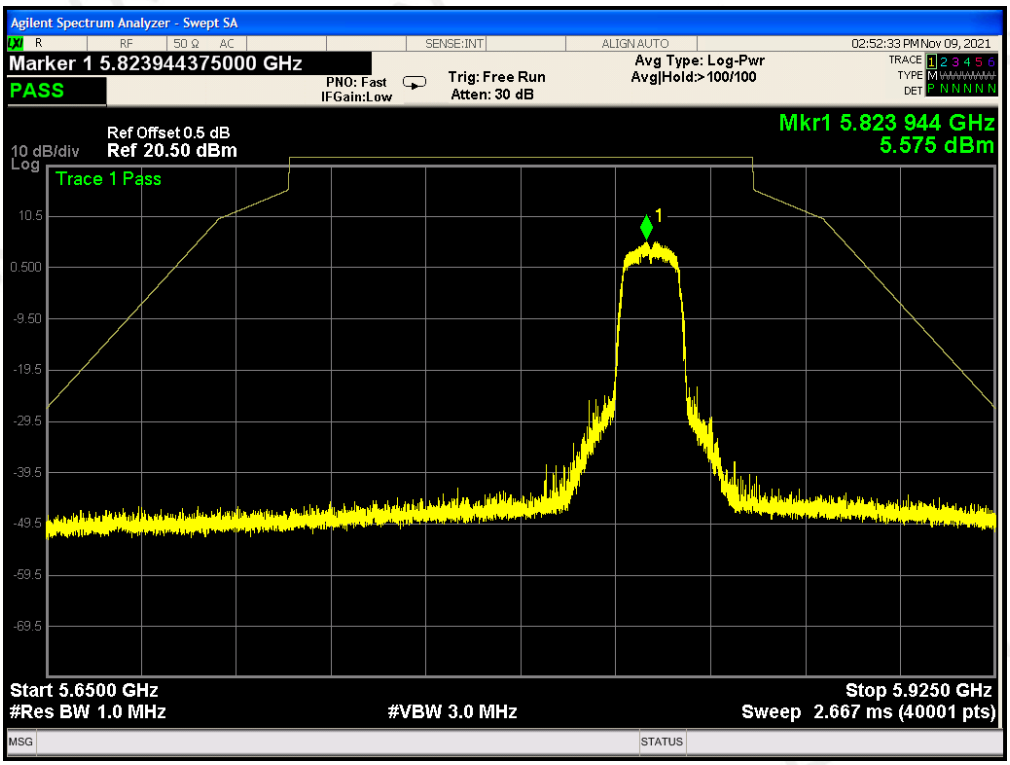

Agilent Spectrum Analyzer - Swept SA
02:43:24 PM Nov 09, 2021
Start Freq 5.925000000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 99/100
Ref Offset 0.5 dB
10 dB/div
Log
Ref 20.50 dBm
Mkr1 26.596 4 GHz
-33.172 dBm
Trace 1 Pass
10.5
0.500
-9.50
-19.5
-29.5
-39.5
-49.5
-59.5
-69.5
Start 5.93 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 27.00 GHz
Sweep 53.33 ms (40001 pts)
MSG
STATUS

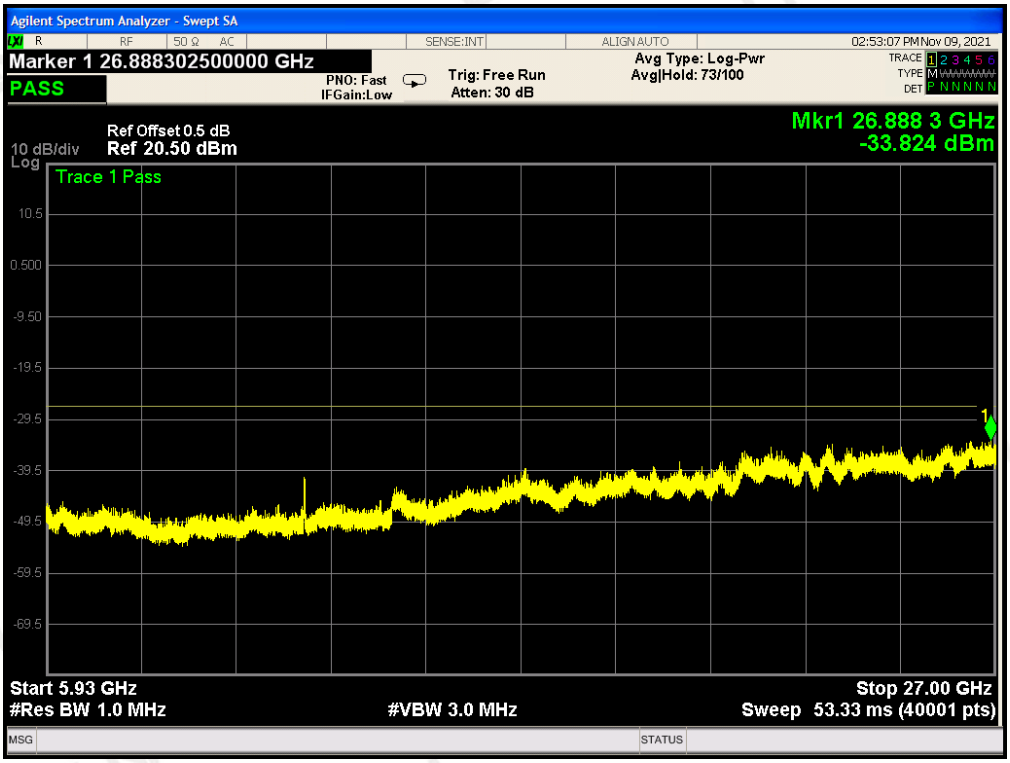


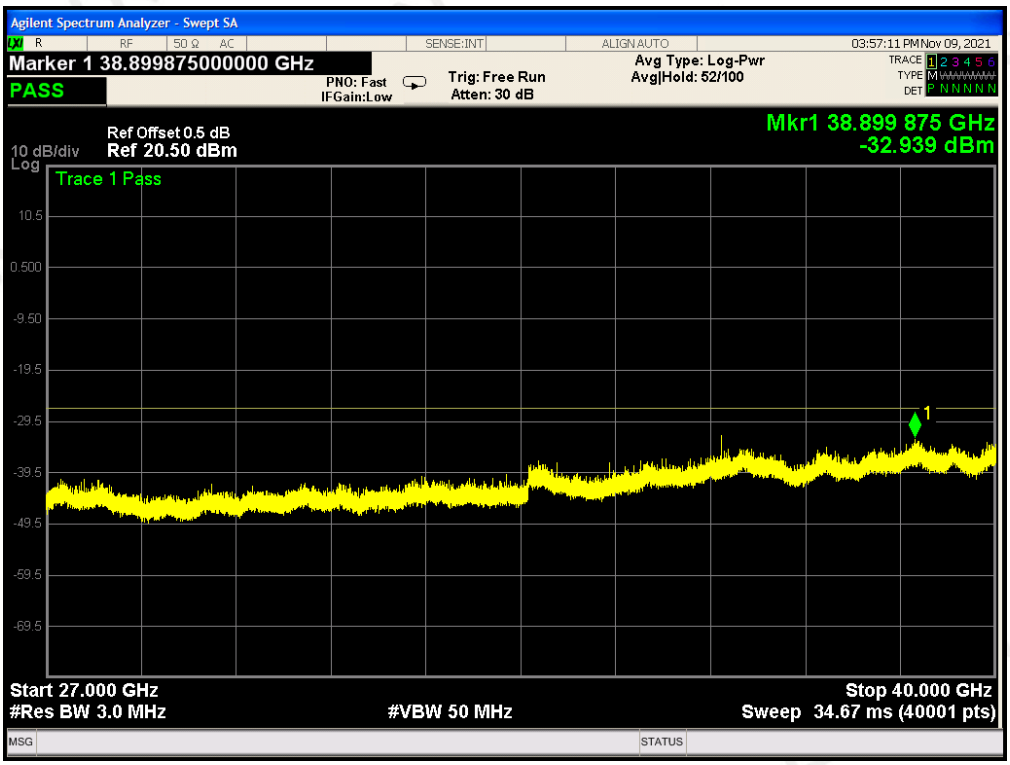
OUT OF BAND EMISSIONS FOR MODULATION IN 5825MHz




Agilent Spectrum Analyzer - Swept SA
Marker 1 5.340542500000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 38/100
02:51:48 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Log
Mkr1 5.340 54 GHz
-46.494 dBm
Trace 1 Pass
10.5
0.500
-9.50
-19.5
-29.5
-39.5
-49.5
-59.5
-69.5
Start 1.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 5.650 GHz
Sweep 8.000 ms (40001 pts)
MSG
STATUS

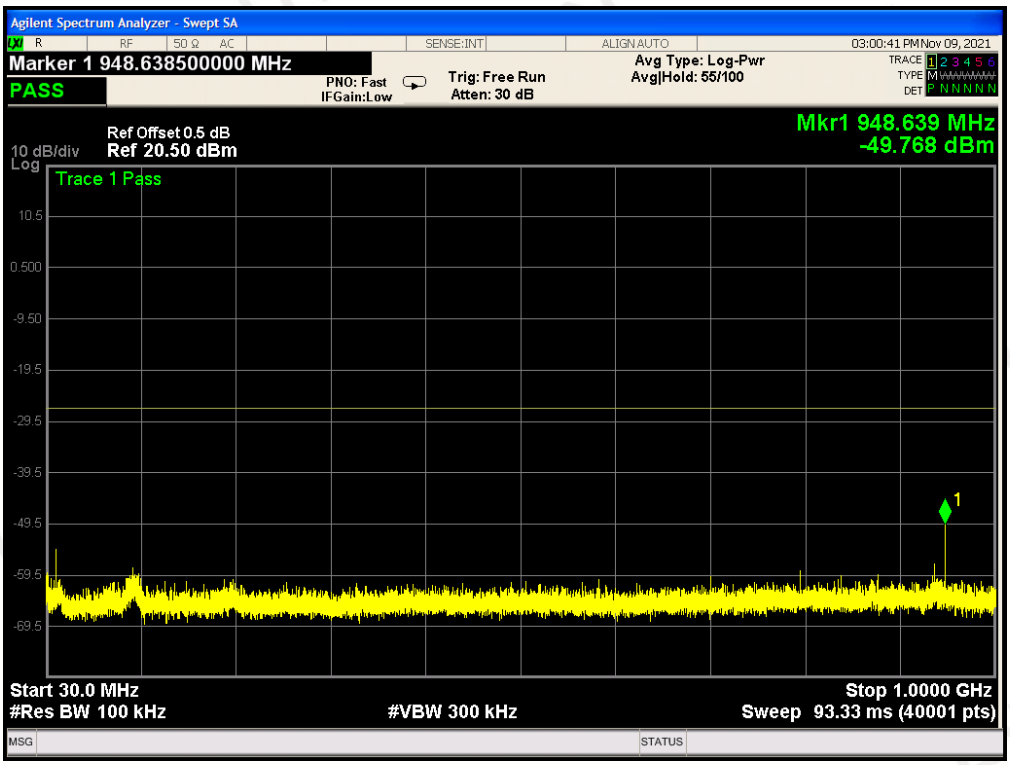

Agilent Spectrum Analyzer - Swept SA
Marker 1 5.823944375000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
02:52:33 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Log
Mkr1 5.823 944 GHz
5.575 dBm
Trace 1 Pass
10.5
0.500
-9.50
-19.5
-29.5
-39.5
-49.5
-59.5
-69.5
Start 5.6500 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 5.9250 GHz
Sweep 2.667 ms (40001 pts)
MSG
STATUS

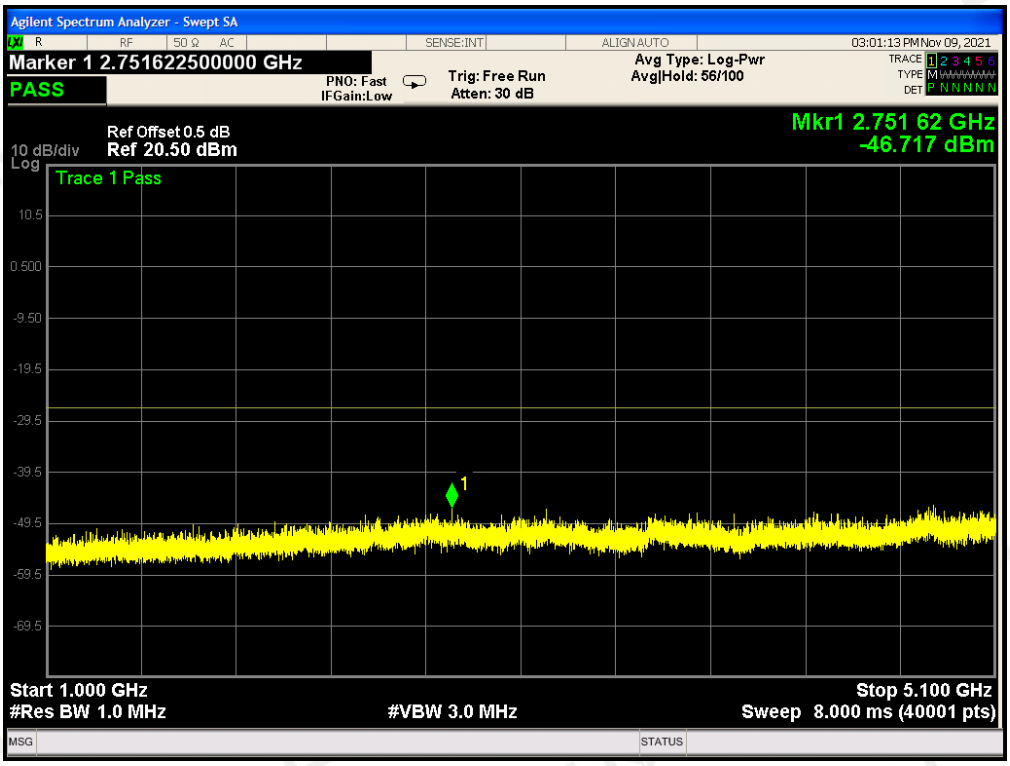

Agilent Spectrum Analyzer - Swept SA
Marker 1 26.888302500000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 73/100
02:53:07 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Mkr1 26.888 3 GHz
-33.824 dBm
Trace 1 Pass
Start 5.93 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 27.00 GHz
Sweep 53.33 ms (40001 pts)

