RF TEST REPORT

Report No.: RF_FCC_SL18010801-PHA-001_W5258
Supersede Report No.:

Applicant	:	Phazr, Inc
Product Name	:	Fixed Wireless Access Customer Premises Equipment (CPE)
Model No.	:	GZR1028
Test Standard	:	47 CFR 15.407
Test Method	:	ANSI C63.4: 2014 789033 D02 General UNII Test Procedures New Rules v01r02
FCC ID	:	2AOHB-G00005A
IC ID	:	N/A
Dates of test	:	09/15/2018 to 09/30/2018
Issue Date	:	09/30/2018
Test Result	:	☒ Pass ☐ Fail
Equipment complied with the specification [X] Equipment did not comply with the specification [ ]		

This Test Report is Issued Under the Authority of:	
Gary Chou	
Gary Chou	Chen Ge
Test Engineer	Engineer Reviewer
This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only	

Issued By:
SIEMIC Laboratories
775 Montague Expressway, Milpitas, 95035 CA

Laboratory Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.

In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Accreditation Body	Scope
USA	FCC, A2LA	EMC, RF/Wireless, Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless, Telecom
Taiwan	BSMI, NCC, NIST	EMC, RF, Telecom, Safety
Hong Kong	OFTA, NIST	RF/Wireless, Telecom
Australia	NATA, NIST	EMC, RF, Telecom, Safety
Korea	KCC/RRA, NIST	EMI, EMS, RF, Telecom, Safety
Japan	VCCI, JATE, TELEC, RFT	EMI, RF/Wireless, Telecom
Mexico	NOM, COFETEL, Caniety	Safety, EMC, RF/Wireless, Telecom
Europe	A2LA, NIST	EMC, RF, Telecom, Safety
Israel	MOC, NIST	EMC, RF, Telecom, Safety

Accreditations for Product Certifications

Country	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC, RF, Telecom
Canada	IC FCB, NIST	EMC, RF, Telecom
Singapore	iDA, NIST	EMC, RF, Telecom
EU	NB	EMC & R&TTE Directive
Japan	MIC (RCB 208)	RF, Telecom
Hong Kong	OFTA (US002)	RF, Telecom

CONTENTS

1 Report Revision History

Report No.	Report Version	Description	Issue Date
RF_FCC_SL18010801-PHA-001_W5258	None	Original	09/30/2018

2 Executive Summary

The purpose of this test program was to demonstrate compliance of following product

Company: Phazr Inc.
Product: Fixed Wireless Access Customer Premises Equipment (CPE)
Model: GZR1028

against the current Stipulated Standards. The specified model product stated above has demonstrated compliance with the Stipulated Standard listed on 1st page.

3 Customer information

Applicant Name	:	Phazr Inc.
Applicant Address	:	8 Prestige Cir, STE 104, Allen, TX 75002
Manufacturer Name	:	Phazr Inc.
Manufacturer Address	:	8 Prestige Cir, STE 104, Allen, TX 75002

4 Test site information

Lab performing tests	SIEMIC Laboratories
Lab Address	775 Montague Expressway, Milpitas, CA 95035
FCC Test Site No.	881796
IC Test Site No.	4842D-2
VCCI Test Site No.	A0133

5 Modification

Index	Item	Description	Note
-	-	-	-

6 EUT Information

6.1 EUT Description

Product Name	Fixed Wireless Access Customer Premises Equipment (CPE)
Model No.	GZR1028
Trade Name	PHAZR
Serial No.	P31180041
Host Model No.	N/A
Input Power	56VDC (PoE)
Date of EUT received	06/14/2018
Equipment Class/ Category	Wideband transmission system
Port/Connectors	PoE, Ethernet

6.2 Radio Description

Radio Type	802.11ac20	802.11ac40	802.11ac80
Operating Frequency	5180-5240MHz 5745-5825MHz	5190-5230MHz 5755-5795MHz	5210MHz 5775MHz
Modulation	OFDM (64QAM, 256QAM)	OFDM (64QAM, 256QAM)	OFDM (64QAM, 256QAM)
Channel Spacing	20MHz	40MHz	80MHz
Number of Channels	9	4	2
Antenna Type	Circular Patch (5GHz Band) Fixed beam patch arrays (28GHz RX Antenna)		
Antenna Gain (Peak)	6 dBi(5GHz Band) 16 dBi (28GHz Band)		
Antenna Connector Type	N/A		
Note	N/A		

EUT Power level setting

Mode	Frequency	Power Setting
802.11-ac-20	5180	17
802.11-ac-20	5200	17
802.11-ac-20	5240	17
802.11-ac-40	5190	17
802.11-ac-40	5230	17
802.11-ac-80	5210	17
802.11-ac-20	5745	17
802.11-ac-20	5785	17
802.11-ac-20	5825	17
802.11-ac-40	5755	17
802.11-ac-40	5795	17
802.11-ac-80	5775	17

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Laptop	PP01L Latitude E5440	F1WPF12	Dell	-
2	P.O.E	POE36U-1AT-R	N/A	PHIHONG	-

7.2 Cabling Description

Name	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
Ethernet cable	PC	Ethernet (RJ-45)	PoE unit	Ethernet (RJ-45)	3m	Unshielded	-
Ethernet cable	PoE unit	Ethernet (RJ-45)	Gazer	Data/Power RJ-45 port	3m	Unshielded	-

7.3 Test Software Description

Test Item	Software	Description
RF Testing	Putty	Set the EUT connect to Laptop
RF Testing	Labtool	Set the EUT to transmit continuously in different test modes and channels

8 Test Summary

Test Item	Test standard		Test Method/Procedure	Pass / Fail
Restricted Band of Operation	FCC	15.205	ANSI C63.4 – 2014 789033 D02 General UNII Test Procedures New Rules v01r02	☒ Pass ☐ N/A
AC Conducted Emissions Voltage	FCC	15.207(a)	ANSI C63.4 – 2014	☒ Pass ☐ N/A

Test Item	Test standard		Test Method/Procedure	Pass / Fail
26 & 6 dB Emission Bandwidth	FCC	15.407 (a) (2)	789033 D02 General UNII Test Procedures New Rules v01r02	☒ Pass ☐ N/A
Maximum conducted Output Power	FCC	15.407 (a) (2)	789033 D02 General UNII Test Procedures New Rules v01r02	☒ Pass ☐ N/A
Power reduction (Antenna Gain > 6 dBi)	FCC	15.407 (a) (2)	-	☐ Pass ☒ N/A
Band Edge and Radiated Spurious Emissions	FCC	15.407(b)(2), 15.407(b)(6)	ANSI C63.4 – 2014 789033 D02 General UNII Test Procedures New Rules v01r02	☒ Pass ☐ N/A
Power Spectral Density	FCC	15.407 (a) (2)	789033 D02 General UNII Test Procedures New Rules v01r02	☒ Pass ☐ N/A
Frequency Stability	FCC	15.407 (g)	-	☐ Pass ☒ N/A
Transmit Power Control (TPC)	FCC	15.407 (h)(1)	-	☐ Pass ☒ N/A
User Manual	FCC	-	-	☒ Pass ☐ N/A
Remark	1. All measurement uncertainties are not taken into consideration for all presented test result. 2. The applicant shall ensure frequency stability by showing that an emission is maintained within the band of operation under all normal operating conditions as specified in the user's manual.			

9 Measurement Uncertainty

9.1 Radiated Emissions (30MHz to 1GHz)

The test is to measure the radiated emissions of the EUT.
Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- NSA Calibration
- Etc., details see the below table

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Filter Insertion Loss	0.25	Normal	2	1	0.125
Antenna Factor	0.65	Normal	2	1	0.325
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.86605081
PRF Response	1.5	Rectangular	1.732	1	0.86605081
Mismatch Filter - Receiver	0.25	U-Shape	1.414	1	0.1768033
NSA Calibration	4.0	U-Shape	1.414	1	2.8288543
Combined Standard Uncertainty					3.0059131
Expanded Uncertainty (K=2)					6.0118262

The total derived measurement uncertainty is +/- 6.00 dB.

9.2 Radiated Emissions (1GHz to 40GHz)

The test is to measure the radiated emissions of the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- VSWR Calibration
- Etc., details see the below table

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.0692840
Cable Insertion Loss	0.21	Normal	2	1	0.1050000
Filter Insertion Loss	0.25	Normal	2	1	0.1250000
Antenna Factor	0.65	Normal	2	1	0.3250000
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.8660508
PRF Response	1.5	Rectangular	1.732	1	0.8660508
Mismatch Filter - Receiver	0.25	U-Shape	1.414	1	0.1768033
VSWR Calibration	2.0	U-Shape	1.414	1	1.4144272
Combined Standard Uncertainty					4.2363
Expanded Uncertainty (K=2)					8.4726

The total derived measurement uncertainty is +/- 8.47 dB.

9.3 RF conducted measurement

The test is to measure the RF output power from the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the Reference Level Uncertainty
- Uncertainty of variable attenuators
- Uncertainty of cables
- Uncertainty due to the mismatches

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Reference Level	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Attenuator	0.25	Normal	2	1	0.125
Mismatch	0.25	U-Shape	1.414	1	0.1768033
Combined Standard Uncertainty					0.476087
Expanded Uncertainty (K=2)					0.952174

The total derived measurement uncertainty is +/- 0.95 dB.

10 Measurements, Examination and Derived Results

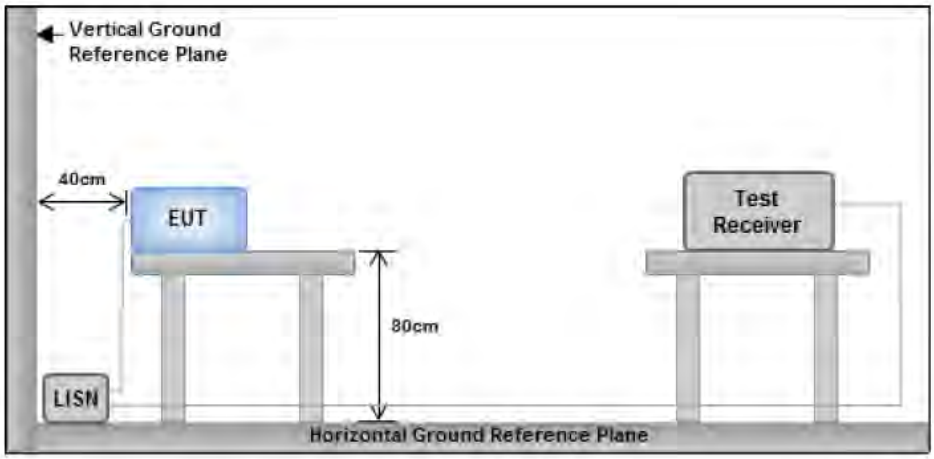
10.1 Conducted Emissions

Conducted Emission Limit

Frequency ranges (MHz)	Limit (dBuV)	
	QP	Average
0.15 ~ 0.5	66 – 56	56 – 46
0.5 ~ 5	56	46
5 ~ 30	60	50

Spec	Item	Requirement	Applicable
FCC 15.207	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequency ranges.	☒

Test Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

Procedure

- The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table, as shown in Annex B.
- The power supply for the EUT was fed through a 50Ω/50µH EUT LISN, connected to filtered mains.
- The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.
- All other supporting equipment was powered separately from another main supply.

Remark: EUT was tested at 56Vdc

Result: ☒ Pass ☐ Fail

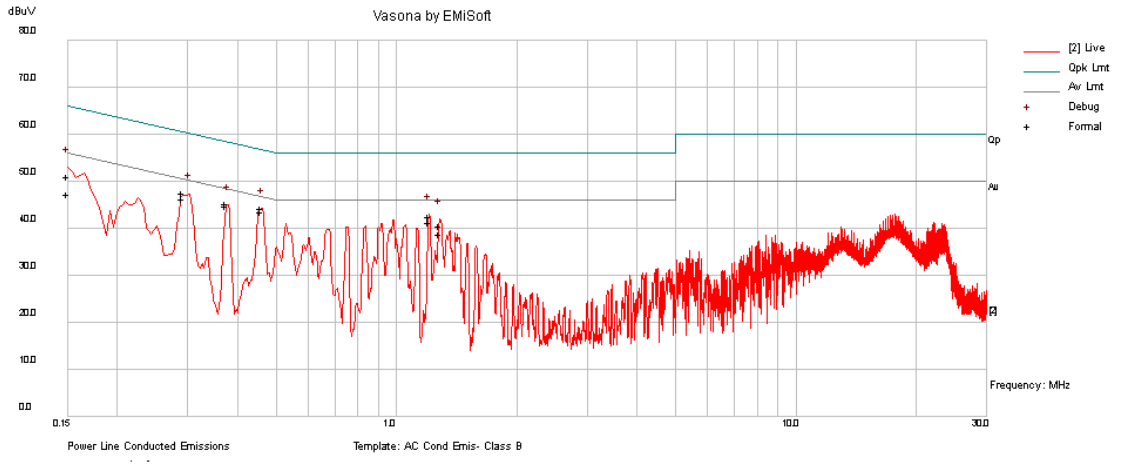
Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Gary Chou at Conducted Emission test site.

Conducted Emission Test Results

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	21	Result:	☒ Pass ☐ Fail
	Humidity (%):	42		
	Atmospheric(mbar):	1021		
Mains Power:	56 Vac			
Tested by:	Gary Chou			
Test Date:	09/25/2018			
Remarks	Line			

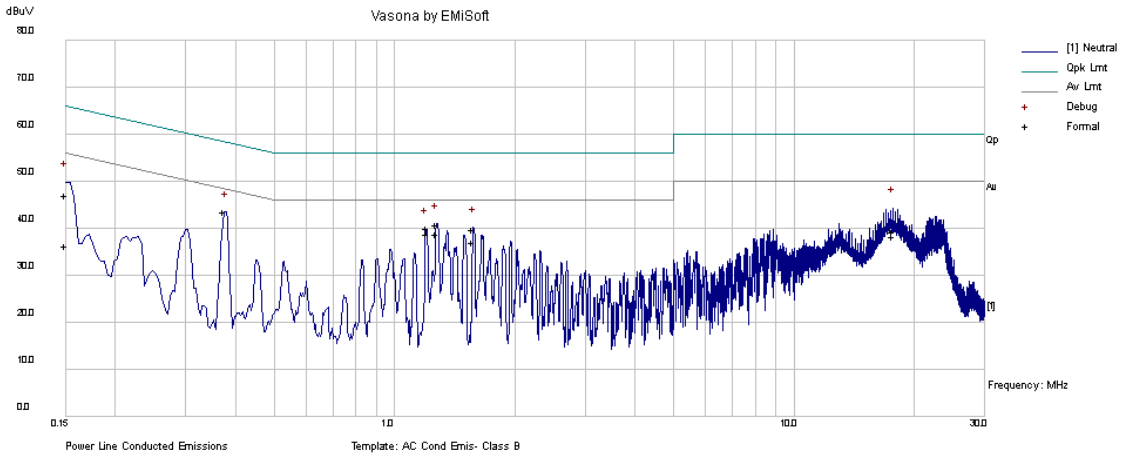


Live Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
0.46	34.99	9.33	0.04	44.36	Quasi Peak	Live	56.75	-12.39	Pass
0.29	38.19	9.32	0.04	47.56	Quasi Peak	Live	60.49	-12.93	Pass
0.15	41.7	9.33	0.05	51.08	Quasi Peak	Live	65.98	-14.9	Pass
1.20	33.32	9.33	0.05	42.7	Quasi Peak	Live	56	-13.3	Pass
0.37	35.91	9.33	0.04	45.28	Quasi Peak	Live	58.4	-13.12	Pass
1.28	31.09	9.34	0.05	40.47	Quasi Peak	Live	56	-15.53	Pass
0.46	34.29	9.33	0.04	43.66	Average	Live	46.75	-3.09	Pass
0.29	36.88	9.32	0.04	46.24	Average	Live	50.49	-4.25	Pass
0.15	38.03	9.33	0.05	47.41	Average	Live	55.98	-8.57	Pass
1.20	31.87	9.33	0.05	41.25	Average	Live	46	-4.75	Pass
0.37	35.57	9.33	0.04	44.93	Average	Live	48.4	-3.47	Pass
1.28	29.57	9.34	0.05	38.95	Average	Live	46	-7.05	Pass