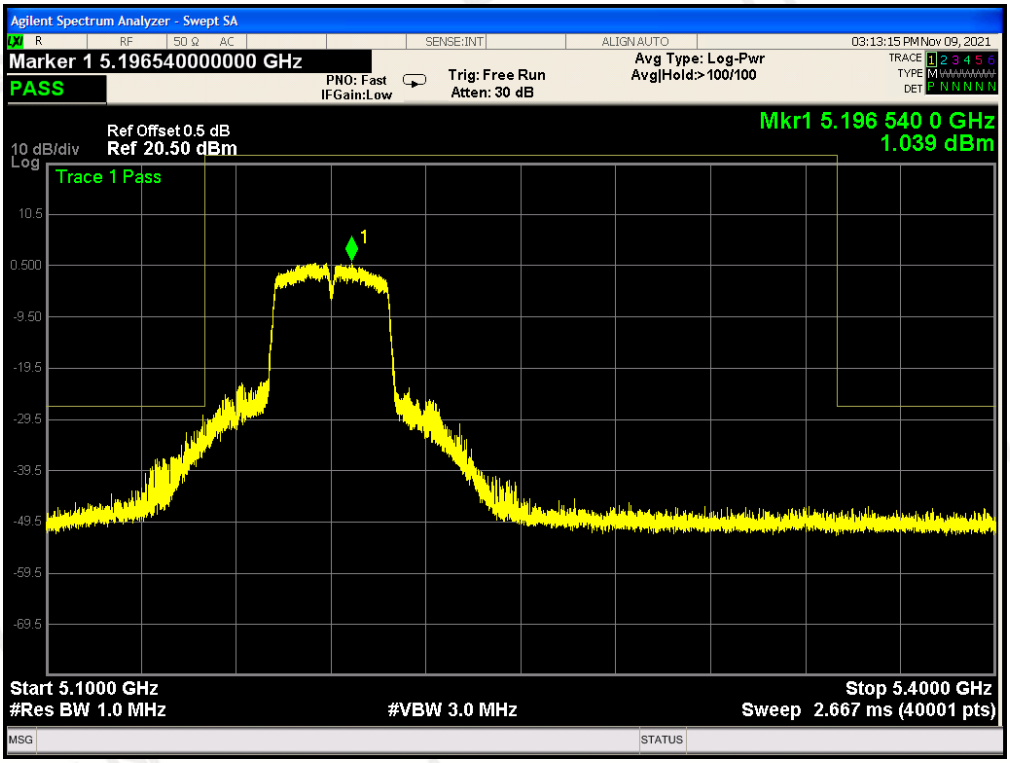

Agilent Spectrum Analyzer - Swept SA
Marker 1 38.899875000000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 52/100
03:57:11 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Mkr1 38.899 875 GHz
-32.939 dBm
Trace 1 Pass
Start 27.000 GHz
#Res BW 3.0 MHz
#VBW 50 MHz
Stop 40.000 GHz
Sweep 34.67 ms (40001 pts)

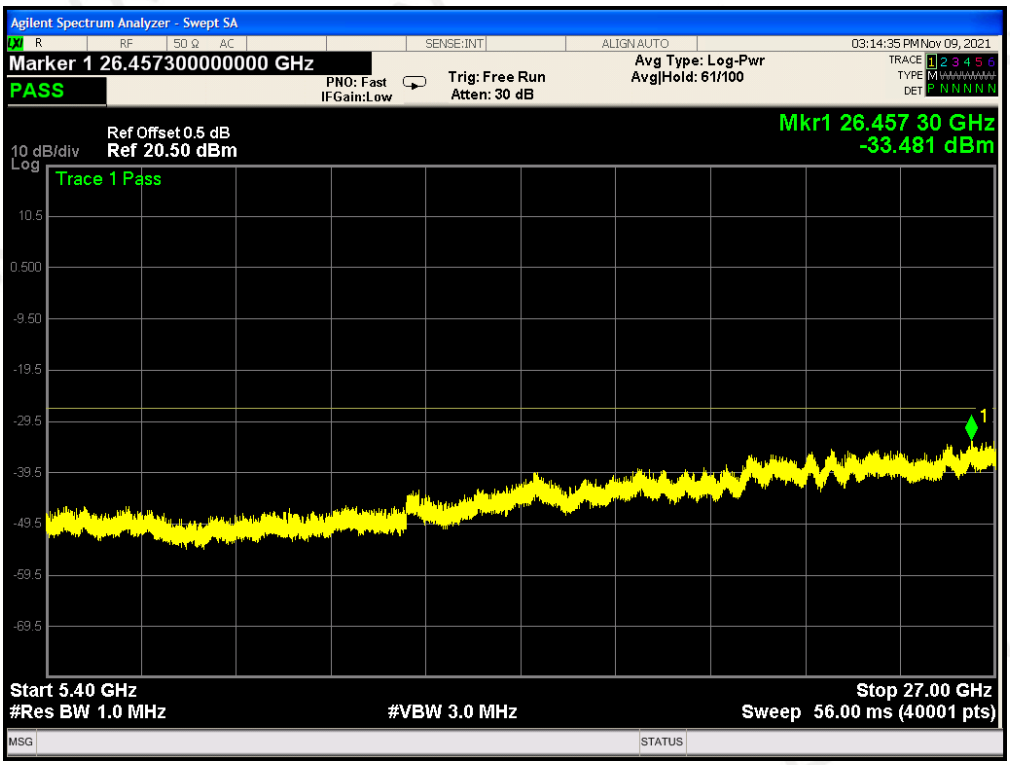
FOR 802.11N40 MODULATION

OUT OF BAND EMISSIONS FOR MODULATION IN 5190MHz

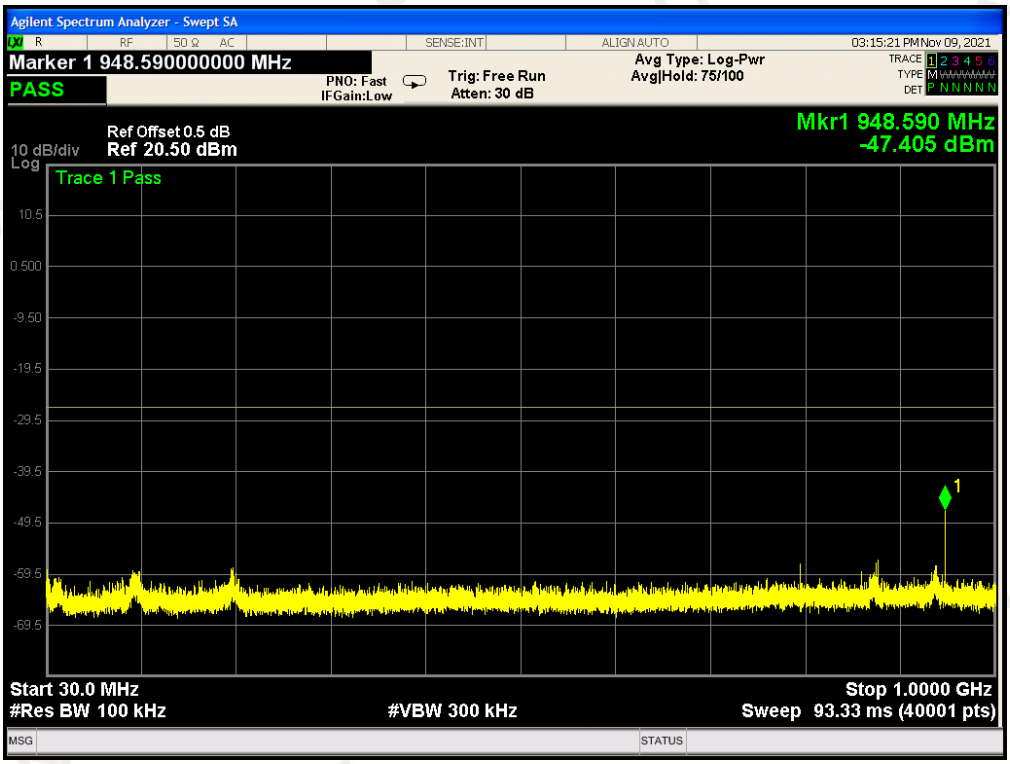


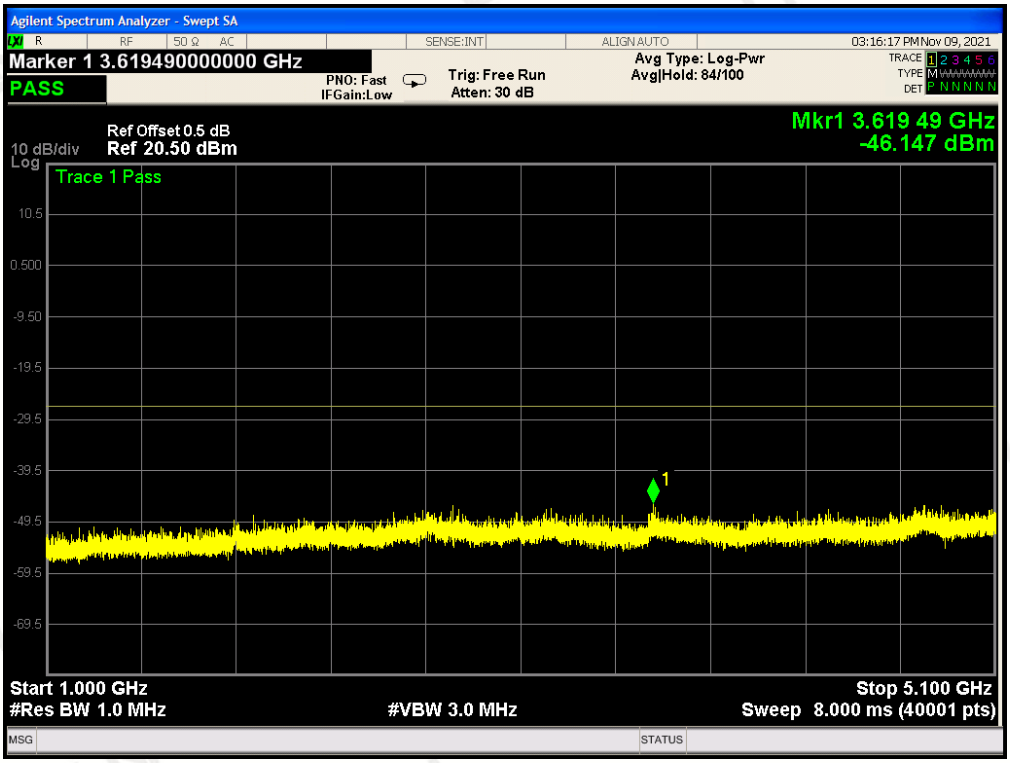


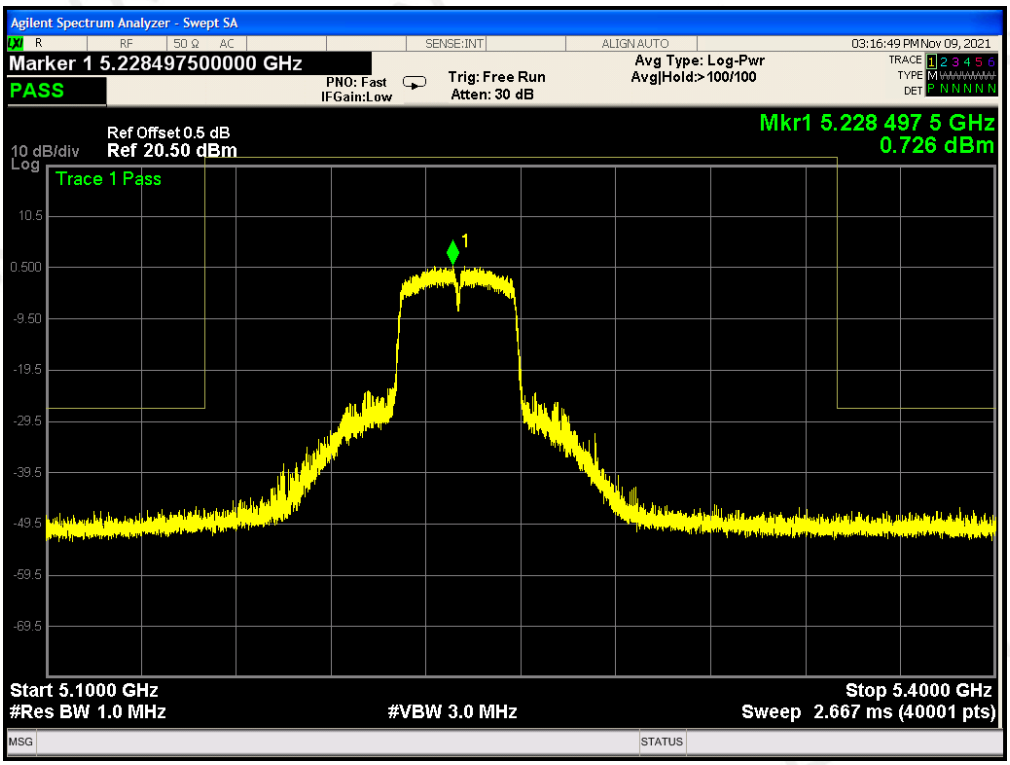

Agilent Spectrum Analyzer - Swept SA
Marker 1 5.196540000000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:13:15 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Log
Mkr1 5.196 540 0 GHz
1.039 dBm
Trace 1 Pass
Start 5.1000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 5.4000 GHz
Sweep 2.667 ms (40001 pts)

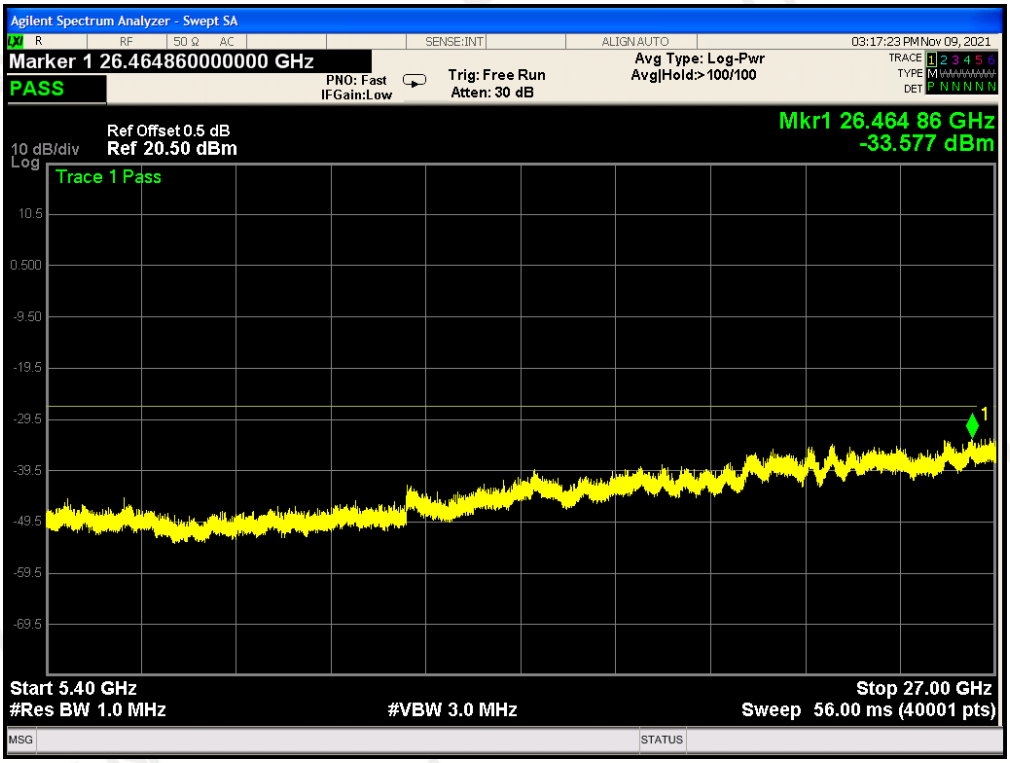

Agilent Spectrum Analyzer - Swept SA
Marker 1 26.457300000000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 61/100
03:14:35 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Log
Mkr1 26.457 30 GHz
-33.481 dBm
Trace 1 Pass
Start 5.40 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 27.00 GHz
Sweep 56.00 ms (40001 pts)

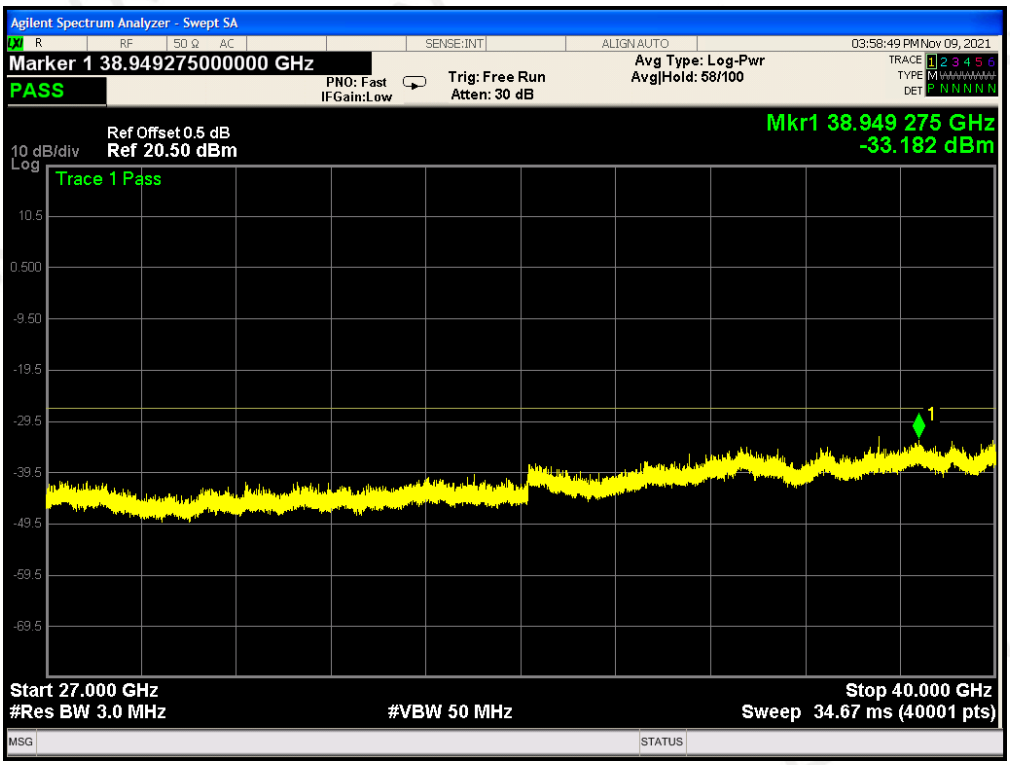
OUT OF BAND EMISSIONS FOR MODULATION IN 5230MHz



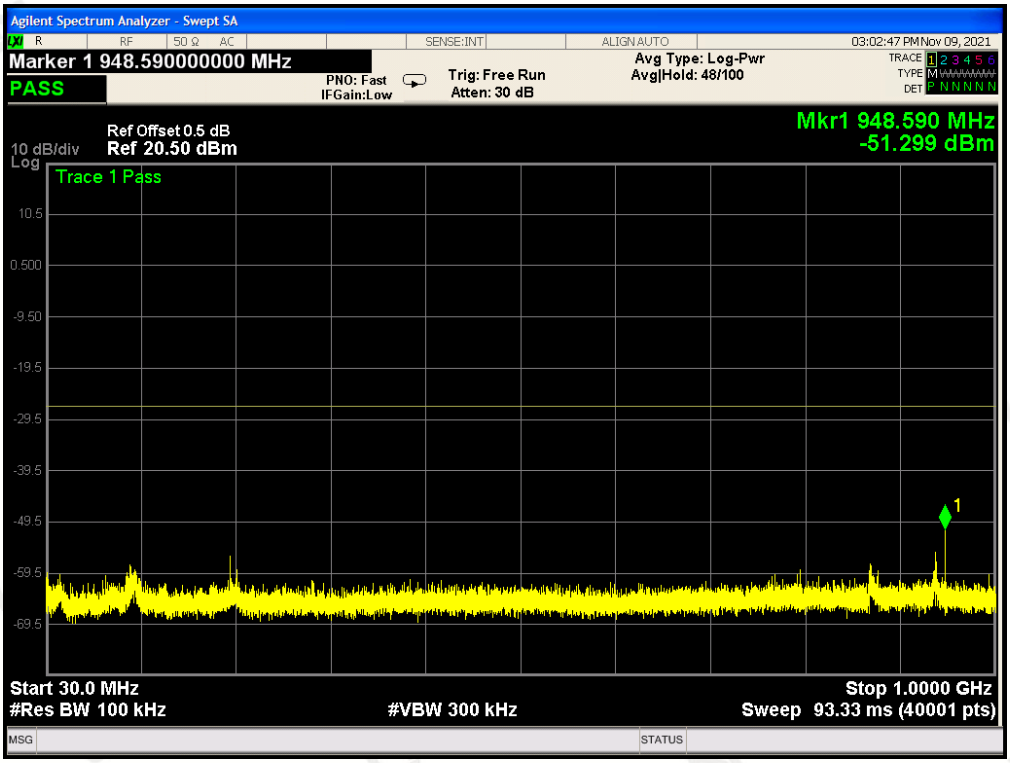

Agilent Spectrum Analyzer - Swept SA
Marker 1 3.619490000000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 84/100
03:16:17 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Log
Mkr1 3.619 49 GHz
-46.147 dBm
Trace 1 Pass
10.5
0.500
-9.50
-19.5
-29.5
-39.5
-49.5
-59.5
-69.5
Start 1.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 5.100 GHz
Sweep 8.000 ms (40001 pts)
MSG
STATUS

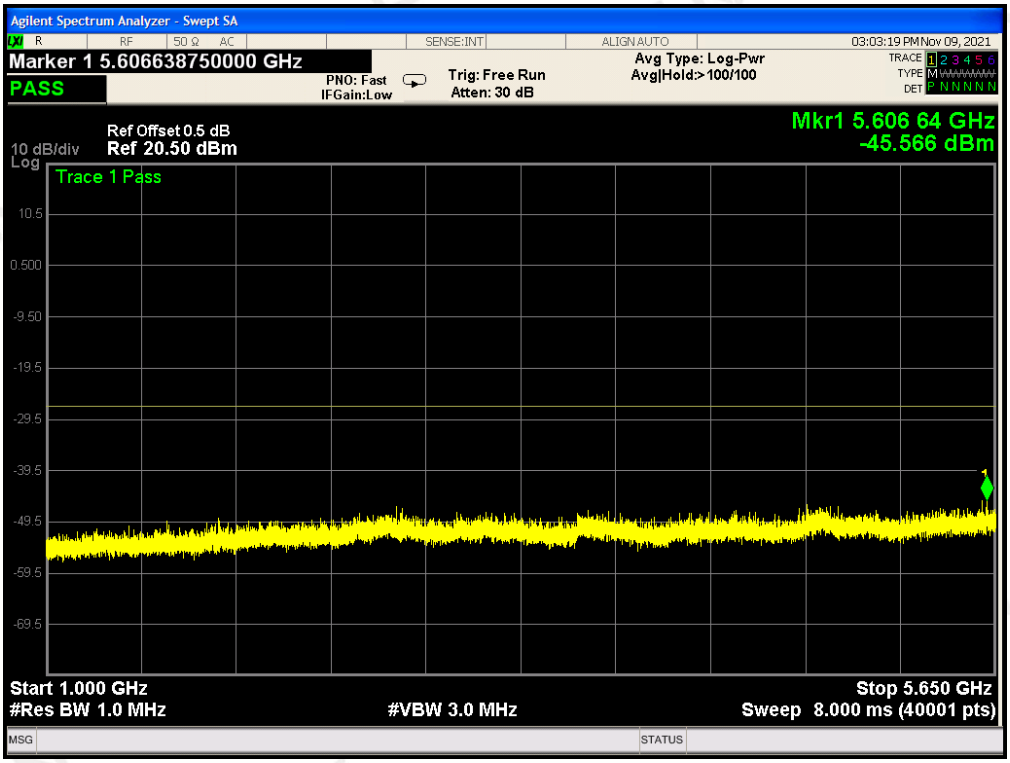

Agilent Spectrum Analyzer - Swept SA
Marker 1 5.228497500000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:16:49 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Log
Mkr1 5.228 497 5 GHz
0.726 dBm
Trace 1 Pass
10.5
0.500
-9.50
-19.5
-29.5
-39.5
-49.5
-59.5
-69.5
Start 5.1000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 5.4000 GHz
Sweep 2.667 ms (40001 pts)
MSG
STATUS