Conducted Emission Test Results

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	21	Result:	☒ Pass ☐ Fail
	Humidity (%):	42		
	Atmospheric(mbar):	1021		
Mains Power:	56 Vac			
Tested by:	Gary Chou			
Test Date:	09/25/2018			
Remarks	Neutral			

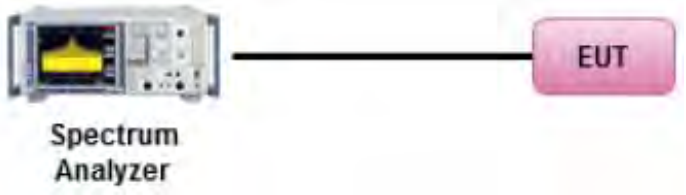


Neutral Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
0.37	34.17	9.33	0.04	43.53	Quasi Peak	Neutral	58.41	-14.88	Pass
1.28	31.46	9.33	0.05	40.85	Quasi Peak	Neutral	56	-15.15	Pass
17.72	29.4	9.43	0.42	39.25	Quasi Peak	Neutral	60	-20.75	Pass
1.57	30.39	9.34	0.06	39.79	Quasi Peak	Neutral	56	-16.21	Pass
1.20	30.6	9.33	0.05	39.99	Quasi Peak	Neutral	56	-16.01	Pass
0.15	37.7	9.33	0.05	47.08	Quasi Peak	Neutral	66	-18.92	Pass
0.37	34.13	9.33	0.04	43.5	Average	Neutral	48.41	-4.91	Pass
1.28	29.46	9.33	0.05	38.84	Average	Neutral	46	-7.16	Pass
17.72	28.45	9.43	0.42	38.3	Average	Neutral	50	-11.7	Pass
1.57	27.65	9.34	0.06	37.05	Average	Neutral	46	-8.95	Pass
1.20	29.54	9.33	0.05	38.92	Average	Neutral	46	-7.08	Pass
0.15	26.86	9.33	0.05	36.24	Average	Neutral	56	-19.76	Pass

10.2 26 dB Bandwidth & 6 dB Bandwidth

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.407	-	26 dB Emission BW: Report only for reference.	☒
	a) (2)	26 dB Emission BW: Report only for power limit calculation.	☐
	e)	Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.	☒
Test Setup			
Test Procedure	789033 D02 General UNII Test Procedures New Rules v01r02 26dB Emission bandwidth measurement procedure (Other than 5.725-5.85 GHz) - Allow the trace to stabilize. - Use the spectrum analyzer built-in measurement function to determine the 26dB BW. o Set RBW = around 1% of emission bandwidth o Set VBW > RBW o Detector = Peak o Trace mode = max hold - Capture the plot. - Repeat above steps for different test channel and other modulation type. 6 dB Minimum emission bandwidth measurement procedure (for 5.725-5.85 GHz) - Allow the trace to stabilize. - Use the spectrum analyzer built-in measurement function to determine the 6dB BW. o Set RBW = 100 KHz o Set VBW ≥ 3 x RBW o Detector = Peak o Trace mode = max hold o Sweep = auto couple - Capture the plot. - Repeat above steps for different test channel and other modulation type.		
Test Date	09/26/2018 – 09/27/2018	Environmental condition	Temperature 22ºC Relative Humidity 38% Atmospheric Pressure 1020mbar
Remark	99% BW result is presented here to show the channels in 5.1GHz is not crossing to DFS channel since the 26 dB BW is too wide.		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A
Test Plot ☒ Yes ☐ N/A

Test was done by Gary Chou at RF test site.

26dB Bandwidth measurement result for 5.2GHz

Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit (MHz)
26dB BW	802.11ac-20	5180	Low	19.945	-
		5200	Mid	19.879	-
		5240	High	19.908	-
	802.11ac-40	5190	Low	39.816	-
		5230	High	38.821	-
	802.11ac-80	5210	Mid	80.616	-

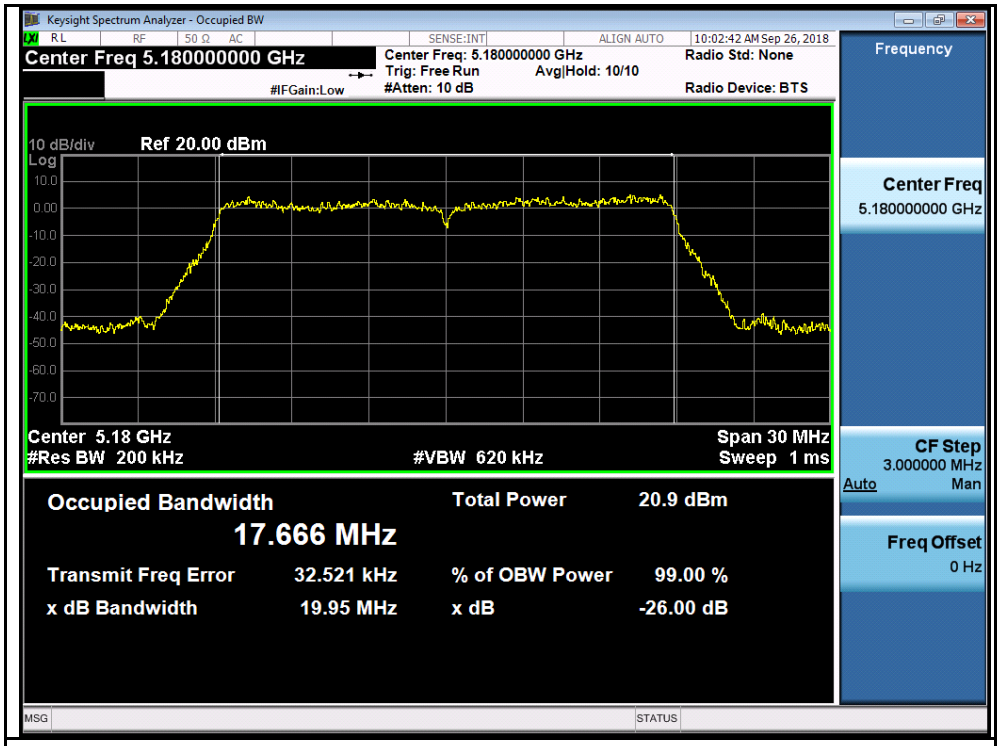
6dB Bandwidth measurement result for 5.8GHz

Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit (MHz)	Result
6dB BW	802.11ac-20	5745	Low	17.627	≥0.5	Pass
		5785	Mid	17.717	≥0.5	Pass
		5825	High	17.675	≥0.5	Pass
	802.11ac-40	5755	Low	36.421	≥0.5	Pass
		5795	High	36.424	≥0.5	Pass
	802.11ac-80	5775	Mid	76.413	≥0.5	Pass

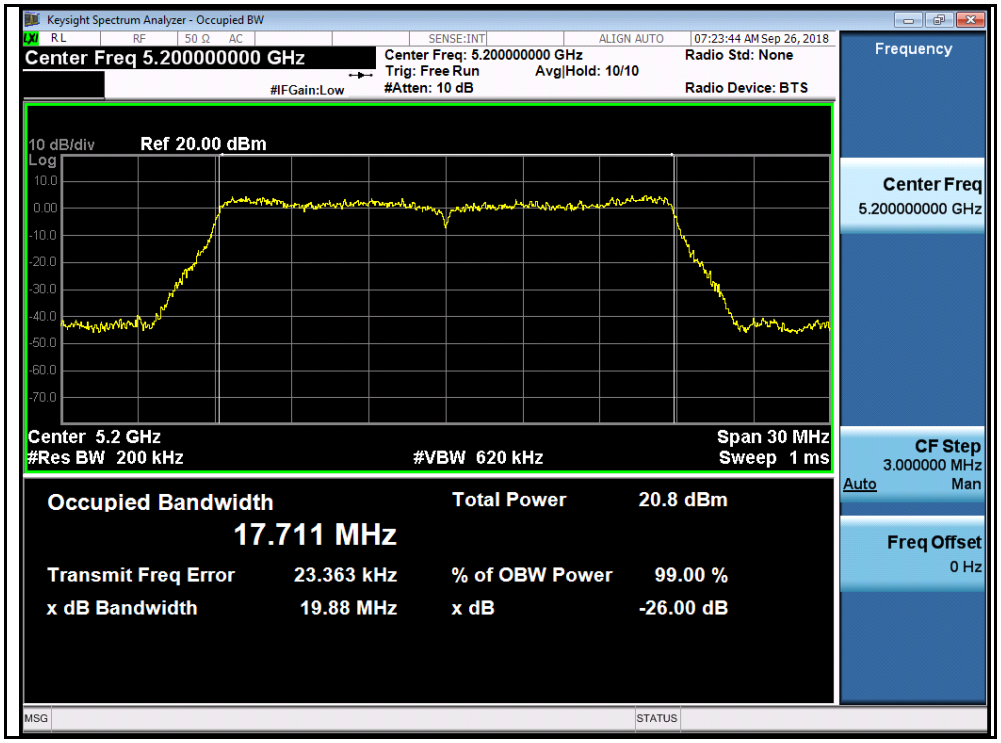
99% Bandwidth Measurement Result for 5.2GHz

Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit (MHz)
26dB BW	802.11ac-20	5180	Low	17.666	-
		5200	Mid	17.711	-
		5240	High	17.694	-
	802.11ac-40	5190	Low	36.005	-
		5230	High	36.035	-
	802.11ac-80	5210	Mid	75.734	-

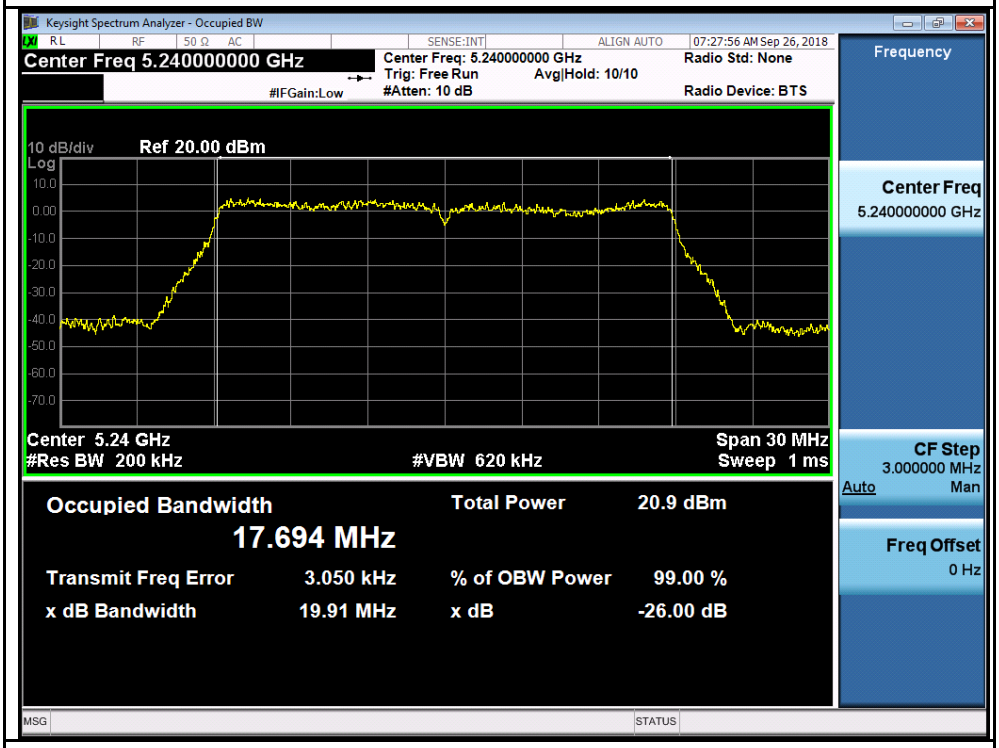
26dB & 99% Bandwidth Test Plots
W52:



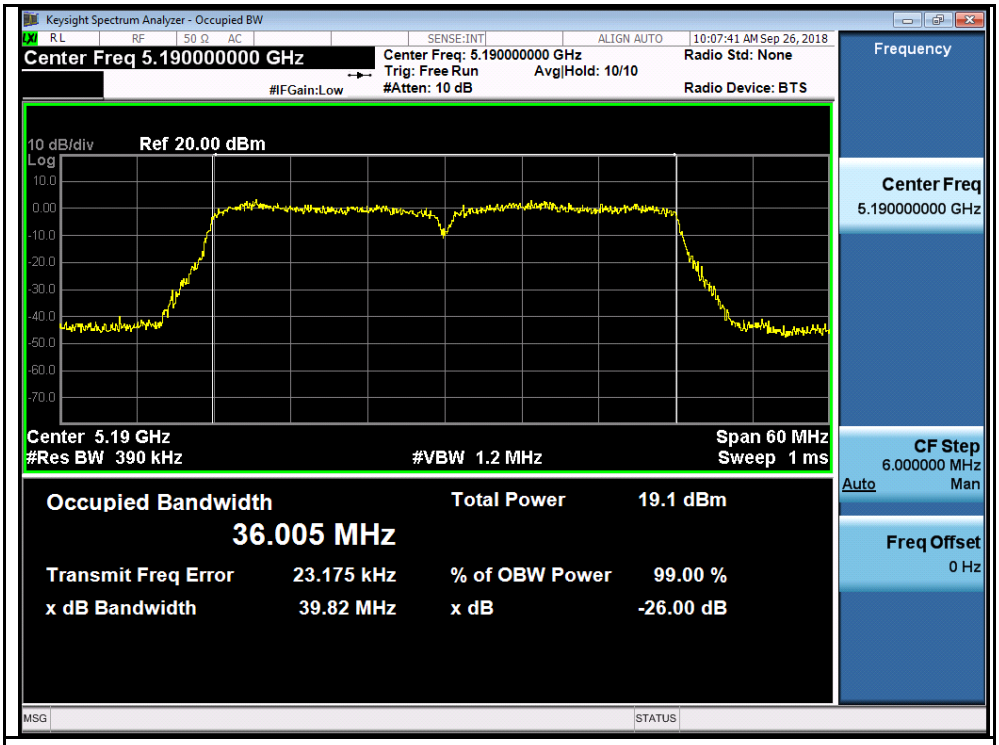
802.11ac20-5180MHz



802.11ac20-5200MHz



802.11ac20-5240MHz



802.11ac40-5190MHz

802.11ac40-5230MHz

802.11ac80-5210MHz

6dB Bandwidth Test Plots
W58:

802.11ac20-5745MHz

802.11ac20-5785MHz

802.11ac20-5825MHz

802.11ac40-5755MHz

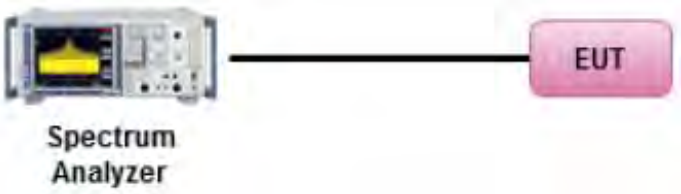
802.11ac40-5795MHz

802.11ac80-5775MHz

10.3 Output Power

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.407	a)(1)(ii)	For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.	☒
	a)(3)	For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.	☒

Test Setup	
Test Procedure	789033 D02 General UNII Test Procedures New Rules v01r02 Measurement using a Spectrum Analyzer or EMI Receiver (SA) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep): (i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal. (ii) Set RBW = 1 MHz (iii) Set VBW = 3 MHz (iv) Number of points in sweep ≥ 2 × span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.) (v) Sweep time = auto. (vi) Detector = power averaging (rms), if available. Otherwise, use sample detector mode. (vii) If transmit duty cycle < 98%, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98%, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run." (viii) Trace average at least 100 traces in power averaging (rms) mode. (ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

Test Date	05/17/2018 – 07/11/2018	Environmental condition	Temperature Relative Humidity Atmospheric Pressure	21ºC 40% 1019mbar
Remark	The EUT has 2 antennas with 1 vertical and 1 horizontal, individual gain = 6dBi, the directional gain = 6 + 10 *log(2) = 9.01, therefore, the power and psd limit should decrease by 9.01 - 6 = 3.01dB.			
Result	☒ Pass ☐ Fail			

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Gary Chou at RF test site.