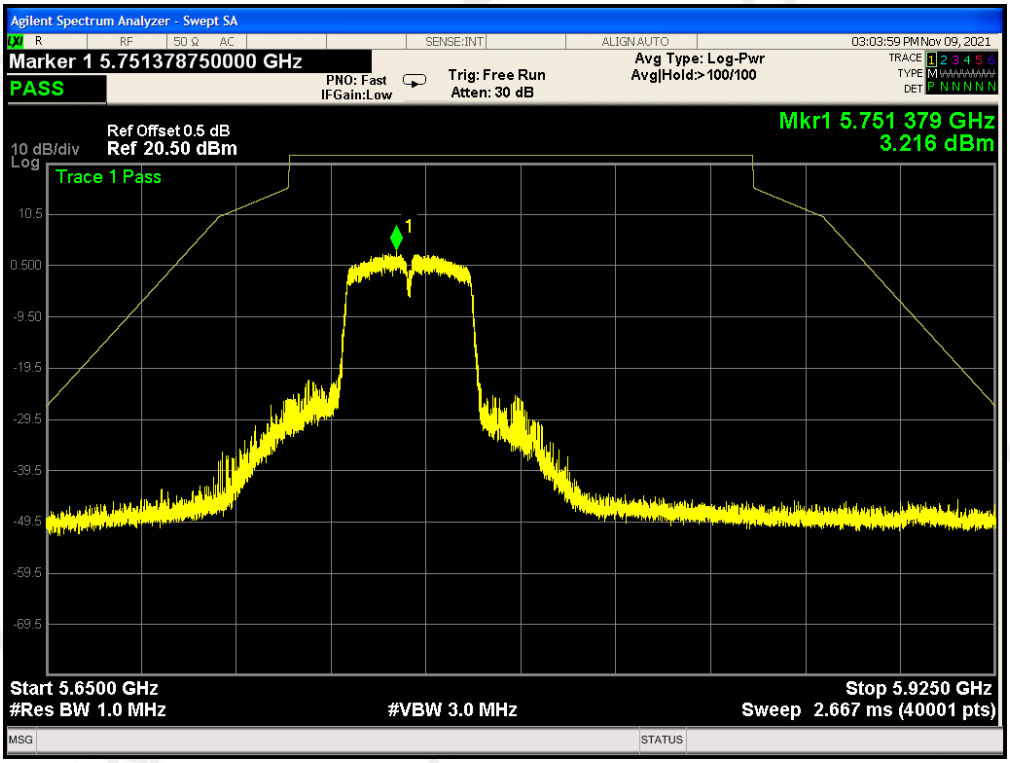

Agilent Spectrum Analyzer - Swept SA
Marker 1 26.464860000000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:17:23 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Mkr1 26.464 86 GHz
-33.577 dBm
Trace 1 Pass
Start 5.40 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 27.00 GHz
Sweep 56.00 ms (40001 pts)

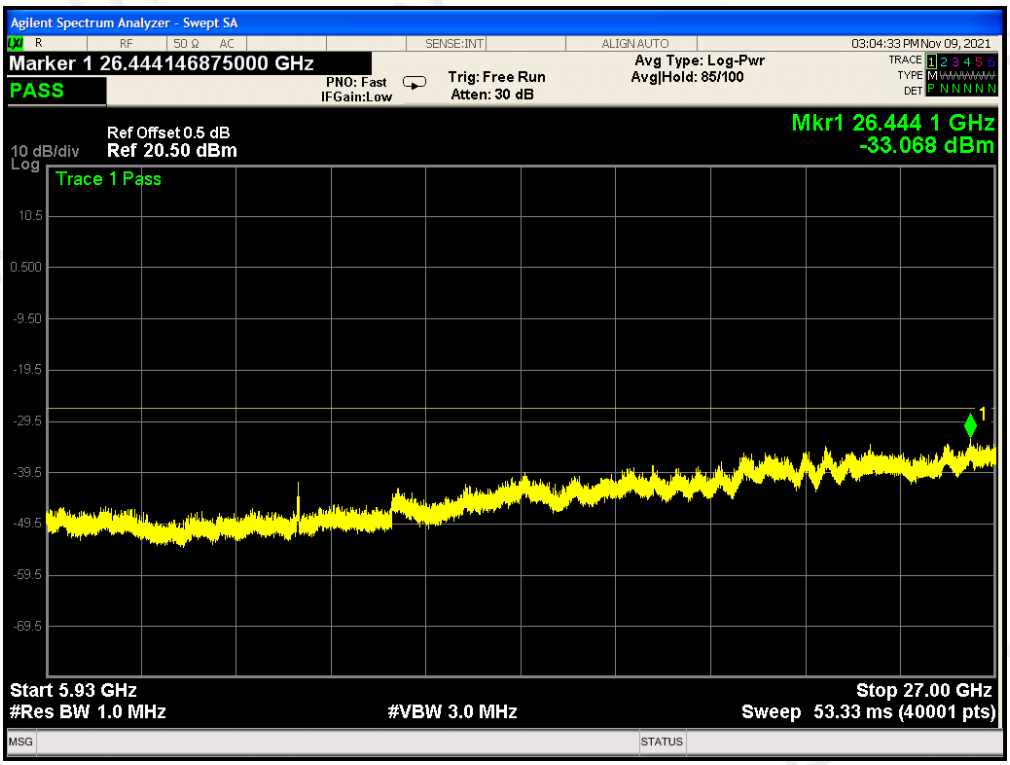

Agilent Spectrum Analyzer - Swept SA
Marker 1 38.949275000000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 58/100
03:58:49 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Mkr1 38.949 275 GHz
-33.182 dBm
Trace 1 Pass
Start 27.000 GHz
#Res BW 3.0 MHz
#VBW 50 MHz
Stop 40.000 GHz
Sweep 34.67 ms (40001 pts)

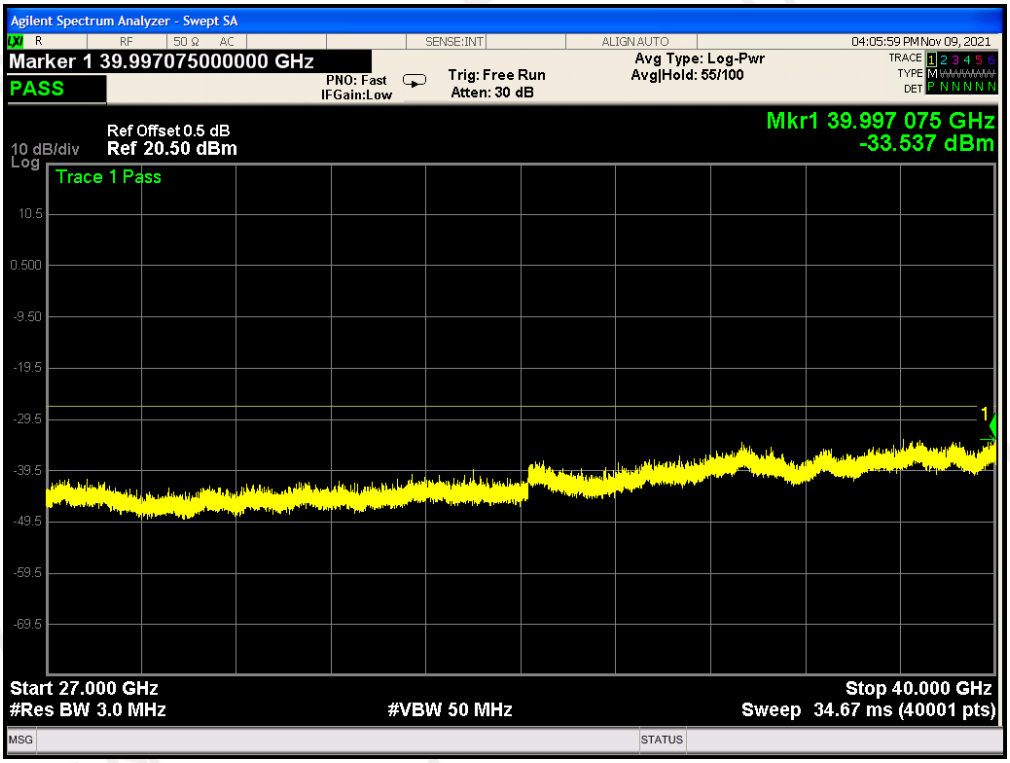
OUT OF BAND EMISSIONS FOR MODULATION IN 5755MHz



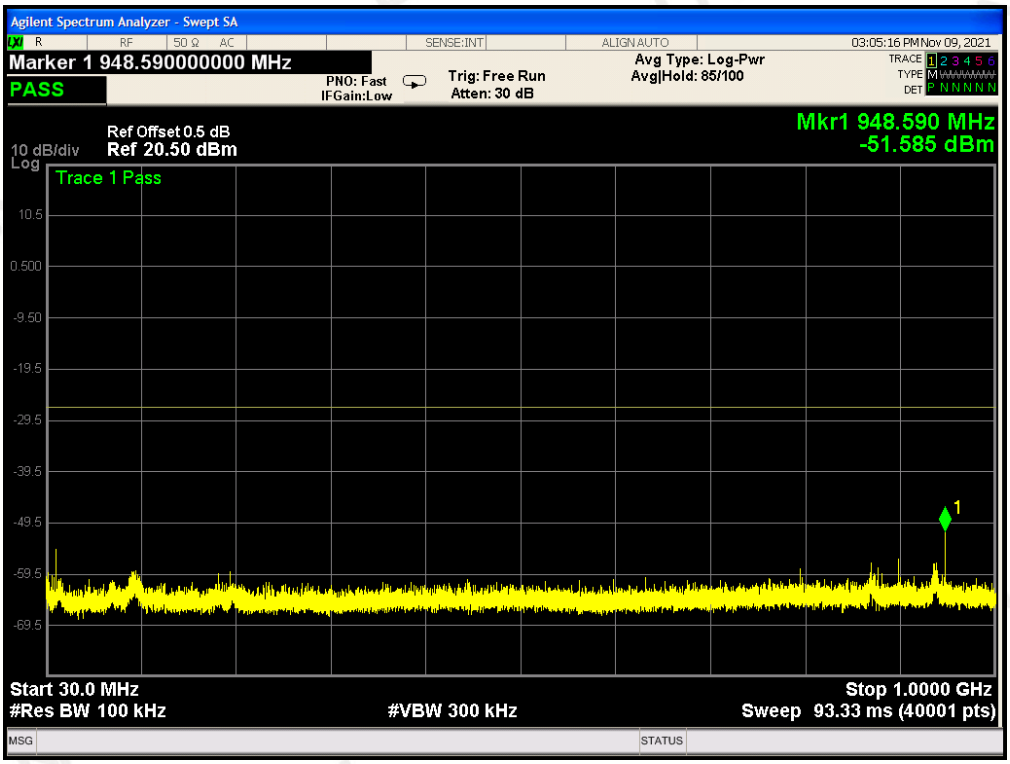


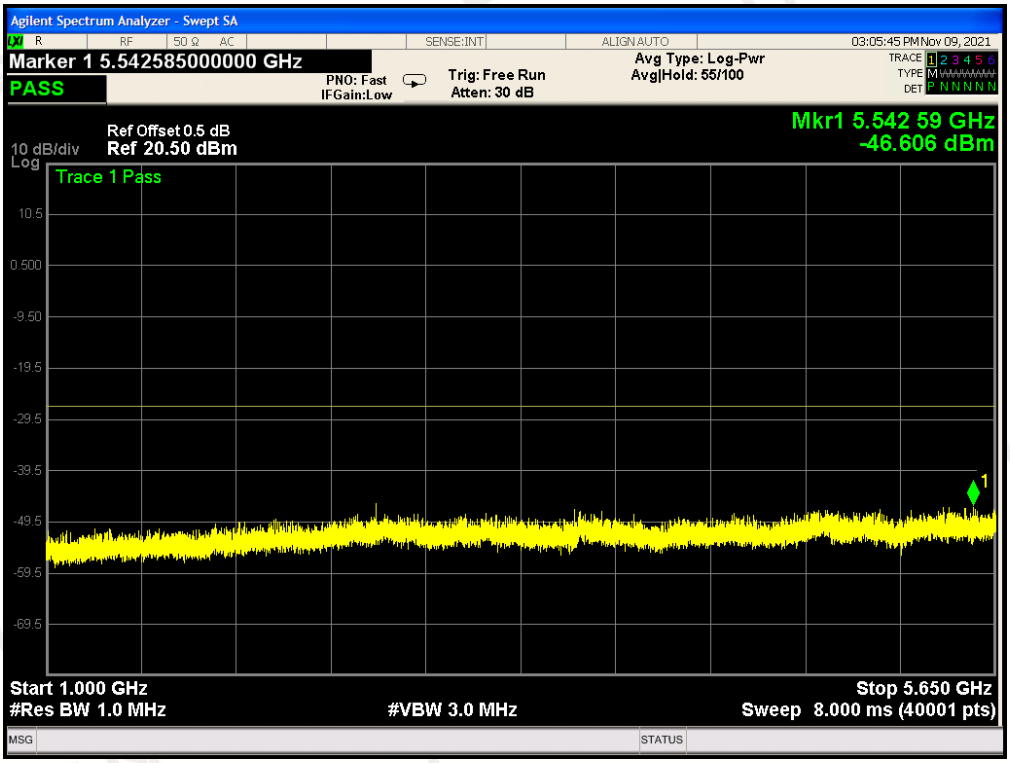

Agilent Spectrum Analyzer - Swept SA
Marker 1 5.751378750000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:03:59 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Log
Ref 20.50 dBm
Mkr1 5.751 379 GHz
3.216 dBm
Trace 1 Pass
Start 5.6500 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 5.9250 GHz
Sweep 2.667 ms (40001 pts)

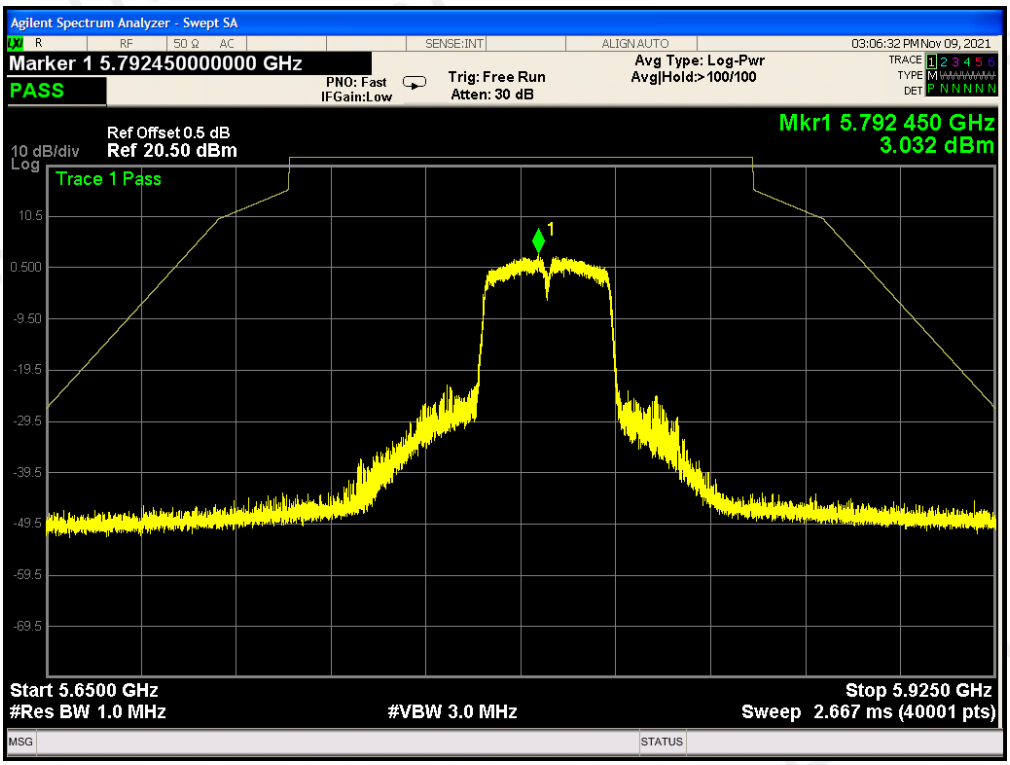

Agilent Spectrum Analyzer - Swept SA
Marker 1 26.444146875000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 85/100
03:04:33 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Log
Ref 20.50 dBm
Mkr1 26.444 1 GHz
-33.068 dBm
Trace 1 Pass
Start 5.93 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 27.00 GHz
Sweep 53.33 ms (40001 pts)

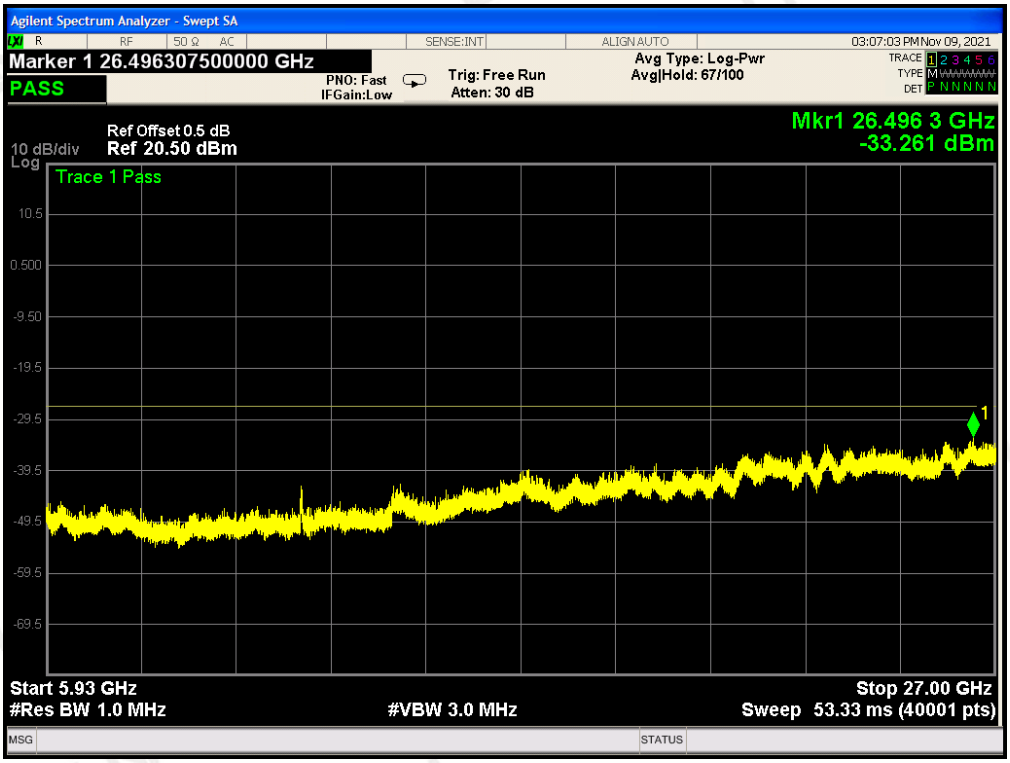


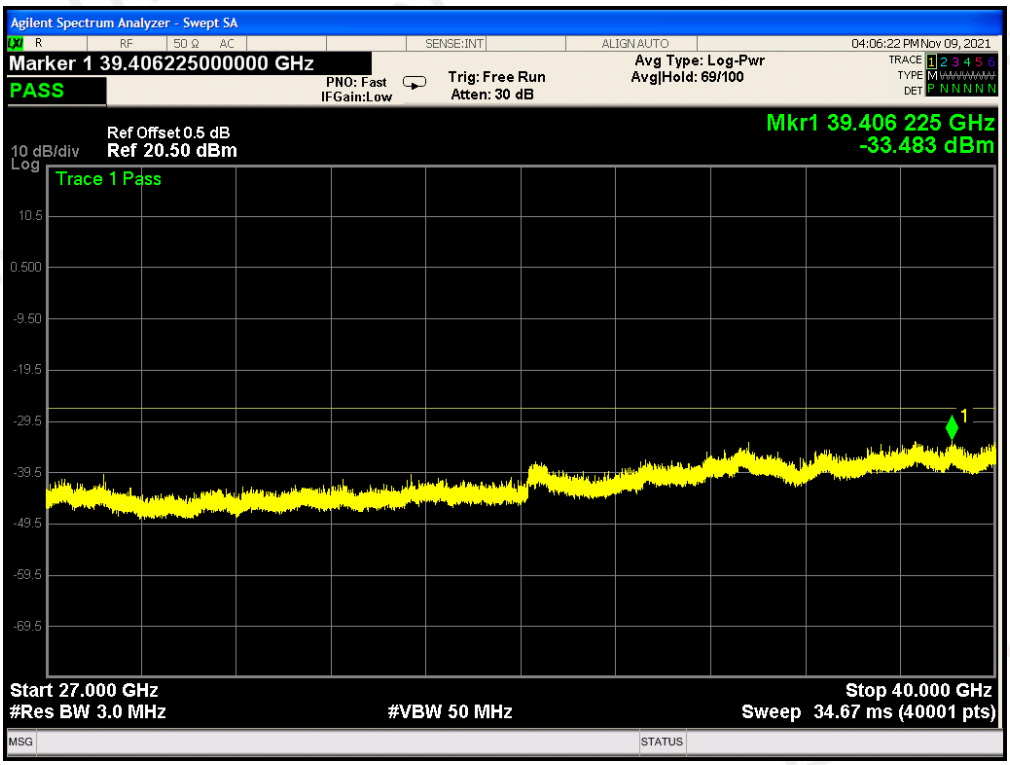
OUT OF BAND EMISSIONS FOR MODULATION IN 5795M




Agilent Spectrum Analyzer - Swept SA
Marker 1 5.542585000000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 55/100
03:05:45 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Log
Mkr1 5.542 59 GHz
-46.606 dBm
Trace 1 Pass
10.5
0.500
-9.50
-19.5
-29.5
-39.5
-49.5
-59.5
-69.5
Start 1.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 5.650 GHz
Sweep 8.000 ms (40001 pts)
MSG
STATUS


Agilent Spectrum Analyzer - Swept SA
Marker 1 5.792450000000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:06:32 PM Nov 09, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Log
Mkr1 5.792 450 GHz
3.032 dBm
Trace 1 Pass
10.5
0.500
-9.50
-19.5
-29.5
-39.5
-49.5
-59.5
-69.5
Start 5.6500 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 5.9250 GHz
Sweep 2.667 ms (40001 pts)
MSG
STATUS





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..

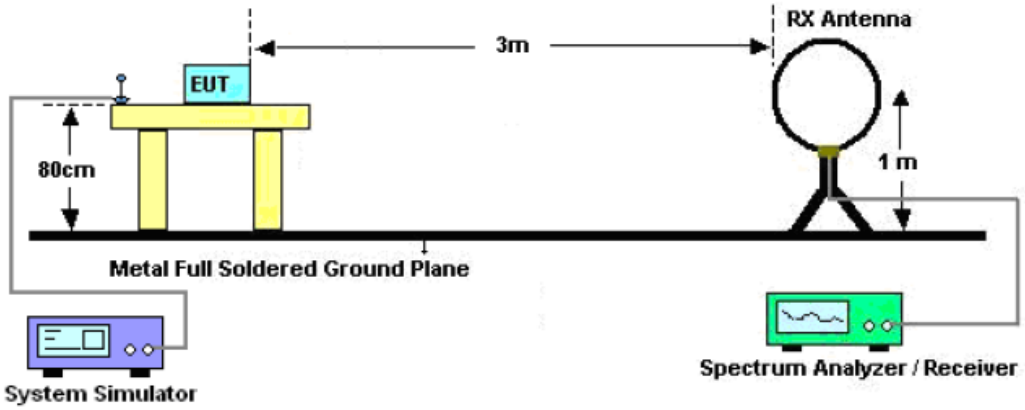
11. RADIATED EMISSION

11.1. MEASUREMENT PROCEDURE

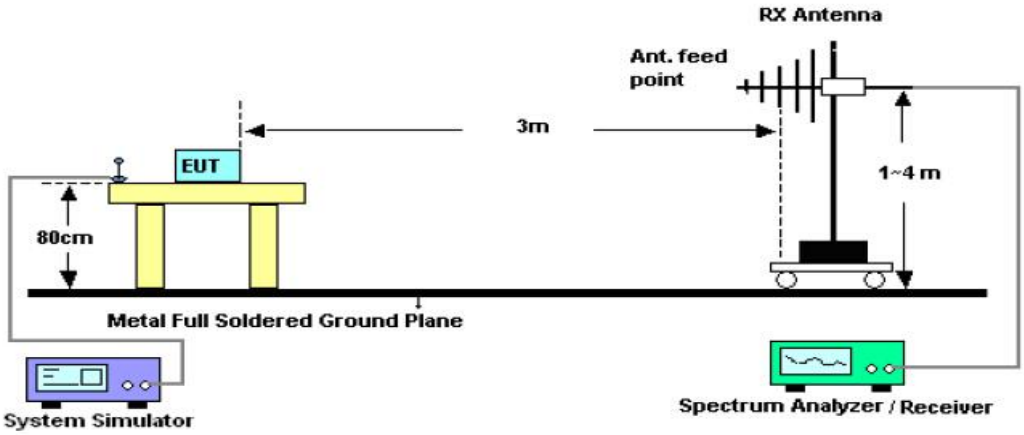
1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated 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.