Output Power measurement result 5.2GHz

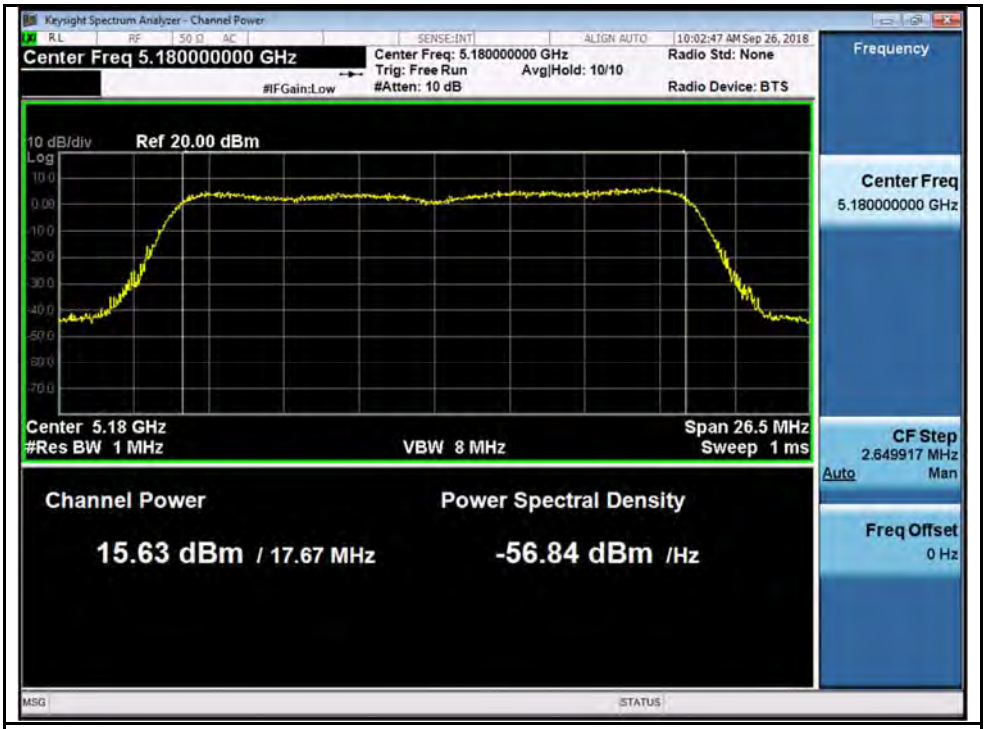
Test mode Freq (MHz) CH			Conducted Power (dBm) Chain No.					Limit (dBm)	Result
			0	1	2	4	Total		
802.11ac-20	5180	Low	15.632	15.823	15.776	15.578	21.72	26.99	Pass
	5200	Mid	15.613	15.822	15.812	15.639	21.74	26.99	Pass
	5240	High	15.780	15.843	15.964	15.690	21.84	26.99	Pass
802.11ac-40	5190	Low	13.981	13.719	13.737	13.426	19.74	26.99	Pass
	5230	Mid	14.541	14.164	14.223	14.947	20.50	26.99	Pass
802.11ac-80	5210	Low	13.862	13.809	13.825	13.625	19.80	26.99	Pass

Output Power measurement result mode 5.8GHz

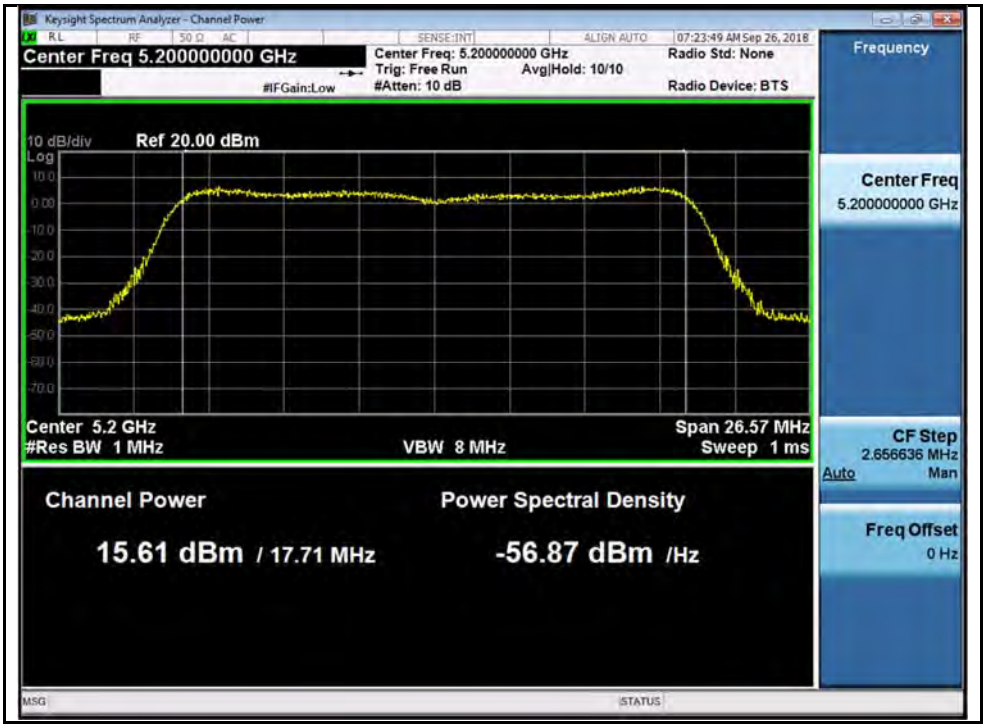
Test mode Freq (MHz) CH			Conducted Power (dBm) Chain No.					Limit (dBm)	Result
			0	1	2	4	Total		
802.11ac-20	5745	Low	15.543	14.795	15.939	16.091	21.64	26.99	Pass
	5785	Mid	17.005	16.241	16.342	15.781	22.38	26.99	Pass
	5825	High	16.859	16.442	16.305	15.973	22.14	26.99	Pass
802.11ac-40	5755	Low	17.032	15.704	15.799	15.782	22.79	26.99	Pass
	5795	Mid	17.596	16.763	16.365	16.211	20.50	26.99	Pass
802.11ac-80	5775	Low	17.113	16.869	16.381	16.488	22.74	26.99	Pass

Test Plot for W52:

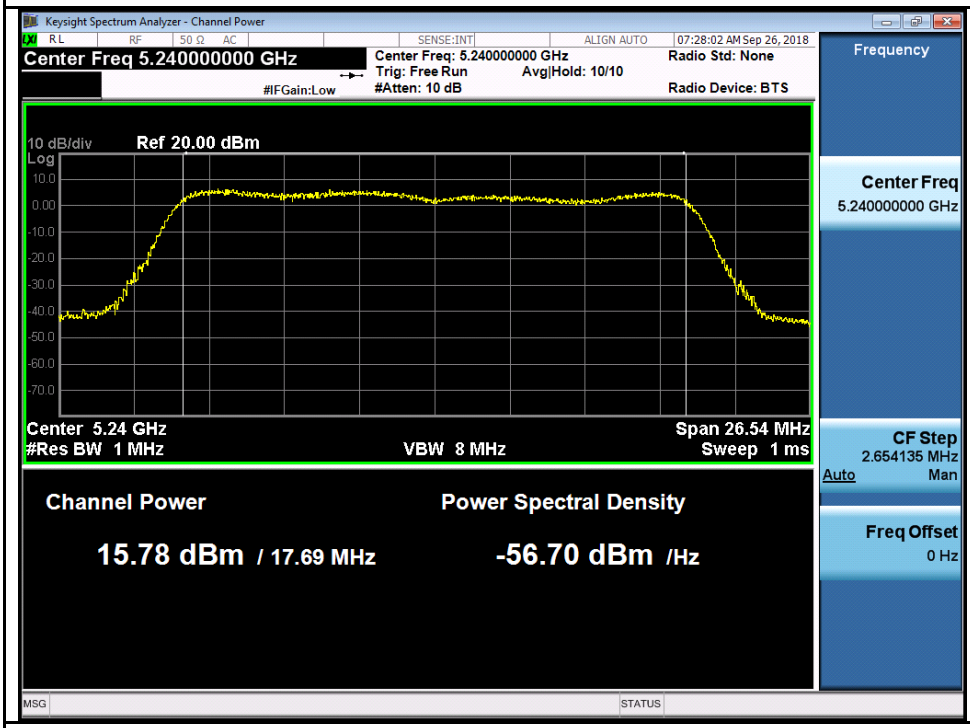
Chain 0:



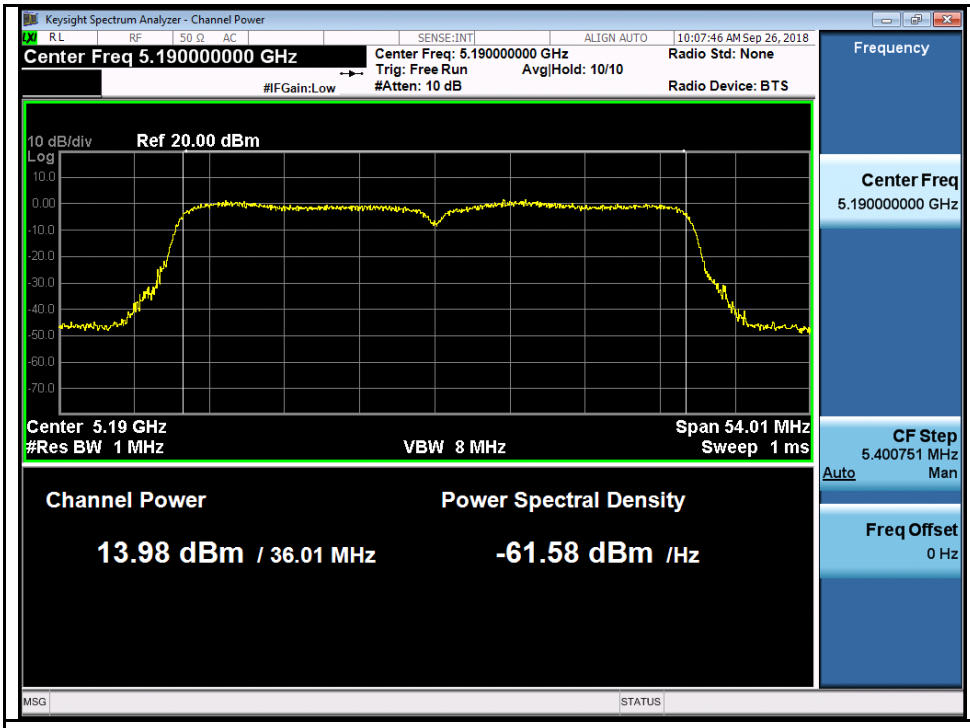
802.11ac20 5180M



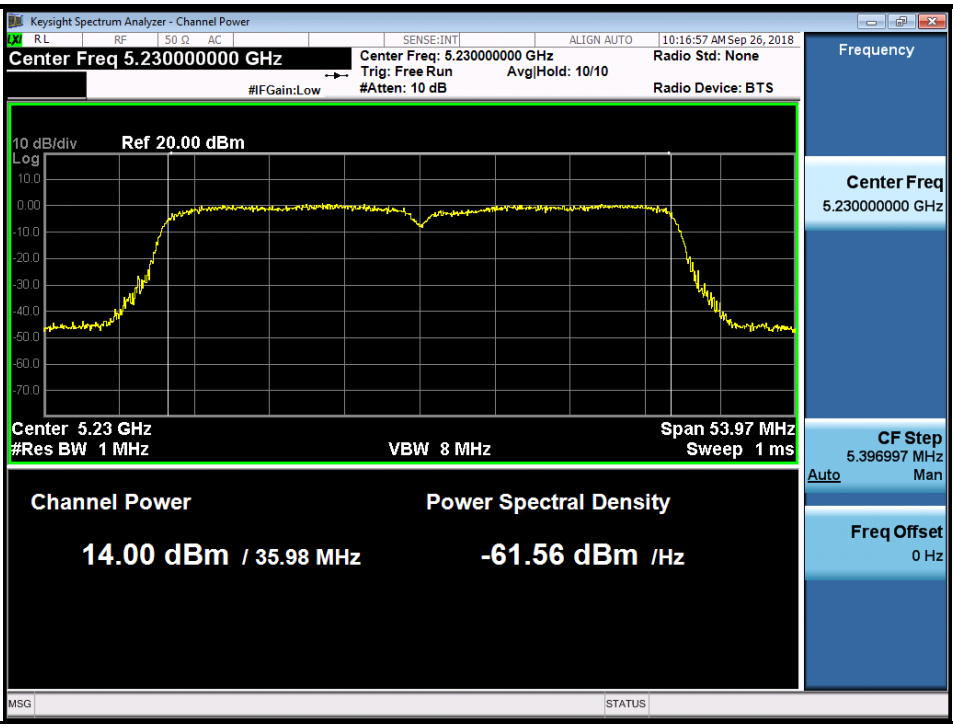
802.11ac20 5200M



802.11ac20 5240M



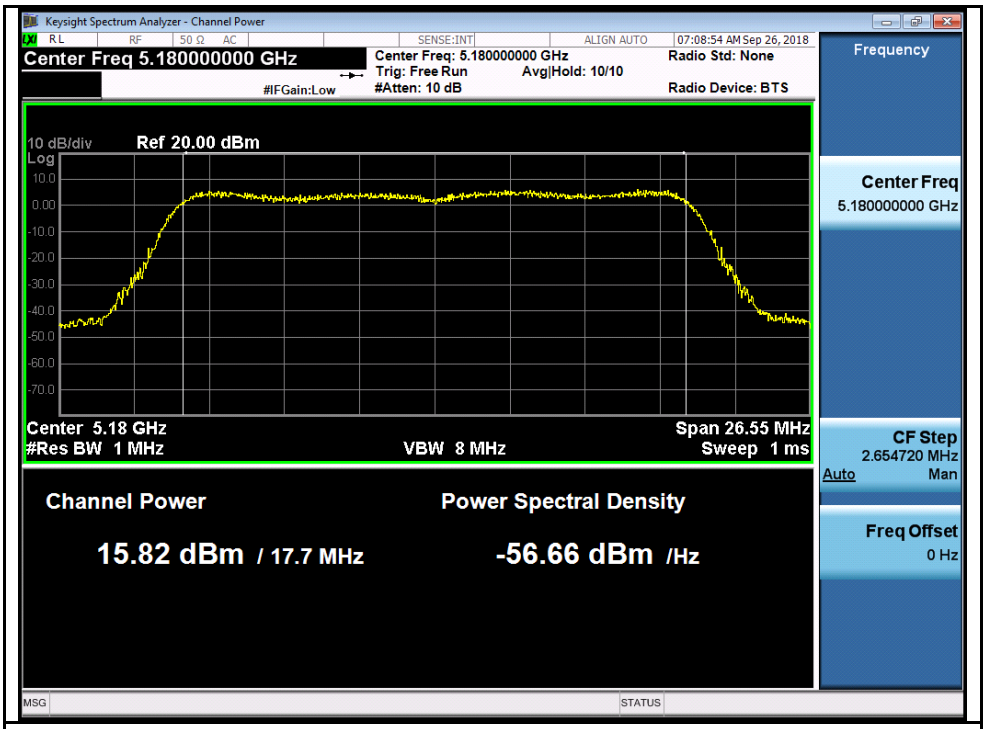
802.11ac40 5190M



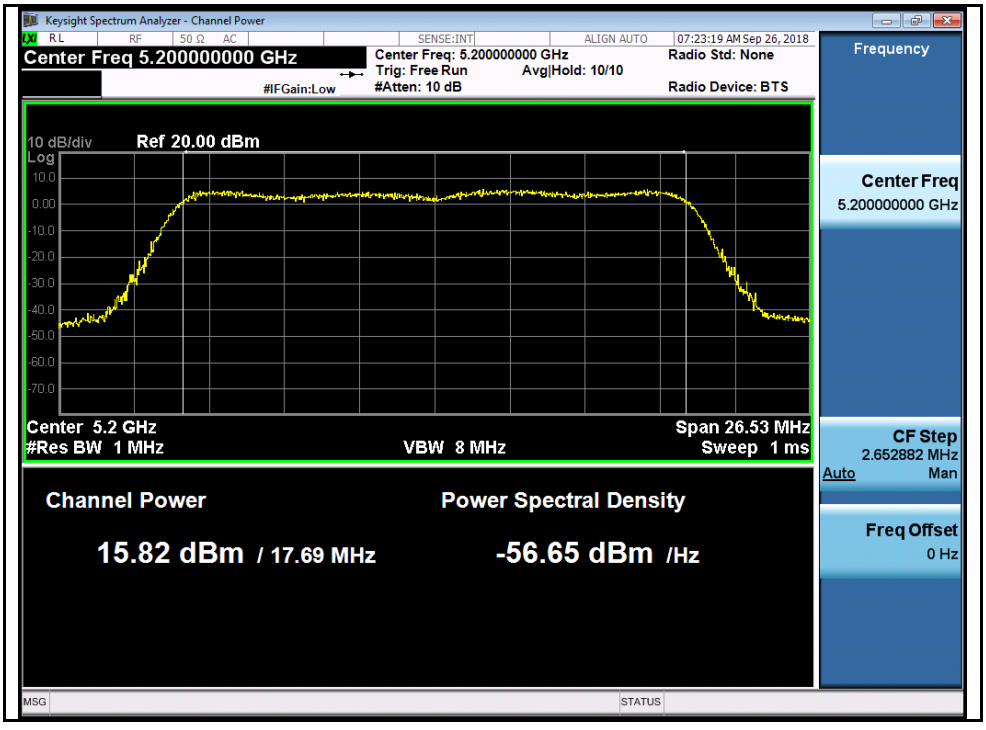
802.11ac40 5230M

802.11ac80 5210M

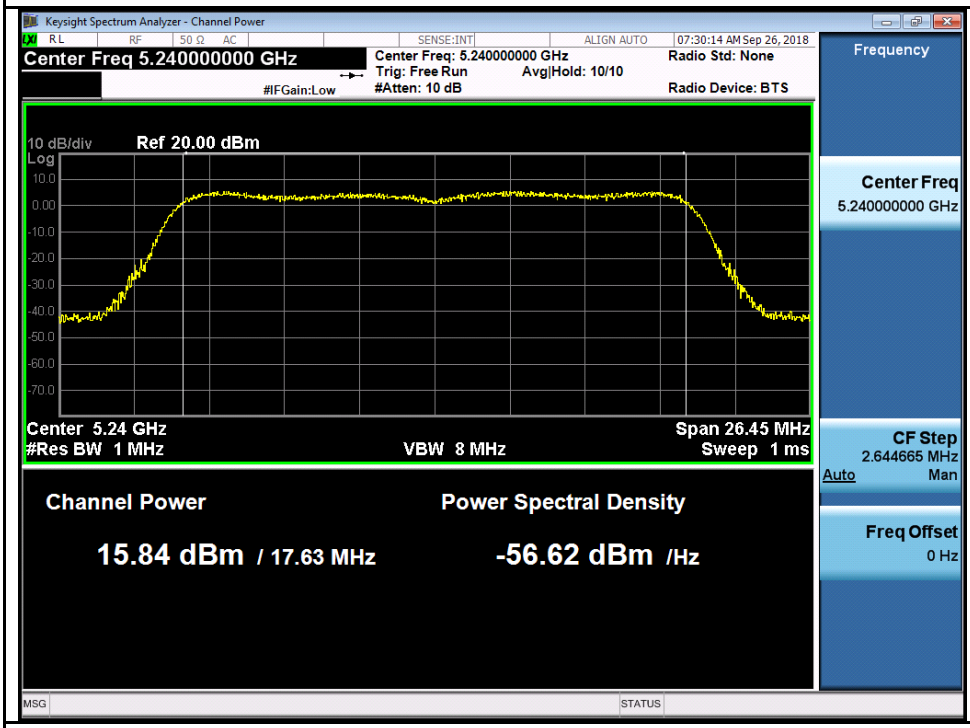
Chain 1:



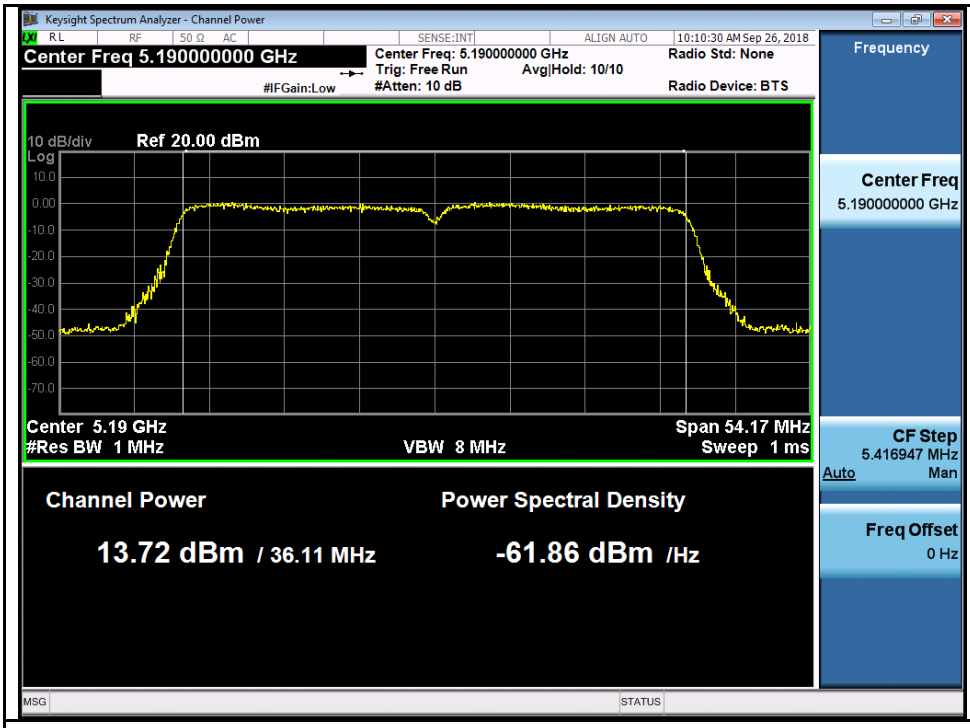
802.11ac20 5180M



802.11ac20 5200M



802.11ac20 5240M

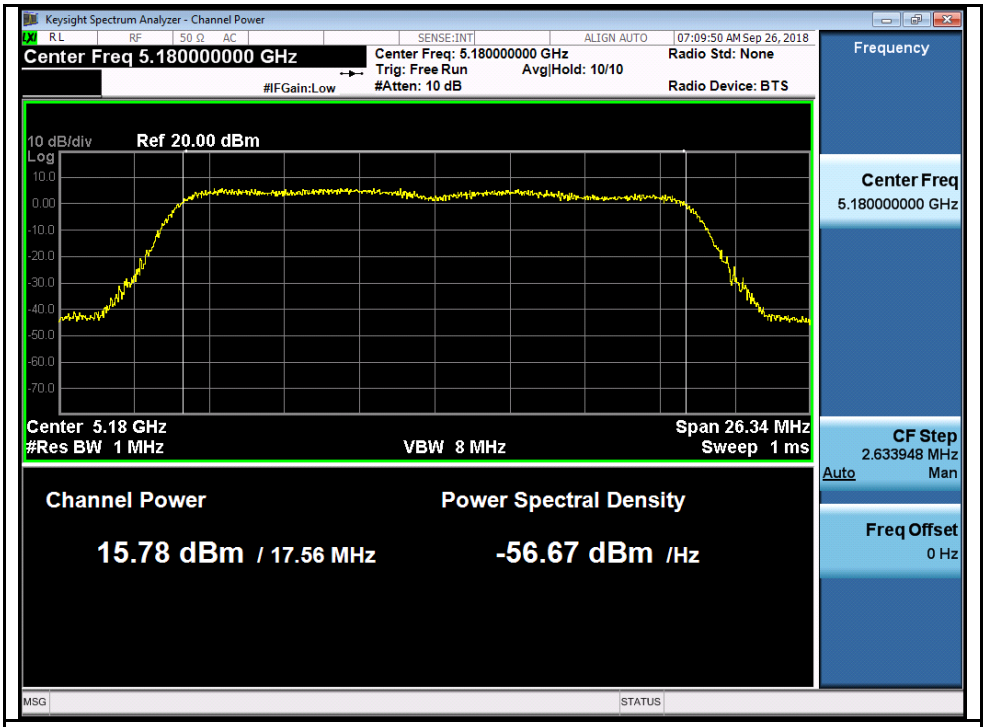


802.11ac40 5190M

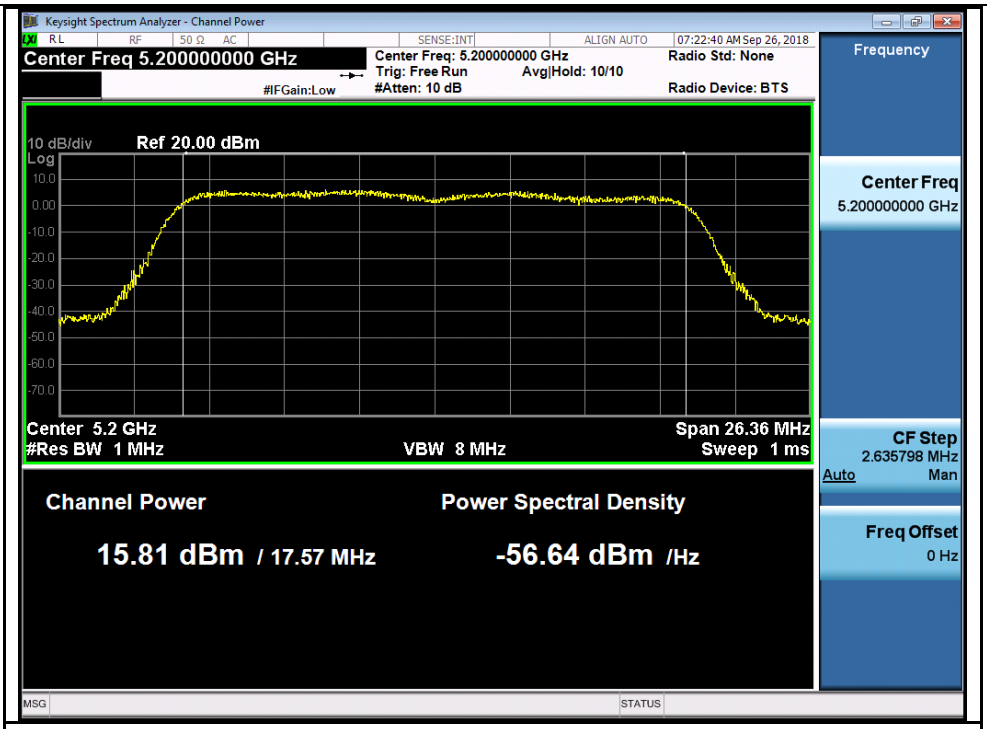
802.11ac40 5230M

802.11ac80 5210M

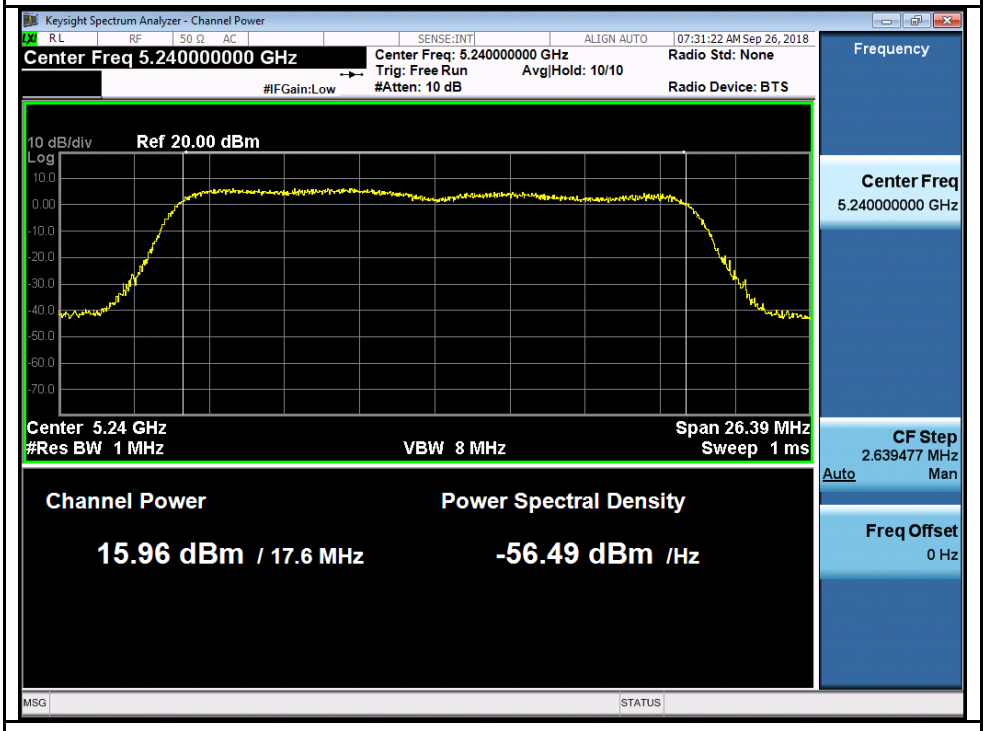
Chain 2:



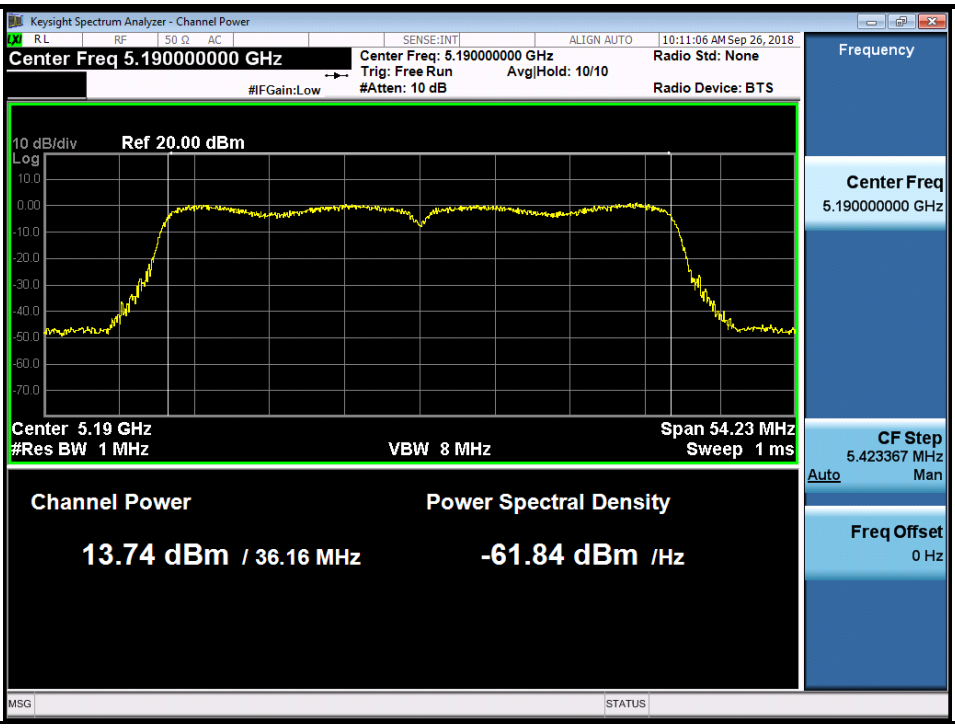
802.11ac20 5180M



802.11ac20 5200M



802.11ac20 5240M

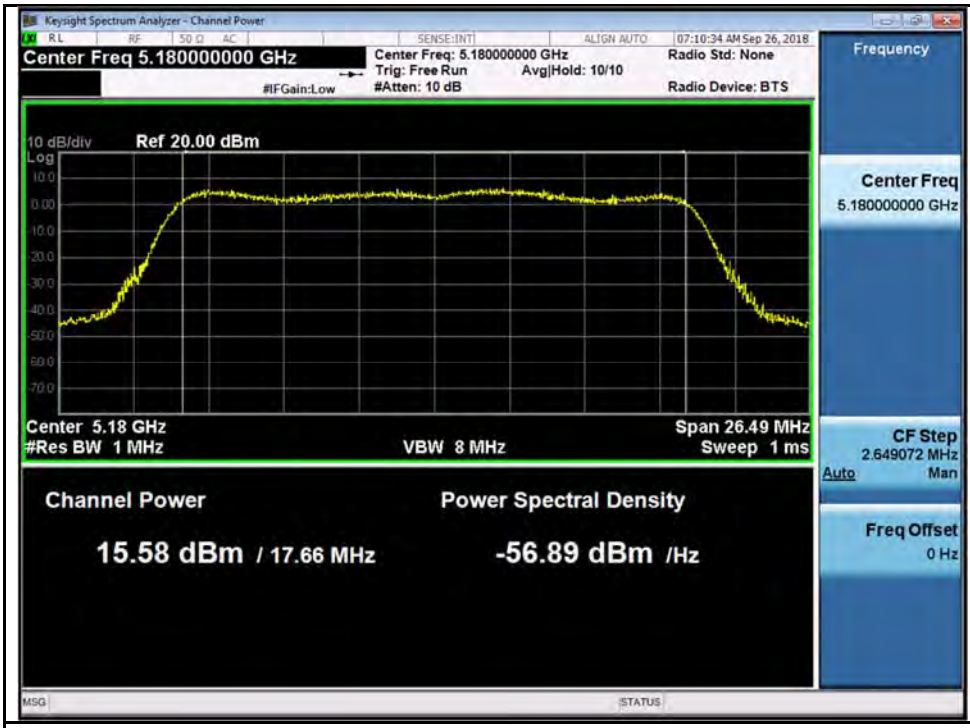


802.11ac40 5190M

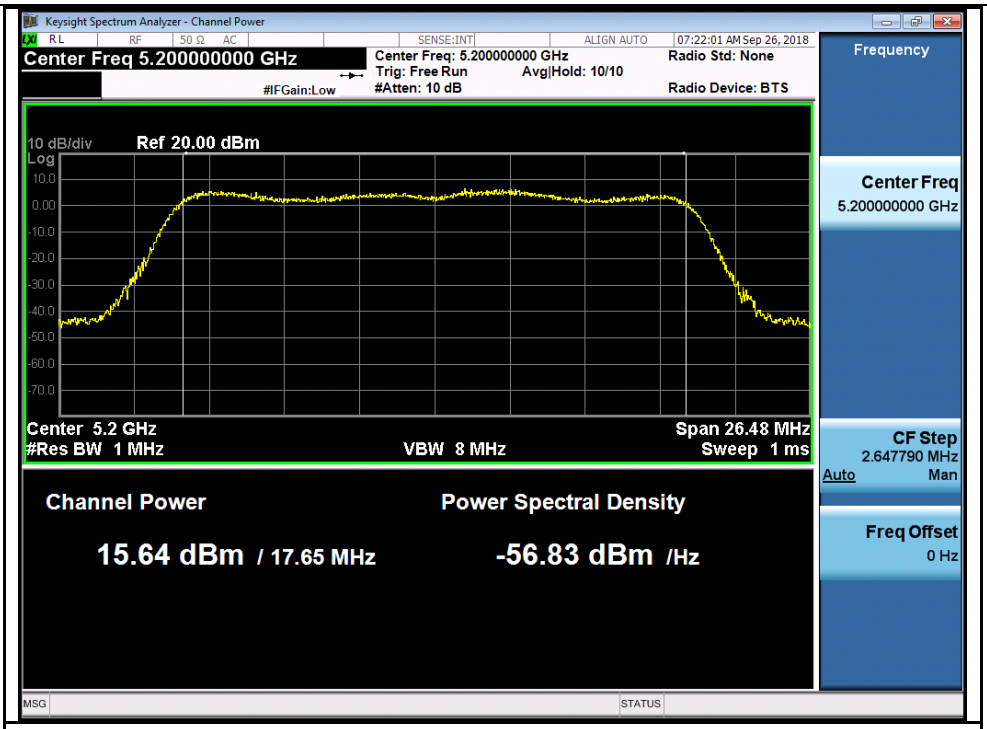
802.11ac40 5230M

802.11ac80 5210M

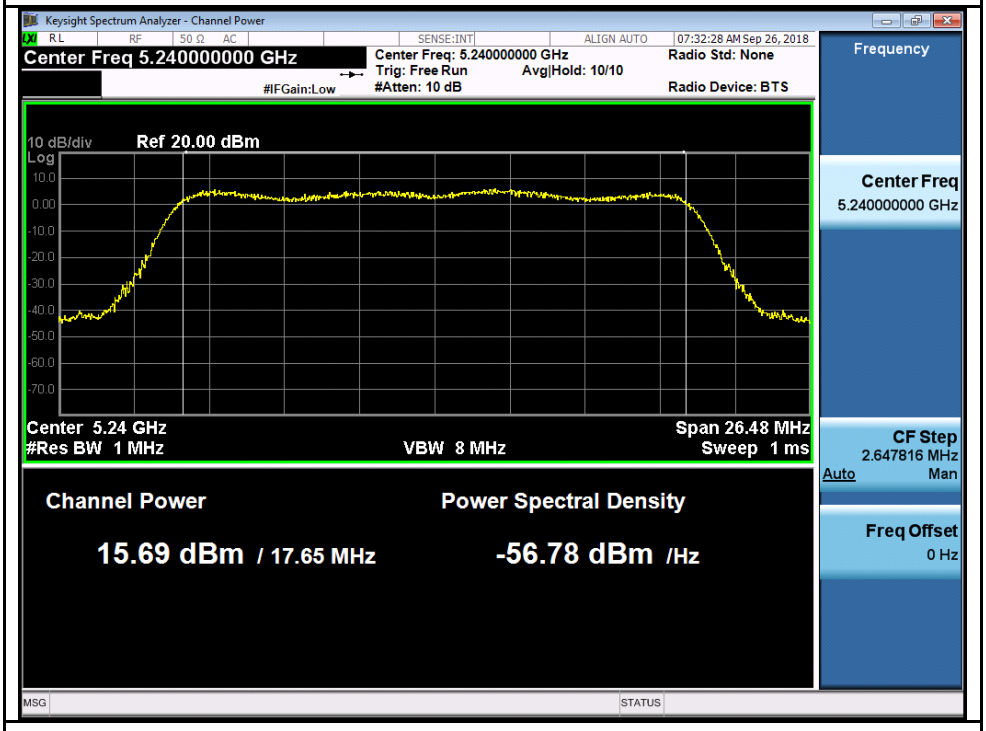
Chain 3:



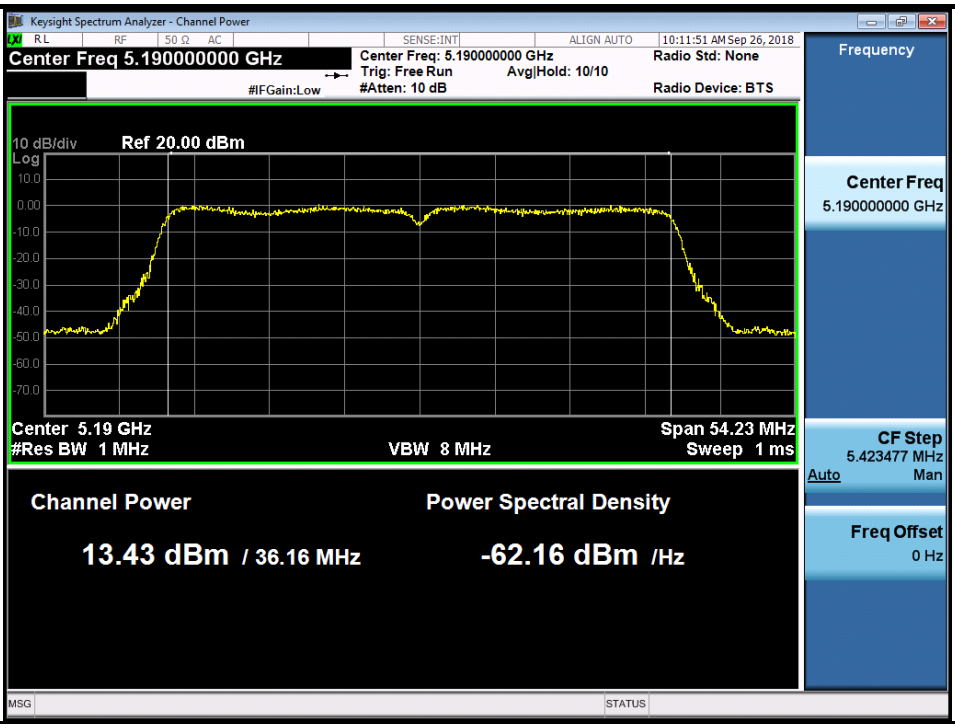
802.11ac20 5180M



802.11ac20 5200M



802.11ac20 5240M



802.11ac40 5190M

802.11ac40 5230M

802.11ac80 5210M

Test Plot for W58:

Chain 0:

802.11ac20 5745M

802.11ac20 5785M

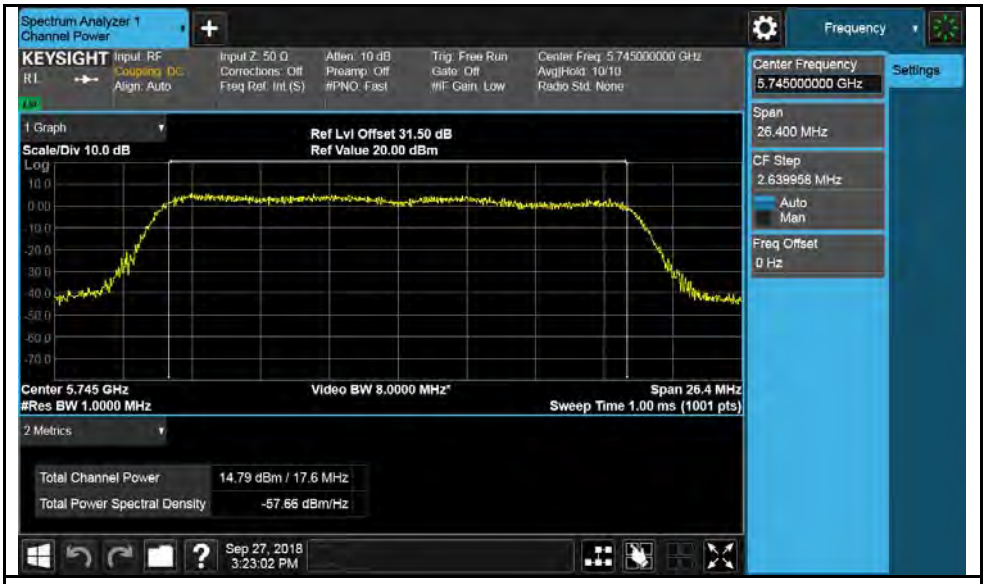
802.11ac20 5825M

802.11ac40 5755M

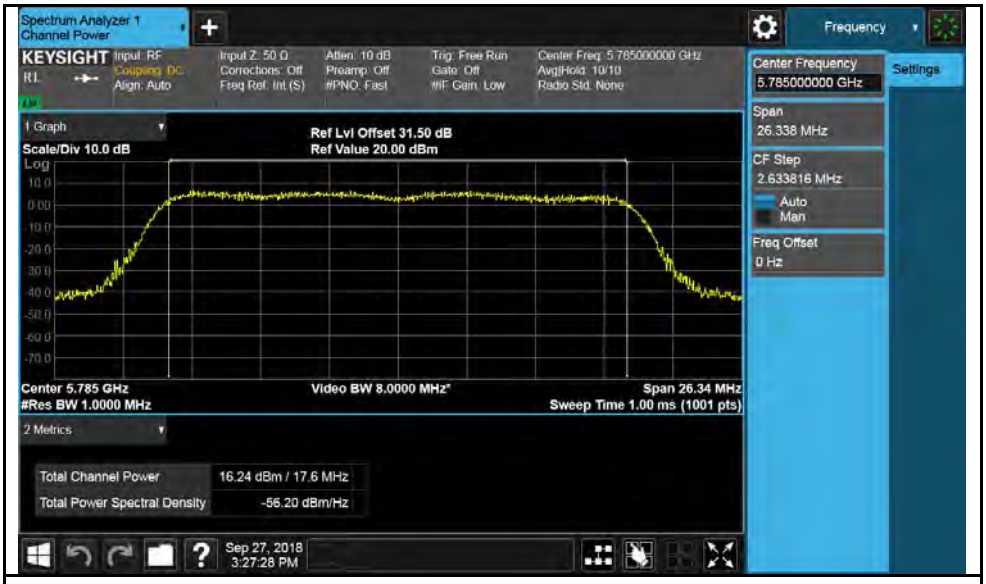
802.11ac40 5795M

802.11ac80 5775M

Chain 1:



802.11ac20 5745M



802.11ac20 5785M

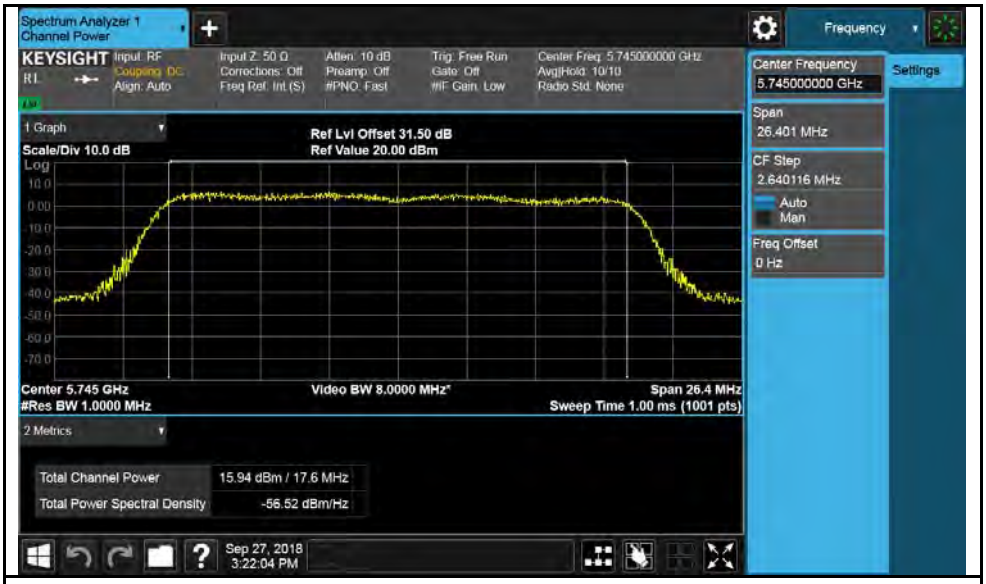
802.11ac20 5825M

802.11ac40 5755M

802.11ac40 5795M

802.11ac80 5775M

Chain 2:



802.11ac20 5745M

802.11ac20 5785M

802.11ac20 5825M

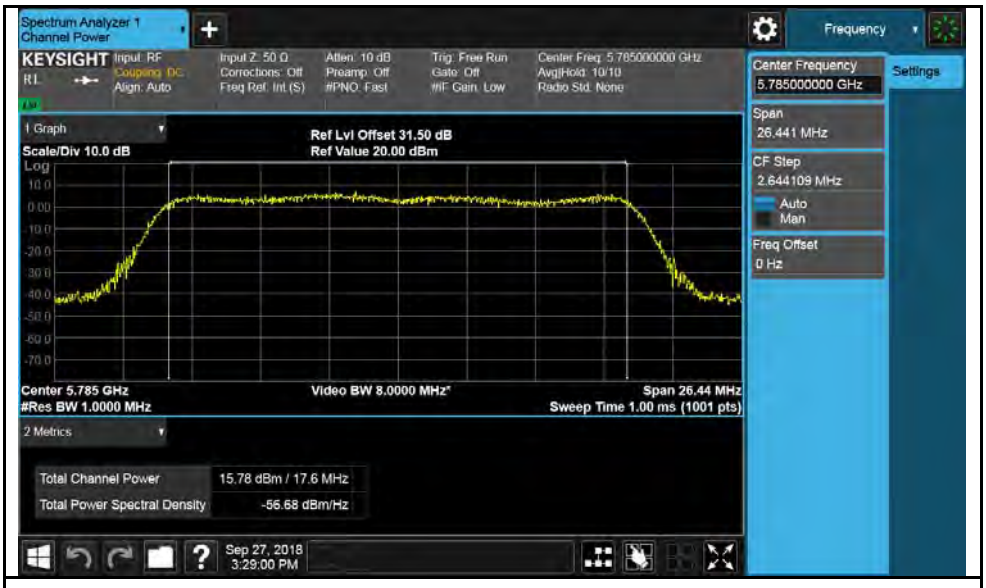
802.11ac40 5755M

802.11ac40 5795M

802.11ac80 5775M

Chain 3:

802.11ac20 5745M



802.11ac20 5785M

802.11ac20 5825M

802.11ac40 5755M

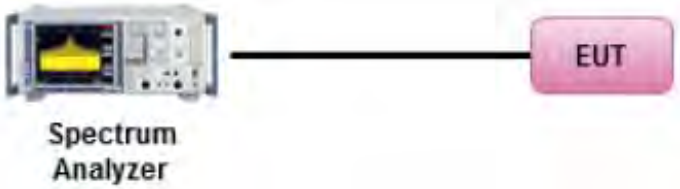
802.11ac40 5795M

802.11ac80 5775M

10.4 Peak Spectral Density

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.407	a)(1)(i)	For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.	☒
	a)(3)	For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.	☒

Test Setup				
Test Procedure	789033 D02 General UNII Test Procedures New Rules v01r02, II.F. Method SA-1 Maximum spectral density measurement procedure - Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal. - Set RBW = 1 MHz - Set VBW ≥ 3 MHz - Detector = RMS. - Sweep time = auto couple. - Trace mode = max hold. - Trace average at least 100 traces in power averaging - Use the peak marker function to determine the maximum amplitude level within the RBW. Apply correction to the result if different RBW is used.			
Test Date	09/26/2018 – 09/27/2018	Environmental condition	Temperature Relative Humidity Atmospheric Pressure	22ºC 42% 1020mbar
Remark	The EUT has 2 antennas with 1 vertical and 1 horizontal, individual gain = 6dBi, the directional gain = 6 + 10 *log(2) = 9.01, therefore, the power and psd limit should decrease by 9.01 - 6 = 3.01dB.			
Result	☒ Pass ☐ Fail			

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Gary Chou at RF test site.

PSD measurement result for 5.2GHz

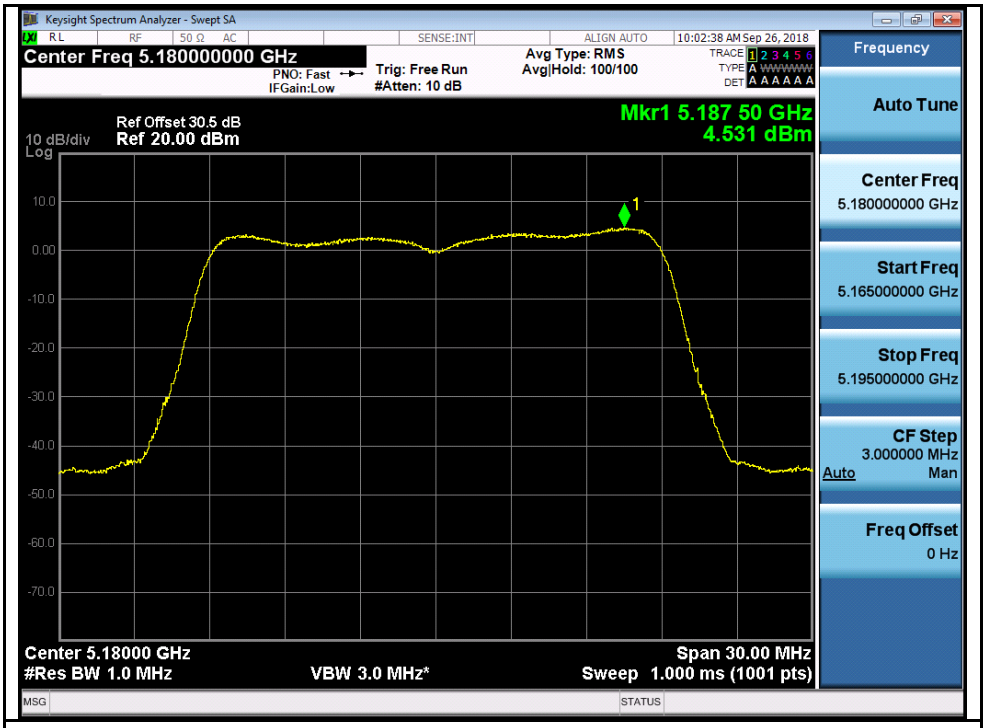
Test mode Freq (MHz) CH			Conducted Power (dBm) Chain No.					Limit (dBm)	Result
			0	1	2	3	Total		
802.11ac-20	5180	Low	4.531	4.017	4.340	4.181	10.29	13.99	Pass
	5200	Mid	4.434	3.879	4.386	4.434	10.31	13.99	Pass
	5240	High	4.755	3.792	4.648	4.243	10.40	13.99	Pass
802.11ac-40	5190	Low	-0.428	-1.131	-0.731	-1.572	5.08	13.99	Pass
	5230	Mid	0.071	-0.351	0.411	0.835	6.28	13.99	Pass
802.11ac-80	5210	Low	-3.876	-4.239	-3.739	-3.878	2.09	13.99	Pass

PSD measurement result for 5.8GHz

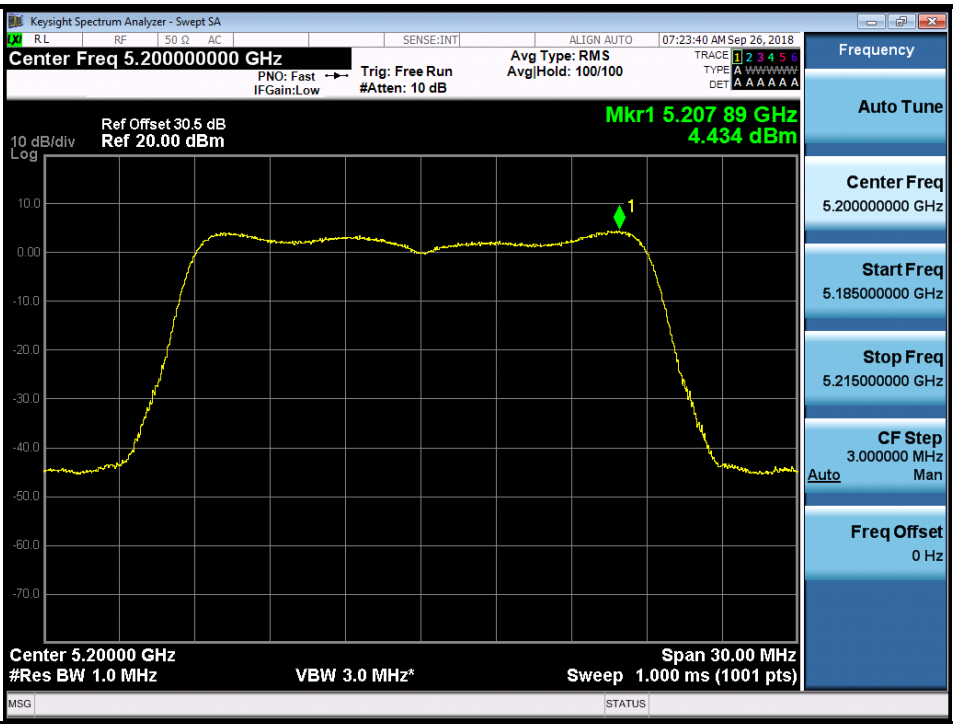
Test mode Freq (MHz) CH			Conducted Power (dBm) Chain No.					Correction factor (dB)	Limit (dBm)	Result
			0	1	2	4	Total			
802.11ac-20	5745	Low	-3.430	-4.224	-3.729	-3.262	2.37	6.99	26.99	Pass
	5785	Mid	-1.934	-3.517	-2.900	-2.668	3.30	6.99	26.99	Pass
	5825	High	-2.223	-2.942	-2.592	-2.801	3.39	6.99	26.99	Pass
802.11ac-40	5755	Low	-6.237	-7.191	-7.058	-7.157	-0.87	6.99	26.99	Pass
	5795	Mid	-5.596	-6.602	-6.611	-6.776	-0.35	6.99	26.99	Pass
802.11ac-80	5775	Low	-9.134	-9.870	-10.362	-10.228	-3.85	6.99	26.99	Pass
Note	BW correction factor = 10log(500kHz/RBW), RBW was set to 100kHz during test.									

Test Plot for W52:

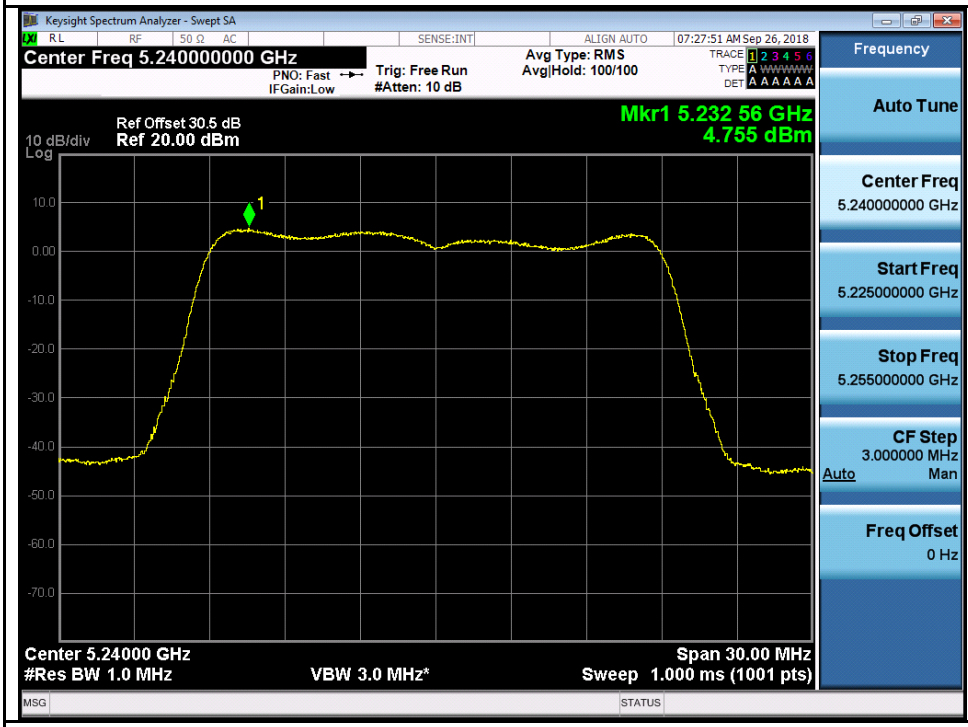
Chain 0:



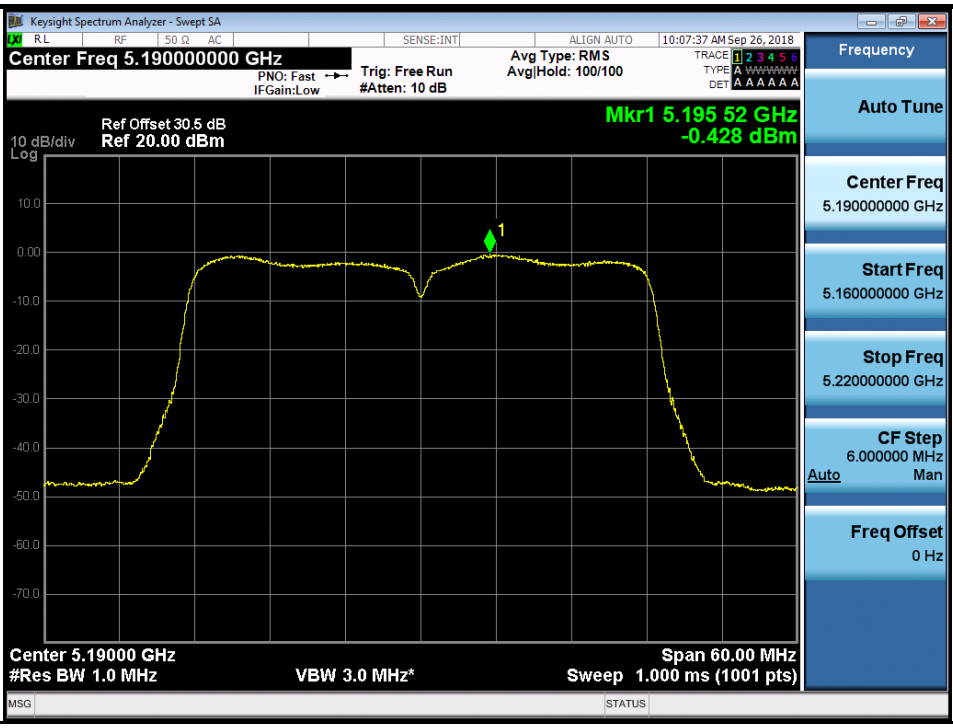
802.11ac20 5180M



802.11ac20 5200M



802.11ac20 5240M

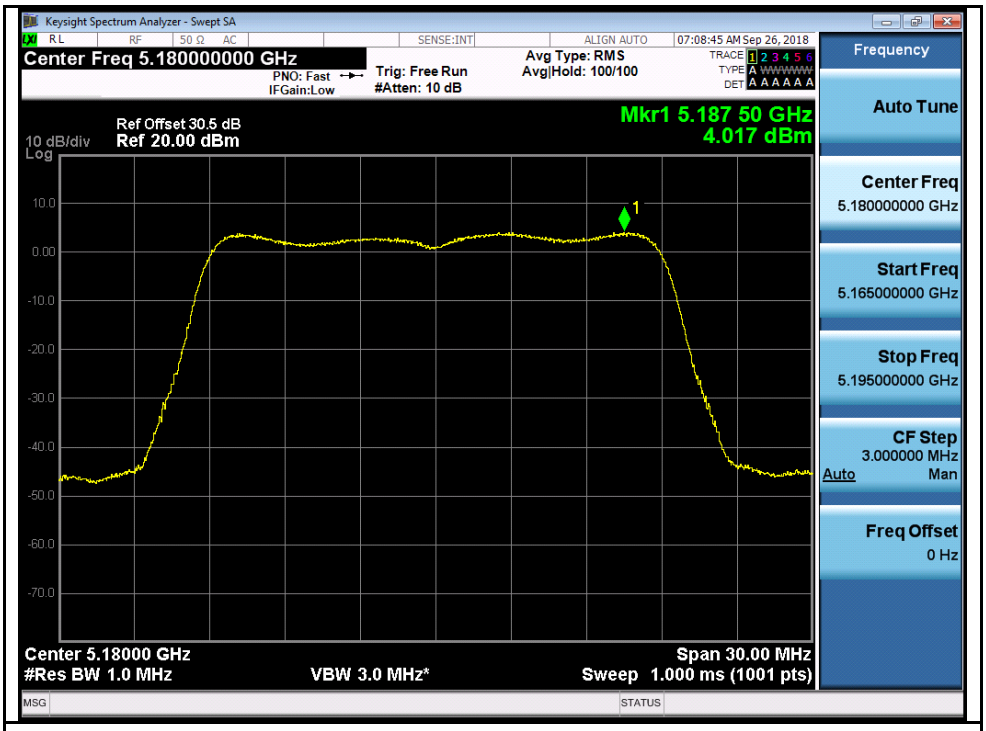


802.11ac40 5190M

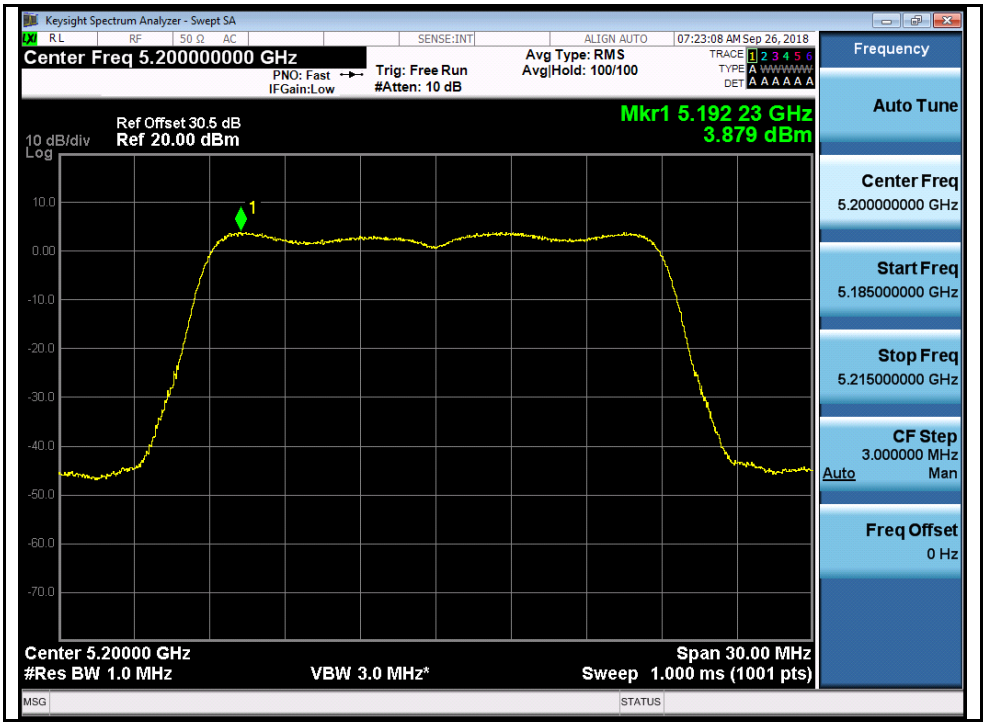
802.11ac40 5230M

802.11ac80 5210M

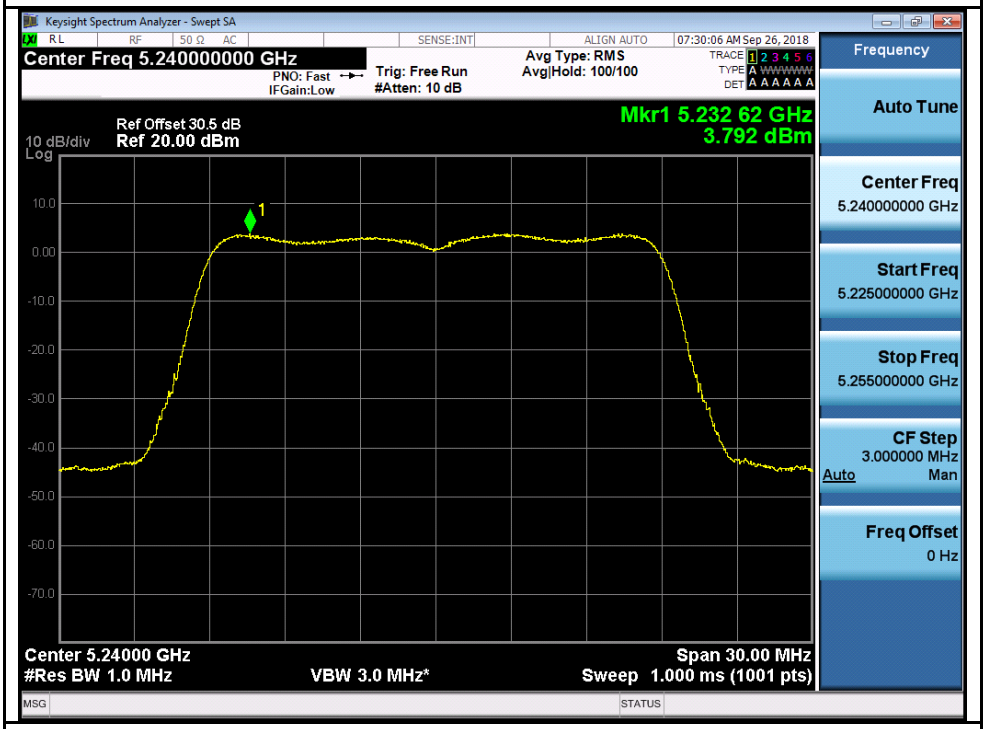
Chain 1:



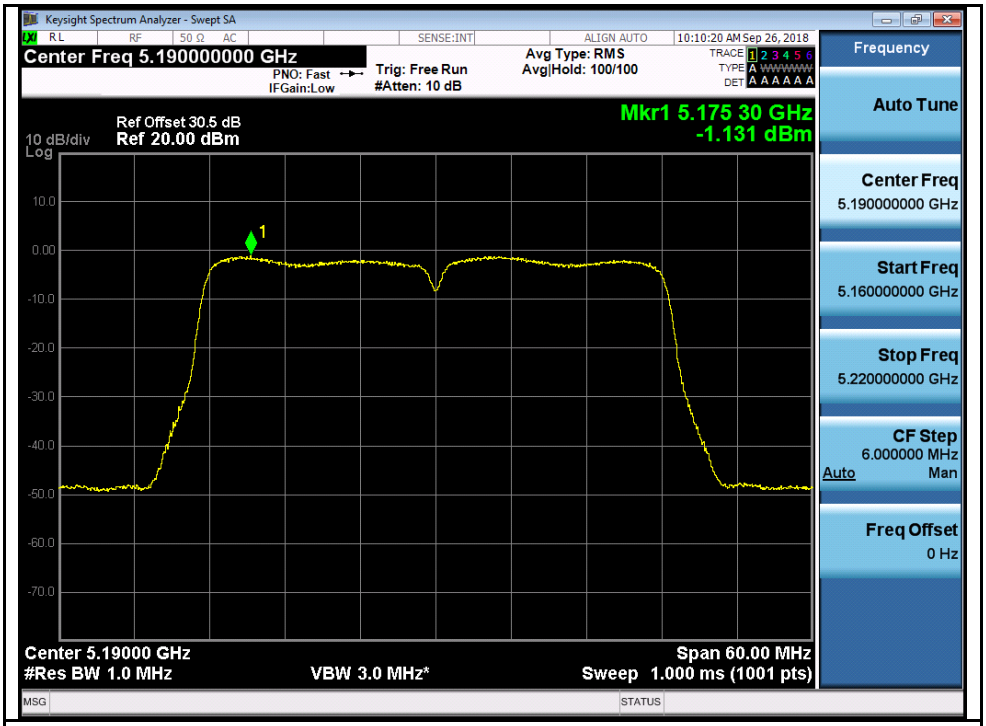
802.11ac20 5180M



802.11ac20 5200M



802.11ac20 5240M

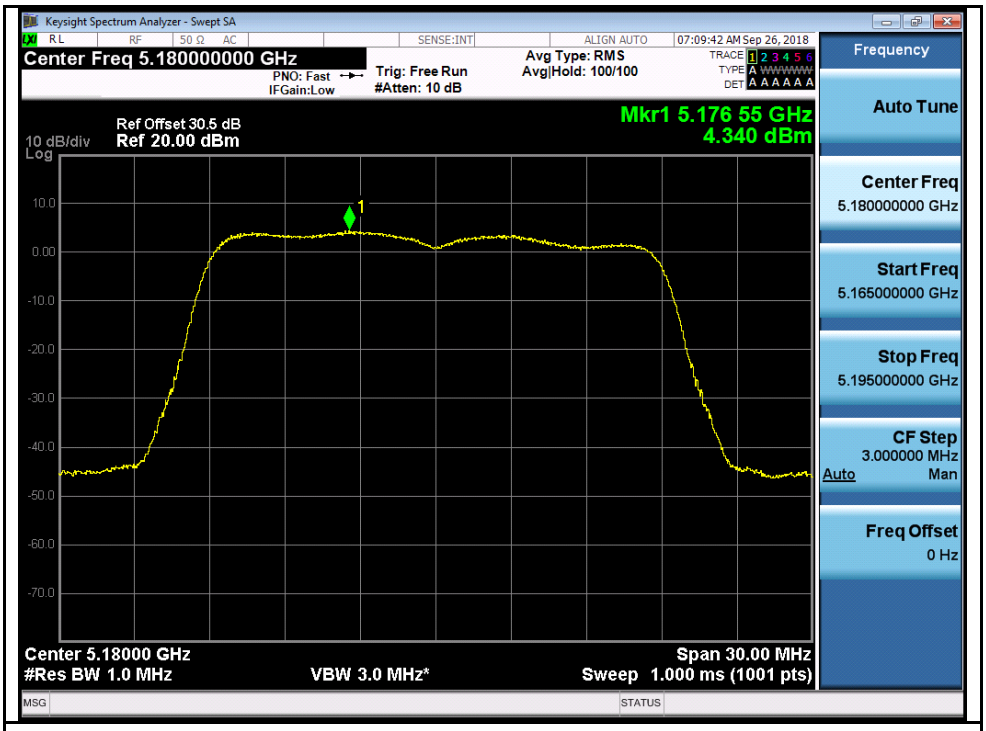


802.11ac40 5190M

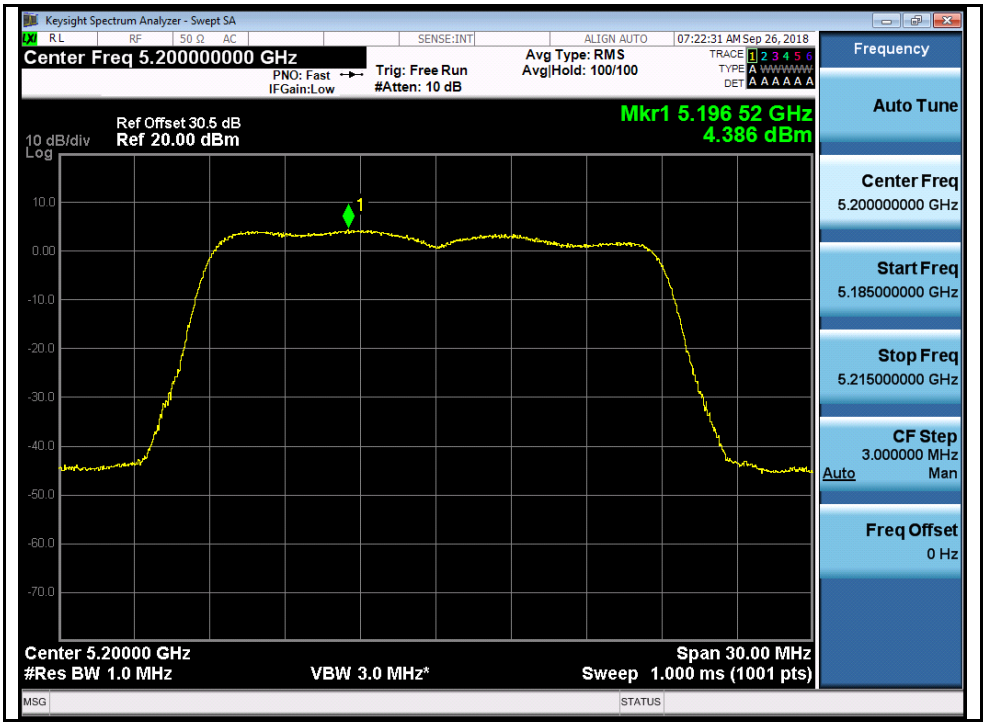
802.11ac40 5230M

802.11ac80 5210M

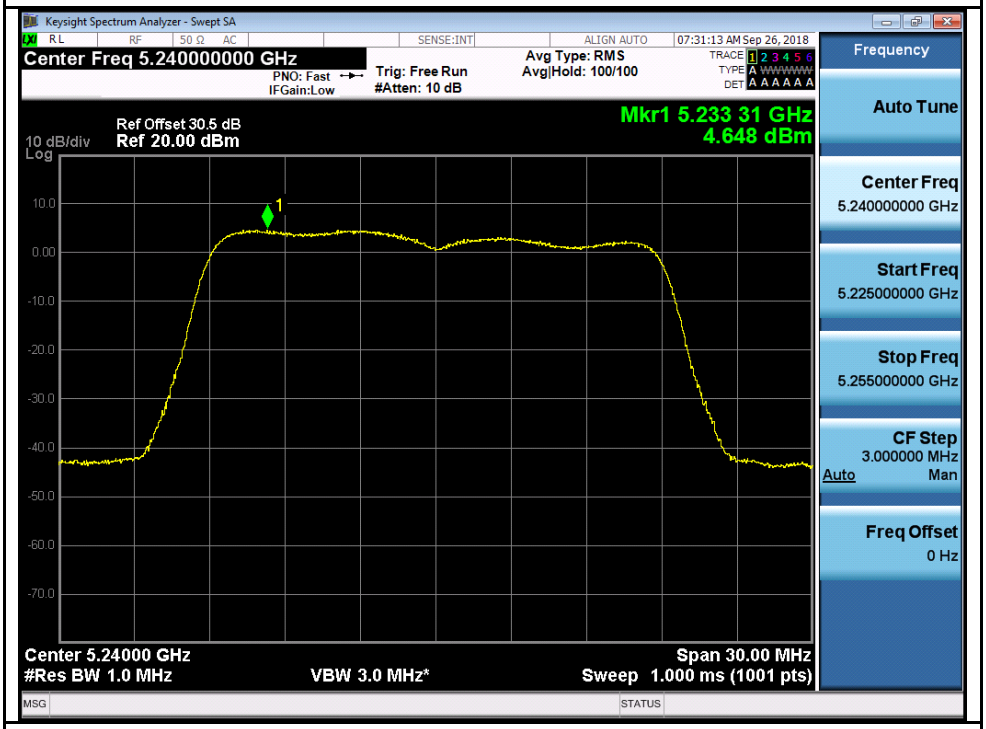
Chain 2:



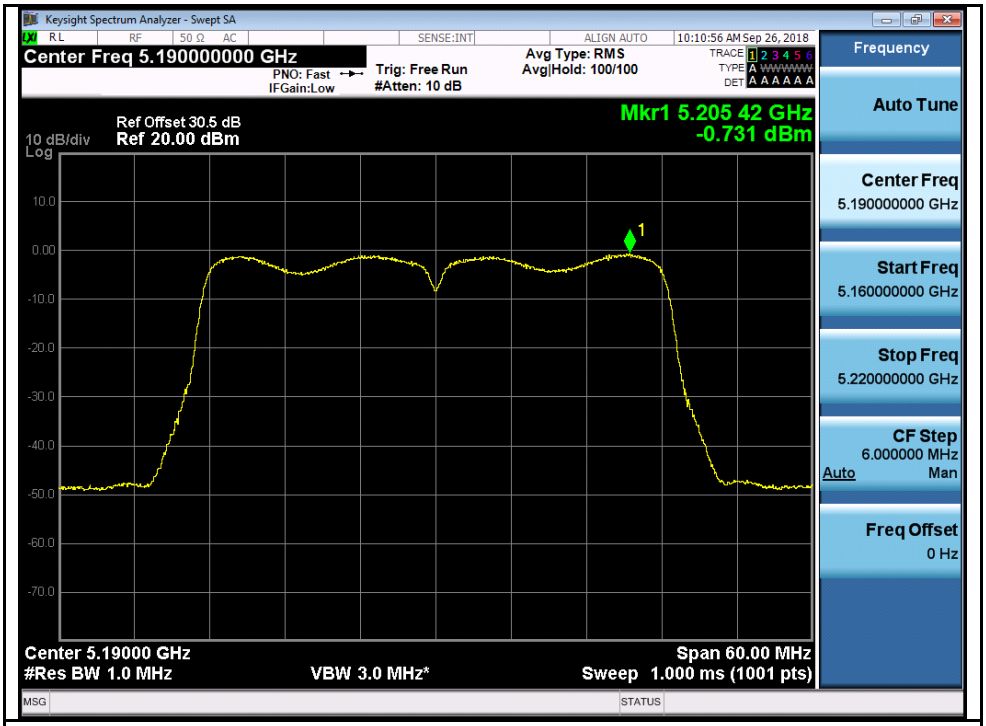
802.11ac20 5180M



802.11ac20 5200M



802.11ac20 5240M

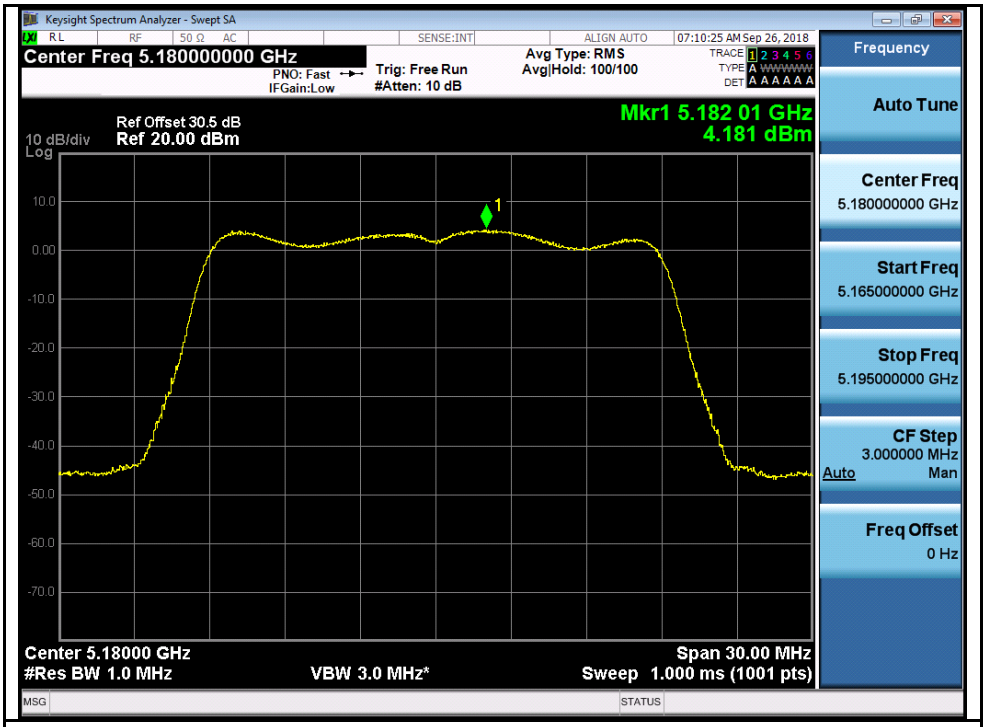


802.11ac40 5190M

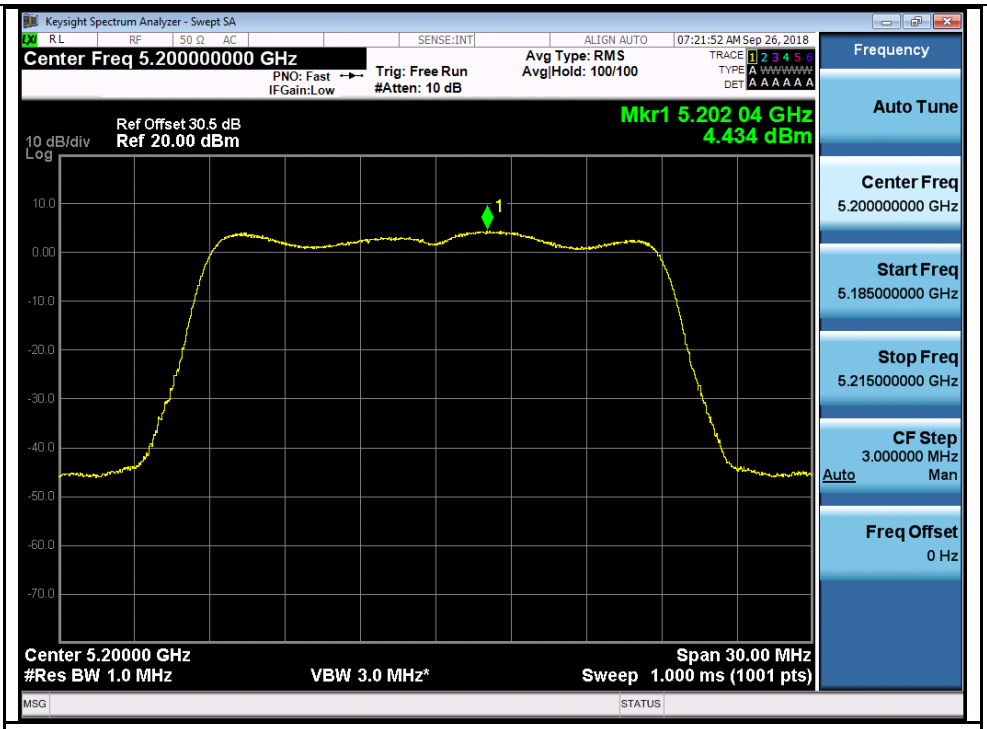
802.11ac40 5230M

802.11ac80 5210M

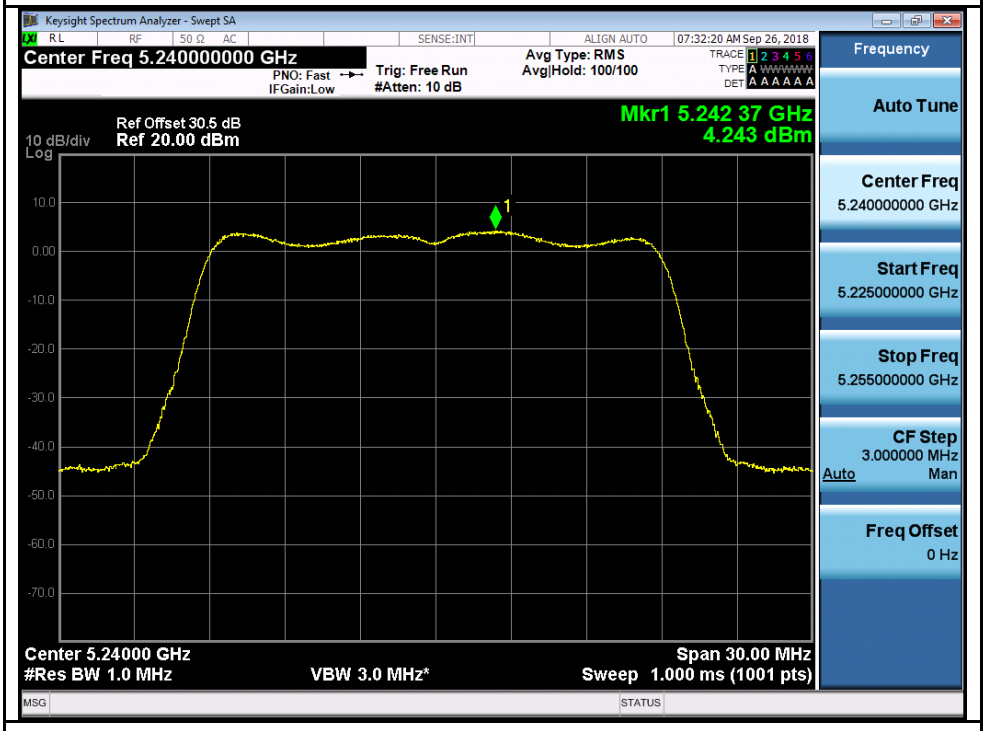
Chain 3:



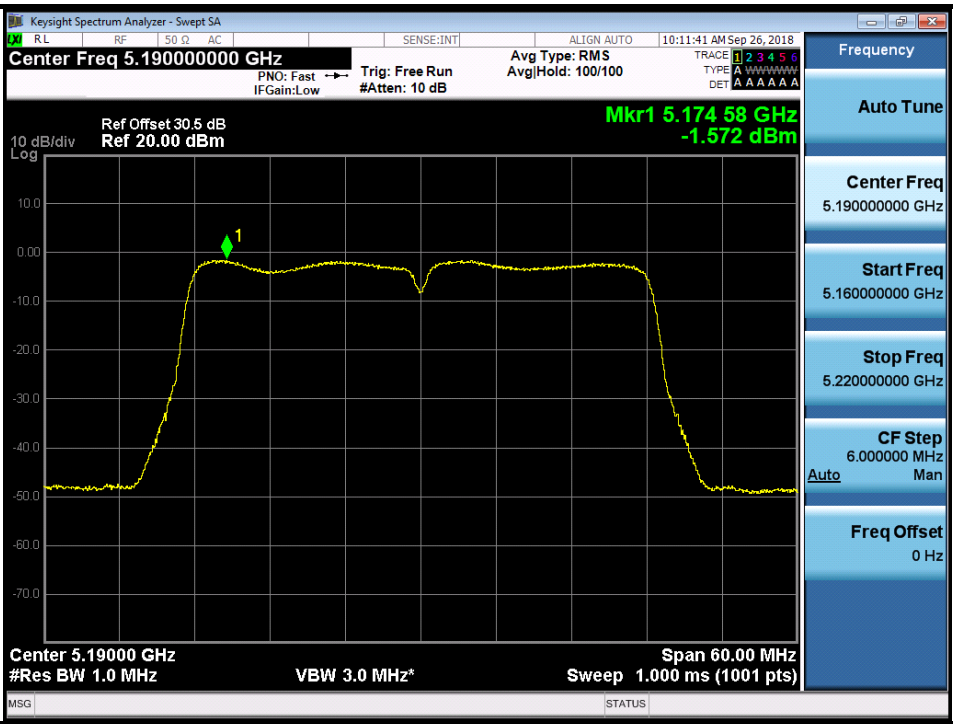
802.11ac20 5180M



802.11ac20 5200M



802.11ac20 5240M



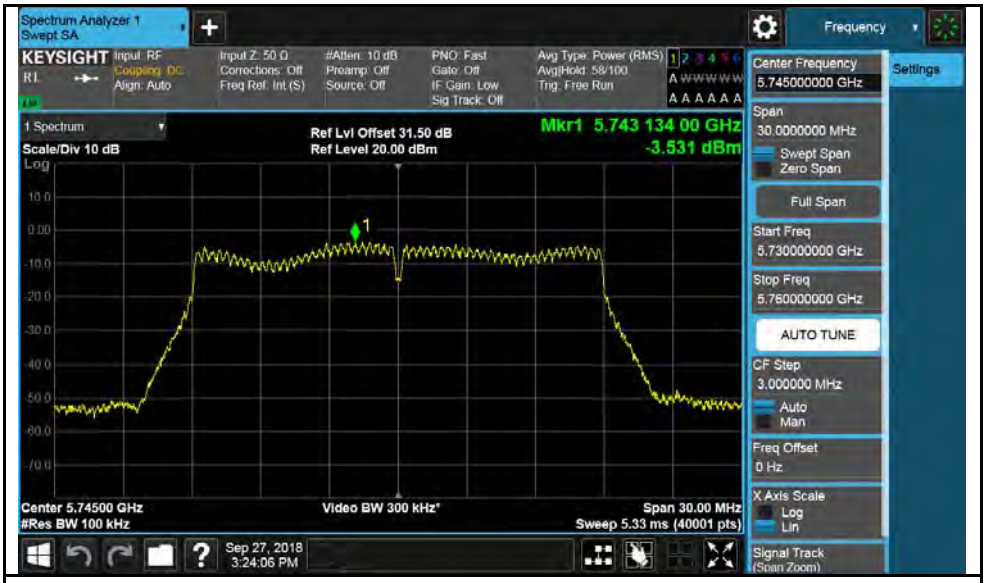
802.11ac40 5190M

802.11ac40 5230M

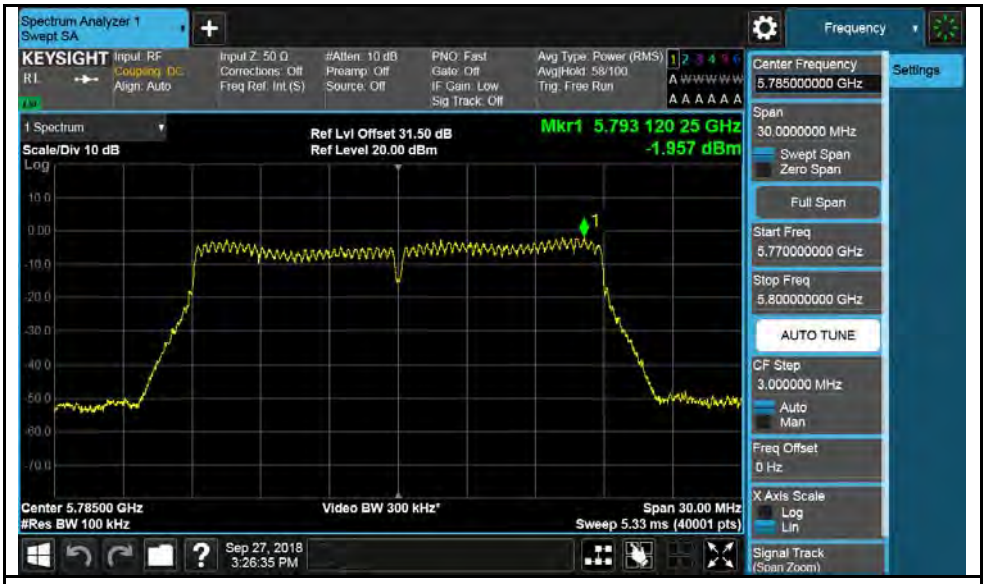
802.11ac80 5210M

Test Plot for W58:

Chain 0:



802.11ac20 5745M



802.11ac20 5785M

802.11ac20 5825M

802.11ac40 5755M

802.11ac40 5795M

802.11ac80 5775M