11.2. TEST SETUP

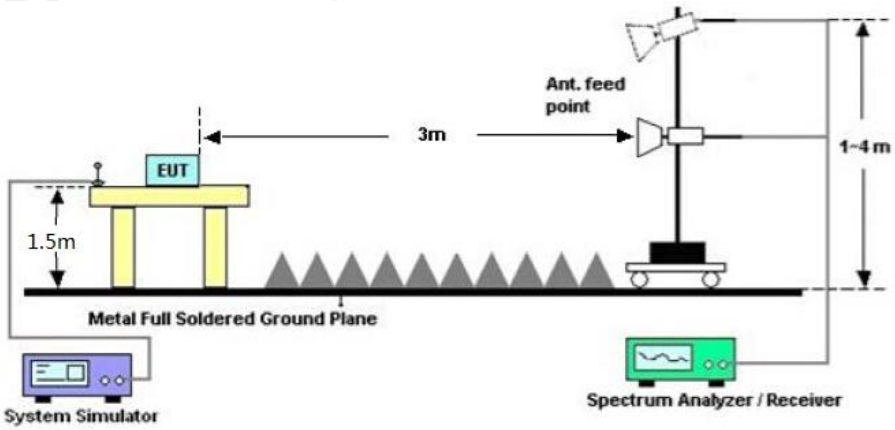
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



11.3. LIMITS AND MEASUREMENT RESULT

15.209(a) Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested For restricted band radiated emission,
the test records reported below are the worst result compared to other modes.

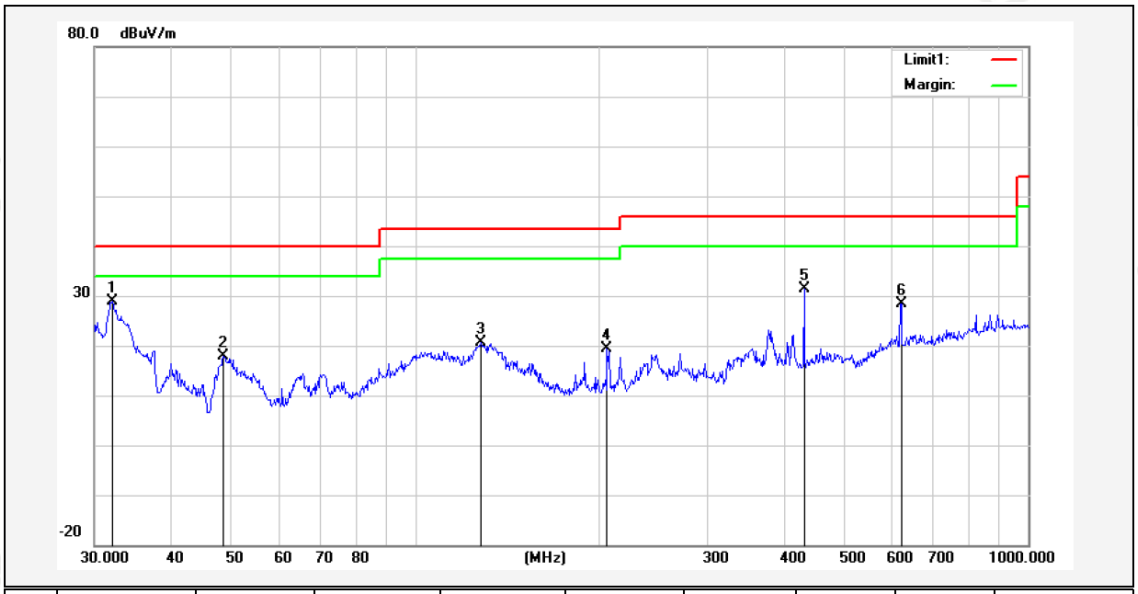
11.4. TEST RESULT

RADIATED EMISSION BELOW 30MHZ

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

RADIATED EMISSION BELOW 1GHZ

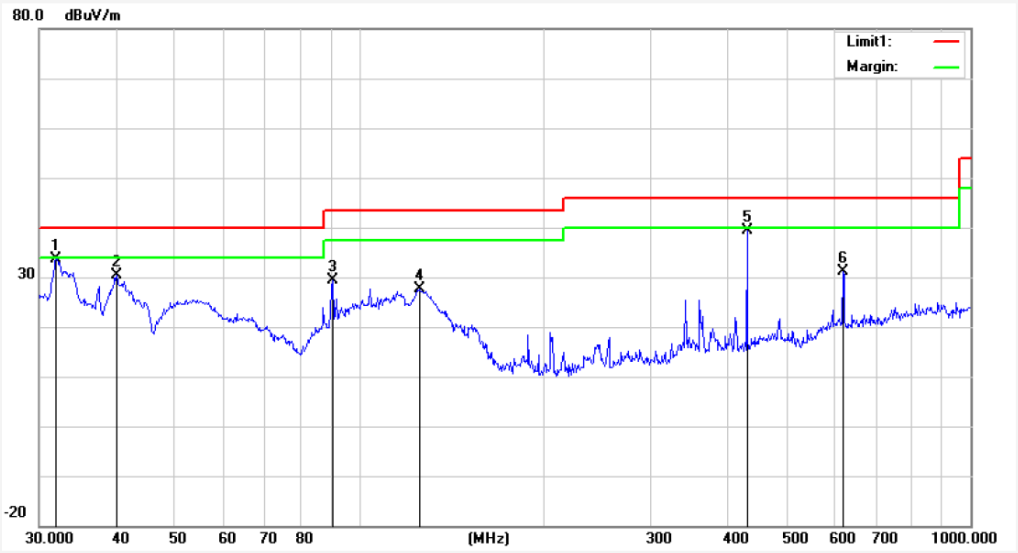
Temperature:	24℃	Relative Humidity:	48%
Test Date:	Nov. 18, 2021	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Horizontal
Test Mode:	Transmitting mode of 802.11a20 5180MHz		



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1*	32.0667	37.48	-8.66	28.82	40.00	-11.18	50	100	peak
2	48.6720	37.57	-19.71	17.86	40.00	-22.14	60	100	peak
3	128.1130	36.79	-16.05	20.74	43.50	-22.76	90	100	peak
4	205.6751	36.03	-16.72	19.31	43.50	-24.19	120	100	peak
5	431.0316	44.10	-12.67	31.43	46.00	-14.57	150	100	peak
6	620.7096	37.44	-9.00	28.44	46.00	-17.56	180	100	peak

RESULT: PASS

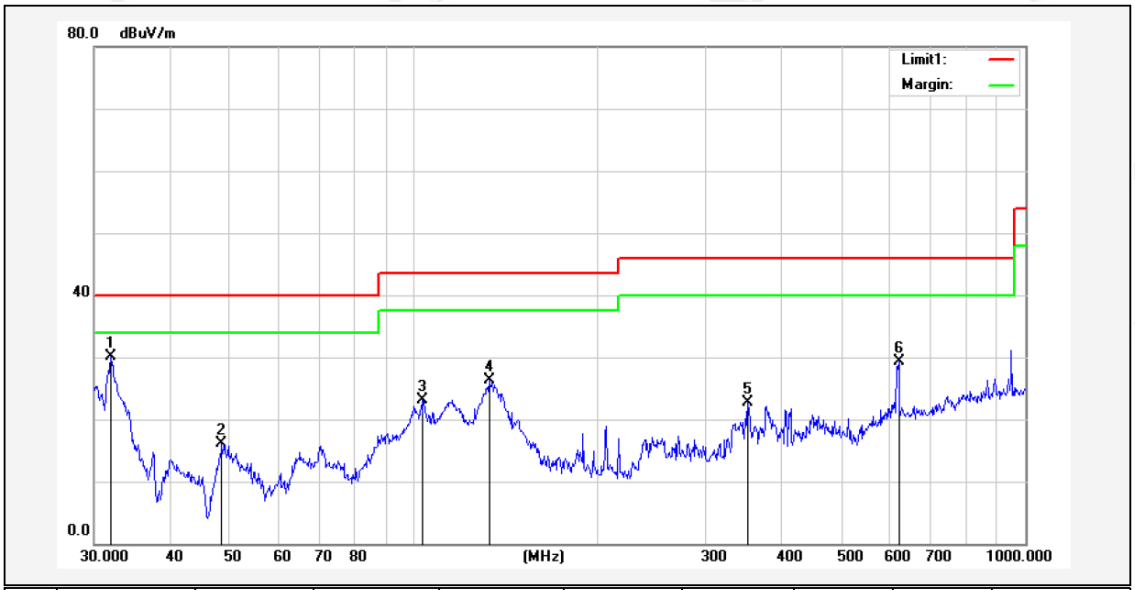
Temperature:	24℃	Relative Humidity:	48%
Test Date:	Nov. 18, 2021	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Vertical
Test Mode:	Transmitting mode of 802.11a20 5180MHz		



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1*	31.9546	42.22	-8.58	33.64	40.00	-6.36	80	100	peak
2	40.1347	45.52	-15.12	30.40	40.00	-9.60	100	100	peak
3	90.5374	49.99	-20.66	29.33	43.50	-14.17	120	100	peak
4	125.8864	43.69	-16.12	27.57	43.50	-15.93	150	100	peak
5	431.0316	52.09	-12.67	39.42	46.00	-6.58	180	100	peak
6	618.5370	40.12	-9.00	31.12	46.00	-14.88	220	100	peak

RESULT: PASS

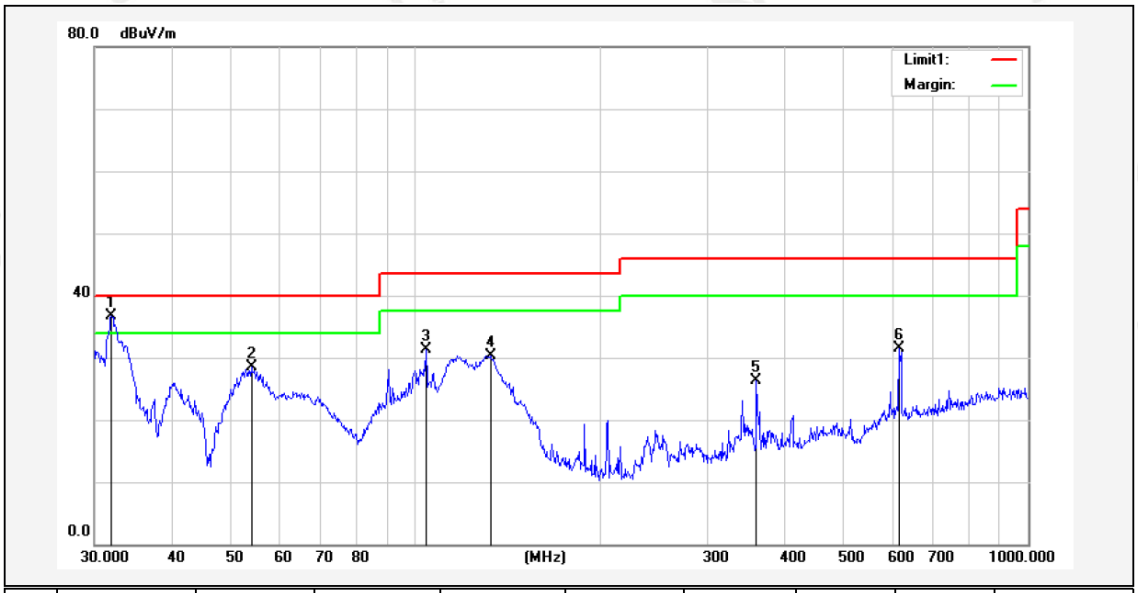
Temperature:	24℃	Relative Humidity:	48%
Test Date:	Nov. 18, 2021	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Horizontal
Test Mode:	Transmitting mode of 802.11a20 5745MHz		



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1*	31.9546	40.97	-10.94	30.03	40.00	-9.97	60	100	peak
2	48.5016	35.73	-19.63	16.10	40.00	-23.90	90	100	peak
3	103.4421	40.58	-17.51	23.07	43.50	-20.43	100	100	peak
4	132.6850	41.09	-14.85	26.24	43.50	-17.26	120	100	peak
5	351.7079	34.62	-11.92	22.70	46.00	-23.30	180	100	peak
6	620.7096	35.67	-6.27	29.40	46.00	-16.60	200	100	peak

RESULT: PASS

Temperature:	24℃	Relative Humidity:	48%
Test Date:	Nov. 18, 2021	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Vertical
Test Mode:	Transmitting mode of 802.11a20 5745MHz		



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1*	31.9546	47.58	-10.94	36.64	40.00	-3.36	90	100	peak
2	54.0711	48.72	-20.26	28.46	40.00	-11.54	100	100	peak
3	104.1701	48.69	-17.37	31.32	43.50	-12.18	120	100	peak
4	132.6850	45.24	-14.85	30.39	43.50	-13.11	150	100	peak
5	360.4477	38.19	-11.87	26.32	46.00	-19.68	180	100	peak
6	616.3718	37.78	-6.28	31.50	46.00	-14.50	220	100	peak

RESULT: PASS

Note: All test channels had been tested. The 802.11a20 is the worst case and recorded in the test report..

Factor = Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Level.

The “Factor” value can be calculated automatically by software of measurement system.

Above 1 GHz Test Results:

802.11a20 5180MHz:

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
10360	38.44	9.14	47.58	68.2	-20.62	PK
15540	45.15	10.22	55.37	74	-18.63	PK
15540	34.69	10.22	44.91	54	-9.09	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
10360	38.90	9.14	48.04	68.2	-20.16	PK
15540	45.87	10.22	56.09	74	-17.91	PK
15540	35.02	10.22	45.24	54	-8.76	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

802.11a20 5200MHz:

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
10400	38.29	9.14	47.43	68.2	-20.77	PK
15600	44.71	10.22	54.93	74	-19.07	PK
15600	34.62	10.22	44.84	54	-9.16	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
10400	38.79	9.14	47.93	68.2	-20.27	PK
15600	45.12	10.22	55.34	74	-18.66	PK
15600	35.01	10.22	45.23	54	-8.77	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

802.11a20 5240MHz:

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
10480	37.82	9.27	47.09	68.2	-21.11	PK
15720	45.67	10.38	56.05	74	-17.95	PK
15720	34.28	10.38	44.66	54	-9.34	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
10480	38.35	9.27	47.62	68.2	-20.58	PK
15720	45.92	10.38	56.30	74	-17.70	PK
15720	34.50	10.38	44.88	54	-9.12	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

802.11a20 5745MHz:

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
11490	43.33	9.42	52.75	74	-21.25	PK
11490	34.56	9.42	43.98	54	-10.02	AV
17235	38.70	10.51	49.21	68.2	-18.99	PK
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
11490	43.15	9.42	52.57	74	-21.43	PK
11490	34.67	9.42	44.09	54	-9.91	AV
17235	38.91	10.51	49.42	68.2	-18.78	PK
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

802.11a20 5785MHz:

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
11570	43.42	9.42	52.84	74	-21.16	PK
11570	34.85	9.42	44.27	54	-9.73	AV
17355	38.16	10.51	48.67	68.2	-19.53	PK
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
11570	44.04	9.42	53.46	74	-20.54	PK
11570	34.82	9.42	44.24	54	-9.76	AV
17355	38.69	10.51	49.20	68.2	-19.00	PK
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

802.11a20 5825MHz:

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
11650	43.52	9.62	53.14	74	-20.86	PK
11650	33.58	9.62	43.20	54	-10.80	AV
17475	38.36	10.75	49.11	68.2	-19.09	PK
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
11650	44.10	9.62	53.72	74	-20.28	PK
11650	34.36	9.62	43.98	54	-10.02	AV
17475	38.75	10.75	49.50	68.2	-18.70	PK
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

Note: All test channels had been tested. The 802.11a20 is the worst case and recorded in the test report. Other frequencies radiation emission from 1 to 40GHz at least have 20dB margin and not recorded in the test report.

Factor = Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Level.

The “Factor” value can be calculated automatically by software of measurement system.

12. BAND EDGE EMISSION

12.1. MEASUREMENT PROCEDURE

1. The EUT operates at transmitting mode. The operate channel is tested to verify the largest transmission and spurious emissions power at the continuous transmission mode.

2. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission: (a) PEAK: RBW=1MHz, VBW=3MHz / Sweep=AUTO

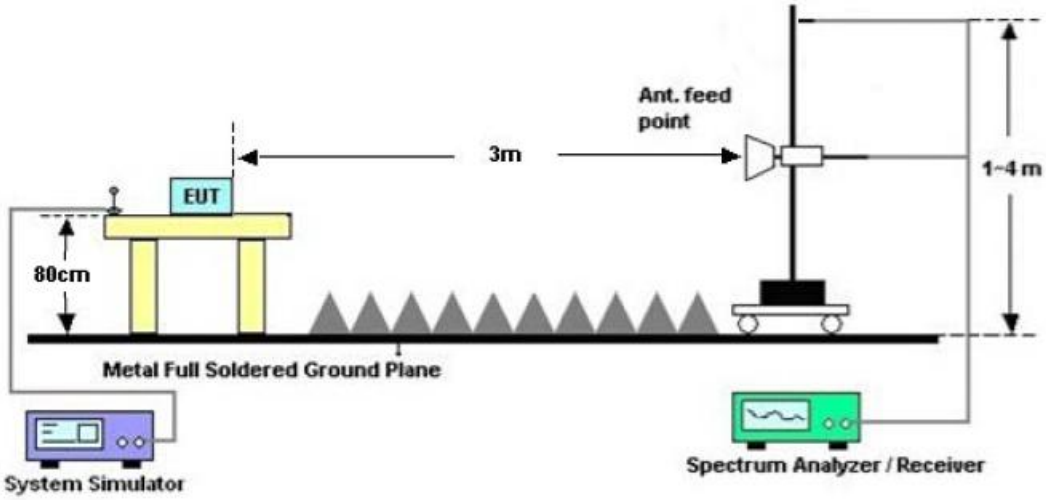
(b) AVERAGE: RBW=1MHz ; VBW=3MHz/ Sweep=AUTO

3. Other procedures refer to clause 11.2.

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain. Field Strength=Factor + Reading level
2. The factor had been edited in the “Input Correction” of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB(μV) to represent the Amplitude. Use the F dB(μV/m) to represent the Field Strength. So A=F.
3. Only the data of band edge emission at the restricted band 4.5GHz-5.15GHz record in the report. Other restricted band 5.35GHz-5.46GHz and 7.25GHz-7.77GHz were considered as ambient noise. No recording in the test report.

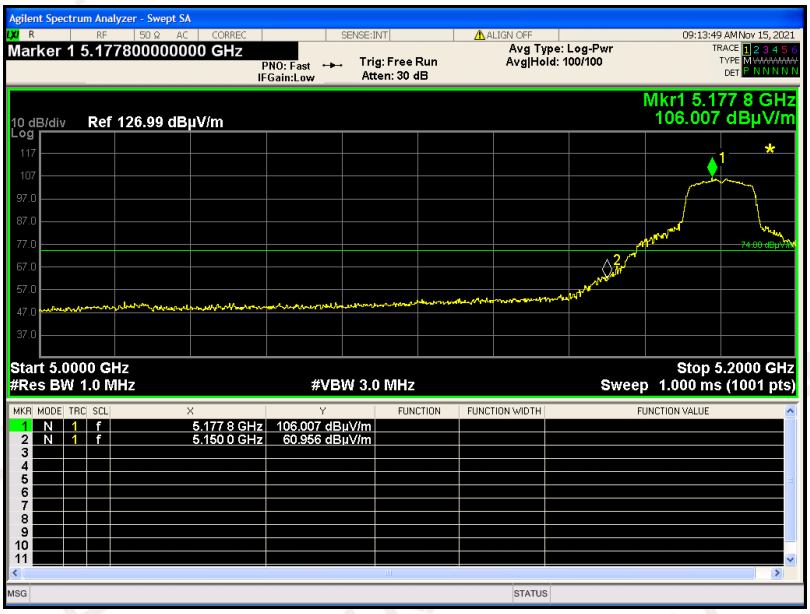
12.2. TEST SET-UP



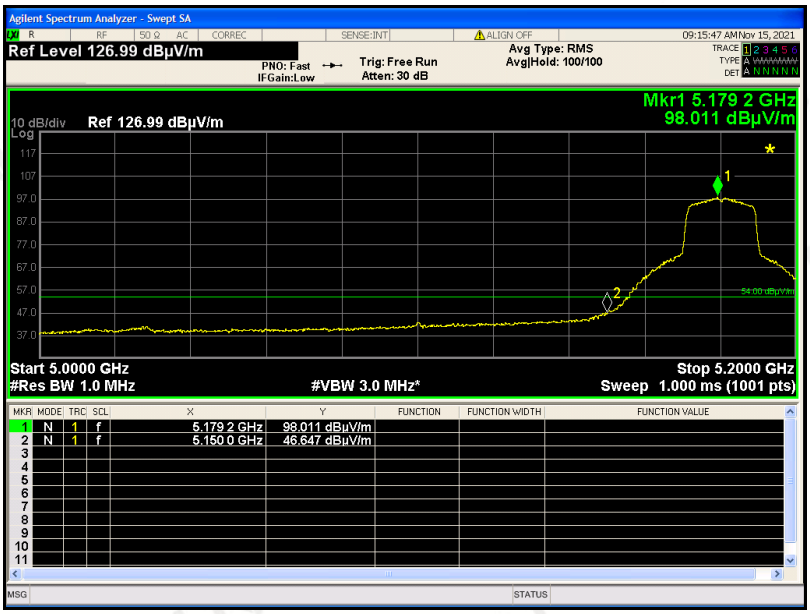
12.3. TEST RESULT

EUT	Media Player	Model Name	ZAP014
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5180MHz	Antenna	Horizontal

PK Value

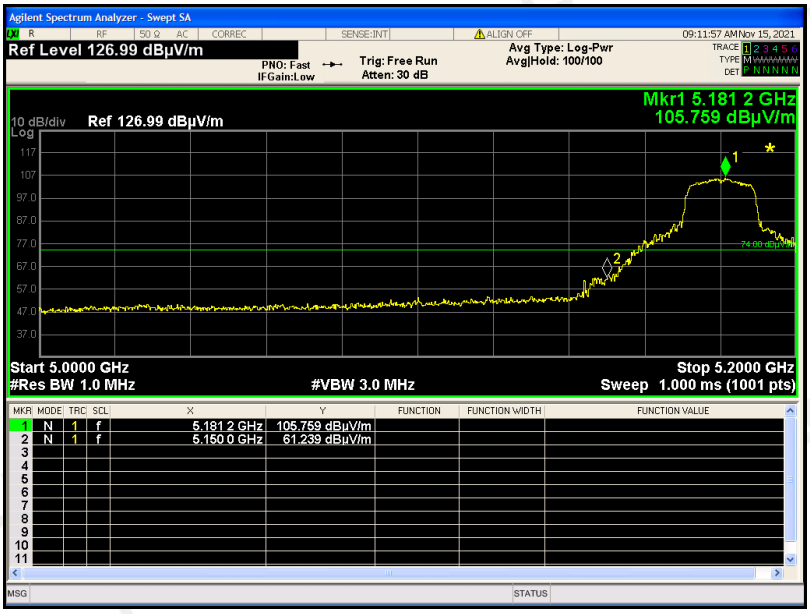


AV Value

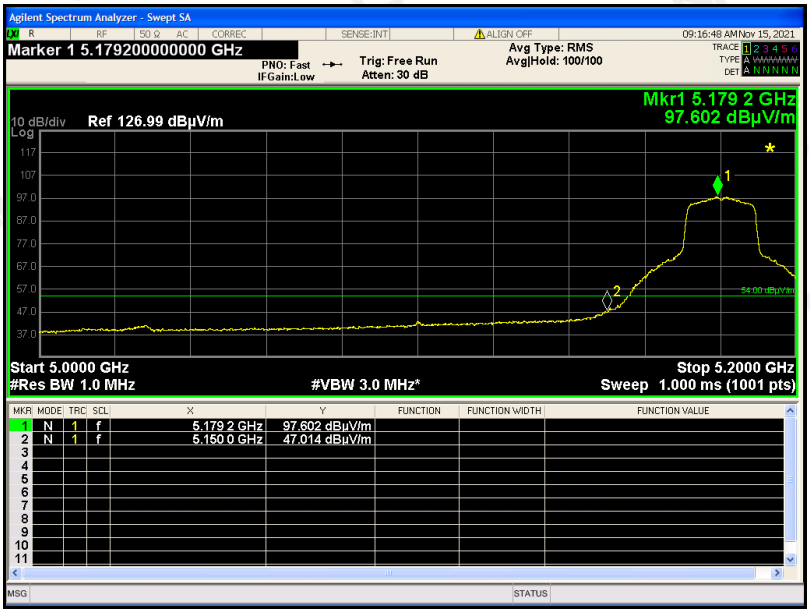


EUT	Media Player	Model Name	ZAP014
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5180MHz	Antenna	Vertical

PK Value



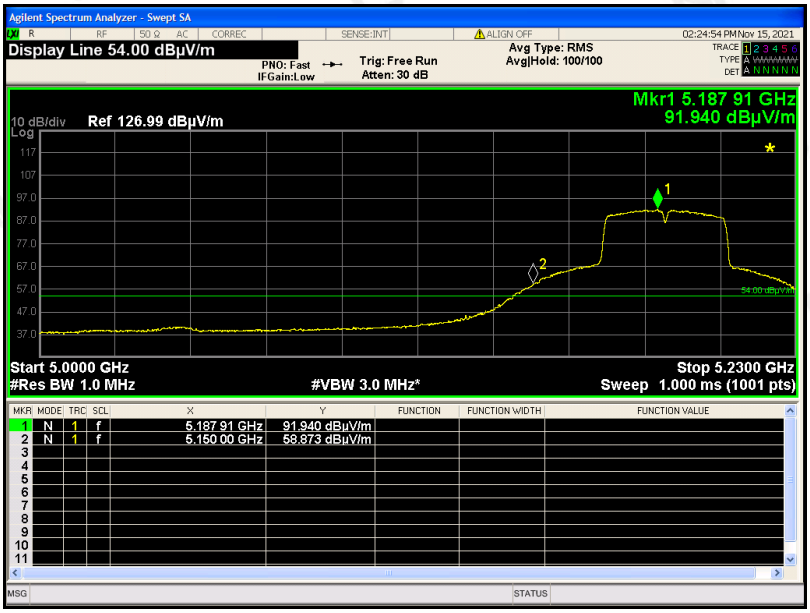
AV Value



EUT	Media Player	Model Name	ZAP014
Temperature	25℃	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n40 5190MHz	Antenna	Horizontal

PK Value

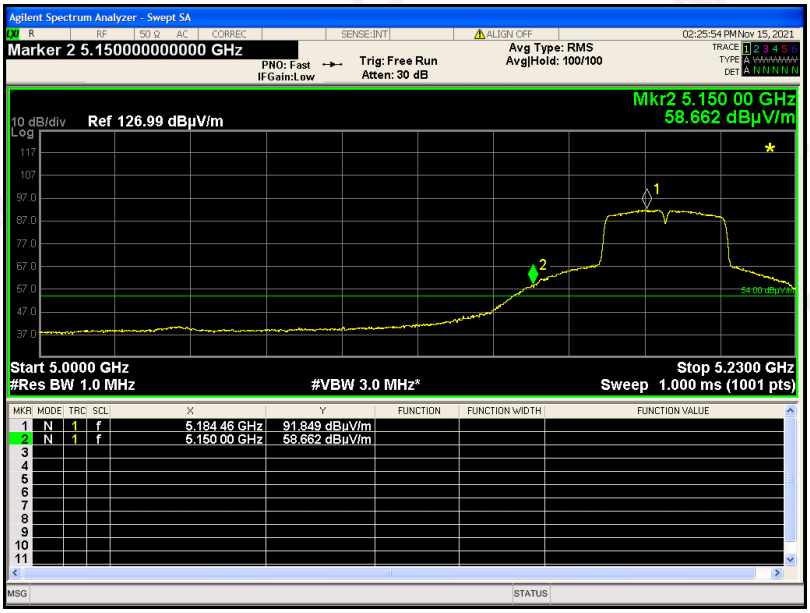
AV Value



EUT	Media Player	Model Name	ZAP014
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n40 5190MHz	Antenna	Vertical

PK Value

AV Value



RESULT: PASS

Note: All the 20MHz bandwidth modulation had been tested, the 802.11a20 at 5180MHz was the worst case and record in his test report. All the 40MHz bandwidth modulation had been tested, the 802.11N40 at 5190MHz was the worst case and record in his test report.

13. FCC LINE CONDUCTED EMISSION TEST

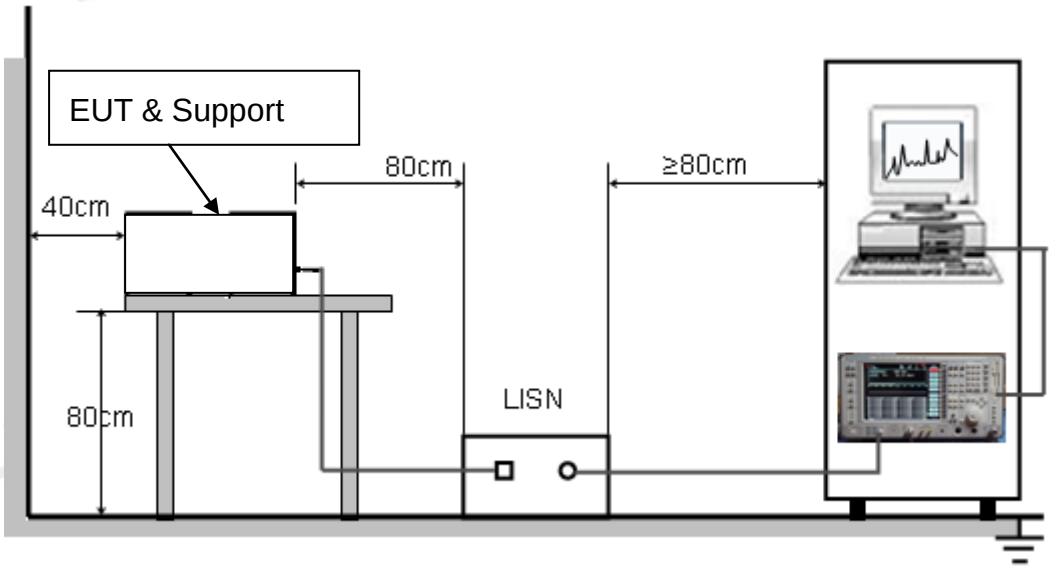
13.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

13.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



13.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received charging voltage by adapter which received 120V/60Hzpower by a LISN.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

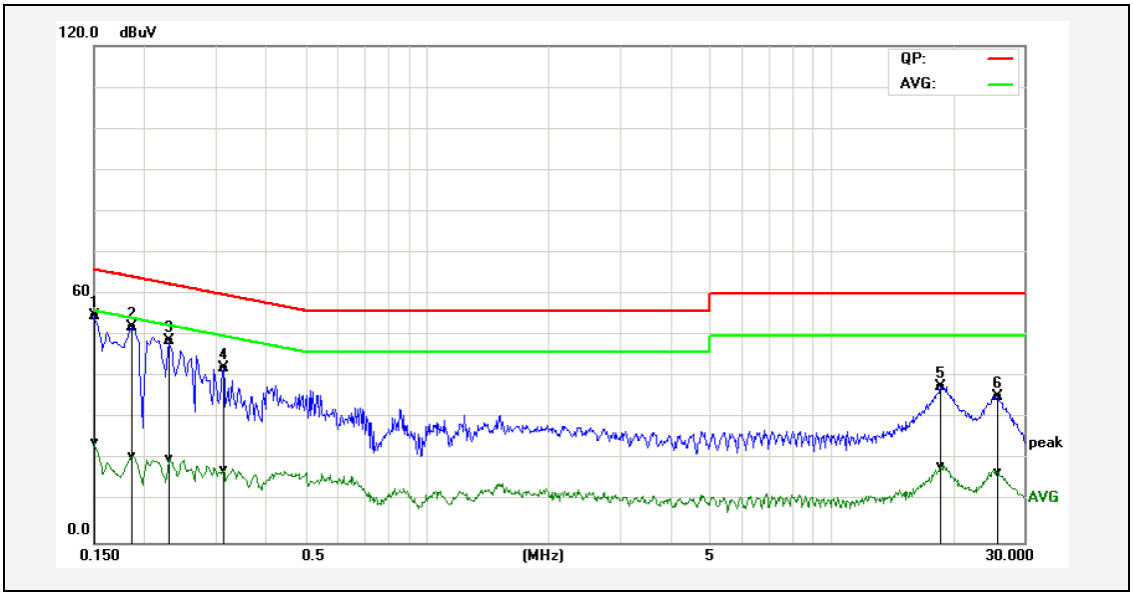
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

13.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

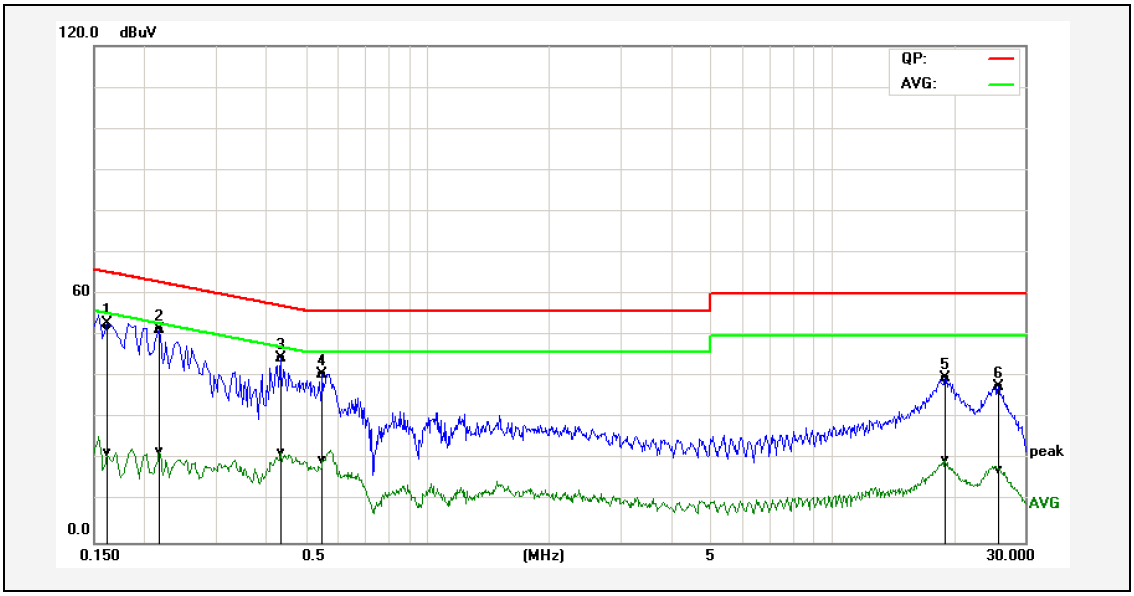
13.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

Temperature:	24℃	Relative Humidity:	48%
Test Date:	Nov. 18, 2021	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Line
Test Mode:	Transmitting mode of 802.11a20 5180MHz		



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1*	0.1500	44.70	14.15	10.12	54.82	24.27	66.00	56.00	-11.18	-31.73	Pass
2P	0.1860	41.89	10.85	10.13	52.02	20.98	64.21	54.21	-12.19	-33.23	Pass
3P	0.2300	38.70	10.06	10.13	48.83	20.19	62.45	52.45	-13.62	-32.26	Pass
4P	0.3140	32.11	7.39	10.09	42.20	17.48	59.86	49.86	-17.66	-32.38	Pass
5P	18.7020	27.07	7.84	10.51	37.58	18.35	60.00	50.00	-22.42	-31.65	Pass
6P	25.7620	24.41	6.05	10.84	35.25	16.89	60.00	50.00	-24.75	-33.11	Pass

Temperature:	24℃	Relative Humidity:	48%
Test Date:	Nov. 18, 2021	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Neutral
Test Mode:	Transmitting mode of 802.11a20 5180MHz		

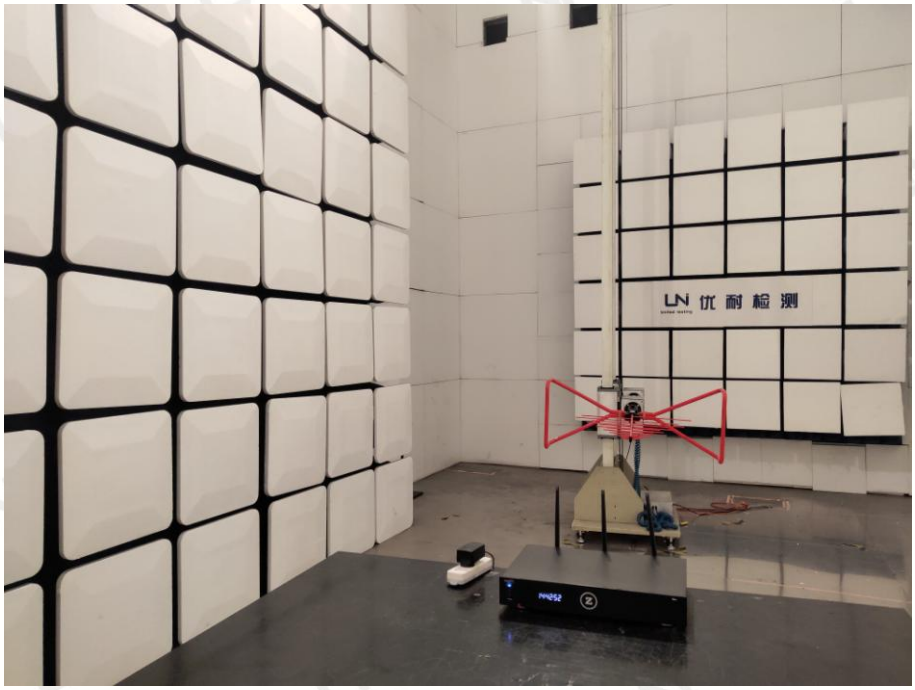


No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1P	0.1620	42.08	11.76	10.13	52.21	21.89	65.36	55.36	-13.15	-33.47	Pass
2*	0.2180	41.17	11.95	10.14	51.31	22.09	62.89	52.89	-11.58	-30.80	Pass
3P	0.4340	34.39	11.61	10.11	44.50	21.72	57.18	47.18	-12.68	-25.46	Pass
4P	0.5500	30.66	9.85	10.11	40.77	19.96	56.00	46.00	-15.23	-26.04	Pass
5P	19.0980	29.15	9.53	10.48	39.63	20.01	60.00	50.00	-20.37	-29.99	Pass
6P	25.7540	26.70	6.86	10.84	37.54	17.70	60.00	50.00	-22.46	-32.30	Pass

RESULT: PASS

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC RADIATED EMISSION TEST SETUP BELOW 1GHZ



FCC RADIATED EMISSION TEST SETUP ABOVE 1GHZ

FCC LINE CONDUCTED EMISSION TEST SETUP

----END OF REPORT----